



When it's on the line.™

# R402

Smart Label Printer and Encoder

## User's Guide



980389-001 Rev. A



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- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different than that to which the receiver is connected.
- Consult the dealer or an experienced Radio/TV technician for help.

**NOTE:** This unit was tested with shielded cables on the peripheral devices. Shielded cables must be used with the unit to insure compliance.

“The user is cautioned that any changes or modifications not expressly approved by Zebra Technologies Corporation could void the user’s authority to operate the equipment.”

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**Appendix**



**Zebra Technologies Corporation**

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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 the Zebra® R402™ Printer, a high-quality thermal transfer on-demand printer with RFID capability 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.

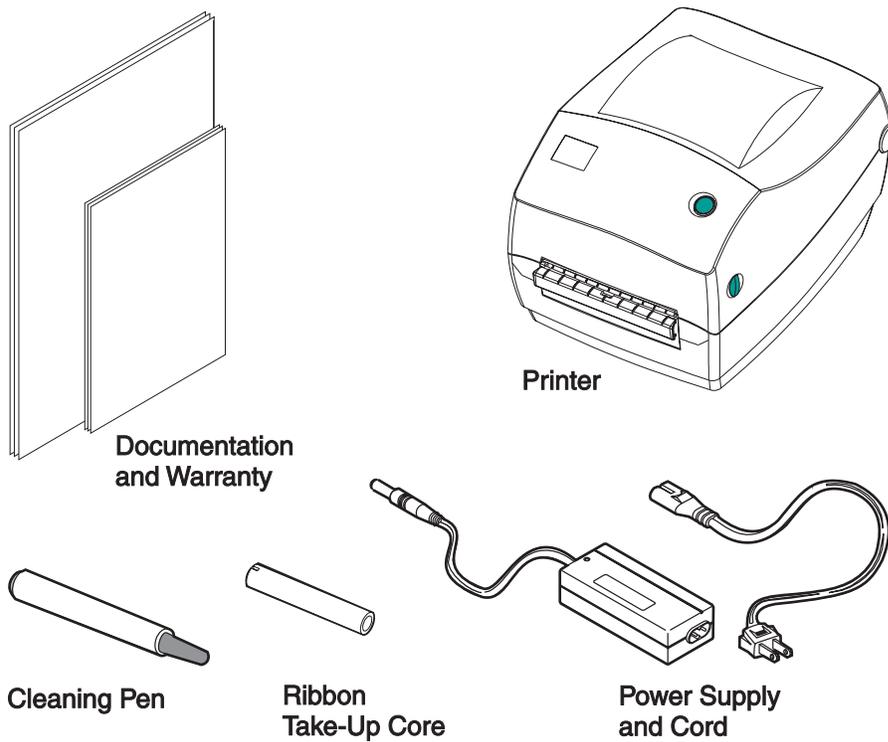
This manual provides all of the information you will need to operate your printer on a daily basis. RFID specific ZPL II commands are contained in this manual. To create label formats, refer to the ZPL II Programming Guide (part # 46530L). This guide is available by contacting your distributor or Zebra Technologies Corporation.

**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.

The Zebra R402 printer, when connected to a host computer, functions as a complete system for printing and encoding “smart” labels, tickets, and tags.

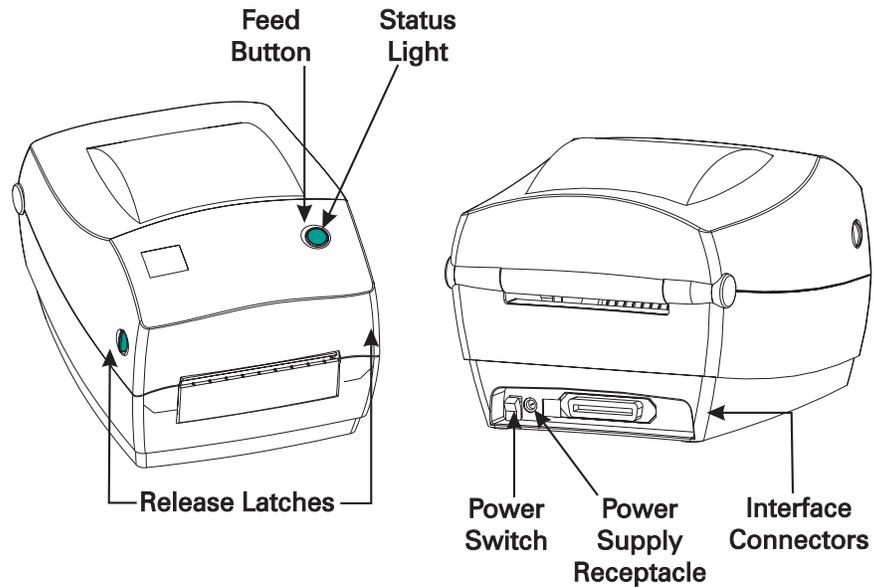
## What's in the Box?

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.

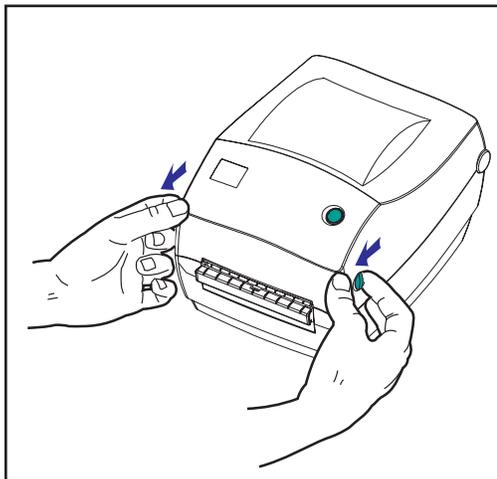


## Inspecting the Printer

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



### *Opening the printer*

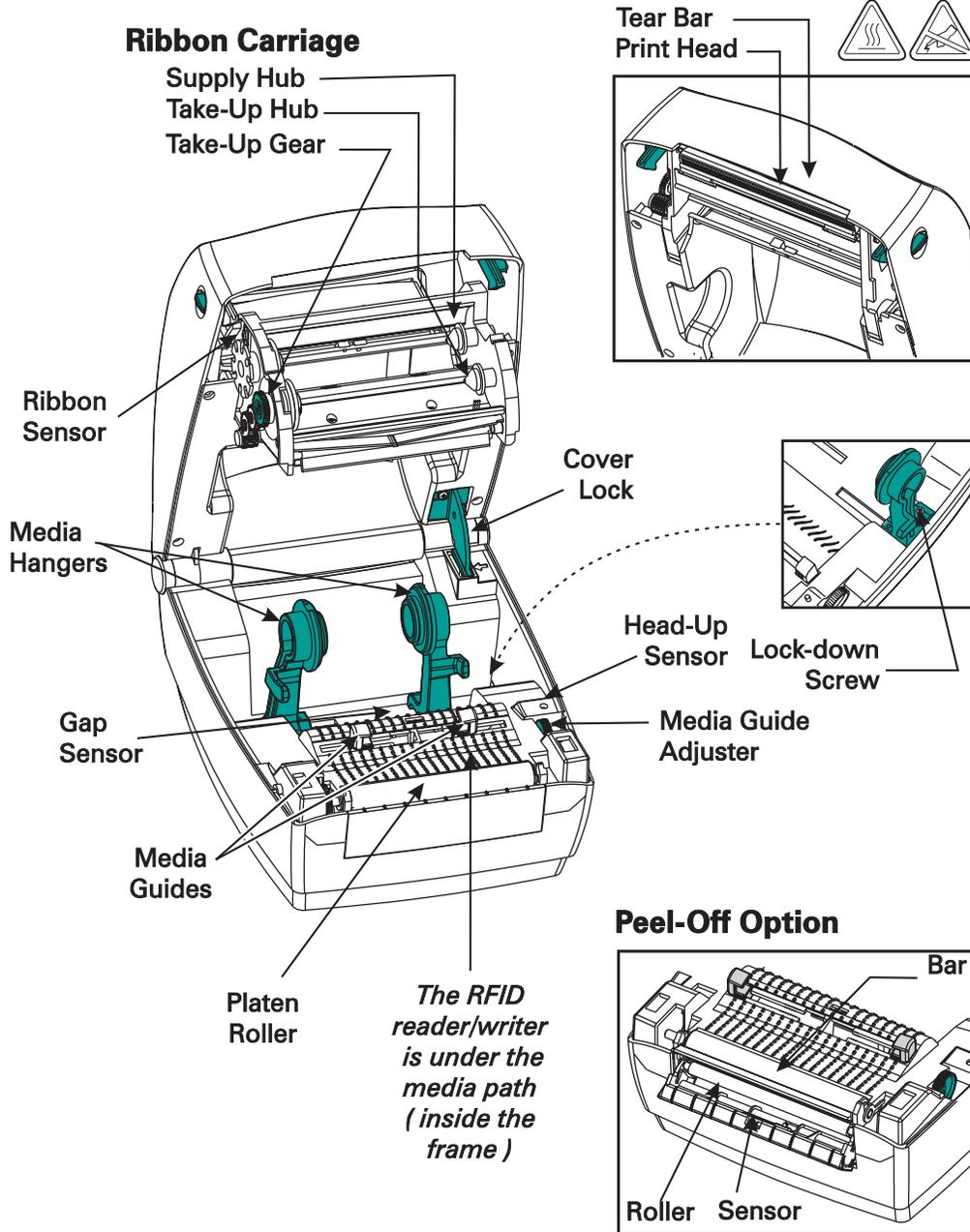


To access the media compartment, you must open the printer.

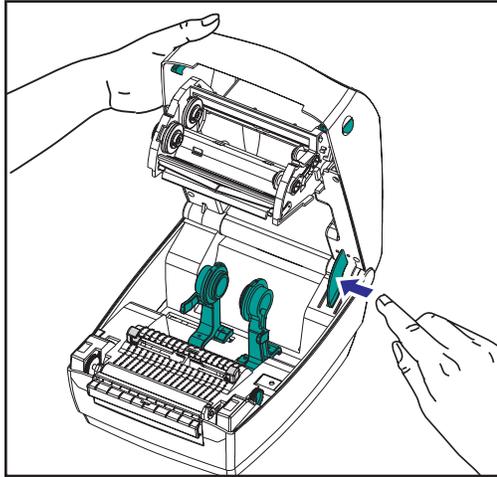
Pull the release levers towards you and lift the cover.

*INSPECTING THE PRINTER (continued)*

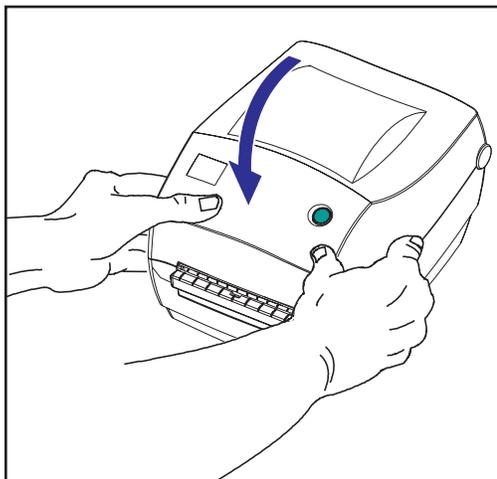
After opening the printer, check the media compartment.



### ***Closing the printer***



Hold the top cover and press the cover lock to release.



Lower the top cover. The ribbon carriage automatically folds up into place.

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 two different modes: tear-off or peel-off.

- 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.

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

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

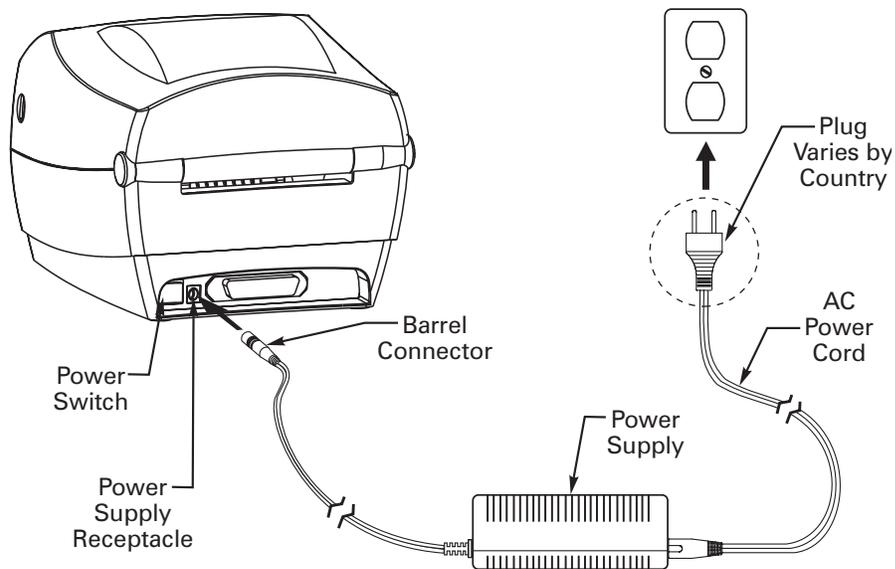
## Attaching Power Supply

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

**Warning: Use the Zebra-supplied 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!**

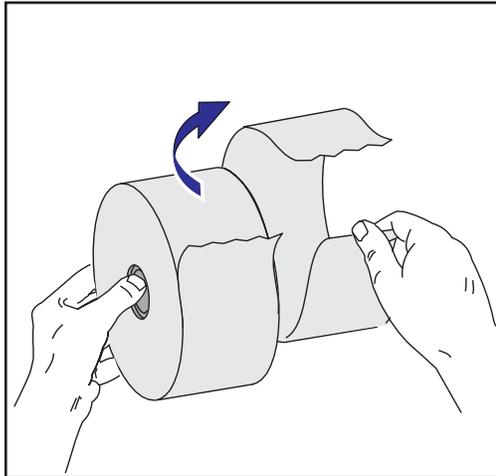
1. Make sure the power switch is in the off position (down).
2. The DC power supply has a barrel connector on one end that must be inserted into the power supply receptacle on the back of the printer.
3. Insert the separate AC power cord into the power supply.
4. Plug the other end of the cord into an appropriate AC electrical outlet.



## Loading Roll Media

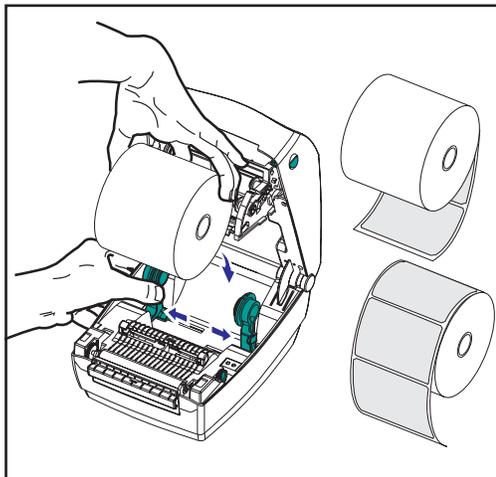
When you load media, you must place the roll on the media hangers and then adjust the media guides.

### *Placing the Roll in the Media Compartment*

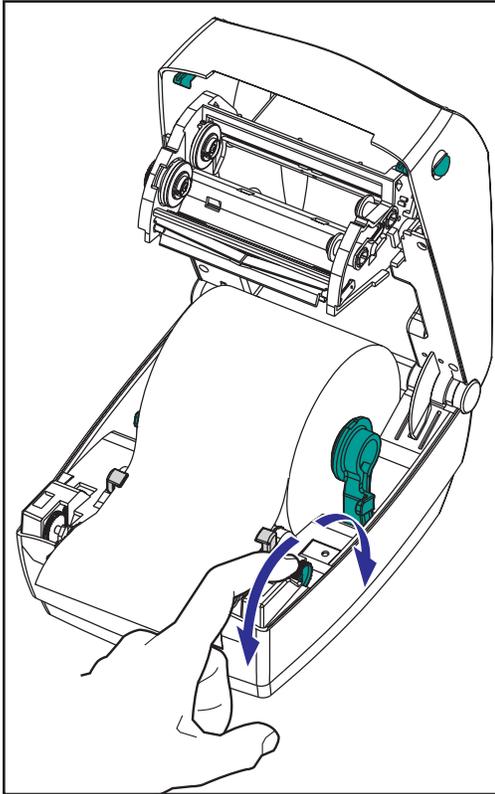


Whether your roll media is inside or outside wound you load it into the printer the same way.

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.



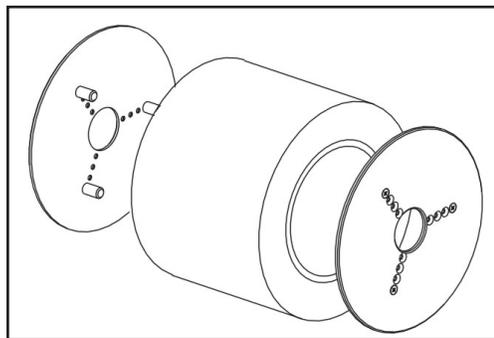
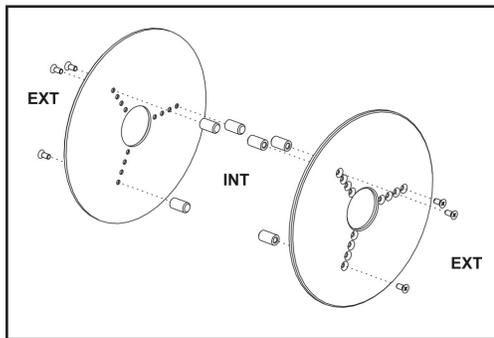
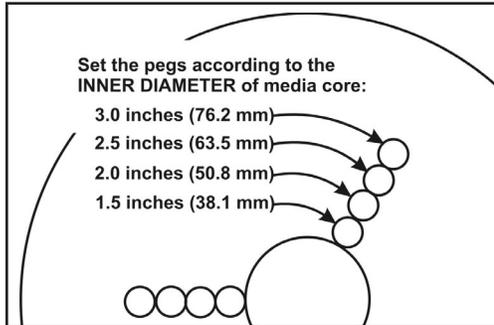
## ***Adjusting the Guides***



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.

## Using the Optional Media Adapter Plates



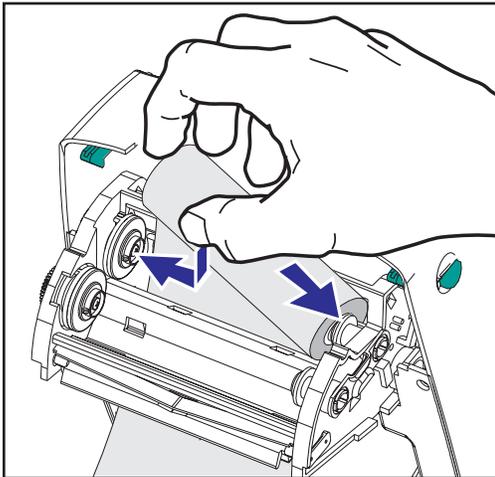
If your media roll has a larger diameter core, you can use an accessory (part number 105810-002) to adapt the core to the media holders.

1. Note which position will fit the diameter of the roll core.
2. On the left side plate, align the pegs with the screws and use a small Phillips driver to tighten them.
3. On the right side plate, align the pegs with the screws and use a small Phillips driver to tighten them.
4. Align the plates so that the pegs hold the roll core and press together.
5. Place the roll into the media compartment.

## 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.

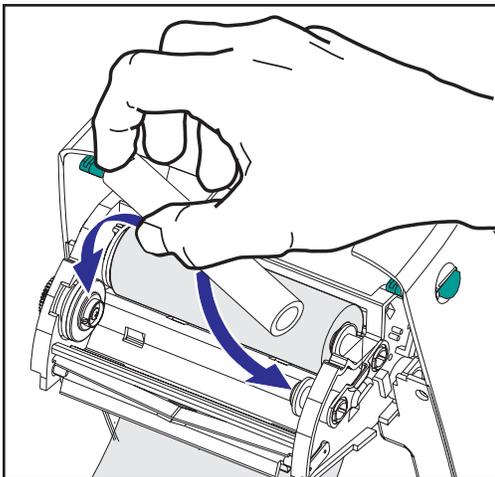
### *Install the Ribbon Supply Roll*



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.

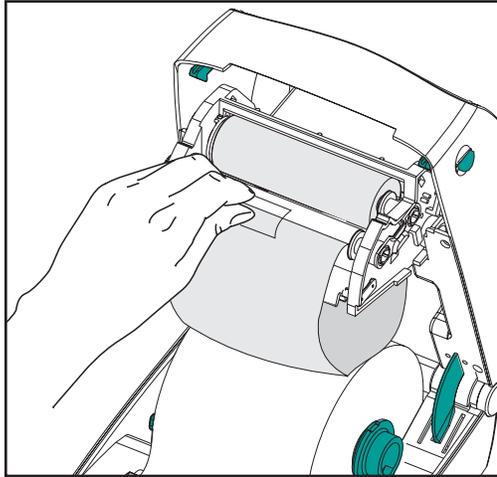
### *Install the Take-Up Core*



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.

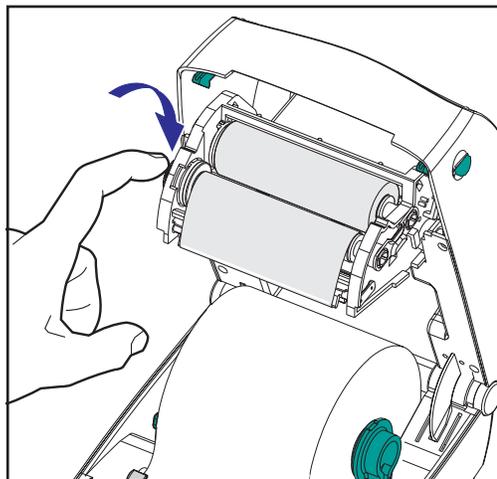
You can find your first ribbon take-up core in the packing box. Subsequently, use the empty supply core to take up the next roll of ribbon.

## ***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.

## Auto Calibration

**NOTE:** If you are using pre-printed labels, pre-printed label backing, or continuous media, see “Manual Calibration” on page 49.

An auto calibration is performed when the printer is turned on (if media is loaded) or after a media error is cleared. When it is auto calibrating, the printer sets the sensor levels for, and determines the length of, the label you are using.

If the status light flashes red, refer to “Manual Calibration” on page 49.

# Operator Controls

## ***Power Switch***

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

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

## ***Feed Button***

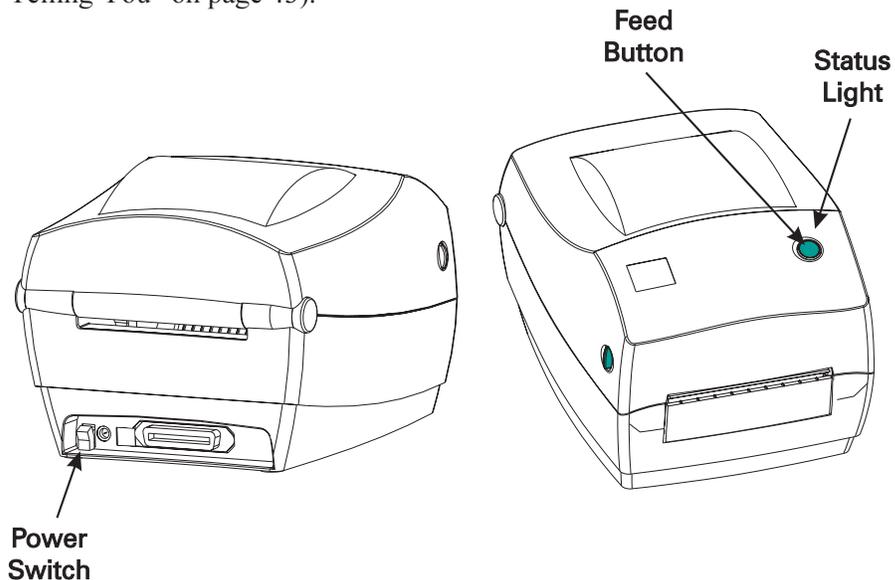
Forces the printer to feed one blank label.

Takes the printer out of a “pause” condition. (The printer is put into “pause” by either a ZPL II command or an error condition.) See “What the Status Light is Telling You” on page 43.

Use the Feed button for printer setup and status (see “Feed Button Modes” on page 52).

## ***Status Light***

Functions as a printer operational indicator (see “What the Status Light is Telling You” on page 43).



## 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 Troubleshooting on page 43.

P R I N T E R   C O N F I G U R A T I O N	
Zebra Technologies ZTC R402-200dpi	
+10. ....	DARKNESS
+000. ....	TEAR OFF
TEAR OFF. ....	PRI NT MODE
NON-CONTINUOUS. ....	MEDIA TYPE
WEB. ....	SENSOR TYPE
THERMAL-TRANS. ....	PRI NT METHOD
104.0/8 MM. ....	PRI NT WIDTH
1233. ....	LABEL LENGTH
22.01N 557MM. ....	MAXIMUM LENGTH
38400. ....	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.
CS. ....	MODES ENABLED
.....	MODES DISABLED
832 8/MM FULL. ....	RESOLUTION
SP. 814. B. ....	FIRMWARE
V2.2.6.98.C. ....	HARDWARE ID
CUSTOM ZED. ....	CONFIGURATION
1024. ....	R: RAM
0000. ....	B: MEMORY CARD
0768. ....	E: ONBOARD FLASH
NONE. ....	FORMAT CONVERT
NONE. ....	OPTION
NONE. ....	ZEBRA NET II
AUTO DETECT. ....	RFID TAG TYPE
oem 400: Ver. 2.00	RFID VERSION

F I R M W A R E   I N   T H I S   P R I N T E R   I S   C O P Y R I G H T E D

## Hooking Up the Printer and Computer

This printer comes with a bidirectional parallel data interface. You must supply the required interface cable for your application.

***CAUTIONS:*** *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.*

*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.*

### ***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 page 57.

### ***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.

## Communicating with the Printer

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.

## 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 52) or refer to the Print Width (^PW) command (consult your ZPL II Programming Guide).

## Adjusting the Print Darkness

The relative darkness setting is controlled by either the six-flash sequence in “Feed Button Modes” (see page 52) or the Set Darkness (~SD) ZPL II command (follow the instructions in the ZPL II Programming Guide).

## Adjusting the Print Speed

Print quality is affected by print speed and the media you are using. Only by experimenting will you find the optimal mix for your application.

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

# Operation & Options

This section helps you get the most from your printer.

You must use programming to control many of the printer's functions. A few examples:

- 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

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.

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, the printer flashes double-green until you 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 orange 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.

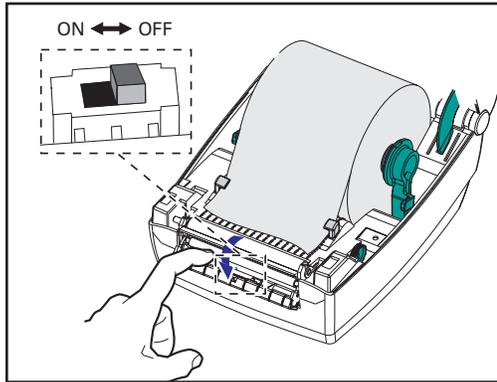
### ***Replacing a Partially Used Transfer Ribbon***

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



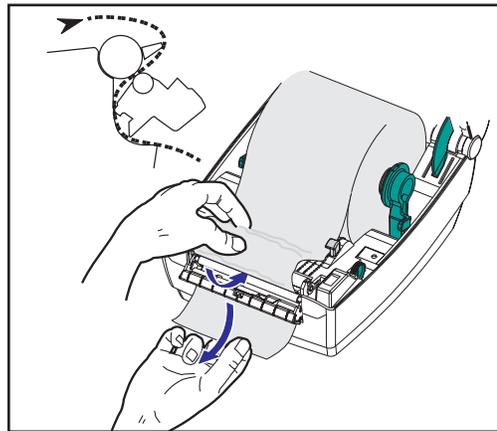
The optional dispenser allows you to print in “peel-mode” where the label backing follows a different path and the labels are presented one at a time for subsequent placement.

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

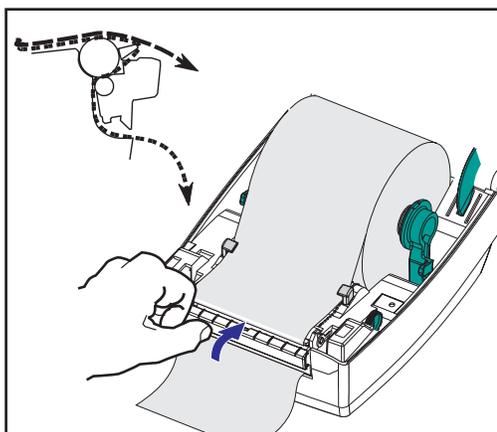
**^XA ^MMP ^XZ**

**^XA ^JUS ^XZ**

to the printer. Refer to your ZPL II Programmer's Manual.



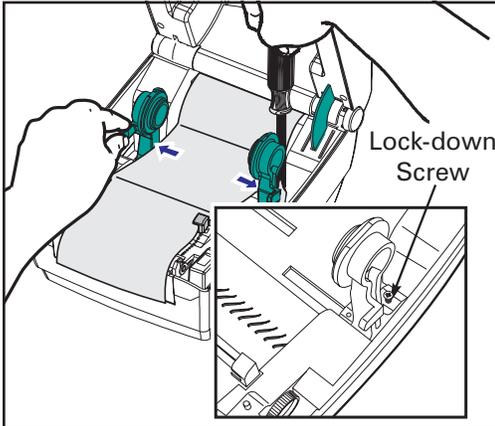
1. Remove several labels from the backing material.
2. Open the top cover.
3. Open the dispenser door.
4. Switch on the label-taken sensor.



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.

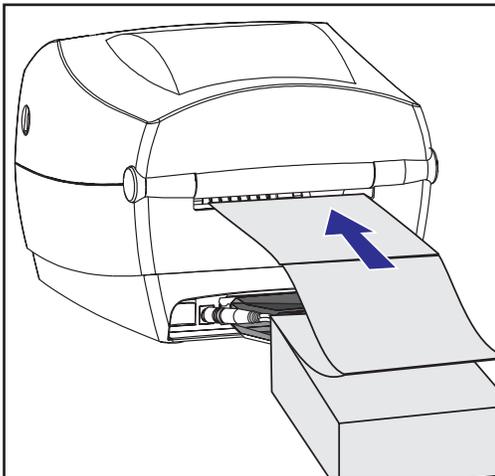
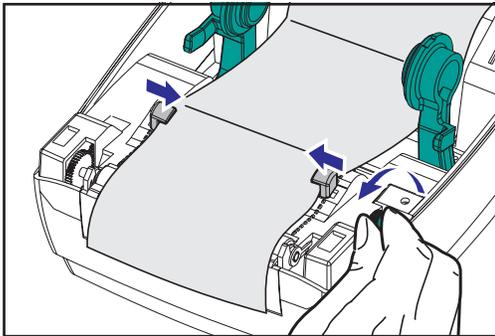
During the print job, the printer will peel off the backing and present a single label. Take the label from the printer so it will print the next label.

## Printing on Fan-Fold Media



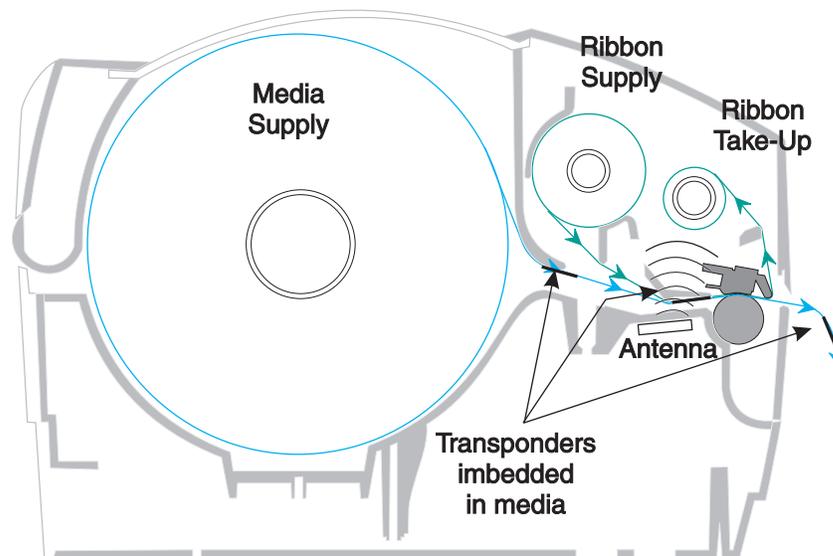
Printing on fan-fold media requires you to set both the media hangers and the media guides in position.

1. Open the top cover.
2. With a sample of your media, adjust the media hangers to the width of the media. The hangers should just touch, but not restrict, the edges of the media.
3. Tighten the screw using a small Phillips driver #1.
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.



# *RFID Guidelines*

The Zebra R402 Smart Label Printer and Encoder serves as dynamic tool for both printing and programming smart labels, tickets and tags. Smart labels are usually made from two components, media and a RFID (radio frequency identification) transponder. The media will usually be comprised of synthetic- or paper-based material that can be printed upon using direct thermal or thermal transfer printing techniques. The media is typically made from the same materials and adhesives standard a non-RFID barcode printer would use. The second component of smart label is the transponder, sometimes known as the RFID tag. The transponder is usually comprised of an antenna coil that is bonded to an integrated circuit (IC) chip. The IC contains the RF drivers, coders, decoders and memory. At a minimum, RFID tags have memory that can be read, while the vast majority also have memory that can be programmed by the user as well.



The communication between the RFID tag and R402 printer is established when the transponder lines up with the printer's antenna. Note that transponder position, prior to encode/decode, is critical. The optimal transponder position varies with antenna coil size and type of RFID IC used. **It is important to use media and tags that have been specifically designed for use in the R402. Failure to do so may result in the inability to read or program the embedded RFID tags.**

Printing and programming of smart labels is handled through the use of Zebra's printer programming language, ZPL. The printer segments the received ZPL's RFID and non-RFID related commands. The R402 will execute the RFID commands first, followed by the others (like the printing commands for barcodes or human readable text). Each transponder has blocks of addressable memory that are written to and read from through ZPL commands. Many transponders also contain a pre-programmed unique ID/serial number. The ZPL commands also provide for exception handling, such as setting the number of read/write retries before declaring the transponder defective. If an RFID tag is declared defective (fails to program correctly or cannot be detected) the printer ejects it and prints the word "void" across the entire label. This process will continue for two more RFID tags using the same data and format, assuming the problems persist. After the third tag is ejected the printer removes the customer format from the print queue, and proceeds with the next format (if one exists in the buffer).

## Supported Transponders

The R402 supports several transponder types:

- Texas Instruments Tag-it™
- Philips I•Code
- Inside Technologies Picotag® 2K
- ISO 15693

## ***Texas Instruments Tag-it™ Transponders***

Texas Instruments transponders are high frequency (13.56MHz) RFID devices. Each transponder has 256 bits of memory. Data is segmented into 4 byte (32 bit) blocks that are uniquely addressable, for a total of 8 blocks. Each memory block is lockable using the write protect function during the writing process.

<b>Texas Instruments Tag-it™ Blocks</b>		
Block #	Description	Bytes
0	User Data	32 User
1	User Data	
2	User Data	
3	User Data	
4	User Data	
5	User Data	
6	User Data	
7	User Data	

## ***Philips I•Code Transponders***

Philips I•Code transponders are high frequency (13.56MHz) RFID devices. Each transponder has 512 bits of memory. Data is segmented into 4 byte (32 bit) blocks that are uniquely addressable for a total of 16 blocks. Each memory block is lockable using the write protect function during the writing process. The first two blocks of data (block 0 and 1) are pre-programmed, non-changeable, and are used for storage of a unique 64 bit serial number. The next two blocks (blocks 2 and 3) are used for storage of configuration information; block 4 is used for family or application identification and blocks 5 to 15 are free for user application use.

If you are using these transponders for your own use, and don't require universal special function or family codes, then you can program blocks 3 through 15.

<b>Philips I•Code Blocks</b>		
Block #	Description	Bytes
0	Serial Number (write protected)	
1	Serial Number (write protected)	
2	Write Protect Block (Caution*)	
3	Special Function Block	8 Optional
4	Family Code	
5	User Data	40 User
6	User Data	
7	User Data	
8	User Data	
9	User Data	
10	User Data	
11	User Data	
12	User Data	
13	User Data	
14	User Data	
15	User Data	

\* The bits in block 2 determine the write access conditions for itself and each of the remaining blocks. You can leave blocks 2 through 15 open or you can write-protect them. Write-protected blocks (included block 2) can never be written to from the moment they are locked

## ***Inside Technologies Picotag® Transponders***

Inside Technologies Picotag® transponders are high frequency (13.56MHz) RFID devices. Each transponder has 2048 bits of memory. Data is segmented into 8 byte (64 bit) blocks that are uniquely addressable for a total of 31 blocks. Blocks 6 to 12 are lockable using the write protect function during the writing process. The first block of data (block 0) is pre-programmed and is used for storage of a unique 64 bit serial number. The next two blocks (blocks 2 and 3) are used for storage of configuration information; blocks 3 to 31 are free for user application use.

<b>Inside Technologies Picotag® 2K</b>								
Block	Byte number within a block							
	0	1	2	3	4	5	6	7
0	Serial Number (64 bits)							
1	FFh	Application 16-bit OTP Area	Block Write Lock	Tun- ing Cap	1Fh	E.A. S.	Fuses	
2	Application Issuer Area							
3	Application Area							
4								
5								
6								
7								
8	Block Write Lockable Application Area							
9								
10								
11								
12								
13	Application Area							
...								
...								
31								

### ***ISO-15693 Transponders***

ISO-15693 is an international standard for 13.56 MHz RFID devices. As this is a public standard, tags and integrated circuits may be produced by a wide variety of manufacturers. The current standard stipulates that manufacturers may configure memory in various ways ( up to 256 blocks comprising a block size up to 256 bits (32 bytes)). The standard also stipulates that a manufacturer may, or may not, use the recommend methods of reading and writing to the tag as stipulated in the standard. For these reasons, the R402 may not be compatible with every manufacturers ISO-15693 transponders. Contact your technical support representative for the latest list of supported ISO-15693 transponders.

## ZPL II Commands for RFID

### ***^WT – Write Tag***

The format for the ^WT instruction is: ***^WTb,r,m,w,s***

where

***^WT*** = Write Tag command

***b*** = Block Number

Default value: 0

Other values: 1 to n, where n is the maximum number of blocks for the tag

This is the starting block number. If the user sends more than a block of data it will overflow into the next block. If the user overflows the block and subsequent blocks cause errors (write protects, beyond range, etc.), the write will be aborted, but blocks already written will not revert to original contents. It's up to the caller to ensure blocks aren't accidentally overwritten.

***r*** = Retries

Default value: 0

Other values: 1 to 10, number of retries

***m*** = motion

Default value: 0 (Feed label after writing)

Other value: 1 (No Feed after writing, other ZPL may cause a feed)

***w*** = Write protect

Default value: 0 (NOT write protected)

Other value: 1 (Write protect)

***s*** = Special mode

Reserved

## ***^RT – Read Tag***

The format for the ^RT instruction is: **^RT#*b,n,f,r,m,s***

where

**^RT** = Read Tag command

**#** = Number to be assigned to the Field

Default value: 0

Other Values: 1 to 9999

**b** = Starting Block Number

Default value: 0

Other values: 1 to n, where n is the maximum number of blocks for the tag

**n** = Number of blocks to read

Default value: 1

Other values: 2 to n, where n is maximum number of blocks minus starting block number. In other words, if the tag has 8 blocks (starting with block 0) and you're starting with block 6, n can be 2. This would give you block 6 and block 7 information.

**f** = Format

Default value: 0 ASCII

Other values: 1 Hexadecimal

**r** = Retries

Default value: 0

Other values: 1 to 10, number of retries

**m** = motion

Default value: 0 (Feed label after writing)

Other value: 1 (No Feed after writing, other ZPL may cause a feed)

**s** = Special Mode

Default value: 0

Other values: 1 to 255, to specify more detailed mode control.

*^RT – Read Tag (continued)*

Example: This reads a block from a tag, and prints it on a label:

```
^XA  
^FO20,120^A0N,60^FN1^FS  
^FO20,100^A0N,20^FN2^FS  
^RT1,0,7,3,0,5,0,0^FS  
^RT2,0,2,2,0,5,0,0^FS  
^XZ
```

The first ^RT command automatically detects the tag type, starting at block 7, reads three blocks of data in ASCII format. It will retry the command 5 times if necessary. A “void” label will be generated if the read is unsuccessful after ‘r’ retries. The data read will go into the ^FN1 location of the recalled format.

The second ^RT command automatically detects the tag type, string at block 2, reads two blocks of data in ASCII format. It retries up to 5 times. The data read will go into the ^FN2 location of the recalled format.

The data can be sent back to the host via the ^HV command.

## **^RS – RFID Setup**

The format for the ^RS instruction is: **^RSt,#**

where

t = tag type

Default value: 0 –NONE (No tags available)

Other values:

- 1- Auto detect (automatically determine the tag type, by querying the tag)
- 2- Texas Instruments Tag-it™ tags
- 3- Philips I•Code tags
- 4- Inside Technologies Picotag® 2K
- 5- ISO 15693 tag\*

# = read/write position of transponder in rows of dots

Set to 0 (zero) to not move the media.

Default value: Label length minus eight dot rows  
(one millimeter)

Other values: 0 (zero) to label length

Use caution when using this function in combination with ^RI (reading the unique ID number) or ^RT (reading tag data). Problems can occur if the data read from the tag is going to be printed on the label. Any data read from the transponder must be positioned to be printed above the read/write position. Failure to do this will prevent read data from being printed on the label, ticket or tag.

\* ISO-15693 is an international standard for 13.56 MHz RFID devices. As this is a public standard, tags and integrated circuits may be produced by a wide variety of manufacturers. The current standard stipulates that manufacturers may configure memory in various ways ( up to 256 blocks comprising a block size up to 256 bits (32 bytes)). The standard also stipulates that a manufacturer may, or may not, use the recommend methods of reading and writing to the tag as stipulated in the standard. For these reasons, the R402 may not be compatible with every manufacturers ISO-15693 transponders. Contact your technical support representative for the latest list of supported ISO-15693 transponders.

## ***^RI – RFID Get Tag Unique ID***

The format for the ^RI instruction is: **^RI***n*

where

*n* = field number to store the unique ID

The unique ID will be read from the tag and available to print or return to the host computer.

The example below reads the unique ID/serial number from a tag, and prints it on a label:

**^XA**

**^FO100,100^A0N,60^FN0^FS**

**^RI0^FS**

**^FD ^FS**

**^XZ**

## ***Sample of RFID Programming***

ZPL II™ is Zebra Technologies Corporation's Zebra Programming Language II label design language. ZPL II lets you create a wide variety of labels from the simple to the very complex, including text, bar codes, and graphics.

This section is not intended as an introduction to ZPL II. If you are a new ZPL II user, order a copy of the ZPL II Programming Guide (part# 46530L) or go to the internet address <http://support.zebra.com> and select the Documentation Button to download the guide.

For your programming, do the following:

1. Set up the printer and turn the power on.
2. Use any word processor or text editor capable of creating ASCII-only files (ex: Microsoft Word® and save as a .txt file) and type in the label format exactly as shown in the sample label format that follow.
3. Save the file in a directory for future use. Use the “.zpl” extension.
4. Copy the file to the printer.

From the DOS command window, use the “COPY” command to send a file to the Zebra printer. For example, if your file name is **format1.zpl** then type, “COPY FORMAT 1.ZPL XXXX”, where “XXXX” is the port to which your Zebra printer is connected, for example, “LPT1.”

5. Compare your results with those shown. If your printout does not look like the one shown, confirm that the file you created is identical to the format shown, then repeat the printing procedure. If nothing prints, refer to the “Getting Started” section to make sure your system is set up correctly, otherwise refer to the “Troubleshooting and Diagnostics” section.

Line #	Type this label format	Resulting printout
1.	^XA	ZEBRA 5A65627261000000
2.	^WT6^FDZebra^FS	
3.	^FO100,100^A0n,60^FN0^FS	
4.	^FO100,200^A0n,40^FN1^FS	
5.	^RT0,6,2^FS	
6.	^RT1,6,2,1	
7.	^XZ	
<p>Line 1 Indicates start of label format.</p> <p>Line 2 Writes the data "Zebra" to block 6 for the tag (one byte will spill into block 7, since we have 4 bytes/block).</p> <p>Line 3 Print field number '0' at location 100,100. ^FN0 is replaced by what we read on line #5.</p> <p>Line 4 Print field number '1' at location 100,200. ^FN1 is replaced by what we read on line #6.</p> <p>Line 5 Read Tag into field number 0, starting at block 6, lasting for 2 blocks in ASCII format (default).</p> <p>Line 6 Read Tag into field number 1, starting at block 6, lasting for 2 blocks in hexadecimal format.</p> <p>Line 7 End of label format.</p>		



# Maintenance

## Cleaning

Use only the cleaning agents indicated. Zebra Technologies Corporation will not be responsible for damage caused by any other cleaning materials used on this printer.

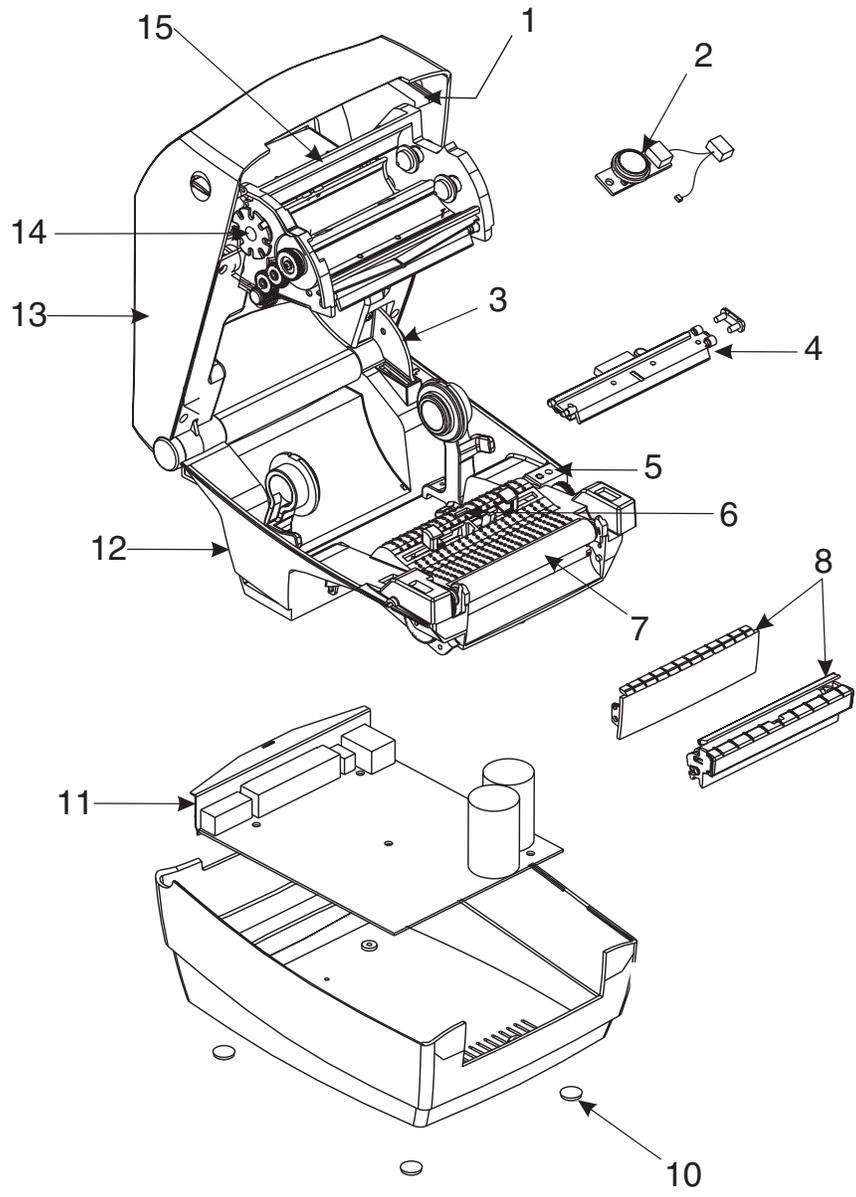
Printer Part	Method	Interval
Print head	After allowing the print head to cool for approximately one minute, use 70% isopropyl alcohol on a cotton swab to clean the print elements from end to end (the print elements are located in the thin gray line on the print head). <b>NOTE:</b> <i>You do not have to turn off the printer to do this.</i>  If print quality has not improved after performing this procedure, try cleaning the print head with Save-a-Print Head cleaning film. This specially coated material removes contamination buildup without damaging the print head. Call your authorized reseller for more information.	After every five rolls of media
Platen roller	Manually rotate the platen roller. Clean it thoroughly with 70% isopropyl alcohol and a cotton swab or lint-free cloth.	
Peel bar	Clean it thoroughly with 70% isopropyl alcohol and a cotton swab.	As needed
Tear bar	Clean it thoroughly with 70% isopropyl alcohol and a cotton swab.	
Exterior	Water-dampened cloth	
Interior	Brush or air blow	

## Lubrication

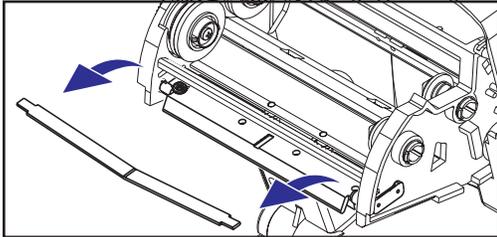
No lubricating agents of any kind should be used on this printer! Some commercially available lubricants, if used, will damage the finish and the mechanical parts inside the printer.

## Parts List

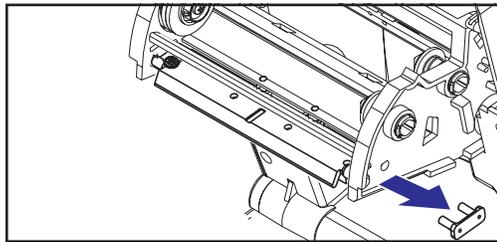
ITEM	DESCRIPTION	
1	Latch Assembly	105910-052
2	Feed Switch/Sensor Assy (set of 3)	105910-128
3	Upper Cover Support (set of 3)	105910-066
4	Print Head Assy - 4" TLP Print Head Cable Assy.	105910-053 105910-065
5	Head Up Sensor	105910-129
6	Gap/Blackline Sensor PCBA (set of 3)	105910-054
7	Platen Kit (standard set of 3)	105910-055
8	Front Bezel (standard set of 10) Front Bezel, Dispenser (single)	105910-057 105910-022
10	Rubber Foot Kit (set of 24)	105910-007
11	Main Control PCBA (RFID)	105910-133
12	Bottom Frame Assy	105910-130
13	Upper Cover Assy	105910-131
14	Ribbon Out Sensor (set of 3)	105910-134
15	Ribbon Carriage w/o printhead	105910-132
Not Shown	Motor (set of 2) Power Supply, 100V-240V Power Cord, U.S. 120V IEC320C13 (set of 5) PCBA, RFID Reader PCBA, Antenna, Type 2 Ribbon Core, 4" (set of 50) Accessory, Media Adapter Plates	105910-051 105950-043 105950-014 105903-135 105950-136 105903-053 810059-001
Manuals	User's Manual, R402 ZPL II Programmer's Manual	980389-001 46530L



## Replacing the Print Head

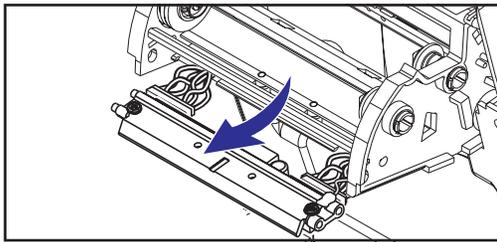


In the event you need to replace the print head, make sure your work area is prepared by protecting against static discharge. Your work area must be static-safe and include a properly grounded conductive cushioned mat to hold the printer a conductive wrist strap for yourself.

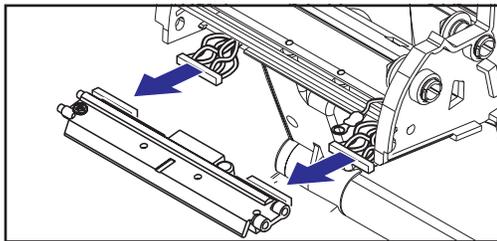
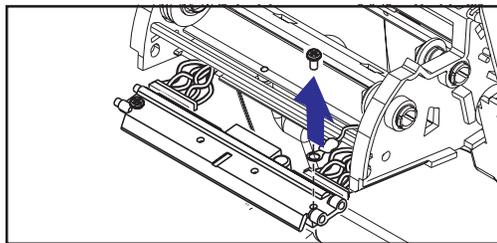


### **Removal**

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.

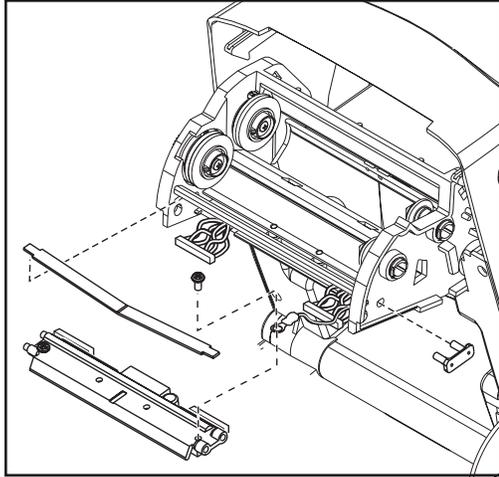


1. Grasp the print head spring and pull it to the left; then, slide it free of the carriage.
2. Use the spring to pry the print head clip off the right side of the carriage.
3. Pull the print head and bracket forward.
4. Use a #2 Phillips driver to remove the screw that holds the ground wire.
5. Unplug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



## REPLACING THE PRINT HEAD (Continued)

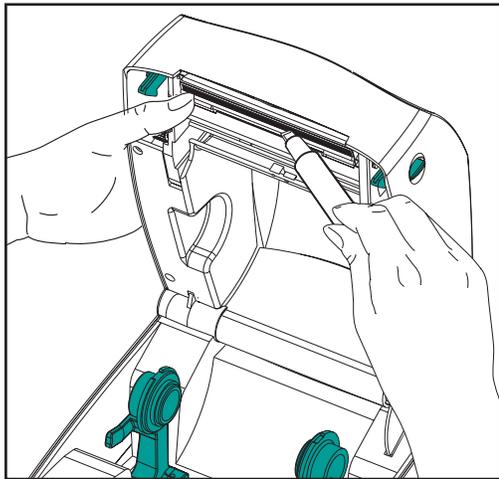
### Assembly



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

1. Align the print head and bracket to plug the left and right connectors into the black and white wire bundles.
2. Attach the ground wire and secure it with the screw. Use a #2 Phillips driver to tighten it.
3. Insert the bracket pegs into the left side of the carriage.
4. Align the right side of the bracket and insert the print head clip through the right side of the ribbon carriage into the bracket.

### Cleaning the Print Head



5. 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.
6. Clean the print head with the cleaning pen.

Reload media and ribbon. Plug in the power cord, turn on the printer and run an automatic or manual calibration to ensure proper function.



# Troubleshooting

What the Status Light is Telling You		
Status LED Condition and Color	Printer Status	For a Resolution, Refer to number:
Off	Off	1
Solid Green	On	2
Flashing Yellow	Stopped	3
Flashing Green	Normal Operation	4
Flashing Red	Stopped	5
Double Flashing Green	Paused	6
Solid Yellow	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” on page 9. Then, press the feed button to resume printing.
- Load a roll of ribbon, following the instructions in “Loading the Ribbon” on page 12. 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” on page 9.

### ***The printed image does not look right.***

- The print head is dirty. Clean the print head according to the instructions on page 41.
- The print head is under temperature.
- Adjust the print darkness and/or print speed. Refer to the six-flash sequence in “Feed Button Modes” on page 52, 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 according to the instructions on page 41.
- The print head elements are damaged. Replace the print head (see “Replacing the Print Head” on page 40).

### ***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” on page 9.
- The printer needs to be calibrated. Refer to “Auto Calibration” on page 14.
- 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 LED is Telling You” on page 43.
- 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” on page 18.

## RFID Symptoms

### *RFID tags generally not programmed*

- Is the printer set up correctly? Print a configuration label to verify RFID version. See “Auto Calibration” on page 14.
- Check if supported RFID media is loaded correctly.

### *VOID messages are printed across media.*

- Verify tag type is properly selected in ZPL II. Use RFID media with supported tag type. Edit ZPL II to select proper tag type or increase retries.
- ZPL II is attempting to write to a non-existent block. Some tags’ blocks are identified as 0-7. If ZPL II attempts to write to block “8,” it will fail.
- Verify voided tag on external reader. Discard bad tags if this is a media problem.

### *Nothing is printed.*

- See if the correct media is loaded or load new, fresh media.
- See if tags can be read/programmed using other hardware.
- Verify ZPL II RFID commands. Debug the printing program.
- Tag is out of reach of the antenna or too close. Verify tag alignment.
- Wrong type of tag was selected. Check ZPL II.
- Block is write protected. Ensure that the tag is not write protected.
- Aluminum and other metals within tag may interfere with read/write. Make sure media meets requirements.
- Increase the number of retries in the ZPL II commands.
- Time out may have occurred during internal communication. Cycle power and try printing label again.

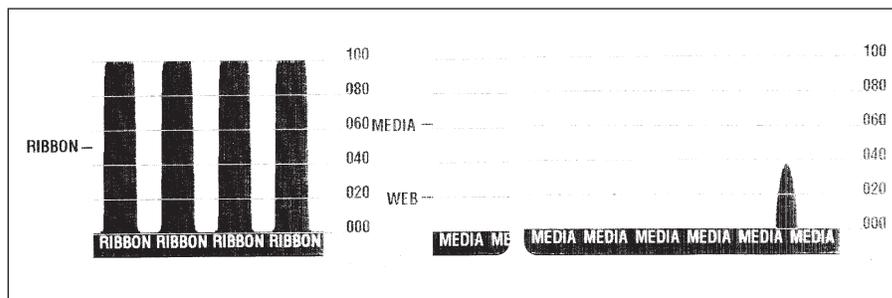
Call a service technician if you have been unsuccessful in getting your expected print out and data.

## Manual Calibration

Manual calibration is recommended whenever you are using pre-printed labels (or label backing) or if the printer will not correctly auto calibrate.

1. Turn on the printer power.
2. Remove approximately 4" (102 mm) of labels from a section of backing material. Load the media so that only the backing material is threaded through the printer and under the print head.
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" on page 52) and recalibrating the printer.

NOTE: Performing a manual calibration disables the auto calibration function. To return to auto calibration, default the printer (see the four-flash sequence in "Feed Button Modes" on page 52).



# 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 52.

## Recalibration

Recalibrate the printer if it starts to display unusual symptoms, such as skipping labels. See "Auto Calibration" on page 14.

P R I N T E R   C O N F I G U R A T I O N	
Zebra Technologies ZTC R402-200dpi	
+10.....	DARKNESS
+000.....	TEAR OFF
TEAR OFF.....	P R I N T M O D E
NON-CONTINUOUS.....	MEDIA TYPE
WEB.....	SENSOR TYPE
THERMAL-TRANS.....	P R I N T M E T H O D
104 / 8 MM.....	P R I N T W I D T H
1233.....	LABEL LENGTH
22.01N 557MM.....	M A X I M U M L E N G T H
38400.....	B A U D
8 BITS.....	D A T A B I T S
NONE.....	P A R I T Y
XON/XOFF.....	H O S T H A N D S H A K E
NONE.....	P R O T O C O L
000.....	N E T W O R K I D
NORMAL MODE.....	C O M M U N I C A T I O N S
<-> 7EH.....	C O N T R O L P R E F I X
<^> 5EH.....	F O R M A T P R E F I X
<.> 2CH.....	D E L I M I T E R C H A R
ZPL II.....	Z P L M O D E
FEED.....	M E D I A P O W E R U P
FEED.....	H E A D C L O S E
DEFAULT.....	B A C K F E E D
+020.....	L A B E L T O P
+0000.....	L E F T P O S I T I O N
029.....	W E B S.
068.....	M E D I A S.
050.....	R I B B O N S.
050.....	M A R K S.
001.....	M A R K M E D S.
CS.....	M O D E S E N A B L E D
.....	M O D E S D I S A B L E D
832 / 8 MM FULL.....	R E S O L U T I O N
SP. 814. B <-.....	F I R M W A R E
V2. 2. 6. 98. C.....	H A R D W A R E I D
CUSTOM ZED.....	C O N F I G U R A T I O N
1024.....	R A M
0000.....	B: M E M O R Y C A R D
0768.....	E: O N B O A R D F L A S H
NONE.....	F O R M A T C O N V E R T
NONE.....	O P T I O N
NONE.....	Z E B R A N E T I I
AUTO DETECT.....	R F I D T A G T Y P E
oem-400: Ver. 2.00	R F I D V E R S I O N

F I R M W A R E I N T H I S P R I N T E R I S C O P Y R I G H T E D

## 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” on page 52.

## 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” on page 52.

```
^FS^F0394,25^AA
5E 46 53 5E 46 4F 33 39 34 2C 32 35 5E 41 41
N,18,10^FDC0000
4E 2C 31 38 2C 31 30 5E 46 44 28 30 30 30 30
)999-9999^FS
29 39 39 39 2D 39 39 39 39 5E 46 53 0D 0A
^F00,50^AAN,18,
5E 46 4F 30 2C 35 30 5E 41 41 4E 2C 31 38 2C
10^FDCENTER STA
31 30 5E 46 44 43 45 4E 54 45 52 20 53 54 41
```

## Feed Button Modes

Power Off Mode (Communications Diagnostics Mode)	
<p>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 (see Figure 22). After printing the label, the printer will automatically enter a diagnostic mode in which the printer prints out a literal representation (see Figure 23) of all data subsequently received. To exit the diagnostic mode and resume printing, turn off and then turn on the printer.</p>	
Power On Modes	
<p>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.</p>	
Flash Sequence	Action
*	A configuration label prints.
* **	The media sensor calibrates and a media sensor profile prints (see “Manual Calibration” on page 49).
* ** ***	To reset the communication parameters. Press and release the feed button while the LED rapidly flashes yellow and green.  For autobaud synchronization: Send a ZPL II format to the printer while the LED rapidly flashes yellow 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 yellow, 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.
<p>If the feed button remains pressed after a 7-flash sequence, the printer will ignore the button when it is released.</p>	

# Appendix

All specifications are subject to change without notice.

## Physical Specifications

Size	7.8 inches wide / 6.8 inches tall / 9.4 inches long (depth) 200 mm wide / 173 mm tall / 240 mm long (depth)
Weight	3.6 pounds / 1.6 kilograms

## Environmental Guidelines

Operating temp.	40 to 104 degrees Fahrenheit / 5 to 40 degrees Celsius
Operating humidity	10 to 90 percent non-condensing
Storage temp.	-40 to 140 degrees Fahrenheit / -40 to 60 degrees Celsius
Storage humidity	5 to 90 percent non-condensing
Electrical	Autoranging external power supply Input: 100-240VAC; 50-60 Hz Output: 20VDC; 2.5A

## Printing Specifications

Print Density	203 dots per inch / 8 dots per millimeter
Print Speed	2 inches / 51 millimeters per second 3 inches / 76 millimeters per second 4 inches / 102 millimeters per second
Print Width	1.0 to 4.09 inches / 25.4 to 104 millimeters
Print Length	0.005 to 22 inches / 0.125 to 559 millimeters with standard memory
Registration Tolerance	Horizontal: +/- 0.0591 inches (1.5 millimeters) Vertical: +/- 0.0393 inches (1.0 millimeters)
FLASH Memory (user available)	768K
DRAM Memory (user available)	1 MB

## Media Specifications

Width	1 to 4.25 inches / 25.4 to 108 millimeters 1 to 2.25 inches / 25.4 to 57 millimeters (tag stock)
Length	0.5 to 22 inches / 13 to 559 millimeters with standard memory
Gap	0.08 to 0.16 inch (2.0 to 4.0 millimeters) 0.118 inch / 3.0 millimeters recommended
Thickness	0.003 to 0.007 inch / 0.08 to 0.18 millimeter
Roll Size	Maximum outer diameter: 5 inches (127 millimeters) Inner Core diameters: 1 or 1.5 inches (25.4 or 38 millimeters) Optional media hangers available for larger inner core diameters
Requirements	<ul style="list-style-type: none"> <li>✓ User Zebra-brand direct thermal or thermal transfer media that is outside wound. Media may be reflective (black mark) sensing or transmissive sensing, die-cut, notched, or continuous)</li> <li>✓ For die-cut labels, use only full auto dies.</li> <li>✓ Notched media must have a 0.5 inch (13 mm) wide by 0.094 inch (2.5 mm) long cutout located in the center of the roll.</li> <li>✓ The reflective media black marks must be located in the center of the roll. Mark width 0.5 inch (13 mm) centered and perpendicular to the edge of the media; mark length 0.094 inch (2.4 mm) parallel to the bottom edge of the media.</li> </ul>
Transponder Requirements	<ul style="list-style-type: none"> <li>✓ Phillips I•Code</li> <li>✓ Texas Instruments Tag-It™</li> <li>✓ Inside Technologies PicoTag®</li> <li>✓ ISO-15693</li> </ul>

Always thoroughly test your desired media for your specific application before buying in large quantities.

## Ribbon Specifications

Roll Size	Maximum outer diameter: 1.3 inches / 33 millimeters
Length	2,900 inches / 74 meter capacity; provides 1:1 media roll to ribbon ratios
Width	At least as wide as media
Setup	Ink-side out
Requirements	User Zebra-brand ribbon that is outside wound.

## Font/Code Specifications

Fonts	<ul style="list-style-type: none"> <li>✓ CG Triumvirate Bold Condensed scalable smooth (0)</li> <li>✓ Zebra fonts A-H, GS, P-V</li> <li>✓ IBM Code Page 850 international Symbols</li> </ul>		
1D Bar Codes	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;"> <ul style="list-style-type: none"> <li>✓ Codabar (supports ratios of 2:1 to 3:1)</li> <li>✓ Code 11</li> <li>✓ Code 128/USD 8 (supports serialization in all subsets and UCC Case Codes)</li> <li>✓ Code 39 (supports ratios of 2:1 to 3:1)</li> <li>✓ Code 93</li> <li>✓ EAN 8/JAN 8</li> <li>✓ EAN 13/JAN 13</li> <li>✓ EAN 14/UPC-A</li> </ul> </td> <td style="width: 50%; border: none;"> <ul style="list-style-type: none"> <li>✓ Industrial 2 of 5</li> <li>✓ Standard 2 of 5</li> <li>✓ Interleaved 2 of 5 (supports ratios of 2:1 to 3:1, Modulus 10 Check Digit)</li> <li>✓ LOGMARS</li> <li>✓ MSI</li> <li>✓ Plessey</li> <li>✓ POSTNET</li> <li>✓ UPC-E</li> <li>✓ UPC-EAN Extensions</li> </ul> </td> </tr> </table>	<ul style="list-style-type: none"> <li>✓ Codabar (supports ratios of 2:1 to 3:1)</li> <li>✓ Code 11</li> <li>✓ Code 128/USD 8 (supports serialization in all subsets and UCC Case Codes)</li> <li>✓ Code 39 (supports ratios of 2:1 to 3:1)</li> <li>✓ Code 93</li> <li>✓ EAN 8/JAN 8</li> <li>✓ EAN 13/JAN 13</li> <li>✓ EAN 14/UPC-A</li> </ul>	<ul style="list-style-type: none"> <li>✓ Industrial 2 of 5</li> <li>✓ Standard 2 of 5</li> <li>✓ Interleaved 2 of 5 (supports ratios of 2:1 to 3:1, Modulus 10 Check Digit)</li> <li>✓ LOGMARS</li> <li>✓ MSI</li> <li>✓ Plessey</li> <li>✓ POSTNET</li> <li>✓ UPC-E</li> <li>✓ UPC-EAN Extensions</li> </ul>
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2D Bar Codes	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;"> <ul style="list-style-type: none"> <li>✓ Codeblock</li> <li>✓ Code 49</li> <li>✓ Data Matrix</li> <li>✓ MaxiCode</li> </ul> </td> <td style="width: 50%; border: none;"> <ul style="list-style-type: none"> <li>✓ MicroPDG417</li> <li>✓ PDF 417</li> <li>✓ QRcode</li> </ul> </td> </tr> </table>	<ul style="list-style-type: none"> <li>✓ Codeblock</li> <li>✓ Code 49</li> <li>✓ Data Matrix</li> <li>✓ MaxiCode</li> </ul>	<ul style="list-style-type: none"> <li>✓ MicroPDG417</li> <li>✓ PDF 417</li> <li>✓ QRcode</li> </ul>
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Rotation Angles	0°, 90°, 180° and 270°		

## Zebra Programming Language (ZPL II®)

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>✓ Downloadable graphics, scalable and bitmap fonts, and label formats</li> <li>✓ Object copying between memory areas (RAM and internal FLASH)</li> <li>✓ Code Page 850 character set</li> <li>✓ Adjustable print cache</li> <li>✓ Data compression</li> <li>✓ Automatic virtual input buffer management</li> <li>✓ Automatic memory allocation</li> <li>✓ Format inversion</li> <li>✓ Mirror image printing</li> <li>✓ Four-position field rotation 0°, 90°, 180° and 270°</li> </ul> | <ul style="list-style-type: none"> <li>✓ Slew command</li> <li>✓ Programmable quantity with print and pause</li> <li>✓ Communicates in printable ASCII characters</li> <li>✓ Error-checking protocol</li> <li>✓ Controlled via mainframe, mini-computer, PC, portable data terminal</li> <li>✓ In-spec OCR-A and OCR-B</li> <li>✓ UPC/EAN</li> <li>✓ User-programmable password</li> <li>✓ Status message to host upon request</li> </ul> |
|--|---|

## Agency Approvals

The Thermal Printer Model R402, manufactured by Zebra Technologies Corporation, complies with the applicable requirements:

- ✓ Emissions and susceptibility: FCC 15.225, FCC Part 15 Class B, RSS-210, EN300-330, EN300-683, IEC60950-1, EN61000-3-2, EN61000-3-3.
- ✓ Safety: UL 1950 3<sup>rd</sup> Ed., CSA C22.2 No. 950-95 3<sup>rd</sup> Ed., IEC950/EN60950

## Options

- ✓ Adjustable core diameter media holders
- ✓ Dispenser for “peel-off mode”

## Parallel Interface Technical Information

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

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



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