

PRINTRONIX®

Maintenance Manual



*Printronix P8000 Cartridge Ribbon Printer Series
of Line Matrix Printers*

*P8000 Series Cartridge Ribbon Printer
Maintenance Manual*

PRINTRONIX®



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1

Maintenance Overview

Printronix P8000 Series Cartridge Ribbon Printer (CRP)

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 P8000™ 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
- Cartridge ribbons – deliver darker image, last longer, and costs less to operate than other print technologies
- Integrated print management system – provides precise control over print quality, print costs, and job planning
- Tabletop, cabinet, pedestal, enclosed pedestal, or zero tear pedestal (ZTP) styles – best user access and forms handling flexibility
- Unsurpassed ease of use – larger graphics LCD simplifies operation and enhances productivity

Table 1. P8000 Series Models and Configurations

Model Number	Configuration	Print Speed (Lines per Minute)
LMPPLS (Line Matrix Printer Pedestal Low Speed)	P8003H	300
	P8003HZT	300
	P8005	500
	P8005ZT	500
	P8010	1000
	P8010ZT	1000
LMPPHS (Line Matrix Printer Pedestal High Speed)	P8006H	600
	P8006HZT	600
	P8000HD	600
	P8000HDZT	600
LMPCLS (Line Matrix Printer Cabinet Low Speed)	P8203H	300
	P8205	500
	P8210	1000
LMPCHS (Line Matrix Printer Cabinet High Speed)	P8215	1500
	P8220	2000
	P8215 (with stacker)	1500
	P8220 (with stacker)	2000
	P8206H	600
	P8208H	800
	P8200HD	800

Five printer configurations are available:

Tabletop (P80XX or P80XXH)

- The tabletop models are designed for space constrained environments, allowing for the printer to be placed on a desk or tabletop for quiet use.
- Paper guides allow for paper input under the table or as a small stack on the table.
- Output forms are easily accessible from the front of the printer.
- Using the top paper exit, this printer is ideal for short print runs and easy access to output.
- Available in the following print speeds:
ASCII – 500 and 1000 line per minute models
H-Series – 300 and 600 line per minute models

Cabinet (P82XX , P8200HD, or P82XXH)

- 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 1500, 2000, H-Series, and OpenPrint HD enclosed cabinet models.
- Available in the following print speeds:
ASCII – 500, 1000, 1500 and 2000 line per minute models
H-Series – 600 and 800 line per minute models
OpenPrint HD (available only for cabinet models)

Pedestal (P80XX, P8000HD, or P80XXH)

- The pedestal model has a clamshell design that allows easy access to all controls providing faster ribbon replacements and easier paper loading.
- Oversized casters are standard making movement easy.
- Available in the following print speeds:
ASCII – 500 and 1000 line per minute models
H-Series – 300 and 600 line per minute models

Enclosed Pedestal (P80XX or P80XXH)

- The enclosed pedestal model has a lower enclosure that holds the input paper while providing for near silent operation.
- The paper enclosure can accommodate a full paper box (12" maximum length forms).
- The paper output area is not enclosed for easy access to printed media.
- Available in the following print speeds:
ASCII – 500 and 1000 line per minute models
H-Series – 300 and 600 line per minute models

Zero Tear Pedestal (P80XXZT or P80XXHZT)

- 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:
ASCII – 500 and 1000 line per minute models
H-Series – 300 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 P8000 Cartridge Ribbon Printer.

How to Identify a P8000 Cartridge Ribbon Printer

A P8000 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 interpret a model number.

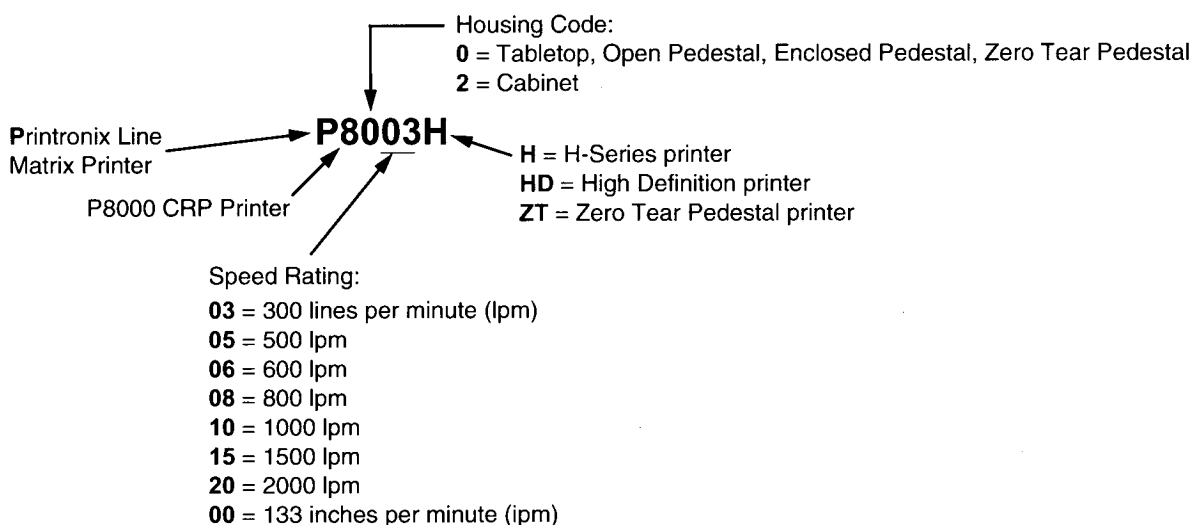


Figure 1. How to Interpret a Model Number

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 304.

H-Series Printers

H-Series models print the ideogrammic symbols used in China, Hong Kong, South Korea, and Taiwan. (See Table 2.) These Kanji/Hanzi/Hangul printers are indicated by the letter H in the model number suffix. (See Figure 1 and Table 2.) 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 2. H-Series Character Sets

Character Set	Where Used
GB	China
BIG-5, with an additional 3000 Cantonese characters	Hong Kong
BIG-5 TCA DCI (1st and 2nd segments) DCI (3rd segment) 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.

See Appendix E on page 425 for more information on ZTP printers.

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.

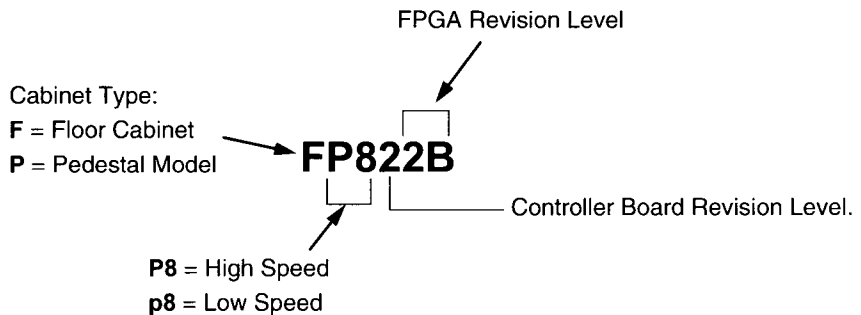


Figure 2. How to Interpret the Printer's Configuration Code

Forms Handling

Tabletop Models

Tabletop models provide access to printed forms with a quick access top cover paper exit. The tabletop stand (riser) allows for placement of the input forms on top of or underneath a desk or table.

Pedestal Models

Pedestal models provide access to printed forms with a paper exit at the rear of the top cover. Pedestal printers also have a base for placement of the input forms 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 377.)

These devices are summarized in Table 3.

Table 3. Paper Stackers Used On Cabinet Models

Printer	Fixed Paper Fence	Passive Paper Stacker	Front Access Stacker	Power Paper Stacker
P8206H	Standard	Option	Option	Option
P8208H	Standard	Option	Option	Option
P8215	Standard	Option	Option	Option
P8220	Standard	Option	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 hammersprings.** The hammersprings are precisely aligned and the hammer tips are delicate. Always handle hammersprings 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 Start 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.
- *PrintNet Ethernet Interface User's Manual*
Information about network protocols, configuration, and network operation.
- *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 P8000 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 23.)

Printing Conventions In This Manual

Control panel keys and indicators are highlighted in **UPPERCASE BOLD PRINT**.

Example: Press the **CANCEL** key, then press the **ONLINE** key.

Messages that appear on the LCD (Liquid Crystal Display) are set off by quotation marks (" ").

Example: Press the **ONLINE** key. "OFF LINE" appears on the LCD.

Control panel key combinations are indicated by the + (plus) symbol.

Example: Press $\triangle + \nabla$.

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

IMPORTANT

The Safety Notices on page 25 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.

Indicators and Controls

Indicators

Power Switch

Turns printer on and off: 1 = on, 0 = off.

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.

Ribbon Life Indicator

If the Panel Display menu is set to Ribbon Life, the bottom of the LCD displays the remaining life of the currently installed ribbon. The default settings for this feature should match the requirements for most applications; no special user setup is needed. If your particular application requires darker printing or can tolerate lighter printing, the ribbon end point can be adjusted as appropriate. Refer to the *User's Manual*.

Control Panel Keys

ONLINE

Toggles the printer between online and offline modes. The key performs the following in Online, Offline, Fault, and Menu modes:

- **Online Mode** – sets the printer to Offline Mode.
- **Offline Mode** – sets the printer to Online Mode.
- **Fault Mode** – causes the printer to recheck the faults; if the faults are cleared, the printer toggles to Offline Mode. If the fault condition is not corrected before pressing the ONLINE key, the fault message reappears.
- **Menu Mode** – sets the printer to Offline Mode.

NOTE: When changing to Online Mode, if the user has changed menu items without saving the changes in a configuration, the user will be prompted to save the changes.

ADVANCE

Performs advance to top-of-form, as defined by the current active form length. The key works both online and offline.

- If online with data in the printer buffer, the data will print and then the paper will move to the next top-of-form.
- In the fault state, pressing ADVANCE will advance the paper. 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

When the printer is online or offline, pressing this key executes the view or eject function, depending on whether the printer is a cabinet or a pedestal model and how the menu options are configured.

If online with data in the printer buffer, the data prints and the key functions as described below.

If in a fault state, this key will be ignored.

- **View Function** — for cabinet models or pedestal models with the View Function menu set to Enable, pressing the VIEW key moves the last data printed to the tractor area for viewing. While in the view state, the message "Printer in View" displays, pressing the UP or DOWN arrow keys moves the paper up or down in 1/72 inch increments. This is done to align the image within a pre-printed form, for example. Refer to the UP and DOWN key functions for additional details on the microstep feature. Pressing VIEW a second time moves the paper back to the adjusted print position.
- **Eject Function** — for pedestal models (with the View Function menu set to Disable, or if the key is pressed for more than 1/2 second), when the VIEW key is pressed, the bottom of the last printed form will move to the tear bar position as set in the Tear Bar Dist. menu. The message "READY TO TEAR/EJECT To Return" displays. While in this position, pressing the UP or DOWN arrow keys moves the paper up or down in 1/72 inch increments. Refer to the Up and Down key functions for additional details on the microstep feature. When the VIEW key is pressed a second time, the printer will move the paper to enable printing on the next available form. This movement may be forward or back depending on the Tear Bar Dist. and form length.

CANCEL

In offline mode, this key cancels all data in the print buffer, if enabled in the ADVANCED USER menu (refer to the *User's Manual*). The print buffer is cleared without printing any of the data and the current paper position is set as the top-of-form. If this function is disabled, the CANCEL key will be ignored.

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.

TOF

Sets the top-of-form on the printer. This key is active only when the printer is offline and will not operate if the printer is in a fault condition. The paper moves down to the print position and aligns to the top-of-form. Refer to the *Quick Setup Guide* for complete instructions on how to set the top-of-form.

CONFIG

In offline mode, CONFIG prints the current short configuration. This key requires a confirmation with the ENTER key; pressing any other key will exit from this function. Refer to the *User's Manual* for an explanation of configuration menus.

SELECT

In offline mode, this key allows for fast selection of any of the previously stored configurations. Pressing this key causes the printer to cycle through the following configuration load options: Factory, Cfg 1, Cfg 2, Cfg 3,..., Cfg 8.

ENTER (↵)

When navigating the configuration menus, the Enter key (referenced by the symbol ↵) selects the currently displayed option value as the active value. An asterisk (*) appears next to the active value on the display. ENTER is also used for starting and stopping printer tests and generating a configuration printout.

NOTE: The ENTER key must be unlocked in order to function.

See UP + DOWN, later in this section.

- In Offline mode, pressing the Enter key places the printer in Menu mode. This will bring up a set of icons to select.
- In Menu mode (at the icon menu level), pressing the Enter key moves down into the menu tree of the highlighted icon.
- Within a menu tree: if the highlighted menu contains submenus instead of a selectable parameter, pressing the Enter key will go into the submenu. If the highlighted menu is a display only menu, then pressing the Enter key performs no function. If the highlighted menu has selectable parameters, pressing the unlocked Enter key will select the displayed parameter. An asterisk (*) displays next to the selected parameter.
- If the highlighted menu is an executable menu, pressing the unlocked Enter key will cause the function associated with the executable menu to run. If the ENTER key is locked, pressing the Enter key for highlighted menus that are executable or contain selectable parameters will cause the message, THE ↵ KEY IS LOCKED, to display momentarily.

NOTE: Press the UP and Down keys at the same time to lock/unlock the ↵ key.

For special Network Address menus or String menus, pressing the Enter key will move down into a special multiple segment setting menu. Exit this menu by pressing Enter again to save changes or Cancel to exit without saving changes. This key is inactive in all other modes.

UP or DOWN (Δ or ∇)

Moves up or down between levels in the configuration menus and makes vertical forms adjustment. In Offline mode or after pressing VIEW, press Δ or ∇ to adjust the paper up or down in 1/72 inch increments for fine vertical forms alignment. When the printer is in Menu mode, press Δ or ∇ to move through levels in the configuration menus.

UP + DOWN (Δ + ∇)

Locks and unlocks the ENTER key.

PREV or NEXT (\triangleleft or \triangleright)

Moves between the options on the current level of configuration menu. In the configuration menu, press \triangleleft to scroll backward or press \triangleright to scroll forward through the menu selections on the same level.

PREV + NEXT (\triangleleft + \triangleright)

When both keys are pressed simultaneously, the printer will reset to the power-up configuration and reset its internal state (in offline mode).

See Detail B (Figure 4) and
Detail C (Figure 5) on page 31.

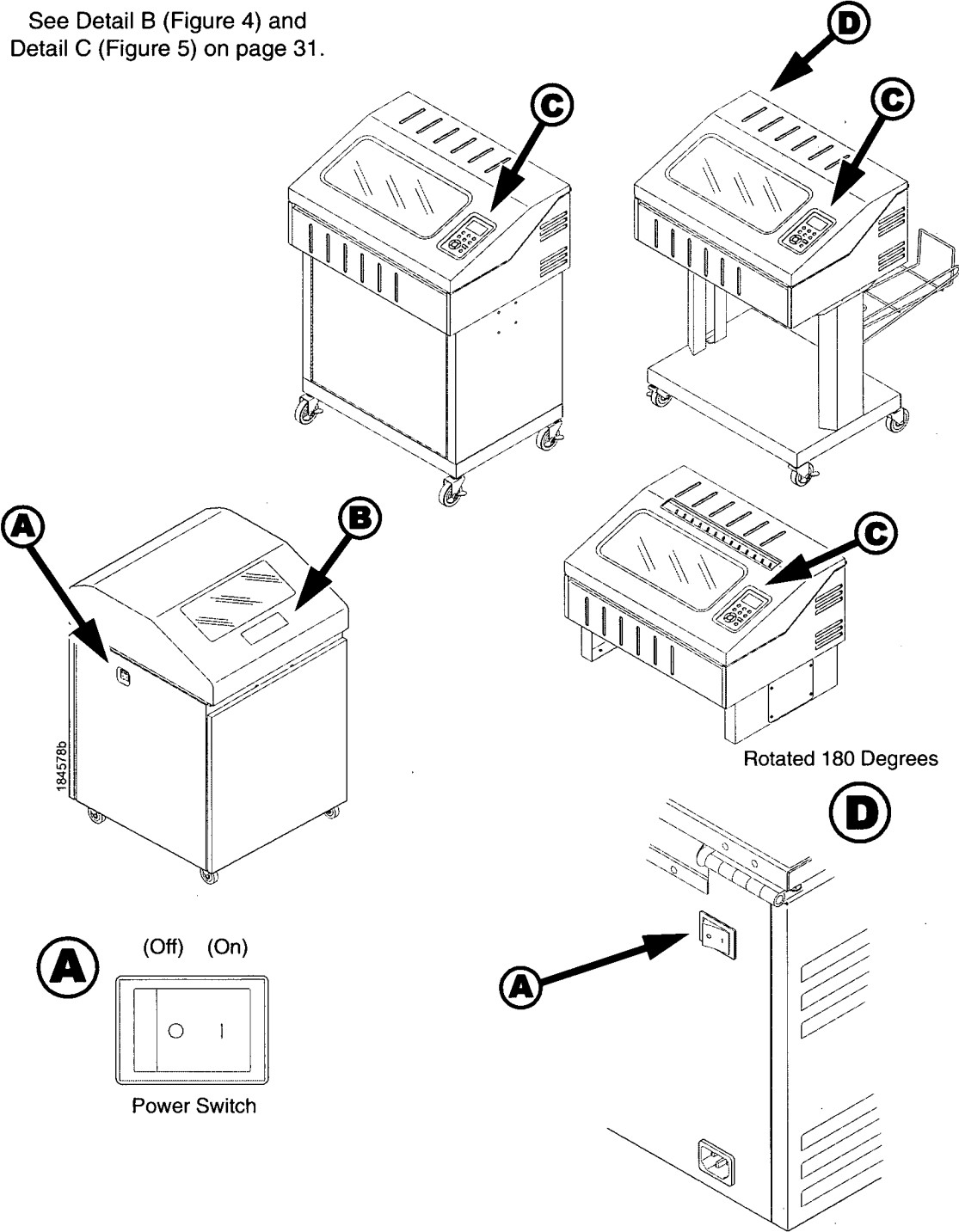


Figure 3. Electrical Controls

B From Figure 3 on page 30. **Cabinet Model**

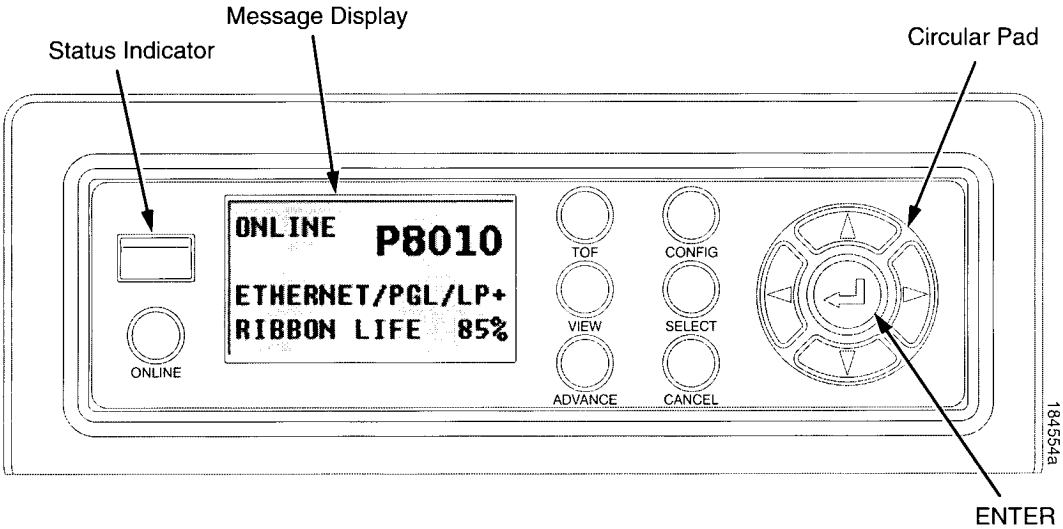
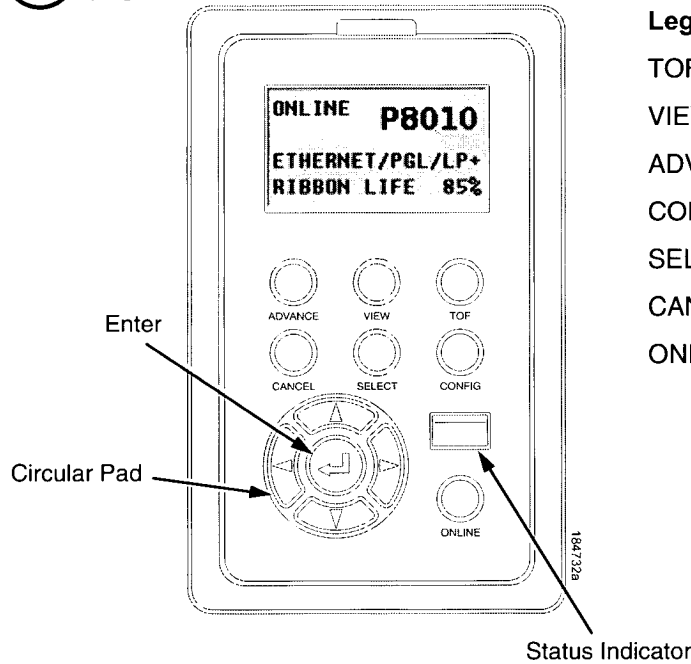


Figure 4. Cabinet Model Control Panel

C From Figure 3 on page 30. **Pedestal Model**



- Legend:**
- TOF = Set TOF (Top of Form)
 - VIEW = View/Eject
 - ADVANCE = Paper Advance
 - CONFIG = Print Config
 - SELECT = Load Config/Print Mode¹
 - CANCEL = Cancel Job
 - ONLINE = Online/Clear

Figure 5. Pedestal Model Control Panel

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.)

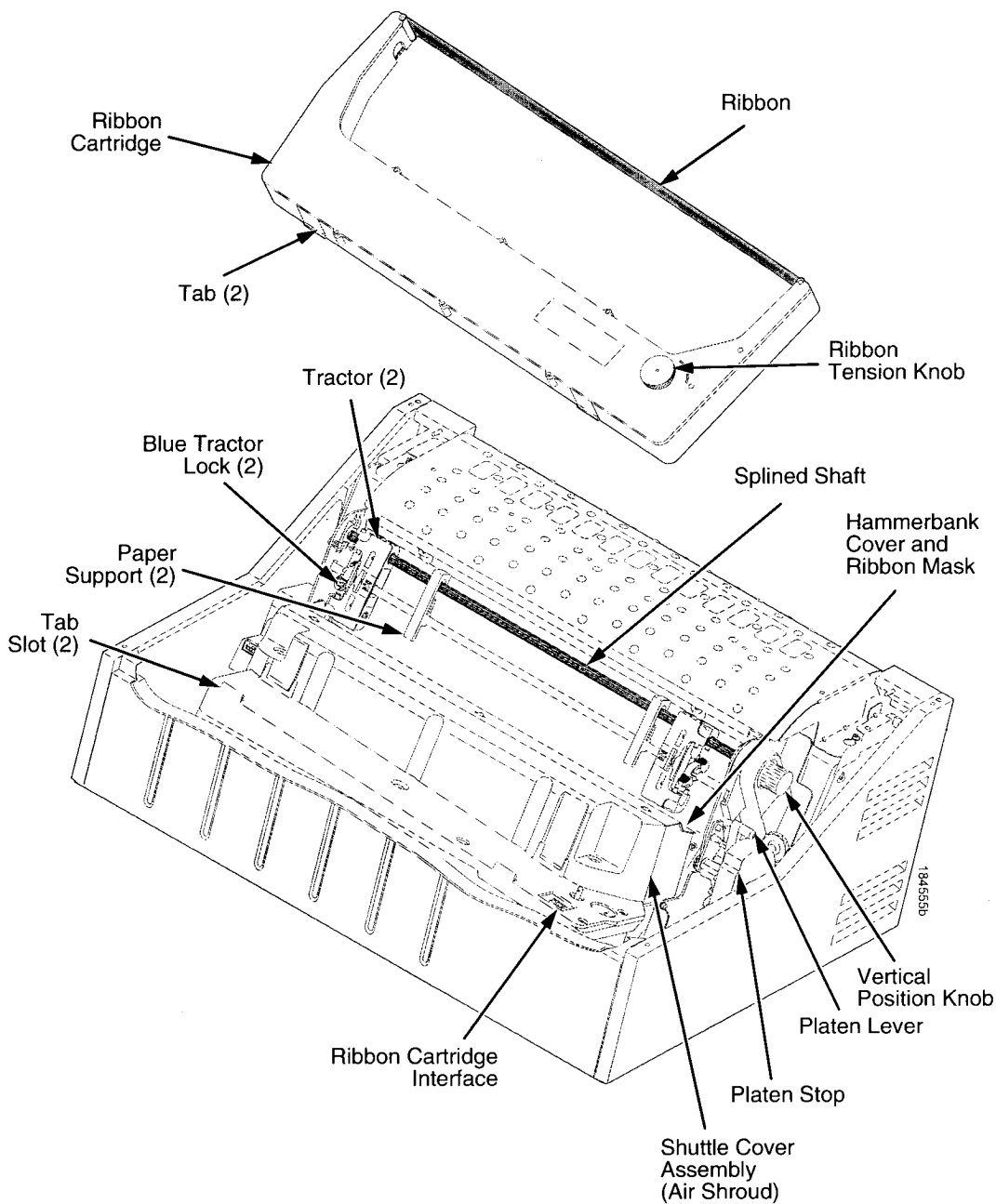


Figure 6. Mechanical Controls

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 (99.95%), anhydrous
- Canned Air or other clean air source
- Cloth, Lint-free, clean and dry
- ESD-Safe Service Vacuum
- ESD Wrist Strap
- Feeler Gauges, Flat — 0.010", 0.011", 0.012", 0.013", 0.040"
- Force Gauge, (Chatillon™ NY, Gauge-r, 0-20 lb., CAT 719-20)
- Force Gauge, "Fish Scale" type, 0-16 oz.
- Hammer Tip Alignment Tool, Long, P7/P8X15/P8X06H (253650-901)
- Hammer Tip Alignment Tool, Long P7/P8X20/HD/P8X08H (253651-901)
- Hex Bits for Torque Screwdriver — 3/16", 3/32", 5/32", 5/64"
- Hex L-Keys — 1/16", 3/32", 5/32", 5/64", 7/64"
- Lubricant, Bearing (Printronix P/N 211191-001)
- Nut Drivers — 1/4", 5/16"
- Nut Driver or Open End Wrench, 7/32"
- Open End Wrench, 5/16"
- Pliers, Grip Ring, External
- Screwdriver, flat tip
- Screwdriver, Phillips — #1 and #2 (magnetic tip recommended)
- Screwdriver, Torque, Utica TS-35
- Shuttle Cleaner Kit (P/N 254946-001)
- Shuttle Stabilizer Tool (P/N 255447-001)
- Tie Wraps, 4" and 8"
- Torx® T-10, T-15 Bits

Plugging in the Printer

Power Cord Requirements

In compliance with international safety standards, a P8000 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 **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) 1 46 25 19 07
Asia Pacific	(65) 6548 4116 or (65) 6548 4182
China	(86) 400-886-5598
India	(800) 102-7869

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

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.
Only use 99.95% alcohol when cleaning printer mechanical elements.

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 38.

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 7.)

CAUTION **Vacuum carefully around the hammerbank and surrounding area to avoid damage. To avoid corrosion damage, use only 99.95% alcohol when cleaning the printer mechanical elements or the alcohol wipes provided in the shuttle cleaner kit (P/N 254946-001). 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 hammerbank cover for bits of torn paper or ribbon lint.
10. Raise the platen lever to the fully open position.
11. 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 hammerbank cover that rotates when the platen is rotated).

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

12. 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.
13. Install the ribbon, load paper, and set the top-of-form. Refer to the *Quick Setup Guide*.
14. Clean the shuttle frame assembly (page 40).

¹ Due to water content in most isopropyl alcohol products, 99.95% 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.

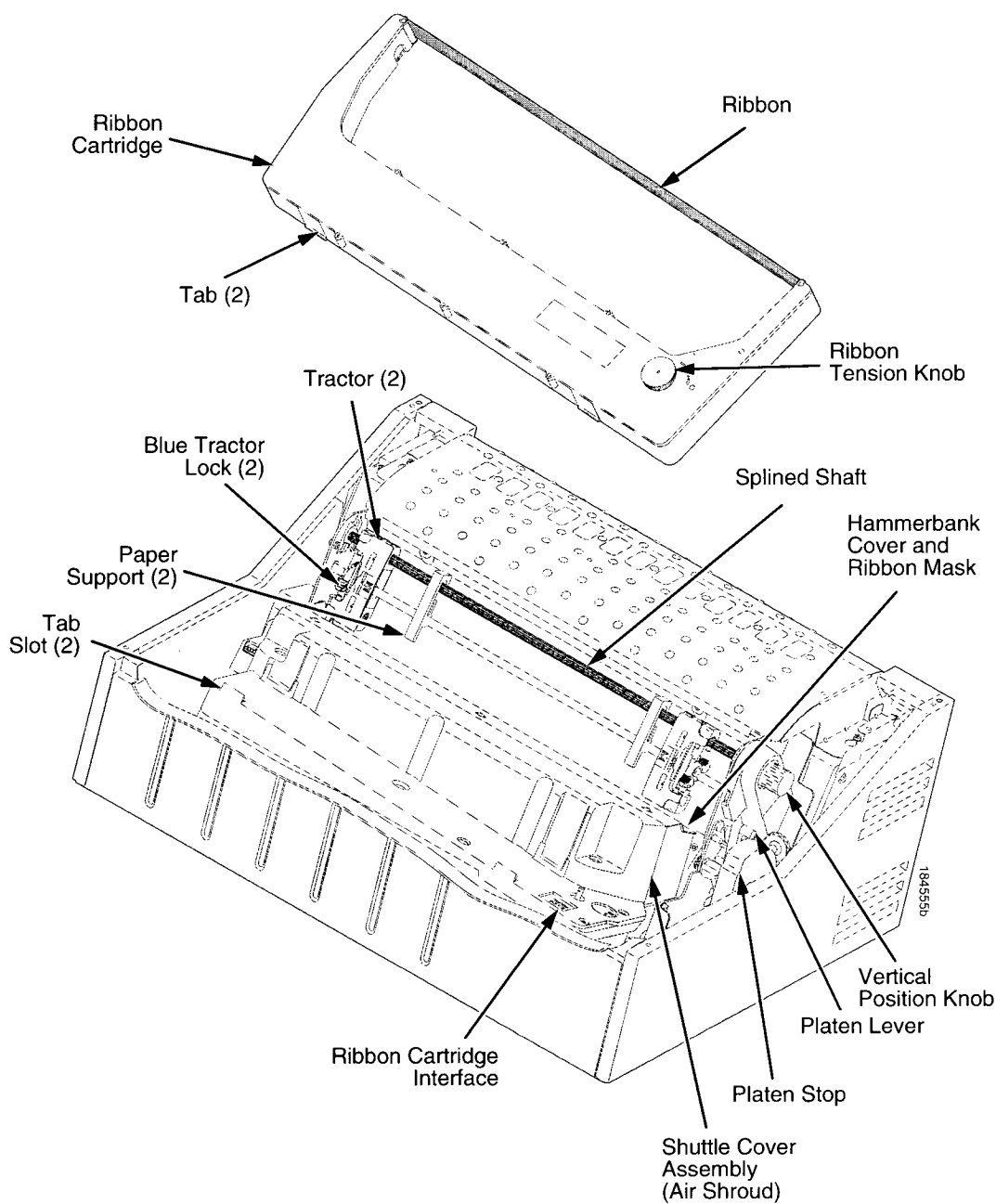


Figure 7. Printer Interior Components

Cleaning the Shuttle Frame Assembly

Low Speed (P8X05, P8X10, P8X03H)

- IMPORTANT

For low speed hammerbanks, DO NOT remove the hammersprings, combs, or frets when cleaning the shuttle.
- CAUTION

When instructed to use alcohol for cleaning, be sure to use 99.95% alcohol or higher otherwise damage to the hammerbanks will occur.

NOTE: To help steady the shuttle, be sure to obtain a shuttle stabilizer tool, P/N 255447-001 (see Figure 45 on page 257).

 1. Prepare the printer for maintenance (page 178).
 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. Disconnect the ribbon weld sensor connector.
 5. Remove the air shroud to expose the shuttle assembly.
 6. Disconnect the shuttle logic, phase power, shuttle motor and MPU connectors.
 7. Disconnect the shuttle logic, data, power, and MPU connectors.
 8. Loosen and disengage the left and right shuttle retaining clamps.
 9. 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.

 10. Remove the paper ironer (page 240).
 11. Wipe the paper ironer with a soft cloth to remove lint, ink, and paper residue.
 12. Install the paper ironer (page 240).
- CAUTION

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

Do not rub the edges of the mask and cover as they can be sharp.
- IMPORTANT

13. Remove the hammerbank/ribbon mask cover assembly (page 232).

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

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

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

15. Use the brush provided to clear any debris from the outside of the ribbon mask and cover plate. Use one or more of the 99.95% alcohol pads to clean all surfaces of the hammerbank cover assembly, removing ink residue and debris.
16. 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.

17. Place the shuttle so that the base sits flat on the work surface. Use a ESD-Safe Service vacuum to clean debris from the hammerbank combs and frets. If necessary, use the alcohol pads (from shuttle cleaner kit, P/N 254946-001) to wipe the surface of the combs and frets. Hold the canned air at a 45° angle along the side of the hammerbank (Figure 8), and clean along the empty cavity underneath the combs and frets.

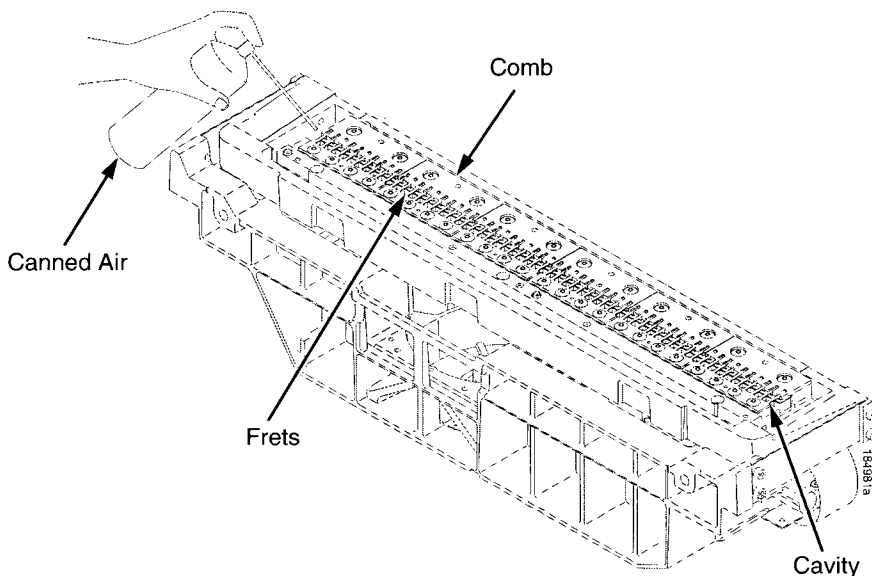


Figure 8. Cleaning the Hammer Tips with Canned Air

18. Reinstall the hammerbank cover assembly (page 232) insuring that it is properly seated over the mounting pins.
19. Reinstall the shuttle into the printer using a 25 inch pound driver and 5/32 hex bit.
20. Install the shuttle cover assembly (page 233).
21. Return the printer to normal operation (see page 179).
22. Set the platen gap as appropriate.
23. Run a test print to verify that the print quality is acceptable.

High Speed (P8215, P8X00HD, P8X06H, P8X08H, P8220)

IMPORTANT For high speed hammerbanks, remove the hammersprings when cleaning the shuttle. Use the hammer tip alignment tool when installing the hammersprings (see Table 4 on page 44).

CAUTION When instructed to use alcohol for cleaning, be sure to use 99.95% alcohol or higher otherwise damage to the hammerbanks will occur.

NOTE: To help steady the shuttle, be sure to obtain a shuttle stabilizer tool, P/N 255447-001 (see Figure 45 on page 257).

1. Prepare the printer for maintenance (page 178).
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. Disconnect the ribbon weld sensor connector.
5. Remove the air shroud to expose the shuttle assembly.
6. Disconnect the shuttle logic, phase power, shuttle motor and MPU connectors.
7. Disconnect the following:
 - J02 Shuttle Motor Cable Connector
 - J03 MPU Cable connector
 - P04 Hammerbank Logic Cable Connector
 - P05 Power Cable Connector.
8. Loosen and disengage the left and right shuttle retaining clamps.
9. 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.

10. Remove the paper ironer (page 240).
11. Wipe the paper ironer with a soft cloth to remove lint, ink, and paper residue.
12. Install the paper ironer (page 240).

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

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

13. Remove the hammerbank/ribbon mask cover assembly (page 232).

IMPORTANT

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

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

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

15. 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.

16. 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.

17. 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 9.). 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.

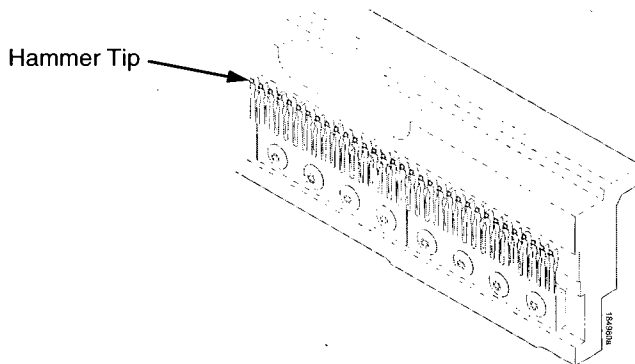


Figure 9. Cleaning the Hammer Tips

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, 99.95% alcohol or higher is required. Do not use alcohol with high water content as the water could later cause corrosion.

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

- 18. Use tape or a nonabrasive marker or pencil to mark the location of each fret in relation to the counter balance.
- 19. Remove the fret mounting hardware and set aside for later reassembly.
- 20. Remove the frets from the shuttle and set aside for later reassembly.
- 21. Use the brush to remove any remaining debris from the spring mounting surface and pole pin areas of the shuttle.
- 22. Use an alcohol pad to remove any remaining debris from these areas of the shuttle.
- 23. 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.
- 24. For P8000 nonflat product reinstall the frets in the appropriate locations using a wood or plastic tool to seat them against the locating pins.

For P8000 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 4. Hammer Tip Alignment Tool Kits

Part Number	Description
253650-901	Hammer Tip Alignment Field kit P8X15/P8X06H
253651-901	Hammer Tip Alignment Field kit P8200HD/P8X08H

- 25. Reinstall the hammerbank cover assembly (page 232) insuring that it is properly seated over the mounting pins.
- 26. Reinstall the shuttle into the printer using a 25 inch pound driver and 5/32 hex bit.
- 27. Install the shuttle cover assembly (page 233).
- 28. Return the printer to normal operation (see page 179).
- 29. Set the platen gap as appropriate.
- 30. 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 241).
Pedestal Models: Remove the electronics barrier panel (page 235).
2. Vacuum the card cage fan assembly and surrounding areas to remove paper particles, dust, and lint. (Figure 10.)
3. Install the ribbon.
4. Cabinet Models: Install the paper path (page 241)
Pedestal Models: Install the electronics barrier panel (page 235).
5. Return the printer to normal operation (page 179).

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

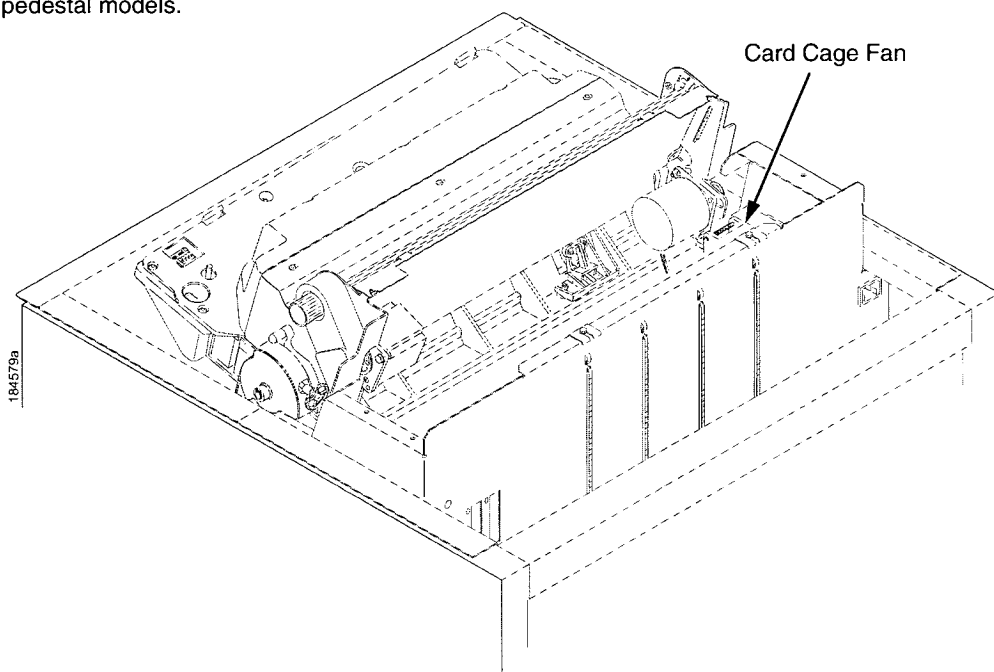


Figure 10. Cleaning the Card Cage Fan Assembly

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.

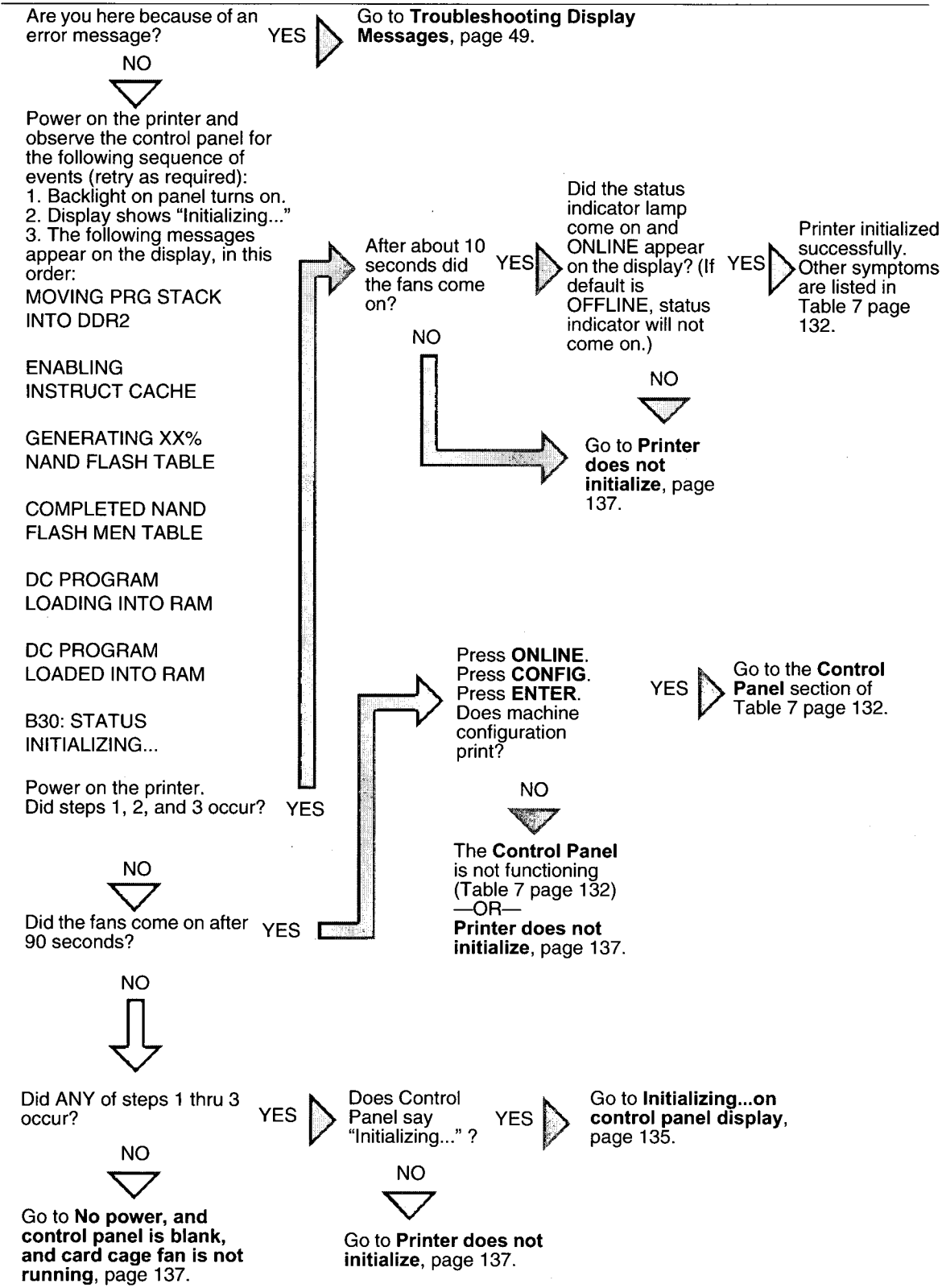
Troubleshooting Aids

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” Logic Tree page 48
- Troubleshooting Display Messages page 49
- Message List page 51
- Troubleshooting Other Symptoms page 131
- General Symptom List page 132
- Communications Failures page 153
- Diagnostic Printer Tests page 155
- Boot Diagnostics Menu page 163
- Factory Menu page 165
- Exception Menu page 168
- Hex Code Printout page 171
- ASCII Character Set page 175
- Appendix A: Wire Data page 315

Start Here...



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 **ONLINE** 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 **ONLINE** to silence the alarm if set to beep continuously.)
- The control panel LCD displays a fault message.

Diagnostics for EXX, BAD NVM, or ILL NVM Errors

If the printer displays LCD error messages such as 'E03E DSI CXIWX', "BAD NVM", or "ILL NVM", reboot the printer (turn power off then back on) and continue. If the problem persists, then invoke a diagnostic option that will capture the failure dump in a flash file that can be later uploaded from PrintNet Enterprise Suite and sent to Printronix Customer Support Center for analysis (see Appendix H, page 485).

This diagnostic option must be enabled for the printer to capture the information. If you choose to perform this diagnostic perform the following procedure:

1. Within the DIAGNOSTICS section, set the menu Auto Dump to Enable..
2. When the failure happens, reboot the printer and wait for it to power up again.
3. Within the ADVANCED USER section, go to Main File System submenu and then to View File List.
4. Verify that files 'autodmp1' or 'autodmp2' are present in the file list.
5. If present, use PrintNet Enterprise Suite to upload these files to your host computer.
6. Contact Printronix Customer Support Center and send them the files along with the printer's configuration printout. Refer to the *PrintNet Enterprise Suite User's Manual* on how to accomplish these tasks.

Fault Messages (ASCII in Alphabetical Order)

Find the message in the **Message List** below and follow the suggested procedure. After correcting an error, press the **CANCEL** 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.

Table 5. P8000 ASCII Error Messages List

Displayed Message	Explanation	Solution
12 VOLT FAILED*	The 12.6 volt output of the power supply has failed.	Replace the the power supply.
ACCESS NULL PTR See Manual	Access Null Pointer: The processor tried to access a pointer that contains nothing (null).	<div>1. Cycle power. Run the print job again. If the message appears, download the emulation software again (page 194).</div> <div>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.</div>
B11 ERROR: RAM TEST FAILED	RAM failed the boot initialization test.	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 printer firmware again.
B13 ERROR: NOT COMPATIBLE*	Attempting to download a program that is not compatible with the printer.	Load the correct emulation software option(s) for this printer.
B20 STATUS: 00% DOWNLOAD MODE USB or B20 STATUS: 00% DOWNLOAD MODE PAR	Status message informing the operator that software is being downloaded through the printer's parallel port using the three-key download activation (page 202). The percentage indicates the approximate amount loaded into the printer.	No action required.

Table 5. P8000 ASCII 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*	Error can only occur during a program download (data was corrupt).	<div><div>1. Download again.</div><div>2. Check communications cable being used (Parallel, USB, Network). If Parallel cable is used, reseal PCI Parallel opt card.</div></div>
B23 ERROR: DECOMPRESS CKSUM*	Error can only occur during a program download (data was corrupt).	<div><div>1. Download again.</div><div>2. Check communications cable being used (Parallel, USB, Network). If Parallel cable is used, reseal PCI Parallel opt card.</div></div>
B30 STATUS: INITIALIZING...	Status message: the printer is running its initialization routines after startup and successful memory tests.	No action required.
B50 STATUS: PANEL CODE BAD	Saved version of Panel Code is corrupt.	Reload released Firmware.
B51 STATUS: XX% LOADING	Status message: printer boot-up routines are loading printer system software into flash memory and RAM.	No action required.
Bxx ERROR: NO DOWNLOADER FOUND	No Downloader was found while downloading a file.	Reload released Firmware.
BAD NVM CALL 1 BAD NVM CALL 2 BAD NVM CALL 3 BAD NVM CALL 4 BAD NVM CALL A	Printer firmware code error with the Novram module that stores configurations and statistics.	<div><div>1. Cycle power. Run the print job again. If the message appears, load the latest emulation software.</div><div>2. Cycle power. Run the print job again. If the message appears again, record the exact display message, follow the instructions on page 50, "Diagnostics for EXX, BAD NVM, or ILL NVM Errors", and contact customer support (page 485).</div></div>

Table 5. P8000 ASCII Error Messages List

Displayed Message	Explanation	Solution
x/y BARCODES / Not Found	Printer 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.	Press the ONLINE key.
BUFFER OVERRUN	The print buffer has overflowed on a serial interface. The printed output may contain random * (asterisk) characters. Make a configuration printout.	<ol style="list-style-type: none"> 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. 2. Send a print job to the printer. If the message appears, go to Communications Failures, page 153.
CARTRIDGE AT END POINT Change Cart	Integrated Print Management System software has determined that the ribbon cartridge is out of ink.	Install a new cartridge.
CARTRIDGE CONNECTION ERROR See User Manual	The hardware cannot communicate properly with the cartridge.	<ol style="list-style-type: none"> 1. Make sure the ribbon cartridge is seated properly. 2. Remove and replace the ribbon cartridge if necessary.
CARTRIDGE INCOMPATIBLE Use Correct Cart	The cartridge board being used is not compatible with the software in the printer.	<ol style="list-style-type: none"> 1. Press the CANCEL key, open the platen, or cycle power to change and clear the error. 2. If necessary, replace the ribbon with an authorized cartridge that matches the printer's firmware level.

Table 5. P8000 ASCII Error Messages List

Displayed Message	Explanation	Solution
CARTRIDGE MISSING Install new cart Press ONLINE	The ribbon cartridge is missing or installed improperly.	<ol style="list-style-type: none">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.
CARTRIDGE NOT SEATED Re-install Cart	The ribbon cartridge is not properly positioned.	<ol style="list-style-type: none">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.
CARTRIDGE/REGION X MISMATCH Use Correct Cart	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. NOTE: Specify the region of the printer when ordering ribbons.
CARTRIDGE/SHUTTLE MISMATCH Use Correct Cart	This message displays when an Extended Life Cartridge is mounted on a 500 lpm printer.	Install Standard Life Cartridge.
CARTRIDGE/TIPSIZE MISMATCH Use Correct Cart	The incorrect cartridge type is being used for the printer.	Install the correct ribbon cartridge type in the printer.

Table 5. P8000 ASCII Error Messages List

Displayed Message	Explanation	Solution
CLEAR PAPER JAM	Paper jam.	<ol style="list-style-type: none"> 1. Inspect the paper path for jams. Clear jams. Load paper. 2. Press 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 147. If forms feed, go to step 3. 3. Press VIEW once and check that forms move up. Make sure the forms thickness lever is not set too tightly. 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 149. 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. 6. Check the dynamic paper tension. 7. Inspect the ribbon mask for bends or deformation. Replace if damaged. 8. Check and adjust the platen open belt. Replace the belt if it is damaged.
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 5. P8000 ASCII Error Messages List

Displayed Message	Explanation	Solution
CLOSE PLATEN	The forms thickness lever is open.	<ol style="list-style-type: none">1. Load paper. Close the forms thickness lever.2. Power off the printer. Remove the paper path (cabinet model) or electronics barrier panel (pedestal model). 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.)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.4. Check and adjust the platen open belt. Replace the belt if it is damaged.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.6. Run a print test. If the message appears, replace the controller board. Record the message and return it with the defective board.
COIL HOT ERR 1 COIL HOT ERR 2	One or more hammer coils are overheating.	Contact customer support (page 485).
COIL TEMP FAIL	The coil temperature was never set or the attempt to set it did not result in correct numbers.	Allow printer to cool completely, then set coil temperature. If message continues to display, contact customer support (page 485).
D50 STATUS: UPGRADING STATUS	Status message: The printer is upgrading the panel, where %XX represents the percentage completed.	No action required.

Table 5. P8000 ASCII Error Messages List

Displayed Message	Explanation	Solution
D51 STATUS PROGRAMMING DONE	Status message: The printer is loading firmware, where %XX represents the percentage completed.	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.
DP FIFO Busy*	There is a timing problem in the Engine Controller firmware.	<ol style="list-style-type: none"> 1. Cycle Power. Run the print job again. If the message appears, download the emulation software again (page 194). 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.

Table 5. P8000 ASCII Error Messages List

Displayed Message	Explanation	Solution
E00 EXE @ ADDR0 E01A TYPE 0x40 E01B TYPE 0x60 E02 MACHINE CHK E03A DSI HASH L E03B DSI HASH S E03C DSI BAT PL E03D DSI BAT PS E03E DSI CXIWX E03F DSI CXOWX E03G DSI ECXIWX E03H DSI ECXOWX E04A ISI NO TRA E04B ISI DIRECT E04C ISI PROTEC E06 NOT ALIGNED E07 ILLEGAL INS E08 FLOATINGPNT E12 SYSTEM CALL E13 TRACE INT E16 ITRANS MISS E17 DLOAD MISS E18 DSTORE MISS E19 BREAKPOINT E20 SYS MANAGE E30 DEBUGGER E31A EVENT 0 BP E31B EVENT 1 BP E31C EVENT 2 BP E31D EVENT 3 BP E31E EVENT 4 BP E31F EVENT 5 BP E31G EVENT 6 BP E31H EVENT 7 BP E32A CND 0 BP E32B CND 1 BP E32C CND 2 BP E32D CND 3 BP E32E CND 4 BP E32F CND 5 BP E32G CND 6 BP E32H CND 7 BP E33 WRITE BP E34 TRACE CMPLT E99 UNKNOWN INT See User Manual	An illegal or unsupported instruction was attempted in the application program.	<div><div>1.</div><div>Cycle Power. Run the print job again. If the message appears, load the latest emulation software.</div></div> <div><div>2.</div><div>Cycle power. Run the print job again. If the message appears again, record the exact display message, follow the instructions on page 50, and contact customer support (page 485).</div></div>

Table 5. P8000 ASCII Error Messages List

Displayed Message	Explanation	Solution
E-Net Test Unavailable	The ethernet did not initialize correctly.	Cycle power. Wait for “E-Net Ready” to display, then retry operation. If it still fails, replace the controller board, and contact customer support (page 485).
ERROR NOR FLASHED WAS NOT CLEARED	Problem programming Boot Code.	Contact customer support (page 485).
ERROR: DC PROGRAM NOT VALID	The printer cannot find the data controller program or the validation checksum is corrupt.	<ol style="list-style-type: none"> 1. Download the program again (page 194). 2. If the message appears, replace the controller board.
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.	<ol style="list-style-type: none"> 1. Remove the SPX from the Debug Port. 2. Cycle printer power.
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. The asterisk (*) rotates while this message displays.	Wait. When the asterisk (*) stops rotating, a different fault message appears.
ERROR: PROGRAM NOT COMPATIBLE	The printer is not compatible with the downloaded program.	Use the correct emulation software option(s) for this model printer.

Table 5. P8000 ASCII Error Messages List

Displayed Message	Explanation	Solution
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.	<ol style="list-style-type: none">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.2. Power on the printer. If the message appears, 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.	Download the program again. 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.	<ol style="list-style-type: none">1. Remove the SPX from the Debug Port.2. Cycle printer power.
ERROR: WRONG PRINTER TYPE	The SPX inserted in the debug port is not intended for this this OEM.	<ol style="list-style-type: none">1. Remove the SPX from the Debug Port.2. Cycle printer power.
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.
EXCEPTION ERROR	An EXCEPTION INTERRUPT has occurred.	Contact customer support (page 485).
EXCESS RIBBON WEAR Install New RBN	Status message that displays when ribbon reaches end of life, whether the Integrated Print Management System is enabled or not.	Install a new ribbon.

Table 5. P8000 ASCII Error Messages List

Displayed Message	Explanation	Solution
EXHAUST FAN FLT (Cabinet models only)	Exhaust Fan Fault. Sensor cannot detect current in the fan circuit.	<ol style="list-style-type: none">1. Cycle power. If the message appears, press CANCEL.2. Check that the exhaust fan is connected to exhaust fan cable connector J307. Connect the fan cable connector.3. Power off the printer. Remove the paper path. Disconnect P109 from controller. Test connector P109 and associated cabling for shorts and opens. (See the Main Wire Harness Test Tables in Appendix A.) Replace components that fail test.4. Make sure corrector P109 is properly plugged into J109 on the controller.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.6. Power on the printer. Check for fan operation. If the message appears or the fan does not work, replace the exhaust fan.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. P8000 ASCII 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.	<ol style="list-style-type: none">1. Cycle power. Run the print job. If the message appears, download the emulation software again (page 194).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.3. 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.
FLASH: CHECK RETURN	Printer encountered an error while trying to program Flash memory.	Contact customer support (page 485).
FLASH: WAS NOT CLEARED	Printer encountered an error while trying to program Flash memory.	Contact customer support (page 485).
FLASH: WRITE ERROR # 2	Printer encountered an error while trying to program Flash memory.	Contact customer support (page 485).
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.	<ol style="list-style-type: none">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.2. Send a print job to the printer. If the message appears, go to Communications Failures, page 153.
GENERATING XX% NAND FLASH TABLE	NAND FLASH is being read and system tables are being initialized.	No action is required.

Table 5. P8000 ASCII Error Messages List

Displayed Message	Explanation	Solution
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.	<ol style="list-style-type: none">1. Cycle power. If the message appears, power down and reseal the PCI card.2. Power on the printer. If the message appears, replace the PCI card.3. 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 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.	<ol style="list-style-type: none">1. Cycle power. If the message appears, power down and reseal the PCI card.2. Power on the printer. If the message appears, replace the PCI card.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. P8000 ASCII 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.	<ol style="list-style-type: none">1. Advise the user to move the printer to cooler, cleaner location.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.3. Power off the printer. Remove the paper path (cabinet model) or electronics barrier panel (pedestal model). Check all fan cable connections.4. Power on the printer. Verify that all fans operate. Replace any fan that does not operate.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.6. Install the paper path (cabinet model) or electronics barrier panel (pedestal model). Load paper. Run the "All E's" print test for 5 to 10 minutes. If the message appears, replace the shuttle frame assembly.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.8. Set the coil temperature (page 213).
HAMMER COIL BAD #, #, #, #, ... etc.	Hammer coil(s) number #, #, etc. failed the current test at power-up. Check that the hammerbank cables are connected.	<ol style="list-style-type: none">1. Cycle power. If the message appears, replace the shuttle frame assembly. Record the message and return it with the defective assembly.2. Power on the printer. If the message appears, replace controller board. Record the message and return it with the defective assembly.

Table 5. P8000 ASCII Error Messages List

Displayed Message	Explanation	Solution
HAMMER DRIVER CIRCUIT BAD*	Driver Circuit Bad: the hammer coil count test failed.	<ol style="list-style-type: none"> 1. Cycle power. If the message appears, press CANCEL. 2. Power off the printer. Remove the shuttle cover. At the shuttle frame assembly, disconnect the hammerbank logic and power cables. Power on the printer. If "HB NOT INSTALLED" appears on the LCD, replace the shuttle frame assembly. If "HB NOT INSTALLED" does not appear on the LCD, replace the controller board.
HAMMERBANK NOT INSTALLED*	Hammerbank 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.	<ol style="list-style-type: none"> 1. Install the shuttle frame assembly. 2. Remove the paper path (cabinet model) or electronics barrier panel (pedestal model). Verify that the hammerbank logic cable is connected to connector J108 on the controller board and to the shuttle frame assembly. 3. Power on the printer. If the message appears, replace the hammerbank logic cable. 4. Power on the printer. If the message appears, replace the shuttle frame assembly. 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. P8000 ASCII Error Messages List

Displayed Message	Explanation	Solution
HMR BANK FAN FLT	Hammerbank Fan Fault. Sensor cannot detect current in the fan circuit.	<div><div>1. Cycle power. If the message appears, press CANCEL. If the message does not clear, go to step 3.</div><div>2. Power off the printer. Check that the hammerbank fan is connected to fan cable connector P308. Connect the fan cable connector. Power on the printer. If the message appears go to step 3.</div><div>3. Power off the printer. Remove the paper path (cabinet model) or electronics barrier panel (pedestal model). Disconnect P109 from the controller. Test connector P109 and the associated cabling for shorts and opens. (Refer to the Main Wire Harness Test Tables in Appendix A.) Replace components that fail test.</div><div>4. Make sure corrector P109 is properly plugged into J109 on the controller.</div><div>5. Inspect for obstructions of airways and vents. Remove obstructions.</div><div>6. Power on the printer. If the message appears, replace the fan.</div><div>7. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board.</div></div>
ILL EXT BUS ACC*	Illegal External Bus Access. Firmware error on the controller board.	<div><div>1. Cycle power. Run the print job again. If the message appears, download the emulation software again (page 194).</div><div>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.</div></div>

Table 5. P8000 ASCII Error Messages List

Displayed Message	Explanation	Solution
ILL INST ACCSS See Manual	Illegal Instruction Accessed. Firmware error on the controller board.	<ol style="list-style-type: none">1. Cycle power. Run the print job again. If the message appears, download the emulation software again (page 194).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 NVM VALUE 5 ILL NVM VALUE 6 ILL NVM VALUE 7	Illegal value was stored into the Novram module.	<ol style="list-style-type: none">1. Cycle power. Run the print job again. If the message appears, load the latest emulation software.2. Cycle power. Run the print job again. If the message appears again, record the exact display message, follow the instructions on page 50, "Diagnostics for EXX, BAD NVM, or ILL NVM Errors", and contact customer support (page 485).
ILLGL OPR ACCSS*	Illegal Operand Accessed. Firmware error on the controller board.	<ol style="list-style-type: none">1. Cycle power. Run the print job again. If the message appears, download the emulation software again (page 194).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.
INITIALIZING...	This message indicates the printer is beginning its initialization process.	No action is required.

Table 5. P8000 ASCII Error Messages List

Displayed Message	Explanation	Solution
INTAKE FAN CHECK	Sensor cannot detect current in the card cage fan circuit.	<div><div>1.</div><div>2.</div><div>3.</div><div>4.</div><div>5.</div><div>6.</div><div>7.</div></div> <div>Cycle power. If the message appears, press CANCEL. If the message does not clear, go to step 3. Power off the printer. Check that the hammerbank fan is connected to fan cable connector P308. Connect the fan cable connector. Power on the printer. If the message appears go to step 3. Power off the printer. Remove the paper path (cabinet model) or electronics barrier panel (pedestal model). Disconnect P109 from the controller. Test connector P109 and the associated cabling for shorts and opens. (Refer to the Main Wire Harness Test Tables in Appendix A.) Replace components that fail test. Make sure corrector P109 is properly plugged into J109 on the controller. Inspect for obstructions of airways and vents. Remove obstructions. Power on the printer. If the message appears, replace the fan. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board.</div>

Table 5. P8000 ASCII 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.	<ol style="list-style-type: none">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.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.
LO DRV. SHORT*	Lower Driver Short. Circuit(s) on the hammerbank or in the hammerbank power cable are shorted to ground.	<ol style="list-style-type: none">1. Cycle power. If the message appears, press CANCEL. If message does not clear, replace the hammerbank logic cable and the hammerbank power cable.2. Power on the printer. If the message appears, replace the shuttle frame assembly.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. P8000 ASCII Error Messages List

Displayed Message	Explanation	Solution
LOAD PAPER	The printer is out of paper.	<div><div>1. Load paper. Press CANCEL. If message does not clear, go to the next step.</div><div>2. Run the Paper Out Adjustment test (page 189).</div><div>3. 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 294, item 3.)</div><div>4. Power off the printer. Remove the paper path (cabinet model) or electronics barrier panel (pedestal model). Remove the barrier shield (cabinet model) or the barrier shield and electronics barrier panel (pedestal model). Check that the paper detector switch assembly is securely mounted in its bracket.</div><div>5. Check that connector P106/PMD is fully seated in connector J106 on the controller board.</div><div>6. Load paper. Power on the printer. Replace the paper detector switch assembly if message appears.</div><div>7. Load paper. Power on the printer. Replace the controller board if message appears. Record the message and return it with the defective board.</div></div>
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 5. P8000 ASCII 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.
MEMORY FAILURE	Boot-up routines did not detect the presence of the DRAM.	Power up the printer. If the message appears, replace the controller board. Record the message and return it with the defective board.
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: <ol style="list-style-type: none"> 1. The SPX copies the printer's security key serial number into its flash memory. 2. The printer reprograms its security key with the information stored in the SPX. 3. The printer verifies that the key was programmed as intended. 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.	<ol style="list-style-type: none"> 1. If the message appears at power-up, replace the controller board. 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.)
OLD RIBBON Install New Ribbon	The sensor detects a ribbon that was previously declared to be at the end of its service life.	Install a new ribbon cartridge.

Table 5. P8000 ASCII Error Messages List

Displayed Message	Explanation	Solution
ONLINE	Printer state message: printer is online and in communication with host.	No action is required.
PANEL BAD CHECKSUM	Panel Code has a bad Checksum.	Reload released firmware.
PAP BAD TABLE*	Paper Bad Table. The paper feed process on the controller board has a corrupted table.	<div><div>1.</div><div>Cycle power. Run the print job again. If the message appears, download the emulation software again.</div><div>2.</div><div>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.</div></div>
PAP FD DRVR CIR* See Manual	Paper Feed Driver Circuit. The paper feed driver circuit on the controller board is drawing too much current.	<div><div>1.</div><div>Cycle power. If the message appears, replace the controller board. Record the message and return it with the defective board.</div><div>2.</div><div>Power on the printer. If the message appears, replace the paper feed motor.</div></div>
PAP FIFO OVERFL *	Paper First In First Out Overflow. Firmware error on the controller board.	<div><div>1.</div><div>Cycle power. Run the print job again. If the message appears, download the emulation software again.</div><div>2.</div><div>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.</div></div>

Table 5. P8000 ASCII Error Messages List

Displayed Message	Explanation	Solution
PAP FIFO UNDRFL*	Paper First In First Out Underflow. Firmware error on the controller board.	<ol style="list-style-type: none"> 1. Cycle power. Run the print job again. If the message appears, download the emulation software again. 2. Run the print job again. If the message appears, power off the printer. Remove the paper path (cabinet model) or electronics barrier panel (pedestal model). Make sure connectors P106 and P107 are fully seated on the controller board. Make sure the MPU cable, the hammerbank logic cable, and the hammerbank power cable are undamaged and have good connections. Replace as necessary. (Refer to Appendix A.) 3. Check hammer phasing. Try using a lower phasing value; sometimes this message indicates too high a hammer phase value. 4. Power on the printer. Run the print job again. If the message appears, replace the shuttle frame assembly. 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 ILLGL ST*	Paper Illegal State. Firmware error on the controller board.	<ol style="list-style-type: none"> 1. Cycle power. Run the print job again. If the message appears, download the emulation software again. 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. P8000 ASCII Error Messages List

Displayed Message	Explanation	Solution
PAP INVLD CMD*	Paper Invalid Command. Firmware error on the controller board.	<ol style="list-style-type: none">1. Cycle power. Run the print job again. If the message appears, download the emulation software again.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.	<ol style="list-style-type: none">1. Cycle power. Run the print job again. If the message appears, download the emulation software again.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.
PARALLEL PORT NOT INSTALLED USING USB	A parallel three-finger download was requested but parallel not present.	Download through USB.
PAPER REQUESTED Install A4	A paper size mismatch is detected.	<ol style="list-style-type: none">1. Check the paper size setting.2. If necessary, load new media and change the paper size menu option.
PARITY ERROR	The printed output may contain random ? (question mark) characters. Make a configuration printout.	<ol style="list-style-type: none">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.2. Send a print job to the printer. If the message appears, replace the serial data cable.3. Send a print job to the printer. If the message appears, go to Communications Failures, page 153.
PLAT DRVR CIR	Platen driver circuit malfunction.	Contact customer support (page 485).

Table 5. P8000 ASCII Error Messages List

Displayed Message	Explanation	Solution
PLAT INV CMD*	Platen Invalid Command. Firmware error on the controller board.	<ol style="list-style-type: none">1. Cycle power. Run the print job again. If the message appears, download the emulation software again.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.	<ol style="list-style-type: none">1. Cycle power. Run the print job again. If the message appears, download the emulation software again.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 STATE*	Platen Invalid State. Firmware error on the controller board.	<ol style="list-style-type: none">1. Cycle power. Run the print job again. If the message appears, download the emulation software again.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.

Table 5. P8000 ASCII Error Messages List

Displayed Message	Explanation	Solution
POWER SUPPLY HOT	<p>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, allowing printer components to cool down, and the POWER SUPPLY HOT message is sent to the LCD. Printing resumes to normal speed after power supply has cool down. 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.</p>	<ol style="list-style-type: none">1. Inspect printer environment for severity. Advise the user to move the printer to cooler, cleaner location.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.3. Power off the printer. Remove the paper path (cabinet model) or electronics barrier panel (pedestal model). Check that the plastic power supply guard/air deflector is correctly positioned over the power supply board. <u>WARNING: DO NOT TOUCH THE POWER SUPPLY</u>, 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.4. Check that all fan cables are connected.5. Inspect vents and fan airways for obstructions. Look underneath cabinet models for items blocking the cabinet exhaust vents.6. Install the paper path (cabinet model) or electronics barrier panel (pedestal model). 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. P8000 ASCII Error Messages List

Displayed Message	Explanation	Solution
PRINTER HOT	This message indicates internal temperatures over 80° Celsius (176° 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.	<ol style="list-style-type: none"> 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. 2. Power off the printer. Remove the paper path (cabinet model) or electronics barrier panel (pedestal model). Check that all fan cables are connected. 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. 4. Install the paper path (cabinet model) or electronics barrier panel (pedestal model). 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.
PROCESSOR HALTED	Fatal error in printer.	Contact customer support (page 485).

Table 5. P8000 ASCII Error Messages List

Displayed Message	Explanation	Solution
PROTECTED INSTR*	Protected Instruction. Firmware error on the controller board.	<ol style="list-style-type: none">1. Cycle power. Run the print job again. If the message appears, download the emulation software again.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.
PS/PDF ERROR: CHECK ERROR	Fault displayed when Postscript/PDF failed to process a job. One or more of the following errors were detected: Type check, limit check, range check, or no current point defined.	<ol style="list-style-type: none">1. Click the Postscript/PDF job for syntax (Postscript) errors.2. Clear the fault. Postscript/PDF will continue with the next job.
PS/PDF ERROR: DICTIONARY ERROR	Fault displayed when Postscript/PDF failed to process a job. One or more of the following errors were detected: Dictionary full, dictionary stack overflow, or dictionary stack underflow.	<ol style="list-style-type: none">1. Click the Postscript/PDF job for syntax (Postscript) errors.2. Clear the fault. Postscript/PDF will continue with the next job.
PS/PDF ERROR: INVALID ACCESS	Fault displayed when Postscript/PDF failed to process a job. One or more of the following errors were detected: Invalid access, invalid font, or invalid exit.	<ol style="list-style-type: none">1. Click the Postscript/PDF job for syntax (Postscript) errors.2. Clear the fault. Postscript/PDF will continue with the next job.
PS/PDF ERROR: I/O ERROR	Fault displayed when Postscript/PDF failed to process a job. One or more of the following errors were detected: I/O error, invalid file access, undefined file, interrupt, or time out.	<ol style="list-style-type: none">1. Click the Postscript/PDF job for syntax (Postscript) errors.2. Clear the fault. Postscript/PDF will continue with the next job.
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.

Table 5. P8000 ASCII Error Messages List

Displayed Message	Explanation	Solution
PS/PDF ERROR: STACK ERROR	Fault displayed when Postscript/PDF failed to process a job. One or more of the following errors were detected: Stack overflow, stack underflow, exec stack overflow, or invalid restore.	<ol style="list-style-type: none"> 1. Check the Postscript/PDF job for syntax (Postscript) errors. 2. Clear the fault. Postscript/PDF will continue with the next job.
PS/PDF ERROR: SYNTAX ERROR	Fault displayed when Postscript/PDF failed to process a job. One or more of the following errors were detected: Syntax error, unmatched mark, undefined, undefined results, or unknown error.	<ol style="list-style-type: none"> 1. Check the Postscript/PDF job for syntax (Postscript) errors. 2. 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.
REMOVE USED SPX THEN PRESS ENTER	Status message: An SPX is depleted because it has successfully reprogrammed the security key on the controller board.	<ol style="list-style-type: none"> 1. Remove the SPX from the Debug Port. 2. Press the ENTER key. The printer will reboot itself.
RESTORING BOOT CODE	Normal download initialization message.	No action required.
RIB INVLD CMD* See User Manual	Ribbon Invalid Command. Firmware error on the controller board.	<ol style="list-style-type: none"> 1. Cycle power. Run the print job again. If the message appears, download the emulation software again. 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. P8000 ASCII Error Messages List

Displayed Message	Explanation	Solution
RIBBON STALL	The controller board does not detect ribbon movement.	<div><div>1. Cycle power. If the message appears, power off the printer.</div><div>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.</div><div>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 hammerbank cover.</div><div>4. Check the platen gap and adjust if required. If the gap is too narrow, it can restrict ribbon movement through the ribbon mask.</div><div>5. Remove the paper path (cabinet model) or electronics barrier panel (pedestal model). Reseat the ribbon drive motor cable connection.</div><div>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.</div><div>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.</div></div>
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 cartridge.

Table 5. P8000 ASCII Error Messages List

Displayed Message	Explanation	Solution
SD CARD ERROR Remove SD Card	The printer has been powered up with a card in the SD slot, but the card is not functioning properly. The card could be a compact flash card or a nonsupported card.	Power down, reseal card, and power up again. If error persists, power down, remove card, and try another card.
SD FILE EXISTS Enable Overwrite	A write operation to the SD has failed because the file already exists on the SD card and the overwriting of existing files is disabled.	Enable overwriting of files on the SD using the overwrite files menu.
SD FILESYS FULL Delete Files	The SD file system is completely full.	Delete files on the SD card to make space.
SD FILESYS FULL File Too Big	A write operation to the SD has failed because the file is too big to fit in the remaining space on the SD card.	Delete files on the SD card to make space.
SD FILESYS WRITE Check SD	A write operation to the SD has failed for an unknown reason.	Ensure that the SD card is inserted correctly and that the SD card is a supported SDHC card.
SD INSERTED Reboot Printer	The SD card has been inserted after the printer was already powered up.	Turn off the printer and insert the SD card only when the printer is not powered on.
SD NOT FOUND Insert SD Card Pwr Off Printer	A write operation to the SD could not be performed because the SD card was not detected.	Ensure that an SD card is inserted correctly and that the SD card is a supported SDHC card.
SD READING Do not Remove	The SD card is currently reading files.	Wait until reading completes.
SD REMOVED Reboot Printer	The SD card has been removed after the printer was already powered up.	Turn off the printer and remove the SD card only when the printer is off.
SD WRITE FAIL WRITE PROTECTED Check SD Card	A write operation to the SD has failed because the the SD card is write protected.	Ensure that the write protect tab on the SD card is not active. If the write protect tab is not active, use another SD card.
SD WRITING Do not Remove	The SD card is currently writing or erasing files.	Wait until the write or erase operation completes.

Table 5. P8000 ASCII Error Messages List

Displayed Message	Explanation	Solution
SDSC CARD NOT SUPPORTED Remove SD Card	The printer has been powered up with an SDSC card, and SDSC cards (< 4 GB) are not supported.	Power down, remove SD card, and insert an SDHC card in the printer.
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.	<div><div>1. Remove the paper path (cabinet model) or electronics barrier panel (pedestal model). Check that the security key is correctly installed.</div><div>2. Install correct key for the customer's emulations.</div><div>3. Run a print test. If the message appears, replace the controller board. Record the message and return it with the defective board.</div></div>
SECURITY KEY NOT DETECTED	The security key is not present or has failed.	<div><div>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.</div><div>2. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board.</div></div>
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.

Table 5. P8000 ASCII Error Messages List

Displayed Message	Explanation	Solution
SHUT DRVR CIR* See User Manual	The shuttle driver circuit on the controller board is drawing too much current.	<ol style="list-style-type: none"> 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. 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.
SHUTL INV CMD*	Shuttle Invalid Command. Firmware error on the controller board.	<ol style="list-style-type: none"> 1. Cycle power. Run the print job again. If the message appears, download the emulation software again. 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.	<ol style="list-style-type: none"> 1. Cycle power. Run the print job again. If the message appears, download the emulation software again. 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 286.)

Table 5. P8000 ASCII Error Messages List

Displayed Message	Explanation	Solution
SHUTTLE JAM SHUTTLE STALL	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.	<ol style="list-style-type: none">1. Set the forms thickness lever to match the thickness of paper, but not too tightly.2. Check and adjust the platen gap.3. Inspect the ribbon mask for deformation that snags and interferes with shuttle movement. Correctly install the hammerbank cover assembly or replace a deformed cover assembly.4. Run a print test. If the message appears, power off the printer.5. Remove the paper path (cabinet model) or electronics barrier panel (pedestal model). 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.6. 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 ± 0.001 inch (0.254 ± 0.025 mm). Torque the 7/16 inch MPU clamp screw to 18 inch-pounds (2.03 N•m).7. Run a print test. If the message appears, replace the MPU and the MPU cable assembly.8. Run a print test. If the message appears, replace the controller board. Record the message and return it with the defective board.9. Run a print test. If the message appears, replace the shuttle frame assembly.

Table 5. P8000 ASCII Error Messages List

Displayed Message	Explanation	Solution
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.	<ol style="list-style-type: none"> 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. 2. Power on the printer. If the message appears, download the emulation software again (page 194). 3. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board. 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.	<ol style="list-style-type: none"> 1. Cycle power. If the message appears, power off the printer. 2. Disconnect the input data line from the host computer. Power on the printer. If the message appears, download the emulation software again (page 194). 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.
SPX FOUND, ERROR: KEY NOT DETECTED	The controller board does not have a security key.	<ol style="list-style-type: none"> 1. Remove the SPX from the Debug Port. 2. Power down the printer. 3. Install the security key.

Table 5. P8000 ASCII Error Messages List

Displayed Message	Explanation	Solution
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.	<div><div>1.</div>Remove the SPX from the Debug Port.</div> <div><div>2.</div>Cycle printer power.</div>

Table 5. P8000 ASCII Error Messages List

Displayed Message	Explanation	Solution
STACKER FAULT	<p>Two situations can trigger this message:</p> <ol style="list-style-type: none"> 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. 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. 	<ol style="list-style-type: none"> 1. Open the cabinet rear door and check for obstructions preventing elevator movement. Remove any obstructions. 2. Power on the printer. Operate the power stacker and check that: <ol style="list-style-type: none"> 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. 3. Adjust the stacker rails if they are not vertical and parallel. 4. Check the stacker limit switches. (See page 141.) If the limit switches are OK, go to the next step. 5. Disable the power stacker unit under the Printer Control menu. (Refer to the <i>User's Manual</i>.) If the message occurs, replace the controller board and download new function code. 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 85, page 395). 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. P8000 ASCII Error Messages List

Displayed Message	Explanation	Solution
STACKER FULL	Status message: the power paper stacker is full.	<div><div>1. Unload the stacker.</div><div>2. Check the stacker limit switches. (See page 141.) If the limit switches are OK, go to the next step.</div><div>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 82, page 392). 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.</div></div>

Table 5. P8000 ASCII 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.	<ol style="list-style-type: none"> 1. Open the cabinet rear door and check for obstructions preventing elevator movement. Remove any obstructions. 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. 3. Power on the printer. Operate the power stacker and check that: <ol style="list-style-type: none"> 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) extension springs are attached and not bent or stretched), f) drive rollers are not damaged. Tighten setscrews and replace damaged components as necessary. 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.
SYS R/T ERROR	Software issue.	Contact your system administrator.

Table 5. P8000 ASCII Error Messages List

Displayed Message	Explanation	Solution
TCB CORRUPTED*	Task Control Block Corrupted. Firmware error on the controller board.	<ol style="list-style-type: none">1. Cycle power. Run the print job again. If the message appears, download the emulation software again.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.
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.	<ol style="list-style-type: none">1. Power on the printer.2. If the printer is online, press the ONLINE key to place the printer offline.3. On the control panel, press the $\Delta + \nabla$ keys to unlock the ENTER key.4. Press the ENTER key to enter the menu.5. Press \triangleright until you reach the DIAGNOSTICS menu, then press ENTER.6. Press Δ until you reach the “Printer Mgmt” option, then press ENTER. The PNE Port option displays.7. Press \triangleright until you reach “Ethernet”, then press ENTER.8. Press ONLINE to return the printer to the online state.9. The Printer Manager should now be able to access the printer. For other communication errors, print out the E-Net Test Page (page 160) and verify the IP address, subnet mask, gateway address, and TCP port settings.
UNKNOWN RBN Install New RBN	The sensor detects a ribbon cartridge, but the region code does not match the printer.	Install a new ribbon cartridge.

Table 5. P8000 ASCII Error Messages List

Displayed Message	Explanation	Solution
UP DRV. SHORT*	Upper Driver Short. Hammer driver circuits on the controller board are shorted to ground.	<ol style="list-style-type: none"> 1. Cycle power. If the message appears, press CANCEL. If the message does not clear, replace the hammerbank logic cable and the hammerbank power cable assemblies. 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.
WELD NOT DETECT See User Manual	The cartridge weld was not detected.	<ol style="list-style-type: none"> 1. Clear the fault message. 2. If message persists, replace the cartridge. 3. If necessary, replace the weld sensor.
WELD SENSR ERROR See User Manual	The cartridge sensor could not be calibrated.	<ol style="list-style-type: none"> 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	The incorrect cartridge type is being used for the printer.	<ol style="list-style-type: none"> 1. Make sure the correct ribbon cartridge type is installed and is properly seated. 2. Make sure the weld sensor cabling is connected. 3. Replace the weld sensor and cabling if necessary.
XXXX CHECKING PATTERN	Running power on memory test.	No action is required.
XXXX MEMORY FAILURE	Memory in bank xxx has failed. Power on memory test.	Cycle power. If message appears again, replace the controller board, Record the message and return it with the defective board.
XXXX WRITING PATTERN	Running power on memory test.	No action is required.

P8000 CRP H-Series (Numerical Prefix Listing)

Table 6. P8000 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.	<div><div>1.</div><div>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.</div><div>2.</div><div>Power on the printer. If the message appears, download the emulation software again (page 194).</div><div>3.</div><div>Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board.</div><div>4.</div><div>Power on the printer. If the message appears, replace the shuttle frame assembly.</div></div>

Table 6. P8000 H-Series Error Messages List

Displayed Message	Explanation	Solution
104:POWER SUPPLY HOT	<p>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 CANCEL 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.</p>	<ol style="list-style-type: none"> 1. Inspect printer environment for severity. Advise the user to move the printer to cooler, cleaner location. 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. 3. Power off the printer. Remove the paper path (cabinet model) or electronics barrier panel (pedestal model). Check that the plastic power supply guard/air deflector is correctly positioned over the power supply board. <u>WARNING: DO NOT TOUCH THE POWER SUPPLY</u>, 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. 4. Check that all fan cables are connected. 5. Inspect vents and fan airways for obstructions. Look underneath cabinet models for items blocking the cabinet exhaust vents. 6. Install the paper path (cabinet model) or electronics barrier panel (pedestal model). 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 6. P8000 H-Series Error Messages List

Displayed Message	Explanation	Solution
105:PRINTER HOT	<p>This message indicates internal temperatures over 80° Celsius (176° 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.</p>	<ol style="list-style-type: none">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.2. Power off the printer. Remove the paper path (cabinet model) or electronics barrier panel (pedestal model). Check that all fan cables are connected.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.4. Install the paper path (cabinet model) or electronics barrier panel (pedestal model). 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.
401:BUFFER OVERRUN	<p>The print buffer has overflowed on a serial interface. The printed output may contain random * (asterisk) characters. Make a configuration printout.</p>	<ol style="list-style-type: none">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.2. Send a print job to the printer. If the message appears, go to Communications Failures, page 153.

Table 6. P8000 H-Series Error Messages List

Displayed Message	Explanation	Solution
402: CLEAR PAPER JAM	Paper jam.	<ol style="list-style-type: none"> 1. Inspect the paper path for jams. Clear jams. Load paper. 2. Press 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 147. If forms feed, go to step 3. 3. Press VIEW once and check that forms move up. Make sure the forms thickness lever is not set too tightly. 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 149. 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. 6. Check the dynamic paper tension. 7. Inspect the ribbon mask for bends or deformation. Replace if damaged. 8. Check and adjust the platen open belt. Replace the belt if it is damaged.

Table 6. P8000 H-Series Error Messages List

Displayed Message	Explanation	Solution
403:CLOSE PLATEN	The forms thickness lever is open.	<ol style="list-style-type: none"> 1. Load paper. Close the forms thickness lever. 2. Power off the printer. Remove the paper path (cabinet model) or electronics barrier panel (pedestal model). 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.) 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. 4. Check and adjust the platen open belt. Replace the belt if it is damaged. 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. 6. Run a print test. If the message appears, 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.	<ol style="list-style-type: none"> 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. 2. Send a print job to the printer. If the message appears, go to Communications Failures, page 153.

Table 6. P8000 H-Series Error Messages List

Displayed Message	Explanation	Solution
410:LOAD PAPER	The printer is out of paper.	<ol style="list-style-type: none"> 1. Load paper. Press CLEAR. If message does not clear, go to the next step. 2. Run the Paper Out Adjustment test (page 189). 3. 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 294, item 3.) 4. Power off the printer. Remove the paper path (cabinet model) or electronics barrier panel (pedestal model). Remove the barrier shield (cabinet model) or the barrier shield and electronics barrier panel (pedestal model). Check that the paper detector switch assembly is securely mounted in its bracket. 5. Check that connector P106/PMD is fully seated in connector J106 on the controller board. 6. Load paper. Power on the printer. Replace the paper detector switch assembly if message appears. 7. Load paper. Power on the printer. Replace the controller board if message appears. Record the message and return it with the defective board.

Table 6. P8000 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.	<div><div>1.</div><div>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.</div></div> <div><div>2.</div><div>Send a print job to the printer. If the message appears, replace the serial data cable.</div></div> <div><div>3.</div><div>Send a print job to the printer. If the message appears, go to Communications Failures, page 153.</div></div>

Table 6. P8000 H-Series Error Messages List

Displayed Message	Explanation	Solution
414:RIBBON STALL	The controller board does not detect ribbon movement.	<ol style="list-style-type: none">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 hammerbank 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 (cabinet model) or electronics barrier panel (pedestal model). 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 6. P8000 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.	<ol style="list-style-type: none">1. Set the forms thickness lever to match the thickness of paper, but not too tightly.2. Check and adjust the platen gap.3. Inspect the ribbon mask for deformation that snags and interferes with shuttle movement. Correctly install the hammerbank cover assembly or replace a deformed cover assembly.4. Run a print test. If the message appears, power off the printer.5. Remove the shuttle cover and the paper path (cabinet model) or electronics barrier panel (pedestal model). 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.6. 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 ± 0.001 inch (0.254 ± 0.025 mm). Torque the 7/16 inch MPU clamp screw to 18 inch-pounds (2.03 N•m).7. Run a print test. If the message appears, replace the MPU and the MPU cable assembly.8. Run a print test. If the message appears, replace the controller board. Record the message and return it with the defective board.9. Run a print test. If the message appears, replace the shuttle frame assembly.

Table 6. P8000 H-Series Error Messages List

Displayed Message	Explanation	Solution
416:STACKER FULL	Status message: the power paper stacker is full.	<ol style="list-style-type: none">1. Unload the stacker.2. Check the stacker limit switches. (See page 141.) If the limit switches are OK, go to the next step.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 82, page 392). 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 6. P8000 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.	<div><div>1. Open the cabinet rear door and check for obstructions preventing elevator movement. Remove any obstructions.</div><div>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.</div><div>3. Power on the printer. Operate the power stacker and check that:<div>a) all motors are operating,</div><div>b) the paddles are rotating,</div><div>c) the elevator moves smoothly and without obstruction,</div><div>d) the timing belts are undamaged and the belt pulleys are not slipping,</div><div>e) extension springs are attached and not bent or stretched),</div><div>f) drive rollers are not damaged.</div>Tighten setscrews and replace damaged components as necessary.</div><div>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.</div></div>
418:RBN UNDER 2% Change RBN Soon	Status message indicating the Integrated Print Management System is enabled and ribbon ink level is 2%.	Install a new ribbon cartridge.

Table 6. P8000 H-Series Error Messages List

Displayed Message	Explanation	Solution
419:RBN END PNT* Install New RBN	Integrated Print Management System software has determined that the ribbon is out of ink.	Install a new ribbon cartridge.
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 cartridge.
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 cartridge.
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 cartridge.
427:CRTG MISSING Install new RBN Press ONLINE	The ribbon cartridge is missing or installed improperly.	<ol style="list-style-type: none"> 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.	<ol style="list-style-type: none"> 1. Make sure the ribbon cartridge is seated properly. 2. Remove and replace the ribbon cartridge if necessary.
432:CRT NOT SET	The ribbon cartridge is not properly positioned.	<ol style="list-style-type: none"> 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.

Table 6. P8000 H-Series Error Messages List

Displayed Message	Explanation	Solution
433:WELD SNSR See User Manual	The incorrect cartridge type is being used for the printer.	<ol style="list-style-type: none">1. Make sure the correct ribbon cartridge type is installed and is properly seated.2. Make sure the weld sensor cabling is connected.3. Replace the weld sensor and cabling if necessary.
434:WELD SENSOR ER See User Manual	The cartridge sensor could not be calibrated.	<ol style="list-style-type: none">1. Cycle power.2. If the message persists, replace the weld sensor and cabling if necessary.3. Replace the cartridge interface board if necessary.
435:NO WELD See User Manual	The cartridge weld was not detected.	<ol style="list-style-type: none">1. Clear the fault message.2. If message persists, replace the cartridge.3. If necessary, replace the weld sensor.
437:REG MISSING Use Correct RBN	The incorrect cartridge type is being used for the printer.	Install region X ribbon cartridge in the printer. NOTE: Specify the region of the printer when ordering ribbons.
438:TIP MISMATCH 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 Use Correct RBN	This message displays when an Extended Life Ribbon is mounted on a 500 lpm printer.	Install Standard Life Ribbon.
445:SD INSERTED Reboot Printer	The SD card has been inserted after the printer was already powered up.	Turn off the printer and insert the SD card only when the printer is not powered on.
446:SD REMOVED Reboot Printer	The SD card has been removed after the printer was already powered up.	Turn off the printer and remove the SD card only when the printer is off.
447:SD FL. EXIST Enable Overwrite	A write operation to the SD has failed because the file already exists on the SD card and the overwriting of existing files is disabled.	Enable overwriting of files on the SD using the overwrite files menu.

Table 6. P8000 H-Series Error Messages List

Displayed Message	Explanation	Solution
448:SD WRT. FAIL WRITE PROTECTED Check SD Card	A write operation to the SD has failed because the the SD card is write protected.	Ensure that the write protect tab on the SD card is not active. If the write protect tab is not active, use another SD card.
449:SD FILE WRITE Check SD	A write operation to the SD has failed for an unknown reason.	Ensure that the SD card is inserted correctly and that the SD card is a supported SDHC card.
450:SD FILE FULL File Too Big	A write operation to the SD has failed because the file is too big to fit in the remaining space on the SD card.	Delete files on the SD card to make space.
451:SD NOT FOUND Insert SD Card Pwr Off Printer	A write operation to the SD could not be performed because the SD card was not detected.	Ensure that an SD card is inserted correctly and that the SD card is a supported SDHC card.
452:SD FILE FULL Delete Files	The SD file system is completely full.	Delete files on the SD card to make space.
453:SD READING Do not Remove	The SD card is currently reading files.	Wait until reading completes.
454:SD WRITING Do not Remove	The SD card is currently writing or erasing files.	Wait until the write or erase operation completes.
608:DRIVER CIRCUIT BAD	Driver Circuit Bad: the hammer coil count test failed.	<ol style="list-style-type: none"> 1. Cycle power. If the message appears, press CANCEL. 2. Power off the printer. Remove the shuttle cover. At the shuttle frame assembly, disconnect the hammerbank logic and power cables. Power on the printer. If "HB NOT INSTALLED" appears on the LCD, replace the shuttle frame assembly. If "HB NOT INSTALLED" does not appear on the LCD, replace the controller board.

Table 6. P8000 H-Series Error Messages List

Displayed Message	Explanation	Solution
609:EXHAUST FAN CHECK (Cabinet model only)	<p>Exhaust Fan Fault. Sensor cannot detect current in the fan circuit.</p> <p>NOTE: For cabinet models only.</p>	<ol style="list-style-type: none">1. Cycle power. If the message appears, press CANCEL.2. Check that the exhaust fan is connected to exhaust fan cable connector J307. Connect the fan cable connector.3. Power off the printer. Remove the paper path. Disconnect P109 from controller. Test connector P109 and associated cabling for shorts and opens. (See the Main Wire Harness Test Tables in Appendix A.) Replace components that fail test.4. Make sure corrector P109 is properly plugged into J109 on the controller.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.6. Power on the printer. Check for fan operation. If the message appears or the fan does not work, replace the exhaust fan.7. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board.
613: HAM. COIL BAD #, #, #, ...etc	<p>Hammer coil(s) number #, #, etc. failed the current test at power-up. Check that the hammerbank cables are connected.</p>	<ol style="list-style-type: none">1. Cycle power. If the message appears, replace the shuttle frame assembly. Record the message and return it with the defective assembly.2. Power on the printer. If the message appears, replace controller board. Record the message and return it with the defective assembly.

Table 6. P8000 H-Series Error Messages List

Displayed Message	Explanation	Solution
614:HAMMER BANK* NOT INSTALLED	Hammerbank 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.	<ol style="list-style-type: none">1. Install the shuttle frame assembly.2. Remove the paper path (cabinet model) or electronics barrier panel (pedestal model). Verify that the hammerbank logic cable is connected to connector J108 on the controller board and to the shuttle frame assembly.3. Power on the printer. If the message appears, replace the hammerbank logic cable.4. Power on the printer. If the message appears, replace the shuttle frame assembly.5. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board.

Table 6. P8000 H-Series Error Messages List

Displayed Message	Explanation	Solution
615:HAMMER FAN CHECK	Hammerbank Fan Check. Sensor cannot detect current in the fan circuit.	<div><div>1.</div><div>Cycle power. If the message appears, press CANCEL. If the message does not clear, go to step 3.</div><div>2.</div><div>Power off the printer. Check that the hammerbank fan is connected to fan cable connector P308. Connect the fan cable connector. Power on the printer. If the message appears go to step 3.</div><div>3.</div><div>Power off the printer. Remove the paper path (cabinet model) or electronics barrier panel (pedestal model). Disconnect P109 from the controller. Test connector P109 and the associated cabling for shorts and opens. (Refer to the Main Wire Harness Test Tables in Appendix A.) Replace components that fail test.</div><div>4.</div><div>Make sure corrector P109 is properly plugged into J109 on the controller.</div><div>5.</div><div>Inspect for obstructions of airways and vents. Remove obstructions.</div><div>6.</div><div>Power on the printer. If the message appears, replace the fan.</div><div>7.</div><div>Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board.</div></div>

Table 6. P8000 H-Series Error Messages List

Displayed Message	Explanation	Solution
616: INTAKE FAN CHECK	Sensors S/B Sensor cannot detect current in the card cage fan circuit.	<ol style="list-style-type: none"> 1. Cycle power. If the message appears, press CANCEL. If the message does not clear, go to step 3. 2. Power off the printer. Remove the paper path (cabinet model) or electronics barrier panel (pedestal model). Disconnect P109 from the controller. Test connector P109 and the associated cabling for shorts and opens. (Refer to the Main Wire Harness Test Tables in Appendix A.) Replace components that fail test. 3. Make sure corrector P109 is properly plugged into J109 on the controller and that J306 on the fan is properly plugged into P306 on the cable harness. 4. Inspect for obstructions of airways and vents. Remove obstructions. 5. Power on the printer. If the message appears, replace the fan. 6. 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 hammerbank or in the hammerbank power cable are shorted to ground.	<ol style="list-style-type: none"> 1. Cycle power. If the message appears, press CANCEL. If message does not clear, replace the hammerbank logic cable and the hammerbank power cable. 2. Power on the printer. If the message appears, replace the shuttle frame assembly. 3. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board.

Table 6. P8000 H-Series Error Messages List

Displayed Message	Explanation	Solution
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.	<div><div>1.</div><div>Cycle power. If the message appears, replace the controller board. Record the message and return it with the defective board.</div></div> <div><div>2.</div><div>Power on the printer. If the message appears, replace the paper feed motor.</div></div>
620:POWER VOLT CHECK*	Power Supply Voltage. The power supply has failed.	Replace power supply board.
622:SHUTTLE DRIVER CIRCUIT*	The shuttle driver circuit on the controller board is drawing too much current.	<div><div>1.</div><div>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.</div></div> <div><div>2.</div><div>Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board.</div></div> <div><div>3.</div><div>Power on the printer. If the message appears, replace the shuttle frame assembly.</div></div>
622 PLAT DRVR CIR	Platen driver circuit malfunction.	Contact customer support (page 485).

Table 6. P8000 H-Series Error Messages List

Displayed Message	Explanation	Solution
623:STACKER FAULT	<p>Two situations can trigger this message:</p> <ol style="list-style-type: none"> 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. 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. 	<ol style="list-style-type: none"> 1. Open the cabinet rear door and check for obstructions preventing elevator movement. Remove any obstructions. 2. Power on the printer. Operate the power stacker and check that: <ol style="list-style-type: none"> 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. 3. Adjust the stacker rails if they are not vertical and parallel. 4. Check the stacker limit switches. (See page 141.) If the limit switches are OK, go to the next step. 5. Disable the power stacker unit under the Printer Control menu. (Refer to the <i>User's Manual</i>.) If the message occurs, replace the controller board and download new function code. 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 85, page 395). 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 6. P8000 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.	<ol style="list-style-type: none">1. Cycle power. If the message appears, press CANCEL. If the message does not clear, replace the hammerbank logic cable and the hammerbank power cable assemblies.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.
701:ACCESS NULL POINTER*	Access Null Pointer: The processor tried to access a pointer that contains nothing (null).	<ol style="list-style-type: none">1. Cycle power. Run the print job again. If the message appears, download the emulation software again (page 194).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.
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.	<ol style="list-style-type: none">1. Cycle power. Run the print job. If the message appears, download the emulation software again (page 194).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.3. 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.

Table 6. P8000 H-Series Error Messages List

Displayed Message	Explanation	Solution
703:ILLEGAL EXTERNAL BUS ACC*	Illegal External Bus Access. Firmware error on the controller board.	<ol style="list-style-type: none"> 1. Cycle power. Run the print job again. If the message appears, download the emulation software again (page 194). 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.	<ol style="list-style-type: none"> 1. Cycle power. Run the print job again. If the message appears, download the emulation software again (page 194). 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.	<ol style="list-style-type: none"> 1. Cycle power. Run the print job again. If the message appears, download the emulation software again (page 194). 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.
706:PAP BAD TABLE*	Paper Bad Table. The paper feed process on the controller board has a corrupted table.	<ol style="list-style-type: none"> 1. Cycle power. Run the print job again. If the message appears, download the emulation software again. 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 6. P8000 H-Series Error Messages List

Displayed Message	Explanation	Solution
708:PAPER FIFO OVERFLOW*	Paper First In First Out Overflow. Firmware error on the controller board.	<ol style="list-style-type: none">1. Cycle power. Run the print job again. If the message appears, download the emulation software again.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.
709:PAPER FIFO UNDERFLOW*	Paper First In First Out Underflow. Firmware error on the controller board.	<ol style="list-style-type: none">1. Cycle power. Run the print job again. If the message appears, download the emulation software again.2. Run the print job again. If the message appears, power off the printer. Remove the paper path (cabinet model) or electronics barrier panel (pedestal model). Make sure connectors P106 and P107 are fully seated on the controller board. Make sure the MPU cable, the hammerbank logic cable, and the hammerbank power cable are undamaged and have good connections. Replace as necessary. (Refer to Appendix A.)3. Check hammer phasing. Try using a lower phasing value; sometimes this message indicates too high a hammer phase value.4. Power on the printer. Run the print job again. If the message appears, replace the shuttle frame assembly.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.

Table 6. P8000 H-Series Error Messages List

Displayed Message	Explanation	Solution
710:PAP ILLGL ST*	Paper Illegal State. Firmware error on the controller board.	<ol style="list-style-type: none"> 1. Cycle power. Run the print job again. If the message appears, download the emulation software again. 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.	<ol style="list-style-type: none"> 1. Cycle power. Run the print job again. If the message appears, download the emulation software again. 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.	<ol style="list-style-type: none"> 1. Cycle power. Run the print job again. If the message appears, download the emulation software again. 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.
717:PLAT INV CMD*	Platen Invalid Command. Firmware error on the controller board.	<ol style="list-style-type: none"> 1. Cycle power. Run the print job again. If the message appears, download the emulation software again. 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 6. P8000 H-Series Error Messages List

Displayed Message	Explanation	Solution
718:PLAT INV PARM*	Platen Invalid Parameter. Firmware error on the controller board.	<div><div>1.</div><div>Cycle power. Run the print job again. If the message appears, download the emulation software again.</div><div>2.</div><div>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.</div></div>
719:PLAT INV STATE*	Platen Invalid State. Firmware error on the controller board.	<div><div>1.</div><div>Cycle power. Run the print job again. If the message appears, download the emulation software again.</div><div>2.</div><div>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.</div></div>
720:PROTECTED INSTRUCTION*	Protected Instruction. Firmware error on the controller board.	<div><div>1.</div><div>Cycle power. Run the print job again. If the message appears, download the emulation software again.</div><div>2.</div><div>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.</div></div>
721:RIB INVLD CMD* See User Manual	Ribbon Invalid Command. Firmware error on the controller board.	<div><div>1.</div><div>Cycle power. Run the print job again. If the message appears, download the emulation software again.</div><div>2.</div><div>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.</div></div>

Table 6. P8000 H-Series Error Messages List

Displayed Message	Explanation	Solution
723:SHUTL INV CMD*	Shuttle Invalid Command. Firmware error on the controller board.	<ol style="list-style-type: none"> 1. Cycle power. Run the print job again. If the message appears, download the emulation software again. 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.	<ol style="list-style-type: none"> 1. Cycle power. Run the print job again. If the message appears, download the emulation software again. 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 286.)
727:SOFTWARE ERROR*	Application software tried to perform an illegal printer function or damaged logic circuits were detected on the controller board.	<ol style="list-style-type: none"> 1. Cycle power. If the message appears, power off the printer. 2. Disconnect the input data line from the host computer. Power on the printer. If the message appears, download the emulation software again (page 194). 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 6. P8000 H-Series Error Messages List

Displayed Message	Explanation	Solution
730:TCB CORRUPTED*	Task Control Block Corrupted. Firmware error on the controller board.	<div>1. Cycle power. Run the print job again. If the message appears, download the emulation software again.</div> <div>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.</div>
733 DP FIFO Busy*	There is a timing problem in the Engine Controller firmware.	<div>1. Cycle Power. Run the print job again. If the message appears, download the emulation software again (page 194).</div> <div>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.</div>
B11 ERROR: RAM TEST FAILED*	RAM failed the boot initialization test.	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 printer firmware again.
B13 ERROR: NOT COMPATIBLE*	The printer is not compatible with the downloaded program.	Load the correct emulation software option(s) for this printer.
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 202). 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.

Table 6. P8000 H-Series Error Messages List

Displayed Message	Explanation	Solution
B22 ERROR: DECOMPRESS SIZE*	Error can only occur during a program download (data was corrupt).	<ol style="list-style-type: none"> 1. Download again. 2. Check communications cable being used (Parallel, USB, Network). If Parallel cable is used, reseal PCI Parallel opt card.
B23 ERROR: DECOMPRESS CKSUM*	Error can only occur during a program download (data was corrupt).	<ol style="list-style-type: none"> 1. Download again. 2. Check communications cable being used (Parallel, USB, Network). If Parallel cable is used, reseal PCI Parallel opt card.
B30 STATUS: INITIALIZING...	Status message: the printer is running its initialization routines after startup and successful memory tests.	No action required.
B50 STATUS: PANEL CODE BAD	Saved version of Panel Code is corrupt.	Reload released Firmware.
B51 STATUS: XX% LOADING...	Status message: printer boot-up routines are loading printer system software into flash memory and RAM.	No action required.
BAD NVM CALL 1 BAD NVM CALL 2 BAD NVM CALL 3 BAD NVM CALL 4 BAD NVM CALL A	Printer firmware code error with the Novram module that stores configurations and statistics.	<ol style="list-style-type: none"> 1. Cycle power. Run the print job again. If the message appears, load the latest emulation software. 2. Cycle power. Run the print job again. If the message appears again, record the exact display message and follow the instructions on page 50, "Diagnostics for EXX, BAD NVM, or ILL NVM Errors" and contact customer support (page 485).
Bxx ERROR: No Downloader Found	No Downloader was found while downloading a file.	Reload released Firmware.
PROCESSOR HALTED	Fatal error in printer.	Contact customer support (page 485).
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 6. P8000 H-Series Error Messages List

Displayed Message	Explanation	Solution
D50 STATUS UPGRADING PANEL	Status message: The printer is upgrading the panel, 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.
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.

Table 6. P8000 H-Series Error Messages List

Displayed Message	Explanation	Solution
E00 EXE @ ADDR0 E01A TYPE 0x40 E01B TYPE 0x60 E02 MACHINE CHK E03A DSI HASH L E03B DSI HASH S E03C DSI BAT PL E03D DSI BAT PS E03E DSI CXIWX E03F DSI CXOWX E03G DSI ECXIWX E03H DSI ECXOWX E04A ISI NO TRA E04B ISI DIRECT E04C ISI PROTEC E06 NOT ALIGNED E07 ILLEGAL INS E08 FLOATINGPNT E12 SYSTEM CALL E13 TRACE INT E16 ITRANS MISS E17 DLOAD MISS E18 DSTORE MISS E19 BREAKPOINT E20 SYS MANAGE E30 DEBUGGER E31A EVENT 0 BP E31B EVENT 1 BP E31C EVENT 2 BP E31D EVENT 3 BP E31E EVENT 4 BP E31F EVENT 5 BP E31G EVENT 6 BP E31H EVENT 7 BP E32A CND 0 BP E32B CND 1 BP E32C CND 2 BP E32D CND 3 BP E32E CND 4 BP E32F CND 5 BP E32G CND 6 BP E32H CND 7 BP E33 WRITE BP E34 TRACE CMPLT E99 UNKNOWN INT See User Manual	An illegal or unsupported instruction was attempted in the application program.	<div>1. Cycle Power. Run the print job again. If the message appears, load the latest emulation software.</div> <div>2. Cycle power. Run the print job again. If the message appears again, record the exact display message, follow the instructions on page 50, "Diagnostics for EXX, BAD NVM, or ILL NVM Errors", and contact customer support (page 485).</div>

Table 6. P8000 H-Series Error Messages List

Displayed Message	Explanation	Solution
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 controller board, and contact customer support (page 485).
ERROR NOR FLASHED WAS NOT CLEARED	Problem programming Boot Code.	Contact customer support (page 485).
ERROR: DC PROGRAM NOT VALID	The printer cannot find the data controller program or the validation checksum is corrupt.	<ol style="list-style-type: none">1. Download the program again (page 194).2. If the message appears, replace 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. The asterisk (*) rotates while this message displays.	Wait. When the asterisk (*) stops rotating, a different fault message appears.
ERROR: LOCKED SN=nnnnnnnnnnnnnnnn nnnnnnnn	Where nnnnnnnnnnnnnnnnn 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.	<ol style="list-style-type: none">1. Remove the SPX from the Debug Port.2. Cycle printer power.
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: PROGRAM NOT COMPATIBLE	The printer is not compatible with the downloaded program.	Use the correct emulation software option(s) for this model printer.

Table 6. P8000 H-Series Error Messages List

Displayed Message	Explanation	Solution
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.	<ol style="list-style-type: none"> 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. 2. Power on the printer. If the message appears, 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.	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.	<ol style="list-style-type: none"> 1. Remove the SPX from the Debug Port. 2. Cycle printer power.
ERROR: WRONG PRINTER TYPE	The SPX inserted in the debug port is not intended for this printer model.	<ol style="list-style-type: none"> 1. Remove the SPX from the Debug Port. 2. Cycle printer power.
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.
EXCEPTION ERROR	An EXCEPTION INTERRUPT has occurred.	Contact customer support (page 485).
FLASH: CHECK RETURN	Printer encountered an error while trying to program Flash memory.	Contact customer support (page 485).

Table 6. P8000 H-Series Error Messages List

Displayed Message	Explanation	Solution
FLASH: WAS NOT CLEARED	Printer encountered an error while trying to program Flash memory.	Contact customer support (page 485).
FLASH: WRITE ERROR # 2	Printer encountered an error while trying to program Flash memory.	Contact customer support (page 485).
GENERATING XX% NAND FLASH TABLE	NAND FLASH is being read and system tables are being initialized.	Contact customer support (page 485).
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.	<ol style="list-style-type: none"> 1. Cycle power. If the message appears, power down and reseal the PCI card. 2. Power on the printer. If the message appears, replace the PCI card. 3. 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 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.	<ol style="list-style-type: none"> 1. Cycle power. If the message appears, power down and reseal the PCI card. 2. Power on the printer. If the message appears, replace the PCI card. 3. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board.

Table 6. P8000 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.	<ol style="list-style-type: none"> 1. Advise the user to move the printer to cooler, cleaner location. 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. 3. Power off the printer. Remove the paper path (cabinet model) or electronics barrier panel (pedestal model). Check all fan cable connections. 4. Power on the printer. Verify that all fans operate. Replace any fan that does not operate. 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. 6. Install the paper path (cabinet model) or electronics barrier panel (pedestal model). Load paper. Run the "All E's" print test for 5 to 10 minutes. If the message appears, replace the shuttle frame assembly. 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. 8. Set the coil temperature (page 213).
HAM. COIL OPEN*	Hammer Coil Open. Electrical malfunction of one or more hammer coils.	<ol style="list-style-type: none"> 1. Cycle power. If the message appears, replace the shuttle frame assembly. 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 6. P8000 H-Series Error Messages List

Displayed Message	Explanation	Solution
ILL NVM VALUE 5 ILL NVM VALUE 6 ILL NVM VALUE 7	Illegal value was stored into the Novram module.	<div><div>1.</div><div>Cycle power. Run the print job again. If the message appears, load the latest emulation software.</div><div>2.</div><div>Cycle power. Run the print job again. If the message appears again, record the exact display message, follow the instructions on page 50, "Diagnostics for EXX, BAD NVM, or ILL NVM Errors", and cusomter support (page 485).</div></div>
INITIALIZING...	This message indicates the printer is beginning its initialization process.	No action is required.
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.	<div><div>1.</div><div>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.</div><div>2.</div><div>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.</div></div>
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.

Table 6. P8000 H-Series Error Messages List

Displayed Message	Explanation	Solution
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: <ol style="list-style-type: none"> 1. The SPX copies the printer's security key serial number into its flash memory. 2. The printer reprograms its security key with the information stored in the SPX. 3. The printer verifies that the key was programmed as intended. 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.	<ol style="list-style-type: none"> 1. If the message appears at power-up, replace the controller board. 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.)
ONLINE	Printer state message: printer is online and in communication with host.	No action required.
PANEL BAD CHECKSUM	Panel Code has a bad Checksum.	Reload released firmware.
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 6. P8000 H-Series Error Messages List

Displayed Message	Explanation	Solution
REMOVE USED SPX THEN PRESS ENTER	Status message: An SPX is depleted because it has successfully reprogrammed the security key on the controller board.	<ol style="list-style-type: none">1. Remove the SPX from the Debug Port.2. Press the ENTER key. The printer will reboot itself.
RESTORING BOOT CODE	Normal download initialization message.	No action required.
SD CARD ERROR Remove SD Card	The printer has been powered up with a card in the SD slot, but the card is not functioning properly. The card could be a compact flash card or a nonsupported card.	Power down, reseal card, and power up again. If error persists, power down, remove card, and try another card.
SDSC CARD NOT SUPPORTED Remove SD Card	The printer has been powered up with an SDSC card, and SDSC cards (< 4 GB) are not supported.	Power down, remove SD card, and insert an SDHC card in the printer.
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.	<ol style="list-style-type: none">1. Remove the paper path (cabinet model) or electronics barrier panel (pedestal model). Check that the security key is correctly installed.2. Install correct key for the customer's emulations.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.	<ol style="list-style-type: none">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.2. Power on the printer. If the message appears, replace the controller board. Record the message and return it with the defective board.

Table 6. P8000 H-Series Error Messages List

Displayed Message	Explanation	Solution
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 100.	See "415:SHUTTLE JAM" on page 100.
SPX FOUND, ERROR: KEY NOT DETECTED	The controller board does not have a security key.	<ol style="list-style-type: none"> 1. Remove the SPX from the Debug Port. 2. Power down the printer. 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.	<ol style="list-style-type: none"> 1. Remove the SPX from the Debug Port. 2. Cycle printer power.
SYS R/T ERROR	Software issue.	Contact your system administrator.

Table 6. P8000 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.	<ol style="list-style-type: none"> 1. Power on the printer. 2. If the printer is online, press the ONLINE key to place the printer offline. 3. On the control panel, press the $\Delta + \nabla$ keys to unlock the ENTER key. 4. Press the ENTER key to enter the menu. 5. Press \triangleright until you reach the DIAGNOSTICS menu, then press ENTER. 6. Press Δ until you reach the "Printer Mgmt" option, then press ENTER. The PNE Port option displays. 7. Press \triangleright until you reach "Ethernet", then press ENTER. 8. Press ONLINE to return the printer to the online state. 9. The Printer Manager should now be able to access the printer. For other communication errors, print out the E-Net Test Page (page 160) and verify the IP address, subnet mask, gateway address, and TCP port settings.

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 132. 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 47.)
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 hammerbank: 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 7 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 7, troubleshoot using the Half-Split Method described on page 131.

Table 7. General Symptom List

Symptom	Solution
Communications Failures	See page 153.
Ribbon	
Ribbon folding or feed problems	<div><div>1.</div><div>2.</div><div>3.</div><div>4.</div><div>5.</div><div>6.</div></div> <div><div>Make sure the ribbon cartridge is correctly installed and fully seated.</div><div>Check that the ribbon runs between the ribbon mask and hammerbank cover. Check that the hammerbank cover is installed correctly.</div><div>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.</div><div>Inspect the paper print path for paper chaff, ink residue, and debris. Clean the shuttle frame assembly.</div><div>Power on the printer. Run a print test and observe ribbon movement.</div><div>Check and clean the platen gap if necessary.</div></div>

Table 7. General Symptom List

Symptom	Solution
Jams	
CLEAR PAPER JAM message instead of LOAD PAPER when printer is out of paper	<ol style="list-style-type: none">1. Power off the printer. Remove the paper path (cabinet model) or electronics barrier panel (pedestal model). Remove the barrier shield (cabinet model) or the barrier shield and electronics barrier panel (pedestal model). Check that the paper detector switch assembly is securely mounted in its bracket. Clean the paper detector switch if necessary.2. Ensure that connector P107 is fully seated in connector J107 on the controller board.3. Ensure that connectors J10/P10 on the paper detector are fully seated and latched.4. Load paper. Power on the printer. Replace the paper detector switch assembly if either message appears.5. Inspect the paper ironer. If the paper ironer has slipped up into the print line, reposition the paper ironer.6. 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	<ol style="list-style-type: none">1. Remove the paper path (cabinet model) or electronics barrier panel (pedestal model). Make sure connector P107 and P103 are fully seated in connector J107 and J103 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 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 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 7. General Symptom List

Symptom	Solution
CLEAR PAPER JAM message will not clear but paper moves	<ol style="list-style-type: none">1. Power off the printer. Remove the paper path. Check that connector P107 is fully seated in connector J107 on the controller board.2. Remove the barrier shield (cabinet model) or the barrier shield and electronics barrier panel (pedestal model). Check that the paper detector switch assembly is securely mounted in its bracket. Clean the paper detector switch if necessary.3. Ensure connector pairs P10/J10 are fully seated and latched.4. 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.5. Check that the motion detector wheel rotates. Replace the paper detector switch assembly if the wheel does not rotate.6. Load paper. Power on the printer. Replace the paper detector switch assembly if the message appears.7. 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 7. General Symptom List

Symptom	Solution
Control Panel	
Initializing...on control panel	<ol style="list-style-type: none"> 1. With the printer powered on, simultaneously press <ONLINE> <TOF><DOWN>. If the display changes to "PANEL CHECK COMPLETE" the panel is good. 2. Power off the printer. Remove the paper path. 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, go to the next step. 3. Power off the printer. Remove the paper path. Turn on power. If Green LED at location CR3 does not turn on, replace the controller board. Record the message and return it with the defective board. If the printer powers-up, download the software. 4. Power on the printer. If the symptom appears, replace the control panel.
Control panel blank	<ol style="list-style-type: none"> 1. Power off the printer. Remove the paper path. Check all cable connections into the controller board; make sure the control panel cable is seated in connector J110 on the controller board and the other end of the panel cable is connected to the panel. 2. Power on the printer. Inspect the control panel display and cooling fans. If the control panel is blank and the green LED at CR3 turn on, replace the control panel cable assembly and/or the control panel, as required. 3. Power on the printer. If the control panel is blank and the green LED at CR3 do not turn on, check printer power.
Control panel keys do not work	<ol style="list-style-type: none"> 1. Power on the printer. Simultaneously press <ONLINE><TOF><DOWN>. If the panel displays "PANEL CHECK COMPLETE", replace the control panel cable assembly. 2. Power on the printer. Check the operation of the control panel keys. Replace the control panel assembly if the keys do not work. 3. Power on the printer. Check the operation of the control panel keys. Replace the controller board if the keys do not work.

Table 7. General Symptom List

Symptom	Solution
Control panel display shows garbled, broken characters	<div><div>1.</div><div>Remove the paper path (cabinet model) or electronics barrier panel (pedestal model). Check cable connections into the controller board. Make sure the control panel cable is seated in connector J110 on the controller board.</div></div> <div><div>2.</div><div>Power on the printer. Inspect the control panel display. If the control panel shows broken characters, replace the control panel.</div></div>

Table 7. General Symptom List

Symptom	Solution
Power Failures	
No power, and control panel blank, and card cage fan not running	<ol style="list-style-type: none"> 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 (cabinet model) or electronics barrier panel (pedestal model). Verify that the AC-In power cable and the AC power input cables are connected to the on/off power switch. (See Figure 60, page 296.) 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 P101A and P101B is connected to J101A and J101B on the controller board. Reseat the connector. 6. Check all cable connections on the controller board. 7. Disconnect AC-in power supply cable connector P1. Set the power switch to 1 (on). Measure AC voltage at pins 1 and 2 of connector P1. If no voltage, replace the power switch. If there is voltage, replace the power supply board.
Printer does not initialize	<p>NOTE: Power-on initialization is explained on page 176.</p> <ol style="list-style-type: none"> 1. Power off the printer. Remove the paper path (cabinet model) or electronics barrier panel (pedestal model). Reseat all cable connectors on the controller board, especially connectors P106, P107, and P109. 2. Check the shuttle for electrical shorts (page 217). 3. Power on the printer. If the fans run but the printer does not initialize, replace the controller board. 4. Power on the printer. If the problem persists, replace the shuttle frame assembly. 5. Power on the printer. If the problem persists, replace the control panel and cable.

Table 7. General Symptom List

Symptom	Solution
Power Stacker	
Printer does not detect presence of power stacker	<ol style="list-style-type: none"> 1. Check that the power stacker is enabled under the Printer Control menu. (Refer to the <i>User's Manual</i>.) 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 ONLINE key and check that the ONLINE indicator lights. If the ONLINE indicator comes on, the stacker is detected by the printer. If the ONLINE indicator does not come on, go to step 4. 3. <ol style="list-style-type: none"> a) Power off the printer. b) Unfasten the cable clamp holding the stacker control panel cables. c) Disconnect the stacker power cable from the back of the stacker control panel. (See Figure 82, page 392.) d) Locate pin 1 of connector P106. (See the cable assembly drawing in Appendix A.) e) Power on the printer. 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 85, page 395.) Check the continuity of the stacker power cable between P6 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 82, page 392). 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 ONLINE indicator lights on the stacker control panel. If the ONLINE indicator does not light, replace the stacker control panel. 6. Power on the printer. Check that the ONLINE indicator lights on the stacker control panel. If the ONLINE indicator does not light, replace the controller board.

Table 7. General Symptom List

Symptom	Solution
Stacker “chatters” at upper or lower limit	<div><div>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.</div><div>2. Verify that the stacker rails are vertical and parallel. Adjust the stacker rails if necessary: they must be vertical and parallel.</div><div>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.</div><div>4. Power on the printer. Operate the power stacker. (Refer to the <i>User’s Manual</i>.) While the stacker is operating, check that:<div><div>a) all motors are operating,</div><div>b) the paddles are rotating,</div><div>c) the elevator moves smoothly and without obstruction,</div><div>d) the timing belts are undamaged and the belt pulleys are not slipping,</div><div>e) the extension springs are attached and undamaged (not bent or stretched),</div><div>f) the drive rollers are not damaged,</div><div>g) the constant force springs are tightly mounted and undamaged.</div></div>Tighten pulley setscrews and/or replace damaged components as necessary.</div></div>

Table 7. General Symptom List

Symptom	Solution
Stacker does not stack properly	<ol style="list-style-type: none">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 <i>User's Manual</i>.) While the stacker is operating, check that:<ol style="list-style-type: none">a) all motors are operatingb) the paddles are rotatingc) the elevator moves smoothly and without obstructiond) the timing belts are undamaged and the belt pulleys are not slippinge) the extension springs are attached and undamaged (not bent or stretched)f) the drive rollers are not damagedg) the constant force springs are tightly mounted and undamagedTighten pulley setscrews and/or replace damaged components as necessary.4. Check the stacker limit switches. (See page 141.) If the limit switches are OK, go to the next step.5. Check the stacker motors. (See page 142.) 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 82, page 392). 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	<ol style="list-style-type: none">1. Power off the printer. Inspect all stacker LEDs for dust, chaff, or dirt. (See Figure 108 through Figure 110, page 419 through page 423.) 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 108 through Figure 110, page 419 through page 423.)

Table 7. General Symptom List

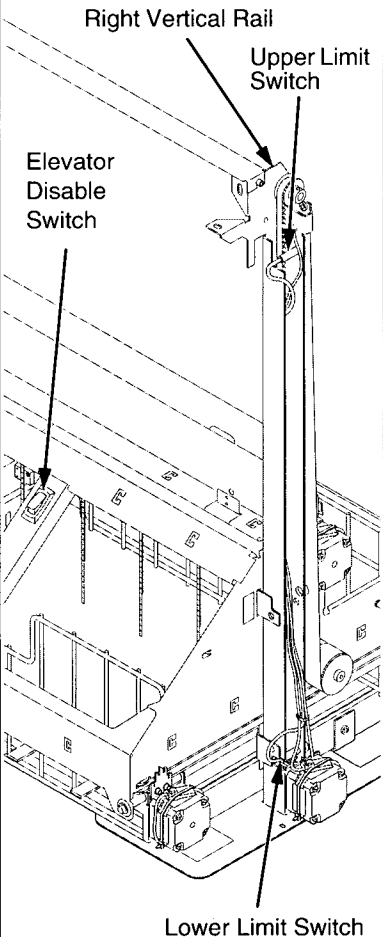
Symptom	Solution
<div>Stacker limit switch check</div> <div></div>	<p>NOTE: This procedure tests the upper and lower limit switches on the right vertical rail. These magnetic switches are normally closed. You can quickly check their functionality with a small, powerful magnet.</p> <p>You will usually be referred to this procedure from other troubleshooting procedures. When you have completed this check procedure, return to the procedure that sent you here.</p> <ol style="list-style-type: none">1. Power on the printer. Open the rear cabinet door. Unload the power stacker.2. Press the Elevator Disable Switch and manually lift the elevator all the way to the top of its travel.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.<ol style="list-style-type: none">a. With the magnet secured next to the lower limit switch press the ELEVATOR DOWN key on the stacker control panel.b. If the elevator does NOT move, the lower limit switch is OK. Remove the magnet and go to step 4.c. If the elevator moves, release the ELEVATOR DOWN key, power down and unplug the printer, and replace the lower limit switch.4. Press the Elevator Disable Switch and manually move the elevator all the way down to the bottom of its travel.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.<ol style="list-style-type: none">a. With the magnet secured next to the upper limit switch press the ELEVATOR UP key on the stacker control panel.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.c. If the elevator moves, release the ELEVATOR UP key, power down and unplug the printer, and replace the upper limit switch.

Table 7. General Symptom List

Symptom	Solution
Stacker motor check	<p>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.</p> <ol style="list-style-type: none">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 connector J3 on the back of the stacker control panel. (See Figure 82, page 392.)5. Disconnect stacker frame cable connector P102 from connector J4 on the rear of the stacker control panel. (See Figure 82, page 392.)6. Locate pin 1 of connector P102 and connector P107. (See the cable assembly drawings in Appendix A, page 356 and page 359.)7. Check both cables for pin damage, continuity, and shorts.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 345.)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 138.

Table 7. General Symptom List

Symptom	Solution
Print Quality	
Characters or dots are missing, smeared, too light, or too dark.	<ol style="list-style-type: none">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 hammerbank cover assembly is correctly installed on its mounting pegs. Check the shuttle frame assembly for broken hammersprings, hammer tips, or contaminations. Replace any damaged hammerspring assemblies. Replace the hammerbank cover assembly if it is deformed or damaged.6. Check the platen gap. Adjust the platen gap if necessary.7. Remove the paper path (cabinet model) or electronics barrier panel (pedestal model). 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 hammerbank logic cable and the hammerbank power cable.9. Power on the printer. If the problem still occurs, replace the shuttle frame assembly.10. Check the shuttle for electrical shorts (page 217).11. Power on the printer. If the problem still occurs, replace the controller board.
Characters are compressed on first line of a form	Adjust the tension of the tractor belts (page 216).

Table 7. General Symptom List

Symptom	Solution
Horizontal misalignment of characters (Dots or characters move left or right from dot row to dot row or line to line)	<ol style="list-style-type: none"> 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. 2. Check the hammer phasing. Adjust hammer phasing if necessary. 3. Check the dynamic paper tension. 4. Inspect the shuttle frame assembly area for ink residue, paper chaff, or debris. Clean the shuttle frame assembly. 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). 6. Power on the printer. Run a print test. If the symptom is not gone, replace the MPU. 7. Power on the printer. Run a print test. If the symptom is not gone, replace the controller board. 8. Power on the printer. Run a print test. If the symptom is not gone, replace the shuttle frame assembly.
Randomly misplaced dots	<ol style="list-style-type: none"> 1. Power off the printer. Check the platen gap. Adjust the platen gap if necessary. 2. Remove the paper path (cabinet model) or electronics barrier panel (pedestal model). 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 60, page 296.) 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 hammerbank logic cable. 5. Power on the printer. Run a print test. If the problem occurs, replace the controller board. 6. Power on the printer. Run a print test. If the problem occurs, replace the shuttle frame assembly.

Table 7. General Symptom List

Symptom	Solution
Vertical misalignment of characters: 1. Dots or characters move up or down from dot row to dot row or line to line 2. Incorrect spacing from dot row to dot row or line to line 3. Characters randomly compressed and/or enlarged	<ol style="list-style-type: none">1. Load paper. Press 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.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 platen gap. Adjust the platen gap.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.5. Check the dynamic paper tension.6. Remove the paper path (cabinet model) or electronics barrier panel (pedestal model). Make sure connector P107/PAPR M is fully seated in connector J107 on the controller board.7. Load paper. Power on the printer. Run a print test. If the problem occurs, replace the paper feed motor.8. Run a print test. If the problem occurs, replace the controller board.9. Run a print test. If the problem occurs, replace the power supply board.

Table 7. General Symptom List

Symptom	Solution
Printer Operation	
Downloads consistently fail	<p>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.</p> <ol style="list-style-type: none">1. Power off the printer. Remove the paper path (cabinet model) or electronics barrier panel (pedestal model). 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. Power on the printer. Download the emulation (page 194). If the download fails, replace controller.

Table 7. General Symptom List

Symptom	Solution
Paper feeds poorly	<ol style="list-style-type: none"> 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. 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. 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. 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. 5. Check the platen gap. Adjust the platen gap. 6. Check the dynamic paper tension. 7. Remove the shuttle frame assembly and check the following: <ol style="list-style-type: none"> a. Inspect the hammerbank 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 hammerbank 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 barrier shield (cabinet model) or the barrier shield and electroincs barrier panel (pedestal model) is 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. 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. 9. Check the dynamic paper tension. 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 7. General Symptom List

Symptom	Solution
Paper feeds poorly (continued)	<div>11. Load paper. Power on the printer. Press 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.</div> <div>12. Power on the printer. Press 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.</div>
Power on "hang" condition	<div>1. Remove the paper path (cabinet model) or electronics barrier panel (pedestal model). Reseat all cable connections to the controller board and the power supply board.</div> <div>2. Power on the printer. If the printer "hangs," replace the controller board.</div> <div>3. Power on the printer. If the printer "hangs," replace the power supply board.</div>
Printer does not print from the host	<div>1. Check the host data cable connection at the rear of the printer. Attach the data cable to the printer interface.</div> <div>2. Make a configuration printout. Verify that the printer matches host interface settings. Set printer interface parameters to match those of the host.</div> <div>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.</div> <div>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.</div> <div>5. Remove the paper path (cabinet model) or electronics barrier panel (pedestal model). Check all cable connections on the controller board. Reseat all cable connectors on the controller board.</div> <div>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.</div>

Table 7. General Symptom List

Symptom	Solution
Printer does not print self tests	<ol style="list-style-type: none">1. Power off the printer. Remove the paper path (cabinet model) or electronics barrier panel (pedestal model). 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.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.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	<ol style="list-style-type: none">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.2. Check the condition and tension of the platen open belt. Adjust the platen open belt. Replace the belt if it is damaged.3. Check the platen gap. Adjust the platen gap.4. Power off the printer. Remove the barrier shield (cabinet model) or the barrier shield and eletronics barrier panel (pedestal model). 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.5. Power on the printer. Press 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 7. General Symptom List

Symptom	Solution
TOF is lost repeatedly	<div><div>1.</div><div>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.</div></div> <div><div>2.</div><div>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.</div></div> <div><div>3.</div><div>Check the condition and tension of the paper feed timing belt. Adjust the paper feed timing belt. Replace the belt if it is damaged.</div></div> <div><div>4.</div><div>Check the dynamic paper tension.</div></div> <div><div>5.</div><div>Remove the paper path (cabinet model) or electronics barrier panel (pedestal model). 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.</div></div> <div><div>6.</div><div>Power on the printer. Load paper and set TOF. Press ADVANCE and VIEW several times and check that paper returns to TOF. Replace the paper feed motor if paper does not return to TOF.</div></div> <div><div>7.</div><div>Power on the printer. Press ADVANCE and VIEW several times and check that paper returns to TOF. Replace the controller board if paper does not return to TOF.</div></div>

Table 7. General Symptom List

Symptom	Solution
Shuttle	
Shuttle does not move	<ol style="list-style-type: none">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 (cabinet model) or electronics barrier panel (pedestal model). 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 hammerbank cover assembly is correctly installed on its mounting pegs. Reinstall the hammerbank cover assembly. Replace a damaged or deformed hammerbank 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 7. General Symptom List

Symptom	Solution
Shuttle is noisy	<div><div>1.</div><div>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.</div></div> <div><div>2.</div><div>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).</div></div> <div><div>3.</div><div>Inspect the shuttle area for loose hardware. Tighten loose hardware.</div></div> <div><div>4.</div><div>Check that the hammerbank 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 hammerbank cover. Check for debris trapped between the ribbon mask, hammerbank cover, and hammerbank. Clean the shuttle frame assembly and hammerbank cover assembly if you find debris. Replace the hammerbank cover assembly if you find any damage to the ribbon mask or hammerbank cover.</div></div> <div><div>5.</div><div>Power on the printer. Run a shuttle test. Replace the shuttle frame assembly if it is noisy or rattles.</div></div>

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 8. Communications Problems

Problem	Interface	Possible Causes & Solutions
Fails to print from host -or- Prints incorrect characters -or- Prints extra characters -or- Drops characters	Parallel	<ul style="list-style-type: none"> Interface cable defective Host/Network configuration Printer logic Terminating Resistors at host PCI card not seated correctly pci card defective
	Serial	<ul style="list-style-type: none"> Host/Printer interface cable pinouts incompatible Host/Printer/Network configuration Set DTR and RTS both True Interface cable defective Printer logic
	Ethernet	<ul style="list-style-type: none"> Interface cable defective Host/Printer/Network configuration Printer logic

Table 8. Communications Problems

Ethernet responds to “ping” and “telnet” utilities, and can print from “ftp”, but card cannot be accessed by a browser.	Ethernet	<div><div><div>1. Open a telnet session using the IP address of the ethernet.</div><div>2. Enter these commands: config http on save reset</div><div>3. Wait up to two minutes for the printer to complete a reset cycle.</div><div>4. Close the telnet session.</div></div><div>You should be able to access the ethernet now through a browser by using the IP address as a URL, as for example http://xxx.xxx.xxx.xxx</div><div>NOTE: If the ethernet cannot be accessed by the Printer Manager, do the steps listed under “TCP Port Busy” on page 90.</div></div>
Ethernet responds to “ping,” “telnet,” and “ftp” utilities, but will not communicate from the host computer.	Ethernet	<div><div><div>1. Under Diagnostics Printer Test, run the Ethernet test.</div><div>2. If the Ethernet test prints correctly, the host computer is not configured properly.</div></div></div>

Diagnostic Printer Tests


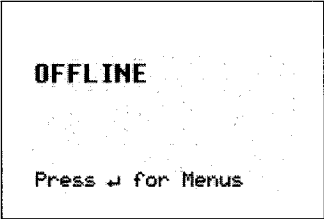

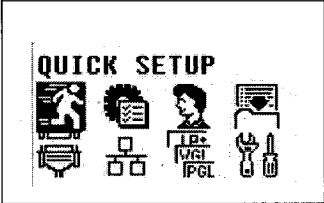
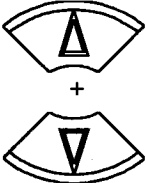
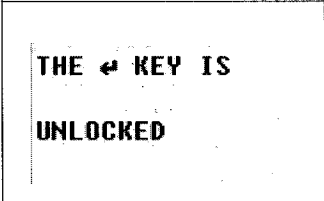
A set of printer tests is included in the DIAGNOSTICS configuration menu for use as diagnostic tools. Use these tests to check the print quality and basic operation of the printer. You will also use some of the tests in some adjustment procedures. The diagnostic tests are summarized below:










- **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 hammerbank 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.
- **Ethernet Test** — Prints the ethernet statistics stored on the ethernet interface (if enabled). See page 160.

- **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 hammersprings.
- **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.
- **Weld Patch Log**. Prints log times for ribbon starts, welds, and ribbon stops.
- **Novram Err Log**. Prints detailed information about the most recent Novram related failure that has occurred. It is useful when the front panel reports “BAD NVM” or “ILL NVM” error types. Contact the Customer Solutions Center and provide this information if such an error occurs.

Selecting and Running Diagnostic Printer Tests










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


Step	Press	LCD Result	Notes
1.			The printer must be offline to run a print test.
2.			
3.			
4.			Unlocks ENTER key and control panel.
5.			
6.			

Step	Press	LCD Result	Notes
7.	 UNTIL	QUICK SETUP 	
		DIAGNOSTICS 	
8.	ENTER 	DIAGNOSTICS Submenu End: Cancel to Exit Printer Tests: Shift Recycle* Test Width: Full Width*	
9.		DIAGNOSTICS Printer Tests: Shift Recycle* Test Width: Full Width* Phase Value: 50*	
10.	 OR 	DIAGNOSTICS Printer Tests: Shift Recycle* Test Width: 80 col.* Phase Value: 50*	
11.	ENTER 	DIAGNOSTICS Printer Tests: Shift Recycle* Test Width: 80 col.* Phase Value: 50*	
12.		DIAGNOSTICS Submenu End: Cancel to Exit Printer Tests: Shift Recycle* Test Width: 80 col.*	

Cycle through choices.
X = Full Width or
X = 80 columns.


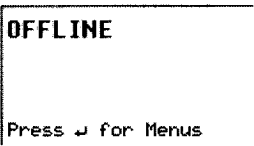

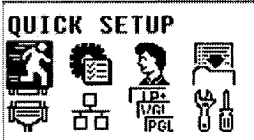


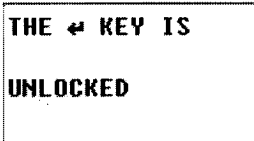

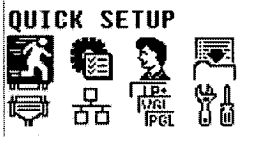

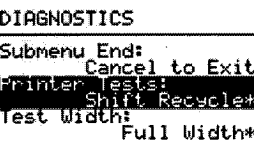
Wait for printer to stop.

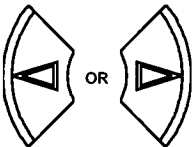






Step	Press	LCD Result	Notes
13.	 OR 	<div>DIAGNOSTICS</div> <div>Submenu End:</div> <div>Cancel to Exit</div> <div>Printer Tests:</div> <div>All E's</div> <div>Test Width: 80 col.*</div>	Cycle through the choices.
14.	ENTER 	<div>DIAGNOSTICS</div> <div>Submenu End:</div> <div>Cancel to Exit</div> <div>Printer Tests:</div> <div>All E's*</div> <div>Test Width: 80 col.*</div>	Starts test.
15.	ENTER 	<div>DIAGNOSTICS</div> <div>Submenu End:</div> <div>Cancel to Exit</div> <div>Printer Tests:</div> <div>All E's*</div> <div>Test Width: 80 col.*</div>	Stops test.
16.	 + 	<div>THE  KEY IS</div> <div>LOCKED</div>	Locks the ENTER key and control panel.
17.	 ONLINE	<div>OFFLINE</div> <div>Press ↵ for Menus</div>	Press ENTER to go back into the menus or press ONLINE again to go ONLINE.
18.	 ONLINE	<div>Menu Changes Detected</div> <div>Save Permanently</div> <div>Save Temporarily</div> <div>Cancel Changes</div> <div>Restore Factory</div> <div>Press ↵ to Select</div>	Configuration changes were detected and you are prompted to save the configuration permanently or temporarily, to cancel changes, or restore the Factory Configuration.

Step	Press	LCD Result	Notes
19a.	ENTER 	Cfg=Cfg 1 = Power-Up Cfg	Saves the Configuration as Config 1 then returns the printer ONLINE.
19b.		ONLINE P8005 ETHERNET/IPDS RIBBON LIFE 72%	Places the printer online after permanently saving the configuration changes as Config 1.
20.	Examine print quality. Characters should be fully formed and of uniform density.		
21.	Set TOF. (Refer to the <i>User's Manual</i> .)		

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 <i>User's Manual</i> .)		
4.			The printer must be offline to run a print test.
5.	ENTER 		
6.	 + 		Unlocks ENTER key and control panel.
7.	 UNTIL		
8.	ENTER 		

Step	Press	LCD Result	Notes
9.		<div>DIAGNOSTICS</div> <div>Submenu End:</div> <div>Cancel to Exit</div> <div>Printer Tests:</div> <div>Ethernet Test</div> <div>Test Width:</div> <div>Full Width*</div>	Starts printing.
10.	ENTER 	<div>DIAGNOSTICS</div> <div>Submenu End:</div> <div>Cancel to Exit</div> <div>Printer Tests:</div> <div>Ethernet Test*</div> <div>Test Width:</div> <div>Full Width*</div>	
11.		PLEASE WAIT	Wait for printing to stop.
12.	 + 	<div>THE ← KEY IS</div> <div>LOCKED</div>	Locks the ENTER key and control panel.
13.	 ONLINE	<div>OFFLINE</div> <div>Press ↓ for Menus</div>	Press ENTER to go back into the menus or press ONLINE again to go ONLINE.
14.	 ONLINE	<div>Menu Changes Detected</div> <div>Save Permanently</div> <div>Save Temporarily</div> <div>Cancel Changes</div> <div>Restore Factory</div> <div>Press ↓ to Select</div>	Configuration changes were detected and you are prompted to save the configuration permanently or temporarily, to cancel changes, or restore the Factory Configuration.
15a.	ENTER 	<div>Cfg=Cfg 1</div> <div>= Power-Up Cfg</div>	Saves the Configuration as Config 1 then returns the printer ONLINE.

Step	Press	LCD Result	Notes
15b.		<div>ONLINE P8005 ETHERNET/IPDS RIBBON LIFE 72%</div>	Places the printer online after permanently saving the configuration changes as Config 1.
16.	Set TOF. (Refer to the <i>User's Manual</i> .)		

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 11 on page 164.

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 repeatedly until the printer enters the menu. (may take 10 or more presses for this to occur). Menu options are shown in Figure 11.

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 164.)
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.

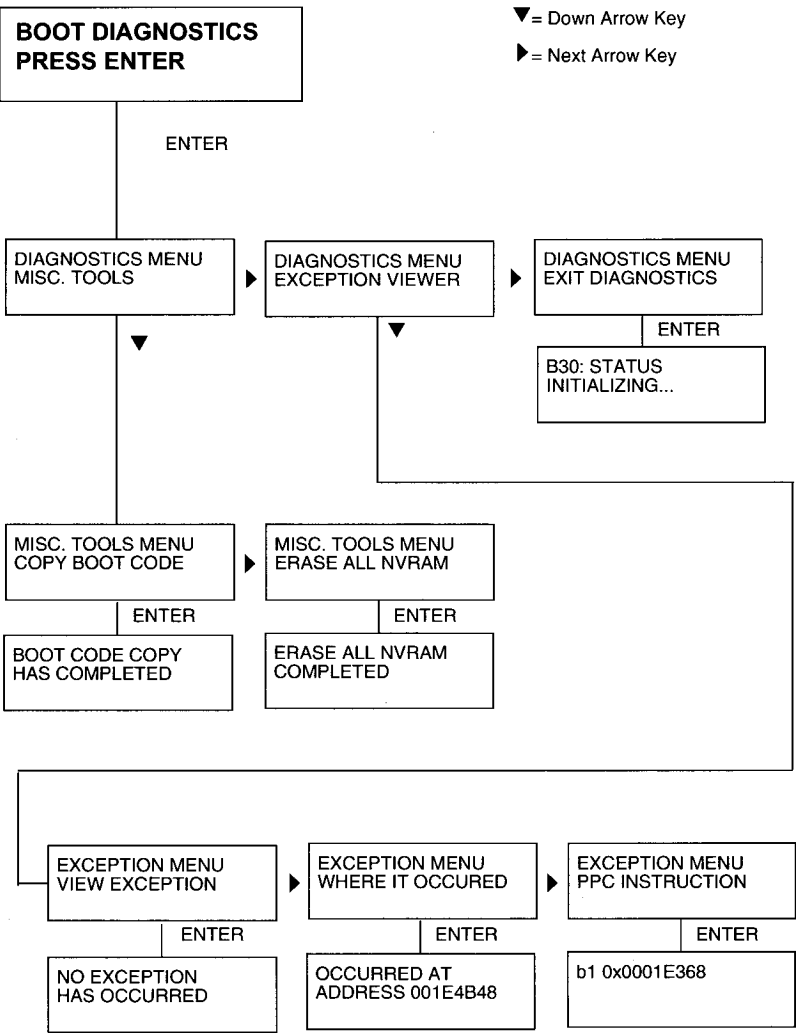


Figure 11. Boot Diagnostics Menu

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 parameters.

The factory menu is a multi-level menu that operates the same way as the user menus. The menu structure is shown in Figure 12 on page 166.

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 **ONLINE** key. "OFFLINE" will display.
4. On the control panel, press the $\triangle + \nabla$ keys to unlock the **ENTER** key. "ENTER SWITCH UNLOCKED" briefly displays. (If "LOCKED" displays, simply press $\triangle + \nabla$ again. This is the default key combination. The lock/unlock key combination can be programmed by the user. If $\triangle + \nabla$ does not unlock the **ENTER** key, get the new key combination from the user.)
5. Press $\triangle + \nabla + \triangleright + \triangleleft$ 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 12.
6. Before exiting the factory menu, press the $\triangle + \nabla$ keys to lock the **ENTER** key.

Exiting the Factory Menu

Press **ONLINE** to exit the Factory menu.

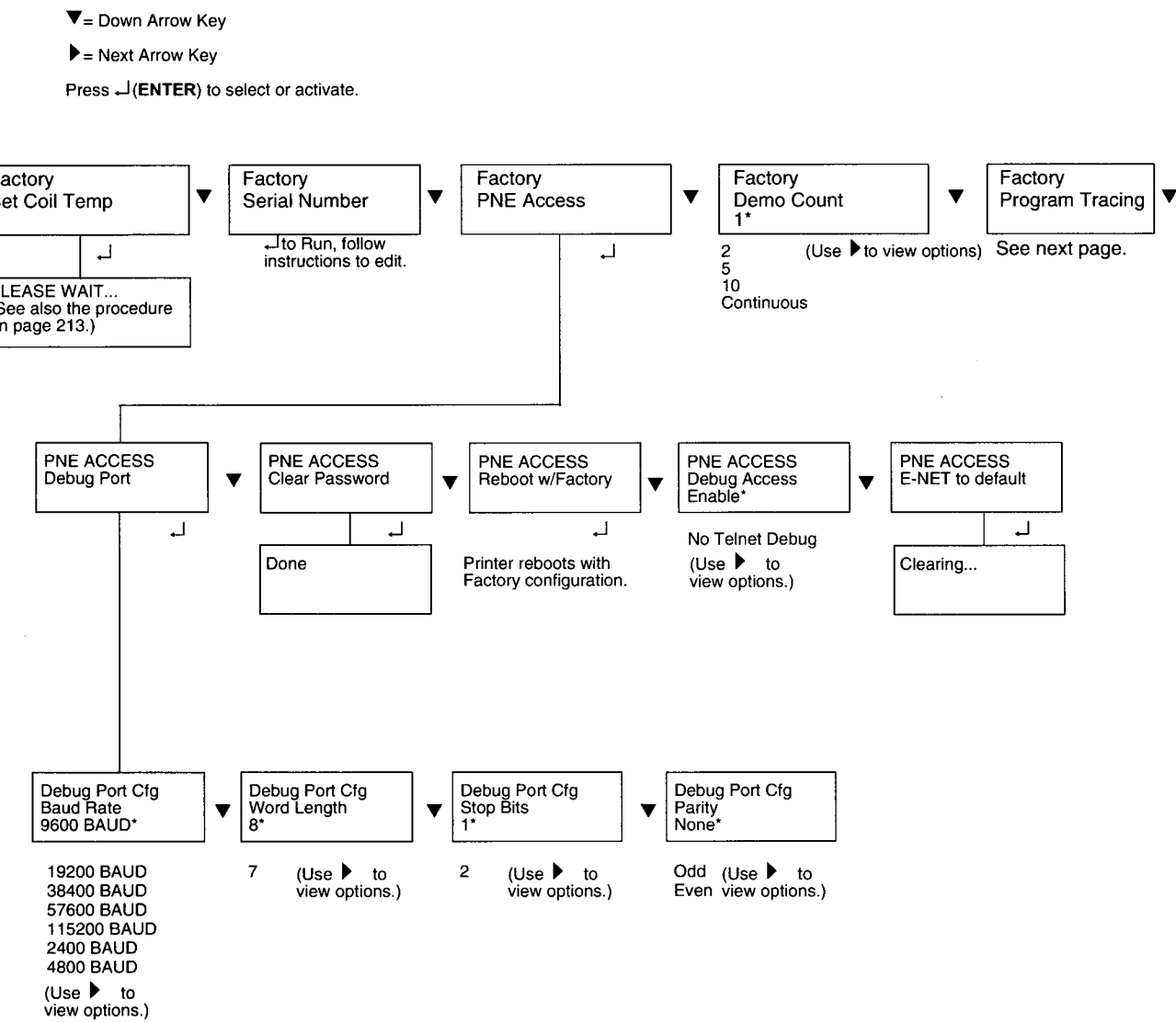


Figure 12. Factory Menu

From previous page. ▼ = Down Arrow Key, ► = Next Arrow Key, Press ↵(ENTER) to select or activate.

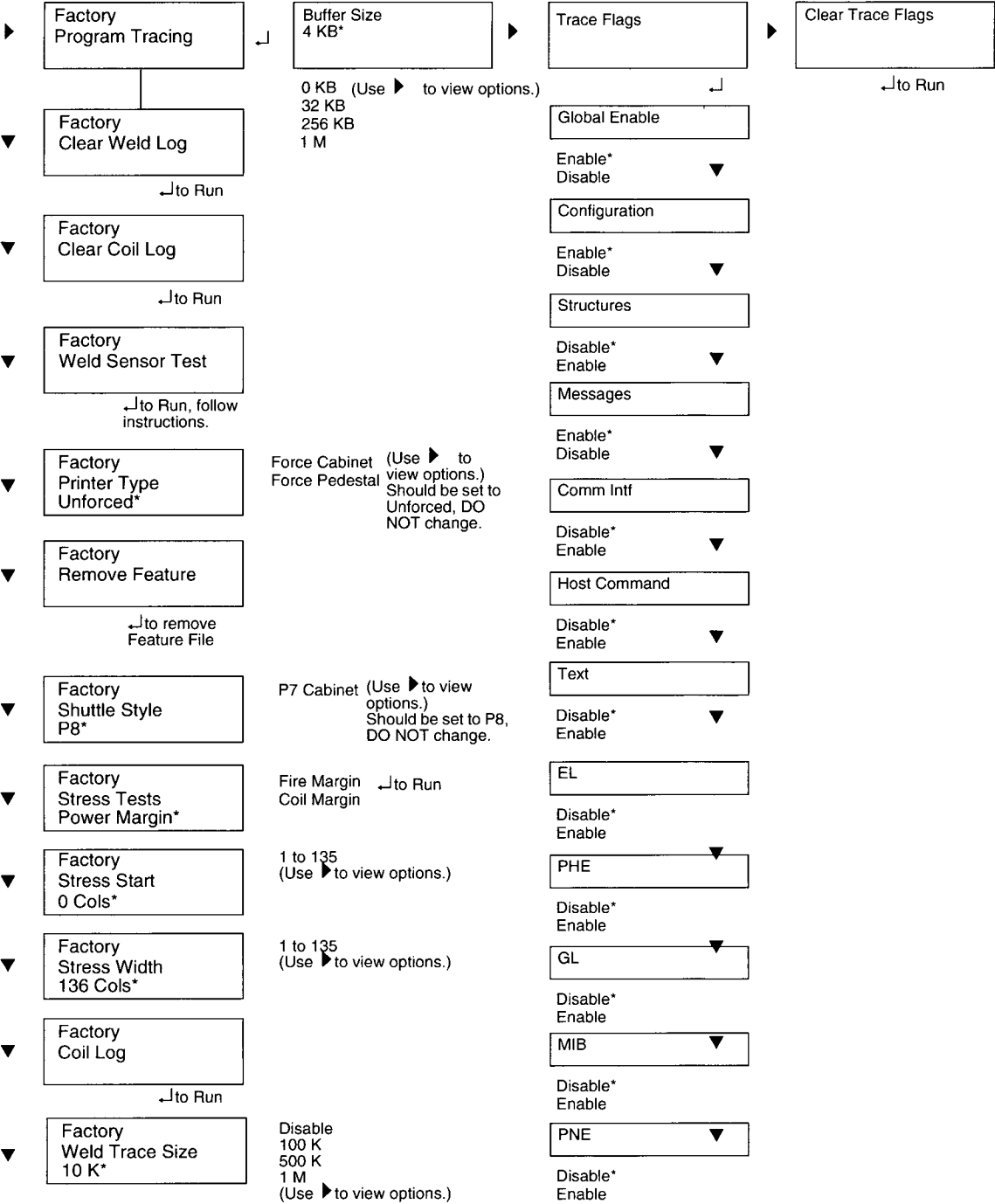


Figure 12. Factory Menu (Continued)

Exception Menu

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

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 Δ (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 \triangleright (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 \triangleright (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.

Autodump on Printer Exception

The default for Auto Dump in the DIAGNOSTICS menu is Disable. You can change the default to Enable and save it in the configuration file.

When the printer gets an exception error, the printer automatically creates a file (autodmp1.log or autodmp2.log), capturing printer internal information for exception analysis. The printer only captures the data twice. Any exceptions occurring after autodmp2.log is created will not be recorded for analysis.

The user can cycle printer power to exit the exception mode. Once the printer is up and running, the user can use PNE to upload the files from the printer to a PC and send the files to the support center.

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 9. 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 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 36).

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 13 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 175. To make a hex code printout, refer to the procedure on page 172.


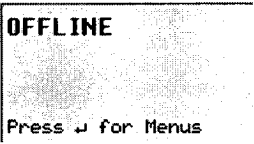

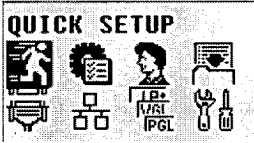



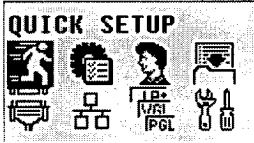

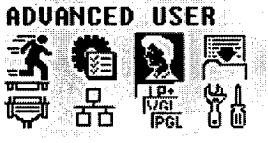

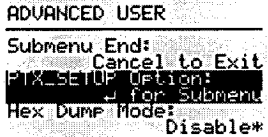
```









!"#$%&'()*+,-./ 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
`abcdefg hijklmno 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
!"#$%&'()*+,-./ 21 22 23 24 25 26 27 28 29 2A 2B 2C 2D 2E 2F 30
123456789:;<=>?@ 31 32 33 34 35 36 37 38 39 3A 3B 3C 3D 3E 3F 40
ABCDEFGHIJ...!"#$%& 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
GHIJKLMNOPQRSTU 47 48 49 4A 4B 4C 4D 4E 4F 50 51 52 53 54 55 56
WXYZ[\]^_`abc def 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{|}~ !"#$%&' 77 78 79 7A 7B 7C 7D 7E 20 21 22 23 24 25 26 27
()*+,-./01234567 28 29 2A 2B 2C 2D 2E 2F 30 31 32 33 34 35 36 37
89:;<=>?@ABCDEF 38 39 3A 3B 3C 3D 3E 3F 40 41 42 43 44 45 46 47
HI...!"#$%&'()*+,- 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
^_`abcdefg hijklm 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
\]^_`abcdefg hijk 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 13. Sample Hex Dump

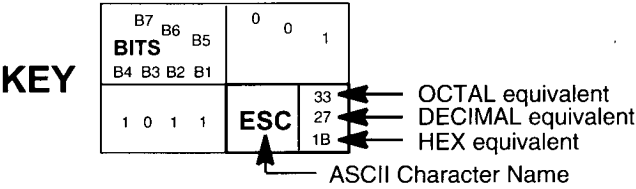
How to Print a Hex Dump

Step	Press	LCD Result	Notes
1.	Make sure the printer is on. Raise the printer cover.		
2.			
	ENTER 		
3.	 + 		Unlocks the ENTER key and control panel.
			
4.	 UNTIL		
5.	ENTER 		

Step	Press	LCD Result	Notes
6.		<div>ADVANCED USER</div> <div>PTX_SETUP Option:</div> <div>└─ for Submenu</div> <div>Hex Dump Mode: Disable*</div> <div>Power-up State: Online*</div>	Cycle through choices.
7.	 OR 	<div>ADVANCED USER</div> <div>PTX_SETUP Option:</div> <div>└─ for Submenu</div> <div>Hex Dump Mode: Enable</div> <div>Power-up State: Online*</div>	
8.	ENTER 	<div>ADVANCED USER</div> <div>PTX_SETUP Option:</div> <div>└─ for Submenu</div> <div>Hex Dump Mode: Enable*</div> <div>Power-up State: Online*</div>	Asterisk (*) indicates choice is active.
9.	 + 	<div>THE ← KEY IS</div> <div>LOCKED</div>	Locks the ENTER key and control panel.
10.	 ONLINE	<div>OFFLINE</div> <div>Press └─ for Menus</div>	Press ENTER to go back into the menus or press ONLINE again to go ONLINE.
11.	 ONLINE	<div>Menu Changes Detected</div> <div>Save Permanently</div> <div>Save Temporarily</div> <div>Cancel Changes</div> <div>Restore Factory</div> <div>Press └─ to Select</div>	Configuration changes were detected and you are prompted to save the configuration permanently or temporarily, to cancel changes, or restore the Factory Configuration.

Step	Press	LCD Result	Notes
12a.	ENTER 	<div>Cfg=Cfg 1 = Power-Up Cfg</div>	Saves the Configuration as Config 1 then returns the printer ONLINE.
12b.		<div>ONLINE P8005 ETHERNET/IPDS RIBBON LIFE 72%</div>	Places the printer online after permanently saving the configuration changes as Config 1.
13.	Send a file from the host computer. the printer outputs a hex dump. Refer to the ASCII chart on page 175.		
14.	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



BITS B7 B6 B5 B4 B3 B2 B1	COLUMN							
	0	1	2	3	4	5	6	7
ROW	0	1	2	3	4	5	6	7
0 0 0 0	0 NUL	0 DLE	0 SP	0 0	0 @	0 P	0 \	0 p
0 0 0 1	1 SOH	1 DC1 (XON)	1 !	1 1	1 A	1 Q	1 a	1 q
0 0 1 0	2 STX	2 DC2	2 "	2 2	2 B	2 R	2 b	2 r
0 0 1 1	3 ETX	3 DC3 (XOFF)	3 #	3 3	3 C	3 S	3 c	3 s
0 1 0 0	4 EOT	4 DC4	4 \$	4 4	4 D	4 T	4 d	4 t
0 1 0 1	5 ENQ	5 NAK	5 %	5 5	5 E	5 U	5 e	5 u
0 1 1 0	6 ACK	6 SYN	6 &	6 6	6 F	6 V	6 f	6 v
0 1 1 1	7 BEL	7 ETB	7 '	7 7	7 G	7 W	7 g	7 w
1 0 0 0	8 BS	8 CAN	8 (8 8	8 H	8 X	8 h	8 x
1 0 0 1	9 HT	9 EM	9)	9 9	9 I	9 Y	9 i	9 y
1 0 1 0	10 LF	10 SUB	10 *	10 :	10 J	10 Z	10 j	10 z
1 0 1 1	11 VT	11 ESC	11 +	11 ;	11 K	11 [11 k	11 {
1 1 0 0	12 FF	12 FS	12 ,	12 <	12 L	12 \	12 l	12
1 1 0 1	13 CR	13 GS	13 -	13 =	13 M	13]	13 m	13 }
1 1 1 0	14 SO	14 RS	14 .	14 >	14 N	14 ^	14 n	14 ~
1 1 1 1	15 SI	15 US	15 /	15 ?	15 O	15 _	15 o	15 DEL

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 **ONLINE** 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

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Belt, Platen Open, Adjustment	page 182
Paper Scale Alignment.....	page 184
Platen Gap Adjustment	page 186
Paper Out Adjustment.....	page 189
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Reprogramming the Security Key	page 211
Coil Temperature Adjustment	page 213
Dynamic Paper Tension Adjustment.....	page 214
Tractor Belt Tension Adjustment.....	page 216
Shuttle Electrical Short Check.....	page 217
Hammerbank Power Cable Shorts Test.....	page 218
Cable Shorts Test	page 219
Main Wire Harness Test Diagnostic.....	page 221

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 hammerbank—it is not field repairable and you must replace the entire shuttle frame assembly. Hammerspring 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 I (on).
6. Test printer operation by selecting and running one of the operator print tests. (See page 155.)
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 178).
2. Cabinet Models: Remove the paper path (page 241).
Tabletop and Pedestal Models: Remove the electronics barrier panel (page 235)
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 241).
Tabletop and Pedestal Models: Install the electronics barrier panel (page 235).
9. Return the printer to normal operation (page 179).

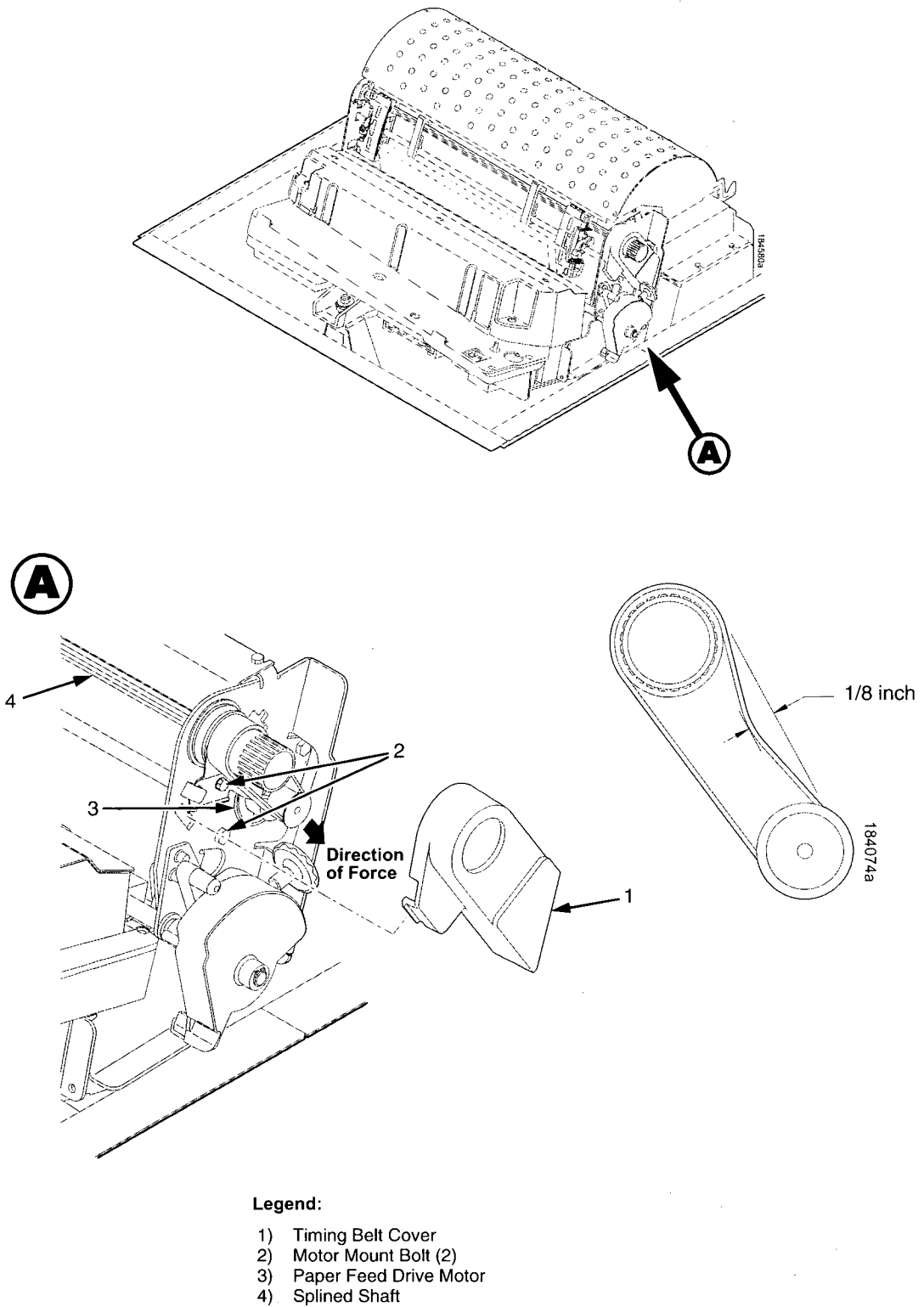


Figure 14. Paper Feed Timing Belt Adjustment

Belt, Platen Open, Adjustment

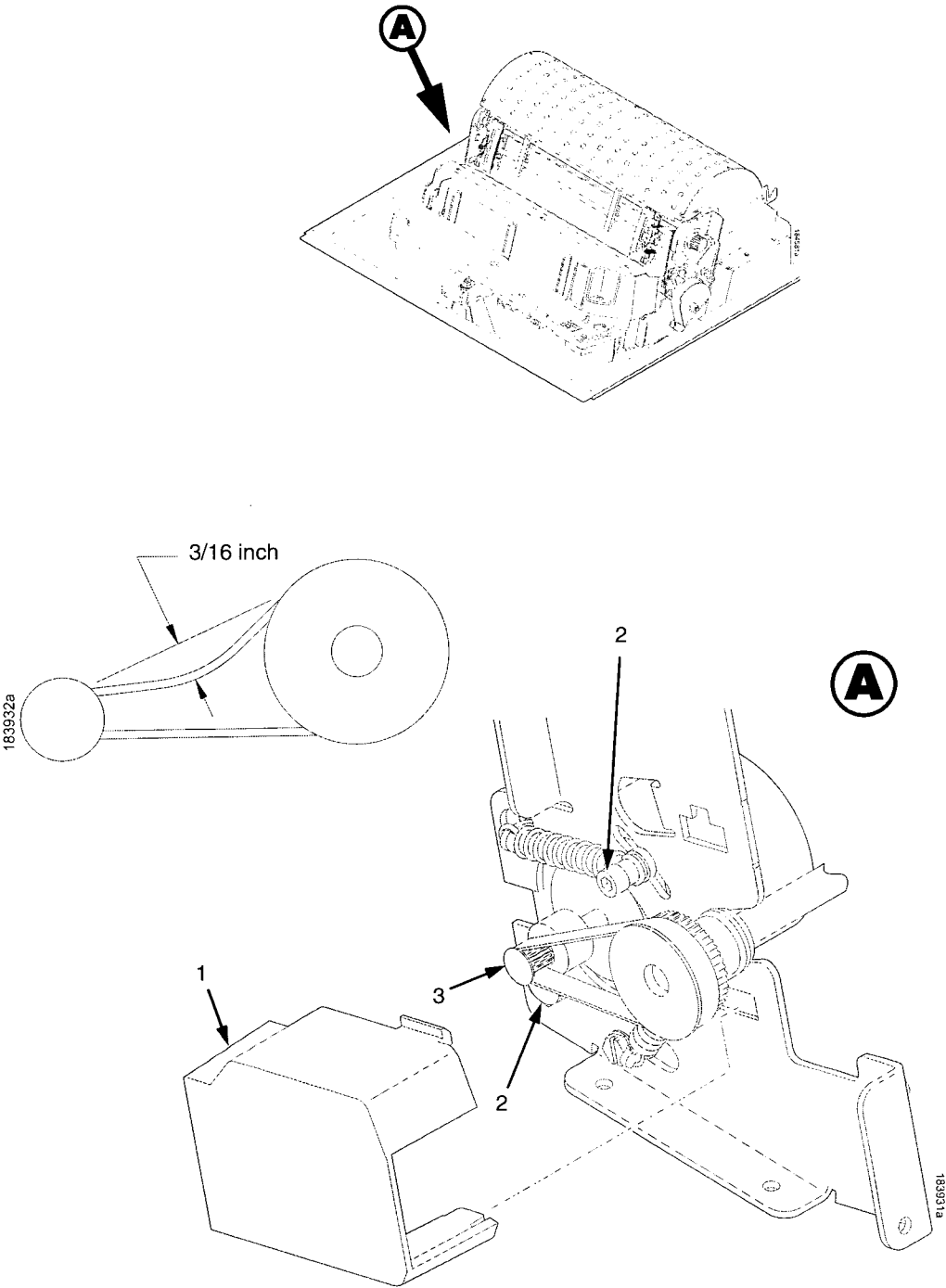
1. Prepare the printer for maintenance (page 178).
2. Cabinet Models: Remove the paper path (page 241).
Tabletop and Pedestal Models: Remove the electronics barrier panel (page 235)
3. Remove the platen open belt cover (1) by squeezing the top and bottom to release the plastic tabs from the slots in 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 241).
Tabletop and Pedestal Models: Install the electronics barrier panel (page 235).
10. Return the printer to normal operation (page 179).

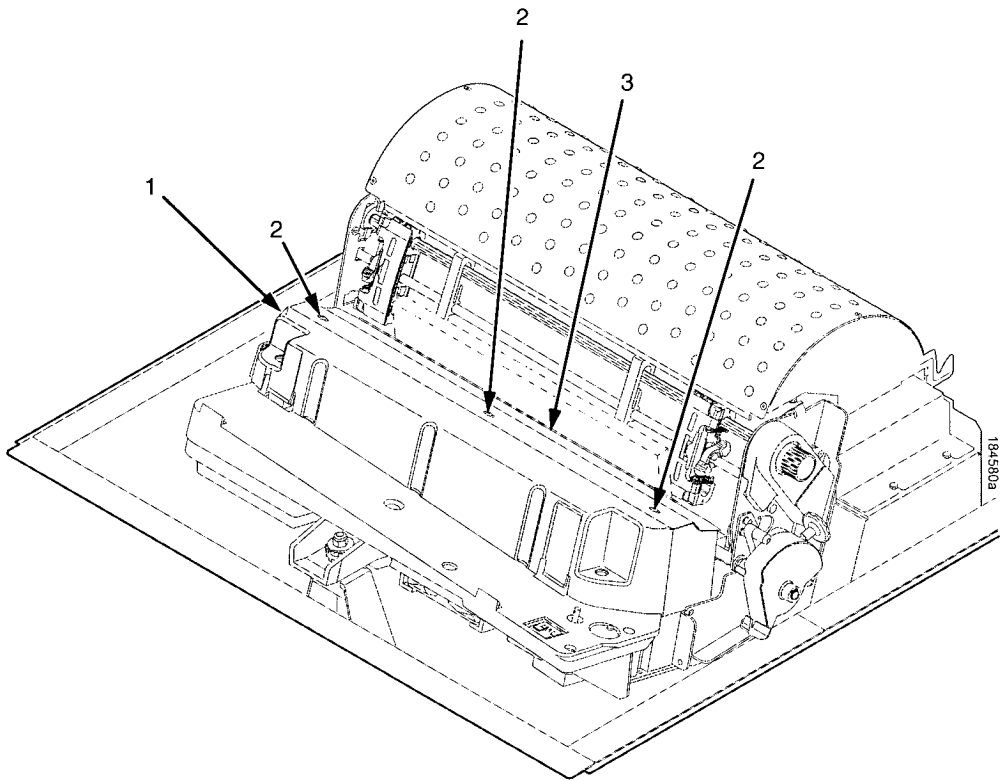


- Legend:**
- 1) Belt Cover
 - 2) Motor Mount Screw (2)
 - 3) Platen Open Motor Shaft

Figure 15. 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 233).
6. Print a full 136 column line by selecting and running one of the diagnostic self-tests. (See page 155.)
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 16. 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.

Table 10 shows recommended platen gap settings for hammerspring assemblies versions 1, 2, and 3.

Table 10. Recommended Platen Gap Settings

Hammerspring Version	Speed	Models	Platen Gap Setting
V1	High	P8220	.012"/0.30mm
V2	High	P8215	.011"/0.28mm
		P8000HD	.012"/0.30mm
		P8200HD	.013"/0.33mm
		P8X06H	.012"/0.30mm
		P8X08H	.013"/0.33mm
V3	Low	P8X05	.012"/0.30mm - .013"/0.33mm*
		P8X10	.012"/0.30mm - .013"/0.33mm*
		P8X03H	.012"/0.30mm - .013"/0.33mm*
NOTE: Platen gap setting value tolerance is +/- 0.001"/0.02mm.			
* Values are based on the center gap set at 0.010" for 0.013" gap at both ends of the hammerspring assembly —OR— a tight 0.010" (approximately 0.009") for 0.012" gap at both ends of the hammerspring assembly.			

Hammerspring Assembly, Versions 1 and 2

1. Prepare the printer for maintenance (page 178).
2. Remove the ribbon cartridge and paper. (Refer to the *User's Manual*.)
3. Remove the shuttle cover assembly (page 233).
4. Loosen the platen open belt (page 182, steps 2, 3, and 4).
5. Rotate the platen stop knob until the pointer is aligned with "A" on the forms thickness label.
6. Raise the platen lever 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 hammerbank. Damage to the hammer tips will result.

7. Insert the flat feeler gauge straight down between the hammerbank cover plate and ribbon mask, within four hammer positions of the left end of the hammerbank.

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.

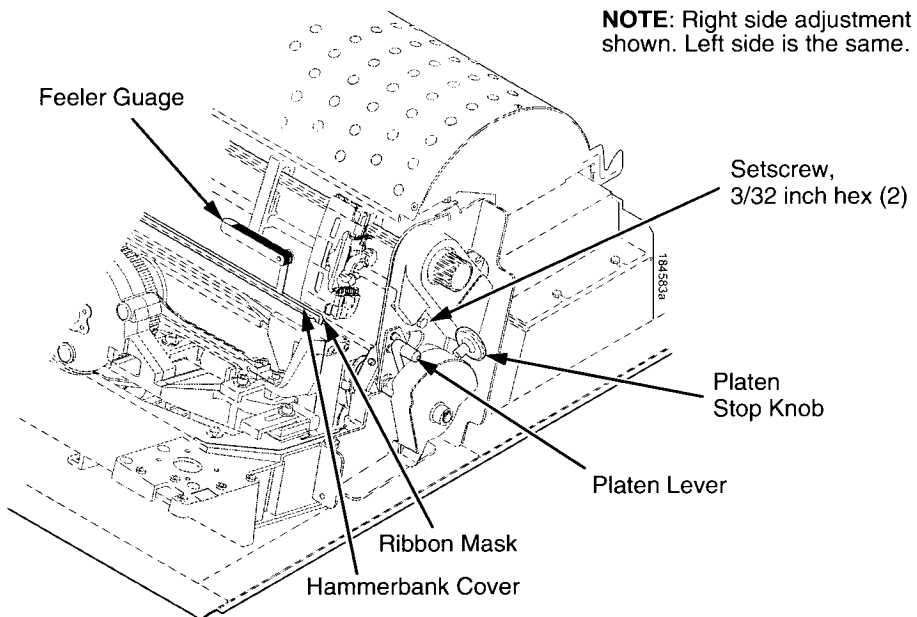


Figure 17. Platen Gap Adjustment

8. Gently close the platen lever 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 at the end of the platen counterclockwise. If the feel is too loose, adjust the setscrew clockwise. With the platen 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 hammerbank.
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 182).
12. Install the shuttle cover assembly (page 233).
13. Install the ribbon cartridge. (Refer to the *User's Manual*.)
14. Check the hammer phasing adjustment (page 192).
15. Return the printer to normal operation (page 179).

Hammerspring Assembly, Version 3

1. Prepare the printer for maintenance (page 178).
2. Remove the ribbon cartridge and paper. (Refer to the *User's Manual*.)
3. Remove the shuttle cover assembly (page 233).
4. Loosen the platen open belt (page 182, steps 2, 3, and 4).
5. Rotate the platen stop knob until the pointer is aligned with "A" on the forms thickness label.
6. Raise the platen lever 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 hammerbank. Damage to the hammer tips will result.

7. Insert the flat feeler gauge approximately 1.5 inches straight down between the hammerbank cover plate and ribbon mask, 1 inch from the left end of the hammerbank.

NOTE: Insert the feeler gauge no more than 2 inches down from the top of the ribbon mask.

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.

8. Gently close the platen lever all the way. Gently slide the feeler gauge up and down, keeping it between the hammer tip and ribbon mask. If the feel is too tight use the next feeler gauge. With the platen 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 hammerbank.
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 182).
12. Install the shuttle cover assembly (page 233).
13. Install the ribbon cartridge. (Refer to the *User's Manual*.)
14. Check the hammer phasing adjustment (page 192).
15. Return the printer to normal operation (page 179).

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. Running this procedure also calibrates the paper out sensor.

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 18.) 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.

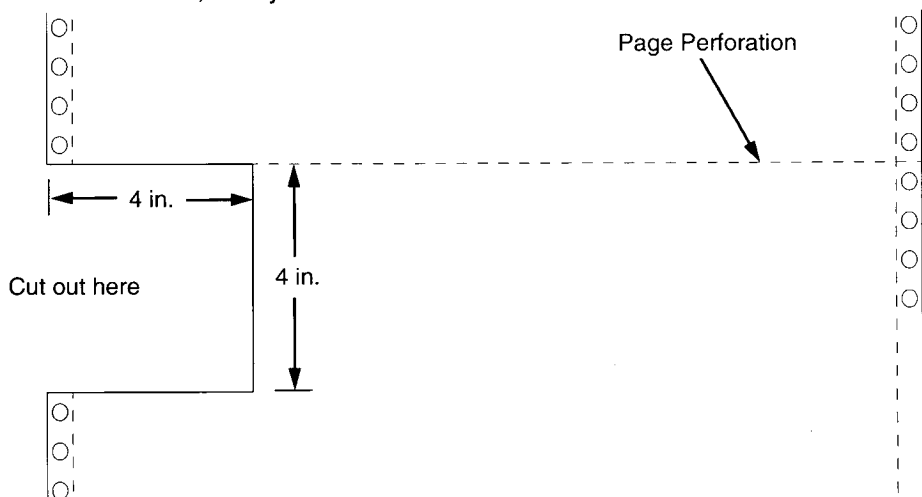
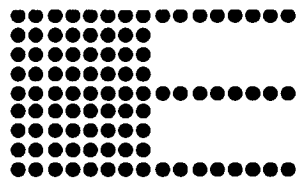


Figure 18. Paper Preparation for Paper Out Adjustment Test

- 7. If the printer is online, press the **ONLINE** key to place the printer offline. "OFFLINE" displays.
- 8. Press (↵) **ENTER** to place the printer in Menu mode. Quick Setup displays.
- 9. 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.)
- 10. Press the ◀ key until "DIAGNOSTICS" displays.
- 11. Press (↵) **ENTER**. "DIAGNOSTICS / Printer Tests" displays.
- 12. Press ▽. "SHIFT / RECYCLE" displays.
- 13. 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.



- 14. 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.
- 15. 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 16.
- 16. 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.

- 17. Close the platen.
- 18. Press **ONLINE** to remove the fault condition. "OFFLINE" displays.

19. Press (↵) **ENTER** to place the printer in Menu mode. Quick Setup displays.
20. Press the ◀ key until "DIAGNOSTICS" displays.
21. Press (↵) **ENTER**. "DIAGNOSTICS / Printer Tests" displays.
22. Press ▽ until "Paper Out Dots" displays.
23. Using the ◀ or ▶ key, adjust the XX DOTS value up or down by the number of dots you counted in step 16. (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 **ONLINE** to place the printer offline. "OFFLINE" 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 11.)
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 **ONLINE** 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.

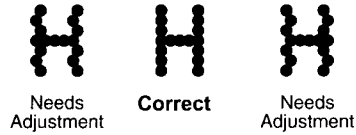
The factory prints the initial phase value on the shuttle assembly casting, next to the motor housing. Adjust the phasing to this value and recheck the vertical alignment. When vertical alignment is acceptable, write the new phasing value on the shuttle.

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 **ONLINE** key to place the printer offline. “OFFLINE” displays.
4. Press (↵) **ENTER** to place the printer in Menu mode. Quick Setup displays.
5. On the control panel, press the $\Delta + \nabla$ keys to unlock the **ENTER** key. “ENTER SWITCH UNLOCKED” briefly displays. (If “LOCKED” displays, simply press Δ and ∇ again. This is the default key combination. The lock/unlock key combination can be programmed by the user. If $\Delta + \nabla$ does not unlock **ENTER**, get the new key combination from the user.)
6. Press the ◀ key. “DIAGNOSTICS” displays.
7. Press (↵) **ENTER**. “DIAGNOSTICS / Printer Tests” displays.
8. Press ∇ . “Printer Tests / Shift Recycle” displays.
9. Press ▶ until “Printer Tests / Phase Printer” displays.
10. 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 11. If the phasing is OK, go to step 14.



11. Press ∇ until Phase Value displays. Press ∇ again: An asterisk (*) appears next to the phase value.
12. Press \triangleleft to decrease or \triangleright to increase 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.
13. Press \triangle twice: "Printer Tests / Phase Printer" displays.
14. Press **ENTER** to stop the test.
15. Press **ONLINE**. "OFFLINE" displays.
16. Press $\triangle + \nabla$ (or the key combination set by the user). "ENTER SWITCH LOCKED" briefly displays.
17. Close the printer cover.
18. Press the **ONLINE** 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.

Downloading Firmware

There is 256 MB of FLASH memory on the controller board. The printer firmware which includes printer control languages (the “emulations”), the engine control, 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:

- Firmware upgrade to a newer level
- Changing to a different firmware (emulation) type
- Replacing a controller or reloading firmware if FLASH becomes corrupt.

Different firmware types may be included on a CD-ROM for printer upgrades. The target firmware type should be copied to a computer’s hard disk. From there, you can employ one of the various download methods presented in this section. Downloading firmware can be accomplished through any host IQ installed on the printer, but may not be valid for all methods.

NOTE: The target firmware must be consistent with the options present in the controller Security Key. Otherwise, the firmware download will be prevented.

With exception to the manual two-key and manual three-key power-up sequences, downloading new firmware does not require the user to put the printer into any special mode. Rather, most downloading methods are employed when the printer is ONLINE and ready to receive data. This makes the download procedure easy.

FLASH is used to store the firmware, but it also contains a file system that holds System and User Flash Files. User Flash Files consist of downloaded fonts, logos, forms, setup files, feature files, CST files, and files that are specific to the user’s setup or application. These files are either preserved or deleted based on the download method used as shown in Table 11 on page 195.

IMPORTANT

Regardless of download method, any saved configurations will be erased. Before starting a download procedure, be sure that you have printed or saved configurations on your host computer so they can be restored after the download process is complete.

Table 11. Firmware Download Methods

Firmware Download Method	File Type(s)	User FLASH Files
Web Page (Ethernet only). User needs the network option installed, a browser, and know the IP address.	FILENAME.prg	Preserved
Windows Driver (any host IO). When the Windows Driver is installed, downloading firmware can be done easily through the About/Help tab.	FILENAME.prg	Preserved
Automatic download (any host IO). Using the FILENAME.exe, firmware can be downloaded from a Windows Command Prompt without having to manually put the printer into download mode.	FILENAME.exe	Preserved
Manual two-key download (any host IO). This two-key (ADVANCE+CANCEL) power-up sequence puts the printer into download mode. Firmware can be loaded through any host IO port.	FILENAME.prg FILENAME.exe	Preserved
Manual three-key download (USB or Parallel). This three-key power-up sequence should be used in situations in which a new controller is installed, the program in FLASH is corrupt, or a different firmware type will be installed. Firmware must be loaded via USB or parallel (if installed).	FILENAME.prg FILENAME.exe	Removed
PrintNet Enterprise (Ethernet only). User must install the PrintNet Enterprise application from the PrintNet CD. This is the most versatile and powerful method to upgrade printers but requires your computer can run Java™ programs.	For a detailed description, refer to the <i>PrintNet Ethernet User's Manual</i> .	

Firmware File Types (.prg) and (.exe)

Using firmware with an .exe extension **FILENAME.exe** is convenient. However, firmware with the .exe extension may not be available in all situations. Download methods described in Table 11 which require the .prg extension, **FILENAME.prg**, is required (e.g., Windows Drivers and Web Page).

The **FILENAME.prg** file can be extracted from the **FILENAME.exe** file by executing the command in a Windows Command Prompt session:

```
FILENAME<Enter>
```

This will extract the **FILENAME.prg** file in the same directory where **FILENAME.exe** was executed. For example, executing **123456.exe** in the directory C:\download will generate a file C:\download\123456.prg.

IMPORTANT Be sure to copy the **FILENAME.exe** file to your computer’s local drive before executing commands in the Windows Command Prompt.

Web Page Download

NOTE: This download method requires firmware with the .prg extension
FILENAME.prg.

- 1. Make sure the printer is powered up, in ONLINE mode, and that the Ethernet cable is connected.
- 2. Get the IP address from the front panel (under Network Setup in the menus).
- 3. Enter the printer's IP address in your browser (e.g., http://10.224.5.21).
- 4. When prompted for a user name and password, enter "root" for user name and click OK.
- 5. Click "System" in the Configuration box.

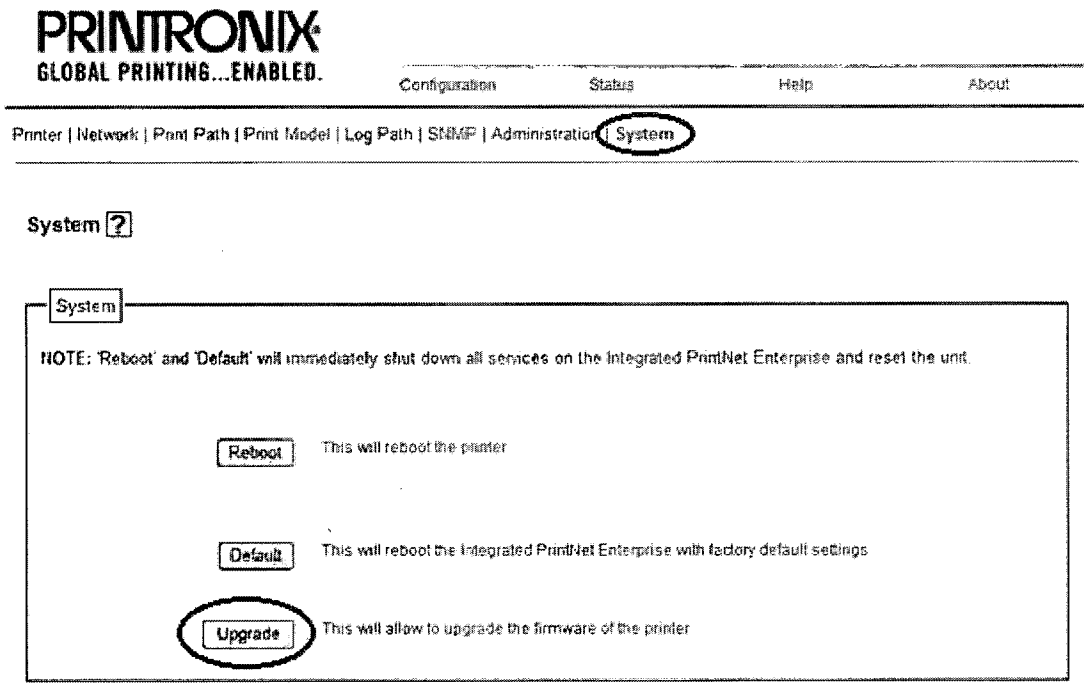


Figure 19. System Configuration Upgrade

- 6. Click the "Upgrade" button.

7. Browse to the directory or enter **FILENAME.prg** in the “File to upload” field and click “Upgrade”. A Warning message opens.

Firmware Upgrade

Current firmware version: 372696 V1 02S
Check with **Printronix Customer Support Center** for the latest firmware updates

File to upload: c:\download\123456.prg

Browse...

Upgrade

Clear Changes

Note: The newly downloaded firmware will only take affect after a restart

After selecting a file to upload, press the Upgrade button **once** to begin the firmware upgrade process

Figure 20. Uploading Firmware File for Upgrade

8. Click “Ok” to continue. After a few minutes, you are prompted to reboot.
9. Click “Yes”.

Notification

File has been downloaded.
Perform restart for changes to take affect?

Yes

No

Figure 21. Confirm Reboot

10. Wait until the printer is finished upgrading firmware.

Notification

Restarting...

You will be redirected in 140 seconds. Please wait...

Time approximate, if the webpage does not redisplay please refresh the browser manually

Figure 22. Waiting for Firmware Upgrade Completion

11. When the Web Page is redirected, the download process in complete.

Windows Driver Download

NOTE: This download method requires firmware in the form **FILENAME.prg**.

- 1. Make sure the printer is powered up, in the ONLINE mode and that desired host IO cables are connected.
- 2. Install the Windows Driver 2000/XP/Server 2003/Server 2008/Vista/Windows 7/Windows 8 on the Starter Kit CD before continuing. Alternatively, drivers can be found on the <http://www.primtronix.com/products/drivers.aspx> website.
- 3. Once the Windows Driver is installed on the PC, right-click the printer driver and select **Properties**.
- 4. Click the **About/Help** tab to access the software download option.
- 5. Click the **Firmware Update** button as in Figure 23.

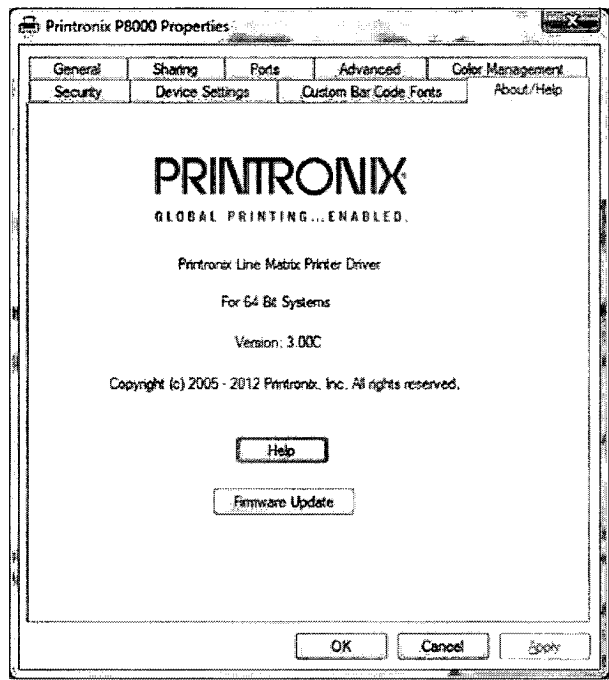


Figure 23. Updating Firmware

- 6. Enter the full path and location to the printer software. For example, **c:\download\FILENAME.prg** where **c:\download** is the directory where **FILENAME.prg** resides.
- 7. Click **OK** to send the software to the printer. To abort this operation, click **Cancel**.
- 8. When the new software has successfully loaded into flash memory and the printer has reset itself, the process is complete.

Automatic Download (.exe)

NOTE: This download method requires firmware in the form **FILENAME.exe**. The firmware can be downloaded without requiring the user to manually put the printer into download mode.

1. Make sure the printer is powered up, in ONLINE mode, and that the applicable host IO cables are connected.
2. Navigate to the directory where the target firmware resides. If the target firmware is on the CD, insert the printer emulation software CD into your computer's CD drive.

NOTE: The target firmware must be in the format **FILENAME.exe** where the FILENAME is a six digit number with the .exe extension (e.g., **123456.exe**).

IMPORTANT For USB connections, the Windows Driver must be installed.

3. Install the Windows Driver 2000/XP/Server 2003/Server 2008/Vista/Windows 7/Windows 8 on the Starter Kit CD before continuing. Alternatively, drivers can be found on the <http://www.primtronix.com/products/drivers.aspx> website. During the installation, make sure to share the printer when prompted and record the "Share name".

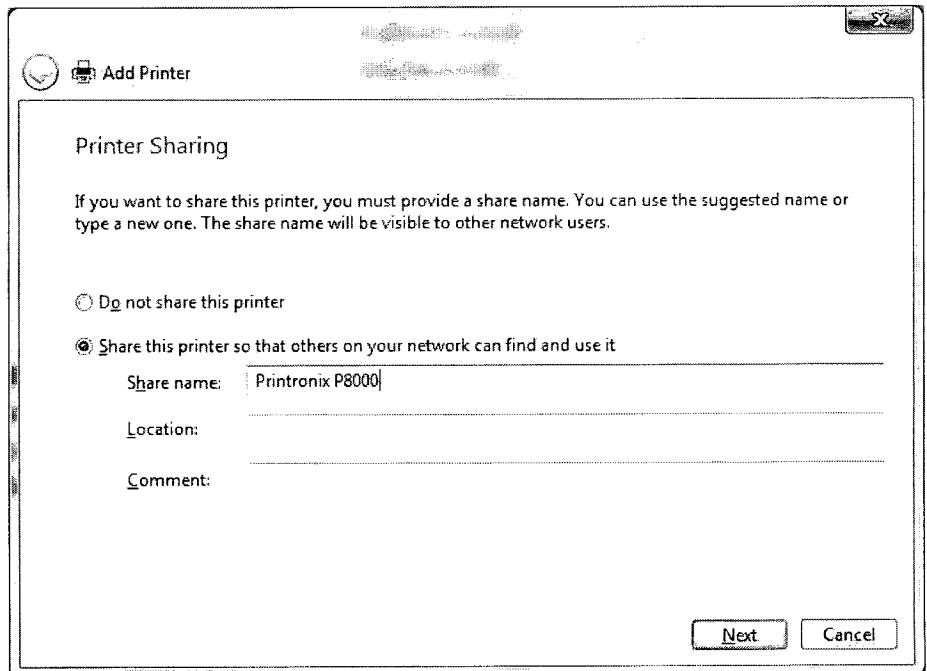


Figure 24. Selecting to Share the Printer

IMPORTANT For USB connections, the printer must have a “Share name” established.

- 4. The “Share name” will be needed when executing the **FILENAME.exe** command. This should be accomplished during installation, but can be verified at any time. Select the driver, right-click the mouse button and select “Printer Properties”. Click the “Sharing” tab, make sure the “Share this printer” box is checkmarked, and enter the “Share name”.

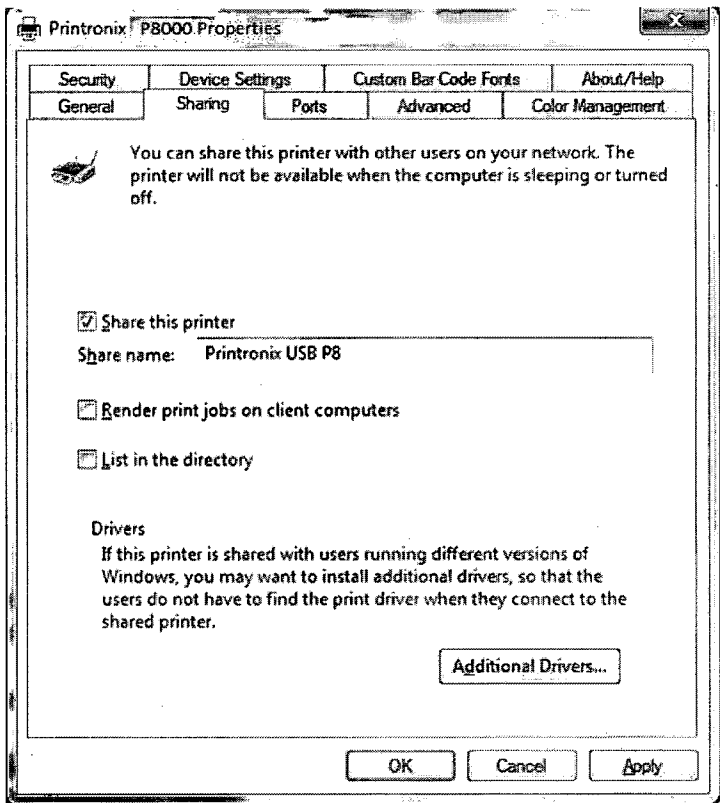


Figure 25. Setting Printer Properties Sharing Options

- 5. Start a Windows Command Prompt session.
- 6. Navigate to the directory with the target firmware (e.g., c:\download).

7. Execute **FILENAME.exe** as follows:

Connection Type	Enter Command
Parallel	FILENAME -a -pb <Enter>
Serial	mode COM1:9600,N,8,1 <Enter> mode LPT1=COM1 <Enter> FILENAME -a -pb <Enter>
USB	FILENAME -a -pbSharedName <Enter> where <i>SharedName</i> of the printer is the 'Share name' entered during installation.
Ethernet	FILENAME -n xxx.xxx.xxx.xxx <Enter> where xxx.xxx.xxx.xxx represents the IP address.

IMPORTANT **DO NOT** interrupt the downloading process once it has started. Interrupting a download will leave the flash memory on the controller PCBA incompletely loaded, and the printer may not boot up.

8. When the new software has successfully loaded into flash memory and the printer has reset itself, the process is complete.

Manual Two-Key Download Sequence

NOTE: This download method can be completed with firmware in the form of **FILENAME.prg** or **FILENAME.exe**.

The following steps prepare the printer for download. When the printer is in the download mode, any host IO can be used to download the firmware.

1. Set the printer power switch to O (Off).
2. Connect the Ethernet cable to the printer interface.
3. Press and hold down the **ADVANCE** and **CANCEL** keys on the printer's control panel.
4. Set the printer power switch to I (On).
5. After five seconds, release the front panel keys.
The printer must power-up so this may take to 1-2 minutes. Wait until "PROGRAM DOWNLOAD" displays on the top line of the LCD before proceeding.
6. Start a Windows Command Prompt session.
7. Navigate to the directory with the target firmware (e.g., c:\download).

8. Send the firmware to the printer as described for various host IO options:
 - “Sending Firmware via Ethernet (LPR)” on page 203
 - “Sending Firmware via USB” on page 203
 - “Sending Firmware via Parallel” on page 209
 - “Sending Firmware via Serial” on page 210

Manual Three-Key Download Sequence

NOTE: If the flash memory contains only boot code (e.g., if it is new), or if flash memory is corrupt, or you want to delete all Flash User Files, you must download software using the manual three-key download method. This can be completed with firmware in the form *FILENAME.exe* or *FILENAME.prg*. When the printer is in the download mode, only USB or parallel can be used to download the firmware.

1. Set the printer power switch to O (Off).
2. Connect the Ethernet cable to the printer interface.
3. **USB Download:**
Press and hold down the **ADVANCE**, **CANCEL**, and **DOWN** control panel keys.

Parallel Download:

Press and hold down the **TOF**, **CONFIG**, and **UP** control panel keys.

NOTE: If the parallel option is not installed, the printer reverts to a USB download.

4. Set the printer power switch to I (On).
5. After five seconds, release the control panel keys.
6. The printer must power-up so this may take up to 1-2 minutes. Wait until “DOWNLOAD MODE USB” displays on the top line of the LCD before proceeding.
7. Start a Windows Command Prompt session.
8. Navigate to the directory with the target firmware (e.g., c:\download).
9. Send the firmware to the printer as described for various host IO options:
 - “Sending Firmware via USB” on page 203
 - “Sending Firmware via Parallel” on page 209

Sending Firmware in Download Mode

This section describes how to send the firmware data to the printer using the desired host IO.

NOTE: The three-key download sequence only allows download through USB or Parallel.

Although the program file **FILENAME.prg** is used in the examples, any file with a Printronix header can be substituted in this process to download flash files.

Sending Firmware via Ethernet (LPR)

NOTE: You will need the IP Address of the printer.

1. Enter the following to start the LPR program:

```
lpr -S xxx.xxx.xxx.xxx -P d1prn FILENAME.prg
```

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 PCBA and NIC incompletely loaded, and the printer may not boot up.

2. The process is complete when the new software has successfully loaded into flash memory and the printer has reset itself.

Sending Firmware via USB

This section explains how to download firmware through USB by remapping LPT1 to the USB port. This can be completed with firmware in the form **FILENAME.exe** or **FILENAME.prg**.

If the PC or laptop you are using is connected to a network or the Microsoft Loopback Adapter is installed, then proceed as shown. If not, you must first complete the section "Installing a Microsoft Loopback Adapter" on page 204.

1. Remap the LPT1 port to USB by entering the following commands at the command prompt:

```
NET USE LPT1\\Comp_Name\Shared_Name\Persistent:YES <Enter>
```

where

Comp_Name is the computer name found in System Properties\Computer Name tab

Shared_Name is the printer's shared name found in the printer's Properties\Sharing tab.

2. To check status of connection type, enter the following commands at the command prompt:

```
Net View \\Comp_Name <Enter>
```

where *Comp_Name* is the computer name found in System Properties\Computer Name tab.

Now the computer system is ready to send the firmware through USB.

3. Navigate to the directory with the target firmware (e.g., c:\download).

4. Copy the file to the printer by entering these commands at the command prompt:
- ```
copy /b FILENAME.prg lpt1: <Enter>
```
- where *FILENAME.prg* is the target firmware
- or
- ```
FILENAME -pb <Enter>
```
- where *FILENAME.exe* is the target firmware.




IMPORTANT

- DO NOT interrupt the downloading process once it has started. Interrupting a download will leave the flash memory on the controller PCBA incompletely loaded, and the printer may not boot up.**
5. The process is complete when the new software has successfully loaded into flash memory and the printer has reset itself.
6. To unmap LPT1 from USB, enter the following in the command prompt:
- ```
NET USE LPT1 /DELETE<Enter>
```




Installing a Microsoft Loopback Adapter

Use this section if USB is required for the download when the laptop or PC is not network connected. If your laptop or PC is already network connected, go to “Sending Firmware via USB” on page 203.

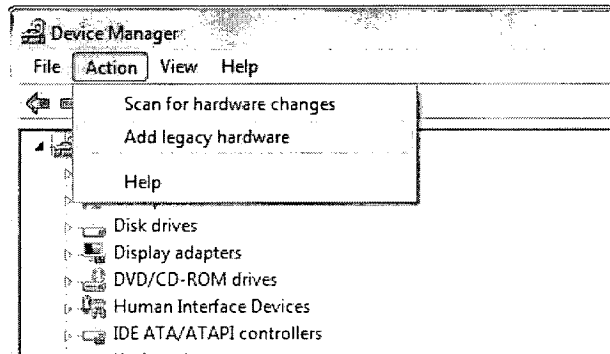
1. For Windows XP:

- a. Go to the “Start” menu 
- b. Select “Control Panel” 
- c. Open the “Add Hardware Wizard” 

For Windows 7:

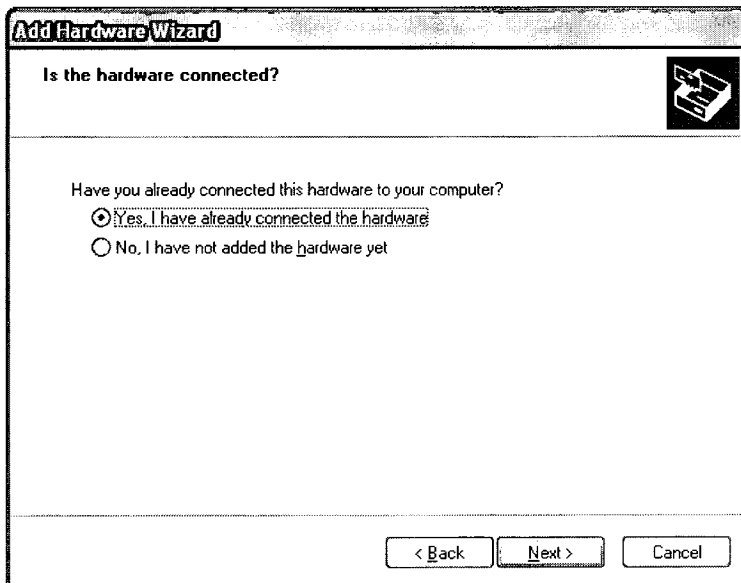
- a. Go to the “Start” menu 
- b. Select “Control Panel” 
- c. Open the “Device Manager”  Device Manager

- d. Start the “Add legacy hardware” process from the “Action” menu as shown Figure 26.



**Figure 26. Adding Legacy Hardware**

2. Click “Next” in the initial “Welcome to the Add Hardware Wizard” screen. The second screen will ask if you have already connected the hardware to your computer.
3. Select “Yes,...hardware” and then click “Next”.



**Figure 27. Hardware Connection Options**

4. Select “Add a new hardware device” (typically at the bottom of the installed hardware list) and then click “Next”.

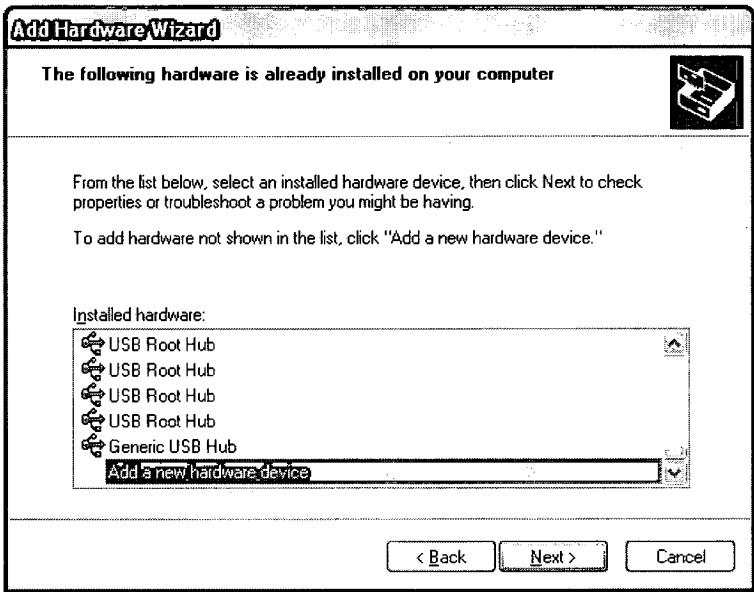


Figure 28. Adding a New Hardware Device

5. When asked how you would like to have the hardware installed, select the “Advanced” option that allows you to select the hardware from a list. Then click “Next”.

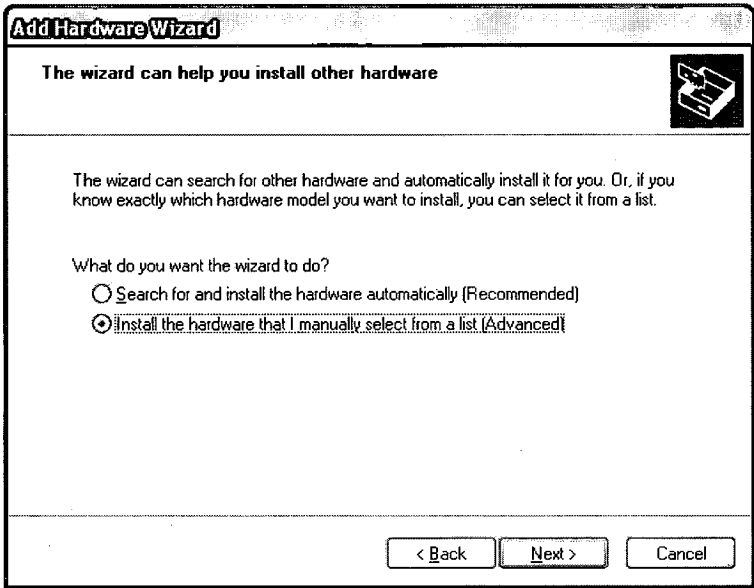


Figure 29. Selecting the Advanced Installation Method

6. Select “Network adaptor”, then click “Next”.

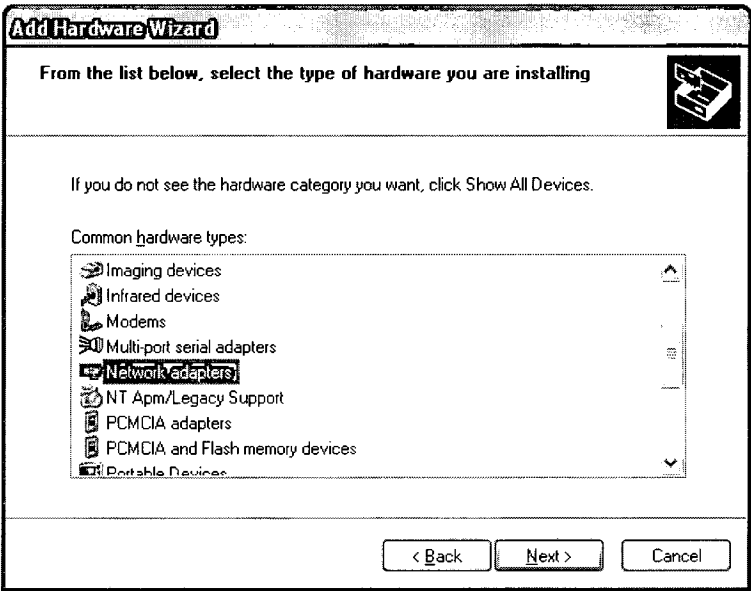


Figure 30. Selecting Network Adapter Hardware

7. Select “Microsoft Loopback Adapter”, then click “Next”.

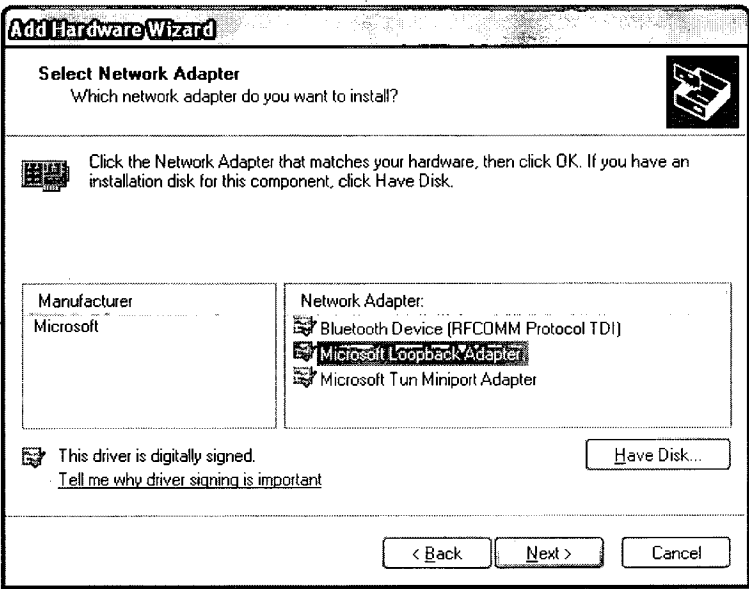


Figure 31. Selecting Microsoft Loopback Adapter as the Network Adapter Type



8. Click “Next” to start installation.

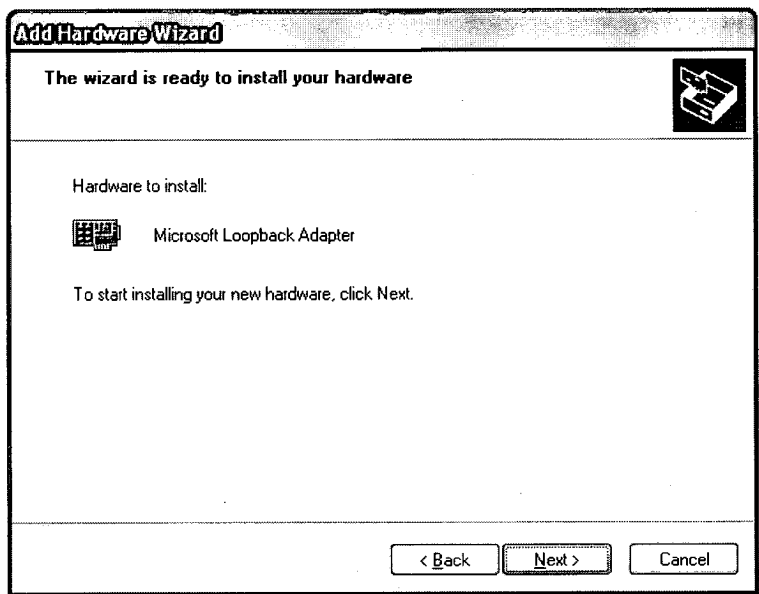


Figure 32. Starting the Installation

9. After installation is complete, click “Finish” to close the wizard.

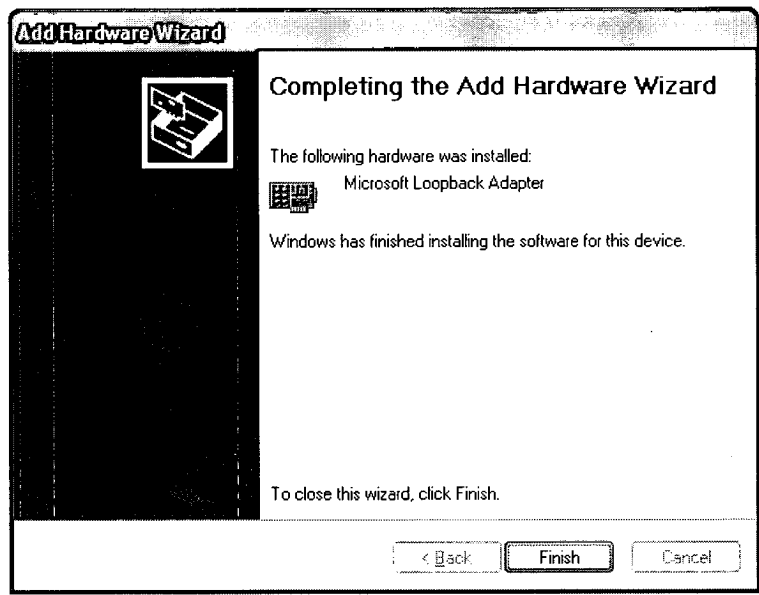
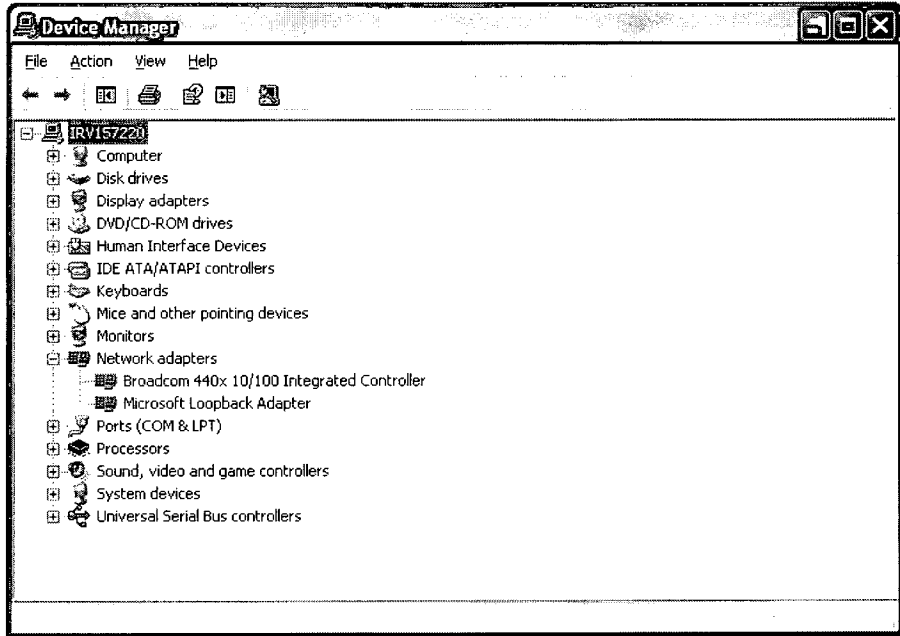


Figure 33. Complete Hardware Installation

10. To verify installation, go back to the Control Panel and select "System" for WinXP. Under the "Hardware" tab, select "Device Manager".  
For Windows 7, select "Device Manager" directly from Control Panel.
11. Select the "Network Adaptors" and expand the selection if necessary. You should see "Microsoft Loopback Adaptor" listed. Leave all default settings.



**Figure 34. Utilizing the Device Manager to Verify Installation**

12. Upon verification, go to "Sending Firmware via USB" on page 203.

## Sending Firmware via Parallel

This download method can be completed with firmware in the form **FILENAME.exe** or **FILENAME.prg**.

**NOTE:** The parallel option must be installed.

1. Copy the firmware to the printer by issuing these commands at the Command prompt:

```
copy /b FILENAME.prg lpt1: <Enter>
```

where **FILENAME.prg** is the target firmware

or

```
FILENAME -pb <Enter>
```

where **FILENAME.exe** is the target firmware

### IMPORTANT

**DO NOT** interrupt the downloading process once it has started. Interrupting a download will leave the flash memory on the controller PCBA and NIC incompletely loaded, and the printer may not boot up.

2. The process is complete when the new software has successfully loaded into flash memory and the printer has reset itself.

## **Sending Firmware via Serial**

---

Downloading firmware using serial RS-232 is not recommended due to the size of the firmware and significant wait time required to complete the process. Downloading through serial requires firmware in the form **FILENAME.prg** only.

1. Copy the firmware to the printer by issuing these commands at the Command prompt:

```
mode COM1:9600,N,8,1,P <Enter>
```

```
copy /b FILENAME.prg com1 <Enter>
```

where *FILENAME.prg* is the target firmware.

**NOTE:** Some systems can only use the 9600 baud rate. The baud rate information entered in the above commands must match the Baud Rate setting saved in the Power-Up Config.

### **IMPORTANT**

**DO NOT interrupt the downloading process once it has started. Interrupting a download will leave the flash memory on the controller PCBA and NIC incompletely loaded, and the printer may not boot up.**

2. The process is complete when the new software has successfully loaded into flash memory and the printer has reset itself.

## Reprogramming the Security Key

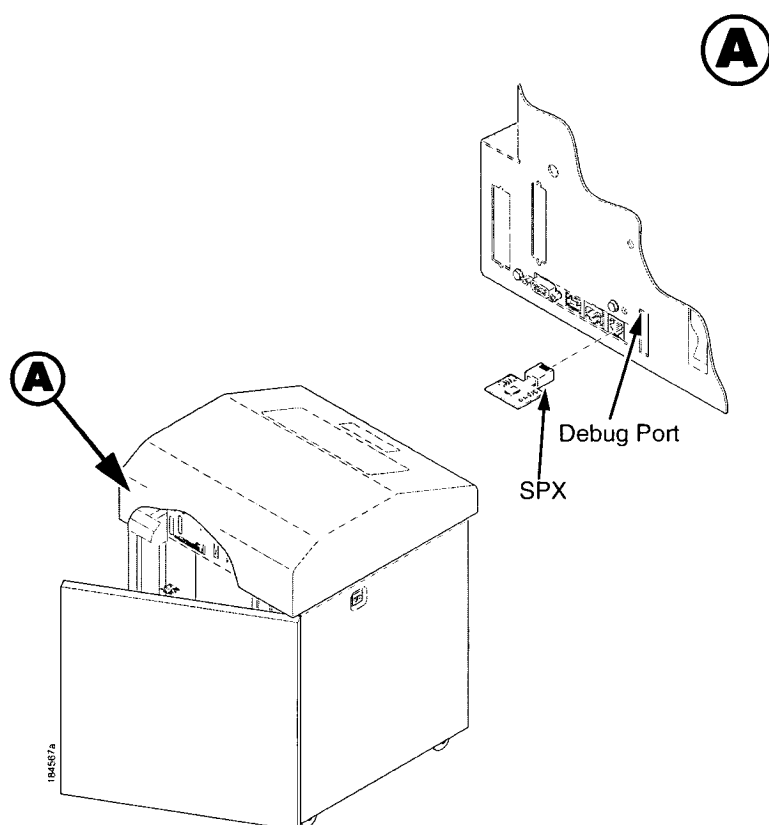
The security key on the PSA4 controller board can be reprogrammed with a Software Program Exchange (SPX) module. This allows the user or a service technician to enable features such as new emulations without having to remove covers and install a new security key on the controller board.

The SPX is an intelligent module that plugs into the debug port on the back of printers equipped with the PSA4 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 35 on page 211.



**Figure 35. 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

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

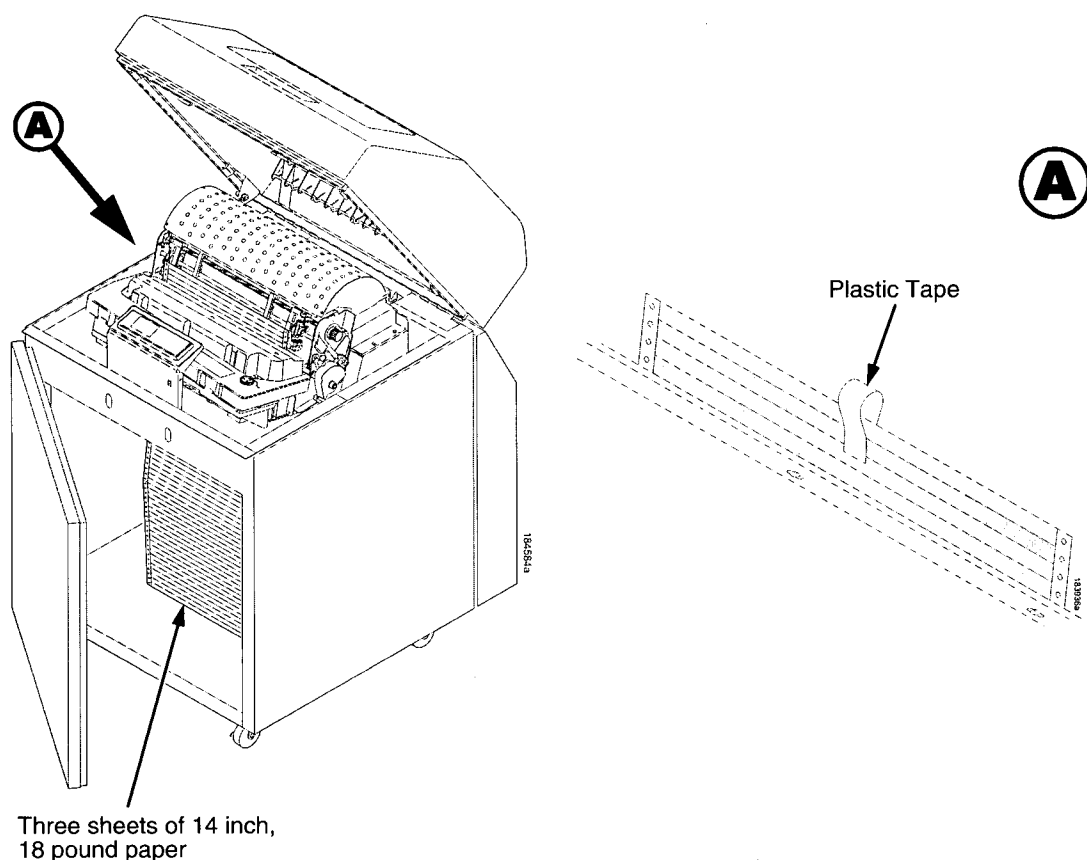
**The shuttle frame assembly must be at room temperature to do this procedure. Power off the printer and let it cool for at least one hour before doing this procedure.**

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 **ONLINE** key. "OFFLINE" will display.
4. Press (↵) **ENTER** to place the printer in Menu mode. Quick Setup displays.
5. On the control panel, press the  $\Delta + \nabla$  keys to unlock the **ENTER** key. "ENTER SWITCH UNLOCKED" briefly displays. (If "LOCKED" displays, simply press  $\Delta$  and  $\nabla$  again. This is the default key combination. The lock/unlock key combination can be programmed by the user. If  $\Delta + \nabla$  does not unlock **ENTER**, get the new key combination from the user.)
6. Press  $\Delta + \nabla + \triangleleft + \triangleright$  to enter the factory menu. (Press all four keys at the same time.) "Factory / Set Coil Temp" appears on the display.
7. Press **ENTER**. The display tells you to "PLEASE WAIT" while the coil temperature is set by an automatic calibration sequence in printer software.
8. When the display again reads "Factory / Set Coil Temp" press  $\Delta + \nabla$  to lock the **ENTER** key.
9. Press the **ONLINE** key to exit the Factory menu.
10. Coil temperature is set. Return the printer to normal operation (page 179).

## 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.

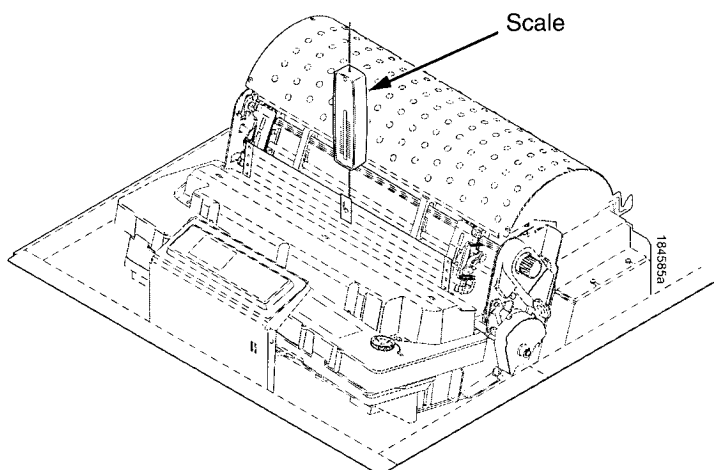
1. Open the printer cover.
2. Unload paper.
3. Unlock both tractors and move them outward to the sides as far as they will go.
4. Prepare a length of 14 inch wide paper consisting of three sheets that are still attached at the perforations. The paper must be single part, 18 lb. maximum weight, 0.0036 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 36.)
5. Fold a two inch piece of plastic tape over the top sheet, midway between the sides, as shown in Figure 36 detail A.



**Figure 36. 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 37.)

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 37.)



**Figure 37. 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 186), adjust if necessary, and recheck the dynamic paper tension.
12. If the platen gap is correct, remove the shuttle frame assembly (page 257) and check the following:
  - a. Inspect the hammerbank cover assembly for ribbon debris, paper debris, or other foreign matter. If the ribbon mask or hammerbank 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 214). Always adjust both tractors.**

1. Prepare the printer for maintenance (page 178).
2. Adjust the dynamic paper tension (page 214).
3. Carefully note the initial position of the adjustment screws. (Figure 38.)

## 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 38.)
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 179).

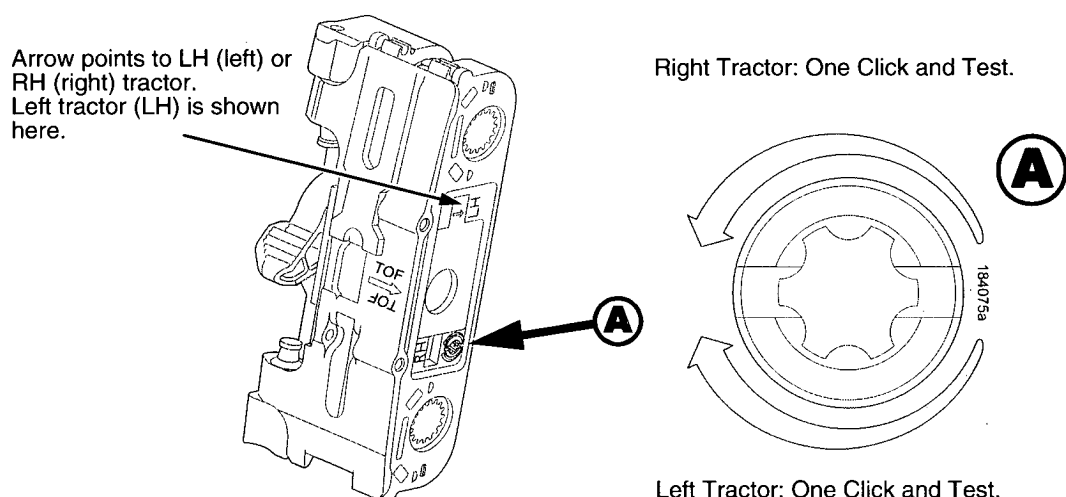


Figure 38. Tractor Belt Tension Adjustment

## 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 hammerbank. 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 178).
2. Remove the ribbon cartridge. (Refer to the *User's Manual*.)
3. Remove the shuttle cover assembly (page 233).
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 hammerbank logic cable (P04) and the hammerbank 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 hammerbank 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 less than 1000 Ohms, replace the shuttle frame assembly (page 257).
  - 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 hammerbank logic cable (P04) and hammerbank power cable(s) (P05, P06) to the shuttle.
12. Install the shuttle cover assembly (page 233).

13. Install the ribbon cartridge. (Refer to the *User's Manual*.)
14. Return the printer to normal operation (page 179).

## **Hammerbank Power Cable Shorts Test**

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This test determines if the hammerbank power cable is shorted.

1. Prepare the printer for maintenance (page 178).
2. Remove the paper path (page 241).
3. For Tabletop and Pedestal models, remove the electronics barrier panel (page 235).
4. Disconnect hammerbank power cable connector P105 from J105 on the controller board. (See Figure 55, page 282, item 10.)
5. Attach or hold the common lead (usually black) of an Ohmmeter to the shuttle frame.
6. At the hammerbank 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 hammerbank power cable. Repeat steps 4 through 6 for the second hammerbank cable if present.
7. Disconnect the common meter lead from the shuttle frame.
8. Check the hammerbank power cable(s) 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.
9. Connect hammerbank power cable connector(s) P105 to J105 on the controller board. (See Figure 55, page 282, item 10.)
10. For Tabletop and Pedestal models, install the electronics barrier panel (page 235).
11. Install the paper path (page 241).
12. Return the printer to normal operation (page 179).

## 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
- Hammerbank Power and Logic Intermediate Cables
- Control Panel Assembly Intermediate Cable
- Power Stacker Logic and Power (Intermediate) Cables

### Procedure:

1. Prepare the printer for maintenance (page 178).
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 at least 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 178).
2. Remove the paper path (page 241).
3. For Tabletop and Pedestal models, remove the electronics barrier panel (page 235).
4. Shuttle Motor test:
  - a. Remove the ribbon.
  - b. Remove the shuttle cover assembly (page 233).
  - 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 219):

- Intermediate cables of devices in the Main Wire Harness Test Tables:
  - Card Cage Fan
  - Hammerbank Fan
  - Ribbon Motor Drive
  - Exhaust Fan (in cabinet models)
  - Magnetic Pick-up Unit (MPU)
- Shuttle Motor Intermediate Cable
- Hammerbank Power and Logic Intermediate Cables
- Control Panel Assembly Intermediate Cable
- Power Stacker Logic and Power (Intermediate) Cables



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# 5

# *Replacement Procedures*

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## 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 263.

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## 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 hammerbank: it is not field repairable so you must replace the entire shuttle assembly. Hammerspring assemblies, the hammerbank cover, and the ribbon mask are the only replaceable components of the shuttle frame assembly.

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### List of Removal / Installation Procedures

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## Belt, Paper Feed Timing

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### Removal

1. Prepare the printer for maintenance (page 178).
2. Cabinet Models: Remove the paper path (page 241).  
Tabletop and Pedestal Models: Remove the electronics barrier panel (page 235).
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 181, item 1.)
4. Loosen (do not remove) the two 5/16 inch paper feed motor mount screws. (See page 181, 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 181, 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 181, item 1.)
5. Cabinet Models: Install the paper path (page 241).  
Tabletop and Pedestal Models: Install the electronics barrier panel (page 235).
6. Return the printer to normal operation (page 179).

## Belt, Platen Open

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### Removal

1. Prepare the printer for maintenance (page 178).
2. Cabinet Models: Remove the paper path (page 241).  
Tabletop and Pedestal Models: Remove the electronics barrier panel (page 235).
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 183, 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 183, item 2.)
5. Push the platen open motor shaft toward the front of the printer to loosen the platen open belt. (See page 183, 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 183, item 3.)
2. Release the platen open motor; the spring will automatically tension the belt.
3. *Slowly* tighten the motor adjustment screw. (See page 183, 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 183, item 1.)
5. Cabinet Models: Install the paper path (page 241).  
Tabletop and Pedestal Models: Install the electronics barrier panel (page 235).
6. Return the printer to normal operation (page 179).

## **Cartridge Interface Board (CIB)**

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### **Removal**

1. Prepare the printer for maintenance (page 178).
2. Unplug P20 from J20 on the CIB.
3. Remove the three 6-32 x 1/4 inch button head fasteners securing the cartridge interface board to the motor mounting flange.
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 mounting flange and secure by using three 6-32 x 1/4 inch button head fasteners.
3. Torque the three fasteners to 18 inch lbs.
4. Return the printer to normal operation (page 179).

## **Control Panel Assembly - Cabinet Model**

---

### **Removal**

1. Prepare the printer for maintenance (page 178).
2. Open the printer cover.
3. Disconnect the ribbon cable connector P310 from the J310 on the back of the control panel assembly. (See page 270, item 2.)
4. Remove the two screws securing the control panel to the panel bracket. (See page 270, 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 270, 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 P310 to J310 on the back of the control panel.
4. Return the printer to normal operation (page 179).

## **Control Panel Assembly - Pedestal Model**

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### **Removal**

1. Prepare the printer for maintenance (page 178).
2. Open the printer cover.
3. Remove the four screws securing the panel bracket to the printer cover. (See page 272, items 1, 2, and 3).
4. Remove the two screws securing the control panel to the panel bracket.
5. Remove the control panel cable from underneath the cable clamp.
6. Disconnect the ribbon cable connector P310 from the J310 on the back of the control panel assembly. (See page 272, item 5).
7. 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.
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 P310 to J310 on the back of the control panel.
4. Secure the control panel cable underneath the cable clamp.
5. Install the four screws securing the panel bracket to the printer. (See page 272, items 1, 2, and 3).
6. Return the printer to normal operation (page 179).

## **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 controller board will be printed on the printer's configuration printout after completing this replacement procedure.

2. Prepare the printer for maintenance (page 178).
3. Cabinet Models: Remove the paper path (page 241).  
Tabletop and Pedestal Models: Remove the electronics barrier panel (page 235).
4. Disconnect all cable connectors from the controller board.  
(See page 280.)
5. Loosen but do not remove the two screws securing the metal controller shield near serial cable connector J201.
6. 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.**

7. 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.
8. If you are removing the controller PCBA and installing a new assembly be sure to remove the security key from the removed PCBA and install it on the new controller PCBA.

## 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 security key on the new controller (page 252).
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 282.)
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. Cabinet Models: Install the paper path (page 241).  
Tabletop and Pedestal Models: Install the electronics barrier panel (page 235).

**If the original board was replaced, you must download the emulation software again.**

7. Load flash memory (page 194).
8. Set coil temperature (page 213)
9. Adjust the hammer phasing (page 192).
10. Adjust the paper out distance (page 189).
11. Make a configuration printout, the MAC address for the onboard ethernet interface is printed on the configuration printout.



## Cover Assembly, Hammerbank / Ribbon Mask

### Removal

1. Prepare the printer for maintenance (page 178).
2. Remove the shuttle frame assembly (page 257).
3. Remove the three button-head fasteners on the hammerbank cover assembly.
4. Lift the thick plate of the hammerbank cover assembly at one end, and peel the cover away from hammerbank magnets. (See Figure 39.)

### Installation

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

1. With the thick plate facing the hammerbank, hold the hammerbank 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 hammerbank. (See Figure 39.)
2. Gently lower the hammerbank cover assembly until it lies flush on the hammerbank.
3. Check that the hammerbank cover assembly is positioned over the alignment pins and the hammer tips.
4. Install the three button-head fasteners on the hammerbank cover assembly.
5. Install the shuttle frame assembly (page 257).
6. Return the printer to normal operation (page 179).

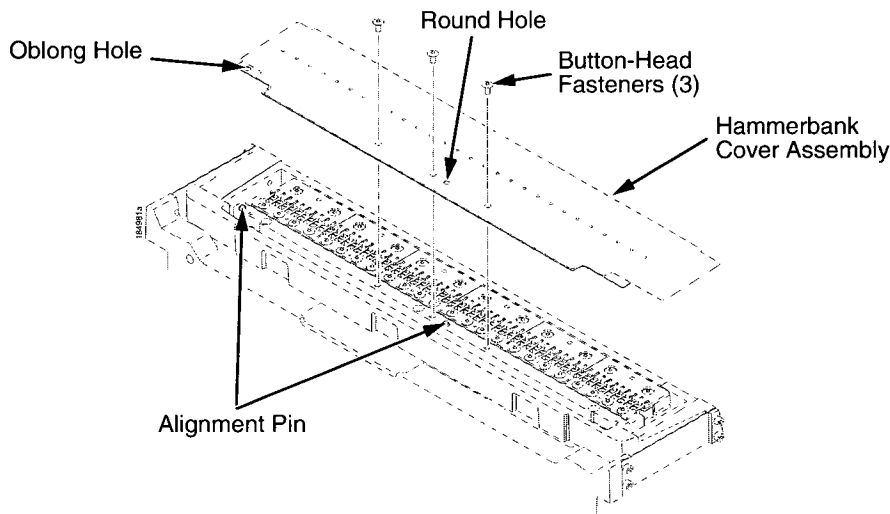


Figure 39. Hammerbank Cover Assembly

## Cover Assembly, Shuttle

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### Removal

1. Prepare the printer for maintenance (page 178).
2. Remove the ribbon cartridge. (Refer to the *User's Manual*.)
3. Loosen the shuttle cover screws (page 276, item 2).
4. Unplug the weld sensor cable (page 318).
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 318).
3. Tighten the shuttle cover screws (page 276, item 2).
4. Install the ribbon cartridge. (Refer to the *User's Manual*.)
5. Return the printer to normal operation (page 179).

## **Dashpot**

---

**CAUTION** Two persons may be required to do this procedure. Prop or hold the printer cover securely while disengaging the dashpot.

### **Removal**

1. Prepare the printer for maintenance (page 178).
2. Cabinet model: open the cabinet rear door.  
Pedestal model: open the printer lid.
3. Pry back the spring retaining clips. (See Figure 49, page 270 for cabinet model and Figure 50, page 272 for pedestal model).
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 49, page 270 for cabinet model and Figure 50, page 272 for pedestal model)
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 179).

## Electronics Barrier Panel

---

**NOTE:** This procedure applies to the pedestal models only.

### CAUTION

**Do not drop screws into the card cage.**

### Removal

1. Prepare the printer for maintenance (page 178).
2. Use a #2 Phillips screw driver to loosen the captive screws on both sides of the lower paper path assembly. **DO NOT** remove the screws. (Figure 53, page 278, item 12).
3. Loosen the screws on the back side of the lower paper path assembly. **DO NOT** remove the screws. (Figure 53, page 278, item 13).
4. Slide the lower paper path assembly back, aligning it with the key hole, and lift up to remove.
5. Loosen the captive screws on the electronics barrier panel, and using both hands, lift panel up to remove. (Figure 53, page 278, items 3 and 4).

### Installation

### IMPORTANT

**Be sure to install the electronics barrier panel inbetween the side plate and the card cage wall.**

1. Reverse step 2 through step 5 of the removal procedure.

### IMPORTANT

**Make sure the electronics barrier panel grommet holes fit over the grommets. Check cables for obstruction.**

2. Return the printer to normal operation (page 179).

## **Fan Assembly, Cabinet Exhaust**

---

**NOTE:** This procedure applies only to cabinet models.

### **Removal**

1. Prepare the printer for maintenance (page 178).
2. Open the front and rear cabinet doors and the printer cover.
3. Remove the paper fence/paper tray assembly. (See page 268.)
4. Remove the two 1/4 inch screws securing bottom of the air exhaust duct. (See page 270, item 4).
5. Remove the 1/4 inch screw directly below the forms thickness lever.
6. Disconnect the fan cable 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 step 2 through step 8 of the removal procedure.
2. Return the printer to normal operation (page 179).

## Fan Assembly, Card Cage

---

### Removal

1. Prepare the printer for maintenance (page 178).
2. Cabinet Models: Remove the paper path (page 241).  
Tabletop and Pedestal Models: Remove the electronics barrier panel (page 235).
3. Disconnect the card cage fan cable connector P306. (See page 294.)
4. Cabinet Models: Remove the two fan mounting screws from the bottom of the fan. (See page 294, item 2.)  
Tabletop and Pedestal Models: Remove the four fan mounting screws and nut. (See page 280, 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 step 2 through step 5 of the removal procedure.
2. Return the printer to normal operation (page 179).

## Fan Assembly, Hammerbank

---

### Removal

1. Prepare the printer for maintenance (page 178).
2. Remove the ribbon. (Refer to the *User's Manual*.)
3. Remove the shuttle cover assembly (page 233).
4. Disconnect the fan cable connector P308 from J308 at the fan.
5. Remove the two screws securing the fan to the base casting. Angle the hammerbank 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 294, items 21 and 22.)

### Installation

**CAUTION** Air flow is UP. Install the hammerbank fan so the label faces up.

1. Reverse step 2 through step 5 of the removal procedure.
2. Return the printer to normal operation (page 179).

## **Magnetic Pickup (MPU) Assembly**

---

### **Removal**

1. Prepare the printer for maintenance (page 178).
2. Remove the ribbon. (Refer to the *User's Manual*.)
3. Remove the shuttle cover (page 233).
4. Disconnect the magnetic pickup (MPU) cable connector P03 (page 286, item 5).
5. Loosen the 7/64 inch hex MPU clamp screw (page 286, 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 56, page 286).
2. Using a feeler gauge, adjust the gap between the MPU assembly and the flywheel to  $0.010 \pm .001$  inch ( $0.254 \pm 0.025$  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  $0.010 \pm .001$  inch ( $0.254 \pm 0.025$  mm), go to step step 4.
  - b. If the gap is not  $0.010 \pm 0.001$  inch ( $0.254 \pm 0.025$  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 286, item 5). Make sure the MPU cable does not touch the extension spring after cable connection.
5. Install the shuttle cover (page 233).
6. Install the ribbon. (Refer to the *User's Manual*.)
7. Adjust the hammer phasing (page 192).
8. Return the printer to normal operation (page 179).

## Paper Feed Motor

---

### Removal

1. Prepare the printer for maintenance (page 178).
2. Cabinet Models: Remove the paper path (page 241).  
Tabletop and Pedestal Models: Remove the electronics barrier panel (page 235).
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 276, item 7).
4. Loosen, but do not remove, the two 5/16 inch paper feed motor mounting screws. (See page 294, 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 and unplug the motor from J103. (See the cable routing diagrams in Appendix A.)

**NOTE:** Some paper feed motors are mounted with nuts and bolts; other motors have threaded flanges, eliminating the need for nuts.

7. Remove the motor mount screws (and nuts, if present).
8. 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 294, items 6 and 18.)
2. Connect the paper feed motor cable connector to J103 on the controller. For pedestal models route the cable through the rubber grommet.
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 241).  
Tabletop and Pedestal Models: Install the electronics barrier panel (page 235).
8. Return the printer to normal operation (page 179).



## Paper Ironer

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

**IMPORTANT** DO NOT remove the paper ironer on the Zero Tear Pedestal printers unless you are solving paper jam problems.

### Removal

1. Prepare the printer for maintenance (page 178).
2. Remove the shuttle frame assembly (page 257).
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 290, item 3).
5. On models P8000HD, P8X06H, P8208H, P8215, and P8220, 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 290, item 3.)
2. Push the paper ironer down into the slots until the tabs engage.
3. On models P8000HD, P8X06H, P8208H, P8215, and P8220, install the auxiliary paper ironer in front of the standard paper ironer. (See also the note on page 290, next to item 27.) Make sure the tabs on both paper ironers are firmly engaged.
4. Install the shuttle frame assembly (page 257).
5. Return the printer to normal operation (page 179).

## Paper Guide Assembly

### Removal

1. Prepare the printer for maintenance (page 178).
2. Loosen—do not remove—the screws that secure the paper path to the card cage. (See Figure 40.)  
Cabinet model: Three screws  
Pedestal model: Four screws
3. Slide the paper path to the left and lift it off the card cage.

### Installation

1. Position the paper path offset slightly on the card cage with the keyway cutouts over the three loosened screws. (See Figure 40.)  
Cabinet model: offset to the left.  
Pedestal model: offset to the rear.
2. Slide the paper path to the right for cabinet models and forward for pedestal models, engaging the screws in the keyway slots. Slide the paper path as far as it will go.
3. Tighten the screws securing the paper path to the card cage. (See Figure 40)
4. Return the printer to normal operation (page 179).

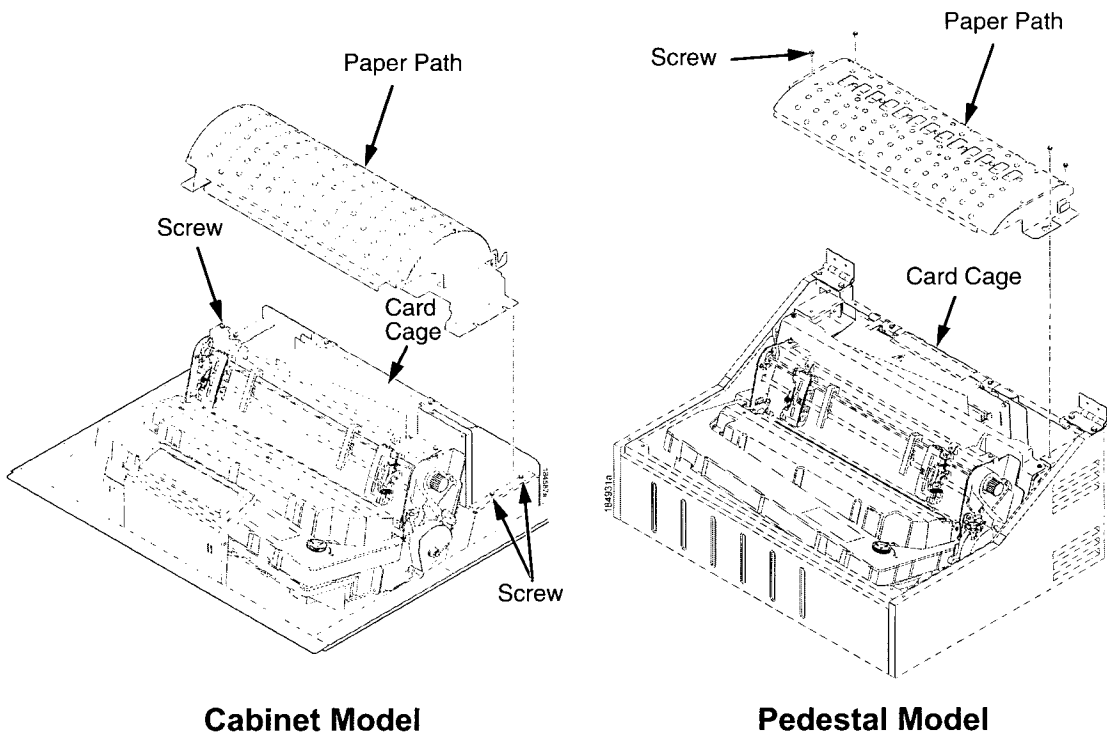


Figure 40. The Paper Path

## **Platen**

---

### **Removal**

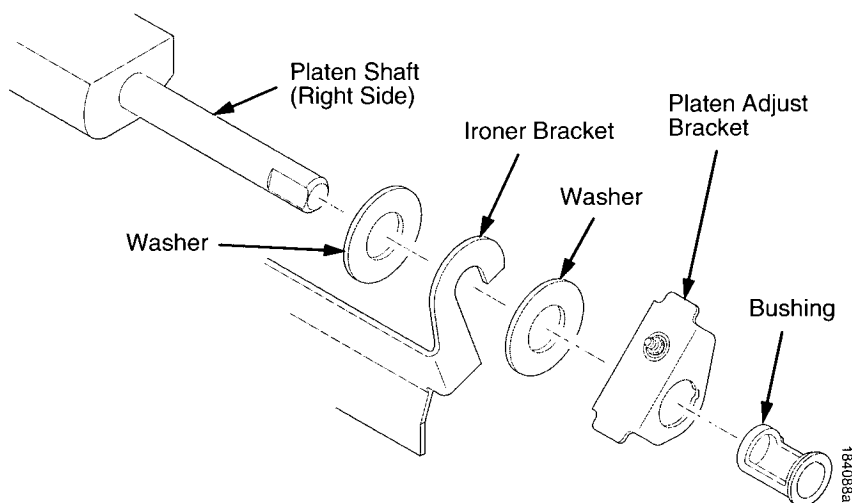
1. Prepare the printer for maintenance (page 178).
2. Remove the shuttle frame assembly (page 257).
3. Remove the paper ironer (page 240).
4. Remove the three 1/4 inch screws securing the paper ironer bracket assembly and remove the assembly. (See page 290, items 4, 5, and 6.)
5. Remove the platen open belt (page 226).
6. Remove the platen pulley (page 290, 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 290, 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 290, 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 290, 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

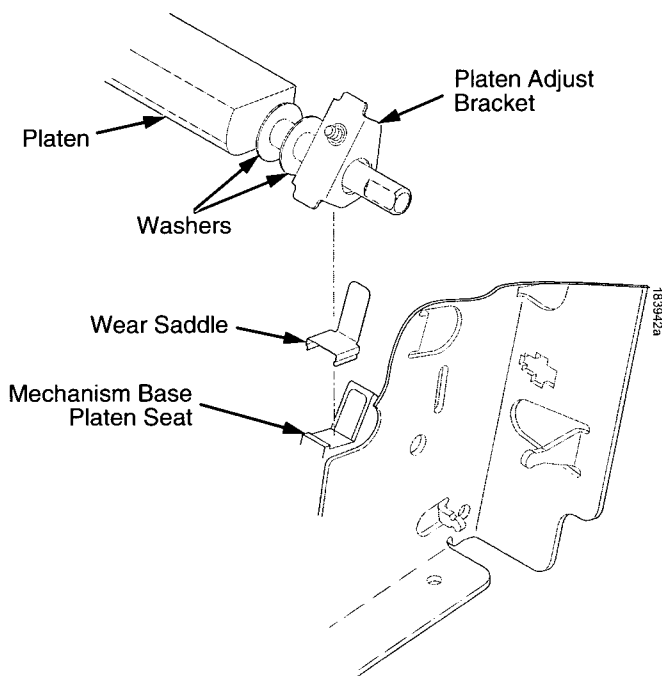
Install the platen with the longer shaft on the right hand side of the printer. The dowel pins protruding from the ends of the platen are the platen shafts. The platen shafts are not of equal length.

1. Wipe the platen shafts clean of grease and debris.
2. Install two washers on the longer (right) platen shaft.  
(See Figure 41 below.)
3. Apply bearing lubricant to both platen shafts.



**Figure 41. 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 42 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 41.)
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 42.



**Figure 42. 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 290, 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 290, 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 41.)
  - 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 41.)
  - 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 290.)
16. Install the platen shaft pulley with the 7/64 inch setscrew facing up and tighten the setscrew (page 290, items 21 and 22).
17. Install, but do not adjust, the platen open belt (page 290, item 23).
18. Install the paper ironer with the black tape towards the rear of the printer (page 290, item 3).
19. Install the shuttle frame assembly (page 257).
20. Adjust the platen gap (page 186).
21. Adjust the platen open belt (page 182).
22. Check the hammer phasing (page 192).
23. Return the printer to normal operation (page 179).

## **Platen Open Motor**

---

### **Removal**

1. Prepare the printer for maintenance (page 178).
2. Cabinet Models: Remove the paper path (page 241).  
Tabletop and Pedestal Models: Remove the electronics barrier panel (page 235).
3. Cabinet Models: Remove the card cage fan (page 237).
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 290, item 24).
5. Using a 5/32 inch Allen wrench, loosen the platen motor adjustment screw (page 294, item 10).
6. Remove the platen open belt (page 290, item 23).
7. Unplug the motor from J06A.
8. Remove the 5/32 inch platen motor adjustment screw, platen spring post, and platen belt spring (page 294, items 10, 20, and 21).
9. Remove the 5/16 inch motor lower mount screw.
10. Remove the platen open motor assembly.

## Installation

1. Position the platen open motor assembly with the wires toward the rear (page 294, 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 294, 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 J06A.
6. 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.**

7. The spring automatically tensions the belt.
8. *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.

9. Snap the platen open belt cover into the slots in the side plate.
10. Cabinet Models: Install the card cage fan (page 237).
11. Cabinet Models: Install the paper path (page 241).  
Tabletop and Pedestal Models: Install the electronics barrier panel (page 235).
12. Return the printer to normal operation (page 179).



## **Platen Stop Assembly**

---

**NOTE:** The forms thickness lever is part of the platen stop assembly.

### **Removal**

1. Prepare the printer for maintenance (page 178).
2. Loosen—do not remove—the 7/64 inch clamp screw and pull the platen stop assembly off the platen shaft. (See page 290, 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 290.)
2. Return the printer to normal operation (page 179).

## 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 178).
2. Cabinet Models: Remove the paper path (page 241).  
Tabletop and Pedestal Models: Remove the electronics barrier panel (page 235).
3. Disconnect all cable assemblies going to and from the power supply board. (See page 282, 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 282, 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 282, item 15.)
4. Reconnect the AC power at P1 and DC power at P101A and P101B.
5. Set the coil temperature if the original power supply was replaced by a new or refurbished power supply (page 177).
6. Cabinet Models: Install the paper path (page 241).  
Tabletop and Pedestal Models: Install the electronics barrier panel (page 235).
7. Return the printer to normal operation (page 179).

## **Power Switch**

---

### **Removal**

1. Prepare the printer for maintenance (page 178).
2. Remove the card cage fan (page 237).
3. Disconnect the power switch electrical leads.  
Cabinet Models: See page 296.  
Tabletop and Pedestal Models: See page 280.
4. Press in on the spring clips and remove the power switch from the printer.

### **Installation**

1. Press the power switch into the cutout until the spring clips snap into place.  
Cabinet models: See page 296.  
Tabletop and Pedestal models: See page 280.

### **CAUTION**

**To prevent severe damage to the printer, the power switch electrical leads must be connected correctly.**

2. Connect the four power switch electrical leads.  
Cabinet Models: See page 296.  
Tabletop and Pedestal Models: See page 280.
3. Install the card cage fan (page 237).
4. Return the printer to normal operation (page 179).

## Ribbon Drive Motor

---

### Removal

1. Prepare the printer for maintenance (page 178).
2. Remove the ribbon cartridge. (Refer to the *User's Manual*.)
3. Remove the shuttle cover (page 233).
4. Disconnect the ribbon drive motor cable connector at J06B (page 294, item 12, cable portion).
5. Remove the four M3 screws securing the ribbon drive motor to the motor mounting flange (page 294, items 12 and 22).
6. Remove the ribbon drive motor.

### Installation

1. Use four M3 screws to mount the ribbon drive motor to the motor mounting flange. Orient the motor so that the motor cable exits to the right side of the bracket.
2. Install the shuttle cover (page 233).
3. Connect the ribbon drive motor cable connector to J06B.
4. Install the ribbon cartridge. (Refer to the *User's Manual*.)
5. Return the printer to normal operation (page 179).

## 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

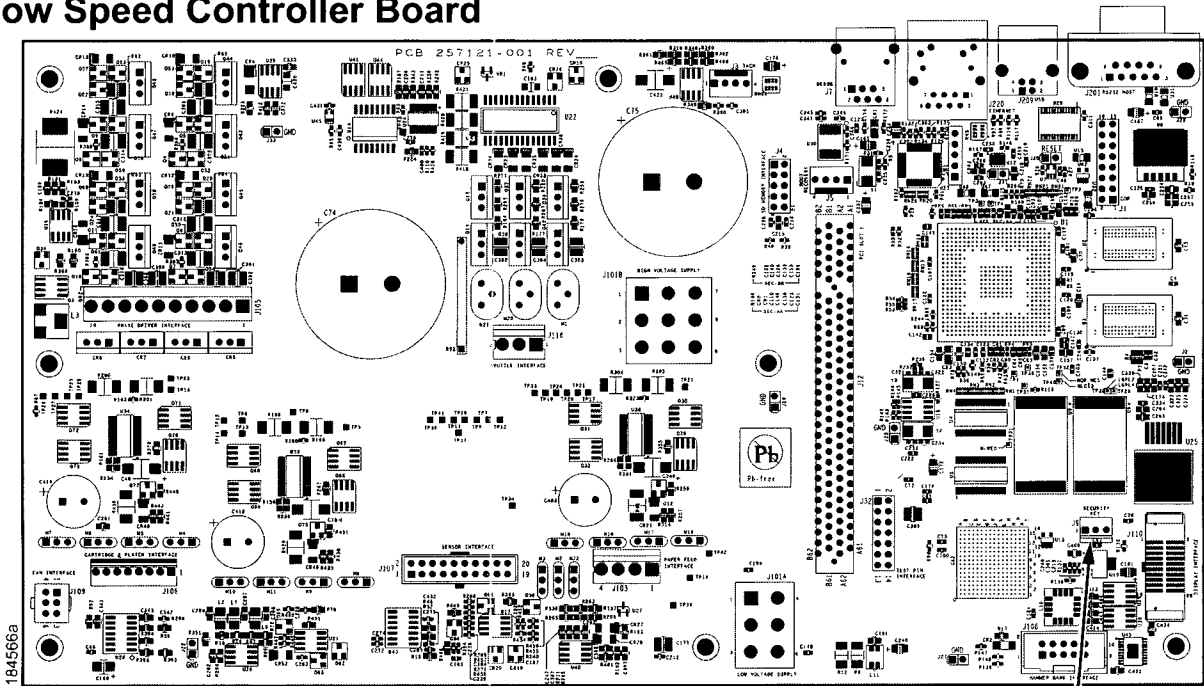
1. Make a configuration printout of all saved configurations. (Refer to the *User's Manual*.)
2. Prepare the printer for maintenance (page 178).
3. Cabinet Models: Remove the paper path (page 241).  
Tabletop and Pedestal Models: Remove the electronics barrier panel (page 235).
4. Put on a static wrist 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 43, page 253.)

**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

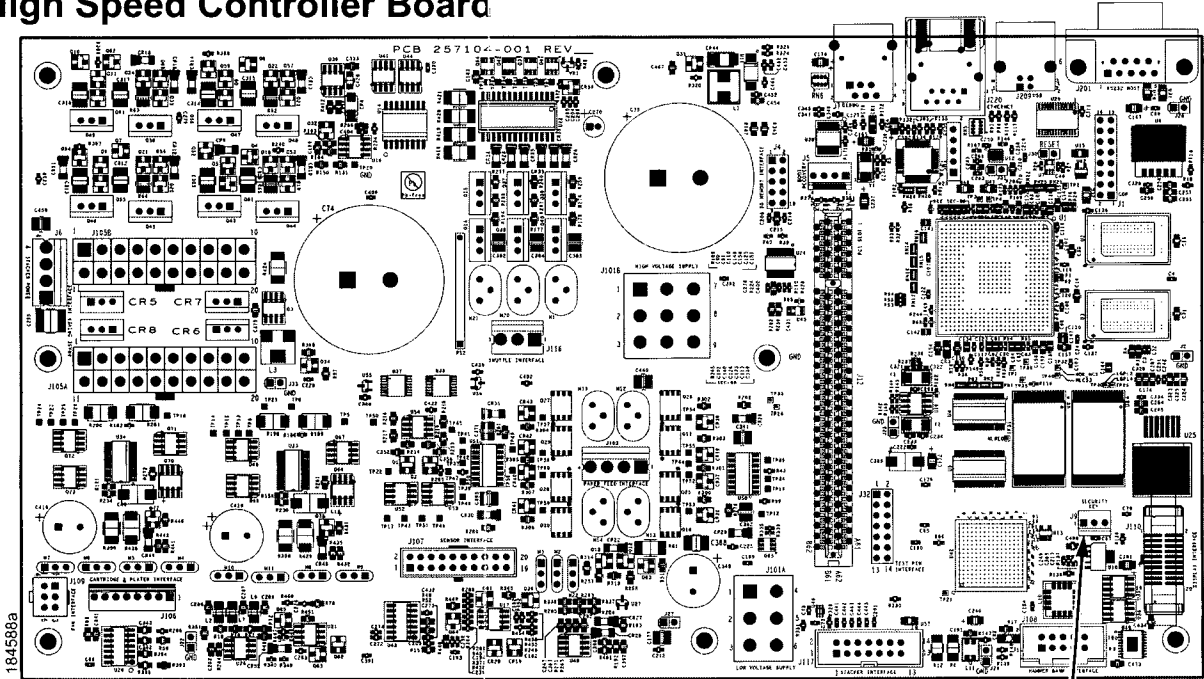
1. Put on a static wrist strap and ground the lead to an unpainted part of the printer frame. Touch the printer frame with the hand wearing the wrist strap before you touch memory modules or the controller board.
2. Position the security key on controller board connector J9 so that the lock indentation 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 43.)
3. Cabinet Models: Install the paper path (page 241).  
Tabletop and Pedestal Models: Install the electronics barrier panel (page 235).
4. Download the emulation (page 194).
5. If an SPX came with the flash memory, reprogram the security key (page 211).
6. Return the printer to normal operation (page 179).
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*.)

Low Speed Controller Board



J9: Security Key

High Speed Controller Board



J9: Security Key

Figure 43. Security Key

## Testing NIC Operation

You can test the NIC by running the Ethernet Test under the DIAGNOSTICS menu -> Printer Test. Verify that the NIC is configured and working correctly by examining the test printout.

## Shaft, Splined

---

### IMPORTANT

**In order to preserve correct alignment of the side plates, the barrier panel must remain installed and fastened during this procedure.**

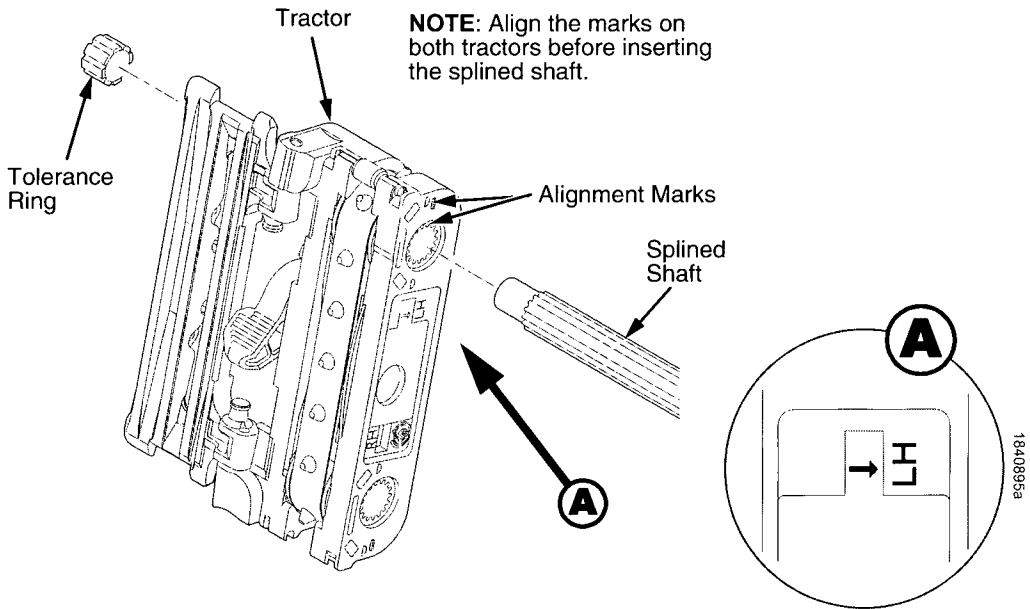
### Removal

1. Prepare the printer for maintenance (page 178).
2. Remove the paper supports from the splined shaft and support shaft. (See page 288, item 4.)
3. Remove the paper feed timing belt (page 225).
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 288, 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 288, 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 44.)
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 44.)
3. Install the tolerance ring on the left end of the splined shaft (page 288, item 5).
4. Insert the tolerance ring lead-in portion into the sealed ball bearing in the left tractor shaft plate (page 288, 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 288, 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" behind the tab on the right side plate.
6. Install the paper feed timing belt (page 225).
7. Set the paper feed timing belt tension (page 180).

8. Install the paper supports on the splined and support shafts.  
(See page 288, item 4.)
9. Return the printer to normal operation (page 179).



**Figure 44. 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 178).
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 288, item 4.)
4. Remove the screw securing the right tractor shaft plate and remove the plate. (See page 288, 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 288, 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 288, 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 288, items 9 and 12.)
3. Install the right tractor shaft plate and screw (page 288, 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” behind the tab on the right side plate.
4. Install the paper supports to the splined shaft and support shaft. (See page 288, item 4.)
5. Return the printer to normal operation (page 179).

## Shuttle Frame Assembly

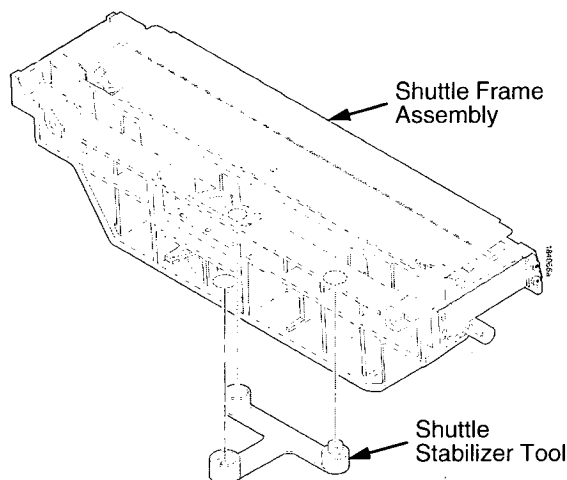
### Removal

1. Prepare the printer for maintenance (page 178).
2. Remove the ribbon cartridge. (Refer to the *User's Manual*.)
3. Remove the shuttle cover assembly (page 233).
4. Disconnect the MPU cable connector P03 and shuttle motor cable connector P02 (page 286, 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 282.)
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 45. Using the Shuttle Stabilizer Tool**

## Installation

1. Install the hammerbank / ribbon mask cover assembly if it was removed (page 232).

### 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 282).  
**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 286, item 6.)
10. Route the MPU cable under the extension spring and connect the MPU cable connector. (See page 286, 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 182, steps 2, 3, and 4.)**

11. If the shuttle assembly is a new or refurbished unit, adjust the platen gap (page 186); otherwise, skip to step step 12.
12. Install the shuttle cover assembly (page 233).
13. Install the ribbon cartridge. (Refer to the *User's Manual*.)
14. Adjust the hammer phasing (page 192).
15. Return the printer to normal operation (page 179).

## Spring, Extension, Hammerbank

---

**CAUTION** Do not let the hammerbank rotate toward the platen during spring replacement.

### Removal

1. Prepare the printer for maintenance (page 178).
2. Remove the ribbon cartridge. (Refer to the *User's Manual*.)
3. Remove the shuttle cover assembly (page 233).
4. P8200HD, P8220, and P8208H models only: Remove the anti-rotation spring constraint from the extension spring. (See page 286, item 6.)
5. Unhook the extension spring from the spring lugs on the hammerbank and shuttle frame. (See page 286, item 4.)

### Installation

1. Apply a dab of bearing lubricant to both spring lugs.

**CAUTION** Do not let the hammerbank 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 286, item 4.)
3. P8200HD, P8220, and P8208H models only: Install the anti-rotation spring constraint over the extension spring. (See page 286, item 6.)
4. Install the shuttle cover assembly (page 233).
5. Install the ribbon cartridge. (Refer to the *User's Manual*.)
6. Return the printer to normal operation (page 179).

## **Switch Assembly, Paper Detector**

---

### **Removal**

1. Prepare the printer for maintenance (page 178).
2. Cabinet Models: Remove the paper path (page 241).  
Tabletop and Pedestal Models: Remove the electronics barrier panel (page 235).
3. Remove the two 1/4 inch screws securing the paper detector switch assembly. (See page 294, items 3 and 4.)
4. Unplug the paper detector from J10.
5. 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 294, items 3 and 4.)
2. Check PMD sensor arm range: make sure it travels freely and completely back into the sensing cavity.
3. Plug the paper detector connector P10 into J10 on the wiring harness. Assure the mating connector pair securely latch.
4. Route the switch cables back to the controller board connector P106. (See the cable routing diagrams in Appendix A.)
5. Cabinet Models: Install the paper path (page 241).  
Tabletop and Pedestal Models: Install the electronics barrier panel (page 235).
6. Check the paper out adjustment (page 189).
7. Return the printer to normal operation (page 179).

## Switch Assembly, Platen Interlock

---

### Removal

1. Prepare the printer for maintenance (page 178).
2. Cabinet Models: Remove the paper path (page 241).  
Tabletop and Pedestal Models: Remove the electronics barrier panel (page 235).
3. Fully close the forms thickness lever (position 'A').
4. Disconnect connector P07 from J07 on the sensor cable harness.
5. Remove two Phillips #1 screws securing the platen interlock switch assembly. (See page 290, item 11.)
6. Remove the platen interlock switch assembly from the switch bracket.
7. Remove the switch cable from the cutout in the right side plate.

### Installation

1. Reverse steps step 2 through step 7 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 179).

## Tractor (L/R)

---

### Removal

1. Prepare the printer for maintenance (page 178).
2. Remove the support shaft (page 256).
3. Remove the splined shaft (page 254).

### Installation

1. Using the replacement tractors, install the support shaft (page 256).
2. Install the splined shaft (page 254).
3. Return the printer to normal operation (page 179).

## Weld Sensor

---

### Removal

1. Prepare the printer for maintenance (page 178).
2. Remove the shuttle cover (see page 257).

### 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 257). Be sure to plug the weld sensor cable connector P31 back into the weld sensor PCBA.
4. Return the printer to normal operation (page 179).

---

# 6

## *Illustrated Parts Breakdown*

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.

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### Illustrations of Printer Components

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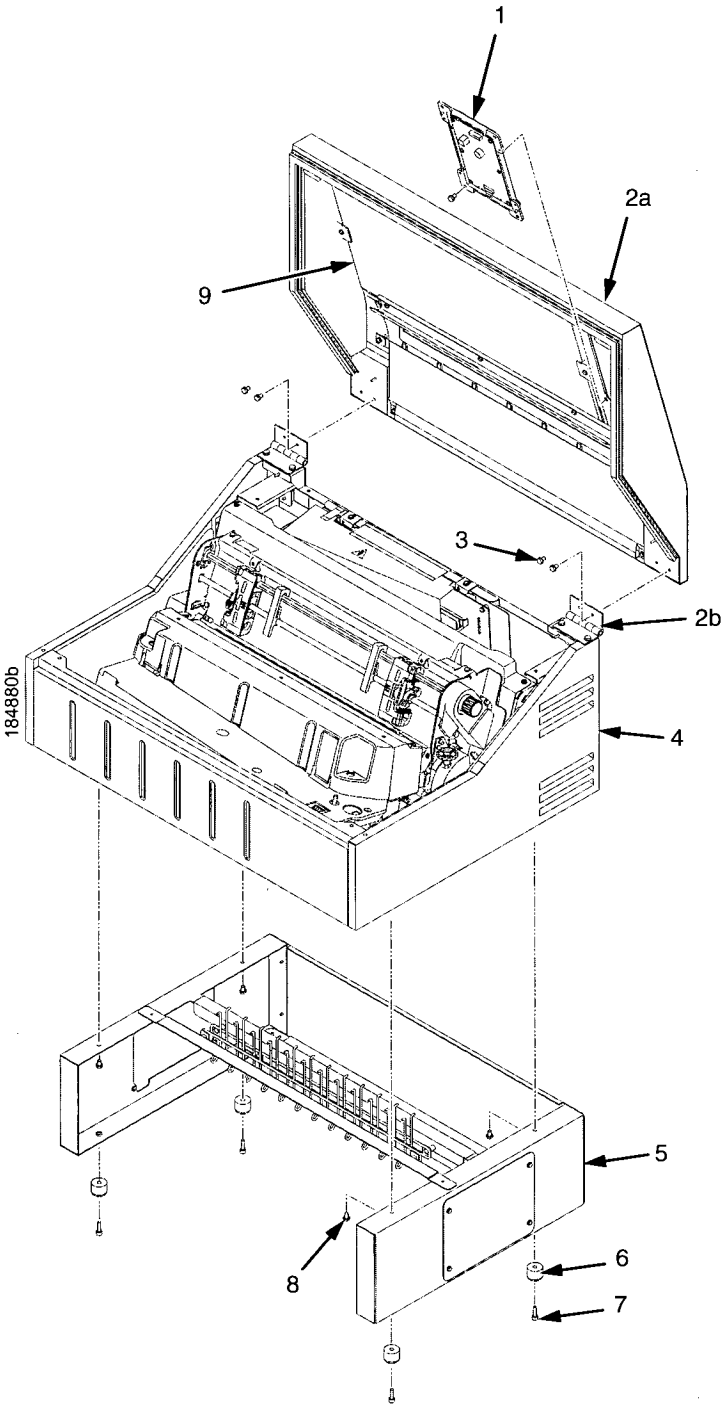


Figure 46. Tabletop Details

| Item No. | Part No.<br>(RoHS Compliant) | Description                                                 | Notes                                       |
|----------|------------------------------|-------------------------------------------------------------|---------------------------------------------|
| 1        | 257655-001                   | Control Panel/Cable/Overlay Pedestal Field Kit              | Includes control panel, cable, and overlay. |
| 2a       | 257552-001                   | Top Cover Assy,Tabletop, P8                                 | Includes two hinges and dashpot.            |
| 2b       | 257662-001                   | Field Kit, Lid,Hinge/Springs                                |                                             |
| 3        | Ref                          | Screw (4)                                                   |                                             |
| 4        | Ref                          | Base Assembly, Tabletop, P8                                 |                                             |
| 5        | Ref<br>256964-001            | Packaged Ped Kit, Stealth Black<br>Stand Assembly, Tabletop | Stand assembly 256964-001 not packaged.     |
| 6        | 101570-001                   | Bumper                                                      |                                             |
| 7        | Ref                          | Screw,10-32x5/8,CHSH,STM/ZNB,AE B18.3                       |                                             |
| 8        | Ref                          | Screw (4)                                                   |                                             |
| 9        | Ref                          | Window, Top Cover                                           | Part of item 2, Top Cover Assy.             |

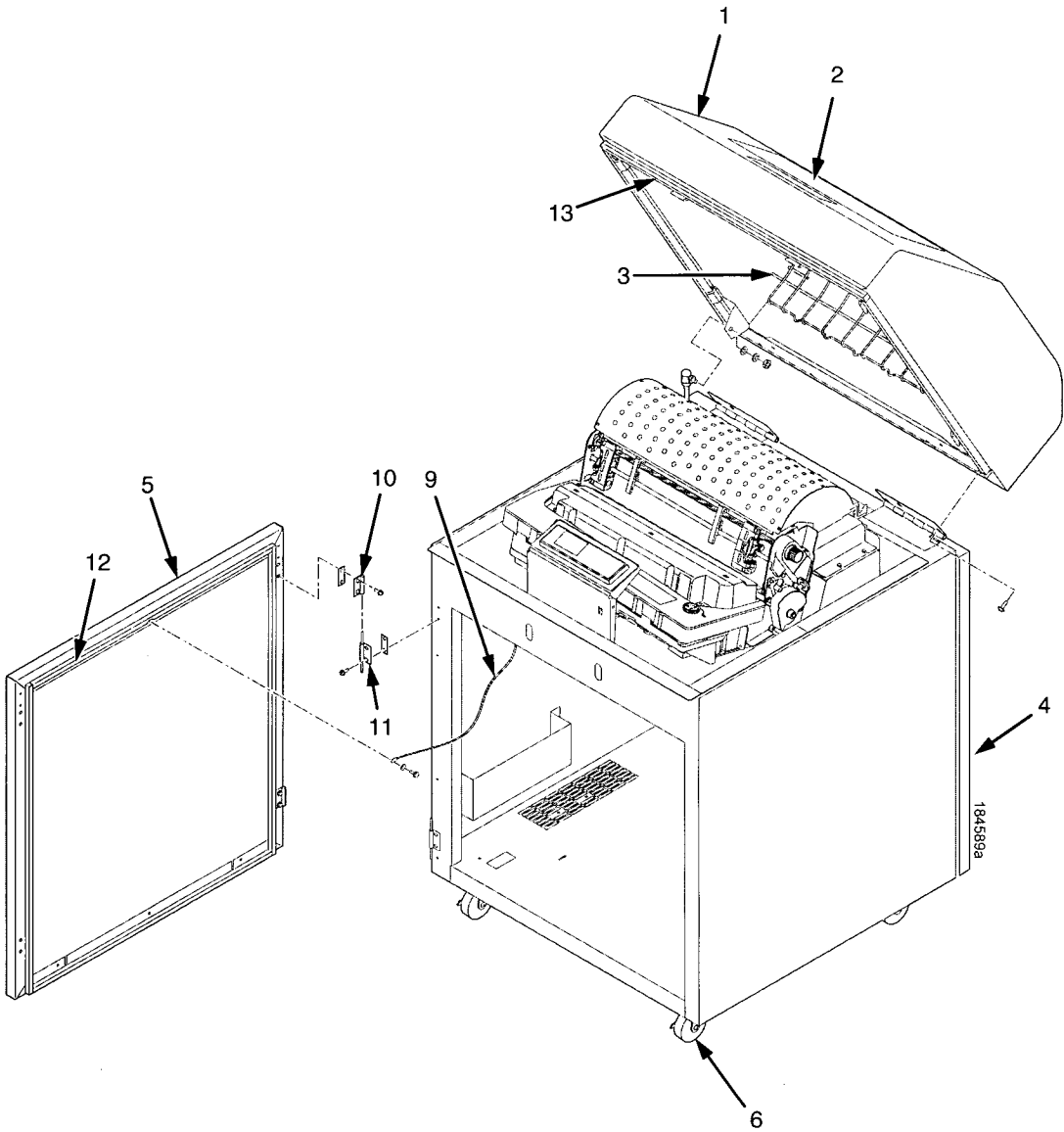


Figure 47. Cabinet Model Top Cover, Doors, and Casters

| Item No. | Part No.<br>(RoHS Compliant) | Description                        | Notes                                                                 |
|----------|------------------------------|------------------------------------|-----------------------------------------------------------------------|
| 1        | 177505-901                   | Top Cover Assembly, Stealth Black  | Includes items 2 and 3.                                               |
| 2        | Ref                          | Window, Cabinet                    | Part of item 1.                                                       |
| 3        | 175680-001                   | Wireform Paper Path, Standard      |                                                                       |
| 4        | 177541-901                   | Rear Door Assembly, Stealth Black  | For printers without power stacker; includes items 9, 10, 11, and 12. |
|          | 177489-901                   | Extended Door Assy, Stealth Black  | For use with power stacker.                                           |
| 5        | 177502-901                   | Front Door Assembly, Stealth Black | Includes items 9, 10, 11, and 12.                                     |
| 6        | 257664-001                   | Caster Kit, Field, Cabinet         | Kit includes two each, front and rear casters.                        |
| 7        | Not Used                     |                                    |                                                                       |
| 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                 |                                                                       |

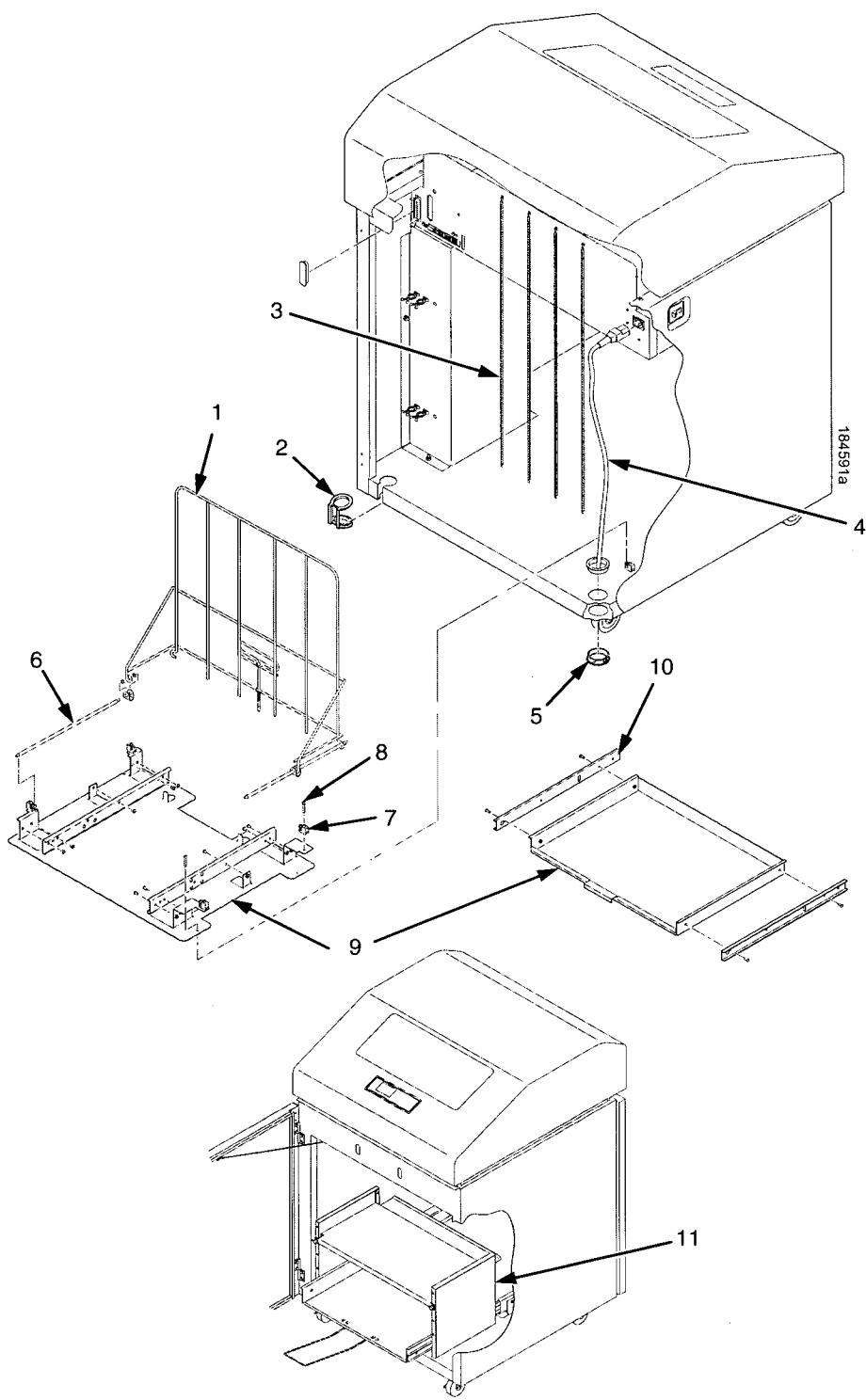


Figure 48. Cabinet Model Paper Fence, Paper Chains, and Front Access Stacker

| Item No. | Part No.<br>(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                   | Includes one each, outer chain and inner chain.                          |
| 4        | Ref                          | AC Power Cord                        |                                                                          |
| 5        | Ref                          | Grommet, Power Cord (2)              | Included in item 2.                                                      |
| 6        | 151910-001                   | Guide Rail, Stacker                  |                                                                          |
| 7        | 151831-001                   | Clip, Rail, Stacker                  |                                                                          |
| 8        | Ref                          | Screw (4)                            |                                                                          |
| 9        | 178913-001                   | Field Kit, Tray, Cab, Rear, Black    | Includes item 10 and paper tent 173864-001.                              |
| 10       | 174392-901                   | Slide Set, Ball Bearing              |                                                                          |
| 11       | 250085-001                   | Field Kit, Front Access Stacker, Cab | Optional on all cabinet models.                                          |

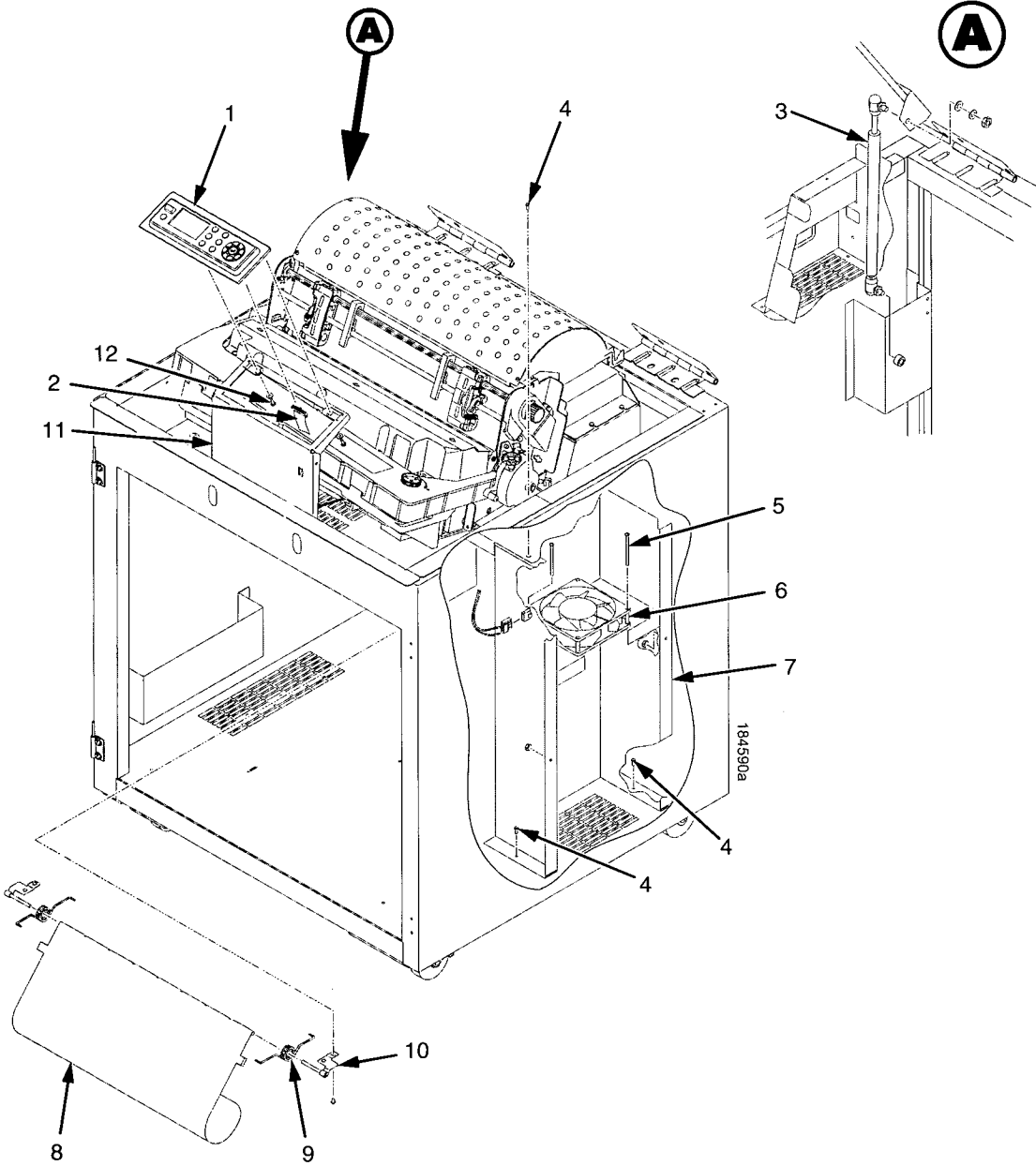


Figure 49. Control Panel and Cabinet Details

| Item No. | Part No.<br>(RoHS Compliant) | Description                                                                 | Notes                                                     |
|----------|------------------------------|-----------------------------------------------------------------------------|-----------------------------------------------------------|
| 1        | 257654-001                   | Control Panel/Cable/Overlay Cabinet Field Kit                               | Includes control panel, cable, and overlay.               |
| 2        | Ref                          | Cable Assembly, Control Panel                                               | Part of item 1.                                           |
| 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        | 257656-001                   | Fan Assembly Spares Kit, HB, CC, EXH                                        | Includes mounting hardware.                               |
| 7        | Ref                          | Duct, Air Exhaust                                                           |                                                           |
| 8        | 177296-001                   | Paper Entrance Guide, V2                                                    | P8220 only.                                               |
| 9        | 173428-001                   | Spring, Paper Entrance Guide (2)                                            | P8220 only.                                               |
| 10       | 173351-001<br>173352-001     | Bracket, Paper Entrance Guide, Right<br>Bracket, Paper Entrance Guide, Left | P8220 only.<br>P8220 only.                                |
| 11       | Ref                          | Control Panel Bracket                                                       |                                                           |
| 12       | Ref                          | Screw, Hex w/Lock Washer (2)                                                | 6-32x.375                                                 |



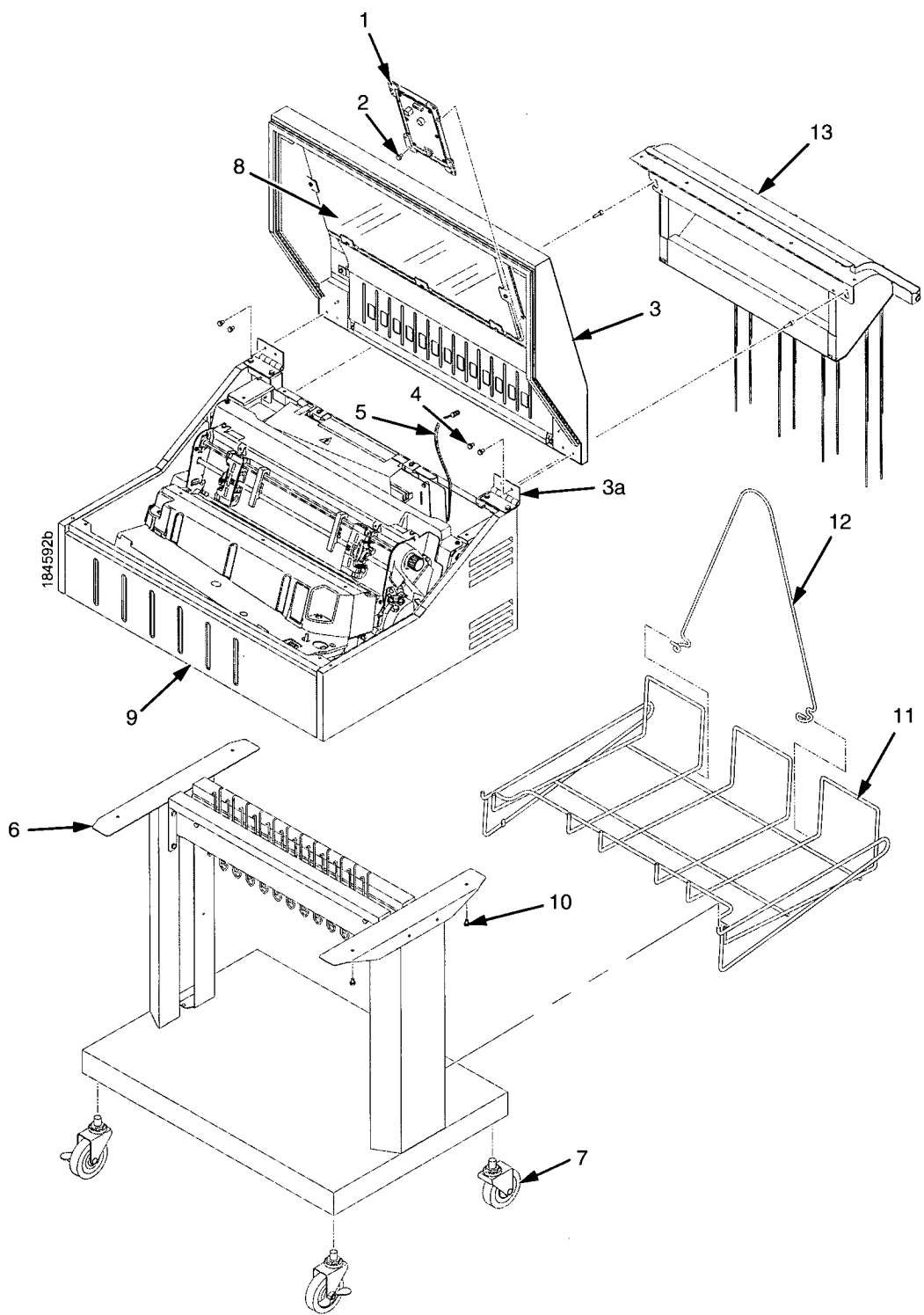


Figure 50. Open Pedestal Details

| Item No. | Part No.<br>(RoHS Compliant) | Description                                                      | Notes                                            |
|----------|------------------------------|------------------------------------------------------------------|--------------------------------------------------|
| 1        | 257655-001                   | Control Panel/Cable/Overlay, Pedestal Field Kit                  | Includes control panel, cable, and overlay.      |
| 2        | Ref                          | Screw (4)                                                        |                                                  |
| 3        | 256956-001                   | Top Cover Assy, Pedestal                                         |                                                  |
| 3a       | 257662-001                   | Field Kit, Lid,Hinge/Springs                                     | Includes two hinges and dashpot.                 |
| 4        | Ref                          | Screw (4)                                                        |                                                  |
| 5        | Ref                          | Cable Assembly, Control Panel                                    | Part of item 1.                                  |
| 6        | Ref<br>256877-001            | Packaged Ped Kit, Stealth Black<br>Stand Assembly, Open Pedestal | Stand assembly 256877-001 is not packaged.       |
| 7        | 179162-001                   | Field Kit, Caster Kit, Ped                                       | Includes two with brakes and two without brakes. |
| 8        | Ref                          | Window, Top Cover                                                | Part of item 3, Top Cover Assy.                  |
| 9        | Ref<br>Ref                   | Base Assy,Pedestal<br>Pedestal Assembly                          |                                                  |
| 10       | Ref                          | Screw (4)                                                        | 10-32x.625                                       |
| 11       | 256935-001                   | Tray, Wire Form                                                  |                                                  |
| 12       | 257357-001                   | Rear Paper Tray, Fence                                           |                                                  |
| 13       | 257303-901                   | Field Kit, Rear Shroud                                           | Optional on all pedestal models except ZT.       |

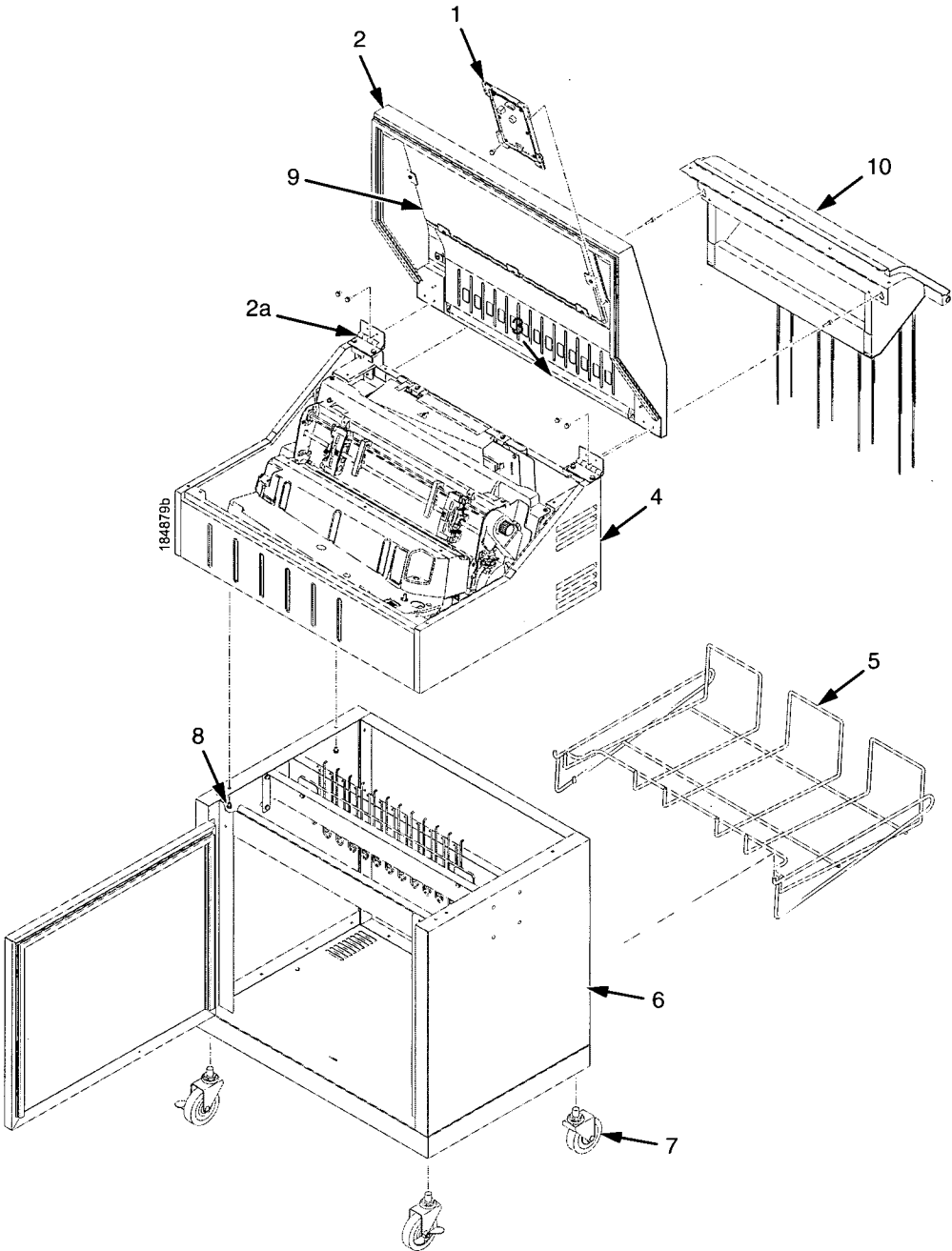


Figure 51. Enclosed Pedestal Details

| Item No. | Part No.<br>(RoHS<br>Compliant) | Description                                     | Notes                                            |
|----------|---------------------------------|-------------------------------------------------|--------------------------------------------------|
| 1        | 257655-001                      | Control Panel/Cable/Overlay, Pedestal Field Kit | Includes control panel, cable, and overlay.      |
| 2        | 256956-001                      | Top Cover Assembly, Ped, Blk                    |                                                  |
| 2a       | 257662-001                      | Field Kit, Lid,Hinge/Springs                    | Includes two hinges and dashpot.                 |
| 3        | Ref                             | Screw (4)                                       |                                                  |
| 4        | Ref                             | Base Assy,Pedestal                              |                                                  |
| 5        | 256935-001                      | Tray, Wire Form                                 |                                                  |
| 6        | Ref                             | Stand Assembly, Enclosed Pedestal, P8           |                                                  |
| 7        | 179162-001                      | Field Kit, Caster Kit, Ped                      | Includes two with brakes and two without brakes. |
| 8        | Ref                             | Screw (4)                                       |                                                  |
| 9        | Ref                             | Window, Top Cover                               | Part of item 2, Top Cover Assy.                  |
| 10       | 257303-901                      | Field Kit, Rear Shroud                          |                                                  |

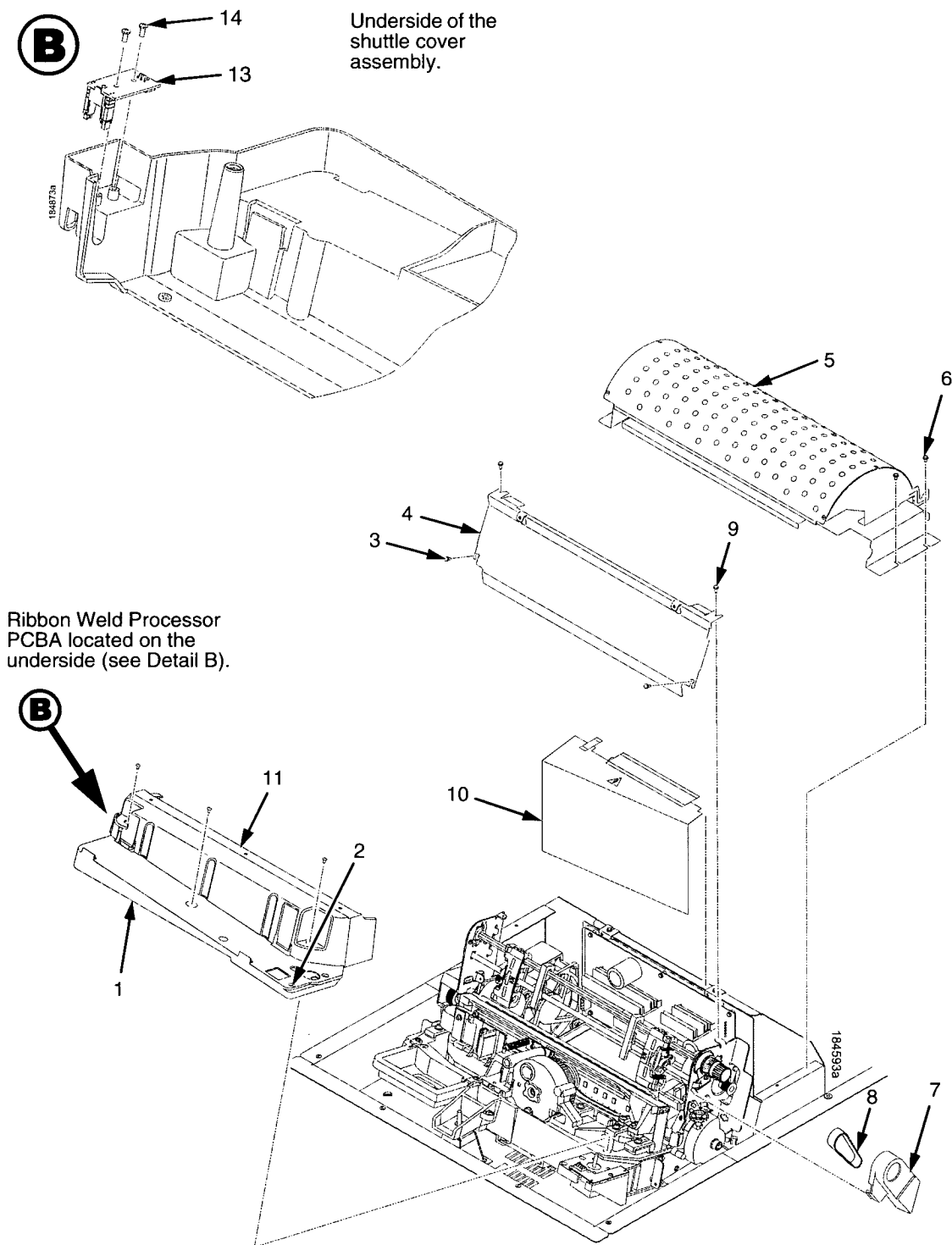


Figure 52. Inside Covers, Cabinet Models

| Item No. | Part No.<br>(RoHS Compliant) | Description                                                                 | Notes                                                                                          |
|----------|------------------------------|-----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| 1        | 256424-901                   | Shuttle Cover Assembly or Shroud Assembly                                   | Air Shroud Assembly.<br>Includes items 11, 13, and 14.                                         |
| 2        | Ref                          | Screw, Captive (5)                                                          | 6-32x.38 with O-ring, .125x.250x.06<br>Part of item 1.                                         |
| 3        | Ref                          | Screw, Thread-forming (2)                                                   | 6-32x.25 and #6 flat washer.                                                                   |
| 4        | Ref                          | Barrier Shield                                                              |                                                                                                |
| 5        | 175188-901                   | Paper Path, V3                                                              | Cabinet models only.                                                                           |
| 6        | Ref                          | Screw (3)                                                                   | 6-32.25                                                                                        |
| 7        | 153488-001                   | Field Kit, Covers                                                           | Paper Feed Belt Cover shown.                                                                   |
| 8        | Ref                          | Belt, Timing, .080 Pitch, 100 Teeth, .500 Wide                              | Paper Feed Belt                                                                                |
|          | 257763-001<br>257764-001     | Motor, Paper Feed, Field Kit, 5, 10, 15<br>Motor, Paper Feed, Field Kit, 20 | Field Kits 257763 and 257764 contains<br>paper feed belt (108664-903) and<br>paper feed motor. |
| 9        | Ref                          | Screw, Thread-forming (2)                                                   | 6-32x.25                                                                                       |
| 10       | 257116-001                   | Insulator, Power Supply                                                     | Taped to the upper edge of the card<br>cage.                                                   |
| 11       | Ref                          | Paper Scale                                                                 | Included in item 1.                                                                            |
| 13       | Ref                          | PCBA,Ribbon Weld Sensor (RWS)                                               | Included in item 1.                                                                            |
| 14       | Ref                          | Screw, 4-20X1/4, PHCRI, STL/ZNB,<br>Plastite 48-2 (2)                       | Included in item 1.                                                                            |

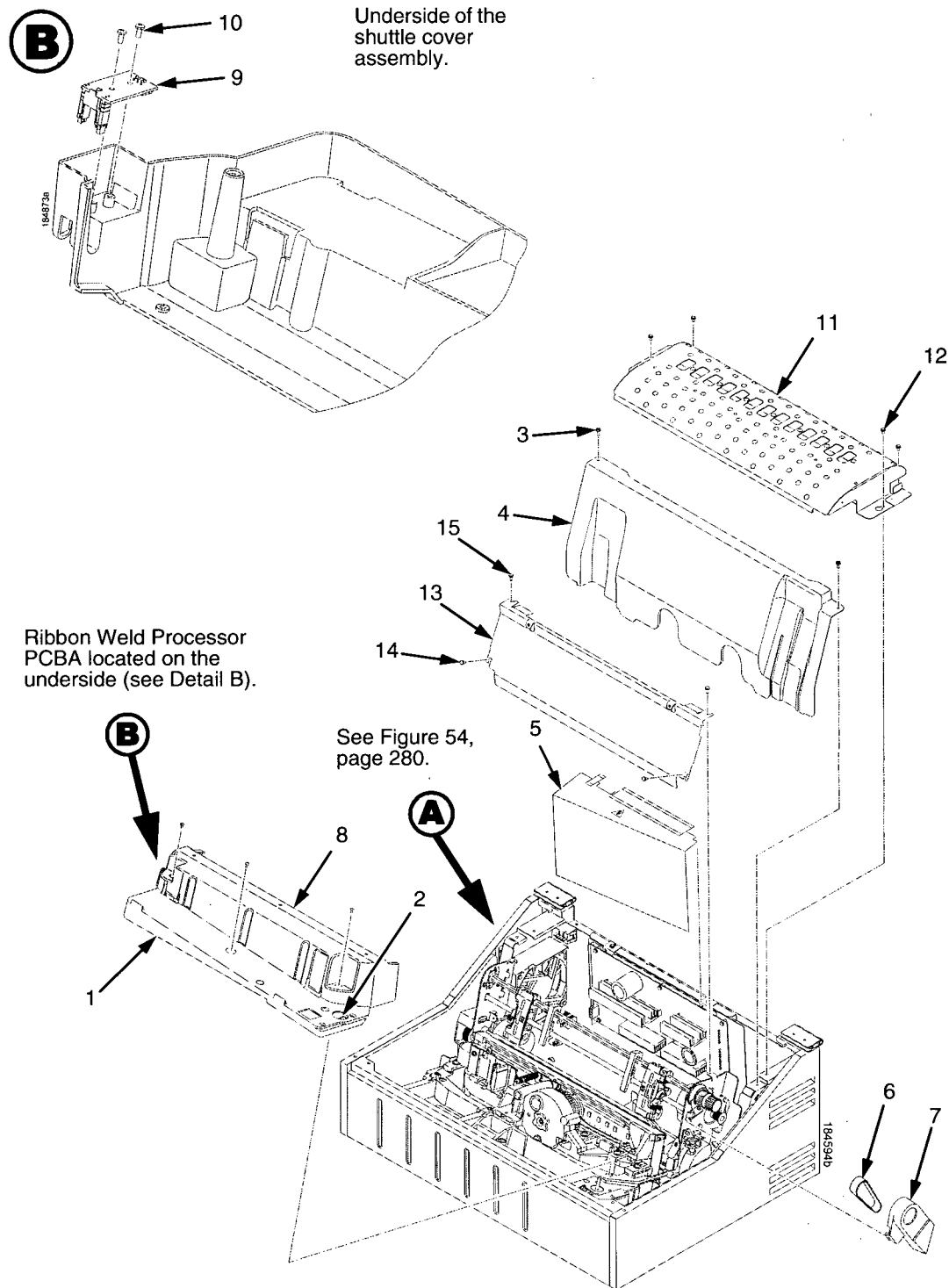


Figure 53. Inside Covers and Card Cage, Pedestal Models

| Item No. | Part No.<br>(RoHS Compliant) | Description                                                                 | Notes                                                                                          |
|----------|------------------------------|-----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| 1        | 256424-901                   | Shuttle Cover Assembly or Shroud Assembly                                   | Air Shroud Assembly. Includes items 8, 9, and 10.                                              |
| 2        | Ref                          | Screw, Captive (5)                                                          | 6-32x.38 with O-ring, .125x.250x.06<br>Part of item 1.                                         |
| 3        | Ref                          | Screw, Captive (2)                                                          | 6-32x.38 and #6 flat washer with<br>o-ring .094x.281x.094.<br>Part of item 4.                  |
| 4        | 257117-001                   | Panel, Cover, Electronics                                                   | For pedestal models only.                                                                      |
| 5        | 257116-001                   | Insulator, Power Supply                                                     | Taped to card cage along upper edge.                                                           |
| 6        | Ref                          | Belt, Timing, .080 Pitch, 100 Teeth, .500 Wide                              | Paper Feed Belt                                                                                |
|          | 257763-001<br>257764-001     | Motor, Paper Feed, Field Kit, 5, 10, 15<br>Motor, Paper Feed, Field Kit, 20 | Field Kits 257763 and 257764 contains<br>paper feed belt (108664-903) and<br>paper feed motor. |
| 7        | 153488-001                   | Field Kit, Covers                                                           | Paper Feed Belt Cover shown.                                                                   |
| 8        | Ref                          | Paper Scale                                                                 | Included in item 1.                                                                            |
| 9        | Ref                          | PCBA,Ribbon Weld Sensor (RWS)                                               | Included in item 1 and in Ribbon<br>Motion/Weld Sensor Field Kit,<br>257663-001.               |
| 10       | Ref                          | Screw, 4-20X1/4, PHCRI, STL/ZNB,<br>Plastite 48-2 (2)                       | Included in item 1.                                                                            |
| 11       | 256876-001                   | Paper Path Assembly, Lower                                                  |                                                                                                |
| 12       | Ref                          | Screw (4)                                                                   | 6-32x.25                                                                                       |
| 13       | Ref                          | Barrier Shield                                                              |                                                                                                |
| 14       | Ref                          | Screw, Thread-forming (2)                                                   | 6-32x.25 with #6 flat washer.                                                                  |
| 15       | Ref                          | Screw, Thread-forming (2)                                                   | 6-32x.25                                                                                       |



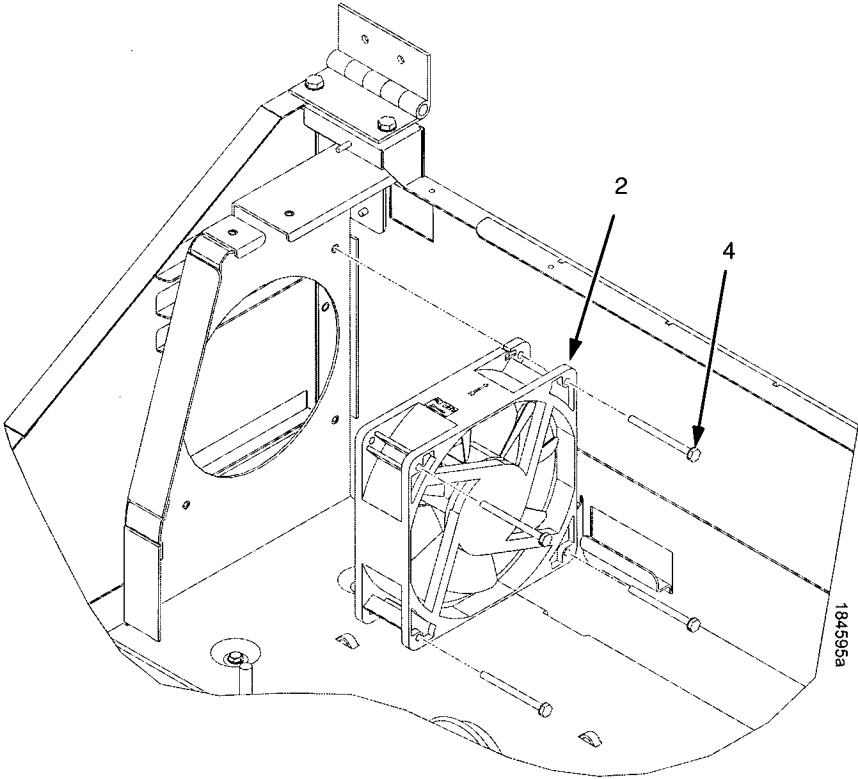
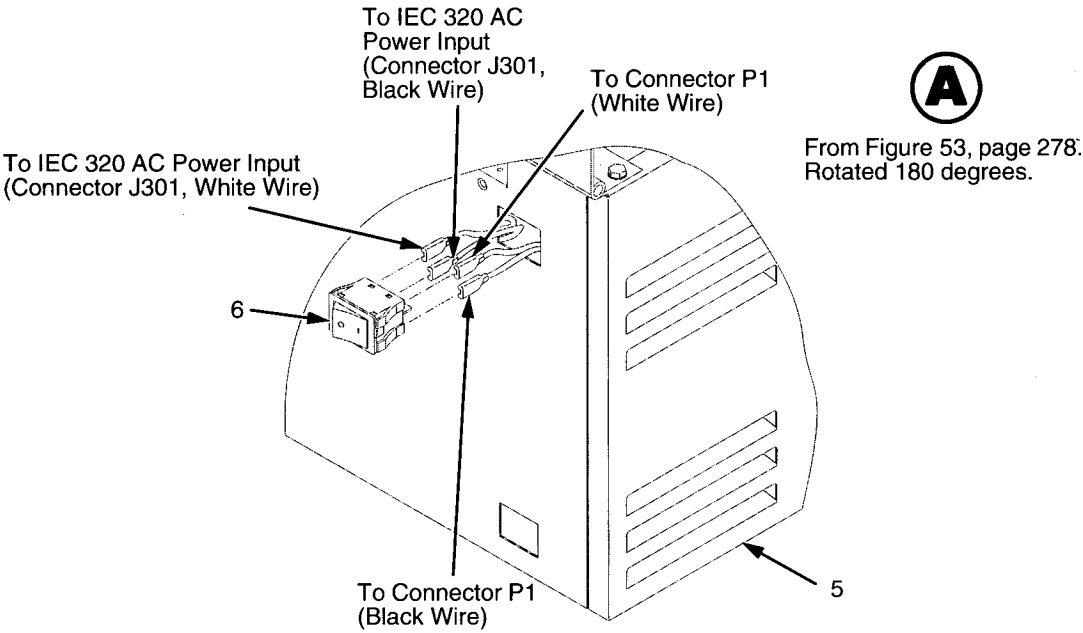


Figure 54. Card Cage Detail, Pedestal Models

| Item No. | Part No.<br>(RoHS<br>Compliant) | Description                           | Notes                        |
|----------|---------------------------------|---------------------------------------|------------------------------|
| 2        | 257656-001                      | Fan Assembly, Spares Kit, HB, CC, EXH | Air flow is into card cage.  |
| 4        | Ref                             | Screw, w/Lock Washer (4)              | 6-32x1.75<br>Part of item 2. |
| 5        | Ref                             | Card Cage, Pedestal                   |                              |
| 6        | 205501-001                      | Switch, Rocker,10A,125/250V           |                              |

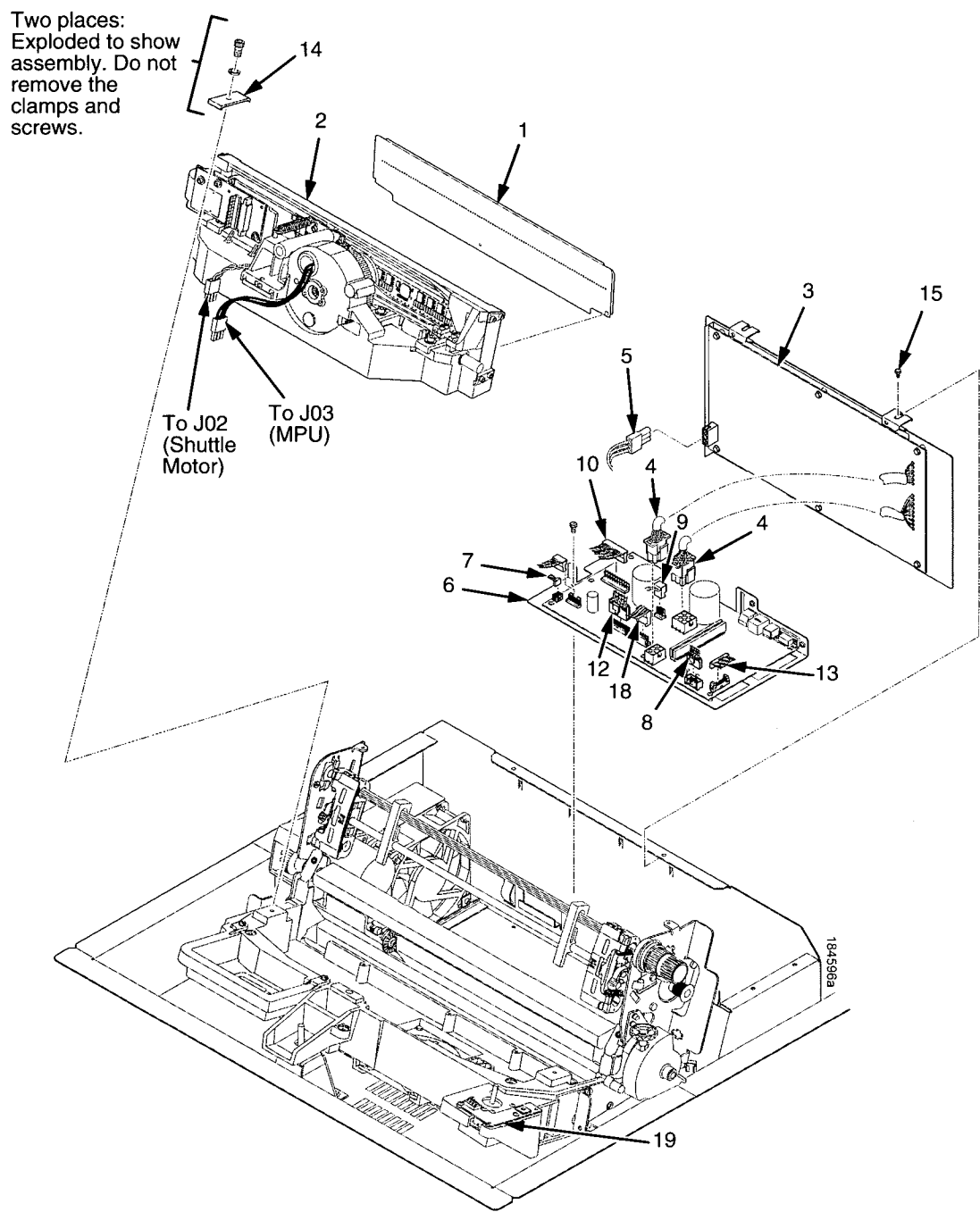


Figure 55. Print Mechanism and Circuit Boards

| Item No. | Part No.<br>(RoHS Compliant)                                                                   | Description                                                                                                                                                             | Notes                                                                                                                                                           |
|----------|------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1        | 256590-901<br>256587-901<br>254356-901<br>254138-901                                           | HB Cover Assy, 05<br>HB Cover Assy, 10<br>HB Cover Assy, 15<br>HB Cover Assy, 20                                                                                        | P8X05<br>P8X10, P8X03H<br>P8X15, P8X06H<br>P8X20, P8X08H                                                                                                        |
| 2        | 256799-901<br>256835-901<br>256921-901<br>256922-901<br>256837-901<br>256929-901<br>256930-901 | Shuttle Assembly, 05<br>Shuttle Assembly, 10<br>Shuttle Assembly, 15<br>Shuttle Assembly, 20<br>Shuttle Assembly, 03H<br>Shuttle Assembly, 06H<br>Shuttle Assembly, 08H | P8X05<br>P8X10<br>P8215<br>P8220<br>P8X03H<br>P8X06H<br>P8X08H                                                                                                  |
| 3        | 256227-901<br>256279-901                                                                       | Power Supply, PFC, 05/10<br>Power Supply, PFC, 15/2000                                                                                                                  | P8X05, P8X10, P8X03H<br>P8215, P8220, P8X06H, P8208H                                                                                                            |
| 4        | Ref                                                                                            | P101A and P101B Cable Connectors                                                                                                                                        | Part of item 3.                                                                                                                                                 |
| 5        | Ref                                                                                            | Cable Assembly, AC-In, Power Supply                                                                                                                                     | Part of the following field kits:<br>257658-001, Field Kit, AC Pwr with cable, Cab.<br><br>257659-001, Field Kit, AC Pwr with cable, Ped.                       |
| 6        | 256443-901<br>257114-901                                                                       | Controller Subassy, LS, 5/10<br>Controller Subassy, HS, 15/20                                                                                                           |                                                                                                                                                                 |
| 7        | Ref                                                                                            | CC/HB/EX Fan Cable Assembly                                                                                                                                             | Part of 256757-001, Cable Assy, Motor Harness.                                                                                                                  |
| 8        | Ref                                                                                            | Cable Assy, Hammerbank Logic                                                                                                                                            | Part of the following field kits:<br>257660-001, Field Kit, HB Cables, 5/10<br>257661-001, Field Kit, HB Cables, 15/20.                                         |
| 9        | Ref                                                                                            | Shuttle Motor Drive Cable Assembly                                                                                                                                      | Part of 256757-001, Cable Assy, Motor Harness.                                                                                                                  |
| 10       | Ref                                                                                            | Dual Hammerbank Power Long Cable Assy                                                                                                                                   | Printers using the High Speed controller use 257661-001, Field Kit, HB Cables, 15/20.<br>Item 10 part of 257660-001, Field Kit, HB Cables, 5/10.                |
| 11       | Not Used                                                                                       |                                                                                                                                                                         |                                                                                                                                                                 |
| 12       | Ref                                                                                            | Sensor Cable Assy                                                                                                                                                       | Part of 256758-001, Cable Assy, Sensor Harness.                                                                                                                 |
| 13       | Ref                                                                                            | Control Panel Cable Assembly                                                                                                                                            | Part of the following field kits:<br>257654-001, Field Kit, Control Panel/ Cable/Overlay, Cab.<br><br>257655-001, Field Kit, Control Panel/ Cable/Overlay, Ped. |
| 14       | Ref                                                                                            | Clamp, Shaft, Receiving                                                                                                                                                 |                                                                                                                                                                 |
| 15       | Ref                                                                                            | Screw, Captive, Power Supply (2)                                                                                                                                        |                                                                                                                                                                 |

| Item No. | Part No.<br>(RoHS Compliant) | Description                           | Notes                                                     |
|----------|------------------------------|---------------------------------------|-----------------------------------------------------------|
| 18       | 257764-001                   | Motor, Paper Feed, Field Kit, 20      | P8X20                                                     |
|          | 257763-001                   | Motor, Paper Feed, Field Kit, 5/10/15 | P8X05, P8X10, P8X15                                       |
| 19       | Ref                          | PCBA, Ribbon Motion Sensor (RMS)      | Part of 257663-001, Field Kit, Ribbon Motion/Weld Sensor. |

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(Parts list continue on the next page.)

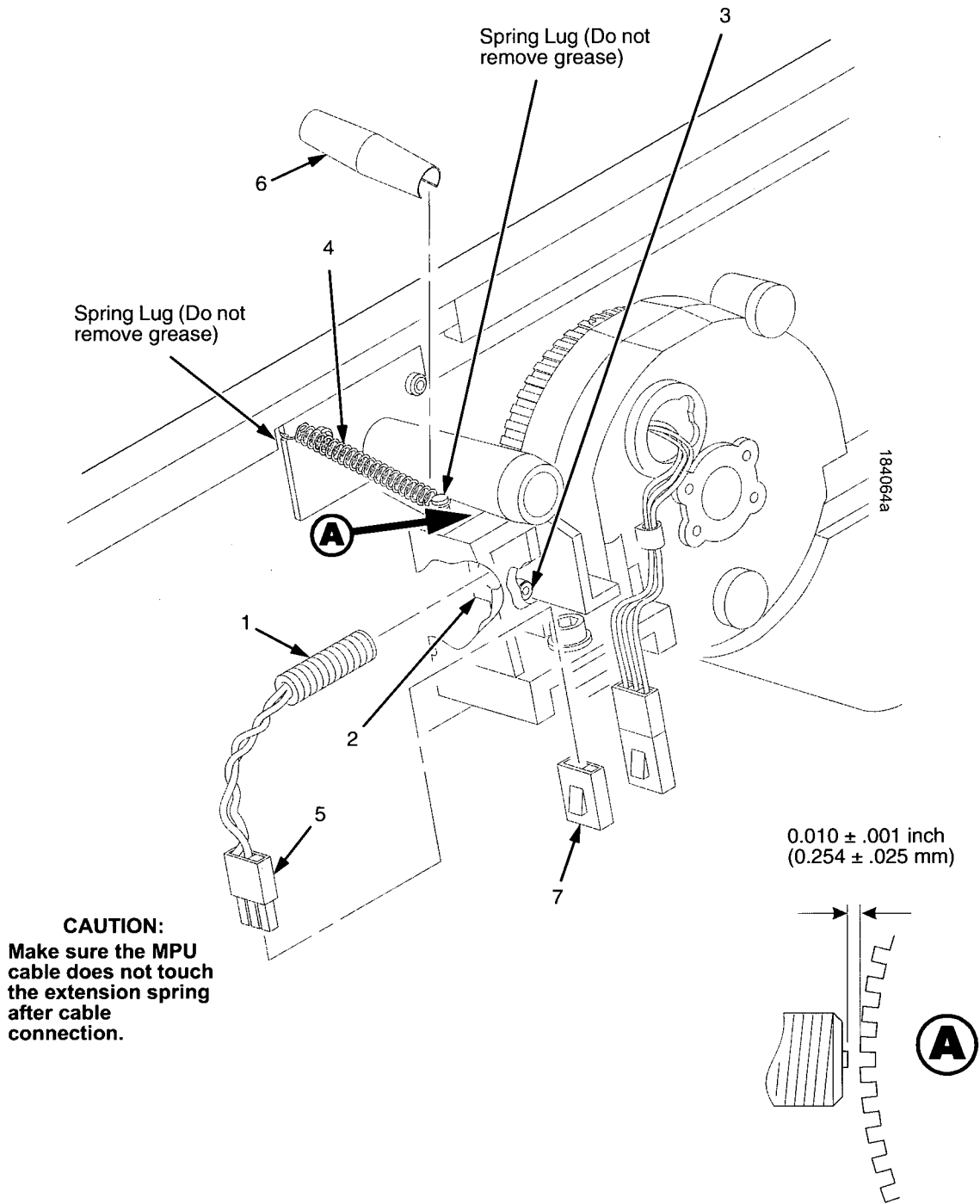


Figure 56. Magnetic Pickup (MPU) and Extension Spring

| Item No. | Part No.<br>(RoHS Compliant) | Description                          | Notes                                           |
|----------|------------------------------|--------------------------------------|-------------------------------------------------|
| 1        | 150281-001                   | Magnetic Pickup (MPU) Assembly       |                                                 |
| 2        | Ref                          | Bracket, MPU                         | Part of item 1.                                 |
| 3        | Ref                          | Screw, Socket Cap                    | Part of item 1.                                 |
| 4        | 153537-001                   | Spring, Hammerbank                   |                                                 |
| 5        | Ref                          | MPU Cable Connector (P03)            | Part of item 1.                                 |
| 6        | 176507-001                   | Anti-Rotation Spring Constraint      | P8220 only.                                     |
| 7        | Ref                          | Magnetic Pickup (MPU) Cable Assembly | Part of 256758-901, Cable Assy, Sensor Harness. |



**IMPORTANT:** 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 52 and Figure 53.

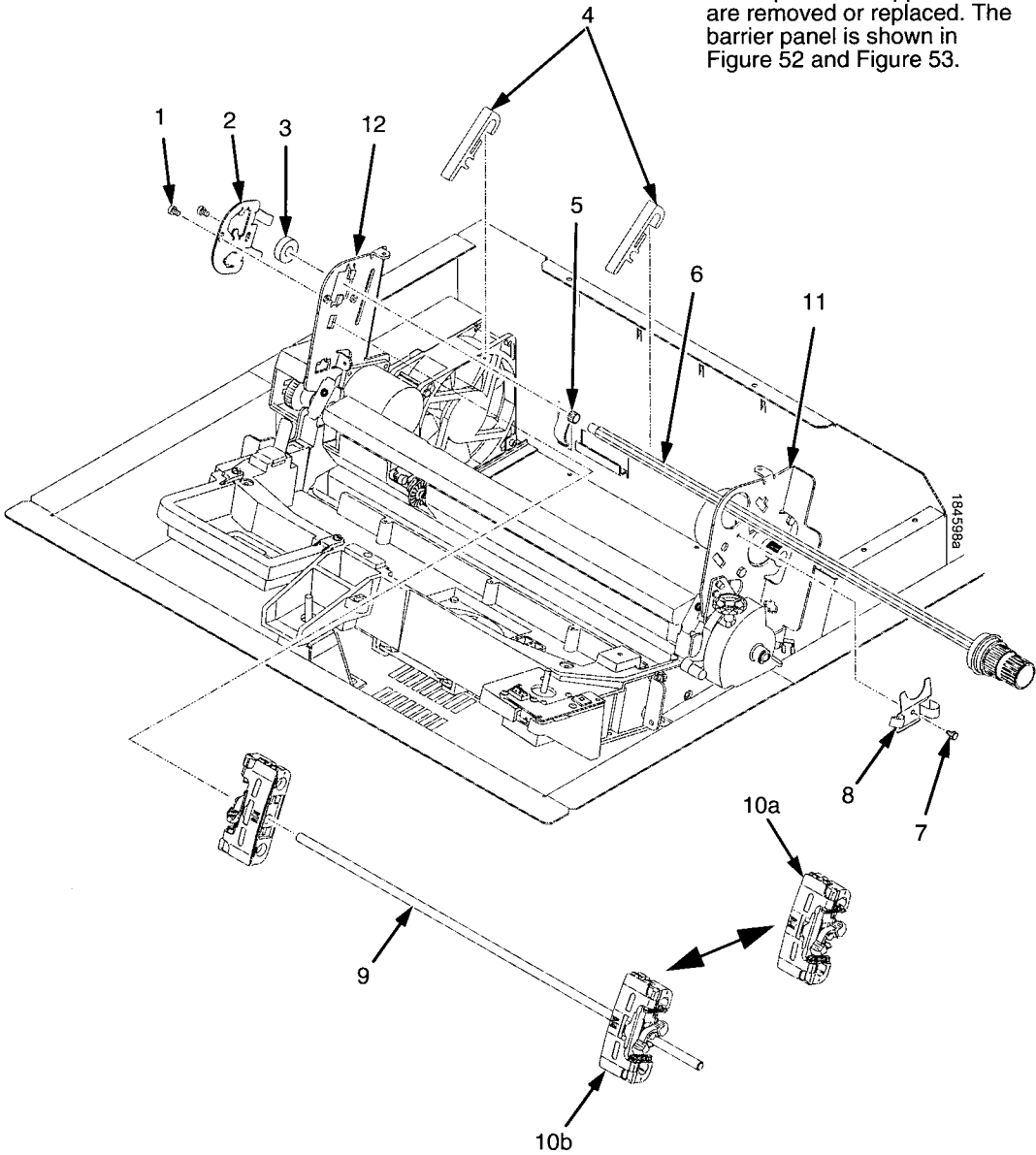


Figure 57. Tractor Shafts

| Item No. | Part No.<br>(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)                                      | Includes two pieces.                                                                           |
| 5        | Ref                          | Tolerance Ring,.37X.25,.006 THK,SS                     | 257667-001, Spline/Support, Shafts with Tolerance Ring. Includes items 5, 6, and 9.            |
| 6        | Ref                          | Splined Shaft Assembly (Blue Handle)                   |                                                                                                |
| 7        | Ref                          | Screw, Socket Cap, 6-32x.312 Trilob (Self-Tapping)     |                                                                                                |
| 8        | 173217-001                   | Plate, Tractor Shaft, Right                            |                                                                                                |
| 9        | Ref                          | Support Shaft                                          |                                                                                                |
| 10a      | 179061-901                   | Tractor Set, 20 (Blue)                                 | P8220. Installed at the factory on models with power stacker; comes standard on P8220 and ZTP. |
| 10b      | 179065-901                   | Tractor Set, Non-Roller, 05/10/15 (Blue)               |                                                                                                |
| 11       | Ref                          | Right Side Plate                                       |                                                                                                |
| 12       | Ref                          | Left Side Plate                                        |                                                                                                |

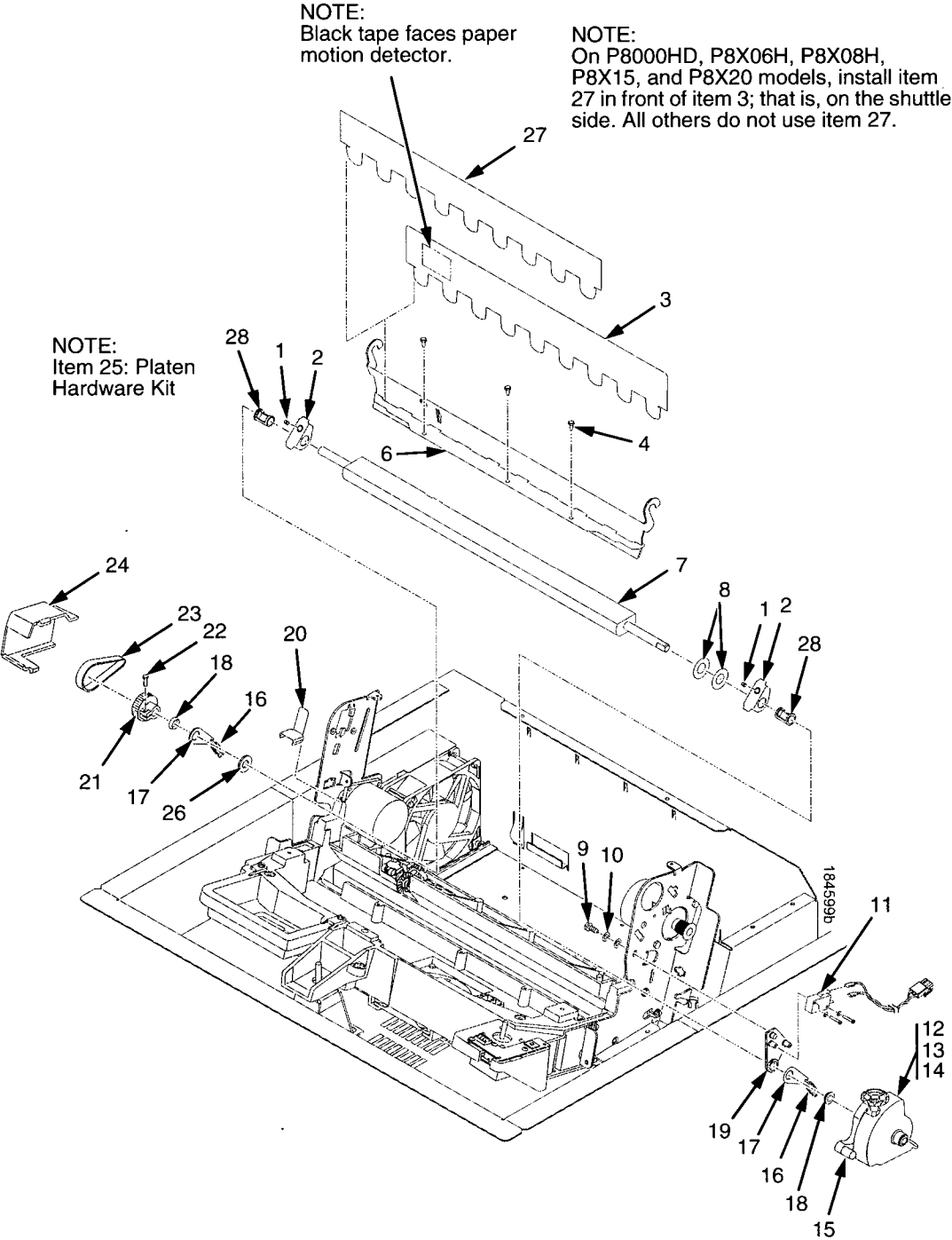


Figure 58. Platen

| Item No. | Part No.<br>(RoHS Compliant) | Description                                          | Notes                                                                                                                                                      |
|----------|------------------------------|------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1        | Ref                          | Setscrew (2)                                         | Part of item 25.                                                                                                                                           |
| 2        | Ref                          | Bracket, Platen (2)                                  | Part of item 25.                                                                                                                                           |
| 3        | Ref                          | Ironer Assembly, Reverse Paper Feed                  | 257665-001, Field Kit, Ironers, PPR Feed, AUX, includes items 3 and 27.                                                                                    |
| 4        | Ref                          | Screw, Thread-forming (3)                            | 6-32x.25                                                                                                                                                   |
| 5        | Not Used                     |                                                      |                                                                                                                                                            |
| 6        | Ref                          | Plate, Ironer                                        | Part of item 3.                                                                                                                                            |
| 7        | Ref                          | Platen Assembly, V2                                  | Part of item 25.                                                                                                                                           |
| 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       | 257653-001                   | Field Kit, Switch Assembly, Platen Open/Paper Detect |                                                                                                                                                            |
| 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, and 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       | Ref                          | Platen Pulley Assy, Drive                            | Part of item 25.                                                                                                                                           |
| 22       | Ref                          | Screw, Socket Cap, 6-32x.44                          | Part of item 25.                                                                                                                                           |
| 23       | Ref                          | Belt, Timing, .080 Pitch, .312 Wide                  | Included in 257652-001, Field Kit, Motor, Platen Open with Timing Belt.                                                                                    |
| 24       | 153488-001                   | Field Kit, Covers                                    | Platen Open Belt Cover shown.                                                                                                                              |
| 25       | 257666-001                   | Field Kit, Platen Hardware                           | Includes items 1, 2, 7, 8, 16, 17, 18, 20, 21, 22, 26, and 28.                                                                                             |
| 26       | Ref                          | Platen Washer                                        | Part of item 25.                                                                                                                                           |
| 27       | Ref                          | Paper Ironer, Auxiliary                              | On P8X00HD, P8X06H, P8208H, P8X15, and P8X20 models install item 27 in front of item 3 (i.e., on the shuttle side). All other models do not use this item. |

| Item No. | Part No.<br>(RoHS Compliant) | Description                | Notes            |
|----------|------------------------------|----------------------------|------------------|
| 28       | Ref                          | Bushing, Platen Adjust, V2 | Part of item 25. |

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(Parts list continue on the next page.)

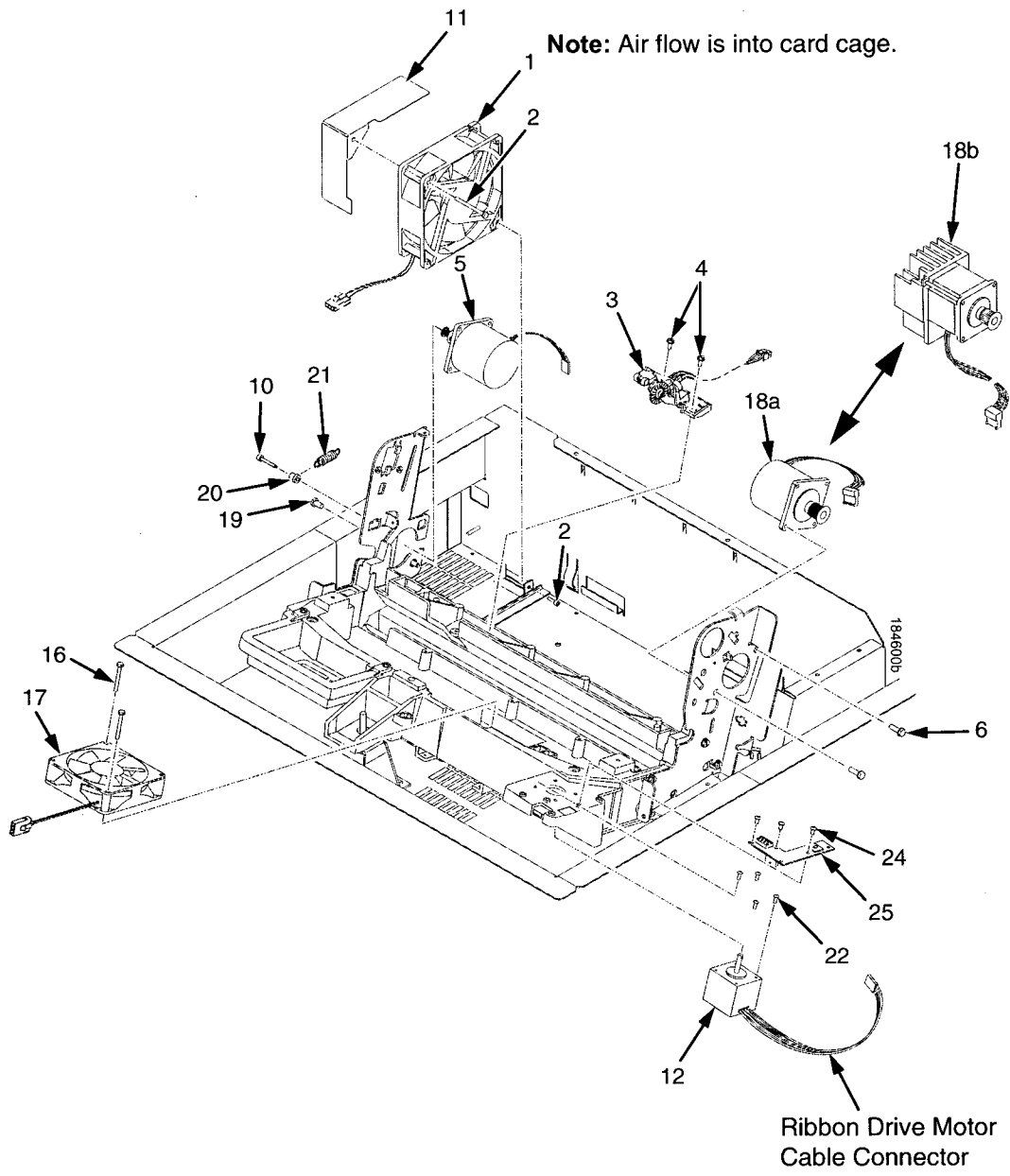


Figure 59. Motors, Fans, and Paper Detector Switch

| Item No. | Part No.<br>(RoHS Compliant) | Description                               | Notes                                                                                                                |
|----------|------------------------------|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| 1        | Ref                          | Card Cage Fan Assembly                    |                                                                                                                      |
| 2        | Ref                          | Screw, w/Lock Washer (3)                  | Two 6-32x1.75 on bottom,<br>One 6-32x0.50 on top left.                                                               |
| 3        | Ref                          | Switch Assembly, Paper Detector           | 257653-001, Field Kit, Switch Assy,<br>Platen Open/Paper Detect.                                                     |
|          | 170172-001                   | Field Kit, Slotted Black Back Form Switch | Optional switch used with black back<br>forms.                                                                       |
| 4        | Ref                          | Screw, Thread-forming, 6-32x.375 (2)      |                                                                                                                      |
| 5        | Ref                          | Motor Assembly, Platen                    | 257652-001, Field Kit, Motor, Platen<br>Open with Timing Belt.                                                       |
| 6        | Ref                          | Screw, Hex w/Lock Washer, 10-24x.50 (2)   |                                                                                                                      |
| 7        | Not Used                     |                                           |                                                                                                                      |
| 8        | Not Used                     |                                           |                                                                                                                      |
| 9        | Not Used                     |                                           |                                                                                                                      |
| 10       | Ref                          | Screw, w/Lock Washer, 10-32x.50 (2)       |                                                                                                                      |
| 11       | Ref                          | Shield, Card Cage Fan                     |                                                                                                                      |
| 12       | 254507-901                   | Motor, Stepper, P8 Ribbon Cartridge       |                                                                                                                      |
| 16       | Ref                          | Screw, w/Lock Washer (2)                  | 6-32x1.25                                                                                                            |
| 17       | Ref                          | Hammerbank Fan Assembly                   | 257656-001, Fan Assy, Spares Kit, HB,<br>CC, EXH. Includes items 1 and 17.                                           |
| 18a      | Ref                          | Motor Assy, Paper Feed                    | 257763-001, Field Kit, Ppr Feed Motor,<br>5/10/15 includes belt.                                                     |
| 18b      | Ref                          | Field Kit, Paper Feed Motor w/Heat Sink   | 257764-001, Field Kit, Ppr Feed Motor,<br>20 includes belt.<br>P8220—Heat sink screws:<br>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       | Ref                          | Screw, M3x6x.5                            |                                                                                                                      |
| 23       | Not Used                     |                                           |                                                                                                                      |
| 24       | Ref                          | Screw, 6-32 x .25, M3                     |                                                                                                                      |
| 25       | Ref                          | PCBA, Ribbon Motion Sensor (RMS)          | 257663-001, Field Kit, Ribbon Motion/<br>Weld Sensor.                                                                |



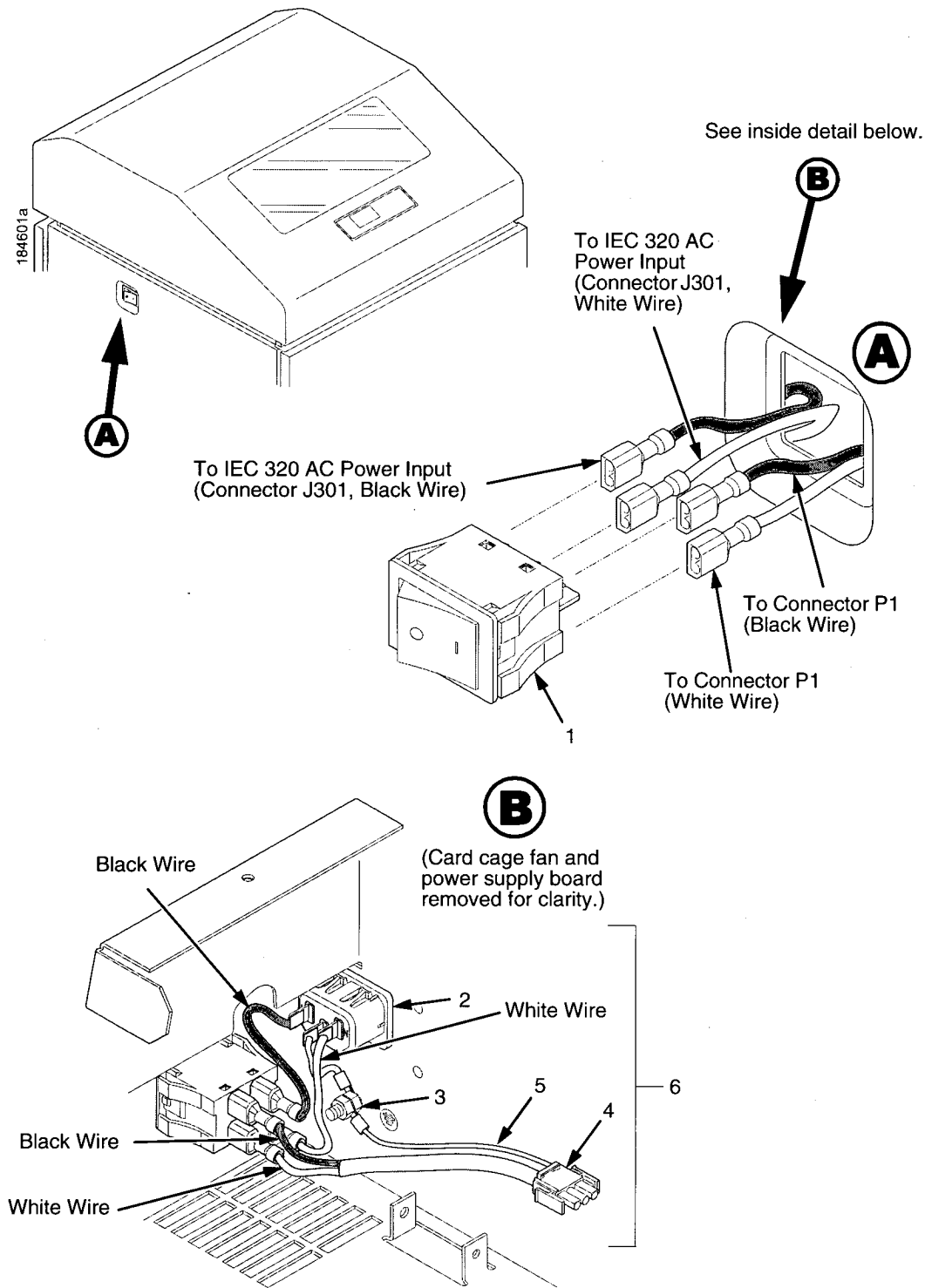
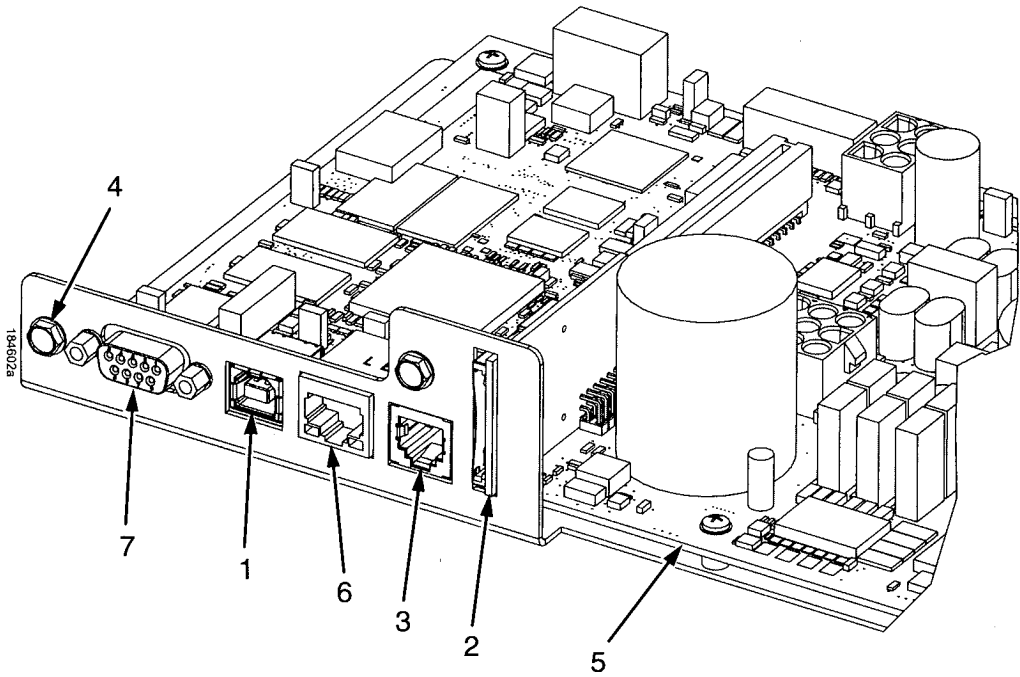


Figure 60. Power Switch, Cabinet Models

| Item No. | Part No.<br>(RoHS<br>Compliant) | Description                                                                | Notes                                                                     |
|----------|---------------------------------|----------------------------------------------------------------------------|---------------------------------------------------------------------------|
| 1        | 205501-001                      | Rocker Switch, DPST,10A,125/250V                                           |                                                                           |
| 2        | Ref                             | IEC 320 AC Power Connector                                                 | Connector J301<br>Part of Field Kit, AC Power.                            |
| 3        | Ref                             | Chassis Ground Stud                                                        |                                                                           |
| 4        | Ref                             | Connector P1                                                               | To power supply board connector J1<br>AC.<br>Part of Field Kit, AC Power. |
| 5        | Ref                             | Cable Assembly, AC-In, Power Supply                                        | Part of Field Kit, AC Power.                                              |
| 6        | 257658-001<br>257659-001        | Field Kit, AC Power with Cable, Cab<br>Field Kit, AC Power with Cable, Ped |                                                                           |



**Figure 61. I/O Panel on the Controller Board**

| Item No. | Part No.<br>(RoHS Compliant) | Description        | Notes                                                                                                                                                                                                                           |
|----------|------------------------------|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1        | Ref                          | USB Port           |                                                                                                                                                                                                                                 |
| 2        | Ref                          | SD Memory Card     |                                                                                                                                                                                                                                 |
| 3        | Ref                          | Debug Port         |                                                                                                                                                                                                                                 |
| 4        | Ref                          | Screw              |                                                                                                                                                                                                                                 |
| 5        | Ref                          | Controller Board   |                                                                                                                                                                                                                                 |
| 6        | Ref                          | Ethernet Port      | Ethernet hard wired on Controller Board. To replace port, you must replace the entire controller board. Be sure to transfer the security key. The new board has a new MAC address which is found on the configuration printout. |
| 7        | Ref                          | RS-232 Serial Port |                                                                                                                                                                                                                                 |



# 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 62.) The ink dots that appear on the paper are made by a row of hammersprings 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.

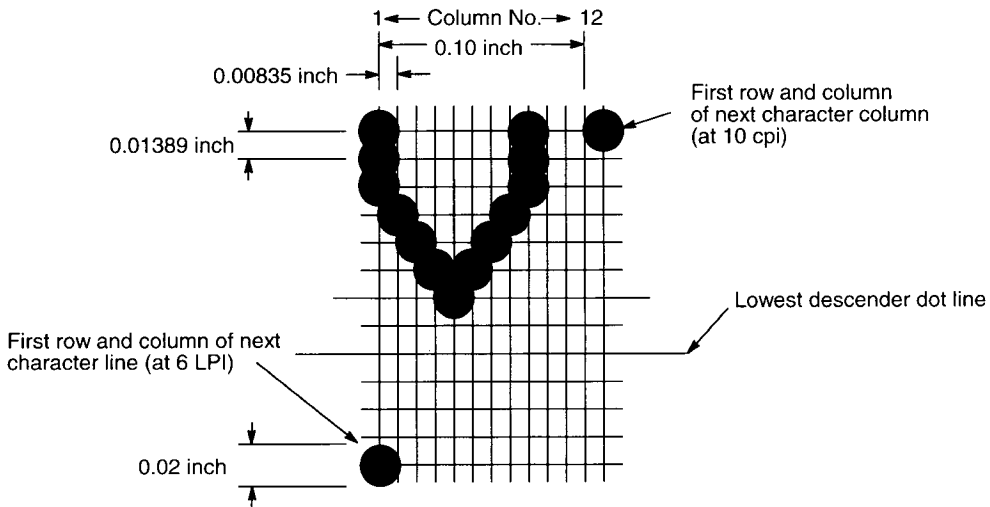


Figure 62. A Dot Matrix

When the shuttle reaches the end of a horizontal sweep, it reverses direction, the paper advances upward one dot row, and the hammersprings 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 62 and Figure 63.) 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 hammerspring can (and usually does) form more than one character as the shuttle moves horizontally. This principle is illustrated in Figure 64.

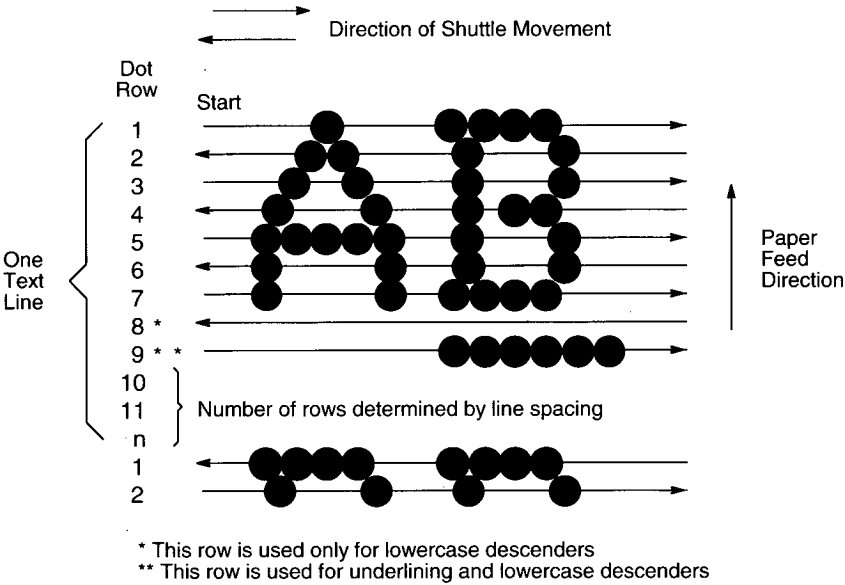
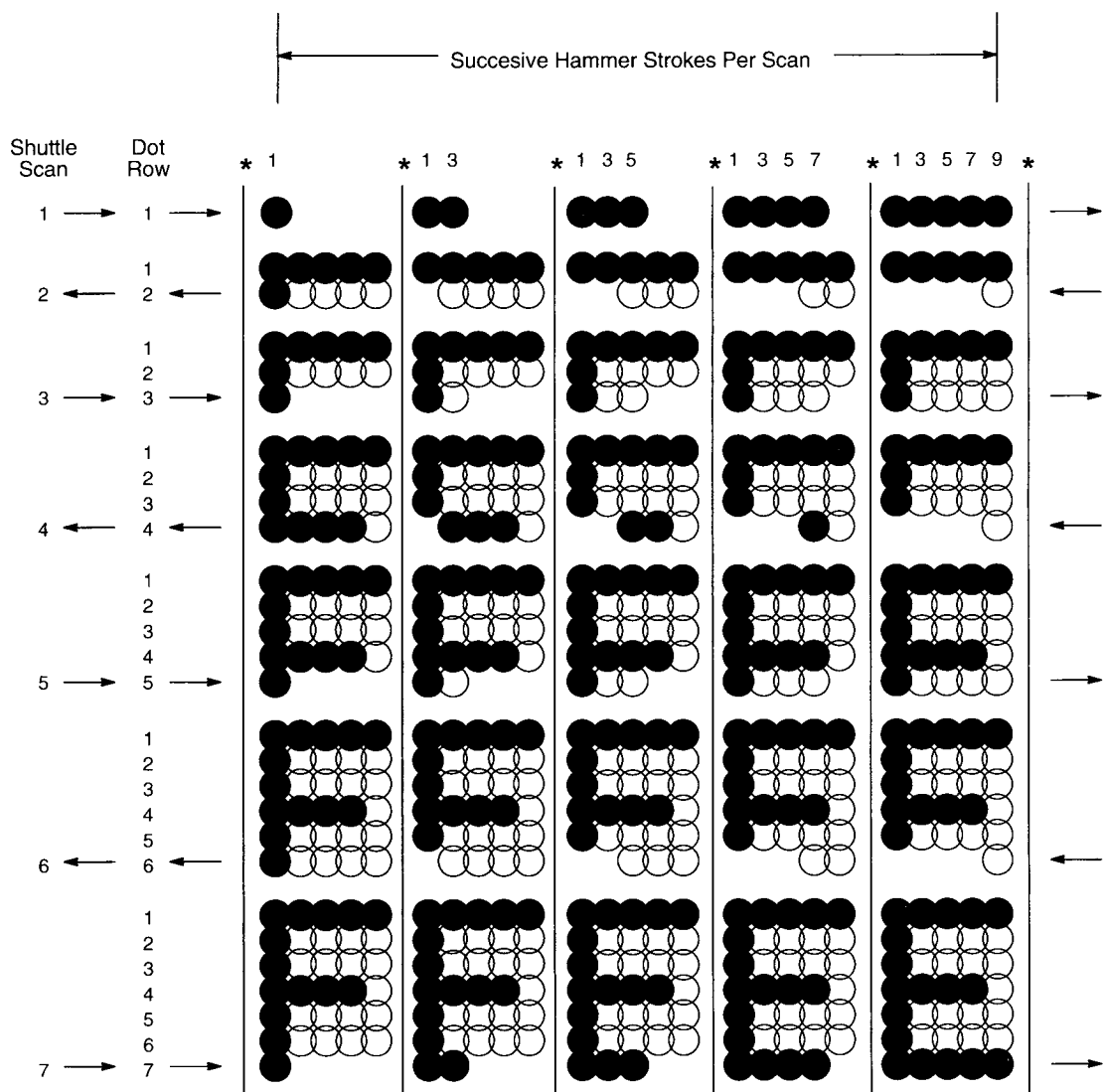


Figure 63. Standard Character Formation



\* Even column dot centers within the printed character area and character space hammer positions are not illustrated in this diagram.

NOTE: ● = Hammer Released and Dot Printed  
○ = Hammer Not Released; No Dot Printed

**Figure 64. Typical Action of One Hammerspring 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

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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 hammerbank assembly and the shuttle drive motor. (Figure 65.)

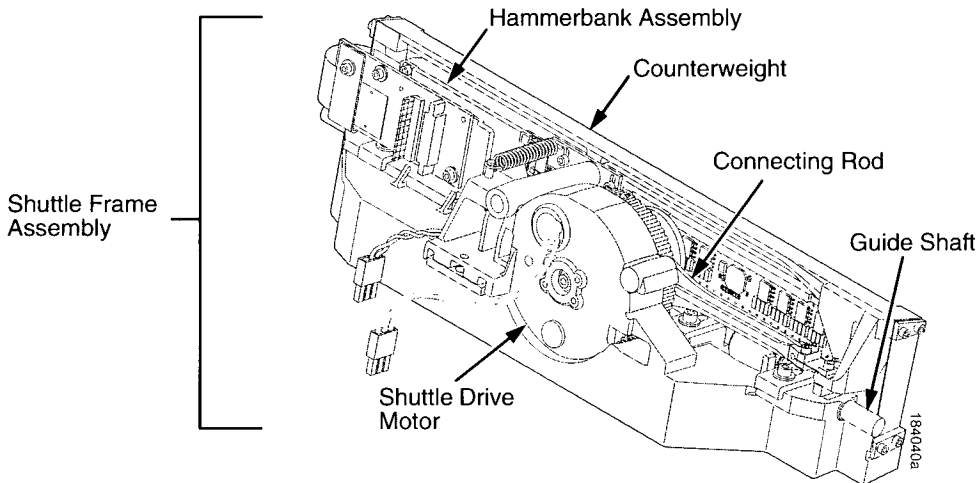


Figure 65. Shuttle Frame Assembly

## Shuttle Drive Motor

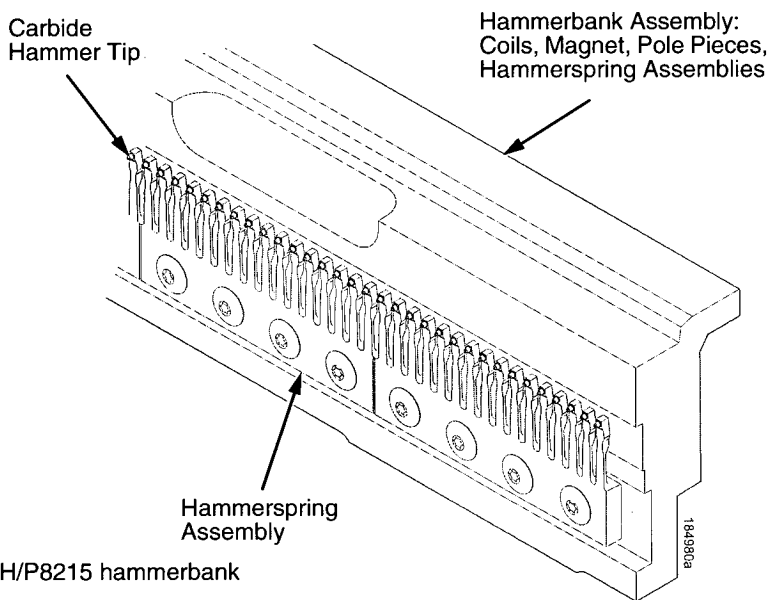
The shuttle drive motor is built into the shuttle assembly casting and spins a crankshaft, to which are attached the big ends of two connecting rods. (Figure 65.) The small end of one connecting rod attaches to the hammerbank; the small end of the other connecting rod attaches to a counterweight frame surrounding the hammerbank. (The hammerbank 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 hammerbank 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.

## Hammerbank Assembly

A number of comb-like hammerspring assemblies are bolted to a solid hammerbank, forming the hammerbank assembly. The number of individual hammers on a hammerspring assembly and the number of hammerspring assemblies attached to the hammerbank vary by printer model:

- Models P8X05 have seven 4-hammer assemblies, for a total of 28 individual hammersprings.
- Models P8X03H and P8X10 have six 10-hammer assemblies, for a total of 60 individual hammersprings.
- Models P8X06H and P8X15 have six 17-hammer assemblies, for a total of 102 individual hammersprings.
- Models P8X08H and P8X20 have seven 18-hammer assemblies, for a total of 126 individual hammersprings.

Each hammerspring is a stiff leaf spring with a carbide tip attached to the free end. (Figure 66.) A powerful permanent magnet is imbedded along the length of the hammerbank and acts on the hammersprings through individual pole pieces. The pole pieces magnetically attract and hold the free end of the hammerspring under tension. This is called the retracted state.



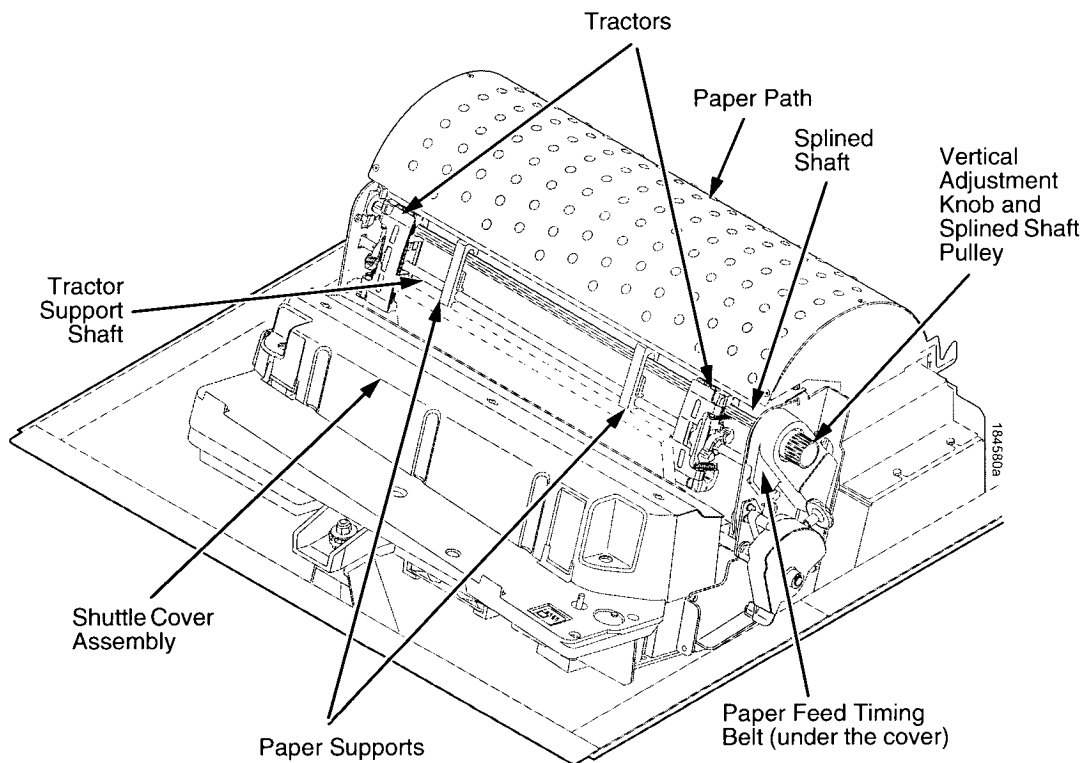
**NOTE:** P8X06H/P8215 hammerbank shown.

**Figure 66. Hammersprings and Hammerbank (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 hammerbank. 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 hammers 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 67. 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

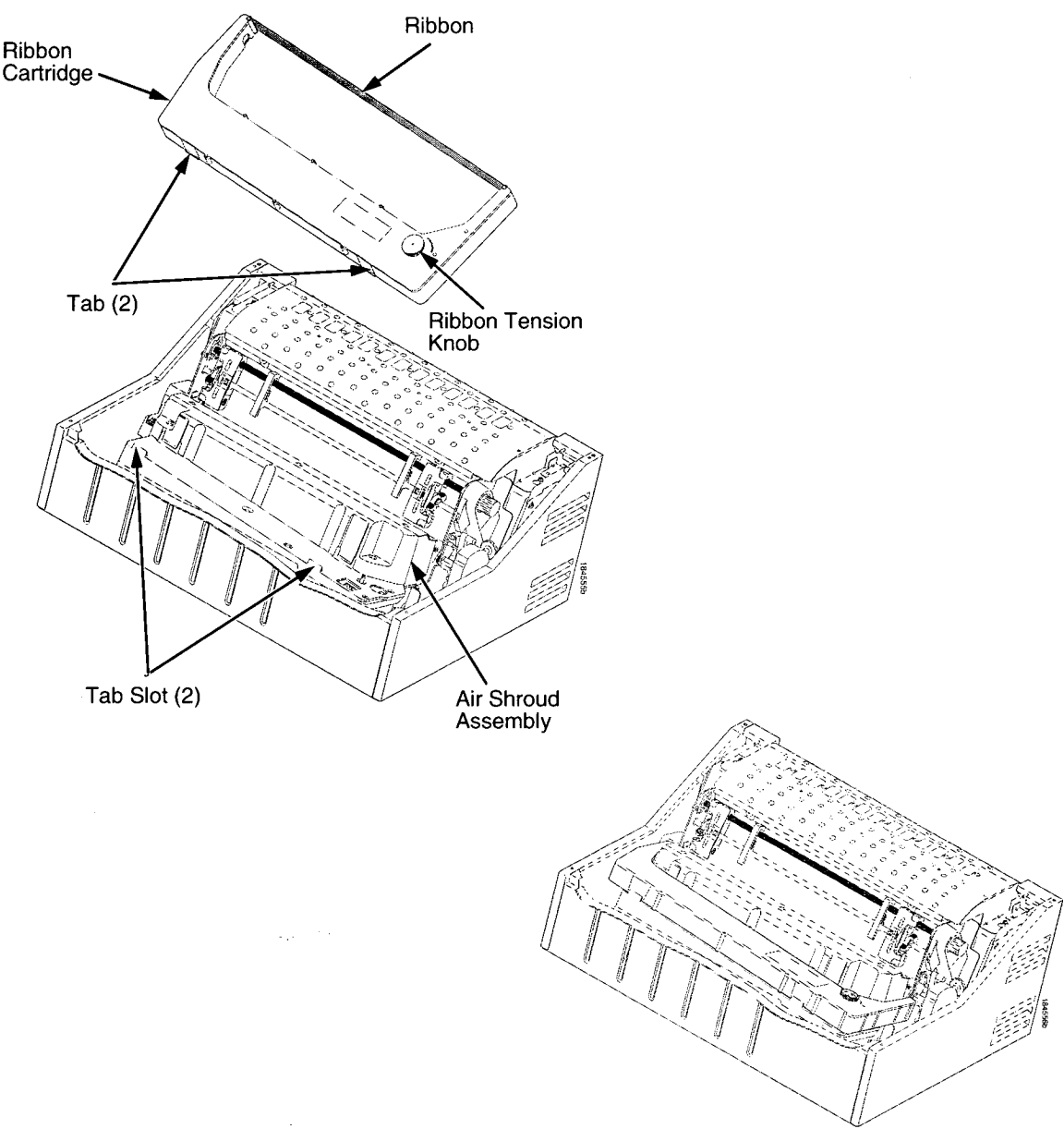
prevents paper jams when paper direction is reversed after viewing the print area, setting top of form, or allowing applications to overprint forms.

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

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**Figure 68. Ribbon Cartridge System**

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# Integrated Print Management System

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The P8000 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 P8000 CRP automatically detects when a new or used ribbon is installed and determines the ribbon's length, ink color, and expected yield.

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## Operation

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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 as follows.

## 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 arrow ◀ or right arrow ▶ key to select either "Darker +1" through "Darker +6" (◀) or "Lighter -1" through "Lighter -10" (▶). Each increment or decrement corresponds to a predetermined density value. Pressing ◀ or ▶ 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**. 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**. 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**. 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 69.

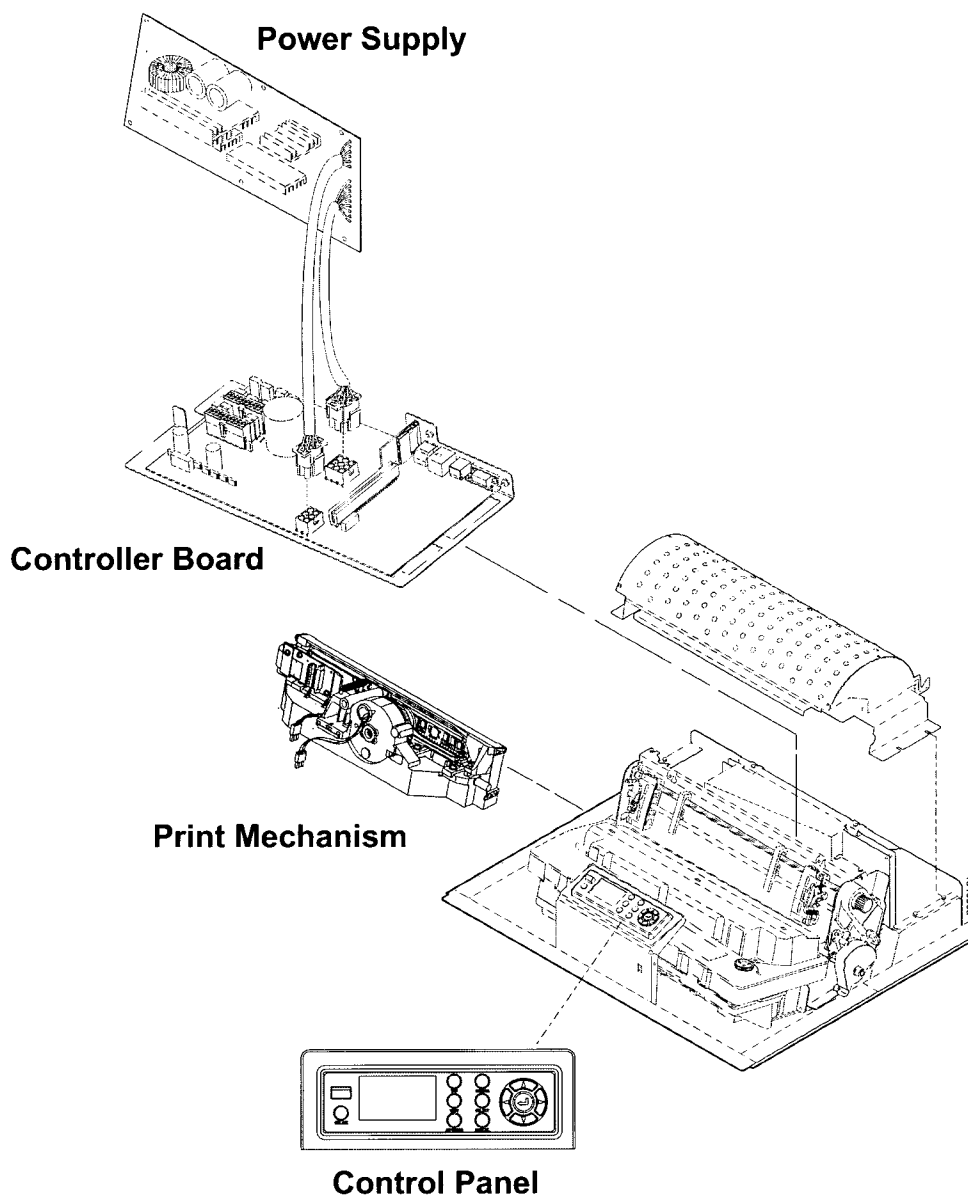


Figure 69. Functional Elements of the Printer



# 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 26.

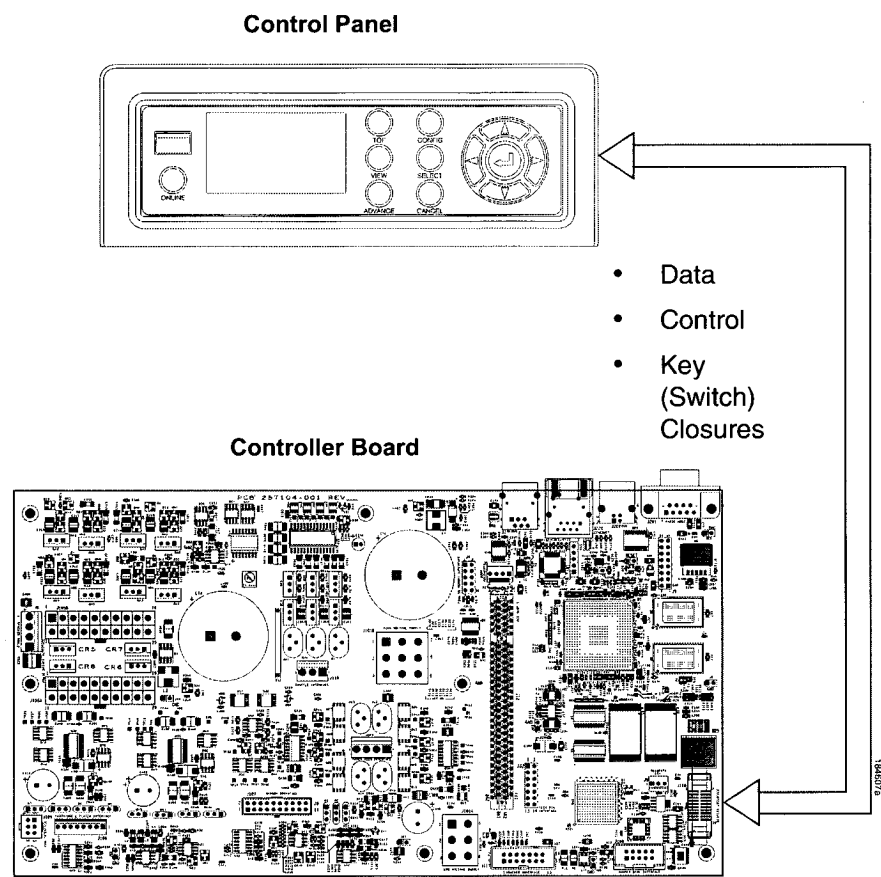


Figure 70. Control Panel Functional Overview

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## Controller Board

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The heart of a P8000 printer is the controller board (low speed for low speed printers and high speed for high speed printers), which controls all printer functions and supports all P8000 models.

The controller board receives and processes all data from the host computer, builds the printable images, controls all motors, and drives the hammersprings. 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 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 hammerbank. The EC synchronizes paper, ribbon, platen, and shuttle motion as it feeds dot data to the hammer drivers.

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## Power Supply Board

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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. Two separate power supplies are available: one for low speed printers and one for high speed printers.

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.

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### AC Power

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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.

## Printer Interface

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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 (optional)
- IEEE 1284 parallel (optional)
- USB2.0 (standard)
- EIA®-232-E serial (standard)
- 10/100Base-T Ethernet (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

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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.

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# A *Wire Data*

**NOTE:** Abbreviations, acronyms, and signal mnemonics are defined in Appendix B (page 367).

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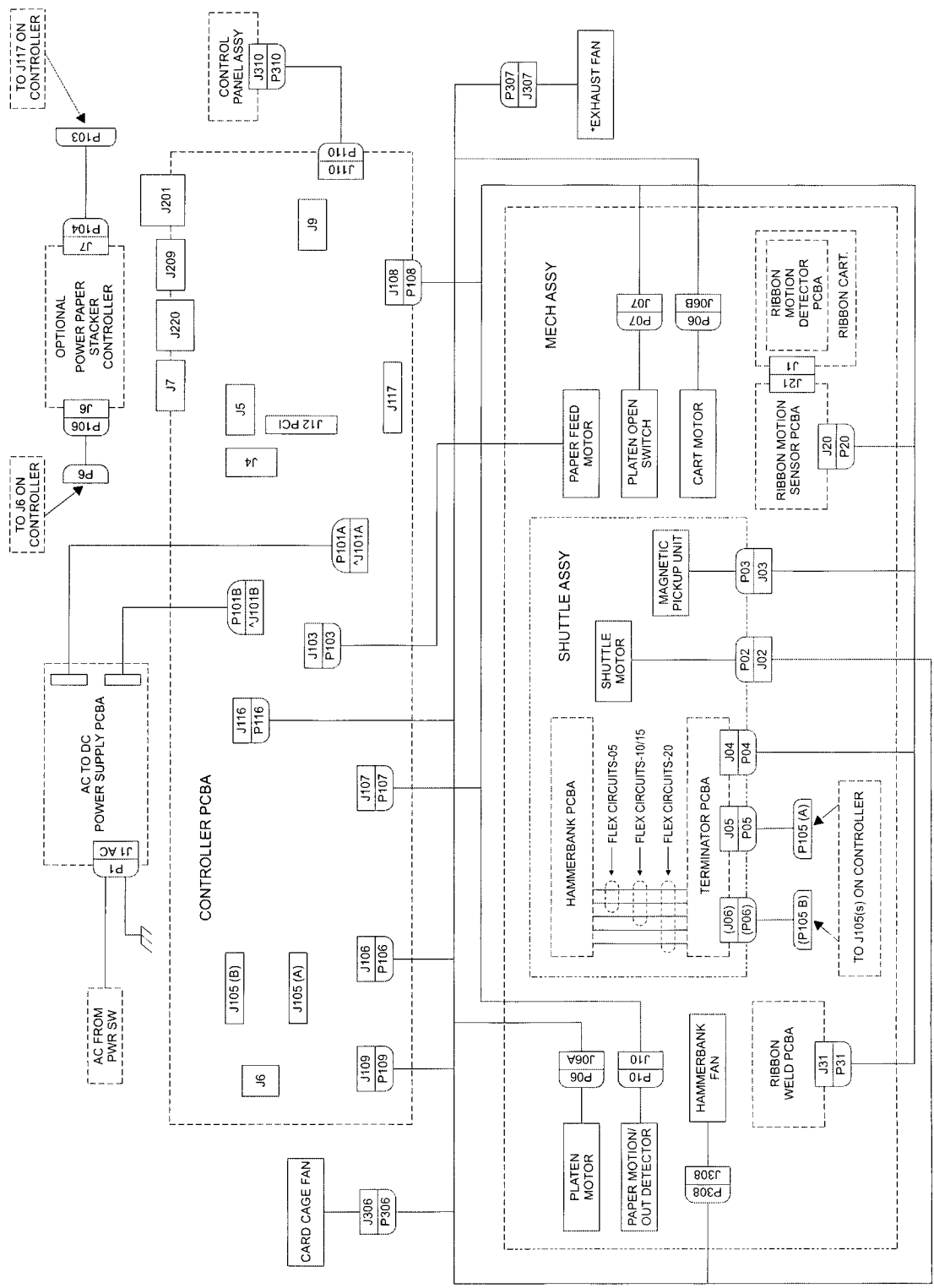
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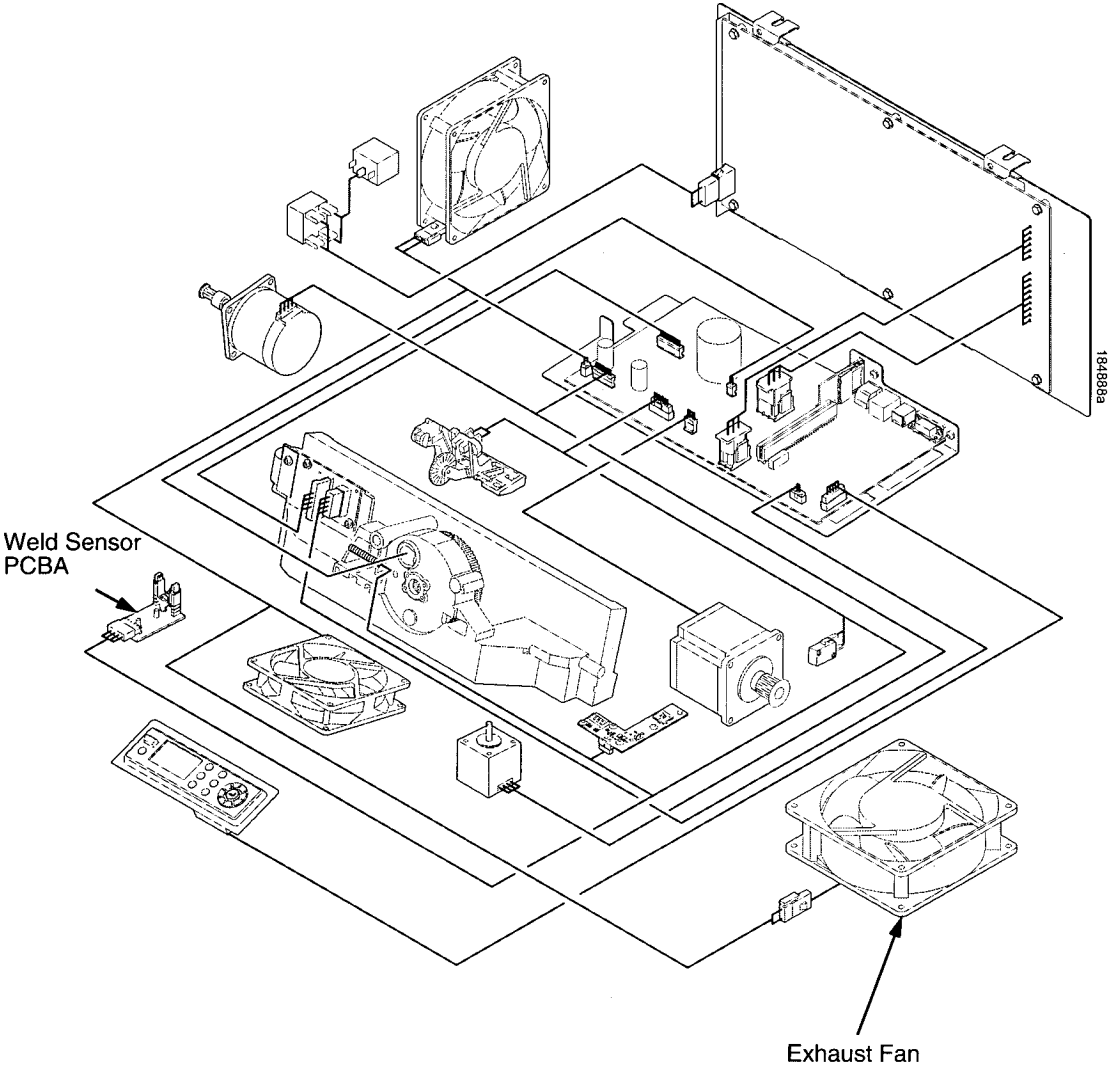
# Interconnection Diagram



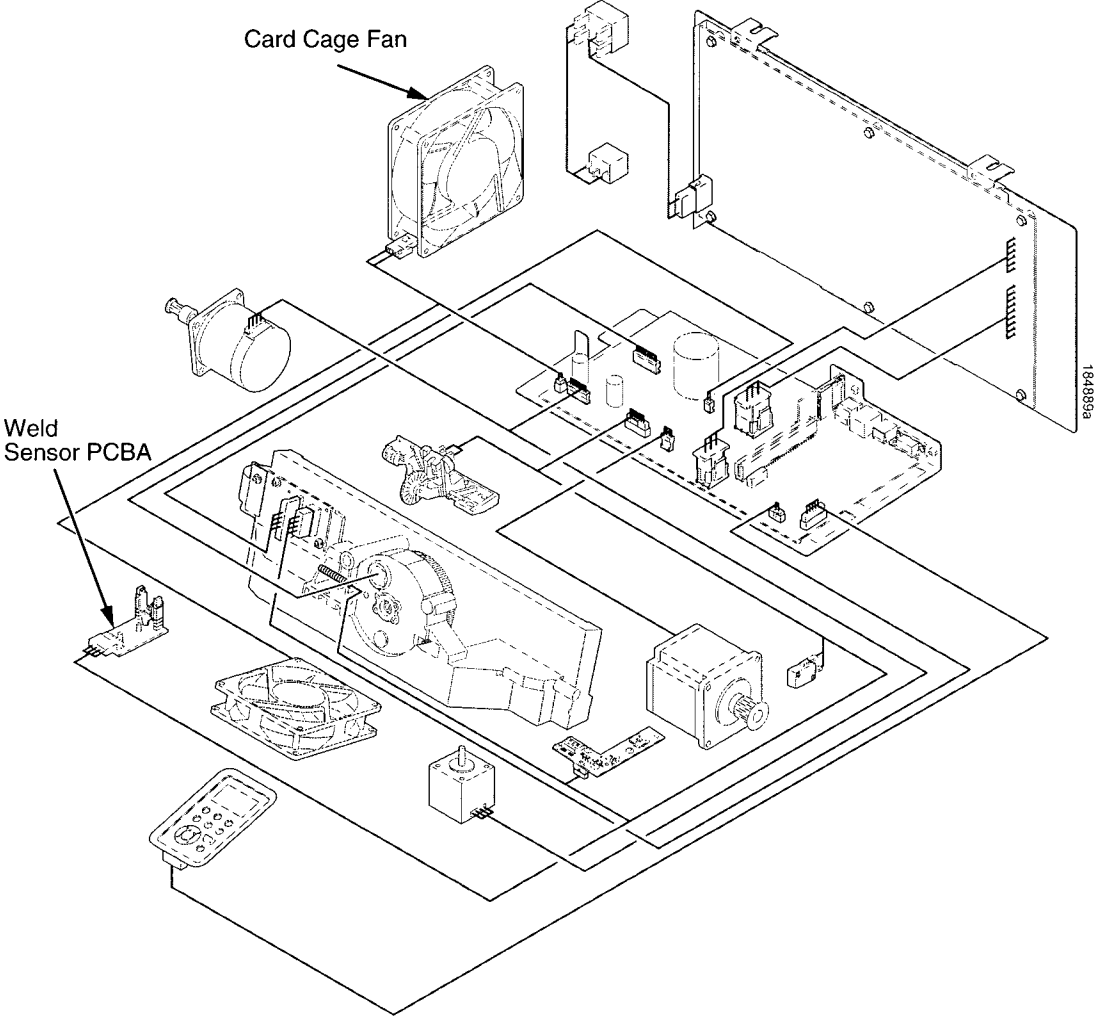
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# Cable Routing

## Low Speed - Cabinet Model

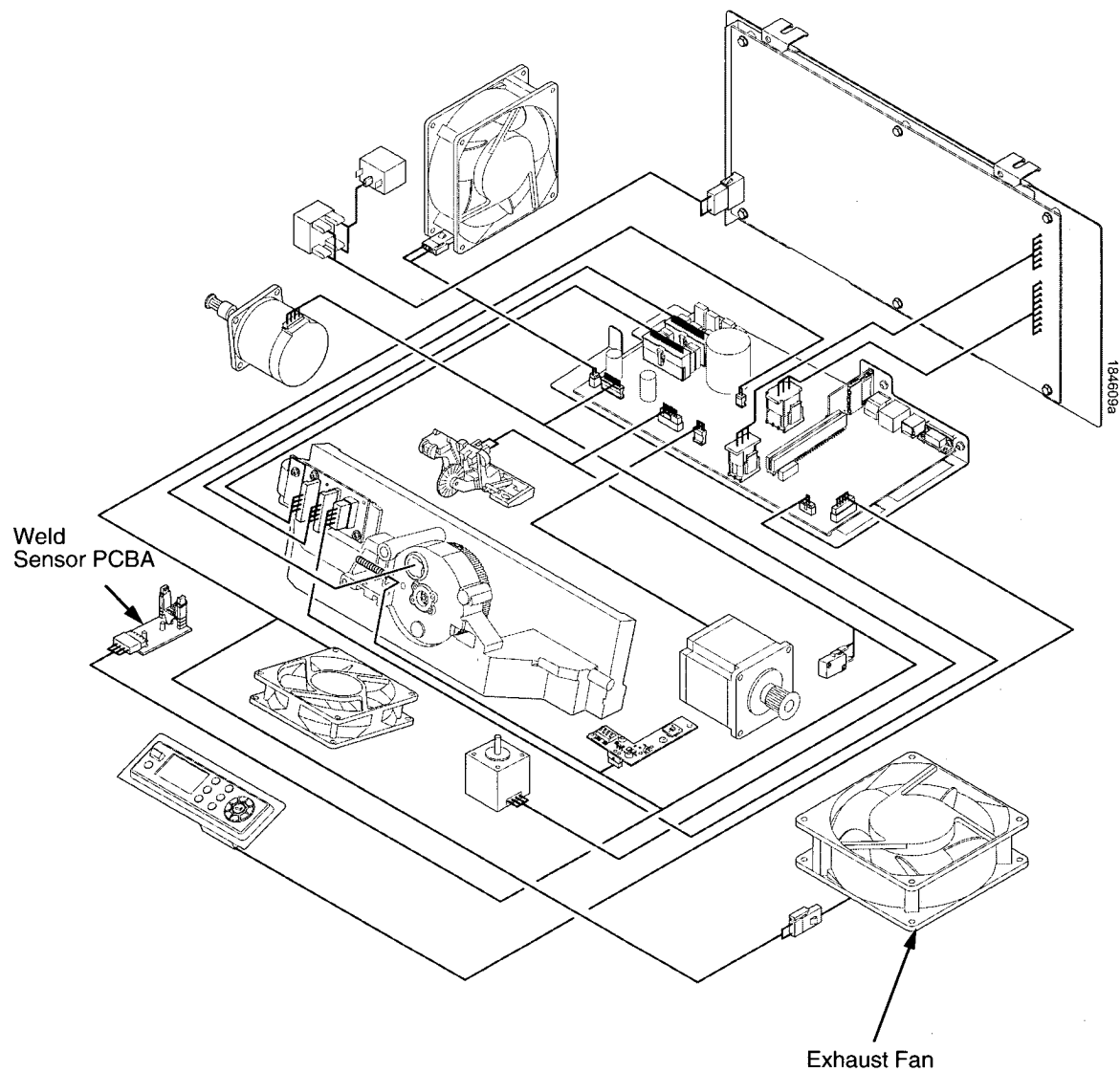


# Low Speed - Pedestal Model

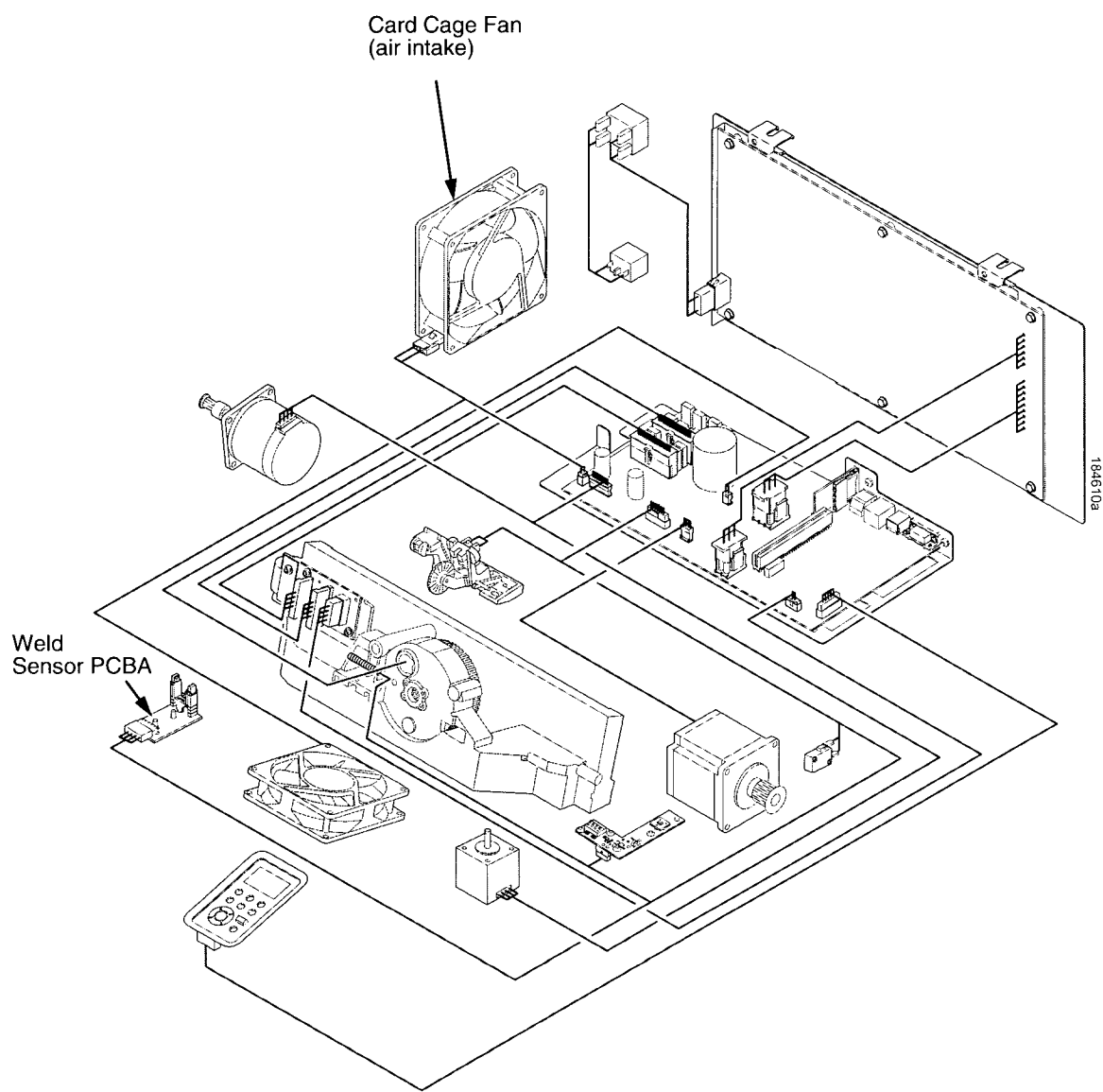




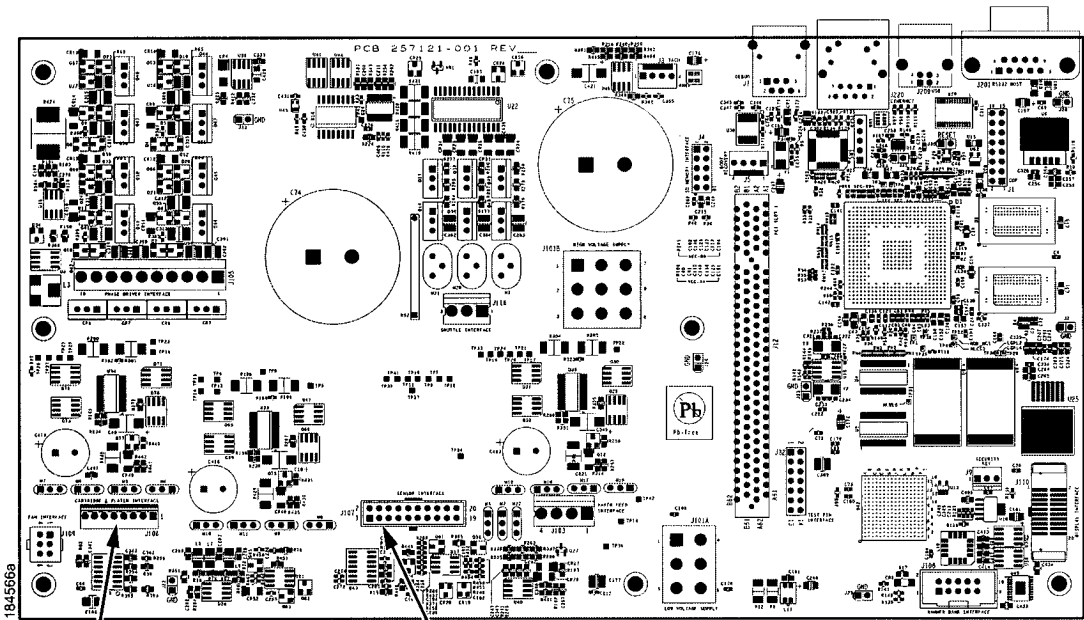
High Speed - Cabinet Model



# High Speed - Pedestal Model

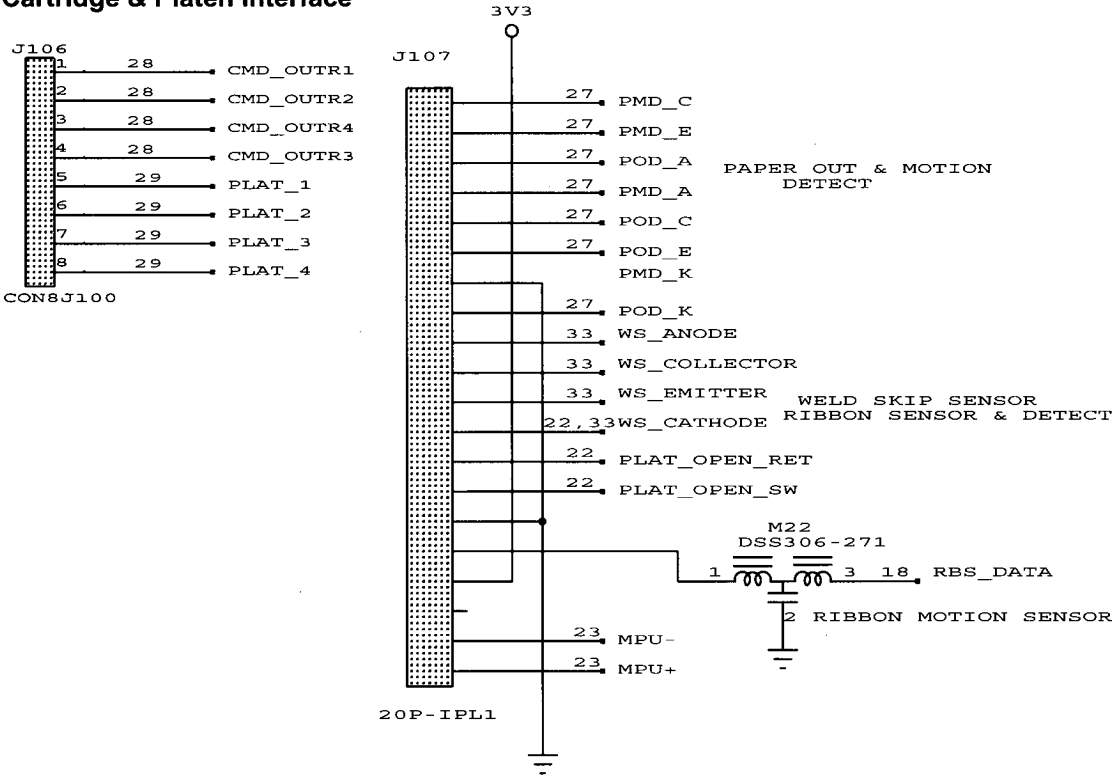


# Low Speed Controller Board



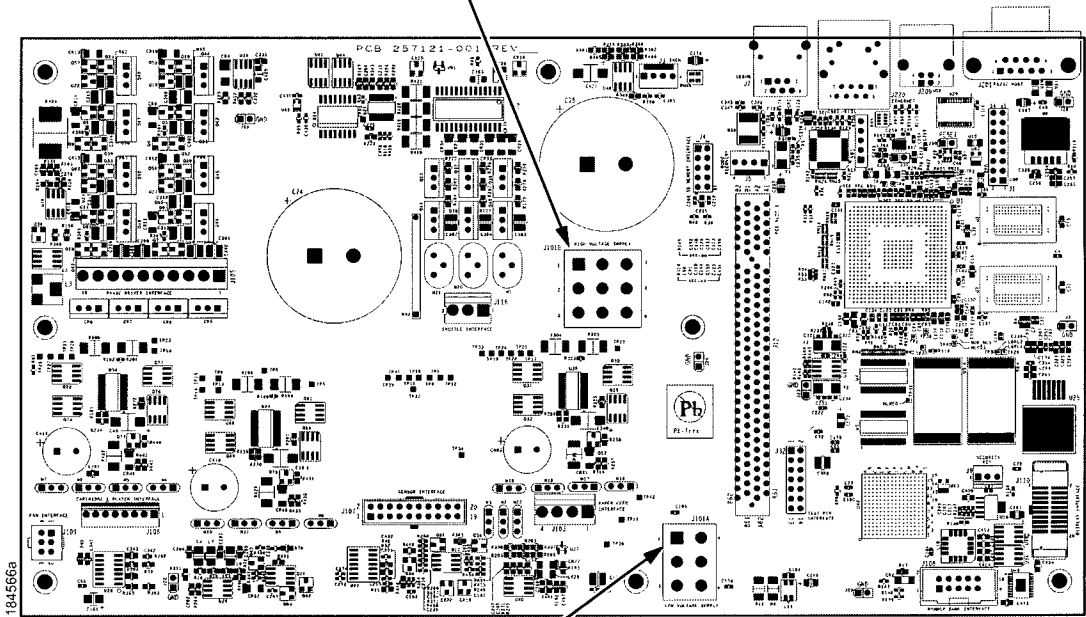
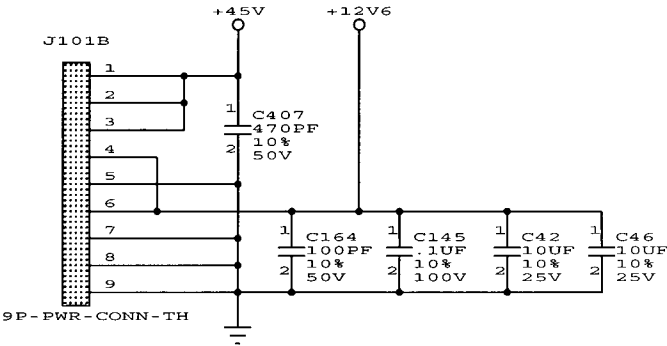
Sensor Interface

Cartridge & Platen Interface

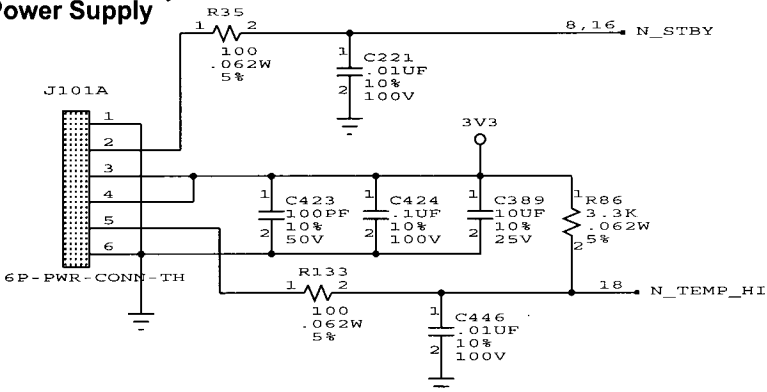


# Low Speed Controller Board (continued)

## High Voltage Power Supply

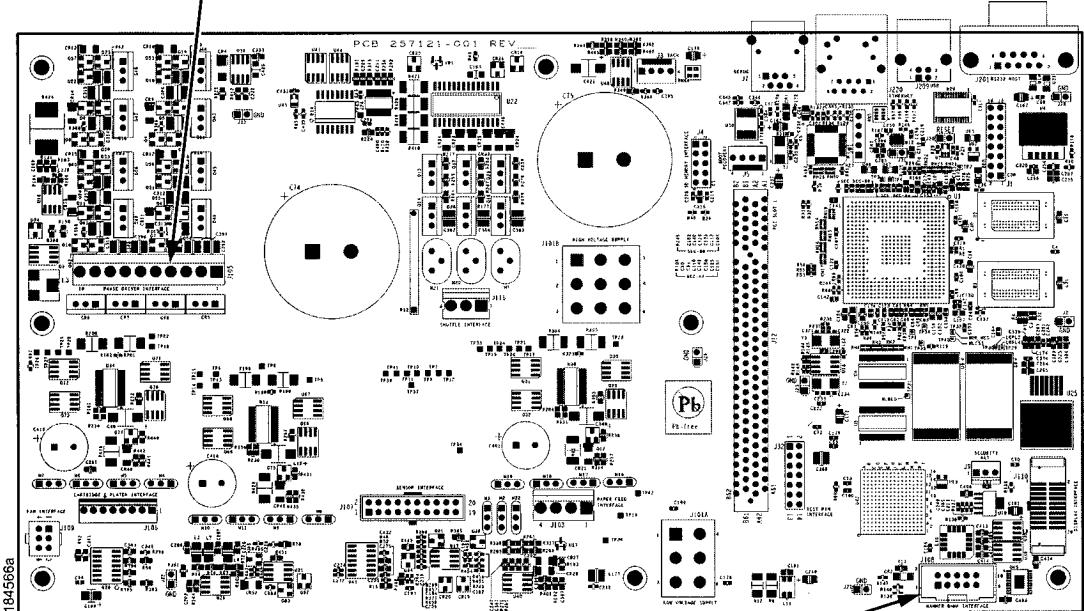
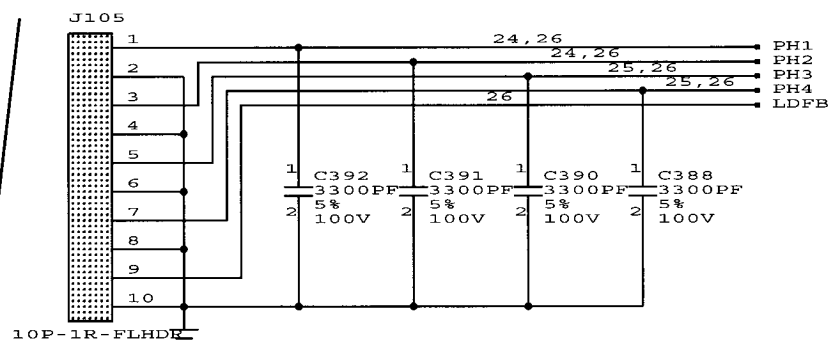


## Low Voltage Power Supply

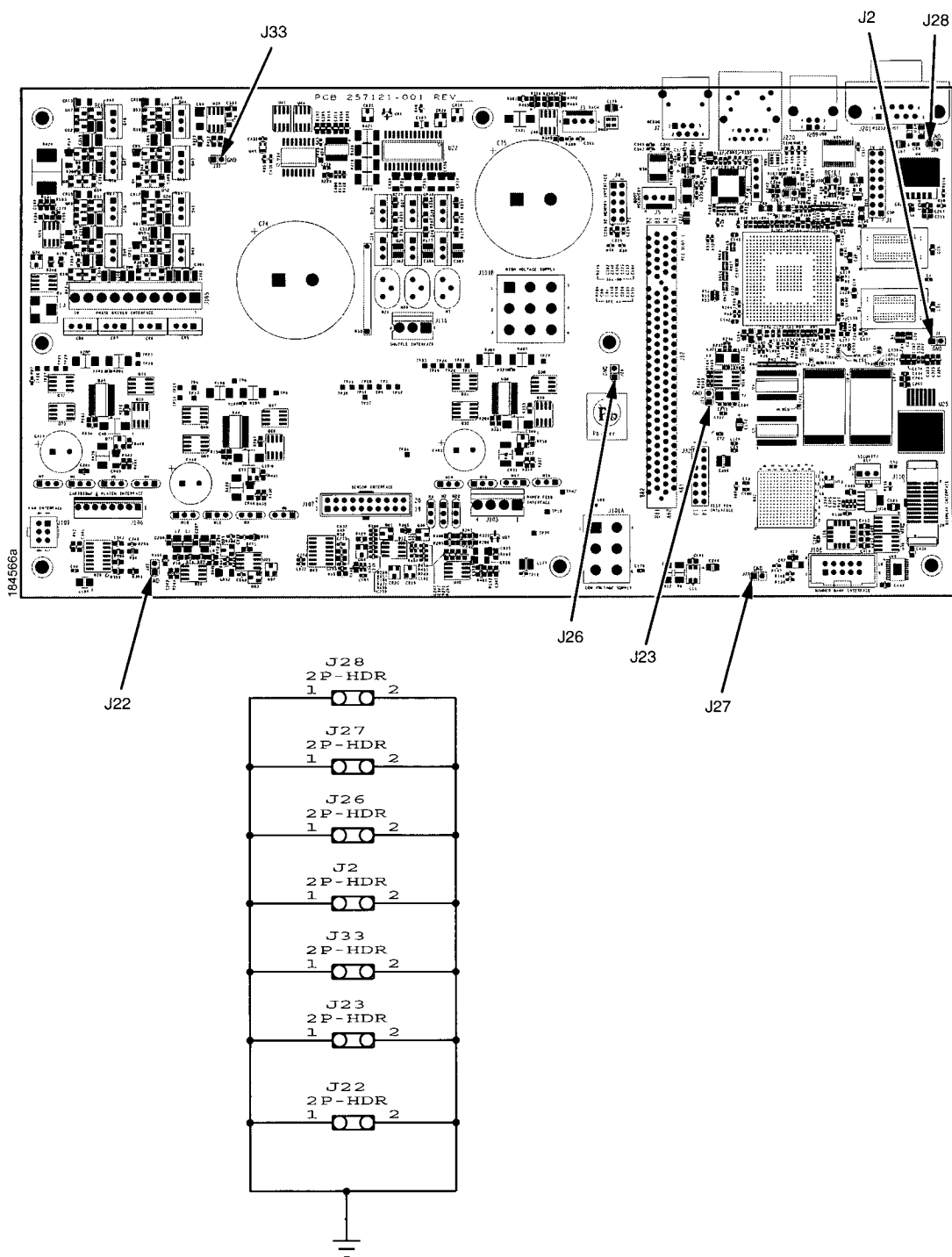


Low Speed Controller Board (continued)

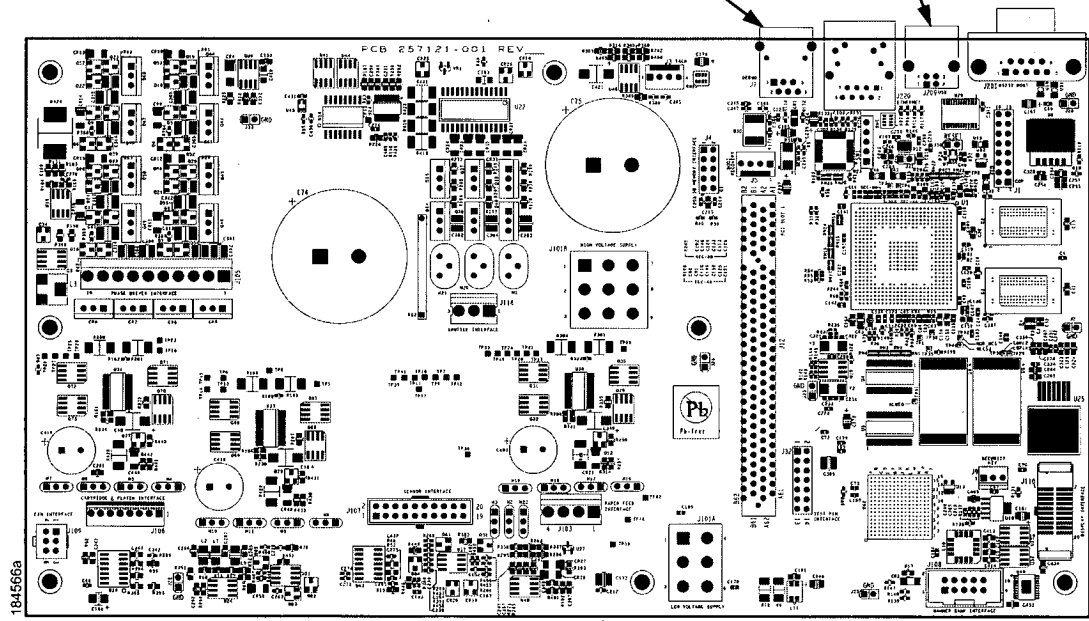
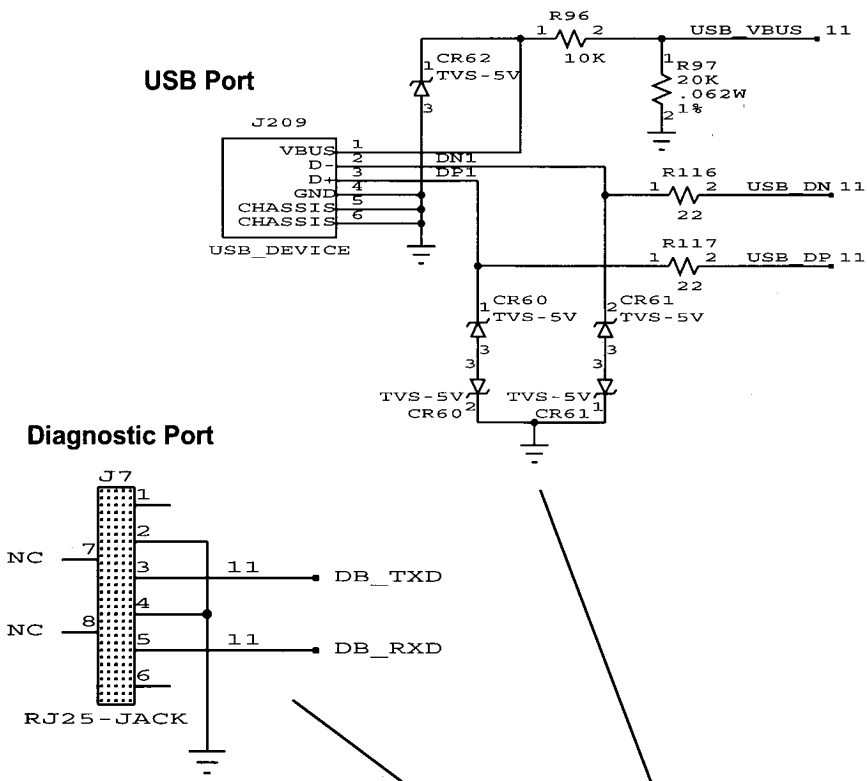
Hammerbank Power



Low Speed Controller Board (continued)



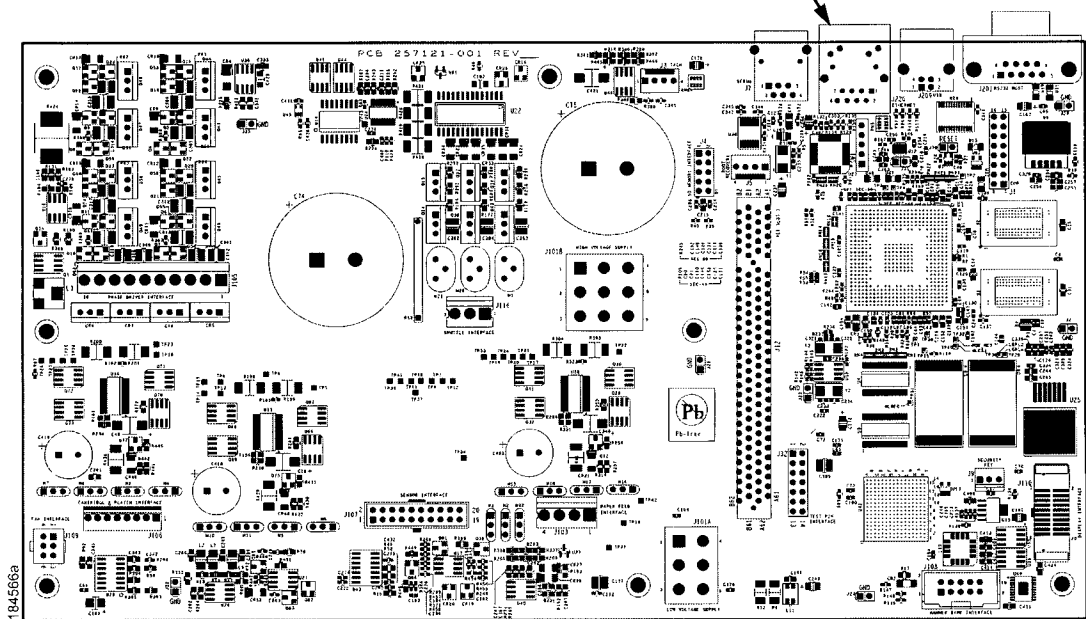
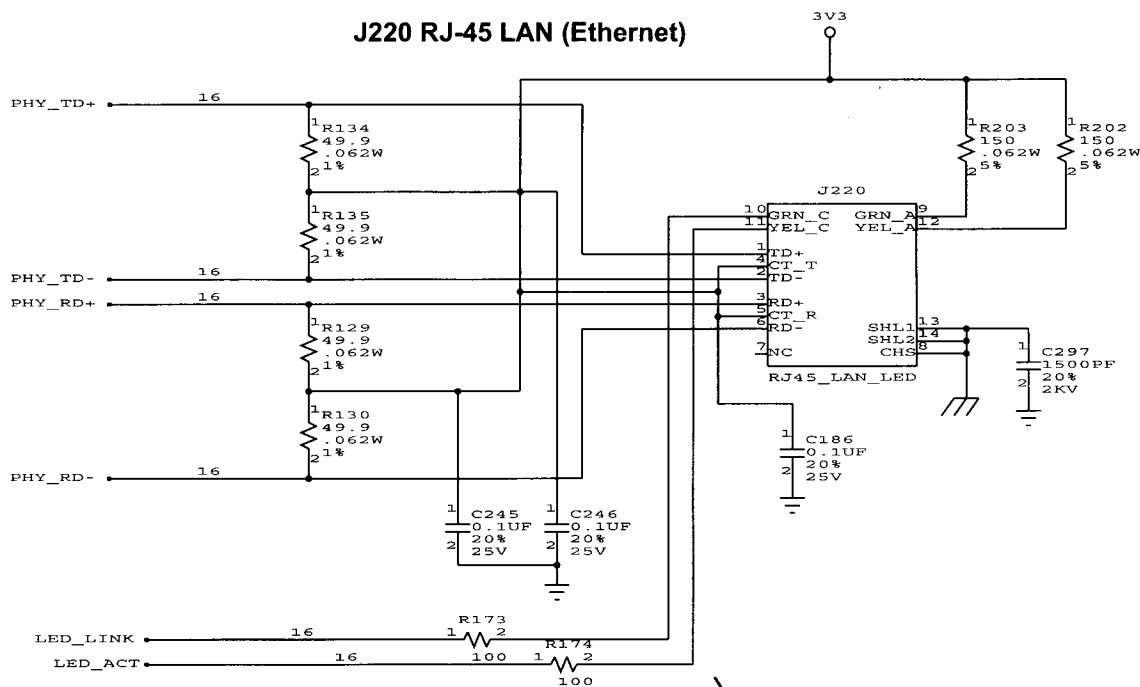
Low Speed Controller Board (continued)



184566a

# Low Speed Controller Board (continued)

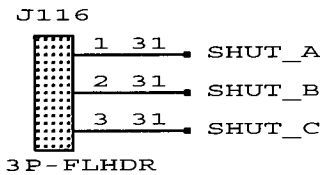
## J220 RJ-45 LAN (Ethernet)



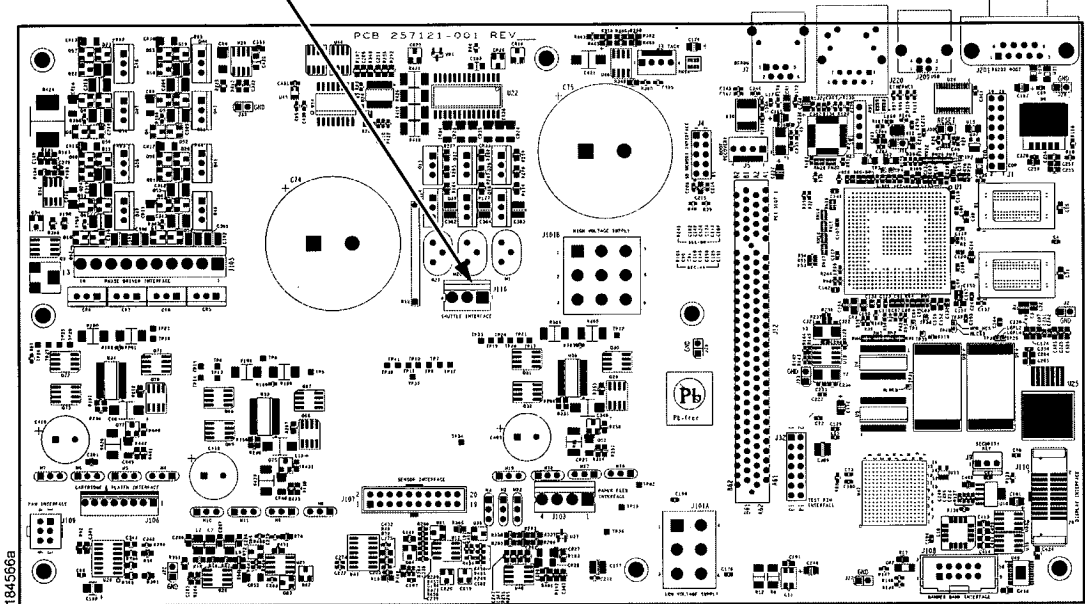
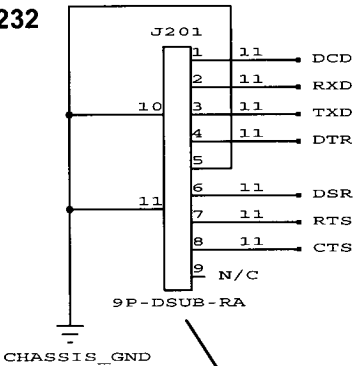


Low Speed Controller Board (continued)

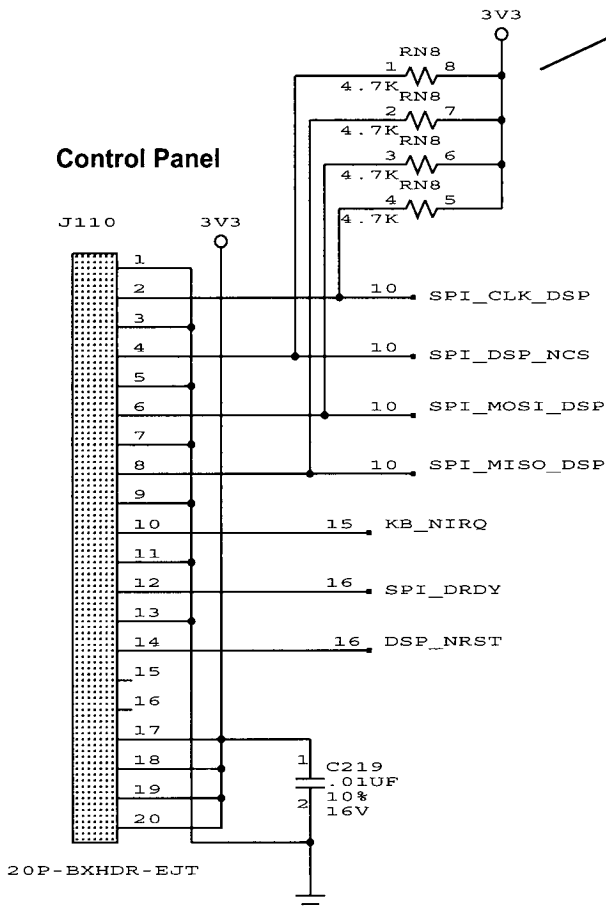
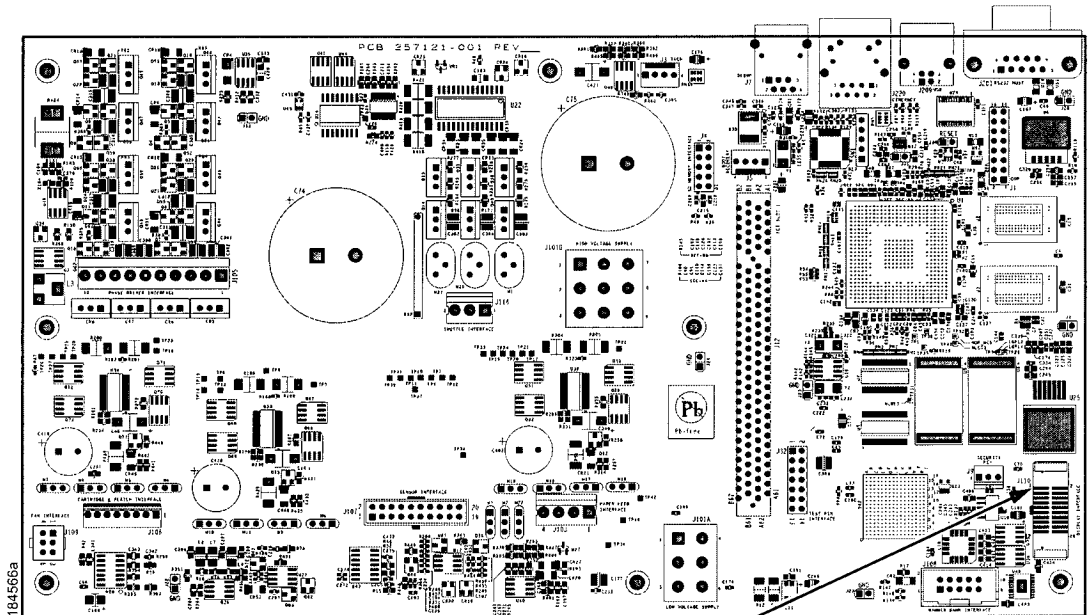
Shuttle Drive



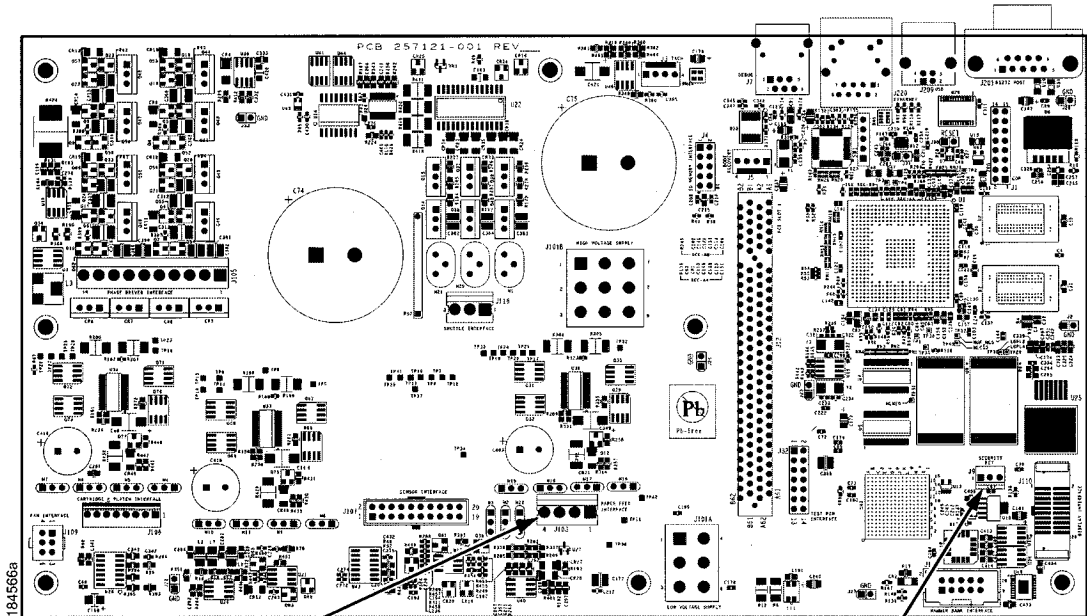
Host RS232



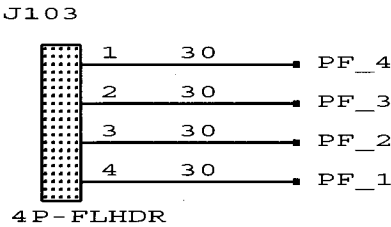
## Low Speed Controller Board (continued)



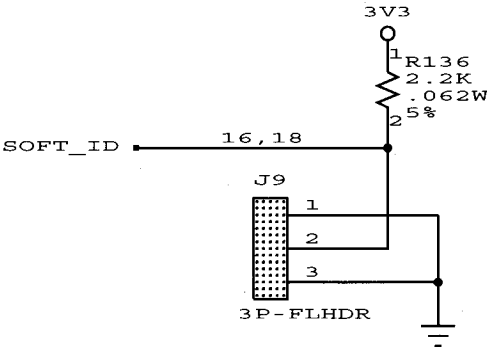
Low Speed Controller Board (continued)



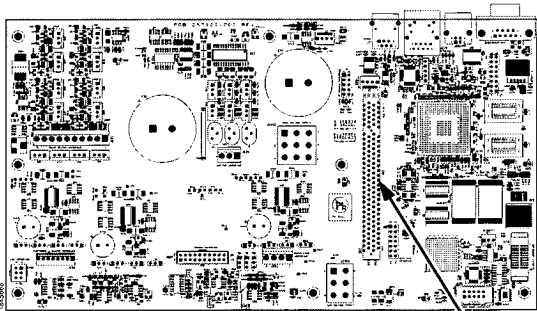
Paper Feed Interface



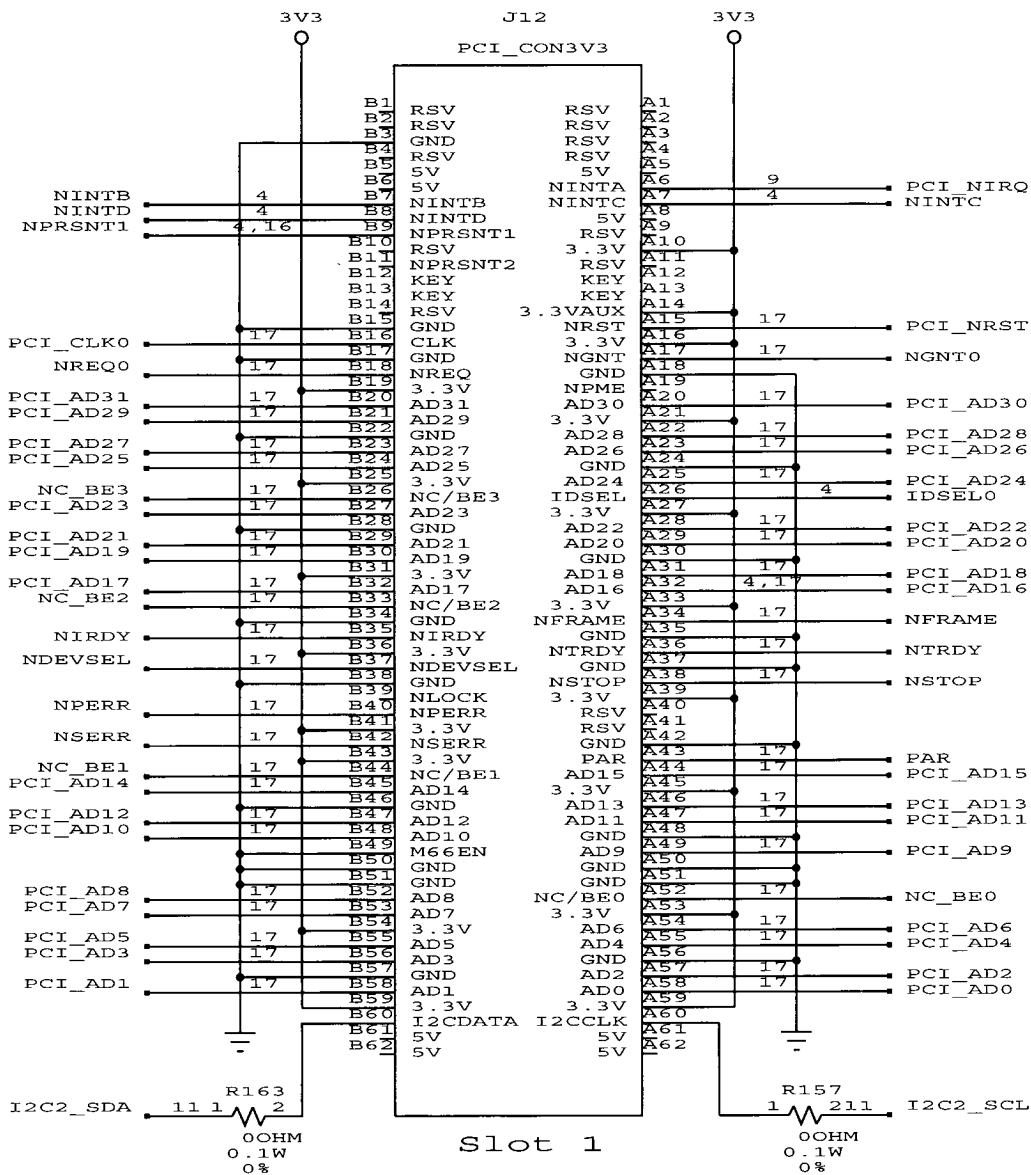
Software Security Key Device



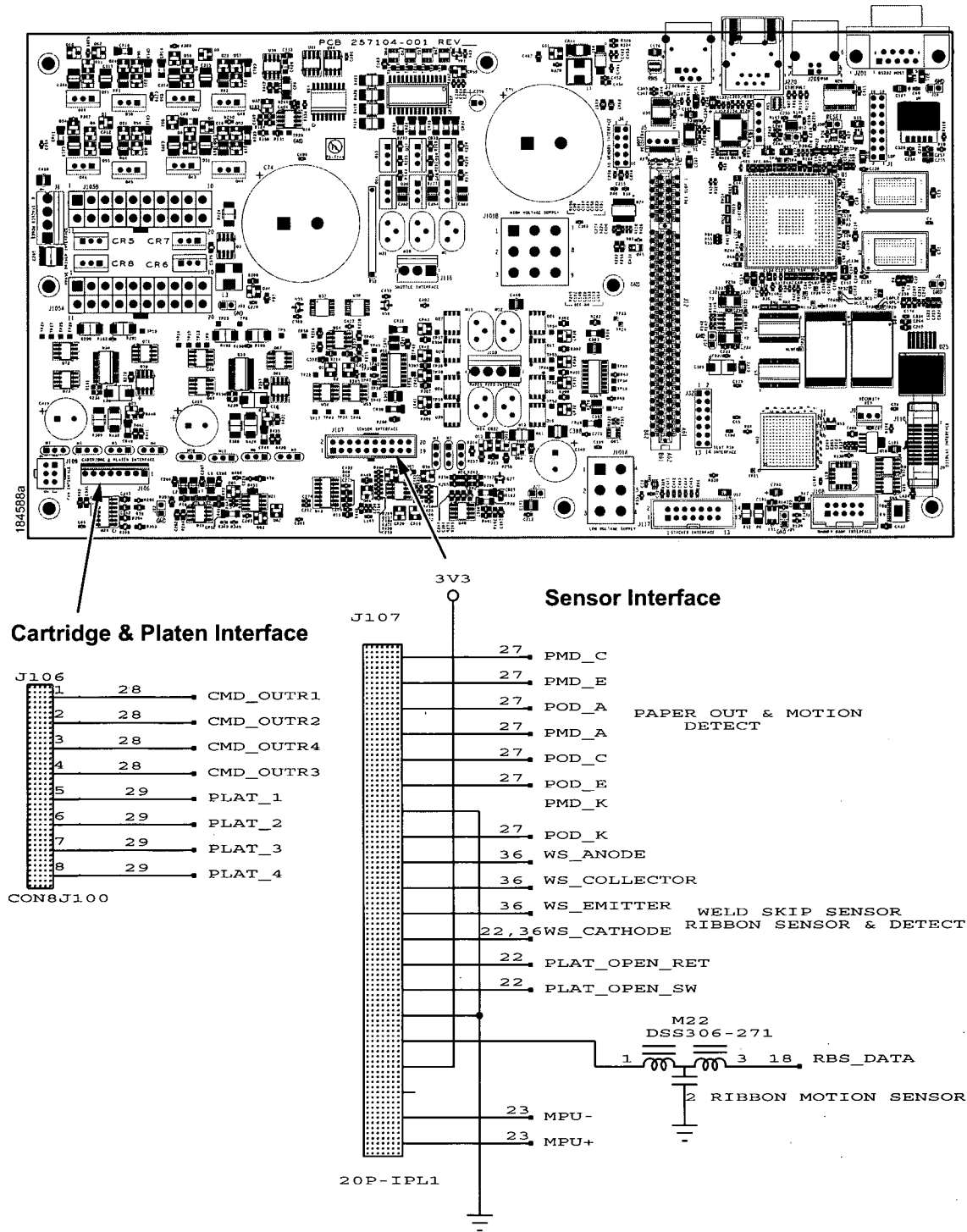
Low Speed Controller Board (continued)



PCI Connection

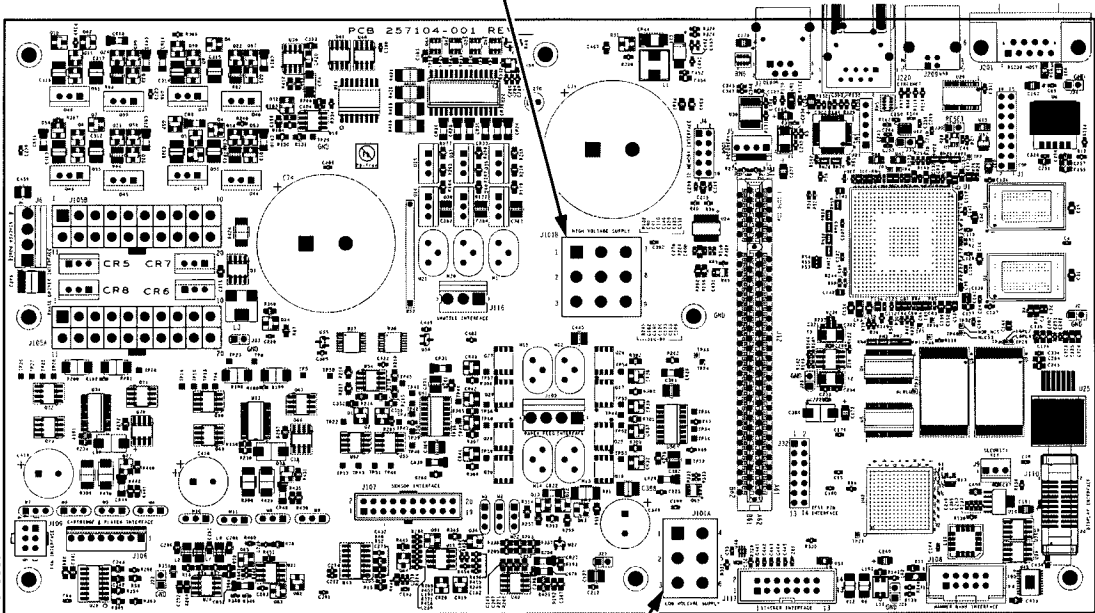
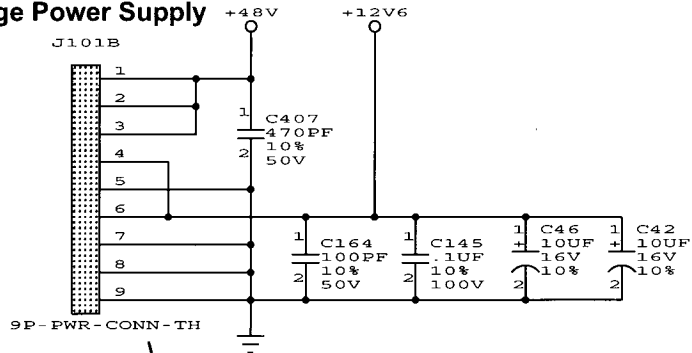


# High Speed Controller Board

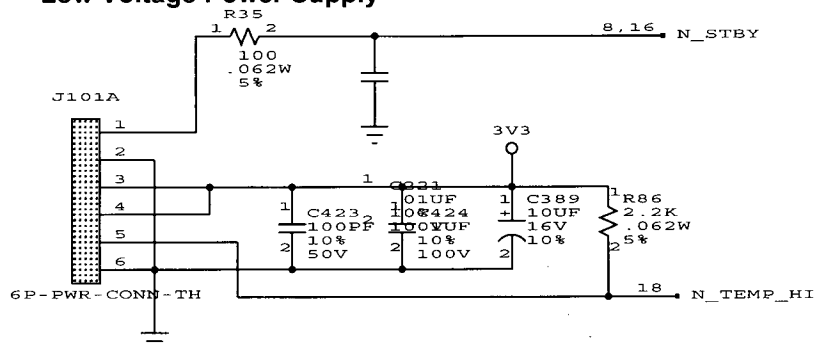


# High Speed Controller Board (continued)

## High Voltage Power Supply

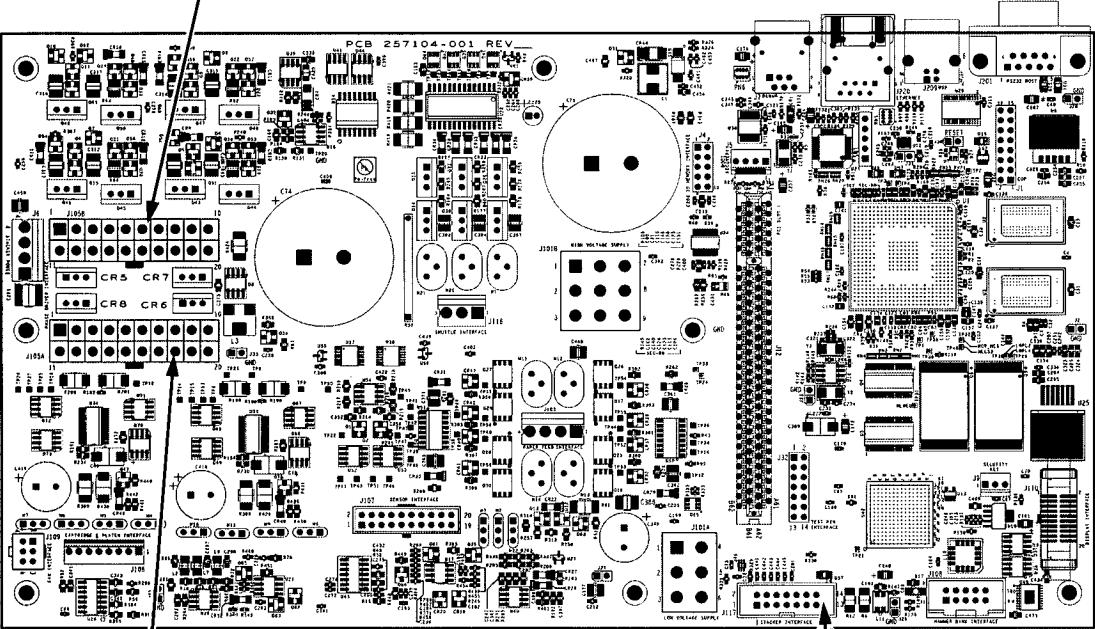
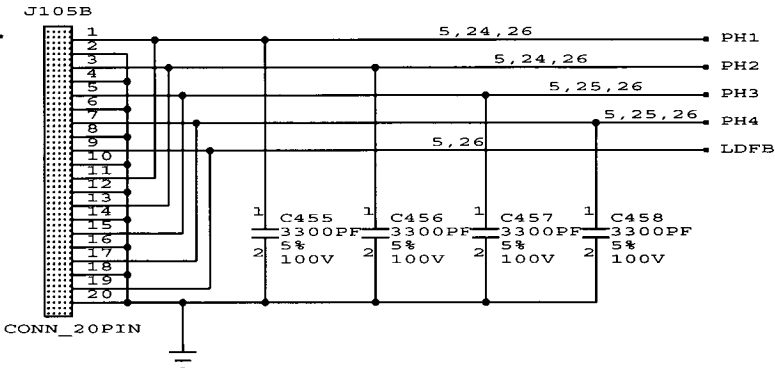


## Low Voltage Power Supply

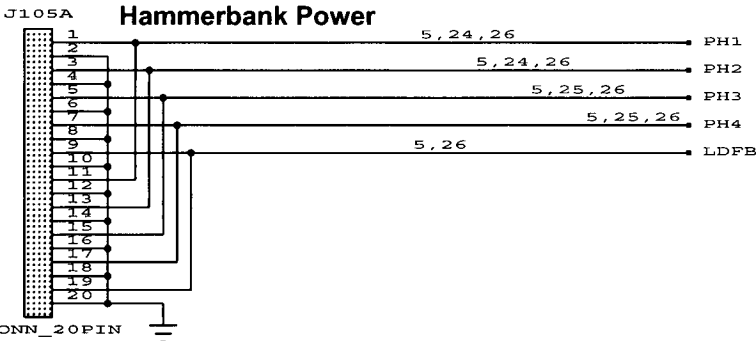


High Speed Controller Board (continued)

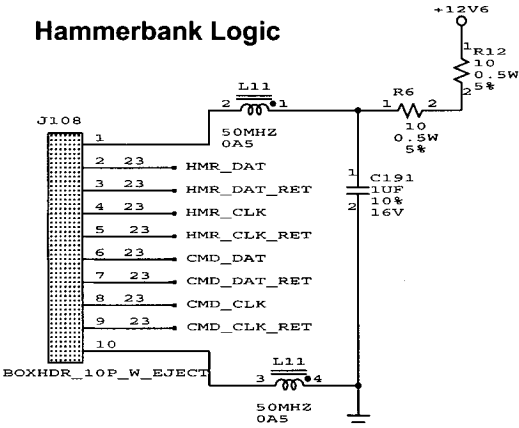
Hammerbank Power



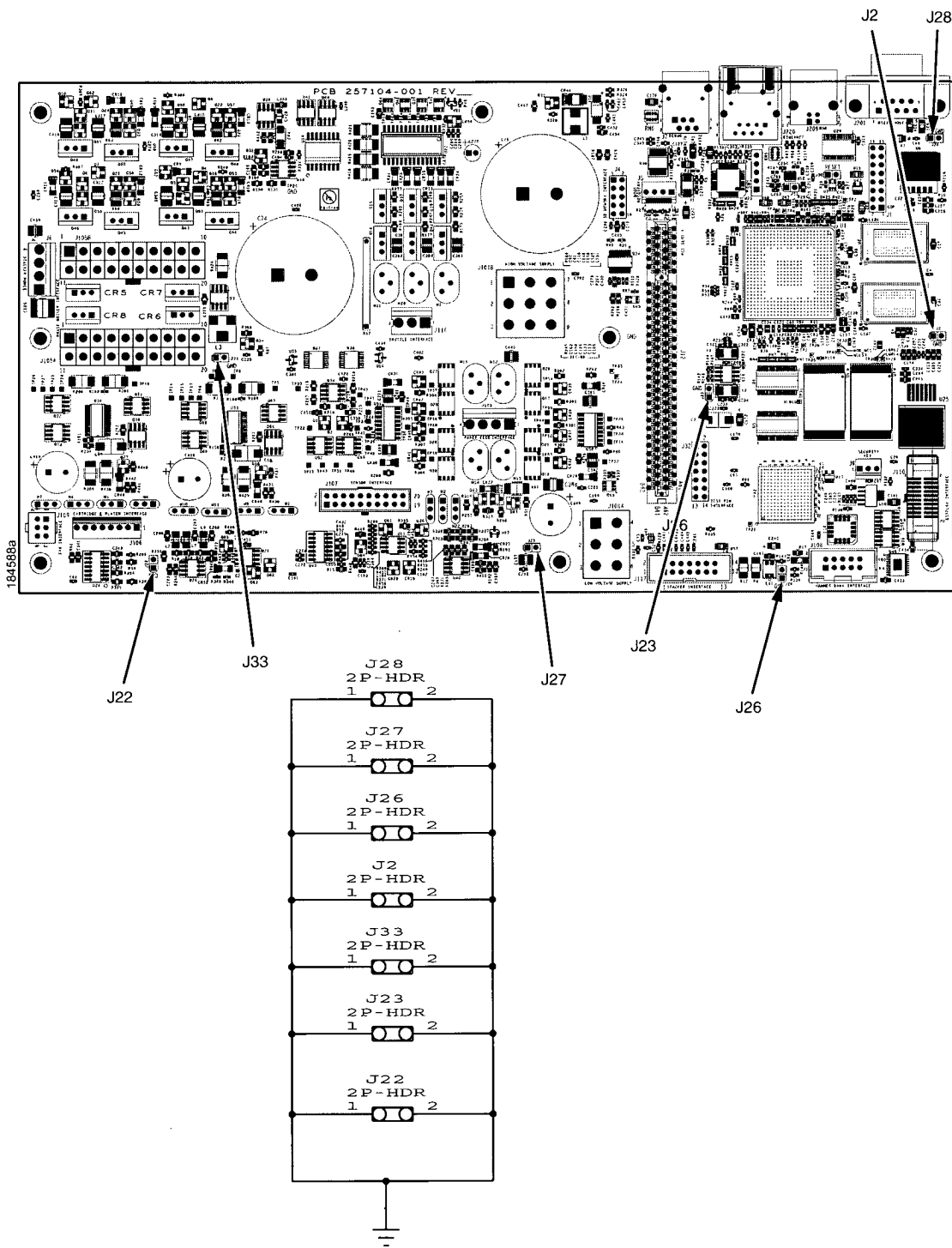
Hammerbank Power



Hammerbank Logic

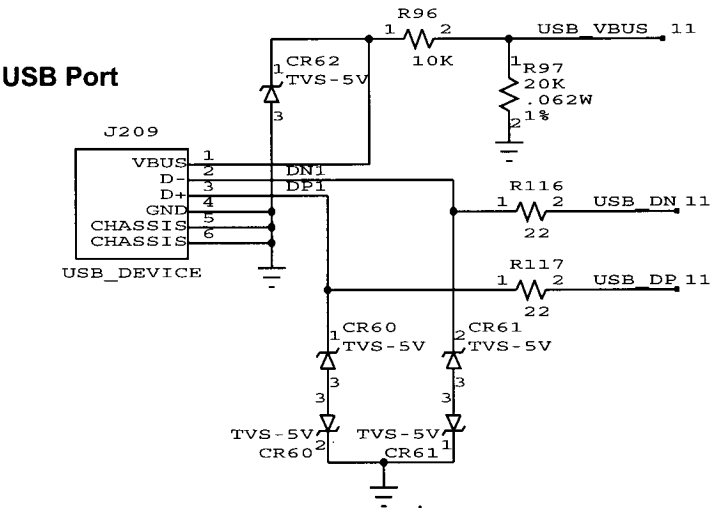


High Speed Controller Board (continued)

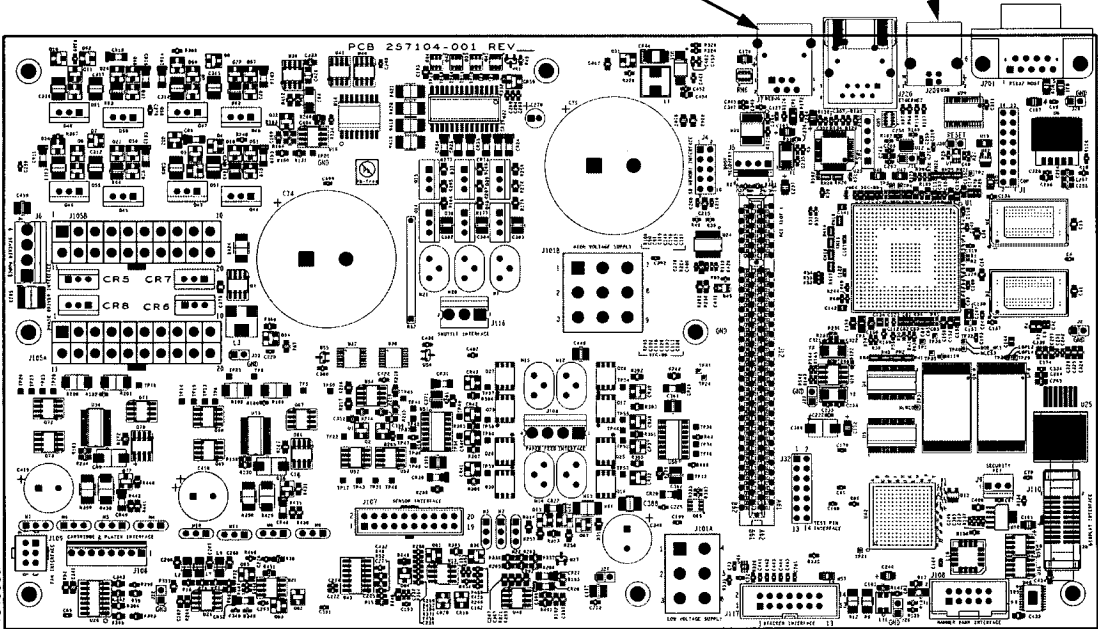
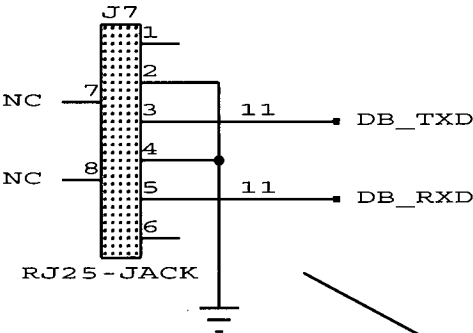




High Speed Controller Board (continued)

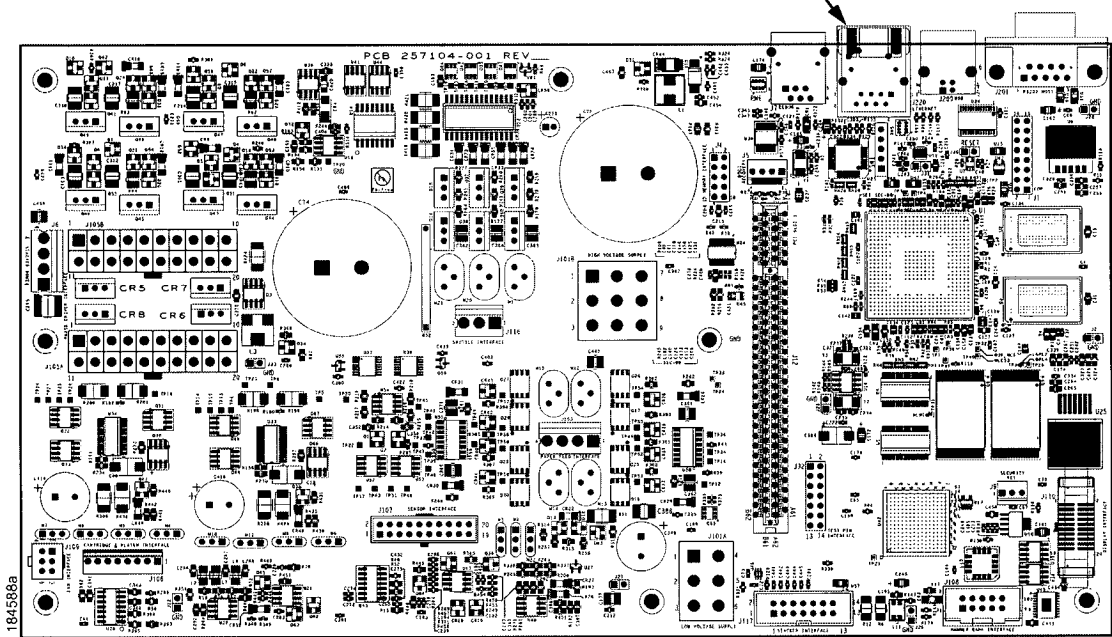
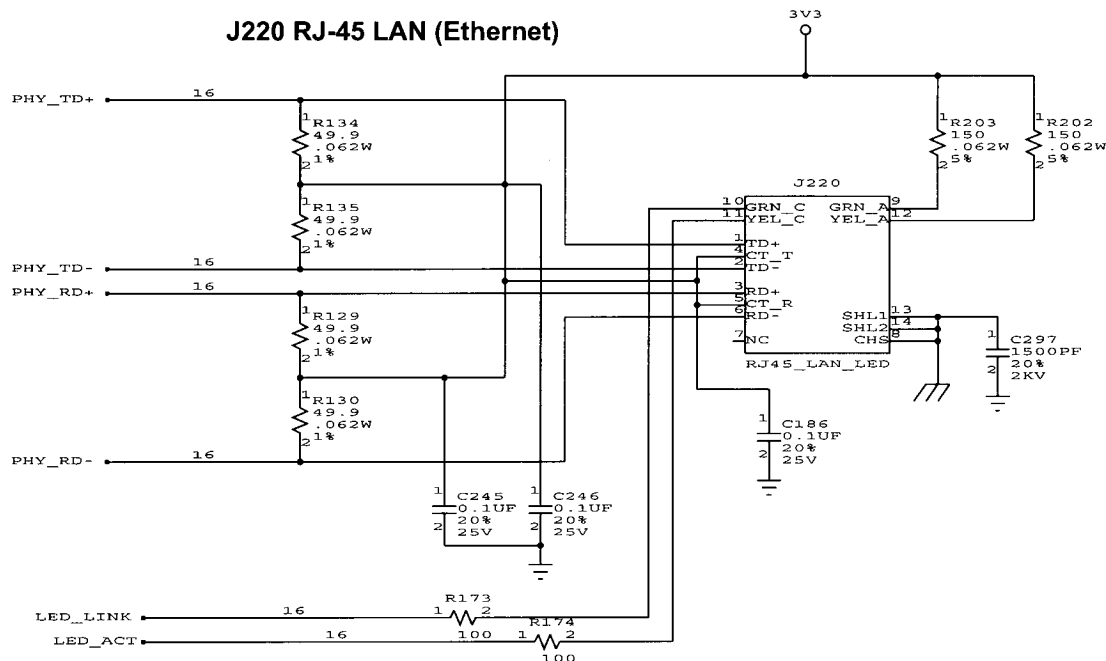


**Diagnostic Port**

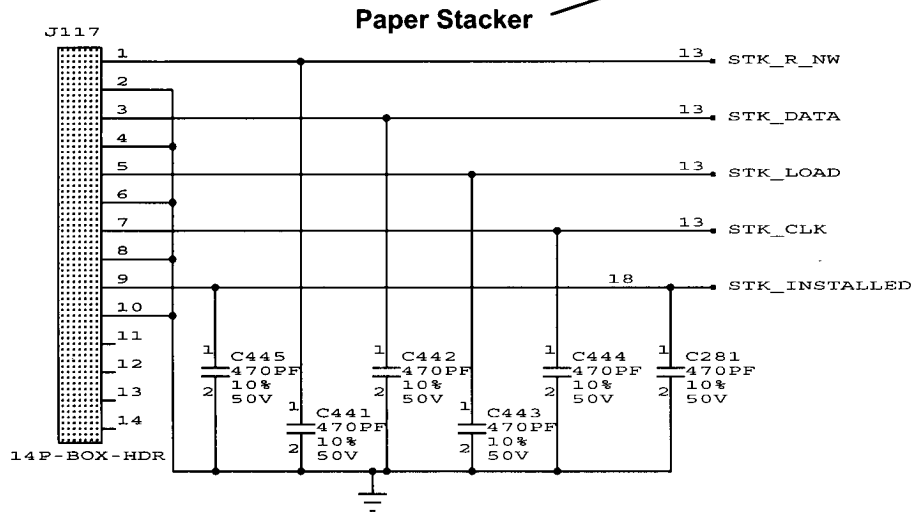
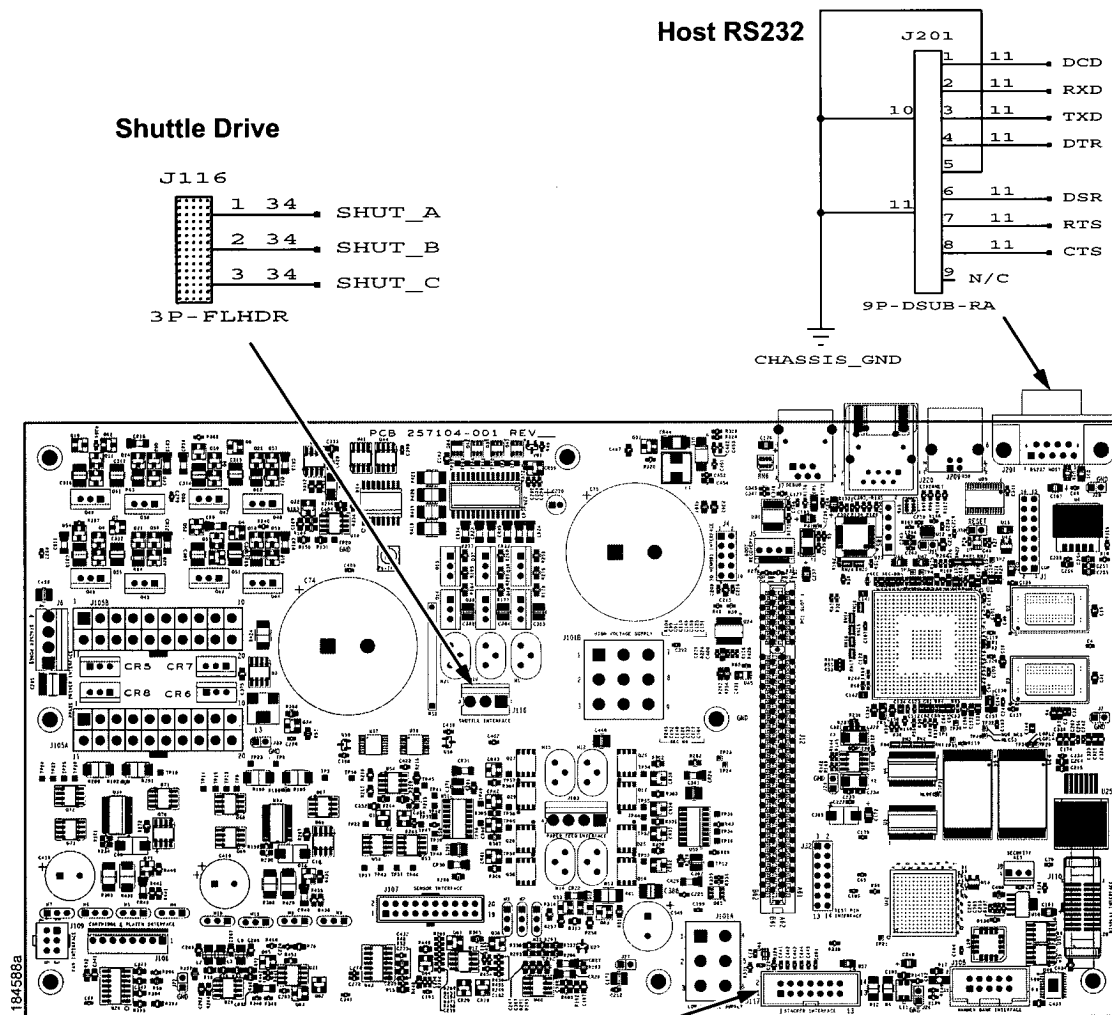


# High Speed Controller Board (continued)

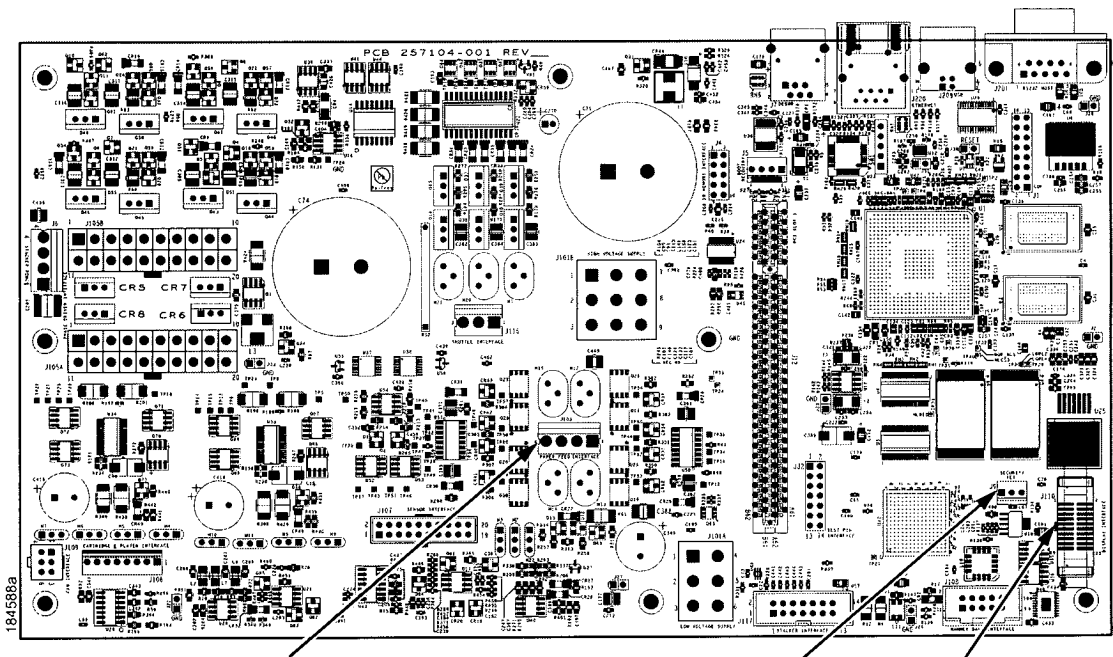
## J220 RJ-45 LAN (Ethernet)



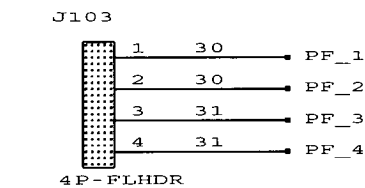
## High Speed Controller Board (continued)



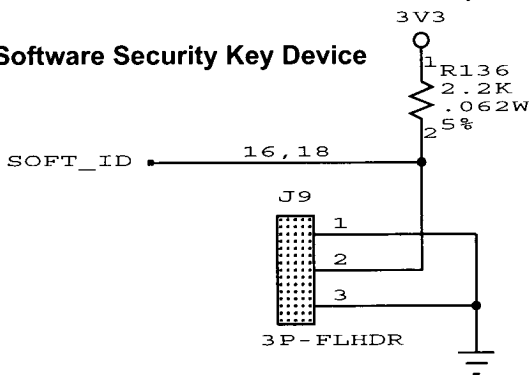
# High Speed Controller Board (continued)



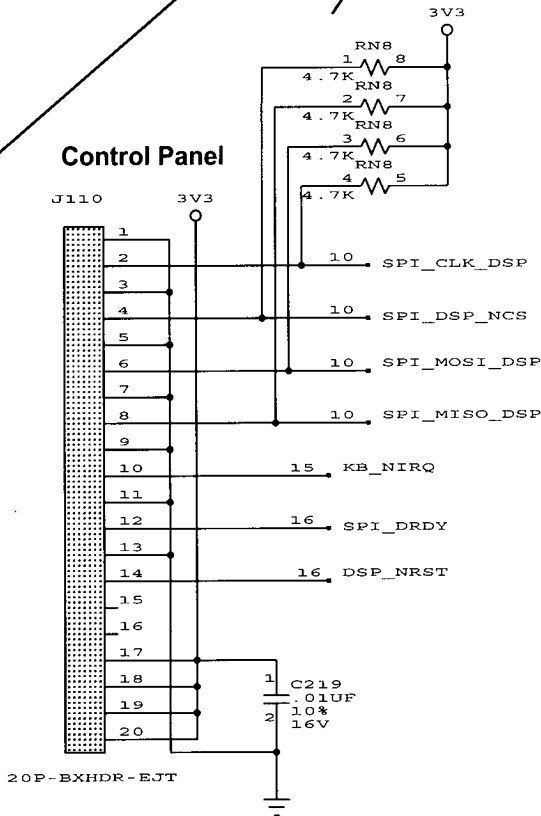
## Paper Feed Interface



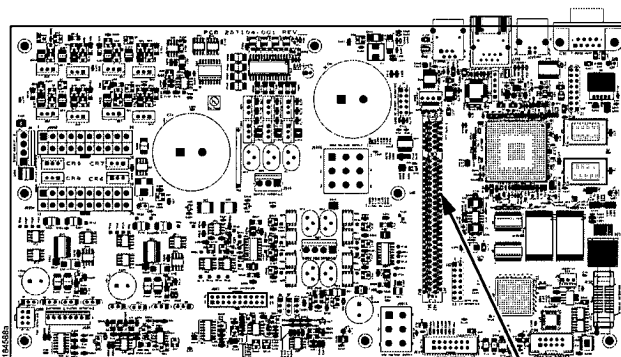
## Software Security Key Device



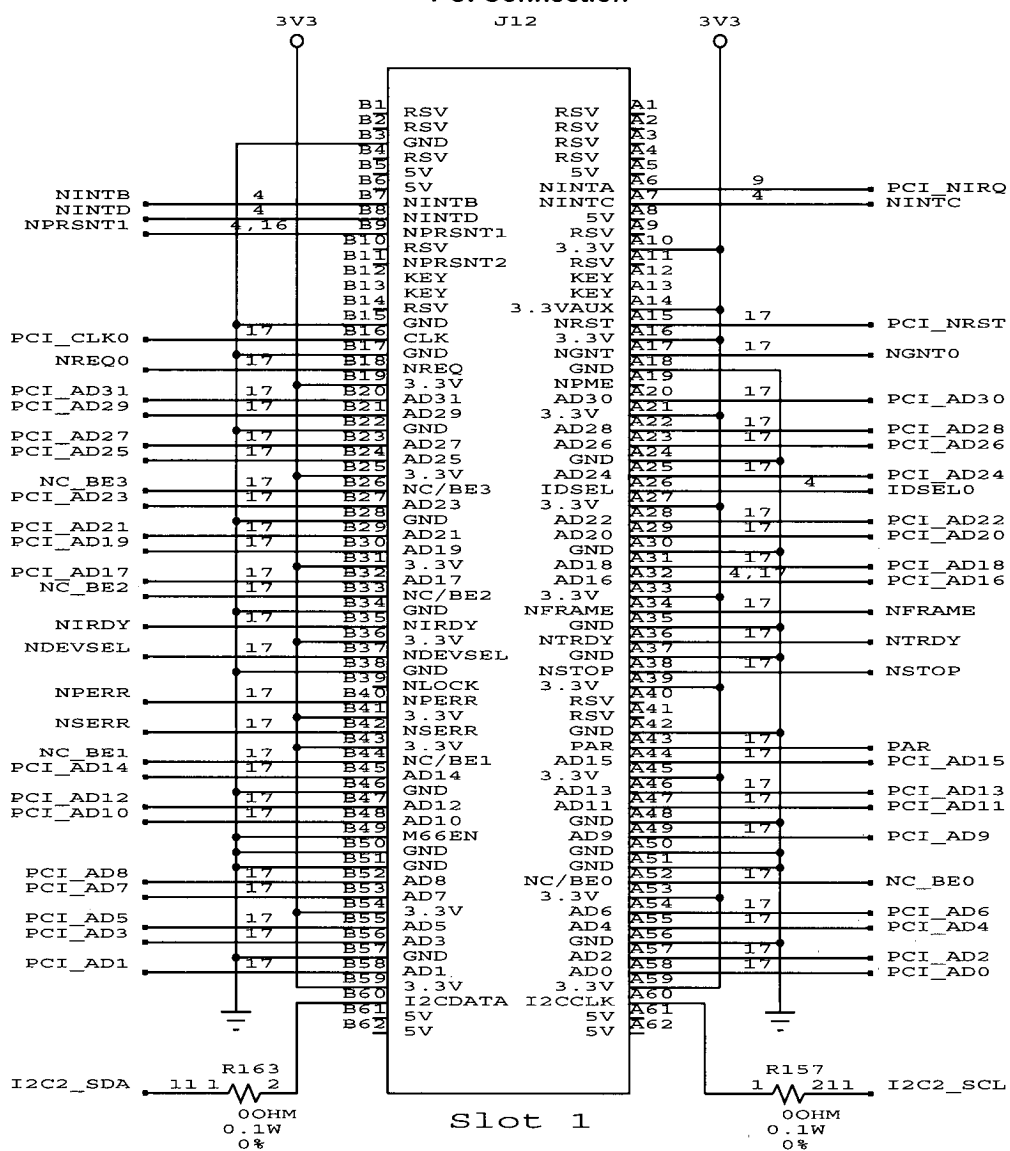
## Control Panel



## High Speed Controller Board (continued)

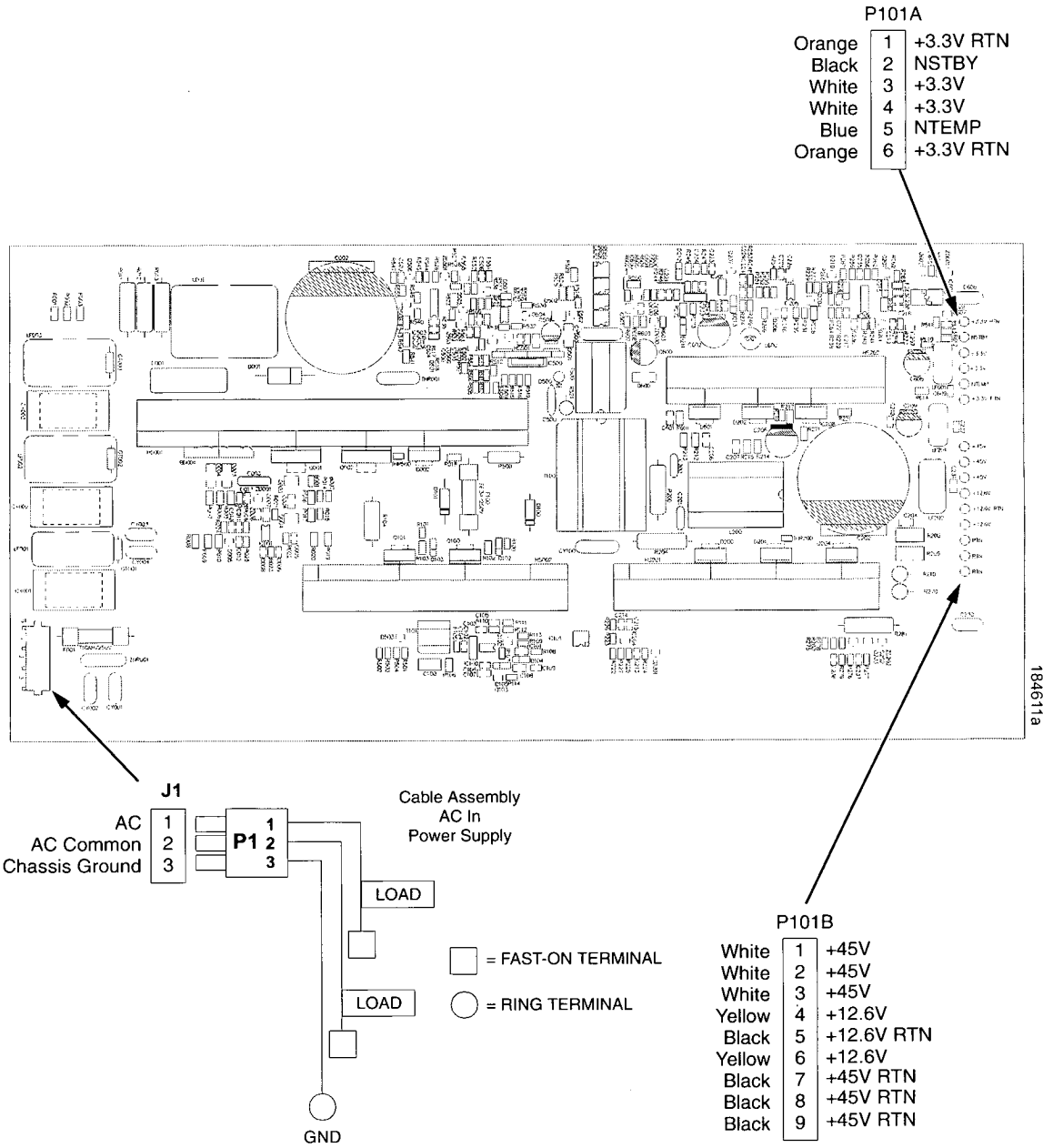


## PCI Connection



# Power Supply

## Low Speed: 300, 500, and 1000 LPM Models



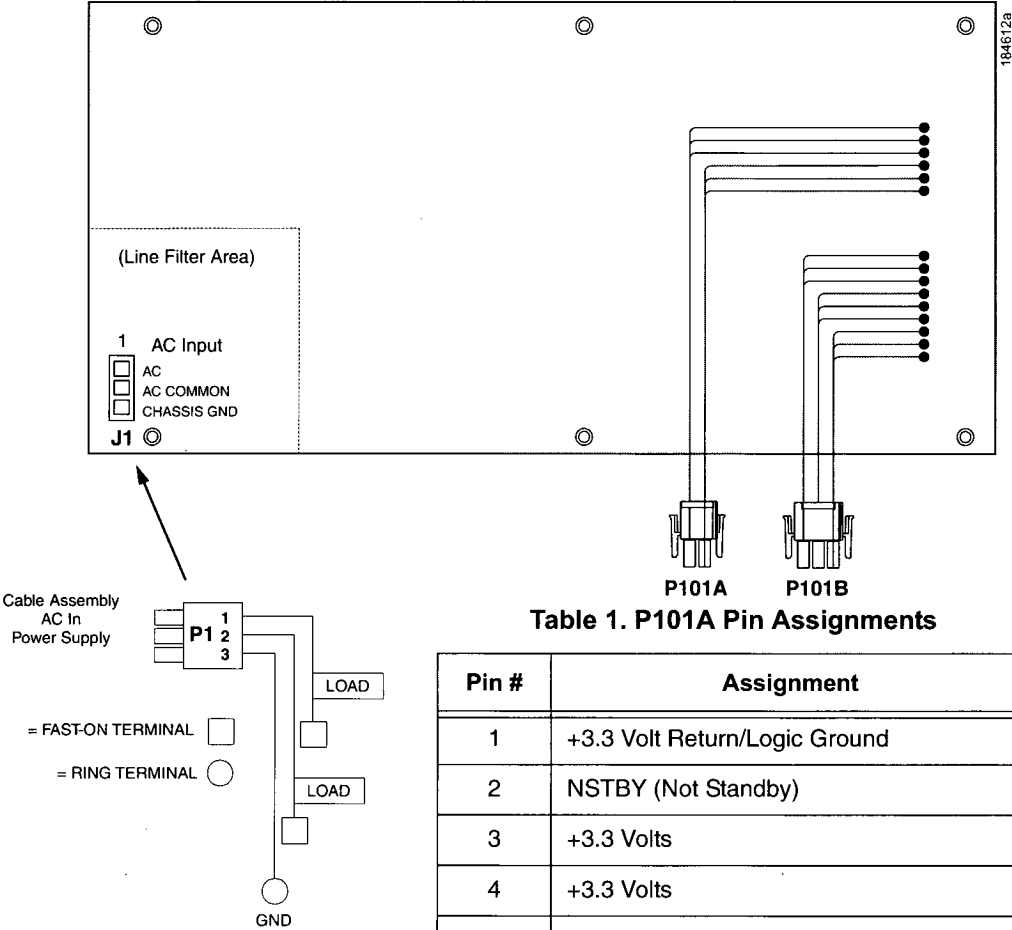


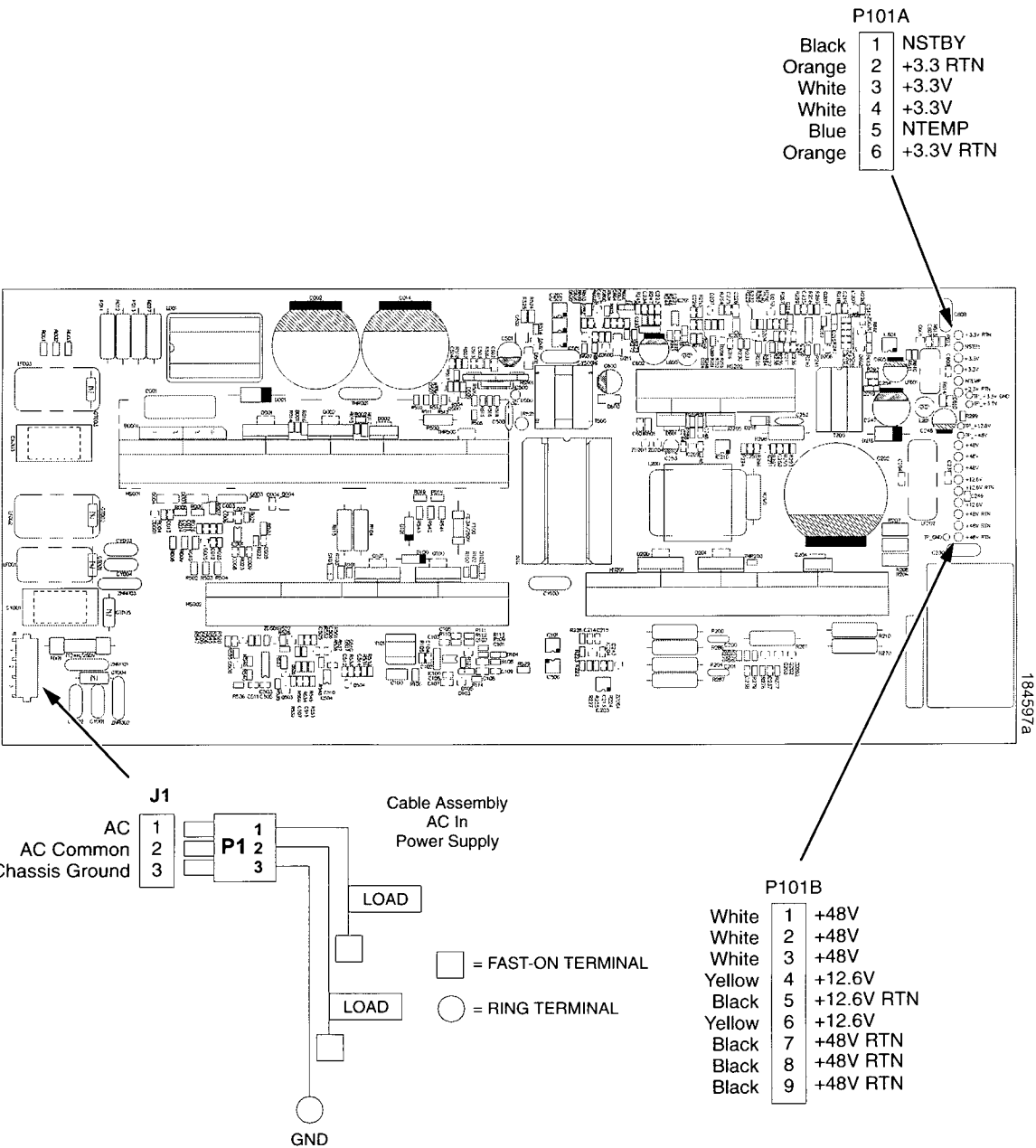
Table 1. P101A Pin Assignments

| Pin # | Assignment                    |
|-------|-------------------------------|
| 1     | +3.3 Volt Return/Logic Ground |
| 2     | NSTBY (Not Standby)           |
| 3     | +3.3 Volts                    |
| 4     | +3.3 Volts                    |
| 5     | N-Temp-Hi (Temperature OK)    |
| 6     | +3.3 Volt Return/Logic Ground |

Table 2. P101B Pin Assignments

| Pin # | Assignment            |
|-------|-----------------------|
| 1     | +45 Volts             |
| 2     | +45 Volts             |
| 3     | +45 Volts             |
| 4     | +12.6 Volts           |
| 5     | +45/+12.6 Volt Return |
| 6     | +12.6 Volts           |
| 7     | +45/+12.6 Volt Return |
| 8     | +45/+12.6 Volt Return |
| 9     | +45/+12.6 Volt Return |

# High Speed: 600, 800, 1500, and 2000 LPM Models





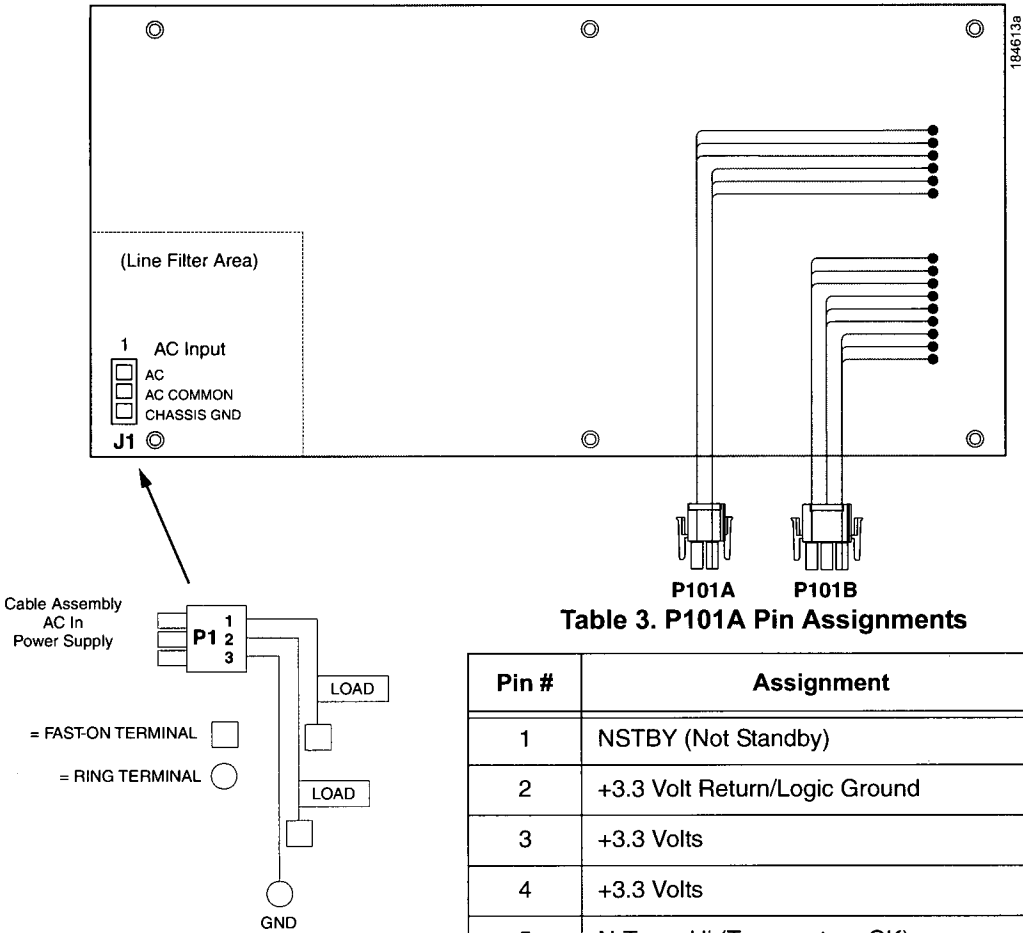


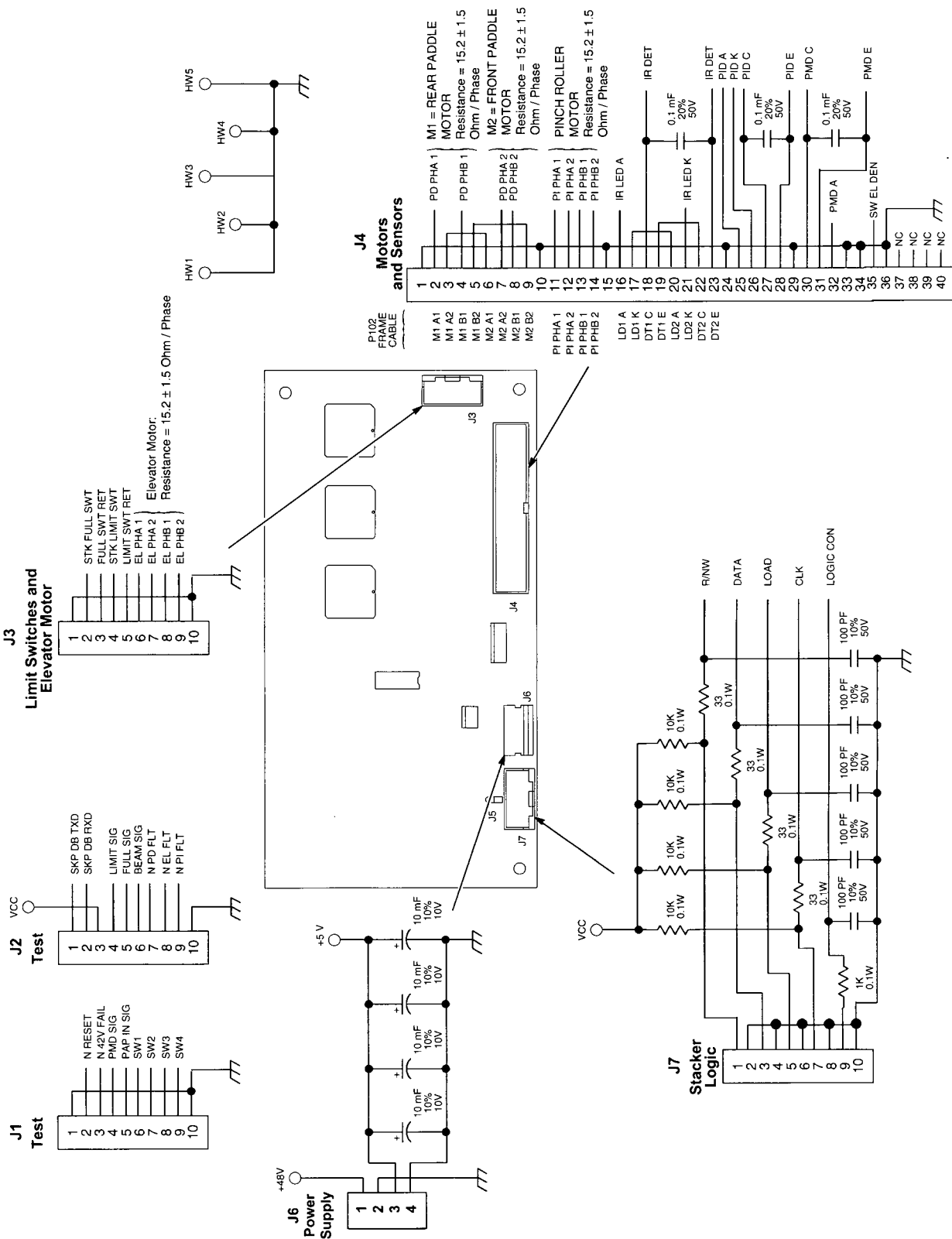
Table 3. P101A Pin Assignments

| Pin # | Assignment                    |
|-------|-------------------------------|
| 1     | NSTBY (Not Standby)           |
| 2     | +3.3 Volt Return/Logic Ground |
| 3     | +3.3 Volts                    |
| 4     | +3.3 Volts                    |
| 5     | N-Temp-Hi (Temperature OK)    |
| 6     | +3.3 Volt Return/Logic Ground |

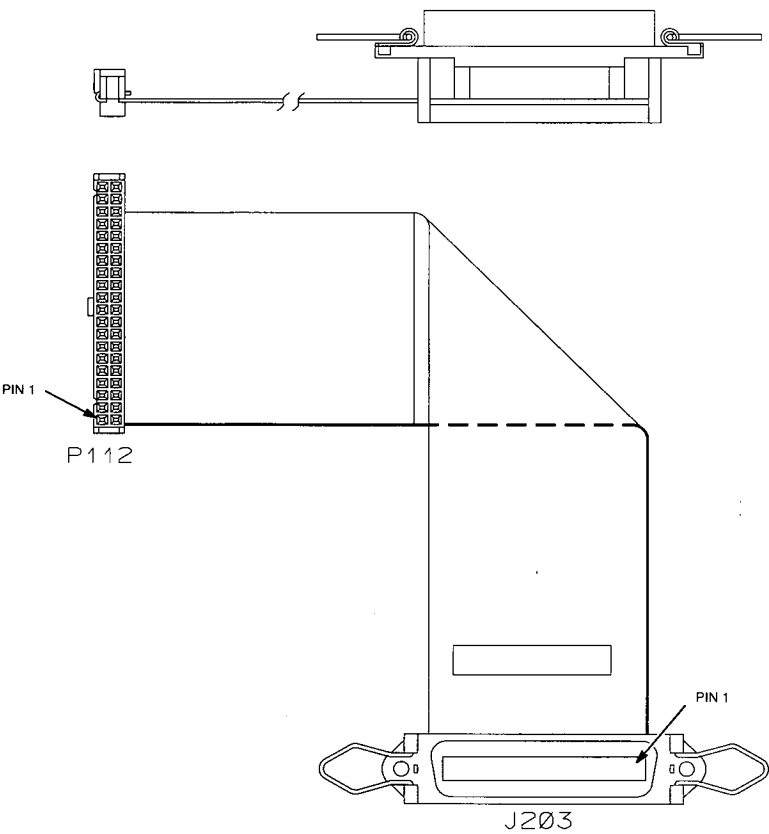
Table 4. P101B Pin Assignments

| Pin # | Assignment            |
|-------|-----------------------|
| 1     | +48 Volts             |
| 2     | +48 Volts             |
| 3     | +48 Volts             |
| 4     | +12.6 Volts           |
| 5     | +48/+12.6 Volt Return |
| 6     | +12.6 Volts           |
| 7     | +48/+12.6 Volt Return |
| 8     | +48/+12.6 Volt Return |
| 9     | +48/+12.6 Volt Return |

SureStak Power Stacker PCBA



Cable Assembly, Centronics I/O  
(Part of Parallel Port Field Kit, 257338-901)



**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.

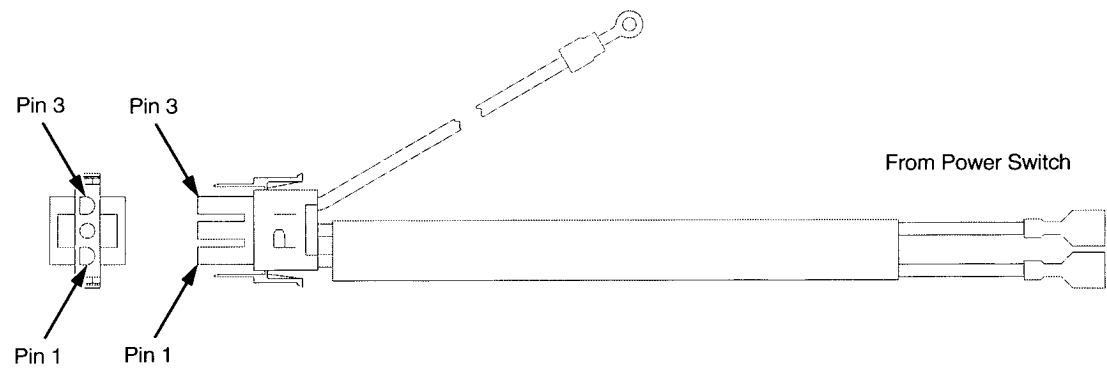
RS-232 port and parallel port cables must meet the following specifications:

- 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.

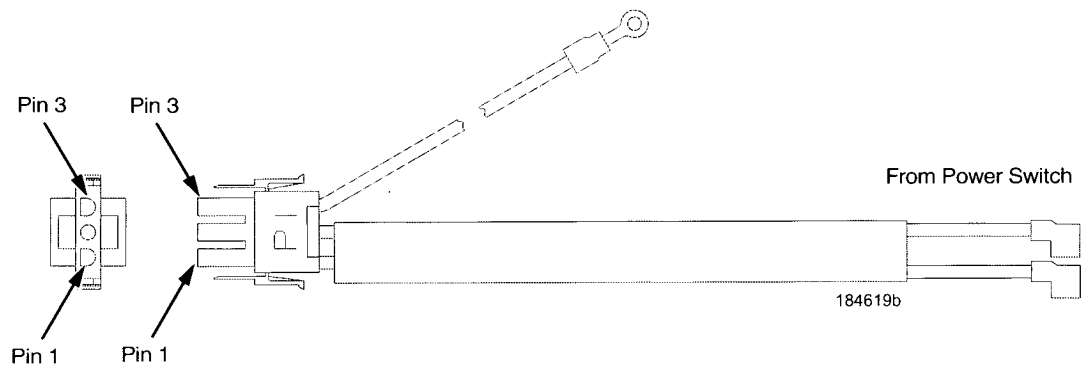
For reference purposes only, two Centronics parallel port cables that have been tested and found to comply with these requirements are a Belkin® P/N F2A046-10 and a Primelogic P/N PLU 2823224. Other electrically equivalent cables are acceptable.

**Cable Assembly, AC In, Power Supply**

**Pedestal Model**  
**Part of AC Power Cables, Ped, Field Kit, 257659-001**



**Cabinet Model**  
**Part of AC Power Cables, Cab, Field Kit, 257658-001**



| PIN | Wire Color   |
|-----|--------------|
| 1   | Black        |
| 2   | White        |
| 3   | Green/Yellow |

Cable Assembly, AC Power Input

Table 5. Pedestal Model - Part of AC Power Cables, Ped, Field Kit, 257659-001

| Pin     | Wire Color   | C1 | C2 |
|---------|--------------|----|----|
| Line    | Black        |    | X  |
| Neutral | White        | X  |    |
| Ground  | Green/Yellow | X  | X  |

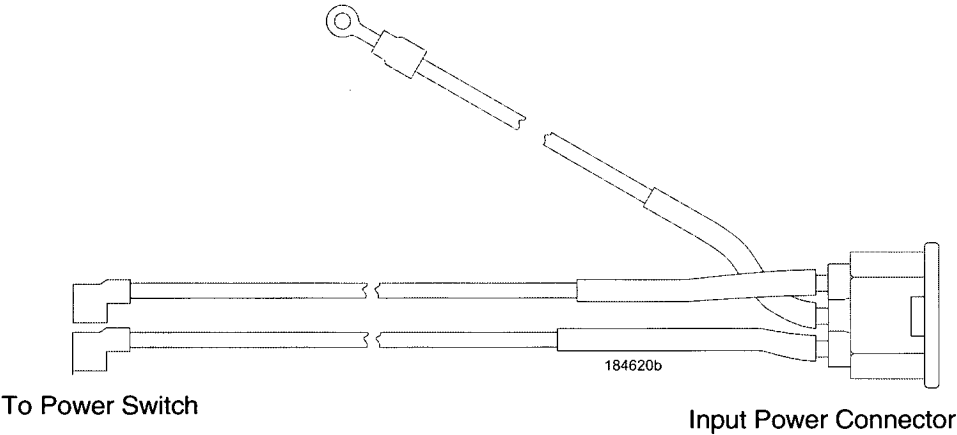
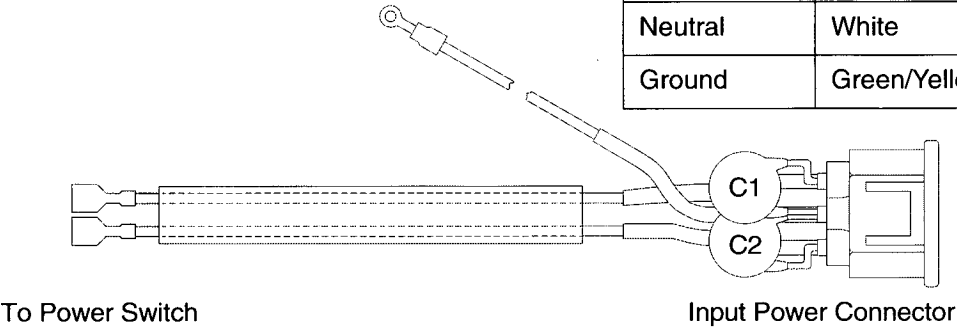


Table 6. Cabinet Model Part of AC Power Cables, Cab, Field Kit, 257658-001

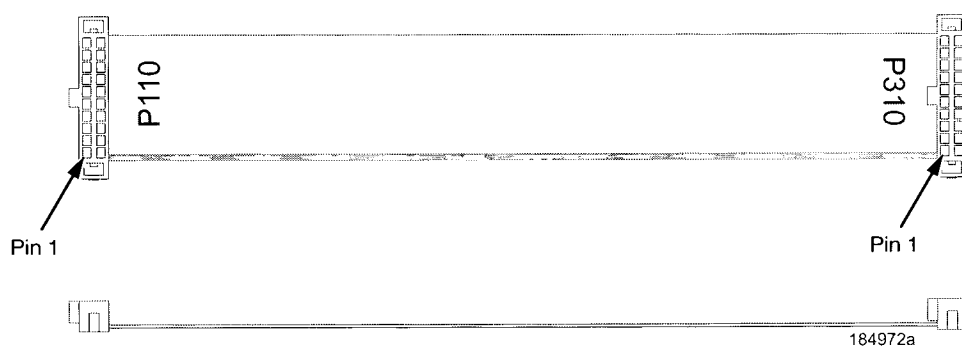
| PIN     | Wire Color   |
|---------|--------------|
| Line    | Black        |
| Neutral | White        |
| Ground  | Green/Yellow |

## Cable Assembly, Control Panel

Part of:

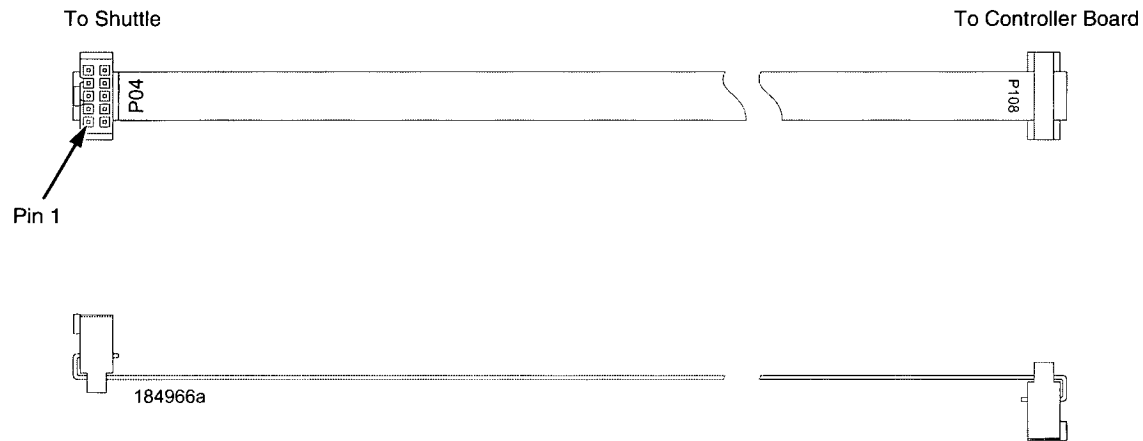
Control Panel/Cable/Overlay, Cab, Field Kit, 257654-001

Control Panel/Cable/Overlay, Ped, Field Kit, 257655-001



**Cable Assembly, Hammerbank Logic**

**Part of:**  
**Cables, Hammerbank Logic/Pwr, 5/10, Field Kit, 257660-001**  
**Cables, Hammerbank Logic/Pwr, 15/20, Field Kit, 257661-001**



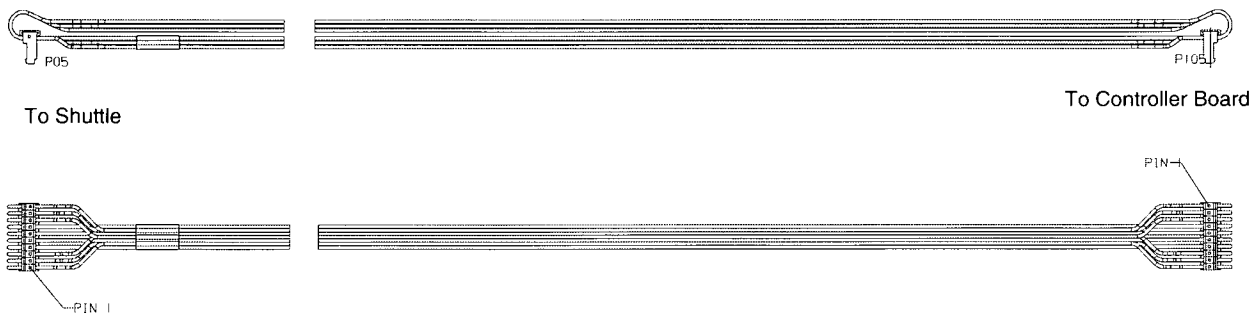
Cable Assy, Hammerbank Power

Part of Cables, Hammerbank Logic/Power, 5/10, Field Kit, 257660-001

IMPORTANT:

Use this cable on any P8000 printer except the P8000HD, P8208H, P8200HD, P8220, and P8206H

For P8000HD, P8208H, P8206H, P8200HD, and P8220 use P/N 256918-901, shown on the next page.



| Wire Table |      |
|------------|------|
| P05        | P105 |
| 2          | 1    |
| 1          | 2    |
| 4          | 3    |
| 3          | 4    |
| 6          | 5    |
| 5          | 6    |
| 8          | 7    |
| 7          | 8    |
| 10         | 9    |
| 9          | 10   |

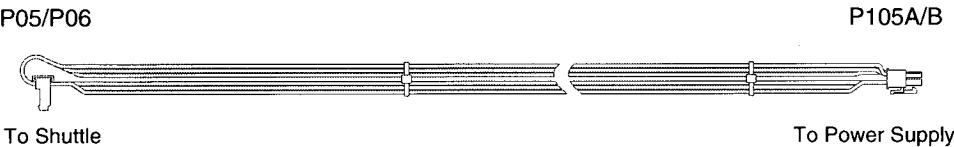


**Cable Assy, Dual Hammerbank Power**  
**Part of Cables, Hammerbank Logic/Pwr, 15/20 Field Kit,**  
**257661-001**

**IMPORTANT:**

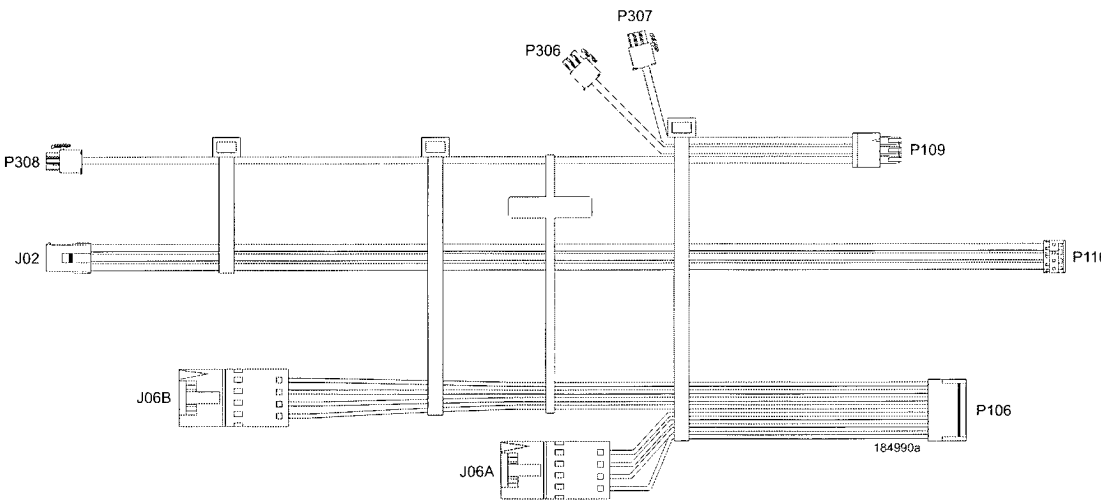
Use this cable on the P8000HD, P8208H, P8220HD, P8206H, and P8220 printer. The P8220 printer requires two cables.

For any other P8000 printer use P/N 257660-001 (part of Cables, Hammerbank Logic/Pwr, 5/10 Field Kit), see previous page.

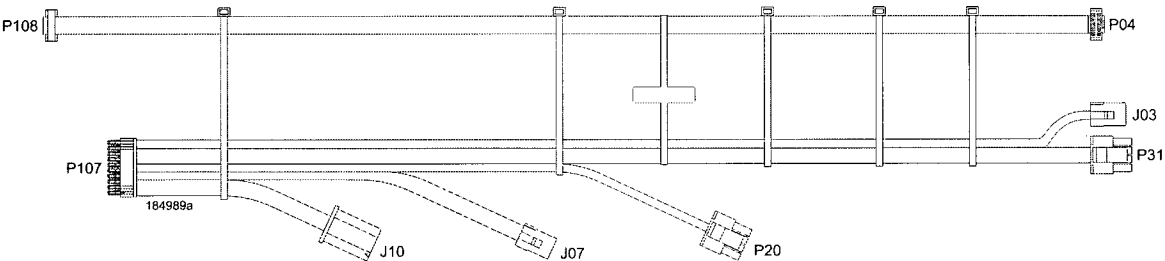


| Wire Table |       |       |
|------------|-------|-------|
| P05/P06    | P105A | P105B |
| 2          | 1     | 11    |
| 1          | 2     | 12    |
| 4          | 3     | 13    |
| 3          | 4     | 14    |
| 6          | 5     | 15    |
| 5          | 6     | 16    |
| 8          | 7     | 17    |
| 7          | 8     | 18    |
| 10         | 9     | 19    |
| 9          | 10    | 20    |

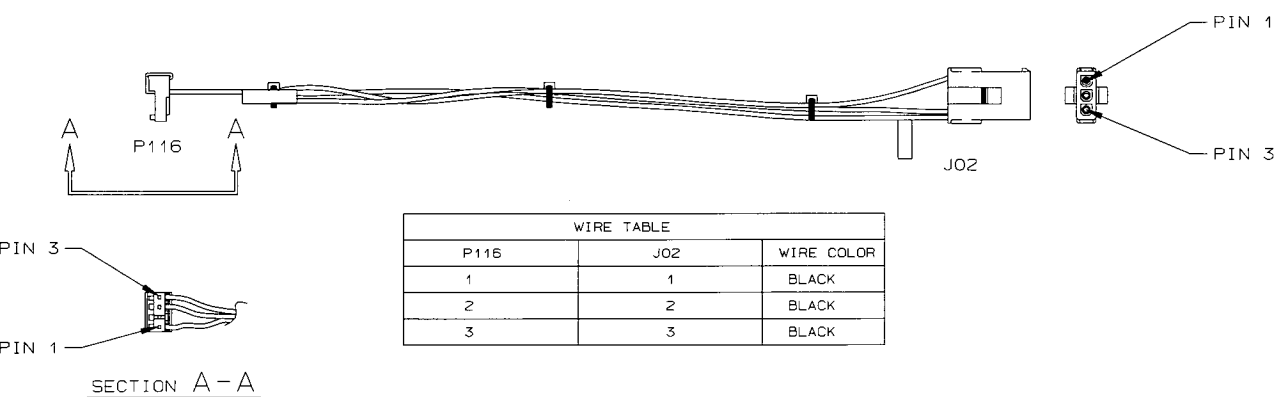
Cable Assembly, Motor Harness (P/N 256757-001)



**Cable Assembly, Sensor Harness (P/N 256758-001)**



**Cable Assembly, Shuttle Motor Drive**  
**Part of Cable Assy, Motor Harness 256757-001**

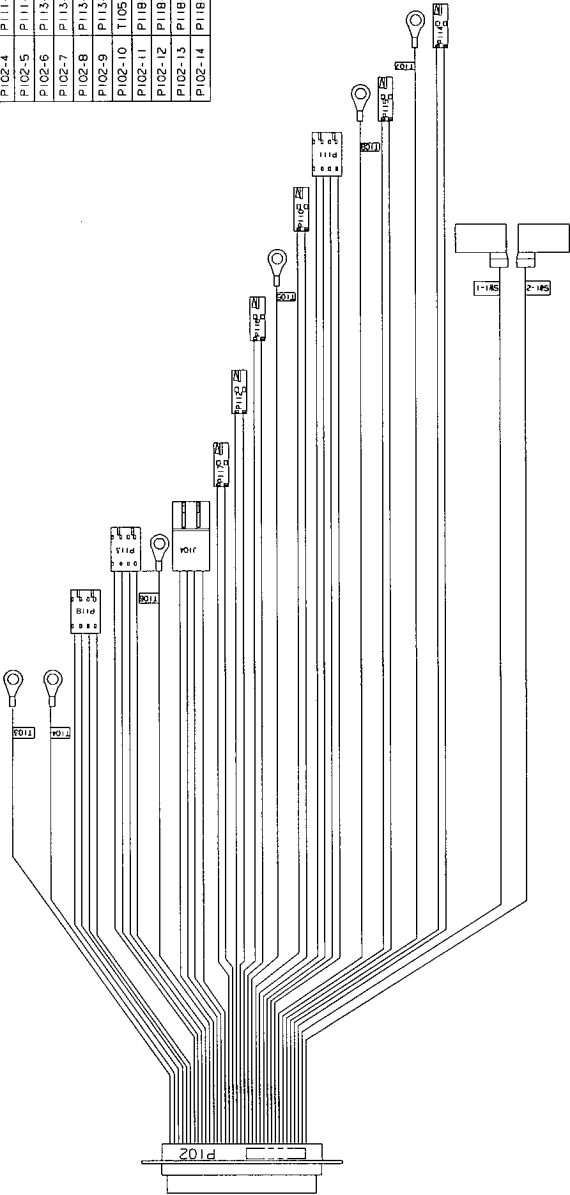


Frame Cable, Power Stacker -  
Part of Cable Kit, Power Stacker, 257670-001

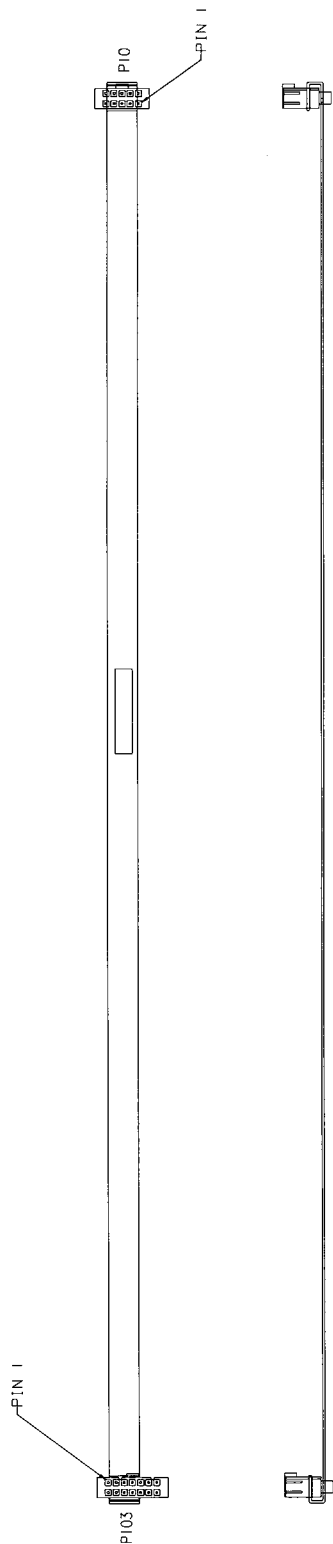
| REF DES |  | ITEM NO. | WIRE LG (XX# 25) (REF.) |
|---------|--|----------|-------------------------|
| FROM    |  | TO       |                         |
| P102-1  |  | T104     | 11                      |
| P102-2  |  | P111-1   | 6                       |
| P102-3  |  | P111-2   | 6                       |
| P102-4  |  | P111-3   | 6                       |
| P102-5  |  | P111-4   | 6                       |
| P102-6  |  | P113-1   | 6                       |
| P102-7  |  | P113-2   | 6                       |
| P102-8  |  | P113-3   | 6                       |
| P102-9  |  | P113-4   | 6                       |
| P102-10 |  | T105     | 11                      |
| P102-11 |  | P118-1   | 6                       |
| P102-12 |  | P118-2   | 6                       |
| P102-13 |  | P118-3   | 6                       |
| P102-14 |  | P118-4   | 6                       |
| P102-15 |  | T106     | 11                      |
| P102-16 |  | P110-2   | 3                       |
| P102-17 |  | P110-1   | 3                       |
| P102-18 |  | P114-2   | 3                       |
| P102-19 |  | P114-1   | 3                       |
| P102-20 |  | P112-2   | 3                       |
| P102-21 |  | P112-1   | 3                       |
| P102-22 |  | P115-2   | 3                       |
| P102-23 |  | P115-1   | 3                       |
| P102-24 |  | T107     | 11                      |
| P102-25 |  | P117-2   | 3                       |
| P102-26 |  | P117-1   | 3                       |
| P102-27 |  | P116-2   | 3                       |
| P102-28 |  | P116-1   | 3                       |
| P102-29 |  | T108     | 11                      |
| P102-30 |  | J104-3   | 7                       |
| P102-31 |  | J104-4   | 7                       |
| P102-32 |  | J104-1   | 7                       |
| P102-33 |  | J104-2   | 7                       |
| P102-34 |  | T103     | 11                      |
| P102-35 |  | SW1-1    | 9                       |
| P102-36 |  | SW1-2    | 9                       |

| 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, P102-21 |
| 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          |

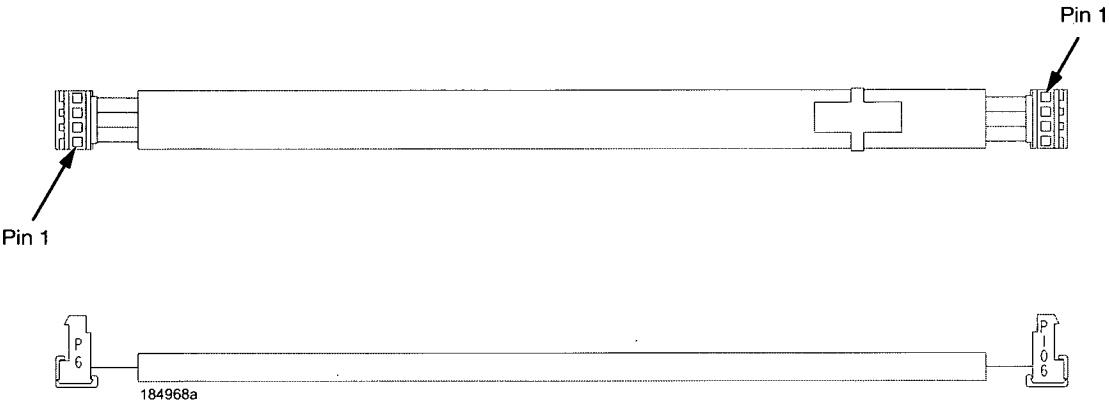
173824



**Logic Cable, Power Stacker**  
**Part of Cable Kit, Power Stacker, 257670-001**



**Power Cable, Power Stacker**  
**Part of Cable Kit, Power Stacker, 257670-001**

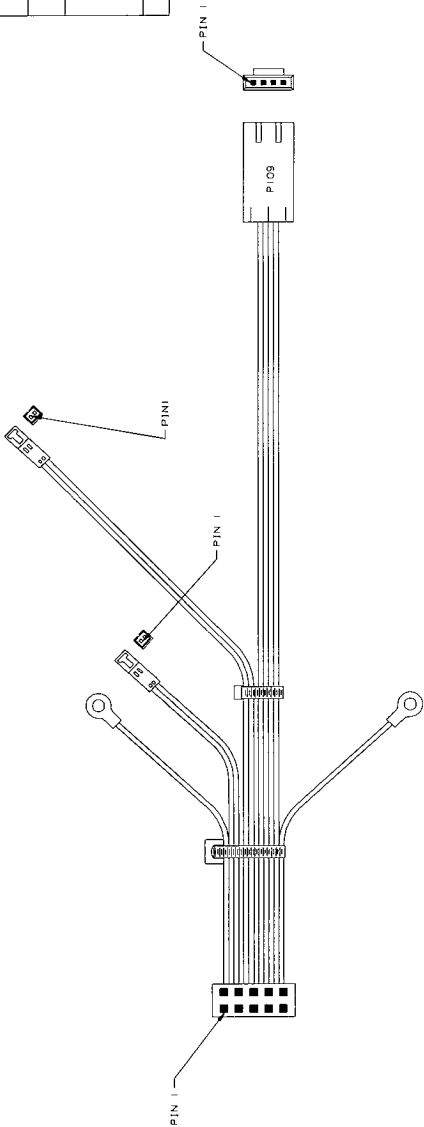


| P6    | P106  |
|-------|-------|
| Pin 1 | Pin 1 |
| Pin 2 | Pin 2 |
| Pin 3 | Pin 3 |
| Pin 4 | Pin 4 |

Rail Cable, Power Stacker - Part of Cable Kit, Power Stacker, 257670-001

| CONNECTION TABLE |              |            |                        |
|------------------|--------------|------------|------------------------|
| FROM             | TO           | COMPONENTS | WIRE LENGTH<br>(FT-IN) |
| P10B-1           | T102         | 202745-001 | 10.00"                 |
| P10B-2           | J18A - PIN 1 | 203499-001 | 8.00"                  |
| P10B-3           | J18A - PIN 2 |            |                        |
| P10B-4           | J18B - PIN 1 | 203499-001 | 19.80"                 |
| P10B-5           | J18B - PIN 2 |            |                        |
| P10B-6           | P109 - PIN 1 | 202748-001 |                        |
| P10B-7           | P109 - PIN 2 |            |                        |
| P10B-8           | P109 - PIN 3 | 202361-001 | 24.00"                 |
| P10B-9           | P109 - PIN 4 |            |                        |
| P10B-10          | T101         | 202746-001 | 10.00"                 |

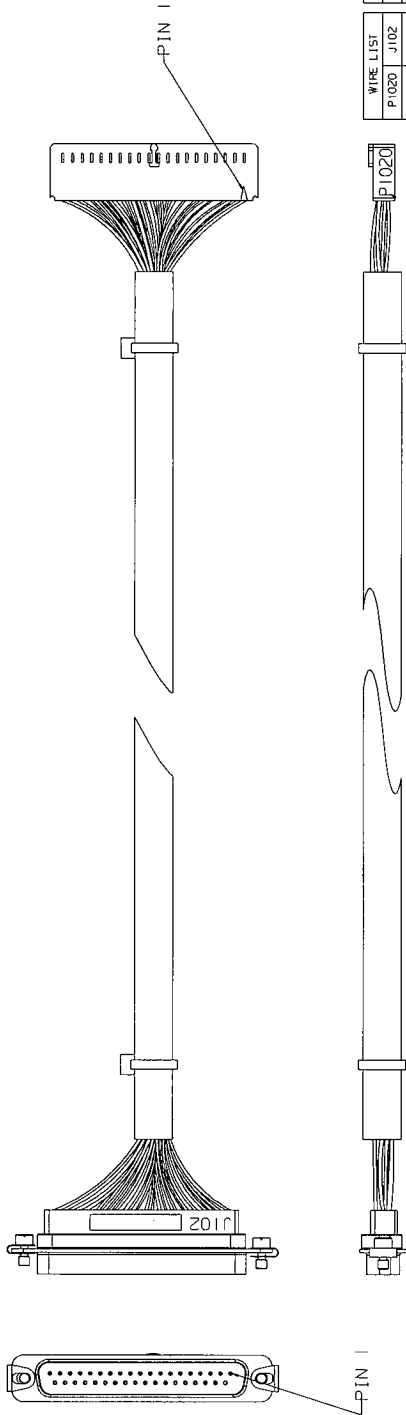
| TWIST WIRE TABLE |                                   |
|------------------|-----------------------------------|
| TWIST GROUP      | WIRES                             |
| A                | P10B-1, P10B-10                   |
| B                | P10B-2, P10B-3                    |
| C                | P10B-4, P10B-5                    |
| D                | P10B-6, P10B-7,<br>P10B-8, P10B-9 |
| E                | P18-1, P18-2                      |





Elevator I/O Cable, Power Stacker

Part of Cable Kit, Power Stacker, 257670-001

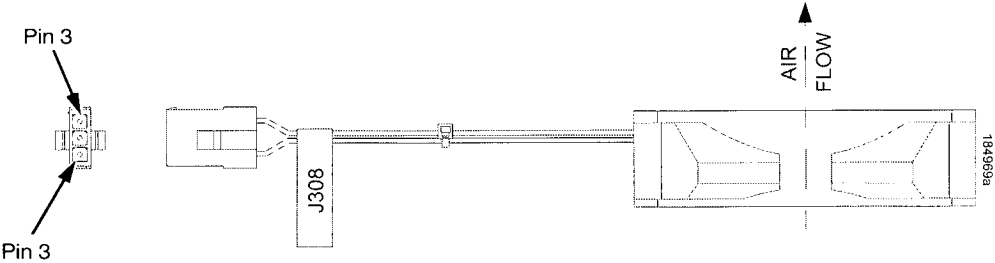


| WIRE LIST |      |
|-----------|------|
| P1020     | J102 |
| 21        | 21   |
| 22        | 22   |
| 23        | 23   |
| 24        | 24   |
| 25        | 25   |
| 26        | 26   |
| 27        | 27   |
| 28        | 28   |
| 29        | 29   |
| 30        | 30   |
| 31        | 31   |
| 32        | 32   |
| 33        | 33   |
| 34        | 34   |
| 35        | 35   |
| 36        | 36   |
| 37        | 37   |
| 38        | 38   |
| 39        | 39   |
| 40        | 40   |

| WIRE LIST |      |
|-----------|------|
| P1020     | J102 |
| 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   |

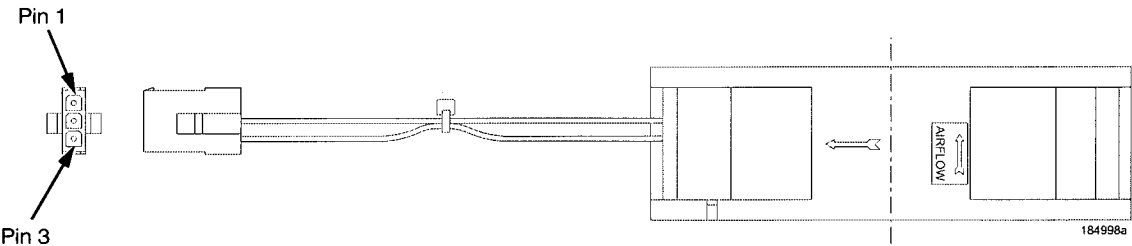
| TWIST WIRE TABLE |  |
|------------------|--|
| P1020 CONN       |  |
| 1 AND 34         |  |
| 2 THRU 5         |  |
| 6 THRU 9         |  |
| 10, 15 AND 17    |  |
| 11 THRU 14       |  |
| 15, 20 AND 21    |  |
| 18, 19 AND 24    |  |
| 22, 23 AND 29    |  |
| 25 AND 26        |  |
| 27 AND 28        |  |
| 30 THRU 33       |  |
| 35 AND 36        |  |

Fan Assembly, Hammerbank  
(Part of Fan Assy Spares Kit, HB/CC/EXH, 257656-001)



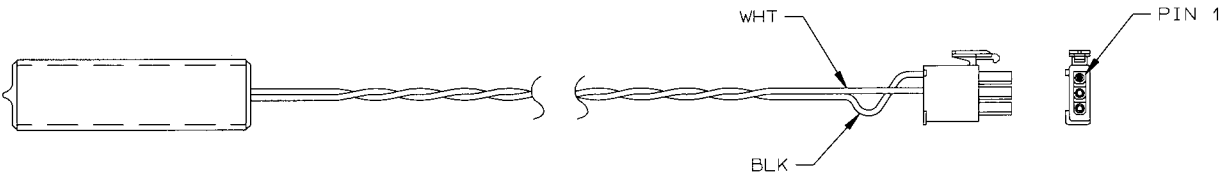
| J308  | Polarity | Wire Color |
|-------|----------|------------|
| Pin 1 | —        | Red        |
| Pin 2 | —        | —          |
| Pin 3 | —        | Black      |

Card Cage (Intake) Fan and Exhaust Fan  
(Part of Fan Assy Spares Kit, HB/CC/EXH, 257656-001)



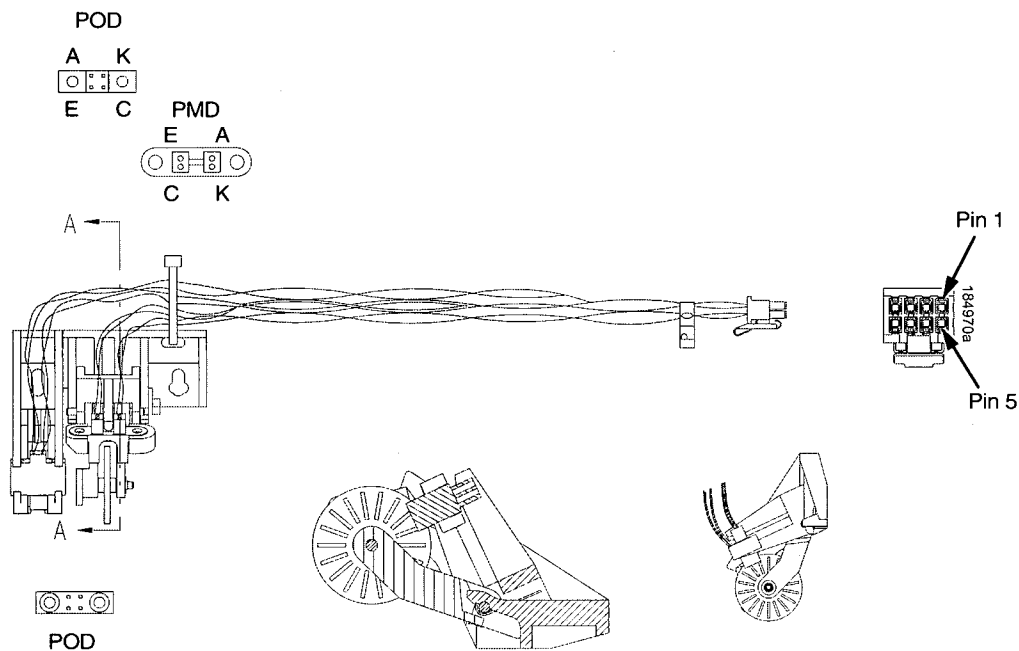
| Wire Table |          |
|------------|----------|
| **F(P)     | Polarity |
| Pin 1      |          |
| Pin 2      | +        |
| Pin 3      | -        |

Magnetic Pickup (MPU) Assembly (P/N 150281-901)



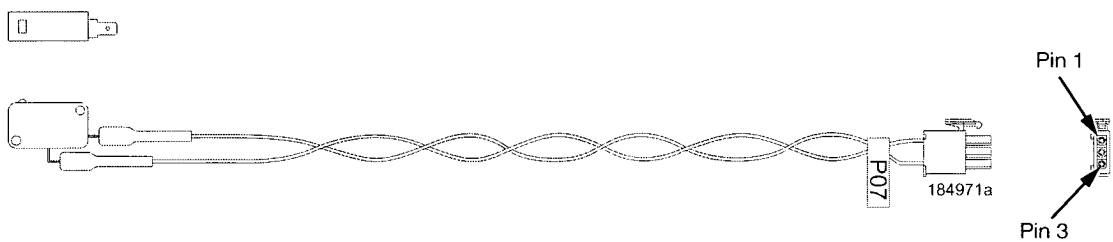
| WIRE TABLE    |            |
|---------------|------------|
| CONN. PIN NO. | WIRE COLOR |
| 1             | BLACK      |
| 2             | WHITE      |
| 3             | N/C        |

Switch Assembly, Paper Detector  
(Part of Switch Assy, Platen Open/Paper Detect, Field Kit,  
257653-001)



| P10   | POD   | PMD   | Cable  |
|-------|-------|-------|--------|
| Pin 1 | Pin E |       | Black  |
| Pin 2 | Pin C |       | Gray   |
| Pin 3 | Pin K |       | White  |
| Pin 4 | Pin A |       | Red    |
| Pin 5 |       | Pin A | Black  |
| Pin 6 |       | Pin K | Brown  |
| Pin 7 |       | Pin C | Orange |
| Pin 8 |       | Pin E | Red    |

**Switch Assembly, Platen Interlock**  
**(Part of Switch Assy, Platen Open/Paper Detect Field Kit,**  
**257653-001)**



| P07   | Interlock Switch | Wire Color |
|-------|------------------|------------|
| Pin 1 | COM              | Black      |
| Pin 2 | —                | —          |
| Pin 3 | NO               | Gray       |



---

# B *Abbreviations*

**NOTE:** Signal abbreviations with first letter “N” are negative true.

| <b>Abbreviation</b> | <b>Definition</b> |
|---------------------|-------------------|
|---------------------|-------------------|

|              |                                         |
|--------------|-----------------------------------------|
| 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     | Hammerbank 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                                                             |
| CTL          | Control                                                                     |
| CRP          | Cartridge Ribbon Printer                                                    |
| 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                                                   |
| 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     | Hammerbank                                                    |
| HBA    | Hammerbank ASIC                                               |
| HBF    | Hammerbank Fan                                                |
| HL     | Hammerbank, Left                                              |
| HBP    | Hammerbank Power                                              |
| HBR    | Hammerbank, Right                                             |

|        |                                                                                                                       |
|--------|-----------------------------------------------------------------------------------------------------------------------|
| HD     | Hammer Driver, High Definition                                                                                        |
| HDIC   | Hammer Driver Integrated Circuit                                                                                      |
| HDPH   | Hammer Driver Phase                                                                                                   |
| HLP    | Hammerbank 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 <b>Europe, Mideast, and Africa (EMEA)</b> 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. |

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|       |                                  |
|-------|----------------------------------|
| RQ    | Request                          |
| RSP   | Ribbon and Shuttle Processor     |
| RST   | Reset                            |
| RTS   | Request to Send                  |
| RXD   | Receive Data                     |
| SCS   | SNA Character Stream             |
| 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/<br>Transmitter                                               |
|                 |                                                                                                           |
| V               | Volts                                                                                                     |
| VAC             | Volts, Alternating Current                                                                                |
| VDC             | Volts, Direct Current                                                                                     |
| V <sub>CC</sub> | Voltage at Collector                                                                                      |
| V <sub>DD</sub> | Voltage at Drain                                                                                          |
| VGL             | Code V™ Graphics Language                                                                                 |
| V <sub>SS</sub> | Voltage at Source                                                                                         |
| V8              | A special ASIC on the controller board containing circuits that<br>help the data controller (DC) operate. |
|                 |                                                                                                           |
| WR              | Write                                                                                                     |
| w/              | With                                                                                                      |
| w/o             | Without                                                                                                   |
|                 |                                                                                                           |
| XMT             | Transmit                                                                                                  |

# 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 Fahrenheit ( $t_f$ ) | $t_f = 1.8 t_c + 32$     |
| temperature Fahrenheit ( $t_f$ ) | temperature Celsius ( $t_c$ )    | $t_c = (t_f - 32) / 1.8$ |

Power

| Multiply                              | By          | To Obtain                             |
|---------------------------------------|-------------|---------------------------------------|
| Btu (International Table)<br>per hour | 0.2930711   | watt (W)                              |
| watt (W)                              | 3.412141    | Btu (International Table) per<br>hour |
| watt (W)                              | 0.001359621 | horsepower (metric)                   |
| horsepower (metric)                   | 735.499     | watt (W)                              |

---

# D *SureStak™ Power Stacker*

## Contents

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|                                             |          |
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# Introduction

The SureStak Power Stacker is both a factory-installed and field upgradable 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 71.) 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 71.

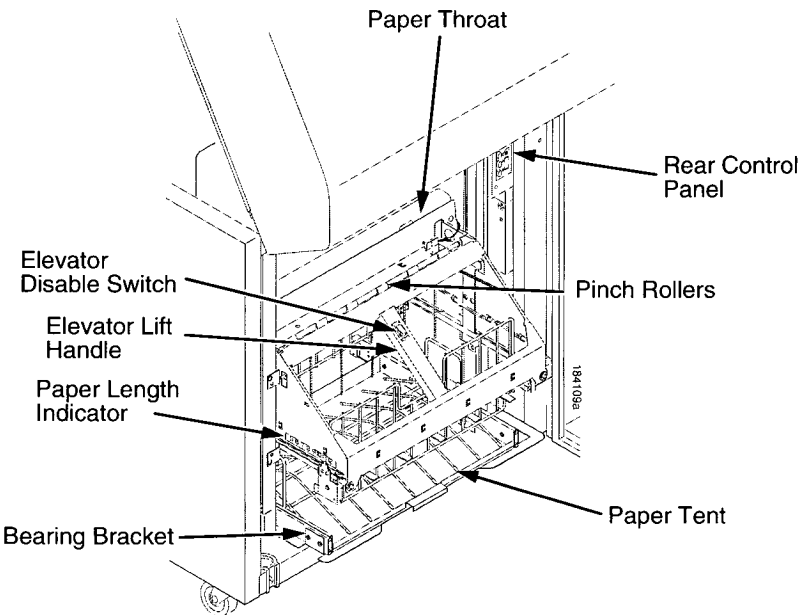


Figure 71. Power Stacker Component Locations

## Setting Up the Power Stacker

### IMPORTANT

If using Ethernet and/or USB, route the cables to the left and attach the cable clips. After connecting and placing the cables, manually move the the stacker to its uppermost position to ensure the stacker does not touch the cables.

1. Set the printer power switch to I (On).
2. On the rear control panel, press the **ONLINE** key to take the printer offline. (Figure 72.)
3. Press the **ELEVATOR UP** key and wait for the elevator assembly to reach the top of its travel. (Figure 72.)

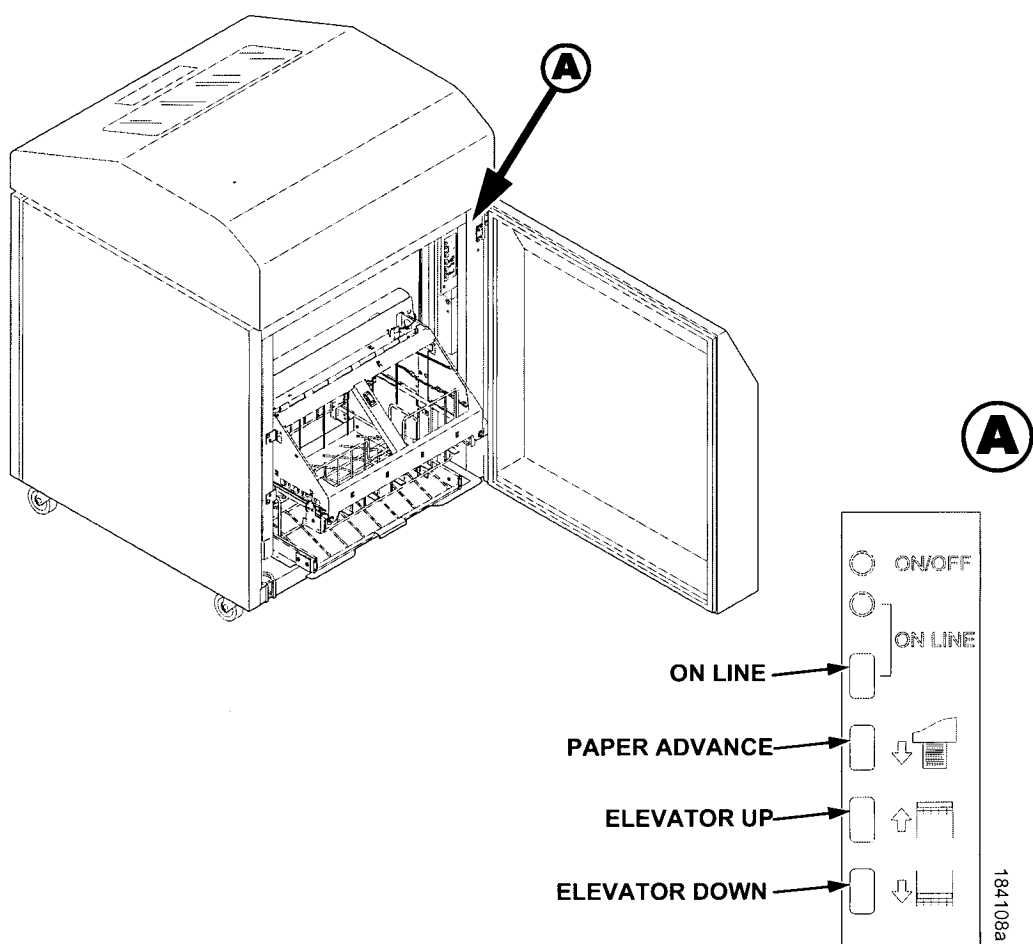


Figure 72. The Rear Control Panel

- 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 73.) If the paper is wider than 15.5 inches (39.5 cm) leave the paper tent out of the printer.

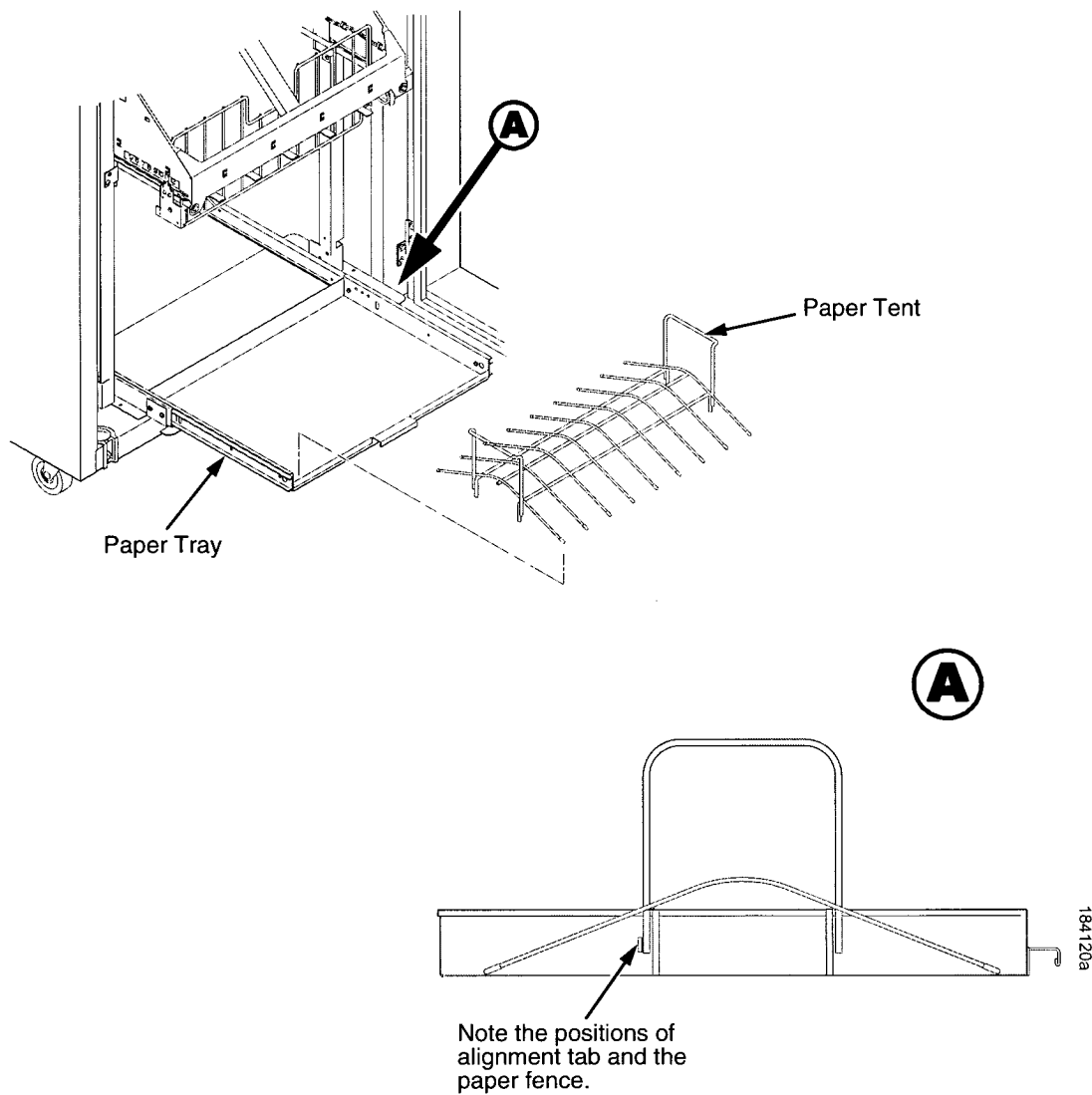
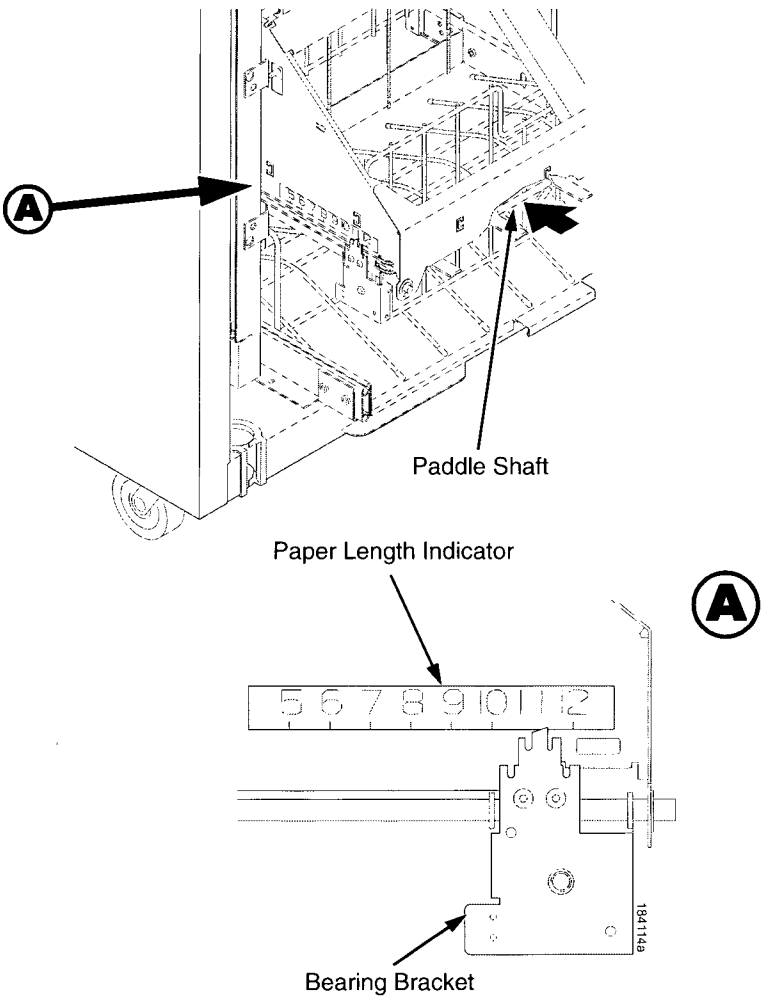


Figure 73. The Paper Tent

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 74.)



**Figure 74. 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 75.)
- 2. Stack the extra pages on top of the wire paper tent (if installed), making sure the paper bends with the natural fold. (Figure 75.)
- 3. Press the **ONLINE** 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*.)

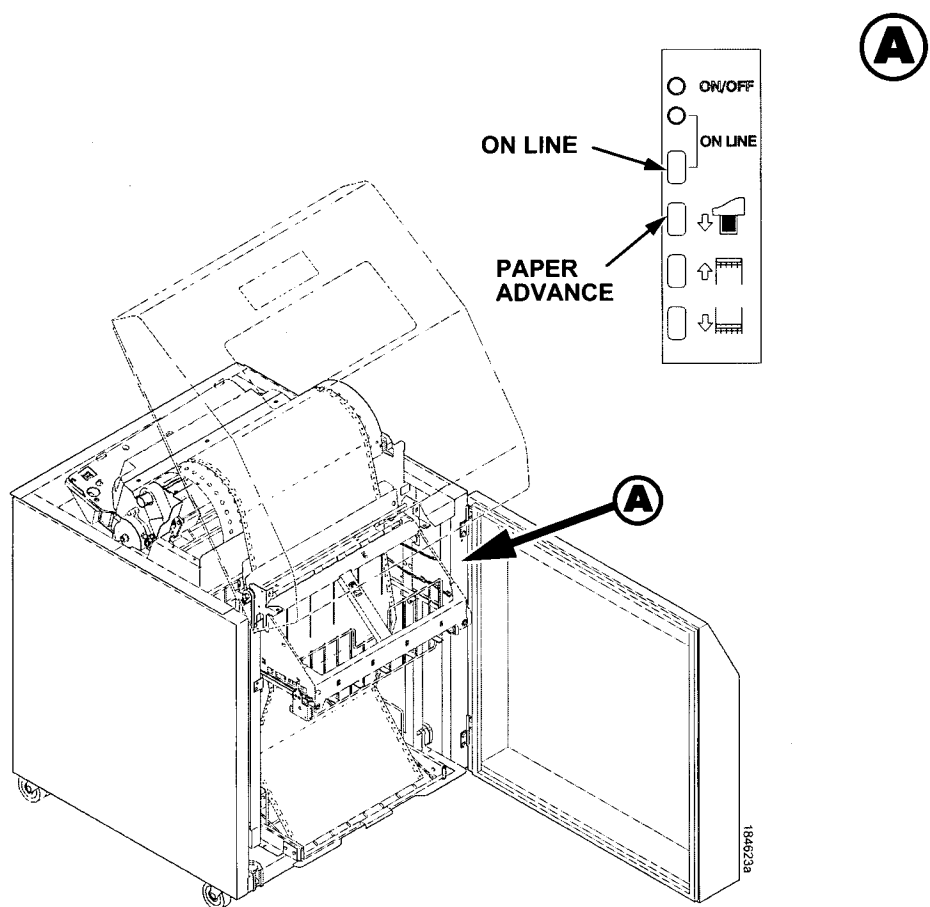


Figure 75. Stacking Paper on the Wire Paper Tent

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# Stacker Problems

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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 6 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 411).
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 141).
  - 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 155) 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 **ONLINE** 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 89.
5. With the power stacker still at its highest position, enable the power stacker using the configuration menu at the 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 155), 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 155) 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 elevator 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 139.
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 5 on page 51 and troubleshoot the appropriate symptom. When the stacker is operational, clear the error log and place the printer online.

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## Stacker Motor Check

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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  $15.2 \pm 1.5$  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 6. Power Stacker Problems

| Symptom                                           | Origin of Symptom             | Explanation                                                                                                | Solution |
|---------------------------------------------------|-------------------------------|------------------------------------------------------------------------------------------------------------|----------|
| Printer does not detect presence of power stacker | Reported by user.             | Various causes possible.                                                                                   | page 138 |
| 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 87  |
| STACKER FULL                                      | Message on control panel LCD. | Status message: the power paper stacker is full.                                                           | page 88  |
| STACKER JAM                                       | Message on control panel LCD. | Paper is bunching above the elevator or the paper motion detector is not working properly.                 | page 89  |
| Stacker “chatters” at upper or lower limit        | Reported by user.             | Various causes possible.                                                                                   | page 139 |
| Stacker does not stack properly                   | Reported by user.             | Various causes possible.                                                                                   | page 140 |
| Stacker elevator does not move                    | Reported by user.             | Various causes possible.                                                                                   | page 140 |
| Stacker elevator moves by itself                  | Reported by user.             | Various causes possible.                                                                                   | page 140 |

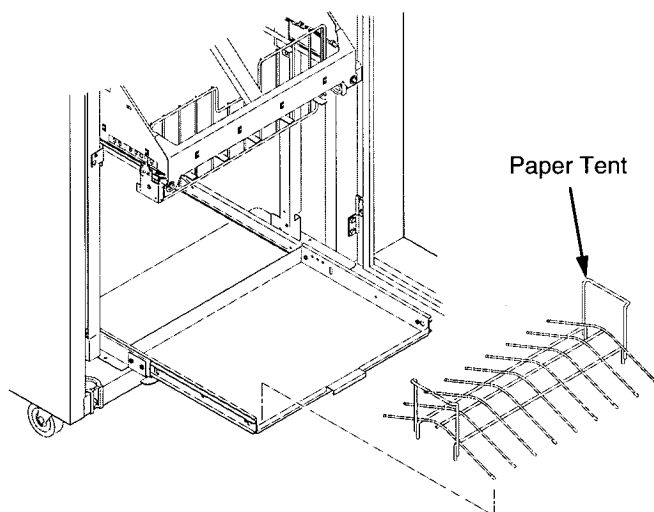
**Table 6. Power Stacker Problems**

| 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 141 |
| 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 142 |
| Stacker not operating      | Reported by user.                 | Same symptom as "Printer does not detect presence of power stacker"                                                                                                                                                                                                         | page 138 |

## **Removing the Power Stacker**

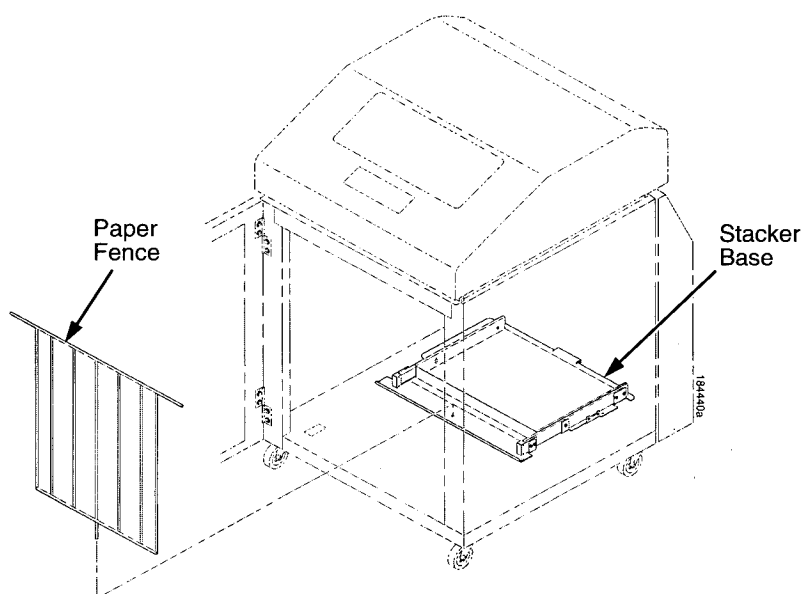
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1. Set the printer power switch to O (off).
2. Unplug the power cord.
3. Unload paper from the stacker area. (Refer to the *User's Manual*.)
4. Remove the paper tent (if present). (Figure 76.)



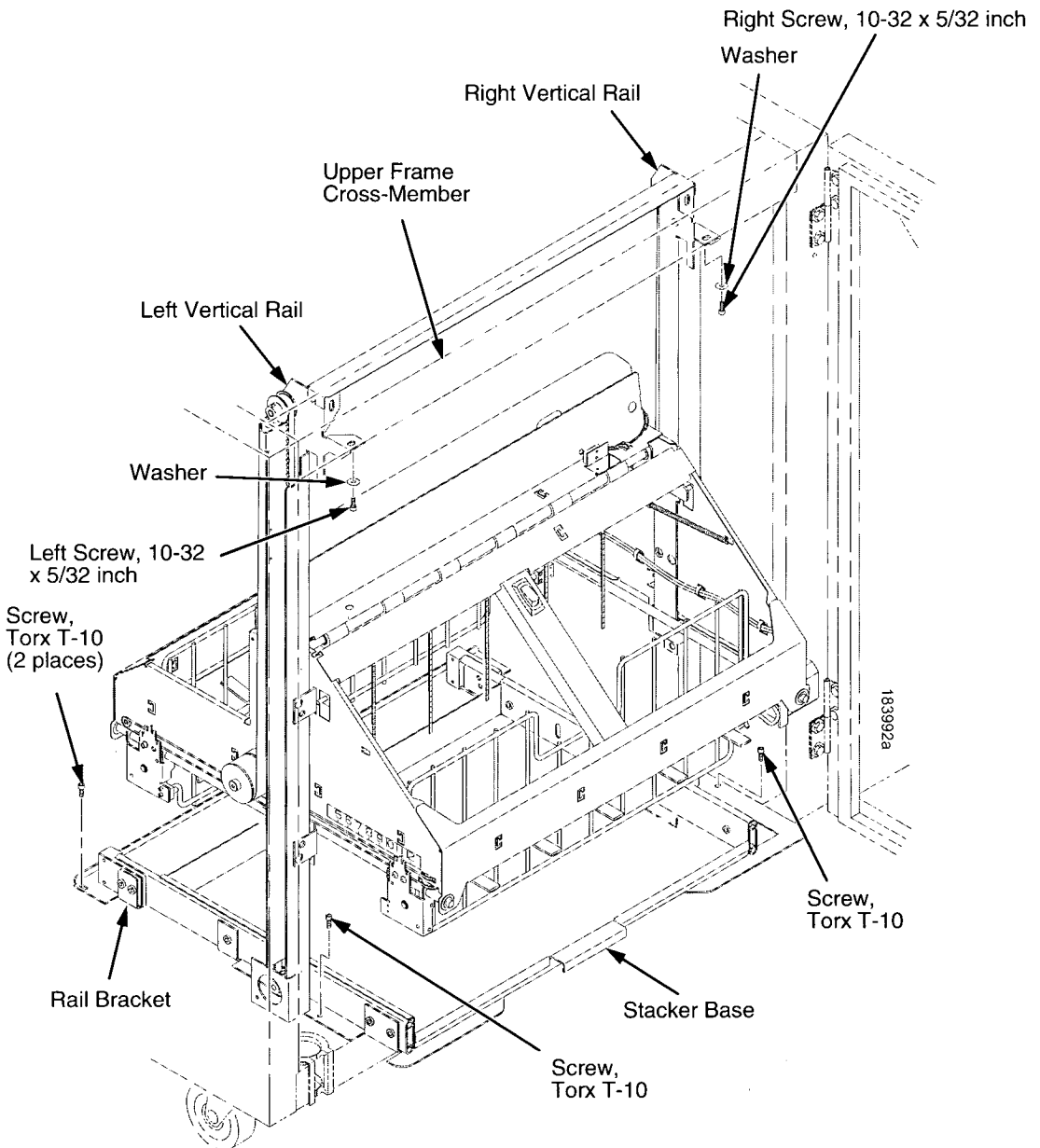
**Figure 76. Removing the Paper Tent**

5. Cut the tie wrap (if present) and remove the paper fence. (Figure 77.)



**Figure 77. Removing the Paper Fence**

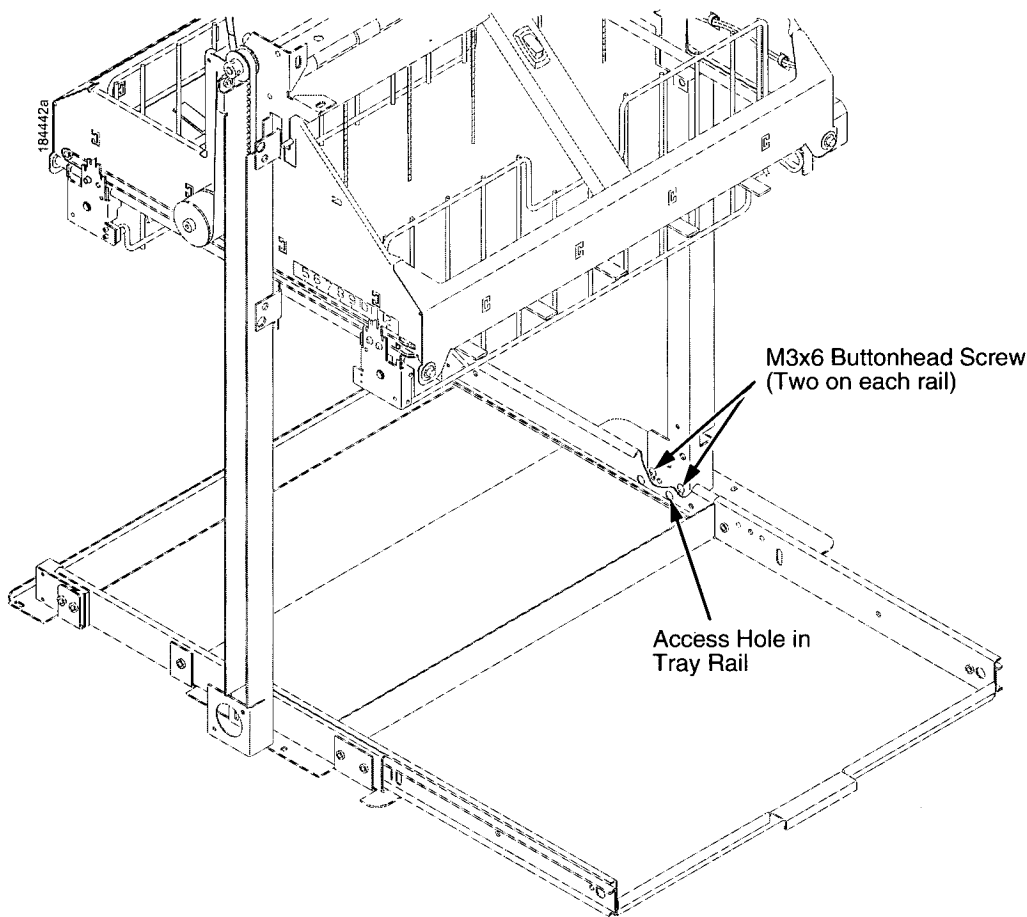
6. Remove the two 10-32 x 5/32 inch buttonhead screws and washers securing the vertical rails to the upper frame cross-member at the rear of the cabinet. (Figure 78.)
7. Remove the two Torx T-10 screws securing the stacker base to the cabinet floor. (Figure 78.)
8. Remove the two Torx T-10 screws that secure the rail bracket to the cabinet floor. (Figure 78.)



**Figure 78. Preparing the Stacker for Removal**

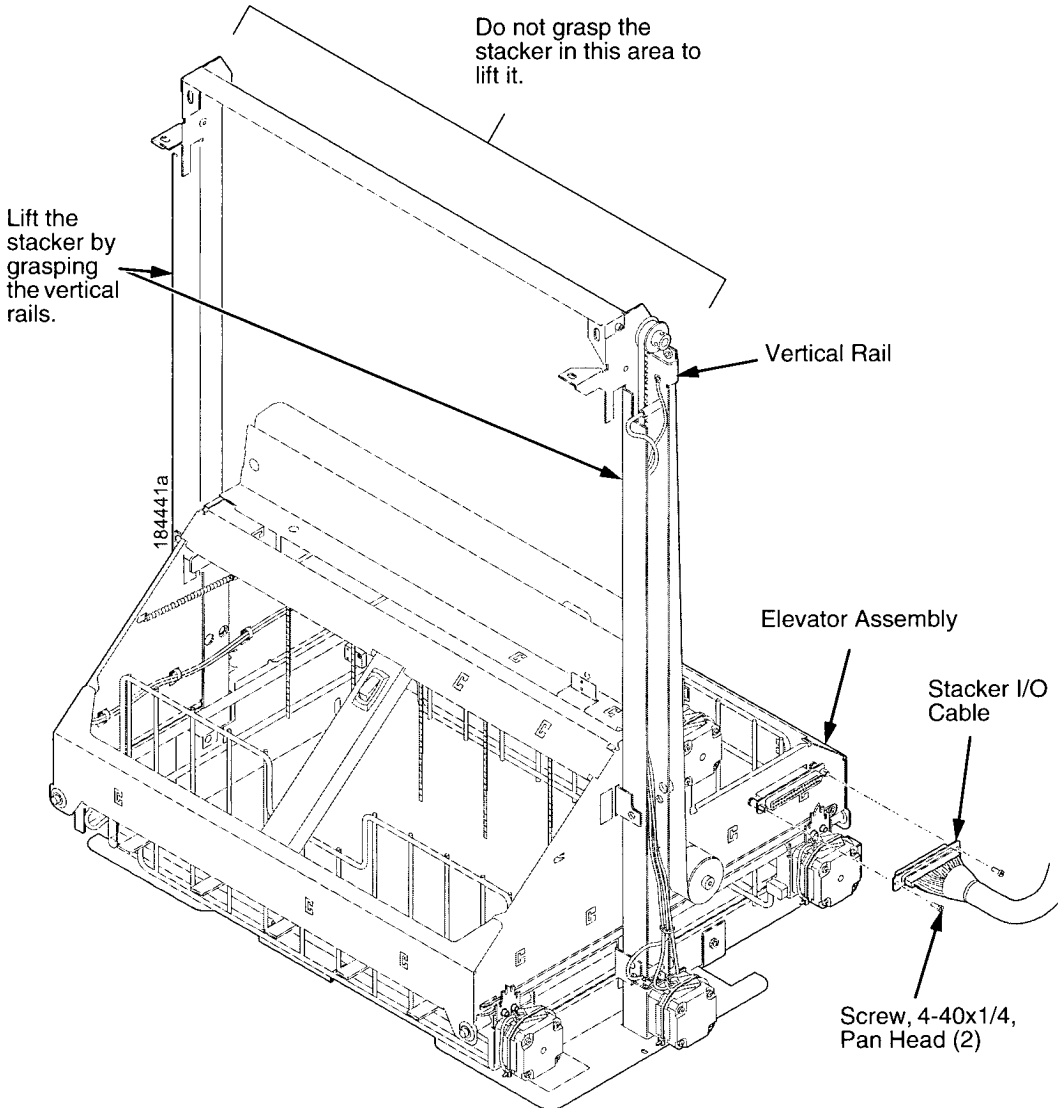
9. Pull the paper tray out until the holes in the rails permit access to the M3 buttonhead screws. (Figure 79.)

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 79.)



**Figure 79. 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 80.)



**Figure 80. Disconnecting the Stacker I/O Cable**



13. Remove two screws, washers, and the standoff from the stacker control panel. (Figure 81.)

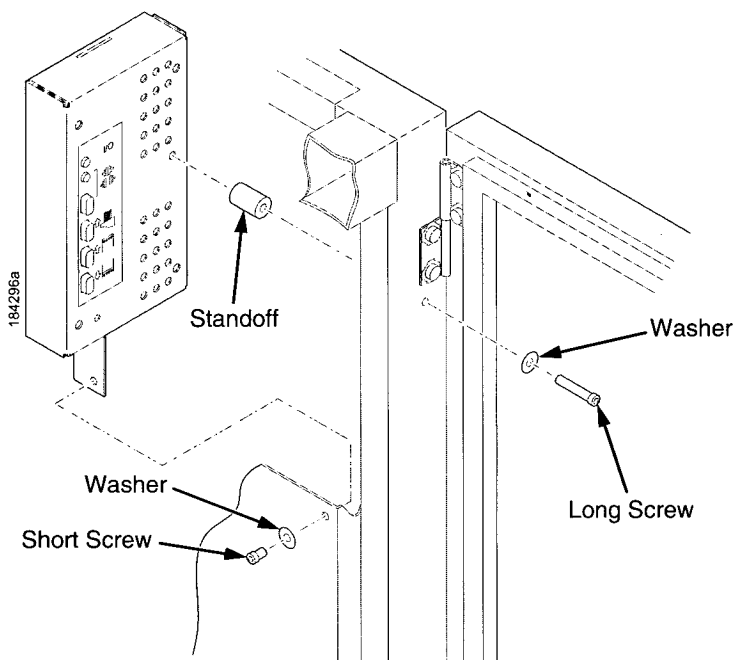


Figure 81. Removing the Stacker Control Panel

14. Remove four cables from the stacker control panel, and remove the stacker control panel. (Figure 82.)

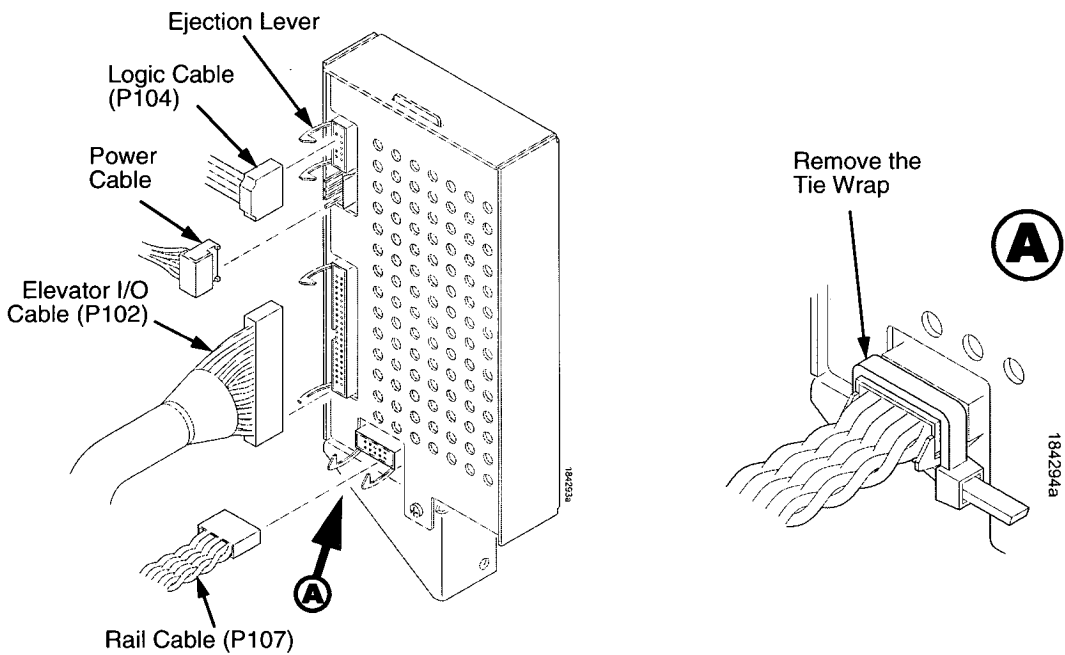
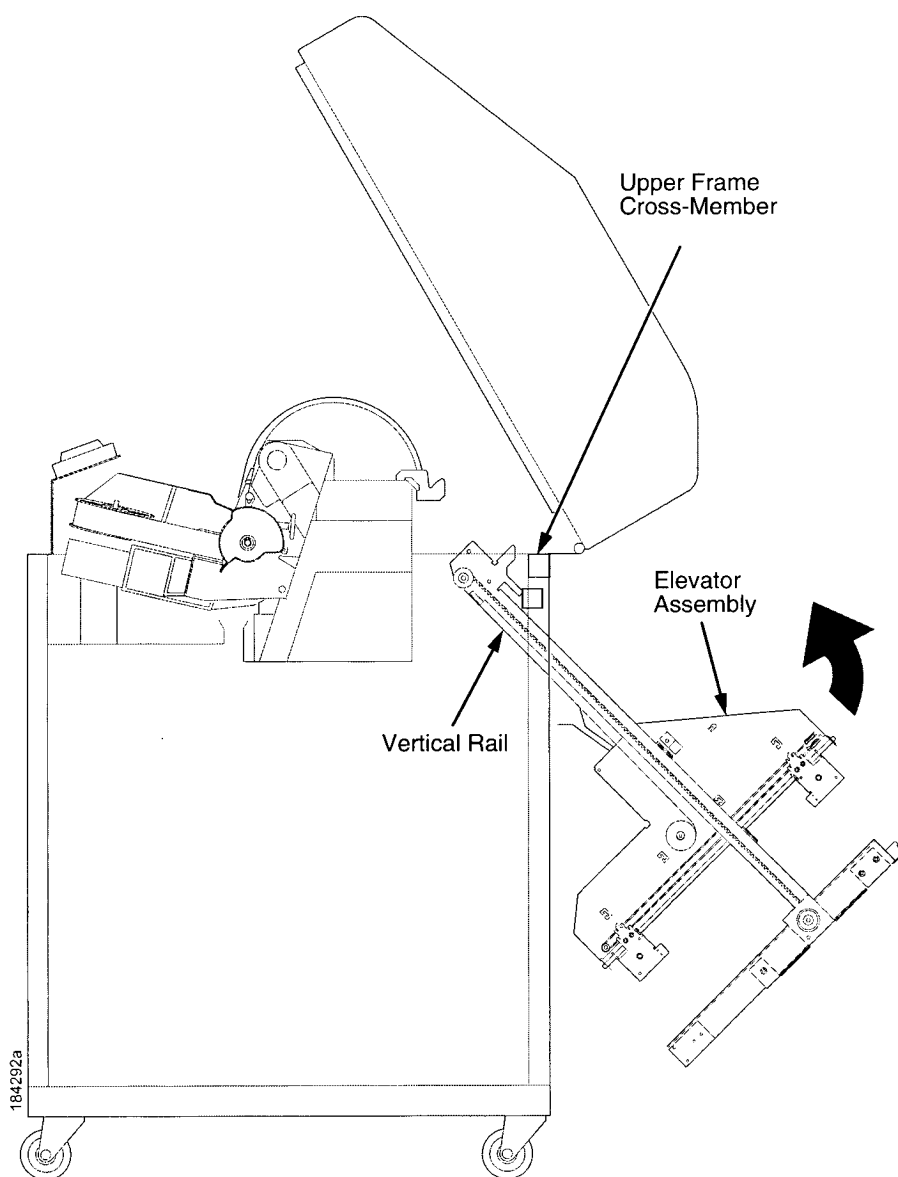


Figure 82. Removing Cables from the Stacker Control Panel

**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 83.

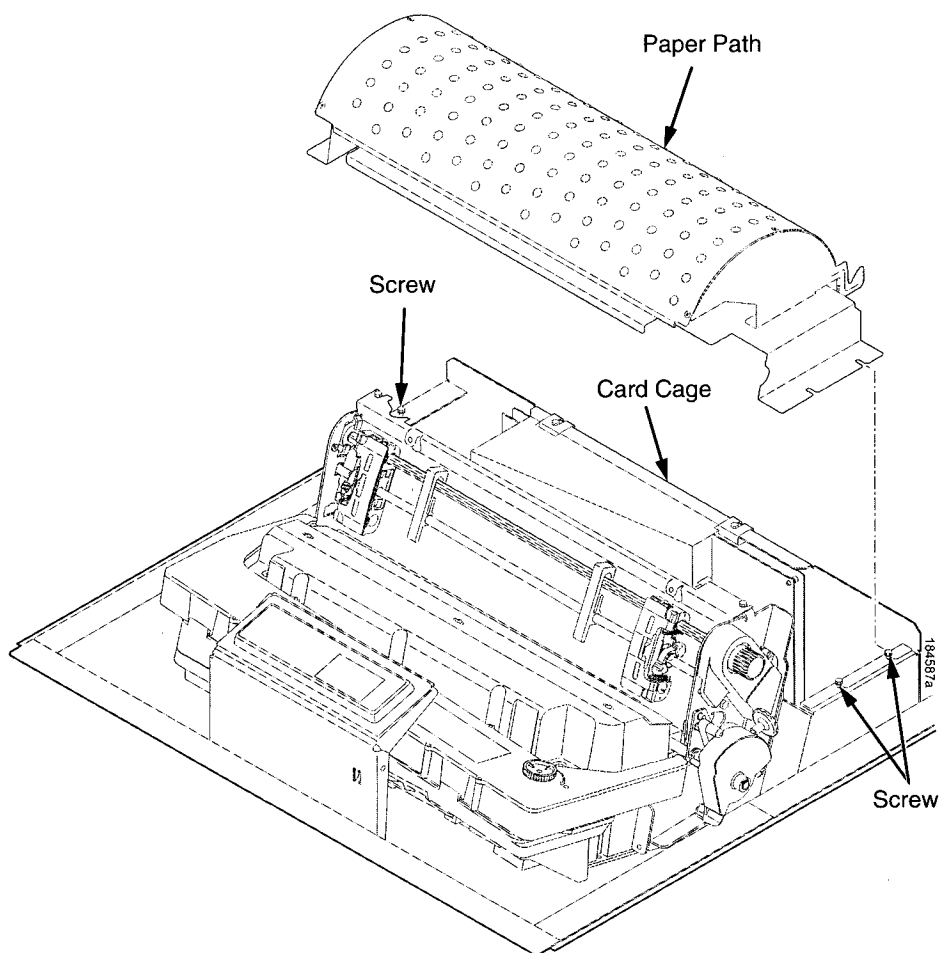


**Figure 83. Removing the Stacker Assembly**

## Installing the Power Stacker

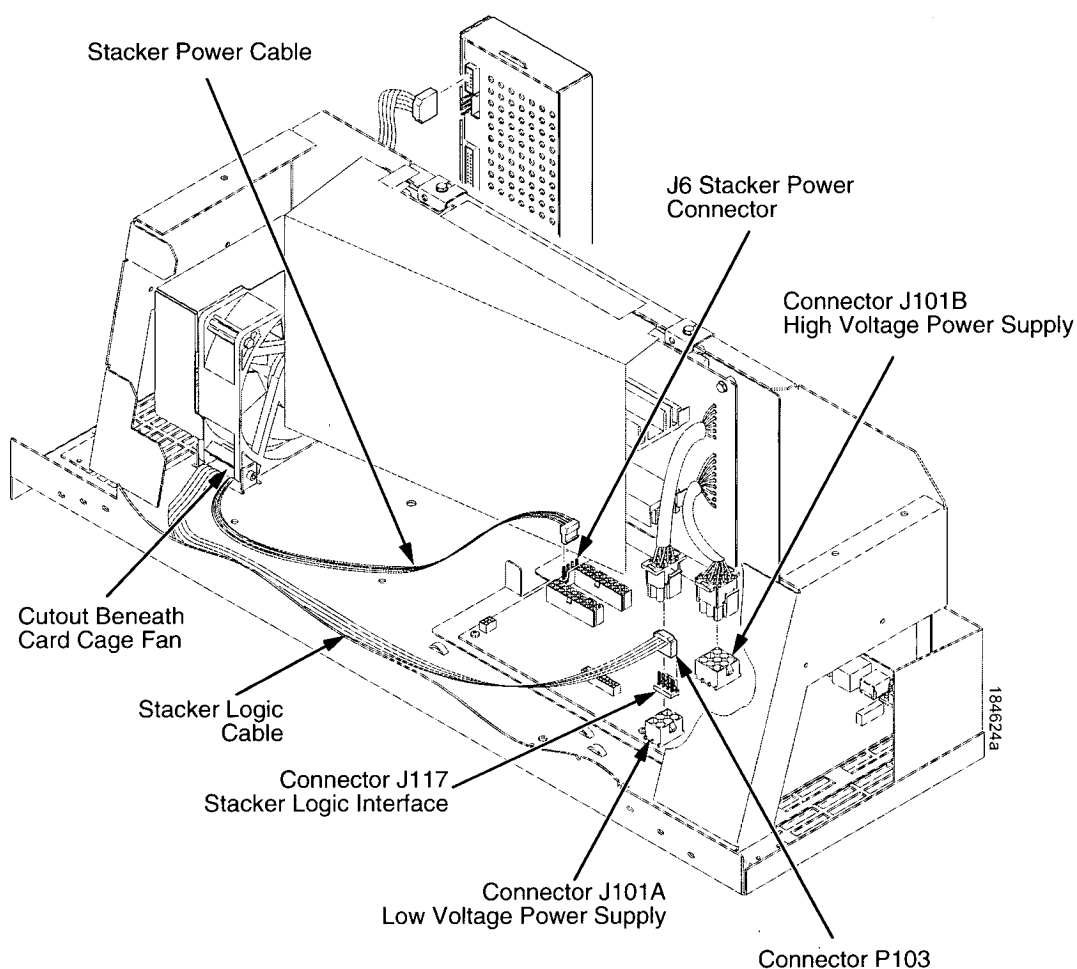
**NOTE:** This section shows installation of the power stacker assembly, the stacker cable assemblies, and the stacker control panel.

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 84.)



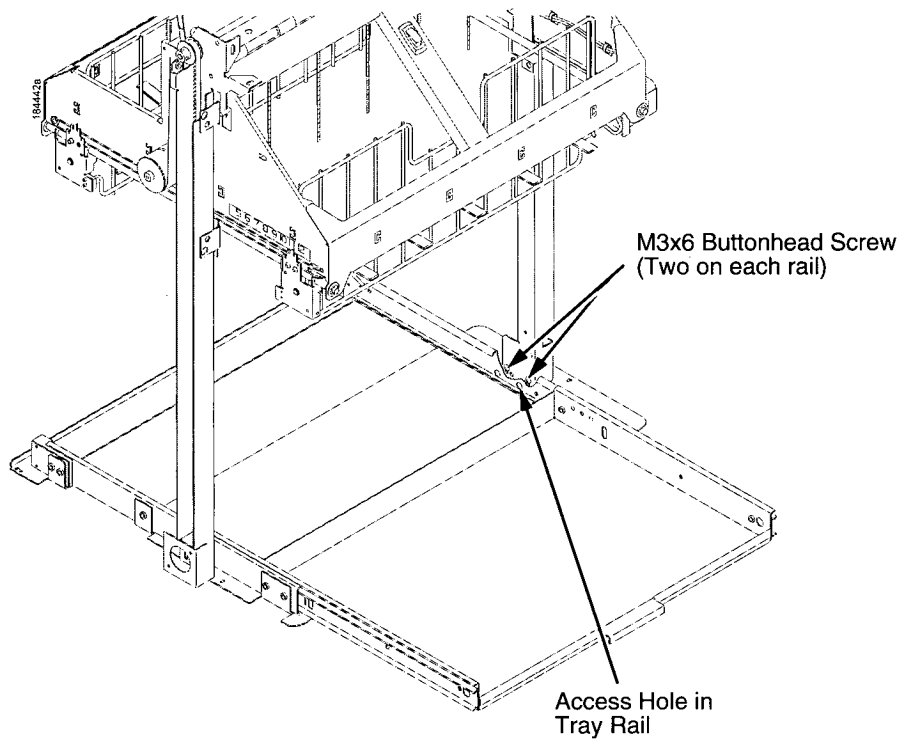
**Figure 84. Remove the Paper Path**

5. Connect the power stacker logic cable P103 to connector J117 on the controller board. (Figure 85.)
6. Connect the stacker power cable P6 to J6 on the controller board. (Figure 85.)
7. Route the stacker logic cable in front of the controller board and down through the cutout under the card cage fan. (Figure 85.)
8. Route the stacker power cable from J6 over to the logic cable (item 7 above) and then along the logic cable and down through the cutout under the card cage fan. (Figure 85.)



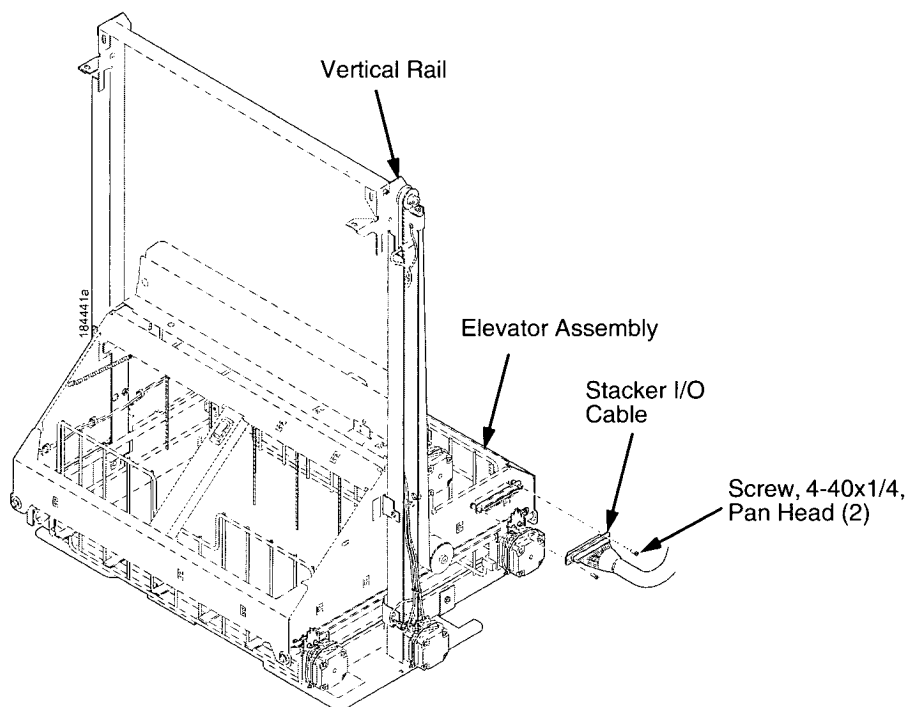
**Figure 85. Power Stacker Connections on the PSA3 Controller Board**

- 9. Pull the paper tray out until the holes in the rails permit access to the M3 buttonhead screws. (Figure 86.)
- 10. 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 86.)



**Figure 86. The Lower Screws in the Vertical Rails**

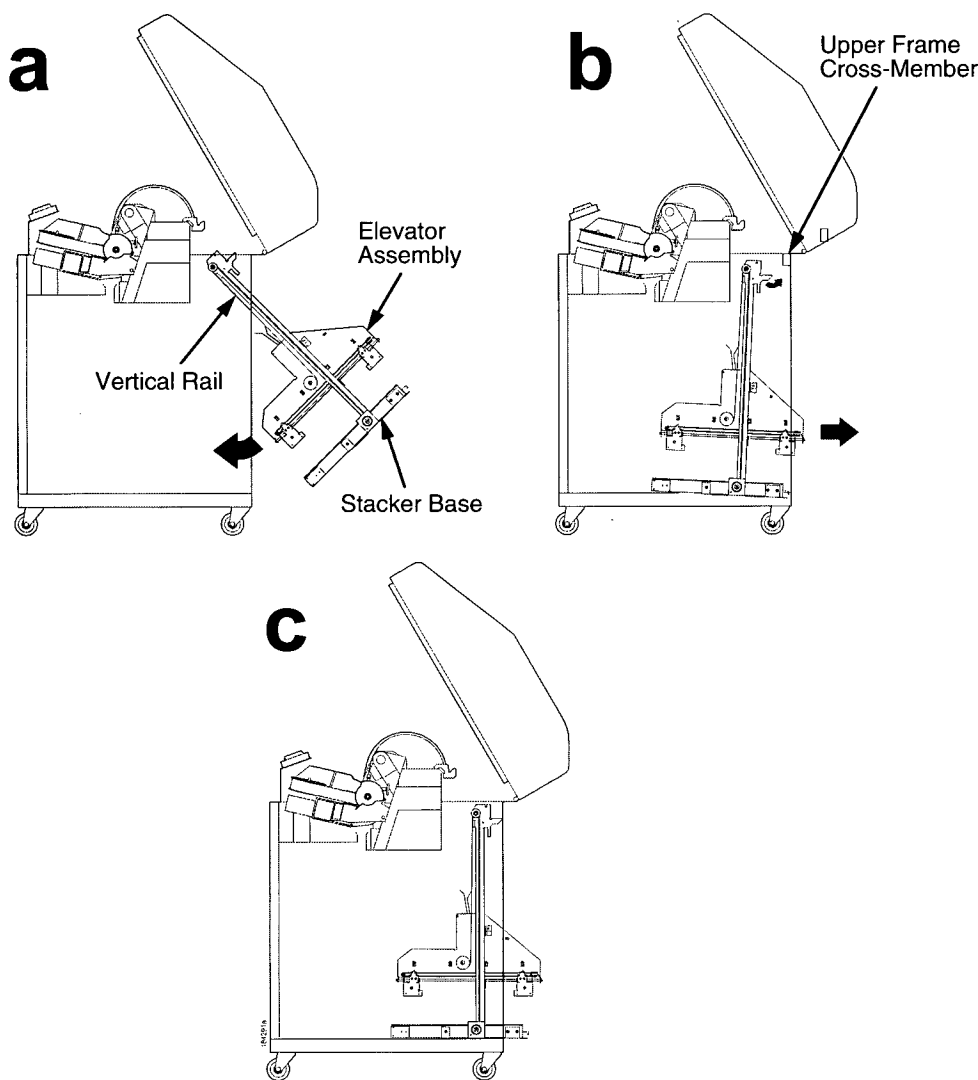
11. Position the elevator assembly at the bottom of the vertical rails.  
(Figure 87.)
12. Connect the elevator I/O cable to the elevator assembly and install the two 4-40 x 1/4 inch screws, as shown in Figure 87.



**Figure 87. The Elevator I/O Cable**

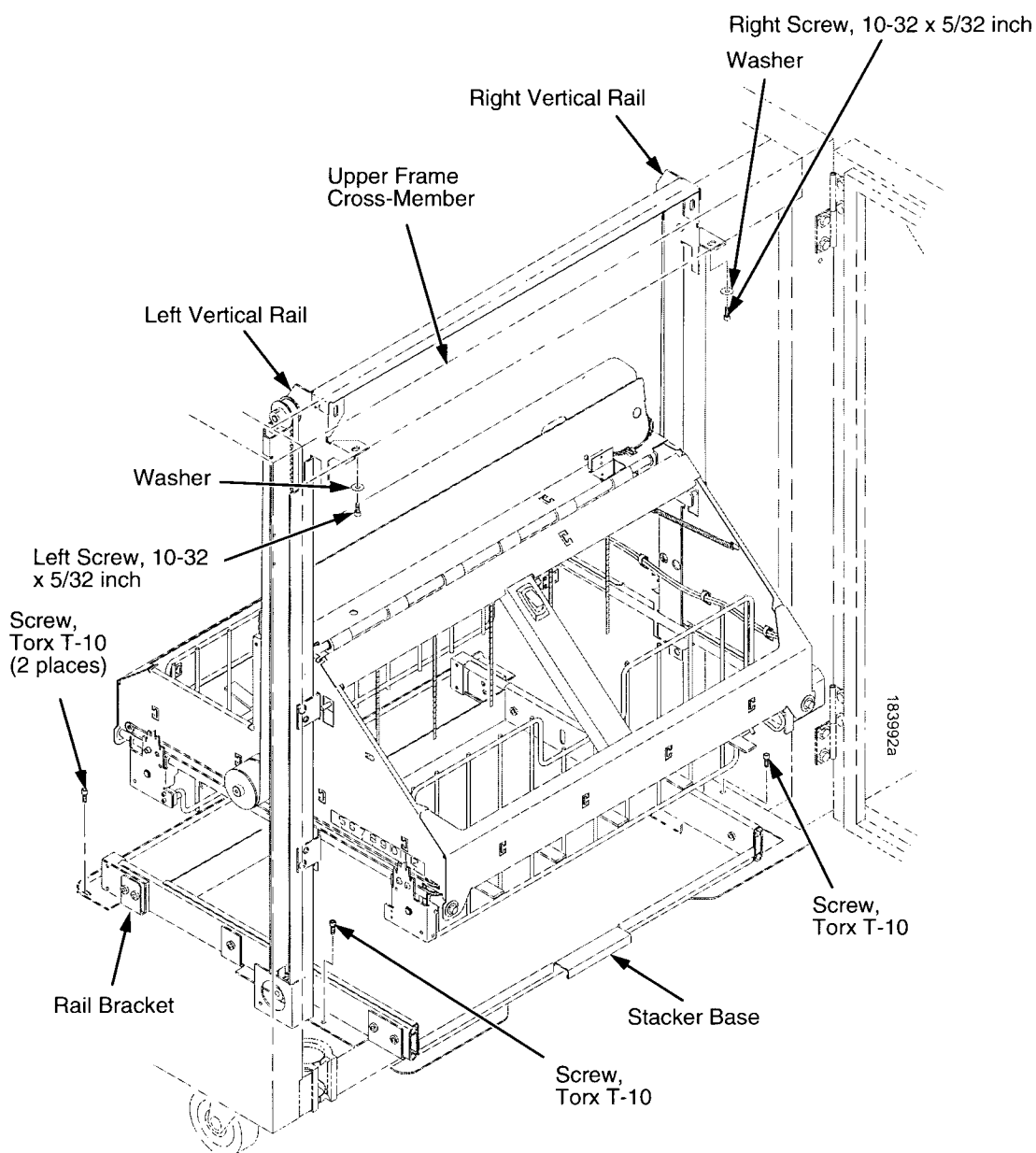
**CAUTION** The paper stacker assembly mounts to the rear upper frame cross-member and the cabinet floor. It is a snug fit. During installation, grasp the stacker by the vertical rails and take care to avoid scratching painted surfaces or damaging the stacker.

- NOTE:** It may be easier to wear gloves for the next step.
- 13. 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 88a.)
  - 14. Work the stacker base rearward and engage the upper brackets of the vertical rails under the upper frame cross-member. (Figure 88b.)
  - 15. Align the holes in the vertical rail brackets with the holes in the upper frame cross-member. (Figure 88c and Figure 89.)



**Figure 88. Stacker Installation**

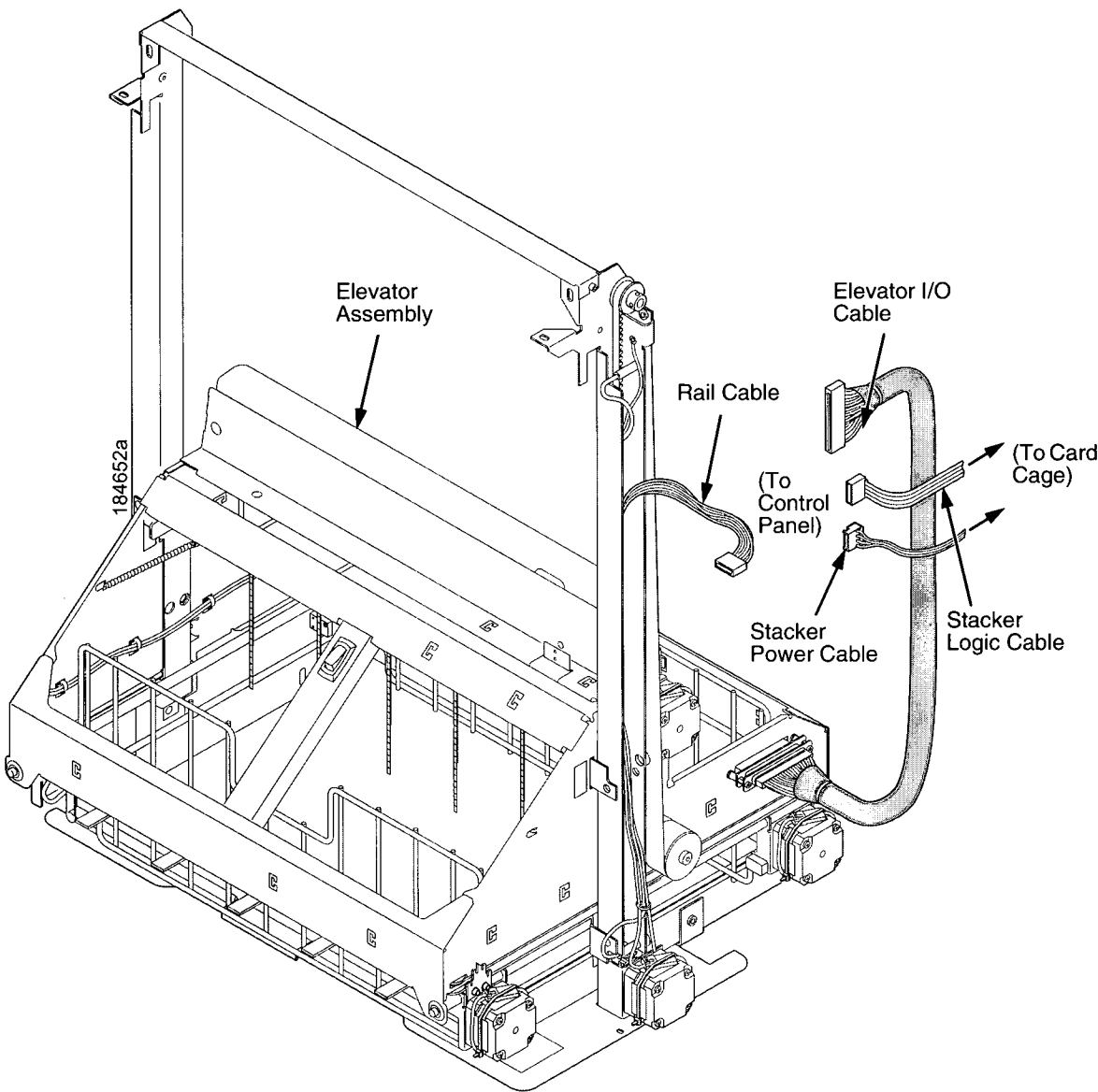
16. Align the holes in the stacker base with the holes in the cabinet floor.  
(Figure 88c and Figure 89)
17. Install finger tight the 10-32 x 5/32 inch buttonhead screw and washer securing the left vertical rail to the upper frame cross-member. (Do not install the right hand screw yet.) (Figure 89.)
18. Install and tighten the two Torx T-10 screws securing the stacker base to the cabinet floor. (Figure 89.)
19. Install and tighten the two Torx T-10 screws that secure the rail bracket to the cabinet floor. (Figure 89.)



**Figure 89. Stacker Fasteners**



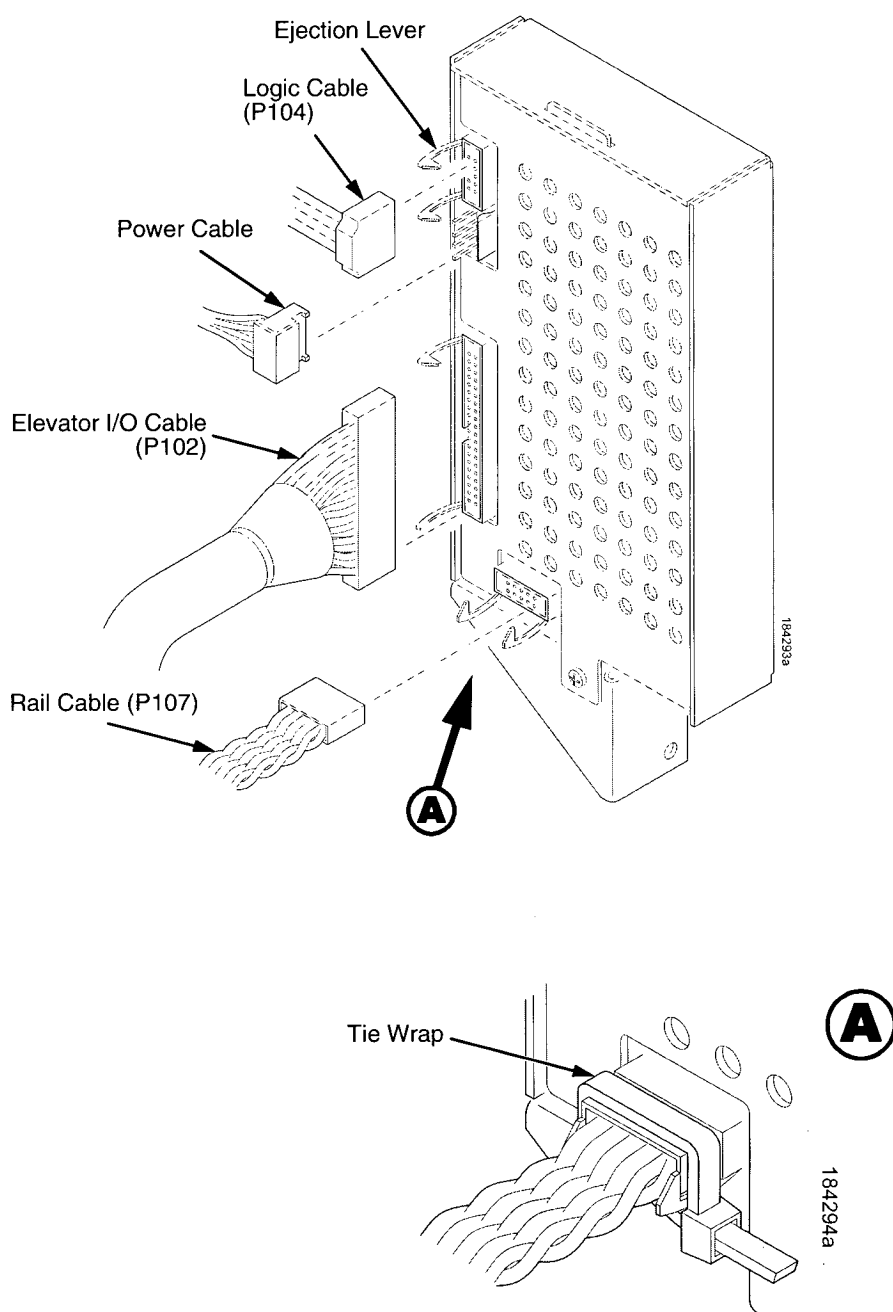
20. Gather the stacker rail cable, elevator I/O cable, logic cable, and power cable. Route the cables outboard of the elevator assembly. (Figure 90.)



**Figure 90. Stacker Cable Routing**

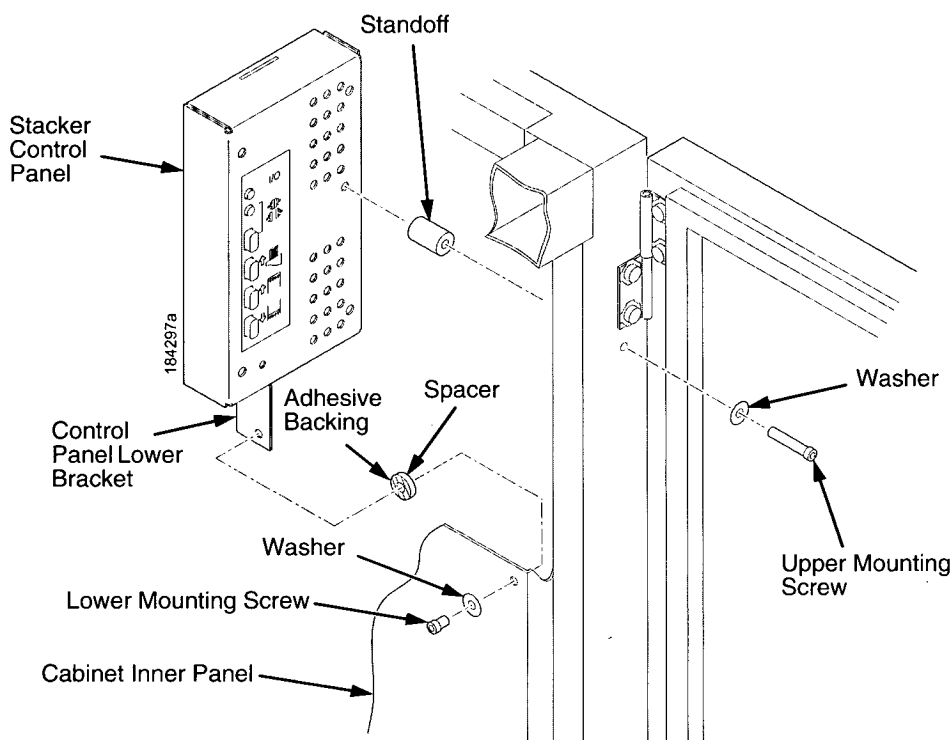
21. Connect the stacker cables to the rear of the stacker control panel assembly and make sure the ejector levers close over the connectors. (Figure 91.)

22. Press rail cable connector P107 into the control panel until the ejectors close, then tie wrap the ejectors to the connector. (Figure 91, detail A.)



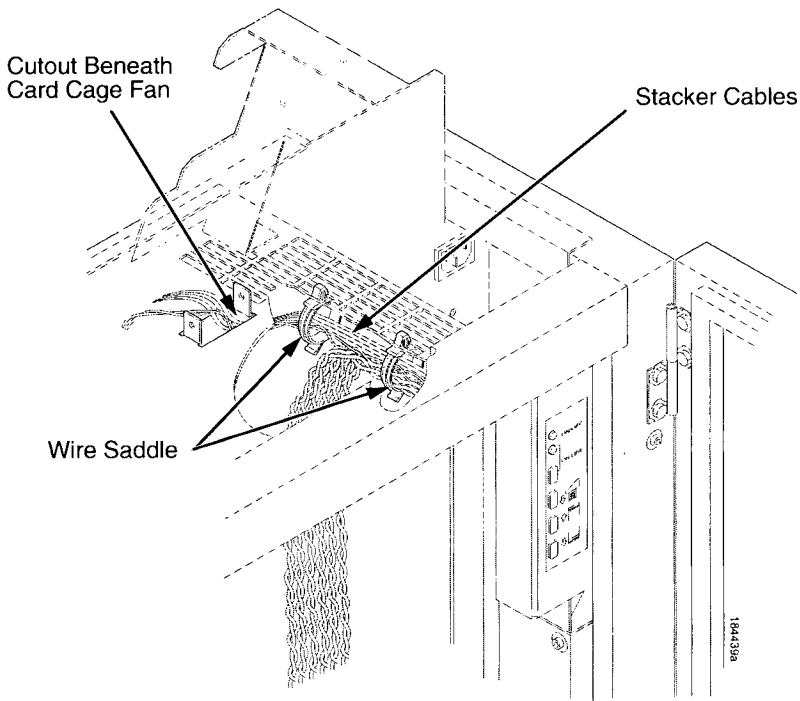
**Figure 91. Stacker Control Panel Cables**

- 23. 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 upper 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 92.)
- 24. 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 25.
  - 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 92.)
    - 2) Align the spacer with the holes in the lower bracket and inner panel. (Figure 92.)
    - 3) Press the spacer adhesive against the inner panel. (Figure 92.)
- 25. Install the lower mounting screw and washer. Tighten the upper mounting screw. (Figure 92.)



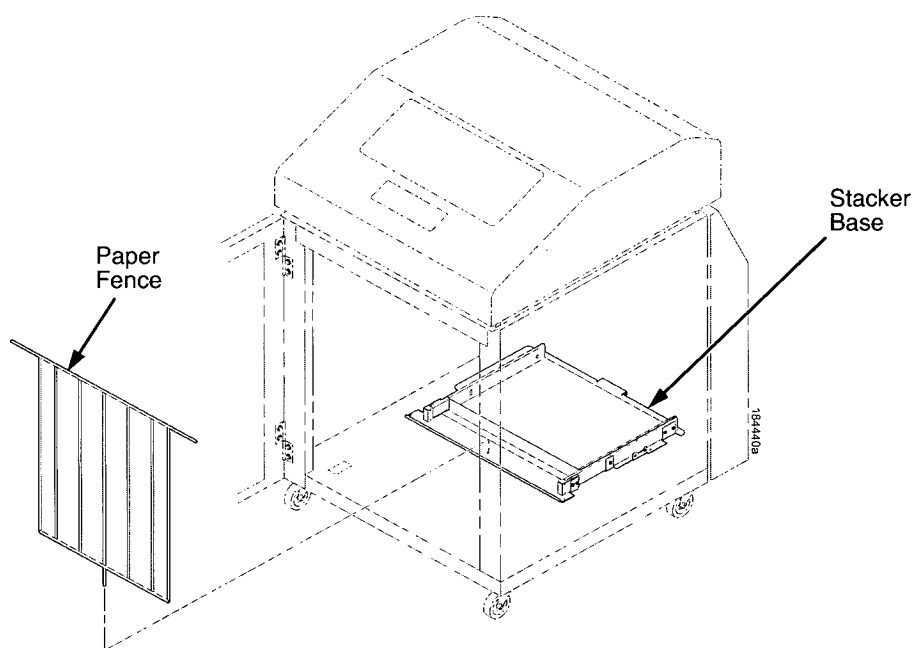
**Figure 92. Installing the Stacker Control Panel**

26. Install finger tight the 10-32 x 5/32 inch buttonhead screw and washer securing the right vertical rail to the upper frame cross-member. (Figure 89.)
27. Move the elevator assembly up and down on the vertical rails until it travels smoothly with no binding.
28. Tighten the two 10-32 x 5/32 inch buttonhead screws securing the vertical rails to the upper frame cross-member.
29. 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 86.)
30. 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 27 and 28 until the elevator moves smoothly.
31. 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 93.)



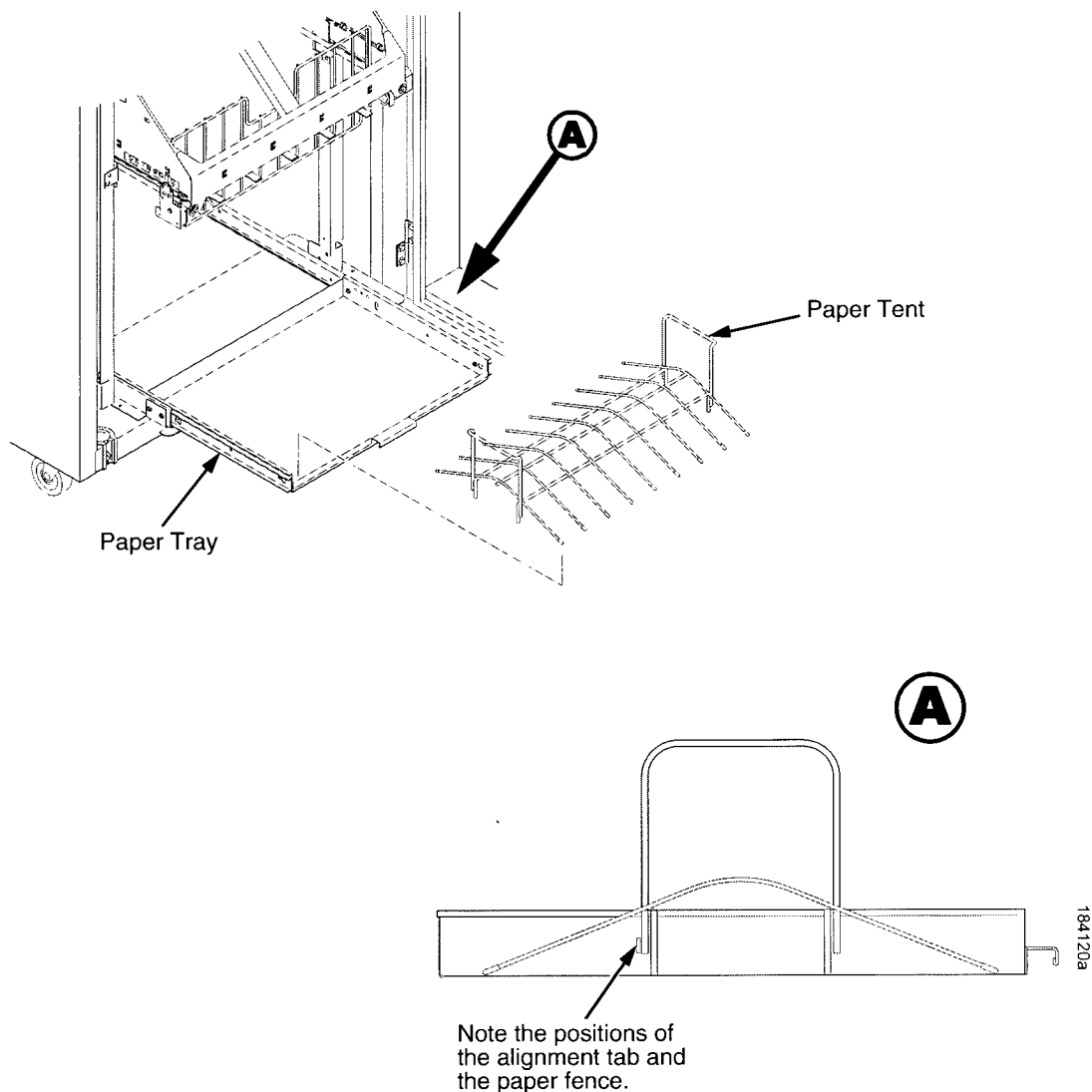
**Figure 93. Securing Stacker Cables**

32. Install the paper fence. (Figure 94.)



**Figure 94. Paper Fence**

33. 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 95.) If the paper is wider than 15.5 inches (39.5 cm) leave the paper tent out of the printer

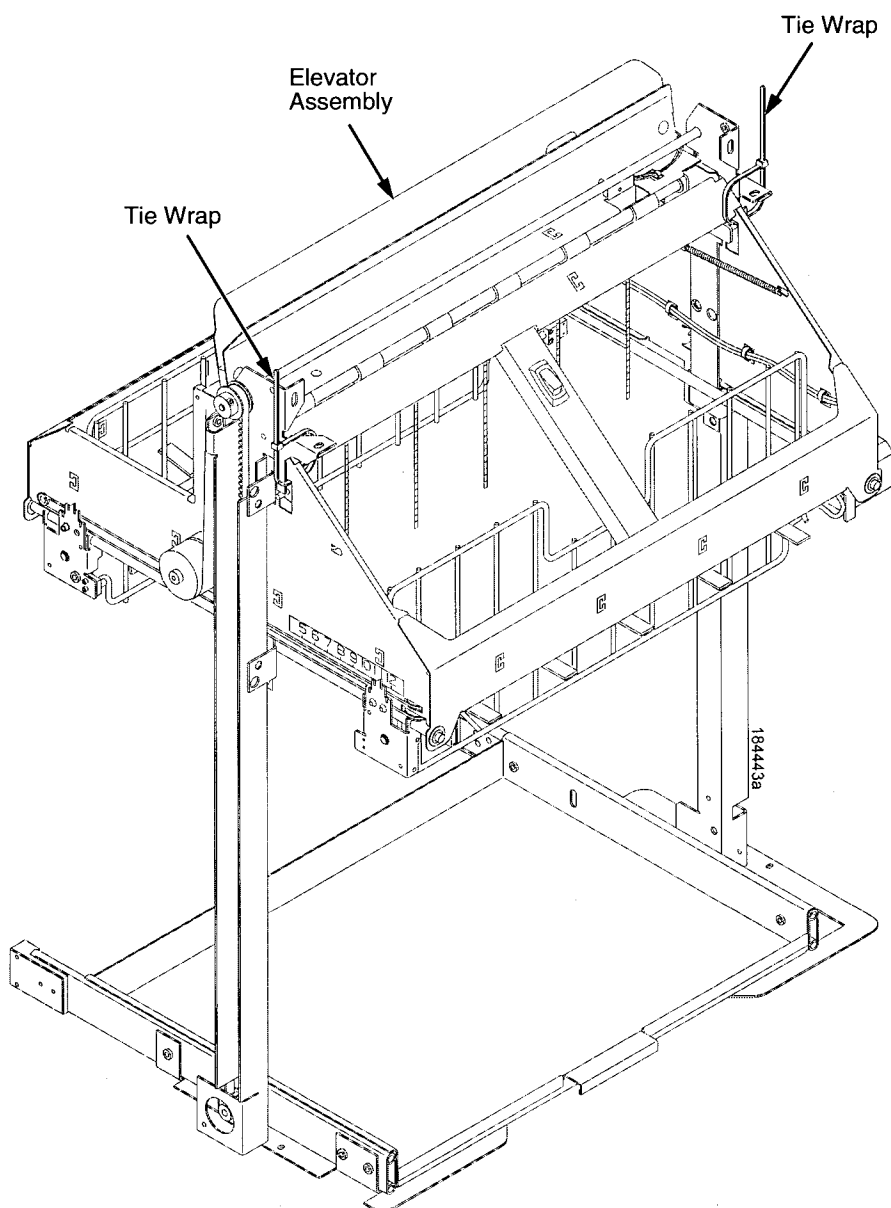


**Figure 95. Paper Tent**

34. Install the paper path that you removed in step 4.
35. 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 388.)
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 96.)

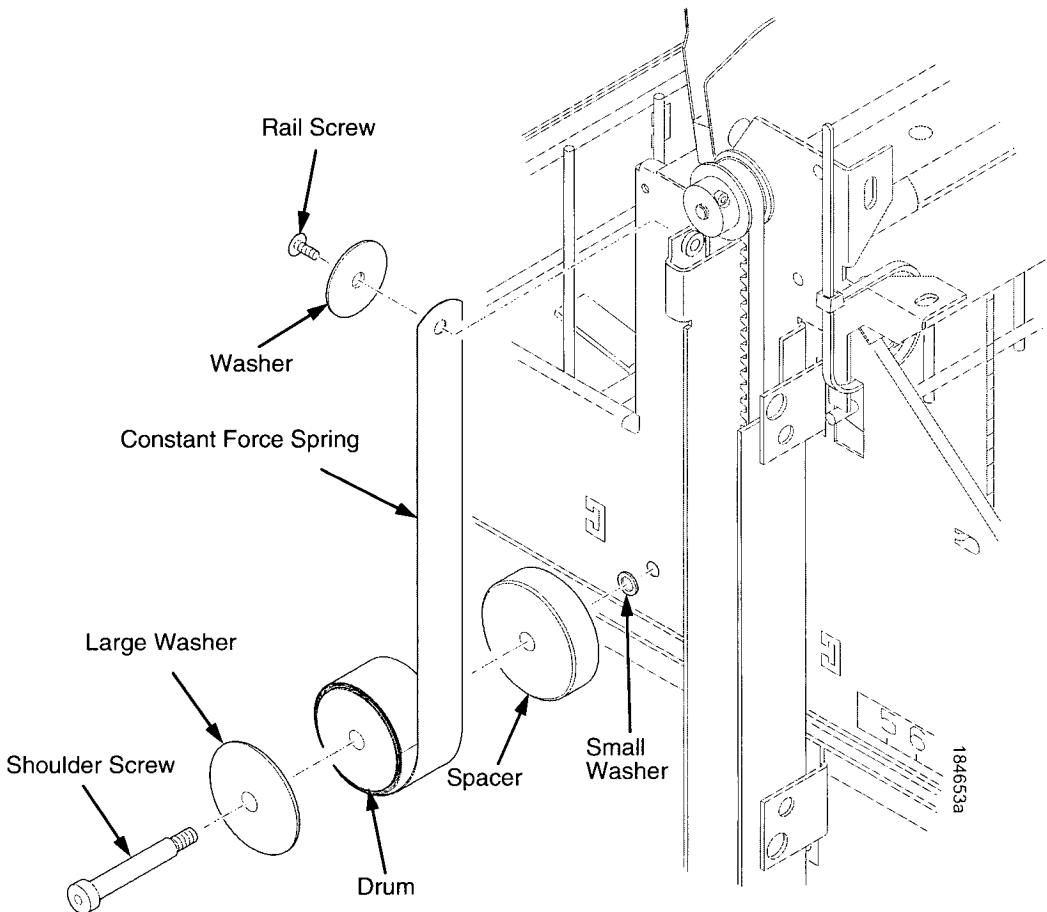


**Figure 96. Securing the Elevator Assembly**

## 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 97.)
4. Firmly gripping the spring and drum, remove the rail screw and washer securing the spring to the vertical rail. (Figure 97.)
5. Position a new constant force spring on the vertical rail and install the rail screw and washer. (Figure 97.)
6. Install the shoulder screw, large washer, spacer, and small washer as shown in Figure 97.

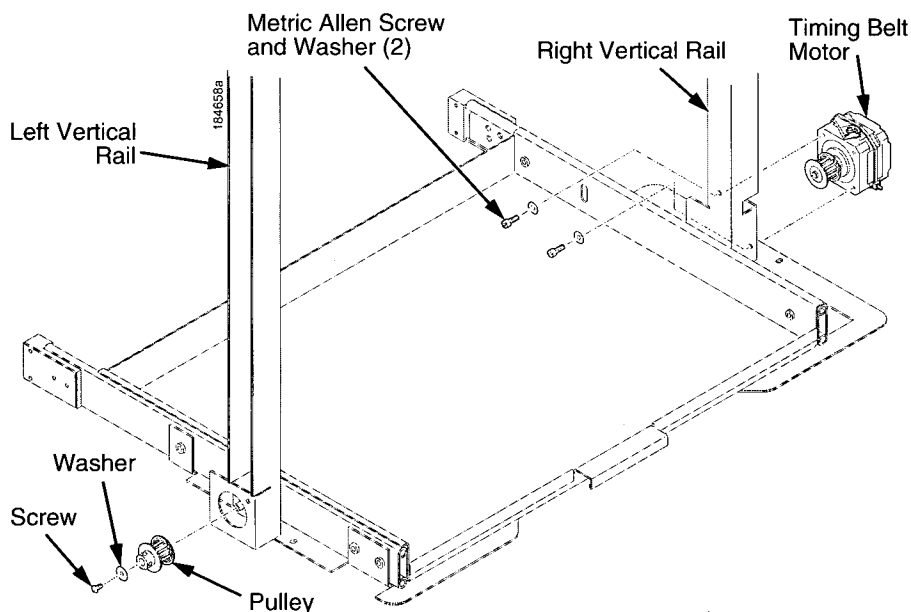


**Figure 97. Removing and Installing the Constant Force Spring**



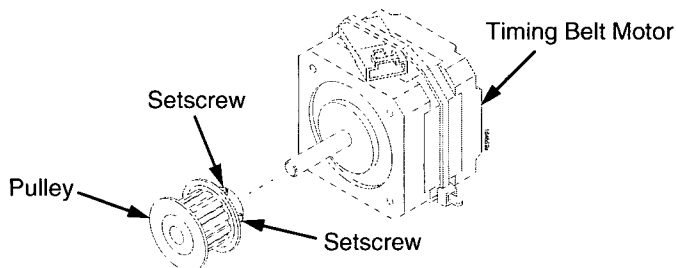
## Replacing the Timing Belts

1. Remove the stacker assembly from the printer (page 388).
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 96, page 406.)
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 98.) 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 98.) Go to step 5.



**Figure 98. Removing the Timing Belt Pulley and Motor**

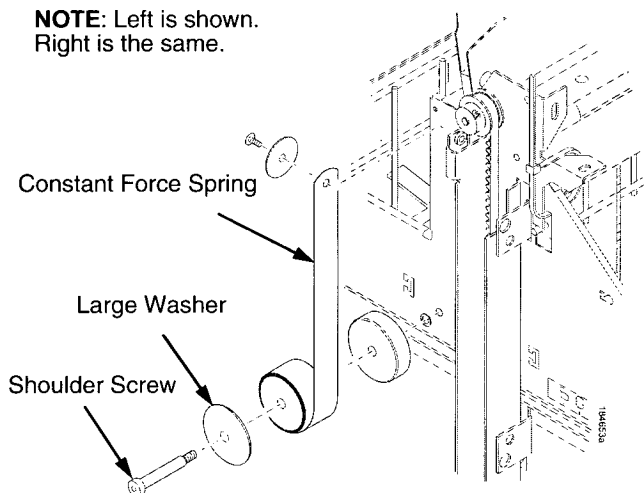
5. Loosen the two setscrews on the motor pulley and remove the pulley. Unplug the motor cable, if necessary. (Figure 99.) Go to step 6.



**Figure 99. Removing the Timing Belt Motor Pulley**

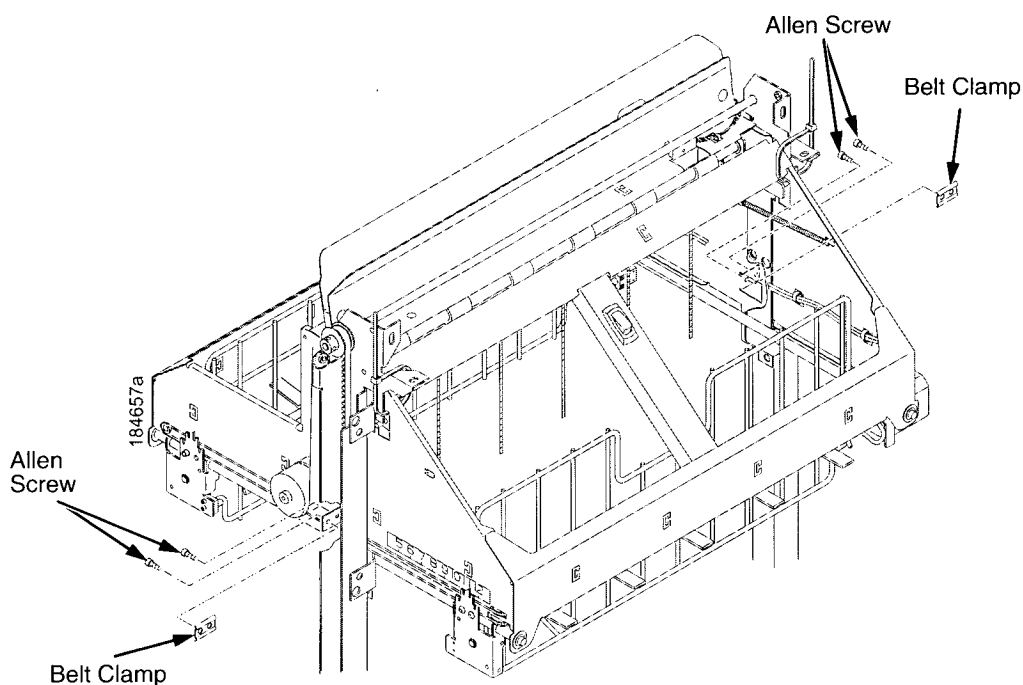
6. Remove the shoulder screw and large washer that secure the constant force spring to the vertical rail. (Figure 100.)

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



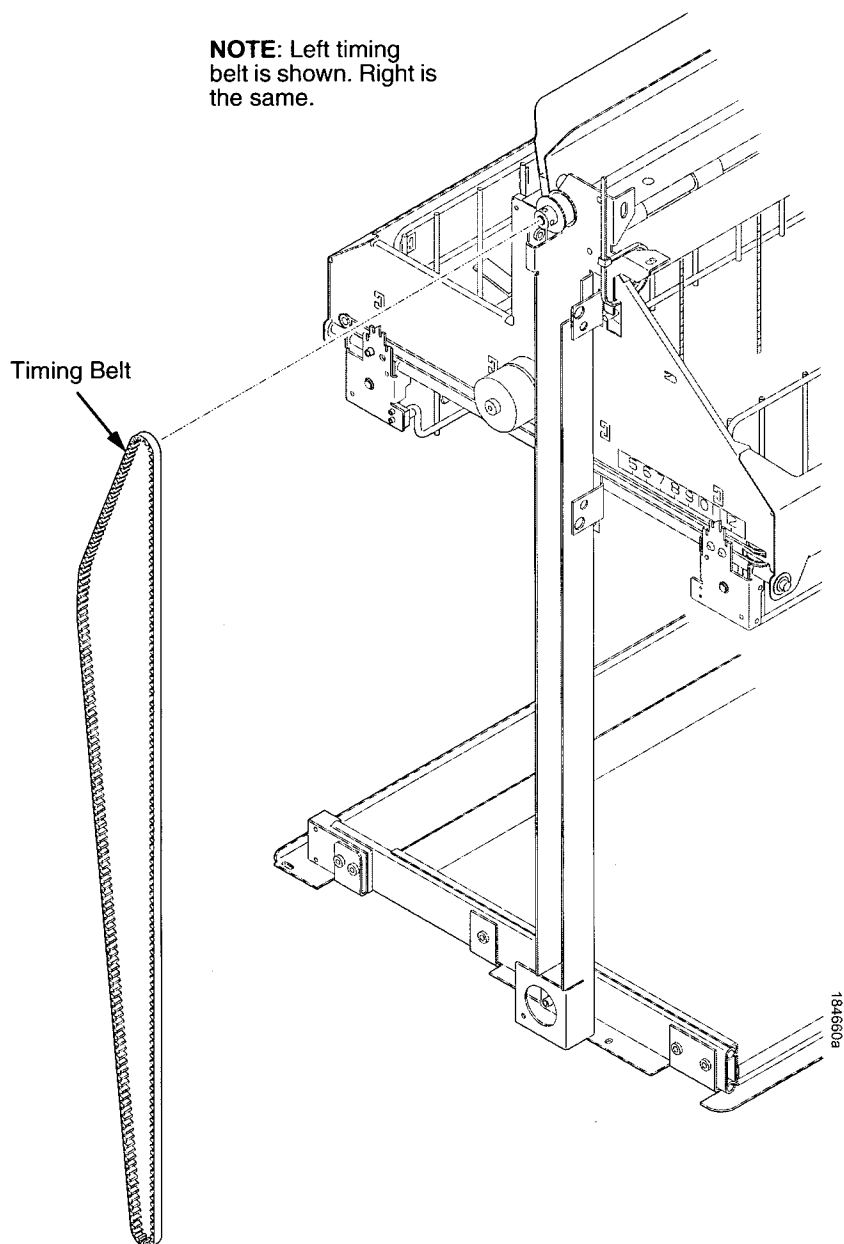
**Figure 100. Releasing the Constant Force Spring**

7. Remove two Allen screws from the belt clamp that secures the timing belt to the stacker frame. (Figure 101.)



**Figure 101. Removing the Belt Clamps**

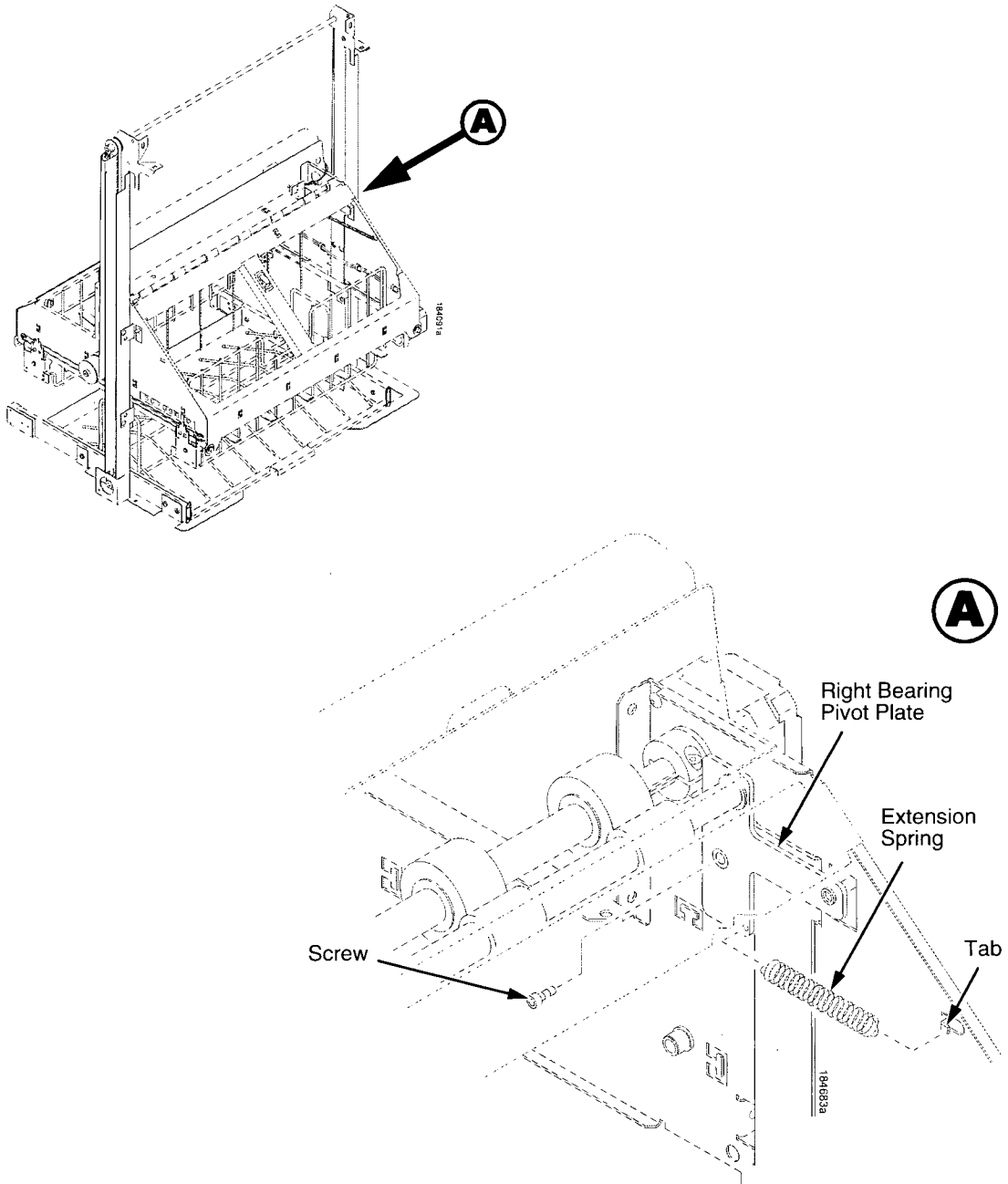
8. Remove the timing belt by working it around the vertical rail and constant force spring. (Figure 102.)
9. To install a timing belt, reverse the steps of this procedure.



**Figure 102. Removing the Timing Belt**

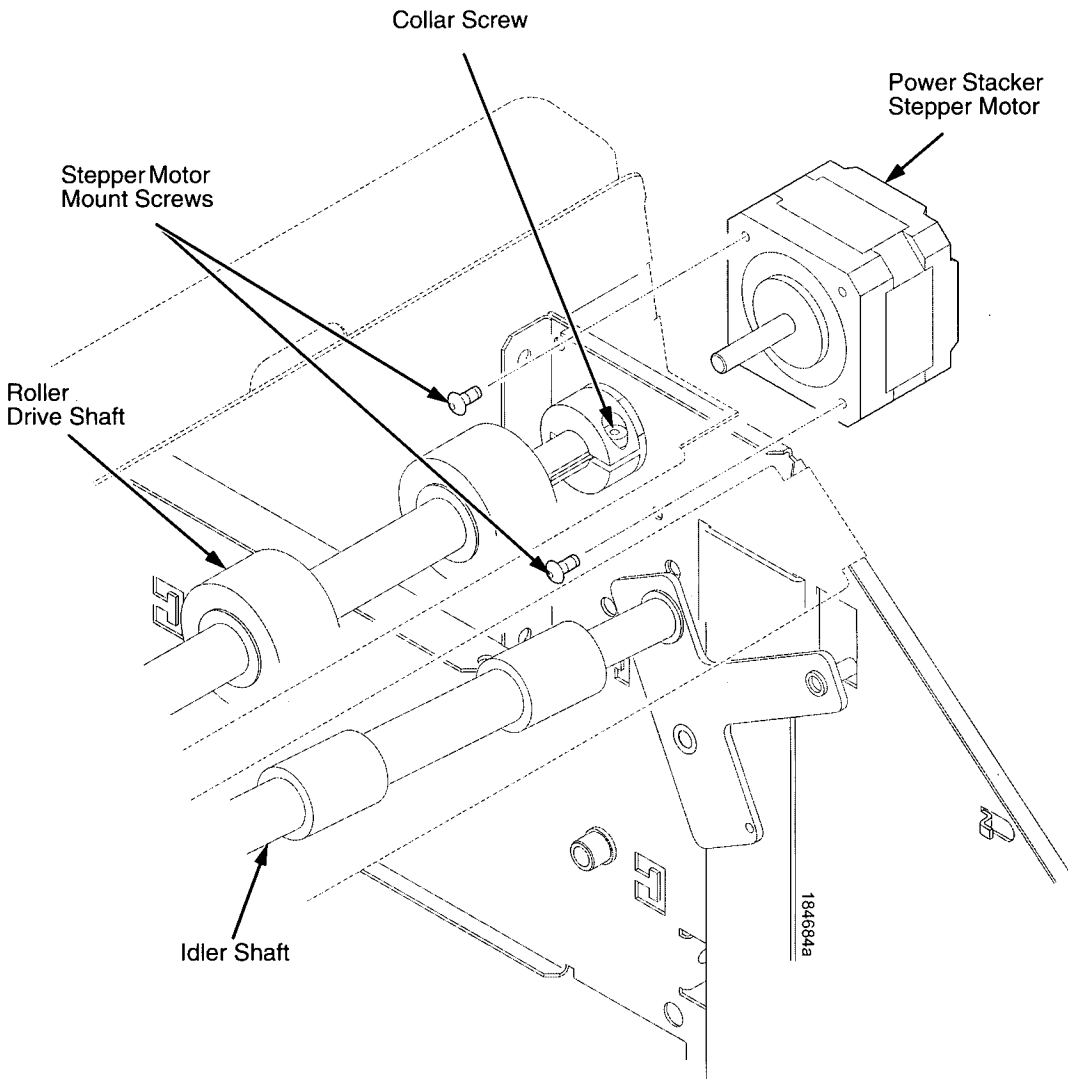
# Replacing the Roller Drive Shaft

1. Remove the stacker assembly from the printer (page 388).
2. Unhook the right bearing pivot plate's extension spring from the tab on the elevator. (Figure 103.)
3. Using an M-2 Allen wrench, remove the screw securing the right bearing pivot plate to the elevator. (Figure 103.)



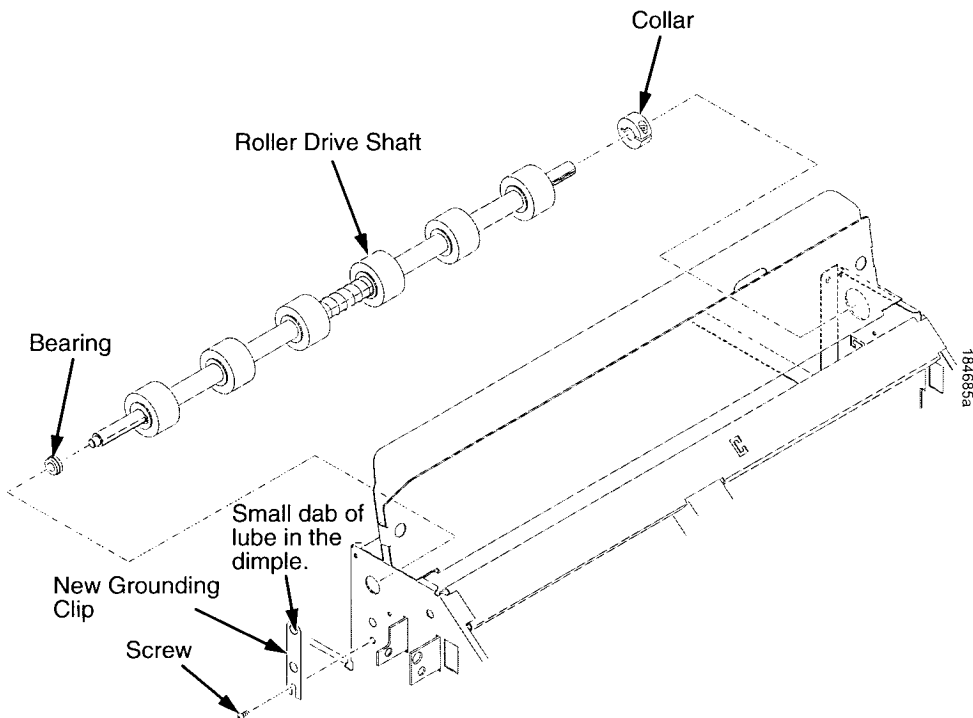
**Figure 103. Right Bearing Pivot Plate and Extension Spring**

4. Move the idler shaft enough to expose the lower mount screw of the power stacker stepper motor. (Figure 104.)
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 104.)
7. Using a 9/64 inch Allen wrench, loosen (do not remove) the collar screw securing the collar to the roller drive shaft. (Figure 104.)
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 104. 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 105.)
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 105.)
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 105.)
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 105.)
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 105. Roller Drive Shaft**

# Illustrated Parts Breakdown

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The Illustrated Parts Breakdown (IPB) consists of exploded drawings of the power stacker assembly and subassemblies. Parts are listed next to each drawing.

**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.

## List of Illustrations

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Figure 107. Elevator Detail: Motors, Rollers, and Paddles ..... page 417

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Figure 110. Stacker Detail: Paper Motion Detector..... page 423

### Parts not Illustrated in this Section:

- Extended Door Assembly, Stealth Black:  
177702-001 (Field Kit, Extended Door)
- Reed Limit Switch Assembly: 204234-001  
257669-001 (Field Kit, Stkr Sensors)
- Control Panel Assy, Pwr Stkr, Black, Americas and Asia/Pacific:  
EMEA (RoHS): 250676-901) (See Figure 92, page 402)  
250676-001 (Control Pnl Assy, Stkr only)
- 257670-001 (Field Kit, Stkr Cables)
  - Rail Cable, Power Stacker (See page 359)
  - Power Cable, Power Stacker (See page 358)
  - Logic Cable, Power Stacker (See page 357)
  - Frame Cable, Power Stacker (See page 356)
  - Elevator I/O Cable, Power Stacker (See page 360)

See page 417.

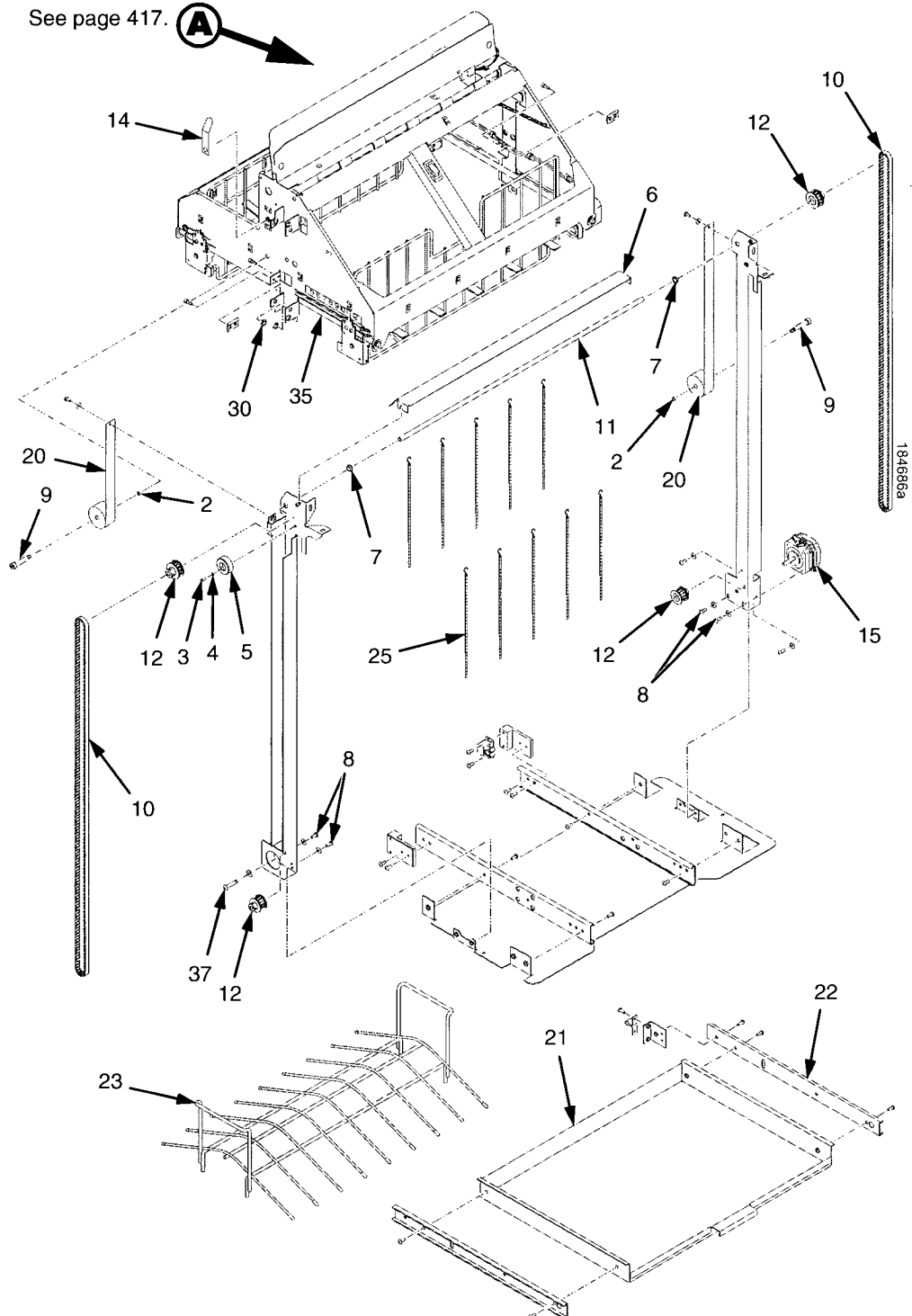
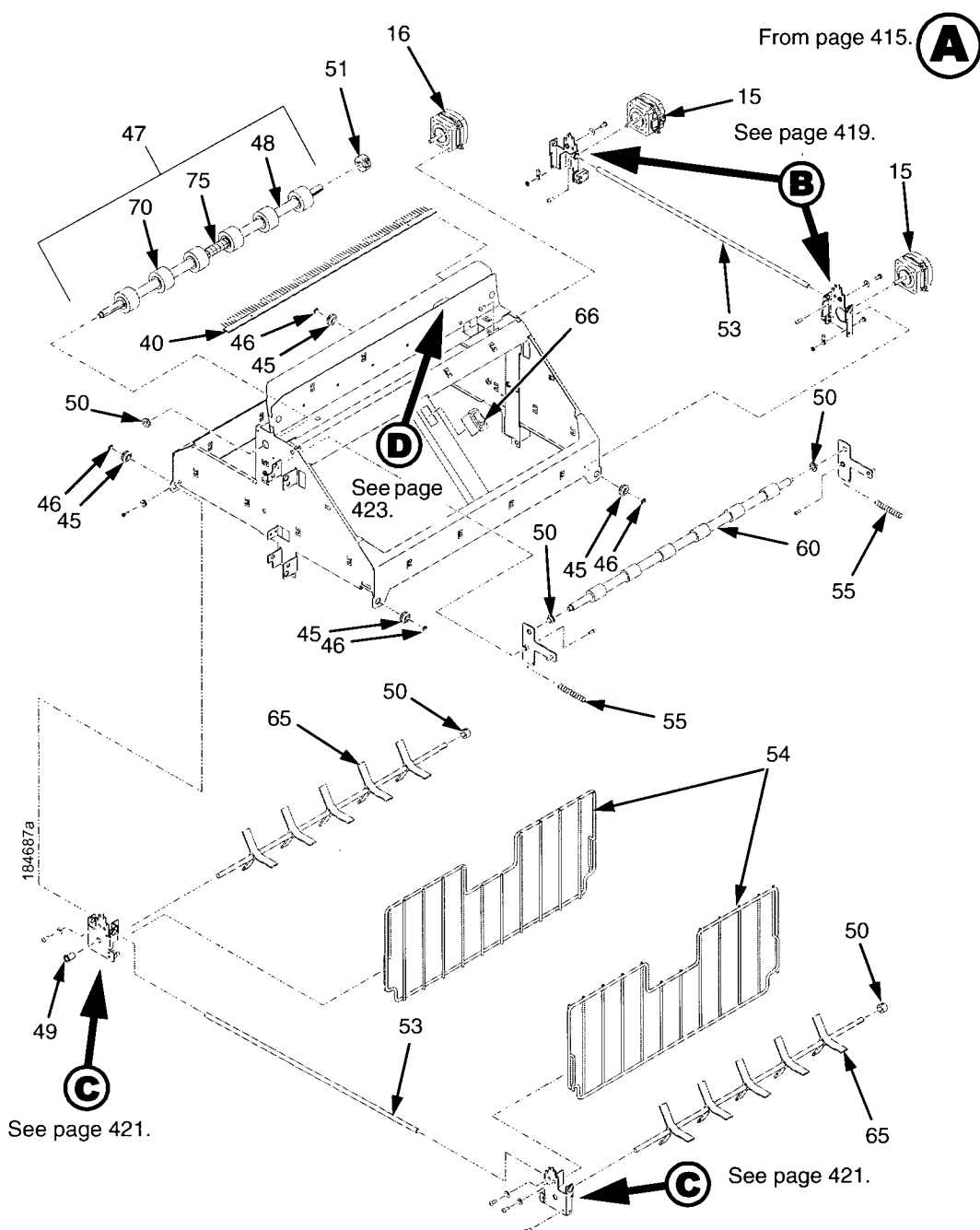


Figure 106. Stacker Assembly



| Item No. | Part No.<br>(RoHS Compliant) | Description                                 | Notes                                                                  |
|----------|------------------------------|---------------------------------------------|------------------------------------------------------------------------|
| 1        | Ref                          | Stacker Assembly, Power, Black              | Part of 251228-001, Field Kit, Pwr Stkr, Blk.                          |
| 2        | Ref                          | Washer, 5/16 X .200 X .030, Stainless Steel |                                                                        |
| 3        | Ref                          | Screw, Hex Skt Btn Hd, Zinc M3X8mm          |                                                                        |
| 4        | Ref                          | Washer, Shim, .125 ID X .010 inch Thick     |                                                                        |
| 5        | Ref                          | Timing Belt Tensioner Assy, Pwr Stkr        | Part of item 1.                                                        |
| 6        | Ref                          | Deflector, Power Stacker, Black             |                                                                        |
| 7        | Ref                          | Clip-On Bearing                             |                                                                        |
| 8        | Ref                          | Screw, Torx, 6-32 x .25                     |                                                                        |
| 9        | Ref                          | Screw, Shoulder, 10-32                      |                                                                        |
| 10       | Ref                          | Timing Belt                                 | Part of 257668-001, Field Kit, Stkr Motor.                             |
| 11       | Ref                          | Shaft, Lift, Phase III                      | Part of item 1.                                                        |
| 12       | Ref                          | Pulley, Timing, Fairloc, 12T                | Part of 257668-001.                                                    |
| 13       | Not Used                     |                                             |                                                                        |
| 14       | Ref                          | Clip, Ground, Dimpled, Pwr Stkr             | 257668-001, Field Kit, Stkr Motor.                                     |
| 15       | Ref                          | Motor Assembly, Power Stacker               | Elevator motor and paddle motor.<br>257668-001, Field Kit, Stkr Motor. |
| 16       | Ref                          | Motor, Stepper, Power Stacker               | Paper puller motor.<br>257668-001, Field Kit, Stkr Motor.              |
| 20       | Ref                          | Spring, Conforce, with Spool Assy           | Part of 257668-001, Field Kit, Stkr Motor.                             |
| 21       | 178913-001                   | Field Kit, Tray, Cab, Rear, Black           |                                                                        |
| 22       | Ref                          | Slide, Ball Bearing, Rear Tray              | Part of item 21.                                                       |
| 23       | 173864-901                   | Tent, Paper, Power Stacker                  |                                                                        |
| 25       | 151527-905                   | Chain                                       | Mount outboard of shafts.                                              |
| 30       | 202705-901                   | Nylon Plug                                  |                                                                        |
| 35       | 202720-901                   | Cable                                       |                                                                        |
| 36       | Not Used                     |                                             |                                                                        |
| 37       | Ref                          | Screw, Shoulder, 8-32                       |                                                                        |



**Figure 107. Elevator Detail: Motors, Rollers, and Paddles**

| Item No. | Part No. (RoHS Compliant) | Description                           | Notes                                                                                |
|----------|---------------------------|---------------------------------------|--------------------------------------------------------------------------------------|
| 40       | 158313-001                | Anti-Static Brush                     |                                                                                      |
| 45       | Ref                       | Shear Grommet                         |                                                                                      |
| 46       | Ref                       | Cap Nut                               |                                                                                      |
| 47       | Ref                       | Drive Shaft Assy (Roller Drive Shaft) | Part of 257668-001, Field Kit, Stkr Motor. Includes items 14, 70, and 75.            |
| 48       | Ref                       | Spacer, Drive Roller                  | Part of item 47.                                                                     |
| 49       | 202789-901                | Bearing, Flanged                      |                                                                                      |
| 50       | 202824-901                | Bearing                               |                                                                                      |
| 51       | 202708-901                | Collar Clamp                          |                                                                                      |
| 52       | 257669-001                | Field Kit, Stkr Sensors               | Not illustrated.                                                                     |
| 53       | Ref                       | Support Shaft                         | Part of item 1.                                                                      |
| 54       | 174570-001                | Fence, Wireform, Phase III            |                                                                                      |
| 55       | Ref                       | Extension Spring                      |                                                                                      |
| 60       | Ref                       | Idler Roller                          | Part of item 1.                                                                      |
| 65       | Ref                       | Paddle, Power Stacker                 | Part of item 1.                                                                      |
| 66       | Ref                       | Switch, Assy, Rocker                  | Elevator Disable Switch.<br>Part of item 52.                                         |
| 70       | Ref                       | Drive Roller                          | Part of item 47.                                                                     |
| 75       | Ref                       | Compression Spring                    | Part of item 47.                                                                     |
| 76       | Ref                       | Switch Assy, Reed Limit (2)           | Not illustrated; attach to item 77.<br>Part of item 52.                              |
| 77       | Ref                       | Reed Switch Mounting Plate (2)        | Not illustrated; attach to top and bottom of right vertical rail.<br>Part of item 1. |

From page 417.

**B**

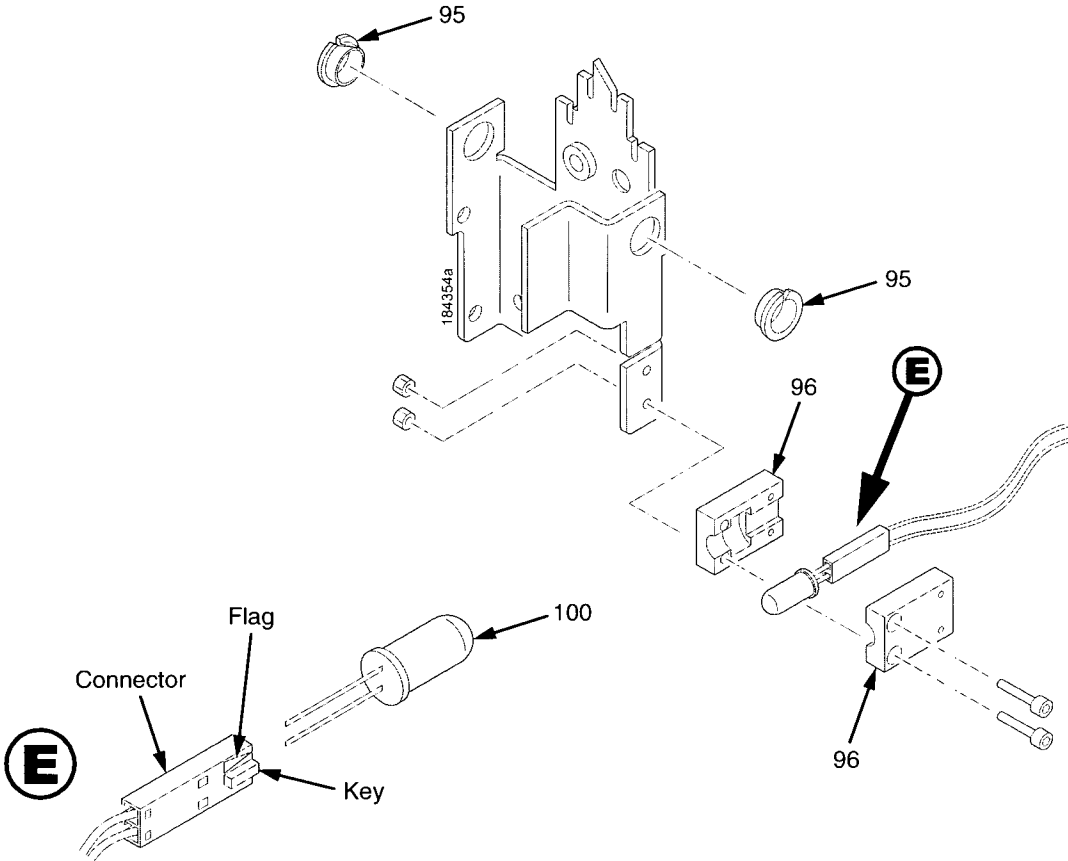
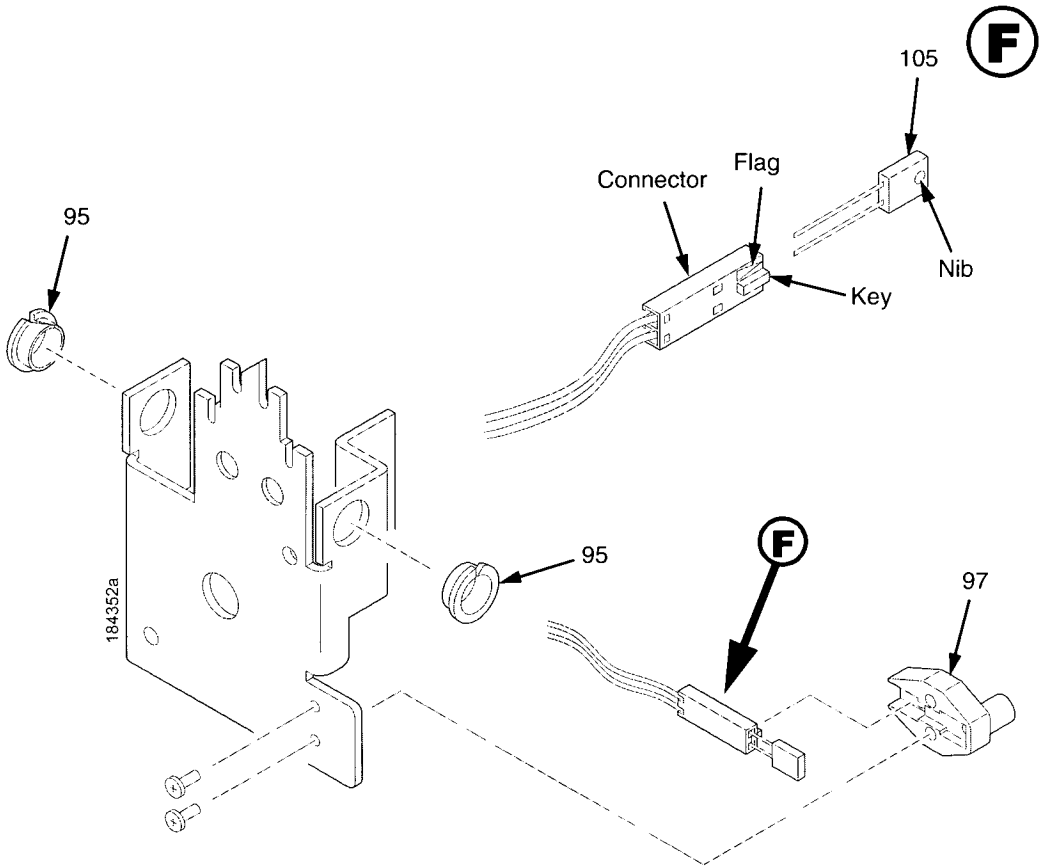


Figure 108. Stacker Detail: Motor Bracket

| Item No. | Part No.<br>(RoHS<br>Compliant) | Description        | Notes            |
|----------|---------------------------------|--------------------|------------------|
| 95       | Ref                             | Clip-On Bearing    |                  |
| 96       | Ref                             | Holder, LED, Round | Part of item 1.  |
| 100      | Ref                             | LED, IR, T-1, 3/4  | Part of item 52. |

**C**

From page 417.



**Figure 109. Stacker Detail: Elevator Bracket**

| Item No. | Part No.<br>(RoHS Compliant) | Description                     | Notes            |
|----------|------------------------------|---------------------------------|------------------|
| 95       | Ref                          | Clip-On Bearing                 |                  |
| 97       | Ref                          | Holder, LED, Flat               | Part of item 1.  |
| 105      | Ref                          | Photodarlington, NPN, Rectifier | Part of item 52. |

From page 417.



Rotated 180 Degrees

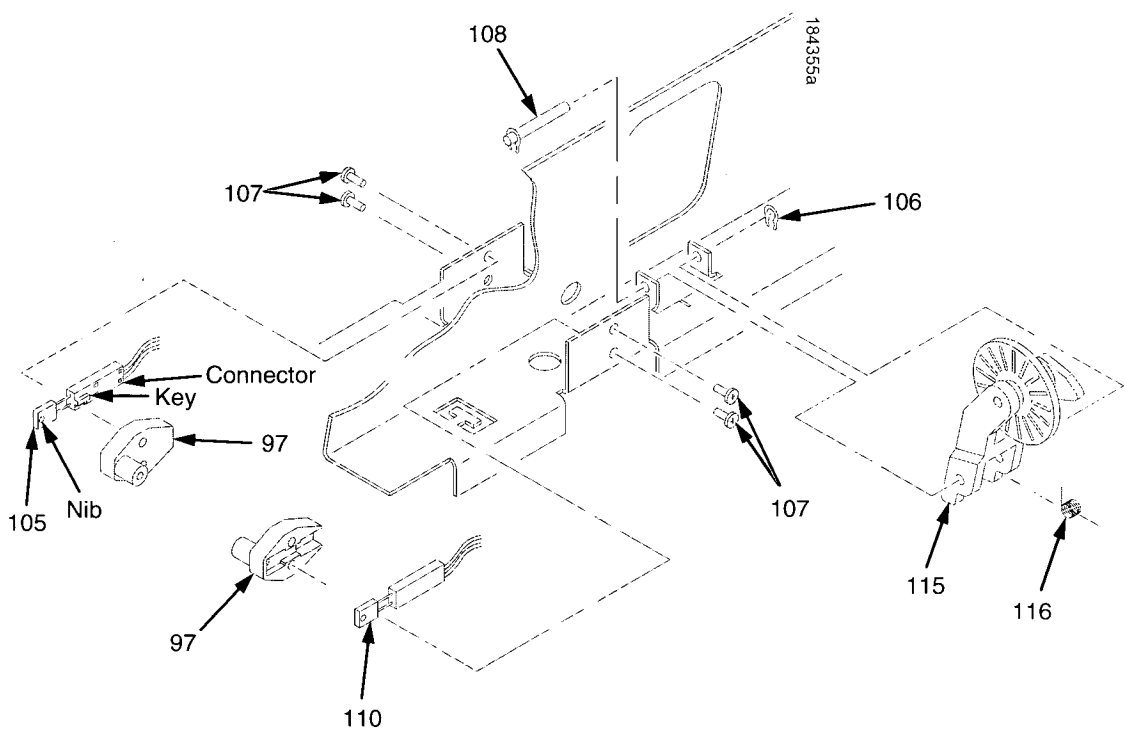


Figure 110. Stacker Detail: Paper Motion Detector



| Item No. | Part No. (RoHS Compliant) | Description                          | Notes                                      |
|----------|---------------------------|--------------------------------------|--------------------------------------------|
| 97       | Ref                       | Holder, LED, Flat                    | Part of item 1.                            |
| 105      | Ref                       | Photodarlington, NPN, Rectifier      | Part of item 52.                           |
| 106      | Ref                       | Retaining Ring, External, 0.093 inch | Part of item 115.                          |
| 107      | Ref                       | Screw, Panhead, Type B, 2 x 3/16     |                                            |
| 108      | Ref                       | Shaft, Paper Detector Switch, Long   | Part of item 115.                          |
| 110      | Ref                       | LED, IR, Rectangular                 | Part of item 52.                           |
| 115      | Ref                       | Wheel Assy, PMD                      | Paper Motion Detector.<br>Part of item 52. |
| 116      | Ref                       | Spring, Torsion                      | Part of item 115.                          |

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# E *Zero Tear Pedestal (ZTP)*

## *Printer*

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## Overview

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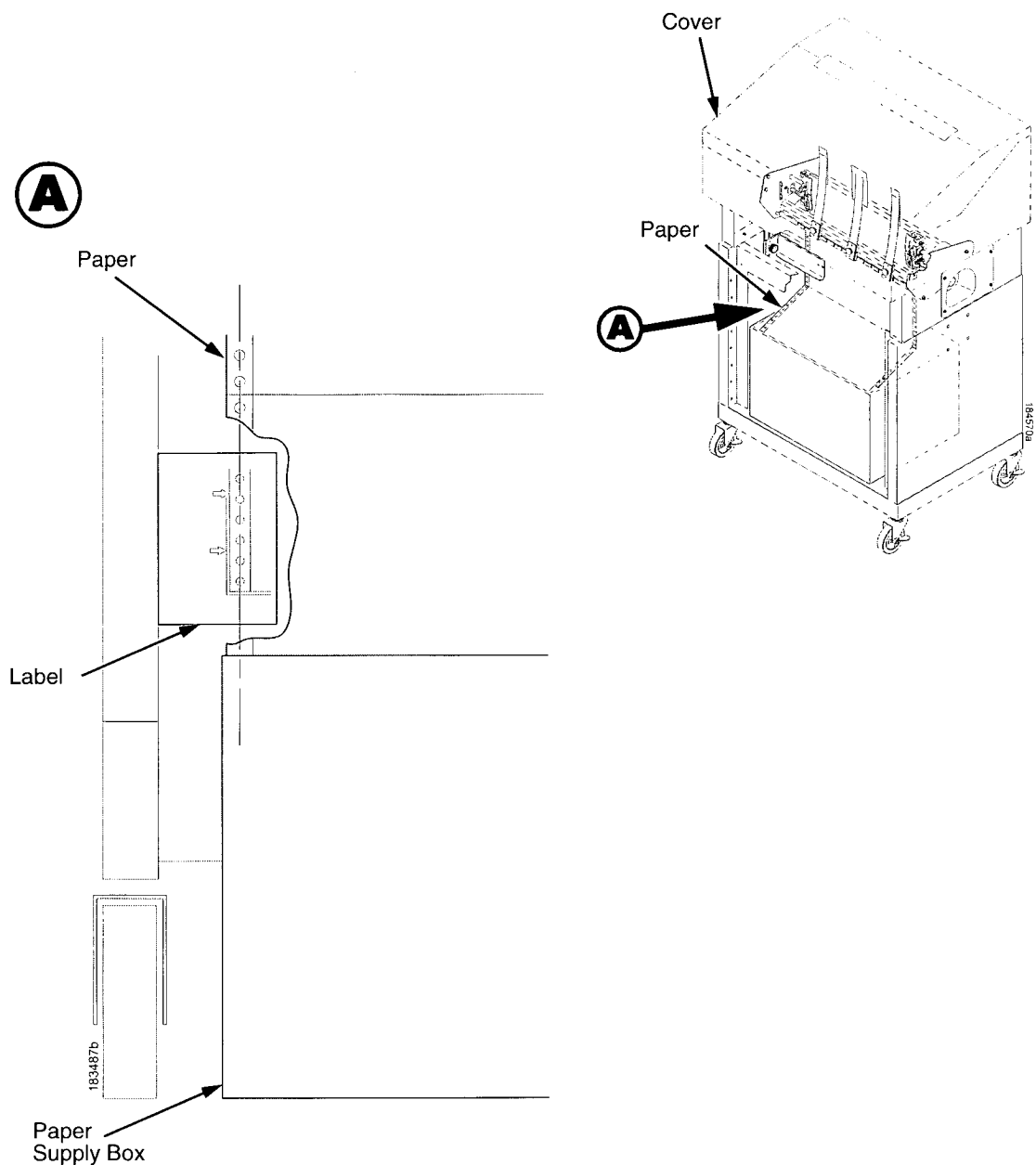
The P8000 Zero Tear Pedestal (ZTP) printer can print a form and present it for tear off without losing a form between print jobs. The printer automatically presents the current print line to the tear bar when it finishes printing and no data are being sent to the printer. When it receives more data from the host computer, the printer pulls the form down to the print station and resumes printing.

The ZTP printer is available as follows:

- ASCII – 500 and 1000 line per minute models
- H-Series – 300 and 600 line per minute models.

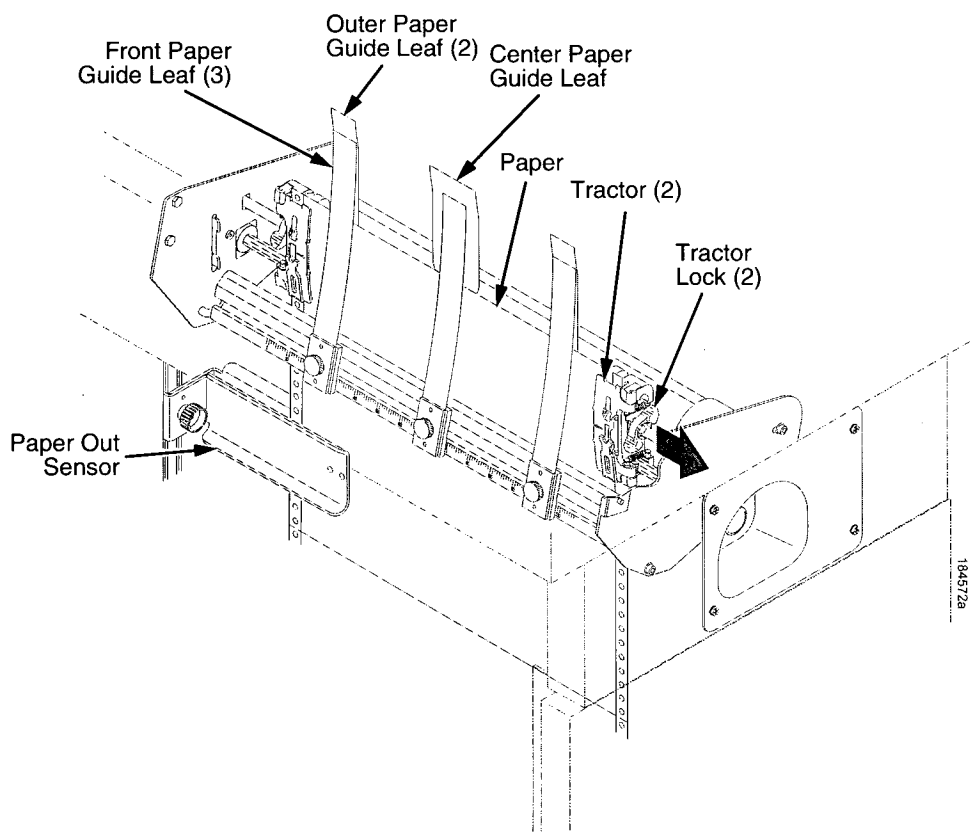
# Operation

## Load Paper and Set Up the Tractors



**Figure 111. Aligning and Loading Paper onto the Printer**

1. Remove the paper from the box and set it down on the lower shelf (See Figure 111.)
2. Open the printer cover.



**Figure 112. 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 112.)
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 112.)
7. Lock the tractors in position by pressing down on the tractor locks.

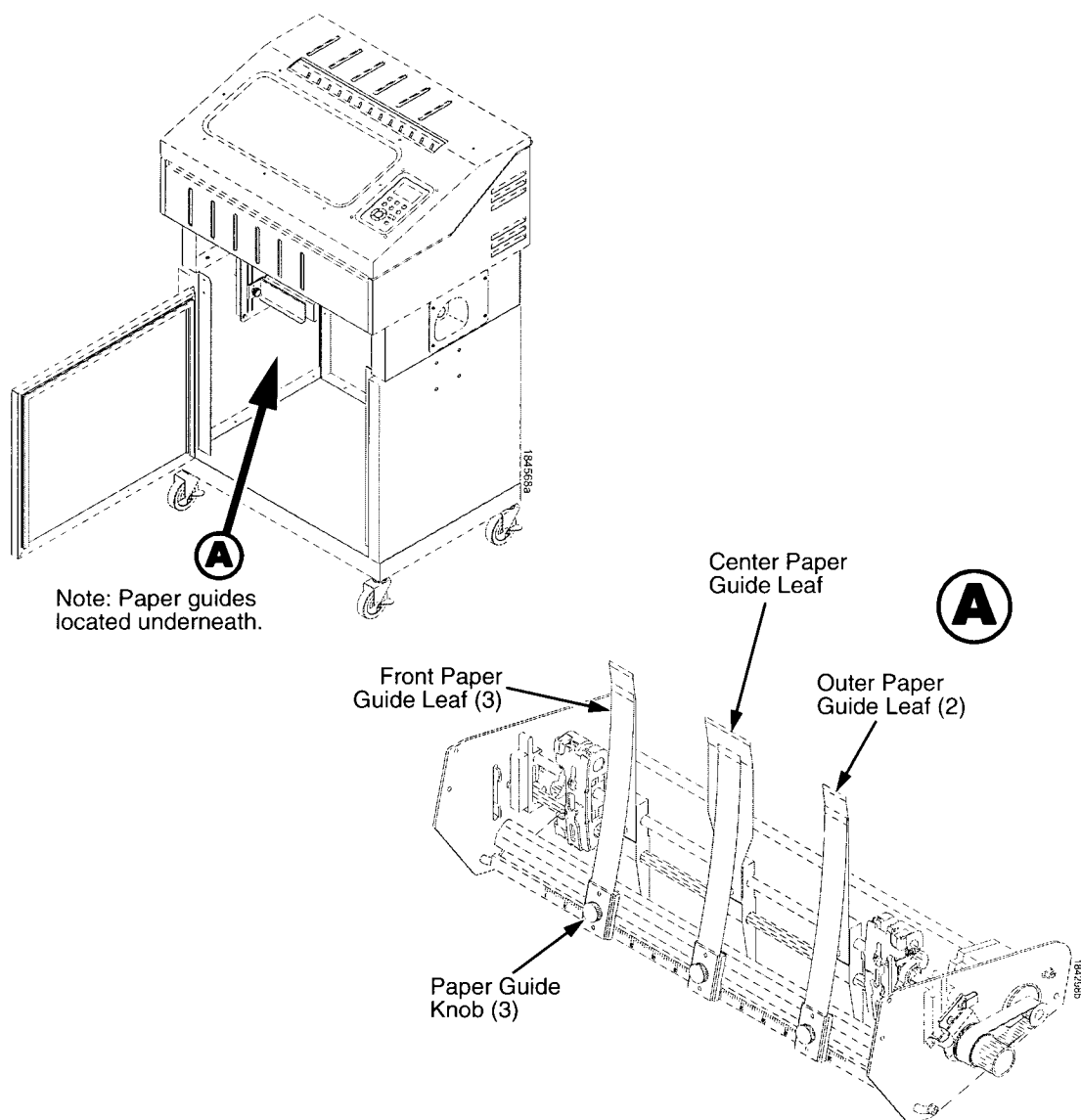
## Remove Paper

---

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



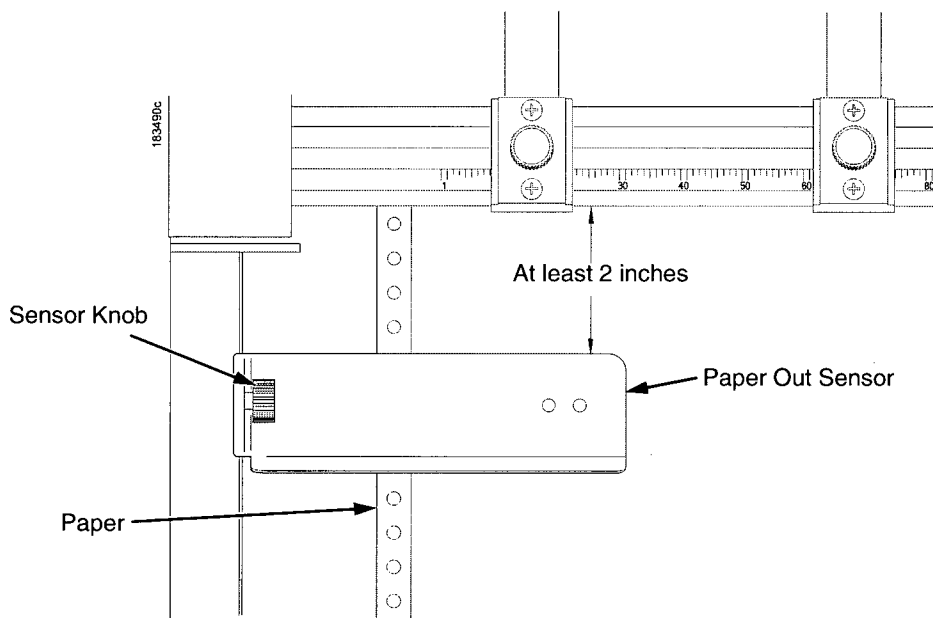
**Figure 113. Adjusting The Paper Guides**

**NOTE:** Ensure that the paper guide leaves are not damaged.

1. Turn the left paper guide knob to counterclockwise to loosen the guide. (See Figure 113.)
2. Slide both the front and rear left paper guides as close to the left tractor as possible.
3. Turn the guide knob on the front left paper guide clockwise to tighten the guide.
4. Similarly, position the right paper guides as close to the right tractor as possible.

- Using the paper scale as reference, position the middle paper guides in the center.
- Reload the paper without unlocking the tractors. (See page 427.)

## Position the Paper Out Sensor



**Figure 114. 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 112 and Figure 114). 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:

- Position the paper properly at the tear bar (page 432).
- Loosen the paper out sensor by turning the sensor knob counterclockwise.
- 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.**

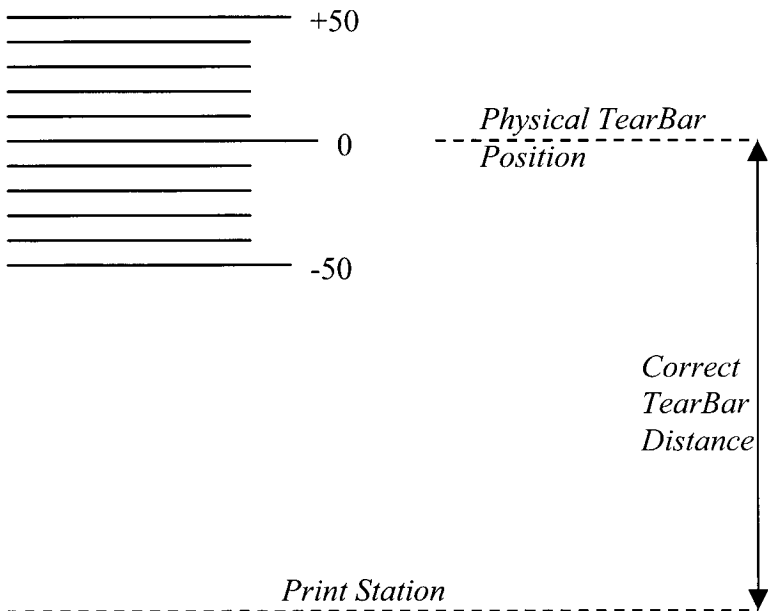
- Tighten the paper out sensor by turning the sensor knobs clockwise.
- Press **ONLINE**. When the first print job is sent to the printer, the paper is drawn into the printer, the top of form aligns with the print station, and the print job begins.

## 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 Menu mode.
3. Press the right arrow  $\triangleright$  until the PRINTER CONTROL icon is highlighted.
4. Press **ENTER** to go into PRINTER CONTROL.
5. Press the down arrow  $\nabla$  until "ZTP SETTINGS" is highlighted.
6. Press **ENTER** to go into the "ZTP SETTINGS" submenu.
7. Press the down arrow  $\nabla$  until "ZTP TearDistance" is highlighted.
8. Press the left arrow  $\triangleleft$  or right arrow  $\triangleright$  to decrease or increase the tear bar distance in increments of 1/144th of an inch.
9. 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 115.

**NOTE:** The Tear Distance value must be changed to print the scale.



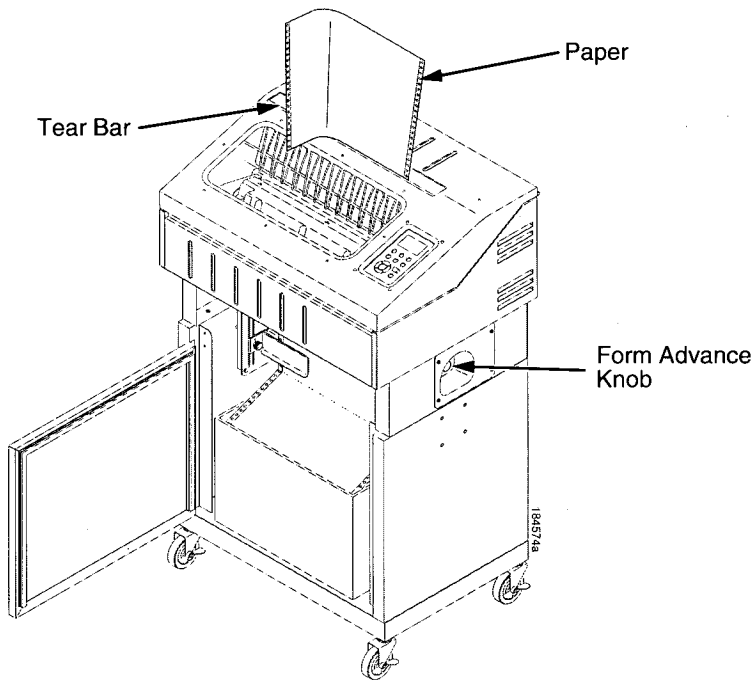
**Figure 115. Correct Tear Bar Distance**

**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.

10. Reset the top of form using the procedure on page 432.



## Set the Top Of Form



**Figure 116. 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 **TOF** button as follows:

1. Make sure the paper guides are adjusted correctly and the paper is properly loaded.
2. Press the **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 **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** 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 Pedestal (ZTP) printer, 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 Considerations

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 7, dot compression, line separation, and jamming 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 7 can have no more than one form per page horizontally.

Table 7. Forms Type

| Description                                                                                                  | Length         | Width<br>(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 | 3 to 12 inches | 7 to 12 inches          |

**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.

## Clearing Paper Jams or Removing Paper

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 427).

## Paper Jams During Reverse Feed

Certain heavy forms may catch on the paper ironer during reverse feed. If this occurs, removal of the paper ironer (page 240) may correct the problem.

## How to Set the ZTP Printer to Help Mitigate Paper Jams

Available settings in the printer's software can help mitigate or even resolve most Forms Jams that may be attributed to the types of forms used on the ZTP printer.

Some single-part forms that are light in weight such as 18 to 20 pounds or multi-part forms that have very thin plies (i.e. 3 to 4 mils) may have a tendency to not hold their stiffness during high-speed slews or while printing medium to high speed typefaces. Since the form is being pushed up into the print station rather than being pulled like in the standard pedestal printers, the form may tend to buckle or deform as it moves through the hammerbank and create a Forms Jam.

**NOTE:** Forms using high Cut-to-Tie Ratios that exceed 4:1 to allow easy perforation tear-off (i.e. check forms, invoices, etc.) may come apart during forms slews and high speed typefaces. The parameter changes listed below may help to avoid Forms Jams.

Try setting one or more of the following parameters to help mitigate Forms Jams when using lightweight stock or multi-part forms with thin plies:

- Under the Emulation menu -> Font Attributes, select Typeface NLQ.
- Under the Emulation menu -> Font Attributes, set Bold Print to Enable.
- Under the Advanced User or Quick Setup menu, set Slow Paper Slew to Enable.
- Under the Printer Control menu, set Unidirectional to Enable.

### IMPORTANT

**Setting any of the previous parameters may cause an overall slowdown in throughput and increased use of consumables. Set at your own discretion.**

For some heavy single-part forms and thick multi-part forms, the rigidity of the forms' construction and the use of thicker plies is usually accompanied by the use of lower Cut-to-Tie Ratios below 4:1 on the primary horizontal perforation to keep the form together and not pull apart.

This primary horizontal perforation is usually where the form is at its thickest point up to .025" max.

On occasion, the forms' perforation may not allow itself to be compressed between the printers' paper ironer and platen, and may cause itself to jam inbetween during forward motion. This usually occurs at the forms outward perforation as it travels upward through the print station.

**NOTE:** Some heavy label stock can also cause jamming in the platen area especially if the label has thick adhesive that can get squeezed out or multi-part forms that are using attachment methods that may include gluing, crimps or staples.

To prevent jamming at the perforation, under the Printer Control or Quick Setup menu, set Open Platen @ BOF (Bottom of Form).

## Removing the Paper Ironer

---

If setting Open Platen @ BOF fails to resolve the Forms Jams for the heavy forms and label stocks AND only these forms are going to be used on this printer (no lightweight form or label stock), the Paper Ironer could be removed to allow the form to travel unabated through the paper throat avoiding the possibility of forms jams. Refer to page 240 on removing the paper ironer.

### WARNING

**DO NOT use lightweight form or label stock on a printer with its ironer removed. The shuttle will move the form laterally while printing and will result in poor print quality.**

---

# 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 ..... | page 438 |
| Returning the Printer to Normal Operation.....  | page 438 |
| Barrier Panel .....                             | page 439 |
| Belt, Paper Feed Timing, Adjustment .....       | page 440 |
| Paper Guide Leaf, Front, Center, Outer .....    | page 442 |
| Paper Out Sensor, Adjustment .....              | page 442 |
| Paper Tension, Horizontal.....                  | page 442 |

## **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 hammerbank—it is not field repairable and you must replace the entire shuttle frame assembly. Hammerspring 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**

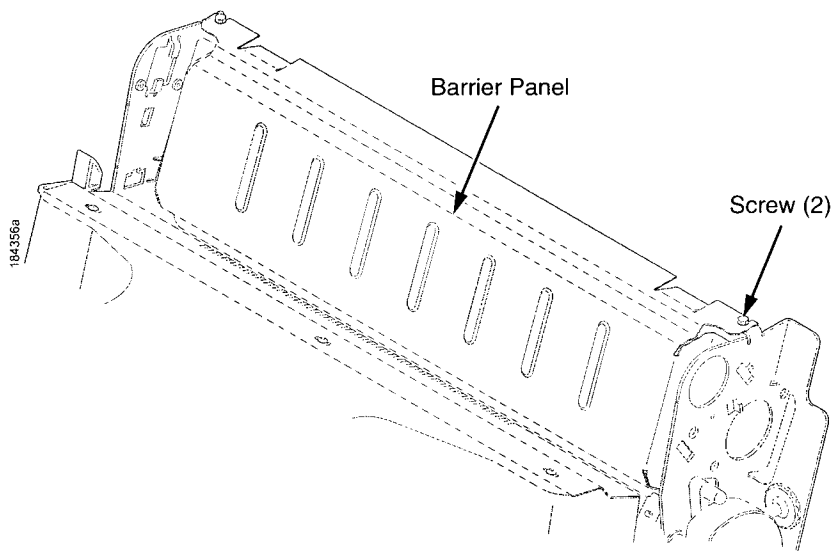
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When you have finished servicing the printer, return it to service by doing the following steps:

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 I (on).
6. Test printer operation by selecting and running one of the operator print tests. (See page 155.)
7. Select the emulation. (Refer to the *User's Manual*.)
8. Set the top-of-form. (Refer to the *User's Manual*.)

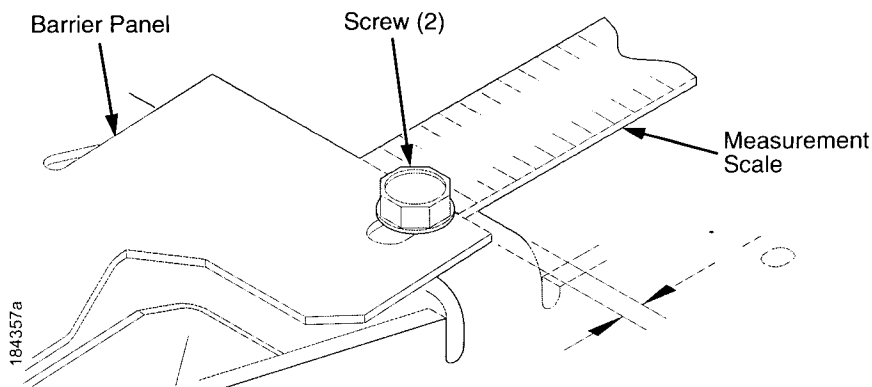
# Barrier Panel

1. Prepare the printer for maintenance (page 438).
2. Loosen (do not remove) the two #2 Phillips hold-down screws on the rear of the printer. (See page 458, item 4.)
3. Loosen the screws in the top corners of the barrier panel. (See Figure 117.)



**Figure 117. The Barrier Panel**

4. 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 118.)
5. Tighten the screw.



**Figure 118. Using a Scale to Adjust the Barrier Panel**

6. Return the printer to normal operation (page 438).



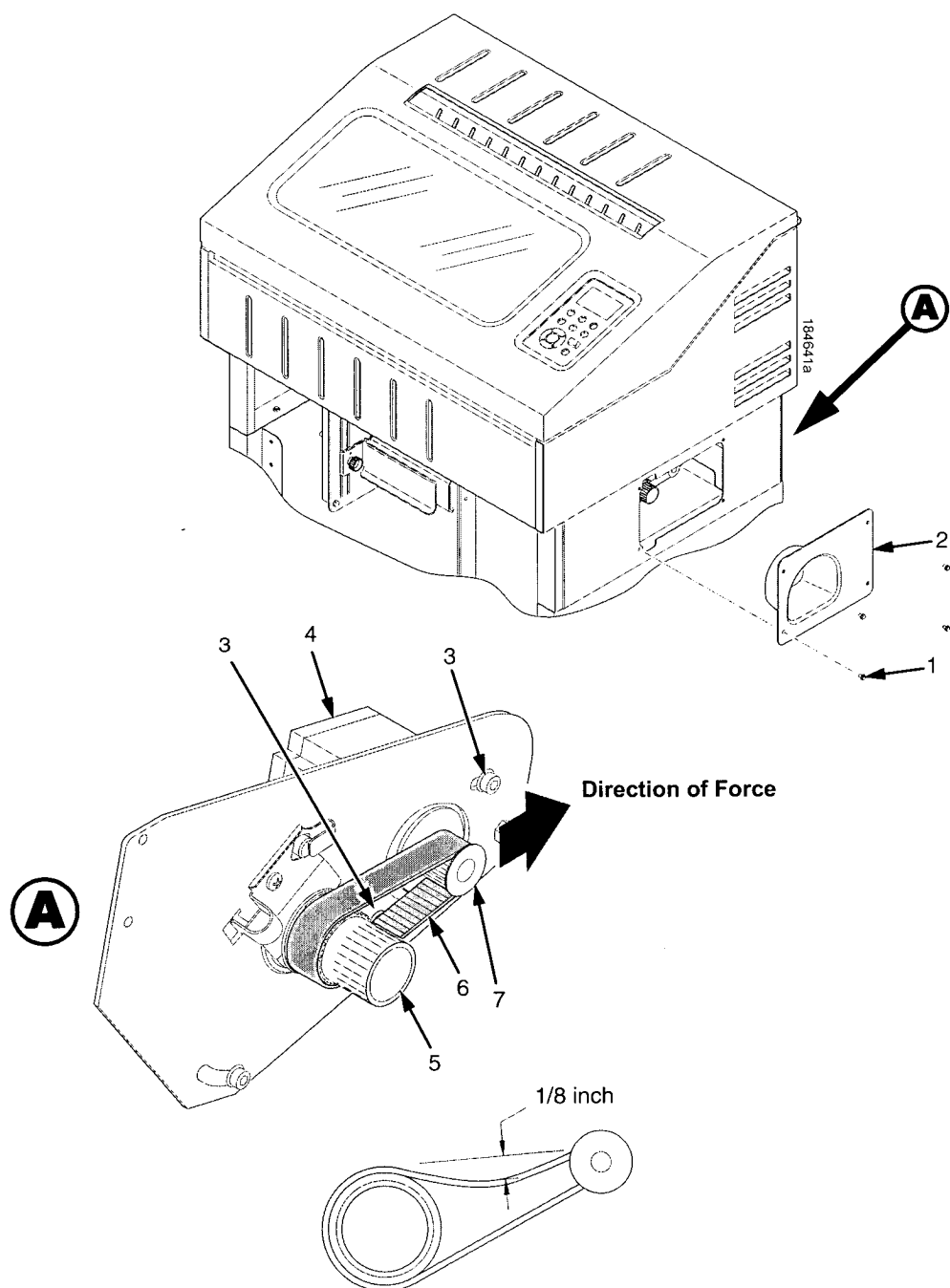
### Belt, Paper Feed Timing, Adjustment

---

1. Prepare the printer for maintenance (page 438).
2. Remove the hex screws and right cover plate. (See page 441, items 1 and 2.)
3. Loosen (do not remove) the two 5/16 inch motor mount bolts (item 3).
4. 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.
5. 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.

6. Install the hex screws and right cover plate. (See page 441, items 1 and 2.)
7. Return the printer to normal operation (page 438).



**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 119. Paper Feed Timing Belt Adjustment**

### Paper Guide Leaf, Front, Center, Outer

---

1. Prepare the printer for maintenance (page 438).
2. Adjust the paper guides. (See page 429.)

### Paper Out Sensor, Adjustment

---

1. Prepare the printer for maintenance (page 438).
2. Adjust the paper out sensor. (See page 430.)

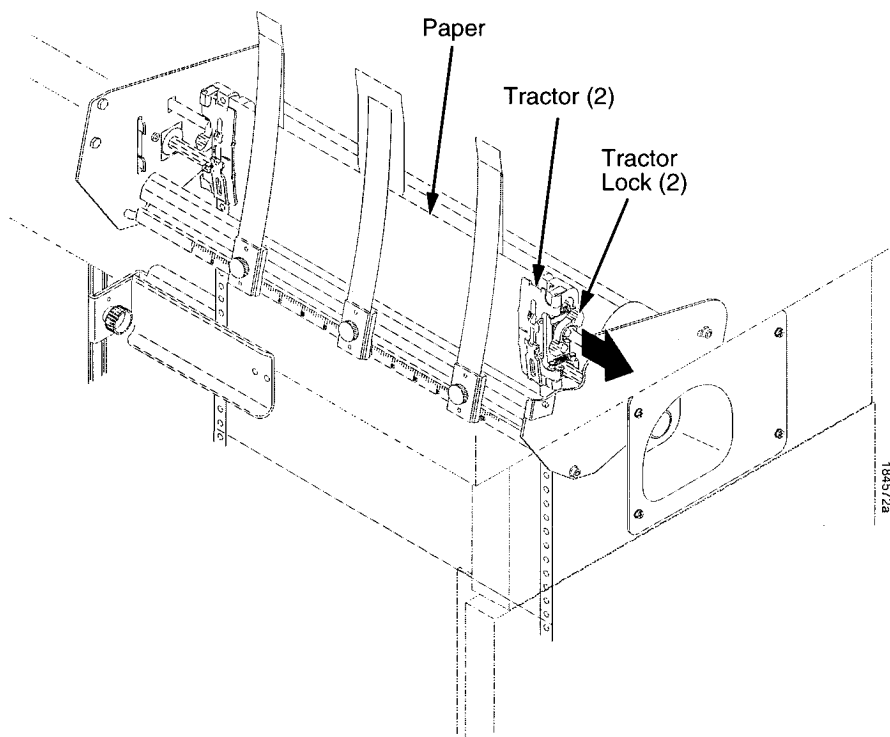
### Paper Tension, Horizontal

---

1. Prepare the printer for maintenance (page 438).
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 120. 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 hammerbank: it is not field repairable so you must replace the entire shuttle assembly. Hammerspring assemblies, the hammerbank cover, and the ribbon mask are the only replaceable components of the shuttle frame assembly.

## List of Removal / Installation Procedures

---

|                                     |          |
|-------------------------------------|----------|
| Belt, Paper Feed Timing .....       | page 444 |
| Control Panel Assembly .....        | page 445 |
| Paper Feed Motor .....              | page 446 |
| Paper Guide Leaf, Center .....      | page 447 |
| Paper Guide Leaf, Front.....        | page 447 |
| Paper Guide Leaf, Outer .....       | page 447 |
| Paper Out Sensor, Adjustment .....  | page 442 |
| Shaft, Splined.....                 | page 450 |
| Shaft, Support .....                | page 453 |
| Tractor (L/R).....                  | page 454 |
| Tractor Assembly Support Gate ..... | page 454 |

### Belt, Paper Feed Timing

---

#### Removal

1. Prepare the printer for maintenance (page 438).
2. Remove the hex screws and right cover plate. (See page 441, items 1 and 2.)
3. Loosen (do not remove) the two 5/16 inch paper feed motor mount screws. (See page 441, item 3.)
4. Roll the paper feed timing belt off the paper feed motor pulley and splined shaft pulley. (See page 441, items 5, 6, and 7.)

#### Installation

1. Roll the paper feed timing belt onto the splined shaft pulley and the motor pulley. (See page 441, 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 441, 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 441, items 1 and 2.)
5. Return the printer to normal operation (page 438).

---

## Control Panel Assembly

---

### Removal

1. Prepare the printer for maintenance (page 178).
2. Open the printer cover.
3. Remove the four screws securing the panel bracket to the printer cover. (See page 458, items 1, 2, and 3).
4. Remove the two screws securing the control panel to the panel bracket.
5. Remove the control panel cable from underneath the cable clamp.
6. Disconnect the ribbon cable connector P310 from the J310 on the back of the control panel assembly. (See page 458, item 5).
7. 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.
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 P310 to J310 on the back of the control panel.
4. Secure the control panel cable underneath the cable clamp.
5. Install the four screws securing the panel bracket to the printer. (See page 458, items 1, 2, and 3).
6. Return the printer to normal operation (page 179).

### Paper Feed Motor

---

#### Removal

1. Prepare the printer for maintenance (page 438).
2. Remove the electronics barrier panel. (See page 235.)
3. Remove the paper feed timing belt. (See page 444.)
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. Remove connector P103 from J103. (See page 322 and page 332).
6. Remove the motor mount screws.
7. Remove the paper feed motor assembly. (See page 466, 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 466, items 5 and 6.)
2. Connect P103 to J103 on the controller board. (See page 322 and page 332).)
3. Install the paper feed timing belt. (See page 444.)
4. Install the electronics barrier panel. (See page 235.)
5. Return the printer to normal operation. (See page 438.)

---

## Paper Guide Leaf, Center

---

### Removal

1. Prepare the printer for maintenance (page 438).
2. Remove the center paper guide knob and center paper guide leaf. (See page 451, Figure 123.)
3. Remove the top button head screw, bottom flat head screw, and center guide leaf. (See page 451, Figure 123.)

### Installation

1. Reverse step 2 and step 3 of the removal procedure above.
2. Return the printer to normal operation (page 438).

---

## Paper Guide Leaf, Front

---

### Removal

1. Prepare the printer for maintenance (page 438).
2. Remove the left paper guide knob and the left, front paper guide leaf. (See page 451, Figure 123.)
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 438).

---

## Paper Guide Leaf, Outer

---

### Removal

1. Prepare the printer for maintenance (page 438).
2. Remove the left paper guide knob and the left, front paper guide leaf. (See page 451, Figure 123.)
3. Remove the top button head screw, bottom flat head screw, and left outer guide leaf. (See page 451, Figure 123.)
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 438).



Paper Out Sensor

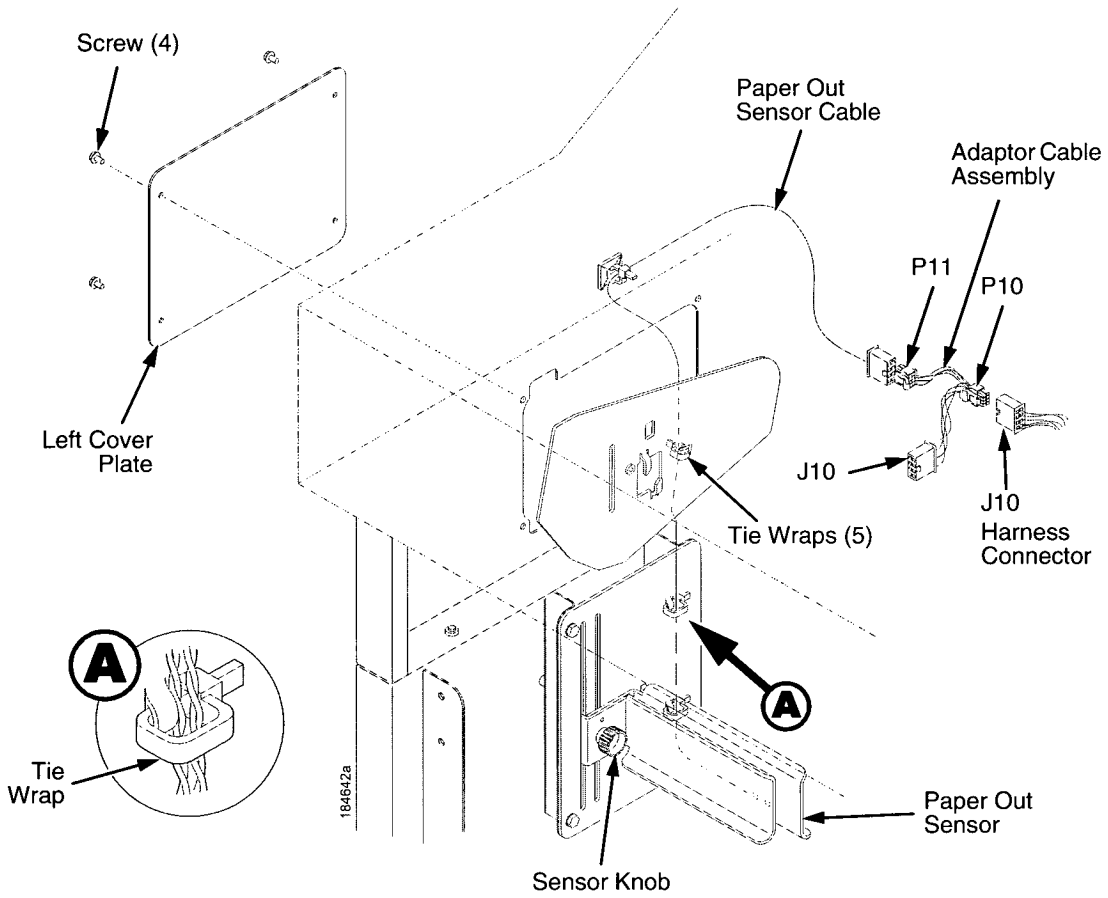


Figure 121. Replacing the Paper Out Sensor Assembly

Removal

1. Prepare the printer for maintenance (page 438).
2. Remove the screw and left cover plate. (See Figure 121.)
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 adaptor cable assembly (256480-001) located at the back of the Mech Assy.
5. Disconnect connector J11 from P11.
6. Remove the sensor knob, paper out sensor, and paper out sensor cable.

---

## Installation

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 121 on page 448.)
3. Connect J11 to P11 and install tie-wraps to secure the sensor 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 121, detail B on page 448.

5. Install the screws and left cover plate.
6. Position the paper out sensor. (See page 430.)
7. Return the printer to normal operation (page 438).

Shaft, Splined

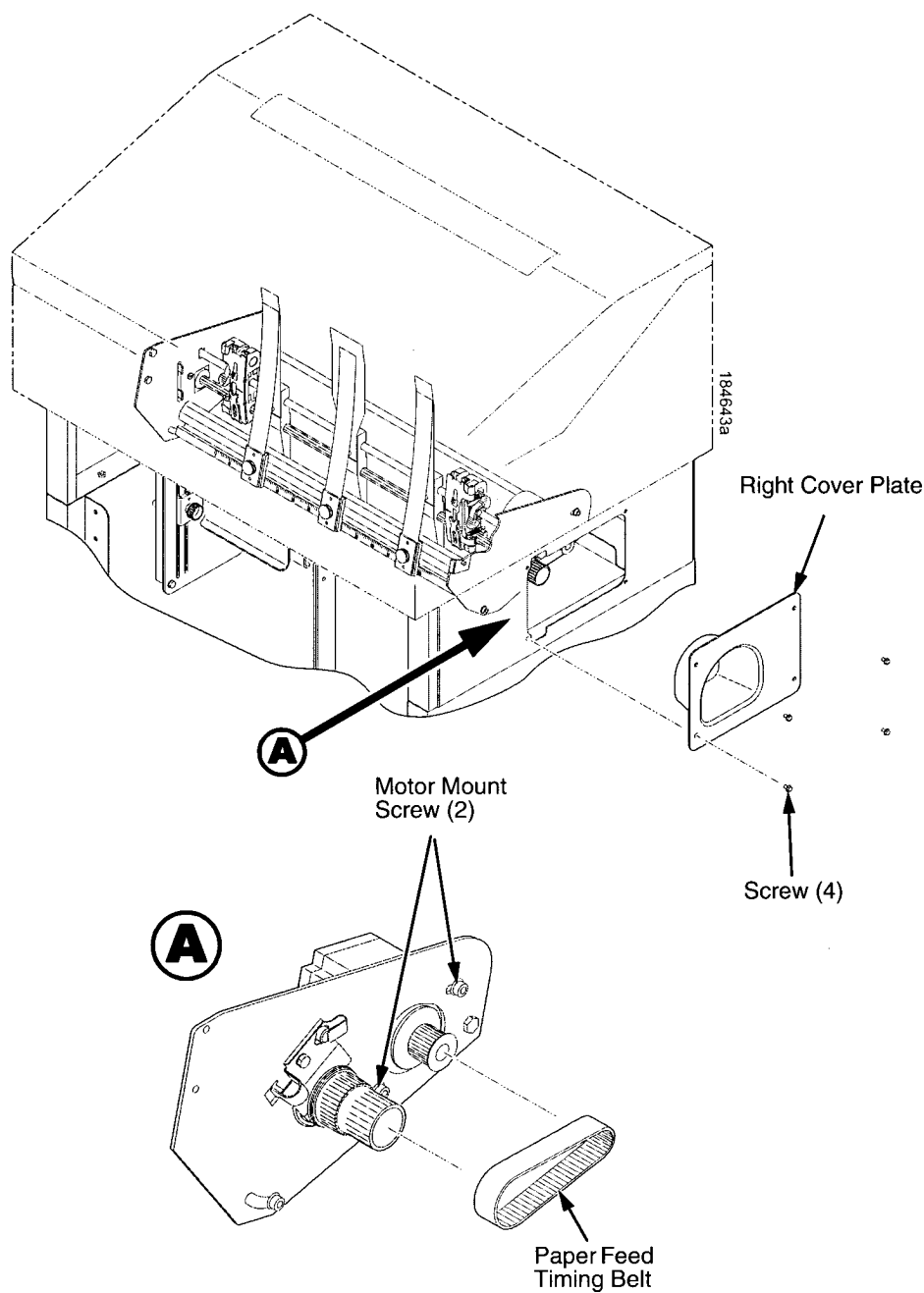
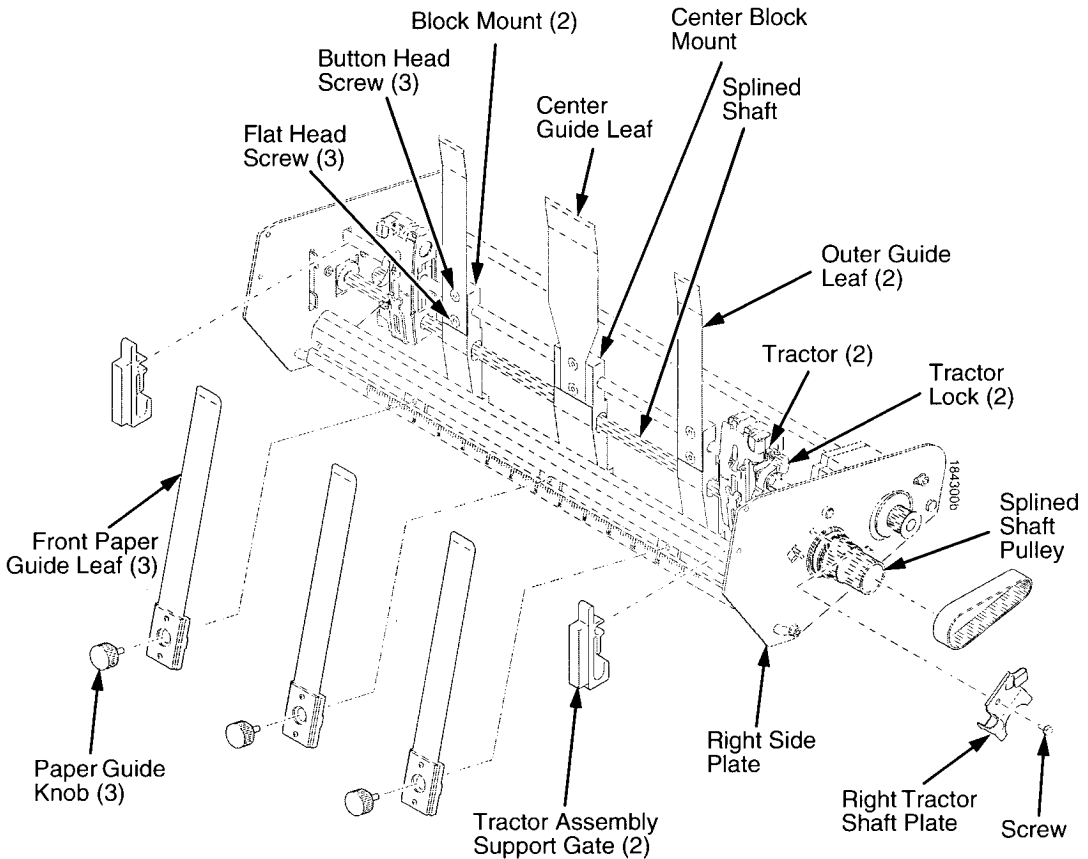


Figure 122. Removing the Right Cover Plate

## Removal

1. Prepare the printer for maintenance (page 438).
2. Remove the hex screws and right cover plate. (See Figure 122.)
3. Loosen (do not remove) the two 5/16 inch paper feed motor mount screws.
4. Remove the paper feed timing belt.

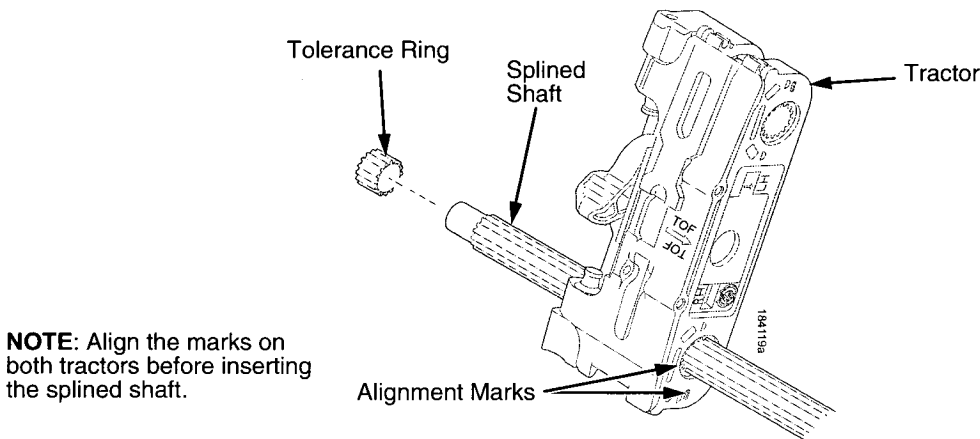


**Figure 123. Removing the Paper Leaf Guides and Tractor Assembly Support Gates**

5. Remove the paper guide knobs and front paper guides leaves. (See Figure 123.)
6. Remove the tractor assembly support gates. (See page 454.)
7. Remove the screw securing the right tractor shaft plate and the tractor shaft plate. (See Figure 123.)
8. 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 466, items 9, 10, 15, and 17).
9. Grasp the splined shaft pulley and slide the splined shaft to the right, out of the tractors and right side plate. (See Figure 123.)

### Installation

1. Position the splined shaft so the alignment marks are at the bottom on both tractors. (See Figure 124.)
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 124.)
3. Install the tolerance ring on the left end of the splined shaft. (See Figure 124.)
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 466, 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 466, 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” behind 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 454.)
7. Install the paper guide knobs and front paper guide leaves. (See page 451, Figure 123.)
8. Install the paper feed timing belt (page 444).
9. Set the paper feed timing belt tension (page 440).
10. Install right cover plate. (See page 450, Figure 122.)
11. Return the printer to normal operation (page 438).



**Figure 124. Splined Shaft and Tractor Installation**

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## Shaft, Support

---

### Removal

1. Prepare the printer for maintenance (page 438).
2. Remove the hex screws and right cover plate. (See page 462, items 24 and 25.)
3. Unlock the tractors and slide them to the far right. (See page 466, item 1.)
4. Remove the paper guide knob from the center leaf paper guide. (See page 466, item 14.)
5. Remove the tractor assembly supports from the splined shaft and support shaft. (See page 454.)
6. Remove the screw securing the right tractor shaft plate and remove the plate. (See page 466, 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 466, 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 466, 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 466, items 2, 17, and 27.)
3. Install the right tractor shaft plate and screw (page 466, 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” behind 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 454.)
5. Install the hex screws and right cover plate. (See page 462, items 24 and 25.)
6. Return the printer to normal operation (page 438).

## **Tractor (L/R)**

---

### **Removal**

1. Prepare the printer for maintenance (page 438).
2. Remove the support shaft (page 453).
3. Remove the splined shaft (page 450).

### **Installation**

1. Using the replacement tractors, install the support shaft (page 453).
2. Install the splined shaft (page 450).
3. Return the printer to normal operation (page 438).

## **Tractor Assembly Support Gate**

---

### **Removal**

1. Prepare the printer for maintenance. (See page 438.)
2. Close the tractor doors. (See page 455.)
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 455, Figure 125.)
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 455.)
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 455.)
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 438).

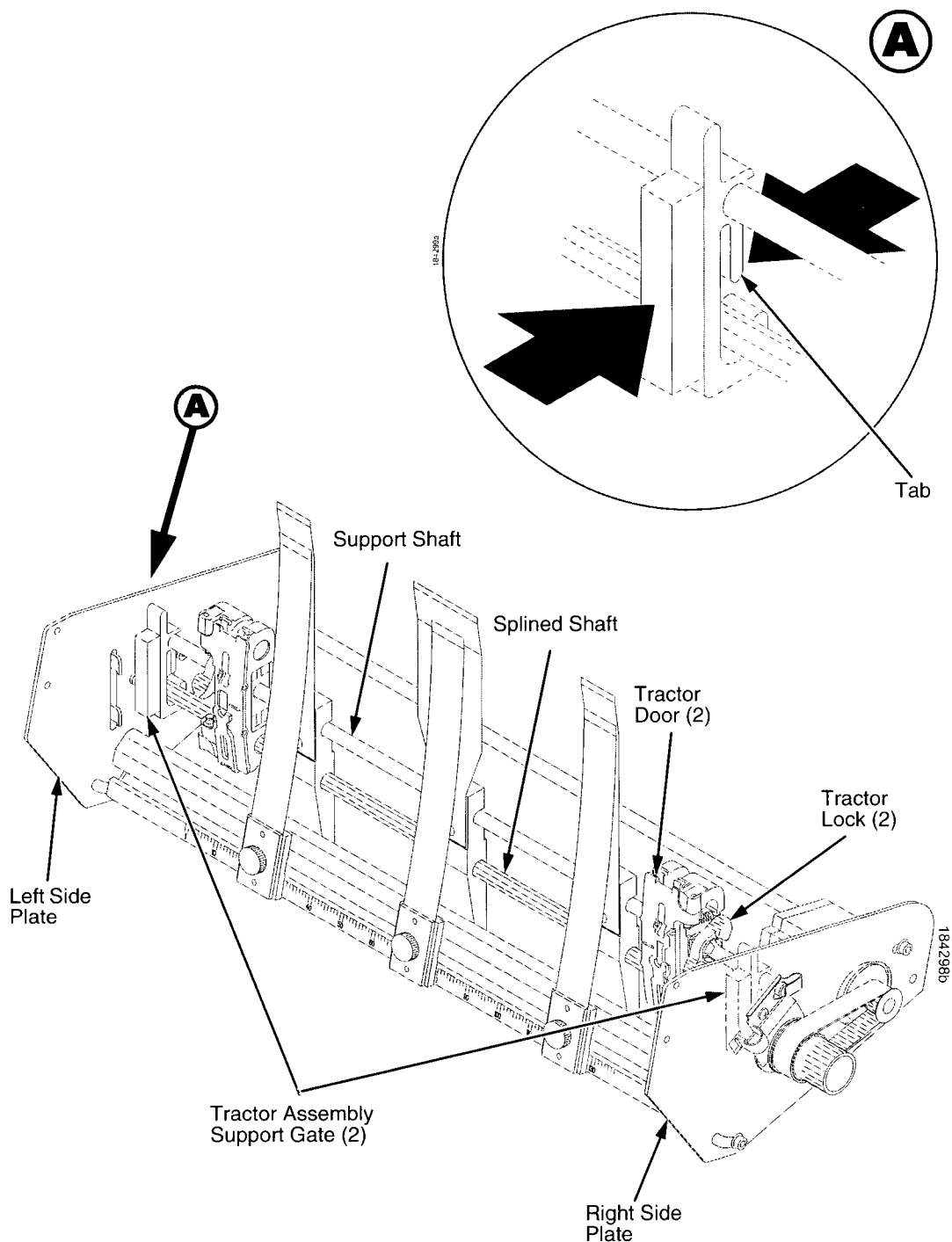


Figure 125. Removing and Installing the Tractor Assembly Support Gate



# Illustrated Parts Lists

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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

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Figure 126. ZTP Details ..... page 458  
Figure 127. ZTP Inside Covers, Barrier Shield, and Shuttle Assy .. page 460  
Figure 128. ZTP Circuit Boards and Paper Feed Assembly ..... page 462  
Figure 129. ZTP Tractor Shafts and Paper Feed Motor..... page 466  
Figure 130. ZTP Platen and Integrated Print Mgmt Sensor Assy ... page 468  
Figure 131. ZTP Hammerbank Fan, and Motors ..... page 470

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(Parts list continue on the next page.)

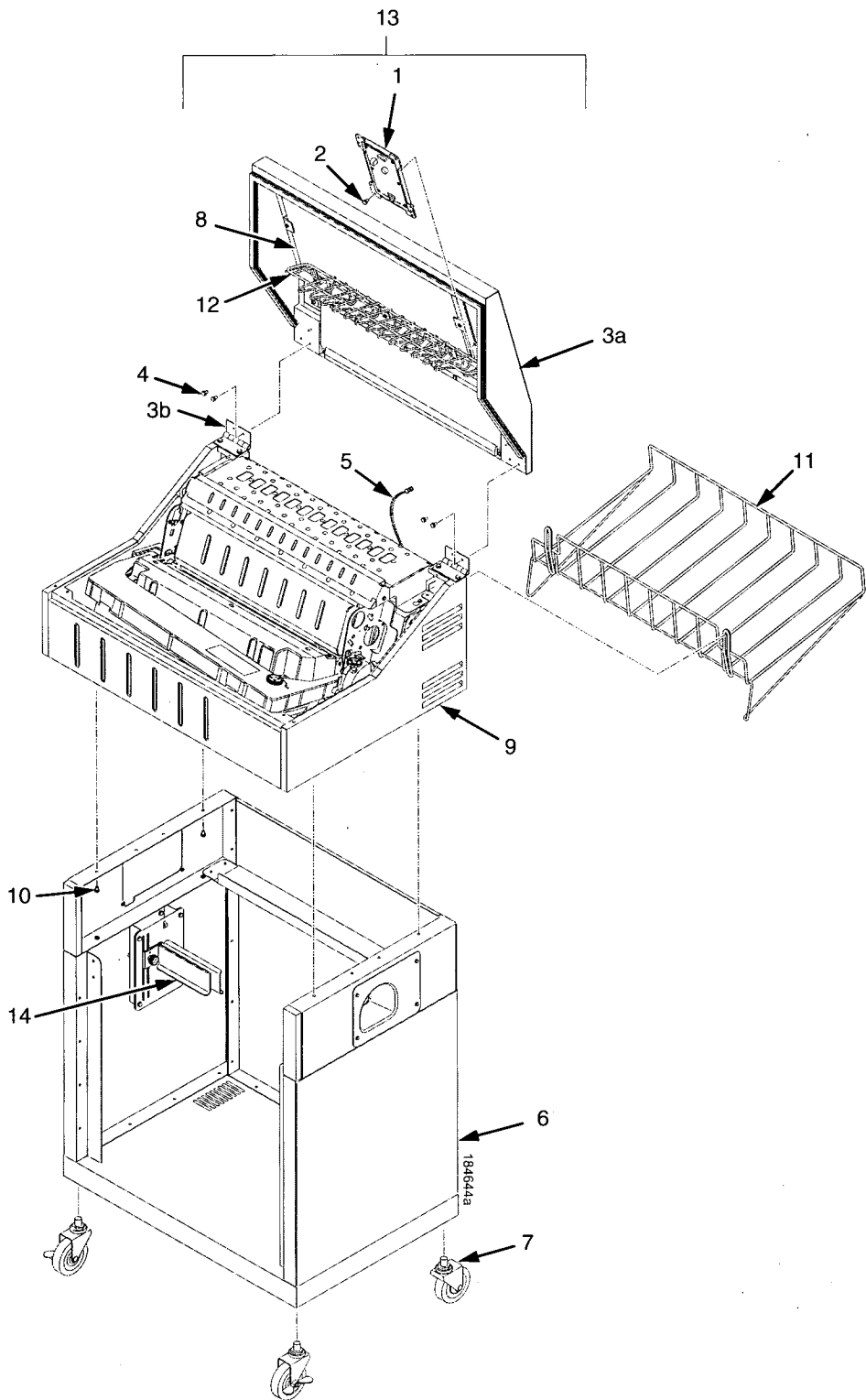


Figure 126. ZTP Details

| Item No. | Part No.<br>(RoHS Compliant) | Description                                                              | Notes                                            |
|----------|------------------------------|--------------------------------------------------------------------------|--------------------------------------------------|
| 1        | 257655-001                   | Control Panel/Cable/Overlay, Pedestal Field Kit                          | Includes control panel, cable, and overlay.      |
| 2        | Ref                          | Screw, Captive (4)                                                       |                                                  |
| 3a       | 257360-001                   | Top Cover Assembly, ZTP, P8                                              |                                                  |
| 3b       | 257662-001                   | Field Kit, Lid, Hinge/Springs                                            | Includes two hinges and dashpot.                 |
| 4        | Ref                          | Screw, 6-32X1/4, HWHS, STM/ZNB, AE B18.6.3                               |                                                  |
| 5        | Ref                          | Cable Assembly, Control Panel                                            | Part of item 1.                                  |
| 6        | 257346-001<br>257495-001     | Stand Assembly, Enclosed Ped, ZTP<br>Packaged Pedestal Assembly, ZTP, P8 |                                                  |
| 7        | 179162-001                   | Field Kit, Caster Kit, Ped                                               | Includes two with brakes and two without brakes. |
| 8        | Ref                          | Window, Top Cover                                                        | Part of item 3, Top Cover Assy.                  |
| 9        | Ref                          | Ped Assy, ZTP, P8                                                        |                                                  |
| 10       | Ref                          | Screw, 6-32X1/4, PHCRI, STM/ZNB, AE B18.6.3                              |                                                  |
| 11       | 257504-001                   | Basket, ZTP, P8                                                          |                                                  |
| 12       | 257364-001                   | Fence, Paper Guide, ZTP, P8                                              |                                                  |
| 13       | 179972-901                   | Top Cover, Full Assy, P8, ZTP, Black                                     | Does not include control panel (item 1).         |
| 14       | 257378-001                   | Paperout Assembly, ZTP                                                   |                                                  |

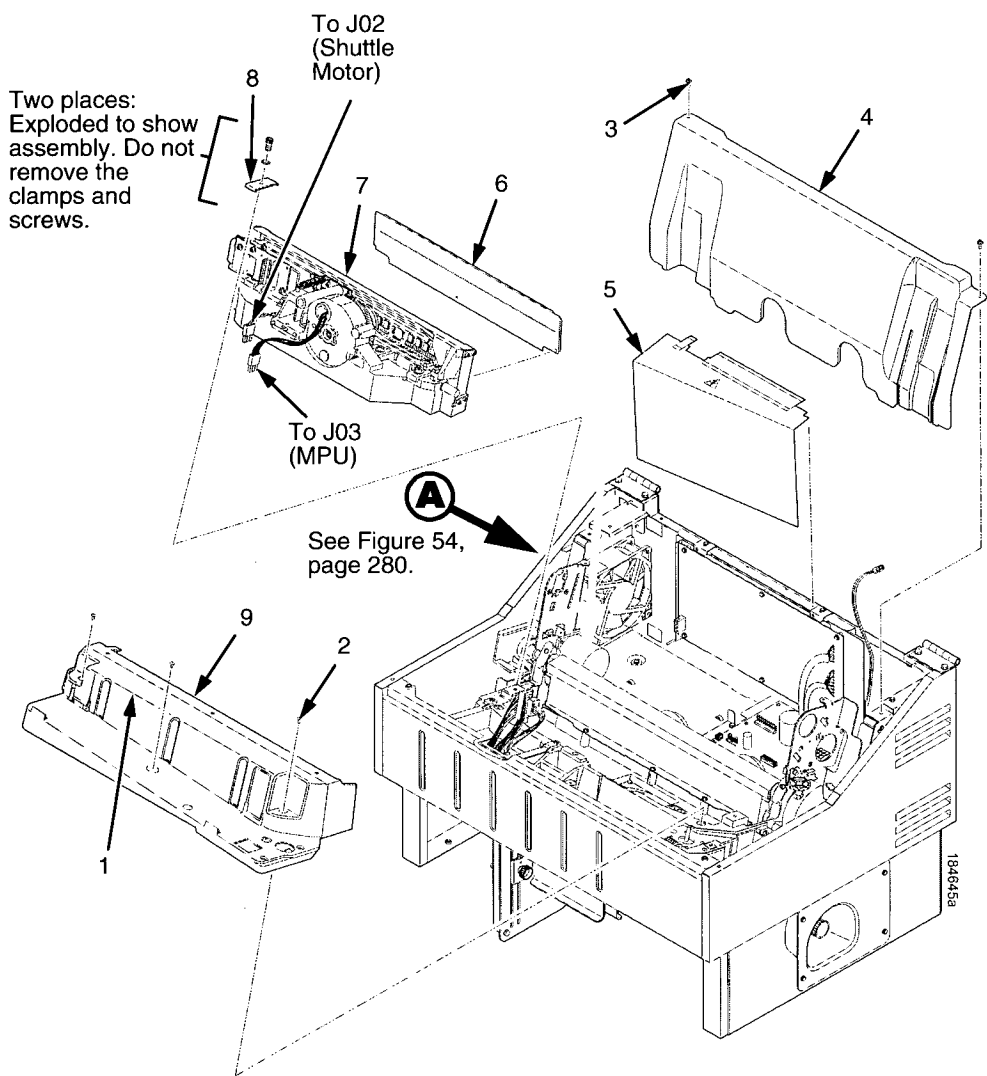


Figure 127. ZTP Inside Covers, Barrier Shield, and Shuttle Assembly

| Item No. | Part No.<br>(RoHS Compliant)                                       | Description                                                                                                             | Notes                                                  |
|----------|--------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|
| 1        | 256424-901                                                         | Shuttle Cover Assembly or Shroud Assembly                                                                               | Air Shroud Assembly. Includes item 9.                  |
| 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        | 257117-001                                                         | Panel, Cover, Electronics                                                                                               |                                                        |
| 5        | 257116-001                                                         | Power Supply Insulator                                                                                                  | Taped to card cage along upper edge.                   |
| 6        | 256590-901<br>256587-901                                           | HB Cover Assembly, 05<br>HB Cover Assembly, 10                                                                          | P8005ZT<br>P8010ZT                                     |
| 7        | 256799-901<br>256835-901<br>256837-901<br>256929-901<br>256930-901 | Shuttle Assembly, 05<br>Shuttle Assembly, 10<br>Shuttle Assembly, 03H<br>Shuttle Assembly, 06H<br>Shuttle Assembly, 08H | P8005ZT<br>P8010ZT<br>P8003HZT<br>P8006HZT<br>P8008HZT |
| 8        | 150399-901                                                         | Clamp, Shaft, Receiving                                                                                                 |                                                        |
| 9        | Ref                                                                | Paper Scale                                                                                                             | Includes item 1.                                       |

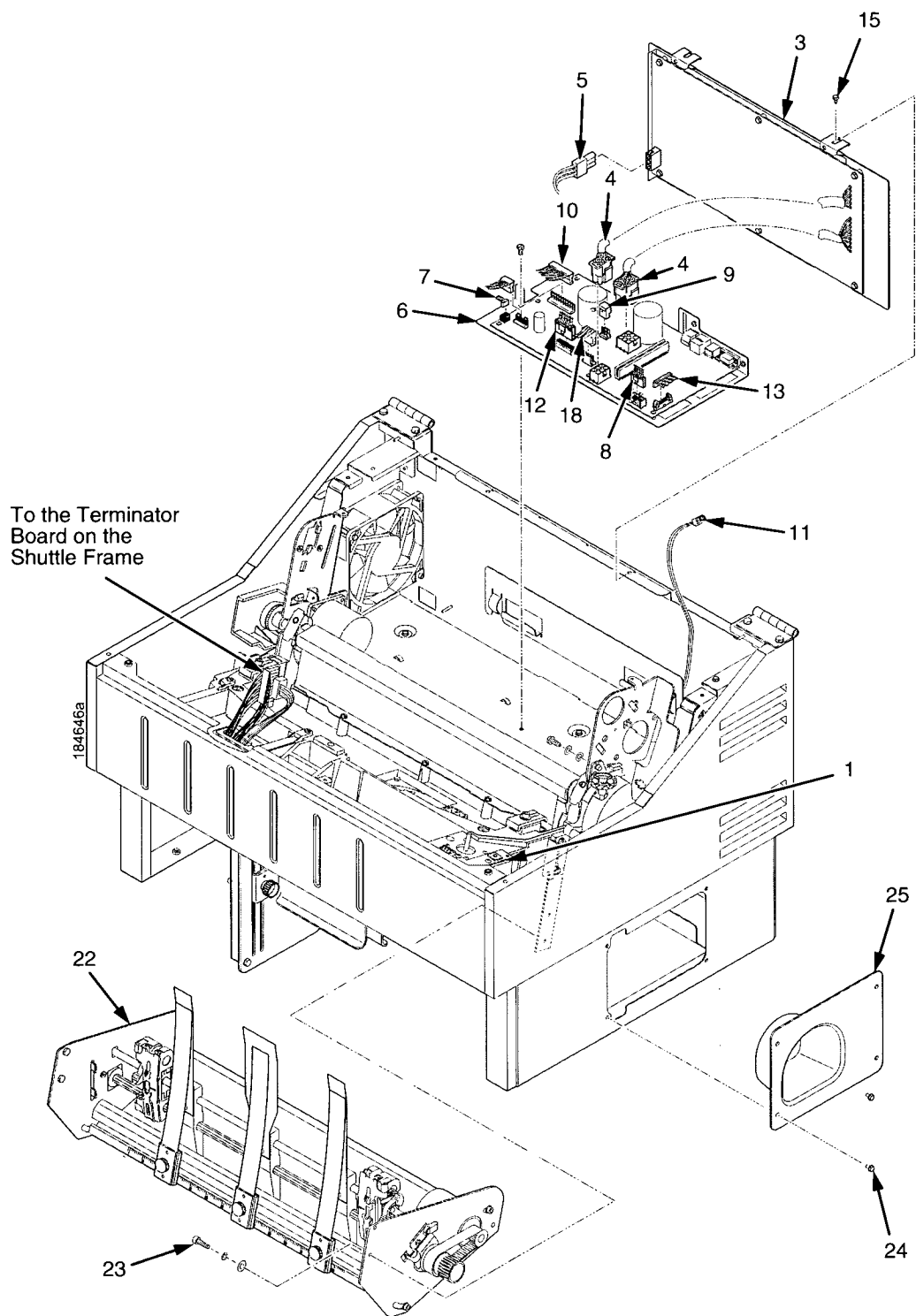


Figure 128. ZTP Circuit Boards and Paper Feed Assembly

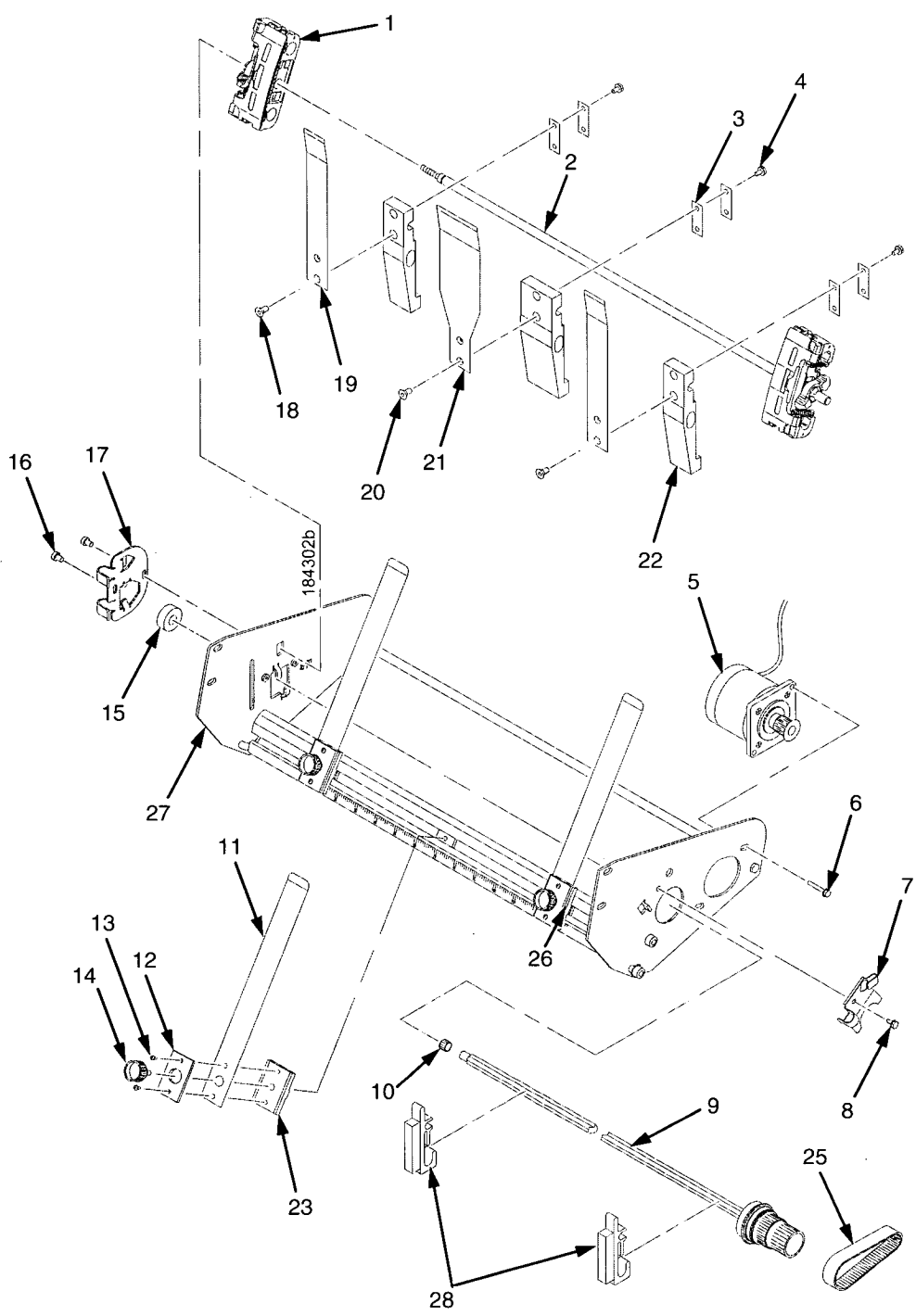
| Item No. | Part No.<br>(RoHS Compliant) | Description                                      | Notes                                                                                                                                                                                                       |
|----------|------------------------------|--------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1        | Ref                          | PCBA, Ribbon Motion Sensor (RMS)                 | Part of 257663-001, Field Kit, Ribbon Motion/Weld Sensor.                                                                                                                                                   |
| 2        | Not Used                     |                                                  |                                                                                                                                                                                                             |
| 3        | 256227-901<br>256279-901     | Power Supply, LM, LS<br>Power Supply, LM, HS     | 500, 1000, 03H<br>1500                                                                                                                                                                                      |
| 4        | Ref                          | P101A and P101B Cable Connectors                 | Part of item 3                                                                                                                                                                                              |
| 5        | Ref                          | Cable Assembly, AC-In, Power Supply              | Part of the following field kits:<br>257658-001, Field Kit, AC Pwr with cable, Cab.<br><br>257659-001, Field Kit, AC Pwr with cable, Ped.                                                                   |
| 6        | 256443-901<br>257114-901     | Controller Subassy, LS<br>Controller Subassy, HS | 500, 1000, 03H<br>1500, 2000, 06H, 08H                                                                                                                                                                      |
| 7        | Ref                          | CC/HB/EX Fan Cable Assembly                      | Part of 256757-901, Cable Assy, Motor Harness.                                                                                                                                                              |
| 8        | Ref                          | Hammerbank Logic Cable Assembly                  | Part of the following field kits:<br>257660-001, Field Kit, HB Cables, 5/10<br>257661-001, Field Kit, HB Cables, 15/20.                                                                                     |
| 9        | Ref                          | Shuttle Motor Cable Assembly                     | Part of 256757-001, Cable Assy, Motor Harness.                                                                                                                                                              |
| 10       | Ref                          | Hammerbank Power Cable Assembly                  | Used on all except 2000 lpm.<br>Printers using the High Speed controller use 257661-001, Field Kit, HB Cables, 15/20.<br>Printers with the low speed controller use 257660-001, Field Kit, HB Cables, 5/10. |
| 11       | Ref                          | Cable Assembly, Control Panel                    | Part of the following field kits:<br>257654-001, Field Kit, Control Panel/ Cable/Overlay, Cab.<br><br>257655-001, Field Kit, Control Panel/ Cable/Overlay, Ped.                                             |
| 12       | Ref                          | Sensor Cable Assembly                            | Part of 256758-901, Cable Assy, Sensor Harness.                                                                                                                                                             |
| 13       | Ref                          | Control Panel Cable Assembly                     | Part of the following field kits:<br>257654-001, Field Kit, Control Panel/ Cable/Overlay, Cab.<br><br>257655-001, Field Kit, Control Panel/ Cable/Overlay, Ped.                                             |
| 15       | Ref                          | Screw, Captive, Power Supply (2)                 |                                                                                                                                                                                                             |
| 16       | Not Used                     |                                                  |                                                                                                                                                                                                             |
| 17       | Not Used                     |                                                  |                                                                                                                                                                                                             |



| Item No. | Part No.<br>(RoHS<br>Compliant) | Description                                                               | Notes |
|----------|---------------------------------|---------------------------------------------------------------------------|-------|
| 18       | 257764-001<br>257763-001        | Motor, Paper Feed, Field Kit, 20<br>Motor, Paper Feed, Field Kit, 5/10/15 |       |
| 19       | Not Used                        |                                                                           |       |
| 20       | Not Used                        |                                                                           |       |
| 21       | Not Used                        |                                                                           |       |
| 22       | Ref                             | Paper Feed Assembly, ZTP                                                  |       |
| 23       | Ref                             | Screw w/Lociwasher and Flat Washer                                        |       |
| 24       | 202220-001                      | Screw, 6-32x1/4, HWHS, STM/ZNB,AE B18.6.3                                 |       |
| 25       | 257347-001                      | Cover, Tractor Knob, ZTP, P8                                              |       |

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(Parts list continue on the next page.)



**Figure 129. ZTP Tractor Shafts, Paper Guides, and Paper Feed Motor**

| Item No. | Part No.<br>(RoHS Compliant) | Description                                            | Notes                                       |
|----------|------------------------------|--------------------------------------------------------|---------------------------------------------|
| 1        | 179065-901                   | Tractor Set, Non-Roller, 05/10/15 (Blue)               |                                             |
| 2        | Ref                          | Shaft, Spacer, Tractor, ZTP                            | Part of item 24.                            |
| 3        | Ref                          | Pad, Nylon, Mount Block, ZTP                           | Part of item 24.                            |
| 4        | Ref                          | Screw, Button Head (3)                                 |                                             |
| 5        | 256323-901                   | Field Kit, Paper Feed Motor, V3                        |                                             |
| 6        | Ref                          | Screw, Hex w/Lock Washer, 10-24x.50 (2)                | Part of item 5.                             |
| 7        | Ref                          | Plate, Tractor Shaft, Right                            |                                             |
| 8        | Ref                          | Screw, Socket Cap, 6-32x.312 Trilob, Self-Tapping      |                                             |
| 9        | 178988-901                   | Splined Shaft Assembly (Blue Handle)                   |                                             |
| 10       | Ref                          | Tolerance Ring,.37X.25,.006 THK,SS                     | Part of 257667-001, Spline Shaft Field Kit. |
| 11       | 250088-001                   | Field Kit, Leaf, Paper Guide, P8000 CRP, ZTP           | Contains three front leaf guide assemblies. |
| 12       | Ref                          | 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       | Ref                          | Plate, Tractor Shaft, Left                             |                                             |
| 18       | Ref                          | Screw, Flat HD, Metric, M3x6mm (3)                     |                                             |
| 19       | Ref                          | Leaf, Guide, Paper, Outer, ZTP (2)                     | Part of 257804-001, Paper Feed Assy, ZTP.   |
| 20       | Ref                          | Leaf, Guide, Paper, Center, ZTP                        | Part of 257804-001, Paper Feed Assy, ZTP.   |
| 21       | Ref                          | Block, Mount, Ctr Paper Guide, ZTP                     | Part of 257804-001, Paper Feed Assy, ZTP.   |
| 22       | Ref                          | Block, Mounting, Outboard, Paper Guide, ZTP (2)        |                                             |
| 23       | Ref                          | 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       | Ref                          | Right Side Plate                                       | Part of 257804-001, Paper Feed Assy, ZTP.   |
| 27       | Ref                          | Left Side Plate                                        | Part of 257804-001, Paper Feed Assy, ZTP.   |
| 28       | Ref                          | Support, Gate, Tractor, Assembly                       | Part of 257804-001, Paper Feed Assy, ZTP.   |

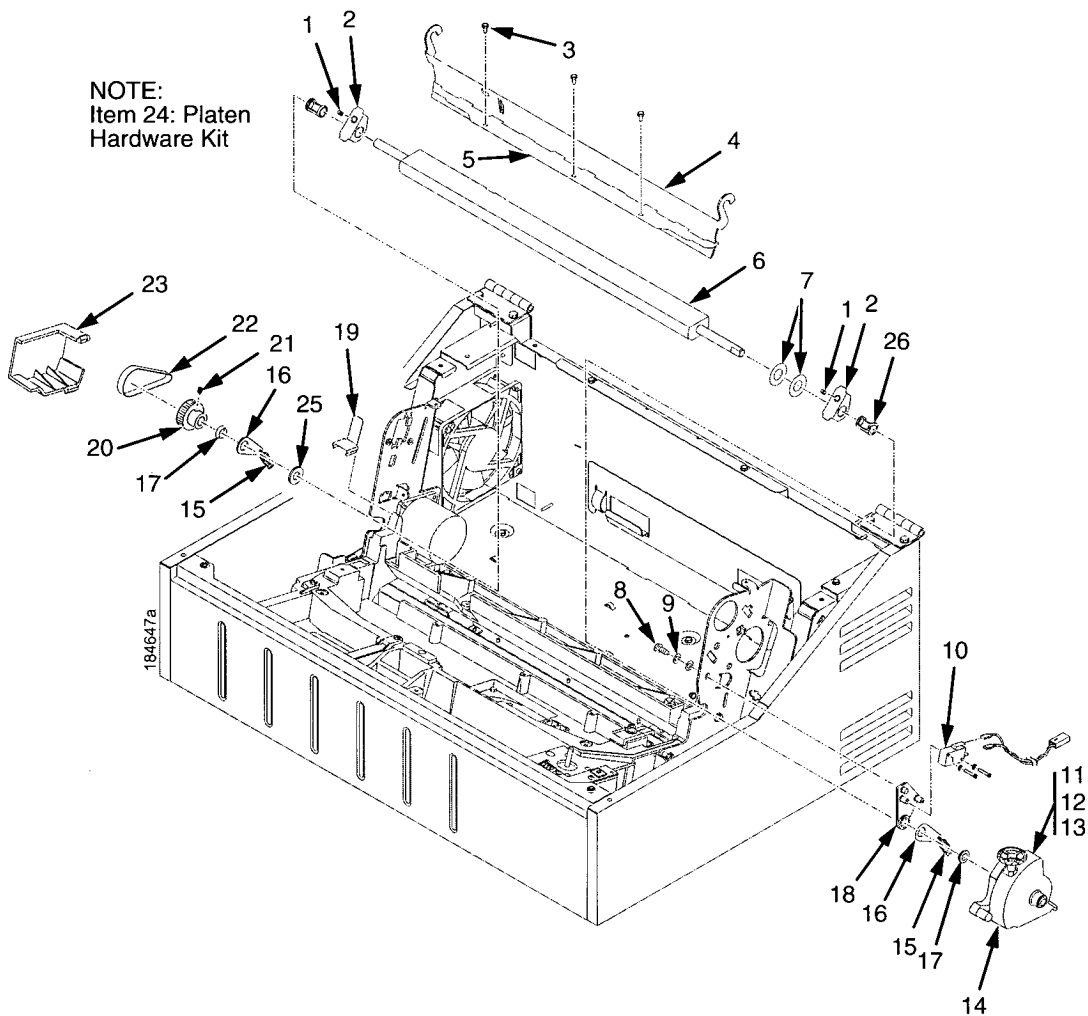


Figure 130. ZTP Platen and Integrated Print Management Sensor Assembly

| Item No. | Part No.<br>(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        | Ref                          | Ironer Assembly, Reverse Paper Feed                  | 257665-001, Field Kit, Ironers, PPR Feed, AUX, includes items 3.        |
| 5        | Ref                          | Plate, Ironer                                        | Part of item 4.                                                         |
| 6        | Ref                          | 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       | 257653-001                   | Field Kit, Switch Assembly, Platen Open/Paper Detect |                                                                         |
| 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 Assembly                                 | Includes items 11, 12, and 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       | Ref                          | Platen Pulley Assy, Drive                            | Part of item 24.                                                        |
| 21       | Ref                          | Screw, Socket Cap, 6-32x.44                          | Part of item 24.                                                        |
| 22       | Ref                          | Belt, Timing, .080 Pitch, .312 Wide                  | Included in 257652-001, Field Kit, Motor, Platen Open with Timing Belt. |
| 23       | 153488-001                   | Field Kit, Covers                                    | Platen Open Belt Cover shown.                                           |
| 24       | 257666-001                   | Field Kit, Platen Hardware                           | Includes items 1, 2, 6, 7, 9, 15, 16, 17, 19, 20, 21, 25 and 26.        |
| 25       | Ref                          | Platen Washer                                        | Part of item 24.                                                        |
| 26       | Ref                          | Bushing, Platen Adjust, V2                           | Part of item 24.                                                        |

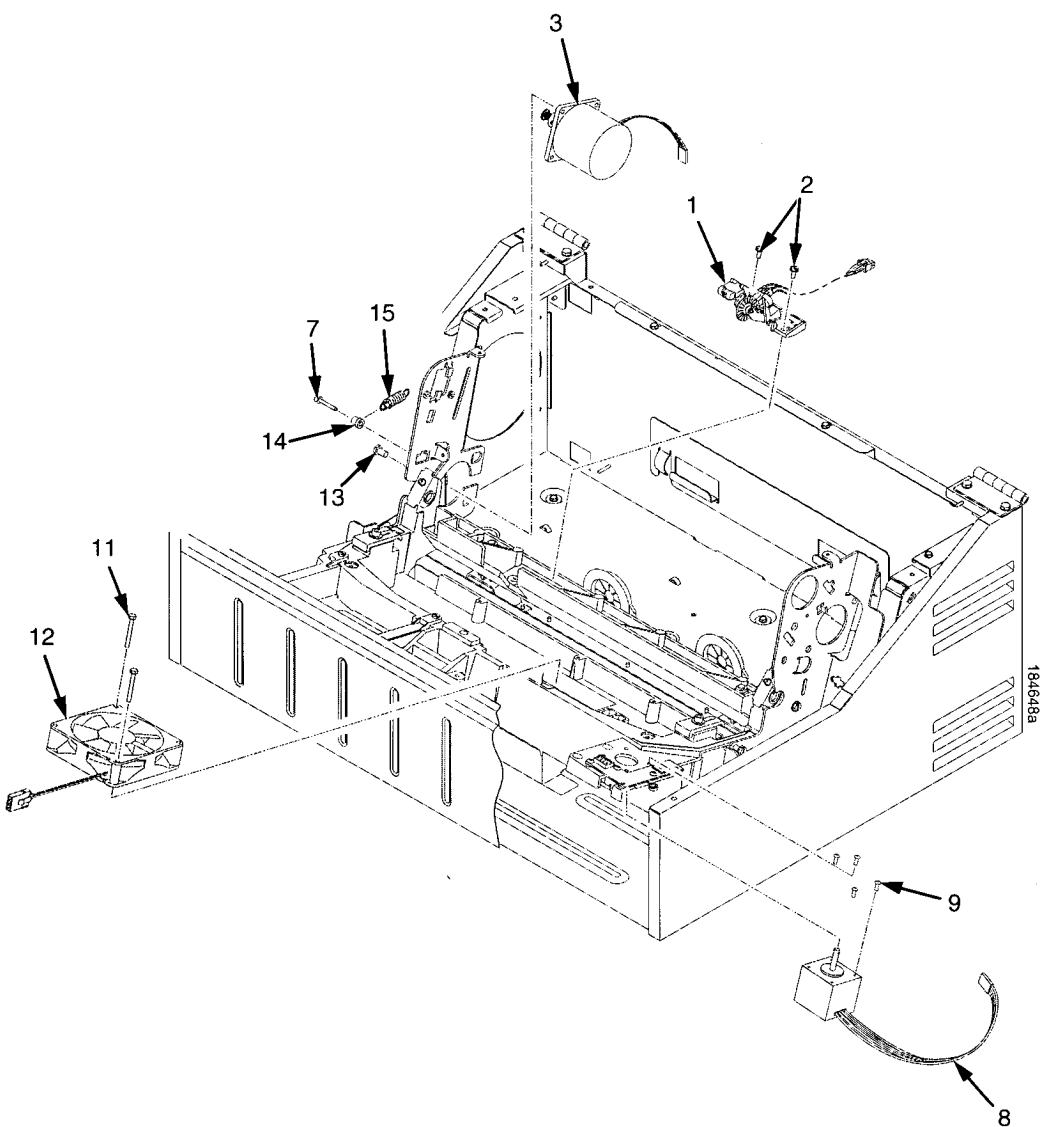


Figure 131. ZTP Hammerbank Fan and Motors

| Item No. | Part No.<br>(RoHS Compliant) | Description                               | Notes                                                            |
|----------|------------------------------|-------------------------------------------|------------------------------------------------------------------|
| 1        | Ref                          | Switch Assembly, Paper Detector           | 257653-001, Field Kit, Switch Assy, Platen Open/Paper Detect.    |
|          | 170172-001                   | Field Kit, Slotted Black Back Form Switch | Optional switch used with black back forms.                      |
| 2        | Ref                          | Screw, Thread-forming, 6-32x.375 (2)      |                                                                  |
| 3        | Ref                          | Motor Assembly, Platen                    | 257652-001, Field Kit, Motor, Platen Open with Timing Belt.      |
| 4        | Not Used                     |                                           |                                                                  |
| 5        | Not Used                     |                                           |                                                                  |
| 6        | Not Used                     |                                           |                                                                  |
| 7        | Ref                          | Screw, w/Lock Washer, 10-32x.50 (2)       |                                                                  |
| 8        | 254507-901                   | Motor, Stepper, P8 Ribbon Cartridge       |                                                                  |
| 9        | Ref                          | Screw, M3 x6 x .5 (4)                     |                                                                  |
| 10       | Not Used                     |                                           |                                                                  |
| 11       | Ref                          | Screw, w/Lock Washer (2)                  | 6-32x1.25                                                        |
| 12       | Ref                          | Hammerbank Fan Assembly                   | 257656-001, Fan Assy, Spares Kit, HB, CC, EXH. Includes item 12. |
| 13       | Ref                          | Screw, Hex w/Lock Washer (2)              | 10-32x.50                                                        |
| 14       | Ref                          | Post, Platen Belt Spring                  |                                                                  |
| 15       | Ref                          | Spring, Platen Belt                       |                                                                  |





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# F *Paper Specifications And Forms Design*

## Introduction

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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° to 26° Celsius (68° to 78° Fahrenheit) and 45% to 55% relative humidity. Printronix printers perform well with forms that meet the specifications listed in Table 8 and Table 9 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 8. 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 9. Paper Weights

| Single-Part Forms  |                                                           |
|--------------------|-----------------------------------------------------------|
| Standard           | 15 to 100 pound (57 to 380 gm/meter <sup>2</sup> )        |
| Best Print Quality | 18 to 60 pound (68 to 227 gm/meter <sup>2</sup> )         |
| Multipart Forms    |                                                           |
| Carbon Paper       | 12 pounds (46 gm/meter <sup>2</sup> ) up to 6 total pages |
| Carbons            | 8 pounds (30 gm/meter <sup>2</sup> ) 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

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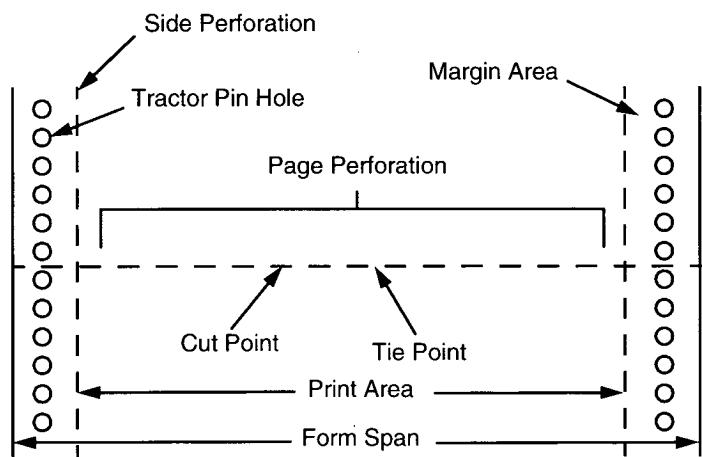
The terms below are used to describe and discuss continuous form paper.

## Terms and Definitions

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|                  |                                                                                                                                                                                                                                    |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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 <i>not</i> 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 View of Form

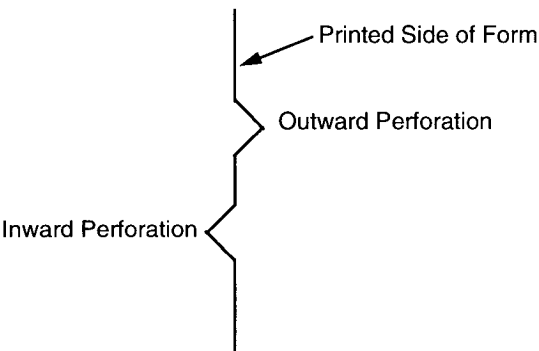


Figure 132. Forms Terminology

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## Environmental Considerations

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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

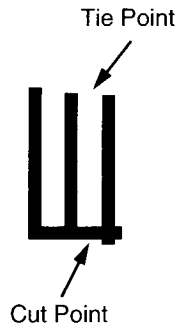
Gluing must be controlled and uniform, since it is a major contributor to the maximum form thickness. A form that meets the maximum forms thickness requirement in the print area but which exceeds the maximum thickness at a glue line is considered an unreliable and unpredictable form.

Staples

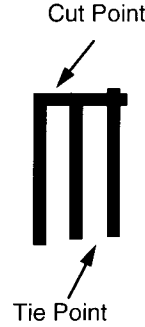
Staples must be used only in the margin area of the form and must not be in line with the path of the tractor holes. Ideally, staples are placed in the margins so that they coincide with areas of the form where printing does not occur.

Figure 133 below shows preferred and unacceptable ways of fabricating staples.

### Preferred



### Unacceptable



Direction of  
Forms  
Movement

**Figure 133. 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.

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## Summary

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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.

P8000 printers are used at temperatures from 5° to 40° C (41° to 104° F) up to 1524 meters (5000 feet), from 5° to 32° C (41° to 90° 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° to 24° C (65° to 75° 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.



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# G *Customer Support*

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## Printronix Customer Support Center

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### 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:  
Press **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.primtronix.com/support.aspx>

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## Printronix Supplies Department

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Contact the Printronix Supplies Department for genuine Printronix supplies.

Americas (800) 733-1900

Europe, Middle East, and Africa (33) 1 46 25 19 07

Asia Pacific (65) 6548 4116  
or (65) 6548 4132

China (86) 400-886-5598

India (800) 102-7869

<http://www.primtronix.com/supplies-parts.aspx>

## **Corporate Offices**

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Phone: (714) 368-2300  
Fax: (714) 368-2600

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Bijsterhuizen 11-38  
6546 AS Nijmegen  
The Netherlands  
Phone: (31) 24 6489489  
Fax: (31) 24 6489499

Printronic Schweiz GmbH  
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Changi South Industrial Estate  
Singapore 486763  
Phone: (65) 6542 0110  
Fax: (65) 6546 1588

Printronic Commercial (Shanghai) Co. Ltd  
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No.555, Pudong Av.  
Shanghai City, 200120, P R China  
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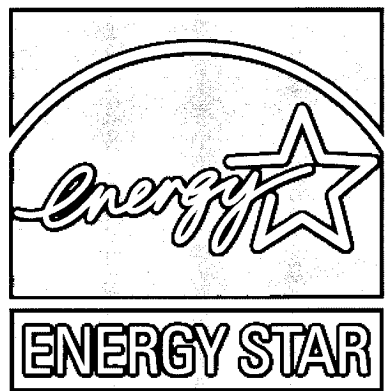
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This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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Hereby, Printronix declares that this product is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.

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### WARNING

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Text Für alle in Deutschland vertriebenen EN 55022 Klasse A Geräte:

Zulassungsbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG) vom 18. September 1998 (bzw. der EMC EG Richtlinie 89/336):

Dieses Gerät ist berechtigt in Übereinstimmung mit dem Deutschen EMVG das EG-Konformitätszeichen - CE - zu führen. Verantwortlich für die Konformitätserklärung nach Paragraph 5 des EMVG ist die:

Printronix GmbH

Goethering 56

D-63067 Offenbach Germany

Informationen in Hinsicht EMVG Paragraph 4 Abs. (1) 4:

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**EN 55024 Hinweis:**

Wird dieses Gerät in einer industriellen Umgebung betrieben (wie in EN 55024 festgelegt), dann kann es dabei eventuell gestört werden. In solch einem Fall ist der Abstand bzw. die Abschirmung zu der industriellen Störquelle zu öergrvßern.

**Anmerkung:**

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