Zebra®
P110*i*™/ P110*m* / P120*i*™
Card Printers

Service Manual

980584-001 Rev. A

Card
Printer
Solutions

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1 General Description

1.1 Description

This manual contains service information for Zebra P110*i*, P110*m*, and P120*i* Plastic Card Printers, manufactured by Zebra Technologies Corporation, Camarillo, California.

The only difference between these models is as follows:

- The P110*i* supports single-sided, full-color or monochrome printing.
- The P110*m* supports single-sided, monochrome printing only.
- The P120*i* supports single- or dual-sided, full-color or monochrome printing.

In this manual, references that are specific to a particular model will be identified as such; references that apply to all three models will use the term “the printer.”

The printers provides full color dye sublimation or monochrome thermal transfer printing on standard 2.125 inch by 3.375 inch (54 mm by 86 mm), PVC or PVC Composite plastic cards.

The integrated card feeder and flipper (P120*i* only) minimizes printer size while maximizing performance.

Load-N-Go™ ribbon cartridges are used with an integrated card cleaning roller for easy ribbon changing or replacement.

A variety of options (some of which can be factory-installed or field-installed as upgrades) are available, making the printers configurable for varied application environments:

- Magnetic stripe encoder option
- CardSense™ single-card feed option
- USB or USB and Ethernet interface option

Its auto-switching 100 ~ 240 Volts AC, 50 ~ 60 Hz external power supply uses interchangeable power cords for maximum flexibility.

1.2 Features, Controls, and Indicators

The picture below points out some of the printer's external features. (See Chapter 3 for an interior view.

Covered Card Feeder

Opening the Card Feeder Cover gives access to the automatic card feeder. The translucent cover allows you to see when the card supply is running low.

Lid Release Button

Pressing the Lid Release Button allows the printer's lid to swing open. This gives internal access for changing the Ribbon Cartridge, changing Cleaning Rollers, and cleaning the printer.

LCD Display Panel

The LCD Display Panel displays printer status information. Messages also alert the user of the need for action, and indicate certain fault conditions.

Multi-Function Control Button

The Multi-Function Control Button initiates several functions; these are described in the appropriate sections of this document.

Card Entry / Exit Slot

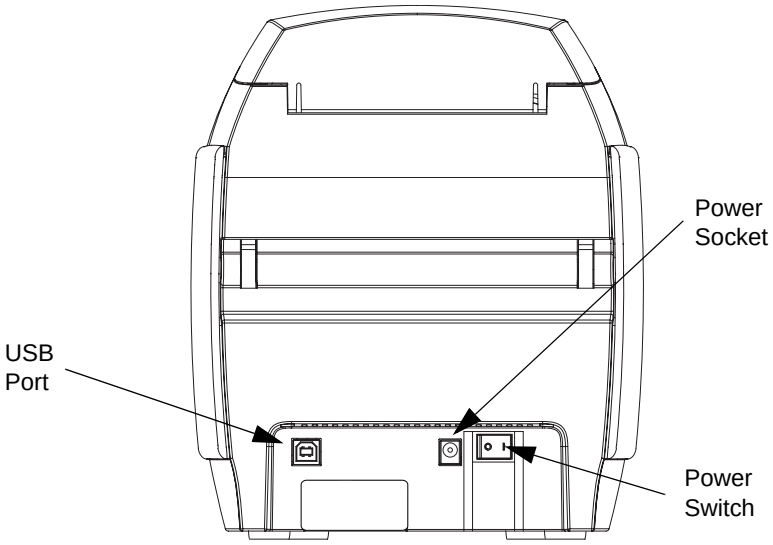
Automatic Card Feeder: A card is automatically fed into the printer from the Card Feeder. The card will be drawn into the printer, printed, encoded, or decoded as specified by the application program, and then be ejected out through the Exit Slot.

CardSense™ single-card feed option: A card is inserted part-way into the Card Entry / Exit Slot. The card will be drawn into the printer, printed, encoded, or decoded as specified by the application program, and then be ejected out through the Card Entry / Exit Slot.

Rear Panel Connectors, Controls, and Indicators

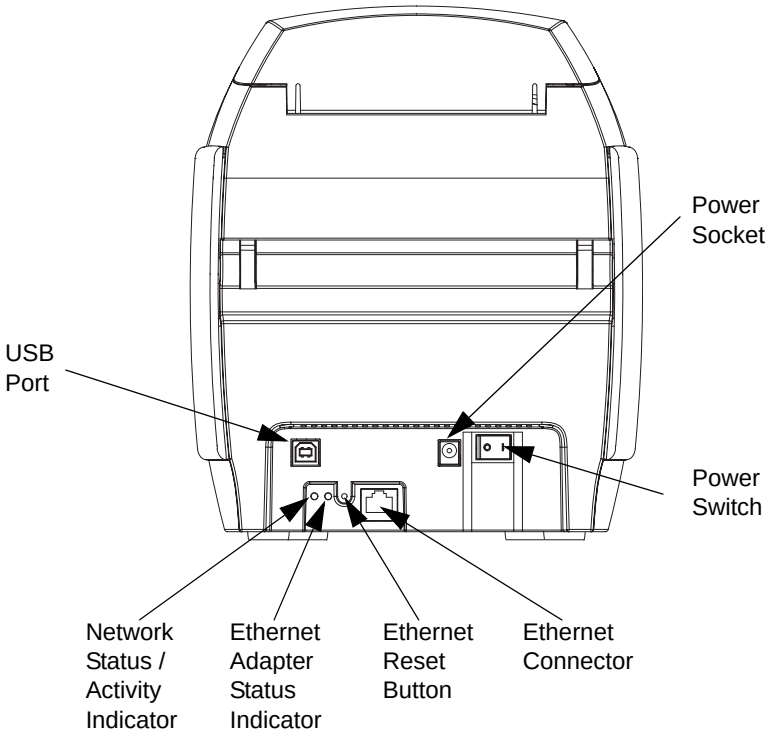
Standard USB Connection

The figure below shows the rear of the Printer with the standard USB interface.



Ethernet Connection

The figure below shows the rear of the printer with the Ethernet Option.



Ethernet Adapter Status Indicator

1. During normal operation, the LED is *solid* **GREEN** for more than 30 seconds. This indicates all the hardware is functioning properly, and the Ethernet Adapter has detected the presence of the network. It does not mean the Ethernet Adapter has an IP address or is attached to a printer queue.
2. If the LED is slowly *flashing* **GREEN** (1 time/sec), the Ethernet Adapter is trying to print.

Network Status/Activity Indicator

1. If the LED is *solid* **GREEN**, a 100Base link is established.
2. If the LED is *flashing* **GREEN**, a 100Base link is established, and network activity has been detected.
3. If the LED is *solid* **ORANGE**, a 10Base link is established.
4. If the LED is *flashing* **ORANGE**, a 10Base link was established, and network activity has been detected.

LCD Panel Messages

LCD Panel messages fall into three categories:

- Operational — Operational Messages are displayed during the Printer's normal operation.
- Warnings — Warnings alert the operator to action that should be taken; the printer will generally continue operation.
- Errors — Errors are displayed when a situation causes the printer to stop operating. Depending on the cause of the error message, restarting the printer or curing the displayed Error may return the printer to operational status, or the printer may require troubleshooting and repair.

MESSAGE
Operational
INITIALIZING
SELF TEST
READY
DOWNLOADING DATA
MAG ENCODING
PRINTING MONO
PRINTING CYAN
PRINTING YELLOW
PRINTING MAGENTA
PRINTING BLACK
PRINTING OVERLAY
DOWNLOADING FIRMWARE
CLEANING
REMOVE RIBBON THEN CLOSE LID
EMPTY FEEDER THEN CLOSE COVER
FEED LONG CLEANING CARD IN EXIT
REMOVE LONG CLEANING CARD
INSERT FEEDER CLEANING CARD
CLOSE FEEDER DOOR
REMOVE FEEDER CLEANING CARD
SINGLE CARD READY-PRINT OR EJECT
INSERT CARD
PUSH BUTTON TO CONTINUE

MESSAGE
Warnings (Printer will still operate)
REMOVE CARD AT EXIT
CLEAN PRINTER
CHECKING RIBBON
ENCODING ERROR
INVALID MAGNETIC DATA
CHECK RIBBON
CLOSE LID
FLASH ERROR
READING ERROR
Errors (Printer will not operate)
OUT OF RIBBON
OUT OF CARDS
MECHANICAL ERROR
COVER OPEN
PARAMETERS ERROR
COMMAND ERROR
LID OPEN
OUT OF RIBBON

1.3 Specifications

General

- Load-N-Go™ drop-in ribbon cartridge
- 16-digit LCD display
- Driver for Windows 2000, Windows XP, Windows Server 2003, and Windows Vista

Color / Monochrome Printing (P110*i* & P120*i*)

- Color dye sublimation or monochrome thermal transfer printing
- 30 seconds per card full color single sided (YMCKO)
- 40 seconds per card full color dual sided (YMCKOK) (P120*i* only)
- 300 dpi (11.8 dots/mm) print resolution

Monochrome Printing (P110m)

- Monochrome thermal transfer printing
- 300 dpi (11.8 dots/mm) print resolution

Bar Code

- Code 39, Code 128 B & C with & without check digit
- 2 of 5 & 2 of 5 Interleaved
- UPC-A, EAN 8, & EAN 13
- PDF-417 2D bar code and other symbologies can be printed via Windows drivers

Cards

- The use of Zebra cards will give the best print quality
- Types: PVC, PVC Composite
- Card width/length: ISO CR-80-ISO 7810, 2.12" (54mm) x 3.38" (86mm)
- Magnetic Stripe-ISO 7811
- Smart Card-ISO 7816
- Card thickness: 30 mil (.76mm) (± 10%)
- Card feeder capacity: 100 cards (30 mil)
- Card output hopper capacity: 45 cards (30 mil)

Ribbon Cartridges

- The use of Zebra True Colours® ribbons will give the best print quality
- Load-N-Go™ ribbon cartridge with integrated card-cleaning roller
- *i* Series technology featuring contact-chip-based ribbon detection (P110*i* & P120*i*)
- YMCKO: 200 cards/cartridge (P110*i* & P120*i*)
- YMCKOK: 165 cards/cartridge (P120*i* only)
- Monochrome: 1000 cards/cartridge in black or blue; 850 cards/cartridge white

Ribbon Storage Information

- True Colours® Ribbons will have a longer shelf life and give better quality printing if the following guidelines are followed.
- Avoid direct sunlight, high temperature, high humidity. Do not place near solvents or other chemicals. Do not touch printing surface of ribbon.
- Storage Temperature Range: 41° to 86° F (+5° to 30° C)
- Optimum Storage Temperature: 70° F / +21° C

Interfaces

- USB 1.1 (cable included)
- USB 1.1 and built-in Ethernet (optional)

Dimensions

- Width: 7.9 in (201mm)
- Depth: 12.9 in (328mm)
- Height: 8.5 in (216mm)
- Weight: 9.5 lbs (4.3kg)

Electrical

- 110 ~ 240 Volts AC, 50 ~ 60 Hz (auto switching)
- 8 MB image memory standard
- FCC Class A, CE, UL, and CUL approved

Environmental

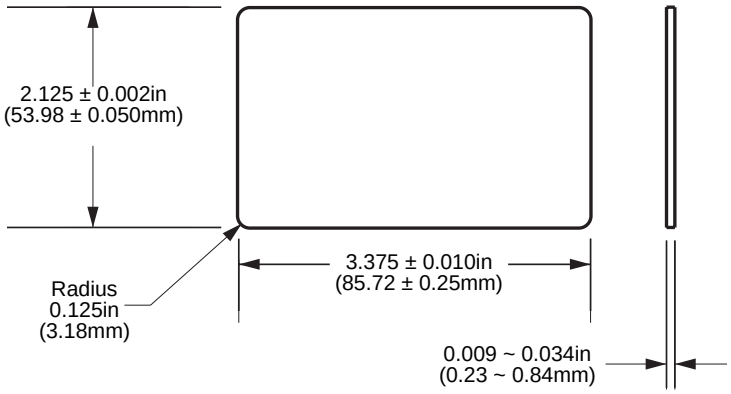
- Operating Temperature: 60°F to 86°F (15°C to 30°C)
- Operating Humidity: 20% to 65% non-condensing
- Storage Temperature: 23°F to 158°F (-5°C to 70°C) (see Ribbon Storage Information, above)
- Storage Humidity: 20% to 70% non-condensing
- Ventilation: Free air

Options

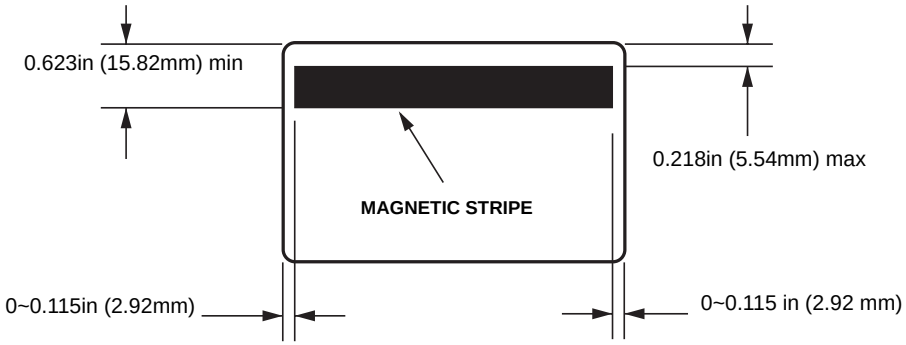
- Magnetic encoder (30 mil cards only), 3 track HiCo/LoCo
- CardSense™ single card-feed mode
- Cleaning Kit (1 cleaning card and 1 cleaning swab)

1.4 Card Dimensions

ISO standard dimensions for plain card



ISO standard dimensions for magnetic stripe card



Declarations of Conformity

89/336/EEC modified by 92/31/EEC and 93/68/EEC	EMC Directive	EN 55022 (1998)	RF Emissions control
	EMC Directive	EN 301489-3 V1.4.1	RF Emissions and Immunity for radio equipment
	EMC Directive	EN55024 (2001)	Immunity to Electro-Magnetic Disturbances
73/23/EEC modified by 93/68/EEC	Low voltage Directive	EN 60950-1 (2001)	Product safety
1999/5/CE	R&TTE Directive	EN300330-2 V1.1.1	Radio Frequency Interferences

For a formal certificate, please contact the Compliance Office at Zebra's Camarillo facility.

EUROPE: Norway Only: This product is also designed for IT power system with phase to phase voltage 230V. Earth grounding is via the polarized, 3-wire power cord.

FI: "Laite on liitettävä suojamaadoitus koskettimilla varustettuun pistorasiaan"

SE: "Apparaten skall anslutas till jordat uttag"

NO: "Apparatet må tilkoples jordet stikkontakt"

FCC Regulations

Models P110*i* / P110*m* / P120*i* have been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and operated in accordance with the User's Manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Pursuant to Part 15.21 of the FCC Rules, any changes or modifications to this equipment not expressly approved by Zebra may cause harmful interference and void the FCC authorization to operate this equipment.

FCC Radiation Exposure Statement (applicable to 15.247 device only)

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum 20 cm between the radiator and your body. This transmitter must not be collocated or operating in conjunction with any other antenna or transmitter unless authorized to do so by the FCC.

Industry Canada Notice

This device complies with Industry Canada ICES-003 class A requirements.

Cet équipement est conforme à l 'ICES-003 classe A de la Norme Industrielle Canadienne.

Icons

Throughout this manual, different icons highlight important information, as follows:

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

Important • Advises you of information that is essential to complete a task, or points out the importance of specific information in the text.

Provides an example or scenario to demonstrate or clarify a section of text.

Electrostatic Discharge Caution • Warns you of the potential for electrostatic discharge.

Electric Shock 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, or could result in physical damage to the hardware.

2 Installation and Setup

2.1 General Information

This section will guide you through the installation and setup of your printer. This consists of the following procedures, which should be performed in the order presented.

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The procedure to be followed for *Packing the Printer for Shipment* is given at the end of this section.

2.2 Unpacking the Printer

Your printer ships in a cardboard carton, protected by styrofoam inserts and a protective anti-static bag. Keep all packaging material in case you need to move or re-ship the printer.

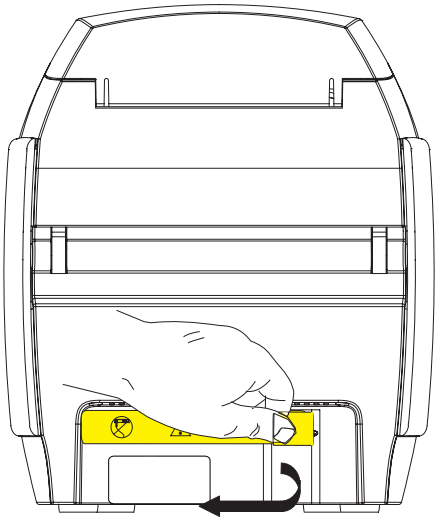
1. Before opening and unpacking the printer, inspect the carton to ensure that no damage occurred during shipment.
2. Ensure that you have a clean and nearly dust free environment for proper operation and storage of the printer.
3. Unlatch and remove the handle, open the carton, and remove the box containing the printer accessories from the shipping carton.
4. Remove the styrofoam packing material from the top of the printer.
5. Lift the printer out of the carton by holding it on both sides of the bottom and lifting the printer gently from the carton.
6. Make sure the following accessories are included with your printer:
   - **a.** Software CD-ROM
   - **b.** Quick Start Guide
   - **c.** Cleaning Kit
   - **d.** 120 VAC and 230 VAC Power Cords
   - **e.** Power Transformer
   - **f.** USB Printer Cable

If any items are missing, please contact your dealer. To reorder, please refer to Appendix F, *Worldwide Support*, of this manual.

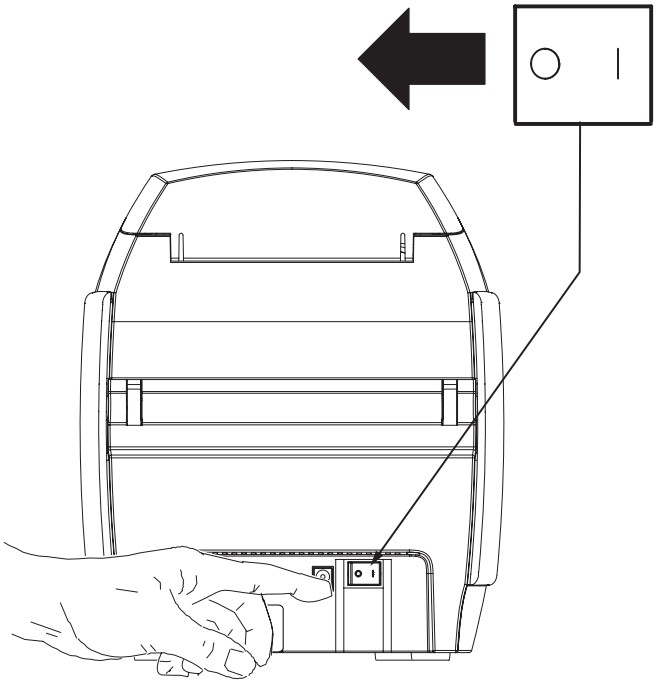
2.3 Setting up the Printer

Step 1. Place the printer in a location that allows easy access to all sides. The printer should never be operated while resting on its side or upside down.

Step 2. Remove the yellow CAUTION label from the back of the printer.



Step 3. Ensure that the printer's power switch is in the OFF (O) position.

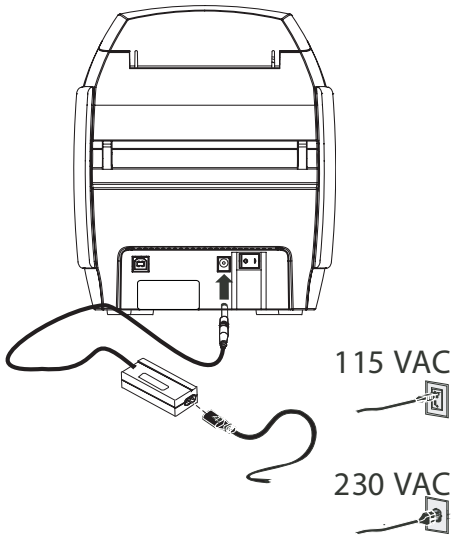


2.4 Connecting Power

Caution • Limit electrical power supplied to the printer to 24 VDC. Limit excess current draw to 16 amps or less, using an associated circuit breaker or other such device. Never operate the printer in a location where operator, computer, or printer can get wet. Personal injury could result. The printer must be connected to an earthed electrical power supply and properly protected against electrical surges and grounding faults. The power supply pack can only be replaced by the same product from the manufacturer.

Caution • Intermittent or unpredictable operation may occur from unsecured connectors. If damaged, the power cable must be replaced by an exact equivalent. The socket should always be easily accessible to power off the printer.

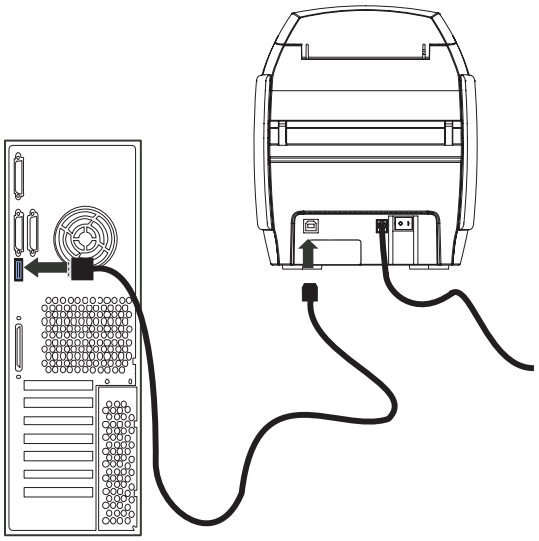
Step 1. Insert the power supply plug into the power socket, attach the power cord (120VAC or 230VAC) to the power supply, then plug the power cord in to a grounded electrical socket of the proper voltage and type.



Step 2. Ensure that the printer's power switch is in the OFF (O) position.

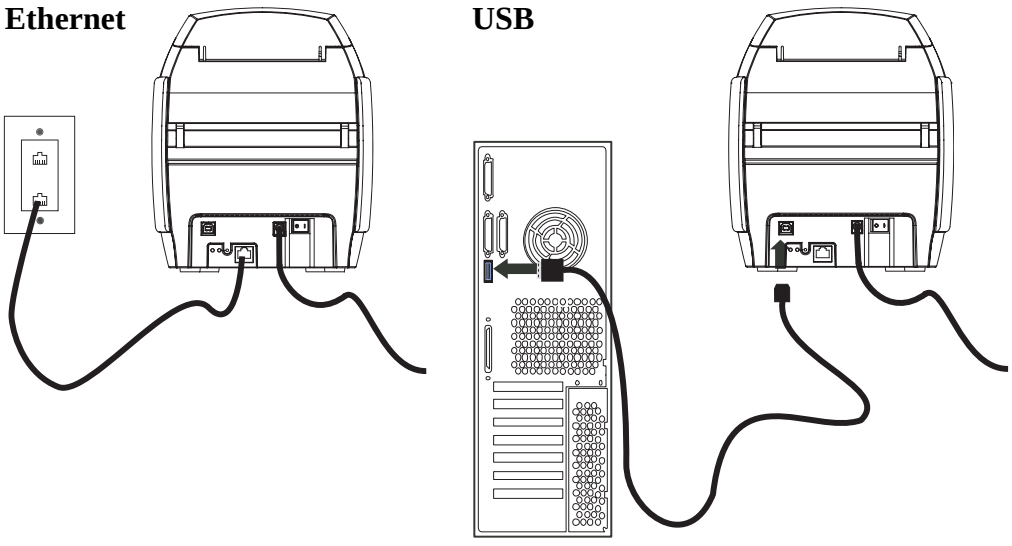
2.5 Connecting the Printer to your Computer

Step 1. If your printer has only the USB interface, attach the included USB cable to your computer and the printer.



Step 2. If your printer has the optional Ethernet interface (as well as the USB interface), connect **either** the USB cable to printer and computer or the Ethernet cable to the printer and the Ethernet network.

Important • Do not connect both the USB and the Ethernet interfaces at the same time!



2.6 Installing the Printer Driver

Important • Do not power the printer with USB attached to your computer at this time. The driver will prompt you when it is time to plug in and power up your printer.

To install the Printer on Windows 2000, Windows XP, Windows Server 2003, or Windows Vista operating systems, insert the User Documentation and Drivers CD, included with your printer, into your computer; and the InstallWizard will walk you through the required installation steps.

The InstallWizard will:

- Automatically install the User Interface when the driver CD is inserted.
- Start the installation process when the **Install Printer Driver** menu item is selected from the Main Menu.
- Allow you to install Ethernet drivers, if you plan on networking your card printer.
- Check to see which operating system you are using.
- Detect previous versions of the driver and clean up any unnecessary Windows registry entries. You must select “Remove” from the install options to remove any previous driver versions.
- Install the new driver files.
- Reboot your computer.

If your User Documentation and Drivers CD does not load automatically:

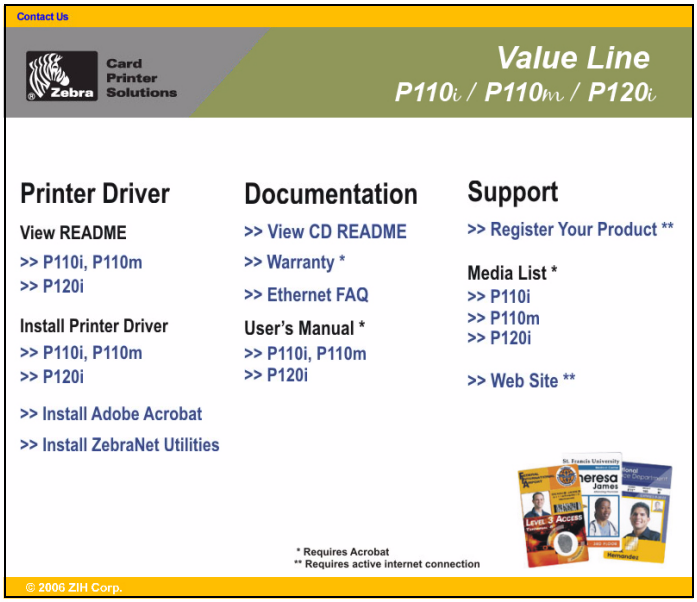
1. Click on Start, then click on Run.
2. Type d:\index.htm, where d: is your CD drive letter.

2.6.1 Print Driver Installation

Install the Printer driver as follows:

Step 1. Insert the **User Documentation and Drivers** CD into the CD drive of the host computer. The **Select Language** window will open.

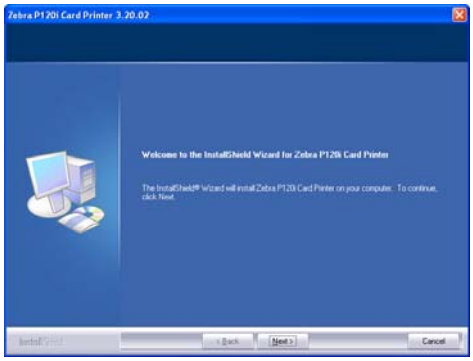
Step 2. From the **Select Language** window, choose the appropriate language for your system. The **Main Menu** will open in the selected language.



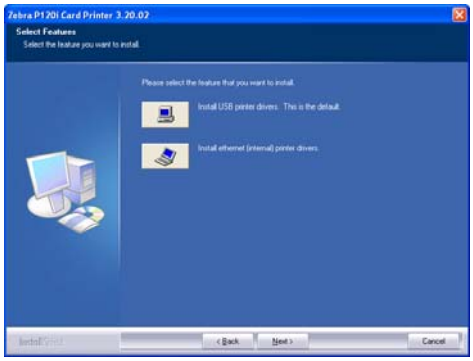
Step 3. From the **Main Menu**, under **Install Printer Driver,** select the appropriate printer model (P110*i* / P110*m* or P120*i*).

Step 4. The InstallShield Wizard will launch, and a progress window will be displayed.

Step 5. Once the InstallShield Wizard has been installed, the **Welcome to InstallShield Wizard** window will open.



Step 6. On the **Select Features** window, you have the option to install USB printer drivers or ethernet (internal) printer drivers.

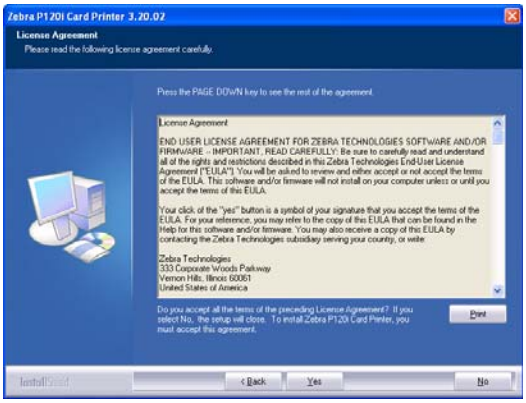


The next two sections detail USB and Ethernet driver installation respectively.

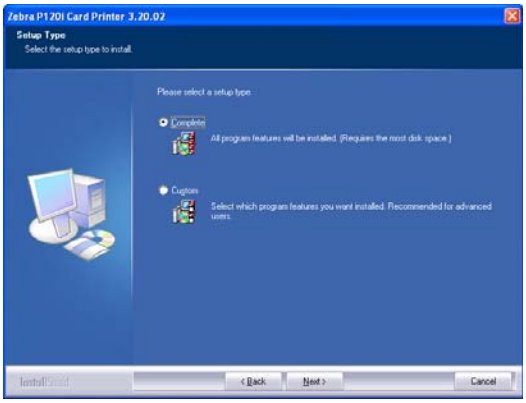
2.6.2 USB Driver Installation

Step 1. Select USB, and click the **Next** button.

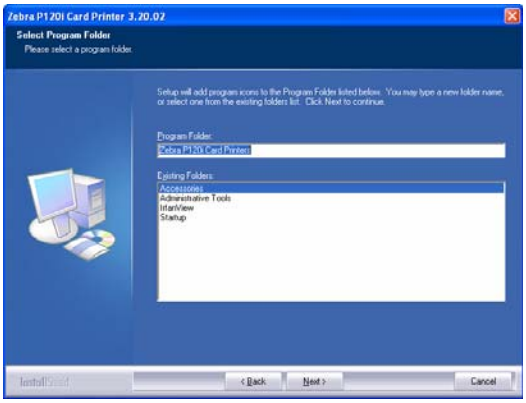
Step 2. Observe the **License Agreement** window. If you agree to the License Agreement, click the **Yes** button



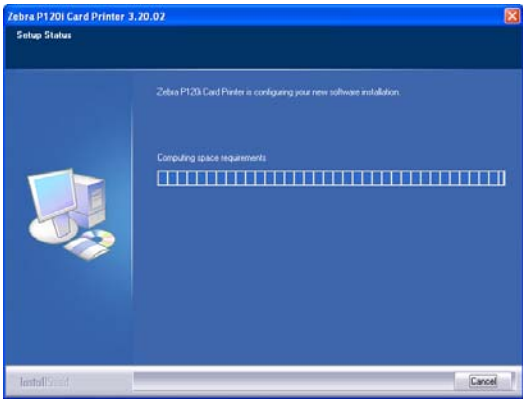
Step 3. Most users should select the Complete setup type; then click the **Next** button.



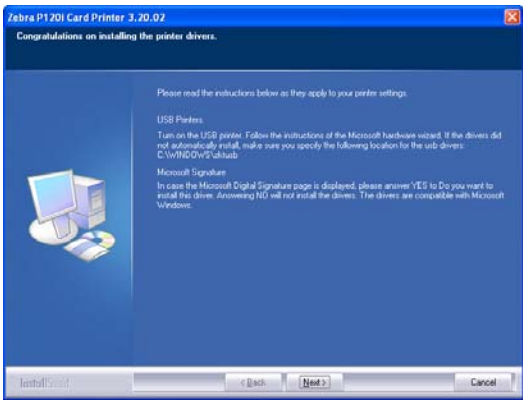
Step 4. Select the appropriate Program Folder, then click the **Next** button.



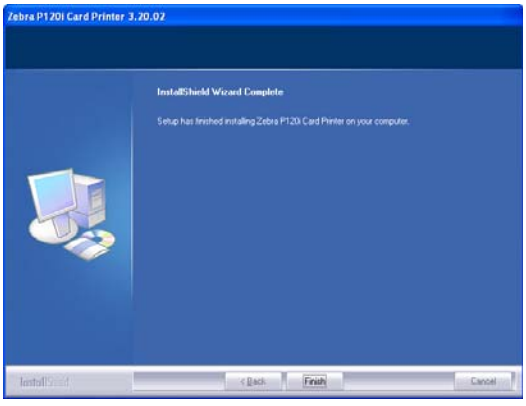
Step 5. The Install Wizard will show the progress of the installation.



Step 6. Read the appropriate information.



Step 7. Driver installation is now complete. Click the **Finish** button.

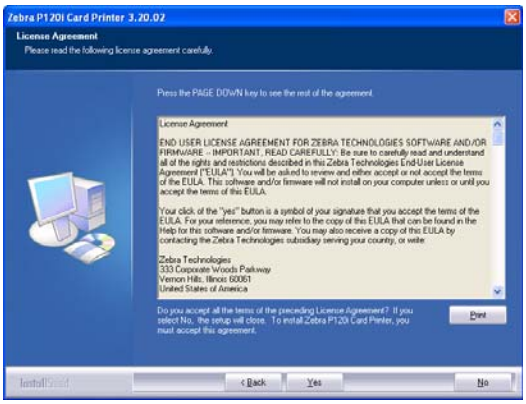


Step 8. After installing the Driver, restart your computer. When you apply power to the printer, the Windows New Hardware Found wizard will find the printer.

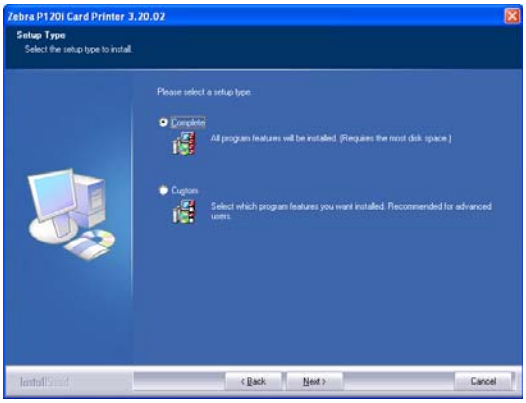
2.6.3 Ethernet Driver Installation

Step 1. Select Ethernet, and click the **Next** button.

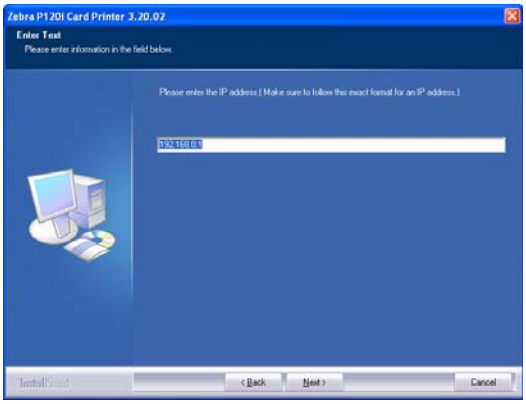
Step 2. Observe the **License Agreement** window. If you agree to the License Agreement, click the **Yes** button.



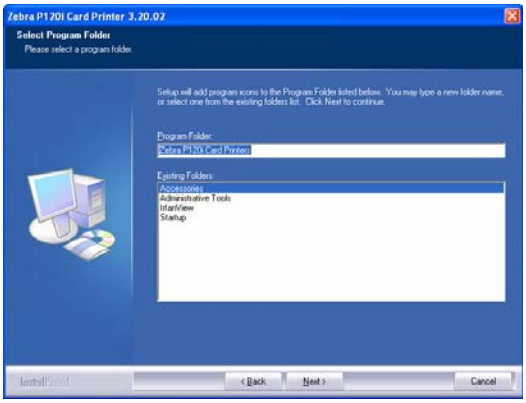
Step 3. Most users should select the Complete setup type; then click the **Next** button.



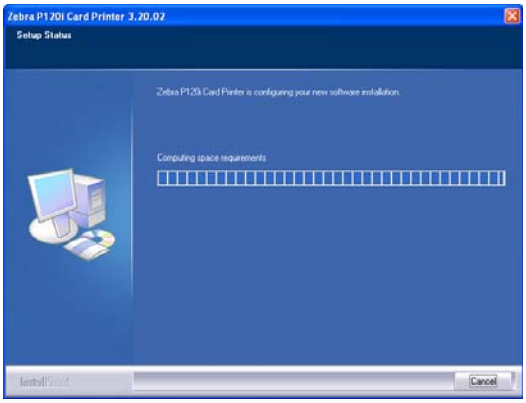
Step 4. Specify the IP address, then click the **Next** button.



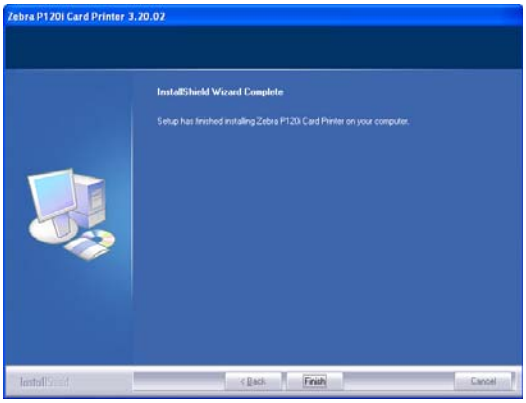
Step 5. Select the appropriate Program Folder, then click the **Next** button.



Step 6. The Install Wizard will show the progress of the installation.



Step 7. Driver installation is now complete. Click the **Finish** button.



Step 8. After installing the Driver, restart your computer. When you apply power to the printer, the Windows New Hardware Found wizard will find the printer.

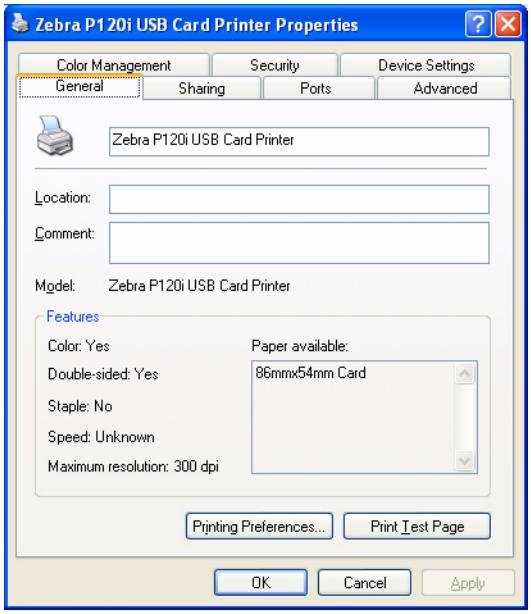
2.7 Changing the Printer Driver Options

Note • The screen shots shown in this section are for the printer using the USB interface. If you are using the Ethernet interface, the screens will refer to the “Network Printer.”

You can change the default settings for the printer driver. Change the options as follows:

Step 1. From the Printers and Faxes list, right click the Card Printer; and select **Properties** from the pop-up menu.

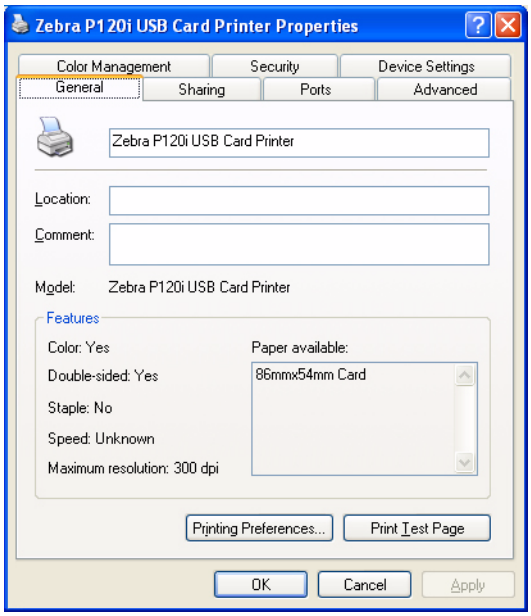
Step 2. The **Printer Properties** window will open.



- **General** - Displays printer name, tab selection for Printing Preferences and Print Test Page.
- **Sharing** - OS feature where printer can be shared to other clients on a network.
- **Ports** - OS feature displays available communication ports.
- **Advanced** - OS feature to select printer availability and spooling options.
- **Color Management** - Allows user to define color profile(s) with color printers.
- **Security** - OS feature where permissions to printers can be defined.
- **Device Settings** - Allows user to view Printer Model and Firmware Version, Encoder Settings, Tools, Firmware Download, Single Feed, and About (driver version information).

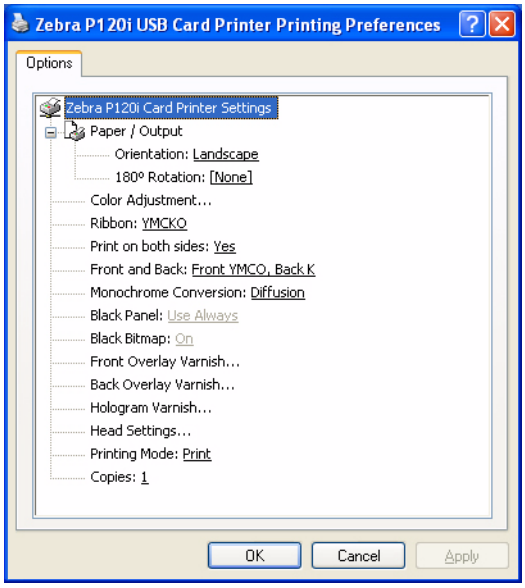
2.7.1 General Tab

The General tab Shows the printer model and lists the features of the printer.



Click on the Printing Preferences button to change the card settings; see *Printing Preferences* on page 27.

Printing Preferences



Paper / Output - Specifies layout of card.

- Orientation - Landscape or Portrait printing layout.
- Rotation - Rotate the image 180° if Front is selected.

Color Adjustment - To adjust color output (Intensity and Contrast).

Allows you to adjust the image colors; these adjustments apply to the entire card, not just photographic images.

- Intensity - decrease or increase the image intensity by moving the RGB (Red, Green, Blue) slider bars left or right. This will change the overall lightness or darkness of the image. Move the slider to the right to increase, and to the left to decrease.
- Contrast - decrease or increase the image contrast by moving the RGB (Red, Green, Blue) slider bars left or right. This magnifies or minimizes the difference between the light and dark parts of the image. Move the sliders to the right to increase, and to the left to decrease.

Important • Printed colors can appear different from displayed colors; the above controls allow you to optimize the printed results.

Use the Restore Defaults Button to reset the settings to the driver defaults.

Ribbon - Displays type of ribbon installed in printer.

Printer/Ribbon Details - Displays ribbon type and remaining panel count.

Print on both sides - Selection for single-sided or dual-sided printing.

Front and Back - Feature selection for dual sided printing.

Choices based on ribbon type:

YMCKOK

- YMCKO on Front, K on Back
- YMCKO on Front, YMCKO on Back

YMCKO

- YMCKO on Front, YMCKO on Back
- YMCO on Front, K on Back

Monochrome Conversion - Specifies the method of monochrome conversion used in printing. Different selections have different effects on the way the image is printed. The options are Diffusion, Halftone regular, and Barcode.

Black Panel - Defines how black panel is applied in a card design.

4 selections:

- Do Not Use - K panel not used
- Use Always - all black pixels will go to K panel
- Text Only - only black text goes to K panel
- Except in Color Picture - all black pixels except bitmap goes to K panel

Black Bitmap - Applies black bitmap option.

Front Overlay Varnish - Feature selection for applying overlay varnish ribbon to front of card. Default setting is full edge-to-edge varnish.

There are various varnish options. A preview pane is shown for each selection.

- Full overlay varnish - Applies an edge-to-edge overlay
- No overlay - Does not apply any overlay
- Selected Area - Applies overlay only in the area selected by user
- Selected area blank - Applies overlay only outside the area selected by user
- Bitmap based overlay - Applies a user-defined bitmap in the overlay panel
- Smartcard ISO - Does not apply overlay in the area of the ISO standard Smart Card contacts
- Smart Card AFNOR - Does not apply overlay in the area of the AFNOR standard Smart Card contacts
- Magnetic Stripe - Does not apply overlay in the area of the ISO standard Magnetic Stripe

Back Overlay Varnish - Feature selection for applying overlay varnish ribbon to back of card. Default setting is full edge-to-edge varnish.

There are various varnish options. A preview pane is shown for each selection.

- Full overlay varnish - Applies an edge-to-edge overlay
- No overlay - Does not apply any overlay
- Selected Area - Applies overlay only in the area selected by user
- Selected area blank - Applies overlay only outside the area selected by user
- Bitmap based overlay - Applies a user-defined bitmap in the overlay panel
- Smartcard ISO - Does not apply overlay in the area of the ISO standard Smart Card contacts
- Smart Card AFNOR - Does not apply overlay in the area of the AFNOR standard Smart Card contacts
- Magnetic Stripe - Does not apply overlay in the area of the ISO standard Magnetic Stripe

Hologram Overlay Varnish - Feature selection for applying hologram overlay varnish ribbon to the front of card. Does not apply to this printer.

There are various varnish options. A preview pane is shown for each selection.

- Full overlay varnish - Applies an edge-to-edge overlay
- No overlay - Does not apply any overlay
- Selected Area - Applies overlay only in the area selected by user
- Selected area blank - Applies overlay only outside the area selected by user
- Bitmap based overlay - Applies a user-defined bitmap in the overlay panel
- Smartcard ISO - Does not apply overlay in the area of the ISO standard Smart Card contacts
- Smart Card AFNOR - Does not apply overlay in the area of the AFNOR standard Smart Card contacts
- Magnetic Stripe - Does not apply overlay in the area of the ISO standard Magnetic Stripe

Head Settings - Setting for heat adjustments on the print head. Adjustments can be made to the Contrast and Intensity.

Head settings can be changed to adjust the monochrome contrast, color intensity, and color contrast. Changes made to head settings will change color quality of printed images. These adjustments directly affect the heating levels used by the printer, for each of the individual panels on a print ribbon.

- Contrast - adjusts the black and overlay contrast from 0 to 10.
- Color Intensity - adjusts the intensity of each color from 0 to 10.
- Color Contrast - adjusts the contrast of each color from 0 to 10.
- Click on Restore Defaults button to reset the settings to the factory default values.

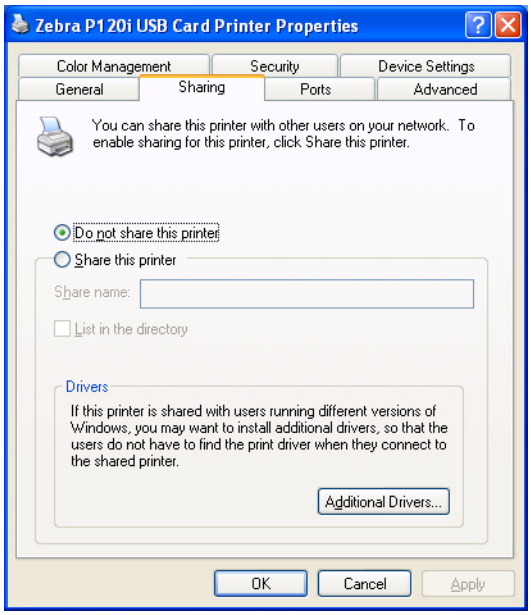
Printing Mode - Feature selection for type of printing required:

- Print only
- Print and Encode
- Encode Only - Use this when magnetic encoding is the only function desired, printing and/or laminating will not occur.

Copies - Default number of copies of cards printed.

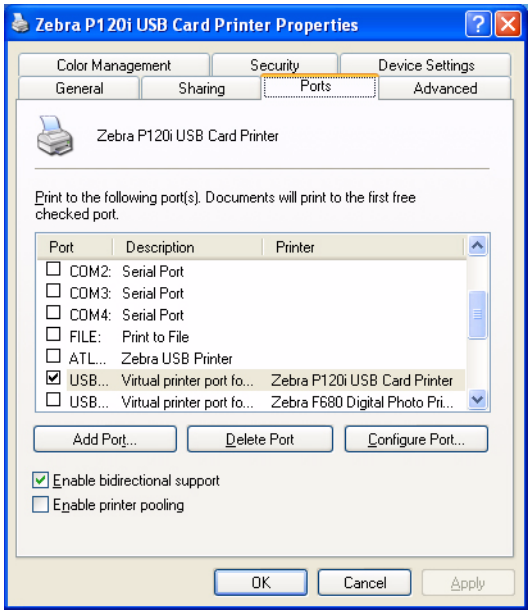
2.7.2 Sharing Tab

On the Sharing tab, you can choose to share the printer over the network, and install additional drivers to accommodate different operating systems.



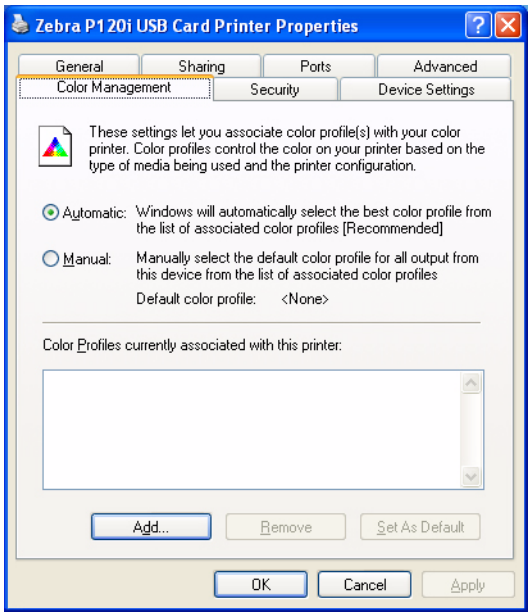
2.7.3 Ports Tab

Use the Ports tab to add, delete, and configure the printer ports, as well as choose which port the printer is assigned.



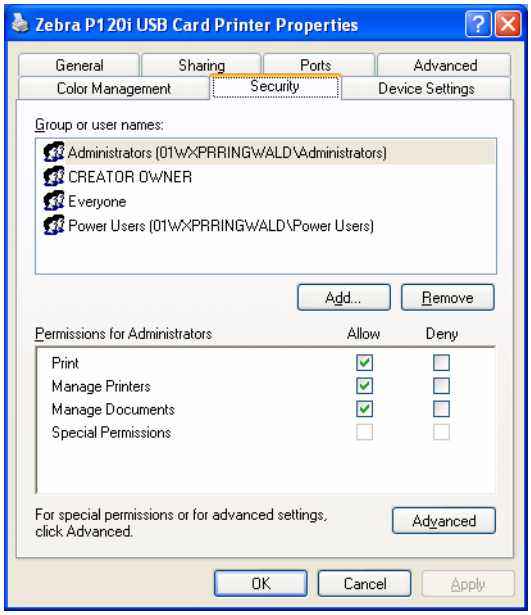
2.7.4 Color Management Tab

Use the Color Management tab to add, remove, or change printer color profiles.



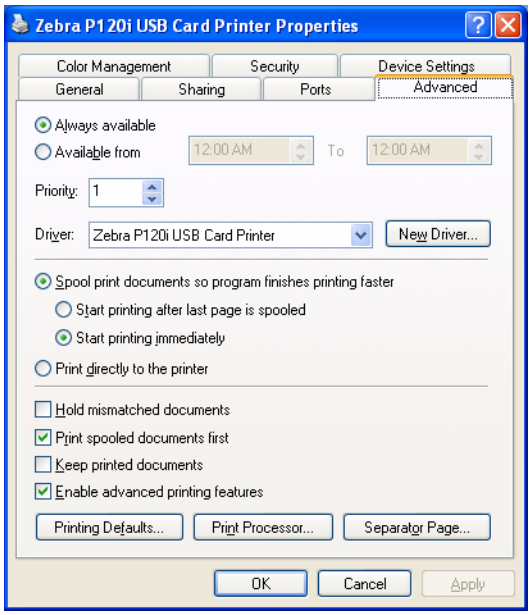
2.7.5 Security Tab

Use the Security tab to change permissions for the printer.



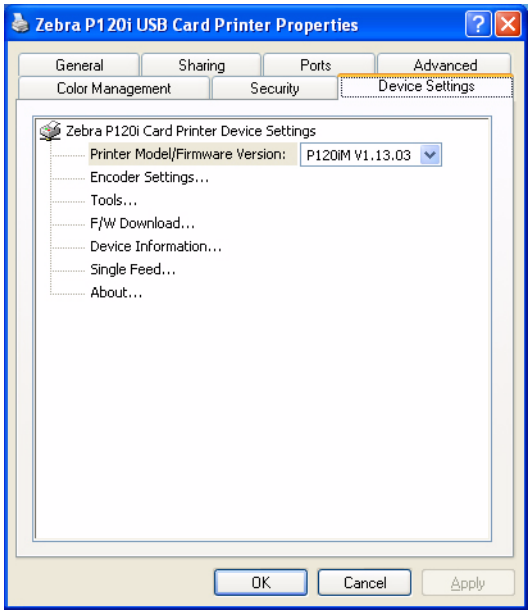
2.7.6 Advanced Tab

On the Advanced tab, you can choose various printer properties, install different printer drivers, and change default printer settings.



2.7.7 Device Settings Tab

On the Device Settings tab, you can change settings for a Magnetic Encoder and change to or from single-feed mode.

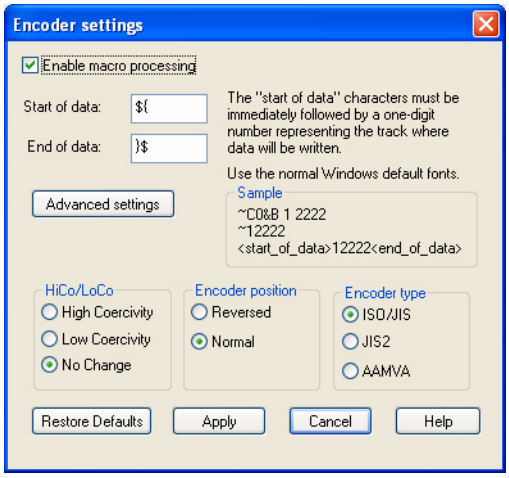


Printer Model/Firmware Version

Gives the printer model and firmware version.

Encoder Settings

Dialog box for setting Magnetic Encoder parameters. This feature is not enabled if the printer does not have the magnetic encoder option.



Enable macro processing - This option will allow the user to choose the encoding preamble.

Start of Data - Beginning of the data string for the encoder. Note that Start of Data characters must be immediately followed by a one-digit number representing desired track where the data will be written. Use the normal Windows default fonts.

End of Data - Ending of the data string for the encoder.

Advanced Settings - Click here for more information. (see *ADVANCED SETTINGS DIALOGUE BOX* on page 35.

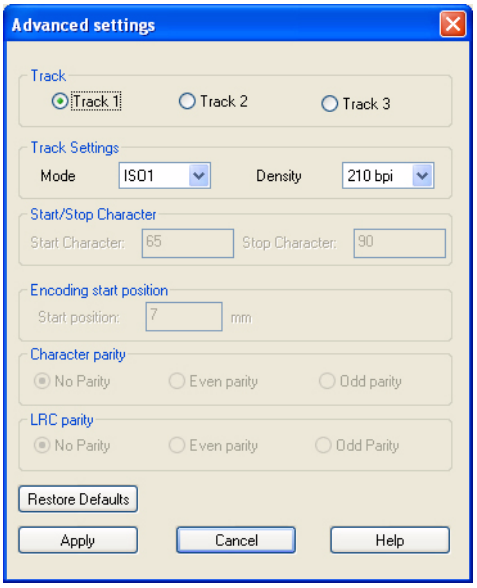
Restore Defaults - Click here to reset the encoder settings to the default values.

HiCo/LoCo - Select the type of coercivity of magnetic stripe cards to be used. Coercivity is a measurement of a material's resistance to being magnetized. Low coercivity material magnetizes easier than high coercivity material.

Encoder Position - Select the printer encoder position between Reversed and Normal. Reversed is not supported by this printer.

Encoder Type - Select the type of encoder. JIS2 and AAMVA are not supported by this printer.

ADVANCED SETTINGS DIALOGUE BOX



Track: Select the track you want to configure.

Track Settings: Select the mode and density for the tracks.

Start/Stop Character (For Non-ISO encoding only): Enter an ASCII value for the Start and Stop characters.

Encoding Start Position (For Non-ISO encoding only): Enter the encoding start position in millimeters (mm).

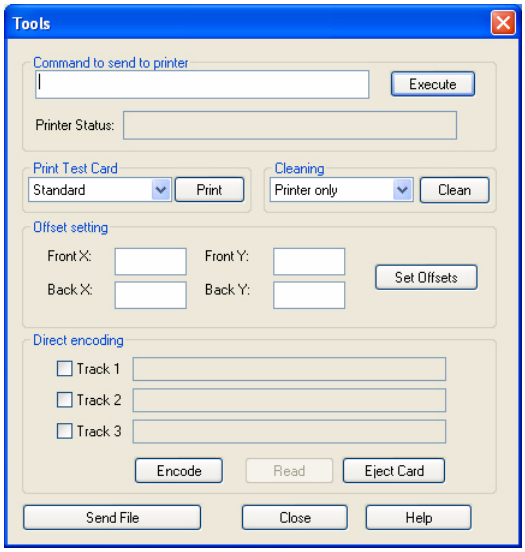
Character Parity (For Non-ISO encoding only): Choose the Character Parity you want to work with, even, odd, or no parity.

LRC Parity (For Non-ISO encoding only): Choose the LRC Parity you want to work with, even, odd, or no parity.

Click the **Restore Defaults** button to reset the settings to the original values.

Tools

Dialog box for testing and communicating with the printer.



Command to send to printer - Enter a printer command (without leading escape character) in the top edit box, and click on the Execute button to send to the printer directly. The Printer Status will show the status of the printer.

Refer to Appendix D, *Software*, for a complete list of the printer commands.

Test Card - Three test cards are available: Standard, Printer Parameters, and Encoder Parameters.

Clean - Click on the Printer Only button to clean the printer. Remove all consumables before executing a cleaning cycle.

Offset Setting - Enter the X and Y direction offset, and click on the Set Offset button to set the X and Y offsets for printing image.

Direct Encoding - Select the track, and enter the data to encode on the magnetic stripe. The Encode button feeds a card from the feeder and encodes the data. To read magnetic data, select the tracks to be read, select Read. To eject the card from the printer, select Eject Card.

Send File - This command will allow a .prn or .txt file to print.

- The .prn file must be created with a Zebra printer driver using the same ribbon as present in the printer.
- The .txt file must contain firmware commands only with only one command per line. The first line must only contain “MASTER”.
- The last line must only contain “SLAVE”.

F/W Download

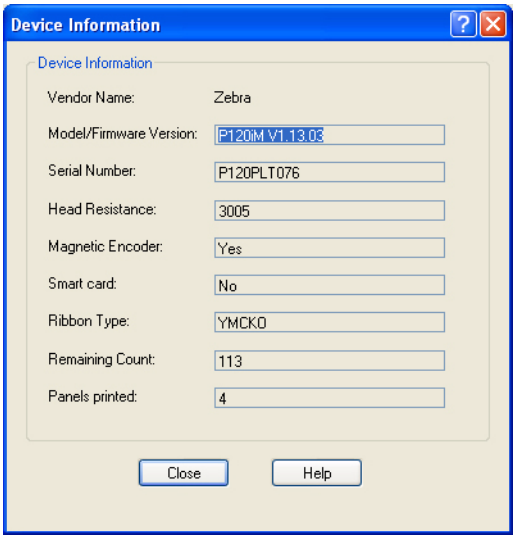
Dialog box for downloading printer firmware.

Important • Do not turn off the power to the printer until the process is done and the LCD displays “READY”. If the download process is interrupted, the printer will not operate.

- Select the appropriate .bin file from the host computer that is specified for the printer.
- Select Start Firmware Download to execute the download process.

Device Information

Printer configuration status window.



Model/Firmware Version - Identifies the printer model number and installed firmware version.

Serial Number - Lists the printer serial number.

Head Resistance - Lists the printhead resistance value.

Magnetic Encoder - Identifies if this option is present.

Smart Card - Identifies if a smart card encoder is present and type of encoder.

Ribbon Type - Identifies the ribbon installed in the printer.

Remaining Count - Shows the remaining card count for the ribbon installed. For monochrome ribbons, this will display Unknown.

Panels Printed - Displays the total number of panels printed for the lifetime of the printer.

Single Feed

Dialog box for disabling or enabling single-feed support.

About

Once the printer driver options have been configured to your satisfaction, click the OK button to save your new configuration and close the Properties window.

2.8 Loading Ribbon Cartridge

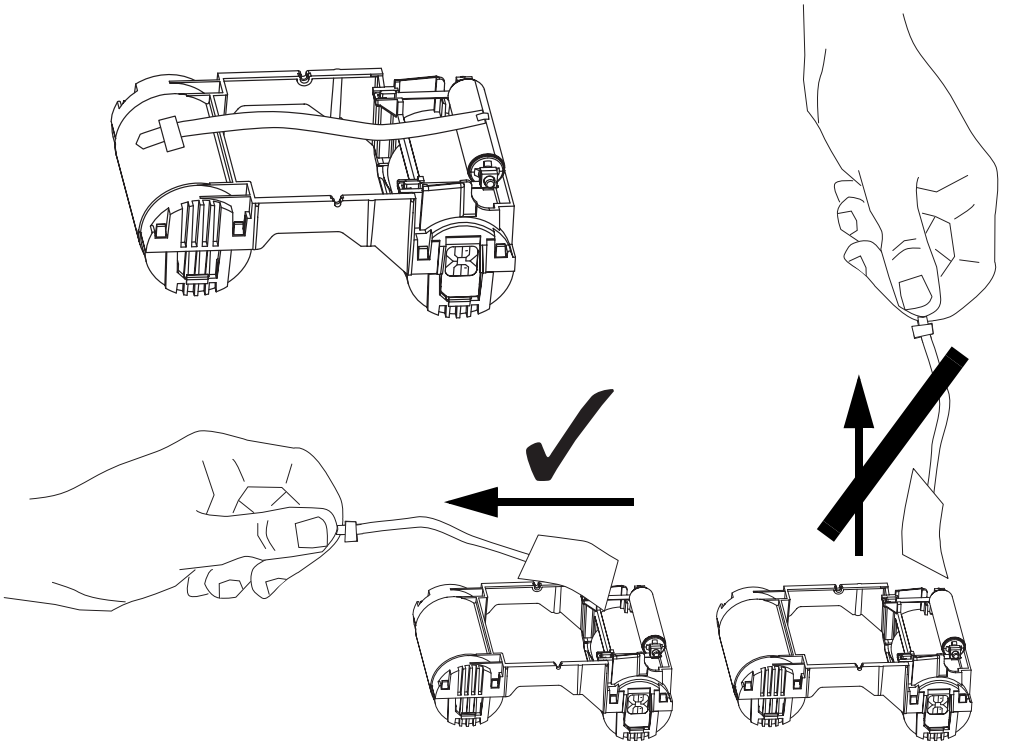
The printer requires approved ribbon cartridges. The Resin Thermal Transfer and Dye Sublimation ribbons are specifically designed for your printer.

- The P110*i* and P120*i* Printers require the use of *i* Series ribbons for full color printing.
- Each ribbon cartridge includes an integrated adhesive cleaning roller assembly that is used to clean the cards entering the printer. Improper cleaning will reduce printer life and degrade print quality.
- When the ribbon is completely used, change the whole cartridge assembly.

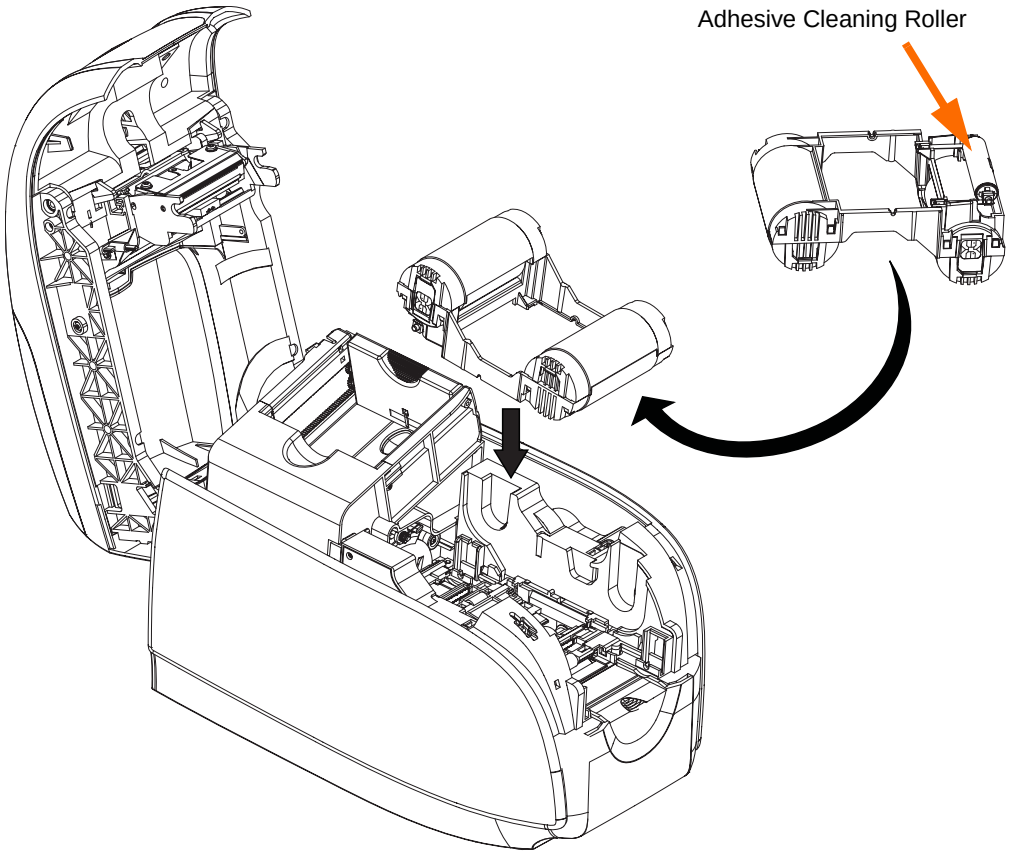
Electrostatic Discharge Caution • DO NOT TOUCH the print head or the electronic components on the print head. Discharge of electrostatic charge from the human body or other surfaces can damage the print head or other electronic components

Step 1. Open the printer lid by pressing the Cover Release button on the top of your printer.

Step 2. Peel protective wrapper from adhesive cleaning roller by gently pulling on the blue tape. Discard the protective wrapper.



Step 3. Insert the ribbon cartridge with the cleaning roller facing down, so the gears on the ends of the rollers fit into the appropriate slots.



Step 4. Close the printer lid, and push down until you hear an audible click. After the lid is closed, the ribbon automatically synchronizes when the printer power is on.

2.9 Loading Cards

To help you load, print, and collect cards, the printer has a Card Feeder and a Card Output Hopper.

Card Feeder

The card feeder is used for loading cards, it can hold up to 100 cards of 30 mils thickness. The card feeder is located under the card feeder cover of the printer.

Caution • **DO NOT** bend cards or touch print surfaces as this can reduce print quality.

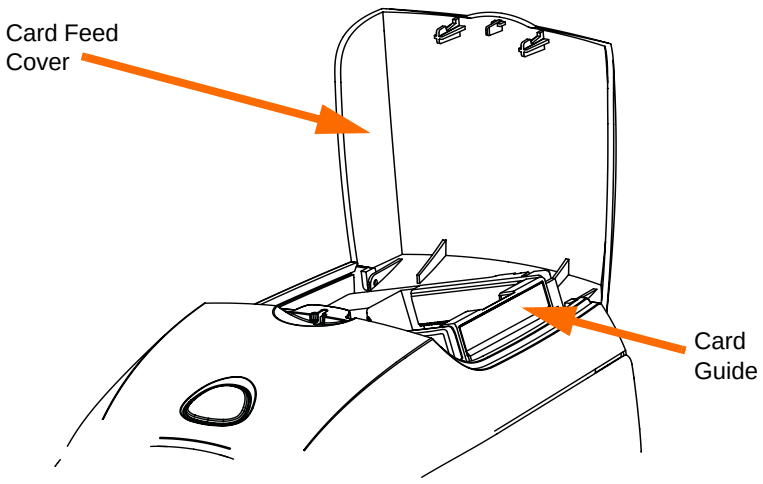
Note • The surface of the cards must remain clean and dust free. Always store cards in an enclosed container. Ideally, use cards as soon as possible. If cards stick together, carefully fan or shuffle them.

Note • For Cards with magnetic stripe, refer to Section for loading instructions.

Load cards into card feeder as follows:

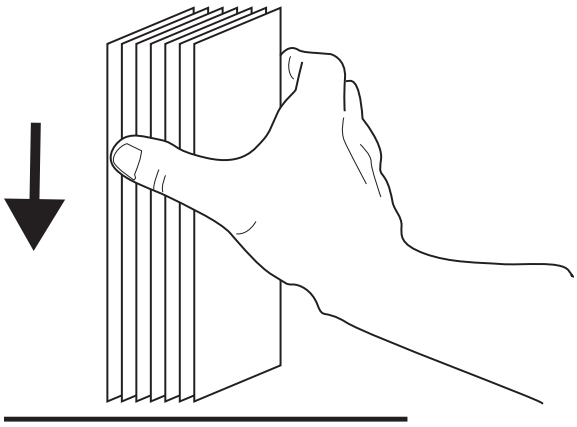
Step 1. Open card feeder cover.

Step 2. Slide card guide all the way to the right until it locks in place with an audible click.

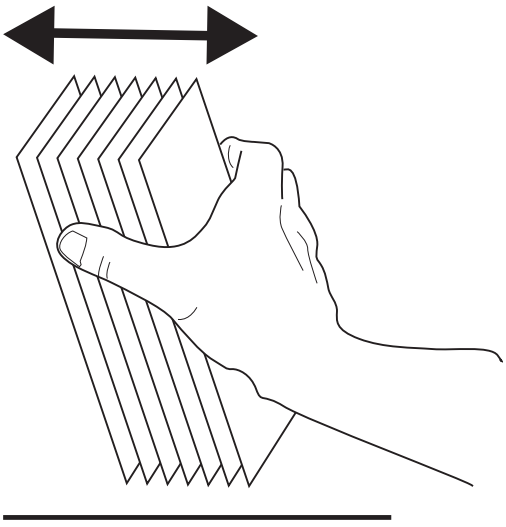


Step 3. Remove cellophane wrapper from card stack.

Note • Static charges and edge burrs from the card die-cutting process can render individual cards stuck together with significant adhesion force. These cards must be physically separated from each other before inserting into the feeder; if not separated, feeding or printing problems may occur.



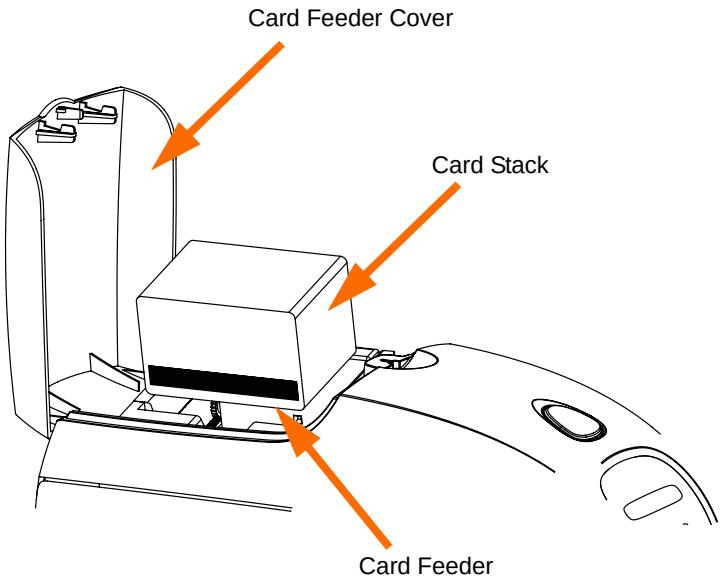
Step 4. Holding the card deck by the sides, hold it vertically against a flat surface such as a desktop. If the deck is too thick for your hand to hold it comfortably, use about half a deck at a time.



Step 5. Push the stack back and forth to an angle of about 45° from vertical, so as to separate all of the cards.

Step 6. Restore the card stack to its original squared-off condition, and place the cards in the input hopper.

Step 7. Place stack of up to 100 cards into card feeder and close the card feeder cover. When card feeder cover is closed, the card guide locking mechanism will automatically be released.

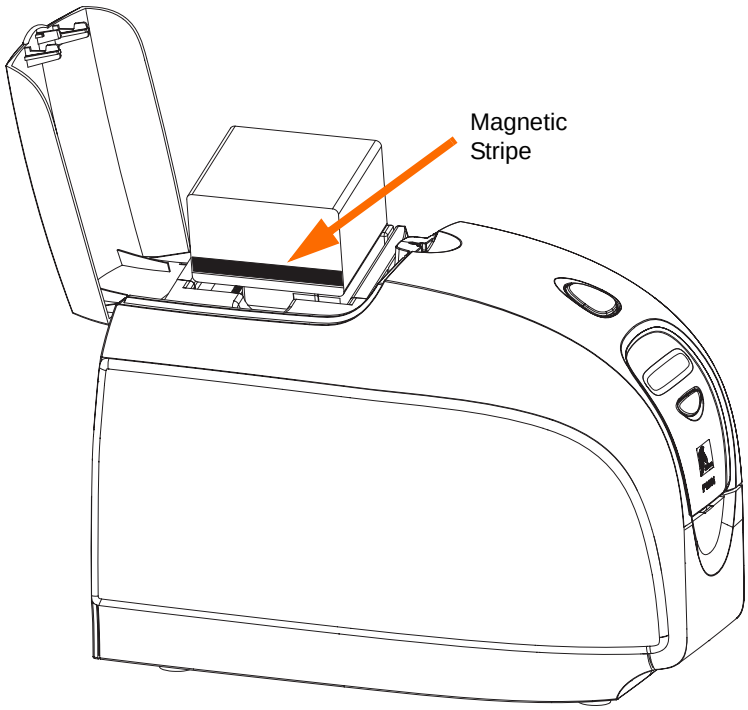


Cards with Magnetic Stripe

Caution • ONLY USE cards that comply with ISO 7810 & 7811 standards for magnetic stripe cards. The magnetic stripe must be flush to the surface of the card to work properly. Never use cards which have taped-on magnetic stripes.

The magnetic encoder is a factory-installed item with the read/write head positioned below or above the card path. Note that the magnetic encoder is settable via the driver for HiCo or LoCo encoding.

When loading cards with magnetic stripes into the card feeder, please ensure that the magnetic stripe is facing the left side of the printer, and closest to the bottom edge of the card feeder, as shown below.

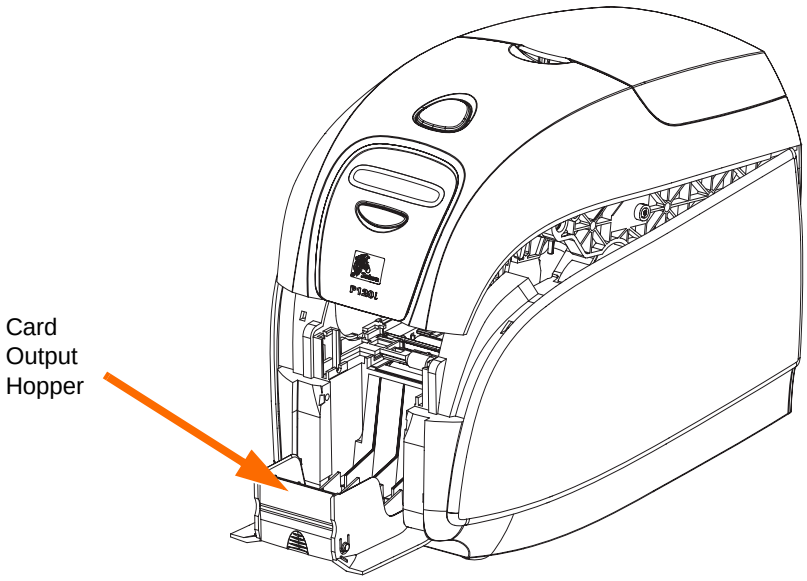


Note • Zebra-approved HiCo and LoCo PVC cards are available.

Card Output Hopper

Step 1. Raise the printer lid and pull the output hopper down to place it in its functional position.

Step 2. When not using the printer, place the card output hopper back in its closed position to protect the printer from dust.

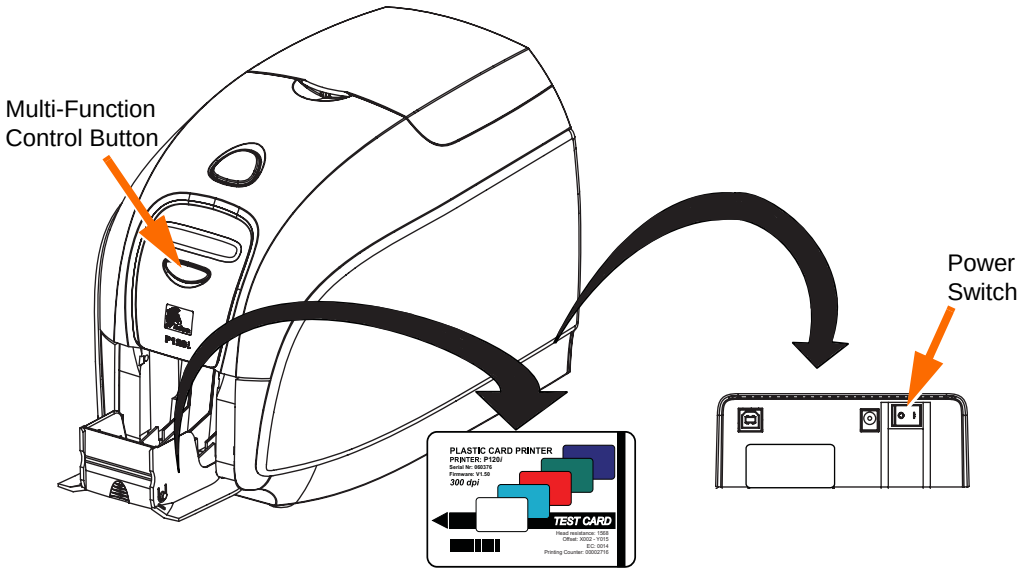


2.10 Printing a Test Card

With ribbon cartridge and cards loaded, your printer is ready to print. To check the operation of the printer, you should print a test card.

Step 1. Place the printer power switch in the OFF (O) position.

Step 2. While holding down the Multi-Function Control Button, place the printer power switch in the ON (|) position. The LCD status window will glow blue.



Step 3. Keep pressing the Multi-Function Control Button until the SELF TEST message appears in the window.

Step 4. Release the Multi-Function Control Button, and a test card will print after a few seconds.

2.11 Printer Operation

Printing with the printer requires the Windows printer driver, your card design/issuing software, or printer command-level programming through the printer interface.

The printer can be used with any Windows 2000 or Windows XP software application program, using the drivers provided on CD with the printer.

Creating a Sample Card

Before you begin a new printing session, print a sample card to ensure that the cards will be printed correctly. Follow the steps below to print your first card using the True Colours™ Card Printer Ribbon Cartridge and the Windows printer driver.

Note • To simplify creating a sample card, you can use one of the sample files that were installed during the driver installation process. These samples (Word files) can be found in *Start* > *All Programs* > *Zebra Card Printers*.

Step 1. Go to the Microsoft Word software.

Step 2. Go to File > Print.

Step 3. Choose the Zebra Card Printer from the printer names list.

Step 4. Press Close to exit the Print dialogue box.

Step 5. Go to File > Page Setup.

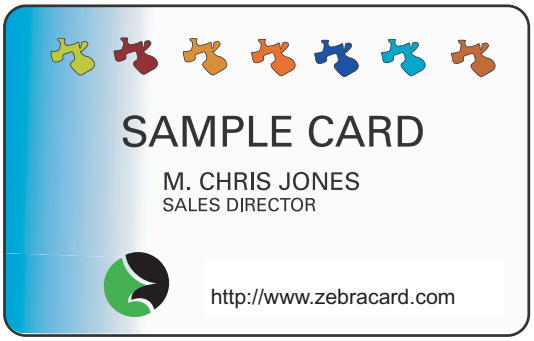
Step 6. Select the Paper tab; and under Paper Size, choose Card.

Step 7. Select the Margins tab; and set all the margins to 0 (zero). Under Orientation, select Landscape or Portrait.

Step 8. Press OK to exit the Page Setup window.

Step 9. The card appears on the window.

Step 10. Design a card with both black and colored text and with colored pictures similar to the sample card shown below. (The P110*m* Printer uses monochrome ribbons only.)



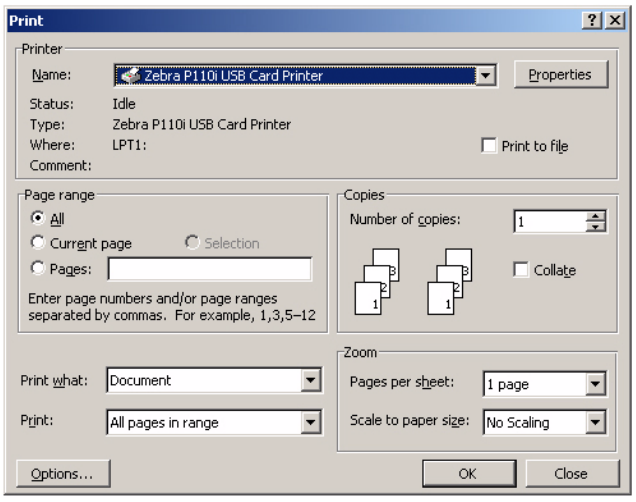
Printing a Sample Card

Once you completed creating your sample card, you are ready to print. Ensure your printer has a True Colours™ Card Printer Ribbon Cartridge installed and there is card stock in the card feeder. Print your sample card as follows:

Step 1. Select File > Print to open the Print dialogue box.

Step 2. Ensure the following settings in the Print dialogue box:

- Printer Name: Zebra < model > Card Printer
- Print to File: Unchecked
- Page Range: All
- Number of Copies: 1
- Collate: Unchecked
- Print What?: Document
- Print: All pages in range
- Pages per sheet: 1 page
- Scale to paper size: No Scaling



Step 3. Click the OK button.

Step 4. The printer will feed in a card and start printing. The data download time will vary depending on complexity of the card design and the computer's processing speed.

Step 5. Once the printing is completed, the card will be ejected from the printer into the printed card hopper.

Step 6. Remove the sample card from the card output hopper, and check for any discrepancies. If the sample card is correct, your printer is ready to produce more cards.

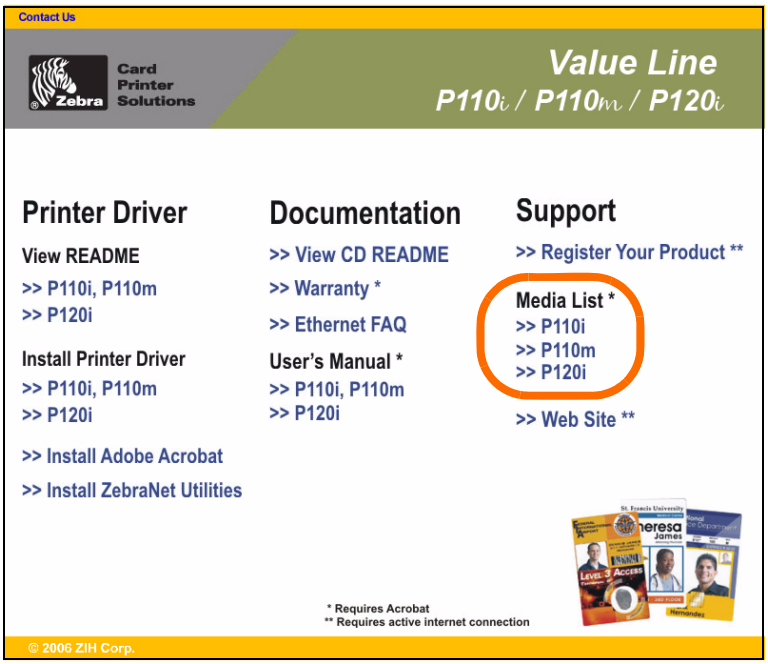
2.12 Packing the Printer for Shipment

If the printer is to be shipped, use the original printer packing and shipping material for shipping the printer only.

It is important to use the original packing and shipping material to prevent damage to the printer.

Important • Do not ship the printer with either the ribbon or the cards in the printer.

If the original material is lost or damaged, a replacement Shipping Kit can be ordered from Zebra. Refer to the Media List on the Windows Drivers and User Documentation CD supplied with this printer.



Worldwide Support locations are listed in Appendix F.

3 Theory of Operation

3.1 Introduction

This section includes five major topics:

Card Printing Basics 52

Card Path Elements 57

Card Movement During Printing 58

Block Diagram 60

CPU PCBA Connections 61

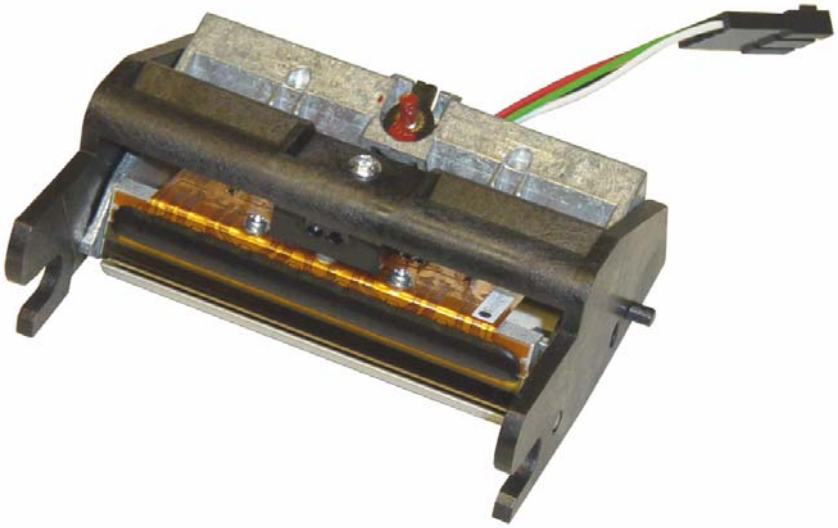
3.2 Card Printing Basics

This section provides an overview description of how images are printed on plastic cards.

Printhead

The Printhead Assembly mounts in the Printhead Bracket, which holds the Printhead at a right angle to the card's long surface.

The Printhead is a thin-film device that consists of a row of individually addressable heating elements. Each heating element is approximately 0.0033 inch (0.08 mm) wide, giving a print resolution of 300 dots per inch.



There are a total of 672 heating elements. Since the width of the plastic card is 2.125 inches (54 mm), 638 elements provide full-width coverage.

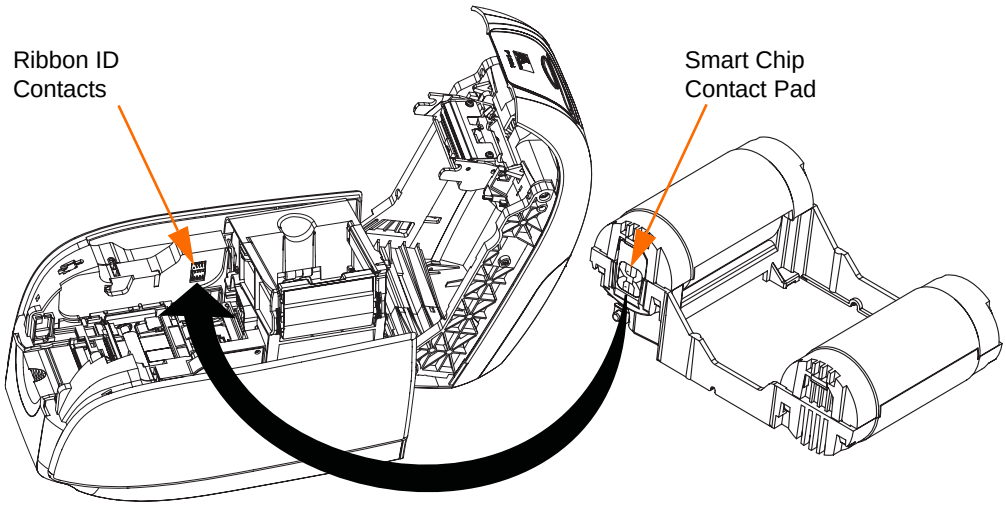
The "extra" 34 elements (17 on either side of the card's nominal width) are present to support programmable image centering and full bleed imaging even if a card is slightly oversize.

Printing Technologies and Ribbons

There are two types of printing technology used in the P110*i* and P120*i* Printers: Dye Sublimation and Thermal Transfer. The technology to use is determined by the type of dye or ink on the ribbon.

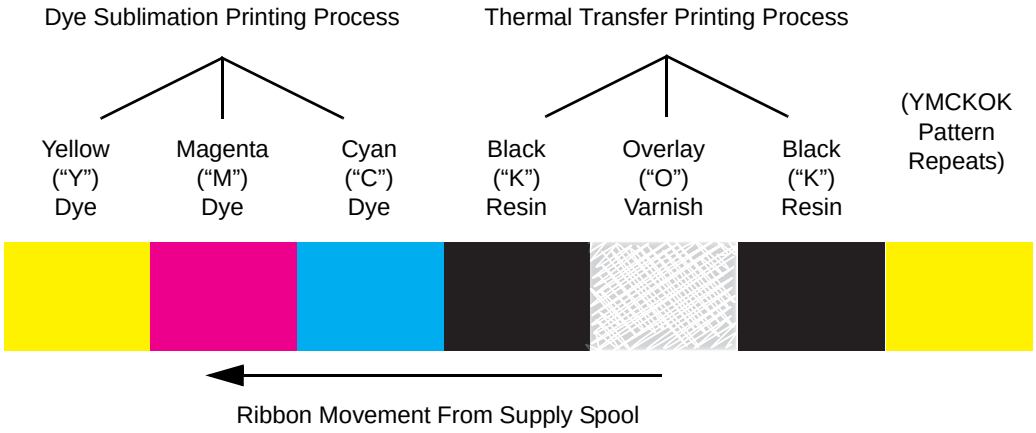
Monochrome Ribbons have a single color ink on the length of the ribbon. the Printer is programmed to use Thermal Transfer printing for monochrome ribbons. (The P110*m* Printer uses only thermal-transfer printing.)

Multi-Panel Ribbons have a repeating sequence of panels of different dye. *i* Series True Colours™ Multi-Panel Ribbons have an smart chip built into the supply spool; the smart chip identifies the ribbon type and panel count. (Note that the lack of a smart chip will be interpreted by the Printer as being a Monochrome Ribbon.) Printing with a Multi-Panel Ribbon requires multiple passes of the card under the Printhead, once per panel.



For dual-sided printing, a typical situation would be to print a full-color graphic (such as a person's picture) along with black text and/or bar-coding on the front, and black text and/or bar-coding on the rear. In this case, a "YMCKOK" Multi-Panel Ribbon would typically be used.

A YMCKOK ribbon has successive panels as follows:

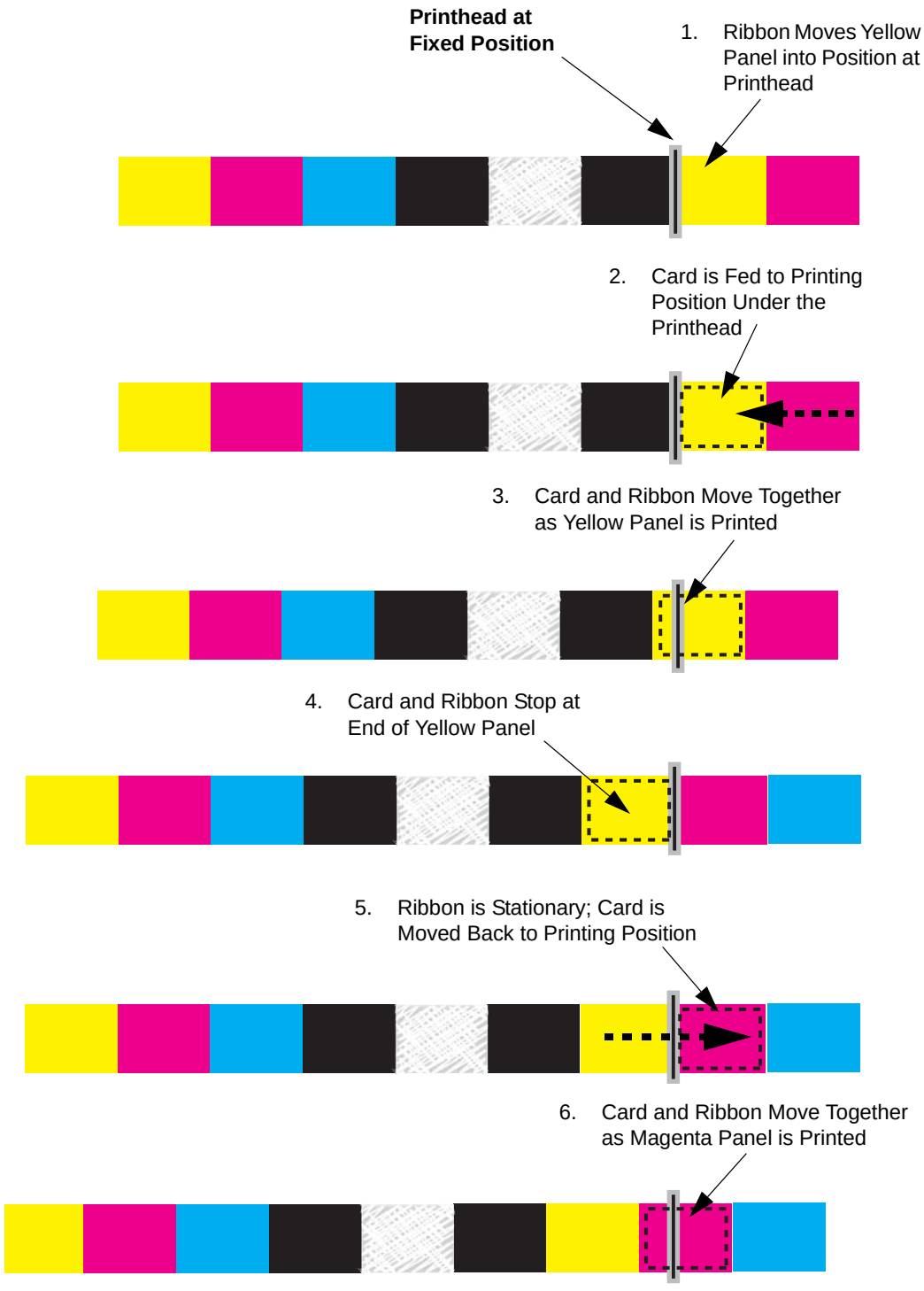


Other ribbons are available for the Printer; see the Supplies List on the Driver and Documentation CD that came with your printer, or go to the Zebra Card Printer Solutions website at http://www.zebracard.com.

Additionally, the driver software allows the user to specify which ribbon panels are printed on either side of the card.

The ribbon synchronizes to its "starting" position whenever the Lid is opened and then closed. For a YMCKOK ribbon, the starting position is with the leading edge of a Yellow Panel at the Printhead location.

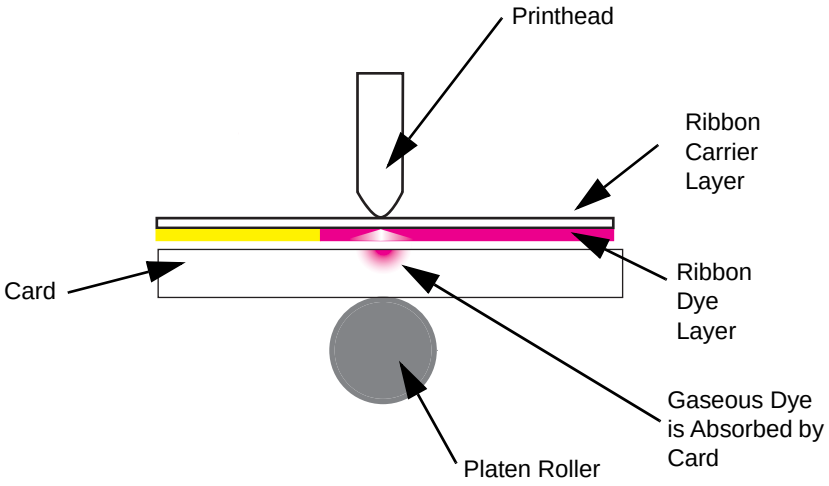
The following figure shows how the ribbon and card move relative to each other during the printing process. (This obviously does not apply to the P110*m* Printer.)



Note that before printing the “second” K Resin black panel, the card would be moved back to the card flipper, flipped over, and then advanced to the Printhead.

Dye Sublimation Printing (P110*i* and P120*i* only)

In Dye Sublimation Printing, each Printhead heating element is applied voltage at one of a number of pulse widths. A wider pulse results in the element getting hotter, which converts more of the dye (at that pixel location) to a gas and diffuses it into the surface of the card (a wider pulse gives more intense color at that pixel). This is repeated for each of the dye panels (i.e., Yellow, Magenta, and Cyan), to result in full-color images.

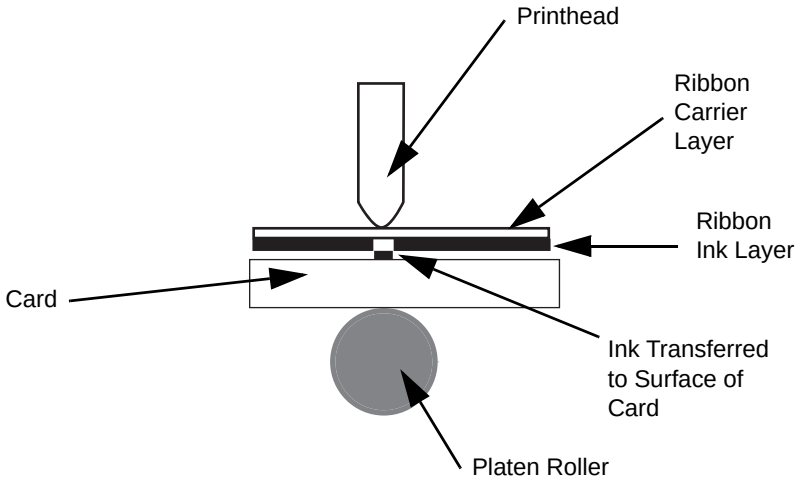


Thermal Transfer Printing (P110*i*, P110*m*, and P120*i*)

In Thermal Transfer, voltage is either applied or not applied to each Printhead printing element. If voltage is applied, the ink at that location is transferred to the surface of the card.

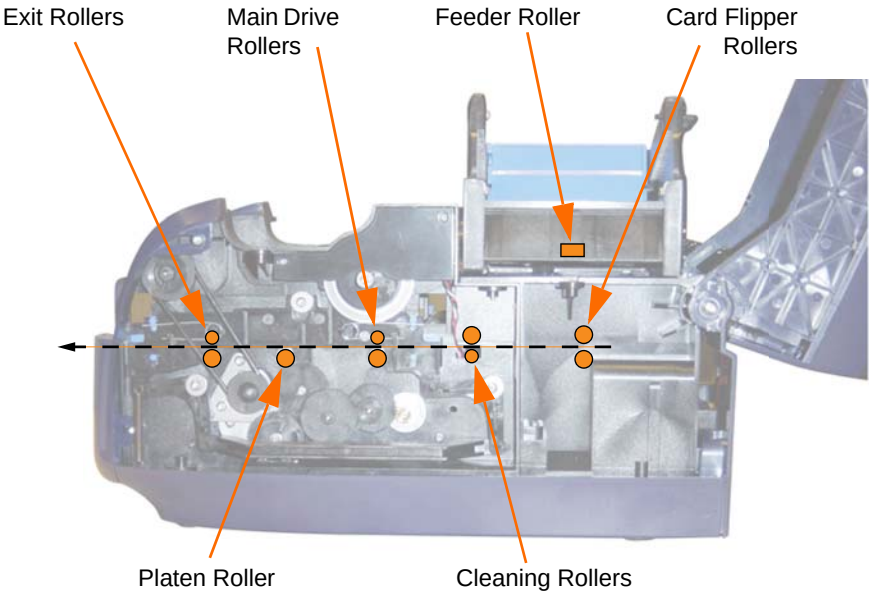
Each pixel is either printed (i.e., the ink transferred to the card) or not; there are no intermediate levels.

Thermal Transfer printing with a resin ribbon is used for printing bar codes, since contrast between the light and dark areas is the highest and the edges are the sharpest.

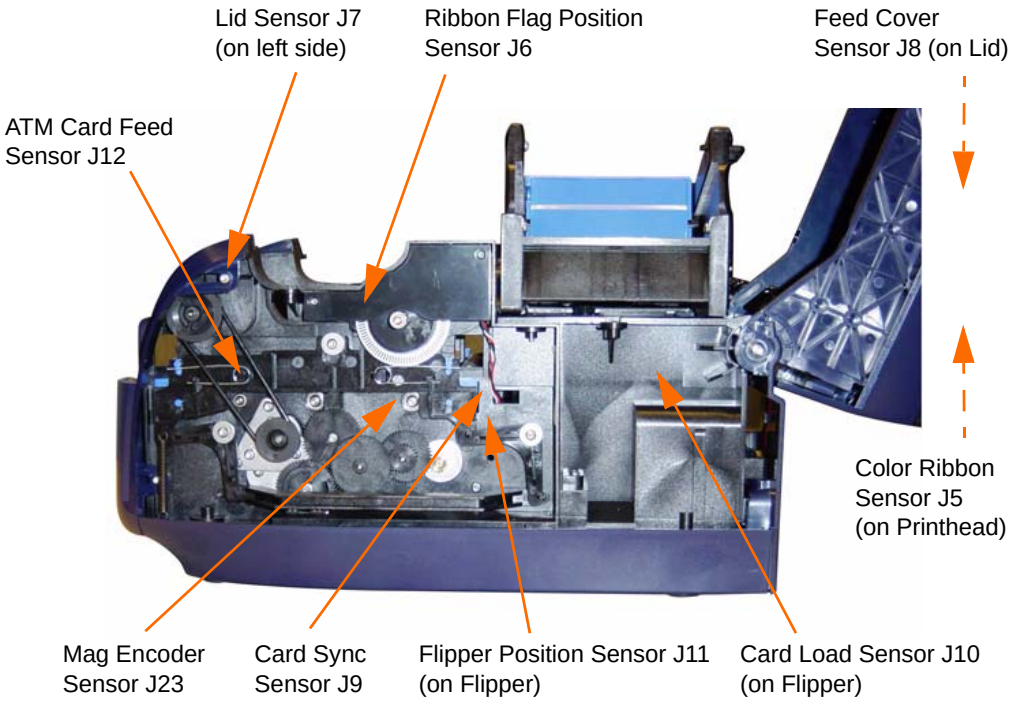


3.3 Card Path Elements

The figure below shows the rollers that transport cards as they make their way through the Printer. The rollers keep the card on a horizontal path, reducing the chance of a card edge catching on anything.

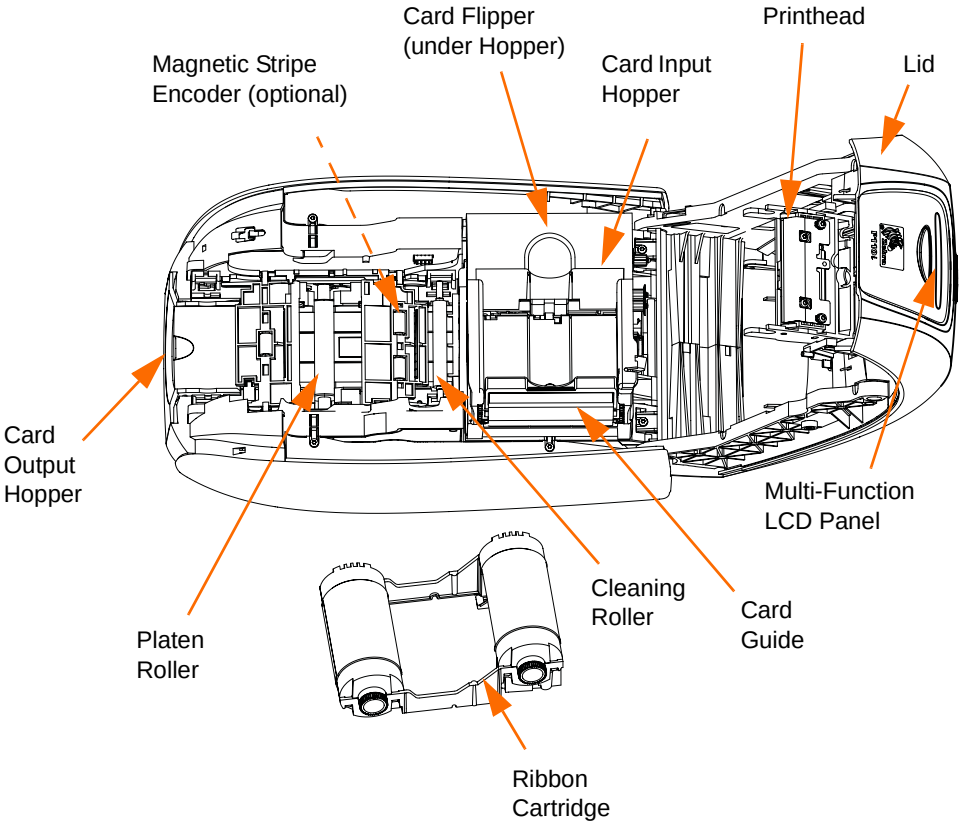


The figure below shows the *relative* locations of the sensors that track card and ribbon position and movement.



3.4 Card Movement During Printing

Step 1. The card is fed from the Card Input Hopper and loaded into the Card Flipper where it is rotated into the print position.



Step 2. The card is moved into the Print Engine, passing the Cleaning Roller; this cleans dust or dirt particles from the upper card surface.

Step 3. If the Printer includes an optional Magnetic Stripe Encoder, the card is moved to the Magnetic Stripe Encoder, and the stripe is encoded.

After the card is encoded, it is checked to verify that the magnetic stripe was properly encoded.

If encoding fails, the card is ejected into the Card Output Hopper. This is done to avoid wasting time and ribbon panels on a defective card.

If the encoding is successful, the card is moved into the pre-print position, just before the Printhead.

Step 4. The card is printed.

Dye-Sublimation Printing (P110*i* and P120*i* only)

The leading edge of the card is moved under the Printhead (over the Platen Roller), and the Printhead is lowered. Lowering the Printhead reduces the space between the Printhead, the ribbon, and the card, which produces sharper images.

The last time the Lid was opened and closed, the ribbon was automatically *synchronized*, bringing the leading edge of the yellow ribbon panel (for a YMCKO or YMCKOK ribbon) under the Print Head.

As the card and ribbon move along, each element of the Printhead receives a pulse of variable width; a wider pulse results in a hotter element which melts a larger amount of yellow dye onto that particular spot on the card.

After this yellow pass is completed, the Printhead is raised, the card is moved back, and printing continues with the Magenta ribbon panel, then the Cyan panel, then the Black panel if present, then an Overlay panel.

Thermal-Transfer Printing (P110*i*, P110*m*, and P120*i*)

If using a monochrome ribbon (used when printing a bar code on a card), the card makes a single pass under the Printhead. The Printhead elements are energized to either **on** or **off**. The **on** level actually transfers the spot of resin under the Printhead element to the card. This results in the sharpest possible images; for bar codes you want the sharpest edges and highest contrast between dark and un-printed areas.

Step 5. For dual-sided printing, the card is now moved back to the Card Flipper where the card is turned over (rotated into the 180 position).

The card is moved into the Print Engine, passing the Cleaning Roller; this cleans dust or dirt particles from the “back” of the card.

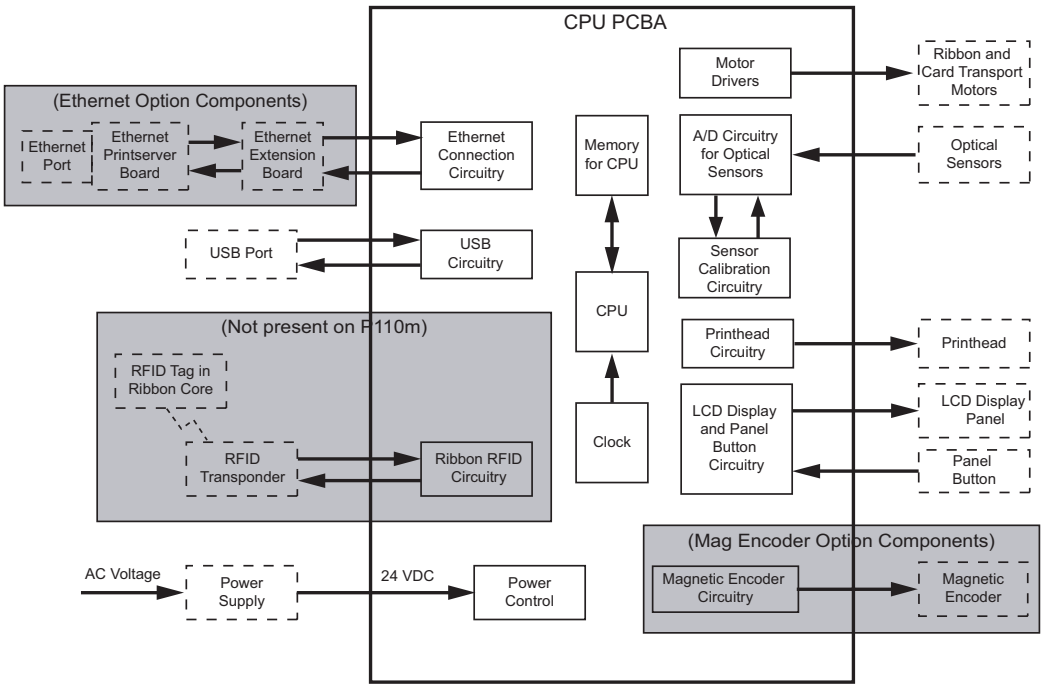
The card is printed (same as Step 4).

Step 6. When printing is completed, the card is moved to the Card Exit, where it falls into the Output Hopper.

3.5 Block Diagram

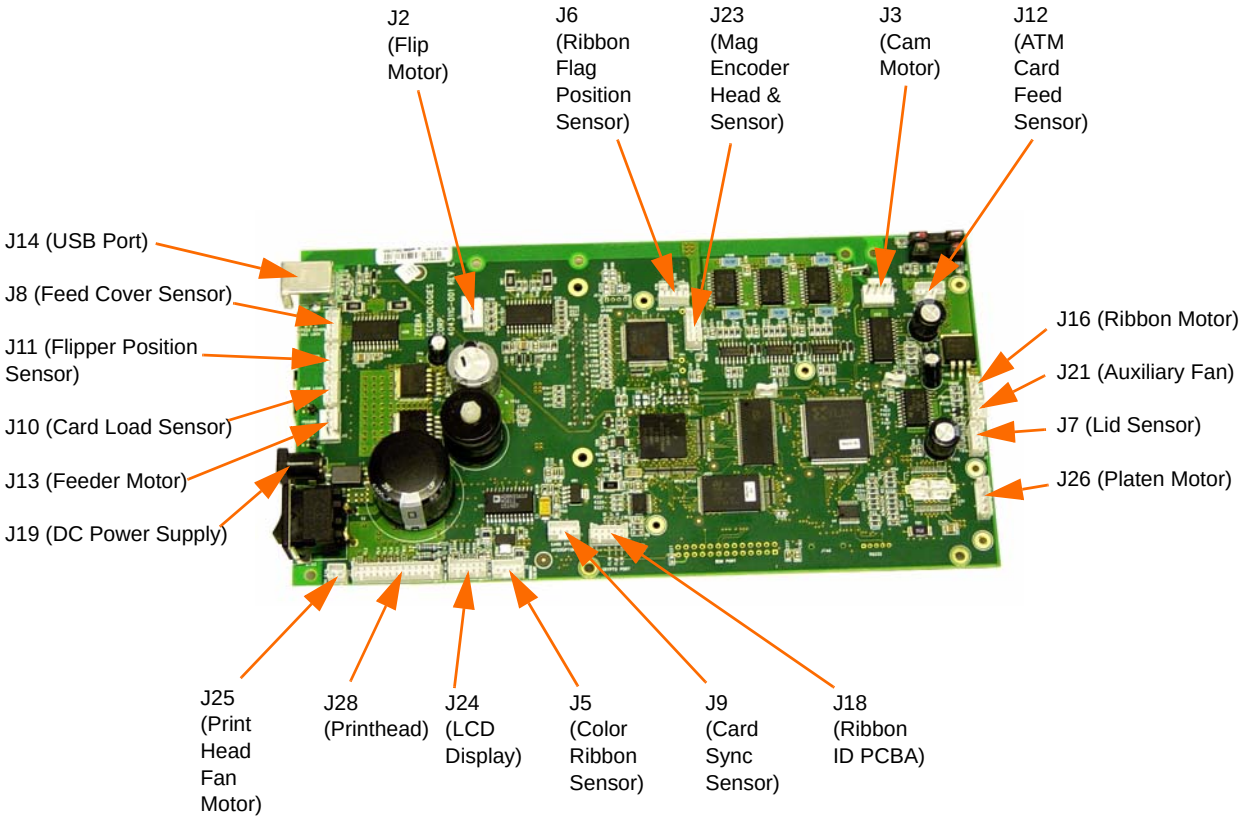
Most of the circuitry in the Printer is on the CPU PCBA. Since the CPU PCBA is not a serviceable unit, circuit analysis to the component level is pointless.

Below is a block diagram of the functional circuits of the Printer; the block diagram also shows how signals are passed to and from the CPU PCBA to the rest of the Printer.



3.6 CPU PCBA Connections

Most of the circuitry in the Printer is on the CPU PCBA. Since the CPU PCBA is not a serviceable unit, circuit analysis to the component level is pointless; but a basic understanding of how the CPU PCBA connects to the rest of the Printer helps to better understand the Printer.



4 Troubleshooting

4.1 Introduction

The objective of troubleshooting is to relate a problem to an associated assembly or system function, in order to most efficiently isolate and repair the problem. Typically this involves determining the failure symptom and then checking one or more possible causes of the failure.

Only a symptom-related list of possibilities appears. In general, for a given failure symptom one or more possible causes are listed, with suggested corrective action to take. These causes should be checked and corrective actions taken in the order given; they are listed in order of likelihood and complexity.

When the suggestions presented fail to lead to a repair, a CPU Board replacement, if not prescribed, should nevertheless be tried. A check for broken or disconnected cables and any loss of power should also take place along with checks for obvious mechanical damage.

Zebra Card Printer solutions offers Technical Support and factory repair as options.

4.2 Troubleshooting Procedures

4.2.1 General Issues

The table below offers causes and solutions to symptoms related to improper operation. Check the table when experiencing any loss of operation or print quality.

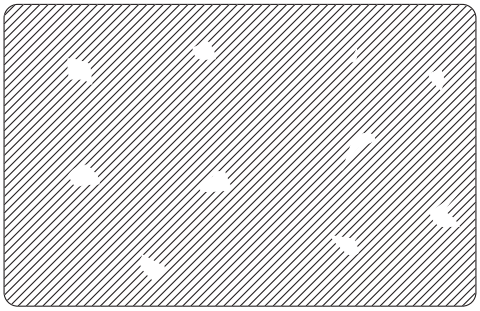
Problem / Description	Cause / Solution
The LCD Panel displays OUT OF CARDS message.	1. Check for cards in the card feeder. If no cards are present, load cards. 2. Press the Control Button for one second. The printing job will restart.
The LCD Panel displays OUT OF RIBBON message.	1. Check the ribbon. Replace if defective or entirely used. 2. Ribbon will automatically synchronize and printing will restart with a new card.
The LCD Panel displays MECHANICAL ERROR message.	1. Check that you are using the correct card type (see Technical Specifications). 2. If two cards are fed into the printer at the same time: Open the Lid and remove the Ribbon Cartridge, empty the Card Feeder, and pull out the jammed cards. Replace the Ribbon Cartridge. Remove cards from Card Feeder, separate them as shown in Loading Cards in Section 2, and replace. 3. Check that ribbon is loaded correctly.
The LCD Panel displays ENCODING ERROR message.	1. Check that you are using the correct magnetic card type (for low or high coercivity encoding). 2. Verify command syntax. 3. Contact Zebra technical support.
The LCD Panel displays INSERT CARD message with cards in the Card Feeder.	1. Printer may be in the Single Feed mode. Change mode.
The LCD Panel displays CLEAN PRINTER message.	1. Printer cleaning required (see Section 6).

4.2.2 Print Quality Issues

Important • The use of Zebra cards and True Colours® ribbons will give the best print quality.

This section will help you resolve print quality problems The print quality is dependent on several factors. The two most important factors that will increase your print quality are cleanliness and card stock. To diagnose and fix print quality problems, follow the troubleshooting procedures below:

Example • Small spots appear on the printed card with a non-printed area or a different color.



- Possible Cause:

  Contamination on the card surface.

  Solution:

  Check that cards are stored in a dust free environment.

  Use a different supply of cards.

- Possible Cause:

  Cleaning roller not installed.

  Dust inside the printer and/or dirty cleaning roller.

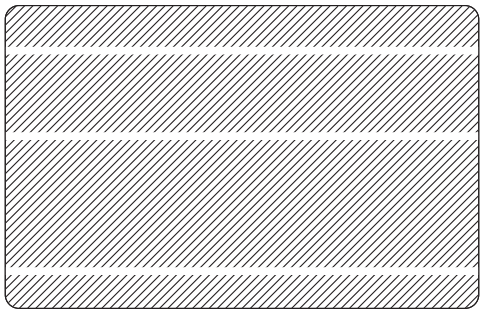
  Solution:

  Perform a cleaning of the printer.

  Check that the protective cover was removed from the ribbon cartridge cleaning roller.

  If printing one card at a time, replace the cleaning roller located at the front of the printer.

Example • There are non-printing horizontal lines (white) on the card surfaces.



- Possible Cause:

  Ribbon cartridge is not correctly positioned.

  Solution:

  Ensure that the ribbon is properly rolled onto the ribbon cores of the cartridge and that there are no wrinkles in the ribbon.

  Replace ribbon cassette.

- Possible Cause:

  Printhead is dirty.

  Solution:

  Clean the printhead.

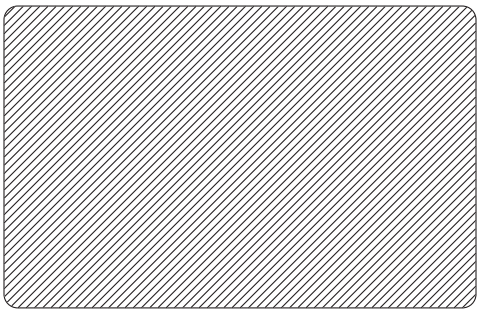
- Possible Cause:

  Printhead elements are damaged (e.g., scratched or burnt).

  Solutions:

  Replace the printhead.

Example • Printing shows very pale or inconsistent results.



- Possible Cause:

  Ribbon cartridge has been stored improperly or is damaged.

  Solution:

  Change the ribbon cartridge and print again.

- Possible Cause:

  Cards may not meet specifications.

  Solution:

  Use a different supply of cards.

- Possible Cause:

  Contrast and/or intensity may be set to values which are too high.

  Solution:

  Adjust contrast and/or intensity values in software.

- Possible Cause:

  Dust or embedded contamination on elements of the printhead.

  Solution:

  Clean the printhead.

Example • Printing shows blurry printed image.

- Possible Cause:

  Ribbon cartridge may not be correctly positioned.

  Solution:

  Check that the ribbon is properly rolled onto the ribbon cores of the cartridge, with no wrinkles.

  Replace ribbon cartridge, making sure it locks in place, and print again.

- Possible Cause:

  Ribbon may not be synchronized on the correct color panel position.

  Solution:

  Open lid, then close lid to synchronize ribbon.

- Possible Cause:

  Cards may not meet specifications.

  Solution:

  Use a different supply of cards.

- Possible Cause:

  Dust or embedded contamination inside the printer and/or dirty cleaning roller.

  Solution:

  Clean the printhead.

  Replace the cleaning roller.

Example • No printing on the card.

- Possible Cause:

  Ribbon cartridge may not be installed in the printer.

  Solution:

  Check for ribbon cartridge in the printer.

- Possible Cause:

  Cards may not meet specifications.

  Solution:

  Use a different supply of cards.

- Possible Cause:

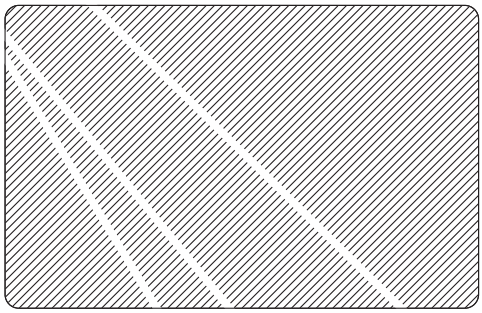
  Cable on printhead may be disconnected.

  Printhead elements may be scratched or burnt.

  Solution:

  Call Service for printhead repair or replacement information.

Example • Irregular white lines in the print, like the ribbon is wrinkling -- Ribbon Wrinkle.



- Possible Cause:

  Ribbon cartridge may not be correctly positioned.

  Solution:

  Check to make sure that the ribbon is loaded correctly.

- Possible Cause:

  Cards may not meet specifications.

  Solution:

  Use a different supply of cards.

- Possible Cause:

  Dirty printhead and/or print path.

  Solution:

  Clean the printhead.

  Clean the print path.

- Possible Cause:

  Worn or uneven platen roller surface.

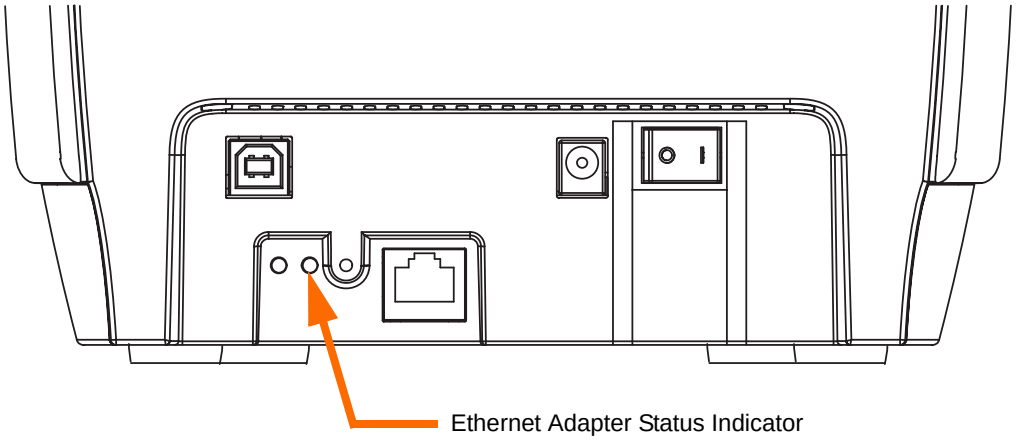
  Solution:

  Replace the platen roller.

4.3 Troubleshooting the Ethernet Connection and Adapter

4.3.1 Ethernet Adapter Status Indicator

A bi-color Status Indicator displays the operational status of the Ethernet Adapter.



The following conditions might occur:

Step 1. During normal operation, the LED is *solid* **GREEN** for more than 30 seconds. This indicates all the hardware is functioning properly and the Ethernet Adapter has detected the presence of the network. It does not mean the Ethernet Adapter has an IP address or is attached to a printer queue.

Step 2. If the LED is rapidly *flashing* **GREEN** (9 times/sec), the Ethernet Adapter has not detected the presence of a network cable. To solve the problem:

- Verify that the network cable is appropriate and has an RJ-45 connector.
- Turn the printer power OFF (O). Remove the network cable from the Ethernet Adapter. Plug the network cable back in until you hear a positive click. Check the other end of the cable in the same manner. Turn the printer power on; if the Ethernet Adapter still does not detect a cable, continue.
- Connect the Ethernet Adapter to a known good network. If the Adapter is still unable to detect the network cable, contact Technical Support for assistance.

Important • Cables with a rating higher than CAT-6 have **not** been tested.

Step 3. If the LED is slowly *flashing* **GREEN** (1 time/sec), the Ethernet Adapter is trying to print a job. If the job does not print, check the following:

- Verify that the printer has media and ribbon. If the printer is showing any errors, it is unlikely that the Ethernet Adapter can send data to the printer. The LED continues to blink until the printer malfunction is resolved or until the printer is turned OFF **(O)**.
- A *flashing* **RED** indicates the Power-On Self Test (POST) is in progress.

Step 4. If the LED is *solid* **RED** for more than 30 seconds, the Ethernet Adapter has failed the POST. A failed POST can be caused by any of the following:

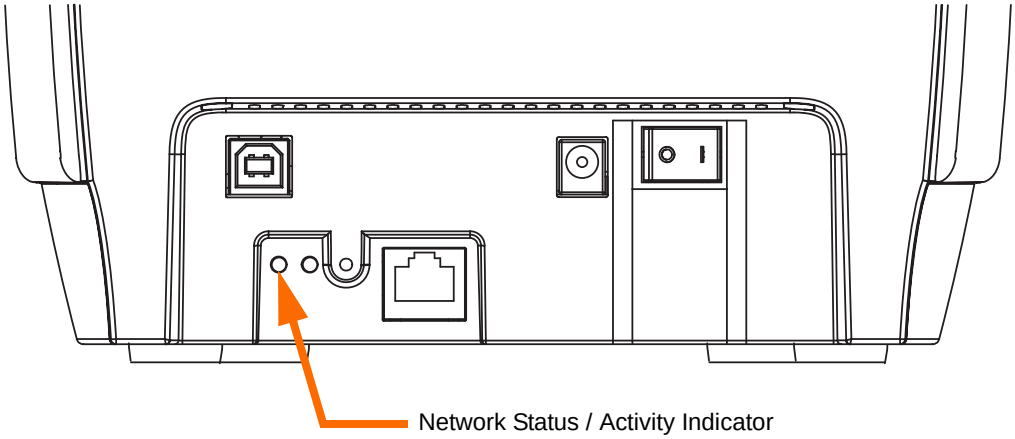
- The printer attached to the Ethernet Adapter device is malfunctioning. Turn the printer power off, wait 10 seconds, then turn the printer back ON (|).
- If the Ethernet Adapter still fails the POST, the Ethernet Adapter has a hardware problem that can be fixed only by replacing or returning the unit. Contact Technical Support for repair or replacement information.

Step 5. If the LED is alternately *flashing* **RED** and **GREEN** for longer than 2 minutes, the Ethernet Adapter is in firmware-download mode. This means it is waiting for new firmware data to be sent before it continues normal functioning. Do the following:

- If the Ethernet Adapter was purposely put into firmware-download mode, finish the download with the proper update utility.
- Contact the Zebra web site at http://www.zebracard.com, and click on the Drivers & Downloads tab.
- Contact Technical Support for help recovering this unit.

4.3.2 Network Status/Activity Indicator

A bi-color Status/Activity LED indicates network speed, established link, and network activity.



Step 1. If the LED is off, no link was established.

Step 2. If the LED is *solid* **GREEN**, a 100Base link is established.

Step 3. If the LED is *flashing* **GREEN**, a 100Base link is established and network activity has been detected.

Step 4. If the LED is *solid* **ORANGE**, a 10Base link is established.

Step 5. If the LED is *flashing* **ORANGE**, a 10Base link was established and network activity has been detected.

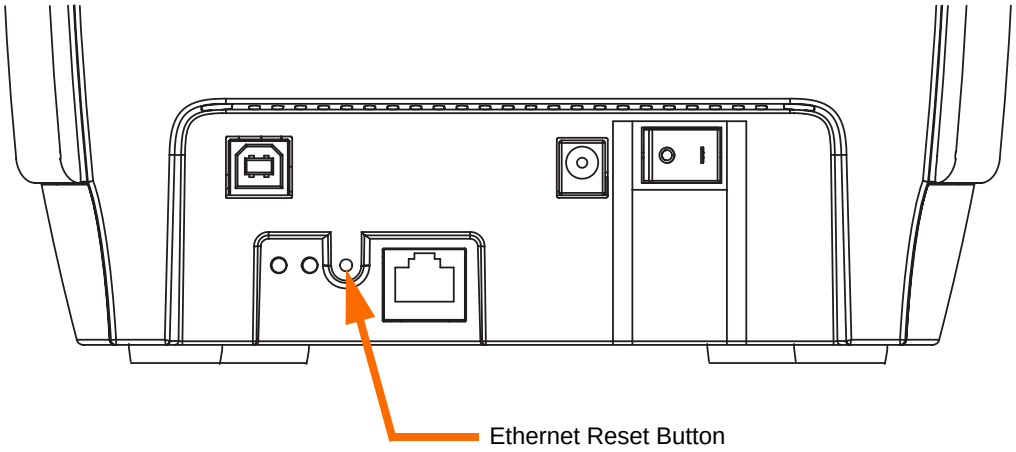
Network activity detected by this LED does not mean the activity is data for the print server. The activity is all activity on the network seen on the Ethernet Adapter.

4.3.3 Resetting to Factory Defaults

To reset the Ethernet Adapter configuration parameters to the factory defaults:

Step 1. Turn printer power OFF (O).

Step 2. Press the Ethernet Reset Button; hold it in while turning the printer power ON (|).



Step 3. Keep the Ethernet Reset Button pressed until the Status Indicator light turns **GREEN**.

Step 4. Release the Ethernet Reset Button.

Printing a Configuration Card

To print a configuration card, press and hold the Ethernet Reset Button until a card starts to print.

5 Replacement Procedures

5.1 Introduction

The following sections describe removing both major assemblies and, where applicable, subassemblies and/or components that are considered replaceable.

In general, only removal directions are presented; unless otherwise noted, replacement would be performed by reversing the removal steps. Replacement instructions for some items are not presented; removal and replacement of these items are considered too obvious to warrant a detailed description.

Spares Kits are listed in *Appendix E*.

Electric Shock Caution • Before performing any of the procedures in this section, set the printer power to OFF (O) and disconnect the power cord.

Electrostatic Discharge Caution • All replacement procedures must be performed at a static-free work station, an anti-static wrist strap must be worn and properly terminated, or other appropriate protection must be used.

Caution • Before beginning any of the procedures that follow, read completely through the procedure. If you do not have the specified tools, or if any step(s) seem beyond your skill or experience level, do not attempt the procedure. You may cause additional damage to the printer.

Note • Some of the photographs in this section may show additional parts removed in addition to removals for the process being described.

Important • If you are going to replace the Main PCBA, **Print a Test Card** (refer to Section 2.10). You will need the Head Resistance, the X and Y Offsets, and the End of Text value to update the firmware on the replacement Main PCBA.

If for any reason you are unable to print the Test Card, contact Zebra Technical Support to obtain the above values.

5.2 Required Tools

This section lists the tools required for the replacement procedures described in this section. Naturally, not all tools are required for a particular procedure; specific tools are called out in each step as appropriate.

Important • When removing **any** of the nylon or plastic pulleys or gears, the use of a gear puller is strongly recommended. If a gear puller is not available, use pliers and/or a flat-blade screwdriver to pry the gear or pulley off its shaft.

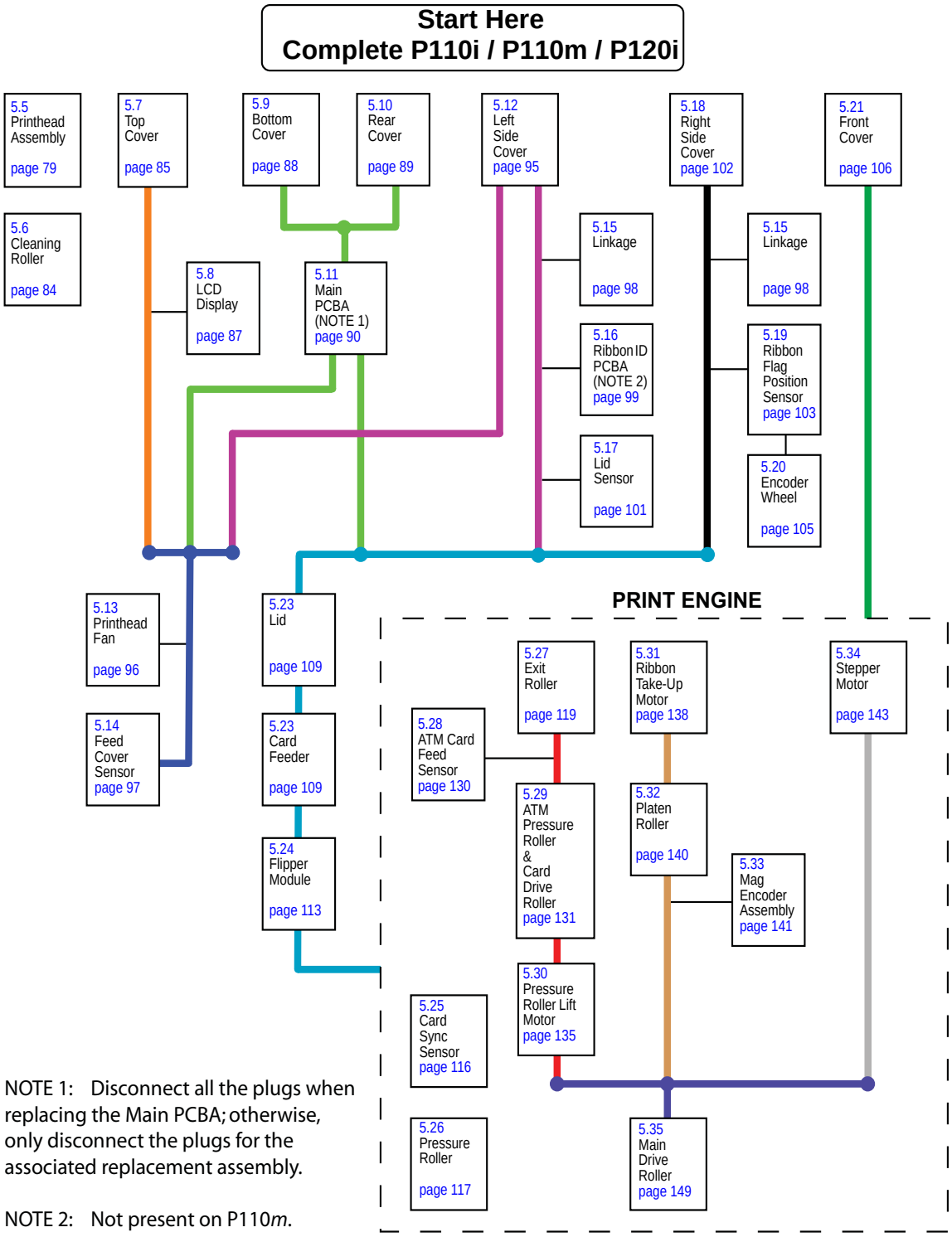
In either case, remove any Loctite residue from the shaft and the gear/pulley.

Inspect the old gear/pulley **very** carefully. If any teeth have burrs, are missing, or are damaged, or if the center hole is distorted or enlarged, the gear/pulley **must** be replaced rather than the old one re-installed.

1. Flat-Blade Screwdrivers, from 1/16 inch (1.5 mm) to 1/4 inch (6.5 mm)
2. Phillips Screwdrivers, numbers 0, 1, and 2
3. TORX T8 and TORX T10 drivers
4. Fine-Point, Offset Fine-Point, and Needle-Nose pliers
5. Small Diagonal Cutters or other cutter for cutting cable ties
6. Hex Keys, 1.5 mm and 2.0 mm
7. Hex Driver, 5.5 mm (this can also be used for securing push nuts)
8. Small and Medium Spring Hook Tools
9. Belt Tensioning Tool, Zebra P/N 900754-003

5.3 Removal Sequence

This figure shows the recommended removal sequence. For each item, follow the diagram upward to see what must be removed for access. For example, to remove the Feed Cover Sensor, you would remove the Top Cover, the Main PCBA, the Bottom and Rear Covers, and the Left Side Cover.

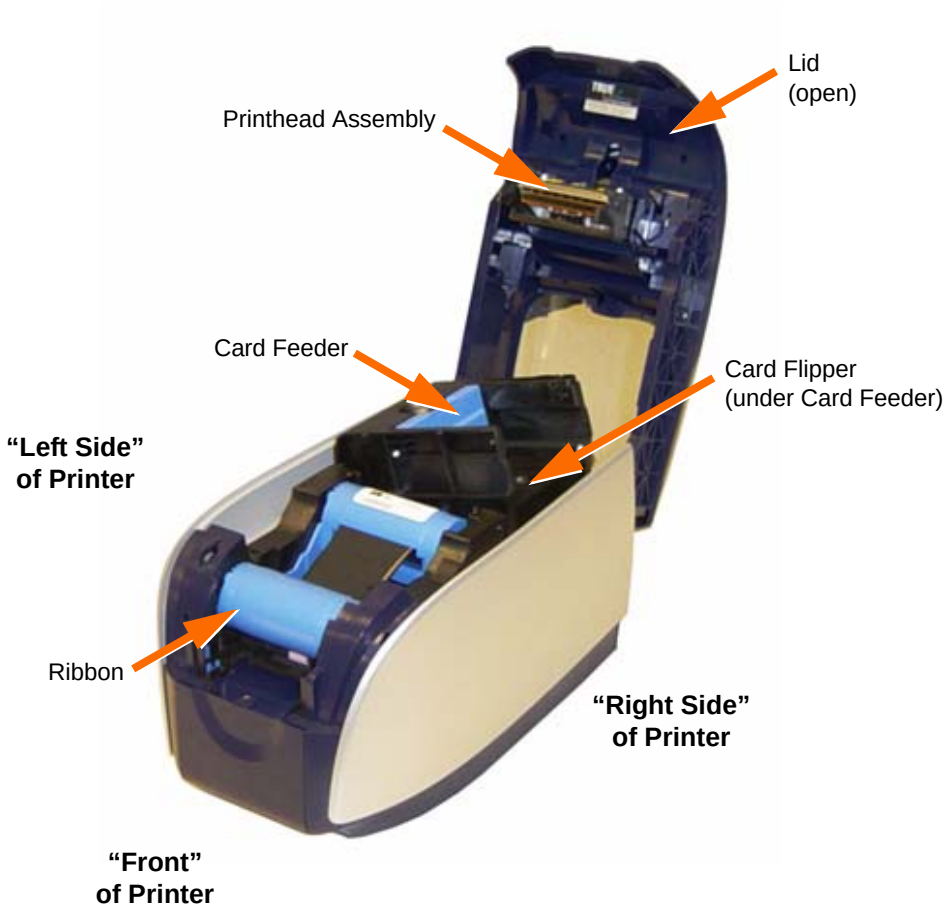


NOTE 1: Disconnect all the plugs when replacing the Main PCBA; otherwise, only disconnect the plugs for the associated replacement assembly.

NOTE 2: Not present on P110*m*.

5.4 Terminology

The following picture, in conjunction with the Removal Sequence drawing, will help you keep track of which side of the printer is which in the procedures that follow.



5.5 Printhead Assembly

Electrostatic Discharge Caution • The Printhead is extremely susceptible to Electrostatic Discharge (ESD) damage. Do not touch the bottom surface of the Printhead. The replacement must be performed at a static-free work station, an anti-static wrist strap must be worn and properly terminated, or other appropriate protection must be used.

Important • This procedure describes replacing the Printhead Assembly. The Printhead Assembly is supplied with components in correct alignment with each other. These alignments are critical to proper operation of the printer. Do not deviate from the procedure given here, do not loosen or tighten any screws except those specifically noted in this procedure, and do not attempt to adjust any part of the Printhead Assembly.

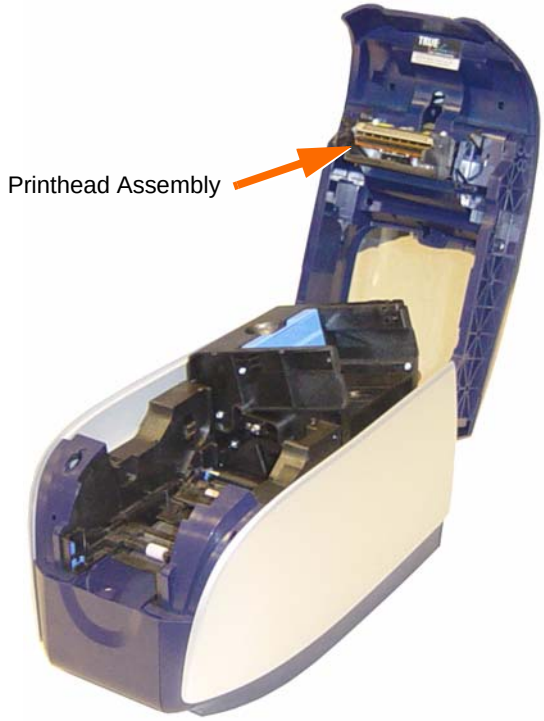
Note • The Printhead Assembly can be replaced without removing any other parts of the printer.

Printhead Removal

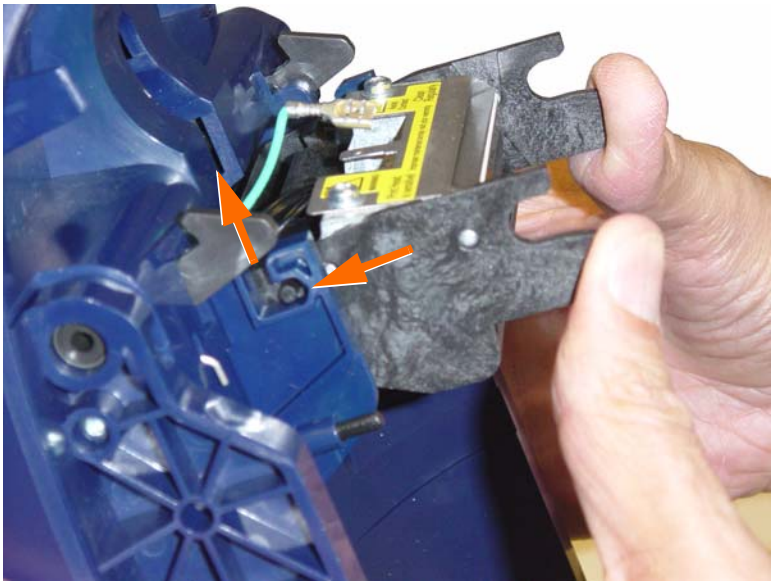
Step 1. Turn the printer off, and disconnect the power cord.

Step 2. Press the access button in, and raise the Lid.

Step 3. Locate the Printhead Assembly.



Step 4. Push the Printhead Assembly in and upward.



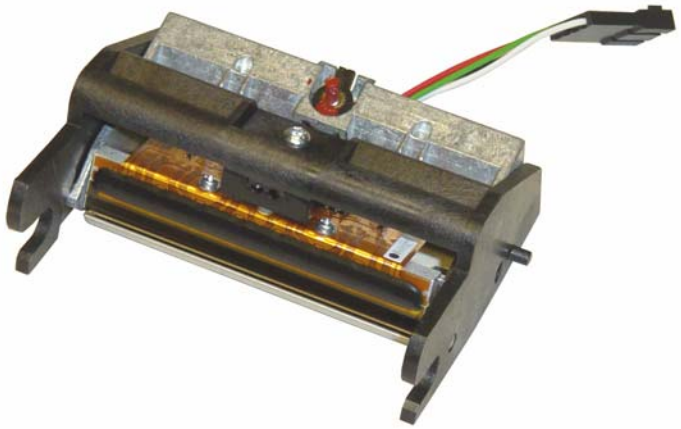
Step 5. Lift the Printhead Assembly out of the frame.

Step 6. Disconnect the green ground wire.

Step 7. With a small flat-blade screwdriver, loosen and remove the printhead data and power cable.

Step 8. Disconnect the 4-wire Color Ribbon Sensor. Do not let the 4-wire connector go into the access hole -- it is difficult to retrieve. Note that this sensor connects to J5 on the Main PCBA.

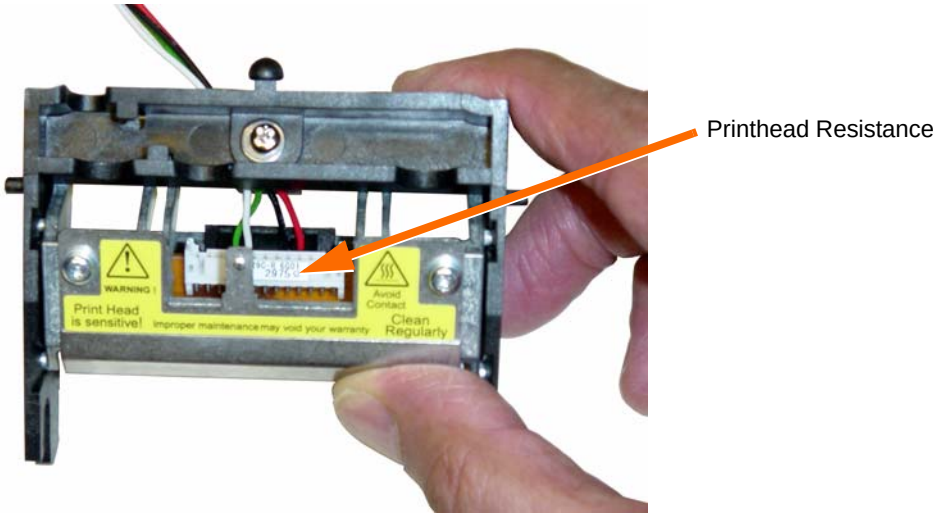
Step 9. Remove the Printhead Assembly.



Printhead Replacement

Printhead Installation

Step 1. Record the resistance of the new Printhead Assembly.

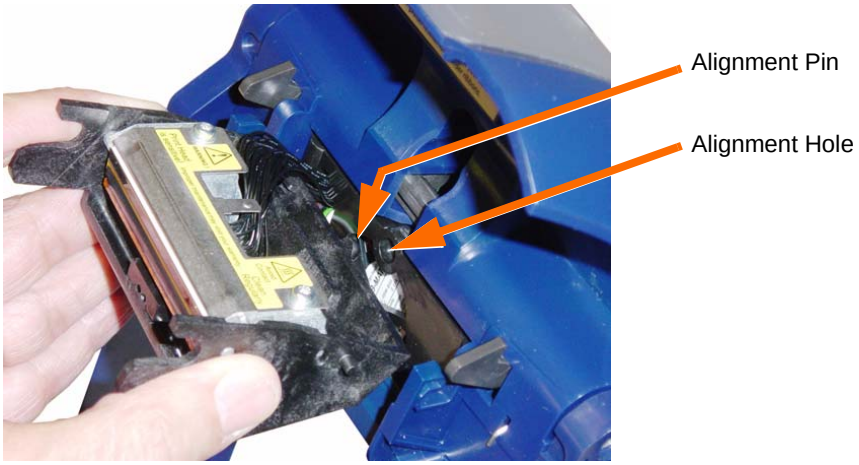


Step 2. Connect the 4-wire Color Ribbon Sensor.

Step 3. Connect the printhead data and power cable. Note that the connector is keyed. Use a flat-blade screwdriver to guide the connector into place.

Step 4. Connect the green ground wire.

Step 5. Push the printhead alignment pin into the alignment hole.



Step 6. Press in and downward, lowering the Printhead Assembly into place.

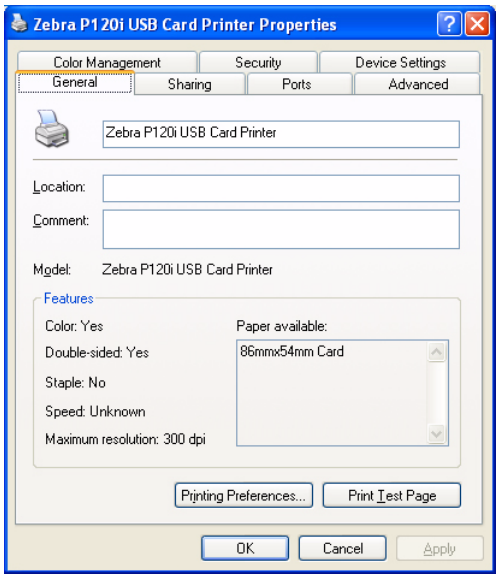
Step 7. The Printhead installation is complete.

Firmware Update

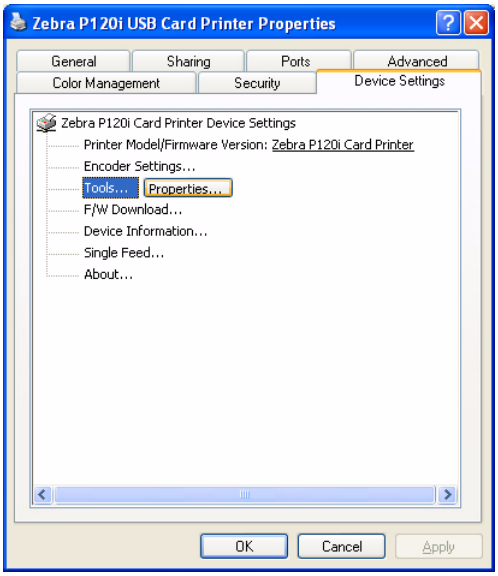
Step 1. Go to start > Printers and Faxes.

Step 2. From the Printers and Faxes list, right click the Card Printer; and select **Properties** from the pop-up menu.

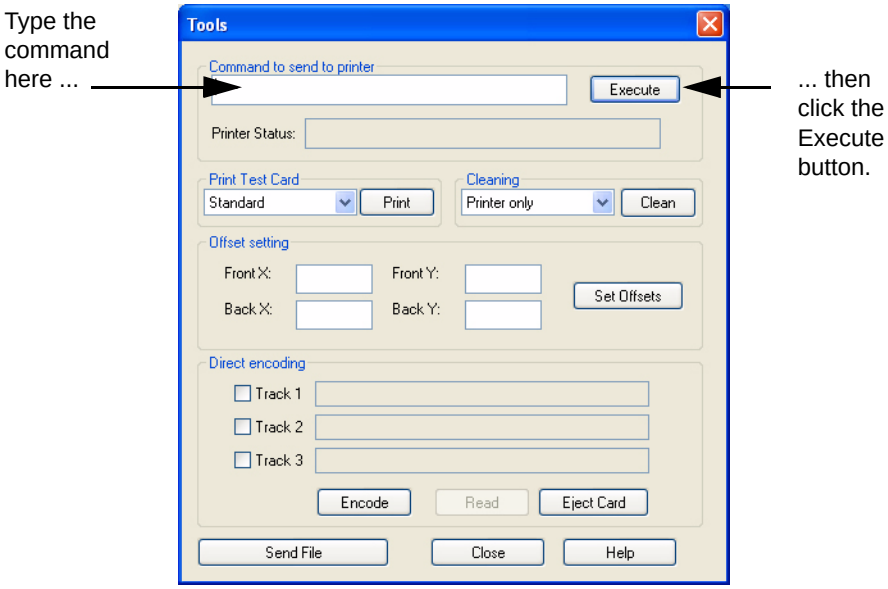
Step 3. The **Printer Properties** window will open. Click on the Device Settings tab.



Step 4. Click on Tools > Properties.



Step 5. This brings up the Tools display.



Note • The Print Head Resistance command is !R. See *Appendix D* for the complete list of commands

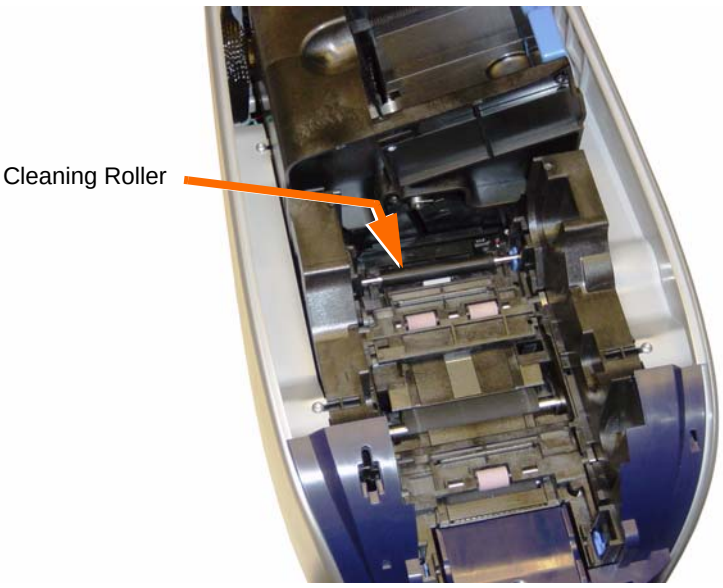
Step 6. In the “Command to send to printer” field., type the Print Head Resistance command, a space, and the resistance of the replacement Printhead Assembly (e.g., !R 1234).

Step 7. Click the Execute button.

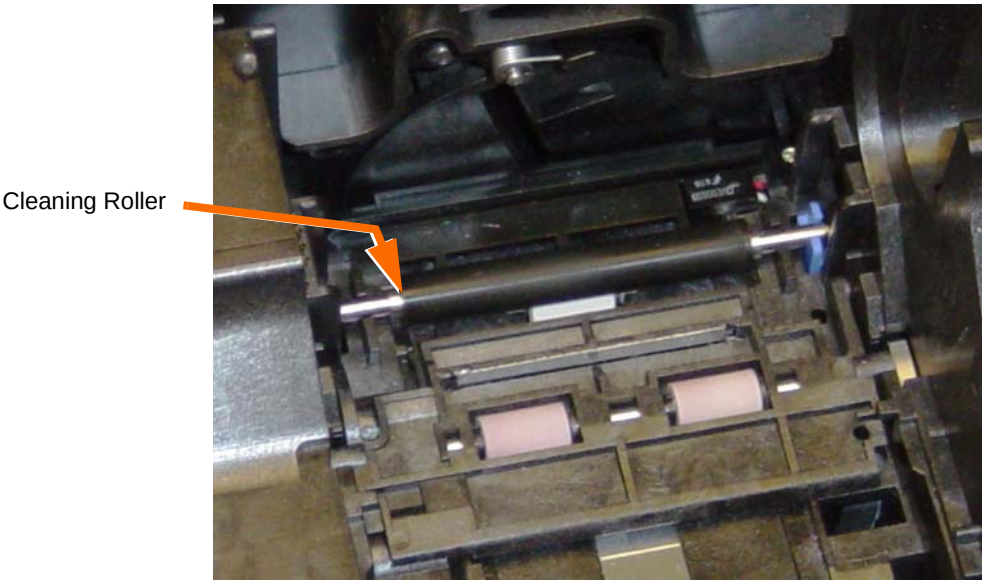
Step 8. The firmware update is complete.

5.6 Cleaning Roller

Step 1. Locate the Cleaning Roller.



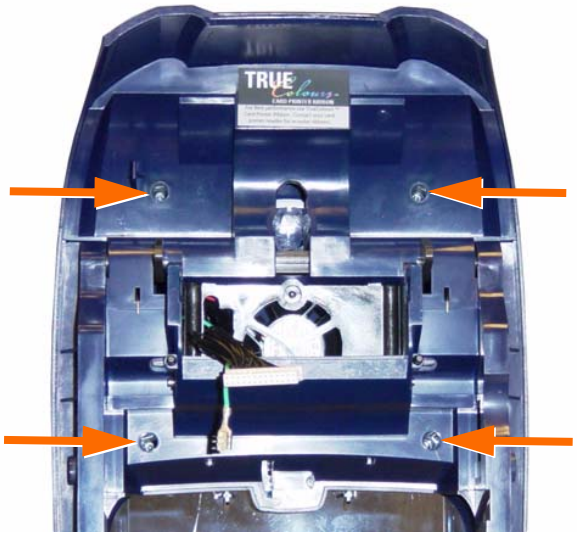
Step 2. Note that the Cleaning Roller snaps in and out of place. Carefully grasp the roller, and lift it up and out of the printer.



5.7 Top Cover

Step 1. Press the access button in, and raise the Lid.

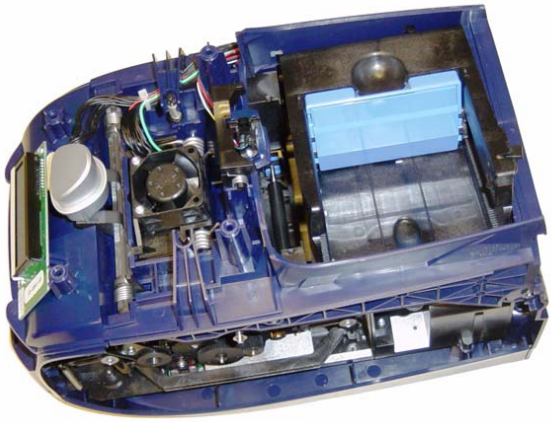
Step 2. With a TORX T10 driver, remove the four screws that hold the Top Cover to the Lid, as shown below. Note that the Printhead has been removed for clarity.



Step 3. Lower, but do not latch, the Lid.

Step 4. With one hand, grasp the front lip of the Top Cover. With the other hand, press down and to the rear with enough force to “pop” the Top Cover loose.

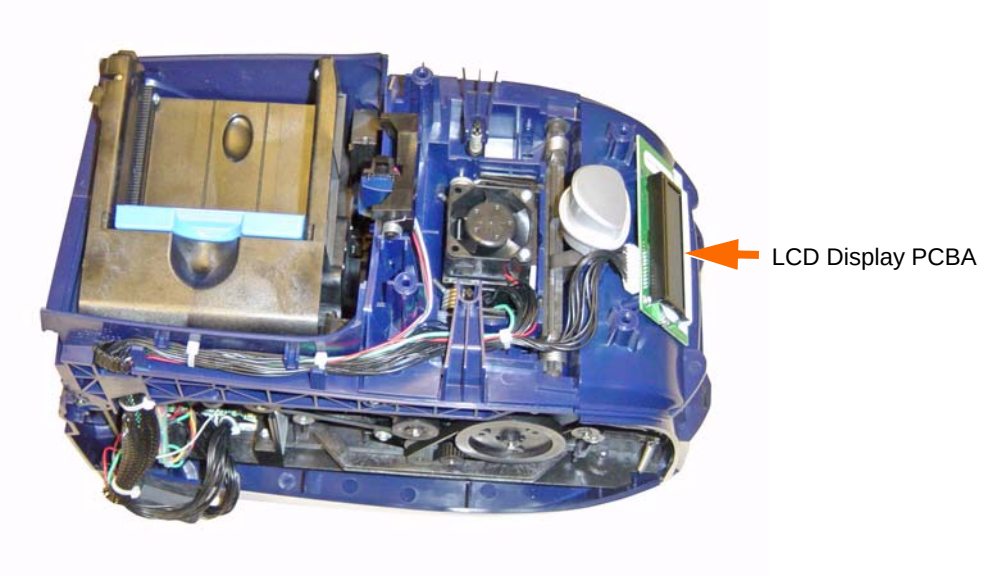
Step 5. Remove the Top Cover.



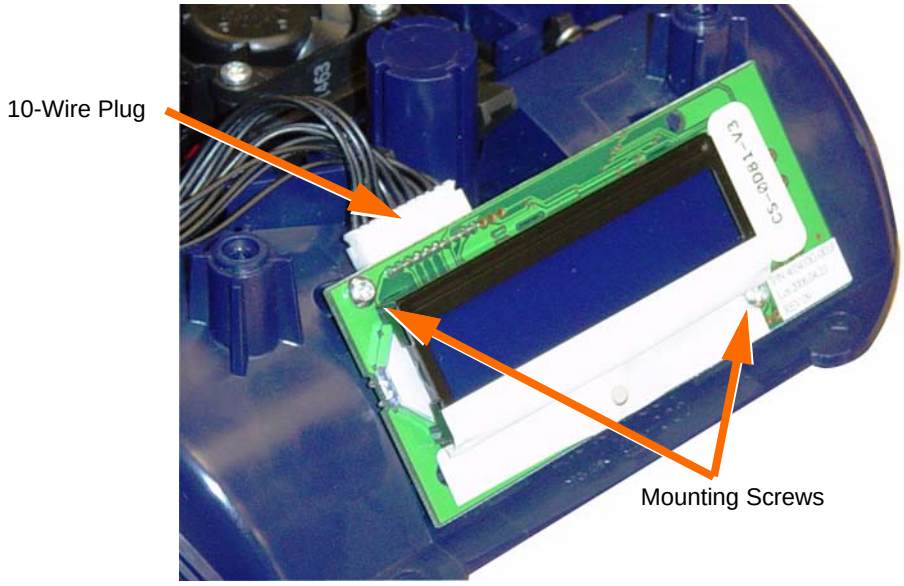
Step 6. Set the Top Cover aside.

5.8 LCD Display PCBA

Step 1. Locate the LCD Display PCBA.



Step 2. Carefully remove the 10-wire plug from the connector on the LCD Display PCBA.



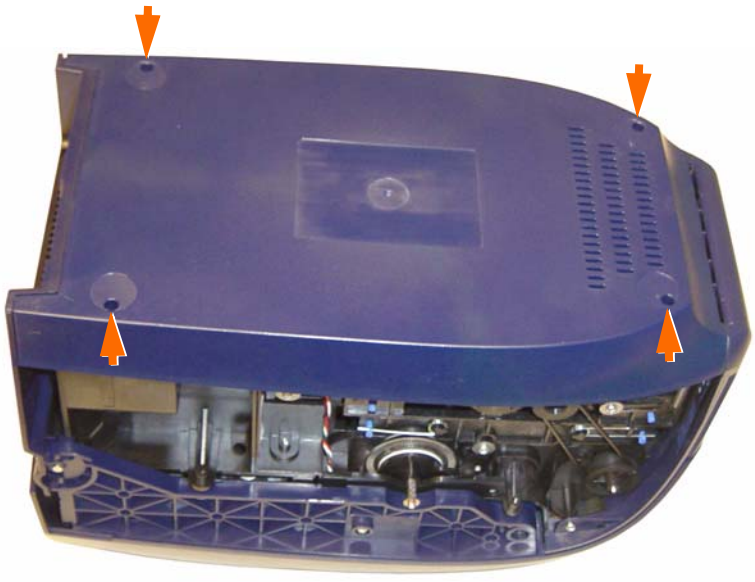
Step 3. With a TORX T10 driver, remove the two screws that hold the LCD Display PCBA to the frame.

Step 4. Remove the LCD Display PCBA.

5.9 Bottom Cover

Step 1. Turn the printer over, bottom side up.

Step 2. With a flat-blade screwdriver, carefully pry off the four rubber feet (they are held in place with adhesive). Note that the feet cover access holes to the screws holding the Bottom Cover in place.

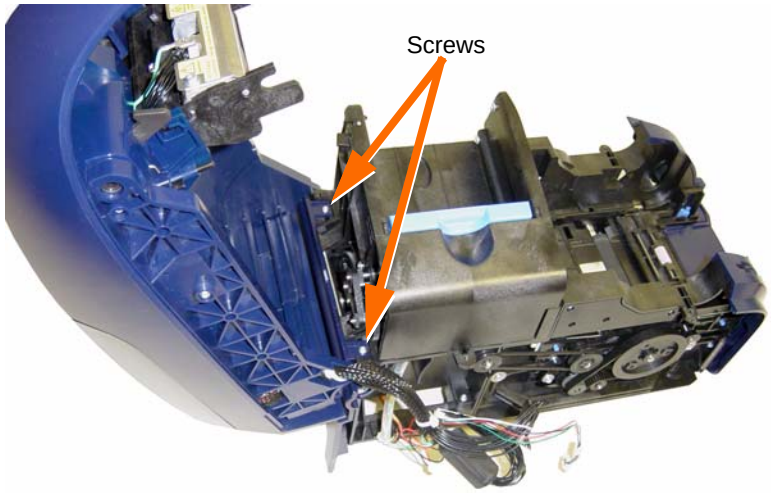


Step 3. With a TORX T10 driver, remove the four bottom-cover screws.

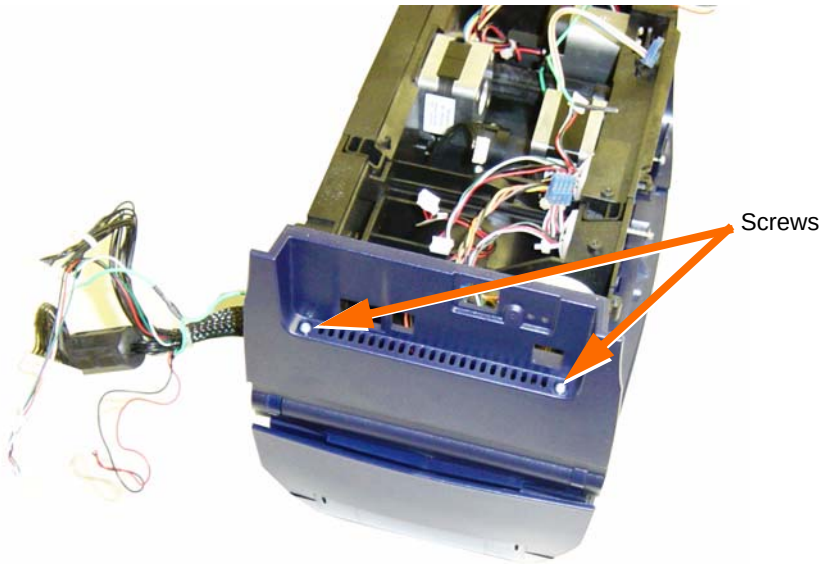
Step 4. Remove the Bottom Cover.

5.10 Rear Cover

Step 1. With a TORX T10 driver, loosen the two screws from the top of the Rear Cover.



Step 2. With a TORX T10 driver, remove the two screws from the bottom of the Rear Cover.



Step 3. Remove the Rear Cover.

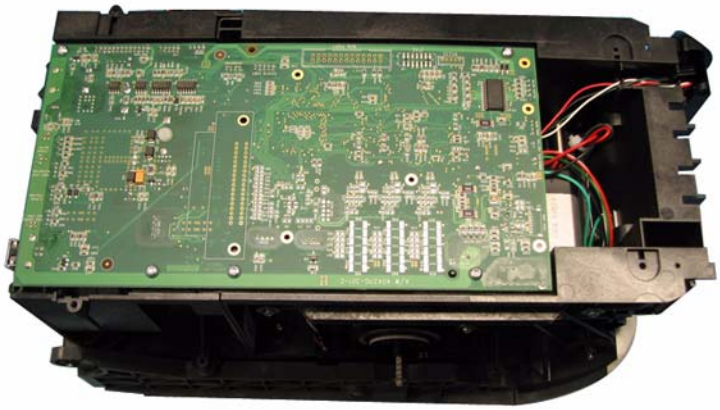
5.11 Main PCBA

Important • Before starting this procedure, **Print a Test Card** (see Section 2.10). You will need the Head Resistance, the X and Y Offsets, and the End of Text value to update the firmware on the replacement Main PCBA.

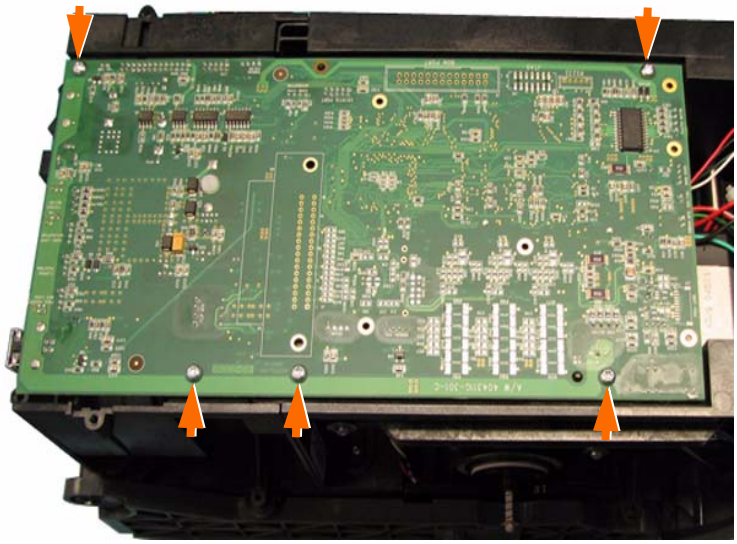
If for any reason you are unable to print the Test Card, contact Zebra Technical Support to obtain the above values.

Note • If replacing a Main PCBA that includes the Ethernet Interface Option, see *Appendix C* for additional information.

Step 1. With the Bottom Cover removed, the Main PCBA is visible and accessible.

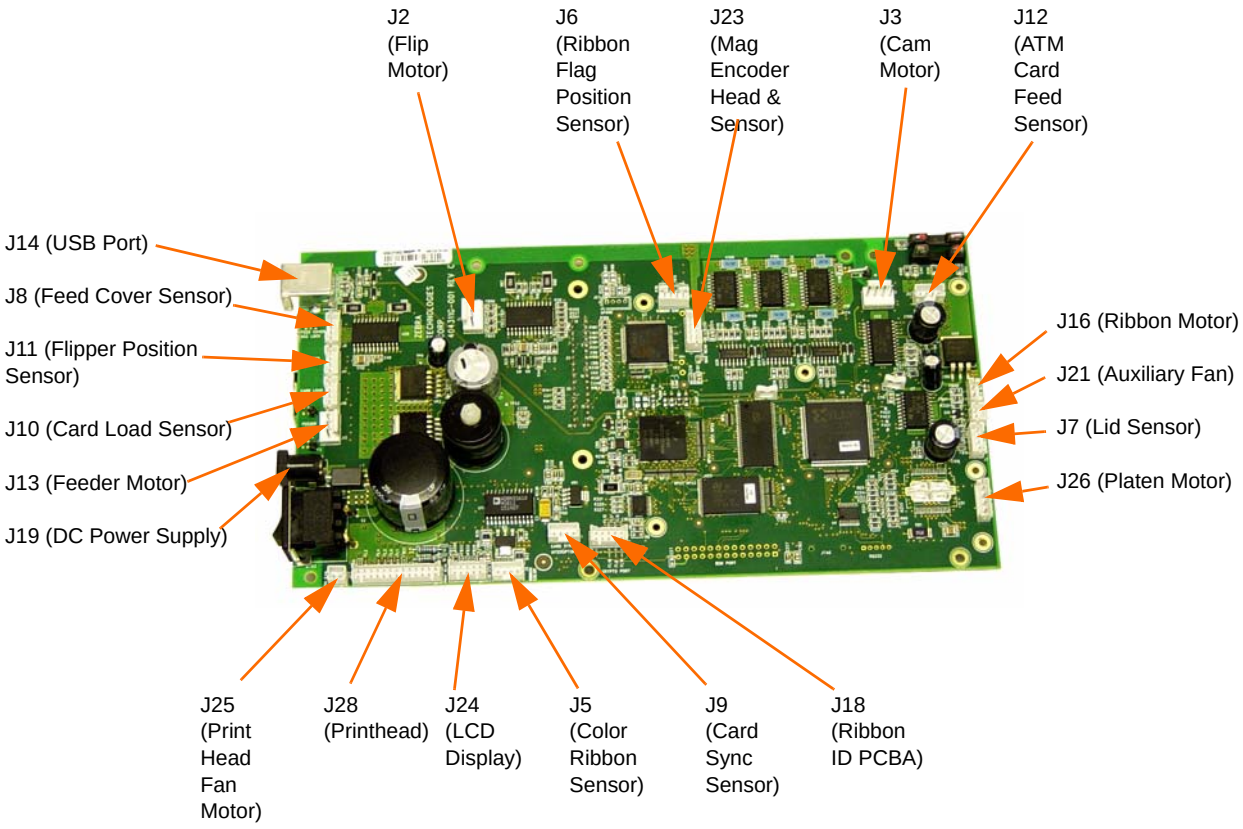


Step 2. With a TORX T10 driver, remove the five screws holding the Main PCBA in place. Note that the five orange arrows point out the PCBA mounting hardware.

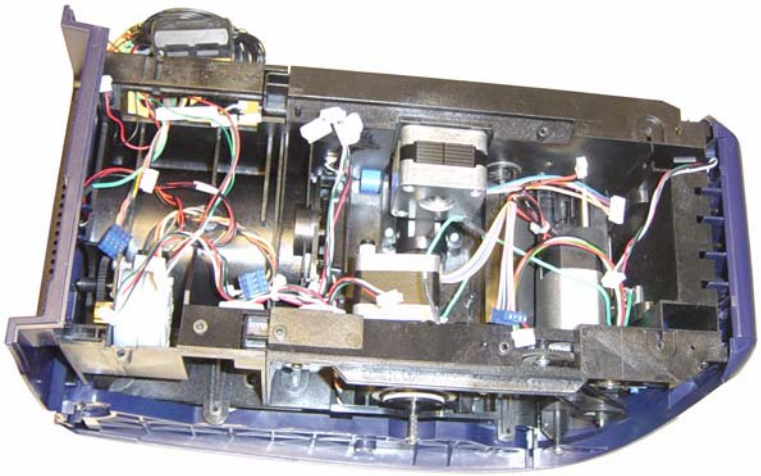


Step 3. Carefully lift the Main PCBA out of the frame, and disconnect the various wires and connectors that attach to the Main PCBA. Be careful to avoid damaging any of them.

Step 4. The following picture shows the connections to the Main PCBA.



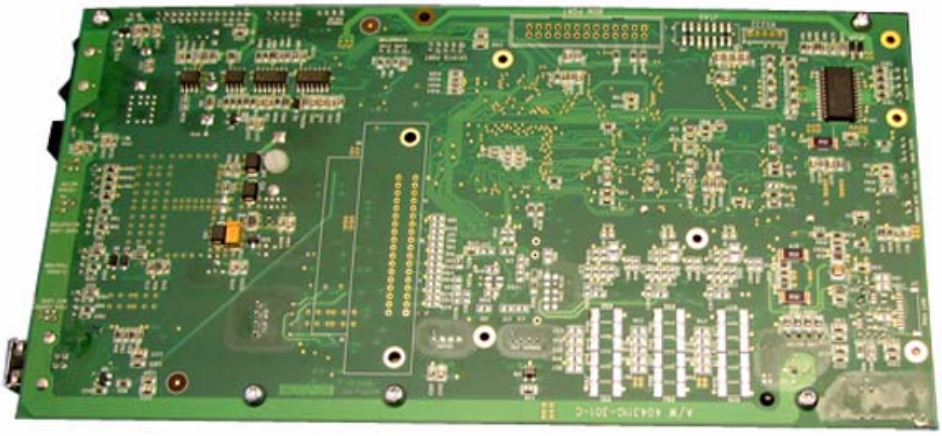
Step 5. When the Main PCBA is removed, the view from the bottom of the printer looks like the following picture.



Step 6. Set the Main PCBA aside.

Side 1

Side 2



Firmware Update

Important • Before starting the Firmware Update, refer to the **Test Card** you printed prior to removing and replacing the Main PCBA. You will need the Head Resistance, the X and Y Offsets, and the End of Text value to update the firmware on the replacement Main PCBA.

If for any reason you were unable to print the Test Card, contact Zebra Technical Support to obtain the above values.

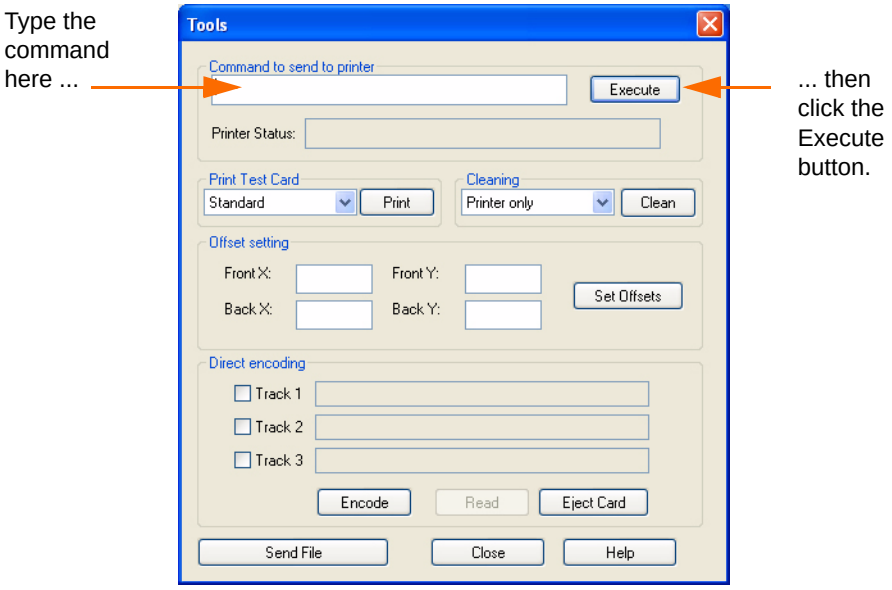
Step 1. Go to start > Printers and Faxes.

Step 2. From the Printers and Faxes list, right click the Card Printer; and select **Properties** from the pop-up menu.

Step 3. The **Printer Properties** window will open. Click on the Device Settings tab.

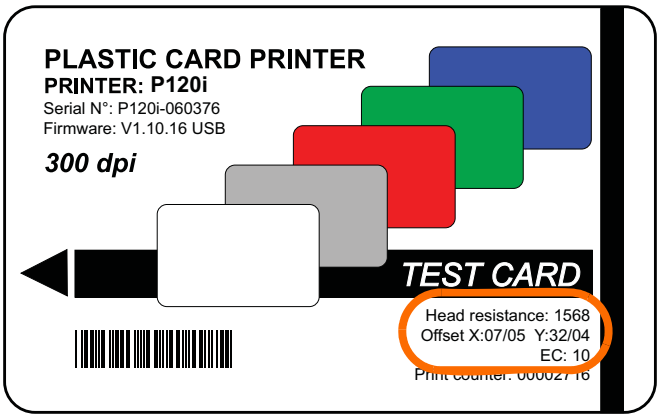
Step 4. Click on Tools > Properties.

Step 5. This brings up the Tools display.



Note • See *Appendix D* for the complete list of commands

Step 6. From the information on the **Test Card**, update the printer's firmware.



a. In the "Command to send to printer" field, type the Print Head Resistance (!R) command, a space, and the resistance of the Printhead. From the Test Card shown above, the complete command is !R 1568.

b. Click the Execute button.

c. In the "Command to send to printer" field, type the End of Print (+EC) command, a space, and the end-of-print value. From the Test Card shown above, the complete command is +EC 10.

d. Click the Execute button.

e. In the Offset setting section, enter the X and Y offsets for the card *front* in the Front X and Front Y fields respectively. From the Test Card shown above, Front X = 07 and Front Y = 32.

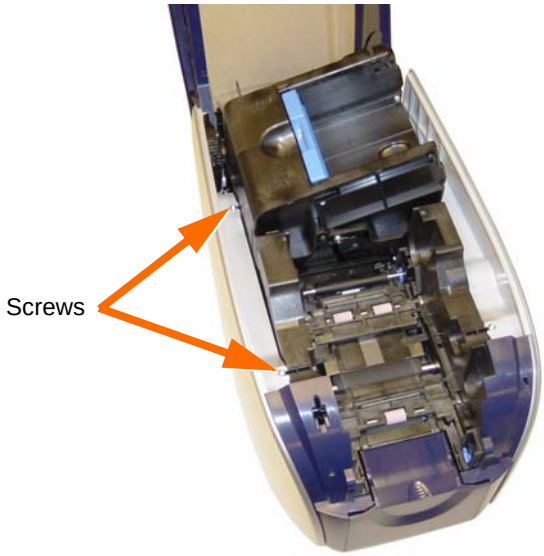
f. In the Offset setting section, enter the X and Y offsets for the card *back* in the Back X and Back Y fields respectively. From the Test Card shown above, Back X = 05 and Back Y = 04.

g. Click the Set Offsets button.

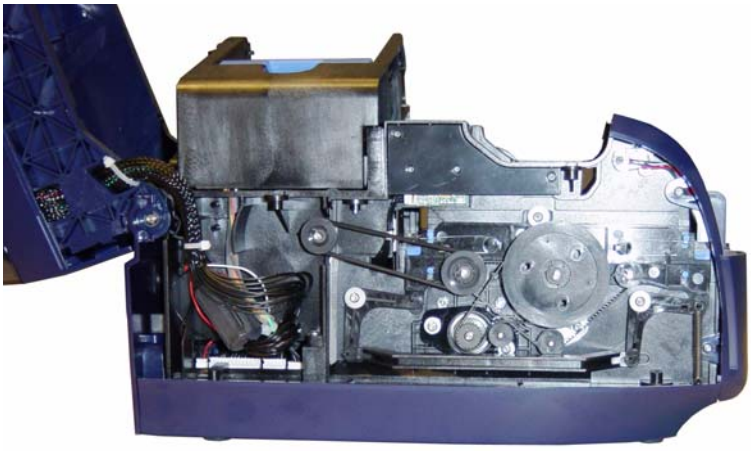
Step 7. The Firmware Update is complete.

5.12 Left Side Cover

Step 1. Locate the two screws that hold the Left Side Cover in place.



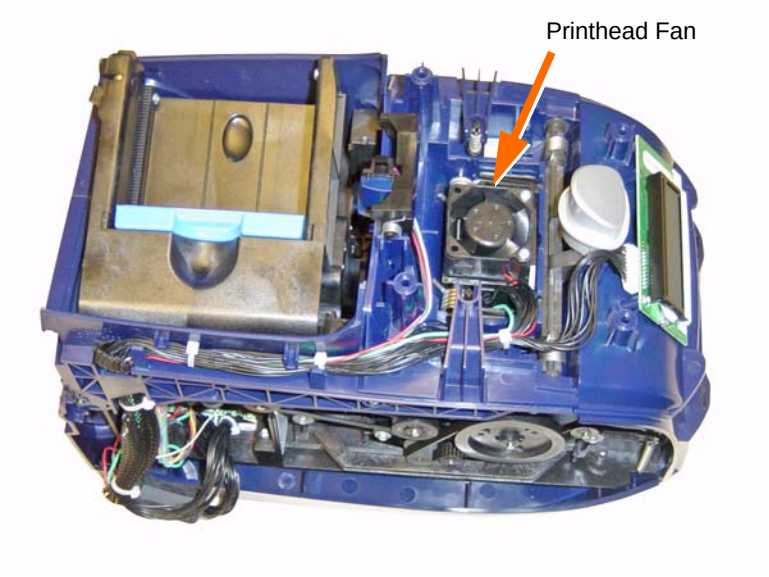
Step 2. With a TORX T10 driver, loosen the two screws.



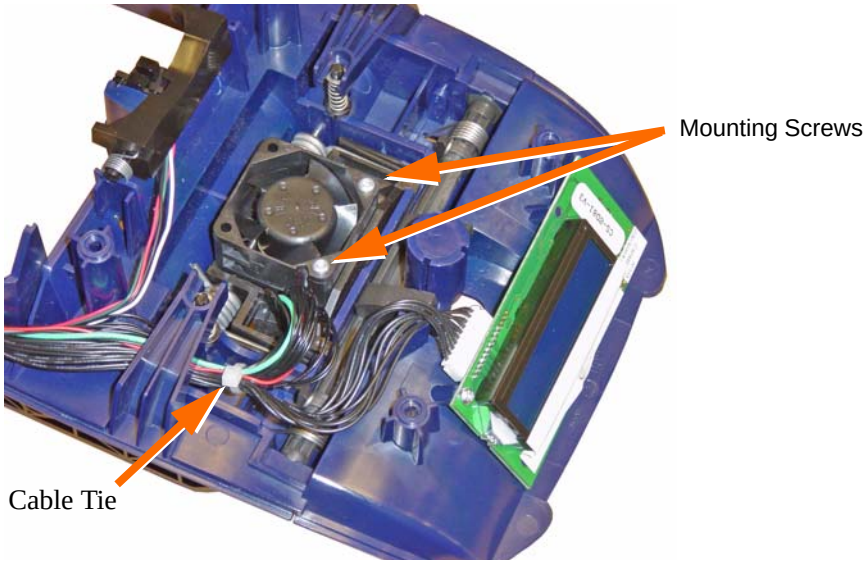
Step 3. Remove the Left Side Cover.

5.13 Printhead Fan

Step 1. Locate the Printhead Fan.



Step 2. With a TORX T10 driver, remove the two screws that hold the fan in place.



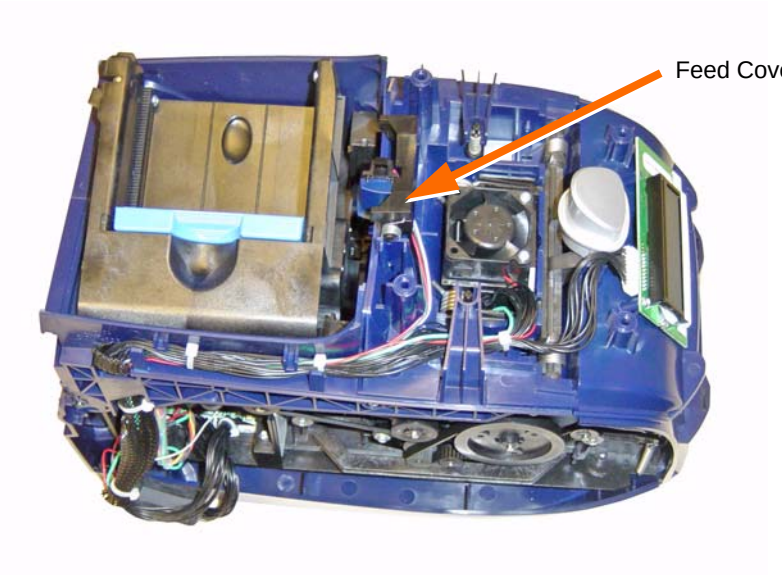
Step 3. Cut the cable ties holding the various wires and connectors going to the Main PCBA.

Step 4. Disconnect the 2-wire Printhead Fan plug from connector J25 on the Main PCBA.

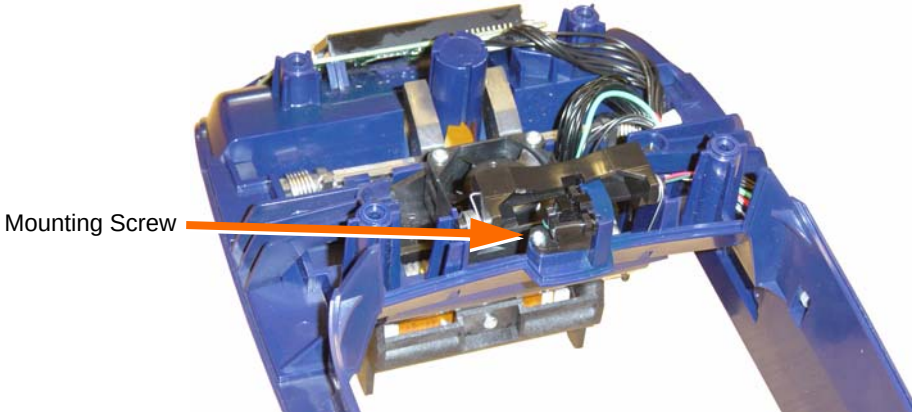
Step 5. Remove the Printhead Fan.

5.14 Feed Cover Sensor

Step 1. Locate the Feed Cover Sensor.



Step 2. With a TORX T8 driver, remove the screw that holds the sensor in place.



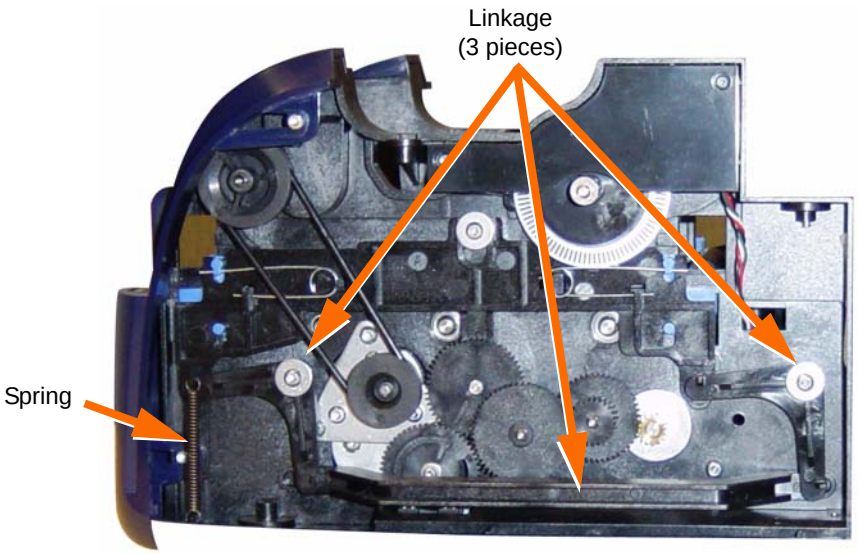
Step 3. Cut the cable ties holding the various wires and connectors going to the Main PCBA.

Step 4. Disconnect the 4-wire sensor plug from connector J8 on the Main PCBA.

Step 5. Remove the Feed Cover Sensor.

5.15 Linkage (Right Side and Left Side)

Step 1. Locate the Linkage (right side).



Step 2. Remove the spring.

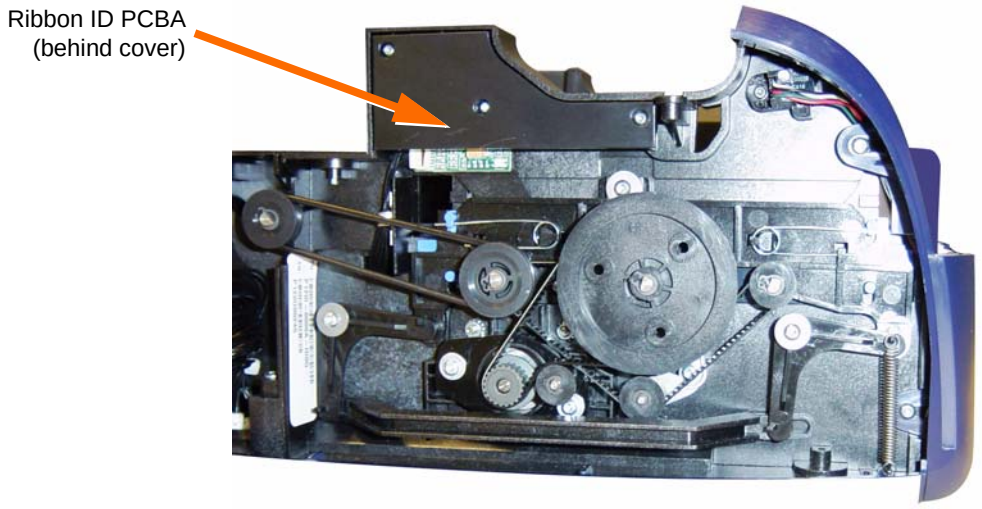
Step 3. With a TORX T10 driver, remove the two screws (and washers) holding the Linkage to the frame.

Step 4. Remove the Linkage (3 pieces).

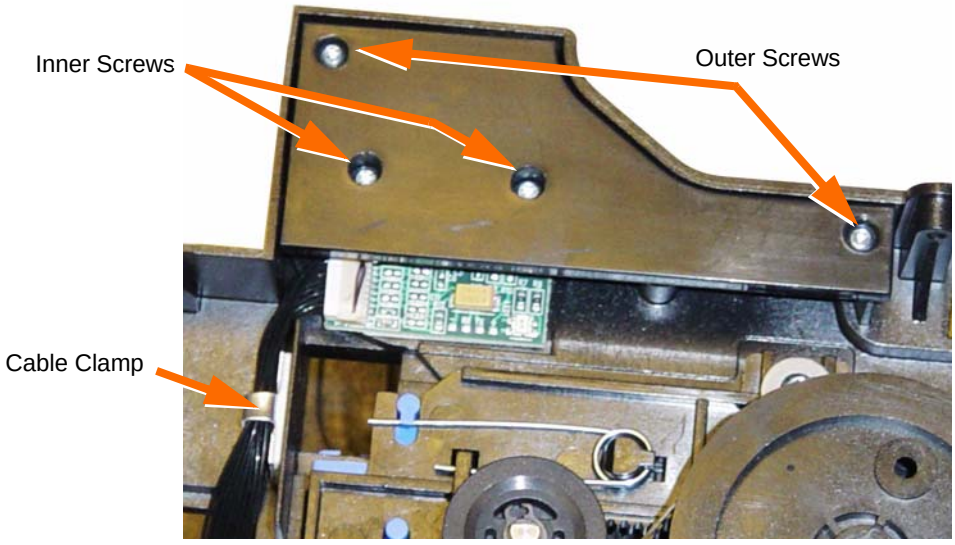
Step 5. Repeat Step 1 through Step 4 for the left side.

5.16 Ribbon ID PCBA (P110*i* and P120*i* only)

Step 1. Locate the PCBA.



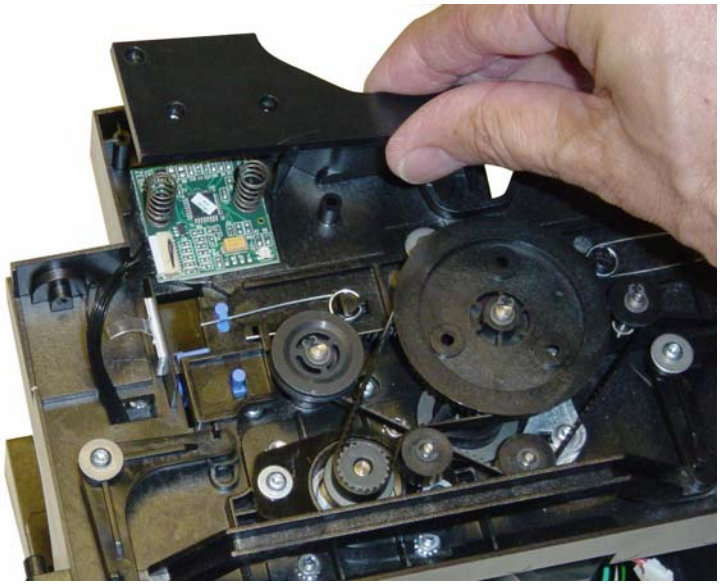
Step 2. With a flat-blade screwdriver, free the cable from the cable clamp.



Step 3. With a TORX T8 driver, remove the two outer screws holding the PCBA cover to the frame.

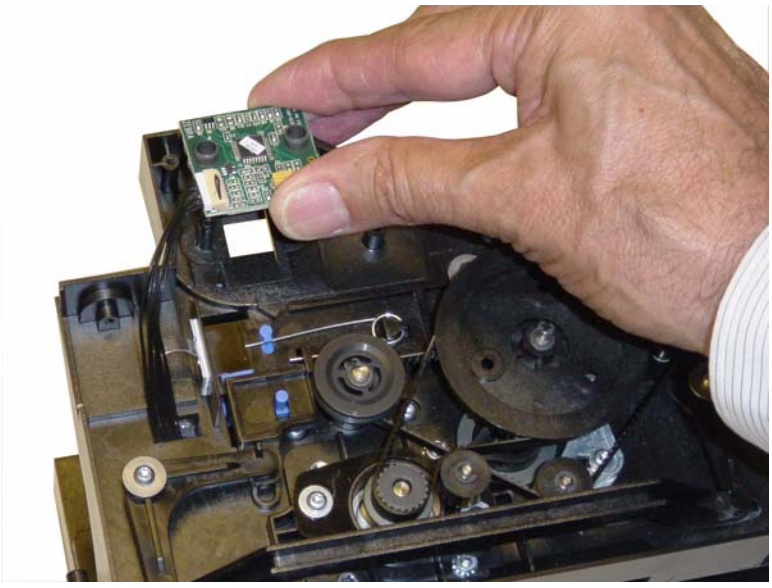
Step 4. With a TORX T8 driver, remove the two inner screws holding the PCBA cover to the standoffs.

Step 5. Remove the cover.



Step 6. Slide the two springs off their respective standoffs.

Step 7. Slide the PCBA of the standoffs.

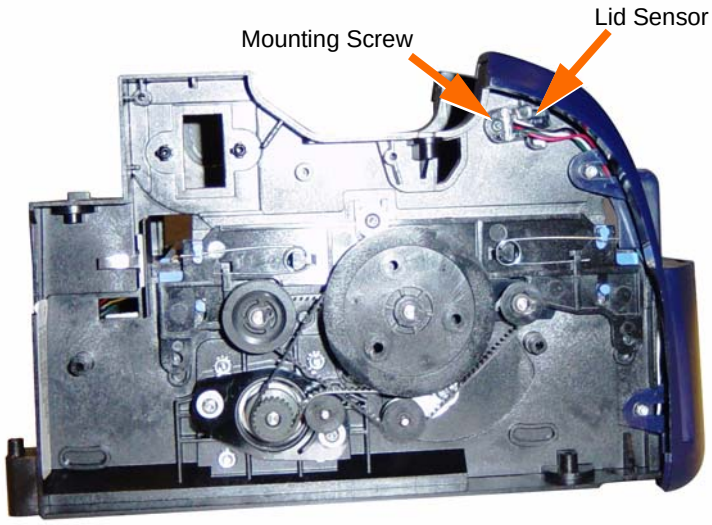


Step 8. If not already done, disconnect the Ribbon ID PCBA plug from connector J18 on the Main PCBA.

Step 9. Remove the Ribbon ID PCBA.

5.17 Lid Sensor

Step 1. Locate the Lid Sensor.



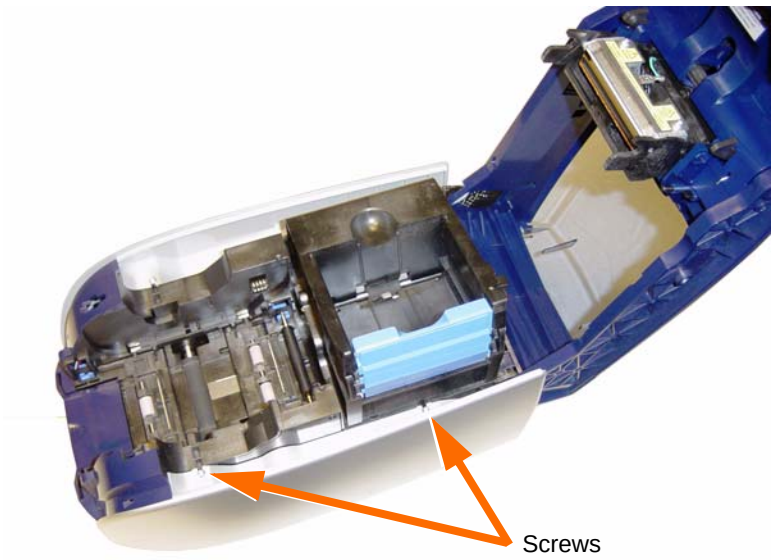
Step 2. With a TORX T8 driver, remove the screw holding the Lid Sensor to the frame.

Step 3. If not already done, disconnect the Lid Sensor plug from connector J7 on the Main PCBA.

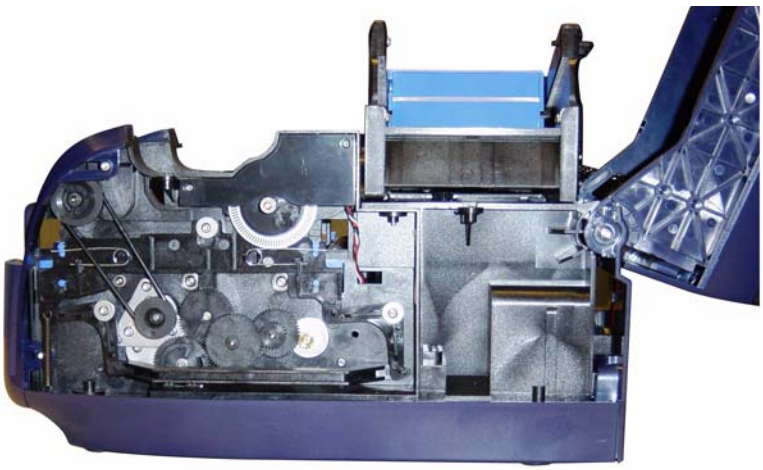
Step 4. Remove the Lid Sensor.

5.18 Right Side Cover

Step 1. Locate the two screws that hold the Right Side Cover in place.



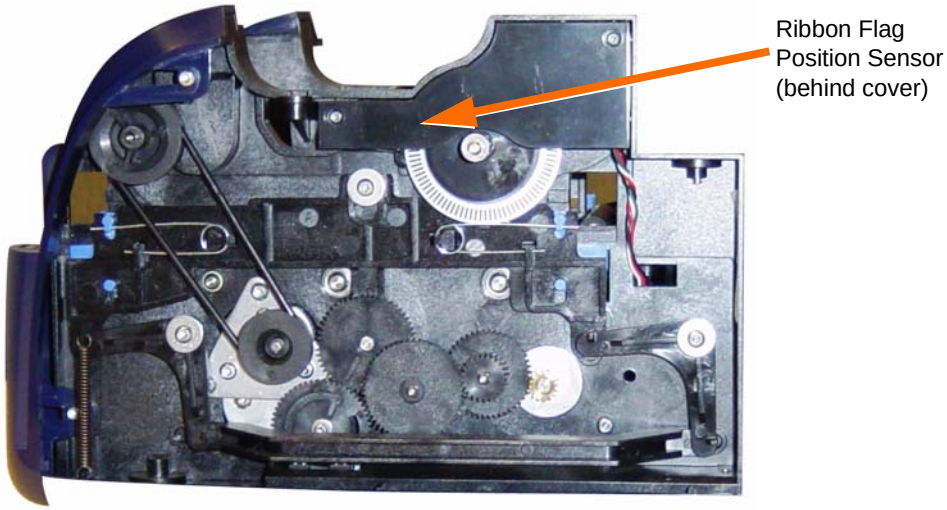
Step 2. With a TORX T10 driver, loosen the two screws.



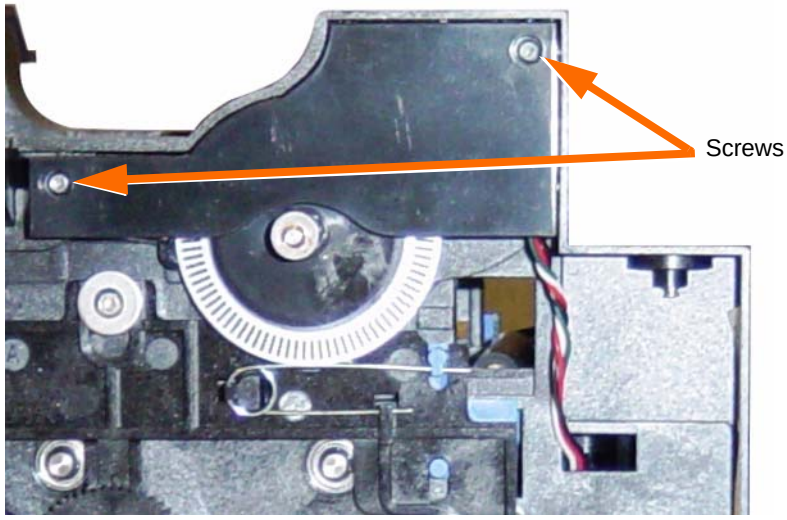
Step 3. Remove the Right Side Cover.

5.19 Ribbon Flag Position Sensor

Step 1. Locate the Ribbon Flag Position Sensor.

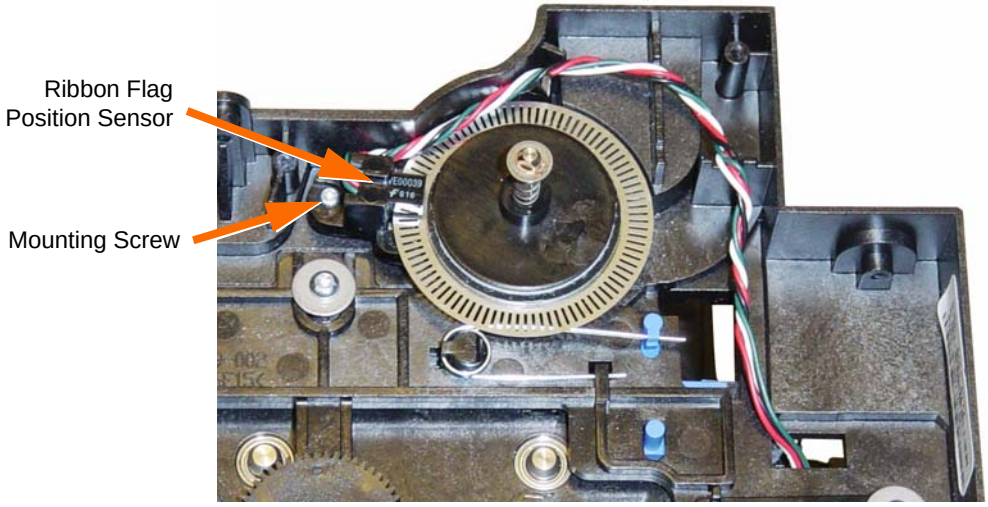


Step 2. With a TORX T8 driver, remove the two screws holding the sensor cover to the frame.



Step 3. Remove the cover.

Step 4. With a TORX T8 driver, remove the screw holding the sensor in place.

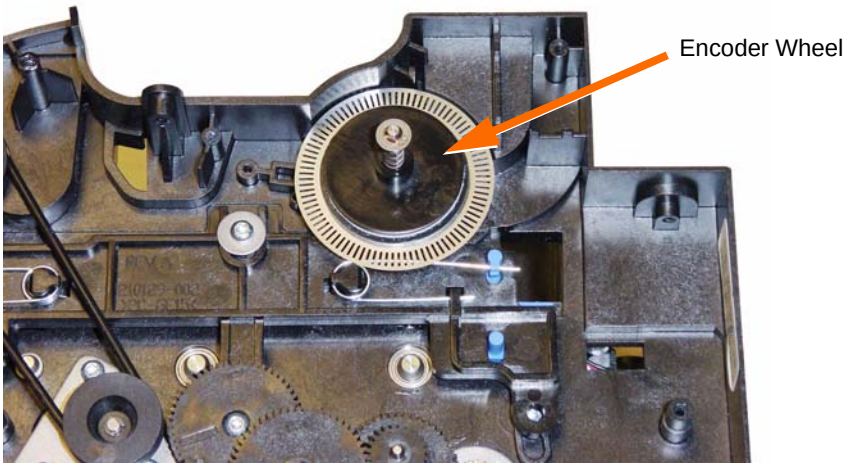


Step 5. If not already done, disconnect the Ribbon Flag Position Sensor plug from connector J6 on the Main PCBA.

Step 6. Remove the Ribbon Flag Position Sensor.

5.20 Encoder Wheel

Step 1. Locate the Encoder Wheel.

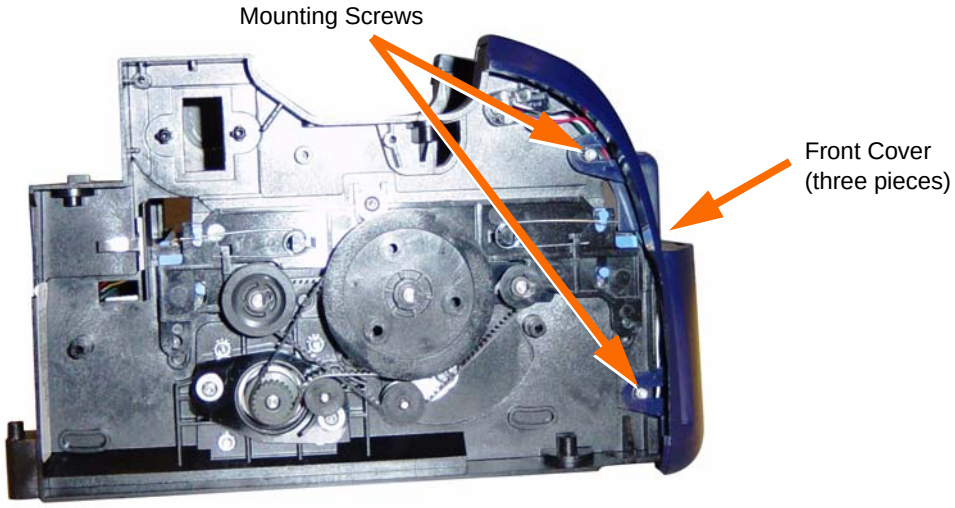


Step 2. Compress the clutch spring by pressing the washer inward, then use fine-point pliers, a small flat-blade screwdriver, or a pair of fine-point retaining-ring pliers to remove the retainer clip, then slip the washer and the clutch spring off the clutch shaft.

Step 3. Slip the gear wheel, felt washer, Encoder Wheel, and second felt washer off the clutch shaft.

5.21 Front Cover

Step 1. Locate the Front Cover.

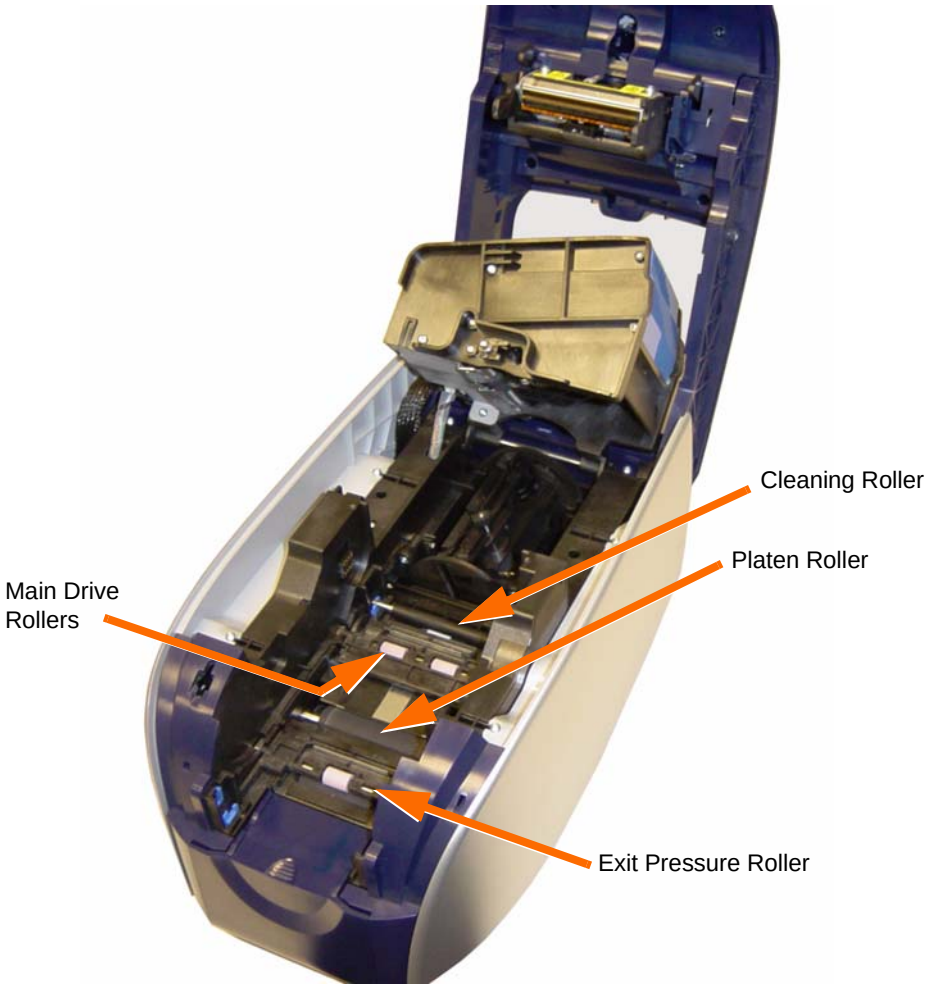


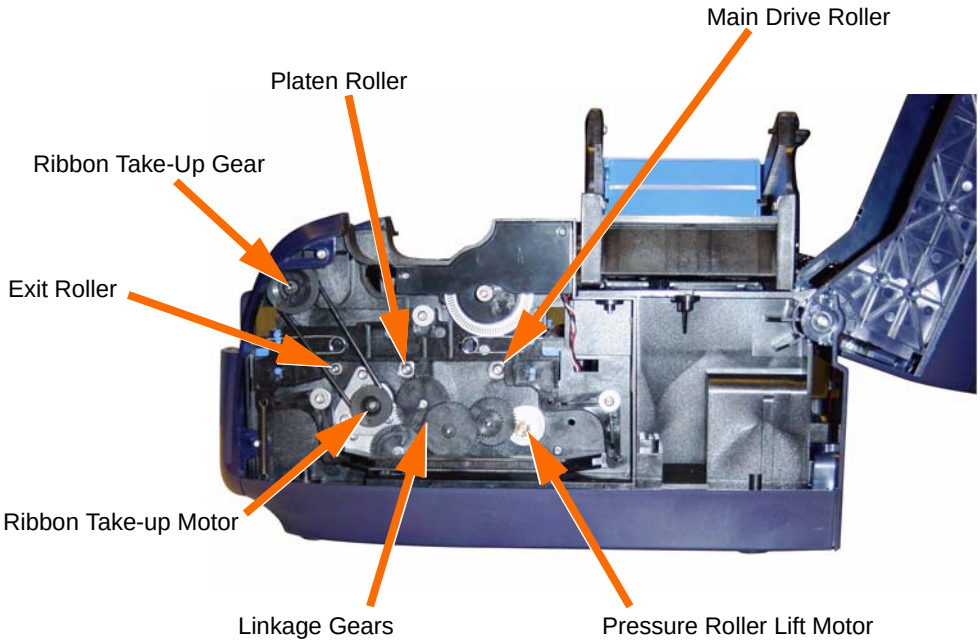
Step 2. With a TORX T10 driver, remove the two screws holding the *right-side* piece of the Front Cover to the frame.

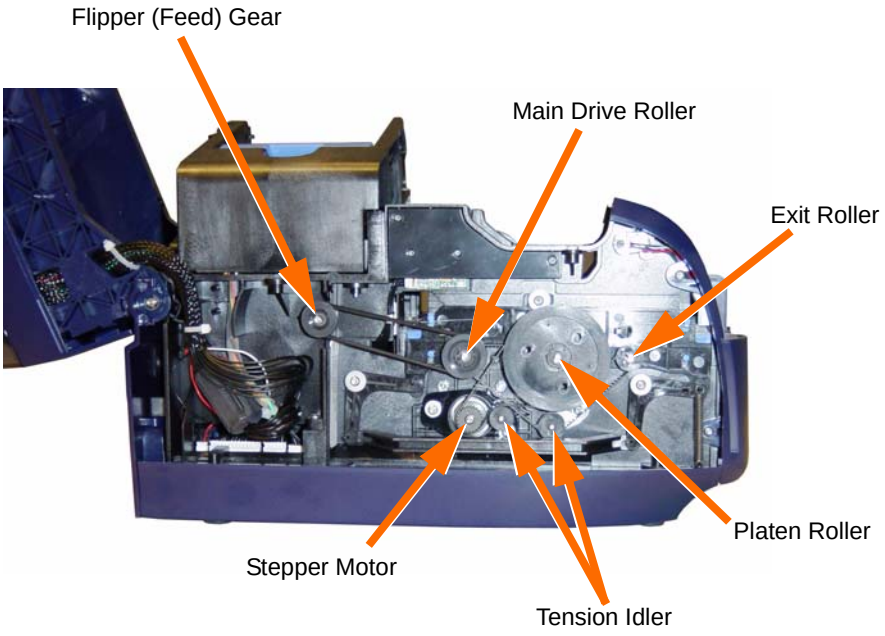
Step 3. With a TORX T10 driver, remove the two screws holding the *left-side* piece of the Front Cover to the frame.

Step 4. Remove the Front Cover (three pieces).

5.22 Motor and Roller Locations

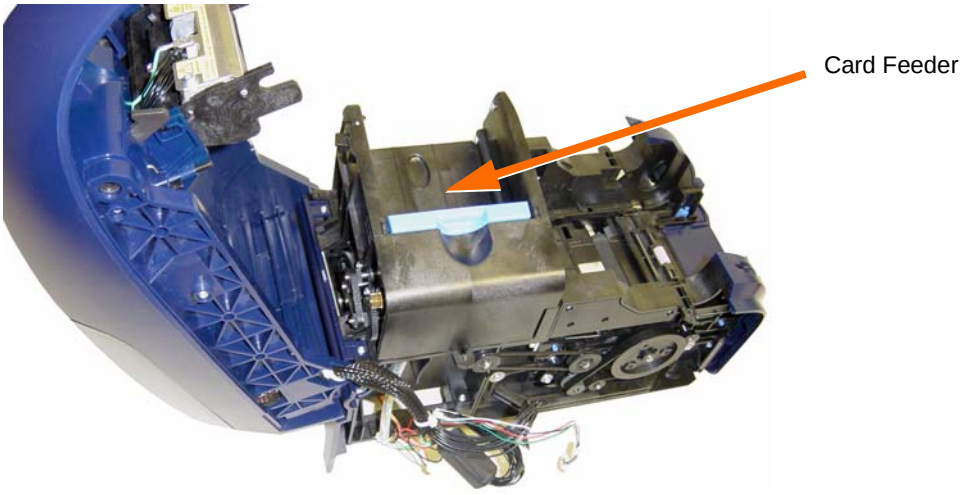



Main Drive Roller
Platen Roller
Ribbon Take-Up Gear
Exit Roller
Ribbon Take-up Motor
Linkage Gears
Pressure Roller Lift Motor

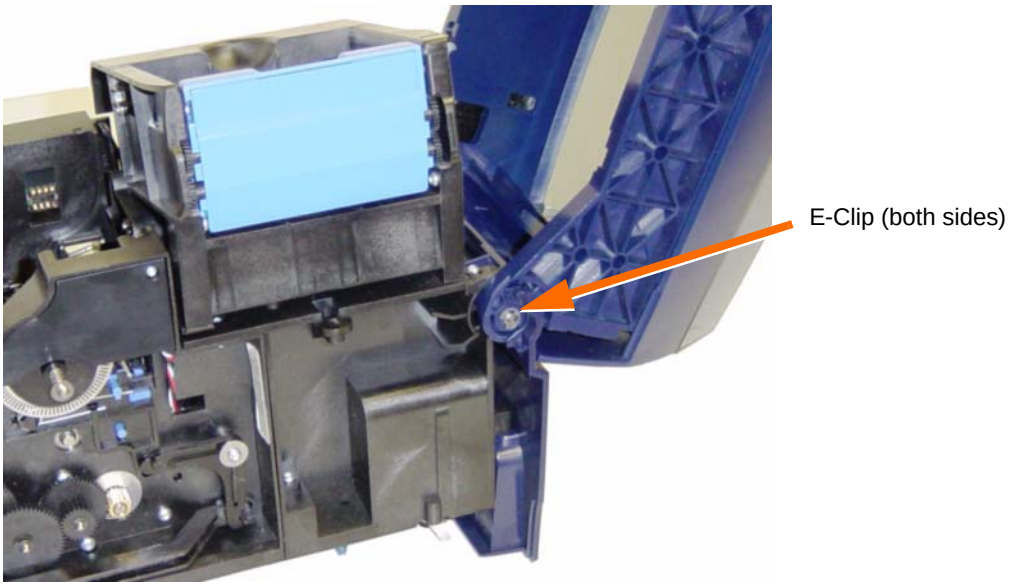

Flipper (Feed) Gear
Main Drive Roller
Exit Roller
Platen Roller
Stepper Motor
Tension Idler

5.23 Card Feeder (and Lid)

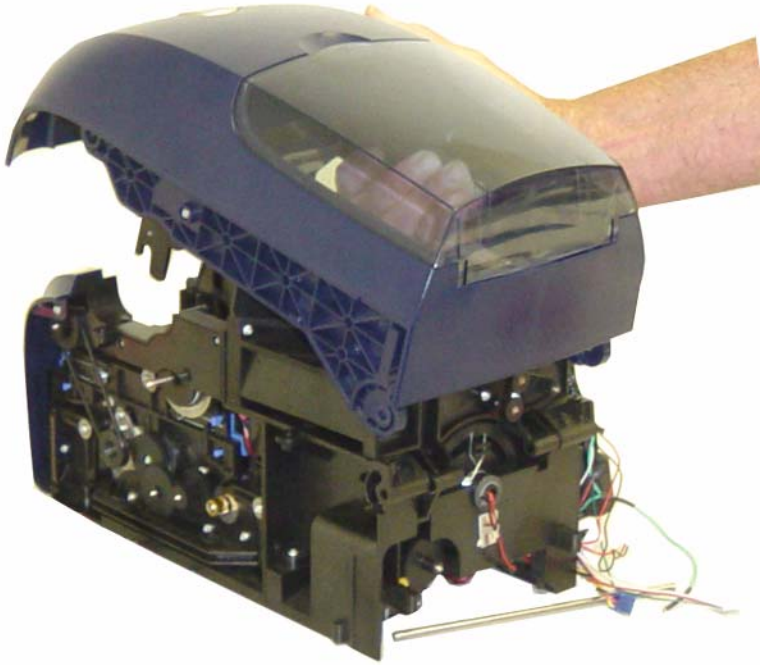
Step 1. Locate the Card Feeder.



Step 2. Remove the E-clips from each end of the shaft (on both sides of the printer).

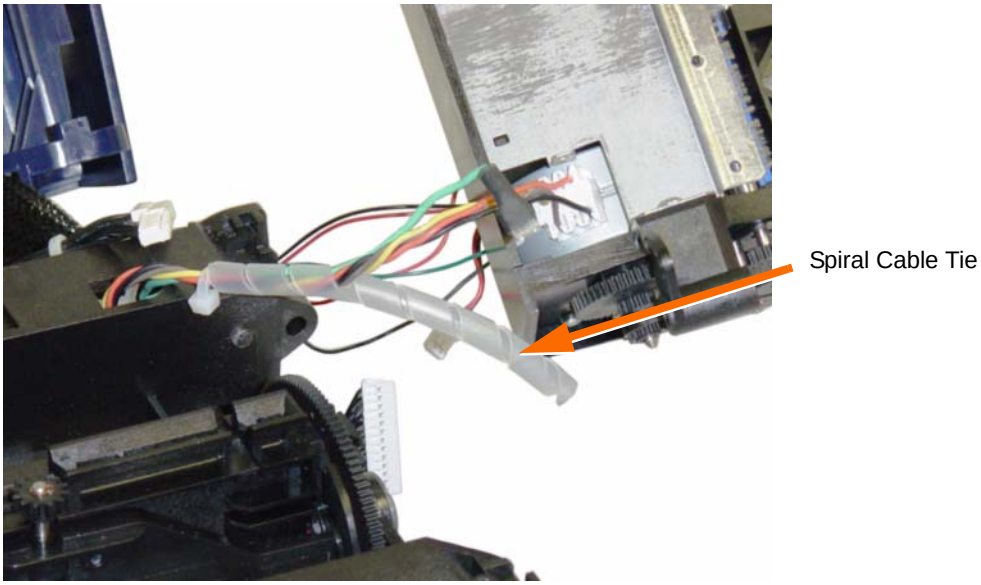


Step 3. Push the shaft through the mounting holes thereby freeing the Lid and Card Feeder. Note that the cable and ground wires are attached.

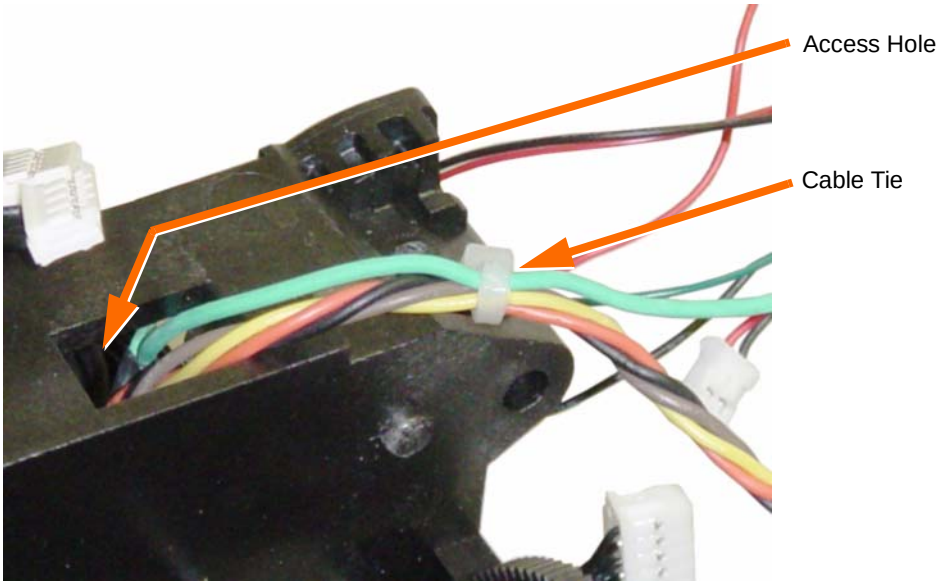


Step 4. Set the Lid to the side.

Step 5. Unwrap the spiral cable tie.

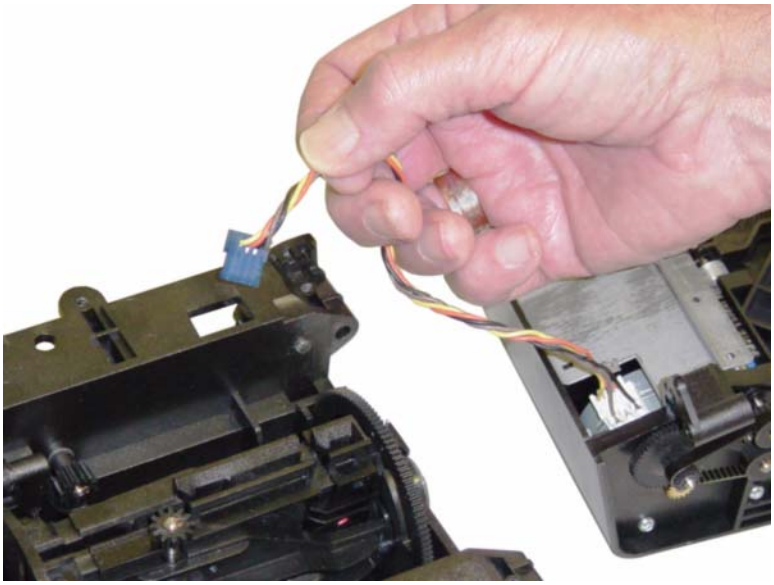


Step 6. Free the ground wire by cutting the cable tie, and then pull the ground wire through the access hole.



Step 7. If not already done, disconnect the Card Feeder Motor plug from connector J13 on the Main PCBA.

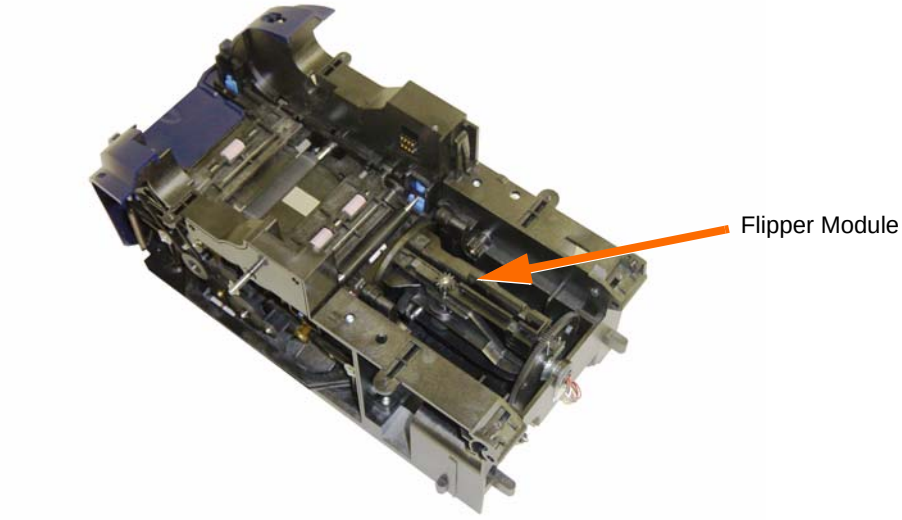
Step 8. Pull the card-feeder cable and connector out of the access hole.



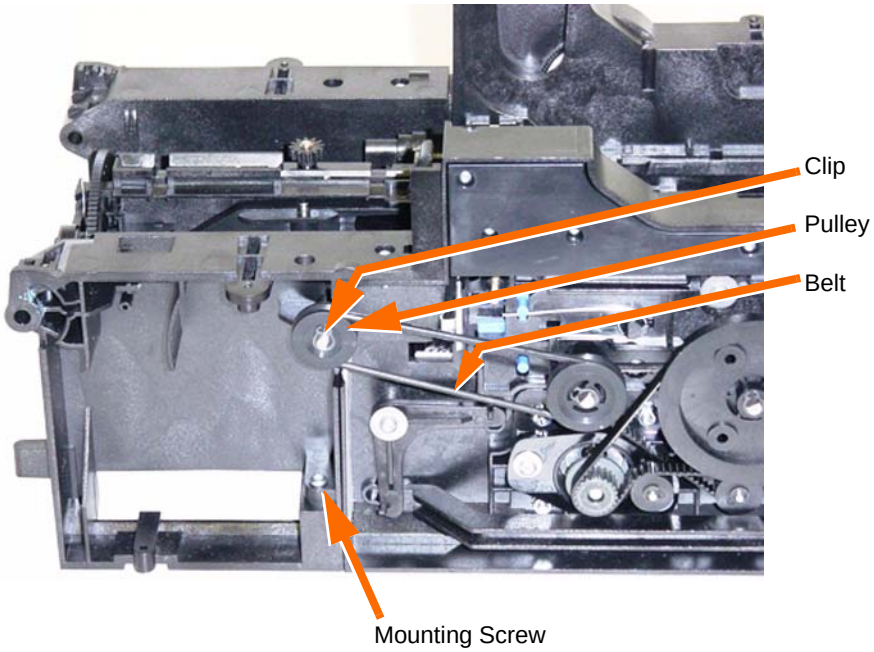
Step 9. Remove the Card Feeder.

5.24 Flipper Module

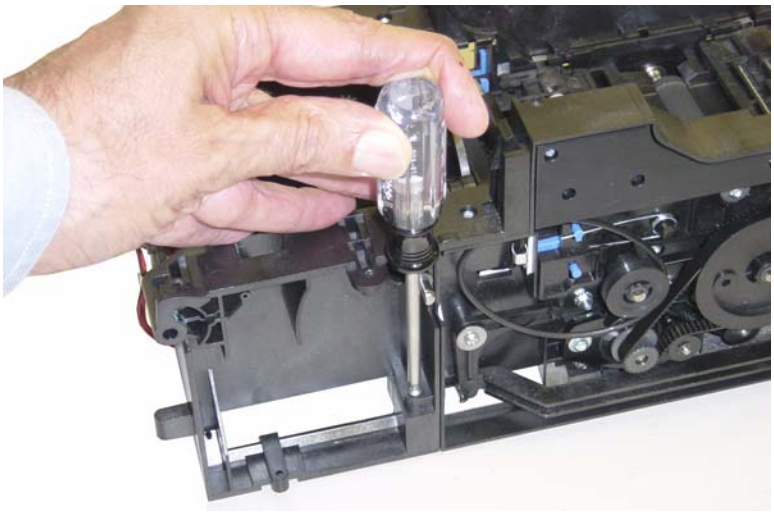
Step 1. Locate the Flipper Module.



Step 2. Remove the clip holding the pulley in place. Slip the belt off the pulley. Slide the pulley off the shaft.

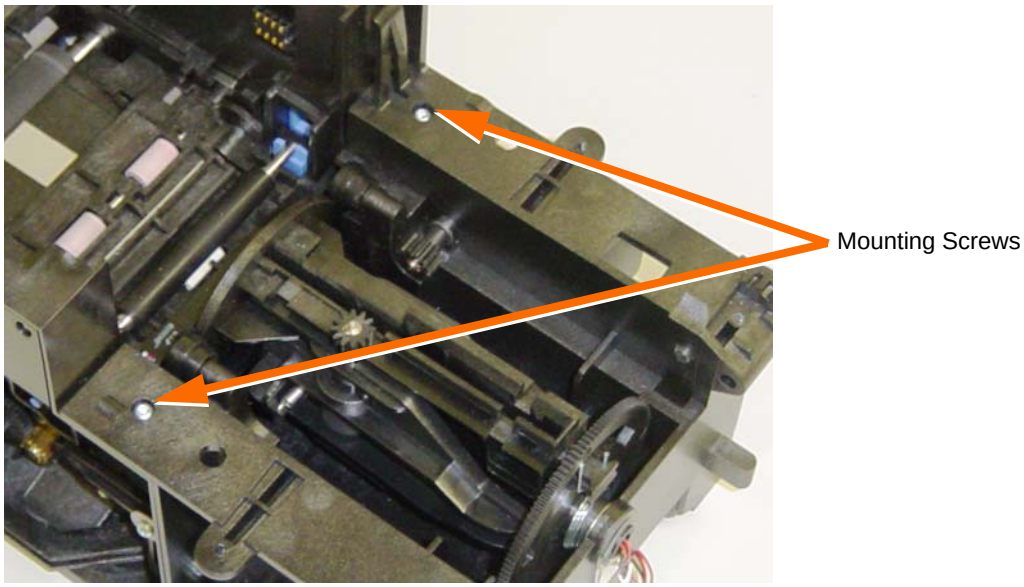


Step 3. With a TORX T10 driver, remove the screw holding the Flipper Module to the frame.

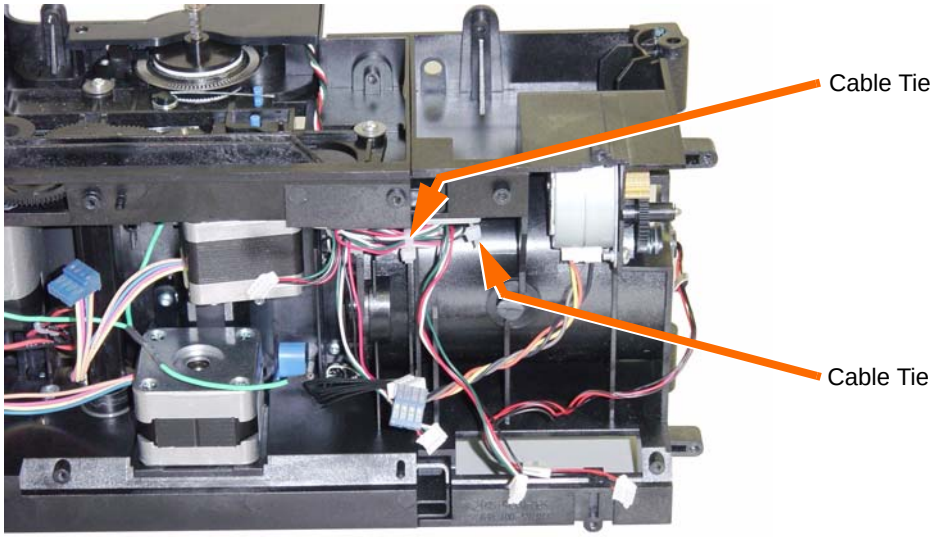


Step 4. With a TORX T10 driver, remove the screw (on the opposite side) holding the Flipper Module to the frame.

Step 5. With a TORX T10 driver, remove the two top mounting screws.

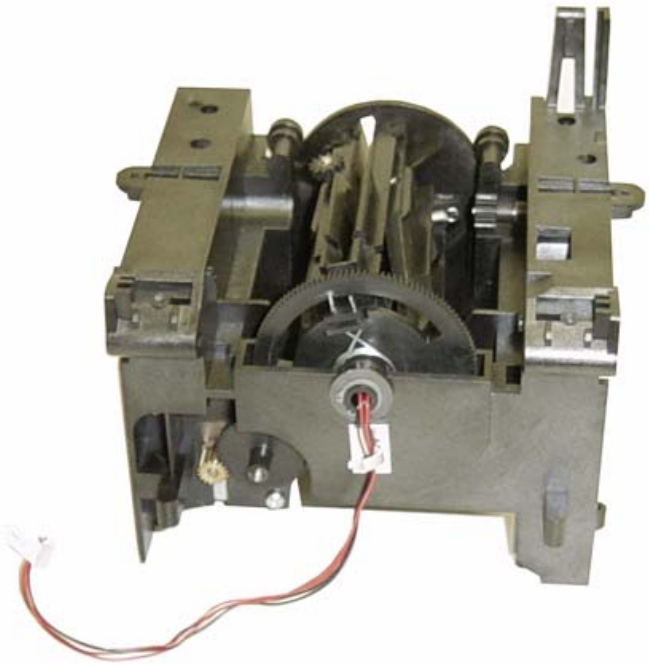


Step 6. Cut the cable ties holding the various cables and connectors.



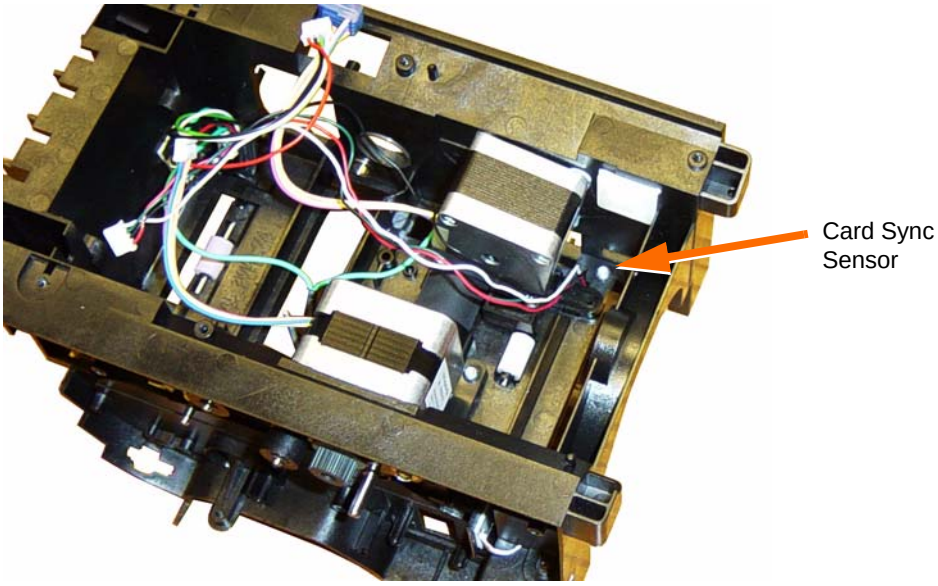
Step 7. If not already done, disconnect the Flipper Motor plug from connector J2, the Card Load Sensor plug from connector J10, and the Flipper Position Sensor from connector J11 on the Main PCBA.

Step 8. Remove the Flipper Module.



5.25 Card Sync Sensor

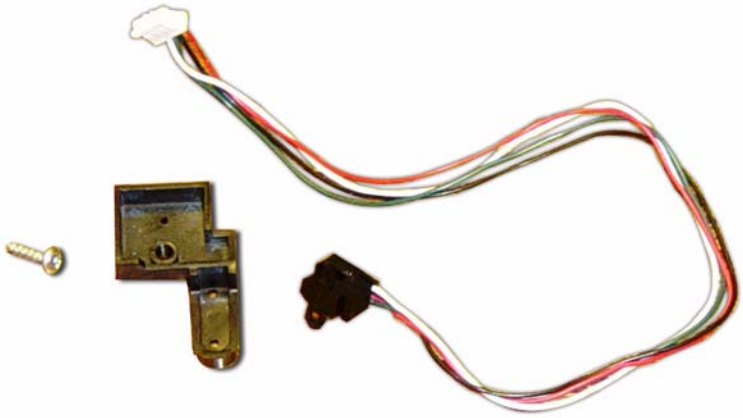
Step 1. Locate the Card Sync Sensor.



Step 2. With a TORX T8 driver, remove the screw and retainer that hold the sensor in place.

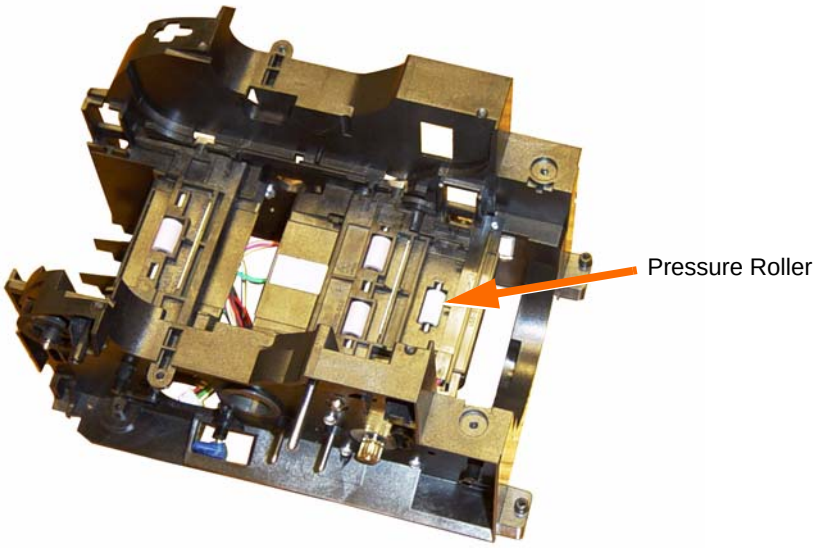
Step 3. If not already done, disconnect the Card Sync Sensor plug from connector J9 on the Main PCBA.

Step 4. Remove the Card Sync Sensor.

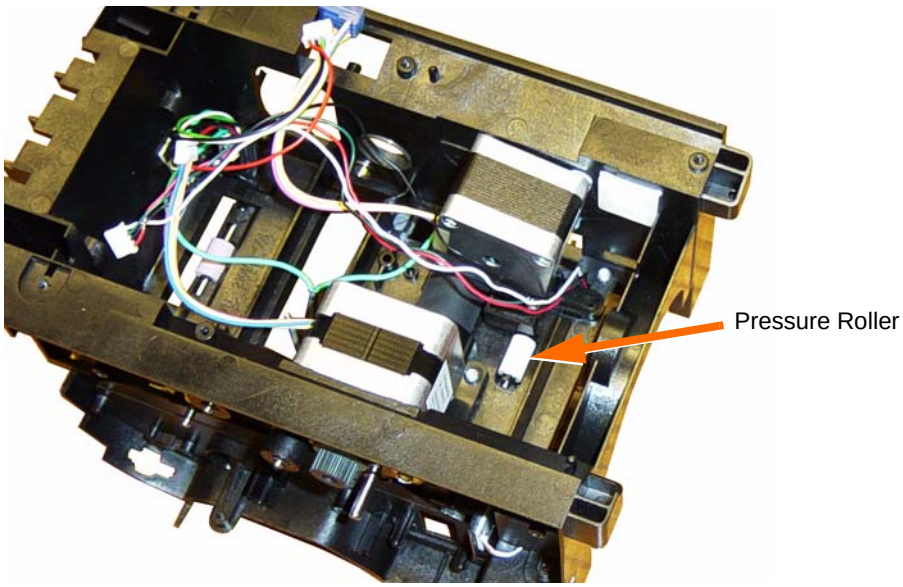


5.26 Pressure Roller

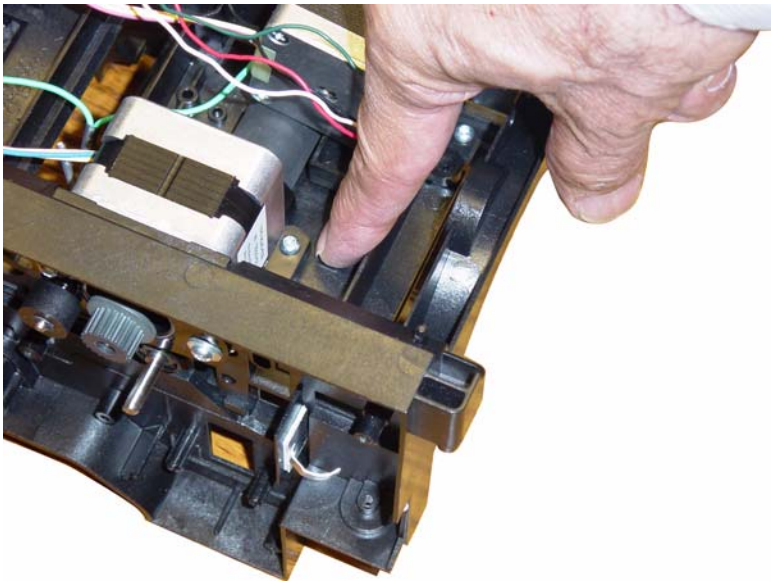
Step 1. Locate the Pressure Roller.



Step 2. Turn the Print Engine over.



Step 3. Carefully apply pressure to the roller to “pop” it loose.

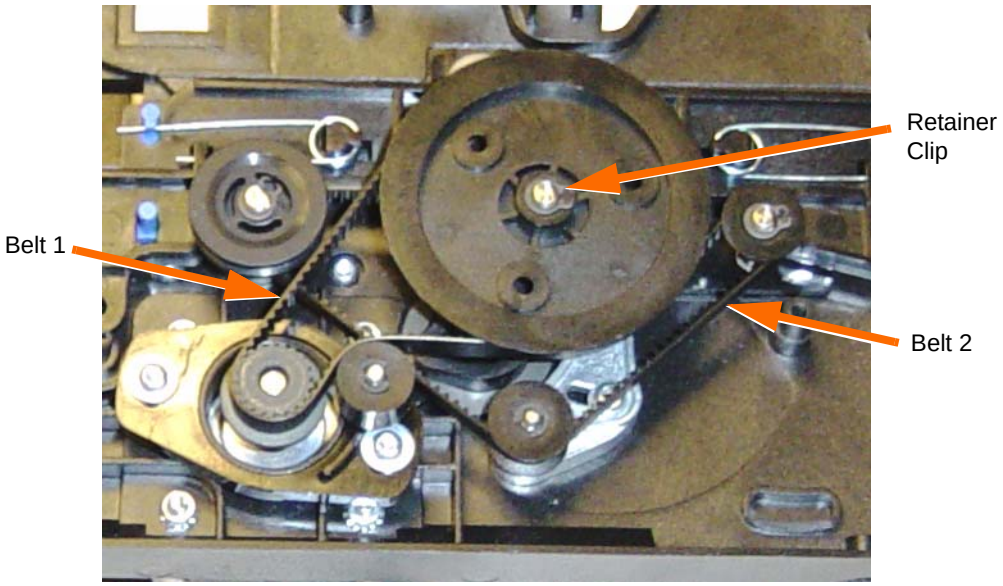


Step 4. Remove the Pressure Roller.

5.27 Exit Roller

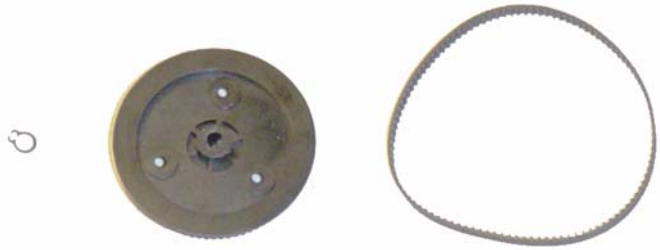
Step 1. Remove the belts.

a. Locate the two belts.



b. Remove the retainer clip on the Platen Roller.

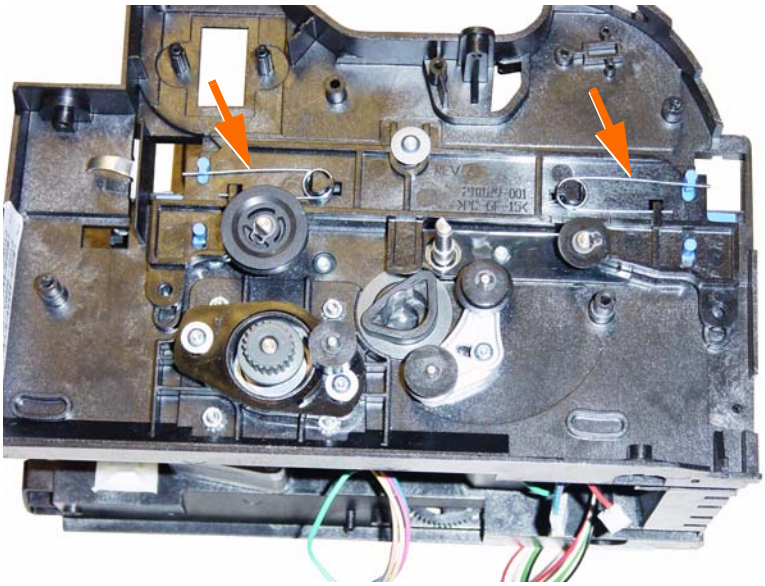
c. Slide the Platen Roller pulley off the shaft (this releases the belt), then remove the belt.



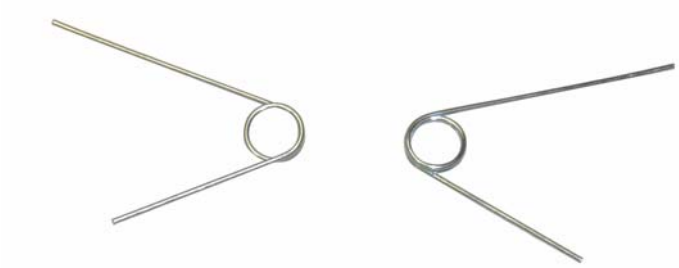
d. Remove the second belt (accessible with the Platen Roller pulley removed).

Step 2. Remove the rocker assembly.

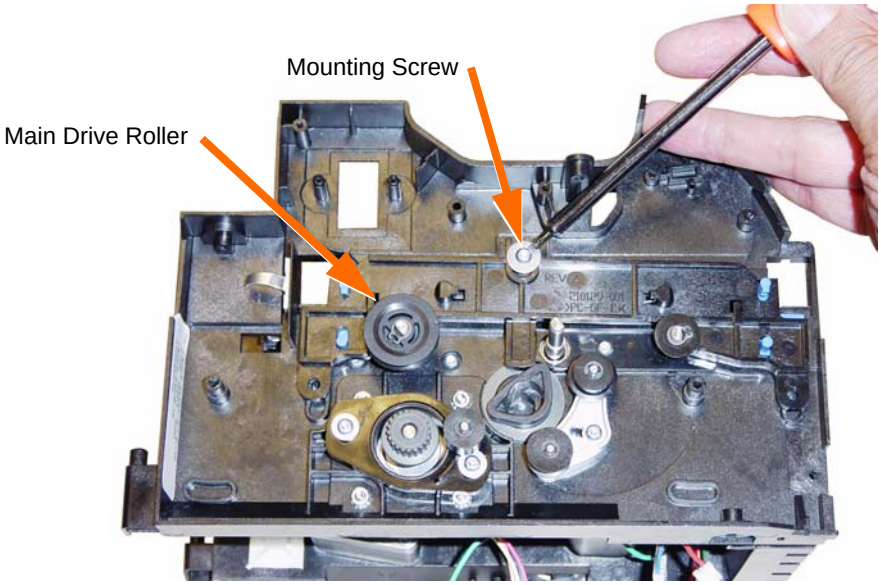
a. Locate the two springs. Note that the orange arrows point out the two springs.



b. Release (and remove) the two springs.



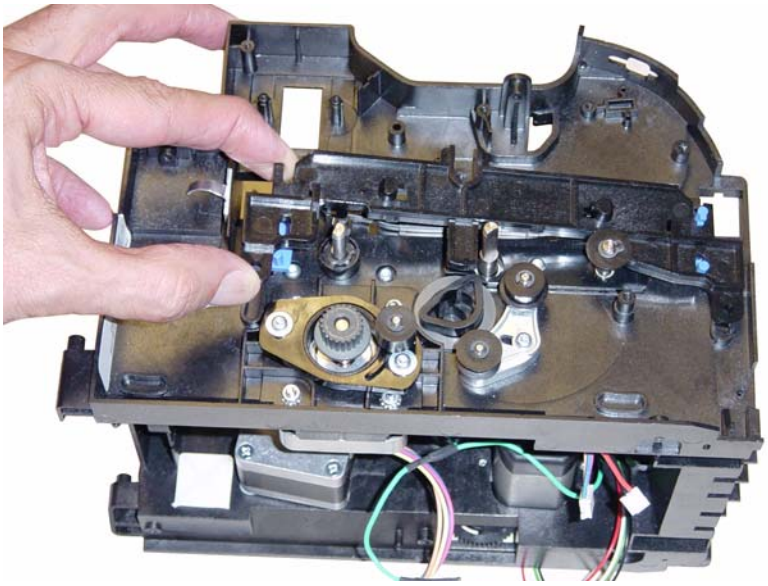
c. With a TORX T10 driver, remove the screw (and washer) holding the rocker assembly to the frame.



d. Remove the retainer clip on the Main Drive Roller.

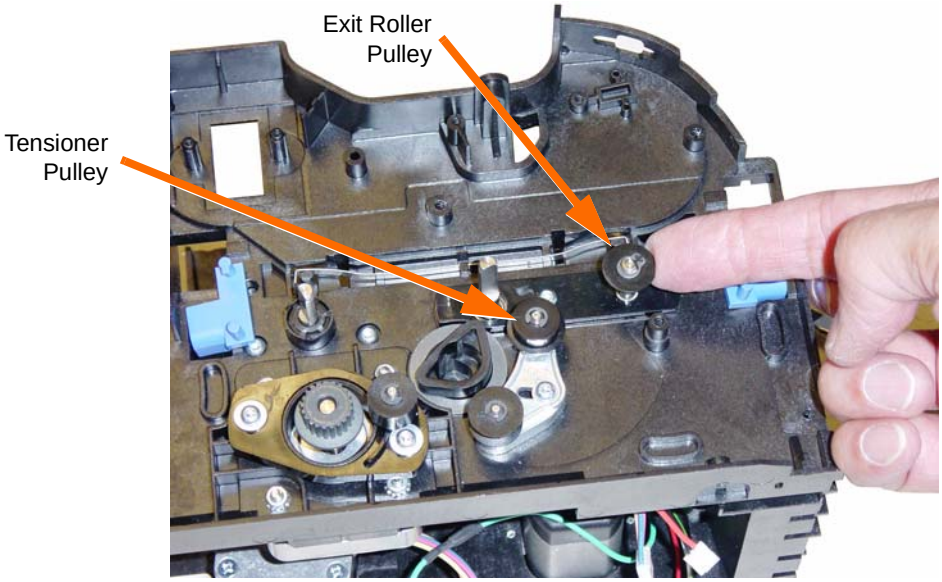
e. Remove the Main Drive Roller pulley.

f. Lift and “jiggle” the left arm to free the rocker assembly.



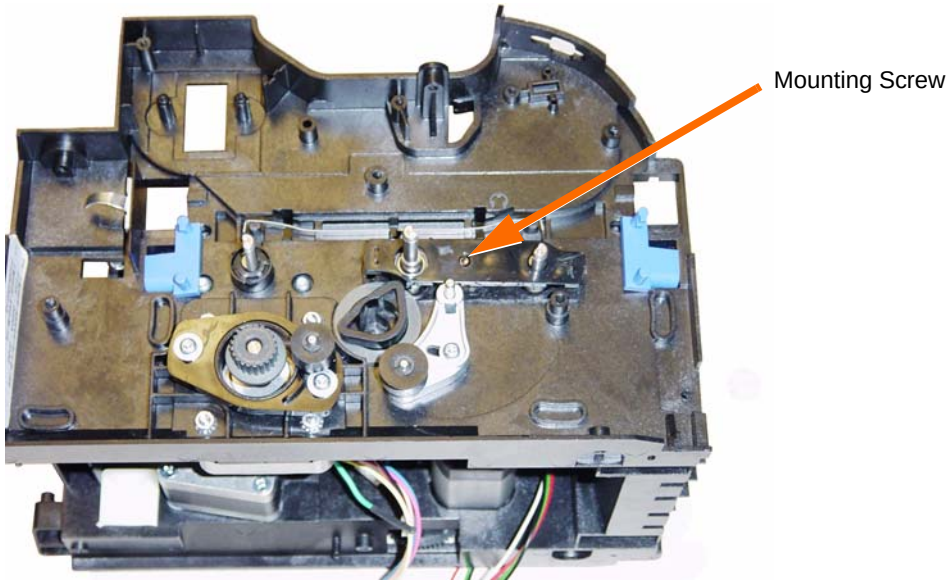
g. Remove the rocker assembly.

Step 3. Remove the retainer clip on the Exit Roller, then remove the Exit Roller pulley.

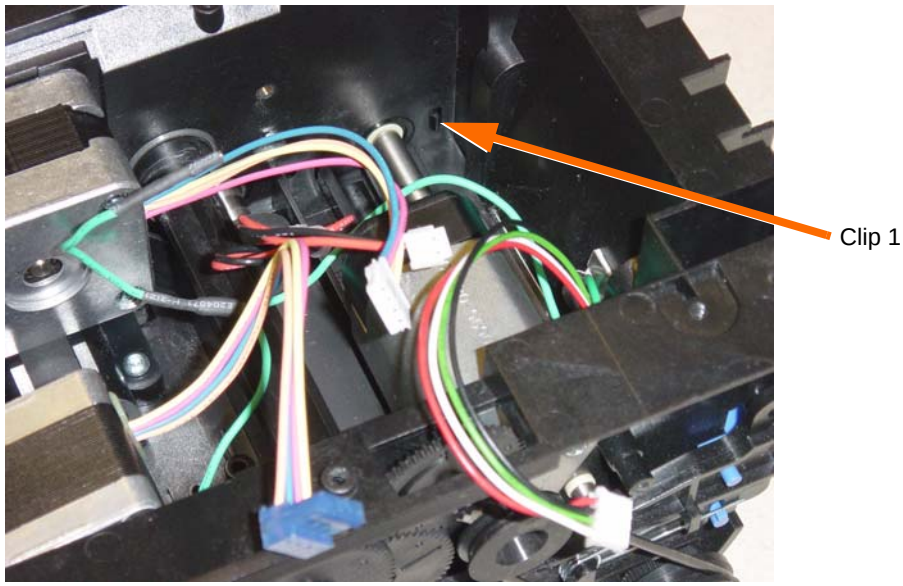


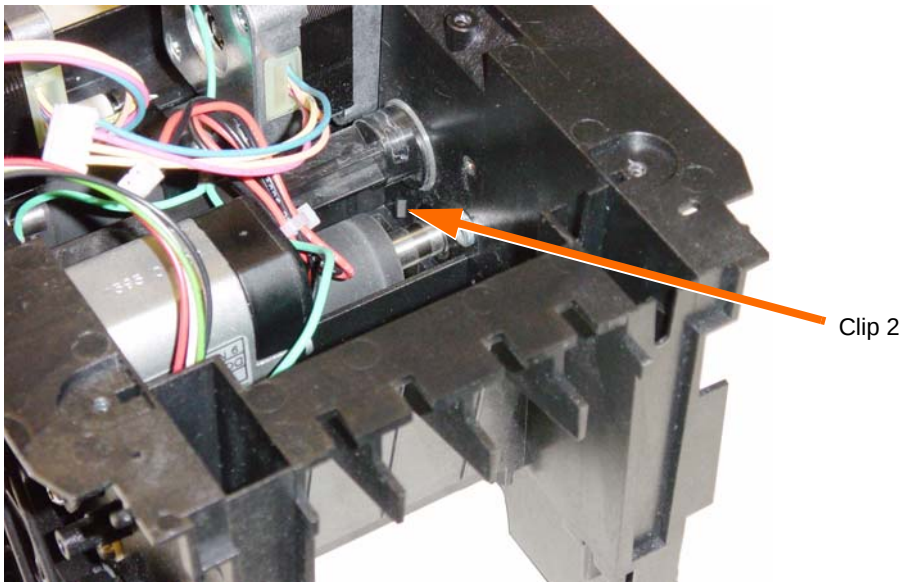
Step 4. Note that a tensioner pulley is accessible with the Platen Roller pulley removed. Remove the retainer clip, then remove the tensioner pulley.

Step 5. With a TORX T10 driver, remove the screw holding the plastic retaining plate to the frame. The retaining plate holds the Platen Roller and Exit Roller in place.



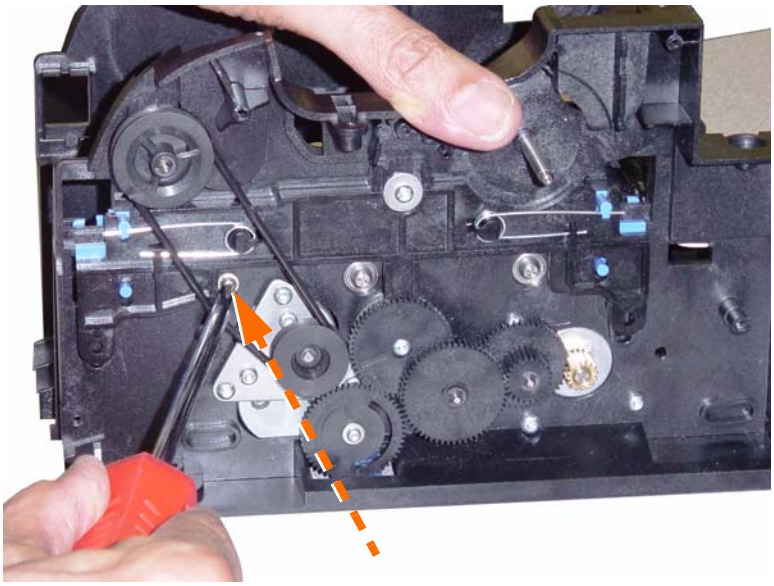
Step 6. In addition to the mounting screw removed in the previous step, two clips hold the plastic retaining plate to the frame. Use a flat-blade screwdriver to loosen the clips inside the printer (shown in the next two figures); then remove the retaining plate.



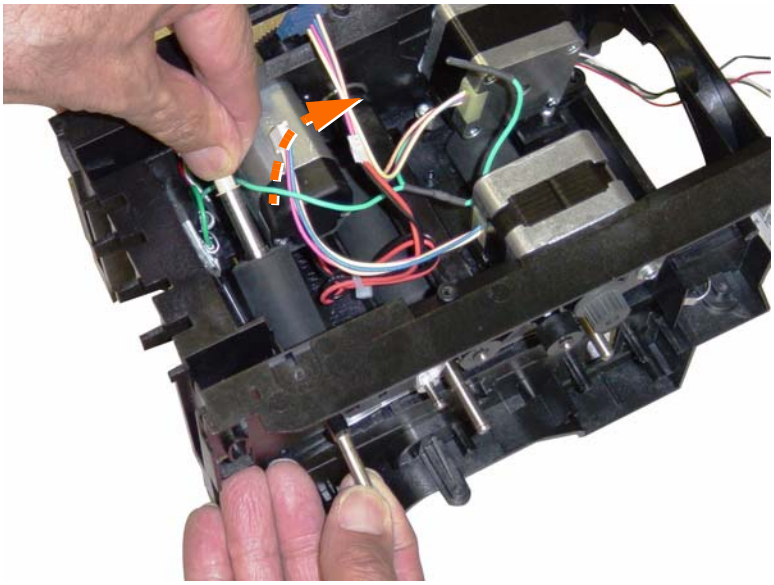


Step 7. Remove the retaining plate.

Step 8. With a Phillips screwdriver, carefully push the Exit Roller shaft out of its right-side mounting hole.

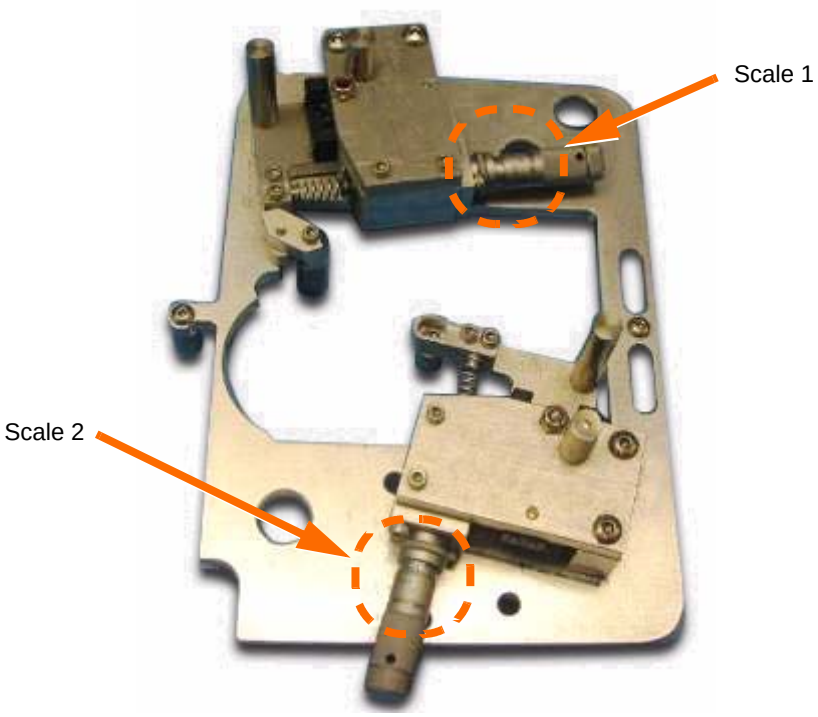


Step 9. Turn the Print Engine over, reach in, and remove the Exit Roller.

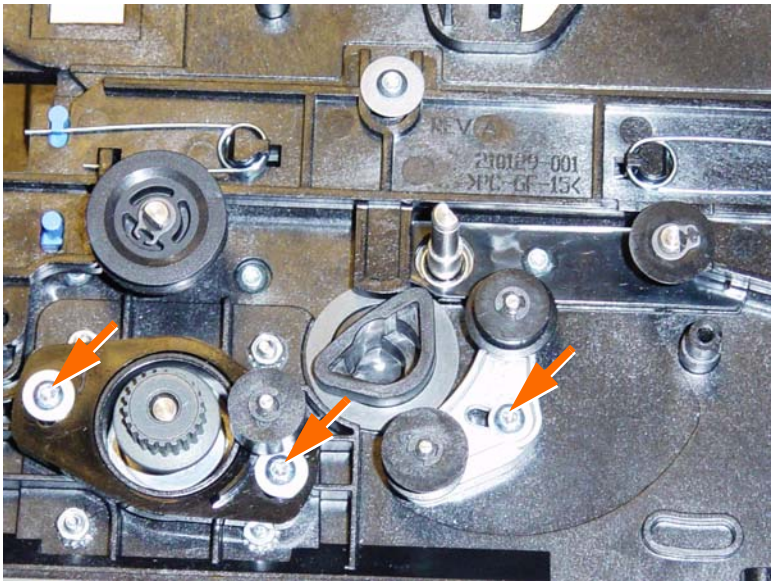


Replacement

Step 1. Check the Belt Tensioning Tool presets (Scale 1 = .075” and Scale 2 = .050”). Adjust the presets as required.

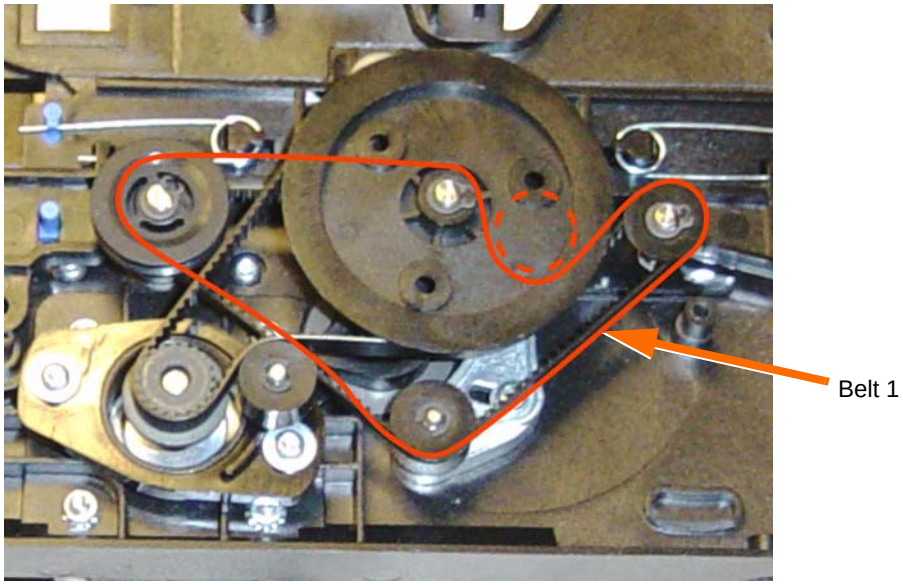


Step 2. With a TORX T10 driver, loosen the three screws indicated in the figure below.



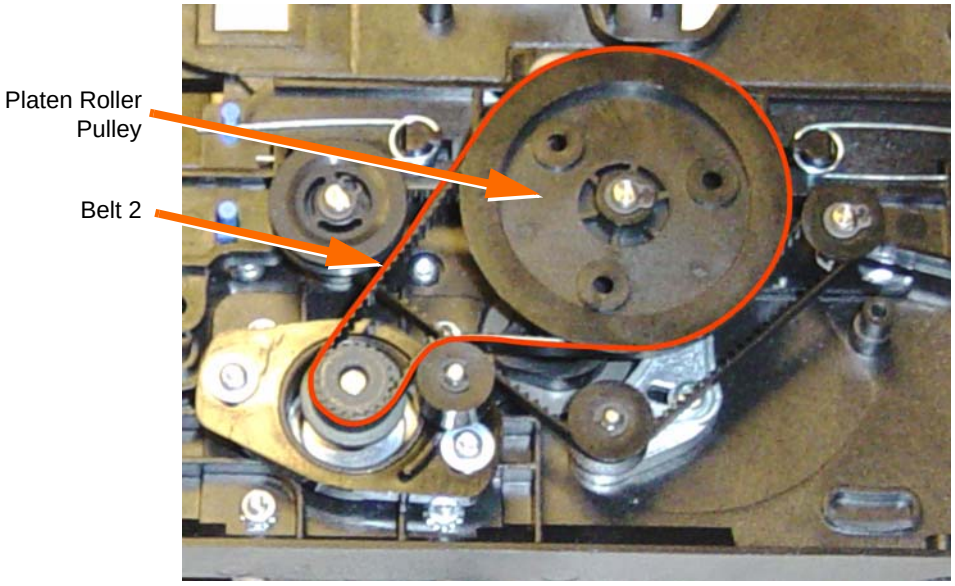
Step 3. Install the belts and associated gears and pulleys. The following two figures show the belt “path” for the two belts removed in this section.

a. Install Belt 1.

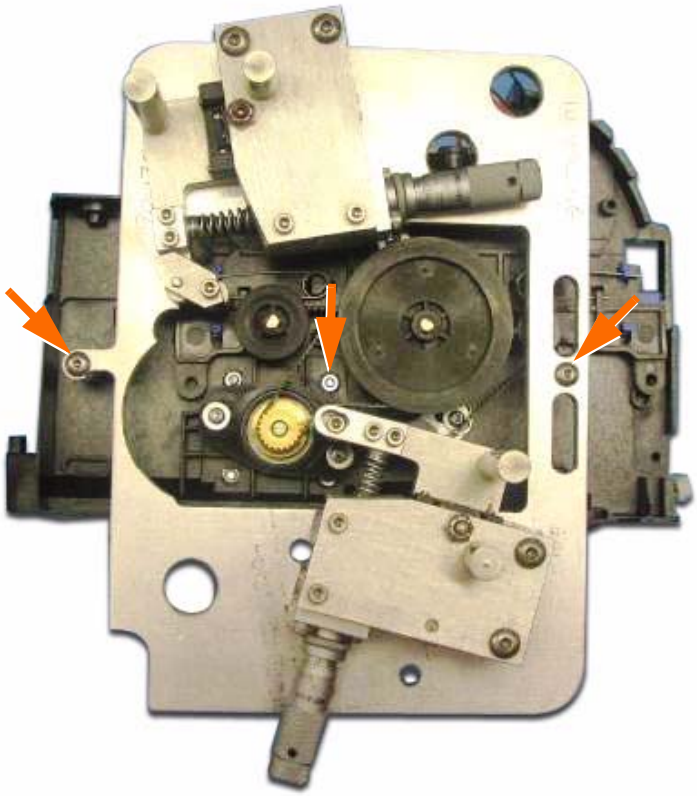


b. Install the Platen Roller Pulley.

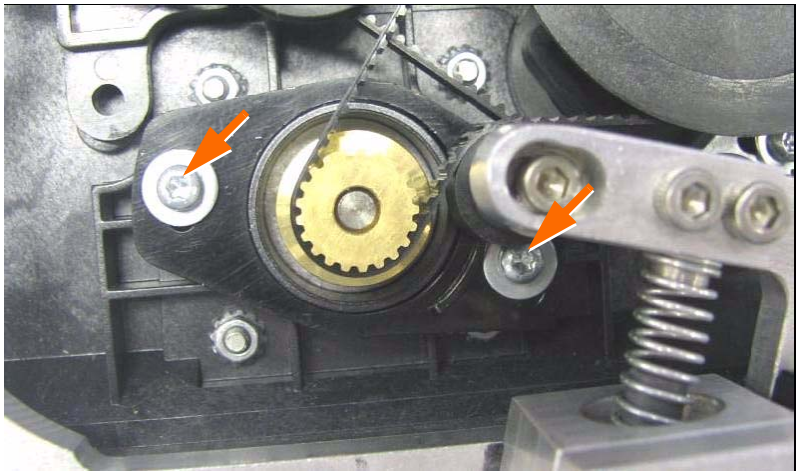
c. Install Belt 2.



Step 4. Set the Belt Tensioning Tool in place. Note that the arrows indicate the alignment guide posts.

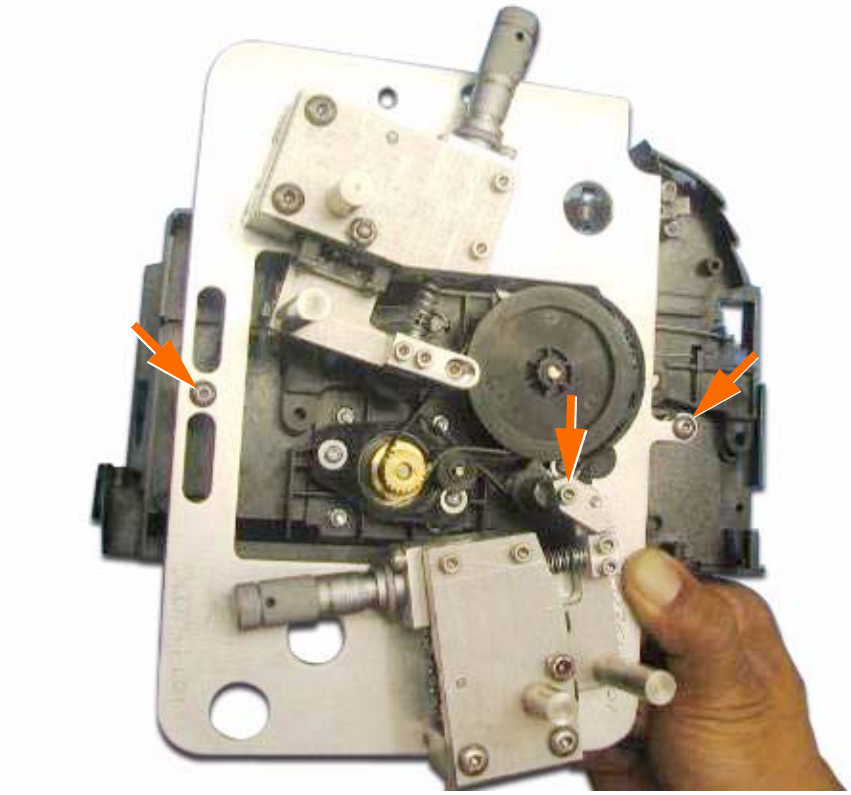


Step 5. With a TORX T10 driver, tighten the two motor mount screws.

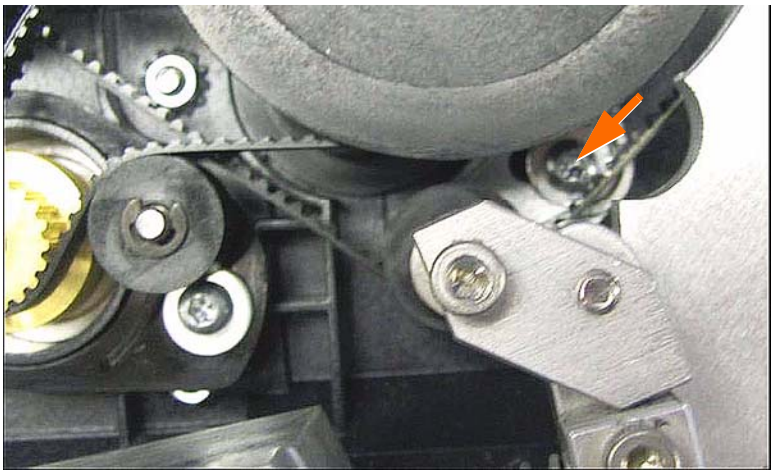


Step 6. Rotate the Belt Tensioning Tool 180 degrees.

Step 7. Set the Belt Tensioning Tool in place. Note that the arrows indicate the alignment guide posts.



Step 8. With a TORX T10 driver, tighten the single screw.

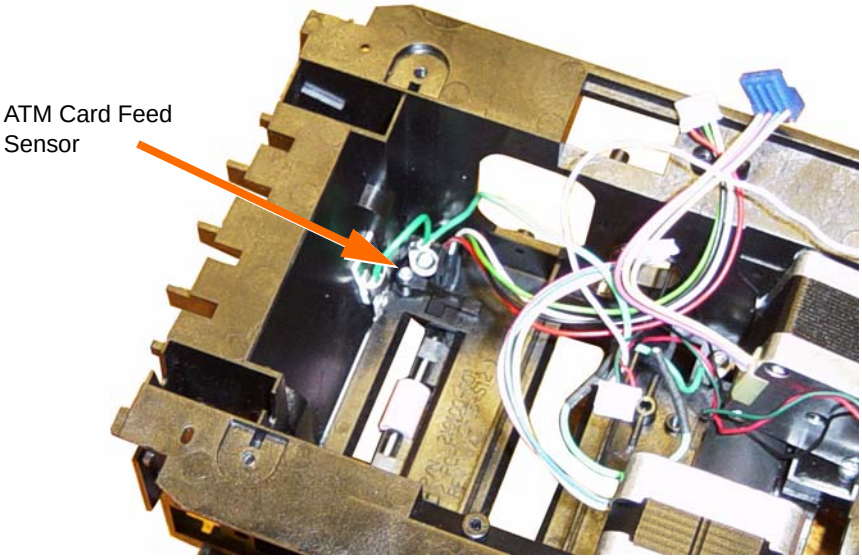


Step 9. Remove the Belt Tensioning Tool.

Step 10. Ensure that the Stepper Motor and associated gears and pulleys rotate freely as the large pulley is turned.

5.28 ATM Card Feed Sensor

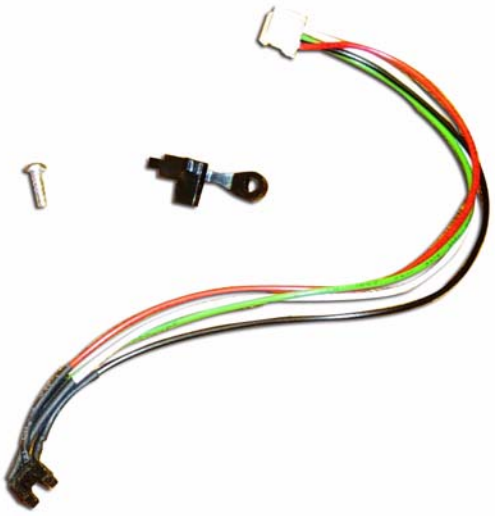
Step 1. Locate the ATM Card Feed Sensor.



Step 2. With a TORX T8 driver, remove the screw and retainer that hold the sensor in place.

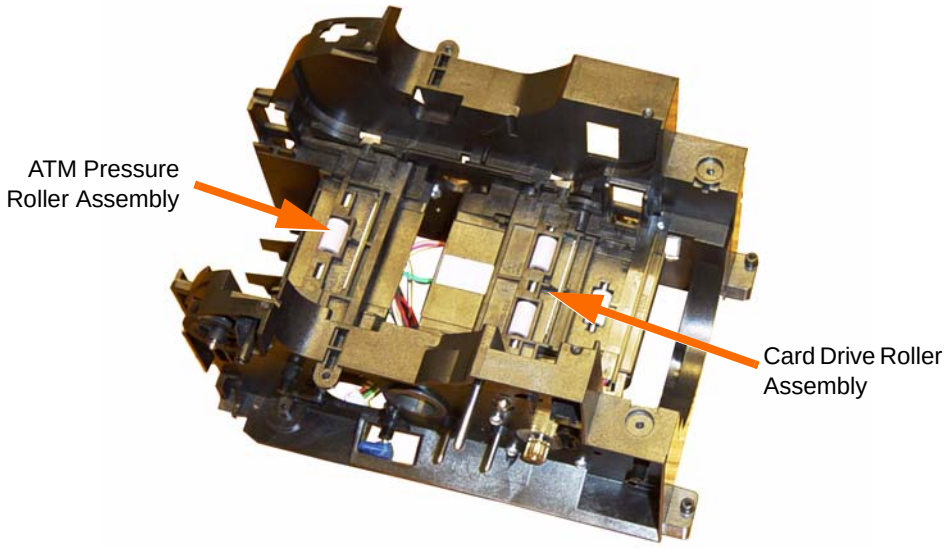
Step 3. If not already done, disconnect the Card Feed Sensor plug from connector J12 on the Main PCBA.

Step 4. Remove the Card Feed Sensor.

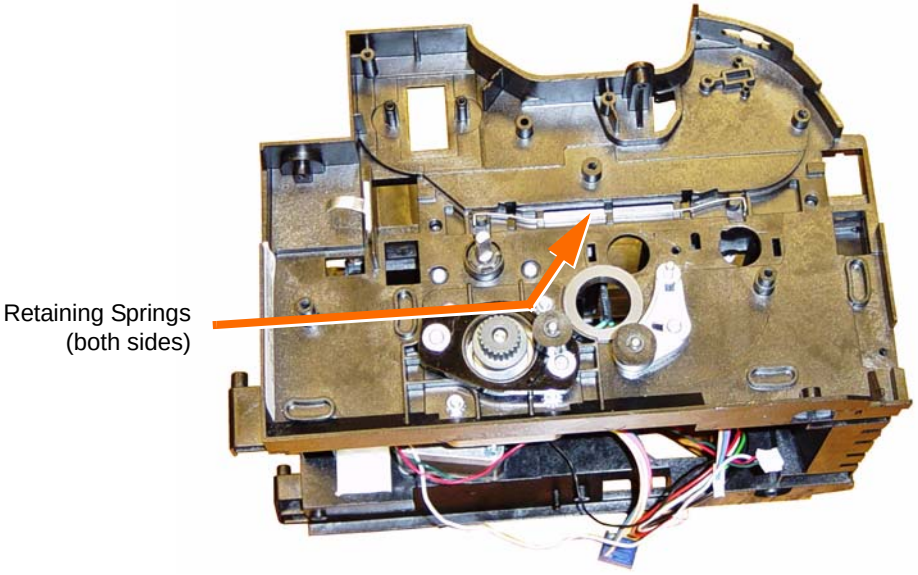


5.29 ATM Pressure Roller & Card Drive Roller Assemblies

Step 1. Locate the ATM Pressure Roller and Card Drive Roller assemblies.

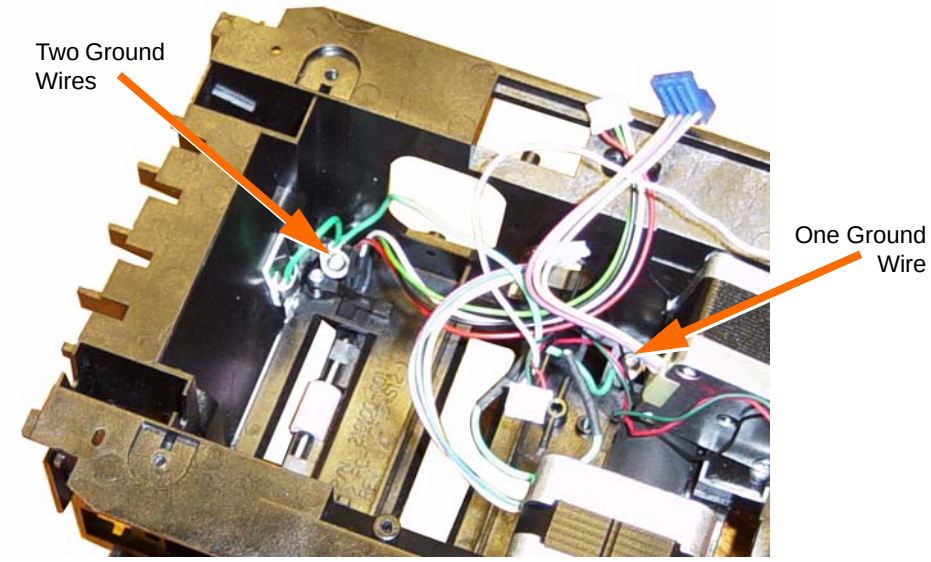


Step 2. Remove the retaining springs from both sides of the Print Engine.

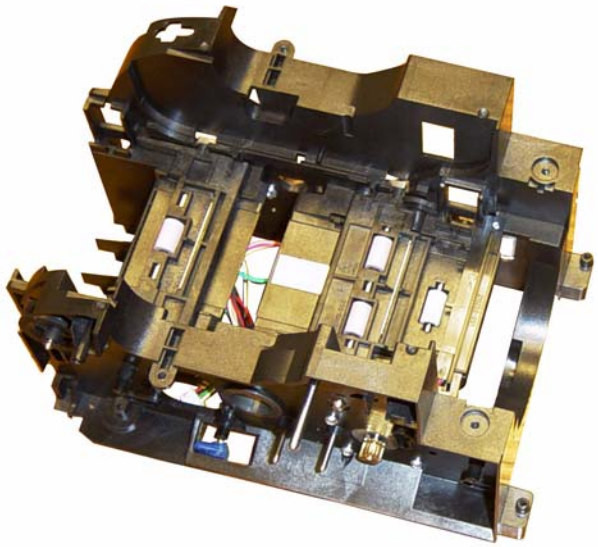


Step 3. Turn the Print Engine over (for access from bottom).

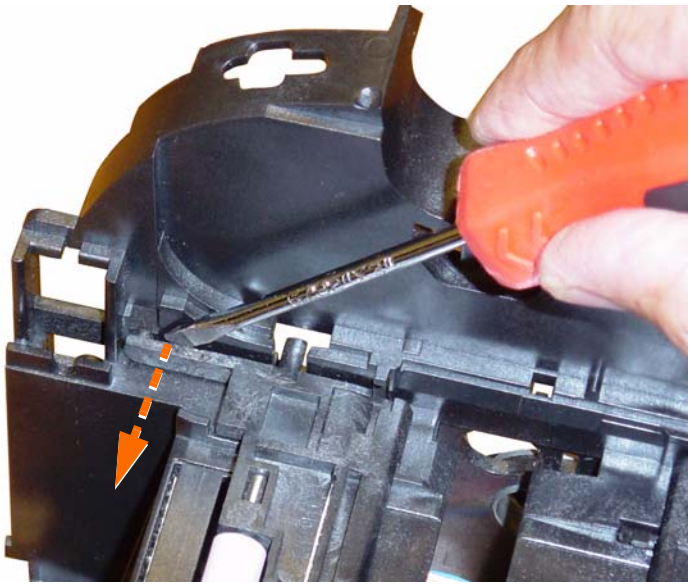
Step 4. With a TORX T10 driver, remove the two screws; and disconnect the ground wires.



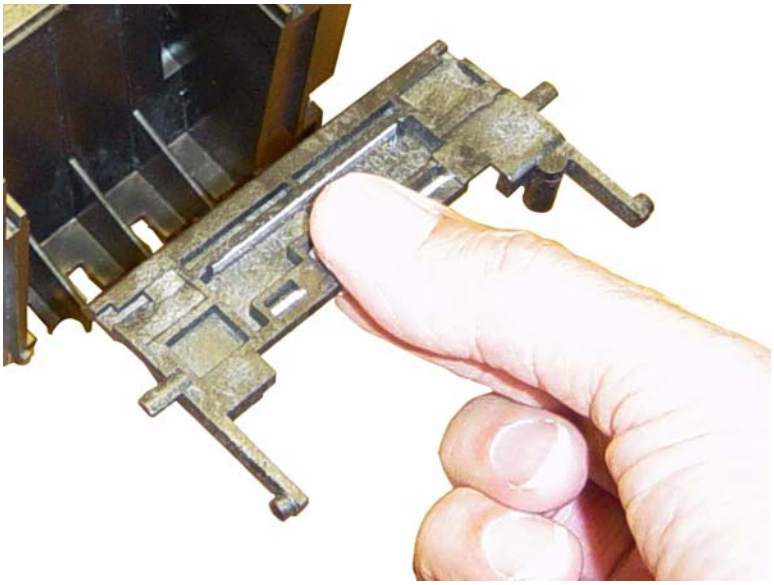
Step 5. Turn the Print Engine over (for access from top).



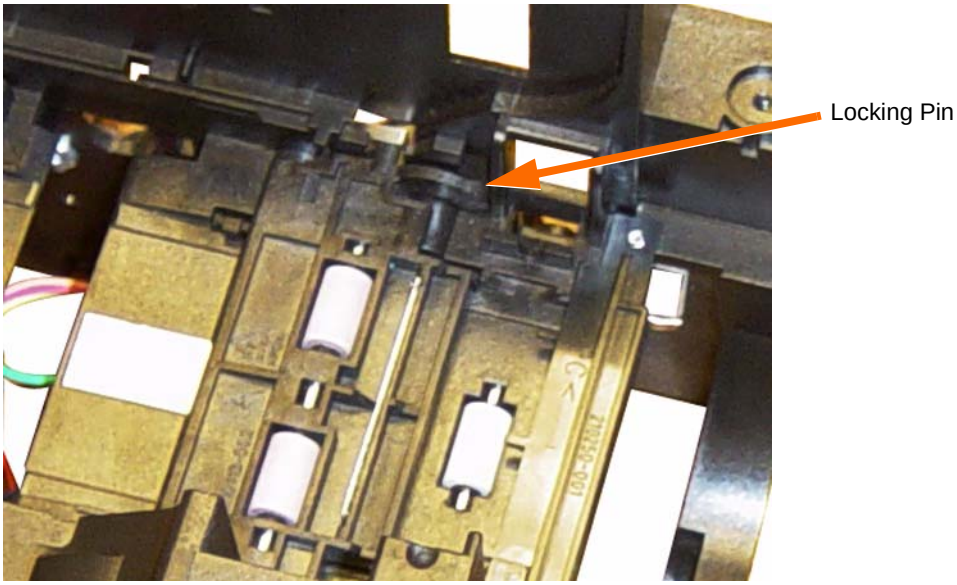
Step 6. With a flat-blade screwdriver, free the locking pins that hold the ATM Pressure Roller assembly in place.



Step 7. Remove the ATM Pressure Roller assembly.



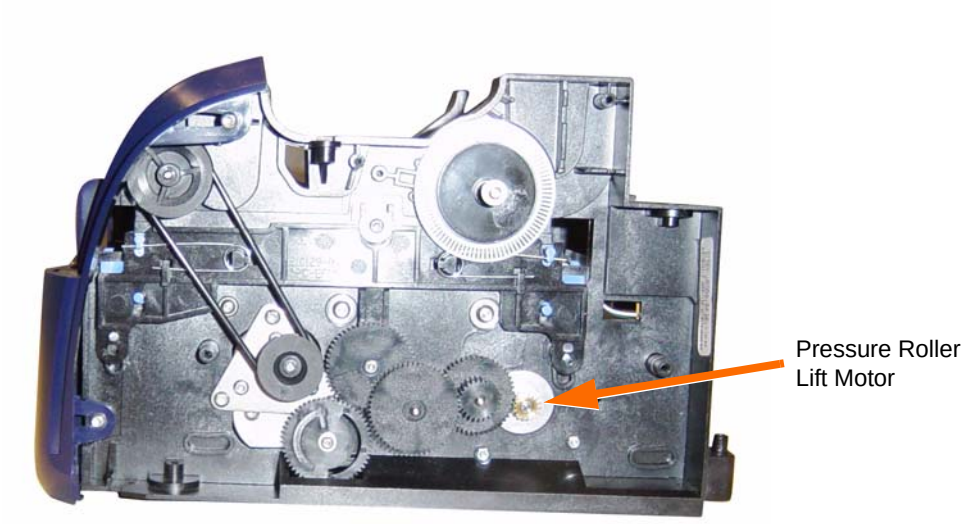
Step 8. With a flat-blade screwdriver, free the locking pins that hold the Card Drive Roller assembly in place.



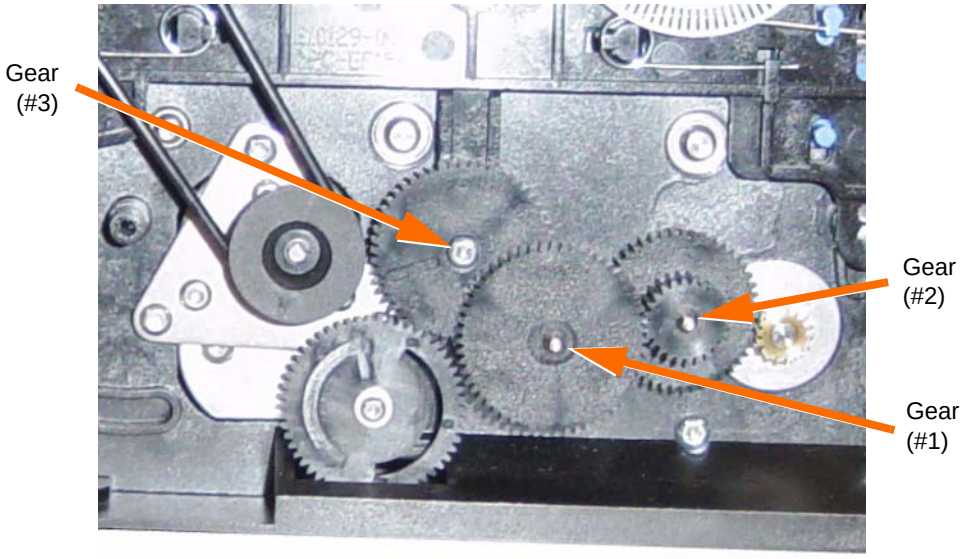
Step 9. Remove the Card Drive Roller assembly.

5.30 Pressure Roller Lift Motor

Step 1. Locate the Pressure Roller Lift Motor.



Step 2. Remove retaining clip from the middle gear (#1).



Step 3. Remove the associated gear.

Step 4. Remove retaining clip from the right gear assembly (#2).

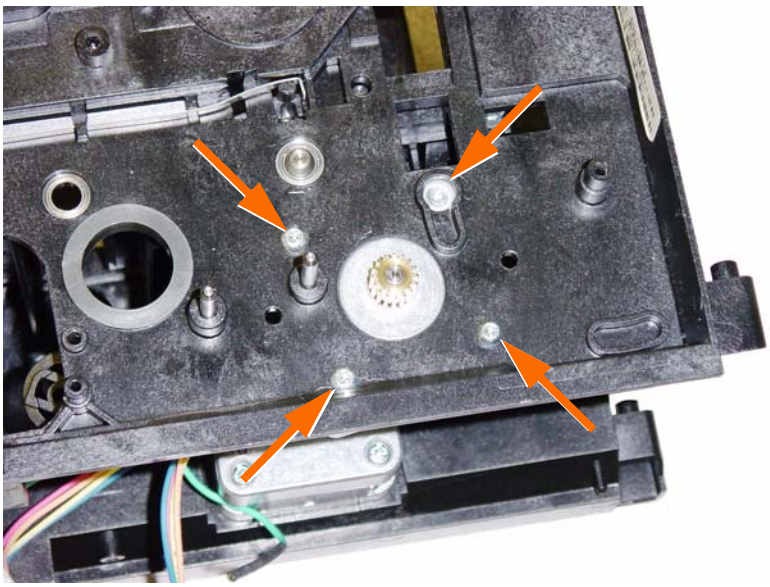
Step 5. Remove the two associated gears.

Step 6. Using a TORX T10 driver, remove the screw holding the gear (#3) in place.

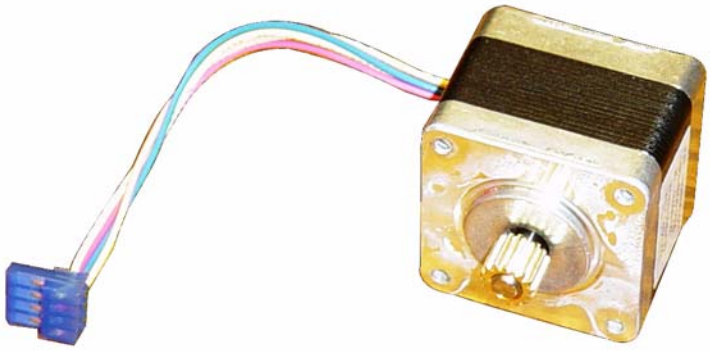
Step 7. Remove the associated gear.

Step 8. Remove the Rocker Assembly. If you need detailed instructions for the removal of the Rocker Assembly, refer to Section 5.27, Step 2.

Step 9. Using a TORX T8 driver, remove the four screws holding the motor to the frame. Note that the orange arrows point out the four mounting screws.

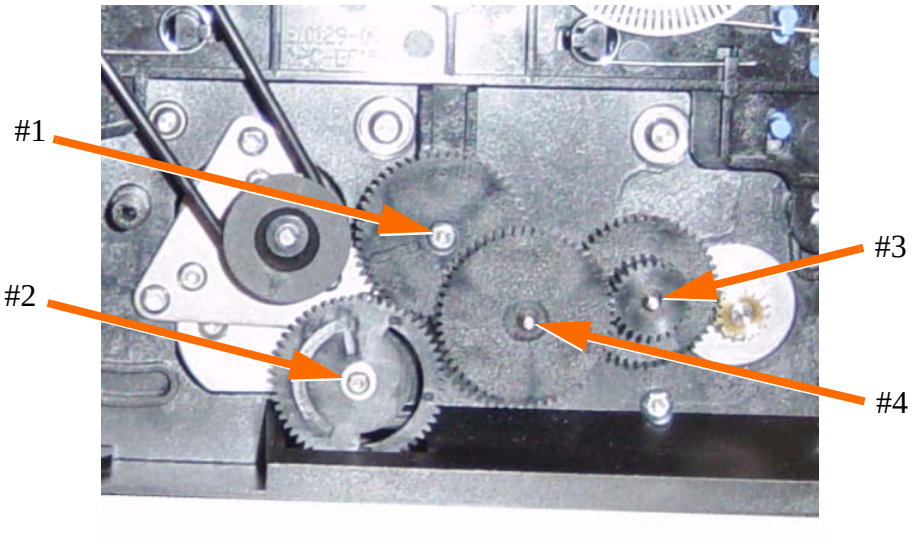


Step 10. Remove the Pressure Roller Lift Motor.

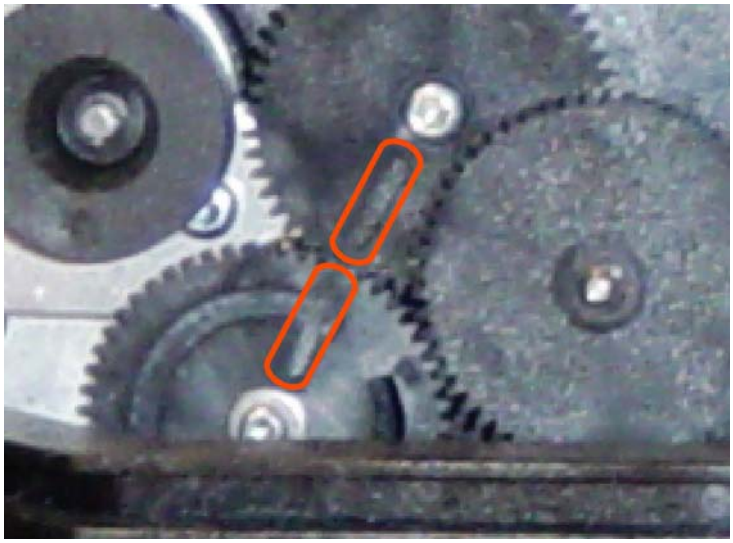


Replacement

Slide the gears on their respective shafts in the order indicated below, then lock them in place (screws for #1 & #2 and clips for #3 & #4) in the same order.

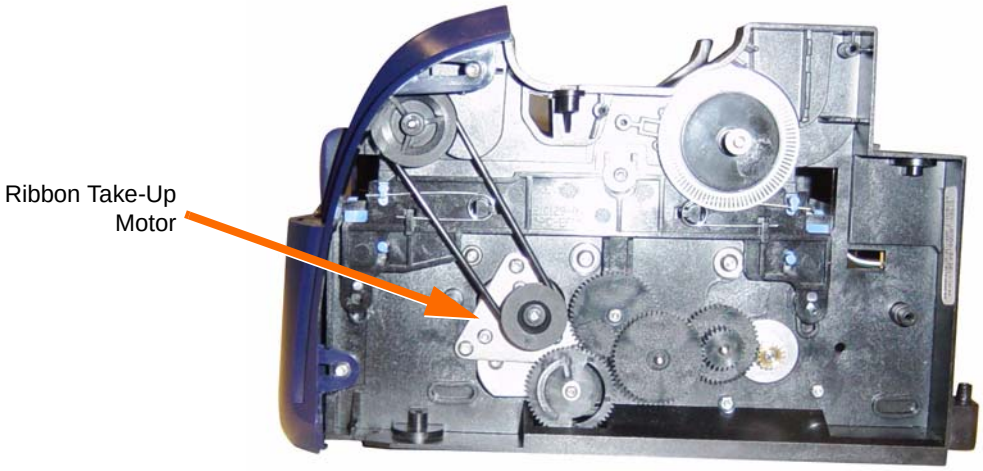


Important • When re-installing the gears #1 & #2, ensure that the grooves (outlined in orange) are aligned as indicated.



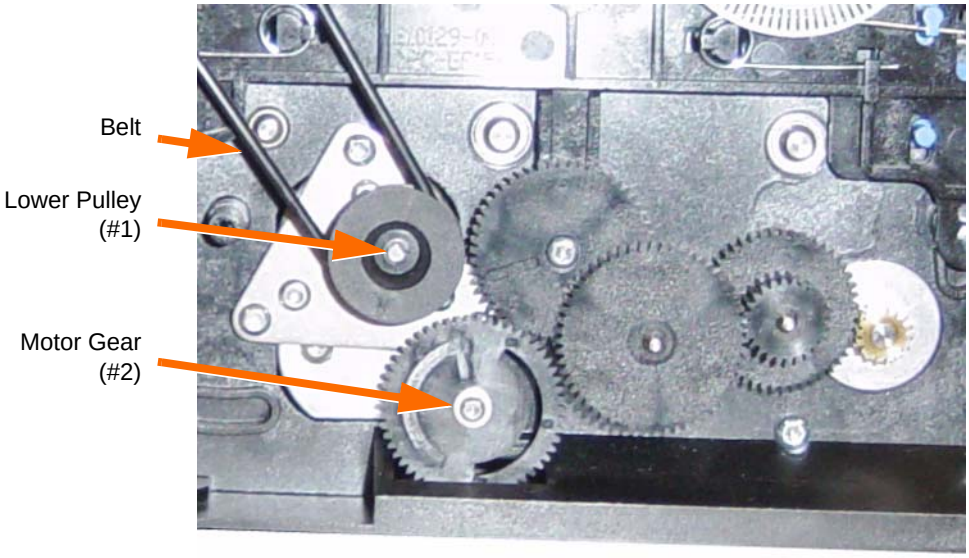
5.31 Ribbon Take-Up Motor

Step 1. Locate the Ribbon Take-Up Motor



Step 2. Remove the belt.

a. Remove the clip from the lower pulley (#1).



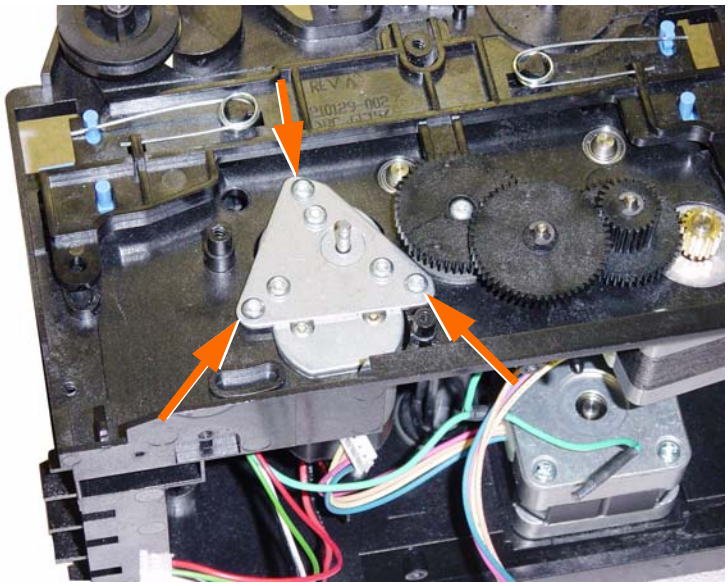
b. Slide the pulley off the shaft.

c. Remove the belt.

Step 3. With a TORX T8 driver, remove the screw holding the motor gear (#2) in place.

Step 4. Remove the gear.

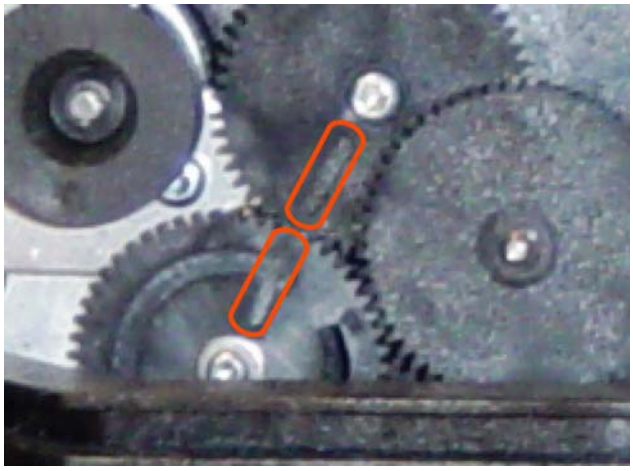
Step 5. With a TORX T10 driver, remove the three “outside” screws holding the motor to the frame. Note that the orange arrows point out the three mounting screws.



Step 6. Remove the Ribbon Take-Up Motor.

Replacement

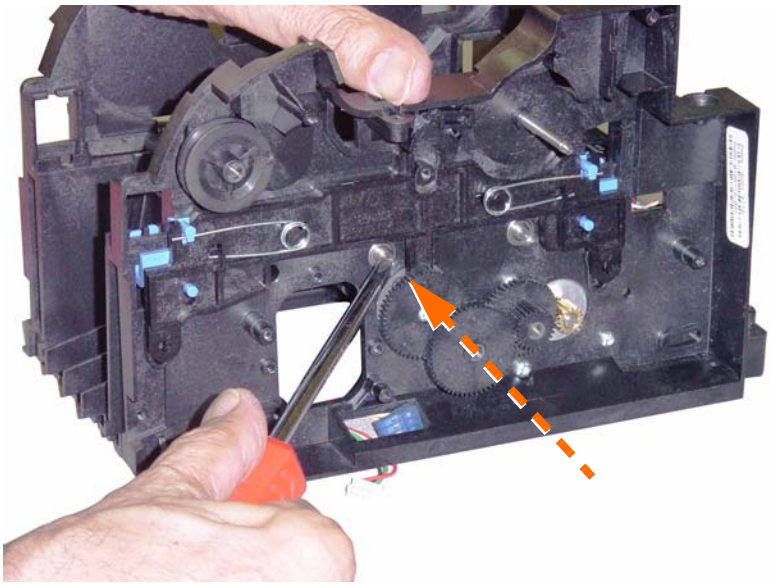
Important • When re-installing the gears, ensure that the grooves (outlined in orange) are aligned as indicated.



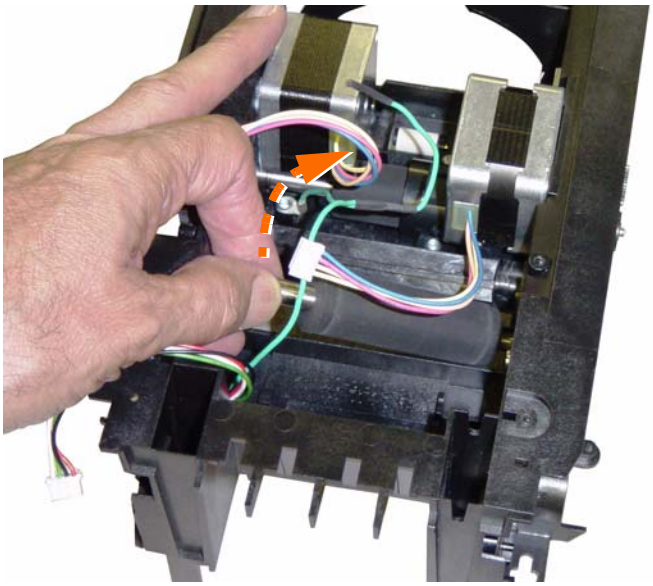
5.32 Platen Roller

With the Ribbon Take-Up Motor removed, you can remove the Platen Roller.

Step 1. With a Phillips screwdriver, carefully push the Platen Roller shaft out of its right-side mounting hole.



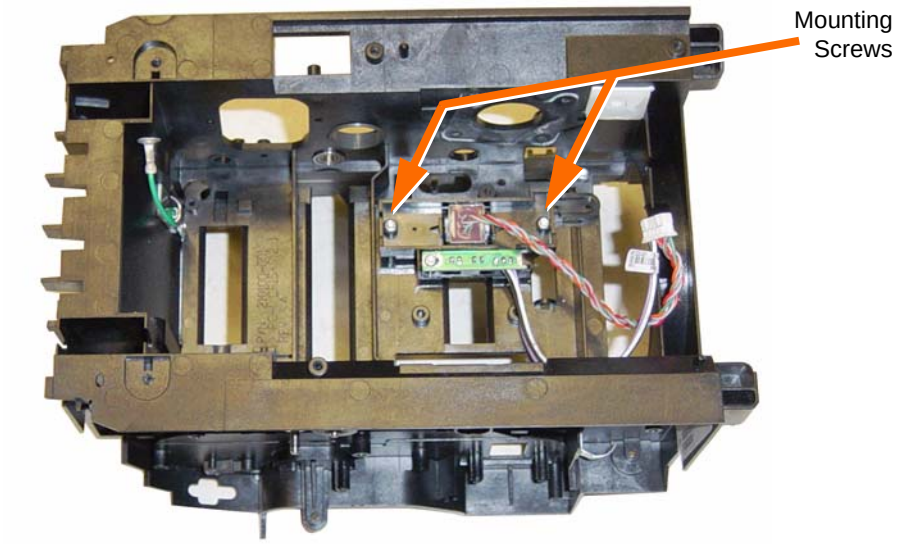
Step 2. Turn the Print Engine over, reach in, and remove the Platen Roller.



5.33 Mag Encoder Assembly (Head and Sensor)

Note • This procedure is for those printers that include the Magnetic Encoder option.

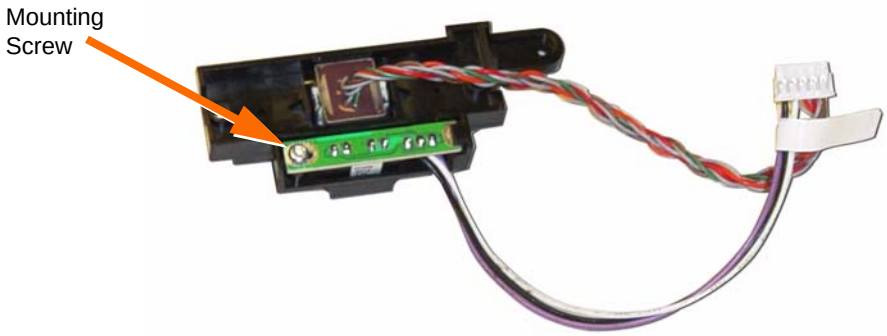
Step 1. Locate the Mag Encoder Assembly (Head and Sensor).



Step 2. With a TORX T10 driver, remove the two screws holding the Mag Encoder assembly to the frame.

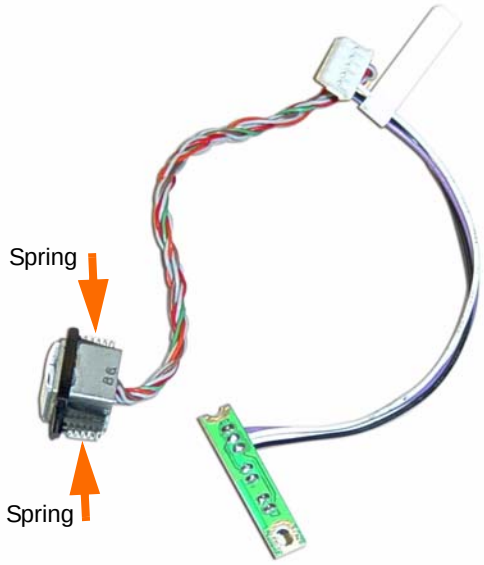
Step 3. If not already done, disconnect the Mag Encoder Head and Sensor plug from connector J23 on the Main PCBA.

Step 4. Remove the Mag Encoder Assembly.



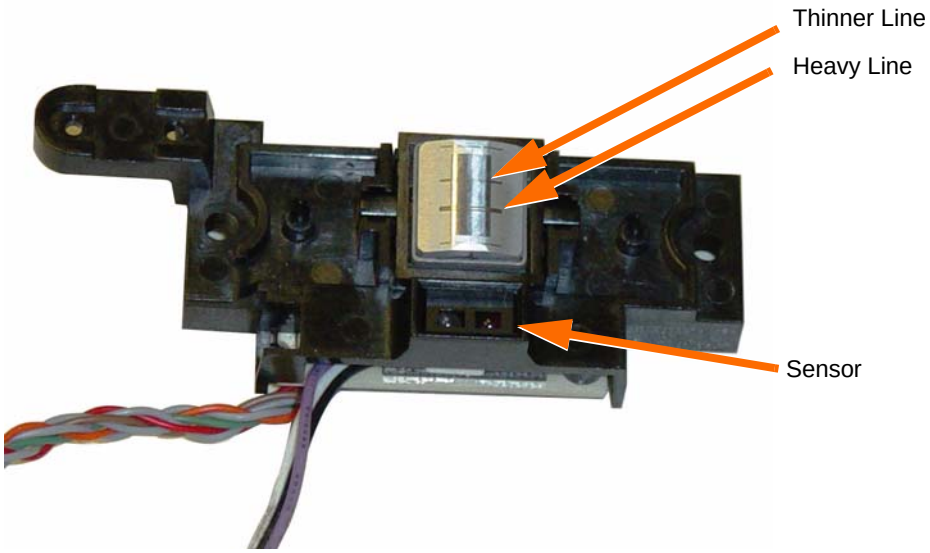
Step 5. With a TORX T8 driver, remove the screw holding the Sensor to the Bracket.

Step 6. Remove the Head & Sensor Cable Assembly from the Bracket. Note that there are two springs attached to the Head. The springs are a snug fit on their mounting pins. Also note that the Magnetic Head is not attached to the bracket; it “floats” on the springs.



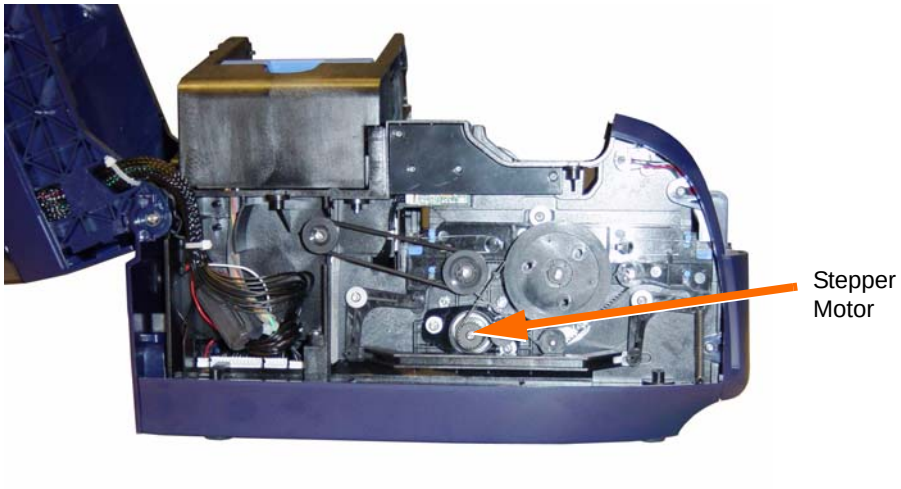
Replacement

Important • The orientation of the Head is critical. When installing the Head, ensure that the heavy line is facing toward the Sensor.

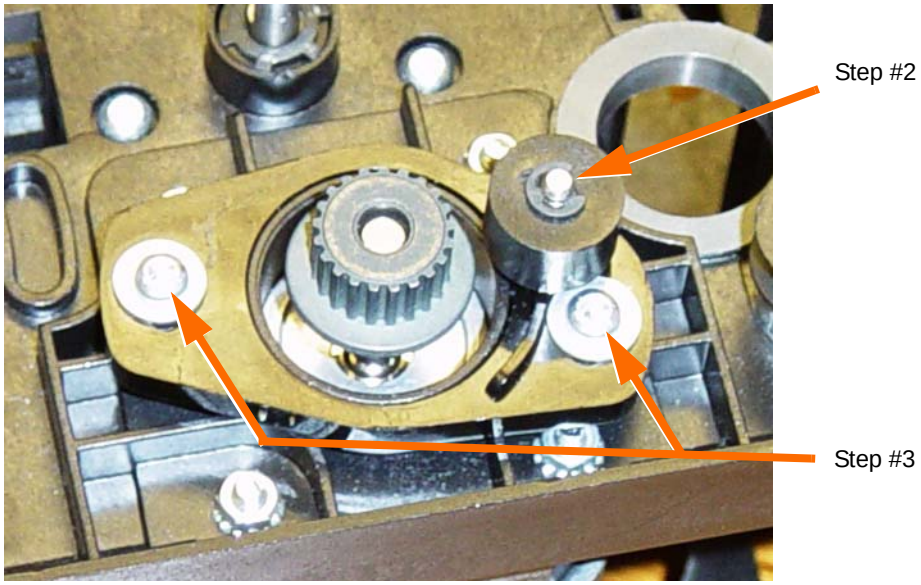


5.34 Stepper Motor

Step 1. Locate the Stepper Motor.

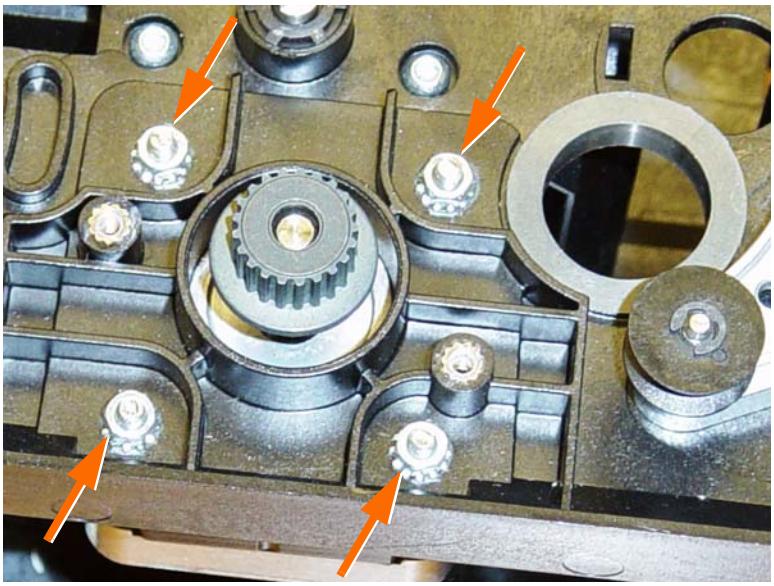


Step 2. Remove the adjacent roller (remove the retaining clip, then remove the roller).



Step 3. With a TORX T10 driver, remove the two screws (and washers) holding the motor bracket to the frame; then remove the bracket.

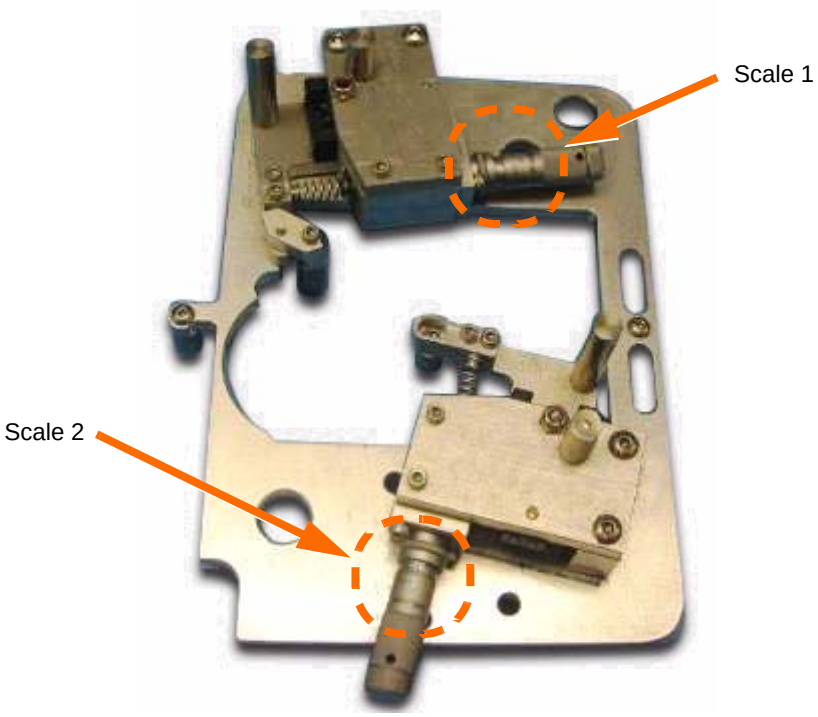
Step 4. With a 5.5 mm Hex driver, remove the four nuts (with attached lock washers) holding the Stepper Motor in place. Note that the orange arrows point out the four mounting nuts.



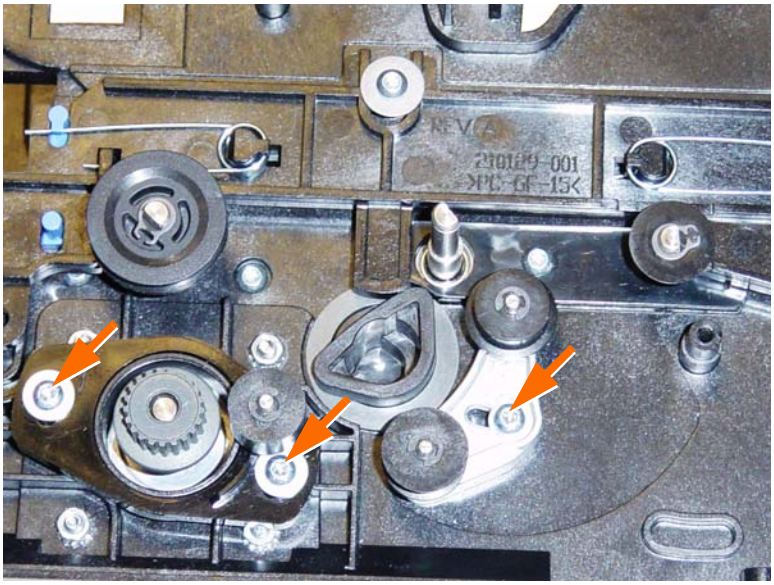
Step 5. Remove the Stepper Motor.

Replacement

Step 1. Check the Belt Tensioning Tool presets (Scale 1 = .075” and Scale 2 = .050”). Adjust the presets as required.

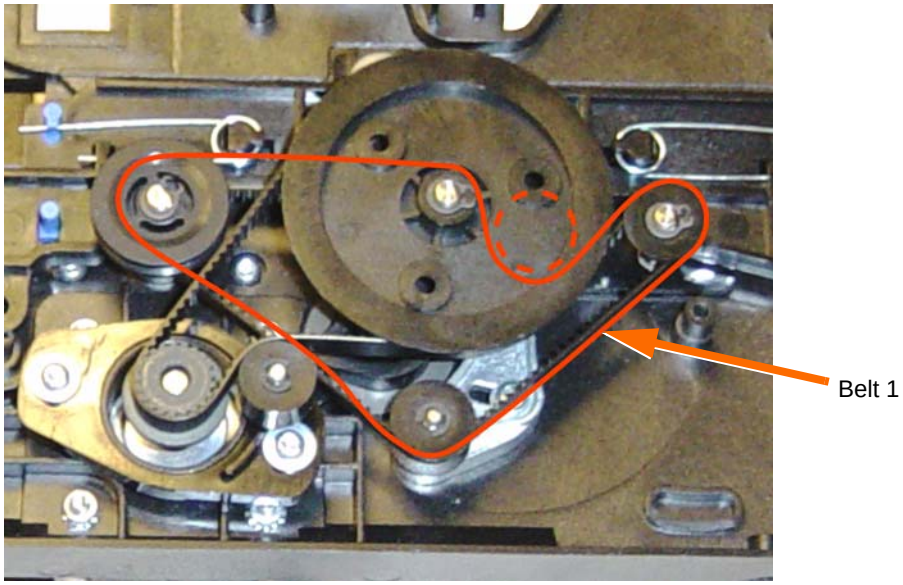


Step 2. With a TORX T10 driver, loosen the three screws indicated in the figure below.



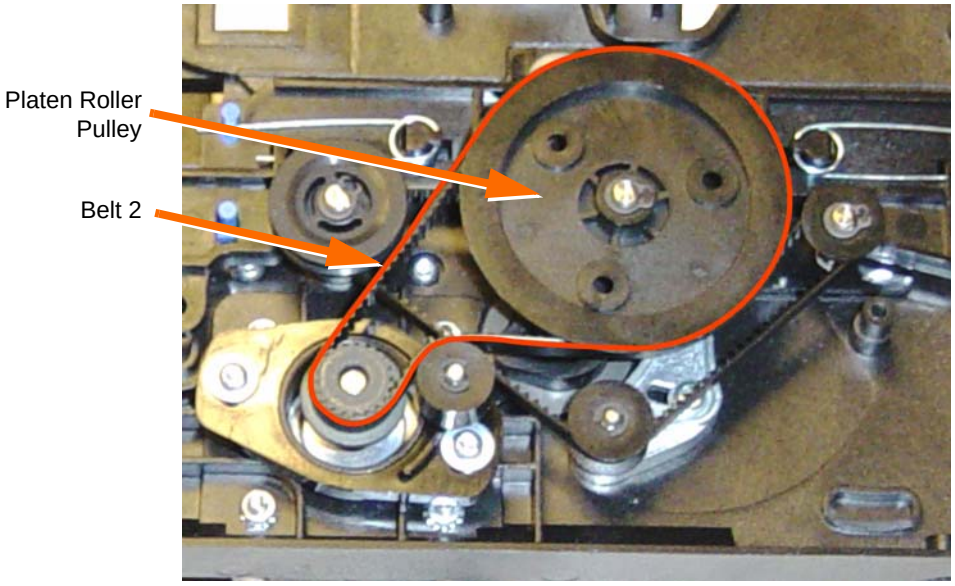
Step 3. Install the belts and associated gears and pulleys. The following two figures show the belt “path” for the two belts removed in this section.

a. Install Belt 1.

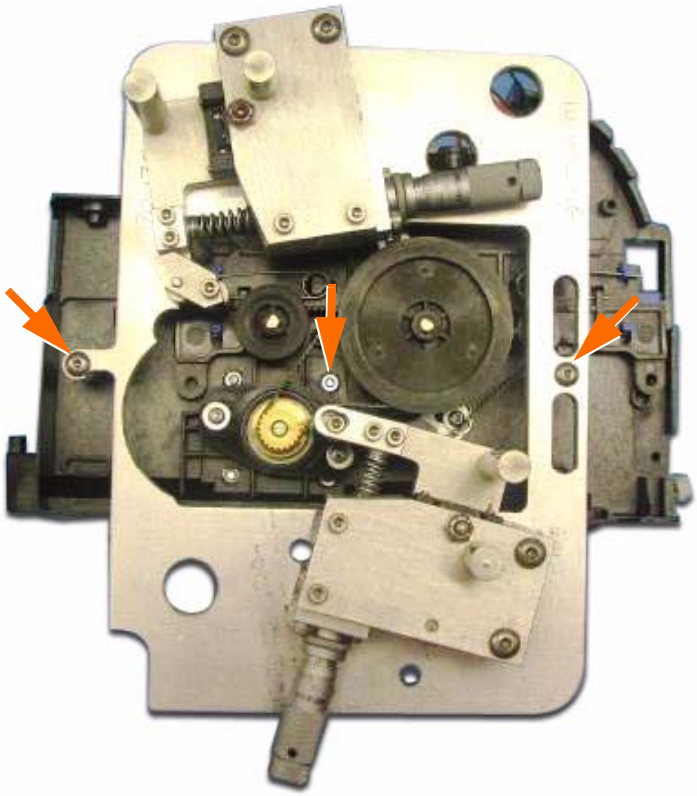


b. Install the Platen Roller Pulley.

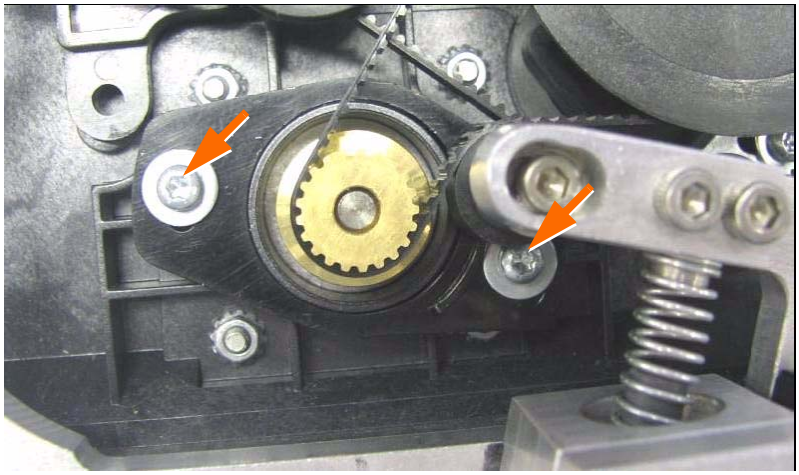
c. Install Belt 2.



Step 4. Set the Belt Tensioning Tool in place. Note that the arrows indicate the alignment guide posts.

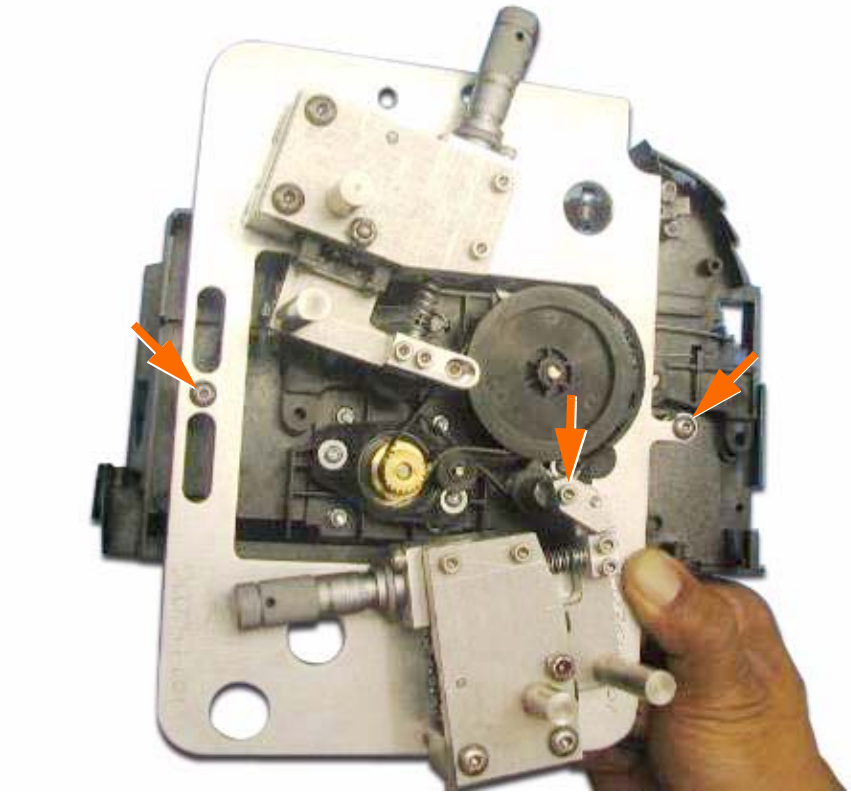


Step 5. With a TORX T10 driver, tighten the two motor mount screws.

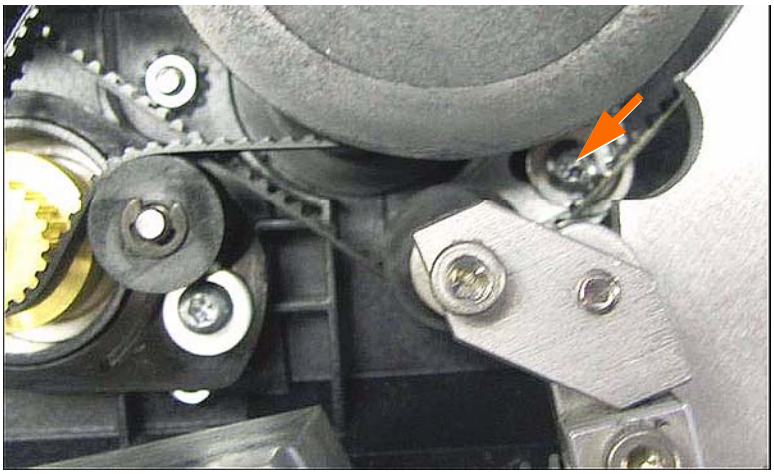


Step 6. Rotate the Belt Tensioning Tool 180 degrees.

Step 7. Set the Belt Tensioning Tool in place. Note that the arrows indicate the alignment guide posts.



Step 8. With a TORX T10 driver, tighten the single screw.

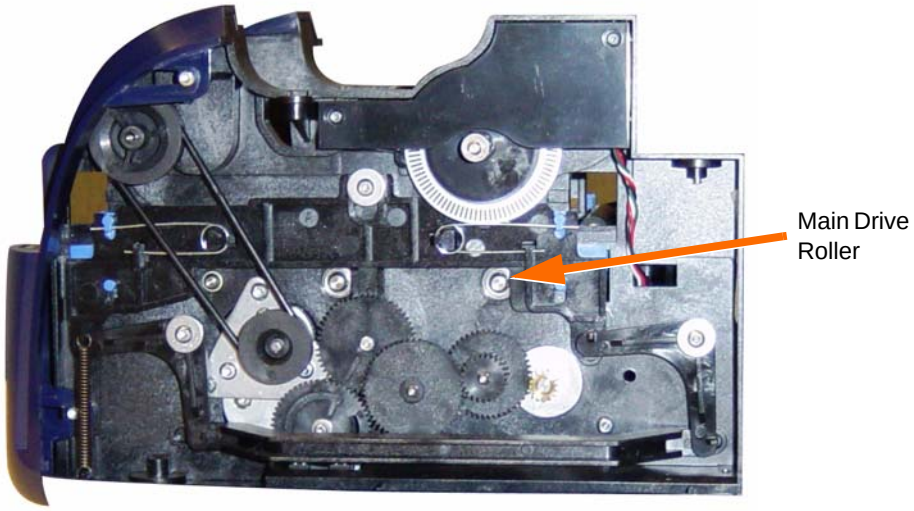


Step 9. Remove the Belt Tensioning Tool.

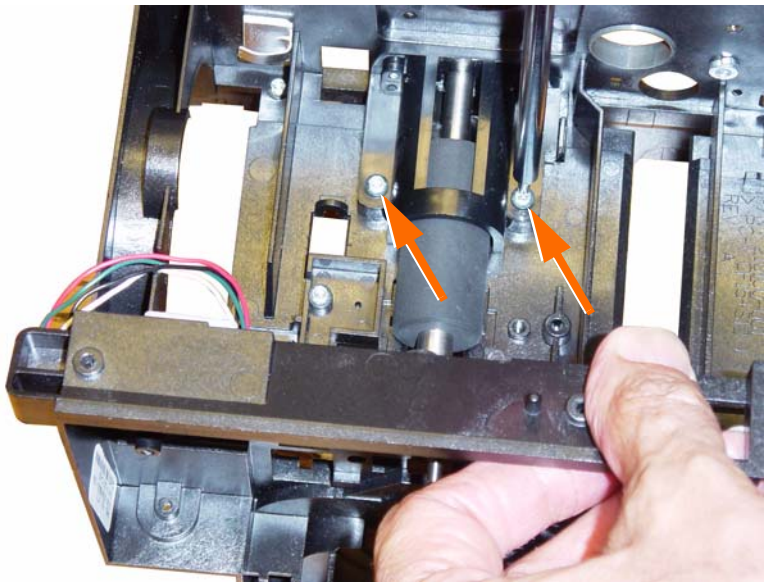
Step 10. Ensure that the Stepper Motor and associated gears and pulleys rotate freely as the large pulley is turned.

5.35 Main Drive Roller

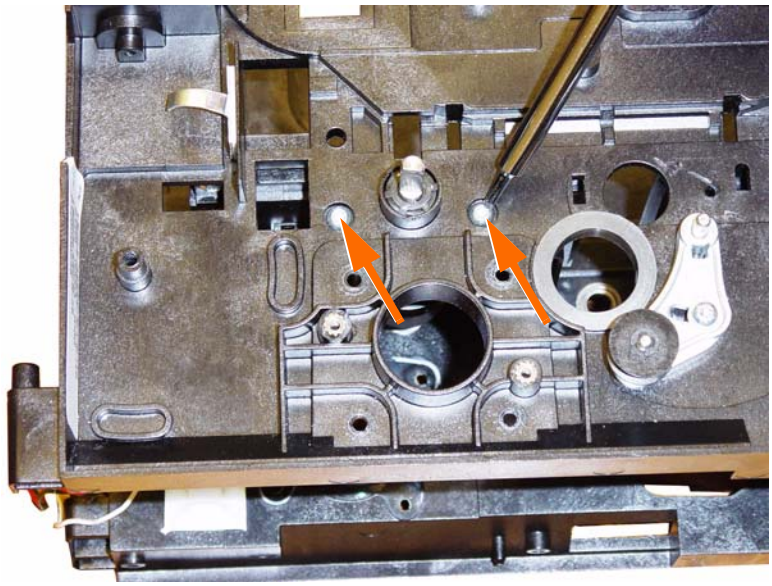
Step 1. Locate the Main Drive Roller.



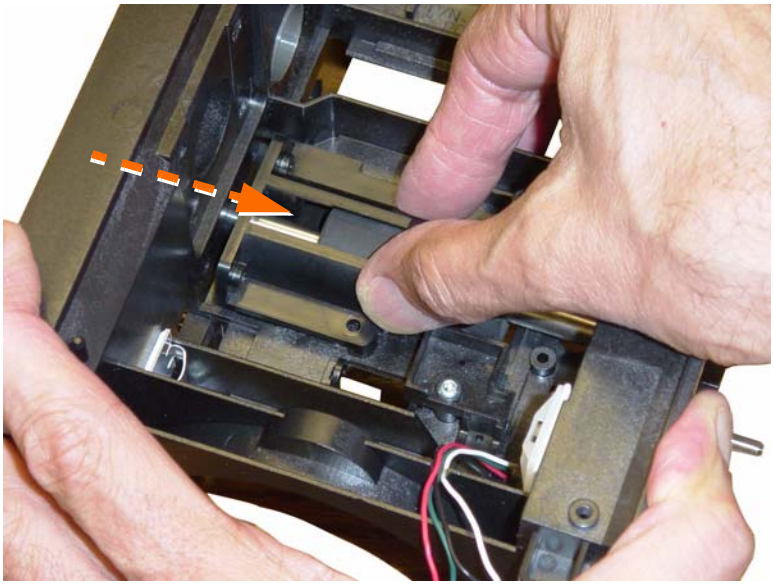
Step 2. With a TORX T10 driver, remove the two screws holding the Main Drive Roller support collar to the frame.



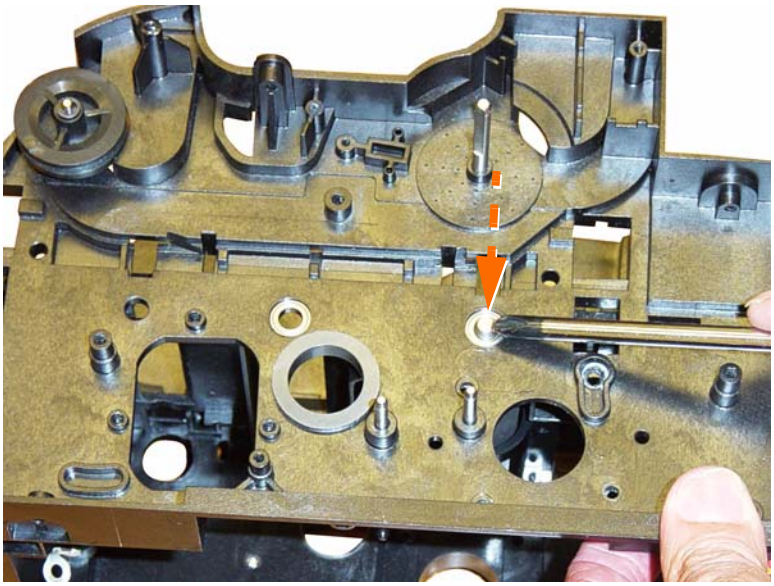
Step 3. With a TORX T10 driver, remove the two screws holding the side of the support collar to the frame.



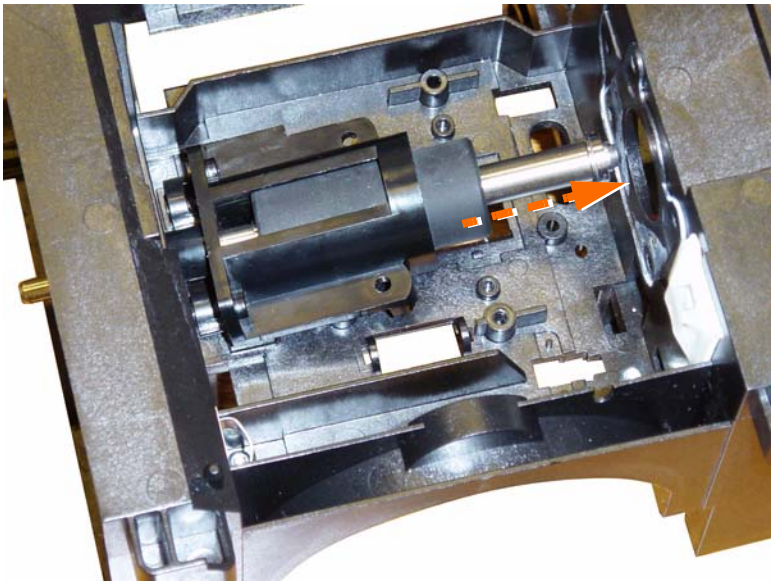
Step 4. Slide the collar over the roller.



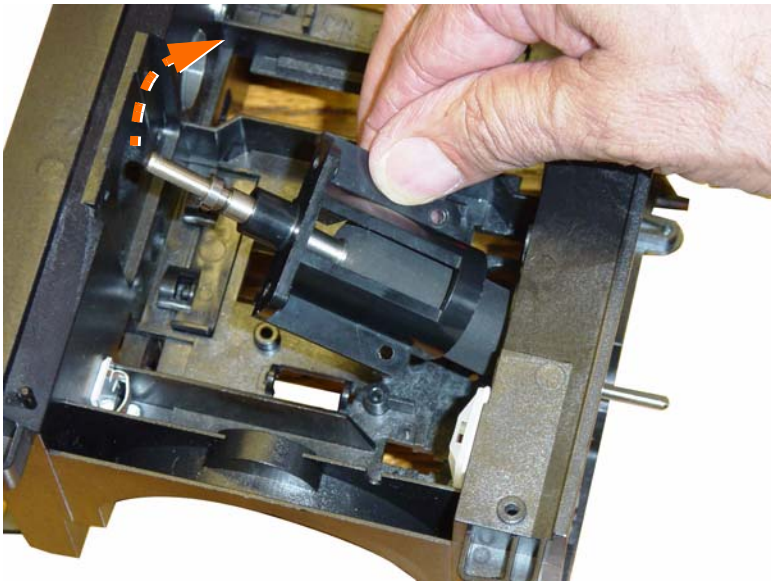
Step 5. With a Phillips screwdriver, carefully push the Main Drive Roller shaft out of its right-side mounting hole.



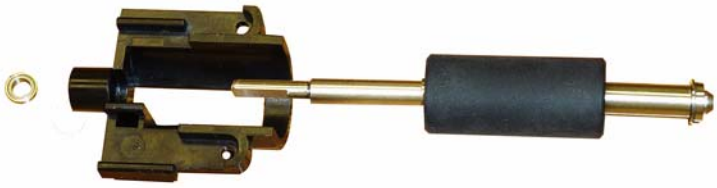
Step 6. Slide the roller assembly into the large hole.



Step 7. Lift the assembly up and out of the Print Engine.



Step 8. Slide the bearing and the support collar off the roller.



6 Preventive Maintenance

6.1 Cleaning System

Caution • PROTECT YOUR FACTORY WARRANTY!
The recommended maintenance procedures must be performed to maintain your factory warranty. Other than the recommended cleaning procedures described in this manual, allow only Zebra authorized technicians to service the Printer.

NEVER loosen, tighten, adjust, or bend, etc., a part or cable inside the printer.

NEVER use a high-pressure air compressor to remove particles from the printer.

Your Printer includes a simple cleaning system using Pre-Saturated Cleaning Cards provided. The regular use of these cards will clean and maintain important parts of your printer that cannot be reached: including the Printhead, the Transport Rollers, and the Magnetic Encoder Station (optional feature).

6.1.1 When to Clean

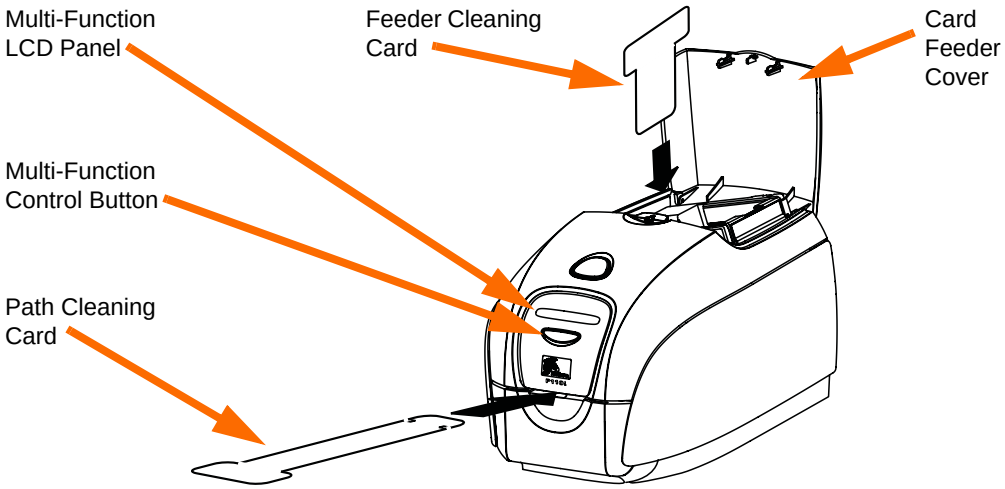
Clean the Printer when:

- Print quality has been degraded.
- The LCD panel displays the message **CLEAN PRINTER**.

6.1.2 How to Clean

Step 1. Place the printer power switch in the ON (|) position, and then press and hold the Multi-Function Control Button for 5 seconds.

Step 2. When the cleaning cycle is initiated, the LCD message **REMOVE RIBBON THEN CLOSE LID** will display.



Step 3. After the ribbon is removed and the lid is closed, the message **EMPTY FEEDER THEN CLOSE COVER** will display.

Step 4. If the lid is opened and closed without removing the ribbon, the **REMOVE RIBBON THEN CLOSE LID** message will remain.

Step 5. Once the cover is closed, the firmware will eject any card inside the printer. The message **EJECTING CARD** will display.

Step 6. The LCD will then display **FEED LONG CLEANING CARD IN EXIT**. When the card sensor registers the presence of the cleaning card, the rollers should take the card into the printer.

Step 7. When the cleaning process is done, the printer will eject the cleaning card. If the card sensor still senses the cleaning card, the message **REMOVE LONG CLEANING CARD** will display.

Step 8. Once the long cleaning card is no longer sensed by the exit card sensor, the message I**NSERT FEEDER CLEANING CARD** will display. Open the feeder cover and insert the feeder cleaning card.

Step 9. When the feeder cleaning card has been sensed by the feeder card sensor, the message **CLOSE FEEDER COVER** will display.

Step 10. When feeder cleaning is complete, the message **REMOVE FEEDER CLEANING CARD** will display.

Step 11. After the card is removed, the LCD will display **READY**. You may now reload the ribbon and cards and continue printing.

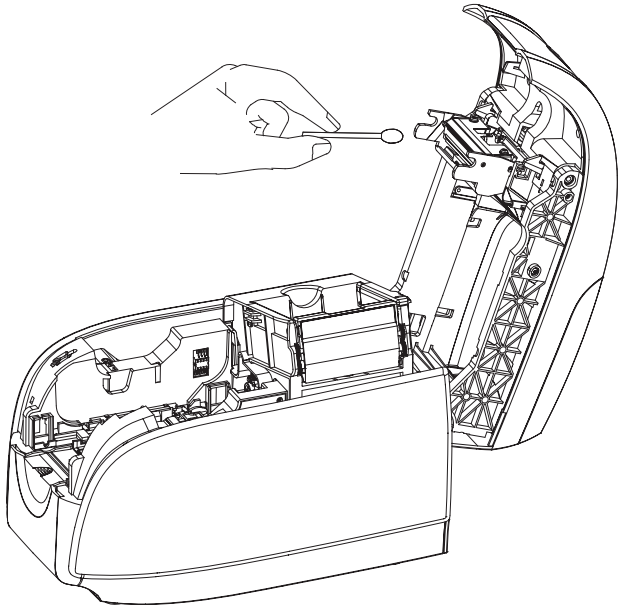
6.2 Cleaning the Printhead

Use of the cleaning cards will normally do an adequate job of cleaning the printer. However, a separate Printhead cleaning, using swabs, can remove more stubborn deposits when print anomalies persist. To avoid deposits, only use foam-tipped swabs.

Caution • Never use a sharp object to scrape deposits from the printhead. Permanent damage to the printhead will result.

Step 1. Place the printer power switch in the OFF (0) position.

Step 2. Open the printer lid by pressing the cover release button. Open the cover fully to reveal the Printhead mounted to the inside of the cover.



Step 3. Clean the Printhead by moving an alcohol-moistened swab tip side-to-side across Printhead elements. Only use moderate force.

Step 4. Allow two to three minutes for the Printhead to dry before placing the printer power switch in the ON (|) position.

Step 5. To reorder swabs, refer to the Media List on the Windows Drivers and User Documentation CD supplied with this printer.

6.3 Magnetic Encoder Cleaning

Use the standard cleaning card process as described in Section 6.1.2. This cleans the most important parts of the printer; including the Printhead, Transport Roller, and Magnetic Stripe Encoder.

APPENDIX A

Model Numbers

The Zebra Product Number tells a story. Here is a quick review of the Zebra Card Printer Series numbering and lettering system to help you.

Model numbers include identifiers that specify options using lettering conventions as follows:

PART NUMBER	DESCRIPTION
P 1 1 0 *i* - _ _ _ _ _ - _ _ _ P 1 1 0 *m* - _ _ _ _ _ - _ _ _ P 1 2 0 *i* - _ _ _ _ _ - _ _ _	Base Printer P110*i* Single-Sided Color Card Printer P110*m* Single-Sided Monochrome Card Printer P120*i* Dual-Sided Color Card Printer
_ _ _ _ _ - 0 _ _ _ _ - _ _ _	Smart Card Options None
_ _ _ _ _ - _ 0 _ _ _ - _ _ _ _ _ _ _ _ - _ M _ _ _ - _ _ _	Magnetic Encoder None Yes (select defaults below)
_ _ _ _ _ - _ _ 0 _ _ - _ _ _ _ _ _ _ _ - _ _ 1 _ _ - _ _ _	Magnetic Encoder Defaults None Stripe Down, HiCo/LoCo
_ _ _ _ _ - _ _ _ 0 _ - _ _ _	Memory Expansion None
_ _ _ _ _ - _ _ _ _ A - _ _ _ _ _ _ _ _ - _ _ _ _ C - _ _ _	Interface USB Only USB and Ethernet
_ _ _ _ _ - _ _ _ _ _ - I _ _ _ _ _ _ _ - _ _ _ _ _ - U _ _	Power Cords U. S. and Europe U. K. and Australia
_ _ _ _ _ - _ _ _ _ _ - _ D _	Windows Drivers and User Documentation are included on one CD (Software & Documentation Package) containing multi-language documentation - English, Spanish, French, German, Chinese, Italian, and Portuguese
_ _ _ _ _ - _ _ _ _ _ - _ _ 0 _ _ _ _ _ - _ _ _ _ _ - _ _ S	Starter Kit No Starter Kit Starter Kit (including 200 - 30 mil PVC cards and one YMCKOK ribbon, part number 800015-948)
EXAMPLE	
P120*i*-0M10A-ID0	P120i Printer, Magnetic Encoder (Stripe Down, HiCo/LoCo), Standard Memory, USB Interface, U.S. and Europe Power Cords, Windows Driver and User Documentation CD, No Starter Kit

ACCESSORIES	DESCRIPTION
105862-001	Card Sense™ single card feed upgrade kit
105912-912	Cleaning Kit, includes 4 print engine cleaning cards and 4 feeder cleaning cards

Appendix B

Card Sense™ Single Card Feed Option

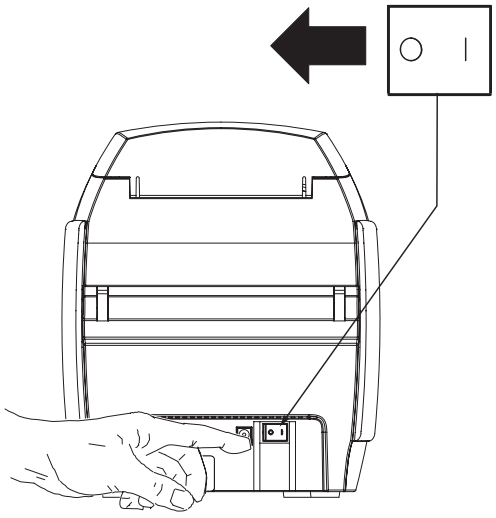
Printing a Single Card Without Using the Feeder

For operating the card printer in single card feed mode, the printer requires that the operator install an optional Card Sense™ Single Card Feed Kit.

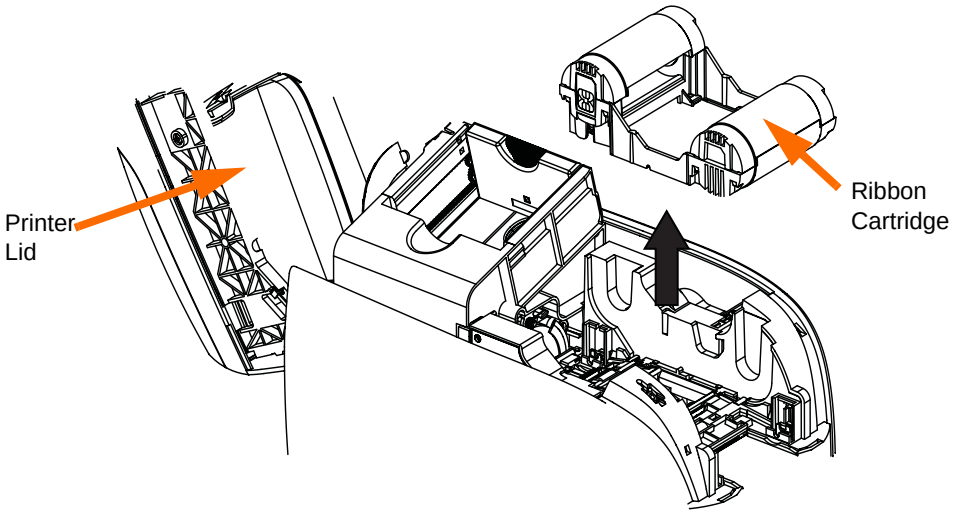
In Single Card Feed Mode (ATM Mode), the printer will only accept cards through the front slot, not from the card feeder.

Installing the Card Sense™ Single Card Feed Kit

Step 1. Set the printer to OFF.

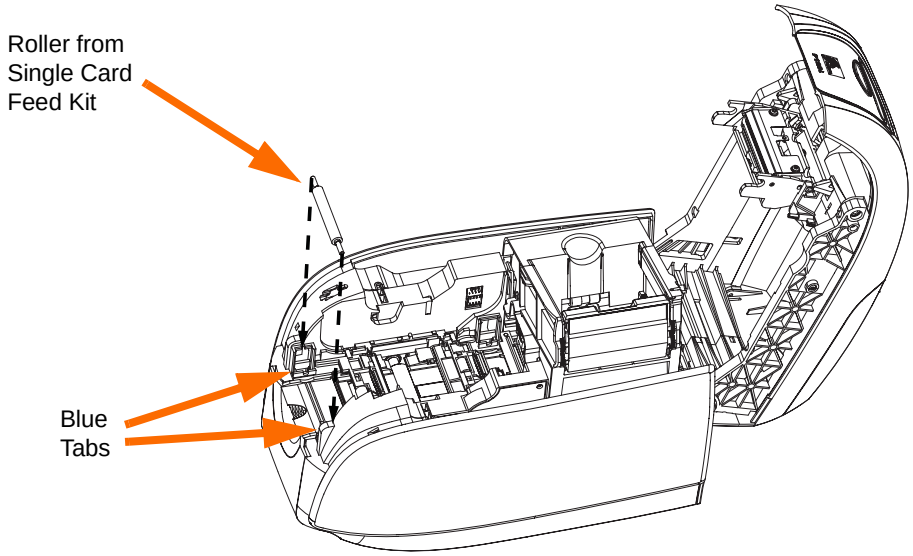


Step 2. Open the lid and remove the Ribbon Cartridge.



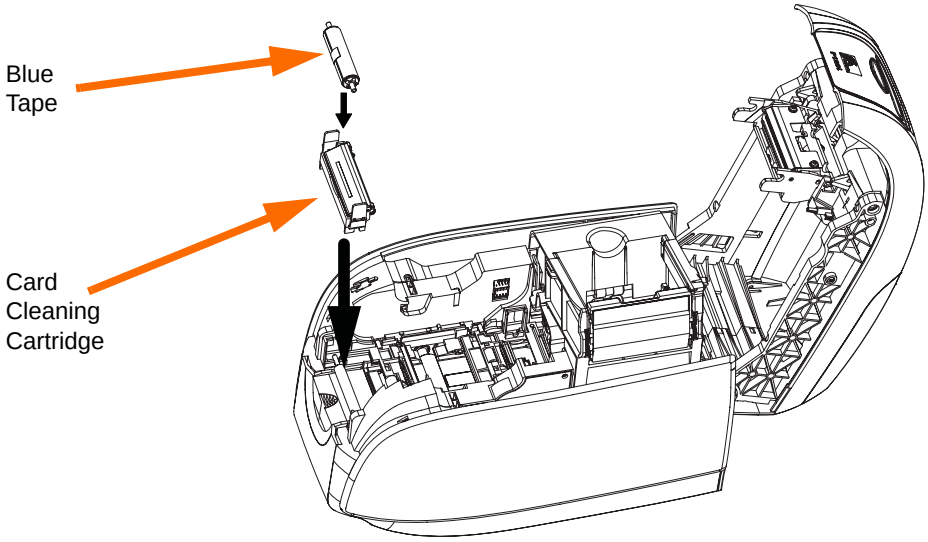
Important • Make sure the output hopper remains closed.

Step 3. Place the black roller from the Single Card Feed Kit into the blue tabs at the front of the printer.



Step 4. While holding the black roller down firmly, set the printer to ON. The printer will initialize, raise the blue tabs, and snap the roller into place.

Step 5. Open the lid of the Card Cleaning Cartridge.

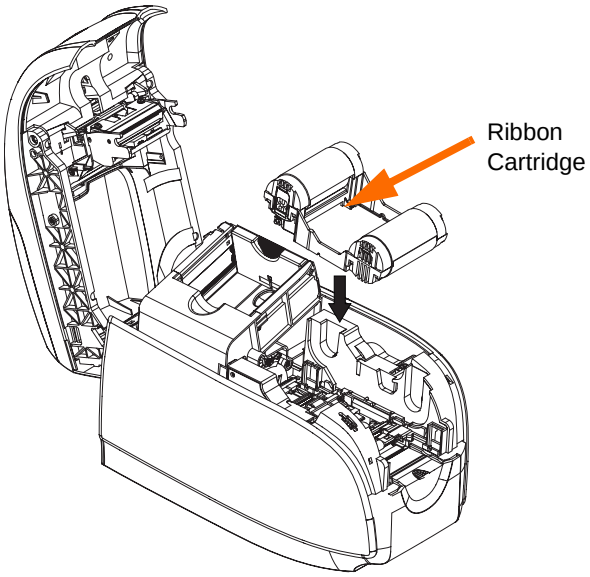


Step 6. Peel protective wrapper from the adhesive cleaning roller by gently pulling on the blue tape, and discard the wrapper.

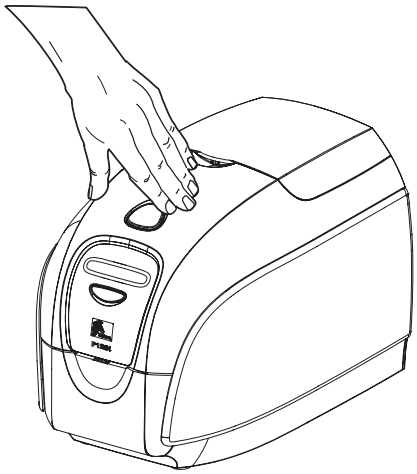
Step 7. Insert the cleaning roller into the Card Cleaning Cartridge, and close the cartridge.

Step 8. Slide the Card Cleaning Cartridge into the slots provided at the front of the printer. An alignment tab is located on the left side of the Card Cleaning Cartridge to ensure proper installation.

Step 9. Insert the Ribbon Cartridge with the cleaning roller facing down, so the gears on the ends of the rollers fit into the appropriate slots.



Step 10. Close the printer lid and push down until you hear an audible click. If you can not close the lid, the cleaning cartridge or the ribbon cartridge may be installed wrong.

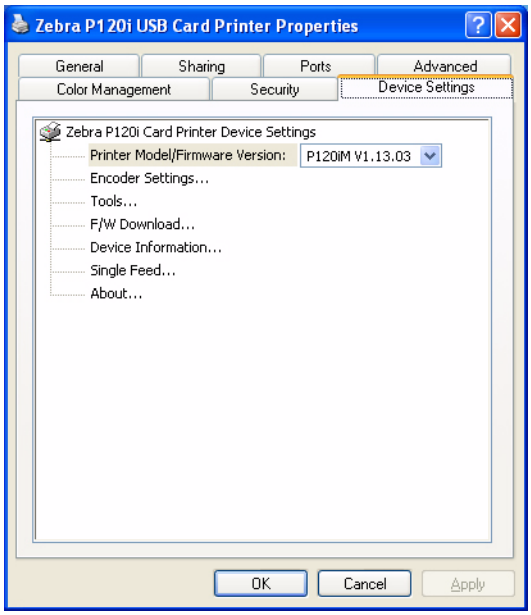


Setting Up the Printer Driver

Step 1. Open Printers and Faxes (click **Start**, then click **Printers and Faxes**).

Step 1. Right-click the printer for which you want to change settings, then click **Properties**.

Step 2. Select the **Device Settings** tab.



Step 3. Select **Single Feed ...**

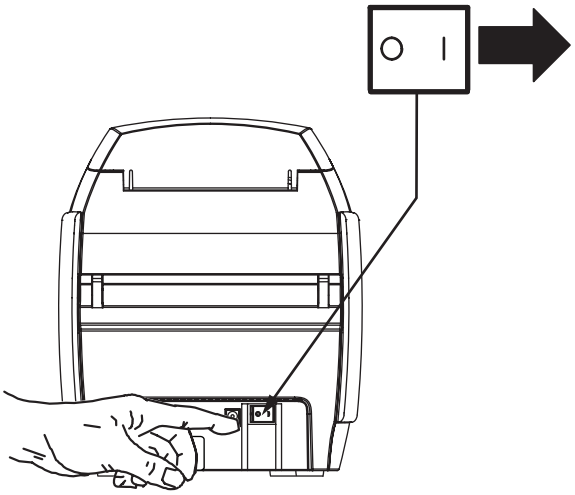
Step 4. Select **Enable Single Feed Support**.

Step 5. Click the **Apply** button.

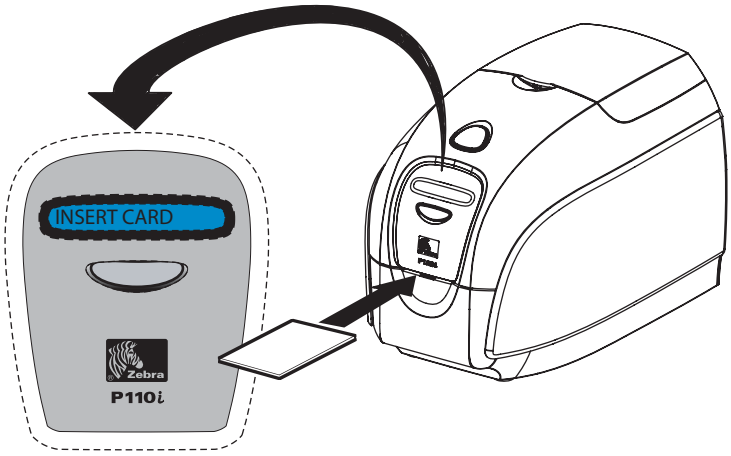
Important • You can disable Single Feed Support and return to printing cards from the hopper. You do not have to remove the components of the Single Card Feed Kit in order to operate in normal mode.

Printing a Single Card

Step 1. Place the printer power switch in the ON (|) position.



Step 1. Insert a single card into the slot at the front of the printer, directly above the card output hopper. Do not feed more than one card at a time. Printer will take the card.



Note • If single-card feeding will be the normal mode of operation, you may select that mode through the driver software. In single-card feed mode, the card will not be printed until the print job has been sent to the printer and the card to be printed has been inserted into the single-card feed slot

APPENDIX C

Ethernet Upgrade

Introduction

This Appendix describes installing the Ethernet Upgrade on P110*i*, P120*i*, or P110*m* Printers.

Important • Your printer's Main PCBA must be part number 404600-009P. Other Main PCBAs do not support this upgrade.

Important • Before beginning this procedure, see Section 5.11 for information concerning removal and replacement of the Main PCBA.

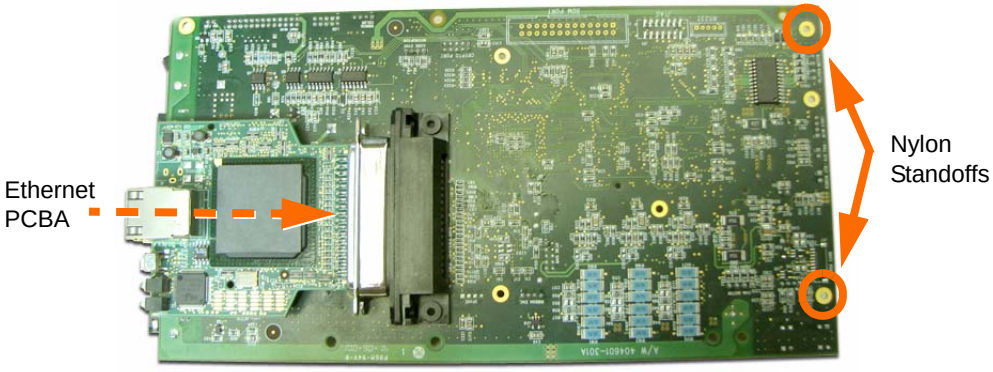
Procedure

Step 1. Remove the printer's Bottom Cover and Rear Cover; see Section 5.9 and Section 5.10 respectively.

Step 2. Remove the "old" Main PCBA; see Section 5.11.

Step 3. Detach the Fan from the "old" Main PCBA.

Step 4. Connect the Ethernet PCBA to the Main PCBA.

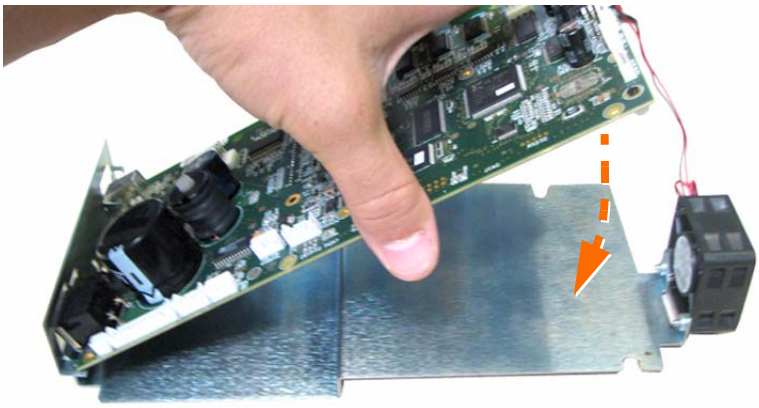


Step 5. Use two 2-56 Panhead Screws to attach the two Nylon Standoffs to the Main PCBA.

Step 6. Use two TORX T10 screws and lockwashers to attach the Fan (removed in Step 3) to the Grounding Plate.

Step 7. Remove the plastic plug shown below from the Rear Cover.

Step 8. Slide the Main PCBA onto the Grounding Plate.



Step 9. Use two 2-56 Panhead Screws to secure the Main PCBA to the Grounding Plate. These screws go into the Nylon Standoffs attached in Step 5.

Step 10. Connect the Fan plug to connector J21 on the Main PCBA.

Step 11. Re-attach the Main PCBA to the underside of the Print Engine.

Step 12. Re-attach the Rear Cover and the Bottom Cover.

APPENDIX D

Software

Introduction

This section lists software commands to initiate, check, or adjust various system functions, parameters, and variables.

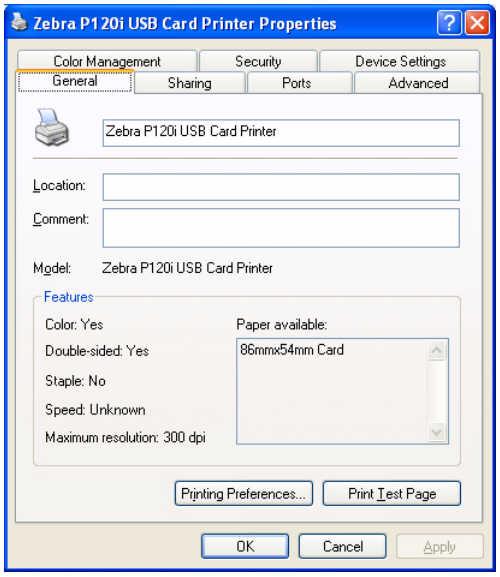
Detailed information on the use of these commands are given in the EPCL Programmer's Guide, Zebra document 980415-001, which can be downloaded from the Zebra Card Printer Solutions website at http://www.zebracard.com.

Entering Software Commands

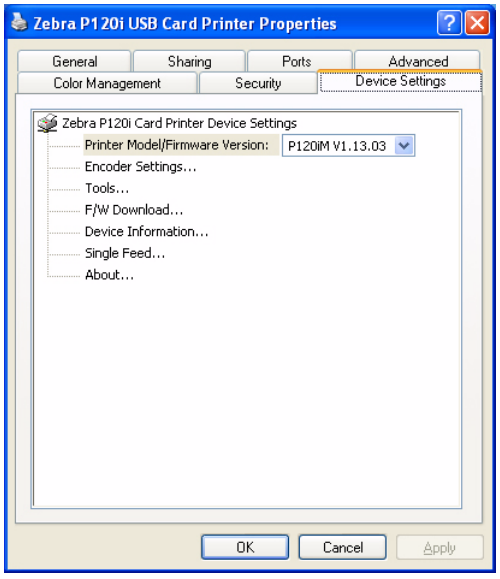
Note • The screen shots shown in this section are for the printer using the USB interface. If you are using the Ethernet interface, the screens will refer to the “Network Printer.”

Step 1. From the Printers and Faxes list, right click the Card Printer; and select **Properties** from the pop-up menu.

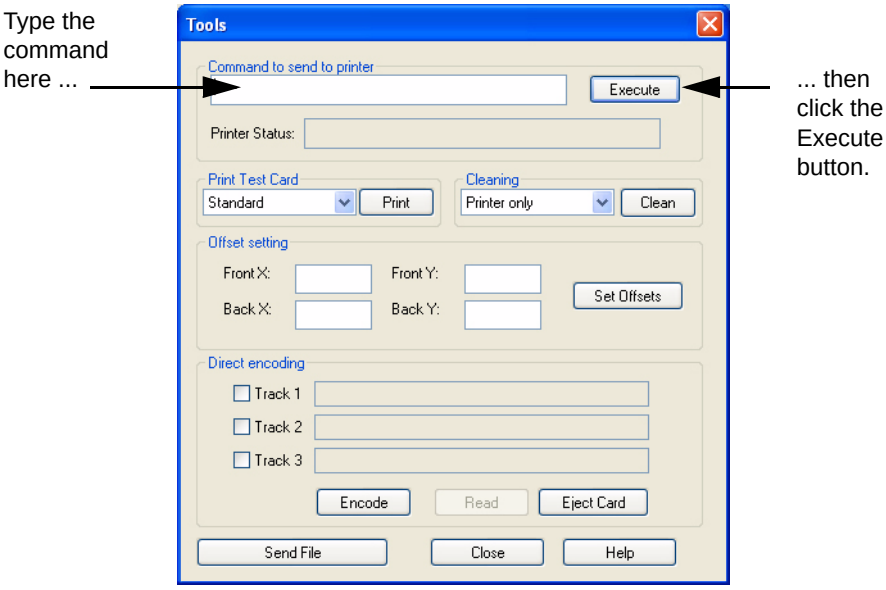
Step 2. The **Printer Properties** window will open. Click on the Device Settings tab.



Step 3. Click on the Tools tab, and then click on the Properties button.



Step 4. This brings up the Tools display.



Step 5. Type the desired command in the “Command to send to printer” field, and click the Execute button.

Software Commands

Complete information about each command, including description, syntax, and parameters, is presented in the *EPCL Programmer's Guide*, Zebra document 980415-001, which can be downloaded from the Zebra Card Printer Solutions website at http://www.zebracard.com.

The following listing includes the software commands that apply to the P110*i*, P110*m*, and P120*i* Printers:

!A	Stop Motor
A	Standard Test Card
A 1	Printer Test Card
A 2	Magnetic Encoder Test Card
ATM	Set Card Feeding Mode
&B	Load Magnetic Encoder Track Write Buffer
+BS	Set Black Synchro
B/vB	Write Bar Code
BLACK	Print Black Card
&C	Set Coercivity
+C	Adjusts Monochrome Intensity
+$C	Adjust Color Contrast
!CC	Get Number of Cards Printed
%CDER	Get Magnetic Encoder Read Settings
&CDER	Set Magnetic Encoder Track Read Encode Parameters
&CDEW	Set Magnetic Encoder Track Write Encode Parameters
+CDOTS	Image Print Quality Compensation Factor
+CH	Adjust Hologram Intensity
CHECK	Return Checksum
CLEAN	Set Cleaning Card Sequence
CLN	Check Due-for-Cleaning Parameters
CLNCARD	Set Cleaning Parameters
+CLCD	Set LCD Contrast
+CV	Adjust Clear Varnish Intensity
C/vC	Write Box (Monochrome)
!D	Move Print Head Down
D/vD	Draw Diagonal Line (Monochrome/Overlay)
E	Retransmit Last Response
&E	Write Single Track

&E*	Write Track Buffers
+EC	End of Print
$F	Clear Color Image Buffers
!F	Move Motor
!FA	Move Ribbon
!FF	Set Ribbon Color Sequence
$FP	Clear Specified Bit-Maps
F/vF	Clear Monochrome Image Buffers
GS	Download Color Graphic
G/vG	Initialize Monochrome Graphic (B/W)
%HEAD	Get Print Head Serial Number
I	Print Monochrome Panel
IH	Print Hologram Overlay
IM	Print Color Test Card
IMB	Print Gray Test Card
IS	Print Card Panel
ISERIES	i-Series Printer Test
IV	Print Clear Varnish
J	Print Multiple Monochrome Cards
!L	Check Status of Printer Sensors
$L	Draw a Horizontal Line/Rectangle in a Color Buffer
&L	Read Single Track
+$L	Adjust Specified Color Intensity
+LLCD	Set LCD Intensity
$LD	Initialize a Color Buffer to a Specified Intensity Level
L/vL	Draw Horizontal Line (Monochrome/Overlay)
!M	Move Print Head Up
MB	Return Card To Card Feeder
MC	Clear Media Path
ME	Exit Card To Output Hopper
MF	Flip Card (P120*i* only)
MI	Move Card Into Print Ready Position
MIB	Move Card Back To Print Ready Position
MM	Move Card Through Printer
M/m	Multiple Command
MO	Move Card To Output Hopper

MR	Check for Card Presence
&N	Select Magnetic Encoding Standard
!NL	Get Printer Impression and Error Counters
+O	Print Offset X-Axis
O/vO	Load Single Line Bit-map (Monochrome)
+OY	Print Offset Y-axis
!P	Move Card Forward 8 cm
PS	Download Color Image Buffer
P/vP	Draw Single Dot (Monochrome/Overlay)
R	Reset
!R	Print Head Resistance
&R	Reset Magnetic Encoder
!RIBBON	Get ribbon type installed
!RIBLEN	Get number of remaining panels on ribbon
!RIBPN	Get ribbon part number
+RO	X-Axis Offset, Relative
+ROY	Y-Axis Offet, Relative
!SA	Self Adjust
!SAN	Perform pre-calibration baseline testing
!SAP	Self Adjust
%SERIE	Get Printer Serial Number
&SVM	Disable/Enable Magnetic Encoding Verifications
&T	Magnetic Encoder Card Eject
T/vT	Draw Text (Monochrome/Overlay)
V	Check Printer Type/Version
VK 115	Sensor Status
!V	Return Operational Parameters
$V	Return Color Operational Parameters
+V	Black Print Speed
!W	Move Card Backward 8 cm
&W	Change Encoding Direction
!Z	Re-Synchronize Card
Z/vZ	Load Bit-map (Monochrome)
.	Clear Error Status Lines

APPENDIX E

Spares List

Introduction

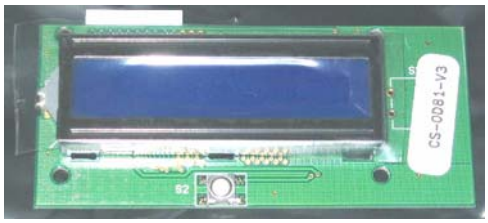
The following tables list the Spare Parts Kits available for the P110*i*, P110*m*, and P120*i* Card Printers. Before ordering, be sure to check the Partner Zone on www.zebracard.com for the latest spare parts kits listing.

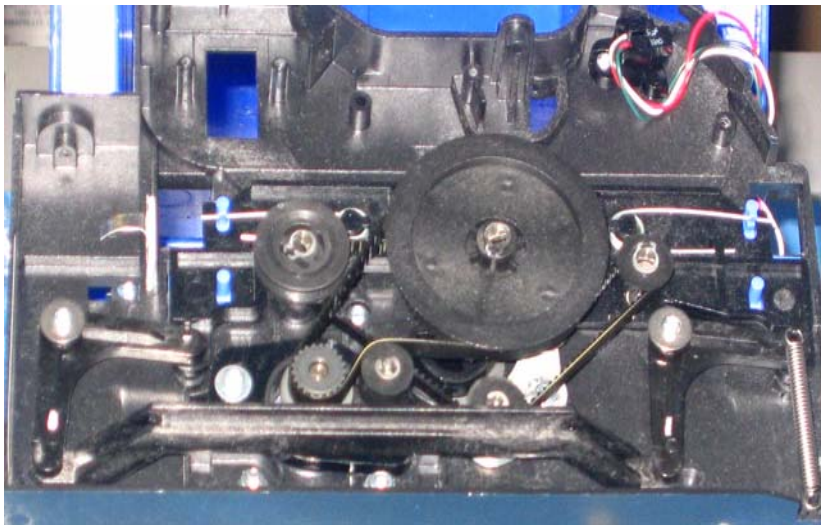
The Spares List is arranged in the following categories:

Assemblies 176
Enclosures & Covers 179
Feeder 182
Flipper 183
Print Engine Transport 188
Print Engine Right Side 190
Print Engine Bottom 194
Print Engine Left Side 197
Shipping Carton 200

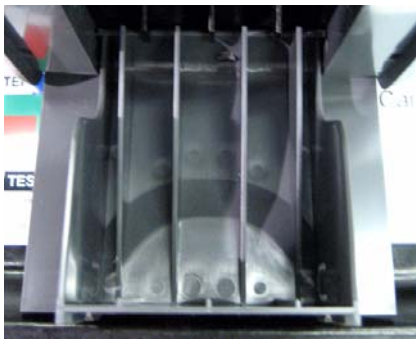
Assemblies

Kit #	Description	Model(s)
105940G-231	KIT,P/H REPL,G4,P110I/P120I	P110i, P110m, P120i
105940G-230	KIT,PCBA,NO ENET,w/MAG,P110I	P110i, P110m
105940G-139	KIT,PCBA,NO ENET,w/MAG,P120I	P120i
105940G-248	KIT,PCBA,ENET,P1XX	P110i, P110m, P120i

Kit #	Description	Model(s)
105912G-904	ASSY,PRINTSERVER,100 SMT	P110i, P110m, P120i
		
105940G-140	KIT,PCBA,LCD,P120I	P110i, P110m, P120i
105940G-165	KIT,PCBA,CRYPTOGRAPHIC,P120I	P110i, P120i

Kit #	Description	Model(s)
		
105940G-007	KIT,TRANSPORT,ENGINE,P120I	P110i, P110m, P120i
105925G-002	KIT,POWER SUPPLY,P2XX	P110i, P110m, P120i

Enclosures & Covers

Kit #	Description	Model(s)
105940G-107	KIT,COVER,FEEDER	P110i, P110m, P120i
		
105940G-103	KIT,HOPPER (left photo)	P120i
105940G-228	KIT,HOPPER (right photo)	P110i, P110m
105940G-110	KIT,BUTTON,DOOR	P110i, P110m, P120i

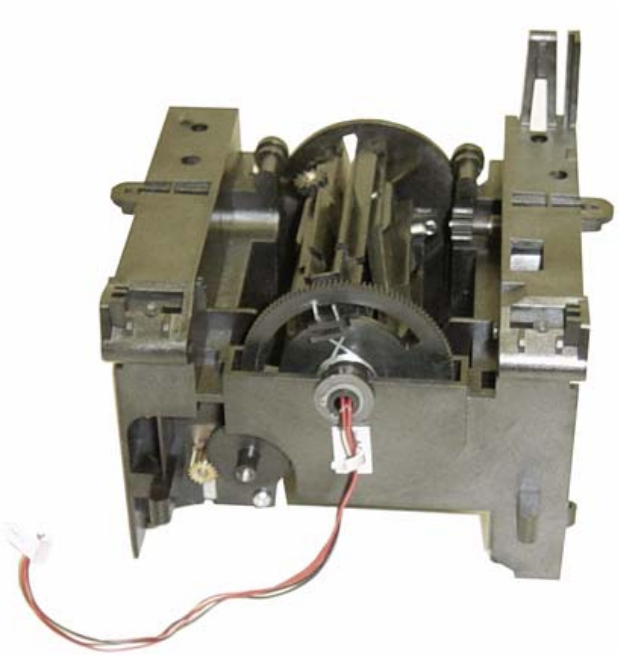
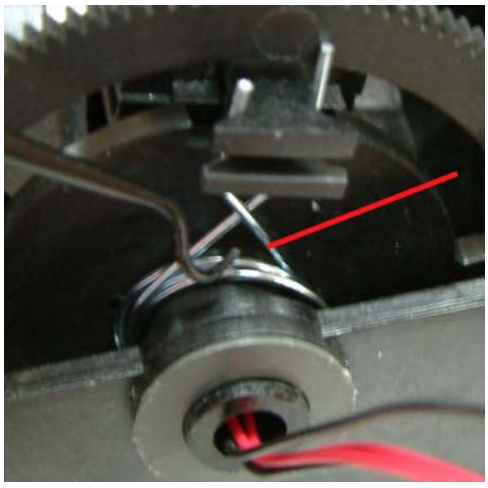
Kit #	Description	Model(s)
105940G-101	KIT,PANEL,SIDE,RIGHT	P110i, P110m, P120i
105940G-102	KIT,PANEL,SIDE,LEFT	P110i, P110m, P120i

Kit #	Description	Model(s)
105940G-106	KIT,COVER,TOP P120i (blue)	P120i
105940G-229	KIT,COVER,TOP P110i (gray)	P110i, P110m
105940G-225	KIT,BADGE P110i	P110i
105940G-249	KIT,BADGE P110m	P110m
105940G-108	KIT,BADGE P120i	P120i

Feeder

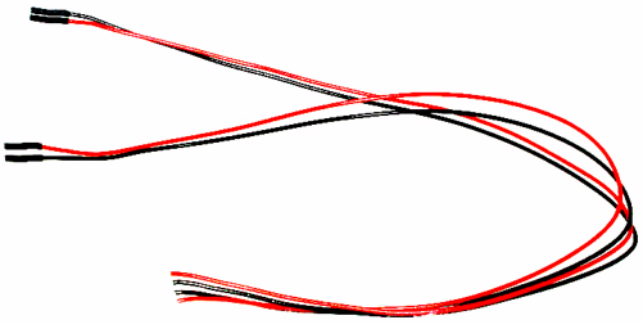
Kit #	Description	Model(s)
105940G-247	KIT, FEEDER ASSY	P110i, P110m, P120i

Flipper

Kit #	Description	Model(s)
		
105940G-TBD	KIT,FLIPPER,P110i	P110i, P110m
105940G-018	KIT,FLIPPER,P120i	P120i
		
105940G-226	KIT,SPRING,TORSION, FLIPPER	P110i, P110m, P120i

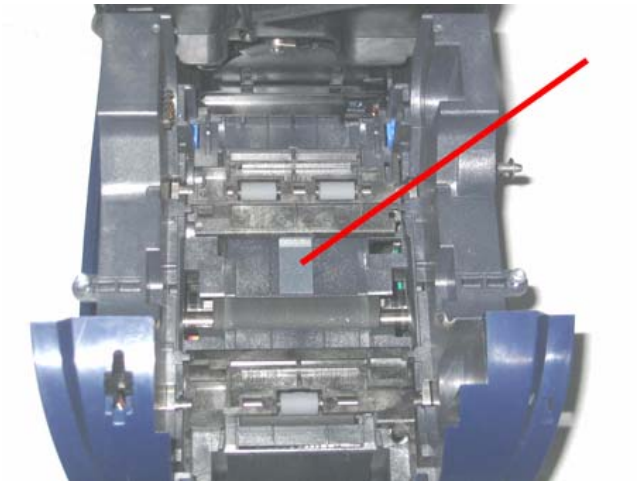
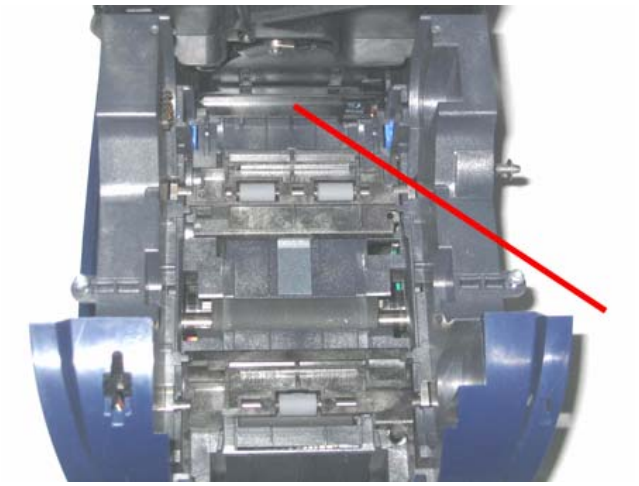
Kit #	Description	Model(s)
105910G-108	KIT,MOTOR	P110i, P110m, P120i
105940G-078	KIT,GEAR,120T,FLIPPER	P120i
105940G-071	KIT,BOTTOM,CARRIER,CARD,FLIPPR	P110i, P110m, P120i

Kit #	Description	Model(s)
105940G-070	KIT,TOP,CARRIER,CARD,FLIPPER	P120i
105940G-072	KIT,ARM,PLATEN,FLIPPER	P110i, P110m, P120i
105940G-073	KIT,PLATEN,FLIPPER	P110i, P110m, P120i
105940G-074	KIT,GEAR,DRIVE,PLATEN,FLIPPER	P110i, P110m, P120i

Kit #	Description	Model(s)
		
105940G-129	KIT,C/A,FLIPPER SENSORS	P110i, P110m, P120i
105940G-079	KIT,GEAR,50T,48P	P110i, P110m, P120i
105940G-075	KIT,GEAR,DRIVE,FLIPPER	P110i, P110m, P120i

Kit #	Description	Model(s)
105940G-155	KIT,BRNG,FLNG,10MM ID,IGLIDUR	P110i, P110m, P120i
105940G-168	KIT,BRNG,FLNG,5/16 ID,IGLIDUR	P110i, P110m, P120i

Print Engine Transport

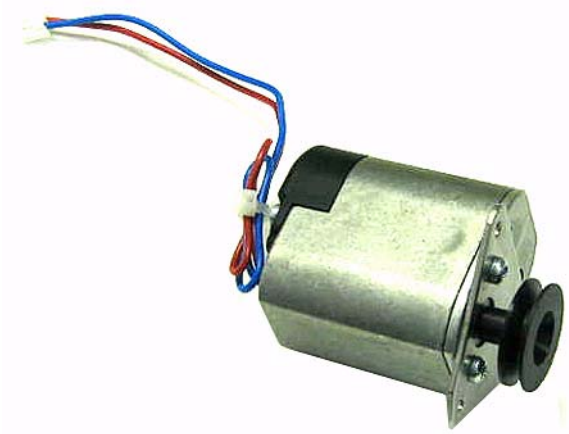
Kit #	Description	Model(s)
		
105912G-201	KIT,REFLECTIVE TAPE,10/KIT	P110i, P110m, P120i
		
105940G-125	KIT, CLEANING ROLLER	P110i, P110m, P120i

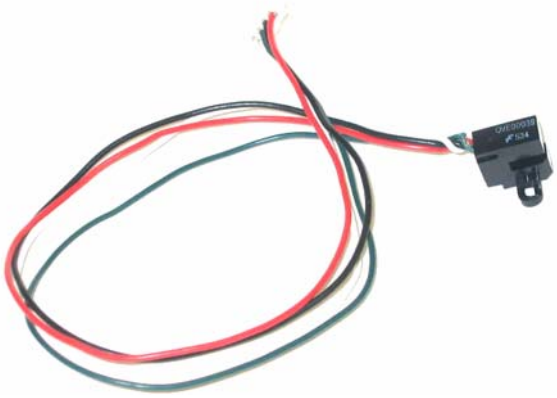
Kit #	Description	Model(s)
105940G-013	KIT,PRESSURE ROLLER,ATM	P110i, P110m, P120i
105940G-014	KIT,PRESSURE ROLLER,MAG	P110i, P110m, P120i
105940G-159	KIT,ROLLER,PLATEN,MAG	P110i, P110m, P120i

Print Engine Right Side

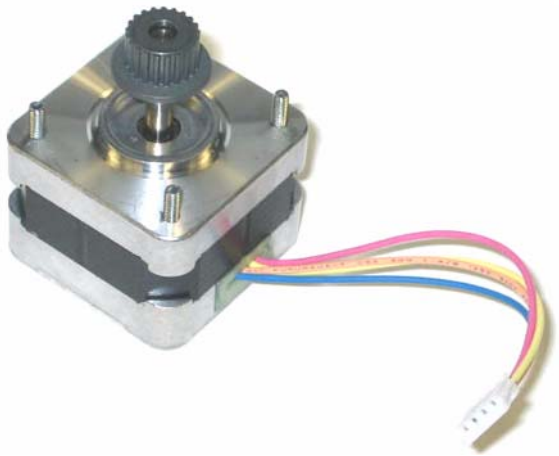
Kit #	Description	Model(s)
105940G-066	KIT,PULLEY,MOTOR,RIBBON	P110i, P110m, P120i
105940G-068	KIT,O-RING,.94 X 2.290	P110i, P110m, P120i
105940G-116	KIT,PLUNGER,RIBBON CONT	P110i, P110m, P120i
105940G-058	KIT,GEAR,54T,48P,CAM	P110i, P110m, P120i

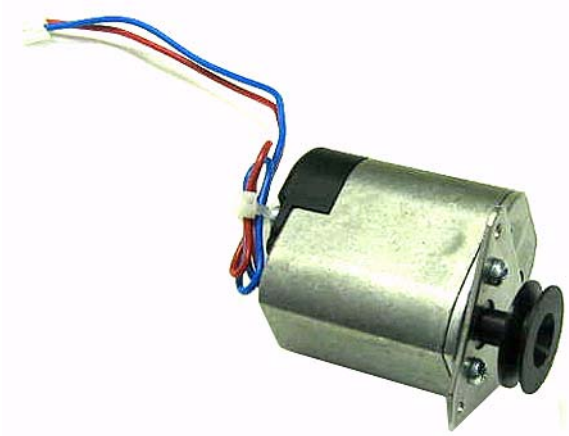
Kit #	Description	Model(s)
105940G-060	KIT,GEAR,COMPD,48T/24T,48P	P110i, P110m, P120i
105940G-061	KIT,GEAR,COMPD,56T/18T,48P	P110i, P110m, P120i
105940G-065	KIT,GEAR/PULLEY,COMPD,44T,64P	P110i, P110m, P120i

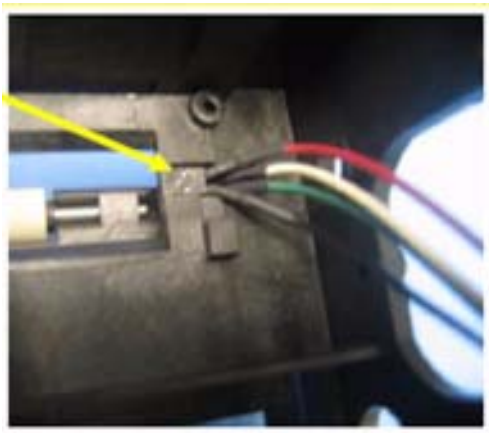
Kit #	Description	Model(s)
105940G-010	KIT,DISC,ENCODER	P110i, P110m, P120i
		
105940G-009	KIT,RIBBON/MOTOR	P110i, P110m, P120i
105940G-121	KIT,ESD STRIP,1.69IN LONG	P110i, P110m, P120i

Kit #	Description	Model(s)
		
105940G-136	KIT,C/A,ATM SENSOR	P110i, P110m, P120i
105940G-138	KIT,PCBA,MAGNETIC SENSOR	P110i, P110m, P120i

Print Engine Bottom

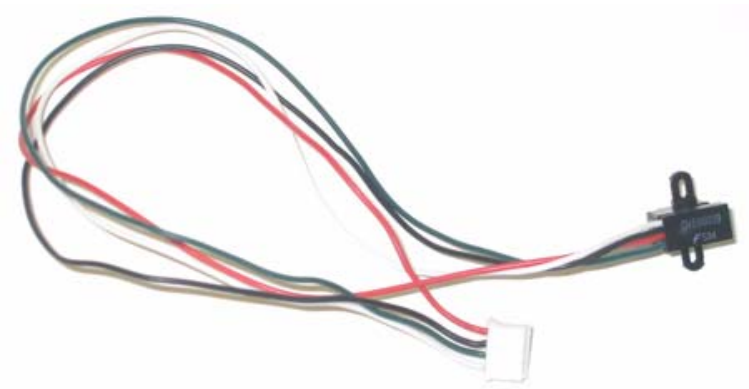
Kit #	Description	Model(s)
		
105940G-002	KIT,NMB,STEP MTR/21G MLX	P110i, P110m, P120i
105940G-003	KIT,MOTOR,CAM,P120I	P110i, P110m, P120i

Kit #	Description	Model(s)
		
105940G-009	KIT,RIBBON/MOTOR	P110i, P110m, P120i
105940G-034	KIT,ROLLER,PLATEN,ATM	P110i, P110m, P120i
105940G-033	KIT,ROLLER,PLATEN,PRINTHEAD	P110i, P110m, P120i
105940G-119	KIT,PLATEN,NON-MAG	P110i, P110m, P120i

Kit #	Description	Model(s)
		
105940G-038	KIT,CAP,SENSOR,ATM	P110i, P110m, P120i
105940G-049	KIT,SHAFT,CAM	P110i, P110m, P120i

Print Engine Left Side

Kit #	Description	Model(s)
105940G-030	KIT,TENSIOR,MAIN DRIVE,P120I	P110i, P110m, P120i
105940G-151	KIT,BELT,MXL,110T,6MM WIDE	P110i, P110m, P120i
105940G-154	KIT,BELT,2MM PITCH,130T,4MM W	P110i, P110m, P120i
105940G-057	KIT,SPRING,LEAF,PINCH ROLLER	P110i, P110m, P120i

Kit #	Description	Model(s)
		
105940G-132	KIT,INTERUPTOR,MULTIPURPOSE	P110i, P110m, P120i
105940G-056	KIT,PULLEY,COMP,MXL 79G/17G	P110i, P110m, P120i
105940G-094	KIT,PULLEY,GROOVED,PPD .7117	P110i, P110m, P120i

Kit #	Description	Model(s)
105940G-093	KIT,PULLEY,GROOVED,PPD .55	P110i, P110m, P120i
105940G-055	KIT,PULLEY,17G,GT2	P110i, P110m, P120i

Shipping Carton

Kit #	Description	Model(s)
105940G-001	KIT,PACKAGING,P120I	P110i, P110m, P120i

Appendix F

Worldwide Support

For Technical Support or Repair Services, contact the appropriate facility listed below.

North America - Technical Support

Zebra Technologies
Card Printer Solutions
1001 Flynn Road
Camarillo, CA 93012-8706 USA

Phone: 1-800-511-9909
email: techsupport@zebra.com

North America - Repair Services

Before returning any equipment to Zebra Technologies Corporation for in-warranty or out-of-warranty repair, contact Repair Services for a Return Materials Authorization (RMA) number. Repack the equipment in the original packing material, and mark the RMA number clearly on the outside. Ship the equipment, freight prepaid, to the address listed below:

Zebra Technologies
Card Printer Solutions
1001 Flynn Road
Camarillo, CA 93012-8706 USA

Phone: 800-452-4034 or 1-805-578-1201
email: repair-ca@zebra.com

Europe, Middle East, and Africa - Technical Support

Zebra Technologies Card Printer Solutions
The Valley Centre, Gordon Road
High Wycombe
Buckinghamshire HP13 6EQ
United Kingdom

Phone: + 44 (0) 870 241 1527
e-mail: cardts@zebra.com

Europe, Middle East, and Africa - Repair Services

Before returning any equipment to Zebra Technologies Corporation for in-warranty or out-of-warranty repair, contact Repair Services for a Return Materials Authorization (RMA) number. Repack the equipment in the original packing material, and mark the RMA number clearly on the outside. Ship the equipment, freight prepaid, to the address listed below:

Zebra Technologies Corporation
Zebra Card Printer Solutions
Pittman Way, Fulwood
Preston, PR2 9ZD
Lancashire, U. K.

Phone: 44 (0) 1772-693-069
FAX: 44 (0) 1772-693-046
email: repairupdate@zebra.com

Latin America - Technical Support

Zebra Technologies
Card Printer Solutions, Latin America
9800 NW 41st Street, Suite 220
Doral, FL 33178 USA

Phone: + 1 (305) 558 3100, extension 2821
e-mail: techsupport@zebra.com

Latin America - Repair Services

(Please contact North America Repair Services.)

Asia Pacific - Technical Support and Repair Services

Before returning any equipment to Zebra Technologies Corporation for in-warranty or out-of-warranty repair, contact Repair Services for a Return Materials Authorization (RMA) number. Repack the equipment in the original packing material, and mark the RMA number clearly on the outside. Ship the equipment, freight prepaid, to the address listed below:

Zebra Technologies Asia Pacific, LLC
16 New Industrial Road
#05-03 Hudson TechnoCentre
Singapore 536204

Phone: + 65 6885 0833
e-mail: esoh@zebra.com

Website

www.zebracard.com