# PRINTRONIX® PSA3

# Maintenance Manual

*Printronix P7000 Cartridge Ribbon Printer Series of Line Matrix Printers*

*P7000 Cartridge Ribbon Printer Series*
*of Line Matrix Printers*

*Maintenance Manual*

**PRINTRONIX**® **PSA3**

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# Table of Contents

# 1    *Maintenance Overview*

## Printronix P7000 Cartridge Ribbon Printer (CRP) Series

Printronix® has been the global leader in industrial printing solutions for over 30 years, earning a reputation for designing and manufacturing leading edge products and delivering them to market with unsurpassed service and support.

The Printronix P7000™ Line Matrix Printing Platform extends the series of technology innovations that cement Printronix's leadership position. Line matrix printing is Printronix's flagship technology, and it remains the workhorse solution for supply-chain and back-office printing applications because of its reliability, lower cost of ownership and flexibility of printing applications.

- Most reliable printer ever – provides more up time and lower operating costs.

- Integrated print management system – provides precise control over print quality, print costs, and job planning.

- Cabinet or Pedestal styles – best user access and forms handling flexibility.

- Unsurpassed ease of use – simplifies operation and enhances productivity.

There are three printer configurations:

### Enclosed Cabinet (P72XX or P72XXH)

- The enclosed cabinet models provide for near silent operation, making these printers perfectly suitable for use in the quietest of office environments.

- Provides the best paper handling for large print runs. All paper input and output is contained inside the cabinet and protected from bumping and contamination.

- Highly effective combination of moveable fences and chains allows for precise stacking all the way up to a full box of paper.

- For tougher forms that tend not to refold well, a SureStak power stacker option is available for the enclosed cabinet models.

- Available in the following print speeds:

  - For P7000 CRP ASCII printers – 500 line per minute, 1000 line per minute, 1500 line per minute, 2000 line per minute and HD models.

  - For H-Series printers – 300 line per minute, 600 line per minute, and 800 line per minute models.

## Pedestal (P70XX or P70XXH)

- The pedestal model has a clamshell design that allows easy access to all controls and easier paper loading.

- Oversized casters are standard making movement easy.

- Versatility to configure the paper path for either top or rear exit.

- Using the top paper exit, this printer is ideal for short print runs and easy access to output.

- Available in the following print speeds:

  - For P7000 CRP ASCII printers – 500 line per minute, 1000 line per minute, 1500 line per minute and HD models.

  - For H-Series printers – 300 line per minute, 600 line per minute, and 800 line per minute models.

## Zero Tear Pedestal (P70XXZT or P70XXZTH)

- Special push tractor configuration enables printing from the very first to the very last line of a form and then tear-off with no forms lost.

- The elimination of wasted forms between jobs can yield significant savings.

- An ideal solution for supply-chain and back-office applications.

- Available in the following print speeds:

  - For P7000 CRP ASCII printers – 500 line per minute, 1000 line per minute, 1500 line per minute and HD models.

  - For H-Series printers – 300 line per minute and 600 line per minute models.

## Order The Correct Spares

When you replace worn or damaged printer components, make sure you order the correct spares for the model you are servicing. The next section shows you how to identify a P7000 Cartridge Ribbon Printer.

## How to Identify a P7000 Cartridge Ribbon Printer

A P7000 CRP has a model number logo and ribbon cartridge logo on the printer front cover. The model number is an alphanumeric code that identifies the printer type, its housing, and its maximum rated print speed. The serial number "C" indicates that this is a cartridge equipped printer. The model number and serial number of the printer are on the identification label next to the input/output ports at the rear of the printer. Figure 1 shows how to inpret a model number.

Housing Code:
**0** = Pedestal
**2** = Floor Cabinet

**H** = H-Series printer
**HD** = High Definition printer
**ZT** = Zero Tear printer

**P**rintronix Line
Matrix Printer

**P7002H**

P7000 CRP Printer

Speed Rating:
02 = 200 lines per minute (lpm)
**03** = 300 lpm
**05** = 500 lpm
**06** = 600 lpm
**08** = 800 lpm
**10** = 1000 lpm
**15** = 1500 lpm
**20** = 2000 lpm
**00** = 133 inches per minute (ipm)

**Figure 1. How to Interpret a Model Number**

The speed of printing for "real world" print jobs is affected by the interaction of many variables and varies from print job to print job. For more information, see "Printing Rates" on page 378.

## H-Series Printers

H-Series models print the ideogrammic symbols used in China, Hong Kong, South Korea, and Taiwan. (See Table 1.) These Kanji/Hanzi/Hangul printers are indicated by the letter H in the model number suffix. (See Figure 1 and Table 1.) H-Series printers have unique shuttle assemblies which are only used in H-Series and HD Series printers. These assemblies are not interchangeable with other Printronix printers.

**Table 1. H-Series Character Sets**

| Character Set | Where Used |
|---|---|
| GB | China |
| BIG-5, with an additional 3000 Cantonese characters | Hong Kong |
| BIG-5<br>TCA<br>DCI (1st and 2nd segments)<br>DCI (3rd segment)<br>CNS | Taiwan |
| KSC 5601 | South Korea |

## HD Printers

HD (High Definition) printers use a Windows printer driver to print in high resolution print quality. HD models print alphabetic character sets as graphic page images instead of in linear character streams. For this reason, the speed of HD printers is measured in inches per minute (ipm) instead of lines per minute (lpm).

## Zero Tear Pedestal (ZTP) Printers

Zero Tear Pedestal (ZTP) printers are models equipped with special hardware and software that permits them to print small jobs or single sheets without losing a sheet between print jobs. A ZTP printer automatically presents the current print line to a tear bar when it finishes printing and presents the perforation of the last form printed to the tear bar. When it receives more data from the host computer, the printer pulls the form down to the print station and resumes printing.

ZTP printers are covered in Appendix E (page 499).

## Printer Configuration Code

Every printer has a configuration code which specifies the printer's cabinet type, controller board revision level, V8 ASIC revision level, and MECA ASIC revision level. The configuration code is included in the configuration printout. Figure 2 shows how to interpret the printer's configuration code.
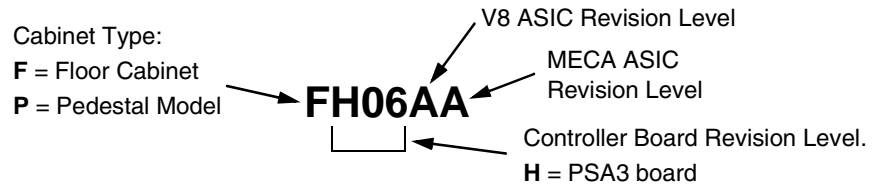


**Figure 2. How to Interpret the Printer's Configuration Code**

## Forms Handling

### Pedestal Models

Pedestal models provide access to printed forms from the top cover with a tear-at-perforation edge for ejected forms or a paper exit at the rear of the top cover. Pedestal printers also have a wireform paper tray attached to the front of the pedestal and a wireform catch basket attached either to the back of the pedestal or to the back of the printer top cover.

### Cabinet Models

Cabinet models can be equipped with four kinds of paper stacking devices:

- The fixed paper fence is a wireform divider that separates the source paper stack from the printed output stack, and is used in combination with hanging chains that guide printed forms downward.

- For improved performance at higher print speeds, the chains are used with a moveable fence called the "passive paper stacker," which can be positioned to match the form's length.

- The front access paper stacker consists of a shelf that holds the input paper and a sliding tray that receives the printed forms. The sliding tray pulls forward, permitting the user to both load and unload paper from the front of the printer. This option is helpful in locations where access to the rear of the printer is limited or impossible.

- For more demanding applications, an optional power stacker is available. (The power stacker is covered in Appendix D on page 449.)

These devices are summarized in Table 2.

**Table 2. Paper Stackers Used On Cabinet Models**

| Printer | Fixed Paper Fence | Passive Paper Stacker | Front Access Stacker | Power Paper Stacker |
|---------|-------------------|-----------------------|----------------------|---------------------|
| P7205 | Standard | Option | Option | Option |
| P7210 | Not Used | Standard | Option | Option |
| P7215 | Not Used | Standard | Option | Option |
| P7220 | Not Used | Standard | Option | Option |

# Important Maintenance Notes

To ensure the best performance of the printer, remember these maintenance principles when you service it. Failure to observe these guidelines can result in damage to the equipment:

- **Do not adjust the platen gap unless**
  1) the original shuttle assembly or platen has been replaced with a new or rebuilt unit, or
  2) you are instructed to do so in a troubleshooting procedure.

- **Never bend or try to adjust ("tweak") the hammer springs.** The hammer springs are precisely aligned and the hammer tips are delicate. Always handle hammer springs by the thick mounting base.

- **Use only the ribbon cartridges specified in the *User's Manual*.** Using ribbon cartridges not made by Printronix can lead to degraded print quality, expensive damage to the printer, and can void the owner's warranty.

- **Never close the forms thickness lever (platen lever) too tightly.** Closing the forms thickness lever too tightly can lead to smeared print, degraded print quality, paper jams, and damage to the platen and shuttle assembly.

## Notices

For your safety and to protect valuable equipment, always read and comply with all information highlighted under notices.

The heading of a notice indicates the kind of information it contains, as explained below:

**WARNING**  **Describes a condition that could hurt you.**

**CAUTION**  **Describes a condition that could damage equipment or data.**

**IMPORTANT**  **Information vital to proper operation and maintenance of the printer.**

**NOTE:** Tips for efficient operation, maintenance, and troubleshooting.

# About this Manual

This is a field service maintenance manual, intended for use by trained service personnel. It is designed so that you can quickly locate the maintenance information you need to restore the printer to operation.

This manual does not explain how to install, operate, or configure the printer. For that information, refer to the *Quick Reference Guide* and the *User's Manual.*

This manual does not explain how to program application software for operation with the printer. Programming information for the printer languages used by the printer is in the appropriate programmer's reference manual:

• *LinePrinter Plus® Programmer's Reference Manual*
  Defines host control codes for the LinePrinter Plus emulations.

• *Character Sets Reference Manual*
  Information about and examples of the character sets available in Printronix line matrix printers.

• *Integrated Network Interface Card User's Manual*
  Information about network protocols, configuration, and network operation.

• *Coax/Twinax Programmer's Reference Manual*
  Defines host control codes and character sets for the optional coax/twinax emulation (CT).

• *ANSI® Programmer's Reference Manual*
  Defines host control codes and character sets for the ANSI emulation.

• *IPDS™ Twinax Emulation Programmer's Reference Manual*
  An overview of Intelligent Printer Data Stream™ (IPDS) features, commands, and diagnostics.

• *IGP®/PGL® Programmer's Reference Manual*
  Describes the optional IGP Printronix emulation. The IGP Printronix emulation allows the user to create and store forms; generate logos, bar codes, and expanded characters; create other graphics, and merge graphics with alphanumeric data as a document is printed.

• *IGP/VGL Programmer's Manual*
  Describes the optional Code V™ Printronix emulation. The Code V Printronix emulation allows the user to create and store forms; generate logos, bar codes, and expanded characters; create other graphics, and merge graphics with alphanumeric data as a document is printed.

• *LQ-1600K Emulation For The P7000 H-Series Of Line Matrix Printers Programmer's Reference Manual*
  Defines the host control codes for the LQ-1600K emulation.

• *KS Programmer's Reference Manual*
  Defines the host control codes for the KS emulation.

• *KSSM Programmer's Reference Manual*
  Defines the host control codes for the KSSM emulation.

## How to Use this Manual

Taking a systematic approach to maintenance tasks will help you restore the printer to operation as quickly as possible:

1. Locate the procedure or information you need in the Table of Contents or Index.

2. Read the entire procedure before you do it.

3. Gather the parts and tools you will need.

4. Make sure you understand all notices before you start a task. (Notices are defined on page 28.)

### Printing Conventions In This Manual

Control panel keys and indicators are highlighted in **UPPERCASE BOLD PRINT**.
Example: Press the **CANCEL** key, then press the **ON LINE/CLEAR** key.

Messages that appear on the LCD (Liquid Crystal Display) are set off by quotation marks (" ").
Example: Press the **ON LINE/CLEAR** key. "OFF LINE" appears on the LCD.

Control panel key combinations are indicated by the **+** (plus) symbol.
Example: Press ▲ **+** ▼.

means press the ⬦ key and the ⬦ key at the same time.

**IMPORTANT** **The Safety Notices on page 31 apply at all times when you are working on the printer. Please read them now.**

# Safety Notices

**WARNING**     **Always disconnect the AC power cord from the printer or power source before performing any maintenance procedure. Failure to remove power could result in injury to persons or damage to equipment. If you must apply power during maintenance, you will be instructed to do so in the maintenance procedure.**

**WARNING**     **Always disconnect the AC power cord before cleaning the printer.**

**WARNING**     **To prevent injury from electric shock, wait at least one minute after shutting off power before removing the power supply circuit board. Wear a properly grounded static wrist strap when handling the power supply board. Handle the board by the sides. Do not touch components or flex the board during removal/installation.**

**WARNING**     **Over time, the upper edge of the paper ironer can become sharp. To avoid cutting yourself, handle the paper ironer on the sides.**

**WARNING**     **Hold the printer cover securely while disengaging the dashpot.**

# Hinweise zur Sicherheit

**VORSICHT**     **Bevor Sie anfällige Wartungsarbeiten durchführen, müssen Sie zuerst immer das Netzkabel aus der Steckdose ziehen. Wird das Netzkabel nicht herausgezogen, können Verletzungen oder Geräteschäden entstehen. Falls die Wartungsarbeit Stromzufuhr erfordert, wird im Wartungsablauf darauf hingewiesen.**

**VORSICHT**     **Ziehen Sie das Netzkabel aus der Steckdose, bevor Sie den Drucker reinigen.**

**VORSICHT**     **Um Verletzungen durch Elektroschocks zu vermeiden, warten Sie mindestens eine Minute nach Stromausschaltung, bevor Sie die elektrische Schaltkarte entfernen. Bitte immer einen geerdeten, statischen Handgelenkriemen tragen, wenn Sie die elektrische Schaltkarte handhaben. Halten Sie die Karte nur an den seitlichen Auswurfshebeln. Während des Herausnehmens/Installierens dürfen die Komponenten der Karte nicht berührt oder gebogen werden.**

**VORSICHT**     **Die obere Kante der Papierschiene wird mit der Zeit scharf. Halten Sie die Schiene deshalb an den Seiten, damit Sie sich nicht schneiden.**

**VORSICHT**     **Behalten Sie die Druckerabdeckung sicher im Griff, wenn Sie das Gasfederpaket entfernen.**

# Controls and Indicators

## Electrical Controls

| Switch or Indicator | Function | Active Online | Active Offline |
|---|---|:---:|:---:|
| Power Switch | Turns printer on and off: 1 = on, 0 = off. This switch is also a circuit breaker. | | |
| Status Indicator | On when the printer is online, off when the printer is offline. Flashes to indicate a fault or warning. | ✓ | ✓ |
| LCD | Liquid Crystal Display. Displays printer status messages, fault messages, and menus which permit user to set various configurations. | ✓ | ✓ |
| ON LINE / CLEAR | Toggles the printer online and offline. Clears the printer after a fault is corrected and returns the printer to offline state. Pressing CLEAR silences the audible alarm (if enabled). | ✓ | ✓ |
| PAPER ADVANCE | Prints any data in the buffer then moves paper to the next Top Of Form as defined by the currently active form length. The first press moves to the top of the next available form. All subsequent presses advances one forms length as defined by the current active forms length. | ✓ | ✓ |
| VIEW / EJECT | **Cabinet**: moves last data printed to the tractor area for viewing. "Printer in View" displays. Press UP or DOWN key to move paper vertically in 1/72 inch increments. (Refer to the Up and Down key functions.) Press VIEW/ EJECT again to move the paper back to the adjusted print position. **Pedestal**: moves bottom of last printed form to the tear bar position. "READY TO TEAR/EJECT TO RETURN" displays. Press UP or DOWN key to move the paper vertically in 1/72 inch increments. (Refer to the Up and Down key functions.) Press VIEW/EJECT again to move the paper to the top of the next available form. | ✓ | ✓ |
| CANCEL | Clears all data from the print buffer (if enabled in the MAINT/MISC menu). **NOTE:** 1. Use of this key will cause loss of data. 2. For OpenPrint products, pressing the CANCEL key advances the paper to the next TOF. | | ✓ |
| ▲ | Displays next higher level of a configuration menu. In VIEW mode, moves paper up 1/72 inch. (See VIEW / EJECT key.) | ✓ | ✓ |
| ▼ | Displays next lower level of a configuration menu. In VIEW mode, moves paper down 1/72 inch. (See VIEW / EJECT key.) | ✓ | ✓ |
| ▶ | Displays the next option in a configuration menu. | | ✓ |
| ◀ | Displays the previous option in a configuration menu. | | ✓ |

| Switch or Indicator | Function | Active Online | Active Offline |
|---|---|---|---|
| SET TOF <br> ⊢--◄ | Moves paper downward from TOF (Top Of Form) alignment mark to the print station and sets this as the first line of print on a page, independent of forms length. If there are data in the buffers, the printer slews to the page position where printing left off and prints the data. | | ✓ |
| PRT CONFIG <br> ▤ | Prints the current printer configuration. | | ✓ |
| JOB SELECT <br> ▥ | Allows selection of the active configuration or print mode (typeface) of the printer. The functionality of this key depends on the current setting of the "Job Select/Print Mode" under the "MAINT/MISC" menu. (Refer to the *User's Manual*.) | | ✓ |
| ENTER <br> ↵ | Enters an option displayed on the LCD into the printer's non-volatile memory. Starts and stops printer tests, sets a value, or prints the configuration. This key is locked and unlocked by a user-selectable key combination. (Refer to the *User's Manual*.) | | ✓ |
| ▲ + ON LINE <br><br> (IPDS emulation only) | When pressed in offline state, if data are in the printer buffer the printer goes online, prints one page, then returns to offline. Can be repeated until the end of a print job. Only one page prints each time you press ▲ + ON LINE. If no data are in the printer buffer, the printer is placed in online mode. (This key combination does not work if the printer is in the fault state.) | | |
| ◀ ▶ | Resets the printer by reloading the power-up configuration and resetting the internal state. | | |

Rotated 180 Degrees

(Off)  (On)

Power Switch

ONLINE     <PGL>
RIBBON LIFE 100%

184071a

Circular Pad

PRT CONFIG

SET TOF

Message Display

Emulation

Status Indicator

JOB SELECT

ENTER

Ribbon Life Indicator

ON LINE/ CLEAR

PAPER ADVANCE

VIEW/EJECT

CANCEL
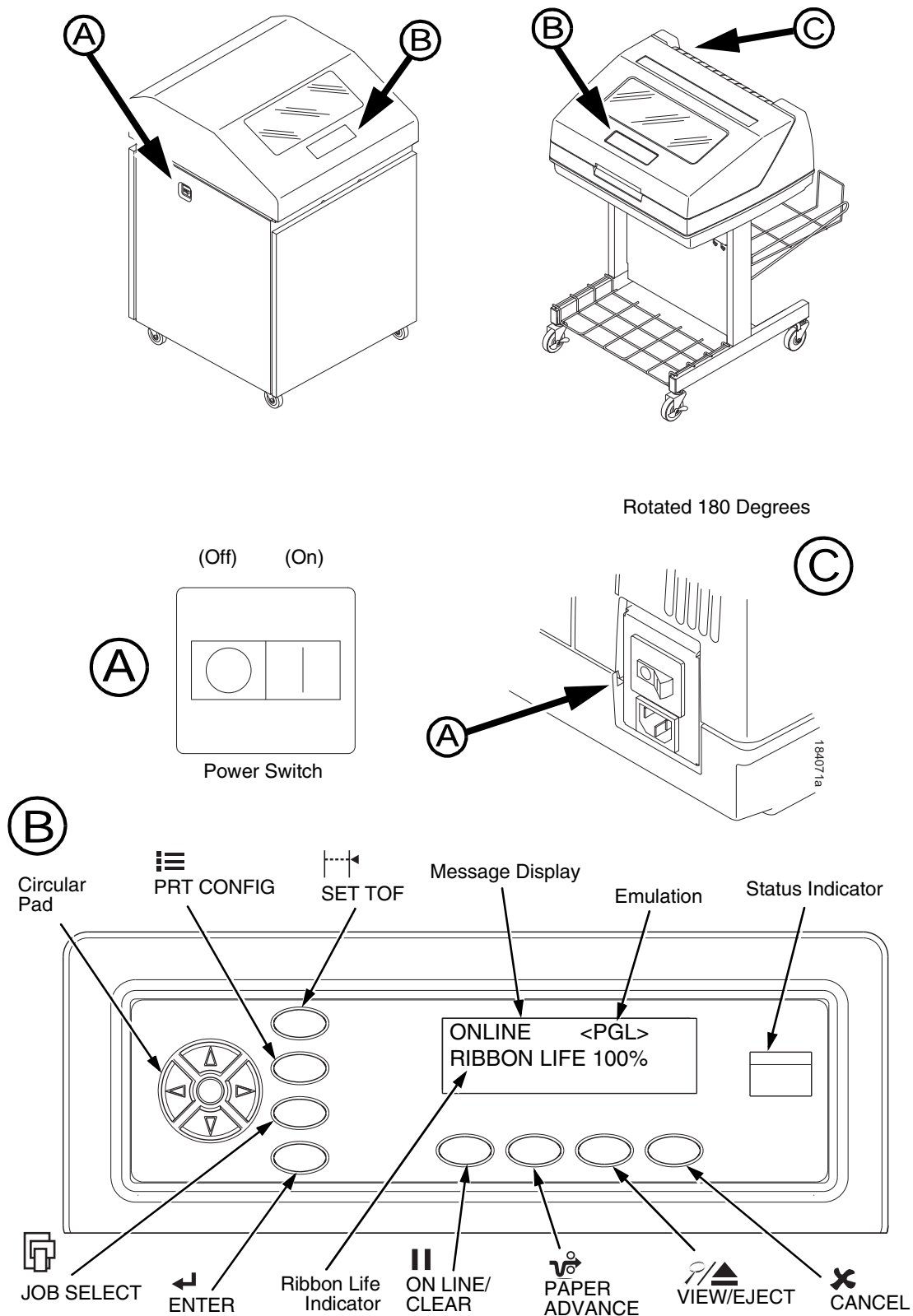
**Figure 3. Electrical Controls**

## Mechanical Controls

| Control or Indicator | Function |
|---|---|
| Paper Supports | Help prevent paper jams by supporting inner sections of paper. They are positioned manually by sliding them along the tractor shafts. |
| Forms Thickness Lever | Sets the platen for paper and forms of different thicknesses. This lever must be fully opened (raised) to load paper, unload paper, and move paper with the vertical position knob. |
| Forms Thickness Pointer and Scale | Indicates the relative thickness of forms and paper. Align pointer with A for thin (single-part) forms, B for thicker forms, and so on. |
| Forms Thickness Lever and Platen Stop Assembly | The forms thickness lever closes the platen to the relative thickness of the paper. The platen stop assembly returns the platen to the lever adjustment made by the user. |
| Tractors (2) | Hold and feed paper. Used to set side margins and position the paper horizontally. |
| Tractor Locks (2) | Lock tractors in position. |
| Vertical Position Knob | Used to set top of form or the first line to be printed. Open the forms thickness lever and rotate this knob to move paper vertically. |
| Paper Scale | A horizontal scale graduated in tenths of an inch, useful for setting paper margins and counting text columns. (See below.) |
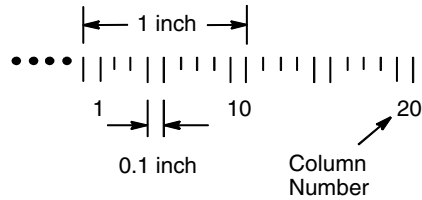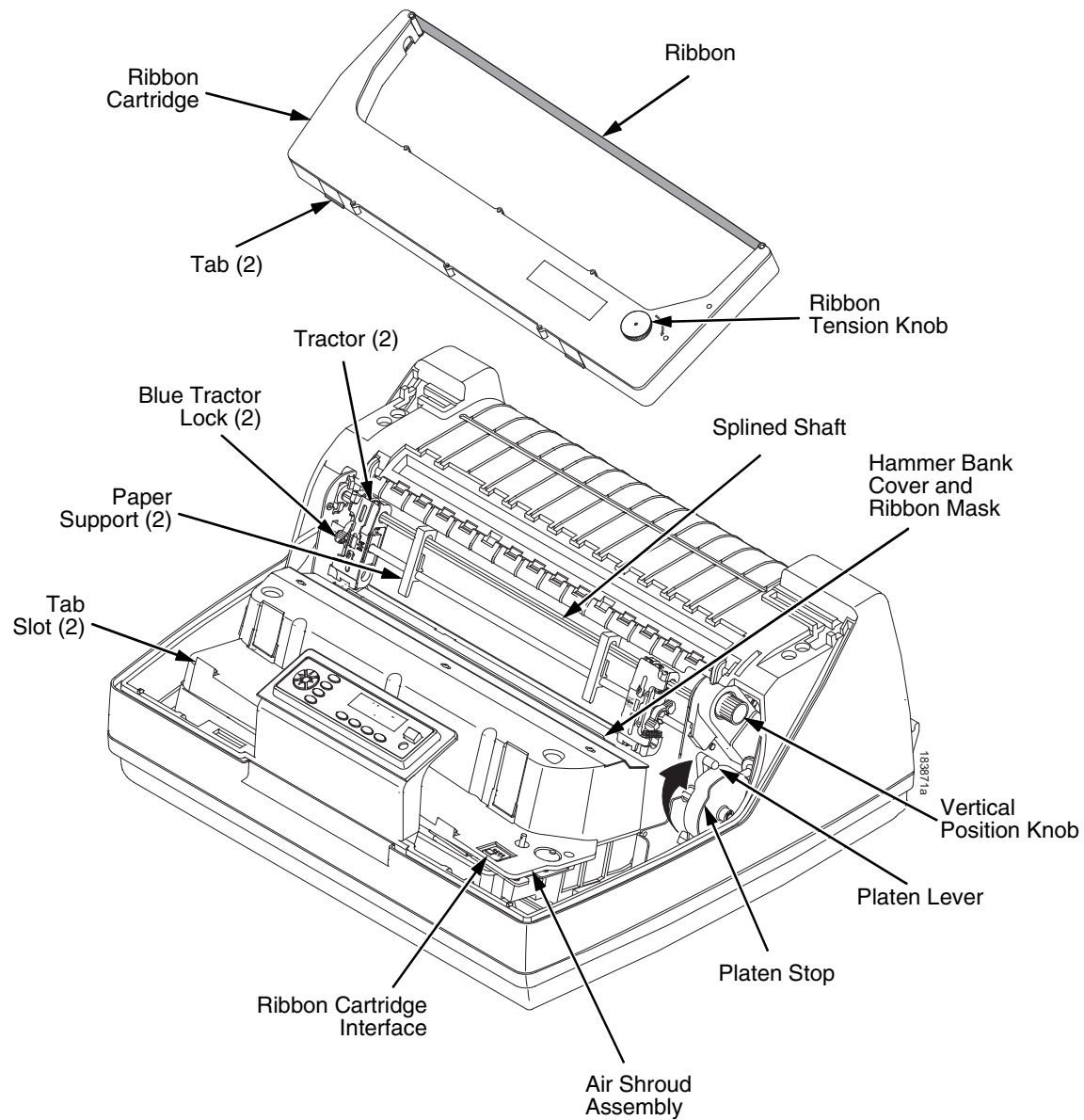
**Figure 4. Mechanical Controls**

# Tools and Test Equipment

For field level maintenance of the printer, you will need these tools:

Adapter, 1/4 in. hex to 1/4 in. square, Utica® HW-18

Alcohol, anhydrous

Allen Wrench, 1/16 inch

Allen Wrench, 3/32 inch

Allen Wrench, 5/32 inch

Allen Wrench, 7/64 inch

Allen Wrench, 5/64 inch

ESD Wrist Strap

Feeler Gauge, Flat, 0.010 inch

Feeler Gauge, Flat, 0.011 inch

Feeler Gauge, Flat, 0.012 inch

Feeler Gauge, Flat, 0.013 inch

Feeler Gauge, Flat, 0.040 inch

Field Kit, Tester, P5 Power Supplies, Generic, (P/N 178083-001)

Force Gauge, (Chatillon™ NY, Gauge-r, 0-20 lb., CAT 719-20)

Force Gauge, "Fish Scale" type, 0-16 oz.

Hardware Kit, P5XXX Mech, ZTP (P/N 178573-001)

Hex bit, 3/16 in., torque screwdriver

Hex bit, 3/32 in., torque screwdriver

Hex bit, 5/32 in., torque screwdriver

Hex bit, 5/64 in., torque screwdriver

Lubricant, Bearing (Printronix P/N 101805-001)

Nut Driver, 1/4 inch

Nut Driver, 5/16 inch

Nut Driver or Open End Wrench, 7/32 inch

Open End Wrench, 5/16 inch

Pliers, Grip Ring, External

Screwdriver, flat tip

Screwdriver, Phillips, #1

Screwdriver, Phillips, #2

Screwdriver, Torque, Utica TS-35

Shuttle Stabilizer Tool (P/N 255447-001)

Tie Wraps, 4 inch and 8 inch

Torx® T-10, T-15 Driver

# Plugging in the Printer

## Power Cord Requirements

In compliance with international safety standards, a P7000 CRP is equipped with a three-pronged electrical plug on the power cord. When this power cord is plugged into a correctly wired AC power outlet, the ground conductor ensures that the printer chassis is at ground (earth) electrical potential.

**WARNING**　　**Failure to properly ground the printer can result in electrical shock to the operator.**

**Never use adapter plugs that have no grounding prong. Never remove the grounding prong from the power cable plug. If an extension cord is required, make sure it is a three-wire cable with a properly grounded plug.**

## Interface Cable Requirements

To comply with Electromagnetic Compatibility (EMC) regulatory requirements all interface cables must be of a minimal quality level, be the correct length, and be properly installed.

RS-232 port and parallel port cables must meet the following specifications:

- The cable design must be double shielded with a copper braid over an aluminum mylar foil and not just a conductive foil spiral wrapped around a drain wire.

- The shield must terminate coaxially (360 degrees) to a metal connector housing and not be terminated by just a simple wire lead.

- Cable length, including connectors, must be three meters or less.

- The cable connector anchor screws must be securely seated in the printer receptor hardware.

For reference purposes only, two Centronics parallel port cables that have been tested and found to comply with these requirements are a Belkin® P/N F2A046-10 and a Primelogic P/N PLU 2823224. Other electrically equivalent cables are acceptable.

# Printronix Customer Support Center

The Printronix Customer Support Center offers technical support with:

- Installation

- Configuration and setup

- Loading supplies and operating the printer

- Specifications of the proper ribbons, forms, and paper

- Answers to post-sale service support questions

**IMPORTANT**  **Please have the following information available before you call the Printronix Customer Support Center:**

- Model number of the printer

- Serial number (located on the back of the printer)

- Installed options (i.e., interface and host type if applicable to the problem)

- Configuration printout (Press **PRT CONFIG** on the control panel, then press **ENTER**)

- Is the problem with a new installation or an existing printer?

- Description of the problem (be specific)

- Good and bad samples that clearly show the problem (faxing or emailing these samples may be required)

| | |
|---|---|
| Americas | (714) 368-2686 |
| Europe, Middle East, and Africa | (31) 24 6489 311 |
| Asia Pacific | (65) 6548 4114 |
| China | (86) 800-999-6836 |

http://www.printronix.com/support.aspx

## Printronix Supplies Department

Contact the Printronix Supplies Department for genuine Printronix supplies.

| | |
|---|---|
| Americas | (800) 733-1900 |
| Europe, Middle East, and Africa | 33 (0) 1 46 25 19 07 |
| Asia Pacific | (65) 6548 4116 or (65) 6548 4182 |
| China | (86) 400-886-5598 |

http://www.printronix.com/supplies-parts.aspx

# Maintenance Training for Printronix Products

Upon request Printronix offers Product Maintenance Training Classes designed to enhance the knowledge of service personnel. Taught by experienced professional instructors, these classes include:

- Theory of operation
- Hands-on work with the products
- Diagnosis of equipment failures
- Preventive and corrective maintenance requirements and procedures

Customized classes designed to meet specific needs are also available upon request. Call Customer Training at (714) 368-2595 or visit the Printronix web page at **www.printronix.com**.

# 2 | *Preventive Maintenance*

## Cleaning the Printer

The printer is designed to require very little maintenance. Aside from normal replenishment of paper and ribbons, the only preventive maintenance necessary is periodic cleaning. Clean the printer every six months or after every 1000 hours of operation, whichever occurs first. If the printer is located in a dusty area or is used for heavy duty printing, clean it more often. Periodic cleaning, especially of the ribbon path, contributes to increased printer life and reliability, and helps sustain superior print quality.

Because operating conditions vary so widely, the user must determine how often to clean the printer. But, since there is no guarantee that the user will clean the printer regularly, you should clean the printer every time you are called to service it.

**NOTE:** A cabinet model printer is illustrated in this chapter, but the cleaning procedures presented here pertain to all models.

**WARNING** **Always disconnect the AC power cord before cleaning the printer.**

**CAUTION** **Do not use abrasive cleaners, particularly on the window.**
**Do not drip water into the printer. Damage to the equipment will result.**
**Do not spray directly onto the printer when using spray solutions. Spray a cloth, then apply the dampened cloth to the printer.**
**Do not vacuum circuit boards.**

### Cleaning the Exterior

1. Power off the printer.
2. Disconnect the AC power cord from the power source.
3. Wipe the outside of the enclosure with a clean, lint-free cloth dampened (not wet) with water and a mild detergent or window cleaning solution.
4. Dry the enclosure with a clean, lint-free cloth.
5. Clean the inside of the printer, as described on page 42.

## Cleaning the Interior

1. Power off the printer and unplug the printer power cord.

2. Open the printer cover.

3. Fully raise the platen lever.

4. Unload the paper.

5. Remove the ribbon cartridge.

6. Lift the ribbon out of the ribbon path.

7. Brush the paper dust and ribbon lint off the tractors, shuttle cover assembly, and base casting with a soft-bristled, non-metallic brush (such as a toothbrush). Vacuum up the residue. (See Figure 5.)

**CAUTION** **Vacuum carefully around the hammer bank and surrounding area to avoid damage. To avoid corrosion damage, use only alcohol when cleaning the printer mechanical elements. Solutions used to clean mechanical elements must contain no water.**

8. Wipe the splined shaft with a soft cloth.

9. Check the ribbon mask and hammer bank cover for bits of torn paper or ribbon lint.

10. Remove dust and ink from the platen using a soft cloth lightly moistened with anhydrous alcohol [1]. (The platen is the thick silver bar behind the hammer bank cover that rotates when the platen is rotated).

**CAUTION** **When cleaning the platen, be very careful not to get any alcohol in the hammer bank, because alcohol will cause severe damage to the hammer bank. Only a trained service technician should clean the shuttle assembly.**

11. For cabinet models:

    a. Brush and vacuum the accumulated dust or residue inside the lower cabinet.

    b. Wipe the lower cabinet interior with a clean, lint-free cloth dampened (not wet) with water and mild detergent or window cleaning solution. Dry the lower cabinet interior by wiping it down with a clean, lint-free cloth.

12. Install the ribbon, load paper, and set the top–of–form. Refer to the *Quick Reference Guide.*

13. Clean the shuttle frame assembly (page 44).

[1] Due to water content in most isopropyl alcohol products, 99% alcohol is required. A lower percentage of alcohol will cause internal components to rust. We recommend MG Chemical Isopropyl Wipes, Product #824-W. Refer to www.mgchemicals.com for product details.

Ribbon

Ribbon
Cartridge

Ribbon
Tension Knob

Tab (2)

Ribbon Turn
Direction Arrow

Tractor (2)

Blue Tractor
Lock (2)

Splined Shaft

Hammer Bank
Cover and
Ribbon Mask

Paper
Support (2)

Tab
Slot (2)

Base
Casting

Vertical
Position Knob

Platen Lever

Platen Stop

Ribbon Cartridge
Interface

Shuttle Cover
Assembly
(Air Shroud)

183871a
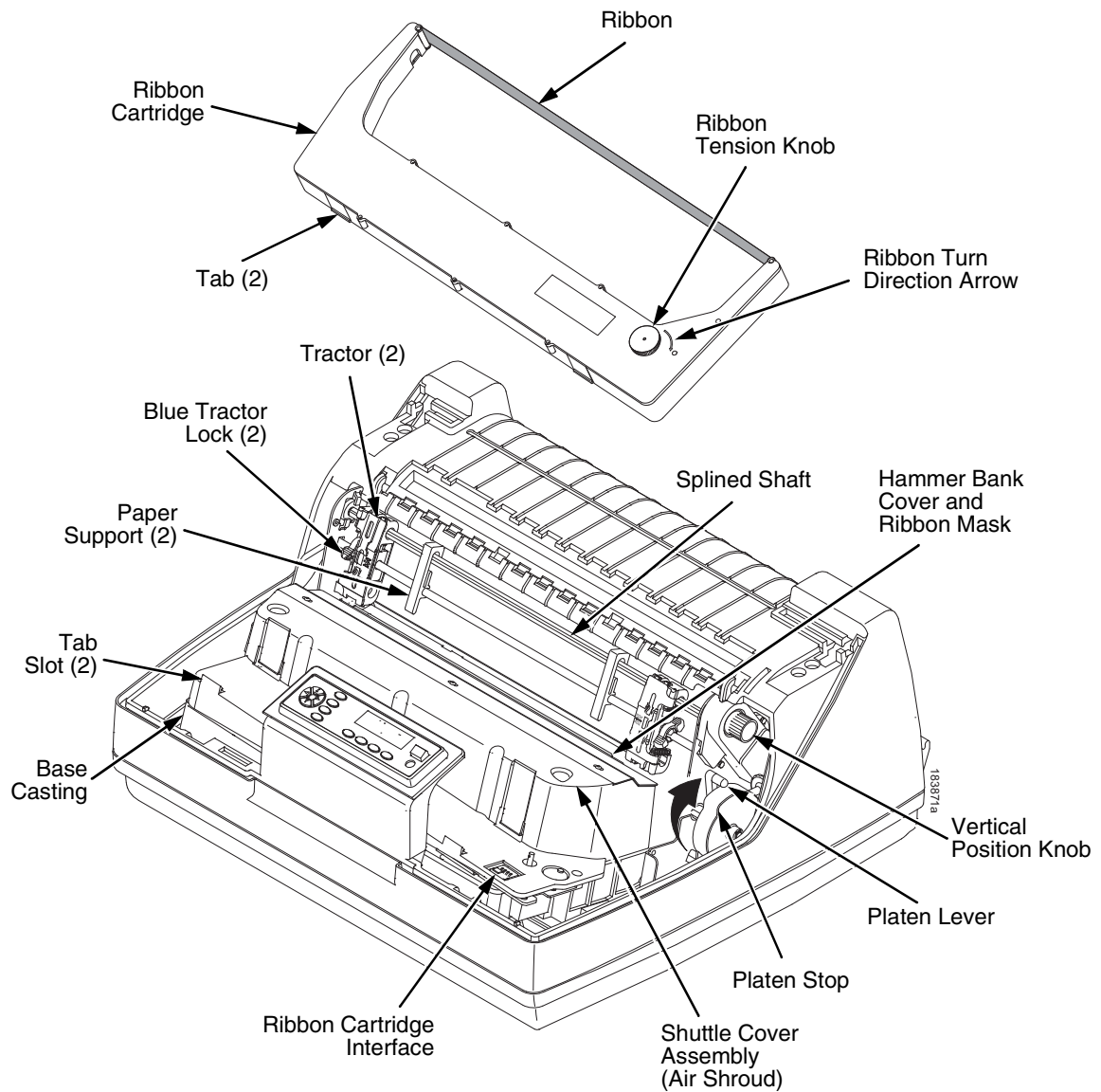
**Figure 5. Printer Interior Components**

# Cleaning the Shuttle Frame Assembly

**NOTE:** To help steady the shuttle, be sure to obtain a shuttle stabilizer tool, P/N 255447-001 (see Figure 38 on page 328).

1. Prepare the printer for maintenance (page 242).

2. Remove the ribbon cartridge and paper. (Refer to the *User's Manual.*)

3. Unlock and slide the tractors outward as far as they will go on the tractor support shaft. Leave the tractor doors open.

4. Remove the air shroud to expose the shuttle assembly.

5. Disconnect the shuttle logic, data, power, and MPU connectors.

6. Loosen and disengage the left and right shuttle retaining clamps.

7. Loosen the rear shuttle mounting screw and carefully lift the shuttle free of the printer, and set it on the shuttle stabilizer tool (P/N 255447-001), on a clean, level work surface.

**NOTE:** Since the paper ironer is now accessible, it can be cleaned with the following three steps.

**WARNING** **Over time, the upper edge of the paper ironer can become sharp. To avoid cutting yourself, handle the paper ironer on the sides.**

8. Remove the paper ironer (page 310).

9. Wipe the paper ironer with a soft cloth to remove lint, ink, and paper residue.

10. Install the paper ironer (page 310).

**CAUTION** **The thin plate (ribbon mask) of the hammer bank cover assembly is fragile. Do not over-bend or kink the ribbon mask when handling and cleaning the hammer bank cover assembly.**

**WARNING** **Do not rub the edges of the mask and cover as they can be sharp.**

11. Remove the hammer bank / ribbon mask cover assembly (page 290).

**IMPORTANT** **Do not bend the ribbon mask when cleaning between the cover and mask.**

12. Using a clean soft cloth, wipe the hammer bank cover and ribbon mask to remove lint, ink, and paper residue. Clean the holes in the cover strips. Carefully wipe between the hammer bank cover and the ribbon mask.

**NOTE:** Due to evaporation, do not open alcohol packets until they are required for cleaning.

13. Use the brush provided to clear any debris from the outside of the ribbon mask and cover plate. Use one or more of the alcohol pads to clean all surfaces of the hammerbank cover assembly, removing ink residue and debris.

14. Set the clean hammerbank cover assembly aside for later reassembly.

**CAUTION** **Do not use solvents or liquids to clean the hammer tips. Clean the hammer tips gently; too much pressure can chip them.**

15. Place the shuttle so that the base sits flat on the work surface. Use the brush provided to remove as much debris as possible from the hammer tips, brushing in a downward direction (Figure 6.). Rotate the shuttle 90° away from you and repeat the brushing this time working from the center of the shuttle outward towards both ends.

**NOTE:** Only remove the frets if contamination is affecting print quality. Study the procedure first to understand how you will align and re-install the frets. Tools are available to aid this process for certain frets.
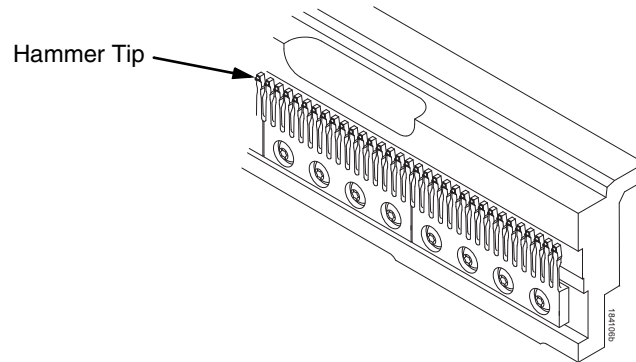
Hammer Tip

**Figure 6. Cleaning the Hammer Tips**

**CAUTION**    **Do not use liquid cleaners of any kind or metal tools of any kind when removing or cleaning the frets. Due to water content in most isopropyl alcohol products, 99% alcohol or higher is required. Do not use alcohol with high water content as the water could later cause corrosion.**

**The hammer bank contains a strong magnet. To prevent damage to the hammer tips, do not let the hammer bank cover assembly snap into place as the hammer bank magnet attracts it. Any impact of the cover against the hammer bank can break hammer tips.**

16. Use tape or a nonabrasive marker or pencil to mark the location of each fret in relation to the counter balance.

17. Remove the fret mounting hardware and set aside for later reassembly.

18. Remove the frets from the shuttle and set aside for later reassembly.

19. Use the brush to remove any remaining debris from the spring mounting surface and pole pin areas of the shuttle.

20. Use an alcohol pad to remove any remaining debris from these areas of the shuttle.

21. Before reinstalling the frets, brush the back side of the tines in the direction of the tines with the brush provided to remove any debris clinging to the tines.

22. For P7000 CRP nonflat product reinstall the frets in the appropriate locations using a wood or plastic tool to seat them against the locating pins.

    For P7000 CRP flat shuttles use the appropriate alignment tool from Table A to align the frets in the appropriate location and torque in place using a 14 inch pound driver and #10 Torx bit.

**Table 3. Hammer Tip Alignment Tool Kits**

| Part Number | Description |
|---|---|
| 253648-901 | Hammer Tip Alignment Field kit P7x05/-12/P7X02H |
| 253649-901 | Hammer Tip Alignment Field kit P7x10/P7X03H |
| 253650-901 | Hammer Tip Alignment Field kit P7x15/P7X06H |
| 253651-901 | Hammer Tip Alignment Field kit P7x20/P7X08H |

23. Reinstall the hammerbank cover assembly (page 290) insuring that it is properly seated over the mounting pins.

24. Reinstall the shuttle into the printer using a 25 inch pound driver and 5/32 hex bit.

25. Install the shuttle cover assembly (page 291).

26. Return the printer to normal operation (see page 243).

27. Set the platen gap as appropriate.

28. Run a test print to verify that the print quality is acceptable.

# Cleaning the Card Cage Fan Assembly

1. Cabinet Models: Remove the paper path (page 311).
   Pedestal Models: Remove the top cover assembly (page 292).

2. Vacuum the card cage fan assembly and surrounding areas to remove paper particles, dust, and lint. (Figure 7.)

3. Install the ribbon.

4. Cabinet Models: Install the paper path (page 311)
   Pedestal Models: Install the top cover assembly (page 292).

5. Return the printer to normal operation (page 243).

**NOTE**: A cabinet model is shown here, but the procedure is the same for pedestal models.

Card Cage Fan

183925a
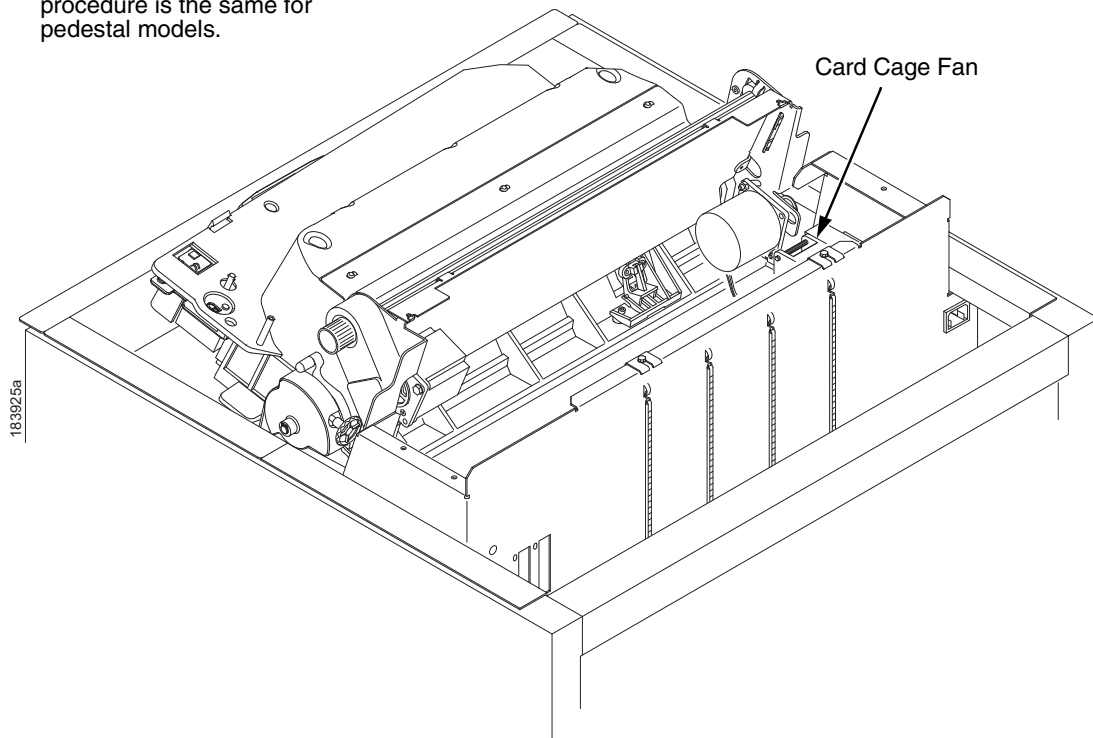
**Figure 7. Cleaning the Card Cage Fan Assembly**

# 3 | *Troubleshooting*

## Introduction

This chapter lists fault messages and general symptoms, and provides procedures for troubleshooting printer malfunctions.

**NOTE:** Because you must operate the printer to check its performance and sometimes you may have to reconfigure it, always have the *User's Manual* handy when you troubleshoot. This manual does not cover printer operation or configuration.

## Troubleshooting Aids

Troubleshooting is faster and more effective if you understand the equipment and make use of all available tools.

This manual has a number of troubleshooting aids to help you isolate printer malfunctions:

# Start Here...

Are you here because of an error message? **YES** ▶ Go to **Troubleshooting Display Messages**, page 51.

**NO** ▼

Power on the printer and observe the control panel for the following sequence of events (retry as required):
1. All black squares appear on the display.
2. Display goes blank.
3. The following messages appear on the display, in this order:

B00 STATUS: SDRAM DETECTION 33MHZ

B01 STATUS: 8245 SDRAM TEST 32MB

B51 STATUS: XX% LOADING

B30: STATUS INITIALIZING...

Power on the printer. Did steps 1, 2, and 3 occur? **YES** ▶

After about 10 seconds did the fans come on? **YES** ▶ Did the status indicator lamp come on and ONLINE appear on the display? (If default is OFFLINE, status indicator will not come on.) **YES** ▶ Printer initialized successfully. Other symptoms are listed in Table 6 page 197.

**NO** ▼

**NO** ▼

Go to **Printer does not initialize**, page 203.

**NO** ▼

Did the fans come on after 10 seconds? **YES** ▶ Press **ON LINE**. Press **PRT CONFIG**. Press **ENTER**. Does machine configuration print? **YES** ▶ Go to the **Control Panel** section of Table 6 page 197.

**NO** ▼

**NO** ▼

The **Control Panel** is not functioning (Table 6 page 197) —OR— **Printer does not initialize**, page 203.

Did ANY of steps 1 thru 3 occur? **YES** ▶ Are there black squares on the control panel? **YES** ▶ Go to **Black squares on control panel display**, page 200.

**NO** ▼

**NO** ▼

Go to **No power, and control panel is blank, and card cage fan is not running**, page 202.

Go to **Printer does not initialize**, page 203.

# Troubleshooting Display Messages

**WARNING** **Always disconnect the AC power cord from the printer before doing a maintenance procedure. Failure to do so could result in injury to you or damage to equipment. If you must apply power during maintenance, you will be instructed to do so in the maintenance procedure.**

Three kinds of messages appear on the Liquid Crystal Display (LCD):

- Status messages
- Configuration menus with associated options
- Fault messages

Most fault messages are cleared from the LCD by correcting the fault condition then pressing the **CLEAR** key.

Some fault messages can only be cleared by shutting down and restarting the printer. These fault messages are indicated by an asterisk (*) after the message.

If printer logic circuits detect a fault condition, three things happen:

- The status indicator on the control panel flashes on and off.
- The audible alarm beeps if it is enabled. (Press **CLEAR** to silence the alarm.)
- The control panel LCD displays a fault message.

# List Of Messages

Find the message in the **Message List** below and follow the suggested procedure. After correcting an error, press the **CLEAR** key to clear the message and place the printer in the offline state.

If an error is not cleared, the printer will try to print again but will display the error message until the error is cleared.

## P7000 CRP

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| 06 HOST REQUEST | Status message: in the CT emulation, the host computer or printer controller requires attention. | Not a printer problem. |
| 08 HOLD PRINT TIMEOUT | Status message: in the CT emulation, the printer was offline more than 10 minutes and the "Intervention Required" parameter is set to "Send to Host." | Press **ON LINE**. |
| 8.5V POWER FAIL * | 8.5 Volt Power Failed. Internal power failure. | 1. Cycle power. If the message appears, do the power supply operational check (page 274). If the power supply fails the check, replace it. If it passes the check, go to the next step. |
|  |  | 2. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |
|  |  | 3. Power on the printer. If the message appears, replace the shuttle frame assembly. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| 15 COMM CHECK | Communication Check: a message that appears in the CT emulation meaning the line is not active on a twinax interface. | 1. Power off the printer. Reseat the twinax host data cable connection and twinax I/O cable connection at the CT board.<br><br>2. Disconnect the twinax auto-termination cable from the printer. Test the cable for the resistances shown in Appendix A. If the resistances are incorrect, replace the twinax auto-termination cable.<br><br>3. Power on the printer. Send a print job to the printer. Verify that all other devices on the twinax line are working properly. (Refer to line problem determination procedures, as recommended by the host system.)<br><br>4. If the message is gone, the host has reestablished communication with the printer. If all other twinax devices work properly and the message still appears, replace the CT board. Record the message and return it with the defective board. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| 15V CTL FAIL* | Controller Voltage Failure. | 1. Cycle Power. Run the print job again. If the message appears, remove the hammer bank logic cable, inspect it for damage, and test it for continuity. (See Appendix A.) Replace the hammer bank logic cable if it is damaged or fails the continuity test.<br><br>2. Cycle Power. Run the print job again. If the message appears, download the emulation software again (page 257).<br><br>3. Cycle power. Run the print job again. If the message appears, replace the flash memory.<br><br>4. Power on the printer. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board.<br><br>5. Power on the printer. Run the print job again. If the message appears, do the power supply operational check (page 274). If the power supply fails the check, replace it. If it passes the check, go to the next step.<br><br>6. Power on the printer. If the message appears, replace the shuttle frame assembly. |
| 22 INVALID ADDR | Invalid Address: poll time-out on the twinax interface indicating the unit address is not recognized by printer. | Have the system administrator make sure the printer address is correct. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| 23.5V CTL FAIL* | 23.5 Volt Controller Failed: a voltage failure on the controller board. | 1. Cycle Power. Run the print job again. If the message appears, download the emulation software again (page 257). |
| | | 2. Cycle power. Run the print job again. If the message appears, replace the flash memory. |
| | | 3. Power on the printer. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| | | 4. Power on the printer. Run the print job again. If the message appears, do the power supply operational check (page 274). If the power supply fails the check, replace it. If it passes the check, go to the next step. |
| | | 5. Power on the printer. If the message appears, replace the shuttle frame assembly. |
| 31 PAPER OUT TIMEOUT | In the CT emulation with a coax interface, a time-out message is sent to the host if paper is not loaded within 10 minutes after **CLEAR** was pressed to clear a paper out fault. | 1. Load paper. Run a print test. If the message appears, replace the paper detector switch assembly. |
| | | 2. Run a print test. If the message appears, replace the controller board. Record the message and return it with the defective board. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| 32 PAPER JAM TIMEOUT | In the CT emulation with a coax interface, a time-out message is sent to the host if paper motion has not occurred for 10 minutes after **CLEAR** was pressed to clear a paper jam fault. | 1. Clear the paper jam. Press **CLEAR**.<br>2. Press **PAPER ADVANCE** several times and check that forms feed without erratic motion, noise, or pin-hole damage. If forms do not feed, go to **Paper feeds poorly**, page 214. If forms feed, go to step 3.<br>3. Press **VIEW** once and check that forms move up. Make sure the forms thickness lever is not set too tightly.<br>4. Press **VIEW** again and check that the forms thickness lever rotates and the paper moves down. If the forms thickness lever does not rotate and/or the paper does not move down, refer to **Reverse paper feed: platen does not open**, page 216.<br>5. Check the paper tension between the tractors. Adjust the right tractor so that it does not pull paper too tightly or leave it too loose. The right tractor should hold the paper under slight tension.<br>6. Check the dynamic paper tension.<br>7. Inspect the ribbon mask for bends or deformation that block the paper path or prevent paper from exiting the pedestal top cover. Replace a damaged hammer bank cover assembly.<br>8. Check the condition and tension of the platen open belt. Adjust the platen open belt. Replace the belt if it is damaged. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| 32 PAPER JAM TIMEOUT (continued) | | 9. Inspect the tractors and tractor door springs for damage, excessive wear, and equal door closing tension. If either tractor is worn, damaged, or exhibits uneven door closing tension, replace both tractor assemblies. |
| | | 10. Check the condition and tension of the paper feed belt. Adjust the paper feed belt. Replace the belt if it is damaged. |
| | | 11. Check the platen gap. Adjust the platen gap if necessary. |
| | | 12. Clean the paper motion detector with a cotton swab and alcohol. At the control panel, set the paper motion detector (PMD) fault setting to DISABLE. Load paper. Run a print test and observe how the paper feeds. If the message appears, replace the controller board. Record the message and return it with the defective board. If the message does not appear, replace the paper detector switch assembly and set the paper motion detector (PMD) to ENABLE. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| 33 PLATEN OPEN TIMEOUT | In the CT emulation with a coax interface, the forms thickness lever has been open for at least one minute. | 1. Load paper. Close the forms thickness lever. Press **CLEAR.**<br><br>2. Run a print test. If a platen open or close platen message appears, power off the printer. Remove the paper path or pedestal top cover. Disconnect connector P107 from the controller board. Check continuity of the platen interlock switch cable from P107 to the switch. Replace the platen interlock switch assembly if it fails continuity test.<br><br>3. Run a print test. If a platen open or close platen message appears, replace the controller board. Record the message and return it with the defective board. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| 34 RIBBON STALL TIMEOUT | In the CT emulation with a coax interface, the ribbon has not moved for 10 minutes after **CLEAR** was pressed to clear the ribbon drive fault. | 1. Set the forms thickness lever to match the thickness of the paper being used, but not too tightly.<br><br>2. Inspect the ribbon guides for ink buildup, which can inhibit ribbon movement. Clean the printer.<br><br>3. Inspect the hammer bank cover/ribbon mask for bending or damage. Replace if bent or damaged.<br><br>4. Check the platen gap: if too small, it can inhibit ribbon movement. Adjust the platen gap.<br><br>5. Power off the printer. Remove the paper path or pedestal top cover. Disconnect P106 and P107 from the controller board. Check the resistance of LRIB M in P106 and RRIB M in P107. (Refer to the Main Wire Harness Test Tables in Appendix A.) If ribbon motor resistance is not correct, replace the motor. If the resistance is correct, disconnect the ribbon motor cables from the motors and check continuity. Replace a cable if it fails the continuity test.<br><br>6. Power on the printer. Run a diagnostic print test. If the RIBBON STALL message appears, replace the controller board. Record the message and return it with the defective board. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| 48V CIRCUIT*<br>See User Manual | Either the power supply is not generating a proper 48 Volts or the controller board is not detecting a 48 Volt output from the power supply board. | 1. Make sure the power supply board is correctly connected to the controller board.<br><br>2. Power on the printer. If the message appears, do the power supply operational check (page 274). If the power supply fails the check, replace it. If it passes the check, go to the next step.<br><br>3. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| 48V CHECK* | 48 Volt Power Failed: an internal power failure. | 1. Power off the printer. Remove the paper path or pedestal top cover. Check that power supply connector P101 is fully seated in connector J101 on the controller board.<br><br>2. If the printer has the CT board, make sure it is correctly seated in the controller board.<br><br>3. Power on the printer. If the message appears, replace the hammer bank logic cable assembly (P108) and the power cable assembly (P105). (Refer to Appendix A.)<br><br>4. Power on the printer. If the message appears, do the power supply operational check (page 274). If the power supply fails the check, replace it. If it passes the check, go to the next step.<br><br>5. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board.<br><br>6. Power on the printer. If the message appears, replace shuttle frame assembly. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| 48V PWR FAIL* | 48 Volt Power Failed: an internal power failure. | 1. Power off the printer. Remove the paper path or pedestal top cover. Check that power supply connector P101 is fully seated in connector J101 on the controller board.<br><br>2. If the printer has the CT board, make sure it is correctly seated in the controller board.<br><br>3. Power on the printer. If the message appears, replace the hammer bank logic cable assembly (P108) and the power cable assembly (P105). (Refer to Appendix A.)<br><br>4. Power on the printer. If the message appears, do the power supply operational check (page 274). If the power supply fails the check, replace it. If it passes the check, go to the next step.<br><br>5. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board.<br><br>6. Power on the printer. If the message appears, replace shuttle frame assembly. |
| A TO D OVERRUN* | Analog to Digital Overrun. The analog-to-digital converter overflowed. | Cycle power. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| ACCESS NULL PTR* | Access Null Pointer: The processor tried to access a pointer that contains nothing (null). | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again (page 257).<br><br>2. Cycle power. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| ACTIVATE LOST | The printer detects a twinax protocol communication error and reports the error. | 1. Power off the printer. Disconnect the AC power cord from the printer. Reseat the twinax host data cable connection and the twinax I/O cable connection at the CT board.<br><br>2. Disconnect the twinax auto-termination cable from the printer. Test the cable for the resistances shown in the Main Wire Harness Test Tables in Appendix A. If resistances are not correct, replace the twinax auto-termination cable.<br><br>3. Connect the power cord to the printer. Power on the printer. Send a print job to the printer. If the message appears, replace the twinax cable.<br><br>4. Send a print job to the printer. If the message appears, go to **Communications Failures**, page 220. |
| B00 STATUS: SDRAM DETECTION 166MHZ | Status message: the printer has begun its boot-up routines and is checking for the presence of SDRAM. | No action required. |
| B01 STATUS: 8245 SDRAM TEST 32MB | Status message: printer boot-up routines are testing SDRAM. | No action required. |
| B02 STATUS: SDRAM PASSED | Status message informing the operator that the printer finished testing SDRAM. | No action required. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| B10 ERROR: NO DRAM DETECTED* | Boot-up routines did not detect the presence of the SDRAM DIMM. | 1. Cycle power. If the message appears again, power down and check that there is an SDRAM DIMM installed on the controller board. If not, install the SDRAM. If so, reseat the SDRAM DIMM.<br><br>2. Power up the printer. If the message appears, replace the SDRAM DIMM.<br><br>3. Power up the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| B11 ERROR: RAM TEST FAILED* | SDRAM failed the boot initialization test. | 1. Cycle power. If the message appears again, reseat the SDRAM DIMM.<br><br>2. Power up the printer. If the message appears, replace the SDRAM DIMM.<br><br>3. Power up the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| B12 ERROR: PROGRAM MISSING* | The printer does not see a program in flash memory. | There is no program in printer memory. Download an emulation. |
| B13 ERROR: NOT COMPATIBLE* | The printer is not compatible with the downloaded program. | Load the correct emulation software option(s) for this printer. |
| B19 ERROR: DC RETURNED* | This message indicates an incorrectly assembled and tested machine. | Cycle power. If the message appears again contact the printer manufacturer and report this message. |
| B20 STATUS: 00% DOWNLOAD MODE | Status message informing the operator that software is being downloaded through the printer's parallel port using the three-key download activation (page 260). The percentage indicates the approximate amount loaded into the printer. | No action required. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| B21 STATUS: PRINTER RESET | Status message informing the operator that the printer is undergoing a system reset. | No action required. |
| B22 ERROR: DECOMPRESS SIZE* | Flash memory has not passed boot initialization tests. | 1. Cycle power. If the message appears again, reseat the flash SIMM.<br>2. Power on the printer. If the message appears, replace the flash SIMM.<br>3. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| B23 ERROR: DECOMPRESS CKSUM* | Flash memory has not passed boot initialization tests. | 1. Cycle power. If the message appears again, reseat the flash SIMM.<br>2. Power on the printer. If the message appears, replace the flash SIMM.<br>3. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| B30 STATUS: INITIALIZING... | Status message: the printer is running its initialization routines after startup and successful memory tests. | No action required. |
| B35 STATUS: WAITING FOR EC STATUS | Status message: the DC on the controller board is waiting for communication with the EC. If this message does not clear within a few seconds there is an electrical or electronic problem on the controller board. | Cycle power. If the message appears again, replace the controller board. Record the message and return it with the defective board. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| B40 ERROR: SDRAM EEPROM CKSUM BAD* | Flash memory has not passed boot initialization tests. | 1. Cycle power. If the message appears again, reseat the flash SIMM.<br>2. Power on the printer. If the message appears, replace the flash SIMM.<br>3. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| B41 ERROR: DIMM MEMORY NOT SDRAM* | The DRAM DIMM installed on the controller board is not Synchronous DRAM (SDRAM). | 1. Cycle power. If the message appears again, reseat the SDRAM DIMM.<br>2. Power on the printer. If the message appears, install a new SDRAM DIMM of the correct type and size.<br>3. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| B42 ERROR: SDRAM ROWS NOT ALLOWED* | Printer boot initialization tests detect incorrect SDRAM. | 1. Cycle power. If the message appears again, reseat the SDRAM DIMM.<br>2. Power on the printer. If the message appears, install a new SDRAM DIMM of the correct type and size.<br>3. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| B43 ERROR: SDRAM TOO MANY BANKS* | Printer boot initialization tests detect incorrect SDRAM. | 1. Cycle power. If the message appears again, reseat the SDRAM DIMM.<br><br>2. Power on the printer. If the message appears, install a new SDRAM DIMM of the correct type and size.<br><br>3. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| B44 ERROR: SDRAM NOT 64 BITS WIDE* | Printer boot initialization tests detect incorrect SDRAM. | 1. Cycle power. If the message appears again, reseat the SDRAM DIMM.<br><br>2. Power on the printer. If the message appears, install a new SDRAM DIMM of the correct type and size.<br><br>3. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| B45 ERROR: SDRAM IS WRONG VOLTAGE* | Printer boot initialization tests detect incorrect SDRAM. | 1. Cycle power. If the message appears again, reseat the SDRAM DIMM.<br><br>2. Power on the printer. If the message appears, install a new SDRAM DIMM of the correct type and size.<br><br>3. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| B46 ERROR: SDRAM HAS MIXED SIZES* | Printer boot initialization tests detect incorrect SDRAM. | 1. Cycle power. If the message appears again, reseat the SDRAM DIMM.<br><br>2. Power on the printer. If the message appears, install a new SDRAM DIMM of the correct type and size.<br><br>3. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| B47 ERROR: SDRAM LARGER THAN 256M* | Printer boot initialization tests detect incorrect SDRAM. | 1. Cycle power. If the message appears again, reseat the SDRAM DIMM.<br><br>2. Power on the printer. If the message appears, install a new SDRAM DIMM of the correct type and size.<br><br>3. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| B49 ERROR: SDRAM # LOGICAL BANKS* | Printer boot initialization tests detect incorrect SDRAM. | 1. Cycle power. If the message appears again, reseat the SDRAM DIMM.<br><br>2. Power on the printer. If the message appears, install a new SDRAM DIMM of the correct type and size.<br><br>3. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| B50 ERROR: SDRAM LOGIC COMB BANKS* | Printer boot initialization tests detect incorrect SDRAM. | 1. Cycle power. If the message appears again, reseat the SDRAM DIMM.<br><br>2. Power on the printer. If the message appears, install a new SDRAM DIMM of the correct type and size.<br><br>3. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| B50 STATUS: XX% CLEAR FLASH | Status message: the printer successfully loaded the emulation software in RAM. Old program is being deleted from flash memory. | No action required. |
| B51 STATUS: XX% LOADING | Status message: printer boot-up routines are loading printer system software into flash memory and SDRAM. | No action required. |
| B53 ERROR: I2C NO ARBITRATION | There is a problem on the $I^2C$ bus which allows the SDRAM DIMM to communicate with the GPIO or CT interface. | 1. Cycle power. If the message appears again, replace the GPIO, in installed.<br><br>2. Power on the printer. If the message appears, replace the CT board, if installed.<br><br>3. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| B54 ERROR: SDA LINE STUCK LOW | The SDRAM or a PCI card is shorting out the serial data bus on the controller board. | 1. Cycle power. If the message appears again, reseat the SDRAM DIMM.<br><br>2. Power on the printer. If the message appears, install a new SDRAM DIMM of the correct type and size.<br><br>3. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| B55 STATUS: SEND PROGRAM TO EC | EC program downloaded and is being programmed in EC. | No action required. |
| BAD VFU CHANNEL | Bad vertical forms unit channel given in host file. | Correct host file. |
| x/y BARCODES / Not Found | In the OpenPrint products, SURE SCAN detects fewer barcodes than the set value for "Barcodes on Page" menu option. x represents the number of barcodes not found, and y represents the "Barcodes on Page" value. | SURE SCAN success depends on the symbology, quality of the barcode graphic, and dimensions of the barcode. For more information refer to the OpenPrint SURE SCAN menu in the *P7000 Cartridge Ribbon Printer User's Manual*. |
| BUFFER OVERRUN | The print buffer has overflowed on a serial interface. The printed output may contain random * (asterisk) characters. Make a configuration printout. | 1. Verify that the printer matches the host serial interface configuration settings for Data Protocol, Baud Rate, Data Bits, Stop Bits, Parity, Data Terminal Ready, and Request to Send. Set printer serial interface parameters to match those of the host.<br><br>2. Send a print job to the printer. If the message appears, go to **Communications Failures**, page 220. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| CLEAR PAPER JAM | Paper jam. | 1. Inspect the paper path for jams. Clear jams. Load paper.<br>2. Press **PAPER ADVANCE** several times and check that forms feed without erratic motion, noise, or pin-hole damage. If forms do not feed, go to **Paper feeds poorly**, page 214. If forms feed, go to step 3.<br>3. Press **VIEW** once and check that forms move up. Make sure the forms thickness lever is not set too tightly.<br>4. Press **VIEW** again and check that the forms thickness lever rotates and the paper moves down. If the forms thickness lever does not rotate and/or the paper does not move down, refer to **Reverse paper feed: platen does not open**, page 216.<br>5. Check the paper tension between the tractors. Adjust the right tractor so that it does not pull paper too tightly or leave it too loose. The right tractor should hold the paper under "slight" tension.<br>6. Check the dynamic paper tension.<br>7. Inspect the ribbon mask for bends or deformation. Replace if damaged.<br>8. Check and adjust the platen open belt. Replace the belt if it is damaged. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| CLEAR PAPER JAM (continued) | | 9. Inspect the tractors and tractor door springs for damage, excessive wear, and equal door closing tension. If either tractor is worn, damaged, or exhibits uneven door closing tension, replace both tractor assemblies |
| | | 10. Check the condition and tension of the paper feed belt. Adjust the paper feed belt. Replace the belt if it is damaged. |
| | | 11. Check and adjust the platen gap. |
| | | 12. Clean the paper motion detector with a cotton swab and alcohol. At the control panel, set the paper motion detector (PMD) fault setting to DISABLE. Load paper. Run a print test and observe how the paper feeds. If the message appears, replace the controller board. Record the message and return it with the defective board. If the message does not appear, replace the paper detector switch assembly and set the paper motion detector (PMD) to ENABLE. |
| CLEARING PROGRAM FROM FLASH | Status message: emulation software successfully loaded into printer RAM and the checksum matched. The old program is now being deleted from flash memory. | No action required. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| CLOSE PLATEN | The forms thickness lever is open. | 1. Load paper. Close the forms thickness lever.<br><br>2. Power off the printer. Remove the paper path or pedestal top cover. Disconnect connector P107 from the controller board. Check continuity of the platen interlock switch from P107/PLO to the switch. Replace the switch assembly if it fails the continuity test. (Refer to Appendix A, Switch Assembly, Platen Interlock.)<br><br>3. With the forms thickness lever closed (position A), hold a 0.011 inch (0.028 cm) feeler gauge between the switch and the body of the forms thickness lever, gently press down on the switch, and tighten the two screws.<br><br>4. Check and adjust the platen open belt. Replace the belt if it is damaged.<br><br>5. Disconnect connector P106 from the controller board. Check the resistance of connector P106/ PLAT M. (See the Main Wire Harness Test Tables in Appendix A.) Replace the platen open motor if it fails the resistance test.<br><br>6. Run a print test. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| CRTG COMM ERR<br>See User Manual | The hardware cannot communicate properly with the cartridge. | 1. Make sure the ribbon cartridge is seated properly.<br><br>2. Remove and replace the ribbon cartridge if necessary. |
| CRTG INCOMPAT<br>Use correct RBN | The cartridge board being used is not compatible with the software in the printer. | 1. Press the CANCEL key, open the platen, or cycle power to change and clear the error.<br><br>2. If necessary, replace the ribbon with an authorized cartridge that matches the printer's firmware level. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| CRTG MISMATCH<br>Use correct RBN | The cartridge board being used is not compatible with the software in the printer. | 1. Press the CANCEL key, open the platen, or cycle power to change and clear the error.<br><br>2. If necessary, replace the ribbon with an authorized cartridge that matches the printer's firmware level. |
| CRTG MISSING<br>Install new RBN | The ribbon cartridge is missing or installed improperly. | 1. Make sure a ribbon cartridge is installed in the printer.<br>2. Make sure the ribbon cartridge is seated properly.<br>3. Remove and replace the cartridge if necessary.<br>4. Check the cable connection from the cartridge interface board to the controller.<br>5. Replace the cartridge interface board if necessary. |
| CRTG NOT SETx<br>Re-install RBN | The ribbon cartridge is not properly positioned. | 1. Make sure a ribbon cartridge is installed in the printer.<br>2. Make sure the ribbon cartridge is seated properly.<br>3. Remove and replace the cartridge if necessary. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| CTL VOLT FAIL* | Controller Voltage Failure. 15 V failure on the controller board. | 1. Cycle Power. Run the print job again. If the message appears, download the emulation software again (page 257).<br><br>2. Cycle power. Run the print job again. If the message appears, replace the flash memory.<br><br>3. Power on the printer. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board.<br><br>4. Power on the printer. Run the print job again. If the message appears, do the power supply operational check (page 274). If the power supply fails the check, replace it. If it passes the check, go to the next step.<br><br>5. Power on the printer. If the message appears, replace the shuttle frame assembly. |
| D50 Status %XX Clearing Flash | Status message: The printer is clearing its flash memory, where %XX represents the percentage completed. | No action required. |
| D51 Status %XX Programming... | Status message: The printer is loading firmware, where %XX represents the percentage completed. | No action required. |
| D55 Status: Send Program to EC | Status message: The printer is loading the engine controller program into the engine controller (EC). | No action required. |
| DIAGNOSTIC PASSED | Status message: the printer passed its memory and hardware initialization tests. | No action required. |
| DO NOT POWER OFF | Status message: the printer is performing an operation that must be completed before you can cycle power. | No action required, but do not power the printer off until the operation is completed. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| DP FIFO Busy* | There is a timing problem in the Engine Controller firmware. | 1. Cycle Power. Run the print job again. If the message appears, download the emulation software again (page 257).<br><br>2. Cycle power. Run the print job again. If the message appears, replace the flash memory.<br><br>3. Power on the printer. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| DRVR CIR BAD* | Driver Circuit Bad: the hammer coil count test failed. | 1. Cycle power. If the message appears, press **CLEAR.**<br><br>2. Power off the printer. Remove the shuttle cover. At the shuttle frame assembly, disconnect the hammer bank logic and power cables. Power on the printer. If "HB NOT INSTALLD" appears on the LCD, replace the shuttle frame assembly. If "HB NOT INSTALLD" does not appear on the LCD, replace the controller board. |
| E00 EXE @ ADDR0<br>See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br><br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E01A TYPE 0x40<br>See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br><br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| E01B TYPE 0x60 See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E02 MACHINE CHK See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E03A DSI HASH L See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E03B DSI HASH S See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| E03C DSI BAT PL<br>See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E03D DSI BAT PS<br>See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E03E DSI CXIWX<br>See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E03F DSI CXOWX<br>See User Manual | An illegal or unsupported instruction was attempted in the application programn. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| E03G DSI ECXIWX<br>See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br><br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E03H DSI ECXOWX<br>See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br><br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E04A ISI NO TRA<br>See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br><br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E04B ISI DIRECT<br>See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br><br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| E04C ISI PROTEC See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232). 2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E06 NOT ALIGNED See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232). 2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E07 ILLEGAL INS See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232). 2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E08 FLOATINGPNT See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232). 2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| E12 SYSTEM CALL<br>See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br><br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E13 TRACE INT<br>See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br><br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E16 ITRANS MISS<br>See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br><br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E17 DLOAD MISS<br>See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br><br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| E18 DSTORE MISS See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232). <br> 2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E19 BREAKPOINT See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232). <br> 2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E20 SYS MANAGE See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232). <br> 2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E30 DEBUGGER See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232). <br> 2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| E31A EVENT O BP See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br><br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E31B EVENT 1 BP See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br><br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E31C EVENT 2 BP See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br><br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E31D EVENT 3 BP See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br><br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| E31E EVENT 4 BP See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E31F EVENT 5 BP See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E31G EVENT 6 BP See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E31H EVENT 7 BP See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| E32A CND 0 BP<br>See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E32B CND 1 BP<br>See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E32C CND 2 BP<br>See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E32D CND 3 BP<br>See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| E32E CND 4 BP<br>See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br><br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E32F CND 5 BP<br>See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br><br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E32G CND 6 BP<br>See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br><br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E32H CND 7 BP<br>See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br><br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| E33 WRITE BP<br>See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E34 TRACE CMPLT<br>See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E99 UNKNOWN INT<br>See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E Net Test Unavailable | The ethernet PCBA did not initialize correctly. | Cycle power. Wait for "E Net Ready" to display, then retry operation. If it still fails, replace the ethernet PCBA. |
| ERROR: CPLD NOT PROGRAMMED | The Complex Programmable Logic Device (CPLD) on the controller board is not programmed. The EC cannot read the version bits in the CPLD which tell the EC which configuration version is installed. | Cycle power. If the message appears again, replace the controller board. Record the message and return it with the defective board. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| ERROR: DC PROGRAM NOT VALID | The printer cannot find the data controller program or the validation checksum is corrupt. | 1. Download the program again (page 257).<br><br>2. If the message appears, replace the flash memory SIMM. |
| ERROR: DRAM AT ADDRESS XXXXXXXX | The printer found a defective memory location. | 1. Replace the DRAM DIMM.<br><br>2. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| ERROR: EC PROGRAM NOT VALID | The printer cannot find the engine controller program or the validation checksum is corrupt. | 1. Download the program again (page 257). If the message occurs again, replace all flash memory SIMMs.<br><br>2. Power on the printer. Download the emulation. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| ERROR: EC STOPPED AT STATE XXXX | Where XXXX is a number from 0000 to 0010. The Engine Controller has stopped and is in the state identified by the number displayed. If the EC stops at state 0000 at power-up, replace the controller board. Record the message and return it with the defective board. | 1. Power off the printer. Remove the flash memory SIMM and SDRAM DIMM. Inspect the SIMM and DIMM sockets on the controller board. If any socket pins are bent or damaged, replace the controller board.<br><br>2. Install the flash SIMM and SDRAM DIMM, making sure they are fully and correctly seated. Power on the printer. Download the emulation (page 257). If the message appears, replace the flash SIMM.<br><br>3. Power on the printer. Download the emulation. If the message appears, replace the SDRAM DIMM.<br><br>4. Power on the printer. Download the emulation. If the message appears, replace the controller board. Record the message and return it with the defective board. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| ERROR: FLASH DID NOT PROGRAM | The printer encountered an error trying to program flash memory. | Download the program again (page 257). If the message occurs again, replace the flash memory. |
| ERROR: FLASH NOT DETECTED | The printer could not find flash memory. | Check flash memory on the controller board. If present, reseat the flash SIMM; if missing, install flash SIMM. |
| ERROR: LOCKED SN= nnnnnnnnnnnnnnnn | Where nnnnnnnnnnnnnnnn is the serial number of the printer's security key. The SPX gets "locked" to the printer as the first part of the security key reprogramming process. The "lock" consists of copying the printer's security key serial number into the flash memory of the SPX, which prevents the SPX from being used on other printers. It also enables the customer to retry upgrading the same printer if the SPX was removed before reprogramming is complete. | 1. Remove the SPX from the Debug Port.<br>2. Cycle printer power. |
| ERROR: NO DRAM DETECTED | The printer could not find any DRAM. | 1. Check SDRAM on the controller board. If present, reseat SDRAM DIMM; if missing, install SDRAM.<br>2. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| ERROR: NVRAM FAILURE | The non-volatile SRAM on the controller board has failed. | Replace the controller board. (Do NOT attempt to replace NVRAM.) Record the message and return it with the controller board. |
| ERROR OCCURRED FLUSHING QUEUES * | An interim message that displays while the printer discards host data it cannot use because a fault condition exists. While this message displays, the asterisk (*) rotates. | Wait. When the asterisk (*) stops rotating, a different fault message will appear: troubleshoot the final message. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| ERROR: PROGRAM NEEDS MORE DRAM | The printer requires more DRAM in order to run the downloaded program. | Add DRAM or use a smaller emulation program. |
| ERROR: PROGRAM NEEDS MORE FLASH | The printer requires more flash memory in order to run the downloaded program. | Add flash memory or use a smaller emulation program. |
| ERROR: PROGRAM NOT COMPATIBLE | The printer is not compatible with the downloaded program. | Use the correct emulation software option(s) for this model printer. |
| ERROR: PROGRAM NOT VALID | The printer does not see a program in flash memory. | There is no program in printer memory. Download the emulation. |
| ERROR: SECURITY KEY NOT DETECTED | The security key is not present or has failed. | 1. Check the security key at connector J9 on the controller board. If the key is absent, install the correct key. If a security key is present, replace it.<br>2. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| ERROR: SHORT AT ADDRESS XXXX | Hardware failure in SDRAM or controller circuitry. | 1. Download the program again.<br>2. If the message occurs again, replace the controller board. Record the message and return it with the defective board. |
| ERROR: WRITING TO FLASH | Hardware or software fault in flash memory. | 1. Replace flash memory.<br>2. If message occurs with new memory, replace the controller board. Record the message and return it with the defective board. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| ERROR: WRONG CHECKSUM | The printer received the complete program but the checksum did not match. The data may have been corrupted during download. | 1. Power off the printer. Download the program again from the beginning. If the messages appears, replace the DRAM.<br>2. Download the program using a new software diskette. If the messages appears, replace the flash memory.<br>3. Download the program. If the messages appears, replace the controller board. Record the message and return it with the defective board. |
| ERROR: WRONG OEM OR PRINTER TYPE | The SPX inserted in the debug port is not intended for this this OEM. | 1. Remove the SPX from the Debug Port.<br>2. Cycle printer power. |
| ERROR: xxxx | User defined fault using PNE. | User defined. |
| Ethernet Adapter Being Initialized | Status message indicating that the ethernet interface is running its boot-up procedure. | No action required. |
| ETHERNET DETECTED | Status message indicating that the PrintNet ethernet interface has established communication. | No action required. |
| ETHERNET INITIALIZING | Status message that indicates that the internal Network Interface Card is processing the boot procedure. (May occur with older versions of microcode.) | No action required. |
| EXCESS RIBBON WEAR Install New RBN | Status message that displays when ribbon reaches the end of its service life, whether the Integrated Print Management System is enabled or not. | Install a new ribbon. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| EXHAUST FAN FLT | Exhaust Fan Fault. Sensors cannot detect current in the fan circuit.<br><br>**NOTE:** For cabinet models only. | 1. Cycle power. If the message appears, press **CLEAR**.<br><br>2. Check that the exhaust fan is connected to exhaust fan cable connector J307. Connect the fan cable connector.<br><br>3. Power off the printer. Remove the paper path. Disconnect connector P107 from the controller board. Test connector P107/EHF for shorts or opens. (See the Main Wire Harness Test Tables in Appendix A.) Replace components that fail test.<br><br>4. Make sure connector P107/EHF has a good connection at J107 on the controller board.<br><br>5. Inspect for obstructions of airways and vents. Check for items beneath the printer blocking cabinet vents. Remove obstructions. Make sure cabinet exhaust fan vents are not blocked.<br><br>6. Power on the printer. Check for fan operation. If the message appears or the fan does not work, replace the exhaust fan.<br><br>7. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| FIRMWARE ERROR | Application software tried to perform an illegal printer function or damaged memory is detected on the controller board. If the message appears at power-up, replace the controller board. Record the message and return it with the defective board. | 1. Cycle power. Run the print job. If the message appears, download the emulation software again (page 257).<br>2. Cycle power. Run the print job again. If the message appears, replace the flash memory.<br>3. Cycle power. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board.<br>4. Power on the printer. Run the print job again. If the message still appears, there is an application software error. Use your local support procedure to request assistance. |
| FM HEADER ERROR | Frame Header Error. Application software has violated header parameters. | Not a printer problem. The system administrator should correct applications data or configuration. |
| FRAMING ERROR | The printed output may contain random ! (exclamation point) characters. | 1. Make a configuration printout. Set printer serial interface parameters to match host configuration settings for Data Protocol, Baud Rate, Data Bits, Stop Bits, Parity, Data Terminal Ready, and Request to Send.<br>2. Send a print job to the printer. If the message appears, go to **Communications Failures**, page 220. |
| FREEFORM OFF | A control panel key is stuck in the down position. | Press the key again. |
| GRF CHK ERROR PRESS STOP | Graphic Check Error: in the CT emulation over a twinax interface, the printer received a non-printable character. | Press **CLEAR** then press **ON LINE**. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| H00: PCI SLOT ?<br>See User Manual | The controller board is not communicating with a PCI card. This could indicate a bad PCI card, poor connection, or problem in the PCI bus. | 1. Cycle power. If the message appears, power down and reseat the PCI card.<br><br>2. Power on the printer. If the message appears, move the PCI card to the other PCI slot.<br><br>3. Power on the printer. If the message appears, replace the PCI card.<br><br>4. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| H01: PCI J12<br>See User Manual | The controller board is not communicating with the PCI card in PCI slot J12. This could indicate a bad PCI card, poor connection, or problem in the PCI bus. | 1. Cycle power. If the message appears, power down and reseat the PCI card.<br><br>2. Power on the printer. If the message appears, move the PCI card to PCI slot J13.<br><br>3. Power on the printer. If the message appears, replace the PCI card.<br><br>4. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| H02: PCI J13<br>See User Manual | The controller board is not communicating with the PCI card in PCI slot J13. This could indicate a bad PCI card, poor connection, or problem in the PCI bus. | 1. Cycle power. If the message appears, power down and reseat the PCI card.<br><br>2. Power on the printer. If the message appears, move the PCI card to PCI slot J12.<br><br>3. Power on the printer. If the message appears, replace the PCI card.<br><br>4. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| <Online, etc. ... .> Half Speed Mode | This is a status message, not an operational state. The controller samples the operating temperature of key components of the print mechanism. When higher than normal temperatures are sensed, the print speed is automatically reduced by 50% and the message sent the LCD. When the components cool down, the print speed returns to 100% and the message clears. Periodic appearance of this message is normal for extremely dense print jobs, such as "All Black" plot. If this message often appears, the printer may be operating in a severe environment. A severe environment has an ambient temperature at or above 40° Celsius (104° Fahrenheit) or is dirty enough to clog air vents. The printer must never be run at ambient temperatures greater than 40° Celsius (104° Fahrenheit). Inspect the printer environment for severity, and if the printer is located in such an environment relocate it to a cooler, cleaner area. | 1. Advise the user to move the printer to cooler, cleaner location.<br>2. Check the kinds of print jobs the user is running: look for very dense graphics and layouts. Advise the user to run jobs in smaller batches.<br>3. Power off the printer. Remove the paper path or pedestal top cover. Check all fan cable connections.<br>4. Power on the printer. Verify that all fans operate. Replace any fan that does not operate.<br>5. Inspect vents and fan airways for obstructions. Look underneath cabinet models for items blocking the cabinet exhaust vents. Remove any obstructions from vents and airways.<br>6. Install the paper path or pedestal top cover. Load paper. Run the "All E's" print test for 5 to 10 minutes. If the message appears, replace the shuttle frame assembly.<br>7. Run the "All E's" print test for 5 to 10 minutes. If the message appears, replace the controller board. Record the message and return it with the defective board.<br>8. If the printer is a P7X08H, P7000HD, or P7220, set the coil temperature (page 265). |
| HAM. COIL OPEN* | Hammer Coil Open. Electrical malfunction of one or more hammer coils. | 1. Cycle power. If the message appears, replace the shuttle frame assembly.<br>2. Power on the printer. Run a print test. If the message appears, replace the controller board. Record the message and return it with the defective board. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| HAMMER COIL BAD #, #, #, #, ... etc. | Hammer coil(s) number #, #, etc. failed the current test at power-up. Check that the hammer bank cables are connected. | 1. Cycle power. If the message appears, replace the shuttle frame assembly. Record the message and return it with the defective assembly.<br><br>2. Power on the printer. If the message appears, replace controller board. Record the message and return it with the defective assembly. |
| HAMMER SHORT * See User Manual | Electrical malfunction of one or more hammer coils. | 1. Cycle power. If the message appears, replace the shuttle frame assembly.<br><br>2. Power on the printer. Run a print test. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| HB NOT INSTALLD* | Hammer Bank Not Installed. Self-test routines do not detect hammer coils at printer start-up. Power off the printer. Verify that the shuttle frame assembly is installed. | 1. Install the shuttle frame assembly.<br><br>2. Remove the paper path or pedestal top cover. Verify that the hammer bank logic cable is connected to connector J108 on the controller board and to the shuttle frame assembly.<br><br>3. Power on the printer. If the message appears, replace the hammer bank logic cable.<br><br>4. Power on the printer. If the message appears, replace the shuttle frame assembly.<br><br>5. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| HMR BANK FAN FLT | Hammer Bank Fan Fault. Sensors cannot detect current in the fan circuit. | 1. Cycle power. If the message appears, press **CLEAR**. If the message does not clear, go to step 2.<br><br>2. Power off the printer. Remove the paper path or pedestal top cover. Disconnect connector P107 from the controller board. Test connector P107/HBF for shorts or opens. (Refer to the Main Wire Harness Test Tables in Appendix A.) Replace components that fail test.<br><br>3. Make sure P107/HBF has a good connection at J107 on the controller board.<br><br>4. Inspect for obstructions of airways and vents. Remove obstructions.<br><br>5. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| ILL EXT BUS ACC* | Illegal External Bus Access. Firmware error on the controller board. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again (page 257).<br><br>2. Cycle power. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| ILL INST ACCSS* | Illegal Instruction Accessed. Firmware error on the controller board. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again (page 257).<br><br>2. Cycle power. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| ILLGL OPR ACCSS* | Illegal Operand Accessed. Firmware error on the controller board. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again (page 257). <br> 2. Cycle power. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| INCOMPAT E-NET Remove NIC | The ethernet NIC for a thermal printer has been installed in this printer. | Remove the installed NIC and replace it with the correct card for this printer. |
| INCOMPAT WLAN Remove NIC | The wireless NIC for a thermal printer has been installed in this printer. | Remove the installed NIC and replace it with the correct NIC for this printer. |
| INTAKE FAN FAULT | Sensors cannot detect current in the card cage fan circuit. | 1. Cycle power. If the message appears, press **CLEAR**. If the message does not clear, go to step 2. <br> 2. Power off the printer. Remove the paper path or pedestal top cover. Disconnect connector P106 from the controller board. Test connector P106/CCF for shorts or opens. (Refer to the Main Wire Harness Test Tables in Appendix A.) Replace components that fail test. <br> 3. Make sure P106/CCF has a good connection at J106 on the controller board. <br> 4. Inspect for obstructions of airways and vents. Remove obstructions. <br> 5. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| INTERRUPT UNUSED VECTOR 00 | This message is generated when the controller board gets an interrupt it does not understand. The problem can be created by electrical noise, by a software problem, or by a hardware problem. | 1. Cycle power. If this message occurred once and never again, you can ignore it. If the message reappears or appears consistently check the grounding of the printer. If the machine is correctly grounded, replace the controller board.<br><br>2. Power on the printer. Cycle power. If the message appears, suspect an application software error. Request assistance from your local support group. Install the original controller board. |
| INVALID ACTIVATE | The printer detects a twinax protocol communications error and reports the error. Power off the printer. Disconnect the AC power cord from the printer. Check the twinax host data cable and twinax I/O cable connection at the CT board. | 1. Reseat the twinax host data cable connection and the twinax I/O cable connection at the CT board.<br><br>2. Disconnect the twinax auto-termination cable from the printer or from the last device on this twinax port. Test the cable for the resistances shown in the Main Wire Harness Test Tables in Appendix A. If resistances are not correct, replace the twinax auto-termination cable.<br><br>3. Connect the power cord to the printer. Power on the printer. Send a print job to the printer. If the message appears, replace the twinax cable.<br><br>4. Send a print job to the printer. If the message appears, go to **Communications Failures**, page 220. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| INVALID COMMAND | The printer detects a twinax protocol communications error and reports the error. Power off the printer. Disconnect the AC power cord from the printer. Check the twinax host data cable and twinax I/O cable connection at the CT board. | 1. Reseat the twinax host data cable connection and the twinax I/O cable connection at the CT board.<br><br>2. Disconnect the twinax auto-termination cable from the printer. Test the cable for the resistances shown in the Main Wire Harness Test Tables in Appendix A. If resistances are not correct, replace the twinax auto-termination cable.<br><br>3. Connect the power cord to the printer. Power on the printer. Send a print job to the printer. If the message appears, replace the twinax cable.<br><br>4. Send a print job to the printer. If the message appears, go to **Communications Failures**, page 220. |
| LO DRV. SHORT* | Lower Driver Short. Circuit(s) on the hammer bank or in the hammer bank power cable are shorted to ground. | 1. Cycle power. If the message appears, press **CLEAR**. If message does not clear, replace the hammer bank logic cable and the hammer bank power cable.<br><br>2. Power on the printer. If the message appears, replace the shuttle frame assembly.<br><br>3. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| LOAD PAPER | The printer is out of paper. | 1. Load paper. Press **CLEAR**. If message does not clear, go to the next step.<br><br>2. Check for black or colored backing on the paper being used in printer. The paper out detector is optical and may not detect paper with a black or dark backing facing the detector. Try paper with a white or light back. If paper with white/light back works and black/dark paper does not, replace the paper detector switch with the optional black back forms switch assembly. (See page 360, item 3.)<br><br>3. Power off the printer. Remove the paper path or pedestal top cover. Remove the barrier shield (cabinet model) or the barrier shield and paper guide (pedestal model). Check that the paper detector switch assembly is securely mounted in its bracket.<br><br>4. Check that connector P106/PMD is fully seated in connector J106 on the controller board.<br><br>5. Load paper. Power on the printer. Replace the paper detector switch assembly if message appears.<br><br>6. Load paper. Power on the printer. Replace the controller board if message appears. Record the message and return it with the defective board. |
| LOADING PROGRAM FROM PORT XX% | Status message: the new emulation program is loading into printer RAM. XX% indicates how much of the program has loaded. | No action required. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| LOADING PROGRAM INTO FLASH | The printer has deleted the previous program from flash memory and is loading the new program into flash memory. | No action required. |
| NEW SPX DETECTED PRESS ENTER | The printer detects an SPX in its debug port and the SPX is valid for this printer. | Press the **ENTER** key. The following actions occur:<br>1. The SPX copies the printer's security key serial number into its flash memory.<br>2. The printer reprograms its security key with the information stored in the SPX.<br>3. The printer verifies that the key was programmed as intended.<br>4. The SPX overwrites itself so that it cannot be used again. |
| NON VOLATILE MEMORY FAILED | Large emulations reduce the amount of space available for saving configurations, which means that sometimes fewer than 8 configurations can be saved. If this message appears when saving a configuration, it means the printer is out of memory. Previously saved configurations will still be available, but the one that was "saved" when the message appeared is not in memory. If this message appears at power-up, it means the flash memory is defective. | 1. If the message appears at power-up, replace the flash memory.<br>2. If the message appears while saving a configuration, the printer is out of memory and will not save that or subsequent configurations. (Previously saved configurations are still okay.)<br>3. If the message appears after replacing/increasing memory, replace the controller board. (Do NOT attempt to replace NVRAM.) |
| NOVRAM ERROR n | Processor Halted message. This error is most likely associated with the V6 PSA3 Logic card. Follow the corrective action steps to resolve it. | Replace the controller board. (Do NOT attempt to replace NVRAM.) Record the message and return it with the controller board. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| OLD RIBBON<br>Install New RBN | The sensor detects a ribbon that was previously declared to be at the end of its service life. | Install a new ribbon. |
| ONLINE<br>28 CU NOT ENAB | Controller Unit Not Enabled. Poll time-out error. The printer was not polled for one minute across a coax interface. | Check cable connection and host system. (Refer to line problem determination procedures, as recommended by the host system.) |
| ONLINE<br>8344 FAILED | Link-level code test detects a hardware failure on the CT board. | Replace the CT board. Record the message and return it with the defective board. |
| ONLINE<br>CU TIMED OUT | Controller Unit Timed Out. The printer was not enabled for one minute or more on a coax interface. | Check cable connection and host system. (Refer to line problem determination procedures, as recommended by the host system.) |
| PAP BAD TABLE* | Paper Bad Table. The paper feed process on the controller board has a corrupted table. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again.<br><br>2. Cycle power. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| PAP BSY TOO LNG* | Paper Busy Too Long. Firmware error on the controller board. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again (page 257). <br><br> 2. Run the print job again. If the message appears, power off the printer. Remove the paper path or pedestal top cover. Make sure connectors P106 and P107 are fully seated on the controller board. Make sure the MPU cable, the hammer bank logic cable, and the hammer bank power cable are undamaged and have good connections. Replace as necessary. (Refer to Appendix A.) <br><br> 3. Power on the printer. Run the print job again. If the message appears, replace the shuttle frame assembly. <br><br> 4. Power on the printer. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| PAP FD DRVR CIR* See Manual | Paper Feed Driver Circuit. The paper feed driver circuit on the controller board is drawing too much current. | 1. Cycle power. If the message appears, replace the controller board. Record the message and return it with the defective board. <br><br> 2. Power on the printer. If the message appears, replace the paper feed motor. |
| PAP FIFO OVERFL* | Paper First In First Out Overflow. Firmware error on the controller board. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again. <br><br> 2. Power on the printer. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| PAP FIFO UNDRFL* | Paper First In First Out Underflow. Firmware error on the controller board. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again.<br><br>2. Run the print job again. If the message appears, power off the printer. Remove the paper path or pedestal top cover. Make sure connectors P106 and P107 are fully seated on the controller board. Make sure the MPU cable, the hammer bank logic cable, and the hammer bank power cable are undamaged and have good connections. Replace as necessary. (Refer to Appendix A.)<br><br>3. Check hammer phasing. Try using a lower phasing value; sometimes this message indicates too high a hammer phase value.<br><br>4. Power on the printer. Run the print job again. If the message appears, replace the shuttle frame assembly.<br><br>5. Power on the printer. Run the print job again. If the message appears, do the power supply operational check (page 274). If the power supply fails the check, replace it. If it passes the check, go to the next step.<br><br>6. Power on the printer. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| PAP ILLGL ST* | Paper Illegal State. Firmware error on the controller board. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again.<br>2. Cycle power. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| PAP INCMPL ENER* | Paper Incompletely Energized. Firmware error on the controller board. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again.<br>2. Cycle power. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| PAP INVLD CMD* | Paper Invalid Command. Firmware error on the controller board. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again.<br>2. Cycle power. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| PAP INVLD PARM* | Paper Invalid Parameter. Firmware error on the controller board. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again.<br>2. Cycle power. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| PAP NOT SCHED* | Paper Not Scheduled. The paper feed process is not scheduling on the controller board, and the printer cannot feed paper. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again.<br>2. Cycle power. Run the print job again. If the message appears, replace the MPU cable assembly.<br>3. Power on the printer. Run the print job again. If the message appears, do the power supply operational check (page 274). If the power supply fails the check, replace it. If it passes the check, go to the next step.<br>4. Power on the printer. Run the print job again. If the message appears, replace the shuttle frame assembly.<br>5. Power on the printer. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| PAP NT AT SPEED* | Paper Not At Speed. Firmware error on the controller board. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again.<br>2. Cycle power. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| PAP UNEXP INT* | Paper Unexpected Interrupt. Firmware error on the controller board. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again.<br>2. Cycle power. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| PAPER REQUESTED: A4 | A paper size mismatch is detected. | 1. Check the paper size setting.<br>2. If necessary, load new media and change the paper size menu option. |
| PARAMETER ERROR | Illegal parameter value received in a command code over a coax/twinax interface. | 1. Press **CLEAR** then press **ON LINE**.<br>2. Run the print job that generated the error message. If the message appears, check the host data for invalid characters.<br>3. Ask the system operator to verify that the printer's Device ID is set to the correct emulation with respect to the host configuration.<br>4. Run the print job that generated the error message. If the message appears, go to **Communications Failures**, page 220. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| PARITY ERROR | The printed output may contain random ? (question mark) characters. Make a configuration printout. | 1. Verify that the printer matches host serial configuration settings for Data Protocol, Baud Rate, Data Bits, Stop Bits, Parity, Data Terminal Ready, and Request to Send. <br> 2. Send a print job to the printer. If the message appears, replace the serial data cable. <br> 3. Send a print job to the printer. If the message appears, go to **Communications Failures**, page 220. <br> 4. If the printer is in a twinax environment, check the error log for parity error entries and inspect the customer's cable hook-ups. Connect all communications cables correctly. <br> 5. Send a print job to the printer. If the message appears, replace the twinax auto-termination cable ("T" connector). <br> 6. Send a print job to the printer. If the message appears, replace the CT. |
| PLAT INV CMD* | Platen Invalid Command. Firmware error on the controller board. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again. <br> 2. Cycle power. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| PLAT INV PARM* | Platen Invalid Parameter. Firmware error on the controller board. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again. <br> 2. Cycle power. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| PLAT INV STATE* | Platen Invalid State. Firmware error on the controller board. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again.<br><br>2. Cycle power. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| PLEASE WAIT... RESET IN PROGRESS | Status message: the printer finished loading the program into flash memory and is automatically resetting itself. | No action required. |
| POWER SAVER MODE | This is a status message. The printer is in low-energy idle state, all fans and higher voltages are off, only +5Vdc logic circuits are active. | No action required. (To revive the printer from power saver mode press the PAPER ADVANCE key.) |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| POWER SUPPLY HOT | The printer has sensor circuits that sample the operating temperature of key components of the power supply. When higher than normal temperatures are sensed, print speed is automatically reduced. If the printer runs at reduced speed for an extended period of time, the POWER SUPPLY HOT message is sent to the LCD and printing stops, allowing printer components to cool down. Pressing the **CLEAR** key resumes the print task. Check the operating environment. A severe environment is one with an ambient temperature at or above 40° Celsius (104° Fahrenheit) or is dirty enough to create blockage of the cabinet fan vents. The printer must never be run at ambient temperatures greater than 40° Celsius (104° Fahrenheit). If the printer is located in such an environment, relocate it to a cooler, cleaner area. | 1. Inspect printer environment for severity. Advise the user to move the printer to cooler, cleaner location.<br><br>2. Check the kinds of print jobs the user is running: look for very dense graphics and layouts. Advise the user to run jobs in smaller batches.<br><br>3. Power off the printer. Remove the paper path or pedestal top cover. Check that the plastic power supply guard/air deflector is correctly positioned over the power supply board. **WARNING: DO NOT TOUCH THE POWER SUPPLY**, but hold your hand close enough to check for heat radiating off the power supply board. If the power supply is noticeably hot, let it cool down, then replace it.<br><br>4. Check that all fan cables are connected.<br><br>5. Inspect vents and fan airways for obstructions. Look underneath cabinet models for items blocking the cabinet exhaust vents.<br><br>6. Install paper path or pedestal top cover. Load paper. Power on the printer. Run the "All E's" print test for 5-10 minutes. If the message appears, replace the controller board. Record the message and return it with the defective board. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| PRINTER HOT | This message indicates internal temperatures over 60° Celsius (140° Fahrenheit). Print jobs will not create such temperatures, so immediately determine that the fans are operating and that all air vents are unobstructed. It is crucial that the exhaust vents on the floor of the cabinet remain unblocked, since hot air from inside the printer is vented through the cabinet floor. Nothing must be stored under the printer. Then check the operating environment. A severe environment is one with an ambient temperature at or above 40° Celsius (104° Fahrenheit) or is dirty enough to create blockage of the cabinet fan vents. The printer must never be run at ambient temperatures greater than 40° Celsius (104° Fahrenheit). If the printer is located in such an environment, relocate it to a cooler, cleaner area. | 1. Controller board sensors report high temperatures on the board. Inspect printer environment for severity. Advise the user to move the printer to cooler, cleaner location. <br> 2. Power off the printer. Remove the paper path or pedestal top cover. Check that all fan cables are connected. <br> 3. Inspect vents and fan airways for obstructions. Look underneath cabinet models for items blocking the cabinet exhaust vents. Remove any obstructions from vents and airways. <br> 4. Install paper path or pedestal top cover. Load paper. Power on the printer. Run the "All Black" print test for 1/4 page. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| PRINTER UNDER REMOTE CONTROL | Status message: The printer is under the control of the PrintNet Enterprise (PNE) remote printer management software. | No action required. |
| PROTECTED INSTR* | Protected Instruction. Firmware error on the controller board. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again. <br> 2. Cycle power. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| PS/PDF ERROR: JOB ABORTED | Fault displayed when Postscript/PDF failed to process a job, e.g. an unsupported command or a large job which requires more DRAM to process. | Clear the fault. Postscript/PDF will continue with the next job. |
| PWR SUPP VOLT* | Power Supply Voltage. The power supply has failed. | Replace the power supply board. |
| QUEUE OVERRUN | In the CT twinax emulation, the print buffer has overflowed. Send a print job to the printer. | 1. If the message appears, replace the CT board. Record the message and return it with the defective board.<br>2. Send a print job to the printer. If the message appears, replace the twinax data cable and the twinax auto-termination cable assembly ("Smart T"). |
| RBN AT END POINT Change Ribbon | Integrated Print Management System software has determined that the ribbon is out of ink. | Install a new ribbon. |
| RBN DRVR CIR* See Manual | The ribbon motor driver circuit on the controller board is drawing too much current. | 1. Cycle power. If the message appears, replace the controller board (page 288). Record the message and return it with the defective board.<br>2. Power on the printer. If the message appears replace the ribbon motor. |
| REGIONx MISMATCH Use Correct RBN | The incorrect cartridge type is being used for the printer. "X" indicates the region of the printer. | Install Region X ribbon cartridge in the printer.<br>**NOTE:** Specify the region of the printer when ordering ribbons. |
| REMOVE USED SPX THEN PRESS ENTER | Status message: An SPX is depleted because it has successfully reprogrammed the security key on the controller board. | 1. Remove the SPX from the Debug Port.<br>2. Press the **ENTER** key. The printer will reboot itself. |
| RESTORING BOOT CODE | Normal download initialization message. | No action required. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| RIB INVLD CMD* See User Manual | Ribbon Invalid Command. Firmware error on the controller board. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again.<br><br>2. Cycle power. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| RIBBON DRIVE | The controller board does not detect a ribbon drive motor. | 1. Cycle power. If the message appears, power off the printer.<br><br>2. Remove the paper path or pedestal top cover. Reseat the ribbon drive motor cable connection.<br><br>3. Power on the printer. Check that the ribbon drive motor winds the ribbon. If the ribbon will not wind, replace the defective ribbon drive motor.<br><br>4. If the ribbon continues not to wind replace the controller board and download new function code. Record the message and return it with defective board. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| RIBBON STALL | The controller board does not detect ribbon movement. | 1. Cycle power. If the message appears, power off the printer.<br><br>2. Check that the ribbon cartridge is properly set. Make sure ribbon motion is free by turning the ribbon tension knob clockwise. Replace cartridge if ribbon does not move freely.<br><br>3. Inspect the ribbon mask for excessive ink build-up or a torn/bunched ribbon. Clean the ribbon mask and replace the ribbon as required to insure unobstructed movement of the ribbon between the ribbon mask and hammer bank cover.<br><br>4. Check the platen gap and adjust if required. If the gap is too narrow, it can restrict ribbon movement through the ribbon mask.<br><br>5. Remove the paper path or pedestal top cover. Reseat the ribbon drive motor cable connection.<br><br>6. Power on the printer. Check that the ribbon drive motor winds the ribbon. If the ribbon will not wind, replace the defective ribbon drive motor.<br><br>7. If the ribbon continues not to wind replace the controller board and download new function code. Record the message and return it with defective board. |
| RIBBON UNDER 2% Change RBN Soon | Status message indicating the Integrated Print Management System is enabled and the ribbon ink level is 2%. | Install a new ribbon. |
| RWP DOWNLOAD Please Wait | Status message indicating the software in the cartridge is being updated. The user must wait for the update to complete. | No action is required unless the message displays for more than 2 to 3 minutes. In this case, replace the weld sensor. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| SCS COMMAND ERROR | In the CT emulation, the printer received undefined control character (hex 40). | 1. The printer clears the error.<br>2. Run the print job that generated the error message. If the message appears, verify that there are no invalid control codes in the host data.<br>3. Ask the system operator to verify that the printer's Device ID is set to the correct emulation with respect to the host configuration.<br>4. Run the print job that generated the error message. If the message appears, go to **Communications Failures**, page 220. |
| SECURITY VIOLATION | Security code of the security key at J9 on the controller board does not match the code of the firmware on the controller board. | 1. Remove the paper path or pedestal top cover. Check that the security key is correctly installed.<br>2. Install correct key for the customer's emulations.<br>3. Run a print test. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| SECURITY KEY NOT DETECTED | The security key is not present or has failed. | 1. Check the security key at connector J9 on the controller board. The security key is a 3-pin jumper connector. If it is absent, install the correct key. If a key is present, replace it.<br>2. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| SENDING PROGRAM TO EC PROCESSOR | Status message: the printer is loading the engine controller program into the engine controller. | No action required. |
| SF ERROR | Structured Field Error. Application software has violated structured data field parameters. | Not a printer problem. Have the system administrator correct applications data or configuration. |

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**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| SHTL MISMATCH Use Correct RBN | This message displays when an Extended Life Ribbon is mounted on a 500 lpm printer. | Install Standard Life Ribbon. |
| SHUT DRVR CIR* See User Manual | The shuttle driver circuit on the controller board is drawing too much current. | 1. Power down the printer. Remove the paper path or top cover to gain access to the card cage. Make sure the shuttle data and power cables are undamaged and have good connections at the shuttle and the controller board. <br> 2. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. <br> 3. Power on the printer. If the message appears, replace the shuttle frame assembly. |
| SHUTL INV CMD* | Shuttle Invalid Command. Firmware error on the controller board. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again. <br> 2. Cycle power. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| SHUTL INV PARM* | Shuttle Invalid Parameter. Firmware error on the controller board. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again. <br> 2. Cycle power. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| SHUTL OVR SPEED* | The shuttle is oscillating too rapidly. | Adjust the gap between the MPU and the shuttle motor flywheel to 0.010 ± 0.001 inch (0.254 ± 0.025 mm). (See page 354.) |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| SHUTTLE JAM | The shuttle is not moving or is moving at the wrong speed. Check the forms thickness lever: if it is set too tightly, it can slow the shuttle enough to trigger the fault message. | 1. Set the forms thickness lever to match the thickness of paper, but not too tightly.<br><br>2. Check and adjust the platen gap.<br><br>3. Inspect the ribbon mask for deformation that snags and interferes with shuttle movement. Correctly install the hammer bank cover assembly or replace a deformed cover assembly.<br><br>4. Run a print test. If the message appears, power off the printer.<br><br>5. Remove the shuttle cover and paper path or the pedestal top cover. Inspect the shuttle mechanism for obstructions. Check that all cables are attached at the shuttle and the controller board. Make sure the MPU cable is not pinched. (Refer to the Interconnection Diagrams in Appendix A.) Reseat all cables. Check the resistance of the MPU at connector P107. (Refer to the Main Wire Harness Test Tables in Appendix A.) Replace the MPU if it fails the test.<br><br>6. Run a print test. If the message appears, do the power supply operational check (page 274). If the power supply fails the check, replace it. If it passes the check, go to the next step.<br><br>7. Run a shuttle test and observe shuttle movement. If the shuttle oscillates too slowly, adjust the gap between the MPU assembly and the flywheel to $0.010 \pm 0.001$ inch ($0.254 \pm 0.025$ mm). Torque the 7/16 inch MPU clamp screw to 18 inch-pounds (2.03 N•m).<br><br>8. Run a print test. If the message appears, replace the MPU and the MPU cable assembly. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| SHUTTLE JAM (continued) | | 9. Run a print test. If the message appears, replace the controller board. Record the message and return it with the defective board.<br><br>10. Run a print test. If the message appears, replace the shuttle frame assembly. |
| SHUTTLE STALL | See SHUTTLE JAM (page 117). | See SHUTTLE JAM (page 117). |
| SHUTTLE TYPE NOT SUPPORTED* | The shuttle type was not detected at power-up or the shuttle installed in the printer is not supported by the firmware. | 1. Power down the printer. Remove the paper path or top cover to gain access to the card cage. Make sure the shuttle data and power cables are undamaged and have good connections at the shuttle and the controller board.<br><br>2. Power on the printer. If the message appears, download the emulation software again (page 257).<br><br>3. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board.<br><br>4. Power on the printer. If the message appears, replace the shuttle frame assembly. |
| SOFTWARE ERROR* CYCLE POWER | Application software tried to perform an illegal printer function or damaged logic circuits were detected on the controller board. | 1. Cycle power. If the message appears, power off the printer.<br><br>2. Disconnect the input data line from the host computer. Power on the printer. If the message appears, download the emulation software again (page 257).<br><br>3. Cycle power. Run the print job again. If the message appears, replace the controller board. If the message is gone, there is an application software error. Request assistance from your local support group. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| SPX FOUND, ERROR: KEY NOT DETECTED | The controller board does not have a security key. | 1. Remove the SPX from the Debug Port.<br>2. Power down the printer.<br>3. Install the security key. |
| SPX NOT NEEDED OPTIONS ENABLED | The user has attempted to use the SPX to turn on printer options that are already enabled. In such a case the SPX does not copy the security key serial number into its memory and does not deplete itself. | 1. Remove the SPX from the Debug Port.<br>2. Cycle printer power. |
| STACK OVERFLOW* | Firmware error on the controller board. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again.<br>2. Cycle power. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| STACK UNDERFLOW* | Firmware error on the controller board. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again.<br>2. Cycle power. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| STACKER FAULT | Two situations can trigger this message:<br>1. The stacker elevator is obstructed while attempting to move up or down. The message will always occur if the user presses the ELEVATOR UP key on the stacker control panel to move the elevator and the elevator is blocked so that it cannot move to the top of its travel.<br>2. Controller hardware tells firmware that an over-current condition exists. This will only occur if the controller board or the stacker motors are bad. | 1. Open the cabinet rear door and check for obstructions preventing elevator movement. Remove any obstructions.<br><br>2. Power on the printer. Operate the power stacker and check that:<br>a) all motors are operating,<br>b) the paddles are rotating,<br>c) the elevator moves smoothly and without obstruction,<br>d) the timing belts are undamaged and the belt pulleys are not slipping,<br>e) the extension springs are attached and undamaged (not bent or stretched),<br>f) the drive rollers are not damaged,<br>g) the constant force springs are tightly mounted and undamaged. Tighten pulley setscrews and/or replace damaged components as necessary.<br><br>3. Adjust the stacker rails if they are not vertical and parallel.<br><br>4. Check the stacker limit switches. (See page 207.) If the limit switches are OK, go to the next step.<br><br>5. Disable the power stacker unit under the Printer Control menu. (Refer to the *User's Manual.*) If the message occurs, replace the controller board and download new function code.<br><br>6. Power off the printer. Remove the paper path. Disconnect stacker cables from the controller board, stacker assy, and the stacker control panel (see Figure 81, page 467). Check cables for cuts, breaks, or damaged pins. Check continuity of cables. (See Appendix A.) Replace cables that are damaged or fail continuity test. If the cables are OK, replace the stacker motors. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| STACKER FULL | Status message: the power paper stacker is full. | 1. Unload the stacker. <br><br> 2. Check the stacker limit switches. (See page 207.) If the limit switches are OK, go to the next step. <br><br> 3. Power off the printer. Remove the paper path. Disconnect stacker cables from the controller board, stacker assembly, and the stacker control panel (see Figure 78, page 464). Check cables for cuts, breaks, or damaged pins. Check continuity of cables. (See Appendix A.) Replace any cable that is damaged or fails continuity test. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| STACKER JAM | This message is triggered if there is paper inside the throat of the stacker elevator, but the elevator is not moving. | 1. Open the cabinet rear door and check for obstructions preventing elevator movement. Remove any obstructions.<br><br>2. Check that the wheel of the stacker paper motion detector rests against the rear brace of the paper throat. Also make sure the wheel rotates freely. If necessary, gently bend the brace toward the paper motion detector wheel until the wheel contacts the brace. Clean the stacker paper motion detector.<br><br>3. Power on the printer. Operate the power stacker and check that:<br>a) all motors are operating,<br>b) the paddles are rotating,<br>c) the elevator moves smoothly and without obstruction,<br>d) the timing belts are undamaged and the belt pulleys are not slipping,<br>e) extension springs are attached and not bent or stretched),<br>f) drive rollers are not damaged. Tighten setscrews and replace damaged components as necessary.<br><br>4. Power off the printer. Remove the paper path. Disconnect stacker cables from the controller board, stacker assembly, and stacker control panel. Check cables for cuts, breaks, or damaged pins. Check continuity of cables. (See Appendix A.) Replace any cable that is damaged or fails continuity test. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| TABLE MISMATCH DOWNLOAD AGAIN | The software update has failed and should be reloaded. | 1. Cycle power. If the message appears, download the emulation software again.<br><br>2. Cycle power. Install the emulation software. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| TCB CORRUPTED* | Task Control Block Corrupted. Firmware error on the controller board. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again.<br><br>2. Cycle power. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| TCP PORT BUSY | Error message reported by the Printer Manager when ethernet interface option is installed. The network address given in the printer properties was reached, but the printer port is "busy." When the port setting is "Serial" the printer manager software cannot interact with the ethernet card, although the card will respond to other TCP/IP utilities. | 1. Power on the printer.<br>2. If the printer is online, press the **ON LINE** key to place the printer offline.<br>3. On the control panel, press the ▲ + ▼ keys to unlock the **ENTER** key.<br>4. Press the ▲ + ▼ + ◀ + ▶ keys simultaneously to enter the Factory Menu.<br>5. Press ▶ until you reach the PRINTER MGMT menu, then press ▼.<br>6. Press ▶ until you reach the "Diagnostics Port" option, then press ▼.<br>7. Press ▶ until you reach "Debug ethernet", then press **ENTER**.<br>8. Press **ON LINE** to return the printer to the online state.<br>9. Save the changes and set up a new power-up configuration, if necessary. The Printer Manager should now be able to access the printer. For other communication errors, print out the E-Net Test Page (page 226) and verify the IP address, subnet mask, gateway address, and TCP port settings. |
| TIP MISMATCH Use Correct RBN | The incorrect cartridge type is being used for the printer. | Install the correct ribbon cartridge type in the printer. |
| UNDEF INTERRUPT* | Undefined Interrupt. Firmware error on the controller board. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again.<br>2. Cycle power. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| UNDFNED OPCODE* | Undefined Opcode. Firmware error on the controller board. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again (page 257). <br><br> 2. Cycle power. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| UNKNOWN RBN1<br>Install New RBN | The sensor detects a ribbon cartridge, but the ribbon model is not permitted on this printer. | Install a new ribbon. |
| UNKNOWN RBN2<br>Install New RBN | The sensor detects a ribbon cartridge, but the region code does not match the printer. | Install a new ribbon. |
| UP DRV. SHORT* | Upper Driver Short. Hammer driver circuits on the controller board are shorted to ground. | 1. Cycle power. If the message appears, press **CLEAR**. If the message does not clear, replace the hammer bank logic cable and the hammer bank power cable assemblies. <br><br> 2. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. <br><br> 3. Power on the printer. If the message appears, replace the shuttle frame assembly. |

**Table 4. P7000 CRP Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| WAITING FOR ETHERNET ADAPTER | This status message appears when the printer is first powered on if the optional ethernet NIC is installed. An ethernet adapter must be detected early in the power up sequence so the printer can tell the adapter it has been detected and continue with its own power up sequence. Compared to the printer, the ethernet adapter takes a long time to complete its internal diagnostic tests, so the boot code allows the adapter to power up in parallel with the printer to reduce its effect on overall boot time | No action required. |
| WELD NOT DETECT See User Manual | The cartridge weld was not detected. | 1. Clear the fault message. 2. If message persists, replace the cartridge. 3. If necessary, replace the weld sensor. |
| WELD RESET ERROR See User Manual | The cartridge weld circuitry lost power. | 1. Cycle power. 2. If the message persists, replace the weld sensor and cabling if necessary. 3. Replace the cartridge interface board if necessary. |
| WELD SENSR ERR See User Manual | The weld sensor fails the diagnostic test at power-up initialization. | 1. Cycle power. 2. If the message persists, replace the weld sensor and cabling if necessary. 3. Replace the cartridge interface board if necessary. |
| WELD SNSR MISSNG See User Manual | Communication with the weld sensor cannot be established. | 1. Make sure the weld sensor cabling is connected. 2. Replace the weld sensor and cabling if necessary. |

# P7000 CRP H-Series

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| 000:SHUTTLE TYPE NOT SUPPORTED* | The shuttle type was not detected at power-up or the shuttle installed in the printer is not supported by the firmware. | 1. Power down the printer. Remove the paper path or top cover to gain access to the card cage. Make sure the shuttle data and power cables are undamaged and have good connections at the shuttle and the controller board.<br>2. Power on the printer. If the message appears, download the emulation software again (page 257).<br>3. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board.<br>4. Power on the printer. If the message appears, replace the shuttle frame assembly. |
| 001:TBL MISMATCH DOWNLOAD AGAIN | Indicates that the software update has failed and should be reloaded. | 1. Power off the printer. Download the program again from the beginning.<br>2. If the message appears, replace the flash memory and download the program again.<br>3. If the problem still exists, replace the hammer bank logic cable and the shuttle frame assembly.<br>4. If the problem still exists, replace the controller board. Record the message and return it with the defective board.<br>5. If the problem still exists, replace the power supply. |
| 002:WRONG E-NET* RE-DOWNLOAD FRMW | Wrong network interface card is installed. | Re-download firmware then reboot. Remove the installed NIC and replace it with the correct card for this printer. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| 48V PWR FAIL* | 48 Volt Power Failed: an internal power failure. | 1. Power off the printer. Remove the paper path or pedestal top cover. Check that power supply connector P101 is fully seated in connector J101 on the controller board.<br><br>2. If the printer has the CT board, make sure it is correctly seated in the controller board.<br><br>3. Power on the printer. If the message appears, replace the hammer bank logic cable assembly (P108) and the power cable assembly (P105). (Refer to Appendix A.)<br><br>4. Power on the printer. If the message appears, do the power supply operational check (page 274). If the power supply fails the check, replace it. If it passes the check, go to the next step.<br><br>5. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board.<br><br>6. Power on the printer. If the message appears, replace shuttle frame assembly. |
| 100:BAD VFU CHANNEL | Bad vertical forms unit channel given in host file. | Correct host file. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| 102:HAM.BANK HOT LET PRINTER COOL | Hammer Bank Hot. | 1. Cycle power. If the message appears, press **CLEAR**. If the message does not clear, go to step 2.<br><br>2. Power off the printer. Remove the paper path or pedestal top cover. Disconnect connector P107 from the controller board. Test connector P107/HBF for shorts or opens. (Refer to the Main Wire Harness Test Tables in Appendix A.) Replace components that fail test.<br><br>3. Make sure P107/HBF has a good connection at J107 on the controller board.<br><br>4. Inspect for obstructions of airways and vents. Remove obstructions.<br><br>5. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| 104:POWER SUPPLY HOT | The printer has sensor circuits that sample the operating temperature of key components of the power supply. When higher than normal temperatures are sensed, print speed is automatically reduced. If the printer runs at reduced speed for an extended period of time, the POWER SUPPLY HOT message is sent to the LCD and printing stops, allowing printer components to cool down. Pressing the **CLEAR** key resumes the print task. Check the operating environment. A severe environment is one with an ambient temperature at or above 40° Celsius (104° Fahrenheit) or is dirty enough to create blockage of the cabinet fan vents. The printer must never be run at ambient temperatures greater than 40° Celsius (104° Fahrenheit). If the printer is located in such an environment, relocate it to a cooler, cleaner area. | 1. Inspect printer environment for severity. Advise the user to move the printer to cooler, cleaner location.<br><br>2. Check the kinds of print jobs the user is running: look for very dense graphics and layouts. Advise the user to run jobs in smaller batches.<br><br>3. Power off the printer. Remove the paper path or pedestal top cover. Check that the plastic power supply guard/air deflector is correctly positioned over the power supply board. **WARNING: DO NOT TOUCH THE POWER SUPPLY**, but hold your hand close enough to check for heat radiating off the power supply board. If the power supply is noticeably hot, let it cool down, then replace it.<br><br>4. Check that all fan cables are connected.<br><br>5. Inspect vents and fan airways for obstructions. Look underneath cabinet models for items blocking the cabinet exhaust vents.<br><br>6. Install paper path or pedestal top cover. Load paper. Power on the printer. Run the "All E's" print test for 5-10 minutes. If the message appears, replace the controller board. Record the message and return it with the defective board. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| 105:PRINTER HOT | This message indicates internal temperatures over 60° Celsius (140° Fahrenheit). Print jobs will not create such temperatures, so immediately determine that the fans are operating and that all air vents are unobstructed. It is crucial that the exhaust vents on the floor of the cabinet remain unblocked, since hot air from inside the printer is vented through the cabinet floor. Nothing must be stored under the printer. Then check the operating environment. A severe environment is one with an ambient temperature at or above 40° Celsius (104° Fahrenheit) or is dirty enough to create blockage of the cabinet fan vents. The printer must never be run at ambient temperatures greater than 40° Celsius (104° Fahrenheit). If the printer is located in such an environment, relocate it to a cooler, cleaner area. | 1. Controller board sensors report high temperatures on the board. Inspect printer environment for severity. Advise the user to move the printer to cooler, cleaner location.<br>2. Power off the printer. Remove the paper path or pedestal top cover. Check that all fan cables are connected.<br>3. Inspect vents and fan airways for obstructions. Look underneath cabinet models for items blocking the cabinet exhaust vents. Remove any obstructions from vents and airways.<br>4. Install paper path or pedestal top cover. Load paper. Power on the printer. Run the "All Black" print test for 1/4 page. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| 400:BUFFER OVERFLOW | Host sends data after the printer buffer is full (serial interface). | Check your printer serial interface parameter settings; if necessary, adjust them so that they match the settings of the attached host. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| 401:BUFFER OVERRUN | The print buffer has overflowed on a serial interface. The printed output may contain random * (asterisk) characters. Make a configuration printout. | 1. Verify that the printer matches the host serial interface configuration settings for Data Protocol, Baud Rate, Data Bits, Stop Bits, Parity, Data Terminal Ready, and Request to Send. Set printer serial interface parameters to match those of the host.<br><br>2. Send a print job to the printer. If the message appears, go to **Communications Failures**, page 220. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| 402:CLEAR PAPER JAM | Paper jam. | 1. Inspect the paper path for jams. Clear jams. Load paper.<br>2. Press **PAPER ADVANCE** several times and check that forms feed without erratic motion, noise, or pin-hole damage. If forms do not feed, go to **Paper feeds poorly**, page 214. If forms feed, go to step 3.<br>3. Press **VIEW** once and check that forms move up. Make sure the forms thickness lever is not set too tightly.<br>4. Press **VIEW** again and check that the forms thickness lever rotates and the paper moves down. If the forms thickness lever does not rotate and/or the paper does not move down, refer to **Reverse paper feed: platen does not open**, page 216.<br>5. Check the paper tension between the tractors. Adjust the right tractor so that it does not pull paper too tightly or leave it too loose. The right tractor should hold the paper under "slight" tension.<br>6. Check the dynamic paper tension.<br>7. Inspect the ribbon mask for bends or deformation. Replace if damaged.<br>8. Check and adjust the platen open belt. Replace the belt if it is damaged. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| 403:CLOSE PLATEN | The forms thickness lever is open. | 1. Load paper. Close the forms thickness lever.<br><br>2. Power off the printer. Remove the paper path or pedestal top cover. Disconnect connector P107 from the controller board. Check continuity of the platen interlock switch from P107/PLO to the switch. Replace the switch assembly if it fails the continuity test. (Refer to Appendix A, Switch Assembly, Platen Interlock.)<br><br>3. With the forms thickness lever closed (position A), hold a 0.011 inch (0.028 cm) feeler gauge between the switch and the body of the forms thickness lever, gently press down on the switch, and tighten the two screws.<br><br>4. Check and adjust the platen open belt. Replace the belt if it is damaged.<br><br>5. Disconnect connector P106 from the controller board. Check the resistance of connector P106/ PLAT M. (See the Main Wire Harness Test Tables in Appendix A.) Replace the platen open motor if it fails the resistance test.<br><br>6. Run a print test. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| 404:FILE EXISTS ENABLE OVERWRITE | The printer has deleted the previous program from flash memory and is loading the new program into flash memory. | No action required. |
| 405:FLASH FULL DELETE FILES | The printer requires more flash memory to run the downloaded program. | Delete files, add flash memory, or use a smaller emulation program. |
| 406:FLASH FULL OPTIMIZE&REBOOT | The printer requires more flash memory to run the downloaded program. | Add flash memory or use a smaller emulation program. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| 408:WRITE ERROR CHECK FLASH | Hardware or software fault in flash memory. | 1. Replace flash memory.<br>2. If message occurs with new memory, replace the controller board. Record the message and return it with the defective board. |
| 409:FRAMING ERROR | The printed output may contain random ! (exclamation point) characters. | 1. Make a configuration printout. Set printer serial interface parameters to match host configuration settings for Data Protocol, Baud Rate, Data Bits, Stop Bits, Parity, Data Terminal Ready, and Request to Send.<br>2. Send a print job to the printer. If the message appears, go to **Communications Failures**, page 220. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| 410:LOAD PAPER | The printer is out of paper. | 1. Load paper. Press **CLEAR**. If message does not clear, go to the next step. |
| | | 2. Check for black or colored backing on the paper being used in printer. The paper out detector is optical and may not detect paper with a black or dark backing facing the detector. Try paper with a white or light back. If paper with white/light back works and black/dark paper does not, replace the paper detector switch with the optional black back forms switch assembly. (See page 360, item 3.) |
| | | 3. Power off the printer. Remove the paper path or pedestal top cover. Remove the barrier shield (cabinet model) or the barrier shield and paper guide (pedestal model). Check that the paper detector switch assembly is securely mounted in its bracket. |
| | | 4. Check that connector P106/PMD is fully seated in connector J106 on the controller board. |
| | | 5. Load paper. Power on the printer. Replace the paper detector switch assembly if message appears. |
| | | 6. Load paper. Power on the printer. Replace the controller board if message appears. Record the message and return it with the defective board. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| 411:PARITY ERROR | The printed output may contain random ? (question mark) characters. Make a configuration printout. | 1. Verify that the printer matches host serial configuration settings for Data Protocol, Baud Rate, Data Bits, Stop Bits, Parity, Data Terminal Ready, and Request to Send.<br><br>2. Send a print job to the printer. If the message appears, replace the serial data cable.<br><br>3. Send a print job to the printer. If the message appears, go to **Communications Failures**, page 220.<br><br>4. If the printer is in a twinax environment, check the error log for parity error entries and inspect the customer's cable hook-ups. Connect all communications cables correctly.<br><br>5. Send a print job to the printer. If the message appears, replace the twinax auto-termination cable ("T" connector).<br><br>6. Send a print job to the printer. If the message appears, replace the CT. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| 414:RIBBON STALL | The controller board does not detect ribbon movement. | 1. Cycle power. If the message appears, power off the printer. |
| | | 2. Check that the ribbon cartridge is properly set. Make sure ribbon motion is free by turning the ribbon tension knob clockwise. Replace cartridge if ribbon does not move freely. |
| | | 3. Inspect the ribbon mask for excessive ink build-up or a torn/bunched ribbon. Clean the ribbon mask and replace the ribbon as required to insure unobstructed movement of the ribbon between the ribbon mask and hammer bank cover. |
| | | 4. Check the platen gap and adjust if required. If the gap is too narrow, it can restrict ribbon movement through the ribbon mask. |
| | | 5. Remove the paper path or pedestal top cover. Reseat the ribbon drive motor cable connection. |
| | | 6. Power on the printer. Check that the ribbon drive motor winds the ribbon. If the ribbon will not wind, replace the defective ribbon drive motor. |
| | | 7. If the ribbon continues not to wind replace the controller board and download new function code. Record the message and return it with defective board. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| 415:SHUTTLE JAM | The shuttle is not moving or is moving at the wrong speed. Check the forms thickness lever: if it is set too tightly, it can slow the shuttle enough to trigger the fault message. | 1. Set the forms thickness lever to match the thickness of paper, but not too tightly.<br><br>2. Check and adjust the platen gap.<br><br>3. Inspect the ribbon mask for deformation that snags and interferes with shuttle movement. Correctly install the hammer bank cover assembly or replace a deformed cover assembly.<br><br>4. Run a print test. If the message appears, power off the printer.<br><br>5. Remove the shuttle cover and paper path or the pedestal top cover. Inspect the shuttle mechanism for obstructions. Check that all cables are attached at the shuttle and the controller board. Make sure the MPU cable is not pinched. (Refer to the Interconnection Diagrams in Appendix A.) Reseat all cables. Check the resistance of the MPU at connector P107. (Refer to the Main Wire Harness Test Tables in Appendix A.) Replace the MPU if it fails the test.<br><br>6. Run a print test. If the message appears, do the power supply operational check (page 274). If the power supply fails the check, replace it. If it passes the check, go to the next step.<br><br>7. Run a shuttle test and observe shuttle movement. If the shuttle oscillates too slowly, adjust the gap between the MPU assembly and the flywheel to $0.010 \pm 0.001$ inch ($0.254 \pm 0.025$ mm). Torque the 7/16 inch MPU clamp screw to 18 inch-pounds (2.03 N•m).<br><br>8. Run a print test. If the message appears, replace the MPU and the MPU cable assembly. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| 415:SHUTTLE JAM (continued) | The shuttle is not moving or is moving at the wrong speed. Check the forms thickness lever: if it is set too tightly, it can slow the shuttle enough to trigger the fault message. | 9. Run a print test. If the message appears, replace the controller board. Record the message and return it with the defective board.<br><br>10. Run a print test. If the message appears, replace the shuttle frame assembly. |
| 416:STACKER FULL | Status message: the power paper stacker is full. | 1. Unload the stacker.<br><br>2. Check the stacker limit switches. (See page 207.) If the limit switches are OK, go to the next step.<br><br>3. Power off the printer. Remove the paper path. Disconnect stacker cables from the controller board, stacker assembly, and the stacker control panel (see Figure 78, page 464). Check cables for cuts, breaks, or damaged pins. Check continuity of cables. (See Appendix A.) Replace any cable that is damaged or fails continuity test. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| 417:STACKER JAM | This message is triggered if there is paper inside the throat of the stacker elevator, but the elevator is not moving. | 1. Open the cabinet rear door and check for obstructions preventing elevator movement. Remove any obstructions.<br><br>2. Check that the wheel of the stacker paper motion detector rests against the rear brace of the paper throat. Also make sure the wheel rotates freely. If necessary, gently bend the brace toward the paper motion detector wheel until the wheel contacts the brace. Clean the stacker paper motion detector.<br><br>3. Power on the printer. Operate the power stacker and check that:<br>a) all motors are operating,<br>b) the paddles are rotating,<br>c) the elevator moves smoothly and without obstruction,<br>d) the timing belts are undamaged and the belt pulleys are not slipping,<br>e) extension springs are attached and not bent or stretched),<br>f) drive rollers are not damaged. Tighten setscrews and replace damaged components as necessary.<br><br>4. Power off the printer. Remove the paper path. Disconnect stacker cables from the controller board, stacker assembly, and stacker control panel. Check cables for cuts, breaks, or damaged pins. Check continuity of cables. (See Appendix A.) Replace any cable that is damaged or fails continuity test. |
| 418:RBN INK LOW Change RBN Soon | Status message indicating the Integrated Print Management System is enabled and ribbon ink level is 2%. | Install a new ribbon. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| 419:RBN INK OUT* Install New RBN | Integrated Print Management System software has determined that the ribbon is out of ink. | Install a new ribbon. |
| 420:EXC RBN WEAR Install New RBN | Status message that displays when ribbon reaches the end of its service life, whether the Integrated Print Management System is enabled or not. | Install a new ribbon. |
| 423:OLD RIBBON Install New RBN | The sensor detects a ribbon that was previously declared to be at the end of its service life. | Install a new ribbon. |
| 424:UNKNOWN RBN1 Install New RBN | The sensor detects a ribbon cartridge, but the ribbon model is not permitted on this printer. | Install a new ribbon. |
| 425:UNKNOWN RBN2 Install New RBN | The sensor detects a ribbon cartridge, but the region code does not match the printer. | Install a new ribbon. |
| 427:CRTG MISSING Install new RBN | The ribbon cartridge is missing or installed improperly. | 1. Make sure a ribbon cartridge is installed in the printer. 2. Make sure the ribbon cartridge is seated properly. 3. Remove and replace the cartridge if necessary. 4. Check the cable connection from the cartridge interface board to the controller. 5. Replace the cartridge interface board if necessary. |
| 428:CRTG COMM ER See User Manual | The hardware cannot communicate properly with the cartridge. | 1. Make sure the ribbon cartridge is seated properly. 2. Remove and replace the ribbon cartridge if necessary. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| 432:CRT NOT SET | The ribbon cartridge is not properly positioned. | 1. Make sure a ribbon cartridge is installed in the printer.<br>2. Make sure the ribbon cartridge is seated properly.<br>3. Remove and replace the cartridge if necessary. |
| 435:NO WELD<br>See User Manual | The cartridge weld was not detected. | 1. Clear the fault message.<br>2. If message persists, replace the cartridge.<br>3. If necessary, replace the weld sensor. |
| 437:REGx MISSING<br>Use Correct RBN | The incorrect cartridge type is being used for the printer. | Install region X ribbon cartridge in the printer.<br>**NOTE:** Specify the region of the printer when ordering ribbons. |
| 438:TIP MISMATCH<br>Use Correct RBN | The incorrect cartridge type is being used for the printer. | Install the correct ribbon cartridge type in the printer. |
| 439:SHTL MISMATCH<br>Use Correct RBN | This message displays when an Extended Life Ribbon is mounted on a 500 lpm printer. | Install Standard Life Ribbon. |
| 440:RWP<br>DOWNLOAD<br>Please Wait | Status message indicating the software in the cartridge is being updated. The user must wait for the update to complete. | No action is required unless the message displays for more than 2 to 3 minutes. In this case, replace the weld sensor. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| 601:15V CTL FAIL* | Controller Voltage Failure. 15 V failure on the controller board. | 1. Cycle Power. Run the print job again. If the message appears, download the emulation software again (page 257).<br><br>2. Cycle power. Run the print job again. If the message appears, replace the flash memory.<br><br>3. Power on the printer. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board.<br><br>4. Power on the printer. Run the print job again. If the message appears, do the power supply operational check (page 274). If the power supply fails the check, replace it. If it passes the check, go to the next step.<br><br>5. Power on the printer. If the message appears, replace the shuttle frame assembly. |
| 602:23.5V CTL FAIL* | 23.5 Volt Controller Failed: a voltage failure on the controller board. | 1. Cycle Power. Run the print job again. If the message appears, download the emulation software again (page 257).<br><br>2. Cycle power. Run the print job again. If the message appears, replace the flash memory.<br><br>3. Power on the printer. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board.<br><br>4. Power on the printer. Run the print job again. If the message appears, do the power supply operational check (page 274). If the power supply fails the check, replace it. If it passes the check, go to the next step.<br><br>5. Power on the printer. If the message appears, replace the shuttle frame assembly. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| 604:48V CIRCUIT*<br>See User Manual | Either the power supply is not generating a proper 48 Volts or the controller board is not detecting a 48 Volt output from the power supply board. | 1. Make sure the power supply board is correctly connected to the controller board.<br><br>2. Power on the printer. If the message appears, do the power supply operational check (page 274). If the power supply fails the check, replace it. If it passes the check, go to the next step.<br><br>3. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| 605:POWER 48V CHECK* | 48 Volt Failed: an internal power failure. | 1. Power off the printer. Remove the paper path or pedestal top cover. Check that power supply connector P101 is fully seated in connector J101 on the controller board.<br><br>2. If the printer has the CT board, make sure it is correctly seated in the controller board.<br><br>3. Power on the printer. If the message appears, replace the hammer bank logic cable assembly (P108) and the power cable assembly (P105). (Refer to Appendix A.)<br><br>4. Power on the printer. If the message appears, do the power supply operational check (page 274). If the power supply fails the check, replace it. If it passes the check, go to the next step.<br><br>5. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board.<br><br>6. Power on the printer. If the message appears, replace shuttle frame assembly. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| 606:POWER 8.5V CHECK | 8.5 Volt Power Failed. Internal power failure. | 1. Cycle power. If the message appears, do the power supply operational check (page 274). If the power supply fails the check, replace it. If it passes the check, go to the next step.<br><br>2. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board.<br><br>3. Power on the printer. If the message appears, replace the shuttle frame assembly. |
| 607:CTL VOLT FAIL* | Controller Voltage Failure. 15 V failure on the controller board. | 1. Cycle Power. Run the print job again. If the message appears, download the emulation software again (page 257).<br><br>2. Cycle power. Run the print job again. If the message appears, replace the flash memory.<br><br>3. Power on the printer. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board.<br><br>4. Power on the printer. Run the print job again. If the message appears, do the power supply operational check (page 274). If the power supply fails the check, replace it. If it passes the check, go to the next step.<br><br>5. Power on the printer. If the message appears, replace the shuttle frame assembly. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| 608:DRIVER CIRCUIT BAD | Driver Circuit Bad: the hammer coil count test failed. | 1. Cycle power. If the message appears, press **CLEAR**.<br><br>2. Power off the printer. Remove the shuttle cover. At the shuttle frame assembly, disconnect the hammer bank logic and power cables. Power on the printer. If "HB NOT INSTALLD" appears on the LCD, replace the shuttle frame assembly. If "HB NOT INSTALLD" does not appear on the LCD, replace the controller board. |
| 609:EXHAUST FAN CHECK | Exhaust Fan Fault. Sensors cannot detect current in the fan circuit.<br><br>**NOTE:** For cabinet models only. | 1. Cycle power. If the message appears, press **CLEAR**.<br><br>2. Check that the exhaust fan is connected to exhaust fan cable connector J307. Connect the fan cable connector.<br><br>3. Power off the printer. Remove the paper path. Disconnect connector P107 from the controller board. Test connector P107/EHF for shorts or opens. (See the Main Wire Harness Test Tables in Appendix A.) Replace components that fail test.<br><br>4. Make sure connector P107/EHF has a good connection at J107 on the controller board.<br><br>5. Inspect for obstructions of airways and vents. Check for items beneath the printer blocking cabinet vents. Remove obstructions. Make sure cabinet exhaust fan vents are not blocked.<br><br>6. Power on the printer. Check for fan operation. If the message appears or the fan does not work, replace the exhaust fan.<br><br>7. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| 610:HAMMER COIL OPEN | Hammer Coil Open. Electrical malfunction of one or more hammer coils. | 1. Cycle power. If the message appears, replace the shuttle frame assembly.<br><br>2. Power on the printer. Run a print test. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| 611:HAMMER COIL SHORT* | Electrical malfunction of one or more hammer coils. | 1. Cycle power. If the message appears, replace the shuttle frame assembly.<br><br>2. Power on the printer. Run a print test. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| 612:HAMMER DRIVER SHORT* | Electrical malfunction of hammer driver. | 1. Cycle power. If the message appears, replace the shuttle frame assembly.<br><br>2. Power on the printer. Run a print test. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| 613: HAM. COIL BAD #, #, #, ...etc | Hammer coil(s) number #, #, etc. failed the current test at power-up. Check that the hammer bank cables are connected. | 1. Cycle power. If the message appears, replace the shuttle frame assembly. Record the message and return it with the defective assembly.<br><br>2. Power on the printer. If the message appears, replace controller board. Record the message and return it with the defective assembly. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| 614:HAMMER BANK* NOT INSTALLED | Hammer Bank Not Installed. Self-test routines do not detect hammer coils at printer start-up. Power off the printer. Verify that the shuttle frame assembly is installed. | 1. Install the shuttle frame assembly.<br><br>2. Remove the paper path or pedestal top cover. Verify that the hammer bank logic cable is connected to connector J108 on the controller board and to the shuttle frame assembly.<br><br>3. Power on the printer. If the message appears, replace the hammer bank logic cable.<br><br>4. Power on the printer. If the message appears, replace the shuttle frame assembly.<br><br>5. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| 615:HAMMER FAN CHECK | Hammer Bank Fan Check. Sensors cannot detect current in the fan circuit. | 1. Cycle power. If the message appears, press **CLEAR**. If the message does not clear, go to step 2.<br><br>2. Power off the printer. Remove the paper path or pedestal top cover. Disconnect connector P107 from the controller board. Test connector P107/HBF for shorts or opens. (Refer to the Main Wire Harness Test Tables in Appendix A.) Replace components that fail test.<br><br>3. Make sure P107/HBF has a good connection at J107 on the controller board.<br><br>4. Inspect for obstructions of airways and vents. Remove obstructions.<br><br>5. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| 616:INTAKE FAN FAULT | Sensors cannot detect current in the card cage fan circuit. | 1. Cycle power. If the message appears, press **CLEAR**. If the message does not clear, go to step 2.<br><br>2. Power off the printer. Remove the paper path or pedestal top cover. Disconnect connector P106 from the controller board. Test connector P106/CCF for shorts or opens. (Refer to the Main Wire Harness Test Tables in Appendix A.) Replace components that fail test.<br><br>3. Make sure P106/CCF has a good connection at J106 on the controller board.<br><br>4. Inspect for obstructions of airways and vents. Remove obstructions.<br><br>5. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| 617:LOWER DRIVER SHORT* | Lower Driver Short. Circuit(s) on the hammer bank or in the hammer bank power cable are shorted to ground. | 1. Cycle power. If the message appears, press **CLEAR**. If message does not clear, replace the hammer bank logic cable and the hammer bank power cable.<br><br>2. Power on the printer. If the message appears, replace the shuttle frame assembly.<br><br>3. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| 619:PAPER FEED DRIVER CIRCUIT* See Manual | Paper Feed Driver Circuit. The paper feed driver circuit on the controller board is drawing too much current. | 1. Cycle power. If the message appears, replace the controller board. Record the message and return it with the defective board.<br><br>2. Power on the printer. If the message appears, replace the paper feed motor. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| 620:POWER VOLT CHECK* | Power Supply Voltage. The power supply has failed. | Replace power supply board. |
| 621:RIBBON DRIVER CIRCUIT* | The ribbon driver circuit on the controller board is drawing too much current. | 1. Power down the printer. Remove the paper path or top cover to gain access to the card cage. Make sure the shuttle data and power cables are undamaged and have good connections at the shuttle and the controller board.<br>2. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board.<br>3. Power on the printer. If the message appears, replace the shuttle frame assembly. |
| 622:SHUTTLE DRIVER CRCUIT* | The shuttle driver circuit on the controller board is drawing too much current. | 1. Power down the printer. Remove the paper path or top cover to gain access to the card cage. Make sure the shuttle data and power cables are undamaged and have good connections at the shuttle and the controller board.<br>2. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board.<br>3. Power on the printer. If the message appears, replace the shuttle frame assembly. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| 623:STACKER FAULT | Two situations can trigger this message:<br>1. The stacker elevator is obstructed while attempting to move up or down. The message will always occur if the user presses the ELEVATOR UP key on the stacker control panel to move the elevator and the elevator is blocked so that it cannot move to the top of its travel.<br>2. Controller hardware tells firmware that an over-current condition exists. This will only occur if the controller board or the stacker motors are bad. | 1. Open the cabinet rear door and check for obstructions preventing elevator movement. Remove any obstructions.<br><br>2. Power on the printer. Operate the power stacker and check that:<br>a) all motors are operating,<br>b) the paddles are rotating,<br>c) the elevator moves smoothly and without obstruction,<br>d) the timing belts are undamaged and the belt pulleys are not slipping,<br>e) the extension springs are attached and undamaged (not bent or stretched),<br>f) the drive rollers are not damaged,<br>g) the constant force springs are tightly mounted and undamaged. Tighten pulley setscrews and/or replace damaged components as necessary.<br><br>3. Adjust the stacker rails if they are not vertical and parallel.<br><br>4. Check the stacker limit switches. (See page 207.) If the limit switches are OK, go to the next step.<br><br>5. Disable the power stacker unit under the Printer Control menu. (Refer to the *User's Manual.)* If the message occurs, replace the controller board and download new function code.<br><br>6. Power off the printer. Remove the paper path. Disconnect stacker cables from the controller board, stacker assy, and the stacker control panel (see Figure 81, page 467). Check cables for cuts, breaks, or damaged pins. Check continuity of cables. (See Appendix A.) Replace cables that are damaged or fail continuity test. If the cables are OK, replace the stacker motors. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| 624:UPPER DRIVER SHORT* | Upper Driver Short. Hammer driver circuits on the controller board are shorted to ground. | 1. Cycle power. If the message appears, press **CLEAR**. If the message does not clear, replace the hammer bank logic cable and the hammer bank power cable assemblies.<br><br>2. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board.<br><br>3. Power on the printer. If the message appears, replace the shuttle frame assembly. |
| 625:WRONG E-NET Remove NIC | The ethernet NIC for a thermal printer has been installed in this printer. | Remove the installed NIC and replace it with the correct card for this printer. |
| 700:A TO D OVERRUN* | Analog to Digital Overrun. The analog-to-digital converter overflowed. | Cycle power. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| 701:ACCESS NULL POINTER* | Access Null Pointer: The processor tried to access a pointer that contains nothing (null). | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again (page 257).<br><br>2. Cycle power. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| 702:FIRMWARE ERROR* | Application software tried to perform an illegal printer function or damaged memory is detected on the controller board. If the message appears at power-up, replace the controller board. Record the message and return it with the defective board. | 1. Cycle power. Run the print job. If the message appears, download the emulation software again (page 257).<br>2. Cycle power. Run the print job again. If the message appears, replace the flash memory.<br>3. Cycle power. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board.<br>4. Power on the printer. Run the print job again. If the message still appears, there is an application software error. Use your local support procedure to request assistance. |
| 703:ILLEGAL EXTERNAL BUS ACC* | Illegal External Bus Access. Firmware error on the controller board. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again (page 257).<br>2. Cycle power. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| 704:ILLEGAL INSTRUCTION ACC* | Illegal Instruction Accessed. Firmware error on the controller board. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again (page 257).<br>2. Cycle power. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| 705:ILLEGAL OPERAND ACCESS* | Illegal Operand Accessed. Firmware error on the controller board. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again (page 257).<br>2. Cycle power. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| 706:PAP BAD TABLE* | Paper Bad Table. The paper feed process on the controller board has a corrupted table. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again.<br><br>2. Cycle power. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| 707:PAPER BUSY TOO LONG* | Paper Busy Too Long. Firmware error on the controller board. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again (page 257).<br><br>2. Run the print job again. If the message appears, power off the printer. Remove the paper path or pedestal top cover. Make sure connectors P106 and P107 are fully seated on the controller board. Make sure the MPU cable, the hammer bank logic cable, and the hammer bank power cable are undamaged and have good connections. Replace as necessary. (Refer to Appendix A.)<br><br>3. Power on the printer. Run the print job again. If the message appears, replace the shuttle frame assembly.<br><br>4. Power on the printer. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| 708:PAPER FIFO OVERFLOW* | Paper First In First Out Overflow. Firmware error on the controller board. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again.<br><br>2. Power on the printer. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| 709:PAPER FIFO UNDERFLOW* | Paper First In First Out Underflow. Firmware error on the controller board. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again. <br><br> 2. Run the print job again. If the message appears, power off the printer. Remove the paper path or pedestal top cover. Make sure connectors P106 and P107 are fully seated on the controller board. Make sure the MPU cable, the hammer bank logic cable, and the hammer bank power cable are undamaged and have good connections. Replace as necessary. (Refer to Appendix A.) <br><br> 3. Check hammer phasing. Try using a lower phasing value; sometimes this message indicates too high a hammer phase value. <br><br> 4. Power on the printer. Run the print job again. If the message appears, replace the shuttle frame assembly. <br><br> 5. Power on the printer. Run the print job again. If the message appears, do the power supply operational check (page 274). If the power supply fails the check, replace it. If it passes the check, go to the next step. <br><br> 6. Power on the printer. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| 710:PAP ILLGL ST* | Paper Illegal State. Firmware error on the controller board. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again.<br><br>2. Cycle power. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| 711:PAP INCMPL ENER* | Paper Incompletely Energized. Firmware error on the controller board. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again.<br><br>2. Cycle power. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| 712:PAP INVLD CMD* | Paper Invalid Command. Firmware error on the controller board. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again.<br><br>2. Cycle power. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| 713:PAP INVLD PARM* | Paper Invalid Parameter. Firmware error on the controller board. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again.<br><br>2. Cycle power. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| 714:PAP NOT SCHED* | Paper Not Scheduled. The paper feed process is not scheduling on the controller board, and the printer cannot feed paper. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again.<br><br>2. Cycle power. Run the print job again. If the message appears, replace the MPU cable assembly.<br><br>3. Power on the printer. Run the print job again. If the message appears, do the power supply operational check (page 274). If the power supply fails the check, replace it. If it passes the check, go to the next step.<br><br>4. Power on the printer. Run the print job again. If the message appears, replace the shuttle frame assembly.<br><br>5. Power on the printer. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| 715:PAP NT AT SPEED* | Paper Not At Speed. Firmware error on the controller board. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again.<br><br>2. Cycle power. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| 716:PAP UNEXP INT* | Paper Unexpected Interrupt. Firmware error on the controller board. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again.<br><br>2. Cycle power. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| 717:PLAT INV CMD* | Platen Invalid Command. Firmware error on the controller board. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again. <br> 2. Cycle power. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| 718:PLAT INV PARM* | Platen Invalid Parameter. Firmware error on the controller board. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again. <br> 2. Cycle power. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| 719:PLAT INV STATE* | Platen Invalid State. Firmware error on the controller board. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again. <br> 2. Cycle power. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| 720:PROTECTED INSTRUCTION* | Protected Instruction. Firmware error on the controller board. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again. <br> 2. Cycle power. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| 721:RIB INVLD CMD*<br>See User Manual | Ribbon Invalid Command. Firmware error on the controller board. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again.<br><br>2. Cycle power. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| 722:RIB INVLD STATE* | Ribbon Invalid State. Firmware error on the controller board. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again.<br><br>2. Cycle power. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| 723:SHUTL INV CMD* | Shuttle Invalid Command. Firmware error on the controller board. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again.<br><br>2. Cycle power. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| 724 SHUTL INV PARM* | Shuttle Invalid Parameter. Firmware error on the controller board. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again.<br><br>2. Cycle power. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| 725:SHUTL OVER SPEED* | The shuttle is oscillating too rapidly. | Adjust the gap between the MPU and the shuttle motor flywheel to 0.010 ± 0.001 inch (0.254 ± 0.025 mm). (See page 354.) |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| 726:SHUTT. FAN FAIL* | Sensors cannot detect current in the hammer bank fan circuit. | 1. Cycle power. If the message appears, press CANCEL.<br><br>2. Power off and unplug the printer. Remove the paper guide assembly or pedestal top cover. Verify that the connector is not installed backwards.<br><br>3. Disconnect connector P107 from the controller board. Test connector P107/HBF for shorts or opens. (Refer to the Main Wire Harness Test Tables in Appendix A.) Replace components that fail test.<br><br>4. Make sure P107/HBF has a good connection at J107 on the controller board.<br><br>5. Inspect for obstructions of airways and vents. Check for items beneath the printer blocking cabinet vents. Remove obstructions. Make sure cabinet exhaust fan vents are not blocked.<br><br>6. Power on the printer. Check for fan operation. If the message appears or the fan does not work, replace the exhaust fan.<br><br>7. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| 727:SOFTWARE ERROR* | Application software tried to perform an illegal printer function or damaged logic circuits were detected on the controller board. | 1. Cycle power. If the message appears, power off the printer.<br>2. Disconnect the input data line from the host computer. Power on the printer. If the message appears, download the emulation software again (page 257).<br>3. Cycle power. Run the print job again. If the message appears, replace the controller board. If the message is gone, there is an application software error. Request assistance from your local support group. |
| 728:STACK OVERFLOW* | Firmware error on the controller board. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again.<br>2. Cycle power. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| 729:STACK UNDERFLOW* | Firmware error on the controller board. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again.<br>2. Cycle power. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| 730:TCB CORRUPTED* | Task Control Block Corrupted. Firmware error on the controller board. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again.<br>2. Cycle power. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| 731:UNDEFINED INTERRUPT* | Undefined Interrupt. Firmware error on the controller board. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again.<br>2. Cycle power. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| 732:UNDEFINED OPCODE | Undefined Opcode. Firmware error on the controller board. | 1. Cycle power. Run the print job again. If the message appears, download the emulation software again (page 257).<br>2. Cycle power. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| 733 DP FIFO Busy* | There is a timing problem in the Engine Controller firmware. | 1. Cycle Power. Run the print job again. If the message appears, download the emulation software again (page 257).<br>2. Cycle power. Run the print job again. If the message appears, replace the flash memory.<br>3. Power on the printer. Run the print job again. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| 900:ERROR: xxxx | User defined fault using PNE. | User defined. |
| 901:FLASH FULL REBOOT/ADD FLASH | The printer requires more flash memory to run the downloaded program. | Add flash memory or use a smaller emulation program. |
| 902:RAM FULL REBOOT/ADD RAM | The printer requires more RAM. | Add RAM or use a smaller emulation program. |
| B00 STATUS: SDRAM DETECTION 166MHZ | Status message: the printer has begun its boot-up routines and is checking for the presence of SDRAM. | No action required. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| B01 STATUS: 8245 SDRAM TEST 32MB | Status message: printer boot-up routines are testing SDRAM. | No action required. |
| B10 ERROR: NO DRAM DETECTED* | Boot-up routines did not detect the presence of the SDRAM DIMM. | 1. Cycle power. If the message appears again, power down and check that there is an SDRAM DIMM installed on the controller board. If not, install the SDRAM. If so, reseat the SDRAM DIMM.<br><br>2. Power up the printer. If the message appears, replace the SDRAM DIMM.<br><br>3. Power up the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| B11 ERROR: RAM TEST FAILED* | SDRAM failed the boot initialization test. | 1. Cycle power. If the message appears again, reseat the SDRAM DIMM.<br><br>2. Power up the printer. If the message appears, replace the SDRAM DIMM.<br><br>3. Power up the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| B12 ERROR: PROGRAM MISSING* | The printer does not see a program in flash memory. | There is no program in printer memory. Download an emulation. |
| B13 ERROR: NOT COMPATIBLE* | The printer is not compatible with the downloaded program. | Load the correct emulation software option(s) for this printer. |
| B19 ERROR: DC RETURNED* | This message indicates an incorrectly assembled and tested machine. | Cycle power. If the message appears again contact the printer manufacturer and report this message. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| B20 STATUS :00% DOWNLOAD MODE | Status message informing the operator that software is being downloaded through the printer's parallel port using the three-key download activation (page 260). The percentage indicates the approximate amount loaded into the printer. | No action required. |
| B21 STATUS: PRINTER RESET | Status message informing the operator that the printer is undergoing a system reset. | No action required. |
| B22 ERROR: DECOMPRESS SIZE* | Flash memory has not passed boot initialization tests. | 1. Cycle power. If the message appears again, reseat the flash SIMM.<br><br>2. Power on the printer. If the message appears, replace the flash SIMM.<br><br>3. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| B23 ERROR: DECOMPRESS CKSUM* | Flash memory has not passed boot initialization tests. | 1. Cycle power. If the message appears again, reseat the flash SIMM.<br><br>2. Power on the printer. If the message appears, replace the flash SIMM.<br><br>3. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| B30 STATUS: INITIALIZING... | Status message: the printer is running its initialization routines after startup and successful memory tests. | No action required. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| B35 STATUS: WAITING FOR EC STATUS | Status message: the DC on the controller board is waiting for communication with the EC. If this message does not clear within a few seconds there is an electrical or electronic problem on the controller board. | Cycle power. If the message appears again, replace the controller board. Record the message and return it with the defective board. |
| B40 ERROR: SDRAM EEPROM CKSUM BAD* | Flash memory has not passed boot initialization tests. | 1. Cycle power. If the message appears again, reseat the flash SIMM.<br><br>2. Power on the printer. If the message appears, replace the flash SIMM.<br><br>3. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| B41 ERROR: DIM MEMORY NOT SDRAM* | The DRAM DIMM installed on the controller board is not Synchronous DRAM (SDRAM). | 1. Cycle power. If the message appears again, reseat the SDRAM DIMM.<br><br>2. Power on the printer. If the message appears, install a new SDRAM DIMM of the correct type and size.<br><br>3. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| B42 ERROR: SDRAM ROWS NOT ALLOWED* | Printer boot initialization tests detect incorrect SDRAM. | 1. Cycle power. If the message appears again, reseat the SDRAM DIMM.<br><br>2. Power on the printer. If the message appears, install a new SDRAM DIMM of the correct type and size.<br><br>3. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| B43 ERROR: SDRAM TOO MANY BANKS* | Printer boot initialization tests detect incorrect SDRAM. | 1. Cycle power. If the message appears again, reseat the SDRAM DIMM.<br><br>2. Power on the printer. If the message appears, install a new SDRAM DIMM of the correct type and size.<br><br>3. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| B44 ERROR: SDRAM NOT 64 BITS WIDE* | Printer boot initialization tests detect incorrect SDRAM. | 1. Cycle power. If the message appears again, reseat the SDRAM DIMM.<br><br>2. Power on the printer. If the message appears, install a new SDRAM DIMM of the correct type and size.<br><br>3. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| B45 ERROR: SDRAM IS WRONG VOLTAGE* | Printer boot initialization tests detect incorrect SDRAM. | 1. Cycle power. If the message appears again, reseat the SDRAM DIMM.<br><br>2. Power on the printer. If the message appears, install a new SDRAM DIMM of the correct type and size.<br><br>3. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| B46 ERROR: SDRAM HAS MIXED SIZES* | Printer boot initialization tests detect incorrect SDRAM. | 1. Cycle power. If the message appears again, reseat the SDRAM DIMM.<br>2. Power on the printer. If the message appears, install a new SDRAM DIMM of the correct type and size.<br>3. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| B47 ERROR: SDRAM LARGER THAN 256M* | Printer boot initialization tests detect incorrect SDRAM. | 1. Cycle power. If the message appears again, reseat the SDRAM DIMM.<br>2. Power on the printer. If the message appears, install a new SDRAM DIMM of the correct type and size.<br>3. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| B49 ERROR: SDRAM # LOGICAL BANKS* | Printer boot initialization tests detect incorrect SDRAM. | 1. Cycle power. If the message appears again, reseat the SDRAM DIMM.<br>2. Power on the printer. If the message appears, install a new SDRAM DIMM of the correct type and size.<br>3. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| B50 ERROR: SDRAM LOGIC COMB BANKS* | Printer boot initialization tests detect incorrect SDRAM. | 1. Cycle power. If the message appears again, reseat the SDRAM DIMM.<br>2. Power on the printer. If the message appears, install a new SDRAM DIMM of the correct type and size.<br>3. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| B51 STATUS: XX% LOADING... | Status message: printer boot-up routines are loading printer system software into flash memory and SDRAM. | No action required. |
| B53 ERROR: I2C NO ARBITRATION | There is a problem on the I2C bus which allows the SDRAM DIMM to communicate with the GPIO or CT interface. | 1. Cycle power. If the message appears again, replace the GPIO, in installed.<br>2. Power on the printer. If the message appears, replace the CT board, if installed.<br>3. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| B54 ERROR: SDA LINE STUCK LOW | The SDRAM or a PCI card is shorting out the serial data bus on the controller board. | 1. Cycle power. If the message appears again, reseat the SDRAM DIMM.<br>2. Power on the printer. If the message appears, install a new SDRAM DIMM of the correct type and size.<br>3. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| CLEARING PROGRAM FROM FLASH | Status message: emulation software successfully loaded into printer RAM and the checksum matched. The old program is now being deleted from flash memory. | No action required. |
| D50 Status %XX Clearing Flash | Status message: The printer is clearing its flash memory, where %XX represents the percentage completed. | No action required. |
| D51 Status %XX Programming... | Status message: The printer is loading firmware, where %XX represents the percentage completed. | No action required. |
| D55 Status: Send Program to EC | Status message: The printer is loading the engine controller program into the engine controller (EC). | No action required. |
| DIAGNOSTIC PASSED | Status message: the printer passed its memory and hardware initialization tests. | No action required. |
| DO NOT POWER OFF | Status message: The printer is performing an operation that must be completed before you can cycle power. | No action is required, but do not power off the printer until the operation is complete. |
| E00 EXE @ ADDR0 See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| E01A TYPE 0x40 See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E01B TYPE 0x60 See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E02 MACHINE CHK See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E03A DSI HASH L See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| E03B DSI HASH S<br>See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br><br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E03C DSI BAT PL<br>See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br><br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E03D DSI BAT PS<br>See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br><br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E03E DSI CXIWX<br>See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br><br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| E03F DSI CXOWX See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232). <br> 2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E03G DSI ECXIWX See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232). <br> 2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E03H DSI ECXOWX See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232). <br> 2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E04A ISI NO TRA See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232). <br> 2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| E04B ISI DIRECT See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232). <br> 2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E04C ISI PROTEC See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232). <br> 2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E06 NOT ALIGNED See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232). <br> 2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E07 ILLEGAL INS See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232). <br> 2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| E08 FLOATINGPNT<br>See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br><br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E12 SYSTEM CALL<br>See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br><br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E13 TRACE INT<br>See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br><br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E16 ITRANS MISS<br>See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br><br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| E17 DLOAD MISS<br>See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E18 DSTORE MISS<br>See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E19 BREAKPOINT<br>See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E20 SYS MANAGE<br>See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| E30 DEBUGGER See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232). <br> 2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E31A EVENT O BP See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232). <br> 2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E31B EVENT 1 BP See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232). <br> 2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E31C EVENT 2 BP See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232). <br> 2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| E31D EVENT 3 BP<br>See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E31E EVENT 4 BP<br>See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E31F EVENT 5 BP<br>See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E31G EVENT 6 BP<br>See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| E31H EVENT 7 BP See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E32A CND 0 BP See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E32B CND 1 BP See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E32C CND 2 BP See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| E32D CND 3 BP<br>See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br><br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E32E CND 4 BP<br>See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br><br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E32F CND 5 BP<br>See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br><br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E32G CND 6 BP<br>See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br><br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| E32H CND 7 BP<br>See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E33 WRITE BP<br>See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E34 TRACE CMPLT<br>See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E99 UNKNOWN INT<br>See User Manual | An illegal or unsupported instruction was attempted in the application program. | 1. Cycle Power. Run the print job. If the message appears again, access the exception menu and record the displayed messages (page 232).<br>2. Power off the printer. Provide this fault message and the messages you recorded from the exception menu to your next higher support facility. |
| E Net Test Unavailable | The ethernet PCBA did not initialize correctly. | Cycle power. Wait for "E Net Ready" to display, then retry operation. If it still fails, replace the ethernet PCBA. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| ERROR: CPLD NOT PROGRAMMED | The Complex Programmable Logic Device (CPLD) on the controller board is not programmed. The EC cannot read the version bits in the CPLD which tell the EC which configuration version is installed. | Cycle power. If the message appears again, replace the controller board. Record the message and return it with the defective board. |
| ERROR: DC PROGRAM NOT VALID | The printer cannot find the data controller program or the validation checksum is corrupt. | 1. Download the program again (page 257).<br>2. If the message appears, replace the flash memory SIMM. |
| ERROR: DRAM AT ADDRESS XXXXXXXX | The printer found a defective memory location. | 1. Replace the DRAM DIMM.<br>2. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| ERROR: EC PROGRAM NOT VALID | The printer cannot find the engine controller program or the validation checksum is corrupt. | 1. Download the program again (page 257). If the message occurs again, replace all flash memory SIMMs.<br>2. Power on the printer. Download the emulation. If the message appears, replace the controller board. Record the message and return it with the defective board. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| ERROR: EC STOPPED AT STATE XXXX | Where XXXX is a number from 0000 to 0010. The Engine Controller has stopped and is in the state identified by the number displayed. If the EC stops at state 0000 at power-up, replace the controller board. Record the message and return it with the defective board. | 1. Power off the printer. Remove the flash memory SIMM and SDRAM DIMM. Inspect the SIMM and DIMM sockets on the controller board. If any socket pins are bent or damaged, replace the controller board. 2. Install the flash SIMM and SDRAM DIMM, making sure they are fully and correctly seated. Power on the printer. Download the emulation (page 257). If the message appears, replace the flash SIMM. 3. Power on the printer. Download the emulation. If the message appears, replace the SDRAM DIMM. 4. Power on the printer. Download the emulation. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| ERROR: FLASH DID NOT PROGRAM | The printer encountered an error trying to program flash memory. | Download the program again (page 257). If the message occurs again, replace the flash memory. |
| ERROR: FLASH NOT DETECTED | The printer could not find flash memory. | Check flash memory on the controller board. If present, reseat the flash SIMM; if missing, install flash SIMM. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| ERROR: LOCKED SN=nnnnnnnnnnnnnn nnnnnnn | Where nnnnnnnnnnnnnnnn is the serial number of the printer's security key. The SPX gets "locked" to the printer as the first part of the security key reprogramming process. The "lock" consists of copying the printer's security key serial number into the flash memory of the SPX, which prevents the SPX from being used on other printers. It also enables the customer to retry upgrading the same printer if the SPX was removed before reprogramming is complete. | 1. Remove the SPX from the Debug Port.<br><br>2. Cycle printer power. |
| ERROR: NO DRAM DETECTED | The printer could not find any DRAM. | 1. Check SDRAM on the controller board. If present, reseat SDRAM DIMM; if missing, install SDRAM.<br><br>2. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| ERROR: NVRAM FAILURE | The non-volatile SRAM on the controller board has failed. | Replace the controller board. (Do NOT attempt to replace NVRAM.) Record the message and return it with the controller board. |
| ERROR OCCURRED FLUSHING QUEUES* | An interim message that displays while the printer discards host data it cannot use because a fault condition exists. While this message displays, the asterisk (*) rotates. | Wait. When the asterisk (*) stops rotating, a different fault message will appear: troubleshoot the final message. |
| ERROR: PROGRAM NEEDS MORE DRAM | The printer requires more DRAM in order to run the downloaded program. | Add DRAM or use a smaller emulation program. |
| ERROR: PROGRAM NEEDS MORE FLASH | The printer requires more flash memory in order to run the downloaded program. | Add flash memory or use a smaller emulation program. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| ERROR: PROGRAM NOT COMPATIBLE | The printer is not compatible with the downloaded program. | Use the correct emulation software option(s) for this model printer. |
| ERROR: PROGRAM NOT VALID | The printer does not see a program in flash memory. | There is no program in printer memory. Download the emulation. |
| ERROR: SECURITY KEY NOT DETECTED | The security key is not present or has failed. | 1. Check the security key at connector J9 on the controller board. The security key is a 3-pin jumper connector. If it is absent, install the correct key. If a key is present, replace it. <br> 2. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| ERROR: SHORT AT ADDRESS XXXX | Hardware failure in SDRAM or controller circuitry. | 1. Download the program again. <br> 2. If the message occurs again, replace the controller board. Record the message and return it with the defective board. |
| ERROR: WRITING TO FLASH | Hardware or software fault in flash memory. | 1. Replace flash memory. <br> 2. If message occurs with new memory, replace the controller board. Record the message and return it with the defective board. |
| ERROR: WRONG CHECKSUM | The printer received the complete program but the checksum did not match. The data may have been corrupted during download. | 1. Power off the printer. Download the program again from the beginning. If the messages appears, replace the DRAM. <br> 2. Download the program using a new software diskette. If the messages appears, replace the flash memory. <br> 3. Download the program. If the messages appears, replace the controller board. Record the message and return it with the defective board. |
| ERROR: WRONG OEM | The SPX inserted in the debug port is not intended for this this OEM. | 1. Remove the SPX from the Debug Port. <br> 2. Cycle printer power. |

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**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| ERROR: WRONG PRINTER TYPE | The SPX inserted in the debug port is not intended for this printer model. | 1. Remove the SPX from the Debug Port.<br>2. Cycle printer power. |
| ETHERNET ADAPTER BEING INITIALIZED | Status message indicating that the ethernet interface is processing the boot procedure. | No action required. |
| ETHERNET DETECTED | Status message indicating that the PrintNet ethernet interface has established communication. | No action required. |
| ETHERNET INITIALIZING | Status message that indicates that the internal Network Interface Card is processing the boot procedure. (May occur with older versions of microcode.) | No action required. |
| FM HEADER ERROR* | Frame Header Error. Application software has violated header parameters. | Not a printer problem. The system administrator should correct applications data or configuration. |
| GRF CHK ERROR PRESS STOP | Graphic Check Error: in the CT emulation over a twinax interface, the printer received a non-printable character. | Press **CLEAR** then press **ON LINE**. |
| H00: PCI SLOT ? See User Manual | The controller board is not communicating with a PCI card. This could indicate a bad PCI card, poor connection, or problem in the PCI bus. | 1. Cycle power. If the message appears, power down and reseat the PCI card.<br>2. Power on the printer. If the message appears, move the PCI card to the other PCI slot.<br>3. Power on the printer. If the message appears, replace the PCI card.<br>4. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| H01: PCI J12<br>See User Manual | The controller board is not communicating with the PCI card in PCI slot J12. This could indicate a bad PCI card, poor connection, or problem in the PCI bus. | 1. Cycle power. If the message appears, power down and reseat the PCI card.<br><br>2. Power on the printer. If the message appears, move the PCI card to PCI slot J13.<br><br>3. Power on the printer. If the message appears, replace the PCI card.<br><br>4. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| H02: PCI J13<br>See User Manual | The controller board is not communicating with the PCI card in PCI slot J13. This could indicate a bad PCI card, poor connection, or problem in the PCI bus. | 1. Cycle power. If the message appears, power down and reseat the PCI card.<br><br>2. Power on the printer. If the message appears, move the PCI card to PCI slot J12.<br><br>3. Power on the printer. If the message appears, replace the PCI card.<br><br>4. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| <Online, etc...> Half Speed Mode | This is a status message, not an operational state. The controller samples the operating temperature of key components of the print mechanism. When higher than normal temperatures are sensed, the print speed is automatically reduced by 50% and the message sent the LCD. When the components cool down, the print speed returns to 100% and the message clears. Periodic appearance of this message is normal for extremely dense print jobs, such as "All Black" plot. If this message often appears, the printer may be operating in a severe environment. A severe environment has an ambient temperature at or above 40° Celsius (104° Fahrenheit) or is dirty enough to clog air vents. The printer must never be run at ambient temperatures greater than 40° Celsius (104° Fahrenheit). Inspect the printer environment for severity, and if the printer is located in such an environment relocate it to a cooler, cleaner area. | 1. Advise the user to move the printer to cooler, cleaner location.<br>2. Check the kinds of print jobs the user is running: look for very dense graphics and layouts. Advise the user to run jobs in smaller batches.<br>3. Power off the printer. Remove the paper path or pedestal top cover. Check all fan cable connections.<br>4. Power on the printer. Verify that all fans operate. Replace any fan that does not operate.<br>5. Inspect vents and fan airways for obstructions. Look underneath cabinet models for items blocking the cabinet exhaust vents. Remove any obstructions from vents and airways.<br>6. Install the paper path or pedestal top cover. Load paper. Run the "All E's" print test for 5 to 10 minutes. If the message appears, replace the shuttle frame assembly.<br>7. Run the "All E's" print test for 5 to 10 minutes. If the message appears, replace the controller board. Record the message and return it with the defective board.<br>8. If the printer is a P7X08H, P7000HD, or P7220, set the coil temperature (page 265). |
| HAM. COIL OPEN* | Hammer Coil Open. Electrical malfunction of one or more hammer coils. | 1. Cycle power. If the message appears, replace the shuttle frame assembly.<br>2. Power on the printer. Run a print test. If the message appears, replace the controller board. Record the message and return it with the defective board. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| HAMMER SHORT*<br>See User Manual | Electrical malfunction of one or more hammer coils. | 1. Cycle power. If the message appears, replace the shuttle frame assembly.<br><br>2. Power on the printer. Run a print test. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| INCOMPAT E-NET<br>Remove NIC | Incompatible network interface card (NIC) is installed. | Remove the installed NIC and replace it with the correct card for this printer. |
| INTAKE FAN FAULT | Sensors cannot detect current in the card cage fan circuit. | 1. Cycle power. If the message appears, press **CLEAR**. If the message does not clear, go to step 2.<br><br>2. Power off the printer. Remove the paper path or pedestal top cover. Disconnect connector P106 from the controller board. Test connector P106/CCF for shorts or opens. (Refer to the Main Wire Harness Test Tables in Appendix A.) Replace components that fail test.<br><br>3. Make sure P106/CCF has a good connection at J106 on the controller board.<br><br>4. Inspect for obstructions of airways and vents. Remove obstructions.<br><br>5. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| INTERRUPT UNUSED VECTOR 00 | This message is generated when the controller board gets an interrupt it does not understand. The problem can be created by electrical noise, by a software problem, or by a hardware problem. | 1. Cycle power. If this message occurred once and never again, you can ignore it. If the message reappears or appears consistently check the grounding of the printer. If the machine is correctly grounded, replace the controller board.<br><br>2. Power on the printer. Cycle power. If the message appears, suspect an application software error. Request assistance from your local support group. Install the original controller board. |
| LOADING PROGRAM FROM PORT XX% | Status message: the new emulation program is loading into printer RAM. XX% indicates how much of the program has loaded. | No action required. |
| LOADING PROGRAM INTO FLASH | The printer has deleted the previous program from flash memory and is loading the new program into flash memory. | No action required. |
| NEW SPX DETECTED PRESS ENTER | The printer detects an SPX in its debug port and the SPX is valid for this printer. | Press the **ENTER** key. The following actions occur:<br><br>1. The SPX copies the printer's security key serial number into its flash memory.<br><br>2. The printer reprograms its security key with the information stored in the SPX.<br><br>3. The printer verifies that the key was programmed as intended.<br><br>4. The SPX overwrites itself so that it cannot be used again. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| NON VOLATILE MEMORY FAILED | Large emulations reduce the amount of space available for saving configurations, which means that sometimes fewer than 8 configurations can be saved. If this message appears when saving a configuration, it means the printer is out of memory. Previously saved configurations will still be available, but the one that was "saved" when the message appeared is not in memory. If this message appears at power-up, it means the flash memory is defective. | 1. If the message appears at power-up, replace the flash memory.<br><br>2. If the message appears while saving a configuration, the printer is out of memory and will not save that or subsequent configurations. (Previously saved configurations are still okay.)<br><br>3. If the message appears after replacing/increasing memory, replace the controller board. (Do NOT attempt to replace NVRAM.) |
| ON LINE | Printer state message: printer is online and in communication with host. | No action required. |
| PARAMETER ERROR* | Illegal parameter value received in a command code over a coax/twinax interface. | 1. Press **CLEAR** then press **ON LINE**.<br><br>2. Run the print job that generated the error message. If the message appears, check the host data for invalid characters.<br><br>3. Ask the system operator to verify that the printer's Device ID is set to the correct emulation with respect to the host configuration.<br><br>4. Run the print job that generated the error message. If the message appears, go to **Communications Failures**, page 220. |
| PLEASE WAIT... RESET IN PROGRESS | Status message: the printer finished loading the program into flash memory and is automatically resetting itself. | No action required. |
| PRINTER UNDER REMOTE CONTROL | Status message: The printer is under the control of PrintNet Enterprise (PNE) remote management software. | No action required. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| QUEUE OVERRUN | In the CT twinax emulation, the print buffer has overflowed. Send a print job to the printer. | 1. If the message appears, replace the CT board. Record the message and return it with the defective board.<br><br>2. Send a print job to the printer. If the message appears, replace the twinax data cable and the twinax auto-termination cable assembly ("Smart T"). |
| REMOVE USED SPX THEN PRESS ENTER | Status message: An SPX is depleted because it has successfully reprogrammed the security key on the controller board. | 1. Remove the SPX from the Debug Port.<br><br>2. Press the **ENTER** key. The printer will reboot itself. |
| RESTORING BOOT CODE | Normal download initialization message. | No action required. |
| SCS COMMAND ERROR* | In the CT emulation, the printer received undefined control character (hex 40). | 1. The printer clears the error.<br><br>2. Run the print job that generated the error message. If the message appears, verify that there are no invalid control codes in the host data.<br><br>3. Ask the system operator to verify that the printer's Device ID is set to the correct emulation with respect to the host configuration.<br><br>4. Run the print job that generated the error message. If the message appears, go to **Communications Failures**, page 220. |
| SECURITY VIOLATION* | Security code of the security key at J9 on the controller board does not match the code of the firmware on the controller board. | 1. Remove the paper path or pedestal top cover. Check that the security key is correctly installed.<br><br>2. Install correct key for the customer's emulations.<br><br>3. Run a print test. If the message appears, replace the controller board. Record the message and return it with the defective board. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| SECURITY KEY NOT DETECTED | The security key is not present or has failed. | 1. Check the security key at connector J9 on the controller board. The security key is a 3-pin jumper connector. If it is absent, install the correct key. If a key is present, replace it.<br><br>2. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. |
| SENDING PROGRAM TO EC PROCESSOR | Status message: The printer is loading the engine controller program into the engine controller (EC). | No action required. |
| SF ERROR | Structured Field Error. Application software has violated structured data field parameters. | Not a printer problem. Have the system administrator correct applications data or configuration. |
| SHUTTLE STALL | The shuttle is not moving. See "415:SHUTTLE JAM" on page 139. | See "415:SHUTTLE JAM" on page 139. |
| SPX FOUND, ERROR: KEY NOT DETECTED | The controller board does not have a security key. | 1. Remove the SPX from the Debug Port.<br><br>2. Power down the printer.<br><br>3. Install the security key. |
| SPX NOT NEEDED OPTIONS ENABLED | The user has attempted to use the SPX to turn on printer options that are already enabled. In such a case the SPX does not copy the security key serial number into its memory and does not deplete itself. | 1. Remove the SPX from the Debug Port.<br><br>2. Cycle printer power. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| TCP PORT BUSY | Error message reported by the Printer Manager when ethernet interface option is installed. The network address given in the printer properties was reached, but the printer port is "busy." When the port setting is "Serial" the printer manager software cannot interact with the ethernet card, although the card will respond to other TCP/IP utilities. | 1. Power on the printer.<br><br>2. If the printer is online, press the **ON LINE** key to place the printer offline.<br><br>3. On the control panel, press the ▲ + ▼ keys to unlock the **ENTER** key.<br><br>4. Press the ▲ + ▼ + ◀ + ▶ keys simultaneously to enter the Factory Menu.<br><br>5. Press ▶ until you reach the PRINTER MGMT menu, then press ▼.<br><br>6. Press ▶ until you reach the "Diagnostics Port" option, then press ▼.<br><br>7. Press ▶ until you reach "Debug ethernet", then press **ENTER**.<br><br>8. Press **ON LINE** to return the printer to the online state.<br><br>9. Save the changes and set up a new power-up configuration, if necessary. The Printer Manager should now be able to access the printer. For other communication errors, print out the E-Net Test Page (page 226) and verify the IP address, subnet mask, gateway address, and TCP port settings. |

**Table 5. P7000 CRP H-Series Error Messages List**

| Displayed Message | Explanation | Solution |
|---|---|---|
| WAITING FOR ETHERNET ADAPTER | This status message appears when the printer is first powered on if the optional ethernet NIC is installed. An ethernet adapter must be detected early in the power up sequence so the printer can tell the adapter it has been detected and continue with its own power up sequence. Compared to the printer, the ethernet adapter takes a long time to complete its internal diagnostic tests, so the boot code allows the adapter to power up in parallel with the printer to reduce its effect on overall boot time | No action required. |

# Troubleshooting Other Symptoms

**WARNING**    **Always disconnect the AC power cord from the printer before doing a maintenance procedure. Failure to do so could result in injury to you or damage to equipment. If you must apply power during maintenance, you will be instructed to do so in the maintenance procedure.**

Use standard fault isolation techniques to troubleshoot malfunctions not indicated by display messages. These techniques are summarized below:

1.  Ask the operator to describe the problem.

2.  Verify the fault by running a diagnostic printer test or by replicating the conditions reported by the user.

3.  Look for a match in the **General Symptom List**, which begins on page 197. If you find a match, go to the troubleshooting procedure and follow the numbered instructions.

4.  If you cannot find the symptom in the **General Symptom List**, use the Half-Split Method to find the malfunction:

    a.  Start at a general level and work down to details.

    b.  Isolate faults to half the remaining systems at a time, until the final half is a field-replaceable part or assembly. (Troubleshooting aids are listed on page 49.)

5.  Replace the defective part or assembly. Do not attempt field repairs of electronic components or assemblies. Most electronic problems are corrected by replacing the printed circuit board assembly, sensor, or cable that causes the fault indication. The same is true of failures traced to the hammer bank: replace the entire shuttle assembly because it is not field repairable.

6.  Test printer operation after every corrective action.

7.  Reinstall any parts you replaced earlier that did not solve the problem.

8.  Stop troubleshooting and return the printer to normal operation when the reported symptoms disappear.

# General Symptom List

Table 6 is a list of possible printer problems that are not indicated by messages on the LCD. Troubleshooting procedures are included for each symptom.

If you encounter a problem that is not listed in Table 6, troubleshoot using the Half-Split Method described on page 196.

**Table 6. General Symptom List**

| Symptom | Solution |
|---------|----------|
| Communications Failures | See page 220. |
| **Ribbon** | |
| Ribbon folding or feed problems | 1. Make sure the ribbon cartridge is correctly installed and fully seated.<br>2. Check that the ribbon runs between the ribbon mask and hammer bank cover. Check that the hammer bank cover is Installed correctly.<br>3. Check that the ribbon cartridge is not rubbing against the shuttle cover assembly. Install the shuttle cover assembly correctly, so that the cartridge does not rub against it.<br>4. Inspect the paper print path for paper chaff, ink residue, and debris. Clean the shuttle frame assembly.<br>5. Power on the printer. Run a print test and observe ribbon movement.<br>6. Check and clean the platen gap if necessary. |

**Table 6. General Symptom List**

| Symptom | Solution |
|---|---|
| Jams | |
| CLEAR PAPER JAM message instead of LOAD PAPER when printer is out of paper | 1. Power off the printer. Remove the paper path or pedestal top cover. Remove the barrier shield (cabinet model) or the barrier shield and paper guide (pedestal model). Check that the paper detector switch assembly is securely mounted in its bracket. Clean the paper detector switch if necessary. |
| | 2. Check that connector P106/PMD is fully seated in connector J106 on the controller board. |
| | 3. Load paper. Power on the printer. Replace the paper detector switch assembly if either message appears. |
| | 4. Inspect the paper ironer. If the paper ironer has slipped up into the print line, reposition the paper ironer. |
| | 5. Load paper. Power on the printer. Replace the controller board if either message appears. Record the message and return it with the defective board. |
| CLEAR PAPER JAM message will not clear and paper does not move | 1. Remove the paper path or pedestal top cover. Make sure connector P107/PAPR M is fully seated in connector J107 on the controller board. |
| | 2. Check the condition and tension of the paper feed timing belt. Adjust the paper feed timing belt. Replace the belt if it is damaged. |
| | 3. Check the dynamic paper tension. |
| | 4. Load paper. Power on the printer. Press **PAPER ADVANCE** and **VIEW** several times and check that paper moves correctly in both directions. Replace the paper feed motor if the message appears or the paper moves erratically. |
| | 5. Power on the printer. Press **PAPER ADVANCE** and **VIEW** several times and check that paper moves correctly in both directions. Replace the controller board if the message appears or the paper moves erratically. Record the message and return it with the defective board. |

**Table 6. General Symptom List**

| Symptom | Solution |
|---|---|
| CLEAR PAPER JAM message will not clear but paper moves | 1. Power off the printer. Remove the paper path or pedestal top cover. Check that connector P106/PMD is fully seated in connector J106 on the controller board. |
| | 2. Remove the barrier shield (cabinet model) or the barrier shield and paper guide (pedestal model). Check that the paper detector switch assembly is securely mounted in its bracket. Clean the paper detector switch if necessary. |
| | 3. Check that the paper detector switch assembly is securely mounted to the mechanism base. Tighten the two screws securing the paper detector switch assembly to the mechanism base. |
| | 4. Check that the motion detector wheel rotates. Replace the paper detector switch assembly if the wheel does not rotate. |
| | 5. Load paper. Power on the printer. Replace the paper detector switch assembly if the message appears. |
| | 6. Load paper. Power on the printer. Replace the controller board if the message appears. Record the message and return it with the defective board. |

**Table 6. General Symptom List**

| Symptom | Solution |
|---|---|
| Control Panel | |
| Black squares on control panel | 1. Power off the printer. Remove the paper path or pedestal top cover. Disconnect the control panel cable from the panel and from J110 on the controller board. Check continuity of the cable. (See Appendix A.) Replace the control panel cable if it fails continuity test. Connect the cable. Power on the printer. If the symptom appears, replace the control panel. |
| | 2. If the printer has the CT board, make sure it is correctly seated in the controller board. |
| | 3. Power off the printer. Make sure the flash memory is seated properly in J10 and J11 on the controller board. Regardless of memory configuration, J10 must be used. |
| | 4. Power on the printer. If black squares appear on the LCD, the flash memory could be blank. Replace the flash SIMM in J10 with a new flash SIMM with the boot program installed. |
| | 5. Power on the printer. If the symptom appears, replace the control panel. |
| | 6. Power on the printer. If black squares appear on the LCD, replace the controller board. Record the message and return it with the defective board. If the LCD displays characters correctly, download the emulation software again (page 257). |
| Control panel blank | 1. Power off the printer. Remove the paper path or pedestal top cover. Check all cable connections into the controller board; make sure the control panel cable is seated in connector J110 on the controller board. |
| | 2. If the printer has the CT board, make sure it is correctly seated in the controller board. |
| | 3. Power on the printer. Inspect the control panel display and cooling fans. If the control panel is blank and the cooling fans come on, replace the control panel cable assembly and/or the control panel, as required. |
| | 4. Power on the printer. If the control panel is blank and the fans do not come on, replace the controller board. |

**Table 6. General Symptom List**

| Symptom | Solution |
|---|---|
| Control panel keys do not work | 1. Power on the printer. Check the operation of the control panel keys. Replace the control panel assembly if the keys do not work.<br><br>2. Power on the printer. Check the operation of the control panel keys. Replace the control panel cable assembly if the keys do not work.<br><br>3. Power on the printer. Check the operation of the control panel keys. Replace the controller board if the keys do not work. |
| Control panel display shows garbled, broken characters | 1. Remove the paper path or pedestal top cover. Check cable connections into the controller board. Make sure the control panel cable is seated in connector J110 on the controller board.<br><br>2. Make sure the SDRAM DIMM is seated properly in its slot on the controller board. Reseat and re-latch the SDRAM DIMM.<br><br>3. Power on the printer. Inspect the control panel display. If the control panel shows broken characters, replace the SDRAM. |

**Table 6. General Symptom List**

| Symptom | Solution |
|---|---|
| Power Failures | |
| No power, and control panel blank, and card cage fan not running | 1. Check that the AC power outlet has power. Restore AC power if necessary. |
| | 2. Unplug the printer AC power cord from the printer (leave it plugged into the power outlet) and check for AC power at the printer end of the cord. If there is no power through the AC power cord, replace it. Plug the AC power cord into the printer and power outlet. |
| | 3. Remove the paper path or pedestal top cover. Verify that the AC-In power cable and the AC power input cables are connected to the on/off switch-circuit breaker. (See Figure 51, page 362.) Make sure all ground connections are clean and tight. |
| | 4. Check that AC-in power cable connector P1 is connected to J1 on the power supply board. Reseat the connector. |
| | 5. Check that power supply cable connector P101 is connected to J101 on the controller board. Reseat the connector. |
| | 6. Check all cable connections on the controller board. |
| | 7. If the printer has the CT board, make sure it is correctly seated in the controller board. |
| | 8. Disconnect AC-in power supply cable connector P1. Set the circuit breaker to 1 (on). Measure AC voltage at pins 1 and 2 of connector P1. If no voltage, replace the circuit breaker. If there is voltage, replace the power supply board. |

**Table 6. General Symptom List**

| Symptom | Solution |
|---|---|
| Printer does not initialize | **NOTE:** Power-on initialization is explained on page 239.<br><br>1. Power off the printer. Remove the paper guide or pedestal top cover. Reseat all cable connectors on the controller board, especially connectors P106 and P107.<br><br>2. Check the shuttle for electrical shorts (page 269).<br><br>3. If the printer has the CT board, verify that the user is running CT emulation software. If the printer does not have the CT board, go to step 7.<br><br>4. If the printer has the CT board, check that the user has enough flash memory installed to handle the emulation software. (See Figure 36 on page 324, and the Boot Diagnostics Menu on page 227.) Install flash memory and download emulation software if necessary.<br><br>5. If the printer has the CT board, make sure it is correctly seated in the controller board.<br><br>6. Power on the printer. If the fans run but the printer does not initialize, replace the CT board.<br><br>7. Power on the printer. If the fans do not run and the printer does not initialize, do the power supply operational check (page 274). If the power supply fails the check, replace it. If it passes the check, go to the next step.<br><br>8. Power on the printer. If the fans run but the printer does not initialize, replace the controller board.<br><br>9. Power on the printer. If the problem persists, replace the shuttle frame assembly.<br><br>10. Power on the printer. If the problem persists, replace the control panel and cable. |

**Table 6. General Symptom List**

| Symptom | Solution |
|---|---|
| | **Power Stacker** |
| Printer does not detect presence of power stacker | 1. Check that the power stacker is enabled under the Printer Control menu. (Refer to the *User's Manual.)* If the power stacker enable/disable option does not appear in the menu, go to the next step. |
| | 2. Open the rear cabinet door. Check that the ON/OFF indicator lamp is lit. If the ON/OFF indicator is not lit, go to step 3. If the ON/OFF indicator is lit, press the ON LINE key and check that the ON LINE indicator lights. If the ON LINE indicator comes on, the stacker is detected by the printer. If the ON LINE indicator does not come on, go to step 4. |
| | 3. a) Power off the printer.<br>b) Unfasten the cable clamp holding the stacker control panel cables.<br>c) Disconnect the stacker power cable from the back of the stacker control panel. (See Figure 78, page 464.)<br>d) Locate pin 1 of connector P106. (See the cable assembly drawing in Appendix A.)<br>e) Power on the printer.<br>f) At connector P106 check for +48 volts DC between pins 1 and 2 and +5 volts DC between pins 3 and 4. If the voltages are correct, replace the stacker control panel. If the voltages are not correct, power off the printer, remove the paper path, and disconnect the stacker power cable from the controller board. (See Figure 81, page 467.) Check the continuity of the stacker power cable between P105 and P106. If the cable fails the continuity test, replace it. If the cable is OK, replace the controller board. |
| | 4. Power off the printer. Remove the paper path. Disconnect stacker cables from the controller board, stacker assembly, and the stacker control panel (see Figure 78, page 464). Check cables for cuts, breaks, or damaged pins. Check continuity of cables. (See Appendix A.) Replace any cable that is damaged or fails continuity test. Reconnect all stacker cables to the controller board, stacker, and stacker control panel. |
| | 5. Power on the printer. Check that the ON LINE indicator lights on the stacker control panel. If the ON LINE indicator does not light, replace the stacker control panel. |
| | 6. Power on the printer. Check that the ON LINE indicator lights on the stacker control panel. If the ON LINE indicator does not light, replace the controller board. |

**Table 6. General Symptom List**

| Symptom | Solution |
|---|---|
| Stacker "chatters" at upper or lower limit | 1. Power off the printer. Unload paper. Open the rear cabinet door and check that stacker motion is not obstructed by the control panel cable or other obstruction. Remove obstruction or reroute the stacker control panel cable as necessary. |
| | 2. Verify that the stacker rails are vertical and parallel. Adjust the stacker rails if necessary: they must be vertical and parallel. |
| | 3. Move the elevator up and down by hand and check that the limit switches are being tripped at the highest and lowest limits of elevator travel. |
| | 4. Power on the printer. Operate the power stacker. (Refer to the *User's Manual*.) While the stacker is operating, check that: a) all motors are operating, b) the paddles are rotating, c) the elevator moves smoothly and without obstruction, d) the timing belts are undamaged and the belt pulleys are not slipping, e) the extension springs are attached and undamaged (not bent or stretched), f) the drive rollers are not damaged, g) the constant force springs are tightly mounted and undamaged. Tighten pulley setscrews and/or replace damaged components as necessary. |

**Table 6. General Symptom List**

| Symptom | Solution |
|---|---|
| Stacker does not stack properly | 1. Check for and remove obstructions preventing elevator movement. |
| | 2. Check for misaligned stacker rails. Adjust the stacker rails if they are not vertical and parallel. |
| | 3. Power on the printer. Operate the power stacker. (Refer to the *User's Manual*.) While the stacker is operating, check that:<br>a) all motors are operating<br>b) the paddles are rotating<br>c) the elevator moves smoothly and without obstruction<br>d) the timing belts are undamaged and the belt pulleys are not slipping<br>e) the extension springs are attached and undamaged (not bent or stretched)<br>f) the drive rollers are not damaged<br>g) the constant force springs are tightly mounted and undamaged<br>Tighten pulley setscrews and/or replace damaged components as necessary. |
| | 4. Check the stacker limit switches. (See page 207.) If the limit switches are OK, go to the next step. |
| | 5. Check the stacker motors. (See page 208.) If the stacker motors are OK, go to the next step. |
| | 6. Remove the paper path. Disconnect stacker cables from the controller board, stacker assembly, and the stacker control panel (see Figure 78, page 464). Check cables for cuts, breaks, or damaged pins. Check continuity of cables. (See Appendix A.) Replace any cable that is damaged or fails continuity test. Reconnect all stacker cables to the controller board, stacker, and stacker control panel. |
| Stacker elevator does not move | See "Stacker does not stack properly" |
| Stacker elevator moves by itself | 1. Power off the printer. Inspect all stacker LEDs for dust, chaff, or dirt. (See Figure 104 through Figure 106, page 492 through page 496.) Clean the stacker LEDs and the sight tubes in the LED mounts. |
| | 2. Power on the printer. If the stacker elevator moves by itself, replace the stacker LEDs. (See Figure 104 through Figure 106, page 492 through page 496.) |

**Table 6. General Symptom List**
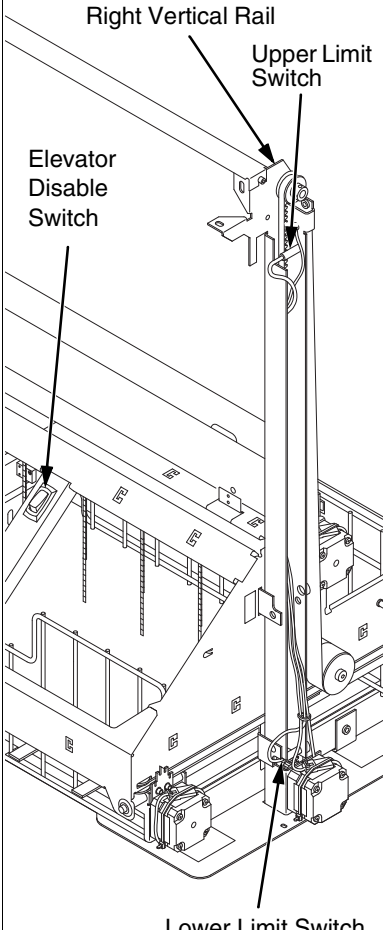
| Symptom | Solution |
|---|---|
| Stacker limit switch check<br><br>Right Vertical Rail<br><br>Upper Limit Switch<br><br>Elevator Disable Switch<br><br>Lower Limit Switch | **NOTE:** This procedure tests the upper and lower limit switches on the right vertical rail. These magnetic switches are normally closed. You can quickly check their functionality with a small, powerful magnet.<br><br>You will usually be referred to this procedure from other troubleshooting procedures. When you have completed this check procedure, return to the procedure that sent you here.<br><br>1. Power on the printer. Open the rear cabinet door. Unload the power stacker.<br><br>2. Press the Elevator Disable Switch and manually lift the elevator all the way to the top of its travel.<br><br>3. Position a small, powerful magnet between the belt and vertical rail so that it is in front of the exposed face of the lower limit switch. Tape or otherwise secure the magnet in position so that your hands are clear of the vertical rail and elevator.<br><br>  a. With the magnet secured next to the lower limit switch press the ELEVATOR DOWN key on the stacker control panel.<br><br>  b. If the elevator does NOT move, the lower limit switch is OK. Remove the magnet and go to step 4.<br><br>  c. If the elevator moves, release the ELEVATOR DOWN key, power down and unplug the printer, and replace the lower limit switch.<br><br>4. Press the Elevator Disable Switch and manually move the elevator all the way down to the bottom of its travel.<br><br>5. Position a small, powerful magnet between the belt and vertical rail so that it is in front of the exposed face of the upper limit switch. Tape or otherwise secure the magnet in position so that your hands are clear of the vertical rail and elevator.<br><br>  a. With the magnet secured next to the upper limit switch press the ELEVATOR UP key on the stacker control panel.<br><br>  b. If the elevator does NOT move, the upper limit switch is OK. Power down, unplug the printer, remove the magnet, and return to the procedure that sent you to this check procedure.<br><br>  c. If the elevator moves, release the ELEVATOR UP key, power down and unplug the printer, and replace the upper limit switch. |

**Table 6. General Symptom List**

| Symptom | Solution |
|---------|----------|
| Stacker motor check | **NOTE:** This procedure tests the four stacker motors and their cables. You will usually be referred to this procedure from other troubleshooting procedures. When you have completed this procedure, return to the procedure that sent you here.<br><br>1. Power off the printer.<br><br>2. Open the rear cabinet door.<br><br>3. Unfasten the cable clamp holding the stacker control panel cables.<br><br>4. Disconnect stacker rail cable connector P107 from connector J3 on the back of the stacker control panel. (See Figure 78, page 464.)<br><br>5. Disconnect stacker frame cable connector P102 from connector J4 on the rear of the stacker control panel. (See Figure 78, page 464.)<br><br>6. Locate pin 1 of connector P102 and connector P107. (See the cable assembly drawings in Appendix A, page 429 and page 432.)<br><br>7. Check both cables for pin damage, continuity, and shorts.<br><br>8. Check all motors for 15.2 ± 1.5 Ohms on both phases. (Refer to the power stacker control panel PCBA pinout drawing on page 410.)<br><br>9. Replace any cable that is damaged or fails continuity test. Replace any motor that fails the resistance test. |
| Stacker not operating | See "Printer does not detect presence of power stacker," page 204. |

**Table 6. General Symptom List**

| Symptom | Solution |
|---|---|
| **Print Quality** | |
| Characters or dots are missing, smeared, too light, or too dark. | 1. Check the forms thickness lever: if it is set too loose or too tightly print quality can be affected. Set the forms thickness lever to match the thickness of the paper being used. |
| | 2. Check the paper tension between the tractors. Adjust the right tractor so that it does not pull paper too tightly or leave it too loose. The right tractor should hold the paper under "slight" tension. |
| | 3. Inspect the shuttle frame assembly for print chaff, debris, or ink residue that could be causing the problem. Clean the shuttle frame assembly. |
| | 4. Check the ribbon for folds or tears. Rewind or install new ribbon cartridge. |
| | 5. Power off the printer. Remove the shuttle cover. Remove the shuttle frame assembly. Inspect the ribbon mask for bends or deformation that adversely affect paper feeding. Make sure the hammer bank cover assembly is correctly installed on its mounting pegs. Check the shuttle frame assembly for broken hammer springs, hammer tips, or contaminations. Replace any damaged hammer spring assemblies. Replace the hammer bank cover assembly if it is deformed or damaged. |
| | 6. Check the platen gap. Adjust the platen gap if necessary. |
| | 7. Remove the paper guide assembly or pedestal top cover. Make sure Connectors P105 and P108 have good connections on the controller board. Make sure connectors P04 and P05 have good connections at the shuttle frame assembly. Reseat connectors P04, P05, P105, and P108. |
| | 8. Power on the printer. If the problem still occurs, replace the hammer bank logic cable and the hammer bank power cable. |
| | 9. Power on the printer. If the problem still occurs, replace the shuttle frame assembly. |
| | 10. Power on the printer. If the problem still occurs, do the power supply operational check (page 274). If the power supply fails the check, replace it. If it passes the check, go to the next step. |
| | 11. Check the shuttle for electrical shorts (page 269). |
| | 12. Power on the printer. If the problem still occurs, replace the controller board. |

**Table 6. General Symptom List**

| Symptom | Solution |
|---|---|
| Characters are compressed on first line of a form | Adjust the tension of the tractor belts (page 268). |
| Horizontal misalignment of characters (Dots or characters move left or right from dot row to dot row or line to line) | 1. Take the printer offline and print a test pattern of All H's. If characters shift left or right from line to line, there might be a proportional spacing problem. If the pattern of H's prints correctly (that is, all the columns line up), contact your support group or configuration help desk, because a configuration change may be necessary. If the pattern of H's did not print OK, go to the next step.<br>2. Check the hammer phasing. Adjust hammer phasing if necessary.<br>3. Check the dynamic paper tension.<br>4. Inspect the shuttle frame assembly area for ink residue, paper chaff, or debris. Clean the shuttle frame assembly.<br>5. Check the MPU gap. Using a feeler gauge, adjust the gap between the MPU assembly and the flywheel to 0.010 ± 0.001 inch (0.254 ± 0.025 mm). Torque the 7/16 inch MPU clamp screw to 18 inch-pounds (2.03 N•m).<br>6. Power on the printer. Run a print test. If the symptom is not gone, replace the MPU.<br>7. Power on the printer. Run a print test. If the symptom is not gone, replace the controller board.<br>8. Power on the printer. Run a print test. If the symptom is not gone, replace the shuttle frame assembly. |

**Table 6. General Symptom List**

| Symptom | Solution |
|---|---|
| Randomly misplaced dots | 1. Power off the printer. Check the platen gap. Adjust the platen gap if necessary. |
| | 2. Remove the paper guide assembly or pedestal top cover. On the left rear wall of the card cage, make sure the nut which secures the line filter ground line and the AC In Power Supply cable lead to the ground stud is tight. (See Figure 51, page 362.) |
| | 3. Disconnect the AC power cord and check the ground leads for continuity. Replace the AC power cord if it fails continuity test. |
| | 4. Make sure the printer is plugged in to a grounded power outlet. Power on the printer. Run a print test. If the problem occurs, replace the hammer bank logic cable. |
| | 5. Power on the printer. Run a print test. If the problem occurs, replace the flash memory and SDRAM. Download the emulation software again. |
| | 6. Power on the printer. Run a print test. If the problem occurs, replace the controller board. |
| | 7. Power on the printer. Run a print test. If the problem occurs, do the power supply operational check (page 274). If the power supply fails the check, replace it. If it passes the check, go to the next step. |
| | 8. Power on the printer. Run a print test. If the problem occurs, replace the shuttle frame assembly. |

**Table 6. General Symptom List**

| Symptom | Solution |
|---|---|
| Vertical misalignment of characters:<br>1. Dots or characters move up or down from dot row to dot row or line to line<br>2. Incorrect spacing from dot row to dot row or line to line<br>3. Characters randomly compressed and/or enlarged | 1. Load paper. Press **PAPER ADVANCE** and check that paper feeds smoothly. Press **VIEW** to verify that paper moves in both directions. Check the forms thickness lever: if it is set too loose or too tightly print quality can be affected. Set the forms thickness lever to match the thickness of the paper being used.<br><br>2. Check the condition and tension of the paper feed timing belt. Adjust the paper feed timing belt. Replace the belt if it is damaged.<br><br>3. Check the platen gap. Adjust the platen gap.<br><br>4. Inspect the tractors and tractor door springs for damage, excessive wear, and equal door closing tension. If either tractor is worn, damaged, or exhibits uneven door closing tension, replace both tractor assemblies.<br><br>5. Check the dynamic paper tension.<br><br>6. Remove the paper guide assembly or pedestal top cover. Make sure connector P107/PAPR M is fully seated in connector J107 on the controller board.<br><br>7. Load paper. Power on the printer. Run a print test. If the problem occurs, replace the paper feed motor.<br><br>8. Run a print test. If the problem occurs, replace the controller board.<br><br>9. Run a print test. If the problem occurs, replace the power supply board. |

**Table 6. General Symptom List**

| Symptom | Solution |
|---|---|
| | **Printer Operation** |
| Downloads consistently fail | **NOTE:** Most download problems are detected by software during the procedure and communicated by LCD messages. If downloads fail consistently with no messages or with erratic messages, suspect a hardware failure. |
| | 1. Power off the printer. Remove the paper path or pedestal top cover. Check the I/O cable connections from the host to the printer. Check the parallel cable connection at J112 on the controller board. Inspect all cables for damaged, bent, broken, or burnt pins. Replace any damaged cables. Reconnect all I/O cables; make sure all connections are clean and tight. |
| | 2. Remove the flash SIMM. Inspect the SIMM sockets on the controller board. If any socket pins are bent or damaged, replace the controller board. |
| | 3. Check that customer has the right size SIMM for the emulation. (See page 323) Install the SIMM that support the emulation software. |
| | 4. Power on the printer. Download the emulation (page 257). If the download fails, activate the Boot Diagnostics Menu (page 227) and run MISC. TOOLS MENU / RUN MEMORY TESTS. If memory fails test, replace the SDRAM. If memory tests OK, replace the flash SIMM. |
| Boot code won't copy | 1. Power off the printer. Remove the flash SIMM. Inspect the flash SIMM socket on the controller board. If any SIMM socket pins are bent or damaged, replace the controller board. |
| | 2. Make sure the blank SIMM is the same size as the SIMM to be copied. Install the SIMM, making sure it is fully and correctly seated. Power on the printer. From the Boot Diagnostics menu, select and run MISC. TOOLS MENU / COPY BOOT CODE. (See page 227.) If the DESTINATION NOT DETECTED message appears, the blank SIMM is not a type supported by the boot code on the original SIMM. If SOURCE LARGER THAN DESTINATION appears, the blank SIMM is not large enough to contain the code on the original SIMM. If the SIMM does not copy or the ERROR WRITING TO FLASH message appears, replace the blank SIMM. |
| | 3. Power on the printer. From the Boot Diagnostics menu, select and run MISC. TOOLS MENU / COPY BOOT CODE. If the new SIMM does not copy, replace the controller board. |

**Table 6. General Symptom List**

| Symptom | Solution |
|---|---|
| Paper feeds poorly | 1. Check the forms thickness lever: if it is set too tightly paper feeding can be affected. Set the forms thickness lever to match the thickness of the paper being used.<br><br>2. Power off the printer. Remove paper. Inspect the paper feed path for obstructions that could snag paper. Clear paper feed path of any obstructions.<br><br>3. Inspect the tractors and tractor door springs for damage, excessive wear, and equal door closing tension. If either tractor is worn, damaged, or exhibits uneven door closing tension, replace both tractor assemblies.<br><br>4. Check the condition and tension of the paper feed timing belt. Adjust the paper feed timing belt. Replace the belt if it is damaged.<br><br>5. Check the platen gap. Adjust the platen gap.<br><br>6. Check the dynamic paper tension.<br><br>7. Remove the shuttle frame assembly and check the following:<br><br>   a. Inspect the hammer bank cover assembly for ribbon debris, paper debris, or other foreign matter. Make sure the four foam spacers on the ribbon mask are properly seated. If the ribbon mask or hammer bank cover is damaged or deformed, replace it.<br><br>   b. Inspect the paper ironer for distortion or misalignment. Reposition or replace it if necessary.<br><br>   c. Make sure the paper guides are properly seated on the splined and support shafts.<br><br>   d. Make sure the paper entrance guide pivots freely with minimal down force. Reposition the springs or the guide if necessary.<br><br>   e. Check for correct position and function of the paper motion detector assembly. Reposition or replace if necessary.<br><br>8. Inspect the paper path from above (below the paper ironer), and from below (above the paper entrance guide), for debris, foreign matter, or anything that could inhibit paper motion. Correct as necessary.<br><br>9. Check the dynamic paper tension.<br><br>10. Remove the paper path. Make sure connector P107/PAPR M is fully seated in connector J107 on the controller board. Check for a good paper feed motor connection to J103 on the controller board. |

**Table 6. General Symptom List**

| Symptom | Solution |
|---|---|
| Paper feeds poorly (continued) | 11. Load paper. Power on the printer. Press **PAPER ADVANCE** and **VIEW** several times and check that paper moves in both directions. Replace the paper feed motor if paper does not move in both directions. |
| | 12. Power on the printer. Press **PAPER ADVANCE** and **VIEW** several times and check that paper moves in both directions. Replace the controller board if paper does not move in both directions. |
| Power on "hang" condition | 1. Remove the paper path or pedestal top cover. Reseat all cable connections to the controller board and the power supply board. |
| | 2. Power on the printer. If the printer "hangs," replace the controller board. |
| | 3. Power on the printer. If the printer "hangs," replace the power supply board. |
| Printer does not print from the host | 1. Check the host data cable connection at the rear of the printer. Attach the data cable to the printer interface. |
| | 2. Make a configuration printout. Verify that the printer matches host interface settings. Set printer interface parameters to match those of the host. |
| | 3. Power on the printer. Send a print job from the host. If printer does not print and the interface is RS-232, interchange the wires to pins 2 and 3. (This is the most common cause of an inoperative RS-232 cable.) Verify that the host and printer have the same baud rate, number of data bits, number of stop bits, and parity. Configure the host for XON/XOFF if possible, since this requires the least complex cable. |
| | 4. Power on the printer. Send a print job from the host. If the printer does not print from the host, replace the data and interface cable assemblies. |
| | 5. Remove the paper path or pedestal top cover. Check all cable connections on the controller board. Reseat all cable connectors on the controller board. |
| | 6. Power on the printer. Send a print job from the host. If the printer still does not print from the host, replace the controller board. |

**Table 6. General Symptom List**

| Symptom | Solution |
|---|---|
| Printer does not print self tests | 1. Power off the printer. Remove the paper path or pedestal top cover. Disconnect the control panel cable from connector J110 on the controller board. Disconnect the control panel cable from the control panel. Check continuity of the control panel cable assembly. Replace the control panel cable assembly if it fails continuity test.<br><br>2. Connect the control panel cable assembly to J110 on the controller board and to the control panel. Load paper. Power on the printer. Run a self test. If the self test does not run, replace the control panel assembly.<br><br>3. Power on the printer. Run a self test. If the self test does not run, replace the controller board. |
| Reverse paper feed: platen does not open | 1. Raise the forms thickness lever and check that the platen opens. If the platen opens with difficulty, inspect for and remove jams or obstructions.<br><br>2. Check the condition and tension of the platen open belt. Adjust the platen open belt. Replace the belt if it is damaged.<br><br>3. Check the platen gap. Adjust the platen gap.<br><br>4. Power off the printer. Remove the paper guide assembly. Disconnect connector P106 from the controller board. Check the resistance of connector P106/PLAT M. (Refer to the Main Wire Harness Test Tables in Appendix A.) Replace the platen open motor if it fails the resistance test.<br><br>5. Power on the printer. Press **PAPER ADVANCE** and **VIEW** several times and check that paper moves in both directions. Replace the controller board if the platen does not open during paper reverse. |

**Table 6. General Symptom List**

| Symptom | Solution |
|---|---|
| TOF is lost repeatedly | 1. Check that the customer is setting the forms length to match the size paper used. Set the forms length to match the length of paper being used. |
| | 2. If the customer is using multi-part forms, check that the forms thickness lever is not being set too tightly. Set the forms thickness lever to match the thickness of paper and provide satisfactory print quality, but not too tightly. |
| | 3. Check the condition and tension of the paper feed timing belt. Adjust the paper feed timing belt. Replace the belt if it is damaged. |
| | 4. Check the dynamic paper tension. |
| | 5. Remove the paper path or pedestal top cover. Make sure connector P107/PAPR M is fully seated in connector J107 on the controller board. Connect P107/PAPR M to J107 on the controller board. |
| | 6. Power on the printer. Load paper and set TOF. Press **PAPER ADVANCE** and **VIEW** several times and check that paper returns to TOF. Replace the paper feed motor if paper does not return to TOF. |
| | 7. Power on the printer. Press **PAPER ADVANCE** and **VIEW** several times and check that paper returns to TOF. Replace the controller board if paper does not return to TOF. |

**Table 6. General Symptom List**

| Symptom | Solution |
|---------|----------|
| | **Shuttle** |
| Shuttle does not move | 1. Power down the printer. Remove the shuttle cover. Check the MPU gap. Adjust the gap between the MPU assembly and the flywheel to 0.010 ± 0.001 inch (0.254 ± 0.025 mm). Torque the 7/16 inch MPU clamp screw to 18 inch-pounds (2.03 N•m). |
| | 2. Check that the MPU cable is connected to J03 on the mechanism base. Check that the shuttle motor cable is connected to J02 on the mechanism base. Connect the MPU and the shuttle motor cables. |
| | 3. Remove the paper path or pedestal top cover. Check that the shuttle motor drive cable is connected to J116 on the controller board. |
| | 4. Check the platen gap. Adjust the platen gap. |
| | 5. Inspect the ribbon mask for bends or deformation that snag and interfere with shuttle movement. Make sure the hammer bank cover assembly is correctly installed on its mounting pegs. Reinstall the hammer bank cover assembly. Replace a damaged or deformed hammer bank cover assembly. |
| | 6. Check continuity of the shuttle motor drive cable assembly. Replace shuttle motor drive cable assembly if it fails continuity test. |
| | 7. Power on the printer. Run a Shuttle Slow or Shuttle Fast test. If the shuttle does not move, replace the shuttle frame assembly. |
| | 8. Power on the printer. Run a Shuttle Slow or Shuttle Fast test. If the shuttle does not move, replace the power supply board. |
| | 9. Power on the printer. Run a Shuttle Slow or Shuttle Fast test. If the shuttle does not move, replace the controller board. |

**Table 6. General Symptom List**

| Symptom | Solution |
|---|---|
| Shuttle is noisy | 1. Check the bolts securing the mechanism base to the base pan. Tighten the mechanism base mounting bolts if they are loose enough to permit movement of the mechanism base. |
| | 2. Remove the shuttle cover. Check the shuttle frame assembly mounting/clamp screws for looseness. Torque the 5/32 inch socket head clamp screws to 30 inch-pounds (3.39 N•m). Torque the center captive 5/32 inch socket head screw to 30 inch-pounds (3.39 N•m). |
| | 3. Inspect the shuttle area for loose hardware. Tighten loose hardware. |
| | 4. Check that the hammer bank cover assembly is correctly installed, that it has not slipped off the mounting pegs. Check that the ribbon mask has not partially separated from the hammer bank cover. Check for debris trapped between the ribbon mask, hammer bank cover, and hammer bank. Clean the shuttle frame assembly and hammer bank cover assembly if you find debris. Replace the hammer bank cover assembly if you find any damage to the ribbon mask or hammer bank cover. |
| | 5. Power on the printer. Run a shuttle test. Replace the shuttle frame assembly if it is noisy or rattles. |

# Communications Failures

Many host-printer communications problems are complex. With the exception of a defective interface cable, most communications problems are not a result of a hardware failure. They usually result from an incompatible configuration of the host computer system, network (LAN, print server, controller, multiplexer, etc.), or the printer. Sometimes the print application program itself is at fault.

If you have limited communications experience, and the cause of the problem is not readily apparent, do the following:

1.  Print out the printer configuration, including the E-Net Test Page if the customer is using the ethernet interface.

2.  Obtain a copy of the Device Host Configuration if possible.

3.  Call your support group for assistance in problem analysis.

If you cannot obtain support, or you have experience solving host-printer communications problems, the following additional information is provided.

You can quickly check the ASCII portion of the printer logic by sending a plain text file from a PC to the printer via the parallel or serial port. For a description of each of the ASCII interfaces, refer to the *User's Manual.*

**Table 7. Communications Problems**

| Problem | Interface | Possible Causes & Solutions |
|---|---|---|
| Fails to print from host<br>-or-<br>Prints incorrect characters<br>-or-<br>Prints extra characters<br>-or-<br>Drops characters | Parallel | • Interface cable defective<br>• Host/Network configuration<br>• Printer logic<br>• Terminating Resistors |
| | Serial | • Host/Printer interface cable pinouts incompatible<br>• Host/Printer/Network configuration<br>• Set DTR and RTS both True<br>• Interface cable defective<br>• Printer logic |
| | Twinax | • Interface cable defective<br>• Host-Printer definition<br>• Controller/Network configuration<br>• Printer logic |
| | Coax | • Interface cable defective<br>• Controller/Network configuration<br>• Printer logic |

**Table 7. Communications Problems**

| | Ethernet | • Interface cable defective<br>• Host/Printer/Network configuration<br>• Printer logic |
|---|---|---|
| Ethernet PCBA responds to "ping" and "telnet" utilities, and can print from "ftp", but card cannot be accessed by a browser. | Ethernet | 1. Open a telnet session using the IP address of the ethernet card.<br><br>2. Enter these commands:<br>`config http on`<br>`save`<br>`reset`<br><br>3. Wait up to two minutes for the ethernet card to complete a reset cycle.<br><br>4. Close the telnet session.<br><br>You should be able to access the ethernet card now through a browser by using the IP address as a URL, as for example http://xxx.xxx.xxx.xxx<br><br>**NOTE:** If the ethernet card cannot be accessed by the Printer Manager, do the steps listed under "TCP Port Busy" on page 124. |
| Ethernet PCBA responds to "ping," "telnet," and "ftp" utilities, but will not communicate from the host computer. | Ethernet | 1. Open a telnet session using the IP address of the ethernet card.<br><br>2. Enter these commands:<br>`start fox prn`<br>`stop prn`<br><br>3. If the fox test prints, the host computer is not configured properly. |

# Diagnostic Printer Tests

A set of printer tests is included in the DIAGNOSTICS configuration menu for use as diagnostic tools. Use these tests to check the print quality and basic operation of the printer. You will also use some of the tests in some adjustment procedures. The diagnostic tests are summarized below:

- **Shift Recycle** — A "sliding" alphanumeric pattern useful for identifying missing or malformed characters, improper vertical alignment, or vertical compression.

- **All E's** — A pattern of all uppercase letter E's useful for identifying missing characters, misplaced dots, smeared characters, improper phasing, or light/dark character variations.

- **E's + TOF** — A pattern of all E's repeated for ten lines and followed by a form feed to the top of the next page. This test is useful for identifying paper motion or paper feed problems.

- **All H's** — A pattern of all uppercase letter H's useful for detecting missing characters or dots, smeared characters, or improper phasing.

- **All Underlines** — An underline pattern useful for identifying hammer bank misalignment.

- **All Black** — A condition where all dot positions are printed, creating a solid black band.

- **Shuttle Slow** — Exercises the shuttle and ribbon mechanisms at low speed. You can also use this test to check ribbon tracking and reversing.

- **Shuttle Fast** — Exercises the shuttle and ribbon mechanisms at high speed. You can also use this test to check ribbon tracking and reversing.

- **Shuttle Only** — Runs the shuttle mechanism with no ribbon movement.

- **Phase Printer** — A hammer timing test that permits you to adjust the hammer phase value. The hammer phase value is a timing parameter that controls the vertical alignment of dots in character printing. The numerical units are relative, they do not represent a physical measurement or value. There is no "correct" value or range. The factory prints the initial phase value on the casting of the shuttle assembly, next to the motor housing. Use this value as your starting point when adjusting hammer phasing.

- **Paperout Adj.** — Prints a vertical comb pattern. You use this pattern when you do the end of forms (paper out) adjustment procedure. The comb pattern lets you measure the number of dot rows from the completion of a paper out fault to the end of the paper.

- **Burnin Test** — Do not use. This test is used by the printer manufacturer to burn in the printer prior to shipment and has no value as a maintenance tool.

- **Print Error Log** — Prints the current log of errors. Most non-routine faults (ribbon stall, voltage faults) are stored in the error log.

- **Clear Error Log** — Clears all entries from the error log.

- **Adapter Test** — Prints the ethernet adapter statistics stored in the ethernet adapter (if present).

- **Ethernet Test —** Prints the ethernet statistics stored on the ethernet interface (if present). See page 226.

- **Acoustics** — A test used by the manufacturer to measure acoustic properties of the printer. This test has no value as a maintenance tool.

- **Demo** — Prints representative lines of the various CPI available and some sample bar codes.

- **Dice 5** — Prints all dot positions, creating a solid black band across the page. Used to detect dark and light hammer springs.

- **Prnt Ribbon Log** — Prints information for the currently installed ribbon, such as installed ribbon (ribbon part number), ribbon brand name, ribbon life, and ribbon end point.

- **Checker**. This pattern helps identify marginal printhead elements, quality of edge sharpness, and uneven print quality.

## Selecting and Running Diagnostic Printer Tests

**NOTE:** You must set TOF after running any diagnostic test.

| Step | Press | LCD Result | Notes |
|------|-------|-----------|-------|
| 1. | Make sure the printer is on. Raise the printer cover. | | |
| 2. | Load paper. | | |
| 3. | Set TOF. (Refer to the *User's Manual*.) | | |
| 4. | ON LINE/CLEAR | OFFLINE<br>QUICK SETUP | The printer must be offline to run a print test. |
| 5. | △ + ▽ | ENTER SWITCH<br>UNLOCKED | Unlocks **ENTER** key and control panel. |
| | | OFFLINE<br>QUICK SETUP | |
| 6. | ▷ UNTIL | OFFLINE<br>DIAGNOSTICS | |
| 7. | ▽ | DIAGNOSTICS<br>Printer Tests | |

| Step | Press | LCD Result | Notes |
|------|-------|-----------|-------|
| 8. | ▷ UNTIL | DIAGNOSTICS<br>Test Width | |
| 9. | ▽ | Test Width<br>Full Width* | |
| 10. | ◁ OR ▷ | Test Width<br>X | Cycle through choices. X = Full Width or X = 80 columns. |
| 11. | ENTER | Test Width<br>X* | Test width is selected. |
| 12. | △ | DIAGNOSTICS<br>Test Width | |
| 13. | ▷ UNTIL | DIAGNOSTICS<br>Printer Tests | |
| 14. | ▽ | Printer Tests<br>Shift Recycle* | |
| 15. | ◁ OR ▷ | Printer Tests<br>All E's | Cycle through the choices. |
| 16. | ENTER | Printer Tests<br>All E's* | Starts test. |
| 17. | ENTER | Printer Tests<br>All E's* | Stops test. |

| Step | Press | LCD Result | Notes |
|------|-------|------------|-------|
| 18. | + | ENTER SWITCH LOCKED | Locks the **ENTER** key and control panel. |
| 19. | ON LINE/CLEAR | ONLINE LinePrinter+ | Places the printer in online mode. |
| 20. | Examine print quality. Characters should be fully formed and of uniform density. | | |
| 21. | Set TOF. (Refer to the *User's Manual*.) | | |
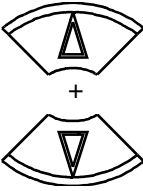
## Printing the Ethernet Test

**NOTE:** You must set TOF after printing the Ethernet Test.

| Step | Press | LCD Result | Notes |
|------|-------|------------|-------|
| 1. | Make sure the printer is on. Raise the printer cover. | | |
| 2. | Load paper. | | |
| 3. | Set TOF. (Refer to the *User's Manual*.) | | |
| 4. | ON LINE/CLEAR | OFFLINE<br>QUICK SETUP | The printer must be offline to run a print test. |
| 5. | △ + ▽ | ENTER SWITCH<br>UNLOCKED<br><br>OFFLINE<br>QUICK SETUP | Unlocks **ENTER** key and control panel. |
| 6. | ▷ UNTIL | OFFLINE<br>DIAGNOSTICS | |
| 7. | ▽ | DIAGNOSTICS<br>Printer Tests | |
| 8. | ▽ | Printer Tests<br>Shift Recycle | |
| 9. | ◁ OR ▷ | Printer Tests<br>Ethernet Test | |
| 10. | ENTER | Printer Tests<br>Ethernet Test* | Starts printing. |
| 11. | ENTER | Printer Tests<br>Ethernet Test | Stops printing. |

| Step | Press | LCD Result | Notes |
|------|-------|-----------|-------|
| 12. | △ + ▽ | ENTER SWITCH LOCKED | Locks the **ENTER** key and control panel. |
| 13. | ON LINE/CLEAR | ONLINE LinePrinter+ | Places the printer in online mode. |
| 14. | Set TOF. (Refer to the *User's Manual.*) | | |

# Boot Diagnostics Menu

Printer boot-up software contains a "Boot Diagnostics" menu that you can access by holding down two keys while powering on the printer. This menu is not intended for the end user, but provides useful information for manufacturing and maintenance personnel.

The boot diagnostics menu is a multi-level menu that operates the same way as the user menus. The menu structure is shown in Figure 8 on page 228.

## Activating The Boot Diagnostics Menu

1. Set the printer power switch to O (off).

2. On the control panel, press and hold down ◀ + ▼.

3. While holding ◀ + ▼ , set the printer power switch to 1 (on).

4. When "BOOT DIAGNOSTICS / PRESS ENTER" appears on the LCD, release the ◀ + ▼ keys and press the **ENTER** key. Menu options are shown in Figure 8.

## Exiting The Boot Diagnostics Menu

**Method 1:** Use the exit option in the Boot Diagnostics Menu

1. Using the arrow keys, move to the DIAGNOSTICS MENU / EXIT DIAGNOSTICS menu option. (Refer to the menu map on page 228.)

2. Press the **ENTER** key. The printer goes into startup initialization. (B30: STATUS INITIALIZING...)

**Method 2:** Cycling power

1. Power off the printer.

2. Wait 15 seconds.

3. Power on the printer.

BOOT DIAGNOSTICS
PRESS ENTER

▼ = Down Arrow Key

▶ = Next Arrow Key

ENTER

DIAGNOSTICS MENU
VERSION CONTROL

▼

| VERSION MENU BOOTCODE VERSION | VERSION MENU \SOFTWARE VERSION | VERSION MENU HARDWARE VERSION | VERSION MENU V8 ASIC VERSION |
|---|---|---|---|

ENTER

ENTER

ENTER

ENTER

BOOT/PPC V2.00A
03-Nov-03 363329

09/12/04
13:22:29

HARDWARE VERSION
HURRICANE II

V8 VERSION=F
MECA VERSION=F

VERSION MENU
EC VERSION

ENTER

EC V3.06M
12-Sep-03

DIAGNOSTICS MENU
FILE SYSTEM

Ⓐ

Continued on
next page

▼

FILE SYSTEM MENU
< - VIEW FILES - >

FILE SYSTEM MENU
FILE STATISTICS

FILE SYSTEM MENU
OPTIMIZE FILES

ENTER

ENTER

▼

OPTIMIZING
FLASH FILES

< - VIEW FILES - >
*93779.sf*

VIEW FILES
*FILENAME*

| FILE STATS MENU BYTES AVAILABLE | FILE STATS MENU BYTES USED | FILE STATS MENU UNOPTIMIZE BYTES | FILE STATS MENU TOTAL ERASE CYCL | FILE STATS MENU # DELETED FILES | FILE STATS MENU NUMBER OF FILES |
|---|---|---|---|---|---|

ENTER

ENTER

ENTER

ENTER

ENTER

ENTER

BYTES AVAILABLE
3010918924

BYTES USED
1288242676

UNOPTIMIZE BYTES
0000000000

TOTAL ERASE CYCL
0000000000

# DELETED FILES
0000000000

NUMBER OF FILES
0000000000

**Figure 8. Boot Diagnostics Menu**

(A)

From previous page

▼ = Down Arrow Key

▶ = Next Arrow Key

```
DIAGNOSTICS MENU
MISC. TOOLS
```
▼

```
DIAGNOSTICS MENU
EXCEPTION VIEWER
```
▼

```
DIAGNOSTICS MENU
EXIT DIAGNOSTICS
```
ENTER
```
B30: STATUS
INITIALIZING...
```

```
MISC. TOOLS MENU
AMOUNT OF MEMORY
```
ENTER
```
SDRAM SIZE 032MB
FLASH SIZE 004MB
```

```
MISC. TOOLS MENU
COPY BOOT CODE
```
ENTER
```
BOOT CODE COPY
HAS COMPLETED
```

```
MISC. TOOLS MENU
ERASE ALL NVRAM
```
ENTER
```
ERASE ALL NVRAM
COMPLETED
```

```
MISC. TOOLS MENU
CACHE CONTROL
```
▼
▶

```
CACHE CONT. MENU
DATA CACHE OFF
```
ENTER
```
DATA CACHE HAS
BEEN DISABLED
```

```
CACHE CONT. MENU
INSTRN CACHE OFF
```
ENTER
```
INSTRUCTION
CACHE DISABLED
```

```
CACHE CONT. MENU
DATA CACHE ON
```
ENTER
```
DATA CACHE HAS
BEEN ENABLED
```

```
CACHE CONT. MENU
INSTRN CACHE ON
```
ENTER
```
INSTRUCTION
CACHE ENABLED
```

```
CACHE CONT. MENU
ALL CACHE ON
```
ENTER
```
ALL CACHE
HAS BEEN ENABLED
```

```
MISC. TOOLS MENU
RUN MEMORY TESTS
```
ENTER
```
RAM TEST MMU OFF
EC=NO DC=WR S2=B
```

```
MISC. TOOLS MENU
STATUS DISABLE
```
▶
```
RUN
MAILBOX TEST
```
ENTER

▼
```
SHOW STATUS MENU
SHOW STATUS OFF
```
ENTER
▶
```
SHOW STATUS MENU
SHOW STATUS ON
```
ENTER

```
EXCEPTION MENU
VIEW EXCEPTION
```
ENTER
```
NO EXCEPTION
HAS OCCURRED
```

```
EXCEPTION MENU
WHERE IT OCCURED
```
ENTER
```
OCCURRED AT
ADDRESS 001E4B48
```

```
EXCEPTION MENU
PPC INSTRUCTION
```
ENTER
```
b1 0x0001E368
```

**Figure 7. Boot Diagnostics Menu (continued)**

# Factory Menu

Printer software contains a Factory menu that you can access by holding down the four arrow keys when the printer is in the offline state. This menu is not intended for the end user, but is used by manufacturing and maintenance personnel to set or change certain operational perameters.

The factory menu is a multi-level menu that operates the same way as the user menus. The menu structure is shown in Figure 9 on page 231.

**IMPORTANT**   **If you do not know the purpose of a setting or value in the Factory Menu, DO NOT change it. Default menu values set at the factory are indicated by an asterisk ( * ) next to the value.**

## Entering the Factory Menu

1.   Plug the AC power cord into the printer and the power source.

2.   Power on the printer.

3.   The printer must be offline to do this procedure. If the printer is online, press the **ON LINE** key. "OFFLINE / QUICK SETUP" will display.

4.   On the control panel, press the ▲ **+** ▼ keys to unlock the **ENTER** key. "ENTER SWITCH UNLOCKED" briefly displays. (If "LOCKED" displays, simply press ▲ **+** ▼ again. This is the default key combination. The lock/unlock key combination can be programmed by the user. If ▲ **+** ▼ does not unlock the **ENTER** key, get the new key combination from the user.)

5.   Press ▲ **+** ▼  **+** ▶ **+** ◀ to enter the factory menu. (Press all four keys at the same time.) "Factory / Set Coil Temp" appears on the display. Menu options are shown in Figure 9.

6.   Before exiting the factory menu, press the ▲ **+** ▼ keys to lock the **ENTER** key.

## Exiting the Factory Menu

Press **ON LINE** to exit the Factory menu.

▼= Down Arrow Key

▶= Next Arrow Key

Press **ENTER** to select or activate.

| Factory<br>Set Coil Temp | Factory<br>PRINTER MGMT | Factory<br>C/T Data Timeout | Factory<br>Demo Count |
|---|---|---|---|

ENTER

PLEASE WAIT...
(See also the procedure on page 265.)

C/T Data Timeout
3 seconds*

3 to 9 seconds
(Use ▶ to view options.)

Demo Count
1 *

2    (Use ▶ to view options.)
5
10
Continuous

| PRINTER MGMT<br>Debug Port Cfg | PRINTER MGMT<br>Clear Password | PRINTER MGMT<br>Reboot w/Factory | PRINTER MGMT<br>Debug Access | PRINTER MGMT<br>E-NET to default |
|---|---|---|---|---|

ENTER

Done

ENTER

Printer reboots with Factory configuration.

Debug Access
Enable*

No Telnet Debug
(Use ▶ to view options.)

ENTER

Clearing...

| Debug Port Cfg<br>Baud Rate | Debug Port Cfg<br>Word Length | Debug Port Cfg<br>Stop Bits | Debug Port Cfg<br>Parity |
|---|---|---|---|

Baud Rate
9600 BAUD *

19200 BAUD
38400 BAUD
57600 BAUD
115200 BAUD
2400 BAUD
4800 BAUD

(Use ▶ to view options.)

Word Length
8 *

7    (Use ▶ to view options.)

Stop Bits
1 *

2    (Use ▶ to view options.)

Parity
None *

Odd  (Use ▶ to view options.)
Even

**Figure 9. Factory Menu**

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# Exception Menu

The exception menu is only accessible when certain faults occur. It provides additional troubleshooting information for some fault mesages.

You will only use this menu when directed to by a troubleshooting procedure. When you come to this procedure, the printer will be powered on, with a specific fault message displayed which prevents further operation.

1.  Press the ▲ (UP arrow) key seven (7) times. "Exception Menu / View Exception" will display.

2.  Press the **ENTER** key. The cause of the fault will display. **Write down the cause of the fault.** (For example, "Machine Check Exception Error: Machine Check.")

3.  Press the ▶ (RIGHT arrow) key **twice**. "Where it Occurred" will display.

4.  Press the **ENTER** key. The address of the fault will display. **Write down the address of the fault.** (For example, "002BA160")

5.  Press the ▶ (RIGHT arrow) key **twice**. "PPC Instruction" will display.

6.  Press the **ENTER** key. The instruction that caused the fault will display. **Write down the instruction that caused the fault.**
    (For example, "r00,r09,0x0001 - > r0")

7.  Power off the printer. Provide the messages you recorded to your next higher support facility.

8.  Return to the troubleshooting procedure that sent you here.

# Firmware Diagnostic Port

The firmware diagnostic port enables you to help with firmware troubleshooting when necessary. Diagnostic routines built into the software are used by Printronix engineers to determine the cause of a fault or failure. In some cases the engineers will ask for specific information to be captured or provide a diagnostics test build. A special serial diagnostic port cable is required to connect the printer to a terminal emulator program on a PC. The terminal emulator can then display and capture information directly from the printer.

## Diagnostic Cable

The printer debug port is a female RJ-12 connector. The debug cable is a male RJ-12 to 9 pin PC RS232 connector. A description of the pin outs is shown below:

**Table 8. RJ-12 and DB-9 Connector Pin Outs**

| Signal Description | Pin of RJ-12 Connector | Pin of DB-9 Connector |
|---|---|---|
| RXD (Printer --> PC) | 3 | 2 |
| Ground | 4 | 5 |
| TXD (Printer <-- PC) | 5 | 3 |
| Not Connected | Unlisted Pins | Unlisted Pins |

For more information on the debug cable, go to
http://www.printronix.com/boc/connections/cables/modemdeb.htm

## Capturing Information

The diagnostic port is located on the rear panel of the printer at J7 on the Hurricane controller board.

1. Connect the cable from the printer's debug port to the serial port on the PC.

2. Start a terminal emulator program on the PC, such as HyperTerminal, which is standard with pre-Vista Windows. For Vista and later, Microsoft recommends downloading a free terminal emulator from the web.

   If the printer's debug port settings have not been changed then set the terminal emulator to run at the printer's default 9600 baud, 8 data bits, 1 stop bit, no parity, and no flow control.

   Also set the COM port in the terminal emulator to the PC serial port that the cable is connected to (usually COM1 or COM2).

3.  Turn on the file capture in the terminal emulator to log the information coming from the printer (Transfer->Capture File).

4.  Press the Return key on the PC. If the connection is correct, the following shall display on the terminal emulator:

    `> Running`

    The diagnosing engineer will tell you which command to type. When a valid command is typed, the printer will respond by printing the requested information. When an invalid command is typed, the terminal emulator will display:

    `** unknown command`

    **NOTE:** The terminal emulator and cable can also be connected after the fatal fault has occurred to get information about the fault. Do not turn off the printer.

5.  Connect the cable and set the terminal emulator to log the information.

6.  Type the command **dump** and capture the output to a file.
    The dump command will take a couple of minutes to complete.

7.  Send the file to the Printronix Customer Support Center along with other diagnostic information (see page 39).

# Hex Code Printout

A hex code printout (or "hex dump") prints every ASCII data character received from the host computer, and lists its corresponding two-character hexadecimal code. (See Figure 10 below.) You can use hex dumps as an aid in troubleshooting data reception problems.

In a hex dump every printable character is printed both as its assigned symbol and as its hex equivalent. Every unprintable (ASCII control) character is printed out as a period (.) and its hex equivalent. If the printer is using a parallel interface, the letter "p" before a hex code indicates an active Paper Instruction (PI) line, and a blank space before a hex code indicates an inactive PI line.

To convert an ASCII character to its corresponding hex code, or vice versa, refer to the ASCII code chart on page 238. To make a hex code printout, refer to the procedure on page 236.

```
 !"#$%&'()*+,-. /   20  21  22  23  24  25  26  27  28  29  2A  2B  2C  2D  2E  2F
0123456789:;<=>?    30  31  32  33  34  35  36  37  38  39  3A  3B  3C  3D  3E  3F
@ABCDEFGHIJKLMNO    40  41  42  43  44  45  46  47  48  49  4A  4B  4C  4D  4E  4F
PQRSTUVWXYZ[\]^_    50  51  52  53  54  55  56  57  58  59  5A  5B  5C  5D  5E  5F
`abcdefghijklmno    60  61  62  63  64  65  66  67  68  69  6A  6B  6C  6D  6E  6F
pqrstuvwxyz{|}~     70  71  72  73  74  75  76  77  78  79  7A  7B  7C  7D  7E  20
 !"#$%&'()*+,-. /0  21  22  23  24  25  26  27  28  29  2A  2B  2C  2D  2E  2F  30
123456789:;<=>?@    31  32  33  34  35  36  37  38  39  3A  3B  3C  3D  3E  3F  40
ABCDEFGH..!"#$%&    41  42  43  44  45  46  47  48  0D  0A  21  22  23  24  25  26
'()*+,-./0123456    27  28  29  2A  2B  2C  2D  2E  2F  30  31  32  33  34  35  36
789:;<=>?@ABCDEF    37  38  39  3A  3B  3C  3D  3E  3F  40  41  42  43  44  45  46
GHIJKLMNOPQRSTUV    47  48  49  4A  4B  4C  4D  4E  4F  50  51  52  53  54  55  56
WXYZ[\]^_`abcdef    57  58  59  5A  5B  5C  5D  5E  5F  60  61  62  63  64  65  66
ghijklmnopqrstuv    67  68  69  6A  6B  6C  6D  6E  6F  70  71  72  73  74  75  76
wxyz{|}~ !"#$%&'    77  78  79  7A  7B  7C  7D  7E  20  21  22  23  24  25  26  27
()*+,-./01234567    28  29  2A  2B  2C  2D  2E  2F  30  31  32  33  34  35  36  37
89:;<=>?@ABCDEFG    38  39  3A  3B  3C  3D  3E  3F  40  41  42  43  44  45  46  47
HI..!"#$%&'()*+,-   48  49  0D  0A  22  23  24  25  26  27  28  29  2A  2B  2C  2D
./0123456789:;<=    2E  2F  30  31  32  33  34  35  36  37  38  39  3A  3B  3C  3D
>?@ABCDEFGHIJKLM    3E  3F  40  41  42  43  44  45  46  47  48  49  4A  4B  4C  4D
NOPQRSTUVWXYZ[\]    4E  4F  50  51  52  53  54  55  56  57  58  59  5A  5B  5C  5D
^_`abcdefghijklm    5E  5F  60  61  62  63  64  65  66  67  68  69  6A  6B  6C  6D
nopqrstuvwxyz{|}    6E  6F  70  71  72  73  74  75  76  77  78  79  7A  7B  7C  7D
~ !"#$%&'()*+,-.    7E  20  21  22  23  24  25  26  27  28  29  2A  2B  2C  2D  2E
/0123456789:;<=>    2F  30  31  32  33  34  35  36  37  38  39  3A  3B  3C  3D  3E
?@ABCDEFGHIJ..#$    3F  40  41  42  43  44  45  46  47  48  49  4A  0D  0A  23  24
%&'()*+,-./01234    25  26  27  28  29  2A  2B  2C  2D  2E  2F  30  31  32  33  34
56789:;<=>?@ABCD    35  36  37  38  39  3A  3B  3C  3D  3E  3F  40  41  42  43  44
EFGHIJKLMNOPQRST    45  46  47  48  49  4A  4B  4C  4D  4E  4F  50  51  52  53  54
UVWXYZ[\]^_`abcd    55  56  57  58  59  5A  5B  5C  5D  5E  5F  60  61  62  63  64
efghijklmnopqrst    65  66  67  68  69  6A  6B  6C  6D  6E  6F  70  71  72  73  74
uvwxyz{|}~ !"#$%    75  76  77  78  79  7A  7B  7C  7D  7E  20  21  22  23  24  25
&'()*+,-./012345    26  27  28  29  2A  2B  2C  2D  2E  2F  30  31  32  33  34  35
6789:;<=>?@ABCDE    36  37  38  39  3A  3B  3C  3D  3E  3F  40  41  42  43  44  45
FGHIJK..$%&'()*+    46  47  48  49  4A  4B  0D  0A  24  25  26  27  28  29  2A  2B
,-./0123456789:;    2C  2D  2E  2F  30  31  32  33  34  35  36  37  38  39  3A  3B
<=>?@ABCDEFGHIJK    3C  3D  3E  3F  40  41  42  43  44  45  46  47  48  49  4A  4B
LMNOPQRSTUVWXYZ[    4C  4D  4E  4F  50  51  52  53  54  55  56  57  58  59  5A  5B
\]^_`abcdefghijk    5C  5D  5E  5F  60  61  62  63  64  65  66  67  68  69  6A  6B
lmnopqrstuvwxyz{    6C  6D  6E  6F  70  71  72  73  74  75  76  77  78  79  7A  7B
|}~ !"#$%&'()*+,    7C  7D  7E  20  21  22  23  24  25  26  27  28  29  2A  2B  2C
```

**Figure 10. Sample Hex Dump**

## How to Print a Hex Dump

| Step | Press | LCD Result | Notes |
|------|-------|-----------|-------|
| 1. | Make sure the printer is on. Raise the printer cover. | | |
| 2. | ON LINE/CLEAR | OFFLINE<br>QUICK SETUP | |
| 3. | △ + ▽ | ENTER SWITCH<br>UNLOCKED | Unlocks the **ENTER** key and control panel. |
| | | OFFLINE<br>QUICK SETUP | |
| 4. | ▷ UNTIL | OFFLINE<br>MAINT / MISC | |
| 5. | ▽ | MAINT / MISC<br>Hex Dump Mode | |
| 6. | ▽ | Hex Dump Mode<br>Disable* | Default |
| 7. | ◁ OR ▷ | Hex Dump Mode<br>Enable | Cycle through choices. |
| 8. | ENTER | Hex Dump Mode<br>Enable* | Asterisk (*) indicates choice is active. |
| 9. | △ + ▽ | ENTER SWITCH<br>LOCKED | Locks the **ENTER** key and control panel. |

| Step | Press | LCD Result | Notes |
|------|-------|-----------|-------|
| 10. | ON LINE/CLEAR | ONLINE<br>LinePrinter+ | Places the printer in online mode. |
| 11. | Send a file from the host computer. the printer outputs a hex dump. Refer to the ASCII chart on page 238. | | |
| 12. | When the hex dump is complete, take the printer offline and change the Hex Dump Mode back to Disable. Follow the steps outlined above and select Disable. | | |

# ASCII Character Set

**KEY**

| | B7 B6 B5 | 0 0 1 |
|---|---|---|
| **BITS** B4 B3 B2 B1 | | |
| 1 0 1 1 | **ESC** | 33 ← OCTAL equivalent<br>27 ← DECIMAL equivalent<br>1B ← HEX equivalent |

ASCII Character Name

| B7 B6 B5 / BITS B4 B3 B2 B1 | ROW | COLUMN 0 (0 0 0) | | 1 (0 0 1) | | 2 (0 1 0) | | 3 (0 1 1) | | 4 (1 0 0) | | 5 (1 0 1) | | 6 (1 1 0) | | 7 (1 1 1) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 0 0 0 | 0 | NUL | 0 0 0 | DLE | 20 16 10 | SP | 40 32 20 | 0 | 60 48 30 | @ | 100 64 40 | P | 120 80 50 | ` | 140 96 60 | p | 160 112 70 |
| 0 0 0 1 | 1 | SOH | 1 1 1 | DC1 (XON) | 21 17 11 | ! | 41 33 21 | 1 | 61 49 31 | A | 101 65 41 | Q | 121 81 51 | a | 141 97 61 | q | 161 113 71 |
| 0 0 1 0 | 2 | STX | 2 2 2 | DC2 | 22 18 12 | " | 42 34 22 | 2 | 62 50 32 | B | 102 66 42 | R | 122 82 52 | b | 142 98 62 | r | 162 114 72 |
| 0 0 1 1 | 3 | ETX | 3 3 3 | DC3 (XOFF) | 23 19 13 | # | 43 35 23 | 3 | 63 51 33 | C | 103 67 43 | S | 123 83 53 | c | 143 99 63 | s | 163 115 73 |
| 0 1 0 0 | 4 | EOT | 4 4 4 | DC4 | 24 20 14 | $ | 44 36 24 | 4 | 64 52 34 | D | 104 68 44 | T | 124 84 54 | d | 144 100 64 | t | 164 116 74 |
| 0 1 0 1 | 5 | ENQ | 5 5 5 | NAK | 25 21 15 | % | 45 37 25 | 5 | 65 53 35 | E | 105 69 45 | U | 125 85 55 | e | 145 101 65 | u | 165 117 75 |
| 0 1 1 0 | 6 | ACK | 6 6 6 | SYN | 26 22 16 | & | 46 38 26 | 6 | 66 54 36 | F | 106 70 46 | V | 126 86 56 | f | 146 102 66 | v | 166 118 76 |
| 0 1 1 1 | 7 | BEL | 7 7 7 | ETB | 27 23 17 | ' | 47 39 27 | 7 | 67 55 37 | G | 107 71 47 | W | 127 87 57 | g | 147 103 67 | w | 167 119 77 |
| 1 0 0 0 | 8 | BS | 10 8 8 | CAN | 30 24 18 | ( | 50 40 28 | 8 | 70 56 38 | H | 110 72 48 | X | 130 88 58 | h | 150 104 68 | x | 170 120 78 |
| 1 0 0 1 | 9 | HT | 11 9 9 | EM | 31 25 19 | ) | 51 41 29 | 9 | 71 57 39 | I | 111 73 49 | Y | 131 89 59 | i | 151 105 69 | y | 171 121 79 |
| 1 0 1 0 | 10 | LF | 12 10 0 A | SUB | 32 26 1A | * | 52 42 2A | : | 72 58 3A | J | 112 74 4A | Z | 132 90 5A | j | 152 106 6A | z | 172 122 7A |
| 1 0 1 1 | 11 | VT | 13 11 0 B | ESC | 33 27 1B | + | 53 43 2B | ; | 73 59 3B | K | 113 75 4B | [ | 133 91 5B | k | 153 107 6B | { | 173 123 7B |
| 1 1 0 0 | 12 | FF | 14 12 0 C | FS | 34 28 1C | , | 54 44 2C | < | 74 60 3C | L | 114 76 4C | \ | 134 92 5C | l | 154 108 6C | \| | 174 124 7C |
| 1 1 0 1 | 13 | CR | 15 13 0 D | GS | 35 29 1D | - | 55 45 2D | = | 75 61 3D | M | 115 77 4D | ] | 135 93 5D | m | 155 109 6D | } | 175 125 7D |
| 1 1 1 0 | 14 | SO | 16 14 0 E | RS | 36 30 1E | . | 56 46 2E | > | 76 62 3E | N | 116 78 4E | ^ | 136 94 5E | n | 156 110 6E | ~ | 176 126 7E |
| 1 1 1 1 | 15 | SI | 17 15 0 F | US | 37 31 1F | / | 57 47 2F | ? | 77 63 3F | O | 117 79 4F | _ | 137 95 5F | o | 157 111 6F | DEL | 177 127 7F |

# Soft vs. Hard Reset

## Soft Reset

A soft(ware) reset clears printer memory then loads the power-up configuration set by the user. (If no power-up configuration has been set by the user, the factory default configuration is loaded.) It is called a soft reset because no hardware is tested. All diagnostic and initialization tests are bypassed and memory is simply refreshed with the power-up printer configuration.

The printer must be offline to do a soft reset:

1.  Press the **ON LINE** key to put the printer in the offline state.

2.  Press the ◀ **+** ▶ keys simultaneously.

The LCD will display "Standby / Soft Reset" while the printer loads the power-up configuration.

## Hard Reset ("Cycle Power")

A hard(ware) reset is a power shutdown and restart that runs all initialization and diagnostic routines. This is also called "cycling power."

1.  Set the printer power switch to O (off).

2.  Wait 15 seconds.

3.  Set the printer power switch to 1 (on).

**NOTE:** A hard printer reset causes the +48V power supply (fans, motors, etc.) to shut down in 1 to 5 seconds, depending on the amount of memory installed on the controller board.

# 4  *Adjustments and Tests*

## Introduction

The printer is a durable, low-maintenance machine, but some components and systems require occasional adjustment and may need to be tested as part of a troubleshooting procedure.

You usually will be referred to this chapter by a troubleshooting procedure, or as part of a removal/installation procedure.

### Adjustments and Tests

# Preparing the Printer for Maintenance

**WARNING**    **Unplug the printer power cord from the printer or power outlet before you do any maintenance procedure. Failure to remove power could result in injury to you or damage to equipment. If you must apply power during maintenance, you will be instructed to do so in the maintenance procedure.**

**IMPORTANT**    **Do not try to repair electronic components or assemblies in the field. Do not de-solder or re-solder any circuit board components. Replace a malfunctioning electronic assembly with an operational spare. Most electronic problems are corrected by replacing the printed circuit board assembly, sensor, or cable that causes the fault indication. This is also true of failures traced to the hammer bank—it is not field repairable and you must replace the entire shuttle frame assembly. Hammer spring assemblies are the only replaceable components of the shuttle frame assembly.**

To prepare the printer for maintenance, do the following steps before you make any adjustments or perform any maintenance procedure:

1. Set the printer power switch to O (off).
2. Unplug the printer power cord from the printer or AC power source.
3. Disconnect the data (signal) cable(s) from the printer interface.
4. Unload paper.
5. Read the entire adjustment or maintenance procedure before you begin working on the printer.
6. Gather the necessary tools and parts before you begin working on the printer.

# Returning the Printer to Normal Operation

When you have finished servicing the printer, return it to service by doing the following steps:

1.  Load paper.

2.  Connect the data (signal) cable(s) to the printer interface.

3.  Plug the AC power cord into the printer and the power source.

4.  Close the cabinet doors and the printer cover.

5.  Set the printer power switch to | (on).

6.  Test printer operation by selecting and running one of the operator print tests. (See page 222.)

7.  Select the emulation. (Refer to the *User's Manual.)*

8.  Set the top-of-form. (Refer to the *User's Manual.)*

# Belt, Paper Feed Timing, Adjustment

1. Prepare the printer for maintenance (page 242).

2. Cabinet Models: Remove the paper path (page 311).
   Pedestal Models: Remove the top cover assembly (page 292).

3. Remove the timing belt cover (1) by squeezing the front and back to release the plastic tabs from the slots in the side plate.

4. Loosen (do not remove) the two 5/16 inch motor mount bolts (2).

5. Using the straight end of a force gauge, apply 15 pounds (66.7 N) of pressure to the paper feed drive motor (3). Use the splined shaft (4) to steady the gauge.

6. Reduce tension to 12 pounds (53.4 N) and torque the 5/16 inch paper feed motor mount bolts (2) to 18 inch-pounds (2.03 N•m).

**NOTE:** Belt tension is correct if the belt deflects 1/8 inch (3.175 mm) midway between the pulleys.

7. Snap the timing belt cover (1) into the slots in the side plate.

8. Cabinet Models: Install the paper path (page 311).
   Pedestal Models: Install the top cover assembly (page 292).

9. Return the printer to normal operation (page 243).
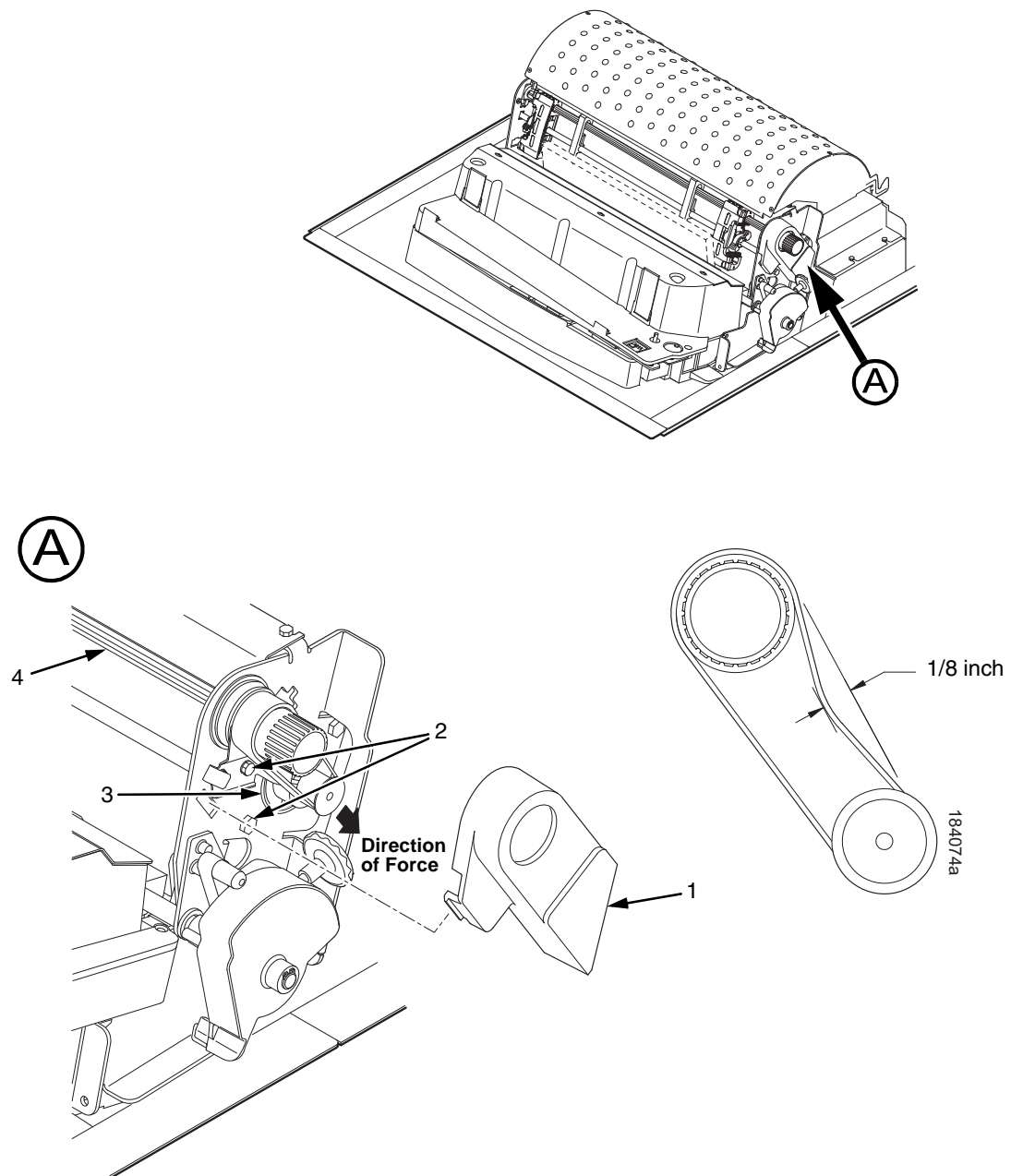
**Legend:**

1) Timing Belt Shield
2) Motor Mount Bolt (2)
3) Paper Feed Drive Motor
4) Splined Shaft

**Figure 11. Paper Feed Timing Belt Adjustment**

# Belt, Platen Open, Adjustment

1.  Prepare the printer for maintenance (page 242).

2.  Cabinet Models: Remove the paper path (page 311).
    Pedestal Models: Remove the top cover assembly (page 292).

3.  Remove the platen open belt cover (1) by squeezing the top and bottom to release the plastic tabs from the slots in the side plate.

4.  Using a 5/32 inch Allen wrench, *slowly* loosen the motor adjustment screw (2) just enough to permit movement of the platen open motor in the slotted side plate.

5.  Close the forms thickness lever all the way.

**CAUTION** **Too much tension on the platen open belt can cause the platen gap to change, which can lead to premature wear of the platen, damaged hammer tips, and poor print quality.**

6.  The spring will automatically tension the belt.

7.  *Slowly* tighten the motor adjustment screw (2).

**NOTE:** Belt tension is correct if the belt deflects 3/16 inch (4.76 mm) midway between the pulleys. If deflection is more or less than 3/16 inch, repeat steps 4 through 7.

8.  Snap the platen open belt cover (1) into the slots in the side plate.

9.  Cabinet Models: Install the paper path (page 311).
    Pedestal Models: Install the top cover assembly (page 292).

10. Return the printer to normal operation (page 243).

3/16 inch
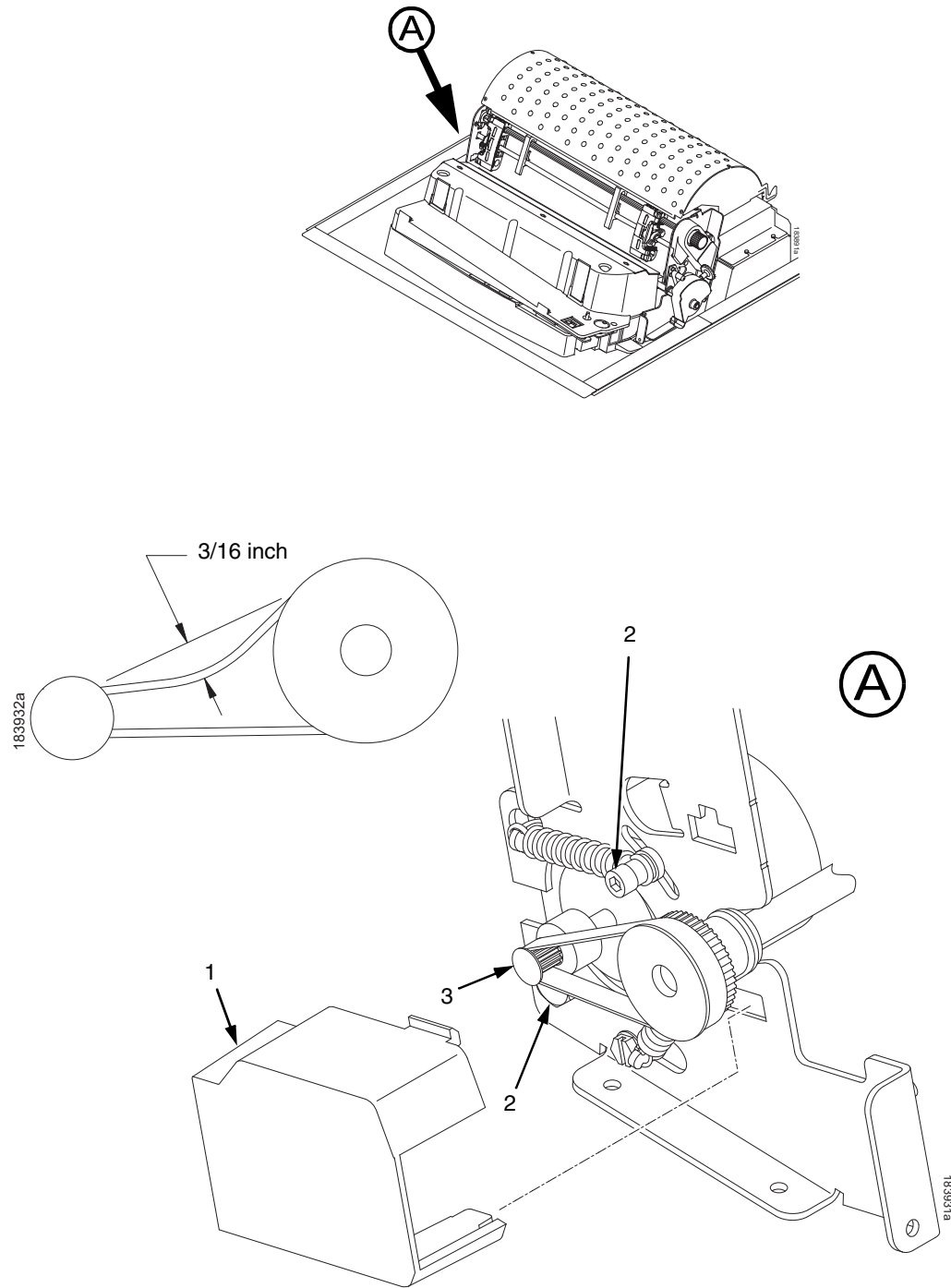
**Legend:**

1) Belt Cover
2) Motor Mount Screw (2)
3) Platen Open Motor Shaft

**Figure 12. Platen Open Belt Adjustment**

# Paper Scale Alignment

1. Open the printer cover.

2. Load paper.

3. Connect the power cord to the AC power source.

4. Set the printer power switch to 1 (on).

5. Verify that the shuttle cover (1) is properly installed (page 291).

6. Print a full 136 column line by selecting and running one of the diagnostic self-tests. (See page 222.)

7. Check alignment of the scale to the print at column positions 1 and 136.

8. If adjustment is necessary, loosen the three 5/64 inch button-head hex screws (2).

9. Position the scale (3) so that column positions 1 and 136 line up with the first and last characters on the 136 character printout.

10. Tighten the 5/64 inch button-head hex screws (2).

11. Close the printer cover.
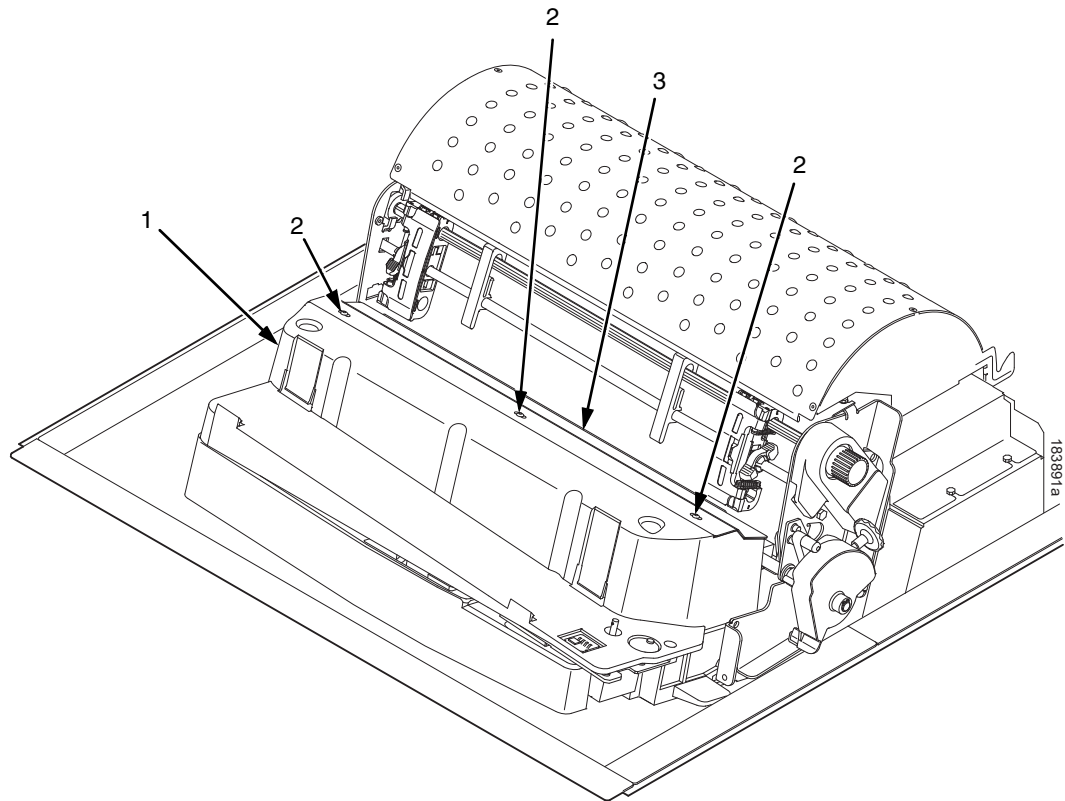
**Legend:**

1) Shuttle Cover
2) Screw, Button-Head, 5/64 inch hex (3)
3) Paper Scale

**Figure 13. Paper Scale Alignment**

# Platen Gap Adjustment

**IMPORTANT**      **Only do this procedure if the original equipment shuttle frame assembly or platen was replaced by a new or refurbished unit, or if you were instructed to in a troubleshooting procedure.**

1.   Prepare the printer for maintenance (page 242).

2.   Remove the ribbon cartridge and paper. (Refer to the *User's Manual.*)

3.   Remove the shuttle cover assembly (page 291).

4.   Loosen the platen open belt (page 246, steps 2, 3, and 4).

5.   Rotate the platen stop knob (1) until the white pointer is aligned with "A" on the forms thickness label.

6.   Raise the forms thickness lever (2) to the fully open position.

**CAUTION**      **Do not force the platen against the feeler gauge and do not move the feeler gauge laterally across the hammer bank. Damage to the hammer tips will result.**

7.   Insert the flat feeler gauge (3) straight down between the hammer bank cover plate (4) and ribbon mask (5), within four hammer positions of the left end of the hammer bank.

**CAUTION**      **Adjust the platen setscrews less than 1/4 turn on one side, then check the other side. Adjustment sensitivity is approximately 0.03 inch per revolution of the setscrew. Also, insert the feeler gauge no more than 2 inches down from the top of the ribbon mask.**

8.   Gently close the forms thickness lever (2) all the way. As the platen is closing, gently slide the feeler gauge up and down, keeping it between the hammer tip and ribbon mask. If the feel is too tight when the platen is being closed, adjust the 3/32 inch setscrew (6) at the end of the platen counterclockwise. If the feel is too loose, adjust the setscrew clockwise. With the forms thickness lever closed all the way, the feeler gauge should contact both the hammer tips and the ribbon mask and move with light friction. Shift the gauge slightly to verify.

9.   Repeat steps 6 through 8 at the right end of the hammer bank.

10.  After adjusting both sides, check the gap again at both ends. Readjust if necessary.

11.  When the platen gap is correct at both ends of the platen, adjust the platen open belt (page 246).

12.  Install the shuttle cover assembly (page 291).

13.  Install the ribbon cartridge. (Refer to the *User's Manual.*)

14.  Check the hammer phasing adjustment (page 255).

15.  Return the printer to normal operation (page 243).

**NOTE**: Right side adjustment shown. Left side is the same.
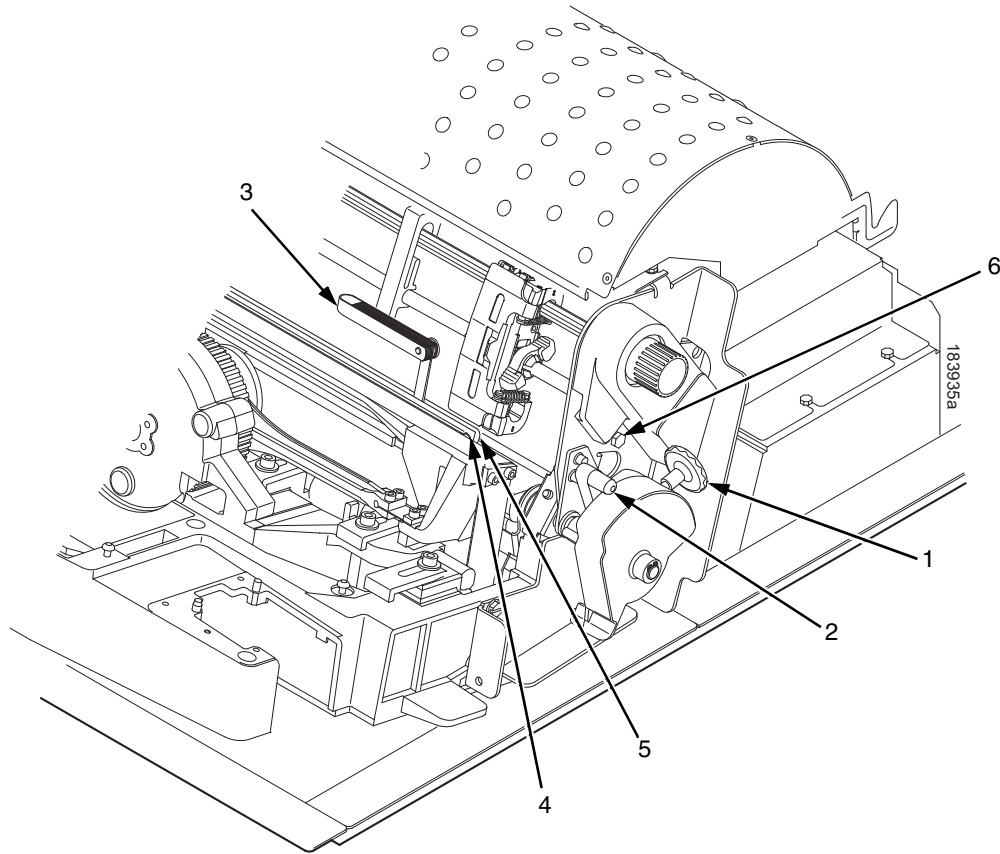


**Legend:**

1) Platen Stop Knob
2) Forms Thickness Lever
3) Feeler Gauge
4) Hammer Bank Cover
5) Ribbon Mask
6) Setscrew, 3/32 inch hex (2)

**Figure 14. Platen Gap Adjustment**

# Paper Out Adjustment

This procedure tests and sets the distance from the page perforation at which a LOAD PAPER fault message is triggered. This adjustment prevents printing on the platen when the printer runs out of paper.

The measurement units are dot rows.

You will use the dot row patterns printed by the Paperout Adj. test to verify that this parameter is set correctly.

**NOTE:** Do this procedure only if a new paper detector switch assembly has been installed, the controller board has been replaced, or if you are sure the paper out adjustment is incorrect. A paper out triggering distance of 1 or 2 dot rows above the perforation is acceptable; 5 to 7 dot rows above or any dot rows below indicates adjustment is required. Also, although it is not required, it is advisable to test the paper out triggering distance with 6-part paper, in order to verify correct printing with multi-part forms.

The procedure below describes how to run the Paperout Adj. test and modify the paper out "Dots" value.

1. Open the printer cover.

2. On cabinet models, open the cabinet front door.

3. Load paper. Make sure the forms thickness lever is closed.

4. Power on the printer.

5. On the sheet of paper just below the paper entrance slot, cut or tear a four inch square on the left side, immediately below the perforation. (See Figure 15.) This creates a hole that will trigger a LOAD PAPER fault message, but allows printing to the right of the hole (which would occur on the platen in a true paper out condition).

6. Cut or tear a four inch square in the manner described above, on every third sheet, until you have made 3 or 4 holes.
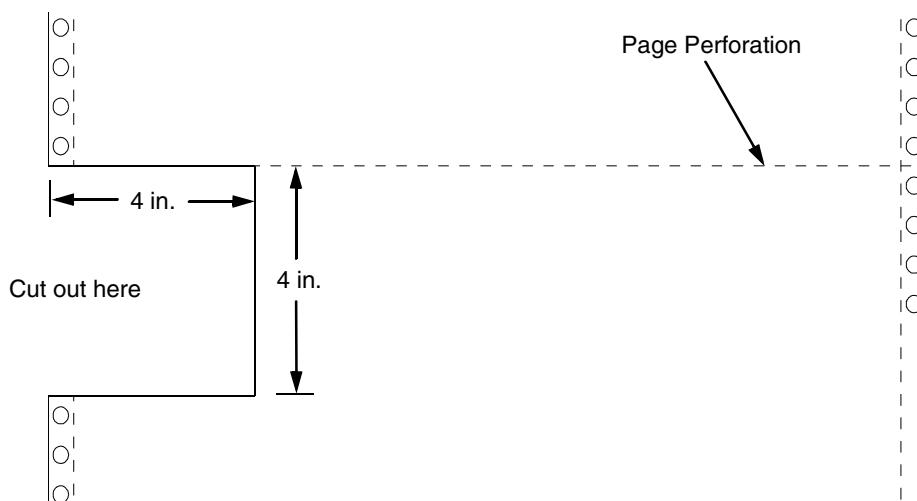


**Figure 15. Paper Preparation for Paper Out Adjustment Test**

7.  If the printer is online, press the **ON LINE** key to place the printer offline. "OFFLINE / QUICK SETUP." displays.

8.  On the control panel, press the ▲ **+** ▼ keys to unlock the **ENTER** key. "ENTER SWITCH UNLOCKED" briefly displays. (If "LOCKED" displays, simply press ▲ and ▼ again. This is the default key combination. The lock/unlock key combination can be programmed by the user. If ▲ **+** ▼ does not unlock **ENTER**, get the new key combination from the user.)

9.  Press the ◀ key until "DIAGNOSTICS" displays.

10. Press ▼. "DIAGNOSTICS / Printer Tests" displays.

11. Press ▼. "SHIFT / RECYCLE" displays.

12. Press ▶ until "Paperout Adj." displays.

    This test will print a vertical "comb" pattern at around column 70, each long bar separated by three shorter bars. An enlarged example of the comb pattern is shown below.
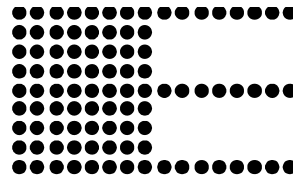


13. Press **ENTER** until the Paper Out Adjustment test starts. The comb pattern will print until the display shows "LOAD PAPER" and the audible alarm sounds.

14. Open the platen and move the paper up with the vertical position knob and examine the area of the page perforation.

    If the bottom of the comb just meets the perforation, the paper out adjustment distance is correct, skip to step 27. (1 or 2 dot rows above the perforation is OK; 5 to 7 dot rows above or any dots below the perforation mean adjustment of the Paper Out Dots value is required.)

    If the comb pattern stopped short of the perforation or printed beyond the perforation, go to step 15.

15. Measure how short or long the comb pattern printed by counting the number of dot rows needed to reach the perforation, or the number of dot rows that printed beyond the perforation.

**NOTE:** You can use the long bars to count the dot rows quickly. There are three dot rows between each long bar, so each long bar increases the number of dot rows by four. You can also tear off a small piece of the comb pattern from the beginning of the pattern and use it as a ruler to help you measure the dot rows required either to reach the perforation or back up to it.

16. Close the platen.

17. Press **CLEAR** to remove the fault condition. "OFFLINE / QUICK SETUP" displays.

18. Press the ◀ key until "DIAGNOSTICS" displays.

19. Press ▼. "DIAGNOSTICS / Printer Tests" displays.

20. Press ▶ until "Paper Out Dots" displays.

21. Press ▼. The top line of the display will show "Paper Out Dots" and the bottom line will show the current setting for the number of dots.

22. Press ▼. The number of dots will move up to the top line of the display with an asterisk (*) next to it.

23. Using the ▶ or ◀ key, adjust the XX DOTS value up or down by the number of dots you counted in step 15. (If the comb pattern stopped short of the perforation, increase the number of dots. If the comb pattern printed beyond the perforation, decrease the number of dots.)

24. Press **ENTER** to select the new number of dots as the active value. (The asterisk that appears tells you that it is now the active value.)

25. Press **CLEAR** to place the printer offline.
"OFFLINE / QUICK SETUP" displays.

26. Run the Paper Out Dots and the Paper Out Adjustment tests until the comb pattern prints at an acceptable distance from the page perforation. (Return to step 10.)

27. When the paper out triggering distance is acceptable, reload the paper, feed it past any remaining unused holes that you tore in it, and set the top of form.

28. Press ▲ + ▼ (or the key combination set by the user). "ENTER SWITCH LOCKED" briefly displays.

29. Close the printer cover.

30. Press the **ON LINE** key to place the printer online.

# Hammer Phasing Adjustment

You must check and adjust hammer phasing if the controller board is replaced, the shuttle frame assembly is removed, or if the MPU is replaced.

The hammer phase value is a timing parameter that permits you to adjust the vertical alignment of dots in character printing. The phase value numerical units are relative; they do not represent a physical measurement or value. Thus there is no "correct" value or range. But, if the phasing value is far enough from the theoretical ideal value on a particular printer, errors can occur. If, for example, you are adjusting phasing and an error such as PAP FIFO UNDRFL* occurs, the phase value may be too high. Try a lower value.

The factory prints the initial phase value on the shuttle assembly casting, next to the motor housing. Adjust the phasing to this value and recheck the vertical alignment. When vertical alignment is acceptable, write the new phasing value on the shuttle.

Phasing should be adjusted with the printer printing at full paper width.

**IMPORTANT**    **The printer must be printing the Phase pattern of "H's" when the Phasing Value is changed, or the New Phasing Value will not be written into memory. If the value is changed when not printing, the printer will return to its default phasing value when powered off then back on.**

1. Load full width (136 column) paper and set the top of form.

2. Power on the printer.

3. If the printer is online, press the **ON LINE** key to place the printer offline. "OFFLINE / QUICK SETUP." displays.

4. On the control panel, press the ▲ **+** ▼ keys to unlock the **ENTER** key. "ENTER SWITCH UNLOCKED" briefly displays. (If "LOCKED" displays, simply press ▲ and ▼ again. This is the default key combination. The lock/unlock key combination can be programmed by the user. If ▲ **+** ▼ does not unlock **ENTER**, get the new key combination from the user.)

5. Press the ◀ key. "OFFLINE / DIAGNOSTICS" displays.

6. Press ▼. "DIAGNOSTICS / Printer Tests" displays.

7. Press ▼. "Printer Tests / Shift Recycle" displays.

8. Press ▶ until "Printer Tests / Phase Printer" displays.

9. Press **ENTER**. The display shows "Printer Tests / Phase Printer" and the test begins. The current phasing value is printed on the left of the printed pattern of all H's. As the pattern prints, compare the H's to the figure below. If the phasing needs adjustment, go to step 10. If the phasing is OK, go to step 13.

| | | |
|---|---|---|
| Needs Adjustment | **Correct** | Needs Adjustment |
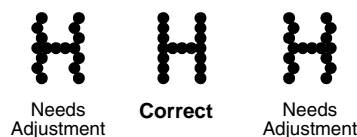
10. Press ▼: The current phase index displays. Press ▼ again: An asterisk (*) appears next to the phase value.

11. Press ▶ to increase or ◀ to decrease the phasing index value, then press **ENTER** to activate the value as it prints. Continue to increase or decrease the phasing index until the pattern of H's is acceptable.

12. Press ▲ twice: "Printer Tests / Phase Printer" displays.

13. Press **ENTER** to stop the test.

14. Press **CLEAR**. "OFFLINE / QUICK SETUP" displays.

15. Press ▲ **+** ▼ (or the key combination set by the user). "ENTER SWITCH LOCKED" briefly displays.

16. Close the printer cover.

17. Press the **ON LINE** key to place the printer online.

**NOTE:** If you changed the phasing value, power down the printer, remove the ribbon and shuttle cover, and write the new phase value on the aluminum shuttle casting.

# Loading Flash Memory

Flash memory is contained in a SIMM (single in-line memory module) located on the controller board. Printer control languages (the "emulations") and printer operating system software are loaded into flash memory at the factory, but there are occasions when you may have to load this software:

- You have replaced the controller board

- You have replaced flash memory

- The customer needs to upgrade printer software

- The customer needs different emulation software

- The customer buys an optional emulation after the printer is installed

Emulation and operating system software are included as files on a CD-ROM that comes with the printer. You will copy the appropriate file from the CD-ROM to a computer's hard disk, then download the file from the computer into printer memory.

**IMPORTANT**    **When downloading emulation and operating system software to the printer, all other optional fonts, customer-supplied logos, setup files, feature files, and TIFF files will be erased. You will need to reload those files. Before starting a download, make sure you have all the necessary files on hand.**

You can load software through the serial, parallel, or ethernet port of the printer, and you can do it three ways:

- If your computer can run Java™ programs, you can load software through any printer port by using the Firmware Download Utility included on the CD that comes with the printer. (See below.)

- You can use DOS commands to load software through the parallel port or serial port. (See page 259.)

- If the printer has the ethernet NIC (Network Interface Card) installed, you can load software through the ethernet port. (See page 262.)

## Loading Software With The Firmware Download Utility

If your computer has the Java runtime environment installed, the Firmware Download Utility (FDU) allows you to load program files into the printer with an easy to use graphical interface. FDU is a utility program included on the CD that comes with the printer and can be used on computers with Windows®, UNIX®, and Linux® operating systems. With FDU, you can choose which printer port through which to load software (all are supported), choose the baud rate if you opt for serial, and launch the load process. FDU is a Java-based program, so you need Java runtime environment version J2re1.4.2 or higher installed on your computer. (The runtime environment can be downloaded free from **http://www.java.com/en/download**.)

1. Make a configuration printout of all saved configurations. (Refer to the *User's Manual.)*

2. Set the printer power switch to O (Off).

3. Disconnect the data (signal) cable(s) from the I/O port(s) connectors on the printer interface.

4. Connect a printer data cable to the parallel, serial, or ethernet port of the computer you will use to download the software.

5. Connect the printer data cable to the appropriate I/O port of the printer.

6. On the printer control panel, press and hold down the **ON LINE** and **PAPER ADVANCE** keys. Without releasing the keys, power the printer on. When you see "B01 STATUS: 8245 SDRAM TEST 32MB" on the LCD, release the keys.

7. Wait until you see "PROGRAM DOWNLOAD" on the LCD before doing the next step. This can take a few seconds to appear, depending on the emulations and interfaces installed in the printer.

8. On your computer, create a directory named **download** at the root level of the hard drive. (For example, **C:\download** on a Windows computer.)

9. Insert the printer emulation software CD into your computer's CD-ROM drive.

10. Copy the **FDU.jar** file from the CD-ROM to your computer.

11. Open the **readme.txt** file on the CD-ROM. There are five emulation sets with corresponding part number files from which to choose:
    CT / IPDS / IGP
    ANSI / IGP
    TN / IGP
    PCL2 / IGP
    LG / IGP
    HD OpenPrint Postscript/PDF (PS)
    All emulations include the LP+ emulation. They are offered in two file formats: .exe and .prg. You can use either format with the FDU program.

12. Identify which emulation set you want to load into the printer and note the filename that corresponds to that emulation. The filename is a six digit number plus **.exe** or **.prg**. For example: 123456.exe or 123456.prg **This is the file you will download into the printer.**

13. Copy the file to the **download** directory you created in step 8.

14. Double-click on the **FDU.jar** file you copied to your computer. It will launch its own window, then you can use it to select the emulation, the location of the file to be downloaded, the port into which to load it, and initiate the download.

**IMPORTANT**   **Do not interrupt the downloading process once it has started. Interrupting a download will leave the flash memory on the controller board incompletely loaded, and the printer may not boot up.**

15. When the new software has successfully loaded into flash memory and the printer has reset itself, set the printer power switch to O (off).

16. Remove the CD-ROM from your computer and store it with the printer.

17. If required, reconnect the data input cable(s) to the printer.

18. Set the printer power switch to | (on).

19. Using the configuration printout(s) you made in step 1, restore the printer configurations. (Refer to the printer *User's Manual*.)

## Loading through Parallel Port Using DOS

1. Make a configuration printout of all saved configurations. (Refer to the *User's Manual.)*

2. Set the printer power switch to O (Off).

3. Disconnect the data (signal) cable(s) from the printer interface connectors.

4. Connect a parallel data printer cable to the LPT1 port or a serial data printer cable to the COM1 port of an IBM-compatible computer running the PC-DOS, MS-DOS, or Windows (3.1x, 95, 98, Me, NT, 2000, or XP) operating system.

**NOTE:** Software loads at 9600 baud if you load through the serial port with a DOS command. This can take a long time. Software loads much faster through the parallel port.

5. Connect the data cable to the appropriate I/O port of the printer.

6. On the printer control panel, press and hold down the **ON LINE** and **PAPER ADVANCE** keys. Without releasing the keys, power the printer on. When you see "B01 STATUS: 8245 SDRAM TEST 32MB" on the LCD, release the keys.

7. Wait until you see "PROGRAM DOWNLOAD" on the LCD before doing the next step. This can take a few seconds to appear, depending on the emulations and interfaces installed in the printer.

8. Using Windows Explorer, create a directory named **download** at the root level of your C: hard drive. (C:\download)

9. Insert the printer emulation software CD-ROM into your computer's CD-ROM drive.

10. Open the readme.txt file on the CD-ROM. There are five emulation sets with corresponding part number files from which to choose:
    CT / IPDS / IGP
    ANSI / IGP
    TN / IGP
    PCL2 / IGP
    LG / IGP
    HD OpenPrint Postscript/PDF (PS)
    All emulations include the LP+ emulation. They are offered in two file formats: .exe and .prg. **Use .exe files to download through the parallel or serial port.**

11. Identify which emulation set you want to load into the printer and note the filename that corresponds to that emulation. The filename is a six digit number plus **.exe**. For example: 123456.exe
    **This is the file you will download into the printer.**

12. Copy the file to the **download** directory you created in step 8.

13. Start a command prompt session. (The Start Menu icon is usually labeled **MS-DOS Prompt** or **Command Prompt**.)

14. At the command prompt type:
    `C:`<Enter>
    `cd \download`<Enter>

15. To load the file through the **LPT1 parallel port** on the computer, type the following at the command prompt on the computer:
    *`filename.exe -pb`*<Enter>
    where *filename.*exe is the file name you noted in step 11. This command decompresses the file on the hard drive and copies it as a binary file into the flash memory on the printer controller board.

**IMPORTANT** **Do not interrupt the downloading process once it has started. Interrupting a download will leave the flash memory on the controller board incompletely loaded, and the printer may not boot up.**

While the file is copied into memory, the display screen on the printer control panel informs you of the load process and status.

16. When the new software has successfully loaded into flash memory and the printer has reset itself, set the printer power switch to O (off).

17. Remove the CD-ROM from the host computer and store it with the printer.

18. If required, reconnect the data input cable(s) to the printer.

19. Set the printer power switch to | (on).

20. Using the configuration printout(s) you made in step 1 on page 259, restore the printer configurations. (Refer to the printer *User's Manual*.)

## Loading Software if Flash Contains only Boot Code

If the flash memory contains only boot code (for example, if it is new), or if a download was interrupted (for example, by a power outage) you must download software through the printer's parallel port using the three-key initialization sequence covered in this section.

1. Make sure the printer's parallel port is available. In some configurations, you may have to re-install the Centronics® I/O cable and connector in order to load basic software into the printer.

2. Make a configuration printout of all saved configurations. (Refer to the *User's Manual.)*

3. Set the printer power switch to O (Off).

4. Disconnect the data (signal) cable(s) from the printer interface connectors.

5. Connect a parallel data printer cable to the LPT1 port of an IBM-compatible computer running the PC-DOS, MS-DOS, or Windows (3.1x, 95, 98, Me, NT, 2000, or XP) operating system.

6. Connect the data cable to the Centronics port of the printer.

7. On the printer control panel, press and hold down the **ON LINE** + **PAPER ADVANCE + VIEW / EJECT** keys. Without releasing

the keys, power the printer on.When you see "B01 STATUS: 8245 SDRAM TEST 32MB" on the LCD, release the keys.

8.  Wait until you see "B20: STATUS 00% / DOWNLOAD MODE" or "PROGRAM DOWNLOAD" on the LCD before doing the next step.

9.  Using Windows Explorer, create a directory named **download** at the root level of your C: hard drive. (**C:\download**)

10. Insert the printer emulation software CD-ROM into your computer's CD-ROM drive.

11. Open the readme.txt file on the CD-ROM. There are five emulation sets with corresponding part number files from which to choose:
    CT / IPDS / IGP
    ANSI / IGP
    TN / IGP
    PCL2 / IGP
    LG / IGP
    HD OpenPrint Postscript/PDF (PS)
    All emulations include the LP+ emulation. They are offered in two file formats: .exe and .prg. **Use .exe files to download through the parallel port.**

12. Identify which emulation set you want to load into the printer and note the filename that corresponds to that emulation. The filename is a six digit number plus **.exe**. For example: 123456.exe
    **This is the file you will download into the printer.**

13. Copy the file to the **download** directory you created in step 8.

14. Start a command prompt session. (The Start Menu icon is usually labeled **MS-DOS Prompt** or **Command Prompt**.)

15. At the command prompt type:
    `C:`<Enter>
    `cd \download`<Enter>

16. At the command prompt on the computer:
    *`filename.exe -pb`*<Enter>
    where *filename*.exe is the file name you noted in step 11. This command decompresses the file on the hard drive and copies it as a binary file into the flash memory on the printer controller board.

17. When the software has successfully loaded into flash memory and the printer has reset itself, set the printer power switch to O (off).

18. Starting at step 6 of "Loading through Parallel Port Using DOS" on page 259, load the software again through the parallel port. (In other words, use the two-key method to load software again. This ensures that all necessary code is loaded into printer memory.

## Loading Software through the NIC

**IMPORTANT**   **To load software through the ethernet NIC (Network Interface Card) you need the IP Address of the printer and the flash memory must contain basic printer code. If the flash memory was replaced, or if a download was interrupted (for example, by a power outage), you must load software through the parallel port. (Refer to "Loading Software if Flash Contains only Boot Code" on page 260.)**

1.  Make a configuration printout of all saved configurations. (Refer to the *User's Manual.)*

2.  Set the printer power switch to O (Off).

3.  Connect the ethernet cable to the printer interface.

4.  On the printer control panel, press and hold down the **ON LINE** and **PAPER ADVANCE** keys. Without releasing the keys, power the printer on. When you see "B01 STATUS: 8245 SDRAM TEST 32MB" on the LCD, release the keys.

5.  Wait until you see "PROGRAM DOWNLOAD" on the LCD before doing the next step. This can take a few seconds to appear, depending on the emulations and interfaces installed in the printer.

6.  Using Windows Explorer, create a directory named **download** at the root level of your C: hard drive. (C:\download)

7.  Insert the printer emulation software CD-ROM into your computer's CD-ROM drive.

8.  Open the readme.txt file on the CD-ROM. There are five emulation sets with corresponding part number files from which to choose:
    CT / IPDS / IGP
    ANSI / IGP
    TN / IGP
    PCL2 / IGP
    LG / IGP
    HD OpenPrint Postscript/PDF (PS)
    All emulations include the LP+ emulation. They are offered in two file formats: .exe and .prg. **Use .exe files to download through the NIC.**

9.  Identify which emulation set you want to load into the printer and note the filename that corresponds to that emulation. The filename is a six digit number plus **.exe**. For example: 123456.exe
    **This is the file you will download into the NIC.**

10. Copy the file to the **download** directory you created in step 6.

11. Start a command prompt session in Windows. (The Start Menu icon is usually labeled **MS-DOS Prompt** or **Command Prompt**.)

12. At the command prompt type:

    **C:**<Enter>
    **cd \download**<Enter>

13. Start the FTP (file transfer protocol) program by typing:

    **123456 -n *xxx.xxx.xxx.xxx*<Enter>**
    (where *xxx.xxx.xxx.xxx* is the IP Address of the printer.)

**IMPORTANT**   **Do not interrupt the downloading process once it has started. Interrupting a download will leave the flash memory on the controller board and NIC incompletely loaded, and the printer may not boot up.**

14. When the new software has successfully loaded into flash memory and the printer has reset itself, set the printer power switch to O (off).

15. Remove the CD-ROM from the host computer and store it with the printer.

16. If required, reconnect the data input cable(s) to the printer.

17. Set the printer power switch to | (on).

18. Using the configuration printout(s) you made in step 1 on page 262, restore the printer configurations. (Refer to the printer *User's Manual.*)

# Reprogramming the Security Key

The security key on the PSA3 controller board can be reprogrammed with a Software Program Exchange (SPX) module. This allows the user or a service technician to enable features such as new emulations without having to remove covers and install a new security key on the controller board.

The SPX is an intelligent module that plugs into the debug port on the back of printers equipped with the PSA3 controller board. The SPX is used only once. It automatically overwrites itself after successfully reprogramming a security key.

The SPX is used at power-up only and is not left in the printer during normal operation. Because it is a single-use disposable item the user is not required to return it to the vendor or manufacturer.

## How to Reprogram the Security Key

1. Power off the printer.

2. On cabinet models, open the rear door. On pedestal models, use the illustration below to locate the debug port at the rear of the printer.

3. Insert the SPX into the debug port, in as shown in Figure 16 on page 264.
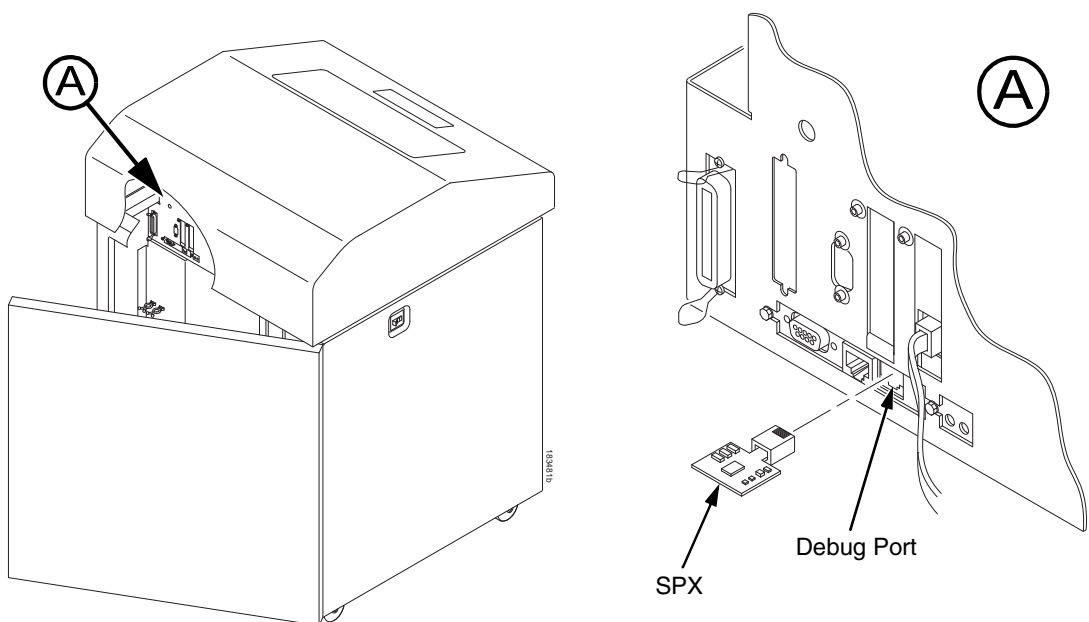
**Figure 16. Inserting the SPX into the Debug Port**

4. Power on the printer. The printer will begin its boot-up sequence.

5. When the printer detects a valid SPX, the control panel displays:
"NEW SPX DETECTED
PRESS ENTER"

**NOTE:** If an error message displays, find the message in the Message List in
Chapter 3 and follow the troubleshooting instructions.

6. Press the **ENTER** key to activate the reprogramming sequence. The
display will read:
"DO NOT POWER OFF
Upgrading..."

7. When the security key is reprogrammed, the display will read:
"REMOVE USED SPX
THEN PRESS ENTER"

8. Remove the SPX from the debug port at the rear of the printer.

9. Press the **ENTER** key. The printer will reboot itself and you may resume
normal printing.

10. You may need to download the emulation if the emulation supported by
the SPX is not in the current printer firmware.

11. You may need to set additional menu parameters for any new features
that have been added or enabled. (Refer to the *User's Manual*.)

# Coil Temperature Adjustment

**IMPORTANT**    **This procedure applies only to models P7000HD, P7X06H, P7X08H, P7X15, and P7220.**

Do this procedure only when the original controller board or shuttle frame assembly have been replaced or you are instructed to do so in a maintenance or troubleshooting procedure. Do **not** do this procedure if the original controller board or shuttle frame assembly were removed and reinstalled as part of other maintenance tasks.

**IMPORTANT**    **The shuttle frame assembly must be at room temperature to do this procedure. Power off the printer and let it cool for at least one hour before doing this procedure.**

1.  Plug the AC power cord into the printer and the power source.

2.  Power on the printer.

3.  The printer must be offline to do this procedure. If the printer is online, press the **ON LINE** key. "OFFLINE / QUICK SETUP" will display.

4.  On the control panel, press the ▲ **+** ▼ keys to unlock the **ENTER** key. "ENTER SWITCH UNLOCKED" briefly displays. (If "LOCKED" displays, simply press ▲ and ▼ again. This is the default key combination. The lock/unlock key combination can be programmed by the user. If ▲ **+** ▼ does not unlock **ENTER**, get the new key combination from the user.)

5.  Press ▲ **+** ▼ **+** ▶ **+** ◀ to enter the factory menu. (Press all four keys at the same time.) "Factory / Set Coil Temp" appears on the display.

6.  Press **ENTER**. The display tells you to "PLEASE WAIT" while the coil temperature is set by an automatic calibration sequence in printer software.

7.  When the display again reads "Factory / Set Coil Temp" press ▲ **+** ▼ to lock the **ENTER** key.

8.  Press the **ON LINE** key to exit the Factory menu.

9.  Coil temperature is set. Return the printer to normal operation (page 243).

# Dynamic Paper Tension Adjustment

This procedure helps you identify and eliminate conditions that contribute to paper jams, excessive tension on the paper feed motor, and vertical dot compression or expansion.

1. Open the printer cover.

2. Unload paper.

3. Unlock both tractors and move them outward to the sides as far as they will go.

4. Prepare a length of 14 inch wide paper consisting of three sheets that are still attached at the perforations. The paper must be single part, 18 lb. maximum weight, 0.0036 inch (0.09 mm) maximum thickness. Open the cabinet front door and feed the paper up through the print station until the first page clears the ribbon mask by about one inch. (Figure 17.)

5. Fold a two inch piece of plastic tape over the top sheet, midway between the sides, as shown in Figure 17 detail A.



Three sheets of 14 inch, 18 pound paper

Plastic Tape
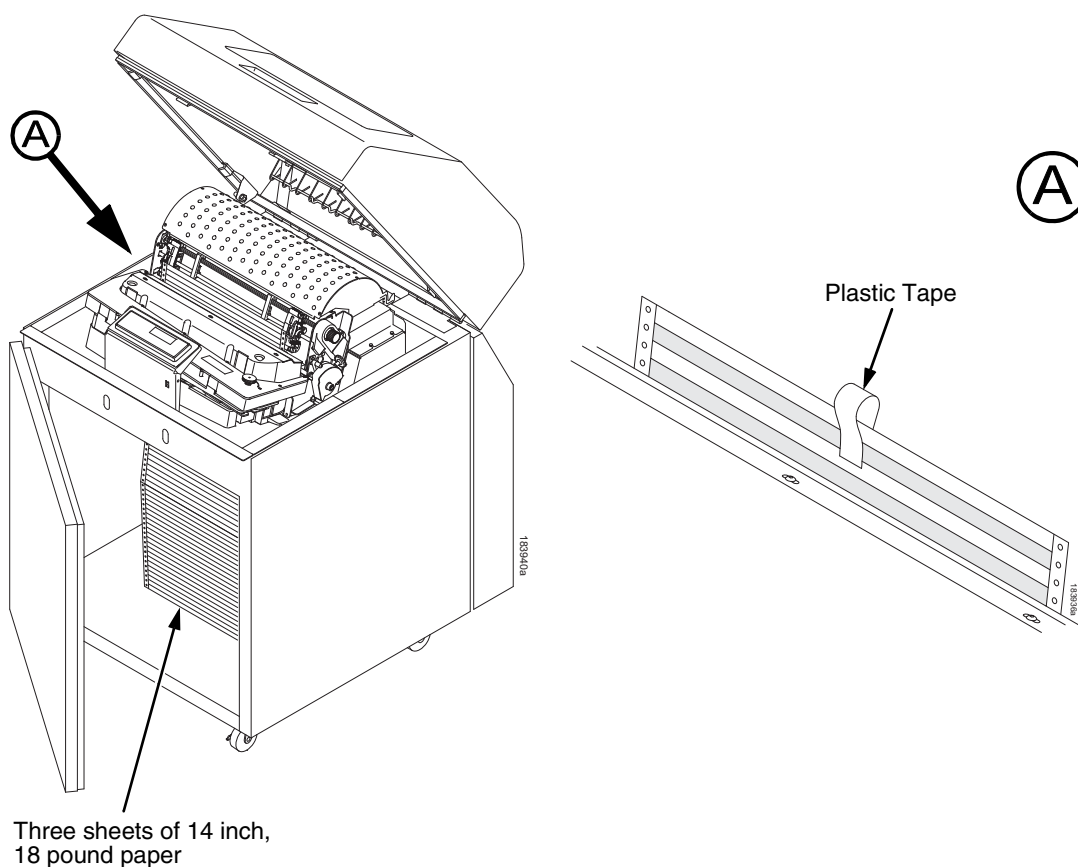
**Figure 17. Preparing Paper for Tension Measurement**

6. Close the forms thickness lever all the way (pointer at 'A').

7. Insert the hook of a "fish scale" force gauge through the tape you installed in step 5. (Figure 18.)

8. Use the scale to pull the paper slowly straight up through the print station for about six inches and note the maximum force exerted on the scale. Do not pull any page perforations through the print station. (Figure 18.)
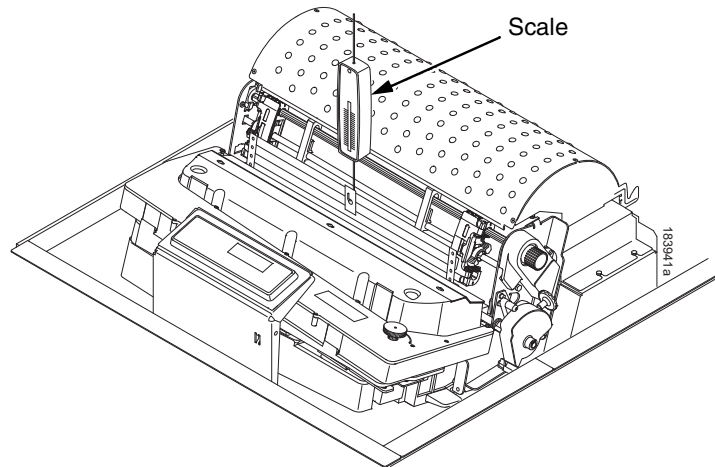


**Figure 18. Measuring Paper Tension**

9. Repeat steps 6 through 8 several times to get an average value of force on the gauge.

10. The average tension should be 6 to 12 ounces for printers with one paper ironer, and 9 to 15 ounces on printers with an additional auxiliary paper ironer. If the average value is greater than 13 (or 16) ounces, paper handling and print quality problems are likely.

11. If the average value is greater than 13 (or 16) ounces, check the platen gap (page 250), adjust if necessary, and recheck the dynamic paper tension.

12. If the platen gap is correct, remove the shuttle frame assembly (page 328) and check the following:

    a. Inspect the hammer bank cover assembly for ribbon debris, paper debris, or other foreign matter. If the ribbon mask or hammer bank cover is damaged or deformed, replace it.

    b. Inspect the paper ironer for distortion or misalignment. Reposition or replace it if necessary.

    c. Make sure the paper guides are properly seated on the splined and support shafts.

    d. Make sure the paper entrance guide pivots freely with minimal down force. Reposition the springs or the guide if necessary.

    e. Check for correct position and function of the paper motion detector assembly. Reposition or replace if necessary.

    f. Inspect the paper path from above (below the paper ironer), and from below (above the paper entrance guide), for debris, foreign matter, or anything that could inhibit paper motion. Correct as necessary.

# Tractor Belt Tension Adjustment

First line print compression can be reduced by adjusting the tension of the tractor belts. The procedure below removes the slack that can occur in some tractors.

**IMPORTANT** **Only do this procedure when the user reports that the first print line of forms is compressed and only after adjusting the dynamic paper tension (page 266). Always adjust both tractors.**

1. Prepare the printer for maintenance (page 242).

2. Adjust the dynamic paper tension (page 266).

3. Carefully note the initial position of the adjustment screws. (Figure 19.)

**CAUTION** **Adjust tractors only ONE detent at a time. Over-tightening a tractor belt can cause other paper feed problems and result in premature wear in the tractors.**

4. On the inner side of the left tractor, use a Torx T-10 driver to rotate the adjustment screw one detent to increase tension. On the inner side of the right tractor, use a Torx T-10 driver to rotate the adjustment screw one detent to increase tension. (See Figure 19.)

5. Load paper, run a print test, and check for first line compression.

6. If compression still occurs, rotate the adjustment screws one more detent and test again.

7. If compression is not improved after adjusting the tension by two detents, return the adjustment screws to the initial positions you noted in step 3.

8. Return the printer to normal operation (page 243).



Arrow points to LH (left) or RH (right) tractor. Left tractor (LH) is shown here.

Right Tractor: One Click and Test.

Left Tractor: One Click and Test.
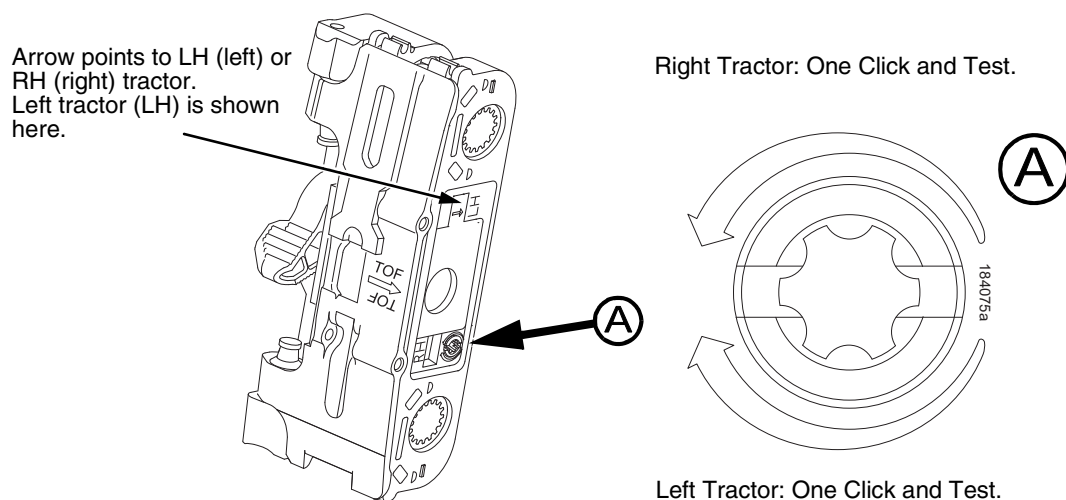
**Figure 19. Tractor Belt Tension Adjustment**

# Shuttle Electrical Short Check

This procedure checks for metallic debris and checks for hammer coils shorting to the shuttle frame.

The hammer driver circuit board attached to the shuttle frame assembly can attract metal objects because of the magnets in the hammer bank. Such stray metal pieces can cause electrical shorting and damage to the shuttle assembly. (The hammer driver board does not have a protective cover because of concerns about component temperatures.)

**IMPORTANT**    **Do this procedure**
**a) If you removed the shuttle cover during servicing and before you re-install the shuttle cover.**
**b) Before you replace the controller board with a new or refurbished board.**

1.   Prepare the printer for maintenance (page 242).

2.   Remove the ribbon cartridge. (Refer to the *User's Manual.*)

3.   Remove the shuttle cover assembly (page 291).

4.   Check the shuttle driver circuit board area for any foreign metal parts or objects (paper clips, staples, screws, chips of metal, broken shuttle spring fragments, etc.).

5.   If you find any foreign metal parts or objects, carefully remove them.

6.   Disconnect the hammer bank logic cable (P04) and the hammer bank power cable (P05) at the shuttle.

7.   Set your Ohmmeter to the 10K Ohm scale or the scale closest to 10K Ohms.

8.   Hold the two meter leads apart from each other (not touching anything) and note how your meter indicates an open circuit. For example, some meters read OL (Over Load), -1, flashing display, infinite resistance, etc.

9.   Attach the common meter lead (usually black) to the shuttle frame.

10.  Touch the positive meter lead (usually red) to another part of the shuttle frame and verify continuity. (Continuity is a low resistance reading of less than 1 Ohms.)

11.  Attach the common meter lead to the shuttle frame, touch the positive lead to pins 1 through 10 of both hammer bank power plugs J05 and J06 located on the terminator board on the shuttle assembly. Pin 1 of each plug is the right-most pin as you face the printer. Hold the positive lead for a few seconds on each pin allowing the meter to stabilize, then read the resistance:

   a.   If the resistance of any pin is <u>less</u> than 1000 Ohms, replace the shuttle frame assembly (page 328).

   b.   If pin resistances are 1000 Ohms or greater (including an "open" reading as in step 7), the shuttle passes the test and is probably okay. Reconnect hammer bank logic cable (P04) and hammer bank power cable (P05) to the shuttle

12.  Install the shuttle cover assembly (page 291).

13. Install the ribbon cartridge. (Refer to the *User's Manual*.)

14. Return the printer to normal operation (page 243).

# Hammer Bank Power Cable Shorts Test

This test determines if the hammer bank power cable is shorted.

1. Prepare the printer for maintenance (page 242).

2. Cabinet Models: Remove the paper path (page 311).
   Pedestal Models: Remove the top cover assembly (page 292).

3. Disconnect hammer bank power cable connector P105 from J105 on the controller board. (See Figure 46, page 350, item 10.)

4. Attach or hold the common lead (usually black) of an Ohmmeter to the shuttle frame.

5. At the hammer bank power cable plug (P05) on the shuttle terminator board, touch each of the 10 pins with the positive (usually red) meter lead and test for shorts to ground. If you find any shorts to ground, replace the hammer bank power cable.

6. Disconnect the common meter lead from the shuttle frame.

7. Check the hammer bank power cable for shorts by checking pin-to-pin: touch pin 1 with one meter lead and pin 2 with the other meter lead. If there is continuity, it means there is a short. (Continuity is defined as a reading of less than 1 Ohm; in other words, very low resistance.) Repeat this process until you have tested all the pins in the cable. If you find any shorts, replace the cable.

8. Connect hammer bank power cable connector P105 to J105 on the controller board. (See Figure 46, page 350, item 10.)

9. Cabinet Models: Install the paper path (page 311).
   Pedestal Models: Install the top cover assembly (page 292).

10. Return the printer to normal operation (page 243).

# Cable Shorts Test

This test determines if a cable has a short to ground or a pin-to-pin short (also called a wire-to-wire short). Such shorts can be caused by cables resting on or moving across sharp edges. The edges over time can wear away the non-conductive shielding of the cable, exposing the conductor. A short occurs when the exposed conductor touches another metal surface or conductor.

This procedure tests only the cables listed below that can be disconnected at both ends:

- Intermediate cables of devices in the Main Wire Harness Test Tables:

    Card Cage Fan

    Ribbon Motor Drive

    Exhaust Fan (in cabinet models)

    Magnetic Pick-up Unit (MPU)

- Shuttle Motor Intermediate Cable

- Hammer Bank Power and Logic Intermediate Cables

- Control Panel Assembly Intermediate Cable

- Power Stacker Logic and Power (Intermediate) Cables

## The Procedure:

1. Prepare the printer for maintenance (page 242).

2. Disconnect the cable to be tested at both ends, but leave the cable routing as it was before you started this procedure.

3. Set your Ohmmeter to the 10K Ohm scale or the scale closest to 10K Ohms.

4. Hold the two meter leads apart from each other (not touching anything) and note how your meter indicates an open circuit. For example, some meters read OL (Over Load), -1, flashing display, infinite resistance, etc. Record this indication for later reference.

## Check for shorts to ground:

5. Attach the common meter lead (usually black) to a bare metal ground point on the printer (e.g., a bolt head on the shuttle casting).

6. Touch the positive meter lead (usually red) to another bare metal ground point and verify continuity. (Continuity is a low resistance reading of less than 1 Ohm.)

**IMPORTANT**   **When making continuity checks, touch the meter leads to the test points for <u>at least</u> 2 to 3 seconds so your meter has time to display correctly.**

7. At one end of the cable, touch one of the pins with the positive (usually red) meter lead while the common lead (usually black) is still touching a ground point.

8. Check the pin for a short to ground, which is indicated by a meter reading of continuity (that is, a low resistance reading of less than 1 Ohm).

9. If you find a short to ground, replace the cable. If no short is detected, repeat steps 7 and 8 for the rest of the pins on the same end of the cable. If no shorts to ground are detected for any of the pins, proceed to the next section, which checks for pin-to-pin shorts.

## Check for pin-to-pin shorts:

10. Disconnect the common (usually black) meter lead from the ground point.

11. Check for shorts within the cable by touching the common (usually black) meter lead to pin 1 at one end of the cable and touching the positive (usually red) meter lead to pin 2 at the same end of the cable.

12. Check for a pin-to-pin short, which is indicated by a meter reading of continuity (that is, a low resistance of less than 1 Ohm). **For a properly functioning cable that has no pin-to-pin short, you will see the "open circuit" meter reading you recorded in step 4**.

13. If you find a short, replace the cable. If no short is detected, check for pin-to-pin shorts on all the remaining pairs on the same end of the cable. If you find a short in any of the remaining pairs, replace the cable. If you find no shorts for any of the remaining pairs, the cable passes the shorts test; return to the procedure that referred you to this diagnostic procedure.

# Main Wire Harness Test Diagnostic

This is a procedure for extended testing of various printer components.

1.  Prepare the printer for maintenance (page 242).

2.  Cabinet Models: Remove the paper path (page 311).
    Pedestal Models: Remove the top cover assembly (page 292).

3.  Disconnect cable connectors P106 and P107 from the controller board.

4.  Refer to the Main Wire Harness Test Tables on page 398 as you do the following substeps:

    a.  Measure the resistance of the device(s) specified in the procedure you are working.

    **NOTE:** If you have a 60-pin expansion-CT adapter that was used on the old CMX and CFX controller boards, you can break it down into a two-row by 10 pin (i.e., a 20-pin) connector, which you can insert into P106 and P107 for easier electrical measurements.

    b.  On motors, use the table to test for winding continuity and for no shorts between windings and motor frame. Rotate the motor by hand and test for shorts. If you find any shorts in a motor, replace the motor.

    c.  Replace any defective devices.

5.  Shuttle Motor test:

    a.  Remove the ribbon.

    b.  Remove the shuttle cover assembly (page 291).

    c.  Disconnect cable P02

    d.  At P02, check for approximately 0.7 Ohms per phase. Use this value to test for winding continuity and for no shorts between windings and the motor frame. Rotate the motor by hand and test for shorts.

    e.  Replace the shuttle frame assembly if you find any shorts.

    **NOTE:** A number of "intermediate" cables in the printer can be disconnected at both ends and tested using the Cable Shorts Test (page 271):

    •   Intermediate cables of devices in the Main Wire Harness Test Tables:

        Card Cage Fan

        Ribbon Motor Drive

        Exhaust Fan (in cabinet models)

        Magnetic Pick-up Unit (MPU)

    •   Shuttle Motor Intermediate Cable

    •   Hammer Bank Power and Logic Intermediate Cables

    •   Control Panel Assembly Intermediate Cable

    •   Power Stacker Logic and Power (Intermediate) Cables

# Power Supply Operational Check

This procedure shows you how to use the Power Supply Tester (Field Kit, Tester, Power Supplies, Generic, P/N 178083-001), to quickly and safely monitor the output voltages of the printer power supply from outside the card cage. You will be able to turn on and off the +48 volt and +8.5 volt outputs at the tester's remote Monitor Block.

To check the power supply you need a DC voltmeter with an input impedance greater than 20,000 ohms per volt and capable of measuring 55 volts DC. To measure +5 volt output, the voltmeter must have a low voltage range (10 volts).

**CAUTION** **This tester is for intermittent monitoring of power supply voltages. Do not hold down the push button on the Monitor Block for more than five minutes at a time. To prevent overheating the Load Block, for each minute you hold down the push button on the Monitor Block, wait at least two minutes with the push button released. (There is no time limit to how long the Load Block can be attached to the power supply, just to how long you should hold down the push button.)**

1. Prepare the printer for maintenance (page 242).

2. Cabinet Models: Remove the paper path (page 311).
   Pedestal Models: Remove the top cover assembly (page 292).

**CAUTION** **To prevent electrostatic damage to electronic components, wear a grounded static wrist strap when you work around the circuit boards.**

3. Put on a static wrist strap and ground the lead to an unpainted part of the printer frame. Touch the printer frame with the hand wearing the wrist strap before you touch the controller board or power supply board.

4. Disconnect power supply cable connector P101 from either the power stacker power cable or connector J101 on the controller board. (Figure 20.)

5. Plug power supply connector P101 into the 12-pin connector on the power supply tester Load Block, as shown in Figure 20. Note the position of Pin 1 relative to the Load Block.

6. Position the tester Monitor Block outside of the printer with the rubber feet resting on a flat surface. (If you are working on a cabinet model, you can close the top cover and use that as the flat surface.)

Power Supply Tester Load Block — Can become warm when used continuously

Pin 1

Power Supply Board

Pin 1

Pin 1

Connector P101

Stacker Power Cable
(Only on cabinet models
with the power stacker)

Controller Board
Connector J101
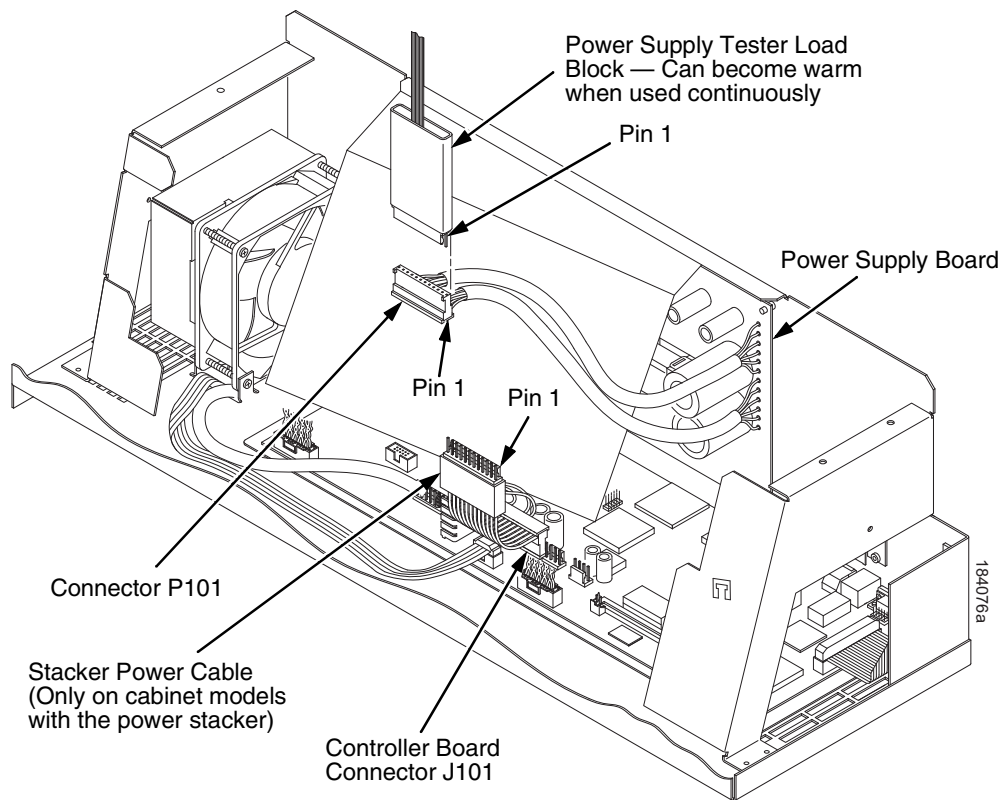
**Figure 20. Connecting the Power Supply Tester**

7.  Plug the printer's power cord into the AC power outlet and the printer.

8.  Insert the negative (-) lead of the voltmeter into the ground (GND) test jack on the Monitor Block. If the negative lead does not fit into the GND test jack, touch the negative lead to the ground (GND) pad. (Figure 21.)

9.  Set the printer's power switch to 1 (on).

10. Touch the positive (+) lead of the voltmeter to the +5 V test point on the Monitor Block. The voltage should be 4.85 to 5.15 volts. (Figure 21.)

11. Measure the voltage at the NTEMPHI test point; it should be greater than 2.4 volts. (Figure 21.)

12. Measure the voltage at the +48 V test point; it should be less than 0.2 volts. (Figure 21.)

13. Measure the voltage at the +8.5 V test point; it should be less than 0.2 volts. (Figure 21.)

14. Press and HOLD IN the Push Button on the Monitor Block. (Figure 21.)

15. Measure the +5 V test point. It should be 4.85 to 5.15 volts.

16. Measure the +48 V test point. It should be 46.0 to 49.6 volts.

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17. Measure the+8.5 V test point. It should be 8.1 to 9.4 volts.

18. Release the Push Button.

19. If you must measure voltages again, for each minute you held the Push Button down, wait at least two minutes with the Push Button released This allows the Load Block to cool.

20. If any voltage reading is outside of the ranges listed above, replace the power supply. If all voltages are within range, return to the diagnostic procedure that caused you to use this tool.

21. Verify that the original problem has been corrected:

    a. If the problem has been corrected, go to step 22.

    b. If the problem has not been corrected, consider the following:
    This tester applies a small electrical load to the power supply. The tester load on the +5 volts is about 1.3 amps, so that a printer boot-up should be possible if the power supply tests OK. However, it is also possible that a power supply can test OK but still have an internal problem that prevents it from supporting a full print load. If the printer still does not print jobs correctly after the power supply has tested OK:

    • Consider replacing the controller board. If the problem persists, restore the original controller board, and

    • Consider again replacing the power supply.
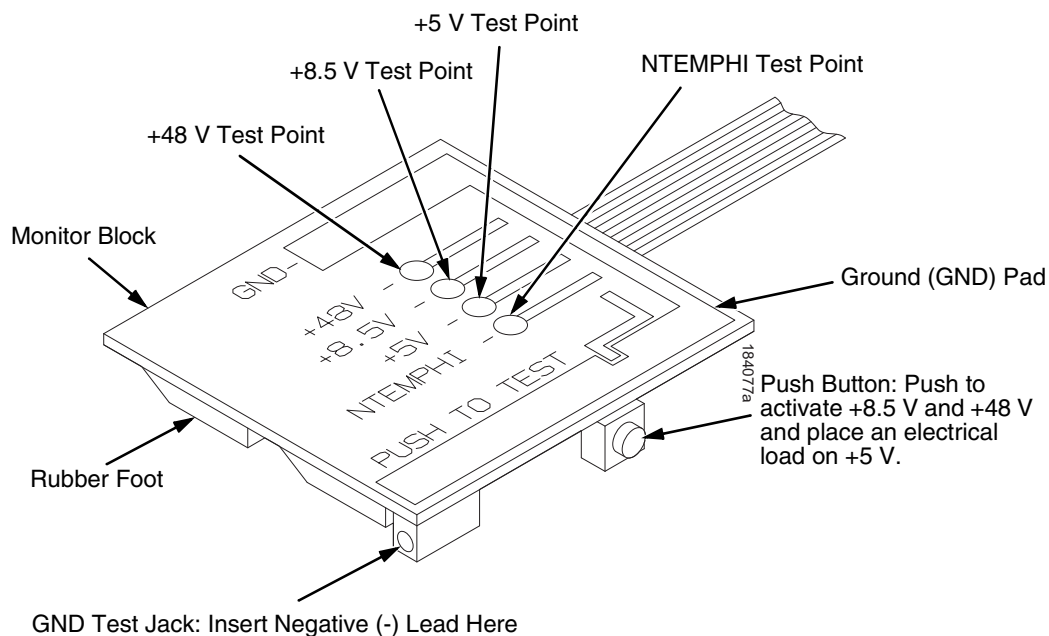


**Figure 21. Testing the Power Supply**

22. Set the printer's power switch to O (off).

23. Unplug power supply connector P101 from the 12-pin connector on the power supply tester Load Block. (Figure 20.)

24. Connect power supply cable connector P101 to either the power stacker power cable or connector J101 on the controller board. (Figure 20.)

25. Cabinet Models: Install the paper path (page 311).
    Pedestal Models: Install the top cover assembly (page 292).

26. Return the printer to normal operation (page 243).

# 5 *Replacement Procedures*

## Organization of this Chapter

This chapter contains written procedures for removing and installing components that are replaceable at the field service level of maintenance. The replacement procedures refer you to the illustrations in Chapter 6 on page 335.

## Replacement Procedures

**WARNING** **Unplug the printer power cord from the printer or power outlet before doing any maintenance procedure. Failure to remove power could result in injury to you or damage to equipment. Only apply power during maintenance if you are instructed to do so in a maintenance procedure.**

**IMPORTANT** **The components specified in this chapter are field replaceable units (FRUs). FRUs must be repaired at the factory. Do not try to repair these items in the field. Also do not attempt field repairs of electronic components or assemblies. Do not de-solder any circuit board components. Replace a malfunctioning electronic assembly with an operational spare. Most electronic problems are corrected by replacing the printed circuit board assembly, sensor, or cable that causes the fault indication. The same is true of failures traced to the hammer bank: it is not field repairable so you must replace the entire shuttle assembly. Hammer spring assemblies, the hammer bank cover, and the ribbon mask are the only replaceable components of the shuttle frame assembly.**

### List of Removal / Installation Procedures

# Belt, Paper Feed Timing

## Removal

1. Prepare the printer for maintenance (page 242).

2. Cabinet Models: Remove the paper path (page 311).
   Pedestal Models: Remove the top cover assembly (page 292).

3. Remove the timing belt cover by squeezing the front and back to release the plastic tabs from the slots in the side plate. (See page 245, item 1.)

4. Loosen (do not remove) the two 5/16 inch paper feed motor mount screws. (See page 245, item 2.)

5. Roll the paper feed timing belt off the paper feed motor pulley and splined shaft pulley.

## Installation

1. Roll the paper feed timing belt onto the splined shaft pulley and the motor pulley.

2. Using the straight end of a force gauge, apply 15 pounds (66.7 N) of pressure to the paper feed drive motor. Use the splined shaft to steady the gauge. (See page 245, item 2.)

**NOTE:** Belt tension is correct if the belt deflects 1/8 inch (3.175 mm) midway between the pulleys.

3. Reduce tension to 12 pounds (53.4 N) and torque the 5/16 inch paper feed motor mount screws to 18 inch-pounds (2.03 N•m).

4. Snap the timing belt cover into the slots in the side plate. (See page 245, item 1.)

5. Cabinet Models: Install the paper path (page 311).
   Pedestal Models: Install the top cover assembly (page 292).

6. Return the printer to normal operation (page 243).

## Belt, Platen Open

### Removal

1. Prepare the printer for maintenance (page 242).

2. Cabinet Models: Remove the paper path (page 311).
   Pedestal Models: Remove the top cover assembly (page 292).

3. Remove the platen open belt cover by squeezing the top and bottom to release the plastic tabs from the slots in the side plate. (See page 247, item 1.)

4. Using a 5/32 inch Allen wrench, *slowly* loosen the motor adjustment screw just enough to permit movement of the platen open motor in the slotted side plate. (See page 247, item 2.)

5. Push the platen open motor shaft toward the front of the printer to loosen the platen open belt. (See page 247, item 3.)

6. Roll the platen open belt off the motor pulley and platen open pulley.

### Installation

1. Push the platen motor toward the front of the printer and install the platen open belt over the platen open pulley and the motor pulley. (See page 247, item 3.)

2. Release the platen open motor; the spring will automatically tension the belt.

3. *Slowly* tighten the motor adjustment screw. (See page 247, item 2.)

**NOTE:** Belt tension is correct if the belt deflects 3/16 inch (4.76 mm) midway between the pulleys. If deflection is more or less than 3/16 inch (4.76 mm), slowly loosen the motor adjustment screw and repeat steps 2 and 3.

4. Snap the platen open belt cover into the slots in the side plate. (See page 247, item 1.)

5. Cabinet Models: Install the paper path (page 311).
   Pedestal Models: Install the top cover assembly (page 292).

6. Return the printer to normal operation (page 243).

# Cartridge Interface Board (CIB)

## Removal

1. Prepare the printer for maintenance (page 242).

2. Remove the motor bracket assembly (page 308).

3. Remove the three 6-32 x 1/4 inch button head fasteners securing the cartridge interface board to the motor bracket assembly.

4. Remove the cartridge interface board.

## Installation

1. Reverse step 2 through step 4 of the removal procedure.

2. Mount the cartridge interface board onto the motor bracket assembly and secure by using three 6-32 x 1/4 inch button head fasteners.

3. Torque the three fasteners to 18 inch lbs.

**NOTE:** Make sure the cable from the motor is oriented to the right side of the bracket.

4. Install the motor bracket assembly (page 308).

5. Return the printer to normal operation (page 243).

## Circuit Breaker

### Removal

1. Prepare the printer for maintenance (page 242).

2. Remove the card cage fan (page 296).

3. Disconnect the four circuit breaker electrical leads.
   (Cabinet Models: See page 362.
   Pedestal Models: See page 348.)

4. Press in on the spring clips and remove the circuit breaker from the printer.

### Installation

1. Press the circuit breaker into the cutout until the spring clips snap into place.
   (Cabinet models: See page 362.
   Pedestal models: See page 348.)

CAUTION    **To prevent severe damage to the printer, the circuit breaker electrical leads must be connected correctly.**

2. Connect the four circuit breaker electrical leads.
   (Cabinet Models: See page 362.
   Pedestal Models: See page 348.)

3. Install the card cage fan (page 296).

4. Return the printer to normal operation (page 243).

# Connector Coupling Shrouds

Some of the cable connectors in the printer are grouped inside connector coupling shrouds designated P106 and P107. This procedure explains how to remove and install cable assemblies from these coupling shrouds.

**NOTE:** There is also a diagram of the P106 / P107 connector coupling shrouds on the plastic protective barrier over the power supply.

## Removal

1. Prepare the printer for maintenance (page 242).

2. Cabinet Models: Remove the paper path (page 311).
   Pedestal Models: Remove the top cover assembly (page 292).

3. Disconnect the connector coupling shroud containing the cable assembly that you will replace.

4. Pull the side of the coupling shroud outward and gently pull the cable connector upward. (See Figure 22.) Notice that in a coupling shroud two-wire connectors are grouped across from two-wire connectors and four-wire connectors are grouped across from four-wire connectors.

5. Disengage the key tab(s) on the cable connector from the slots in the side of the coupling shroud.

6. Remove the cable connector from the coupling shroud. (Remove only the cable connector for the cable you are replacing; leave the other cable connectors in the coupling shroud.)

## Installation

1. Position the cable connector in the connector coupling shroud. Two-wire connectors are always grouped across from two-wire connectors in a coupling shroud. Four-wire connectors are always grouped across from four-wire connectors in a coupling shroud. (See Figure 22.)

2. Pull the side of the coupling shroud outward and gently push the cable connector down into the coupling shroud.

3. Engage the key tab(s) on the cable connector in the slots in the side of the coupling shroud. Press the sides of the coupling shroud inward to make sure all cable connector key tabs are engaged in the coupling slots.

4. Connect the connector coupling shroud to its printer connection.

5. Cabinet Models: Install the paper path (page 311).
   Pedestal Models: Install the top cover assembly (page 292).

6. Return the printer to normal operation (page 243).

**P106 Connector Configuration**

19 17 15 13   11 9   7 5 3 1

| POD | CCF | PLAT M |
|-----|-----|--------|
| PMD | SP2 | SP4 |

20 18 16 14   12 10   8 6 4 2

Connectors are viewed from the top, as seen when plugged into the controller board.

Pin No.

CCF = Card Cage Fan
PLAT M = Platen Motor
PMD = Paper Motion Detector (Switch)
POD = Paper Out Detect (Switch)
SP2 = 2 Position Spacer
SP4 = 4 Position Spacer

**P107 Connector Configuration**

19 17 15 13   11 9   7 5 3 1

| MPU | PLO | EHF | ✱ ✱ |
|-----|-----|-----|------|
| SP4 | | HBF | RIB M |

20 18 16 14   12 10   8 6 4 2

EHF = Exhaust Fan
HBF = Hammer Bank Fan
MPU = Magnetic Pickup Unit
PLO = Platen Open (Switch)
RIB M = Ribbon Motor
SP4 = 4 Position Spacer
✱ ✱ = Spacer for 20 only
      = PAPR M for 05, 10, 15



Key Tab

Typical 2-Wire
Cable Connector

Typical 4-Wire
Cable Connector

Pull the sides outward just enough to release the connector key tab from the slot in the connector coupling shroud.

Key Tab Slot

Connector Coupling Shroud
P106 / P107
P/N 202362-001

Push here to remove the coupling shround from the controller board.

J106 or J107 on the Controller Board

184078a
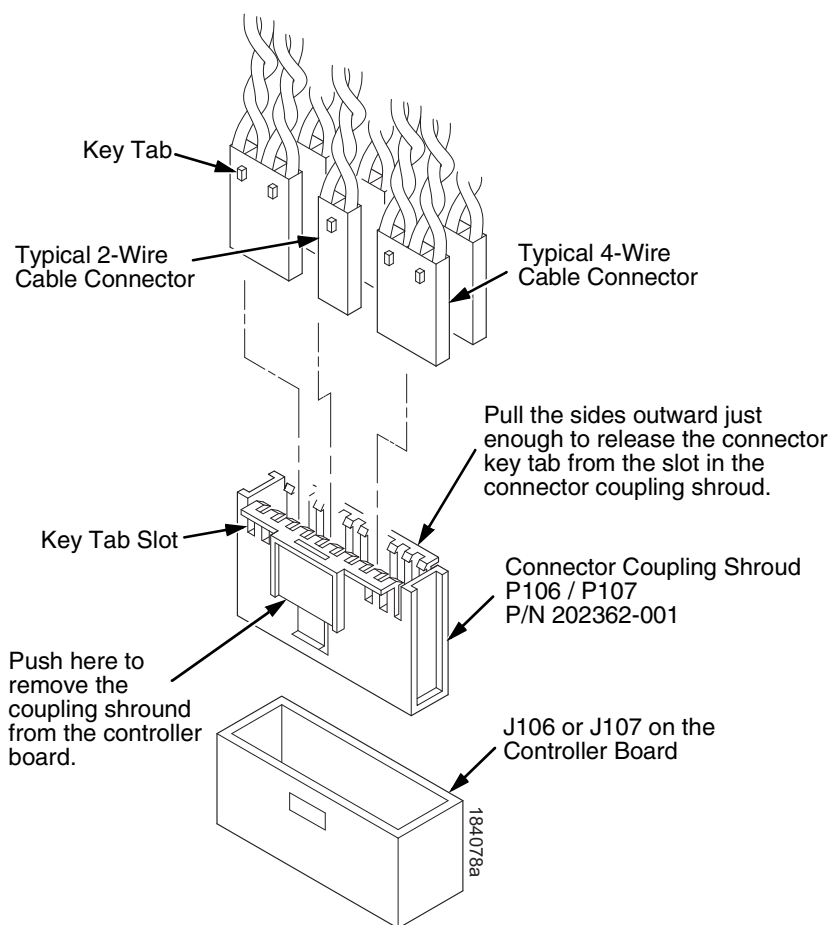
**Figure 22. Connector Coupling Shrouds, Disassembly/Assembly**

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# Control Panel Assembly

**NOTE:** The procedure for removing and installing the control panel is the same for cabinet and pedestal model printers.

## Removal

1. Prepare the printer for maintenance (page 242).

2. Open the printer cover.

3. Disconnect the RJ-11 connector P310 from J2 on the back of the control panel. (See page 340, item 2.)

4. Remove the two screws securing the control panel to the panel bracket. (See page 340, items 1 and 11.)

5. Remove the control panel assembly from the panel bracket.

## Installation

1. Engage the slot on the bottom of the control panel on the bottom edge of the panel bracket cutout. (See page 340, items 1 and 11.)

2. Align the holes on the top rear of the control panel with the holes in the upper edge of the panel bracket, and install the two mounting screws.

3. Connect RJ-11 connector P310 to connector J2 on the rear of the control panel.

4. Return the printer to normal operation (page 243).

## Controller Board

### Removal

**IMPORTANT** **To prevent electrostatic damage to electronic components, always wear a properly grounded static wrist strap when you handle circuit boards.**

1. Make a configuration printout of all saved configurations. (Refer to the *User's Manual.)*

   **NOTE:** The MAC address for the onboard ethernet interface on the V6 controller board will be printed on the printer's configuration printout after completing this replacement procedure.

2. Prepare the printer for maintenance (page 242).

3. Cabinet Models: Remove the paper path (page 311).
   Pedestal Models: Remove the top cover assembly (page 292).

4. Remove the CT board, if it is installed (step page 293).

5. Disconnect all cable connectors from the controller board.
   (See page 348.)

6. Loosen but do not remove the two screws securing the metal controller shield near serial cable connector J201.

7. Loosen but do not remove the screw securing the metal shield to the bottom of the card cage, on the left side near the card cage fan.

**CAUTION** **Do not separate the controller board from the metal shield. The shield serves as a stiffener and ground plane, and is an integral part of the controller board assembly.**

8. Slide the controller board assembly to the left until the keyway clears the screw securing the controller board to the bottom of the card cage. Lift the controller board out of the printer.

9. If you are removing the controller board for reasons other than replacement (i.e., you will re-install the original controller board at some point), you do not need to remove the flash memory or security key. But if you are replacing the controller board, remove the flash SIMM and security key (page 323), and install them on the replacement controller board. The security key must be installed on the replacement controller board to ensure the printer functions correctly.

## Installation

**CAUTION**   **To prevent electrostatic damage to electronic components, always wear a properly grounded static wrist strap when you handle circuit boards.**

1. If this is a replacement controller board, install the flash SIMM and security key on the new controller (page 323).

2. Position the controller board in the card cage, metal shield side down, component side uppermost. Engage the screw on the bottom of the card cage in the keyway in the metal controller shield. Slide the board to the right until the serial cable connector J201 on the controller board lines up with the cutout in the card cage. (See page 350.)

3. Tighten the two screws securing the metal shield near serial cable connector J201.

4. Tighten the screw securing the metal shield to the bottom of the card cage.

5. Connect all cable connectors to the controller board, using the Interconnection Diagram in Appendix A as your guide.

6. Install the CT board, if necessary (page 293).

7. Cabinet Models: Install the paper path (page 311).
   Pedestal Models: Install the top cover assembly (page 292).

**IMPORTANT**   **If the original board was replaced, you must download the emulation software again. Installing flash memory from the old board onto the new board does not transfer all operating system software.**

8. Load flash memory (page 257).

9. Adjust the hammer phasing (page 255).

10. Adjust the paper out distance (page 252).

11. Make a configuration printout, the MAC address for the onboard ethernet interface is printed on the configuration printout.

# Cover Assembly, Hammer Bank / Ribbon Mask

## Removal

1. Prepare the printer for maintenance (page 242).

2. Remove the shuttle frame assembly (page 328).

3. Lift the thick plate of the hammer bank cover assembly at one end, and peel the cover away from hammer bank magnets. (See Figure 23.)

## Installation

**CAUTION** **The hammer bank contains a strong magnet. To prevent damage to the hammer tips, do not let the steel hammer bank cover assembly snap into place as the hammer bank magnet attracts it. Any impact of the cover against the hammer bank can break hammer tips.**

1. With the thick plate facing the hammer bank, hold the hammer bank cover assembly at a slight angle and engage the bottom edge on the alignment pins. First engage the center (round) hole, then the left (oblong) hole, to ensure that the cover lies flat on the hammer bank. (See Figure 23.)

2. Gently lower the hammer bank cover assembly until it lies flush on the hammer bank.

3. Check that the hammer bank cover assembly is positioned over the alignment pins and the hammer tips.

4. Install the shuttle frame assembly (page 328).

5. Return the printer to normal operation (page 243).
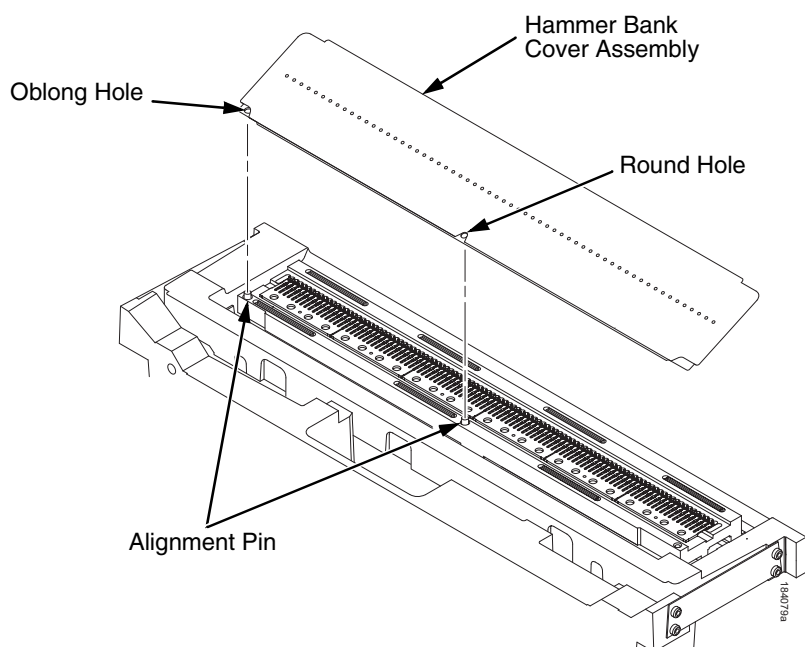


**Figure 23. Hammer Bank Cover Assembly**

# Cover Assembly, Shuttle

## Removal

1.  Prepare the printer for maintenance (page 242).

2.  Remove the ribbon cartridge. (Refer to the *User's Manual.*)

3.  Loosen the shuttle cover screws (page 344, item 2).

4.  Unplug the weld sensor cable (page 396).

5.  Grasping the edges of the shuttle cover assembly, tilt the rear edge up and lift the shuttle cover assembly out of the printer.

## Installation

1.  Place the shuttle cover assembly in the printer. Tilt the forward edge of the cover down slightly and work the cover into position.

**NOTE:** Make sure the two posts on the shuttle cover seat into the circular recesses in the base casting.

2.  Plug the weld sensor cable (page 396).

3.  Tighten the shuttle cover screws (page 344, item 2).

4.  Install the ribbon cartridge. (Refer to the *User's Manual.*)

5.  Return the printer to normal operation (page 243).

## Cover Assembly, Top, Pedestal Models

### Removal

1. Prepare the printer for maintenance (page 242).

2. Remove the control panel assembly (page 287).

3. Loosen (do not remove) the two #2 Phillips hold-down screws on the rear of the printer. (See page 342, item 5.)

4. Remove the #2 Phillips screw in the lower left front corner of the top cover and the screw just to the right of the control panel bracket. (See page 342, item 3.)

5. Lift the top cover assembly off the printer base.

### Installation

1. Reverse steps step 3 through step 5 of the removal procedure.

2. Return the printer to normal operation (page 243).

## CT Board

### Removal

1. Prepare the printer for maintenance (page 242).

2. Cabinet Models: Remove the paper path (page 311).
   Pedestal Models: Remove the top cover assembly (page 292).

**CAUTION**  **To prevent electrostatic damage to electronic components, always wear a grounded static wrist strap when you handle circuit boards.**

3. Put on a static wrist strap and ground the lead to an unpainted part of the printer frame. Touch the printer frame with the hand wearing the wrist strap before you touch electronic components or the controller board.

4. Remove the screw securing the CT board connector plate to the rear of the card cage. (See page 364, item 4.)

5. Angle the CT board out of the card cage cutout as you lift the CT board out of the PCI slot on the controller board. (See page 364, item 1.)

### Installation

1. Reverse steps step 2 through step 5 of the removal procedure.

**IMPORTANT**  **There are two expansion slots on the controller board. If the printer is a cabinet model with a power stacker installed, you must install the CT board in the outermost slot and leave the innermost slot empty.**

2. Return the printer to normal operation (page 243).

## Dashpot

**CAUTION**  **Two persons may be required to do this procedure. Prop or hold the printer cover securely while disengaging the dashpot.**

**NOTE:** This procedure applies only to cabinet models.

### Removal

1. Prepare the printer for maintenance (page 242).
2. Open the cabinet rear door.
3. Pry back the spring retaining clips. (See Figure 41, page 340.)
4. Remove the dashpot from the ball studs.

### Installation

**CAUTION**  **Install the dashpot with the narrow rod uppermost.**

**Two persons may be required to do this procedure. Prop or hold the printer cover securely while installing the dashpot.**

1. Position the dashpot against the ball studs on the upper and lower brackets with the narrow rod uppermost. (See Figure 41, page 340.)
2. Using external grip ring pliers to spread the retaining clips, push the dashpot onto the ball joints and slide the spring clips over the top (bottom) of the ball joint into the retaining grooves.
3. Close the printer cover.
4. Return the printer to normal operation (page 243).

## Fan Assembly, Cabinet Exhaust

**NOTE:** This procedure applies only to cabinet models.

### Removal

1. Prepare the printer for maintenance (page 242).

2. Open the front and rear cabinet doors and the printer cover.

3. Remove the paper fence/paper tray assembly. (See page 338.)

4. Remove the two 1/4 inch screws securing bottom of the air exhaust duct. (See page 340, item 4).

5. Remove the 1/4 inch screw directly below the forms thickness lever.

6. Disconnect the fan cable connector from connector P307 and remove the air exhaust duct.

7. Disconnect the fan cable connector from the side of the air exhaust duct.

8. Remove the two 1/4 inch fan mounting screws and the cabinet exhaust fan assembly.

### Installation

**CAUTION**    **Air flow is DOWN. Install the cabinet exhaust fan so the label on the fan faces down.**

1. Reverse steps step 2 through step 8 of the removal procedure.

2. Return the printer to normal operation (page 243).

# Fan Assembly, Card Cage

## Removal

1. Prepare the printer for maintenance (page 242).

2. Cabinet Models: Remove the paper path (page 311).
   Pedestal Models: Remove the top cover assembly (page 292).

3. Disconnect the card cage fan cable connector. (See page 360.)

4. Cabinet Models: Remove the two fan mounting screws from the bottom of the fan. (See page 360, item 2.)
   Pedestal Models: Remove the four fan mounting screws and nut. (See page 348, items 1 through 4.)

5. Remove the card cage fan assembly from the card cage.

## Installation

**CAUTION** **Air flow is INTO the card cage. Install the card cage fan so the label faces toward the inside of the printer and the cable faces the front of the printer.**

1. Reverse steps step 2 through step 5 of the removal procedure.

2. Return the printer to normal operation (page 243).

# Fan Assembly, Hammer Bank

## Removal

1. Prepare the printer for maintenance (page 242).

2. Remove the ribbon. (Refer to the *User's Manual.*)

3. Remove the shuttle cover assembly (page 291).

4. Cabinet Models: Remove the paper path (page 311).
   Pedestal Models: Remove the top cover assembly (page 292).

5. Trace the hammer bank fan cable assembly back to the controller board connector P107, releasing it from all cable constraints. (See the cable routing diagrams in Appendix A.)

6. Disconnect the fan connector from connector coupling shroud P107 on the controller board. (See page 285.)

7. Remove the two screws securing the fan to the base casting. Angle the hammer bank fan assembly up and out of the base casting and feed the motor wires and cable connector out from between the base casting and the base pan. (See page 360, items 21 and 22.)

## Installation

**CAUTION**  **Air flow is UP. Install the hammer bank fan so the label faces up.**

1. Feed the hammer bank fan cable connector and motor wires between the fan well of the base casting and the base pan. Reach up under the base casting and route the fan cable to the right and angle the hammer bank fan assembly under the shuttle motor and down into the fan well. (See page 360.)

2. Route the fan motor wires (see cable routing diagrams, Appendix A) and connect the fan cable connector to J107 on the controller board. (See page 285.)

3. Install two screws in the locations shown in Figure 50 (page 360, item 21).

4. Cabinet Models: Install the paper path (page 311).
   Pedestal Models: Install the top cover assembly (page 292).

5. Install the shuttle cover assembly (page 291).

6. Install the ribbon. (Refer to the *User's Manual.*)

7. Return the printer to normal operation (page 243).

## Hammer Spring Assembly, Version 1

### Removal

1. Prepare the printer for maintenance (page 242).

2. Remove the shuttle frame assembly (page 328).

3. Carefully vacuum the shuttle frame assembly.

4. Remove the hammer bank cover assembly (page 290).

**CAUTION** **Hammer springs and hammer tips are fragile. Do not touch the hammer springs or tips. Handle hammer spring assemblies by the thick mounting base only. Apply pressure only to the mounting base.**

5. Remove the mounting screws from the old hammer spring assembly. (See Figure 24.)

6. Handling the hammer spring assembly by the mounting base only, gently push up the mounting base and pry the old hammer spring assembly off its mounting pins. (See Figure 24.)

7. Inspect the hammer bank and the old hammer spring assembly:

   a. If there is ink on the hammer bank mounting surface that was under the hammer spring, or if there is ink on the hammer spring assembly mounting surface that was against the hammer bank, or if there is ink on the hammer spring neck or tines, ink migration has occured. Reinstall the old hammer spring assembly and replace the entire shuttle frame assembly (page 328).

   b. If the old hammer spring assembly and the hammer bank are free of ink, install the new hammer spring assembly, as shown in the next section.

**NOTE**: A P7X06H/P7X15 lpm version 1 hammer bank is shown here. Removal, installation, and fastener torque values are the same for all version 1 hammer spring assemblies, even though hammer spring assemblies vary in number of hammers and number of mounting screws.

Discard old screws.

**Figure 24. Hammer Spring Assembly, Removal**

## Installation

1.  Using a clean dry cloth, wipe the hammer spring mounting surface on the hammer bank. Make sure the cloth does not leave lint on the hammer bank.

**CAUTION**    **Hammer springs and hammer tips are fragile. Do not touch the hammer springs or tips. Handle hammer springs by the thick mounting base only. Apply pressure only to the mounting base.**

2.  Handling the hammer spring assembly by the mounting base only, remove the new assembly and mounting screws from the box.

3.  Handling the hammer spring assembly by the mounting base only, carefully position it on the hammer bank mounting pins. then gently press the mounting base down against the alignment pins. (See Figure 25, page 299.)

4.  Continue pressing down on the mounting base of the new hammer spring assembly as you install the mounting screws from the replacement kit. Using a Torx T-10 bit adapter, and starting with the inner screws, torque each screw to 14 inch-pounds (1.58 N•m). (See Figure 25.)

5.  Install the hammer bank cover assembly (page 290).

6.  Install the shuttle frame assembly (page 328).

7.  Install the ribbon and load paper.

**CAUTION**    **Do not attempt to adjust or "tweak" hammer springs.**

8.  Run a Diagnostic Printer Test and check print quality (page 222):

    a.  If print quality is acceptable, return the printer to normal operation (page 243).

    b.  If print quality is still degraded, replace the shuttle frame assembly (page 328).

**NOTE**: A P7X06H/P7X15 lpm version 1 hammer bank is shown here. Removal, installation, and fastener torque values are the same for all version 1 hammer spring assemblies, even though hammer spring assemblies vary in number of hammers and number of mounting screws.

Gently press down on the mounting base and hold the hammer spring in position as you install the screws.

Use new screws from the hammer spring replacement kit. Starting with the inner screws, torque all screws to 14 inch-pounds (1.58 N•m).

New Hammer Spring Assembly

184081a
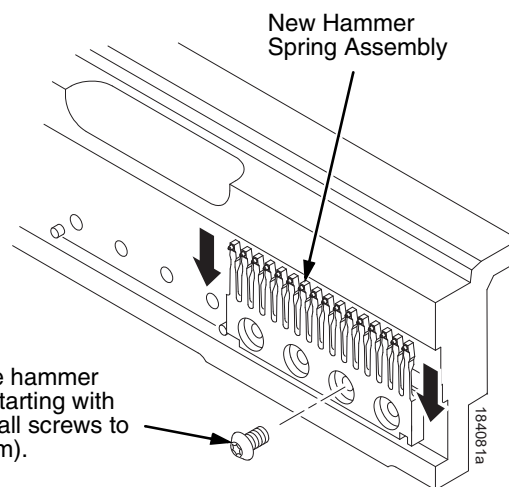
**Figure 25. Hammer Spring Assembly, Installation**

## Hammer Spring Assembly, Version 2
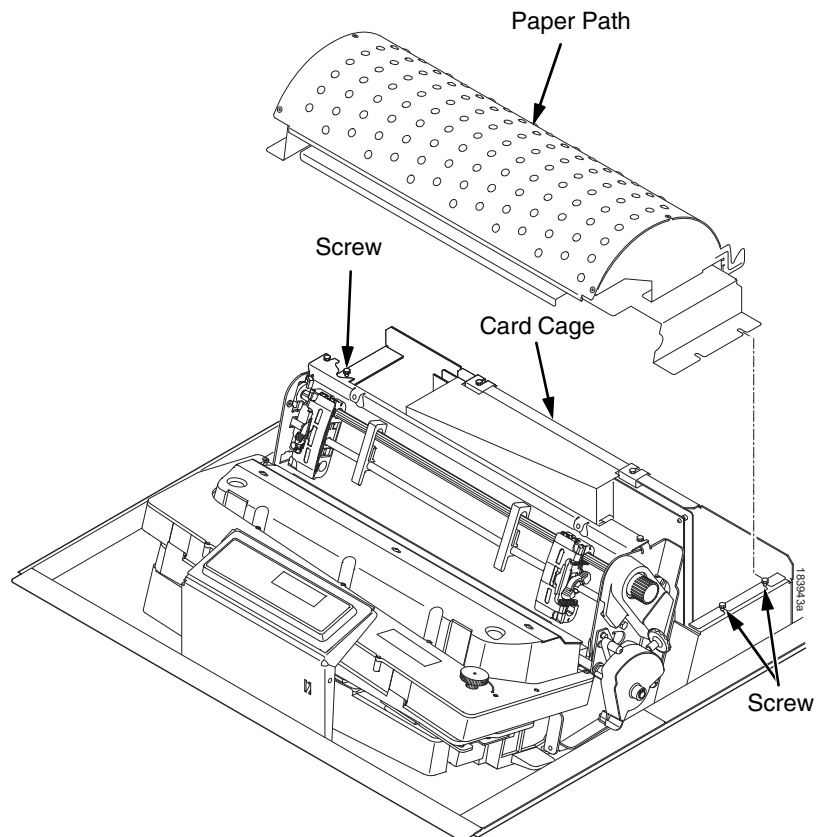
### Removal

1. Prepare the printer for maintenance (page 242).

2. Remove the shuttle frame assembly (page 328).

3. Carefully vacuum the shuttle frame assembly.

4. Remove the hammer bank cover assembly (page 290).

**CAUTION** **Hammer springs and hammer tips are fragile. Handle hammer spring assemblies by the thick mounting base only. Apply pressure only to the mounting base.**

5. Remove the screws securing the old hammer spring. There will be three or four mounting screws, depending on the printer model. (Figure 26.)

6. Using the beveled end of the guide tool included in the kit, gently pry the old hammer upward and remove it.

7. Discard the old hammer spring assembly and the screws that secured it.

8. Inspect the hammer bank and the old hammer spring assembly:

   a. If there is ink on the hammer bank mounting surface that was under the hammer spring, or if there is ink on the hammer spring assembly mounting surface that was against the hammer bank, or if there is ink on the hammer spring neck or tines, ink migration has occured. Reinstall the old hammer spring assembly and replace the entire shuttle frame assembly (page 328).

   b. If the old hammer spring assembly and the hammer bank are free of ink, install the new hammer spring assembly, as shown in the next section.
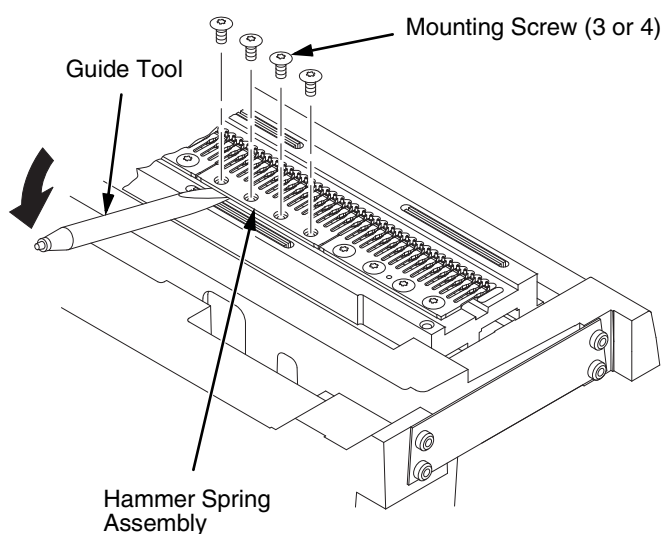


**NOTE**: A P7X06H/P7X15 lpm version 2 hammer bank is shown here. Removal is the same for all version 2 hammer spring assemblies, even though hammer spring assemblies vary in number of hammers and number of mounting screws.

**Figure 26. Version 2 Hammer Spring Assembly, Removal**

## Installation using the Short Tip Alignment Tool

This procedure is for installing one hammer spring assembly at a time, using short the tip alignment tool that comes with version 2 replacement hammer spring. To install more than one hammer spring assembly at a time, you must use the long tip alignment tool (page 303).

1.  Using a clean dry cloth, wipe the hammer spring mounting surface on the hammer bank. Make sure the cloth does not leave lint on the hammer bank.

**CAUTION**    **Hammer springs and hammer tips are fragile. Do not touch the hammer springs or tips. Handle hammer springs by the thick mounting base only. Apply pressure only to the mounting base.**

2.  Handling the hammer spring assembly by the mounting base only, remove the new assembly and mounting screws from the box.

3.  Handling the hammer spring assembly by the mounting base, position it on the hammer bank and center it over the mounting screw holes. (See Figure 27.)

4.  Position the tip alignment tool over the end hammer tips of the new hammer spring and the end hammer tips of the adjacent hammer springs used for alignment. Use the guide tool to maneuver the hammer tips into the alignment tool. (See Figure 27.)

**NOTE**: A P7X06H/P7X15 lpm version 2 hammer bank is shown here. Removal, installation, and fastener torque values are the same for all version 2 hammer spring assemblies, even though hammer spring assemblies vary in number of hammers and number of mounting screws.
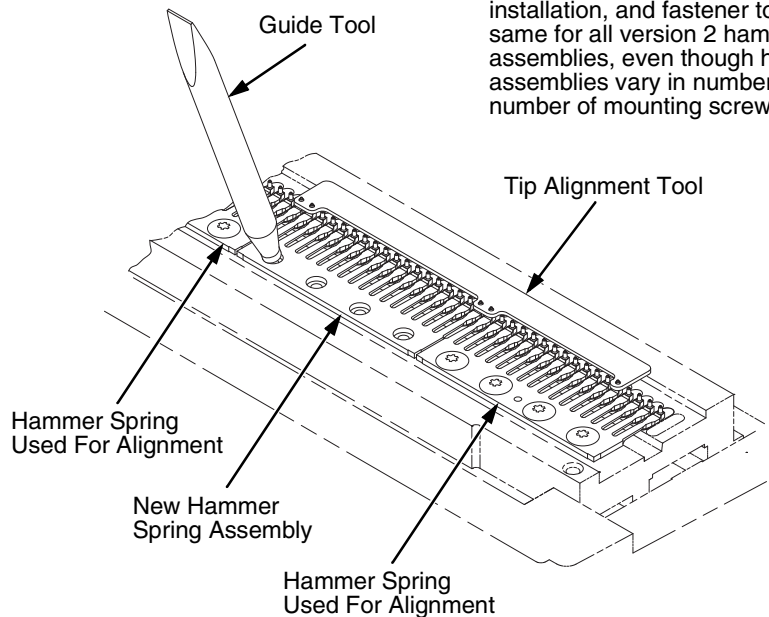


Models -05 and 02H: Tool 253258-001
Models -10 and 03H: Tool 253257-001
Models -15 and 06H: Tool 253256-001
Models -20, 7000HD, and 08H: Tool 253255-001

**Figure 27. Installing a Version 2 Hammer Spring Assembly Using the Short Alignment Tool**

**Torque Sequence**
14 inch-pounds (1.58 N•m)
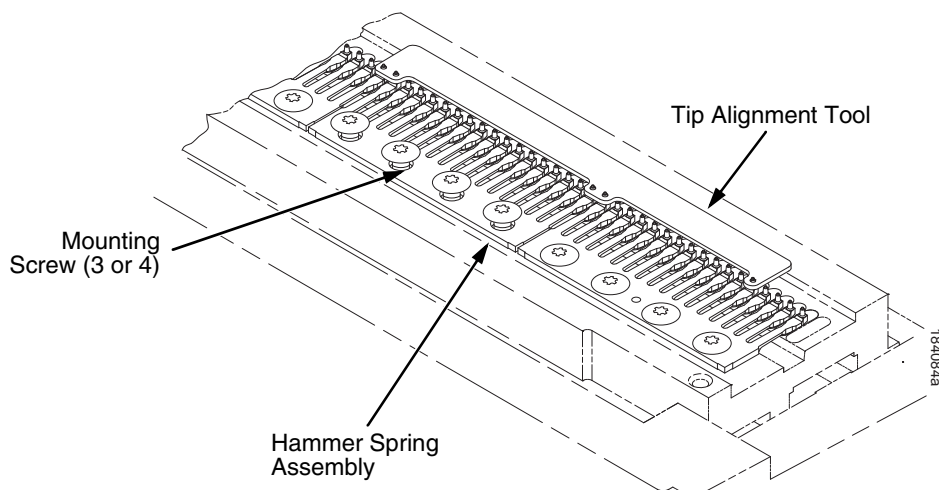


Figure 28. Installing the Mounting Screws in the Hammer Spring Assembly

5.  Install the mounting screws in the hammer spring assembly. There will be three or four mounting screws, depending on the printer model. Torque the inner screw(s) to 14 in-lbs (1.58 N•m), then torque the outer screws to 14 in-lbs (1.58 N•m) in the sequence shown in Figure 28.

6.  Lift the tip alignment tool off both hammer springs. Do not bend or re-use the tip alignment tool.

7.  Install the hammer bank cover assembly (page 290).

8.  Install the shuttle frame assembly (page 328).

9.  Install the ribbon and load paper.

**CAUTION**   **Do not attempt to adjust or "tweak" hammer springs.**

10. Run a Diagnostic Printer Test and check print quality (page 222):

    a.  If print quality is acceptable, return the printer to normal operation (page 243).

    b.  If print quality is still degraded, replace the shuttle frame assembly (page 328).

## Installation using the Long Tip Alignment Tool

This procedure is for installing more than one version 2 hammer spring assembly at a time, using the long tip alignment tool. To install one hammer spring assembly at a time, use the short tip alignment tool (page 301).

**NOTE:** If the hammer spring assemblies are being removed for cleaning, note their locations on the hammer bank and return them to the same locations when you reinstall them. This minimizes the impact to print quality when you reinstall the shuttle frame assembly.

1. Using a clean dry cloth, wipe the hammer spring mounting surface on the hammer bank. Make sure the cloth does not leave lint on the hammer bank.

**CAUTION**  **Hammer springs and hammer tips are fragile. Handle hammer springs by the thick mounting base only. Apply pressure only to the mounting base.**

2. Handling the hammer spring assemblies by the mounting bases only, remove the new assemblies and mounting screws from the boxes.

3. Handling the hammer spring assemblies by the mounting base, position them on the hammer bank. Center the hammer spring assemblies as closely as possible over the mounting screw holes in the hammer bank.

4. Gently position the Long Tip Alignment Tool so the right alignment pin on the hammer bank is in the round hole in the tool, and the left alignment pin is in oblong hole. (See Figure 29.)

**NOTE**: A P7X06H/P7X15 lpm version 2 hammer bank is shown here. Removal, installation, and fastener torque values are the same for all version 2 hammer spring assemblies, even though hammer spring assemblies vary in number of hammers and number of mounting screws.
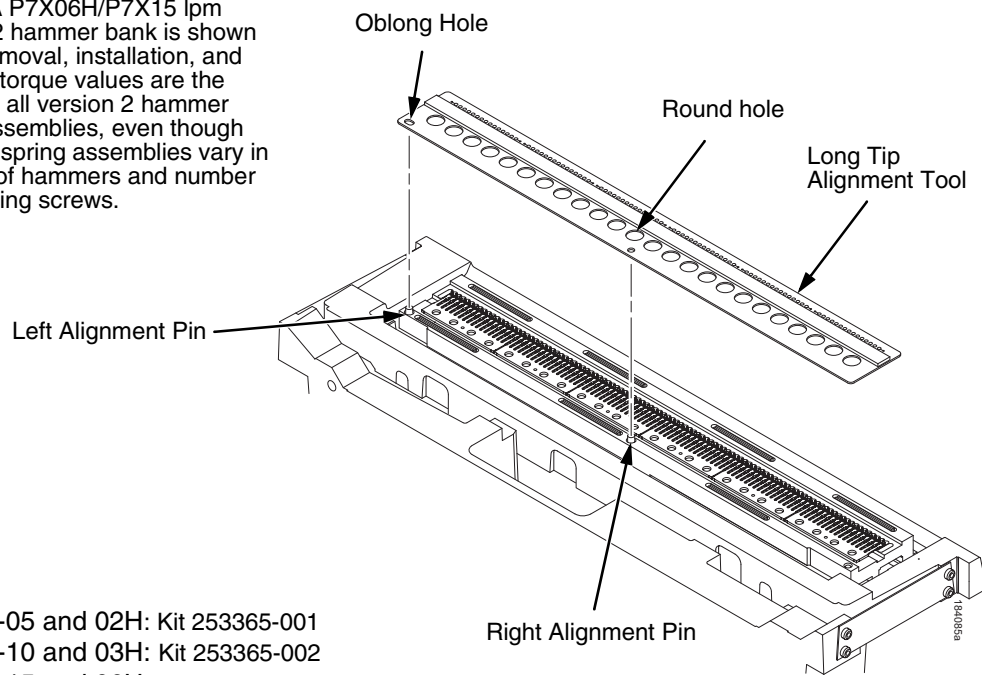


Models -05 and 02H: Kit 253365-001
Models -10 and 03H: Kit 253365-002
Models -15 and 06H: Kit 253365-003
Models -20, 7000HD, and 08H: Kit 253365-004

**Figure 29. Positioning the Long Alignment Tool**

**CAUTION**     **In the next step, use ONLY the guide tool that comes with the alignment tool to align the version 2 hammer spring assemblies. To avoid damaging threads, never insert any metallic tool into the hammer spring mounting holes in the hammer bank.**

5.  Apply a gentle, continuous downward pressure to the alignment tool and gently swivel the guide tool in the hammer spring mounting holes to maneuver the hammer tips into the clearance and alignment holes in the alignment tool. You will feel and/or hear a small "click" when the hammer tips slip into the holes. (See Figure 30.)

Alignment Holes for Hammer Springs

Alignment Hole for Hammer Spring

Clearance Holes for Hammer Tips

Guide Tool

184086a

Long Tip Alignment Tool. Apply gentle downward pressure to hold the hammer tips in the tool.
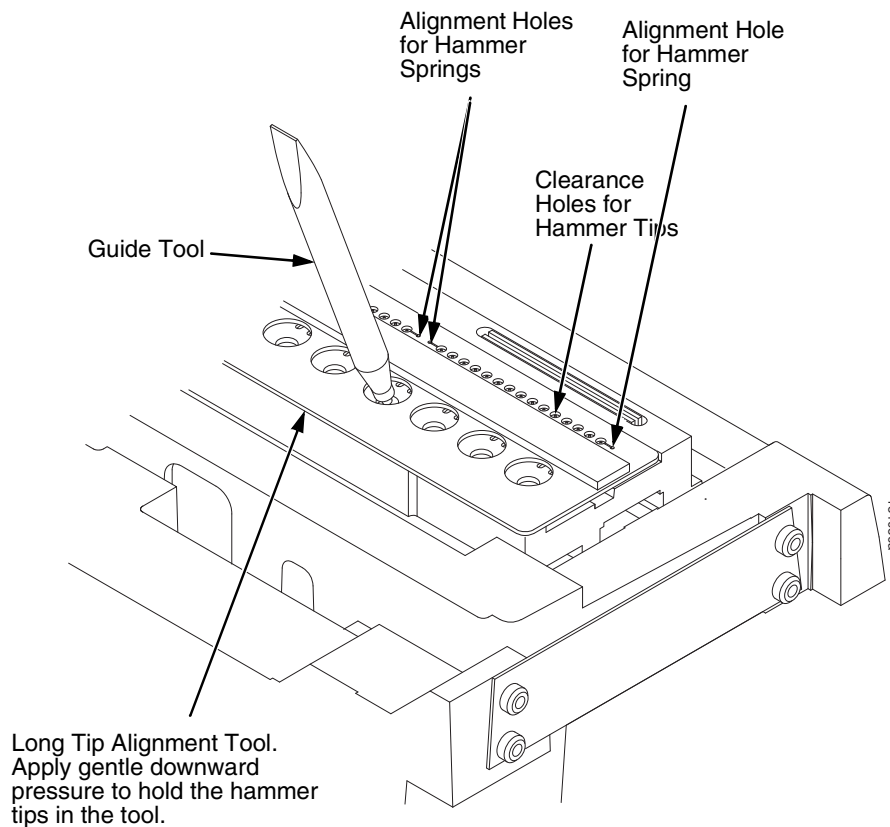
**Figure 30. Using the guide tool to maneuver the hammer tips into the alignment tool holes.**

6.  Continue to apply a slight downward pressure on the tool and install the mounting screws in the hammer spring assemblies. Depending on the printer model, there will be three or four mounting screws per assembly. Torque the inner screw(s) to 14 in-lbs (1.58 N•m), then torque the outer screws to 14 in-lbs (1.58 N•m). (See Figure 31.)
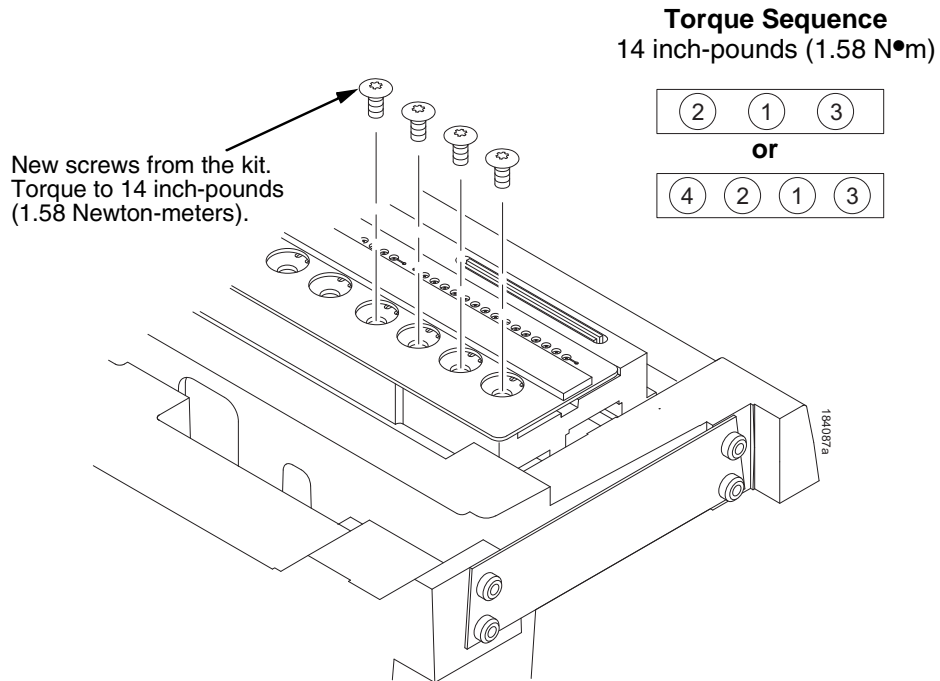


**Figure 31. Installing the Torx T-10 Screws**

7.  When you have installed and torqued all hammer spring assemblies, gently lift the long tip alignment tool off both hammer springs.

8.  Install the hammer bank cover assembly (page 290).

9.  Install the shuttle frame assembly (page 328).

10. Install the ribbon and load paper.

**CAUTION**    **Do not attempt to adjust or "tweak" hammer springs.**

11. Run a Diagnostic Printer Test and check print quality (page 222):

    a.  If print quality is acceptable, return the printer to normal operation (page 243).

    b.  If print quality is still degraded, replace the shuttle frame assembly (page 328).

## Magnetic Pickup (MPU) Assembly

### Removal

1. Prepare the printer for maintenance (page 242).

2. Remove the ribbon. (Refer to the *User's Manual.*)

3. Remove the shuttle cover (page 291).

4. Disconnect the magnetic pickup (MPU) cable connector (page 354, item 5).

5. Loosen the 7/64 inch hex MPU clamp screw (page 354, item 3).

6. Unscrew the MPU assembly from the MPU bracket.

### Installation

1. Install the MPU assembly by screwing it into the MPU bracket. (See Figure 47, page 354).

2. Using a feeler gauge, adjust the gap between the MPU assembly and the flywheel to 0.010 ± .001 inch (0.254 ± 0.025 mm). Torque the 7/16 inch MPU clamp screw to 18 inch-pounds (2.03 N•m).

3. Check the gap between the MPU assembly and the flywheel with a feeler gauge:

   a. If the gap is 0.010 ± .001 inch (0.254 ± 0.025 mm), go to step step 4.

   b. If the gap is not 0.010 ± 0.001 inch (0.254 ± 0.025 mm), loosen the MPU clamp screw and go back to step step 2.

4. Route the MPU cable under the extension spring and connect the MPU cable connector (page 354, item 5). Make sure the MPU cable does not touch the extension spring after cable connection.

5. Install the shuttle cover (page 291).

6. Install the ribbon. (Refer to the *User's Manual.*)

7. Adjust the hammer phasing (page 255).

8. Return the printer to normal operation (page 243).

## Memory (Flash, Expansion)

**CAUTION**  **To prevent electrostatic damage to electronic components, wear a properly grounded static wrist strap when handling circuit boards, the shuttle frame assembly, and any other electronic component.**

### Removal

1.  Make a configuration printout of all saved configurations. (Refer to the *User's Manual.)*

2.  Prepare the printer for maintenance (page 242).

3.  Cabinet Models: Remove the paper path (page 311).
    Pedestal Models: Remove the top cover assembly (page 292).

4.  Put on a static wrist strap and ground the lead to an unpainted part of the printer frame. Touch the printer frame with the hand wearing the wrist strap before you touch memory modules or the controller board

5.  To remove the expansion flash SIMM (J10), gently open the side locks, angle the memory module upward, and remove it from the socket.

### Installation

**NOTE:** Installing flash memory from one controller board to another does not transfer all operating system software, so you must download the emulation again.

1.  Put on a static wrist strap and ground the lead to an unpainted part of the printer frame. Touch the printer frame with the hand wearing the wrist strap before you touch memory modules or the controller board.

2.  Insert the expansion flash SIMM in socket J10 on the controller board at a 45 degree angle. Position the expansion flash SIMM with the notched end toward the right side of the controller board. Press the SIMM gently into the socket until the edge connectors are seated, then press the SIMM downward until the side latches lock the SIMM is place. (See page 324.)

3.  Cabinet Model: Install the paper guide assembly (page 311).
    Pedestal Model: Install the top cover assembly (page 292).

4.  Download the emulation (page 257).

5.  Return the printer to normal operation (page 243).

6.  Using the configuration printout(s) you made in step 1 of the removal procedure, reset and save the printer configuration(s). (Refer to the *User's Manual.)*

## Motor Bracket Assembly

### Removal

1. Prepare the printer for maintenance (page 242).

2. Cabinet Model: Remove the paper guide assembly (page 311).
   Pedestal Model: Remove the top cover assembly (page 290).

3. Unplug the CIB cable from the controller board at P122CIB/J122CIB.

4. Remove the ribbon cartridge (Refer to the *User's Manual*).

5. Remove the shuttle cover (page 291).

6. Disconnect the ribbon drive motor cable connector (page 360, item 12, cable portion).

7. Remove the three 6-32 x 1/2 captive screws securing the motor bracket assembly to the mech base.

8. Unplug the weld sensor cable from the CIB PCBA.

9. Remove the motor bracket assembly (you may have to wiggle it off of the guide pins).

### Installation

1. Reverse step 4 through step 9 of the removal procedure.

2. Return the printer to normal operation (page 243).

# Paper Feed Motor

## Removal

1.   Prepare the printer for maintenance (page 242).

2.   Cabinet Models: Remove the paper path (page 311).
     Pedestal Models: Remove the top cover assembly (page 292).

3.   Remove the timing belt cover by squeezing the front and back to release the plastic tabs from the slots in the side plate (page 344, item 7).

4.   Loosen, but do not remove, the two 5/16 inch paper feed motor mounting screws. (See page 360, item 6.)

5.   Roll the paper feed timing belt off the paper feed motor pulley and splined shaft pulley.

6.   Trace the paper feed motor cables back to the controller board, releasing it from tie wraps. (See the cable routing diagrams in Appendix A.)

7.   Disconnect connector P107 from the controller board and remove the paper feed motor connector from connector P107. (See page 286.)

**NOTE:**  Some paper feed motors are mounted with nuts and bolts; other motors have threaded flanges, eliminating the need for nuts.

8.   Remove the motor mount screws (and nuts, if present).

9.   Remove the paper feed motor assembly.

## Installation

1.   Position the paper feed motor assembly on the right side plate and install the motor mount bolts and nuts finger tight. (See page 360, items 6 and 18.)

2.   Connect the paper feed motor cable connector to connector P107, then connect P107 to J107 on the controller board. (See page 286.)

3.   Roll the paper feed timing belt onto the splined shaft pulley and the motor pulley

4.   Using the straight end of a force gauge, apply 15 pounds (66.7 N) of pressure to the paper feed motor. Use the splined shaft to steady the force gauge.

5.   Reduce pressure to 12 pounds (53.4 N) and torque the 5/16 inch motor mount screws to 18 inch-pounds (2.03 N•m).

**NOTE:**  Belt tension is correct if the belt deflects 1/8 inch midway between the pulleys.

6.   Snap the timing belt cover into the slots in the side plate.

7.   Cabinet Models: Install the paper path (page 311).
     Pedestal Models: Install the top cover assembly (page 292).

8.   Return the printer to normal operation (page 243).

## Paper Ironer

WARNING **Over time, the upper edge of the paper ironer can become sharp. To avoid cutting yourself, handle the paper ironer on the sides.**

### Removal

1. Prepare the printer for maintenance (page 242).
2. Remove the shuttle frame assembly (page 328).
3. Move the forms thickness lever to the open position.
4. Push the ends of the paper ironer toward the rear of the printer, disengage the tabs, then lift it up and out (page 358, item 3).
5. On models P7000HD, P7X06H, P7X08H, P7x15, and P7220, remove the auxiliary paper ironer, which is directly in front of the standard paper ironer.

### Installation

**NOTE:** The black tape on the standard paper ironer faces toward the rear of the printer and toward the paper detector switch assembly.

1. Position the paper ironer so the black tape is on the side that faces the rear of the printer, towards the paper detector switch assembly. (See page 358, item 3.)
2. Push the paper ironer down into the slots until the tabs engage.
3. On models P7000HD, P7X06H, P7X08H, P7x15, and P7220, install the auxiliary paper ironer in front of the standard paper ironer. (See also the note on page 358, next to item 27.) Make sure the tabs on both paper ironers are firmly engaged.
4. Install the shuttle frame assembly (page 328).
5. Return the printer to normal operation (page 243).

# Paper Guide Assembly

**NOTE:** This procedure applies only to cabinet models.

## Removal

1.  Prepare the printer for maintenance (page 242).

2.  Loosen—do not remove—the three screws that secure the paper path to the card cage. (See Figure 32.)

3.  Slide the paper path to the left and lift it off the card cage.

## Installation

1.  Position the paper path offset slightly to the left on the card cage with the keyway cutouts over the three loosened screws. (See Figure 32.)

2.  Slide the paper path to the right, engaging the three screws in the keyway slots. Slide the paper path to the right as far as it will go.

3.  Tighten the screws securing the paper path to the card cage. (See Figure 32.)

4.  Return the printer to normal operation (page 243).

**Figure 32. The Paper Path**

## Platen

### Removal

1. Prepare the printer for maintenance (page 242).

2. Remove the shuttle frame assembly (page 328).

3. Remove the paper ironer (page 310).

4. Remove the three 1/4 inch screws securing the paper ironer bracket assembly and remove the assembly. (See page 358, items 4, 5, and 6.)

5. Remove the platen open belt (page 282).

6. Remove the platen pulley (page 358, item 21), as follows:

   a. Loosen the 7/64 inch collar clamp screw.

   b. Pull the platen pulley off the platen shaft.

7. Pull the spring link and white plastic bushing off the platen shaft and remove the spring link, bushing, and spring. (See page 358, items 16, 17, and 18.)

8. Remove the platen stop assembly by loosening the 7/64 inch clamp screw and pulling the assembly off the platen shaft. (See page 358, item 15.)

9. Remove the right side platen support spring by repeating step 7 on the right side of the platen.

10. Remove the Phillips #1 screw and washer securing the interlock switch bracket from the inside of the right side bracket. (See page 358, items 9 and 10.)

11. Pull the bracket, with the interlock switch assembly attached, off the platen shaft.

12. Pull the right side of the platen toward the front of the printer and move the platen to the right and out of the left side plate. (Hold the black metal washer on the left side of the shaft as you remove the platen. Make sure the wear saddles in the platen seat of the mechanism base stay in place.)

## Installation

**IMPORTANT** **Install the platen with the longer shaft on the right hand side of the printer. The dowel pins protruding from the ends of the platen are the platen shafts. The platen shafts are not of equal length.**

1. Wipe the platen shafts clean of grease and debris.

2. Install two washers on the longer (right) platen shaft. (See Figure 33 below.)

3. Apply bearing lubricant to both platen shafts.
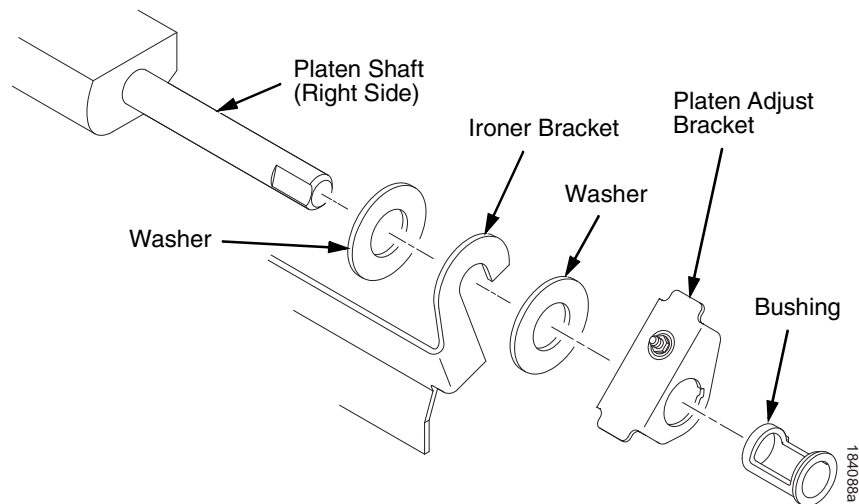


**Figure 33. Installing the Platen Adjust Bracket**

4. Make sure the two wear saddles are set flush into the corners of the mechanism base platen seat. (See Figure 34 below.)

5. Apply a layer of bearing lubricant 1/4 inch high to the seat of each wear saddle, making the layer as wide as the saddle and touching the rear angled surface.

6. Install one platen adjust bracket and bushing onto the longer platen shaft, with the screw at the top of the bracket. (See Figure 33.)

7. Place the other bracket and bushing onto the left side mechanism base platen seat so that the mechanism base platen seat is between the flanges of the bracket.

8. Insert the shorter platen shaft through the left platen adjust bracket and through the opening in the left side plate. Rotate the longer shaft into the opening in the right side plate and position the platen adjust brackets as shown in Figure 34.
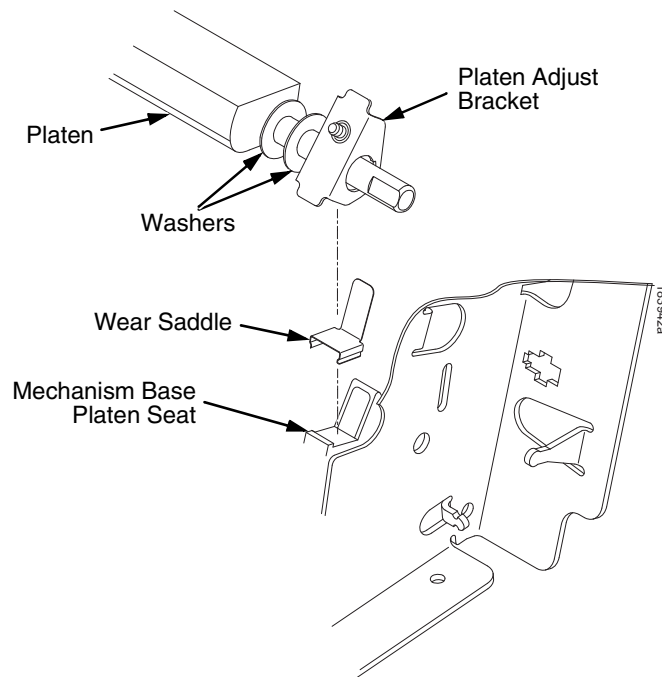
**Figure 34. Positioning the Platen Adjust Brackets**

9.  Install the interlock switch bracket:

    a.  Slide the bracket, with the interlock switch assembly attached, onto the platen shaft and up against the right side plate.

    b.  Install the Phillips #1 screw and washer securing the switch and bracket.

10. Install the black metal washer onto the left side of the platen shaft. (See page 358, item 26.)

11. Apply bearing lubricant to the nylon bearings in the two spring links, slide the spring links onto the platen shafts, and connect the springs to the spring hooks in the side plates. (See page 358, items 16, 17, and 18.)

12. Apply bearing lubricant to the platen shafts on both sides, between the ends of the platen and the platen adjust brackets.

13. Install the paper ironer bracket. (See Figure 33.)

   a. With the flat part of the bracket facing the front of the printer, place the two hooks of the upper part of the paper ironer over the platen shafts.

      The left hook of the paper ironer bracket goes between the left platen adjustment bracket and the platen.

      On the right side of the platen, a washer goes on both sides of the paper ironer bracket hook and the hook goes to the left of the right platen adjustment bracket. (See Figure 33.)

   b. Install and torque three screws to 20 inch-pounds (2.26 N•m).

14. Push the platen to the left.

15. Install the platen stop assembly on the right hand platen shaft, pressing the interlock switch out of the way as the lever slides past it. Torque the 7/64 inch clamp screw to 18 inch-pounds (2.03 N•m). (See page 358.)

16. Install the platen shaft pulley with the 7/64 inch setscrew facing up and tighten the setscrew (page 358, items 21 and 22).

17. Install, but do not adjust, the platen open belt (page 358, item 23).

18. Install the paper ironer with the black tape towards the rear of the printer (page 358, item 3).

19. Install the shuttle frame assembly (page 328).

20. Adjust the platen gap (page 250).

21. Adjust the platen open belt (page 246).

22. Check the hammer phasing (page 255).

23. Return the printer to normal operation (page 243).

## Platen Open Motor

### Removal

1. Prepare the printer for maintenance (page 242).

2. Cabinet Models: Remove the paper path (page 311).
   Pedestal Models: Remove the top cover assembly (page 292).

3. Cabinet Models: Remove the card cage fan (page 296).

4. Remove the platen open belt cover by squeezing the top and bottom to release the plastic tabs from the slots in the side plate (page 358, item 24).

5. Using a 5/32 inch Allen wrench, loosen the platen motor adjustment screw (page 360, item 10).

6. Remove the platen open belt (page 358, item 23).

7. Trace the platen open motor cables back to connector P106 on the controller board, releasing the cables from all tie-wraps. (See cable routing diagrams in Appendix A.)

8. Remove the platen open cable connector from connector P106. (See page 286.)

9. Remove the 5/32 inch platen motor adjustment screw, platen spring post, and platen belt spring (page 360, items 10, 20, and 21).

10. Remove the 5/16 inch motor lower mount screw.

11. Remove the platen open motor assembly.

## Installation

1. Position the platen open motor assembly with the wires toward the rear (page 360, item 5).

2. Install the 5/16 inch lower motor mount screw and torque it to 30 inch-pounds (3.39 N•m).

3. Install the 5/32 inch upper motor mount screw, platen spring post, and platen belt spring such that the screw is just loose enough to permit movement of the motor in the slotted side plate. (See page 360, items 10, 20, and 21.)

4. Rotate the motor all the way forward and install the platen open belt.

5. Connect the platen motor cable connector to connector coupling shroud P106.

6. Connect coupling shroud connector P106 to the controller board and install tie-wraps to secure the motor cable. (See the wire routing diagrams in Appendix A.)

7. Close the forms thickness lever all the way.

**CAUTION** **Too much tension on the platen open belt can cause the platen gap to change, which can lead to premature wear of the platen, damaged hammer tips, and poor print quality.**

8. The spring automatically tensions the belt.

9. *Slowly* tighten the motor adjustment screw.

**NOTE:** Belt tension is correct if the belt deflects 3/16 inch midway between the pulleys. If deflection is more or less than 3/16 inch, repeat steps 7 through 9.

10. Snap the platen open belt cover into the slots in the side plate.

11. Cabinet Models: Install the card cage fan (page 296).

12. Cabinet Models: Install the paper path (page 311).
Pedestal Models: Install the top cover assembly (page 292).

13. Return the printer to normal operation (page 243).

## Platen Stop Assembly

**NOTE:** The forms thickness lever is part of the platen stop assembly.

### Removal

1. Prepare the printer for maintenance (page 242).

2. Loosen—do not remove—the 7/64 inch clamp screw and pull the platen stop assembly off the platen shaft. (See page 358, items 12 through 15.)

### Installation

1. Install the platen stop assembly on the right hand platen shaft, pressing the interlock switch out of the way as the lever slides past it. Torque the 7/64 inch clamp screw to 18 inch-pounds (2.03 N•m). (See page 358.)

2. Return the printer to normal operation (page 243).

## Power Supply Board

**WARNING**   **To prevent injury from electric shock, wait at least one minute after shutting off power before removing the power supply board. Do not touch components on the board during removal or installation. Lift and handle the board only by the loops provided for this purpose.**

### Removal

1. Prepare the printer for maintenance (page 242).

2. Cabinet Models: Remove the paper path (page 311).
   Pedestal Models: Remove the top cover assembly (page 292).

3. Mark then disconnect all cable assemblies going to and from the power supply board. (See page 350, item 3.)

4. Loosen—do not remove—the two screws securing the power supply board to top rear wall of the card cage. (See page 350, item 15.)

5. Grasp the power supply by the handling loops, tilt it forward, and lift it out of the printer.

### Installation

1. Holding the power supply by the handling loops, tilt the bottom of the power supply toward the rear of the card cage and insert the tabs on the the power supply base in the channels on the lower rear card cage wall.

2. Rotate the top of the power supply board toward the rear of the card cage until the slots on the upper brackets bottom out on the screws on the top rear wall of the card cage.

3. Tighten the two screws securing the power supply board to top rear wall of the card cage. (See page 350, item 15.)

4. On models P7000HD, P7X06H, P7X08H, P7X15, and P7220 adjust the coil temperature if the original power supply was replaced by a new or refurbished power supply (page 241).

5. Cabinet Models: Install the paper path (page 311).
   Pedestal Models: Install the top cover assembly (page 292).

6. Return the printer to normal operation (page 243).

# Resistors, Terminating, V6 Controller Board

For parallel interface configurations, the printer is equipped with 470 Ohm and and 1K Ohm terminating resistors on the controller board. These are suitable for most applications. (See Figure 35, page 321.)

If the standard terminating resistor pack is not compatible with the particular interface driver requirements of the host computer, other RP1 and RP2 values may be required. 220 Ohm and 330 Ohm alternate terminating resistors are provided with the printer. If you install the 220 Ohm resistor, you must also install the 330 Ohm resistor. Possible terminating resistor combinations are shown below.

| Configuration | RP1 | RP2 |
|---|---|---|
| Factory Default | 470 Ohm | 1K Ohm |
| Alternate | 220 Ohm | 330 Ohm |

## Removal

**CAUTION** **To prevent electrostatic damage to electronic components, always wear a properly grounded static wrist strap when you handle circuit boards.**

1. Prepare the printer for maintenance (page 242).

2. Cabinet Models: Remove the paper path (page 311).
   Pedestal Models: Remove the top cover assembly (page 292).

3. Locate the terminating resistor packs. (See Figure 35, page 321.)

4. Using a chip puller, remove the resistor packs.

## Installation

**CAUTION** **To prevent electrostatic damage to electronic components, always wear a properly grounded static wrist strap when you handle circuit boards.**

1. Using a chip installation tool, install the resistor packs in the correct socket. (See Figure 35, page 321.)

2. Cabinet Models: Install the paper path (page 311).
   Pedestal Models: Install the top cover assembly (page 292).

3. Return the printer to normal operation (page 243).

RP1 and RP2

Default: 470/1K Ohm
Alt: 220/330 Ohm

183480b
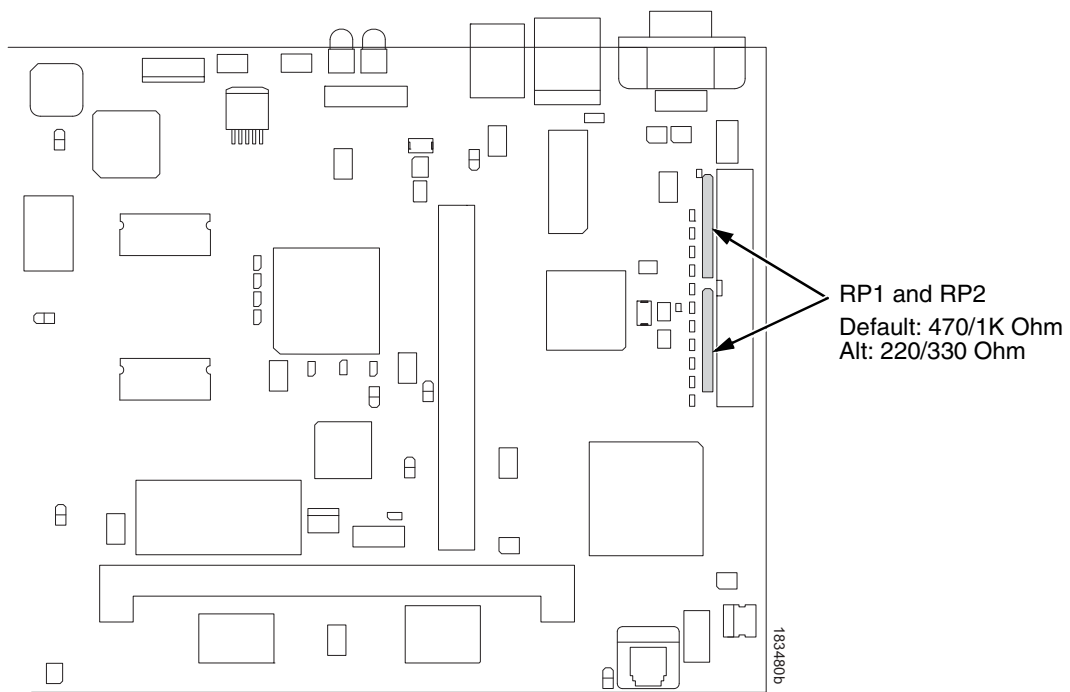
**Figure 35. Terminating Resistors, V6 Controller Board, Removal/Installation**

## Ribbon Drive Motor

### Removal

1. Prepare the printer for maintenance (page 242).

2. Remove the ribbon cartridge. (Refer to the *User's Manual.*)

3. Remove the shuttle cover (page 291).

4. Disconnect the ribbon drive motor cable connector (page 360, item 12, cable portion).

5. Remove the three 6-32 x 1/2 captive screws securing the motor bracket assembly to the mech base.

6. Remove the motor bracket assembly from the mech base.

7. Remove the spacer plate from the mech base.

8. Remove the four M3 screws securing the ribbon drive motor to the motor bracket (page 360, items 12, 22, and 23).

9. Remove the ribbon drive motor.

### Installation

1. Use four M3 screws to mount the ribbon drive motor to the motor bracket. Orient the motor so that the motor cable exits to the right side of the bracket.

2. Place a spacer plate onto the mech base aligning the plate onto the two dowel pins in the mech base.

3. Place the motor bracket assembly onto the same two alignment dowels that protrude through the spacer plate.

4. Secure the motor bracket assembly to the mech base using three 6-32 x 1/2 captive screws. Torque the three fasteners to 20 in. lbs.

5. Install the shuttle cover (page 291).

6. Install the ribbon cartridge. (Refer to the *User's Manual.*)

7. Return the printer to normal operation (page 243).

## Security Key

**CAUTION**    **To prevent electrostatic damage to electronic components, wear a properly grounded static wrist strap when handling circuit boards, the shuttle frame assembly, and any other electronic component.**

### Removal

1. Make a configuration printout of all saved configurations. (Refer to the *User's Manual.)*

2. Prepare the printer for maintenance (page 242).

3. Cabinet Models: Remove the paper path (page 311).
   Pedestal Models: Remove the top cover assembly (page 292).

4. Put on a static wrist strap and ground the lead to an unpainted part of the printer frame. Touch the printer frame with the hand wearing the wrist strap before you touch memory modules or the controller board

5. Gently lift the locking tab on the top side of controller board connector J9 enough to release the key, then lift and remove the security key. (See Figure 36, page 324.)

**NOTE:** The security key is a 3-pin semi-programmable EEPROM that enables the loading of microcode and emulation software. The printer will not operate correctly without a security key. If you need to replace the security key, contact Printronix for a replacement.

### Installation

1. Put on a static wrist strap and ground the lead to an unpainted part of the printer frame. Touch the printer frame with the hand wearing the wrist strap before you touch memory modules or the controller board.

2. Position the security key on controller board connector J9 so that the lock indentation is on the same side as the locking tab on connector J9. Gently press the security key down onto the pins until the locking tab engages the lock indentation and locks the key in place. (See Figure 36.)

3. Cabinet Models: Install the paper path (page 311).
   Pedestal Models: Install the top cover assembly (page 292).

4. Download the emulation (page 257).

5. If an SPX came with the flash memory, reprogram the security key (page 263).

6. Return the printer to normal operation (page 243).

7. Using the configuration printout(s) you made in step 1 of the removal procedure, reset and save the printer configuration(s). (Refer to the *User's Manual.)*

## Controller Board



**J9: Security Key**

Notched End
on this side

**Flash Memory**:

J10: 72-pin Flash Memory SIMM:
4 MB = P/N 204480-901
8 MB = P/N 204480-902
16MB = P/N 204480-903
32MB = P/N 204480-904
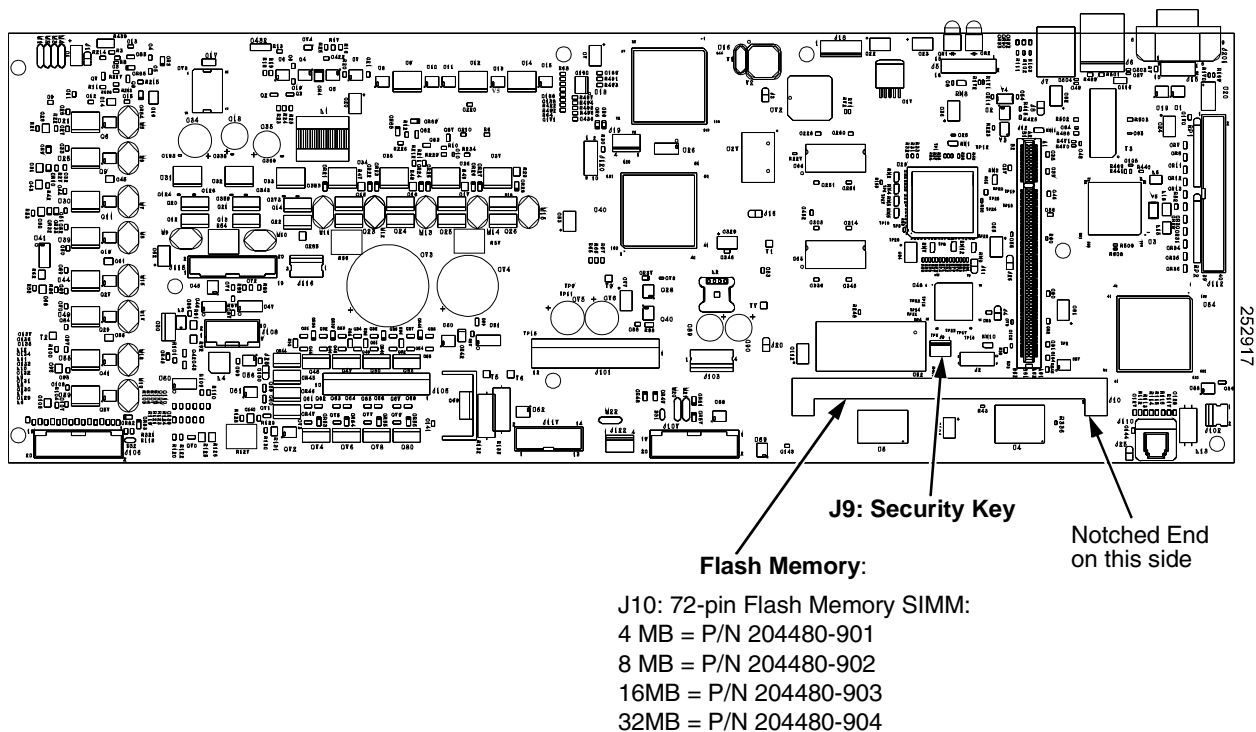
**Figure 36. Memory Modules and Security Key**

### Testing NIC Operation

You can test the NIC by starting a telnet session (telnet *IP address*) and sending

```
start fox prn<Return>
stop prn<Return>
```

This command sequence sends consecutively numbered lines of text from the interface to the printer. The "fox" test is resident in the NIC and verifies that it can receive commands and can transfer data successfully to the printer.

**NOTE:** Reprogram the security key before using the NIC.

# Shaft, Splined

**IMPORTANT**   **In order to preserve correct alignment of the side plates, the barrier panel must remain installed and fastened during this procedure.**

## Removal

1.  Prepare the printer for maintenance (page 242).

2.  Remove the paper supports from the splined shaft and support shaft. (See page 356, item 4.)

3.  Remove the paper feed timing belt (page 281).

4.  Unlock the left and right tractors and slide them to the center of the shaft.

5.  Remove the screw securing the right tractor shaft plate and remove the plate (page 356, items 7 and 8).

6.  Slide the splined shaft out of the sealed ball bearing in the left tractor shaft plate and remove the tolerance ring from the left end of the splined shaft (page 356, items 3, 5, and 6).

7.  Hold the tractors so they do not fall, grasp the vertical adjustment knob, and slide the splined shaft to the right, out of the tractors and side plate.

## Installation

1.  Open the doors on the left and right tractors. Position the splined shaft so the alignment marks are at the top on both tractors. (See Figure 37.)

2.  Slide the splined shaft through the right side plate and tractors. Make sure the same spline passes the marked groove on each tractor. (See Figure 37.)

3.  Install the tolerance ring on the left end of the splined shaft (page 356, item 5).

4.  Insert the tolerance ring lead-in portion into the sealed ball bearing in the left tractor shaft plate (page 356, items 3, 5, and 6) while sliding the ball bearing into the right side plate. Push the splined shaft to the left until the flange on the ball bearing is in solid contact with the right side plate. The splined shaft will protrude about 1/16 inch (1.6mm) from the ball bearing.

5.  Install the right tractor shaft plate and screw (page 356, items 7 and 8) by first sliding the upper "fingers" up and against the flange on the ball bearing, then sliding the rectangular cutout over the support shaft end, then snapping the U-shaped "spring" <u>behind</u> the tab on the right side plate.

6.  Install the paper feed timing belt (page 281).

7.  Set the paper feed timing belt tension (page 244).

8.  Install the paper supports on the splined and support shafts. (See page 356, item 4.)

9.  Return the printer to normal operation (page 243).

Tractor

**NOTE**: Align the marks on both tractors before inserting the splined shaft.

Tolerance Ring

Alignment Marks

Splined Shaft

A

A

LH

1840895a
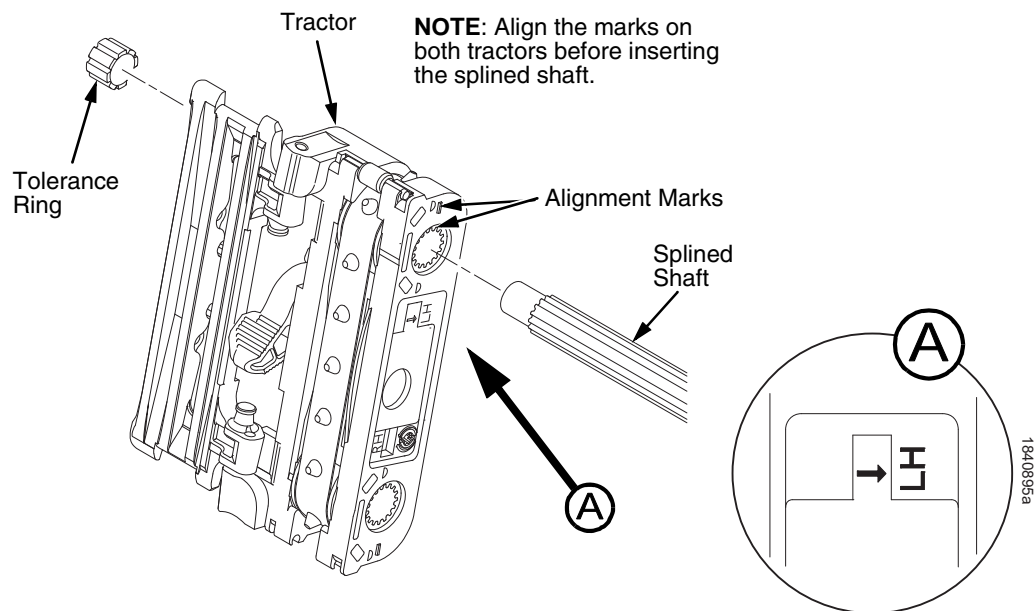
**Figure 37. Splined Shaft and Tractor Installation**

## Shaft, Support

**IMPORTANT**   **In order to preserve correct alignment of the side plates, make sure the barrier panel remains installed and fastened during this procedure.**

### Removal

1.  Prepare the printer for maintenance (page 242).

2.  Unlock the tractors and slide them to the far right.

3.  Remove the paper supports from the splined shaft and support shaft. (See page 356, item 4.)

4.  Remove the screw securing the right tractor shaft plate and remove the plate. (See page 356, items 7 and 8.)

**NOTE:**  Hold the tractors while removing the support shaft.

5.  Slide the support shaft to the right, out of the tractors and the right side plate. (See page 356, items 9, 10, and 11.)

### Installation

1.  Slide the support shaft into the right side plate and through the lower holes in the tractors. (See page 356, items 9, 10, and 11.)

2.  Slide the support shaft through the left side plate until it bottoms in the left tractor shaft plate. (See page 356, items 9 and 12.)

3.  Install the right tractor shaft plate and screw (page 356, items 7 and 8) by first sliding the upper "fingers" up and against the flange on the ball bearing, then sliding the rectangular cutout over the support shaft end, then snapping the U-shaped "spring" <u>behind</u> the tab on the right side plate.

4.  Install the paper supports to the splined shaft and support shaft. (See page 356, item 4.)

5.  Return the printer to normal operation (page 243).

## Shuttle Frame Assembly

### Removal

1. Prepare the printer for maintenance (page 242).

2. Remove the ribbon cartridge. (Refer to the *User's Manual.*)

3. Remove the shuttle cover assembly (page 291).

4. Disconnect the MPU cable connector P03 and shuttle motor cable connector P02 (page 354, items 5 and 6).

**CAUTION** **To prevent electrostatic damage to electronic components, always wear a properly grounded static wrist strap when you handle the shuttle frame assembly.**

5. Disconnect the hammer drive and hammer logic cable connectors from the terminator board on the shuttle frame assembly. (See page 350.)

6. Loosen the side 5/32 inch socket head clamp screws on each end of the shuttle and pull the clamps back and off the guide shaft. Do not remove the clamps. Hand tighten the clamp screws to hold the clamps back.

7. Loosen the center 5/32 inch socket head screw enough to release the shuttle frame assembly from the base casting.

8. Unlock and slide the tractors outward as far as they will go on the tractor support shaft.

9. Open the forms thickness lever all the way.

10. Grasp the support legs cast on both sides of the shuttle motor and lift the shuttle frame assembly out of the base casting. Lift it slowly and carefully: the shuttle frame assembly is heavy.

11. Place the shuttle frame assembly on the shuttle stabilizer tool for support.

**NOTE:** Orient the shuttle frame assembly so that the rods on the shuttle drive motor seats onto the shuttle stabilizer tool.
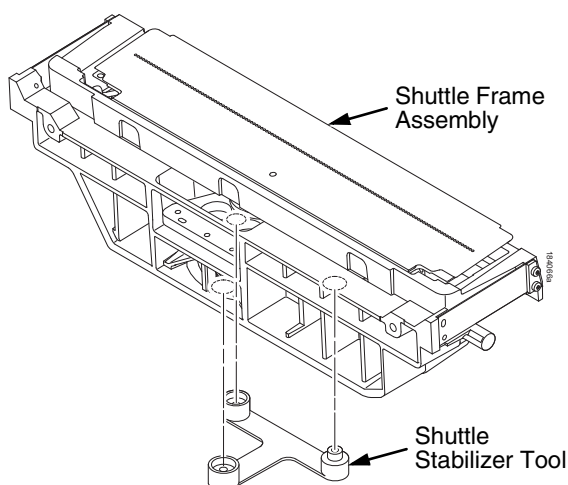


**Figure 38. Using the Shuttle Stabilizer Tool**

## Installation

1. Install the hammer bank / ribbon mask cover assembly if it was removed (page 290).

**CAUTION**   **To prevent electrostatic damage to electronic components, wear a properly grounded static wrist strap when you handle the shuttle frame assembly.**
**DO NOT remove the grease from the shaft of the replacement shuttle frame assembly. The shuttle shaft is aluminum, and the clamped ends of the shaft must be greased to prevent galling.**

2. Open the forms thickness lever and move the tractors as far left and right as possible.

3. Holding the shuttle frame assembly by the support legs located on both sides of the shuttle motor and set it into the base casting (page 350).
   **Use both hands: the shuttle frame assembly is heavy.**

4. Align the center 5/32 inch socket head screw in the base casting and hand turn the screw until only two or three threads have started.

5. Pull the shuttle frame assembly toward the front of the printer and hold it in this position while you do step step 6.

**CAUTION**   **Do not over-tighten the shuttle frame assembly clamp screws.**

6. Slide each side clamp over the guide shaft and torque the 5/32 inch socket head clamp screw to 20 inch-pounds (2.26 N•m).

7. Torque the center captive 5/32 inch socket head screw to 20 inch-pounds (2.26 N•m).

8. Connect the hammer drive and hammer logic cable connectors to the terminator board on the shuttle frame assembly.

9. Connect the shuttle motor cable connector. (See page 354, item 6.)

10. Route the MPU cable under the extension spring and connect the MPU cable connector. (See page 354, item 5.) After the MPU cable is connected make sure that it does not touch the extension spring.

**IMPORTANT**   **In the next step you must loosen the platen motor so the belt or pulley will not be over-stressed when the platen gap is adjusted after the shuttle is installed. (See page 246, steps 2, 3, and 4.)**

11. If the shuttle assembly is a new or refurbished unit, adjust the platen gap (page 250); otherwise, skip to step step 12.

12. Install the shuttle cover assembly (page 291).

13. Install the ribbon cartridge. (Refer to the *User's Manual*.)

14. Adjust the hammer phasing (page 255).

15. Return the printer to normal operation (page 243).

## Spring, Extension, Hammer Bank

**CAUTION**  **Do not let the hammer bank rotate toward the platen during spring replacement.**

### Removal

1. Prepare the printer for maintenance (page 242).
2. Remove the ribbon cartridge. (Refer to the *User's Manual*.)
3. Remove the shuttle cover assembly (page 291).
4. Model P7220 only: Remove the anti-rotation spring constraint from the extension spring. (See page 354, item 6.)
5. Unhook the extension spring from the spring lugs on the hammer bank and shuttle frame. (See page 354, item 4.)

### Installation

1. Apply a dab of bearing lubricant to both spring lugs.

**CAUTION**  **Do not let the hammer bank rotate toward the platen during spring replacement. Make sure the extension spring does not touch the MPU cable after installation.**

2. Hook the extension spring over the spring lugs. (See page 354, item 4.)
3. Model P7220 only: Install the anti-rotation spring constraint over the extension spring. (See page 354, item 6.)
4. Install the shuttle cover assembly (page 291).
5. Install the ribbon cartridge. (Refer to the *User's Manual*.)
6. Return the printer to normal operation (page 243).

# Switch Assembly, Paper Detector

## Removal

1. Prepare the printer for maintenance (page 242).

2. Cabinet Models: Remove the paper path (page 311).
   Pedestal Models: Remove the top cover assembly (page 292).

3. Remove the two 1/4 inch screws securing the paper detector switch assembly. (See page 360, items 3 and 4.)

4. Trace the paper detector switch cables back to controller board connector P106, removing all tie wraps. (See the cable routing diagrams in Appendix A.)

5. Disconnect connector coupling shroud P106 from the controller board (page 286).

6. Trace the paper detector switch cables to the connector coupling shroud, and remove the PMD and POD cable connector from the shroud (page 285).

7. Remove the paper detector switch assembly.

## Installation

1. Holding the slotted wheel against the PMD sensor, position the paper detector switch assembly and install the two 1/4 inch screws securing it to the printer base. (See page 360, items 3 and 4.)

2. Check PMD sensor arm range: make sure it travels freely and completely back into the sensing cavity.

3. Route the switch cables back to the controller board connector P106. (See the cable routing diagrams in Appendix A.)

4. Connect switch cables PMD and POD to the connector coupling shroud (page 286), then connect P106 to controller board connector J106.

5. Cabinet Models: Install the paper path (page 311).
   Pedestal Models: Install the top cover assembly (page 292).

6. Check the paper out adjustment (page 252).

7. Return the printer to normal operation (page 243).

## Switch Assembly, Platen Interlock

### Removal

1. Prepare the printer for maintenance (page 242).

2. Cabinet Models: Remove the paper path (page 311).
   Pedestal Models: Remove the top cover assembly (page 292).

3. Fully close the forms thickness lever (position 'A').

4. Trace the platen interlock switch cable back to the controller board. Remove tie-wraps as necessary to free the cable. (See cable routing diagrams in Appendix A.)

5. Disconnect connector coupling shroud P107 from the controller board.

6. Remove the platen interlock cable connector from the connector coupling shroud (page 286).

7. Remove two Phillips #1 screws securing the platen interlock switch assembly. (See page 358, item 11.)

8. Remove the platen interlock switch assembly from the switch bracket.

9. Remove the switch cable from the cutout in the right side plate.

### Installation

1. Reverse steps step 2 through step 9 of the removal procedure, and do the following when you have installed the switch on its bracket:

   a. Install the two Phillips #1 screws finger tight.

   b. Fully close the forms thickness lever (position A).

   c. Insert a 0.011 inch (0.028 cm) feeler gauge between the bottom of the interlock switch assembly and the shaft of the forms thickness lever, gently push down on the interlock switch, and tighten the mounting screws. Remove the feeler gauge.

2. Return the printer to normal operation (page 243).

## Tractor (L/R)

### Removal

1.  Prepare the printer for maintenance (page 242).

2.  Remove the support shaft (page 327).

3.  Remove the splined shaft (page 325).

### Installation

1.  Using the replacement tractors, install the support shaft (page 327).

2.  Install the splined shaft (page 325).

3.  Return the printer to normal operation (page 243).

## Weld Sensor

### Removal

1.  Prepare the printer for maintenance (page 242).

2.  Remove the shuttle cover (see page 328).

**CAUTION**     **Wear an ESC wrist strap for the next steps to avoid equipment damage.**

3.  Remove the two plastite self-tapping screws securing the weld sensor PCBA to the shuttle cover.

4.  Remove the weld sensor from the shuttle cover.

### Installation

1.  Place the weld sensor PCBA into the pocket on the shuttle cover.

2.  Use the two plastite self-tapping screws to secure the weld sensor PCBA into the pocket on the shuttle cover.

3.  Install the shuttle cover (see page 328).

4.  Return the printer to normal operation (page 243).

# 6 *Illustrated Parts Breakdown*

## Organization of this Chapter

This chapter contains drawings of all electrical and mechanical assemblies in the printer. The table following each illustration lists the illustrated parts and their part numbers. Items marked "Ref" in the illustrations refer to parts that are not spared or are part of another assembly.

**NOTE:** Part numbers listed in the column labeled **Europe, Mideast, and Africa (EMEA)** are **RoHS compliant**. These parts conform to requirements specified in DIRECTIVE 2002/95/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

## Illustrations of Printer Components

**Figure 39. Top Cover, Doors, and Casters**

| Item No. | Part No. (RoHS Compliant) | Description | Notes |
|---|---|---|---|
| 1 | 177505-901<br>179781-901 | Top Cover Assembly, Stealth Black<br>Top Cover Assembly, Lt Gray | Includes items 2 and 3<br>Includes items 2 and 3 |
| 2 | 131803-904 | Window, Cabinet | |
| 3 | 175680-001 | Wireform Paper Path, Standard | |
| 4 | 177541-901<br>179785-901 | Rear Door Assembly, Stealth Black<br>Rear Door Assembly, Lt Gray | For printers without power stacker; includes items 9, 10, 11, 12, and 13<br>For use with power stacker |
| | 177489-901<br>179792-901 | Extended Door Assy, Stealth Black<br>Extended Door Assy, Lt Gray | For use with power stacker |
| 5 | 177502-901<br>179779-901 | Front Door Assembly, Stealth Black<br>Front Door Assembly, Lt Gray | Includes items 9, 10, 11, 12, and 13 |
| 6 | 141278-901 | Caster, with Brake | Two at front |
| 7 | 141278-902 | Caster, without Brake | Two at rear |
| 9 | 101607-003 | Wire Rope, Front and Rear | One on each door (rear not shown) |
| 10 | 131829-001 | Door Hinge, Top | |
| 11 | 112367-001 | Door Hinge, Bottom | |
| 12 | 157332-901 | Door Seal Kit | |
| 13 | 156030-001 | Top Cover Seal Kit | |
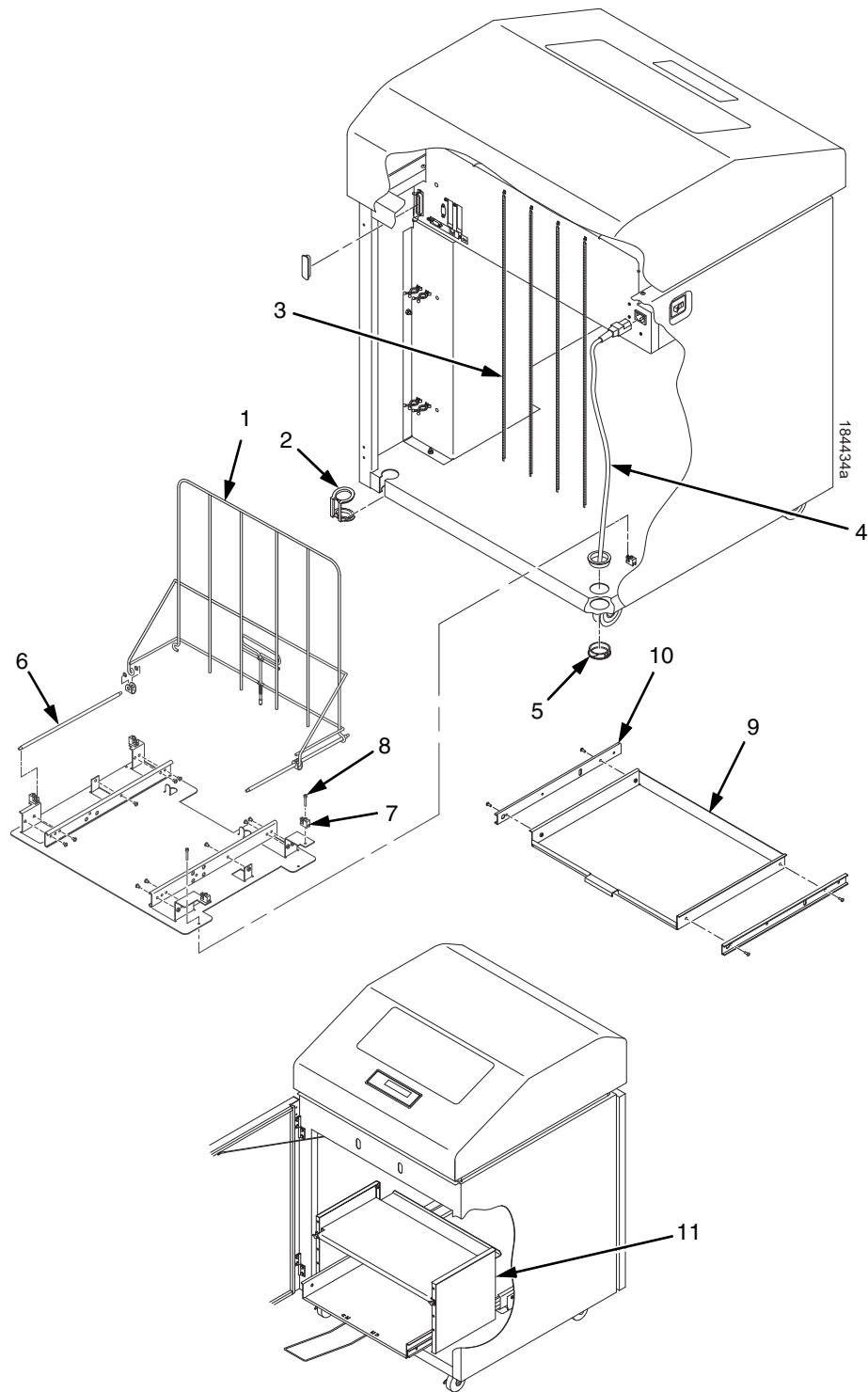
**Figure 40. Paper Fence, Paper Chains, and Front Access Stacker**

| Item No. | Part No. (RoHS Compliant) | Description | Notes |
|---|---|---|---|
| 1 | 158179-901 | Passive Stacker Assembly | Not used on printers with the power stacker; includes items 6, 7, and 8 |
| 2 | 153503-001 | Grommet Kit, Cabinet | |
| 3 | 153778-001 | Chain Assembly Kit | |
| 4 | Ref | AC Power Cord | |
| 5 | Ref | Grommet, Power Cord (2) | Included in item 2 |
| 6 | 151910-001 | Guide Rail, Stacker | Part of item 1 |
| 7 | 151831-001 | Clip, Rail, Stacker | |
| 8 | Ref | Screw (4) | |
| 9 | 178913-001 | Field Kit, Tray, Cab, Rear, Black | Includes items 1, 6, 7, 8, 9, 10, and paper tent 173864-001 |
| | 179799-001 | Tray, Power Stacker, Pull-Out, Gray | |
| 10 | 174392-901 | Slide Set, Ball Bearing | |
| 11 | 250085-001 | Field Kit, Front Access Stacker, Cab | Optional on all cabinet models |
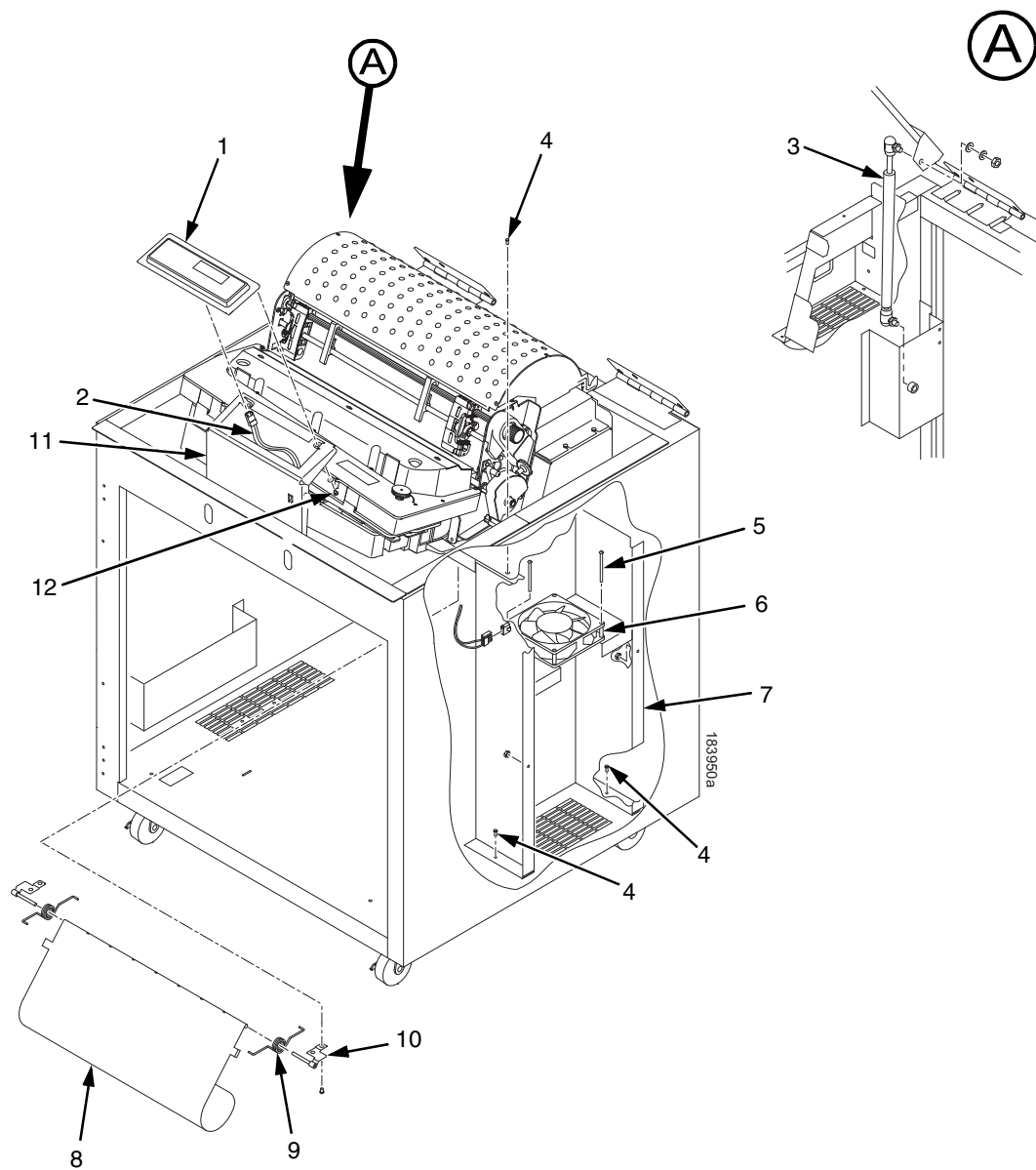
**Figure 41. Control Panel and Cabinet Details**

| Item No. | Part No. (RoHS Compliant) | Description | Notes |
|---|---|---|---|
| 1 | 254284-901 | Control Panel Assembly, Cab, P7c | |
| 2 | 152440-901 | Cable Assembly, Control Panel | |
| 3 | 107961-905 | Dashpot Kit | Includes ball studs, spring clips, and mounting hardware |
| 4 | Ref | Screw, w/Lock Washer (3) | 6-32x.375 |
| 5 | Ref | Screw, w/Lock Washer (3) | 6-32x2.00 |
| 6 | 150261-901 | Fan Assembly | Includes mounting hardware |
| 7 | Ref | Duct, Air Exhaust | |
| 8 | 177296-001 | Paper Entrance Guide, V2 | P7220 only |
| 9 | 173428-001 | Spring, Paper Entrance Guide (2) | P7220 only |
| 10 | 173351-001 173352-001 | Bracket, Paper Entrance Guide, Right Bracket, Paper Entrance Guide, Left | P7220 only P7220 only |
| 11 | Ref | Control Panel Bracket | |
| 12 | Ref | Screw, Hex w/Lock Washer (2) | 6-32x.375 |
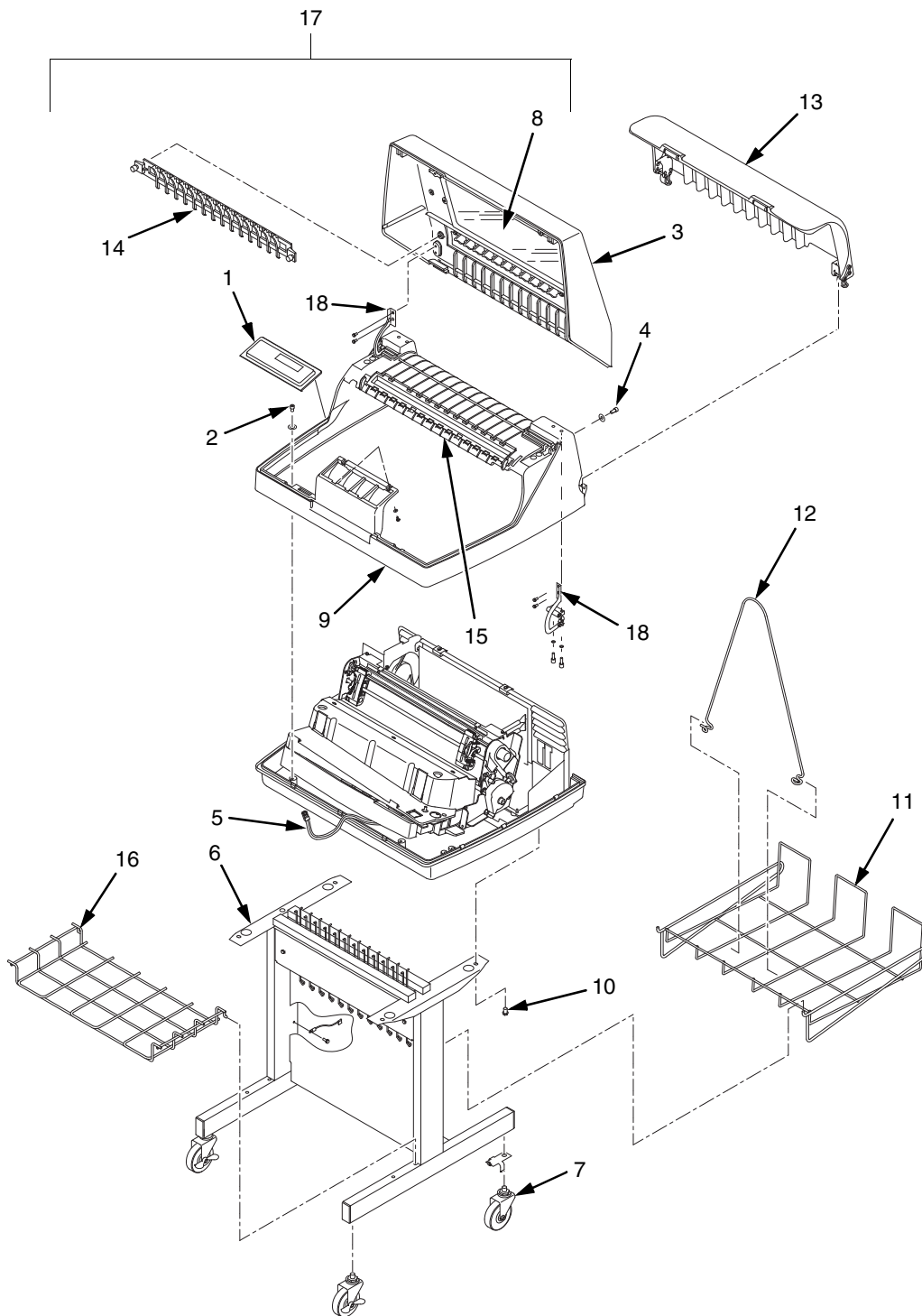
**Figure 42. Pedestal Details**

| Item No. | Part No. (RoHS Compliant) | Description | Notes |
|---|---|---|---|
| 1 | 254284-902 | Control Panel Assembly, Ped, P7c | |
| 2 | Ref | Screw, Captive (2) | |
| 3 | 179163-001<br>179845-001 | Field Kit, Lid Assembly, Ped, Blk<br>Field Kit, Lid Assembly, Ped, Gray | Both kits also contain items 8, 14, and 17 |
| 4 | Ref | Screw (2) | |
| 5 | 152440-901 | Cable Assembly, Control Panel | |
| 6 | 179081-001<br>179776-001 | Packaged Ped Kit, Stealth Black<br>Packaged Ped Kit, Lt Gray | |
| 7 | 179162-001 | Field Kit, Caster Kit, Ped | |
| 8 | 178692-901 | Window, Top Cover | |
| 9 | 179193-901 | Top Cover, Ped, Base Assy, Stealth Black, P7 | |
| 10 | Ref | Screw (4) | 10-32x.625 |
| 11 | 110718-001 | Paper Tray | |
| 12 | 157070-901 | Paper Fence, Rear, Ped | |
| 13 | 250083-001 | Field Kit, Acoustic Shroud, Ped, P7000 CRP | Optional on all pedestal models |
| 14 | 178259-901<br>179765-901 | Panel, Lid, Quick Access, Black<br>Panel, Lid, Quick Access, Gray | |
| 15 | 178241-901<br>179766-901 | Panel, Quick Access, Flip Up, Black<br>Panel, Quick Access, Flip Up, Gray | |
| 16 | 156033-901 | Paper Tray, Front, Ped | |
| 17 | 179193-901<br>179770-901 | Top Cover, Ped, Base Assy, Stealth Black<br>Top Cover, Ped, Base Assy, Lt Gray | |
| 18 | 253272-001 | Spares Kit, Hinges,LT/RT,P7000 CRP Pedestal | |

Underside of the
shuttle frame
assembly.

Ribbon Weld Processor
PCBA located on the
underside (see Detail B).
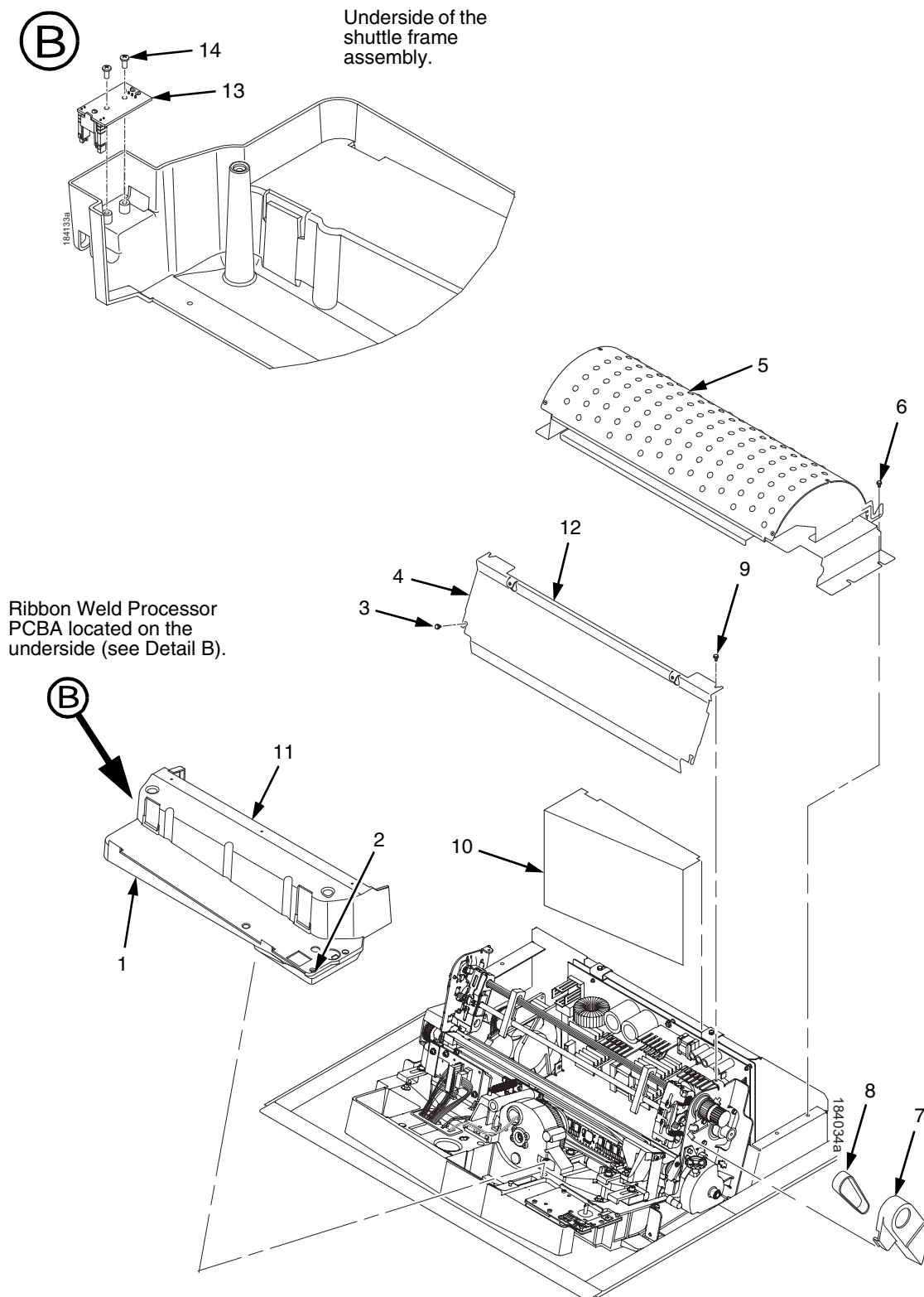
**Figure 43. Inside Covers, Cabinet Models**

| Item No. | Part No. (RoHS Compliant) | Description | Notes |
|---|---|---|---|
| 1 | 179128-901 | Shuttle Cover Assembly or Shroud Assembly | Air Shroud Assembly |
| 2 | Ref | Screw, Captive (2) | 10-24x.62 with O-ring, .125x.250x.06 |
| 3 | Ref | Screw, Thread-forming (2) | 6-32x.25 and #6 flat washer |
| 4 | Ref | Barrier Shield | |
| 5 | 175188-901 | Paper Path, V3 | |
| 6 | Ref | Screw, w/Lock Washer (3) | 6-32.25 and #6 flat washer |
| 7 | 153488-001 | Field Kit, Covers | Paper Feed Belt Cover shown |
| 8 | 108664-903 | Belt, Timing, .080 Pitch, 100 Teeth, .500 Wide | Paper Feed Belt |
| 9 | Ref | Screw, Thread-forming (2) | 6-32x.25 |
| 10 | 179276-001 | Power Supply Insulator | Taped to the upper edge of the card cage |
| 11 | 153528-901 | Paper Scale | |
| 12 | 152284-901 | Anti-static Brush Kit | Mounts to top of item 4 |
| 13 | 254476-001 | PCBA, Ribbon Weld Processor, V1 | |
| 14 | 103677-001 | Screw, 4-20X1/4, PHCRI, STL/ZNB, Plastite 48-2 | |

Underside of the
shuttle frame
assembly.

Ribbon Weld Processor
PCBA located on the
underside (see Detail B).

See Figure 45,
page 348.
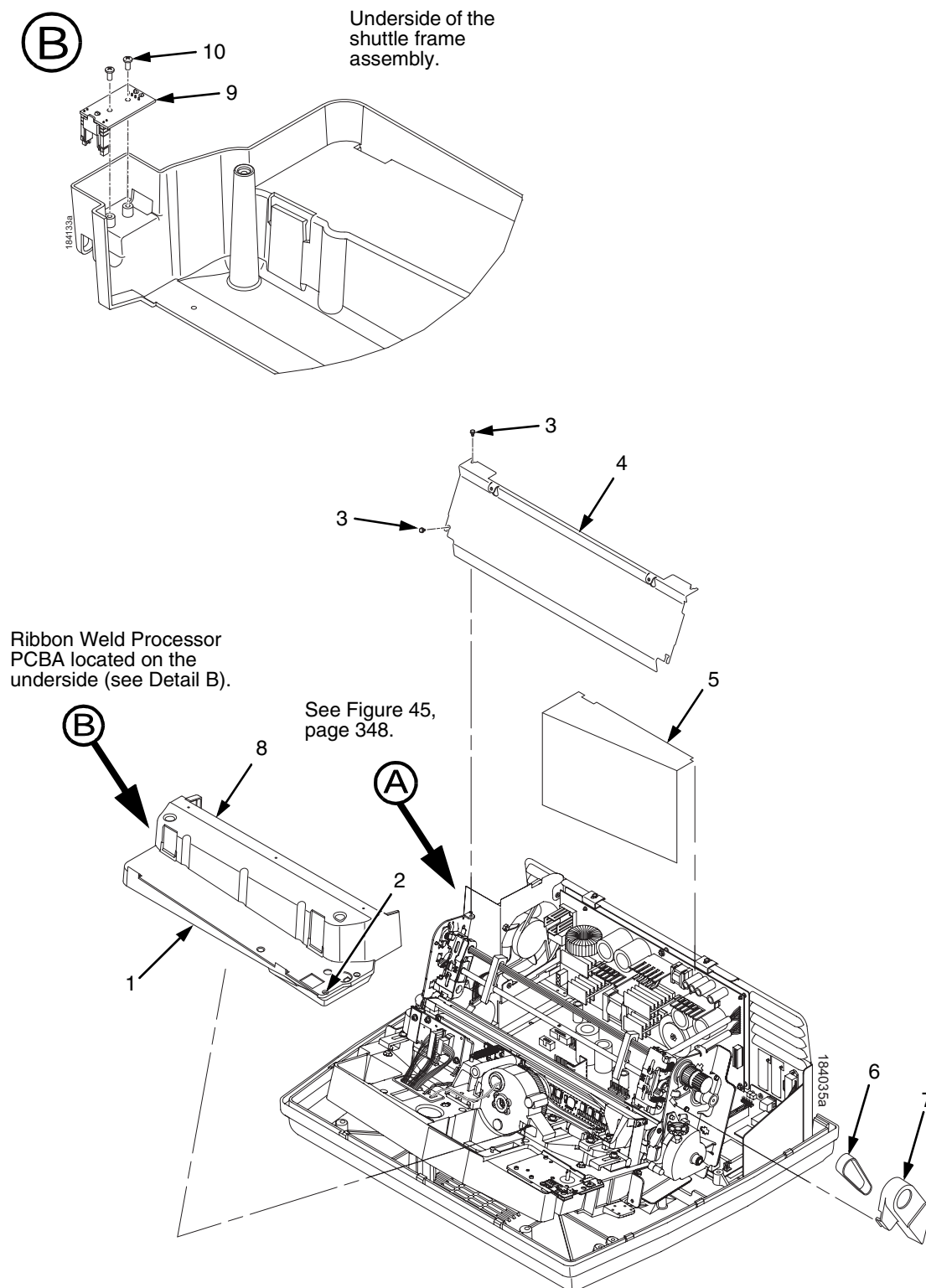
**Figure 44. Inside Covers and Card Cage, Pedestal Models**

| Item No. | Part No. (RoHS Compliant) | Description | Notes |
|---|---|---|---|
| 1 | 179128-901 254991-901 | Shuttle Cover Assembly or Shroud Assembly Shuttle Cover (including paper scale) | Air Shroud Assembly Air Shroud Assembly (including paper scale) |
| 2 | Ref | Screw, Captive (2) | 10-24x.62 with O-ring, .125x.250x.06 |
| 3 | Ref | Screw, Thread-forming (2) | 6-32x.25 and #6 flat washer |
| 4 | Ref | Barrier Shield | |
| 5 | 179276-001 | Power Supply Insulator | Taped to card cage along upper edge |
| 6 | 108664-903 | Belt, Timing, .080 Pitch, 100 Teeth, .500 Wide | Paper Feed Belt |
| 7 | 153488-001 | Field Kit, Covers | Paper Feed Belt Cover shown |
| 8 | 254478-901 | Paper Scale | |
| 9 | 254476-001 | PCBA, Ribbon Weld Processor, V1 | |
| 10 | 103677-001 | Screw, 4-20X1/4, PHCRI, STL/ZNB, Plastite 48-2 | |

1

7

(A)

From Figure 44, page 346.
Rotated 180 degrees.

2

3

4

5

To IEC 320 AC
Power Input
(Connector
J301, White
Wire)

To Connector P1
(White Wire)

To IEC 320 AC
Power Input
(Connector J301,
Black Wire)

6

184100a

To Connector P1
(Black Wire)
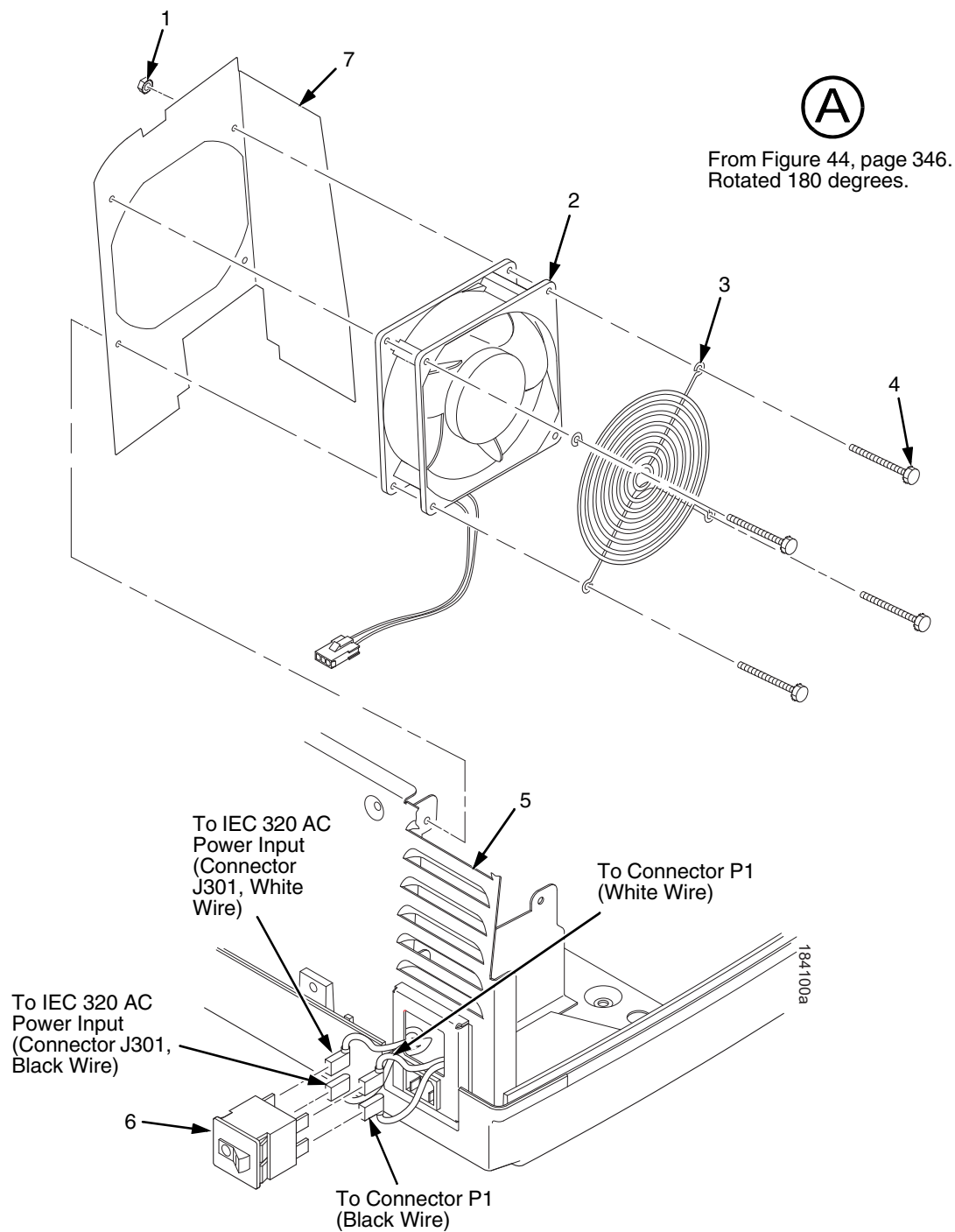
**Figure 45. Card Cage Detail, Pedestal Models**

| Item No. | Part No. (RoHS Compliant) | Description | Notes |
|----------|---------------------------|-------------|-------|
| 1 | Ref | Nut, 6-32 (1) | Upper right fan corner only |
| 2 | 150261-901 | Card Cage Fan Assembly | Air flow is into card cage |
| 3 | Ref | Fan Guard | |
| 4 | Ref | Screw, w/Lock Washer (4) | 6-32x1.75 |
| 5 | Ref | Card Cage, Pedestal | |
| 6 | 142013-901 | Circuit Breaker | |
| 7 | Ref | Baffle, Power Supply, Ped, P7000 CRP | |

Two places:
Exploded to show
assembly. Do not
remove the
clamps and
screws.

14

2

1

To J02
(Shuttle
Motor)

To J03
(MPU)

3

15

10

5

8

9  19

11

7

20

4

18

10

6

13

21

12

16

17

To the Terminator
Board on the
Shuttle Frame

184036a
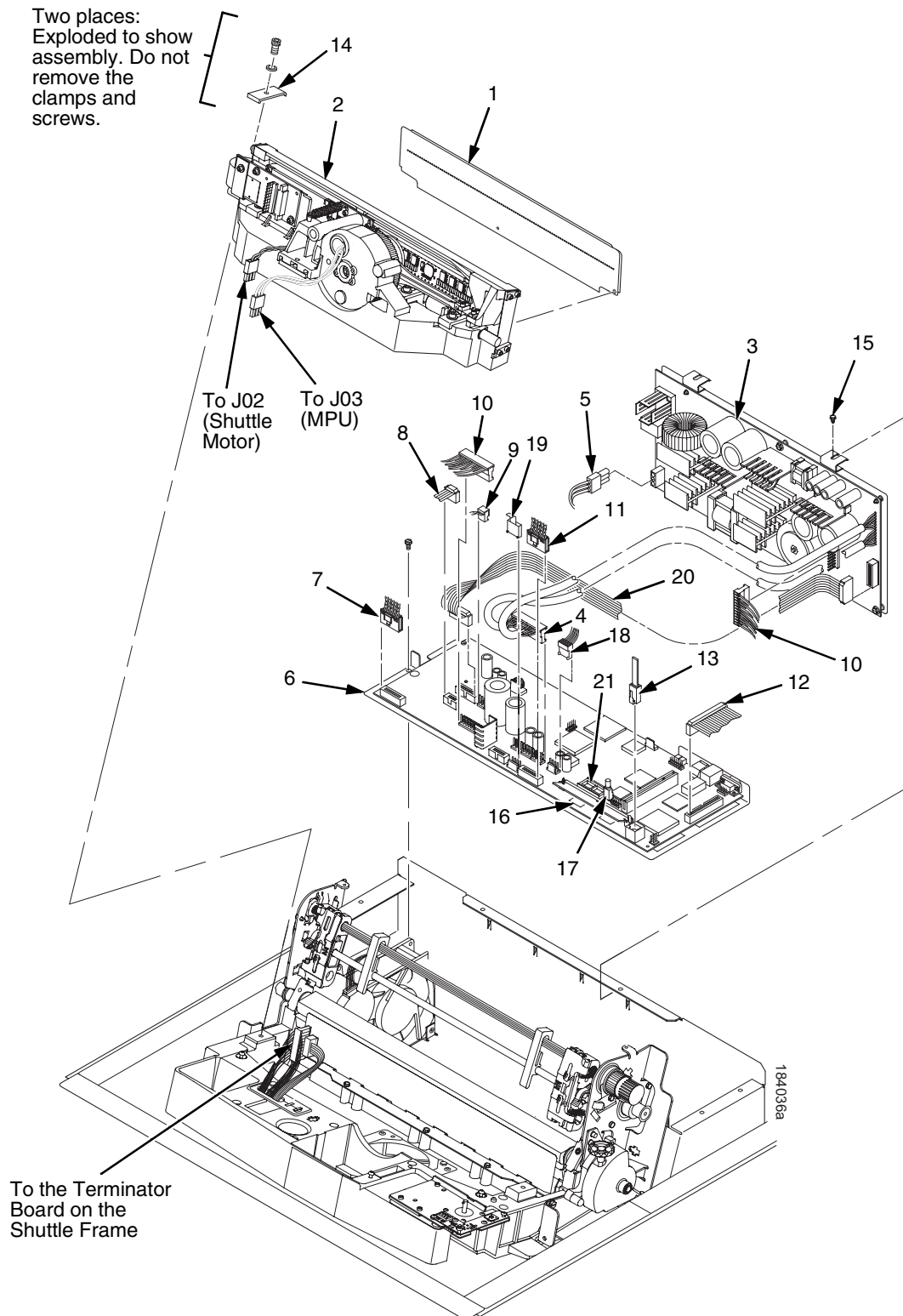
**Figure 46. Print Mechanism and Circuit Boards**

350

| Item No. | Part No. (RoHS Compliant) | Description | Notes |
|---|---|---|---|
| 1 | 254350-901 | HB Cover Assy | P7X05c, P7X02CH |
|   | 254353-901 | HB Cover Assy | P7X10c, P7X03CH |
|   | 254356-901 | HB Cover Assy | P7X15c, P7X06CH |
|   | 254138-901 | Cover Assy | P7X20c, P7X08CH |
| 2 | 254504-901 | Shuttle Assembly, 05 | P7X05c |
|   | 254504-991 | Shuttle Assembly, 05, Adv Exch | P7X05c |
|   | 254496-901 | Shuttle Assembly, 10 | P7X10c |
|   | 254496-991 | Shuttle Assembly, 10, Adv Exch | P7X10c |
|   | 254488-901 | Shuttle Assembly, 15 | P7X15c |
|   | 254488-991 | Shuttle Assembly, 15, Adv Exch | P7X15c |
|   | 254135-901 | Shuttle Assembly, 20 | P7220c |
|   | 254135-901 | Shuttle Assembly, 20, Adv Exch | P7220c |
|   | 254505-001 | Shuttle Assembly, 02HC | P7X02Hc |
|   | 254505-991 | Shuttle Assembly, 02HC, Adv Exch | P7X02Hc |
|   | 254497-901 | Shuttle Assembly, 03HC | P7X03Hc |
|   | 254497-991 | Shuttle Assembly, 03HC, Adv Exch | P7X03Hc |
|   | 254489-901 | Shuttle Assembly, 06HC | P7X06Hc |
|   | 254489-991 | Shuttle Assembly, 06HC, Adv Exch | P7X06Hc |
|   | 254506-901 | Shuttle Assembly, 08HC | P7X08Hc |
|   | 254506-991 | Shuttle Assembly, 08HC, Adv Exch | P7X08Hc |
|   | 252700-901 | Hammer Spring Assembly, 05, Thin | P7X05 |
|   | 252715-901 | Hammer Spring Assembly, 10, Thin | P7X10 |
|   | 252723-901 | Hammer Spring Assembly, 15, Thin | P7X15 |
|   | 174514-901 | Hammer Spring Assembly, 20S | P7220 |
|   | 252743-901 | Hammer Spring Assembly, 02H | P7X02H |
|   | 252719-901 | Hammer Spring Assembly, 03H | P7X03H |
|   | 252719-901 | Hammer Spring Assembly, 06H | P7X06H |
|   | 175613-901 | Hammer Spring Assembly, 06H, Version 2 | P7X06H |
|   | 252739-901 | Hammer Spring Assembly, 08H, Thin | P7X08H |
|   | 252739-901 | Hammer Spring Assembly, HD, Thin | P7000HD |
| 3 | 250297-901 | Power Supply, PFC, 5/10 | P7X05, -10,- 02H, -03H |
|   | 250297-991 | Power Supply, PFC, 5/10, Adv Exch | P7X05, -10,- 02H, -03H |
|   | 250251-901 | Power Supply, PFC, 15 | P7X15, P7X06H |
|   | 250251-991 | Power Supply, PFC, 15, Adv Exch | P7X15, P7X06H |
|   | 250410-901 | Power Supply, PFC, 20 | P7220, P7X08H, P7HD |
|   | 250410-991 | Power Supply, PFC, 20, Adv Exch | P7220, P7X08H, P7HD |
| 4 | Ref | P101 Cable Connector | Part of item 3 |
| 5 | Ref | Cable Assembly, AC-In, Power Supply | Part of Field Kit, AC Assy, 153502-901 |
| 6 | 253081-901 | Controller PCBA, V6 | V6 Controller Board has integrated ethernet port. |
|   | 253081-991 | Controller PCBA, V6, Adv Exch | |
| 7 | 202362-001 | Housing, Connector Kit | P106, Motor Sensor, Left |
| 8 | 152421-901 | Hammer Bank Logic Cable Assembly | |
| 9 | 152420-901 | Shuttle Motor Cable Assembly | |
| 10 | 164805-901 | Hammer Bank Power Cable Assy | Use on all except P7220 |
|    | 173215-901 | Hammer Bank Dual Power Cable Assy, Long, 20 | P7220 only |
| 11 | 202362-001 | Housing, Connector Kit | P107, Motor Sensor, Right |

| Item No. | Part No. (RoHS Compliant) | Description | Notes |
|---|---|---|---|
| 12 | 152439-901 | Centronics I/O Cable Assembly | |
| 13 | 152440-901 | Control Panel Cable Assembly | |
| 14 | 150399-901 | Clamp, Shaft, Receiving | |
| 15 | Ref | Screw, Captive, Power Supply (2) | |
| 16 | 250488-902 250488-903 | SIMM, Flash Memory, 8 MB SIMM, Flash Memory, 16 MB | Install in J10 on V6 board |
| 17 | | Security Key | |
| 18 | 177482-001 178046-001 178535-001 | Paper Feed Motor Assembly with Pulley, (20) Paper Feed Motor Paper Feed Motor | P7220 P7X05/10/15 P7X05/10/15LG |
| 19 | 179526-901 | PCBA, Cartridge Interface Board, w/ harness. | |
| 20 | 173164-901 | Cable Assembly, PS I/O, 2000 | Used only in P7220. (See page 419.) |
| 21 | 250489-901 | SDRAM DIMM, MEM, 32 MB, PC100 (V5 controller board only) | SDRAM is permanently soldered to the V6 controller board |

(Parts lists continue on the next page.)

Spring Lug (Do not
remove grease)

3

6

4

Spring Lug (Do not
remove grease)

184064a

A

1

2

5

7

0.010 ± .001 inch
(0.254 ± .025 mm)

**CAUTION:**
**Make sure the MPU**
**cable does not touch**
**the extension spring**
**after cable**
**connection.**

A
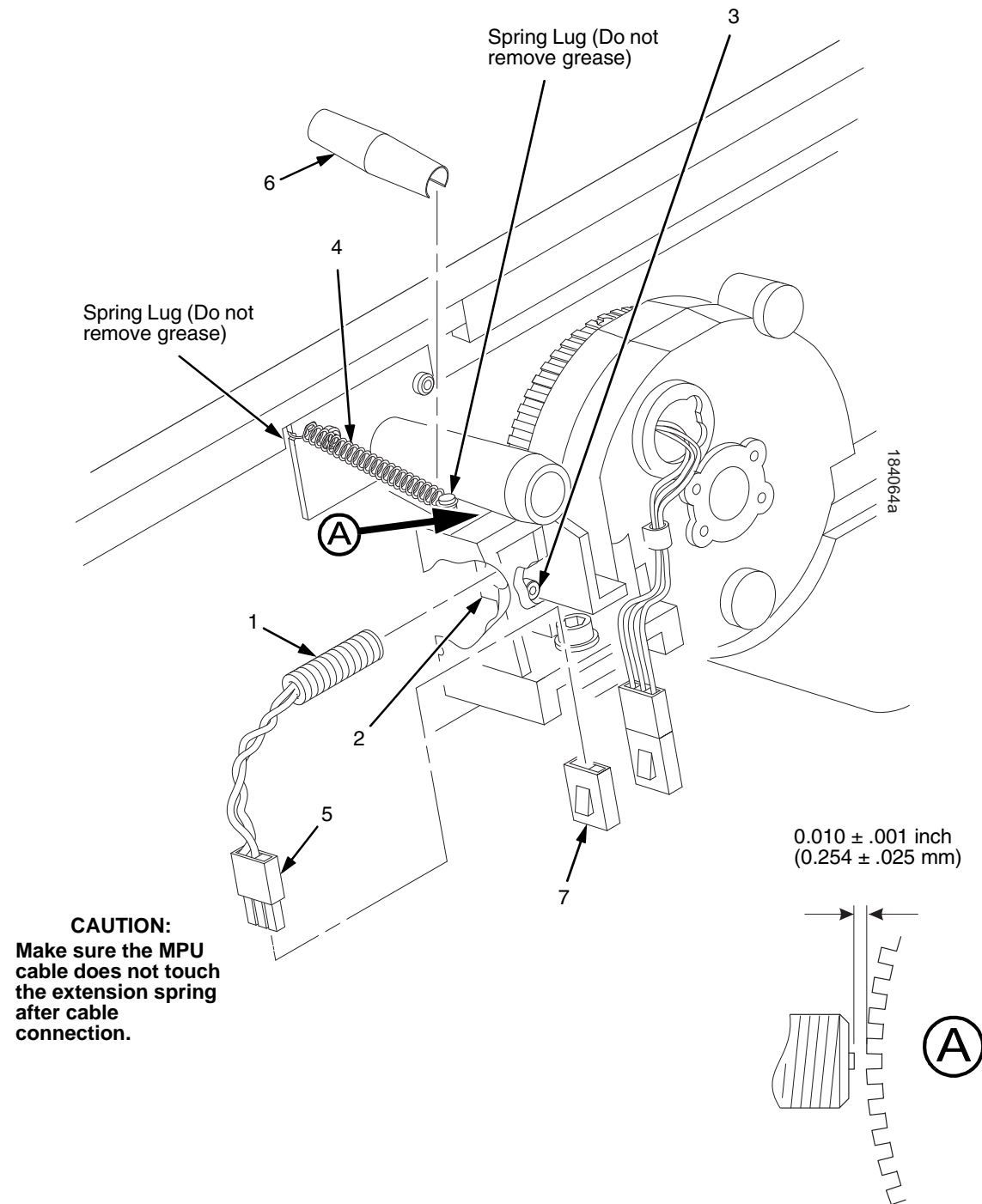
**Figure 47. Magnetic Pickup (MPU) and Extension Spring**

| Item No. | Part No. (RoHS Compliant) | Description | Notes |
|---|---|---|---|
| 1 | 150281-901 | Magnetic Pickup (MPU) Assembly | |
| 2 | Ref | Bracket, MPU | Part of item 1 |
| 3 | Ref | Screw, Socket Cap | 6-32x.38 |
| 4 | 153537-901 | Spring, Hammer Bank | |
| 5 | Ref | MPU Cable Connector (P03) | |
| 6 | 176507-001 | Anti-Rotation Spring Constraint | P7220 only |
| 7 | 152425-901 | Magnetic Pickup (MPU) Cable Assembly | |

IMPORTANT: In order to preserve correct alignment of the side plates, the barrier panel must remain installed and fastened if the splined or support shafts are removed or replaced. The barrier panel is shown in Figure 43 and Figure 44.

184037a
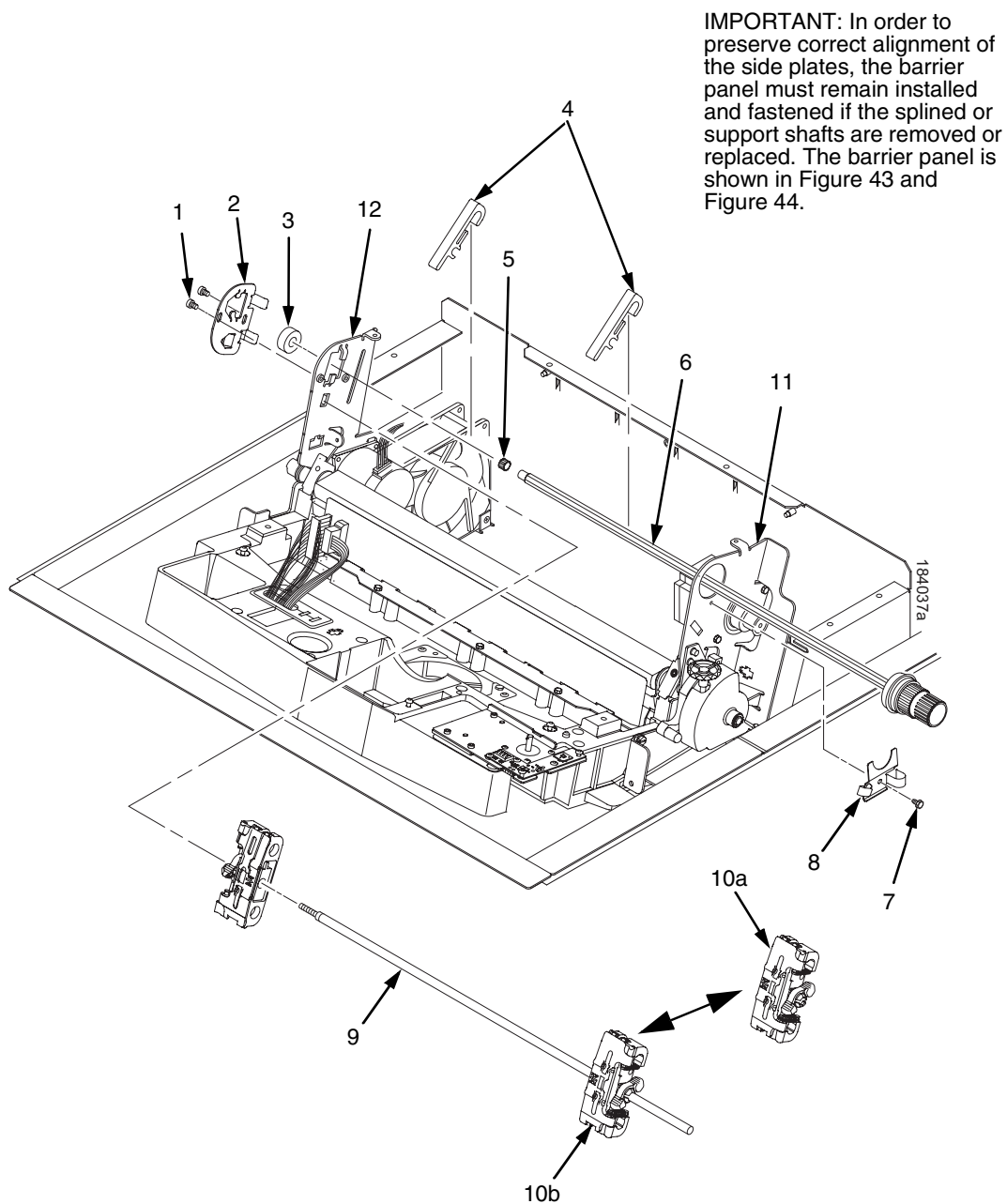
**Figure 48. Tractor Shafts**

| Item No. | Part No. (RoHS Compliant) | Description | Notes |
|---|---|---|---|
| 1 | Ref | Screw, Socket Cap, 6-32x.312 Trilob (Self-Tapping) (2) | |
| 2 | 173130-001 | Plate, Tractor Shaft, Left | |
| 3 | 151944-001 | Bearing, Ball, Sealed | |
| 4 | 178990-901 | Paper Support (2) | |
| 5 | 204155-001 | Tolerance Ring,.37X.25,.006 THK,SS | |
| 6 | 178988-901 | Splined Shaft Assembly (Blue Handle) | |
| 7 | Ref | Screw, Socket Cap, 6-32x.312 Trilob (Self-Tapping) | |
| 8 | 173217-001 | Plate, Tractor Shaft, Right | |
| 9 | 173137-001 | Support Shaft | |
| 10a<br>10b | 179061-901<br>179065-901 | Tractor Set, 20 (Blue)<br>Tractor Set, Non-Roller, 05/10/15 (Blue) | P7220<br>Installed at the factory on models with power stacker; comes standard on P7220 |
| 11 | Ref | Right Side Plate | |
| 12 | Ref | Left Side Plate | |

NOTE:
Black tape faces paper
motion detector.

NOTE:
On P7000HD, P7X06H, P7X08H,
P7X15, and P7220 models, install item
27 in front of item 3; that is, on the shuttle
side. All others do not use item 27.
Do NOT install Items 3 and 27 on ZTP
printers.

NOTE:
Item 25: Platen
Hardware Kit

184038a
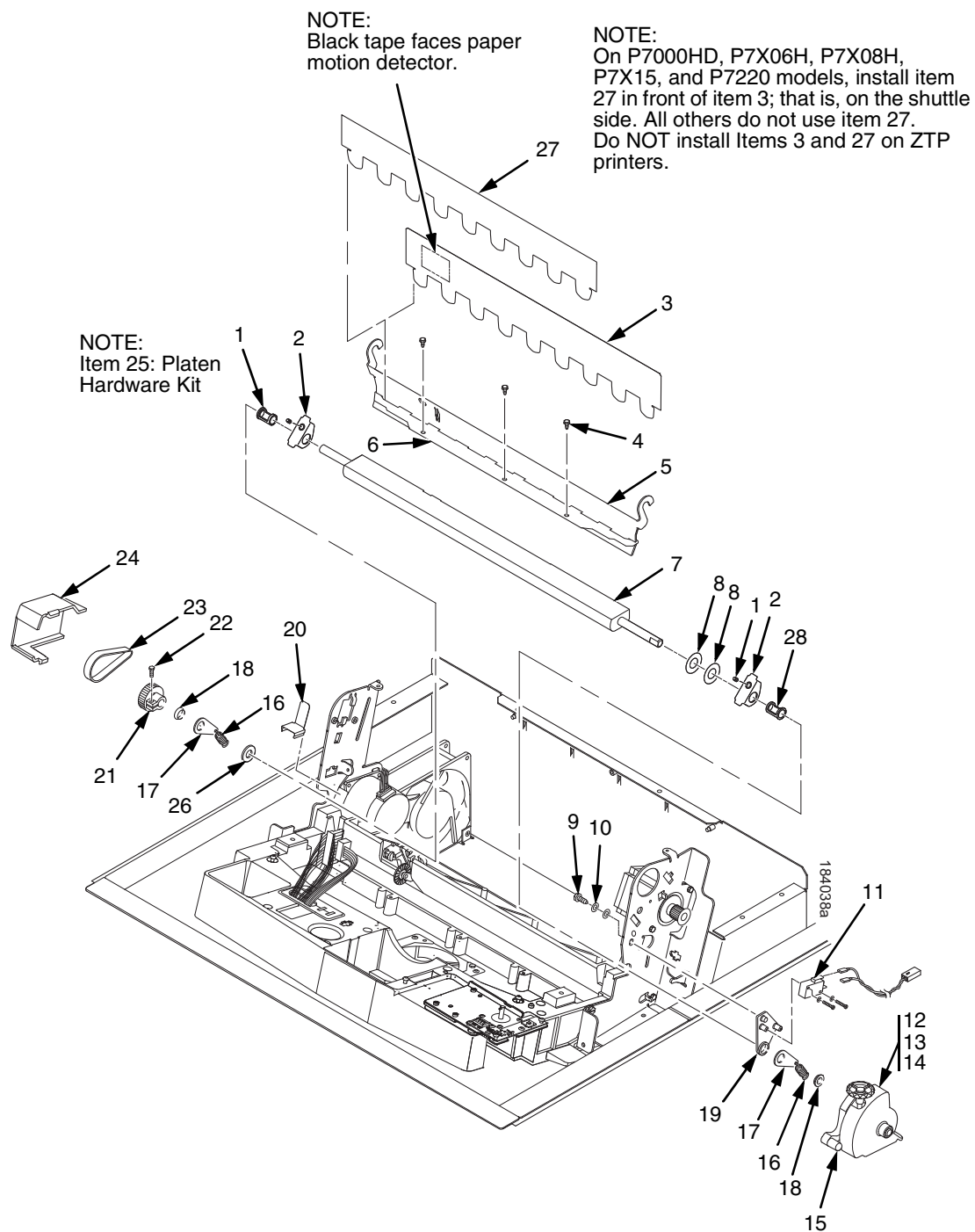
**Figure 49. Platen**

| Item No. | Part No. (RoHS Compliant) | Description | Notes |
|---|---|---|---|
| 1 | Ref | Setscrew (2) | Part of item 25 |
| 2 | Ref | Bracket, Platen (2) | Part of item 25 |
| 3 | 150957-901 | Ironer Assembly, Reverse Paper Feed | All except ZTP printers |
| 4 | Ref | Screw, Thread-forming (3) | 6-32x.25 |
| 5 | 174968-001 | Ironer Bracket/Plate Field Kit | |
| 6 | Ref | Plate, Ironer | Part of item 5 |
| 7 | 253246-901 | Platen Assembly, V2 | |
| 8 | Ref | Washer, Flat (2) | Part of item 25 |
| 9 | Ref | Screw (2) | Part of item 11 |
| 10 | Ref | Washer, Flat #4 (2) | Part of item 11 |
| 11 | 179334-901 | Field Kit, Switch Assy, w/Bracket | Includes items 9, 10, 19 |
| 12 | Ref | Screw, Socket Cap, 6-32x.75 | Part of item 15 |
| 13 | Ref | Washer | Part of item 15 |
| 14 | Ref | Nut | Part of item 15 |
| 15 | 178705-901 | Platen Stop Assembly | Includes items 12, 13, 14 |
| 16 | Ref | Spring, Extension 1.12L | Part of item 25 |
| 17 | Ref | Link, Spring | Part of item 25 |
| 18 | Ref | Bearing, Nylon .376 | Part of item 25 |
| 19 | Ref | Bracket, Switch Mount | Part of item 11 |
| 20 | Ref | Wear Saddle, Platen (2) | Part of item 25 |
| 21 | 155071-902 | Platen Pulley, Drive | |
| 22 | Ref | Screw, Socket Cap, 6-32x.44 | Part of item 21 |
| 23 | 141516-901 | Belt, Timing, .080 Pitch, .312 Wide | Platen Open Belt |
| 24 | 153488-001 | Field Kit, Covers | Platen Open Belt Cover shown |
| 25 | 177558-001 | Platen Hardware Kit | Includes items 1, 2, 8, 16, 17, 18, 20, 26, 30 |
| 26 | Ref | Platen Washer | Part of item 25 |
| 27 | 176630-901 | Paper Ironer, Auxiliary | On P7X00HD, P7X06H, P7X08H, P7X15, and P7220 models install item 27 in front of item 3 (i.e., on the shuttle side). All other models do not use this item. Do **NOT** install this item on ZTP printers. |
| 28 | 173941-001 | Bushing | Part of item 25. |

11

2

1

5

3

4

18b

2

18a

10

21

20

19

16

17

184039a

6

24

25

22

23

12

Ribbon Drive Motor
Cable Connector
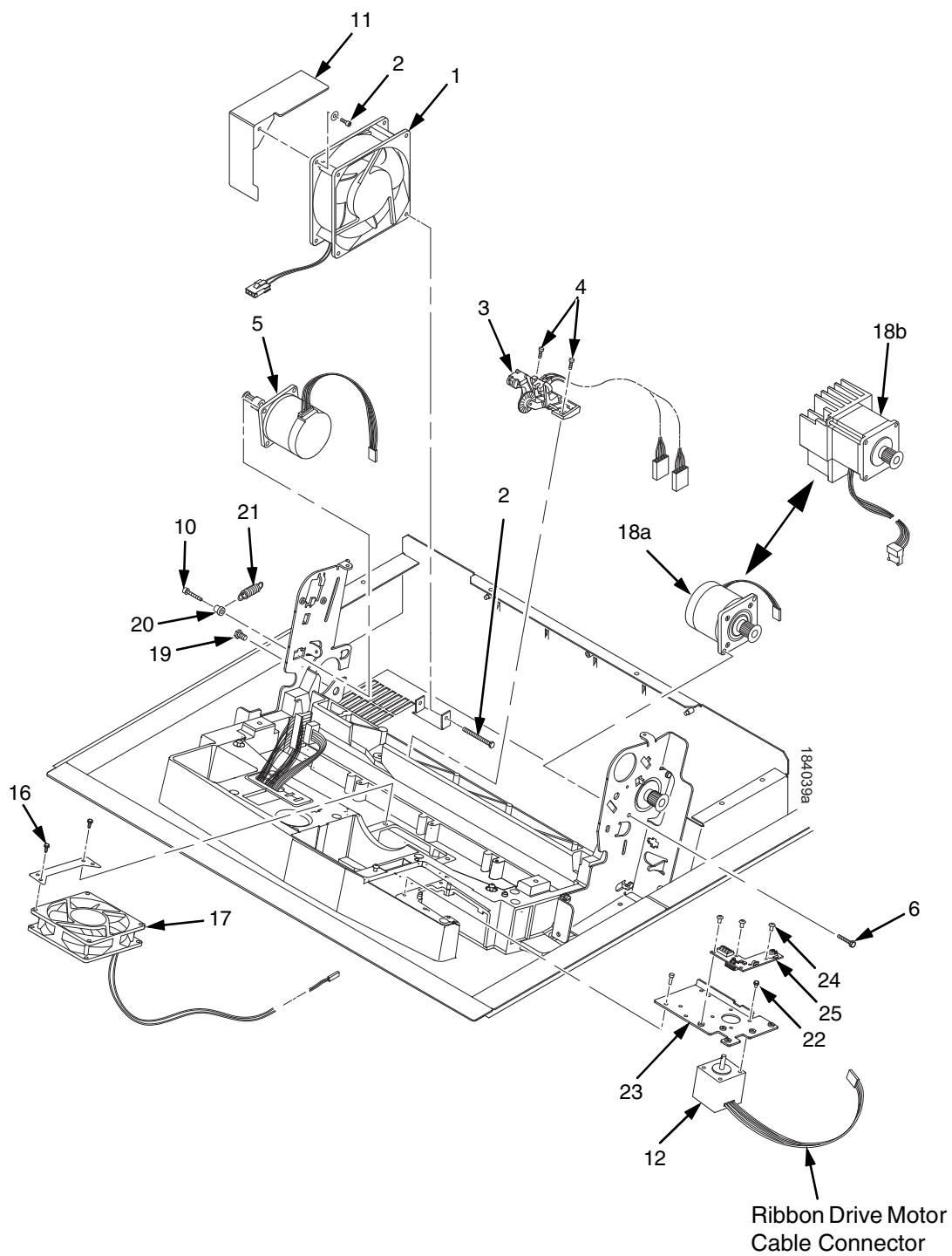
**Figure 50. Motors, Fans, and Paper Detector Switch**

| Item No. | Part No. (RoHS Compliant) | Description | Notes |
|---|---|---|---|
| 1 | 150261-901 | Card Cage Fan Assembly | Air flow is into card cage |
| 2 | Ref | Screw, w/Lock Washer (3) | Two 6-32x1.75 on bottom, One 6-32x0.50 on top left |
| 3 | 152415-901 170172-001 | Switch Assembly, Paper Detector Field Kit, Slotted Black Back Form Switch | Optional switch used with black back forms |
| 4 | Ref | Screw, Thread-forming, 6-32x.375 (2) | Part of item 3 |
| 5 | 179638-001 | Motor Assembly, Platen | Includes pulley |
| 6 | Ref | Screw, Hex w/Lock Washer, 10-24x.50 (2) | Part of item 18 |
| 7 | Undefined | | |
| 8 | Undefined | | |
| 9 | Undefined | | |
| 10 | Ref | Screw, w/Lock Washer, 10-32x.50 (2) | Part of item 5 |
| 11 | Ref | Shield, Card Cage Fan | |
| 12 | 254507-901 | Motor, Stepper, P7c Ribbon Cartridge | |
| 16 | Ref | Screw, w/Lock Washer (2) | 6-32x1.25 |
| 17 | 152416-901 | Hammer Bank Fan Assembly | All except P7220; air flow is up P7220; air flow is up |
|  | 173427-901 | Hammer Bank Fan Assembly | |
| 18a 18b | 178046-001 177482-001 | Field Kit, Paper Feed Motor, V3 Field KIt, Paper Feed Motor w/Heat Sink | All except P7220 P7220—Heat sink screws: 18 inch-pounds (2.03 N•m) |
| 19 | Ref | Screw, Hex w/Lock Washer (2) | 10-32x.50 |
| 20 | Ref | Post, Platen Belt Spring | |
| 21 | Ref | Spring, Platen Belt | |
| 22 | 203281-001 | Screw, M3x6x.5 | |
| 23 | 254460-001 | Bracket, Mtg, Motor | |
| 24 | 205477-001 | Screw, 6-32 x .25, M3 | |
| 25 | 254161-001 | PCBA, Cartridge Interface Board, LF | |

See inside detail below.

Ⓑ

Ⓐ

To IEC 320 AC
Power Input
(Connector J301,
White Wire)

To IEC 320 AC Power Input
(Connector J301, Black Wire)

184101a

To Connector P1
(Black Wire)

To Connector P1
(White Wire)

Ⓐ

1

Ⓑ

(Card cage fan and
power supply board
removed for clarity.)

Black Wire

2

White Wire

3

5

4

Black Wire

6

White Wire
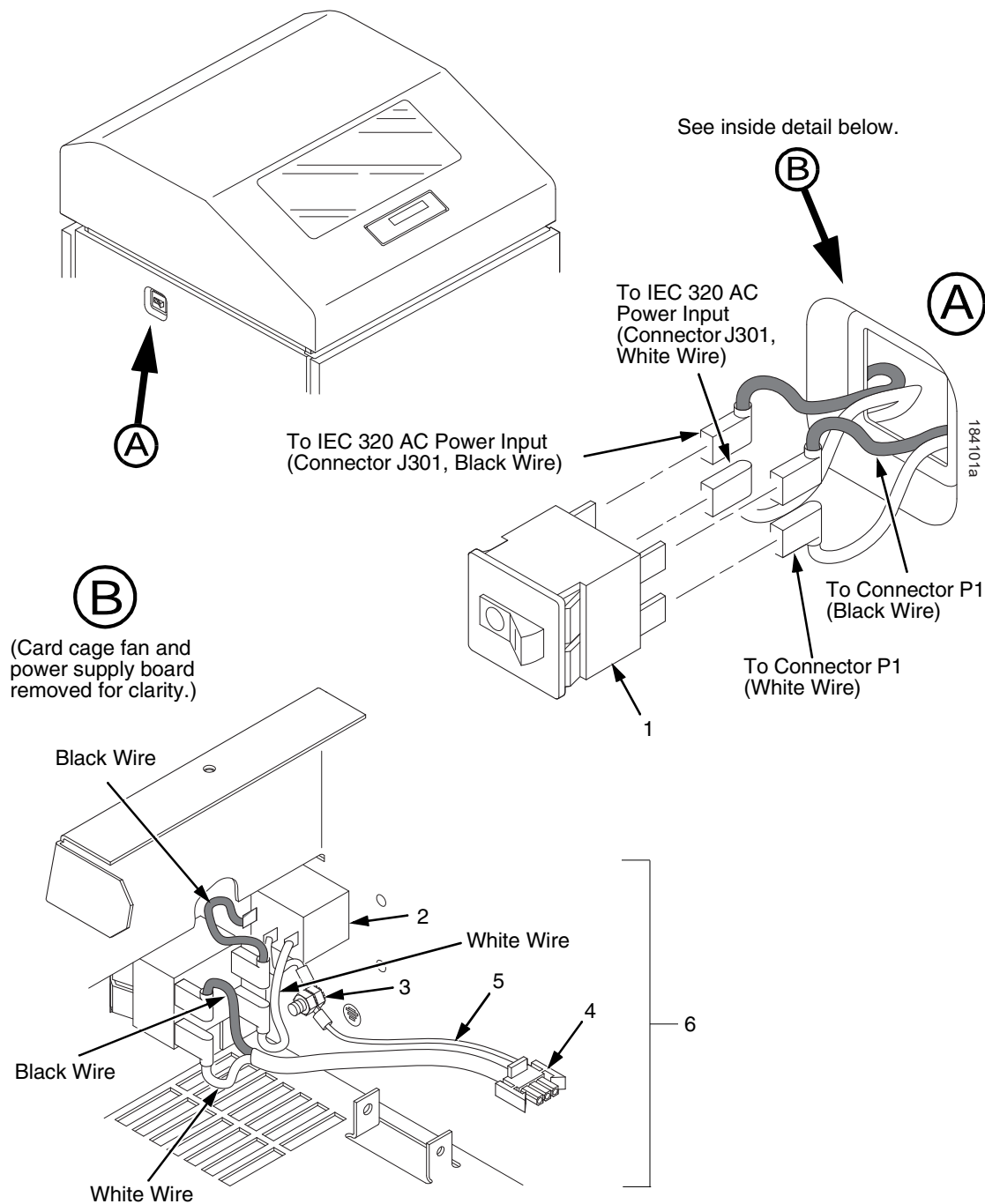
**Figure 51. Circuit Breaker, Cabinet Models**

| Item No. | Part No. (RoHS Compliant) | Description | Notes |
|----------|---------------------------|-------------|-------|
| 1 | 142013-901 | Circuit Breaker | |
| 2 | Ref | IEC 320 AC Power Connector | Connector J301 <br> Part of Field Kit, AC Assy 153502-001 |
| 3 | Ref | Chassis Ground Stud | Part of Field Kit, AC Assy 153502-001 |
| 4 | Ref | Connector P1 | To power supply board connector J1 AC <br> Part of Field Kit, AC Assy 153502-001 |
| 5 | Ref | Cable Assembly, AC-In, Power Supply | Part of Field Kit, AC Assy 153502-001 |
| 6 | 153502-001 | Field Kit, AC Assy | |
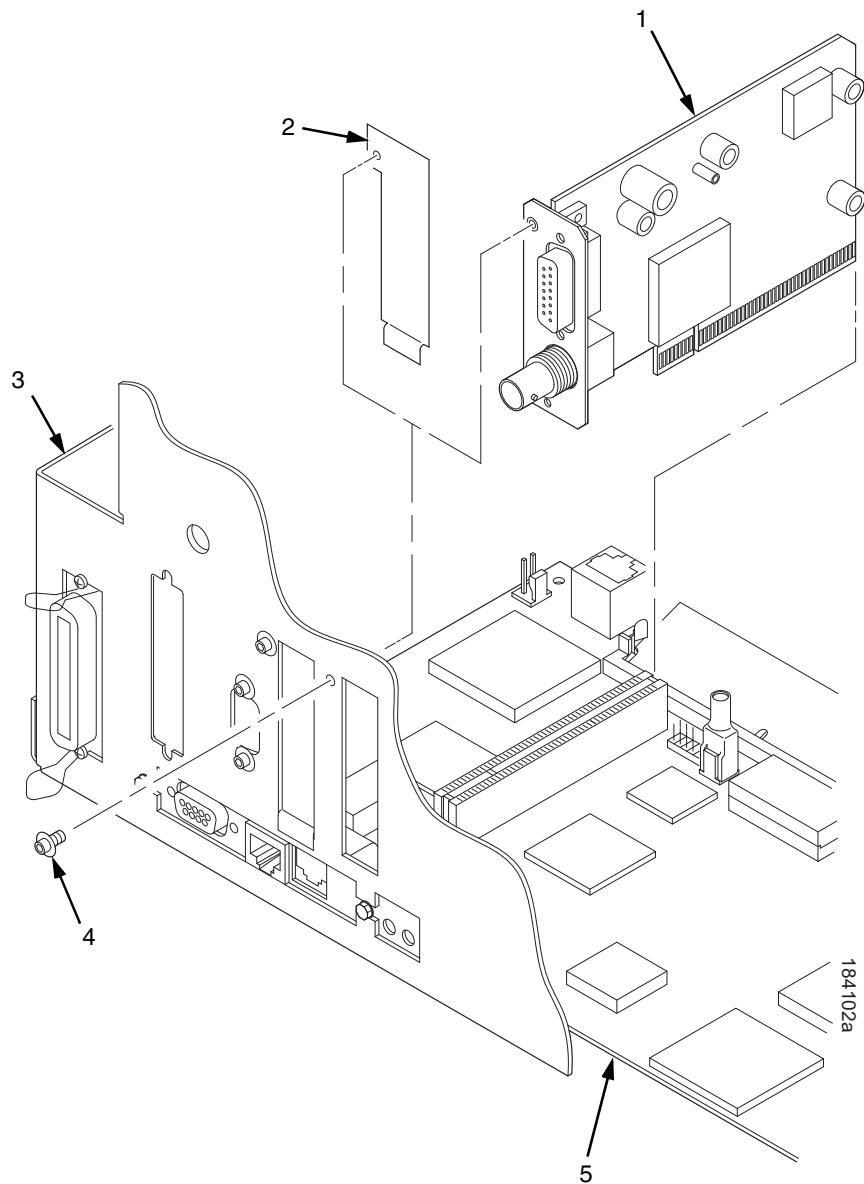
**Figure 52. CT Board**

| Item No. | Part No. (RoHS Compliant) | Description | Notes |
|---|---|---|---|
| 1 | 179913-901<br>179913-991 | Spare PCBA, PCI-CT, V3, LF<br>Spare PCBA, PCI-CT, V3, Adv Exch | |
| 2 | 176257-001 | Plate, PCI Cover | |
| 3 | Ref | Card Cage | |
| 4 | Ref | Screw | |
| 5 | Ref | V5 Controller Board | |

184104a
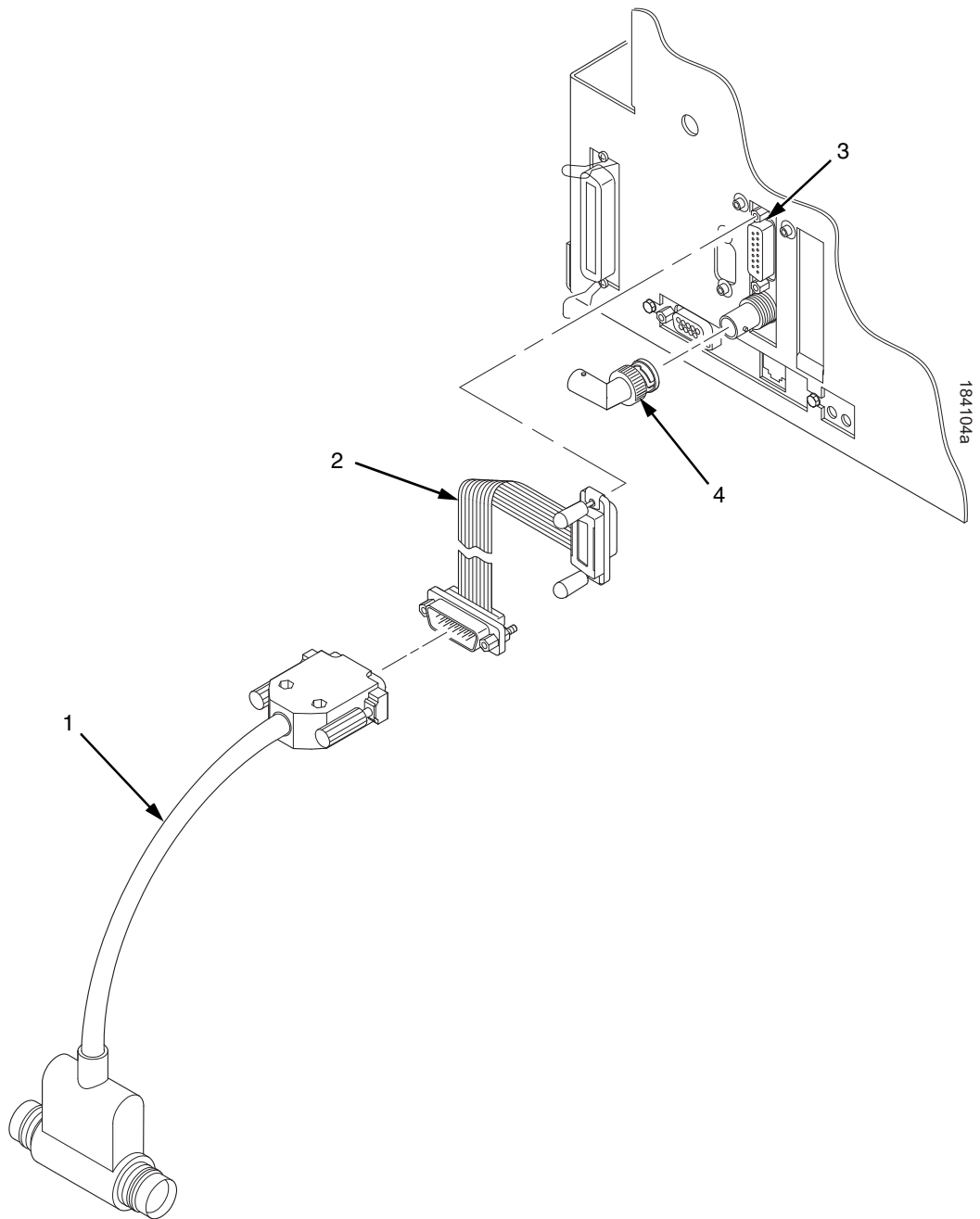
**NOTE:** Twinax is not available on a
V6 controller board with stacker.

**Figure 53. Twinax Extension Cable for Printers with PSA3 V5 Controller, Twinax I/O, and
Power Stacker**

| Item No. | Part No. (RoHS Compliant) | Description | Notes |
|---|---|---|---|
| 1 | 140752-002 | Twinax Auto-Termination Cable ("Smart-T") | |
| 2 | 204806-901 | Cable, Extension, Smart-T | Required in printers with the power stacker so the twinax auto-termination cable will clear the stacker elevator. (See also page 415.) |
| 3 | Ref | PCI-CT Twinax Connector | |
| 4 | Ref | PCI-CT Coax Connector | |
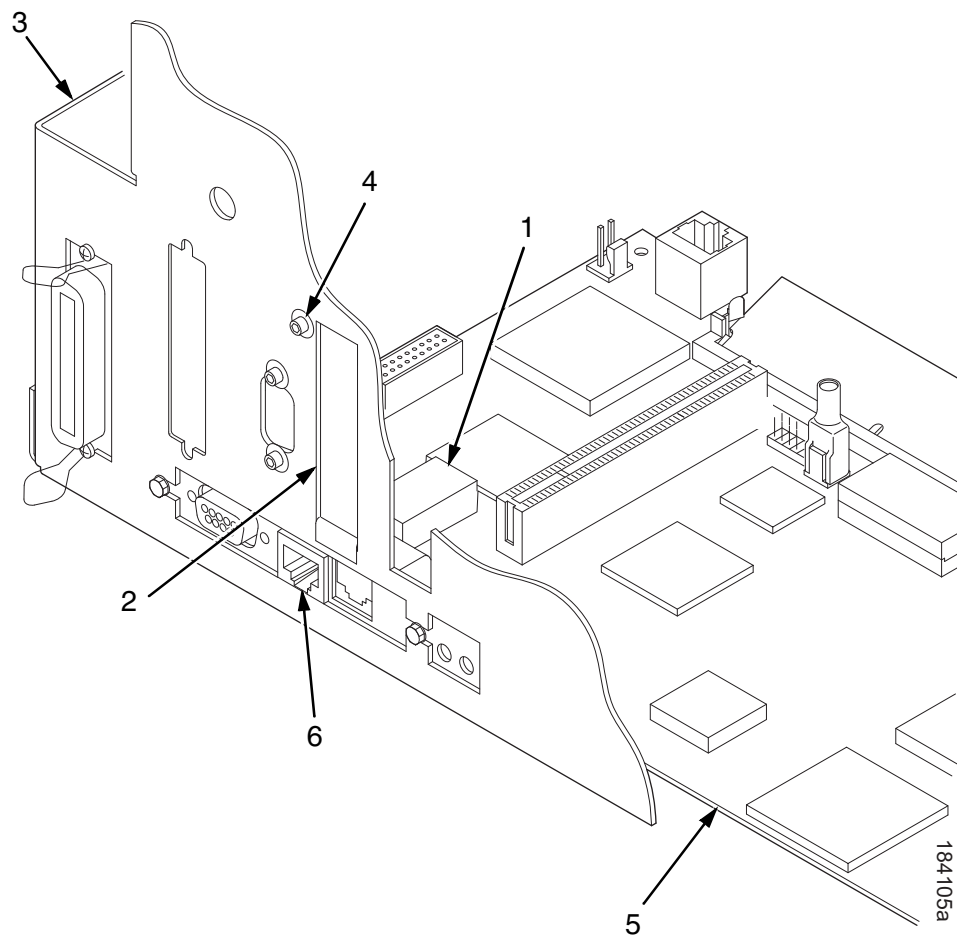
**Figure 54. The NIC (Network Interface Card) on the V6 Controller Board**

| Item No. | Part No. (RoHS Compliant) | Description | Notes |
|---|---|---|---|
| 1 | 250678-901<br>250678-991<br>250675-901 | Spare PCBA, PCI-Network<br>Spare PCBA, PCI-Network, Adv Exch<br>Spare PCBA, PCI Wireless | On the V6 controller board the NIC is part of the board. |
| 2 | 176257-001 | Cover Plate, PCI | |
| 3 | Ref | Rear of Card Cage | |
| 4 | Ref | Screw | |
| 5 | Ref | V6 Controller Board | Ethernet hard wired on V6 controller board. |
| 6 | Ref | Ethernet Port | Ethernet hard wired on V6 Controller Board. To replace port, you must replace the entire V6 controller board. Be sure to transfer the security key. The new board has a new MAC address which is found on the configuration printout. |
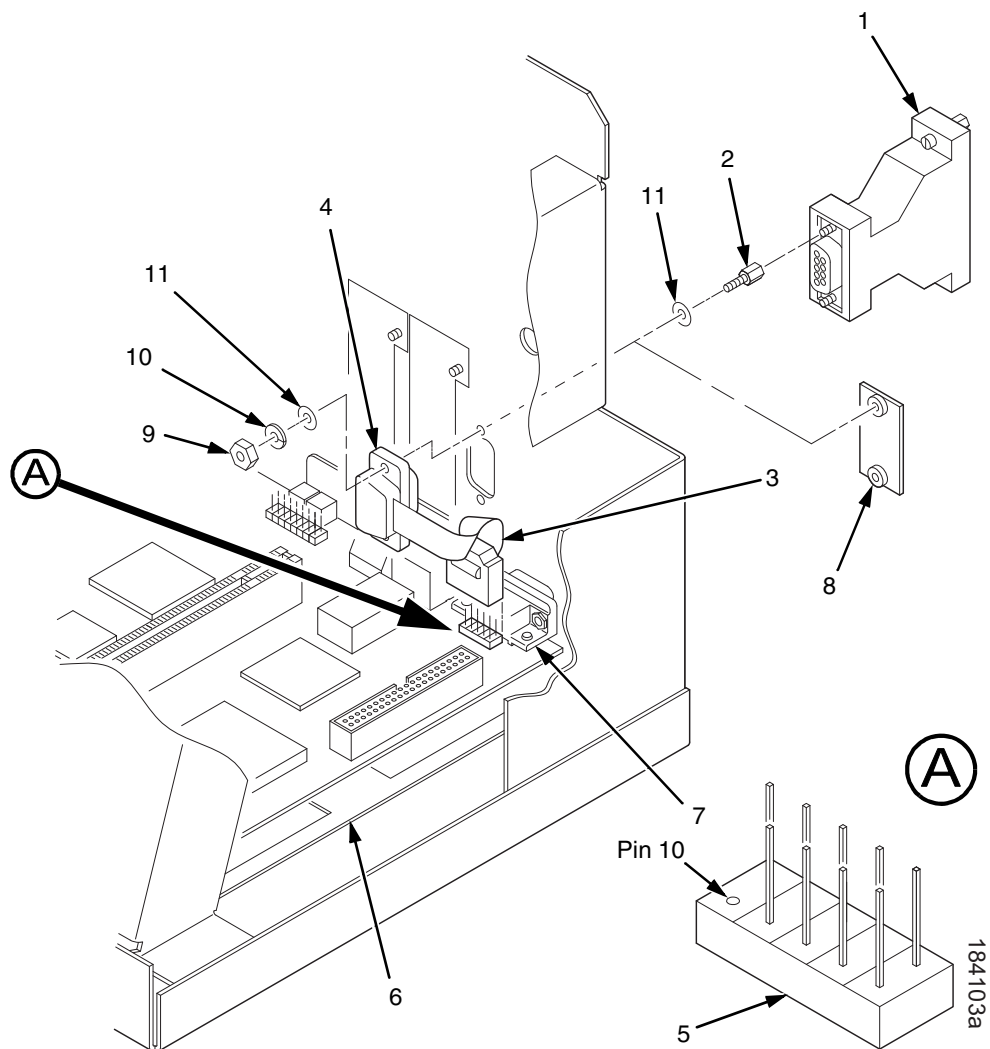
**Figure 55. RS-422 Interface**

| Item No. | Part No. (RoHS Compliant) | Description | Notes |
|---|---|---|---|
| 1 | 179134-901 | PCBA, RS422 ADAPTER, DB9/DB25 | Part of Field Kit 176425-001 |
| 2 | 102922-001 | Screwlock Kit, Female (2) | |
| 3 | 176075-901 | Cable Assembly, RS-422, I/O | Part of Field Kit 176425-001 |
| 4 | Ref | RS-422 Connector, 9-Pin | Part of item 3 |
| 5 | Ref | Connector J15 | Note that there is no Pin 10. If Pin 10 is present, remove it. |
| 6 | Ref | Controller Board | |
| 7 | Ref | Connector J201, RS-232, 9-Pin | |
| 8 | Ref | Cover Plate | |
| 9 | Ref | Nut (2) | Part of item 2 |
| 10 | Ref | Lock Washer (2) | Part of item 2 |
| 11 | Ref | Flat Washer (4) | Part of item 2 |

**Cabinet Model**

1

2

**Pedestal Model**

1

2

184107a
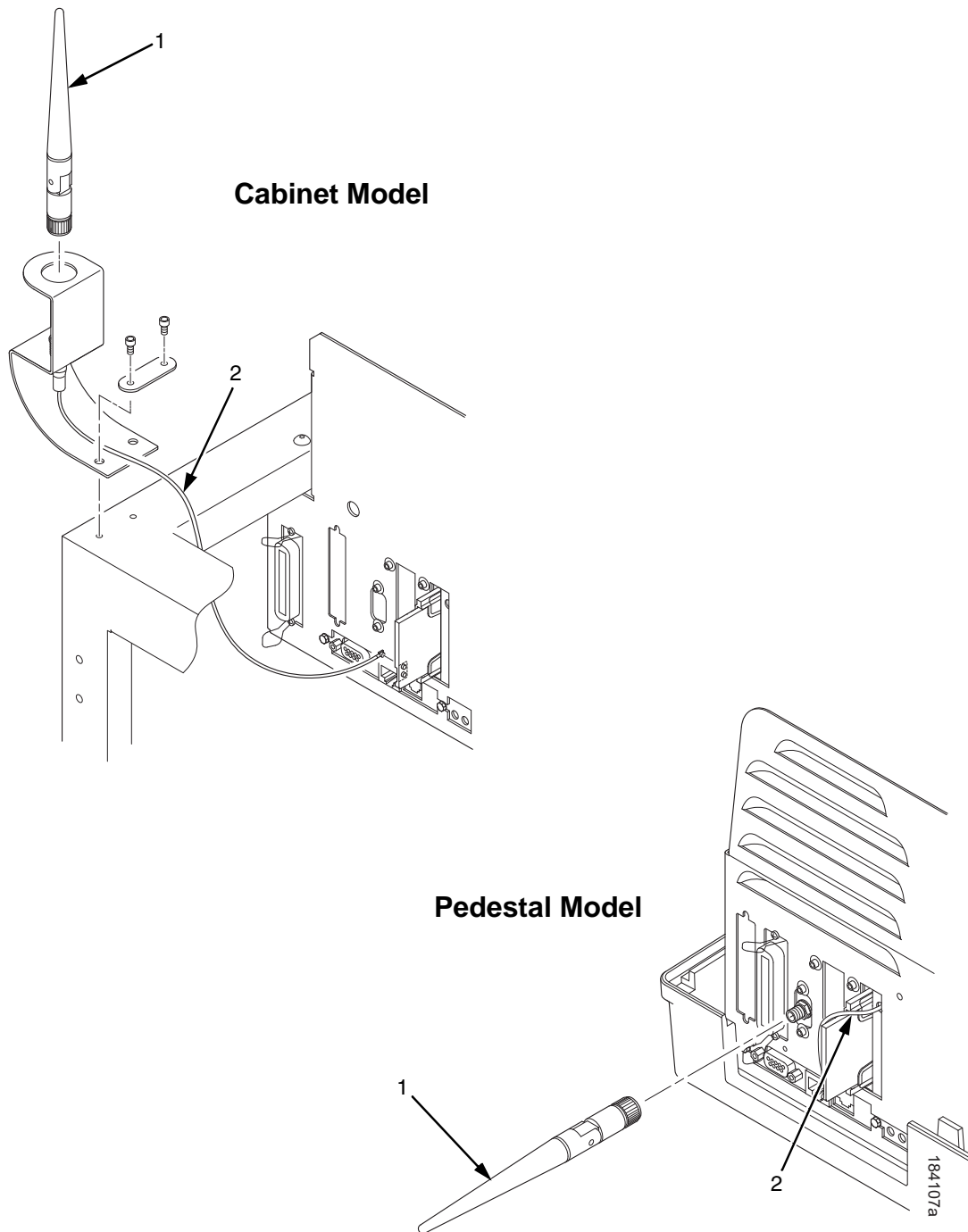
**Figure 56. Dipole Antenna and Cable Used With the Optional Wireless NIC**

| Item No. | Part No. (RoHS Compliant) | Description | Notes |
|---|---|---|---|
| 1 | 179228-001 | Field Kit, Antenna, Fixed Point, Dipole | |
| 2 | 204479-001 | Cable, MMCX-BNC, 10 inch, S24 | |

# 7     *Principles Of Operation*

## Line Matrix Printing

A line matrix printer creates characters and graphics by printing patterns of ink dots an entire line at a time.

Every text character is stored in printer memory as a pattern of dots on a logical grid called the dot matrix. (Figure 57.) The ink dots that appear on the paper are made by a row of hammer springs mounted on a shuttle that sweeps rapidly back and forth. Logic circuits on the controller board divide every line of incoming print data into horizontal dot rows. The hammers put dots at the required positions for the entire line by driving an inked ribbon onto the paper.
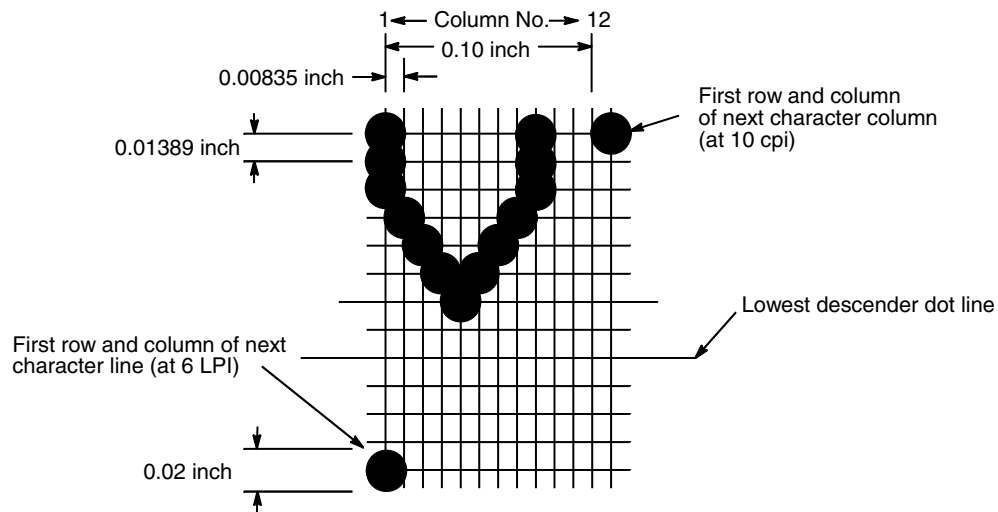
**Figure 57. A Dot Matrix**

When the shuttle reaches the end of a horizontal sweep, it reverses direction, the paper advances upward one dot row, and the hammer springs print the next row of dots as the shuttle moves in the opposite direction. When a line of text characters is completed, hammer action stops and the paper advances to the first dot row of the next print line. The number of dot rows used to separate print lines depends on the vertical line spacing selected by the user.

The dot matrix patterns of text characters vary according to the font the user selects. For example, in the data processing (DP) font at a line spacing of six lines per inch (lpi), a dot matrix contains 12 dot rows from the top of one character line to the top of the next. (Figure 57 and Figure 58.) At eight lpi there are nine dot rows per character line, at nine lpi there are eight dot rows per character line, and so on.

Each individual hammer spring can (and usually does) form more than one character as the shuttle moves horizontally. This principle is illustrated in Figure 59.



* This row is used only for lowercase descenders
** This row is used for underlining and lowercase descenders
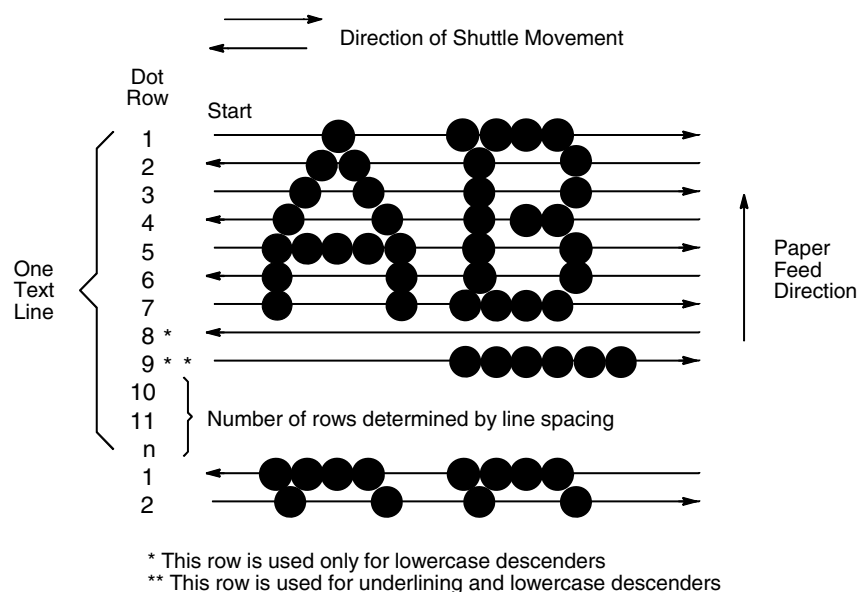
**Figure 58. Standard Character Formation**
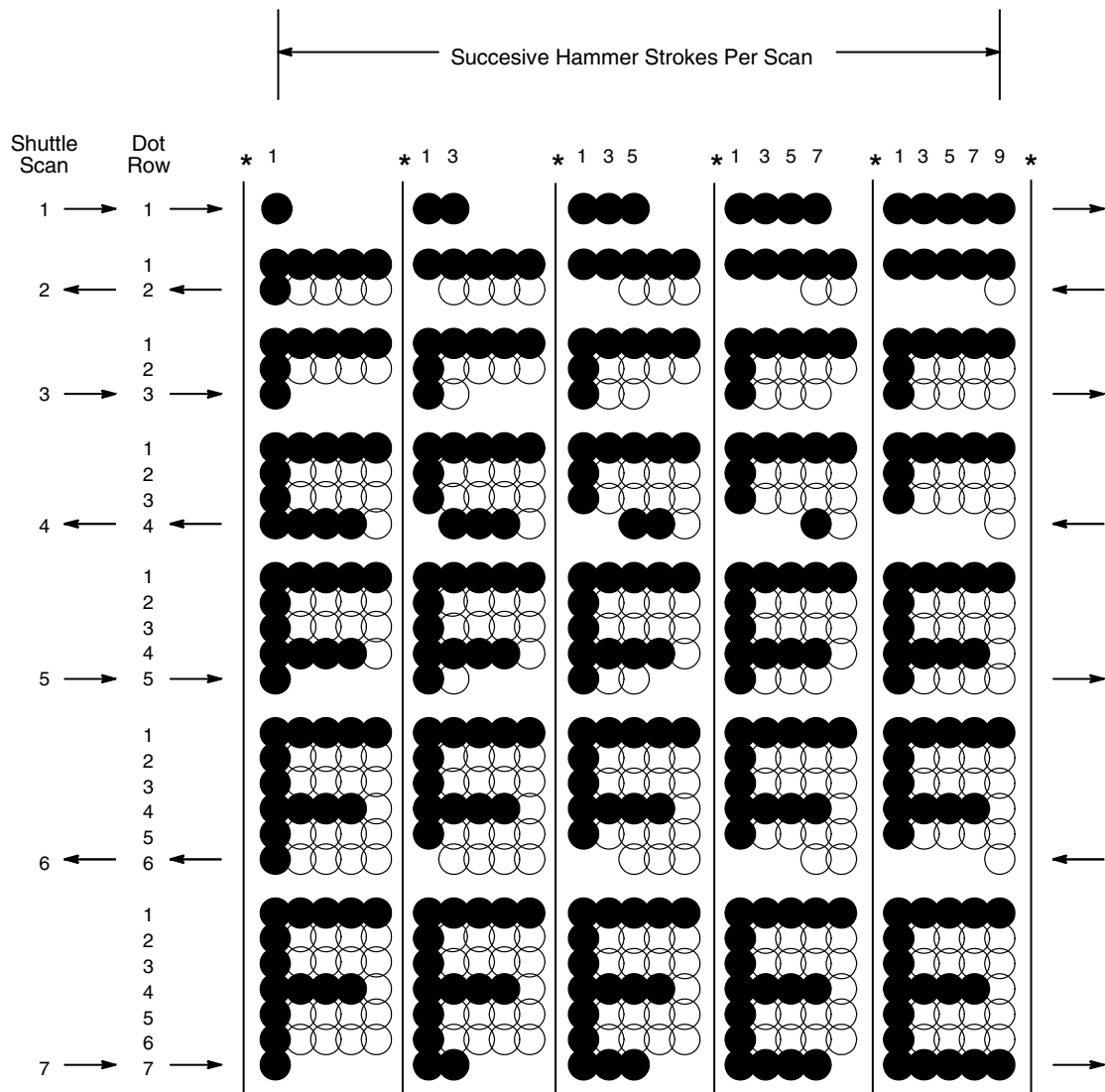
**Figure 59. Typical Action of One Hammer Spring in Text Printing**

# Printing Rates

A line matrix printer prints entire lines sequentially, and measures the printing speed of text in lines per minute (lpm). This is faster than a moving-printhead printer, which prints single characters sequentially and measures its speed in characters per minute (cpm).

Many variables affect printing speed, the main ones being the font and the vertical dot density selected by the user. Lines containing such print attributes as bold or emphasized print, superscripts, subscripts, or elongated characters also reduce print speed, but the speed reduction is never less than half the rate of the same line printed without such attributes. The actual print rate of lines containing these attributes depends on the specific print job, but printer software maximizes the throughput by dynamically determining which dot rows contain adjacent dots and must be printed in two strokes.

The number of characters in a character set has no effect on printing speed.

The printing speed of graphics ("plot mode") is expressed in inches per minute (ipm).

The ability of the printer to feed paper both downward and upward allows the printing of multiple dot densities on a single line. This makes it possible to print forms and text simultaneously and to mix fonts on the same print line. The use of multiple dot densities and reverse paper feed affect printing rates the same way print attributes do.

# Printing Mechanism

While the principles of line matrix printing are easy to state, the act of printing dots accurately from a rapidly oscillating shuttle onto a piece of paper that is moving vertically requires complex timing and coordination between printer logic and the printing mechanism.

The printing mechanism consists of three integrated subassemblies:

- Shuttle Frame Assembly
- Paper Transport System
- Ribbon Transport System

# Shuttle Frame Assembly

The central element of the printing mechanism is the shuttle frame assembly, which houses the hammer bank assembly and the shuttle drive motor. (Figure 60.)

Hammer Bank Assembly

Counterweight

Connecting Rod

Shuttle Frame Assembly

Guide Shaft

18-4040a

Shuttle Drive Motor
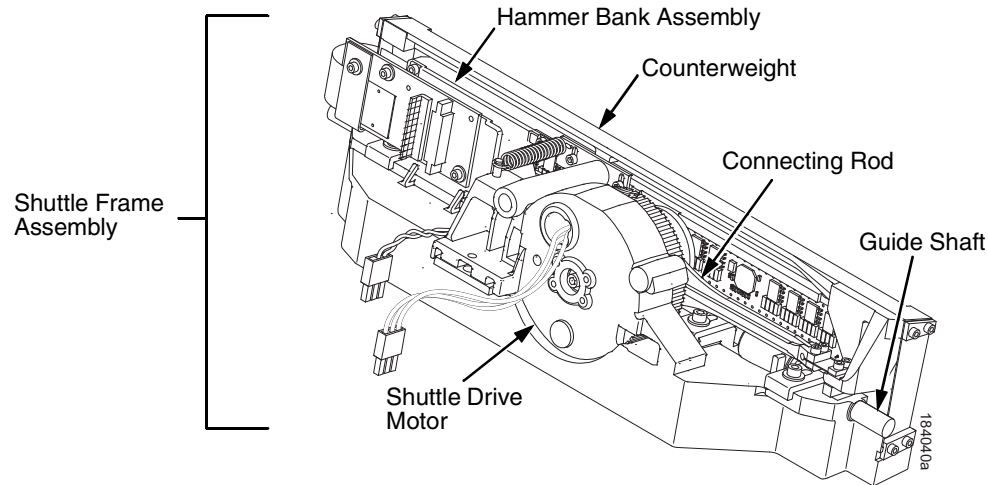
**Figure 60. Shuttle Frame Assembly**

## Hammer Bank Assembly

A number of comb-like hammer spring assemblies are bolted to a solid hammer bank, forming the hammer bank assembly. The number of individual hammers on a hammer spring assembly and the number of hammer spring assemblies attached to the hammer bank vary by printer model:

- Models P7002H, P7002HZT, P7202H, P7005, P7005ZT, and P7205 have seven 4-hammer assemblies, for a total of 28 individual hammer springs.

- Models P7003H, P7003ZT, P7203H, P7010, P7010ZT, and P7210 have six 10-hammer assemblies, for a total of 60 individual hammer springs.

- Models P7006H, P7006HZT, P7206H, P7015, P7015ZT, and P7215 have six 17-hammer assemblies, for a total of 102 individual hammer springs.

- Models P7008H, P7208H, P7220, P7000HD, P7000HDZT, and P7200HD have seven 18-hammer assemblies, for a total of 126 individual hammer springs.

## Shuttle Drive Motor

The shuttle drive motor is built into the shuttle assembly casting and spins a crankshaft, to which are attached the big ends of two connecting rods. (Figure 60.) The small end of one connecting rod attaches to the hammer bank; the small end of the other connecting rod attaches to a counterweight frame surrounding the hammer bank. (The hammer bank and the counterweight constitute the shuttle assembly.) The shuttle drive motor, acting through the crankshaft and connecting rods, converts rotary motion to linear and opposing motion of the hammer bank and counterweight, in an arrangement similar to that of a horizontally-opposed gasoline engine. Mechanically, this design achieves the same benefits as that type of engine: perfect primary balance, low vibration, and durability.

Each hammer spring is a stiff leaf spring with a cylindrical tungsten carbide tip attached to the free end. (Figure 61.) A powerful permanent magnet is imbedded along the length of the hammer bank and acts on the hammer springs through individual pole pieces. The pole pieces magnetically attract and hold the free end of the hammer spring under tension. This is called the retracted state.



Tungsten Carbide Hammer Tip

Hammer Bank Assembly: Coils, Magnet, Pole Pieces, Hammer Spring Assemblies

Hammer Spring Assembly

**NOTE**: P7X06H/P7X15 hammer bank shown.

Alignment Pin

184106a
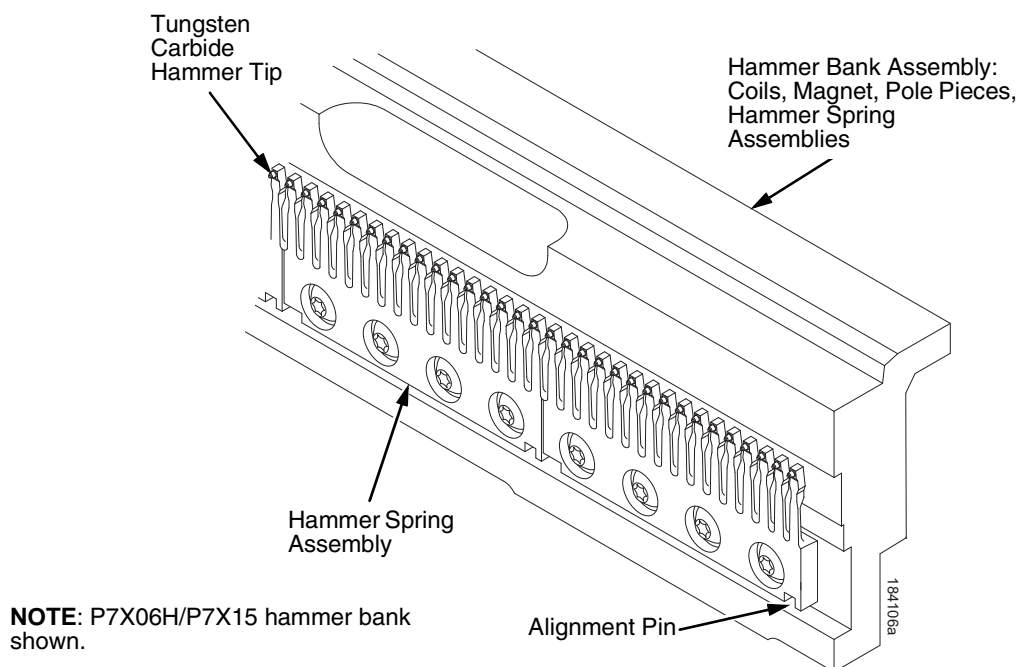
**Figure 61. Hammer Springs and Hammer Bank (Detail)**

Two electromagnetic coils are mounted behind each hammer and wound around each pole piece. The coils are normally de-energized. When hammer driver logic determines that a hammer must print a dot, a current pulse energizes the coils behind the hammer. The polarity of the resulting magnetic field opposes the field of the permanent magnet, canceling the magnetic attraction and releasing the hammer, which springs forward, striking the ribbon and paper and leaving an impression of its tip (a "dot") on the paper.

While the hammer is in flight the coils are de-energized and their magnetic field collapses, restoring the magnetic attraction of the permanent magnet in the hammer bank. After striking the ribbon and paper, the hammer rebounds and is recaptured by the permanent magnet. When the shuttle reaches the end of a sweep, it reverses direction, the paper is micro-stepped upwards one dot row, and the hammer springs print the next row of dots as the shuttle sweeps in the opposite direction. All this happens extremely rapidly: hammer re-firing in a 2000 lpm printer, for example, takes about 419 microseconds, with the vertical paper movement between dot rows occurring in 2.10 milliseconds.

# Paper Transport System
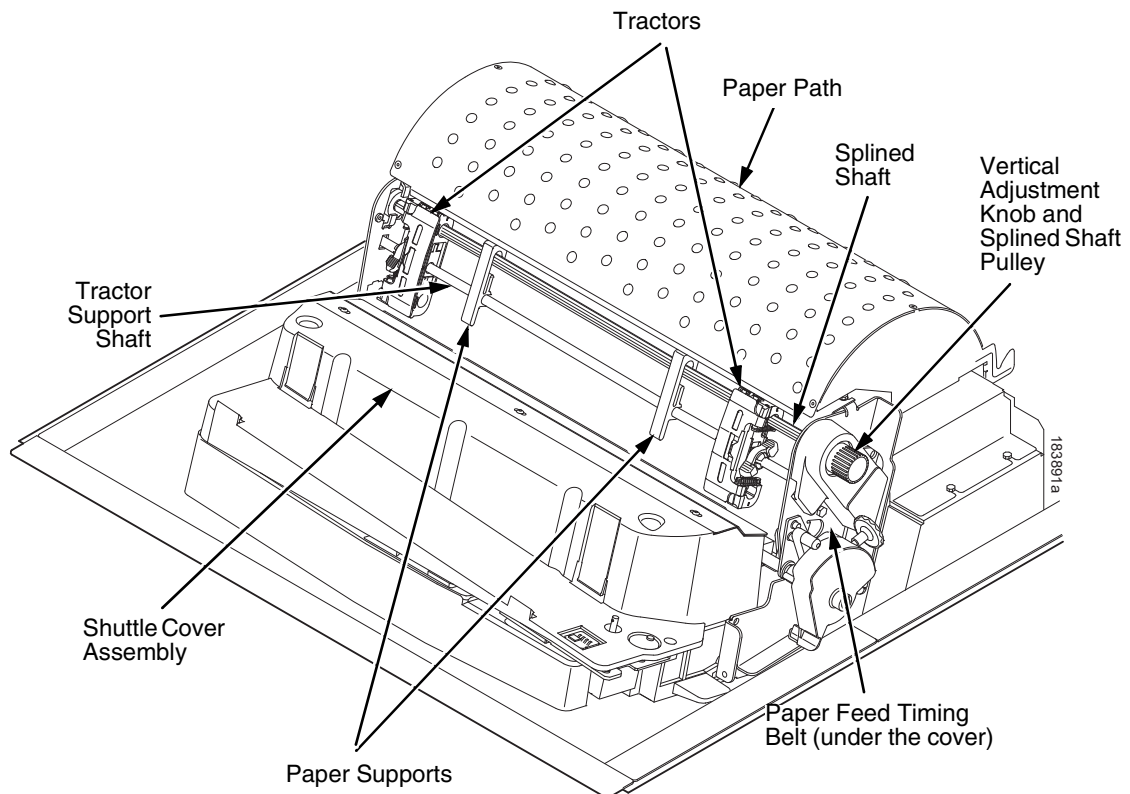


**Figure 62. Paper Transport System**

A two-phase DC stepper paper feed motor, directed by the engine controller (EC) on the controller board, drives two tractor sprockets by means of a toothed belt linked to a pulley on the splined shaft. The stepper motor permits extremely accurate vertical paper movement in 1/72 inch increments. This drive configuration is designed for continuous, fan-folded paper from 3 to 17 inches wide and 1 to 6 sheets thick. To reverse paper movement (that is, move it downward) a second motor opens and closes the platen by means of a toothed belt linked to a pulley on the platen shaft. Opening the platen

prevents paper jams when paper direction is reversed after viewing the print area, setting top of form, or allowing applications to overprint forms.

Paper is positioned horizontally using the tractors. Each tractor is locked in position with a friction lock and engages the paper perforations with six sprocket pins.

The vertical adjustment knob is used to position paper vertically by hand.

# Ribbon Transport System
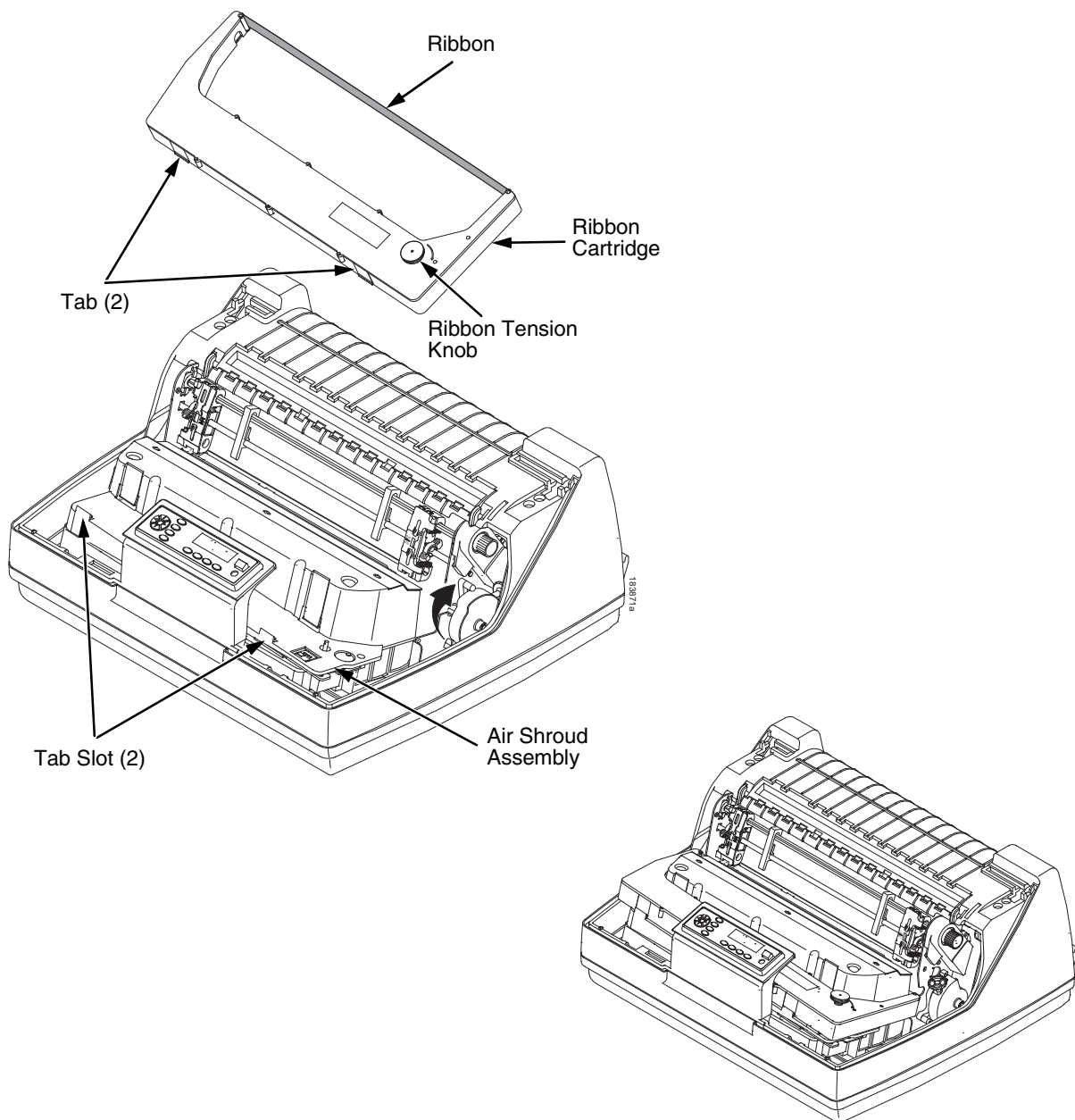


**Figure 63. Ribbon Cartridge System**

# Integrated Print Management System

The P7000 CRP has a new feature that automatically monitors and communicates the status of the ribbon life to help the operator know when to change ribbons. Using an ink delivery system called the Cartridge Ribbon System (CRS), the printer can automatically detect when a new or used ribbon is loaded, and all ribbon properties. The ribbon is contained in a plastic box (the cartridge) and feeds only in one direction. The CRS contains an interface board that allows communication between the printer and the cartridge. Using the CRS, the P7000 CRP automatically detects when a new or used ribbon is installed and determines the ribbon's length, ink color, and expected yield.

## Operation

The ribbon life, starting from 100% when new and decreasing to 0% when depleted, is always displayed on the control panel.

When the ribbon life reaches 2%, a warning message "RIBBON UNDER 2%/ Change RBN soon" appears on the control panel display. The control panel status indicator lamp flashes. The printer will continue printing in this condition until the ribbon life reaches 0% at which time, printing will stop. The ribbon may be changed at any time while the printer is in the "RBN END POINT/ Change Ribbon" condition without losing data in the printer's buffer. If a new ribbon is loaded, the system automatically detects the change, clears the condition when the platen is closed, and restarts the life at 100%. If a partially used ribbon is loaded, the system continues the life at the percentage indicated for the used ribbon.

Ribbon usage information is calculated by maintaining a count of impressions (dots) that is stored on the ribbon cartridge and updated periodically so that the cartridge can be used on a different printer with the information intact. This allows the system administrator to have precise control over print quality and consumable costs. The accurate presentation of available ribbon life allows for efficient planning of print jobs. For example, if the displayed ribbon life were low, you can install a new ribbon before printing a large print job.

The default settings for the Integrated Print Management System are enabled at the factory, and the system functions without intervention as long as genuine Printronix ribbon cartridges are used and the Integrated Print Management options have been set. The user can change settings, as discussed later in this section.

### Control Panel Menus

Two Integrated Print Management System options are located in the QUICK SETUP, PRINTER CONTROL, and ADVANCED USER menus. (The *User's Manual* explains how to navigate the menu system and has complete menu maps.) From either the QUICK SETUP or the PRINTER CONTROL menu you can adjust the Ribbon End Point. From the ADVANCED USER menu you can set the Ribbon Action option. These options are discussed below.

### Ribbon End Point

Factory default is Normal. This value corresponds to the life expectancy of an authorized ribbon. The Integrated Print Management System tracks ribbon life to the recommended end point before declaring RIBBON INK LOW or RIBBON INK OUT. Ribbon End Point is a global setting, which means it is in effect for all printer configurations and cannot be set for individual printer configurations.

By changing this setting, you specify a point lower or higher at which the "RIBBON INK LOW" or "RIBBON INK OUT" message will display. You can thus set ribbon life to match the required print density for a specific application. To change this setting, press the **LEFT** or **RIGHT ARROW** key to select either "Darker +1" through "Darker +6" (**LEFT ARROW**) or "Lighter -1" through "Lighter -10" (**RIGHT ARROW**). Each increment or decrement corresponds to a predetermined density value. Pressing **LEFT** or **RIGHT** changes the value by one increment per key press. The second line of the display changes to show the action taken. Press **ENTER** to select the desired level.

The changed setting will remain in effect until it is adjusted again. If a different type of ribbon is installed, the density setting will remain as selected, but the end of life value for the new ribbon type will be used.

Changes to Ribbon End Point setting can be made at any time during a ribbon's life, and the new end point will be calculated accordingly.

### Ribbon Action

Factory default is Stop At RBN End. When the ribbon life reaches 0%, the message "RIBBON INK OUT / Install New RBN" displays on the control panel. The status lamp flashes, the alarm sounds (if enabled), printing stops, and the printer enters the fault state. Printing cannot resume until this condition is cleared. To complete a print job in progress, you can return the printer to ONLINE state by pressing **ONLINE / CLEAR**. This allows the printer to continue printing for approximately two minutes, at which point the printer will go into the fault state again. You can print for another two minutes by again pressing **ONLINE / CLEAR**. You can repeat this routine indefinitely, or until power to the printer is turned off. Once power is restored and a depleted ribbon is detected, "OLD RIBBON / Install New RBN" displays. A new ribbon must be installed to clear this condition.

When Ignore RBN End is selected, the ribbon life display remains on the control panel, and the Integrated Print Management System continues to monitor ink consumption to the appropriate value as set by the Ribbon End Point . When this end point is reached, the display will continuously show "RIBBON LIFE 0%" and the system will continue to run with no other warning indications. The printer can be taken OFFLINE or the power cycled and the Integrated Print Management System will permit the use of this ribbon. However, when the ribbon reaches the calculated absolute end of life, the printer stops printing, the status indicator flashes, the alarm sounds (if enabled), and the display switches to the "EXCESS RBN WEAR / Install New RBN" message. This fault cannot be cleared by pressing **ONLINE / CLEAR**. It can only be cleared by opening the platen or cycling power, at which time the ribbon will now be detected as a depleted ribbon. A new, recognized (authorized) ribbon must be installed to clear this fault.

## Ribbon Installation and Detection

Previously used ribbons can be installed and used again to print, as long as they were not fully depleted and declared RIBBON INK OUT.

# Logical Control of the Printer

The printer consists of four subsystems: the control panel, the controller board, the power supply board, and the print mechanism, as illustrated in Figure 64.

**Power Supply**

**Controller Board**

**Print Mechanism**
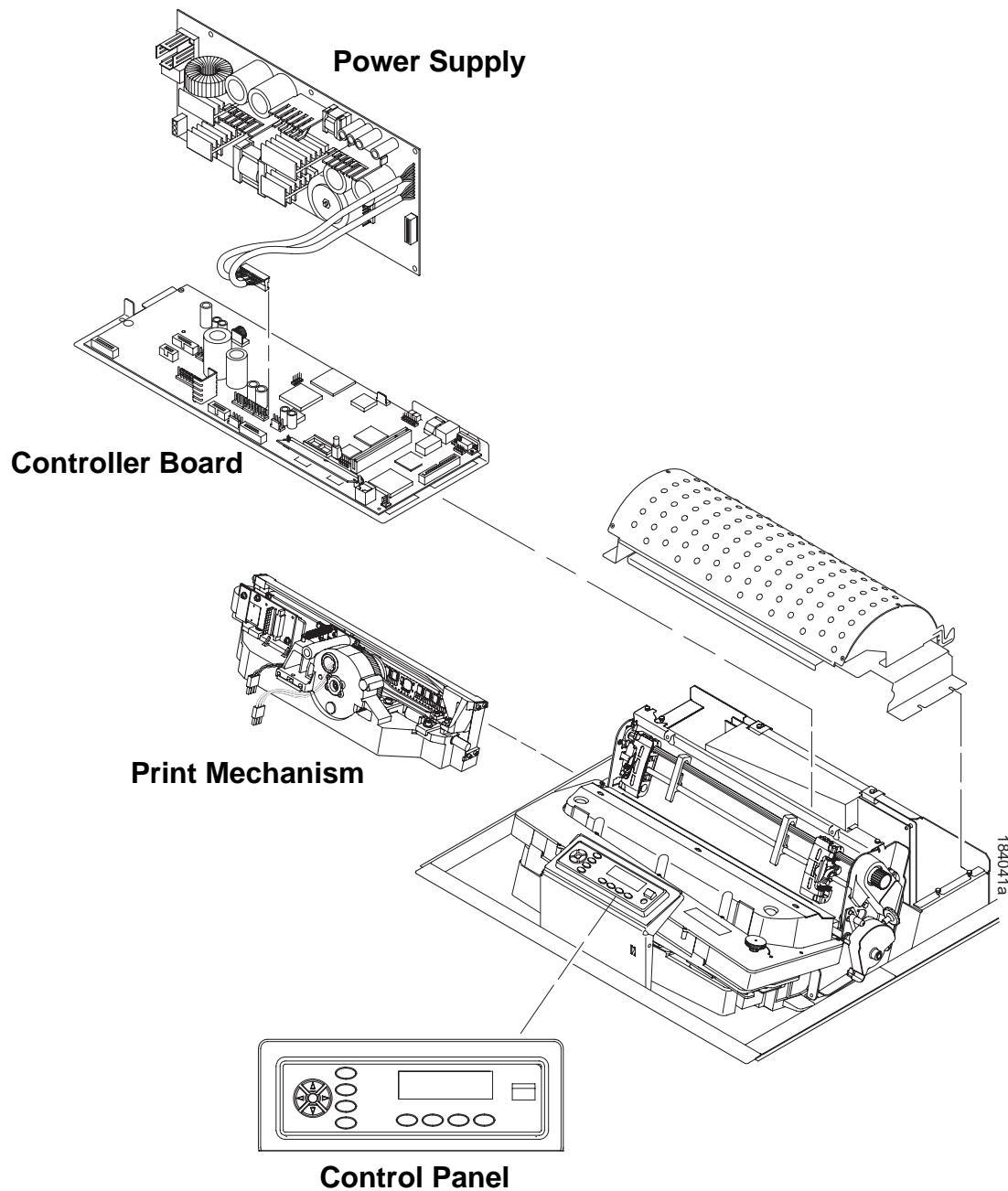
**Control Panel**

**Figure 64. Functional Elements of the Printer**

# Control Panel

The user communicates with the printer by pressing keys on the control panel. The keys are momentary contact switches. The control panel processes and sends key closure information to the controller board and displays information from the controller on the LCD. A status indicator next to the LCD also conveys printer status information to the user.

The LCD, status indicator, and keys are mounted on a printed circuit board assembly enclosed in a protective housing. The functions of the keys and indicators are defined on page 32.

**Control Panel**



• Data

• Control

• Key (Switch) Closures
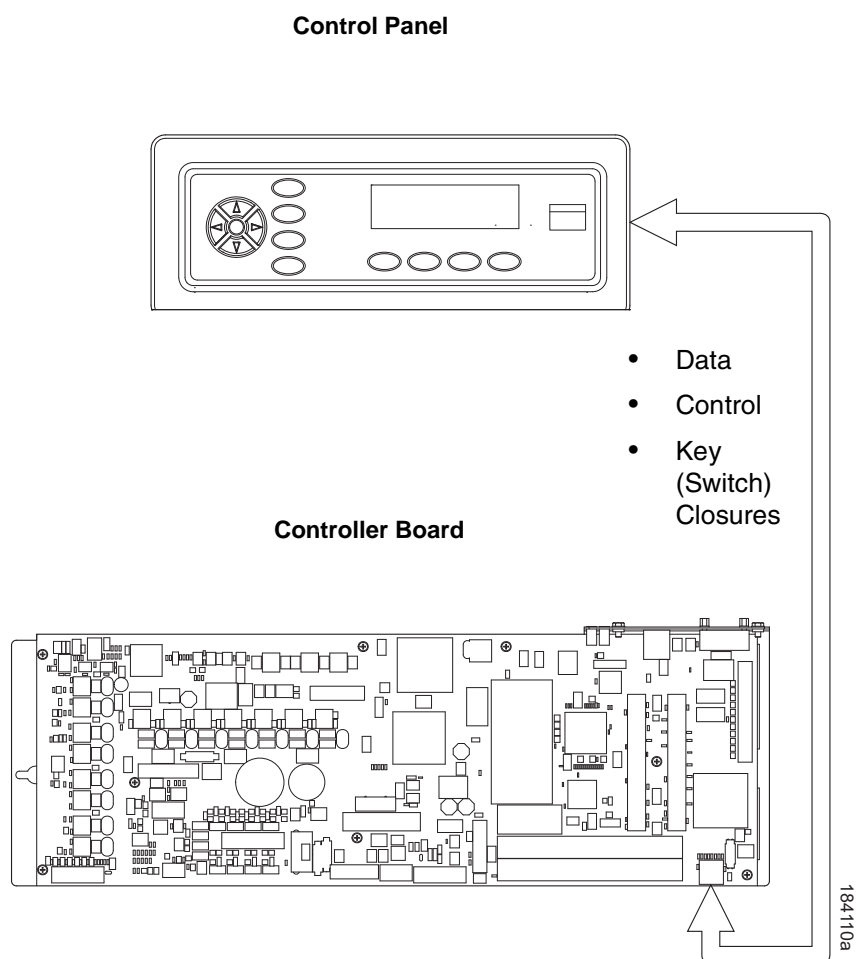
**Controller Board**

**Figure 65. Control Panel Functional Overview**

# Controller Board

The heart of a P7000 CRP printer is the "Hurricane" V6 controller board, which controls all printer functions and supports all P7000 models.

The controller board receives and processes all data from the host computer, builds the printable images, controls all motors, and drives the hammer springs. Except for the power supply, all logic and drive circuitry for the printer are contained on the controller board.

The controller board consists of two functional units: the DC (Data Controller) and the EC (Engine Controller).

The DC is responsible for:

- Host Input/Output (I/O)

- Operator I/O

- Security Interface

- Print Image Generation

- Overall High Level (Logical) Control

The EC is responsible for:

- Operating the print mechanism

- Monitoring the print mechanism for faults

- Power shutdown and power saving modes

The EC and DC communicate through semaphore registers. The DC receives input from the host and operator and returns dot images and LCD messages to buffers in memory. Image data are passed to the EC upon request, are processed, then sent to the hammer bank. The EC synchronizes paper, ribbon, platen, and shuttle motion as it feeds dot data to the hammer drivers. Figure 66 summarizes this architecture.

**Figure 66. Controller Board Block Diagram**

# Power Supply Board

The printer's power supply is on a printed circuit board mounted on the rear wall of the card cage. The power supply automatically senses and adjusts to any commercial electrical system that provides AC mains potential in 50 or 60 Hertz systems. This means the printer can operate anywhere in the world on local commercial power.

The power supply converts alternating current (AC) to direct current (DC) at three voltage levels and sends the DC voltages to the controller board. The controller board distributes all DC power to the logic and electromechanical circuits.

## AC Power

The power supply operates on AC voltages ranging from 88 volts to 270 volts. It can tolerate variations in frequency of 47 to 63 Hz. The power supply is designed to withstand an AC input overvoltage of 300 VAC for one second with no degradation of DC output voltage or damage to printer circuits.

## DC Power

The power supply board contains two DC power supply systems for the printer. The first is a +5 V bus for logic. The second consists of +48 V and +8.5 V buses for the hammer bank and motors.

The +5 V supply has an isolated return line that connects to the +48 V return at the printer load. Both returns are tied together in a one-point ground. The +5 V power supply has its own inverter, separate from the +48 V and +8.5 V outputs.

There is an opto-isolated input on the power supply that will shut down and latch off the +48 V and +8.5 V supplies unless it is pulled up to +5V with a 1K Ω resistor. This resistor is mounted on the controller board and may be pulled down or disconnected by software or internal cable interlocks. The +5 V output will remain stable for reporting and latching the fault condition. The return for this signal is the +5 V return. In addition, this shutdown circuit discharges and latches the +48 V down to a level lower than +15 V in less than 200 milliseconds and requires recycling of the circuit breaker (On/Off switch) to reset the latch.

Loss of +48 V is seen by the EC and reported as a fault.

# Printer Interface

The printer interface is the point where the data (signal) cable from the host computer plugs into the printer. The printer interface processes all signals and data to and from the host computer.

The printer supports a number of standard and optional interfaces to the host: computer:

• Centronics parallel (standard)

• IEEE 1284 parallel (standard)

• EIA®-232-E serial (standard)

• EIA-422-B serial (standard, but requires 9-pin/25-pin interface adapter kit)

• CT (Coaxial/Twinaxial) (optional)

• 10/100Base-T Ethernet Network Interface Card (NIC) (optional)

Selection of the interface is controlled by configuration menus accessed at the control panel. It is possible to physically connect more than one interface, but only one interface may be electrically active at any given time.

# Graphics

The *VGL Advanced Graphics* programming language (a QMS graphics emulation) and the *PGL Advanced Graphics* programming language (a Printronix IGP emulation) are options that install in flash memory on the controller board.

These programming languages simplify the job of creating forms, bar codes, logos, expanded characters, and other graphics. The languages enable the printer to print sideways, upside down, and to make forms combining graphics, alphanumeric data, and bar codes—all in a single pass. Documents explaining configuration, operation, and programming are included with each option.

# A    *Wire Data*

**NOTE:** Abbreviations, acronyms, and signal mnemonics are defined in Appendix B (page 439).

# Interconnection Diagram

## Cable Routing, Cabinet Model

NOTE: P7220 model uses a unique power supply. See page 408.

Weld Sensor Cable

184042a

Exhaust Fan

**Cable Routing, Pedestal Model**

Exhaust Fan

Weld
Sensor Cable

184043a

## Main Wire Harness Test Tables

### P106 Connector

| 19 17 15 13 | 11 9 | 7 5 3 1 |
|---|---|---|
| POD | CCF | PLAT M |
| PMD | SP2 | SP4 |

20 18 16 14   12 10   8 6 4 2 ← Pin No.

Connectors are viewed from the top, as seen when plugged into the controller board. For connector assembly and disassembly, see page 285.

### P107 Connector

| 19 17 | 15 13 | 11 9 | 7 5 3 1 |
|---|---|---|---|
| MPU | PLO | EHF | ★ ★ |
| SP4 | | HBF | RIB M |

20 18  16 14  12 10  8 6 4 2

Resistance

| Device | P106 Pins | Normal |
|---|---|---|
| SP4 | 2, 4 and 6,8 | |
| PLAT M | 1, 3 and 5, 7 | 1.35 - 1.65 Ω |
| SP2 | 10, 12 | Open across pins Short across post |
| CCF | 9, 11 | 4.6 KΩ |
| PMD | 14, 16 18, 20 | 8 Meg Ω Open |
| POD | 13, 15 17, 19 | 8 Meg Ω Open |

CCF = Card Cage Fan
PLAT M = Platen Open Motor
PMD = Paper Motion Detector (Switch)
POD = Paper Out Detect (Switch)
SP2 = 2 Position Spacer
* * * = 4 Position Spacer

Resistance

| Device | P107 Pins | Normal |
|---|---|---|
| RIB M | 2, 4 and 6,8 | |
| * * | 1, 3 and 5, 7 | 0.417 - 0.681 Ω |
| HBF | 10, 12 | 2.7 KΩ |
| EHF | 9, 11 | 4.6 KΩ |
| SP4 | 14, 16 and 18, 20 | Open across pins Short across post Continuity: switch closed Open: switch open |
| PLO | 13, 15 | Continuity: switch closed Open: switch open |
| MPU | 17, 19 | 670 Ω |

EHF = Exhaust Fan
HBF = Hammer Bank Fan
MPU = Magnetic Pickup
PLO = Platen Open (Switch)
RIB M = Ribbon Motor
SP4 = 4 Position Spacer
* * = Spacer for 20 only
   = PAPRM for 05, 10, 15

J106                  J107

**MOTOR NOTES**:

**All Motors:** Use the table values to test for winding continuity and for no shorts between winding and the motor frame. Rotate the motor by hand and test for shorts; replace the motor if you find any shorts.

**Shuttle Motor** = approx. 0.7 - 0.8 Ω per phase, except for the P20Q printer, which shows 0.42 Ω per phase. Use this value to test for winding continuity and for no shorts between windings and the motor frame. Rotate the motor by hand and test for shorts; replace the shuttle frame assembly if you find any shorts.

**All fans** have brushless DC motors powered by solid-state circuits and controlled by feedback from a fan rotor position Hall Effect sensor. Fans driven by +48V measure 4 - 5 KΩ. Fans driven by +24V measure 2 - 3 KΩ. A very low reading can mean one of the winding drive transistors is shorted. An open circuit could indicate defective fan electronics or an open cable. Fans will run whenever +48V is present; failure to run can mean a defective cable, connector, or current sense resistor on the controller board. An open circuit current sense resistor (on the controller board) will prevent the fan from running but will not allow software to detect the fault.

## V6 Controller Board



**CAUTION**: Do not try to remove or replace the NVRAM. The NVRAM contains a lithium battery that can explode if replaced incorrectly. NVRAM is replaced only at the factory.

252917

Power Supply
J101

| 1 | N TEMP HI |
| 2 | N STDBY |
| 3 | VCC1 |
| 4 | |
| 5 | 100 PF / .01µF / 10 µF |
| 6 | 10% / 10% / 10% |
| 7 | 50V / 100V / 16V TANT |
| 8 | |
| 9 | |
| 10 | |
| 11 | +8.5V / +48V |
| 12 | |

470 PF
10%
50V

470 PF
10%
50V

Motor Sensor Left
J106

| 1 | PLAT 1 |
| 2 | RIB L1 |
| 3 | PLAT 2 |
| 4 | RIB L2 |
| 5 | PLAT 3 |
| 6 | RIB L3 |
| 7 | PLAT 4 |
| 8 | RIB L4 |
| 9 | CC FAN + |
| 10 | L RBN POST + |
| 11 | CC FAN - |
| 12 | L RBN POST - |
| 13 | POD A |
| 14 | PMD A |
| 15 | POD K |
| 16 | PMD K |
| 17 | POD C |
| 18 | PMD C |
| 19 | POD E |
| 20 | PMD E |

+48V

.01µF
10%
100V

Motor Sensor Right
J107

| 1 | PF 1 |
| 2 | RIB R1 |
| 3 | PF 2 |
| 4 | RIB R2 |
| 5 | PF 3 |
| 6 | RIB R3 |
| 7 | PF 4 |
| 8 | RIB R4 |
| 9 | EXH FAN + |
| 10 | |
| 11 | EXH FAN - |
| 12 | BANK FAN |
| 13 | PLAT OPEN SW |
| 14 | R RBN POST + |
| 15 | PLAT OPEN RET |
| 16 | R RBN POST - |
| 17 | MPU - |
| 18 | NC |
| 19 | MPU + |
| 20 | COVER OPEN RET |

+48V

.01µF
10%
100V

399

# V6 Controller Board (continued)



**Hammer Bank Logic**

J108

| Pin | Signal |
|-----|--------|
| 1 | |
| 2 | HMR DAT |
| 3 | HMR DAT RET |
| 4 | HMR CLK |
| 5 | HMR CLK RET |
| 6 | CMD DAT |
| 7 | CMD DAT RET |
| 8 | CMD CLK |
| 9 | DMD CLK RET |
| 10 | |

COIL 50 MHz  +10V SW

.01µF 10% 50V

COIL 50 MHz

**EC Diagnostics**

J120

VCC

10K 1% 0.1W

0 Ohm 0.125W  EC BOOT STRAP

| Pin | Signal |
|-----|--------|
| 1 | C167 DB TXD |
| 2 | C167 DB RXD |
| 3 | |
| 4 | C167 NCS1 |
| 5 | PPR TRIG |
| 6 | PPR MOVING |
| 7 | FT EVENT |
| 8 | MPU OUT |
| 9 | SHUT DIR |
| 10 | |

**Hammer Bank Power**

J105

| Pin | Signal |
|-----|--------|
| 1 | PH1 |
| 2 | PH2 |
| 3 | PH3 |
| 4 | PH4 |
| 5 | LDFB |
| 6 | |
| 7 | |
| 8 | |
| 9 | |
| 10 | |

3300 PF 5% 100V  3300 PF 5% 100V  3300 PF 5% 100V  3300 PF 5% 100V

252917

400

# V6 Controller Board (continued)



J1

J16    J23

J8

252917

J28

J20

J4

J25

Cartridge Interface Board
Sensor

J122

```
1
2 ——— BC DATA
3 ——— COVER OPEN
4 ——— VCC
```

J1
J4   1    2
J8
J16
J20
J23
J25
J28

2-Pin Jumpers

VCC

4.7 K
0.1 W

U58
```
1        8
2        7
3        6
4        5  NC
```

PER
LOGIC
HIGH

4.7 K
0.1 W

0.1µF
20%
16V

External Power

J102
```
1
2
```

10 µF
10%
16V

1000 PF
10%
50V

EXT 5V

1000 PF
10%
50V

500 Ohm

CHASSIS GND

## V6 Controller Board (continued)

RJ-45 LAN (Ethernet)

J6

| | |
|---|---|
| 1 | TX+ |
| 2 | TX- |
| 3 | RX+ |
| 4 | NC1 |
| 5 | NC2 |
| 6 | RX- |
| 7 | NC3 |
| 8 | NC4 |
| 9 | |
| 10 | |

SHL1

SHL2

Host RS232

J201

| | |
|---|---|
| 1 | DCD |
| 2 | RXD |
| 3 | TXD |
| 4 | DTR |
| 5 | |
| 6 | DSR |
| 7 | RTS |
| 8 | CTS |
| 9 | NC |

10

11

Diagnostic Port

J7

| | |
|---|---|
| 1 | NC |
| 2 | |
| 3 | DB TXD |
| 4 | |
| 5 | DB RXD |
| 6 | NC |
| 7 | NC |
| 8 | NC |

252917

Shuttle Drive

J116

| | |
|---|---|
| 1 | SHUT A |
| 2 | SHUT B |
| 3 | SHUT C |

Paper Stacker

J117

VCC

| | |
|---|---|
| 1 | STK R NW |
| 2 | |
| 3 | STK DATA |
| 4 | |
| 5 | STK LOAD |
| 6 | |
| 7 | STK CLK |
| 8 | |
| 9 | |
| 10 | |
| 11 | NC |
| 12 | NC |
| 13 | NC |
| 14 | NC |

470 PF 10% 50V   470 PF 10% 50V   470 PF 10% 50V   470 PF 10% 50V   470 PF 10% 50V

Control Panel

J110

VCC

| | |
|---|---|
| 1 | N FP DATA AVAIL |
| 2 | |
| 3 | FP CLK |
| 4 | |
| 5 | N FP LED WR |
| 6 | FP DATA |
| 7 | |
| 8 | N FP LCD WR |

470 PF 10% 50V

# V6 Controller Board (continued)

VDD

2.2K
0.062W

SOFT ID

J9 | 1 | 2 | 3

Software Security Key

Host RS422
J15

| 1 | |
| 2 | NC |
| 3 | NC |
| 4 | DIFF TXD+ |
| 5 | DIFF TXD- |
| 6 | NC |
| 7 | NC |
| 8 | DIFF RXD+ |
| 9 | DIFF RXD- |
| 10 | NC |

Paper Feed Motor
J103

| 1 | PF 4 |
| 2 | PF 3 |
| 3 | PF 2 |
| 4 | PF 1 |

252917

Phase Driver Port
J115

| 1 | UD 1 |
| 2 | UD 2 |
| 3 | PH REF |
| 4 | |
| 5 | UD 3 |
| 6 | UD 4 |
| 7 | |
| 8 | DIODE 1 |
| 9 | DIODE 2 |
| 10 | |
| 11 | |
| 12 | DIODE 3 |
| 13 | DIODE 4 |
| 14 | N COILTEST |
| 15 | |
| 16 | CABLE DET |
| 17 | HD SENSE |
| 18 | LDFB |
| 19 | |
| 20 | |

VCC

| RN7 1K | RN7 1K | RN7 1K | RN7 1K |

CPLD Program Port
J2

| 1 | LC TCK |
| 2 | |
| 3 | LC TDI |
| 4 | |
| 5 | LC TMS |
| 6 | NC |
| 7 | NC |
| 8 | NC |
| 9 | LC TDO |
| 10 | |

## V6 Controller Board (continued)



J12
PCI Connection

| | | | | |
|---|---|---|---|---|
| B1 | RSV | RSV | A1 | |
| B2 | RSV | RSV | A2 | |
| B3 | GND | RSV | A3 | |
| B4 | RSV | RSV | A4 | |
| B5 | 5V | 5V | A5 | |
| B6 | 5V | NINTA | A6 | NIRQ1 |
| B7 | NINTB | NINTC | A7 | NINTC |
| B8 | NINTD | 5V | A8 | |
| B9 | NPRSNT1 | RSV | A9 | |
| B10 | RSV | 3.3V | A10 | |
| B11 | NPRSNT2 | RSV | A11 | |
| B12 | KEY | KEY | A12 | |
| B13 | KEY | KEY | A13 | |
| B14 | RSV | 3.3VAUX | A14 | |
| B15 | GND | NRST | A15 | PCI_NRST |
| B16 | CLK | 3.3V | A16 | |
| B17 | GND | NGNT | A17 | NGNT1 |
| B18 | NREQ | GND | A18 | |
| B19 | 3.3V | NPME | A19 | |
| B20 | AD31 | AD30 | A20 | AD30 |
| B21 | AD29 | 3.3V | A21 | |
| B22 | GND | AD28 | A22 | AD28 |
| B23 | AD27 | AD26 | A23 | AD26 |
| B24 | AD25 | GND | A24 | |
| B25 | 3.3V | AD24 | A25 | AD24 |
| B26 | NC/BE3 | IDSEL | A26 | IDSEL1 |
| B27 | AD23 | 3.3V | A27 | |
| B28 | GND | AD22 | A28 | AD22 |
| B29 | AD21 | AD20 | A29 | AD20 |
| B30 | AD19 | GND | A30 | |
| B31 | 3.3V | AD18 | A31 | AD18 |
| B32 | AD17 | AD16 | A32 | AD16 |
| B33 | NC/BE2 | 3.3V | A33 | |
| B34 | GND | NFRAME | A34 | NFRAME |
| B35 | NIRDY | GND | A35 | |
| B36 | 3.3V | NTRDY | A36 | NTRDY |
| B37 | NDEVSEL | GND | A37 | |
| B38 | GND | NSTOP | A38 | NSTOP |
| B39 | NLOCK | 3.3V | A39 | |
| B40 | NPERR | RSV | A40 | |
| B41 | 3.3V | RSV | A41 | |
| B42 | NSERR | GND | A42 | |
| B43 | 3.3V | PAR | A43 | PAR |
| B44 | NC/BE1 | AD15 | A44 | AD15 |
| B45 | AD14 | 3.3V | A45 | |
| B46 | GND | AD13 | A46 | AD13 |
| B47 | AD12 | AD11 | A47 | AD11 |
| B48 | AD10 | GND | A48 | |
| B49 | M66EN | AD9 | A49 | AD9 |
| B50 | GND | GND | A50 | |
| B51 | GND | GND | A51 | |
| B52 | AD8 | NC/BE0 | A52 | NC_BE0 |
| B53 | AD7 | 3.3V | A53 | |
| B54 | 3.3V | AD6 | A54 | AD6 |
| B55 | AD5 | AD4 | A55 | AD4 |
| B56 | AD3 | GND | A56 | |
| B57 | GND | AD2 | A57 | AD2 |
| B58 | AD1 | AD0 | A58 | AD0 |
| B59 | 3.3V | 3.3V | A59 | |
| B60 | I2CDATA | I2CCLK | A60 | |
| B61 | 5V | 5V | A61 | |
| B62 | 5V | 5V | A62 | |

VDD  VCC1

NINTB
NINTD
NPRSNT2

NPRSNT3

CLK1

NREQ1

AD31
AD29

AD27
AD25

NC_BE3
AD23

AD21
AD19

AD17
NC_BE2

NIRDY

NDEVSEL

NPERR

NSERR

NC_BE1
AD14

AD12
AD10

AD8
AD7

AD5
AD3

AD1

VDD  VCC1

0 Ohm
0.1W
0 %

SDA —⟍⟋⟍—

Slot 1

0 Ohm
0.1W
0 %

—⟍⟋⟍— SCL

# V6 Controller Board (continued)



Centronics Connector
J112

| Pin | Signal |
|-----|--------|
| 1 | N STROBE |
| 3 | P1 |
| 5 | P2 |
| 7 | P3 |
| 9 | P4 |
| 11 | P5 |
| 13 | P6 |
| 15 | P7 |
| 17 | P8 |
| 19 | N ACK |
| 21 | BUSY |
| 23 | PAPER EMPTY |
| 25 | SELECT |
| 26 | N INIT |
| 27 | N AUTOFEED |
| 28 | N FAULT |
| 29 | PI |
| 30 | VCC |
| 34 | NDPSEL |
| 35 | EXT 5V |
| 36 | N SELECT IN |
| 37 | HOST LOGIC H |
| 38 | NDPEN |

4.7K
0.1W
5%

10K
1%
0.1W

CHASSIS GND

252917

**Power Supply: P7X05, P7X10, P7X02H, and P7X03H**



176096

**J1**

| | | |
|---|---|---|
| AC | 1 | |
| AC Common | 2 | **P1** |
| Chassis Ground | 3 | |

Cable Assembly
AC In
Power Supply

LOAD

LOAD

GND

□ = FAST-ON TERMINAL

○ = RING TERMINAL

P101

| | | |
|---|---|---|
| White | 1 | N TEMP HI |
| Orange | 2 | N STDBY |
| Red | 3 | +5V |
| Red | 4 | +5V |
| Black | 5 | +5V RTN |
| Black | 6 | +5V RTN |
| Brown | 7 | +48V / +8.5V RTN |
| Brown | 8 | +48V / +8.5V RTN |
| Yellow | 9 | +8.5V |
| Yellow | 10 | +8.5V |
| Blue | 11 | +48V |
| Blue | 12 | +48V |

# Power Supply: P7X06H and P7X15

(Line Filter Area)

1   AC Input

AC
AC COMMON
CHASSIS GND

J1

**P101**

Cable Assembly
AC In
Power Supply

**P1**  1
2
3

LOAD

= FAST-ON TERMINAL

LOAD

= RING TERMINAL

GND

| | |
|---|---|
| 1 | NACFAIL (Not AC Fail) |
| 2 | NSTBY (Not Standby) |
| 3 | +5 Volts |
| 4 | +5 Volts |
| 5 | +5 Return / Logic GND |
| 6 | +5 Return / Logic GND |
| 7 | +48 / +8.5 Return |
| 8 | +48 / +8.5 Return |
| 9 | +8.5 Volts |
| 10 | +8.5 Volts |
| 11 | +48 Volts |
| 12 | +48 Volts |

## Power Supply: P7000HD, P7X08H, and P7220

(Phase Driver Control)

| | |
|---|---|
| 1 | UD 1 |
| 2 | UD 2 |
| 3 | +2.5V reference |
| 4 | |
| 5 | UD 3 |
| 6 | UD 4 |
| 7 | |
| 8 | DIODE 1 |
| 9 | DIODE 2 |
| 10 | |
| 11 | |
| 12 | DIODE 3 |
| 13 | DIODE 4 |
| 14 | N COILTEST |
| 15 | OPTO RET |
| 16 | CABLE DET |
| 17 | HD SENSE |
| 18 | LDFB BUF |
| 19 | |
| 20 | |

Controller GND

(Phase Driver Power)

| | |
|---|---|
| 1 | PH1 |
| 2 | |
| 3 | PH2 |
| 4 | |
| 5 | PH3 |
| 6 | |
| 7 | PH4 |
| 8 | |
| 9 | LDFB |
| 10 | |

Chassis GND

(Line Filter Area)

**AC Input**

**J1**

- AC
- AC Common
- Chassis Ground

J2

1 **P1**
2
3

LOAD

☐ = FAST-ON TERMINAL

○ = RING TERMINAL

LOAD

GND

| | |
|---|---|
| 1 | NACFAIL (Not AC Fail) |
| 2 | NSTBY (Not Standby) |
| 3 | +5 Volts |
| 4 | +5 Volts |
| 5 | +5 Return / Logic GND |
| 6 | +5 Return / Logic GND |
| 7 | +48 / +8.5 Return |
| 8 | +48 / +8.5 Return |
| 9 | +8.5 Volts |
| 10 | +8.5 Volts |
| 11 | +48 Volts |
| 12 | +48 Volts |

# CT Board

Twinax Connection

J2

| | | |
|---|---|---|
| 1 | NC | |
| 2 | NC | |
| 3 | NC | |
| 4 | NC | |
| 5 | | |
| 6 | NC | |
| 7 | | TWINAX PHASE A |
| 8 | NC | |
| 9 | NC | |
| 10 | NC | |
| 11 | NC | |
| 12 | NC | |
| 13 | NC | |
| 14 | | TWINAX PHASE B |
| 15 | NC | |

16

17

PCB 177930-001 REV____

PCBA

CONFIGURATION

PCI-CT, V3

PRINTRONIX

Coax Connection

J3

1
2

COAX DATA

COAX SHIELD

9400 pF, 1500 V Built-in
capacitor coax shield to
frame ground

.01μF
10%
500V

**SureStak Power Stacker PCBA**

## Cable Assembly, Weld Sensor (P/N 254475-001)
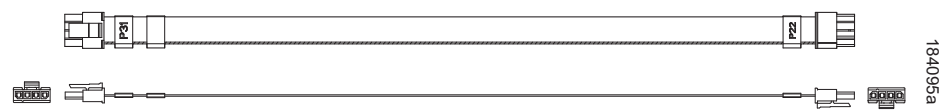


| Wiring Table | |
|:---:|:---:|
| **CONN 1** | **CONN 2** |
| PIN 1 | PIN 1 |
| PIN 2 | PIN 2 |
| PIN 3 | PIN 3 |
| PIN 4 | PIN 4 |

## Cable Assembly, Centronics I/O (P/N 152439-901)

PIN 1

P112

PIN 1

J203
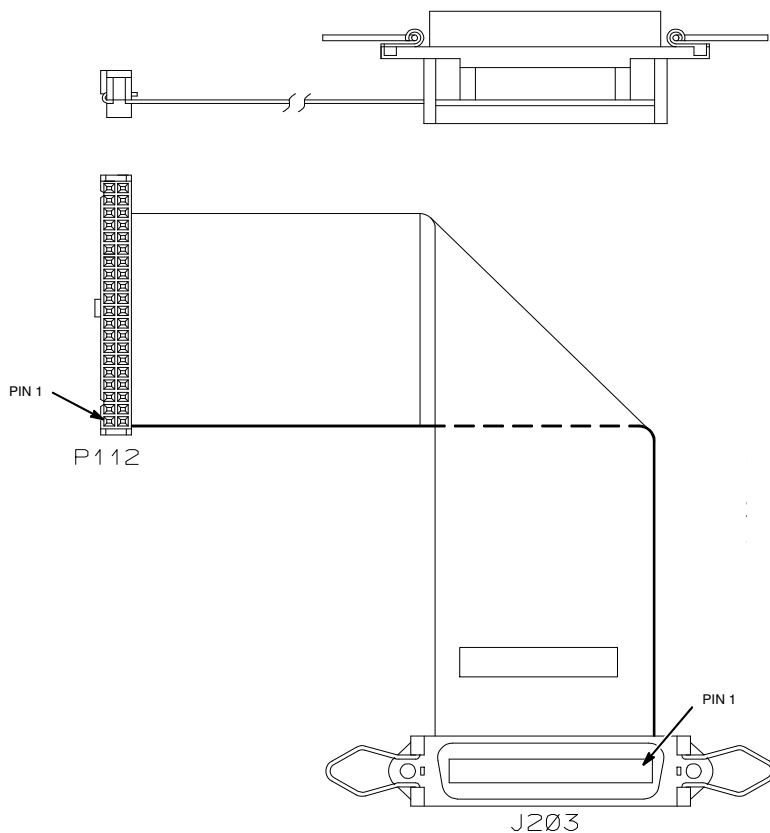
**IMPORTANT**

To comply with Electromagnetic Compatibility (EMC) regulatory requirements, all interface cables must be of a minimal quality level, be the correct length, and be properly installed.

RS-232 port and parallel port cables must meet the following specifications: 1) The cable design must be double shielded with a copper braid over an aluminum mylar foil and not just a conductive foil spiral wrapped around a drain wire. 2) The shield must terminate coaxially (360 degrees) to a metal connector housing and not be terminated by just a simple wire lead. 3) Cable length, including connectors, must be three meters or less. 4) The cable connector anchor screws must be securely seated in the printer receptor hardware.

For reference purposes only, two Centronics parallel port cables that have been tested and found to comply with these requirements are a Belkin® P/N F2A046-10 and a Primelogic P/N PLU 2823224. Other electrically equivalent cables are acceptable.

## Cable Assembly, Centronics-to-Dataproducts Adapter (P/N 154695-001)

| WIRING TABLE | | |
|---|---|---|
| CENTRONICS | TWISTED PAIR | DATAPRODUCTS |
| PIN 1 | #1 | PIN 38 |
| * PIN 19 | | * PIN 37 |
| PIN 2 | #2 | PIN 19 |
| * PIN 20 | | * PIN 3 |
| PIN 3 | #3 | PIN 20 |
| * PIN 21 | | * PIN 4 |
| PIN 4 | #4 | PIN 1 |
| * PIN 22 | | * PIN 2 |
| PIN 5 | #5 | PIN 41 |
| * PIN 23 | | * PIN 40 |
| PIN 6 | #6 | PIN 34 |
| * PIN 24 | | * PIN 18 |
| PIN 7 | #7 | PIN 43 |
| * PIN 25 | | * PIN 42 |
| PIN 8 | #8 | PIN 36 |
| * PIN 26 | | * PIN 35 |
| PIN 9 | #9 | PIN 28 |
| * PIN 27 | | * PIN 44 |
| PIN 10 | #10 | PIN 23 |
| * PIN 28 | | * PIN 7 |
| PIN 12 | #11 | PIN 22 |
| * PIN 30 | | * PIN 6 |
| PIN 13 | #12 | PIN 21 |
| * PIN 29 | | * PIN 5 |
| PIN 15 | #13 | PIN 30 |
| * PIN 33 | | * PIN 14 |
| PIN 31 | #14 | PIN 31 |
| * PIN 16 | | * PIN 15 |
| * PIN 16,35 | #15 | * PIN 11,27 |
| * PIN 17 | | * PIN 39 |
| | JUMPER WIRE | PIN 45 |
| * GROUND | | * PIN 46 |

154695
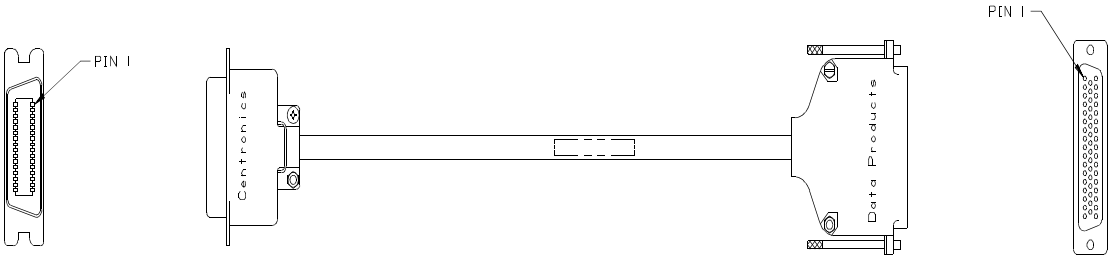
**Cable Assembly, Twinax Auto-Termination (P/N 140752-002)**

| | | |
|---|---|---|
| **Resistance Chart** | | |
| **Pin** | **Pin** | **Ohms** |
| 1 | 2 | 110 |
| 3 | 4 | 110 |
| 1, 2, 3, 4 | Shield | 55 |
| 5 | Shield | 0 |
| 14 | 1, 4 | 0 |
| 7 | 2, 3 | 0 |
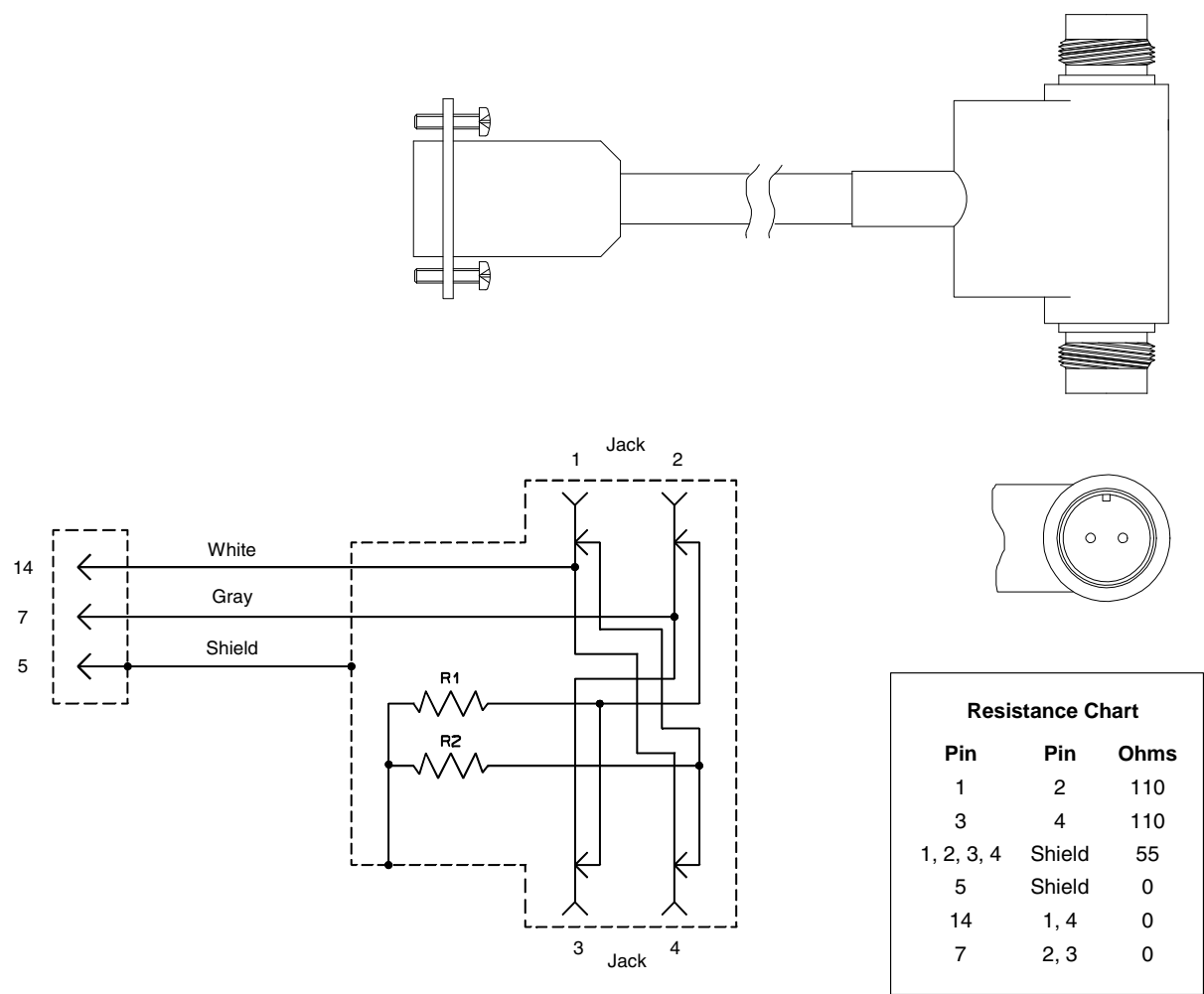
**Cable Extension, Smart-T (P/N 204806-901)**

Pin 1

Pin 1

204806

P2

**Cable Assembly, 2-Pin Jumper, 0.1 Ctr (P/N 154470-901)**

JMP

JMP
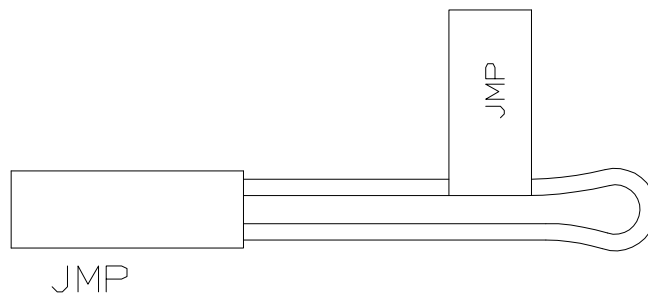
**Cable Assembly, AC In, Power Supply
(AC Kit P/N 153502-901)**

PIN 3

PIN 3

GND

PIN 3

To Circuit Breaker

LOAD

PIN 1

P1

PIN 1

LOAD

PIN 1

To Power Supply J1

| PIN | WIRE COLOR |
|-----|--------------|
| 1 | BLACK |
| 2 | WHITE |
| 3 | GREEN/YELLOW |
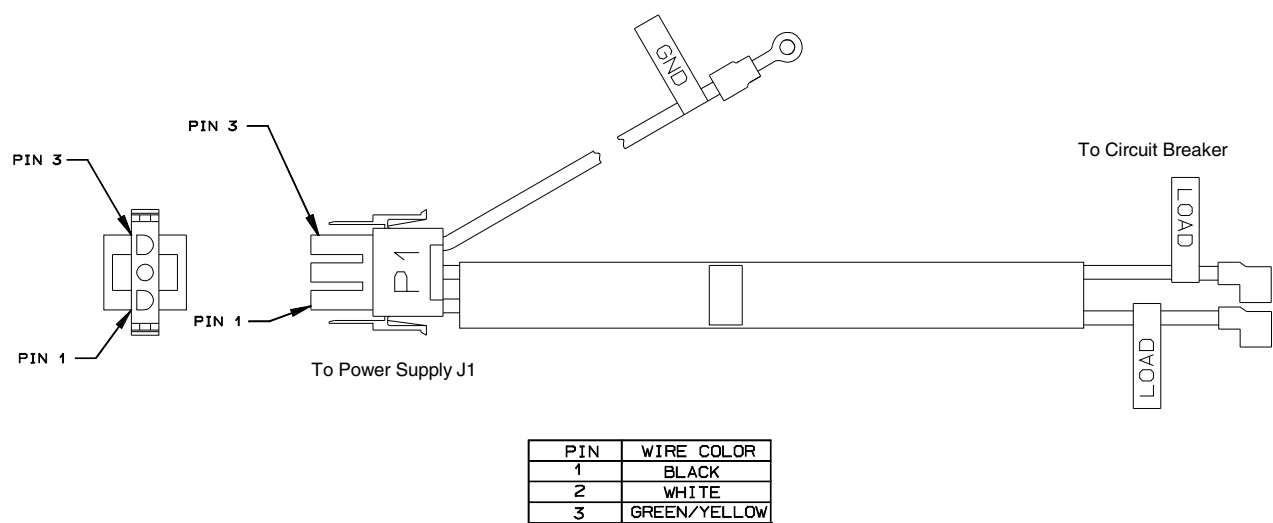
**Cable Assembly, AC Power Input (AC Kit P/N 153502-901)**

J301

To Circuit Breaker

Input Power Connector
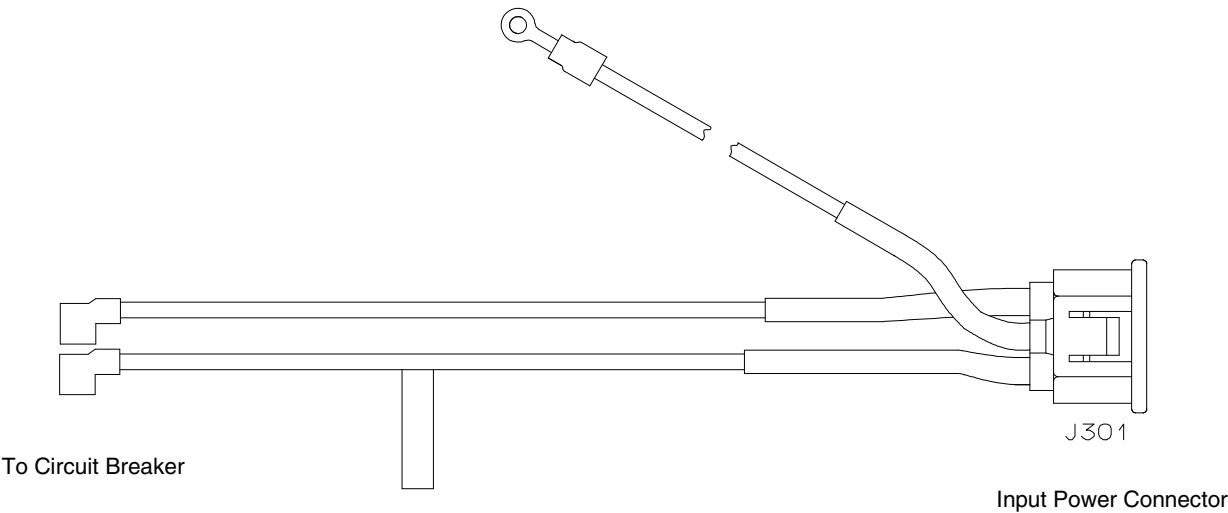
| PIN | WIRE COLOR |
|---------|--------------|
| LINE | BLACK |
| NEUTRAL | WHITE |
| GROUND | GREEN/YELLOW |

## Cable Assy, PS I/O (P/N 176601-901)

CONDUCTOR 17

DETAIL A

**NOTE:**

**This cable is used on P7000HD, P7X08H, and P7220 printers.**

P115

PIN 1

CONDUCTOR 20

COLOR STRIPE

CONDUCTOR 1

PIN 1

A

SEE DETAIL

P02
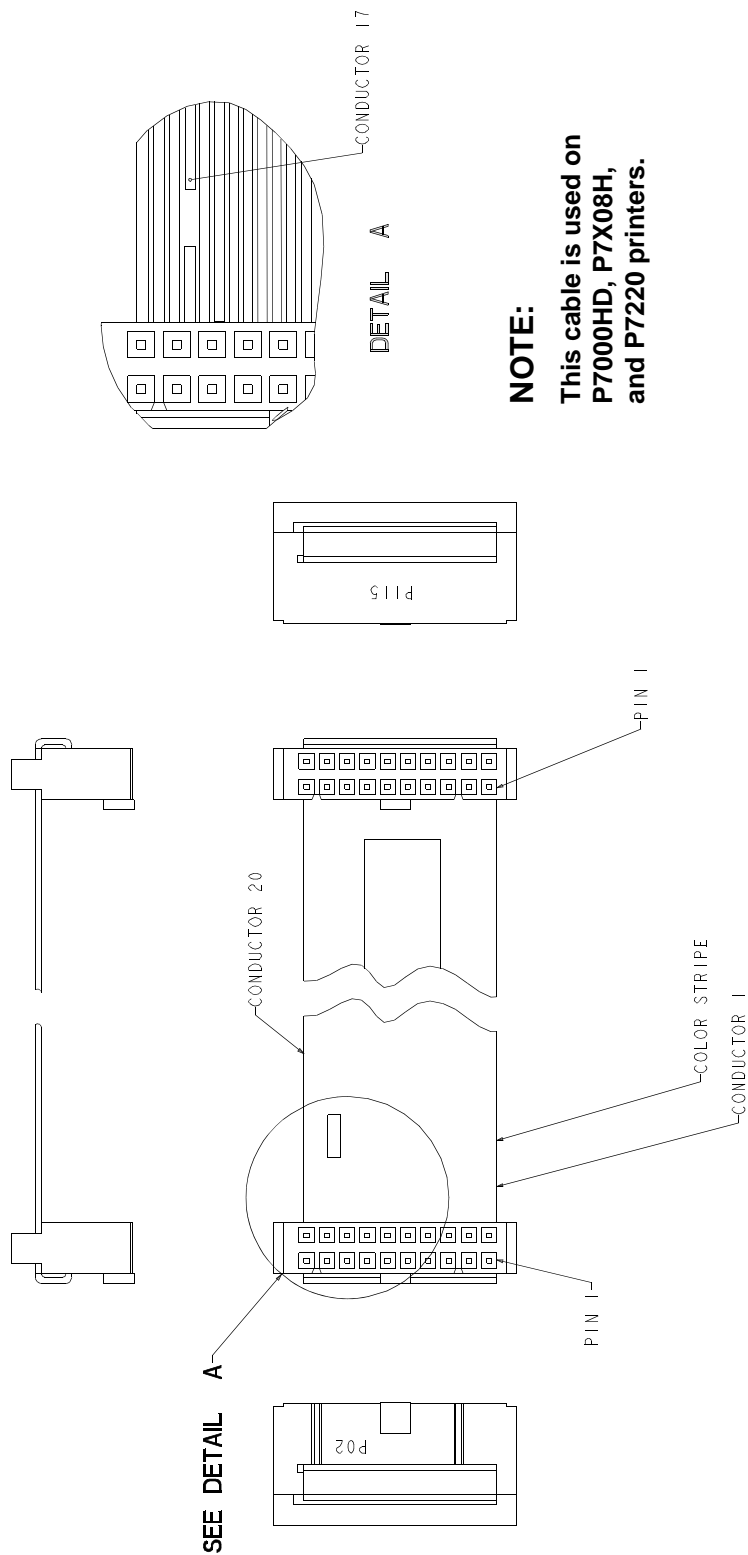
## Cable Assembly, Card Cage Fan (P/N 152422-901)
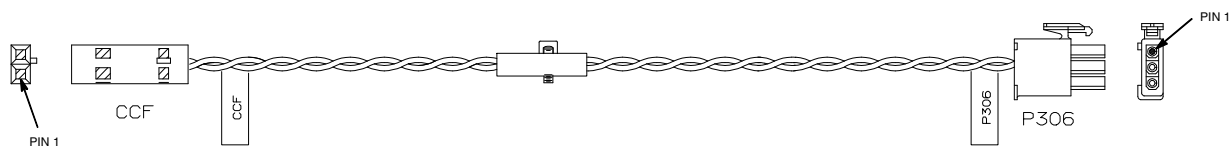


| WIRE TABLE | | |
|---|---|---|
| CCF | P306 | WIRE COLOR |
| PIN 1 | PIN 3 | BLACK |
| PIN 2 | PIN 2 | GRAY |
| | PIN 1 | N/C |

# Cable Assembly, Control Panel (P/N 152440-901)

P310

PIN 1
(Gray)

PIN 8
(Brown)

PIN 8
(Brown)

P110

PIN 1
(Gray)

## Cable Assembly, Exhaust Fan (P/N 152424-901)

PIN 1

EHF

EHF

P307
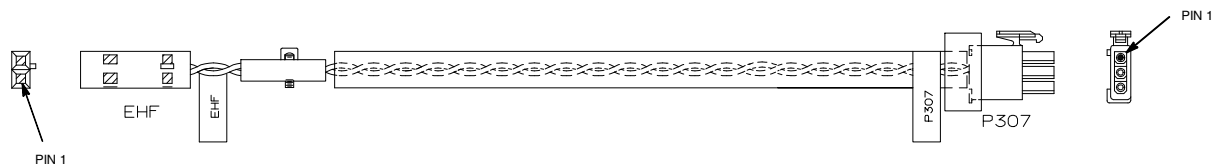
P307

P307

PIN 1

PIN 1

| WIRE TABLE | | |
|---|---|---|
| EHF | P307 | WIRE COLOR |
| PIN 1 | PIN 3 | BLACK |
| PIN 2 | PIN 2 | GRAY |
| | PIN 1 | N/C |

**Cable Assembly, Hammer Bank Logic (P/N 152421-901)**

To Shuttle

To Controller Board

PIN 1

PO4

P108
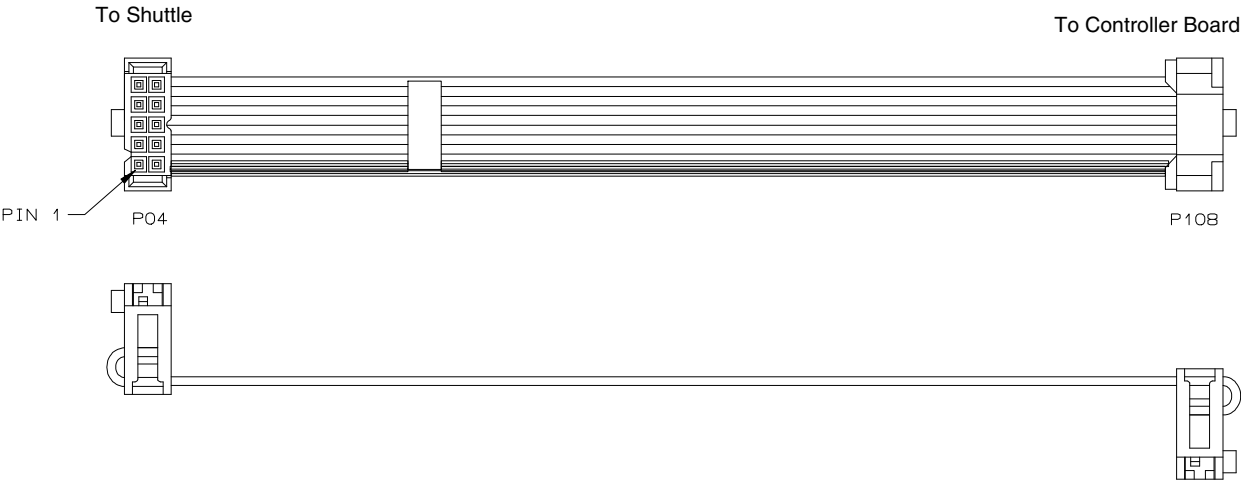
### Cable Assy, Hammer Bank Power (P/N 164805-901)

#### IMPORTANT:

**Use this cable on any P7000 CRP printer except the P7000HD, P7X08H, and P7220. On the P7000HD, P7X08H, and P7220 use P/N 173215-901, shown on the next page.**

P05

To Shuttle

P105

To Controller Board

PIN 1

PIN 1

| Wire Table | |
|---|---|
| **P05** | **P105** |
| 2 | 1 |
| 1 | 2 |
| 4 | 3 |
| 3 | 4 |
| 6 | 5 |
| 5 | 6 |
| 8 | 7 |
| 7 | 8 |
| 10 | 9 |
| 9 | 10 |

## Cable Assy, Dual Hammer Bank Power (P/N 173215-901)

**IMPORTANT:**

**Use this cable on the P7000HD, P7X08H, and P7220 printer. On any other P7000 printer use P/N 164805-901, shown on the previous page.**

To Shuttle                                                                 To Power Supply

P06                                                                                P3

173215
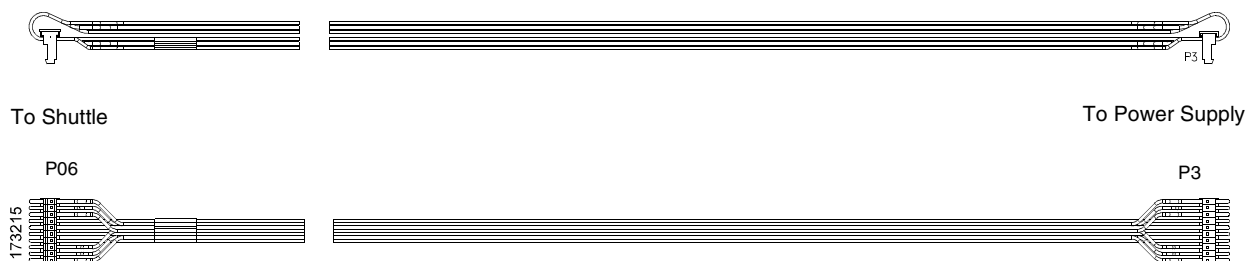
| Wire Table | |
|:---:|:---:|
| **P06** | **P3** |
| 2 | 1 |
| 1 | 2 |
| 4 | 3 |
| 3 | 4 |
| 6 | 5 |
| 5 | 6 |
| 8 | 7 |
| 7 | 8 |
| 10 | 9 |
| 9 | 10 |

**Cable Assembly, MPU (P/N 152425-901)**

PIN 2

PIN 1

MPU

MPU

J03

J03

PIN 3

PIN 1

| WIRE TABLE | | |
|:---:|:---:|:---:|
| MPU | J03 | WIRE COLOR |
| 1 | 1 | BLACK |
| 2 | 2 | GRAY |
| | 3 | N/C |
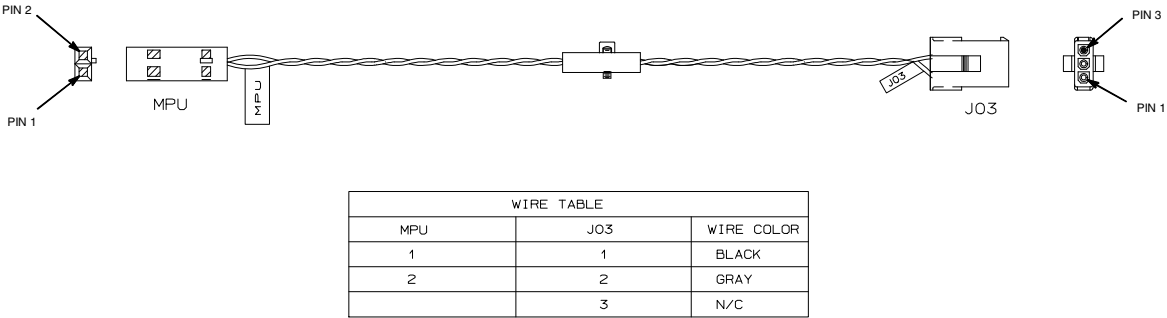
## Cable Assembly, Ribbon Motor, Extension (P/N 154067-001)

PIN 1

J06

PIN 4

J06

RBN M

RBN M

PIN 1

PIN 4

| PIN CONNECTION | | |
|---|---|---|
| J06 | RBN M | WIRE COLOR |
| PIN 1 | PIN 1 | BROWN |
| PIN 2 | PIN 2 | ORANGE |
| PIN 3 | PIN 3 | RED |
| PIN 4 | PIN 4 | YELLOW |
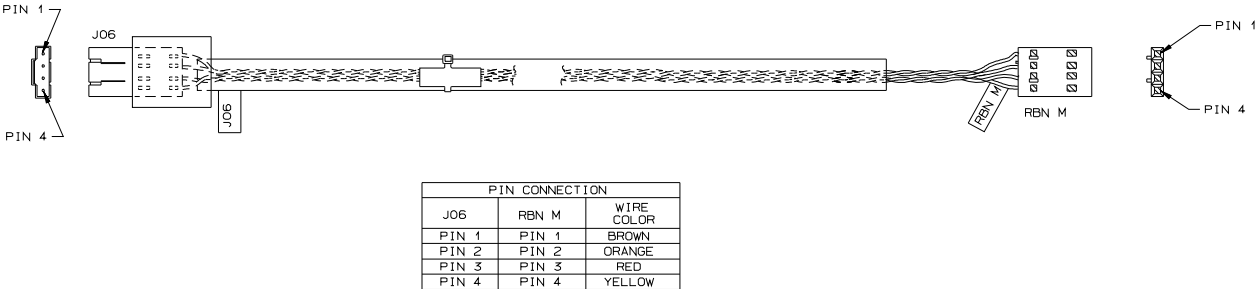
## Cable Assembly, Shuttle Motor Drive (P/N 152420-001)



| WIRE TABLE | | |
|---|---|---|
| P116 | J02 | WIRE COLOR |
| 1 | 1 | BLACK |
| 2 | 2 | BLACK |
| 3 | 3 | BLACK |

SECTION A—A

# Frame Cable, Power Stacker (P/N 173824-001)

| REF DES FROM | TO | ITEM NO. | WIRE LG (XX±.25)(REF) |
|---|---|---|---|
| P102-15 | T106 | 11 | 11.50 |
| P102-16 | P110-2 | 3 | 22.50 |
| P102-17 | P110-1 | | |
| P102-18 | P114-2 | 3 | 43.00 |
| P102-19 | P114-1 | | |
| P102-20 | P112-2 | 3 | 12.50 |
| P102-21 | P112-1 | | |
| P102-22 | P115-2 | 3 | 36.00 |
| P102-23 | P115-1 | | |
| P102-24 | T107 | 11 | 43.00 |
| P102-25 | P117-2 | 3 | 12.00 |
| P102-26 | P117-1 | | |
| P102-27 | P116-2 | 3 | 15.00 |
| P102-28 | P116-1 | | |
| P102-29 | T108 | 11 | 36.00 |
| P102-30 | J104-3 | 7 | 11.50 |
| P102-31 | J104-4 | | |
| P102-32 | J104-1 | | |
| P102-33 | J104-2 | | |
| P102-34 | T103 | 11 | 6.00 |
| P102-35 | SW1-1 | 9 | 22.00 |
| P102-36 | SW1-2 | | |

| REF DES FROM | TO | ITEM NO. | WIRE LG (XX±.25)(REF) |
|---|---|---|---|
| P102-1 | T104 | 11 | 6.00 |
| P102-2 | P111-1 | 6 | 23.00 |
| P103-3 | P111-2 | | |
| P102-4 | P111-3 | | |
| P102-5 | P111-4 | | |
| P102-6 | P113-1 | 6 | 11.50 |
| P102-7 | P113-2 | | |
| P102-8 | P113-3 | | |
| P102-9 | P113-4 | | |
| P102-10 | T105 | 11 | 21.50 |
| P102-11 | P118-2 | 6 | 7.00 |
| P102-12 | P118-1 | | |
| P102-13 | P118-3 | | |
| P102-14 | P118-4 | | |

| TWIST WIRE TABLE | |
|---|---|
| TWIST GROUPS | WIRES |
| 1 | P102-2 THRU P102-5 |
| 2 | P102-6 THRU P102-9 |
| 3 | P102-10,P102-16,P102-17 |
| 4 | P102-11 THRU P102-14 |
| 5 | P102-15,P102-20,P102-20,P102-21 |
| 6 | P10-18,P102-19,P102-24 |
| 7 | P102-22,P102-23,P102-29 |
| 8 | P102-25,P102-26 |
| 9 | P102-27,P102-28 |
| 10 | P102-30 THRU P102-33 |
| 11 | P102-35,P102-36 |

173824

429

**Logic Cable, Power Stacker (P/N 176029-001)**
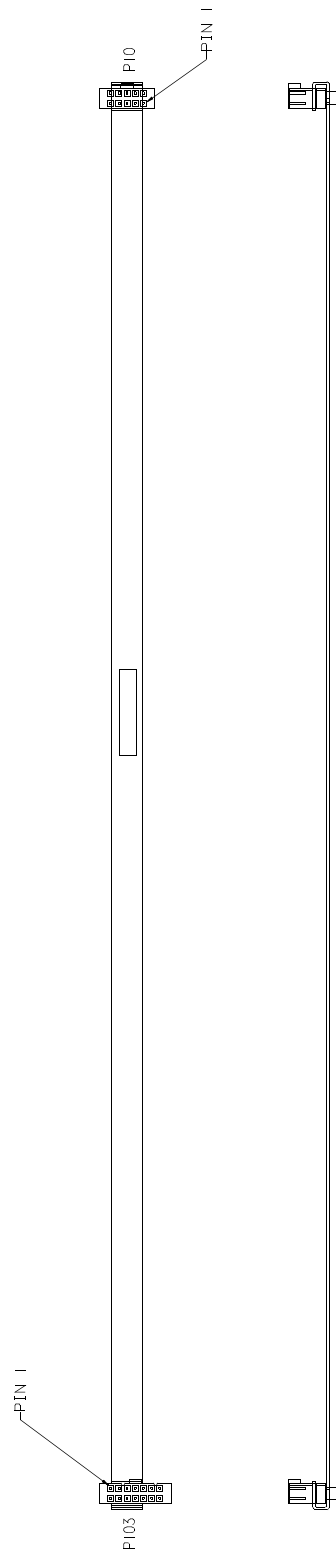
# Power Cable, Power Stacker (P/N 174414-001)



DETAIL A
SCALE: 4.00

PIN 1

PIN 1

PIN 1

SEE DETAIL A
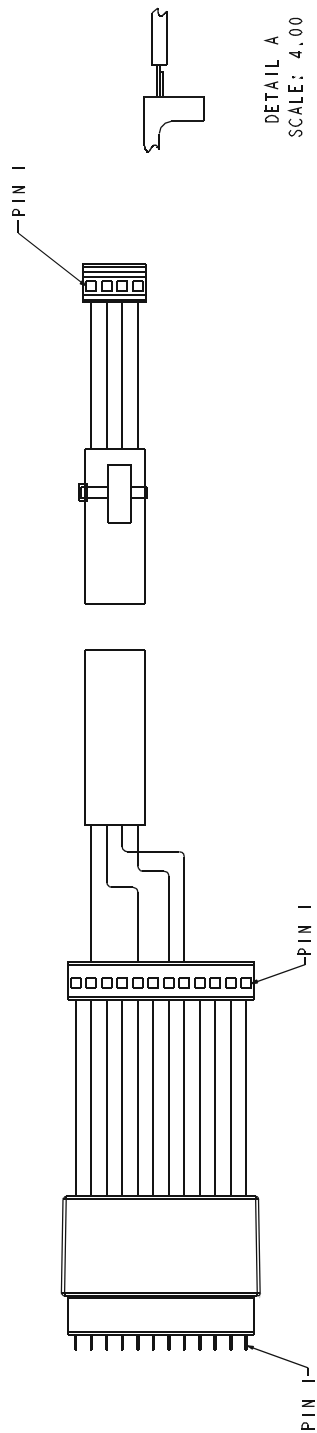
| CONNECTION TABLE | | | |
|---|---|---|---|
| J101 | P110T | P110T | P106 |
| PIN 1 | PIN 1 | PIN 11 | PIN 1 |
| PIN 2 | PIN 2 | PIN 8 | PIN 2 |
| * | * | PIN 4 | PIN 3 |
| * | * | PIN 5 | PIN 4 |
| PIN 11 | PIN 11 | | |
| PIN 12 | PIN 12 | | |
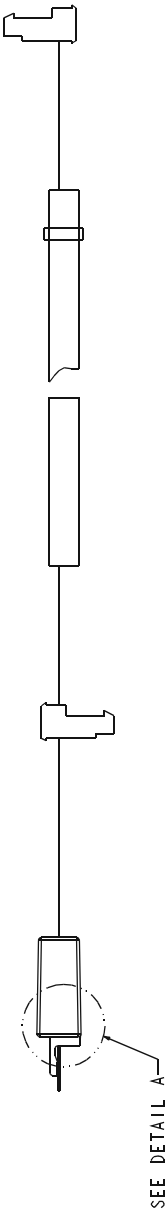
## Rail Cable, Power Stacker (P/N 173823-001)

**CONNECTION TABLE**

| FROM | TO | COMPONENTS | WIRE LENGTH (+/- .25") |
|---|---|---|---|
| P108-1 | T102 | 202746-001 | 10.00" |
| P108-2 | J18A - PIN 1 | 205499-001 | 8.00" |
| P108-3 | J18A - PIN 2 | | |
| P108-4 | J18B - PIN 1 | 205499-001 | 19.80" |
| P108-5 | J18B - PIN 2 | | |
| P108-6 | P109 - PIN 1 | 202748-001 | 24.00" |
| P108-7 | P109 - PIN 2 | 202361-001 | |
| P108-8 | P109 - PIN 3 | | |
| P108-9 | P109 - PIN 4 | | |
| P108-10 | T101 | 202746-001 | 10.00" |

**TWIST WIRE TABLE**

| TWIST GROUP | WIRES |
|---|---|
| A | P108-1, P108-10 |
| B | P108-2, P108-3 |
| C | P108-4, P108-5 |
| D | P108-6, P108-7, P108-8, P108-9 |
| E | P18-1, P18-2 |
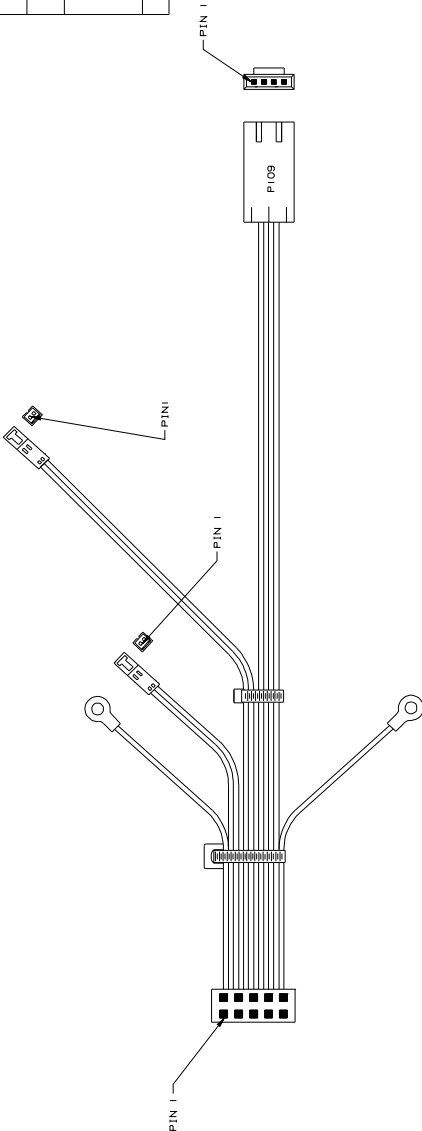
# Elevator I/O Cable, Power Stacker (P/N 174759-001)



| WIRE LIST | |
|---|---|
| P1Q20 | J1Q2 |
| 21 | 21 |
| 22 | 22 |
| 23 | 23 |
| 24 | 24 |
| 25 | 25 |
| 26 | 26 |
| 27 | 27 |
| 28 | 28 |
| 29 | 29 |
| 30 | 30 |
| 31 | 31 |
| 32 | 32 |
| 33 | 33 |
| 34 | 34 |
| 35 | 35 |
| 36 | 36 |
| 37 | |
| 38 | |
| 39 | |
| 40 | |

| WIRE LIST | |
|---|---|
| P1Q20 | J1Q2 |
| 1 | 1 |
| 2 | 2 |
| 3 | 3 |
| 4 | 4 |
| 5 | 5 |
| 6 | 6 |
| 7 | 7 |
| 8 | 8 |
| 9 | 9 |
| 10 | 10 |
| 11 | 11 |
| 12 | 12 |
| 13 | 13 |
| 14 | 14 |
| 15 | 15 |
| 16 | 16 |
| 17 | 17 |
| 18 | 18 |
| 19 | 19 |
| 20 | 20 |

| TWIST WIRE TABLE |
|---|
| P1Q20 CONN |
| 1 AND 34 |
| 2 THRU 5 |
| 6 THRU 9 |
| 10, 16 AND 17 |
| 11 THRU 14 |
| 15, 20 AND 21 |
| 18, 19 AND 24 |
| 22, 23 AND 29 |
| 25 AND 26 |
| 27 AND 28 |
| 30 THRU 33 |
| 35 AND 36 |

PIN 1

P1Q20

J1Q2

PIN 1
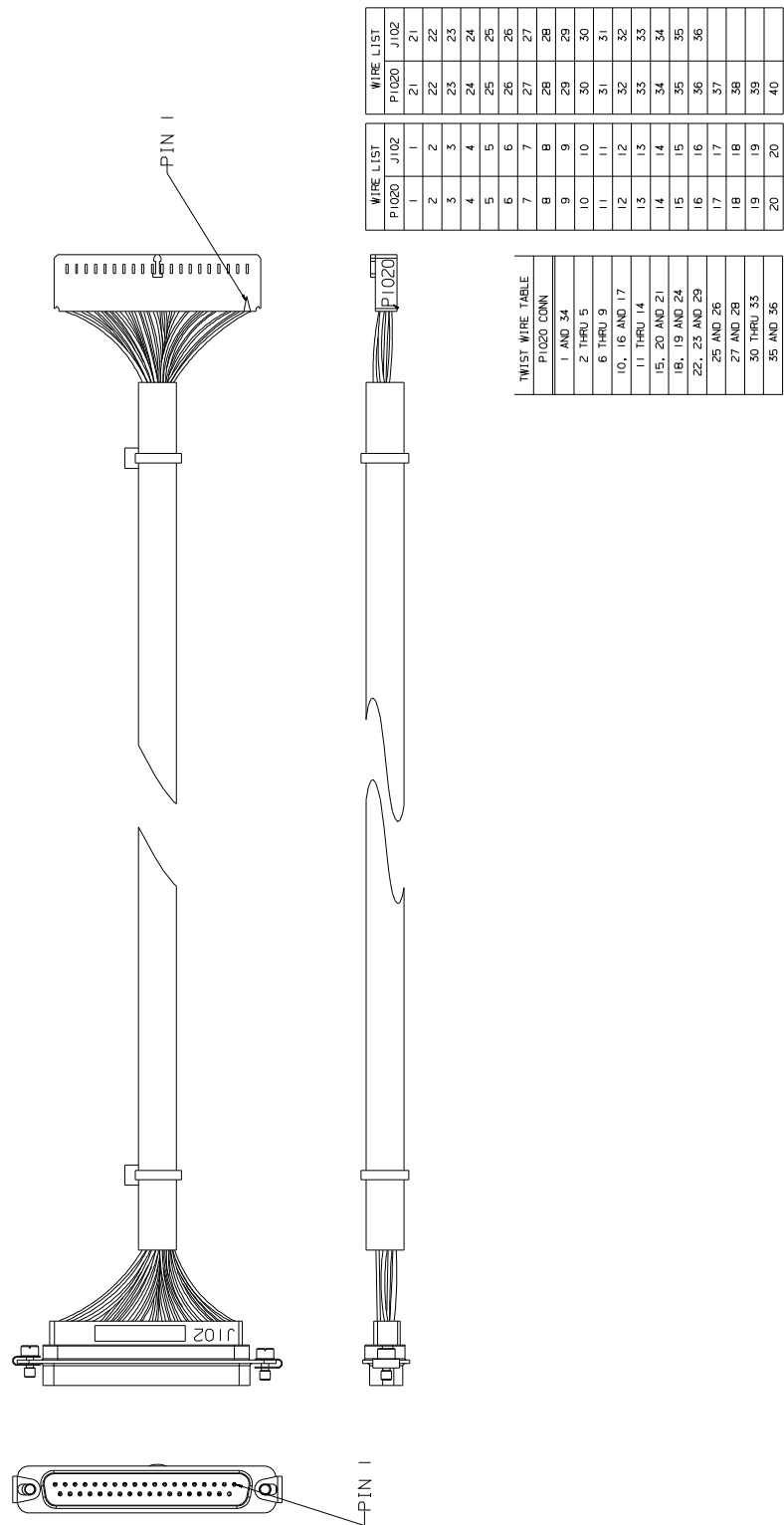
**Fan Assembly, Hammer Bank (P/N 152416-901)**

| WIRE TABLE | | |
|---|---|---|
| P107 | POLARITY | HBF(J) |
| PIN 2 | – | BLACK |
| PIN 1 | + | RED |
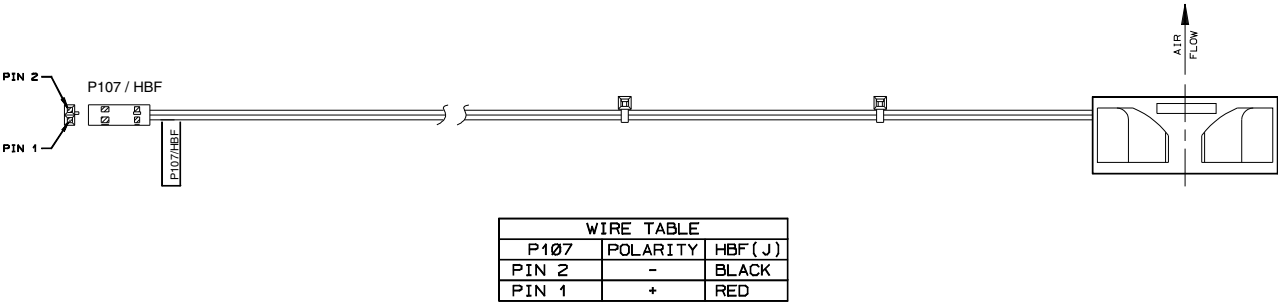
# Magnetic Pickup (MPU) Assembly (P/N 150281-901)

WHT

PIN 1

BLK
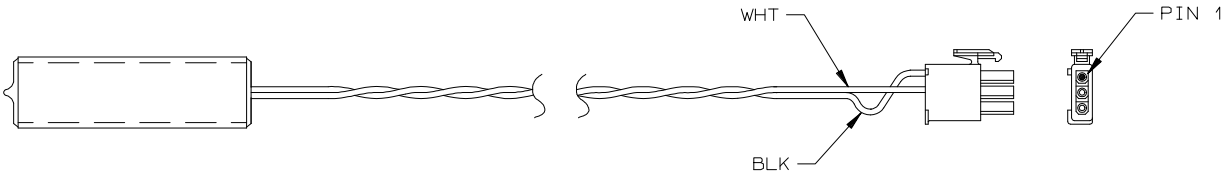
| WIRE TABLE | |
|---|---|
| CONN PIN NO. | WIRE COLOR |
| 1 | BLACK |
| 2 | WHITE |
| 3 | N/C |

**Switch Assembly, Paper Detector (P/N 152415-901)**

(POD)

A  K
E  C

(PMD)

E  A
C  K

A

A

P106/POD        PIN 1

POD

PMD

P106/PMD

SECTION A-A

WHITE DOT FOR ORIENTATION

| WIRE TABLE | | | | |
|---|---|---|---|---|
| P106/POD | P106/PMD | POD | PMD | CABLE |
| PIN 1 | | PIN E | | BLACK |
| PIN 2 | | PIN C | | GRAY |
| PIN 3 | | PIN K | | WHITE |
| PIN 4 | | PIN A | | RED |
| | PIN 1 | | PIN A | BLACK |
| | PIN 2 | | PIN K | BROWN |
| | PIN 3 | | PIN C | ORANGE |
| | PIN 4 | | PIN E | RED |
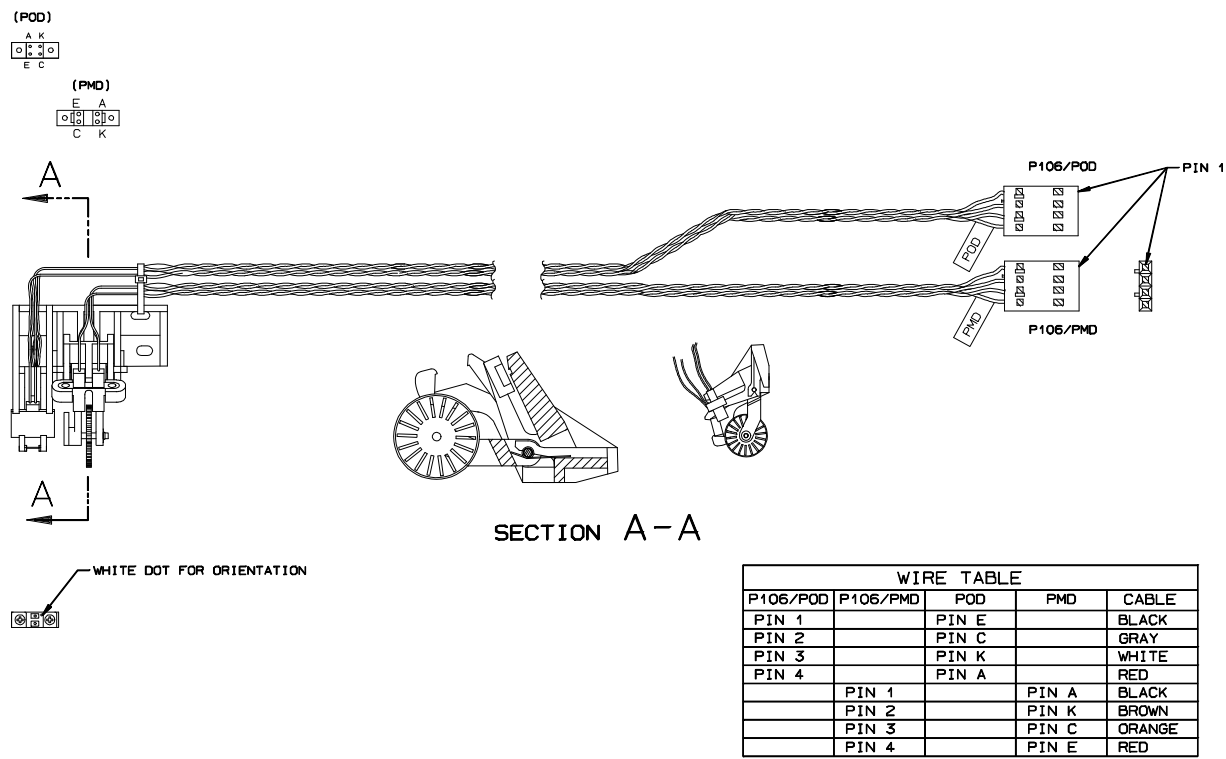
## Switch Assembly, Platen Interlock (P/N 152417-901)

COM

PIN 2

PIN 1

P107/PLO

| WIRE TABLE | | WIRE COLOR |
|---|---|---|
| PIN NO. | INTERLOCK SWITCH | |
| PIN 1 | COM | BLACK |
| PIN 2 | NO | GRAY |

NO
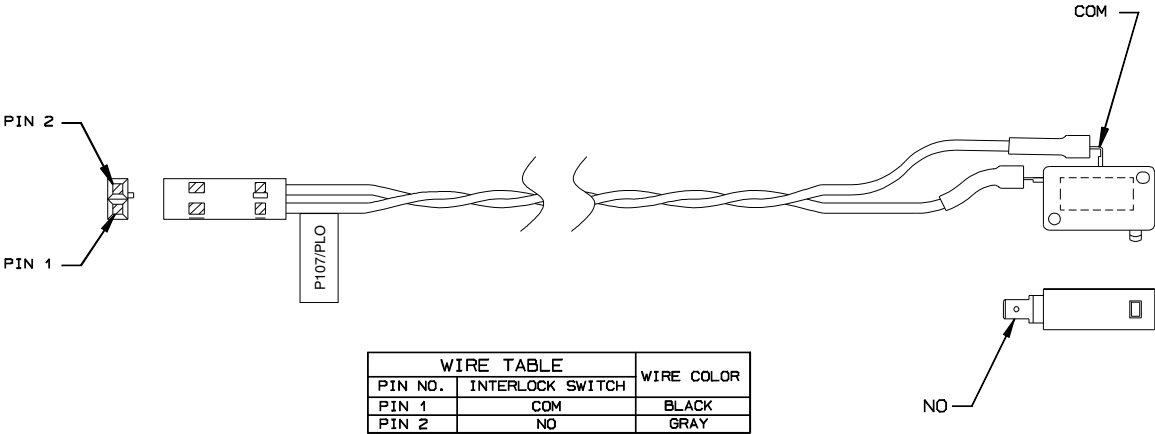
# B  *Abbreviations*

**NOTE:** Signal abbreviations with first letter "N" are negative true.

| Abbreviation | Definition |
| --- | --- |
| KΩ | 1,000 Ohms |
| MegΩ | 1,000,000 Ohms |
| μF | microfarad ($10^{-6}$ farad) |
| μs | microsecond ($10^{-6}$ second) |
| μsec | microsecond ($10^{-6}$ second) |
| | |
| A0, A1, etc. | Address 0, Address 1, etc. |
| AC | Alternating Current |
| ACC | Access |
| ACK | Acknowledge |
| AMP | Amplitude; Ampere |
| AMPL | Amplitude |
| AN | Anode |
| ASIC | Application-Specific Integrated Circuit |
| ATTN | Attention |
| | |
| B | Buffered |
| BANK FAN | Hammer Bank Fan |
| BCOM | Buffered Communication |
| BCP | Bi-phase Communications Processor |
| BHSC | Buffered Hammer Shift Clock |
| BN | Buffered, Low True |
| BNLD | Buffered, Low True, Lower Driver |
| BPS | Bits Per Second |
| BSY | Busy |
| BTU | British Thermal Unit |
| BUD | Buffered Upper Driver |

| | |
|---|---|
| CA | Cathode |
| CC | Card Cage |
| CCF | Card Cage Fan |
| CHNG | Change |
| CIR | Circuit |
| CLK | Clock |
| CO | Cover Open |
| COLL | Collector |
| COMM | Communication |
| CONTLR | Controller |
| CMD | Command |
| CNC | Connector, Connection |
| CPI | Characters Per Inch |
| CPLD | Complex Programmable Logic Device |
| CR | Carriage Return |
| CT | Coaxial/Twinaxial ("Coax/Twinax") |
| CTL | Control |
| CRS | Cartridge Ribbon System |
| CTS | Clear to Send |
| CU | Control Unit |
| CUR | Current |
| | |
| D0, D1, etc. | Data Bit 0, Data Bit 1, etc. |
| DAT | Data |
| DBCS | Double Byte Character Set |
| DC | Direct Current, Data Controller (a functional unit of the controller board) |
| DCD | Data Carrier Detect |
| DIAG | Diagnostic |
| DIFF | Differential |
| DIMM | Dual Inline Memory Module |
| DMA | Direct Memory Access |
| DP | Data Processing, Dataproducts |
| DPEN | Dataproducts Enable |
| DPMC | Dot Plucker Memory Controller |
| DPU | Data Processing Unit |
| DRAM | Dynamic Random Access Memory |
| DRV | Drive or Driver |

| | |
|---|---|
| DRVR | Driver |
| DSR | Data Set Ready |
| DTR | Data Terminal Ready |
| | |
| EC | Engine Controller (a functional unit of the controller board) |
| EEPROM | Electrically Erasable/Programmable Read-Only Memory |
| EHF | Exhaust Fan |
| EL | Elevator motor (power stacker) |
| EMEA | Europe, Mideast, and Africa |
| EMI | ElectroMagnetic Interference |
| EMIT | Emitter |
| EPROM | Electrically Programmable Read-Only Memory |
| ERR | Error |
| ESD | Electrostatic Discharge |
| EX | Exhaust, Extra |
| EXH | Exhaust |
| EXF | Exhaust Fan |
| EXP | Expansion |
| EXPND | Expand |
| | |
| FD | Feed |
| FF | Form Feed |
| FIFO | First In, First Out |
| FLT | Fault |
| FLTR | Filter |
| FP | Front Panel (Control Panel) |
| FRU | Field Replaceable Unit |
| FTIC | Fire Timer Integrated Circuit |
| | |
| GND | Ground |
| | |
| HB | Hammer Bank |
| HBA | Hammer Bank ASIC |
| HBF | Hammer Bank Fan |
| HBL | Hammer Bank, Left |
| HBP | Hammer Bank Power |

| | |
|---|---|
| HBR | Hammer Bank, Right |
| HD | Hammer Driver, High Definition |
| HDIC | Hammer Driver Integrated Circuit |
| HDPH | Hammer Driver Phase |
| HLP | Hammer Bank Logic, Signals, and Power |
| HW | Hardware |
| | |
| IC | Integrated Circuit |
| ID | Identification |
| IGP | Intelligent Graphics Printing |
| INST | Instruction |
| INT | Interrupt |
| I/O | Input/Output |
| IPB | Illustrated Parts Breakdown |
| IPM | Inches Per Minute |
| IRQ | Interrupt Request |
| | |
| (J) | Jack connector |
| JEDEC | Joint Electron Device Engineering Council. An organization that sets standards for electronic devices and components. |
| | |
| L | Left |
| LAN | Local Area Network |
| LCD | Liquid Crystal Display |
| LED | Light-Emitting Diode |
| LF | Line Feed |
| LO | Low |
| LPI | Lines Per Inch |
| LPM | Lines Per Minute |
| | |
| M | Motor |
| m | meter (metric unit of length) |
| MAIN | Maintenance Jack, RS-232 (Optional) |
| MECA | Mechanism Engine Control ASIC |
| MECH | Mechanism |
| MF | microfarad ($10^{-6}$ farad) |
| MH | Mounting Hole, Main Harness |

| | |
|---|---|
| MOSFET | Metal Oxide Semiconductor Field Effect Transistor |
| MOT | Motor |
| MPU | Magnetic Pick-Up (Unit) |
| ms | millisecond ($10^{-3}$ second) |
| MSL | Motor and Sensors, Left |
| MSR | Motor and Sensors, Right |
| | |
| N | Negative True; Newton (metric unit of force) |
| NIC | Network Interface Card (ethernet interface) |
| N/C | Not Connected |
| NC | Not Connected |
| NLQ | Near Letter Quality |
| No. | Number |
| NOVRAM | Nonvolatile Random Access Memory |
| ns | nanosecond ($10^{-9}$ second) |
| NT | Not |
| NVRAM | Nonvolatile Random Access Memory |
| | |
| OEM | Original Equipment Manufacturer |
| OLV | On Line Verify |
| OP | Operand |
| | |
| P5 | + 5 VDC |
| (P) | Pin connector |
| P(1), P(2), etc. | Parallel data 1, data 2, etc. |
| PAL | Programmable Array Logic |
| PAP | Paper |
| PAPR | Paper |
| PARM | Parameter |
| PCBA | Printed Circuit Board Assembly |
| PCB | Printed Circuit Board |
| PCI | Peripheral Component Interconnect |
| PD | Paper Detect(or) |
| PE | Printer Error, Paper Empty |
| PER | Peripheral Device |
| PF | Paper Feed, picofarad ($10^{-12}$ farad) |

| | |
|---|---|
| PFC | Paper Feed Controller, Power Factor Corrected (a power supply used on 500 lpm and 1000 lpm printers) |
| PFM | Paper Feed Motor |
| PGL | Printronix Graphics Language |
| PHA | Phase A |
| PHB | Phase B |
| PI | Paper Instruction |
| PLAT | Platen |
| PLM | Platen Motor |
| PLO | Platen Open Switch |
| PMD | Paper Motion Detect |
| PN | Pin or Plug |
| P/N | Part Number |
| PO | Paper Out |
| POD | Paper Out Detector Switch |
| PPR | Paper |
| PROM | Programmable Read-Only Memory |
| PS | Power Supply |
| PS5 | Power Supply + 5 Volt |
| PSA3 | Printronix System Architecture, Third Generation |
| PTR | Pointer, Printer |
| PWM | Pulse Width Modulation |
| PWR | Power |
| | |
| R | Right |
| RBN | Ribbon |
| RD | Read |
| RDY | Ready |
| RET | Return |
| RIB | Ribbon |
| RM | Ribbon Motor |
| RoHS | Restriction of Hazardous Substances: In the illustrated parts sections part numbers listed in the column labeled **Europe, Mideast, and Africa (EMEA)** conform to requirements specified in DIRECTIVE 2002/95/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment. |

| | |
|---|---|
| RQ | Request |
| RSP | Ribbon and Shuttle Processor |
| RST | Reset |
| RTS | Request to Send |
| RXD | Receive Data |
| | |
| SCS | SNA Character Stream |
| SDRAM | Synchronous Dynamic Random Access Memory |
| SEC | Security (Key) |
| SEL | Select |
| SEN | Sense, Sensor |
| SF | Structured Field |
| SG | Signal Ground |
| SHH | Shuttle Hall (Effect) |
| SHM | Shuttle Motor |
| SHUT | Shuttle |
| SHUTL | Shuttle |
| SIMM | Single Inline Memory Module |
| SLCT | Select (Online) |
| Slew | Rapid vertical paper movement |
| SMD | Shuttle Motor Drive |
| SNA | Systems Network Architecture |
| SOFT | Software |
| SPU | Shuttle Processor Unit |
| SPX | Software Program Exchange module |
| SRAM | Static Random Access Memory |
| STAT | Status or State |
| STBY | Standby |
| STK | Stacker |
| SW | Switch, Software |
| SYNC | Synchronize |

| | |
|---|---|
| TCB | Task Control Block |
| TEMP | Temperature; Temporary |
| TOF | Top Of Form (first print line) |
| TP | Test Point |
| TTL | Transistor-Transistor Logic |
| TXD | Transmit Data |
| | |
| UART | Universal Asynchronous Receiver/Transmitter |
| UDPH | Upper Drive Phase |
| UNDEF | Undefined |
| USART | Universal Synchronous/Asynchronous Receiver/ Transmitter |
| | |
| V | Volts |
| VAC | Volts, Alternating Current |
| VDC | Volts, Direct Current |
| $V_{CC}$ | Voltage at Collector |
| $V_{DD}$ | Voltage at Drain |
| VGL | Code V™ Graphics Language |
| $V_{SS}$ | Voltage at Source |
| V8 | A special ASIC on the controller board containing circuits that help the data controller (DC) operate. |
| | |
| WR | Write |
| w/ | With |
| w/o | Without |
| | |
| XMT | Transmit |
| | |
| ZTP | Zero Tear Pedestal (printer) |
| ZTP | Zero Tear Printer |

# C Metric Conversion Tables

## Length

| Multiply | By | To Obtain |
|:---:|:---:|:---:|
| foot | 0.3048* | meter (m) |
| foot | 30.48* | centimeter (cm) |
| foot | 304.8* | millimeter (mm) |
| inch | 0.0254* | meter (m) |
| inch | 2.54* | centimeter (cm) |
| inch | 25.4* | millimeter (mm) |
| meter | 3.280840 | foot |
| centimeter | 0.03280840 | foot |
| millimeter | 0.003280840 | foot |
| meter | 39.37008 | inch |
| centimeter | 0.3937008 | inch |
| millimeter | 0.03937008 | inch |

  * Figure is exact.

## Torque and Force

| Multiply | By | To Obtain |
|:---:|:---:|:---:|
| pound-inch | 0.11298 | Newton-meter (N•M) |
| pound-foot | 1.3558 | Newton-meter (N•M) |
| Newton-meter (N•M) | 8.8511 | pound-inch |
| Newton-meter (N•M) | 0.7376 | pound-foot |
| pound | 4.4482 | Newton (N) |
| Newton (N) | 0.22481 | pound |

## Mass and Density

| Multiply | By | To Obtain |
|----------|-----|-----------|
| pound* | 0.4535924 | kilogram (kg) |
| ounce* | 28.34952 | gram (g) |
| kilogram | 2.204622 | pound* |
| gram | 0.03527393 | ounce* |

\* avoirdupois

## Temperature

| To Convert | To | Use Formula |
|------------|-----|-------------|
| temperature Celsius ($t_c$) | temperature Fahreheit ($t_f$) | $t_f = 1.8\, t_c + 32$ |
| temperature Fahreheit ($t_f$) | temperature Celsius ($t_c$) | $t_c = (t_f - 32) / 1.8$ |

## Power

| Multiply | By | To Obtain |
|----------|-----|-----------|
| Btu (International Table) per hour | 0.2930711 | watt (W) |
| watt (W) | 3.412141 | Btu (International Table) per hour |
| watt (W) | 0.001359621 | horsepower (metric) |
| horsepower (metric) | 735.499 | watt (W) |

# D SureStak™ *Power Stacker*

## Contents

# Introduction

The SureStak Power Stacker is a factory-installed option that augments the paper feed system of cabinet model printers. It is designed to work with forms 5 to 12 inches long (12.7 to 30.5 cm) and up to 16 inches (41 cm) wide without the paper tent installed or up to 15.5 inches (39.5 cm) wide with the paper tent installed. (See Figure 67.) Using longer or shorter paper can cause error messages and unpredictable operation of the stacker.

Because most of the stacker assembly is inside the cabinet, you must remove the stacker from the printer to service it or replace most of its components.

This appendix has three parts:

- An overview of stacker operation.

- Removal/installation instructions for the entire power stacker assembly and for components that require the most frequent replacement.

- An illustrated parts breakdown (IPB) showing how the power stacker is assembled and listing the part numbers for replaceable parts.

**NOTE:** Only replaceable parts have part numbers in the IPB. If you need to replace a part for which no part number is shown, replace the entire stacker assembly.

# Stacker Operation

The power stacker mechanically directs the paper from the printer to the paper stack. It is mounted in the rear of the cabinet and has its own control panel. Its main components are shown in Figure 67.
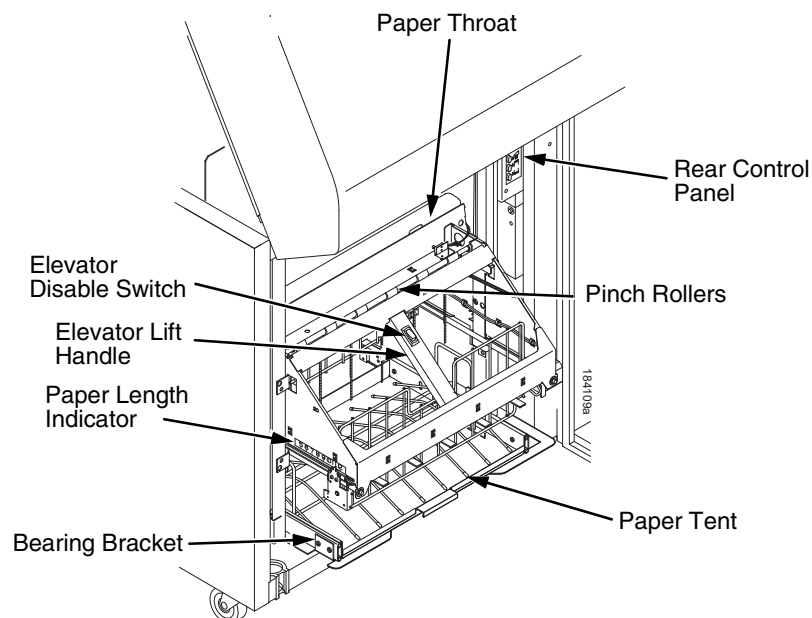


**Figure 67. Power Stacker Component Locations**

## Setting Up the Power Stacker

1. Set the printer power switch to | (On).

2. On the rear control panel, press the **ON LINE** key to take the printer offline. (Figure 68.)

3. Press the **ELEVATOR UP** key and wait for the elevator assembly to reach the top of its travel. (Figure 68.)
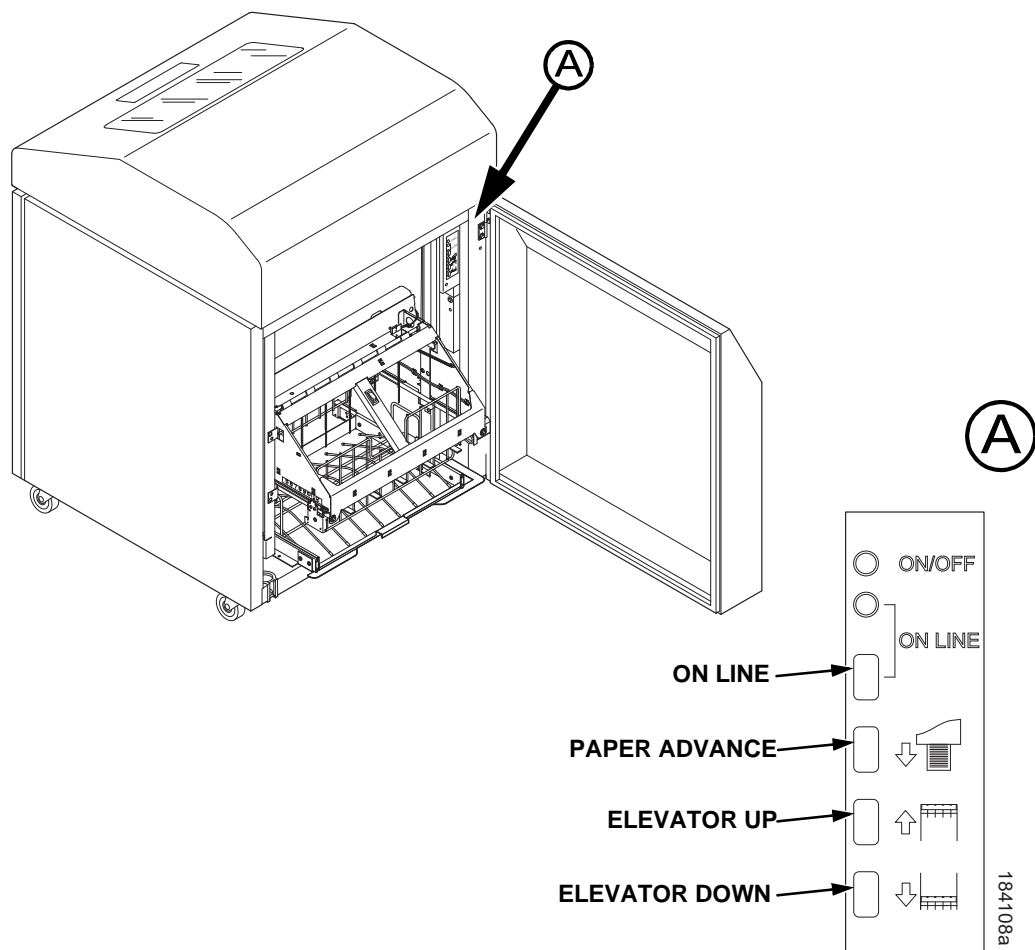


**Figure 68. The Rear Control Panel**

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4.  If the paper you will use is not wider than 15.5 inches (39.5 cm) pull out the paper tray and install the wireform paper tent. (Figure 69.) If the paper is wider than 15.5 inches (39.5 cm) leave the paper tent out of the printer.
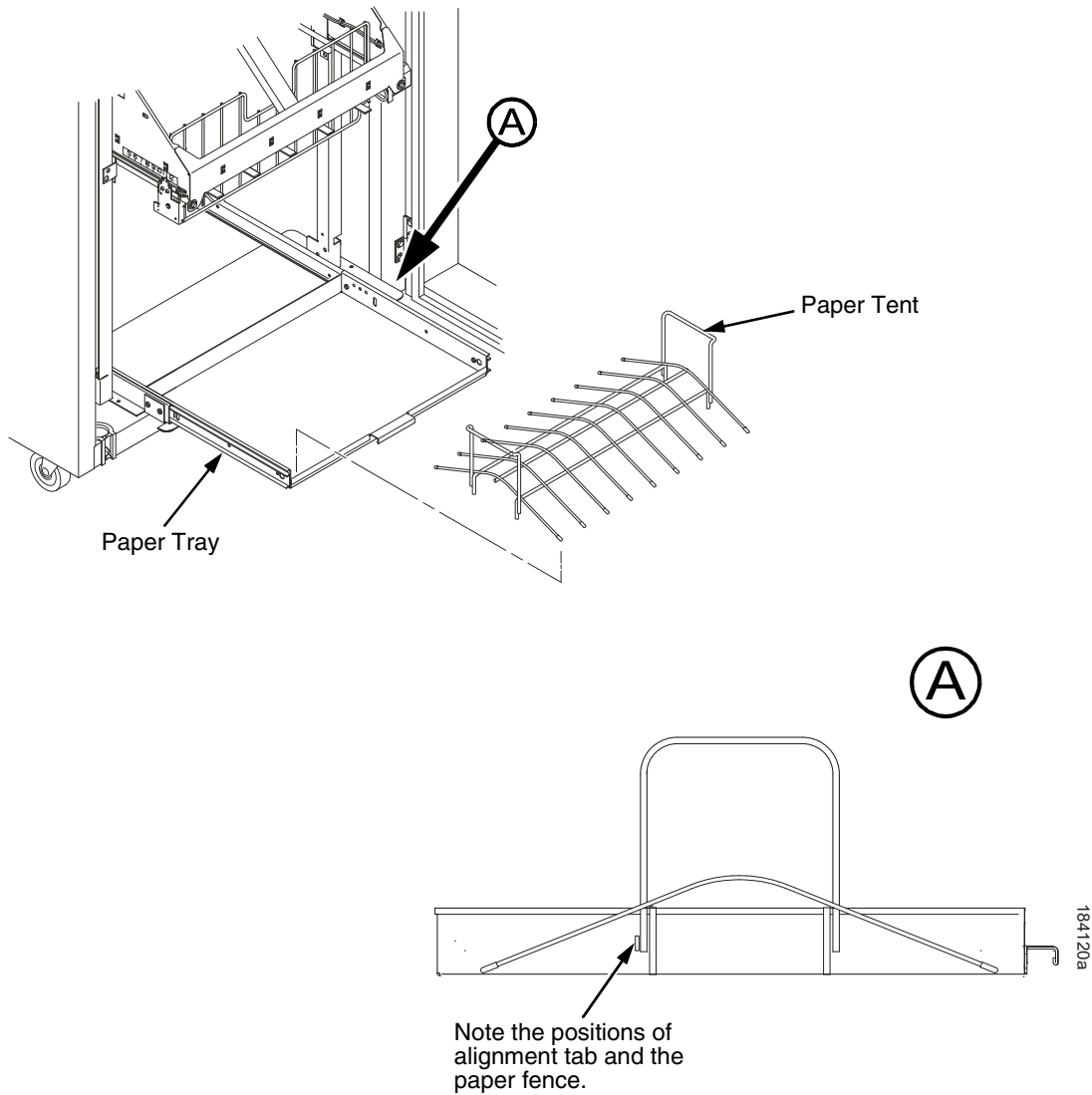


**Figure 69. The Paper Tent**

5. Push or pull the paddle shaft toward the front or the rear of the printer to set the desired paper length. Align the indicator notch on the bearing bracket with the paper length indicator. The power stacker can handle paper or forms from 5 to 12 inches (12.7 to 30.5 cm) long. (Figure 70.)
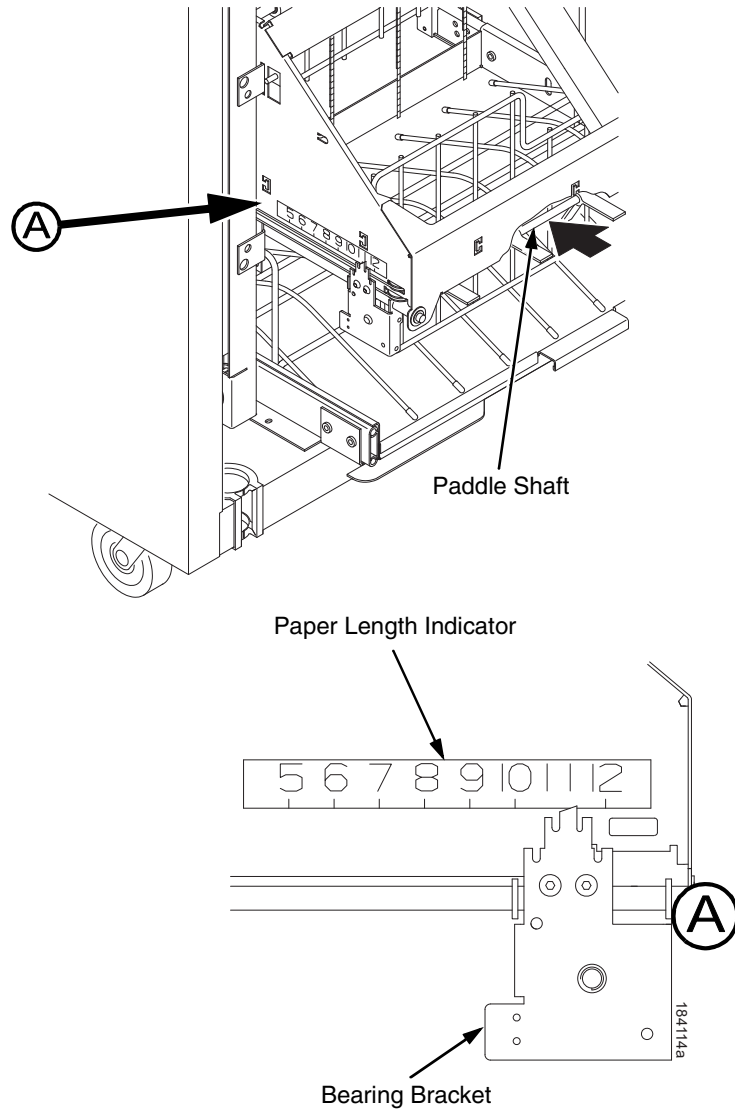
**Figure 70. The Paper Length Indicator**

## Loading and Starting the Power Stacker

1. Press the **PAPER ADVANCE** key and hand feed the paper down into the paper throat of the stacker. Continue to advance the paper until it reaches the paper tent (if installed) and feed three to five extra sheets into the stacker. Make sure the paper passes through the paper throat of the stacker. (Figure 71.)

2. Stack the extra pages on top of the wire paper tent (if installed), making sure the paper bends with the natural fold. (Figure 71.)

3. Press the **ON LINE** key to put the printer in the online state. The stacker elevator will return to the correct position for printing.

4. Check that the paper is still centered between the sides of the paper tent (if installed).

5. Close the cabinet rear door.

6. If necessary, set Top Of Form. (Refer to the *User's Manual.*)
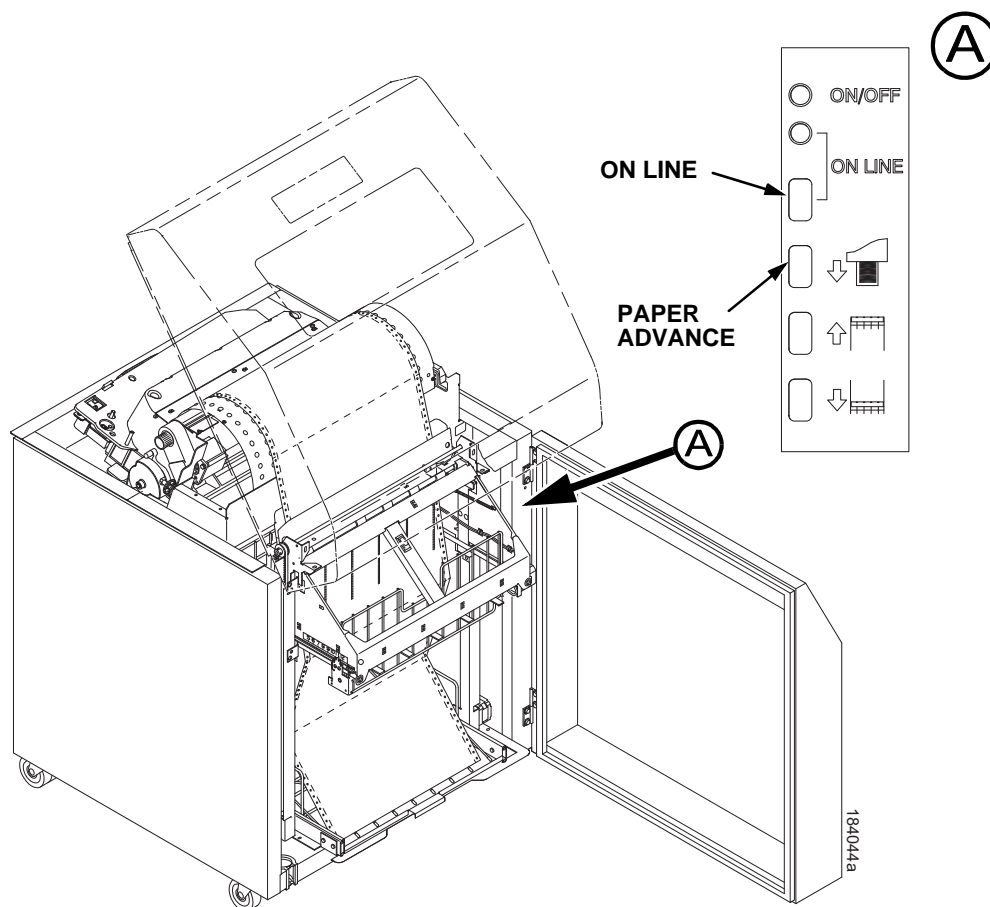


**Figure 71. Stacking Paper on the Wire Paper Tent**

# Stacker Problems

The power stacker augments the paper feed system of the printer. The most frequently occurring problems in the paper feed system are paper jams. Other problems that can occur are worn or poor electrical connections and cabling, worn or defective feed motors, worn or damaged mechanical components, or incorrect installation of the stacker assembly. Table 9 shows some of the problems that can occur with the power stacker and the page where you can find the troubleshooting procedure.

## Stacker First Inspection

**NOTE:** Do this inspection before doing any other troubleshooting or repair work on the power stacker.

1. Verify that the elevator seats all the way down on its left and right hand stops without having to force it down or hold it in position.

    a. If necessary, correct improper seating by moving the elevator all the way down to the bottom of its travel and loosen the drive belt pulley on the side(s) that does not seat properly.

    b. While holding the elevator in the fully down position, tighten the pulley setscrews.

    c. Verify that the elevator seats against both stops.

**ATTENTION** **While doing the next step, make sure the idler rollers do not interfere with the drive rollers as they move along the drive shaft.**

2. Verify that the friction washers do not bind on the driver shaft.

    a. Manually retract and hold the idler roller shaft so the paper throat is open. While the throat is open, slide the drive roller on one end toward the center of the shaft.

    b. Wipe a finger across the shaft and check for lubricant.

    c. Release the drive roller and allow it to spring back into position along the drive shaft.

    d. Repeat substeps a, b, and c on the other end of the driver shaft.

    e. Verify that there was no oil on the shafts.

    f. If the drive rollers returned to position without hanging up on the shaft, they are not binding and are OK.

    g. If there was oil on the shafts or the drive rollers hung up on the shaft, replace the roller drive shaft (page 483).

3. Power on the printer and move the stacker elevator up and down using the ELEVATOR UP and ELEVATOR DOWN keys on the rear operator panel.

    a. Check the stacker limit switches (page 207).

    b. Move the elevator up and down using the ELEVATOR UP and ELEVATOR DOWN keys on the rear operator panel. While the elevator is moving, press the ELEVATOR UP or ELEVATOR DOWN key. Elevator motion should stop.

    c. With the elevator at its lowest position, run the Shuttle Slow test (page 222) from the front operator panel. While the test runs, interrupt both IR beams, one at a time, and verify that the elevator rises.

    d. With the Shuttle Slow test running, verify that:
- Both paddle shafts rotate downwards towards the paper stack;
- While holding each of the idler rollers one at a time, the rest of the idler assembly continues to rotate freely;
- That the pinch rollers are rotating downwards at the pinch point;
- With the elevator at its lowest position, create a stack of four continuous forms. Press the FORM FEED key on rear operator panel. All of the forms should pass through the pinch rollers and stack normally.

## Stacker Confidence Check

1. Verify that all cables are properly connected at the back of the rear control panel.

2. From the rear control panel, do and observe the following:

    a. Power on the printer and make sure it goes the READY state.

    b. The green LED should be on.

    c. Press the ON LINE key and observe the yellow LED. The yellow LED should come on when the printer is online.

    d. The yellow LED should be off when the printer is offline.

    e. Press the PAPER ADVANCE (down arrow) key. The printer should do a form feed every time you press this key.

    f. Press and release the ELEVATOR UP key. The elevator should go up.

    g. Press and release the ELEVATOR DOWN key. The elevator should go down.

3. Disable the power stacker from the configuration menu using the front operator panel. With the printer in the offline state, press the ELEVATOR UP key on the rear control panel. The elevator should move upward and automatically stop when it reaches its highest position. (Do NOT force it up.)

4. Using the heaviest form available, slide the form over the paper path and into the stacker throat. It should be able to go through the stacker throat without having to force it. If the form cannot go through the stacker throat, do the STACKER JAM troubleshooting procedure on page 122.

5. With the power stacker still at its highest position, enable the power stacker using the configuration menu atthe front operator panel. Put the printer in READY state. The stacker elevator should automatically go to the lowest position possible, depending on how much paper is in the stacker tray.

6.  Using the rear operator panel, press the PAPER ADVANCE (down arrow) key until three or four pages feed through the stacker throat.

    a.  Check the LCD on the front operator panel for faults. If there is a fault, the paper out detector is failing and needs to be checked and cleaned.

    b.  If there are no faults on the LCD, load the forms in the printer and through the stacker throat. Feed enough forms into the stacker so that they fold properly in the tray or stacker base.

7.  Run a Ripple Print or All H's print test (page 222), and make sure that both rows of rubber paddles are rotating inward and the pinch rollers are rotating downward.

8.  Run the All E's + FF test (page 222) for ten pages. The stacker should stack and fold the paper without errors.

9.  Move the elevator up approximately one inch and cover the emitter with opaque or black tape. From your laptop or the host computer, run a multiple page print job. The elevator should start to move upward about 1/2 inch every three seconds until it reaches its topmost position. The LCD should display STACKER FULL when the elevator reaches the top of its travel.

10. Lower the elebator by pressing ELEVATOR DOWN key. The elevator should stop at its bottom position without motor noise. If you hear motor noise, do the "Stacker 'chatters' at upper or lower limit" procedure on page 205.

11. Set the elevator at the lowest position permitted by the amount of paper stacked in the tray. Run an operator print test and induce a paper jam before the paper throat of the power stacker. STACKER JAM should display on the front operator panel.

12. If the stacker has not failed any test up to this point, the stacker checks out OK. If errors occurred during these checks refer to Table 4 on page 52 and troubleshoot the appropriate symptom. When the stacker is operational, clear the error log and place the printer online.

## Stacker Motor Check

1.  Power off the printer.

2.  Open the rear cabinet door.

3.  Unfasten the cable clamp holding the stacker control panel cables.

4.  Disconnect stacker rail cable connector P107 from J3 on the back of the stacker operator panel.

5.  Disconnect stacker frame cable connector P102 from connector J4 on the back of the stacker operator panel.

6.  Find pin 1 of connectors P107 and P102.

7.  Check both cables for damaged pins, continuity, and shorts.

8.  Check all four stacker motors for 15.2 ± 1.5 Ohms resistance per phase.
    All four motors are the same:
    Measure pin 1 to pin 2 for Phase A
    Measure pin 3 to pin 4 for Phase B
    pin 1 = red
    pin 2 = yellow
    pin 3 = orange
    pin 4 = brown

    a.  Elevator motor assembly connector J3, pins 6, 7, 8, and 9

    b.  Rear paddle motor assembly (M1) connector J4 pins 2, 3, 4, and 5

    c.  Front paddle motor assembly (M2) connector J4 pins 6, 7, 8, and 9

    d.  Pinch roller motor assembly connector J4 pins 11, 12, 13, and 14

9.  Replace any cable that is damaged or fails continuity/shorts check.

10. Replace any motor that fails the resistance check.

**Table 9. Power Stacker Problems**

| Symptom | Origin of Symptom | Explanation | Solution |
|---|---|---|---|
| Printer does not detect presence of power stacker | Reported by user. | Various causes possible. | page 204 |
| STACKER FAULT | Message on control panel LCD. | This message is triggered when the elevator cannot reach the top or bottom limit switch before timing out. | page 120 |
| STACKER FULL | Message on control panel LCD. | Status message: the power paper stacker is full. | page 121 |
| STACKER JAM | Message on control panel LCD. | Paper is bunching above the elevator or the paper motion detector is not working properly. | page 122 |
| Stacker "chatters" at upper or lower limit | Reported by user. | Various causes possible. | page 205 |
| Stacker does not stack properly | Reported by user. | Various causes possible. | page 206 |
| Stacker elevator does not move | Reported by user. | Various causes possible. | page 206 |
| Stacker elevator moves by itself | Reported by user. | Various causes possible. | page 206 |

**Table 9. Power Stacker Problems**

| Symptom | Origin of Symptom | Explanation | Solution |
|---------|-------------------|-------------|----------|
| Stacker limit switch check | Other troubleshooting procedures. | A procedure that tests the motion limit switch at the top and bottom of the right vertical rail. You will usually be referred to this procedure from other troubleshooting procedures. When you have completed this procedure, return to the procedure that sent you there. | page 207 |
| Stacker motor check | Other troubleshooting procedures. | A procedure that tests the four stacker motors and their cables. You will usually be referred to this procedure from other troubleshooting procedures. When you have completed the procedure, return to the procedure that sent you there. | page 208 |
| Stacker not operating | Reported by user. | Same symptom as "Printer does not detect presence of power stacker" | page 204 |

# Removing the Power Stacker

1.   Set the printer power switch to O (off).

2.   Unplug the power cord.

3.   Unload paper from the stacker area. (Refer to the *User's Manual.)*

4.   Remove the paper tent (if present). (Figure 72.)
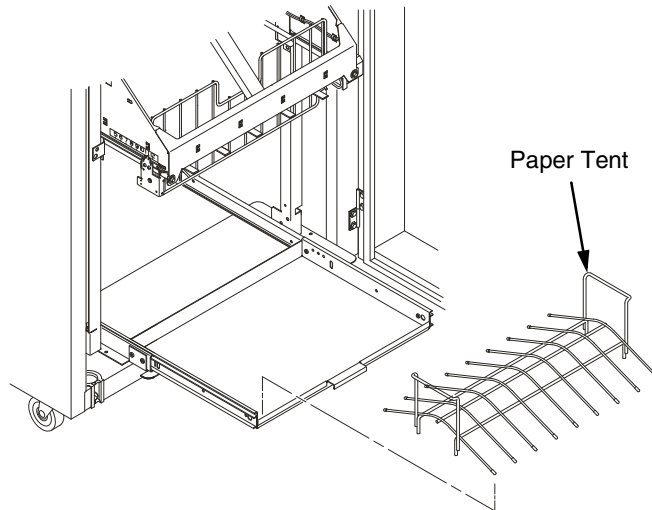
Paper Tent

**Figure 72. Removing the Paper Tent**

5.   Cut the tie wrap (if present) and remove the paper fence. (Figure 73.)

Paper
Fence

Stacker
Base
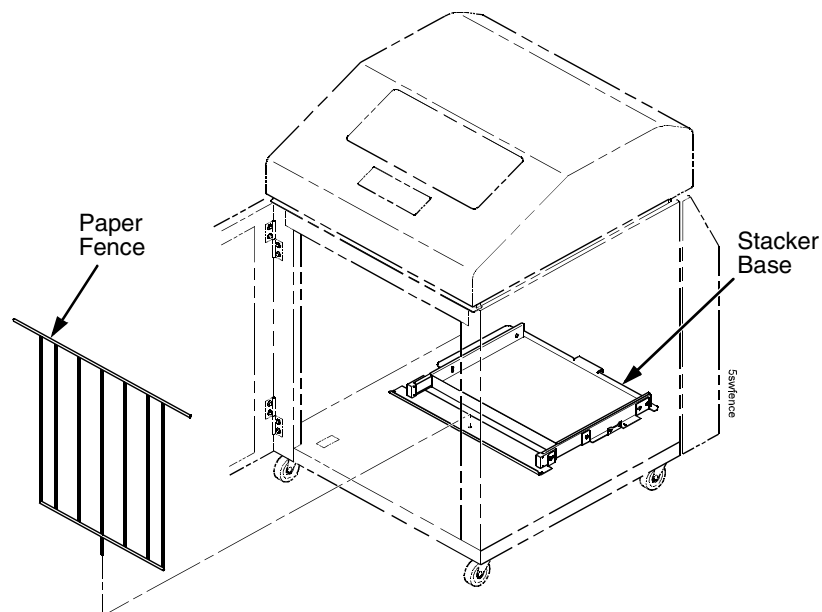
**Figure 73. Removing the Paper Fence**

6. Remove the two 10-32 x 5/32 inch buttonhead screws and washers securing the vertical rails to the upper frame cross-member at the rear of the cabinet. (Figure 74.)

7. Remove the two Torx T-10 screws securing the stacker base to the cabinet floor. (Figure 74.)

8. Remove the two Torx T-10 screws that secure the rail bracket to the cabinet floor. (Figure 74.)
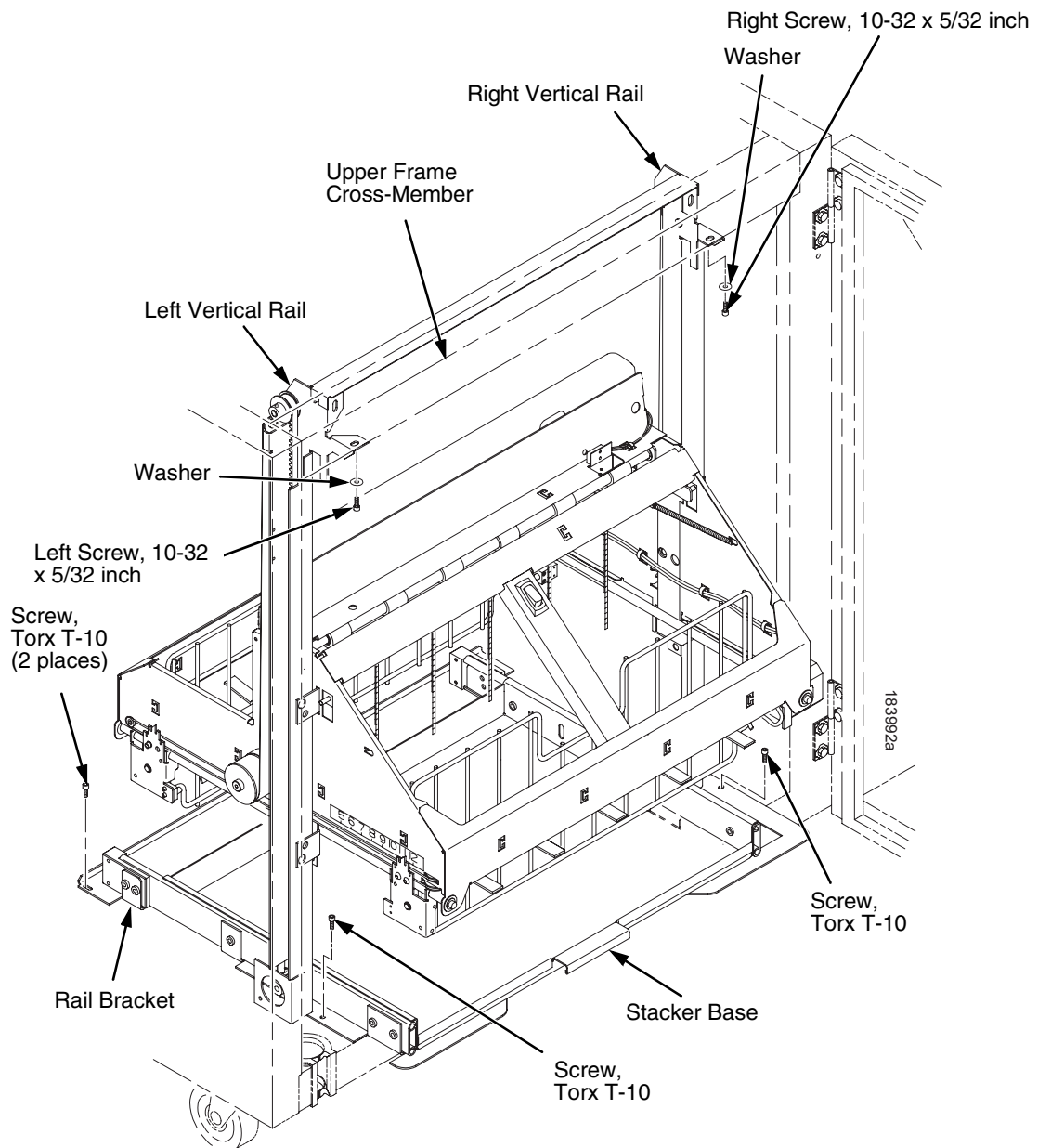
**Figure 74. Preparing the Stacker for Removal**

9. Pull the paper tray out until the holes in the rails permit access to the M3 buttonhead screws. (Figure 75.)

10. Loosen one turn (do not remove) the M3x6 screws securing the vertical
rails to the stacker base. Each rail is secured by two screws. (Figure 75.)

5snstin2

M3x6 Buttonhead Screw
(Two on each rail)

Access Hole in
Tray Rail
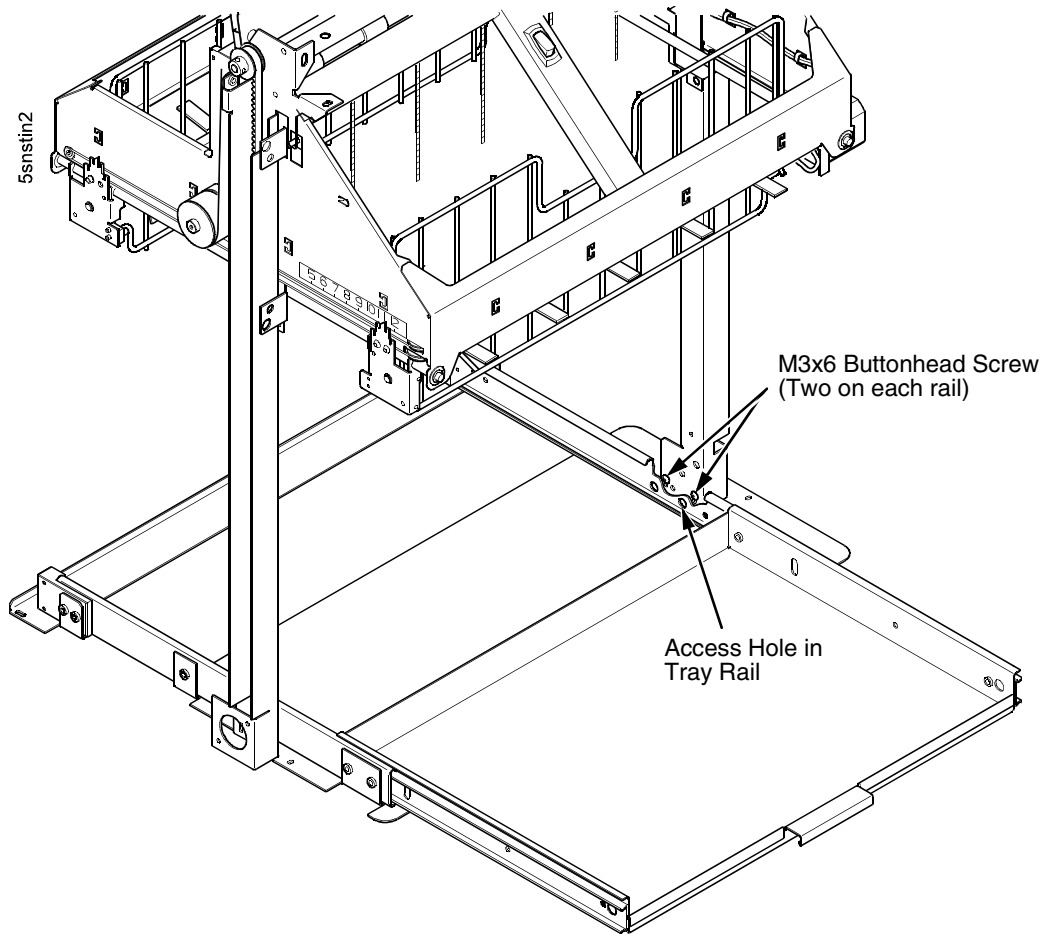
**Figure 75. The Lower Screws in the Vertical Rails**

11. Lower the elevator assembly to its lowest position. Tilt the vertical rails towards the front of the printer to make room for removing the control panel.

12. Remove the two 4-40 x 1/4 inch screws securing the elevator I/O cable to the elevator assembly and disconnect the stacker I/O cable. (Figure 76.)

Do not grasp the stacker in this area to lift it.

Lift the stacker by grasping the vertical rails.

Vertical Rail

5swiocbl

Elevator Assembly

Stacker I/O Cable

Screw, 4-40x1/4, Pan Head (2)
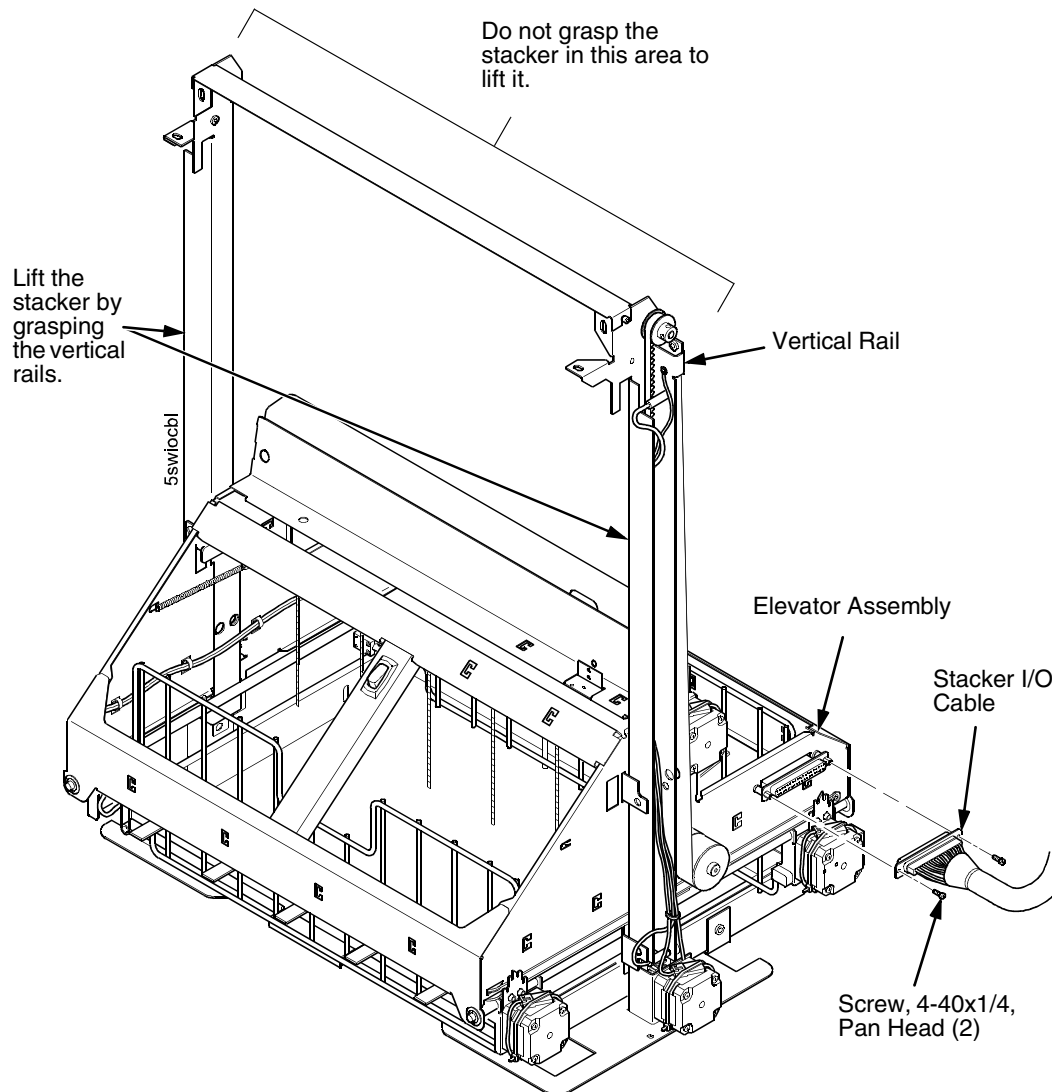
**Figure 76. Disconnecting the Stacker I/O Cable**

13. Remove two screws, washers, and the standoff from the stacker control panel. (Figure 77.)
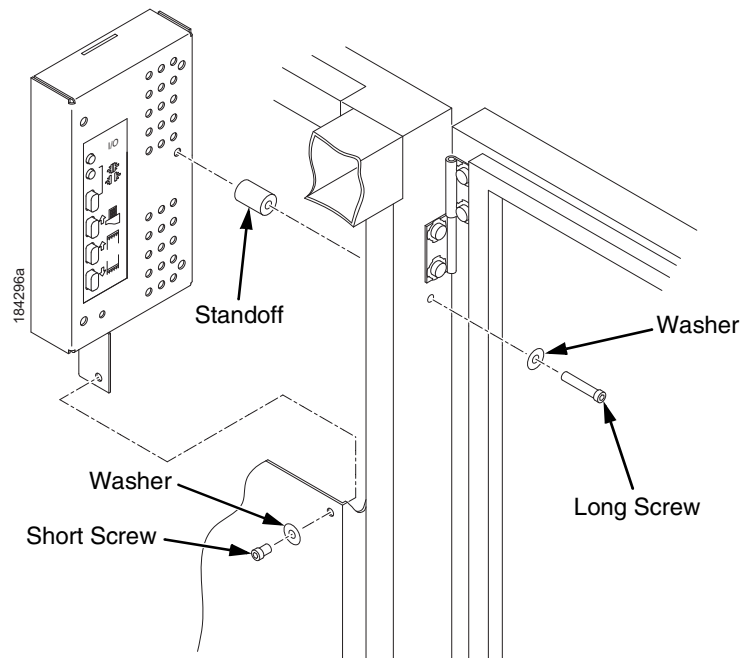


**Figure 77. Removing the Stacker Control Panel**

14. Remove four cables from the stacker control panel, and remove the stacker control panel. (Figure 78.)
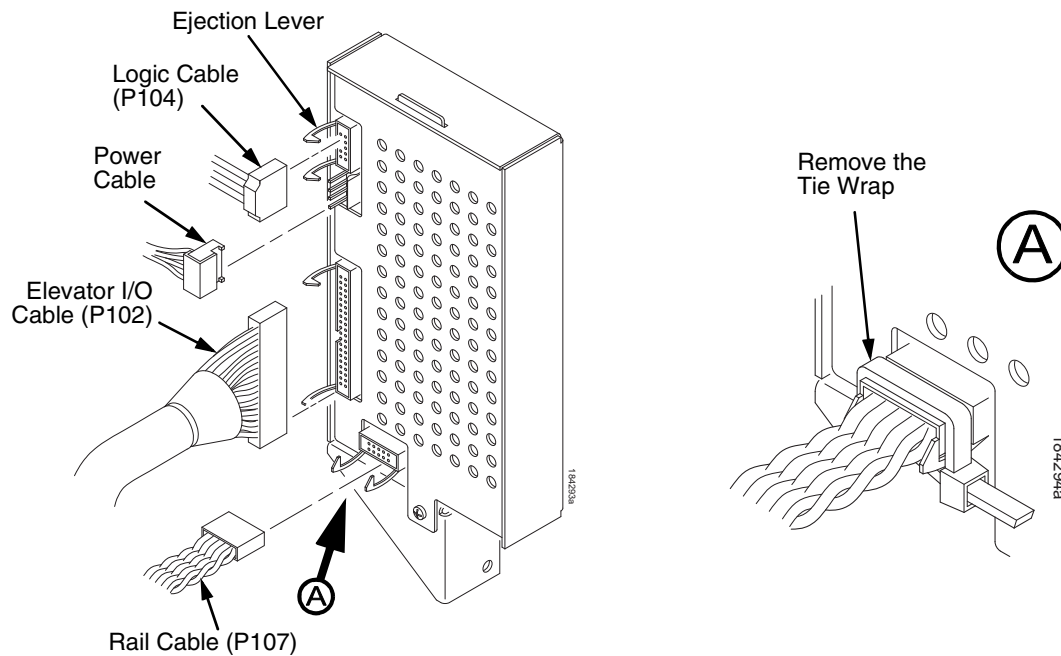


**Figure 78. Removing Cables from the Stacker Control Panel**

**NOTE:** It may be easier to wear gloves for the next step.

15. Slide the stacker assembly slightly to the right to clear the air exhaust duct. Tilt the vertical rails toward the front of the printer until they clear the upper frame cross-member. Grasping the stacker assembly by the vertical rails, lift and slide it to the rear and angle it out of the cabinet, as shown in Figure 79.



Upper Frame
Cross-Member

Elevator
Assembly

Vertical Rail

184292a
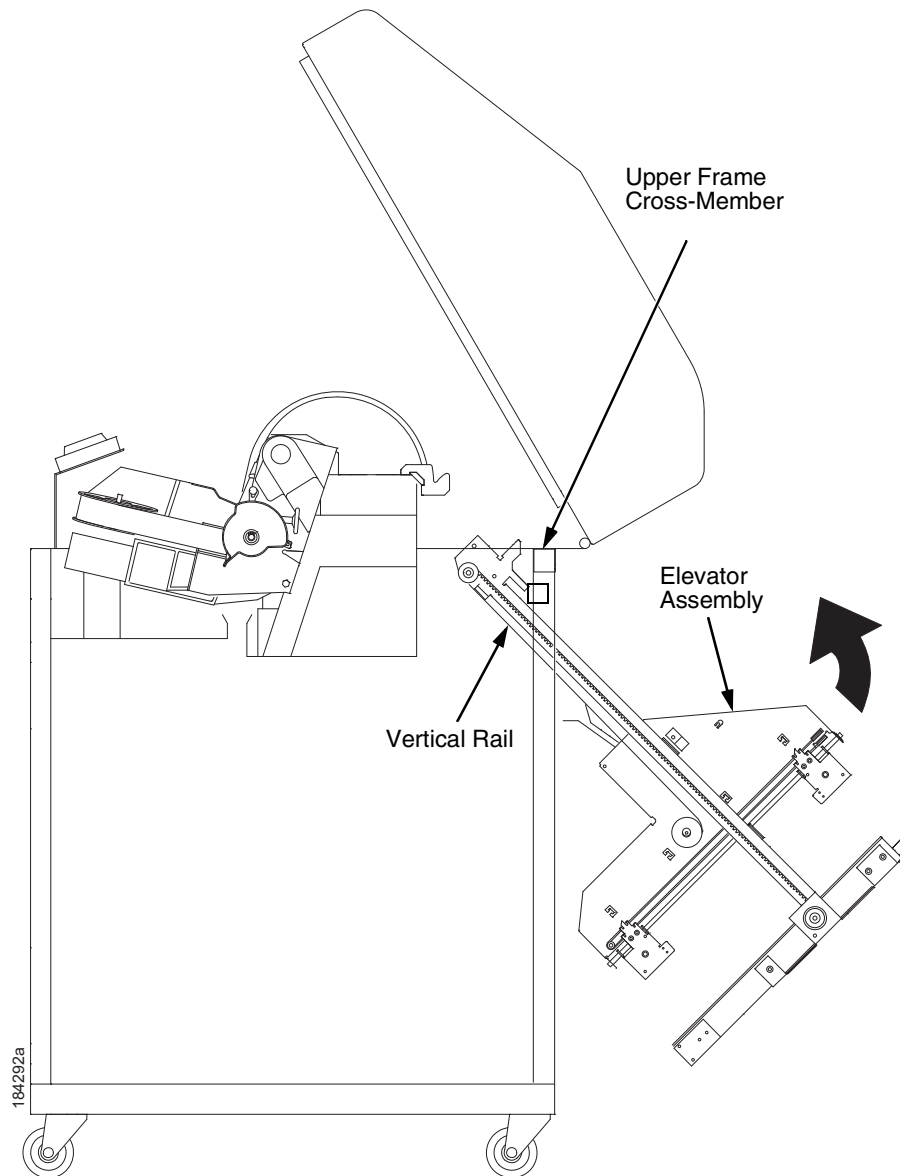
**Figure 79. Removing the Stacker Assembly**

# Installing the Power Stacker

**NOTE:** This section shows installation of the power stacker assembly, the stacker cable assemblies, and the stacker control panel.

1.  Set the printer power switch to O (off).

2.  Unplug the power cord.

3.  Remove paper.

4.  Loosen—do not remove—the three paper path hold-down screws. Slide the paper path to the left and lift it off the card cage. (Figure 80.)



Paper Path

Screw

Card Cage

Screw

183943a
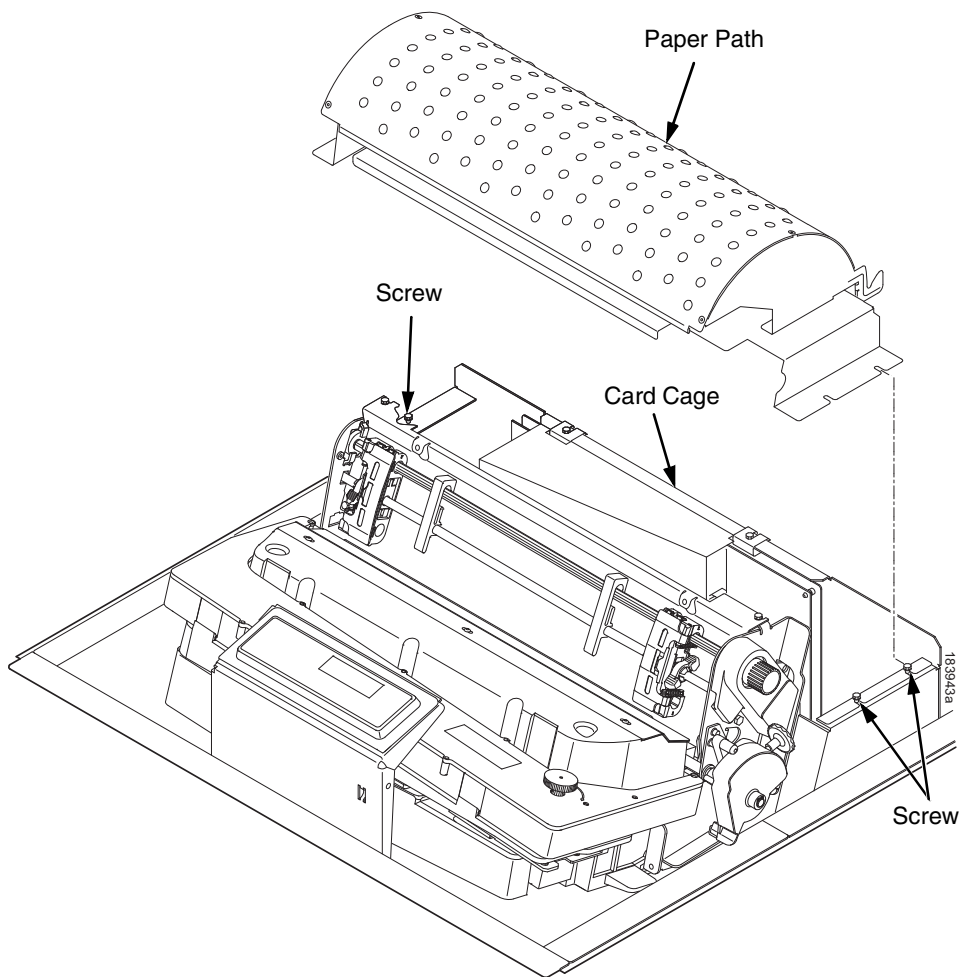
**Figure 80. Remove the Paper Path**

5.  Connect the power stacker logic cable P103 to connector J117 on the controller board. (Figure 81.)

6.  Disconnect the power supply cable from connector J101 on the controller board. (Figure 81.)

7.  Connect power supply cable connector P101 to the stacker power cable, then connect the stacker power cable to connector J101 on the controller board. (Figure 81.)

8.  Route the stacker power cable in front of the controller board and down through the cutout under the card cage fan. (Figure 81.)

9.  Route the stacker logic cable in front of the controller board and down through the cutout under the card cage fan. (Figure 81.)
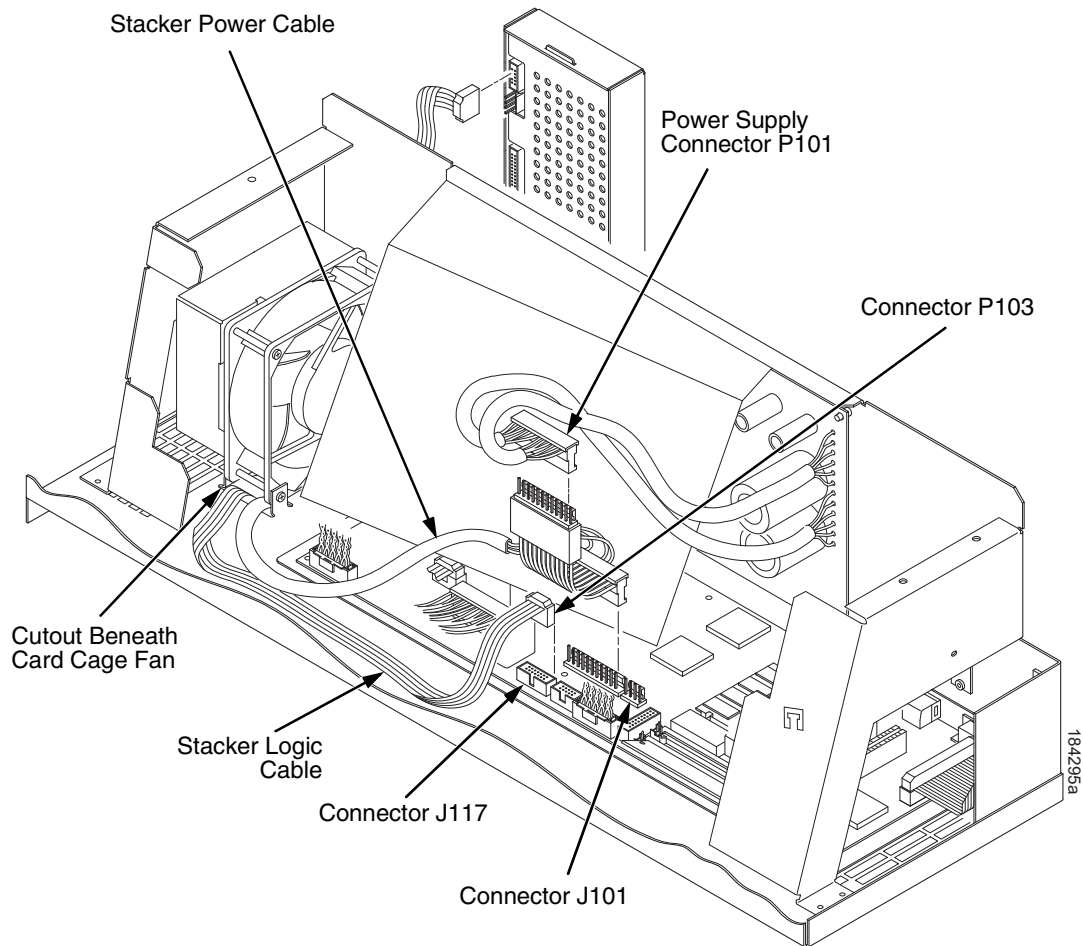
**Figure 81. Power Stacker Connections on the PSA3 Controller Board**

467

10. Pull the paper tray out until the holes in the rails permit access to the M3 buttonhead screws. (Figure 82.)

11. Loosen one turn—do not remove—the M3 screws securing the vertical rails to the stacker base. Each rail is secured by two screws. (Figure 82.)
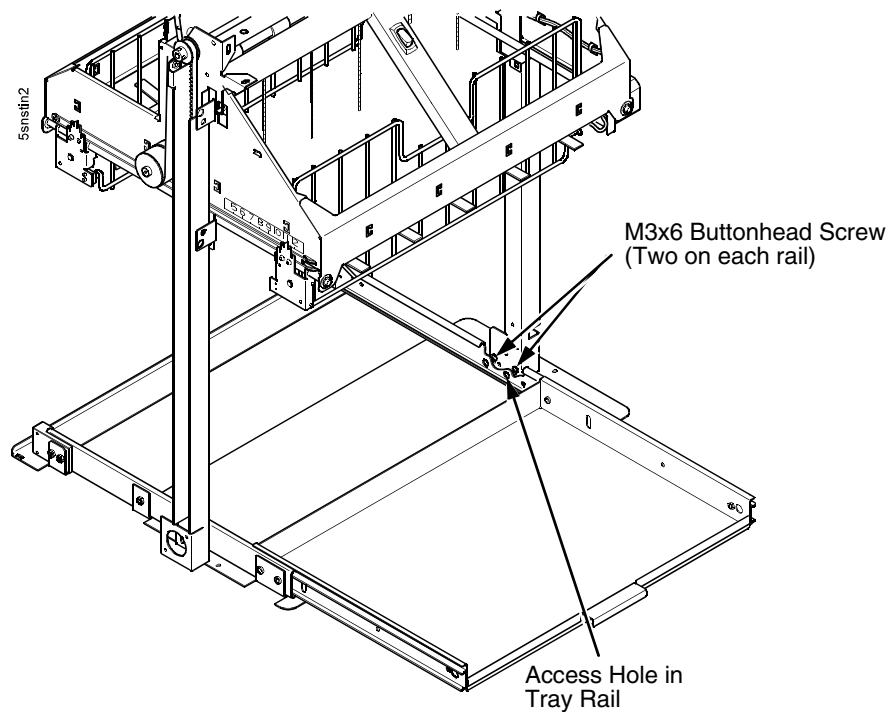


**Figure 82. The Lower Screws in the Vertical Rails**

M3x6 Buttonhead Screw
(Two on each rail)

Access Hole in
Tray Rail

12. Position the elevator assembly at the bottom of the vertical rails. (Figure 83.)

13. Connect the elevator I/O cable to the elevator assembly and install the two 4-40 x 1/4 inch screws, as shown in Figure 83.
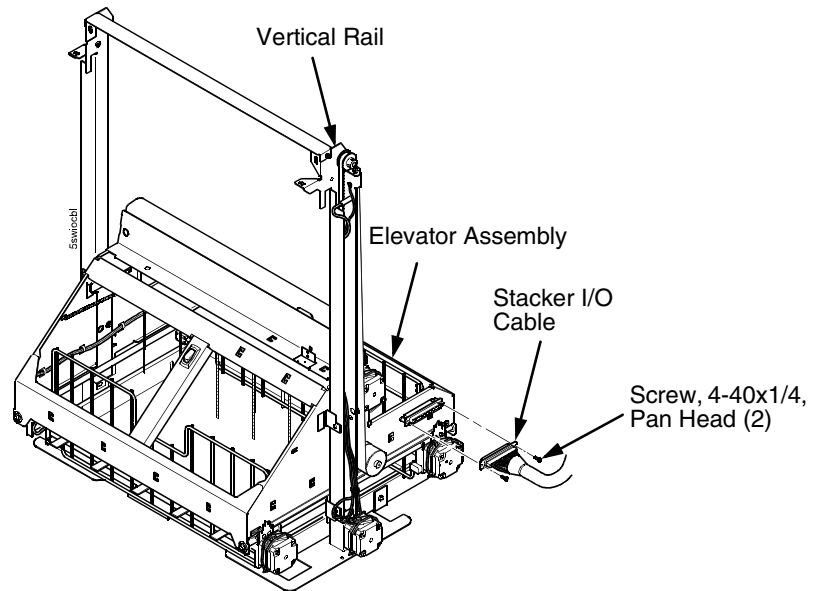


**Figure 83. The Elevator I/O Cable**

CAUTION     **The paper stacker assembly mounts to the rear upper frame cross-member and the cabinet floor. It is a snug fit. During installation, grasp the stacker by the vertical rails and take care to avoid scratching painted surfaces or damaging the stacker.**

**NOTE:** It may be easier to wear gloves for the next step.

14. Position the stacker assembly slightly to the right in order to clear the air exhaust duct, insert the vertical rails inside and under the upper frame cross-member, then slowly swing the base of the stacker assembly into the cabinet. (Figure 84a.)

15. Work the stacker base rearward and engage the upper brackets of the vertical rails under the upper frame cross-member. (Figure 84b.)

16. Align the holes in the vertical rail brackets with the holes in the upper frame cross-member. (Figure 84c and Figure 85.)
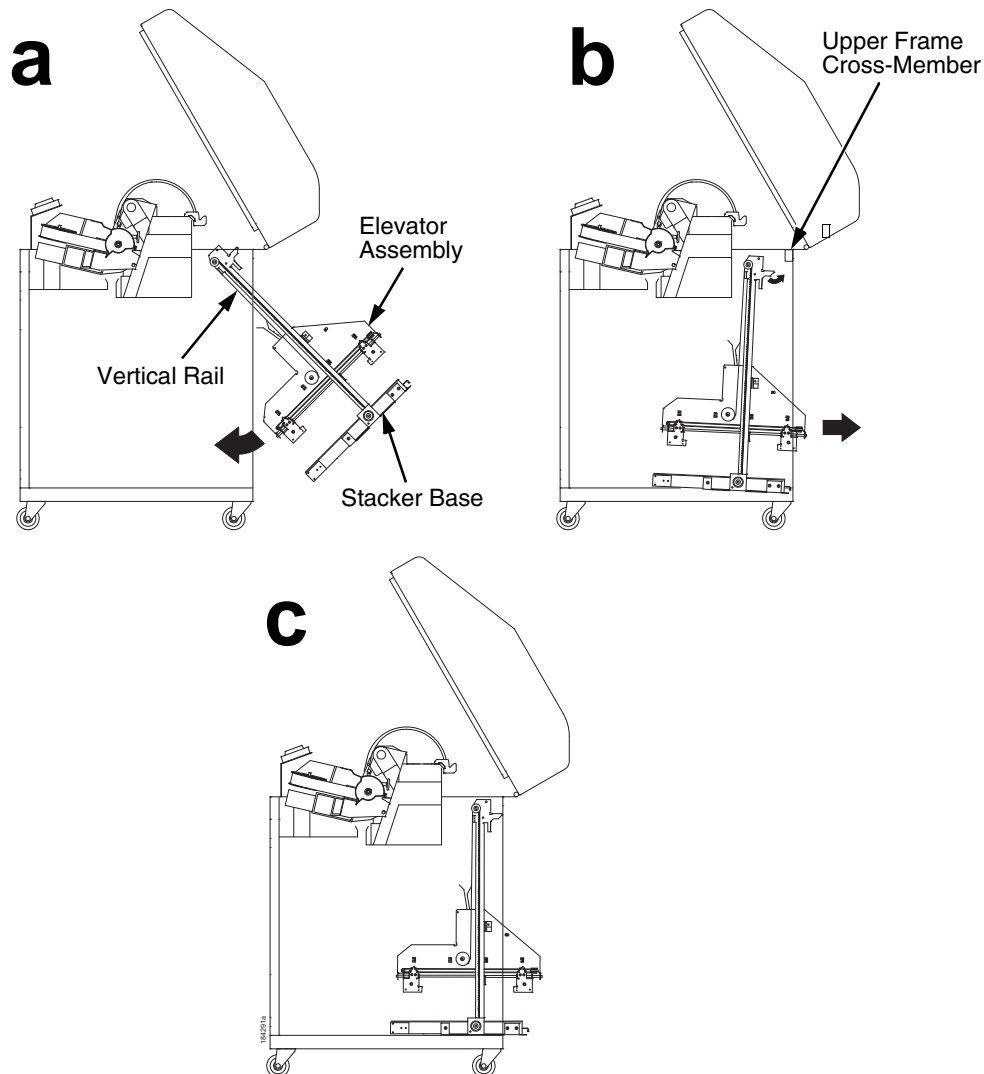


**Figure 84. Stacker Installation**

17. Align the holes in the stacker base with the holes in the cabinet floor. (Figure 84c and Figure 85)

18. Install finger tight the 10-32 x 5/32 inch buttonhead screw and washer securing the <u>left</u> vertical rail to the upper frame cross-member. (Do not install the right hand screw yet.) (Figure 85.)

19. Install and tighten the two Torx T-10 screws securing the stacker base to the cabinet floor. (Figure 85.)

20. Install and tighten the two Torx T-10 screws that secure the rail bracket to the cabinet floor. (Figure 85.)
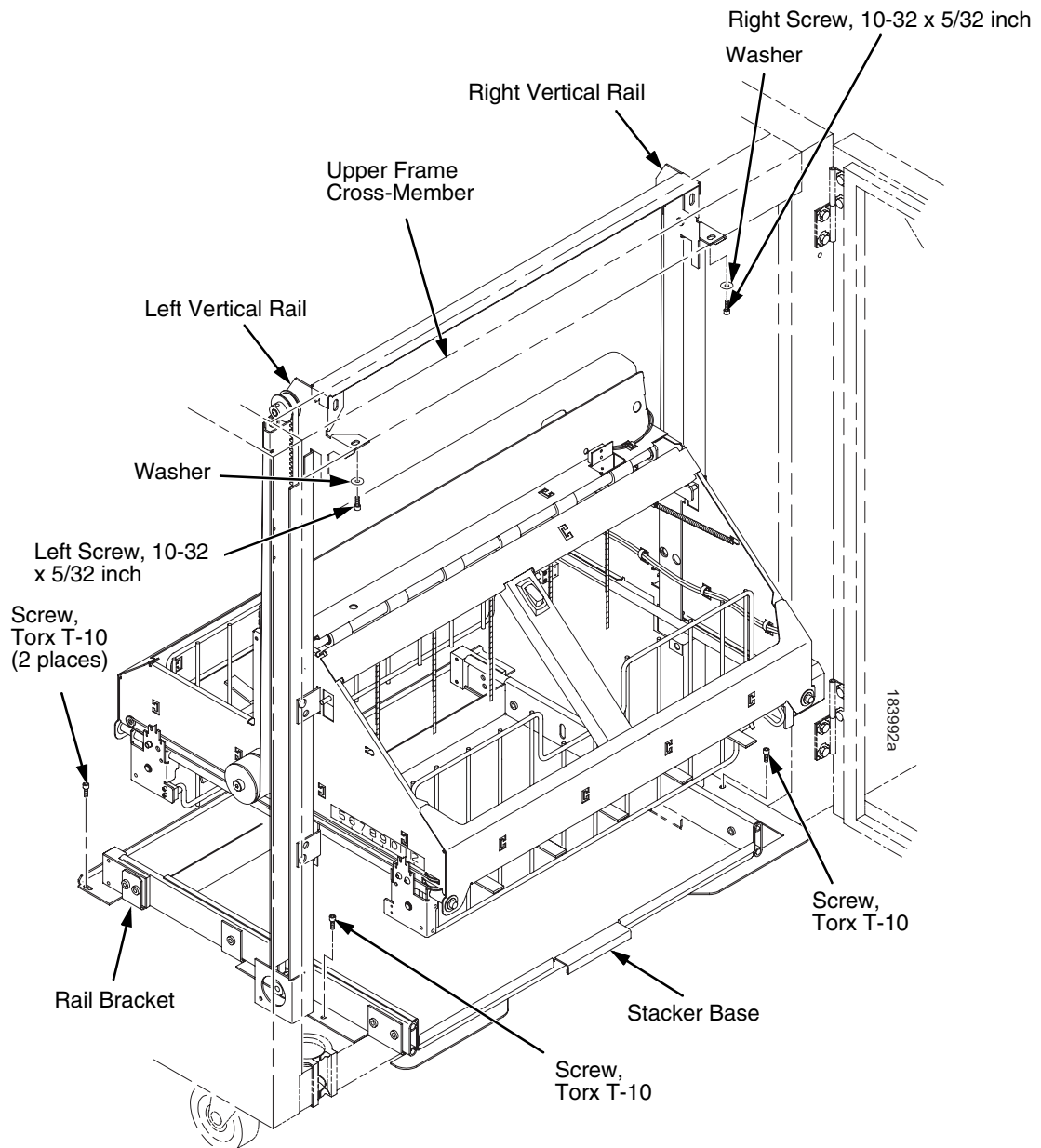


**Figure 85. Stacker Fasteners**

21. Gather the stacker rail cable, elevator I/O cable, logic cable, and power cable. Route the cables outboard of the elevator assembly. (Figure 86.)

Elevator Assembly

Elevator I/O Cable

Rail Cable

(To Control Panel)

(To Card Cage)

Stacker Power Cable

Stacker Logic Cable

5swroute
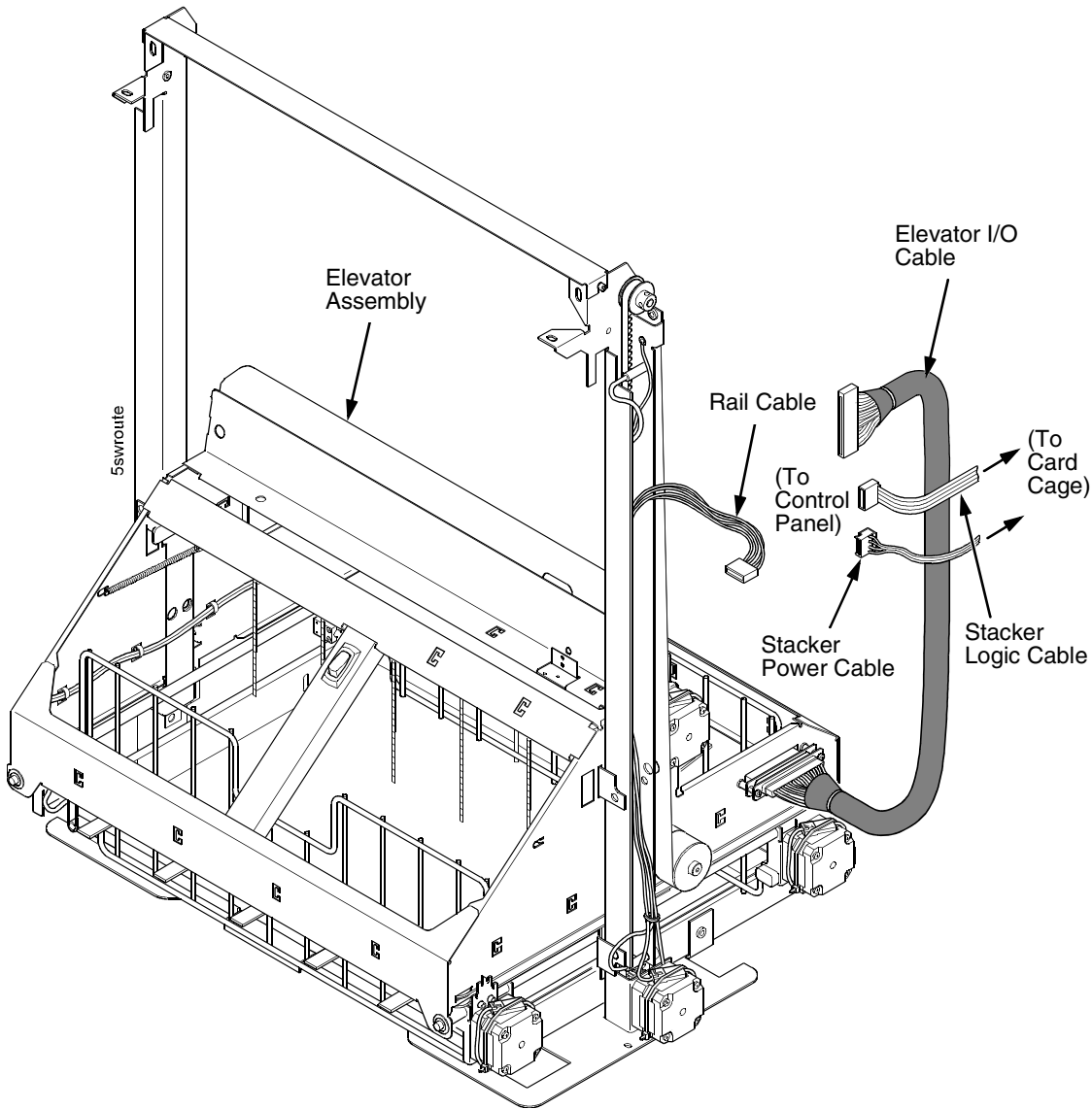
**Figure 86. Stacker Cable Routing**

22. Connect the stacker cables to the rear of the stacker control panel assembly and make sure the ejector levers close over the connectors. (Figure 87.)

23. Press rail cable connector P107 into the control panel until the ejectors close, then tie wrap the ejectors to the connector. (Figure 87, detail A.)

Ejection Lever

Logic Cable
(P104)

Power Cable

Elevator I/O Cable
(P102)

Rail Cable (P107)

A

184293a

Tie Wrap

A

184294a
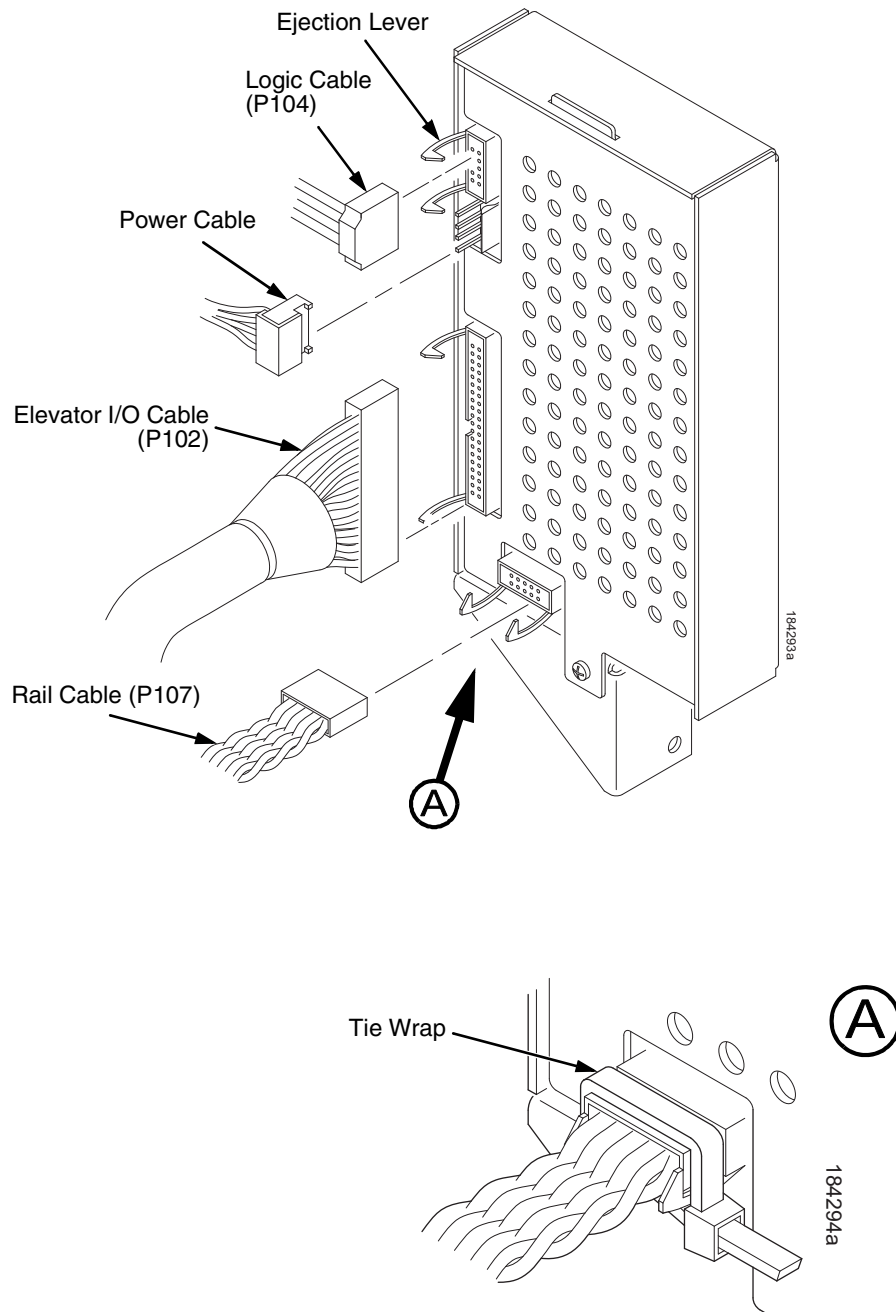
**Figure 87. Stacker Control Panel Cables**

473

24. Apply the double-sided tape to one end of the control panel standoff. Remove the paper backing and hold the standoff inside the cabinet while you insert the <u>upper</u> mounting screw and washer through the hole in the frame. Use the screw as a guide to align the standoff with the hole, then press the standoff against the inside wall and push the upper screw in as far as it will go. Now maneuver the control panel into position and install the upper mounting screw finger tight in the control panel. (Figure 88.)

25. Inspect the distance between the control panel lower bracket and the inner panel of the cabinet.

    a. If the control panel lower bracket is flush with the cabinet inner panel, proceed to step 26.

    b. If there is a gap between the control panel lower bracket and the cabinet inner panel, do the following:

    1) Peel the backing off the spacer adhesive. (Figure 88.)

    2) Align the spacer with the holes in the lower bracket and inner panel. (Figure 88.)

    3) Press the spacer adhesive against the inner panel. (Figure 88.)

26. Install the lower mounting screw and washer. Tighten the upper mounting screw. (Figure 88.)
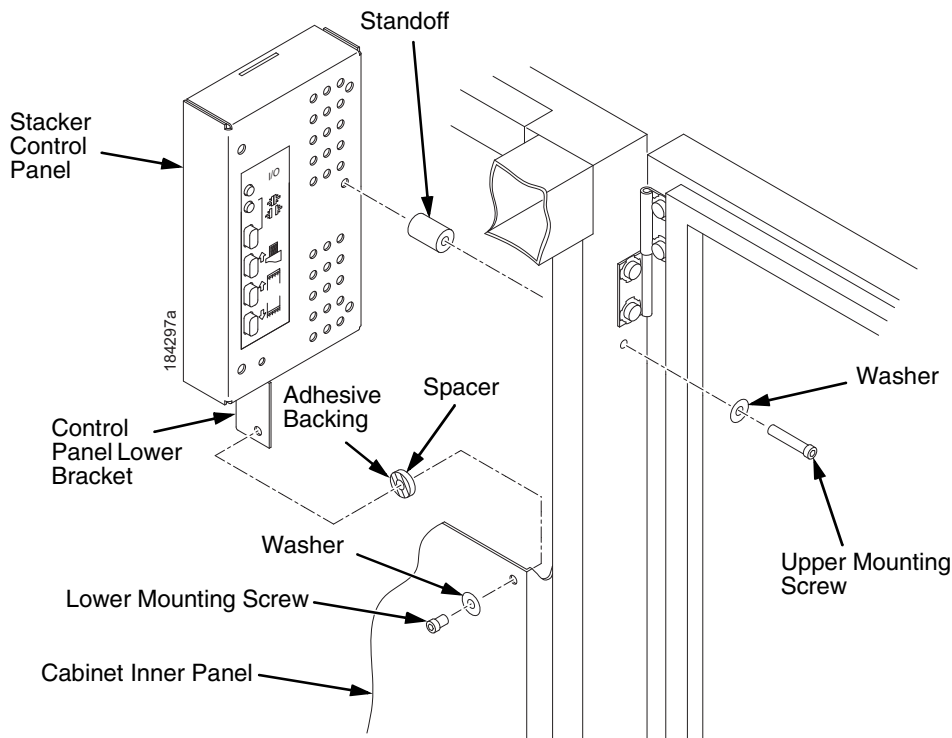


**Figure 88. Installing the Stacker Control Panel**

27. Install finger tight the 10-32 x 5/32 inch buttonhead screw and washer securing the <u>right</u> vertical rail to the upper frame cross-member. (Figure 85.)

28. Move the elevator assembly up and down on the vertical rails until it travels smoothly with no binding.

29. Tighten the two 10-32 x 5/32 inch buttonhead screws securing the vertical rails to the upper frame cross-member.

30. Pull the paper tray out until the holes in the rails permit access to the M3x6 screws. Tighten the M3 screws securing the vertical rails to the stacker base. Each rail is secured by two screws. (Figure 82.)

31. Move the elevator assembly up and down and make sure it travels smoothly with no binding. If the elevator binds or catches anywhere along its path of travel, slightly loosen the upper rail screws and repeat steps 28 and 29 until the elevator moves smoothly.

32. Bundle the stacker control panel cables in the wire saddles located under the card cage. Tie wrap the cables so they do not catch in the stacker mechanism as it moves up and down. Route the stacker rail and frame cables so they move without snagging as the elevator assembly moves up and down. (Figure 89.)

Cutout Beneath
Card Cage Fan

Stacker Cables

Wire Saddle

184439a
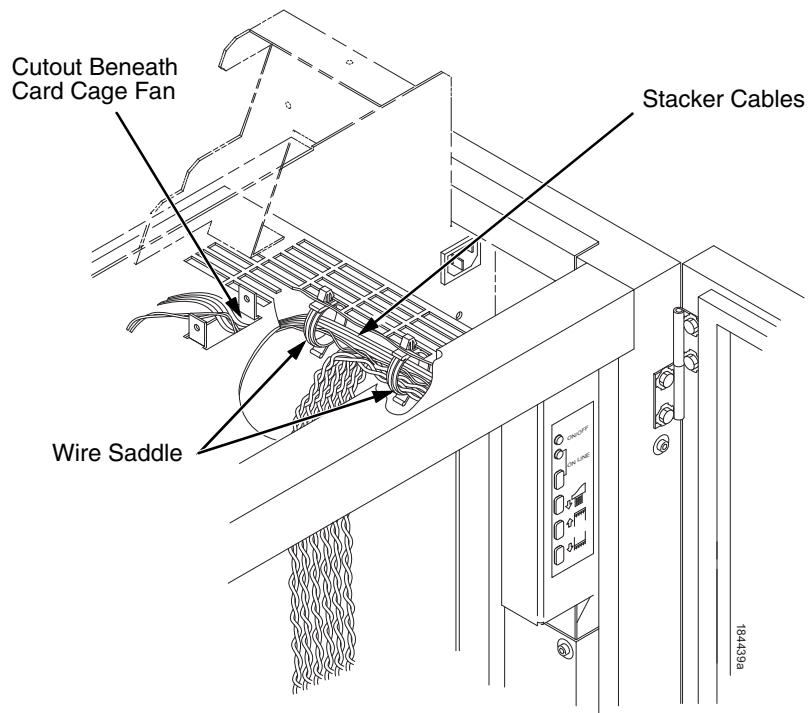
**Figure 89. Securing Stacker Cables**

33. Install the paper fence. (Figure 90.)

Paper
Fence

Stacker
Base

184440a
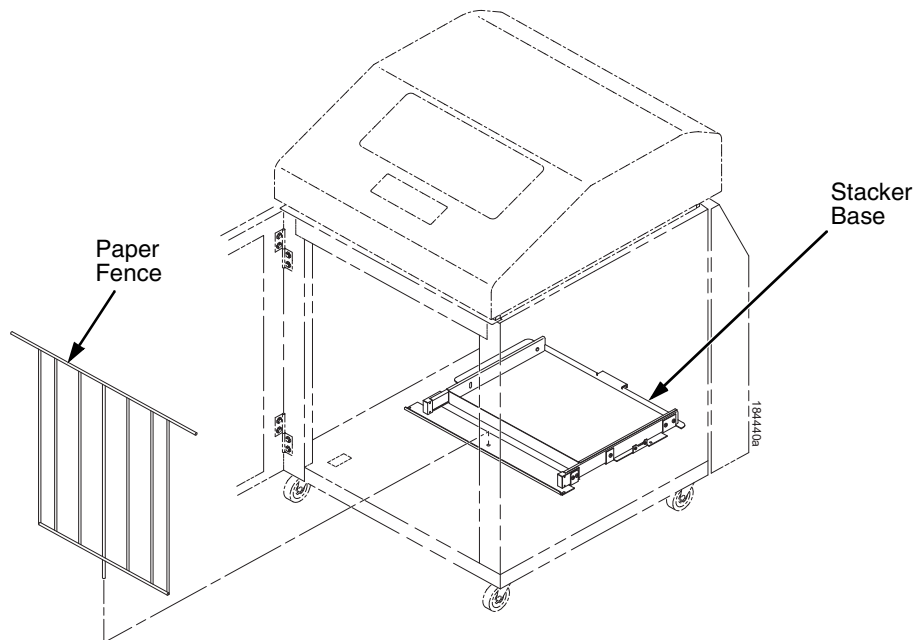
**Figure 90. Paper Fence**

34. If the paper you will use is not wider than 15.5 inches (39.5 cm), pull out the paper tray and install the paper tent. (Figure 91.) If the paper is wider than 15.5 inches (39.5 cm) leave the paper tent out of the printer

Ⓐ

Paper Tent

Paper Tray

Ⓐ

184120a

Note the positions of
the alignment tab and
the paper fence.
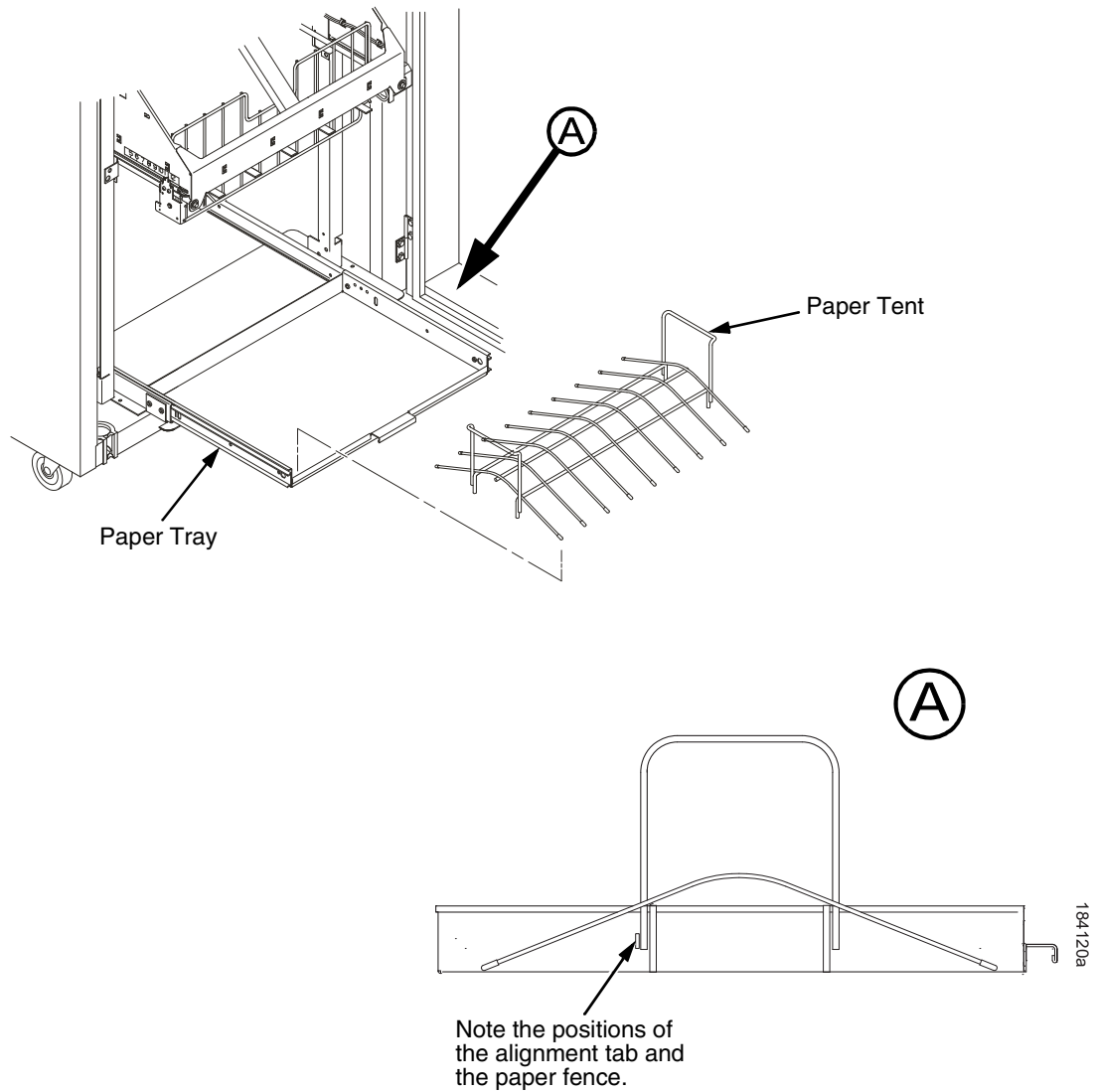
**Figure 91. Paper Tent**

35. Install the paper path that you removed in step 4.

36. Install paper and test stacker operation. (Refer to the *User's Manual.)*

# Replacing the Constant Force Spring

1.  Remove the stacker assembly from the printer. (See page 460.)

2.  Raise the elevator assembly to within about 1/4 inch of its highest position and secure it to the vertical rails using tie wraps or string. Do not over-tighten the tie wraps or string; tighten them just enough to hold the elevator up. (Figure 92.)

Tie Wrap

Elevator
Assembly

Tie Wrap

184443a
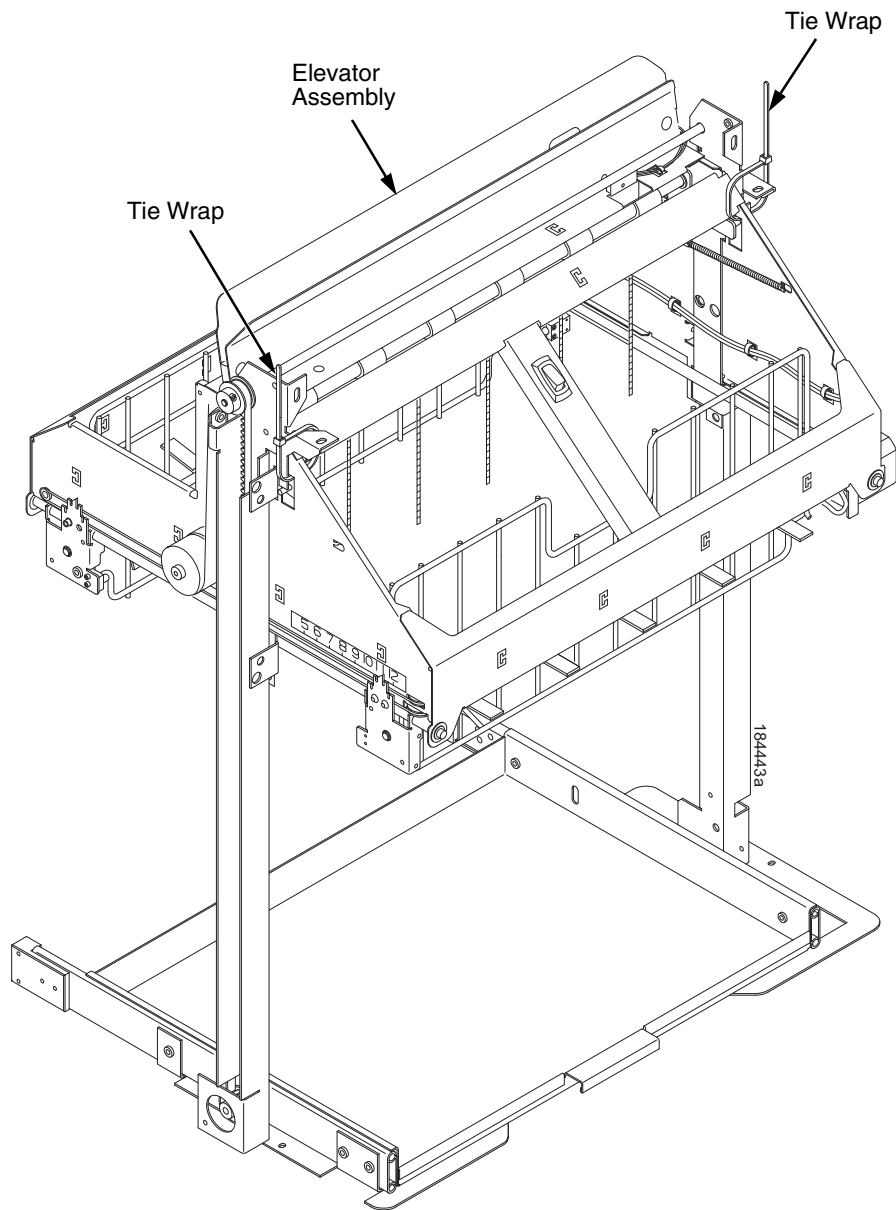
**Figure 92. Securing the Elevator Assembly**

**WARNING**    **The constant force spring is powerful and under high tension. Protect your hands with gloves. To avoid pinching or cutting your fingers, grip the spring and drum firmly in the next two steps. Coil the spring slowly and carefully. Do not let the spring twist or crimp.**

3. Remove the shoulder screw, large washer, spacer, and small washer from the constant force spring and drum. Let the spring coil itself up until it reaches the top of its travel on the vertical rail. (Figure 93.)

4. Firmly gripping the spring and drum, remove the rail screw and washer securing the spring to the vertical rail. (Figure 93.)

5. Position a new constant force spring on the vertical rail and install the rail screw and washer. (Figure 93.)

6. Install the shoulder screw, large washer, spacer, and small washer as shown in Figure 93.
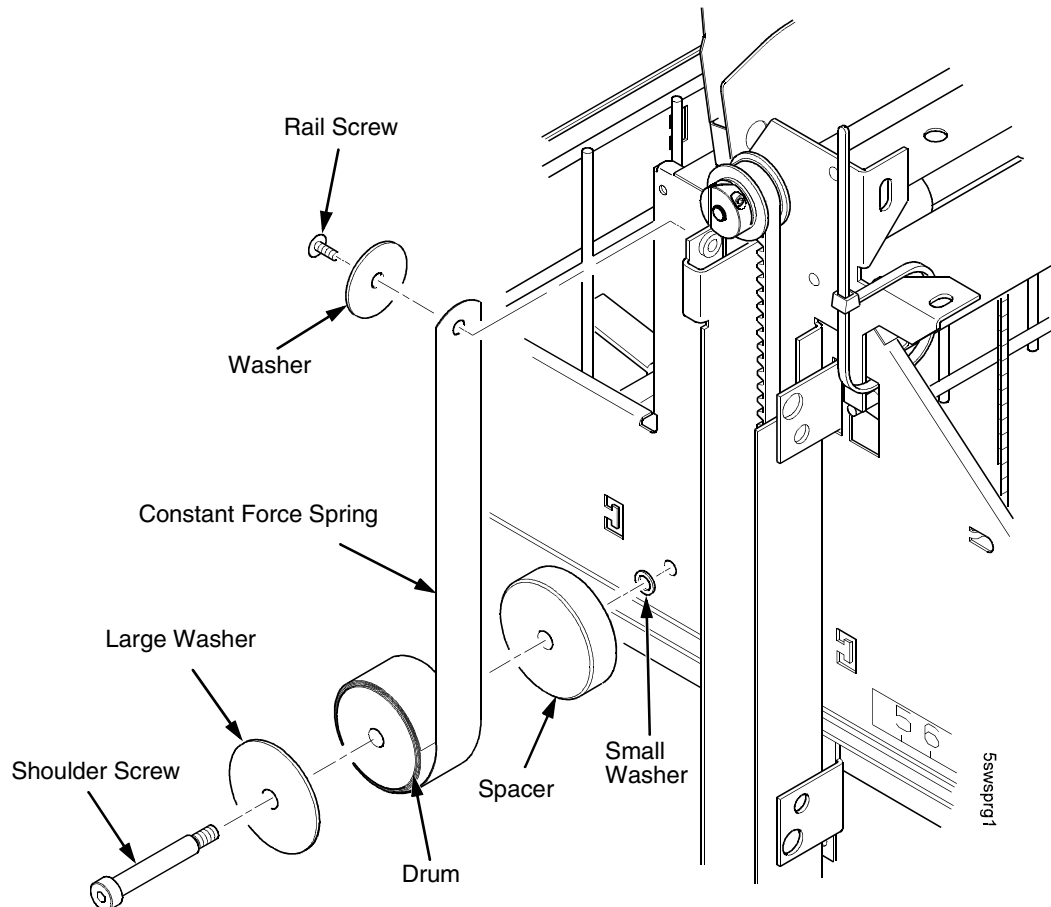


**Figure 93. Removing and Installing the Constant Force Spring**

# Replacing the Timing Belts

1.  Remove the stacker assembly from the printer (page 460).

2.  Raise the elevator assembly to its highest position and secure it to the vertical rails using tie wraps or string. Do not over-tighten the tie wraps or string; tighten them just enough to hold the elevator up. (Figure 92, page 478.)

3.  If you are removing the left timing belt, remove the screw and washer from the pulley at the bottom of the left vertical rail, and remove the pulley. (Figure 94.) Go to step 6.

4.  If you are removing the right timing belt, remove the two metric Allen screws that secure the timing belt motor to the right vertical rail. (Figure 94.) Go to step 5.
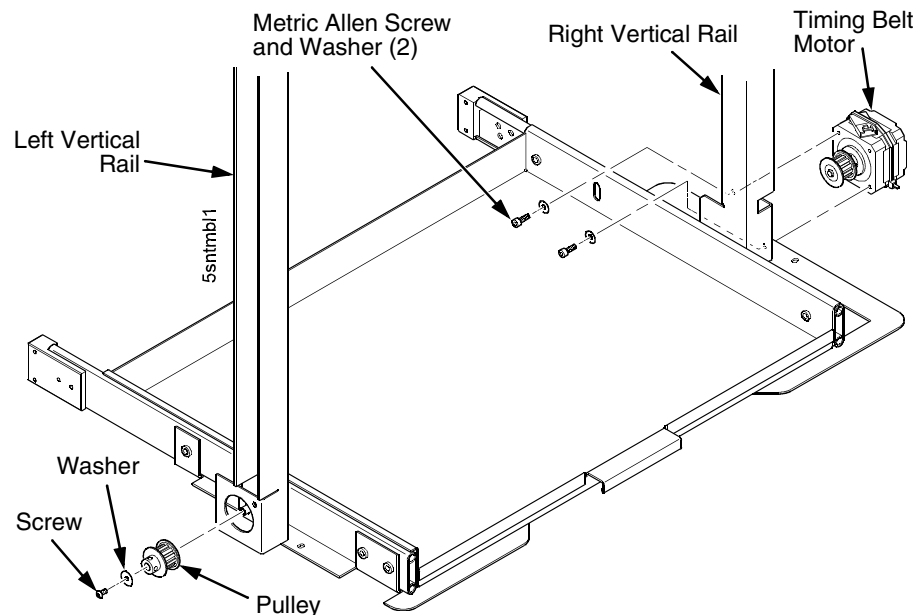
**Figure 94. Removing the Timing Belt Pulley and Motor**

5.  Loosen the two setscrews on the motor pulley and remove the pulley. Unplug the motor cable, if necessary. (Figure 95.) Go to step 6.
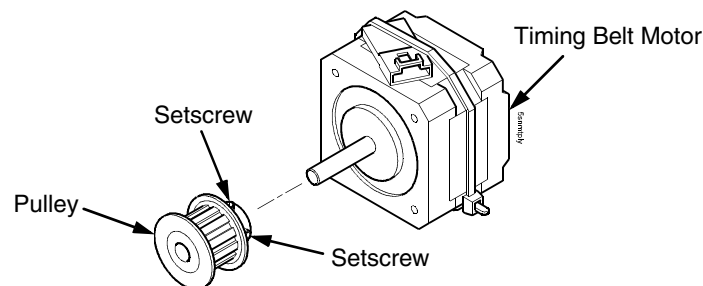
**Figure 95. Removing the Timing Belt Motor Pulley**

6.  Remove the shoulder screw and large washer that secure the constant force spring to the vertical rail. (Figure 96.)

NOTE: Left is shown.
Right is the same.

Constant Force Spring

Large Washer

Shoulder Screw

5swsprg1
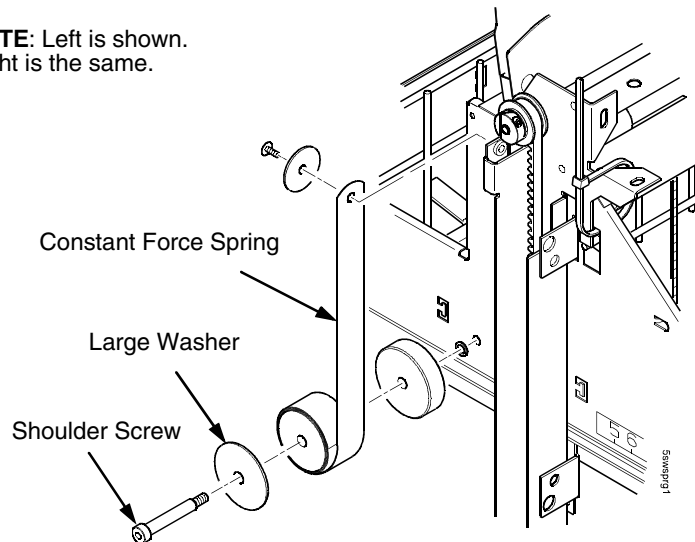
**Figure 96. Releasing the Constant Force Spring**

7.  Remove two Allen screws from the belt clamp that secures the timing belt to the stacker frame. (Figure 97.)

Allen Screw

Belt Clamp

6sntmbl2

Allen
Screw
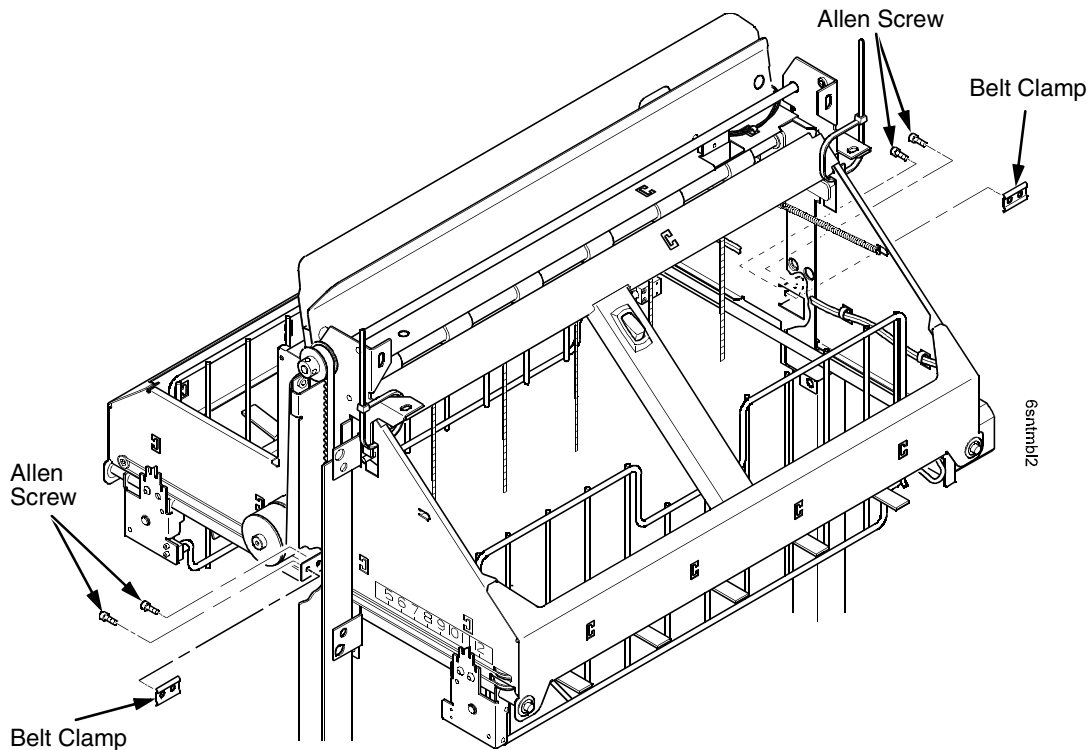
Belt Clamp

**Figure 97. Removing the Belt Clamps**

8. Remove the timing belt by working it around the vertical rail and constant force spring. (Figure 98.)

9. To install a timing belt, reverse the steps of this procedure.

**NOTE**: Left timing belt is shown. Right is the same.

Timing Belt

5sntmbl3
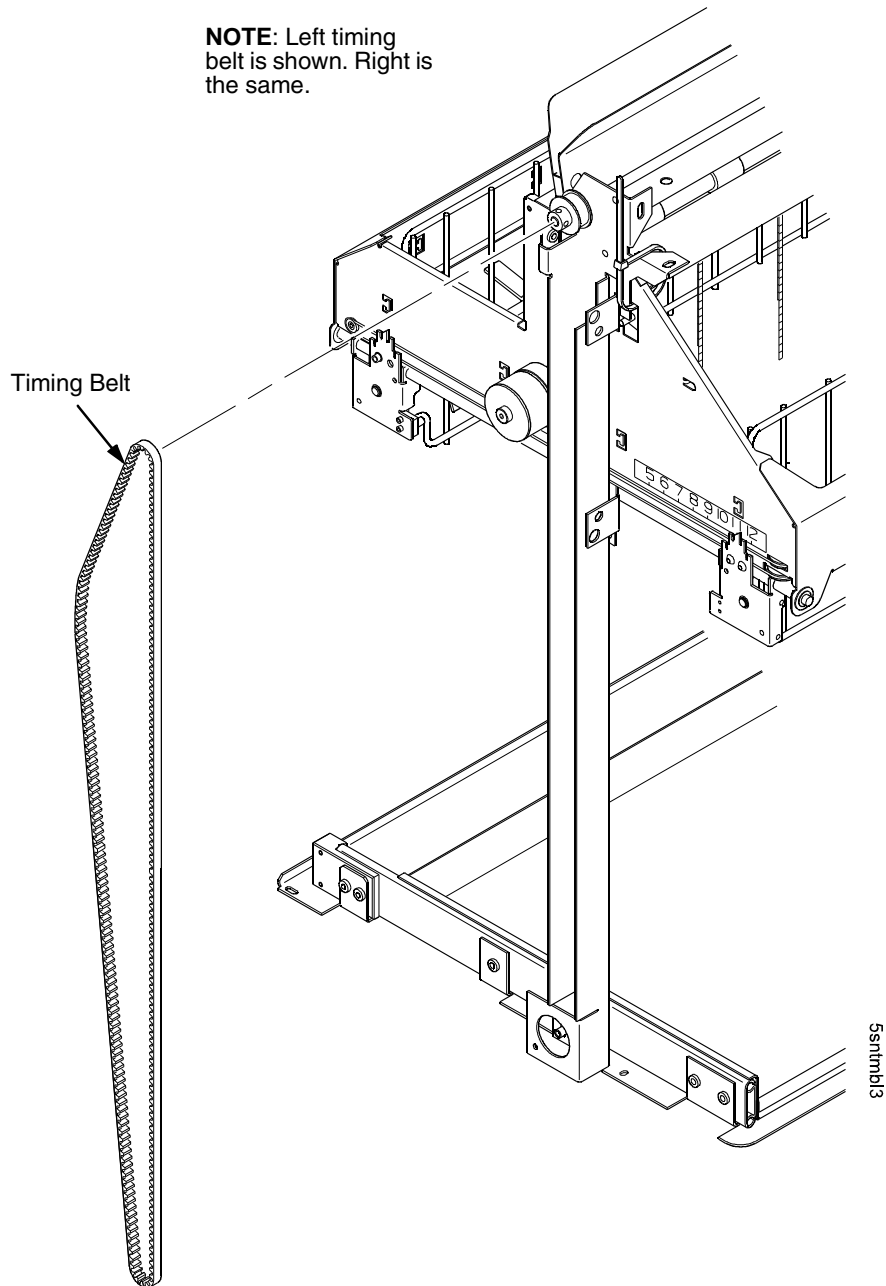
**Figure 98. Removing the Timing Belt**

# Replacing the Roller Drive Shaft

1.  Remove the stacker assembly from the printer (page 460).

2.  Unhook the right bearing pivot plate's extension spring from the tab on the elevator. (Figure 99.)

3.  Using an M-2 Allen wrench, remove the screw securing the right bearing pivot plate to the elevator. (Figure 99.)
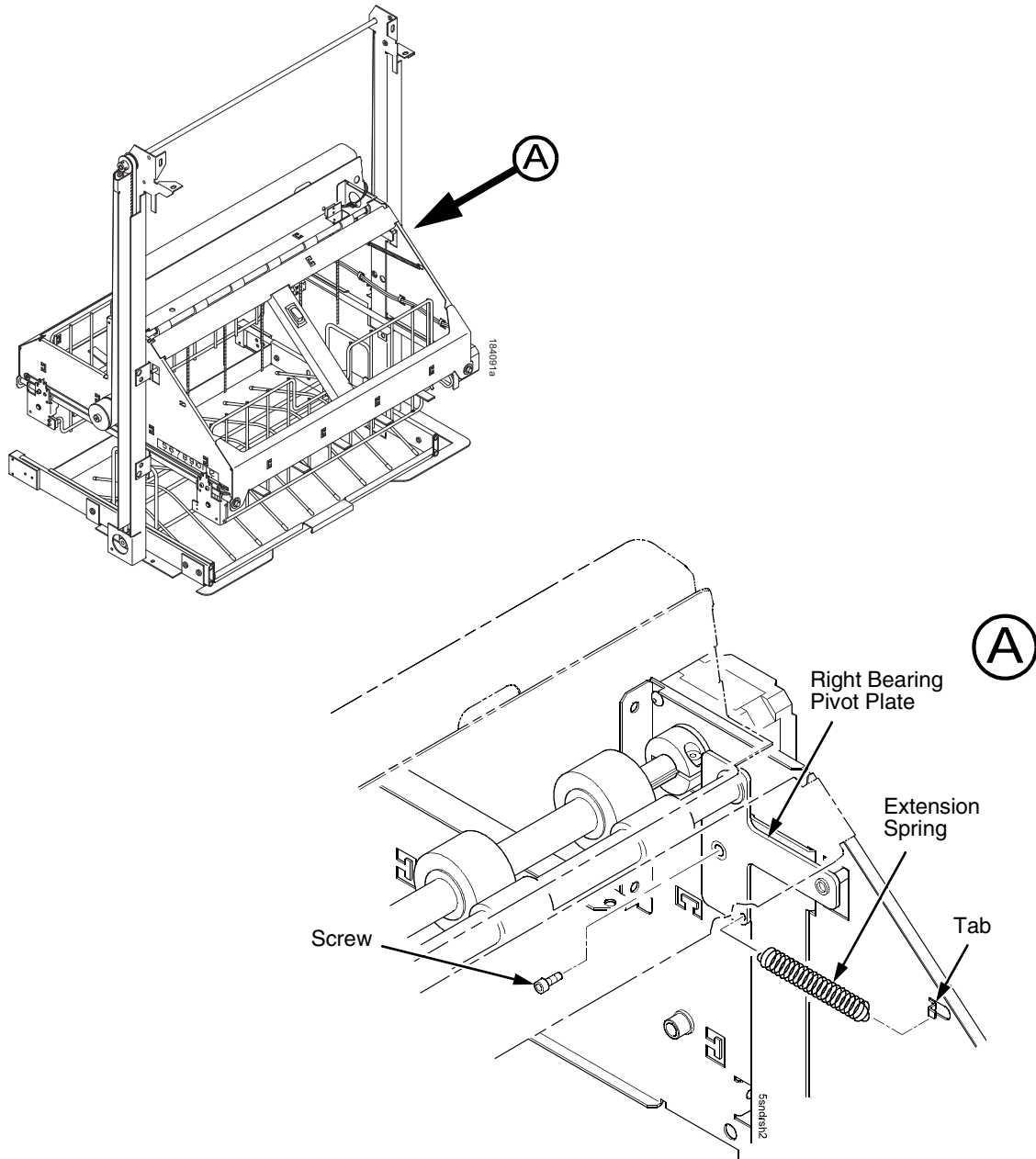
**Figure 99. Right Bearing Pivot Plate and Extension Spring**

4. Move the idler shaft enough to expose the lower mount screw of the power stacker stepper motor. (Figure 100.)

5. Cut and remove the upper tie wrap securing the stepper motor wires to the elevator. (Be careful not to cut a motor wire.)

6. Using an M-2 Allen wrench, remove the two screws securing the power stacker stepper motor to the elevator. (Figure 100.)

7. Using a 9/64 inch Allen wrench, loosen (do not remove) the collar screw securing the collar to the roller drive shaft. (Figure 100.)

8. Support the roller drive shaft with one hand and pull the stepper motor shaft out of the roller drive shaft. Let the stepper motor hang from its cables.
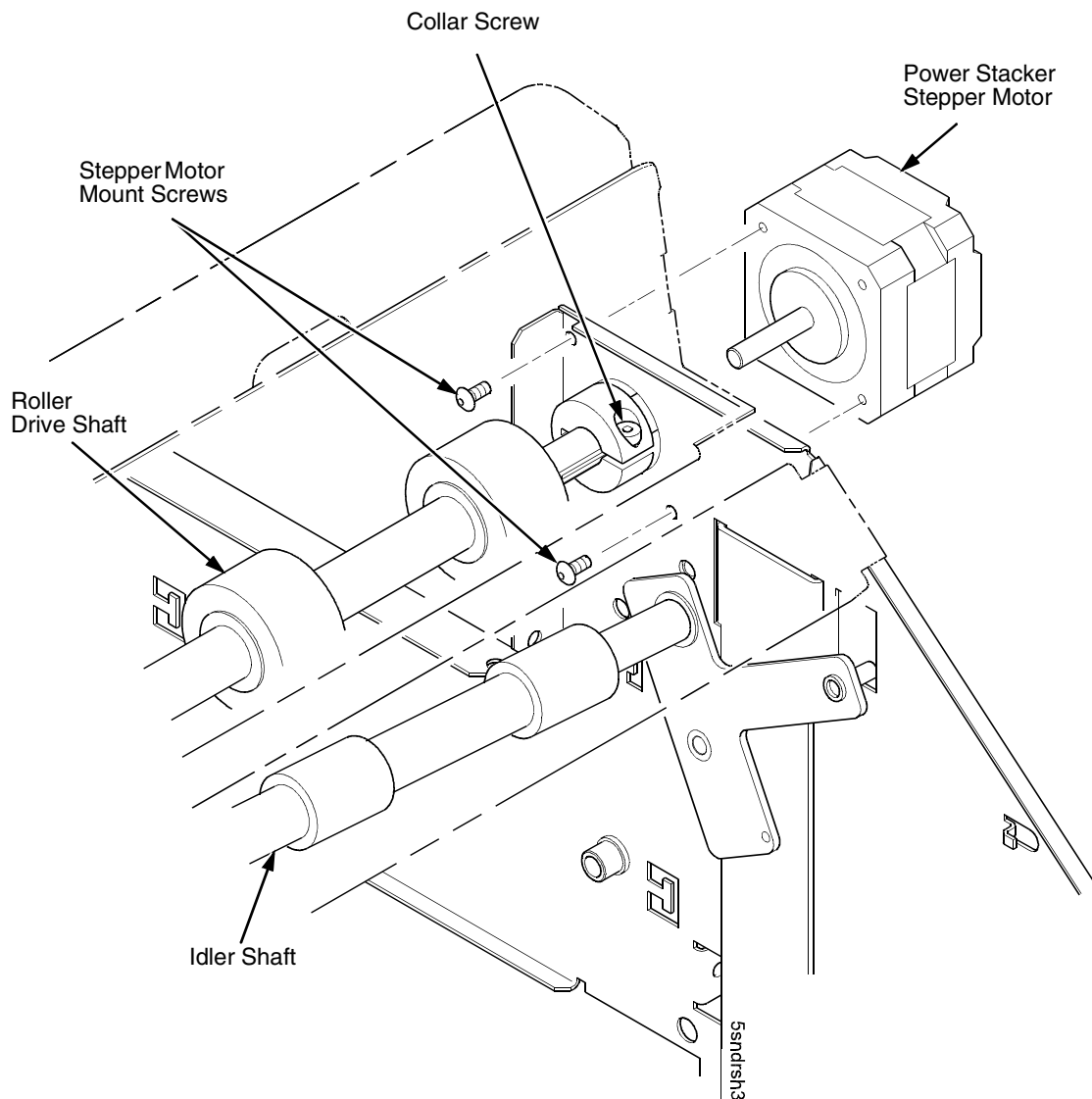
**Figure 100. Power Stacker Stepper Motor**

9. Remove the roller drive shaft, taking care to retain the bearing at the left end of the shaft and the collar at the right end of the shaft. (Figure 101.)

10. Remove the bearing and collar from the old roller drive shaft and retain these items for installation on the new roller drive shaft. (Figure 101.)

11. Using an M-2 Allen wrench, remove the screw securing the grounding clip to the left side of the elevator. Discard the old grounding clip, but retain the screw so you can install a new grounding clip when you install the new roller driver shaft. (Figure 101.)

12. Remove the new roller drive shaft, grounding clip, and bearing lubricant from the packaging.

13. Inspect the new roller drive shaft for oil and grease; wipe off any oil or grease from the roller drive shaft and rollers. The roller drive shaft must be dry and clean.

14. Apply a small dab of bearing lubricant to the dimple in the new grounding clip. Make sure this is the only area containing lubricant. (Figure 101.)

15. Reverse the steps of the removal procedure, making sure to to install the new grounding clip to the side of the elevator and the bearing and collar onto the new roller drive shaft.
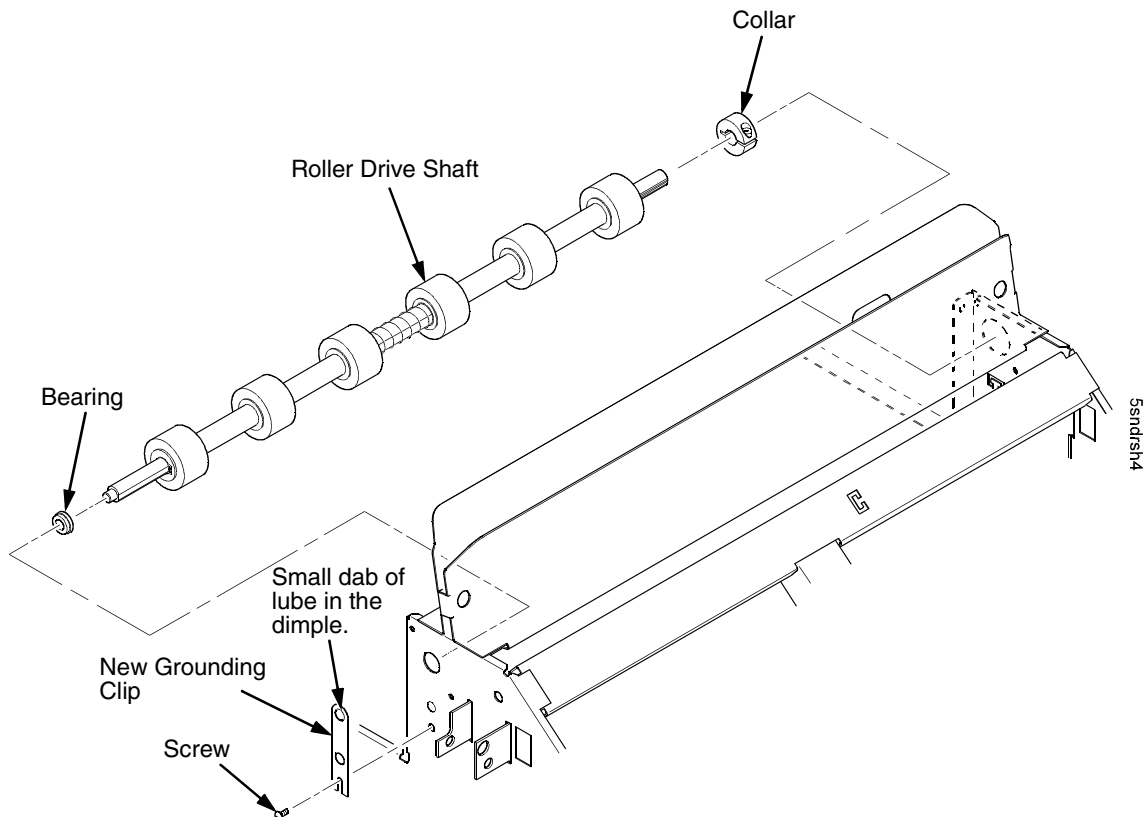


**Figure 101. Roller Drive Shaft**

# Illustrated Parts Breakdown

The Illustrated Parts Breakdown (IPB) consists of exploded drawings of the power stacker assembly and subassemblies. Parts are listed next to each drawing.

**IMPORTANT** **The Phase III (newest) power stacker is illustrated in this section. If the stacker you are working on does NOT look like the one illustrated here, order the part designated Phase II if the part has both a Phase II and Phase III listing. If a part is not listed as both Phase II and Phase III, you can use that part on any stacker.**

Only replaceable parts are assigned part numbers. If a part or assembly is damaged but does not have a part number, replace the entire power stacker assembly.

**NOTE:** Part numbers listed in the column labeled **Europe, Mideast, and Africa (EMEA)** are **RoHS compliant**. These parts conform to requirements specified in DIRECTIVE 2002/95/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

The IPB starts on the next page.

## List of Illustrations

## Parts not Illustrated in this Section:

- Extended Door Assembly, Stealth Black:177489-001
  Extended Door Assembly, Lt Gray: 179792-001

- Reed Limit Switch Assembly: 204234-001

- Control Panel Assy, Pwr Stkr, Black, Americas and Asia/Pacific:
  178911-901; EMEA (RoHS): :250676-901) (See Figure 88, page 474)
  Cont. Pnl Assy, Pwr Stkr, Blk, Adv Exch, Americas and Asia/
  Pacific:178911-991; EMEA (RoHS):250676-991
  Control Panel Assy, Pwr Stkr, Gray: 179798-001

- Stacker Hardware Kit: 173830-001

- Rail Cable, Power Stacker: 173823-001 (See page 432)

- Power Cable, Power Stacker: 174414-001 (See page 431)

- Logic Cable, Power Stacker: 176029-001 (See page 430)

- Frame Cable, Power Stacker: 173824-001 (See page 429)

- Elevator I/O Cable, Power Stacker: 174759-001 (See page 433)

See page 490.
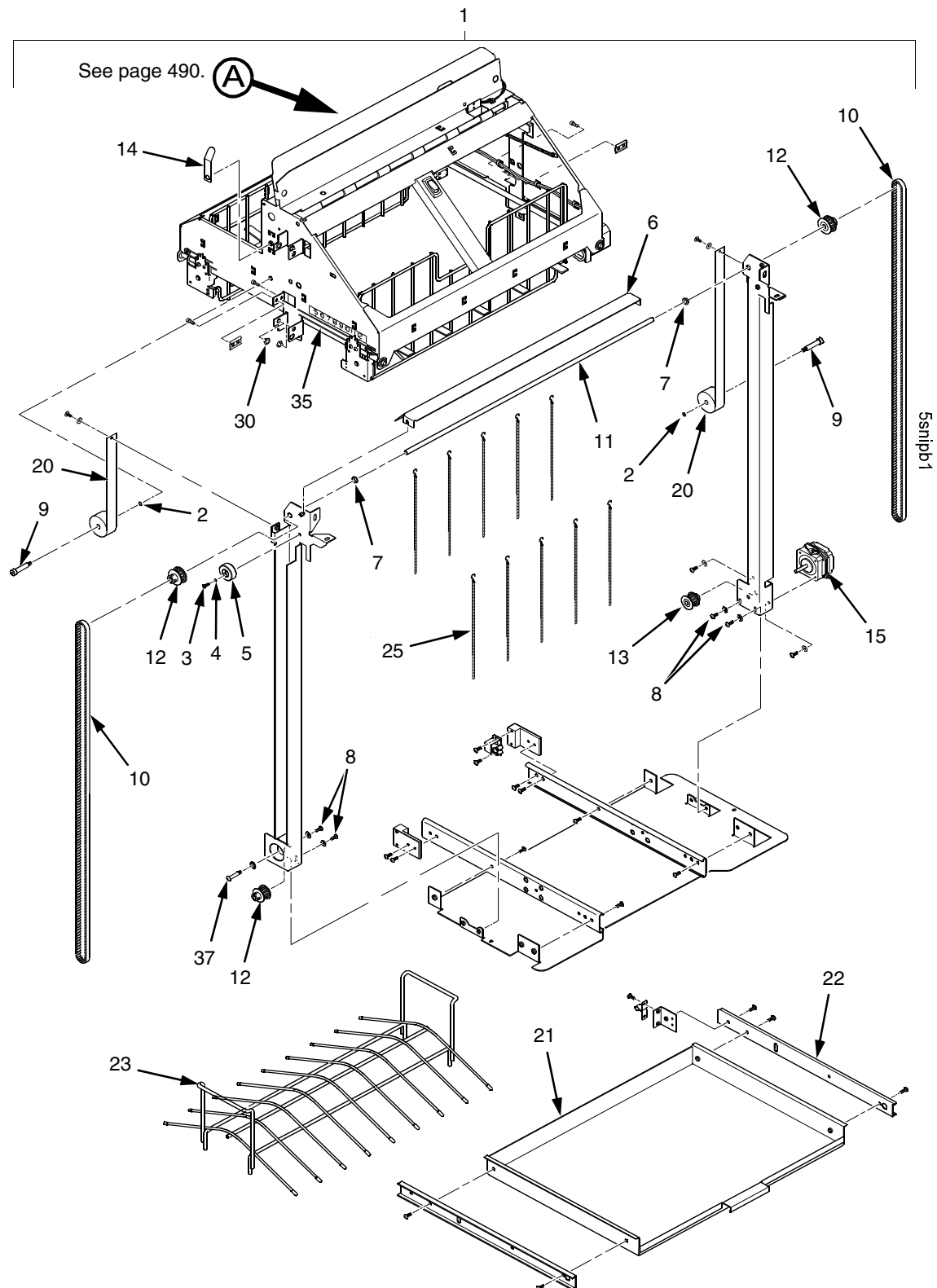
**Figure 102. Stacker Assembly**

| Item No. | Part No. (RoHS Compliant) | Description | Notes |
|---|---|---|---|
| 1 | 178908-001<br>179804-001 | Stacker Assembly, Power, Black<br>Stacker Assembly, Power, Gray | |
| 2 | 204956-001 | Washer, 5/16 X .200 X .030, Stainless Steel | Part of item 36 |
| 3 | 203251-001 | Screw, Hex Skt Btn Hd, Zinc M3X8mm | |
| 4 | 204458-001 | Washer, Shim, .125 ID X .010 inch Thick | |
| 5 | 173818-001 | Timing Belt Tensioner Assy, Pwr Stkr | |
| 6 | 178899-001<br>179802-001 | Deflector, Power Stacker, Black<br>Deflector, Power Stacker, Gray | |
| 7 | 202721-901 | Clip-On Bearing | Part of item 36 |
| 8 | Ref | Screw, Torx, 6-32 x .25 | Part of item 36 |
| 9 | Ref | Screw, Shoulder, 10-32 | Part of item 36 |
| 10 | 202716-001 | Timing Belt | |
| 11 | 173726-001 | Shaft, Lift, Phase III | |
| 12 | 178058-001 | Pulley, Timing, Fairloc,12T | |
| 13 | 159398-001 | Pulley, Motor | |
| 14 | 175726-901 | Clip, Ground, Dimpled, Pwr Stkr | Part of item 47 |
| 15 | 158446-001 | Motor Assembly, Power Stacker | Elevator motor and paddle motor<br>Paper puller motor |
| 16 | 173530-001 | Motor, Stepper, Power Stacker | |
| 20 | 178918-001 | Spring, Conforce, with Spool Assy | |
| 21 | 178913-001 | Field Kit, Tray, Cab, Rear, Black | |
| 22 | 174392-001 | Slide, Ball Bearing, Rear Tray | |
| 23 | 173864-001 | Tent, Paper, Power Stacker | |
| 25 | 151527-905 | Chain | Mount outboard of shafts |
| 30 | 202705-901 | Nylon Plug | |
| 35 | 202720-901 | Cable | |
| 36 | 173830-001 | Stacker Hardware Kit | Kit not illustrated |
| 37 | Ref | Screw, Shoulder, 8-32 | Part of item 36 |
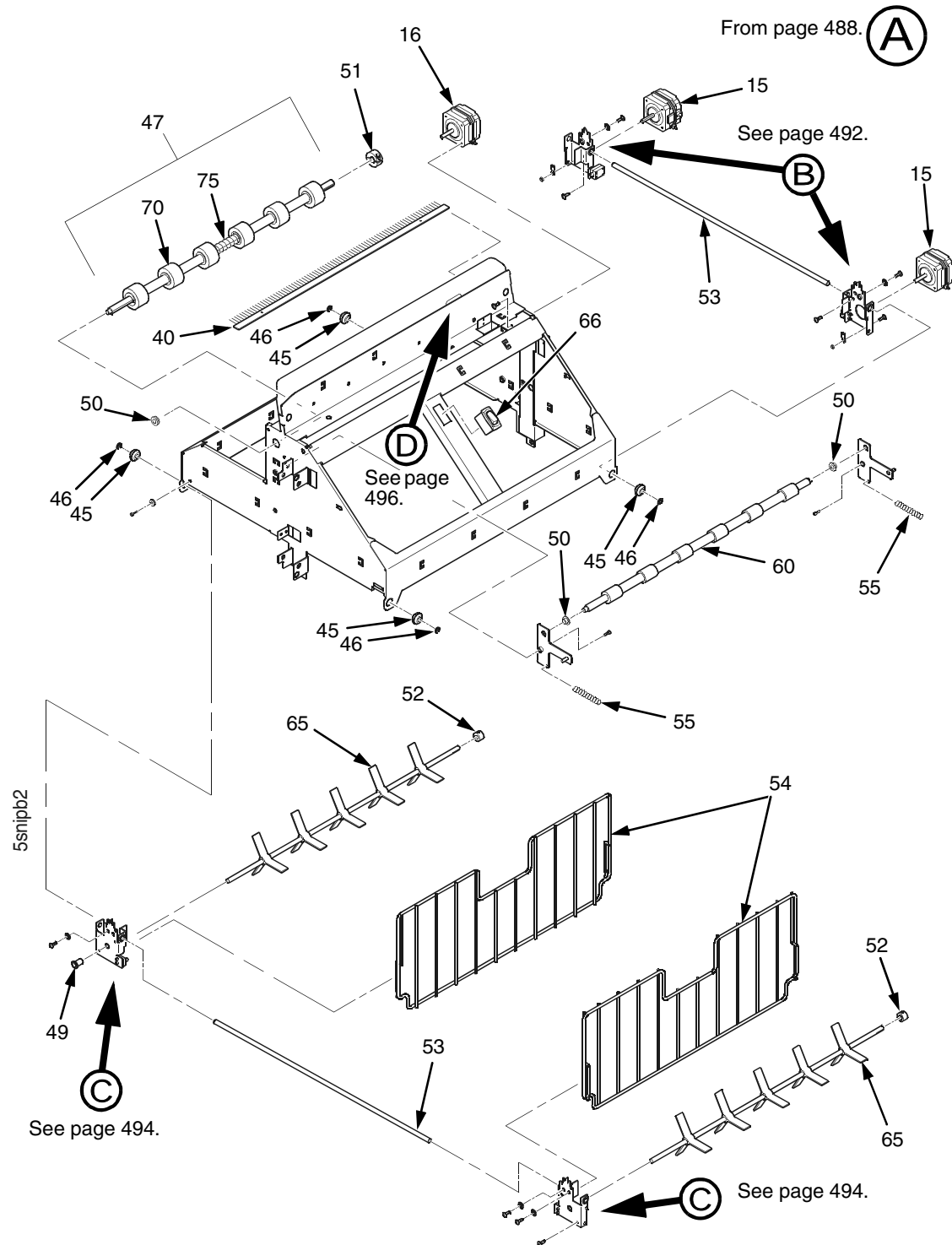
**Figure 103. Elevator Detail: Motors, Rollers, and Paddles**

| Item No. | Part No. (RoHS Compliant) | Description | Notes |
|---|---|---|---|
| 40 | 158313-001 | Anti-Static Brush | |
| 45 | Ref | Shear Grommet | Part of item 36 |
| 46 | Ref | Cap Nut | Part of item 36 |
| 47 | 158736-901 | Drive Shaft Assy (Roller Drive Shaft) | Includes items 14, 70, and 75 |
| 48 | 156393-001 | Spacer, Drive Roller | Part of item 47 |
| 49 | 202789-901 | Bearing, Flanged | Part of item 36 |
| 50 | 202824-901 | Bearing | Part of item 36 |
| 51 | 202708-901 | Collar Clamp | |
| 52 | Ref | Collar, Setscrew | Part of item 36 |
| 53 | 156390-001 | Support Shaft | |
| 54 | 174570-001 | Fence, Wireform, Phase III | |
| 55 | 203032-001 | Extension Spring | |
| 60 | 157275-001 | Idler Roller | |
| 65 | 157054-001 | Paddle, Power Stacker | |
| 66 | 204235-001 | Switch, Assy, Rocker | Elevator Disable Switch |
| 70 | 157960-001 | Drive Roller | Part of item 47 |
| 75 | 176781-001 | Compression Spring | Part of item 47 |
| 76 | 204234-001 | Switch Assy, Reed Limit (2) | Not illustrated; attach to item 77 |
| 77 | 250235-001 | Reed Switch Mounting Plate (2) | Not illustrated; attach to top and bottom of right vertical rail |

From page 490.

B

95

95

184354a

96

E

96

Connector

Flag

E

100

Key

**Figure 104. Stacker Detail: Motor Bracket**

| Item No. | Part No. (RoHS Compliant) | Description | Notes |
|---|---|---|---|
| 95 | Ref | Clip-On Bearing | Part of item 36 |
| 96 | 158288-001 | Holder, LED, Round | |
| 100 | Ref | LED, IR, T-1, 3/4 | |

Ⓒ

Ⓕ

105

Connector    Flag

Key

Nib

95

95

Ⓕ

97

184352a
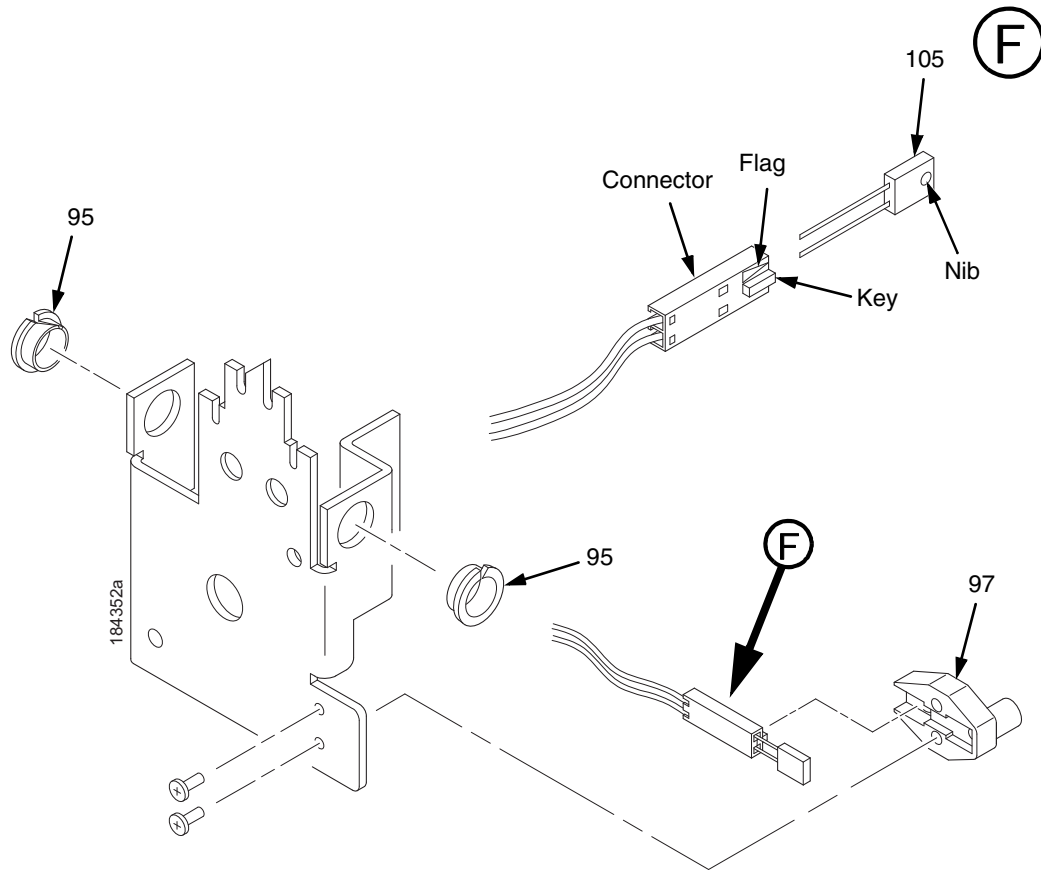
**Figure 105. Stacker Detail: Elevator Bracket**

| Item No. | Part No. (RoHS Compliant) | Description | Notes |
|---|---|---|---|
| 95 | Ref | Clip-On Bearing | Part of item 36 |
| 97 | 158290-001 | Holder, LED, Flat | |
| 105 | Ref | Photodarlington, NPN, Rectifier | |

(D)

Rotated 180 Degrees

108

107

106

184355a

Connector

Key

97

105    Nib

107

97

110

115

116

**Figure 106. Stacker Detail: Paper Motion Detector**

| Item No. | Part No. (RoHS Compliant) | Description | Notes |
|---|---|---|---|
| 97 | 158290-001 | Holder, LED, Flat | |
| 105 | Ref | Photodarlington, NPN, Rectifier | |
| 106 | Ref | Retaining Ring, External, 0.093 inch | Part of item 115 |
| 107 | Ref | Screw, Panhead, Type B, 2 x 3/16 | Part of item 36 |
| 108 | Ref | Shaft, Paper Detector Switch, Long | Part of item 115 |
| 110 | Ref | LED, IR, Rectangular | |
| 115 | 170289-001 | Field Kit, Power Stacker, PMD | Paper Motion Detector |
| 116 | Ref | Spring, Torsion | Part of item 115 |

# E   *Zero Tear Pedestal (ZTP) Printer*

## Contents

## Overview

The P7000 CRP Zero Tear Pedestal (ZTP) printer can print a form and present it for tear off without losing a form between print jobs. The printer automatically presents the current print line to the tear bar when it finishes printing and no data are being sent to the printer. When it receives more data from the host computer, the printer pulls the form down to the print station and resumes printing.

The ZTP printer is available as a 500 lpm, 1000 lpm, 1500 lpm standard ASCII printer and as a 300 lpm, and 600 lpm H-Series (DBCS) printer.

# Operation

## Load Paper and Set Up the Tractors
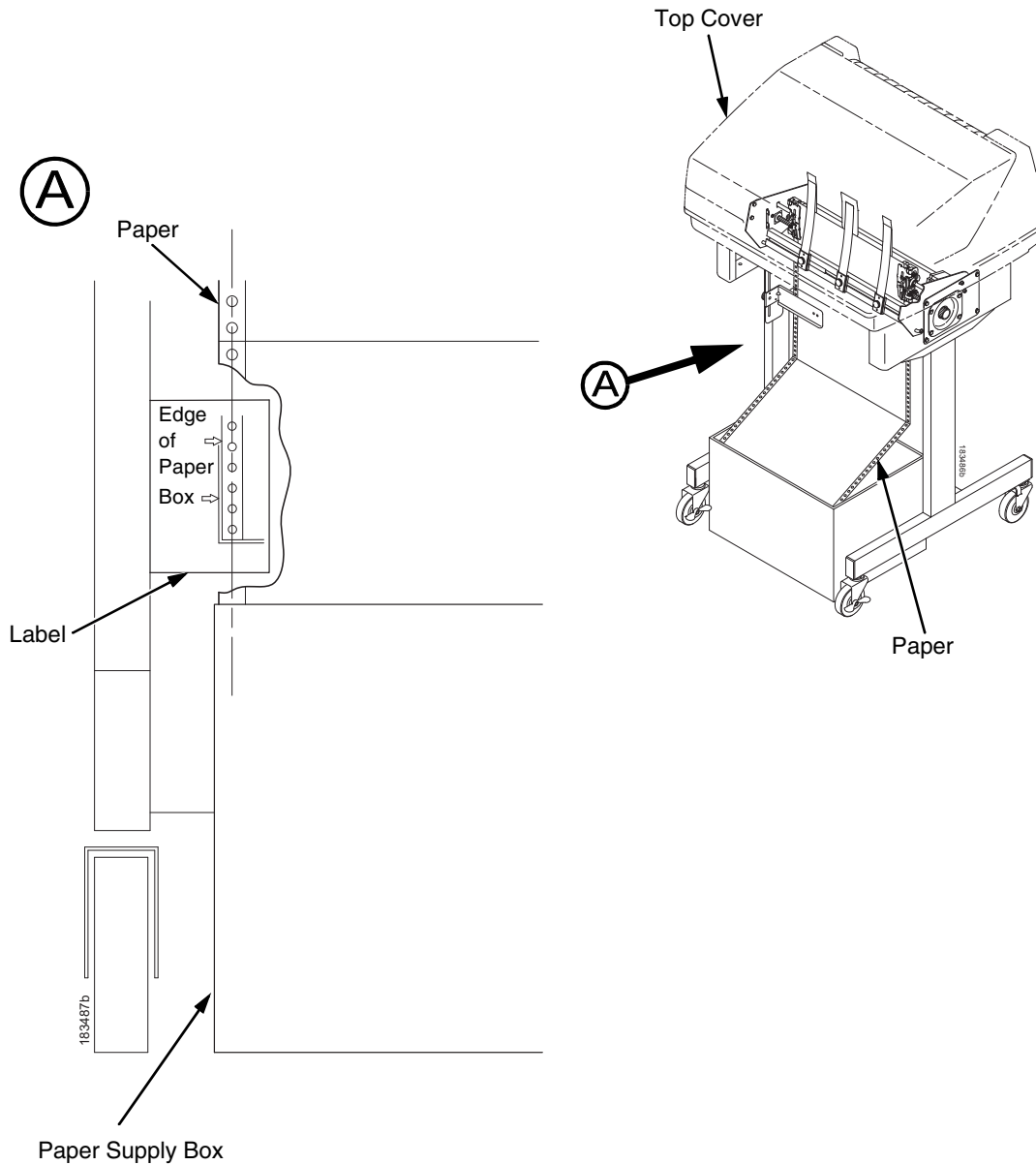
**Figure 107. Aligning and Loading Paper onto the Printer**

1. Align the paper supply box with the label on the bottom left side of the modesty panel. (See Figure 107.)

2. Open the printer cover.

501
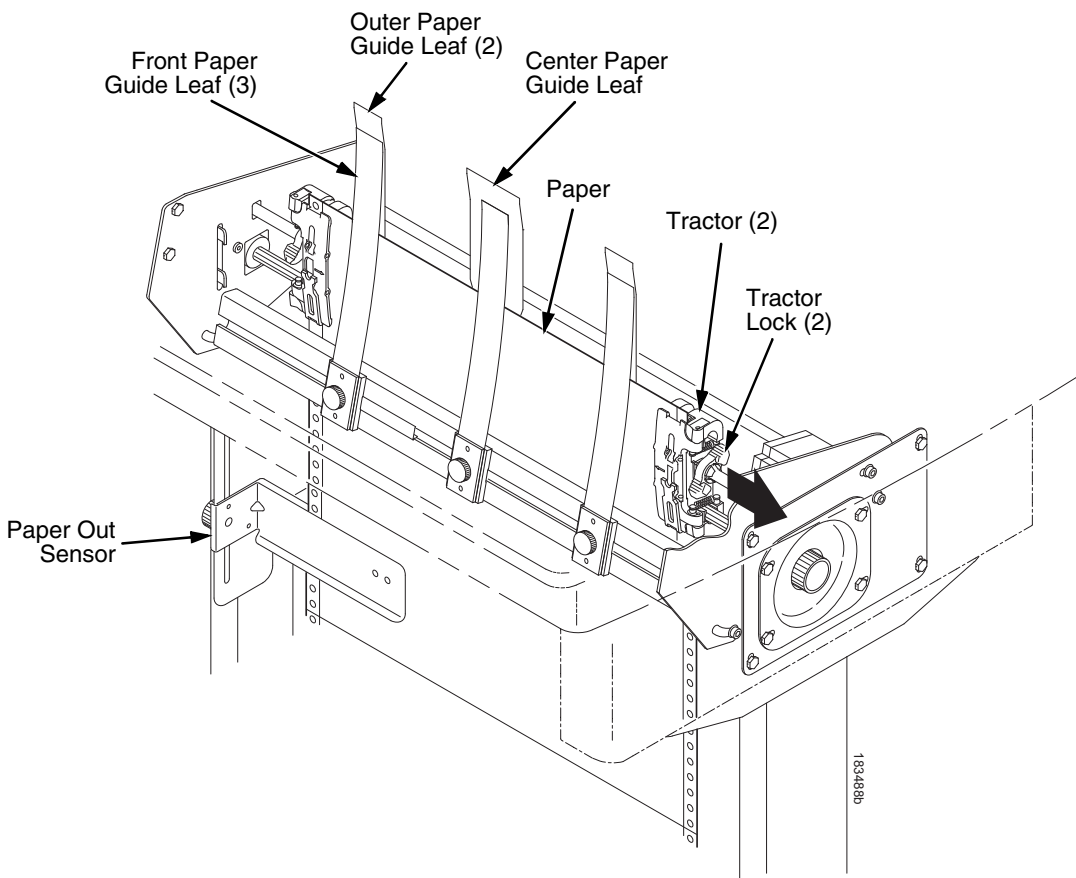
**Figure 108. Adjusting the Horizontal Paper Tension**

3.   Unlock and open the tractor doors and slide the paper from below, through the black paper out sensor slot on the left side, and up between all front and rear paper guide leaves. (See Figure 108.)

4.   Load the paper on the left tractor sprockets and close the tractor door.

5.   Load the paper onto the right tractor sprockets and close the tractor door.

6.   Adjust the paper web tightness by sliding the right tractor to remove slack or to adjust for various paper widths. (See Figure 108.)

7.   Lock the tractors in position by pressing down on the tractor locks.

## Remove Paper

1.   Open the left and right tractor doors.

2.   Pull the paper upward through the top of the printer.

**NOTE:**  DO NOT pull the paper downwards from the bottom. This could cause the paper guide leaves to bend.

# Adjust the Paper Guides
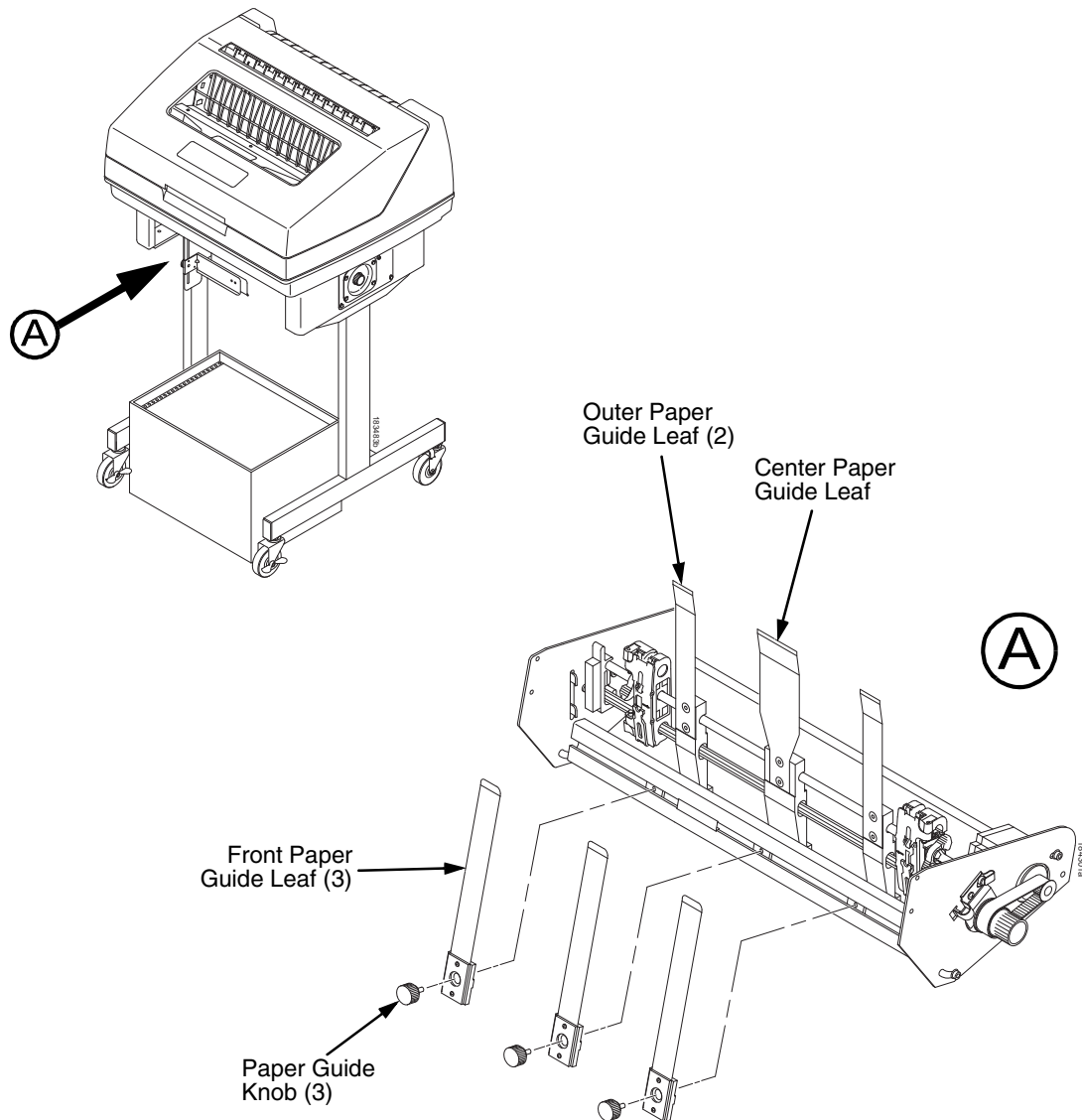


**Figure 109. Adjusting The Paper Guides**

**NOTE:** You must remove the paper before adjusting the paper guide leaves. Ensure that the paper guide leaves are not damaged.

1.  Remove the left paper guide knob and the left, front paper guide leaf. (See Figure 109.)

2.  Remove the center paper guide knob and the center, front paper guide leaf.

3.  Remove the right paper guide knob and the right, front paper guide leaf.
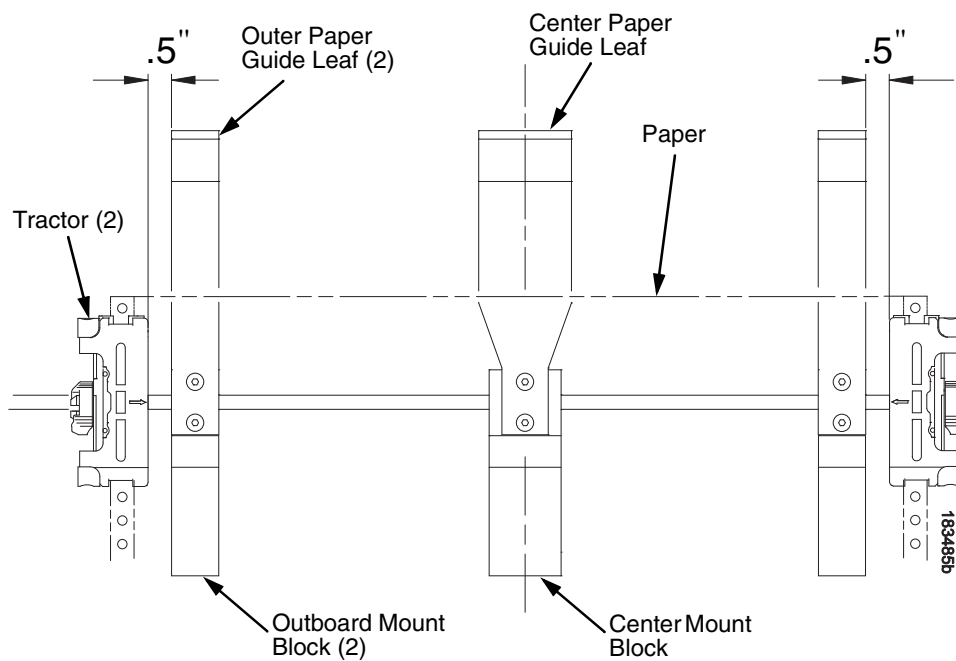
**Figure 110. Adjusting Paper Guide Leaves**

4. Slide the left outboard mount block so that the left outer paper guide leaf is .5 inches from the left tractor. (See Figure 110).

5. Slide the right outboard mount block so that the right outer paper guide leaf is .5 inches from the right tractor.

6. Slide the center mount block so that the center paper guide leaf is centered between the left and right outer paper guide leaves.

7. Install the paper guide knobs and front paper guide leaves. (See Figure 109 on page 503.)

8. Reload the paper without unlocking the tractors. (See page 501.)

# Position the Paper Out Sensor
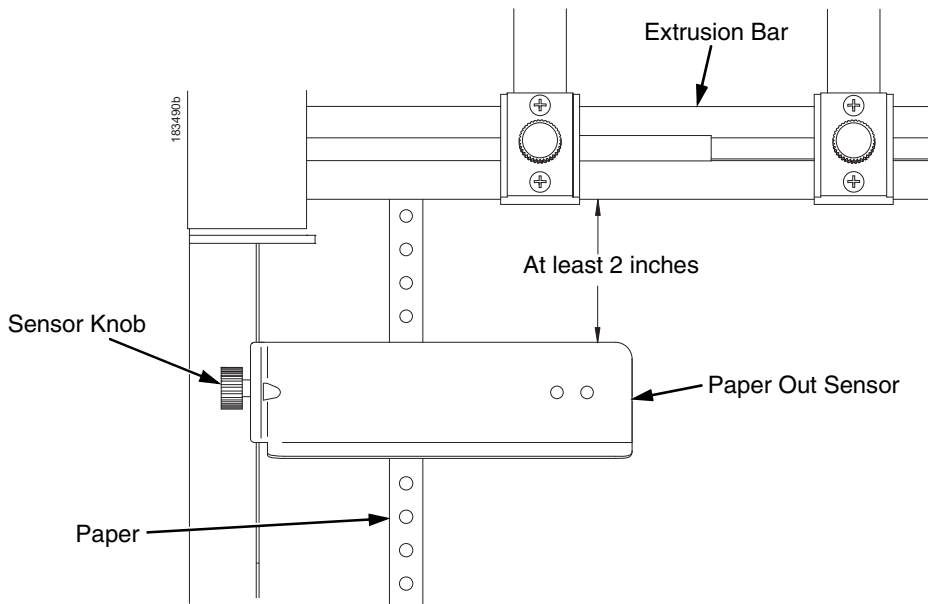
**Figure 111. The Paper Out Sensor**

The paper out sensor indicates when the printer runs out of paper. (The sensor does not work with black backed forms.) Unlike the standard pedestal printer, the ZTP printer requires you to load the paper through the paper out sensor slot (Figure 108 and Figure 111). Correct positioning of the paper out sensor ensures that the last form the printer prints will be properly presented to the tear bar. To position the paper out sensor, do the following:

1. Position the paper properly at the tear bar (page 507).

2. Loosen the paper out sensor by turning the sensor knob counterclockwise.

3. Position the paper out sensor so that there are at least 2 inches between the bottom of the aluminum extrusion bar and the top of the paper out sensor.

**IMPORTANT** **For optimal performance, 2 inches is recommended for 11 inch forms. For shorter forms, position the paper out sensor so that there are at least 2 inches between a perforation and the top of the paper out sensor.**

4. Tighten the paper out sensor by turning the sensor knobs clockwise.

5. Press **ONLINE/CLEAR**. When the first print job is sent to the printer, the paper is drawn into the printer, the top of form aligns with the print station, and the print job begins.

## Set the Tear Bar Distance

To set the tear bar distance, do the following steps:

1. Make sure the printer is offline.

2. Press **ENTER** key to enter the menu.

3. Press the right arrow ▷ until "OFFLINE/ZTP Menu" displays.

4. Press the down arrow ▽. "ZTP Data Time" displays.

5. Press the right arrow ▷ until "ZTP TearDistance" displays.

6. Press the down arrow ▽. "ZTP TearDistance/xx/144 Inch" displays.

7. Press the left arrow ◁ or right arrow ▷ to decrease or increase the tear bar distance in increments of 1/144th of an inch.

8. Press **ENTER** to select the desired value. An asterisk appears next the selected value and a scale prints to indicate the tear bar distance in relation to the tear bar. For correct tear bar distance, the zero should align with the tear bar. See Figure 112.

**NOTE:** The Tear Distance value must be changed to print the scale.
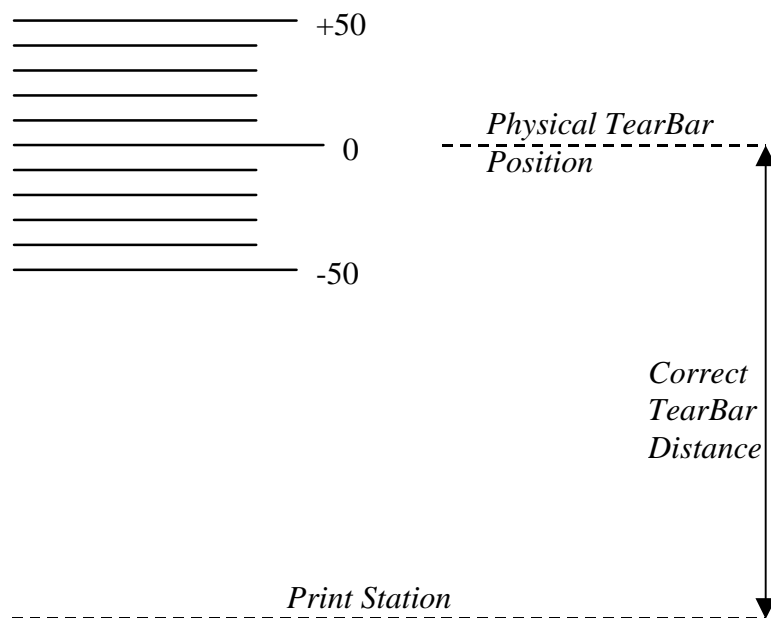


**Figure 112. Correct Tear Bar Distance**

**NOTE:** When a new ZTP Tear Bar Dist value is selected, the printer will lose the current print position until you reset the top of form to automatically save the new value.

9. Reset the top of form using the procedure on page 507.

# Set the Top Of Form
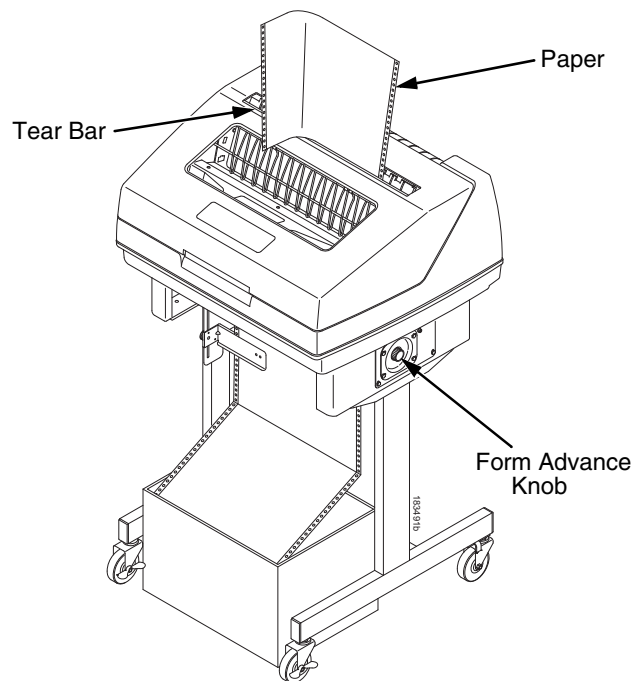


**Figure 113. Setting The Tear Off Position**

The ZTP printer uses the tear bar as the reference point for setting the tear off position. To set the position of the forms perforation to the tear bar, use the **SET TOF** button as follows:

1.  Make sure the paper guides are adjusted correctly and the paper is properly loaded.

2.  Press the **SET TOF** button on the control panel. The printer display will read "Align at TearBar/Then Press TOF".

3.  Use the form advance knob to move the top of the form to the tear off bar.

4.  Position the perforation so it aligns with the tear off bar.

**NOTE:** This is easily done by advancing one complete sheet above the tear off bar and folding it over at the perforation.

5.  Position the fold exactly at the tear bar.

6.  Tear the sheet off to ensure proper positioning.

**NOTE:** If you do not want to lose a form, position the top of the form at the tear bar. Run a finger along the back of the form along the tear bar to ensure the perforation is presented at the tear off point.

7.  Press the **SET TOF** button again. The printer display will read "Top Of Form Set/Press ONLINE". The printer will then be brought OFFLINE and the top of form will be set.

8.  Press the **ONLINE/CLEAR** key to bring the printer online.

# Control Panel Menus

The ZTP SETTINGS menu includes the ability to enable and disable features unique to the Zero Tear printer (ZTP), set the tear bar distance, set the auto present data time, and set the auto present wait time. This section defines these options.

### ZTP Function

This option enables or disables all unique ZTP functions. The default is Enable.

**NOTE:** When the ZTP Function is enabled, the View/Eject key is disabled and Slow Paper Slew is enabled.

### ZTP TearDist

This option sets the tear off distance from the current print position to the tear bar. Adjustable values in increments of 1/144th of an inch range from 200 to 2880. The up and down arrows adjust the display value. When you press the **Enter** key, the selected value is stored and a scale is printed to indicate the current tear off position. The default value is 1060.

**NOTE:** When a new value is selected, the printer will lose the current print position. You must reset the top of form to automatically save the new value.

### ZTP DataTime

This option sets the pause time in the data stream that the ZTP requires before moving the form to the tear bar once a print job is completed. The values range from .5 to 15 seconds. The default is .5 seconds.

### ZTP WaitTime

This option sets the minimum amount of time that the form stays at the tear bar. This allows you time to remove the form before the form is retracted to print the next form. The adjustable values range from 1 to 10 seconds in increments of seconds. The default value is 2 seconds.

### ZTP Platen Open

This option allows the user to have the platen open whenever forms are reversed. Enabled is the default, used for most papers and labels. The feature can be disabled as required by some multi-part forms.

# Performance Limitations

## Forms Type

The paper feed tractors on the ZTP printer push the paper up through the print station instead of pulling it through, as in the standard pedestal printer. This limits the variety of forms the ZTP printer can use. If the forms do not fall within the range specified in Table 10, dot compression and line separation may occur. The user should match the media to the application to ensure acceptable print quality. Also, because paper is pushed from below the print station, the last form in the tractors may not print fully or may not be presented to the printer exit for retrieval.

All paper used in the ZTP printer requires standard half inch spaced tractor feed holes. Cut sheet and continuous friction fed paper is not supported. The forms specified in Table 10 can have no more than one form per page horizontally.

**Table 10. Forms Type**

| Description | Length | Width (edge to edge) |
|---|---|---|
| One to three part, continuous, with carbon, fan-folded, edge-perforated paper forms | 3 to 12 inches | 7 to 16.5 inches |
| One to four part, continuous, with carbon, fan-folded, edge-perforated paper forms | 3 to 12 inches | 7 to 12 inches |
| One to four part, continuous, carbonless, fan-folded, edge-perforated paper forms | 3 to 12 inches | 7 to 16.5 inches |
| One to six part, continuous, carbonless, fan-folded, edge-perforated paper forms | 3 to 12 inches | 7 to 12 inches |
| Forms with a paper weight of 20 to 100 pounds and a maximum thickness of 0.025 inches | 3 to 12 inches | 7 to 16.5 inches |
| Forms with a paper weight of 18 to 100 pounds and a maximum thickness of 0.025 inches | 3 to 12 inches | 7 to 12 inches |
| Forms with all approved types of interleaf edge attachment except those using metallic or other hard devices | | |

**NOTE:** If you use forms outside these limits, the print quality may not be optimum, the printer may lose top-of-form, or the frequency of paper jams will increase.

## Paper Jams

Printer jams can occur if you tear off the form incorrectly. If you experience two or more paper jams per box of forms, follow these guidelines to help reduce jams:

- Position the lower paper guides properly
- Align the paper web tightness properly
- Position the form perforation against the tear bar
- Time the tear, while the paper is not moving
- Direct the tear force toward the user and across the tear bar, not upward.

### To Clear Paper Jams

1. Raise the platen lever to open the platen.
2. Open the left and right tractor doors.
3. Pull the paper upward through the top of the printer.

**NOTE:** DO NOT pull the paper downwards from the bottom. This could cause the paper guides to bend.

4. Reload the paper (see page 501).

# Adjustments and Tests

The printer is a durable, low-maintenance machine, but some components and systems require occasional adjustment and may need to be tested as part of a troubleshooting procedure.

You usually will be referred to this chapter by a troubleshooting procedure, or as part of a removal/installation procedure.

## List of Adjustments and Tests Procedures

## Preparing the ZTP Printer for Maintenance

**WARNING**   **Unplug the printer power cord from the printer or power outlet before you do any maintenance procedure. Failure to remove power could result in injury to you or damage to equipment. If you must apply power during maintenance, you will be instructed to do so in the maintenance procedure.**

**IMPORTANT**   **Do not try to repair electronic components or assemblies in the field. Do not de-solder or re-solder any circuit board components. Replace a malfunctioning electronic assembly with an operational spare. Most electronic problems are corrected by replacing the printed circuit board assembly, sensor, or cable that causes the fault indication. This is also true of failures traced to the hammer bank—it is not field repairable and you must replace the entire shuttle frame assembly. Hammer spring assemblies are the only replaceable components of the shuttle frame assembly.**

To prepare the printer for maintenance, do the following steps before you make any adjustments or perform any maintenance procedure:

1. Set the printer power switch to O (off).
2. Unplug the printer power cord from the printer or AC power source.
3. Disconnect the data (signal) cable(s) from the printer interface.
4. Unload paper.
5. Read the entire adjustment or maintenance procedure before you begin working on the printer.
6. Gather the necessary tools and parts before you begin working on the printer.

## Returning the Printer to Normal Operation

When you have finished servicing the printer, return it to service by doing the following steps:

1. Load paper.
2. Connect the data (signal) cable(s) to the printer interface.
3. Plug the AC power cord into the printer and the power source.
4. Close the cabinet doors and the printer cover.
5. Set the printer power switch to | (on).
6. Test printer operation by selecting and running one of the operator print tests. (See page 222.)
7. Select the emulation. (Refer to the *User's Manual.)*
8. Set the top-of-form. (Refer to the *User's Manual.)*

# Barrier Panel

1. Prepare the printer for maintenance (page 512).

2. Loosen (do not remove) the two #2 Phillips hold-down screws on the rear of the printer. (See page 532, item 4.)

3. Remove the top cover assembly. (See page 519.)

4. Loosen the screws in the top corners of the barrier panel. (See Figure 114.)
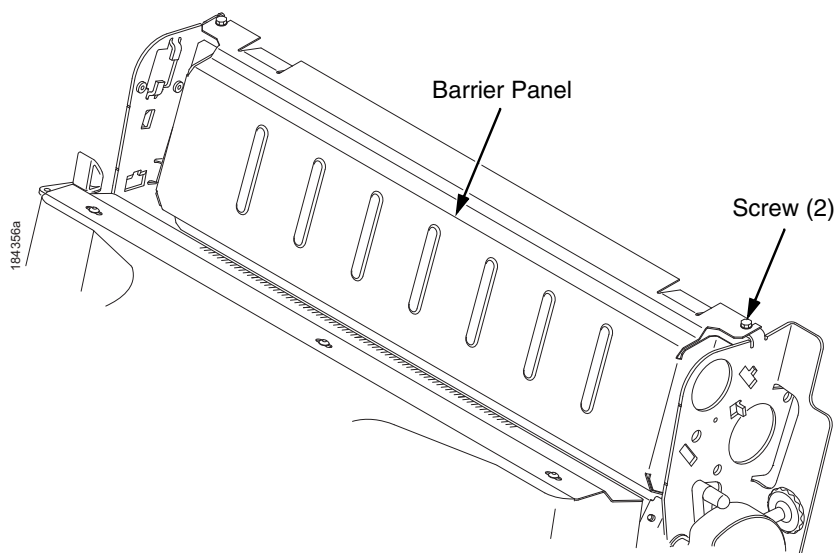


**Figure 114. The Barrier Panel**

5. Adjust the top portion of the barrier panel so that it protrudes forward, towards the front of the printer 1/10 inch. Use a measurement scale as a guide. (See Figure 115.)

6. Tighten the screw.
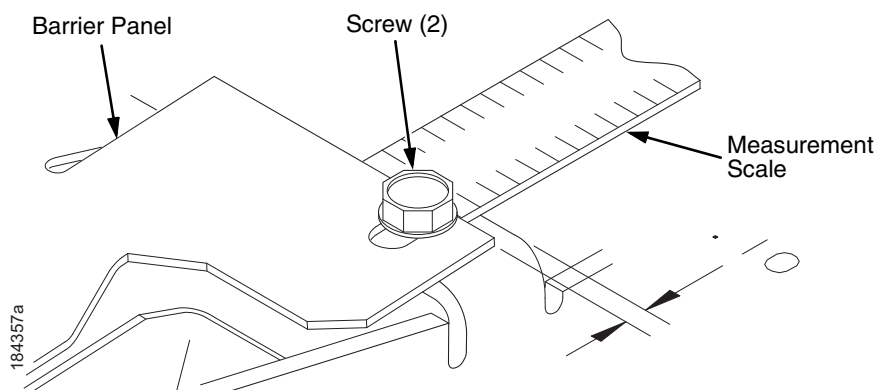


**Figure 115. Using a Scale to Adjust the Barrier Panel**

7. Install the top cover assembly. (See page 519.)

8. Return the printer to normal operation (page 512).

# Belt, Paper Feed Timing, Adjustment

1.  Prepare the printer for maintenance (page 512).

2.  Remove the top cover assembly (page 519).

3.  Remove the hex screws and right cover plate. (See page 515, items 1 and 2.)

4.  Loosen (do not remove) the two 5/16 inch motor mount bolts (item 3).

5.  Using the straight end of a force gauge, apply 15 pounds (66.7 N) of pressure to the paper feed drive motor (item 4). Use the splined shaft to steady the gauge.

6.  Reduce tension to 12 pounds (53.4 N) and torque the 5/16 inch paper feed motor mount bolts (item 3) to 18 inch-pounds (2.03 N•m).

**NOTE:** Belt tension is correct if the belt deflects 1/8 inch (3.175 mm) midway between the pulleys.

7.  Install the hex screws and right cover plate. (See page 515, items 1 and 2.)

8.  Install the top cover assembly (page 519).

9.  Return the printer to normal operation (page 512).
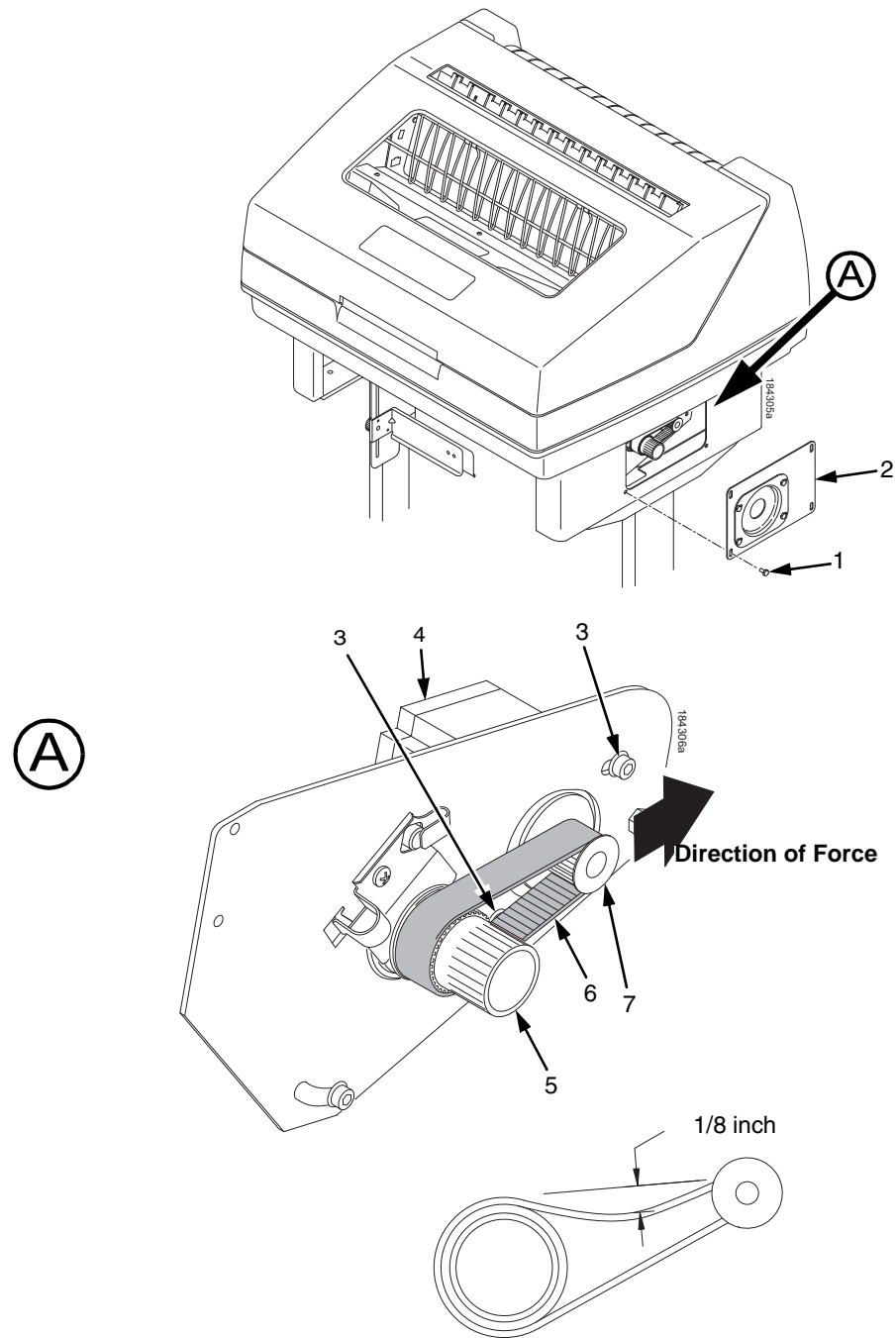
**Legend:**

1) Screw, Hex w/Lockwasher (4)
2) Cover Plate, Right Extension
3) Motor Mount Bolt (2)
4) Paper Feed Drive Motor
5) Splined Shaf Pulley
6) Paper Feed Timing Belt
7) Paper Feed Motor Pulley

**Figure 116. Paper Feed Timing Belt Adjustment**

515

## Paper Guide Leaf, Front, Center, Outer

1. Prepare the printer for maintenance (page 512).
2. Adjust the paper guides. (See page 503.)

## Paper Out Sensor, Adjustment

1. Prepare the printer for maintenance (page 512).
2. Adjust the paper out sensor. (See page 505.)

## Paper Tension, Horizontal

1. Prepare the printer for maintenance (page 512).
2. Unlock the right tractor.
3. Slide the right tractor to properly adjust the paper web tightness.

**NOTE:** The paper should be taut.

4. Lock the right tractor.
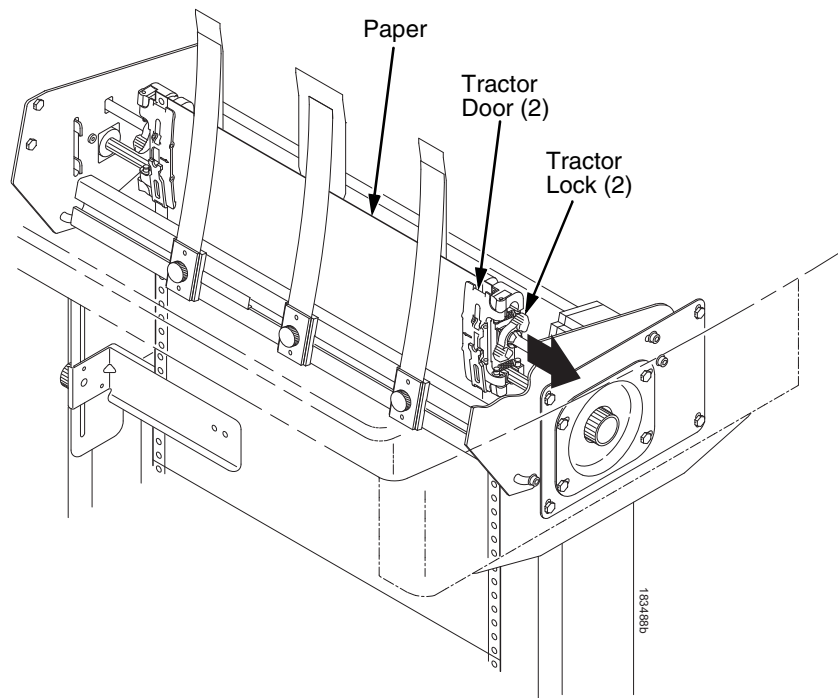


**Figure 117. Adjusting the Horizontal Paper Tension**

# Replacement Procedures

**WARNING**  **Unplug the printer power cord from the printer or power outlet before doing any maintenance procedure. Failure to remove power could result in injury to you or damage to equipment. Only apply power during maintenance if you are instructed to do so in a maintenance procedure.**

**IMPORTANT**  **The components specified in this chapter are field replaceable units (FRUs). FRUs must be repaired at the factory. Do not try to repair these items in the field. Also do not attempt field repairs of electronic components or assemblies. Do not de-solder any circuit board components. Replace a malfunctioning electronic assembly with an operational spare. Most electronic problems are corrected by replacing the printed circuit board assembly, sensor, or cable that causes the fault indication. The same is true of failures traced to the hammer bank: it is not field repairable so you must replace the entire shuttle assembly. Hammer spring assemblies, the hammer bank cover, and the ribbon mask are the only replaceable components of the shuttle frame assembly.**

## List of Removal / Installation Procedures

# Belt, Paper Feed Timing

## Removal

1.  Prepare the printer for maintenance (page 512).

2.  Remove the hex screws and right cover plate. (See page 515, items 1 and 2.)

3.  Loosen (do not remove) the two 5/16 inch paper feed motor mount screws. (See page 515, item 3.)

4.  Roll the paper feed timing belt off the paper feed motor pulley and splined shaft pulley. (See page 515, items 5, 6, and 7.)

## Installation

1.  Roll the paper feed timing belt onto the splined shaft pulley and the motor pulley. (See page 515, items 5, 6, and 7.)

2.  Using the straight end of a force gauge, apply 15 pounds (66.7 N) of pressure to the paper feed drive motor. Use the splined shaft to steady the gauge. (See page 515, item 3.)

**NOTE:** Belt tension is correct if the belt deflects 1/8 inch (3.175 mm) midway between the pulleys.

3.  Reduce tension to 12 pounds (53.4 N) and torque the 5/16 inch paper feed motor mount screws to 18 inch-pounds (2.03 N•m).

4.  Install the hex screws and right cover plate. (See page 515, items 1 and 2.)

5.  Return the printer to normal operation (page 512).

## Control Panel Assembly

### Removal

1. Prepare the printer for maintenance (page 512).

2. Open the printer cover.

3. Disconnect the RJ-11 connector P310 from J2 on the back of the control panel. (See page 532, item 5.)

4. Remove the two screws securing the control panel assembly to the panel bracket. (See page 532, items 1, 18, and 19.)

5. Remove the control panel assembly from the panel bracket. (See page 532, items 1 and 18.)

### Installation

1. Engage the slot on the bottom of the control panel on the bottom edge of the panel bracket cutout. (See page 532, items 1 and 18.)

2. Align the holes on the top rear of the control panel with the holes in the upper edge of the panel bracket, and install the two mounting screws.

3. Connect RJ-11 connector P310 to connector J2 on the rear of the control panel. (See page 532, item 5.)

4. Return the printer to normal operation (page 512).

## Cover Assembly, Top, Pedestal Models

### Removal

1. Prepare the printer for maintenance (page 512).

2. Remove the control panel assembly (page 519).

3. Loosen (do not remove) the two #2 Phillips hold-down screws on the rear of the printer. (See page 532, item 4.)

4. Remove the #2 Phillips screw in the lower left front corner of the top cover and the screw just to the right of the control panel bracket. (See page 532, item 2.)

5. Lift the top cover assembly off the printer base. (See page 532, item 15.)

### Installation

1. Reverse step 3 through step 5 of the removal procedure.

2. Return the printer to normal operation (page 512).

## Paper Feed Motor

### Removal

1. Prepare the printer for maintenance (page 512).

2. Remove the top cover assembly. (See page 519.)

3. Remove the paper feed timing belt. (See page 518.)

4. Trace the paper feed motor cables back to the controller board, releasing it from tie wraps. (See the cable routing diagrams in Appendix A.)

5. Disconnect connector 106 from the controller board and remove the paper feed motor connector from connector 106. (See page 286.)

**NOTE:** Some paper feed motors are mounted with nuts and bolts; other motors have threaded flanges, eliminating the need for nuts.

6. Remove the motor mount screws (and nuts, if present).

7. Remove the paper feed motor assembly. (See page 538, item 5.)

### Installation

1. Position the paper feed motor assembly on the right side plate and install the motor mount bolts and nuts finger tight. (See page 538, items 5 and 6.)

2. Connect the paper feed motor cable connector to connector 106, then connect 106 to J106 on the controller board. (See page 286.)

3. Install the paper feed timing belt. (See page 518.)

4. Install the top cover assembly. (See page 519.)

5. Return the printer to normal operation. (See page 512.)

## Paper Guide Leaf, Center

### Removal

1. Prepare the printer for maintenance (page 512).

2. Remove the center paper guide knob and center paper guide leaf. (See page 525, Figure 120.)

3. Remove the top button head screw, bottom flat head screw, and center guide leaf. (See page 525, Figure 120.)

### Installation

1. Reverse step 2 and step 3 of the removal procedure above.

2. Return the printer to normal operation (page 512).

## Paper Guide Leaf, Front

### Removal

1. Prepare the printer for maintenance (page 512).

2. Remove the left paper guide knob and the left, front paper guide leaf. (See page 525, Figure 120.)

3. Repeat step 2 to remove the center and right, front paper guide leaves.

### Installation

1. Reverse step 2 and step 3 of the removal procedure above.

2. Return the printer to normal operation (page 512).

## Paper Guide Leaf, Outer

### Removal

1. Prepare the printer for maintenance (page 512).

2. Remove the left paper guide knob and the left, front paper guide leaf. (See page 525, Figure 120.)

3. Remove the top button head screw, bottom flat head screw, and left outer guide leaf. (See page 525, Figure 120.)

4. Repeat step 2 through step 3 to remove the right outer leaf guide.

### Installation

1. Reverse step 2 through step 4 of the removal procedure above.

2. Return the printer to normal operation (page 512).

## Paper Out Sensor
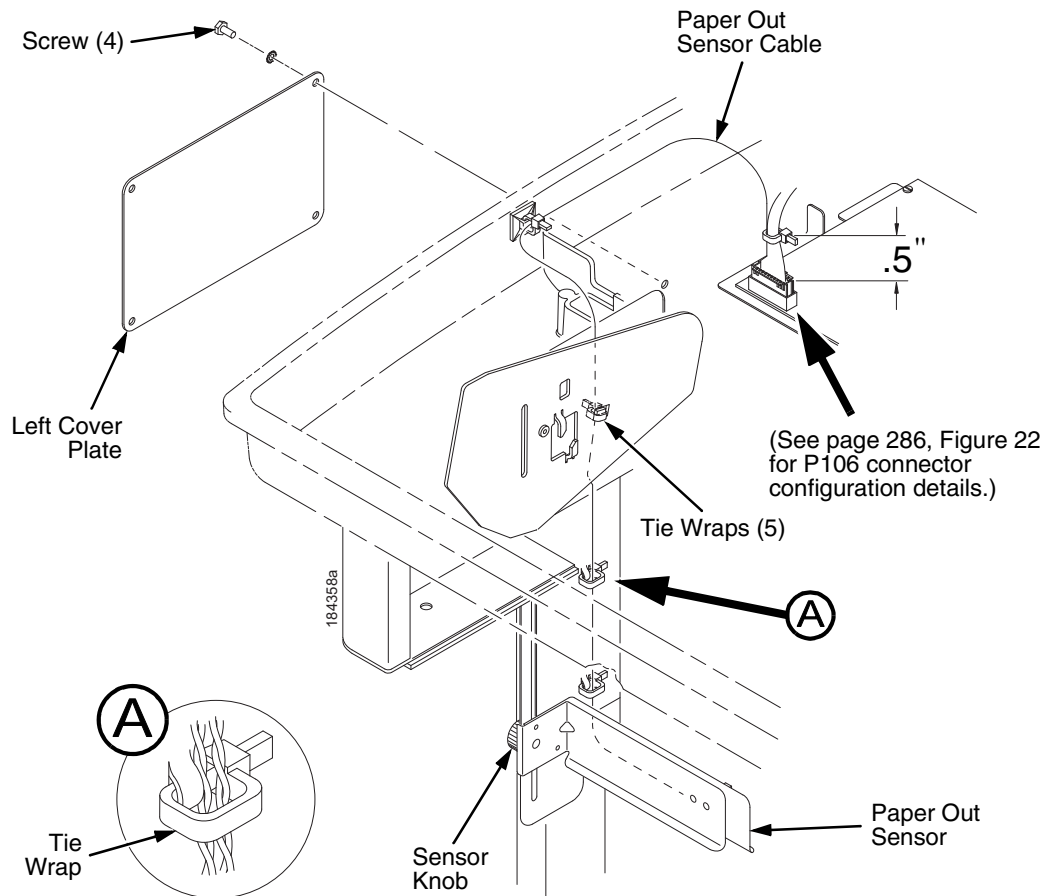


**Figure 118. Replacing the Paper Out Sensor Assembly**

### Removal

1.  Prepare the printer for maintenance (page 512).

2.  Remove the screw and left cover plate. (See Figure 118.)

3.  Cut and remove the tie wraps from the tie wrap holes to free the paper out sensor cable.

4.  Trace the paper out sensor cable back to the controller board, releasing it from the cable restraints.

5.  Disconnect connector coupling shroud P106 from the controller board.

6.  Remove the sensor knob, paper out sensor, and paper out sensor cable.

## Removal

1. Install the sensor knob and paper out sensor.

2. Route the paper out sensor cable up along the left side of the printer. (See Figure 118 on page 522.)

3. Connect coupling shroud connector P106 to the controller board and install tie-wraps to secure the motor cable.

4. Route the tie wraps through the tie wrap holes and around the paper out sensor cable.

**NOTE:** Be sure that the tie wrap loops around the cable, towards the back of the printer as shown in Figure 118, detail B on page 522.

5. Install the screws and left cover plate.

6. Position the paper out sensor. (See page 505.)

7. Return the printer to normal operation (page 512).

## Shaft, Splined
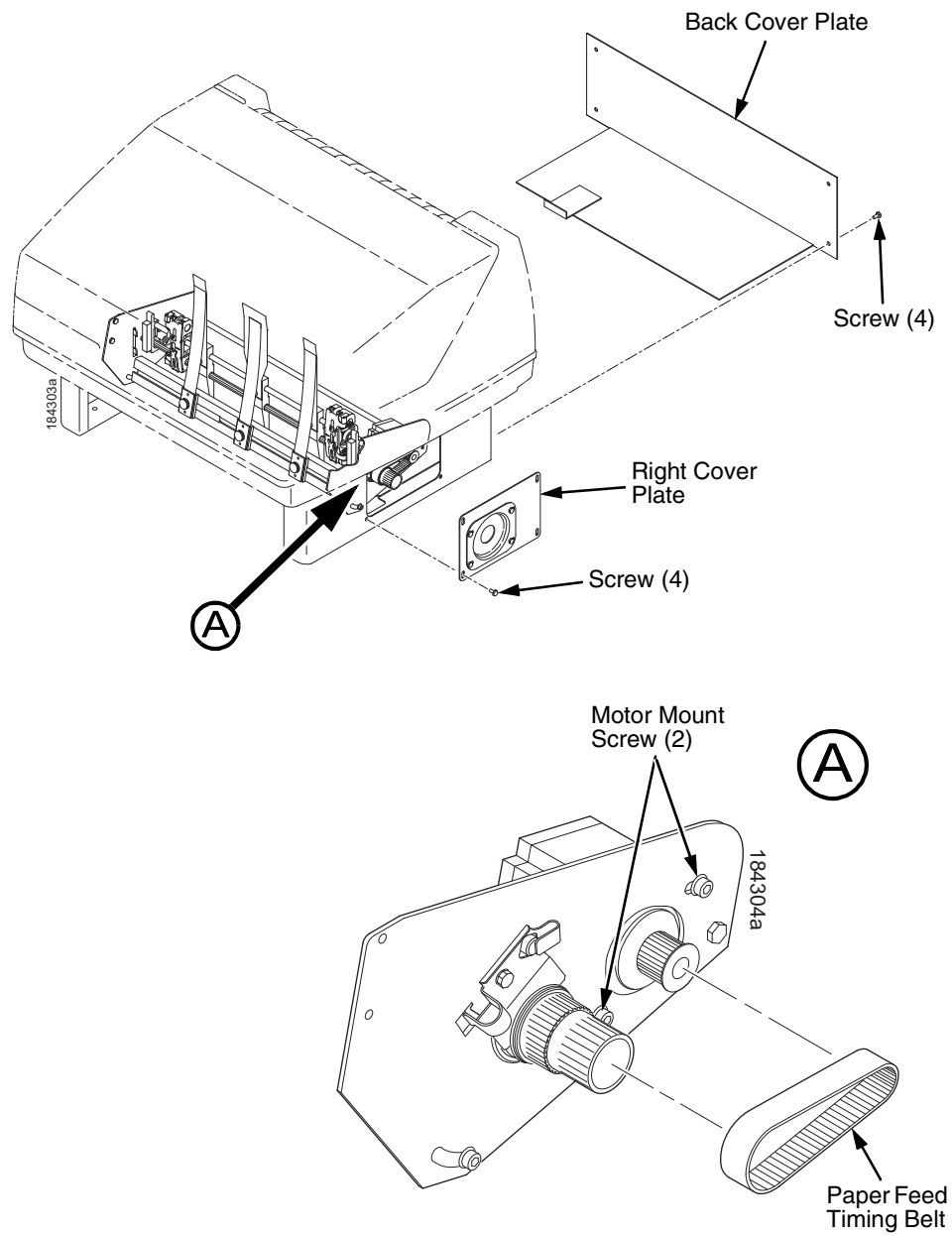


**Figure 119. Removing the Right Cover Plate and Back Cover Plate**

## Removal

1. Prepare the printer for maintenance (page 512).

2. Remove the hex screws and right cover plate. (See Figure 119.)

3. Remove the screws and the back cover plate.

4. Loosen (do not remove) the two 5/16 inch paper feed motor mount screws.

5. Remove the paper feed timing belt.
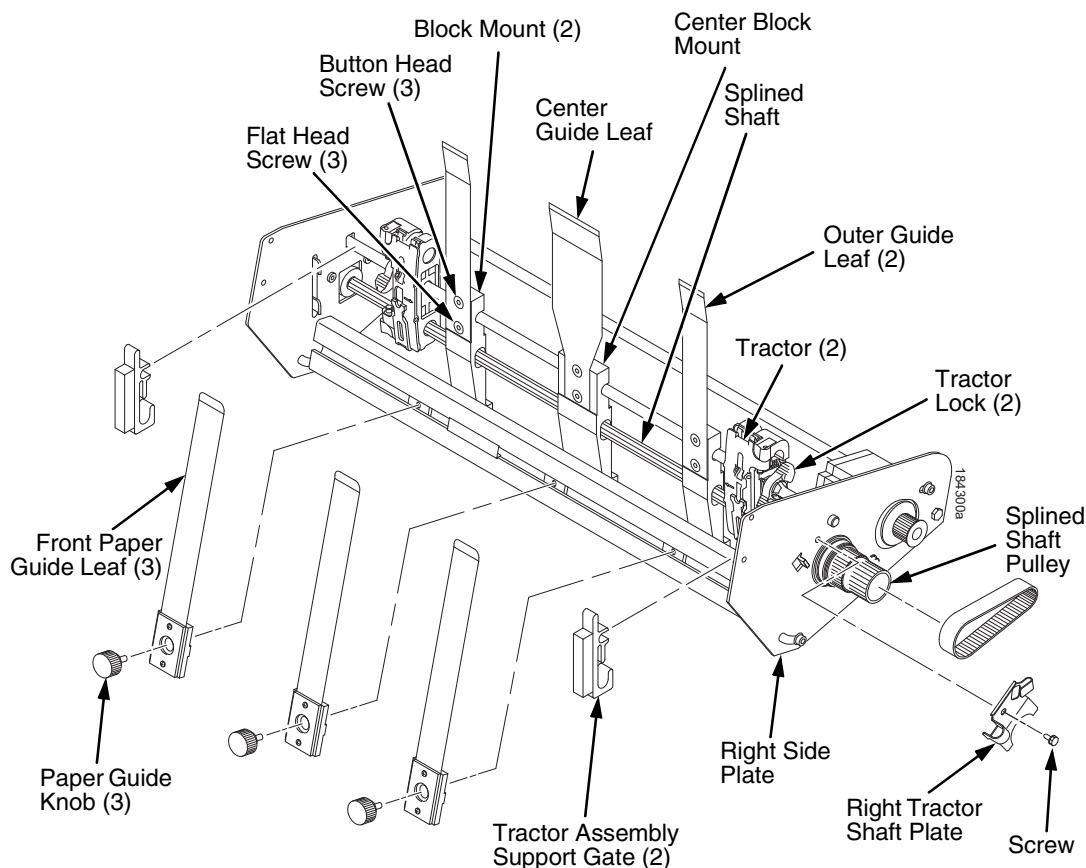


**Figure 120. Removing the Paper Leaf Guides and Tractor Assembly Support Gates**

6. Remove the paper guide knobs and front paper guides leaves. (See Figure 120.)

7. Remove the tractor assembly support gates. (See page 529.)

8. Remove the screw securing the right tractor shaft plate and the tractor shaft plate. (See Figure 120.)

9. Slide the splined shaft out of the sealed ball bearing in the left tractor shaft plate and remove the tolerance ring from the left end of the splined shaft (page 538, items 9, 10, 15, and 17).

10. Grasp the splined shaft pulley and slide the splined shaft to the right, out of the tractors and right side plate. (See Figure 120.)

## Installation

1. Position the splined shaft so the alignment marks are at the bottom on both tractors. (See Figure 121.)

2. Slide the splined shaft through the right side plate, tractors, and block mounts. Make sure the same spline passes the marked groove on each tractor. (See Figure 121.)

3. Install the tolerance ring on the left end of the splined shaft. (See Figure 121.)

4. Insert the tolerance ring lead-in portion into the sealed ball bearing in the left tractor shaft plate while sliding the ball bearing into the right side plate (page 538, items 9, 10, 15, and 26). Push the splined shaft to the left until the flange on the ball bearing is in solid contact with the right side plate. The splined shaft will protrude about 1/16 inch (1.6mm) from the ball bearing.

5. Install the right tractor shaft plate and screw (page 538, items 7 and 8) by first sliding the upper "fingers" up and against the flange on the ball bearing, then sliding the rectangular cutout over the support shaft end, then snapping the U-shaped "spring" <u>behind</u> the tab on the right side plate.

6. Install the tractor assembly support gates on the splined and support shafts. (See installation instructions on page 529.)

7. Install the paper guide knobs and front paper guide leaves. (See page 525, Figure 120.)

8. Install the paper feed timing belt (page 518).

9. Set the paper feed timing belt tension (page 514).

10. Install the back cover plate. (See page 524, Figure 119.)

11. Install right cover plate. (See page 524, Figure 119.)

12. Return the printer to normal operation (page 512).



**NOTE**: Align the marks on both tractors before inserting the splined shaft.
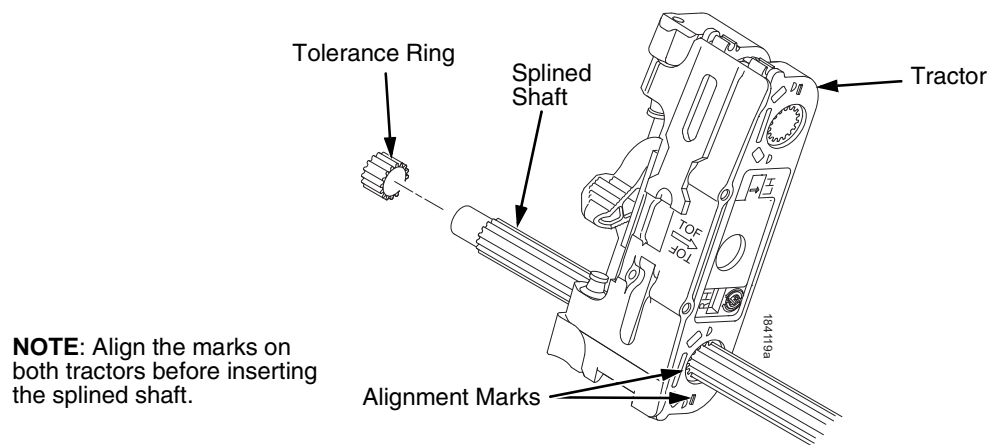
**Figure 121. Splined Shaft and Tractor Installation**

## Shaft, Support

### Removal

1.  Prepare the printer for maintenance (page 512).

2.  Remove the hex screws and right cover plate. (See page 536, items 24 and 25.)

3.  Unlock the tractors and slide them to the far right. (See page 538, item 1.)

4.  Remove the paper guide knob from the center leaf paper guide. (See page 538, item 14.)

5.  Remove the tractor assembly supports from the splined shaft and support shaft. (See page 529.)

6.  Remove the screw securing the right tractor shaft plate and remove the plate. (See page 538, items 7 and 8.)

7.  Slide the support shaft to the right, out of the tractors, block mounts, and the right side plate. (See page 538, items 1, 2, 21, 22, and 26.)

### Installation

1. Slide the support shaft into the right side plate, through the top holes in the tractors, and block mounts. (See page 538, items 1, 2, 21, 22, and 26.)

2. Slide the support shaft through the left side plate until it bottoms in the left tractor shaft plate. (See page 538, items 2, 17, and 27.)

3. Install the right tractor shaft plate and screw (page 538, items 7 and 8) by first sliding the upper "fingers" up and against the flange on the ball bearing, then sliding the rectangular cutout over the support shaft end, then snapping the U-shaped "spring" <u>behind</u> the tab on the right side plate.

4. Install the tractor assembly supports to the splined shaft and support shaft. (See installation instructions on page 529.)

5. Install the hex screws and right cover plate. (See page 536, items 24 and 25.)

6. Return the printer to normal operation (page 512).

## Tractor (L/R)

### Removal

1. Prepare the printer for maintenance (page 512).

2. Remove the support shaft (page 527).

3. Remove the splined shaft (page 524).

### Installation

1. Using the replacement tractors, install the support shaft (page 527).

2. Install the splined shaft (page 524).

3. Return the printer to normal operation (page 512).

# Tractor Assembly Support Gate

## Removal

1. Prepare the printer for maintenance. (See page 512.)

2. Close the tractor doors. (See page 530.)

3. Unlock the left tractor and slide it to the center of the support shaft and splined shaft.

4. Squeeze the tab on the left tractor assembly support gate and remove the support gate from the splined shaft and support shaft. (See page 530, Figure 122.)

5. Repeat step 3 and step 4 to remove the right tractor assembly support gate.

## Installation

1. Squeeze the tab on the tractor assembly support gate and install the support gate to the left of the left tractor, onto the support shaft and splined shaft. (See page 530.)

2. Slide the tractor assembly support gate until it is flushed against the left side plate.

3. Slide the left tractor until it is flushed against the left tractor assembly support gate.

4. Lock the left tractor.

5. Squeeze the tab on the tractor assembly support gate and install the support gate to the right of the right tractor, onto the support shaft and splined shaft. (See page 530.)

6. Slide the tractor assembly support gate until it is flushed against the right side plate.

7. Slide the right tractor until it is flushed against the right tractor assembly support gate.

8. Lock the left tractor.

9. Return the printer to normal operation (page 512).

A

184298a

Tab

A

Support Shaft

Splined Shaft

Tractor
Door (2)

Tractor
Lock (2)

Left Side
Plate

184298a

Tractor Assembly
Support Gate (2)

Right Side
Plate
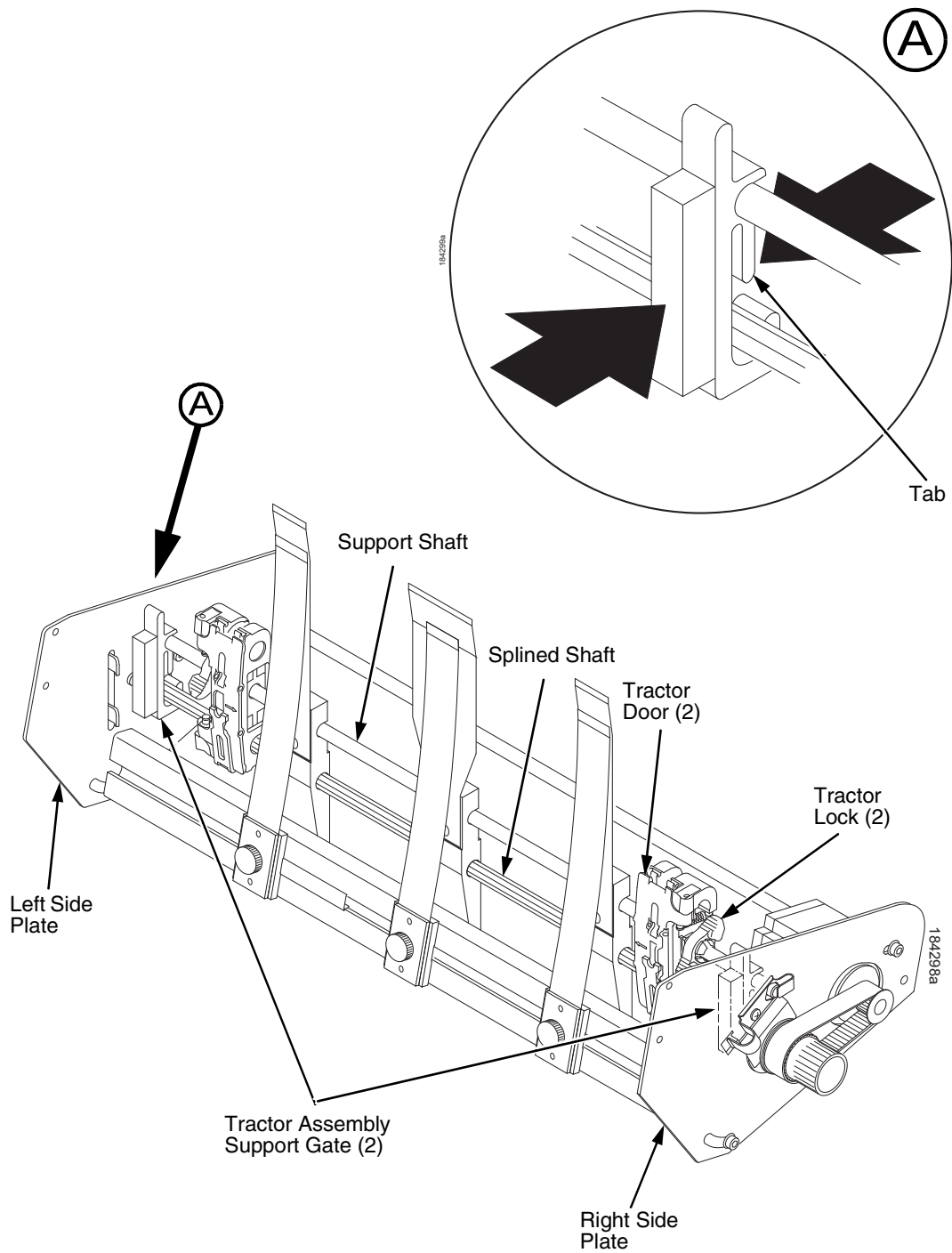
**Figure 122. Removing and Installing the Tractor Assembly Support Gate**

# Illustrated Parts Lists

Only replaceable parts are given part numbers in the illustrated parts lists.

Part numbers are not listed for common fasteners and attachment hardware. Items marked "Ref" in the illustrations refer to parts that are not spared or are part of another assembly.

**NOTE:** Part numbers listed in the column labeled **Europe, Mideast, and Africa (EMEA)** are **RoHS compliant**. These parts conform to requirements specified in DIRECTIVE 2002/95/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

## Illustrations of ZTP Components

**Figure 123. ZTP Details**

184045a

| Item No. | Part No. (RoHS Compliant) | Description | Notes |
|---|---|---|---|
| 1 | 250483-002 | Control Panel Assembly, Ped | |
| 2 | Ref | Screw, Captive (2) | |
| 3 | 250086-001<br>250087-001 | Top Cover Assembly, Ped, Blk<br>Top Cover Assembly, Ped, Gray | |
| 4 | Ref | Screw (2) | |
| 5 | 152440-901 | Cable Assembly, Control Panel | |
| 6 | 179081-001<br>179776-001 | Packaged Ped Kit, Stealth Black<br>Packaged Ped Kit, Lt Gray | |
| 7 | 179162-001 | Field Kit, Caster Kit, Ped | |
| 8 | 178692-901 | Window, Top Cover | |
| 9 | Ref | Housing, Pedestal, V3 | |
| 10 | Ref | Screw (4) | 10-32x.625 |
| 11 | 250081-001 | Field Kit, Short Stack, Ped, P7000 CRP | Contains items 16 |
| 12 | 179395-001 | Wireform, Upper, ZTP, Ped, P7000 CRP | |
| 13 | 178241-901<br>179766-901 | Panel, Quick Access, Flip Up, Black<br>Panel, Quick Access, Flip Up, Gray | |
| 14 | 157070-901 | Paper Fence, Rear, Ped | |
| 15 | 179972-901 | Top Cover, Full Assy, P7000 CRP, ZTP, Black | Does not include control panel (item 1) |
| | 177119-901 | Top Cover, Full Assy, P7000 CRP, ZTP, Gray | Does not include control panel (item 1) |
| 16 | 250014-001 | Slide, Output Basket, Pedestal | Part of item 11 |
| 17 | 252028-901 | Paperout Assembly, ZTP, V2 | |
| 18 | Ref | Control Panel Bracket | |
| 19 | Ref | Screw (2) | |
| 20 | 110718-001 | Paper Tray | |

Two places:
Exploded to show
assembly. Do not
remove the
clamps and
screws.

8

To J02
(Shuttle
Motor)

3

4

6

7

5

To J03
(MPU)

See Figure 45,
page 348.

Ⓐ

9

2

1

184046a
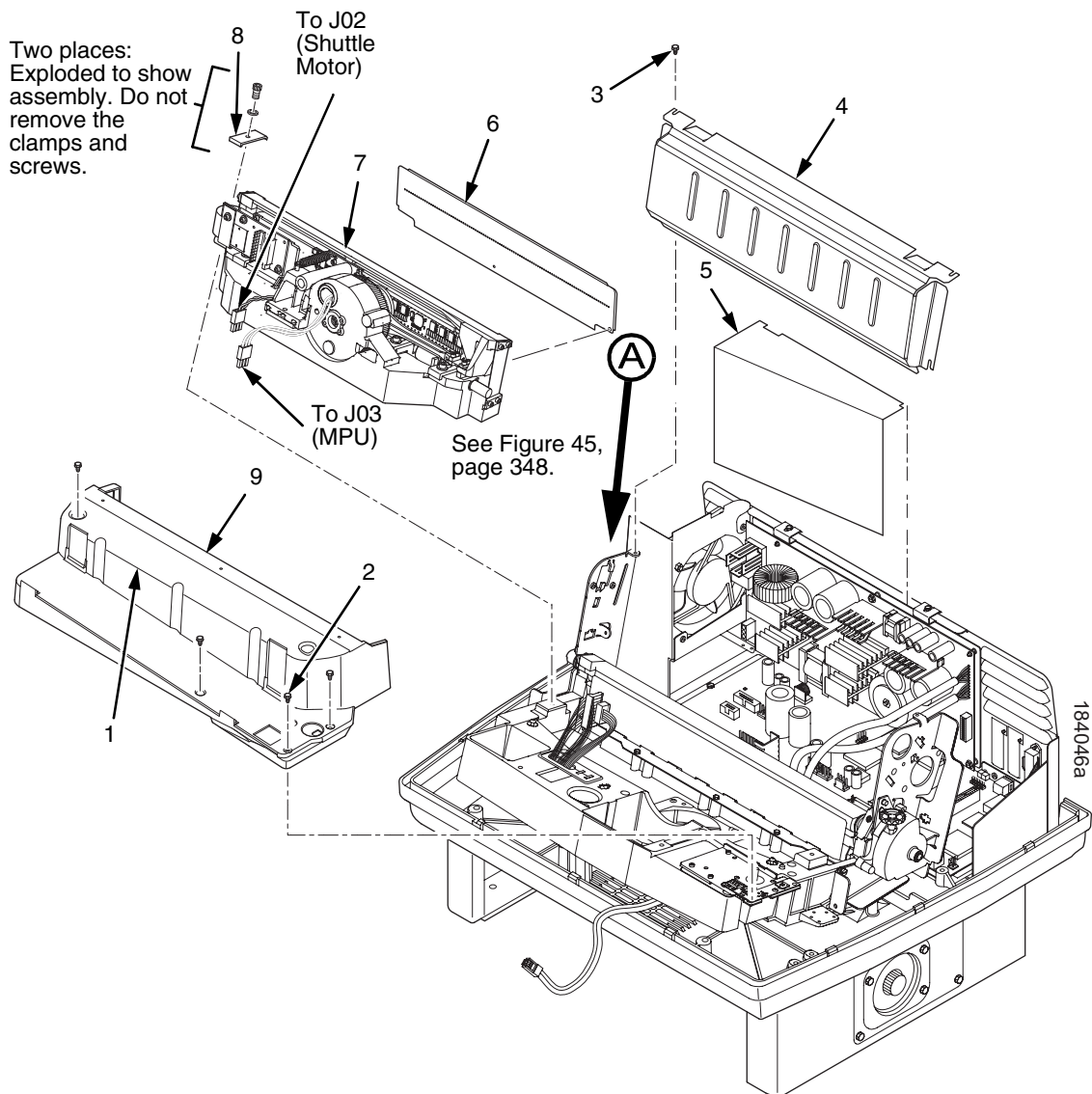
**Figure 124. ZTP Inside Covers, Barrier Shield, and Shuttle Assembly**

| Item No. | Part No. (RoHS Compliant) | Description | Notes |
|---|---|---|---|
| 1 | | Shuttle Cover | Air Shroud Assembly |
| 2 | Ref | Screw, Captive (2) | 10-24x.62 with O-ring, .125x.250x.06 |
| 3 | Ref | Screw, Thread-forming (2) | 6-32x.25 and #6 flat washer |
| 4 | 179396-001 | Barrier Shield | |
| 5 | 179276-001 | Power Supply Insulator | Taped to card cage along upper edge |
| 6 | 254350-901 | Cover Assy | P7X05C, P7002CH |
| | 254353-901 | Cover Assy | P7X10C, P7003CH |
| | 254356-901 | Cover Assy | P7X15c, P7006CH |
| | 254138-901 | Cover Assy | P7X20C, P7008CH |
| 7 | 254504-901 | Shuttle Assembly, 05 | P7X05c |
| | 254504-991 | Shuttle Assembly, 05, Adv Exch | P7X05c |
| | 254496-901 | Shuttle Assembly, 10 | P7X10c |
| | 254496-991 | Shuttle Assembly, 10, Adv Exch | P7X10c |
| | 254488-901 | Shuttle Assembly, 15 | P7X15c |
| | 254488-991 | Shuttle Assembly, 15, Adv Exch | P7X15c |
| | 254135-901 | Shuttle Assembly, 20 | P7220c |
| | 254135-901 | Shuttle Assembly, 20, Adv Exch | P7220c |
| | 254505-001 | Shuttle Assembly, 02HC | P7X02Hc |
| | 254505-991 | Shuttle Assembly, 02HC, Adv Exch | P7X02Hc |
| | 254497-901 | Shuttle Assembly, 03HC | P7X03Hc |
| | 254497-991 | Shuttle Assembly, 03HC, Adv Exch | P7X03Hc |
| | 254489-901 | Shuttle Assembly, 06HC | P7X06Hc |
| | 254489-991 | Shuttle Assembly, 06HC, Adv Exch | P7X06Hc |
| | 254506-901 | Shuttle Assembly, 08HC | P7X08Hc |
| | 254506-991 | Shuttle Assembly, 08HC, Adv Exch | P7X08Hc |
| | 252700-901 | Hammer Spring Assembly, 05, Thin | P7X05 |
| | 252715-901 | Hammer Spring Assembly, 10, Thin | P7X10 |
| | 252723-901 | Hammer Spring Assembly, 15, Thin | P7X15 |
| | 174514-901 | Hammer Spring Assembly, 20S | P7220 |
| | 252743-901 | Hammer Spring Assembly, 02H | P7X02H |
| | 252719-901 | Hammer Spring Assembly, 03H | P7X03H |
| | 252719-901 | Hammer Spring Assembly, 06H | P7X06H |
| | 175613-901 | Hammer Spring Assembly, 06H, Version 2 | P7X06H |
| | 252739-901 | Hammer Spring Assembly, 08H, Thin | P7X08H |
| | 252739-901 | Hammer Spring Assembly, HD, Thin | P7000HD |
| 8 | 150399-901 | Clamp, Shaft, Receiving | |
| 9 | 153528-901 | Paper Scale | |

To the Terminator
Board on the
Shuttle Frame

184047a
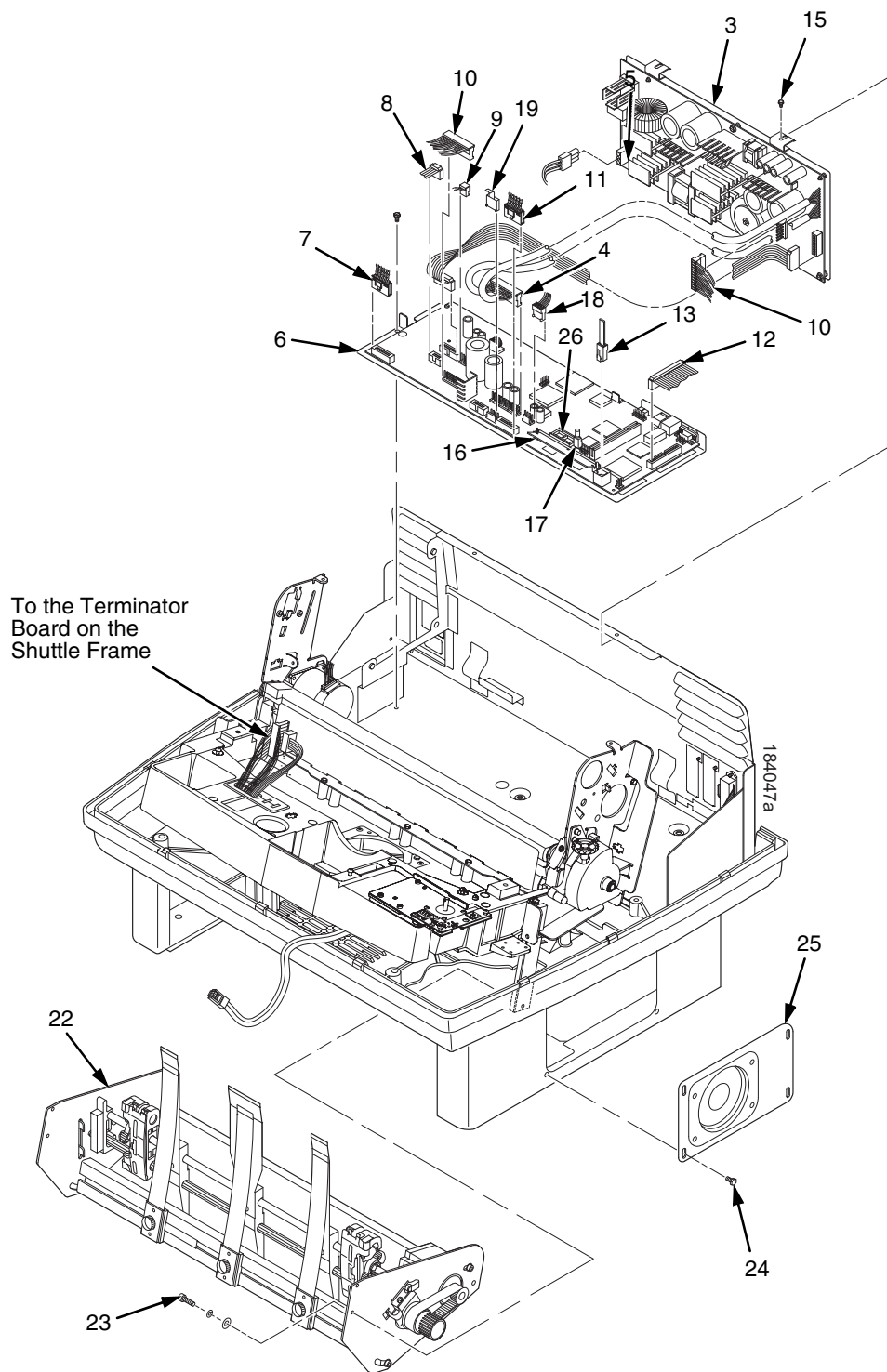
**Figure 125. ZTP Circuit Boards and Paper Feed Assembly**

| Item No. | Part No. (RoHS Compliant) | Description | Notes |
|---|---|---|---|
| 3 | 250297-901 | Power Supply, PFC, 5/10 | P7005, -10,- 02H, -03H |
|  | 250297-991 | Power Supply, PFC, 5/10, Adv Exch | P7005, -10,- 02H, -03H |
|  | 250251-901 | Power Supply, PFC, 15 | P7015, P7X06H |
|  | 250251-991 | Power Supply, PFC, 15, Adv Exch | P7015, P7X06H |
|  | 250410-901 | Power Supply, PFC, 20 | P7008H, P7000HD |
|  | 250410-991 | Power Supply, PFC, 20, Adv Exch | P7008H, P7000HD |
| 4 | Ref | P101 Cable Connector | Part of item 3 |
| 5 | Ref | Cable Assembly, AC-In, Power Supply | Part of Field Kit, AC Assy, 153502-901 |
| 6 | 250298-901 | Controller PCBA, (V5) |  |
|  | 250298-991 | Controller PCBA, (V5) Adv Exch |  |
| 7 | 202362-001 | Housing, Connector Kit | P106, Motor Sensor, Left |
| 8 | 152421-901 | Hammer Bank Logic Cable Assembly |  |
| 9 | 152420-901 | Shuttle Motor Cable Assembly |  |
| 10 | 164805-901 | Hammer Bank Power Cable Assembly | Used on all except P7220 |
| 11 | 202362-001 | Housing, Connector Kit | P107, Motor Sensor, Right |
| 12 | 152439-901 | Centronics I/O Cable Assembly |  |
| 13 | 152440-901 | Control Panel Cable Assembly |  |
| 15 | Ref | Screw, Captive, Power Supply (2) |  |
| 16 | 250488-902 | SIMM, Flash Memory, 8 MB | Install in slot J11. J10 is not used. |
|  | 250488-903 | SIMM, Flash Memory, 16 MB |  |
| 17 | Ref | Security Key |  |
| 18 | 178046-001 | Paper Feed Motor | P7X05/10/15 |
|  | 178535-001 | Paper Feed Motor | P7X05/10/15LG |
| 19 | Ref | Integrated Print Management System Ribbon Cartridge Sensor (179526-901) Cable |  |
| 20 | Ref | Not Used |  |
| 21 | Ref | Not Used |  |
| 22 | 179990-001 | Paper Feed Assembly, ZTP | Not spared as an assembly |
| 23 | Ref | Screw w/Lociwasher and Flat Washer |  |
| 24 | Ref | Screw, Hex w/Lockwasher, 8X.38 |  |
| 25 | 250128-001 | Cover Plate, Right Extension |  |
| 26 | 250489-901 | SDRAM DIMM, MEM, 32 MB, PC100 |  |
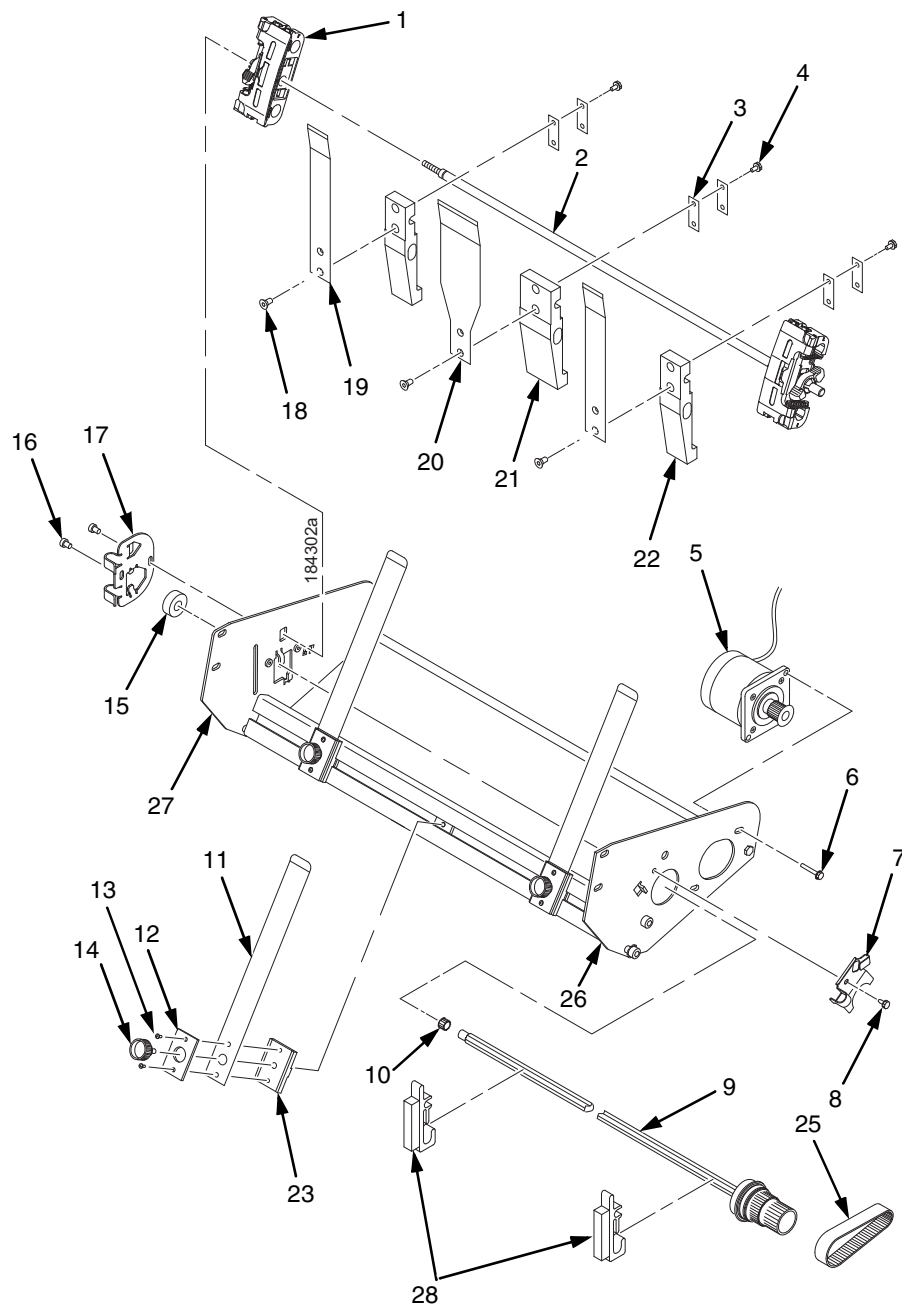
**Figure 126. ZTP Tractor Shafts, Paper Guides, and Paper Feed Motor**

| Item No. | Part No. (RoHS Compliant) | Description | Notes |
|---|---|---|---|
| 1 | 179065-901 | Tractor Set, Non-Roller, 05/10/15 (Blue) | |
| 2 | 177821-001 | Shaft, Spacer, Tractor, ZTP | Part of item 24 |
| 3 | 178132-001 | Pad, Nylon, Mount Block, ZTP | Part of item 24 |
| 4 | Ref | Screw, Button Head (3) | |
| 5 | 178046-001 | Field Kit, Paper Feed Motor, V3 | |
| 6 | Ref | Screw, Hex w/Lock Washer, 10-24x.50 (2) | Part of item 5 |
| 7 | 173217-001 | Plate, Tractor Shaft, Right | |
| 8 | Ref | Screw, Socket Cap, 6-32x.312 Trilob, Self-Tapping | |
| 9 | 178988-901 | Splined Shaft Assembly (Blue Handle) | |
| 10 | 204155-001 | Tolerance Ring,.37X.25,.006 THK,SS | |
| 11 | 250088-001 | Field Kit, Leaf, Paper Guide, P7000 CRP, ZTP | Contains three front leaf guide assemblies |
| 12 | 177812-001 | Plate, Clamping, Paper Guide, ZTP (3) | Part of item 11 |
| 13 | Ref | Screw, 6-32x.25, ¼ Hex Hd, Washer (6) | Part of item 11 |
| 14 | Ref | Screw, M5X16X.8, SHCS-Thumb, SS, ASTM F837M | Part of item 24 |
| 15 | Ref | Bearing, Ball, Sealed | |
| 16 | Ref | Screw, Socket Cap, 6-32x.312 Trilob (Self-Tapping) (2) | |
| 17 | 173130-001 | Plate, Tractor Shaft, Left | |
| 18 | Ref | Screw, Flat HD, Metric, M3x6mm (3) | |
| 19 | 179755-001 | Leaf, Guide, Paper, Outer, ZTP (2) | |
| 20 | 179756-001 | Leaf, Guide, Paper, Center, ZTP | |
| 21 | 177808-001 | Block, Mount, Ctr Paper Guide, ZTP | |
| 22 | 178728-001 | Block, Mounting, Outboard, Paper Guide, ZTP (2) | |
| 23 | 177814-001 | Extrusion, Paper Guide, ZTP (3) | Part of item 11 |
| 24 | 178717-001 | Field Kit, Hardware, ZTP | |
| 25 | 108664-903 | Belt, Timing, .080 Pitch, 100 Teeth, .500 Wide | Paper Feed Belt |
| 26 | 177803-001 | Right Side Plate | |
| 27 | 177806-001 | Left Side Plate | |
| 28 | 178137-001 | Support, Gate, Tractor, Assembly | |

NOTE:
Item 24: Platen
Hardware Kit

184048a
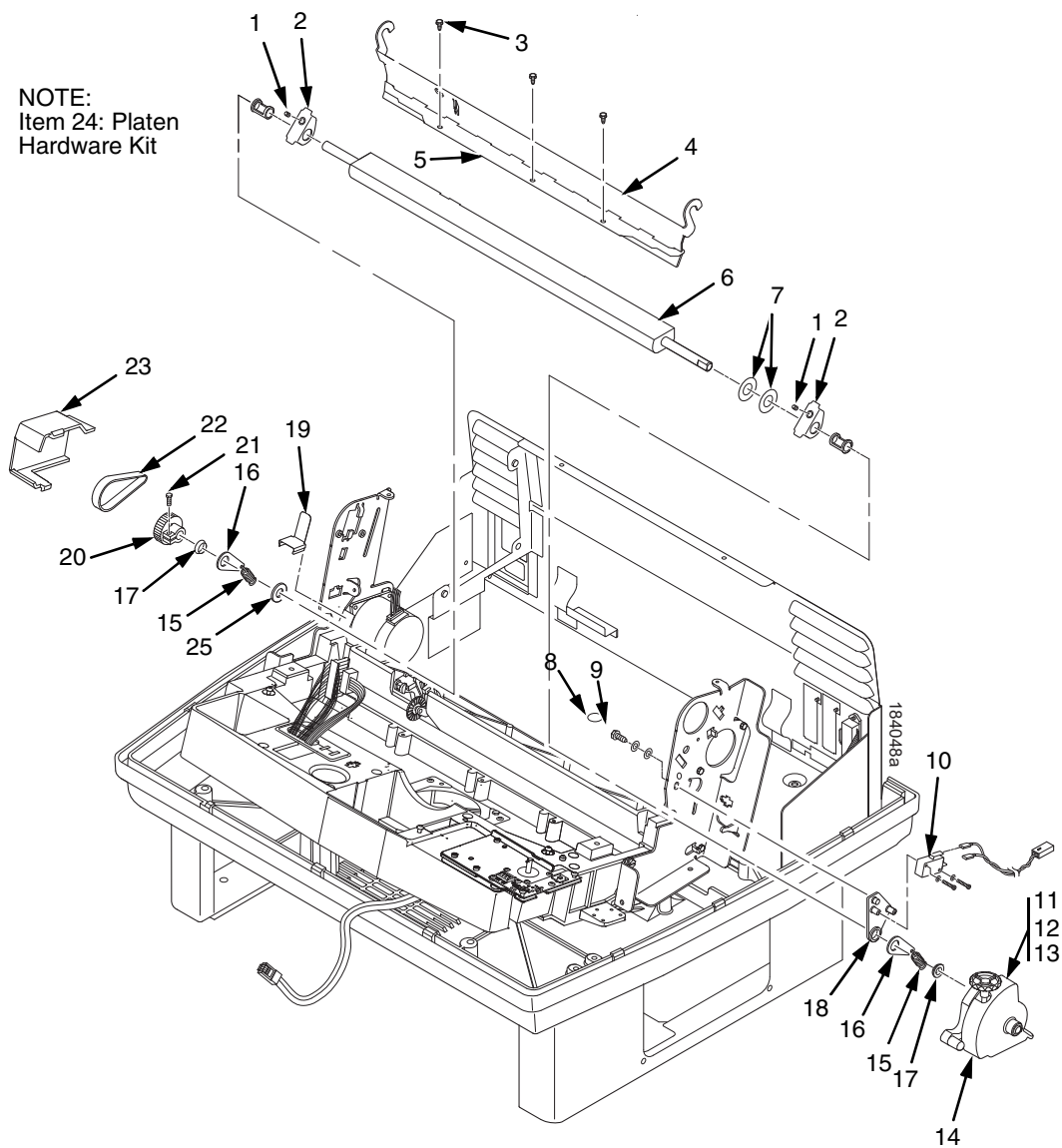
**Figure 127. ZTP Platen and Integrated Print Management Sensor Assembly**

| Item No. | Part No. (RoHS Compliant) | Description | Notes |
|---|---|---|---|
| 1 | Ref | Setscrew (2) | Part of item 24 |
| 2 | Ref | Bracket, Platen (2) | Part of item 24 |
| 3 | Ref | Screw, Thread-forming (3) | 6-32x.25 |
| 4 | 174968-001 | Ironer Bracket/Plate Field Kit | |
| 5 | Ref | Plate, Ironer | Part of item 4 |
| 6 | 112657-901 | Platen Assembly | |
| 7 | Ref | Washer, Flat (2) | Part of item 24 |
| 8 | Ref | Screw (2) | Part of item 10 |
| 9 | Ref | Washer, Flat #4 (2) | Part of item 10 |
| 10 | 179334-901 | Field Kit, Switch Assy, w/Bracket | Includes items 8, 9, 18 |
| 11 | Ref | Screw, Socket Cap, 6-32x.75 | Part of item 14 |
| 12 | Ref | Washer | Part of item 14 |
| 13 | Ref | Nut | Part of item 14 |
| 14 | 178705-901 | Platen Stop Lever Kit | Includes items 11, 12, 13 |
| 15 | Ref | Spring, Extension 1.12L | Part of item 24 |
| 16 | Ref | Link, Spring | Part of item 24 |
| 17 | Ref | Bearing, Nylon .376 | Part of item 24 |
| 18 | Ref | Bracket, Switch Mount | Part of item 10 |
| 19 | Ref | Wear Saddle, Platen (2) | Part of item 24 |
| 20 | 150703-902 | Platen Pulley, Drive | |
| 21 | Ref | Screw, Socket Cap, 6-32x.44 | Part of item 20 |
| 22 | 141516-901 | Belt, Timing, .080 Pitch, .312 Wide | Platen Open Belt |
| 23 | 153488-001 | Field Kit, Covers | Platen Open Belt Cover shown |
| 24 | 177558-001 | Platen Hardware Kit | Includes items 1, 2, 7, 15, 16, 17, 19, 25 |
| 25 | Ref | Platen Washer | Part of item 24 |
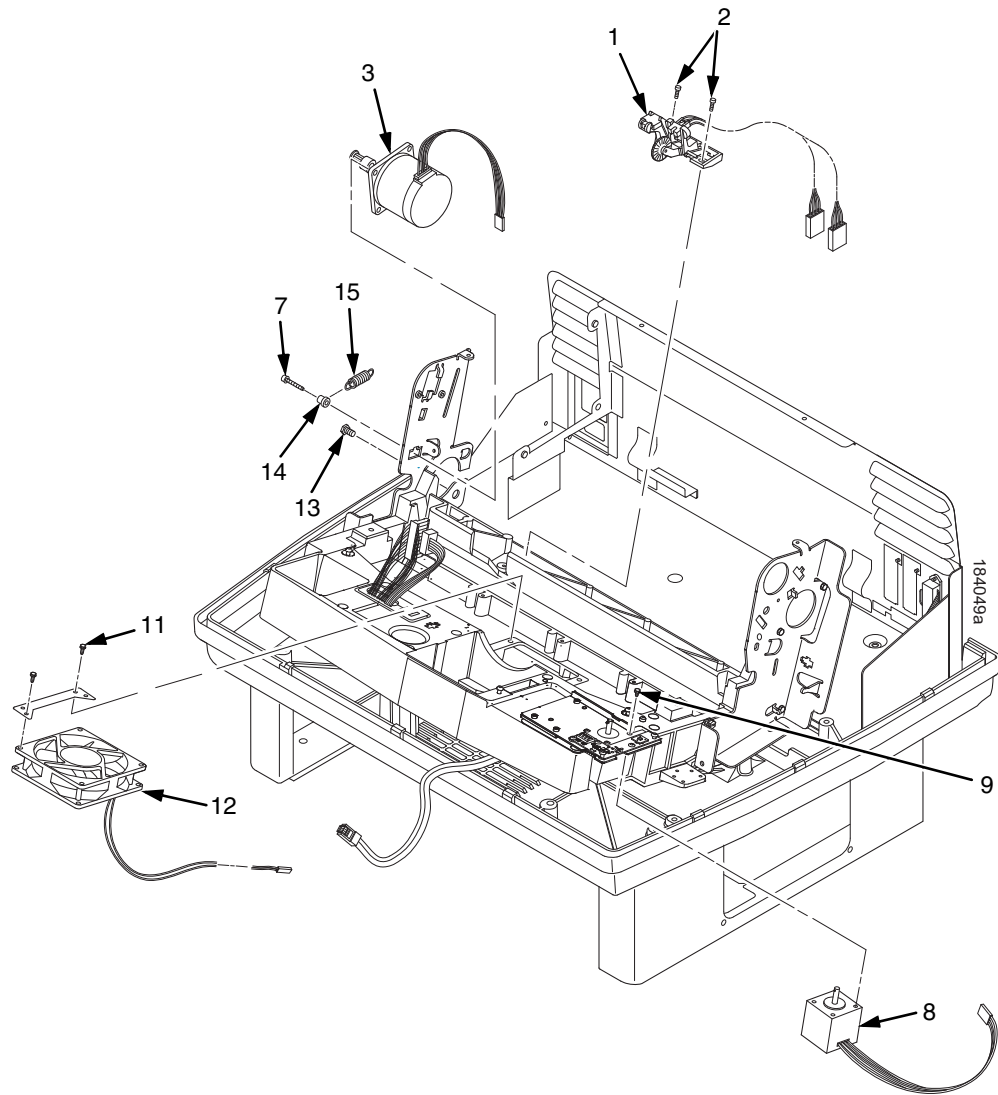
**Figure 128. ZTP Hammer Bank Fan and Motors**

| Item No. | Part No. (RoHS Compliant) | Description | Notes |
|----------|---------------------------|-------------|-------|
| 1 | 152415-901<br>170172-001 | Switch Assembly, Paper Detector<br>Field Kit, Slotted Black Back Form Switch | Optional switch used with black back forms |
| 2 | Ref | Screw, Thread-forming, 6-32x.375 (2) | Part of item 1 |
| 3 | 179638-001 | Motor Assembly, Platen | Includes pulley |
| 4 | Undefined | | |
| 5 | Undefined | | |
| 6 | Undefined | | |
| 7 | Ref | Screw, w/Lock Washer, 10-32x.50 (2) | Part of item 3 |
| 8 | 254507-001 | Motor, Stepper, P7c Ribbon Cartridge | |
| 9 | 203281-001 | Screw, M3 x6 x .5 (4) | |
| 10 | Undefined | | |
| 11 | Ref | Screw, w/Lock Washer (2) | 6-32x1.25 |
| 12 | 152416-901 | Hammer Bank Fan Assembly | All except P7220; air flow is up<br>P7220; air flow is up |
| | 173427-901 | Hammer Bank Fan Assembly | |
| 13 | Ref | Screw, Hex w/Lock Washer (2) | 10-32x.50 |
| 14 | Ref | Post, Platen Belt Spring | |
| 15 | Ref | Spring, Platen Belt | |

# F  *Paper Specifications And Forms Design*

## Introduction

This appendix is divided into two sections.

The first section lists general specifications for continuous form paper used in this printer. (Specific brands of paper are not recommended.)

The second section goes into more detail, providing definitions, guidelines, and a checklist you can use to design forms that will run smoothly through the printer.

Adherence to these specifications will ensure the best print quality and reliable operation of the printer.

# General Paper Specifications

This section describes the minimum paper specifications that must be met to ensure the best printer performance.

Always test paper and forms before buying large quantities. Make all measurements at $20^\circ$ to $26^\circ$ Celsius ($68^\circ$ to $78^\circ$ Fahrenheit) and 45% to 55% relative humidity. Printronix printers perform well with forms that meet the specifications listed in Table 11 and Table 12 below.

**NOTE:** Printronix conforms to ANSI® Standard X3.96-1983, "American National Forms Information Systems for Continuous Business Forms," and ISO Recommendation No. 2784, which cover common form widths and depths, standards for sprocket feed holes and margins, and other basic tolerances.

**Table 11. Paper Sizes**

| | |
|---|---|
| Maximum Form Width | 17.0 inches (43.18 cm) edge to edge |
| Minimum Form Width | 3.0 inches (7.62 cm) edge to edge |
| Maximum Printing Width | 13.6 inches (34.54 cm) |
| Maximum Right Margin | 1 to 13.6 inches (2.54 to 34.54 cm) |
| Maximum Left Margin | 0 to 13.5 inches (0 to 34.29 cm) |
| Maximum Form Length | 16 inches (40.64 cm) |
| Minimum Form Length | 2 inches (5.08 cm) |

**Table 12. Paper Weights**

| Single-Part Forms | |
|---|---|
| Standard | 15 to 100 pound (57 to 380 gm/meter$^2$) |
| Best Print Quality | 18 to 60 pound (68 to 227 gm/meter$^2$) |
| **Multipart Forms** | |
| Carbon Paper | 12 pounds (46 gm/meter$^2$) up to 6 total pages |
| Carbons | 8 pounds (30 gm/meter$^2$) up to 6 total pages |
| Pack Thickness | Maximum 0.025 inch (0.635 mm) total |
| Carbonless | Up to 4-part forms |

Test the paper first if it will be used in environments with greater than 80% or less than 20% humidity. Test paper that will be used at high humidity for satisfactory feeding and handling. Test paper that will be used at low humidity to determine if static buildup must be eliminated for proper paper stacking.

# Paper Guidelines

The terms below are used to describe and discuss continuous form paper.

## Terms and Definitions

| | |
|---|---|
| Chaff | Bits of paper not completely removed after the punch process that creates tractor pin holes, major and minor perforations, etc. |
| Cut Point | The area along a perforation where a cut has been made that extends through the entire form. (Compare Tie Point.) |
| Cut-to-Tie Ratio | The ratio of cut points to tie points occurring along a perforation. |
| Evenness | The amount of variation between the thickest and thinnest points measured across the print area (i.e., between the side perforations). |
| Form Thickness | Thickness measured at the thickest point of the entire form. This includes glue lines, compressed staples, perforations, etc., and is not limited to the printed region of the form. |
| Margin | The region outside the print area of the form. The margin is typically bounded by the outermost vertical perforations (i.e., where the tractor holes are located) and the edge of the form. |
| Print Area | The region where printing occurs, and which is always between the side perforations. |
| Print Station | The area in the printer where occur the actual impacts that constitute printing. |
| Staple | A punch-cut fastening stitch located along the vertical edge and within the side perforation region of a multipart form. (Note that this is *not* a metal staple.) |
| Tenting | The measured thickness between the print area of the form and the peak thickness of a major perforation. Tenting is typically caused by overly stiff perforations or incorrect registration of the inner parts of multipart forms. |
| Tie Point | The area along a perforation between the cut points. (Compare Cut Point.) |

The figure below illustrates the terms used in this appendix.

Side Perforation

Margin Area

Tractor Pin Hole

Page Perforation

Cut Point

Tie Point

Print Area

Form Span

**Side View of Form**

Printed Side of Form

Outward Perforation

Inward Perforation
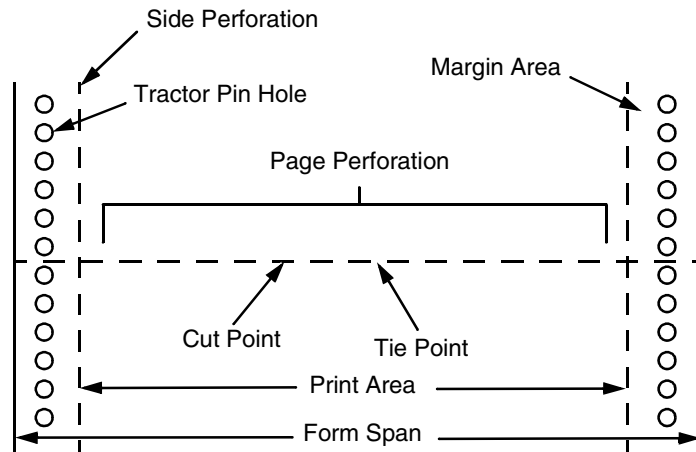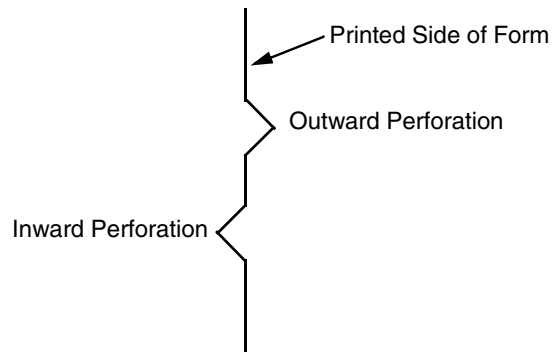
**Figure 129. Forms Terminology**

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# Environmental Considerations

Before they are used, forms should be stored for at least 24 hours — preferably 48 hours — in the environment in which they will be used. This stabilizes the moisture content of the paper, resulting in better feeding and stacking. But forms should never be stored in environments that result in damage such as delamination of glues, creasing, folding, etc.

## Form Types

Three kinds of continuous form paper are specified for use with the printer:

- Edge-perforated, fanfolded, single-part forms
- 2- to 6-part multipart carbon forms
- 2- to 4-part multipart carbonless forms

For all forms, the width range is 3 to 17 inches, the length range is 2 to 12 inches.

## Form Weight

Use 15 to 100 pound (6.80 to 45.36 kg) stock. Light weight and recycled forms must be strong enough to assure that tractor holes and perforations do not tear or detach during form feed, skipping, and ejecting operations.

## Form Thickness

Forms must be no thicker than 0.025 inches (0.0635 cm) at the thickest part of the form — including glue lines, staples, perforations, etc. — and is not restricted to just the print area.

## Form Evenness

The evenness of forms must not exceed 0.003 inches (0.00762 cm) across the print area (between the side perforations).

Tenting caused by buildup of perforation thickness must be minimized. A perforation thickness measured at the major perforation that exceeds 1.25 times the forms thickness measured in the print area will result in an unpredictable and unreliable form. The perforation thickness must never exceed the maximum forms thickness of 0.025 inches (0.0635 cm).

## Tractor Pin Engagement

The printer uses tractors with 6-pin engagement. Detailed engagement specifications are given in ISO-2784, but are summarized in the table below.

| Specification | Inches | Millimeters |
|---|---|---|
| Hole centerline (CL) to edge of form | 0.236 ± 0.028 | 6.0 ± 0.10 |
| Hole Diameter (Serrations or any occlusion due to incorrect registration of multipart forms cannot exceed this dimension.) | 0.156 ± 0.004 | 4.0 ± 0.10 |
| Distance between centers of two consecutive holes | 0.500 ± 0.002 | 12.7 ± 0.05 |
| Maximum deviation of holes from their centerline | 0.004 | 0.10 |
| Maximum deviation of lefthand hole to adjacent righthand hole (CL to CL) | 0.006 | 0.15 |
| Maximum parallel deviation of lefthand hole CL to righthand hole CL | 0.006 | 0.15 |

## Methods of Forms Attachment

Any method of attachment (staples, crimps, gluing, etc.) must be designed in a way that does not permit air to be trapped between copies of a form. Hard or wire brads and staples must not be used.

Any attachment must not coincide with the major perforation or any horizontal perforation.

### Gluing

Gluing must be controlled and uniform, since it is a major contributor to the maximum form thickness. A form that meets the maximum forms thickness requirement in the print area but which exceeds the maximum thickness at a glue line is considered an unreliable and unpredictable form.

### Staples

Staples must be used only in the margin area of the form and must not be in line with the path of the tractor holes. Ideally, staples are placed in the margins so that they coincide with areas of the form where printing does not occur.

Figure 130 below shows preferred and unacceptable ways of fabricating staples.

**Preferred**      **Unacceptable**
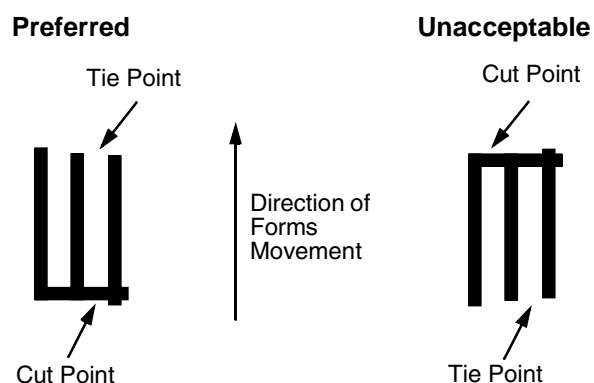
**Figure 130. Preferred vs. Unacceptable Form Staples**

## Cut-To-Tie Ratio

A common cut-to-tie ratio for bond forms is 4:1 (that is, 80% cut to 20% ties). This value is dictated chiefly by the application program that the form runs under. Lower cut-to-tie ratios will yield better form handling, but stacking may suffer due to increased stiffness of the perforations. Some level of experimentation is required to determine the best cut-to-tie ratio. But remember that a cut-to-tie ratio that causes a thickness buildup greater than 0.025 inch (0.635 mm) or that creates an evenness variation greater than 0.003 inch (0.0762 mm) will result in an unreliable and unpredictable form.

## Perforation Intersections

Whenever a horizontal line of perforations intersects with a vertical line of perforations, the point of intersection must be a tie point. Cut points at such intersections make the form unacceptable.

# Chaff Content

Tractors holes should be clear of chaff. As much as possible, there should not be loose chaff in the box in which the paper is packed.

# Form Design Checklist

Use this checklist to help you remember key areas of consideration when designing and ordering forms and paper stocks.

## Environment

_____ Before they are used, forms are given at least 24 hours of condensing time in the environment in which they will be used.

_____ Forms are not stored in environments that result in such damage as delamination of glue lines, creasing, folding, etc.

## Type of Form

| Form Type (Check One) | | | | | |
|---|---|---|---|---|---|
| **1 Part** | **2 Part** | **3 Part** | **4 Part** | **5 Part** | **6 Part** |
| | | | | | |

<--------- Carbonless Range --------->

<---------------------------- Carbon Range ---------------------------->

Recycled Paper? Yes _____ No _____ If yes, assure adequate form strength to prevent tractor holes and perforations from tearing or detaching during form feeds and page ejects.

Security Form? Yes _____ No _____ If yes, the last page of the form should have a minimum 50% reflectance and, if possible, the stippled page faces inward to the form.

## Form Weight

Form weight = _____
(Minimum = 15 lb. / 6.8 kg ; Maximum = 100 lb / 45.36 kg)

## Form Thickness

Form thickness = _____
(0.025 inches / 0.0635 cm maximum measured at the thickest point of the form, which includes perforations, compressed staples, glue lines, etc.)

## Form Evenness

The evenness of the form = _____
(Not to exceed 0.003 in. / 0.00762 cm)

Tenting due to buildup of perforation thickness must be minimized. A perforation thickness measured at the major perforation that exceeds 1.25 times the forms thickness measured in the print area will result in an unreliable and unpredictable form. Perforation thickness must not exceed the maximum form thickness of 0.025 in. / 0.0635 cm.

## Tractor Pin Holes

The holes which engage the tractor pins must conform to the following specifications:

| Specification | Inches | Millimeters |
|---|---|---|
| Hole centerline (CL) to edge of form | 0.236 ± 0.028 | 6.0 ± 0.1 |
| Hole Diameter (Serrations or any occlusion due to incorrect registration of multipart forms cannot exceed this dimension.) | 0.156 ± 0.004 | 4.0 ± 0.1 |
| Distance between centers of two consecutive holes | 0.500 ± 0.002 | 12.7 ± 0.05 |
| Maximum deviation of holes from their centerline | 0.004 | 0.1 |
| Maximum deviation of lefthand hole to adjacent righthand hole (CL to CL) | 0.006 | 0.15 |
| Maximum parallel deviation of lefthand hole CL to righthand hole CL | 0.006 | 0.15 |

## Methods Of Forms Attachment

_____      Must not allow air entrapment between copies of the form

_____      Must not use hard brads or staples

_____      Must not coincide with major perforation or any horizontal perforation

_____      Gluing lines must not result in a form that exceeds 0.025 in. / 0.0635 cm thickness

_____      Staples must be used only in margin area of form

_____      Staple cuts must not be in the direction of form movement through the tractors

_____      Staples must not occur in-line with the path of the tractor holes

_____   Staples should be placed in the margins so that they coincide with areas of the form where printing will not occur

## Cut-To-Tie Ratio

____:____ (Typical ratio is 4:1, or 80% cut to 20% tie)

Thickness Buildup = _____ in. / cm

**NOTE:** A cut-to-tie ratio that causes a thickness buildup greater than 0.025 in. / 0.0635 cm, or that creates an evenness variation greater than 0.003 in. / 0.00762 cm, will result in an unreliable and unpredictable form.

## Perforation Intersections

_____   Horizontal-vertical perforations are tie points. Cut points at such intersections are unacceptable.

## Chaff Content

_____   Tractor holes are clear of chaff.

_____   There is no loose chaff in the box the paper is packed in.

# Summary

Because it is impossible to test all possible forms available for use in the printer, Printronix recommends that paper conform to the specifications outlined in this appendix for the best printer performance.

But the guidelines in this appendix are not a substitute for actual testing. Always test forms—including special single-part paper, multipart forms, forms with glue strips, carbonless forms, card stock, and labels—for satisfactory feeding, registration, and print quality prior to purchase. For best results in selecting standard or specialty forms, consult a forms vendor who can ensure conformance to the guidelines in this appendix and who can recommend cost-effective purchases.

## Storage and Handling

The performance of the printer depends to a large degree on the condition of the paper used; therefore, the following principles for packaging, handling, and storage are highly recommended.

### Packaging

To avoid damage during handling, use top and bottom fillers in continuous form cartons to hold the paper stack firmly in place. Proper packaging ensures that the paper remains flat and is not damaged along the edges.

### Storage

Do not store cartons directly on the floor, and do not stack them more than six high. Set each carton upright and squarely on the one underneath. Do not place anything else on the stack of paper, as this can damage the paper.

### Preconditioning Forms

Protect paper from temperature and humidity extremes. Store paper in the same environment as the printer for 24 to 48 hours before using the paper. This allows the moisture content of the paper to stabilize.

P7000 CRP printers are used at temperatures from $5^\circ$ to $40^\circ$ C ($41^\circ$ to $104^\circ$ F) up to 1524 meters (5000 feet), from $5^\circ$ to $32^\circ$ C ($41^\circ$ to $90^\circ$ F) up to 2438 meters (8000 feet), with a non-condensing relative humidity of 10% to 90%. This is the full operating range; for the best results store the printer paper at $18^\circ$ to $24^\circ$ C ($65^\circ$ to $75^\circ$ F), with a relative humidity of 40% to 50%.

If the printer is in an environment subject to extremes of temperature or humidity, store the printer paper in a better environment and move it to the printer as needed.

# G Maintenance Manuals For P5000 and P7000 Spool Printers

This manual covers only P7000 CRP printers. Information about Printronix P5000 and P7000 (spool) line matrix printers is contained in the maintenance manuals summarized as follows. See page 563 for P7000 (spool) line matrix printers.

## P5000 Line Matrix Printers

| Printer Model | Type of Controller Board | Type of Hammer Bank | Maintenance Manual |
|---|---|---|---|
| P5000 - Early | CMX, CFX | Single | 164253-001 (See Table 13) |
| P5B / 10 / 15 | CMX, CFX | Single | 175455-001 (See Table 14) |
| P5000 - Recent | PSA3 | Single | 176475-001 (See Table 15) |
| P5220D, P5224D | CFX, PSA3 | Dual | 173843-001 (See Table 16) |

Table 13. Early P5000 Single Hammer Bank Printers: Maintenance Manual 164253-001

| Model | Max Print Speed | Enclosure | Single Hammer Bank | Controller Board[1] |
|---|---|---|---|---|
| P50KA™ | 585 lpm | Pedestal | 91 Hammers Kanji / Hanzi | 25 MHz CMX |
| P500™ | 900 lpm | Pedestal | 49 Hammers | 25 MHz CMX |
| P5003H™ | N/A | Pedestal | 60 Hammers | 40 MHz CFX |
| P5005™ | 475 lpm | Pedestal | 28 Hammers | 25 MHz CMX |

**Table 13. Early P5000 Single Hammer Bank Printers: Maintenance Manual 164253-001**

| Model | Max Print Speed | Enclosure | Single Hammer Bank | Controller Board[1] |
|---|---|---|---|---|
| P5005-QA™ | 475 lpm | Pedestal w/ Quick-Access Cover | 28 Hammers | 25 MHz CMX |
| P5005-12™ | 475 lpm | Pedestal | 28 Hammers, 12 MIL tips | 25 MHz CMX |
| P5005-12-QA™ | 475 lpm | Pedestal w/ Quick-Access Cover | 28 Hammers, 12 MIL tips | 25 MHz CMX |
| P5005A™ | 500 lpm | Pedestal | 28 Hammers | 25 MHz CMX |
| P5005A-QA™ | 500 lpm | Pedestal w/ Quick-Access Cover | 28 Hammers | 25 MHz CMX |
| P5005A-12™ | 500 lpm | Pedestal | 28 Hammers, 12 MIL tips | 25 MHz CMX |
| P5005A-12-QA™ | 500 lpm | Pedestal w/ Quick-Access Cover | 28 Hammers, 12 MIL tips | 25 MHz CMX |
| P5005B™ | 500 lpm | Pedestal | 28 Hammers | 40 MHz CMX |
| P5005B-QA™ | 500 lpm | Pedestal w/ Quick-Access Cover | 28 Hammers | 40 MHz CMX |
| P5005B-12™ | 500 lpm | Pedestal | 28 Hammers, 12 MIL tips | 40 MHz CMX |
| P5005B-12-QA™ | 500 lpm | Pedestal w/ Quick-Access Cover | 28 Hammers, 12 MIL tips | 40 MHz CMX |
| P5006H™ | N/A | Pedestal | 102 Hammers | 40 MH CFX |
| P5008™ | 800 lpm | Pedestal | 49 Hammers | 25 MHz CMX |
| P5008-QA™ | 800 lpm | Pedestal w/ Quick-Access Cover | 49 Hammers | 25 MHz CMX |
| P5009-QA™ | 900 lpm | Pedestal w/ Quick-Access Cover | 49 Hammers | 25 MHz CMX |
| P5010™ | 1000 lpm | Pedestal | 60 Hammers | 40 MHz CMX |

**Table 13. Early P5000 Single Hammer Bank Printers: Maintenance Manual 164253-001**

| Model | Max Print Speed | Enclosure | Single Hammer Bank | Controller Board[1] |
|---|---|---|---|---|
| P5010-QA™ | 1000 lpm | Pedestal w/ Quick-Access Cover | 60 Hammers | 40 MHz CMX |
| P5015™ | 1500 lpm | Pedestal | 102 Hammers | 40 MHz CMX |
| P5015-QA™ | 1500 lpm | Pedestal w/ Quick-Access Cover | 102 Hammers | 40 MHz CMX |
| P51KA™ | 585 lpm | Table Top | 91 Hammers Kanji / Hanzi | 25 MHz CMX |
| P52KA™ | 585 lpm | Cabinet | 91 Hammers Kanji / Hanzi | 40 MHz CMX |
| P5203H™ | N/A | Cabinet | 60 Hammers | 40 MHz CFX |
| P5205™ | 475 lpm | Cabinet | 28 Hammers | 25 MHz CMX |
| P5205-12™ | 475 lpm | Cabinet | 28 Hammers, 12 MIL tips | 25 MHz CMX |
| P5205A™ | 500 lpm | Cabinet | 28 Hammers | 25 MHz CMX |
| P5205A-12™ | 500 lpm | Cabinet | 28 Hammers, 12 MIL tips | 25 MHz CMX |
| P5205B™ | 500 lpm | Cabinet | 28 Hammers | 40 MHz CMX |
| P5205B-12™ | 500 lpm | Cabinet | 49 Hammers, 12 MIL tips | 40 MHz CMX |
| P5206H™ | N/A | Cabinet | 102 Hammers | 40 MHz CFX |
| P5208™ | 800 lpm | Cabinet | 49 Hammers | 25 MHz CMX |
| P5209™ | 900 lpm | Cabinet | 49 Hammers | 25 MHz CMX |
| P5210™ | 1000 lpm | Cabinet | 60 Hammers | 40 MHz CMX |
| P5212™ | 1200 lpm | Cabinet | 91 Hammers | 25 MHz CMX |
| P5214™ | 1400 lpm | Cabinet | 91 Hammers | 40 MHz CMX |
| P5214-SS™ | 1400 lpm | Cabinet w/SureStak Paper Stacker | 91 Hammers | 40 MHz CMX |
| P5215™ | 1500 lpm | Cabinet | 102 Hammers | 40 MHz CMX |

**Table 13. Early P5000 Single Hammer Bank Printers: Maintenance Manual 164253-001**

| Model | Max Print Speed | Enclosure | Single Hammer Bank | Controller Board[1] |
|---|---|---|---|---|
| P5215-SS™ | 1500 lpm | Cabinet w/SureStak Paper Stacker | 102 Hammers | 40 MHz CMX |
| [1] The 40 MHz CMX controller board is also compatible with earlier models that used the 25 MHz CMX board and should be used if the CMX board is replaced in one of these older models. The CFX, V1, controller board was used only in early models P5003H, P5203H, P5006H, and P5206H. | | | | |

**Table 14. Later P5000 Single Hammer Bank Printers (The "P5B/10/15" Line): Maintenance Manual 175455-001**

| Model | Maximum Print Speed | Enclosure | Hammer Bank | Controller Board[1] |
|---|---|---|---|---|
| P5003H™ | N/A | Pedestal | 60 Hammers | 40 MHz CFX |
| P5005B™ | 500 lpm | Pedestal | 28 Hammers | 40 MHz CMX |
| P5005B-QA™ | 500 lpm | Pedestal w/Quick-Access Cover | 28 Hammers | 40 MHz CMX |
| P5005B-12™ | 500 lpm | Pedestal | 28 Hammers, 12 MIL tips | 40 MHz CMX |
| P5005B-12-QA™ | 500 lpm | Pedestal w/Quick-Access Cover | 28 Hammers, 12 MIL tips | 40 MHz CMX |
| P5006H™ | N/A | Pedestal | 102 Hammers | 40 MH CFX |
| P5010™ | 1000 lpm | Pedestal | 60 Hammers | 40 MHz CMX |
| P5010-QA™ | 1000 lpm | Pedestal w/Quick-Access Cover | 60 Hammers | 40 MHz CMX |
| P5015™ | 1500 lpm | Pedestal | 102 Hammers | 40 MHz CMX |
| P5015-QA™ | 1500 lpm | Pedestal w/Quick-Access Cover | 102 Hammers | 40 MHz CMX |
| P5203H™ | N/A | Cabinet | 60 Hammers | 40 MHz CFX |
| P5205B™ | 500 lpm | Cabinet | 28 Hammers | 40 MHz CMX |
| P5205B-12™ | 500 lpm | Cabinet | 49 Hammers, 12 MIL tips | 40 MHz CMX |
| P5206H™ | N/A | Cabinet | 102 Hammers | 40 MHz CFX |
| P5210™ | 1000 lpm | Cabinet | 60 Hammers | 40 MHz CMX |
| P5215™ | 1500 lpm | Cabinet | 102 Hammers | 40 MHz CMX |
| P5215-SS™ | 1500 lpm | Cabinet w/SureStak Paper Stacker | 102 Hammers | 40 MHz CMX |

[1] The 40 MHz CMX controller board is compatible with all PSA P5XXX printers except the P5220S and H-Series (which use the CFX controller board) and printers that use the PSA3 controller board. The 40 MHz CFX, V3, controller board was used in PSA models P5003H, P5203H, P5006H, and P5206H until the H-Series line expanded and upgraded to the PSA3 controller board.

**Table 15. P5000 PSA3 Single Hammer Bank Printers: Maintenance Manual 176475-001**

| Model | Maximum Print Speed | Printer Enclosure | Hammer Bank | Controller Board[1] |
|---|---|---|---|---|
| P5003H™ | 340 lpm | Pedestal | 60 Hammers | PSA3 |
| P5203H™ | 340 lpm | Cabinet | 60 Hammers | PSA3 |
| P5006H™ | 600 lpm | Pedestal | 102 Hammers | PSA3 |
| P5206H™ | 600 lpm | Cabinet | 102 Hammers | PSA3 |
| P5008H™ | 750 lpm | Pedestal | 126 Hammers | PSA3 |
| P5208H™ | 750 lpm | Cabinet | 126 Hammers | PSA3 |
| P5220S™ | 2000 lpm | Cabinet | 126 Hammers | PSA3 |
| P5220S-SS™ | 2000 lpm | Cabinet w/SureStak Paper Stacker | 126 Hammers | PSA3 |

[1] The PSA3 controller board is the only controller board that can be used in these printers. Printers that use the PSA3 board cannot use the CMX or CFX controller boards.

**Table 16. P5220D and P5224D Dual Hammer Bank Printers: Maintenance Manual 173843-001**

| Model | Maximum Print Speed | Printer Enclosure | Hammer Bank | Controller Board[1] |
|---|---|---|---|---|
| P5220D™ | 2000 lpm | Cabinet | 156 Hammers | CFX |
| P5220D-SS™ | 2000 lpm | Cabinet w/SureStak Paper Stacker | 156 Hammers | CFX |
| P5224D™ | 2400 lpm | Cabinet | 156 Hammers | PSA3 |
| P5224D-SS™ | 2400 lpm | Cabinet w/SureStak Paper Stacker | 156 Hammers | PSA3 |

[1] The controller boards are not interchangeable in these printers. The PSA3 and CFX controller boards and their respective card cages differ in physical dimensions and design.

# P7000 (Spool) Line Matrix Printers

| Printer Model | Type of Controller Board | Type of Hammer Bank | Maintenance Manual |
|---|---|---|---|
| P7000 (Spool) | PSA3 | Single | 177705-001 (See Table 17) |

**Table 17. P7000 Spool Printers: Maintenance Manual 177705-001**

| Model | Maximum Print Speed | Enclosure | Hammer Bank | Controller Board |
|---|---|---|---|---|
| P7002H | 200 lpm | Pedestal | 28 Hammers | PSA3 |
| P7002HZT | 200 lpm | ZT Pedestal | 28 Hammers | PSA3 |
| P7202H | 200 lpm | Cabinet | 28 Hammers | PSA3 |
| P7003H | 300 lpm | Pedestal | 60 Hammers | PSA3 |
| P7003HZT | 300 lpm | ZT Pedestal | 60 Hammers | PSA3 |
| P7203H | 300 lpm | Cabinet | 60 Hammers | PSA3 |
| P7005 | 500 lpm | Pedestal | 28 Hammers | PSA3 |
| P7005ZT | 500 lpm | ZT Pedestal | 28 Hammers | PSA3 |
| P7205 | 500 lpm | Cabinet | 28 Hammers | PSA3 |
| P7006H | 600 lpm | Pedestal | 102 Hammers | PSA3 |
| P7006HZT | 600 lpm | ZT Pedestal | 102 Hammers | PSA3 |
| P7206H | 600 lpm | Cabinet | 102 Hammers | PSA3 |
| P7008H | 800 lpm | Pedestal | 126 Hammers | PSA3 |
| P7008HZT | 800 lpm | ZT Pedestal | 126 Hammers | PSA3 |
| P7208H | 800 lpm | Cabinet | 126 Hammers | PSA3 |
| P7010 | 1000 lpm | Pedestal | 60 Hammers | PSA3 |
| P7010ZT | 1000 lpm | ZT Pedestal | 60 Hammers | PSA3 |
| P7210 | 1000 lpm | Cabinet | 60 Hammers | PSA3 |
| P7015 | 1500 lpm | Pedestal | 102 Hammers | PSA3 |
| P7015ZT | 1500 lpm | ZT Pedestal | 102 Hammers | PSA3 |
| P7215 | 1500 lpm | Cabinet | 102 Hammers | PSA3 |

**Table 17. P7000 Spool Printers: Maintenance Manual 177705-001**

| Model | Maximum Print Speed | Enclosure | Hammer Bank | Controller Board |
|---|---|---|---|---|
| P7220 | 2000 lpm | Cabinet | 126 Hammers | PSA3 |
| P7000HD | 133 ipm | Pedestal | 126 Hammers | PSA3 |
| P7000HDZT | 133 ipm | ZT Pedestal | 126 Hammers | PSA3 |
| P7200HD | 133 ipm | Cabinet | 126 Hammers | PSA3 |

# H  *Customer Support*

## Printronix Customer Support Center

**IMPORTANT**    **Please have the following information available prior to calling the Printronix Customer Support Center:**

- Model number
- Serial number (located on the back of the printer)
- Installed options (i.e., interface and host type if applicable to the problem)
- Configuration printout:

  <u>Line Matrix Printer</u>
  Press PRT CONFIG on the control panel, then press Enter.

- Is the problem with a new install or an existing printer?
- Description of the problem (be specific)
- Good and bad samples that clearly show the problem (faxing or emailing of these samples may be required)

| | |
|---|---|
| Americas | (714) 368-2686 |
| Europe, Middle East, and Africa | (31) 24 6489 311 |
| Asia Pacific | (65) 6548 4114 |
| China | (86) 800-999-6836 |

http://www.printronix.com/support.aspx

## Printronix Supplies Department

Contact the Printronix Supplies Department for genuine Printronix supplies.

| | |
|---|---|
| Americas | (800) 733-1900 |
| Europe, Middle East, and Africa | 33 (0) 1 46 25 19 07 |
| Asia Pacific | (65) 6548 4116 or (65) 6548 4182 |
| China | (86) 400-886-5598 |

http://www.printronix.com/supplies-parts.aspx

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