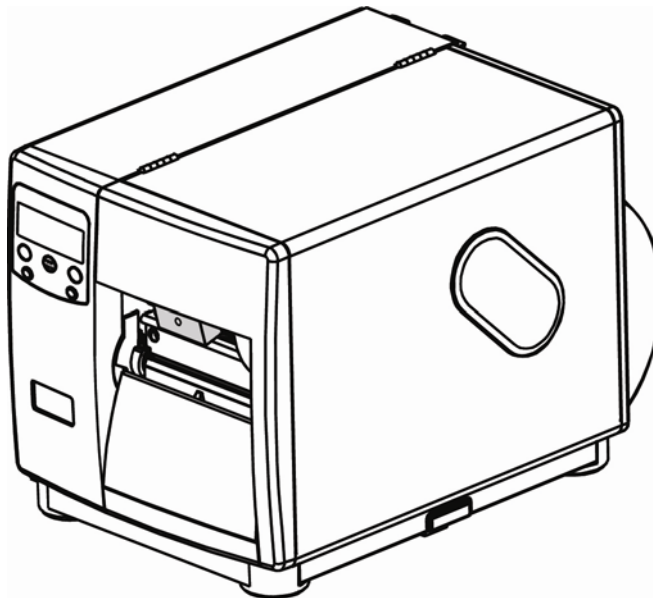


I-Class™

Maintenance Manual ■ ■ ■



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Lithium Battery: There is a danger of explosion or fire if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

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- 3** Troubleshooting
- 4** Removal and Replacement

1

Overview

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1.0 Introduction



This manual, which primarily includes technical information relating to the electrical and mechanical components, is intended for use by qualified service personnel in the maintenance and repair of I-Class printers. For related information, refer to the following documents, available at <http://www.datamax-oneil.com/>

- For operating information, reference the *Operator's Manual* (part number 88-2241-01).
- For software information, reference the *Class Series 2 Programmer's Manual* (part number 88-2341-01).

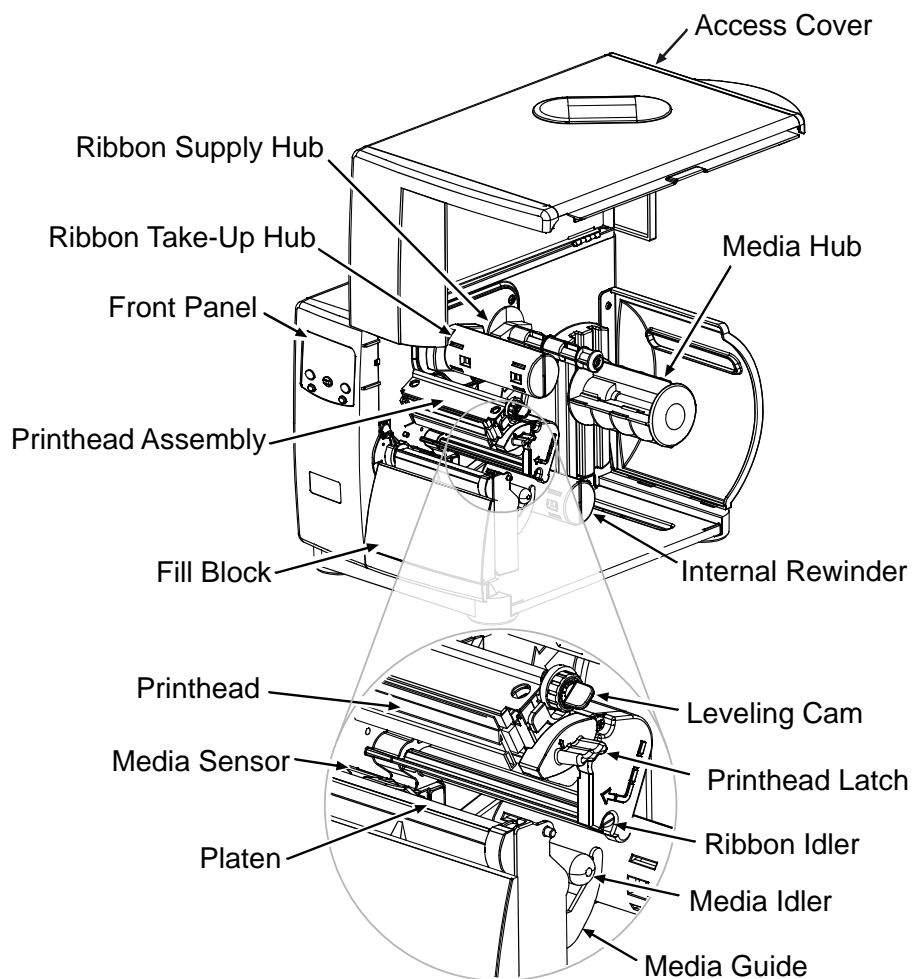
Important Information:



The exclamation point inside an equilateral triangle is intended to alert the technician to the presence of important operating, maintenance or servicing information. Always, as with all electrical equipment, follow basic safety precautions to avoid personal injury or printer damage.

1.1 About the Printer

The following drawing highlights the user-assessable components of the printer.



2 Adjustments and Maintenance

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2.0 Introduction

This section covers the necessary maintenance and alignment procedures for the printer.


2.1 Media Sensor Calibration

This printer can use many different media compositions, configurations and colors. In addition to adjusting the Media Sensor and selecting the SENSOR TYPE, calibration is required. There are three different calibration methods.

2.1.1 Quick Calibration

Note: *This procedure is not required for continuous media unless UNCALIBRATED is displayed; see Section 2.1.2.*

This calibration method is effective for most media types. Perform Quick Calibration as follows:

1. Ensure that media is loaded, that the Media Sensor is adjusted and that the printer is idle.
2. Press and hold the  **FEED** Key. *The printer will advance media; allow at least one label gap or mark to pass through the sensor.*


Upon successful completion, CALIBRATION COMPLETE will be displayed, the printer will feed to the next label TOF and READY will be displayed. (WARNING LOW BACKING may appear if using notched media or media on a transparent liner; however, the calibration was successful).

Note: *Die-cut media containing large gaps may require a change in the PAPER OUT DISTANCE setting; see the Operators Manual for details.*

Calibration Hints

In certain cases, the printer may have trouble differentiating between the label and liner.

If CANNOT CALIBRATE is displayed, or if the printer stops feeding mid-label then try the following:

- Press and hold the  **FEED** Key to allow two gaps (or marks) to pass through under the sensor.








If CANNOT CALIBRATE is displayed again, or if the printer stops feeding mid-label, retry the procedure -- this time allowing three or more gaps (or marks) to pass through the sensor; otherwise, if this fails, see Section 2.1.2.

2.1.2 Standard Calibration







During calibration, the printhead assembly can be raised for visual access, which can be helpful when using small, position-critical TOF notches or marks. Three sample readings are required:

- Empty: No media in the sensor.
- Gap (or Mark): Only the backing (liner), notch, or reflective mark in the sensor.
- Paper: The label (with liner) in the sensor.

Make sure that the appropriate SENSOR TYPE has been selected, and then perform a Standard Calibration following the steps below:

Step	Action	Displayed Message	Comment
1	Turn ON the printer.	UNCALIBRATED	Wait briefly, about six seconds, for the printer to initialize.
2	Press the  MENU Key, and then raise the printhead assembly.	MENU MODE MEDIA SETTINGS	You are in MENU MODE.
3	Press the ENT  Key.	MEDIA SETTINGS MEDIA TYPE	You are in MEDIA SETTINGS.
4	Press the FWD  Key then scroll to SENSOR CALIBRATION and press the ENT  Key.	MEDIA SETTINGS SENSOR CALIBRATION	Press the ESC  Key to cancel this procedure.
5	Press the ENT  Key.	SENSOR CALIBRATION PERFORM CALIBRATION	You are beginning the procedure.
6	After making sure no media is in the sensor, press the ESC  Key.	REMOVE LABEL STOCK PRESS ESC KEY <yyy>	No media should be in the sensor. This sets the Empty value, where “yyy” is the current sensor reading.

(continued)











Step	Action	Displayed Message	Comment
7	<p>Proceed according to the media type:</p> <ul style="list-style-type: none"> Die-cut – peel media from the backing and place the backing under the Sensor Eye Mark then press the ESC  key. Notched – place the notch under the Sensor Eye Mark then press the ESC  key. Reflective – place the black mark facedown under the Sensor Eye Mark then press the ESC  key. Continuous – go to Step 8. 	<p>SCAN BACKING PRESS ESC KEY <yyy></p> <p><i>Or, for reflective media:</i></p> <p>SCAN MARK PRESS ESC KEY <yyy></p>	<p>Never position a perforation in the sensor when recording a reading.</p> <p>This sets the backing, gap, or mark value where “yyy” is the current sensor reading.</p>
8	Position the label (and backing, if any) under the sensor then press the ESC  key.	<p>SCAN PAPER PRESS ESC KEY <yyy></p>	<p>If using preprinted media ensure that the sampled label area is free of preprinted text, graphics or borders.</p> <p>This sets the paper value, where “yyy” is the current sensor reading.</p>
9	Observe the LCD.	<p>GAP MODE CALIBRATION COMPLETE</p> <p><i>Or, for reflective media:</i></p> <p>REFLECTIVE MODE CALIBRATION COMPLETE</p> <p><i>Or, for continuous media:</i></p> <p>CONTINUOUS MODE CALIBRATION COMPLETE</p>	<p>The calibration was successful if CALIBRATION COMPLETE appears.</p> <p>Also, WARNING LOW BACKING is a normal message when calibrating notched media or media on a transparent backing; see Section 3.3 for other possible messages.</p>
10	<p>Press the ESC  Key three times to exit the menu.</p> <p>Load media. Position the Media Sensor. Press and hold the  FEED Key until at least one label advances.</p>	READY	<p>The printer is ready.</p> <p>If this calibration was unsuccessful, go to Section 2.1.3.</p>

2.1.3 Advanced Entry Calibration



Advanced Entry is the alternate calibration method for special-case media types. In the procedure, sensor readings for the label and TOF values are taken using different sampling algorithms. From this compiled list of values the best algorithm is selected and then used to generate new readings for manual entry into memory.

Note: Use this method only when Standard Calibration was unsuccessful.

With the SENSOR TYPE enabled, perform an Advanced Entry Calibration by following the steps below:





Step	Action	Displayed Message	Comment
1	Turn ON the printer.	UNCALIBRATED	Wait briefly, about six seconds, for the printer to initialize.
2	Press the  MENU Key, and then raise the printhead assembly.	MENU MODE MEDIA SETTINGS	You are in MENU MODE.
3	Press the ENT  Key.	MEDIA SETTINGS MEDIA TYPE	You are in MEDIA SETTINGS.
4	Press the FWD  Key then scroll to SENSOR CALIBRATION.	MEDIA SETTINGS SENSOR CALIBRATION	Press the ESC  Key to cancel this procedure.
5	Press the ENT  Key, and then the FWD  Key.	SENSOR CALIBRATION ADVANCED ENTRY	Press the ESC  Key to cancel this procedure.
6	Press the ENT  Key, and then the FWD  Key.	ADVANCED ENTRY SENSOR GAIN	You are beginning the procedure.
7	Press the ENT  Key. Place the label under the Sensor Eye Mark, and then lower the printhead assembly.	GAIN TRAN <yyy> *00 <0 - 31> Or, for reflective media: GAIN REFL <yyy> *00 <0 - 31>	If using preprinted media, ensure the label area under the Sensor Eye Mark is free of text, graphics, or borders. Never position a perforation in the sensor when recording a reading.

(continued)

Step	Action	Displayed Message	Comment
8	<p>Use the FWD  Key to scroll to the 00 GAIN setting and then press the ENT  Key.</p> <p>Record the sensor reading as a Label Value in a table similar to the one shown below.</p>	<p>GAIN TRAN <yyy> *00 <0 - 31></p> <p><i>Or, for reflective media:</i></p> <p>GAIN REFL <yyy> *00 <0 - 31></p>	<p>Selection is denoted by an asterisk (*).</p> <p>The sensor reading equals the "yyy" value.</p>



Sampling Table

Gain Number	Label Value	TOF Value	Difference Value
00	255		
01			
02			
...			
31			

Step	Action	Displayed Message	Comment
9	<p>Press the FWD  Key to increment the Gain Number then press the ENT  Key and record the resulting Label Value.</p> <p>Repeat this step for each of the remaining Gain Numbers (01-31).</p>	<p>GAIN TRAN <yyy> *31 <0 - 31></p> <p><i>Or, for reflective media:</i></p> <p>GAIN REFL <yyy> *31 <0 - 31></p>	
10	<p>Proceed according to your media type:</p> <ul style="list-style-type: none"> Die-cut – peel media from the backing and place the backing under the Sensor Eye Mark. Notched – place the notch under the Sensor Eye Mark. Reflective – place the black mark facedown under the Sensor Eye Mark. <p>Use the FWD  Key to scroll to the 00 GAIN setting and then press the ENT  Key. Record the sensor reading as a TOF Value.</p>	<p>GAIN TRAN <yyy> *00 <0 - 31></p> <p><i>Or, for reflective media:</i></p> <p>GAIN REFL <yyy> *00 <0 - 31></p>	<p>Never position a perforation in the sensor when recording a reading.</p>









(continued)

Sampling Table			
Gain Number	Label Value	TOF Value	Difference Value
00	255	254	
01	251		
02	241		
...	...		
31	112		




Step	Action	Displayed Message	Comment
11	<p>Press the FWD  Key to increment the Gain Number then press the ENT  Key and record the resulting TOF Value.</p> <p>Repeat this step for each of the remaining Gain Numbers (01-31).</p>	<p>GAIN TRAN <yyy> *31 <0 - 31></p> <p><i>Or, for reflective media:</i></p> <p>GAIN REFL <yyy> *31 <0 - 31></p>	
12	<p>From the collected data, where both the values are above 20, subtract the Label Value from the corresponding TOF Value to find the Difference Value.</p> <p>Note the Gain Number of the largest Difference Value.</p>	<p>GAIN TRAN <yyy> *31 <0 - 31></p> <p><i>Or, for reflective media:</i></p> <p>GAIN REFL <yyy> *31 <0 - 31></p>	For example in the table below, Gain Number 08 is chosen because it has the highest Difference Value (146) where both the Label and the TOF Values are above 20.

Sampling Table			
Gain Number	Label Value	TOF Value	Difference Value
00	255	254	1
01	251	240	11
02	241	213	28
03	231	182	49
04	219	150	69
05	212	119	93
06	200	88	112
07	189	58	131
08	178	32	146
09	167	19	N/A
10	156	17	N/A
...
31	116	14	N/A

(continued)

Step	Action	Displayed Message	Comment
13	Using the FWD  Key, scroll to the Gain Number determined in Step 12, and then press the ENT  Key.	GAIN TRAN <yyy> *08 <0 - 31> <i>Or, for reflective media:</i> GAIN REFL <yyy> *08 <0 - 31>	
14	a) Place the media in the sensor. Record the reading and label it "P" (paper). b) Place the backing, notch, or mark in the sensor. Record the reading and label it "G" or "M" (Gap or Mark). c) Remove media. Record the reading and label it "E" (Empty).	GAIN TRAN <yyy> *08 <0 - 31> <i>Or, for reflective media:</i> GAIN REFL <yyy> *08 <0 - 31>	The samplings using the selected Gain Number are taken.
15	Press the ESC  Key, and then press the FWD  Key.	ADVANCED ENTRY SENSOR LEVELS	The sensor readings must be entered into the printer.
16	Press the ENT  Key. Using the FWD  Key or the REV  Key, set the Paper Sensor Level to the value determined in the previous step. Then press the ENT  Key to select the entry and advance the menu. Repeat for the Gap Sensor Level (or Mark Sensor Level) and the Empty Sensor Level entries.	PAPER SENSOR LEVEL P*198 G*084 E*014 ↓ GAP SENSOR LEVEL P*198 G*084 E*014 ↓ EMPTY SENSOR LEVEL P*198 G*084 E*014 <i>Or, for reflective media:</i> PAPER SENSOR LEVEL P*015 M*181 E*213 ↓ MARK SENSOR LEVEL P*015 M*181 E*213 ↓ EMPTY SENSOR LEVEL P*015 M*181 E*213	Selection is denoted by an asterisk (*). The displayed message will change and the selection will flash to indicate the next entry.

(continued)

Step	Action	Displayed Message	Comment
17	<p>After all entries have been made, press the ESC  Key to back out of the menu and then press the ENT  Key to save the settings when prompted.</p> <p>Load media. Position the Media Sensor.</p>	<p>SAVE CHANGES? ENTER KEY = YES</p>	<p>Press and hold the  FEED Key until at least one label advances.</p>

Note: If the Advanced Entry Calibration is unsuccessful, enter **MEDIA SETTINGS / CALIBRATION / ADVANCED ENTRY / SENSOR GAIN** and lower the selected Gain Number by one. Select the new Gain Number then save the changes and exit the menu. Retest your media. If unsuccessful, repeat the procedure until a usable gain is obtained.

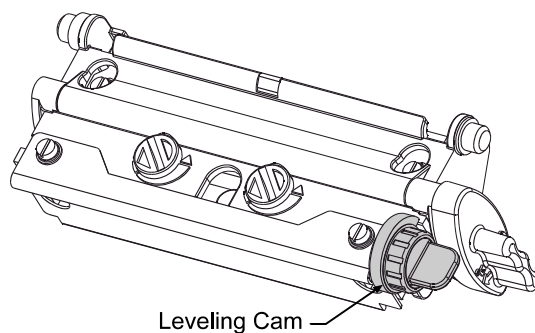
2.2 Printhead Adjustments

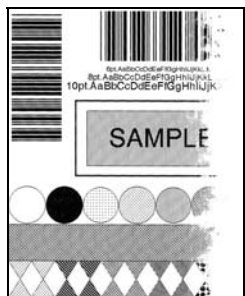
To ensure even and consistent print quality across a wide range of media types and sizes, the printhead is adjustable.

2.2.1 Leveling Cam Adjustment

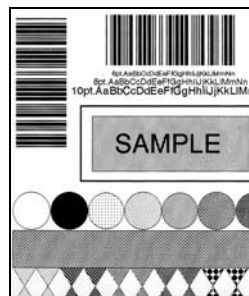
The Leveling Cam ensures that even pressure is maintained across the label. Whenever using media that is less than the full width of the platen, proceed as follows:

1. Load the printer with media. Download a label format or choose a Quick Test Label and begin printing.
2. While observing the right side of the label, rotate the Leveling Cam clockwise, or counter-clockwise, until even print is achieved across the width of the label (see examples below).



**Example 1 –**

Over-adjustment produces an image that fades across the label, requiring a decrease in the setting of the Leveling Cam.


**Example 2 –**

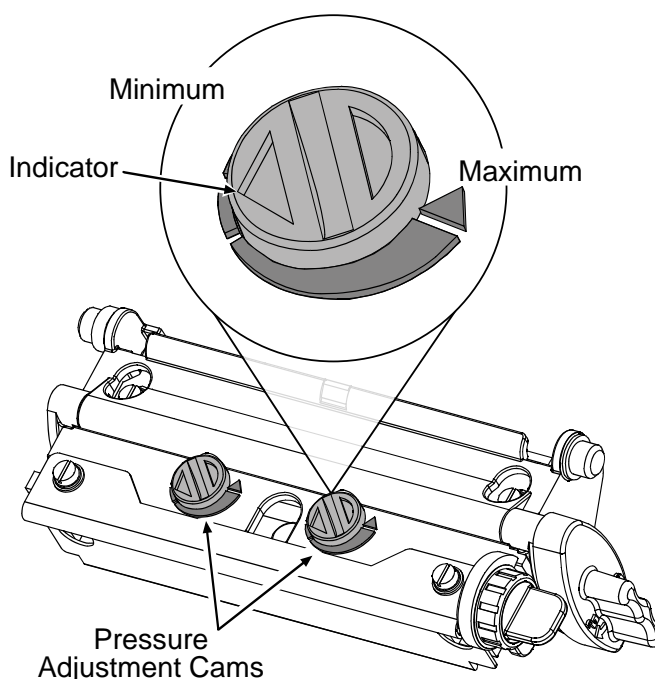
Correct adjustment produces a complete image, with even print contrast across the label.

Note: Under-adjustment can cause ribbon wrinkling, tracking problems, and excessive wear on printer components.

2.2.2 Pressure Adjustment

To maintain print quality across the variety of media types, the printhead pressure is adjustable. This adjustment should only be performed, however, after attempting improvement using the HEAT and/or PRINT SPEED settings. Use only the minimum pressure needed, following the steps below:

1. Load 4 inch (102mm) wide media (and ribbon, if needed). Then, disengage the Leveling Cam and latch the Printhead Assembly.
2. Enter the Quick Test Mode then select 100 Print Quality Labels and press the  **TEST** Key to begin printing.
3. Turn each Pressure Adjustment Cam equally (counterclockwise to increase pressure or clockwise to decrease it) until even print quality is achieved across the label.



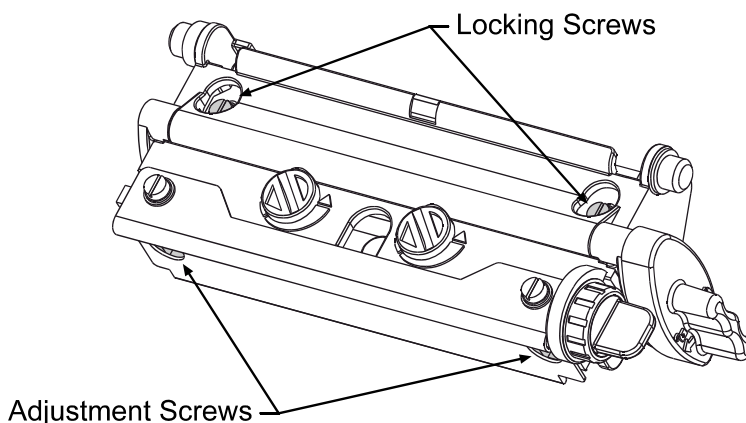
Note: Excessive pressure can cause ribbon wrinkling, tracking problems, and excessive wear on printer components.

2.2.3 Burn Line Adjustment

Note: *This adjustment is NOT REQUIRED during a normal printhead replacement.*

The Burn Line, a row of thermal elements that creates the image, is adjusted to compliance using 6.5-mil (.0065 inch) media to maintain print quality across a majority of types. In extreme cases, however, when media with a different thickness or rigidity is used (e.g., heavy tag stock) this relationship can change. If the print quality cannot be improved using HEAT and/or PRINT SPEED changes, then a Burn Line may be required as follows:

1. Load media (and ribbon, if needed). Disengage the Leveling Cam and latch the Printhead Assembly.
2. Enter the Quick Test Mode then select 100 Print Quality Labels.
3. Loosen the two Locking Screws $\frac{1}{2}$ to $\frac{3}{4}$ of a turn.



4. Turn the Adjustment Screws counter-clockwise until the Burn Line is past the platen vertex. Print a Validation Label from the Quick Test Menu. The label should look light and uneven.
5. Tighten the Locking Screws just until they are "snug"—tight enough to remove any play in the printhead assembly, yet loose enough to allow the Adjustment Screws to move the printhead.
6. Turn each Adjustment Screws clockwise about $\frac{1}{4}$ a turn (or $\frac{1}{8}$ a turn for finer adjustments). Print another Validation Label and examine the print quality. Repeat this step until labels with even print contrast (darkness) and acceptable print quality are produced.

Note: *Use care. When the Locking Screws are snug, turning the Adjustment Screws counter-clockwise will not move the printhead outward. If the printhead has been adjusted inward too far, the entire procedure must be restarted.*

7. Tighten the Locking Screws then print a final test label to verify the adjustment.

2.2.4 Voltage Adjustment

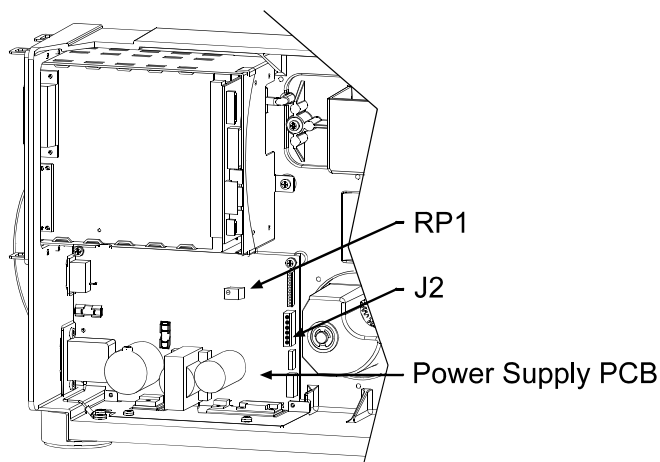


CAUTION

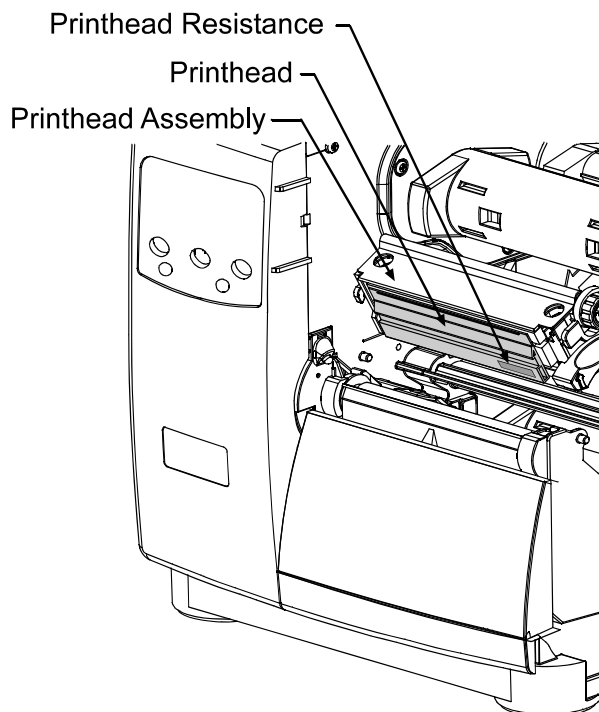
Voltage measurement required; use extreme caution.

The printhead voltage adjustment is required (1) when replacing the power supply or (2) if the factory voltage setting of the power supply has been changed. No voltage adjustment is required during a routine printhead replacement. Adjust the Printhead Voltage as follows:

1. Turn OFF and unplug the printer and remove the cover; see Section 4.1.



2. Using a multi-meter set to measure DC voltage, connect the positive lead to Power Supply Connector J2 - pin 1 and the negative lead to J2 - pin 6.
3. Raise the Printhead Assembly. Locate and note the Printhead Resistance.
4. After ensuring that media is loaded, latch the Printhead Assembly in the down position. Plug in and turn ON the printer.
5. After READY is displayed, press the FEED button (this will enable the printhead voltage for approximately 30 seconds). Adjust the voltage using RP1 on the Power Supply PCB according to the printhead resistance listed in the appropriate table below.
6. Turn OFF and unplug the printer. Remove the multi-meter and replace the cover.





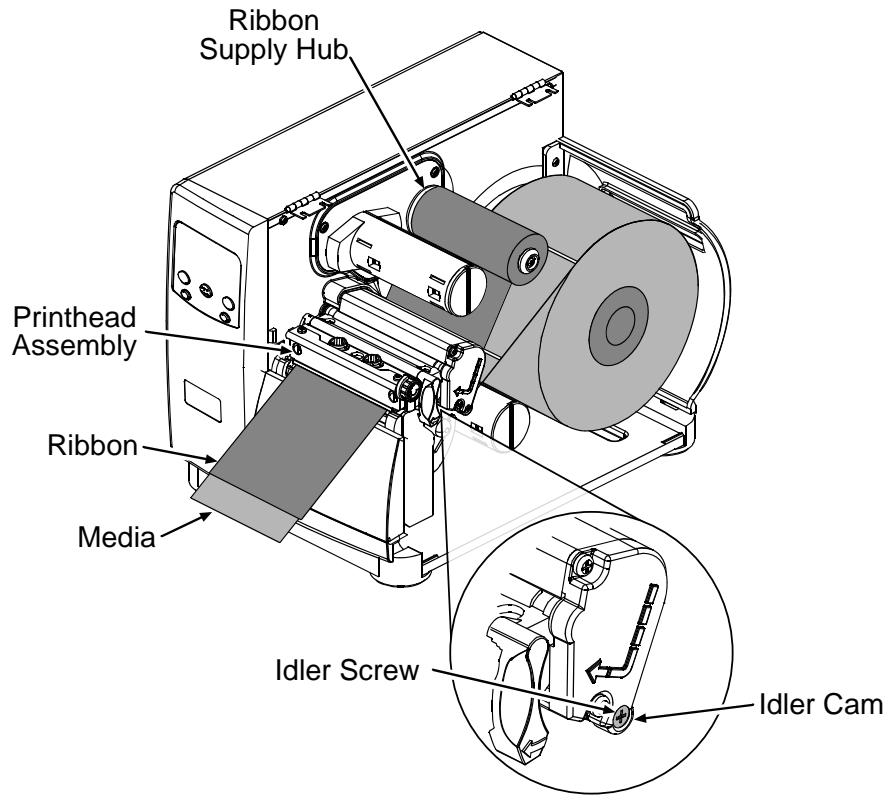
NEVER exceed the recommended Printhead Voltage; permanent damage or shortened service life can result.

Printhead Voltage Adjustment Table		
Printer Model	Printhead Resistance (ohms)	Printhead Voltage (+/- 0.1 Volt DC)
I4206, I4208, I4210, & I4212	561 – 586	22.4
	587 – 611	22.9
	612 – 635	23.3
	636 – 660	23.8
	661 – 685	24.2
	686 – 710	24.7
	711 – 734	25.1
	735 – 759	25.5
I4308	947 – 989	22.4
	990 – 1030	22.9
	1031 – 1072	23.4
	1073 – 1114	23.8
	1115 – 1156	24.2
	1157 – 1197	24.7
	1198 – 1239	25.1
	1240 – 1281	25.5
I4406	935 – 976	22.4
	977 – 1018	22.9
	1019 – 1059	23.3
	1060 – 1100	23.8
	1101 – 1141	24.2
	1142 – 1183	24.7
	1184 – 1224	25.1
	1225 – 1265	25.5
I4604	1530 – 1598	22.4
	1599 – 1665	22.9
	1666 – 1733	23.4
	1734 – 1800	23.8
	1801 – 1868	24.2
	1869 – 1935	24.7
	1936 – 2003	25.1
	2004 – 2070	25.5

2.3 Ribbon Path Alignment

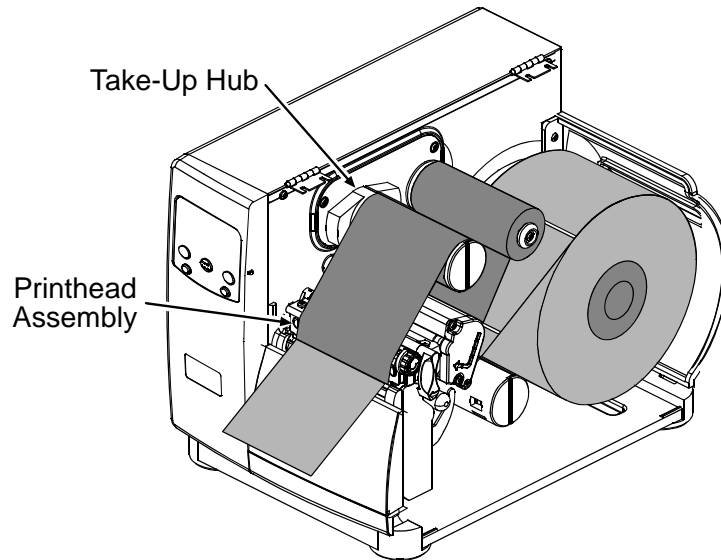
If irregular voids extend intermittently, diagonally through an image printed with ribbon, the cause may be due to ribbon overlap (wrinkling). However, other factors can be involved. Begin troubleshooting by verifying correct adjustment of the Leveling Cam (Section 2.2.1), Printhead Pressure (Section 2.2.2), and Burn Line (Section 2.2.3). Also, examine the platen for wear, debris buildup, and excessive lateral movement. If all of these adjustments and components are in good order, then perform a Ribbon Path Alignment as follows:

1. Load 4 inch (102mm) or wider Media.
2. Load a matching Ribbon and allow it to feed with the Media from the printer.

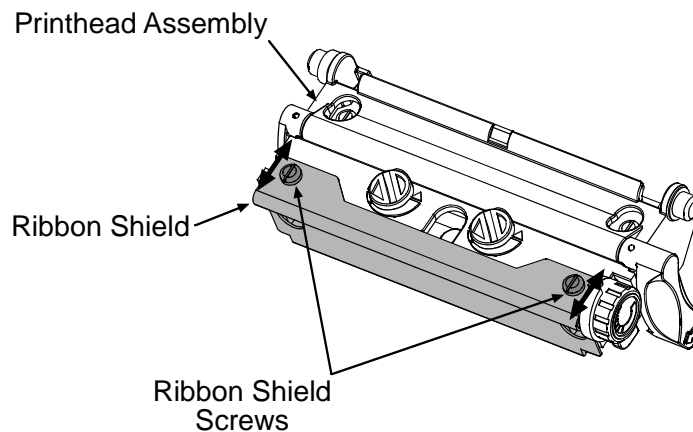


3. Disengage the Leveling Cam; see Section 2.2.1.
4. Plug in and turn ON the printer. Press FEED several times to normalize ribbon and label tracking. (If lateral movement is excessive, this must be corrected before proceeding-- typical causes include an unlatched printhead, uneven printhead pressure, a worn platen or worn platen bearings.)
5. Observe the ribbon for rippling and bagging as it travels from the Ribbon Supply Hub to the Printhead Assembly. If smooth, proceed to Step 6; otherwise, loosen the Idler Screw then, while repeatedly pressing FEED, rotate the Idler Cam until the ribbon is smoothly dispensed. Tighten the Idler Screw and feed several more labels to verify adjustment; repeat if necessary.

6. Attach the ribbon to the Take-Up Hub. Enter the Quick Test Mode and select 100 Quick Ribbon Test Labels then press TEST to begin printing.



7. Observe the ribbon for rippling and bagging as it travels from the Printhead Assembly to the Take-Up Hub. If smooth and if printed labels show no evidence of ribbon wrinkling, proceed to Step 8; otherwise, slightly loosen the Ribbon Shield Adjustment Screws. Move the Ribbon Shield forward or backward to smooth the ribbon. Tighten the Ribbon Shield Adjustment Screws and print several more labels to verify adjustment; repeat if necessary.



8. Press TEST to stop printing.
9. Install operating media and ribbon. Adjust the Printhead Leveling Cam, if needed. Send a label format from the host. Examine the printed labels and then, if needed, slightly readjust the Ribbon Shield.

2.4 Maintenance

This section details the items, techniques and schedules to help safely and effectively maintain the printer. The following cleaning items are recommended:

- Isopropyl alcohol
- Cotton swabs
- A clean, lint-free cloth
- Lens tissue
- Soapy water/mild detergent
- Compressed air or a soft-bristle brush
- Printhead Cleaning Cards and/or Printhead Cleaning Film



For your safety and to avoid damaging the printer, always turn OFF and unplug the printer before servicing. Always take proper precautions when using isopropyl alcohol, a flammable liquid.

Recommended Maintenance Schedule		
Component / Area	Cleaning Interval *	Method / Supplies
Printhead	Media type dependent: <ul style="list-style-type: none"> • Thermal transfer – after each roll of ribbon. • Direct thermal – after each roll of media, or as needed. 	Isopropyl alcohol; and, if necessary, Printhead Cleaning Cards and / or Printhead Cleaning Film. See Section 2.4.1.
Platen	After each roll of labels, after each roll of ribbon, or as needed.	Cotton swab or cloth dampened with isopropyl alcohol. See Section 2.4.2.
Media Sensor, Media Path & Interior	As needed, based on a weekly visual inspection.	Compressed air or a soft brush. Isopropyl alcohol, as needed to remove all buildup. See Section 2.4.3.
Ribbon Path	As needed, based on a weekly visual inspection.	Isopropyl alcohol to remove all buildup. See Section 2.4.4.
Exterior Surfaces	As needed, based on a weekly visual inspection.	Mild detergent applied with a dampened cloth. See Section 2.4.5.

2.4.1 Cleaning the Printhead

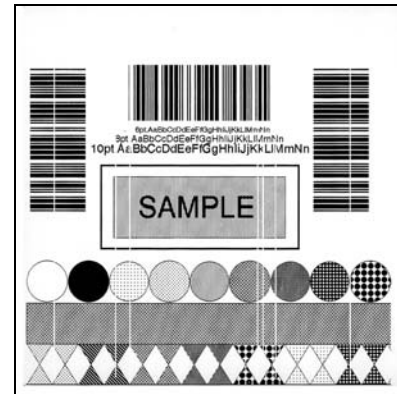


NEVER use a sharp object on the Printhead; damage can result.

If print quality declines (symptoms can include non-compliant bar codes or streaks in the image), the typical cause is debris buildup on the printhead.

If not removed, debris buildup can result in permanent damage.

Depending upon the media and settings most typically used, different methods and materials are recommended for cleaning the printhead, as detailed below.

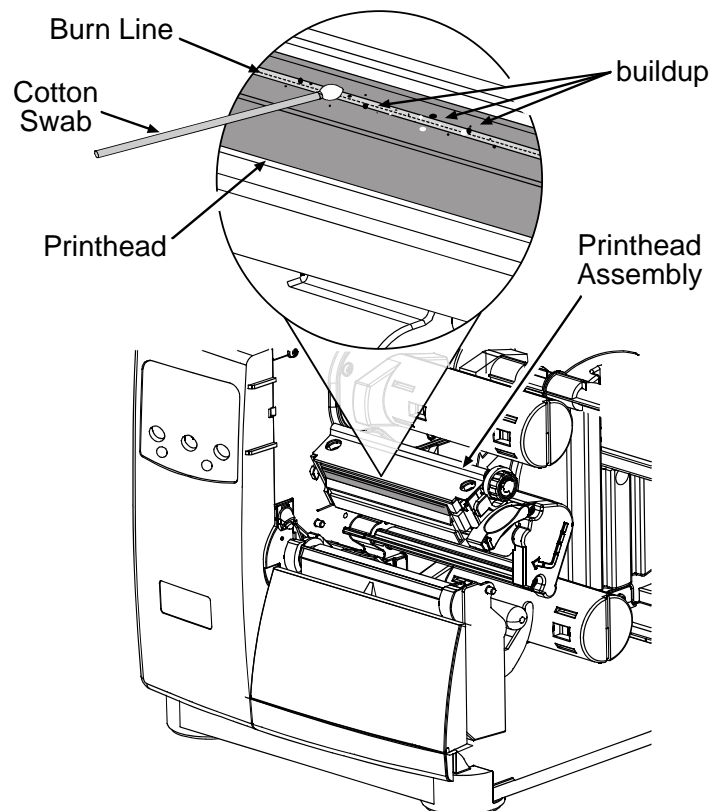


Faulty Label: Streaks (e.g., white lines) in the direction of print can indicate a dirty or faulty printhead.

2.4.1.1 Cotton Swab Procedure

This cleaning method is recommended when using direct thermal media or thermal transfer media with a wax ribbon.

1. Turn OFF and unplug the printer. **Wait for the printhead to cool.**
2. Raise the Printhead Assembly then remove the media (and ribbon, if installed). Using a Cotton Swab moistened (not soaked) with isopropyl alcohol, gently wipe the Printhead and Burn Line clean.

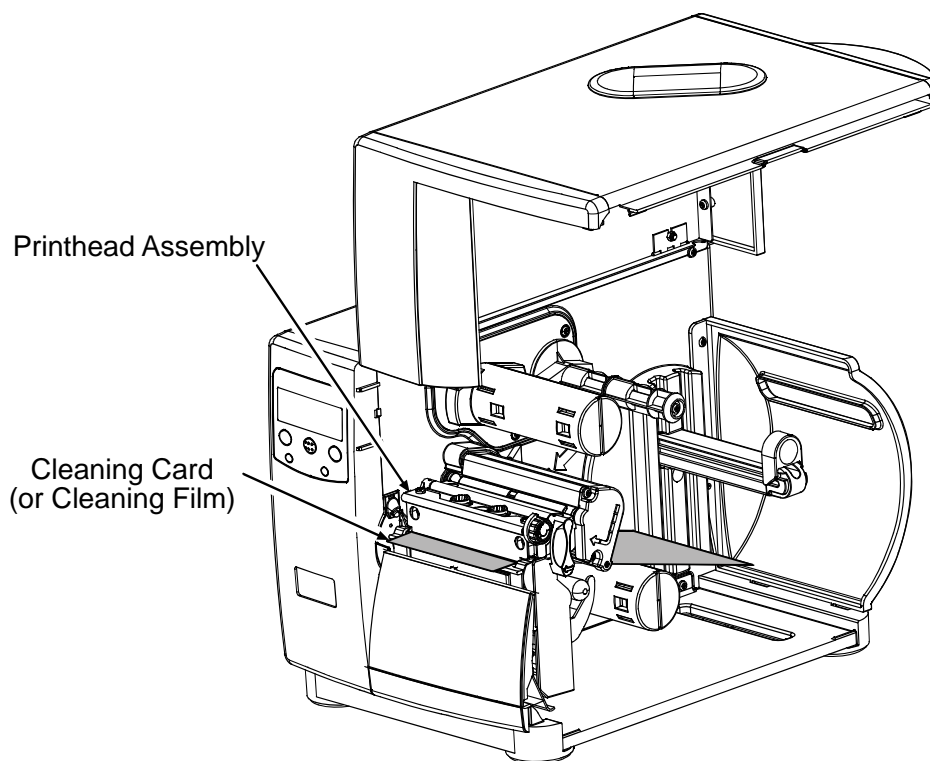



3. **Allow the printhead to dry.**
4. Install media (and ribbon, if necessary). Lower and latch the Printhead Assembly. Close the cover. Plug in and turn ON the printer. Run several sample labels and examine the print quality. If streaks are still present, go to Section 2.4.1.2; otherwise, this completes the procedure.

2.4.1.2 Cleaning Card Procedure

This cleaning method is recommended when using direct thermal media, thermal transfer media with a wax ribbon, or if symptoms persist after performing the cotton swab procedure (see Section 2.4.1.1).


1. Turn OFF and unplug the printer. **Wait for the printhead to cool.**
2. Raise the Printhead Assembly then remove the media (and ribbon, if installed).
3. Place a Cleaning Card (part number 70-2013-01) under the printhead.
4. Lower and latch the Printhead Assembly.
5. Disengage the Leveling Cam; see Section 2.2.1.



6. Close the cover. Press and hold the  **TEST** Key for approximately four seconds. (As an alternate, CLEAN HEAD NOW can be selected in the menu.)
7. Install media (and ribbon, if necessary). Lower and latch the Printhead Assembly. Adjust the Leveling Cam. Close the cover. Run a few sample labels and examine them. If streaking is still present, go to Section 2.4.1.3; otherwise, this completes the procedure.

2.4.1.3 Cleaning Film Procedure

This cleaning method is recommended when using thermal transfer media with a resin ribbon, a HEAT setting of 22 or higher, or if symptoms persist after performing the other cleaning procedures.

1. Turn OFF and unplug the printer. **Wait for the printhead to cool.**
2. Raise the Printhead Assembly then remove the media (and ribbon, if installed).
3. Place a sheet of Cleaning Film (part number 70-2087-01) under the printhead (see illustration, Section 2.4.1.2).
4. Lower and latch the Printhead Assembly.
5. Disengage the Leveling Cam; see Section 2.2.1.
6. Close the cover. Press and hold the  **TEST** Key for approximately four seconds. (As an alternate, CLEAN HEAD NOW can be selected in the menu.)
7. Turn OFF and unplug the printer. Clean the printhead; see Section 2.4.1.1.
8. Install media (and ribbon, if necessary). Lower and latch the Printhead Assembly. Adjust the Leveling Cam. Close the cover. Run a few sample labels and examine them. If streaking is still present, see Section 3.2.4.

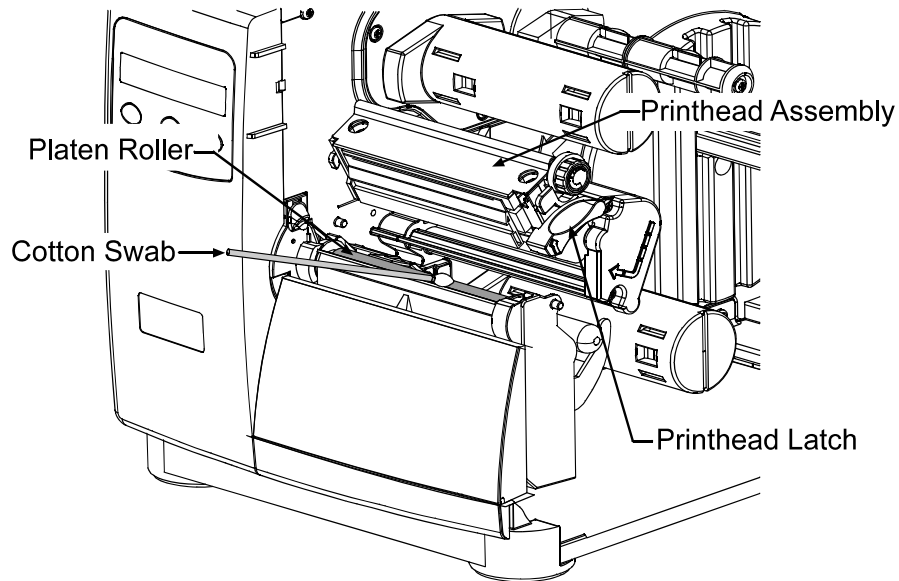
2.4.2 Cleaning the Platen



NEVER use a sharp object on the Platen.

A Platen contaminated with grit, label adhesive or ink can cause a decline in print quality and, in extreme cases, cause labels to wrap the roller. Clean the Platen as follows:

1. Turn OFF and unplug the printer.
2. Open the cover. Raise the Printhead Assembly and remove the media.
3. Using a Cotton Swab (or lint-free cloth) dampened with isopropyl alcohol wipe the Platen, manually rotating the roller until the entire surface is clean. **Allow the Platen to dry.**

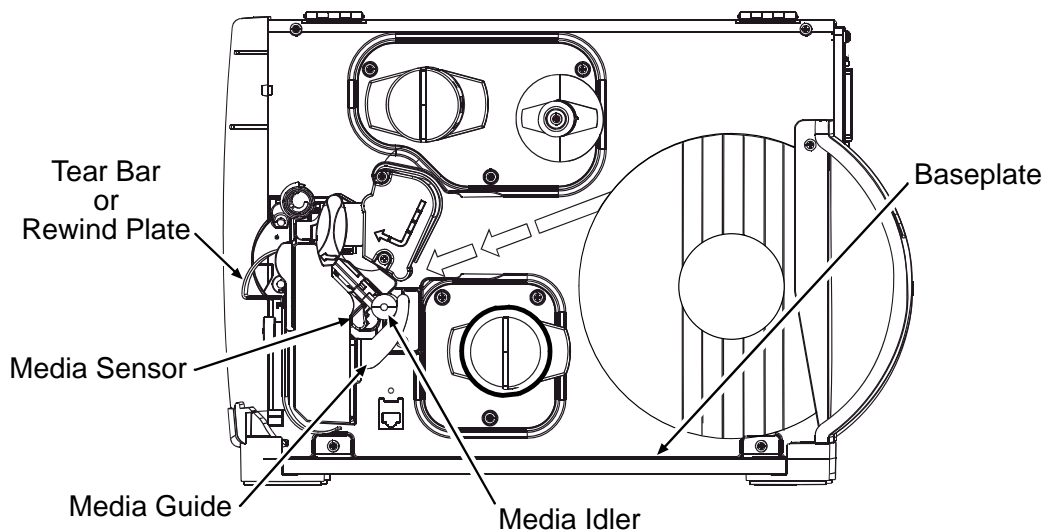


4. Install media then lower and latch the Printhead Assembly.
5. Close the cover. Plug in and turn ON the printer. Feed several labels to normalize tracking.

2.4.3 Cleaning the Media Path, Media Sensor, and Interior

As paper dust and other contaminants accumulate inside the printer, the particles can be pulled through the Media Sensor to the printhead, causing inconsistent label detection and voids in the print. To prevent problems, clean Media Path, Media Sensor and other components as follows:

1. Turn OFF and unplug the printer. Raise the cover.
2. Raise the Printhead Assembly then remove the media (and ribbon, if installed).

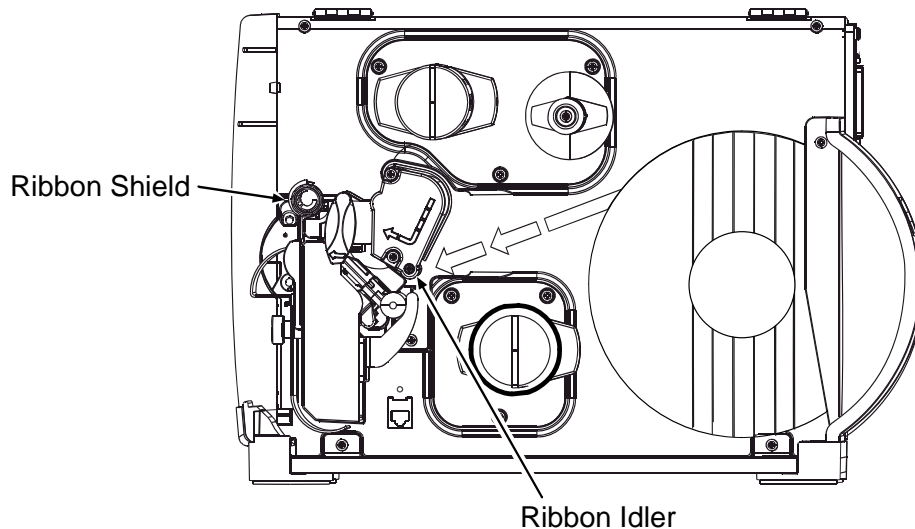


3. Using compressed air or a soft brush, remove all debris from the Baseplate and the Media Sensor.
4. Using a cotton swab dampened with isopropyl alcohol, wipe the Media Idler, Media Guide and, if attached, the Tear Bar or Rewind Plate clean.
5. Allow the components to dry then replace the media (and ribbon, if necessary). Lower and latch the Printhead Assembly.
6. Close the cover. Plug in and turn ON the printer. Feed several labels to normalize tracking.

2.4.4 Cleaning the Ribbon Path

If equipped with the Thermal Transfer option, as ink accumulates on the Ribbon Path components, smooth ribbon flow can be impeded causing wrinkling. To prevent problems, clean the Ribbon Path components as follows:

1. Turn OFF and unplug the printer. Raise the cover.
2. Raise the Printhead Assembly then remove ribbon.



3. Using a cotton swab dampened with isopropyl alcohol, wipe the Ribbon Idler and the Ribbon Shield clean.
4. Allow the components to dry then replace the ribbon. Lower and latch the Printhead Assembly.
5. Close the cover. Plug in and turn ON the printer. Feed several labels to normalize tracking.

2.4.5 Cleaning the Exterior Surfaces

When soiled, clean the outer surfaces of the printer with a general-purpose cleanser. (Never use abrasive cleansers or solvents.)

1. Turn OFF and unplug the printer.
2. Using a soft cloth or sponge dampened with a general-purpose cleanser to wipe the exterior surfaces clean.
3. Allow the surfaces to dry.

2.5 Application Version Updates

As available, application program (firmware) updates can be found at <http://www.datamax-oneil.com/> and then installed.

The update can be performed in Ready Mode or in Download Mode. Before starting, identify the current Application Version by printing a Configuration Label.

Compare the Application Version string to those available from our web site then download the desired file onto your computer's hard drive and proceed according to the currently installed version:

- If 2.091 or greater, see Section 2.5.1; or,
- If 2.08 or less, see Section 2.5.2.

CONFIGURATION	COMMUNICATIONS
TUE 09:09 AM 29JUL2008	SERIAL PORT A:
PRINTER KEY:	BAUD RATE:
4308-2840-020512-001	9600 BPS
APPLICATION VERSION:	PROTOCOL:
83-2284-11E4 11.054 07/07/2008	BOTH
MCL Version: 1.20.02-126	PARITY:
BOOT LOADER:	NONE
83-2289-11A 11.01 10/02/2007	DATA BITS:
UNLOCKED:	8
NONE	STOP BITS:
FPGA:	1
MACO:	SERIAL PORT B:
NOT SET	NOT INSTALLED
MACR:	SERIAL PORT C:
00-90-c9-01-d0-84	NOT INSTALLED
SYSTEM INFORMATION	SERIAL PORT D:
PRINT BUFFER SIZE:	NOT INSTALLED
100 in.	USB PORT:
FLASH SIZE:	NOT INSTALLED
2 MB	PARALLEL PORT A:
RAM TEST:	PORT DIRECTION:
PASS	UNI-DIRECTIONAL
OPTIONAL LANGUAGES:	PARALLEL PORT A:
FRANCIAS.DLN	NOT INSTALLED:
ITALIANO.DLN	
DEUTSCH.DLN	
ESPAÑOL.DLN	
CONF	

Note: If updating to version 11.021 or greater, the Boot Loader must be updated before proceeding; see Section 2.6.

Also, those desiring an alternate menu language must also download the EFIGS menu language file. Go to the EFIGS directory and copy 832296.01C (or most current version) to `lpt1: /b` (where the DOS Copy command requires the `/b` parameter because this file contains binary code).



WARNING

If an error occurs during the download the update will be terminated, and if the process did not reach ERASING FLASH or UPDATING SOFTWARE, the previous program will remain intact; otherwise, a successful download must be completed to make the printer operable.

2.5.1 Updating from READY

Application Version 2.091 (or greater) Update Procedure			
Step	Displayed Message	Action	Comment(s)
1	READY	Using the DOS copy command (where "filename" is the program to be loaded and "lpt1" is the selected interface port), enter the following: copy filename lpt1:	As an example, this would be entered as: copy i4212_1105.zg lpt1 (Where "lpt1" can differ to include another port, as equipped.) The Ready Indicator will flash as data is received.
2	UPGRADING SOFTWARE	No action required.	The new application is being stored and verified.
3	4214 11.05 03/26/2008	No action required.	The printer has reset and is displaying the new firmware version.
4	READY	No action required.	The new application is running. <i>⚠ Note:</i> If <i>UNCALIBRATED</i> or <i>POSITION FAULT</i> is displayed, see <i>Section 2.1</i> .

2.5.2 Updating from Download Mode

Application Version 2.08 (or less) Update Procedure*			
Step	Displayed Message	Action	Comment(s)
1	BOOT-PA10 02.08 2/11/00	Turn OFF the printer. Press and hold the PAUSE Key and TEST Key while turning ON the printer.	The Boot Loader version is displayed. Note: This information will vary with the printer model and Boot Loader version.
2	UPDATE SOFTWARE SEND SOFTWARE	Using the DOS copy command, copy the filename to the printer (see Section 2.5.1 for an example).	The printer is ready to accept the new application version. Note: The parallel port (LPT1) must be used to write to the printer.
3	UPDATE SOFTWARE READING IMAGE	No action required.	The printer is receiving the new program.
4	ERASING FLASH SOFTWARE IMAGE	No action required.	Received and verified, memory is now being cleared of the previous program.
5	WRITING FLASH SOFTWARE IMAGE	No action required.	The new program is being written into Flash memory. Upon completion and after a printer invoked reset, the new application will run. Note: If UNCALIBRATED or POSITION FAULT is displayed, see Section 2.1.

*This alternate method can be used to download all versions.

2.5.3 Resolving Update Issues

If experiencing trouble when downloading application updates to the printer, try an alternate method:

- Use Download Mode (see Section 2.5.2); or,
- Use the Datamax-O'Neil Printer Driver to send the file.

If an error message appears during the updating process, locate it in the following table along with the cause and suggested solution:

Application Update Error Messages	
Displayed Message	Descriptions / Causes / Solutions
DECOMPRESSION ERROR	An error was detected during the decompression and transfer of file data from cache storage into Flash memory, a possible Flash memory defect -- confirm the version then retry in Download Mode; however, if the problem continues the Main Logic PCB may be defective; see Section 4.11.
ERROR ERASING FLASH	Flash memory could not be erased, a possible Flash memory defect -- try the download again; however, if the problem continues the Main Logic PCB may be defective; see Section 4.11.
ERROR WRITING FLASH	The program could not be written into the Flash memory, a possible Flash memory defect -- try the download again; however, if the problem continues the Main Logic PCB may be defective; see Section 4.11.
HARDWARE MISMATCH DATA REJECTED	The downloaded application was not compatible with the printer supported by this Boot Loader version -- check the PRINTER KEY information (see the <i>Operator's Manual</i>) then ensure that the desired file corresponds to the hardware level of the printer.
INVALID SOFTWARE DATA REJECTED	The printer detected an error, where the possible causes include: <ul style="list-style-type: none"> • An invalid or corrupted file was downloaded -- try resaving the file to the host and then download again; or, • A communications error occurred --check the interface cabling and port settings.
SOFTWARE MISMATCH DATA REJECTED	The downloaded application was not compatible with the printer supported by this Boot Loader version -- check the PRINTER KEY information (see the <i>Operator's Manual</i>) then ensure that the desired file corresponds to the software level of the printer.

2.6 Boot Loader Program Updates

The printer stores its Boot Loader program in Flash memory. As available, updates can be found on our web site at <http://www.datamax-oneil.com/> and then installed.



If power is lost while UPGRADING SOFTWARE is displayed, the printer will become non-functional and will require factory reprogramming of the Main Logic PCB.

Before updating, identify the current program version by printing a Configuration Label. Compare that version string to those available from our web site then download the file onto your computer's hard drive and follow the steps below to update the version.

Note: *Boot Loader program updates can only be performed when Application Version 2.09 or greater is running in the printer.*

Boot Loader Update Procedure			
Step	Displayed Message	Operator Action	Comment(s)
1	READY	Using the DOS copy command (where "filename" is the program to be loaded and "lpt1" is the selected interface port), enter the following: <code>copy filename lpt1:</code>	For example, this would be entered as: <code>copy boottb~1.bs lpt1</code> (Where "lpt1" can differ to include a serial or other port, as equipped). The Ready Indicator will flash as data is received.
2	UPGRADING SOFTWARE	No action required.	The new program is being stored and verified.
3	4214 3.04 07/26/2000	No action required.	The printer has reset automatically.
4	READY	No action required.	The new application is now running. Note: <i>If UNCALIBRATED or POSITION FAULT is displayed, see Section 2.1.</i>

2.7 Resetting the Printer

Depending upon the method used, there are three reset levels possible:

2.7.1 Soft Reset

To reset the printer and clear any temporary host settings, press and hold the CANCEL Key for approximately four seconds.

2.7.2 Level One Reset

To return the printer to the factory default settings or, if saved, to restore the Factory Setting File:

1. Turn OFF the printer.
2. Press and hold the PAUSE and CANCEL Keys while turning ON the printer then continue to depress the keys until the SYSTEM RESET message flashes.

Note: *This reset has the same effect as the SYSTEM SETTINGS / SET FACTORY DEFAULTS selection in the menu system.*

2.7.3 Level Two Reset

To return the printer to the firmware default settings, and clear all calibration and adjustment parameters:

1. Turn OFF the printer.
2. Press and hold the PAUSE, FEED, and CANCEL Keys while turning ON the printer; continue to depress the keys until the SYSTEM RESET message flashes.

Note: *After executing this reset, calibration must be performed; see Section 2.1.*

3 Troubleshooting

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3.0 Overview

This section covers techniques for isolating and correcting printer problems.

3.1 Troubleshooting

Use the following procedures to isolate and correct malfunctions. When problems are isolated to a Printed Circuit PCB (PCB), assembly replacement is suggested, as component level repair is not generally feasible in the field.

Note: *Unless otherwise noted, see the Operator's Manual for configuration, interfacing and setup information.*

3.1.1 Initial Steps



(1) Before servicing always unplug the printer; (2) ensure that the unit has been placed on a level, stable surface; and, (3) use extreme care if measuring voltages.

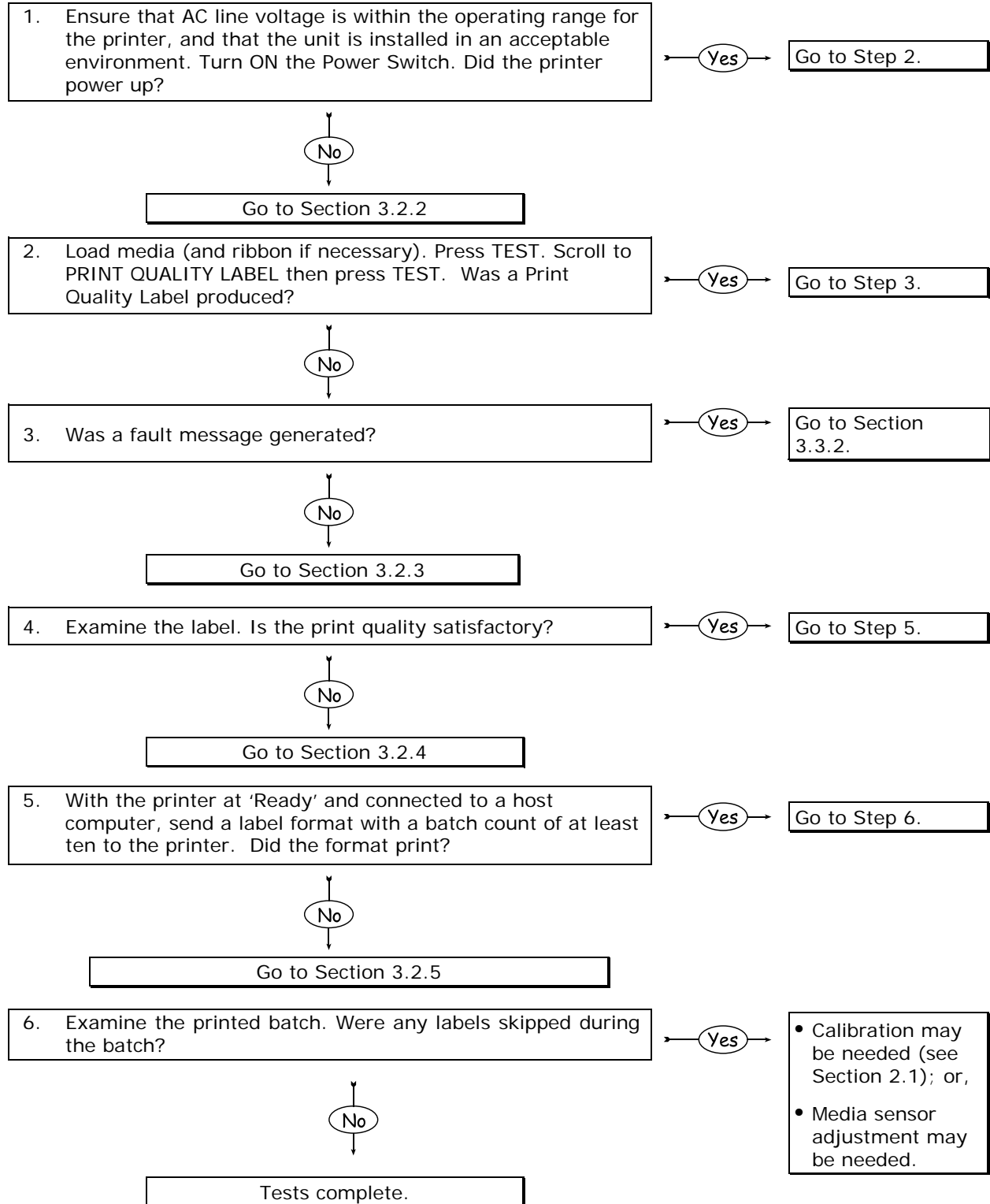
Perform the following actions before troubleshooting then proceed according to the symptom:

- Remove any dirt or dust accumulations (see Section 2.4);
- Confirm that the AC outlet voltage is within specification;
- Confirm that the environment is acceptable;
- Confirm correct media and loading; and,
- If installed, disable the Present Sensor.

3.2 General Problem Resolution

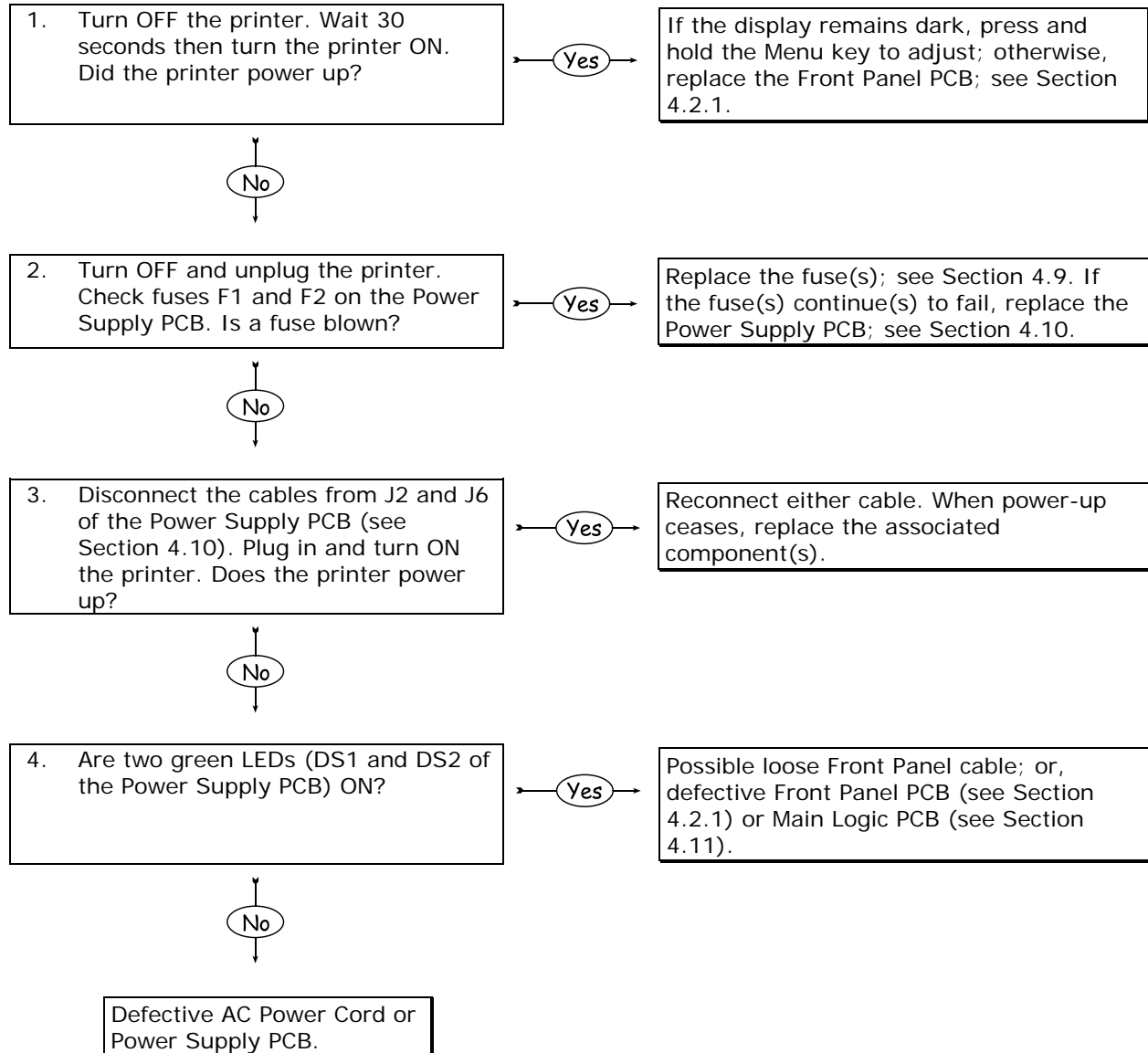
When troubleshooting, if the problem is not accompanied by an error message, begin with Problem Isolation (Section 3.2.1). Follow the flowchart steps then take the appropriate action to find the defective item (listed by probability) or, when necessary, further instructions.

3.2.1 Problem Isolation

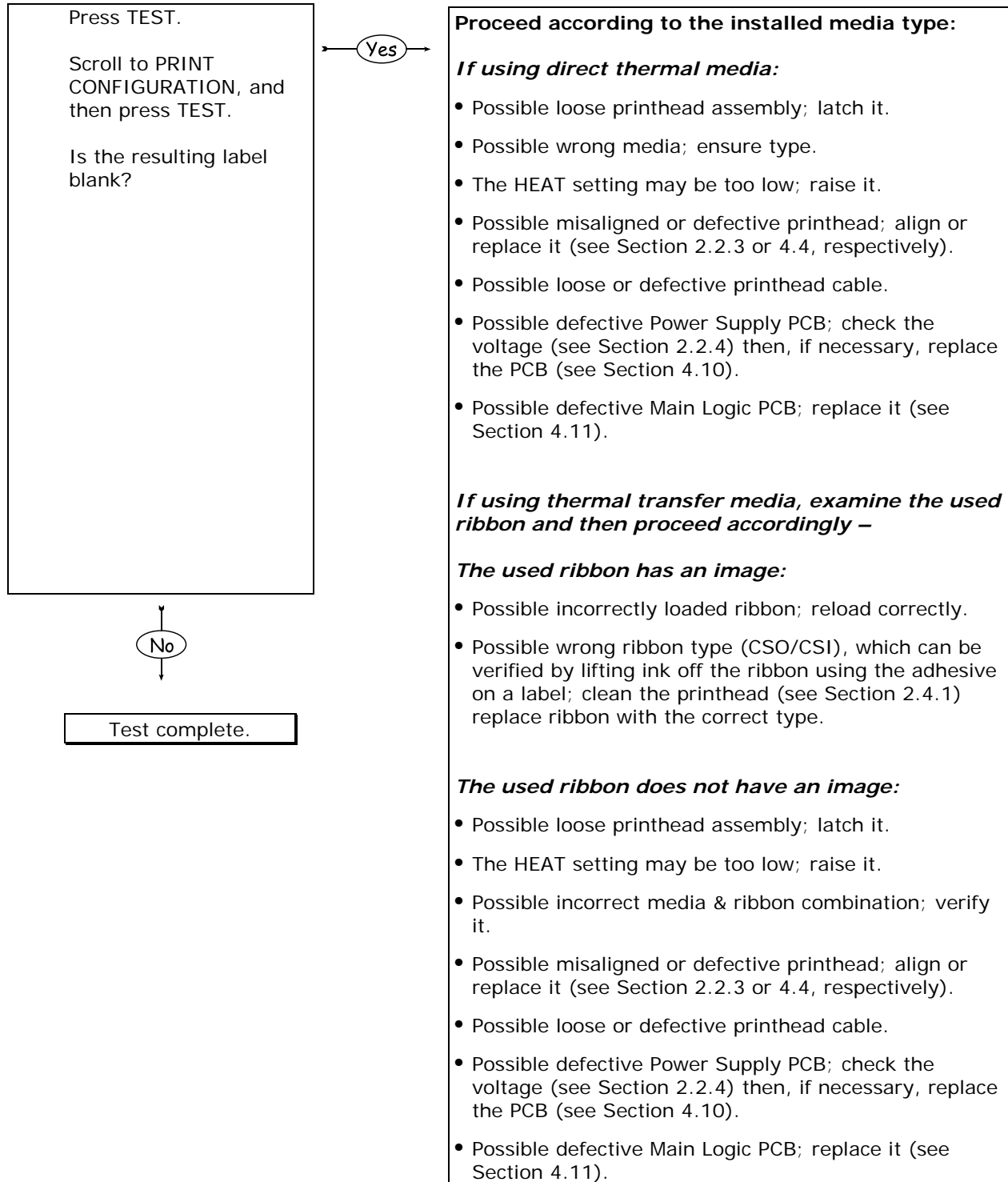


3.2.2 No Power

Note: (1) Ensure the AC outlet is functioning properly, with the power cord securely connected to the outlet and printer; and, (2) some printer circuits are protected by resettable fuses, when tripped cycling power will reset those fuses.

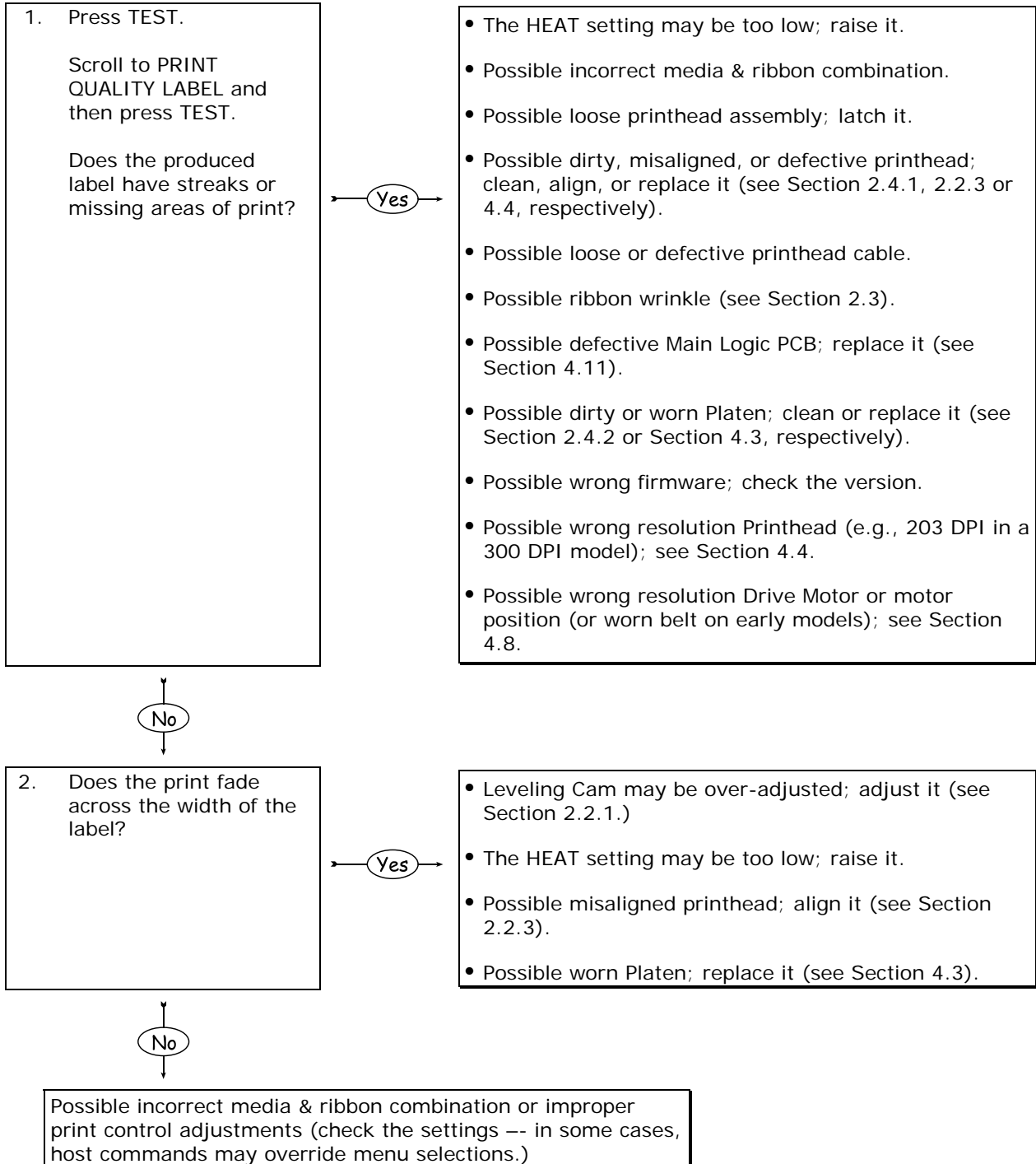


3.2.3 No Print



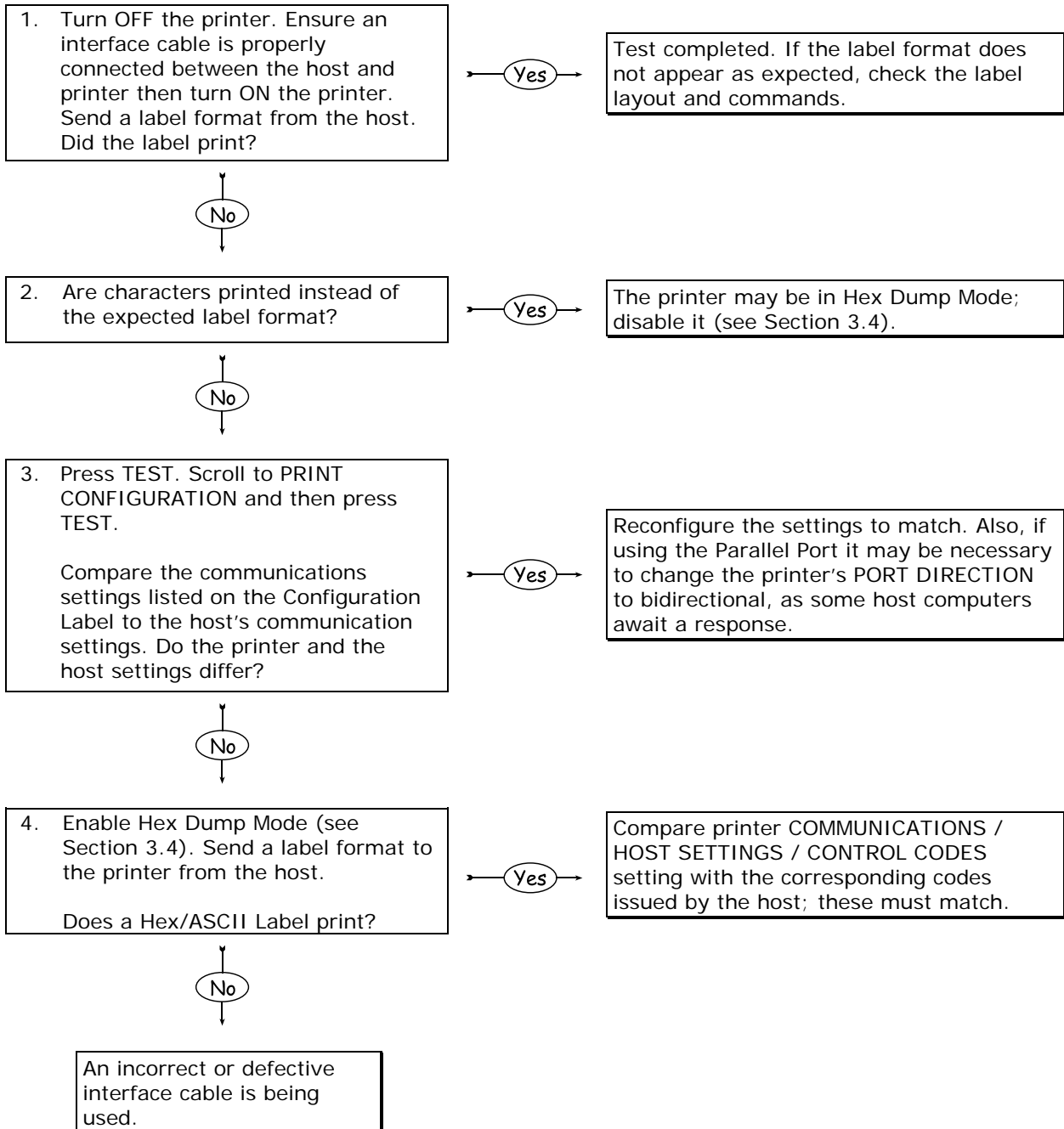
3.2.4 Poor Print Quality

Note: (1) If printed results are uneven, light or splotchy try increasing HEAT or reducing PRINT SPEED as no further adjustments may be needed; (2) during the procedure below, synthetic media may not produce the intended results due to the requirements of the material; and, (3) in extreme conditions, over-temperature protection circuitry can interrupt printing.



3.2.5 Communications Problems

Note: If troubleshooting an Ethernet or USB equipped printer, refer to the documentation that accompanied the option.



3.3 Error Resolution

All functions are monitored during operation and when a problem is detected a corresponding message will be displayed. (If no message appears, see Section 3.2.) In the tables below locate the Displayed Message, the Description, and then use Solution (listed by probability) to isolate the malfunction.

Note: Warning and Fault Messages are not displayed in Menu or Test Mode.

3.3.1 Warning Messages

Warning Messages (lasting about five seconds) receive a medium display priority and, if multiples occur, the priority Warning will be displayed.

Warning Messages		
Displayed Message	Description	Solution
24V OUT OF TOLERANCE	A drop in the 24 VDC supply has been detected.	<p>Cycle the power OFF and ON. If the message appears, try the following:</p> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p>⚠ WARNING! Use extreme caution when measuring voltages.</p> </div> <ol style="list-style-type: none"> 1) Move the printer to another circuit. If the message reappears, go to Step 2. 2) Check the AC voltage input range (@ 47 – 63 Hz): <ul style="list-style-type: none"> ▶ 120 VAC users = 90 to 132 VAC; or, ▶ 220 VAC users = 180 to 264 VAC. <p>Then, proceed according to the results:</p> <ul style="list-style-type: none"> • If out of range, connect the printer to a circuit that is with specification; or, • If within range, go to Step 3. <ol style="list-style-type: none"> 3) Verify the +24 VDC output (see Section 2.2.4): <ul style="list-style-type: none"> • If out of range, replace the Power Supply PCB; see Section 4.10. • If within range, check the cabling from J5 of the Power Supply PCB to J7 of the Backplane PCB).
DOT FAILURE	Defective printhead elements have been detected.	Replace the printhead if print quality becomes unacceptable; see Section 4.4.

Warning Messages (continued)		
Displayed Message	Description	Solution
GAP MODE WARNING LOW BACKING	A small difference exists between the measured "empty" and "gap" media sensor readings.	This is typical of labels mounted on a transparent backing, or of notched media. A slight delay in OUT OF STOCK detection may be evident; however, no action is required.
GOODBYE	Power has been removed and printer shutdown is in progress.	The power switch was turned OFF, a fuse has blown, or the AC line voltage has been lost. If unable to restore power, try moving the printer to another location. If the condition persists, see Section 3.2.2.
HEAD NEEDS CLEANING	The scheduled printhead cleaning distance has been reached.	Clean the printhead; see Section 2.4.1.
HOST CHANGES PENDING	The host has changed the printer's configuration, but the changes have not taken effect.	To save these changes, send a host reset command (in DPL); or, to discard the changes, perform a soft reset; see Section 2.7.1.
LOW VOLTAGE	A low operating voltage has been detected.	Possible low or fluctuating AC line voltage. Try moving the printer to another AC circuit; or, if more than 50% black is being printed, try reducing the Heat value or modify the format's percentage of black. If the condition persists, possible failing Power Supply PCB; see Section 4.10.
RIBBON LOW	The ribbon supply is almost exhausted.	Load a new roll of ribbon.
RTC RAM FAILURE	The printer was unable to save its settings in permanent memory.	The Main Logic PCB could be faulty. If the condition persists, see Section 4.11.
TEMPERATURE PAUSE	A high printhead temperature has been detected.	Wait for the printhead to cool and then, when an acceptable temperature has been reached, operations will automatically resume.

3.3.2 Fault Messages

Fault Messages receive the highest display priority and, if multiples occur, messages will cycle.

Note: To return operation after a fault, correct the condition and then press FEED.

Fault Messages		
Displayed Message	Description	Solution
ADC FAULT	An analog to digital converter failure has occurred.	Attempt to clear the fault by cycling the power OFF and ON; if the fault does not clear, replace the Main Logic PCB (see Section 4.11).
CUTTER FAULT	A blade-positioning fault has occurred.	<ol style="list-style-type: none"> 1) Try cycling printer power OFF and ON. 2) Ensure the media being cut is within specification. <hr/> <p>⚠ WARNING! Turn OFF and unplug the printer before examining the cutter.</p> <hr/> <ol style="list-style-type: none"> 3) Ensure the cutter and cable are properly installed, and that the cutter cable is free of damage. 4) Clear any obstructions from the cutter. 5) The Cutter Motor or Motor Controller PCB may be defective; replace the option. 6) The Main Logic PCB may be defective; replace it (see Section 4.11).
DMA FAULT	A Direct Memory Access failure has occurred.	Cycle the power OFF and ON. If the fault does not clear, replace the Main Logic PCB (see Section 4.11).

Fault Messages <i>(continued)</i>		
Displayed Message	Description	Solution
GAP MODE CANNOT CALIBRATE	Consistently low sensor readings were detected.	<p>Press any key to continue. Then, retry STANDARD CALIBRATION, ensuring that media is inserted at the appropriate step (see Section 2.1.2). If this fails, try ADVANCED ENTRY (see Section 2.1.3).</p> <p>If the problem persists, it can be due to one of following reasons:</p> <ol style="list-style-type: none"> 1) The media is transparent; try installing an alternate media and retry calibration. 2) Possible debris in the Media Sensor; clean it then retry calibration (see Section 2.4.3). 3) The Media Sensor may be defective; replace it (see Section 4.7). 4) The Main Logic PCB may be defective; replace it (see Section 4.11).
GAP MODE FAULTY SENSOR	Consistently high sensor readings have been recorded.	<p>Press any key to continue. Retry the STANDARD CALIBRATION, ensuring that the backing is inserted and the media withdrawn at the appropriate step (see Section 2.1.2).</p> <p>If the problem persists, it can be due to one of following reasons:</p> <ol style="list-style-type: none"> 1) Possible debris in the Media Sensor; clean it then retry calibration (see Section 2.4.3). 2) The Media Sensor may be defective; replace it (see Section 4.7). 3) The Main Logic PCB may be defective; replace it (see Section 4.11).
HEAD CLEANING FAULT	The programmed printhead cleaning distance has been exceeded three times.	Press and hold the TEST Button or select CLEAN HEAD NOW to initiate cleaning (see Section 2.4.1).

Fault Messages <i>(continued)</i>		
Displayed Message	Description	Solution
OUT OF STOCK	No media is detected.	<p>Ensure correct media loading and Media Sensor adjustment. Then, if the problem persists, it can be due to one of following reasons:</p> <ol style="list-style-type: none"> 1) The PAPER OUT DISTANCE may need to be increased. 2) Calibration may be needed (see Section 2.1.2). 3) The Media Sensor may be defective; replace it (see Section 4.7). 4) The Main Logic PCB may be defective; replace it (see Section 4.11).
POSITION FAULT	Quick Calibration failed; or, the printer was turned off (or reset) during a ribbon, out of stock or TOF fault condition.	Calibrate the printer (see Section 2.1). Then, if subsequent messages appear, continue troubleshooting according to the new message.
PRINT ENGINE FAULT	A problem within the print logic has been detected.	Try cycling the power OFF and ON. If the problem persists, possible defective Main Logic PCB; replace it (see Section 4.11).
RAM FAULT	RAM error has occurred.	Try cycling the power OFF and ON. If the problem persists, possible defective Main Logic PCB; replace it (see Section 4.11).
REFLECTIVE MODE CANNOT CALIBRATE	Consistently low sensor readings have been recorded.	<p>Press any key to continue. Retry the STANDARD CALIBRATION, ensuring that the reflective mark is inserted facedown during the appropriate step in the procedure (see Section 2.1.2). If this fails, try ADVANCED ENTRY (see Section 2.1.3).</p> <p>If the problem persists, it can be due to one of following reasons:</p> <ol style="list-style-type: none"> 1) The reflective marks may not be made of carbon-based ink. 2) Possible debris in the Media Sensor; clean and retry calibration (see Section 2.4.3). 3) The Media Sensor may be defective; replace it (see Section 4.7). 4) The Main Logic PCB may be defective; replace it (see Section 4.11).

Fault Messages <i>(continued)</i>		
Displayed Message	Description	Solution
REFLECTIVE MODE FAULTY SENSOR	Consistently high sensor readings have been recorded.	<p>Press any key to continue. Retry the STANDARD CALIBRATION, ensuring that media is removed during the appropriate step in the procedure (see Section 2.1.2).</p> <p>If the problem persists, it can be due to one of following reasons:</p> <ol style="list-style-type: none"> 1) Possible debris in the Media Sensor; clean it then retry calibration (see Section 2.4.3). 2) The Media Sensor may be defective; replace it (see Section 4.7). 3) Possible defective Main Logic PCB; replace it (see Section 4.11).
RIBBON FAULT	No rotation, sporadic movement, or unusable sensor values have been detected for the Ribbon Supply.	<p>Ensure that ribbon is correctly installed, that the Printhead is latched, that the Leveling Cam is adjusted, and that the printer is calibrated (see the <i>Operator's Manual</i>).</p> <p>If the problem persists, it can be due to one of following reasons:</p> <ol style="list-style-type: none"> 1) The Ribbon Supply Hub may be bound; identify then clear the obstruction. 2) The ribbon core may be loose on the Ribbon Supply Hub; install a ribbon with a core that is within specification. 3) The ribbon may be slipping over the media. Possible causes include an incorrect media / ribbon combination, a worn Platen, or a severely misaligned printhead assembly; proceed accordingly. 4) Possible damaged timing disk; replace the Ribbon Supply Hub (see Section 4.5.1). 5) Possible occluded light pipe; clean it (see Section 4.5 for location). 6) Possible defective Backplane PCB; replace it (see Section 4.12). 7) Possible defective Main Logic PCB; replace it (see Section 4.11).

Fault Messages <i>(continued)</i>		
Displayed Message	Description	Solution
SCANNER FAULT	<p>A bar code could not successfully be decoded.</p> <hr/> <p>Note: <i>This is normal if a bar code is not decodable.</i></p>	<p>Press FEED to clear the fault. Examine the failed bar code and then if it is free of voids, with sufficient quiet zones, try the following:</p> <ol style="list-style-type: none"> 1) Ensure that the cabling from the scanner to the Centerplate to the Backplane PCB is firmly connected. 2) Cycle the power OFF and ON. 3) Check for debris on the scanner window and clean it if necessary. 4) Ensure that the bar code is supported and is within specification for the scanner. 5) Ensure that AUTO Mode is <u>not</u> being used if the bar code is bitmapped or if addendums are used. 6) The settings may be too restrictive. Decrease PRINT SPEED, increase the bar code height, or adjust the MIN READABLE HEIGHT or the REDUNDANCY LEVEL. 7) Align the scanner. 8) Ambient light maybe interfering with the optics. Reduce bright light sources; alternately, increase the lighting in low light conditions. 9) Ensure a level label and verify the scanner's alignment. The Tear Bar or Rewind Plate should be installed; or, if using an external rewinder, attached to that device. 10) If using same data multiple-up bar codes, ensure that sufficient white space exists between the rows. 11) Possible missing jumpers on the Backplane PCB, E1-E2 & E5-E6 should be installed. 12) Possible defective scan head; replace it. 13) Possible defective Backplane PCB; replace it (see Section 4.12). 14) Possible defective Main Logic PCB; replace it (see Section 4.11).
STROBE TIMING FAULT	A printhead clocking problem has been detected.	Attempt to clear the fault by cycling the power OFF and ON; if the fault does not clear, replace the Main Logic PCB (see Section 4.11).

Fault Messages <i>(continued)</i>		
Displayed Message	Description	Solution
TEMPERATURE FAULT	A high printhead temperature has caused a shutdown.	<p>Turn OFF the printer. Then, when cooled, turn ON the printer. If the problem persists, it can be due to one of following reasons:</p> <ol style="list-style-type: none"> 1) The location may be too hot; move the printer to a place that does not exceed 100°F (38°C) ambient. 2) Enter DIAGNOSTICS / SENSOR READINGS then examine the THR value: If 000 or 255, the Printhead or Printhead Cable may be defective (see Section 4.4).
TOP OF FORM FAULT	<p>TOF was not detected within the maximum label length setting, or a TOF was unexpectedly detected.</p> <hr/> <p>Note: When the SENSOR TYPE is REFLECTIVE, this fault is given for an out of stock condition.</p> <hr/>	<p>Press the FEED Key then proceed accordingly:</p> <p>If media moves –</p> <ol style="list-style-type: none"> 1) The media may be improperly loaded, or calibration may be needed; reload then calibrate (see Section 2.1). 2) Sensor positioning may be required, or the SENSOR TYPE may be incorrect; check the position and setting. 3) The Media Sensor may need cleaning (see Section 2.4.3). 4) The Leveling Cam may be improperly set; adjust it (see Section 2.2.1). 5) The label's length may be longer than the MAXIMUM LABEL LENGTH; check and if needed adjust the setting. 7) The Media Sensor may be defective; replace it (see Section 4.7). <p style="text-align: right;"><i>-continued next page-</i></p>

Fault Messages (continued)		
Displayed Message	Description	Solution
TOP OF FORM FAULT	<p>TOF was not detected within the maximum label length setting, or a TOF was unexpectedly detected.</p> <hr/> <p>Note: When the <i>SENSOR TYPE</i> is <i>REFLECTIVE</i>, this fault is given for an out of stock condition.</p> <hr/>	<p>If media does <i>not</i> move –</p> <p>Possible defective drive train component. Press the FEED Key, listen for Drive Motor operation, and then proceed accordingly:</p> <ul style="list-style-type: none"> • If the Drive Motor is operating, check for a loose or broken drive train component, including a worn roller; or, • If the Drive Motor is not operating: <ol style="list-style-type: none"> 1) The Drive Motor Assembly may be defective; replace it (see Section 4.8). 2) Power Supply PCB may be defective; replace it (see Section 4.10). 3) Main Logic PCB may be defective; replace it (see Section 4.11).
VERIFIER FAULT	<p>A bar code could not successfully be verified.</p> <hr/> <p>Note: This is a normal condition if a bar code is not verifiable.</p> <hr/>	<p>Simultaneously press the Verifier's ENTER and F1 Keys to clear. If the fault continues, see the <i>DMX 2970 Operators Manual</i>.</p>

3.4 Hex Dump Mode

Hex Dump Mode is a diagnostic tool for isolating communications and DPL™ syntax errors, by allowing input (host) data to output (printer) data comparisons. All data received by the printer will be output in hexadecimal code along with the printable ASCII equivalents, as shown below. To identify possible handshaking problems, repeatedly send the format and sections of missing data can become apparent. To debug DPL label formats reference the *Class Series 2 Programmer's Manual*.

After sending a label format to the printer, the output will be immediate and in the form shown below. As a final note, many software programs use bit mapping to construct the label making diagnosis difficult. Contact Datamax-O'Neil Technical Support with any questions.

0000	02	4C	00	44	31	31	00	31	^L.D11.1
0008	36	31	31	30	30	30	30	33	61100003
0010	32	30	30	30	31	30	46	4F	200010F0
0018	4E	54	20	36	3A	20	41	4C	NT 6: AL
0020	4C	20	56	41	4C	49	44	20	L VALID
0028	20	20	20	20	20	20	20	20	
0030	20	20	20	00	31	36	31	31	1611
0038	30	30	30	30	32	38	30	30	00002800
0040	30	31	30	20	20	20	20	20	010
0048	20	20	20	43	48	41	52	41	CHARA
0050	43	54	45	52	53	3A	00	31	CTERS: 1
0058	36	31	31	30	30	30	30	32	61100002
0060	34	30	30	30	31	30	23	24	400010#\$
0068	25	26	28	29	2A	2B	2E	2D	%&()*+,-

To print a Hex Dump, load four-inch wide media (and ribbon, if thermal transfer printing) then proceed according to the type:

- Turn ON the printer. Enter DIAGNOSTICS and enable HEX DUMP MODE. Exit the menu and save the changes.

Note: To exit Hex Dump Mode, enter DIAGNOSTICS and disable HEX DUMP MODE then exit the menu, saving the changes.

4 Removal and Replacement

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4.0 Introduction

This section details removal and replacement methods for various printer components; where multiple equipment types or options are available, use the procedure that best matches the configuration.



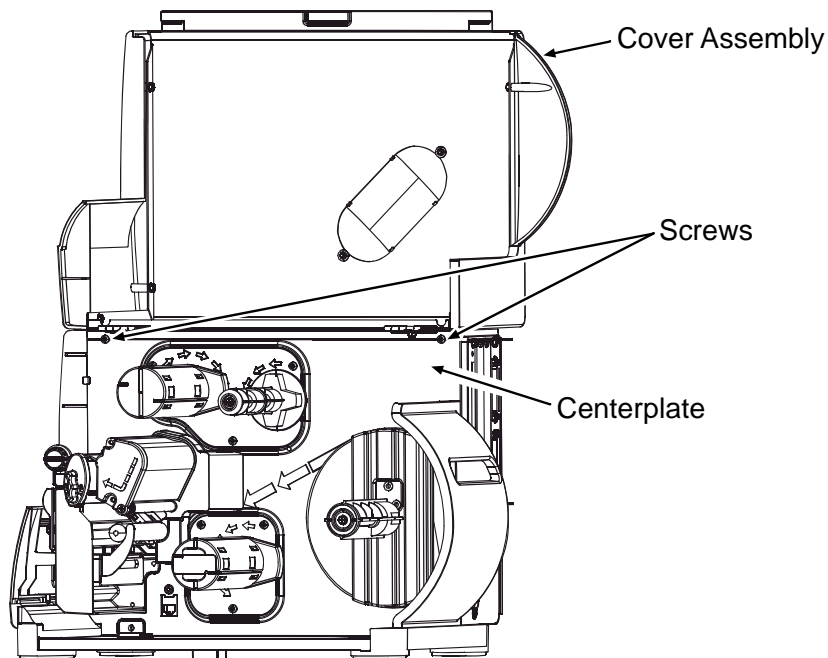
- ▶ Always disconnect AC power before performing service;
- ▶ Wear a wrist strap and follow all ESD prevention measures; and,
- ▶ Use extreme care and never use sharp objects on the Printhead or Platen.

Note: *The procedures below assume a printer empty of media and ribbon.*

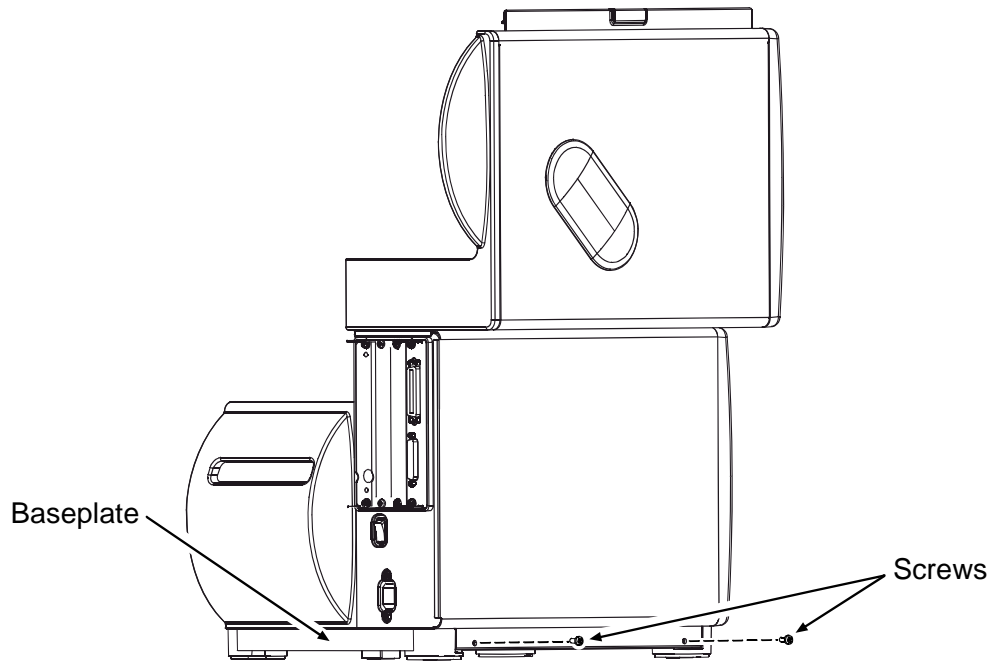
4.1 Cover Assembly

Removal:

1. Turn OFF and unplug the printer.
2. Raise the Cover Assembly and loosen the two Screws that secure it to the Centerplate.



3. Remove the two Screws that secure the Cover Assembly to the Baseplate, and then lift the Cover Assembly off the printer.



Replacement:

1. Lower the Cover Assembly onto the printer.
2. Reinstall the two Screws through the Cover Assembly and into the Baseplate.
3. Tighten the two Screws along the Baseplate and the two Screws along the Centerplate.

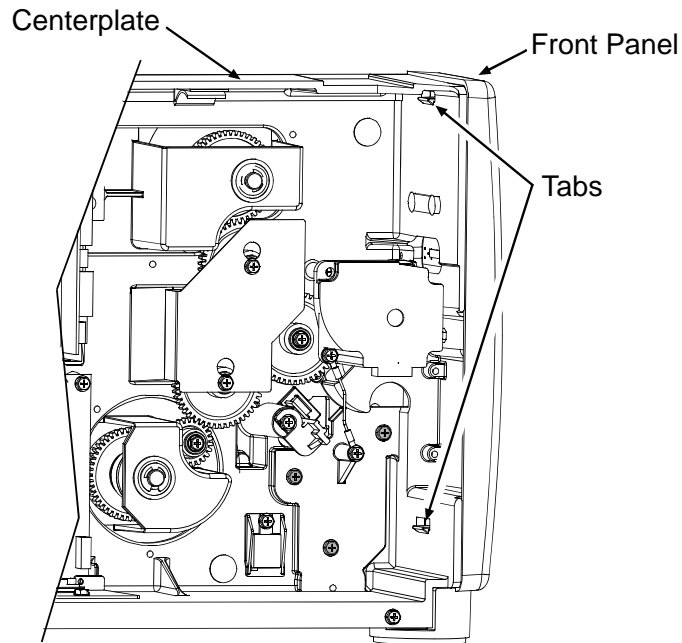
4.2 Front Panel

Removal:

1. Turn OFF and unplug the printer.
2. Remove the Cover Assembly (see Section 4.1) and the Fascia (see Section 4.3).

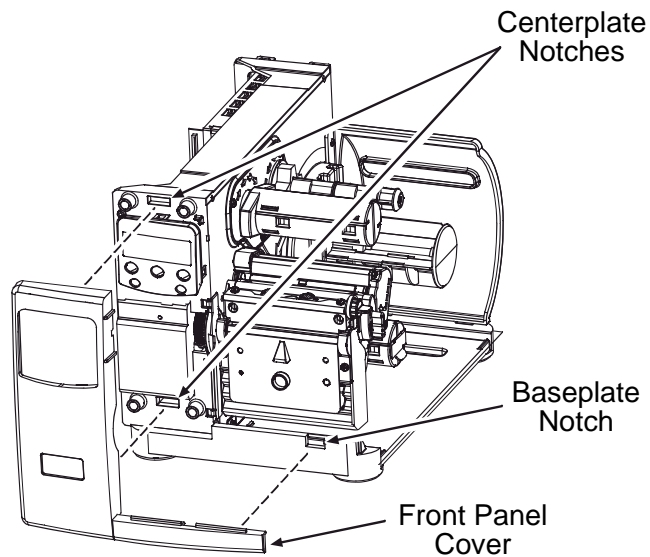
3. Slightly bend the Tabs that extend through notches in the Centerplate and Baseplate then remove the Front Panel.

Note: Use care when removing the panel from the Baseplate Notch, as Tab access is limited.



Replacement:

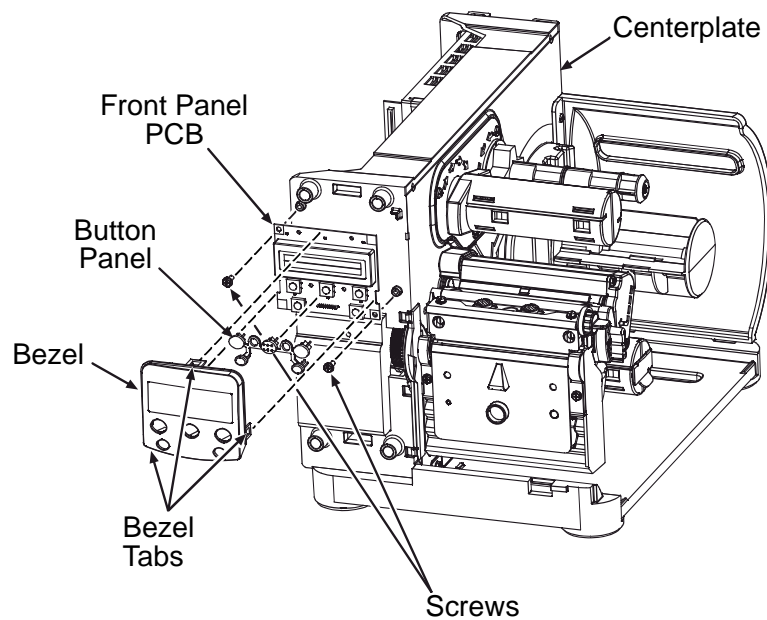
1. Align the Tabs of the Front Panel to the Centerplate Notches and the Baseplate Notch.
2. Press firmly until the Tabs of the Front Panel lock into place.
3. Reinstall the Cover Assembly (see Section 4.1) and the Fascia (see Section 4.3).



4.2.1 Front Panel PCB

Removal:

1. Remove the Front Panel; see Section 4.2.
2. Slightly bend the Bezel Tabs, and then remove the Bezel (and Button Panel) from the Front Panel PCB.
3. Remove the two Screws that secure the Front Panel PCB to the Centerplate then disconnect the Front Panel Cable and remove the Front Panel PCB.



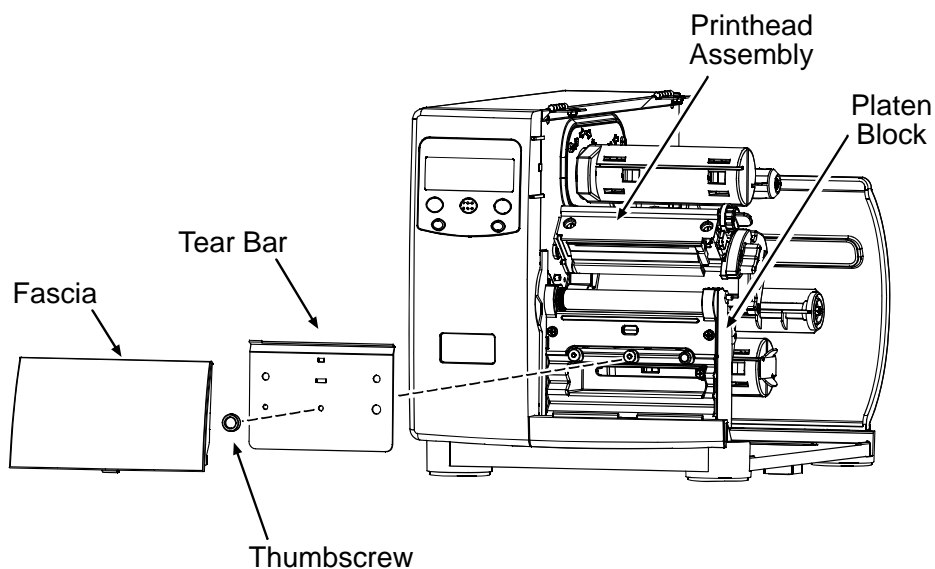
Replacement:

1. Connect the Front Panel Cable to the Front Panel PCB and then attach the Front Panel PCB to the Centerplate with two Screws.
2. Press firmly until the Bezel Tabs lock into place around the Front Panel PCB.
3. Reinstall the Front Panel; see Section 4.2.

4.3 Platen

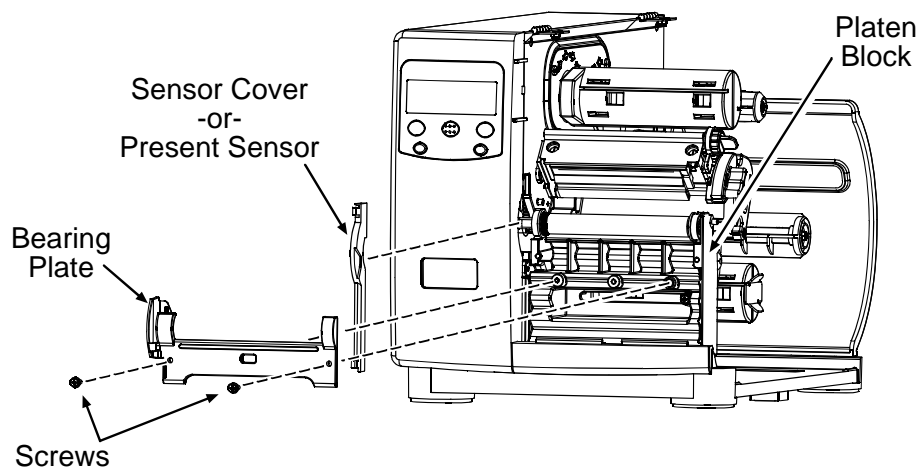
Removal:

1. Turn OFF and unplug the printer.
2. Raise the cover and remove the Fascia.
3. Raise the Printhead Assembly then remove the Thumbscrew and Tear Bar from the Platen Block.

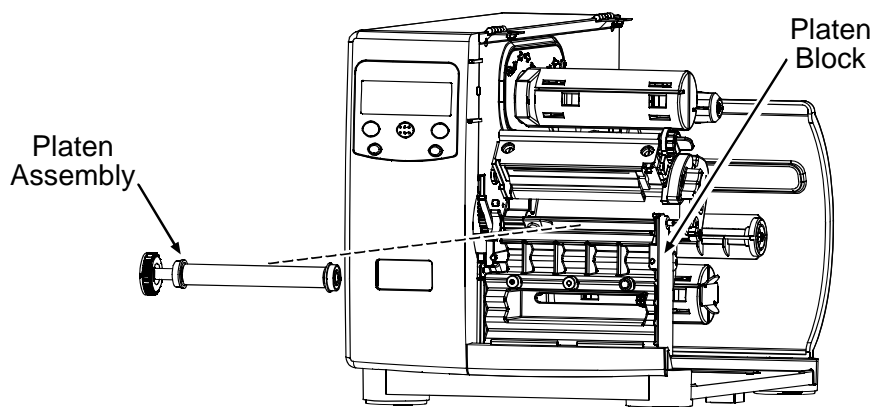


4. Remove the Sensor Cover (or, if equipped, the Present Sensor), pulling the far side out then away from the Centerplate. (If Present Sensor equipped, disconnect the cable from the Options Connector before removal).

Note: If necessary, loosen the Front Panel to facilitate removal; see Section 4.2.



5. Remove the two Screws that secure the Bearing Plate and then remove the Bearing Plate from the Platen Block.
6. Remove the Platen Assembly from the Platen Block.



Replacement:

1. Place the Platen Assembly into the Platen Block, ensuring proper gear mesh.
2. Position the Bearing Plate onto the Platen Block and secure it with the two Screws. Rotate the Platen Assembly to verify gear mesh.
3. Position and then snap the Sensor Cover (or Present Sensor) into place. (If reinstalling the Present Sensor, also reconnect the cable to the Options Connector.)
4. Clean the Platen; see Section 4.3.
5. Place the Tear Plate onto the Platen Block, secure it using the Thumbscrew, and then attach the Fascia.

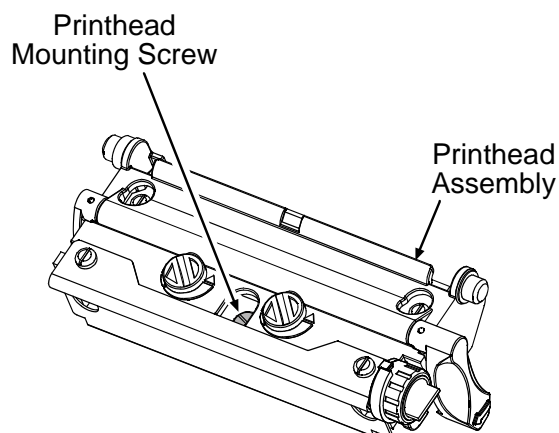
4.4 Printhead



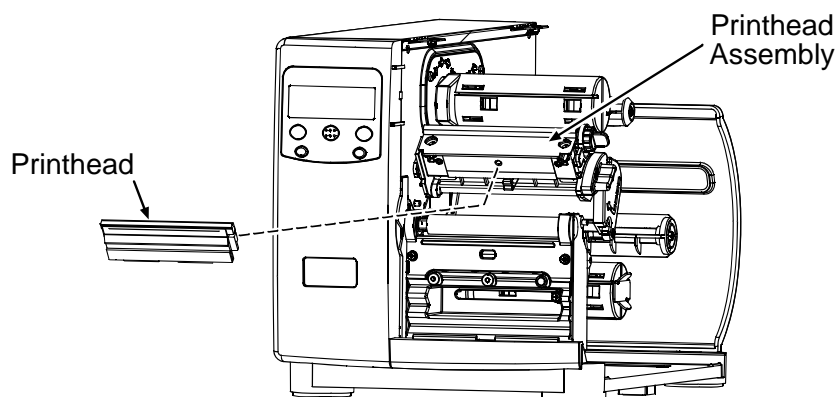
- ▶ Use extreme care when handling the printhead.
- ▶ If overvoltage is suspected, verify the supply voltage proceeding (see Section 2.2.4).

Removal:

1. Turn OFF and unplug the printer.
2. Raise the cover. With the Printhead Assembly lowered, loosen the Printhead Mounting Screw (it will remain in the assembly).

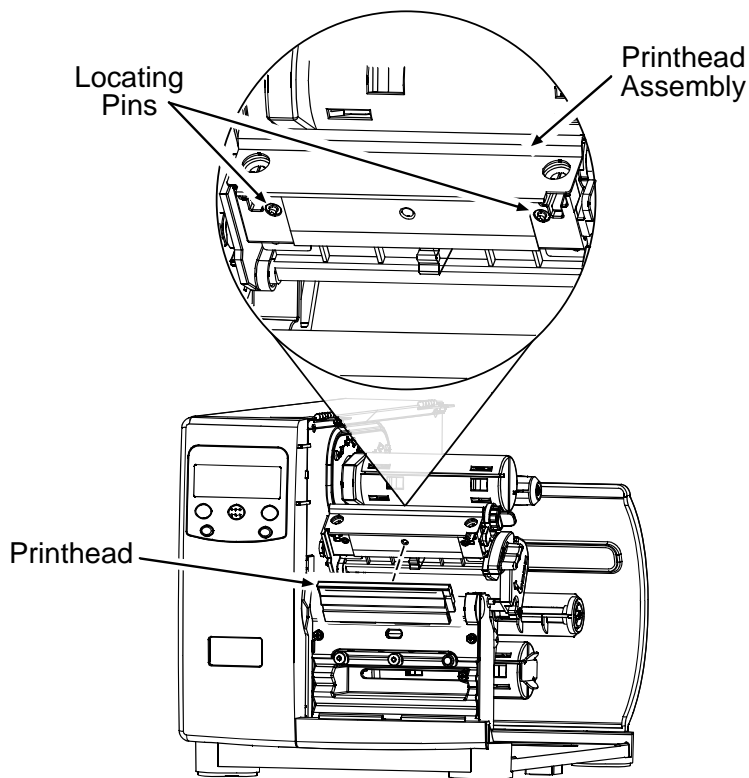


3. While carefully supporting the Printhead, raise the Printhead Assembly and disconnect the cables then remove the Printhead from the Printhead Assembly.



Replacement:

1. Carefully reconnect both cables to the Printhead.
2. Position the Printhead onto the Locating Pins in the Printhead Assembly.



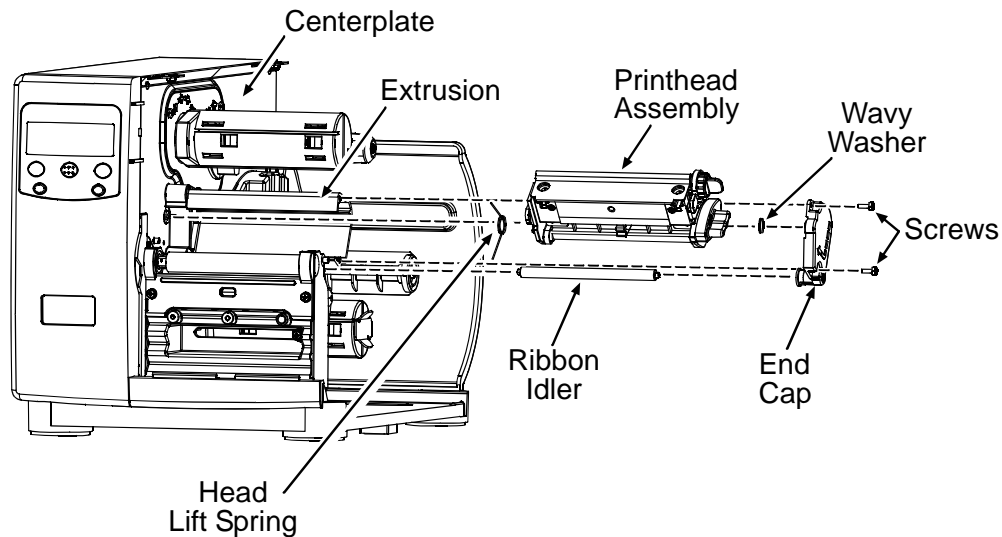
3. Secure the Printhead to the Printhead Assembly with the Printhead Mounting Screw, but do NOT over-tighten.
4. Clean the Printhead; see Section 2.5.1.
5. Lower and latch the Printhead Assembly.
6. Adjust the darkness; see Section 2.7.

Note: *Burn Line adjustment is not normally required as part of the replacement process; however, if necessary, see Section 2.2.3.*

4.4.1 Printhead Assembly

Removal:

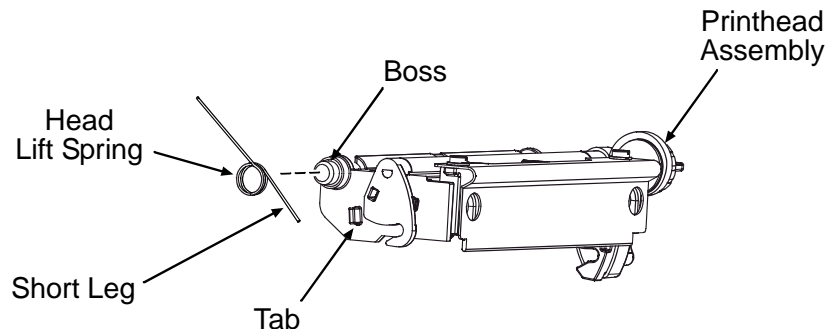
1. Turn OFF and unplug the printer.
2. Remove the Printhead; see Section 4.4.
3. Remove the two Screws that secure the End Cap to the Extrusion.
4. While supporting the Printhead Assembly, remove the End Cap, Wavy Washer, and Ribbon Idler.



5. Remove the Printhead Assembly and the Head Lift Spring.

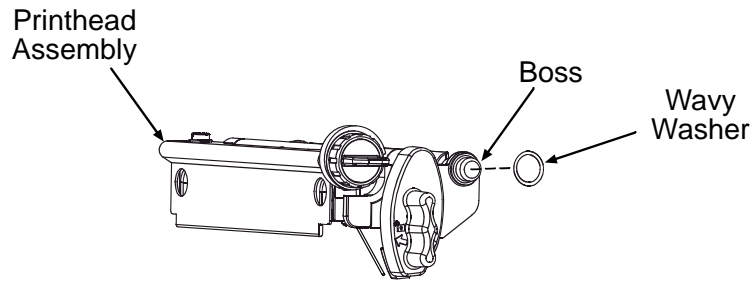
Replacement:

1. Place the Head Lift Spring onto the Printhead Assembly Boss; situate the Short Leg behind the Tab.



2. Rotate the Long Leg of the Head Lift Spring downward, loading it against the Extrusion, and then insert the Printhead Boss into the Centerplate bushing.

3. While holding the spring-loaded Printhead Assembly in the Centerplate bushing, place the Wavy Washer onto the (opposite) Printhead Assembly Boss.

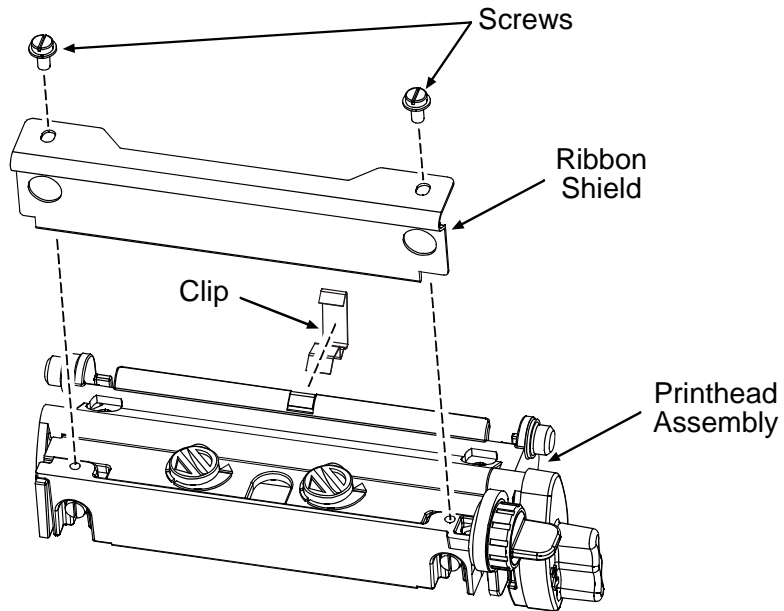


4. Insert the Ribbon Idler shaft into the Centerplate bushing.
5. Reinstall the End Cap onto the Extrusion to captivate the Printhead Assembly Boss and Ribbon Idler shaft then secure the End Cap with the two Screws.
6. Test the Printhead Assembly for correct movement and latching; also, check the Ribbon Idler for proper rotation.
7. Reinstall the Printhead; see Section 4.4.

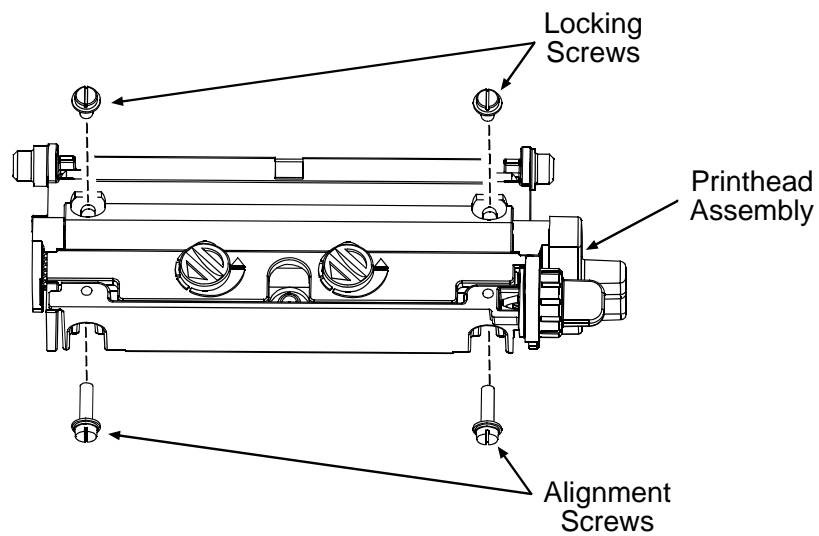
4.4.1.1 Head Pressure Cams and Springs

Removal:

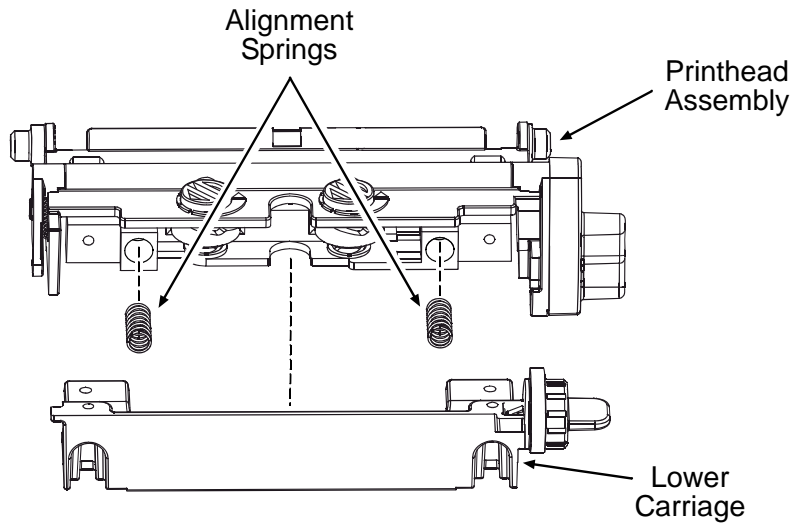
1. Remove the Printhead Assembly; see Section 4.4.1.
2. Carefully pry the Clip from the Printhead Assembly. Also, remove the two Screws that secure the Ribbon Shield and then remove it from the Printhead Assembly.



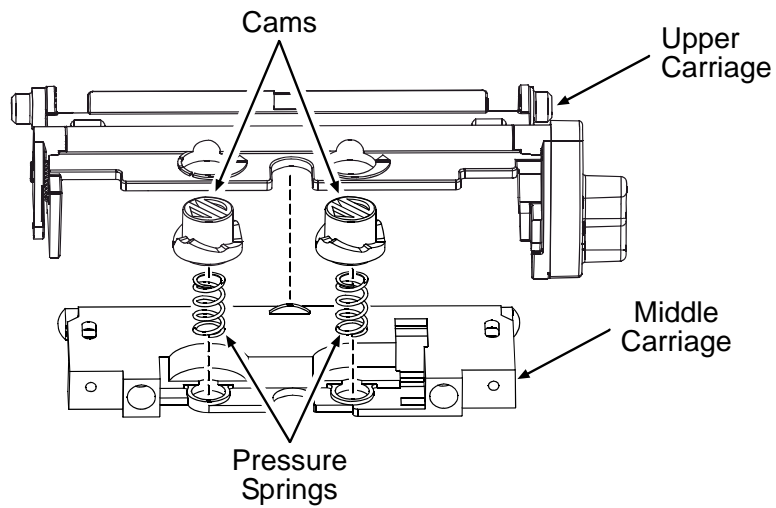
3. Remove the Locking Screws and the Alignment Screws.



4. Carefully separate the Lower Carriage from the Printhead Assembly, compressing the spring-loaded assembly as necessary to separate the parts, and then remove the Alignment Springs.

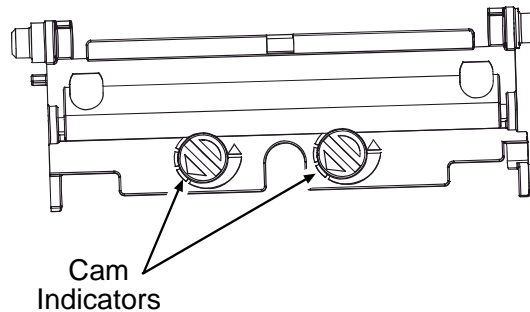


5. Separate the Middle Carriage from the Upper Carriage then remove the Cams and the Pressure Springs.



Replacement:

1. Place the Pressure Springs and the Alignment Springs into the sockets of the Middle Carriage and place the Cams into the socket holes of the Upper Carriage then orient the Cam Indicators for least pressure (see below).

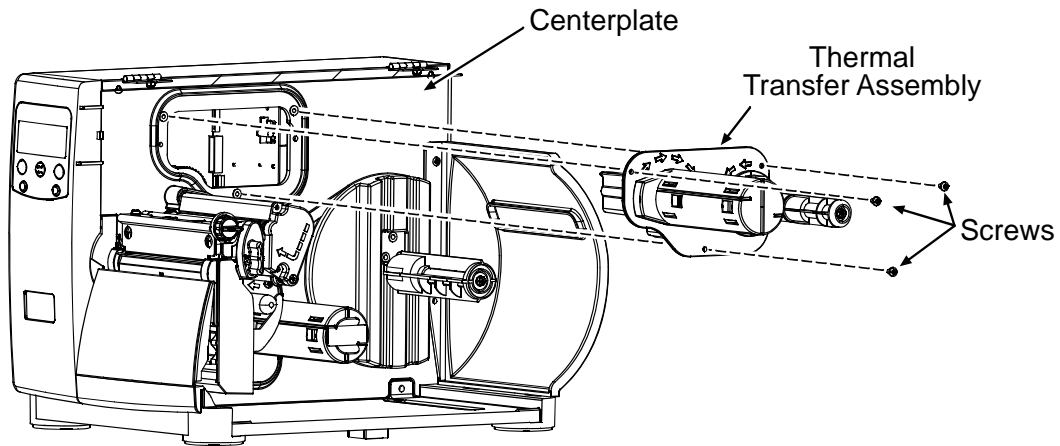


2. Insert the Pressure Springs in the Cams then compress the Upper and Middle Carriage and attach the Lower Carriage to the assembly.
3. Secure (but do not tighten) the Upper, Middle, and Lower Carriages with the Alignment Screws and the Locking Screws.
4. Reinstall the Clip and secure the Ribbon Shield to the Printhead Assembly with the two Screws.
5. Reinstall the Printhead Assembly; see Section 4.4.1.
6. Adjust the Pressure; see Section 2.2.2.
7. Adjust the Burn Line; see Section 2.2.3.
8. If equipped with Thermal Transfer, align the Ribbon Path; see Section 2.3.

4.5 Thermal Transfer Assembly

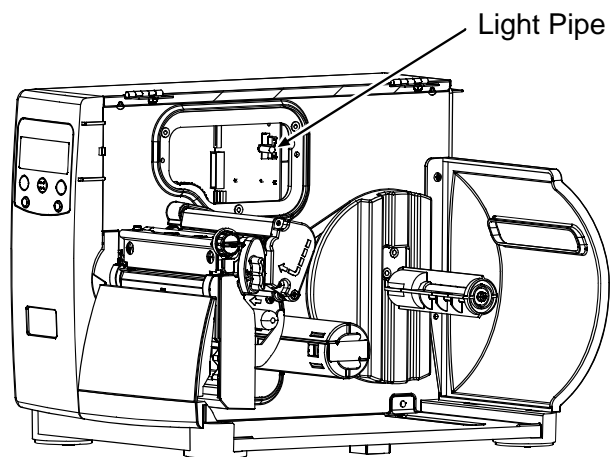
Removal:

1. Turn OFF and unplug the printer. Raise the cover.
2. Remove the three Screws that secure the Thermal Transfer Assembly and then remove the assembly from the Centerplate.



Replacement:

1. Inspect and if necessary wipe the Light Pipe clean using isopropyl alcohol and lens tissue (or lint free cloth).

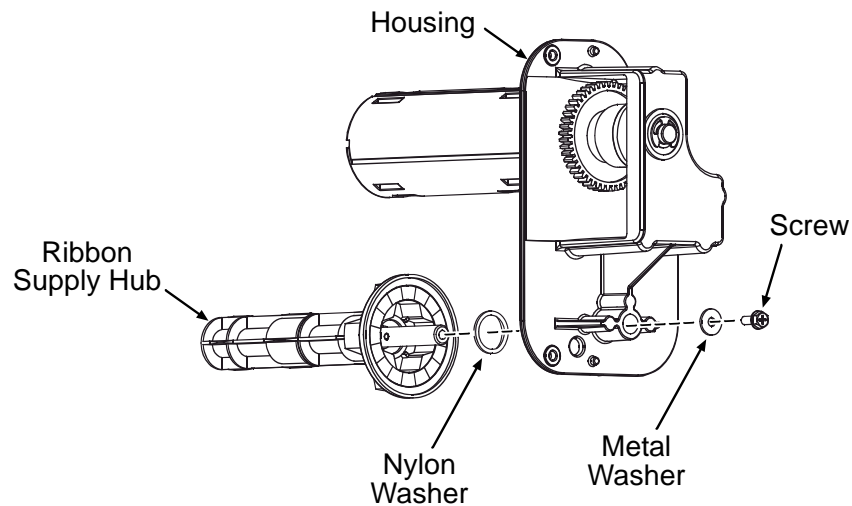


2. Reinstall the Thermal Transfer Assembly in the Centerplate, carefully engaging the gears, and secure it using the three Screws.

4.5.1 Ribbon Supply Hub

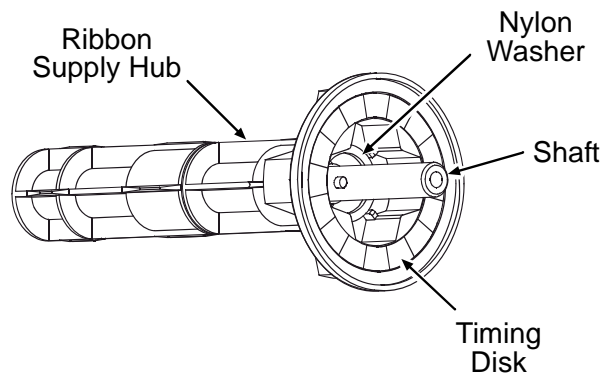
Removal:

1. Remove the Thermal Transfer Assembly; see Section 4.5.
2. Remove the Screw and Metal Washer that secures the Ribbon Supply Hub to the Housing.
3. Remove the Ribbon Supply Hub and Nylon Washer from the Housing.



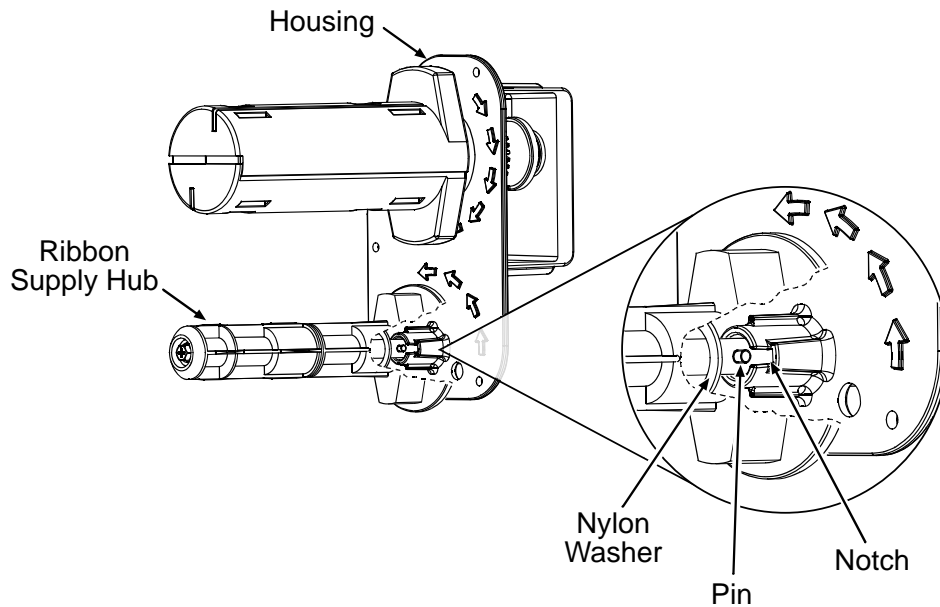
Replacement:

1. Place the Nylon Washer over the Shaft into the Ribbon Supply Hub housing.



2. Slide the Ribbon Supply Hub shaft into the Housing.

3. Rotate the Ribbon Supply Hub until the Pin engages the Notch in the Housing.

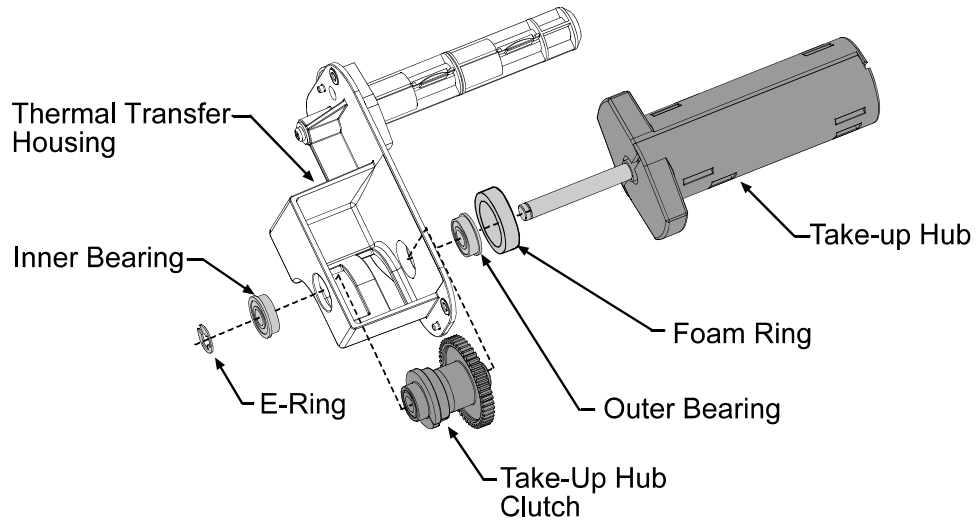


4. Secure the Ribbon Supply Hub to the Housing with the Metal Washer and Screw.
5. Reinstall the Thermal Transfer Assembly; see Section 4.5.

4.5.2 Ribbon Take-up Hub & Clutch Assembly

Removal:

1. Remove the Thermal Transfer Assembly; see Section 4.5.
2. Remove the E-Ring from the Take-Up Hub shaft and then remove the Inner Bearing.
3. Remove the Take-Up Hub and the Outer Bearing from the Thermal Transfer Housing.
4. Slightly compress the Take-Up Hub Clutch then remove it from the Thermal Transfer Housing.



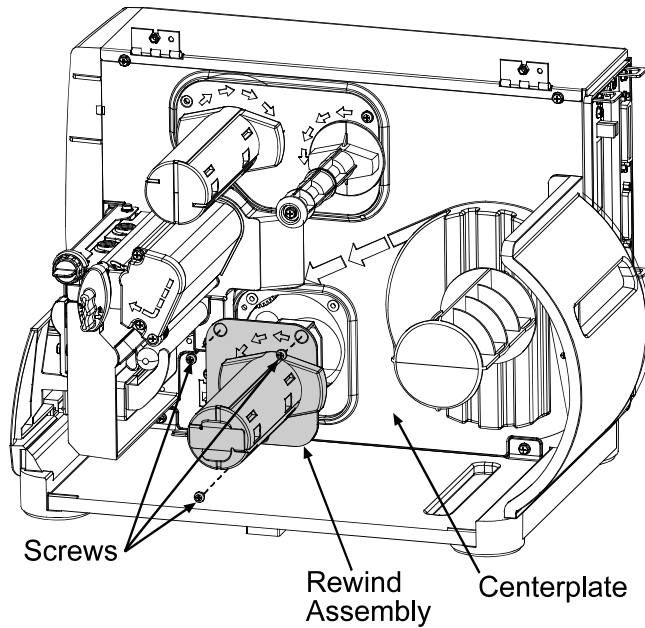
Replacement:

1. Reinstall the Outer Bearing in the Thermal Transfer Housing.
2. Position the Take-Up Hub Clutch in the Thermal Transfer Housing
3. Slide the Take-Up Hub shaft through the Take-Up Hub Clutch and Thermal Transfer Housing.
4. Reinstall the Inner Bearing and clip the E-Ring onto the Take-Up Hub shaft.
5. Reinstall the Thermal Transfer Assembly; see Section 4.5.

4.6 Rewind Assembly

Removal:

1. Turn OFF and unplug the printer. Raise the cover.
2. Remove the three Screws that secure the Rewind Assembly to the Centerplate then remove the Rewind Assembly.



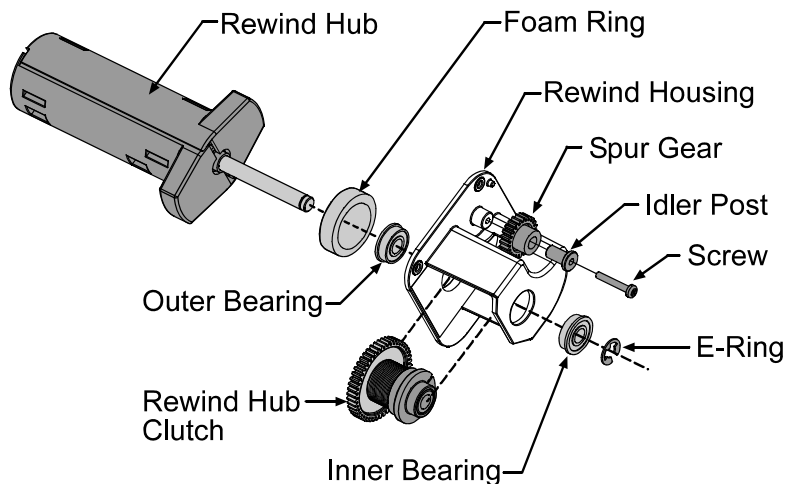
Replacement:

Reinstall the Rewind Assembly in the Centerplate, carefully engaging the gears, and secure it using the three Screws.

4.6.1 Rewind Hub, Clutch Assembly, and Spur Gear

Removal:

1. Remove the Rewind Hub Assembly; see Section 4.6.
2. Remove the E-Ring from the Rewind Hub shaft and remove the Inner Bearing.



3. Remove the Rewind Hub and the Outer Bearing from the Rewind Housing.
4. Remove the Rewind Hub Clutch from the Housing (and to remove the Spur Gear, remove the Screw that secures the Idler Post to the Rewind Housing).

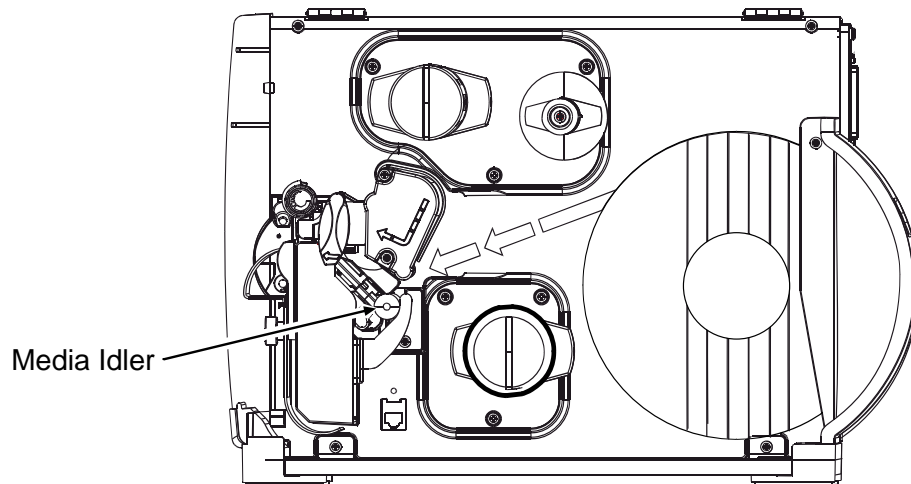
Replacement:

1. Reinstall the Outer Bearing in the Rewind Housing.
2. Position the Rewind Hub Clutch in the Rewind Housing.
3. Slide the Rewind Hub shaft through the Rewind Hub Clutch and Rewind Housing.
4. Reinstall the Inner Bearing and clip the E-Ring onto the Rewind Hub shaft (also, if removed, position the Spur Gear onto the Idler Post and secure the post the Rewind Housing with the Screw).
5. Reinstall the Rewind Assembly; see Section 4.6.

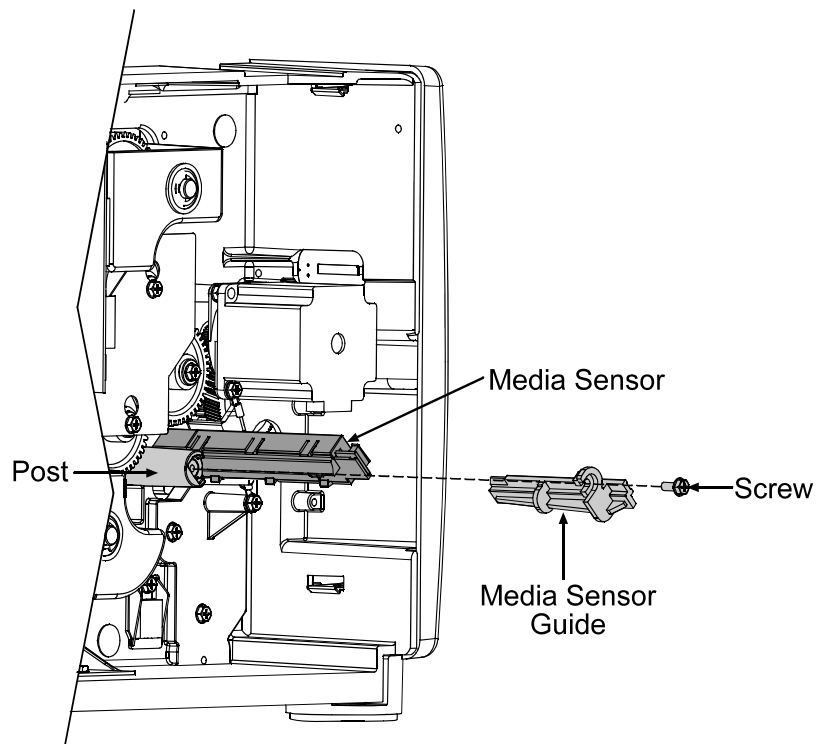
4.7 Media Sensor

Removal:

1. Turn OFF and unplug the printer.
2. Remove the Cover Assembly; see Section 4.1.
3. Disconnect the Media Sensor cable and, while holding the Media Idler, remove the Screw that secures the Media Sensor Guide to the Post.



4. Pull the Media Sensor Guide and then the Media Sensor from the printer.



Replacement:

1. Reinstall the Media Sensor and then the Media Sensor Guide.
2. Secure the Media Sensor Guide to the Post with the Screw.

3. Raise the lock then reconnect the cable to the Media Sensor.
4. Reinstall the Cover Assembly; see Section 4.1.
5. Perform calibration; see Section 2.1.2.

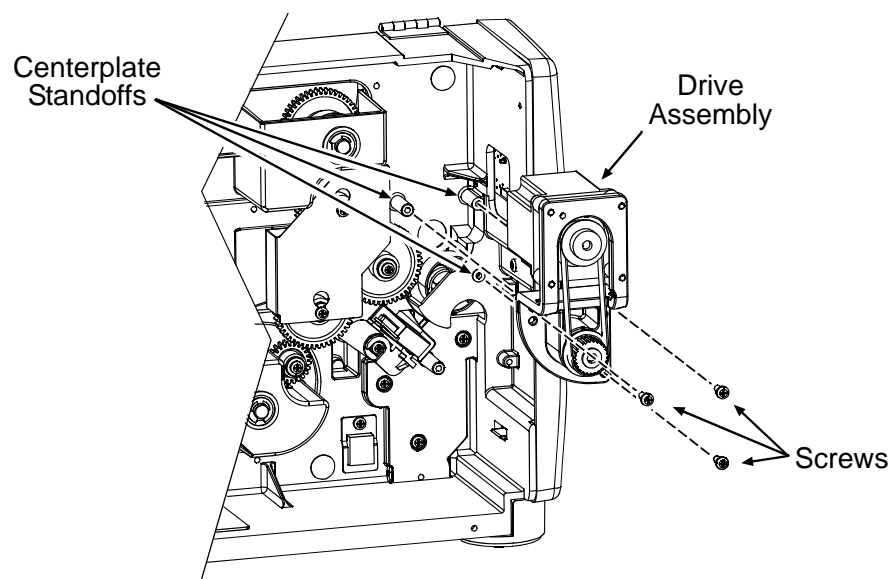
4.8 Drive Motor Assembly

Proceed with removal and replacement of the Drive Motor Assembly depending upon the type.

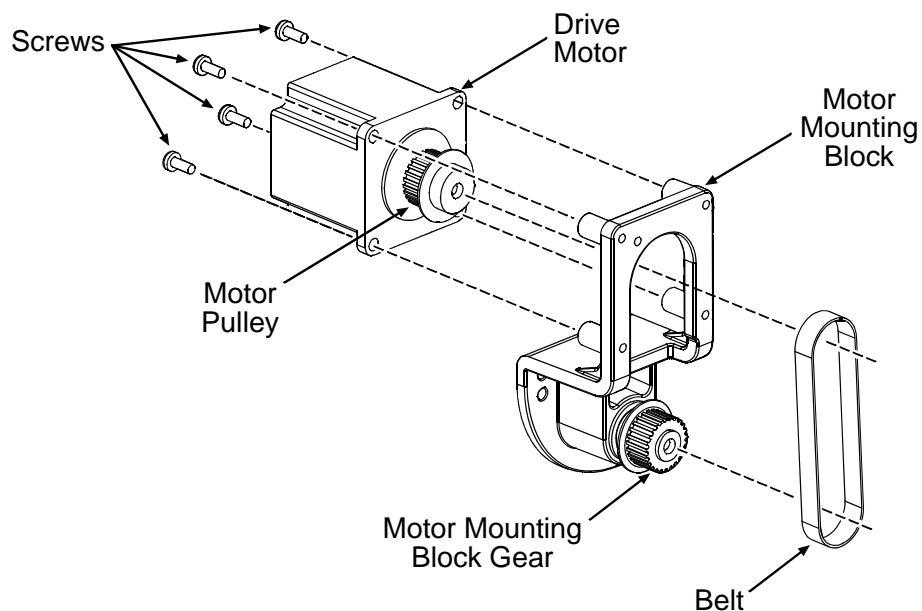
4.8.1 Belt Drive

Removal:

1. Turn OFF and unplug the printer.
2. Remove the Cover Assembly; see Section 4.1.
3. Disconnect the motor cable then remove the three Screws that secure the Drive Assembly to the Centerplate Standoffs.



4. Remove the four Screws that secure the Drive Motor to the Motor Mounting Block then slip the Belt off the Motor Pulley.



Replacement:

1. Position the Drive Motor on the Motor Mounting Block. Route the Belt around the Motor Pulley and the Motor Mounting Block Gear, engaging the teeth, then reinstall and tighten the four Screws.
2. Position the Drive Assembly onto the Centerplate Standoffs and then secure the assembly with three Screws.
3. Reconnect the motor cable.
4. Reinstall the Cover Assembly; see Section 4.1.

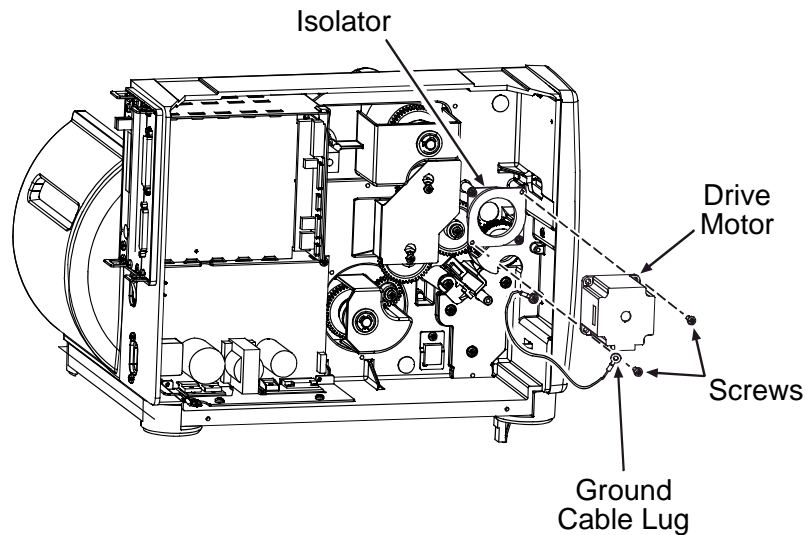
4.8.2 Direct Drive

Note: *Though the illustration depicts the motor replacement of a 203 / 400 DPI model, except as detailed below the procedure is the same.*

Removal:

1. Turn OFF and unplug the printer.
2. Remove the Cover Assembly; see Section 4.1.

3. If replacing a 300 / 600 DPI model motor, remove the Front Panel (see Section 4.2); otherwise, proceed to Step 4.
4. Disconnect the motor cable.
5. Remove the two Screws that secure the Drive Motor to the Isolator (which also frees the Ground Cable Lug) and then remove the Drive Motor.



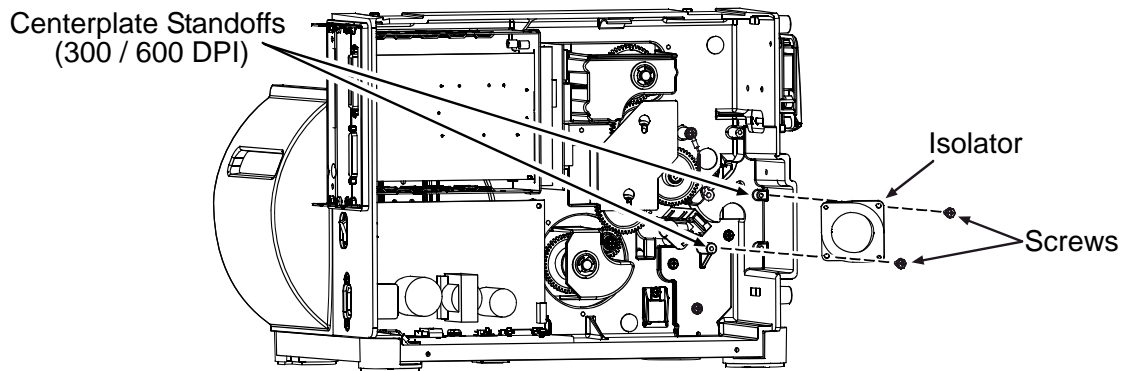
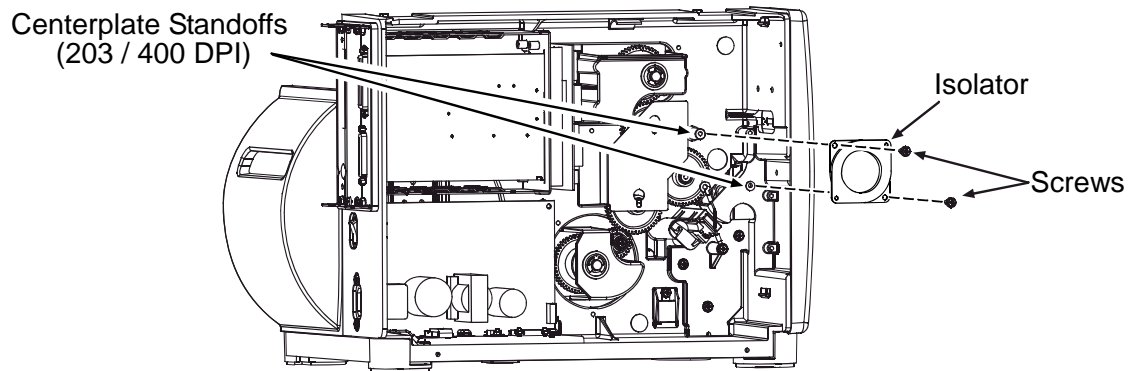
Replacement:

1. Position the Drive Motor against the Isolator.
2. Place the Ground Cable Lug onto one Screw then secure the Drive Motor to the Isolator with the two Screws.
3. Reconnect the motor cable to the Drive Motor.
4. If replacing a 300 / 600 DPI model motor, reinstall the Front Panel (see Section 4.2); otherwise, proceed to Step 5.
5. Reinstall the Cover Assembly; see Section 4.1.

4.8.2.1 Isolator

Removal:

1. Remove the Drive Motor Assembly; see Section 4.8.2.
2. Depending upon the resolution of the printer, remove the Screws that secure the Isolator to the Centerplate Standoffs.



Replacement:

1. Depending upon the resolution of the printer, position the Isolator against the Centerplate Standoffs then secure it with the two Screws.
2. Replace the Drive Motor Assembly; see Section 4.8.2.

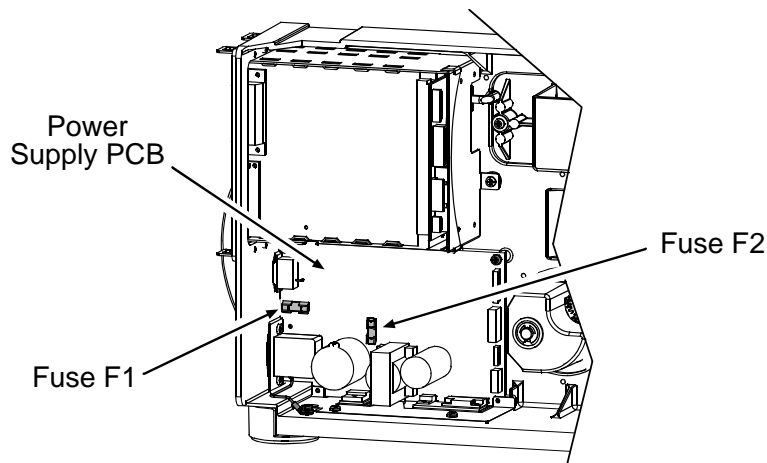
4.9 Fuses



- ▶ Only use a replacement fuse with the rating and type as the original fuse; failure to comply could cause serious damage, including fire.
- ▶ Use caution when replacing Fuse F1, as this fuse will only blow during a failure in the primary switching circuit and may indicate a more serious electrical problem.

Removal:

1. Turn OFF and unplug the printer.
2. Remove the Cover Assembly; see Section 4.1.
3. Remove Fuses F1 and/or F2 from the Power Supply PCB.



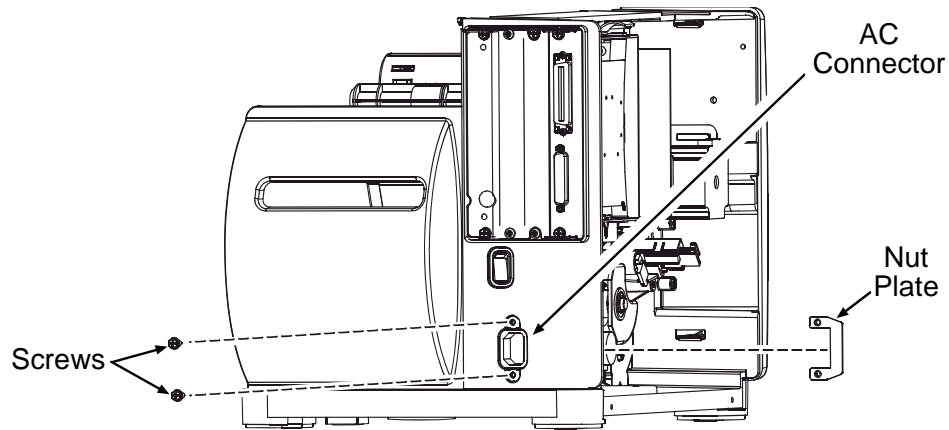
Replacement:

1. Only replace the defective fuse(s) with the same type and rating as the factory original:
 - Fuse F1 & F2: Fast acting, 3 amps @ 250 Volts, 5 x 20 mm.
2. Reinstall the Cover Assembly; see Section 4.1.

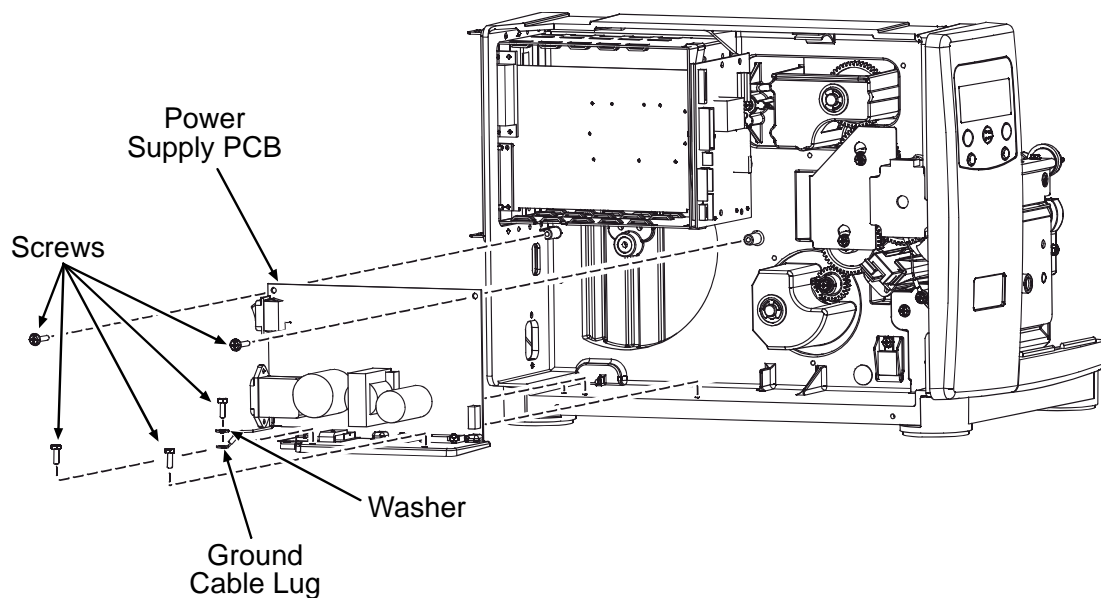
4.10 Power Supply PCB

Removal:

1. Turn OFF and unplug the printer.
2. Remove the Cover Assembly; see Section 4.1.
3. Disconnect the cables from the Power Supply PCB.
4. Remove the two Screws and Nut Plate that secure the AC Connector.

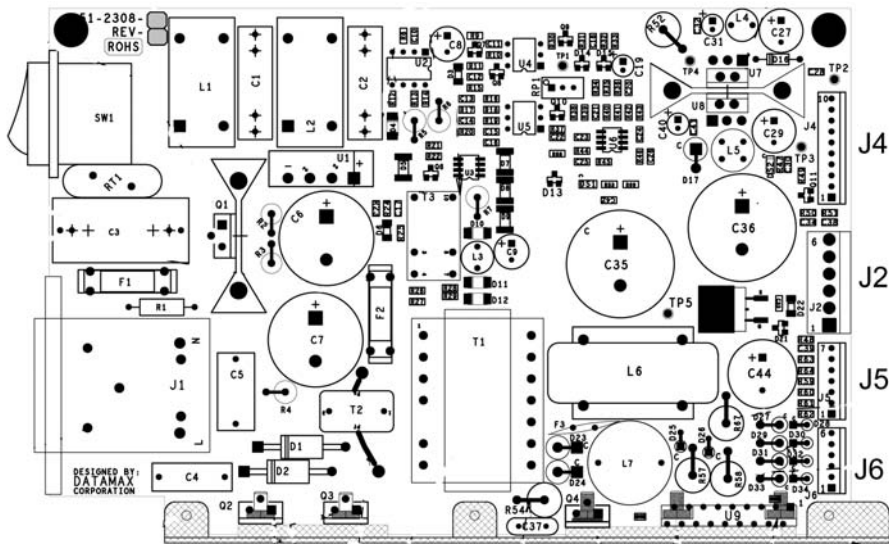


5. Remove the Screw and Washer that secures the Ground Wire Lug to the chassis.
6. Remove the four Screws that secure the Power Supply PCB and then remove the Power Supply PCB.



Replacement:

1. Position the Power Supply PCB in the printer then secure it with the four Screws.
2. Place the Washer onto the Screw, and then secure the Ground Wire Lug to the chassis with the Screw.
3. Position the Nut Plate over the AC Connector and then secure the AC Connector and the Nut Plate to the chassis with the two Screws.
4. Reconnect the cables to the Power Supply PCB.



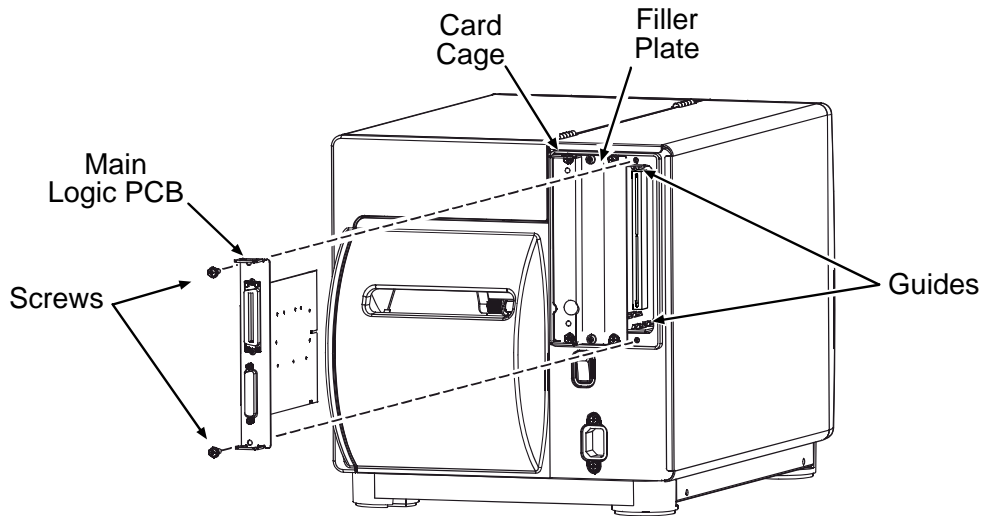
5. Verify the correct Printhead supply voltage; see Section 2.2.4.

4.11 Main Logic PCB

Removal:

1. Turn OFF and unplug the printer.
2. Disconnect the interface cable(s) from the Main Logic PCB.

3. Remove the two Screws that secure the Main Logic PCB to the Card Cage. (In some cases it may also be necessary to remove the adjacent Filler Plate.)

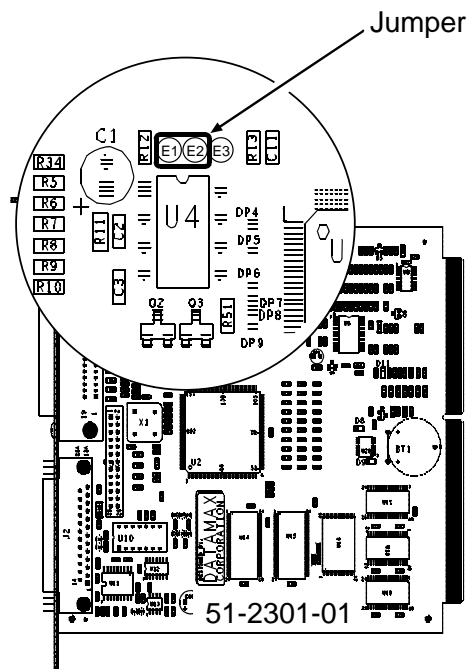


4. Pull the Main Logic PCB from the Card Cage.

Replacement:

1. If replacing Main Logic PCB P/N 51-2301-01, ensure that the Jumper is placed between E1 & E2 (also, see note below for communications options); otherwise proceed to Step 2.

Note: If using the RS-422 option, ensure that the correct U10 is installed and that a Jumper is placed across E12 & E13.



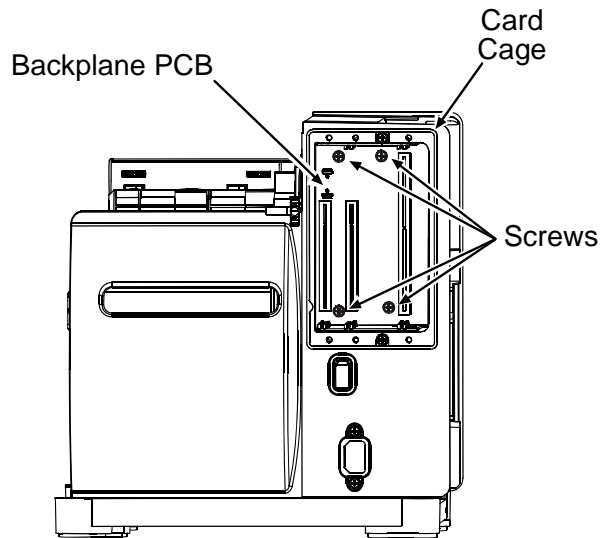
2. Insert the Main Logic PCB between the Guides in the Card Cage then slide it forward until seated.
3. Reinstall the two previously removed screws and secure the Main Logic PCB in the Card Cage.
4. Reinstall the interface cable(s).
5. Verify the installed Application Version for the printer model; see Section 2.6.
6. Configure the printer; see the *Operator's Manual* for details.
7. Perform calibration; see Section 2.1

4.12 Backplane PCB

Removal:

1. Turn OFF and unplug the printer.
2. Disconnect the interface cable(s) from the Main Logic PCB.
3. Remove the Cover Assembly; see Section 4.1.
4. Remove the Main Logic PCB and the Filler Plate; see Section 4.11. Also remove any other optional PCB installed in the Card Cage.
5. Disconnect the cables from the Backplane PCB.

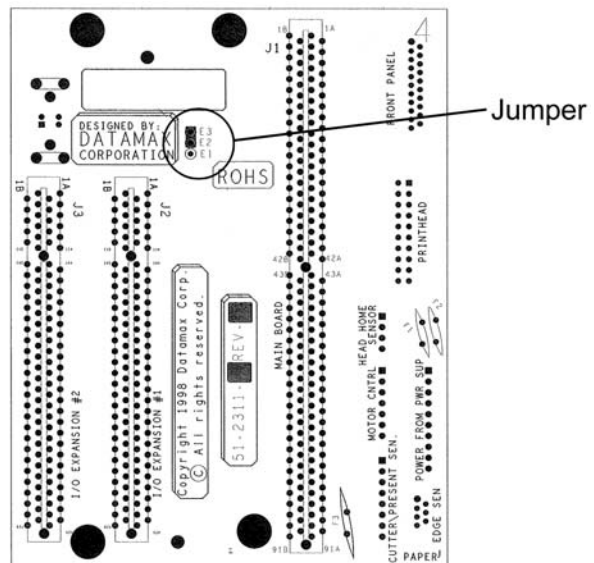
6. Remove the four Screws that secure the Backplane PCB to the Card Cage and then remove the Backplane PCB.



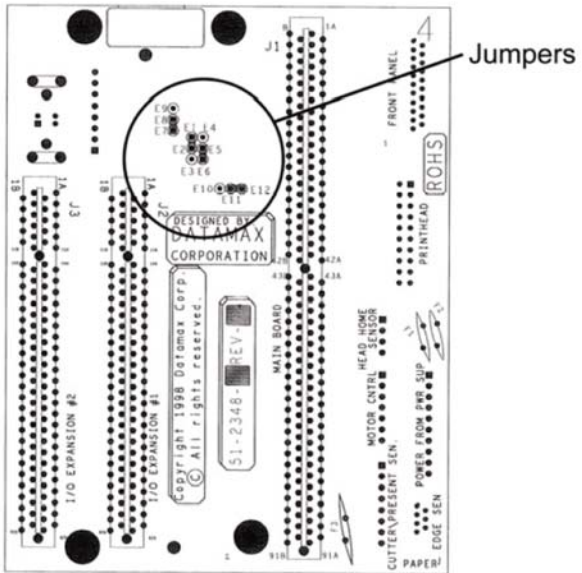
Replacement:

Proceed according to the Part Number of the Backplane PCB:

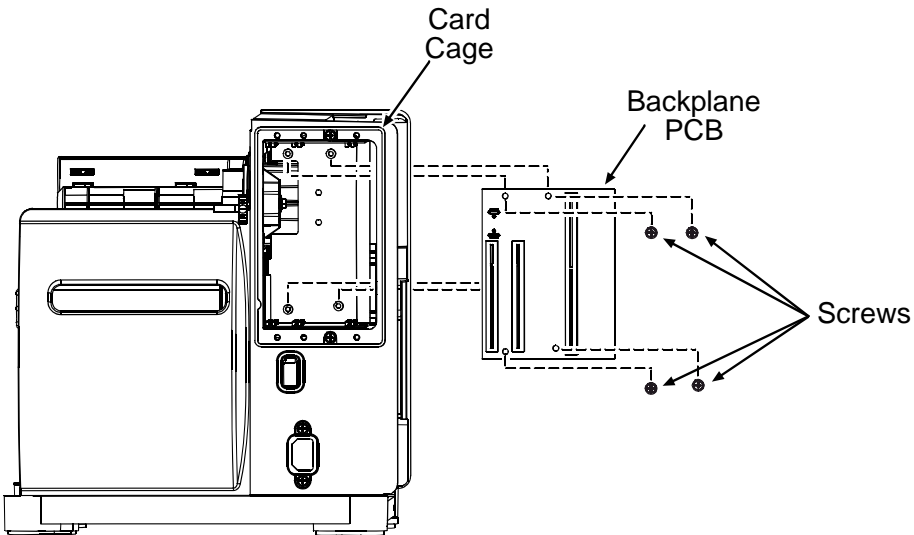
- If installing P/N 51-2311-00, ensure a Jumper is placed across E2 & E3.



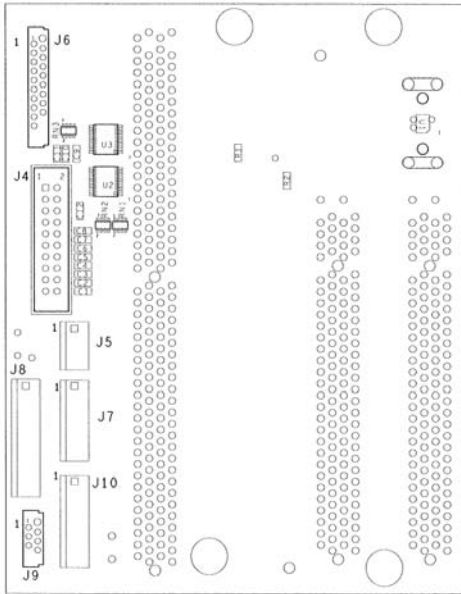
- Scanner equipped: E1 & E2, E5 & E6;
- RFID equipped: E2 & E3, E4 & E4;
- COM2 DTR Active (default): E7 & E8;
and,
- Ribbon Motion (default): E11 & E12.



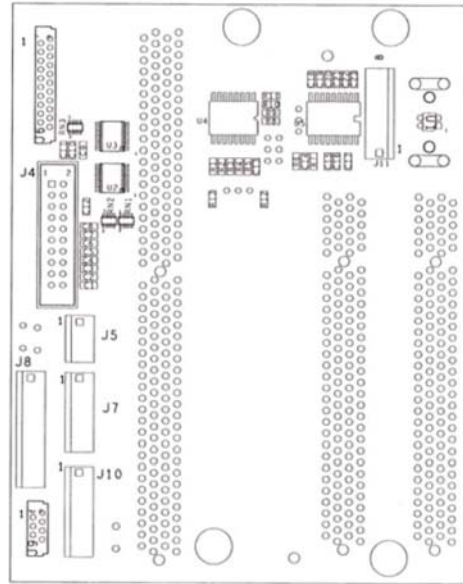
2. Place the Backplane PCB into the Card Cage and then secure it with the four Screws.



3. Reconnect the cables according to the Part Number of the Backplane PCB.



P/N 51-2311-00



P/N 51-2348-00

4. Replace the Main Logic PCB and the Filler Plate; see Section 4.11. Also replace any optional PCB removed from in the Card Cage.
5. Replace the Cover Assembly; see Section 4.1.
6. Reconnect the interface cable(s) to the Main Logic PCB.