



ZD420 Series TM

Desktop Printers

Service Manual



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

For more information, please see our website at:

Web address: www.zebra.com/environment

Document Conventions

Table 1 • Document Conventions

Alternate Color

If you are viewing this guide on-line, you can click the **blue text** used for cross-references or hyper-links to jump directly to other sections in the guide or to web sites on the Internet.

Command Line Examples, File Names, and Directories

Command line examples, file names, and directories appear in a `Typewriter` style (`Courier`) mono-spaced font. For example:

Table 2 • Type `ZTools` to get to the Post-Install scripts in the `/bin` directory.
Open the `Zebra<version number>.tar` file in the `/root` directory.

Icons and Advisory Words

The following icons and advisory words are used to draw your attention to certain areas of text.



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**.

(No icon)

Caution • 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.



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



Notes • _____

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Introduction

This manual provides ZD420 printer repair, maintenance, and troubleshooting procedures for field engineers or technicians.

Follow the part replacement procedures as closely as possible. If you are unsure of any procedure, please contact your service representative or call the products technical support group at Zebra Technologies Corporation.

Zebra Technologies stocks all replacement parts for the printer. Be sure your facility stocks sufficient parts for the printer so that scheduled maintenance can take place in a timely manner.

How Repairs and Maintenance Procedures are Documented

This manual is a part of a multi-media service CD-ROM. It is designed to provide training and instruction for repair and maintenance of your Zebra printer.

Each ZD420 Series™ printer Spares Kit has one or more repair procedures that support it. Most procedures include videos of the actual repair. The Replacing Parts section of this service manual includes a repair flow diagram. See a list of available Spare Parts Kits at:

<http://www.zebra.com/parts>

The videos are accessed via links in the electronic version of this manual with Adobe Reader version 9 or higher (PDF files). They consist of compressed movies in MP4 video format. Most of the videos do not have an audio track. The simplest procedures do not have video. The service videos are complemented by step by step instructions and additional information, such as cautions and warnings for your safety or to protect the printer from damage during service.

How to share access to the contents of this CD-ROM

This service CD-ROM has been designed to be copied to a PC or network server for sharing access. **FOR YOUR INTERNAL USE ONLY! DO NOT COPY! DO NOT REDISTRIBUTE OR PLACE ON THE INTERNET!**

Copy all the files in the root directory of this CD (i.e. D:\) including all the sub-directories intact to a directory on your PC or network server. RunCD.exe file opens the service CD's user interface screen.

Do not change any file or sub-directory names or their locations relative to the location of the RunCD.exe file.

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.

Preparing a Static-Safe Work Area

Prepare a static-safe work area before opening the printer for repair. The area must include a properly grounded conductive cushioned mat to hold the printer and a conductive wrist strap for the technician. ESD protective devices are available from most electronic supply stores or by contacting 3M corporation at (800) 328-1368.



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.

Packaging

Printers are carton shipped and wrapped inside a protective bag. Keep all packing materials in case you need to reship the printer later or store the printer for any length of time.

Environmental and Shock Protection

Extreme temperature and humidity fluctuations or mishandling can damage the printer and power supply.

Allow 30 minutes or more before opening the printer's plastic bag. This time allows the printer to stabilize temperature especially after storage in a cool, dry location and then placed in a warmer, more humid location. Warm, humid air condenses on the cool components of the printer and this condensation may damage the components.

Move the printer carefully. Mechanical damage can certainly result from falls or rough handling.

Long Term Printer Inactivity or Storage

Over time 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.

RTC Battery

The RTC (Real-Time Clock) battery is not operator replaceable. See a Zebra authorized service technician to replace the battery. The battery has been rated for up to ten (10) years of operation.



Caution • The printer has a three volt lithium battery. You can discern a low or flat battery if the printer provides a consistently delayed date stamp. Battery replacement must be performed by a qualified service technician. Only use a Zebra approved replacement battery.



Important • Recycle batteries according to local your guidelines and regulations. Wrap the battery when disposing (or storing) to avoid a short circuit.

DO NOT short circuit the battery. Short circuiting the battery may result in heat generation, fire or bursting.

DO NOT heat, disassemble or dispose of battery in fire.

Fuses

There are no replaceable fuses in the ZD420 Series™ printer or power supply.



Notes • _____

Cleaning and Maintenance

The printers are manufactured and tested under a strict quality management program. Zebra Technologies uses only high quality components and materials in its printers. Although only minimal routine maintenance is required, following these simple maintenance guidelines will ensure longer life with quality printing performance.

Cleaning

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

Cleaning Supplies	Order Quantity	Intended Purpose
Cleaning pens (105950-035)	Set of 12	Clean printhead
Cleaning swabs (105909-057)	Set of 25	Clean media path, guides and sensors

You can find access to cleaning supplies at <http://www.zebra.com/supplies>.

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

Printer Part	Method	Interval
Printhead	Let the printhead to cool for a minute, then use a new cleaning pen to swab the dark line on the printhead cleaning from the center to the outside edges of the printhead (see <i>Cleaning the Printhead on page 7</i>).	Clean the printhead after every 5 rolls printed
Platen roller	Before cleaning, remove the platen roller by releasing both the left and right platen bearings. Clean the roller thoroughly with 99% pure Isopropyl Alcohol and a cleaning swab or lint-free cloth (see <i>Platen Cleaning on page 17</i>).	As needed.
Peel bar	Clean it thoroughly with 99% pure Isopropyl Alcohol and a fiber-free cleaning swab or lint-free cloth. Let alcohol evaporate completely.	
Media path		
Cutter Option	The cutter blade mechanism does not require maintenance cleaning. DO NOT clean the blade or mechanism with solvents or WD-40. This blade has a special coating to resist adhesives and wear.	
Exterior	Water-dampened cloth. See the 'Guide To Disinfecting and Cleaning Zebra® Healthcare Printers' on the Zebra Web site for the latest information on tested and approved cleaning materials, and cleaning methods.	As needed. Healthcare printers – cleaning frequency is set by medical policies and practices of your institution or governing agencies.
Interior	Gently brush out printer.	



Caution • Over time, adhesives and small pieces of media can transfer onto the printer components along the media path including the platen and printhead. This build-up can accumulate dust and debris. Failure to clean the printhead, media path and platen roller could result in inadvertent loss of labels, label jams and possible damage to the printer.



Important • Using too much alcohol can result in contamination of the electronic components requiring a much longer drying time before the printer will function properly.

Cleaning the Printhead

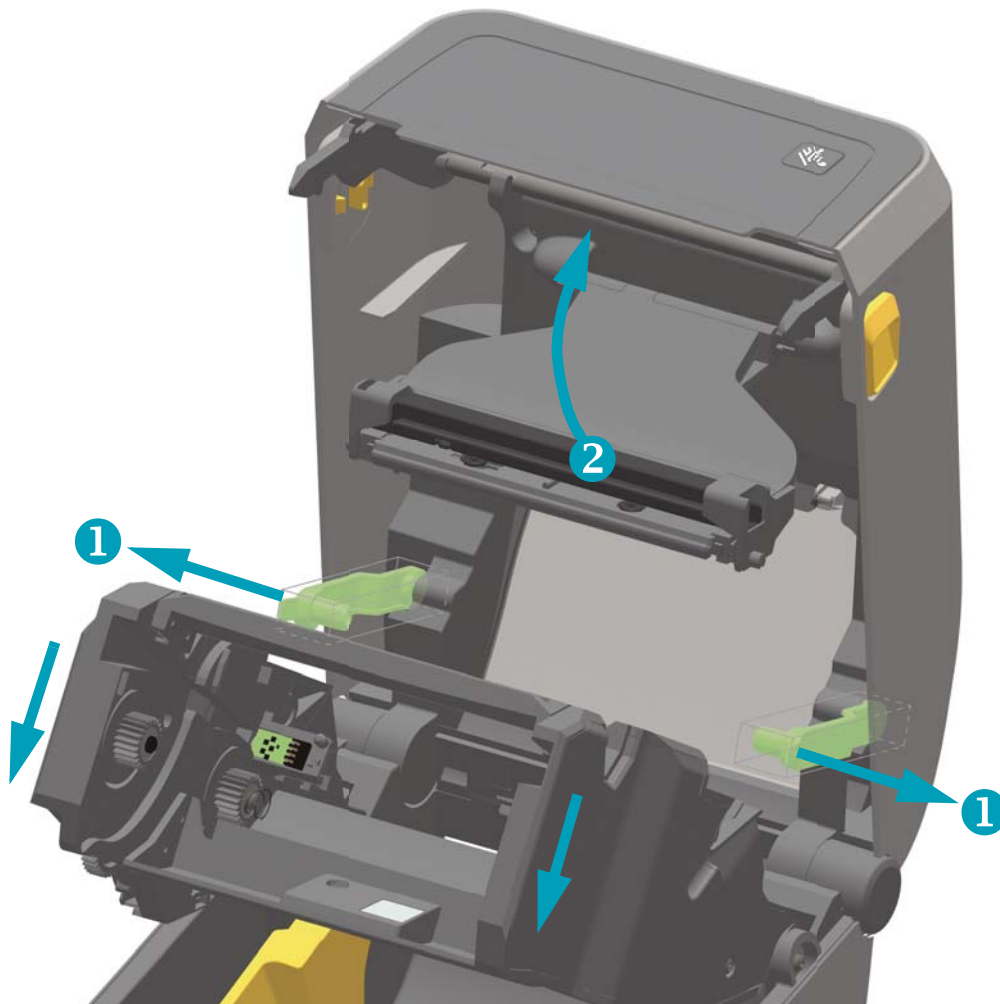
Always use a new cleaning pen on the printhead (an old pen carries contaminants from its previous use that may damage the printhead).



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

When you load new media, you can also clean the printhead.

1. Pull the two (2) Release Arms out to release the Ribbon Drive Transport. The arms are located on the left and right sides of the printer. The Ribbon Drive Transport and Printhead Actuator Arm will now be loose.

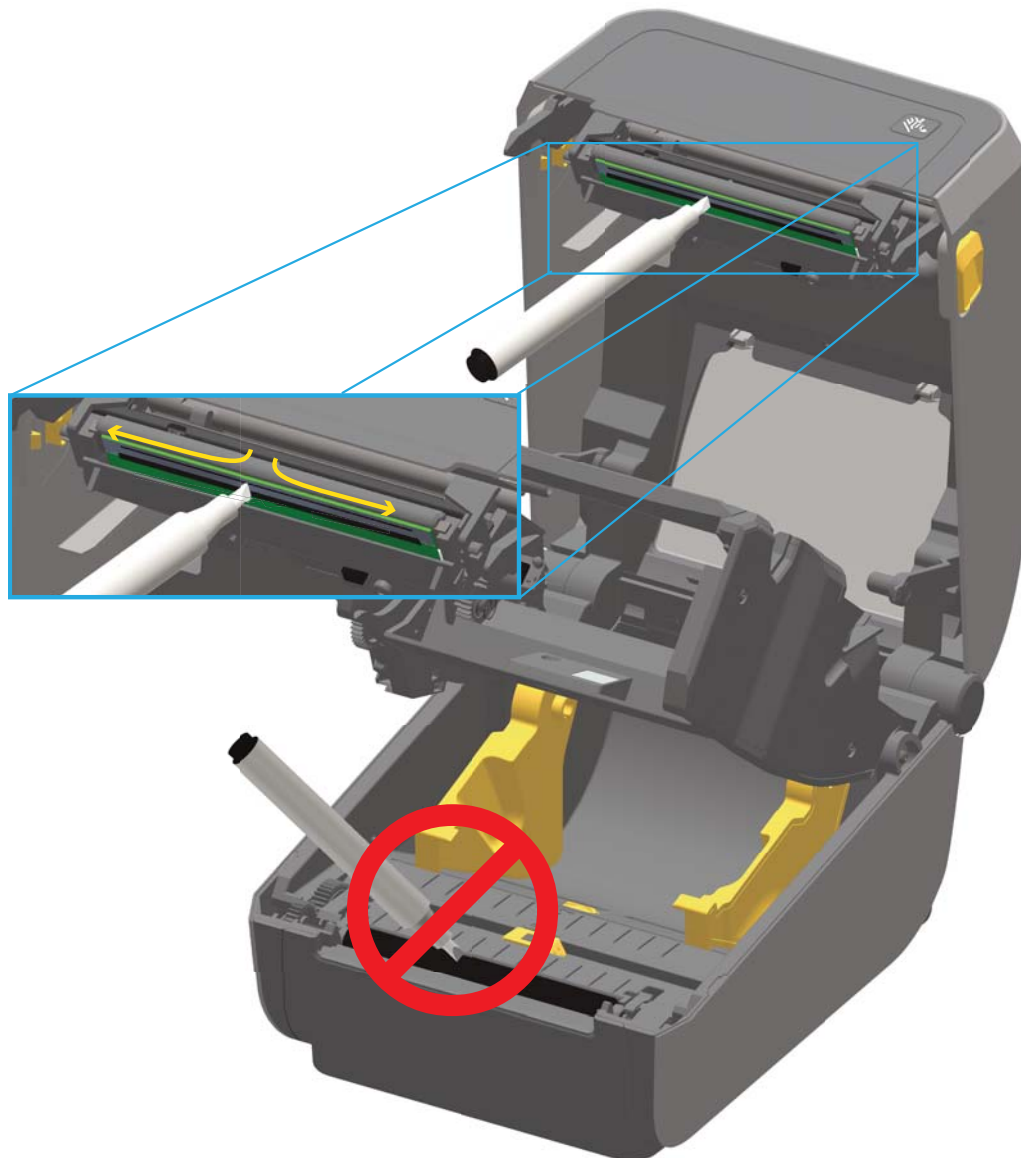


2. Swing the Printhead Actuator Arm up until it touches the printer's top cover. Hold the Printhead Actuator Arm in this position for access to the printhead.

8 | Cleaning and Maintenance

Cleaning

3. Rub the cleaning pen across the dark area of the printhead. Clean from the middle to the outside. This will move adhesive transferred from the outer edges of media to the area outside of the media path.



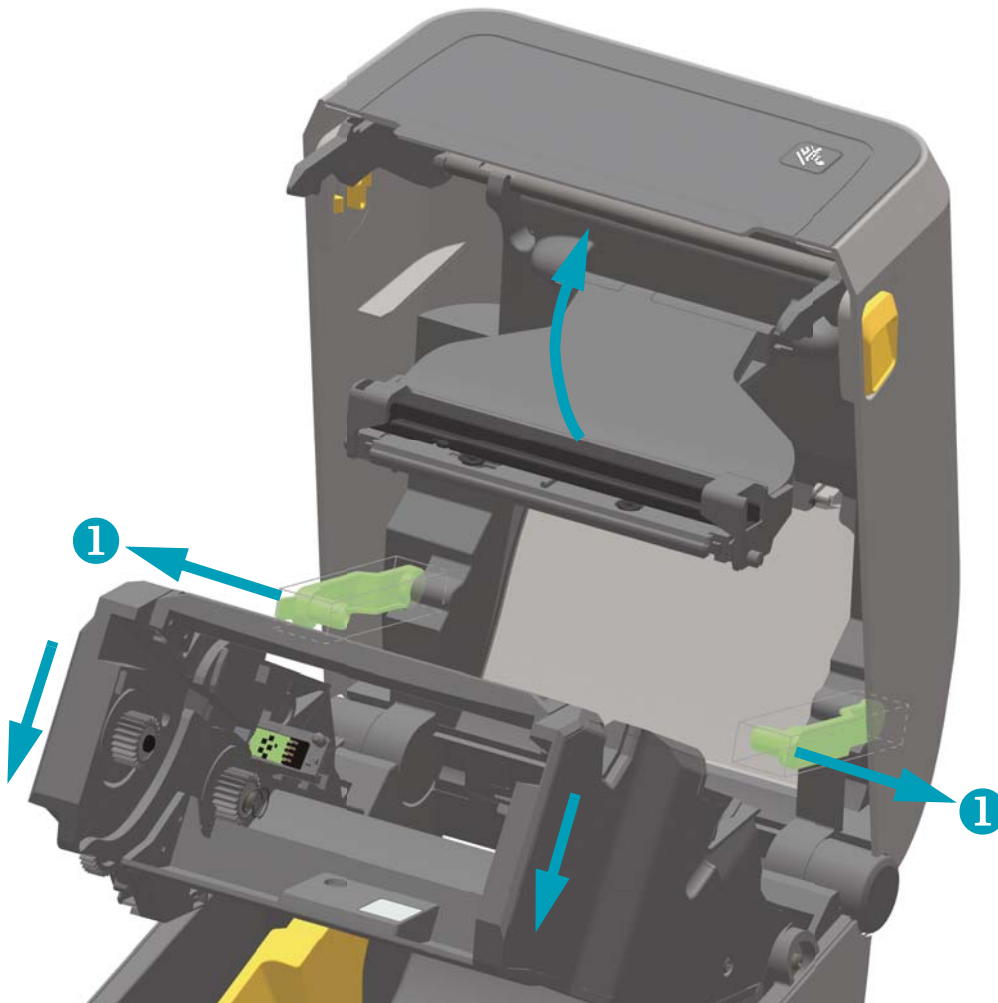
4. Release the Printhead Actuator Arm and then push the Ribbon Drive Transport into the Printhead Actuator Arm. The Release Arms will snap into place relinking the Ribbon Drive Transport to the top cover and the Printhead Actuator Arm.
5. Wait one minute before closing the printer.

Media Path Cleaning

Use a cleaning swab and/or a lint free cloth to remove debris, dust or crust that has built-up on the holders, guides and media path surfaces. Lightly moisten the swab or cloth with 99% solution medical-grade alcohol. For hard to clean areas, use extra alcohol on a cleaning swab to soak the debris to break up any adhesive that may have accumulated on surfaces in the media compartment.

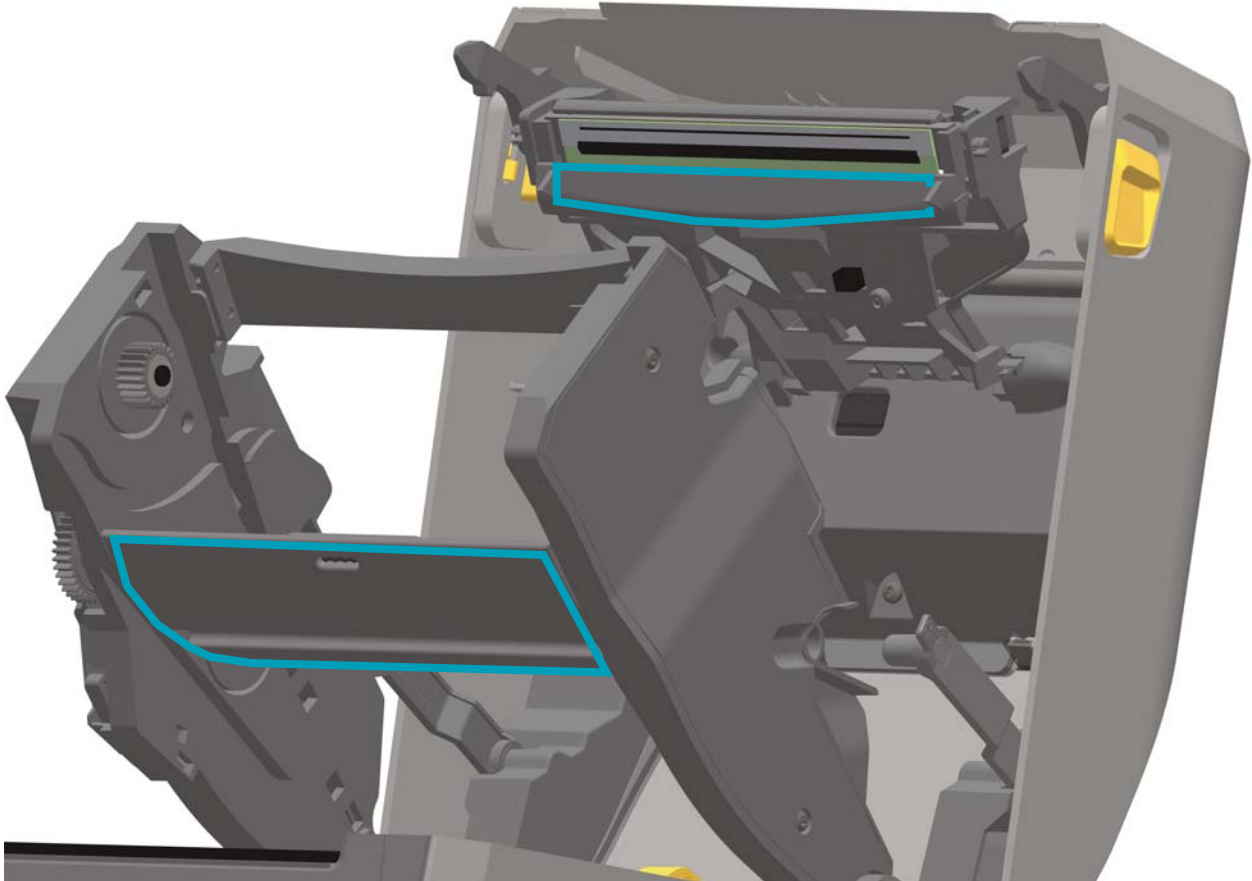
Do not clean the printhead, movable sensor, or platen as part of this process.

1. Pull the two (2) Release Arms out to release the Ribbon Drive Transport. The arms are located on the left and right sides of the printer. The Ribbon Drive Transport and Printhead Actuator Arm will now be loose.

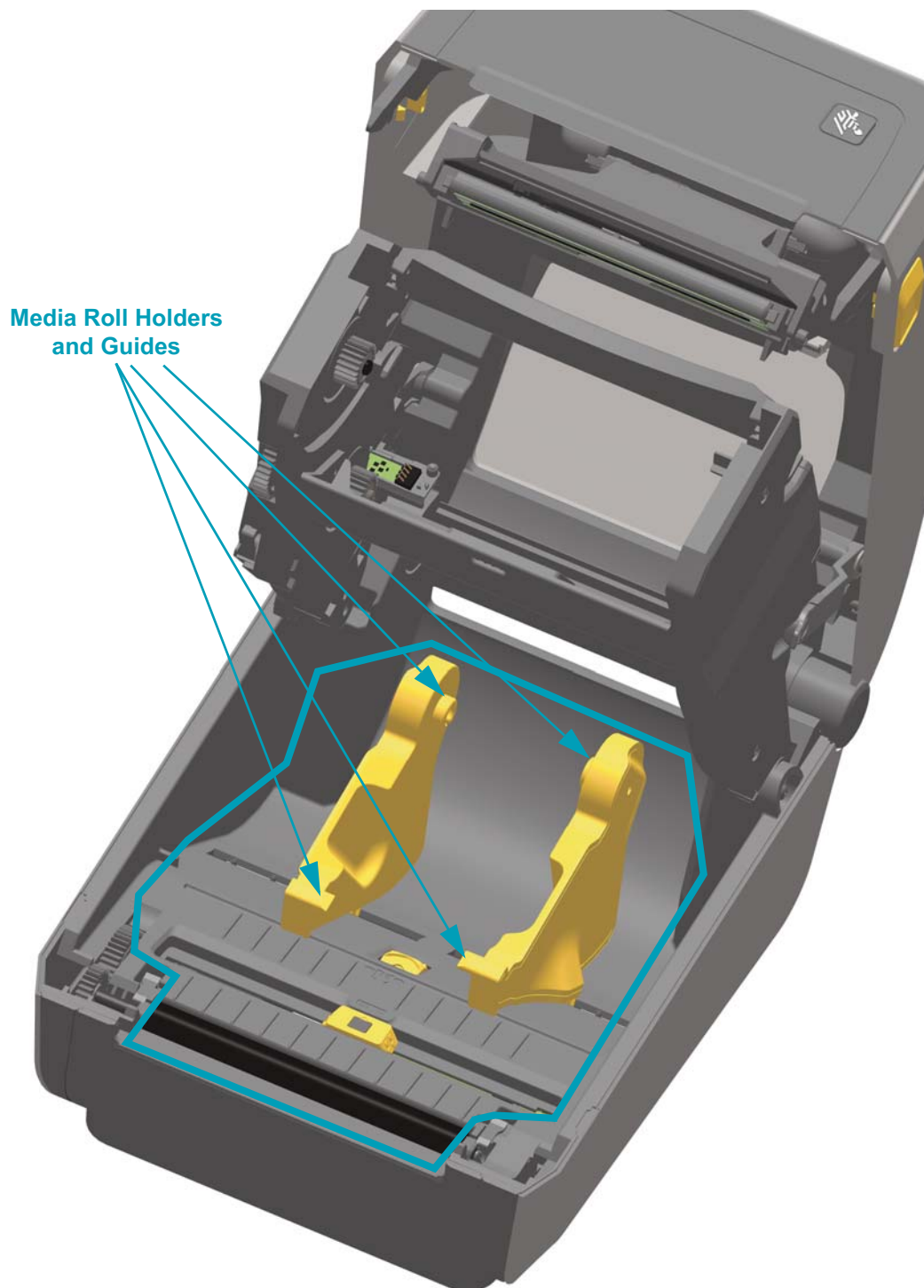


2. Swing the Printhead Actuator Arm up until it touches the printer's top cover. Hold the Printhead Actuator Arm in this position for access to the area below the printhead, see the next graphic.

3. Wipe the areas (outlined in blue) below the Printhead Actuator Arm and the Ribbon Drive Transport.



4. Wipe the inside surfaces of the roll holders and the underside of the media guides with a swab.
5. Wipe the movable sensor slide channel (but not sensor). Move the sensor to get to all areas.
6. Wait one minute before closing the printer. Discard the cleaning swab after use.



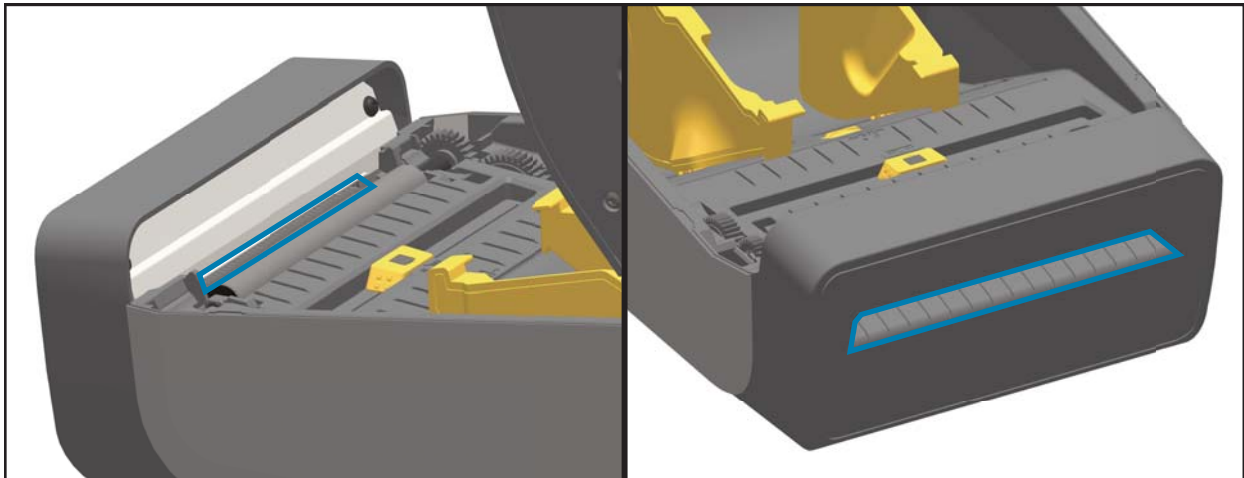
Cleaning the Cutter and Label Dispenser Options

This is a continuation of cleaning the media path for either option if it is installed on your printer.

Cutter

Clean the media path surfaces, but not the internal cutter blades or mechanism.

1. Wipe the ridges and the plastic surfaces of the media entry (inside) and exit slot (outside) of the cutter. Clean inside the areas outlined in blue.
2. Repeat as necessary to remove any adhesive or contaminate residue after it dries.

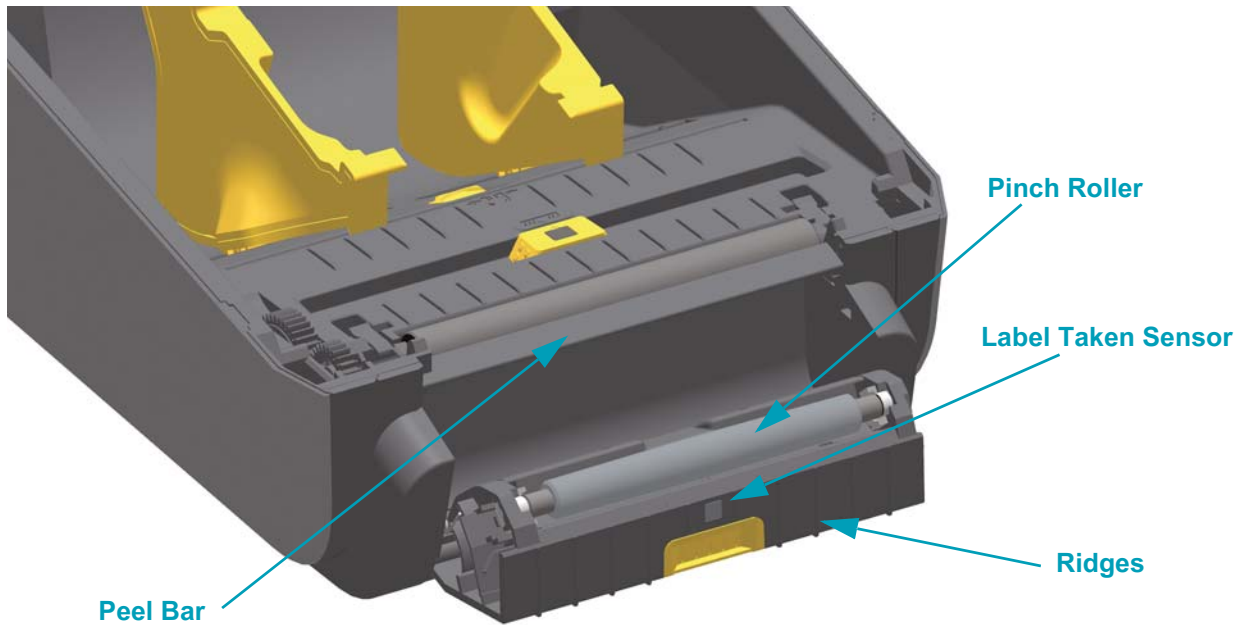


Cutter Facts

- Higher paper weights than the rated weight can cause the cutter blade to wear out quicker.
- The cutter is not designed to cut adhesive backed media, only label liners. Cutting through adhesive backed media normally will jam the cutter blade over time by leaving adhesive deposits. Common adhesives such as acrylic will build up on the fixed blade of the cutter. With the cutter's tight design tolerances required to deliver an accurate, clean cut every time, the cutter can not tolerate the accumulated hardened adhesives building up on the fixed cutting blade. These materials can push the moving blade at an angle to the fixed blade causing the blade to bind.
- The printer uses a cutter jam detection algorithm to reverse a jammed cutter and flag a media error condition (with a red printer status LED and via printer interface communication). Cutting adhesive backed media, unapproved non-paper media or paper weights exceeding the rated paper range of the cutter are typically the cause of cutter jams.

Label Dispenser

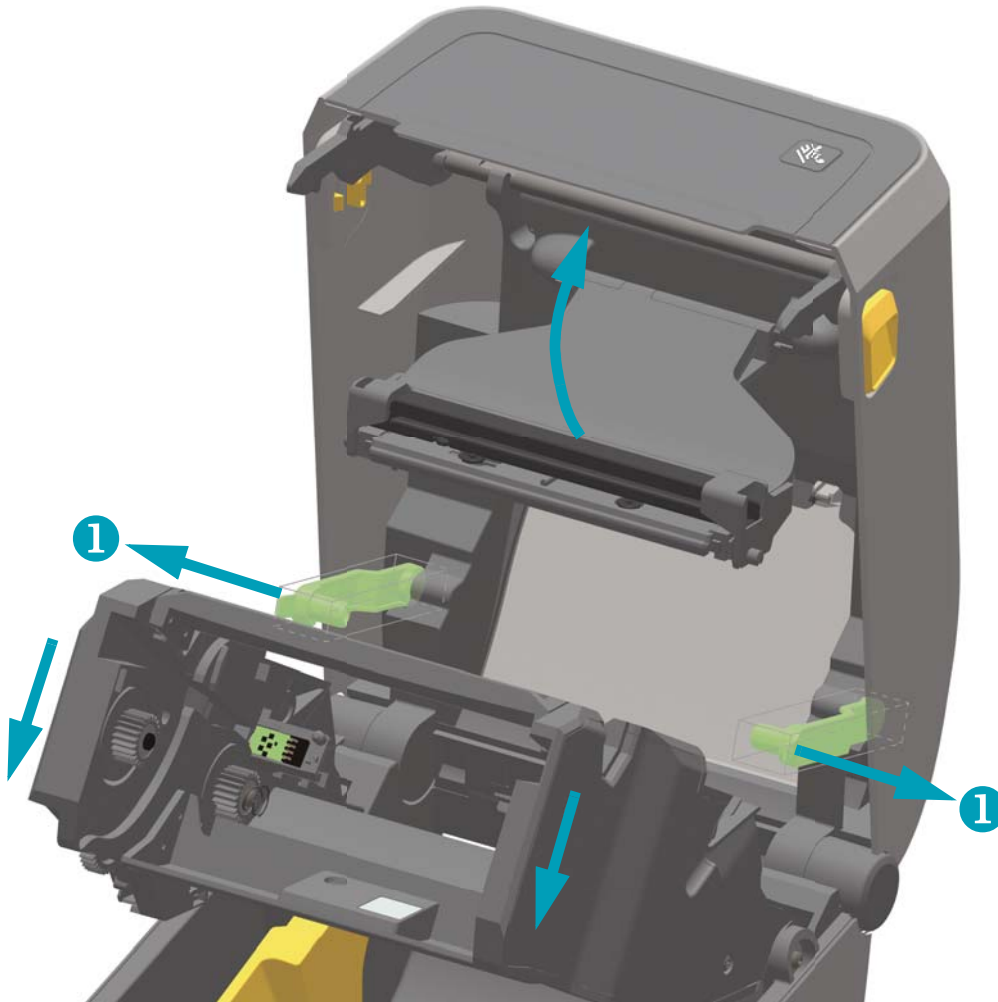
1. Open the door and clean the peel bar, inner surfaces and ridges on the door.
2. Wipe the pinch roller while rotating it. Discard the swab or cloth and clean again to remove residue.
3. Clean the sensor window. The window should be clear of streaks and residue.



Sensor Cleaning

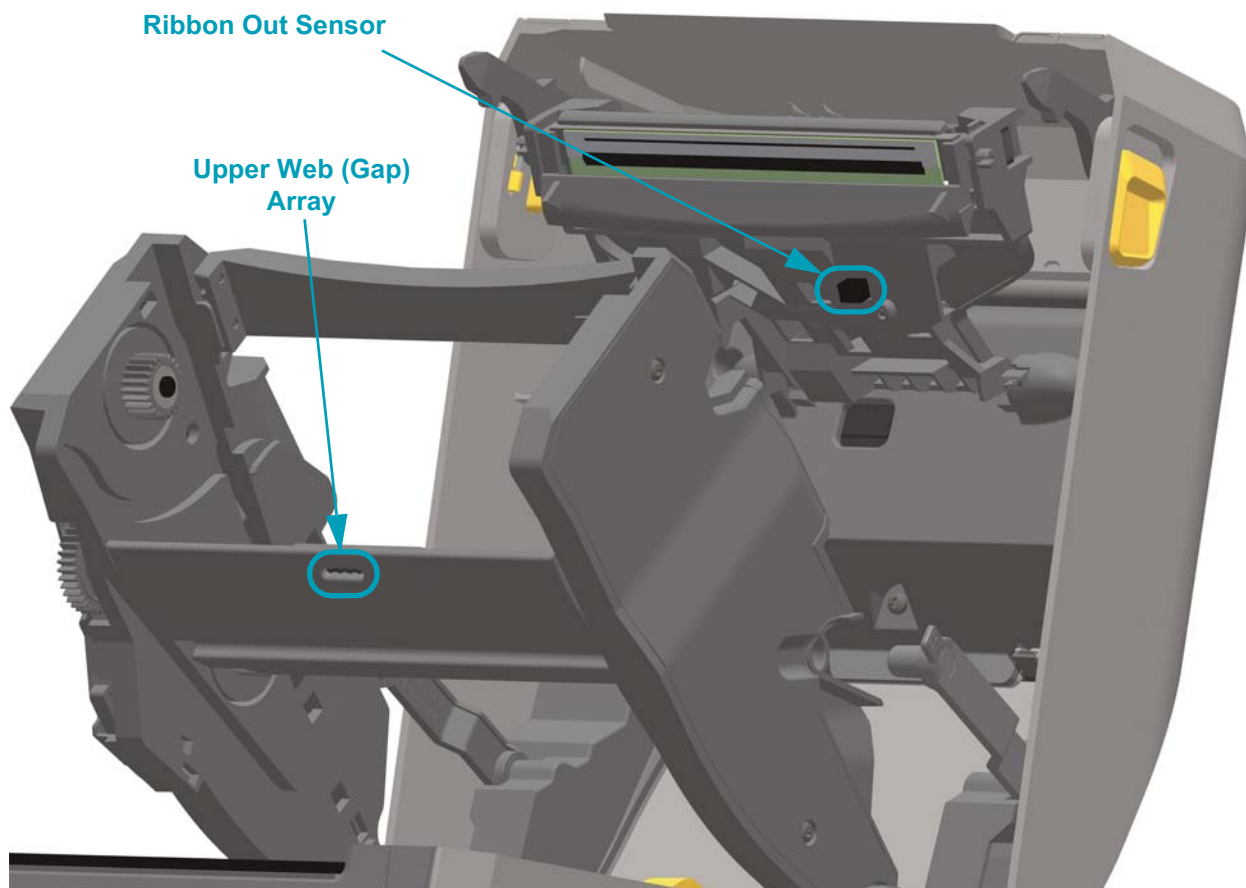
Dust can accumulate on the media sensors. Do not use an air compressor to remove dust. Compressors add moisture, fine grit, and lubricant which can contaminate your printer.

1. Pull the two (2) Release Arms out to release the Ribbon Drive Transport. The arms are located on the left and right sides of the printer. The Ribbon Drive Transport and Printhead Actuator Arm will now be loose.

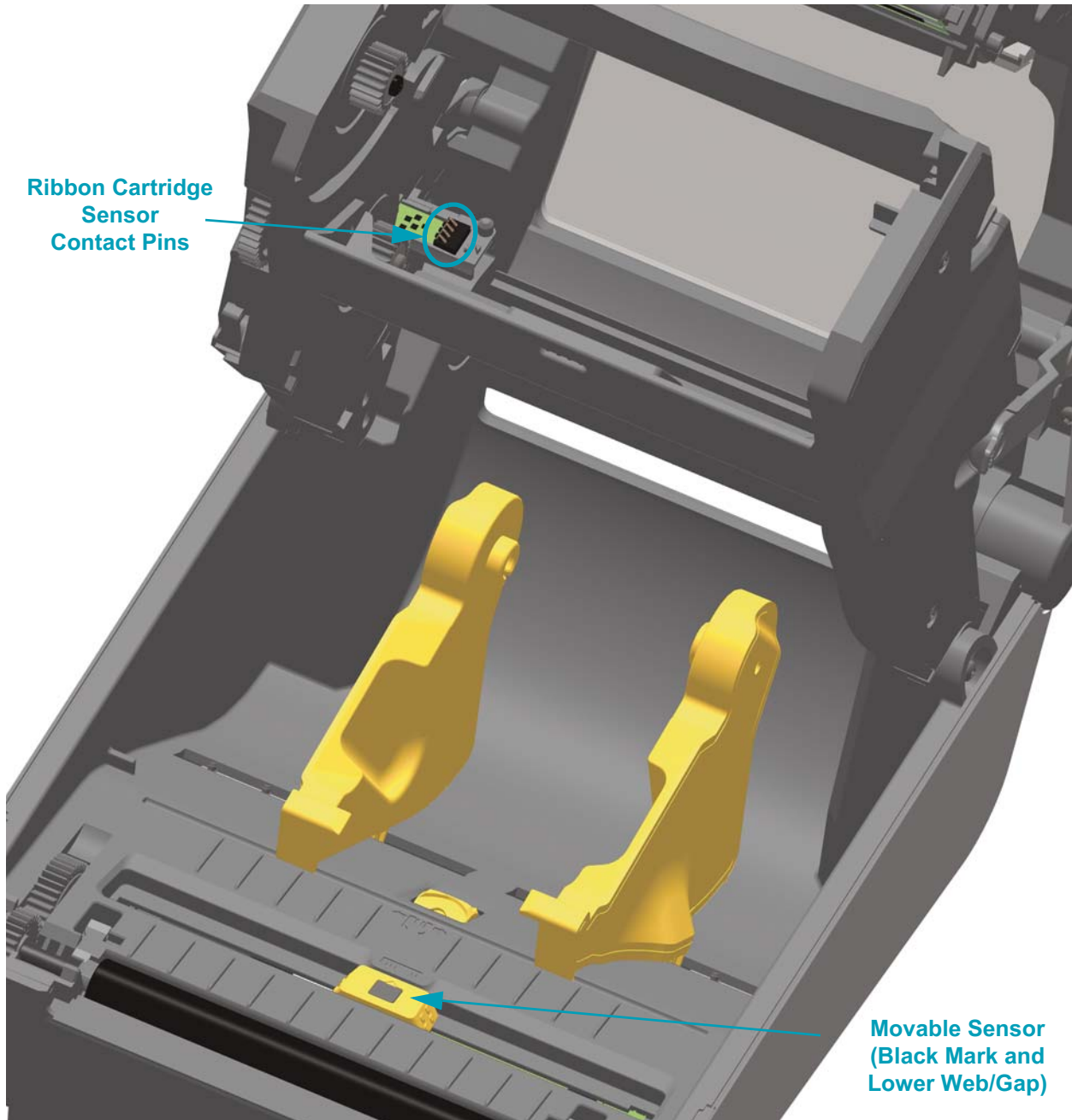


2. Swing the Printhead Actuator Arm up until it touches the printer's top cover. Hold the Printhead Actuator Arm in this position for access to the area below the printhead, see the next graphic.

3. Spray the Upper Web (Gap) Array Sensor under the Ribbon Drive Transport and the Ribbon Out Sensor on the underside of the Printhead Actuator Arm with a can of compressed air. If necessary, use an alcohol moistened swab to break it up. Use a dry swab to remove any residue that may be left from the first cleaning.



4. Clean the Movable Sensor's window. Gently brush away dust or use a can of compressed air; if necessary, use a dry swab to brush away dust. If adhesives or other contaminants remain, use an alcohol moistened swab to break it up.
5. Use a dry swab to remove any residue that may be left from the first cleaning.
6. Repeat steps 4 and 5 as required until all residue and streaks are removed from the sensor.



7. **Ribbon Cartridge Sensor Pins** – Only clean when the cartridges are failing detection. Clean the Ribbon Cartridge interface pins with a gentle wiping from right to left. Up and down motions may damage the pins.

Platen Cleaning

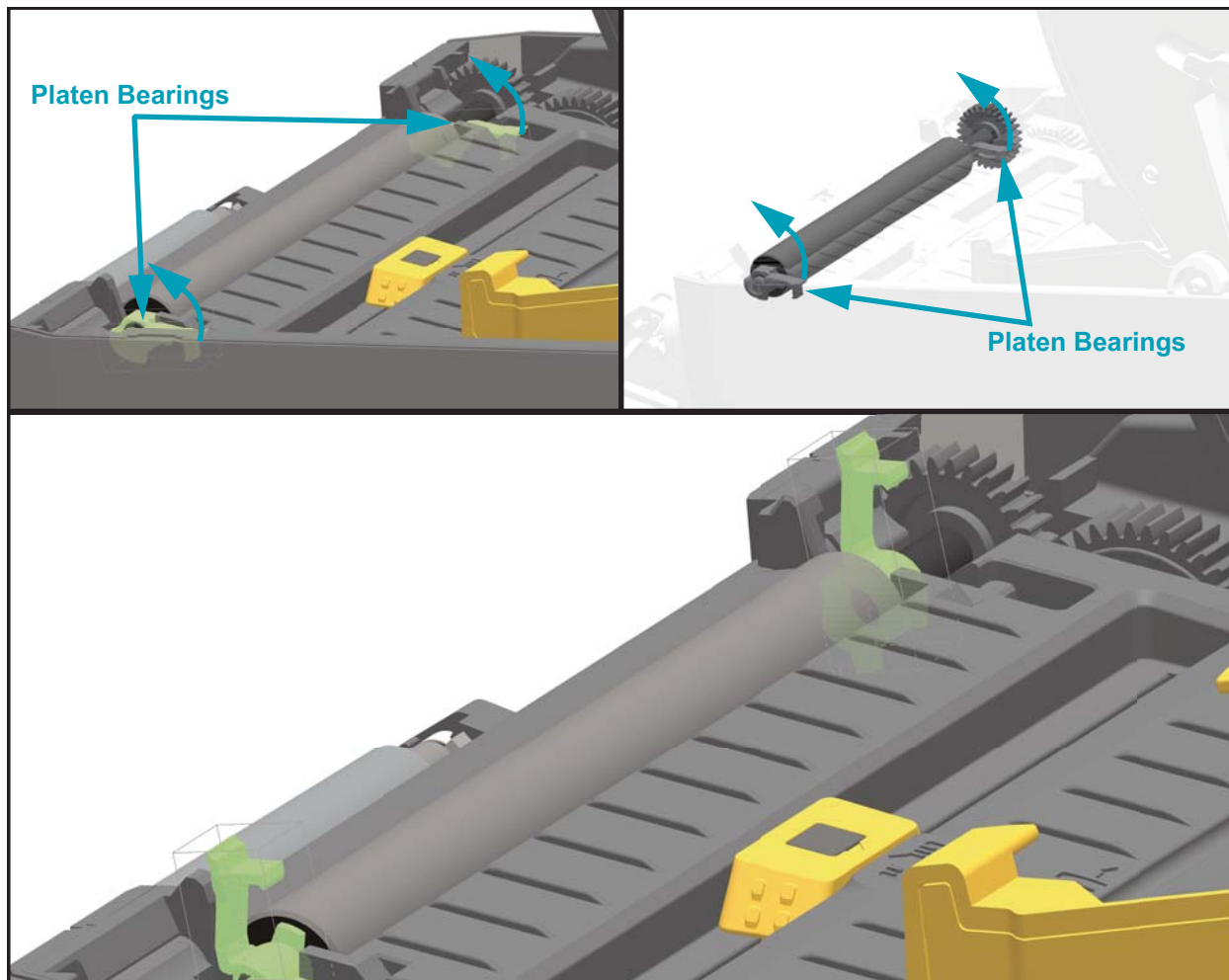
The platen (drive roller) normally does not require cleaning. Paper and liner dust can accumulate without affecting print operations.

Contaminants on the platen roller can damage the printhead or cause the media to slip or stick when printing. Adhesive, dirt, general dust, oils and other contaminants should be cleaned immediately off the platen.

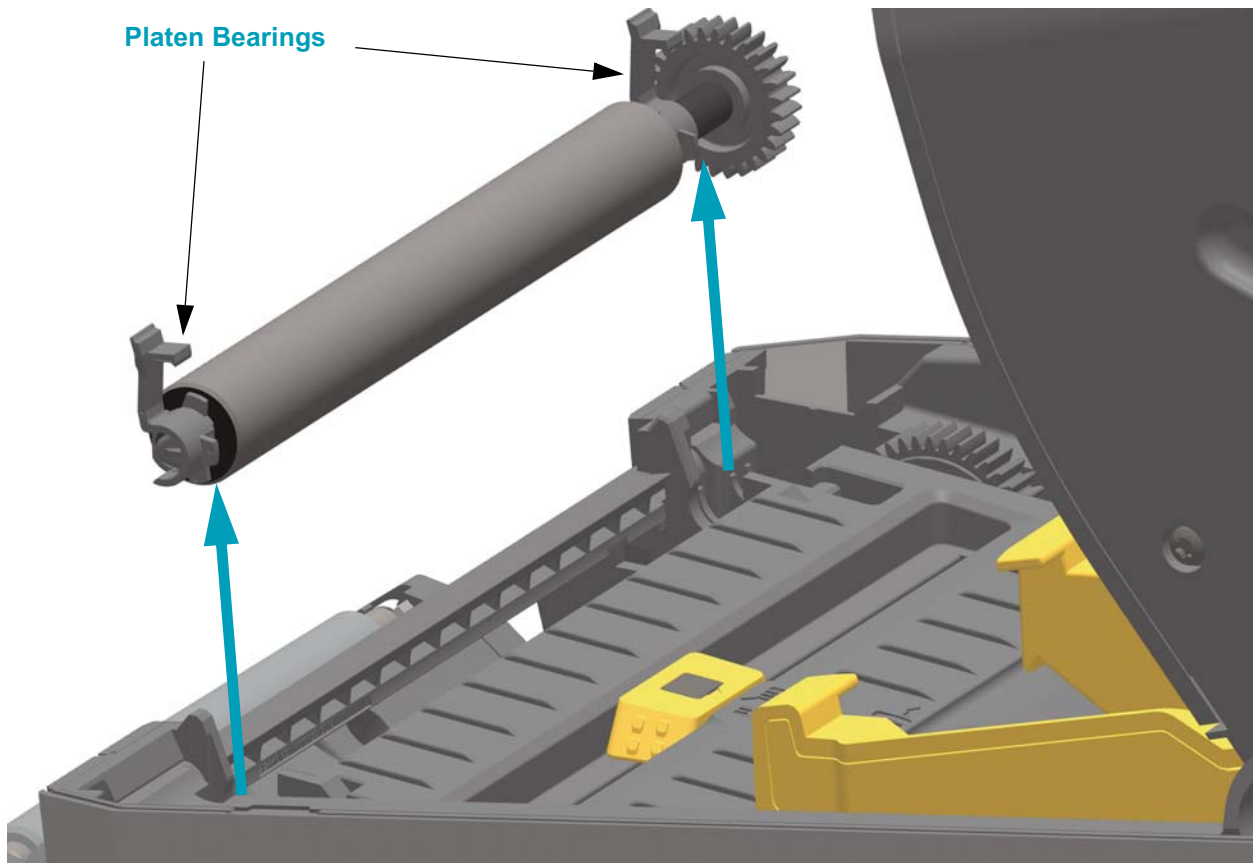
Clean the platen (and media path) whenever the printer has significantly poorer performance, print quality or media handling. The platen is the print surface and drive roller for your media. If sticking or jamming continues even after cleaning, you must replace the platen.

The platen can be cleaned with a fiber-free swab (such as a Texpad swab) or a lint free, clean, damp cloth very lightly moistened with 99% pure Isopropyl Alcohol.

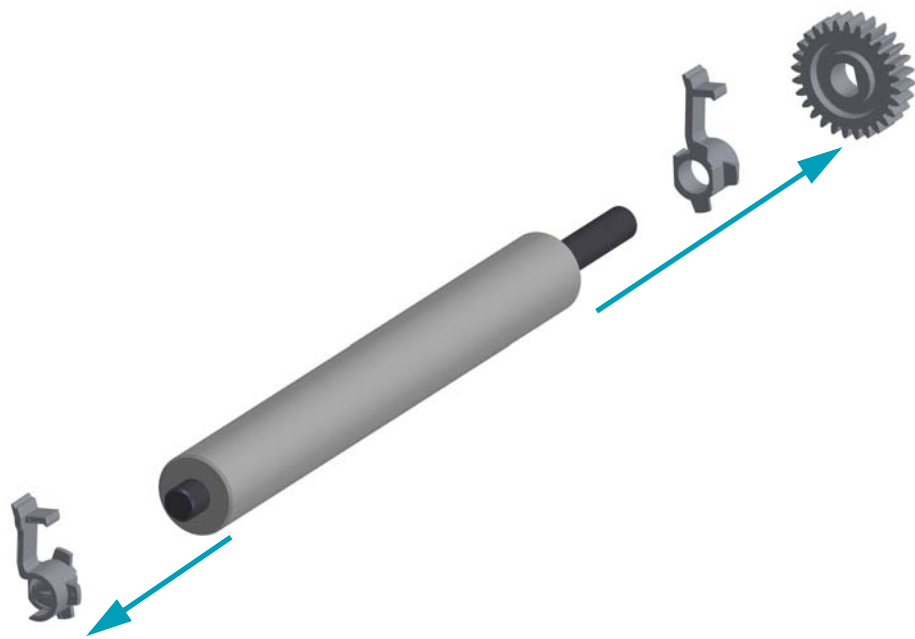
1. Open the cover (and dispenser door if the dispenser is installed). Remove media from platen area.
2. Pull the platen bearing latch release tabs on the right and left sides towards the front of the printer and rotate them up.



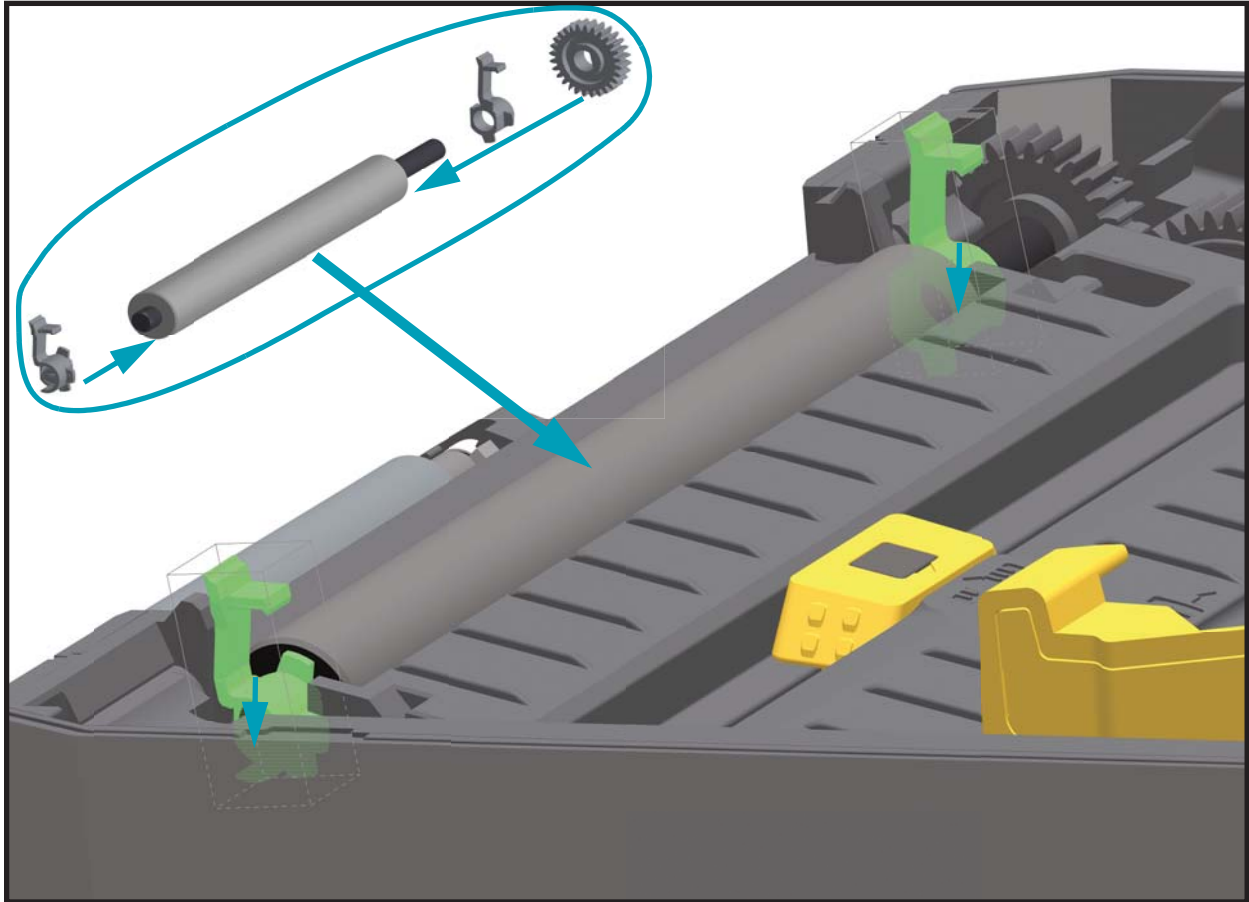
3. Lift the platen out of the printer's bottom frame.



4. Slide the gear and the two (2) bearings off the shaft of the platen roller.



5. Clean the platen with the alcohol moistened swab. Clean from the center out. Repeat this process until all of the roller surface has been cleaned. If there has been heavy adhesive build-up or label jam, repeat with a new swab to remove residual contaminants. Adhesives and oils, for example, may be thinned by the initial cleaning but not completely removed.
6. Discard the cleaning swabs after use – do not reuse.
7. Make sure the bearings and drive gear are on the shaft of the platen roller.



8. Align the platen with the gear to the left and lower it into the printer's bottom frame.
9. Rotate the platen bearing latch release tabs down on the right and left sides towards the rear of the printer and snap them into place.

Allow the printer to dry for one minute before closing the dispenser door, media cover or loading labels.

Other Printer Maintenance

There are no user level maintenance procedures beyond those detailed in this section; see [Troubleshooting on page 21](#) for more information on diagnosing printer and print problems.

Troubleshooting

This section provides troubleshooting procedures.

Meaning of the Indicator Light Patterns

The indicators on the control panel show the current status of the printer.

Table 3 • Status of Printer As Shown by Indicator Lighting Patterns







































































Typical Operating Conditions					 Steady  Flashing  Fade
STATUS	PAUSE	DATA	SUPPLIES	NETWORK	
					The printer is ready.
					The printer is paused.
					The media supply is out. The printer needs attention and cannot continue without user intervention.
					Ribbon In – The printer is in direct thermal mode and has a ribbon cartridge installed. Remove the ribbon cartridge to continue printing in direct thermal mode.
					Ribbon Low – Default is 10% of ribbon remaining. The Media indicator flashes red and yellow while the Status indicator is solid yellow.
					Ribbon Out – Missing ribbon cartridge or the ribbon cartridge needs to be replaced to continue printing when the printer is in thermal transfer mode.
					A data communication operation has not finished, but is not actively being transferred.
					Data communications are in process.
Special Error Conditions					
					There is a jam in the cutter.
					The printhead is open. The printer needs attention and cannot continue without user intervention.
					The printhead is over temperature.  Caution • The printhead may be hot and could cause severe burns. Allow the printhead to cool.
					The printhead is over temperature. Turn the printer OFF. After several minutes to allow the printer to completely cool, turn the printer ON.  Caution • The printhead may be hot and could cause severe burns.
					The printhead is under temperature.

Table 3 • Status of Printer As Shown by Indicator Lighting Patterns


















































































Typical Operating Conditions					 Steady  Flashing  Fade
STATUS	PAUSE	DATA	SUPPLIES	NETWORK	
					The printhead was replaced with one that is not a genuine Zebra printhead. Install a genuine Zebra printhead to continue.
					The printer is unable to read the printhead type (dpi). The printhead has been replaced incorrectly or with a non-Zebra printhead. Call a service technician.
					Out of memory while storing content (formats, graphics, fonts, etc.).
					The ribbon cartridge can not be authenticated or has been altered. The printer only supports Genuine Zebra Ribbon Cartridges and does not support refurbished or non-Zebra cartridges.
Printers with a Bluetooth Low Energy option					
					Bluetooth Low Energy has paired.
					Bluetooth Low Energy has failed to pair.
Printers with an Ethernet (LAN) option					
					NETWORK light off No Ethernet link is available.
					A 100 Base link was found.
					A 10 Base link was found.
					An error condition exists. The printer is not connected to your network.
Printers with a Wi-Fi (WLAN) option					
					The light flashes red while the printer associates with the network.
					The light then flashes yellow while the printer is authenticating with the network.
					The printer is connected to your network and the Wi-Fi signal is strong.

Table 3 • Status of Printer As Shown by Indicator Lighting Patterns

Typical Operating Conditions					
STATUS	PAUSE	DATA	SUPPLIES	NETWORK	 Steady  Flashing  Fade
					The printer is connected to your network and the Wini signal is weak.
					An error condition exists. The printer is not connected to your network.

Printing Issues

This section helps you identify issues with printing or print quality, the possible causes, and the recommended solutions.

Table 4 • Printing Issues

Issue	Possible Cause	Recommended Solution
General print quality issues – The printed image does not look right.	The printhead is dirty.	Clean the printhead (see <i>Cleaning the Printhead on page 7</i> and <i>Platen Cleaning on page 17</i>).
	The printer is set at an incorrect darkness level and/or print speed.	Perform the <i>Print Quality Report on page 40</i> to determine the ideal darkness and speed settings for your application. Do not set print speeds above the manufacturer's maximum rated speed for your media (print material and ribbons both).
	You may be using the wrong power supply.	Verify you are using the power supply that came with this printer.
	The printhead has worn out.	Replace the printhead. The printhead is a consumable item which will wear over time due to friction between the media and printhead. Using unapproved media may shorten printhead life or damage your printhead.
	The platen (drive) roller may need cleaning or replacement.	Clean or replace the platen (drive) roller (see <i>Platen Cleaning on page 17</i>).
	Thermal Transfer printing – You may not be using the correct ribbon cartridge type.	The print material (wax, wax-resin, or resin) may not match the material (paper, media coating, or synthetics) in use.
	Thermal Transfer printing – Voids or holes in print with no particular pattern.	The print material (wax, wax-resin, or resin) or print speed may not match the material (paper, media coating, or synthetics) in use. Set the printer for no higher than the maximum recommended print speed of the ribbon cartridge (see <i>Ribbon Cartridge Programming Commands on page 34</i> for reading cartridge features).
No print on the label.	The media may not be direct thermal media (and is thermal media made for thermal transfer printers).	See the test procedure <i>Determining Thermal Media Types on page 114</i> .
	Media has been loaded incorrectly.	The media printable surface must face up towards the printhead. See the User's Guide or 'How To ...' videos on the Zebra Web site or more information: www.zebra.com

Table 4 • Printing Issues (Continued)

Issue	Possible Cause	Recommended Solution
Vertical image or label drift. Excessive vertical drift in top-of-form registration. Loss of printing registration on labels.	The platen (drive) roller is dirty.	Clean the printhead and platen roller. <i>Cleaning the Printhead on page 7</i> and <i>Platen Cleaning on page 17</i>
	The media type is set incorrectly.	Set the printer for the correct media type (gap/notch, continuous, or mark); see <i>SmartCal Media Calibration on page 37</i> . or if it still skips labels try a <i>Manual Media Calibration on page 48</i> .
	The media is loaded incorrectly.	Load media correctly. See the User's Guide or 'How To ...' videos on the Zebra Web site or more information: www.zebra.com
	The printer is out of calibration.	Calibrate the printer (see <i>SmartCal Media Calibration on page 37</i>).
	The media is loaded incorrectly.	Ensure that the media is loaded correctly. See the User's Guide or 'How To ...' videos on the Zebra Web site or more information: www.zebra.com
	Incompatible media.	You must use media that meets the printer specifications. Ensure that the inter-label gaps or notches are 2 to 4 mm and consistently placed.
Long tracks of missing print on several labels	Printhead element damaged.	Replace the printhead (see <i>Replacing the Printhead on page 59</i>).
Printing too light or too dark over the entire label Smudge marks or voids on labels	The media or ribbon is not designed for high-speed operation.	<ol style="list-style-type: none"> 1. Reduce speed and adjust darkness level to be within the media's rated maximum speed. 2. Verify media and ribbon are correctly paired - for example, hard resin ribbon and polyester labels typically work together. See the media and ribbon supplier specifications. 3. Replace supplies with those recommended for high-speed operation.
Mis-registration/ skips labels	The printer is not calibrated.	Calibrate the printer (see <i>SmartCal Media Calibration on page 37</i>), or if it still skips labels try a <i>Manual Media Calibration on page 48</i> .
	Improper label format.	Check your label format and correct it as necessary.

Table 4 • Printing Issues (Continued)

Issue	Possible Cause	Recommended Solution
<p>The barcode printed on a label does not scan.</p>	<p>The barcode is not within specifications because the print is too light or too dark.</p>	<p>Perform the <i>Print Quality Report on page 40</i>. Adjust the darkness or print speed settings as necessary.</p>
	<p>There is not enough blank space around the barcode.</p>	<p>Leave at least 1/8 in. (3.2 mm) of blank space around the barcode (referred to as the quiet zone) and other printed areas on the label and between the barcode and the edge of the label. This requirement varies by barcode type.</p>
	<p>There is a void or missing print in a barcode, text, or graphic in a printed form. Voids can look like a white bar area in a barcode.</p>	<ol style="list-style-type: none"> 1. Perform <i>Cleaning the Printhead on page 7</i> to remove contaminants on the printhead. Reprint and test the barcode. 2. The print material and transfer ribbon type may not match – causing random voids. 3. Use the <i>Print Quality Report on page 40</i> to see if the printhead has damaged printhead elements. Verify that the large black bar on the bottom of the printed test label does not have any streaks or voids after thoroughly cleaning the printhead. Call a service technician.

Communications Problems

Table 5 identifies problems with communications, the possible causes, and the recommended solutions.

Table 5 • Communications Problems

Problem	Possible Cause	Recommended Solution
A label format was sent to the printer but was not recognized. The DATA light does not flash.	The communication parameters are incorrect.	Check the printer driver or software communications settings (if applicable).
		Check the printer's handshake protocol and serial port settings. The setting used must match the one being used by the host computer. See the User's Guide on the Zebra Web site or more information: www.zebra.com
		The serial cable you are trying to use may not be a standard DTE or DCE type cable. See the User's Guide on the Zebra Web site or more information: www.zebra.com
A label format was sent to the printer. Several labels print, then the printer skips, misplaces, misses, or distorts the image on the label.	The serial communication settings are incorrect.	Ensure that the flow control settings match the host system.
		Check the communication cable length.
		Check the printer driver or software communications settings (if applicable).
A label format was sent to the printer but was not recognized. The DATA light flashes but no printing occurs.	The prefix and delimiter characters set in the printer do not match the ones in the label format.	Verify the ZPL programmings prefix (COMMAND CHAR) and delimiter (DELIM./CHAR) characters (see <i>Configuration Setting to Command Cross-reference on page 119</i>).
	Incorrect data is being sent to the printer.	Check the communication settings on the computer. Ensure that they match the printer settings. If the problem continues, check the label format.

Miscellaneous Issues

Table 6 identifies miscellaneous issues with the printer, the possible causes, and the recommended solutions.

Table 6 • Miscellaneous Printer Problems

Problem	Possible Cause	Recommended Solution
Changes you made to parameter settings did not take effect or stay set.	Some parameters are set incorrectly.	1. Check the parameters and change or reset if necessary. 2. Cycle the printer OFF and then back ON.
	The ZPL ^J command was not used to save your configuration.	See the ZPL Programming Guide on the Zebra Web site or more information: www.zebra.com
	A firmware command turned off the ability to change the parameter.	
	A firmware command changed the parameter back to the previous setting.	
	If the problem persists, there may be a problem with the main logic board.	Replace the main logic board (see <i>Replacing the Main PCBA on page 85</i>).
Non-continuous labels are being treated as continuous labels.	The printer was not calibrated for the media being used.	Set the printer for the correct media type (gap/notch, continuous, or mark) and calibrate the printer (see <i>SmartCal Media Calibration on page 37</i> or <i>Manual Media Calibration on page 48</i>).
	The printer is configured for continuous media.	
All indicator lights are on and the printer locks up. - or - The printer locks up while restarting	Internal electronic or firmware failure.	<ul style="list-style-type: none"> • Turn the printer off and disconnect it from power for 15 sec. or more. Reattach power and turn the printer on. • Reload the printers firmware (see <i>Updating Printer Firmware on page 31</i>). • Replace the main logic board (see <i>Replacing the Main PCBA on page 85</i>).

Table 6 • Miscellaneous Printer Problems (Continued)

Problem	Possible Cause	Recommended Solution
<p>Ribbon Out warning, but a ribbon cartridge is installed</p> <hr/> <p>Ribbon Cartridge Authentication error, but a Genuine Zebra Ribbon Cartridge is installed and has not been refurbished or altered.</p>	<p>The Ribbon Cartridge Sensor Contact Pins or the Ribbon Cartridge's Smart Chip's contacts may be dirty or the chip may be damaged.</p>	<ol style="list-style-type: none"> 1. Try a different cartridge. 2. The cartridge's smart chip may be dirty, defective, or damaged. Inspect and clean the ribbon cartridge's Smart Chip's contacts with alcohol and a cleaning swab. Try a different cartridge if this does not work. 3. Clean the Ribbon Cartridge Sensor Contact Pins (see Sensor Cleaning on page 14). 4. Replace the Ribbon Cartridge Sensor that is part of the Ribbon Transport (see Replacing the Ribbon Transport on page 95).

Updating Printer Firmware

The printer's firmware may need to be updated periodically to get new features, improvements, and printer upgrades for media handling and communications.

Use Zebra Setup Utilities (ZSU) to load new firmware.

1. Open Zebra Setup Utilities.
2. Select your installed ZD420 printer.
3. Click on the 'Open Printer Tools' button and a 'Tools' window will open.
4. Click on the 'Action' tab.
5. Load the printer with media.
6. Click on the text line 'Send file'. The lower half of the window will present a filename and path with a Browse (...) button to select the latest firmware file you have downloaded from the Zebra Web site.
7. Observe the control panel and wait.
 If the firmware version is different than the version installed on the printer, the firmware will download to the printer. The data indicator will flash green while the firmware is downloading. The printer will restart with all indicators flashing. When the firmware update has completed, the STATUS indicator (◊) will display solid Green as the firmware is validated and installed. A printer Configuration Report is automatically printed and the firmware update has been completed.

USB Host

The USB host port allows you to connect a USB Flash drive to the printer to perform firmware updates.

Figure 1 • USB Host Port Location



USB Host Port



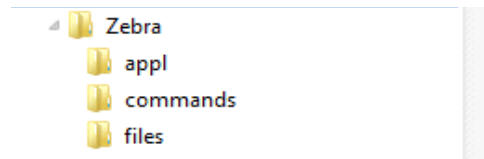
Important • The USB Flash drive must be formatted with the FAT file system.

Filenames may be 1 to 16 alphanumeric characters (A, a, B, b, C, c, ..., 0, 1, 2, 3, ...) only.

Do not use Asian characters, Cyrillic characters, or accented characters in file names.

Flash Drive Preparation and Firmware Update

1. On your USB Flash Drive, create the following:
 - a folder called Zebra
 - in that folder, create three sub-directories:
 - appl
 - commands
 - files



2. In the /appl folder, place a copy of the latest firmware for your printer.
3. Load the printer with media.
4. Insert the USB Flash drive into the USB host port on your printer.
5. Observe the control panel and wait.
 If the firmware version is different than the version installed on the printer, the firmware will download to the printer. The data indicator will flash green while the firmware is downloading. The printer will restart with all indicators flashing. When the firmware update has completed, the STATUS indicator (◻) will display solid Green as the firmware is validated and installed. A printer Configuration Report is automatically printed and the firmware update has been completed.
6. Remove the USB Flash drive from the printer.

Ribbon Cartridge Programming Commands

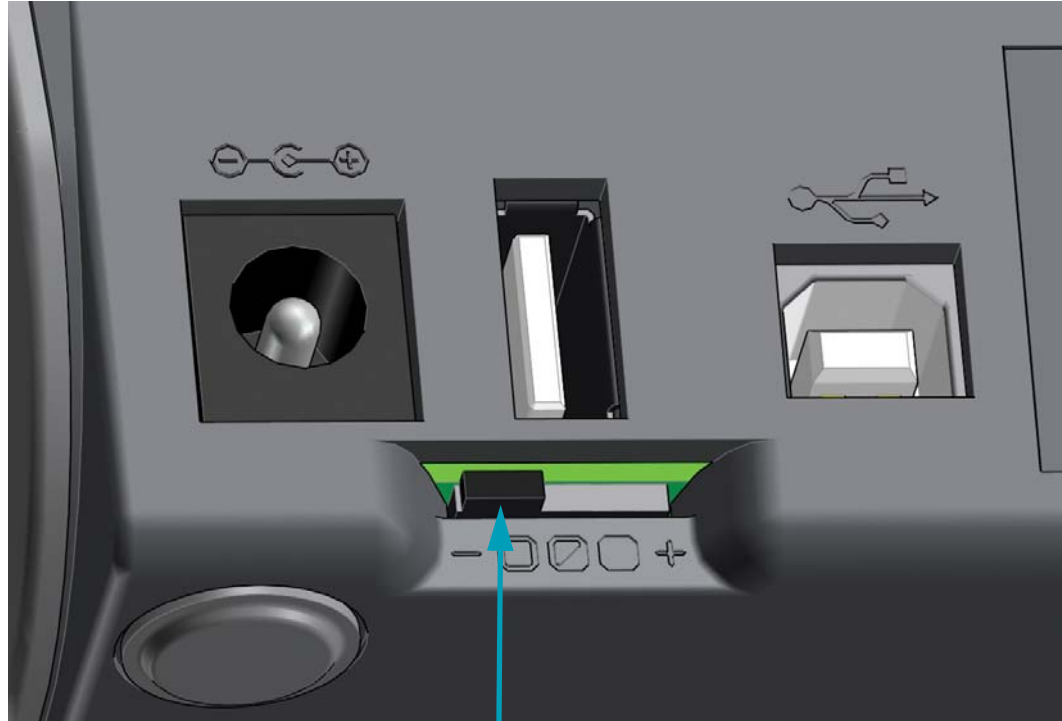
The ZD420 printer has several Set Get Do (SGD) programming commands to support the use of the ribbon cartridge. See the ZPL Programmer's Guide for more details on SGD commands and SGD "ribbon" commands in particular. The following are examples of SGD ribbon cartridge commands.

```
! U1 getvar "device.feature.ribbon_cartridge"  
! U1 getvar "ribbon.cartridge.part_number"  
! U1 getvar "ribbon.cartridge.authenticated"  
! U1 getvar "ribbon.cartridge.length_remaining"  
! U1 getvar "ribbon.cartridge.serial_number"  
! U1 getvar "ribbon.cartridge.width"  
! U1 getvar "ribbon.cartridge.type"  
! U1 getvar "ribbon.cartridge.length"  
! U1 getvar "ribbon.cartridge.inserted"  
  
ribbon.ribbon_low.warning : 50 , Choices: off,5,10,15,25,50,75,100  
! U1 getvar "ribbon"  
! U1 getvar "ribbon.ribbon_low.warning"  
! U1 setvar "ribbon.ribbon_low.warning" "75"  
! U1 setvar "ribbon.ribbon_low.warning" "off"
```

Zebra Setup Utilities may be used to send commands and receive status from the printer using the 'Open Communication With Printer' feature.

Operator Darkness Control

The Operator Darkness Control switch allows the operator to modify the darkness setting for minor variations in media and printers avoiding the need to change the program or driver settings sent to the printer.



Darkness Control

The control switch has three (3) settings:

- Left: no effect (Low – Default)
- Middle: increases 3 ZPL darkness levels (Medium)
- Right: increases 6 ZPL darkness levels (High).

The Low (default) setting makes no change to the actual Darkness setting as set by programming or driver setting. The Medium setting increases the Darkness level by 3, i.e. if the printer is set to the ZPL darkness level of 20, then the actual darkness applied while printing will be 23. The High setting will add six (6) ZPL darkness levels to the set darkness level.



Important • Setting the Darkness too high or too low will reduce barcode readability.

Printer Diagnostics

The procedures in this section provide or change information about the condition of the printer.



Important • Use full-width (101.6 mm / 4 inch wide) media when performing these diagnostic procedures and reports.

Each self test is enabled by pressing a specific control panel key or combination of buttons while turning ON the printer power. Keep the button(s) pressed until the first indicator light turns off. The selected self test automatically starts at the end of the Power-On Self Test.



Note •

- When performing these self tests, do not send data to the printer from the host.
- If your media is shorter than the label to be printed, the test label continues on the next label.
- When canceling a self test prior to its actual completion, always reset the printer by turning it OFF and then ON.
- If the printer is in dispense mode and the liner is being taken up by the applicator, the operator must manually remove the labels as they become available.

Power-On Self Test

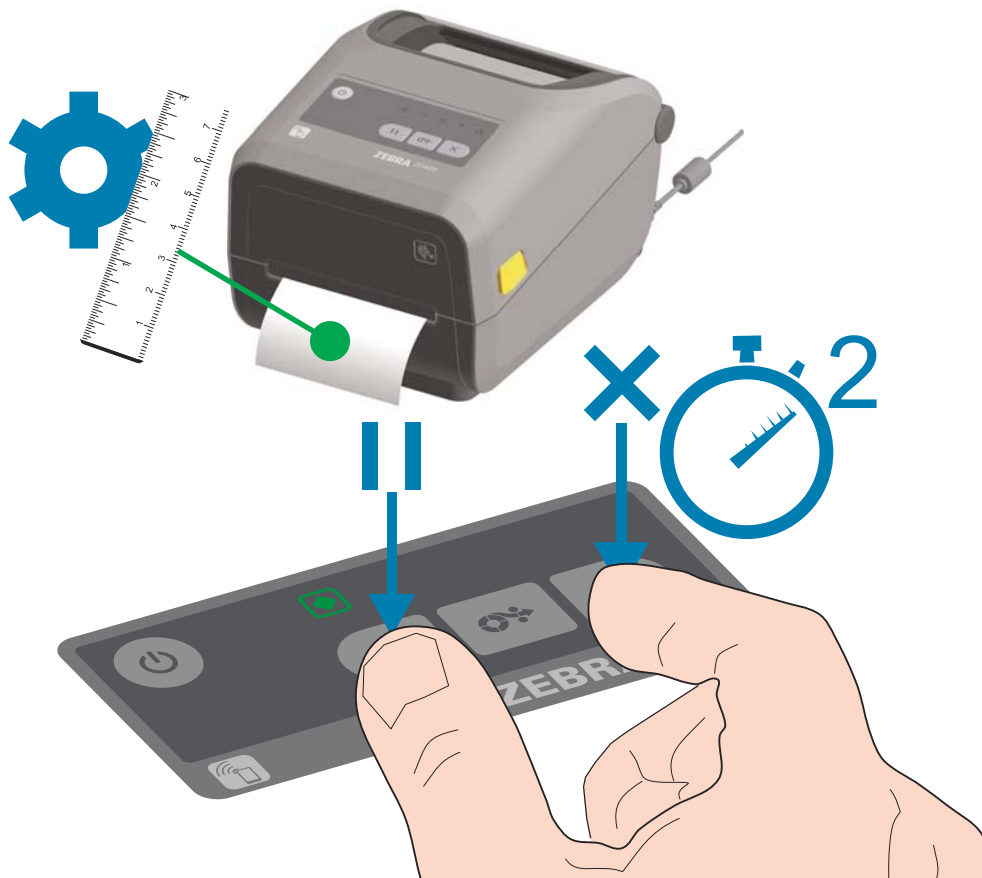
A Power-On Self Test (POST) is performed each time the printer power is turned ON. During this test, the control panel indicators turn on and off to ensure proper operation. At the end of this self test, only the STATUS indicator remains lit.

SmartCal Media Calibration

The printer needs to set media parameters prior to printing for optimal operation. The printer will automatically determine media type (web/gap, black mark/notch, or continuous) and measure media characteristics.

SmartCal Procedure

1. Make sure the media and ribbon cartridge (if you are thermal transfer printing) are loaded properly in the printer and the top cover of the printer is closed.
2. Press the POWER button to turn the printer on.
3. Once the printer is in the ready state (Status indicator (◊) is solid green), press and hold the PAUSE and CANCEL button for two (2) seconds and release.
4. The printer will measure a few labels and adjust media sensing levels.
5. When the printer stops, the Status indicator (◊) will turn solid green.

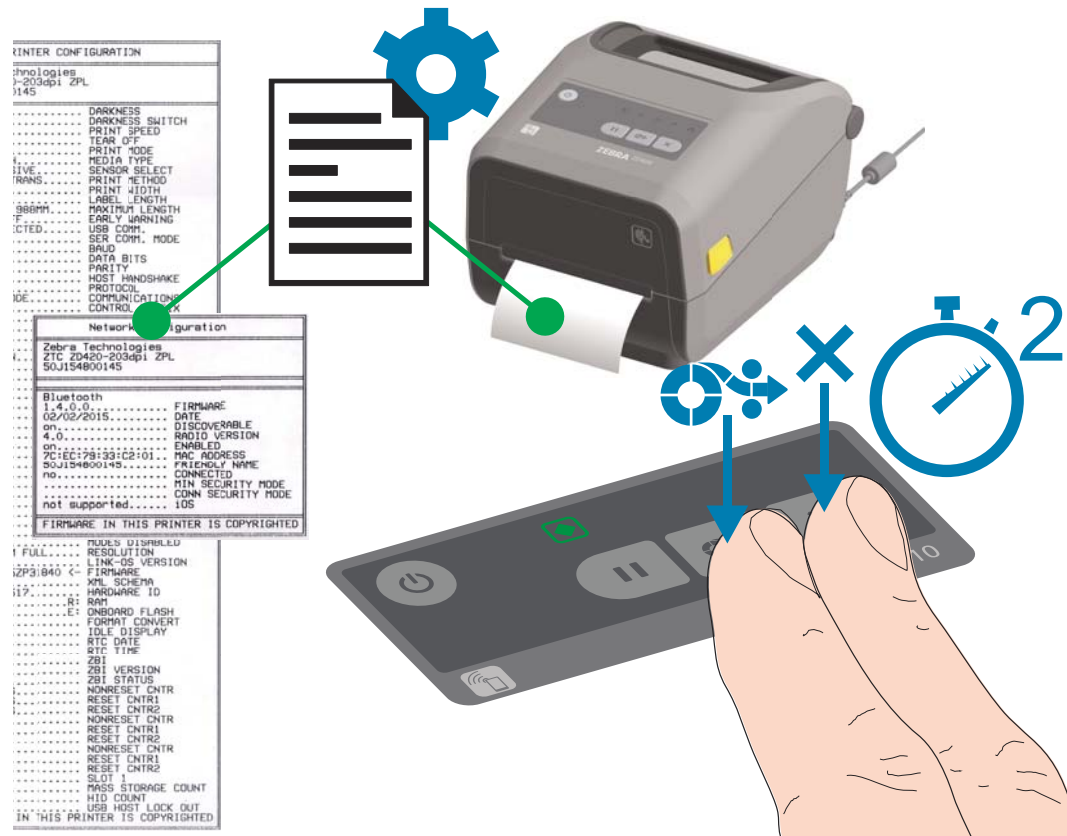


If the printer should fail to recognize and correctly calibrate to the media, please refer to the *Manual Media Calibration on page 48* procedure later in this section.

Test Printing with the Configuration Report

Before you connect the printer to a computer, make sure that the printer is in proper working order. You can do this by printing a configuration report. The information on the Configuration reports printout may be helpful with printer installation and troubleshooting your printer.

1. Make sure the media and ribbon cartridge (if you are thermal transfer printing) are loaded properly in the printer and the top cover of the printer is closed.
2. Turn the printer ON.
3. Once the printer is in the ready state (Status indicator (◊) is solid green), press and hold the **FEED** and **CANCEL** buttons for two (2) seconds and release.
4. The Printer and Network Configuration Reports (shown below) will be printed.
5. When the printer stops, the Status indicator (◊) will turn solid green.



Configuration Report (Option #2)

The Configuration Report (CANCEL self test) diagnostic prints a set of printer and network configuration reports.

To print the configuration report, complete these steps:

1. Make sure media is properly loaded, the printer cover is closed, and printer power is ON.
2. If printer power is OFF, press and hold **CANCEL** button while setting the printer power to ON. Hold **CANCEL** button down until the STATUS indicator is the only indicator lit.
 - or -
 If printer power is ON, press **FEED + CANCEL** for two seconds.
3. The Printer and Network Configuration Reports (below) will be printed and the printer will return to READY status.

Sample Printer Configuration

PRINTER CONFIGURATION	
Zebra Technologies ZTC ZD420-203dpi ZPL 50J154800145	
+10.0.....	DARKNESS
HIGH.....	DARKNESS SWITCH
6.0 IPS.....	PRINT SPEED
+000.....	TEAR OFF
TEAR OFF.....	PRINT MODE
GAP/NOTCH.....	MEDIA TYPE
TRANSMISSIVE.....	SENSOR SELECT
THERMAL-TRANS.....	PRINT METHOD
832.....	PRINT WIDTH
1224.....	LABEL LENGTH
39.0IN 988MM.....	MAXIMUM LENGTH
MAINT. OFF.....	EARLY WARNING
NOT CONNECTED.....	USB COMM.
AUTO.....	SER COMM. MODE
9600.....	BAUD
8 BITS.....	DATA BITS
NONE.....	PARITY
XON/XOFF.....	HOST HANDSHAKE
NONE.....	PROTOCOL
NORMAL MODE.....	COMMUNICATIONS
<^> 7EH.....	CONTROL PREFIX
<^> 5EH.....	FORMAT PREFIX
<,> 2CH.....	DELIMITER CHAR
ZPL II.....	ZPL MODE
INACTIVE.....	COMMAND OVERRIDE
NO MOTION.....	MEDIA POWER UP
FEED.....	HEAD CLOSE
DEFAULT.....	BACKFEED
+000.....	LABEL TOP
+0000.....	LEFT POSITION
10.....	RIBBON LOW MODE
DISABLED.....	REPRINT MODE
041.....	WEB SENSOR
096.....	MEDIA SENSOR
075.....	RIBBON SENSOR
128.....	TAKE LABEL
069.....	MARK SENSOR
004.....	MARK MED SENSOR
048.....	TRANS GAIN
028.....	TRANS LED
040.....	RIBBON GAIN
076.....	MARK GAIN
070.....	MARK LED
DPCSWFXM.....	MODES ENABLED
.....	MODES DISABLED
*832 8/MM FULL.....	RESOLUTION
3.2.....	LINK-OS VERSION
V77.19.152P31840 <-	FIRMWARE
1.3.....	XML SCHEMA
6.5.0 0.517.....	HARDWARE ID
8192k.....R	RAM
65536k.....E	ONBOARD FLASH
NONE.....	FORMAT CONVERT
ENABLED.....	IDLE DISPLAY
01/08/16.....	RTC DATE
19:43.....	RTC TIME
DISABLED.....	ZBI
2.1.....	ZBI VERSION
READY.....	ZBI STATUS
28 LABELS.....	NONRESET CNTR
28 LABELS.....	RESET CNTR1
28 LABELS.....	RESET CNTR2
137 IN.....	NONRESET CNTR
137 IN.....	RESET CNTR1
137 IN.....	RESET CNTR2
347 CM.....	NONRESET CNTR
347 CM.....	RESET CNTR1
347 CM.....	RESET CNTR2
EMPTY.....	SLOT 1
0.....	MASS STORAGE COUNT

Sample Network Configuration Bluetooth LE only

Network Configuration	
Zebra Technologies ZTC ZD420-203dpi ZPL 50J154800145	
Bluetooth	
1.4.0.0.....	FIRMWARE
02/02/2015.....	DATE
on.....	DISCOVERABLE
4.0.....	RADIO VERSION
on.....	ENABLED
7C:EC:79:33:C2:01..	MAC ADDRESS
50J154800145.....	FRIENDLY NAME
no.....	CONNECTED
.....	MIN SECURITY MODE
.....	CONN SECURITY MODE
not supported.....	IOS
FIRMWARE IN THIS PRINTER IS COPYRIGHTED	

Print Quality Report

Different types of media may require different darkness settings. This section contains a simple but effective method for determining the ideal darkness for printing barcodes that are within specifications.

During the Print Quality Report (FEED self test), a series of labels are printed at different darkness settings at two different print speeds. The relative darkness and the print speed are printed on each label. The barcodes on these labels may be ANSI-graded to check print quality.

During this test, one set of labels is printed at low speed, and another set is printed at the high speed. The darkness value starts at three settings lower than the printer's current darkness value (relative darkness of -3) and increase until the darkness is three settings higher than the current darkness value (relative darkness of +3).

The speed at which labels are printed during this print quality test depends on the dot density of the printhead.

- 300 dpi printers: prints 7 labels at 51mm/sec (2 ips) and 102 mm/sec (4 ips) print speeds.
- 203 dpi printers: prints 7 labels at 51mm/sec (2 ips) and 152 mm/sec (6 ips) print speeds.

To perform a Print Quality Report, complete these steps:

1. Print a configuration report to show the printer's current settings. Press and hold the **FEED** and **CANCEL** buttons for two (2) seconds to print the report.
2. Turn OFF the printer.
3. Press and hold **FEED while setting the printer power to ON**. Hold **FEED** until the Status indicator is the only indicator lit.

The printer prints a series of labels ([Figure 2](#)) at various speeds and darkness settings higher and lower than the darkness value shown on the configuration label.

Figure 2 • Print Quality Report



- See [Figure 3](#) and [Table 7](#). Inspect the test labels and determine which one has the best print quality for your application. If you have a barcode verifier, use it to measure bars/spaces and calculate the print contrast. If you do not have a barcode verifier, use your eyes or the system scanner to choose the optimal darkness setting based on the labels printed in this self test.

Figure 3 • Barcode Darkness Comparison



Table 7 • Judging Barcode Quality


Print Quality	Description
Too dark	Labels that are too dark are fairly obvious. They may be readable but not “in-spec.” <ul style="list-style-type: none"> • The normal barcode bars increase in size. • The openings in small alphanumeric characters may appear filled in. • Rotated barcode have bars and spaces run together.
Slightly dark	Slightly dark labels are not as obvious. <ul style="list-style-type: none"> • The normal barcode will be “in-spec.” • Small character alpha numerics will be bold and could be slightly filled in. • The rotated barcode spaces are small when compared to the “in-spec” code, possibly making the code unreadable.
“In-spec”	The “in-spec” barcode can only be confirmed by a verifier, but it should exhibit the following visible characteristics. <ul style="list-style-type: none"> • The normal barcode will have complete, even bars and clear, distinct spaces. • The rotated barcode will have complete, even bars and clear, distinct spaces. Although it may not look as good as a slightly dark barcode, the barcode will be “in-spec.” • In both normal and rotated styles, small alphanumeric characters look complete.
Slightly light	Slightly light labels are, in some cases, preferred to slightly dark ones for “in-spec” barcodes. <ul style="list-style-type: none"> • Both normal and rotated barcodes will be in spec, but small alphanumeric characters may not be complete.
Too light	Labels that are too light are obvious. <ul style="list-style-type: none"> • Both normal and rotated barcodes have incomplete bars and spaces. • Small alphanumeric characters are unreadable.

5. Note the relative darkness value and print speed printed on the best test label.
6. Add or subtract the relative darkness value from the darkness value specified on the configuration label. The resulting numeric value is the best darkness value for that specific label/ribbon combination and print speed.
7. If necessary, change the current darkness value to the darkness value on the best test label.
8. If necessary, change the current print speed to the speed value on the best test label.

Reset Printer Factory Defaults (PAUSE + FEED Self Test)

This resets the printer configuration to the factory default values for the non-network printer settings. Perform a sensor calibration after this procedure (see [Manual Media Calibration on page 48](#)).

To perform a Reset Printer Factory Defaults procedure, complete these steps:

1. Turn OFF the printer.
2. Press and hold **PAUSE + FEED** while turning ON the printer.
3. Hold **PAUSE + FEED** until the STATUS indicator () is the only indicator lit.

The printer configuration is reset to the factory default values. No labels print at the end of this action.




Note • The printer has a reset button under the printer (see [Reset Button on page 44](#)).

Reset Network Factory Defaults (PAUSE + CANCEL Self Test)

This procedure resets the network configuration settings only to the factory default values.

To perform a Reset Network Factory Defaults procedure, complete these steps:

1. Turn OFF the printer.
2. Press and hold **PAUSE + CANCEL** while turning ON the printer.
3. Hold **PAUSE + CANCEL** until the STATUS indicator () is the only indicator lit.

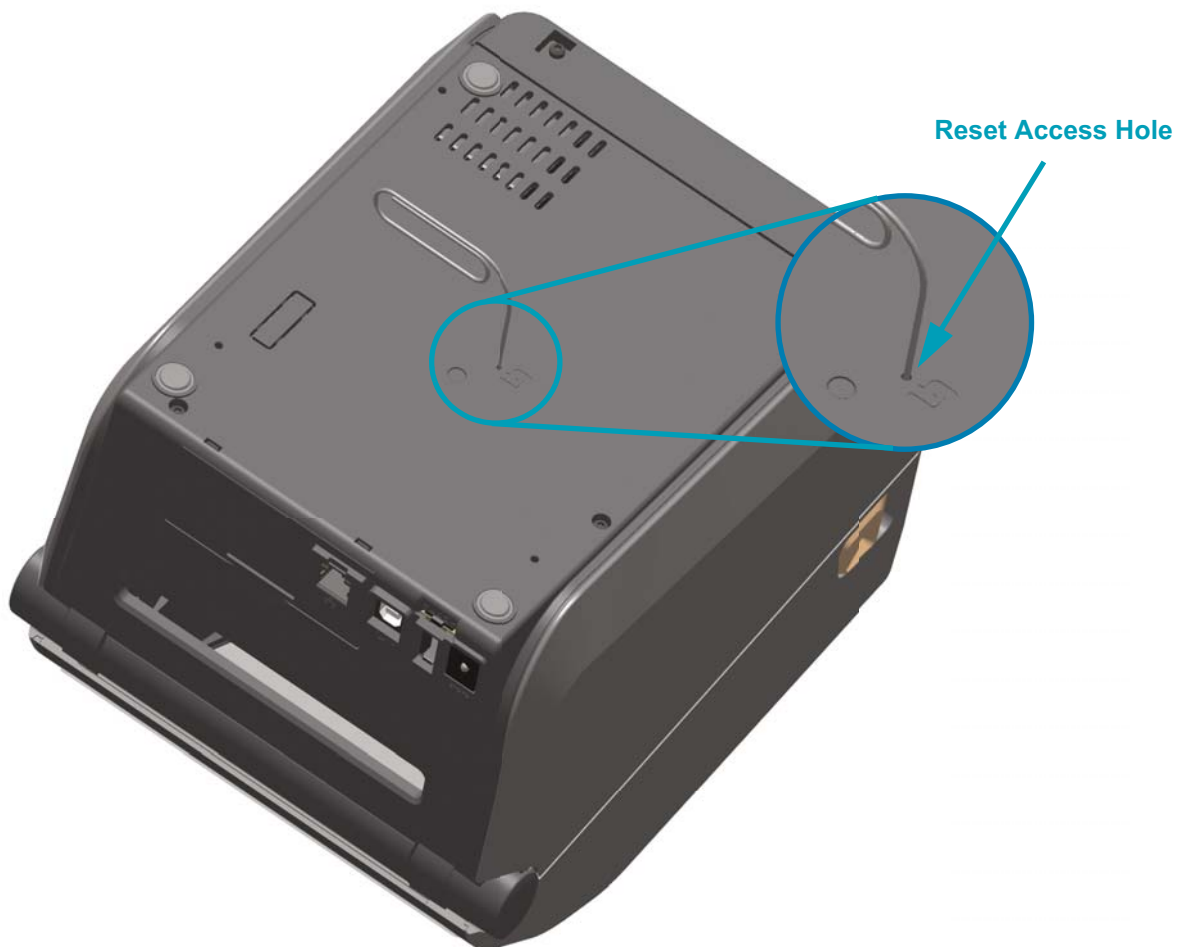
The printer's network configuration is reset to the factory default values. No labels print at the end of this action.

Reset Button

In addition to the power on configurations described previously, the ZD420 has a dedicated reset button located on the bottom of the printer which can be pressed with a paper-clip or similar small object.

Pressing the button has the following results based on the length of the button press:

0-1 second	No action
1-5 seconds	Printer reset – Printer performs a factory reset and will automatically print a configuration label (and network label if present)
6-10 seconds	Network reset – Printer drops connection to the network, and a network factory default reset occurs. Upon completion of the reset, a configuration and network configuration label are automatically printed.
More than 10 seconds	Exits the factory defaults function without resetting the printer or making changes



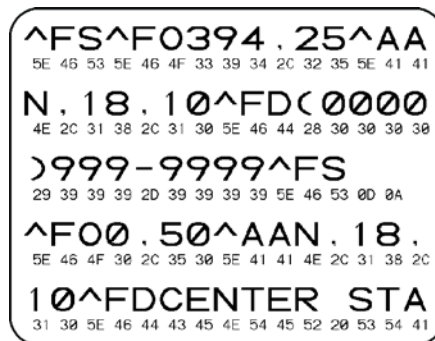
Communication Diagnostics Test

The communication diagnostics test is a troubleshooting tool for checking the connection between the printer and the host computer. When the printer is in diagnostics mode, it prints all data received from the host computer as straight ASCII characters with the hex values below the ASCII text. The printer prints all characters received, including control codes such as CR (carriage return). Figure 4 shows a typical test label from this test.



Note • The test label prints upside-down.

Figure 4 • Communications Diagnostics Test Label



To use communications diagnostics mode, complete these steps:

1. Ensure media is loaded and printer power is ON.
2. Set the print width equal to or less than the label width being used for the test.
3. Press and hold **Pause + Feed** for two seconds. When active, the STATUS indicator (◊) will alternate between green and yellow.

The printer enters diagnostics mode and prints any data received from the host computer on a test label

4. Check the test label for error codes. For any errors, check that your communication parameters are correct.

Errors show on the test label as follows:

- **FE** indicates a framing error.
- **OE** indicates an overrun error.
- **PE** indicates a parity error.
- **NE** indicates noise.


5. Press and hold **Pause + Feed** for two seconds or turn the printer power OFF and then back ON to exit this self test and return to normal operation.

Sensor Profile

Use the sensor profile image (which will extend across several labels or tags) to troubleshoot the following situations:

- The printer experiences difficulty in determining gaps (web) between labels.
- The printer incorrectly identifies preprinted areas on a label as gaps (web).
- The printer cannot detect ribbon.

With the printer in the Ready state, print a sensor profile in one of these ways:

Using the buttons on the control panel	<ol style="list-style-type: none"> a. Turn OFF the printer. b. Press and hold FEED + CANCEL while turning ON the printer. c. Hold FEED + CANCEL until the STATUS indicator () is the only indicator lit.
Using ZPL	<ol style="list-style-type: none"> a. Send the <code>~JG</code> command to the printer. See the Zebra Programming Guide for more information about this command.

Compare your results to the examples shown earlier in this section. If the sensitivity of the sensors must be adjusted, calibrate the printer (see [Manual Media Calibration on page 48](#)).

Media Sensor Profile (Figures 5 and 6) The line labeled MEDIA (1) on the sensor profile indicates the media sensor readings. The media sensor threshold settings is indicated by WEB (2). The media out threshold is indicated by OUT (3). The upward spikes (4) indicate gaps between labels (the web), the lines between the spikes (5) indicate where labels are located, and the numbered line at the top (6) provides measurement in dots from the start of the printout.

If you compare the sensor profile printout to a length of your media, the spikes should be the same distance apart as the gaps on the media. If the distances are not the same, the printer may be having difficulty determining where the gaps are located.

Figure 5 • Sensor Profile (Gap Media)

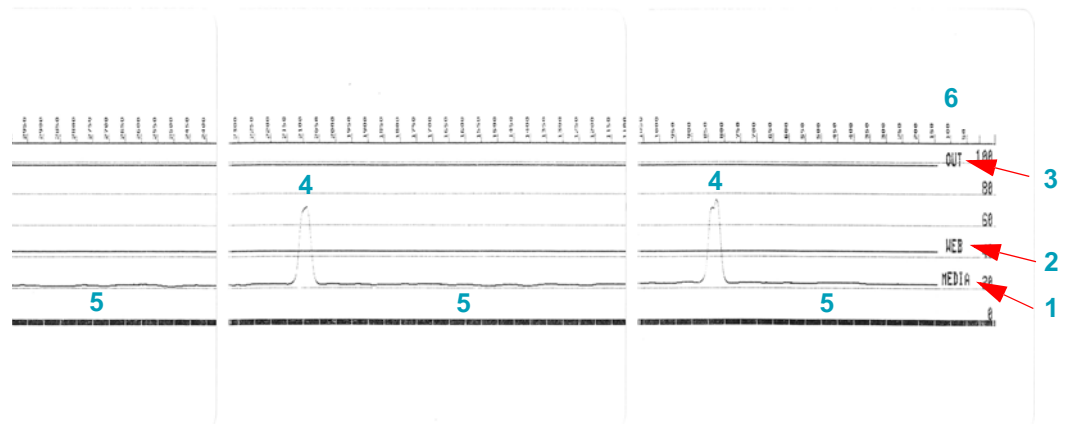
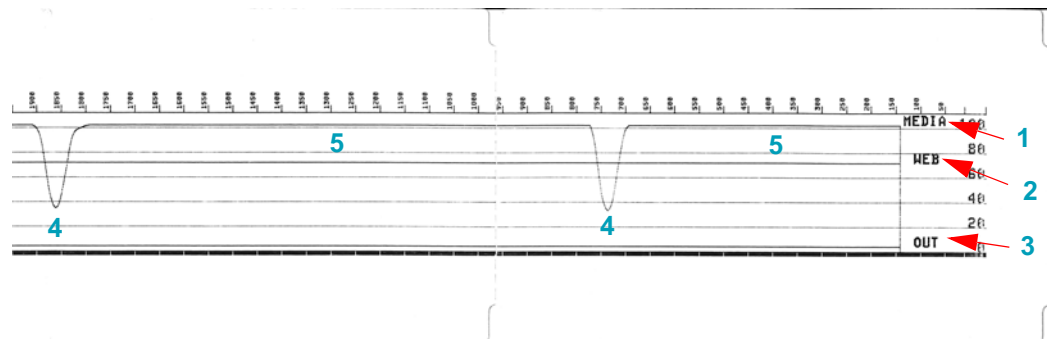



Figure 6 • Sensor Profile (Black Mark Tag Media)



Advanced Mode





Advanced Mode is used to access several manual adjustment modes in the printer. Each manual adjustment mode is described in detail in the following sections.

To activate Advanced Mode, complete these steps:

1. Ensure media is loaded and printer power is ON.
2. Press **PAUSE** for two seconds, all indicators will flash yellow.
3. The STATUS indicator () will show solid yellow, indicating the currently selected mode is:
Manual Media Calibration.
4. Pressing **FEED** will sequentially cycle through all available modes.
5. Pressing **PAUSE** will activate the selected mode.
6. Pressing **CANCEL** will exit Advanced Mode.


Manual Media Calibration

While in Advanced Mode, pressing **PAUSE** while the Status indicator () is illuminated yellow will start Manual Media Calibration.

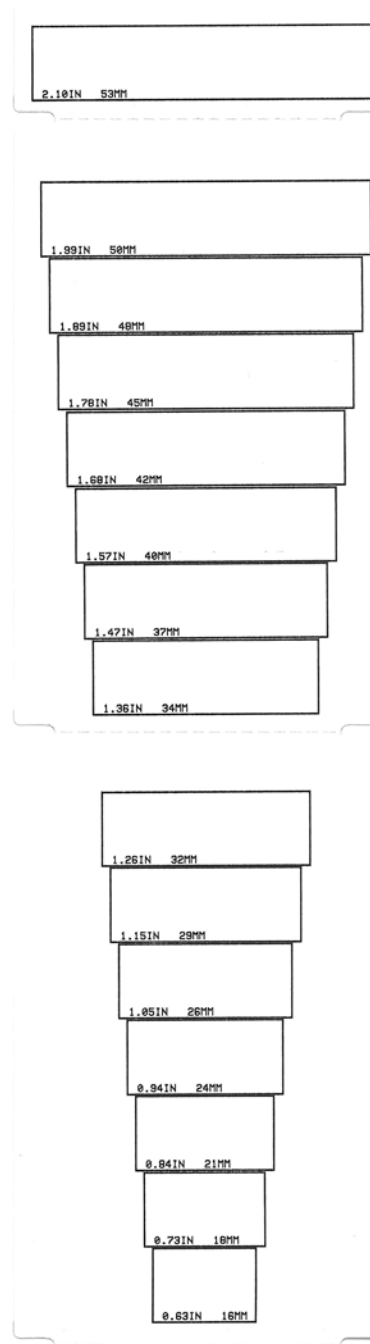
1. The MEDIA indicator () will flash yellow then the Pause indicator () will flash. Open the printer and verify the media sensor is in the center position for label gap (transmissive) sensing. Remove 3 inches or 80mm of labels from the liner. Place the label-less area of the liner over the platen (drive) roller with the leading edge of the first label under the media guides.
2. Close the printer and press **PAUSE** once. The MEDIA indicator () will flash as the media liner is measured. When complete, the Pause indicator () will begin flashing.
3. Open the printer and reposition the media so that a label is located directly above the movable sensor. Close the printer.
4. Press **PAUSE** once. The printer will feed and measure several labels. If the printer is able to determine the correct media type (gap, black mark or notch) and measure the media length, the printer will return to the READY state.

This advanced mode is typically used to calibrate the printer to media that is not correctly recognized during Smart Calibration. If your media uses black mark or notch sensing, ensure the media sensor is in to the proper location to “see” the mark or notch. If your media is pre-printed, either on the front of the label or on the back of the liner, position the sensor so that it is in a position with minimal printing. You may need to perform Manual Media Calibration several times, moving the media sensor, until the printer completes the calibration process and returns to the READY state.

Manual Print Width Adjustment

While in Advanced Mode, pressing the **PAUSE** button while the Pause indicator () is illuminated yellow will start Manual Print Width Adjustment while in Advanced mode, see [Advanced Mode on page 48](#). The printer will print a 16mm (0.63 inch) box and pause momentarily. The printer will then print a slightly larger box and again pause. When you see the printer print a box that matches the width of your media, press **FEED** to set the print width and return to READY state.

To return to the maximum print width setting, allow the printer to proceed without pressing the **FEED** button.



Manual Print Darkness Adjustment

Pressing **PAUSE** while the DATA indicator () is illuminated yellow will start Manual Print Darkness Adjustment. The printer will print a test pattern showing the current darkness number and several barcode patterns and then pause momentarily. The printer will then repeat the pattern with the next darkness level. When you see the printer print a pattern with solid even black lines, press **FEED** to set the darkness value and return to the READY state.



Factory Test Modes

The printer includes print modes that are intended for factory test only.

Test mode 1 is initiated by holding **PAUSE** while turning ON printer power. When activated, the printer will begin printing various test patterns used to evaluate printer performance.

Test mode 2 is initiated by holding **PAUSE + FEED + CANCEL** for two seconds while printer power is ON. When activated, the printer will begin printing various test patterns used to evaluate printer performance.



Note • Both of these test modes will consume a considerable amount of media.

Canceling Tests

To stop the test in progress, press **PAUSE** to pause the test and then hold the **CANCEL** button for two (2) seconds

You can also exit either of these test modes by pressing and holding **POWER** button until the printer power is switched OFF.



Notes • _____

Required Tools

Tools • Make use of the following tools while performing replacement procedures:

- #10 Torx driver (ideally magnetized)
Torque value range: 0.53 +/-0.11 NM = 4.7 inch*lb
- #6 Torx driver (ideally magnetized)
Torque value range: 0.53 +/-0.11 NM = 4.7 inch*lb
- Small flat bladed (slot-head) screwdriver
- Small pliers
- Printhead cleaning pen
- Fiber free swabs
- Lint free wipes, such as Kim-Wipes
- Isopropyl Alcohol – 99% pure solution



Notes • _____

Replacing Parts

The part replacement procedures in this manual have been broken down into common procedures and sub-procedures with most aligning to spare parts. Each procedure lists which procedures and actions must precede it in order to perform the procedure. A “Repair Path” flow diagram is on the following page.

In the event you must replace a part, review the repair path flow diagram to see which procedures to perform. Read the part’s procedure to identify procedures and steps required to remove the old part and install the new part. Many repair sequences include simple functionality tests, cleaning or other operations after the spare has been replaced to verify the repair and printer state.

The Service CD (which also contains this manual) is designed to open this electronic service manual and its associated videos in the proper sequence of procedures and sub-procedures needed to remove and install a given spare part. The videos and procedures are broken down into small, easy to follow instructions.

Repair Procedure Sequence for ZD420 Printers

The “Repair Path” flow diagram shows the starting point (green blocks) to the endpoint – the replacement procedure for your spare part. The diagram does not include any general repair preparation or post repair operations that may be recommended for the printer.

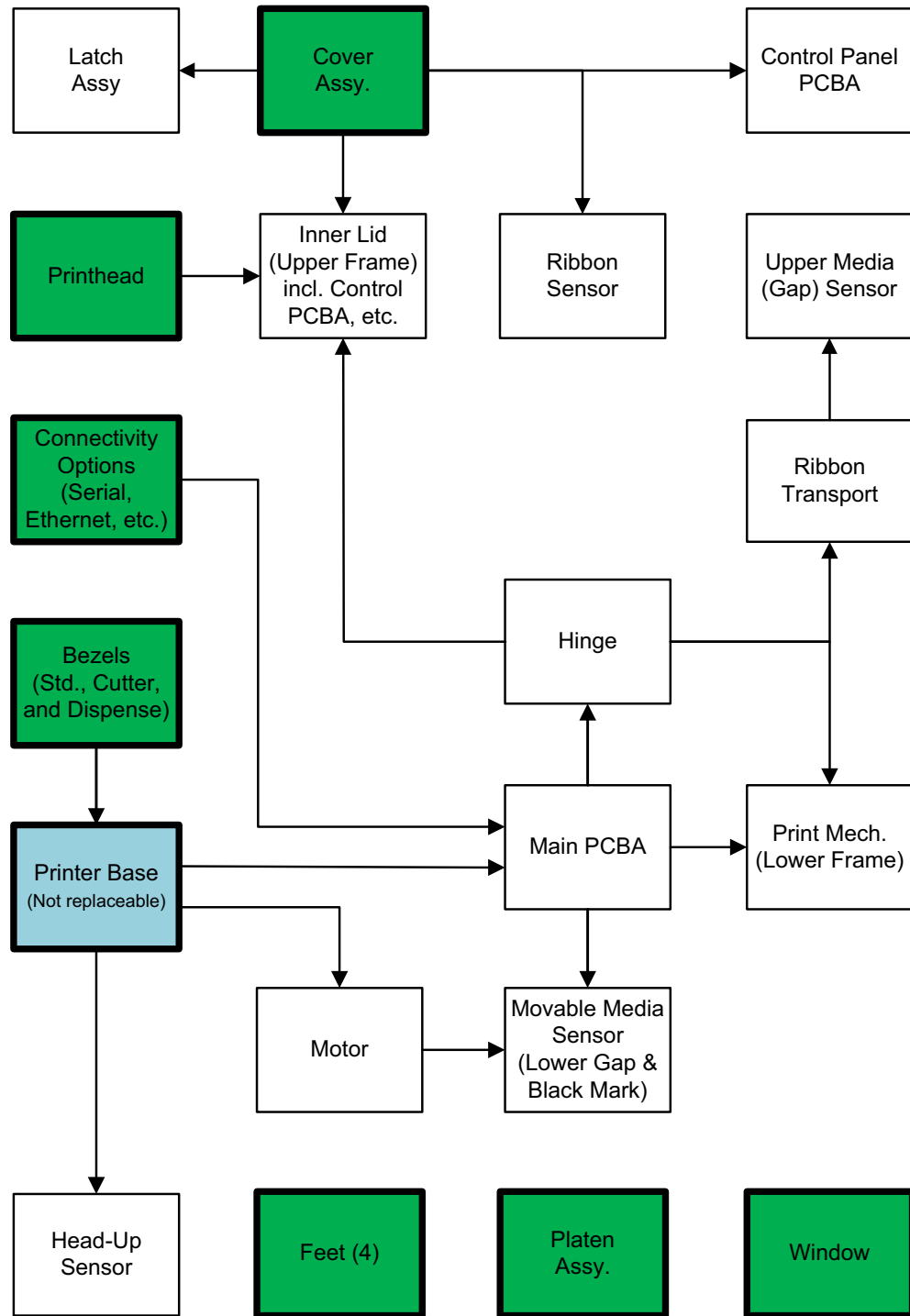


Figure 7 • Repair Path

How to Determine a Repair Sequence for your Part

Repair procedures are broken down into sub-procedures that mainly align to spare parts. Many procedures require you to remove other parts to gain access to the part needing replacement. The green blocks represent stand alone or starting procedures needing to be performed to access other parts. Use the connecting arrow lines (going backwards and forward) to determine procedure order for your repair item. One or more starting procedure paths may be needed to access a given part being replaced. Individual repair procedures include references (and links) to prerequisite procedures (and the Service CD includes videos) for each procedure in repair order.

After you have diagnosed and identified the part that needs replacing in your printer, you can use the chart in [Figure 7, Repair Path, on page 56](#), to identify the prerequisite repair procedures needed to complete your repair. Alternately, you may go directly to the part's repair procedure and find the "Repair Prerequisites" with the hyper-linked references to the prerequisite procedures in proper repair sequence.

Repair Path Example

For this example, we have chosen the Main PCBA. It requires multiple paths to complete the repair.

During the troubleshooting process (for the purposes of this example), we have determined that the printer has a problem with the Main PCBA (yellow square below). By following the arrows leading into the Main PCBA repair square, we can see the Connectivity Options and the Printer Base precede the Main PCBA. The Connectivity Options procedure square is green to denote a starting procedure. It has no arrows leading into it, therefore no prerequisite procedures. The Printer Base has an arrow coming from the Bezel procedure square and it is a prerequisite for both the Printer Base and Main PCBA repair procedures by following all the arrows to the Main PCBA.

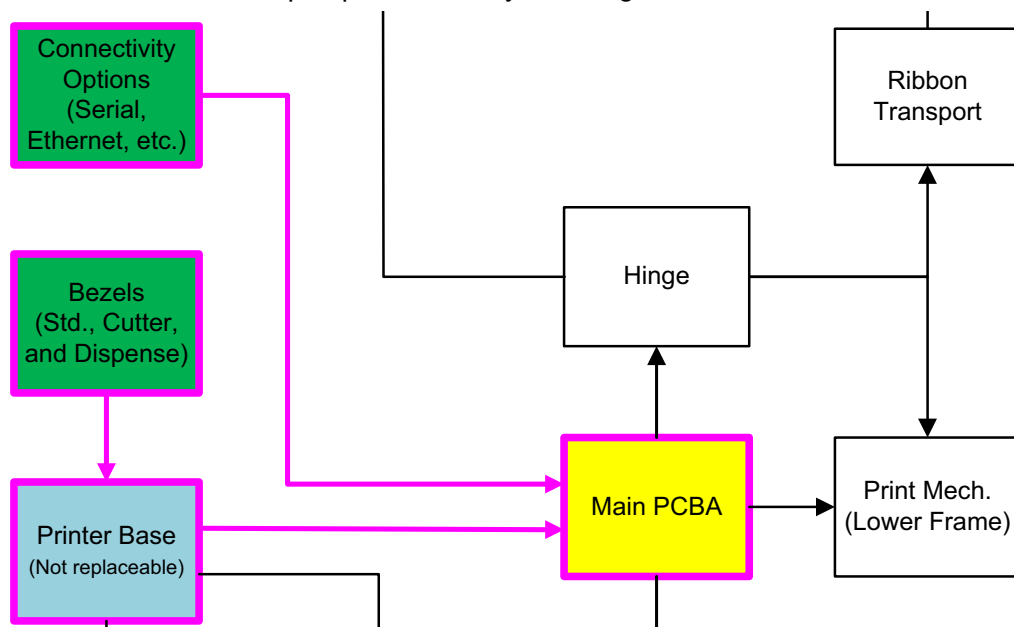


Figure 8 • Repair Path Example

Repair Preparation and Post Repair Basic Operational Tests

To prevent additional damage or injury, the printer and its repair area needs to be prepared prior to repairing the printer.

Preparation



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

- The repair surface and area should be clean.
- Use electrostatic protection (grounded mats, ground straps, etc.).
- Remove all media and ribbon cartridges from the printer.
- Disconnect all cables and power from the printer.

Post Repair Cleaning and Basic Testing

1. Clean the printer. This will leave the printer in a optimal state and provide assurance the contamination has not migrated or been added during handling and repair.
 - ["Cleaning the Printhead" on page 7](#)
 - ["Sensor Cleaning" on page 14](#)
 - ["Media Path Cleaning" on page 9](#)
 - ["Platen Cleaning" on page 17](#)
2. Load a full width roll of labels and a ribbon cartridge into the printer; see the printers user's guide for details.
3. Calibrate the media (see ["SmartCal Media Calibration" on page 37](#)).
4. Connect the printer to power and turn ON the printer. The printer runs self tests and configures itself for the options installed.
5. Set the print width to full width printing, if needed after troubleshooting and repair (see ["Manual Print Width Adjustment" on page 49](#)).
6. Print a Configuration Report to test printing and provide information on the status and configuration of the printer and its option (see ["Test Printing with the Configuration Report" on page 38](#)).
7. Attach the printer to Windows PC

Replacing the Printhead

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



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

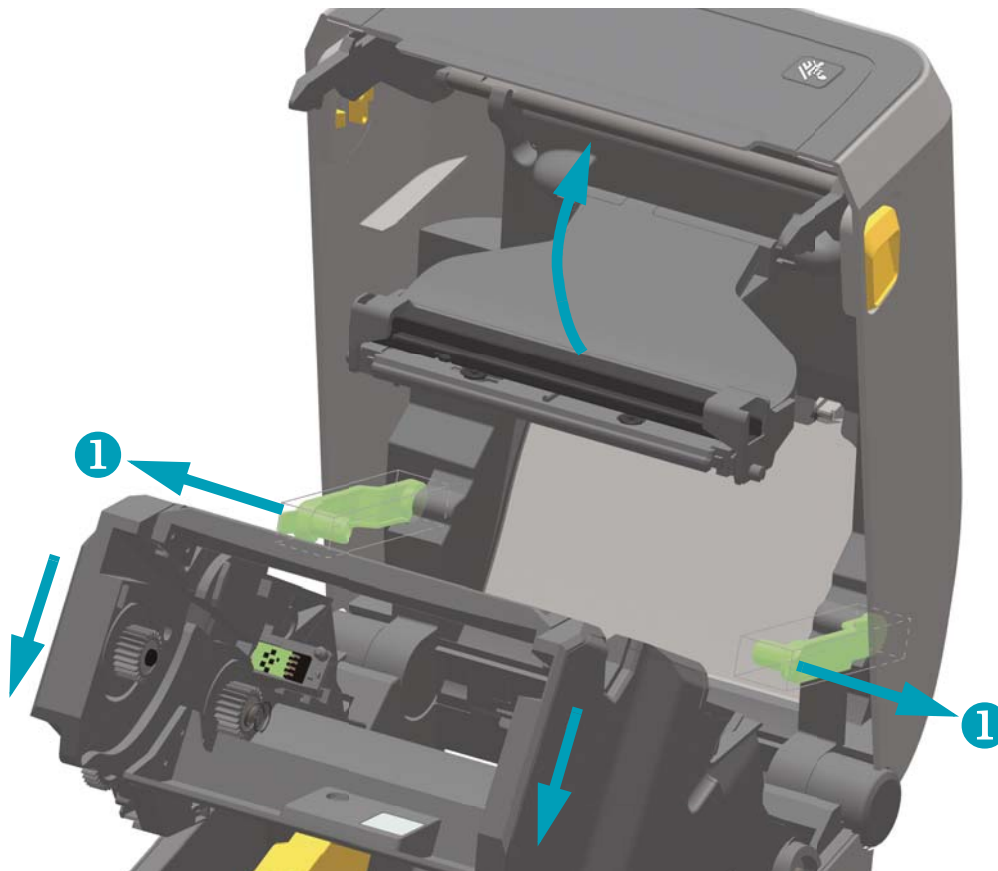


Caution • Turn the printer power off and unplug the power cord before replacing the printhead.

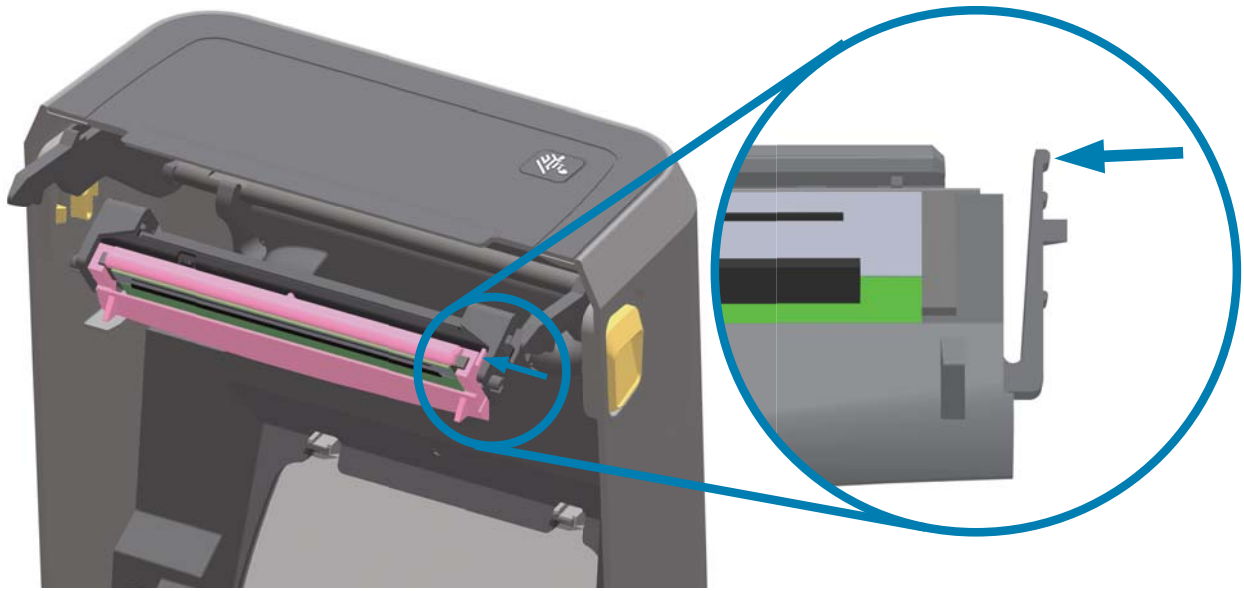
Before following the steps in this procedure, open the printer by pulling the release latches forward then lifting the top cover.

Printhead Removal

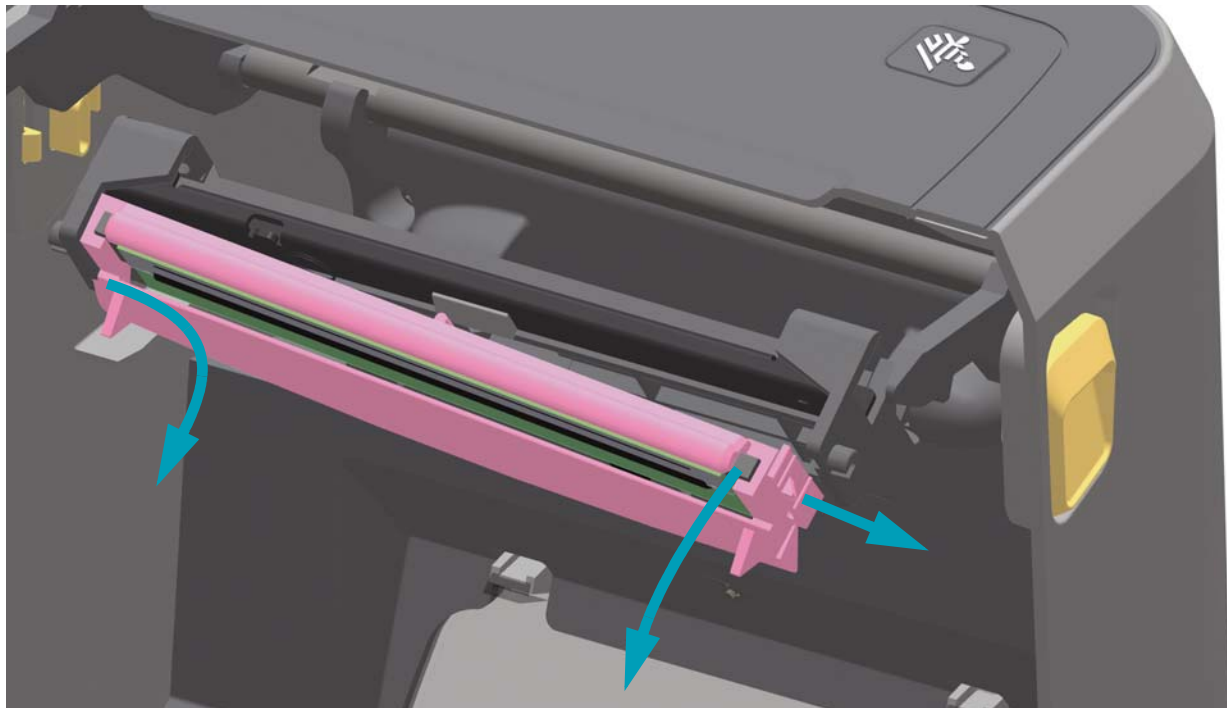
1. Turn the printer OFF. Open the printer.
2. Pull the two (2) Release Arms out to release the Ribbon Drive Transport. The arms are located on the left and right sides of the printer. The Ribbon Drive Transport and Printhead Actuator Arm will now be loose.



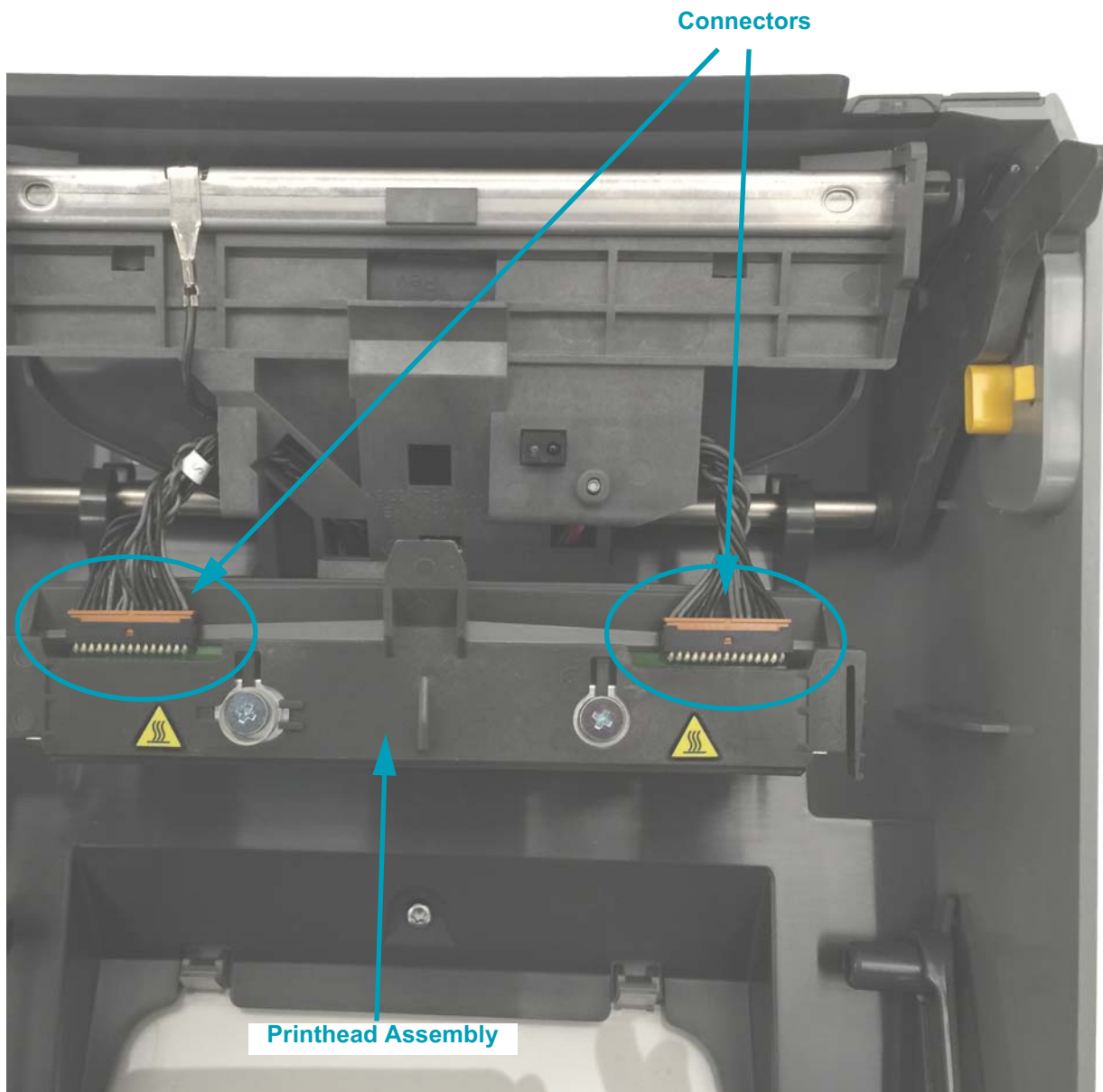
3. Swing the Printhead Actuator Arm up until it touches the printer's top cover. Hold the Printhead Actuator Arm in this position for access to the printhead, see the next graphic.
4. Push the printhead release latch toward the printhead (shown as pink for visibility). The right side printhead releases down and away from the Printhead Actuator Arm.



5. Swing the loose right side of the printhead out of the printer. Pull it to the right a little to get the left side of the printhead clear. Pull the printhead down and free of the Printhead Actuator Arm to gain access to its attached cables.

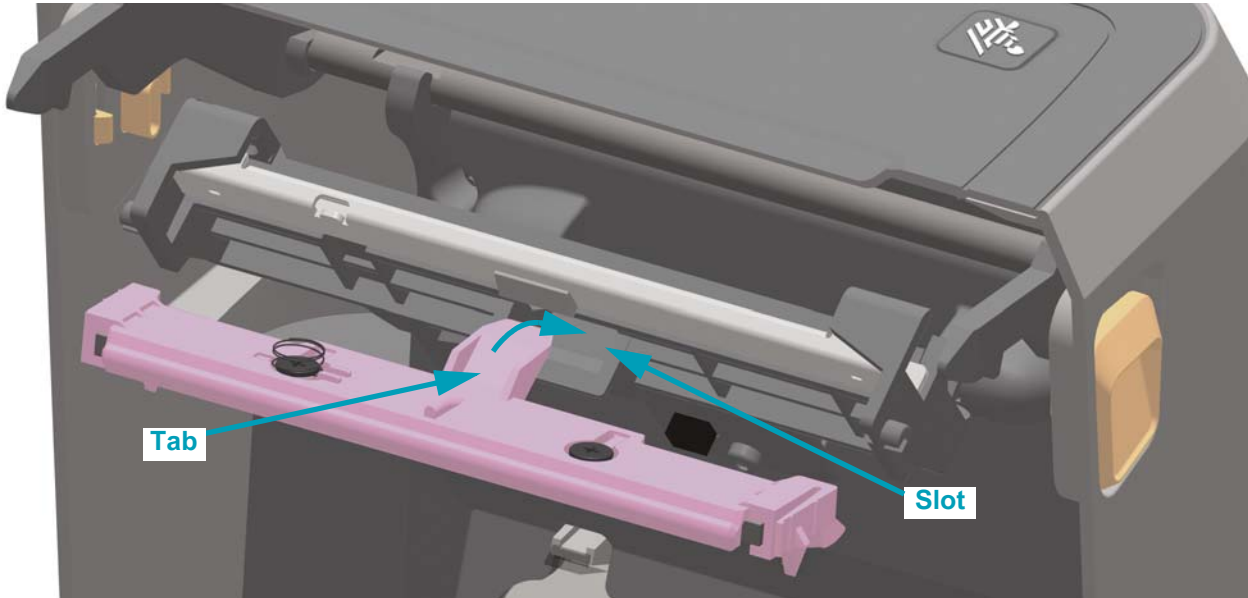


6. Pull the two printhead cable bundle connectors off of the printhead.

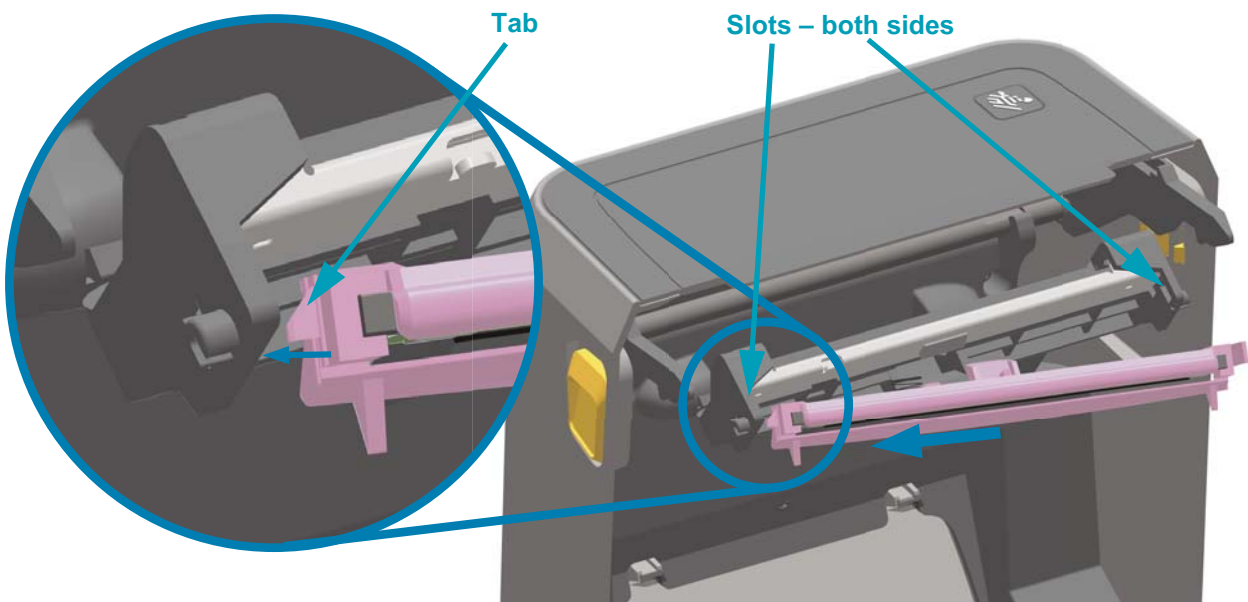


Replacing the Printhead

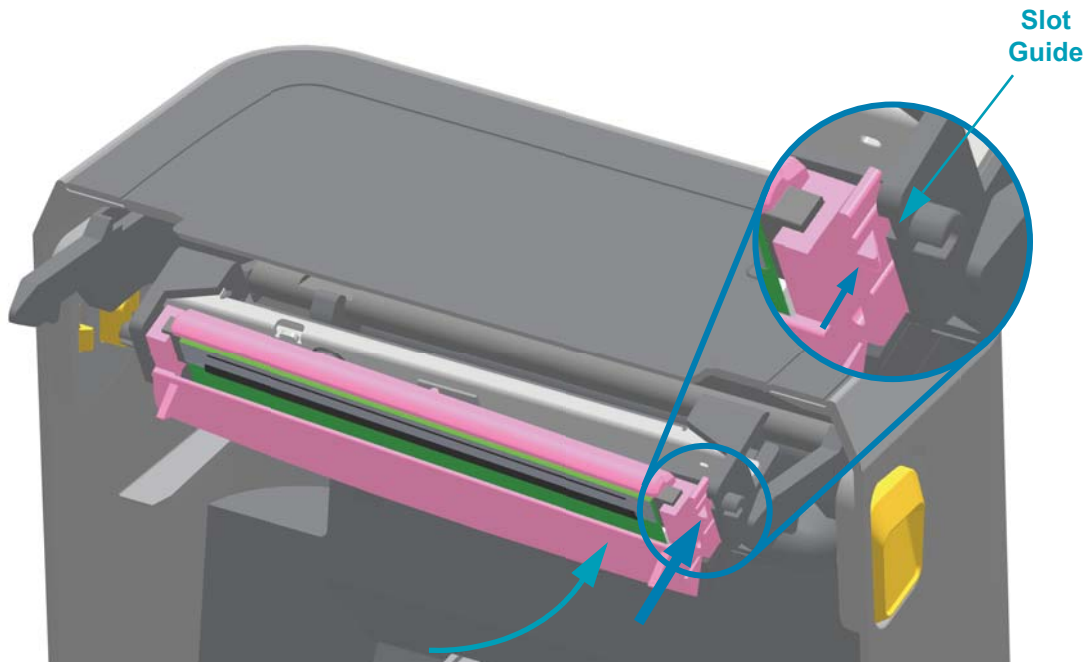
1. Push the right side printhead cable connector into the printhead. The connector is keyed to only insert one way.
2. Push the left side printhead cable connector onto the printhead.
3. Insert the center tab on the printhead assembly into the center slot on the Printhead Actuator Arm.



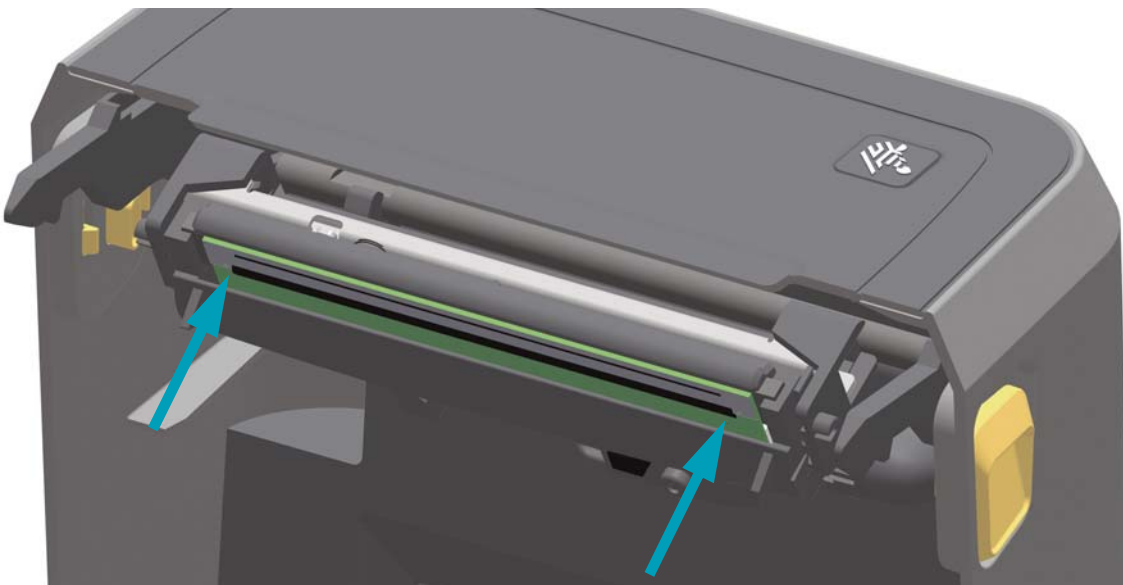
4. Insert the left side tab of the printhead assembly into the recessed slot on the left side of the Printhead Actuator Arm.



5. Push the right side of the printhead into the printer until the latch locks the right side of the printhead into the printer.



6. Verify that the printhead moves freely into the printer when pressure is applied (see arrow) and remains locked when pressure is released.



7. Clean the printhead by using a new cleaning pen to wipe body oils (finger prints) and debris off the printhead. Clean from the center of the printhead to the outside (see "Cleaning the Printhead" on page 7).

Reload media. Turn on the printer and print a status report to ensure proper function (see "SmartCal Media Calibration" on page 37).

Replacing the Platen (Drive) Roller

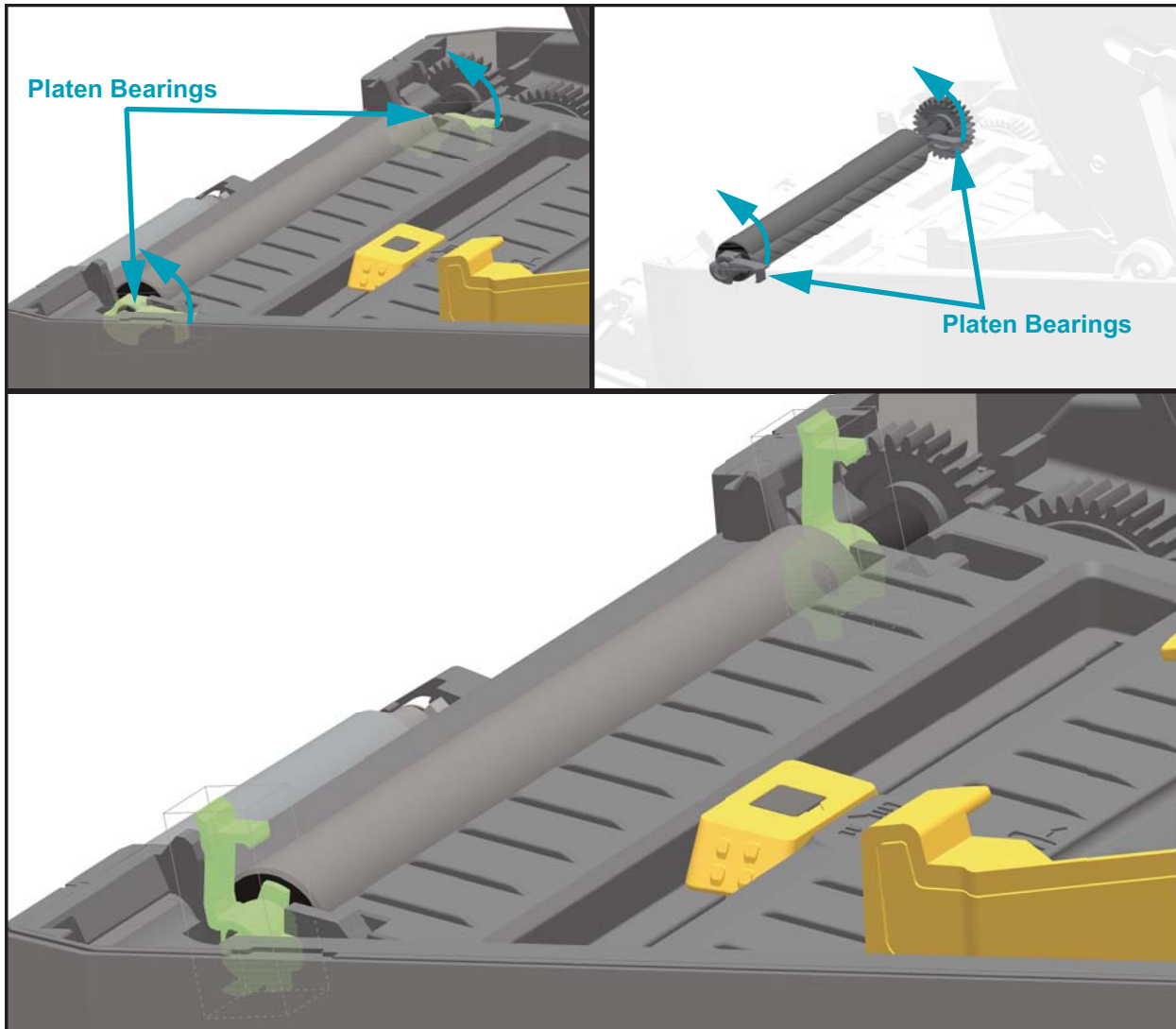
If you need to replace the platen drive roller assembly, read the procedure and review the removal and installation steps before actually replacing the platen.



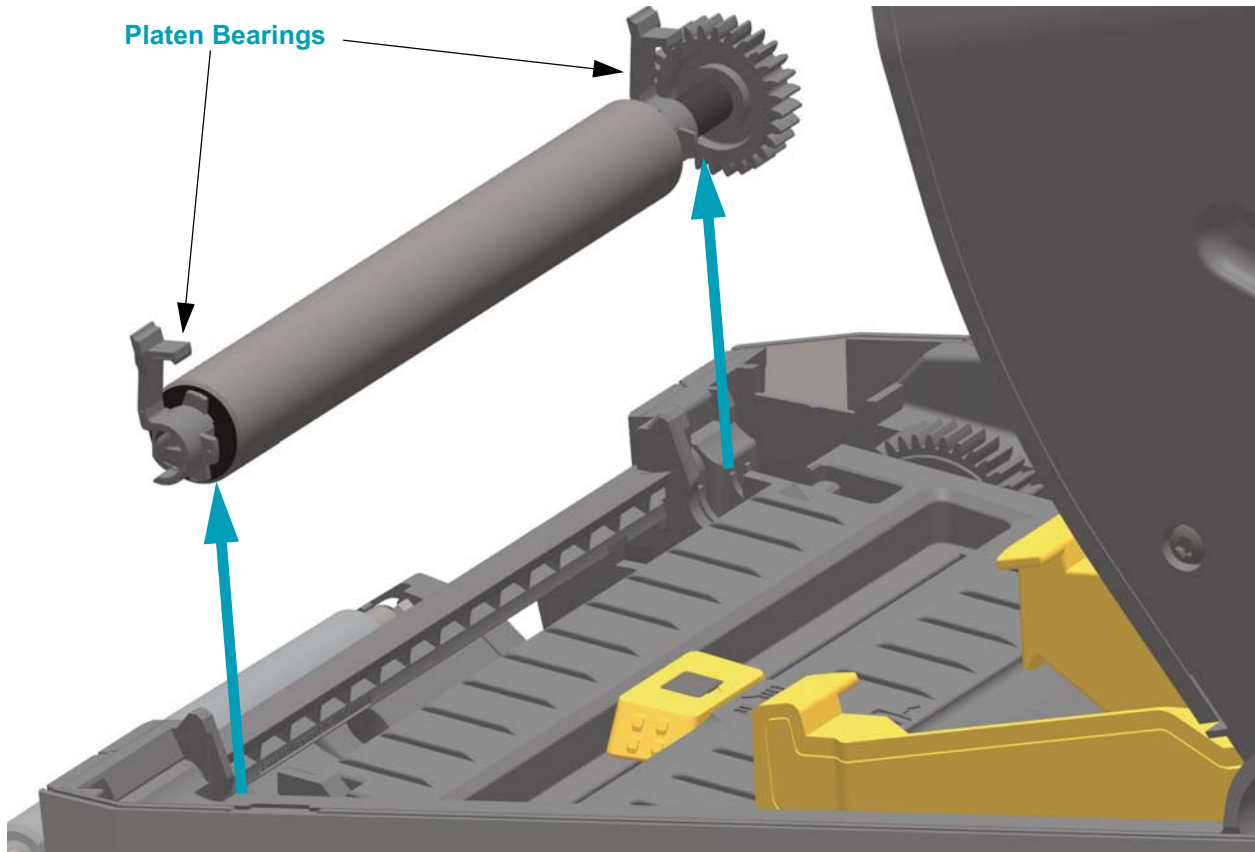
Caution • Prepare your work area by protecting against static discharge. Your work area must be static-safe and include a properly grounded conductive cushioned mat to hold the printer and a conductive wrist strap for yourself.

Removal

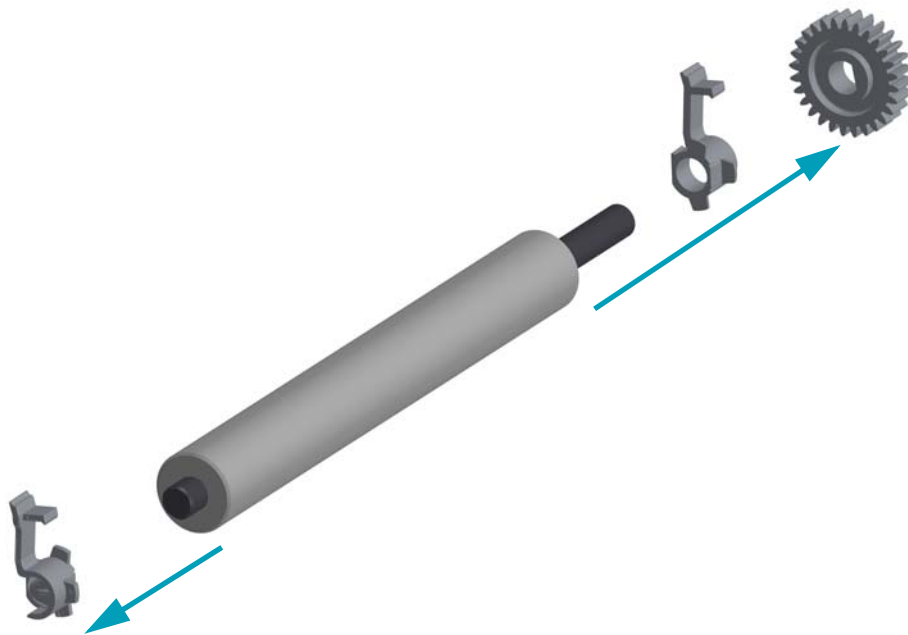
1. Open the cover (and dispenser door if the dispenser is installed). Remove media from platen area.
2. Pull the platen bearing latch release tabs on the right and left sides towards the front of the printer and rotate them up.



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



4. Slide the gear and the two (2) bearings off the shaft of the platen roller.

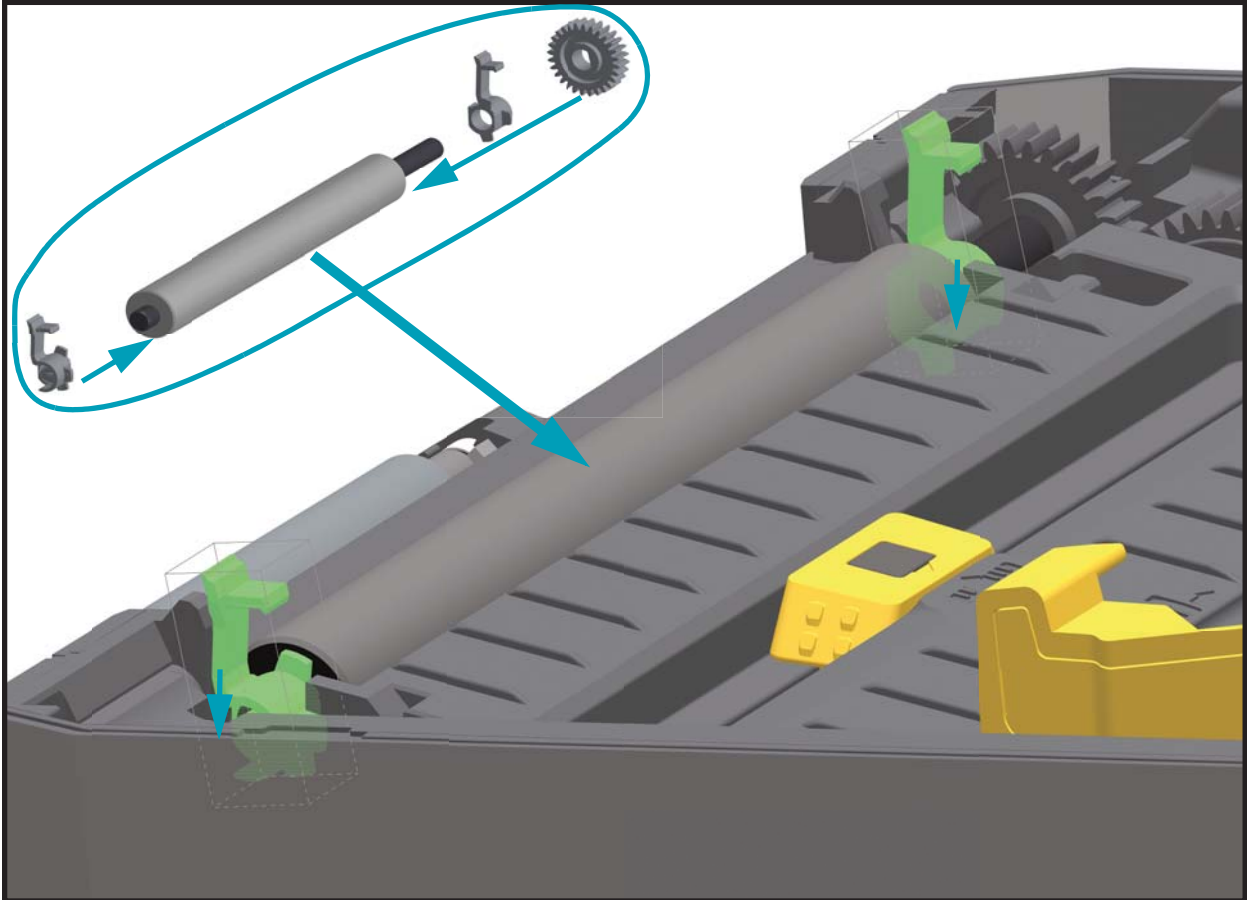


Installation

Your new platen may be dirty from shipping and handling. Inspect the platen for dirt and other contaminants. Clean if necessary.

Clean the platen with a 99% pure Isopropyl Alcohol moistened swab or fiber free cloth. Clean from the center out. Repeat this process until all of the roller surface has been cleaned.

1. Make sure the bearings and drive gear are on the shaft of the platen roller.



2. Align the platen with the gear to the left and lower it into the printer's bottom frame.
3. Rotate the platen bearing latch release tabs down on the right and left sides towards the rear of the printer and snap them into place.

If you cleaned the platen roller, allow the printer to dry for one minute before closing the dispenser door, media cover or loading labels.

Removing and Replacing Connectivity Option Modules

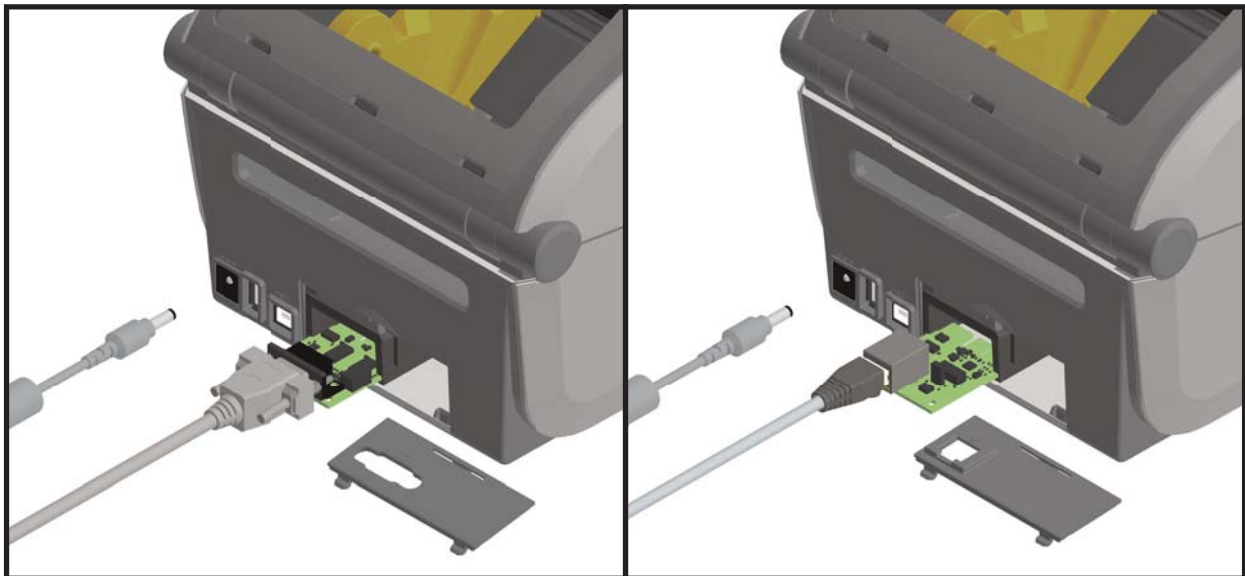


Caution • Prepare your work area by protecting against static discharge. Your work area must be static-safe and include a properly grounded conductive cushioned mat to hold the printer and a conductive wrist strap for yourself.

Connectivity modules can easily be removed for the purpose of reconfiguring a printer or repair. You should not remove and replace connectivity modules as a general practice.

Removal

1. Remove the interface cable (Ethernet or Serial).
2. Remove the module access door. Push down on the top of the door with your finger tip. This releases the latch. Pull the door away and down to remove.
3. Re-attach the interface cable to the connectivity module and secure the cable.
4. Gently pull on the interface cable that is secured to the connectivity module. Slowly pull the module out of the printer.



Installation

1. With the module's access door removed, slide the connectivity module into the printer. Push the circuit card in slowly but firmly until the card is just past the inside lip of the access door.
2. Align the bottom of the connectivity module door cover to the bottom lip of the module access opening. Swing the door up and snap the cover closed.

Torx Replacing a Front Bezel Option (Tear-off, Dispense, Cut)

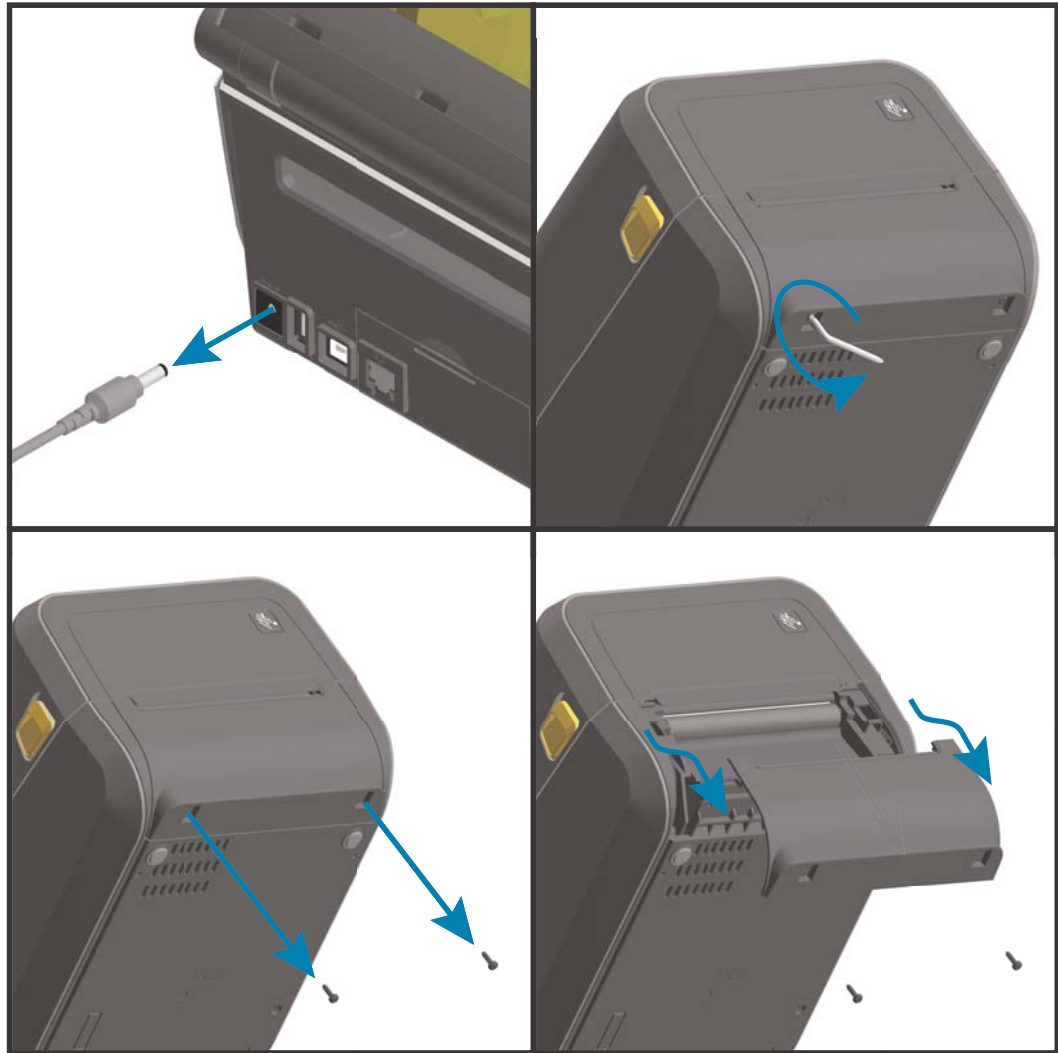


Caution • Prepare your work area by protecting against static discharge. Your work area must be static-safe and include a properly grounded conductive cushioned mat to hold the printer and a conductive wrist strap for yourself.

All three (3) of the front bezel options (standard tear-off bezel, the dispenser module, and cutter module) mount in the same way

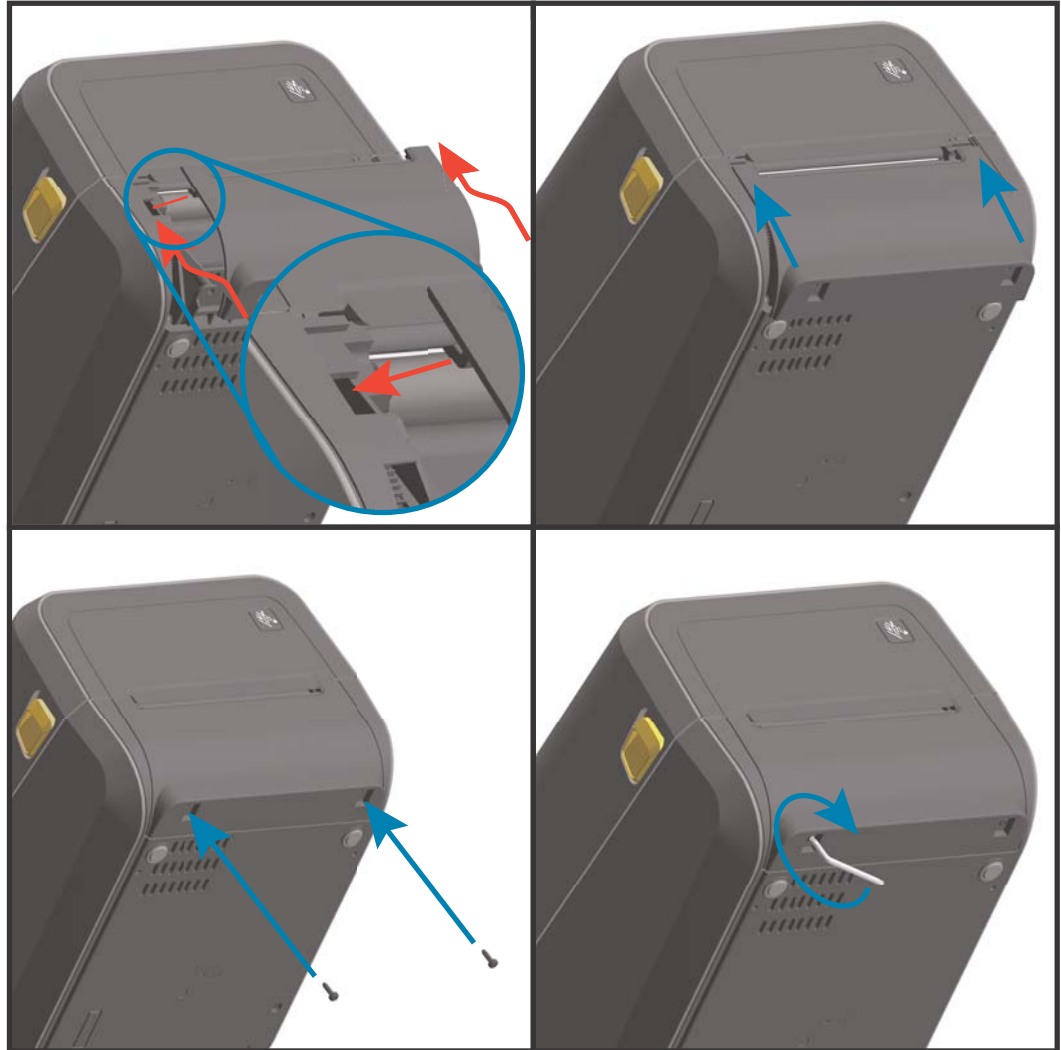
Removal

1. Turn the printer upside down. Remove the two (2) mounting screws with a Torx T10 driver or wrench. Save the screws.
2. Slide the bezel down the front and pull the loose bezel out.



Installation

1. Place the front bezel option and printer right side up with the top of the module even with the bottom of the top cover. Center and push the module into the front of the printer and slide it up until it stops.
2. Turn the printer upside down and attach the media exit option to the printer with the two screws using a Torx T10 driver or wrench.

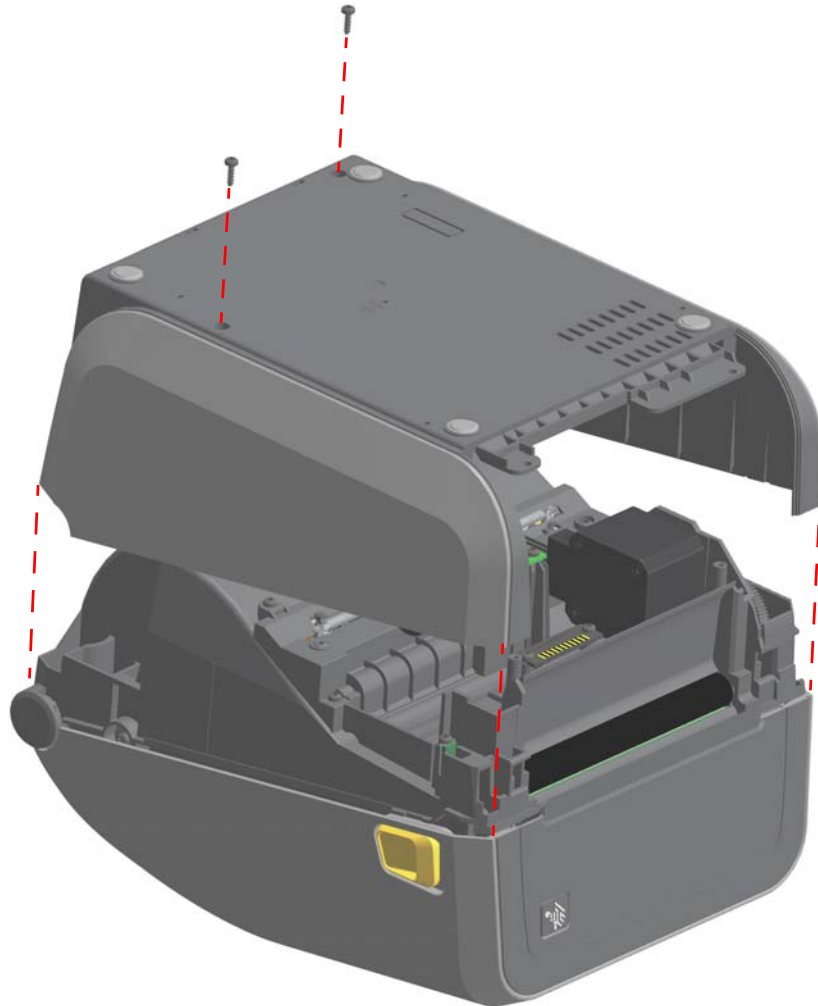


Removing the Printer Base for Repair Access

The printer base (bottom cover) is not a spare part and must be replaced at a Zebra repair center.

Repair Prerequisites

You must remove the [Front Bezel Option](#) bezels (tear-off, dispenser, or cutter) before you can remove the printer base. Connectivity option PCBA's and bezel do not have to be removed to gain access to remove the base.



Removal

1. Remove the two (2) screws with a Torx T10 driver.
2. Lift the base off the printer.

Installation

1. Place the base on the lower printer's frame.
2. Secure the base with the two (2) screws using a Torx T10 driver.

Replacing the Printer's Feet

Installation

1. Turn the printer over with the bottom facing up.
2. Replace any missing feet as needed. Insert the adhesive backed rubber foot into the round foot holder (see below).



Replacing the Window

Repair Prerequisites

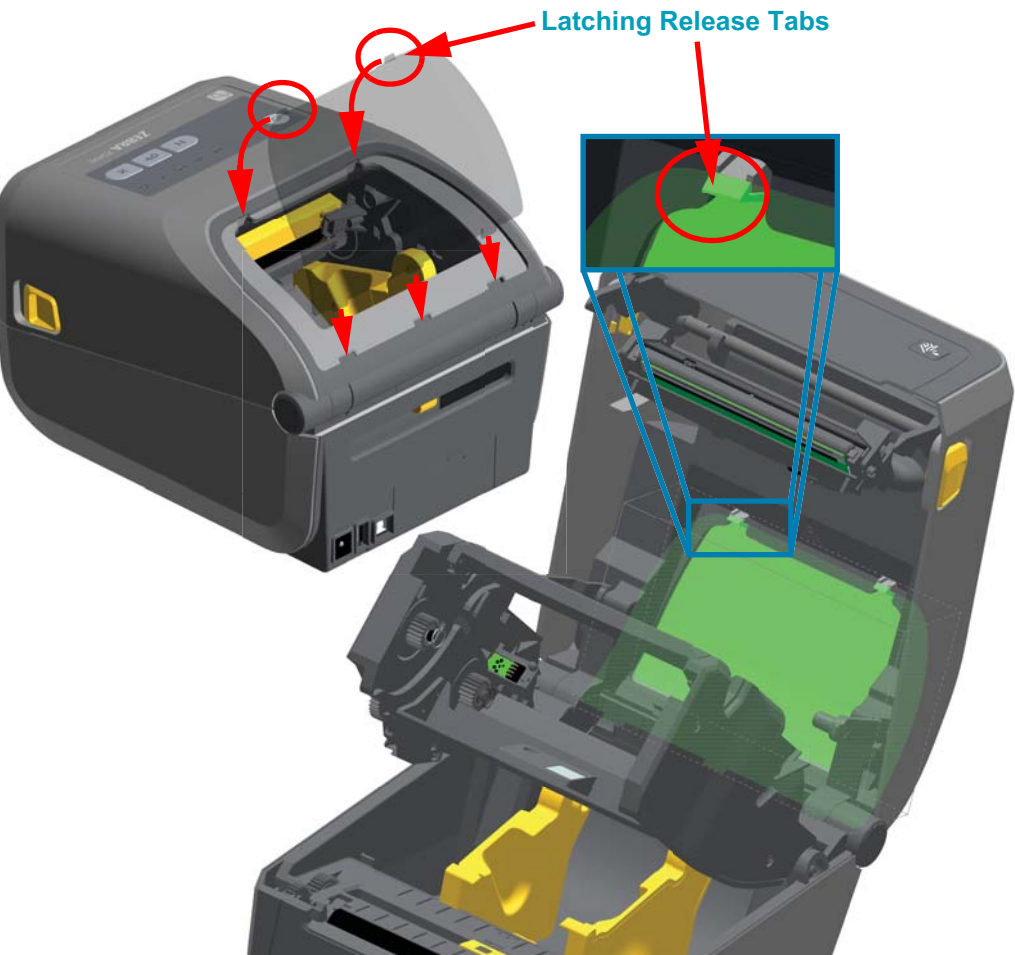
Open the printer to gain access to the window release tabs on the inside of the printer.

Removal

1. Use your finger to push the window's release tabs towards the middle area of the window.

Installation

1. Slide the three (3) tabs on the window part into the three (3) slots in the top cover at the rear of the printer.
2. Swing the window down into the front of the window recess area and press it into the cover to latch.



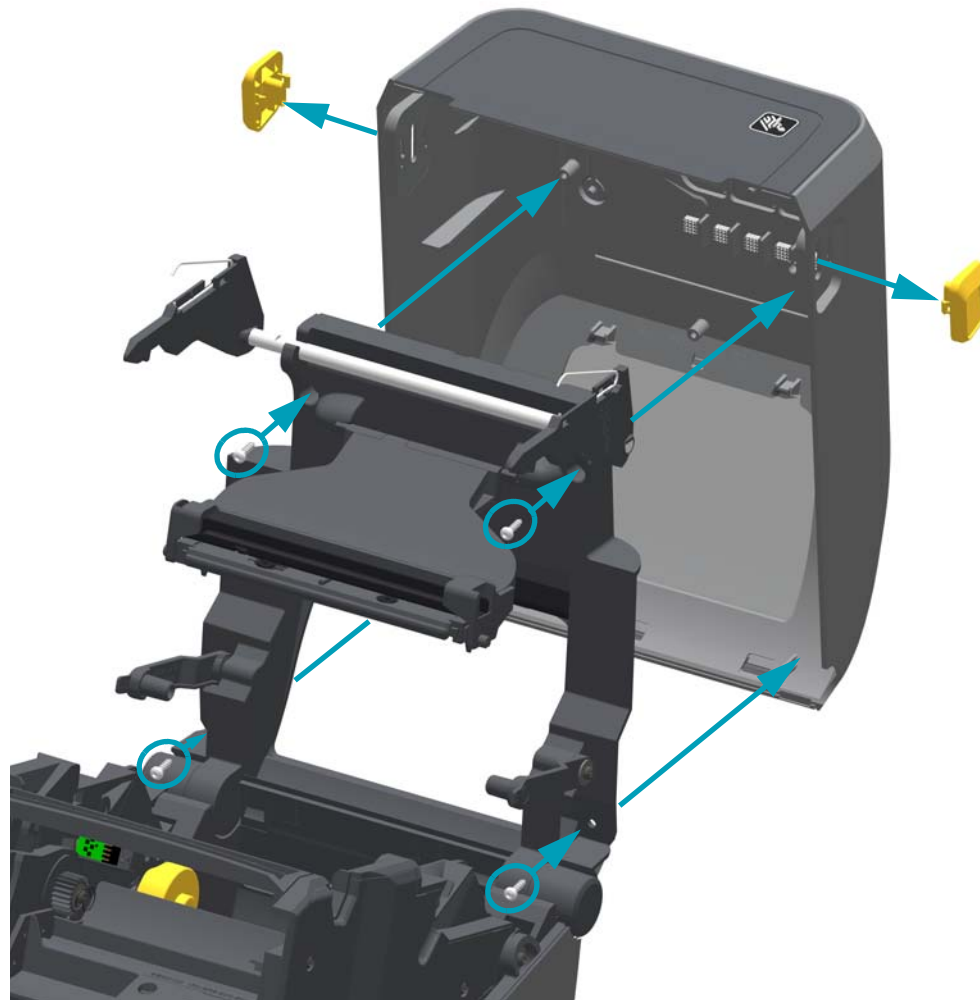
Replacing the Cover Assembly



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

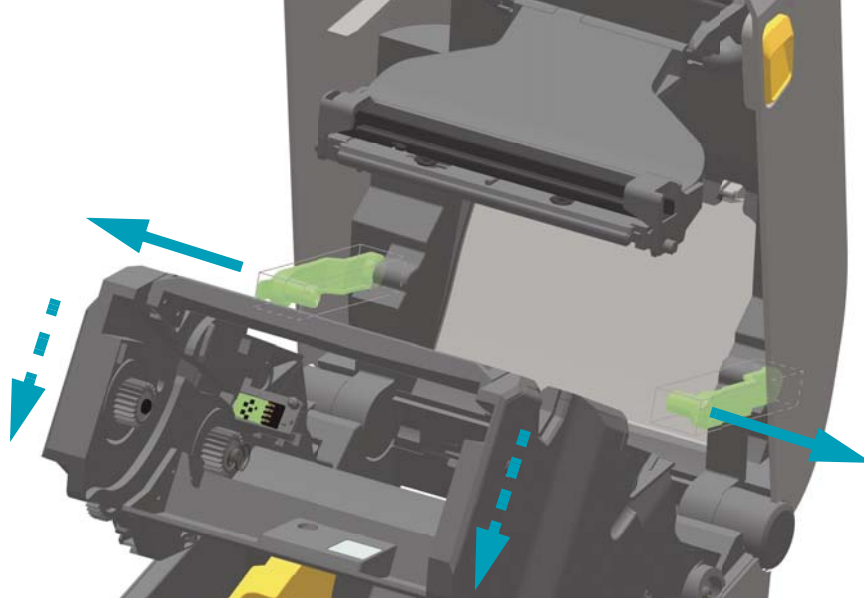
Repair Prerequisites

Before you begin this procedure, turn the printer OFF, open the printer, and remove media or ribbon.

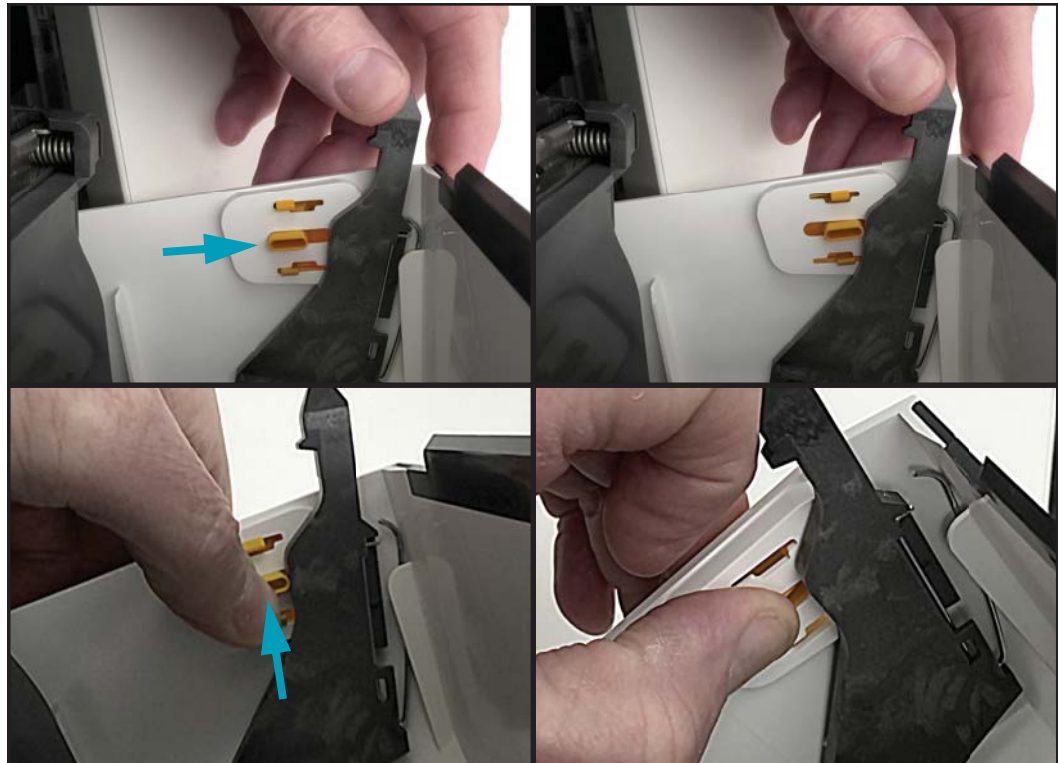


Removal

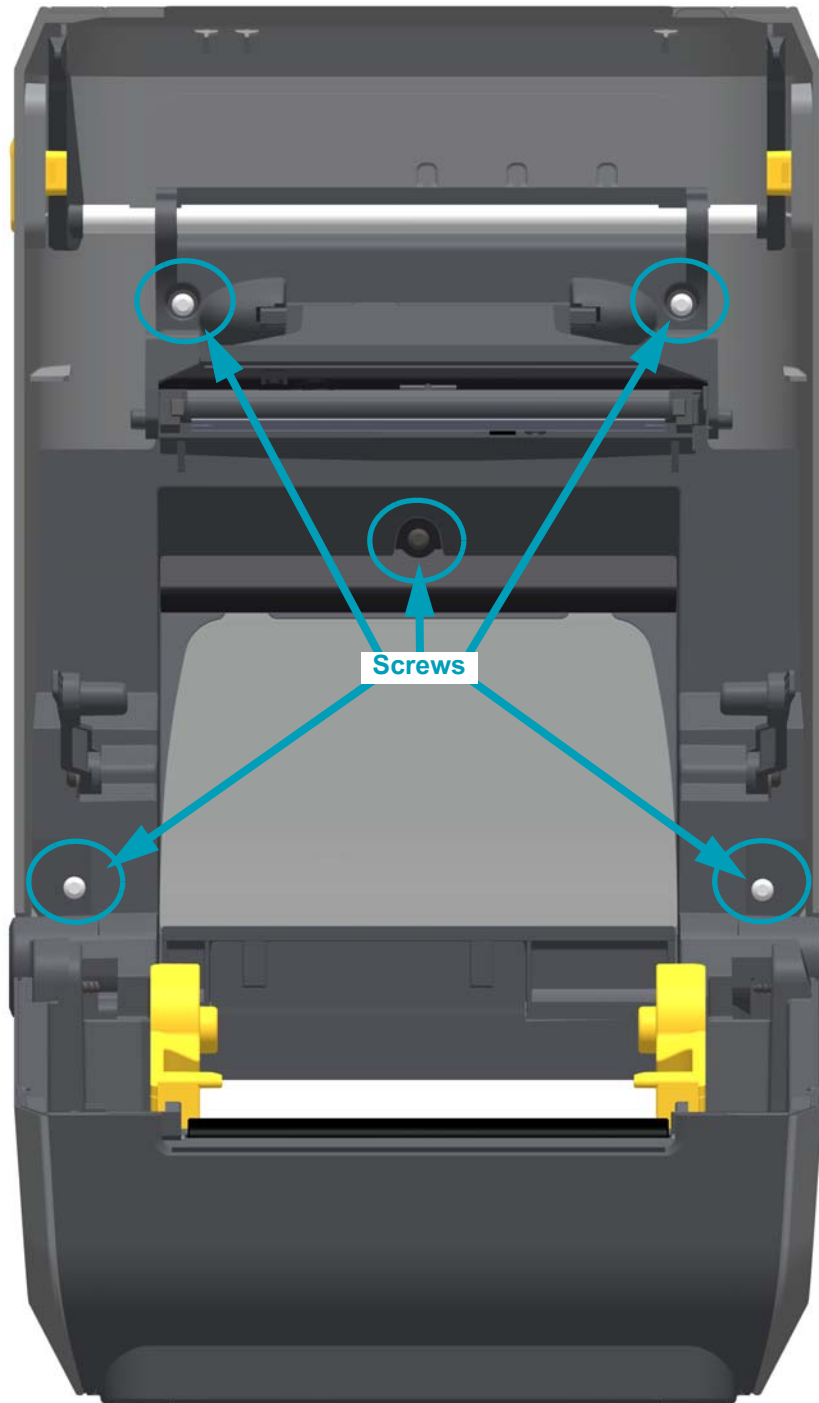
1. Pull the two (2) Release Arms out to release the Ribbon Drive Transport. The arms are located on the left and right sides of the printer. The Ribbon Drive Transport and Printhead Actuator Arm will now be loose.



2. Slide both of the gold latch release slider buttons towards the front of the top cover. Stop sliding the gold buttons when they are slightly past the mid point in the slide channel. Push the button out of the slide channel (and cover) from the inside of the cover.



- Using a Torx T10 driver, remove the five (5) screws securing the top cover to the inner lid.



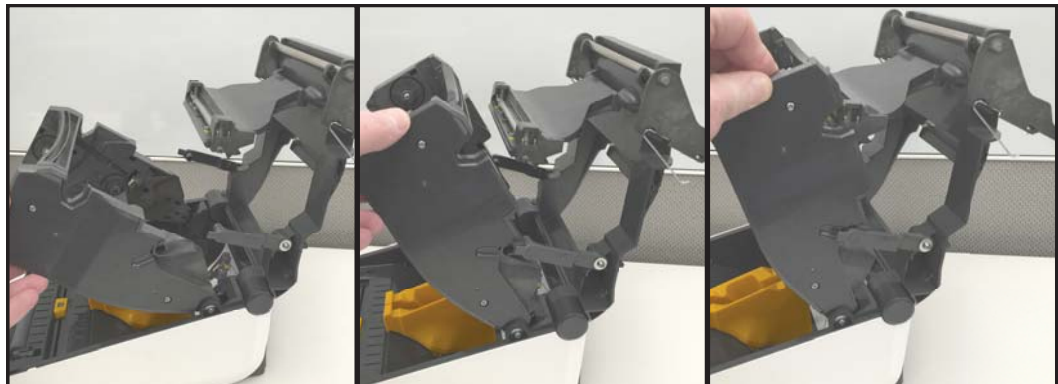
- Remove the top cover.

Installation

1. Open the upper inner frame to the full open position. Flip the latch arms over towards the back of the printer.



2. With the link arms down, lift the ribbon transport into the printhead and link arms till both the link arms engage with the ribbon transport.



3. Swing inner frame down to the lower printer assembly. Center and swing the latch arms straight down so they enter into the lower printer assembly. Push down on the front top edge of both latch arms to lock the upper frame to the lower half of the printer.



4. Place the cover on the upper inner frame.

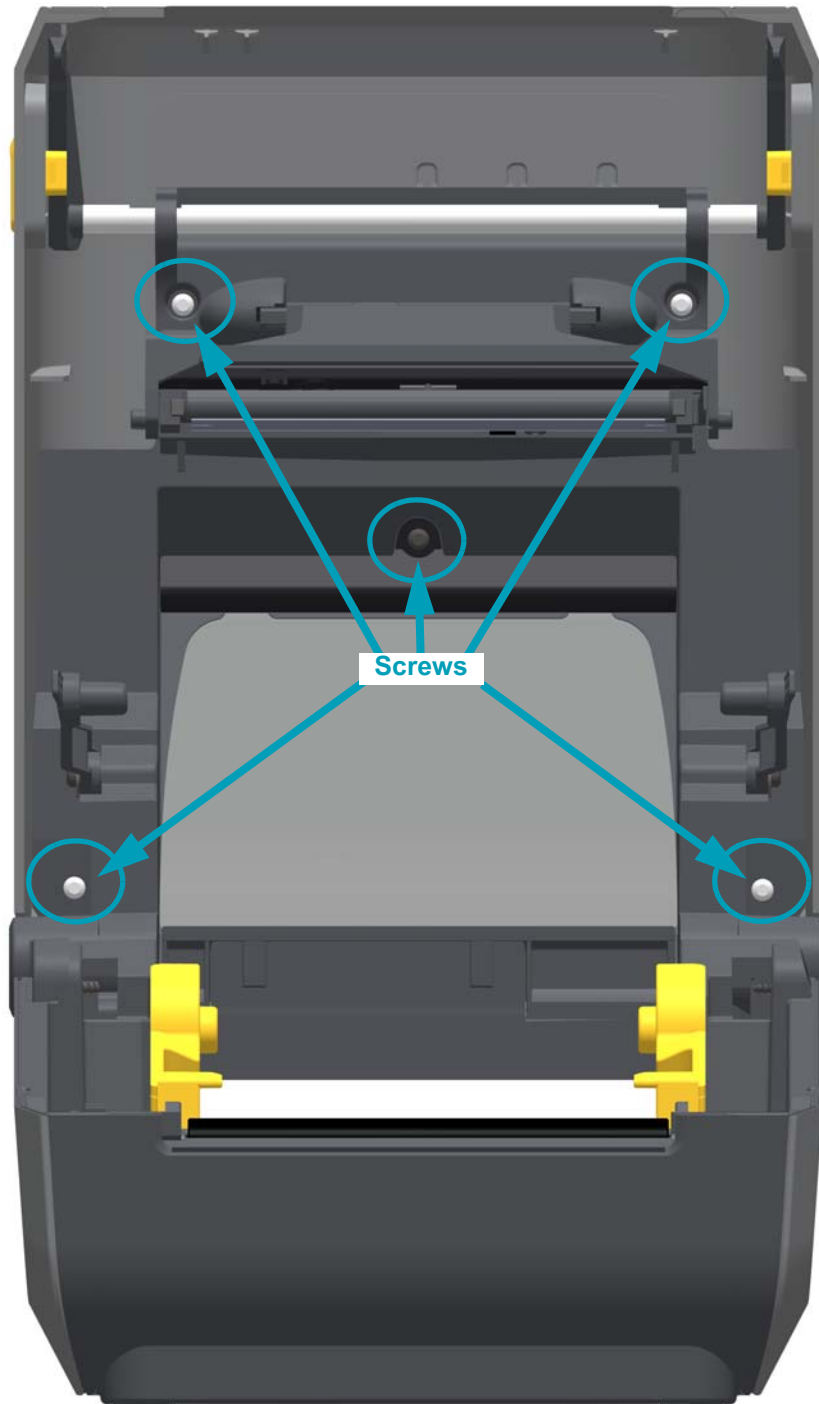


5. Insert the left and right (gold) latch buttons into the sides of the cover. Swing the rounded post into the slide channel and push the latch towards the front of the printer. The two (2) latches on the inside of the button will lock the buttons into place.



6. Lift the cover up. If the latch buttons have not released the cover, pull them forward to release the latches.

7. Using a Torx T10 driver, secure the cover to the printer with the five (5) screws. Release the Ribbon Drive Transport to gain better access – reference Cover Removal Step 1 for more details.



Replacing the Latch Assembly

Repair Prerequisites

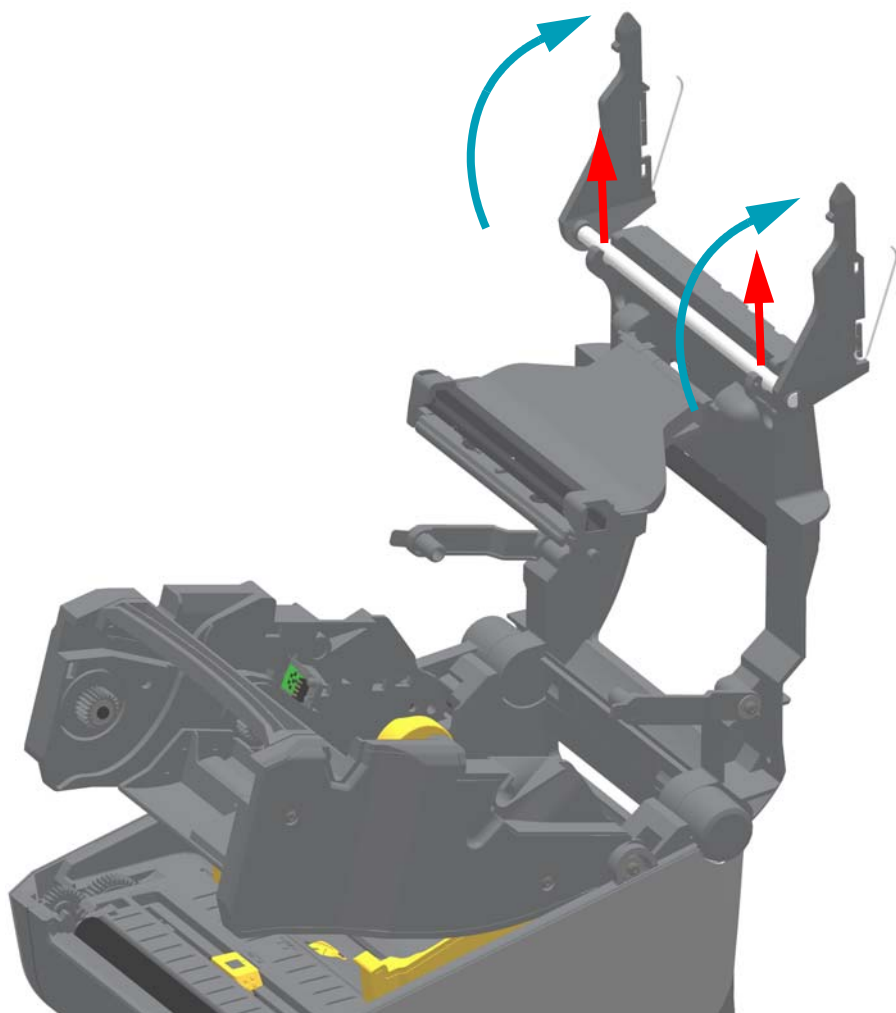
You must remove the [Cover Assembly](#) before performing this procedure.

Removal

1. With the Cover removed and inner frame in the full open position, rotate the latch assembly up and lift it out of the inner frame.

Installation

1. With the inner frame in the full open position, slide the flat surface on the latch assembly's pivot bar into the two (2) molded 'C' shaped latch bar bearings at the top of the inner frame. The two (2) springs face the rear when inserting them into the 'C' bearings (see below).



Replacing the Control Panel PCBA

Repair Prerequisites

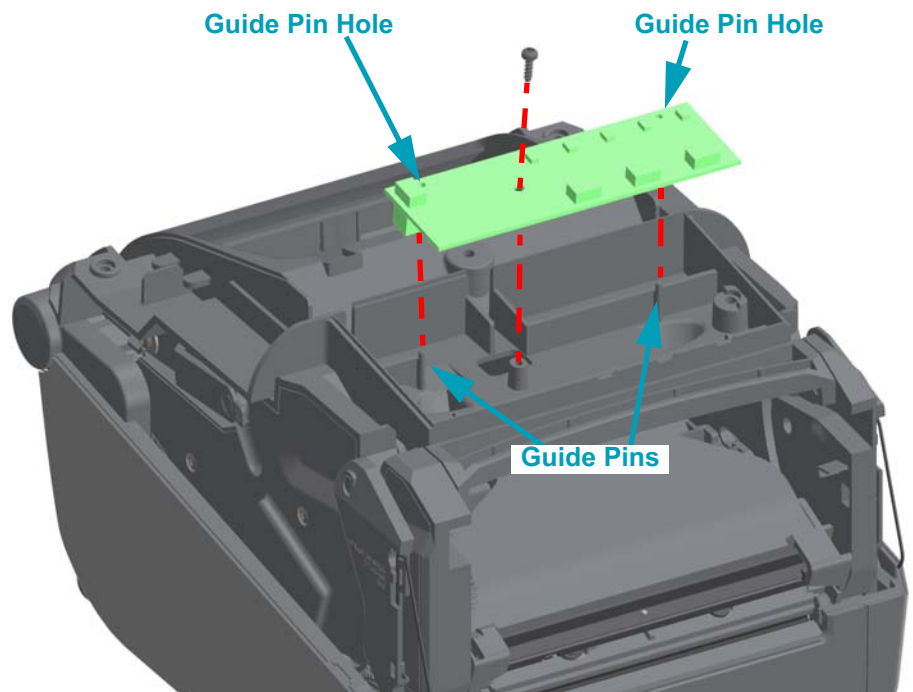
You must remove the [Cover Assembly](#) before performing this procedure.

Removal

1. With the Cover removed, use a Torx T10 driver to remove the screw holding the Control Panel PCBA to the inner frame.
2. Lift the PCBA off the inner frame and disconnect the cable from the backside of the PCBA.

Installation

1. Connect the cable to the Control Panel PCBA.
2. Place the PCBA with the connector/cable side facing down onto the two (2) small guide pins molded into the top of the inner frame.

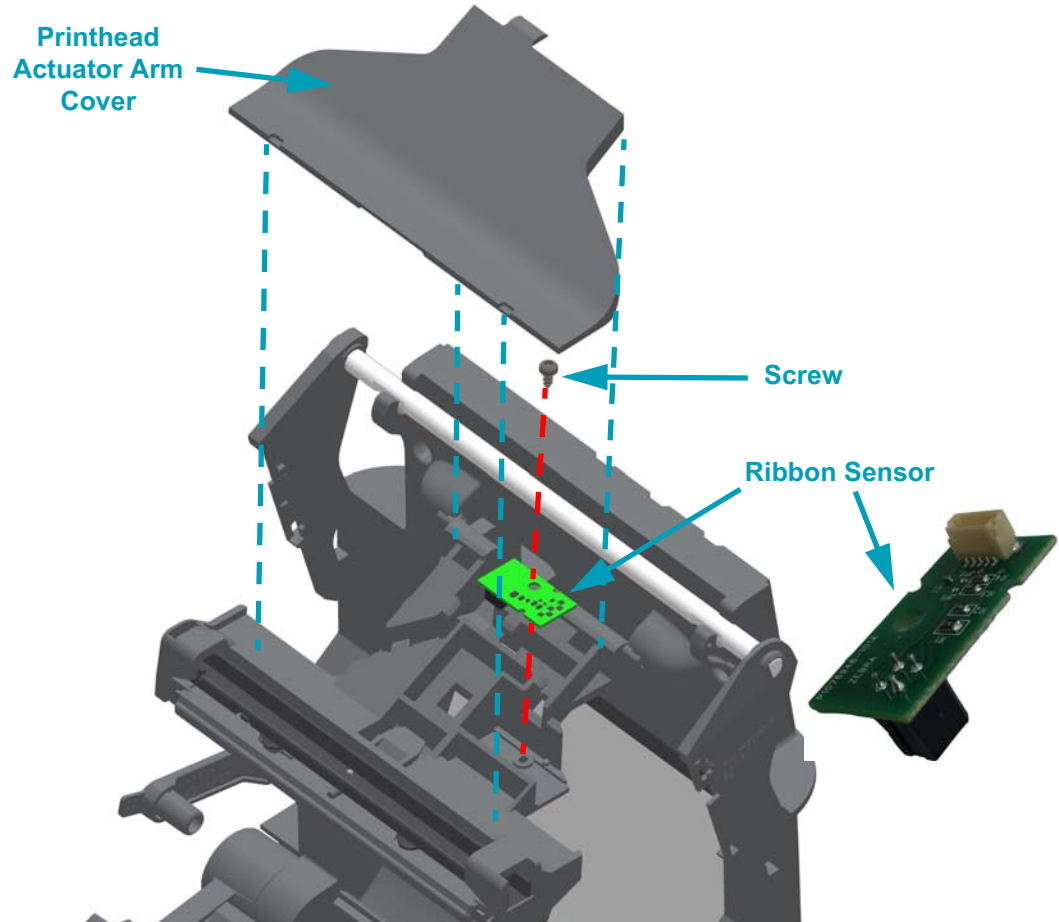


3. Secure the PCBA to the inner frame with the screw using a Torx T10 driver.

Replacing the Ribbon Sensor PCBA

Repair Prerequisites

You must remove the [Cover Assembly](#) before performing this procedure.

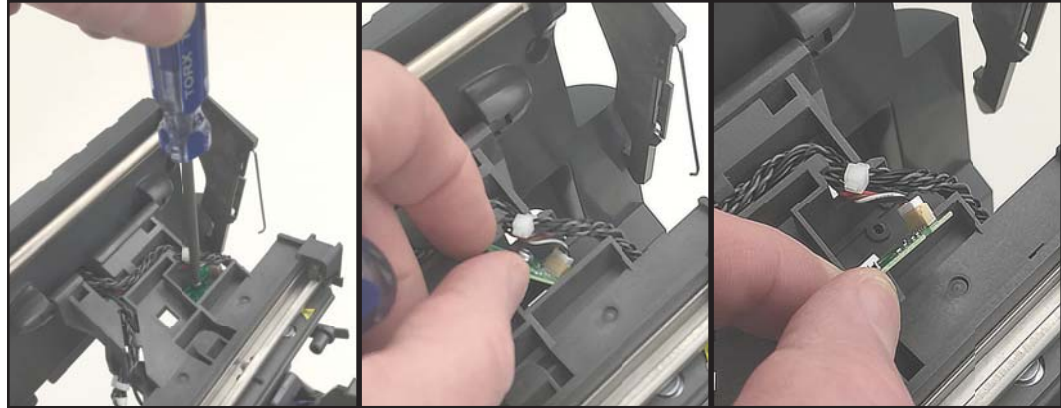


Removal

1. Use your hand to pry the cover off the Printhead Actuator Arm. Grab both sides of the cover (close to the Actuators Arm's hinge) and lift up. Swing it up and lift the cover out.



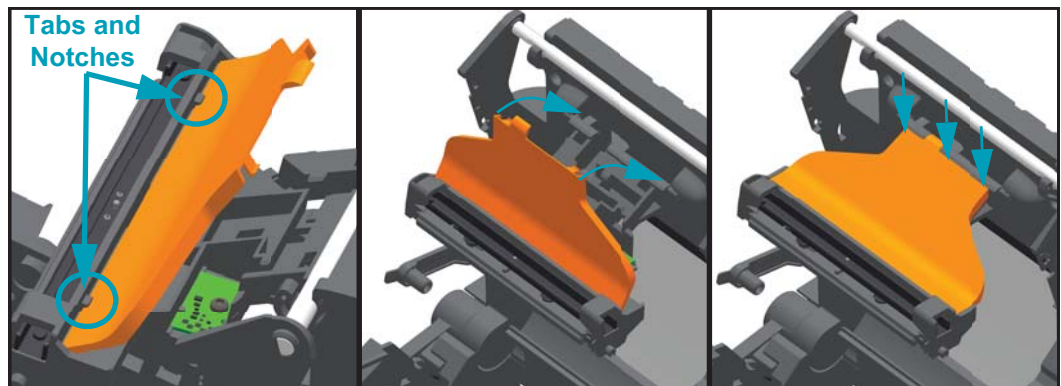
2. Using a Torx T10 driver, remove the screw securing the Ribbon Sensor PCBA to the Printhead Actuator Arm. Lift the PCBA out. The printhead may be unlatched from the Printhead Actuator Arm if necessary to gain more clearance from the printhead cable. See [“Replacing the Printhead” on page 59.](#)



3. Disconnect the cable from the PCBA.

Installation

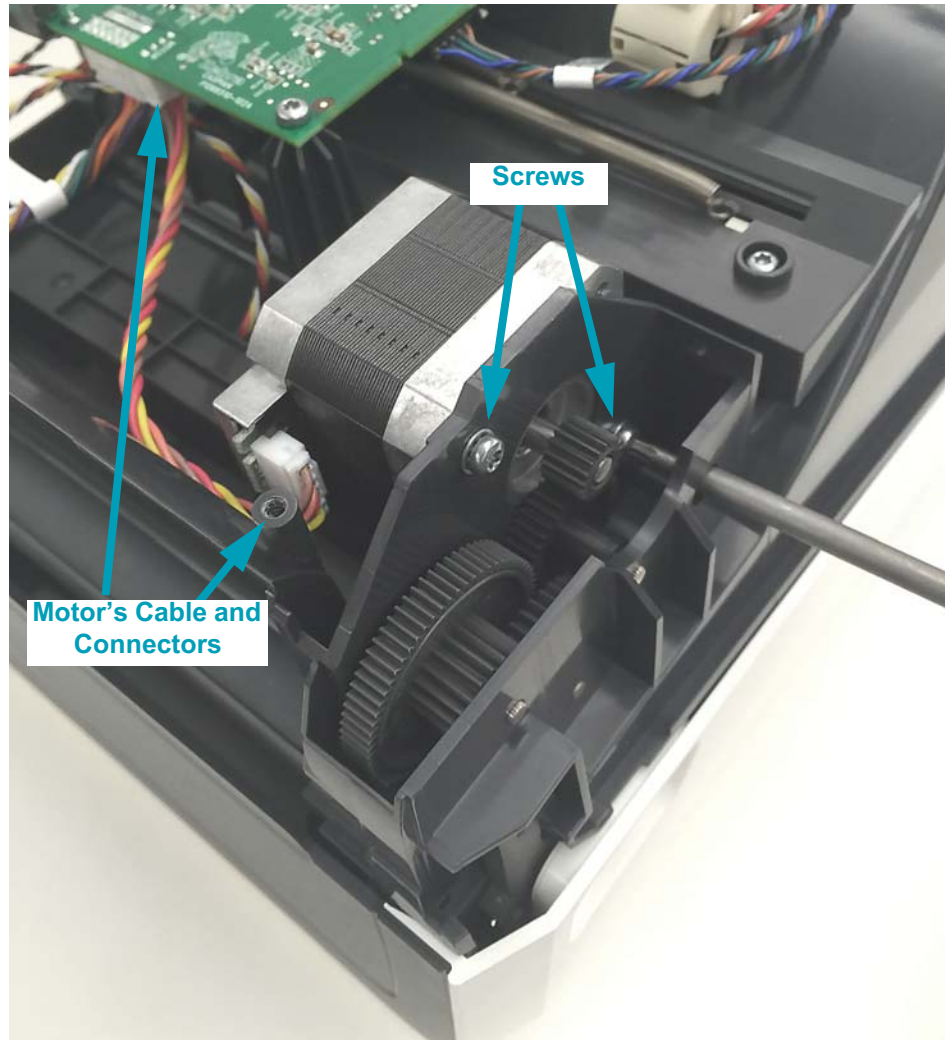
1. Connect the cable to the Ribbon Sensor PCBA.
2. Place the PCBA with the black sensor body down into the Actuator Arm body. The connector/cable side is on the outer edge of the Actuator Arm body. Align the PCBA with the two notches and the screw hole in the Actuator Arm body.
3. Secure the PCBA to the Actuator Arm body with screw using a Torx T10 driver.
4. Place the Actuator Arm's cover back onto the Actuator Arm body. Slide the notches on the cover under the tabs on the Actuator Arm body. Swing the narrow end down into the arm's hinge. Press the cover into the Actuator Arm body to lock it in place.



Replacing the Motor

Repair Prerequisites

You must remove the [Front Bezel Option](#) (tear-off, dispenser, or cutter) and [Printer Base](#) before you can remove the motor.



Removal

1. Use a Torx T10 driver to remove the two (2) screws holding the motor to the inner frame. Pull the motor out of the gears and inner frame.
2. Disconnect the cable from the motor.

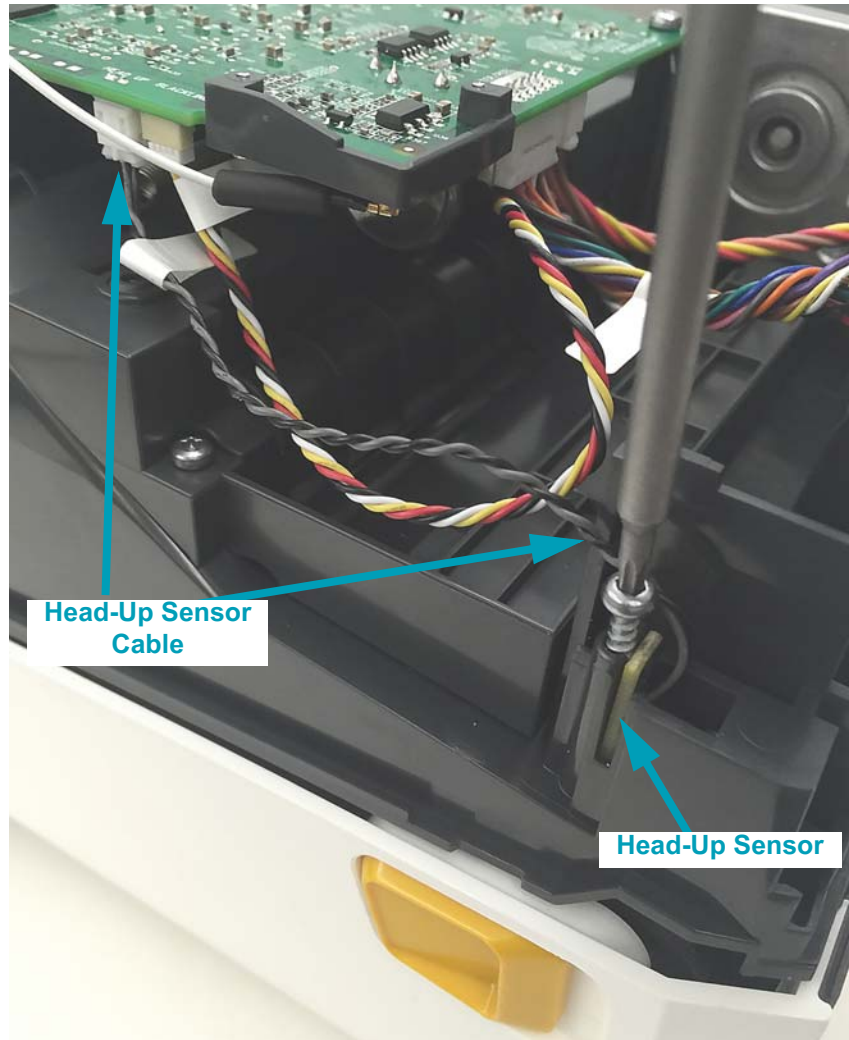
Installation

1. Connect the cable to the motor.
2. Orient the motor with the cable facing the front of the printer. Insert the motor gear into the inner frame to mesh with the drive train gears. Secure the motor to the inner frame with the two (2) screws using a Torx T10 driver.

Replacing the Head-Up Sensor

Repair Prerequisites

You must remove the [Front Bezel Option](#) (tear-off, dispenser, or cutter) and [Printer Base](#) before you can remove the Head-Up Sensor.



Removal

1. Use a Torx T10 driver to remove the screw holding the Head-Up Sensor to the inner frame. Pull the sensor out of the inner frame.
2. Disconnect the cable from the Main PCBA.

Installation

1. Connect the cable to the Main PCBA.
2. Slide the Head-Up Sensor PCBA into the slot in the inner frame. The switch on the PCBA faces the front of the printer with the cable oriented towards the printer bottom. Secure it with the screw using a Torx T10 driver.

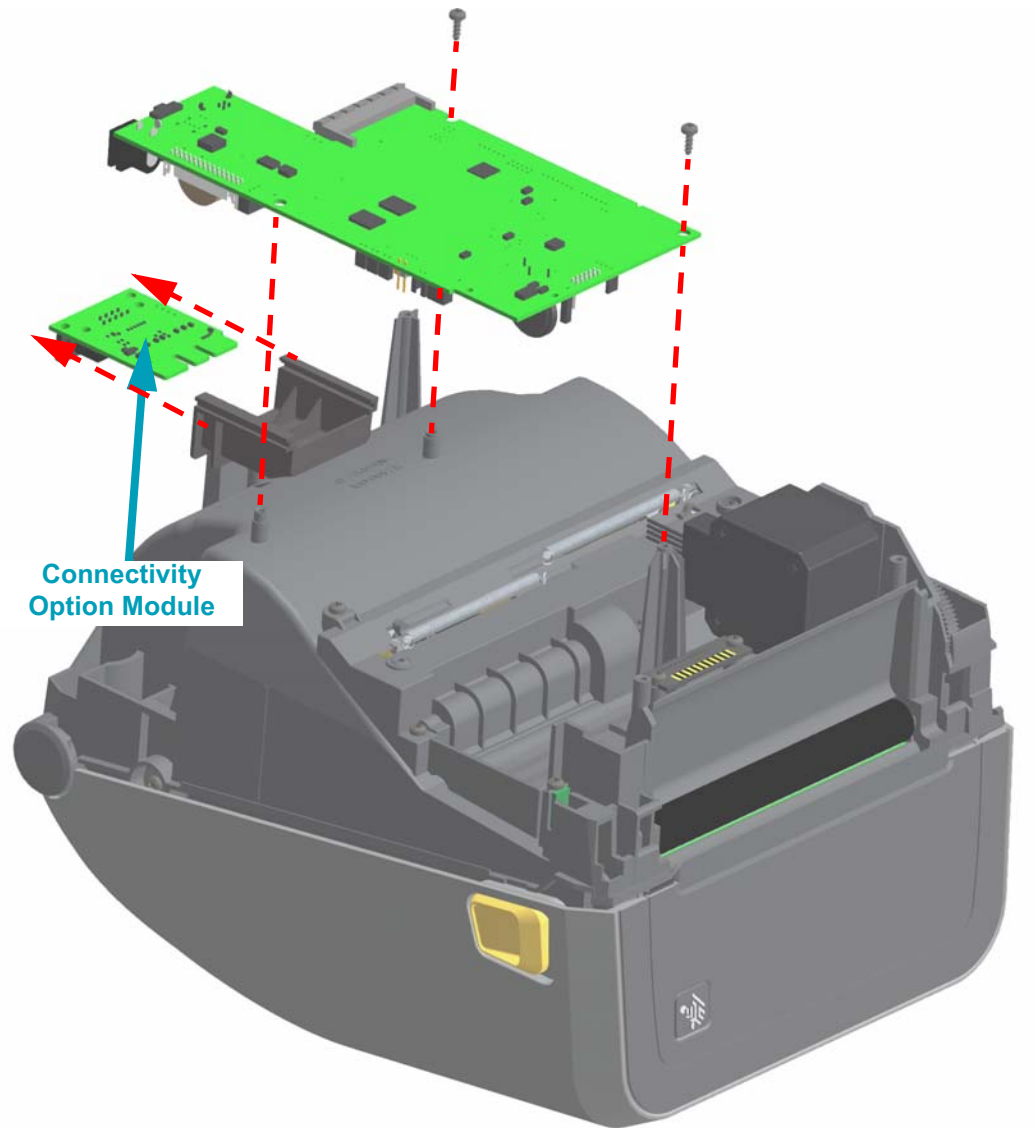
Replacing the Main PCBA

Repair Prerequisites

You must remove the [Front Bezel Option](#) (tear-off, dispenser, or cutter) and [Printer Base](#) before you can remove the Main PCBA. The [Connectivity Option Modules PCBA](#) can be removed during or prior to this procedure.

Removal

1. Remove any Connectivity option PCBA (Serial, Ethernet, etc.) that may be installed in the Connectivity slot. Slide it out of the Connectivity slot.

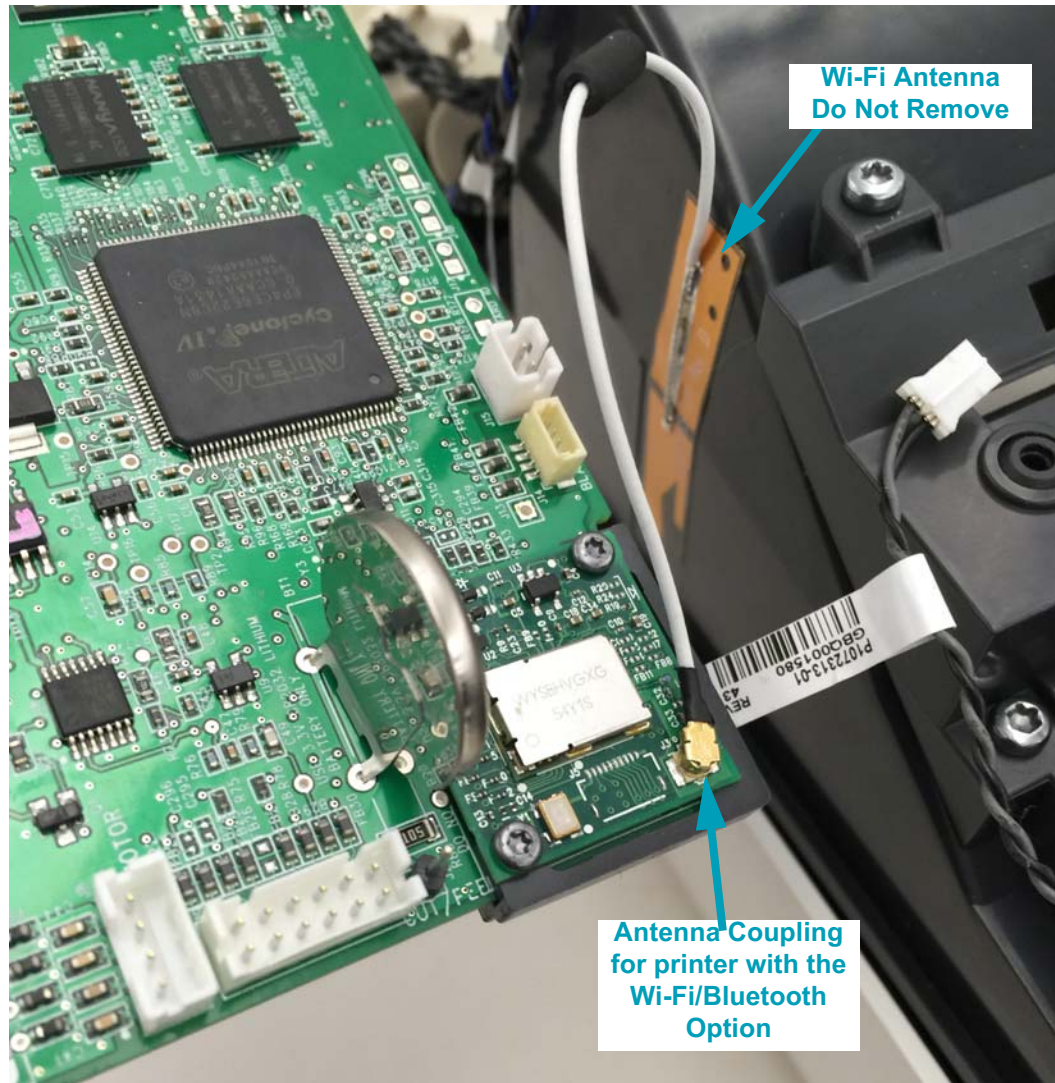


2. Loosen the two (2) screws retaining the Main PCBA. Lift the PCBA off the opposite side's mounting post. Slide the Main PCBA side ways, away from the Connectivity module's mounting bracket. Carefully lift the Main PCBA away from the printer to disconnect the wires from the board.
3. Carefully remove each connector from the Main PCBA:
 - a. Disconnect the PRINTHEAD cable from J23.
 - b. Disconnect the USER INTERFACE (control panel) cable from J10.
 - c. Disconnect the GAP (upper media) sensor cable from J22.
 - d. Disconnect the MOTOR cable from J8.
 - e. Disconnect the CARTRIDGE (reader) sensor cable from J1.
 - f. Disconnect the RIBBON sensor cable from J5.
 - g. Disconnect the CUT/PEEL (media handling option) cable from J9.
 - h. Disconnect the BLACKLINE (lower media) sensor cable from J14.
 - i. Disconnect the HEAD UP sensor cable from J16.
 - j. The Wi-Fi/Bluetooth option antenna must be disconnected at the PCBA. The other end of the antenna cable is attached to the side wall of the printer with adhesive backing and should not be removed. Only use fingers to disconnect and replace the antenna. Gently pull the coupling straight up (as close as you can get to the coupling).

Only printers with the Wi-Fi radio option have a separate antenna. All other ZD420 Series™ printers have an on-board antenna for Bluetooth LE operation.

Installation

1. Reattach the Antenna if this unit has the Wi-Fi/Bluetooth radio option (see below). Use your finger only to apply a slow steady pressure directly above the Antenna Coupling Post.

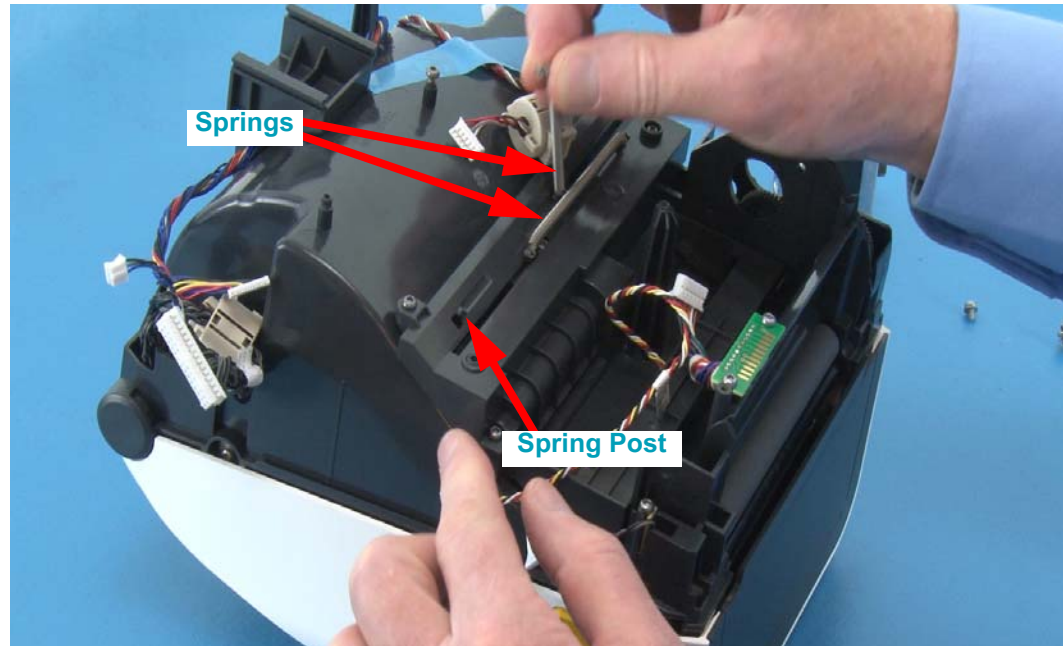


2. Reconnect the cables to the main board in reverse order for easiest access.
3. Slide the Main PCBA into the slot on the outside of the Connectivity PCBA Mounting Bracket and between the mounting post and loosened screw.
4. Align the Main PCBA to the other mounting post and tighten the loosened screw to secure the main board to the printer.
5. Finish securing the Main PCBA to print mechanism with a screw to the mounting post near the motor.

Replacing the Movable Sensor

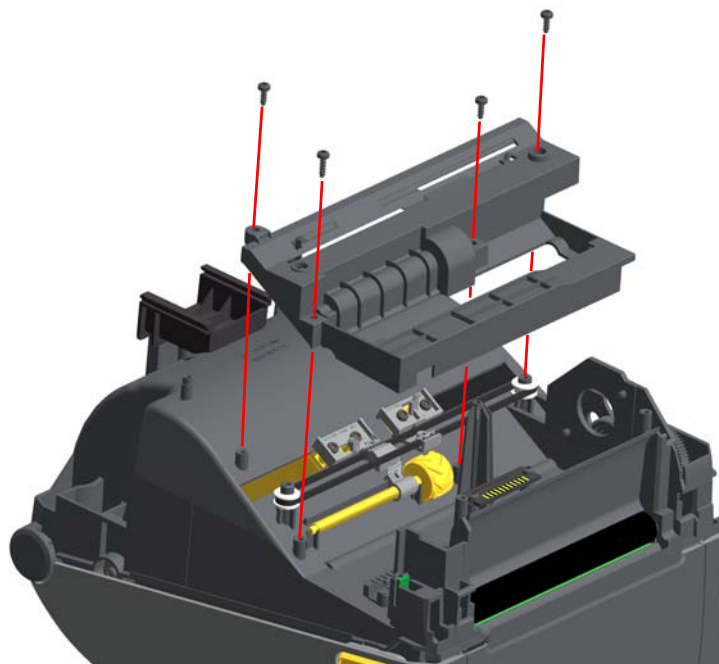
Repair Prerequisites

You must remove the [Front Bezel Option](#) (tear-off, dispenser, or cutter), [Printer Base, Motor](#), and the [Main PCBA](#) before you can remove the Movable Sensor.

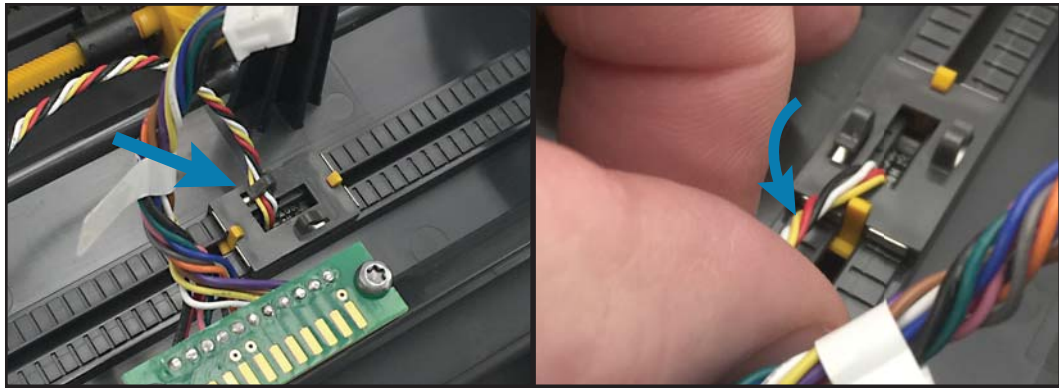


Removal

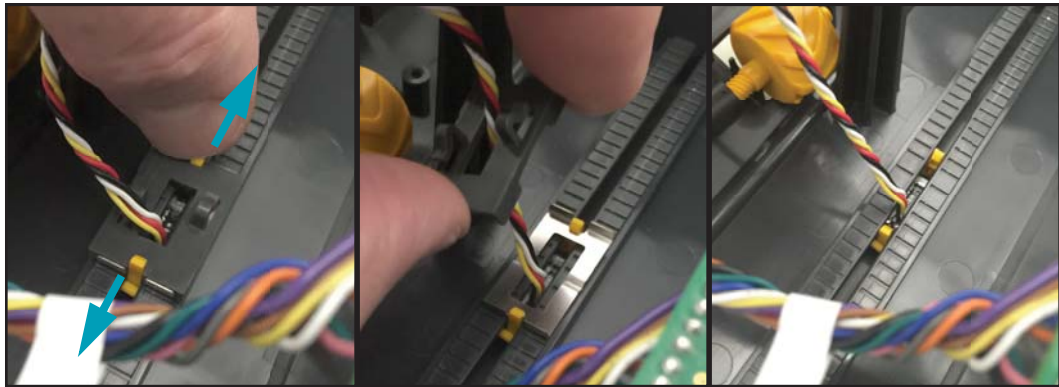
1. Remove the two (2) roll holder tension springs.
2. Use a Torx T10 driver to remove the four screws securing the roll holder cover bracket.



3. Un-hook the sensor's cable from the backside of the movable sensor.



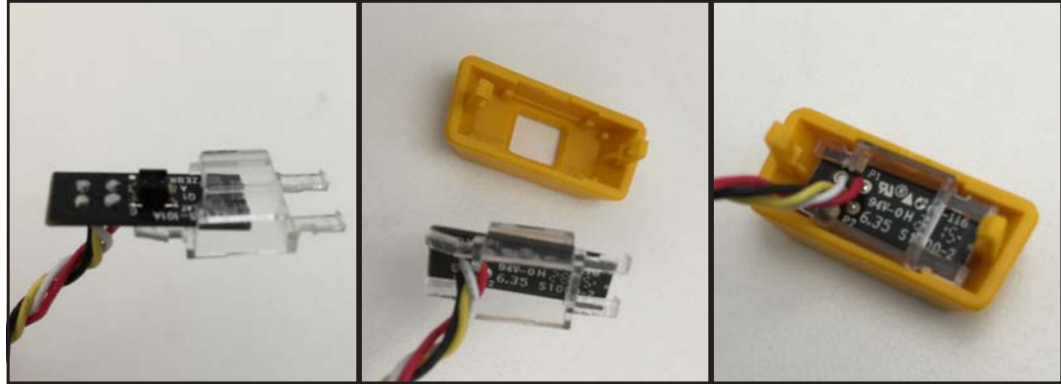
4. Un-snap the two gold prongs on the backside of the movable sensor. Push them away from the center of the movable sensor body to release the latching prongs.



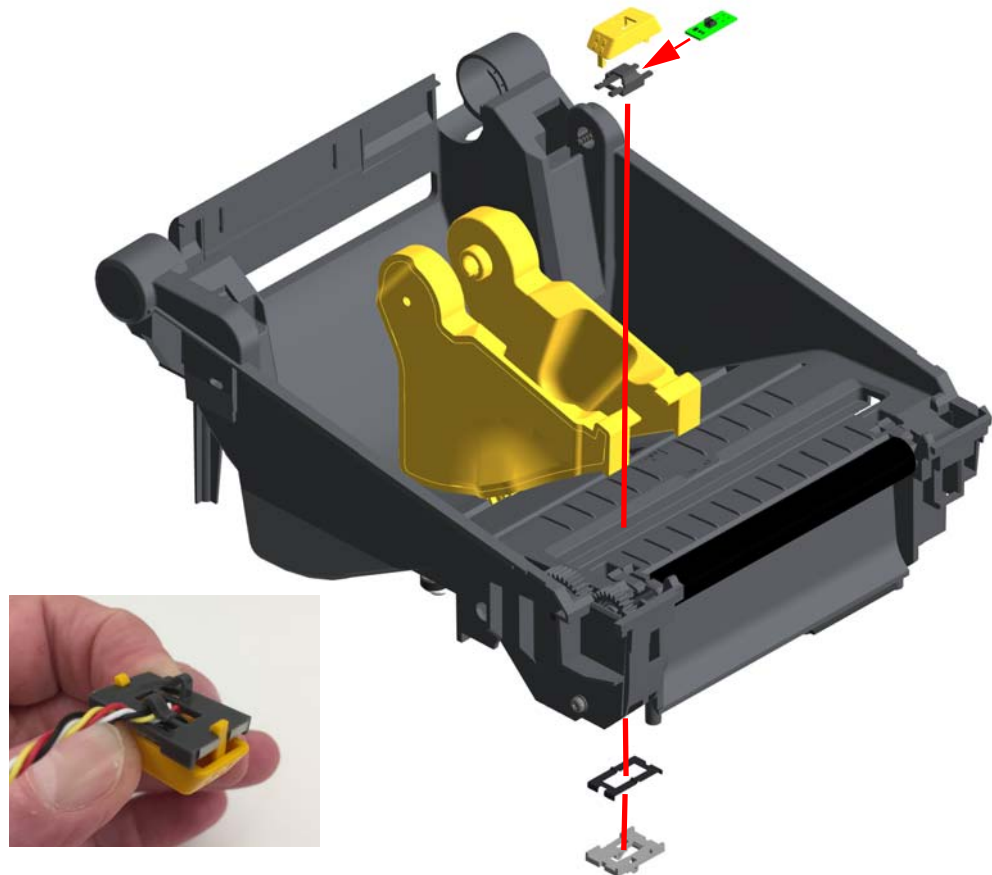
5. Pull the metal spring-lock and black plastic bracket out of the frame and clear of the sensor's cable. Open the printer. The gold sensor body, PCBA and cable can now be pulled out of the printer's inner cavity and movable sensor's recessed slide track.

Installation

1. Slide the new sensor's PCBA and cable into the lens bracket for the PCBA. The cable is on the open end and hangs below the bracket.

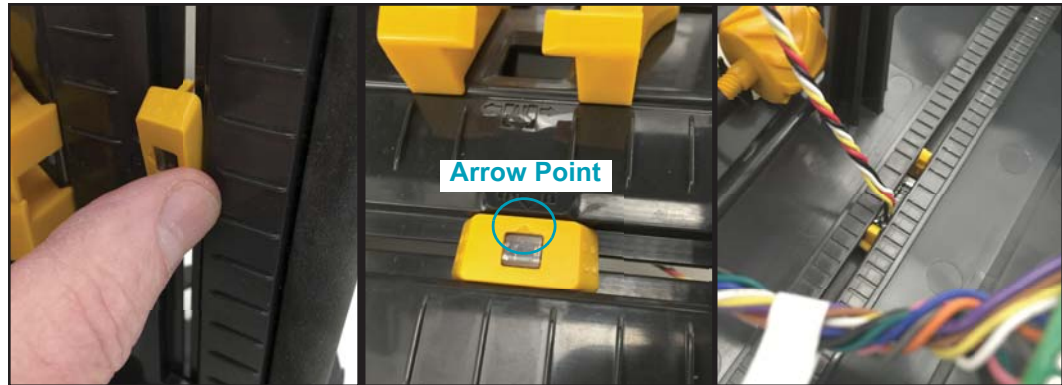


2. Snap the PCBA and bracket into the movable sensor body. The lens bracket should be flush with the top surface of the sensor body.



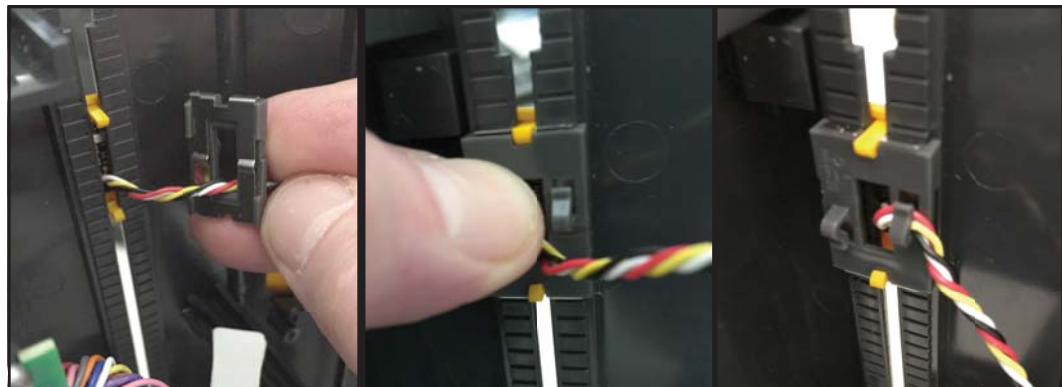
3. Place the sensor's cable and connector into sensor guide channel and cable slot. There is a wider opening on one end to allow the connector to slip through the slot.

- Align the (gold plastic) sensor body (with the sensor PCBA inside) to the movable sensor channel on the inside of the printer. The prongs go into the cable channel. The arrow point on the sensor body points to the rear of the printer.

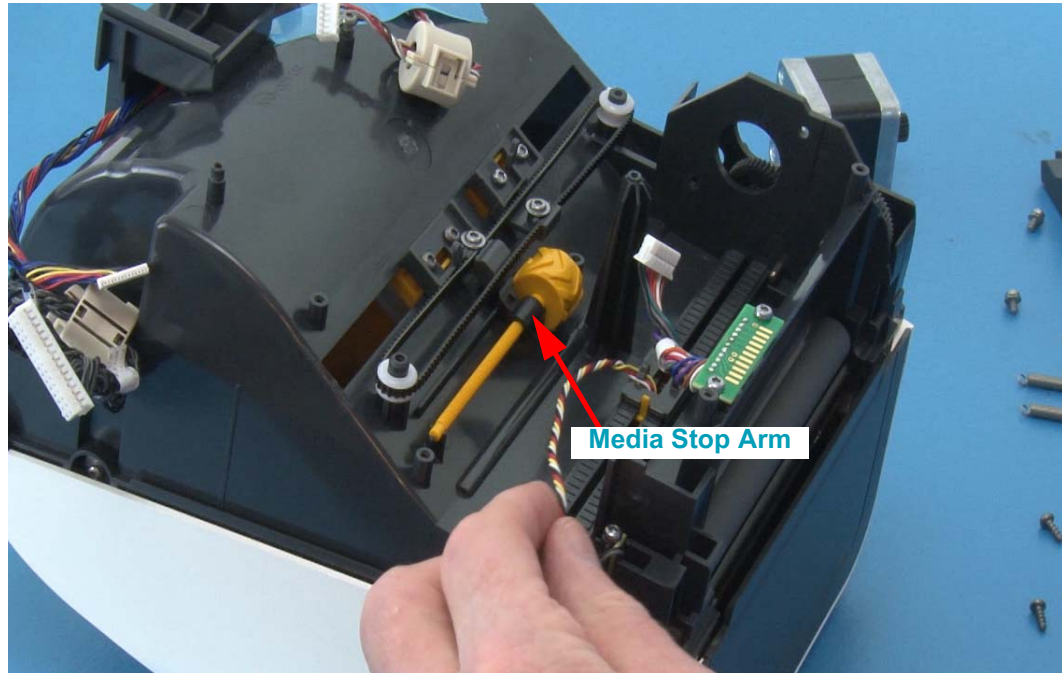


- Put the sensor's cable into the center of the metal spring-lock with the metal spring-lock's notch facing the inner frame. Put the sensor's cable into the center of the black plastic bracket with the black plastic bracket's cable retainer (hooks) facing away from the inner frame.
- Align the black plastic bracket to the metal spring-lock and lock them to the movable sensor. The prong's tabs will lock the bracket and spring in place.

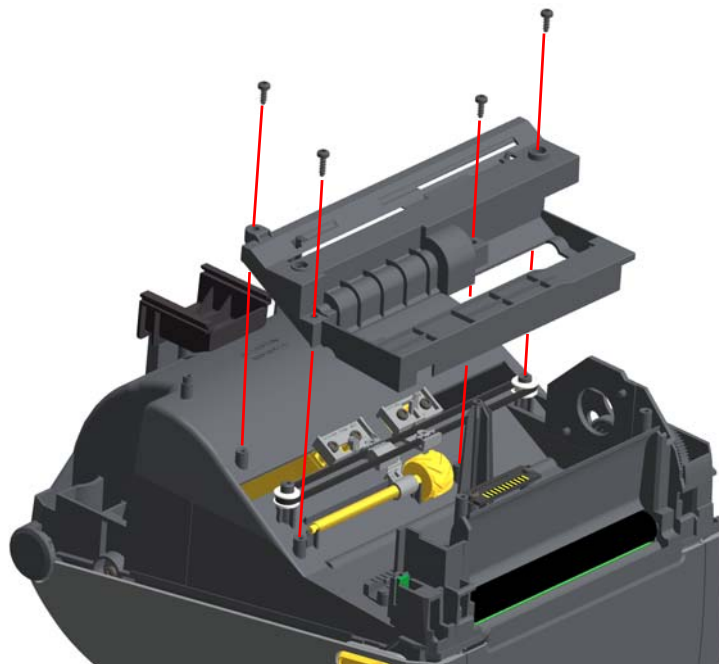
Slide the movable sensor from end to end to verify that the bracket is lated properly.



7. Verify that the Media Stop Arm on the gold thumb wheel's threaded shaft are both still in place on the inner frame.



8. Place the roll holder cover bracket over the movable sensor and roll holder components. The sensor's cable goes through the larger opening in the roll holder cover.

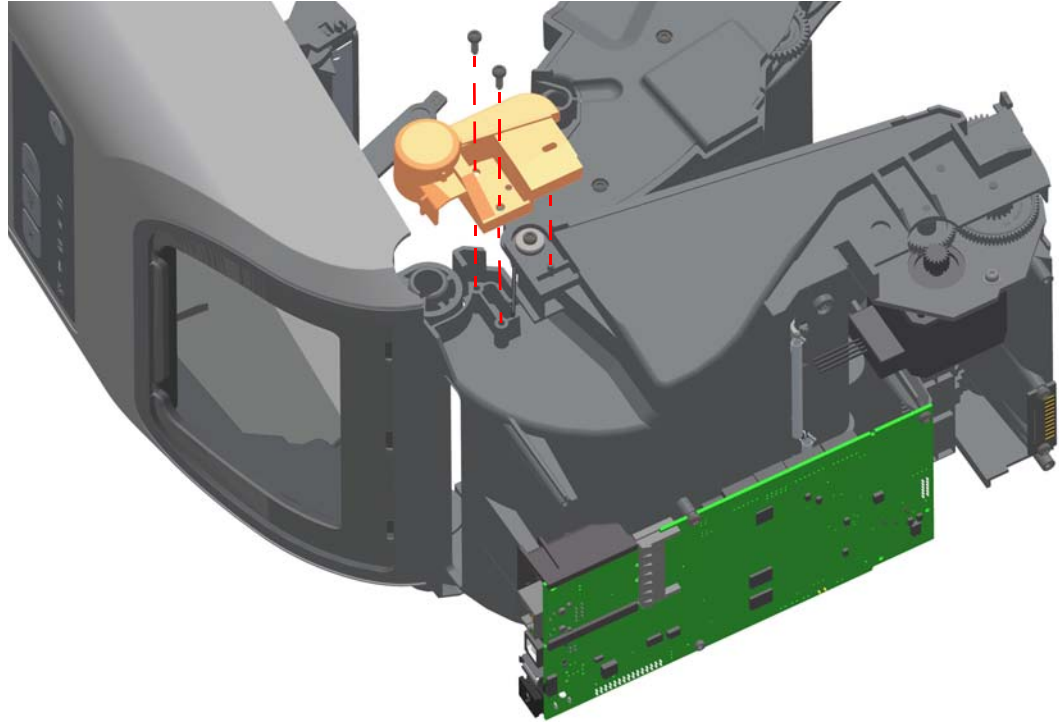


9. Use a Torx T10 driver to tighten the four screws securing the roll holder cover bracket to the inner frame.
10. Replace the two (2) roll holder tension springs.

Replacing the Hinge

Repair Prerequisites

You must remove the [Front Bezel Option](#) (tear-off, dispenser, or cutter) and [Printer Base](#) before you can remove the Hinge. The [Main PCBA](#) can be removed to gain better access to cable connector on the Main PCBA.

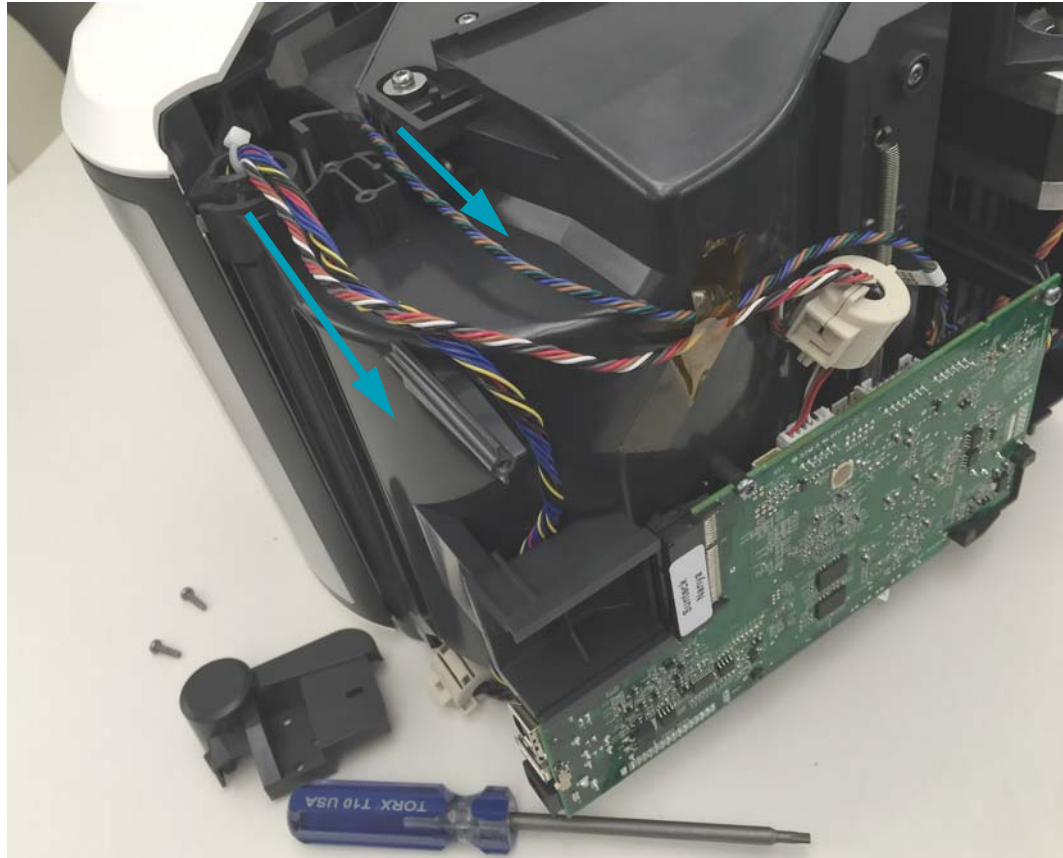


Removal

1. Open the printer (with bezel and printer base removed).
2. Remove the two (2) screws securing the hinge to the print mechanism (lower frame) using a Torx T10 driver.

Installation

1. Align the cables exiting the center of the inner frames hinge joint and pull them straight down towards the bottom of the printer.
2. Align the Cartridge (reader) sensor cable exiting the Ribbon Transport where it joins the print mechanism (lower inner frame) and put the cable straight down into the channel in the print mechanism (lower inner frame) towards the bottom of the printer.



3. Place the Hinge on the printer and verify that the cables are not pinched between the inner frames.
4. Secure the Hinge to the frame with the two (2) screws using a Torx T10 driver.

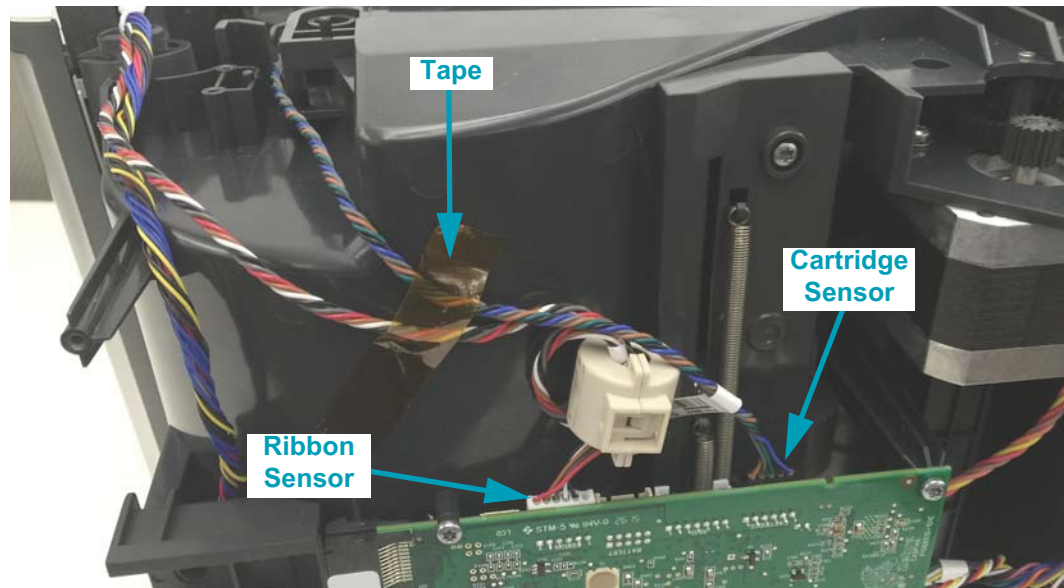
Replacing the Ribbon Transport

Repair Prerequisites

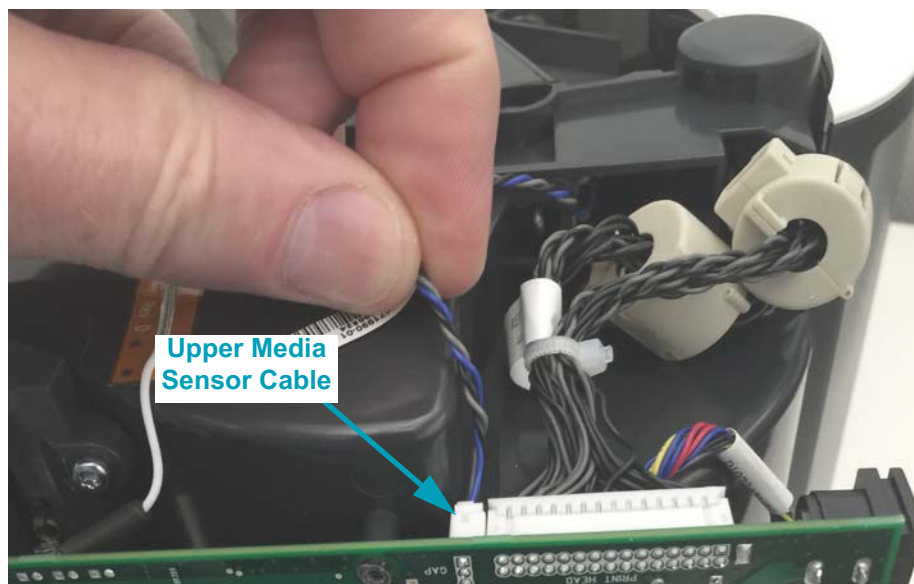
You must remove the [Front Bezel Option](#) (tear-off, dispenser, or cutter), [Printer Base](#), and [Hinge](#) before you can remove the Ribbon Transport. The [Main PCBA](#) can be removed to gain better access to cable connectors on the Main PCBA.

Removal

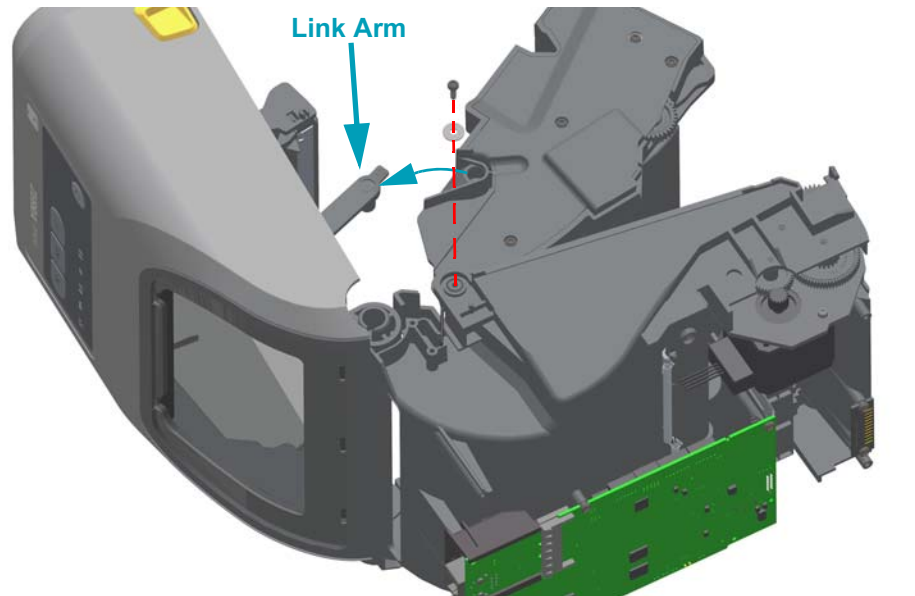
1. Disconnect the (Ribbon) Cartridge Sensor cable from the Main PCBA. Loosen the tape holding the Cartridge Sensor and Ribbon Sensor (with toroid clamp) cables to the bottom of the lower frame.



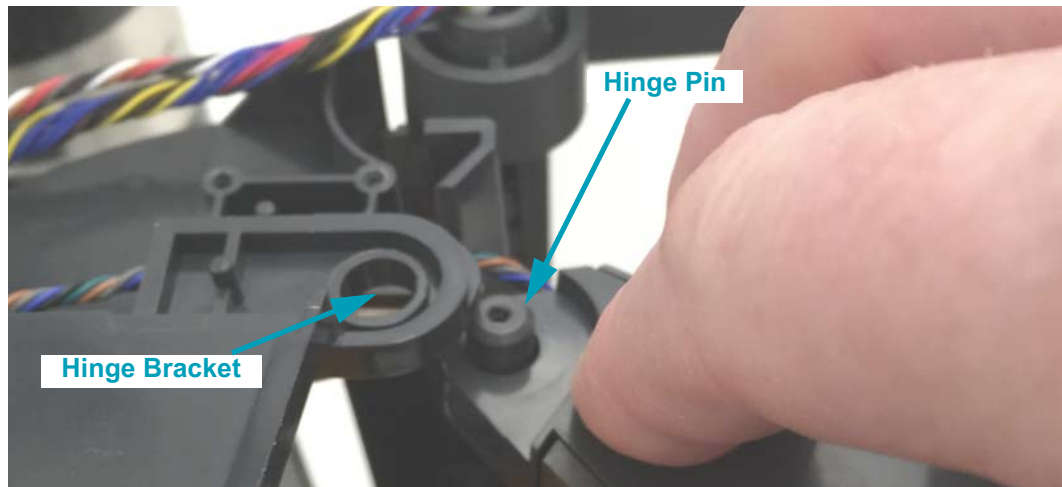
2. Disconnect the Upper (Gap/Web) Media Sensor cable from the Main PCBA.



3. Disconnect the two link arms that connect the Ribbon Transport to the top cover (and upper frame).



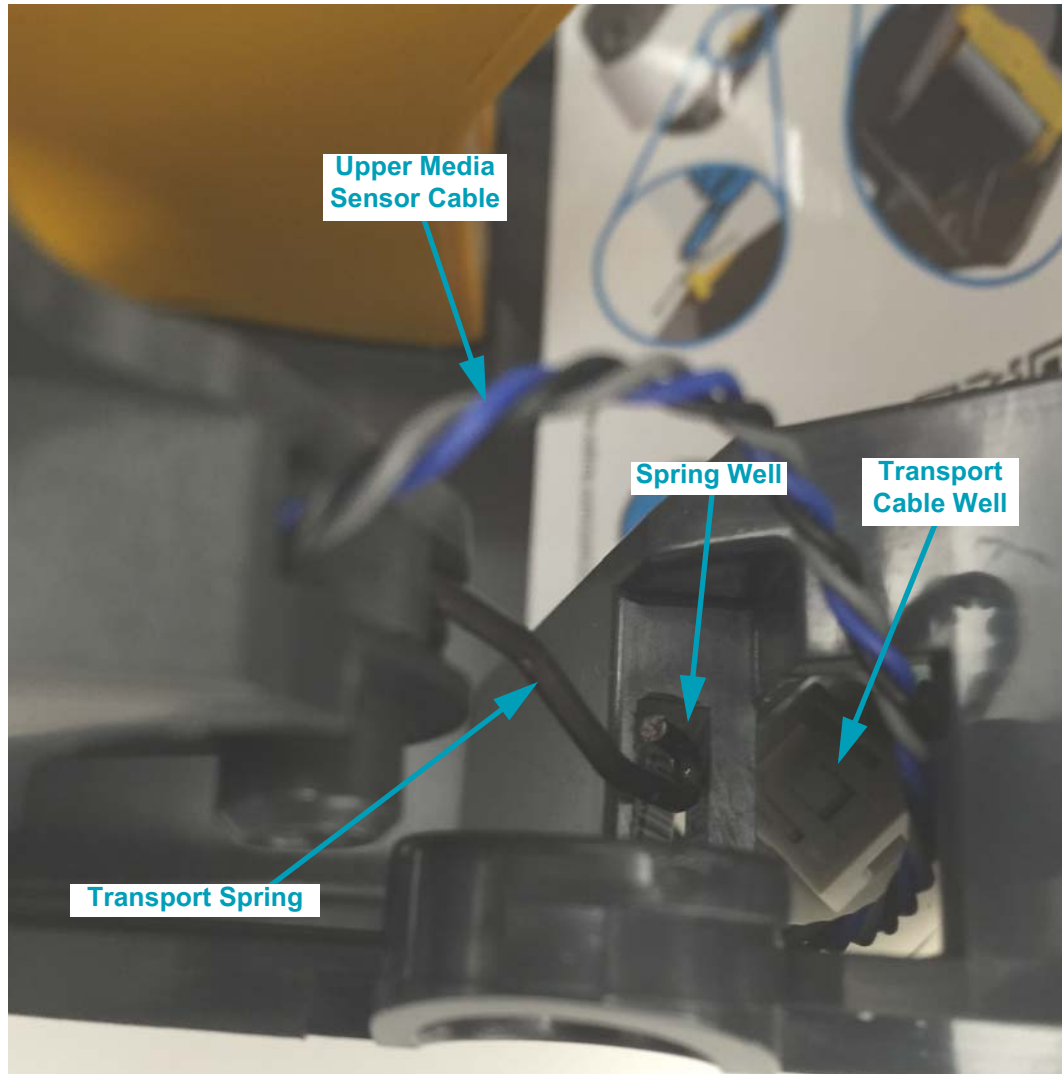
4. Remove the screw and washer on each side of the print mechanism at the Ribbon Transport's hinge using a Torx T10 driver.



5. Push the Ribbon Transport's hinge pin out of the hinge bracket molded into the print mechanism (lower frame) on the left side. The inner frame and transport both bend to allow you to get the pin out of the bracket.
6. Pull the Ribbon Transport up and out of the printer. Gently pull the Upper Media Sensor's cable (and connector) out of the well in the top of the lower frame.

Installation

1. Align the Ribbon Transport with the two (2) hinge springs with the two (2) hinge spring wells in the top of the lower inner frame. Lower the springs into the wells until the transports hinge pins and hinge brackets are close.

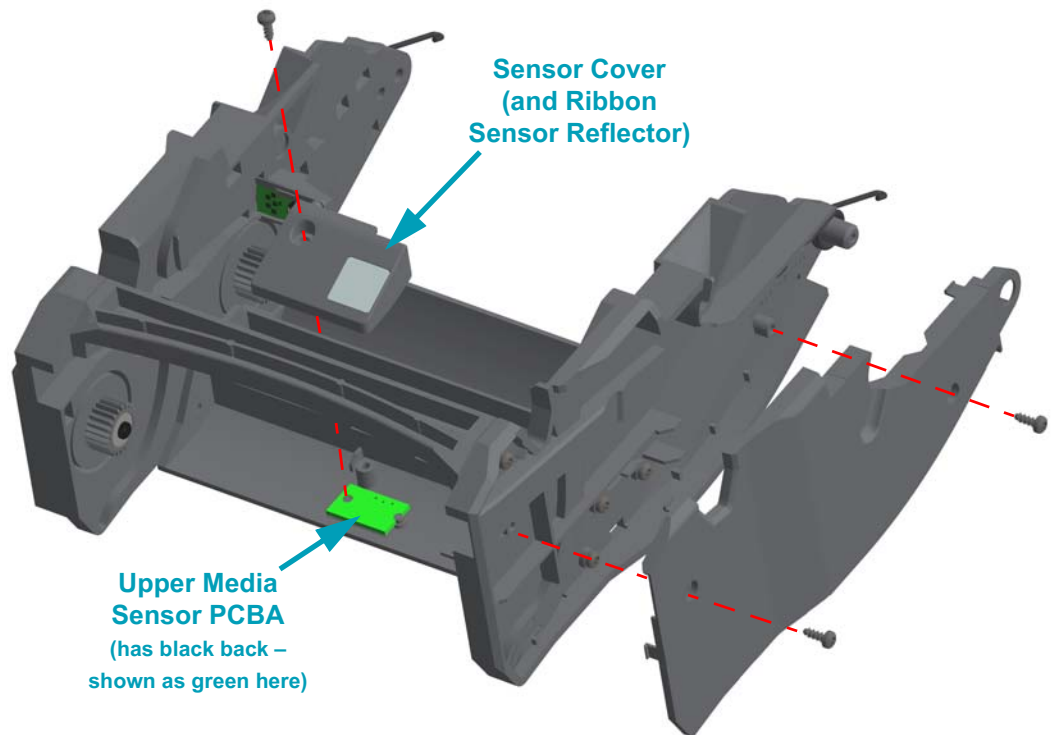


2. Push the right side transport hinge pin into the right side bracket on the inner frame. Repeat for the left side.
3. Insert the Upper Media Sensor cable (and connector) into the larger well on the top of the inner frame on the left side of the printer.
4. Plug the Cartridge Sensor and Upper Media Sensor cables into the Main PCBA.
5. Re-secure the Cartridge Sensor and Ribbon Sensor cables to the bottom of the print mechanism with tape.
6. Secure the Ribbon Transport hinge to the print mechanism with a screw and washer on each side of the printer with a Torx T10 driver.

Replacing the Upper Media (Gap/Web) Sensor

Repair Prerequisites

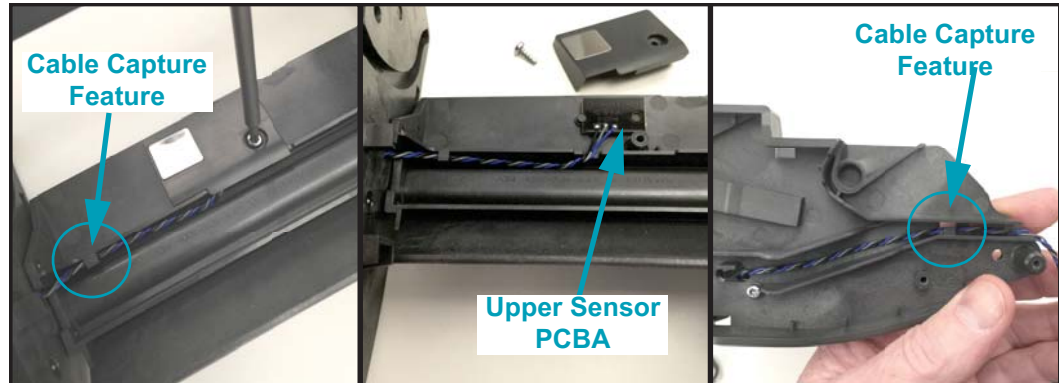
You must remove the [Front Bezel Option](#) (tear-off, dispenser, or cutter), [Printer Base, Hinge](#), and [Ribbon Transport](#) before you can remove the Upper Media Sensor. The [Main PCBA](#) can be removed to gain better access to cable connectors on the Main PCBA.



Removal

1. With the Ribbon Transport removed from the printer, remove the two (2) screws securing the lift side panel to the transport using a Torx T10 driver.
2. At the Ribbon Transport's hinge pin, lift the side panel off the transport. The side panel has snap to lock features that are holding the panel lightly in place. Continue lifting all the way around the side panel to release the latches and pull it away from the transport frame.

3. Remove the screw securing the Sensor Cover using a Torx T10 driver and remove the cover.



4. Locate the cable on side of the transport frame and pull it out. The cable channels include cable capture features to hold the cable in place during assembly. Pull the cable around them and then out of the transport's side frame through the inside of the transport's side frame.

Installation

1. Place the new Upper Media Sensor PCBA on the two (2) guide posts with the four (4) LEDs in the hole in the transport frame's cross member. The cable from the sensor PCBA exits toward the back of the transport (hinges in the back) and the cable sits in a notch in the cross member.



2. Place the Sensor Cover over the Upper Media Sensor PCBA and secure it and the PCBA to the frame with a screw using a Torx T10 driver. Verify that the cable is not pinched between the frame and the cover.

3. Put the cable's loose end with the connector through the left side transport's inside wall and route the cable through the channel and under the cable capture feature.
4. From the outside of the transport frame's left side, gently pull the cable tight and route it through the cable channel and out over the hinge pin. Push the cable in the channel and under the cable capture feature. Pull the cable gently tight again to remove any slack.
5. Align and press the left side transport frame's cover pack onto the transport. Secure it to the frame with two (2) screws using a Torx T10 driver.

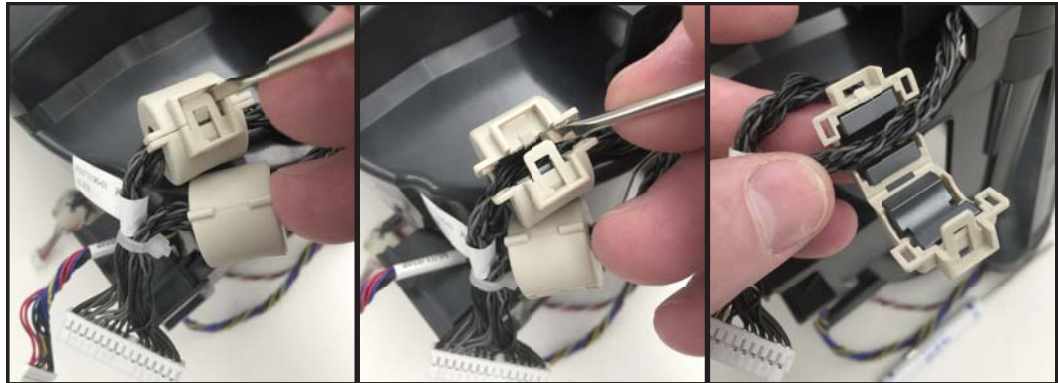
Replacing the Print Mechanism or Upper Inner Frame

Repair Prerequisites

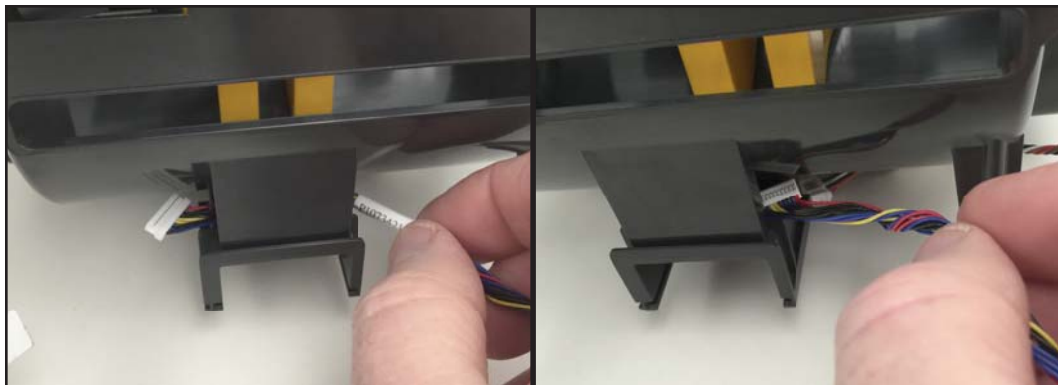
You must remove the [Front Bezel Option](#) (tear-off, dispenser, or cutter), [Printer Base](#), [Main PCBA](#), [Hinge](#), and [Ribbon Transport](#) before you can remove the Print Mechanism or Upper Inner Frame.

Removal

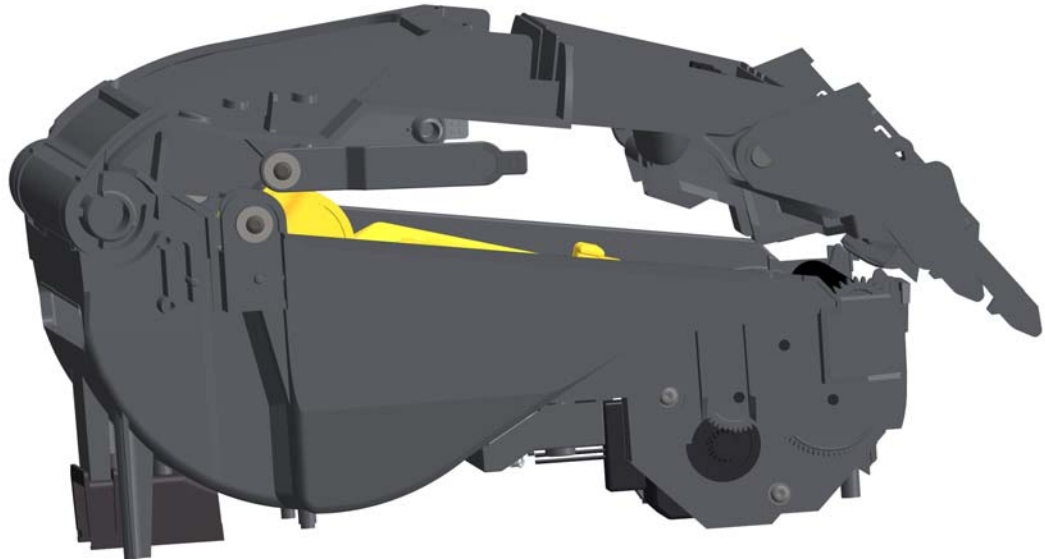
1. Remove the two (2) toroid clamps from the printhead cables exiting the right side cover hinge. Use a small flat bladed screw driver to gently pry the clamp's lock open.



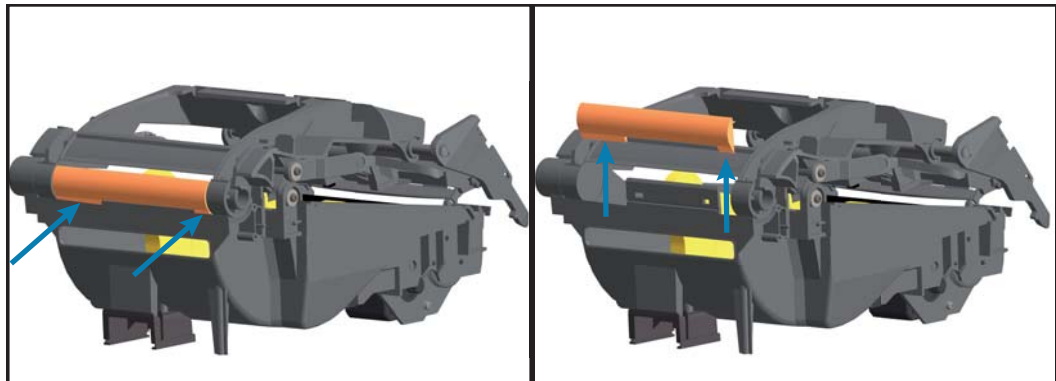
2. Pull the Control Panel (User Interface) cable (and connector) out of the Connectivity Module's mounting bracket. Turn the connector body parallel to the cable and remove. Do not remove the bracket.



3. Close the upper frame with the printhead (on the actuator arm) and latch (arms) pointing towards the front of the printer.



4. Use the small flat bladed screwdriver to gently pry the left side of the rear hinge cover up from the print mechanism. Repeat for the right side and lift the hinge cover up and away from the printer.

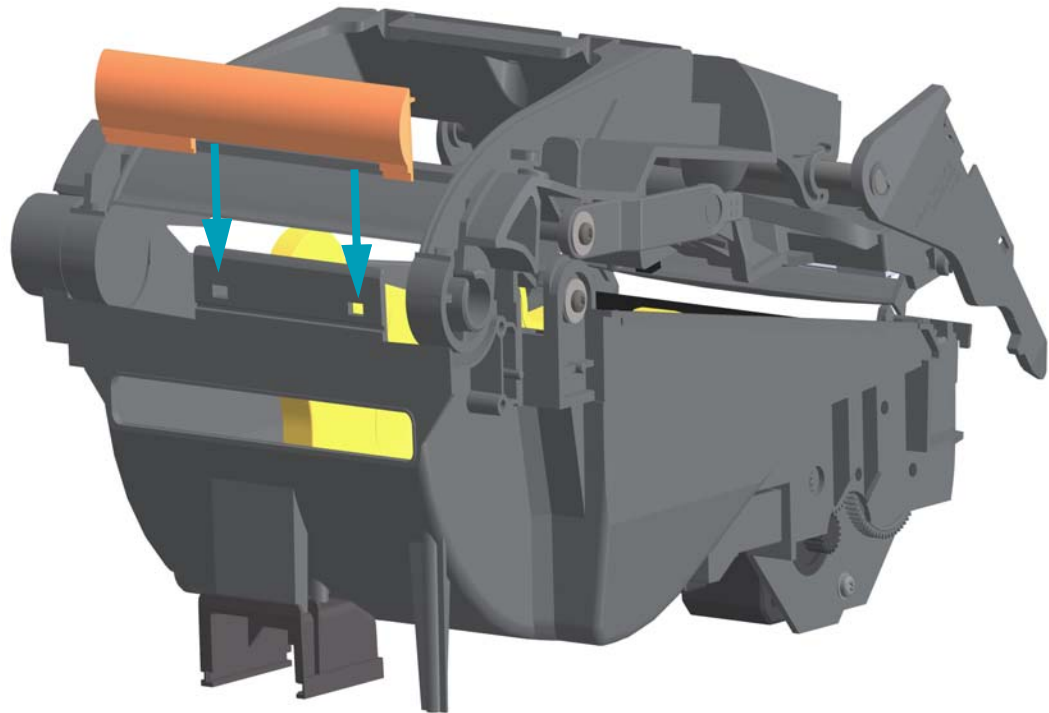


5. Lift the upper frame assembly out of the right hinge on the print mechanism.
6. Pull the printhead cables and connector out of the right hinge (and out of the print mechanism too).



Installation

1. Insert the printhead cable and connector into the right hinge in the print mechanism.
2. Put the upper frame's right side hinge into the print mechanism's mating right side hinge while pulling the printhead cable through the hinge joint.
3. Close the upper frame with the printhead and latch arms pointing towards the front of the printer.
4. Slide the rear hinge cover down onto the upper part of the rear panel on the print mechanism. This will lock the right hinge in place.



5. Push the Control Panel (User Interface) cable and connector through the Connectivity Module's mounting bracket and lower frame. Turn the connector body parallel to the cable to push it through the bracket. Do not remove the bracket.

Cable Routing

Main Printed Circuit Board Assembly

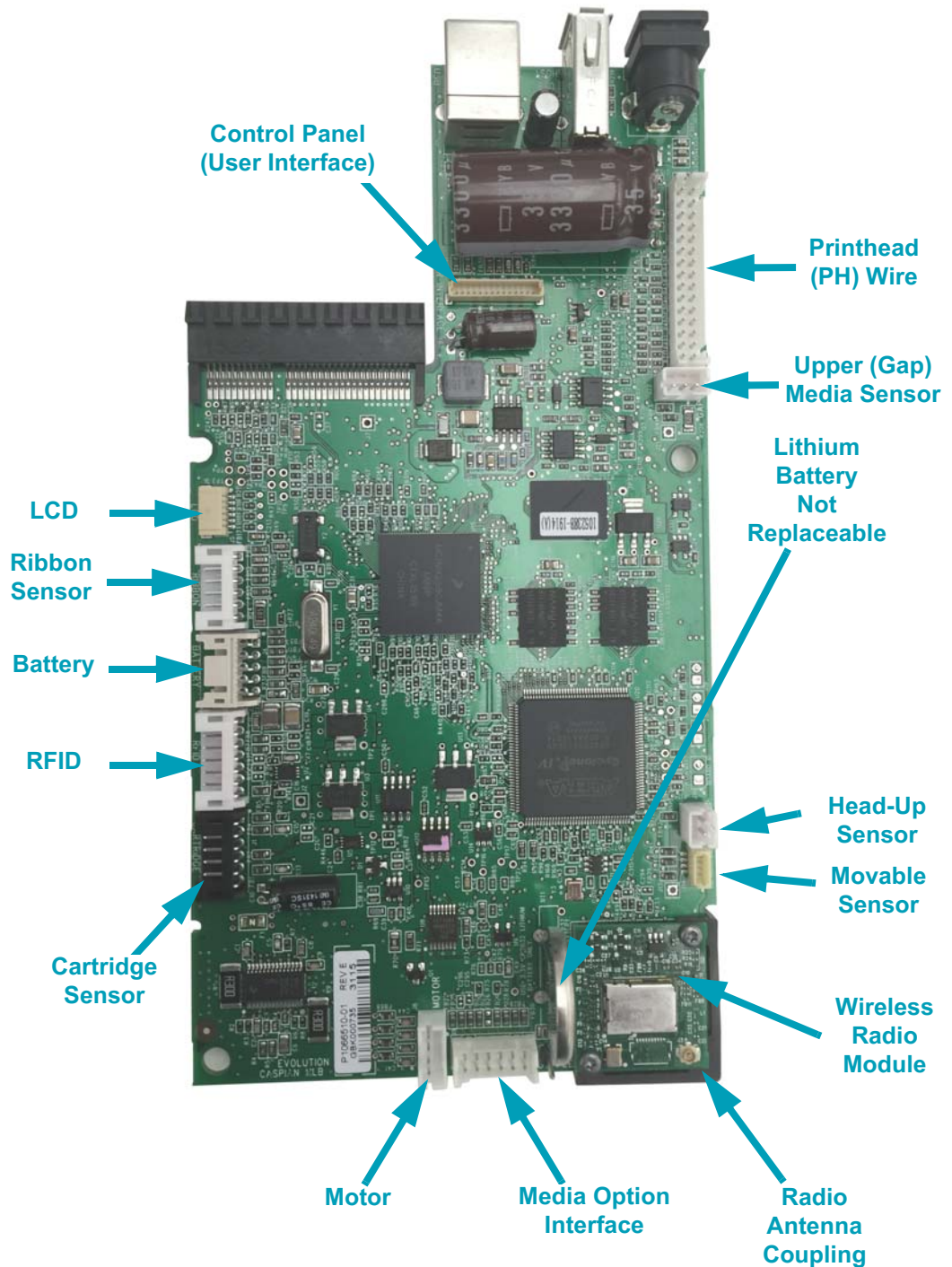
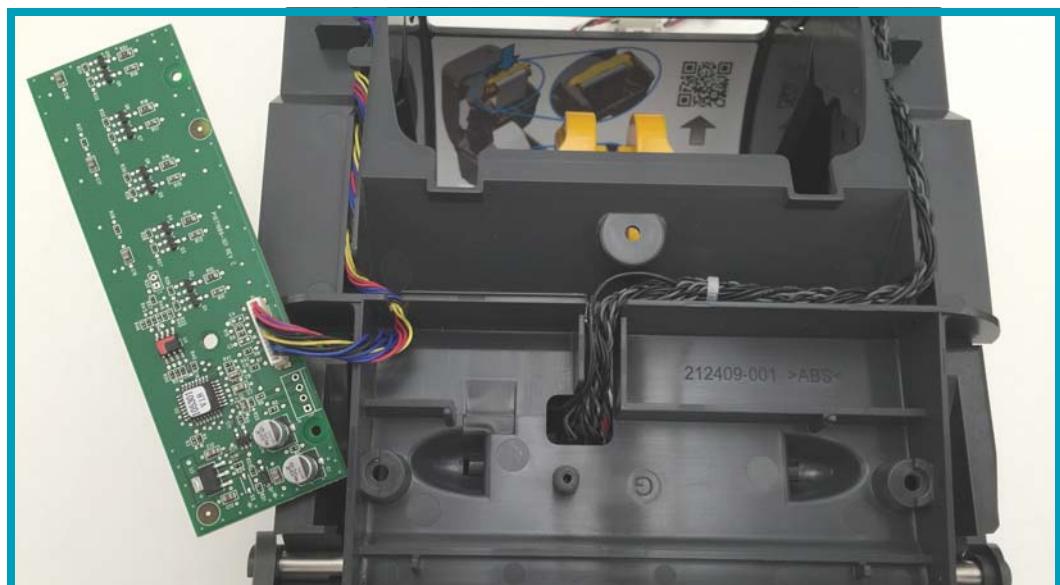
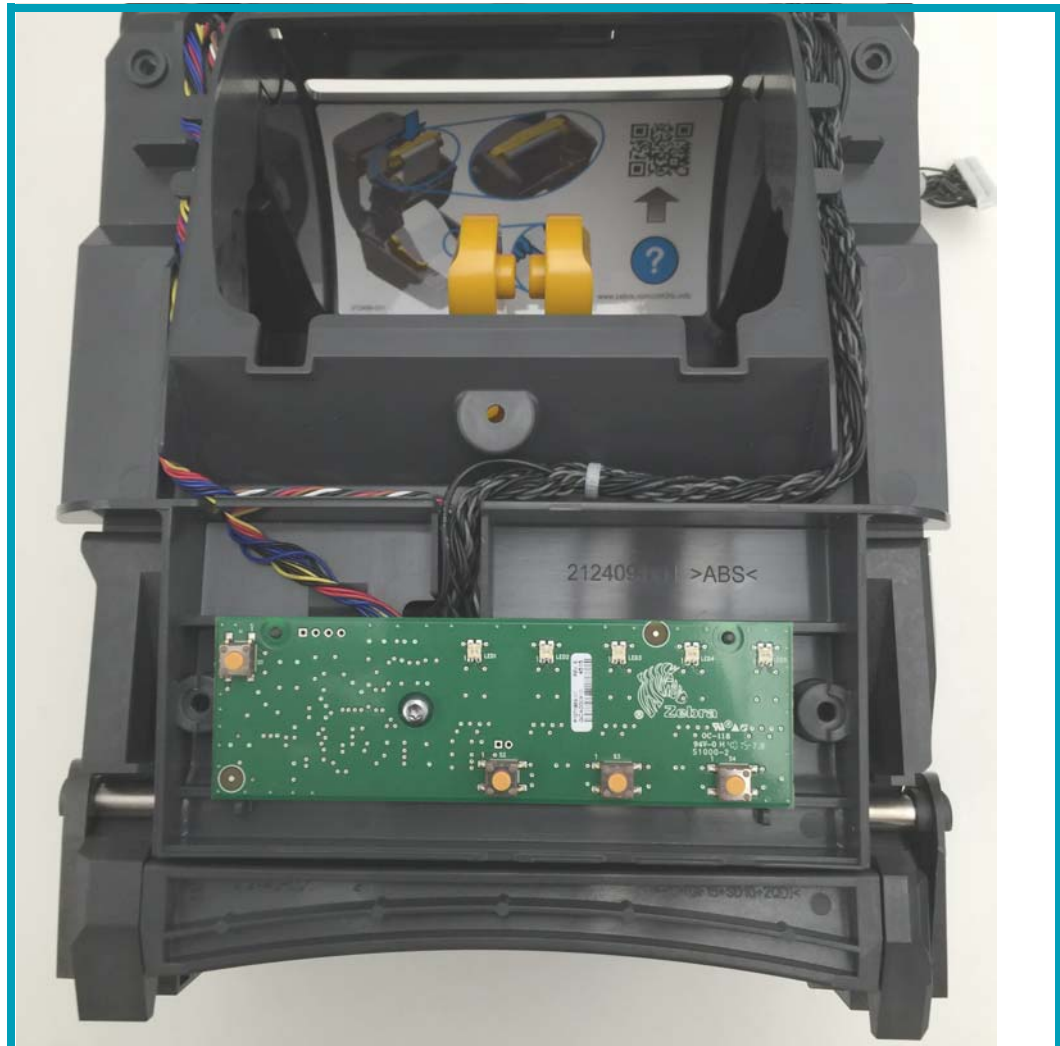
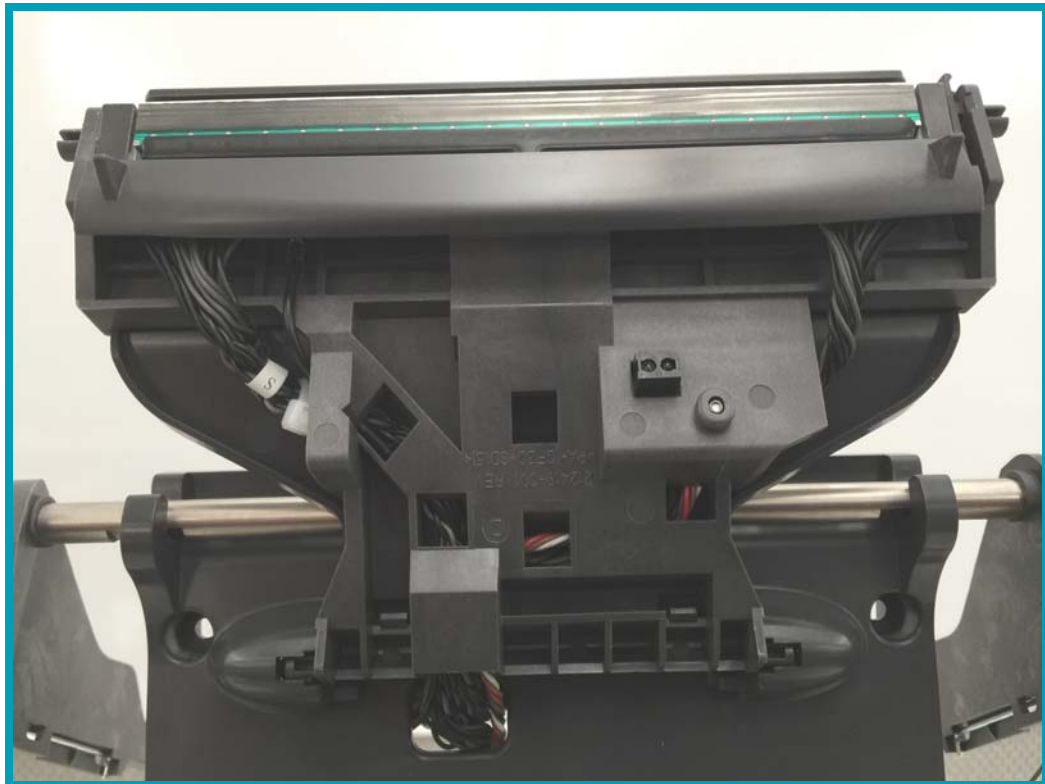
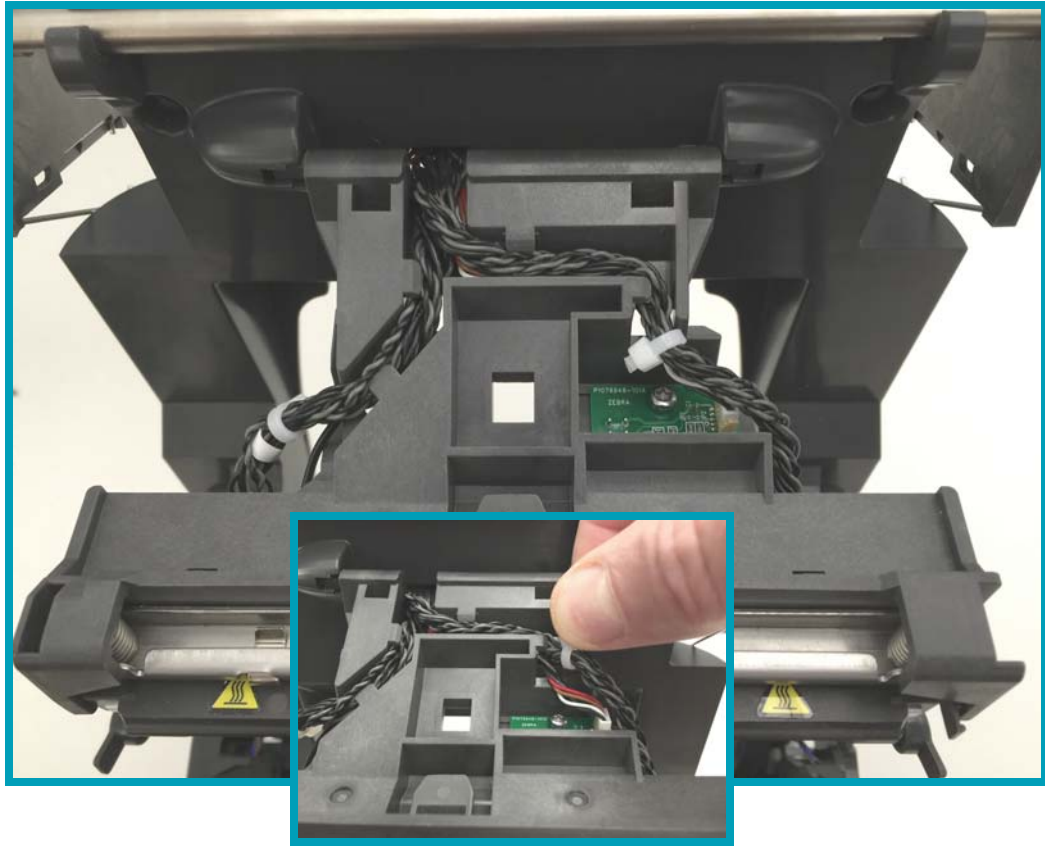
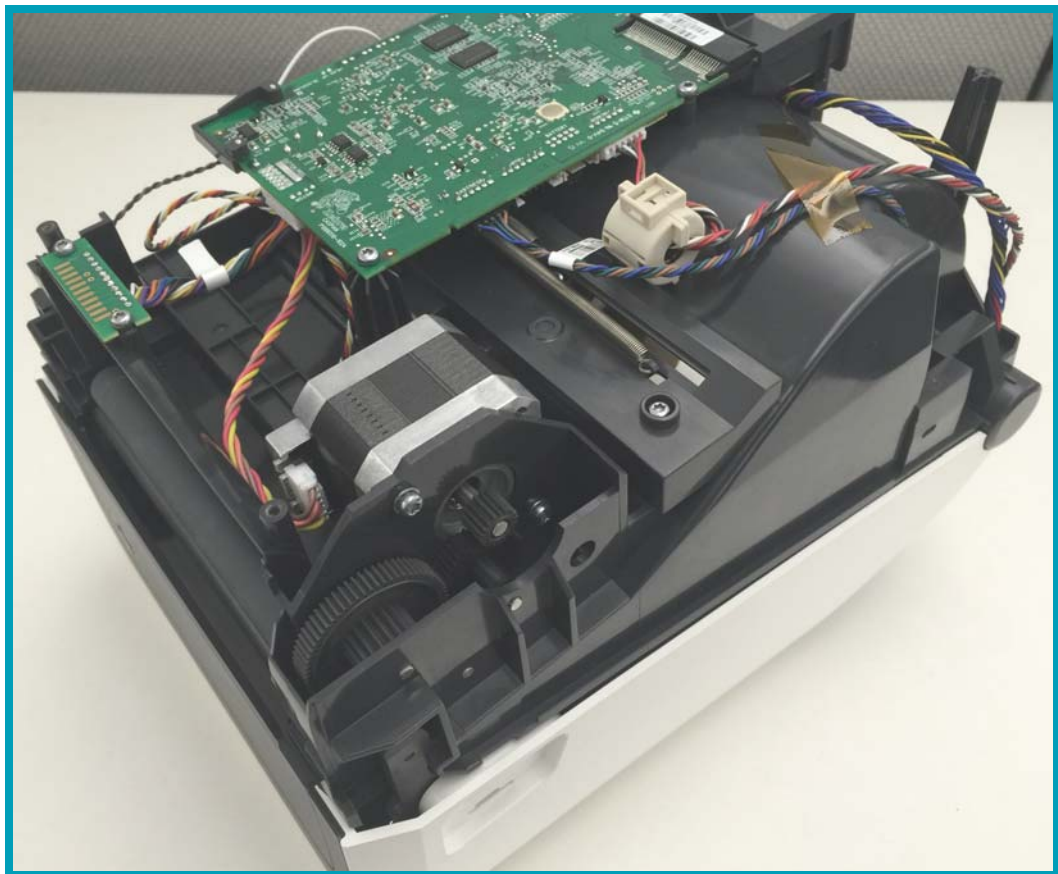
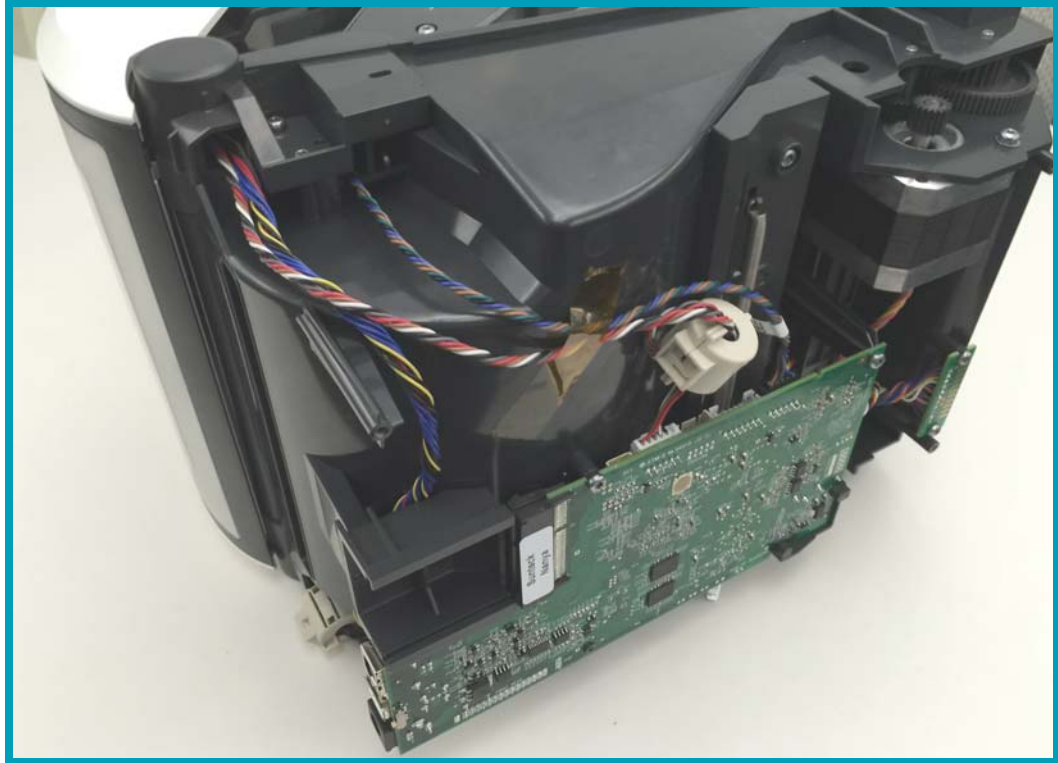


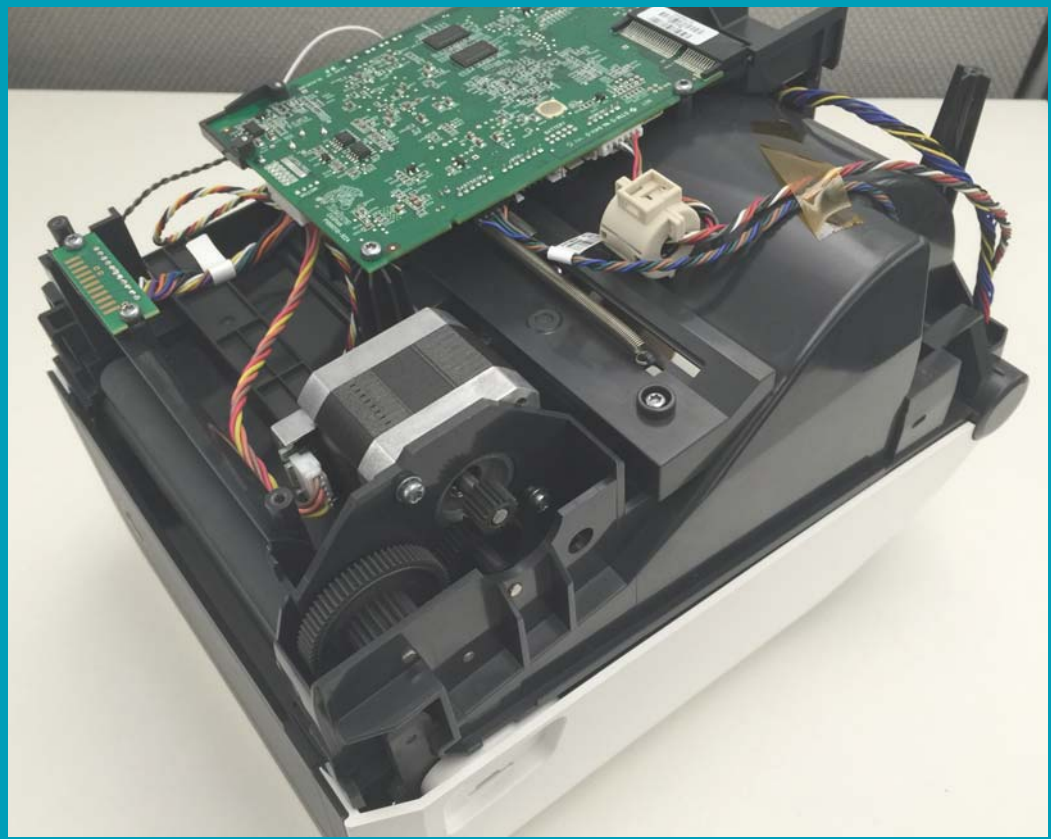
Figure 9 • Connectors on the Main Logic Board PCBA

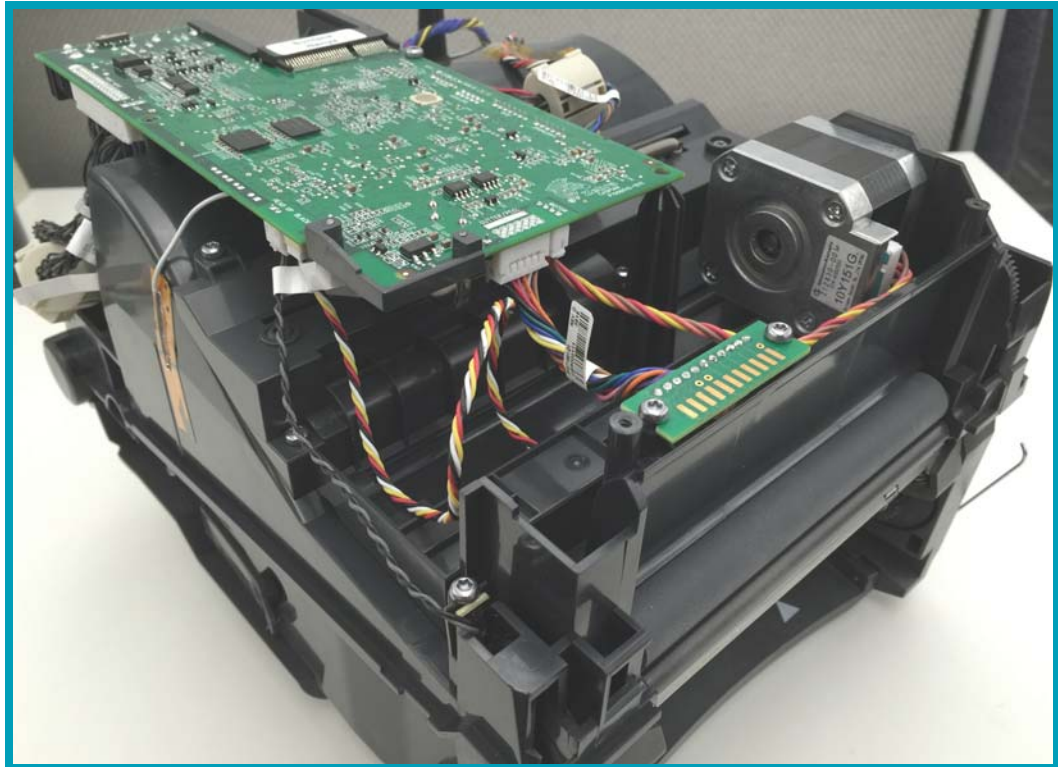
Cable Routing

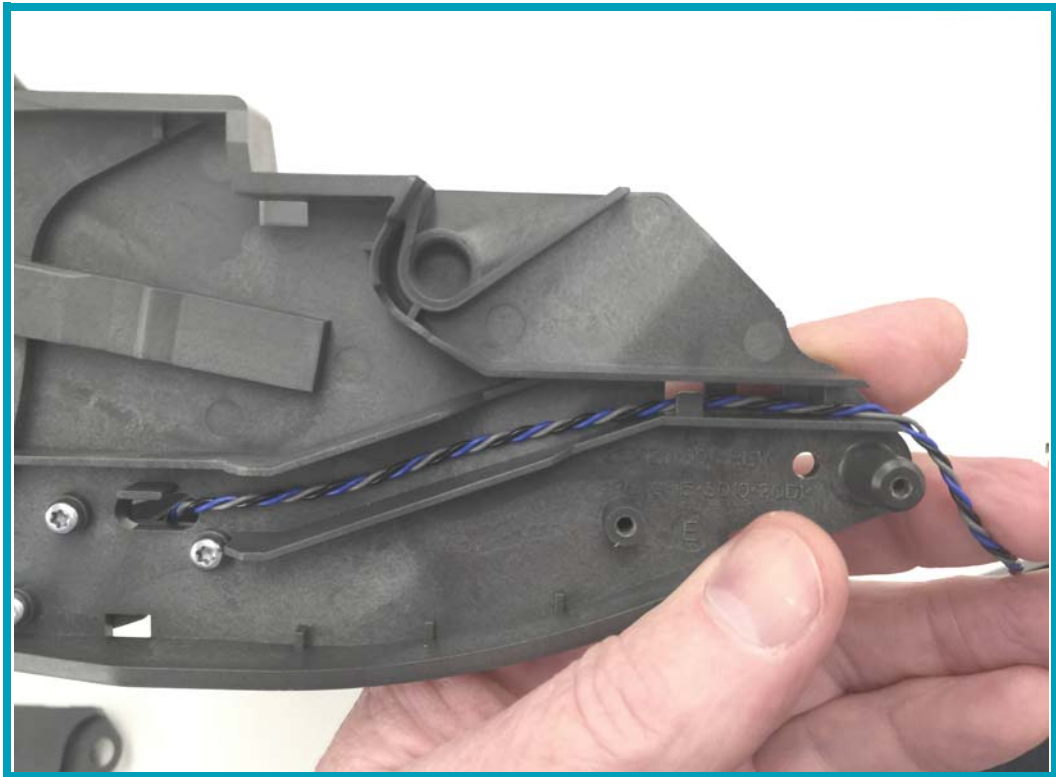












A

Appendix: Media

This section provides a simple media overview for your printer.

Types of Thermal Media



Important • Zebra strongly recommends the use of Zebra-brand supplies in order to ensure consistent 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.

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:

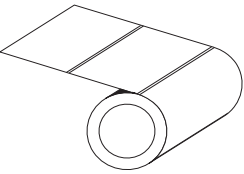
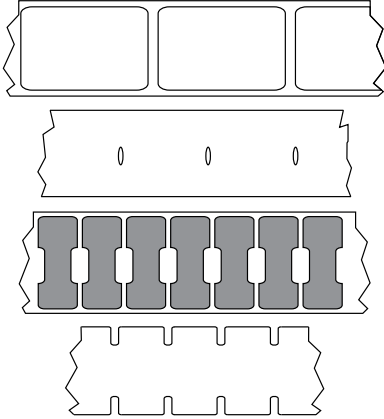
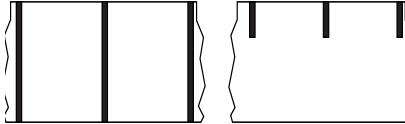
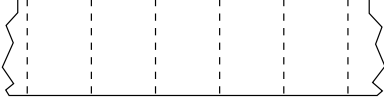
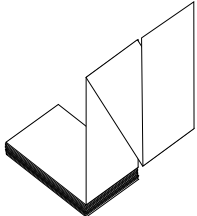
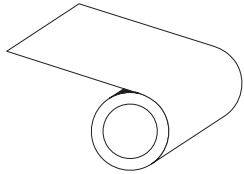
1. Scratch the print surface of the media with a finger nail or pen cap. Press firmly and quickly while dragging it across the media surface. Direct thermal media is chemically treated to print (expose) when heat is applied. This test method uses friction heat to expose the media.
2. Did a black mark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

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

General Media and Print Specifications

- Media thickness:
 - 0.08mm (0.003 inch) min – all requirements
 - 0.1905mm (0.0075 inch) max – all requirements
- Media width:
 - 60mm (2.36 inch) max
 - 15mm (0.585 inch) min
- Media length:
 - 990mm (39 inch) max
 - 6.35mm (0.25 inch) min – Tear Off or Label
 - 12.7mm(0.50 inch) min – Peel
 - 25.4mm (1.0 inch) min – Cutter
- Media Roll Outer Diameter (O.D.) max: 127mm
- Media Roll Core Inner Diameter (I.D.):
 - 12.7mm (0.5 inch) I.D. – Standard roll configuration
 - 25.4mm (1 inch) I.D. – Standard roll configuration
 - 38.1mm (1.5 inches) I.D. – with optional media roll adapter
 - 50.8mm (2.0 inches) I.D. – with optional media roll adapter
 - 76.2mm (3.0 inches) I.D. – with optional media roll adapter
- Print width:
 - 1 dot (ZPL) min.
 - 56mm (2.20 inches) max @ 203 dpi
 - 54mm (2.12 inches) max @ 300 dpi
- Dot pitch:
 - 203 dpi: 0.125mm (0.0049 inch)
 - 300 dpi: 0.085mm (0.0033 inch)
- Barcode modulus x-dim:
 - 203 dpi: 0.005–0.050 inch
 - 300 dpi: 0.00327–0.03267 inch
- ZD420 Ribbon Cartridges
 - Ribbon Length – 74 m (243 feet)
 - Ribbon Widths – 110 mm (4.33 in.)
 - Colors available in Black – Wax, Wax Resin, and Resin transfer materials

Table 1 • Types of Media Roll and Fanfold Media

Media Type	How It Looks	Description
<p>Non-Continuous Roll Media</p>		<p>Labels have adhesive backing that sticks them to a liner. Tags (or tickets) are separated by perforations.</p> <p>Individual labels or tags are tracked and position controlled by one or more of the following methods:</p> <ul style="list-style-type: none"> <p>Web media separates labels by gaps, holes, or notches.</p>  <p>Black mark media uses pre-printed black marks on the back side of the media to indicate label separations.</p>  <p>Perforated media has perforations that allow the labels or tags to be separated from each other easily in addition to position control marks, notches or label gaps.</p> 
<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>This type of media uses black marks or notches to track media format positioning.</p>
<p>Continuous Roll Media</p>		<p>Continuous roll media does not have gaps or typically holes, notches, or black marks either 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>

Appendix: ZPL Configuration

This section provides an overview of managing printer configuration, the Configuring Status Printout, and Printer Memory Printouts.

Managing the ZPL Printer Configuration

The ZPL printer is designed to allow you to change printer settings dynamically for fast first label out printing. Printer settings can be saved. These settings will remain in effect until changed by commands, a printer reset, a power cycle, or restoring factory default parameters. The ZPL Configuration Update command (^JUS) saves and restores printer configurations to pre-configured settings.

- To keep settings after a power cycle or printer reset, a ^JUS can be sent to the printer to save all current persistent settings.
- The values are recalled with a ^JUR command to restore the last saved values to the printer.

ZPL stores all parameters at once with a single command mentioned above. The legacy EPL programming language (supported by this printer) changes and saves individual commands immediately. Most printer settings are shared between ZPL and EPL. For example, changing the speed setting with EPL will also change the speed set for ZPL operations. The changed EPL setting will persist even after a power cycle or reset issued by either printer language.

A printer Configuration Report is available to assist the developer. The Configuration Report lists operating parameters, sensor settings, and printer status. It can be accessed by using the procedure in [Test Printing with the Configuration Report on page 41](#). The Zebra Setup Utility and the ZebraDesigner™ Windows driver also print this report and other printer reports to help you manage your printer.

ZPL Printer Configuration Format

Managing more than one printer can be done by creating a printer configuration programming file to send to one or more printers or ZebraNet™ Bridge can be used to clone a printer's setup. Figure 1 below shows the basic structure of a ZPL programming configuration file.

See the ZPL programmer's guide and the [Configuration Setting to Command Cross-reference on page 119](#) to create a programming file. The Zebra Setup Utility (ZSU) can be used to send programming files to the printer. Windows Notepad (text editor) can be used to create programming files.

Figure 1 • Configuration Parameter Format Structure

^XA — Start Format Command

Format Commands are order sensitive

- a) General Print and command settings
- b) Media handling and behaviors
- c) Media print size

^JUS command to save

^XZ — End Format Command

Configuration Setting to Command Cross-reference

The Printer Configuration Report, shown below, provides a listing of a majority of the configurations settings that can be set by ZPL command.

Figure 2 • Configuration Report Printout

PRINTER CONFIGURATION	
Zebra Technologies ZTC ZD420-203dpi ZPL 50J154800145	
+10.0.....	DARKNESS
HIGH.....	DARKNESS SWITCH
6.0 IPS.....	PRINT SPEED
+000.....	TEAR OFF
TEAR OFF.....	PRINT MODE
GAP/NOTCH.....	MEDIA TYPE
TRANSMISSIVE.....	SENSOR SELECT
THERMAL-TRANS.....	PRINT METHOD
832.....	PRINT WIDTH
1224.....	LABEL LENGTH
39.0IN 988MM.....	MAXIMUM LENGTH
MAINT. OFF.....	EARLY WARNING
NOT CONNECTED.....	USB COMM.
AUTO.....	SER COMM. MODE
9600.....	BAUD
8 BITS.....	DATA BITS
NONE.....	PARITY
XON/XOFF.....	HOST HANDSHAKE
NONE.....	PROTOCOL
NORMAL MODE.....	COMMUNICATIONS
<~> 7EH.....	CONTROL PREFIX
<^> 5EH.....	FORMAT PREFIX
<, > 2CH.....	DELIMITER CHAR
ZPL II.....	ZPL MODE
INACTIVE.....	COMMAND OVERRIDE
NO MOTION.....	MEDIA POWER UP
FEED.....	HEAD CLOSE
DEFAULT.....	BACKFEED
+000.....	LABEL TOP
+0000.....	LEFT POSITION
10.....	RIBBON LOW MODE
DISABLED.....	REPRINT MODE
041.....	WEB SENSOR
096.....	MEDIA SENSOR
075.....	RIBBON SENSOR
128.....	TAKE LABEL
069.....	MARK SENSOR
004.....	MARK MED SENSOR
048.....	TRANS GAIN
028.....	TRANS LED
040.....	RIBBON GAIN
076.....	MARK GAIN
070.....	MARK LED
DPCSWFXM.....	MODES ENABLED
.....	MODES DISABLED
832 8/MM FULL.....	RESOLUTION
3.2.....	LINK-OS VERSION
V77.19.152P31840 <-	FIRMWARE
1.3.....	XML SCHEMA
6.5.0 0.517.....	HARDWARE ID
8192k.....R:	RAM
65536k.....E:	ONBOARD FLASH
NONE.....	FORMAT CONVERT
ENABLED.....	IDLE DISPLAY
01/08/16.....	RTC DATE
19:43.....	RTC TIME
DISABLED.....	ZBI
2.1.....	ZBI VERSION
READY.....	ZBI STATUS
28 LABELS.....	NONRESET CNTR
28 LABELS.....	RESET CNTR1
28 LABELS.....	RESET CNTR2
137 IN.....	NONRESET CNTR
137 IN.....	RESET CNTR1
137 IN.....	RESET CNTR2
347 CM.....	NONRESET CNTR
347 CM.....	RESET CNTR1
347 CM.....	RESET CNTR2
EMPTY.....	SLOT 1
0.....	MASS STORAGE COUNT
0.....	HID COUNT
OFF.....	USB HOST LOCK OUT
FIRMWARE IN THIS PRINTER IS COPYRIGHTED	

Sensor Settings
used for
Service Purposes

Table 1 • ZPL Commands and Configuration Report Callout Cross-Reference

Command	Listing Name	Description
~SD	DARKNESS	Default: 10.0
–	DARKNESS SWITCH	LOW (Default), MEDIUM, or HIGH
^PR	PRINT SPEED	Default: 152.4 mm/s / 6 IPS (max.) – 203 dpi 101.6 mm/s / 4 IPS (max.) – 300 dpi
~TA	TEAR OFF	Default: +000
^MN	MEDIA TYPE	Default: GAP/NOTCH
	SENSOR SELECT	Default: AUTO (^MNA - Auto-Detect)
^MT	PRINT METHOD	THERMAL-TRANS or DIRECT-THERMAL
^PW	PRINT WIDTH	Default: 448 (dots for 203 dpi) or 640(dots for 300 dpi)
^LL	LABEL LENGTH	Default: 1225 (dots) (dynamically updated while printing)
^ML	MAXIMUM LENGTH	Default: 39.0IN 989MM
–	USB COMM.	Connection Status: Connected / Not Connected
^SCa	BAUD	Default: 9600
^SC,b	DATA BITS	Default: 8 BITS
^SC,,c	PARITY	Default: NONE
^SC,,,,e	HOST HANDSHAKE	Default: AUTO
^SC,,,,,f	PROTOCOL	Default: NONE
– SGD –**	COMMUNICATIONS	Default: NORMAL MODE
	SER COMM. MODE	Default: AUTO
^CT / ~CT	CONTROL CHAR	Default: <~> 7EH
^CC / ~CC	COMMAND CHAR	Default: <^> 5EH
^CD / ~CD	DELIM./CHAR	Default: <, > 2CH
^SZ	ZPL MODE	Default: ZPL II
????	COMMAND OVERRIDE	Default: INACTIVE
^MFA	MEDIA POWER UP	Default: NO MOTION
^MF,b	HEAD CLOSE	Default: FEED
~JS	BACKFEED	Default: DEFAULT
^LT	LABEL TOP	Default: +000
^LS	LEFT POSITION	Default: +0000
~JD / ~JE	HEXDUMP	Default: NO (~JE)
	REPRINT MODE	Default: DISABLED

From this point in the Configuration Receipt listing, the printout has sensor settings and values displayed to troubleshoot sensor and media operations. These are typically used by Zebra Tech Support to diagnose printer problems.

** - Not supported with a ZPL command, uses the Set Get Do command in the ZPL manual. See `device.command_override.xxxxx`.

The configuration settings listed here resume after the **TAKE LABEL** sensor value. These listings contain printer features seldom changed from default or provide status information (e.g. Firmware Version).

Table 2 • ZPL Commands and Configuration Receipt Callout Cross-Reference

Command	Listing Name	Description
^MP	MODES ENABLED	Default: CWF (See ^MP Command)
	MODES DISABLED	Default: (nothing set)
^JM	RESOLUTION	Default: 448 8/mm FULL (203 dpi) 640 8/mm FULL (300 dpi)
–	FIRMWARE	Lists ZPL Firmware Version
–	XML SCHEMA	1.3
–	HARDWARE ID	Lists Firmware Boot-block Version
	LINK-OS VERSION	
–	CONFIGURATION	CUSTOMIZED (after first use)
–	RAM	2104k..... R:
–	ONBOARD FLASH	6144k.....E:
^MU	FORMAT CONVERT	NONE
	RTC DATE	Date Displayed
	RTC TIME	Time Displayed
^JI / ~JI	ZBI	DISABLED (Requires key to enable)
	ZBI VERSION	2.1 (Displayed if installed)
	ZBI STATUS	READY
^JH ^MA ~RO	LAST CLEANED	X,XXX IN
	HEAD USAGE	X,XXX IN
	TOTAL USAGE	X,XXX IN
	RESET CNTR1	X,XXX IN
	RESET CNTR2	X,XXX IN
	NONRESET CNTR0 (1, 2)	X,XXX IN
	RESET CNTR1	X,XXX IN
	RESET CNTR2	X,XXX IN
	SLOT1	EMPTY / SERIAL / WIRED
	MASS STORAGE COUNT	0
	HID COUNT	0
	USB HOST LOCK OUT	OFF / ON
–	SERIAL NUMBER	XXXXXXXXXXXX
^JH	EARLY WARNING	MAINT. OFF

The printer has the ability to set a command or a group of commands once for all receipts (or labels) that follow. Those settings will remain in effect until they are changed by subsequent commands, the printer is reset, or you restore factory defaults.

Printer Memory Management and Related Status Reports

To help you manage printer resources, the printer supports a variety of format commands to manage memory, transfer objects (between memory areas, import and export), object naming, and provide various printer operating status reports. They are very similar to the old DOS commands like DIR (directory listing) and DEL (delete file). The most common reports are also part of the Zebra Setup Utility and ZebraDesigner™ Windows driver.

Figure 3 • Memory Management Format Structure

^XA — Start Format Command

A Single Format Command is recommended
for purposes of reuse

^XZ — End Format Command

It is recommended that a single command be processed within this type of format (form). A single command is easily reused as a maintenance and development tool.

Many of the commands that transfer objects, manage and report on memory are control (~) commands. They do not need to be within a format (form). They will be processed immediately upon receipt by the printer whether in a format (form) or not. ZPL Programming for Memory Management

ZPL has various printer memory locations that are used to run the printer, assemble the print image, store formats (forms), graphics, fonts and configuration settings.

- ZPL treats Formats (Forms), Fonts, and Graphics like files; and memory locations like disk drives in the DOS operating system environment:
 - Memory Object Naming: Up to sixteen (16) alphanumeric characters followed by a three (3) alphanumeric character file extension:
i.e. 123456789ABCDEF.TTF
Legacy ZPL printers with V60.13 firmware and earlier can only use the 8.3 file name format versus today's 16.3 file name format.
- Allows moving objects between memory locations and deleting objects.
- Supports DOS directory style file list reports as printouts or status to the host.
- Allows use of 'wild cards' (*) in file access

Table 3 • Object Management and Status Report Commands

Command	Name	Description
^WD	Print Directory Label	Prints a list of objects and resident barcodes and fonts in all addressable memory locations
~WC	Print Configuration Label	Prints a configuration Status Receipt (Label) Same as Feed Button mode one flash routine
^ID	Object Delete	Deletes objects from printer memory
^TO	Transfer Object	Used to copy an object or group of objects from one memory area to another.
^CM	Change Memory Letter Designation	Reassigns a letter designation to a printer memory area.
^JB	Initialize Flash memory	Similar to formatting a disk – erases all objects from the specified memory locations B: or E:.
~JB	Reset Optional Memory	Similar to formatting a disk – erases all objects from the B: memory (factory option).
~DY	Download Objects	Downloads and installs wide variety of printer usable programming objects: fonts (OpenType and TrueType), graphics, and other object data types. Recommendation: Use ZebraNet™ Bridge for downloading graphics and fonts in the printer.
~DG	Download Graphic	Downloads an ASCII Hex representation of a graphic image. This is used by ZebraDesigner™ (label creation application) for graphics.
^FL	Font Linking	Appends secondary TrueType font or fonts to the primary TrueType font to add glyphs (characters).
^LF	List Font Links	Prints a list of the linked fonts
^CW	Font Identifier	Assigns a single alphanumeric character as an alias to a font stored in memory.



Important • Some factory installed ZPL fonts in your printer cannot be copied, cloned or restored to your printer by reloading or updating firmware. If these license restricted ZPL fonts are removed by an explicit ZPL object delete command, they must be repurchased and reinstalled via a font activation and installation utility. EPL fonts do not have this restriction.