

**PHASER® 840**  
**COLOR LASER PRINTER**  
**SERVICE QUICK REFERENCE GUIDE**

**Warning**

The following servicing instructions are for use by qualified service personnel only. To avoid personal injury, do not perform any servicing other than that contained in operating instructions unless you are qualified to do so.

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**Tektronix**

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TE/mq/mm

# User safety summary

## Terms in manual

**CAUTION** Conditions that can result in damage to the product.

**WARNING** Conditions that can result in personal injury or loss of life.

**Power source:** For 110 VAC printers, Do not apply more than 130 volts RMS between the supply conductors or between either supply conductor and ground. Use only the specified power cord and connector. For 220 VAC printers, do not apply more than 250 volts RMS between the supply conductors or between either supply conductor and ground. Use only the specified power cord and connector. Refer to a qualified service technician for changes to the cord or connector.

**Operation of product:** Avoid electric shock by contacting a qualified service technician to replace fuses inside the product. Do not operate without the covers and panels properly installed. Do not operate in an atmosphere of explosive gases.

**WARNING** Turning the power off using the On/Off switch does not de-energize the printer. You must remove the power cord to disconnect the printer from the mains. Keep the power cord accessible for removal in case of an emergency.

**Safety instructions:** Read all installation instructions carefully before you plug the product into a power source.

## Terms on product

**CAUTION** A personal injury hazard exists that may not be apparent. For example, a panel may cover the hazardous area. Also applies to a hazard to property including the product itself.

**DANGER** A personal injury hazard exists in the area where you see the sign.

**Care of product:** Disconnect the power plug by pulling the plug, not the cord. Disconnect the power plug if the power cord or plug is frayed or otherwise damaged, if you spill anything into the case, if product is exposed to any excess moisture, if product is dropped or damaged, if you suspect that the product needs servicing or repair, and whenever you clean the product.

**Ground the product:** Plug the three-wire power cord (with grounding prong) into grounded AC outlets only. If necessary, contact a licensed electrician to install a properly grounded outlet.

Symbols as marked on product:

DANGER high voltage:



Protective ground (earth) terminal:



Use caution. Refer to the manual(s) for information:



**WARNING:** If the product loses the ground connection, usage of knobs and controls (and other conductive parts) can cause an electrical shock. Electrical product may be hazardous if misused.

## Service safety summary

**For qualified service personnel only:** Refer also to the preceding Users Safety Summary.

**Do not service alone:** Do not perform internal service or adjustment of this product unless another person capable of rendering first aid or resuscitation is present.

**Use care when servicing with power on:** Dangerous voltages may exist at several points in this product. To avoid personal injury, do not touch exposed connections and components while power is on.

Disconnect power before removing the power supply shield, soldering, or replacing components.

**Do not wear jewelry:** Remove jewelry prior to servicing. Rings, necklaces, and other metallic objects could come into contact with dangerous voltages and currents.

**Power source:** This product is intended to operate from a power source that will not apply more than 250 volts rms between the supply conductors or between either supply conductor and ground. A protective ground connection by way of the grounding conductor in the power cord is essential for safe operation.

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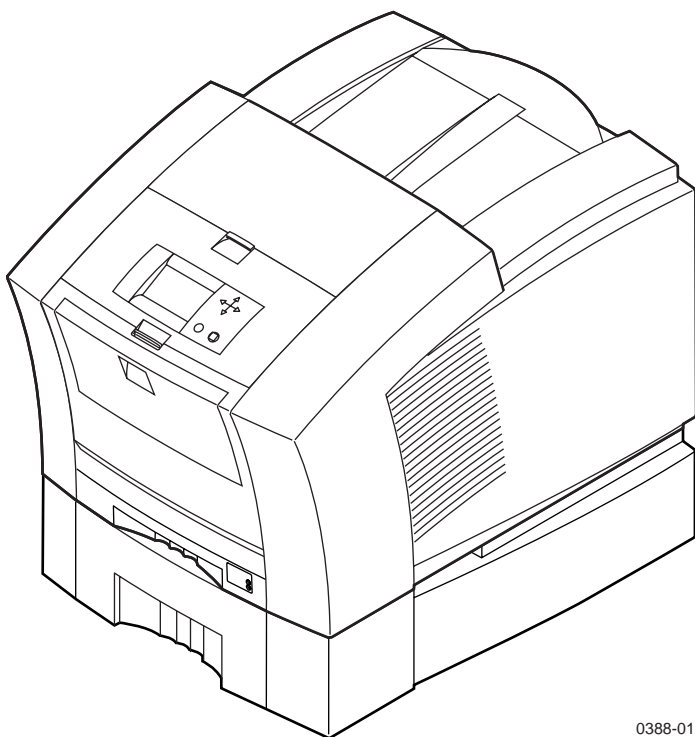
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# General Information

This service guide contains information useful to verify operation, troubleshoot, repair, adjust, and maintain a Tektronix Phaser® 840 Color Printer. This guide includes a Field Replacement Unit list.

Topics such as printer theory of operation, detailed removal/replacement procedures, configuration page details, and verifying printer operation are located on the companion *Color Printer Service & Support Resources* CD-ROM.

To ensure complete understanding of the product, we recommend participation in Phaser 840 printer service training, if available.



0388-01

**The Phaser 840 printer (shown with optional High-capacity Paper Tray Assembly)**

# Phaser 840 printer overview

The Phaser 840 Color Printer is an Adobe PostScript Level 3 (Version 3010) color, solid ink-jet printer. It also supports color PCL 5C at 600 x 600 dots-per-inch resolution. The Phaser 840 printer prints at a number of resolutions: A 10 page-per-minute (ppm) Fast Color Mode, a standard 5.7 ppm mode, an Enhanced mode of 491 x 982 dpi at 3.3 ppm and a High-Resolution/Photo mode of 600 x 1200 dpi at 2.2 ppm.

All printer models but the standard version feature built-in auto-duplex printing.

**Standard Phaser 840 printer.** The base Phaser 840 printer features 136 built-in fonts, and is equipped with 32 Mbytes of RAM. It can be upgraded to as much as 128 MBytes of RAM using any combination of two 16-, 32-, and 64-Mbyte RAM DIMMs.

**The Phaser 840 Plus printer.** The Phaser 840 Plus printer option upgrades the printer to 64 Mbytes of RAM. It include a SCSI port daughter card to support an external SCSI disk for additional font storage as well as a scanner. Special circuitry on the SCSI port daughter card enables additional features like duplex printing, job pipelining and Check Print mode. With job pipelining, the printer can print one image and process the data for the next image at the same time. Check Print mode prints the first page of a multiple page print job while holding the remainder of the job pending front panel approval.

**The Phaser 840 Extended printer.** The Extended Features option has all the features of the Phaser 840 Plus printer but includes additional RAM to bring the printer to 128 Mbytes of RAM. It also includes a High-capacity Paper Tray and an internal IDE hard drive.

All printers support four available paper trays: Two A and A4 trays are meant for paper and low volumes of transparencies; two other A and A4 trays are meant for label stock and high-volume transparencies. The optional 500-sheet High-capacity Paper Tray Assemblies gives the printer a two-tray capability. With the addition of a second High-capacity Paper Tray, the printer has a three tray capability. (The High-capacity Paper Tray Assembly is sometimes referred to as a lower feeder; it only supports paper printing.) The printer can also print six sizes of handfed envelopes in low volumes.

A 133-MHz PowerPC processor oversees print engine operations and PostScript image processing. The printer features an integral bi-directional parallel port (IEEE 1284C with ECP mode) and a 10baseT Ethernet port (with support for EtherTalk, Novell NetWare/NDS, TCP/IP, DHCP and Windows Peer-to-Peer). A USB high-speed serial port is also provided. A rear panel slot allows customers to install one "smart card" PhaserShare Series B Network Card. One card provides a LocalTalk port. A second, alternative card offers a 10BaseT/100BaseT/10Base2 Ethernet board providing standard protocol support for EtherTalk, Novell NetWare/NDS, TCP/IP and DHCP. When installed, this card disables the standard 10baseT port. A third card provides a Token Ring board providing protocol support for TokenTalk, Novell NetWare/NDS and TCP/IP. When inserted, this card also disables the standard 10baseT port.

A second rear panel slot accommodates an internal IDE hard drive for print job collation, job accounting, font storage and PDF direct printing.

The printer features Job Accounting, which maintains from 50 to 5000 records of processed print jobs, depending on memory options and hard drive options. The record contains information such as time and duration of the print and the percentage of color coverage on the print. The log of records can be retrieved using PhaserLink or PhaserShare.

## Solid inks

Solid inks, sometimes called phase-change inks, are solid at room temperature and are liquid at the higher temperature used during printing. The inks solidify almost instantly after being jetted onto the printer's drum. Because Tektronix' proprietary solid inks bleed much less than ordinary liquid inks, they allow the printer to print brilliant colors on plain paper. Each Tektronix solid-ink printer inks are especially formulated for that printer; the inks are not interchangeable.

**Note**      *Turning the printer off and allowing it to cool causes it to perform a printhead cleaning and purge cycle upon power-up. The printer's purge cycle consumes a significant amount of ink. During normal use and servicing, turn the printer off and allow it to cool only when necessary.*

## About RAM upgrades

The printer features two DIMM connectors which accept both 32-, or 64-Mbytes RAM DIMMs (16-Mbyte RAM DIMMs work but are not offered). The printer can use SDRAM DIMMs meeting these specifications:

- 168-pin DIMM
- Synchronous DRAM
- 3.3 volts
- 10 nsec speed
- Valid on-board Serial Presence Detect ROM
- Unbuffered
- Latency of 2
- 9 address columns
- Maximum of 2.8 cm (1.1 in.) in height. SDRAM DIMMs from other Phaser printers, such as the Phaser 740 and Phaser 780 color printers may be too tall to fit inside a Phaser 840 printer.

Upon power-up, the image processor interrogates the 256 byte Serial Presence Detect ROM, which describes the DIMM in great detail, such as data width, clock delay, number of address columns and row, refresh rate and more. If the DIMM does not meet the required specifications, it will be ignored; no error message will be reported.

# Memory considerations

With more memory the printer dual frame buffers for printing one image while processing a second image (which gives greater printing throughput). With additional RAM memory, and the SCSI daughter card installed (the Plus and Extended configurations), the printer’s capabilities increase as detailed in the following table:

**Installed RAM and printer capabilities**

Feature	Base (32 Mbytes)	Plus configuration (64 Mbytes)	Extended configuration (128 MBytes)
Fast Color (draft) printing	yes	yes	yes
Standard Printing	yes	yes	yes
Enhanced Printing	yes	yes	yes
High-Resolution/ Photo Printing	no	yes	yes
Duplex printing	no	yes. The printer requires at least 80 Mbytes of RAM to print duplexed, high-resolution, 1200 x 600 dpi prints	yes
Color PCL 5C	yes	yes	yes
Pipelining	no	yes	yes
Check Print	no	yes	yes
Collation (requires hard drive)	no	yes	yes
PDF printing. Requires hard drive	no	Standard.	Standard.
Job accounting	50 records	500 records. 5000 records with optional hard drive	5000 records with included hard drive
Frame buffer (lower print resolutions can provide additional frame buffer space)	1 Letter size image	1 Letter-size image	2 Letter-size images

Print the Configuration Page and check the item “Installed RAM” to see what type of RAM is installed.

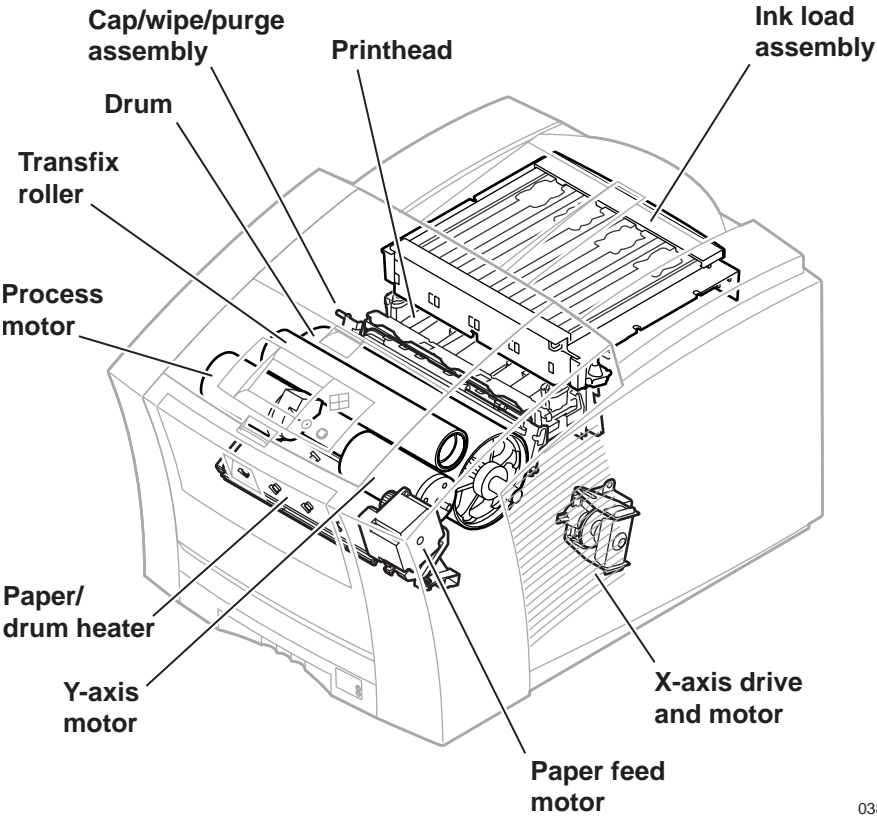
For example:

```
Installed RAM: 64 Mbytes
Mem slot 1: SDRAM/parity/64 MB/KMM366S823BTL-G0
Mem slot 2: empty
```

This is a list of SDRAM DIMMs that are branded for use by Tektronix in this printer at the time this guide was published:

<u>Size</u>	<u>Maker</u>	<u>Part Number</u>
32 Mbytes	Samsung	KMM366S403CTL-G0
32 Mbytes	Samsung	KMM366S403CTL-G0
32 Mbytes	Micron	MT166LSDT464Ag-66ZXX
64 Mbytes	Samsung	KMM366S823BTL-G0
64 Mbytes	Micron/Crucial	CT8M64S4D10-MBTBGLP

# Print engine assemblies

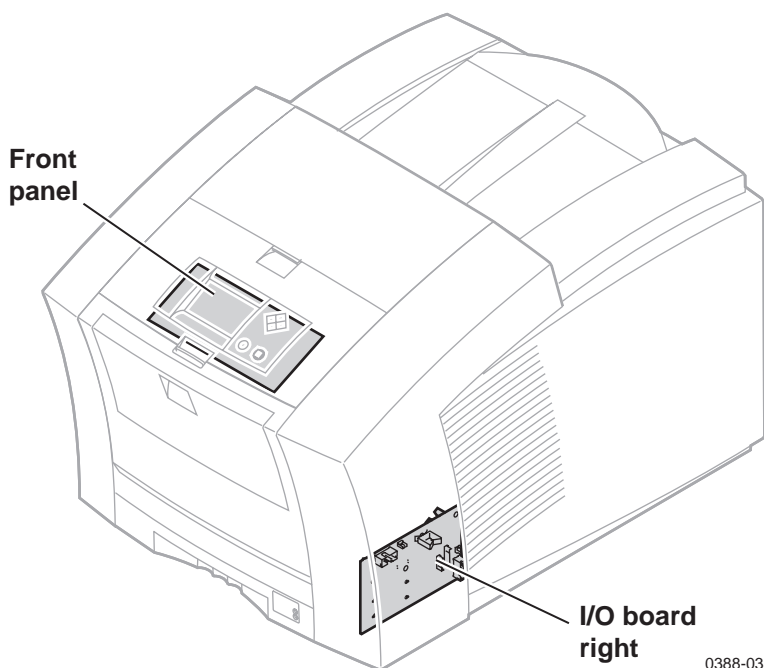


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Internal features of the print engine

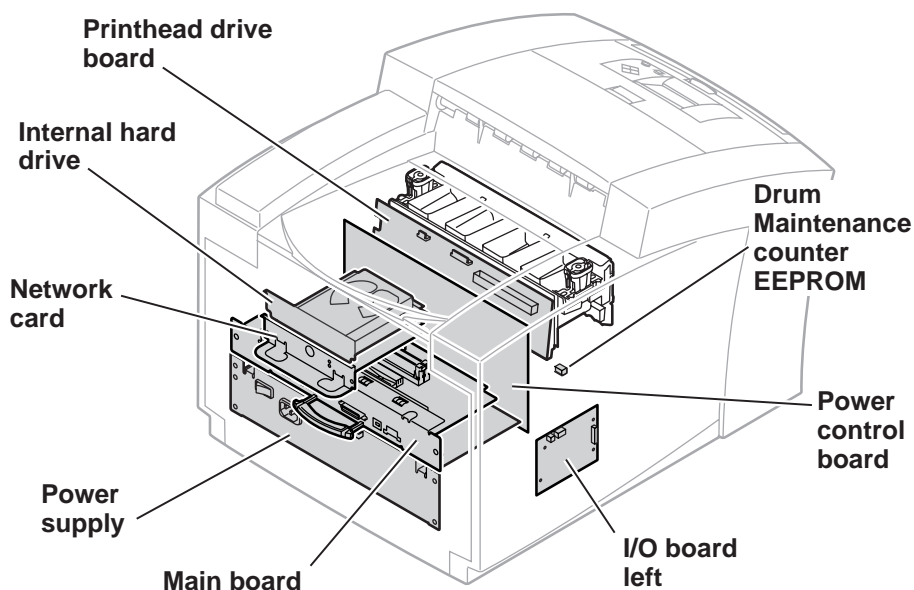


Six circuit boards support the printer's electronics. Two boards, called I/O boards, support the front panel, solenoids and sensors. The main board contains the printer's CPU processor, RAM and ROM. The power control board distributes power supply voltages to the other printer boards as well as drive many printer motors. The front panel provides a user interface to the printer. The printhead drive board, a part of the printhead, manages the signals and voltages of the printhead's printing elements and sensors. The optional network card and internal hard drive could be considered a seventh and eighth circuit boards.



0388-03

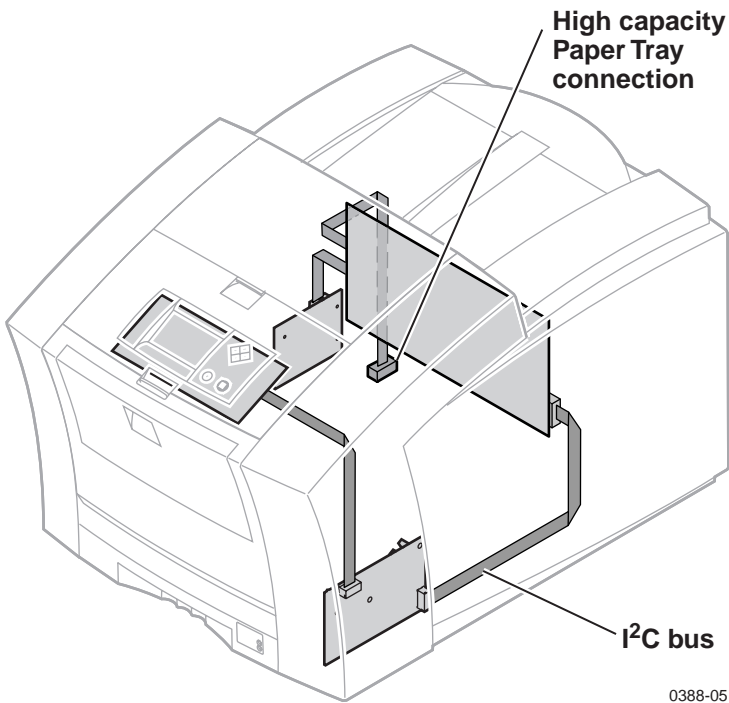
**Circuit boards of the print engine (right front view)**



0388-04

**Circuit boards of the print engine (left-rear view)**

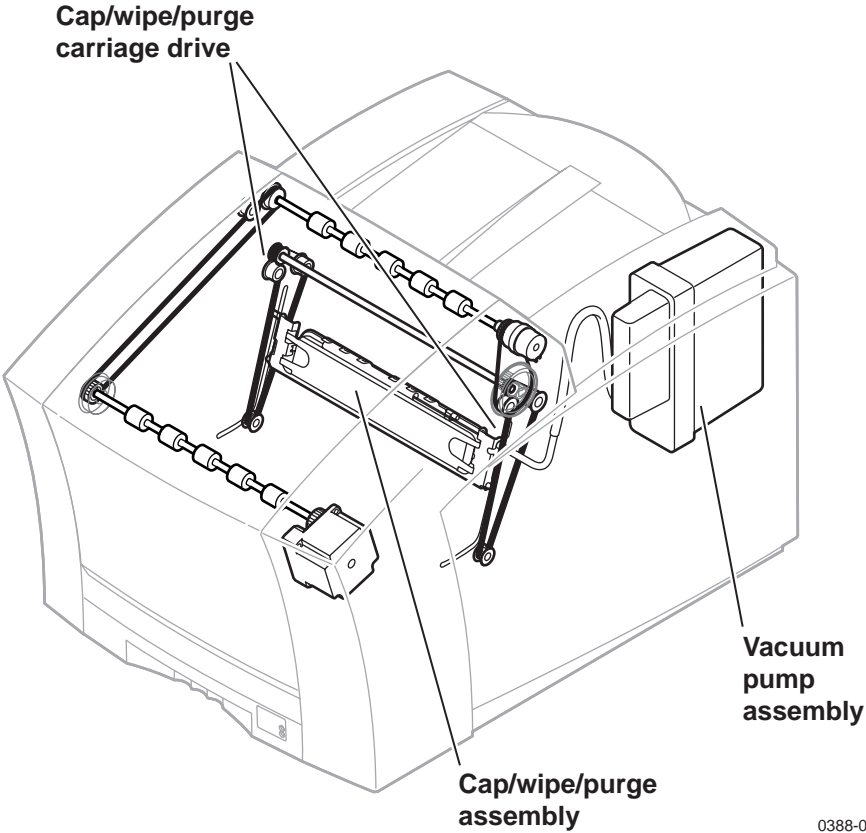
An internal data bus, called the I<sup>2</sup>C bus, connects all I/O boards to the main board. Through this single bus, the main board can “poll” the I/O boards for the state of the printer’s sensors as well as actuate the printer’s solenoids. This data bus greatly simplifies the wiring that would otherwise be required for monitoring numerous sensors and solenoids. The I<sup>2</sup>C bus also extends down to the High-capacity Paper Trays.



0388-05

**The printer's I<sup>2</sup>C bus**

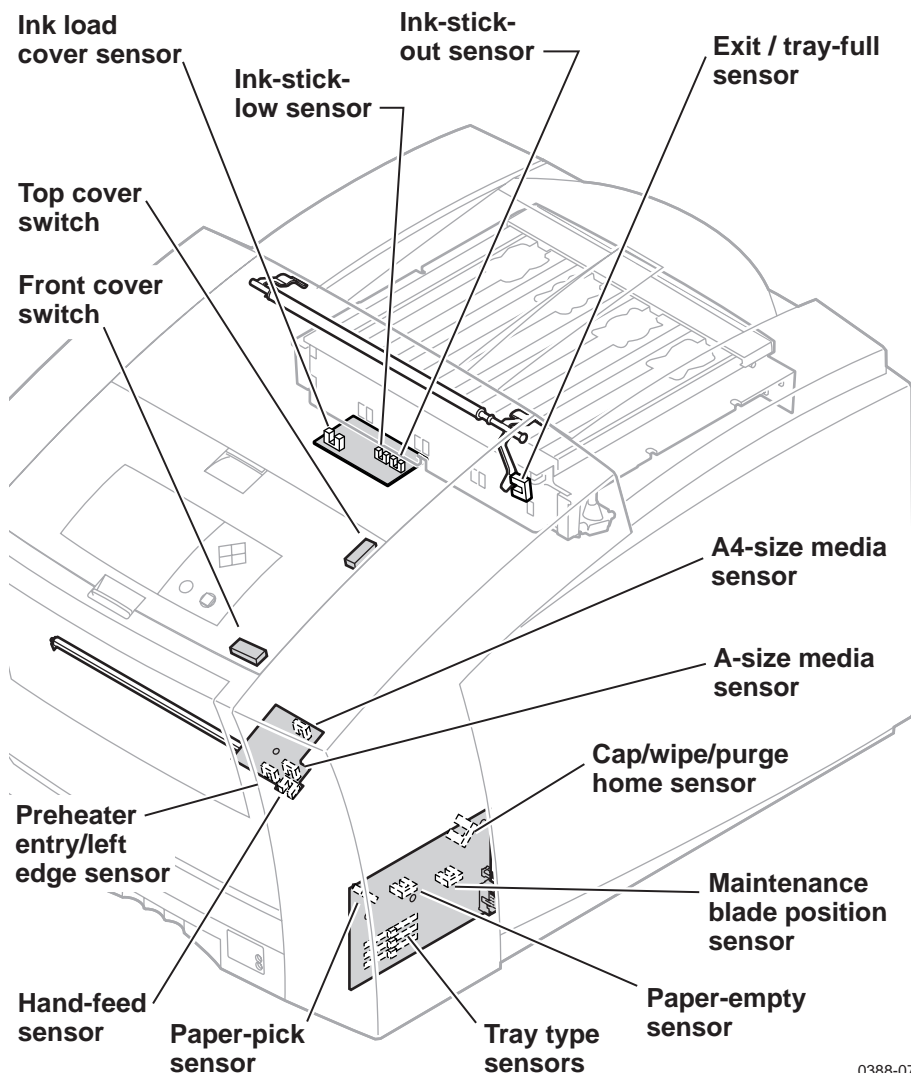
The printer features a printhead maintenance system used to clean the printhead faceplate and clear clogs from the printhead nozzles. The system consists of a vacuum pump assembly, the cap/wipe/purge assembly and the cap/wipe/purge carriage drive.



0388-06

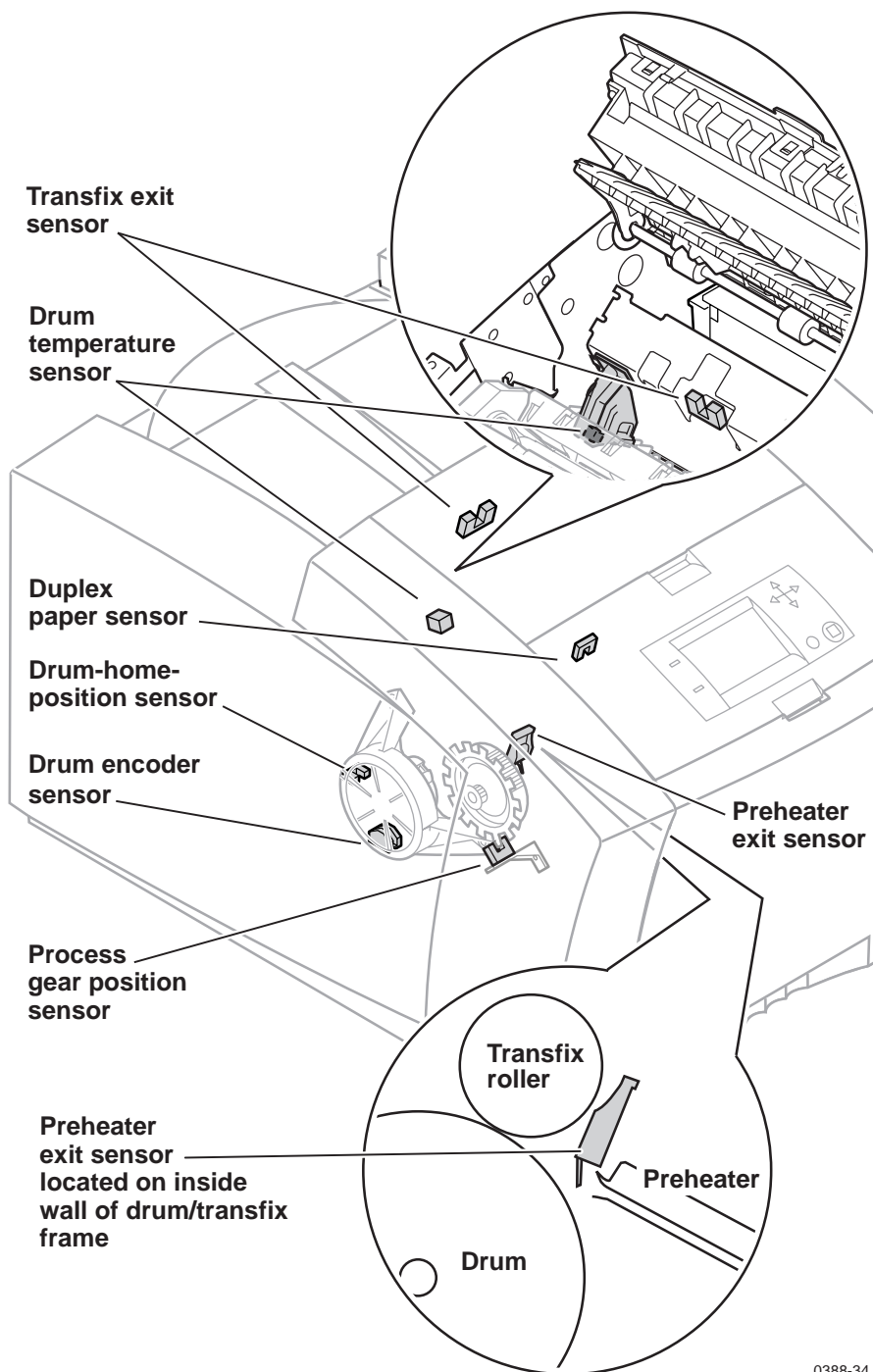
**Printhead maintenance system of the print engine**

Sensors in the printer provide information to the main board to determine the state of the printer. The printer monitors the positions of some of the movable assemblies, such as the drum, as well as the temperature of many other assemblies, such as the printhead, paper preheater and the drum.



0388-07

**Sensors and switches on the right side of the print engine**



0388-34

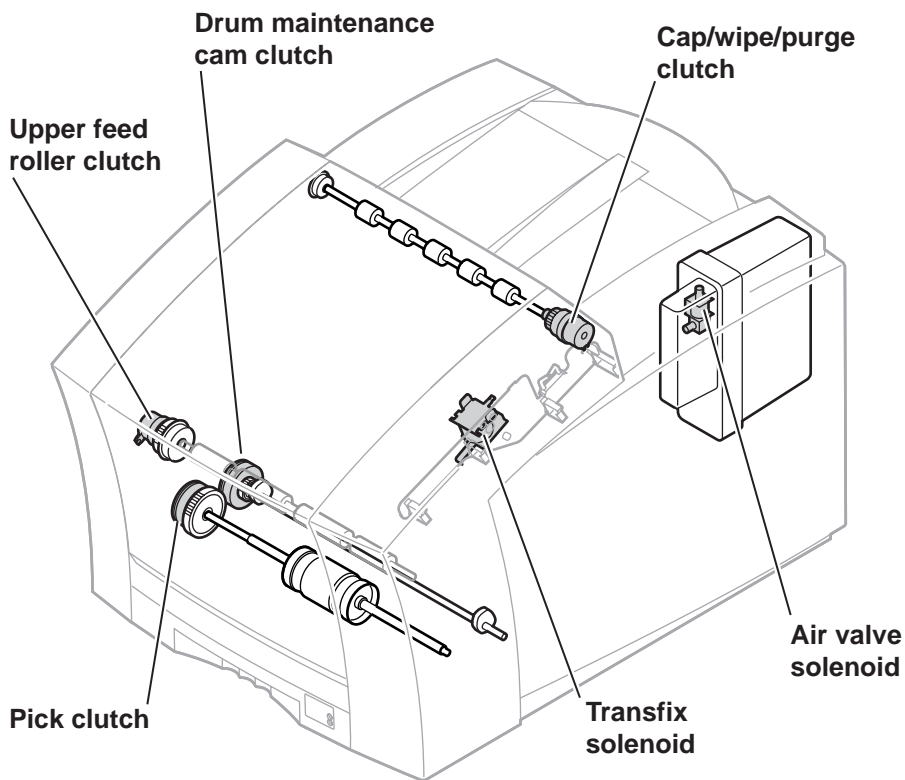
## Sensors and switches on the left side of the printer

**Caution**

*The actual position of some printer assemblies, such as the printhead or the cap/wipe/purge assembly, cannot be ascertained at all times. The printer records, in NVRAM, where it last positioned such assemblies each time it moves them. If, after power-down or a power interruption, the assemblies are manually repositioned, the printer erroneously assumes that the assemblies are in the position it last left them. This assumption can result in damage to the printer when it tries to position the assemblies. For example, the printhead could be tilted forward and crash into the raised cap/wipe/purge assembly.*

*Before turning on the printer, ensure the printhead is tilted forward, centered in front of the drum and the cap/wipe/purge assembly is in the retracted, home position. The tilt cam gear should be disengaged from the gear drive train.*

Electric clutches and solenoids are used by the printer to engage rollers as needed to move paper through the printer as well as start some print processes.



0388-08

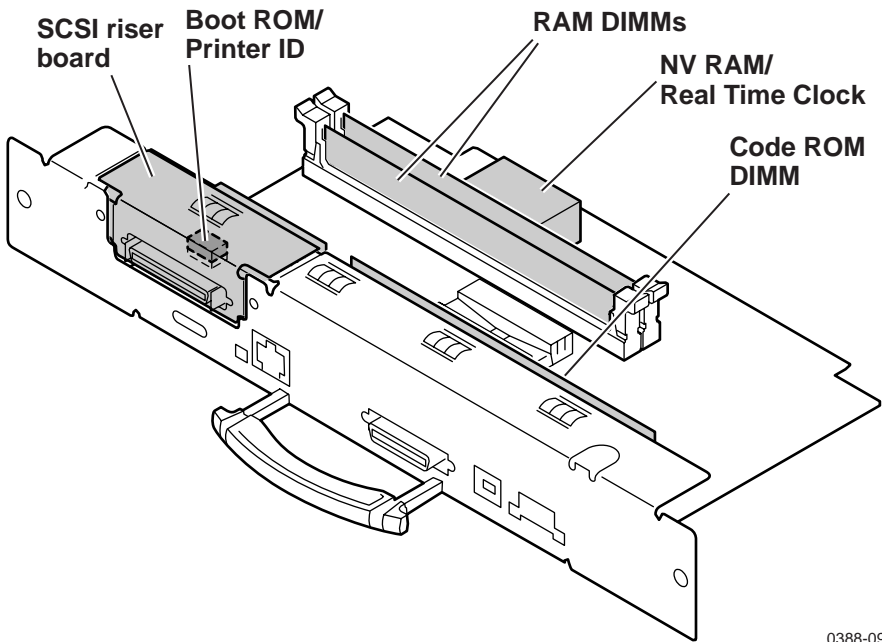
## Solenoids and clutches on the print engine

# The main board

The main board features the printer's PowerPC processor that controls the engine and the PostScript processing. Prominent on the main board is the ROM code DIMM and the RAM DIMM plug-in modules. The code ROM DIMM also contains the printer's on-board fonts. Variations of the ROM code DIMM contain alternate language fonts such as Kanji or Hangul.

Network connection is provided through a built-in 10baseT port. A plug-in SCSI interface adaptor board provides a SCSI port for an external hard drive or scanner.

The printer stores unique printer status and PostScript values in its NVRAM module. The printer's Ethernet address, unique to each printer, is stored in the printer ID chip, an 8-pin socketed IC. All these socketed components should be transferred to a replacement main board to maintain customer-unique settings.



0388-09

## Features of the main board



# Combination sensors and their meanings

Combinations of sensors are used by the printer to determine the type of standard (or upper) media tray installed in the printer.

## Media tray type sensing

The combinations of the three tray sensors inform the print engine what type of media tray is installed. (The print engine does not detect the type of media installed in the tray; it only detects the particular tray being used by the presence of sensor flags on the side of the tray.) The tray sensors are located on the right-side interior of the paper tray slot, mounted on I/O board right. There are four tray types:

- **Letter (A-size).** This tray is sized for 8.5 x 11-inch (U.S.) paper as well as low-volumes of A-size transparency film.
- **Metric Letter (A4-size).** This tray is used for 210 x 297 mm (Metric) paper as well as low-volumes of A4-size transparency film.
- **High-volume Transparency/Label (A).** This tray supports high volumes of U.S.-size transparency film as well as laser quality, adhesive label stock.
- **High-volume Transparency/Label (A4).** This tray supports high volumes of Metric-size transparency film as well as laser quality, adhesive label stock.

**Table 1 Tray switch sensor combinations**

Tray type	A Paper	A4 Paper	A Transparency	A4 Transparency
Top switch	Closed	Open	Closed	Open
Middle switch	Open	Closed	Open	Closed
Bottom switch	Open	Open	Closed	Closed

## Front panel

These front panel features are found on the printer:

- 128 x 64 pixel backlit graphic display
- Two push buttons and four arrow buttons
- Two LEDs

**LCD.** The backlit LCD serves two purposes: displaying current image processor and print engine status information and displaying an interactive menu. Status information includes image processor status such as `Ready to print`, `Receiving data` and `Printing`. Print engine status includes messages such as `Out of paper`, `Paper Jam`, `Add ink` as well as error messages.

Customers can review and modify certain NVRAM, I/O ports and peripheral parameters. Using the front panel to review and change parameters is discussed in the topic, “Adjustments” on page 59.

**Buttons.** Four of the six buttons are arranged as a diamond-shaped keypad. The other two buttons are used as **Select** and **Help**.

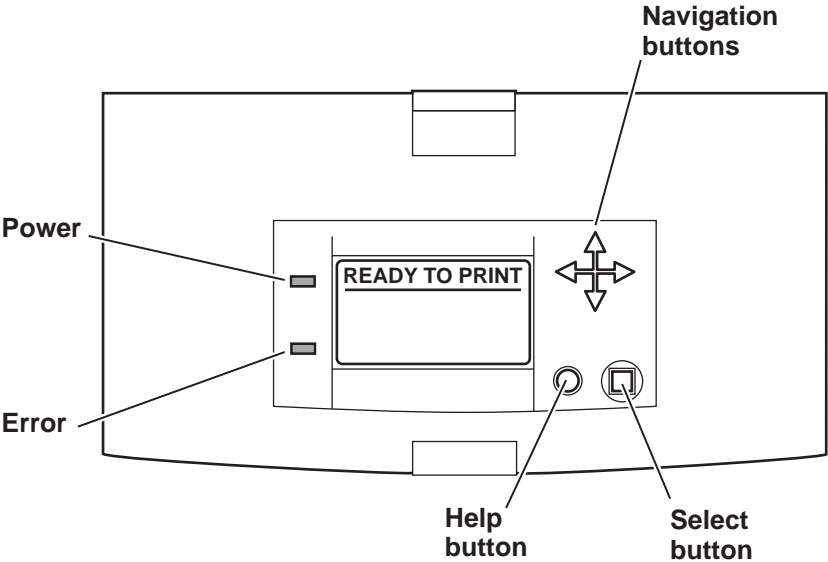
In addition, when in the troubleshooting menu, pressing the **Left arrow** and the **Select** button enters the hidden service support menu.

Pressing and holding the **Right arrow** and the **Select** button proceeds immediately to the language selection menu.

Holding the **Left arrow** while turning off the printer will confirm the printhead is correctly parked by flashing both front panel LEDs.

Turning the printer on with the rear panel DIP 2 in the “down” position, allows access to the front panel during the warm-up cycle.

The topic “Resetting NVRAM” on page 83 explains how to use the front panel buttons to reset the NVRAM to its factory-default values.



0388-10

**Printer front panel**

# Rear panel

## Connectors

The rear panel of the printer features the host interface connectors to the printer; it includes the following connectors:

- Standard parallel (high-density connector), IEEE 1284C
- Twisted Pair (10BaseT) Ethernet connector
- A Universal Serial Bus port
- Optional SCSI high-density connector (hard disk drive or Tektronix approved scanner).
- A special 5-pin connector accommodates a service RS-232 cable from a PC or Macintosh computer running PC-based diagnostics.

The rear panel also includes two option slots. With the addition of a PhaserShare network card in one slot, the printer can feature either of these connector combinations:

- LocalTalk connector
- ThinNet (10Base2) and Twisted Pair (100BaseT) Ethernet or Token Ring connectors.

**Note**      *When an Ethernet or TokenRing PhaserShare card is installed, the printer's built-in 10BaseT Ethernet port is disabled.*

The second slot accommodates an internal IDE hard drive for print job collation, job accounting, font storage and PDF direct printing.

## Health LEDs

Two health LEDs indicate the status of the printer's CPU functions: PostScript processing and print engine control.

- *Blinking:* The printer is operating normally. Both LEDs blink irregularly during diagnostics.

If a soft error occurs, image processing occurs, but in a reduced capacity. Soft failures include failure of expansion memory DIMMs or any of the interface ports. When a soft error occurs, the printer automatically prints a startup page listing the error.

- *On or Off, or blinking a coded error indication:* A hard error condition has occurred that would keep the image processor board from operating. Refer to the topic "Error Codes and Messages" on page 25 for the meaning of a coded indication.

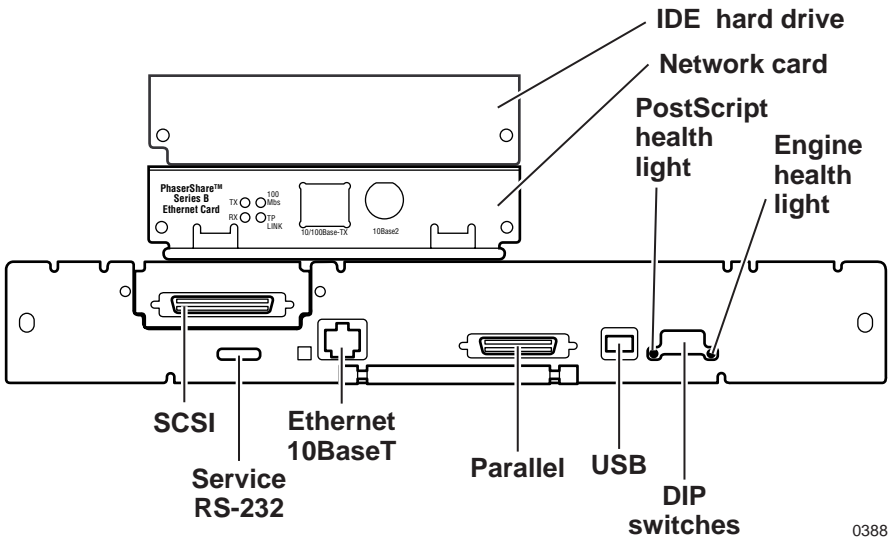
# Switches

Four DIP switches allow you to reset the printer or place the printer in different operating modes.

**Table 2 Rear panel DIP switch settings**

Function	Switch 1	Switch 2	Switch 3	Switch 4
Normal operating mode	UP	UP	UP	UP
Service mode	DOWN	UP	UP	UP
Reset printer	UP	UP	UP	DOWN
Manufacturing mode (Bypass mode)	UP	DOWN	UP	UP
Development mode (engineering use only)	DOWN	DOWN	DOWN	UP
Recovery mode (engineering use only)	DOWN	UP	DOWN	UP

The following figure illustrates the rear panel of the printer.



**Printer rear panel**

## Physical dimensions

Dimensions	Value
Height:	38.7 cm. (15.25 ins.) 51.4 cm (20.25 ins.) with one High-capacity Paper Tray Assembly 64.1 cm (25.25 ins.) with two High-capacity Paper Tray Assemblies
Width:	40 cm (17.25 ins.)
Depth:	57.8 cm (22.75 ins.)
Weight:	Approximately 36 kgs (79 lbs). Print engine weight only; add 9 kgs (20 lbs.) for each optional High-capacity Paper Tray Assembly.

## Printer installation clearances

Clearances	Value
Top:	45.7 cm (18 ins.)
Left:	10.2 cm (4 ins.)
Right:	10.2 cm (4 ins.)
Front:	Unrestricted to replace trays and clear paper jams
Rear:	10.2 cm (4 ins.)
Bottom:	No obstruction under printer that could block its cooling vents.
Mounting surface flatness:	Within 3 degrees of horizontal with all four feet in contact with the surface.

## Functional specifications

Characteristic	Specification
Printing process	Solid ink-jet onto plain paper.
Color medium	Cyan, magenta, yellow and black ink sticks, each shape-coded. The printer uses the subtractive color system to produce the colors red, green, and blue.
Addressability	Selectable 273 x 300, 409 x 409, 491 x 982 or 600 x 1200 dots-per-inch (horizontal and vertical).
Engine printing speed (single-sided)	<p>The time it takes from loading to ejecting:</p> <p>Fast Color 273 x 300 dot per inch:  on A- or A4-size: <math>\approx</math> 6 seconds per print</p> <p>Standard 409 x 409 dpi:  on A- or A4-size: <math>\approx</math> 10.5 seconds per print</p> <p>Enhanced 491 x 982 dpi:  on A- or A4-size: <math>\approx</math> 18 seconds per print</p> <p>Photo 600 x 1200 dpi:  on A- or A4-size: <math>\approx</math> 24 seconds per print</p> <p>Fast Transparency film (273 x 300 dpi):  on A- or A4-size: <math>\approx</math> 12 seconds per print</p> <p>Standard Transparency film 409 x 409 dpi):  on A- or A4-size: <math>\approx</math> 22 seconds per print</p> <p>Print times do not include image processing time, which varies, due to image complexity. 25 mm (1 in.) margins assumed with 35% ink coverage.</p>
Minimum printing margins	All sides: 5 mm (0.2 in.)
Maximum print area	A-size: 8.1 x 10.6 in. A4-size: 200 x 283 mm
Usable paper weights	Tray fed: 16 - 32 lb. Bond (60 - 120 g/m <sup>2</sup> ) 65 lb. (176 g/m <sup>2</sup> ) Cover stock (main tray only) Manual fed: 16 - 32 lb. Bond (60 - 120 g/m <sup>2</sup> ) 50 - 80 lb. Cover (135 - 220 g/m <sup>2</sup> ) -single-sided 110 lb (216 g/m <sup>2</sup> ) Index stock
Usable envelopes	#10 (U.S.) #6 3/4 (U.S.) C5 (Metric) DL (Metric) Choukei 3 Gou Choukei 4 Gou <b>Do not use envelopes with endflaps, plastic windows or metal clasps; they can damage the printer.</b>
Label	A/A4 laser quality sheet stock only, Recommended Avery™ white laser labels: U.S.: 5160, 5960 Metric: L7162

## Electrical specifications

Characteristic	Specification
Primary line voltages	87 to 132 VAC (115 VAC nominal) 174 to 264 VAC (220 VAC nominal) Input voltage range is auto-sensed.
Primary voltage frequency range	47 to 63 Hz
Power consumption	200 watts standby; 300 watts at idle; 600 watts during printing. Maximum power consumption 1000 watts during warm-up.
Current rating	115 VAC configuration – 8 amp max./1 amp min. 220 VAC configuration – 4 amp max./1 amp min.
Fusing	F1: DC switcher - 6.3 amp slo-blo F2: Drum heater 1, reservoir heater 1, ink melt chambers, cap/wipe/purge unit - 10 amp slo-blo F3: Jet stack left and right, paper pre-heaters, reservoir heaters 2,3,and 4 10 amp slo blo Fuses are not user-accessible.
Secondary voltages	+5V $\pm$ 2.5% +12 V $\pm$ 5% -12 V $\pm$ 5% +40 V -5%, +12% -52 V $\pm$ 10% +54 V $\pm$ 10%
RF emissions	Both 115 and 220 VAC-configured instruments pass these standards: EC EN60950:1992 Safety of Information Technology Equipment including Business Equipment EC EN55022:1992 Limits and methods of measurement of radio interference characteristic of Information Technology Equipment EC EN50082-1:1997 The Generic Immunity Standard Residential, Commercial, and Light Industry EN61000-4-3:1995-02 RF Field Immunity EN61000-4-2:1995-01 ESD (Electro-Static Discharge) EN61000-4-4:1995-01 Fast Burst Transient EN61000-4-5:1995-02 Line Surge EN61000-4-6:1996-03 RF conducted Immunity EN61000-4-11:1994-06 Voltage Dips and Interruptions EN61000-3-3:1994-12 Flicker 73/23/EEC Low Voltage Directive 89/336/EEC Electromagnetic Compatibility Directive 89/392/EEC Machinery Directive



## Environmental specifications

Characteristic	Specification
Temperature	
Operating	10 to 32 °C (50 to 90 °F)
Storage and shipping	-30 to 60 °C (-22 to 140 °F)
Humidity	
Operating	10 to 80% relative humidity, non-condensing
Non-operating	10 to 95% relative humidity, non-condensing
Altitude	
Operating	0 to 2400 m (8,000 ft.) at 25 °C
Non-operating	0 to 15000 m (50,000 ft.)
Vibration/shock	
Non-Operating (vibration)	Will withstand 0.15 G excitation, 5 to 200 Hz, 3 axes for up to 7 minutes with no impairment or subsequent damage.
Non-operating (shock)	0.5 g, 25 minute sweep, 5-200-5 Hz, 100-200 sec/sweep cycles
Operating (shock)	The printer may have any corner raised and dropped 1.5 cm (0.6 in.) while printing is in progress, without impairment of operation that cannot be recovered by a printhead purge cycle. The printer may have any corner raised and dropped 6 cm (2.4 in.) while idle without subsequent impairment of operation.

## Regulatory specifications

The Phaser 840 Color Printer is in conformance with the following regulatory standards:

- FCC Part 15 Class B (for 115 VAC equipment)
- EN55022 (CISPR 22) Class B
- VCCI (CISPR 22) Class B
- EN61000-3-2 Flicker on AC Mains Susceptibility
- The packaged product meets National Safe Transit Committee Test Procedures

Listed:

- UL 1950 Information Technology Equipment

Certified to:

- CSA C22.2 No. 950 Safety of Information Technology Equipment, Including Electrical Business Equipment

GS licensed:

- IEC 950 (1991) Second Edition; EN60950 Information Technology Equipment

# Error Codes and Messages

## Rear panel LEDs error codes

The rear panel LEDs are located on each side of the rear panel DIP switches. *The left LED represents the operation of the PostScript firmware. The right LED represents operation of the main board's print engine firmware.* During the POST tests, the two LEDs toggle back and forth for each successful pass through each SDRAM test. A failure in the power on self tests is indicated by the left LED (the PS LED) flashing in a specific pattern of long and/or short flashes and repeated indefinitely. A long flash represents a 5, while a short flash is a 1. For example, a long flash followed by 4 short flashes is  $5 + 4 = 9$ . If the left LED repeatedly flashes in the same sequence, then the PostScript processor has encountered an error and is looping. The possible LED-encoded error codes are listed in the following table. Other failures are indicated by the failure being printed on the Startup Page.

After successful power-up, the left LED flashes at a regular "heartbeat" rate. The front panel **Power** light is turned on, the **Error** light is flashed, and the LCD is cleared.

**Table 3 Main board power-up self-test error codes**

Left LED flashes	Meaning	Details
Long flash =5 Short flash=1 2L+1S=11		
1	<i>not used</i>	
2	SDRAM SIMM Presence	This test verifies for the presence of both SDRAM SIMMs. If both SDRAM SIMMs are missing the resultant error indication is 2 short flashes from the left LED.
3	SDRAM bank 0	This test verifies DRAM bank 0 in the DRAM DIMM located in Position 0 (closest to the rear panel)
4	SDRAM bank 1	This test verifies DRAM bank 1 in the DRAM DIMM located in Position 0 (closest to the rear panel)
5	SDRAM bank 2	This test verifies DRAM bank 0 in the DRAM DIMM located in Position 1 (farthest from the rear panel)
6	SDRAM bank 3	This test verifies DRAM bank 1 in the DRAM DIMM located in Position 1 (farthest from the rear panel)
7	not used	
8	<i>not used</i>	

**Table 3 Main board power-up self-test error codes**

<b>Left LED flashes</b> Long flash =5 Short flash=1 2L+1S=11	<b>Meaning</b>	<b>Details</b>
9	NVRAM	This test does a walking 1s and a walking 0s test for that last 4 bytes in the VxWorks section of the NVRAM.
10	EPROM	This test reads in the first 24 bytes from the EPROM then verifies that the Tektronix Ethernet address 0x08, 0x00, and 0x11 has been copied into three locations.
11	Mariner ASIC	This test reads and verifies the version level of the Mariner ASIC.
12	Medusa ASIC	This tests reads and verifies the version level of the Medusa ASIC.
13	Super Glue ASIC	This tests reads and verifies the version level of the Super Glue ASIC.
14	CL1284 IC	This tests reads and verifies the version level of the parallel port controller CL1284 chip.
<i>none</i>	SCSI	<p>This test verifies the functionality of the SCSI I/O processor. Any test failures with this component are treated as non-fatal errors with the error information written to the Start Page. If a failure is detected, the message "SCSI Option Card:" with one of the following messages will be sent to the Start Page.</p> <ul style="list-style-type: none"><li>■ Wrong values in script-set scratch registers.</li><li>■ Script operation timed-out.</li><li>■ Script operation returns wrong exit code.</li><li>■ DMA transfer spills outside buffer.</li><li>■ DMA transfer data mismatch.</li></ul>
<i>none</i>	10baseT	<p>This test verifies the functionality of the Ethernet LAN Controller chip. Any test failures with this component are treated as non-fatal errors with the error information written to the start page. If a failure is detected, the message "Ethernet:" with one of the following messages will be sent to the start page.</p> <ul style="list-style-type: none"><li>■ General Failure.</li><li>■ MAC internal loopback failure.</li><li>■ MII internal loopback failure (currently disabled)</li></ul>

**Table 3 Main board power-up self-test error codes**

<b>Left LED flashes</b> Long flash =5 Short flash=1 2L+1S=11	<b>Meaning</b>	<b>Details</b>
<i>none</i>	Ethernet 100BaseT Option Card	<p>This test verifies the functionality of the Ethernet LAN Controller chip. Any test failures with this component are treated as non-fatal errors with the error information written to the Start Page. If a failure is detected, the message "Ethernet Option Card: with one of the following messages will be sent to the Start Page.</p> <ul style="list-style-type: none"> <li>■ General Failure.</li> <li>■ MAC internal loopback failure.</li> <li>■ MII internal loopback failure.</li> </ul>
<i>none</i>	Token Ring Option Card	<p>This test verifies the functionality of the processor chip. Any test failures with this component are treated as non-fatal errors with the error information written to the Start Page. If a failure is detected, the message "Token Ring Option Card:" with one of the following messages will be sent to the Start Page.</p> <ul style="list-style-type: none"> <li>■ General error</li> <li>■ Problem with EEPROM</li> <li>■ Error trying to Bring Up Diags</li> <li>■ Error initializing device</li> <li>■ Command completion error</li> <li>■ Interrupt error</li> <li>■ Wrong vendor ID</li> <li>■ Wrong microcode version</li> <li>■ Wrong version ID</li> </ul>
<i>none</i>	LocalTalk Option Card	<p>This test verifies the functionality of the LocalTalk option card. Any test failures with this component are treated as non-fatal errors with the error information written to the Start Page. If a failure is detected, the message LocalTalk Option Card: General Error will be sent to the Start Page.</p>

# Error messages

Error codes indicate the following:

- The failing system (XX,yyy.zz)
- The failing subsystem (xx,YYY.zz)
- The actual problem (xx,yyy.ZZ).
- The print engine copy count (xx,yyy.zz:123) the error occurred on.

**Table 4 Front panel and fault history log error codes and messages**

Error code	Meaning
<b>2,000: System fault I/O board...</b>	
2,001.40: SY_DEV_FAULT_IO_ RIGHT	The engine can not detect the presence of the right I/O board. Ensure the connections are good.
2,002.40: SY_DEV_FAULT_IO_ LEFT	The engine can not detect the presence of the left I/O board. Ensure the connections are good.
<b>4,000: PC (process control supervisor)....</b>	
4,001.40 (0x2401): PC_DEV_FAULT_HEAD _READ	Failure reading printhead NVRAM data: check the wiring to the printhead, I <sup>2</sup> C bus and other hardware.
4,002.41 (0x2402): PC_DEV_FAULT_HEAD _ZEROS	Printhead NVRAM data was all zeros: has this printhead been through normalization? If so, check wiring to printhead.
4,003.42 (0x2403): PC_DEV_FAULT_HEAD _ONES	Printhead NVRAM data was all ones: has this printhead been through normalization? If so, check the wiring to the printhead.
4,004.43 (0x2404): PC_DEV_FAULT_HEAD _CHECKSUM	Printhead NVRAM checksum failure: the data within the printhead NVRAM has been corrupted. Check the hardware and wiring. The printhead may need to be renormalized (a manufacturing function).
4,005.44 (0x2405): PC_DEV_FAULT_DM_ CAM_ERR	Failure positioning drum maintenance cam during a drum maintenance cycle: check drum maintenance cam solenoid, clutch, home sensor, and related hardware.
4,009.48 (0x2409) PC_DEV_FAULT_DM_ CAM_BEGIN	At the start of a drum maintenance cycle, when the drum maintenance cam position should have been at blade down, oil roller down, the drum maintenance cam home sensor should have been TRUE and was instead FALSE. Check the drum maintenance cam solenoid, clutch, home sensor, and related hardware.

**Table 4 Front panel and fault history log error codes and messages**

<b>Error code</b>	<b>Meaning</b>
4,010.40 (0x240A) PC_DEV_FAULT_DM_ CAM_BU_WU	During the drum maintenance cycle, when the drum maintenance cam position should have been at blade up/oil roller up, the drum maintenance cam home sensor should have been FALSE and was instead TRUE. Check the drum maintenance cam solenoid, clutch, home sensor, and related hardware.
4,011.41 (0x240B) PC_DEV_FAULT_DM_ CAM_BU_WD	During the drum maintenance cycle, when the drum maintenance cam position should have been at blade up/oil roller down, the drum maintenance cam home sensor should have been FALSE and was instead TRUE. Check the drum maintenance cam solenoid, clutch, home sensor, and related hardware.
4,012.42 (0x240C) PC_DEV_FAULT_DM_ CAM_END	At the end of a drum maintenance cycle, when the drum maintenance cam position should have been at blade down/oil roller down, the drum maintenance cam home sensor should have been TRUE and was instead FALSE. Check the drum maintenance cam solenoid, clutch, home sensor, and related hardware.
4,013.43 (0x240D) PC_DEV_FAULT_GEAR_ GRIND	During power-on initialization, the engine is unable to disengage the process motor. Prior to declaring this fault, the engine has attempted to move the process motor through enough revolutions to disengage the head tilt mechanism, but the motor stalled. The X-axis was then displaced to the right 3.8 mm (0.15 in.) and the disengage was repeated, but the motor stalled again. This fault is then declared. The head is unable to move on its tilt axis, perhaps because it is colliding with something (head restraint pin, cap, poorly installed ink loader, screwdriver.)
4,014.44 (0x240e) PC_DEV_FAULT_6x6DP I_CAL	Calibration Failure: Defined but not used.
4,015.45 (0x240F) PC_DEV_FAULT_HEAD_ ADJUST_TIMEOUT	The engine spent too much time in the printhead adjust-state. The engine declares a device fault and shuts down, rather than leave a hot heater against a cold drum for an indefinite period.
4,016.46 (0x2410) PC_DEV_FAULT_HEAD_ NV_FORMAT	The printhead format number, stored in printhead NVRAM, is not understood by this version of engine firmware.
4,016.68	Bad Message in main pc_ready message loop. The code received an unexpected message while the printer was in ready state waiting for a command from PostScript. Typically this message is a PM_RESULT_OK message that is the result of a previous command to PM to tilt the head back. The odd behavior is that PC is not waiting for the operation to finish.

**Table 4 Front panel and fault history log error codes and messages**

<b>Error code</b>	<b>Meaning</b>
4,017.47 (0x2411) PC_DEV_FAULT_ AMBIENT_TOO_COLD	Ambient temperature has fallen to less than 10° C. Something may be wrong with a heater.
4,018.48 (0x2412) PC_DEV_FAULT_LATE_CLEAN_REQUEST	After the printer determined, at power-up, that the printhead was warm enough not to need cleaning, and while the printer was warming up, the printhead temperature dropped below the head-clean-needed threshold. Something may be wrong with a heater.
4,019.40 (0x2413) PC_DEV_FAULT_193DPI_CAL	Calibration Failure: Target Volt-Sec Area of Fast Color mode could not be achieved. Check the hardware. The head may need to be renormalized.
4,020.41 PC_DEV_FAULT_FTTR_HEADCAP	Declared when the printer is booted and the head/cap contact flag is set in NVRAM. The printer cannot run with the head and cap/wipe/purge unit in contact because it would be unwise to separate the two when the printhead is cold.
04,021.4x PC_DEV_FAULT_FTTR_DIRTYDRUM	Declared when the printer is booted and the drum is dirty. Cleaning the drum when very cold could increase the chance of gluing media to the drum surface and creating a mess around the stripper fingers.
4,023.66	Cannot tilt head forward. The engine was attempting to do something that required the printhead to be in print position. The printhead was not in position and some condition was preventing the code from tilting it.
<b>5,000: Y axis (drum)</b>	
5,001.41 (0x2c01) YA_HOME_FAIL	Drum-home sensor failure: the drum turned one full revolution without seeing the drum home sensor activate. Check the drum-home sensor or I/O board 1.
5,002.41 (0x2b02): YA_STALL_FAIL	The Y-axis (drum) motor stalled, possibly because the drum position sensor electronics have failed, or because the motor drive or drive belts have failed, or because something is physically blocking the motion of the drum.
5,002.42 (0x2b03): YA_POS_FAIL	Y-axis position failure, the drum is not where it should be, possibly because the drum position sensor electronics have failed, or because the motor drive or drive belts have failed, or because something is physically blocking the motion of the drum.
<b>6,000: X axis</b>	
6,000.41 (0x3400): XA_FAULT_MCURRENT	X axis motor over/under current. Indicates motor coil(s) are open, or shorted, or the motor fuse has opened.
<b>7,000: Process motor</b>	



**Table 4 Front panel and fault history log error codes and messages**

<b>Error code</b>	<b>Meaning</b>
7,001.43 (0x3c01): PM_FAULT_AUXILIARY_ MOTOR_ERROR	The electronics report an error while operating the motor in the auxiliary feeder (the optional High-capacity paper Tray)
7,002.44 (0x3c02): PM_FAULT_PROCESS_ MOTOR_STALL	The process motor stalled during operation. This has several possible causes, depending on what the process motor was gear-connected to at the time of failure.
7,003.45 (0x3c03): PM_FAULT_ COMPOUND_ GEAR_SENSOR_BAD	No transitions are observed of the compound gear sensor when the compound gear should be turning. Perhaps the sensor is failing, or the process motor to compound gear linkage is broken.
7,004.46 (0x3c04): PM_FAULT_DM_CAM_ SENSOR_BAD	No transitions are observed of the drum maintenance cam sensor. The sensor may be failing or the drum maintenance cam may be jammed.
<b>8,000: Cap drive and web sensors</b>	
8,001.44 (0x4401): CAP_FAULT_HOME_ SENSOR	An expected transition of the cap-home sensor did not occur. The home sensor may be faulty, or the cap motor may not be operating, or the cap may be jammed and unable to move.
8,002.46 CAP_FAULT_ OVERCURRENT	The cap/wipe/purge assembly stalled: Defined but not used.
<b>9,000: Ink loader: ink melters and printhead ink level sensors.</b>	
9,001.45 (0x4c01): IL_FAULT_C_ TWANGER	Malfunction of the ink-level sensor in the cyan reservoir. Replace the printhead.
9,002.46 (0x4c02): IL_FAULT_M_ TWANGER	Malfunction of the ink-level sensor in the magenta reservoir. Replace the printhead.
9,003.47 (0x4c03): IL_FAULT_Y_ TWANGER	Malfunction of the ink-level sensor in the yellow reservoir. Replace the printhead.
9,004.48 (0x4c04): IL_FAULT_K_ TWANGER	Malfunction of the ink-level sensor in the black reservoir. Replace the printhead.
9,005.40 (0x4c05): IL_FAULT_C_JAM	The cyan ink-melt heater is on, but ink does not seem to be dripping. Check that the ink stick is able to advance in the chute. An ink stick jam will be reported three times before an ink-melter fault is declared.

**Table 4 Front panel and fault history log error codes and messages**

Error code	Meaning
9,006.41 (0x4c06): IL_FAULT_M_JAM	The magenta ink-melt heater is on, but ink does not seem to be dripping. Check that the ink stick is able to advance in the chute. An ink stick jam will be reported three times before an ink-melter fault is declared.
9,007.42 (0x4c07): IL_FAULT_Y_JAM	The yellow ink-melt heater is on, but ink does not seem to be dripping. Check that the ink stick is able to advance in the chute. An ink stick jam will be reported three times before an ink-melter fault is declared.
9,008.43 (0x4c08): IL_FAULT_K_JAM	The black ink-melt heater is on, but ink does not seem to be dripping. Check that the ink stick is able to advance in the chute. An ink stick jam will be reported three times before an ink-melter fault is declared.
<b>11,000:DMC</b>	
11,011.61	DMC event parameter block not found. The DMC library was attempting to locate an event parameter block in its linked list. The block was not found.
11,020.61	DMC event parameter block not found. The DMC library was attempting to locate a timer parameter block in its linked list. The block was not found.
<b>13,000:Printhead thermals</b>	
13,001.40 (0x6c01): TCH_JS_LEFT_OPEN	The thermistor in the left jet stack appears to be open. Replace the printhead.
13,002.41 (0x6c02): TCH_JS_LEFT_SHORT	The thermistor in the left jet stack appears to be shorted. Replace the printhead.
13,003.42 (0x6c03): TCH_JS_LEFT_HOT	The left jet stack heater is running away. Unplug the printer NOW!
13,004.43 (0x6c04): TCH_JS_LEFT_SLOW	The left jet stack heater is not heating at all, or is not heating as quickly as it should. Replace the printhead.
13,017.47 (0x6c11): TCH_JS_RIGHT_OPEN	The thermistor in the right jet stack appears to be open. Replace the printhead.
13,018.48 (0x6c12): TCH_JS_RIGHT_SHORT	The thermistor in the right jet stack appears to be shorted. Replace the printhead.
13,019.40 (0x6c13): TCH_JS_RIGHT_HOT	The right jet stack heater is running away. Unplug the printer NOW!
13,020.41 (0x6c14): TCH_JS_RIGHT_SLOW	The right jet stack heater is not heating at all, or is not heating as quickly as it should.
13,033.45 (0x6c21): TCH_RESERVOIR_OPEN	The thermistor in the reservoir appears to be open. Replace the printhead.

**Table 4 Front panel and fault history log error codes and messages**

<b>Error code</b>	<b>Meaning</b>
13,034.46 (0x6c22): TCH_RESERVOIR_SHORT	The thermistor in the reservoir appears to be shorted. Replace the printhead.
13,035.47 (0x6c23): TCH_RESERVOIR_HOT	The reservoir heater is running away. Unplug the printer NOW!
13,036.48 (0x6c24): TCH_RESERVOIR_SLOW	The reservoir heater is not heating at all, or is not heating as quickly as it should.
<b>14,000: Cap/wipe/purge thermals</b>	
14,001.42 (0x7c01): TCC_THERMISTOR_OPEN	The cap/wipe/purge thermistor appears to be open. Replace the drum temperature sensor.
14,002.43 (0x7c02): TCC_THERMISTOR_SHORT	The cap/wipe/purge thermistor appears to be shorted. Replace the drum temperature sensor.
14,003.44 (0x7c03): TCC_THERMISTOR_HOT	The cap/wipe/purge heater is running away. Unplug the printer NOW!
14,004.45 (0x7c04): TCC_THERMISTOR_SLOW	The cap/wipe/purge heater is not heating at all, or is not heating as quickly as it should. Check for an open connection or open thermistor in power supply.
<b>15,000: Drum thermals</b>	
15,001.42 (0x7c01): TCD_THERMISTOR_OPEN	The drum thermistor appears to be open. Replace the drum temperature sensor.
15,002.43 (0x7c02): TCD_THERMISTOR_SHORT	The drum thermistor appears to be shorted. Replace the drum temperature sensor.
15,003.44 (0x7c03): TCD_THERMISTOR_HOT	The drum heater is running away. Unplug the printer NOW! Verify that the vent on the right side of the printer is not blocked.
15,004.45 (0x7c04): TCD_THERMISTOR_SLOW	The drum heater is not heating at all, or is not heating as quickly as it should. Check for an open connection or open thermistor in power supply.
15,005.4x TCD_FAN_BLOCKED	The drum fan is not rotating properly.
<b>16,000: Preheater thermals</b>	
16,001.43 (0x8401): TCP_THERMISTOR_OPEN	The preheater thermistor appears to be open. Replace the paper preheater.

**Table 4 Front panel and fault history log error codes and messages**

Error code	Meaning
16,002.44 (0x8402): TCP_THERMISTOR_ SHORT	The preheater thermistor appears to be shorted. Replace the paper preheater.
16,003.45 (0x8403): TCP_THERMISTOR_ HOT	The preheater heater is running away. Unplug the printer NOW!
16,004.46 (0x8404): TCP_THERMISTOR_ SLOW	The preheater heater is not heating at all, or is not heating as quickly as it should. Check for an open connection or open thermistor in power supply.
<b>19,000 Head Calibration Fault</b>	
19,001.4X HC_DEV_FAULT (0x01)	Occurs during the scales and offset calibration. If this process fails a fault is declared. Any part in the chain could be responsible for the incorrect reading including the print head electronics, the A/D electronics, the waveform generation electronics, power supply, Wave Amplifier (on the power control board), print head interconnect cable, etc.
19,002.4X HC_DEV_FAULT (0x02)	Occur when the printer is attempting to determine how many data taps the print head uses. If this process fails an fault is declared. Any part in the chain could be responsible for the incorrect reading including the print head electronics, the A/D electronics, the waveform generation electronics, power supply, Wave Amplifier (on the power control board), print head interconnect cable, etc.
<b>22,700: Media jams</b>	
22,703,0C DECLARED JAM	Stall event
22,704,0C DECLARED JAM	Sensor failure
22,705,0C DECLARED JAM	Media jam at exit tray
22,707,0C DECLARED JAM	Media too long at exit tray
22,708,0C DECLARED JAM	Media too short at exit tray
22,721,0C DECLARED JAM	Media not staged at preheater entry in time for transfix
22,722, 0C DECLARED JAM	Media jam at stripper fingers

**Table 4 Front panel and fault history log error codes and messages**

Error code	Meaning
22,901,0C DOOR EVENT	The front access door is opened
22,902, 0C DOOR EVENT	The top, stripper, access door is opened
<b>22,LSS,TC: Media jams</b>	
<b>L</b> indicates the location of the jam	<b>SS</b> indicates sensor location:
1 Bottom Hi-capacity Paper Feeder	00 Usually because of an opened door
2 Middle Hi-capacity Paper Feeder	01 Bottom High-Capacity tray sensors
3 Top standard tray	02 Bottom High-Capacity pick sensors
4 Handfeed	03 Middle High-Capacity tray sensors
5 Front cover	04 Middle High-Capacity pick sensors
6 Top cover	05 Standard tray sensors
7 Y-axis jams (see following error codes)	06 Standard tray pick sensors
9 Door opened jams (see following error codes)	07 Handfeed sensors
	08 Preheat entry sensor
	09 Width sensors
	10 Width A sensor
	11 Width A4 sensor
	12 Preheat exit sensor
	13 Stripper exit sensor
	14 Media Exit sensor
	15 <undefined>
<b>T</b> indicates whether a timeout or an event occurred	16 VE_DM CYCLE_DONE out of order
0 = event	17 VE_TF_ROLLER_LIFTED out of order
1 - timeout	18 Unknown reason
<b>C</b> indicates checksum	
<b>31,000 Motor Faults</b>	
31,001.4x MP_FAULT_AUX_MOTOR_ERROR	Not used as a device fault condition.
31,002.4x MP_FAULT_PROCESS_MOTOR_STALL	Not used as a device fault condition.
31,003.4x MP_FAULT_PREHEAT_EXIT_SENSOR_BAD	Declared at boot time when a check is made to determine the condition of the preheat exit sensor. Declared when the sensors around the preheat exit sensor indicate the presence or absence of media contrary to that indicated by the preheat exit sensor.



# Troubleshooting

## System power-up sequence

The following lists the chain of events that occur when you turn on a printer. You can follow this list as one means of determining if the printer is operating correctly. The exact chain of events depends upon where the printer “believes” the printhead is positioned. The printer records in NVRAM the last known position of the printhead and the cap/wipe/purge assembly.

Power switch turned on:

1. Low-level, power-on self-test (POST) diagnostics are performed. The two status LEDs at the rear panel should be blinking and the front panel LEDs are turned on.
2. If POST diagnostics pass, the front panel **Error** LED is turned off and the LCD display is cleared.
3. **If the printhead is in either the Standby or Print position:**
  - a. If the printer is in its Standby mode, the cap/wipe/purge motor is run to ensure that the cap/wipe/purge assembly activates its home position sensor. If the printer is in Print mode, the printhead is moved to its X-axis home position and then centered.
  - b. The process motor is rotated to tilt the printhead forward (if not already forward), rotate all the rollers to their ready positions, disengage the transfix roller, and lower the maintenance drawer blade and wiper.

**If the printhead is in the cap/wipe/purge position:**

- a. The heaters in the printhead and cap/wipe/purge assembly are activated to melt the ink “gluing” them together.
- b. The printhead is tilted back.
- c. The ink is allowed to drain from the cap/wipe/purge assembly.
- d. The cap/wipe/purge assembly is lowered to its home position.
- e. A short wipe is performed and the cap/wipe/purge assembly is returned to its home position.
- f. The process motor is rotated to tilt the printhead forward (if not already forward), rotate all the rollers to their ready positions, disengage the transfix roller, and lower the maintenance drawer blade and wiper.
- g. The printhead is moved to its X-axis home position and then centered.

**If the printhead is in the print position but the cap/wipe/purge assembly is in some unknown intermediate position:**

- a. If the cap/wipe/purge assembly is not detected in its home position, then the heaters in the printhead and cap/wipe/purge assembly are activated in case the printhead and cap/wipe/purge may be “glued” together by cooled ink.
  - b. After waiting for the ink to melt, the cap/wipe/purge assembly is lowered to its home position.
  - c. The process motor is rotated to tilt the printhead forward (if not already forward), rotate all the rollers to their ready positions, disengage the transfix roller, and lower the maintenance drawer blade and wiper.
  - d. The printhead is moved to its X-axis home position and then centered.
  - e. A short wipe is performed and the cap/wipe/purge assembly is returned to its home position.
- 4. The printhead is tilted back to the locked position.
  - 5. The front panel displays a warm up message.
  - 6. The heaters are enabled and the drum begins to rotate.
  - 7. When the ink in the printhead is molten, the cap/wipe/purge assembly is positioned to the purge position.
  - 8. The printhead tilts forward and a purge cycle begins.
  - 9. A cleaning page is printed.
  - 10. The front panel displays a message that the printer is initializing and then ready.

The print engine is initialized.



## Verifying main board CPU operation

1. If the printer does not power up (rear fan is off and power-up diagnostics LEDs are off), go to the topic, “Verifying power supply operation” below.
2. Observe the rear panel LEDs located on each side of the rear panel DIP switches. *The left LED represents the operation of the PostScript firmware. The right LED represents operation of the main board’s print engine firmware.* During the POST tests the two LEDs toggle back and forth for each successful pass through each DRAM test. A failure in the power on self tests is indicated by the left LED (the PS led) flashing in a specific pattern of long and/or short flashes and repeated indefinitely. Other failures are indicated by the failure being printed on the Startup page.

After successful power-up, the left LED flashes at a regular “heartbeat” rate. The front panel **Power** light is turned on, the **Error** light is flashed, and the LCD is cleared.

## Verifying print engine operation by printing its startup page

1. If not already on, turn on the printer. If the printer does not begin initializing, go to the topic, “Verifying power supply operation” below.
2. Once the **Power** light is on (not blinking) and the front panel displays Ready to Print, scroll to **Menu** and press **Select**. Then scroll to the Printer Configuration menu item, press **Select**, and then scroll and select the **Startup page** menu item. The printer should print out a Startup Page.

If the printer prints a startup page, then the print engine is working correctly. If the printer does not print a startup page, then a problem exists with the print engine.

## Verifying power supply operation

### Required tools

- TORX T-20 screwdriver
- Digital multi-meter (DMM)

The power supply is divided into two sections: the AC section used for heaters and the DC section for control logic, printhead drivers and motors. Verifying the power supply involves three steps:

- Checking for proper AC voltage.
- Inspecting the power supply fuses.
- Testing for a shorted motor or solenoid driver, which shuts down the power supply.

## Measuring power supply voltages

**Warning** *AC line voltages are present on the power supply and possibly in the printer, via the heaters, while the printer is plugged into an AC outlet, even if the power switch is off.*

1. Turn off the printer and unplug it from its power outlet.
2. **AC Input:** With the DMM set to measure AC voltages, measure the power being supplied to the printer; it should measure between 87 to 128 VAC (115 VAC nominal) or 174 to 250 VAC (220 VAC nominal).
3. Proceed to the step, “Inspecting the power supply fuses” below.

If a heater shorts, F2 or F3 opens. The power supply does NOT shut down, however, a Service Required error code is displayed on the front panel.

## Inspecting the power supply fuses

Three fuses (F1 - F3) are mounted on the power supply.

1. Turn off the printer and remove the power cord.
2. Remove the screws securing the power supply. Disconnect the wiring harnesses plugged into the power supply and remove power supply.
3. With a DMM, determine that the fuses on the power supply are functional. Fuse F1 is the AC input fuses for the DC section of the power supply. If F1 opens, the power supply does not function and should be replaced.

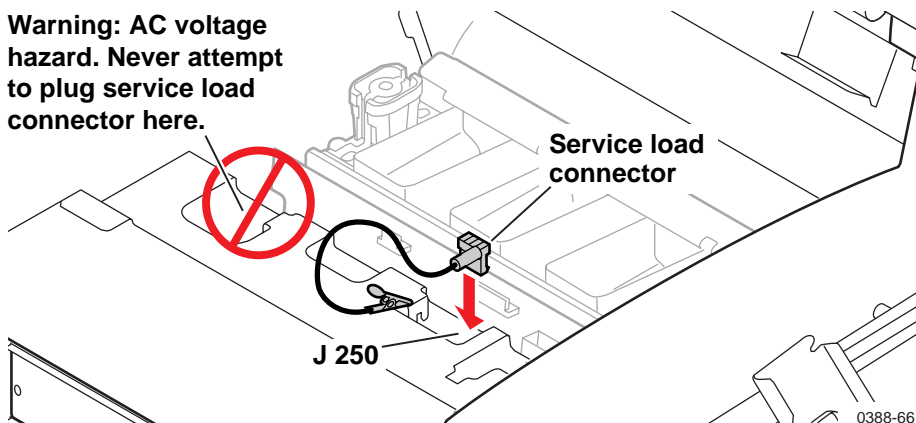
**Caution** *Fuse F2 and F3 are used for the AC heaters within the printer; they protect the power supply from, most often, a shorted triac. If F2 or F3 blows, it is best to replace the power supply rather than the fuse. Otherwise, with the fuse replaced, but the triac shorted, AC power may be applied to the heater without the printer even being turned on, resulting in a thermal runaway condition.*

If the fuses are functional, but the printer's power supply does not output DC voltages, proceed to the topic, “Testing for shorted drivers” on page 41.

## Testing for shorted drivers

1. Turn off the printer.
2. Disconnect the +40 DC loopback connector (the 4-pin connector with the two loopback wires) from J250 at the top of the power control board. (This isolates the Y-axis motor, process motor, X-axis motor, paper feed motor, vacuum pump, solenoids and clutches).
3. Attach the service load connector to J250 on the top of the power control board (behind the printhead) to simulate a load on the power supply. Attach the service load connector's ground clip to the printer frame. Do not leave the service load connector in place and powered-up for longer than 5 minutes; it gets hot from the current load.

**Warning: AC voltage hazard. Never attempt to plug service load connector here.**



### Attaching the service load connector to J250

4. Turn on the printer. If the rear panel LEDs illuminate (indicating power), the power control board or its loads are current-limiting the power supply. Go to Step 5. If no power is evident (no lit LEDs), replace the power supply.
5. Turn off the printer. Reconnect the +40 volt service connector to the power control board; then disconnect all load connectors from the power control board. Turn the printer on. If the rear panel LEDs still do not illuminate, the power control board has a shorted driver and must be replaced. If the LEDs do illuminate, isolate which motor or fan is overloading the power control board and power supply by turning off the printer and sequentially plugging each cable in one at a time and turning on the printer until the power supply is disabled. Replace the defective component. Also refer to the next topic "Testing for a shorted motor" on page 42.
6. Turn off the printer. Disconnect the two I<sup>2</sup>C bus cables from the power control board. (This isolates the I/O boards and their solenoid drivers.) If the rear panel LEDs illuminate, isolate which I/O board is shorting or which I<sup>2</sup>C cable is defective.
7. If the power supply still does not work, replace the power supply.

# Testing for a shorted motor

1. Reinstall the power supply if removed in the previous procedure.
2. Disconnect the process motor, the Y-axis motor, X-axis motor and the cap/wipe/purge assembly motor wiring harness.
3. Turn on the printer again to see if it does not overload now that the motors are disconnected from the power supply.

If the power supply is functional, move to the procedure, “Testing motor and solenoid resistances” on page 42.

If the motors and solenoids are not shorted, but the power supply still does not function, replace the power control board.

# Testing motor and solenoid resistances

1. Turn off the printer and disconnect the power cord.
2. With a DMM set for measuring resistance, test each motor's windings for correct resistance (disconnected from the printer). Rotate the motor's drive shaft slightly while taking the measurement.

**Table 5 Motor and solenoid resistances**

Motor or solenoid	Resistance (approximately)
Process motor	3 ohms
Y-axis motor	2 ohms
X-axis motor	60 ohms/phase
Paper feed motor	<1 ohms/phase
Maintenance drawer camshaft electric clutch	10. ohms
Paper-pick electric clutch	10 ohms
Transfix cam solenoid	45 ohms

# Media jams and the paper path

## Required tools

- TORX screwdriver and tips
- Digital multi-meter

Jams fall into the following four categories:

- Media-based problems
- Paper-pick errors
- Paper-feeding errors
- Paper-ejecting errors

## Media-based problems

1. Check that the correct type of media is being used. Fanning the media eliminates its tendency to double-pick.
2. Inspect the paper for bent, torn or folded corners.
3. Check to ensure no small pieces of paper are in the paper path.
4. Ensure that the correct media is in the correct media tray. The tray switch actuators indicates the size and the type of media loaded in the tray; the printer does not directly sense the size or type of media.
5. Ensure the correct weight of paper is being used. Use 16 - 32 lb. Bond (60 - 120 g/m<sup>2</sup>) in the paper trays. For manual feeding use 16 - 32 lb. Bond (60 - 120 g/m<sup>2</sup>) or 50 - 80 lb Cover (135 - 220 g/m<sup>2</sup>).
6. Ensure that envelopes are of the acceptable size and orientation with the side-flap up.

## Paper-pick errors

Paper-pick errors occur when the media in the media tray mispicks or the printer double-picks two or more sheets of paper.

1. Fan the media before inserting it in the media tray.
2. In humid environments, keep media sealed in packaging until it is needed for printing.
3. Ensure that the media fits properly in the tray. With the left edge of the stack of paper flush against the tray rail, there should be a small gap between the opposite edge of the stack of paper and the opposite side rail.
4. Clean the interior of the media tray. When installing paper, push the stack of paper down until the tray's lift-plate locks to the bottom of the tray. This prevents the top sheet of paper from being mispositioned as the tray is inserted in the printer.

5. Check that the pick roller is being rotated. In its starting position, the pick roller's flat side should face down; the flat, keyed end on the left end of the pick roller shaft faces up. If it is not, go to the topic "Checking the process motor and drive train" on page 45. Otherwise, go to Step 6.
6. Clean the pick roller with alcohol and a lint-free cloth. Paper dust can coat the pick roller and affect its ability to grip the paper and pull it out of the tray. Also clean the transport rollers.
7. Use the PC-based diagnostic's Verify Drive Current Requirement Test to check the operation of the paper-pick system.
8. Inspect the wiring harness leading to the paper transport clutch for nicks, cuts or crimped wiring. Ensure the connector is seated.
9. Inspect the paper-feed module for obstructions.

### Print transfer jams

1. Using PC-diagnostics, test the paper preheater. If the test fails, replace the paper/drum heater assembly.
2. Check to see if the upper feed roller drive belt is broken or slipped off of its pulleys. In such a case, the upper feed roller does not rotate when the lower feed roller rotates.
3. Check that the feed rollers rotate smoothly and that the front cover is fully closed and seated.
4. Check the paper-eject path for obstructions. Ensure no small pieces of paper are trapped around the stripper fingers.

If a piece of paper is trapped in the paper pre-heater, try pushing it out by inserting a stiff piece of cardstock into the paper preheater.

5. Ensure that the transfix roller rotates during the transfix process.
6. Test the sensors in the paper path. Look for damaged or non-operating sensor flags.
7. Check the transfix solenoid and its cam. Ensure they operate correctly and are properly lubricated.

## Checking the process motor and drive train

1. Determine if the process motor runs. If it does not rotate, go to Step 2. If it does rotate, go to Step 5.
2. Measure to determine if +40 VDC is being supplied to the motor. If it is, go to Step 3. If it is not, inspect the process motor's wiring harness. If the harness is functional, then troubleshoot the power control board and power supply. Refer back to the topic, "Verifying power supply operation" on page 39.
3. Disconnect the motor's wiring harness. Measure the resistance of the motor's windings. The expected resistances are listed in Table 5 "Motor and solenoid resistances," on page 42. If the windings are opened, shorted or far out of tolerance, replace the motor.
4. If the motor's winding resistances are within specification, inspect the wiring harness for nicks, crimps, opens or other problems. If the harness is functional, then replace the power control board.
5. Inspect the gear train on the inside of the printer frame; look for stripped gears or broken teeth. Be sure to inspect the inner teeth on the process motor gear.

## Media skews passing through the paper path

1. Check to see if the media is excessively curled. Curled media can get mistracked in the paper path.
2. Examine the paper path; ensure it is clear of obstructions.
3. Ensure that the pick roller is clean so that it picks up a sheet of media smoothly and evenly.
4. Check the upper and lower feed rollers. Also make sure that the front door is properly closed.
5. Check the flexible, white "paper deskew" springs on the inside of the front cover. Ensure none are bent, damaged, or missing.
6. The printer should be installed on a flat, level surface.

# Printing and print quality problems

Generally, print problems fall into the following six categories:

- Streaks or lines in the prints
- No printing
- Printing too light or too dark
- Poor quality printing
- Image is offset or cut off
- Wrinkling

## Streaks or lines across the print

1. Check the Y-axis belt tension. If the Y-axis drive is not smoothly and consistently rotating the drum, horizontal bands or lines appear in the print.
2. Replace the Y-axis motor.
3. Replace the power control board.

## Streaks or lines down the print



1. Clean the blade of the drum maintenance drawer.
2. Possible missing or weak jet. Print the service test print Weak/Missing Jet to determine if a jet is not performing. Perform up to three printhead cleaning cycles to try to clean a clogged jet.
3. If necessary, turn off the printer and allow the printhead to cool for 4 hours.
4. Test the vacuum system for proper vacuum levels and operation.
5. Ensure that no wiring harnesses are interfering with the horizontal slewing of the printhead. In such a case, the streaks or lines should be parallel and evenly spaced.

6. Check for media in the exit path.



7. The x-axis drive is not functioning correctly. If the X-axis drive does not slew the printhead smoothly and evenly during printing, vertical lines appear in the print. Print Service Test Print 1 "X-axis" to reveal an X-axis problem. Replace the X-axis drive, if indicated.
8. Replace the x-axis drive assembly.
9. Replace the power control board.
10. If streaks are on the front side of a duplex print, the paper preheater may be scraping ink off the print. Clean the preheater using the front panel initiated cleaning process "Remove ink smears."
11. Smears on a duplex print can also be caused by the paper preheater operating at a too high temperature. Use the PC-diagnostics to check the paper preheater's temperature. Replace, if necessary.

## Missing ink or light colored ink band running length of print



0388-42

Possible missing or weak jet.

1. Print the Service Test Print 2 "Weak Jet" to determine if a jet is not performing. Perform up to three printhead cleaning cycles to try to clean a clogged jet.
2. If necessary, turn off the printer and allow the printhead to cool for 6 hours.
3. Ensure the printhead maintenance vacuum system operates correctly.
4. If weak or missing jet cannot be recovered, replace the printhead.

## Scratches parallel to the long axis of printing, particularly with film



0388-43

Usually caused by foreign debris in the paper path.

1. Run a transparency through the manual feed to see if the scratch appears on the print. If it does not, the scratch occurred in the paper pick and early transport of the transparency film.
2. A scratch or smear caused by the paper preheater can be caused by debris built up on the heating surfaces. Run the front panel cleaning procedure Remove Ink smears. Additionally, you can manually force a sheet of thick 65 to 80 lb. paper through the paper preheater to "buff" the paper preheater heating surfaces. With the leading and trailing ends of the sheet of paper extending from the entry and exit of paper preheater, gently pull the sheet of paper back and forth several times and then remove the sheet of paper. Be careful of the paper sensor flags.

## White portion of print is colored



0388-44

Color on a print where no color should be printed is often called a latent image. A latent image remains on the drum when it should have been transferred to its sheet of paper. An insufficient amount of oil on the drum, provided by a dirty or defective or old maintenance drawer may be the problem.

1. Clean the wiper blade of the drum maintenance drawer. If necessary, replace the maintenance kit.
2. Run diagnostics to ensure that printer temperatures are in tolerance. Ensure that the drum heater is properly positioned. Print using a smoother, laser quality paper. Some recycled paper brands may be too rough.

3. Dark rectangular marks on transparency film can be caused by an accumulation of paper dust and oil on the feed rollers. Run 2 or 3 sheets of blank paper through the printer to clean the rollers or manually clean the rollers.
4. Replace the power control board.
5. Non-functioning printhead data cable. Replace the main board.
6. Replace the printhead.

## Color is uneven



This may be due to poor thermal regulation in the printer, resulting in uneven heating of the printhead, which in turn results in uneven ink drop jetting.

1. Clean the wiper blade and the wick of the drum maintenance drawer. Inspect the operation of the drum maintenance cam roller and the left and right cam actuators it pushes against.
2. Perform the procedure, "Printhead-to-drum spacing adjustment" on page 66 and "Transfix roller pressure spring adjustment" on page 72.
3. Replace the printhead.

0388-45

## Not printing

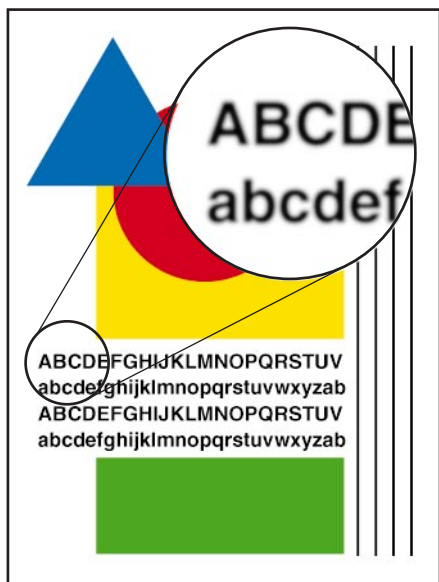
The printer processes a sheet of paper, but no image is printed on it.

1. No drive voltages to the printhead. Check for a loose connector leading to the printhead.
2. Replace the power control board.
3. Replace the printhead.

## Printing too light or too dark

1. Make sure the printer is correctly reading the type of tray installed and that the tray is correctly set for the media loaded in it. Printing on paper in transparency mode significantly darkens a print. Try a different color correction setting.
2. Perform the procedure, "Printhead-to-drum spacing adjustment" on page 66.

## Fuzzy text



0388-46

Text appears indistinct and difficult to read.

1. Head-to-drum gap is too great. Verify the gap with the adjustment as explained in the topic "Printhead-to-drum spacing adjustment" on page 66.
2. Verify the drum temperature using PC-based diagnostics. Ensure the drum temperature sensor is properly positioned.
3. If the problem persists, replace the printhead.

## Poor primary color fills



0388-47

Primary fills appear banded and inconsistent.

1. Head-to-drum gap is too small. Verify the gap with the adjustment explained in the topic "Printhead-to-drum spacing adjustment" on page 66.
2. Verify the drum temperature using PC-based diagnostics. Ensure the drum temperature sensor is properly positioned.
3. Verify the paper preheater temperature using PC-based diagnostics.
4. If the problem persists, replace the printhead.

### Poor small text resolution



0388-48

Small characters appear heavy and “plug up.”

1. Verify the drum temperature using PC-based diagnostics. Ensure the drum temperature sensor is properly positioned.
2. Inspect and clean the drum temperature sensor.
3. Ensure that the X-axis drive system is correctly assembled and lubricated.
4. If the problem persists, replace the printhead.

### Ghosting



0388-49

Drum is too warm.

1. Verify the drum temperature using PC-based diagnostics. Ensure the drum temperature sensor is properly positioned.

## Variation of density on second side of print

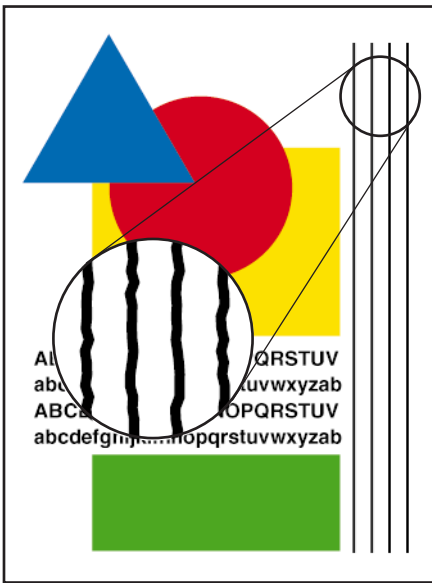
1. The transfix spring pressure is incorrect. Perform the procedure "Transfix roller pressure spring adjustment" on page 72.

## Ghost of first side image on second side of print

Incomplete image transfer is taking place on the first side of the print.

1. Inspect the drum maintenance system. Does the drum maintenance roller contain sufficient oil? Replace the drum maintenance roller (and counter chip), if necessary.
2. Is the drum maintenance cam roller and electric clutch operating correctly? Test them using PC-based diagnostics.
3. Ensure the left and right drum maintenance actuators operate correctly when lifted by the cams of the drum maintenance cam roller.

## Vertical line appear wavy



0388-50

Straight vertical lines appear to be wavy and ill-formed.

1. Too much oil on the drum. Inspect the drum maintenance drawer. Is the wiper blade damaged? If necessary, replace the drum maintenance drawer.
2. Are the drum maintenance cam roller and electric clutch operating correctly? Test them using PC-based diagnostics.
3. Ensure the left and right drum maintenance actuators operate correctly when lifted by the cams of the drum maintenance cam roller.

## Oil streaks on print



0388-51

Oil stains the edge of the print.

1. Inspect the drum maintenance drawer. Is the wiper blade damaged? If necessary, replace the drum maintenance drawer.
2. Are the drum maintenance cam roller and electric clutch operating correctly? Test them using PC-based diagnostics.
3. Ensure the left and right drum maintenance actuators operate correctly when lifted by the cams of the drum maintenance cam roller.

## Poor ink adhesion, poor image durability

1. Verify the paper preheater temperature using PC-based diagnostics.
2. The drum is too cold. Verify the drum temperature using PC-based diagnostics. Ensure the drum temperature sensor is properly positioned and has no contamination between it and the drum surface.
3. Try a different paper, if a specialty coated paper is being used.
4. The transfix spring pressure is incorrect. Perform the procedure "Transfix roller pressure spring adjustment" on page 72.

## Incomplete image transfer to paper



0388-52

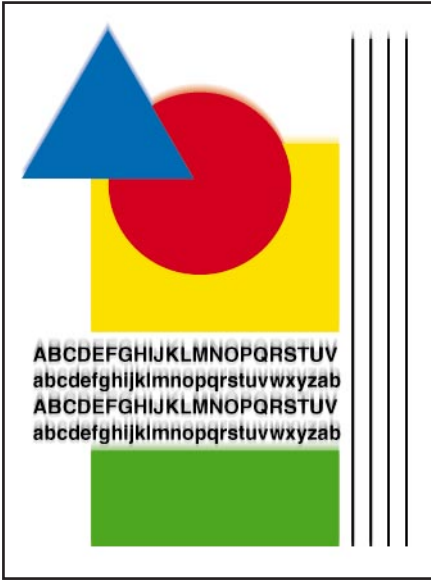
All of the image does not transfer to the paper. Part of the image remains on the drum to be picked up by a chase page or the next print, usually caused by insufficient or non-uniform drum oiling.

1. Inspect the drum maintenance drawer. Is the wiper blade damaged? If necessary, replace the drum maintenance drawer.
2. Inspect the drum maintenance system. Does the drum maintenance roller contain sufficient oil? Replace the drum maintenance roller, if necessary.
3. Are the drum maintenance cam roller and electric clutch operating correctly? Test them using PC-based diagnostics.

4. Ensure the left and right drum maintenance actuators operate correctly when lifted by the cams of the drum maintenance cam roller.
5. The drum may be too warm, verify the drum temperature using PC-based diagnostics. Ensure the drum temperature sensor is properly positioned and has no contamination between it and the drum surface.
6. Verify the paper preheater temperature using PC-based diagnostics.
7. Try a different paper, if a specialty coated paper is being used.



## Ink smears of first side of duplex print



0388-53

Preheater temperature is too high.

1. Verify the paper preheater temperature using PC-based diagnostics. Replace the paper preheater, if necessary.

## Repeating print defects on print



0388-54

The distance between each artifact of a repeating image defect reveals which imaging component is causing the defect.

1. Repeating defect 13.6 cm (5.34 in.) are caused by the transfix roller.
2. White or dark lines parallel to the long edge of the print, spaced 1.4 mm (0.054 in) in solid fills, using Standard printing mode indicate the X-axis step accuracy is incorrect. Ensure the long spring mounted underneath the printhead is intact and not contaminated with ink; remove the maintenance drawer to access the underside of the printhead. Inspect the X-axis drive system; replace it if necessary.

## Banding parallel to long edge of print



0388-55

Fills are inconsistent with wide bands of variegated color.

1. The head-to-drum gap is too great. Perform the adjustment detailed in the topic "Printhead-to-drum spacing adjustment" on page 66.
2. If the problem persists, replace the printhead.

## Wrinkling



0388-56

1. Try different media from a sealed package. In high-humidity environments, paper left exposed (unpacked) absorbs moisture and begins to warp.
2. Ensure the deskew fingers inside the front cover are not damaged or missing.
3. Inspect the maintenance drawer wiper blade. Replace the maintenance drawer, if necessary.
4. The transfix spring pressure is incorrect. Perform the procedure "Transfix roller pressure spring adjustment" on page 72.
5. Replace the drum/transfix assembly.

## Image is offset or cut off

1. Check the application for the correct image sizing and orientation.
2. Ensure that **Letter** or **A4** is the selected paper-size.

## Oil streaks on top of print

1. Clean the stripper fingers.
2. Run chase pages through the printer to clean the drum. Use the front panel menu item **Remove Ink Smears**.
3. Clean the maintenance drawer blade or replace the maintenance kit.

# Macintosh printing problems

## Image never prints

The printer indicates it is receiving data, but no print comes out of printer or the printer goes back to **Ready to Print** mode without printing an image.

1. Make sure that the correct Phaser 840 printer icon was selected in the **Chooser**. Try printing the job again. Try printing a different file or from a different application.
2. In the **Chooser**, switch background printing *off*. Try printing the job again. With newer LaserWriter printer drivers, select **Foreground Printing** in the **Print** dialog box.
3. Download the *Echo showpage* snippet which produces a blank sheet of paper, to determine if the printer is receiving and processing files.
4. Make sure you are printing with the correct PPD file.
5. Activate *Error Handler* using the front panel **Advanced Printer Settings** menu. Alternately, download the *Error Handler* utility and try printing the job again. If an error page is printed after printing the job again, call the Customer Support Hotline at 1-800-835-6100 for further assistance. Please have the error page in hand.
6. If available, try printing to a black-and-white PostScript Level 2 printer (such as an Apple LaserWriter). If the file does not print on the black-and-white PostScript printer, this may mean that the problem is application- or network-related.

## Image prints in black-and-white

1. In the **Chooser**, ensure a color printer icon is displayed next to the Phaser 840 in the list of available printers. This indicates the printer's PPD has been selected and configured.
2. In the Print dialog box, make sure that the **Color/Grayscale** option has been selected.
3. Make sure that the Phaser 840 printer icon was selected in the **Chooser**. Try printing the job again.
4. Check the version of your LaserWriter driver to ensure that it is version 6.0.x or higher. Earlier versions of the driver do not support color PostScript.
5. The application may require special instructions to print, such as those contained in a .PPD file; check in the *Phaser 840 Printer CD-ROM*.

## Image is rotated 90 degrees

1. In the application's **Page Setup**, make sure that the image is selected to print in Portrait or Landscape orientation, as you expect.

## Printer isn't in the Chooser

1. Ensure that the printer is turned on and the rear panel health light is flashing at a regular rate.
2. Check the **Network** or **AppleTalk** control panel to ensure the proper network or zone is selected.
3. Check to see if the printer has not been renamed or placed in another zone. You can print a Configuration Page, which lists this EtherTalk information as well as other information about the printer.

## Windows printing problems

### Image never prints

The printer's front panel Receiving data message is displayed as if receiving data, but nothing comes out of printer or the printer goes back to Ready to Print mode without printing an image.

1. From the printer driver, under the printer's set up options, set **TRANSMISSION RETRY = 850**.

# Adjustments

## Bypass mode (manufacturing mode)

Bypass mode allows you to access the front panel menus (bypassing the engine and PostScript initializing processes) without having to wait for the printhead to warm up. This way, you can reset NVRAM or read fault codes immediately. Meanwhile, the printer continues to warm-up and initialize “in the background.”

1. At the rear of the printer, set DIP Switch 2 into the *down* position. Ensure Switches 1, 3 and 4 are up. (Normal operation is all switches up.)
2. Turn on the printer.

The printer will not print a Cleaning page nor a Startup Page when placed in Bypass Mode.

## Cool down mode

The printer features a menu item that accelerates the cooling down of the printhead. When the printer is turned off, it automatically gives the option of performing a quick cool down.

1. Turn off the printer.
2. Scroll to the menu item Shutdown For Moving Printer and push **Select**.
3. Open printer doors to help speed the cooling process.

The printer turns off all the engine heaters and runs the fans on high until the ink in the printhead has solidified. Then the printer shuts itself off. If you are shipping the printer, remove the maintenance drawer.

## Hidden service menu

To access the hidden service menu:

1. Scroll to the Troubleshooting menu and press **Select**.
2. Press and hold the Left arrow button.
3. While holding the Left arrow button; press **Select**.

### Hidden Service Menu

Troubleshooting

Previous Menu

Test Prints

Fault History

Reset NVRAM

Cool Down for Power Off

Reset Printer

Head Adjust

Adjust X-axis Scale

Drift Compensation (On/Off)

Head-to-Drum Adjust

Execute Head Wipe

Print Usage Profile

Engine Copy count: xxxxx

Head SN: xxxxxxxx

Head Cal Date: dd mmm yyyy

Head Version: xx

Engine FW Version x.xx

Duplex Oil chase

Exit

## Bypassing a “short menu”

When the front panel is locked, the Printer Configuration menu will not show the Default Printer Settings and Network Settings.

1. Scroll to the Printer Configuration menu.
1. While holding the Left arrow button; press **Select**. The front panel will display the complete menu list.
2. Exiting from the submenu returns the printer to the short version of the Printer Configuration menu.

## Printing service test prints

1. Turn on the printer.
2. Allow the printer to complete its power-up self-tests. The front panel displays:  
READY TO PRINT
3. Scroll to the Troubleshooting menu and press **Select**.
4. Press and hold the Left arrow button.
5. While holding the Left arrow button, press **Select** to enter the hidden service menu.
6. Scroll to the menu item Test Prints. Select a test print.

Refer to “Test Prints” on page 133; it discusses each test print and what printing defect it reveals.

## Printing the Configuration Page

1. Turn on the printer.
2. Allow the printer to complete its power-up self-tests. The front panel displays:  
READY TO PRINT
3. Scroll to the Menu and press the **Select** button.
4. Scroll to the menu item Printer Configuration and press the **Select** button.
5. Scroll to the menu item Print Configuration Page and press the **Select** button.

The configuration page shows a great deal of information regarding the data and set-up values stored in NVRAM. Refer to the topic, “Configuration Page” on the *Color Printer Service & Support Resources CD-ROM* for an explanation of the configuration page.

## Selecting Duplex Oil Chase

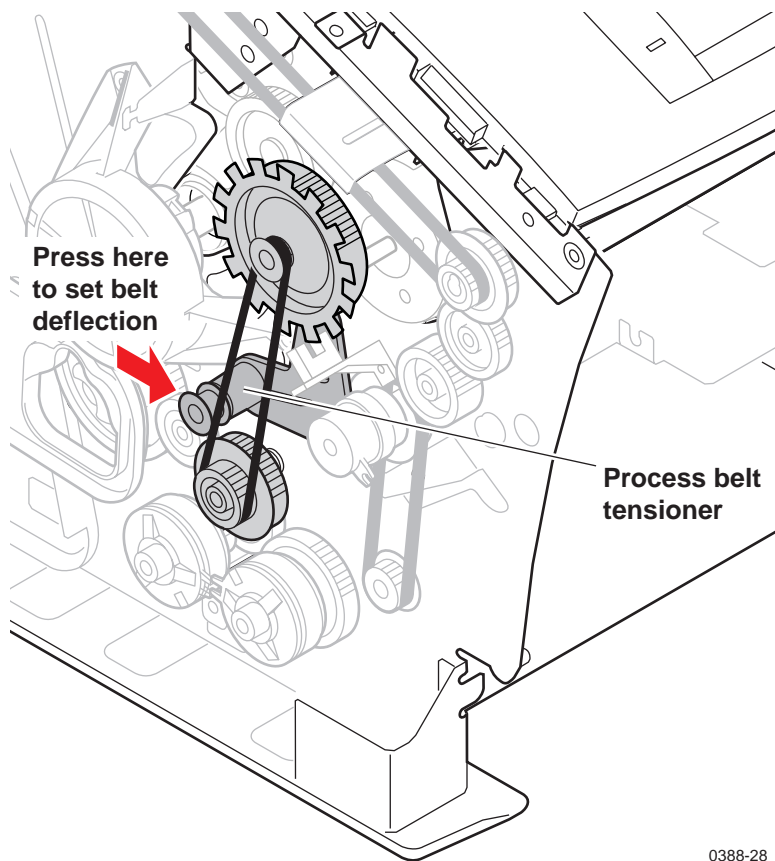
This item is turned on to correct a print artifact called “blistering.” Blistering, when it occurs, affects the duplexed side of a solid fill and appears as the texture of an orange peel. For blistering to occur, it must appear on the second side of the second of two or more solid-fill duplex prints. Before enabling Duplex Oil Chase, try different, heavier paper. Duplex Oil Chase enabled causes a blank page to print on simplex to duplex printing transitions and after every 50 duplex prints.

1. Scroll to the hidden service menu.
2. Scroll and highlight the menu item Duplex Oil Chase.
3. Press Select to turn the menu item on.
4. Exit the hidden service menu.

# Adjustments

## Process belt tension adjustment

1. Turn off the printer and remove the left-side cabinet panel.
2. To adjust the belt tension, loosen the process belt tensioner. With a spring scale, press inward on the tension idler of the process belt with a pressure of 0.7 kgs (1.5 lbs) and then tighten the tensioner in place. Do not over-tension the belt.



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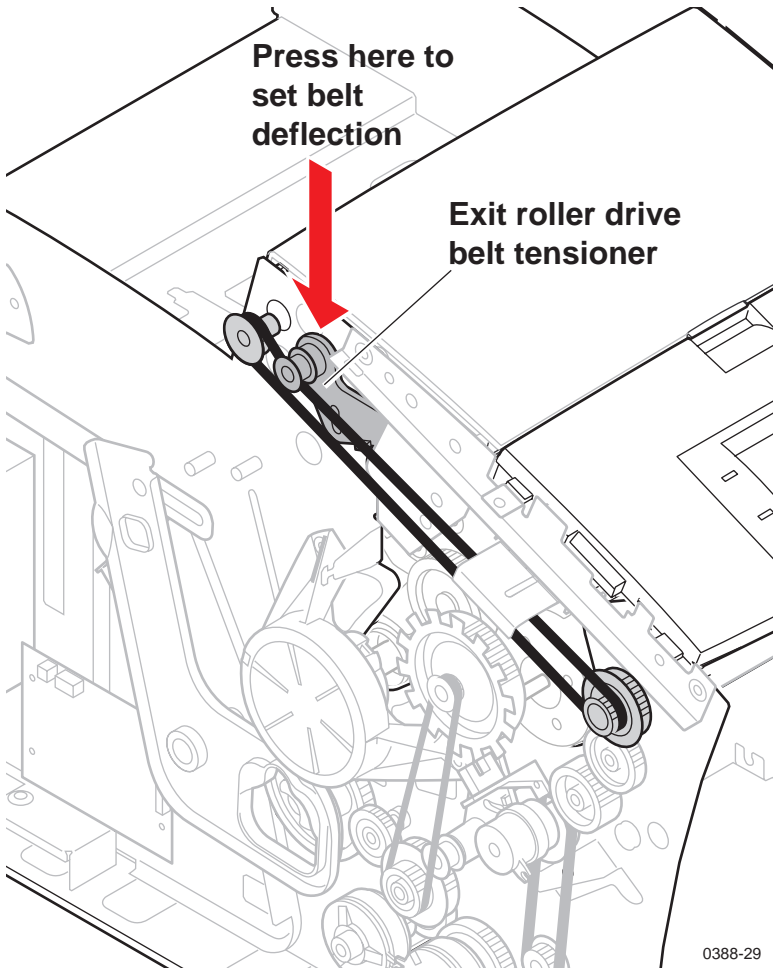
### Setting process belt tension

3. Reinstall the left side panel.



## Exit roller drive belt tension adjustment

1. Turn off the printer and remove the left-side cabinet panel.
2. To adjust the belt tension, loosen the exit roller drive belt tensioner. With a spring scale, press downward on the idler tensioner of the exit roller drive belt with a pressure of 0.5 kg (1 lb) then tighten the tensioner in place. Do not over-tension the belt.



### Setting exit roller drive belt tension

3. Reinstall the left side panel.

## Y-axis belts tension adjustment

Perform this procedure after loosening or removing the Y-axis belt drive assembly.

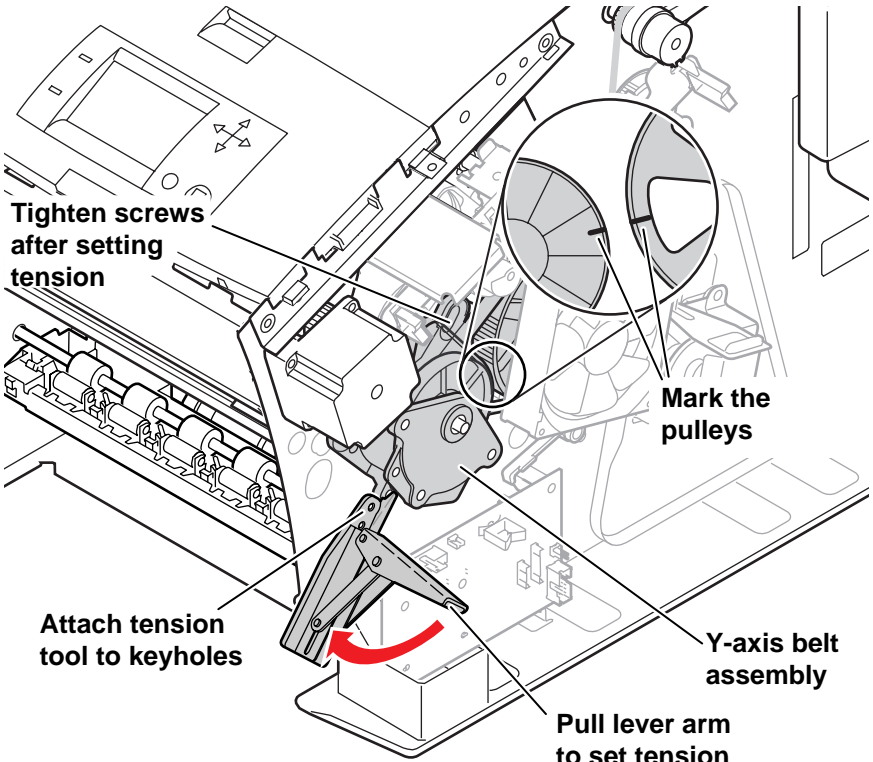
1. Ensure that the three mounting screws that secure the Y-axis drive assembly to the chassis are 1 turn loose and that the Y-axis idler bracket slides freely with respect to the chassis.

### Note

*If there is a situation in which diagnostics are not available when installing a new Y-axis drive assembly or drum/transfix assembly, then locate any previously placed index marks on the pulleys and proceed as if re-using existing parts. Allow the system to cool as long as feasible before mounting the Y-axis drive assembly onto the chassis. Tensioning of the y-axis drive assembly without diagnostics increases the risk of failures associated with low belt tension (for example, a "growling" sound heard upon cold power-ups).*

2. Attach the Y-axis belt tension tool (in its unloaded or folded out position) to the keyholes in the side frame of the printer just below and in front of the Y-axis drive assembly. The tool's fishhook should engage the eyelet of the Y-axis drive assembly.
3. Pull forward and down on the lever arm of the tension tool to apply tension to the Y-axis belts.
4. While the belts are under tension, rotate the drum pulley 5 times to rotate the belts and seat them in place.
5. Beginning with the upper-right screw, tighten the three mounting screws to 30 in.-lbs. to secure the Y-axis drive assembly in place.
6. Using PC-based diagnostics, run the test: "Position for Belt Tightening" in the "Y-Axis Group" test suite. This positions the belts in the proper orientation for retensioning. Do not move the pulleys.
7. Place an index mark on the edge of each pulley: Mark the Y-axis drive pulley and the drum pulley where the edges are closest to one another, disregarding previous marks. Use a distinct color if the pulleys have been previously marked.
8. Loosen the 3 mounting screws until the bracket slides freely on the chassis and then re-tighten the screws to 30 in.-lb.
9. Release the tension tool's lever arm and remove the tool.

10. Reassemble the printer and make a test print.



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**Setting the Y-axis belt tension**

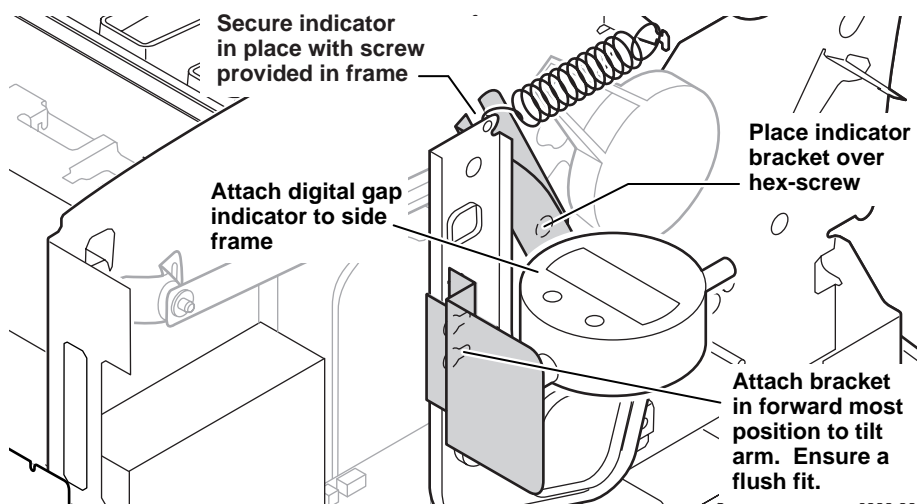
# Printhead-to-drum spacing adjustment

## Tool required

- Printhead-to-drum gap tools
- Small (3/16 in.) flat-blade screwdriver
- 9/64 in. hex tip
- Magnetic screwdriver
- T-20 TORX tip

This procedure assures that the printhead is the proper distance from the drum. Make this adjustment after removing or replacing the printhead.

1. Remove the top cover. Remove the metal heat cover.
2. Tilt the printhead to its print position and, if removed, attach the head tilt spring.
3. For the "hot" adjustment, scroll to the printer's hidden service support menu. Activate the diagnostic's Printhead to Drum Gap Adjustment (Hot) routine. The routine automatically centers the printhead, and brings the printhead and drum to their operating temperatures.
4. Lift the ink loader up and back slightly so that the printhead can be accessed. Do not unplug the printhead.
5. If not already tightened, tighten the printhead mounting screws to 20 in- lbs.
6. If not already loose, loosen the printhead's four locking screws (two at each end of the printhead) until they are just snug in place.
7. Install the digital gap indicator and bracket to the left side of the printer frame and tilt arm. Ensure the digital indicator is set to inches, "in." Press **Origin** to zero the digital indicator.

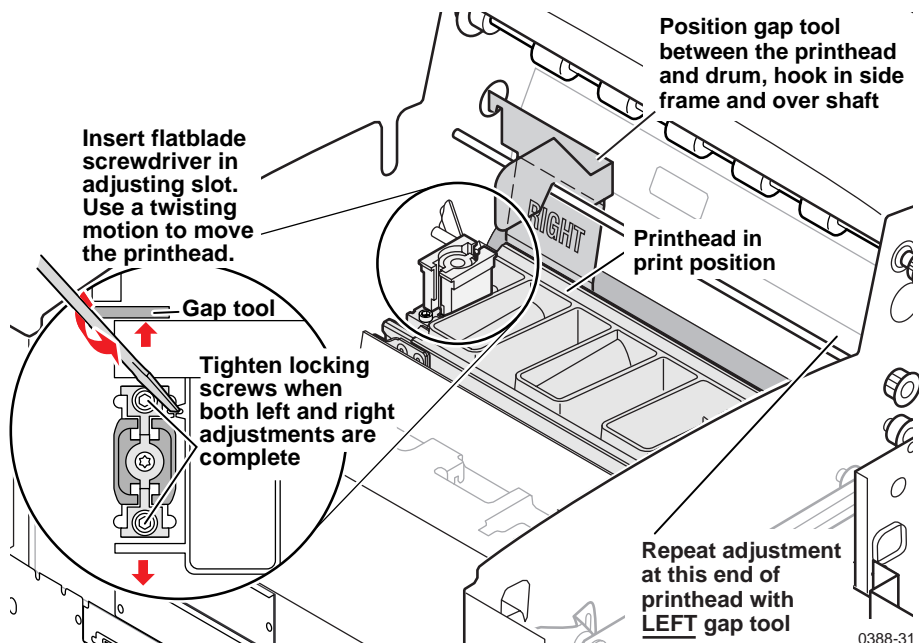


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## Attaching the digital gap indicator

8. At the right side of the printhead, insert the RIGHT printhead spacer between the printhead and the drum. Check the indicator; for a "hot adjustment" it should read  $0.0070 \pm 0.0010$  inches, and  $0.0030 \pm 0.0010$  inches for a "cold" adjustment. Adjust the printhead's spacing adjustment screws until the indicator reads the correct value.

**Note** *Do not insert both spacers at the same time as this will only measure the larger of the two gaps.*



### Spacing the printhead to the drum

9. Remove the right printhead spacer and install the LEFT spacer between the printhead and drum. Repeat the adjustment.
10. Remove the spacer. Snug the four locking screws using an X-pattern. Then tighten the four screws, using the same X-pattern, to 20 in./lbs.
11. If not connected, plug the printhead's data ribbon cable and power wiring harness into the power control board. Inspect both ends of the data ribbon cable to ensure they are properly seated.
12. Recheck the gap at both ends of the printhead.
13. Remove the head-to-drum gap indicator and bracket from the frame.
14. Reinstall the ink loader and metal heat cover.
15. Select complete from the front panel. Reinstall the top cover.
16. Print service test print Head to Drum Gap to check alignment.

## Cap/wipe/purge assembly belt adjustments

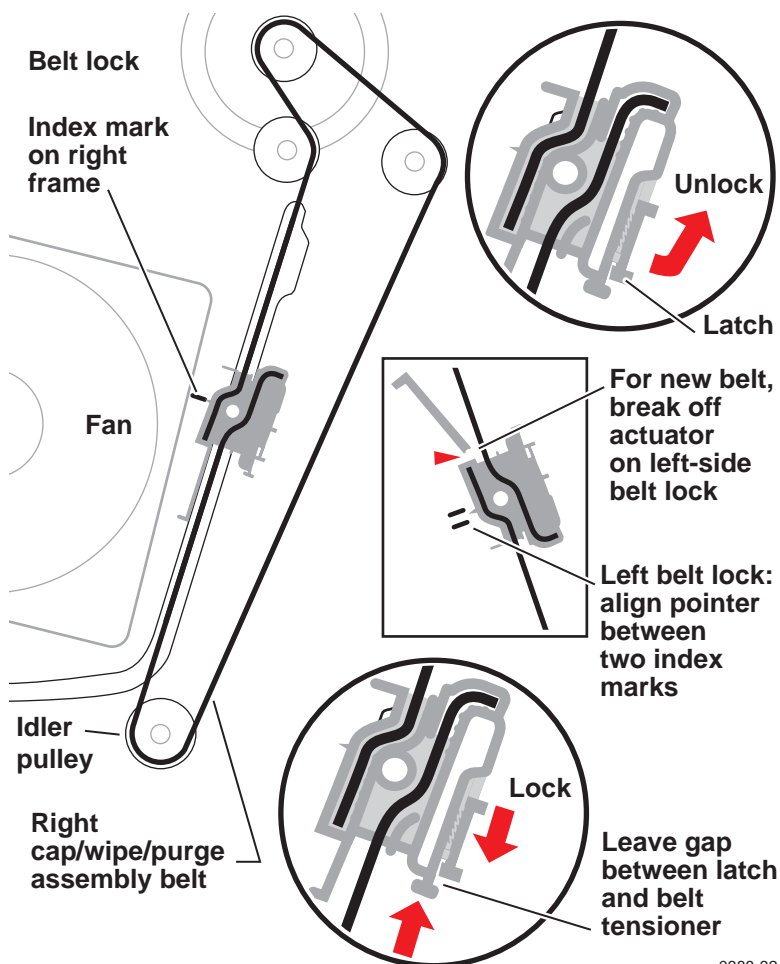
The tension of the cap/wipe/purge assembly belts is factory-set. Do not adjust them unless you remove or replace one or both belts. The belts are Kevlar-reinforced; they will not stretch over their lifetime. The belts are also factory-adjusted for parallel tracking (alignment). As long as the belts, cap/wipe/purge assembly motor, or the belt clips (which hold the cap/wipe/purge assembly) are not disturbed, no adjustment is needed.

However, if you replace one or both of the belts or the cap/wipe/purge drive motor, you must ensure that the belts are in alignment (timing) with each other; this ensures that the cap/wipe/purge assembly is perfectly aligned to the faceplate of the printhead. If the belts are not aligned, the printhead purging is ineffective, due to poor sealing between the printhead faceplate and the cap/wipe/purge assembly.

1. Ensure that the cap/wipe/purge assembly is properly installed.
2. Rotate the large drive gear to pull the cap/wipe/purge assembly to about the middle of its travel in the chassis frame slot.
3. Ensure each timing belt lock is tightened to its fourth tooth, as illustrated.
4. Position the left-side timing belt lock so its pointer points between the index mark on the printer frame.
5. Holding the left belt so it does not move, inspect the right-side timing belt lock's pointer. It should point at the index mark on the right-side printer frame.

If the right-side pointer does not point to the index mark while the left-side belt lock is between its marks, loosen the right timing belt by removing the lower idler pulley and adjusting the belt so that it aligns with the timing mark.

6. Repeat until the right-side timing lock's pointer points at the index mark on the right-side frame as the left-side timing belt lock's pointer points between its index marks on the left-side frame.



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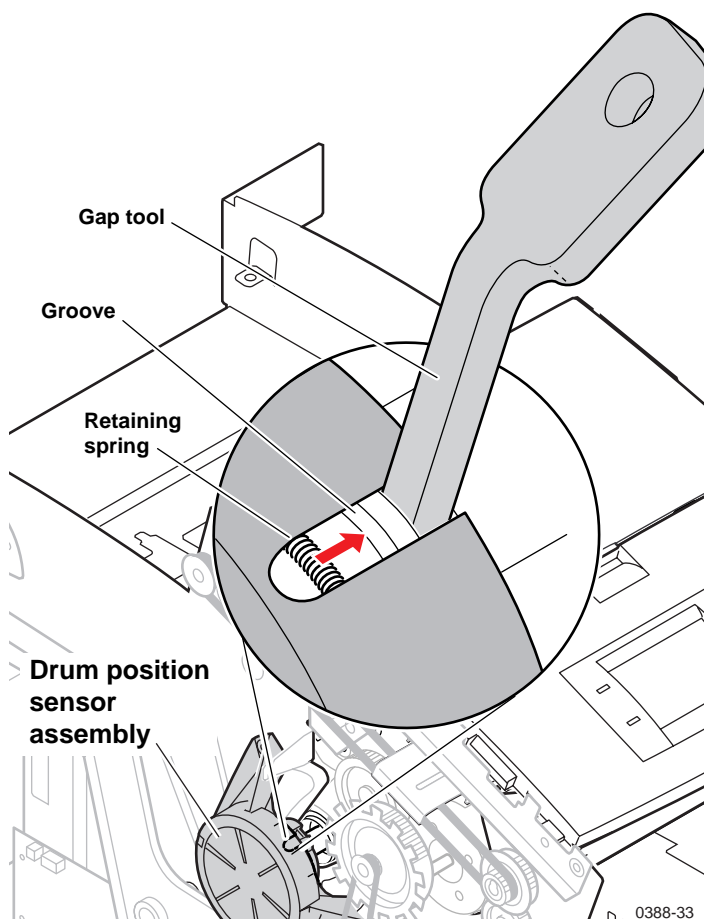
**Aligning (timing) the cap/wipe/purge assembly drive belts**

## Drum position encoder gap

This procedure ensures that the drum-position sensor assembly's encoder wheel rotates freely inside the gap of the drum-position sensor without the encoder wheel's disk touching the sensor. If the disk touches the sensor, it can abrade the disk and result in erroneous drum position readings.

1. Ensure that the retaining spring is not in the drum-position sensor assembly's encoder wheel groove. This ensures that the encoder wheel is not tensioned and slides easily onto the drum shaft.
2. If not already mounted in place, secure the drum-position sensor assembly onto the drum shaft and secure it to the printer frame.
3. Through the access hole in the drum-position sensor assembly, position the encoder gap tool on the drum shaft.
4. Reposition the drum-position sensor assembly's encoder wheel on the drum shaft until it butts firmly against the encoder gap tool.
5. Holding the gap tool in place, with a small, flatblade screwdriver, slide the encoder wheel's retaining spring into the encoder wheel's groove.
6. Remove the gap tool. Reassemble the printer and make a test print.





## Setting the drum position encoder gap

## Transfix roller pressure spring adjustment

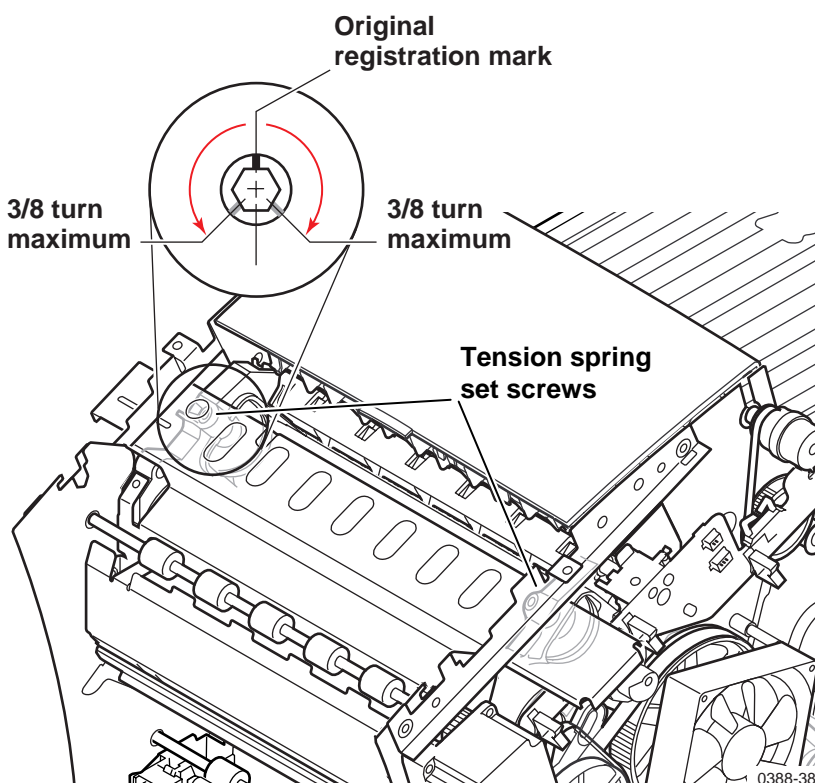
1. Print the service test print YMCKRGB in duplex mode. Duplex mode can be set using the front panel menu **Printer Default Settings**.
2. If any of the prints are wrinkled on both the left and right sides of the print, the drum/transfix assembly must be replaced. No adjustment will solve the problem.
3. If wrinkling is only present on the left or right side of any print, note which side.
4. Remove the front cover to access the drum/transfix assembly.
5. Draw a reference mark on the both the left and right spring set screws.
6. On the side of the printer corresponding to the wrinkling, tighten the set screw clockwise 1/8 of a revolution, using a 4 mm hex driver. On the side that does not wrinkle, loosen its set screw 1/8 of a revolution.

**Note**      *Whatever adjustment is added to one side must be taken away from the other side to maintain roller balance.)*

7. Reassemble the printer and again print the service test print YMCKRGB in duplex mode.
8. If wrinkling still occurs on the same side, repeat Step 6 and 7.

Do not adjust the set screws more than 3/8 of a revolution from their original position. Any adjustment beyond this point results in ink adhesion problems.

9. If wrinkling continues to occur, replace the drum/transfix assembly.

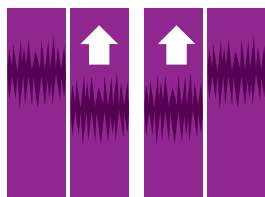


**Adjusting the transfix roller pressure springs**

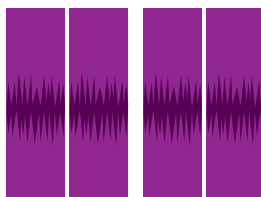
## X-axis scale adjustment

This adjustment sets the gain or rate-of travel of the printhead's x-axis movement. Perform this adjustment:

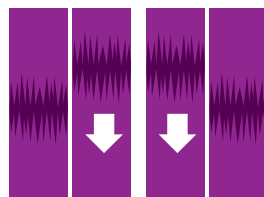
- To correct thin, parallel pin stripes running the length of the page, appearing evenly-spaced across the width of the page (not due to a weak or missing jet).
  - Anytime the NVRAM chip is replaced
  - Anytime an X-axis component is replaced.
1. Allow the printer to warm up to its idle, "Ready to Print," state.
  2. Enter the "hidden" service menu by scrolling to the Troubleshooting menu and pressing **Select**. Then press and hold the Left arrow button and, while holding the Left arrow button, press **Select**.
  3. Scroll to the service menu item `Test Prints` and press **Select**. Choose the test print 1: `X-axis Motion` and press **Select** to print it.
  4. Interpret the second of the two X-axis motion prints. The print features four purple columns, each containing a jagged black band. The black bands should all align horizontally with each other.
  5. If an adjustment is needed, scroll to the menu item `Set X-axis Scale`. Change the displayed value to a new value, if necessary. Increasing the scale value raises the two center black bars. Decreasing the scale value lowers the two center black bars.
  6. Select the menu item `Print X-axis calibration pattern` to verify the adjustment. Repeat the adjustment, if necessary.



**Increase scale  
adjust to raise  
center bars**



**Correct**



**Decrease scale  
adjust to lower  
center bars**

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**Adjusting the x-axis scale adjustment**

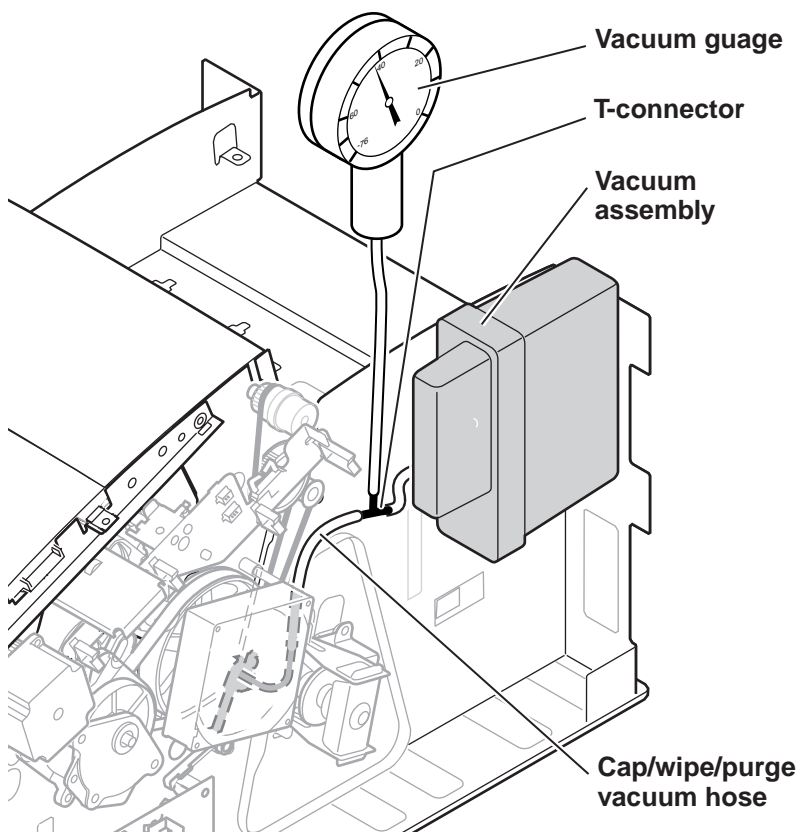
# Vacuum check

## Tools required

- Magnetic screwdriver
- T-20 TORX tip
- PC diagnostics
- Vacuum gauge
- T-15 TORX tip

Use this check to verify the actions of the vacuum pump and the solenoid valve. In addition, you can determine if the cap/wipe/purge assembly is sealing properly against the printhead faceplate.

1. Turn off the printer.
2. Remove the top and right-side covers.
3. With a T-connector, connect the vacuum gauge to the between the vacuum/pump module and the cap/wipe/purge unit.



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**Connecting the vacuum gauge to the printer**

4. Turn on the printer and enable the PC diagnostics as explained in the topic, "PC-based diagnostics" on the *Phaser 840 Printer Service CD-ROM*.
5. Run the **Purge Printhead Test** from the **Head Maintenance** test suite. When the solenoid valve is energized, you should see the vacuum gauge jump to about the value 51 cm Hg (20 in. Hg, 10 psi) and within 4 to 6 seconds bleed off to 0.

If the vacuum does not reach the expected value:

- There is a leak in the vacuum system from the pump
- The accumulator and their plumbing or the vacuum pump is defective

If the vacuum drops to zero immediately, the cap/wipe/purge unit is not sealed to the printhead.

This test allows you to check the action of the vacuum as it is applied to the printhead; the cap/wipe/purge assembly should be sharply sucked against the printhead faceplate. If it is not, there may be an ink clog in the vacuum tube leading to the cap/wipe/purge assembly.

If the vacuum does not bleed off, then the air valve is not opening properly, the 7-mil orifice (a part of the vacuum/pump assembly) is blocked or the vacuum tubing may be clogged. *If the printhead is hot, such a condition can allow ink to be sucked into the vacuum system tubing.* If the vacuum takes longer than 4 to 6 seconds to bleed off the cap/wipe/purge assembly is defective

If the vacuum bleeds off too quickly, then the cap/wipe/purge assembly is defective; check to see if the cap/wipe/purge assembly is not sealing properly to the faceplate. Check that the cap/wipe/purge assembly is properly positioned by performing the "Cap/wipe/purge assembly belt adjustments" on page 68.

# *Cleaning and Maintenance*

The printer requires periodic cleaning to keep it in peak operating condition. Some cleaning procedures, such as purging the ink-jets are done automatically when necessary. Other procedures, such as scrubbing the paper-feed rollers with an alcohol-soaked cloth, must be done by customers.

The printer should be cleaned when any of the following symptoms occur:

- Light stripes or missing colors appear in prints.
- Ink smears or random streaks appear on the front or back of prints.
- Oily spots appear along the top of prints.
- Mispicks or multiple picks occur at the media tray.
- Persistent paper jams inside the printer or at the media tray.
- Wiggly vertical stripes caused by too much oil created by a dirty maintenance drawer blade.

Most print-quality and media-transport problems can be cured by initiating cleaning procedures available through the printer's front panel menu.

# Cleaning

## Supplies required

- 90% pure isopropyl alcohol
- Alcohol-moistened wipes
- Foam swabs

**Caution** Do not use **rubbing alcohol** because it can contain water and oils that leave undesirable residue on the printer parts. Never use **water** to clean the printer's internal components.

Appropriate cleaning procedures, as listed in the following tables, should be performed when specific print-quality or paper transport problems occur. All cleaning procedures are detailed in the *Phaser 840 Printer Advanced Features and Troubleshooting Manual*.

## Light stripes or missing colors

Problem type	Solution
Missing or light-colored stripes on prints.	Select the automated procedure <b>Eliminate Light Stripes</b> from the front panel <b>Troubleshooting</b> menu.

## Ink smears, oil spots or random ink streaks

Problem type	Solution
Ink smears on the front, back or edges of a page.	Select the automated procedure <b>Remove Ink Smears</b> from the front panel <b>Troubleshooting</b> menu.  Check the drum maintenance tray for ink and paper-dust build-up on the wiper blade.
Oil (drum fluid) on top edge of print.	Select the automated procedure <b>Remove Ink smears</b> from the front panel <b>Troubleshooting</b> menu.

## Media jams

Problem type	Solution
Paper-pick or jamming problems at the tray.	Clean the pick roller.
Paper jamming problems at the front door.	Clean the transport rollers. Use the blue thumbwheel on the duplex roller to manually rotate the rollers.
Paper- jamming problems at the exit.	Clean the exit rollers and the stripper fingers. Use the blue thumbwheel on the duplex roller to manually rotate the rollers.
Paper-pick or jamming problems at the tray of the High-capacity Paper Tray Assembly.	Clean the High-capacity Paper Tray Assembly feed roller.
Duplex path jam	Clean the preheat, duplex and exit rollers. Use the blue thumbwheel on the duplex roller to manually rotate the rollers.
Double picks	Clean pick pad with 90% alcohol



## Cleaning Page

Under certain conditions, the printer purges its ink-jet nozzles to clear any jets plugged with ink. When the purge is completed, the printer outputs a cleaning page to clear the purge pattern from the print drum. Ink jets are purged under the following conditions:

- During warm-up from a power-off condition.
- When the printer exits the Energy Star mode.
- When customers initiate the Eliminate Light Stripes automatic cleaning procedure from the front panel.

## Vacuum

Vacuum dust from the top cover, the metal heat duct over the printhead and plastic dust cover under the stripper fingers.

## Drum temperature sensor

With a dry swab, clean any buildup around the drum temperature sensor. You can access the sensor through the opened stripper finger cover. Also make sure the sensor rides evenly on the drum surface. You can remove the sensor, if necessary, to clean under it.

# Maintenance

## Maintenance roller

The printer uses the maintenance roller as part of its self-maintenance routine to coat the print drum with oil before each print. The maintenance roller (and its counter) must be replaced after about 30,000 prints (the starter maintenance roller must be replaced after 10,000 prints). A front panel message indicates when the maintenance roller is low. Printing is still possible when the maintenance roller fluid is low. When a front panel message indicates the maintenance roller is “empty,” the maintenance roller and its counter must be replaced before continued printing is possible. Refer to the instructions included with the kit to replace the maintenance roller kit.

**Note**      *The drum fluid, an oil, poses no known adverse health effects. Refer to the Material Safety Data Sheet for amino oil in Phaser 840 Printer Advanced Features and Troubleshooting Manual for more information.*

## Waste tray

The maintenance drawer contains a waste tray that collects ink that has been purged from the printer’s ink jets. The waste tray should be emptied each time the maintenance drawer is removed from the printer. Refer to “Caring for Your Printer,” in the *Phaser 840 Quick Reference Guide* for instructions on removing and emptying the waste tray. Be sure to insert the waste tray into the maintenance drawer before reinstalling the maintenance drawer in the printer. Never reuse waste ink in the printer.

# Lubrication

## Tools and supplies required

- Light oil
- Grease 006-7997-00

In general, all of the printer's bearings and motors are lifetime factory-lubricated. However, over time and under certain extreme operating conditions, oil and grease may dry out, causing squeaks and rumbling noises in the printer. Look for fine metal particles — a clear sign of an old or worn bearing. Replace the bearing or the assembly it is a part of.

A drop of grease on a noisy bushing will quiet a noisy printer. Too much lubrication can get into the paper path and attract dust, so apply lubrication sparingly.

Lubricate the following only when needed:

- **Bushings:** Apply a drop of light oil to a bushing if it is noisy or running dry.
- **Plastic gear train:** This gear train from the process motor to the paper-feed module requires only a small amount of white grease for noise reduction purposes. Apply grease sparingly so that it does not fling off of the gears when they turn. You need only to apply a dab of grease to a single gear and the grease will migrate throughout the entire gear train. Do not apply oil to gears; only use approved grease.

**Note**      *Do not apply lubricant to the head tilt gear or the head tilt gear guide.*

- **X-axis drive.** Apply a *small* amount of grease on the tip of the nose cone. Apply a *small* amount, 3 dabs, on the threads of the X-axis shaft.
- **White (nylon) plastic bearings and cams:** No lubrication required.

# Inspection

**Rollers:** Replace the rollers when you see any of the following defects:

- Flat spots.
- Out of roundness.
- Cracked rubber.
- Loss of traction (tackiness) causing pick or feed failures.

**Gears:** Replace gears that show any signs of wear or breakage. Look for these problems:

- Thinned gear teeth.
- Bent or missing gear teeth; check especially where a metal gear drives a plastic gear.
- Fractured or cracked gears. (Oil or incorrect grease on a plastic gear can cause the gear to crack.)

**Belts:** Inspect the belts for wear. There are eight rubber belts in the printer:

- A belt from the process motor to the compound gear
- Two belts from the y-axis motor drive
- A belt from the lower paper feed roller to the upper paper feed roller
- Two belts on the cap/wipe/purge drive
- An exit roller drive belt
- A small belt for driving the cap/wipe purge assembly from the cap/wipe/purge clutch

Look for these problems:

- Loose rubber particles below the belts indicate a worn belt.
- Missing teeth in the belts.
- Cracking or moderate fraying; a small amount of fraying is inevitable, so look for other signs of wear before replacing the belt.

**Clutches:** There are four clutches: the paper-pick roller clutch, the upper feed roller clutch, the maintenance drawer cam clutch and the cap/wipe/purge clutch. Symptoms of a malfunctioning clutch are the printer not picking paper from the tray or other paper jams. Also the cap/wipe/purge system could fail. In such cases, replace the clutch.

# Resetting NVRAM

## Resetting NVRAM

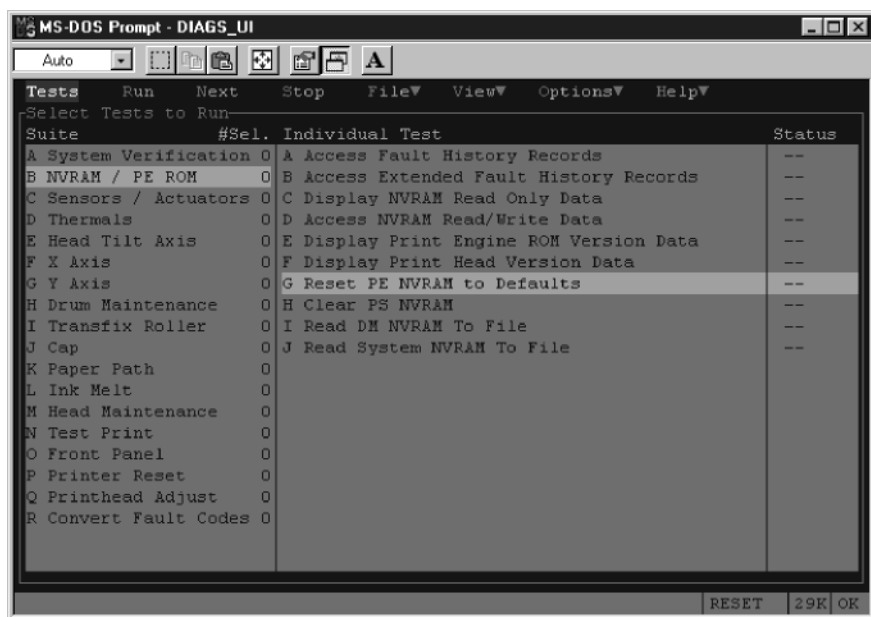
Resetting NVRAM returns *all* the printers's PostScript NVRAM-stored parameters, including those of the network card, to their factory defaults, except the print count (for images processed through the image processor), the Adobe firmware serial number, the usage profile and the authorization codes. Print engine NVRAM values are not changed by the following procedure.

To reset the printer to its factory-default values, follow this procedure:

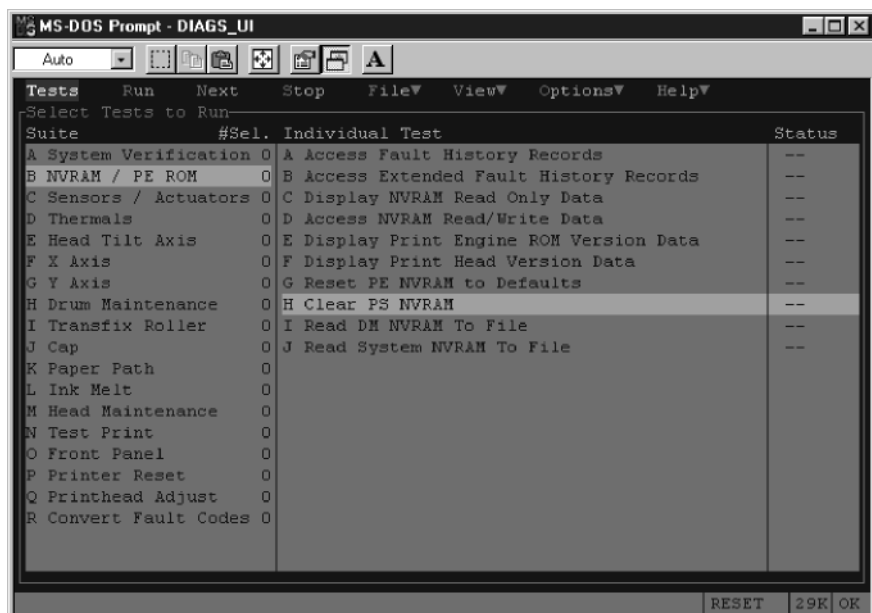
1. If possible, print the Configuration Page for a record of all the printer's port settings and other customer-unique settings.
2. Enter the Troubleshooting menu.
3. Press and hold the Left arrow button.
4. While holding the Left arrow button, press **Select** to enter the hidden service menu.
5. Scroll to the menu item Reset NVRAM.
6. Press **OK** to reset NVRAM.

Alternately, you can also use the PC diagnostics to selectively return either the print engine NVRAM contents or the PostScript NVRAM contents to their factory default values as shown in the following illustrations.

Running **Reset PE NVRAM to Default** or **Clear PS NVRAM** downloads a file to the printer that performs the indicated reset function; there is no confirmation or cancel function.



**Resetting print engine NVRAM menu item**



Clearing PostScript NVRAM menu item





# Key FRU Removal and Replacement

This topic illustrates how to remove and replace key printer Field Replaceable Units (FRUs). For more detailed removal/replacement procedures, refer to the *Color Printer Service & Support Resources CD-ROM*. Procedures included here are:

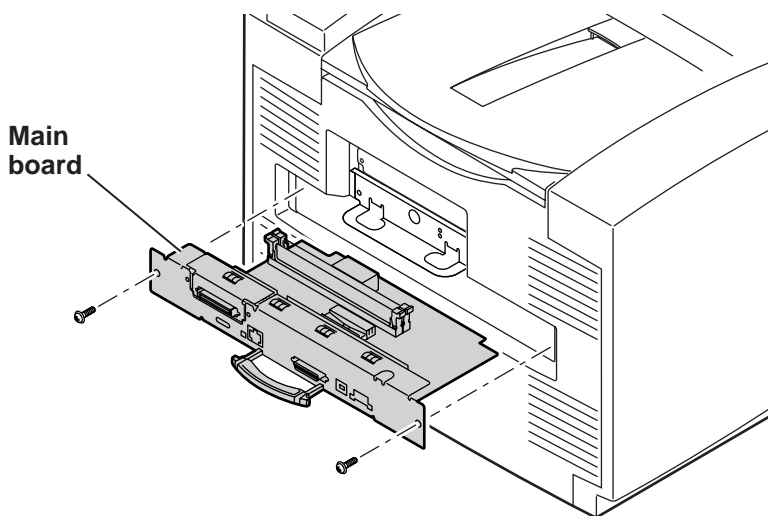
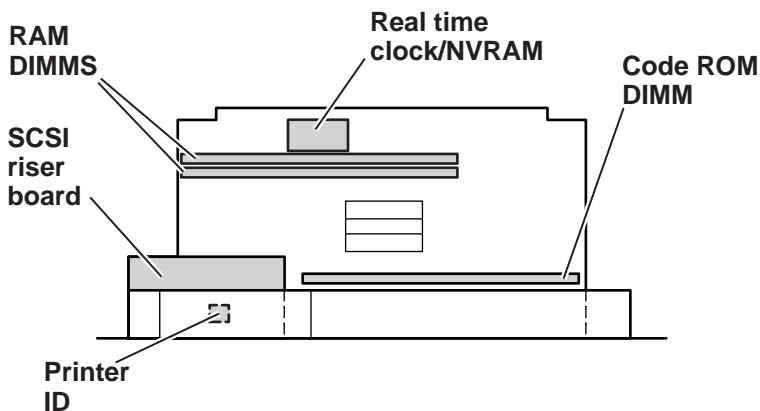
- Main board
- Power control board
- Power supply
- Upper feed roller assembly
- Preheat/drum heater assembly.
- Drum/transfix assembly.
- Drum position sensor assembly
- Printhead
- X-axis motor and drive assembly
- Y-axis belt drive assembly
- Cap/wipe/purge assembly

This topic concludes with a discussion about printhead locking.

## Main board

1. Power down the printer. Leave the power cord plugged in to provide a ground path for static discharges. Remove the interface cables.
2. Loosen the two rear panel securing screws.
3. Slide out the main board.

If you are replacing the main board, transfer the socketed realtime clock/NVRAM chip and the printer ID chip to the new board so the printer's settings and Ethernet address are retained. Also swap the SCSI riser board, code ROM DIMM and the SDRAM DIMMs.



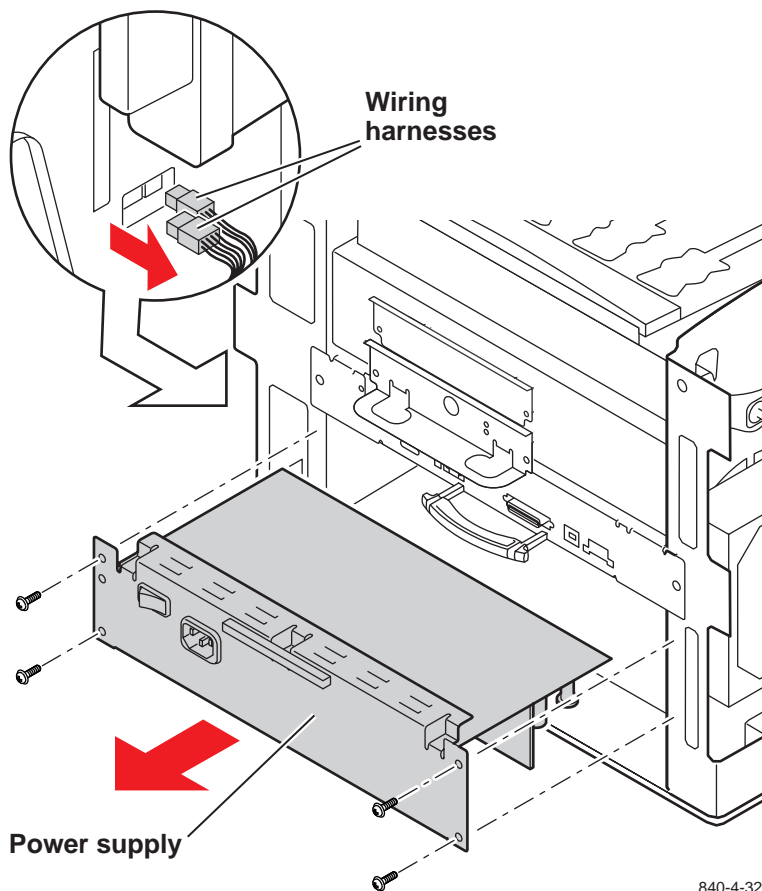
840-4-36

### Removing the main board

## Power supply

**Warning** *Even when the printer is off, AC line voltages may be present at the printer heaters while the printer is plugged into AC power.*

1. Turn off the printer and remove the power cord.
2. Remove the right cover. Remove the left cover.
3. Remove the rear cover.
4. Remove the top cover.
5. At the right side of the printer, disconnect the two wiring harnesses leading to the power supply.
6. Remove the four screws securing the power supply in place. Remove the power supply.

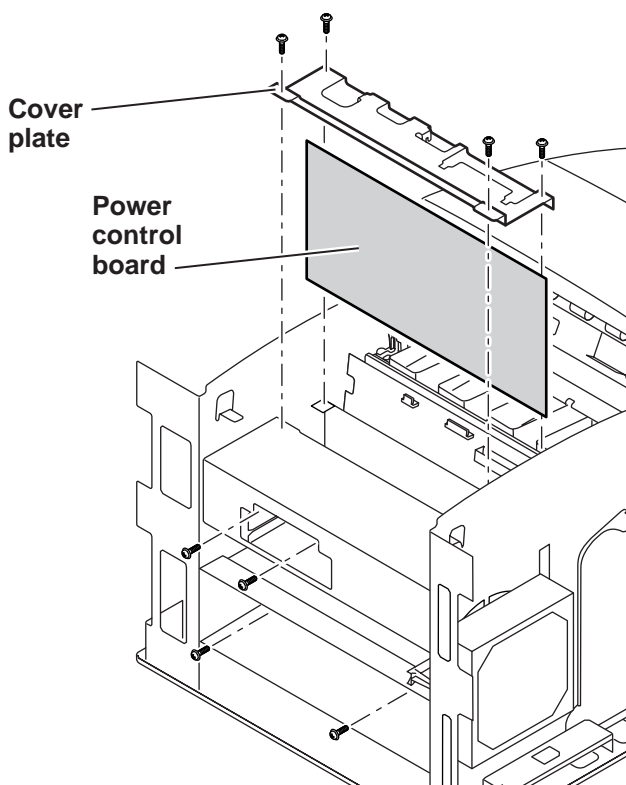


840-4-32

### Removing the power supply

## Power control board

1. Turn off the printer and remove the power cord.
2. Remove the right cover. Remove the left cover.
3. Remove the top cover.
4. Remove the ink loader.
5. Remove the main board.
6. Remove the power supply.
7. Remove the network card or its cover plate, whichever is in place.
8. Remove the internal hard drive or cover plate which ever is in place.
9. Disconnect the wiring harnesses leading to the power control board.
10. Remove the four screws securing the power control board cover plate. Remove the plate.
11. Remove the four screws securing the power control board in place. Lift and remove the board.

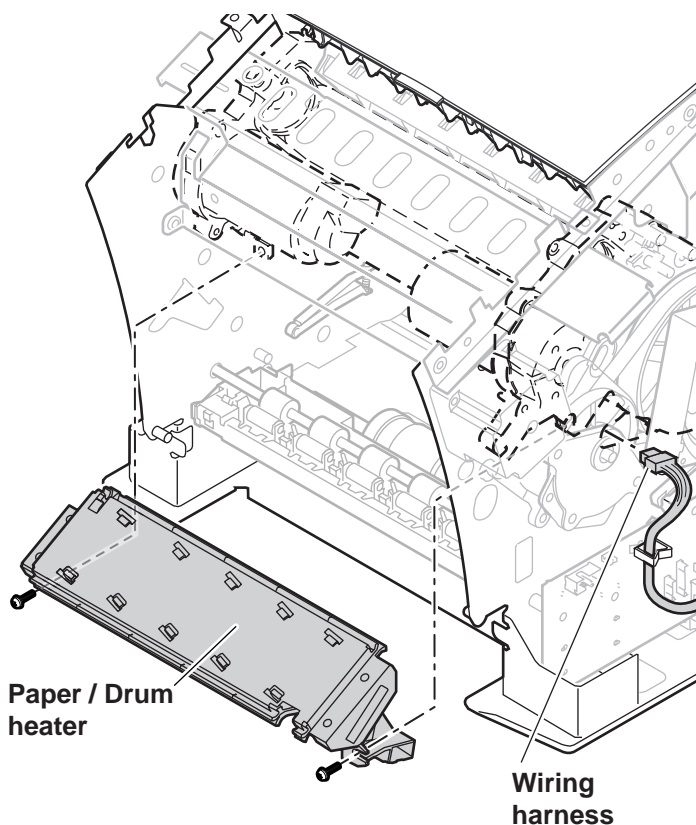


### Removing the power control board

## Paper/drum heater

**Warning** *Disconnect the power cord. AC voltages may be present at the heaters, even with the printer turned off.*

1. Remove the right cover.
2. Remove the left cover.
3. Remove the upper feed roller as described in the topic "Upper feed roller assembly" on page 92.
4. Disconnect the locking wiring harness from the right side of the paper/drum heater.
5. At the front of the paper/drum heater remove the two screws securing the heater to the inside of the printer frame. Do not confuse the mounting screws with the nearby smaller, brass-colored assembly screws.

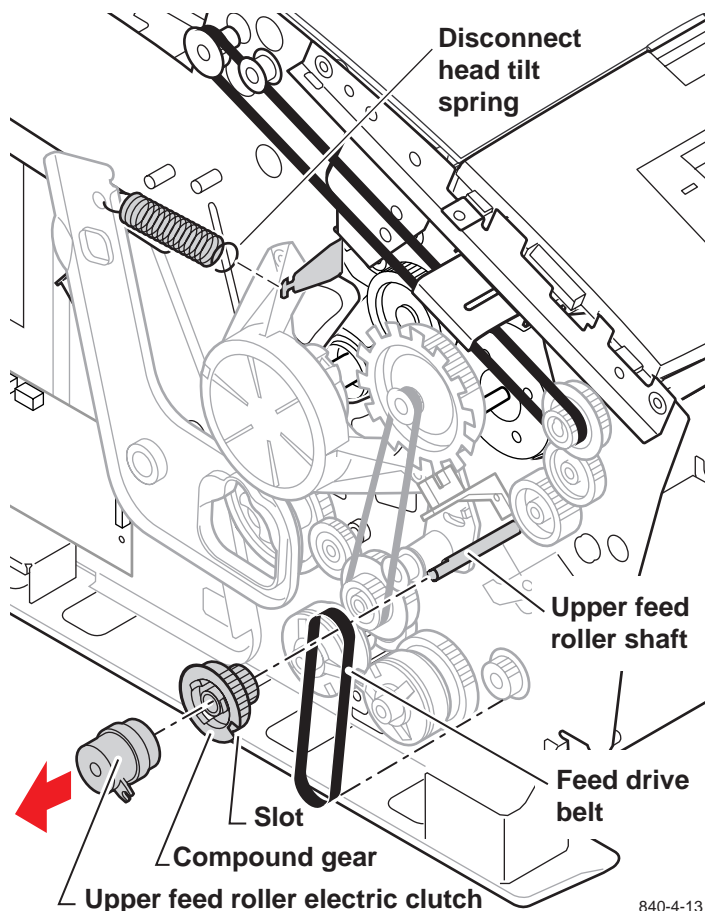


840-4-16

### Removing the paper/drum heater

## Upper feed roller assembly

1. Remove the right cover.
2. Remove the left cover.
3. Disconnect the head tilt spring.
4. **Left side:** Remove the upper feed roller electric clutch from the end of the upper feed roller shaft.
5. Remove the feed roller drive belt and compound gear from the left end of the upper feed roller. Note the small slot in the compound gear to ease removal.



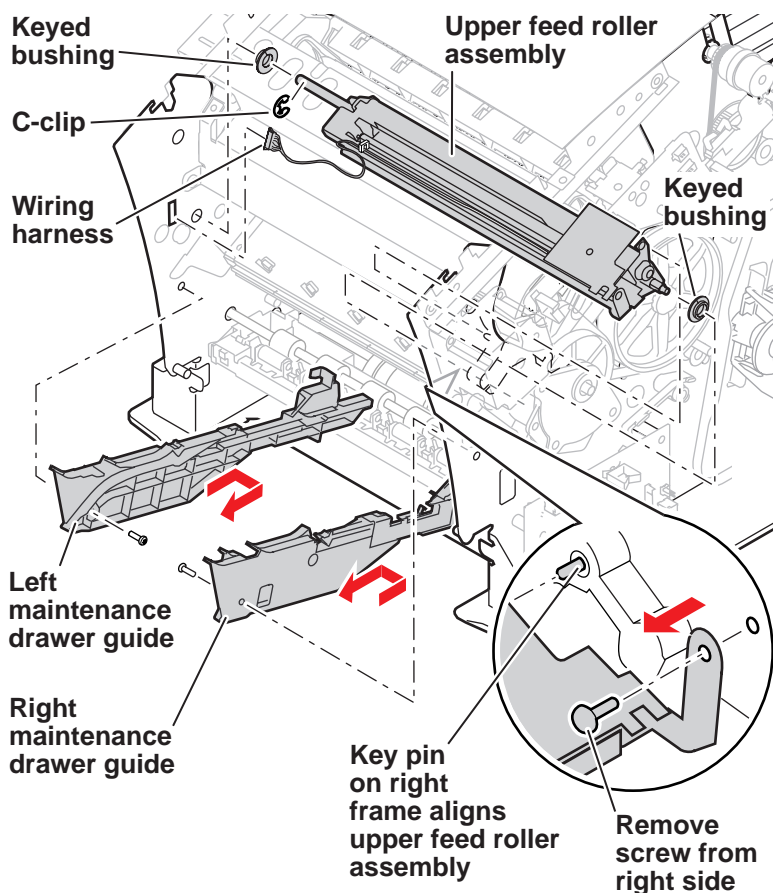
### Remove the upper feed roller assembly (left side)

6. **Front:** Open the front door and remove the drum maintenance drawer. Also, remove the bright, metal duplex paper guide from the front of the printer. It is held in place with two screws.

7. Remove the left and right maintenance drawer guides. Each is held in place by a single screw at the front and two frame latches at the rear.

**Note** *If you have trouble removing the right maintenance drawer guide, manually rotate the x-axis drive to move the printhead (in its forward position) to the center of its travel.*

8. Remove the screw securing the right side of the upper feed roller assembly to the inside of the printer frame.
9. Disconnect the wiring harness leading from the upper feed roller assembly to the inside the left side of the printer frame.
10. Remove the C-clip located on the left-inside printer frame securing the upper feed roller assembly in place.
11. Remove the upper feed roller assembly. Separate the assembly into its two halves.



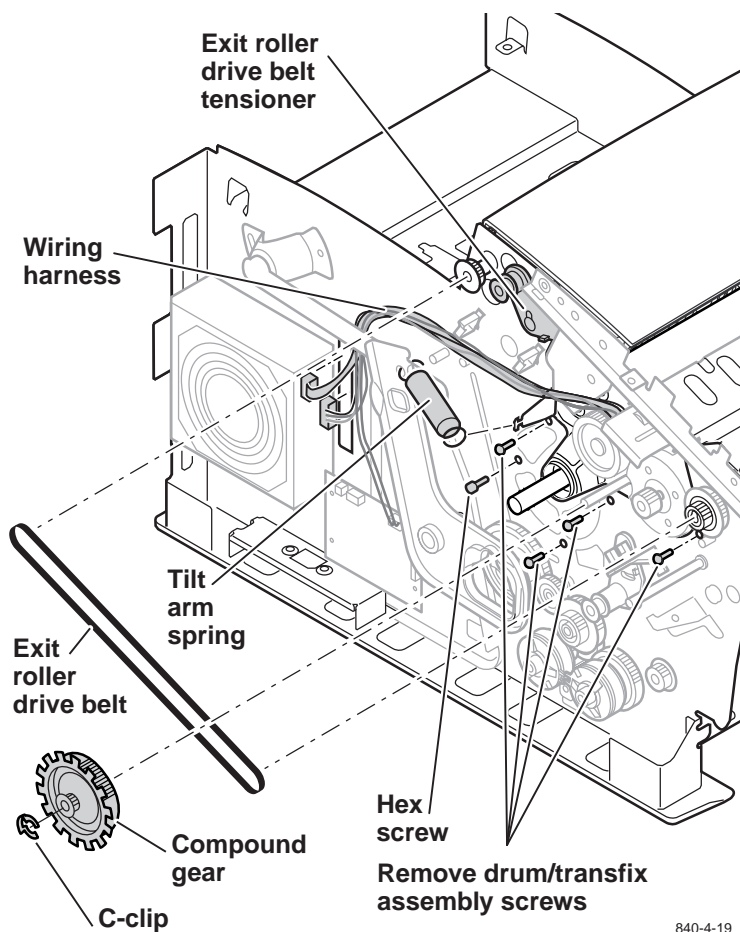
840-4-14

## Removing the upper feed roller assembly (front)

## Drum/transfix assembly

1. Remove the right cover.
2. Remove the left cover.
3. Remove the front panel.
4. **Left side:** Free the wiring harness leading from the drum/transfix assembly along the left side of the print engine to the power control board and left I/O board.
5. Remove the drum position sensor assembly.
6. Remove the upper feed roller assembly.
7. Remove the paper/drum heater.
8. Remove the drum temperature sensor.
9. Remove the C-clip securing the compound gear and remove the gear.
10. Loosen the exit roller drive belt tensioner. Remove the exit roller drive belt.
11. Remove the tilt arm spring.

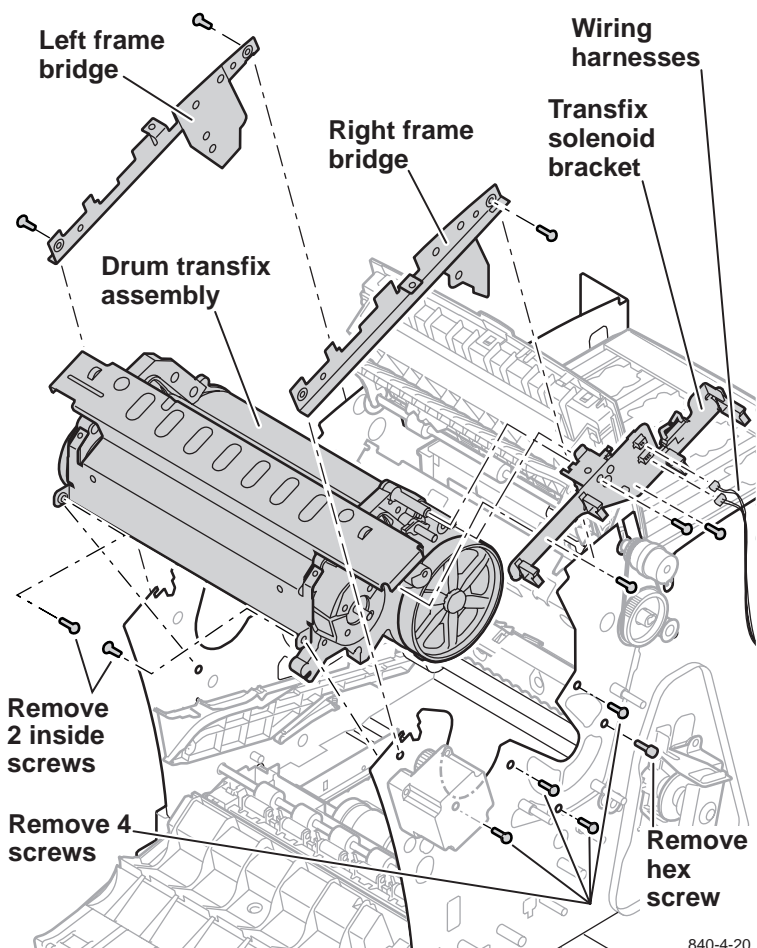




840-4-19

**Removing the drum transfix assembly (left side)**

12. **Right side.** Remove the y-axis belt drive assembly.
13. Disconnect the wiring harnesses leading to the transfix solenoid bracket. Remove the three screws securing the bracket in place and remove the bracket.
14. Remove the left and right frame bridges. Each is held in place with two screws.
15. Remove the two screws securing the front of the drum/transfix frame to the inside printer frame.
16. Remove the five screws securing the left side of the drum/transfix assembly to the print engine. Note that one screw is removed with a 3/32" hex key.
17. Remove the five screws securing the right side of the drum/transfix assembly to the print engine. Note that one screw is removed with a hex key.
18. Carefully, lift and remove the drum/transfix assembly. Protect the drum surface.



840-4-20

### Removing the drum/transfix assembly (right side)

Reverse these steps to reinstall the drum/transfix assembly. *Upon reassembly, install the hex-keyed screws first; they align the drum/transfix assembly to the engine frame.*

Make these adjustments after installing a new drum.

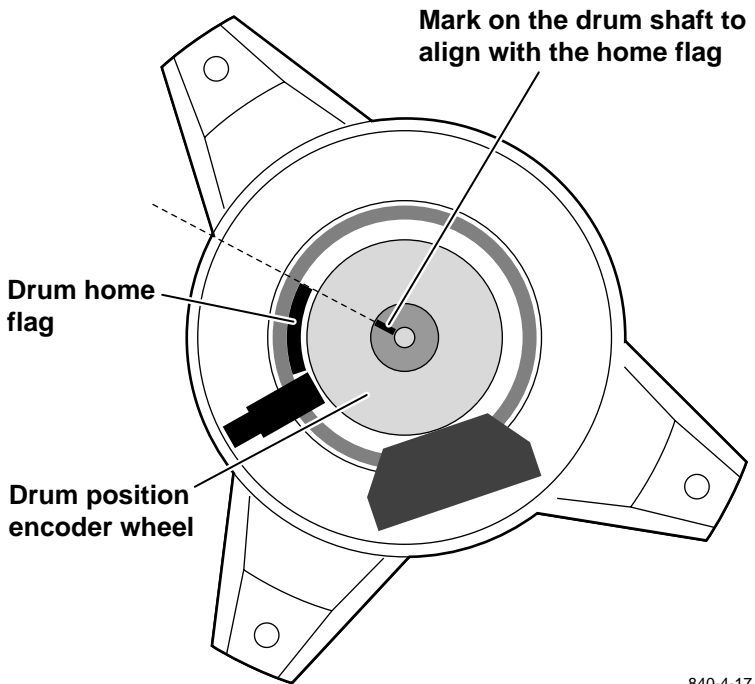
- a. Ensure the drum position encoder sensor gap.
- b. Set the Y-belt tension; refer to the topic “Y-axis belts tension adjustment” on page 64.
- c. Power up the printer in Bypass Mode to skip the startup and mud pages.
- d. Select service test print 10: Manufacturing Paper Path to verify the paper path and that all ink jets operate.
- e. Print service test print 9: Seal Drum to seal the new drum.
- f. Perform the printhead to drum adjustment described in the topic “Printhead-to-drum spacing adjustment” on page 70.

## Drum position sensor assembly

1. Remove the left cover.
2. Remove the top cover.

**Caution** *Unhook the **head tilt spring** to avoid possible damage to the printhead and drum.*

3. Disconnect the drum home-position sensor wiring harness from J180 of left I/O board leading to the drum position assembly. Disconnect the drum position encoder sensor at the drum position assembly.
4. Remove the clear plastic dust cover from the drum position assembly.
5. Precisely mark the end of the drum shaft relative to the drum home flag on the drum position sensor assembly; this is not necessary if you are also replacing the drum (as part of the drum/transfix assembly).

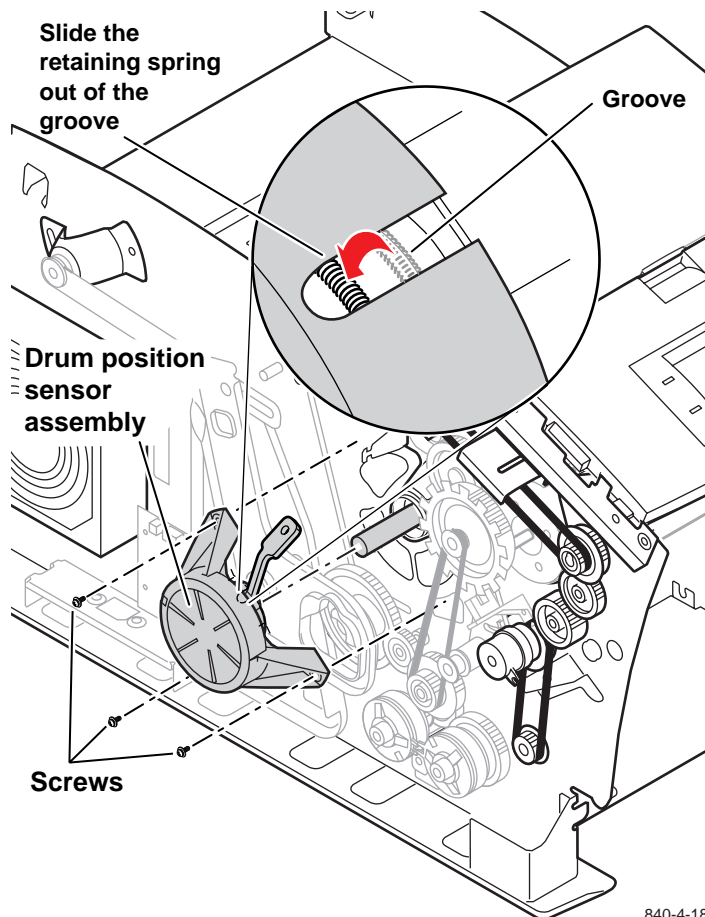


840-4-17

### Marking the drum home flag sensor alignment

6. Rotate the tilt gear to orient the gear's missing teeth to the drum position sensor assembly's rear mounting screw.
7. With a small, flatblade screwdriver, slide the retaining spring out of the encoder wheel's groove toward the encoder disk.

8. Remove the three screws securing the drum position sensor assembly housing to the print engine. Insert the gap tool to hold the encoder wheel in position. Slide the assembly off the drum shaft. If necessary, use the small flat-blade screwdriver to push the encoder disk hub along the shaft as you remove the assembly.



840-4-18

## Removing the drum position sensor assembly

Reverse these steps to reinstall the drum position sensor assembly. The drum must be in the same position relative to the drum position encoder wheel when the drum position sensor assembly was removed. This ensures that the stripper fingers contact the drum in the same location as before; otherwise, print artifacts will result.

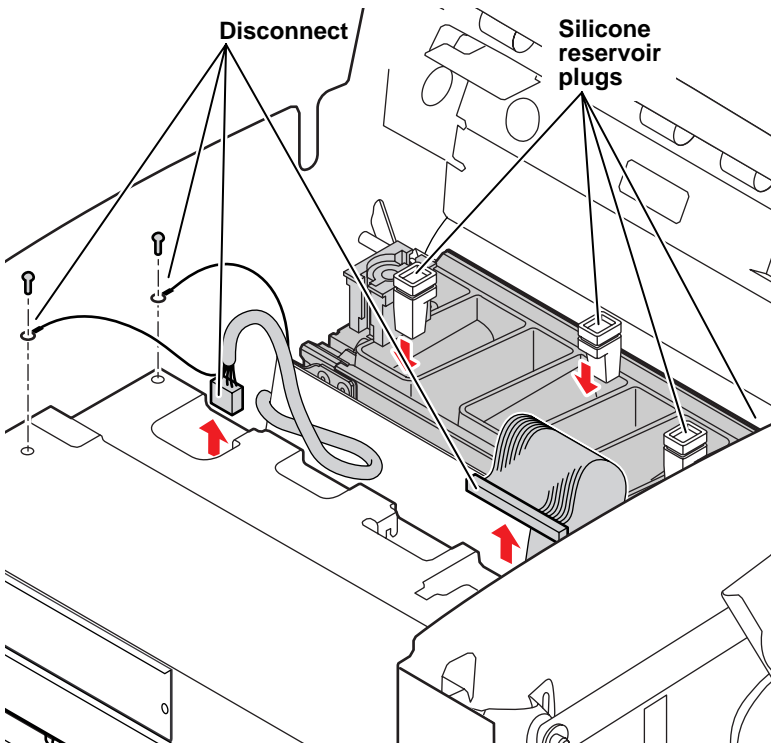
- Install the encoder wheel on the drum shaft, *precisely* aligning the home flag to the alignment mark drawn on the shaft.
- Use the encoder wheel gap tool to space the encoder wheel to the drum position sensor.

# Printhead

**Warning** *Even when the printer is turned off, AC line voltages may be present at the printer heaters while the printer is plugged into AC power.*

*The printhead is hot.*

1. Remove the right cover and the left cover.
2. Disconnect the head-tilt spring.
3. Remove the top cover.
4. Remove the ink loader.
5. Remove the metal heat duct from over the printhead.
6. Disconnect the power wiring and data harnesses leading from the printhead to the power control board. Also disconnect the two ground wires from the printer frame.
7. Carefully plug the printhead's reservoir chamber holes with the silicone plugs. The plugs keep liquid ink from spilling if you should inadvertently tip the printhead.



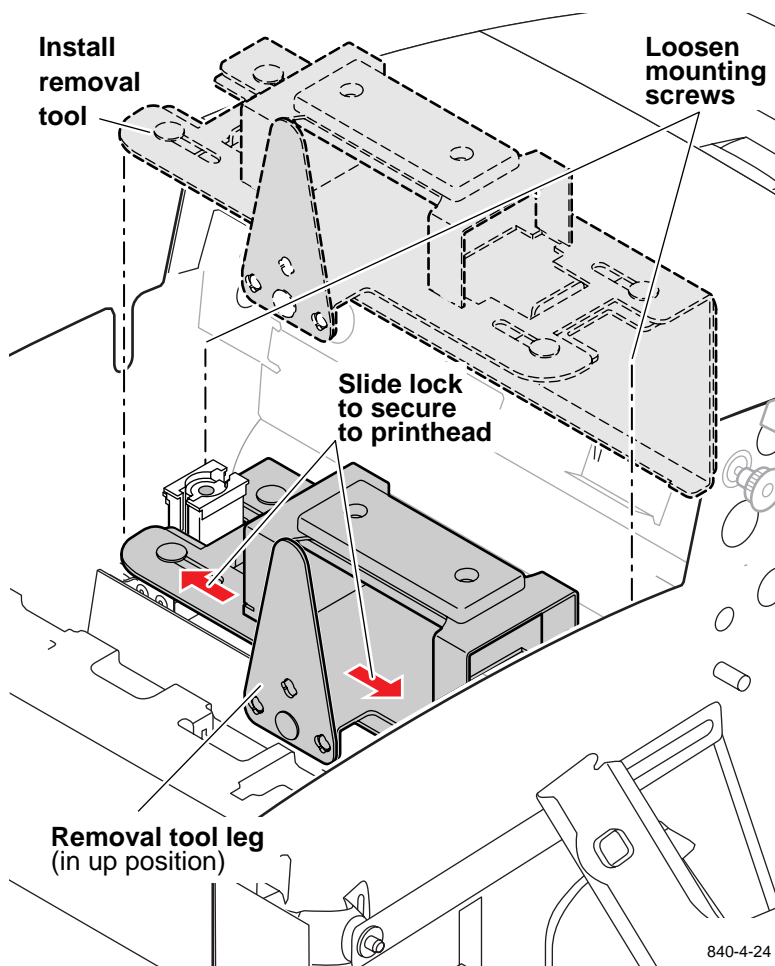
**Plugging the reservoir holes**

8. Rotate the removal tool's plastic leg into its up position. Slide the removal tool's standoff locks inward.
9. Place a few sheets of paper between the printhead and the drum to protect the drum surface.
10. Carefully, lower the printhead removal tool onto the printhead. Rotate the process motor to tilt the printhead forward about 2.5 cm (1 inch).
11. Slide the standoff locks outward to secure the tool to the printhead. Loosen the two mounting screws securing the printhead in place.
12. Lift and remove the printhead. Lower the removal tool leg to safely rest the printhead on a flat surface.

**Installation.** If not already in place, install the printhead's data ribbon cable to the printhead.

1. Using the printhead removal tool, reverse the removal steps to reinstall the printhead.
2. Rotate the printhead to its print position and attach the head tilt spring.
3. Torque the mounting screws to 20 in/lbs.
4. Install the digital gap indicator and bracket to the left side of the printer frame and tilt arm as described in the procedure "Printhead-to-drum spacing adjustment" on page 66. Ensure the digital indicator is set to inches, "in." Press **Origin** to zero the digital indicator.
5. At the left of the printhead, insert the left printhead spacer between the printhead and the drum. Check the indicator, it should read  $0.0030 \pm 0.0010$  inches. Adjust the printhead's spacing adjustment by twisting a flat-blade screwdriver in the adjustment slot to move the printhead's position until the indicator reads the correct value. This sets the "cold" printhead-to-drum gap. Refer to the illustration "Spacing the printhead to the drum," on page 67.
6. Remove the left printhead spacer and install the right spacer between the printhead and the drum. Repeat the adjustment.
7. Tighten the four locking screws in an X-pattern.
8. Remove the head-to-media gap indicator tool and bracket.
9. Plug the printhead's data ribbon cable and power wiring harness into the power control board. Inspect both ends of the data ribbon cable to ensure they are properly seated. Reconnect the two printhead ground wires to the printer frame.
10. Install the ink loader.
11. Turn on the printer.
12. Refer to the topic "Printhead-to-drum spacing adjustment" on page 66 to set the correct gap between the "hot" printhead and the drum.

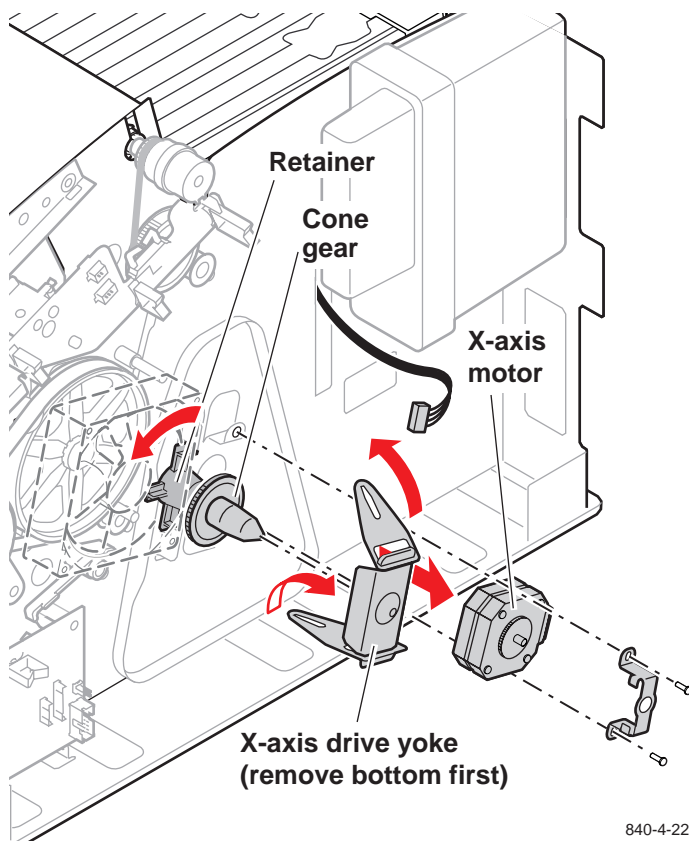




## Removing the printhead

## X-axis motor and drive assembly

1. Remove the right cover.
2. Remove the left cover. Disconnect the head-tilt spring.
3. Disconnect the X-axis motor wiring harness at the x-axis motor.
4. Remove the two screws securing the X-axis motor and bracket in place.
5. Rotate the black, plastic retainer counter-clockwise.
6. Lift up on the bottom portion of the X-axis drive yoke. Lift up on the yoke and remove the upper portion of the yoke.
7. Rotate the X-axis cone gear counter-clockwise to remove it from the X-axis shaft.



840-4-22

### Removing the x-axis motor and drive assembly

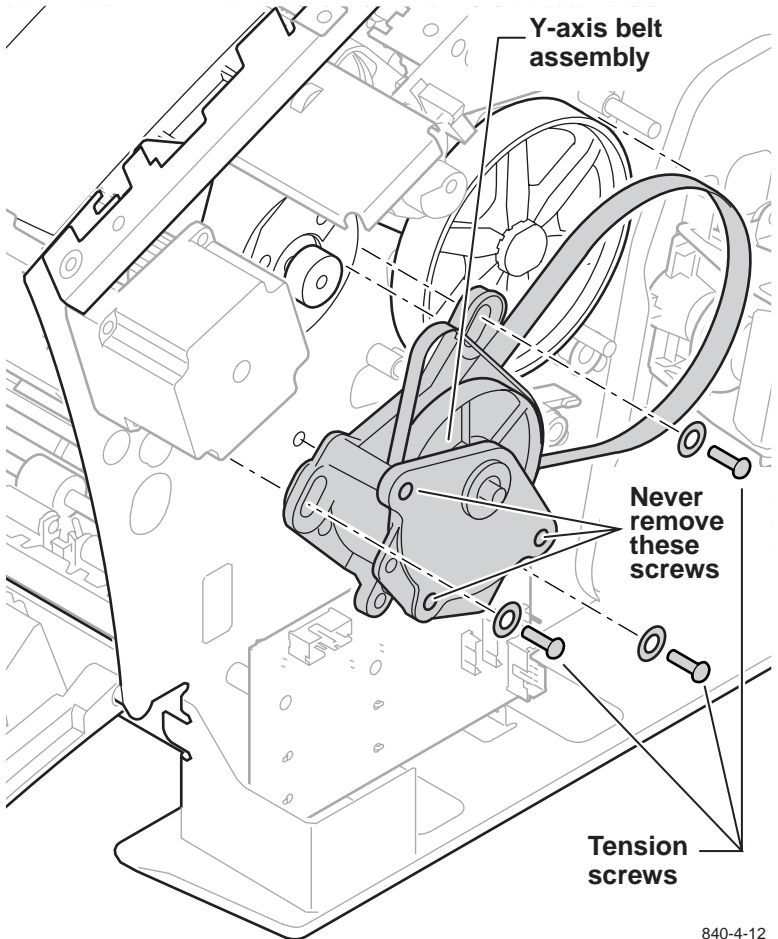
For reassembly, apply a *small* amount of grease on the tip of the nose cone. Apply a *small* amount, 3 dabs, on the threads of the X-axis shaft. Be sure to rotate the black, plastic retainer so it ends locks the yoke in position. Perform the "X-axis scale adjustment" on page 74.

## Y-axis belt drive assembly

1. Remove the right cover.
2. Disconnect the wiring harness leading from the front panel to the right I/O board passing beside the Y-axis belt drive assembly.
3. Remove the drum fan.

**Caution** *Never loosen or remove the three screws securing the assembly parts together.*

4. Remove the three tension set screws securing the Y-axis belt drive assembly to the engine frame. Remove the assembly with its two belts.



840-4-12

### Removing the Y-axis belt drive assembly

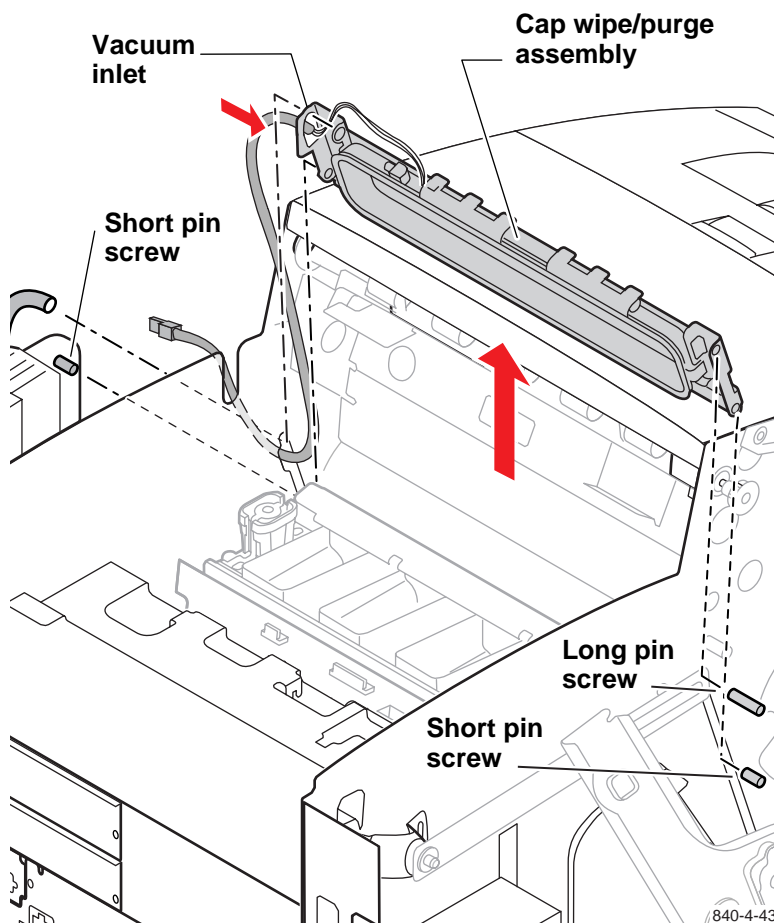
**Note** *Tension the drive belts using the procedure, "Y-axis belts tension adjustment" on page 68.*

## Cap/wipe/purge assembly

**Warning** *Even when the printer is turned off, AC line voltages may be present at the printer heaters while the printer is plugged into AC power.*

1. Remove the right cover. Remove the left cover.
2. Disconnect the head-tilt spring.
3. Remove the top cover.
4. Remove the ink loader.
5. Disconnect the wiring harness leading from the cap/wipe/purge assembly to the power supply wiring harness. Clip the tie wraps and disconnect the vacuum hose leading to the vacuum/pump module.
6. Tilt back the printhead and center it.
7. Rotate the cap wipe drive gear to position the cap/wipe/purge assembly 25 mm (1 in.) from the top of its travel.
8. Place a few sheets of paper between the drum and the cap/wipe/purge assembly to prevent scratching the drum.
9. Remove the right timing belt's lower pulley to create slack in the right timing belt.
10. Remove the metal vacuum line from the assembly.
11. Remove the wiring from the right cap/wipe/purge assembly bracket.
12. Push the wiring through the print engine's frame so that you can unloop it from the cap/wipe/purge assembly.
13. While holding onto the cap/wipe/purge assembly, remove the three pin screws that hold the cap/wipe/purge assembly in the grooves on each side of the print engine.

Reverse these steps to reinstall the cap/wipe/purge assembly. Refer to "Wiring Diagrams" on page 145 for details on dressing the cap/wipe/purge wiring.



**Removing the cap/wipe/purge assembly**

# Locking the printhead

During normal power-down, the printer tilts the printhead back and energizes the x-axis drive to move the printhead to the far right. This allows the printhead's tilt arm, which moves as the printhead moves, to engage a pin protruding from the left-side printer frame. This effectively automatically locks the printhead in place for moving and shipping. The printer will not lock the printhead if any printer door is open.

**Caution** *After servicing the printer with power off, never leave the printhead in the tilted-forward, far-right position. Upon power-up, the printhead will be tilted backward and the head tilt arm will crash into the head lock pin. This can damage process gears and belts driving the tilt arm.*

**After servicing the printer.** When you service the printhead, x-axis drive, cap/wipe/purge assembly or other relevant printer components, leave the printhead in its print position, centered in front of the drum. Upon power-up the printer can safely move the printhead.

**Manually locking the printhead.** If you must manually lock the printhead:

1. With the printer powered off, carefully tilt the printhead back about two-thirds of the way by rotating the compound gear. *Do not allow the spring-loaded printhead to fall forward or it may damage the drum.*
2. Manually rotate the X-axis drive gear, to move the printhead to the right extreme of its travel. Ensure the lock pin on the left side of the printer frame properly engages the slot in the head tilt arm.
3. Rotate the x-axis gear in the opposite direction about 1 rotation. This prevents the x-axis drive from binding so tightly that the motor cannot free it upon power-up.

# FRU List

This topic provides a list of field-replaceable units for the Phaser 840 Color Printer.

Changes to Tektronix products are made to accommodate improved components as they become available. It is important when ordering parts to include the following information:

- Component's part number
- Product type or model number
- Serial number of the printer

**Serial numbering.** Particular fields in the serial number indicate the modification level of the printer, the date of its manufacture and the sequence number of the printer produced on that day. The serial number is coded as follows:

*BLxxDMY*

*B* indicates the headquarter city of the manufacturing company, Beaverton.

*L* indicates the modification level of the printer, ranging alpha-numerically from 0 to Z.

*xx* alpha-numerically indicates the sequence of the printer among the printers produce on that day of manufacture, ranging from 01 to ZZ representing 1 to 1296 (the letters I and O are not used).

*D* alpha-numerically indicates the day of manufacture, ranging from 1 to X representing 1 to 31 (the letters I and O are not used).

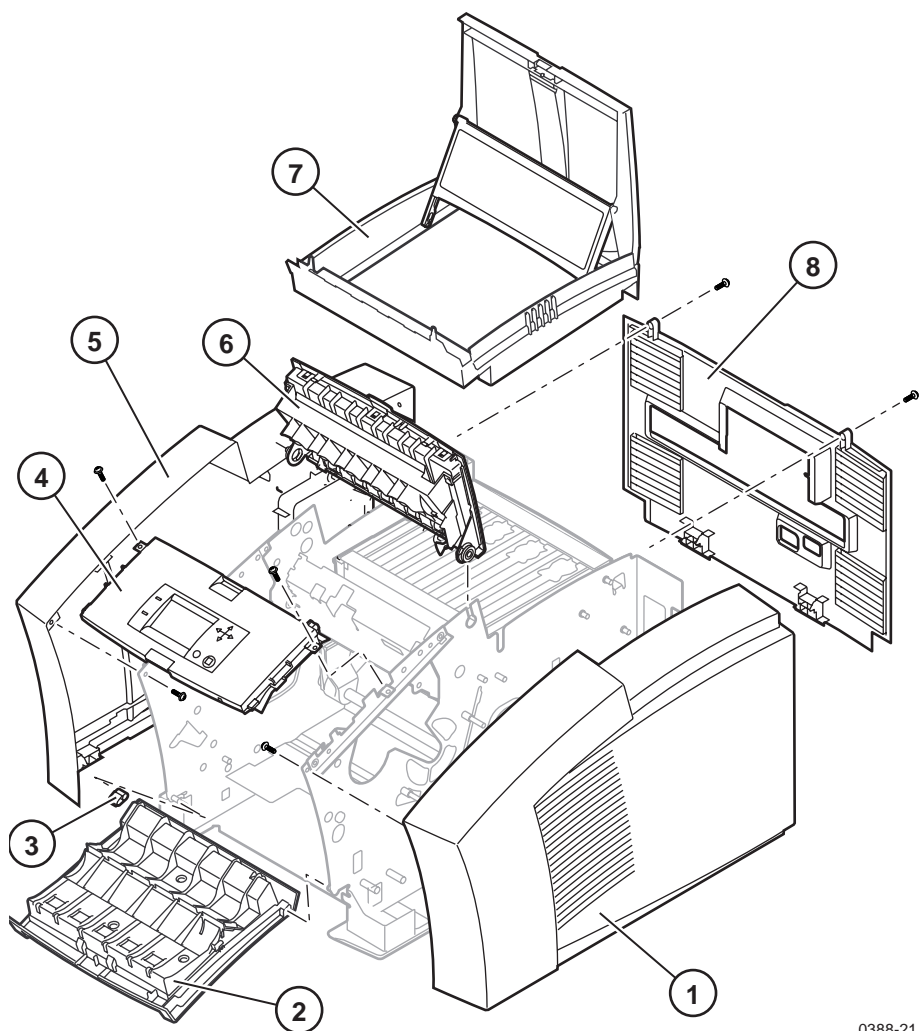
*M* alpha-numerically indicates the month of manufacture, ranging from 1 to C representing 1 to 12.

*Y* numerically indicates the last digit of the year of manufacture, ranging from 0 to 9.

**Table 1 Cabinet FRUs**

Parts	Part number	Serial number		Qty	Name and description
		Effective	Discont'd		
1	200-4412-00 200-4591-00			1	Right cover Right cover, 840DP "Designer Edition"
2	200-4370-00 200-4598-00			1	Front cover, jam access door Front cover, 840DP "Designer Edition"
3	214-4814-00			1	Hinge, Front cover pivot
4	650-4028-00 650-4121-00			1	Front cover, control panel Front cover, control panel, 840DP "Designer Edition"
5	200-4365-00 200-4589-00			1	Left cover Left cover, 840DP "Designer Edition"
6	200-4375-00 200-4599-00			1	Exit cover Exit cover, 840DP "Designer Edition"
7	200-4367-00 200-4600-00			1	Top cover with inkload door Top cover with inkload door, 840DP "Designer Edition"
8	200-4377-00 200-4592-00			1	Rear cover Rear cover, 840DP "Designer Edition"



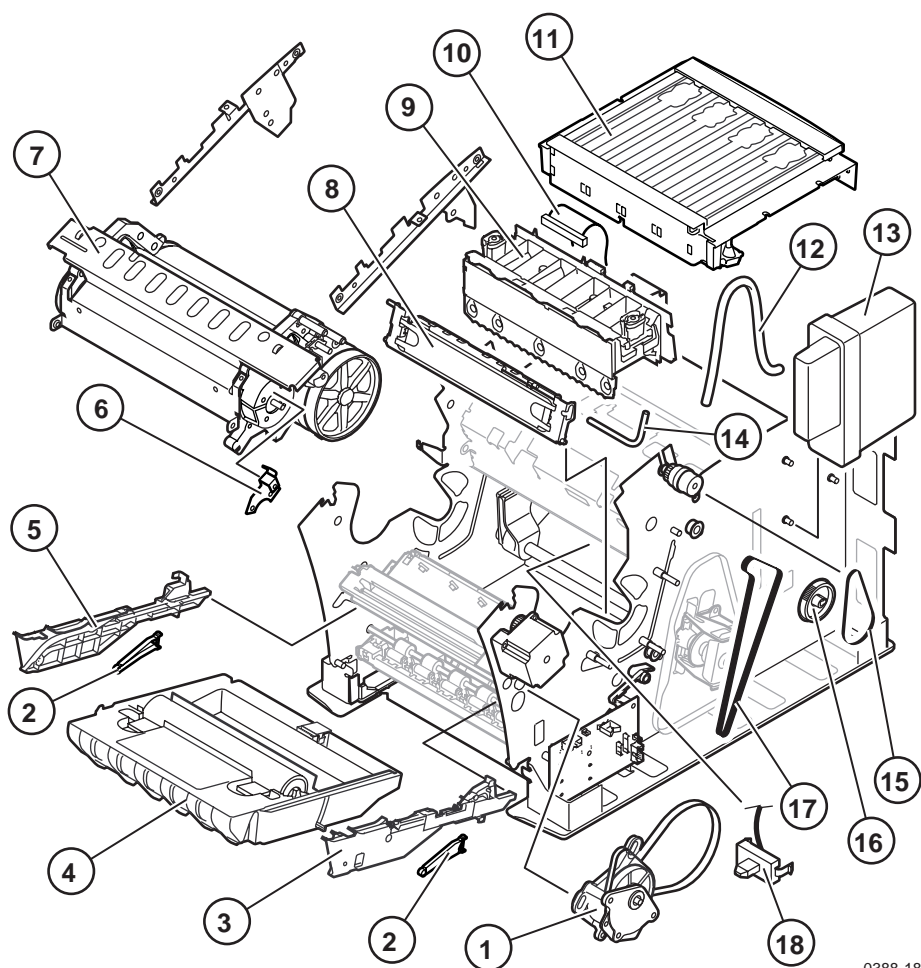


0388-21

**Figure 1 Cabinet FRUs**

**Table 2 Imaging FRUs**

<b>Parts</b>	<b>Part number</b>	<b>Serial number Effective    Discont'd</b>	<b>Qty</b>	<b>Name and description</b>
1	650-4027-00		1	Y-axis pulley assembly
2	214-4651-01		1	Drum maintenance actuators, left and right
3	351-1051-00		1	Maintenance drawer guide, left
4	436-0383-00		1	Maintenance drawer
5	351-1053-00		1	Maintenance drawer guide, right
6	650-3617-00		1	Spring, transfix actuation. Part of 650-3617-00 Drum/Transfix Assy Kit
7	650-3617-00		1	Drum/transfix assembly. Part of 650-3617-00 Drum/Transfix Assy Kit
8	441-2137-00		1	Cap/wipe/purge assembly
9	650-3623-00		1	Printhead kit
10	174-3807-00		1	Cable, printhead data
11	650-4025-00		1	Ink loader
12	166-0714-00		1	Vacuum hose, rubber
13	147-0079-00		1	Vacuum/pump assembly
14	166-0713-00		1	Vacuum hose, rigid
15	650-3615-00		1	Head maintenance drive belt. Part of 650-3615-00 Belt Kit
16	650-3619-00		1	Pulley, head maintenance drive. Part of 650-3619-00 Gear Kit
17	650-3615-00		1	Head maintenance timing belt and ratchet clips. Part of 650-3615-00 Belt Kit
18	134-0265-00		1	Plug, Maintenance drawer life counter
	200-4379-00		1	Cover heat plate, printhead thermal duct

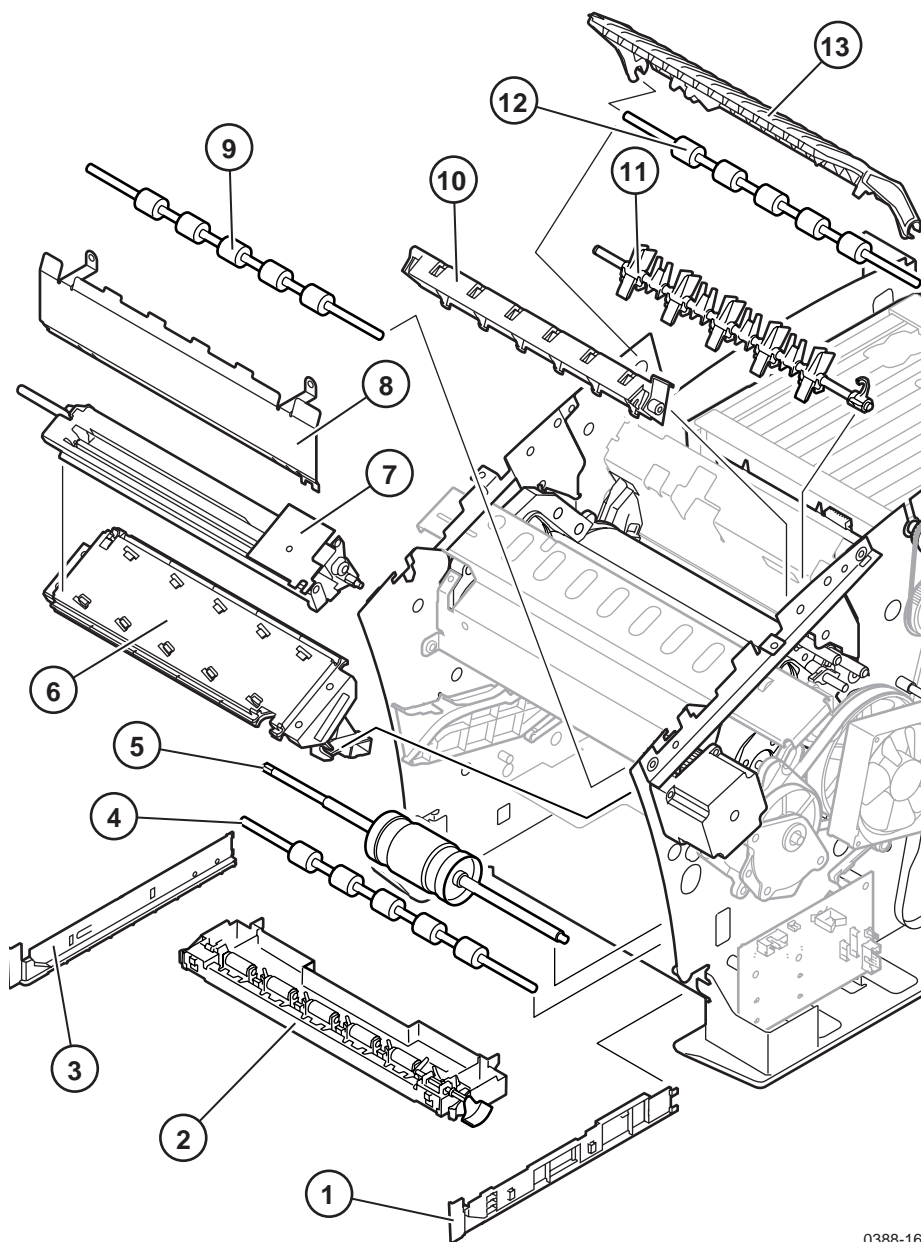


0388-18

**Figure 2** Imaging FRUs

**Table 3 Paper path FRUs**

Parts	Part number	Serial number		Qty	Name and description
		Effective	Discont'd		
1	351-1045-00			1	Guide, media tray, right
2	351-1032-00			1	Guide, pick assembly
3	351-1046-00			1	Guide, media tray, left
4	401-0778-01			1	Lower feed roller
5	401-0813-00			1	Paper pick roller
6	119-5743-00			1	Drum/paper heater assembly
7	351-1047-00			1	Upper feed assy, top half, with circuit bd
	351-1048-00			1	Upper feed assembly, lower half
8	351-1035-00			1	Duplex paper guide
9	401-0784-01			1	Duplex roller
10	650-4026-00			1	Upper stripper finger assembly
11	386-7018-00			1	Lower stripper finger assembly
12	401-0781-01			1	Exit roller
13	351-1016-00			1	Guide, lower exit, pivoting

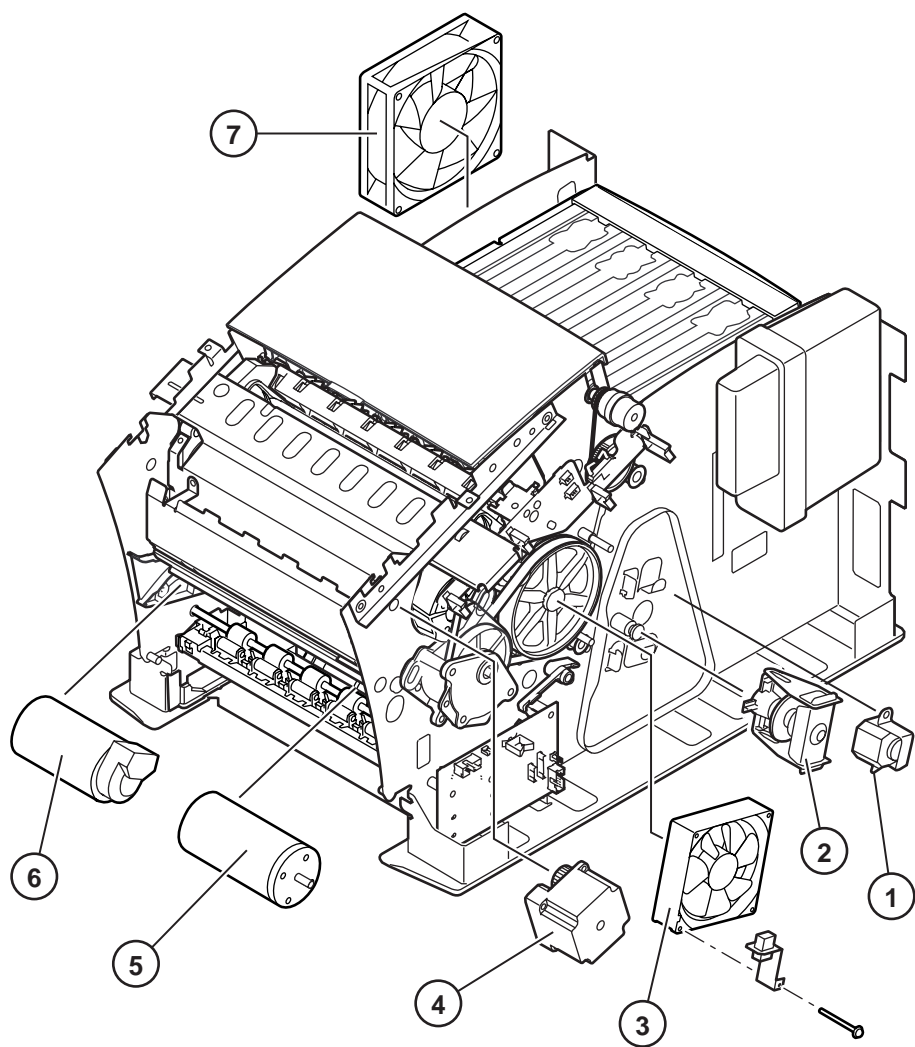


0388-16

**Figure 3 Paper path FRUs**

**Table 4 Motors and fans FRUs**

Parts	Part number	Serial number		Qty	Name and description
		Effective	Discont'd		
1	147-0086-00			1	X-axis motor with gear
2	650-3621-00			1	X-axis drive assembly
3	119-5876-00			1	Drum fan
4	147-0180-00			1	Paper path motor
5	147-0082-00			1	Y-axis motor
6	147-0108-01			1	Process motor, with encoder
7	119-5781-00			1	Main fan



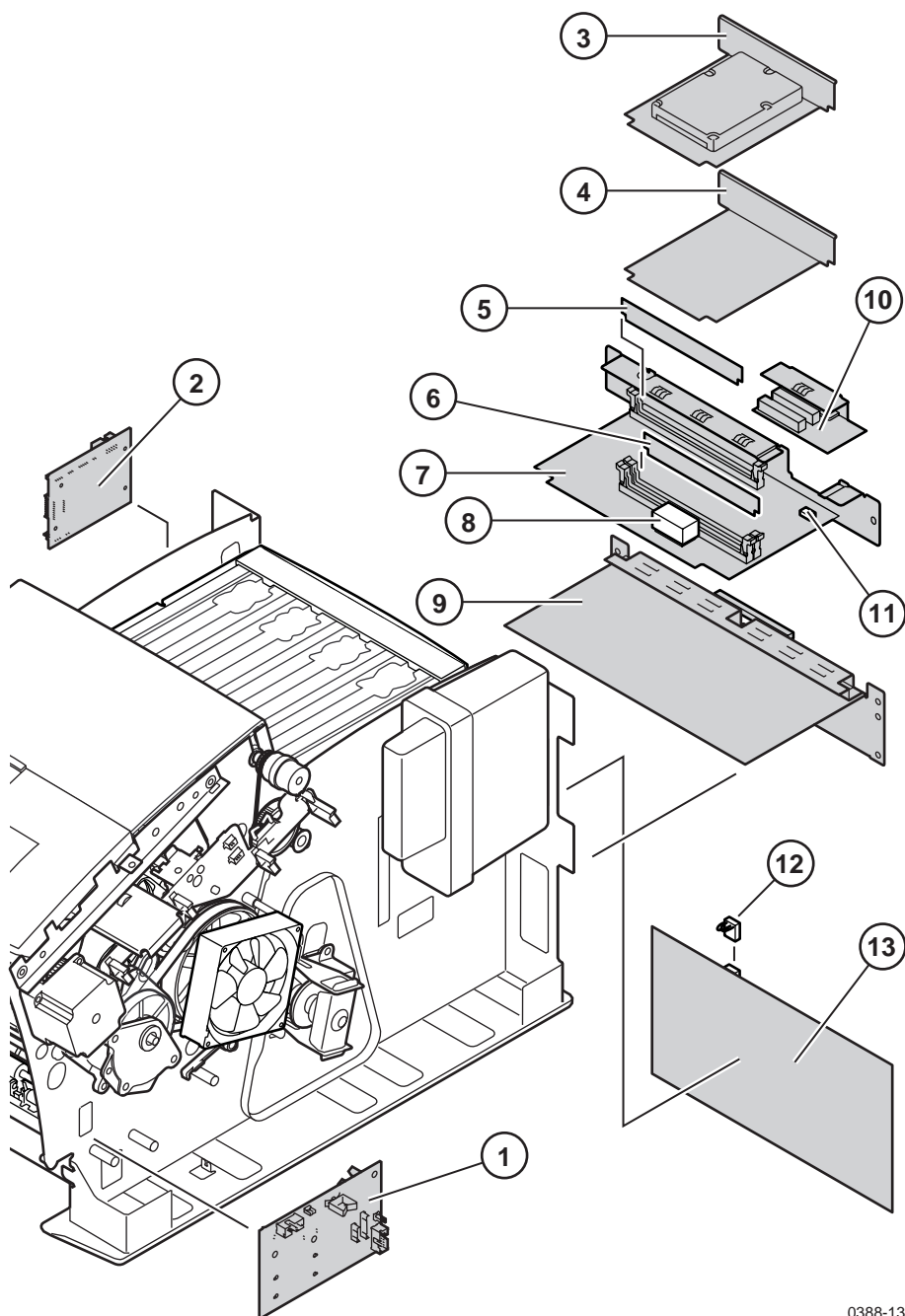
0388-14

**Figure 4 Motors and fans FRUs**

**Table 5 Circuit board FRUs**

Parts	Part number	Serial number Effective    Discont'd	Qty	Name and description
1	671-4194-50		1	I/O board, right
2	671-4195-50		1	I/O board, left
3	671-4542-50 386-6997-00		1	ZDISK3, IDE hard drive, internal Blank cover plate (no hard drive)
4a	671-3994-00		1	100Base T Ethernet network card
4b	671-4034-00		1	LocalTalk network card
4c	671-3932-00		1	Token Ring network card
4d	386-6998-00		1	Blank cover plate, no network card
5	671-4576-50		1	<b>Masked</b> (avail Mar '99) Code ROM DIMM, English OS 1.36/PS 8.64/Eng 8.12/Net 10.50
	671-4575-53		1	Code ROM DIMM, English OS 1.38/PS 8.76/Eng 8.22/Net 10.62
	671-4674-00		1	Code ROM DIMM, Japanese Morisawa
	671-4675-00		1	Code ROM DIMM, Chinese Traditional
	671-4676-00		1	Code ROM DIMM, Chinese Simplified
	671-4677-00		1	Code ROM DIMM, Korean Hangul
	671-4748-00		1	Code ROM DIMM, Japanese Heisei
	671-4517-00		1	<b>Flash</b> Code ROM DIMM, Japanese Morisawa
	671-4571-00		1	Code ROM DIMM, Chinese Traditional
	671-4573-00		1	Code ROM DIMM, Chinese Simplified
	671-4574-00		1	Code ROM DIMM, Korean Hangul
	671-4744-00		1	Code ROM DIMM, Japanese Heisei
6	156-4800-00 156-4811-00		1 1	32-Mbyte RAM DIMM 64-Mbyte RAM DIMM
7	650-3991-00		1	Main board
8	156-4691-00		1	Dallas Real Time Clock/NVRAM Module
9	650-4024-00		1	Power supply
10	671-4053-50 386-7074-00		1	SCSI riser board assembly Blank cover plate (no SCSI riser board)
11	163-1217-00		1	Boot ROM/Printer ID
12	131-1641-00		1	Jumper, +40 volt isolation
13	650-4029-00		1	Power control board



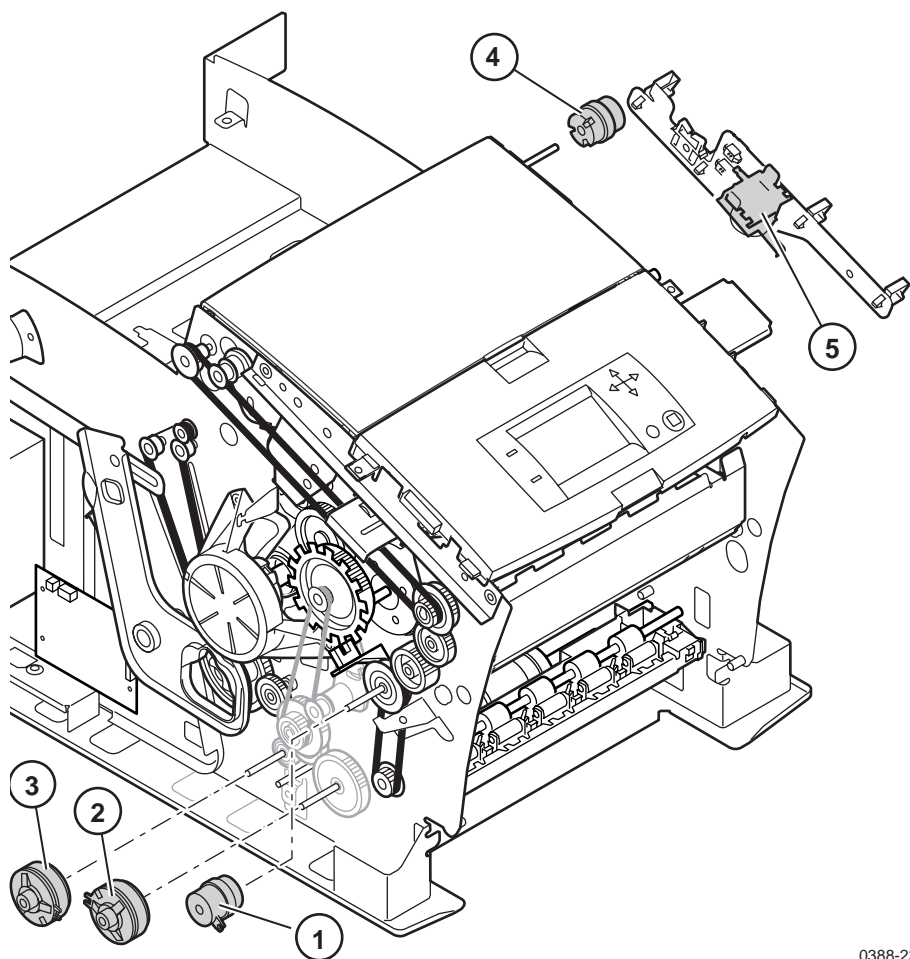


0388-13

**Figure 5** Circuit boards FRUs

**Table 6 Solenoid and clutches FRUs**

Parts	Part number	Serial number		Qty	Name and description
		Effective	Discont'd		
1	401-0792-00			1	Electric clutch, upper feed roller, exit roller
2	401-0808-00			1	Electric clutch, pick roller
3	401-0807-00			1	Electric clutch, drum maintenance
4	401-0792-00			1	Electric clutch, cap/wipe/purge drive
5	148-0301-00			1	Solenoid, transfix assembly

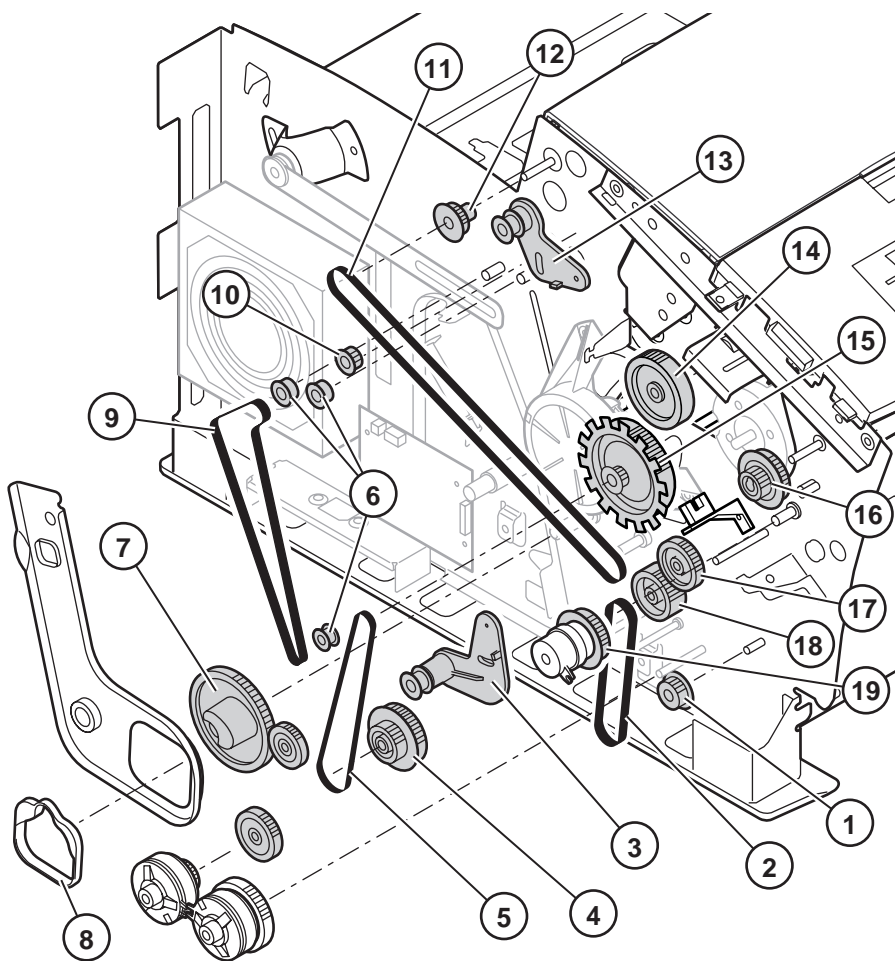


0388-23

**Figure 6 Solenoids and clutches FRUs**

**Table 7 Gears and belts FRUs**

<b>Parts</b>	<b>Part number</b>	<b>Serial number Effective    Discont'd</b>	<b>Qty</b>	<b>Name and description</b>
1	650-3619-00		5	Pulley, lower paper transport. Part of 650-3619-00 Gear Kit
2	650-3615-00		2	Paper feed roller drive belt. Part of 650-3615-00 Belt Kit
3	650-3615-00		5	Tensioner, process belt. Part of 650-3615-00 Belt Kit
4	650-3619-00		1	Lower process, gear/pulley; Part of 650-3619-00 Gear Kit
5	650-3615-00		1	Process drive belt. Part of 650-3615-00 Belt Kit
6	650-3619-00		5	Roller, flat, head maintenance. Part of 650-3619-00 Gear Kit
7	650-3619-00		5	Head tilt cam gear. Part of 650-3619-00 Gear Kit
8	351-1015-00		1	Guide, head tilt
9	650-3615-00		2	Head maintenance timing belt and ratchet clip. Part of 650-3615-00 Belt Kit
10	650-3619-00		5	Pulley, drive, head maintenance. Part of 650-3619-00 Gear Kit
11	650-3615-00		1	Exit roller drive belt. Part of 650-3615-00 Belt Kit
12	650-3619-00		5	Pulley, exit drive. Part of 650-3619-00 Gear Kit
13	650-3615-00		1	Tensioner, exit drive belt. Part of 650-3615-00 Belt Kit
14	650-3619-00		5	Transfix gear, eccentric. Part of 650-3619-00 Gear Kit
15	650-3619-00		5	Gear, compound eccentric, flagged. Part of 650-3619-00 Gear Kit
16	650-3619-00		5	Duplex roller, gear pulley. Part of 650-3619-00 Gear Kit
17	650-3619-00		5	Paper path, idler 1. Part of 650-3619-00 Gear kit
18	650-3619-00		5	Paper path, idler 2. Part of 650-3619-00 Gear Kit
19	650-3619-00		5	Gear/pulley, upper feed roller, preheat entry. Part of 650-3619-00 Gear Kit

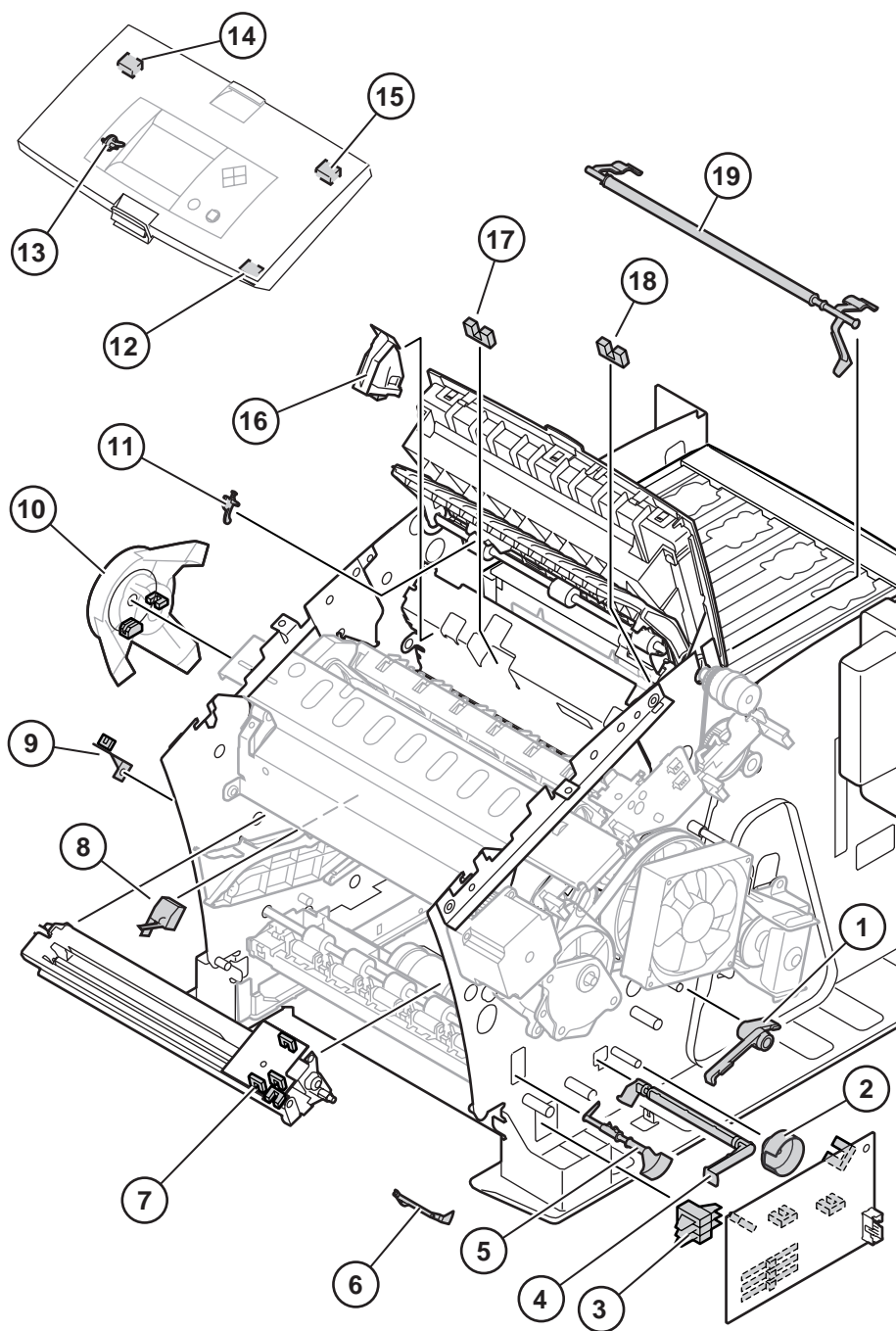


0388-22

**Figure 7 Gears and belts FRUs**

**Table 8 Sensors and flags FRUs**

<b>Parts</b>	<b>Part number</b>	<b>Serial number Effective    Discont'd</b>	<b>Qty</b>	<b>Name and description</b>
1	650-3618-00		1	Cap/wipe/purge home flag. Part of 650-3618-00 Flag Kit
2	650-3618-00		1	Drum maintenance cam home flag. Part of 650-3618-00 Flag Kit
3	386-6902-00			Media tray sense flag assembly
4	650-3618-00		1	Paper out sensor flag. Part of 650-3618-00 Flag Kit
5	650-3618-00		1	Paper pick flag. Part of 650-3618-00 Flag Kit
6	650-3618-00		1	Handfeed sensor flag, inside front access cover. Part of 650-3618-00 Flag Kit
7	351-1047-00		1	Preheat entry/left edge sensor, A-size sensor, handfeed sensor. Part of 351-1047-00 upper feeder roller assy with circuit bd
8	119-5803-00		1	Preheater exit sensor assembly
9	119-4968-00		1	Process gear sensor
10	650-3622-00		1	Y-axis encode kit
11	650-3618-00		1	Transfix exit sensor flag. Part of 650-3618-00 Flag Kit
12	644-0927-00		1	Front cover open sensor. Part of 644-0927-00 Front cover, Control Panel
13	650-3618-00		1	Duplex paper sensor flag. Part of 650-3618-00 Flag Kit
14	644-0927-00		1	Duplex paper sensor. Part of 644-0927-00 Front cover, Control Panel
15	644-0927-00		1	Exit cover open sensor. Part of 644-0927-00 Front cover, Control Panel
16	119-5795-00		1	Drum temperature sensor assembly
17	119-5802-00		1	Transfix exit sensor
18	119-5802-00		1	Paper exit/tray full sensor
19	650-3618-00		1	Paper exit/tray full flag. Part of 650-3618-00 Flag Kit



0388-15

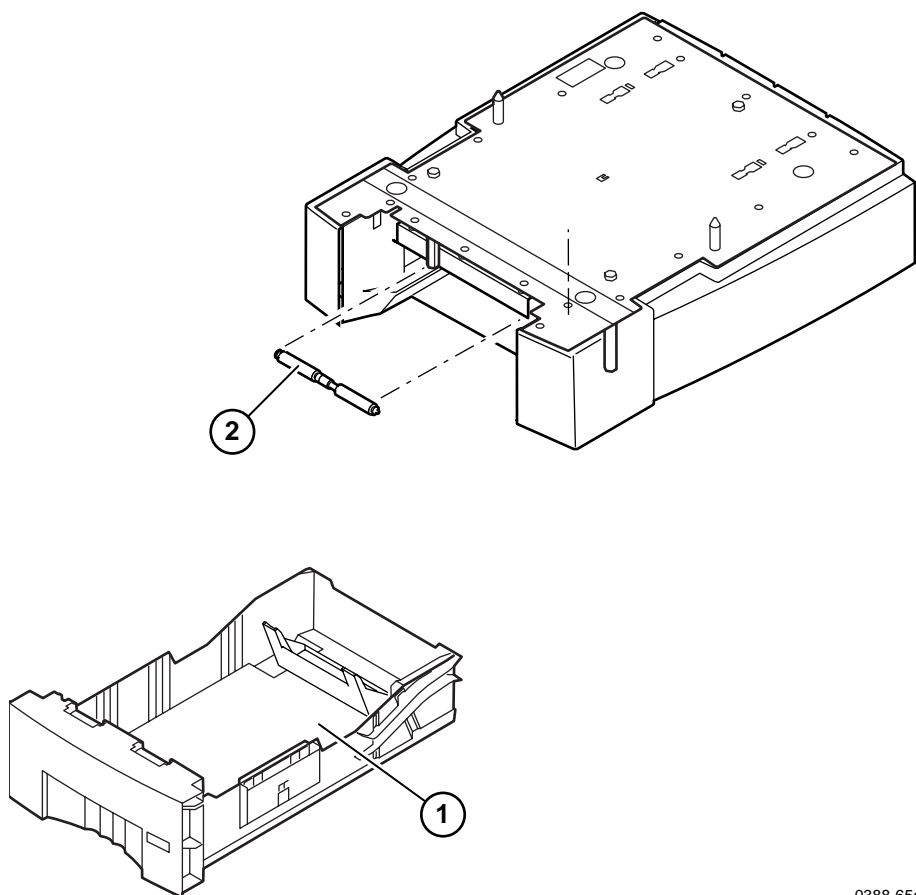
**Figure 8** Sensors and flags FRUs

# High-capacity Paper Tray Assembly

Table 9 High-capacity Paper tray FRUs

Parts	Part number	Serial number		Qty	Name and description
		Effective	Discont'd		
1	436-0328-00			1	High-capacity paper tray, A-size
	436-0329-00				High-capacity paper tray, A4-size
2	116-0272-00			1	Paper pick roller
	437-0467-00				High-capacity paper tray assembly, A-size, includes tray
	437-0468-00				High-capacity paper tray assembly, A4-size, includes tray





0388-65a

**Figure 9 High-capacity Paper Tray**

## Service tools

**Table 10 Service tools**

Parts	Part number	Serial number		Qty	Name and description
		Effective	Discont'd		
	003-1489-00			1	Y-axis encoder disk spacer tool
	003-1500-00			1	Y-axis belt tensioner
	006-7997-00			1	Grease, Rheolube 768
	012-1535-00			1	Cable, Diagnostics, PC, DB-9F to DB25M
	012-1543-00			1	Cable, adapter, diagnostics
	0031707-00			1	+40 volt service plug and jumper
	003-1749-00			1	Head-to-drum calibration tool kit
	003-1733-00			1	Head-to-drum spacer replacements
	063-3009-00			1	Service diagnostics diskette, SW
	650-3973-00				Tool kit - Torque Screwdriver - Encoder Alignment Tool - Head to Drum Gap Tool Assy. - Y-Axis Belt Tensioner tool - Hot Head Assy. - Hot Head Plug Assy. - Serial Adapter Cable - 40-v Service Plug - PC DB-9F to DB25M Cable - T-10 Torx Bit - T-15 Torx Bit - T-20 Torx Bit - T-25 Torx Bit
	003-1623-00			1	Spring removal tool
	650-3620-00				Hardware kit
	650-3616-00				Cable kit, printer wiring harnesses

## Supplies and accessories

**Table 11 Supplies and accessories**

Parts	Part number	Serial number		Qty	Name and description
		Effective	Discont'd		
	016-1595-00			1	Cleaning Kit
	016-1604-00			1	Black Ink, 3 pack
	016-1605-00			1	Cyan Ink, 5 pack plus 2 black sticks
	016-1606-00			1	Magenta Ink, 5 pack plus 2 black sticks

**Table 11 Supplies and accessories**

<b>Parts</b>	<b>Part number</b>	<b>Serial number Effective</b>	<b>Discont'd</b>	<b>Qty</b>	<b>Name and description</b>
	016-1607-00			1	Yellow Ink, 5 pack plus 2 black sticks
	016-1608-00			1	Rainbow pack, 1 stick each color
	016-1582-00			1	Cyan Ink, 2 pack plus 1 black sticks
	016-1583-00			1	Magenta Ink, 2 pack plus 1 black sticks
	016-1584-00			1	Yellow Ink, 2 pack plus 1 black sticks
	436-0330-00 436-0395-00			1	Tray, Paper, A-size Tray, Paper, A-size, Z840DP "Designer Edition"
	436-0332-00 436-0396-00			1	Tray, Paper, A4-size Tray, Paper, A4-size, Z840DP "Designer Edition"
1	436-0336-00			1	Tray, High-volume transparency, A-size
1	436-0338-00			1	Tray, High-volume transparency, A4-size
	116-0838-00				Separator pad, paper
	016-1727-00				Maintenance cartridge kit; roller and counter
	436-0370-00				Waste ink tray
	016-1368-00				A-size paper, 500 sheets
	016-1369-00				A4-size paper, 500 sheets
	016-1724-00				Premium Transparency, 50 sheets, A-size
	016-1725-00				Premium Transparency, 50 sheets, A4-size
	016-1720-00				Standard Transparency, 50 sheets, A-size
	016-1721-00				Standard Transparency, 50 sheets, A4-size
	016-1194-00				A-size transparency pockets
	016-1130-00				A-size transparency sleeves
	016-1131-00				A4-size transparency sleeves
	013-0299-00				Parallel cable adapter, 1284C to 1284B
	070-9102-00				User Quick Reference Guide, English
	070-9102-10				User Quick Reference Guide, French
	070-9102-20				User Quick Reference Guide, Italian
	070-9102-30				User Quick Reference Guide, German
	070-9102-40				User Quick Reference Guide, Spanish

**Table 11 Supplies and accessories**

<b>Parts</b>	<b>Part number</b>	<b>Serial number Effective    Discont'd</b>	<b>Qty</b>	<b>Name and description</b>
	070-9102-70			User Quick Reference Guide, Simplified Chinese
	070-9102-80			User Quick Reference Guide, Traditional Chinese
	070-9102-90			User Quick Reference Guide, Korean
	070-9102-05			User Quick Reference Guide, Russian
	061-4200-00			Z840 "Designer Edition" Manual Pack: Welcome Kit, User Guide, Driver CD-ROM,
	061-4201-00			Z840 "Designer Edition" Country Kit: Cleaning Kit, Setup Poster, Parallel Cable Adapter, ATM CD-ROM,
	070-9103-00			Advanced Topics and Troubleshooting Manual, English
	070-9103-10			Advanced Topic and Troubleshooting Manual, French
	070-9103-20			Advanced Features and Troubleshooting Manual, Italian
	070-9103-30			Advanced Features and Troubleshooting Manual, German
	070-9103-40			Advanced Features and Troubleshooting Manual, Spanish
	070-9103-70			Advanced Features and Troubleshooting Manual, Simplified Chinese
	070-9103-80			Advanced Features and Troubleshooting Manual, Traditional Chinese
	070-9103-50			Advanced Features and Troubleshooting Manual, Korean
	070-9103-05			Advanced Features and Troubleshooting Manual, Russian
	063-3126-01			Adobe Type Manager, CD SW
	063-3166-00			Drivers and Utilities, CD SW
	063-2627-00			Drivers and Utilities, Diskettes, English
	063-2627-10			Drivers and Utilities, Diskettes, French
	063-2627-20			Drivers and Utilities, Diskettes, Italian
	063-2627-30			Drivers and Utilities, Diskettes, German
	063-2627-40			Drivers and Utilities, Diskettes, Spanish
	063-2627-70			Drivers and Utilities, Diskettes, Simplified Chinese

**Table 11 Supplies and accessories**

<b>Parts</b>	<b>Part number</b>	<b>Serial number Effective</b>	<b>Discont'd</b>	<b>Qty</b>	<b>Name and description</b>
	063-2627-80				Drivers and Utilities, Diskettes, Traditional Chinese
	063-2627-90				Drivers and Utilities, Diskettes, Korean
	063-2627-05				Drivers and Utilities, Diskettes, Russian
	161-0066-00				Power cord, Standard U.S., 115V
	161-0066-09				Power cord, Euro, 220V
	161-0066-10				Power cord, United Kingdom, 240V
	161-0066-11				Power cord, Australian, 250V
	161-0154-00				Power cord, Swiss, 220V
	161-0240-00				Power cord, Danish
	065-0580-00				Shipping carton kit



# Test Prints

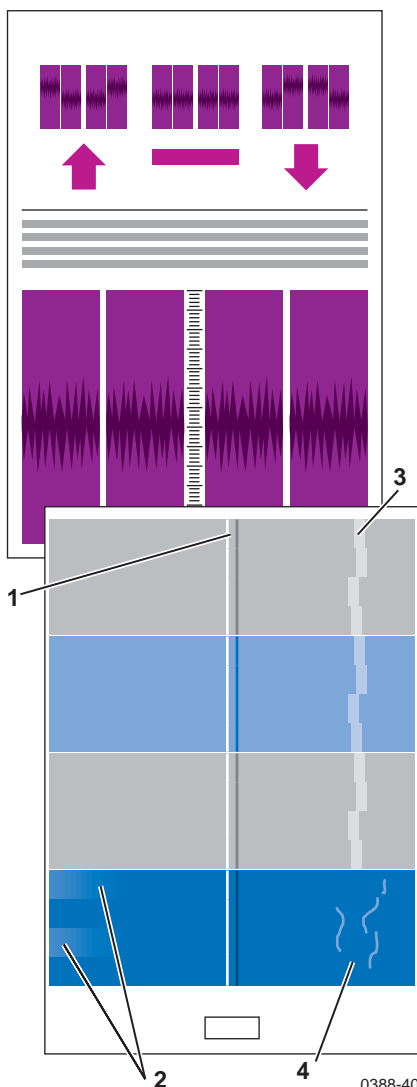
This topic illustrates the service test prints produced by the printer. The test prints push the printer to the extremes of its performance to reveal possible shortcomings. Note that defects revealed by the prints may not show up at all in the course of ordinary printing. In servicing the printer, you should minimize the defects shown by the prints but not necessarily eliminate them.

**1: X-axis motion.** These prints reveals problems with the X-axis motion of the printhead. Look for:

1. A thin white line and black line are normally present in the print
2. Uniform density. Look for uniform fill from the left to the right edge of the the print. Lack of uniformity could be caused by printhead-to-drum misalignment. Lack of uniformity on the edge of the print may be caused by incorrect transfix roller pressure. A defective printhead can also cause uniformity problems, particularly if the density difference is about 1/3 of an A-size page wide. Narrower density problems may be caused by a paper preheater. Print Service Print 6.
3. Weak jets or off-axis jets. Defective printhead. Defective cap/wipe/purge system that is unable to clear a clogged jet. Print Service Print 2.
4. Wrinkling. See Service Print 8.

**Causes:** Gaps could either be caused by a defective X-axis drive or by something else, such as a wiring harness interfering with the horizontal movement of the printhead. The ink loader, without the top cover installed to secure it in place, may rest too low and interfere with the printhead's motion. In this case the ink loader should rest on extrusions on the printer's side frames. Also ensure that the spring under the printhead is intact and free of ink.

In the second print, the jagged black bars in the four purple columns should align horizontally. If they do not adjust the x-axis scale using the procedure "X-axis scale adjustment" on page 74.

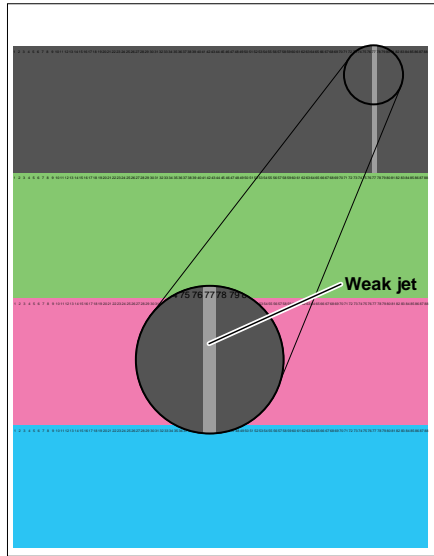


0388-40

**2: Weak/missing jet.** This print shows which jets are not outputting enough, if any, ink compared to its neighboring jets. Note that the yellow jets' bands have a small amount of cyan ink added to them, which tints them green, to make them more visible.

**Look for:** No interlacing is used in this print; expect light/dark variation between jets. Look for *much* lighter colored vertical bands in the horizontal bars. Weak jets in the yellow band are distinguished by a cyan tint.

**Causes:** A jet may be partially clogged; perform printhead clean/purge cycles on the printhead to remove contaminants from the poor performing jet. Test the vacuum system of the cap/wipe/purge system. Turn the printer off for 4 to 6 hours (or overnight, if practical). Then perform clean/purge cycle again. As a last resort, replace the printhead.



9923-114

**3: Color Bands, RGBK Dither** - The large, secondary colored areas in this print reveal banding and weak jets.

**Look for:** Vertical “bars” or bands of *much* lighter color or a different hue running in-line in one or more of the solid fills.

**Causes:** Banding is caused by color-to-color misregistration inherent in the fabrication of the jet. Ensure the printhead-to-drum spacing is correct. Then use the PC diagnostics to ensure that the printhead and drum thermals are correct. A weak jet can also cause banding; refer to the **Weak/missing Jets** test print. Make sure that the drum temperature sensor is correctly mounted and in proper, even contact with the drum. If necessary, remove the sensor and check it for an accumulation of debris at its contact point. As a last resort, replace the printhead.



9923-115



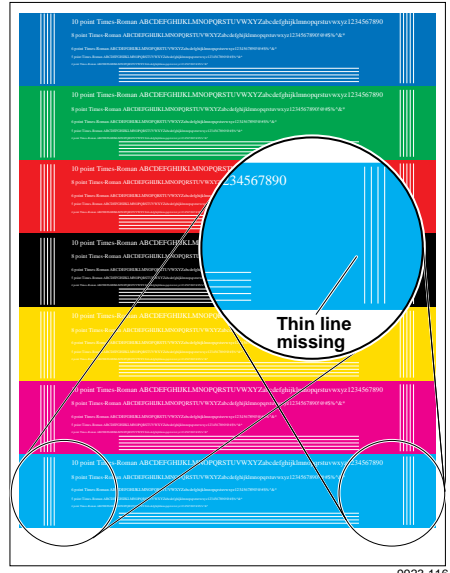
**4: Reverse Text.** The print indicates if the printhead is outputting properly sized drops of ink and that the drum temperature is not too high.

**Note:** This print should be made with the printer covers closed and in place. The heat loss without the covers can hide the “too-hot” thermal problem. Also print the test print in Standard print mode.

**Look for:** Legibility in the lines of 6-point text; particularly in the primary colors. If the letters are closed or badly “plugged” with ink, the printhead is laying down too much ink. A good-quality print shows **five** vertical parallel lines of different thicknesses on the left and right side of the print. If the thinnest line is missing, the printhead is outputting too much ink or the drum temperature is too high.

**Causes:** Check the thermal regulation of the printhead and of the drum. Make sure that the drum temperature sensor is correctly mounted and in proper, even contact with the drum. If necessary, remove the sensor and check it for an accumulation of debris at its contact point. Replace the drum temperature sensor.

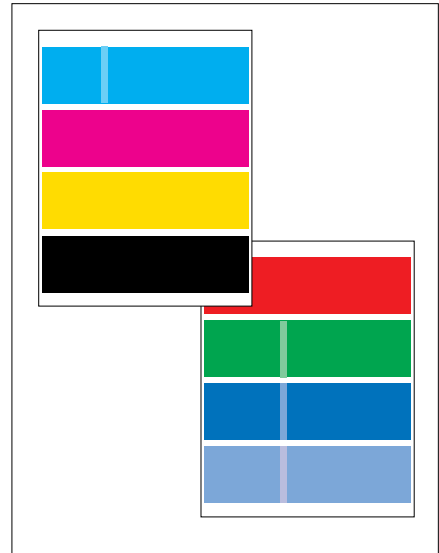
Check the printhead-to-drum gap. As a last resort, replace the printhead.



**5: Big bands Handfeed OHP.** This print allows you to evaluate transparency printing as well as manual feeding. It prints two prints, one with primary color fills and one with secondary color fills and a band of 50% blue, as this is a popular background for overhead transparencies.

**Look for:** Uniformity of fill with no scratching. Evaluate the print on an overhead projector. Some print artifacts visible on the print do not show when projected. Likewise, some defects do not show until projected.

**Causes:** The ink drops from the jets are traveling in incorrect trajectories. The printhead is incorrectly mounted or its printhead-to-drum spacing is incorrect.

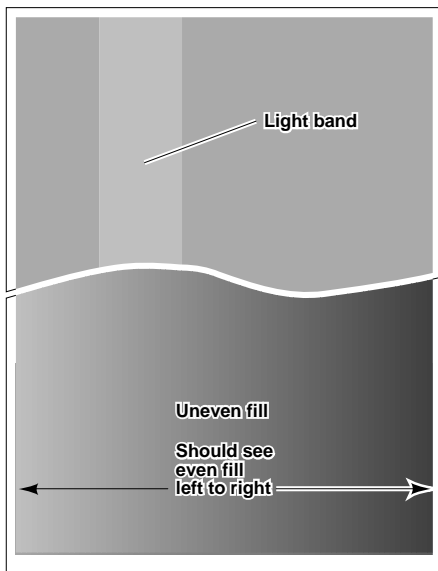


**6: 66% Gray, dot size uniformity.** This print is made up of a 66% black fill. It reveals variations in the ink-drop-spread caused by thermal variations or transfix roller pressure variations or drum oiling variations.

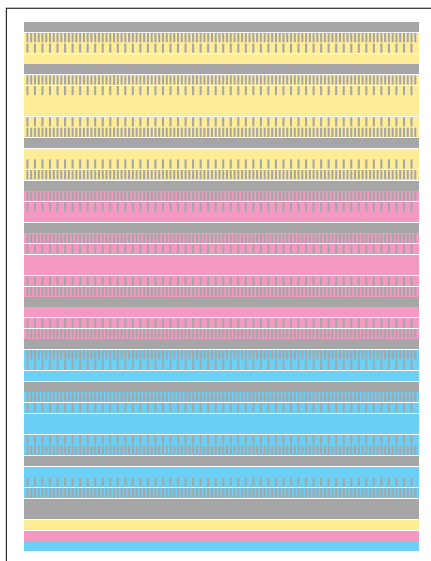
**Look for:** Large area of differences in the density across the width of the page. (A slight variation is normal.) Look for a lighter vertical band, about 1/5 the width of the page, running the length of the page. Also look for small, light spots or irregular white lines, vertically aligned with each other, in the print every 13.3 cm (5.25 in.).

This pattern is sensitive to the density variations in the paper it is printed on. Use a high-quality grade of laser printer paper; otherwise, the print will appear mottled.

**Causes:** Use the PC diagnostics to check the printhead and drum for good thermal regulation. Also check the printhead-to-drum gap. Ensure the drum fan is running properly. A vertical band, 1/5 page wide, running the length of the page, is caused by a stuck heating plate in the paper preheater. Run the front panel cleaning procedure *Clean Ink Smears* which raises the temperature of the paper preheater and may free the stuck heating plate. Additionally, you may manually force a thick sheet of paper (65 to 80#) through the paper preheater to jar the plate free. Light spots are caused by a defective transfix roller with a weak, soft spot that is not pushing the ink into the paper as the rest of the roller does. In this case, replace the drum/transfix unit. Replace the drum maintenance cartridge roller; particularly if you observe variations in the glossiness of the print.



**7: Dot position (scanner) - Printhead diagnostic.** This print is used for manufacturing and engineering evaluation of printhead performance.



9923-118

**8: YMCKRGB Solid Fills.** These seven prints show uniformity of fill.

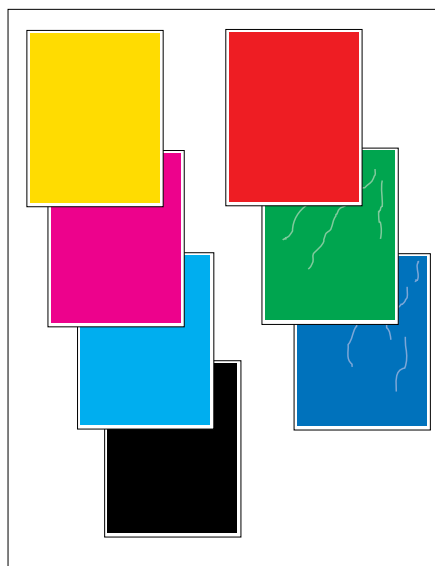
**Look for:** Even, uniform fills throughout each print. Wrinkles or deformity of the paper itself caused by the print process show up in duplexed solid fill prints at standard or enhanced resolutions. To test for wrinkling, print the YMCKRGB prints in duplex mode at the standard resolution.

**Causes:** Weak jets or uneven drum heating may cause uneven fills.

To solve wrinkling, try different print media. Replace the drum maintenance drawer to correct streaking.

Check the drum temperature sensor for debris build-up on the sensor or the sensor is in improper contact with the drum. Refer to the **Reverse Text** test print.

The transfix pressure may be incorrect. Perform the transfix spring adjustment described in "Transfix roller pressure spring adjustment" on page 72. As a last resort, replace the drum/transfix assembly.

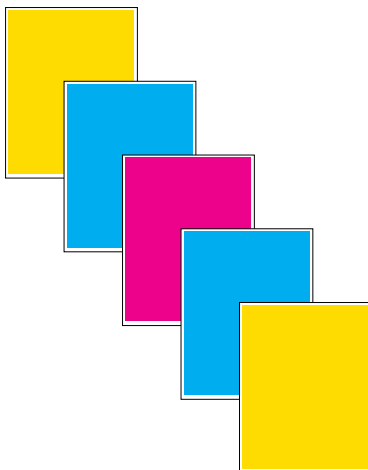


9923-119

**9: Drum Seal.** These five prints are used to treat a newly installed drum.

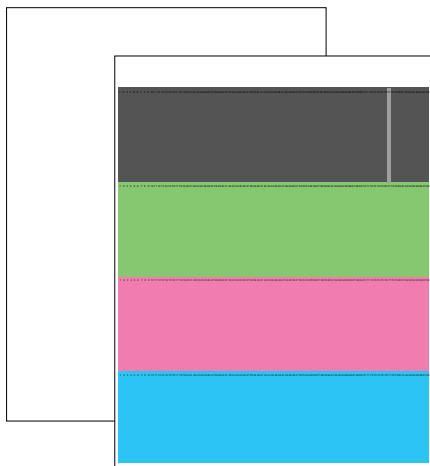
To seal a newly installed drum:

1. Power up the printer in Bypass Mode to skip the startup and mud pages (refer to “Bypass mode (manufacturing mode)” on page 59).
2. Select the test print **Manufacturing paper path** to verify the paper path and that all ink jets operate.
3. Print the test print **Drum Seal** to seal the new drum.



9923-154

**10: Manufacture paper path.** These two prints verify that the paper path works correctly by processing a blank sheet of paper through the paper path. Following this, a weak jet test print, identical to Test Print 2, is printed to verify that all the printhead jets operate correctly.



9923-153

**11: Head-to-Drum Gap.** This print indicates if the gap between the printhead and the drum is correct.

**Lines.** The horizontal lines of the print are made up of long lines and short dashes. If the dashes are positioned above the lines, then the drum gap is too wide.

If the dashes are positioned below the lines, then the drum gap is too narrow.

Also examine each end of the band of text. Look for differences between the quality of the characters on the left and right ends of the print. A difference indicates the printhead is misaligned.

**Text.** Look for text that is fuzzy or text that differs in quality from one side of the print to the other. Either conditions indicates the printhead-to-drum gap is incorrect.

Perform the procedure "Printhead-to-drum spacing adjustment" on page 66.



**Indicates  
that head-to-drum  
gap is too small**

0388-39

**12: Black Solid Fill.** This prints shows uniformity of fill.

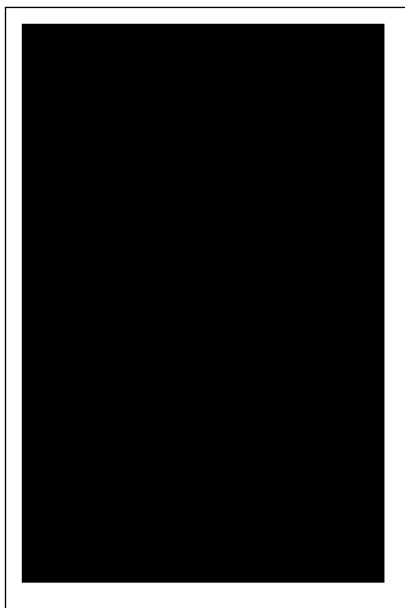
**Look for:** Even, uniform fills throughout the print. There should be no wrinkling or deformity of the paper throughout the print.

**Causes:** Weak jets or uneven drum heating may cause uneven fills.

To solve wrinkling, try different print media. Replace the drum maintenance tray to correct streaking.

Check the drum-temperature sensor for debris build-up on the sensor. Or the sensor is in improper contact with the drum. Refer to the test print **Reverse Text**.

The transfix pressure may be incorrect. Perform the transfix spring adjustment described in "Transfix roller pressure spring adjustment" on page 72. As a last resort, replace the drum/transfix assembly.



**13: Red Solid Fill.** This prints shows uniformity of fill.

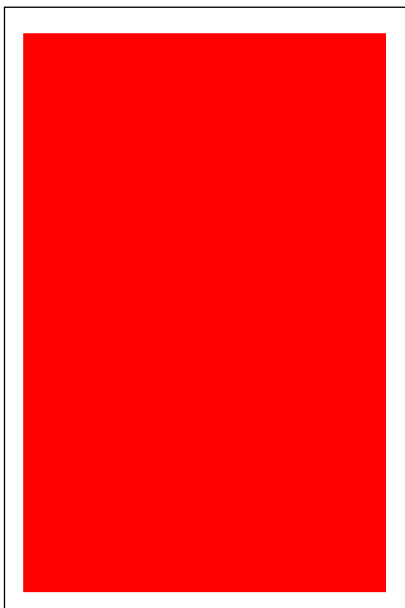
**Look for:** Even, uniform fills throughout the print. There should be no wrinkling or deformity of the paper throughout the print.

**Causes:** Weak jets or uneven drum heating may cause uneven fills.

To solve wrinkling, try different print media. Replace the drum maintenance tray to correct streaking.

Check the drum-temperature sensor for debris build-up on the sensor. Or the sensor is in improper contact with the drum. Refer to the test print **Reverse Text**.

The transfix pressure may be incorrect. Perform the transfix spring adjustment described in "Transfix roller pressure spring adjustment" on page 72. As a last resort, replace the drum/transfix assembly.



**14: Green Solid Fill.** This prints shows uniformity of fill.

**Look for:** Even, uniform fills throughout the print. There should be no wrinkling or deformity of the paper throughout the print.

**Causes:** Weak jets or uneven drum heating may cause uneven fills.

To solve wrinkling, try different print media. Replace the drum maintenance tray to correct streaking.

Check the drum-temperature sensor for debris build-up on the sensor. Or the sensor is in improper contact with the drum. Refer to the test print **Reverse Text**.

The transfix pressure may be incorrect. Perform the transfix spring adjustment described in "Transfix roller pressure spring adjustment" on page 72. As a last resort, replace the drum/transfix assembly.

**15: Blue Solid Fill.** This prints shows uniformity of fill.

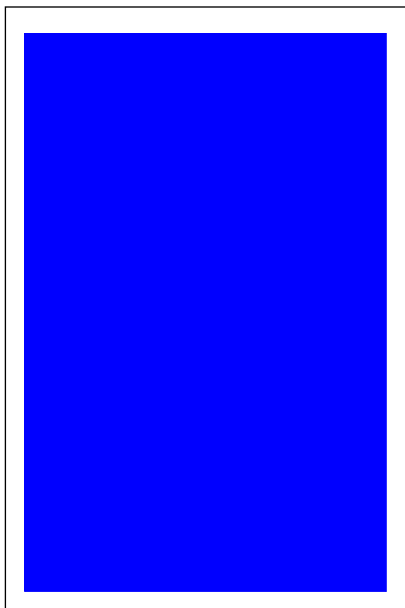
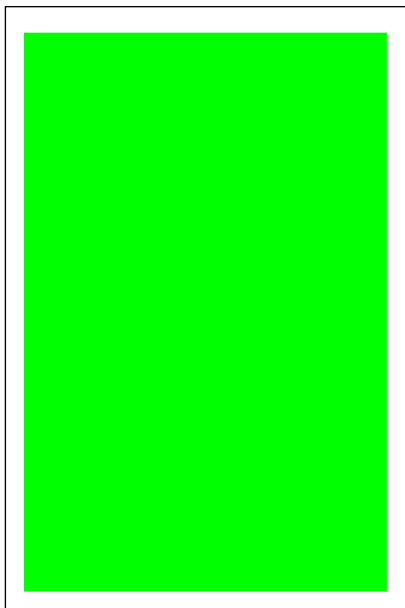
**Look for:** Even, uniform fills throughout the print. There should be no wrinkling or deformity of the paper throughout the print.

**Causes:** Weak jets or uneven drum heating may cause uneven fills.

To solve wrinkling, try different print media. Replace the drum maintenance tray to correct streaking.

Check the drum-temperature sensor for debris build-up on the sensor. Or the sensor is in improper contact with the drum. Refer to the test print **Reverse Text**.

The transfix pressure may be incorrect. Perform the transfix spring adjustment described in "Transfix roller pressure spring adjustment" on page 72. As a last resort, replace the drum/transfix assembly.



**16: Cyan Solid Fill.** This prints shows uniformity of fill.

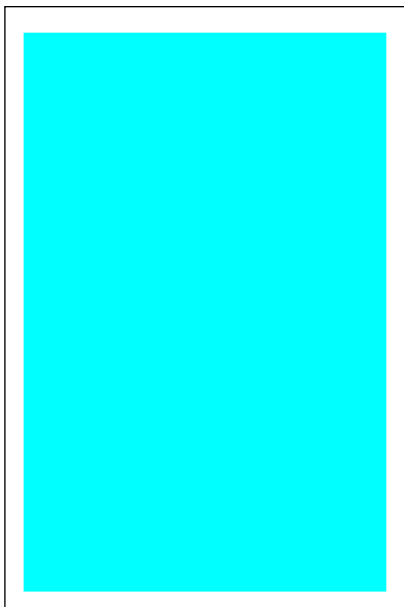
**Look for:** Even, uniform fills throughout the print. There should be no wrinkling or deformity of the paper throughout the print.

**Causes:** Weak jets or uneven drum heating may cause uneven fills.

To solve wrinkling, try different print media. Replace the drum maintenance tray to correct streaking.

Check the drum-temperature sensor for debris build-up on the sensor. Or the sensor is in improper contact with the drum. Refer to the test print **Reverse Text**.

The transfix pressure may be incorrect. Perform the transfix spring adjustment described in "Transfix roller pressure spring adjustment" on page 72. As a last resort, replace the drum/transfix assembly.



**17: Magenta Solid Fill.** This prints shows uniformity of fill.

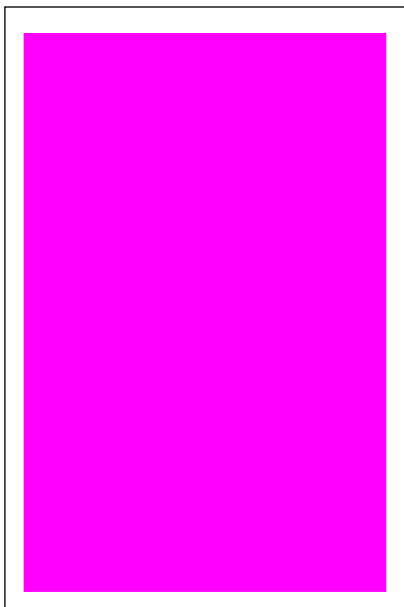
**Look for:** Even, uniform fills throughout the print. There should be no wrinkling or deformity of the paper throughout the print.

**Causes:** Weak jets or uneven drum heating may cause uneven fills.

To solve wrinkling, try different print media. Replace the drum maintenance tray to correct streaking.

Check the drum-temperature sensor for debris build-up on the sensor. Or the sensor is in improper contact with the drum. Refer to the test print **Reverse Text**.

The transfix pressure may be incorrect. Perform the transfix spring adjustment described in "Transfix roller pressure spring adjustment" on page 72. As a last resort, replace the drum/transfix assembly.





**18: Yellow Solid Fill.** This print shows uniformity of fill.

**Look for:** Even, uniform fills throughout the print. There should be no wrinkling or deformity of the paper throughout the print.

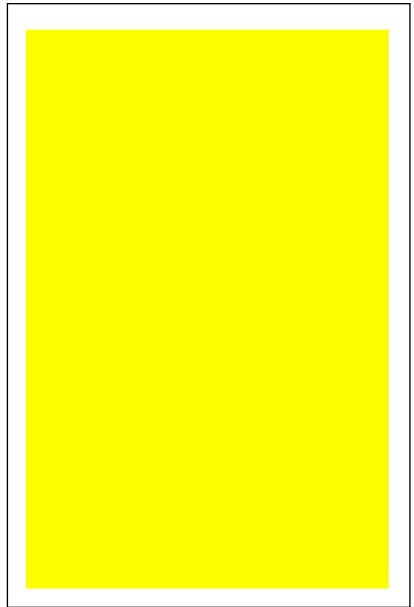
**Causes:** Weak jets or uneven drum heating may cause uneven fills.

To solve wrinkling, try different print media. Replace the drum maintenance tray to correct streaking.

Check the drum-temperature sensor for debris build-up on the sensor. Or the sensor is in improper contact with the drum. Refer to the test print **Reverse Text**.

The transfix pressure may be incorrect. Perform the transfix spring adjustment described in "Transfix roller pressure spring adjustment" on page 72. As a last resort, replace the drum/transfix assembly.

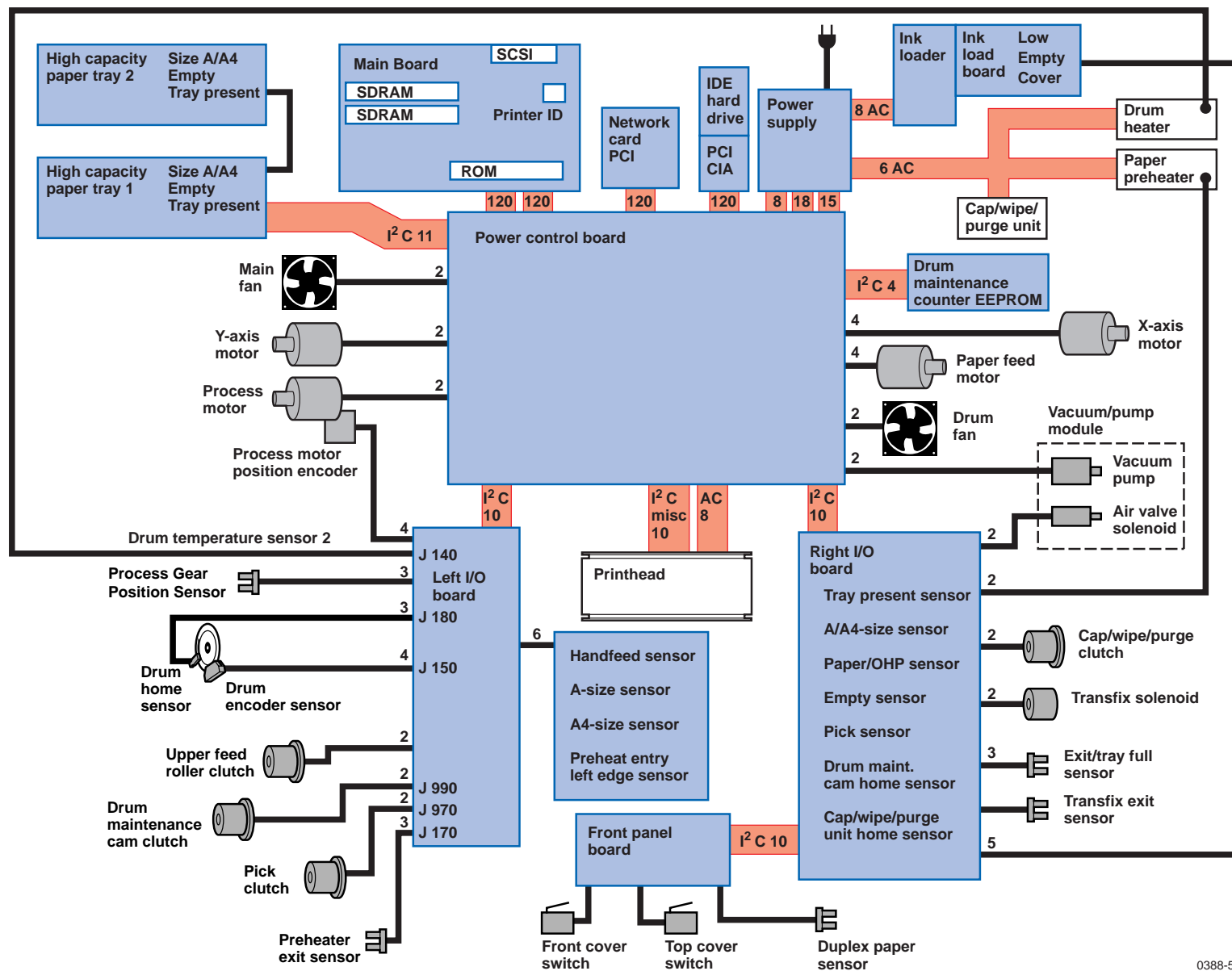
**19: Color Bands** This print consists of sequential bands of primary and secondary colors followed by a blue tint. This print is used for manufacturing and engineering evaluation of printhead performance.



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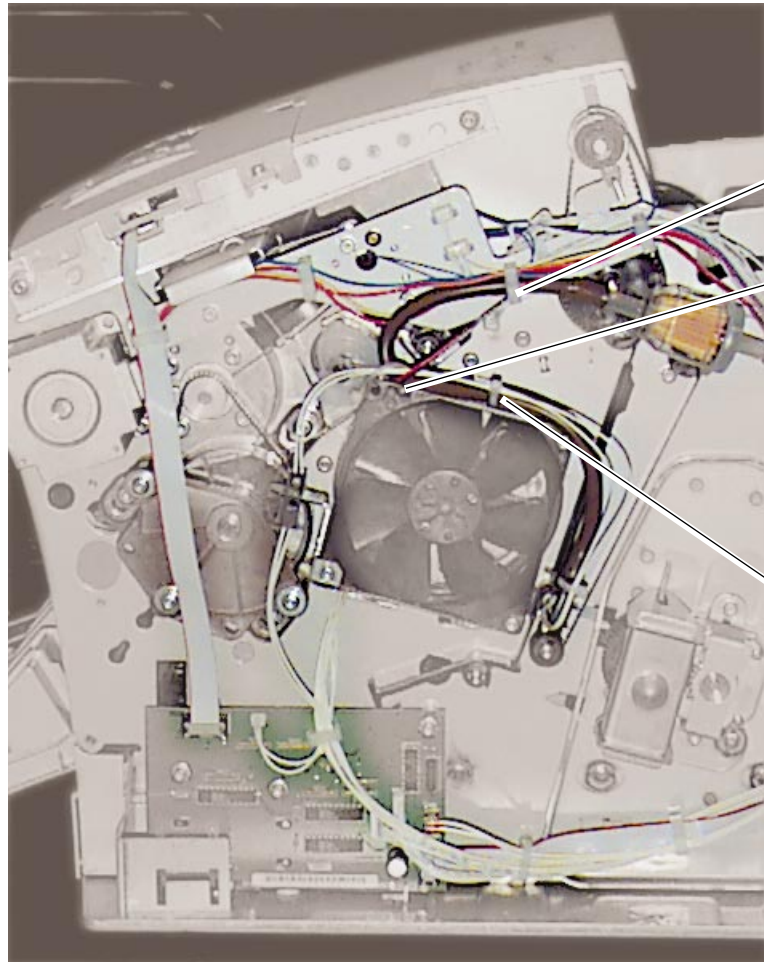
# Wiring Diagrams



0388-57

Print engine wiring diagram

The following illustrations detail the proper means of routing and dressing printer wiring. Incorrect wiring dressing can result in wires pinched by cabinet panels or damaged by moving parts of the printer.



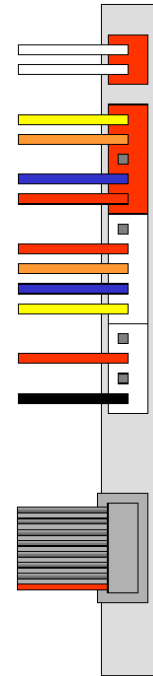
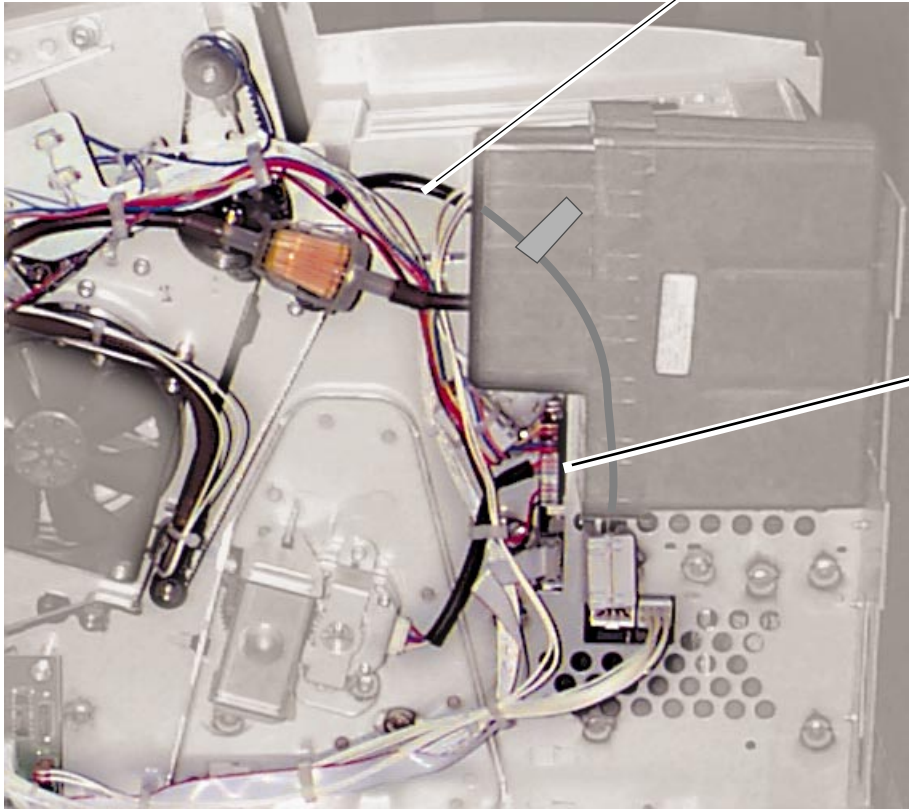
Bundle vacuum hose through  
cable restraint

Tie-wrap hose and wiring to corner  
of fan

Tie-wrap wiring harness

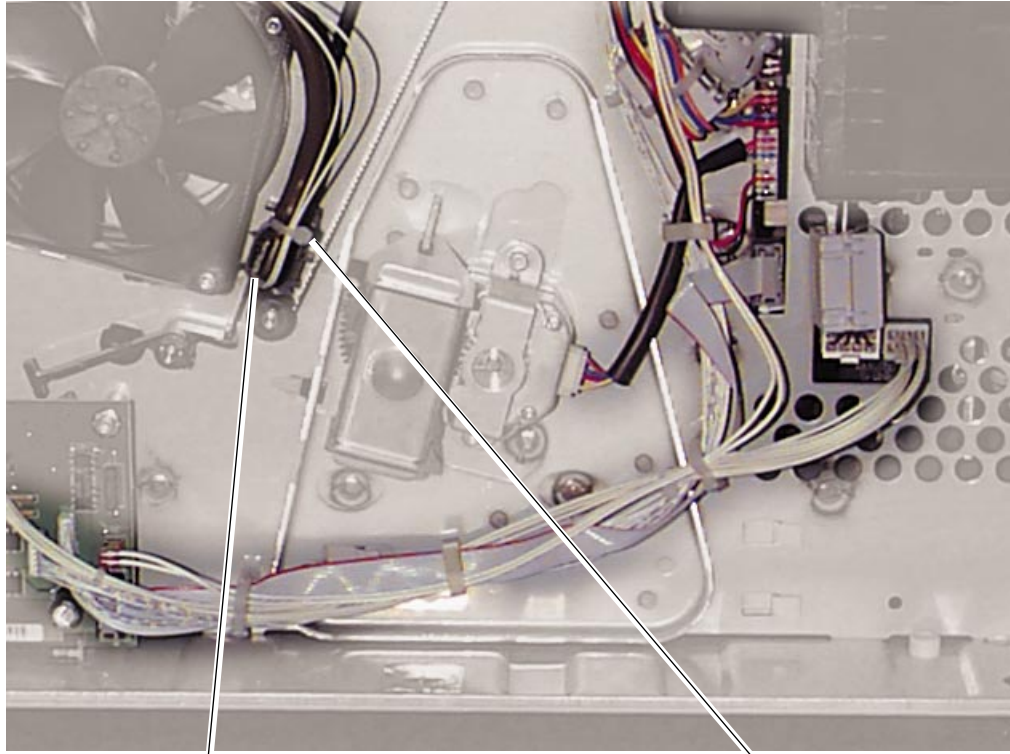
Wire routing on the right side of the printer near right I/O board

The power wiring harness for the ink loader is routed through a cable strap located behind the vacuum/pump module



Wire dressing above the x-axis drive

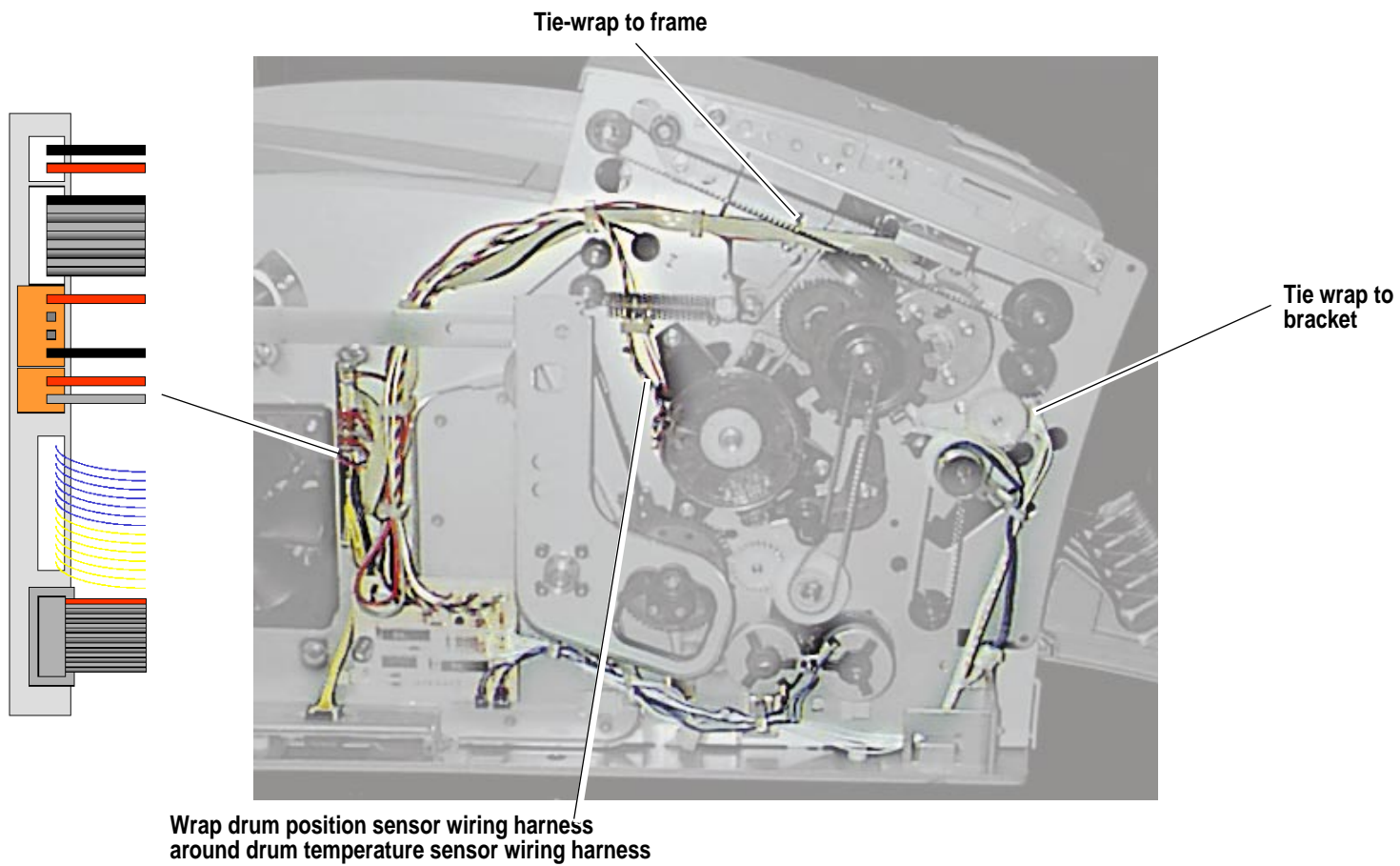
Tie wraps on the vacuum hose should be trimmed closely and each tie-wrap's "knot" should be oriented inward so it does not rub against the printer cabinet panel. Do not pinch the vacuum hose shut.



Tie-wrap cap/wipe/purge wiring harness to both ends of metal vacuum hose

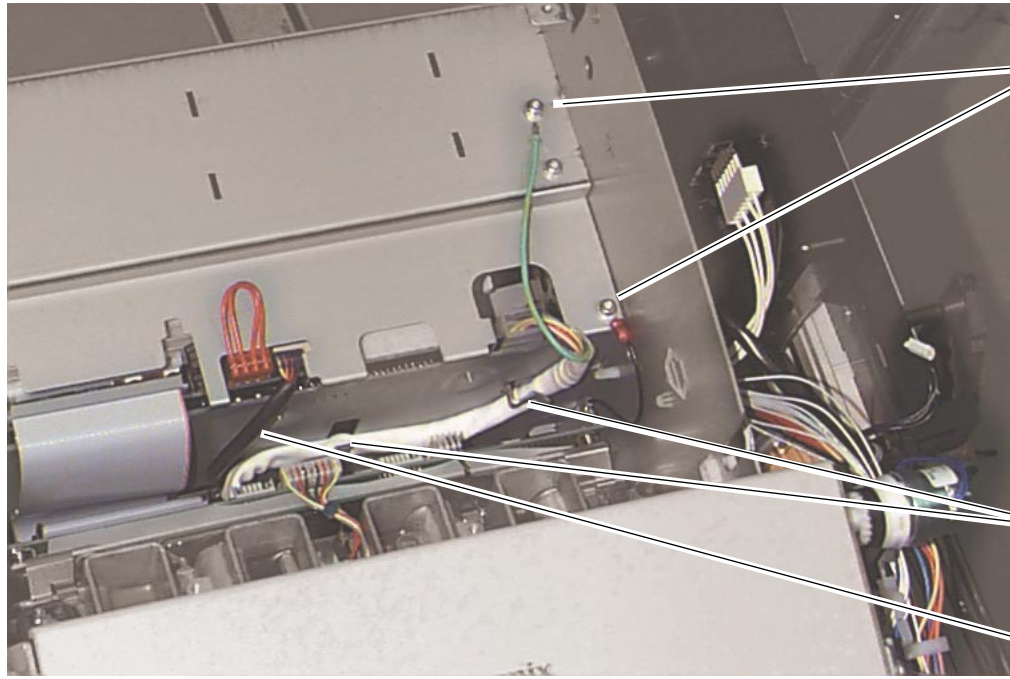
Orient knots in ties inward. Bundle cap/wipe/purge wiring with hose

#### Vacuum hose dressing



Routing wiring on the left side of the printer





**Printhead ground lugs**

**Printhead cable restraints  
built into frame**

**Maintenance tray counter  
sensor wiring harness  
restraint**

**Wire dressing behind the printhead**