



**Zebra GK420d**  
Desktop Thermal Printer

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**User Guide**



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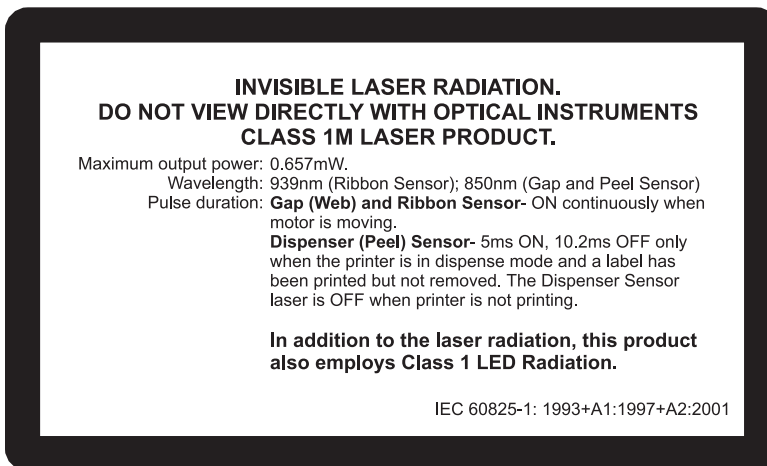
1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for Class B Digital Devices, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the product manuals, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, the user is encouraged to do one or more of the following measures:

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- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced RF service technician for help.

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## G-Series Printers



**Caution** • CLASS 1M LASER PRODUCT

- Viewing the laser output with certain optical instruments (for example, eye loops, magnifiers and microscopes) within a distance of 100mm may pose an eye hazard.
- Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.
- Do not tamper or attempt to repair any sensor inside this product. No serviceable sensors inside.
- Do not stare into Gap (Web) or Dispenser (Peel) sensors. Avoid possible exposure to hazardous laser radiations.

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Do not dispose of this product in unsorted municipal waste. This product is recyclable, and should be recycled according to your local standards.

For more information, please see our website at:

**Web address:** [www.zebra.com/environment](http://www.zebra.com/environment)



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# About This Document

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

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## Who Should Use This Document

This User Guide is intended for use by any person who needs to operate or to troubleshoot problems with the printer.

## How This Document Is Organized

The User Guide is set up as follows:

| <b>Section</b>                     | <b>Description</b>   |
|------------------------------------|--|
| <i>Introduction on page 1</i>      | This section describes what you get in your shipping box and provides an overview of printer features. This section also has procedures that describe how to open and close the printer and report any problems. |
| <i>Getting Started on page 9</i>   | This section describes how to set up your printer for the first time and use the most common operating procedures for loading media.   |
| <i>Print Operations on page 21</i> | This section provides media and print handling, font and language support, and the set up of less common printer configurations.   |
| <i>Printer Options on page 39</i>  | 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.   |
| <i>Maintenance on page 49</i>      | This section provides routine cleaning and maintenance procedures.   |
| <i>Troubleshooting on page 59</i>  | This section provides information about printer error reporting that you might need for printer troubleshooting. Assorted diagnostic tests are included.   |
| <i>Appendix on page 71</i>         | This section provides additional interface information and wiring diagrams to assist with printer to host system integration (typically a PC).   |

## Contacts

### Web Site

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### Asia Pacific

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|--|--|--|
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## Document Conventions

The following conventions are used throughout this document to convey certain information.

**Alternate Color** (online only) Cross-references contain hot links to other sections in this guide. If you are viewing this guide online in `.pdf` format, you can click the cross-reference ([blue text](#)) to jump directly to its location.

**Command Line Examples** Command line examples appear in `Courier New` font. For example, type `ZTools` to get to the Post-Install scripts in the `bin` directory.

**Files and Directories** File names and directories appear in `Courier New` font. For example, the `Zebra<version number>.tar` file and the `/root` directory.

### Icons Used



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**Caution** • Warns you of the potential for electrostatic discharge.

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**Caution** • Warns you of a potential electric shock situation.

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**Caution** • Warns you of a situation where excessive heat could cause a burn.

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**Caution** • Advises you that failure to take or avoid a specific action could result in physical harm to you.

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**Caution** • (No icon) Advises you that failure to take or avoid a specific action could result in physical harm to the hardware.

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**Important** • Advises you of information that is essential to complete a task.



**Note** • Indicates neutral or positive information that emphasizes or supplements important points of the main text.



**Example** • Provides an example, often a scenario, to better clarify a section of text.



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**Notes •** \_\_\_\_\_

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# 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.

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## GK Series Thermal Printers

The Zebra GK model is your best value in a basic desktop thermal printer. The GK420d printer provides direct thermal printing at speeds up to 5 ips (inches per second) at a 203 dpi (dots per inch) print density. The GK420d 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.
- Resident scalable font, supports font download, Unicode fonts and resident bitmap fonts.
- Improved printer performance: faster print speeds, 32-bit processor, and VCSEL laser media sensing.
- Printhead test and maintenance reporting.
- 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 basic printer options:

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

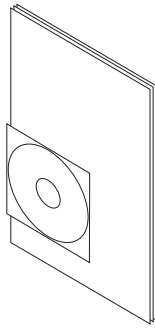
This users guide provides all of the information you will need to operate your printer on a daily basis. To create label formats, refer to your programming guides or label design applications such as Zebra Designer.

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.

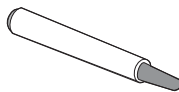
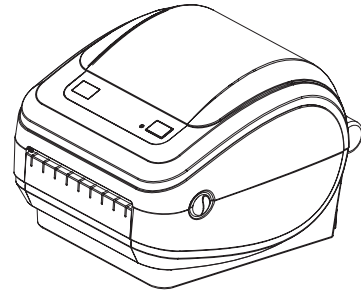
## What's in the Box?

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.

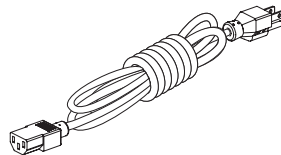


**Documentation  
and Software**

**Printer**

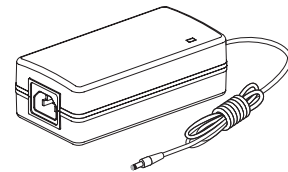


**Cleaning  
Pen**



**Power Cord  
varies by locale or region**

**Power  
Supply**



## Unpack and Inspect the Printer

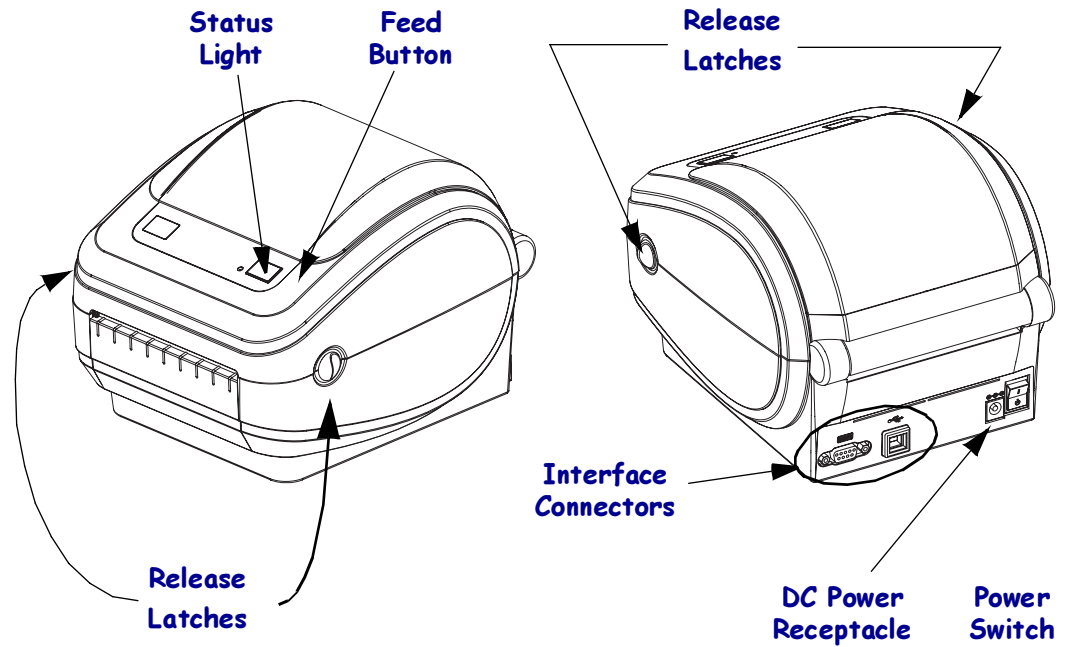
When you receive the printer, immediately unpack it and inspect for shipping damage.

- 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:

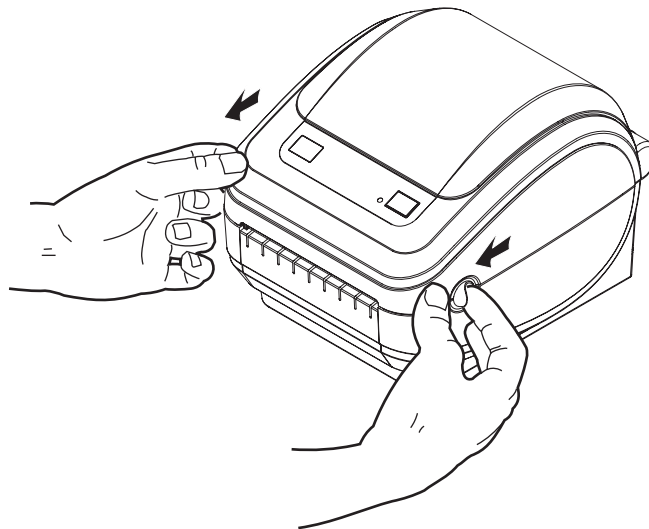
- Immediately notify the shipping company and file a damage report. Zebra Technologies Corporation is not responsible for any damage incurred during shipment of the printer and will not cover the repair of this damage under its warranty policy.
- Keep all packaging material for shipping company inspection.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

## Your Printer



## Opening the printer

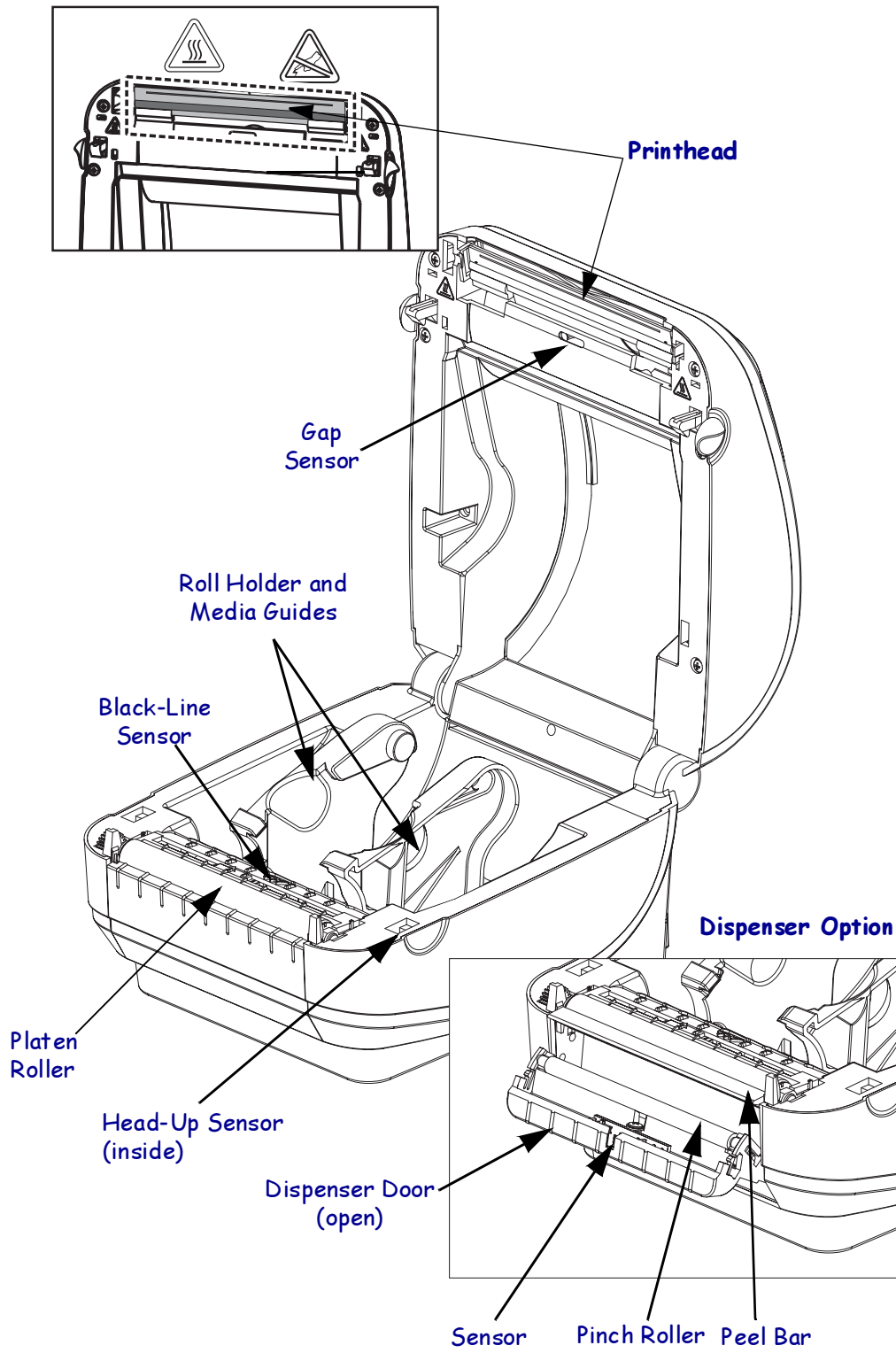
To access the media compartment, you must open the printer. Pull the release latches towards you and lift the cover. Check the media compartment for loose or damaged components.



**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



## Operator Controls

### Power Switch

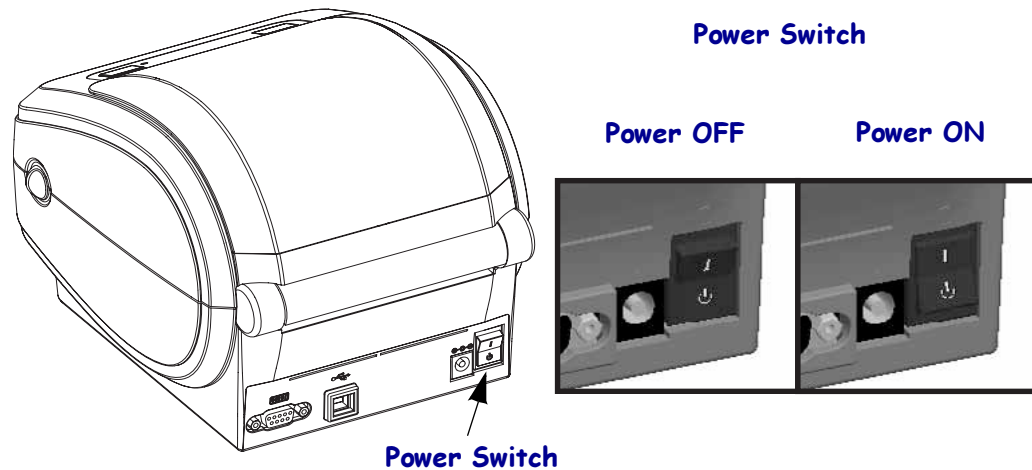
Press *up* to turn ON or *down* to turn OFF the printer.



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**Caution** • The printer power should be turned off before connecting or disconnecting the communications and power cables.

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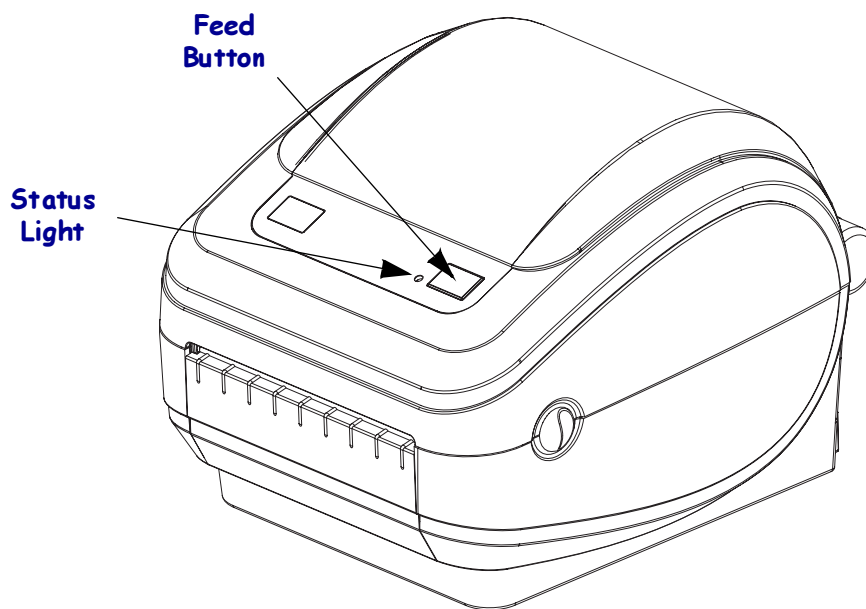


### Feed Button

- Tap the Feed button once to force the printer to feed one blank label.
- Press the Feed button to take the printer out of a “pause” condition. The printer is put into “pause” by either a programming command or an error condition. See [What the Status Light is Telling You on page 60](#) in the Troubleshooting chapter.
- Use the Feed button for printer setup and status (see [Feed Button Modes on page 69](#) in the Troubleshooting chapter).

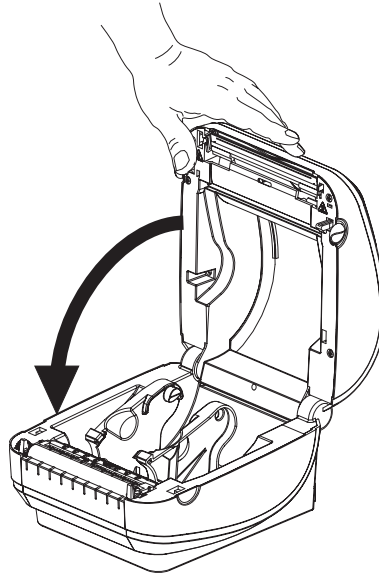
## Status Light

Located on the top case next to the feed button, the status light functions as a printer operational indicator (see [What the Status Light is Telling You](#) on page 60 in the Troubleshooting chapter).

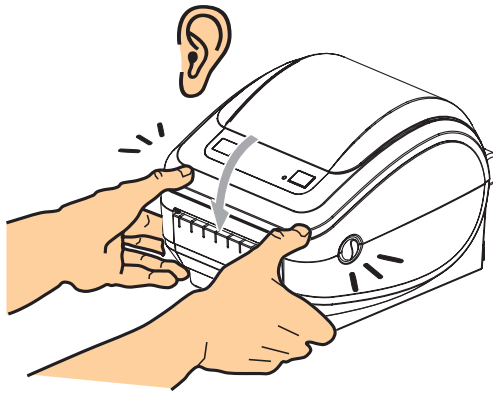


## Closing the printer

1. Lower the top cover.



2. Press down until the cover snaps closed.





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# Getting Started

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

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## Attaching Power

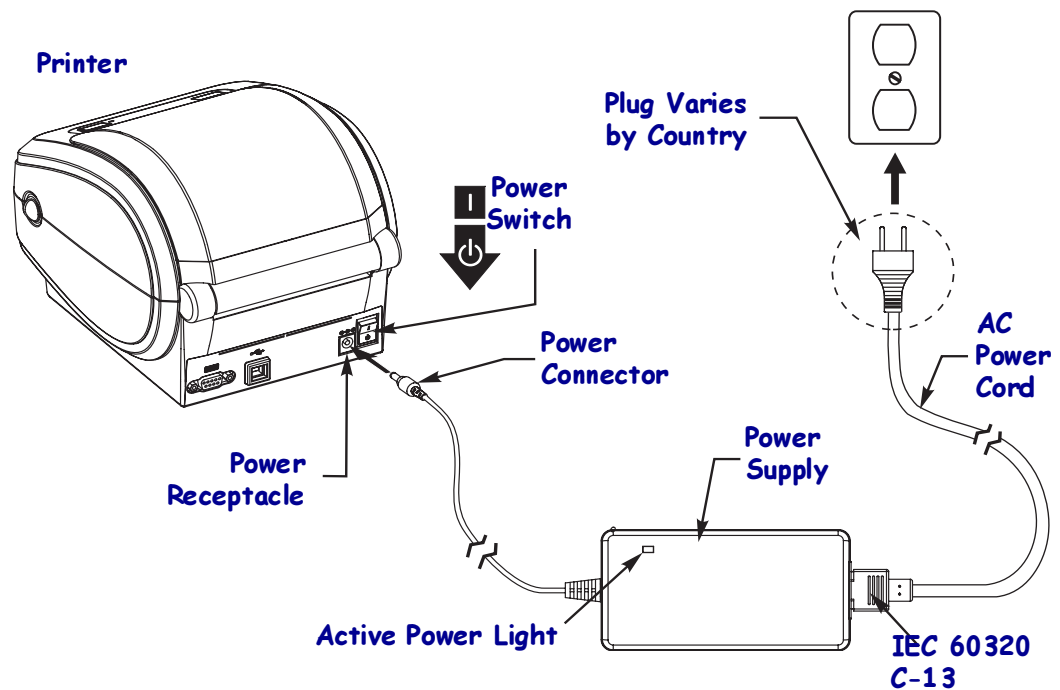


**Important** • Set up your printer so that you can handle the power cord easily if needed. To make certain the printer cannot carry electrical current, you must separate the power cord from the power supply receptacle or AC electrical outlet.



**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: The active power light will go on if power is on at the AC outlet.
4. Insert the power supply's power connector into the printer's 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

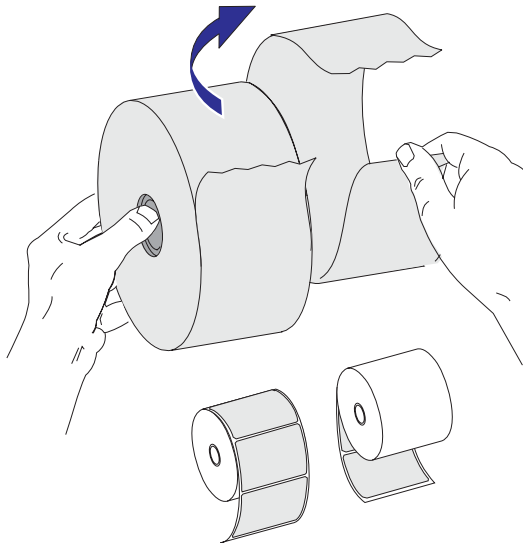
When you load media, you must place the roll onto the media hangers.

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

## Preparing Media

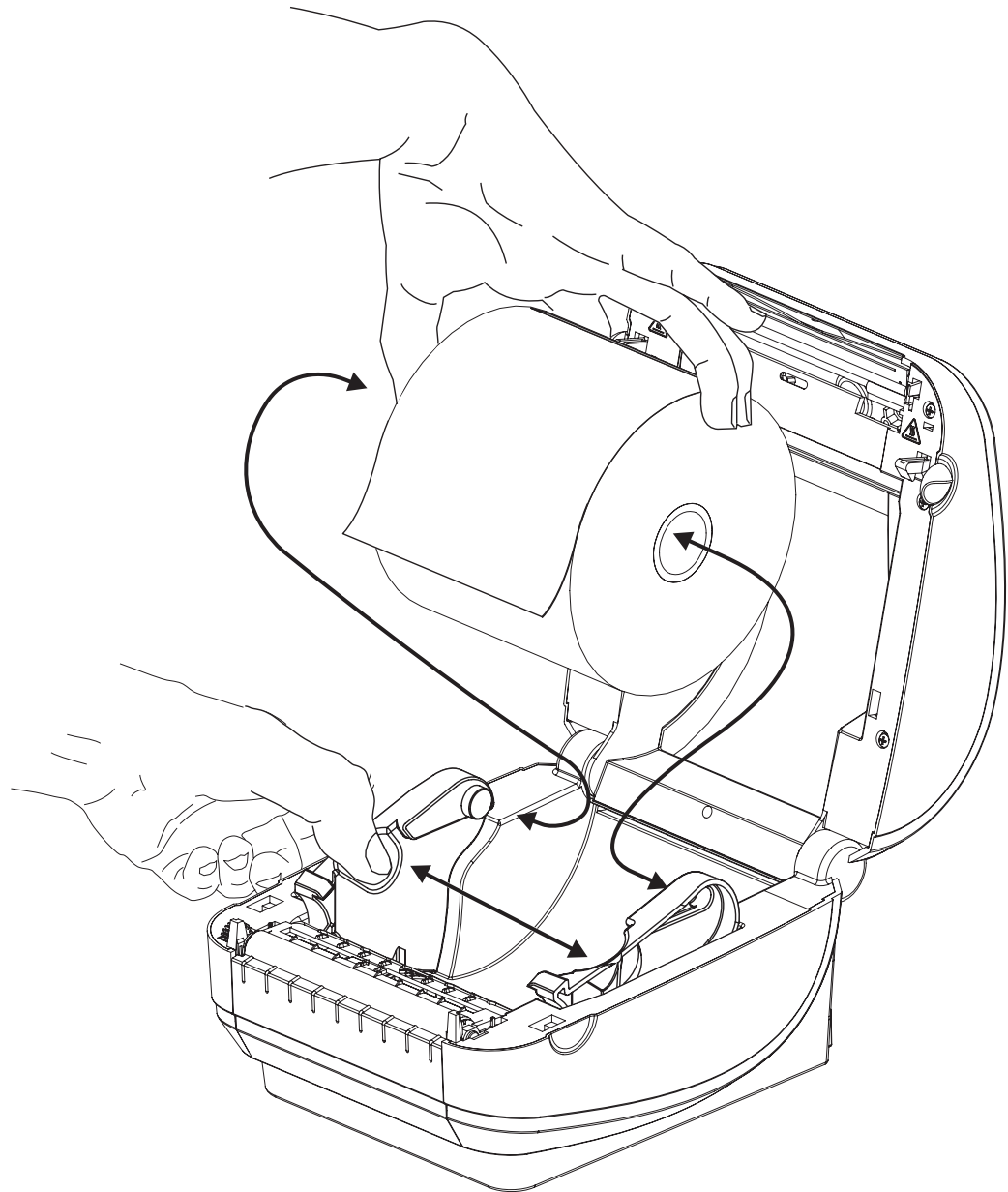
Whether your roll media is inside or outside wound, you load it into the printer the same way.

- Remove the outside length of 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.



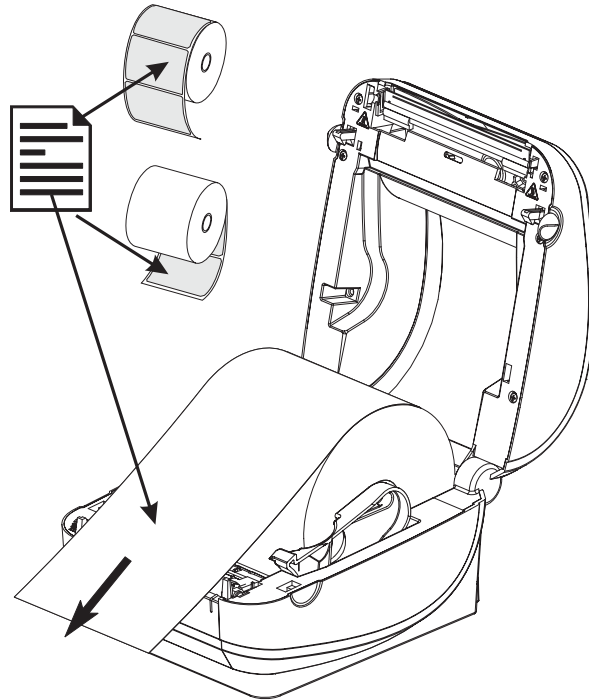
## Placing the Roll in the Media Compartment

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.

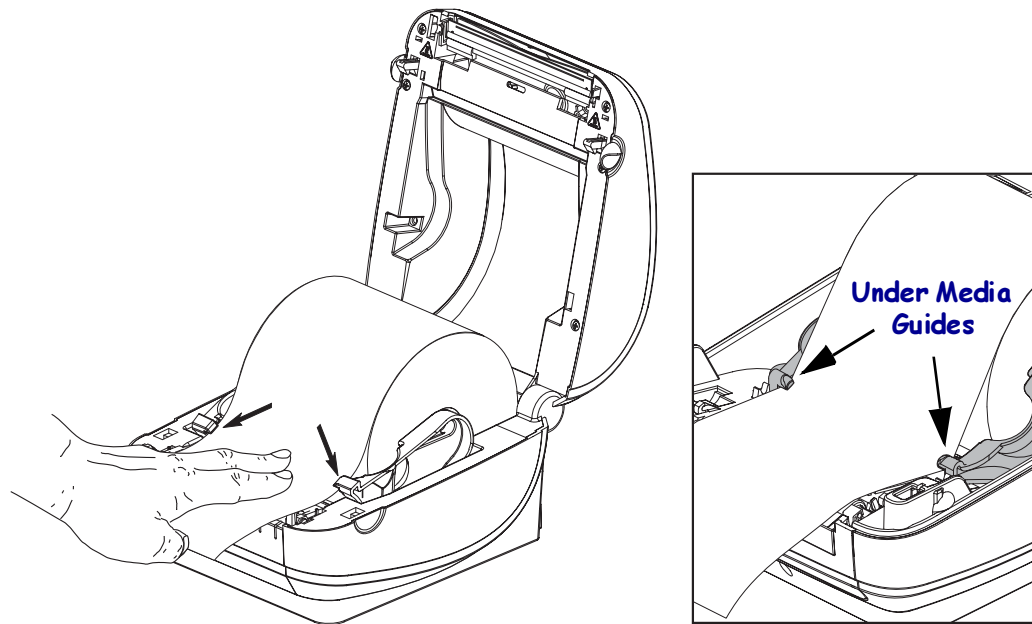




3. Pull the media so that it extends out of the front of the printer. Verify the roll turns freely. The roll must not sit in the bottom of the media compartment. Verify that media's printing surface is facing up.



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



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

## 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 label.

1. Make sure the media is properly loaded and the top cover of the printer is closed. Then, turn the printer power on if you have not already done so. If the printer initializes with the status light blinking green (pause mode), press the Feed button once to set the printer in Ready (to print) mode. See the [Troubleshooting on page 59](#) if the printer's status light does not turn solid green (Ready).
2. Press the Feed button two to three times to allow the printer to calibrate the printer for the installed media. The printer may feed several labels during this process.
3. When the status light is solid green, press and hold the Feed button until the status light flashes once.
4. Release the Feed button. A configuration label will print.

If you cannot get this label to print, refer to [Getting Started on page 9](#).

| PRINTER CONFIGURATION            |                  |
|----------------------------------|------------------|
| Zebra Technologies<br>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    |
| 832.....                         | PRINT WIDTH      |
| 1242.....                        | LABEL LENGTH     |
| 39.0IN 989MM.....                | MAXIMUM LENGTH   |
| CONNECTED.....                   | USB COMM.        |
| 9600.....                        | BAUD             |
| 8 BITS.....                      | DATA BITS        |
| NONE.....                        | PARITY           |
| DTR/XON/XOFF.....                | HOST HANDSHAKE   |
| NONE.....                        | PROTOCOL         |
| <~> 7EH.....                     | CONTROL CHAR     |
| <^> 5EH.....                     | COMMAND CHAR     |
| <, > 2CH.....                    | DELIM. CHAR      |
| ZPL II.....                      | ZPL MODE         |
| NO MOTION.....                   | MEDIA POWER UP   |
| FEED.....                        | HEAD CLOSE       |
| DEFAULT.....                     | BACKFEED         |
| +000.....                        | LABEL TOP        |
| +0000.....                       | LEFT POSITION    |
| NO.....                          | HEXDUMP          |
| 037.....                         | WEB S.           |
| 096.....                         | MEDIA S.         |
| 017.....                         | WEB GAIN         |
| 050.....                         | MARK S.          |
| 000.....                         | MARK GAIN        |
| 095.....                         | MARK MED S.      |
| 000.....                         | MARK MEDIA GAIN  |
| 095.....                         | CONT MEDIA S.    |
| 007.....                         | CONT MEDIA GAIN  |
| 000.....                         | TAKE LABEL       |
| CWF.....                         | MODES ENABLED    |
| .....                            | MODES DISABLED   |
| 832 87MM FULL.....               | RESOLUTION       |
| V61.15.1ZP98 <-.....             | FIRMWARE         |
| V07.00.0.....                    | HARDWARE ID      |
| CUSTOMIZED.....                  | CONFIGURATION    |
| 2944k.....                       | R: RAM           |
| 1536k.....                       | E: ONBOARD FLASH |
| NONE.....                        | FORMAT CONVERT   |
| 8,801 IN.....                    | LAST CLEANED     |
| 19,938 IN.....                   | HEAD USAGE       |
| 19,938 IN.....                   | TOTAL USAGE      |
| 19,938 IN.....                   | RESET CNTR1      |
| 19,938 IN.....                   | RESET CNTR2      |
| 28A07170011.....                 | SERIAL NUMBER    |
| 2007-12-04 00:04:09              | TIME STAMP       |

FIRMWARE IN THIS PRINTER IS COPYRIGHTED

## Hooking Up the Printer and Computer

The GK printers support a limited set of interface options and configurations. These include: Universal Serial Bus (USB) interface, RS232 Serial and 10/100 Ethernet. See Zebra G-Series GX printer models for more interface options.

### GK420 Printers

- USB and Serial
- USB and Ethernet



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**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 connecting or disconnecting the communications cables.

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**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.

## Interface Cable Requirements

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

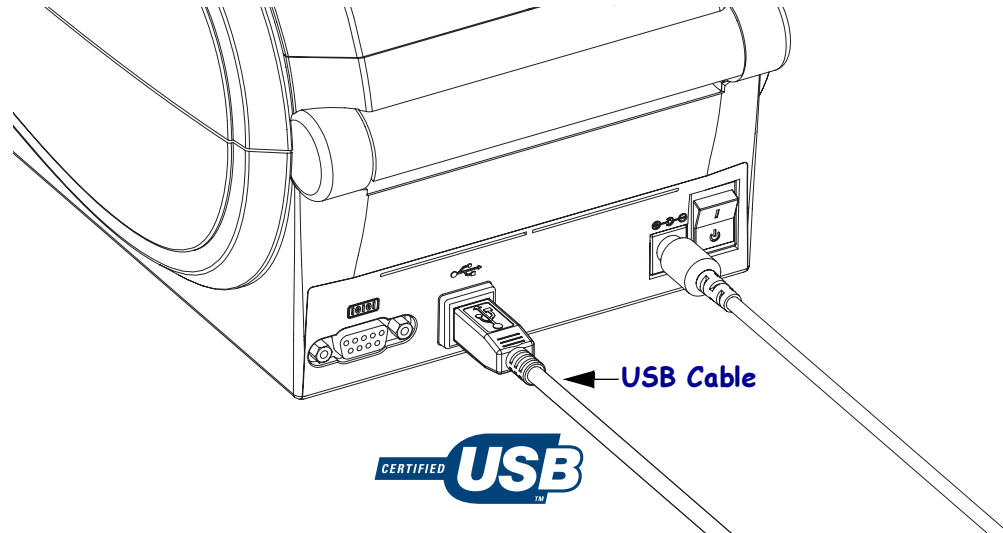
To minimize electrical noise pickup in the cable:

- Keep data cables as short as possible (6 foot [1.83 m] recommended).
- Do not tightly bundle the data cables with power cords.
- Do not tie the data cables to power wire conduits.

## USB Interface Requirements

Universal Serial Bus (version 2.0 compliant) provides a fast interface that is compatible with your existing PC hardware. USB's "plug and play" design 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.



## Serial Communications

The required cable must have a nine-pin “D” type (DB-9P) male connector on one end, which is plugged into the mating (DB-9S) serial port located on the back of the printer. The other end of this signal interface cable connects to a serial port at the host computer. Depending on the specific interface requirements, this will most likely be a Null Modem (cross-over) cable. Early models of Zebra printers running the EPL programming typically utilized a straight through signal connections cable (no cross-over). For pinout information, refer to Appendix A.



**Note** • The printer design does not allow for the use non-molded cables such as hand-made cables with large clam shell connector covers.

The serial port communication settings between the printer and host (typically a PC) must match for reliable communication. The Bits per second (or Baud rate) and Flow control are the most common settings that get changed. The hosts (typically a Windows PC) needs to have the data Flow control changed to match the printer’s default communication method: **Hardware** and is noted by the Host Handshake setting **DTR/Xon/Xoff**. This combined hardware (DTR) and software (Xon/Xoff) mode may need to change depending upon the non-Zebra application software and the serial cable variation in use.

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

- Autobaud synchronization
- ZPL programming **^SC** command
- EPL programming **Y** command
- Resetting the printer to its default printer configuration.

### 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. (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 the data flow control, use the **Xon/Xoff** setting.
2. Change the host computer settings to match the new printer settings.

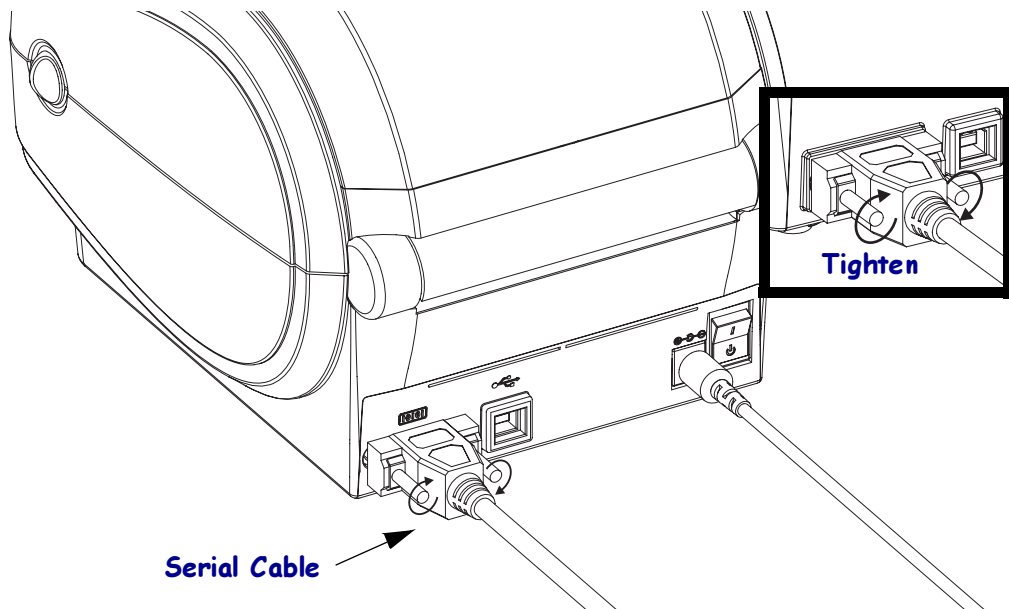
Refer to the *EPL Page Mode Programming Guide* for more information about this command.

## 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, waits a moment and 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. Serial communications between the printer and the host computer can be set by the ZPL ^SC command or the EPL Y command.

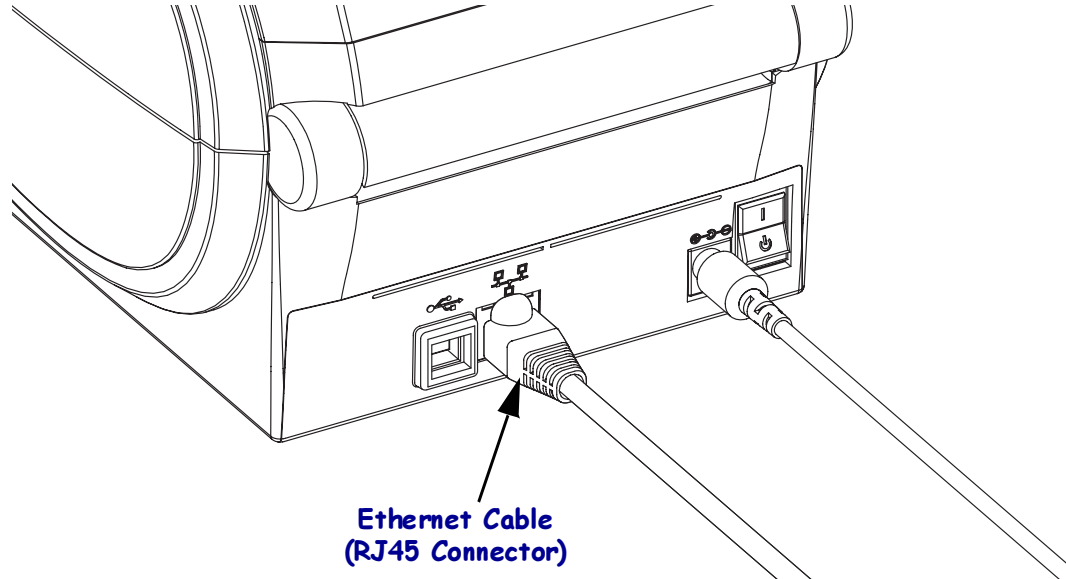
**Note** • Early models of Zebra printers running the EPL programming language had 9600 baud, NO parity, 8 data bits, 1 stop bit and a **HARDWARE** and **SOFTWARE** (merged) data control (essentially DTR/Xon/Xoff) as the default serial port settings. The Windows operating system flow control setting was Hardware for most applications.



## Ethernet

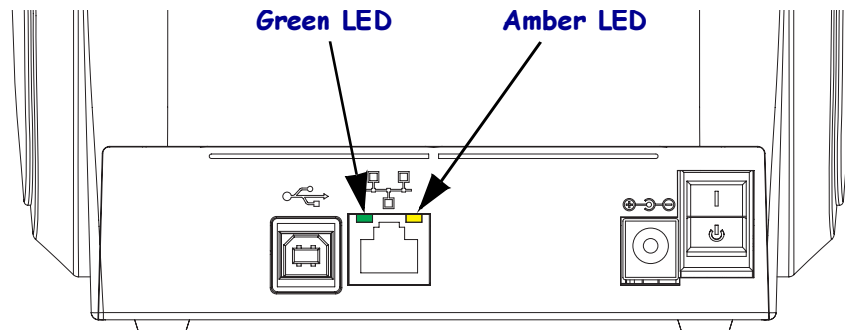
The printer requires UTP RJ45 Ethernet cable rated CAT-5 or better.

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). The print server on board your printer can be accessed through the printer's web pages.



### 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  |





**Notes •** \_\_\_\_\_

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# Print Operations

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

## Contents

|   |    |
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| Determining Printer Configuration .....           | 22 |
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| Replacing Supplies .....                          | 25 |
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| Printing on Fan-Fold Media .....                  | 28 |
| Printing with Externally Mounted Roll Media ..... | 30 |
| Fonts and Your Printer .....                      | 31 |
| Sending Files to the Printer .....                | 34 |
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## 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 conventions 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 on the 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.

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 on page 14](#) or [Feed Button Modes on page 69](#) for information on accessing the printer configuration status label.

## Thermal Printing



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**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.

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**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.

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## Modes of Printing

You can operate this printer in many different modes and media configurations:

- Direct thermal printing (which uses heat sensitive media to print).
- Standard Tear-Off mode allows you to tear off each label (or batch print a strip of labels) after it is printed.
- Label Dispense Mode: If an optional dispenser is installed, the backing material can be peeled away from the label as it is printed. After this label is removed, the next one is printed.
- Media Cutting: If an optional media cutter is installed, the printer can cut the label liner between labels, receipt paper or tag stock depending upon the cutter option purchased.
- Stand-alone: The printer can run in a stand-alone mode (not connected to a computer) using the printer's auto running label form feature (programming based) or by using an data input device. This mode accommodates data input devices, such as scanners, weigh scales, Zebra KDU Plus or KDU (Keyboard Display Unit) with a KDU Adapter, etc., via the printer's serial port.
- Shared network printing: Printers configured with the Ethernet interface option include an internal print server with ZebraLink printer configuration web page and ZebraNet Bridge software for managing and monitoring status of Zebra printers on a network.

## Print Media Types



**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 to prevent premature printhead wear. To purchase supplies, go to <http://www.zebra.com/howtobuy>.

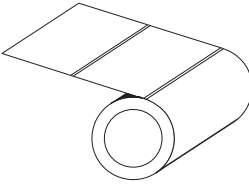
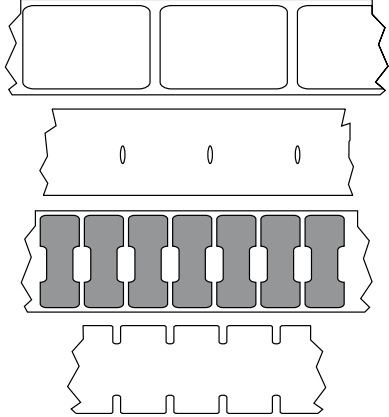

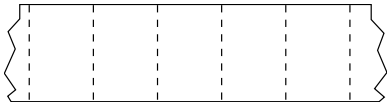
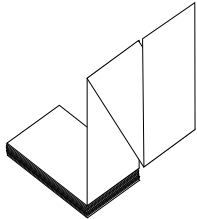
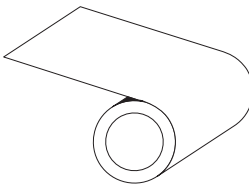
Your printer can use various types of media:

- *Standard media*—Most standard (non-continuous) media uses an adhesive backing that sticks individual labels or a continuous length of labels to a liner.
- *Continuous roll media*—Most continuous roll media is direct thermal media (similar to FAX paper) and is used for receipt or ticket style printing.
- *Tag stock*—Tags are usually made from a 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 [Table 1](#).

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

Table 1 • Types of Media Roll and Fanfold Media

| Media Type                                 | How It Looks  | Description   |
|--|---|---|
| <p><b>Non-Continuous Roll Media</b></p>    |    | <p>Roll media is wound on a core that can be 1 in. to 3 in. (25 to 76 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:</p> <ul style="list-style-type: none"> <li> <p><i>Web media</i> separates labels by gaps, holes, or notches.</p>  </li> <li> <p><i>Black mark media</i> uses pre-printed black marks on the back side of the media to indicate label separations.</p>  </li> <li> <p><i>Perforated media</i> 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.</p>  </li> </ul> |
| <p><b>Non-Continuous Fanfold Media</b></p> |  | <p>Fanfold media is folded in a zigzag pattern. Fanfold media can have the same label separations as non-continuous roll media. The separations would fall on or near the folds.</p>  |
| <p><b>Continuous Roll Media</b></p>        |  | <p>Roll media is wound on a core that can be 1 in. to 3 in. (25 to 76 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. Sometimes a cutter is used to cut apart individual labels. With continuous media, use the transmissive (gap) sensor so the printer can detect when the media runs out.</p>  |

## Determining Thermal Media Types

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

### To perform a media scratch test, complete these steps:

1. Scratch the print surface of the media with a finger nail 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...                           |
|------------------------------|--|
| Does not appear on the media | <b>Thermal transfer.</b> A ribbon is required. |
| Appears on the media         | <b>Direct thermal.</b> No ribbon is required.  |

## Replacing Supplies

If labels run out while printing, leave the printer power on while reloading (data loss results if you turn off the printer). 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 Zebra Designer.
- The five-flash sequence in *Feed Button Modes* on page 69.
- 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 or density (setting) of the printhead, the print speed, and the type of media you are using. Only by experimenting will you find the optimal mix for your application.



**Note** • Media manufactures 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.

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

- The six-flash sequence in *Feed Button Modes* on page 69. 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 Zebra Designer.
- 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 blacklines (or notches with blackline sensing) after feeding the media the default maximum label length distance of 39 inches (1 meter), then 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 up to three labels while calibrating.

The printer's media settings can be verified by printing a Printer Configuration label. See the [Printing a Test \(Printer Configuration\) Label on page 14](#) 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 65](#) 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 the [Feed Button Modes on page 69](#) for more details.

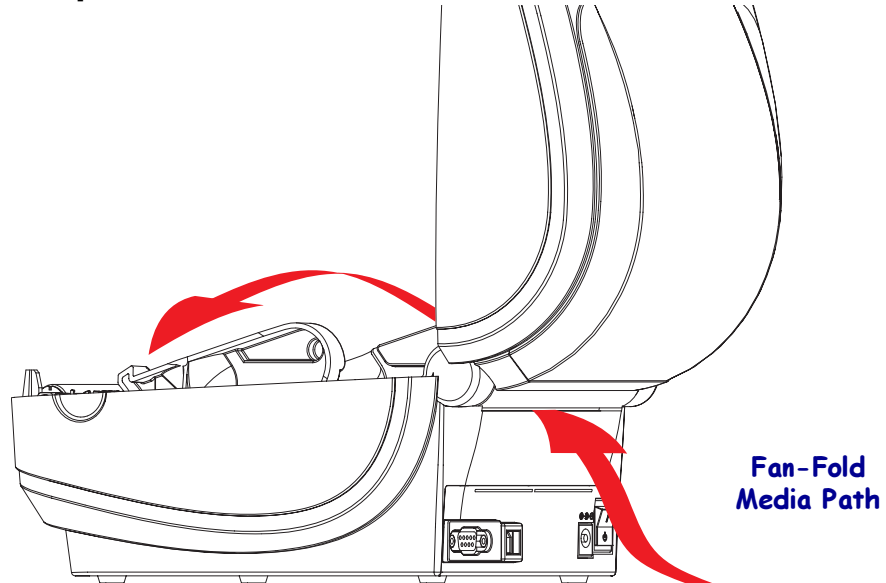
The automatic media calibration can be modified, turned on or turned off to meet your needs. Sometimes print job conditions require that the printer use all the media on a roll. The two automatic media conditions, power up with media loaded and closing the printer with power on, can be controlled individually 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, blackline 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 blackline marks. If the ^MN parameter for continuous media is set, then the print 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.

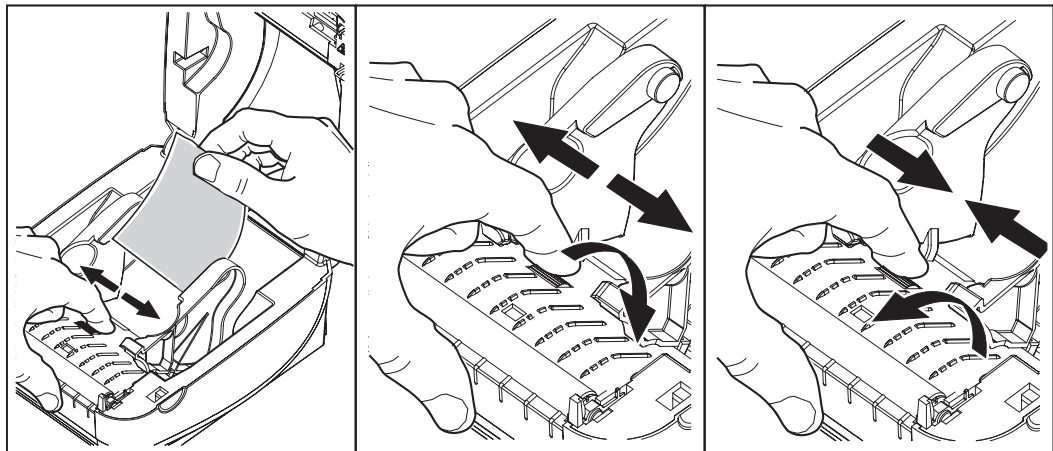
## Printing on Fan-Fold Media

Printing on fan-fold media requires you to adjust the media guide's stop position.

1. Open the top cover.

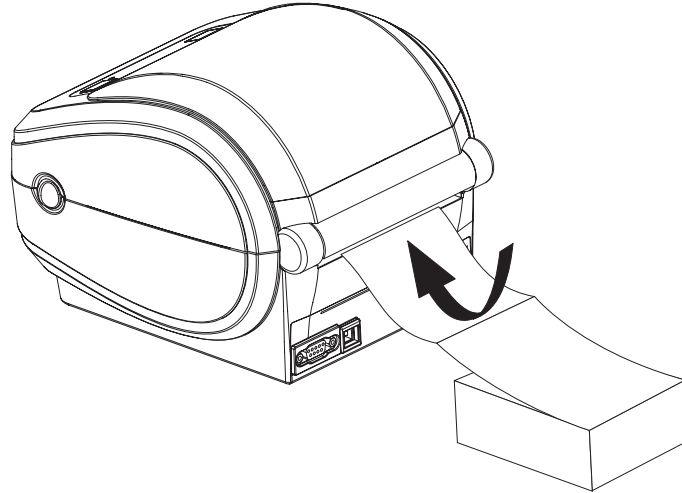


2. Adjust the media guide stop position with the green thumb wheel. Use a piece of the fan-fold media to set the stop position. Rotate the wheel away from you to open the guides wider. Rotate the wheel towards you to make the media guide narrower.

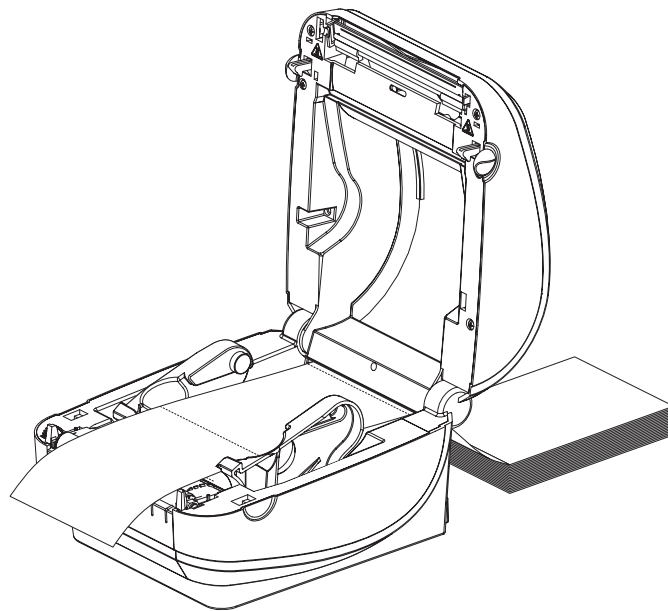




3. Insert the media through the slot at the rear of the printer.



4. Run the media between the hangers.



5. Close the top cover.

## Printing with Externally Mounted Roll Media

The G-Series printer accommodates externally mounted roll media similar to the printer's support of fan-fold media. The printer requires the media roll and stand combination to have a 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:

- The media ideally should enter the printer directly behind the printer through the fan-fold media slot in the rear of the printer. See [Printing on Fan-Fold Media on page 28](#) 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 for 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 download into the printer for both printer programming languages.

## 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 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.
  - The six fonts `LMu.FNT` through `LMz.FNT` are EPL Line Mode fonts and are not available for use in EPL programming on thermal transfer G-Series printers.
  - When displayed in ZPL, the EPL Soft fonts have are separated into two groups—horizontal and vertical. The EPL Soft fonts are noted with single lowercase alpha characters (`a-z`) followed by an uppercase `H` or `V` and the `.FNT` file extension.

### EPL Fonts:

- To download fonts for EPL print operation, use the EPL Font Downloader.
- To display Soft Fonts (ext.) available to EPL, send the printer the EPL command `EI`.
  - 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.

## 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.

## Asian fonts and Other Large Font Sets

Asian language pictographic fonts have large character sets with thousands of characters that support single language code page. In order to support the large Asian character sets, the industry adopted a double-byte (67840 maximum) character system instead of the single-byte characters (256 maximum) used by Latin based language characters to address large font sets. In order to address multiple languages with a single font set, Unicode was invented. A Unicode font supports one or more code points (relate these to code page character maps) and is accessed in a standard method that resolves character mapping conflicts. The ZPL programming language supports Unicode; EPL does not. Both of the printer's programming languages support the large pictographic double-byte character Asian font sets.

Asian language support requires additional memory support by the G-Series printer configured with the RTC and Full Flash Memory factory option. The number of fonts that can be downloaded is dependent upon the amount of available flash memory not already in use and the size of the font to be downloaded.

Some large Unicode fonts are too large to be installed in the printer with the RTC and Full Flash Memory factory option such as MS (Microsoft) Arial Unicode font (23MB) or the Andale font (22MB) offered by Zebra. These large font sets typically support a large number of languages as well.

## Getting Asian Fonts

Asian font sets are downloaded into the printer by the user or integrator. The fonts are purchased separately from the printer.

- Simplified and Traditional Chinese (ZPL and EPL)
- Japanese — JIS and Shift-JIS mappings (ZPL and EPL)
- Korean (ZPL including Johab and EPL)
- Thai (ZPL only)

## Stand Alone 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 **AUTOFR** form operation in EPL printers, the **XOFF** character (13 hex or ASCII 19).

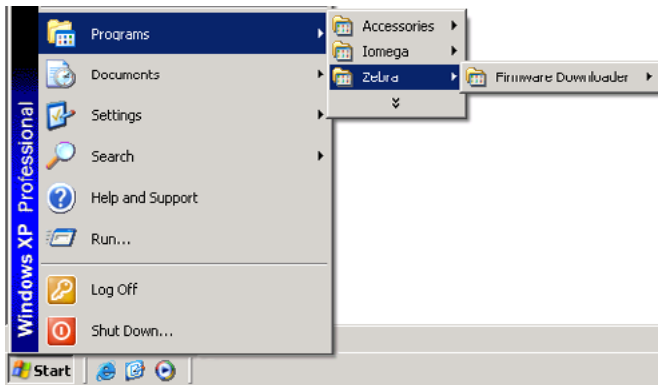
The G-Series printer can source up to 750mA through the serial port's 5 volt line; see Appendix A for more information on the printer's serial port interface.

## Sending Files to the Printer

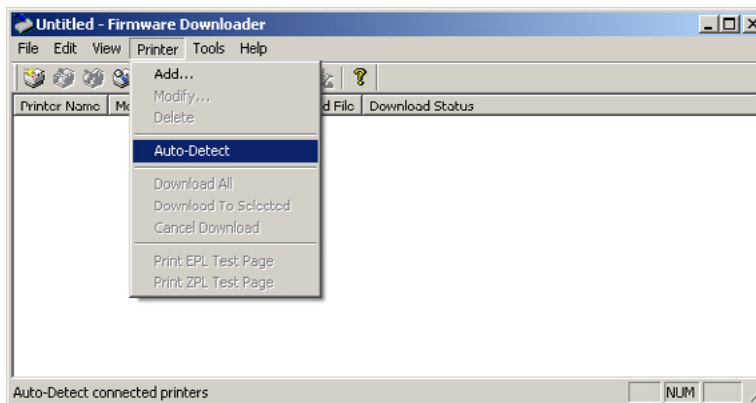
Files can be sent to the printer from the Microsoft Windows operating systems by using the Zebra Firmware (and File) Downloader found on the user's CD or at [www.zebra.com](http://www.zebra.com). This method is common for both programming languages, all G-Series wired interfaces (including USB) and wired network printers.

### Transferring files with the Firmware Downloader

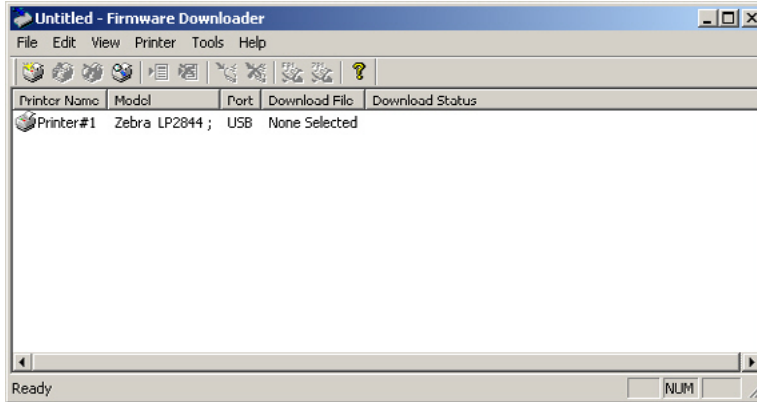
1. Install the printer. Verify communication is working properly by using the drivers **Print Test Page** located on the printer driver properties window.
2. Install the Zebra Firmware Downloader on your system.
3. Find the Firmware Downloader by selecting **start > Programs > Zebra**.



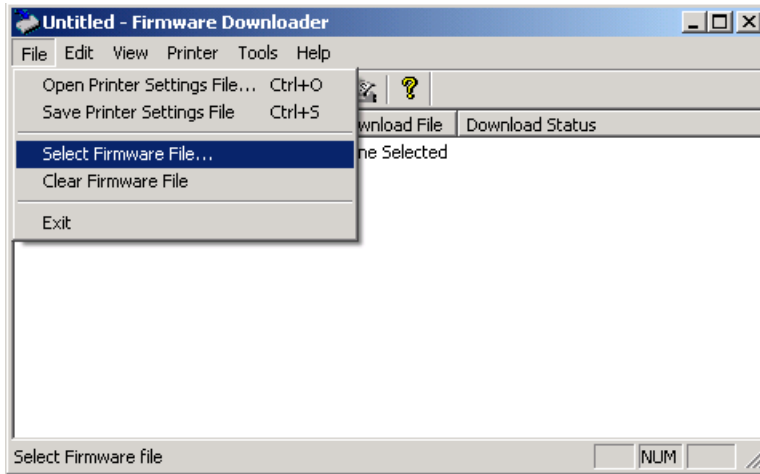
4. Select the **Printer** menu and run the **Auto-Detect**.



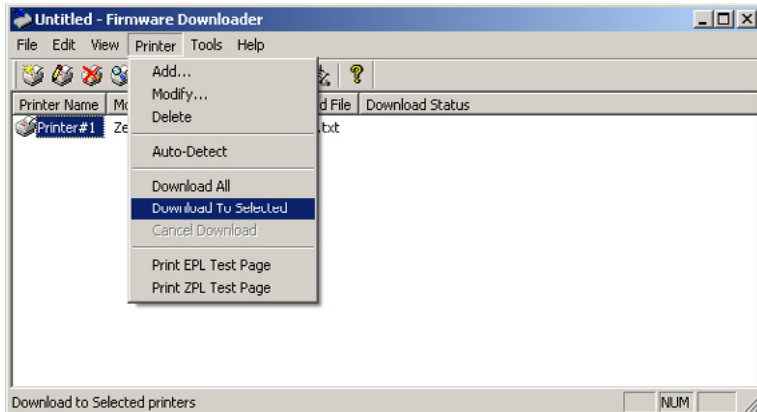
- Click on your Zebra printer to select the printer for download.



- Select the **File** menu and click on the **Select Firmware File...** Use the Browser window to select your file for download to your printer.



- Select the **Printer** menu and click on the **Download to Selected (printer)**. The downloader may display a download status indicator to show download progress of larger files.



## 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 customize able. See the *ZPL or EPL Programming Guides* for more information on the Print Meter.

To active the 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 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, work flow control, and general labeling. EPL printers with Line Mode, are versatile and are capable of printing a wide range 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 **escEPL2** 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.



**Notes •**

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# 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.

## Contents

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| Label Dispenser Option . . . . .                        | 40 |
| ZebraNet® 10/100 Internal Print Server Option . . . . . | 43 |
| KDU — Printer Accessory . . . . .                       | 45 |
| KDU Plus — Printer Accessory . . . . .                  | 47 |

## 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.

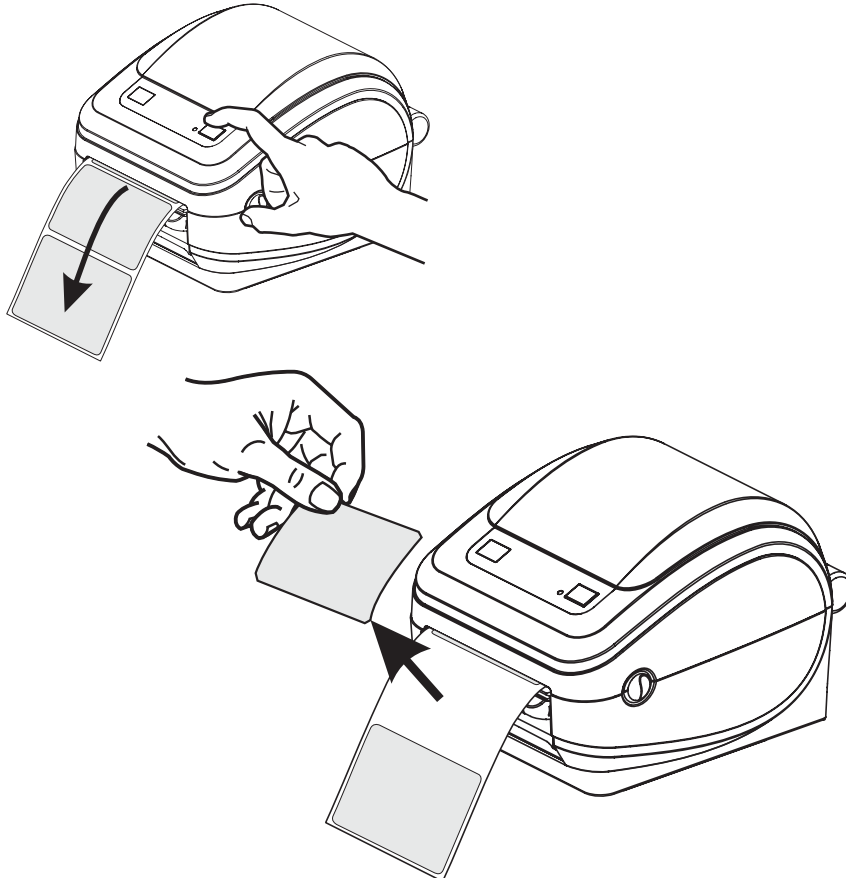
To use dispenser-mode correctly, use your printer driver to activate the label (taken) sensor along with these typical label settings which include but are not limited to length, non-continuous (gap), and web (liner). Otherwise, you must send the ZPL or EPL programming commands to the printer.

**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.

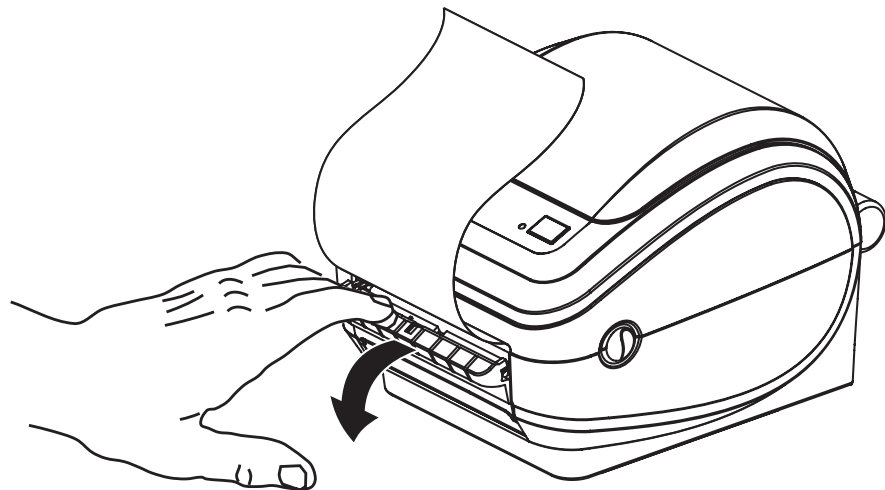
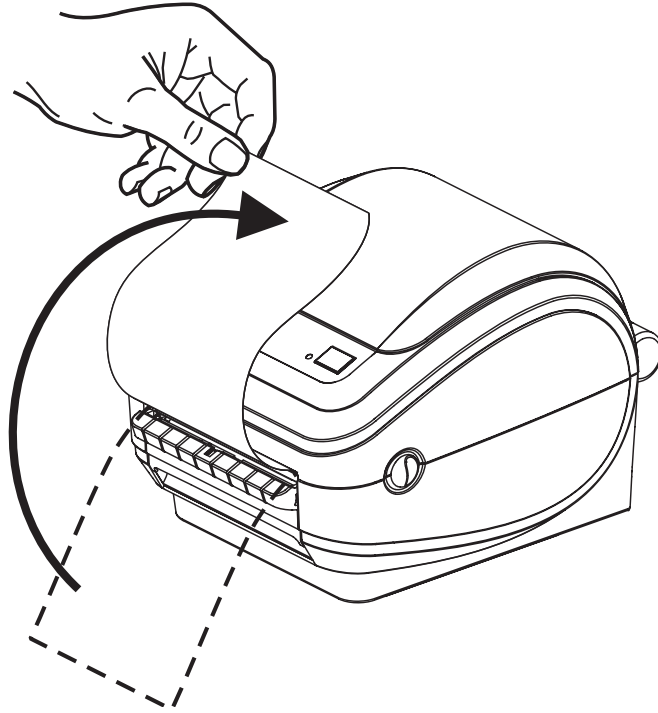
```
^XA ^MMP ^XZ  
^XA ^JUS ^XZ
```

**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.

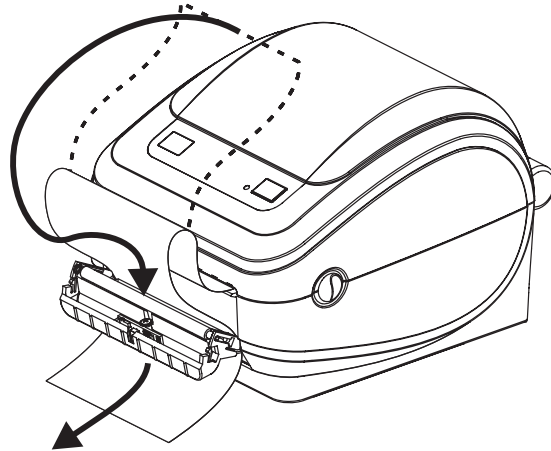
1. Load your labels into the printer. Close the printer and press the Feed button until a minimum of 4 inches or 100 millimeters of exposed labels exit the printer. Remove the exposed labels from the liner.



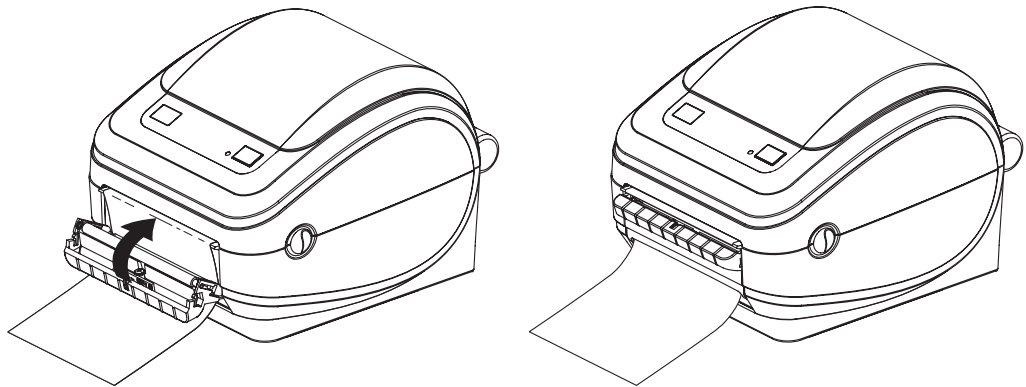
2. Lift the liner over the top of the printer and open the dispenser door.



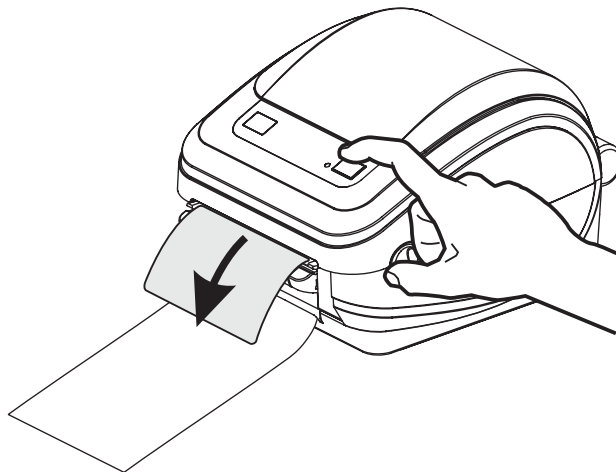
3. Insert the label liner between the dispenser door and the printer body.



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. Taking 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 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.

Printer with 10/100 Internal PS—10/100 Internal PS gives your printer these features:

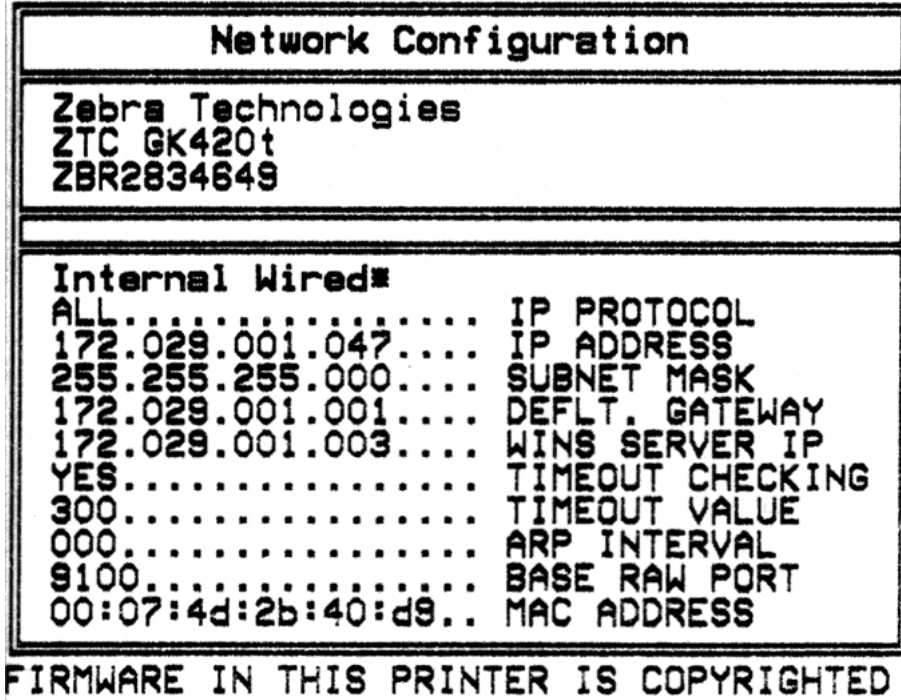
- Print server and printer setup using a browser
- Remote monitoring and configuration capability of the 10/100 Internal PS using a browser
- Alerts
- The ability for you to send unsolicited printer status messages via E-mail-enabled devices

ZebraNet™ Bridge — ZebraNet™ Bridge is 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:

- ZebraNet™ Bridge allows you to 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 on-board print an additional printer configuration status label for information needed to establish and trouble shoot network printing. The following printout is printed with the ZPL ~WL command.



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.



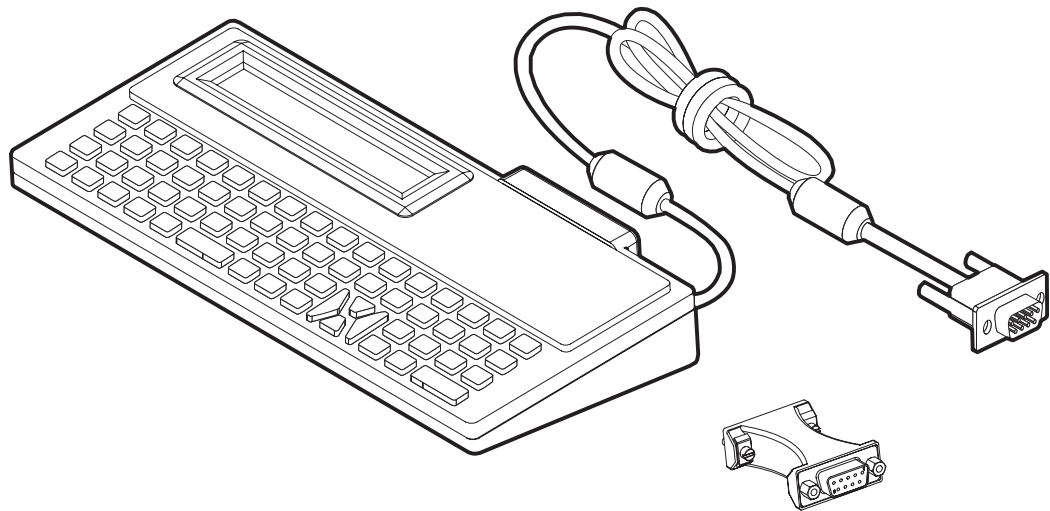
## KDU — Printer Accessory

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:

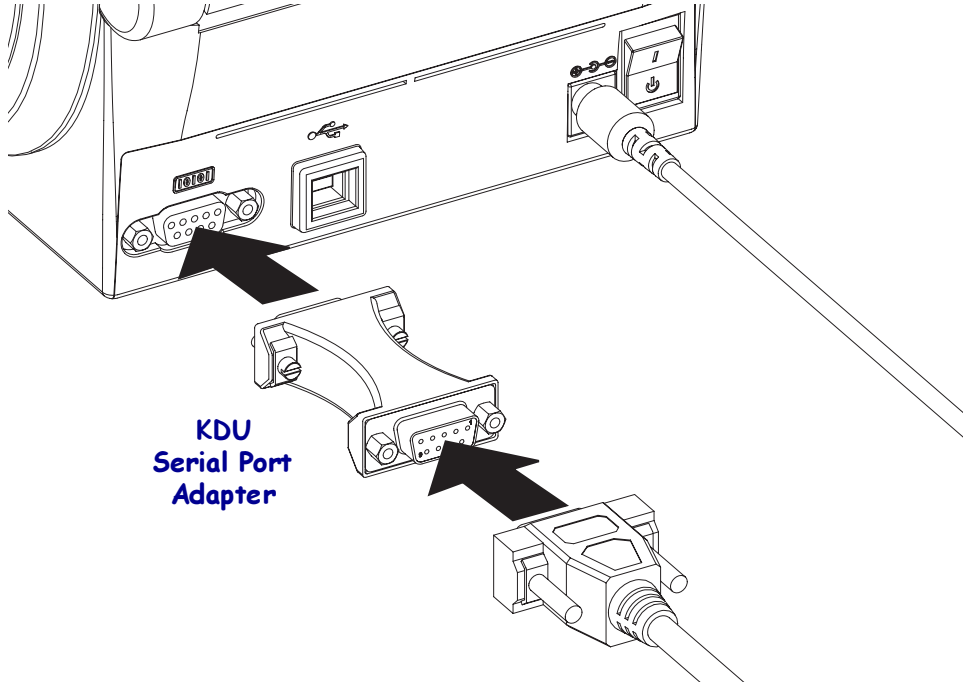
- List label forms stored in printer
- Retrieve label forms stored in printer
- Input variable data
- Printing labels

The KDU was designed for Zebra EPL printers. The EPL printer's serial port was configured for DCE (data communication equipment) communications configuration. The G-Series printer has a DTE (data terminal equipment) serial port configuration. Because of the KDU and G-Series have different wiring configurations, a KDU serial port adapter is needed to properly supply power to the KDU and enable communications between them.

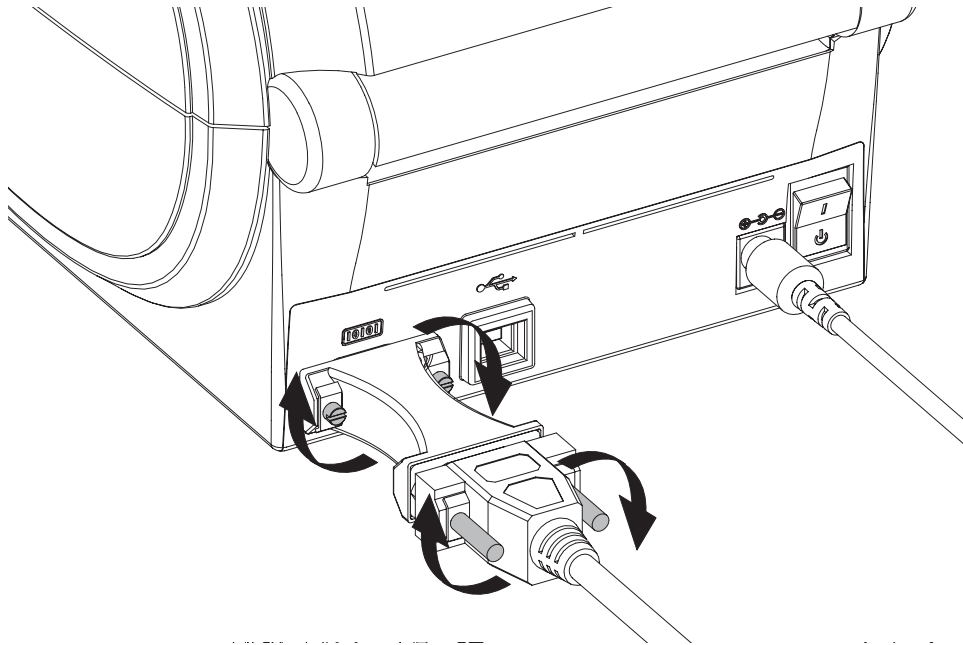


## KDU and G-Series Printer Serial Port Adapter Installation

1. Switch the printer power to OFF.
2. Align the adapter between the KDU's serial connector and the serial interface on the printer.



3. Plug the adapter onto the printer's serial interface; use a small, slotted screwdriver to tighten the screws and secure the adapter.
4. Plug the KDU's cable onto the adapter; tighten the screws to secure the cable.



## 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 printer
- Retrieve label forms stored in 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.

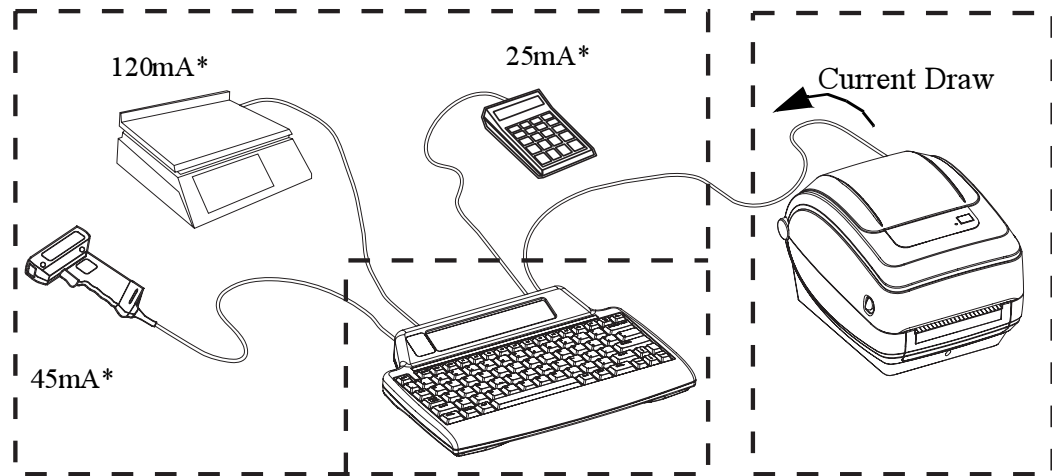
The KDU Plus has file transfer and storage capabilities. This is great for maintaining remote and stand alone printers with label forms, logos and smaller font sets.

The KDU Plus has two configurable serial port 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

50mA

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



**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.



**Notes •** \_\_\_\_\_

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# Maintenance

This section provides routine cleaning and maintenance procedures.

## Contents

|                                       |    |
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| Cleaning .....                        | 50 |
| Cleaning the Printhead .....          | 51 |
| Media Path Considerations .....       | 52 |
| Platen Cleaning and Replacement ..... | 54 |
| Other Printer Maintenance .....       | 56 |
| Replacing the Printhead .....         | 56 |

## Cleaning

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

| 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 [www.zipzebra.com](http://www.zipzebra.com).

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

| Printer Part  | Method   | Interval                   |
|---------------|--|----------------------------|
| Printhead     | Let 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.<br>See <i>Cleaning the Printhead</i> on page 51 | 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.<br>See <i>Platen Cleaning and Replacement</i> on page 54                             | As needed.                 |
| Peel bar      | Clean it thoroughly with 90% medical-grade alcohol and a fiber-free cleaning swab.<br>Let alcohol dissipate and the printer dry completely.  |                            |
| Media path    |  |                            |
| Exterior      | Water-dampened cloth.  |                            |
| Interior      | Gently brush out 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).



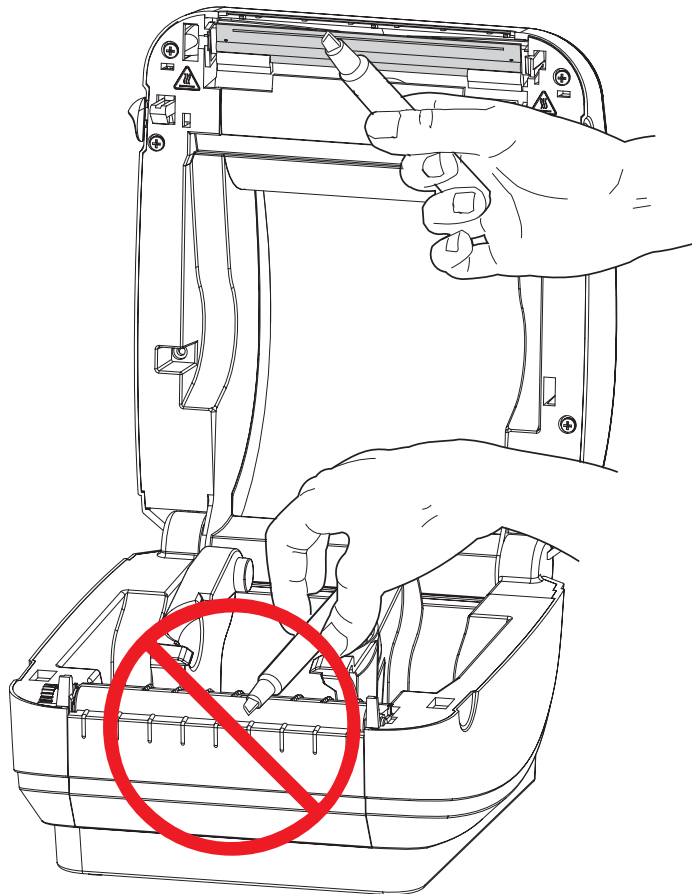
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**Caution** • The printhead becomes hot while printing. To protect from damaging the printhead and risk of personal injury, avoid touching the printhead. Use only the cleaning pen to perform maintenance.

---

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 media to the printhead outside of media path.
2. Wait one minute before closing the printer.

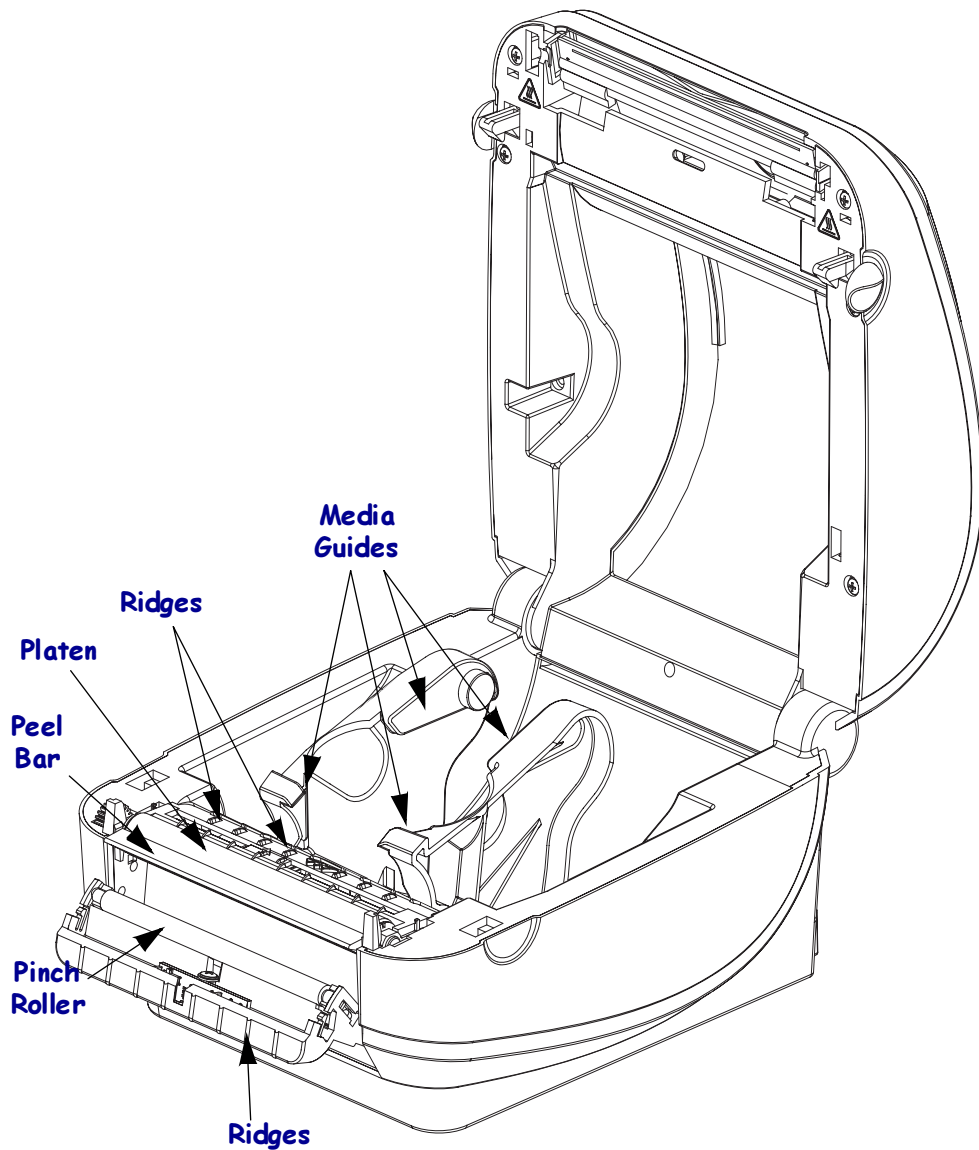


## Media Path Considerations

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

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

Discard the cleaning swab after use.

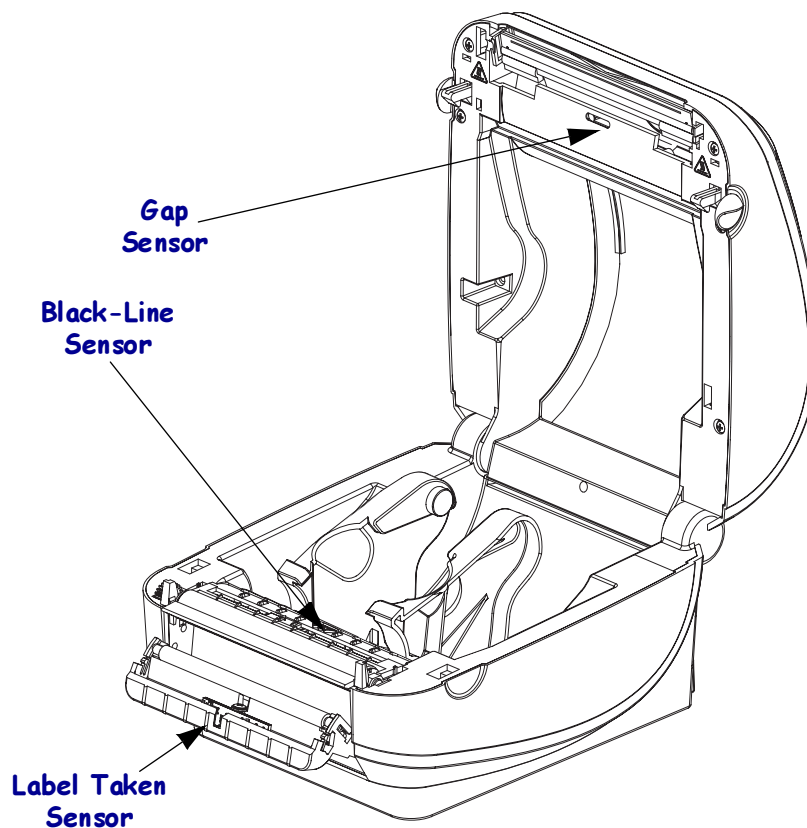




## Sensor Cleaning

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 it 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.



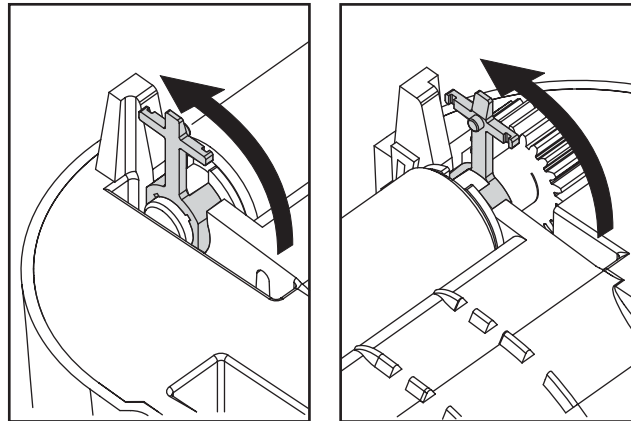
## Platen Cleaning and Replacement

The standard platen (drive roller) normally does not require cleaning. Paper and liner dust can accumulate without effecting 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 contaminates should be cleaned immediately off the platen.

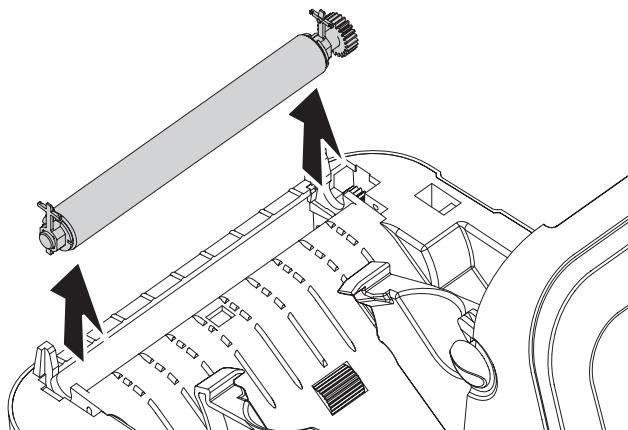
Clean the platen (and media path) whenever the printer has significantly poorer performance, print quality or media handling. The platen is the print surface and drive roller for your media. If sticking or jamming continues even after cleaning, you must replace the platen.

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 platen area.
2. Press the tabs on the right and left sides out. Then rotate them up.



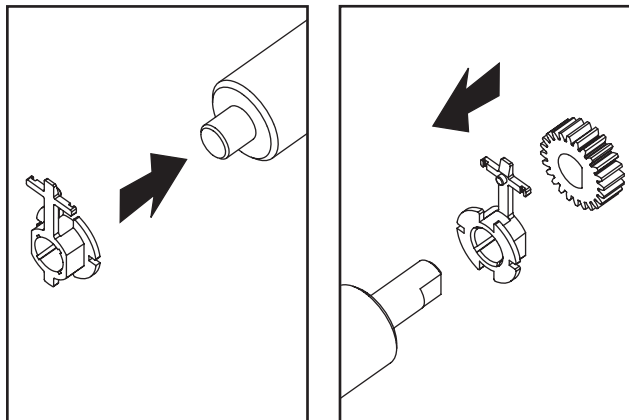
3. Lift the platen out of the printer's bottom frame.



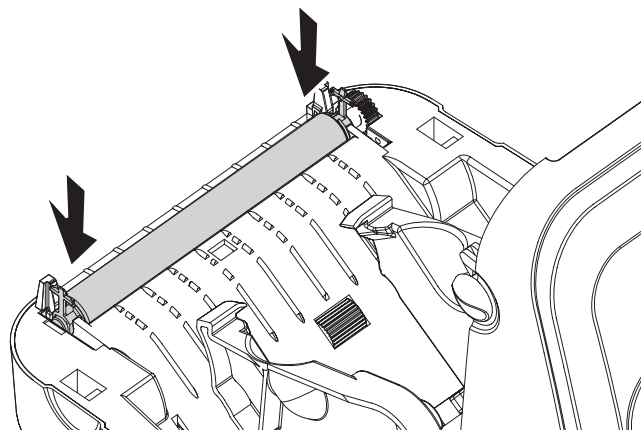
4. Clean the platen with the alcohol moistened swab. Clean from the center out. Repeat this process until the all of the roller surface has been cleaned. If there has been heavy adhesive build-up or label jam, repeat with a new swab to remove residual contaminates. Adhesives and oils, for example, may be 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.

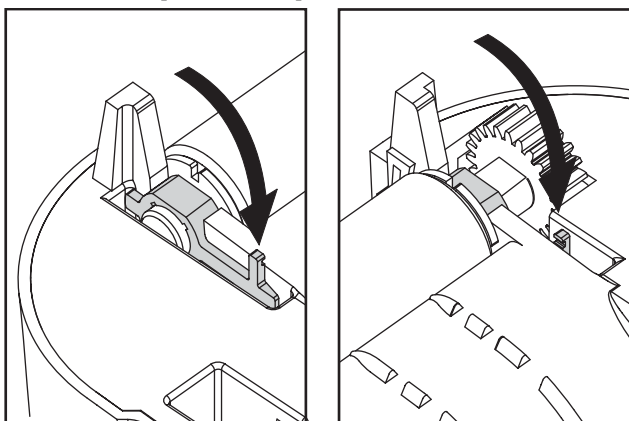
6. Make sure the bearings are on the shaft of the platen.



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 the [Troubleshooting on page 59](#) 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.



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**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.

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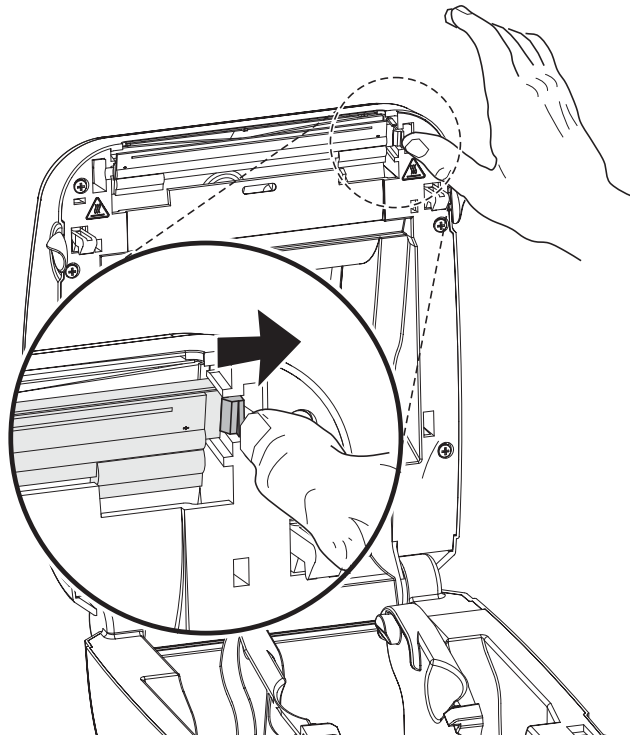
**Caution** • Turn the printer power off and unplug the power cord before replacing the printhead.

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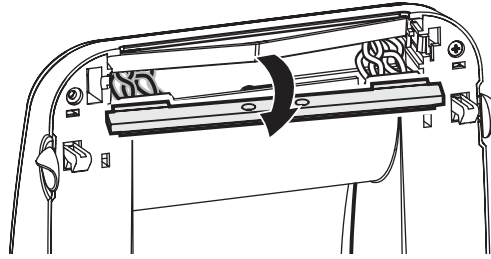
Before following the steps in this procedure, open the printer by pulling the release latches forward then lifting the top cover.

### Printhead Removal

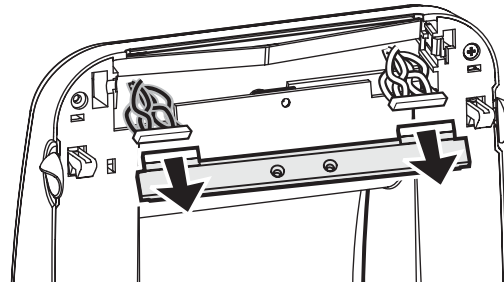
1. Push the printhead's right side catch to the right.



2. Pull the printhead forward and pull it free of the top case if necessary.

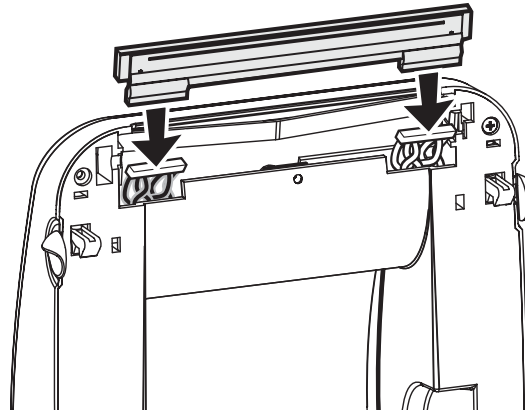


3. Unplug both bundles of printhead wires from their connectors.

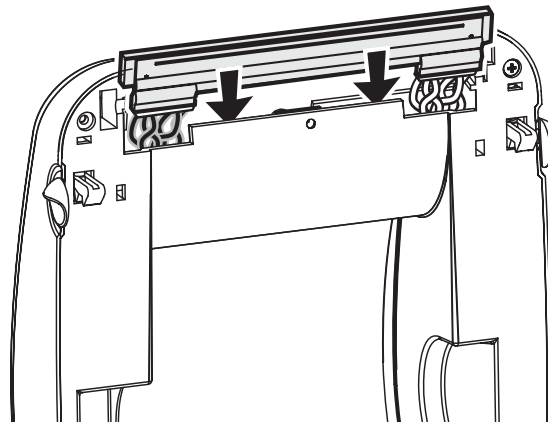


### Replacing the Printhead

1. Align the printhead to the left and right connectors into the wire bundles.



2. Slide the printhead into the left side and jog it into the right side catch.



3. Clean the print head as described under [Cleaning the Printhead](#) on page 51.
4. Reload media. Plug in 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 14



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# Troubleshooting

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

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| Status Light Error Resolutions . . . . .       | 60 |
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## Status Light Descriptions

| What the Status Light is Telling You |                  |                                    |
|--------------------------------------|------------------|------------------------------------|
| 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 and Green          | Needs Service    | 9                                  |

## Status Light Error Resolutions

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

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

No action necessary.

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

- If this error occurs right after you turn 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).

### There is a memory error.

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

### 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.

- Follow the instructions for [Loading Roll Media on page 11](#) in the Getting Started section, and then press the Feed button to resume printing.

## The printhead is open.

- 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.

## Print Quality Problems

### No print on the label.

- The media may not be direct thermal media. See the test procedure [Determining Thermal Media Types](#) on page 25.
- Is the media loaded correctly? Follow the instructions for [Loading Roll Media](#) on page 11 in the Getting Started section.

### 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 69.
  - The Windows printer driver or application software may change these settings and may require a change to optimize print quality.
- The media being used is incompatible with the printer. Be sure to 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 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 maybe 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 normally smooth and flat print surface such as 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 11](#) in the Getting Started section.
- The printer needs to be calibrated. Refer to the two-flash sequence of [Feed Button Modes on page 69](#) in this section.
- ZPL Label Formats - The correct media sensor may not be activated. Manual calibration 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 for 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, refer to [What the Status Light is Telling You on page 60](#).
- 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 [Hooking Up the Printer and Computer on page 15](#) in the Getting Started section.
- 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 69](#) to print this label.

## A 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 40](#).
- If the status LED is on or flashing, refer to [What the Status Light is Telling You on page 60](#).
- Make sure the data cable is correctly installed.
- A communications problem has occurred. First, make sure that the correct communications port (USB) on the computer is selected. Refer to [Hooking Up the Printer and Computer on page 15](#) in the Getting Started section.

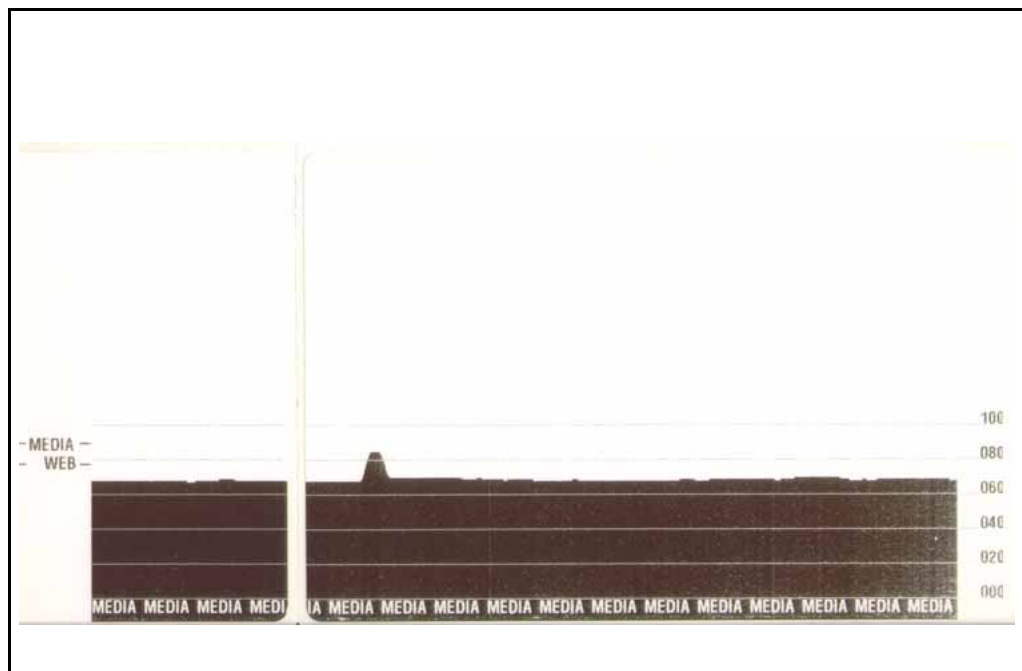
## Manual Calibration

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 on the printer power.
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” later in this chapter) and recalibrating the printer.



**Note** • Performing a manual calibration disables the auto calibration function. To return to auto calibration, default the printer (refer to the four-flash sequence in [Feed Button Modes](#) on page 69 in this section).



## Troubleshooting Tests

### 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 69](#) in this section

| PRINTER CONFIGURATION            |                 |
|----------------------------------|-----------------|
| Zebra Technologies<br>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   |
| 832.....                         | PRINT WIDTH     |
| 1242.....                        | LABEL LENGTH    |
| 39.0IN 989MM.....                | MAXIMUM LENGTH  |
| CONNECTED.....                   | USB COMM.       |
| 9600.....                        | BAUD            |
| 8 BITS.....                      | DATA BITS       |
| NONE.....                        | PARITY          |
| DTR/XON/XOFF.....                | HOST HANDSHAKE  |
| NONE.....                        | PROTOCOL        |
| <~> 7EH.....                     | CONTROL CHAR    |
| <^> 5EH.....                     | COMMAND CHAR    |
| <, > 2CH.....                    | DELIM. CHAR     |
| ZPL II.....                      | ZPL MODE        |
| NO MOTION.....                   | MEDIA POWER UP  |
| FEED.....                        | HEAD CLOSE      |
| DEFAULT.....                     | BACKFEED        |
| +000.....                        | LABEL TOP       |
| +0000.....                       | LEFT POSITION   |
| NO.....                          | HEXDUMP         |
| 037.....                         | WEB S.          |
| 096.....                         | MEDIA S.        |
| 017.....                         | WEB GAIN        |
| 050.....                         | MARK S.         |
| 000.....                         | MARK GAIN       |
| 095.....                         | MARK MED S.     |
| 000.....                         | MARK MEDIA GAIN |
| 095.....                         | CONT MEDIA S.   |
| 007.....                         | CONT MEDIA GAIN |
| 000.....                         | TAKE LABEL      |
| CWF.....                         | MODES ENABLED   |
| .....                            | MODES DISABLED  |
| 832 8/MM FULL.....               | RESOLUTION      |
| V61.15.12P38 <-.....             | FIRMWARE        |
| V07.00.0.....                    | HARDWARE ID     |
| CUSTOMIZED.....                  | CONFIGURATION   |
| 2944k.....R:                     | RAM             |
| 1536k.....E:                     | ONBOARD FLASH   |
| NONE.....                        | FORMAT CONVERT  |
| 8,801 IN.....                    | LAST CLEANED    |
| 19,938 IN.....                   | HEAD USAGE      |
| 19,938 IN.....                   | TOTAL USAGE     |
| 19,938 IN.....                   | RESET CNTR1     |
| 19,938 IN.....                   | RESET CNTR2     |
| 28A07170011.....                 | SERIAL NUMBER   |
| 2007-12-04 00:04:09              | TIME STAMP      |

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### Recalibration

Recalibrate the printer if it starts to display unusual symptoms, such as skipping labels. Refer to the two-flash sequence in [Feed Button Modes on page 69](#) in this section.

## Resetting the Factory Default Values

Sometimes, resetting the printer to the factory defaults may solve some problems. Refer to the four-flash sequence in [Feed Button Modes on page 69](#) in this section.

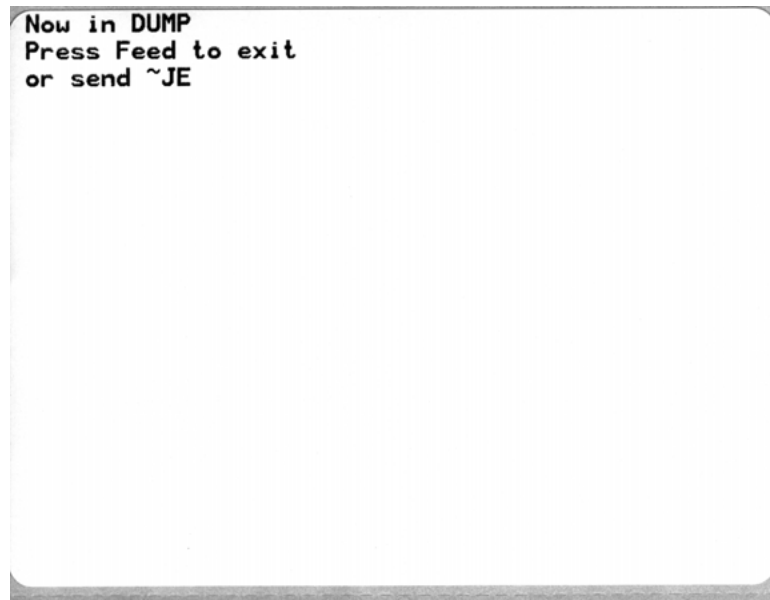
## Communications Diagnostics

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 (a sample is shown below) for any data received from the host computer. ~~To find out how,~~

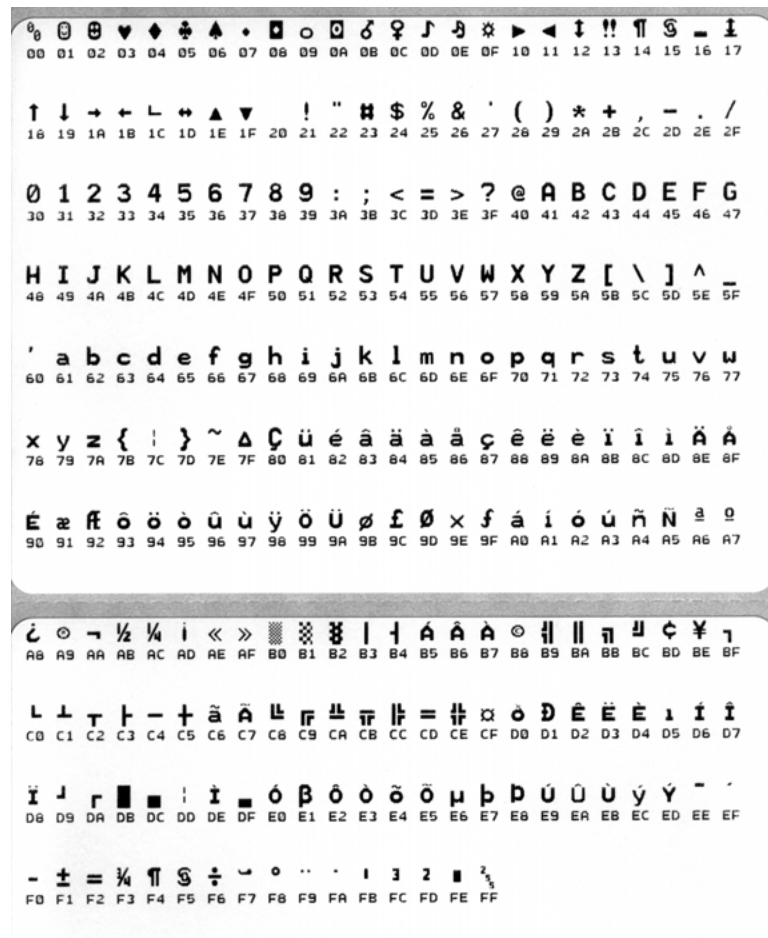
There are multiple ways to enter hex data dump mode:

- The `~JD` ZPL command
- The `dump` EPL command
- On power up with the Feed button pressed. Refer to the power off mode procedure in [Feed Button Modes on page 69](#) in this section.

The printer will print 'Now in DUMP' (see below) and advance to the top of the next label.



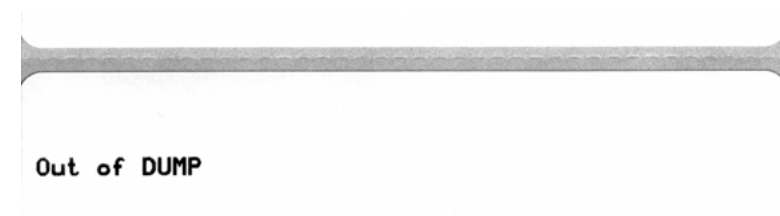
The following example of a communications DUMP mode printed out. The printout displays hexadecimal data 00h-FFh (0-255 decimal) with a unique character for each hexadecimal value displayed above the hexadecimal data.



The blank lines between the lines of data are where 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.





# Feed Button Modes

| Power Off Mode (Communications Diagnostics Mode)  |  |
|---|--|
| With the printer power off, press and hold the Feed button while you turn on the power. |  |
| Flash Sequence  | Action   |
| <b>Rapid Red Flashing</b>   | <p><b>Firmware Download Mode</b> - 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.</p> <p>See <i>Sending Files to the Printer</i> on page 34 for more information on using the Firmware (and File) Download utility available for use with this printer. Firmware updates for your printer, if available, are posted on the Zebra on our web site at: <a href="http://www.zebra.com">www.zebra.com</a></p>  |
| <b>Amber</b>  | <p><b>Normal Operations Mode</b> - 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 diagnostics mode.</p>  |
| <b>Green</b>  | <p><b>Communications Diagnostic (Dump) Mode</b> - 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 will automatically enter into diagnostic mode in which the printer prints out a literal representation of all data subsequently received.</p> <p><i>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.</i></p> |

| <b>Power On Modes</b>  |  |
|--|--|
| With the printer power on and 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) shows what happens when you release the key after the start specific number of flashes and before the next flash sequence starts. |  |
| <b>Flash Sequence</b>  | <b>Action</b>  |
| *  | <b>Configuration Status</b> - Prints a detailed printer configuration status label. The label can be used to verify printing, assist printer to computer communication configuration, maintenance, troubleshooting, and help us with customer care communications.   |
| *<br>**  | <b>Standard Media Calibration</b> - The printer detects and sets media type and media length, and it adjusts the media sensors for optimal performance with the installed media. The printer will feed one to four labels.<br><i>Note: Users familiar with the Zebra EPL desktop printer use this Feed mode to replace power-up AutoSensing calibration.</i>   |
| *<br>**<br>***   | <b>Serial Port Configuration</b> - <i>Applies only to printers with serial interface ports.</i><br>To reset the communication parameters. Press and release the Feed button while the LED rapidly flashes amber and green.<br>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.                                 |
| *<br>**<br>***<br>****   | <b>Factory Defaults</b> - Resets the printer to the default factory settings and modes. See the configuration label for a list of the primary settings affected by this Feed Mode option. Other settings are exclusively set, viewed and controlled by programming are also reset. The printer then performs a standard media calibration.   |
| *<br>**<br>***<br>****<br>*****  | <b>Print Width Adjustment</b> - Prints a succession 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 that the printer driver and applications can override this setting.   |
| *<br>**<br>***<br>****<br>*****<br>*****   | <b>Print Darkness (Density) Adjustment</b> - 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. Bar code line widths may become distorted reducing readability. Note that the printer driver and applications can override this setting. |
| *<br>**<br>***<br>****<br>*****<br>*****<br>*****  | <b>Manual Media Calibration</b> - 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. 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 <a href="#">Manual Calibration on page 65</a> for more details and considerations.                          |

**If the Feed button remains pressed after a 8-flash sequence, the printer exits the configuration mode when the Feed button is released.**

# A



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## Appendix

This section provides printer interface connection information.

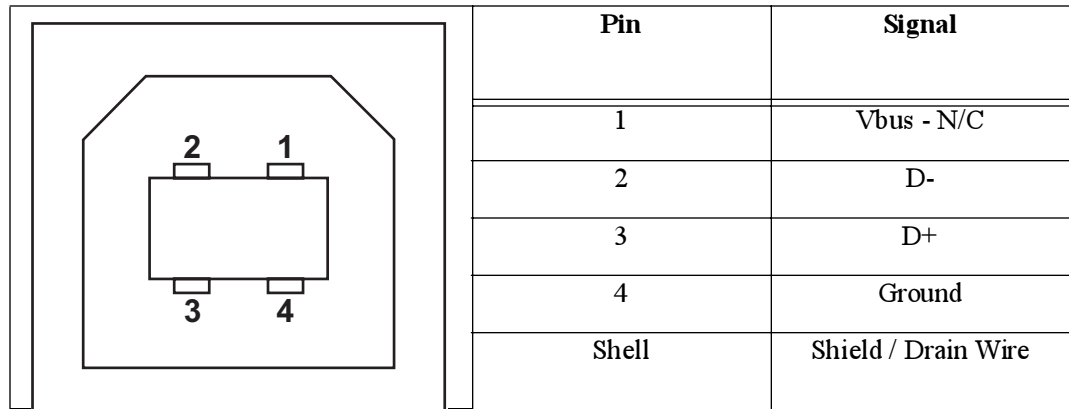
### Contents

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## Universal Serial Bus (USB) Interface

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

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



For printer supported operating systems and drivers, see the software and documentation CD or visit the Zebra printer web site at:

<http://www.zebra.com>

For information on the USB interface, go to the USB web site at:

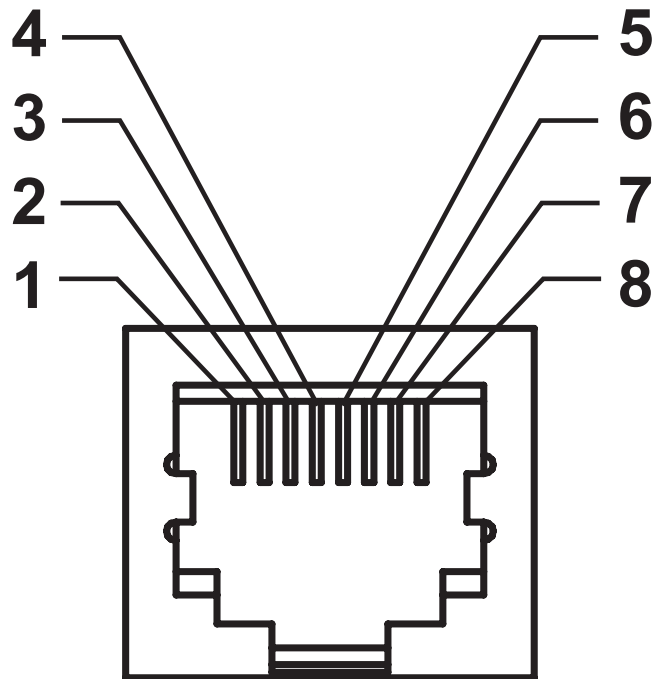
<http://www.usb.org>

## Ethernet Interface

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

The table below provides the cable's pinout assignments.

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



## Serial Port Interface

| 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   |

The maximum current available through the serial and/or parallel port is not to exceed a total of 0.75 Amps.

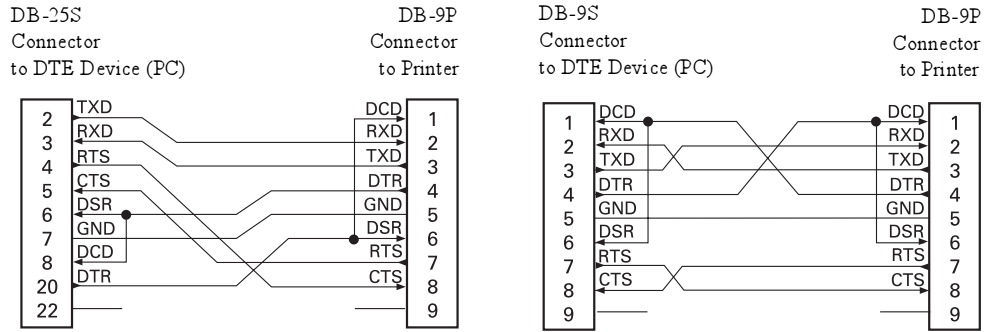
When XON/XOFF handshaking is selected, data flow is controlled by the ASCII control codes DC1 (XON) and DC3 (XOFF). The DTR control lead will have no effect.

**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. Figure 31 shows the required cable connections.

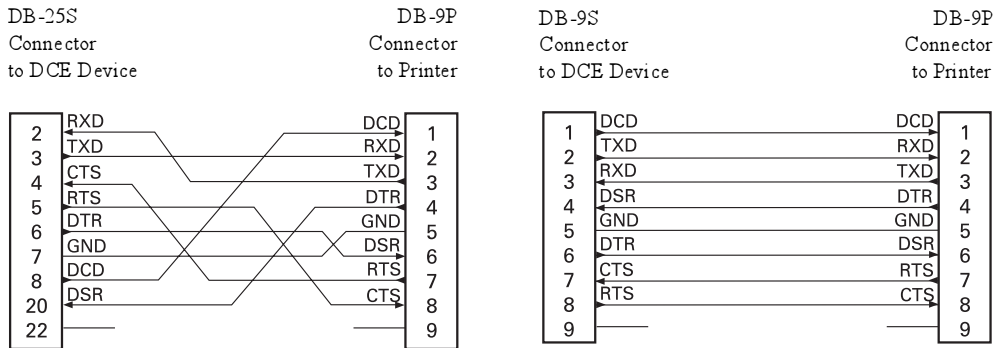
**Interconnecting to DCE Devices** — When the printer is connected via its RS-232 interface to data communication equipment (DCE) such as a modem, a STANDARD RS-232 (straight-through) interface cable must be used. Figure 32 shows the connections required for this cable.

**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.

### Connecting the Printer to a DTE Device



### Connecting the Printer to a DCE Device





**Notes •** \_\_\_\_\_

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