



Zebra[®] GC420d[™]
Desktop Thermal Printer

User Guide



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Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

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

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

- 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 RF service technician for help.

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About This Document



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

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Who Should Use This Document

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

How This Document Is Organized

The User Guide is set up as follows:

Section	Description
<i>Introduction on page 1</i>	This section describes what you get in your shipping box and provides an overview of printer features. This section also has procedures that describe how to open and close the printer and report any problems.
<i>Getting Started on page 9</i>	This section describes how to set up your printer for the first time and use the most common operating procedures for loading media.
<i>Print Operations on page 25</i>	This section provides media and print handling, font and language support, and the set up of less common printer configurations.
<i>Printer Options on page 39</i>	This section covers the common printer options and accessories with brief descriptions and how to get you started using or configuring your printer option or accessory.
<i>Maintenance on page 47</i>	This section provides routine cleaning and maintenance procedures.
<i>Troubleshooting on page 59</i>	This section provides information about printer error reporting that you might need for printer troubleshooting. Assorted diagnostic tests are included.
<i>Appendix: Interface Wiring on page 73</i>	This section provides additional interface information and wiring diagrams to assist with printer to host system integration (typically a PC).
<i>Appendix: Dimensions on page 77</i>	This section provides external printer dimensions for the standard printer and printer with options.
<i>Appendix: ZPL Configuration on page 81</i>	This section briefly covers printer configuration and includes a cross-reference to ZPL printer configuration commands.

Contacts

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Key: T: Telephone
F: Facsimile
E: E-mail

Document Conventions

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

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

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

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

Icons Used



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



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



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



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

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Introduction

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

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GC420d™ Thermal Printers

The Zebra® GC420d™ model is the best value in a desktop thermal printer. The GC420d™ printer provides direct thermal printing at speeds up to 4 ips (inches per second) at a 203 dpi (dots per inch) print density. The GC420d™ supports both ZPL™ and EPL™ Zebra printer programming languages and a wide variety of interface and feature options.

The GC420 printers feature:

- Automatic printer language detection and switching between ZPL and EPL programming and label formats.
- OpenAccess™ design for simplified media loading.
- Color-coded operator controls and media guides.
- Zebra™ Global Printing Solution – supports Microsoft Windows keyboard encoding (and ANSI), Unicode UTF-8 and UTF 16 (Unicode Transformation Formats), XML, ASCII (7 and 8 bit used by legacy programs and systems), basic single and double byte font encoding, Hexadecimal encoding, and custom character maps (DAT table creation, font linking, and character remapping).
- Improved printer performance: faster print speeds and a 32-bit processor.
- A complete suite of free software applications and drivers to configure printer settings, design and print labels and receipts, get printer status, import graphics and fonts, send programming commands, update firmware, and download files. Clone printer settings and send graphics, files, fonts, and firmware (updates) to one or more Zebra® Ethernet and locally connected printers with ZebraNet™ Bridge.
- Maintenance reporting enabled and customizable by the user.
- The GC420 direct thermal printer models also include support for Line Mode printing to support EPL1 legacy programming based printing applications.

The GC420 printers offer these basic printer options:

- Label Dispense (Peel-Off).
- Zebra® ZBI 2.0™ (Zebra BASIC Interpreter) programming language. ZBI™ allows you to create custom printer operations that can automate processes, use peripherals (i.e. scanners, scales, keyboards, Zebra® KDU or KDU Plus™, etc.) all without being attached to a PC or network.

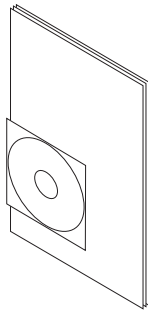
This user's guide provides all the information you need to operate your printer on a daily basis. To create label formats, refer to your programming guides or label design applications such as ZebraDesigner™.

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

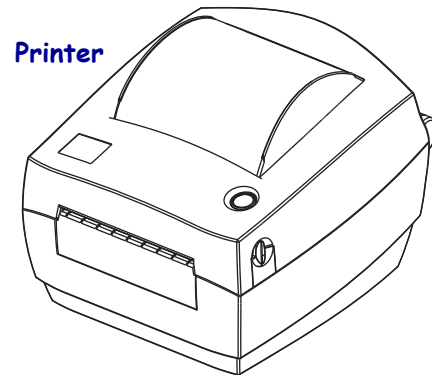
Note • Many printer settings may also be controlled by your printer's driver or label design software. Refer to the driver or software documentation for more information.

What's in the Box?

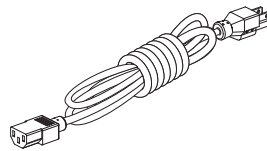
Save the carton and all packing materials in case you need to ship or store the printer later. After unpacking, make sure you have all parts. Follow the procedures for inspecting the printer to familiarize yourself with printer parts so you can follow the instructions in this book.



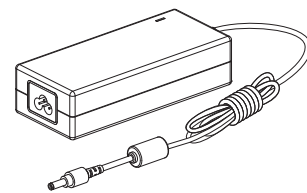
**Documentation
and Software**



Printer



**Power Cord
varies by locale or region**



**Power
Supply**

Unpack and Inspect the Printer

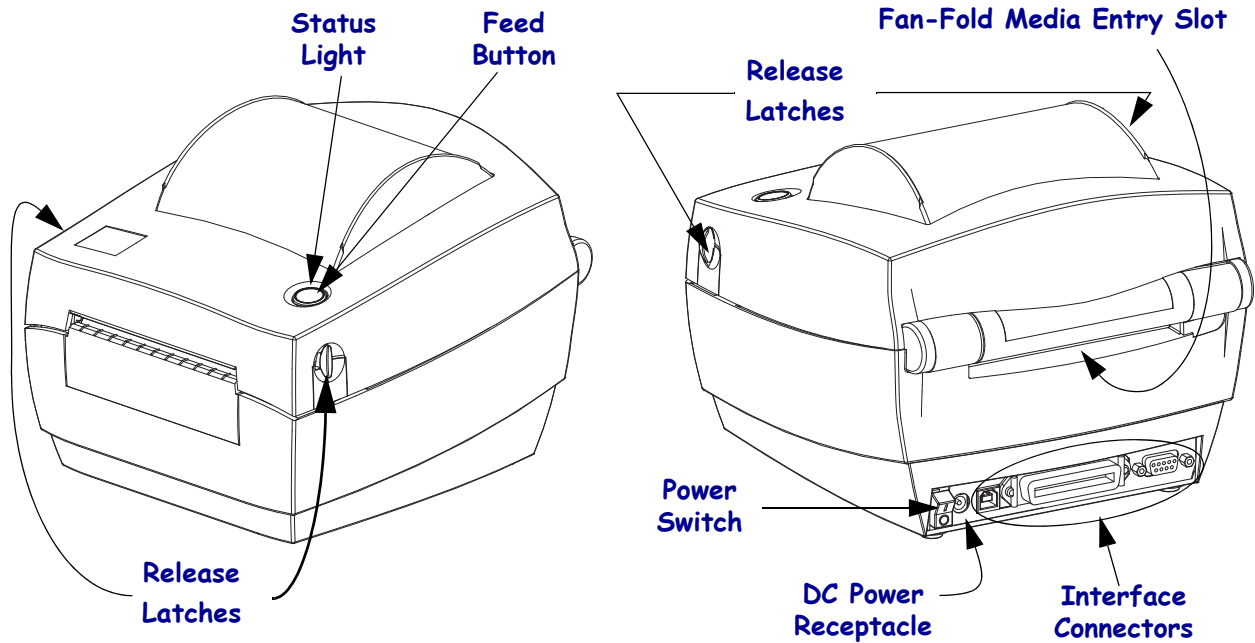
When you receive the printer, immediately unpack it and inspect for shipping damage.

- Save all packing materials.
- Check all exterior surfaces for damage.
- Open the printer and inspect the media compartment for damage to components.

If you discover shipping damage upon inspection:

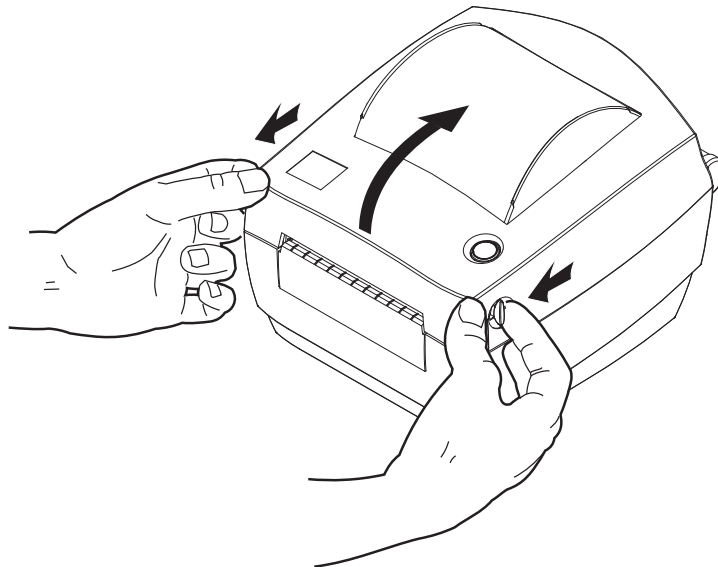
- Immediately notify the shipping company and file a damage report. Zebra Technologies Corporation is not responsible for any damage to the printer incurred during shipment, and will not cover the repair of this damage under its warranty policy.
- Keep all packaging material for shipping company inspection.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

Your Printer



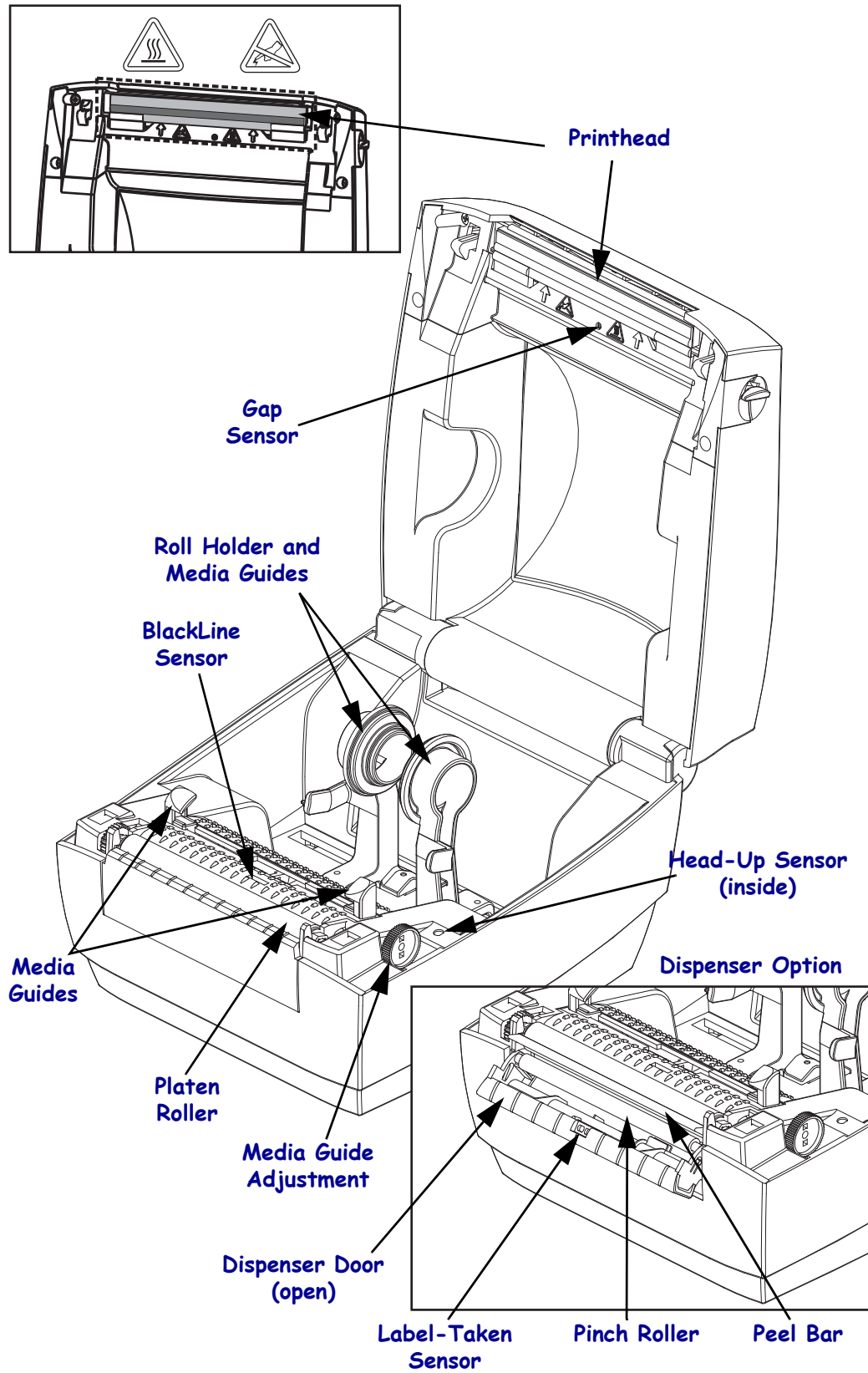
Opening the printer

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



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

Printer Features



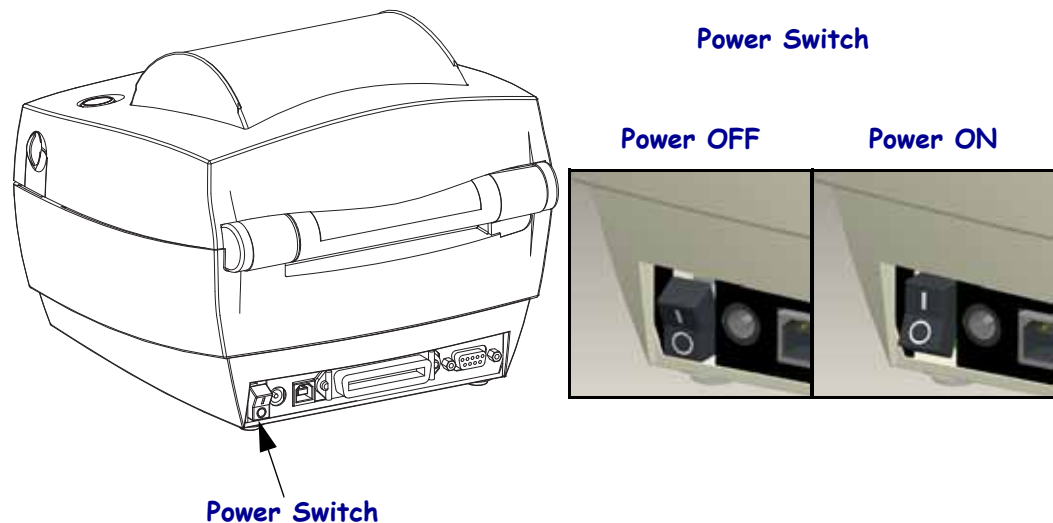
Operator Controls

Power Switch

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



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

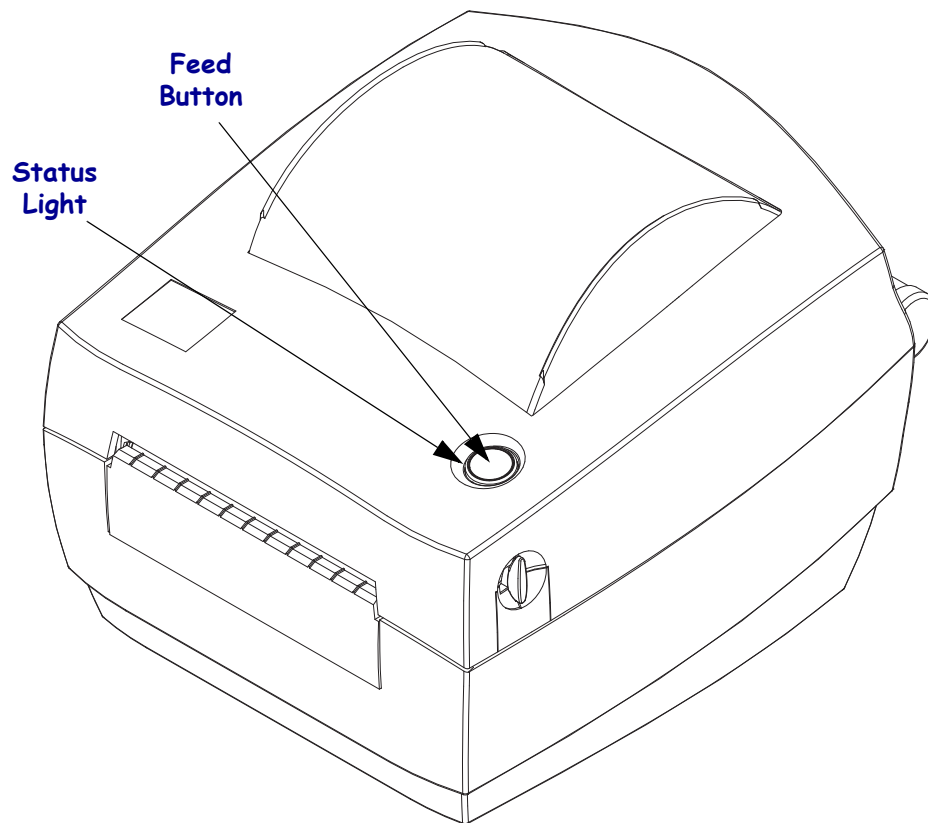


Feed Button

- Tap the Feed button once to force the printer to feed one blank label.
- Press the Feed button to take the printer out of a “pause” condition. The printer is put into “pause” by either a programming command or an error condition. See *What the Status Light is Telling You* on page 60 in the Troubleshooting chapter.
- Use the Feed button for printer setup and status (see *Feed Button Modes* on page 70 in the Troubleshooting chapter).

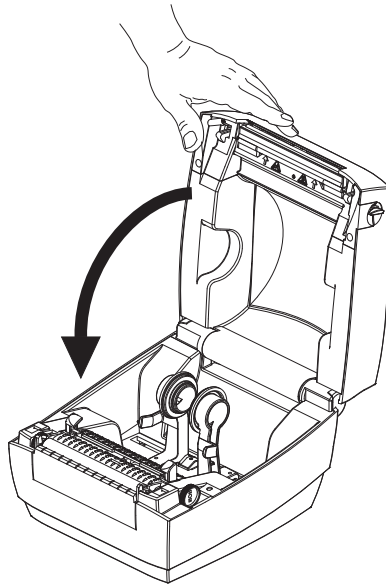
Status Light

Located on the top case next to the feed button, the status light functions as a printer operational indicator (see *Status Light Descriptions on page 60*).

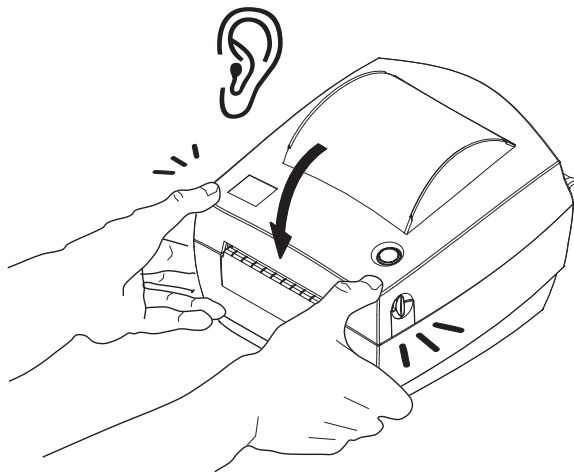


Closing the printer

1. Lower the top cover.



2. Press down until the cover snaps closed.





Getting Started

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

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Attaching Power

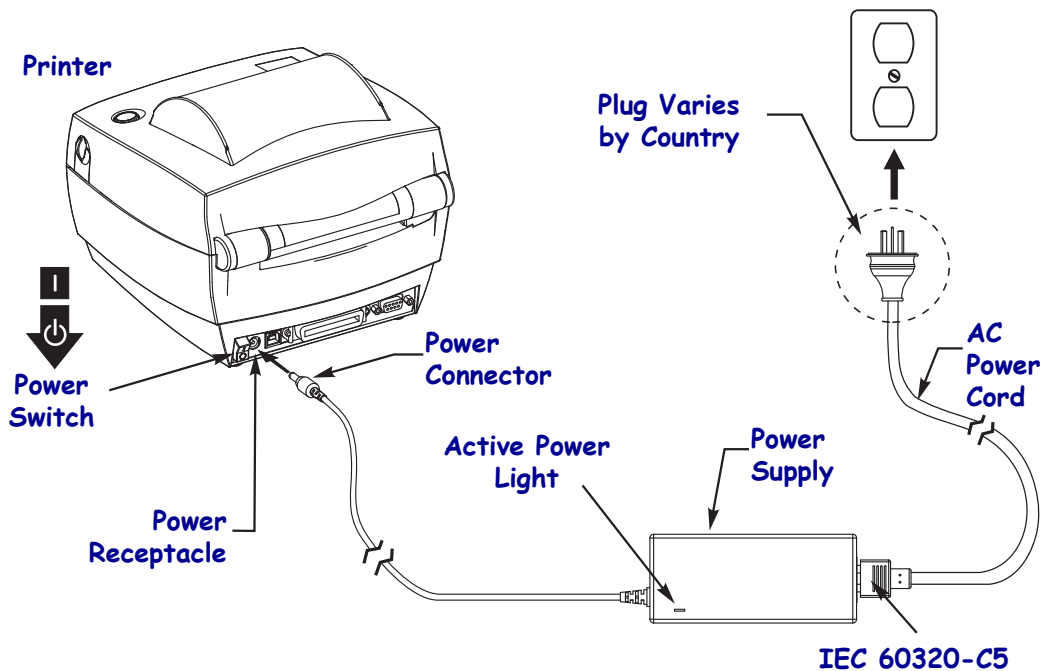


Important • Set up your printer so that you can handle the power cord easily if needed. To make certain the printer cannot carry electrical current, you must separate the power cord from the power supply receptacle or AC electrical outlet.



Caution • Never operate the printer and power supply in an area where they can get wet. Serious personal injury could result!

1. Make sure the printer's power switch is in the off position (down).
2. Insert the AC power cord into the power supply.
3. Plug the other end of the cord into an appropriate AC electrical outlet. Note: The active power light will go on if power is on at the AC outlet.
4. Insert the power supply's power connector into the printer's power receptacle.



Note • Ensure the appropriate power cord with a three (3) prong plug and an IEC 60320-C5 connector are used at all times. These power cords must bear the relevant certification mark of the country in which the product is being used.

Loading Roll Media

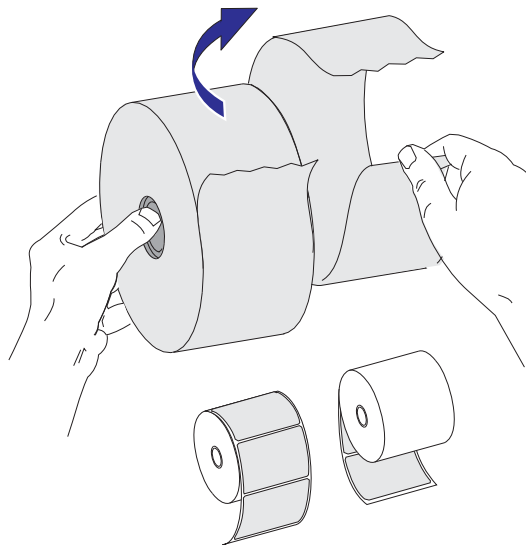
When you load media, you must place the roll onto the media hangers.

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

Preparing Media

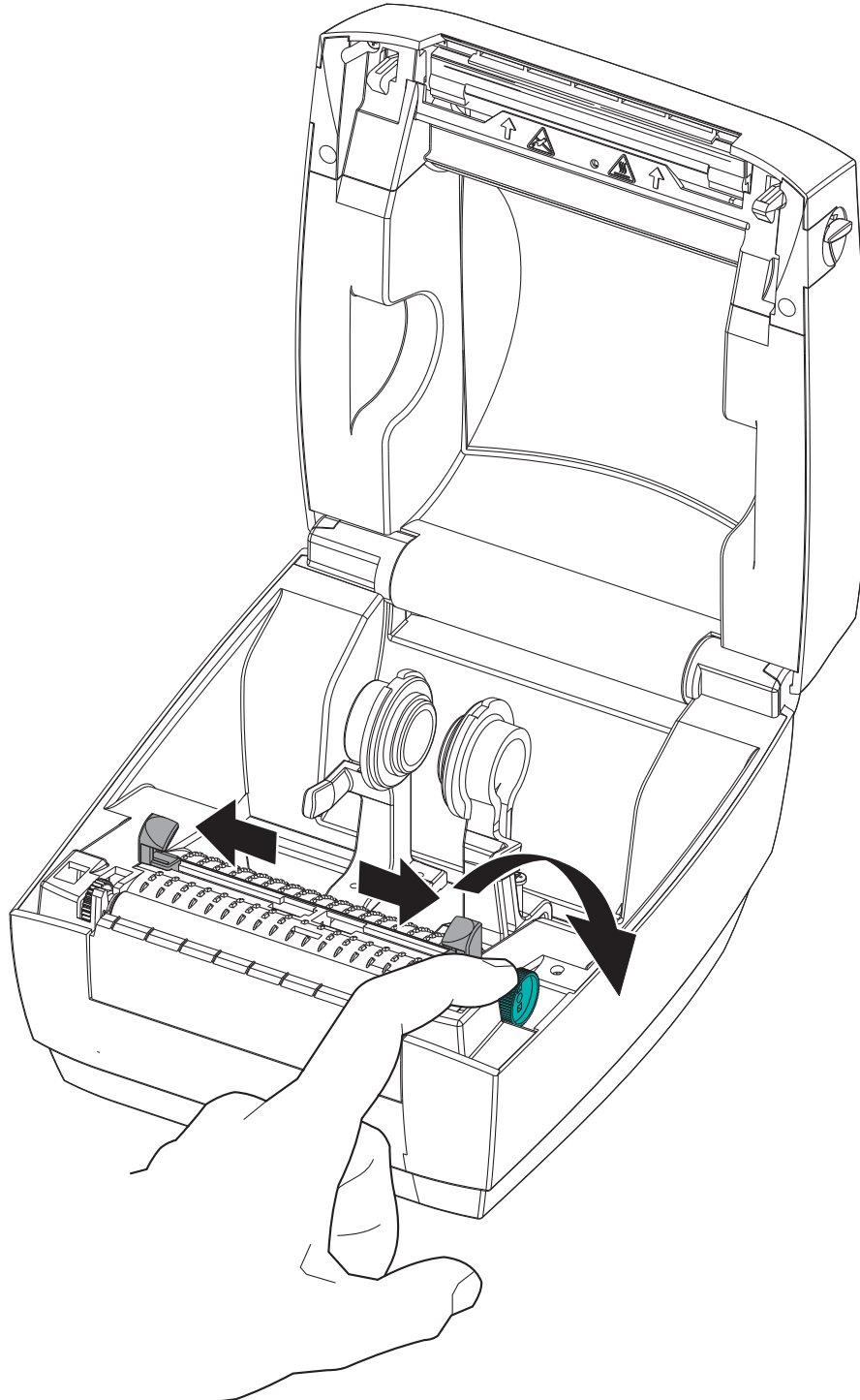
Whether your roll media is inside or outside wound, you load it into the printer the same way.

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

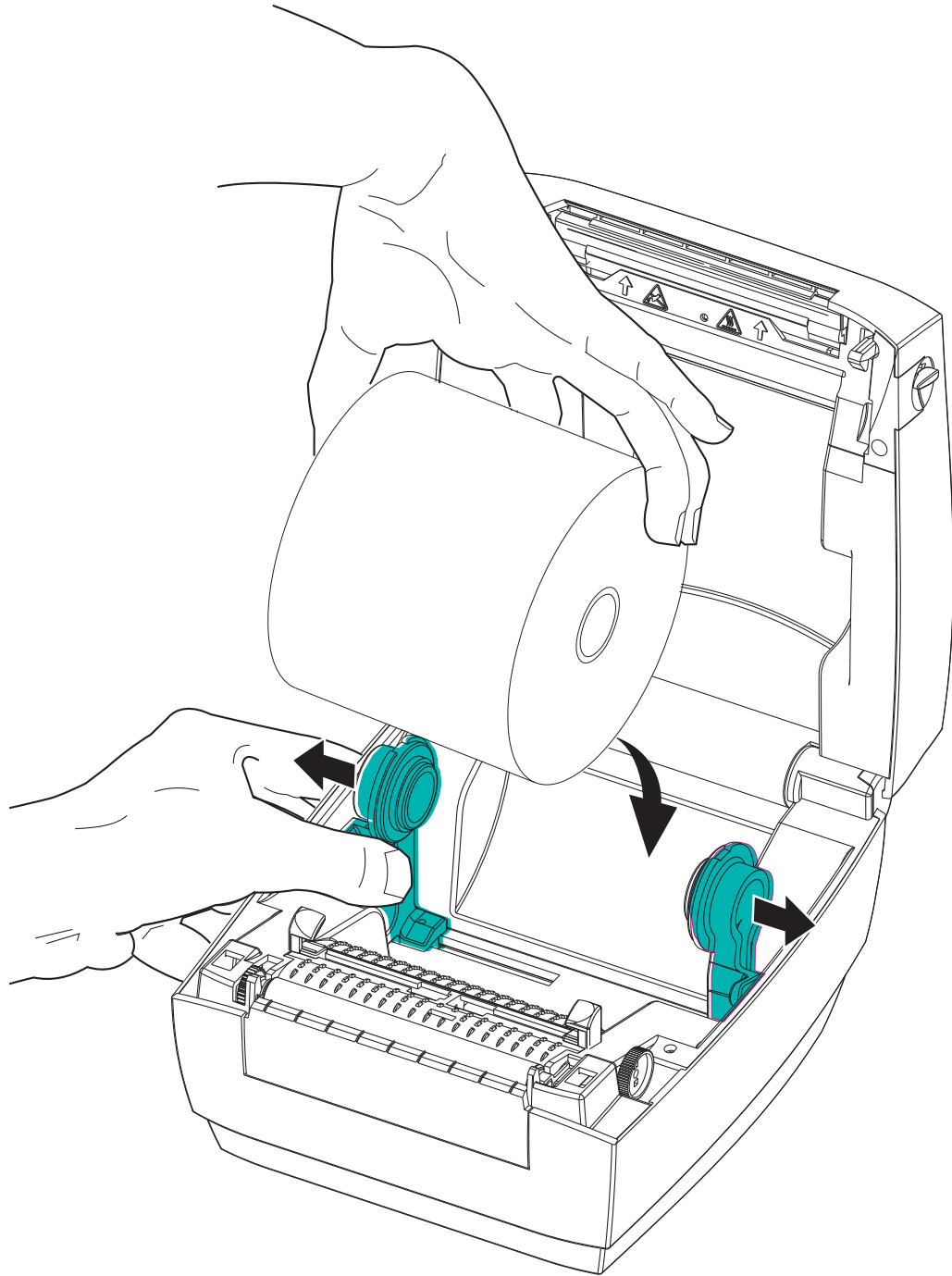


Placing the Roll in the Media Compartment

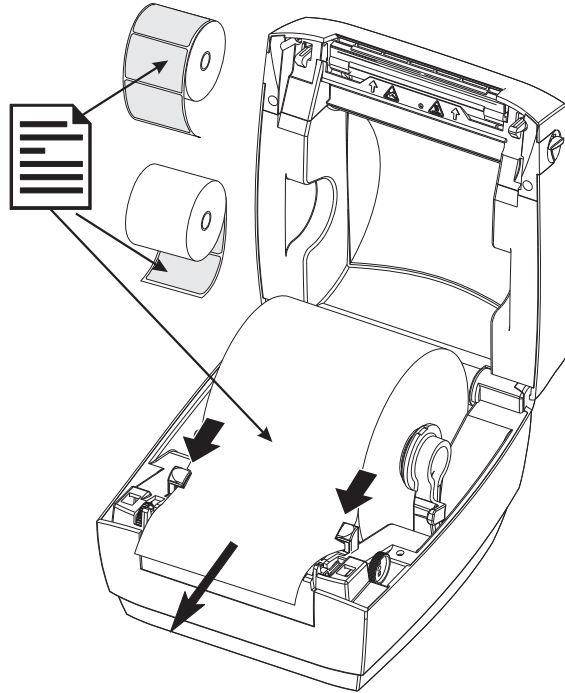
1. Open the printer. Remember that you need to pull the release latch levers toward the front of the printer.
2. Open the media guides by turning the media guide adjustment knob toward the rear of the printer.



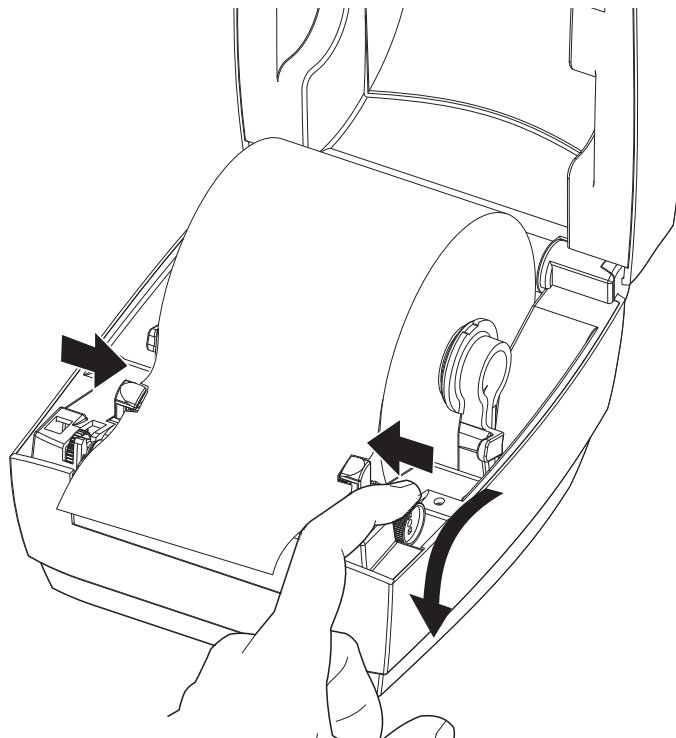
3. Pull the media roll holders open with your free hand and place the media roll on the roll holders and release. Orient the media roll so that its printing surface will face up as it passes over the platen (drive) roller.



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



5. 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.



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

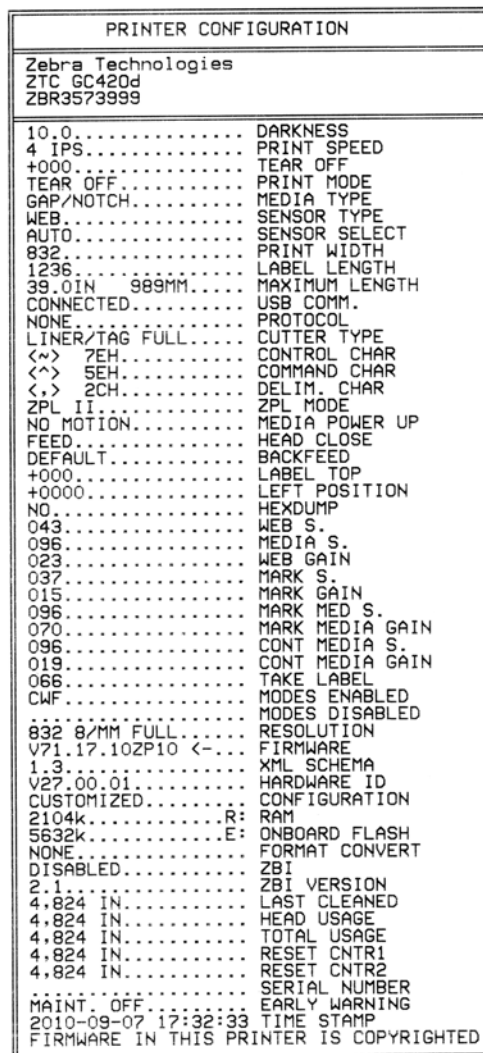
Printing a Test (Printer Configuration) Label

Before you connect the printer to your computer, make sure that the printer is in proper working order.

You can do this by printing a configuration status label.

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

If you cannot get this label to print, refer to *Getting Started on page 9*.



Pre-install Windows® Printer Drivers

Zebra is changing the way you install and use your printer with your Windows based PC systems. We recommend that at minimum, the ZebraDesigner™ Windows® driver be pre-installed to take advantage of the advancements in ease of use and simplicity of the Windows operating systems since the release of Windows XP® SP2.

Zebra provides the Zebra Setup Utilities (ZSU); a suite of Zebra® printer drivers, utilities, and communications and installation tools for use with most Windows PC operating systems. Zebra Setup Utilities and Zebra Windows printer drivers are available on the user's CD and the Zebra web site (www.zebra.com) for latest versions.

ZebraDesigner™ Driver and Zebra Setup Utilities (includes the driver): Supports Windows 7®, Windows Vista®, Windows XP®, Windows® 2000®, Windows Server® 2008, and Windows Server® 2003 operating systems. The driver supports 32 bit and 64 bit Windows operating systems and is Microsoft Certified. Zebra Setup Utilities and the ZebraDesigner driver support the following printer communication interfaces: USB, parallel, serial, Wired and Wireless Ethernet and Bluetooth (using a Bluetooth virtual printer port).

Install the Zebra Setup Utilities before applying power to the printer connected to the PC (running a Zebra driver supported Windows operating system). The Zebra Setup Utility will prompt you to apply the printer power. Continue to follow the instructions to complete your printer installation.

Plug'N'Play (PnP) Printer Detection and Windows® operating systems

More recent Windows operating systems automatically detect the printer when it is connected via the USB interface. Depending on the hardware configuration and the Windows version, your printer may be Plug-and-Play (PnP) detected when connecting to the USB, parallel, or serial port interfaces. The printer drivers do not support serial port PnP installation at this time. The printer's PC interface configuration for the parallel port must support and have bidirectional communications for PnP operations.

The operating system automatically starts a "Add new hardware" wizard when connecting the printer for the first time to the PC. If you have pre-loaded the driver suite with the Zebra Setup Utility, then the printer driver will automatically install. Go to your Windows printer directory and right-click and select 'Properties'. Click on the 'Print test page' button to verify a successful installation.

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

Universal Serial Bus (USB) Device Communications

The printer is a terminal device (not a host or hub) when using a USB interface. You can refer to the USB Specification for details regarding this interface.

Scanners, scales or other data input (terminal) devices must use the serial port (not the USB port) to send data to the printer.

Serial Port and Windows® operating systems

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



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

Ethernet

This printer option has a variety of methods and utilities to assist with printer connection and configuration of networked Zebra printers on a LAN (local area network) or WAN (wide area network). The Zebra Setup Utility configuration wizards support creating a connection to the printer on a shared network with Windows based systems by using the printer's IP address. The printer includes internal Web pages to provide easy access to printer and network configuration. The web pages are accessible via the printer's IP address using any web browser. The free version of ZebraNet™ Bridge software allows you to centrally deploy, manage, and monitor your Zebra® printers with automatic Zebra® printer discovery up to 3 printers from a single PC screen anywhere on your global network. ZebraNet™ Bridge Enterprise is available for purchase to manage larger numbers of Zebra® printers.

Connecting your Printer to a Computer

The printer support a variety of interface options and configurations. These include: Universal Serial Bus (USB) interface, RS232 Serial and Parallel (IEEE 1284.4).

- USB, Serial and Parallel

The Zebra Setup Utility is designed to assist you with installing these interfaces. The cabling and unique parameters for each of these physical printer communication interfaces is discussed in the following pages to assist you with making configuration setup choices prior to and immediately following applying power. The Zebra Setup Utilities configuration wizards will instruct you to turn the printer's power on at the appropriate time to complete the installation of your printer.



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

Interface Cable Requirements

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

To minimize electrical noise pickup in the cable:

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

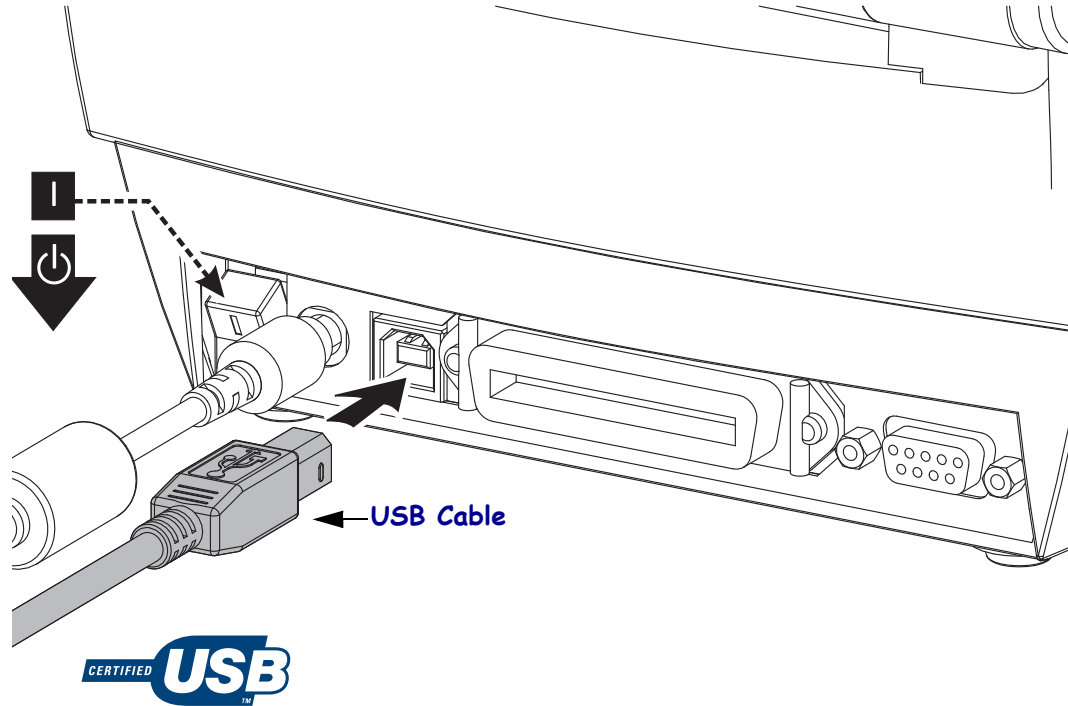


Important • This printer complies with FCC “Rules and Regulations,” Part 15, for Class B Equipment, using fully shielded data cables. Use of un-shielded cables may increase radiated emissions above the Class B limits.

USB Interface Requirements

Universal Serial Bus (version 2.0 compliant) provides a fast interface that is compatible with your existing PC hardware. USB's "plug and play" design makes installation easy. Multiple printers can share a single USB port/hub.

When using a USB cable (not supplied with your printer), verify that the cable or cable packaging bears the "Certified USB™" mark (see below) to guarantee USB 2.0 compliance.



Serial Communications

The GK888 has a DCE serial communication port for hardware compatibility with legacy 888 printers. The required cable must have a nine-pin “D” type (DB-9P) male connector on one end which plugs into the mating (DB-9S) serial port located on the back of the printer. The other end of this signal interface cable connects to a serial port on the host computer. The cable is a Null-Modem (cross-over signal connections) cable. For pinout information, refer to Appendix A.

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

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

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

Autobaud

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

1. Press and hold the feed button until the green status LED flashes once, twice, and then three times.
2. While the status LED flashes, send the **^XA^XZ** command sequence to the printer.
3. When the printer and host are synchronized, the LED changes to solid green. (No labels will print during autobaud synchronization.)

ZPL **^SC** Command

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

1. With the host computer set at the same communications settings as the printer, send the **^SC** command to change the printer to the desired settings.
2. Change the host computer settings to match the new printer settings.

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

EPL Y Command

Use the serial port setup (**Y**) command to change the communications settings on the printer.

1. With the host computer set at the same communications settings as the printer, send the **Y** command to change the printer to the desired settings. Note: the **Y** command does not support setting the data flow control, use the **Xon/Xoff** setting.
2. Change the host computer settings to match the new printer settings.

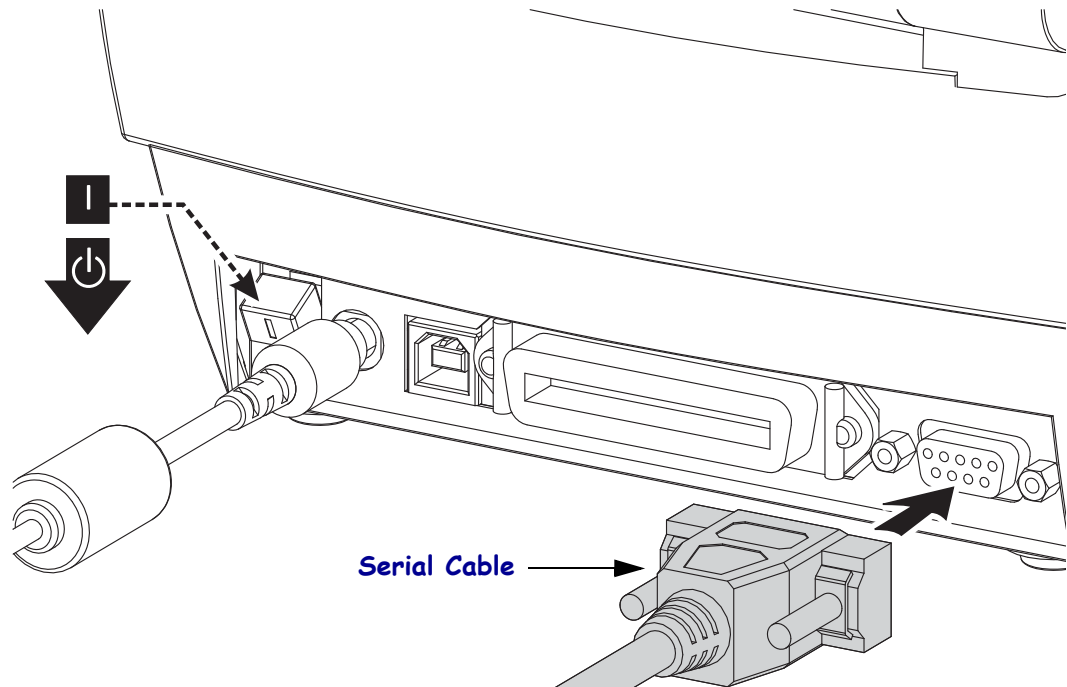
Refer to the *EPL Page Mode Programming Guide* for more information about this command.

Resetting the Default Serial Port Parameters

Do the following to reset the communications parameters on the printer to the factory defaults (serial communication settings are: **9600** baud, **8** bit word length, **NO** parity, **1** stop bit, and **DTR/XON/XOFF** data flow control).

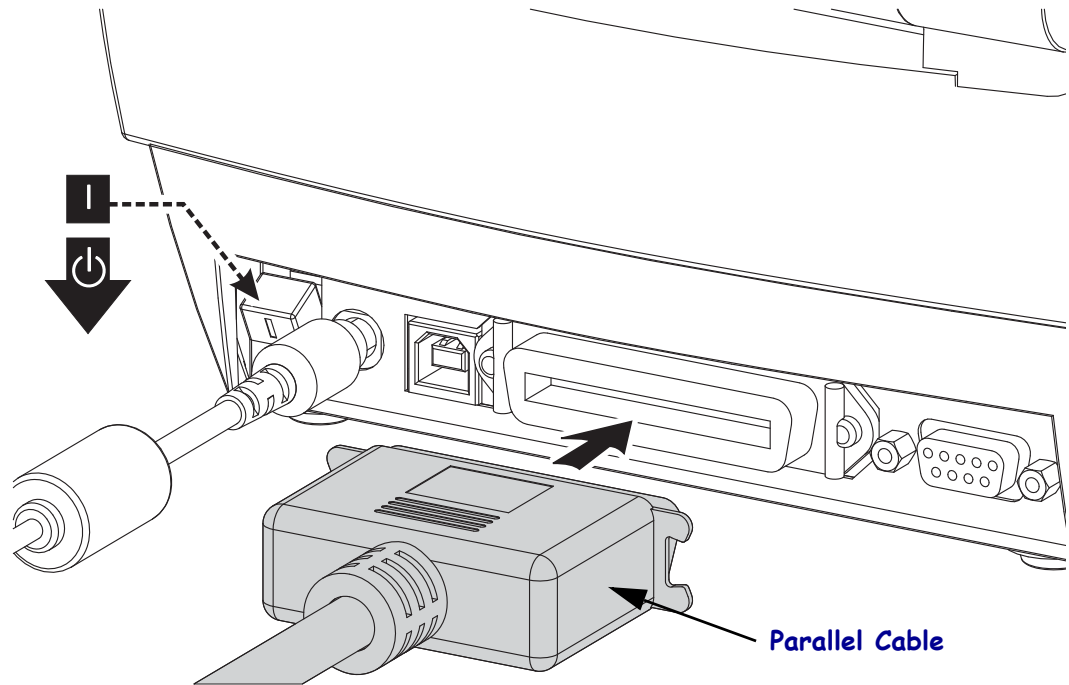
1. Press and hold the feed button until the green status LED flashes once, waits a moment and flashes twice, and then waits again before flashing three times (release immediately).
2. While the status LED rapidly flashes amber and green, press the feed button. Serial communications between the printer and the host computer can be set by the ZPL **^SC** command or the EPL **Y** command.

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



Parallel Port

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



After Your Printer is Connected

Now that you have basic communication to your printer, you may want to test printer communications and then install other printer related applications, drivers or utilities.

Testing Communications by Printing

Verifying the print system's operation is a relatively simple process. For Windows operating systems, the Zebra Setup Utility or the Windows 'Printers and Faxes' Control Panel to access and print a test label. For non-Windows operation systems, copying a basic ASCII text file with a single command (`~WC`) to the printer will print a configuration status label.

Test Printing with Zebra Setup Utility:

1. Open the Zebra Setup Utility.
2. Click on the newly installed printer's icon to select the printer and activate the printer configuration buttons below it in the window.
3. Click the 'Open Printer Tools' button.
4. In the 'Print' tab window, click on the 'Print configuration label' line and click on the 'Send' button. The printer should print a configuration status label.

Test Printing with Windows 'Printer and Faxes' menu:

1. Click on the Windows 'Start' menu button, to access the 'Printers and Faxes' menu or 'Control Panel' to access the 'Printers and Faxes' menu. Open the menu.
2. Select the newly installed printer's icon to select the printer and right-click the mouse to access the printer 'Properties' menu.
3. From the printer's 'General' tab window, click on the 'Print Test Page' button. The printer should print a Windows test print page.

Test Print with a Copied ZPL Command File for Non-Windows Operating Systems:

1. Create a text file with the following ASCII three characters: `~WC`
2. Save the file as: TEST.ZPL (an arbitrary file name and extension name).
3. Copy the file to the printer. For DOS, a file sent to a printer connected to the system's parallel port would be as simple as:

```
COPY TEST.ZPL LPT1
```

Other interface connection types and operating systems will have different command strings. See your operating system documentation for detailed instructions to copy to the appropriate printer interface for this test.



Print Operations

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

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Determining Printer Configuration

The printer uses a ZPL printer configuration status label to report the printer's configuration status for both EPL and ZPL operations. The ZPL style label provides a more intuitive and functionally descriptive naming conventions than the EPL style printer status label. Operational status (darkness, speed, media type, etc.), installed printer options (network, interface settings, cutter, etc.) and printer description information (serial number, model name, firmware version, etc.) are all included on the status label. See *Printing a Test (Printer Configuration) Label* on page 15 to print this label. See *Appendix: ZPL Configuration* on page 81 for details on printer configuration and the ZPL commands that control the printer settings listed on the Printer Configuration Status Label.

To get an EPL style printer configuration status label, send the printer the EPL **U** command. See the EPL programmer's guide for more information on the various EPL **U** commands and interpreting the settings displayed on these labels.

Long Term Printer In-activity or Storage

Overtime the printhead may stick to the platen (drive) roller. To prevent this, always store the printer with a piece of media (a label or paper) between the printhead and platen roller. Do not ship the printer with a roll of media installed or damage to the printer or media may result.

Thermal Printing



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



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

Modes of Printing

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

- Direct thermal printing (which uses heat sensitive media to print).
- Standard Tear-Off mode allows you to tear off each label (or batch print a strip of labels) after it is printed.
- Label Dispense Mode: If an optional dispenser is installed, the backing material can be peeled away from the label as it is printed. After this label is removed, the next one is printed.
- Stand-alone: The printer can print without being connected to a computer using the printer's auto running label form feature (programming based) or by using a data input device connected to the printer's serial port. This mode accommodates data input devices, such as scanners, weigh scales, Zebra® KDU Plus™ or Zebra® KDU (Keyboard Display Unit), etc.

Print Media Types



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

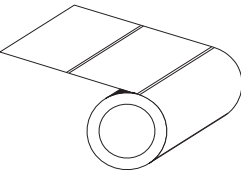
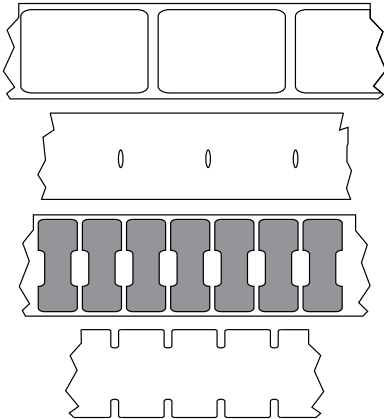
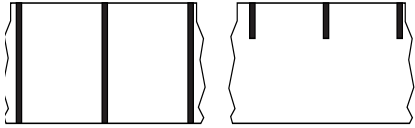
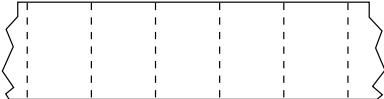
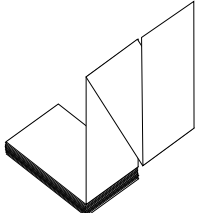
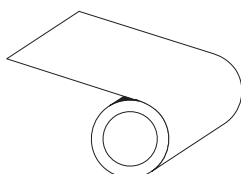
Your printer can use various types of media:

- *Standard media*—Most standard (non-continuous) media uses an adhesive backing that sticks individual labels or a continuous length of labels to a liner.
- *Continuous roll media*—Most continuous roll media is direct thermal media (similar to FAX paper) and is used for receipt or ticket style printing.
- *Tag stock*—Tags are usually made from a heavy paper (up to 0.0075in./0.19mm thick). Tag stock does not have adhesive or a liner, and it is typically perforated between tags.

For more information on basic media types, see [Table 1](#).

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

Table 1 • Types of Media Roll and Fanfold Media

Media Type	How It Looks	Description
<p>Non-Continuous Roll Media</p>		<p>Roll media is wound on a core that can be 0.5 to 1.5 in. (12.7 to 38.1 mm) in diameter. Labels have adhesive backing that sticks them to a liner, and they are separated by gaps, holes, notches, or black marks. Tags are separated by perforations. Individual labels are separated by one or more of the following methods:</p> <ul style="list-style-type: none"> • <i>Web media</i> separates labels by gaps, holes, or notches.  <ul style="list-style-type: none"> • <i>Black mark media</i> uses pre-printed black marks on the back side of the media to indicate label separations.  <ul style="list-style-type: none"> • <i>Perforated media</i> has perforations that allow the labels or tags to be separated from each other easily. The media may also have black marks or other separations between labels or tags. 
<p>Non-Continuous Fanfold Media</p>		<p>Fan-Fold media is folded in a zigzag pattern. Fanfold media can have the same label separations as non-continuous roll media. The separations would fall on or near the folds.</p>
<p>Continuous Roll Media</p>		<p>Roll media is wound on a core that can be 0.5 to 1.5 in. (12.7 to 38.1 mm) in diameter. Continuous roll media does not have gaps, holes, notches, or black marks to indicate label separations. This allows the image to be printed anywhere on the label. A cutter can be used to cut apart individual labels. With continuous media, use the transmissive (gap) sensor so the printer can detect when the media runs out.</p>

Determining Thermal Media Types

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

To perform a media scratch test, complete these steps:

1. Scratch the print surface of the media with a finger nail or pen cap. Press firmly and quickly while dragging it across the media surface. Direct thermal media is chemically treated to print (expose) when heat is applied. This test method uses friction heat to expose the media.
2. Did a black mark appear on the media?

If a black mark...	Then the media is...
Does not appear on the media	Thermal transfer. A ribbon is required. Your printer does not support this media.
Appears on the media	Direct thermal. No ribbon is required.

Replacing Supplies

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

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

Adjusting the Print Width

Print width must be set when:

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

Print width may be set by:

- The Windows printer driver or application software such as ZebraDesigner™.
- The five-flash sequence in *Feed Button Modes* on page 70.
- Controlling printer operations with ZPL programming; refer to the Print Width (^PW) command (consult your *ZPL Programming Guide*).
- Controlling printer operations with EPL Page Mode programming, refer to the Set Label Width (q) command (consult your *EPL Programmer's Guide*).

Adjusting the Print Quality

Print quality is influenced by the heat (density) setting of the printhead, the print speed, and the media in use. Experiment with these settings to find the optimal mix for your application. Print quality can be set with the Zebra Setup Utility's 'Configure Print Quality' routine.



Note • Media manufactures may have specific recommendations for speed settings for your printer and the media. Some media types have lower maximum speeds than your printer's maximum speed.

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

- The six-flash sequence in *Feed Button Modes* [on page 70](#). This will overwrite any ZPL and EPL programmed darkness/density settings.
- The Set Darkness (~SD) ZPL command (consult your *ZPL Programming Guide*).
- The Density (D) EPL command (consult your *EPL Programmer's Guide*).

If you find that the print speed needs to be adjusted, use:

- The Windows printer driver or application software such as ZebraDesigner™.
- The Print Rate (^PR) command (consult your *ZPL Programming Guide*).
- The Speed Select (S) command (consult your *EPL Programmer's Guide*).

Media Sensing

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

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

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

The printer's media settings can be verified by printing a Printer Configuration label. See the *Printing a Test (Printer Configuration) Label* on page 15 for more details.

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

If the printer has difficulty automatically detecting the media type and auto-calibrating, see *Manual Calibration* on page 66 to perform an extensive calibration. It includes a printed graph of sensor operation for your media. This method disables the printer's automatic media sensing capability until the printer's default parameters are reset to the factory defaults with the four flash Feed button mode. See the *Feed Button Modes* on page 70 for more details.

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

The media calibration and detection process can also be refined to match the media type loaded into the printer. Use the ZPL Media Tracking command (**^MN**) to set the media type. Sometimes the printer can detect preprinted media as the gap between labels or the liner backing with print as a black marks. If the **^MN** parameter for continuous media is set, then the print does not preform the automatic calibration. The **^MN** command also includes an automatic calibration parameter (**^MNA**) to return the printer to its default setting to automatically detect all media types.

