



**Zebra® TLP 2824-Z™**

---

# **User Guide**



© 2004 ZIH Corp.

The copyrights in this manual and the label printer described therein are owned by Zebra Technologies. Unauthorized reproduction of this manual or the software in the label printer may result in imprisonment of up to one year and fines of up to \$10,000 (17 U.S.C.506). Copyright violators may be subject to civil liability.

All product names and numbers are Zebra trademarks, and Zebra, the Zebra logo, ZPL, ZPL II, ZebraNet, ZebraLink, are registered trademarks of ZIH Corp. All rights reserved.

All other brand names, product names, or trademarks belong to their respective holders.

**Customer Order # 980533-001 A**

---

# Proprietary Statement



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

## Product Improvements

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

## 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 Shielded Communication Cables.

## **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.

## **Liability Disclaimer**

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

## **Limitation of Liability**

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

---

# 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: +1 847.634.6700

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



---

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

---



---

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

---



---

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

---



---

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

---

---

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

---



---

**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.

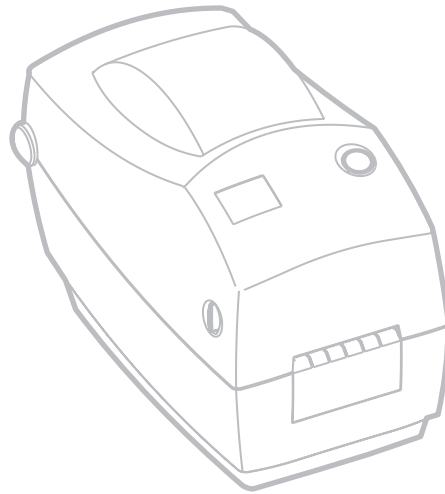


**Video** • (online only) Links to a motion picture that demonstrates a procedure.

## Related Documents

The following documents might be helpful references:

- *ZPL II<sup>®</sup> Programming Guide Volume I* (part number 45541L) and *Volume II* (part number 45542L).
- *ZebraNet<sup>®</sup> Wireless Print Server User Guide* (part number 13422L)
- *ZebraNet 10/100 Print Server User and Reference Guide* (part number 47619L-001)
- *ZebraNet PrintServer II<sup>™</sup> Installation and User Guide* (part number 45537L)
- *Universal Serial Bus Specification* available from the USB Implementation Forum





---

# Contents



<b>Proprietary Statement</b>	<b>3</b>
<b>Preface</b>	<b>5</b>
Contacts	5
Support	6
Environmental Management	6
Document Conventions	6
Related Documents	7
<b>1 • Introduction</b>	<b>11</b>
What's in the Box?	12
Inspecting the Printer	13
<b>2 • Getting Started</b>	<b>17</b>
Modes of Printing	17
Attaching Power Supply	18
Loading Roll Media	19
Adjusting the Roll Holders	19
Placing the Roll in the Media Compartment	20
Adjusting the Guides	21
Loading Ribbon	22
Install the Ribbon Supply Roll	22
Install the Take-Up Core	22
Attach and Tighten the Ribbon	23
Operator Controls	24
Printing a Test Label	25
Hooking Up the Printer and Computer	26
Interface Cable Requirements	26
Communicating with the Printer	27

Adjusting the Print Width. . . . .	28
Adjusting the Print Quality. . . . .	28
<b>3 • Operations &amp; Options . . . . .</b>	<b>29</b>
Thermal Printing . . . . .	30
Replacing Supplies . . . . .	31
Adding a New Transfer Ribbon. . . . .	31
Replacing a Partially Used Transfer Ribbon. . . . .	31
Printing in Peel-Mode . . . . .	32
Printing on Fan-Fold Media. . . . .	34
Using the Cutter Option . . . . .	35
<b>4 • Maintenance . . . . .</b>	<b>37</b>
Cleaning . . . . .	37
Print Head Considerations . . . . .	38
Media Guide Considerations . . . . .	39
Platen Considerations. . . . .	41
Lubrication . . . . .	41
Replacing the Platen. . . . .	42
Replacing the Print Head . . . . .	43
Thermal-Transfer TLP Model . . . . .	44
<b>5 • Troubleshooting . . . . .</b>	<b>47</b>
Resolutions . . . . .	47
Print Quality Problems . . . . .	50
Manual Calibration . . . . .	52
Troubleshooting Tests. . . . .	53
Printing a Configuration Label . . . . .	53
Recalibration. . . . .	53
Resetting the Factory Default Values . . . . .	54
Communications Diagnostics . . . . .	54
Feed Button Modes. . . . .	55
Battery. . . . .	56
<b>6 • Interfaces . . . . .</b>	<b>57</b>
Universal Serial Bus (USB) Connector . . . . .	57
Parallel Interface. . . . .	58
ZebraNet® PrintServer II for Ethernet Networks. . . . .	59
Serial (RS-232) Connector . . . . .	60



---

# 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 thermal-transfer printing (which uses ribbon) and 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.

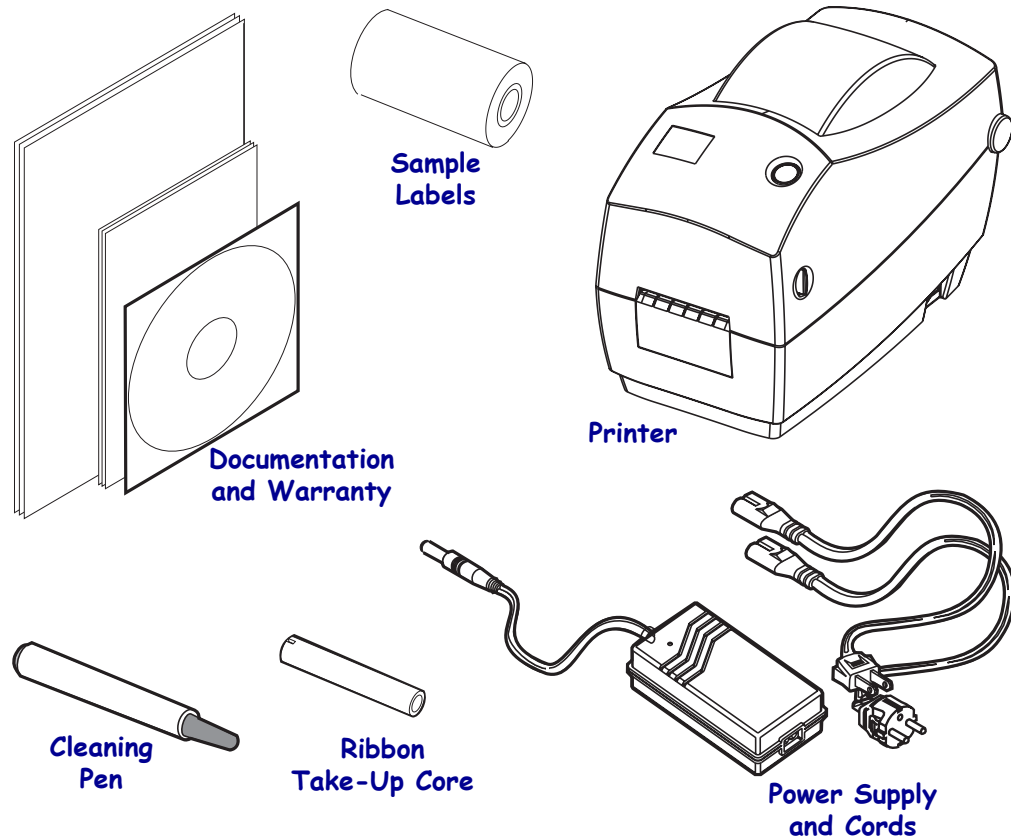
Your printer, when connected to a host computer, functions as a complete system for printing labels and tags.



**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.

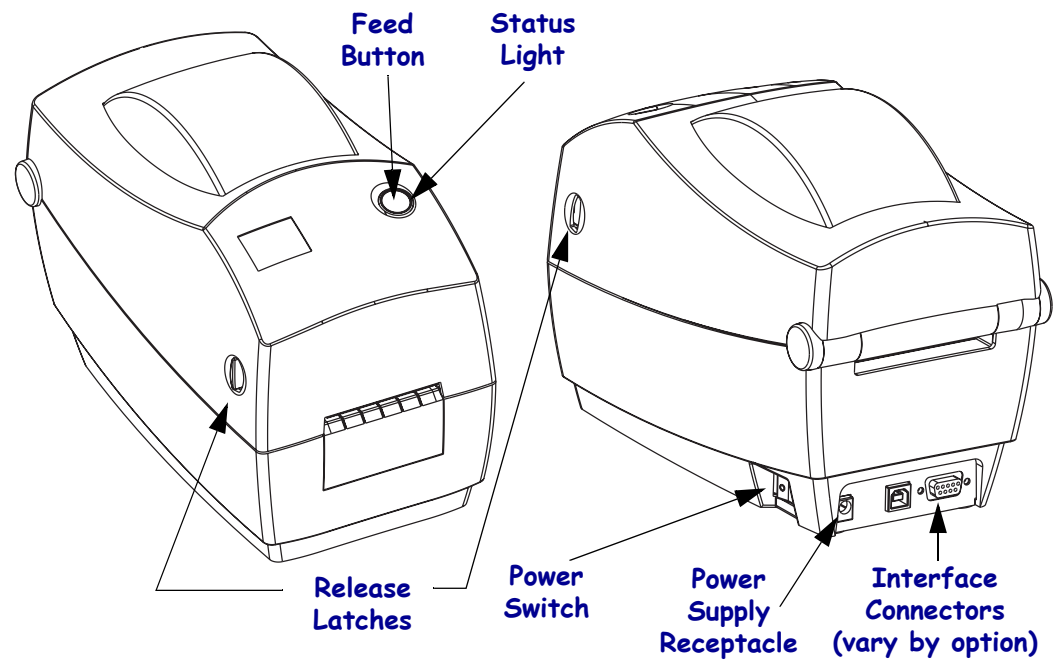
## What's in the Box?

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.



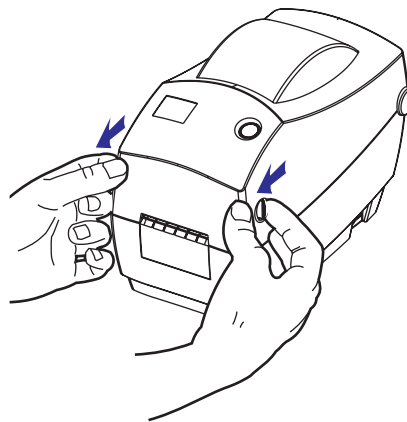
## Inspecting the Printer

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

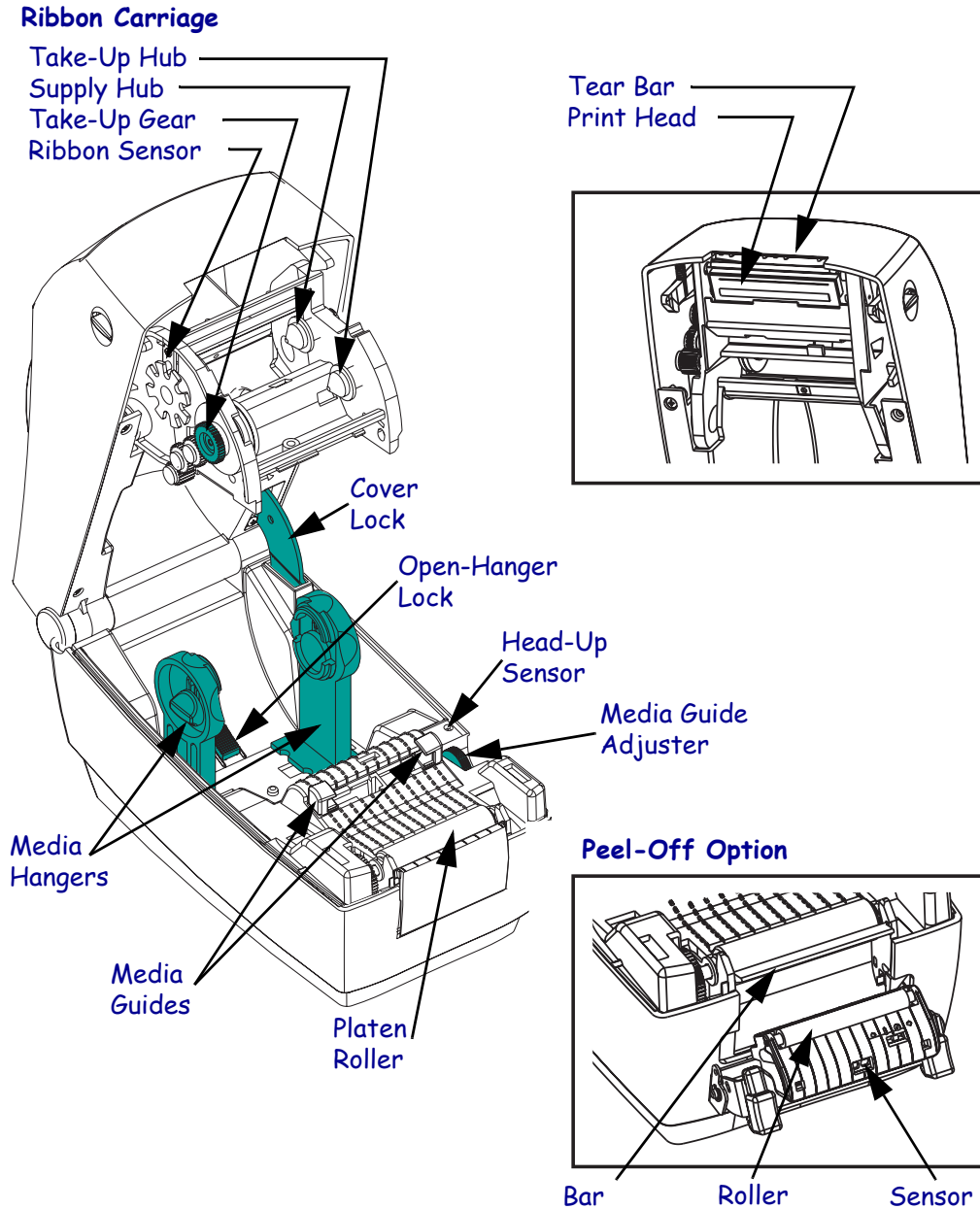


## Opening the printer

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

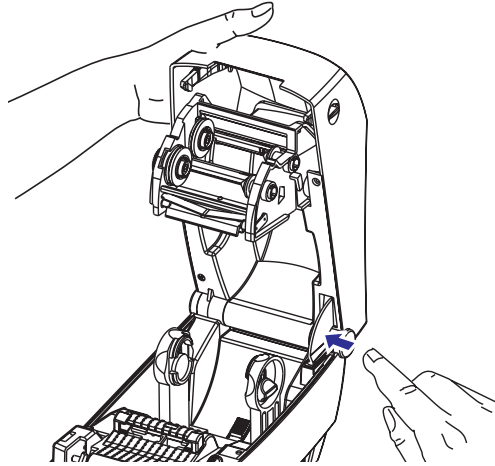


After opening the printer, check the media compartment.



## Closing the printer

1. Hold the top cover and press the “kick-stand” cover lock to release.



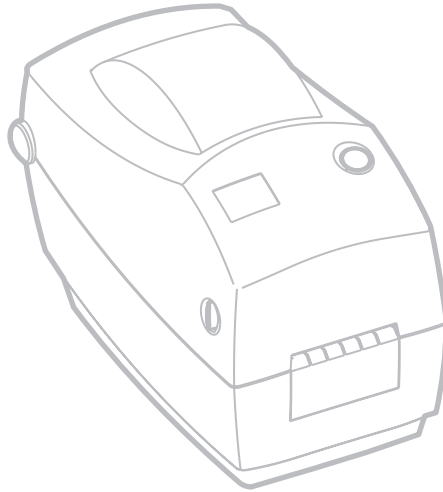
2. Lower the top cover. The ribbon carriage automatically folds up into place.
3. Press down until the cover snaps closed.



## Reporting Damage

If you discover damage or missing parts:

- Immediately notify and file a damage report with the shipping company. 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 the carton and all packing material for inspection.
- Notify the authorized reseller.







---

# 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 and loading ribbon.

## 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.
- In optional peel-off mode, the backing material is peeled away from the label as it is printed. After this label is removed, the next one is printed.
- In optional cutter mode, an attached unit cuts through the media.

The printer typically uses roll media, but you can use fan-fold or other continuous media as well.

For procedures to use optional modes and features, refer to the Operation and Options section.

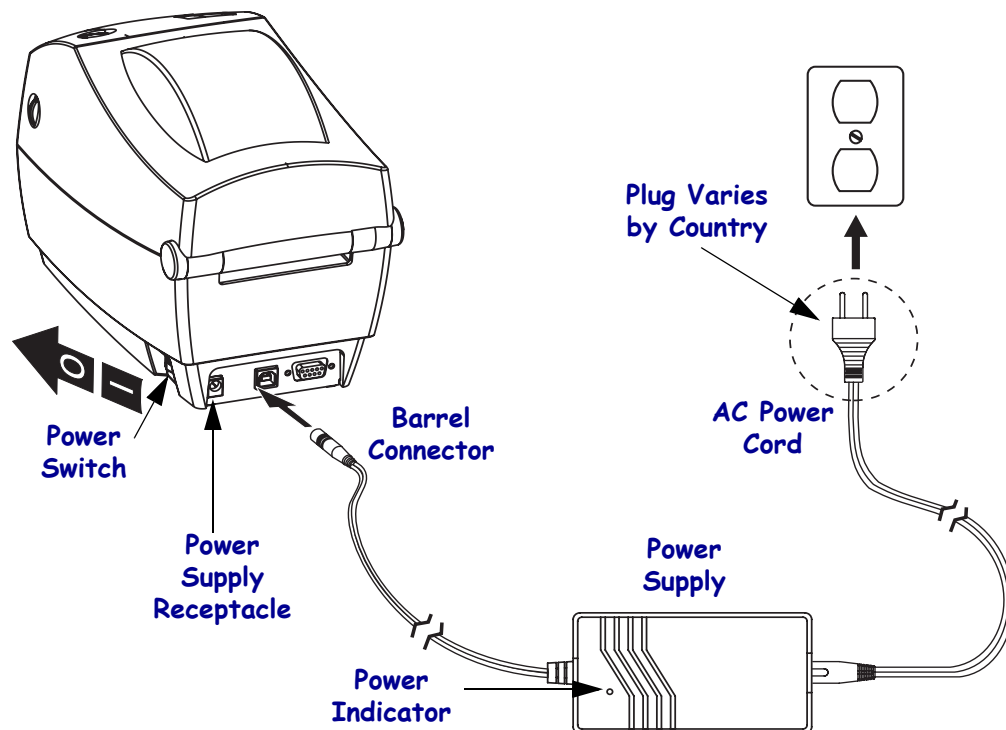
## Attaching Power Supply

Check the power supply to make certain it is appropriate for your input voltage.



**Caution** • Use the power supply that came with your printer. 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 (forward).
2. The DC power supply has a barrel connector on one end that must be inserted into the power supply receptacle on the back of the printer.
3. Insert the separate AC power cord into the power supply.
4. Plug the other end of the cord into an appropriate AC electrical outlet.



## Loading Roll Media

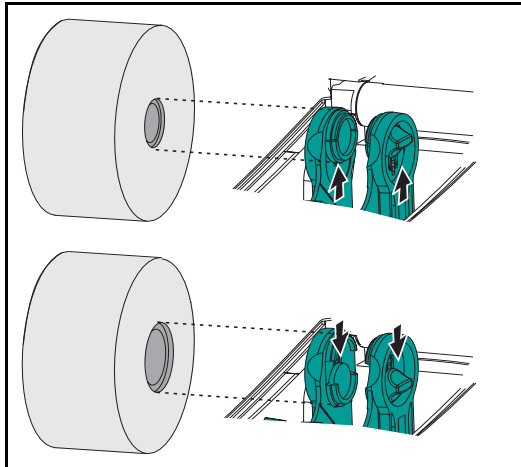
When you load media, you must place the roll on the media hangers and then adjust the media guides.

You must use the correct media for the type of printing you require. When printing without a ribbon, you must use direct thermal media. When using ribbon, you must use thermal transfer media. The printer's ribbon sensor detects motion of the supply spindle.

### Adjusting the Roll Holders

Check the core of the media roll and adjust the holders if necessary.

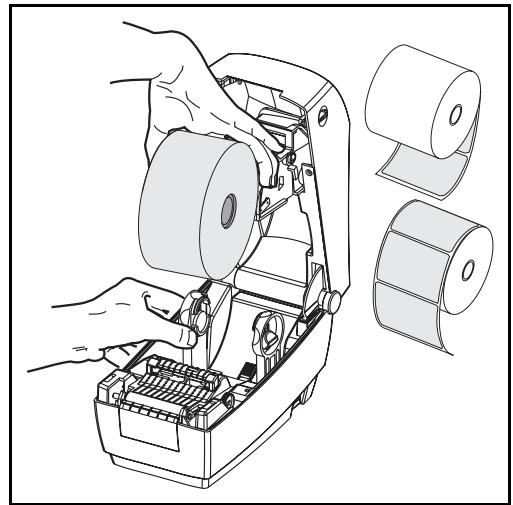
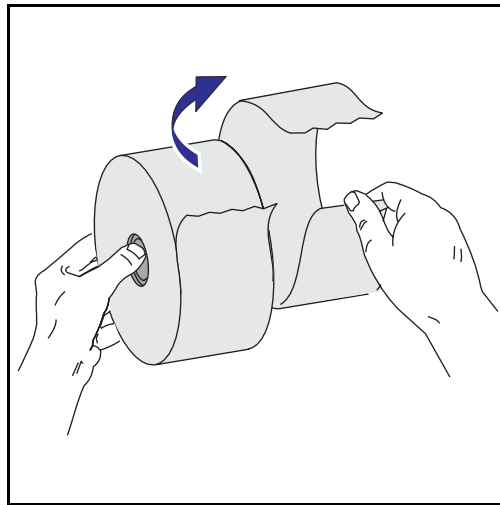
- For a narrow core, lift the adjusters up.
- For a wide core, press the adjusters down.



## Placing the Roll in the Media Compartment

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

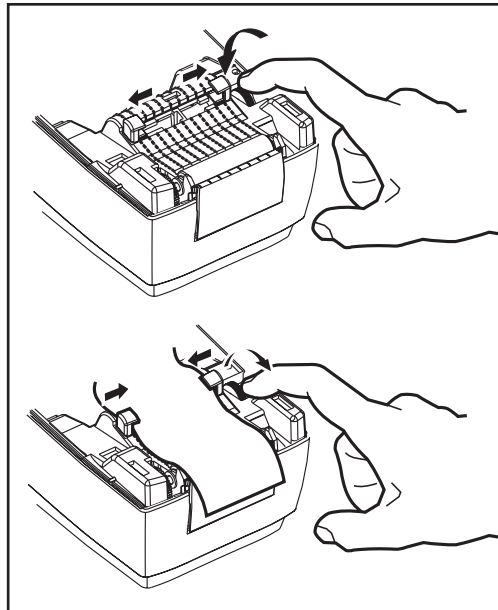
1. Open the printer. Remember that you need to pull the release levers toward the front of the printer.
2. Remove the outside length of media. During shipment, the roll may become dirty when handled or dusty when stored. Removing the outside length avoids dragging adhesive or dirty media between the print head and platen.
3. Separate and hold open the media hangers.
4. Orient the media roll so that its printing surface will be up as it passes over the platen.
5. Lower the roll between the hangers and close them onto the core.



## Adjusting the Guides

The adjustable guides direct the media toward the platen and print head.

1. Open the media guides by turning the guide adjuster knob to the rear.
2. Thread the media through the guides.
3. Close the media guides by turning the guide adjuster knob to the front. They should just touch, but not restrict, the edges of the media.
4. Unless you need to load ribbon, close the top cover. Remember that you need to release the cover lock, lower the top cover, and press down until the latches snap into place



## Loading Ribbon

You must use thermal transfer media (accepts wax and/or resin transferred off a ribbon) when you use a ribbon. When loading ribbon, you install the supply and take-up rolls, then tighten the ribbon on the carriage.

### Install the Ribbon Supply Roll

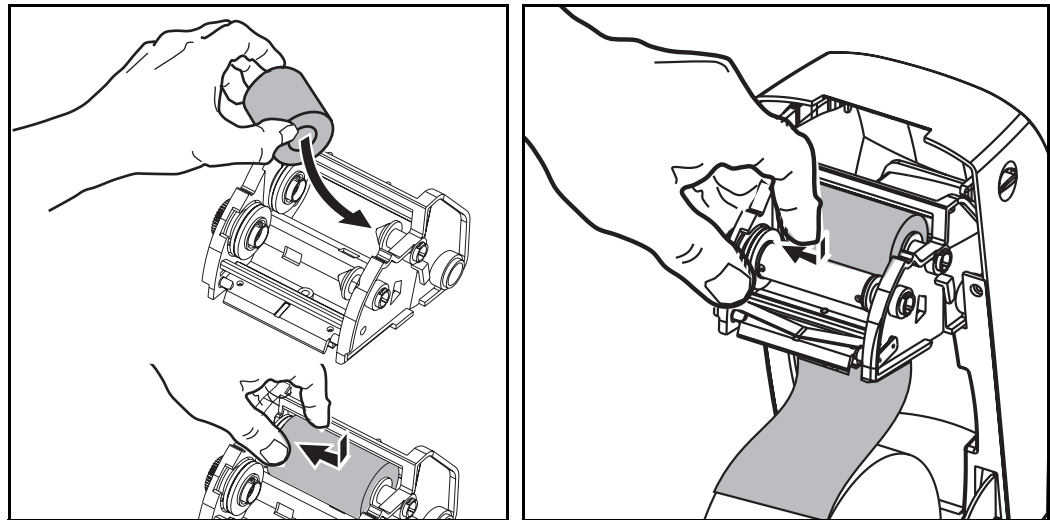
Before following these steps, prepare the ribbon by removing its wrapping and pulling its adhesive strip free.

1. Thread the ribbon through the carriage.
2. Press the right side onto the supply hub.
3. Align the notches on the left side and mount onto the spokes of the left hub.

### Install the Take-Up Core

1. Press the right side onto the take-up hub.
2. Align the notches on the left side and mount onto the spokes of the left hub.

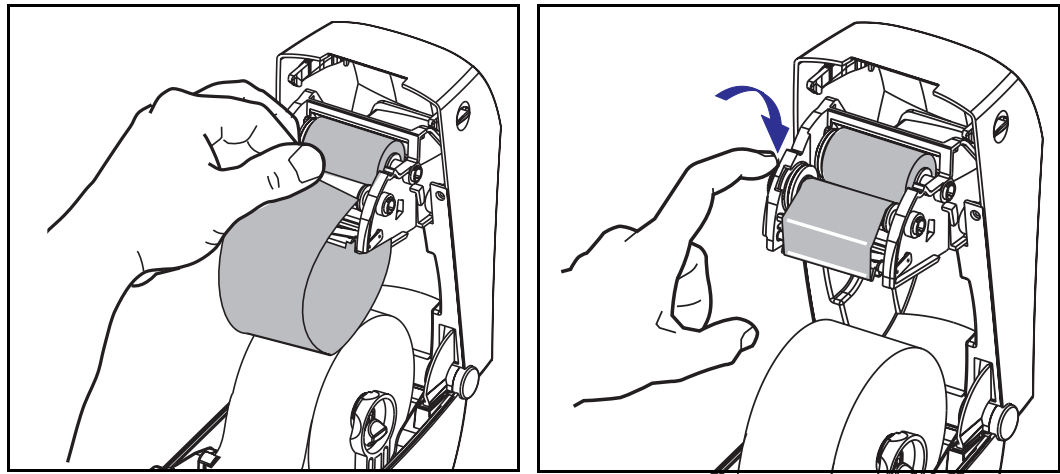
You can find your first ribbon take-up core in the packing box. Subsequently, use the empty supply core to take up the next roll of ribbon.



## Attach and Tighten the Ribbon

You must align the ribbon so that it will be taken straight onto the core.

1. Attach the ribbon to the take up core. Use the adhesive strip on new rolls; otherwise, use tape.
2. Turn the ribbon take-up gear counter-clockwise (top moves toward rear) to remove slack from the ribbon.
3. Close the top cover. Remember that you need to release the cover lock, lower the top cover, and press down until the latches snap into place.



## Operator Controls

### Power Switch

Press *backward* to turn **ON** or *forward* to **OFF** the printer.



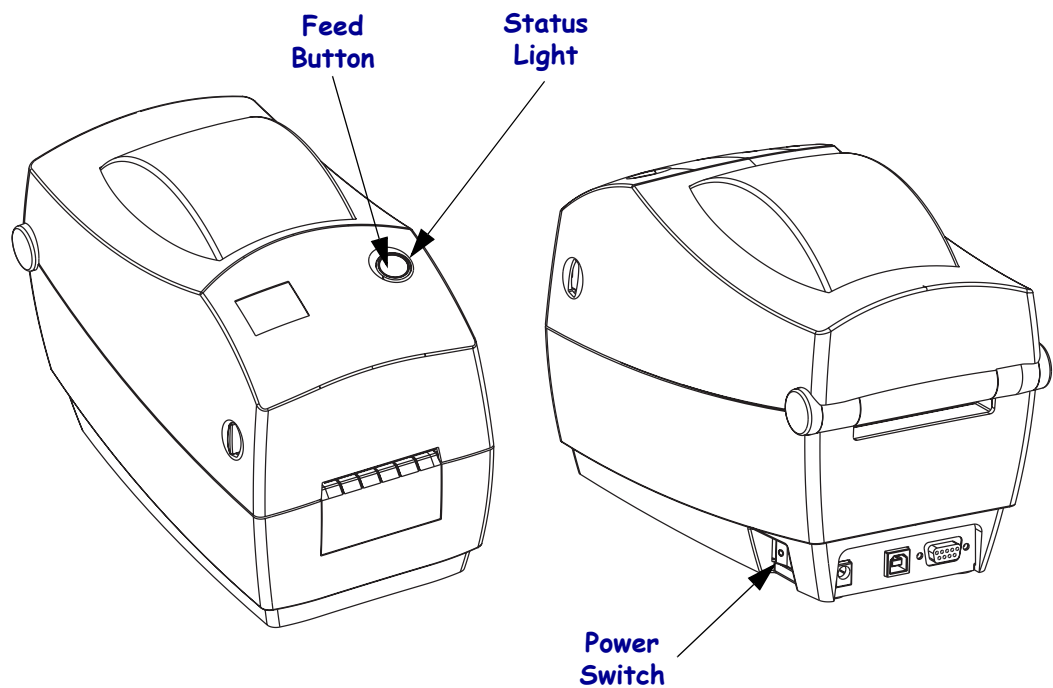
**Caution** • The power should be turned off before connecting or disconnecting the communications and power cables.

### Feed Button

- Tapping the Feed button forces the printer to feed one blank label.
- Holding the Feed button forces the printer to feed continuously.
- Pressing the Feed button takes 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” in the Troubleshooting chapter.
- Use the Feed button for printer setup and status (see “Feed Button Modes” in the Troubleshooting chapter).

### Status Light

Functions as a printer operational indicator (see “What the Status Light is Telling You” 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.
  2. When the status light is solid green, press and hold the feed button until the status light flashes once.
  3. Release the feed button. A configuration label will print.
- If you cannot get this label to print, refer to the Troubleshooting chapter.

PRINTER CONFIGURATION	
Zebra Technologies ZTC modelname=resdpi	
+10.....	DARKNESS
+000.....	TEAR OFF
TEAR OFF .....	PRINT MODE
NON-CONTINUOUS.....	MEDIA TYPE
WEB.....	SENSOR TYPE
THERMAL-TRANS.....	PRINT METHOD
056 0/8 MM .....	PRINT WIDTH
0831.....	LABEL LENGTH
39.0IN 988MM .....	MAXIMUM LENGTH
NOT CONNECTED .....	USB COMM.
PARALLEL.....	PARALLEL COMM.
RS232 .....	SERIAL COMM.
8600.....	BAUD
8 BITS .....	DATA BITS
NONE.....	PARITY
XON/XOFF.....	HOST HANDSHAKE
NONE.....	PROTOCOL
000.....	NETWORK ID
NORMAL MODE .....	COMMUNICATIONS
<~> 7EH .....	CONTROL PREFIX
<^> 5EH .....	FORMAT PREFIX
<, > 2CH .....	DELIMITER CHAR
ZPL II .....	ZPL MODE
FEED.....	MEDIA POWER UP
FEED.....	HEAD CLOSE
DEFAULT.....	BACKFEED
+020.....	LABEL TOP
+0000.....	LEFT POSITION
029.....	WEB S.
068.....	MEDIA S.
050.....	RIBBON S.
050.....	MARK S.
001.....	MARK MED S.
062.....	MEDIA LED
000.....	RIBBON LED
081.....	MARK LED
CS.....	MODES ENABLED
.....	MODES DISABLED
448 8/MM FULL .....	RESOLUTION
SP.814.B <- .....	FIRMWARE
V2.2.6.98.C.....	HARDWARE ID
CUSTOMIZED.....	CONFIGURATION
1024.....	R: RAM
0768.....	E: ONBOARD FLASH
NONE.....	FORMAT CONVERT
.....	TWINAX/COAX ID
FW VERSION .....	IDLE DISPLAY
05/05/37.....	RTC DATE
00:00.....	RTC TIME
NONE.....	ZEBRA NET II
.....	
2004-06-08 10:07:34	TIME STAMP

FIRMWARE IN THIS PRINTER IS COPYRIGHTED

## Hooking Up the Printer and Computer

Your printer will have one of these combinations of interfaces:

- Parallel
- Universal Serial Bus (USB) and DB-9 serial
- Ethernet and RJ-11 serial

Each specific interface option—USB, parallel, ethernet, serial—is discussed individually.

You must supply the required interface cable for your application.



---

**Caution** • Keep the power switch in the OFF position when attaching the interface cable. The power supply barrel connector must be inserted into the power supply receptacle 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 six-foot data cables. Use of longer cables or 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 metalized connector shells. Shielded cables and connectors are required to prevent radiation and reception of electrical noise.

To minimize electrical noise pickup in the cable:

Keep data cables as short as possible (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 1.1) provides a high-speed 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.

### Parallel Interface Requirements

The required cable (IEEE 1284-compliant is recommended) must have a standard 36-pin parallel connector on one end, which is plugged into the parallel port located on the back of the printer. The other end of the parallel interface cable connects to the printer connector at the host computer.

For pinout information, refer to *Parallel Interface* [on page 58](#).

## Ethernet Interface Requirements

Ethernet provides a powerful networking capability that can be of use in a variety of internet/intranet printing solutions. After you load media and close the top cover, you can press the test button next to the connector on the rear of the printer to get an ethernet configuration label.

## Serial Interface Requirements

The standard 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.

On Ethernet boards, there is an optional serial interface used for factory tests.

The other end of the signal interface cable connects to a serial port at the host computer. Depending on the specific interface requirements, this will most likely be a straight-through cable.

For pinout information, refer to *Serial (RS-232) Connector* on page 60.

## 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.

### Parallel Communications

When using the parallel port, typically there is no setup is required once the cable is plugged in. If you should encounter any problems, consult the user’s guide that came with your computer.

### Internal ZebraNet® PrintServer II™ Ethernet Communications

You can refer to the ZebraNet® PrintServer II™ for Ethernet Networks Installation and Operation Guide for details regarding this interface.

## Serial Communications

Serial communications between the printer and the host computer can be set by either autobaud synchronization or the ^SC command.

### 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 a ZPL II format to the printer.

3. When the printer and host are synchronized, the LED changes to solid green. (No labels will print during autobaud synchronization.)

### **^SC Command**

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

4. 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.
5. Change the host computer settings to match the new printer settings.

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

### **Default the Serial Parameters**

To reset the communications parameters on the printer to the factory defaults (9600 baud, 8 bit word length, no parity, 1 stop bit, and XON/XOFF), do the following:

6. Press and hold the feed button until the green status LED flashes once, twice, and then three times.
7. While the status LED rapidly flashes amber and green, press the feed button.

## **Adjusting the Print Width**

Print width must be calibrated when:

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

Print width may be set by way of the five-flash sequence in “Feed Button Modes” (see page ) or refer to the Print Width (^PW) command (consult your *ZPL II Programming Guide*).

## **Adjusting the Print Quality**

Print quality is influenced by the heat of the print head, 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 setting is controlled by either the six-flash sequence in “Feed Button Modes” (see page ) or the Set Darkness (~SD) ZPL II command (follow the instructions in the *ZPL II Programming Guide*).

If you find that the print speed needs to be adjusted, refer to the Print Rate (^PR) command in the *ZPL II Programming Guide*.



---

## 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^MTD^XZ command changes the printing mode to direct thermal; the ^XA^MTT^XZ command changes the printing mode to thermal transfer.

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

For detailed information about creating labels using ZPL II, refer to the *ZPL II 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



---

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

---



---

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

---

You must use the correct media for the type of printing you require. When printing without a ribbon, you must use direct thermal media. When using ribbon, you must use thermal transfer media. The printer's ribbon sensor detects motion of the supply spindle.

## Replacing Supplies

If labels or ribbon run out while printing, leave the printer power on while reloading (data loss results if you turn off the printer). After you load a new label or ribbon roll, press the Feed button to restart.

Always use high quality, approved labels, tags and ribbons. 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. Permanent damage to the print head may result if a non-approved ribbon is used as it may be wound incorrectly for the printer or contain chemicals corrosive to the print head. Approved supplies can be ordered from your dealer.

### Adding a New Transfer Ribbon

If ribbon runs out in the middle of a print job, the indicator lights red and the printer waits for you to add a fresh roll.

1. Keep the power on as you change ribbon.
2. Open the top cover, then cut the used ribbon so you can remove the cores.
3. Load a new ribbon roll. If necessary, review the Ribbon Loading steps.
4. Close the top cover.
5. Press the Feed button to restart printing.

### Replacing a Partially Used Transfer Ribbon

To remove used transfer ribbon, perform the following steps.

1. Cut the ribbon from the take-up roll.
2. Remove the take-up roll and discard used ribbon.
3. Remove the supply roll and tape the end of any fresh ribbon to prevent it from unwrapping.

When reinstalling a partially used supply roll, tape the cut end onto the empty take-up roll.

## Printing in Peel-Mode

The optional dispenser allows you to print in “peel-mode” where the label backing follows a different path and the labels are presented one at a time for subsequent placement.

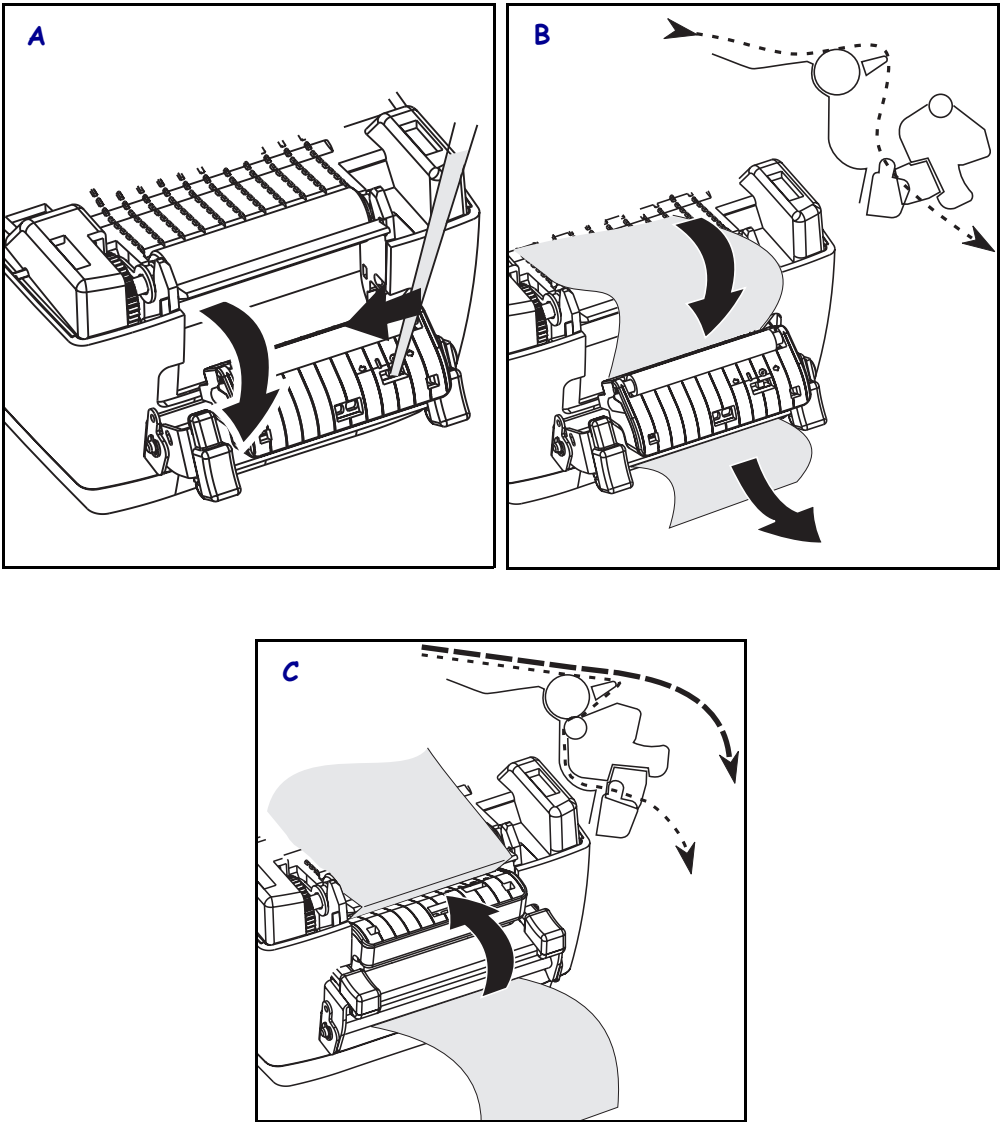
Before using peel-mode, you must send the programming commands to the printer.

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

Refer to your ZPL II Programmer’s Manual.

1. Remove several labels from the backing material.
2. Open the top cover.
3. Open the dispenser door.
4. Using a stylus, switch on the label-taken sensor.
5. Insert the backing in front of the peel bar and behind the peel roller.
6. Close the dispenser door.
7. Close the top cover.
8. Press the Feed button to advance the label.
9. During the print job, the printer will peel off the backing and present a single label. Take the label from the printer so it will print the next label.

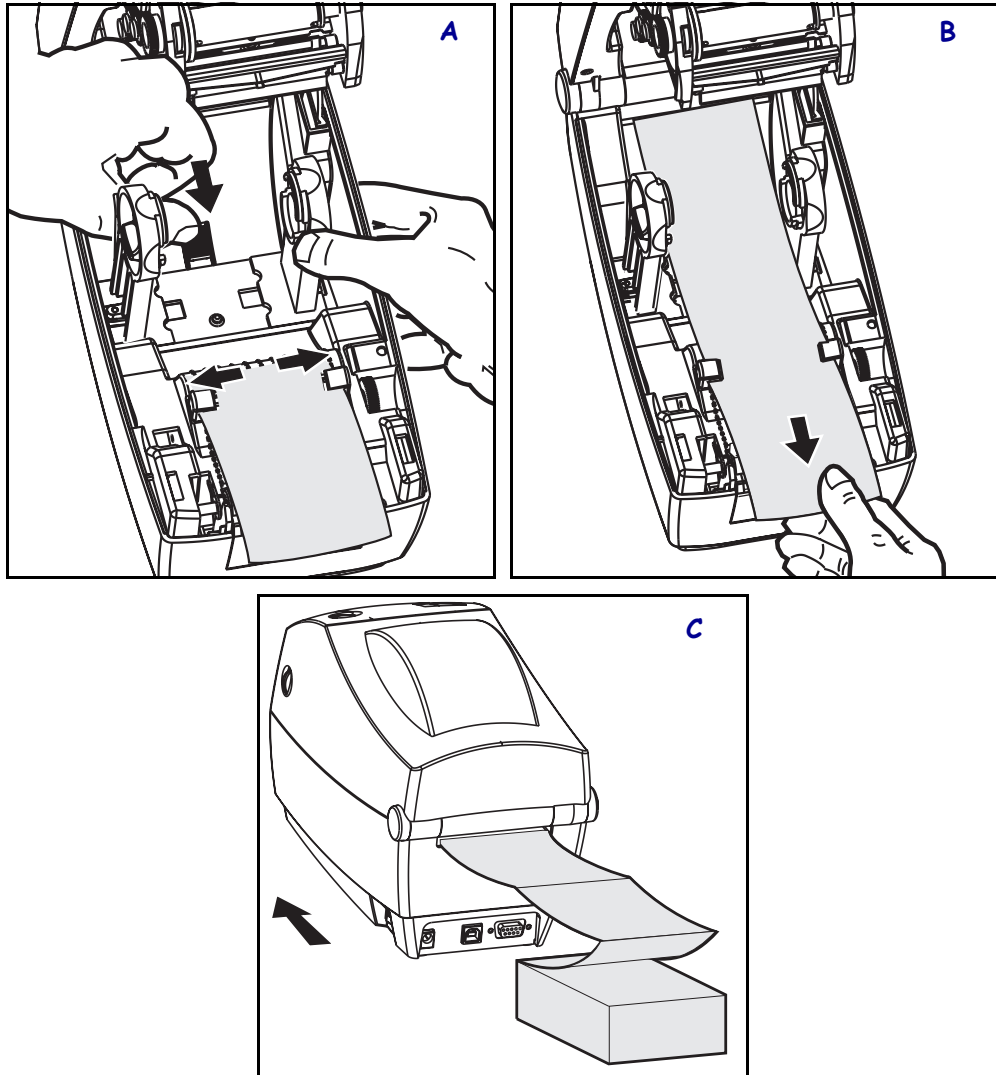




## Printing on Fan-Fold Media

Printing on fan-fold media requires you to set both the media hangers and the media guides in position.

1. Open the top cover.
2. Open the hangers to their widest position.
3. Snap the holder-open lock towards the front of the printer.
4. With a sample of your media, adjust the guides to the width of the media. The guides should just touch, but not restrict, the edges of the media.
5. Insert the media through the slot at the rear of the printer.
6. Run the media between the hangers and guides.
7. Close the top cover.



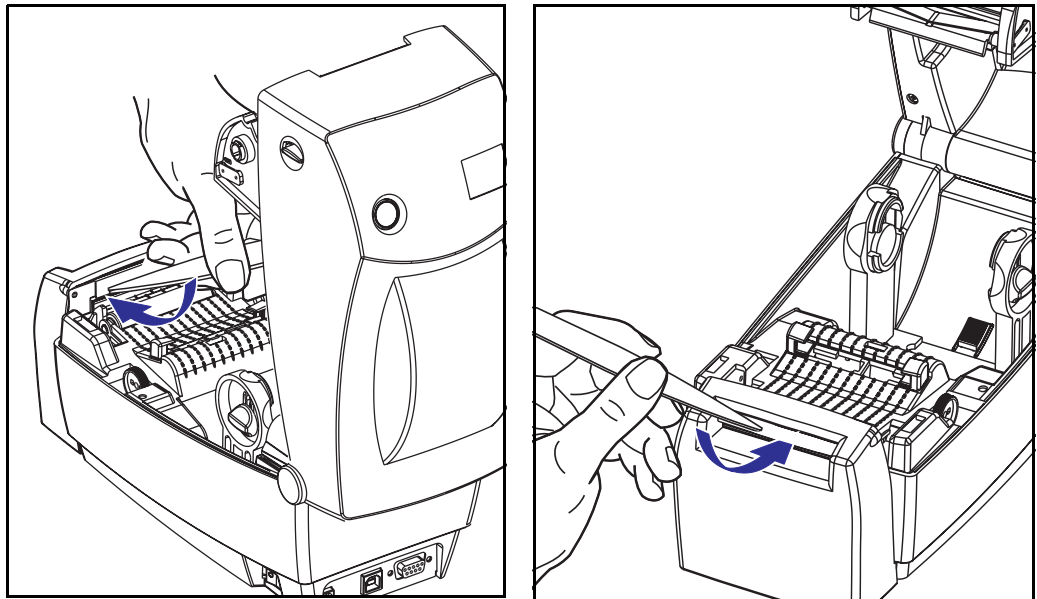
## Using the Cutter Option

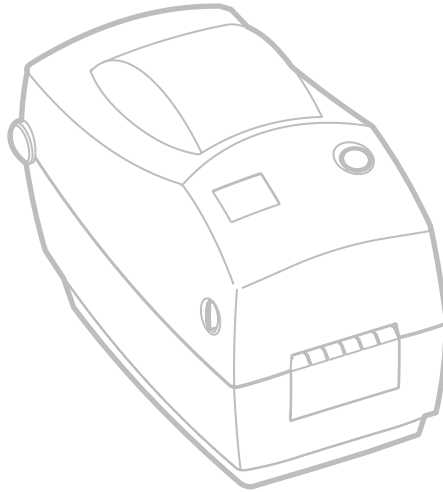
Printers that have a bezel with a motorized blade can dispense one or more forms that are then automatically cut from the media supply. This option cuts through continuous paper from rolls and liner between labels. Keep the cutter dry. Never use any solutions or solvents to clean the blade.

Use the ^MM command to activate the cutter and the ^LL command to set the form length and gap distance. See the *ZPL II Programmer's Manual*.

If the blade cuts through labels, adhesive can jam the cutter.

1. Turn OFF (O) printer power and unplug the power and interface cables before clearing the cutter.
2. After removing debris, plug in the power and interface cables, turn on the printer, then test for normal operation.







# Maintenance

## Cleaning

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

### Cleaning Supplies

Cleaning pens (12)

Cleaning swabs (25)

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

Printer Part	Method	Interval
Print head	Let the print head to cool for a minute, then use a new cleaning pen to swab the the thin gray line on the print head from end to end.  NOTE: You do not have to turn off the printer to do this.	When using ribbon: after every roll of ribbon; 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 95% medical-grade alcohol and a cleaning swab, cleaning card, or lint-free cloth.	As needed.
Peel bar	Clean it thoroughly with 95% medical-grade alcohol and a cotton swab.	
Tear bar		
Media path		
Exterior	Water-dampened cloth.	
Interior	Brush or air blow.	
Cutter	Use tweezers to remove scraps.	



**Caution** • Adhesives and coatings of media can over time transfer onto the printer components along the media path including the platen and print head. This build-up can accumulate dust and debris. Failure to clean the print head, 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.

## Print Head Considerations

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

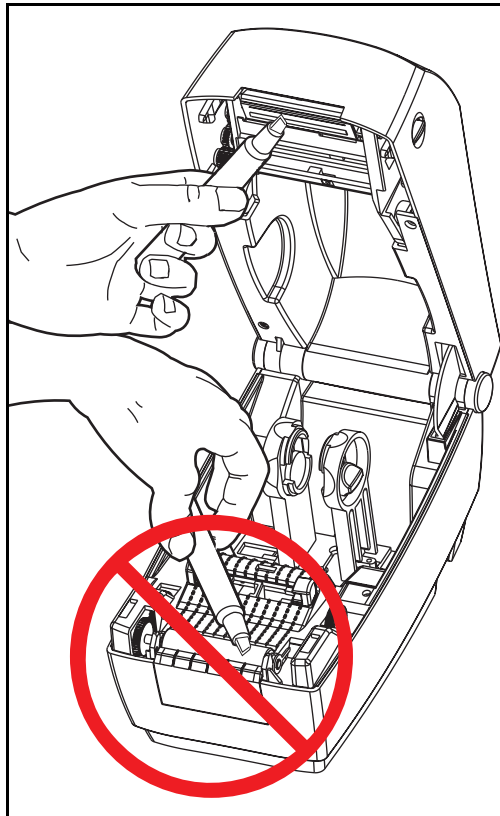


**Caution** • The print head becomes hot while printing. To protect from damaging the print head and risk of personal injury, avoid touching the print head. Use only the cleaning pen to perform maintenance.

When you load new media, you can also clean the print head.

1. Rub the cleaning pen across the dark area of the print head.
2. Wait one minute before closing the printer.

Do not clean the platen roller.

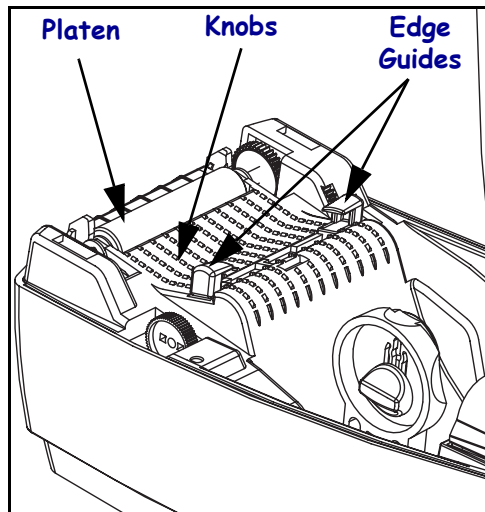


## Media Guide Considerations

Use a cleaning swab or pen 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 or pen to soak the debris so that it breaks up.
2. Wipe the knobs 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.

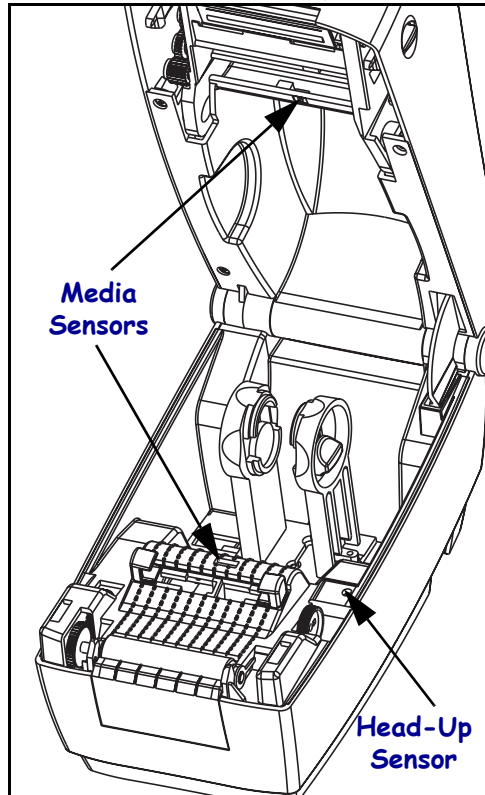
Discard the cleaning swab or pen after use.



## Sensors

Dust can accumulate on the media and head-up 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 swab to break up.
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 print head or cause the media to slip when printing. Adhesive, dirt, general dust, oils and other contaminants should be cleaned immediately off the platen.

Keep a new platen available as a spare and install it whenever the printer has significantly poorer performance, print quality or media handling. 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 (95% pure or better).

1. Open the media door and remove the media.
2. Remove the platen from the printer (refer to the replacement procedure in this section).
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 (refer to the replacement procedure in this section).
5. Discard the cleaning swab or pen after use.

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

## Lubrication



---

**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.

---

## Replacing the Platen



**Tools** • You will need to use a pointed stylus (such as tweezers, small slot-head screwdriver or razor-knife) during this procedure.

### Removal

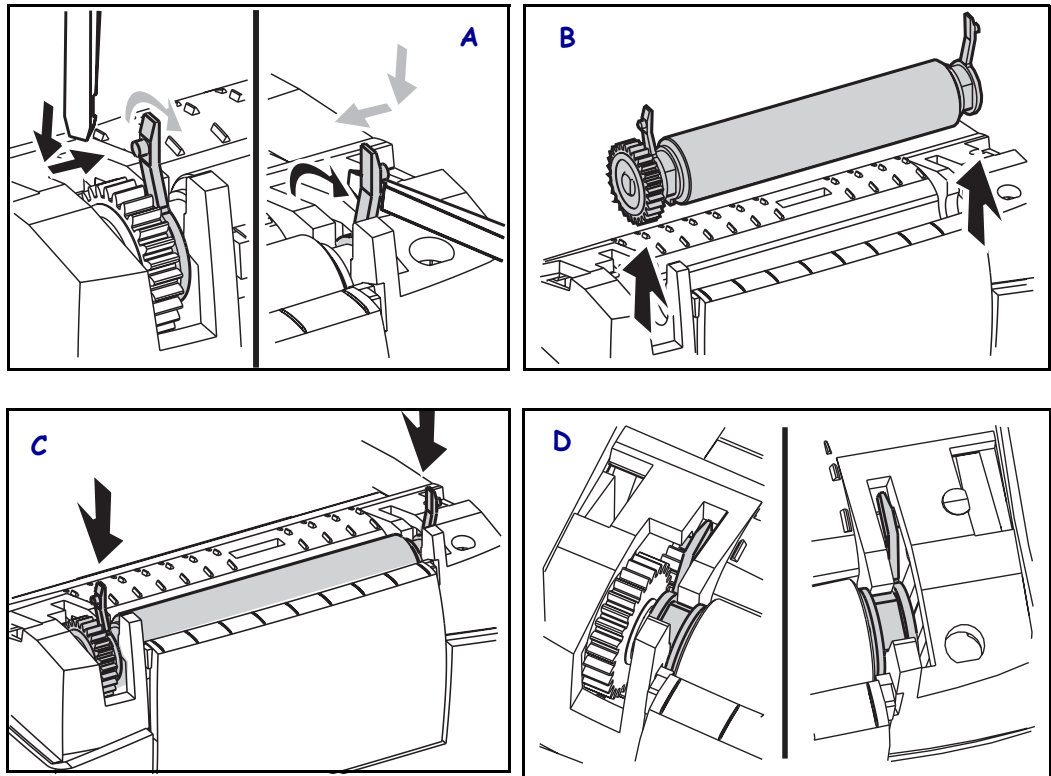
Open the printer and remove any media.

1. Using a pointed stylus (such as tweezers, small slot-head screwdriver, or razor-knife), unhook the tabs on the right and left sides. Then rotate them forward.
2. Lift the platen out of the printer's bottom frame.

### Assembly

Make sure the right bearing is on the shaft of the platen.

1. Align the platen with the gear to the left and lower it into the printer's bottom frame.
2. Rotate the tabs back and snap them into place.



## Replacing the Print Head

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



---

**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 print head.

---



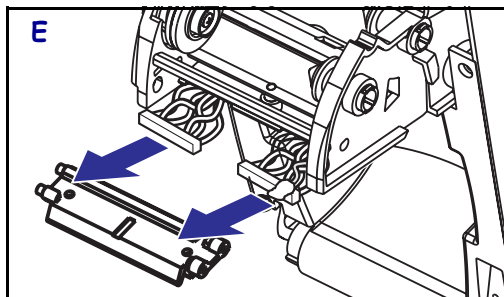
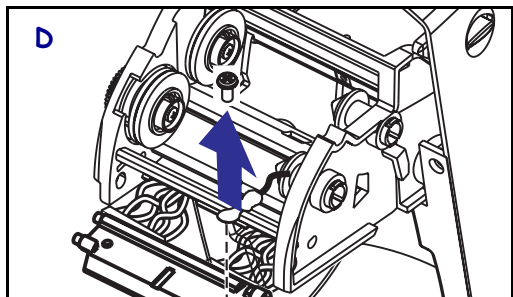
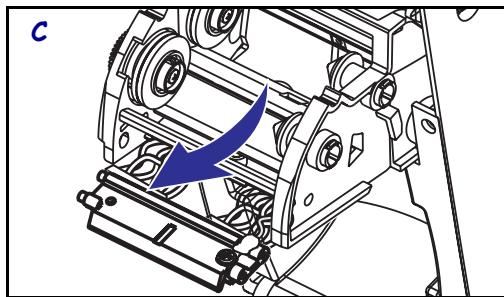
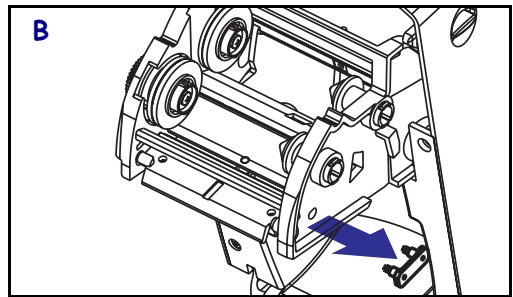
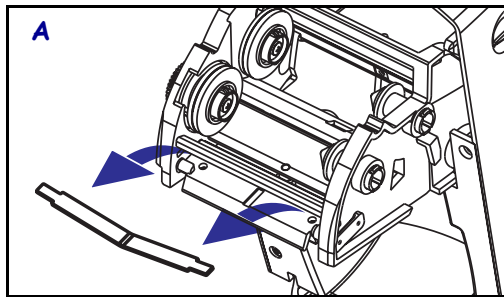
**Tools** • You will need to use a #2 Phillips driver during this procedure.

## Thermal-Transfer TLP Model

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

### Removal

1. Grasp the print head spring and pull it to the left; then, slide it free of the carriage.
2. Use the spring to pry the print head clip off the right side of the carriage.
3. Pull the print head and bracket forward.
4. Use a #2 Phillips driver to remove the screw that holds the ground wire.
5. Unplug both bundles of print head wires from their connectors.



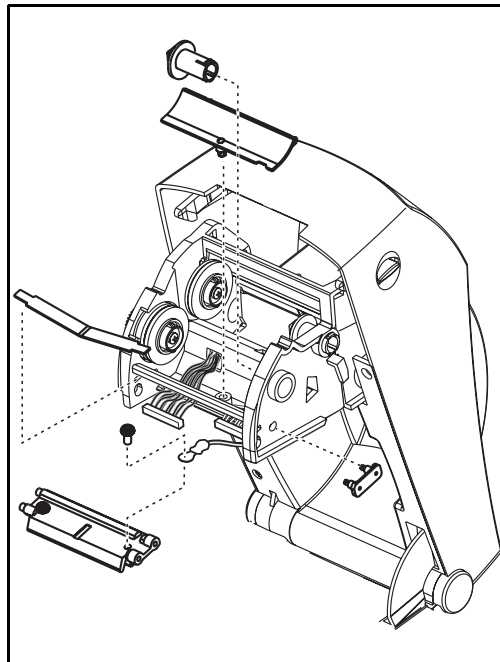
### *Replacing the TLP Print Head (Continued)*

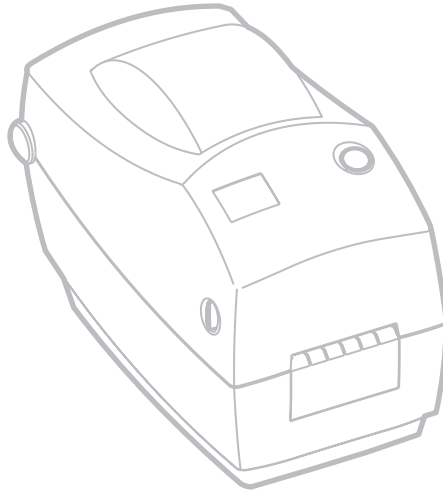
#### **Assembly**

The new print head comes with the clip and ground screw attached.

1. Detach the wire cover.
2. Detach the ribbon take-up hub.
3. Align the print head and bracket to plug the left and right connectors into the black and white wire bundles.
4. Attach the ground wire and secure it with the screw). Use a #2 Phillips driver to tighten it.
5. Insert the bracket pegs into the left side of the carriage.
6. Align the right side of the bracket and insert the print head clip through the right side of the ribbon carriage into the bracket.
7. Slip the left end of the print head spring into the left side of the ribbon carriage; then slide the right end into the other side. The angle of the "v" fits into the indent on top of the print head bracket.
8. Attach the ribbon take-up hub.
9. Attach the wire cover.
10. Clean the print head with the cleaning pen.

Reload media and ribbon. Plug in the power cord. 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
Flashing Amber	Stopped	3
Flashing Green	Normal Operation	4
Flashing Red	Stopped	5
Double Flashing Green	Paused	6
Solid Amber	Various	7
Alternately Flashing Green and Red	Needs Service	8

## 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.

### 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 shortage of memory.**

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

### **5. Either the media or ribbon is out.**

- Load a roll of media, following the instructions in “Loading the Media” in the Getting Started chapter. Then, press the feed button to resume printing.
- Load a roll of ribbon, following the instructions in “Loading the Ribbon” in the Getting Started chapter. Then, press the feed button to resume printing.

### **The print head 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 print head is under temperature.**

- Continue printing while the print head reaches the correct operating temperature.

## **The print head is over temperature.**

- Printing will stop until the print head 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.

## Print Quality Problems

### No print on the label.

- You must use the correct media for the method of printing you require. When printing without a ribbon, you must use direct thermal media. When using ribbon, you must use thermal transfer media. The printer's ribbon sensor detects motion of the supply spindle.
- Is the media loaded correctly? Follow the instructions in “Loading the Media” in the Getting Started chapter.

### The printed image does not look right.

- The print head is dirty. Clean the print head.
- The print head is under temperature.
- Adjust the print darkness and/or print speed. Refer to the six-flash sequence in “Feed Button Modes” later in this chapter, or the ^PR and ~SD commands in the ZPL II Programming Guide.
- 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.

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

- The print head is dirty. Clean the print head.
- The print head elements are damaged. Replace the print head (see “Replacing the Print Head” in the Maintenance chapter).

### The ribbon sensor settings did not print.

- The printer is set for direct thermal printing; use the ^XA^MTT^XZ command to reset the printer for thermal transfer printing and calibrate again.

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

- The media may not be threaded under the media guides. Refer to “Loading the Media” in the Getting Started chapter.
- The printer needs to be calibrated. Refer to “Auto Calibration” in the Getting Started chapter.
- 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 II Programming Guide).
- Verify that the Label Top (^LT) command is correctly set for your application (consult the ZPL II Programming Guide).

## **A 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” 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 “Communicating with the Printer” in the Getting Started chapter.

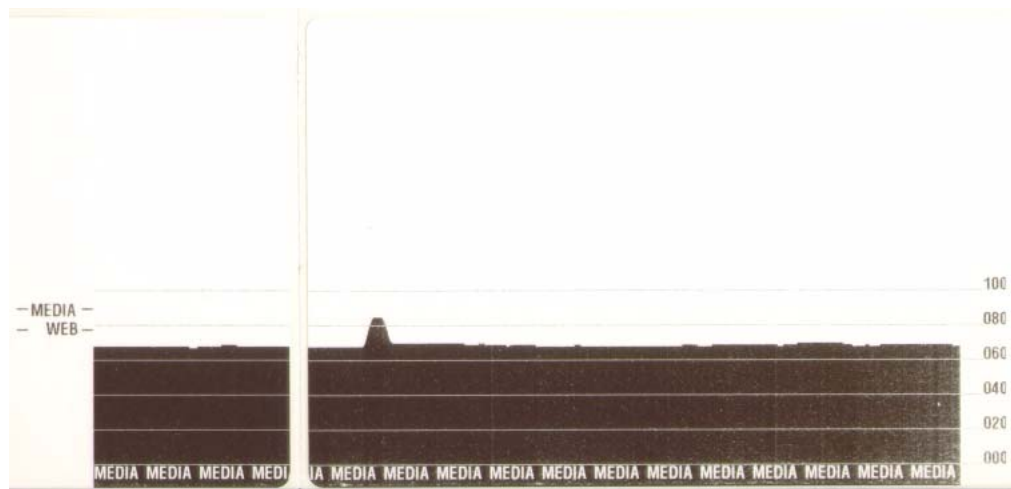
## Manual Calibration

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 LED flashes once, then twice. 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 print head.
5. 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.
6. 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 (see the four-flash sequence in “Feed Button Modes” later in this chapter).



## 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" later in this chapter.

PRINTER CONFIGURATION	
Zebra Technologies ZTC modelname=resdpi	
+10.....	DARKNESS
+000.....	TEAR OFF
TEAR OFF .....	PRINT MODE
NON-CONTINUOUS.....	MEDIA TYPE
WEB.....	SENSOR TYPE
THERMAL-TRANS.....	PRINT METHOD
056 0/8 MM .....	PRINT WIDTH
0831.....	LABEL LENGTH
39.0IN 988MM .....	MAXIMUM LENGTH
NOT CONNECTED .....	USB COMM.
PARALLEL.....	PARALLEL COMM.
RS232 .....	SERIAL COMM.
8600.....	BAUD
8 BITS .....	DATA BITS
NONE.....	PARITY
XON/XOFF.....	HOST HANDSHAKE
NONE.....	PROTOCOL
000.....	NETWORK ID
NORMAL MODE .....	COMMUNICATIONS
<~> 7EH .....	CONTROL PREFIX
<^> 5EH .....	FORMAT PREFIX
<,> 2CH .....	DELIMITER CHAR
ZPL II .....	ZPL MODE
FEED.....	MEDIA POWER UP
FEED.....	HEAD CLOSE
DEFAULT.....	BACKFEED
+020.....	LABEL TOP
+0000.....	LEFT POSITION
029.....	WEB S.
068.....	MEDIA S.
050.....	RIBBON S.
050.....	MARK S.
001.....	MARK MED S.
062.....	MEDIA LED
000.....	RIBBON LED
081.....	MARK LED
CS.....	MODES ENABLED
.....	MODES DISABLED
448 8/MM FULL .....	RESOLUTION
SP.814.B <- .....	FIRMWARE
V2.2.6.98.C.....	HARDWARE ID
CUSTOMIZED.....	CONFIGURATION
1024.....	R: RAM
0768.....	E: ONBOARD FLASH
NONE.....	FORMAT CONVERT
.....	TWINAX/COAX ID
FW VERSION .....	IDLE DISPLAY
05/05/37.....	RTC DATE
00:00.....	RTC TIME
NONE.....	ZEBRA NET II
.....	
2004-06-08 10:07:34	TIME STAMP

FIRMWARE IN THIS PRINTER IS COPYRIGHTED

### Recalibration

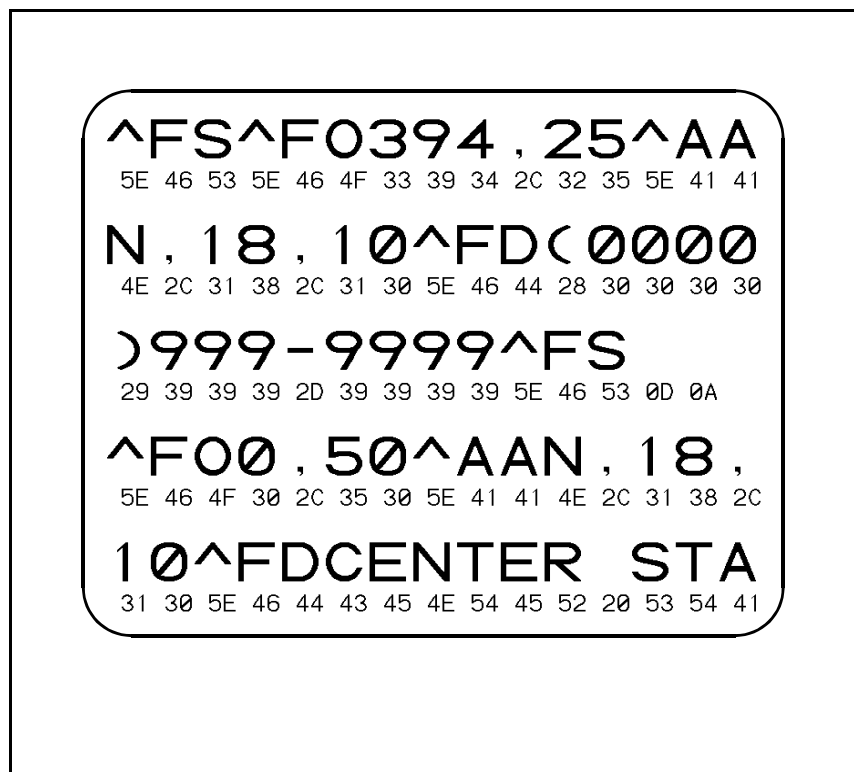
Recalibrate the printer if it starts to display unusual symptoms, such as skipping labels. See "Printing a Test Label" in the Getting Started chapter.

## Resetting the Factory Default Values

Sometimes, resetting the printer to the factory defaults solves some of the problems. Follow the four-flash sequence instructions in “Feed Button Modes” later in this chapter

## 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, refer to the power off mode procedure in “Feed Button Modes” later in this chapter.



# 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. The printer prints out a listing of its current configuration. After printing the label, the printer will automatically enter a diagnostic mode in which the printer prints out a literal representation of all data subsequently received. To exit the diagnostic mode and resume printing, turn off and then turn on the printer.	
Power On Modes	
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 specific number of flashes	
Flash Sequence	Action
*	A configuration label prints.
* **	The media sensor calibrates and a media sensor profile prints (see “Manual Calibration” earlier in this chapter).
* ** ***	To reset the communication parameters. Press and release the feed button while the LED rapidly flashes amber and green.  For autobaud synchronization: Send a ZPL II format 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.
* ** *** ****	Resets the factory defaults, auto calibrates, and saves settings into memory.
* ** *** **** *****	The print width calibrates. While the status LED alternately flashes green and amber, a series of stacking rectangles print on the label. When the rectangle prints to the outer edges of the label, press and release the feed button. The label width and current communication parameters will be saved into memory.
* ** *** **** ***** *****	The print darkness calibrates. A series of nine samples print, starting with the lightest and ending with the darkest image. When the desired print darkness is achieved, press and release the feed button. The print darkness will be saved into memory
If the feed button remains pressed after a 7-flash sequence, the printer will ignore the button when it is released	

## Battery

The optional Real Time Clock requires a three-volt lithium battery on the main printed circuit board. You can discern a low or flat battery if the printer provides a consistently delayed date stamp. Only a qualified technician observing precautions against both static discharge and electric shock can replace the battery.



---

**Caution** • Risk of explosion if battery is replaced with an incorrect type.

---



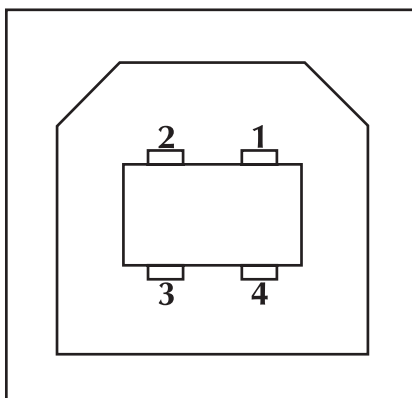
**Important** • Recycle batteries according to local your guidelines and regulations.



# 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.zebra.com](http://www.zebra.com)

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

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

## Parallel Interface

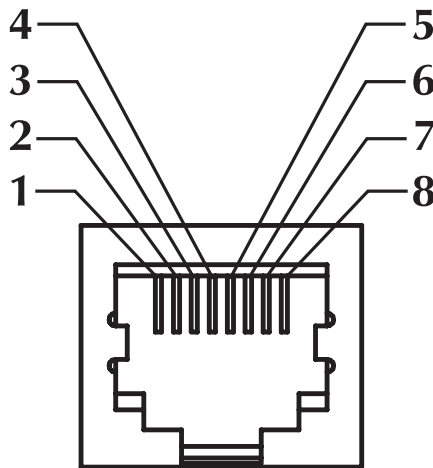
The maximum current available through the interface port is not to exceed a total of 0.75 amps.

Pin No.	Description
1	NStrobe/Host Clk
2-9	Data Bits 1-8
10	nACK/PtrClk
11	Busy/Per Busy
12	PError/ACK Dat Req.
13	Select/Xflag
14	NAuto Fd/Host Busy
15	Not Used
16-17	Ground
18	+5 V @ 0.75 A Fused
19-30	Ground
31	nInit
32	NFault/nData Avail.
33-34	Not Used
35	+5 V through 1.8 K Ohms Resistor
36	NSelectin/1284 active

## ZebraNet® PrintServer II for Ethernet Networks

This interface uses an RJ-45 straight-through cable type. The table below provides the pinout assignments.

Signal	Pin	Pin	Signal
<b>Tx+</b>	1	1	Tx+
<b>Tx-</b>	2	2	Tx-
<b>Rx+</b>	3	3	Rx+
---	4	4	---
---	5	5	---
<b>Rx-</b>	6	6	Rx-
---	7	7	---
---	8	8	---



The figure above has the perspective looking into the printer RJ-45 modular connector.

You can refer to the ZebraNet® PrintServer IITM for Ethernet Networks Installation and Operation Guide for details regarding this interface.

The RJ-11 jack on Ethernet boards is used for factory tests only.

## Serial (RS-232) Connector

Pin No.	Description
1	Not used
2	RXD (receive data) input to the printer
3	TXD (transmit data) output from 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) input to 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.

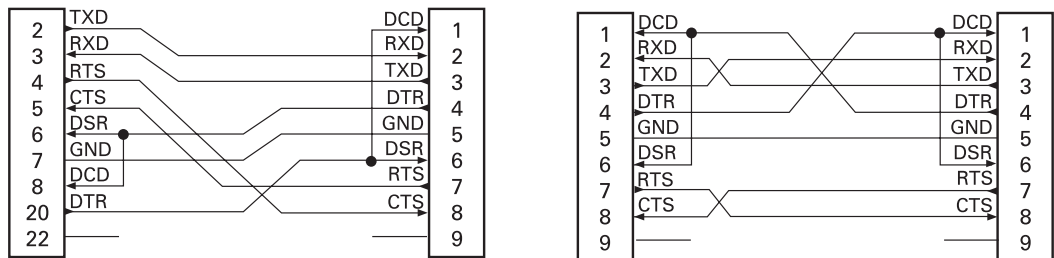
When XON/XOFF handshaking is selected, data flow is controlled by the ASCII control codes DC1 (XON) and DC3 (XOFF). The DTR control lead will have no effect.

**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.

**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.

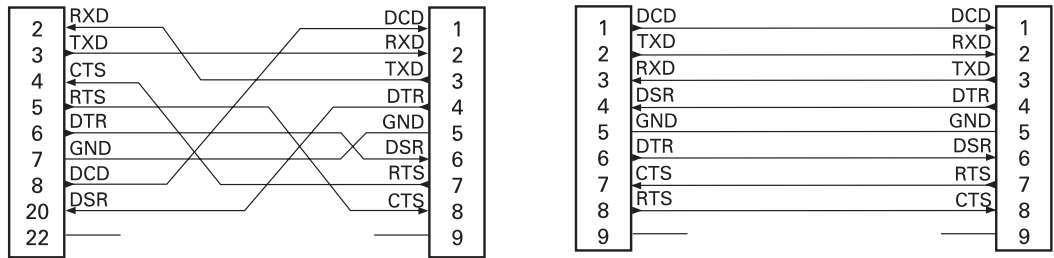
Connecting the Printer to a DTE Device

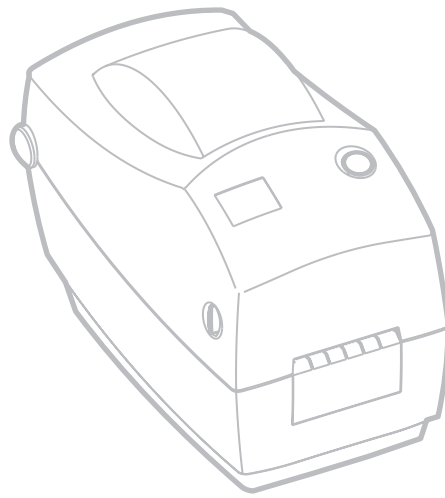
DB-25S Connector to DTE Device (PC)	DB-9P Connector to Printer	DB-9S Connector to DTE Device (PC)	DB-9P Connector to Printer
---	----------------------------------	--	----------------------------------



Connecting the Printer to a DCE Device

DB-25S Connector to DCE Device (PC)	DB-9P Connector to Printer	DB-9S Connector to DCE Device (PC)	DB-9P Connector to Printer
---	----------------------------------	--	----------------------------------









**Zebra Technologies Corporation**

333 Corporate Woods Parkway  
Vernon Hills, Illinois 60061.3109 U.S.A.  
Telephone: +1 847.634.6700  
Facsimile: +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  
Facsimile: +44 (0) 1494 450103