



**Zebra ZP 450™**  
Desktop Thermal Printer

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**User Guide**



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## **Canadian DOC Compliance Statement**

This Class B digital apparatus complies with Canadian ICES-003.  
Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

## FCC Compliance Statement

This device complies with Part 15 rules. Operation is subject to the following two conditions:

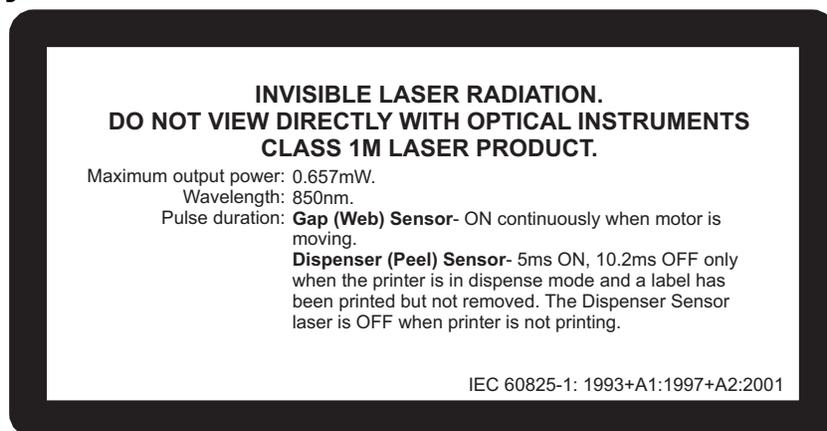
1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

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:

- Reorient or relocate the receiving antenna.
- 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 radio/TV technician for help.

The user is cautioned that any changes or modifications not expressly approved by Zebra Technologies could void the user's authority to operate the equipment. To ensure compliance, this printer must be used with fully shielded communication cables.

## ZP Family 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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# Preface



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

## Contacts

You can contact Zebra Technologies at any of the following:

Visit us at: [www.zebra.com](http://www.zebra.com)

### **Our Mailing Addresses:**

#### **Zebra Technologies Corporation**

333 Corporate Woods Parkway  
Vernon Hills, Illinois 60061.3109 U.S.A  
Telephone: +1 847.793.2600  
Toll-free (USA) +1 800.423.0422  
Fax: +1 847.913.8766

#### **Zebra Technologies Europe Limited**

Zebra House  
The Valley Centre, Gordon Road  
High Wycombe  
Buckinghamshire HP13 6EQ, UK  
Telephone: +44 (0)1494 472872  
Fax: +44 (0)1494 450103

## Support

You can contact Zebra support at:

**Web Address:** [www.zebra.com/SS/service\\_support.htm](http://www.zebra.com/SS/service_support.htm)



**Note** • The web address is case-sensitive.

**US Phone Number** +1 847.913.2259

**UK/International Phone Number** +44 (0) 1494 768289

## Environmental Management



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)

## Document Conventions

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

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

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

```
Ztools
```

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

### Cautions, Important, Note, and Example



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

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**Caution** • Advises you need to wear protective eyewear.

---



**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.



**Tools** • Tells you what tools you need to complete a given task.

## Related Documents

The following documents might be helpful references:

- *ZPL Programming Guide*
- *EPL Programming Guide*



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# Contents



<b>• Preface</b> .....	<b>v</b>
Contacts .....	v
Support .....	vi
Environmental Management .....	vi
Document Conventions .....	vi
Related Documents .....	vii
<b>1 • Introduction</b> .....	<b>1</b>
What's in the Box? .....	2
Inspecting the Printer .....	3
Mini-CD on Printer Storage .....	5
<b>2 • Getting Started</b> .....	<b>7</b>
Modes of Printing .....	7
Attaching Power .....	8
Loading Roll Media .....	9
Preparing Media .....	9
Placing the Roll in the Media Compartment .....	10
Operator Controls .....	12
Printing a Test Label .....	14
Hooking Up the Printer and Computer .....	15
Interface Cable Requirements .....	15
Communicating with the Printer .....	19
Adjusting the Print Width .....	20
Adjusting the Print Quality .....	20
<b>3 • Operations &amp; Options</b> .....	<b>21</b>
Thermal Printing .....	22
Replacing Supplies .....	22

Printing in Dispenser Mode . . . . .	23
Printing on Fan-Fold Media . . . . .	28
ZebraNet® 10/100 Internal Print Server Option . . . . .	29
Printer Network Configuration Status Label . . . . .	30
Liner-less Media Printing . . . . .	31
Sending Files to the Printer . . . . .	32
Transferring files with the Firmware Downloader . . . . .	32
Media Sensing . . . . .	34
<b>4 • Maintenance . . . . .</b>	<b>35</b>
Cleaning . . . . .	35
Printhead Cleaning . . . . .	36
Media Path Cleaning . . . . .	37
Platen Considerations . . . . .	39
Lubrication . . . . .	40
Replacing the Platen . . . . .	41
Replacing the Printhead . . . . .	43
<b>5 • Troubleshooting . . . . .</b>	<b>45</b>
Resolutions . . . . .	45
Print Quality Problems . . . . .	47
Manual Calibration . . . . .	49
Troubleshooting Tests . . . . .	50
Printing a Configuration Label . . . . .	50
Recalibration . . . . .	50
Resetting the Factory Default Values . . . . .	51
Feed Button Modes . . . . .	53
Repackaging the Printer for Return . . . . .	55
<b>6 • Interfaces . . . . .</b>	<b>57</b>
Universal Serial Bus (USB) Connector . . . . .	57
Ethernet Interface . . . . .	58
Serial Port Interface . . . . .	59



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# Introduction

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

## Hello!

Thank you for choosing a Zebra® desktop printer, a high-quality on-demand printer manufactured by the industry leader in quality, service, and value—Zebra Technologies Corporation. For over 25 years, Zebra Technologies Corporation has provided customers with the highest caliber of products and support.

Your printer is a high-quality on-demand printer. The printer provides direct-thermal printing.

This manual provides all of the information you will need to operate your printer on a daily basis. To create label formats, refer to your programming guide. This guide is available by contacting your distributor or dealer.

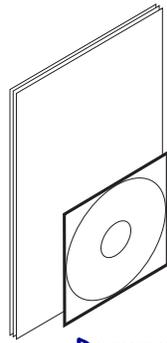
Your printer, when connected to a host computer, functions as a complete system for printing labels and tags.



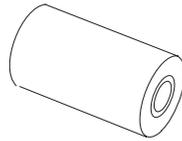
**Note** • Many printer settings may also be controlled by your printer's driver or label preparation software. Refer to the driver or software documentation for more information.

## 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.

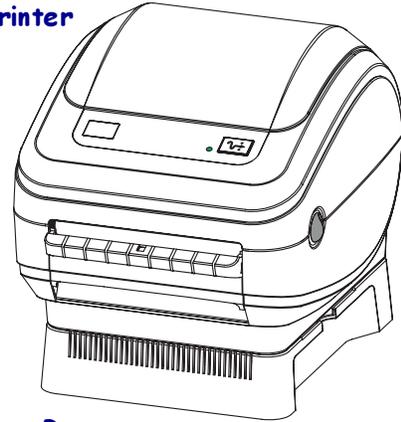


**Documentation  
and Software**

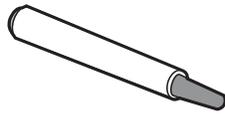


**Sample  
Labels**

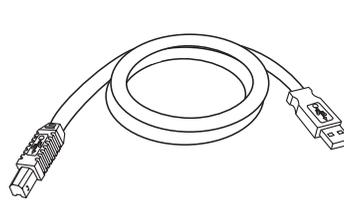
**Printer**



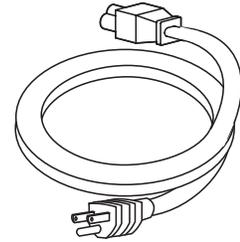
**Power  
Base**



**Cleaning  
Pen**



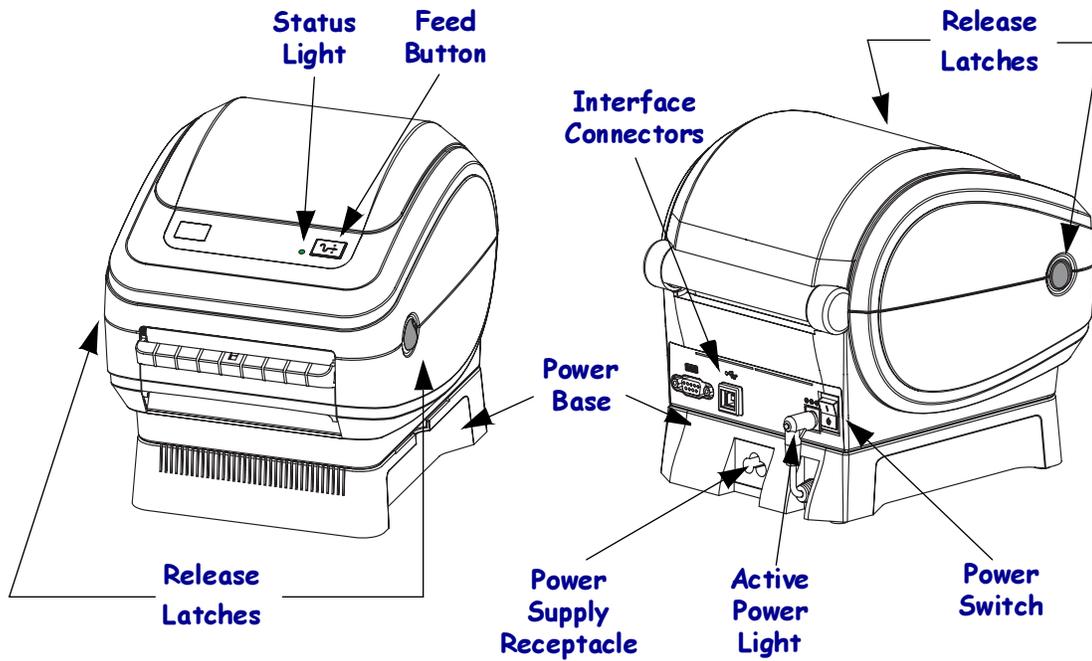
**Interface  
Cable**



**Power  
Cord**

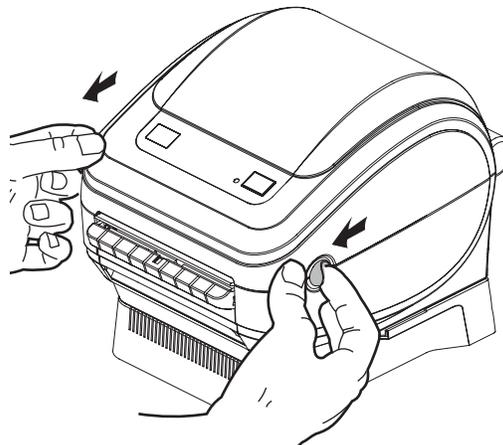
## Inspecting the Printer

Look at the outside of the printer and make sure that all parts are present.



## Opening the printer

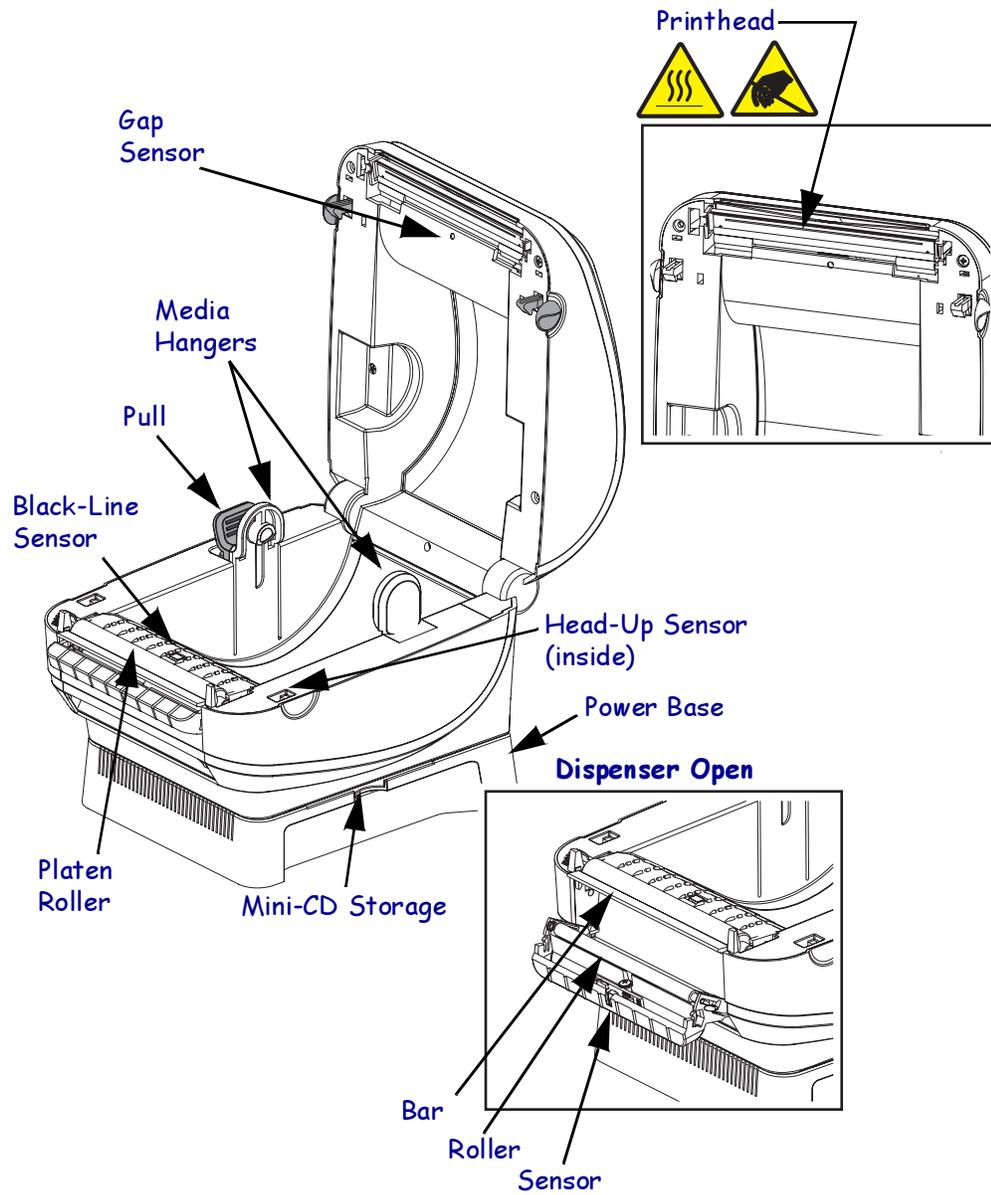
To access the media compartment, you must open the printer. Pull the release latches towards you and lift the cover.



## 4 | Introduction

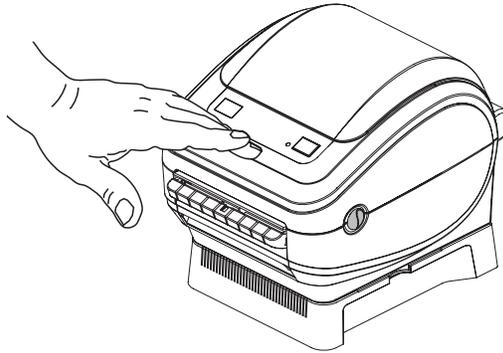
### Inspecting the Printer

After opening the printer, check the media compartment.

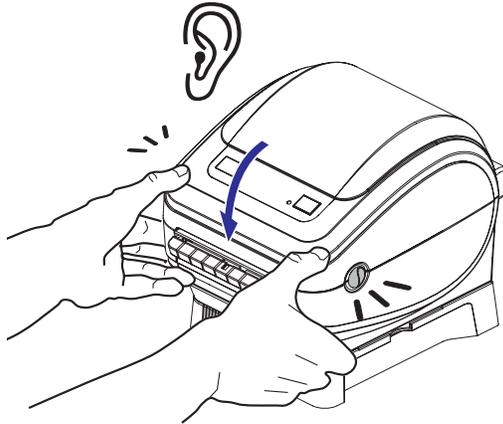


## Closing the printer

1. Lower the top cover.



2. Press down until the cover snaps closed.



## Reporting Damage

If you discover damage or missing parts:

- Immediately notify and file a shipping damage report.
- Keep the carton and all packing material for inspection.

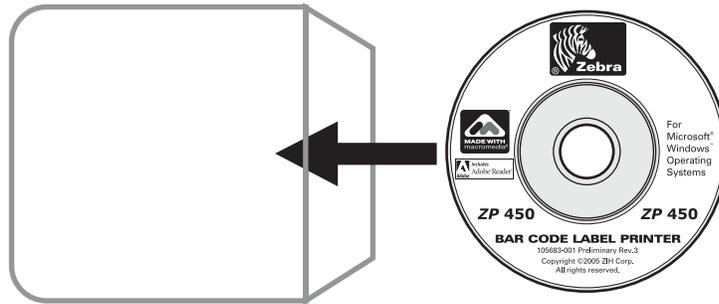
## Mini-CD on Printer Storage

The printer has a mini-CD storage slot molded between the printer and its power base. Please keep the mini-CD there for quick access to maintenance, troubleshooting, printer usage animations, media, contact information and more.

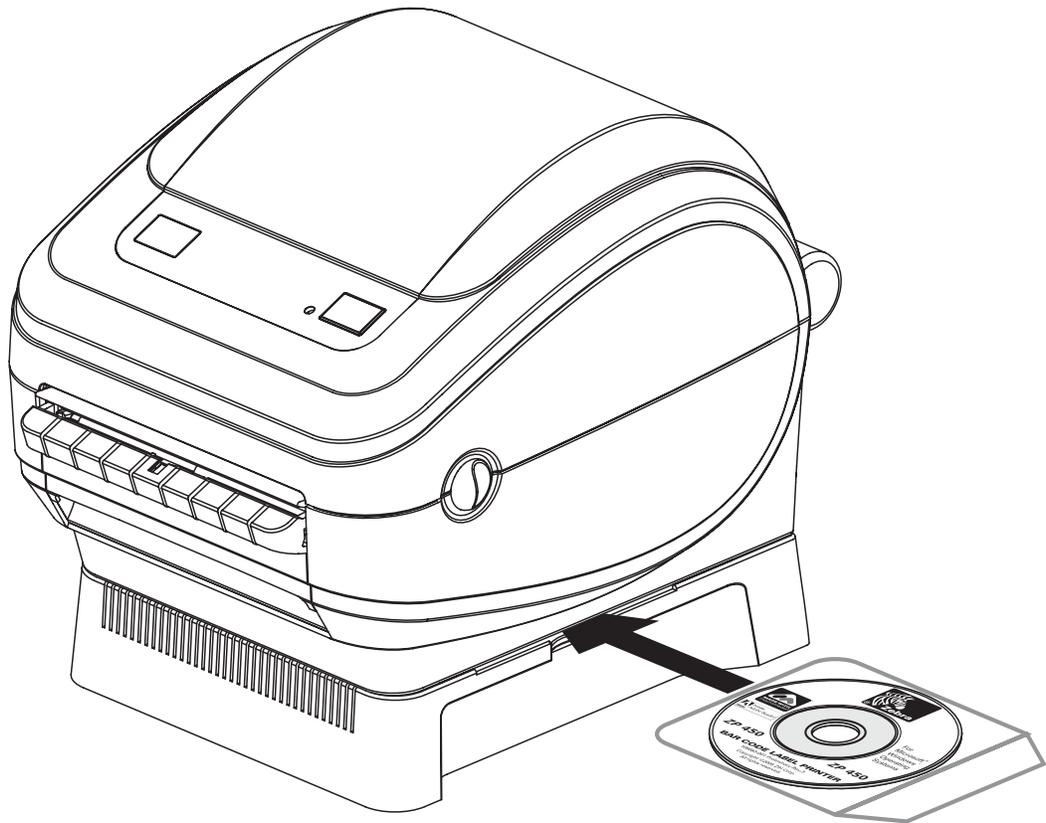
## 6 | Introduction

### Inspecting the Printer

1. Always place the mini-CD in its plastic sleeve to protect the mini-CD from damage.



2. Slide the plastic sleeve with the mini-CD inside, into the printer.





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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 in tear-off mode.

## Modes of Printing

You can operate this printer in different modes:

- Standard tear-off mode allows you to tear off each label (or a strip of labels) after it is printed.
- Dispense mode will peel the backing material away from the label as it is printed. After this label is removed, the next one is printed. The printer typically uses roll media, but you can use fan-fold or other continuous media as well.

For procedures to use optional equipment and features, refer to [Operations & Options](#) on page 21.

## Attaching Power

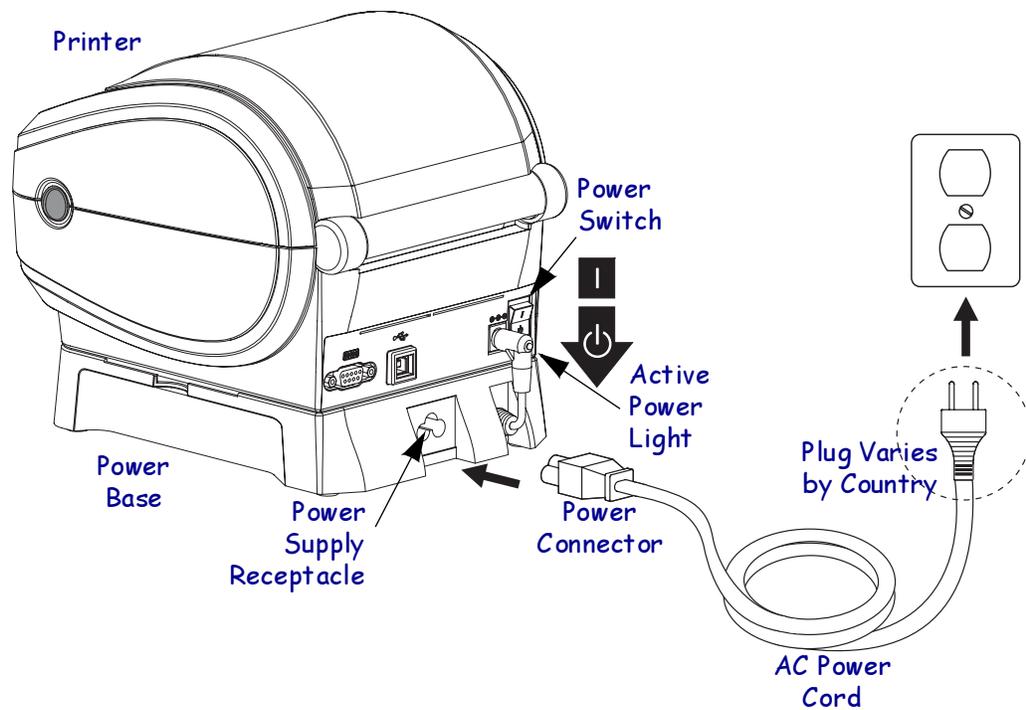


**Important** • Set up your printer so that you can handle the power cord easily if needed. To make certain the printer cannot carry electrical current, you must separate the power cord from the power supply receptacle or AC electrical outlet.



**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 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.



## Loading Roll Media

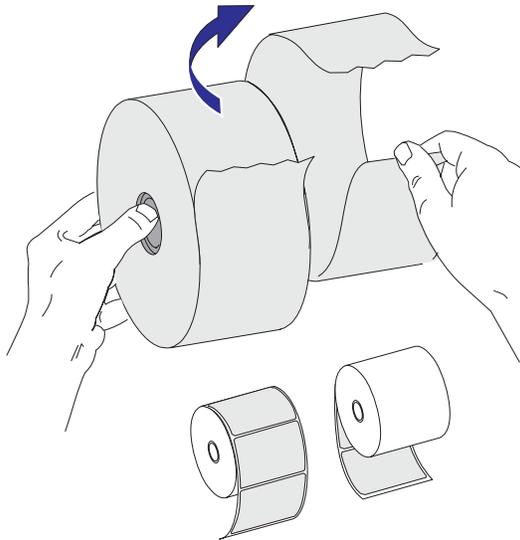
When you load media, you must place the roll on the media hangers.

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

## Preparing Media

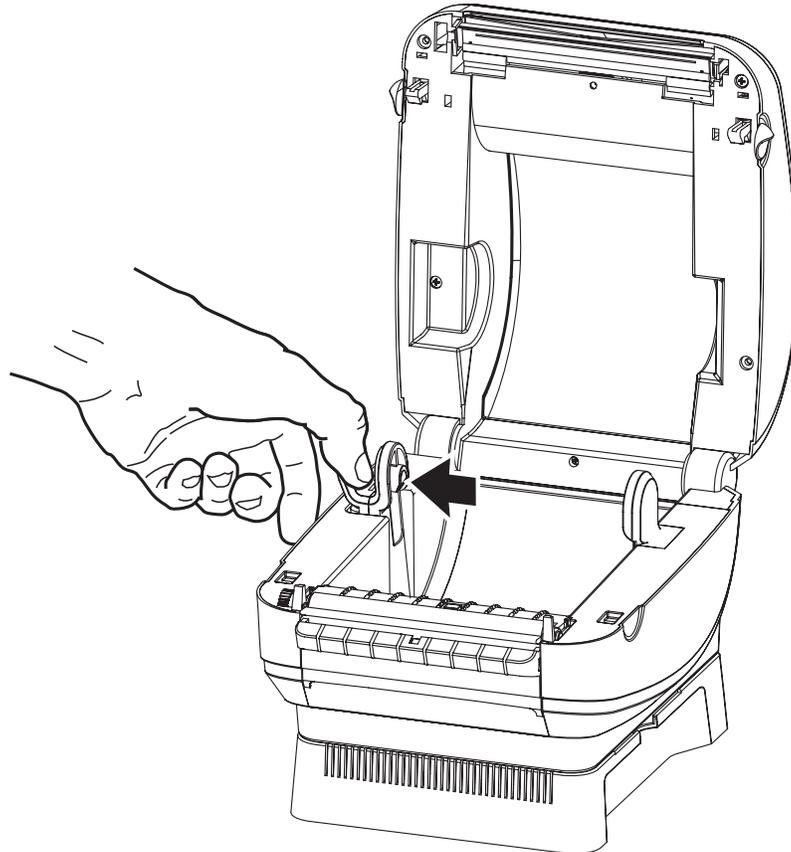
Whether your roll media is inside or outside wound you load it into the printer the same way.

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



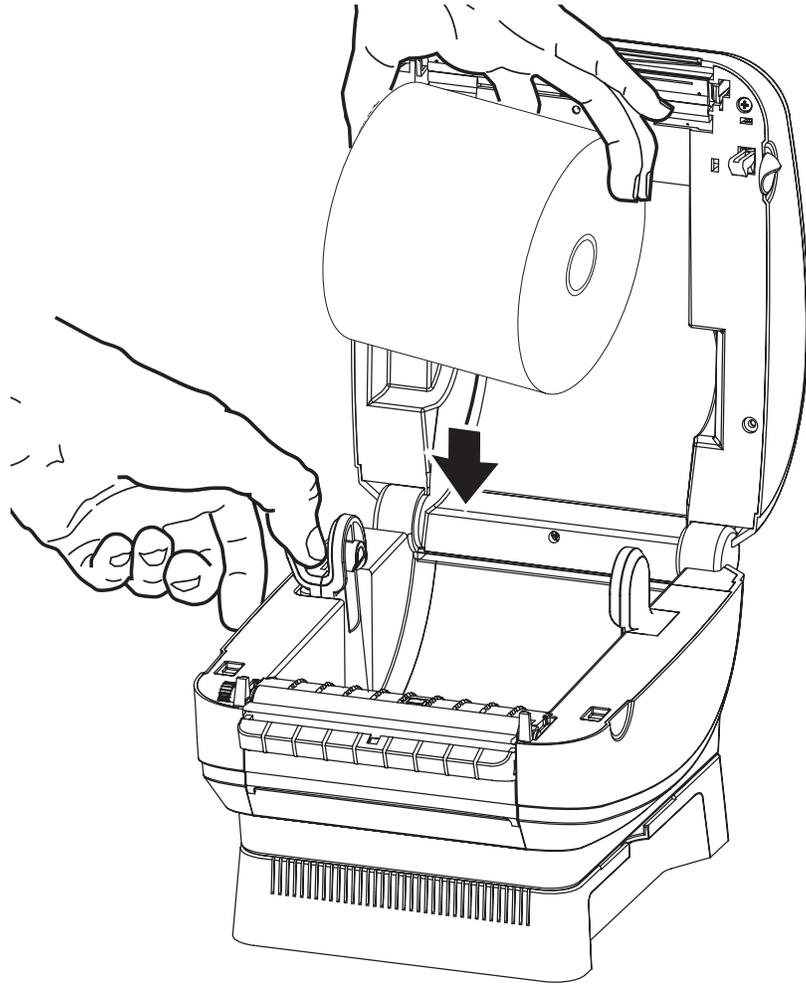
## Placing the Roll in the Media Compartment

1. Open the printer. Remember that you need to pull the release levers toward the front of the printer.
2. Pull the left media hanger to the side.

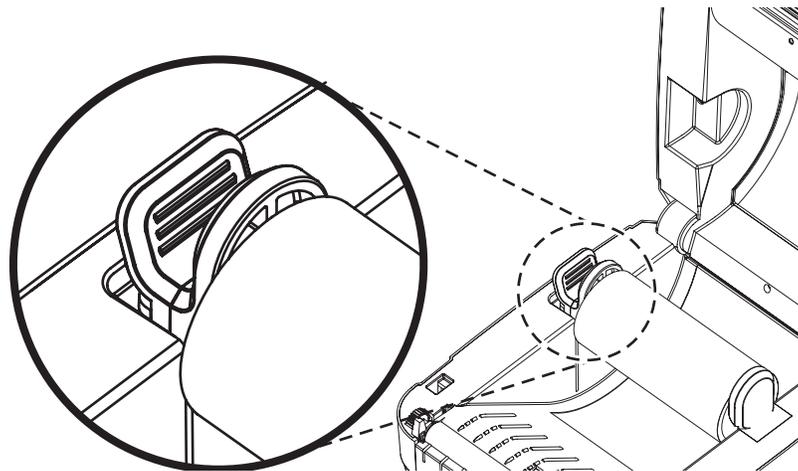


3. Orient the media roll so that its printing surface will be up as it passes over the platen.

4. Lower the roll between the hangers and release the left hanger onto the core.



5. Verify the core rests on the hangers and the roll turns freely. The roll must not sit in the bottom of the media compartment.



## Operator Controls

### Power Switch

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



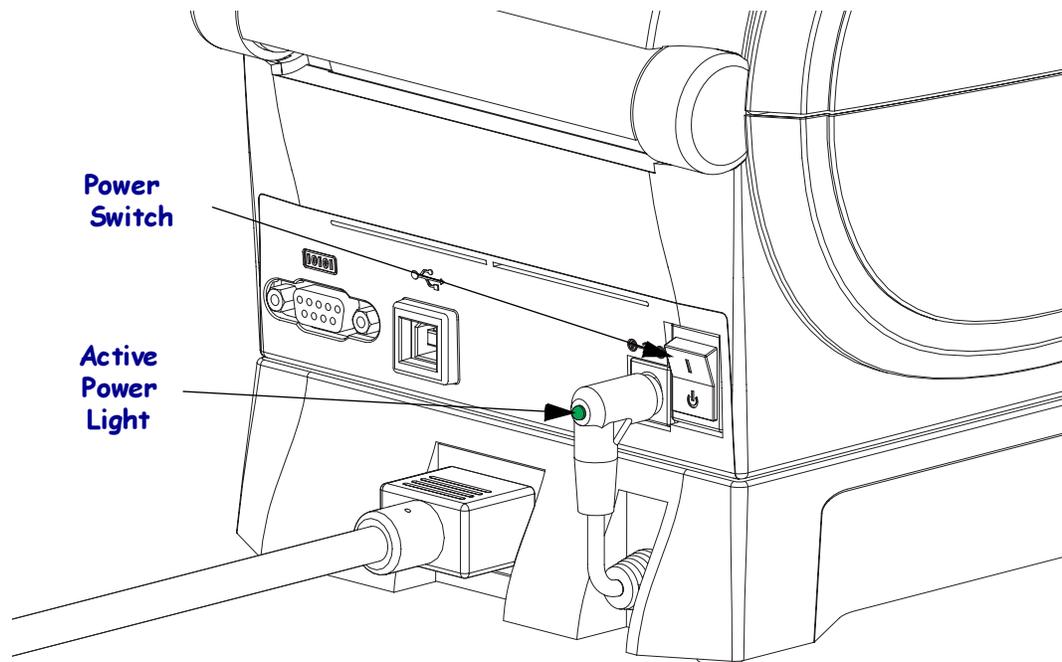
**Important** • To make certain the printer cannot carry electrical current, you must separate the power cord from the power supply receptacle or AC electrical outlet. Set up your printer so that you can handle the power cord easily if needed.



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

### Active Power Light

Located at the rear of the printer, the active power light indicates that electrical power is energizing the printer.

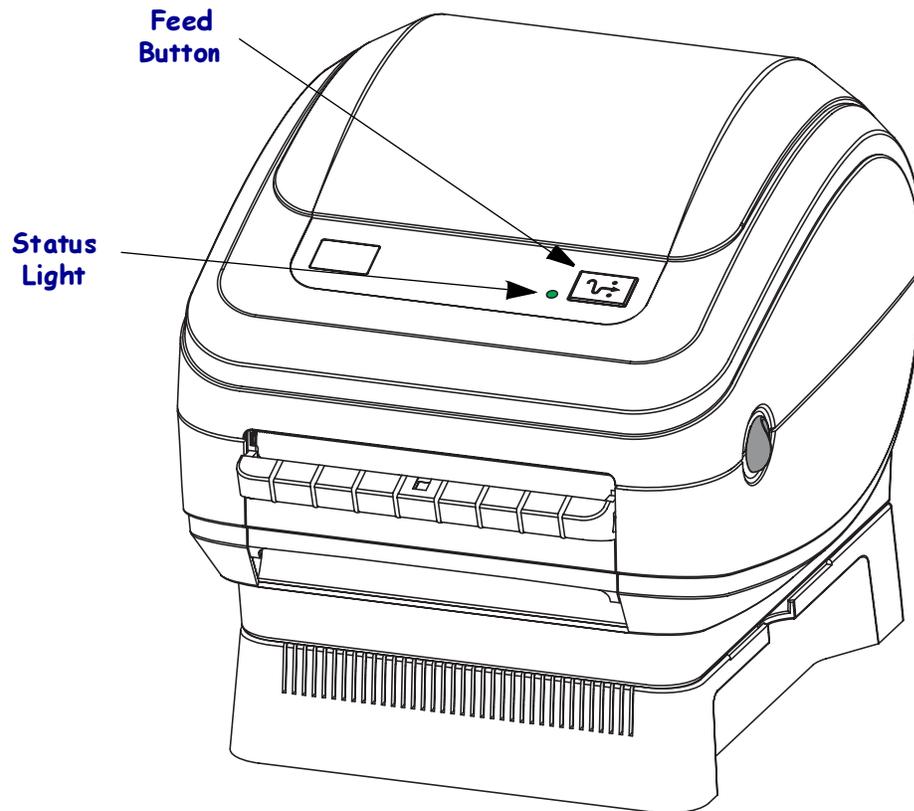


## Feed Button

- 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 45](#) in the Troubleshooting chapter.
- Use the Feed button for printer setup and status (see [Feed Button Modes on page 53](#) 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 45](#) in the Troubleshooting chapter).



## Printing a Test 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 *What the Status Light is Telling You on page 45* 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. Release the Feed button. A configuration label will print. If you cannot get this label to print, refer to *Getting Started on page 7*.

PRINTER CONFIGURATION	
Zebra Technologies UPS ZP 450-200dpi	
15.0.....	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
1245.....	LABEL LENGTH
13.0IN 329MM.....	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
CALIBRATION.....	MEDIA POWER UP
FEED.....	HEAD CLOSE
DEFAULT.....	BACKFEED
+000.....	LABEL TOP
+0000.....	LEFT POSITION
NO.....	HEXDUMP
032.....	WEB S.
096.....	MEDIA S.
013.....	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
8.879 IN.....	LAST CLEANED
20,016 IN.....	HEAD USAGE
20,017 IN.....	TOTAL USAGE
20,016 IN.....	RESET CNTR1
20,016 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

Your printer will have a combination of interfaces: USB and Serial or USB and Ethernet.



**Caution** • Keep the power switch in the OFF position when attaching the interface cable. The power cord must be inserted into the power base on the back of the printer before connecting or disconnecting the communications cables.



**Important** • This printer complies with FCC “Rules and Regulations,” Part 15, for Class B Equipment, using fully shielded data cables. Use of unshielded 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.

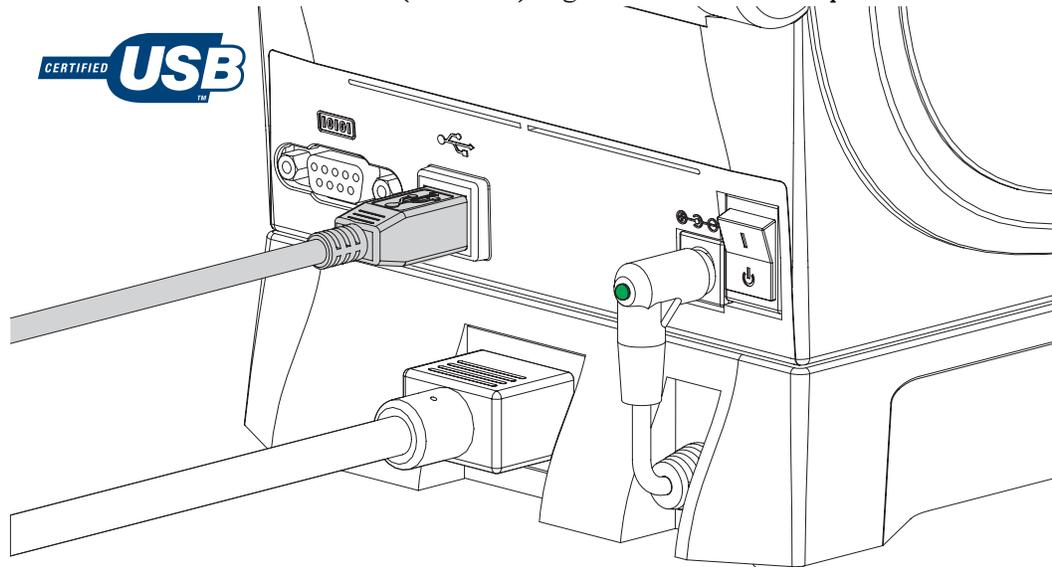
To minimize electrical noise pickup in the cable:

- Keep data cables as short as possible (6' [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 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.

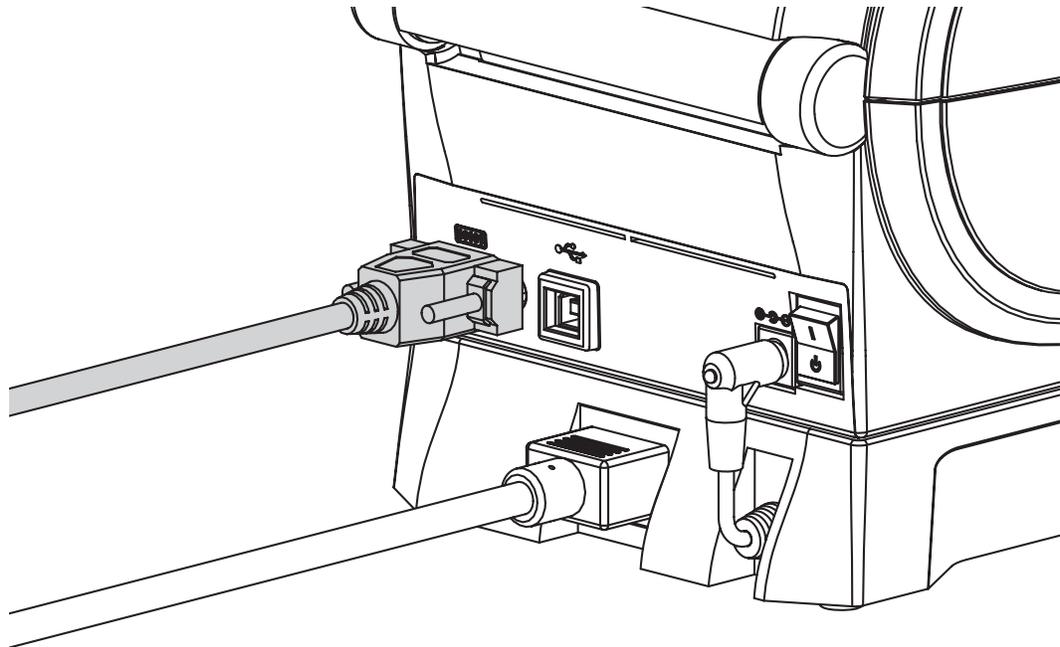
Refer to the *EPL Page Mode Programming Guide* for more information about this command.

## 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.

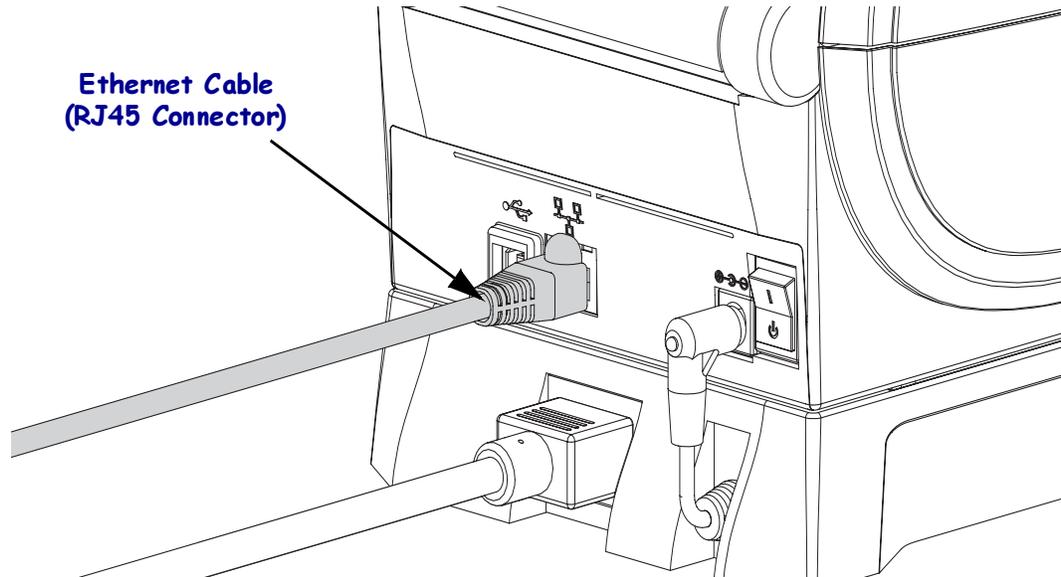
**Note** • Early models of Zebra printers running the EPL programming language had 9600 baud, NO parity, 8 data bits, 1 stop bit and a **HARDWARE** and **SOFTWARE** (merged) data control (essentially DTR/Xon/Xoff) as the default serial port settings. The Windows operating system flow control setting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



## Ethernet

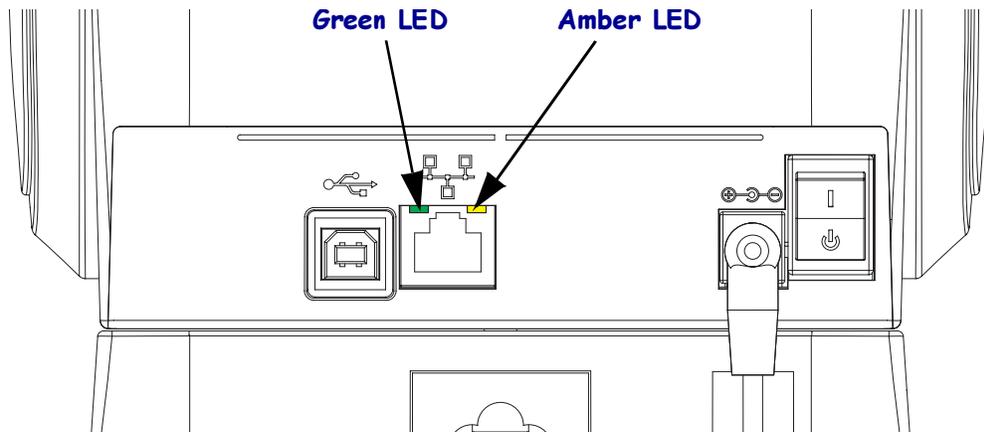
The printer requires UTP RJ45 Ethernet cable rated CAT-5 or better.

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



## Communicating with the Printer

### Universal Serial Bus (USB) Communications

The printer is a terminal device when using a universal serial bus interface. You can refer to the Universal Serial Bus Specification for details regarding this interface.

### USB Printer Detection and Windows® operating systems.

Windows 98 Second Edition, Windows 2000 and Windows XP and later operating systems support the USB communications with printers. The Zebra Windows Driver supports your printer in these operating systems.

These operating systems automatically detect the printer when connected via the USB interface. The operating system automatically starts a “Add new hardware” wizard when connecting the printer for the first time to the PC. Close the wizard. Install the Zebra Windows Driver found on the user’s CD. Select the USB port and media size (closest match). Click on the ‘Print test page’ button to verify a successful installation.

The Windows operating system will detect and relink a previously installed printer if it is reconnected to the USB interface or power is turned on after the PC has finished its restart of the operating system. Ignore the new device detected warnings and close the Task bar prompts. Wait several seconds for the operating system to match the printer to the driver software. The warnings will quit and the printer now should be ready to begin printing.

### Serial Port and Windows® operating systems

The Windows operating system default settings for the serial port communication closely match the printer’s default settings with one exception; the data *Flow Control* settings. The Windows default data *Flow Control* setting is NONE. The printer requires data *Flow Control* set to **Hardware**.



**Note** • The printer does not support Windows Serial Port Plug and Play (PnP) device detection at this time.

## 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 53.
- 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 of the printhead, the speed of the media and the type of media you are using. Only by experimenting will you find the optimal mix for your application.

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

- The six-flash sequence in *Feed Button Modes* on page 53. 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.
- The Print Rate (^PR) command (consult your *ZPL Programming Guide*).

The Speed Select (S) command (consult your *EPL Programmer's Guide*).



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# Operations & Options

This section helps you get the most from your printer.

You must use programming to control many of the printer's functions.



**Example** • The `~JL` command controls label length.

The `^XA^JUS^XZ` command saves the new settings to flash memory.

For detailed information about creating labels using ZPL, refer to the *ZPL Programming Guide* or visit our web site at [www.zebra.com](http://www.zebra.com).

To improve print quality, changing both print speed and density may be required to achieve the desired results. Your application's printer driver provides control of the speed and heat (density).

## 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. Use only the cleaning pen to perform 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.

---

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

## Replacing Supplies

If labels run out while printing, leave the printer power on while reloading (data loss results if you turn off the printer).

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. Approved supplies can be ordered from your dealer.

## Printing in Dispenser Mode

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.

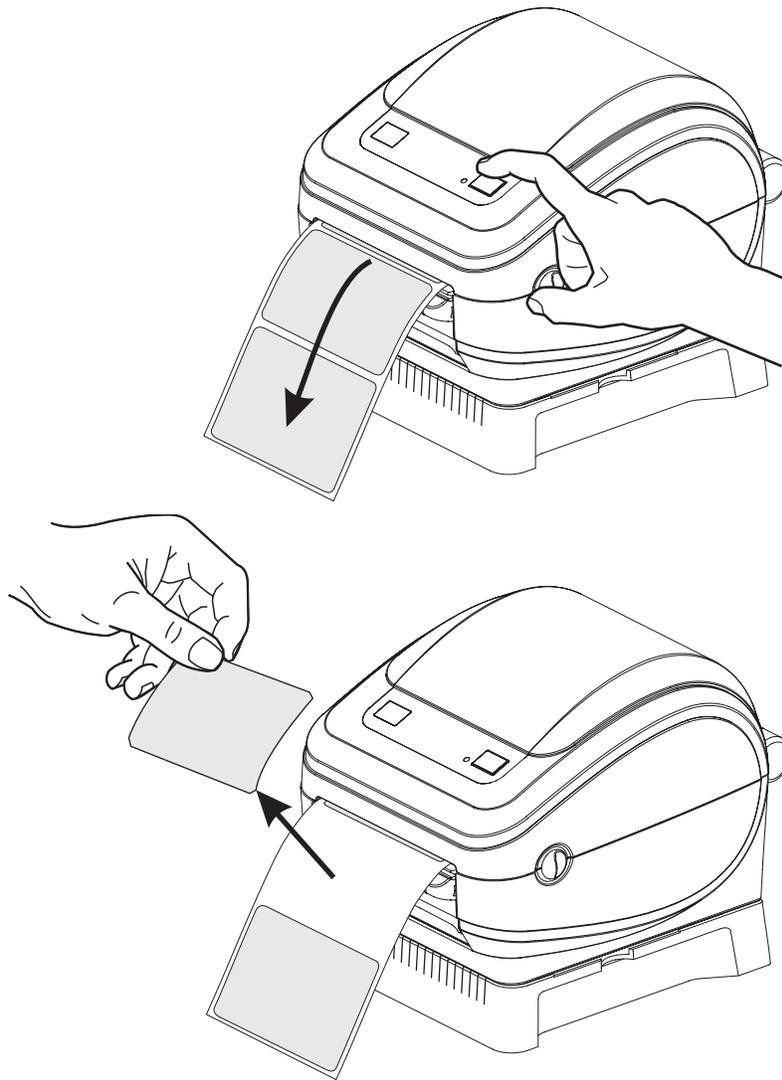
To use dispenser-mode correctly, use your printer driver to activate the label (taken) sensor along with these typical label settings which include but are not limited to length, non-continuous (gap), and web (liner). Otherwise, you must send the ZPL or EPL programming commands to the printer.

**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.

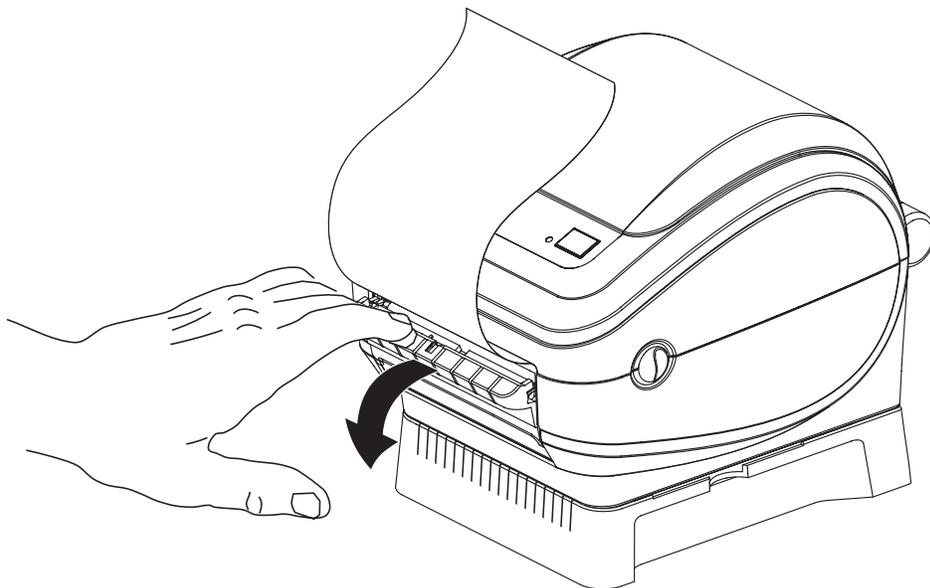
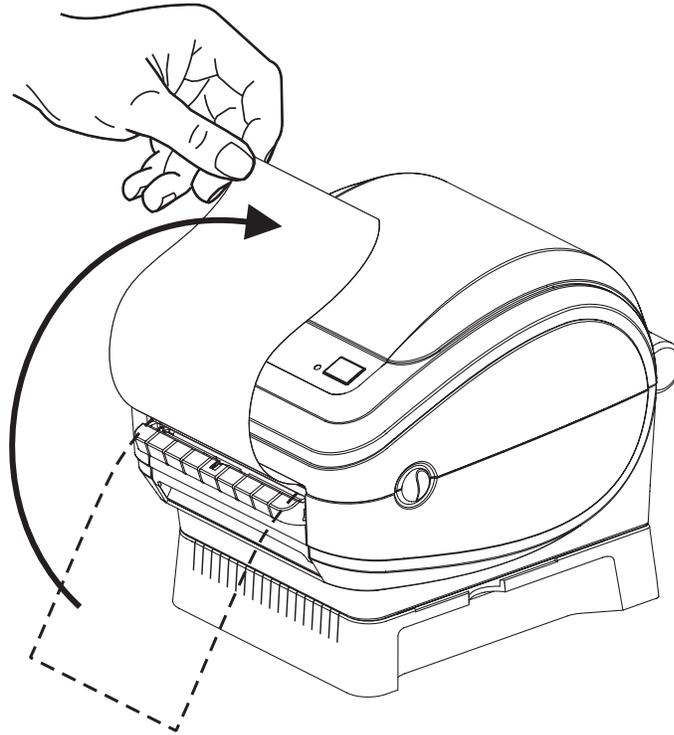
```
^XA ^MMP ^XZ  
^XA ^JUS ^XZ
```

**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.

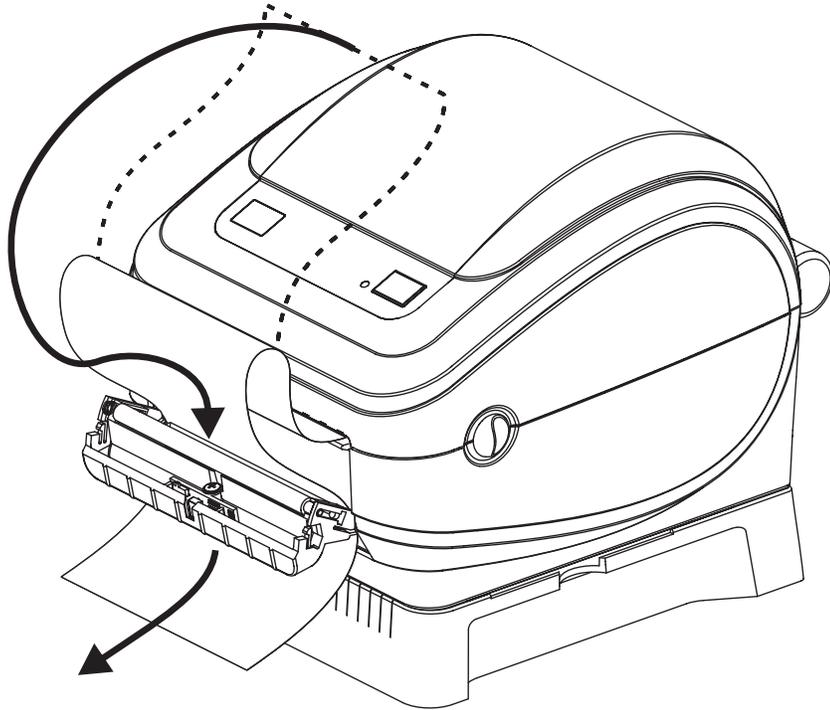
1. Load your labels into the printer. Close the printer and press the feed button until a minimum of 4 inches or 100 millimeters of exposed labels exit the printer. Remove the exposed labels from the liner.



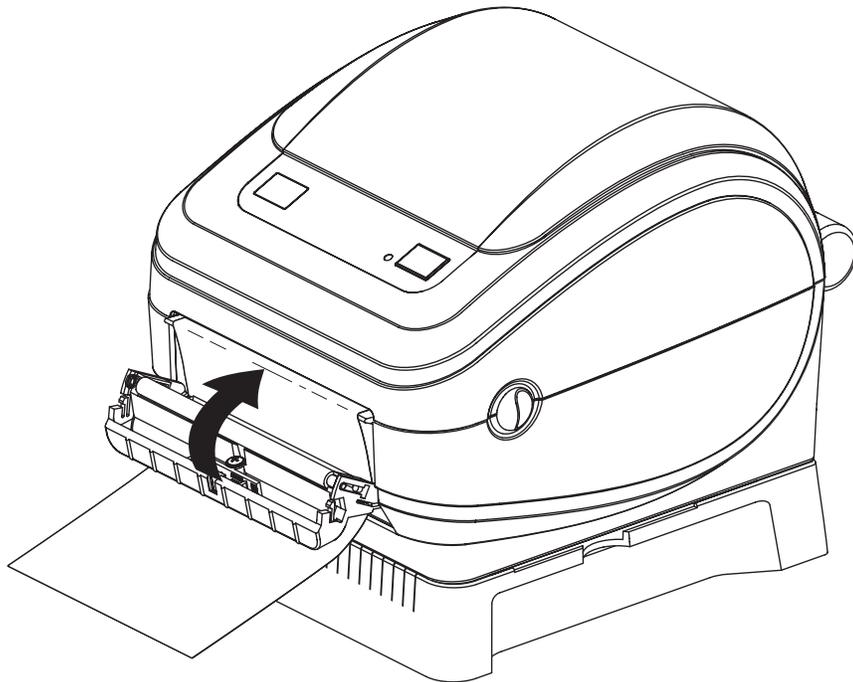
2. Lift the liner over the top of the printer and open the dispenser door.



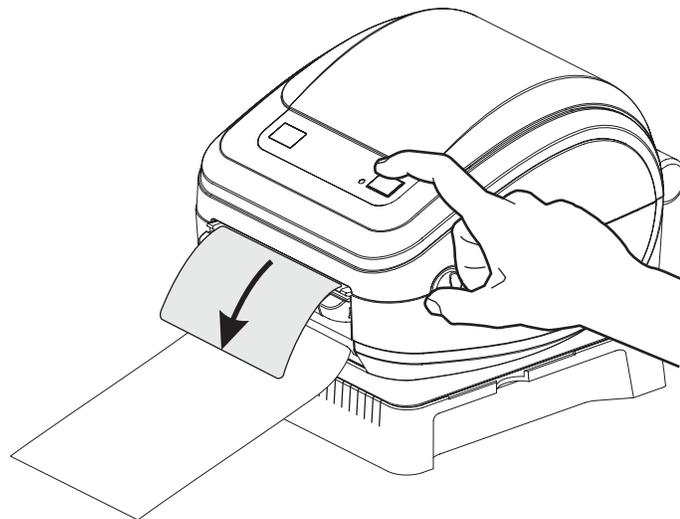
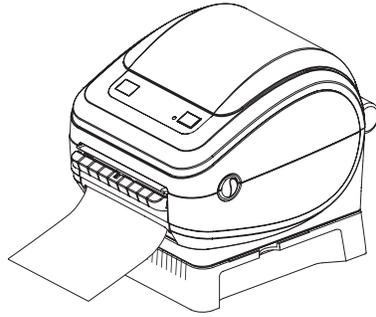
3. Insert the label liner between the dispenser door and the printer body.



4. Close the dispenser door.



5. Press the Feed button to advance the media.

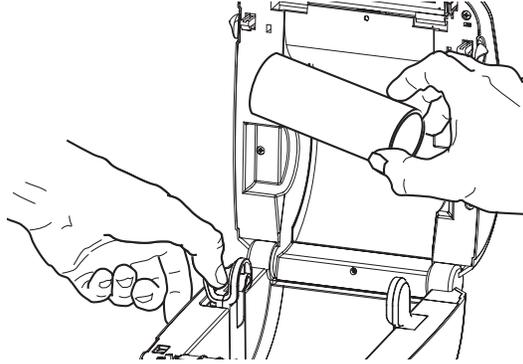


6. Set the label (taken) sensor to detect removed labels. This is set by the Windows printer driver (a configuration setting), your application software or via the printer's EPL or ZPL programming languages.
7. During the print job, the printer will peel off the backing and present a single label. Take the label from the printer to allow the printer to print the next label. Note: If you skipped step six, the printer will stack and eject peeled labels.

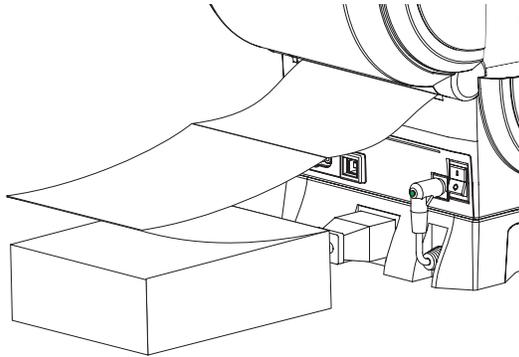
## Printing on Fan-Fold Media

Printing on fan-fold media requires you to prepare the media hangers.

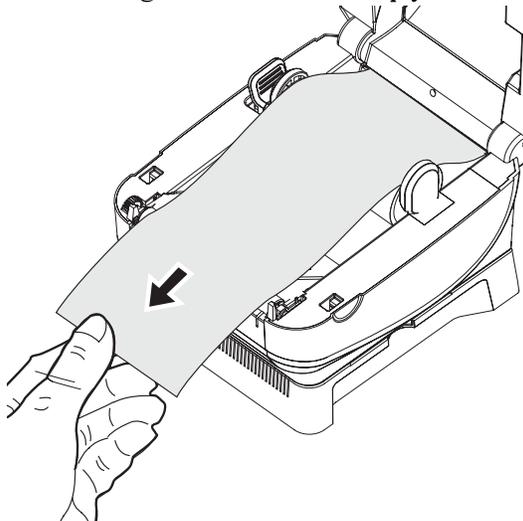
1. Open the top cover.
2. Place an empty core between the media hangers.



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



4. Run the media between the hangers and above the empty core.



5. Close the top cover.

## 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

ZP-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.

Network Configuration	
Zebra Technologies UPS ZP 450-200dpi	
Internal Wired	
ALL.....	IP PROTOCOL
000.000.000.000....	IP ADDRESS
255.255.255.000....	SUBNET MASK
000.000.000.000....	DEFLT. GATEWAY
000.000.000.000....	WINS SERVER IP
YES.....	TIMEOUT CHECKING
300.....	TIMEOUT VALUE
000.....	ARP INTERVAL
9100.....	BASE RAW PORT
00:07:4d:2b:4e:69..	MAC ADDRESS

FIRMWARE IN THIS PRINTER IS COPYRIGHTED

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

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

## Liner-less Media Printing

The ZP-Series printer includes a liner-less media printing option. The liner-less media printer includes a non-stick platen (drive) roller. The liner-less platen roller has a sponge-like wavy surface with a thin layer on the outer surface impregnated with silicon. The silicon is continuously squeezed out of the roller when printing and feeding media. When the printer is paired with specially formulated, Zebra approved liner-less media; the operator can print, tear-off and apply labeling without removing any label backing or liner.

The specially formulated Zebra approved liner-less media has a printing surface that does not allow the specially formulated acrylic adhesive stick to media (or the liner-less platen roller). Only use Zebra approved liner-less media with liner-less printers.



**Note • Keep a spare liner-less platen available.** The liner-less platen has a limited life. The thin layer of silicon is eventually squeezed out of the liner-less platen with use and will begin jamming media.

The liner-less platen is normally self cleaning. Foreign materials, dust and adhesive will be removed by the media's adhesive backing.

Cleaning a liner-less platen shortens or ends the platen's usable life.

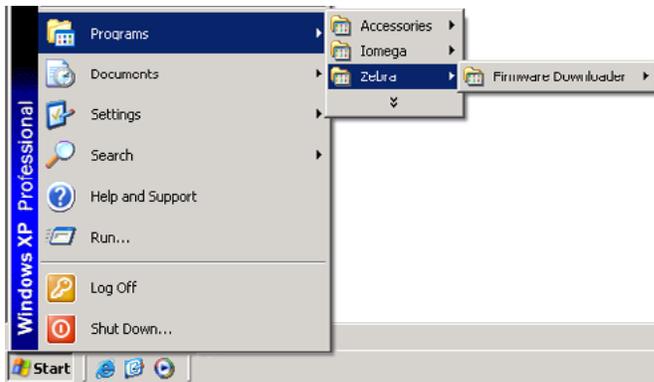
See *Platen Considerations* on page 39 for more information on your printer's platen and maintenance.

## Sending Files to the Printer

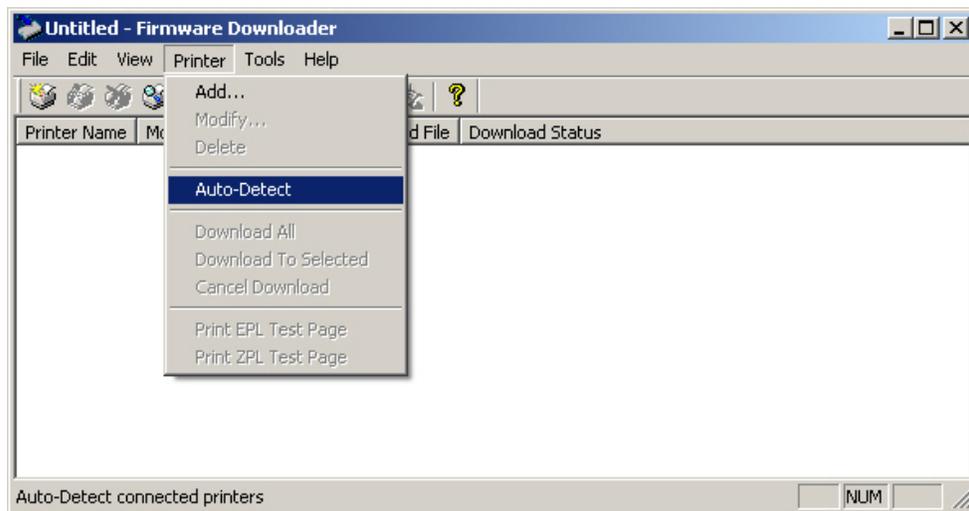
Files can be sent to the printer from the Microsoft Windows operating systems by using the Zebra Firmware (and File) Downloader found on the user's CD or at [www.zebra.com](http://www.zebra.com). This method is common for both programming languages, all wired interfaces (including USB) and wired network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

### Transferring files with the Firmware Downloader

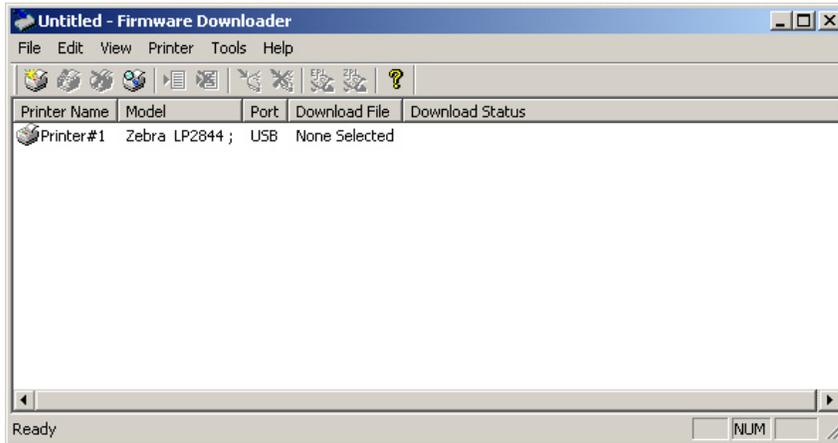
1. Install the printer. Verify communication is working properly by using the drivers **Print Test Page** located on the printer driver properties window.
2. Install the Zebra Firmware Downloader on your system.
3. Find the Firmware Downloader by selecting **start > Programs > Zebra**.



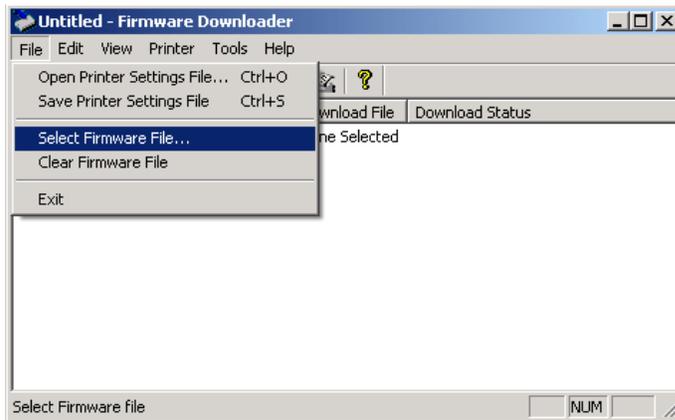
4. Select the **Printer** menu and run the **Auto-Detect**.



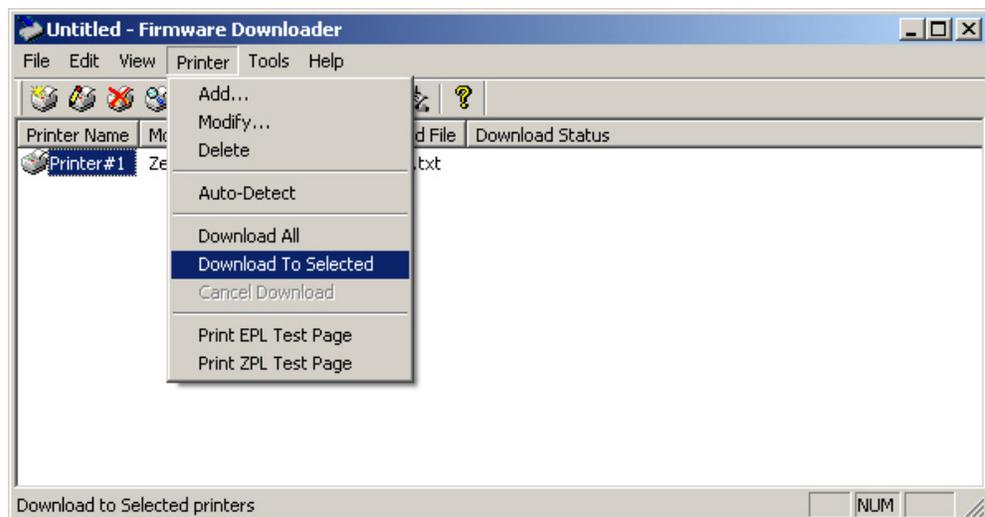
- Click on your Zebra printer to select the printer for download.



- 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.



## Media Sensing

The 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 ZP-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 ZP 450 printer's default maximum label length distance of 13 inches, 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 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 ZPL default distance of 39 inches down to 12 inches. Your printer has a default distance of 13 inches

If the printer has difficulty automatically detecting the media type and auto-calibrating, see [Manual Calibration on page 49](#) 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 53](#) 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.



# Maintenance

## 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	Set of 12	Clean printhead
Cleaning swabs	Set of 25	Clean media path, guides and sensors

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 from end to end.	When using direct thermal: after every roll of media.
Platen roller	See “Platen Considerations” in the Maintenance chapter. Manually rotate the platen roller. Clean it thoroughly with 90% medical-grade alcohol and a fiber-free cleaning swab (such as a alcohol filled Texpad swab or alcohol moistened lint-free cloth).	As needed.
Peel bar	Clean it thoroughly with cleaning swab (such as a alcohol filled Texpad swab or alcohol moistened lint-free cloth). Let alcohol dissipate and the printer dry completely.	
Media path		
Exterior	Water-dampened cloth.	
Interior	Gently brush out printer.	



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**Caution** • Adhesives and coatings of media 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.

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**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.

## Printhead Cleaning

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



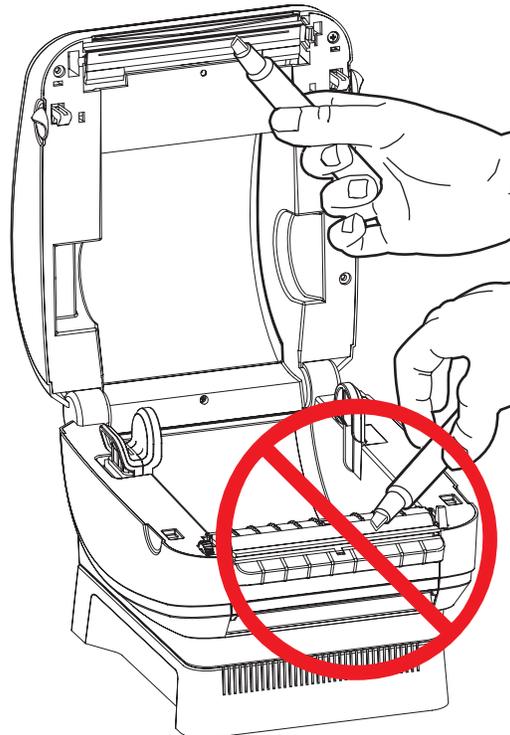
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**Caution** • The printhead becomes hot while printing. To protect from damaging the printhead and risk of personal injury, avoid touching the printhead. Use only the cleaning pen to perform maintenance.

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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.

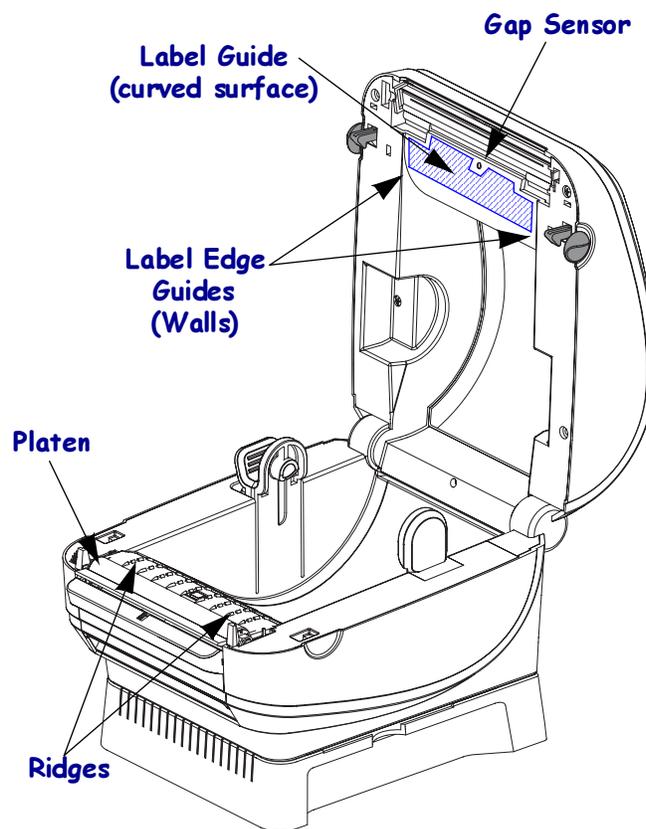


## Media Path Cleaning

Use a cleaning swab (such as a Texpad swab or alcohol moistened lint-free cloth) to remove debris, dust or crust that has built-up on the holders, guides and media path surfaces. Do not touch or clean the printhead with the same cleaning swab or cloth.

1. Use the alcohol in the cleaning swab (or cloth) to soak the debris so that it breaks up.
2. Wipe the ridges to remove accumulated debris.
3. Wipe the inside edges of both label edge guide walls to remove any built-up residue.
4. Wipe the label guide's curved surface to remove accumulated debris. Do not wipe debris or alcohol into the gap sensor. Tamp the gap sensor with a dry swab to remove any excess alcohol that may get onto the sensor.
5. Wait one minute to dry before closing the printer.

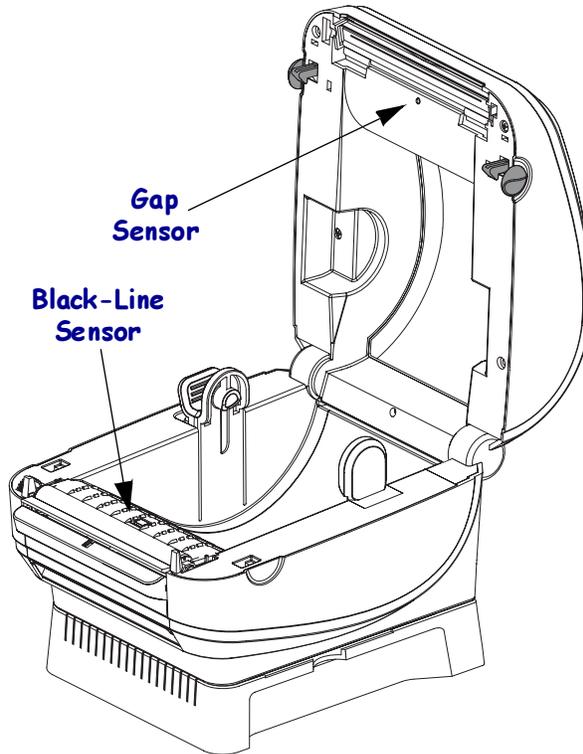
Discard the cleaning swab or cloth after use.



## Sensor Cleaning

Dust can accumulate on the media sensors.

1. Gently blow away dust; if necessary, use a dry swab to brush away dust. If adhesives or other contaminants remain, use an alcohol moistened cleaning swab (such as a Texpad swab) to break up the foreign material.
2. Use a dry swab several times to remove any residue that may be left from the first cleaning.



## Platen Considerations

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 when printing. Adhesive, dirt, general dust, oils and other contaminants should be cleaned immediately off the platen.

Clean the standard 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.

Cleaning the liner-less platen removes the outer layer of silicon. If contaminants other than adhesive and paper dust are on your platen, you may need to clean your platen. This will shorten your platen's usable life.

**Reminder** - *Always clean the printhead before installing a new media roll to help prevent adhesive buildup on the printhead and adhesive transfer to the platen. Adhesive buildup on the printhead should always be cleaned from the middle of the printhead to the outside. Any adhesive residue will be moved outside of the media feed and print area. Discard the cleaning pen after each cleaning to keep diluted adhesive from building up on the pen and transferring to the printhead surface. This is the most common cause of media feed (jamming, slippage and stalls) and print quality issues.*

### Standard Media Platen Cleaning

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 media door and remove the media.
2. Remove the platen from the printer (see [Replacing the Platen on page 41](#)).
3. Clean the platen surface with the alcohol moistened swab. Rotate the platen while swabbing. Repeat this process two to three times with a new swab to remove residual contaminants. Adhesives and oils, for example, may be thinned by the initial cleaning but not completely removed.
4. Install the platen in the printer (see [Replacing the Platen on page 41](#)).
5. Discard the cleaning swab after use.

Allow the printer to dry for one minute before loading labels.

### Liner-less Platen Cleaning

Normal Cleaning: If the liner-less platen roll has adhesive or paper dust build-up at the edges of the media path, use the following procedure to remove the material. Do not use this procedure to remove foreign contaminants (oils, dirt, etc.), see the Foreign Contaminates Cleaning procedure.

1. Open the printer and remove the liner-less media.
2. Remove the platen roller. Use the platen replacement procedure.

3. Remove several inches of new liner-less media from the roll.
4. Gently tamp the adhesive and paper dust off of the platen roller with the adhesive side of the liner-less media.
5. Clean the printhead. Use the printhead cleaning procedure. Remember to clean the adhesive buildup on the head from the middle of the printhead to the outside.
6. Replace the platen roller.
7. Load the media. Let it extend out of the printer. Press the Feed button to verify that it is operating correctly. Remove excess media.

**Liner-less Platen Foreign Contaminates Cleaning:** *This is an stop gap procedure only to remove foreign contaminants (oils, dirt) from the liner-less platen that can damage the printhead or other printer components. This procedure will shorten or even exhaust the platen's useable life!*

The liner-less 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 printer and remove the liner-less media.
2. Liner-less platen rollers can damage easily. Gently swab the platen surface with the alcohol moistened swab to clean. Rotate the platen or remove the platen while swabbing. Repeat this process two to three times with a new swab to remove residual contaminants. Adhesives and oils, for example, may be thinned by the initial cleaning but not completely removed.
3. Discard the used cleaning swabs.
4. Allow the printer to dry for one minute before loading media. Load the liner-less media roll. Let it extend out of the printer.
5. All of the non-stick coating was removed from the surface by cleaning. Feed a meter (39 inches) or more of media while gently pulling the media. This keeps the media from wrapping around the platen roller and jamming in the printer. Feeding media causes the roller to leach more silicon to the surface.

Note: If the liner-less media continues to jam after cleaning and feeding 1 to 2 meters (3 to 5 feet) of media, replace the liner-less platen.

## Lubrication



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**Caution** • No lubricating agents of any kind should be used on this printer. Some commercially available lubricants, if used, will damage the finish and the mechanical parts inside the printer.

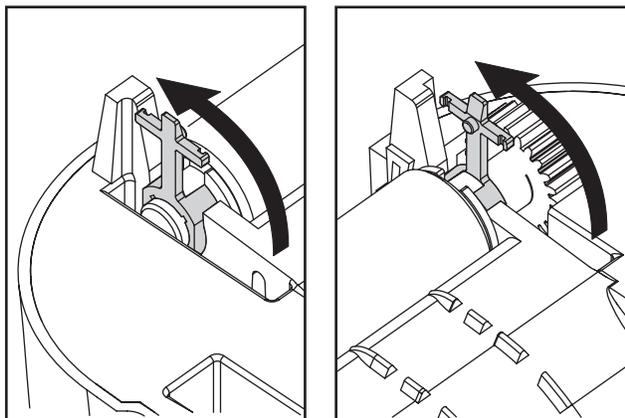
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## Replacing the Platen

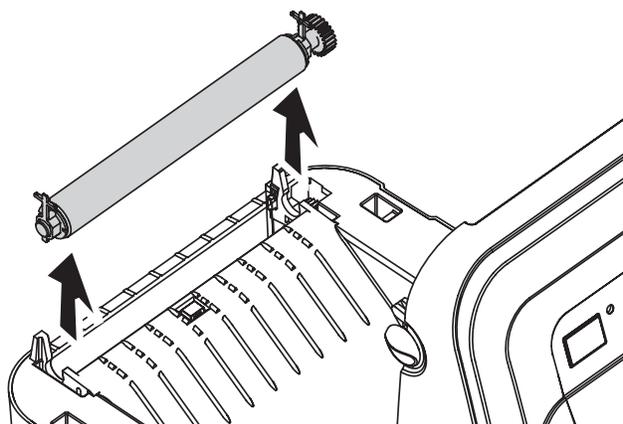
### Removal

Open the printer and remove any media.

1. Press the tabs on the right and left sides out. Then rotate them up.

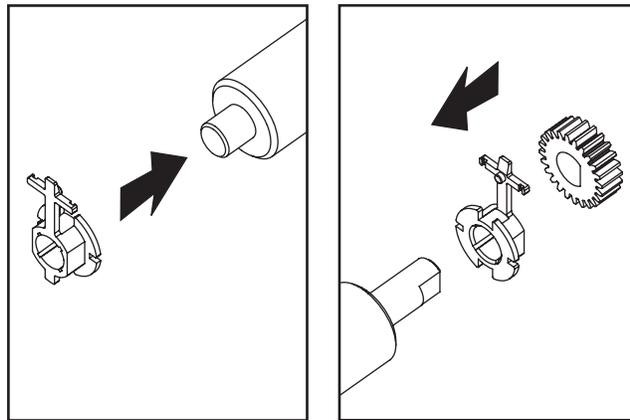


2. Lift the platen out of the printer's bottom frame.

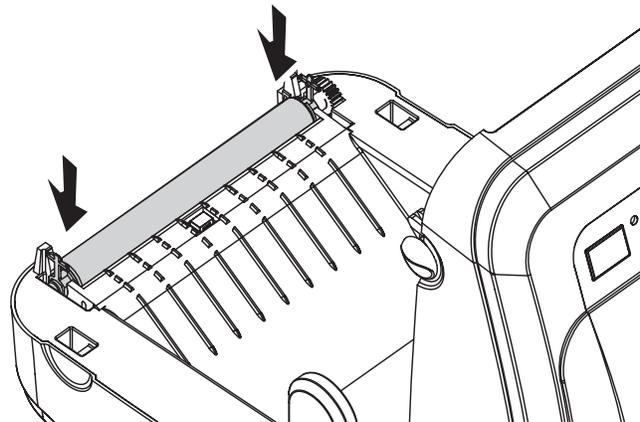


### Installation

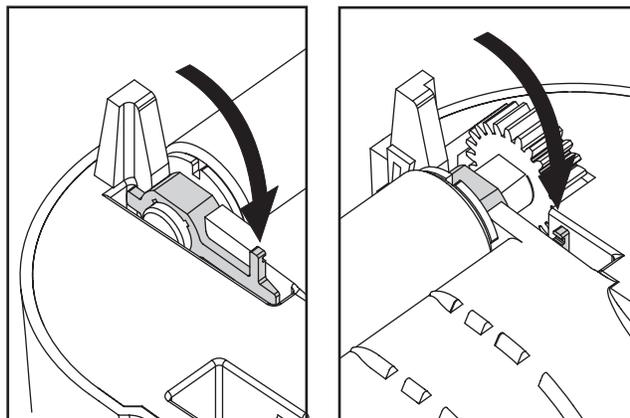
1. Make sure the bearings are on the shaft of the platen.



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



3. Rotate the tabs back and snap them into place.



## Replacing the Printhead

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



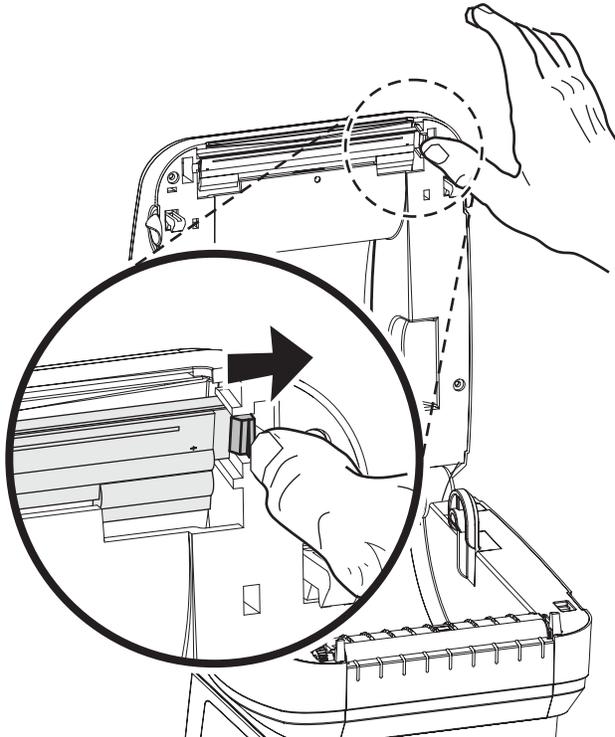
**Caution** • Prepare your work area by protecting against static discharge. Your work area must be static-safe and include a properly grounded conductive cushioned mat to hold the printer and a conductive wrist strap for yourself.



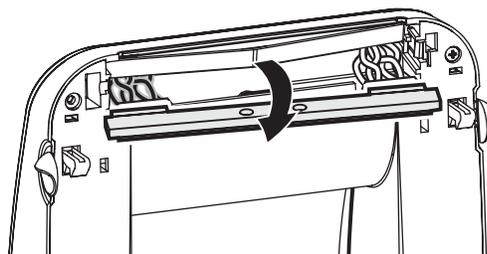
**Caution** • Turn the printer power off and unplug the power cord before replacing the printhead.

### Removal

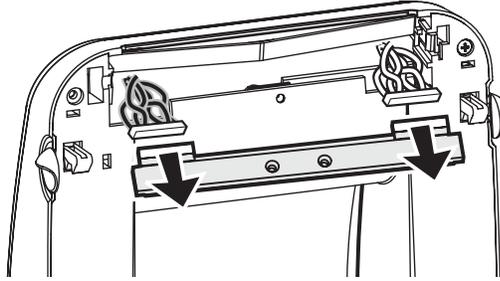
1. Open the cover. Press the printhead to the left; then, release the right side catch.



2. Let the printhead fall forward; pull it free of the top case if necessary.

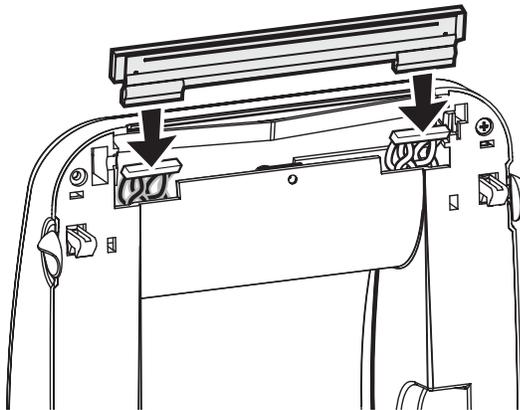


3. Unplug both bundles of printhead wires from their connectors.

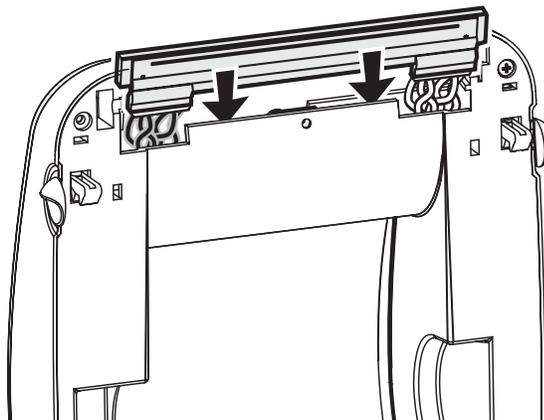


### Installation

1. Align the printhead to plug 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.



Clean the printhead as described under [Printhead Cleaning](#) on page 36.

Reload media. Plug in the power cord, turn on the printer and print a status report to ensure proper function.



# Troubleshooting

## 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

## 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.

#### **There is a memory error.**

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

#### **The printer needs to cool or requires service.**

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

### 4. The printer is receiving data.

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

### 5. The media is out.

- Follow the instructions for [Loading Roll Media on page 9](#) in the Getting Started section. Then, press the feed button to resume printing.

#### **The printhead is open.**

- Close the top cover. Then, press the feed button to resume printing.

### 6. The printer is paused.

- Press the feed button to resume printing.

### 7. The printhead is under temperature.

- Continue printing while the printhead reaches the correct operating temperature.

#### **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.

- You must use direct thermal media for printing. Direct thermal media is chemically treated to print (expose) when heat is applied. A finger nail or pen cap may be used to test for direct thermal media by pressing firmly and quickly dragging it across the media surface. This test method uses friction heat to expose the media.
- Is the media loaded correctly? The media's print surface must face up to make contact with the printhead. Follow the instructions for [Loading Roll Media on page 9](#) 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 53](#).
  - 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. Follow the instructions for [Replacing the Printhead on page 43](#) in the Maintenance section).

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

- The printer needs to be calibrated for the media. Refer to the two-flash sequence of *Feed Button Modes* on page 53 in this section.
- The correct media sensor may not be activated. Manual calibration selects the media sensing method for the labels being used (refer to the  $\wedge$ MN command in the *ZPL II Programming Guide*).
- Verify that the Label Top ( $\wedge$ LT) command is correctly set for your application (consult the *ZPL II Programming 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 *Feed Button Modes* on page 53 in this chapter.
- 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.

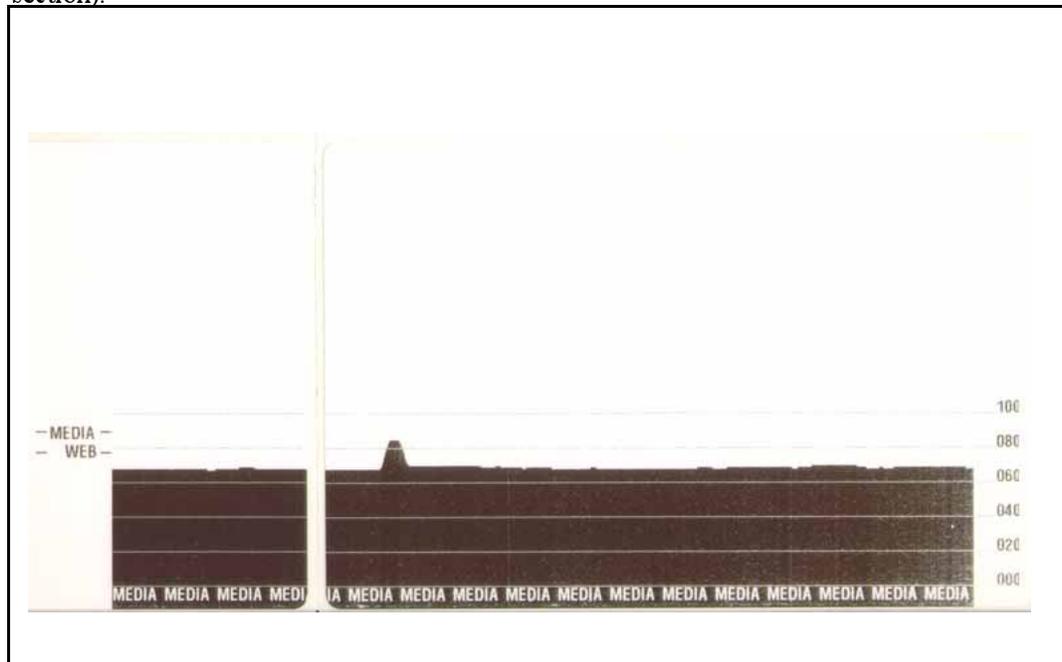
## Manual Calibration

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 automatic media type detection the is part of the automatic media sensing (and calibration) function. To return to auto calibration, default the printer (refer to the four-flash sequence in [Feed Button Modes](#) on page 53 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 53](#) in this section

PRINTER CONFIGURATION	
Zebra Technologies UPS ZP 450-200dpi	
08.0.....	DARKNESS
5 IPS.....	PRINT SPEED
+000.....	TEAR OFF
TEAR OFF.....	PRINT MODE
CONTINUOUS.....	MEDIA TYPE
WEB.....	SENSOR TYPE
AUTO.....	SENSOR SELECT
640.....	PRINT WIDTH
1225.....	LABEL LENGTH
13.0IN 329MM.....	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
CALIBRATION.....	MEDIA POWER UP
FEED.....	HEAD CLOSE
DEFAULT.....	BACKFEED
+000.....	LABEL TOP
+0000.....	LEFT POSITION
NO.....	HEXDUMP
050.....	WEB S.
095.....	MEDIA S.
017.....	WEB GAIN
050.....	MARK S.
000.....	MARK GAIN
095.....	MARK MED S.
000.....	MARK MEDIA GAIN
096.....	CONT MEDIA S.
006.....	CONT MEDIA GAIN
000.....	TAKE LABEL
CWF.....	MODES ENABLED
.....	MODES DISABLED
832 8/MM FULL.....	RESOLUTION
V61.15.1ZP35 <-.....	FIRMWARE
V06.00.0.....	HARDWARE ID
CUSTOMIZED.....	CONFIGURATION
2944k.....R:	RAM
1536k.....E:	ONBOARD FLASH
NONE.....	FORMAT CONVERT
1,977 IN.....	LAST CLEANED
1,977 IN.....	HEAD USAGE
1,978 IN.....	TOTAL USAGE
1,977 IN.....	RESET CNTR1
1,977 IN.....	RESET CNTR2
.....	SERIAL NUMBER
2007-10-09 13:50:28	TIME STAMP

FIRMWARE IN THIS PRINTER IS COPYRIGHTED

### 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 53](#) in this section.

## Resetting the Factory Default Values

Sometimes, resetting the printer to the factory defaults solves some of the problems. Refer to the four-flash sequence in [Feed Button Modes on page 53](#) in this section.

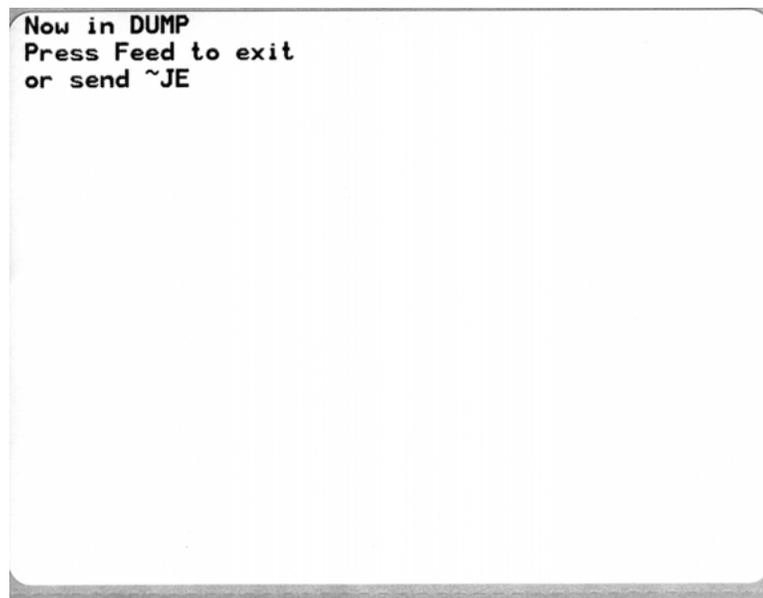
## Communications Diagnostics

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,

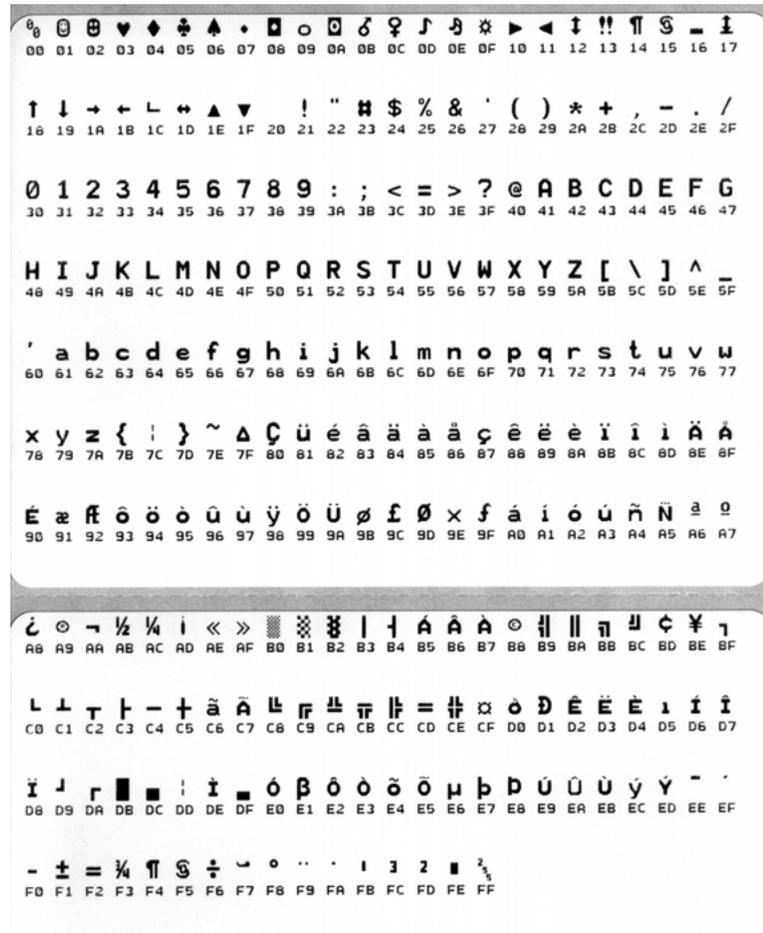
There are multiple ways to enter hex data dump mode:

- 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 53](#) 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 32 for more information on using the Firmware (and File) Download utility available for use with this printer.</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>

Power On Modes	
Flash Sequence	Action
*	<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.
* **	<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. <i>Note: Users familiar with the Zebra EPL desktop printer use this Feed mode to replace power-up AutoSensing calibration.</i>
* ** ***	<b>Serial Port Configuration</b> - <i>Applies only to printers with serial interface ports.</i> To reset the communication parameters. Press and release the Feed button while the LED rapidly flashes amber and green. For autobaud synchronization: Send the ^XA^XZ command sequence to the printer while the LED rapidly flashes amber and green. When the printer and host are synchronized, the LED changes to solid green. NOTE: No labels will print during autobaud synchronization.
* ** *** ****	<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.
* ** *** **** *****	<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.
* ** *** **** ***** *****	<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.
* ** *** **** ***** ***** *****	<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 49</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.**

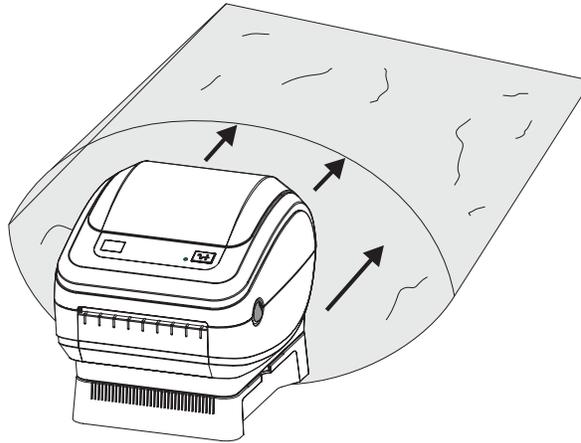
## Repackaging the Printer for Return

Before repackaging your printer for return, please call customer service to get a Return Material Authorization (RMA) tracking number.

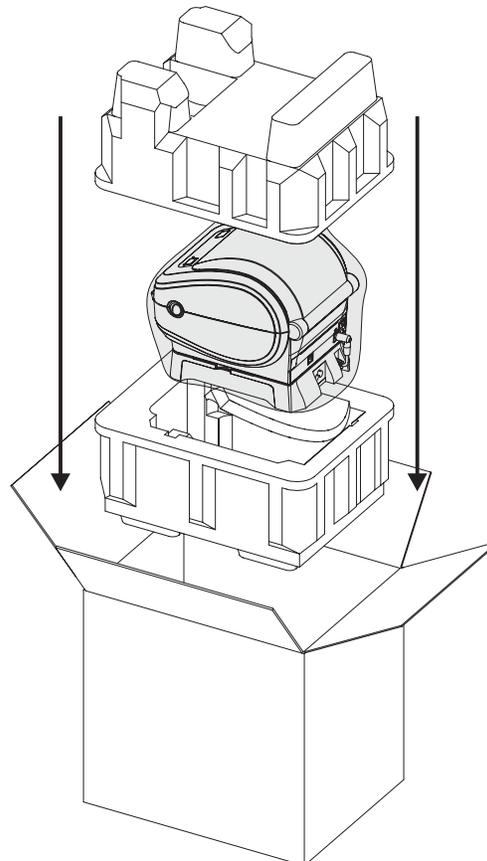
To repackage your printer, use the saved packaging materials or ask your customer service representative to send a new printer packaging kit.

**Items to return:** Printer, power cord and USB cable.

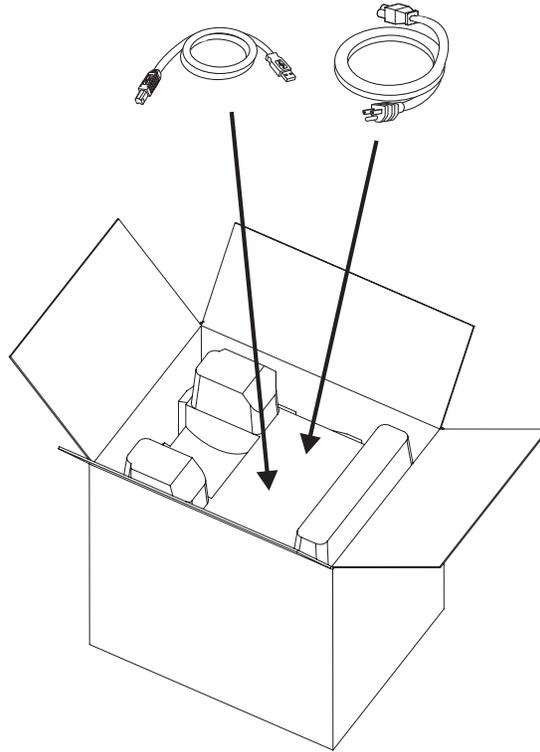
1. Place the printer in the plastic bag.



2. Place the bagged printer between the two ridged foam shells and place them into the carton.



3. Place the power cord and USB cable on the top of the foam shell in the carton.



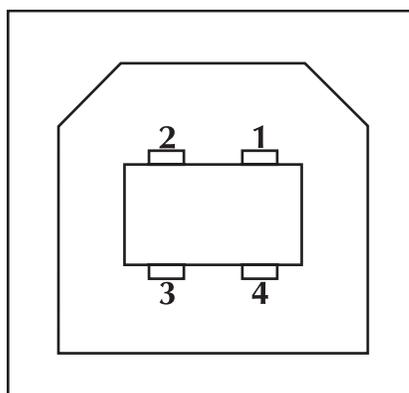
4. Seal the carton.



# Interfaces

## Universal Serial Bus (USB) Connector

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



Pin No.	Description
1	Vbus
2	D-
3	D+
4	Ground
Shell	Shield/Drain Wire

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

[www.ups.zebra.com](http://www.ups.zebra.com)

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

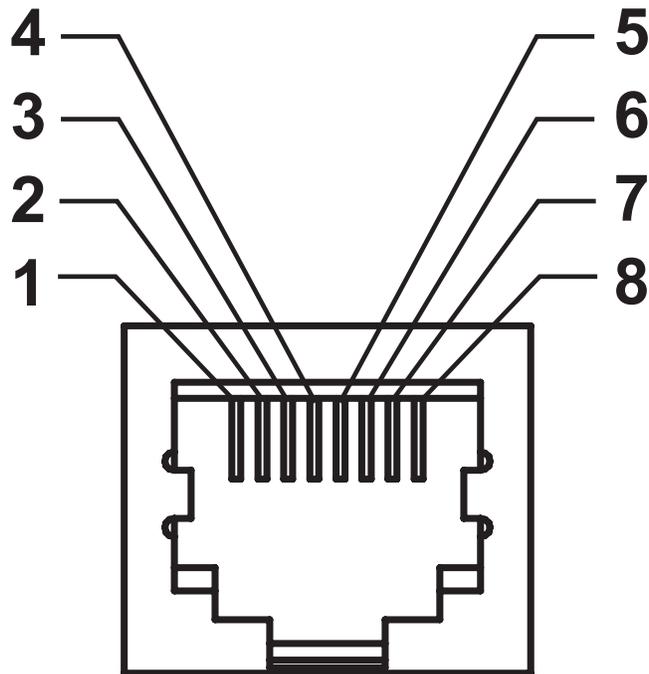
[www.usb.org](http://www.usb.org)

## 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.

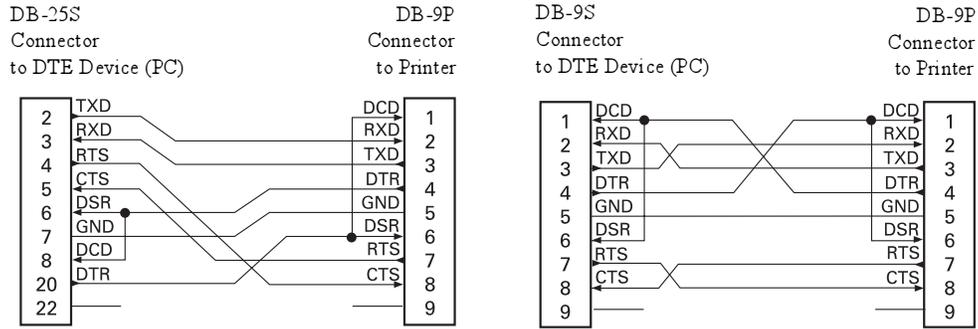
When XON/XOFF handshaking is selected, data flow is controlled by the ASCII control codes DC1 (XON) and DC3 (XOFF). The DTR control lead will have no effect.

**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

