Service Manual

Tektronix

Phaser® 360
Color Printer

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.

This printing: 10-27 1997
070-9923-00

TE/JY/ss/ta

Users 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: 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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Chapter

1 General Information

This service manual contains information useful to verify operation, troubleshoot, repair, adjust, and maintain a Tektronix Phaser® 360 Color Printer. The first half of this manual familiarizes you with the printer and provides information on installing and verifying the printer and training printer customers as a part of the Option S0 printer installation procedure. The latter half of the manual includes troubleshooting guides, adjustment procedures, assembly/disassembly procedures and an FRU list.

To ensure complete understanding of the product, we recommend participation in Phaser 360 service training, if available.

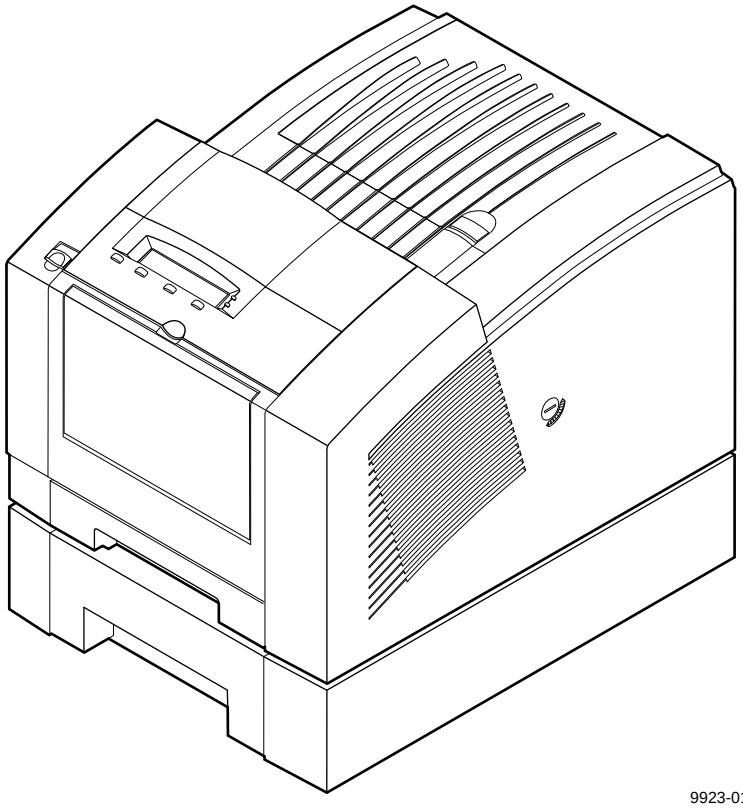


Figure 1-1 The Phaser 360 printer (shown with optional Lower Paper Tray Assembly)

Phaser 360 overview

The Phaser 360 Color Printer is an Adobe PostScript Level 3 (Version 3010) color, solid ink-jet printer. It also supports monochrome PCL 5e at 300 x 300 dots per inch. The Phaser 360 prints at a number of resolutions. A 5.8 page-per-minute (ppm) Fast Color Mode, a standard 4 ppm mode of 300 x 300 dots per inch (dpi), and an Enhanced mode of 800 x 450 dpi at 1.2 ppm.

The Phaser 360 features 164 built-in fonts, and is equipped with 24 Mbytes of RAM. It can be upgraded to 48 MB of RAM. The Phaser 360 is capable of job pipelining; it can print one image and process the data for the next image at the same time. It supports Check Print mode in which the first page of a multiple page print job is printed and the remainder of the job is held pending front panel approval. The printer features a SCSI port to support an external SCSI disk for additional font storage.

The printer support two available paper trays: A and A4, with an optional 500-sheet high-capacity Lower Paper Tray Assembly which gives the printer a dual-tray capability. (The Lower Paper Tray Assembly is sometimes referred to as the second feeder; it only supports paper printing.) The printer prints images on A- and A4-size paper and transparency film with 5 mm (0.2 in.) margins; the bottom margin is 7 mm (0.3 in).

A 64 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 rear panel slot allows customers to install one “smart card” Phaser Share B Network Card. One card provides a LocalTalk port. A second, alternative card offers a 10baseT/100baseTx/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.

The printer features Job Accounting which maintains up to 5000 records of processed printjobs. 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.

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.*

Memory considerations

With its total of 24 Mbytes, the Phaser 360 prints in Fast Color, 300 x 300 dpi and 450 x 800 dpi modes, job pipeline images, quickly off-load images from the host, and store downloadable fonts. Upgrading the printer to 48 Mbytes of RAM provides maximum performance through greater image throughput, more virtual memory and greater data port buffering.

Print engine assemblies

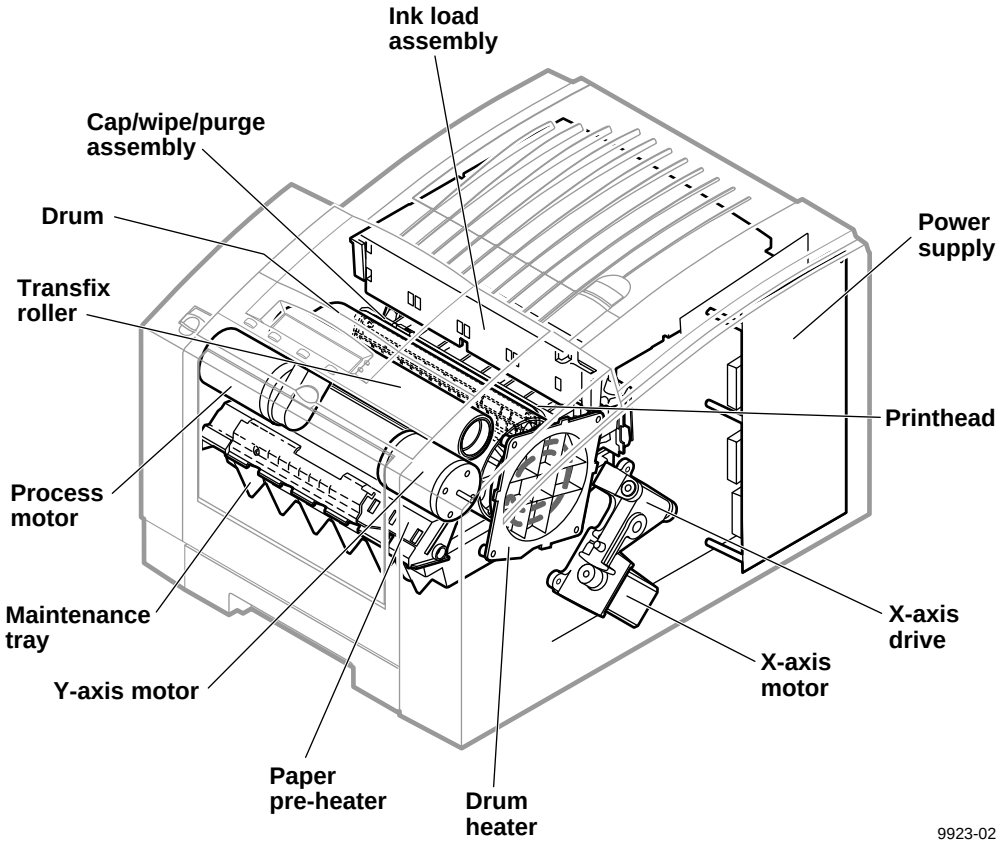


Figure 1-2 Internal features of the print engine

Ten circuit boards support the printer's electronics. Three boards, called I/O boards support the front panel, solenoids and sensors. I/O board 4 is contained inside the paper preheater. The main board contains the printer's CPU processor, RAM and ROM.

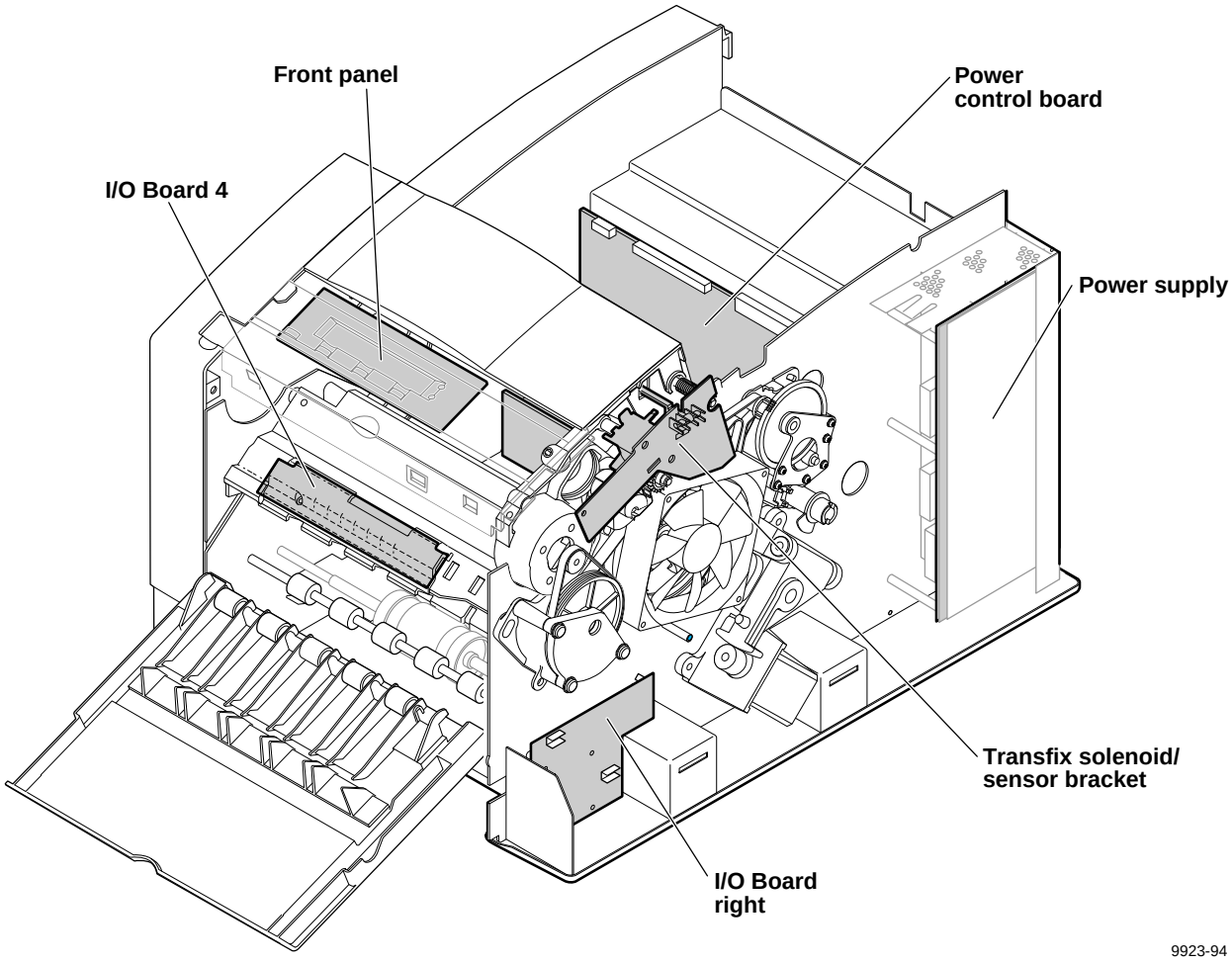


Figure 1-3 Circuit boards of the print engine (right front view)

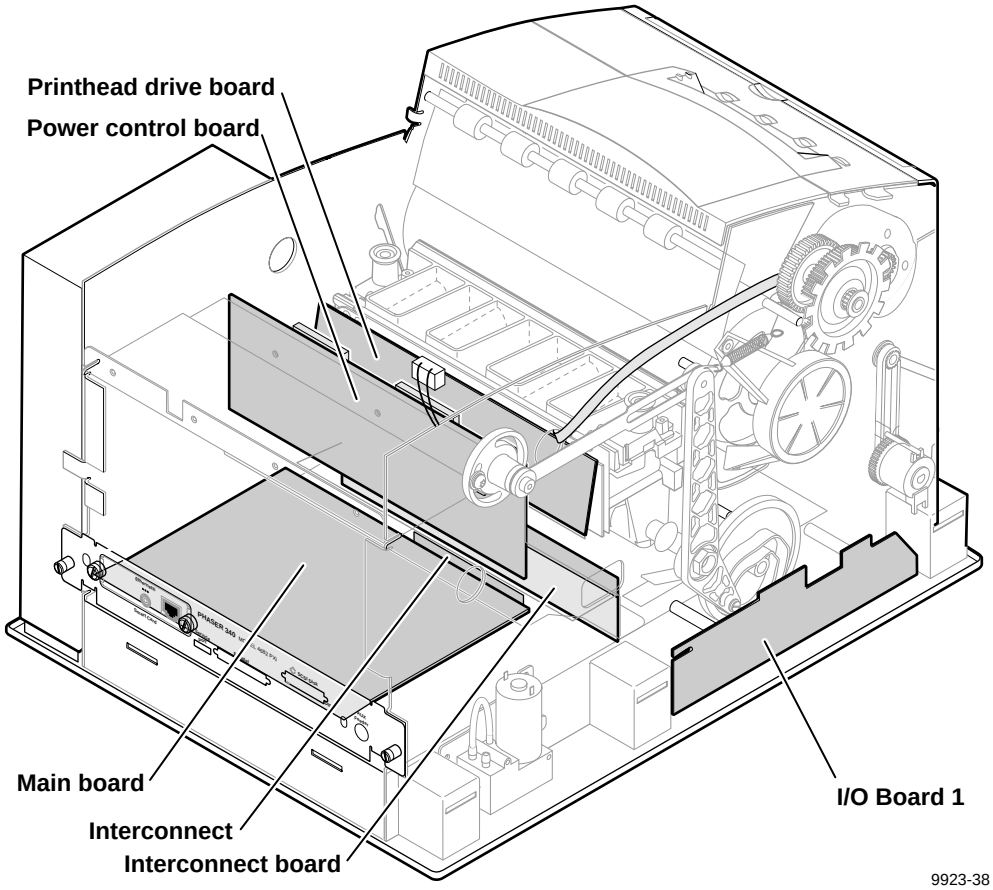


Figure 1-4 Circuit boards of the print engine (left-rear view)

An internal data bus, called the I^2C 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.

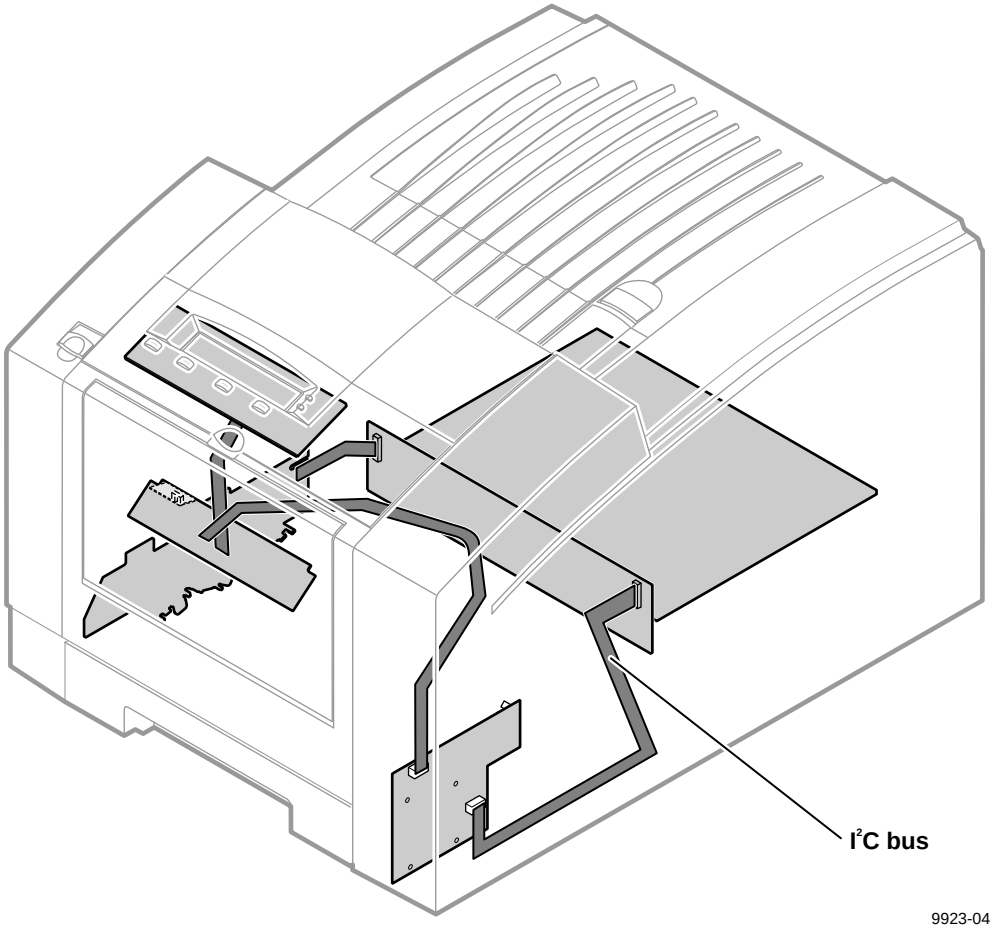


Figure 1-5 The printer's I^2C bus

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, a vacuum accumulator, an air valve solenoid and a cap/wipe/purge assembly.

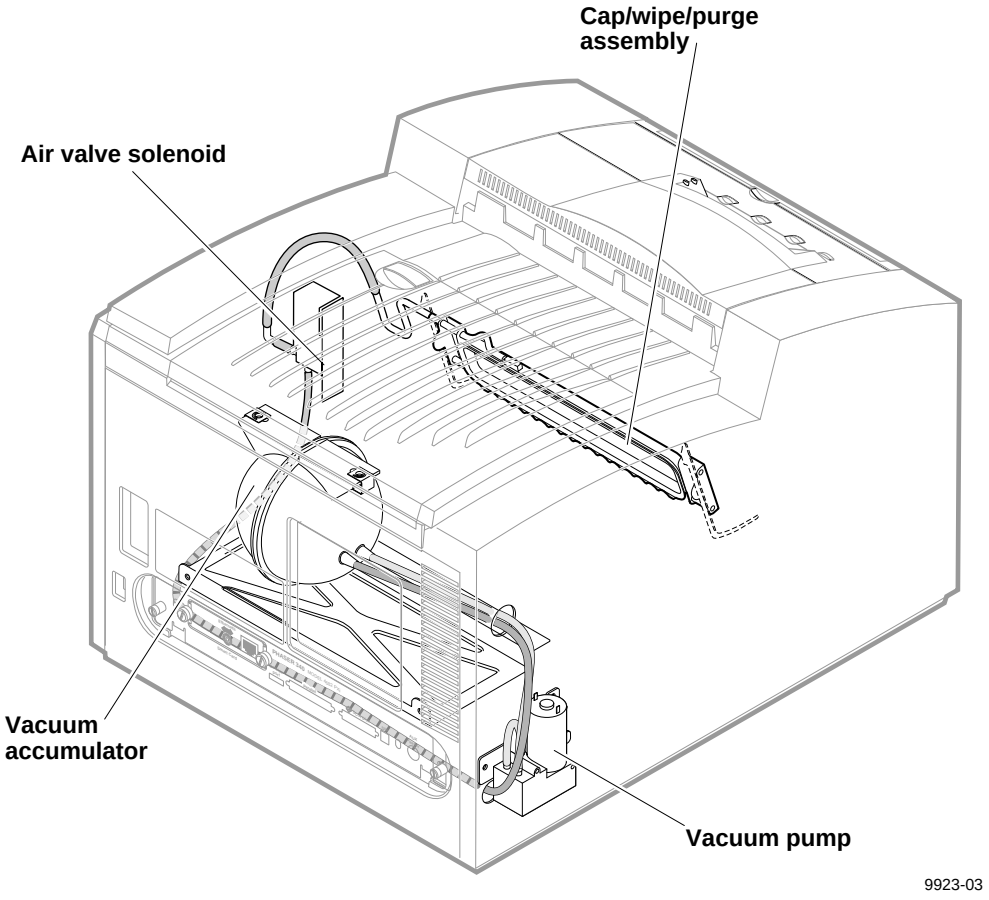


Figure 1-6 Printhead maintenance system of the print engine

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.

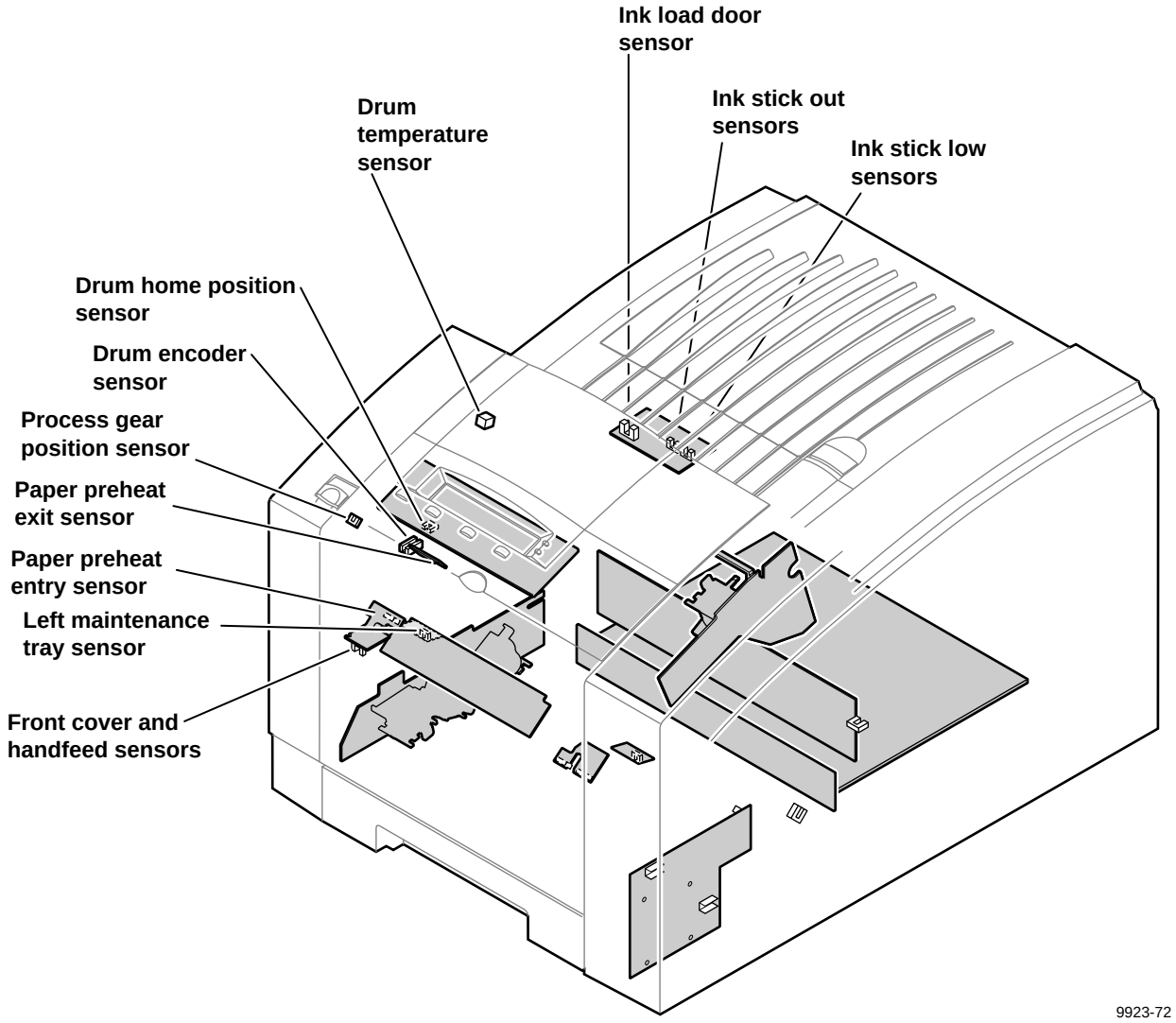


Figure 1-7 Left-side sensors and switches on the print engine

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 to be 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.*

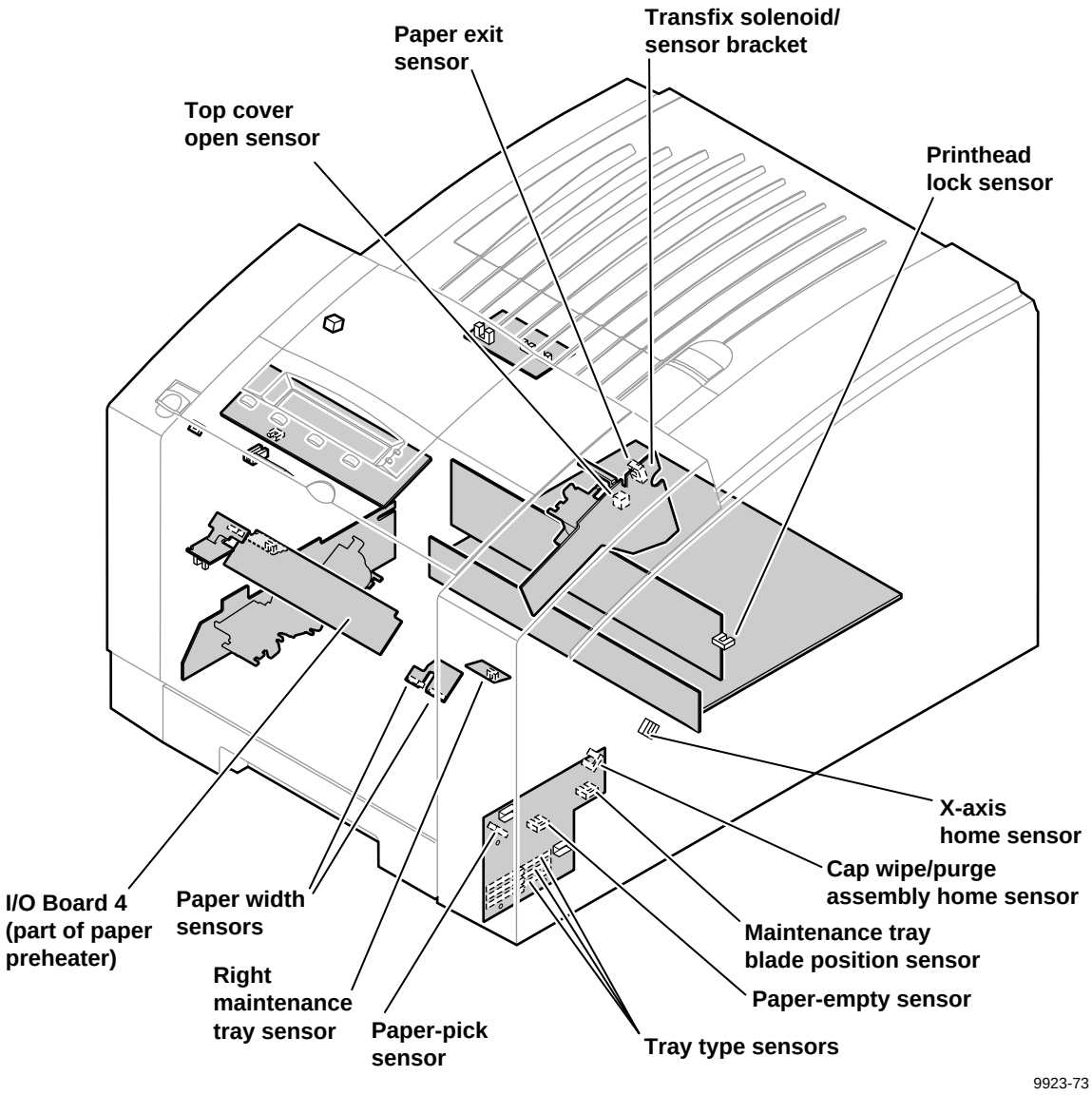


Figure 1-8 Right-side sensors and switches on the print engine

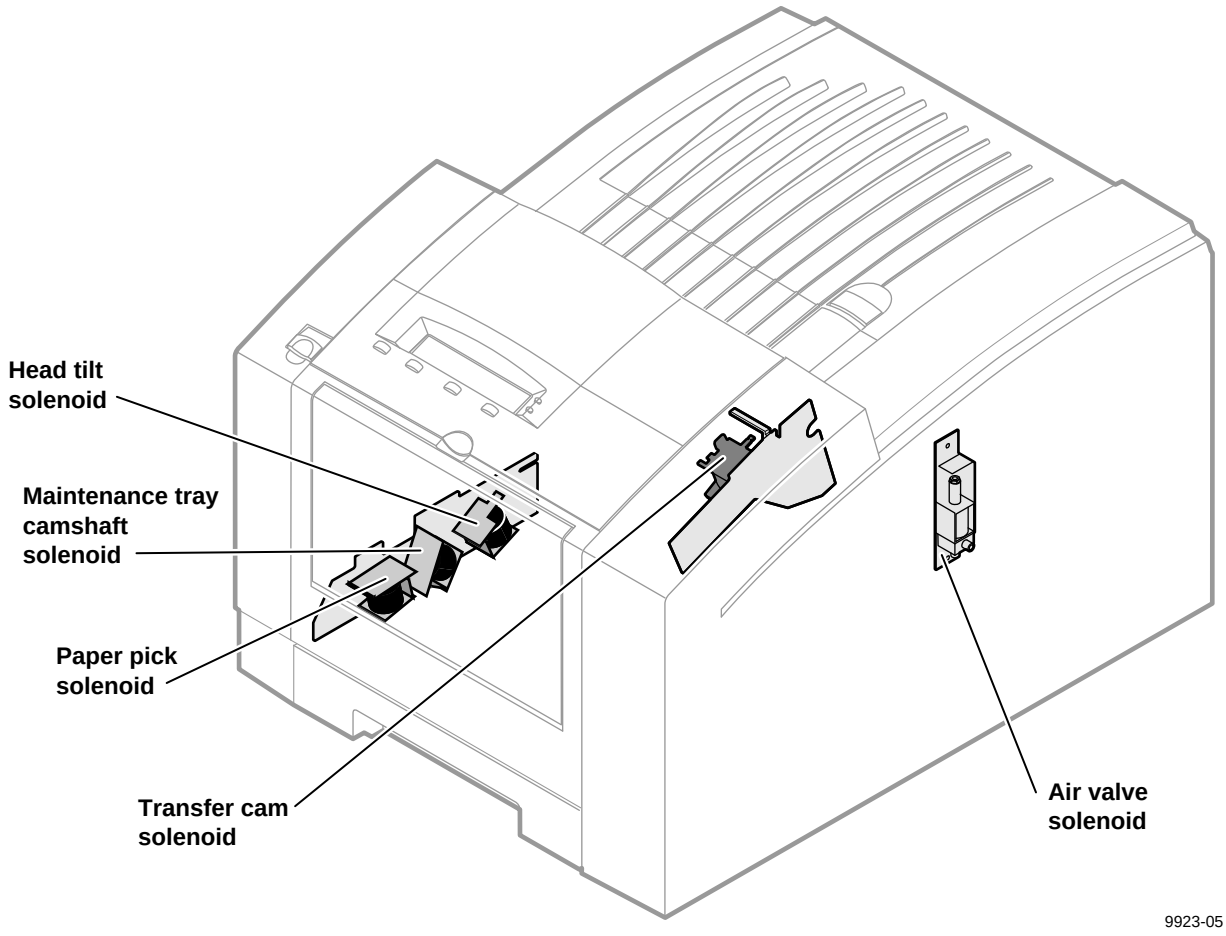


Figure 1-9 Solenoids on the print engine

The main board

The main board features the printer's PowerPC processor which controls the engine and the PostScript processing. Prominent on the main board is the ROM code SIMM and the RAM SIMM plug-in modules. The optional Font SIMMs contains language fonts such as Kanji or Hangul.

Network connection is provided through the plug-in network card. A plug-in SCSI interface adaptor board provides a SCSI port for an external hard drive.

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.

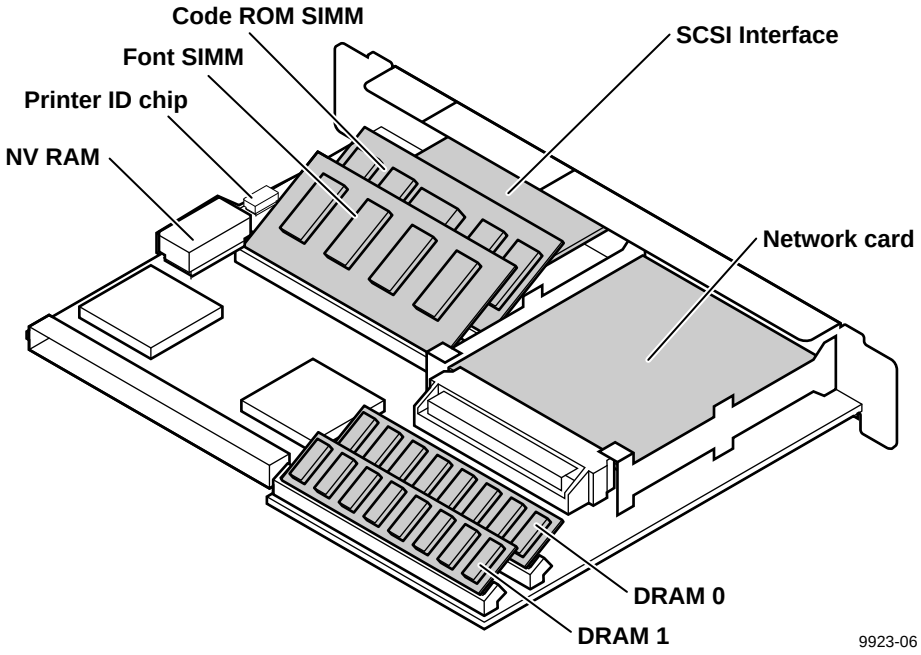


Figure 1-10 Features of the main board

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.) The tray sensors are located on the right-side interior of the paper tray slot, mounted on I/O right. There are four tray types:

- **Letter (A-size).** This tray is sized for 8.5 x 11-inch (English) paper.
- **Metric Letter (A4-size).** This tray is used for 210 x 297 mm (Metric) paper.
- **Transparency (A).** This tray supports English-size transparency film.
- **Transparency (A4).** This tray supports Metric-size transparency film.

Table 1-1 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:

- A two-line, 24-character LCD
- Four push 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`, `Receiving data` and `Printing`. Print engine status includes messages such as `Out of paper`, `Paper Jam`, `Add ink` and error codes.

The interactive menu can only be entered while the printer is idle and ready. 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, "Check and Adjustments."

Buttons. Button 1, the left-most button, is an **Exit** key used to cancel an operation while in the interactive menu. The functions of buttons 2, 3 and 4 are defined by the particular menu or function being displayed on the LCD. The bottom row of the LCD labels the current function of each button.

In addition, pressing the buttons as you turn on the printer enables certain diagnostic modes.

- Pressing and holding Button 1, as you turn on the printer, skips power-up self-tests. Refer to Table 6-1, "Main board power up self-test error codes," on page 6-3.

The topic "Resetting NVRAM" on page 9-17 explains how to use the front panel buttons to reset the NVRAM to its factory default values.

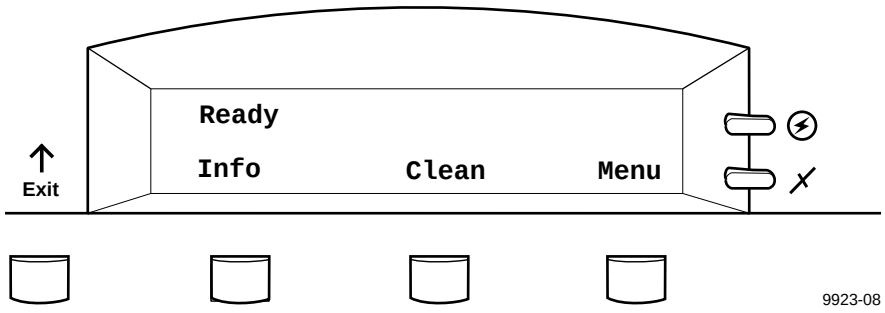


Figure 1-11 Printer front panel

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
- SCSI high-density connector (font hard disk drive only)
- A special five-pin connector accommodates a service RS-232 cable from a PC or Macintosh computer running PC-based diagnostics.

With the addition of a PhaserShare network card, the printer can feature either of these connector combinations:

- LocalTalk connector
- ThinNet (100base2) and Twisted Pair (100baseT) Ethernet or TokenRing connectors.

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

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 SIMMs 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 Chapter 6 topic "Verifying main board CPU operation" on page 6-3 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 1-2 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
Bypass mode (refer to “Bypass mode” on page 9-4)	UP	DOWN	DOWN	UP
Development mode (engineering use only)	DOWN	DOWN	UP	UP
Recovery mode (engineering use only)	DOWN	UP	DOWN	UP

The following figure illustrates the rear panel of the printer.

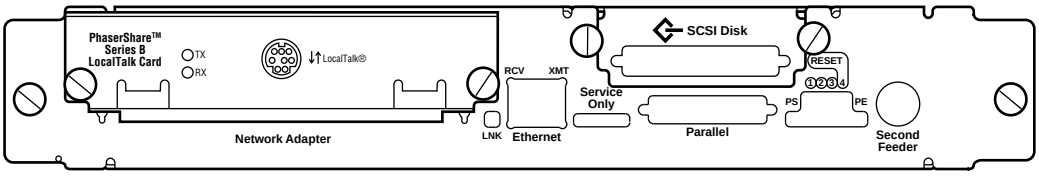


Figure 1-12 Printer rear panel with the optional LocalTalk card

Specifications

These specifications apply to the printer.

Table 1-3 Physical dimensions

Dimensions	Value
Height:	33 cm. (13 ins.) 45.7 cm (18 ins.) with Lower Paper Tray Assembly
Width:	40 cm (15.7 ins.)
Depth:	50.2 cm (19.7 ins.)
Weight:	Approximately 32 kgs (70 lbs). Print engine weight only; add 7 kgs (15.5 lbs.) for optional Lower Paper Tray Assembly.

Table 1-4 Printer 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. The printer should not be tilted more than 15^{o} from horizontal for more than 1 minute while the printer is idle or the ink is hot (in liquid state) or if the maintenance tray is installed.

Table 1-5 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. Only black ink is ever used to create the color black.
Addressability	Selectable Fast Color, 300 x 300, 600 x 300 or 450 x 800 dots-per-inch (horizontal and vertical).
Engine printing speed (typical)	The time it takes from loading to ejecting: Fast Color: on A- or A4-size: ≈10.3 seconds per print 300 x 300 dots per inch: on A- or A4-size: ≈15 seconds per print 600 x 300 dots per inch: on A- or A4-size: ≈ 32 seconds per print 450 x 800 dots per inch: on A- or A4-size: ≈32 seconds per print Transparency film printing: on A- or A4-size: ≈ 28 seconds per print (300 x 300 dpi) Transparency film printing: on A- or A4-size: ≈ 32 seconds per print (600 x 300 dpi) Fast Transparency film printing: on A- or A4-size: ≈ 12 seconds per print (193 x 300 dpi) Print times do not include image processing time, which varies, due to image complexity.
Minimum printing margins	All sides: 5 mm (0.2 in.) except bottom which is 9 mm (0.35 in.)
Maximum print area	A-size: 8.1 x 10.4 in. 2432 x 3134 pixels A4-size: 200 x 283 mm 2368 x 3342 pixels
Usable paper weights	Tray fed: 16 - 32 lb Bond (60 - 120 g/m^2) Manual fed: 16 - 32 lb Bond (60 - 120 g/m^2) 50 - 80 lb Cover (135 - 220 gm^2)

Table 1-6 Electrical specifications(tbd)

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 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 ± 2% +12 V ± 5% -12 V ± 5% +40 V -5%, +12% -40 V ± 10% +54 V ± 10%
RF emissions	Both 115 and 220 VAC-configured instruments pass these standards: EN55022 (CISPR 22) class B EN61000-3-2 AC mains Harmonic Distortion EN61000-3-3 Flicker on AC Mains Susceptibility (EN50082-1:1994) IEC 1000-4-2:1993 Electro-Static Discharge ENV50140:1993 Radiated RF Immunity IEC1000-4-4:1993 Fast Burst Transients EN61000-4-11:1993 Voltage Dips and Interruptions IEC 1000-4-5:1993 Line Surge

Table 1-7 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 0.15G 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.
Acoustic Noise (operating)	Average sound level (LEQ) is less than 50 dbA. Peak noise is 55 dbA.

Regulatory specifications

The Phaser 360 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

Chapter

2 Installing the Printer and Drivers

This chapter discusses installing the printer and its drivers as a part of the S0 installation option. Tektronix Service Option S0 consists of three main functions detailed in this and the next two chapters of this manual:

- Chapter 2 "Installing the Printer and Drivers." The first portion of installation instructions, this chapter, consists of five basic processes:
  - Pre-installation interview. This is a phone interview to verify that the customer is ready for the printer. The interview verifies that the customer has a suitable place for the printer with the proper environment. The call also verifies that any assistance, such as network system administration, will be available for the scheduled installation and that all necessary cables will be available.
  - Unpacking. This is the procedure for taking the printer out of its shipping box.
  - Testing. This checks that the printer works properly prior to connecting it to a host computer.
  - Cabling and configuring. This discusses setting up the printer for communicating to the appropriate host computers.
  - Loading drivers. This covers installing software on the host computers and configuring the host applications to drive the printer.

Following these steps, proceed to Chapter 3 and then Chapter 4.

- Chapter 3 "Verifying the Printer and Its Hosts" explains how to verify that the printer, the host driver and the connection between them functions correctly.
- Chapter 4 "Key Operator Training" gives a procedure for training customers to use and care for the printer.

Pre-install questions for customers

Prior to installing the printer, you should contact the customer and verify that he or she has prepared an appropriate location for the printer. You will also want to ensure that you have all the information you need to install the printer at the customer's site. Ask the customer the following:

Customer's name _____
Address _____
Phone number _____
E-mail address _____
Product and options ordered _____

- What type of computers will be networked to the printer?
  - ❑ PC _____ ❑ Macintosh_____
  - ❑ UNIX_____ ❑ other _____

- Which type of host-to-printer connection will be used:
  - ❑ network ❑ parallel

- If you are installing the printer into a networked environment, determine the following:

  - What kind of network environment will the printer be installed into?

    Hardware
    - ❑ LocalTalk
    - ❑ Token Ring
    - ❑ ThinNet (10Base2)
    - ❑ Twisted Pair (10BaseT)
    - ❑ Twisted Pair (100BaseT)
    - ❑ other _____

    Protocols
    - ❑ EtherTalk
    - ❑ TCP/IP
    - ❑ Novell NetWare
    - ❑ DHCP

    Administrator's name _____
    Phone Number _____

  - For a TCP/IP network, what are the appropriate names and addresses for the printer?

    Printer Name_____
    Printer IP address_____
    Net Mask_____
    Broadcast address_____
    Gateway_____

  - For installations using the printer's Ethernet interface, you should inform the network administrator of the printer's preconfigured Ethernet address; it is printed on the configuration page.

  - For AppleTalk installations, *customers must provide* the appropriate network adapter to the printer's 8-pin circular LocalTalk connector. Customers can obtain an adapter from their dealer. For Ethernet networks, *customers must provide* the appropriate network cables to connect to the printer's ThinNet or Twisted Pair connector.

- What software application packages will be used with the printer? (Some applications require special printing utility files.)
  _____

- Will the application(s) and sample files be available at the time of the installation to send test files to the printer? _____

- Will a SCSI font disk be installed on the printer? _____

- Does the customer have the appropriate power outlet available? The printer's AC power input auto-selects for these voltages:
  115 VAC (87 to 128 VAC)
  220 VAC (174 to 264 VAC)

- Did the customer order the correct power cord?
  _____ U.S. Standard (161-0230-01)
  _____ European Option A1 (161-0104-06)
  _____ United Kingdom Option A2 (161-0066-10)
  _____ Australian Option A3 (161-0104-05)
  _____ Swiss Option A5 (161-0154-00)

- *Customers must provide* the particular interface cable or network adapter they need to use with the printer. Customers can purchase the following cable from the Tektronix Graphics Supplies Order Desk by calling 1-800-835-6100.
  - Parallel cable, DB25-pin plug to Centronics 1284C 012-1468-00

The printer requires the following environmental conditions:

- Temperature: 10 to 32° C (50 to 90° F)
- Humidity: 10 to 80% relative humidity, non-condensing
- Power: 115 VAC or 220 VAC. The printer requires about 5.7 amps of current at full load in 115 VAC mode; 3.6 A at 220 VAC mode. The printer draws 10 amps (5 amps at 220 VAC) for about 3 minutes upon a cold start-up.
- Clearances: A space measuring 61 cm wide by 61 cm deep by 91 cm high (24 ins. wide by 24 ins. deep by 36 ins. high). The space in front of the printer accounts for enough clearance to install the paper tray. The extra height is to install the ink sticks.
- Weight support: 45 kgs (100 lbs.)

Driver software must be installed on the host computer to use the printer's fullest potential. A host computer must meet the following conditions:

Mac

- Mac II, Performa, Centris, Quadra or PowerMac
- Operating System 6.0.7 or later
- 4 Mbytes RAM

PC

- IBM AT, PS/2 or compatible, with a 386 or later CPU, a 3.5-inch floppy disk drive, and a hard disk drive, 2 Mbytes RAM, 2 Mbytes of hard disk space

  #### DOS systems

  DOS 3.1 or later

  An application that supports color PostScript or PCL5

  #### Windows systems

  Windows 3.1

  Windows 95

  OS/2

  Windows for Workgroups 3.11

  Windows NT and Daytona

Workstation

- UNIX workstations: The X Window System,
  SUN workstations: Solaris 1.1 (BSD), Solaris 2.x (Sys V, optional LPD support required)
  DEC: Ultrix, VMS, OpenVMS
  HP: HP-UX
  SGI: IRIX
  IBM RS6000: AIX (optional LPD support required)

- 750 kbyte hard disk space for files

Based on the results of the pre-install interview with the customer, you may wish to access the Tektronix Website at www.tek.com/Color_Printers or the Tektronix-confidential service support site cpidserv.wv.tek.com for the latest information regarding installing, servicing and supporting the printer.

Additionally, you can access the Tektronix Highly Automated Library (HAL) during business hours, at 1-800-835-6100 (ask to be transferred to HAL) for articles that may help with installing the printer into a customer's network. You can call HAL directly at (503) 682-7450, 24 hours a day, 7 days a week. The articles can be faxed to you in just minutes. HAL may also have articles that may be of interest to your customer, such as printing from a specific application. (This is a good way of introducing the HAL system to the customer.) Outside of the U.S. you may use EuroHAL. Refer to the topic, "Using the automated fax systems" on page 4-9.

Unpacking

Inventory for printer

- Printer
- A-size paper tray (or A4)
- Power cord
- TekColor Care envelope (includes a printer registration card)
- Cleaning kit
- Supplies information sheet
- Ink sticks
- Maintenance tray
- Paper sampler
- User manual
- Installation instructions
- Phaser 360 Printer Software CD-ROM and diskettes
- Optional Lower Paper Tray Assembly (with paper tray), in a separate box
- PhaserShare network utilities user manual

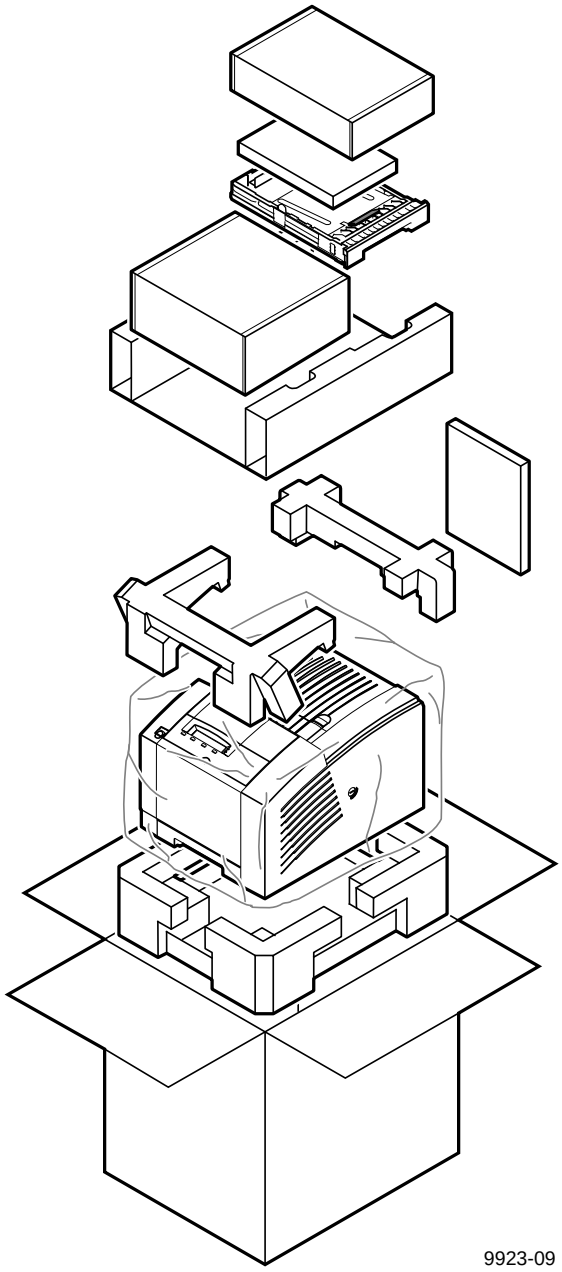


Figure 2-1 The printer packaging

Setting up the printer

Installing the printer is explained in detail in the *Phaser 360 Color Printer User Manual*. The following is a brief list of the steps you follow to unpack and set up the printer.

1. Remove the printer from its shipping box and place it in its working location. If the Lower Paper Tray Assembly was also purchased, place the Lower Paper Tray Assembly in the working location and then install the printer on top of it.

2. Install the paper tray(s) in the printer.

3. Unlock the transit restraint lock on the right side of the printer.

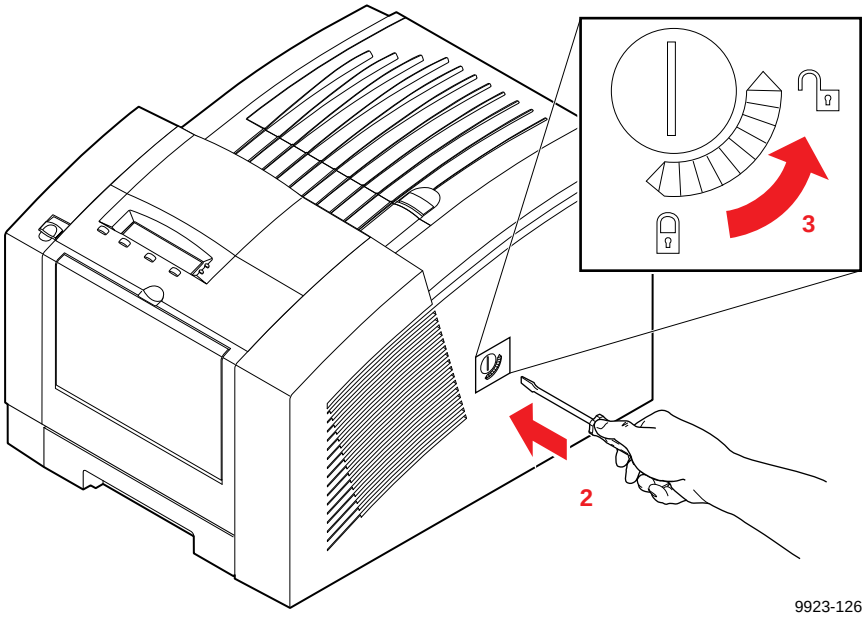


Figure 2-2 Unlocking the transit restraint lock

4. Ensure that the power switch is *off*.

5. Plug the printer's power cord into the printer's AC receptacle. Plug the other end into an appropriate AC power outlet.

6. Install the printer's maintenance tray and paper tray. Note that when a new maintenance tray is installed, the printer requires a 15-minute wait before it will print.

7. **Installing RAM SIMMs**. The standard configuration of the printer includes 24 Mbytes of RAM. This can be supplemented with a 16- or 32-Mbyte RAM SIMM (replacing an 8 Mbytes RAM SIMM). To install the optional memory, refer to the topic, "RAM SIMM" on page 8-58.

8. **Installing a network card**. Network support is provided via three optional Phaser Share Network Interface plug-in cards.

   - The LocalTalk supports AppleTalk/LocalTalk protocols.
   - The Ethernet 10/100baseT Interface Card supports the EtherTalk, Novell NetWare, and TCP/IP protocols.
   - The Token Ring Network Card supports Novell NetWare, TokenTalk and TCP/IP protocols.

   To install a network card, refer to the topic, "Network card" on page 8-62.

9. Following RAM SIMM or network card installation, turn on the printer to ensure that the card works properly. The printer executes a power-up self-test and prints a startup page. If the printer fails its self-test, refer to the topic "Print engine troubleshooting" on page 6-3. The printer takes up to 15 minutes to warm up from a cold start.

10. Turn off the printer and connect the printer to a host or network. If the printer is "off" no more than 3 minutes after being powered-down from its "Ready" state operating temperature, a print head cleaning purge will not be required nor performed upon power-up.

Cabling the printer

Note ***Carry spare parallel cables and network adapters.*** *You can use them if you encounter a defective cable or as an alternate means of testing the printer-to-host communications.*

This topic explains making a hardware connection between the printer and its host computer, setting the communication parameters for the printer's parallel ports to be compatible with the user's host computer and driver installation. This topic is divided into three main parts: Macintosh, PC, and workstation.

Connecting the printer to a Macintosh

LocalTalk connection to a Macintosh

1. Turn off the printer. LocalTalk protocol requires that you attach the LocalTalk cable with the printer powered *off*.
2. For a LocalTalk network connection, attach the network adapter to the printer's LocalTalk port.
3. Turn on the printer.

Ethernet connection to a Macintosh

Note *If the optional Ethernet or TokenRing card is installed, the built-in Ethernet connector is disabled.*

1. Turn off the printer. Ethernet protocol requires that you attach the Ethernet cable with the printer powered *off*.
2. Attach the Ethernet cable to the printer’s active Ethernet port. A ThickNet (10base 5) cable requires a 10base 5-to-ThinNet (10base2) or Twisted Pair (10baseT) network adapter to connect to the printer's Ethernet connectors.
3. Turn on the printer. During the printer's boot-up process, the printer's network name is displayed in the Mac's Chooser and its node address is resolved with the network. If the network has multiple zones, the network router assigns the printer a default zone name. The printer’s configuration page lists the zone name. The topic, “Printing the configuration page” on page 9-5, explains printing this page.

Connecting the printer to a PC

Direct connection to a PC

1. Turn off the printer. Turn off the host computer.
2. Attach the parallel interface cable to the host computer; attach the other end to the printer.
3. Turn on the printer *first* and then the computer.

Networked connection to a PC using the printer's Ethernet port

In the Novell network, the printer is connected to the network in the same manner as workstations using an Ethernet connection.

Note *If the optional 100baseT Ethernet or TokenRing card is installed, the built-in Ethernet connector is disabled.*

1. Turn off the printer.
2. Connect the interface cable to the printer's Ethernet connector.
3. Turn on the printer.

Connecting the printer to a workstation

Direct connection to a workstation

1. Turn off the printer. Turn off the host computer.
2. Attach the parallel interface cable to the workstation; attach the other end to the printer.
3. Turn on the printer and the computer.

Networked connection to a workstation

Note *If the optional Ethernet or TokenRing card is installed, the built-in Ethernet connector is disabled.*

1. Turn off the printer.
2. In the case of an Ethernet network, connect the interface cable to the printer's Ethernet connector.
3. Turn on the printer.

Installing a SCSI hard disk drive on a Phaser 360

Perform this procedure if the customer has a hard disk drive available for font storage.

1. Make sure that the printer and the SCSI disk drive are turned *off*.
2. Set the SCSI drive address to a value between 1 and 6.
3. Attach the SCSI cable to the printer's SCSI port. The printer may require the SCSI cable (part numbered 013-1465-00) to connect the drive's standard 50-pin SCSI connector to the smaller, high-density SCSI connector on the printer's rear panel.
4. Attach the other end of the SCSI cable to the SCSI drive.
5. Attach a terminator to the SCSI drive's second connector. (This is not required if the disk drive is internally terminated.)

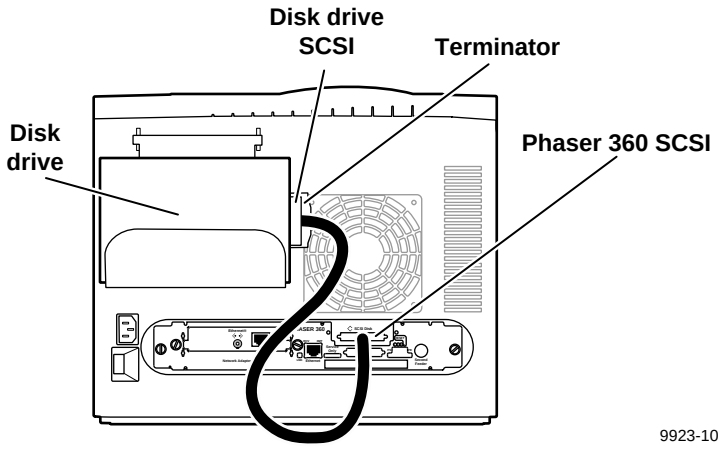


Figure 2-3 Connecting a SCSI hard disk drive to a Phaser 360

6. Turn on the disk drive *first*, wait a few seconds, and then turn on the printer.
7. Refer to the *Phaser 360 Driver and Utilities Printing Reference* for details on formatting a SCSI disk, controlling *Sys/Start* job files, and using the LaserWriter Utility to load fonts onto the disk drive.

Turning on the printer

Startup page

When you turn on a Phaser 360 printer, it executes a series of self-tests to determine if there are any problems. After running self-tests and reaching the "Ready" state, the printer prints a startup page (if the startup page has been enabled). After running self-tests and printing the startup page, the printer is ready for operation. A downloadable PostScript utility file, found on the Drivers and Utilities diskette, allows you to enable or disable the startup page. Alternately, you can disable the startup page using the front panel menu; refer to the topic, "Front panel menu" on page 9-2.

The startup page provides valuable information about the printer:

- Fonts
- Ports (Parallel, LocalTalk, Ethernet, TokenRing)
- Printer name
- Ethernet protocols
- TekColor corrections and print quality mode
- Pages printed
- RAM installed
- Tektronix firmware version
- Adobe PostScript software version
- Printer ID
- Authorization codes
- SCSI disk attached

If the printer detects a non-fatal error at power-up, the startup page prints with an error message printed in red; this is true, even if the startup page has been disabled; the printer will still force a print to report the error.

Message	Description
Parallel, LocalTalk, EtherTalk, or SCSI Port failed	The named port is not working. The other ports can still be used.
DRAM SIMM failed	The memory SIMMs are not working. Since one of the printer's SIMM is still working, the printer can still be used, but large images may not print, special imaging features may not work and throughput may be reduced.

Configuration page

To provide further diagnostic information, the printer can print a configuration page. The configuration page lists the values that the printer stores in its NVRAM as well as those of an installed network card's NVRAM. These values can be informative when troubleshooting the printer, particularly networked operations. To print a configuration page, while the printer is powered-up and idle, scroll through the front panel menu and select **Configuration Page** from the **Help Page**s menu. Refer to the topic, "Printing the configuration page" on page 9-5.

The configuration page gives the following information:

- General information about the printer, such as print count, the assigned name, Ethernet address, the authorization codes (if loaded), timeouts, number of fonts, and total memory
- Color settings such as Photofine enabled and Vivid Color
- Parallel port settings
- LocalTalk port settings (if installed)
- EtherTalk settings (if installed)
- TCP/IP settings (if installed)
- Novell NetWare settings (if installed)

Table 2-1 Configuration page settings

Parameter	Description	Saved in NVRAM	Default	Limits or alternate choices
Printer name	The current name of the printer as seen on a network.	yes	Phaser 360	Any name defined by the user up to 31 characters in length.
Page count	Total number of prints processed through the image processor.	yes	0	
Start Page Enabled	Indicates if a startup page prints upon power-up or reset	yes	yes	no
Serial Number	Production serial number of the printer			Installed using service diagnostics
Printer ID	A unique number for each printer. This doubles as the Ethernet link-layer address if an Ethernet card is installed; it is used to generate the Token Ring link-layer address if a Token Ring card is installed; and it is used to generate the Novell printserver name.	Saved in separate socketed PROM	Varies. Each is unique.	Legal values have form xx:xx:xx:xx:xx:xx
PostScript version number	Adobe version number of the PostScript firmware	no	3010.103	

Table 2-1 Configuration page settings (cont'd.)

Parameter	Description	Saved in NVRAM	Default	Limits or alternate choices
Tektronix FW version number	Tektronix version number of the firmware running on the main board and the network cards, separated by slashes. Read from ROM and stored in NVRAM.	yes	not applicable	Expressed as a.aa,/b.bb/c.cc/d.dd where: a.aa is VxWorks version b.bb is PostScript version c.cc is engine firmware version d.dd is network card firmware version
Fonts in ROM	Number of font stored in the printers ROM memory.		Base: 136 Extended: 164 Kanji: 138, 141, or 143 Simplified or Traditional Chinese: 140 Korean: 142	
Job Timeout	Amount of time a job can take to process.	yes	0 seconds	Any value denoted in seconds; 0 means unlimited amount of time.
Wait Timeout	Amount of time the image processor will wait for additional data from a host.	yes	40 seconds	Any value denoted in seconds; 0 means unlimited amount of time.
Manual Feed time-out	Amount of time allowed to install a sheet of media in the manual feed tray.	yes	60 seconds	Any integer, denoted in seconds. 0 indicates an unlimited amount of time.
Energy Star time-out	Amount of idle time allowed before the printer switches to a low energy power mode.	yes	999	Any integer from 0 to 999 denoting hours; 0 means unlimited amount of time.
CheckPrint Enabled	Indicates if the CheckPrint features is enabled.	yes	yes	
CheckPrint Timeout	Amount of time the printer waits before clearing the pending printjob.	yes	300 seconds	
RAM memory	Total amount of RAM on the image processor board.	no	24 MBytes	32 or 48 Mbytes
Media tray	Indicates the default media tray.	yes	Upper	Lower, Auto
Tekcolor Print Quality Mode	Indicates the default resolution.	Yes	Standard	Enhanced and Fast Color
Color Correction	Indicates the type of color adjustments used to simulate different color uses.	yes	None	Automatic, User-defined, Vivid Color, Simulate Display, SWOP (Specification for Web Offset Publication) Press, Euroscale Press, Commercial Press, SNAP (Specification for Non-heat Advertising Print) Newsprint Monochrome, Raw RGB Colors, Raw CMYK Colors.

Table 2-1 Configuration page settings (cont'd.)

Parameter	Description	Saved in NVRAM	Default	Limits or alternate choices
Print Head Serial Number	Serial number of the print head	Yes Head NV-RAM	Varies, each is unique	
Calibration Date	Date head was calibrated	Yes, Head NV-RAM	Varies, any legal date	
Head Adjust	Adjust value from the protected service support menu. Indicates a relative piezo drive to the ink-jets	yes	128	0 thru 255
Parallel Port	Indicates if the port is enabled.	yes	Enabled	Disabled
Parallel Printer Control			PSPrinter	
Parallel port Interpreter	Indicates the type of interpreters in use at the port.	yes	PostScript	Autoselect, PCL, PGL
Parallel port Protocol	Indicates the type of data encoding the parallel port is expecting.	yes	Binary	ASCII, Raw, TBCP
Delayed Output Close		yes	Yes	No
Parallel port mode	Indicates the mode of the port (Unidirectional for compatibility mode. Bi-directional for nibble mode).	yes	Compatibility	Nibble
Output Device	The device used for standard output and standard error.	yes	Parallel port	Any communication device such as LocalTalk, AppSocket
LocalTalk	Indicates if the port is enabled.	yes	Enabled	Disabled
LocalTalk Printer Control			PSPrinter	
LocalTalk port Interpreter	Indicates the type of interpreter in use at the port.	yes	PostScript	Autoselect, PCL, PGL
LocalTalk Printer Type	Indicates the type of printer installed at the port.	yes	LaserWriter	Any string 32 characters in length or less
LocalTalk node	Indicates the LocalTalk network node number of the printer.	no	0	Any integer 0 through 254
EtherTalk®	Indicates if the port is enabled.	yes	Enabled	Disabled
EtherTalk Printer Control			PSPrinter	
EtherTalk Port interpreter	Indicates the type of interpreter in use at the port.	yes	PostScript	Autoselect, PCL, PGL
EtherTalk Filtering		yes	None	
Delayed Output Close		yes	Yes	No

Table 2-1 Configuration page settings (cont'd.)

Parameter	Description	Saved in NVRAM	Default	Limits or alternate choices
EtherTalk Name	Name the printer present to the network	yes	Phaser 360	Any 31 digit name defined by the user
EtherTalk Printer Type	Indicates the type of printer installed at the port.		LaserWriter	Any string of 32 character or less.
EtherTalk zone	Name assigned by the network administrator for the zone the printer is assigned to	yes	*	Any string of 32 characters or less.
Ethertalk Network	The EtherTalk protocol address assigned at boot time for routing.	yes	0	Integer 1 through 65535
Ethertalk Address	A unique number for each printer. This is the Ethernet link-layer address	Saved in separate socketed PROM	Varies. Each is unique.	Legal values have form xx:xx:xx:xx:xx:xx
EtherTalk node	Indicates the EtherTalk address of a printer on a network.	yes	0	Integer 1 through 65535
IPX				
IPX Networks: Ethernet_802.2 Ethernet_802.3 Ethernet_II Ethernet_SNAP			 00000000 00000000 00000000 00000000	
NetWare®	Indicates if the port is enabled	yes	Disabled	Enabled
Netware Printer Control			PSPrinter	
NetWare port Interpreter	Indicates the type of interpreters in use at the port.	yes	Auto Select	PostScript, PCL, PGL
Netware Filtering		yes	None	
Delayed Output Close		yes	Yes	No
Operating Mode		yes	Print Server	
Print Server Name	Name of the printer server.	yes	TEK01B009, hardware-dependent	*user-defined*
Connection Mode		yes	Bindery	
Configuration file server	Name of the configuring file server.	yes	null string	*user-defined*
Login Password	Indicates whether a network password has been set.	yes	Not set	Set
Enable Banners		yes	False	

Table 2-1 Configuration page settings (cont'd.)

Parameter	Description	Saved in NVRAM	Default	Limits or alternate choices
Config Retry Interval		yes	60 seconds	An integer 1 through 3600 in seconds
Queue Scan interval	Interval between successive queue scans by the printer.	yes	15 seconds	An integer 1 through 3600 in seconds
Status Message		no	null string	
TCP/IP	Indicates if the port is enabled	yes	Enabled	Disabled
Host Name		yes	phaser.	
IP Address	The Internet Protocol address. If null, the address will be set at run time via RARP or BOOTP.	yes	Not Set	String of 15 or fewer characters of the format N.N.N.N followed by the word “Dynamic” if IP Address Dynamic parameter is set to True.
Network Mask	Indicates which fields of the IP Address designates the network portion and which designates the node portion. If null, the mask will be determined from the printer’s IP address or the BOOTP or ICMP (Internet Control Message Protocol) Netmask Reply.	yes	Default	String of 15 or fewer characters of the format *N.N.N.N*
Broadcast Address	The IP Address used to broadcast messages on the local network. If null, the value will be determined from the IP Address and Network Mask at run time.	yes	Default	String of 15 or fewer characters of the format *N.N.N.N*
Gateway Address(es)	A list of addresses of the gateways to other networks.	yes	None	String of 15 or fewer characters of the format *N.N.N.N*
Ethernet Frame Type	Data packet encapsulation type for ARP (Address Resolution Display and Control/RARP requests and IP datagrams.	yes	Ethernet_II	Adaptive, DIX, 802.2-SNAP, may be followed by the word “Dynamic.”
IP Address Source			RARP/BOOTP/ DHCP	
RARP	Used for setting the printer’s IP address from a boot server.	yes	Enabled	Disabled
BOOTP/DHCP				
DHCP Server			0.0.0.0	
DHCP Lease Expiration			Infinite	
DHCP Lease Renewal			Infinite	
Media Type			Undefined	
SMTP Server IP Address				

Table 2-1 Configuration page settings (cont'd.)

Parameter	Description	Saved in NVRAM	Default	Limits or alternate choices
SMTP Reverse Path				
LPR	Indicates if the port is enabled	yes	Enabled	Disabled
LPR Printer Control		yes	PSPrinter	
LPR port interpreter	Indicates the type of interpreter in use at the BSD system configured port.	yes	PostScript	AutoSelect, PCL, PGL
LPR Filtering			None	
LPR Delayed Output Close		yes	Yes	No
Data Port Number		yes		
Host Access List	List of TCP/IP network addresses for host access to printer.	yes		Unrestricted, only first 16 network addresses on list print on the configuration page.
AppSocket	Indicates if the port is enabled	yes	Enabled	Disabled
AppSocket Printer Control		yes	PSPrinter	
AppSocket port interpreter	Indicates the type of interpreter in use at the BSD system configured port.	yes	PostScript	AutoSelect, PCL, PGL
AppSocket Filtering			None	
AppSocket Delayed Output Closed		yes	Yes	No
AppSocket Host Access List	List of TCP/IP network addresses for host access to printer.	yes		Unrestricted, only first 16 network addresses on list print on the configuration page.
AppSocket Data Port Number	Port number for bi-directional transmission of printer language jobs.	yes	9100	1024 through 65535
AppSocket status port number	Port number for sending status information back to the host computer.	yes	9101	1024 through 65535
Syslog	Protocol that acts as a remote front panel to the printer.	yes		Not Authorized, <null string>
Log Hosts	Address list of hosts that want to receive syslog messages.	yes	Send no messages	List of IP addresses in the format N.N.N.N

Table 2-1 Configuration page settings (cont'd.)

Parameter	Description	Saved in NVRAM	Default	Limits or alternate choices
Log Priority	The threshold indicating the priority level of messages from the printer that will be sent to the list of log host(s).	yes	5	0 – unit is no longer usable, 1 – messages indicating action is needed on part of system admin, 2 – critical error messages, 3 – error message, 4 – warning messages, 5 – normal but significant message, 6 – informational messages, 7 – debugging messages
SNMP	Allow the printer to respond to status queries from host-resident Simple Network Management Protocol (SNMP) utilities.	yes		Not Authorized, <null string>
Trap Hosts	A list of hosts, one for each protocol, which are able to receive traps.	yes	None	None, *N.N.N.N*/Public, *N.N.N.N*/Proxy, *N.N.N.N*/Private, *N.N.N.N*/Regional, *N.N.N.N*/Core
Authentication Failure Traps	If enabled, the printer sends a trap for SNMP authentication failure.	yes	Enabled	Disabled
HTTP	Indicates if HTTP support has been enabled.	yes	Enabled	Disabled
Local URL Address		yes		
HTTP Password		yes	Not Set	
Refresh Delay		yes	60 seconds	
Information forwarding		yes	Yes	No
FTP	Indicates if FTP support has been enabled	yes	Enabled	Disabled
FTP Printer Control		yes	PSPrinter	
FTP port interpreter	Indicates the type of interpreter in use.	yes	PostScript	AutoSelect, PCL, PGL
Filtering		yes	None	
Delayed Output Closed		yes	Yes	No
Login Password		yes	Not set	
Telnet	Indicates if Telnet support has been enabled.	yes	Enabled	Disabled
Telnet Printer Control		yes	PSPrinter	

Table 2-1 Configuration page settings (cont'd.)

Parameter	Description	Saved in NVRAM	Default	Limits or alternate choices
Telnet port interpreter	Indicates the type of interpreter in use.	yes	PostScript	AutoSelect, PCL, PGL
Filtering		yes	None	
Protocol		yes	Normal	
Delayed Output Close		yes	Yes	No
Data Port Number		yes	23	
Login Password		yes	Not set	
Email Notification		yes	Disabled	Enabled
PhaserLink Printing	Indicates if Printing via PhaserLink is enabled	yes	Enabled	Disabled
Printer Control		yes	PSPrinter	
Interpreter			PostScript	AutoSelect, PCL, PGL
Filtering			None	
Delayed Output Close			Yes	
POP3 Server IP Address				
POP3 User Name				
POP3 Password			Set	
POP3 Polling Interval			3 Minutes	
Printing Password			Set	
Authorized Hosts				
Authorized Users				
SCSI Disk	Indicates if a SCSI disk is attached to the printer. Also indicates its storage capacity and the amount of free space.		Not connected	On-line, *total space, free space.* Uninitialized.
Execute Sys/Start Job	Determine whether or not to run the system start file during system initiation.	Yes	Run	Skip
Boot Delay	Number of seconds the printer waits before booting up the attached hard drive.	Yes	0	Any positive integer.
Check parity	If true, data parity should be checked.		False	True

Table 2-1 Configuration page settings (cont'd.)

Parameter	Description	Saved in NVRAM	Default	Limits or alternate choices
Disk Address	SCSI address of disk for the SCSI communication channel.	No	disk-dependant	0 to 6
Printer address	SCSI address of printer when it is the initiator.	No	7	

Driver and communication set up

Installing printer software for Macintosh

Use the installer application on the printer's CD-ROM or diskettes to install the printer's standard software. Then, continue with driver-specific setup instructions for the driver you are using.

1. Insert either the printer's CD-ROM or the first Macintosh diskette into the appropriate drive on your computer.
2. Double-click the **Phaser 360 Installer** icon. Click **Continue** until the **Easy Install** window appears.
3. Select **Easy Install** or **Custom Install**:

   For Easy Install

   a. Click Install.

   b. For details on each item to be installed, click Read Me.

   For Custom Install:

   a. Select Custom Install.

   b. Select individual items to install.

   c. Click the information buttons for information on each item.

   d. Click Install to install the selected items.

Setting up the Phaser 360 printer driver

Use with System Software 6.0.7, or 7.0 and later.

1. Select **Chooser** from the **Apple** menu after installing the printer's software.
2. Click on the icon of the Phaser 360 printer driver (on the left side of the **Chooser**).
3. Click on the **Zone** for your printer. See your network administrator if you have questions.
4. Select your printer from the list of printers on the right side of the **Chooser**. If it is not in the list, check your hardware connections and which zone you have selected in the **Chooser**.
5. Close the **Chooser**.

Setting up the Apple LaserWriter 8 printer driver

1. Select **Chooser** from the **Apple** menu after installing the printer's software).
2. Click on the icon of the LaserWriter 8 printer driver (on the left side of the **Chooser**).
3. Click on the **Zone** for your printer. Refer to the configuration page which lists the name of the zone it is installed into.
4. Select your printer from the list of printers on the right side of the **Chooser**. If it is not in the list, check your hardware connections and which zone you have selected in the **Chooser**.
5. Click **Setup**. The printer driver will automatically select the correct PPD file for the Phaser 360. If it does not, select the PPD file TKP360P1.PPD.

   Check the Configuration Page for your printer's configuration information
6. Close the **Chooser**.

Setting up the Phaser 360 GX printer driver

Refer to the on-line manual on the printer's CD-ROM.

1. Select **Chooser** from the **Apple** menu after installing the printer's software.
2. Click on the icon of the Phaser 360 GX printer driver (on the left side of the **Chooser**).
3. Click on the **Zone** for your printer. See your network administrator if you have questions.
4. Select your printer from the list of printers on the right side of the **Chooser**. If it is not in the list, check your hardware connections and which zone you have selected in the **Chooser**.
5. In the **Connect via** field's pop-up menu, select your printer's communication method:

   AppleTalk Standard network connection

   Servers Shared desktop printer
6. Click **Create** to create a desktop printer. An icon of the printer appears on the desktop.
7. Close the **Chooser**.

Installing a printer driver for Microsoft Windows 95

For best performance and added features when printing from Windows 95, use the Windows 95 printer driver (as opposed to the Windows 3.1 printer driver, which may cause printing problems in Windows 95). The *Phaser 360 Color Printer User Manual* gives the step by step procedure you follow to perform this configuration. Also refer to the Tektronix web pages *www.tek.com/Color_Printers/userdocs* for the latest install information.

Caution *If the customer had previously installed a Tektronix Windows 3.1 printer driver in Windows 3.1, then upgraded to Windows 95, that driver will appear in Windows 95 and may cause printing problems in the new operating system.*

1. Insert either the printer's CD-ROM or the Windows Disk 1 into the appropriate drive on the computer.
2. Click the **Start** icon in the taskbar, and select **Run**.
3. Type in the drive for the CD-ROM or diskette, type *SETUP.EXE*, and click **OK**.
4. Click **Next** in the two introduction screens in the *Installer*.
5. In the **Select Installation Type** dialog box, select either **Easy Installation** or **Custom Installation**, and click **Next**.

Easy Installation	Custom Installation
The following files are copied to the hard disk: ■ **QuarkXPress PDF** (installs an application-specific printer description file) ■ **PhaserPrint Plug-in for Photoshop** (installs an application-specific plug-in, if the application if found) ■ **Samplers** (installs color sampler charts and a fonts sampler)	1. In the **Driver Installation** dialog box, select from the following options: ■ **Drivers/PPDs** (installs driver files and printer description files) ■ **QuarkXPress PDF** (installs an application-specific printer description file) ■ **PhaserPrint Plug-in for Photoshop** (installs an application-specific plug-in, if the application if found) 2. Click **Next**. 3. In the **Custom Install: Select Utilities** dialog box, select from the following options: ■ **Printer Utilities** (installs utility files for selecting printer features) ■ **Network Utilities** (installs utility files for using the printer on a network) ■ **Samplers** (installs color sampler charts and a fonts sampler) *Use the default Destination Directory or click Browse.* 4. Click **Next**. The files are copied to the hard disk.

6. The **Finish Installation** dialog box contains instructions for completing the printer software setup; click **Next**. The **Add Printer Wizard** program is automatically launched.

7. In the **Add Printer Wizard**, click **Next** in the opening dialog box.

8. Select the printer's connection, either **Local Printer** or **Network Printer**, and click **Next**.

9. In the **Manufacturers/Printers** dialog box, click **Have Disk**.

10. Type in the drive for the CD-ROM or diskette, and click **OK**.

11. Select the printer, and click **Next**:

12. Select the port the printer is connected to, and click **Next**.

13. Enter a name for the printer, and select the Phaser 360 as the default printer if desired, and click **Next**.

14. Decide if you want to print a test page, **Yes** or **No**, and click **Finish**.

15. In the **Installation Completed** dialog box, click **Finish**.

16. You may see a **Restart Windows** dialog box if the system needs to update some files. Decide if you want to restart now or later, and click **OK**.

Note *See the "Adobe PostScript Printer Driver User Guide" on the printer's CD-ROM (USERGUIDE.PDF) for detailed information on the Adobe PS 4 driver.*

Installing printer software for Windows NT 4.0

1. Insert either the printer's CD-ROM or the Windows Disk 1 into the appropriate drive on the computer.
2. Click the **Start** icon in the taskbar, and select **Run**.
3. Type in the drive for the CD-ROM or diskette, type *SETUP.EXE*, and click **OK**.
4. Click **Next** in the two introduction screens in the *Installer*.
5. In the **Select Installation Type** dialog box, select either **Easy Installation** or **Custom Installation**, and click **Next**.

Easy Installation	Custom Installation
The following files are copied to the hard disk: ■ **QuarkXPress PDF** (installs an application-specific printer description file) ■ **PhaserPrint Plug-in for Photoshop** (installs an application-specific plug-in, if the application if found) ■ **Samplers** (installs color sampler charts and a fonts sampler)	1. In the **Driver Installation** dialog box, select from the following options: ■ **Drivers/PPDs** (installs driver files and printer description files) ■ **QuarkXPress PDF** (installs an application-specific printer description file) ■ **PhaserPrint Plug-in for Photoshop** (installs an application-specific plug-in, if the application if found) 2. Click **Next**. 3. In the **Custom Install: Select Utilities** dialog box, select from the following options: ■ **Printer Utilities** (installs utility files for selecting printer features) ■ **Network Utilities** (installs utility files for using the printer on a network) ■ **Samplers** (installs color sampler charts and a fonts sampler) *Use the default Destination Directory or click Browse.* 4. Click **Next**. The files are copied to the hard disk.

6. The **Finish Installation** dialog box contains instructions for completing the printer software setup; click **Next**. The **Add Printer Wizard** program is automatically launched.
7. In the **Add Printer Wizard**, click **Next** in the opening dialog box.
8. Select printer management, either **My computer** or **Network printer server**, and click **Next**.
9. Select the port the printer is connected to, and click **Next**.
10. In the **Manufacturers/Printers** dialog box, click **Have Disk**.
11. Type in the drive for the CD-ROM or diskette, and click **OK**.

12. Select the printer, and click **Next**:

13. Enter a name for the printer, and select the Phaser 360 as the default printer if desired, and click **Next**.

14. Determine if the printer is to be shared, **Shared** or **Not shared**, and click **Next**.

15. Print a test page, by clicking **Yes**, and click **Finish**.

16. In the **Installation Completed** dialog box, click **Finish**.

17. You may see a **Restart Windows** dialog box if the system needs to update some files. Decide if you want to restart now or later, and click **OK**.

Installing printer software for Windows NT 3.51

1. Insert either the printer's CD-ROM or the Windows Disk 1 into the appropriate drive on the computer.
2. Select **Run** from the **File** menu.
3. Type in the drive for the CD-ROM or diskette, type *SETUP.EXE*, and click **OK**.
4. Click **Next** in the two introduction screens in the *Installer*.
5. In the **Select Installation Type** dialog box, select either **Easy Installation** or **Custom Installation**, and click **Next**.

Easy Install	Custom Install
The following files are copied to the hard disk: ■ **QuarkXPress PDF** (installs an application-specific printer description file) ■ **PhaserPrint Plug-in for Photoshop** (installs an application-specific plug-in, if the application if found) ■ **Samplers** (installs color sampler charts and a fonts sampler)	1. In the **Driver Installation** dialog box, select from the following options: ■ **Drivers/PPDs** (installs driver files and printer description files) ■ **QuarkXPress PDF** (installs an application-specific printer description file) ■ **PhaserPrint Plug-in for Photoshop** (installs an application-specific plug-in, if the application if found) 2. Click **Next**. 3. In the **Custom Install: Select Utilities** dialog box, select from the following options: ■ **Printer Utilities** (installs utility files for selecting printer features) ■ **Network Utilities** (installs utility files for using the printer on a network) ■ **Samplers** (installs color sampler charts and a fonts sampler) *Use the default Destination Directory or click Browse.* 4. Click **Next**. The files are copied to the hard disk.

6. The **Finish Installation** dialog box contains instructions for completing the printer software setup; click **Next**. The **Print Manager** opens automatically.
7. From the **Printer** menu select **Create Printer**.
8. In the **Create Printer** dialog box, under **Driver**, select **Other**.
9. Type in the drive for the printer's CD-ROM or diskette, click **OK**.

10. In the **Select Driver** dialog box, under **Printer Driver**, select the Phaser 360 printer, and click **OK**:

11. In the **Create Printer** dialog box, fill in the other fields as desired, then click **OK**.

12. Select options in the **PostScript Printer Setup** dialog box, and click **OK**. Enabling the **Use Printer Halftoning** option is recommended.

13. In the **Print Manager**, from the **Printer** menu select **Exit**.

14. In the **Installation Completed** dialog box, click **Finish**.

Installing printer software for Windows 3.1

1. Insert either the printer's CD-ROM or the Windows Disk 1 into the appropriate drive on the computer.
2. Select **Run** from the **File** menu.
3. Type in the drive for the CD-ROM or diskette, type *SETUP.EXE*, and click **OK**.
4. Click **Next** in the two introduction screens in the *Installer*.
5. In the **Select Installation Type** dialog box, select either **Easy Installation** or **Custom Installation**, and click **Next**.

Easy Installation

The following files are copied to the hard disk:

- **Tektronix Printer Driver**
- **QuarkXPress PDF** (installs an application-specific printer description file)
- **Samplers** (installs color sampler charts and a fonts sampler)

Custom Installation

1. In the **Driver Installation** dialog box, select from the following options:
   - **Drivers/PPDs** (installs driver files and printer description files)
   - **QuarkXPress PDF** (installs an application-specific printer description file)
2. Click **Next**.
3. If you selected **Drivers/PPDs** in the previous window, the **Custom Install: Select Drivers** dialog box appears. Select one of the following drivers and click **Next**:
   - **Adobe Printer Driver for Windows 3.1**
   - **Tektronix Printer Driver for Windows 3.1**

Note: *The Tektronix Printer Driver for Windows 3.1 must be installed in the Windows directory (default Destination Directory). Do not change the Destination Directory when installing the Tektronix driver unless you are installing the driver on a network and you know the location of the Windows directory on the network drive.*

4. In the **Custom Install: Select Utilities** dialog box, select from the following options:
   - **Printer Utilities** (installs utility files for selecting printer features)
   - **Network Utilities** (installs utility files for using the printer on a network)
   - **Samplers** (installs color sampler charts and a fonts sampler)

   Use the default Destination Directory or click Browse.
5. Click **Next**. The files are copied to the hard disk.

6. Select the printer type and click **Next**:
7. The **Finish Installation** dialog box contains instructions for completing the printer software setup; click **Next**.
8. In the **Installation Completed** dialog box, click **Finish**.

9. Go on to the setup instructions.

Tektronix Driver for Windows 3.1: Setup instructions

If you selected **Easy Installation**, or if you selected the **Tektronix Driver for Windows 3.1** in the **Custom Installation**, continue with the following instructions:

1. Open the Windows **Control Panel**.
2. Open the **Printers** dialog box.
3. Under **Installed Printers**, select the Phaser 360 printer, click **Connect**:
4. Select the printer's port, click **OK**.

AdobePS 3 Driver for Windows 3.1: Setup instructions

If you selected the **AdobePS 3 Driver for Windows 3.**1 in the **Custom Installation**, continue with the following instructions:

1. In the Adobe installer, click **Read** or **Skip** in the **README.WRI** dialog box to start the installation.
2. Click **Continue** in the **PostScript Printer Driver Setup** dialog box. Files are copied to the computer.
3. Click the **Restart Windows** button in the dialog box that appears.
4. After Windows restarts, the **Install PostScript Printer from PPD** dialog box opens. Select the printer in the list and click **Install**:
5. Click **OK** in the next dialog box.
6. Click **Close** in the **Install PostScript Printer from PPD** dialog box.
7. Click **OK** in the information dialog box.
8. In the **Control Panel**, double-click **Printers**.
9. In the **Printers** dialog box, select the printer you just installed, and click **Connect**.
10. In the **Connect** dialog box, select the port the printer is connected to, and click **OK**.

Setting up the printer on a network (Windows NT 3.5 and 3.51)

TCP/IP connection

Note *Windows NT 3.5 and 3.51 include network software called* ***Services for Macintosh*** *(AppleTalk) and* ***TCP/IP print services*** *(for TCP/IP; lpr print services). Refer to the Windows NT manual for instructions on installing this network software. After this software is loaded, follow these steps:*

1. Select **Create a new printer** in the **Print Manager**; select the appropriate printer driver.
2. Select **Other** in the **Print to** field of the **From the Printer Properties** dialog box.
3. Select **LPR Port** for **Available Print Monitors**; click **OK**.
4. For **Name or address of host providing lpd**, type the printer's **IP address** (or Host name if known to the network).

Note *The printer's IP address may be available on the printer's Configuration Page. If not, ask the network administrator.*

5. For **Name of printer on that machine**, type in one of the following (use capital letters):

   PS for PostScript

   AUTO for automatic selection

6. Click **OK** to complete the installation.

AppleTalk connection

Note *Windows NT 3.5 and 3.51 include network software called* ***Services for Macintosh*** *(AppleTalk) and* ***TCP/IP print services*** *(for TCP/IP; lpr print services). Refer to the Windows NT manual for instructions on installing this network software. After this software is loaded, follow these steps:*

1. Select **Create a new printer** in the **Print Manager**; select the appropriate printer driver.
2. Select **Other** in the **Print to** field of the **From the Printer Properties** dialog box.
3. Select **AppleTalk Printing Devices** for **Available Print Monitors**; click **OK**.
4. Double-click on the appropriate zone (if there are multiple AppleTalk zones).
5. Select the Tektronix printer and click **OK**.
6. At the prompt ***Do you want to capture this AppleTalk Printing Device?***, click **No**.

Note *Clicking* ***Yes*** *hides the printer from regular Macintosh users, forcing them to use NT Server as a spooler, as long as NT Server allows sharing of this printer.*

7. Click **OK** to complete the installation.

Setting up the printer on a network (Windows NT 4.0)

To add or update the driver on a Windows NT 4.0 Server or Workstation

Note *You must have the original Windows NT 4.0 diskettes (or CD-ROM) to complete this procedure.*

You will need the printer's IP address for this procedure; it may be available on the printer's Configuration Page. If not, ask the network administrator.

1. Log-in as Administrator or a user with administrator access privileges.
2. Click on the **Start** button. Select **Settings**, then select **Printer** from the submenu.
3. Double-click on the **Add Printer** icon In the **Printers** dialog box.
4. Select one of these options, then click **Next**:

   My Computer Locally installed and managed printer

   Network Networked printer

1. If this is a locally connected printer, click on the port that the printer is connected to:

   LPTx Parallel-printer connection

   COM Serial-connected printer

   Add Port Networked printer. For mixed environments, the printer can also connect using EtherTalk.

   Recommended: Connect via TCP/IP by double-clicking on the **LPR Port**.

Note *If the LPR port is not listed in this box, the Microsoft TCP/IP Printing Services needs to be added to the NT machine. The original Windows NT distribution diskettes are needed during installation. Click **Start**, **Settings**, **Control Panel**, **Network**. Click on the **Services** tab, then click **Add**. Select **Microsoft TCP/IP Printing**, then click **OK** and install this service.*

*If Microsoft TCP/IP Printing Services is not listed in the options box, install the TCP/IP protocol on the server. This is done from the Control Panel/Network box. Click on the **Protocols** tab and click **Add**. Select **TCP/IP Protocol** and click **OK**. To apply these changes, restart the Windows NT 4.0 server.*

2. Enter the printer's IP address in the box labeled **Name or address of server providing lpd**.

3. In the box marked **Name of printer or print queue on that server**, enter **PS** (for PostScript) in uppercase, then click **OK**.

4. Click **Close** in the **Printer Ports** box.

5. In the **Add Printer Wizard** dialog box, click the box next to this new port; then click **Next**.

6. In the **Add Printer Wizard** dialog box, click **Have Disk** to add a new Tektronix driver.

7. Type in the path name (CD-ROM or diskette) to the driver files, then click **OK**.

8. Select the printer model and click **Next**.

9. If prompted that a driver is already installed for this printer, select **Replace existing driver**, then click **Next**.

10. Type in the printer's name (any name you want). Click the appropriate box to use this printer as the default.
Click **Next**.

11. Check one of the following options, then click **Next**:

    Shared To share the printer on the network (click on all platforms that may use this printer). When sharing, the option becomes available to install additional operating system printer drivers such as Windows 95 or NT 3.51, so the appropriate driver will automatically install on a workstation when it connects to this NT queue. Using this option, individual drivers will not have to be installed on each workstation.

    Not shared If the printer is a local printer only

12. Select one of these options, then click **Finish**:

    Yes Print a Test Page ***Recommended***

    No Do not print a Test Page

13. Insert the original Windows NT distribution CD-ROM into the computer's CD-ROM drive.

14. Type in the path name to the requested files, then click **OK**.
(The files are usually in the *I386* directory for Intel-based Windows NT servers.)

15. If you printed a Test Page, check if it printed; then click **OK**.

Workstation software - downloadable printer utility files

Note *Refer to the on-line manuals on the printer's CD-ROM for more information on printing from a workstation.*

The utility files on the printer's CD-ROM and diskettes let you set up a spooling system to select the following:

- Print-quality mode
- Color correction mode
- Default tray
- Other printer features

UNIX workstation users can access utility files in any of the following ways:

- If your system includes a CD-ROM drive, install the files from the printer's CD-ROM.
  Look in the *.bin* directory for workstation-specific files.
- Mount the printer's PC diskette 1 and copy the files to your workstation's hard drive.
- Access the Tektronix anonymous **ftp** site on the Internet at **ftp.tek.com**.
- Download utility files from the Tektronix Bulletin Board Service (BBS).
- Access the Tektronix World Wide Web server on the Internet:
- **http://www.tek.com/Color_Printers/** Home page
- **ftp://ftp.tek.com/bbs/<*platform*>/360** Utility files
- Access sample scripts that are available on-line.

PhaserPrint for UNIX software (demo)

- Optional PhaserPrint™ for UNIX software provides:
- Driver-selectable printer options
- Fast raster file printing to Tektronix color printers
- Fast screen-copy printing to Tektronix color printers

The printer's CD-ROM contains a demonstration copy of the PhaserPrint for UNIX software and an on-line instruction guide in the UNIXDEMO directory.

Setting the printer's IP address using the front panel

To correctly function on an Ethernet network using TCP/IP protocols and to use PhaserLink, the printer must have the correct IP address. The IP address is assigned by the local system administrator. Additionally, the printer's IP address must be set and TCP/IP enabled to access the printer through a Web browser. With the printer's IP address set the printer is accessible on an Ethernet network for software authorization to enable PCL or UNIX-host TCP/IP printing. As an alternative you can download the editable PostScript snippet *IPconfig.ps* to the printer. the snippet is available on the Tektronix web page, bulletin board and the printer's CD-ROM.

To check or set the printer's IP address:

1. Press the front panel's **Menu** button and scroll to the menu item `Network settings`.
2. Enter the Network settings sub-menu by pressing the **Menu** button.
3. Scroll to the sub-menu item `TCP/IP` and press **Menu** to enter it.
4. Scroll to the item `TCP/IP Address` and press **Select**.
5. In a moment the front panel will display the printer's IP address in the format XXX.XXX.XXX.XXX. Verify that the IP address is correct for the printer. Use button 2 to increment a digit and button 3 to shift to the next digit.
6. When the displayed address is correct, press button 4 `Set`. The printer will now return to its Ready state.
7. Use the same technique to set the printers NetMask, Broadcast Address and Gateway Address also listed in the front panel menu item Network Settings.

Configuring a Novell NetWare 3.x server for the printer

This is a brief overview of the steps you follow to configure a Novell NetWare file server and set up print queue to support the printer on a Novell network. The *PhaserShare Network Cards and Software System Administrator User Manual* gives the step by step procedure you follow to perform this configuration. Also refer to the Tektronix web pages *www/tek./com/Color_Printers/userdocs* for the latest install information.

There are two methods, each using a different utility program, you can use to configure the file server and set up print queues. In brief, this is what you will do:

1. Load the utility Advanced Configuration Tool (ACT) onto the file server through a workstation.
2. Log on to a file server as supervisor with supervisor privileges.
3. Run **ACT** and select **Quick Configuration**.
4. At this point you will be able to "see" a list of available printers. The printer's print server name is displayed. The default name is **TEKxxxxxx** where *xxxxxx* is the last six hex digits of the printer's Ethernet address. Select the printer. If the printer is not displayed, refer to the Novell NetWare Configuration topic in the *Phaser Color Printers Network Manual*.
5. Select a file server for the printer to service.
6. Select a queue for the printer to service or create a new queue.
7. Save the configuration.
8. Following this, you can select another file server and create more queues for the printer to service. You can have a total of 32 queues on up to eight file servers.
9. After all file servers have been configured, save the configuration file and restart the print server. Then restart the printer.

Alternately, you can use a Novell 4.x Network Administrator utility called *PCONSOLE* to perform the same configuration. However, using PCONSOLE, you will not "see" and select the printer on the network as you did in Step 4. Instead, you must enter the print server name (**TEKxxxxxx**) of the printer as it is shown on the printer's configuration page. (Refer to the topic "Printing the configuration page" on page 9-5 for details on printing the configuration page.)

Configuring Novell Netware 4.x server for the printer

NDS method

1. Log in to the network as ADMIN and open the NWAdmin utility.
2. Create a queue object and add the correct queue users.
3. Create a printer object, and add the queue just created to the list of queues through the **Assignments** option.
4. Create a print server object; the print server name must match the print server name of the printer being used (note the name on the configuration page). Add the printer to the list of printers through the **Assignments** option.

Bindery method

1. Load the utility Advanced Configuration Tool (ACT) onto the file server through a workstation.
2. Log on to a file server as supervisor with supervisor privileges.
3. Run **ACT** and select **Quick Configuration**.
4. Enter the print server name (**TEKxxxxxx**) of the printer as it is shown on the printer's configuration page. (Refer to the topic "Printing the configuration page" on page 9-5 for details on printing the configuration page. Select the printer.
5. Select a file server for the printer to service.
6. Select a queue for the printer to service or create a new queue.
7. Save the configuration.
8. Following this, you can select another file server and create more queues for the printer to service. You can have a total of 32 queues on up to eight file servers.
9. After all file servers have been configured, save the configuration file and restart the print server. Then restart the printer.

Configuring TCP/IP on a UNIX host

This is a brief overview of the steps you follow to configure the host and the printer for TCP/IP network. The *PhaserShare Network Cards and Software System Administrator User Manual* gives the step-by-step procedure you follow to perform this configuration. Also refer to the Tektronix web pages *www/tek./com/Color_Printers/userdocs* for the latest install information. You will first configure the host and then the printer.

Configuring the host

1. Add the printer name to the host table (*/etc/host*) and assign an IP address to the printer's name.

2. Assign a print queue to the printer. If necessary, refer to the Tektronix web page *http://www.tek.com/Color_Printers/userdoc/PShare3/tcpunix.html*", for the latest information on host-specific, TCP/IP configurations.

   For BSD systems, edit the /etc/printcap file and add a spool directory (for example, to /usr/spool/lpr).

   For System V hosts, configure the queue as a remote BSD print queue (support for TCP/IP LPR is required).

Note *Some UNIX hosts report an error when you configure a print queue that is not currently on the network. Ignore this message.*

Configuring the printer

1. Set the printer's IP address as described in the earlier topic "Setting the printer's IP address using the front panel" on page 2-39. Alternately, you can create a RARP or BOOTP configuration file to automatically configure the printer's IP address (although it will not be stored in the printer's NVRAM).

2. Optionally, configure the printer's TCP/IP parameters. This can be done using PhaserLink or by downloading PostScript snippets created from a shell script:

   - **lpr**, the host access list (if the customer site uses **lpr** and filtering).
   - **AppSocket**, the printer language(s) supported by the printer (if the customer site uses AppSocket and filtering).
   - **Syslog**, collect printer information for the network administrator.
   - **SNMP**, allow the administrator to query and control the printer's status remotely.

- **HTTP**. As you set the printer's IP address, also set the gateway address as described in the earlier topic "Setting the printer's IP address using the front panel" on page 2-39.

- **FTP**. An ftp session is opened with the ftp command, followed by the printer's IP address. The put command is used to send the file sample-file.ps to the printer. The bye command terminates the connection.

  ftp 134.67.66.11
  put *sample-file.ps*
  bye

- **Telnet**. If the printer is to be used with standard TELNET clients, the DataPortNumber parameter must be set to 23 decimal (23 is the default).

Chapter

3 *Verifying the Printer and Host Connections*

In this chapter, you verify that the host computer can send files to the printer. This chapter assumes that the printer and the printer drivers have been properly installed as explained in the previous chapter "Installing the Printer and Drivers."

Verifying printing from a Macintosh

Selecting the printer via the Chooser

This procedure applies to both operating system version 6.0.7 (and higher) and system 7.0 (and higher).

Note *If the Mac is served by an Ethernet network or by both a LocalTalk and Ethernet network, ensure that the Mac's proper network port is enabled. Click on the* ***Apple*** *menu (in the upper-left corner of the screen) and select the item* ***Control Panels****. Click on the control panel item* ***Network****. From its dialog box, select the appropriate network port.*

1. Turn on the printer and the Macintosh, if they are turned off.

2. With the mouse, click and hold on the Macintosh's **Apple** menu (in the upper-left corner of the screen). Select the **Chooser** from the Apple's pull-down menu.

3. The Chooser dialog box is now displayed on the screen. On the left side of the dialog box are icons representing the printer drivers installed on the Macintosh. Select the driver icon **Phaser 360**, by clicking on it once. If the host and the printer are a part of a zone, you should first select the printer driver and then pick the zone that the printer resides in. The configuration page lists the zone the printer is currently installed in.

4. Displayed on the right side of the dialog box are a list of printers that the selected driver will print to. Select the newly installed printer **Phaser 360**. (If, for example, a Phaser 360 is already on the network with the name `Phaser 360`, then the newly installed printer will be named `Phaser 3601`.)

5. Displayed on the bottom of the dialog box is the background printing option. Click the **OFF** button to turn it off. (If desired, this can be turned back on after the printer verification.)

6. Close the **Chooser** by clicking on the small box in the upper-left corner of the dialog box; the Phaser 360 is now your chosen printer.

You have now verified that the printer is on the network and is communicating with the Macintosh.

If you do not see the printer listed in the dialog box, then the printer is not communicating with the Macintosh. Check the printer's cable connection to the network. Also check the printer to see if its rear panel health LED is blinking. Ensure that the correct network is selected, in the event that the Macintosh is connected to more than one network (such as both LocalTalk and Ethernet). Refer to Chapter 6, "Troubleshooting" for more information about networks. More troubleshooting tips are included in the reference manual *Phaser 360 Drivers and Utilities Printing Reference.*

Printing the directory from a Macintosh

1. Make sure that you have an open window displayed on the screen (such as the hard disk drive's window).

2. At the Macintosh desktop, click and hold on the **File** menu bar item.

3. **For System 7 or higher**: Scroll down the **File** pull-down menu and select the item **Print Window...** .

   For System 6.0.7 to 6.0.8: Scroll down the **File** pull-down menu and select the item **Print Directory...** .

4. A print dialog box appears on the screen. Click on the **Print** button in the upper right corner of the dialog box to send a file to the printer.

This verifies that the Macintosh and the printer driver can send a file to the printer. If the printer does not make a print, then there may be a problem with the printer driver. In this case, if possible, you should verify that the Macintosh can print to a different printer on the same network. Choose a different PostScript printer driver such as an Apple LaserWriter in the Chooser and then repeat Steps 2 and 3. If the file doesn't print, then the customer must diagnose and fix the problem on the Macintosh.

Verifying that an application communicates to the printer

This procedure verifies that an application installed on the Macintosh can print to the printer. Note that many applications require a special printer page description file (*APD*, *PDF*, *PDX* or *PPD* files) to print to a printer. These files contain information specific to a particular printer, such as page sizes, margins, and printing options. Refer to the Driver's and Utility diskette's *README* file for the latest information on which applications require which printer page description file. The printer page description files are provided on the Drivers and Utilities diskette.

1. Ensure that the correct driver is selected in the Chooser.
2. Start an application and select a file that contains text.
3. With an illustration or a page of text displayed, click and scroll down the **File** pull-down menu and select **Print...** .
4. A print dialog box appears on the screen. Click on the **Print** button in the upper right corner of the dialog box to send a file to the printer.

If problems occur at this point, download the error handling utility to the printer as explained in the next procedure. Contact the Customer Support Hotline at 1-800-835-6100. Refer to the appropriate reference manual for your printer: the *Phaser 360 Drivers and Utilities Printing Reference*. Each provides information on using the printer with specific applications.

Using the Error Handler utility

If the Macintosh does not print to the printer, scroll to the menu item **Printer Defaults** and enable the sub-menu item **Error Handler**. If an error occurs, the printer will print a page listing the error. Send a file to the printer as explained in the previous procedure.

Verifying printing from a PC

DOS connection verification

Verify that the PC can communicate with the printer.

1. Power up the printer and the PC. If the PC is running under Windows, exit Windows so that the PC is operating under DOS alone.

2. At the DOS prompt, type (in lowercase) the following:

   echo showpage > *port:*

   Substitute *port:* with **LPT1**:, **LPT2**:, or **COM1**: etc. or whichever corresponds to the port the printer is attached to.

The printer should respond by picking, processing, and ejecting a blank sheet of paper; if this does not happen, check your cabling. Ensure that you have the port properly configured as explained in the Chapter 2 topic, "Cabling the printer" on page 2-10.

Windows 95 driver verification

Using the Windows Write application, verify that the PC, running under Windows 95, can print to the printer.

1. If it is not already running, start Windows 95

2. Launch a simple text program such as one of the Windows 95 programs Notepad or WordPad. (If Notepad or WordPad is not available, you can use any other text editor-type program.)

3. Type in a line of text such as `THIS IS A TEST.`

4. Click the **File** menu item and select **Printer Setup...** from the menu list. Select **Phaser 360** from the displayed list of available printer drivers. Click **OK**.

5. Click **File** and select **Print**. A print file will be transmitted to the printer.

Windows 3.1 driver verification

Using the Windows Write application, verify that the PC, running under Windows 3.1, can print to the printer.

1. If it is not already running, launch Windows by typing this command:

   WIN

2. Launch the program manager by double-clicking the **Program Manager** icon.

3. Open the Accessories window by double-clicking the **Accessories** icon.

4. Double-click on the **Write** icon. (If Write is not available, you can use any other text editor-type program.)

5. Type in a line of text such as `THIS IS A TEST.`

6. Click the **File** menu item and select **Printer Setup...** from the menu list. Select **Phaser 360**, whichever applies) from the displayed list of available printer drivers. Click **OK**.

7. Click **File** and select **Print**. A print file will be transmitted to the printer.

OS/2 connection verification

Note *The Print Screen function is controlled from within the OS/2 System folder.*

1. Open the **System** folder, then open the **System** object.
2. Click on the **Print Screen Tab** to view the Print Screen settings. Be sure that **Enable** has been selected. With Enable Print Screen selected, the following options are available.
   a. You may print the contents of a window by pointing to that window and pressing **Print Screen**.
   b. You may print the full screen by first opening any window, placing the cursor on the desktop away from any open windows, and then pressing **Print Screen**. *Be sure that at least one window is open*.
   c. You may use Print Screen on any port (any available printer) by changing the default printer selection. (Point to any printer object, click the right mouse button, click on **Select Default**, and click on Phaser 360.) This is a simple way to be sure that all printers are set up correctly.

Novell NetWare verification

NetWare is a shell program running above DOS. Generally, in a Novell network, a file server, which looks and acts much like a PC computer, maintains queues for the print files created and sent for printing from other workstations on the network. The printer, in turn, finds all file servers with Phaser 360 queues and extracts its print files from them. You must determine if a computer can communicate a print file to the file server.

Generally, as outlined in the Chapter 2 topic, "Configuring a Novell NetWare 3.x server for the printer" on page 2-40, the file server and printer are configured during the printer installation using software such as Advanced Configuration Tool (ACT) or **pconsole**. The file server is given a name and configured with queues for the printer.

Send a print file to the printer

1. Log into a file server from a NetWare workstation.
2. Type:

   CAPTURE NB NT Q=<queue name> **L=1**

   where <queue name> is the name established by the network administrator of a queue the printer is to service, such as **TEK360. L=1** specifies port LPT1
3. Use any text editor to create the following two-line, text-only print file.

   %!
   showpage
4. Copy the print file to LPT1 using this syntax:

   copy <*file.nam*> **LPT1:**

   where <*file.nam*> is the name of the print file.

   The printer should load and then eject a blank sheet of paper.

   If the print file does not print, verify that:

   - The printer has been set up to service the queue.
   - The password set for the printer (if one was set by the administrator), is the same as that used for the print server.
   - The Ethernet frame type that the printer is using is supported by the file server.
   - The correct printer language is being used by the printer to interpret the incoming print file; this is indicated on the printer's configuration page.
5. When you are able to send a print file to the printer, launch an application on one of the Novell-networked workstations and print to the printer's queue.

Using the Error Handler utility

If the PC does not print to the printer, scroll to the menu item **Printer Defaults** and enable the sub-menu item **Error Handler**. If an error occurs, the printer will print a page listing the error. Send a file to the printer as explained in the previous procedure.

Verifying printing from a workstation

Verifying and printing using the TCP/IP protocols

The Phaser 360 accepts files from networked UNIX and VMS workstations using TCP/IP communications. The printer supports BSD UNIX 4.3, AT&T's UNIX System V with BSD 4.3 **lpr** extensions, and DEC VMS with Tektronix PhaserSym software. The Phaser 360 conforms to Ethernet IEEE 802.3 network specifications.

UNIX

1. To verify the host-to-Phaser 360 (UNIX host) connection, execute the **ping** command from the host.

2. To print to the printer from the host, you must first have the printer's queue established. This is site-dependent and requires the aid of the site's network administrator. After the queue is in place you can proceed to the next step.

3. Send a print file to the printer using the following syntax:

   lpr -P<*queue name***> <***file.nam***>**

   The queue name was established earlier in Step 3. The print file <*file.nam*> can be any PostScript print file. To keep things simple, send a simple file such as the one of the snippets included in the software diskettes: *config.ps* causes the printer to print out its configuration page.

If the page prints, then both the printer and the network connection are working correctly. If the print file cannot be sent, then a problem probably exists in the network set-ups for the printer. You and the network administrator should repeat the TCP/IP installation as outlined in the printer's Phaser Share user manual.

VMS

To print to the Phaser 360 in the VMS environment, you must have the symbiont PhaserSym running on the host. To print to the printer from the host, you must first have the printer's queue established. This is site-dependent and requires the aid of the site's network administrator. When the queue is in place, you can proceed to the next step.

1. To verify the VMS host-to-Phaser 360 connection, use the **NCP LOOP CIRCUIT** command from the host.

2. From the host, issue the **SHOW QUEUE /full** command to list all the available printer queues. Ensure that the Phaser 360's queue is listed.

3. Print to the printer by sending the command:

   print/queue=<*queue name*> <*file.nam*>

   where <*queue name*> is the printer's queue and <*file.nam*> is any PostScript file.

Using the Error Handler utility

If the workstation does not print to the printer, scroll to the menu item **Printer Defaults** and enable the sub-menu item **Error Handler**. If an error occurs, the printer will print a page listing the error. Send a file to the printer as explained in the previous procedure.

Chapter

4 *Key Operator Training*

This chapter covers the last portion of the Tektronix Service Option S0 installation: Training the printer's key operator. The steps you follow here place an emphasis on encouraging the key operator to read and use the printer's user manual to operate, clean, and care for the printer.

Printer controls and indicators

Front panel LEDs: Explain the meanings of the front panel LEDs.

- Show where these indicators are explained in the user manual.

Front panel LCD display: Explain the layout and use of the front panel LCD display. Explain how to use the front panel buttons and how they correspond to the display.

Error reporting: Explain how error conditions are displayed on the front panel.

- Show where error conditions are explained in the user manual.

Printer rear panel connections

Network connections: Explain the different types of PhaserShare cards that provide printer connectivity.

- Show where these connections are explained in the user manual and where to find more information about expanding their printing system with other network options, cables, and accessories.

Loading consumables

Paper/transparencies: Demonstrate how to load paper or transparency film into a paper or transparency tray.

- Emphasize to customers not to touch the printing surface of the transparency media; handle it by the edges only. Fingerprints affect print quality.
- Show how to load transparency film in the tray with the orientation notch in the rear-right corner of the transparency tray.
- Explain to customers that they should not bend the media (especially transparency film) too sharply. Otherwise, print quality may be affected and jams may occur inside the printer.
- Demonstrate fanning the media prior to installing it in the paper tray.
- Emphasize that the first sheet of manually-fed media should be fed only after the front panel prompt appears. Subsequent sheets should be fed using the same prompt message to avoid jams at the manual feeder.
- Explain the advantages of purchasing a separate, dedicated transparency tray and Lower Paper Tray Assembly.
- Show where media loading information is explained in the user manual.

Maintenance tray: Explain the purpose of the maintenance tray.

- Explain to the customer that the printer will periodically ask for the waste tray to be emptied with the message `Waste Tray Full`. Explain how and when to empty the waste tray. Then explain that after 10,000 prints the printer will indicate that the maintenance tray must soon be replaced with the message `Maintenance Tray Low` because it will soon run out of transfer oil. Order a new maintenance tray. Explain that when the Maintenance tray is depleted of transfer oil, it gives the message `Replace Maintenance Tray`. Explain how to remove and install the new maintenance tray, and proper handling procedures for a used maintenance tray.
- Emphasize that the maintenance tray must be fully latched on both sides to prevent media jams.
- Instruct customers not to leave the maintenance tray in a tilted position.

Ink sticks: Demonstrate how to load an ink stick.

- Emphasize to customers to use only Phaser 360 ink sticks. Also emphasize that they should not use ink sticks that have large pieces missing and not to load any small broken pieces.
- Show where ink stick handling and loading instructions are explained in the user manual and on the ink stick card shipped with each ink stick box.
- Emphasize to the user never to load used waste ink from the waste tray in the ink loader. This will damage the printhead and violate the printer warranty.

Cleaning

Explain how keeping the printer clean can ensure the highest-quality prints. Emphasize how dirt and dust can affect print quality and paper-pick reliability.

- Stress the importance of using 90% or higher isopropyl alcohol, not rubbing alcohol. Note that rubbing alcohol can be used only if it only contains 90% or higher isopropyl alcohol with the remainder deionized water; it should contain no oils or lanolin.
- Stress the importance of not printing on both sides of the media; doing so will offset ink inside the printer, requiring subsequent cleaning to be performed.
- Explain the contents and use of the cleaning kit.
- Show how to use the user manual to locate proper cleaning procedures. Demonstrate the use of the front panel menu to initiate cleaning routines.
- Show the location of the paper feed rollers inside the printer and inside the front cover.
- Show the location of the exit cover release button inside the front cover and the surfaces that will require cleaning inside the exit cover.

Clearing paper jams

Media jam locations: Show the four possible locations for media jams: inside the exit cover, inside the front cover, at the manual feed slot, at the media tray.

- Show the location of the jam-clearing information in the user manual.

Affecting print quality

Printing transparencies using a paper tray: The printer tries to make the print the customer requests. If paper is loaded in the printer, and the customer requests, via the print driver, a transparency, then the printer indicates that transparency film must be loaded and waits for the customer to do so.

- Show where this is explained in the user manual and where to find the Tektronix order number for the transparency tray.

Using TekColor color corrections: Explain that different color correction modes are available and where to find more information in the user manual.

Moving the printer

Transit restraint: Explain the importance of powering down the printer using the power switch and locking the transit restraint before moving or shipping the printer. Failure to properly lock the print head can result in serious damage to the printer.

- Show where this is explained in the user manual.
- Remove the maintenance tray. Don't ship or tilt the printer with the maintenance tray installed inside.
- Never ship a used maintenance tray. Explain that due to the oil-saturated wick bar the maintenance tray is unwise to attempt to transport the maintenance tray. The oil in the maintenance tray can be messy if the tray is tipped or left tilted.
- Allow the inks in the printhead to solidify (about 30 to 45 minutes) before moving or tilting the printer.

Warranty information

Review the warranty information with customers to ensure that they are aware of the printer's warranty and the duration of its coverage.

Supplies ordering

The printer is shipped with the latest version of the supplies information sheet; it lists all the available supplies for the printer, as well as printer accessories, such as software and printer carts, that customers may be interested in. Additionally, some supplies are listed in the user manual.

United States: Customers can call toll-free at 1-800-835-6100 (ask for the Color Printing Supplies Order Desk) to place a supplies order. Open Monday through Friday, 6:00 am to 5:00 pm (PST). Shipments are made within 24 hours.

Outside the United States: Contact your nearest Tektronix dealer.

If you need help

If a customer needs assistance, have them contact a local Tektronix dealer or sales representative or any of these listed resources:

Type of service	How to access	Details
Online services Technical support: World Wide Web: Anonymous ftp server:	 **support@ColorPrinters.tek.com** **www.tek.com/Color_Printers/** **ftp.tek.com/Color_Printers**	Technical support, drivers, error codes and troubleshooting Login as anonymous
Customer Support Hotline (hardware and software support)	**U. S. and Canada** 1-800-835-6100 **Austria** 0 660 5804 **Belgium** 0800 1 5059 **Denmark** 80 01 81 76 **Eastern Europe** and the **Middle East** +44 1908 681707 **Finland** 0800 1 14494 **France** 05 90 85 41 **Germany** 0130 82 10 68 **Italy** 1678 77261 **Luxembourg** 0800 2853 **Norway** 800 11782 **Spain** 900 97 4499 **Sweden** 020 795 177 **Switzerland** 155 9493 **The Netherlands** 06 0221647 **UK** 0800 558668	Monday through Friday; 6:00 am to 5:00 pm PST
Printer service	**U. S. and Canada** 1-800-835-6100 **Outside U. S. and Canada** Contact local Tektronix dealers or offices	Monday through Friday; 6:00 am to 5:00 pm PST
Tektronix Bulletin Board Service (BBS)	(503) 685-4504	24 hours per day, 7 days per week. Use 9600 baud, 8 bits, 1 stop bit, and no parity.
Technical support: Europe	**euro-tech-support@colorprinters.tek.com**	
HAL automated fax system	(503) 682-7450 direct outside U. S., Canada 1-800-835-6100 toll-free for U. S., Canada	24 hours per day, 7 days per week
EuroHAL automated fax system	Refer to “Using the automated fax systems” in this manual.	24 hours per day, 7 days per week
OzHAL automated fax system (Australia)	02 9878 0332, or 1-800-650-633 toll-free	24 hours per day, 7 days per week
Email update notices	World Wide Web: **www.tek.com/Color_Printers/support/subscribe.html**	

Receiving email update notices

Using the World Wide Web, you can register to receive email notification of new printer drivers, accessories and upgrades for your Tektronix Phaser color printer as they become available. To subscribe to this free service, simply follow these steps:

1. Point your browser to the Tektronix web site:

   http://www.tek.com/Color_Printers/support/subscribe.html

2. Enter your email address and select your model of Phaser color printer from the pull-down list.

3. Click the **subscribe** button.

Customer Support Hotline

If customers encounter problems while using their printer, they can call toll-free at **1-800-835-6100** (ask for the Customer Support Hotline). The Hotline can answer technical questions regarding using the printer, ranging from printing from application software to technical specifications.

United States and Canada: The customer can call toll free **1-800-835-6100** (ask for the Customer Support Hotline). Open Monday through Friday 6:00 am to 5:00 pm (PST).

Downloading files from the Tektronix Color Printer Information Server

Unix and VMS workstation utility files included with the printer on a PC diskette let you set up the printer to select between media trays, print quality modes, color correction modes and other features. If you don't have the means of transferring these files from the PC diskette, you can request files from the Tektronix Color Printer Information Server, an automatic file serving program on the Internet that responds to requests for files.

If you can exchange electronic mail with other Internet sites, you can access the Tektronix Color Printer Information Server. From this server you can retrieve driver and utility files and color printer information.

Send your electronic mail requests for files to the following address:

color_printer_info@TEKTRONIX.TEK.COM

To receive the list of information available on the server, type the following at the **Subject** prompt:

send index

To examine the full index for any library, type:

send index from *library-name*

To request a single file from a directory, type:

send *filename* from *library-name*

To determine file size, type:

send list of *filename* from *library-name*

Using the automated fax systems

As an alternative to other resources, and to provide up-to-date information quickly, Tektronix has set up HAL (Highly Automated Library) and EuroHAL, two interactive, automated fax systems. These automated fax systems provide Macintosh, PC, and workstation users with the latest technical hints and tips (like color adjustments), solutions to common technical problems, and application notes for software problems (such as CorelDRAW! and QuarkXPress).

Use HAL to order a catalog or individual documents in the U.S.A. and Canada

If customers have a fax machine and a touch-tone voice telephone, they can order a HAL catalog, listing all of the information offered by HAL, by calling **(503) 682-7450** (direct) or, in the U.S. and Canada, call **1-800-835-6100**. The customer may call HAL or EuroHAL from anywhere in the world. The fax systems are available 24 hours a day, seven days a week.

1. Before calling, instruct customers to write down the area code and telephone number for customers fax machine. HAL will ask customers to key this number through the keypad on their voice telephone. If they are calling from outside the United States or Canada, they'll need to know the international access code to reach their country from the United States. Without a complete fax number, HAL cannot call their fax machine.
2. Call only from a touch-tone voice telephone.
3. Follow through the voice-prompted menu.
4. Order individual documents by entering the desired document's number as listed in the HAL catalog. Enter the number by using the telephone's keypad.
5. Customers can order up to three documents per call.
6. The HAL catalog or documents that customers request are faxed to them in a matter of minutes.

Use EuroHAL to order a catalog or individual documents in Europe

EuroHAL includes many documents, some in English and some in other European languages. If a localized version of the document is available, EuroHAL will send it in that specific language. Otherwise, it will send English documents.

If customers have a tone-dial telephone and a fax machine, they can use EuroHAL. If customers' telephones have star (*) and hash mark (#) keys, then they can probably use tones; ask a local telephone supplier if unsure.

If customers' telephones do not have these keys or have a dial, they need to buy a *tone dialer* from their local telephone or electronics shop. This device is held to the phone and will send the standard tones that are needed to talk to EuroHAL.

Country	Numbers
Austria	00 44 1908 681839
Belgium	
Denmark	
Finland	
Holland	
Italy	
Norway	
Switzerland	
France	0800 90 81 86
Germany	0130 819 220
Spain	07 44 1908 681839
Sweden	009 44 1908 681839
UK	01908 681839
Other countries	+44 1908 681839 (where + is your country's International Access Code)

7. The first time customers use EuroHAL, they should order a catalog; this lists all the documents that are available and is continually updated.

Service support

If the printer needs service, customers should contact their Tektronix service representative at **1-800-835-6100** in the United States. Customers should be prepared with the printer type, serial number and, if applicable, print samples revealing the problem. Ask the customer to be near the printer, if possible.

Accessing the printer's web page

PhaserLink, the Tektronix implementation of a World Wide Web server inside the printer, allows a customer to communicate to the printer using a web browser. With PhaserLink, a customer can view and set printer and networking parameters. A homepage built into the printer links the printer to other homepages such as the Tektronix World Wide Web home page.

To view the printer's homepage, the printer must be connected to a network supporting TCP/IP protocols. Refer to the *PhaserShare Network Cards and Software User Manual*.

Chapter

5 *Theory of Operation*

Overview

This chapter covers the theory of operation of each subsystem within the printer:

- Functional block diagram
  - Drum/transfix assembly
  - Maintenance tray
  - Printhead
  - Ink loader
  - Cap/wipe/purge assembly
  - Power supply
  - Main board
- Print process in operation
- Printhead maintenance cycle

Functional block diagram

The printer is made of seven major sub-systems:

- Drum/transfix assembly
- Drum maintenance tray
- Printhead
- Ink loader
- Cap/wipe/purge assembly
- Power supply
- Main board

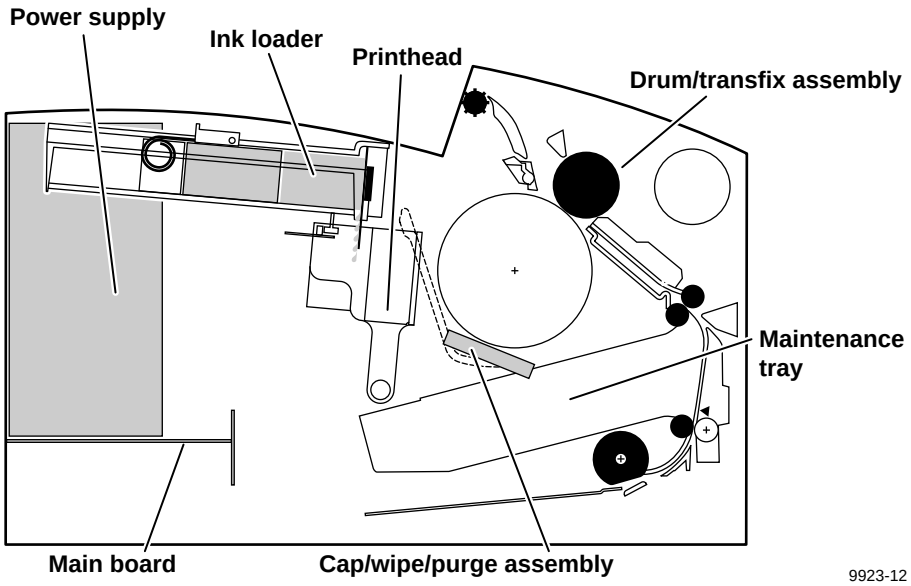


Figure 5-1 Overview of the printer

Drum/transfix assembly

The drum/transfix assembly forms the key portion of the printer where imaging takes place. The main features of the drum/transfix assembly are the drum and transfix roller. In operation, the image to be printed on paper is first "printed" on the rapidly rotating drum. A sheet of heated paper is then passed between the drum (now rotating much more slowly) and the transfix roller. Under the pressure between the drum and the transfix roller, the image is transferred to the sheet of paper. The paper pre-heater heats up the sheet of paper prior to image transferring.

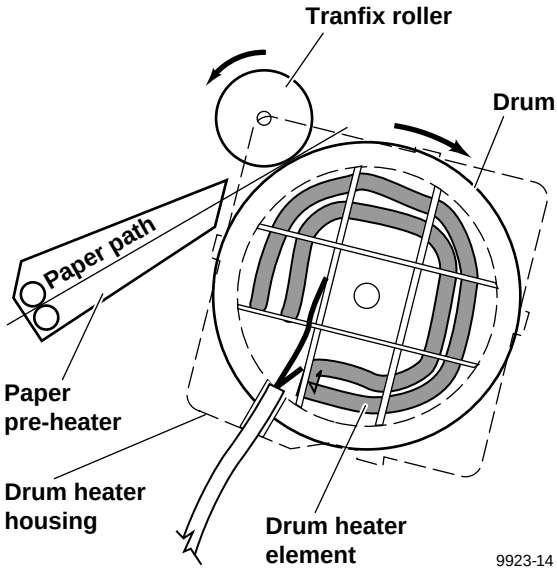


Figure 5-2 The drum and its systems

An encoder wheel and sensor on the left end of the drum monitors the drum's speed as well as its "home" position. Also necessary for printing is the drum heater, which heats the surface of the drum to about 49° C (120° F) for imaging. A temperature sensor in contact with the drum surface monitors the drum temperature. The main board interprets the sensor's signal and turns on the drum heater and drum fan to heat the drum, or turns on the drum fan alone to cool the drum.

The drum is driven by a closed-loop servo motor which, through a double reduction belt drive, rotates the drum for imaging and a constant low speed for image transfer to paper.

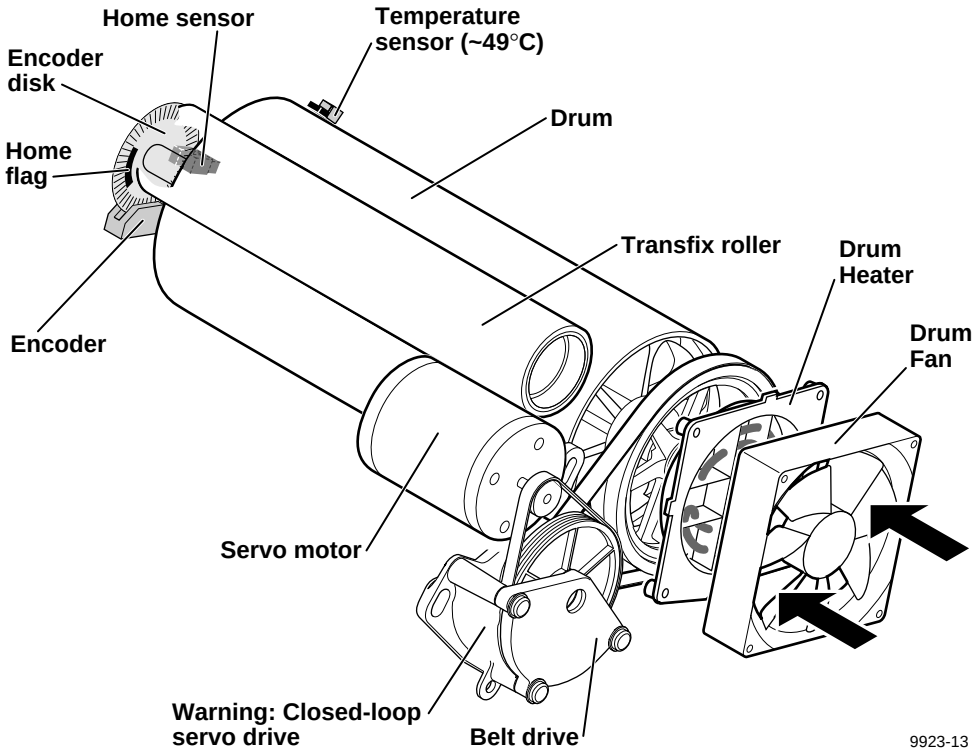


Figure 5-3 The drum/transfix assembly

Warning *Keep your fingers away from the drum drive system; it uses a closed-loop drive system. A closed-loop servo drive system is inherently dangerous. Since the motor speeds up if it senses the drum drive system slowing down, fingers caught in the drum belts and gears can be severely injured.*

Maintenance tray

The maintenance tray performs two functions. Its primary function is to create a thin intermediate liquid transfer surface, a layer of silicone oil, on the surface of the drum prior to printing. The oil keeps the ink from sticking to the drum's surface and facilitates its transfer to the sheet of paper or transparency film. The oil is contained in a 100 cc bladder. Oil is applied to the drum using an oil-saturated wick supplied by two tubes from the bladder. Small valves keep the oil from leaking out of the bladder when the maintenance tray is not in the printer. The drum maintenance tray's second function is to collect waste ink from printhead purges in a waste bin.

Note *The oil valves are always open when the maintenance tray is installed in the printer. The oil can leak if the printer does not remain level.*

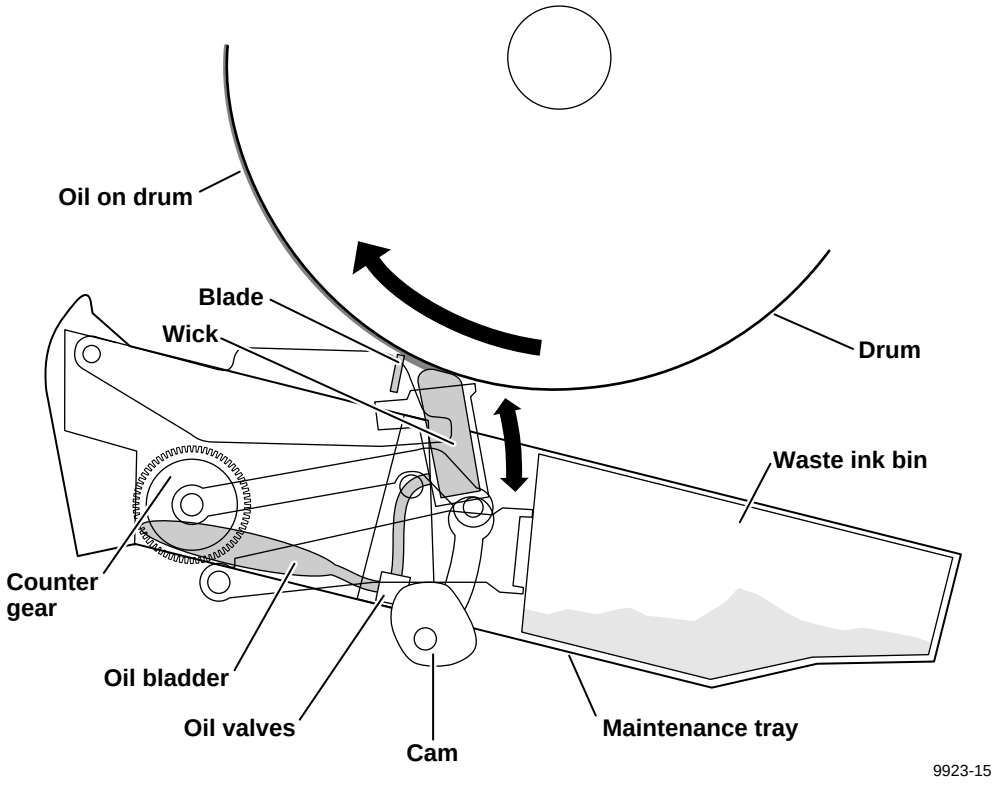


Figure 5-4 The drum maintenance tray

Prior to each print, a cam, driven by the process motor, raises the wick against the slowly rotating drum. A compliant blade, also raised by the same cam, assures that the oil film is smooth and even across the drum's surface. As the drum completes one rotation, the rotating cam lowers the wick and then a moment later, lowers the blade.

A counter gear slowly and incrementally advances a sensor interrupt flag across the width of the maintenance tray for each oiling cycle. When the flag interrupts its sensor, it indicates the maintenance cartridge must be replaced. The sensors are mounted on the maintenance tray guides on the inside of the printer frame.

Printhead

The printhead is the heart of the printer. The printhead spans nearly the length of the drum. Using its 352 ink-jet nozzles (88 jets for each primary color), with a horizontal motion of slightly less than 5 mm (0.2 inches), the printhead can print the entire image on the rotating drum. The printhead produces three sizes of ink drops: a large drop for Fast Color mode, a medium-sized drop for 300 dpi printing and a smaller drop for 600 x 300 and 450 x 800 dpi printing.

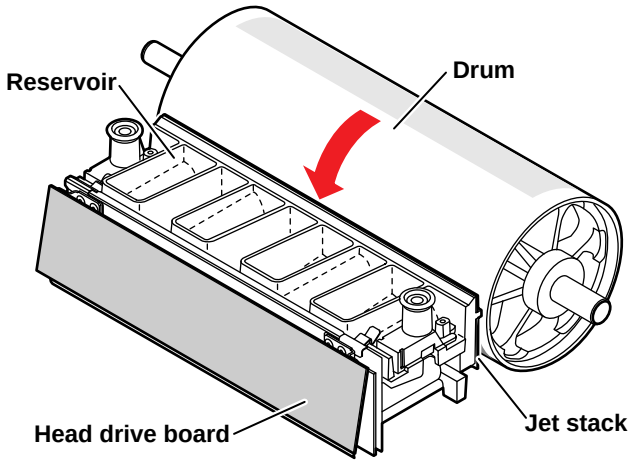


Figure 5-5 The printhead

The printhead's jet stack is fabricated from a stack of chemically etched steel plates which are brazed together to form the ink-jet array. Channels formed by the stacked plates route ink past the 352 individual, piezoelectric crystal-driven diaphragms, which force the ink in droplets out the 352 corresponding nozzles. Looking at the printhead face, the nozzles are arranged in four rows with the yellow nozzles forming the top row, the magenta nozzles forming the next row 24 pixels below, and the cyan row forming the third row 24 pixels below the magenta row. The black nozzles are located 12 pixels below and 2 to the left of the cyan nozzles. Each nozzle is separated horizontally by 28 pixels. (Pixel spacing is at 300 pixels per inch.) During the printing process, the printhead would only have to travels 28 pixels horizontally to provide complete coverage. (In actuality, the printhead travels much further to interlace with the output of neighboring jets.)

The ink-jet array is bonded to a cast aluminum ink reservoir. The reservoir supplies the molten ink to the ink-jet array. Heaters in the reservoir and the ink-jet array maintain the ink at a temperature of about 140^{o} C for printing. The level of the ink in the reservoir is kept at a constant level.

The illustration below shows a cross-section of the ink-jet array and the jet nozzle arrangement.

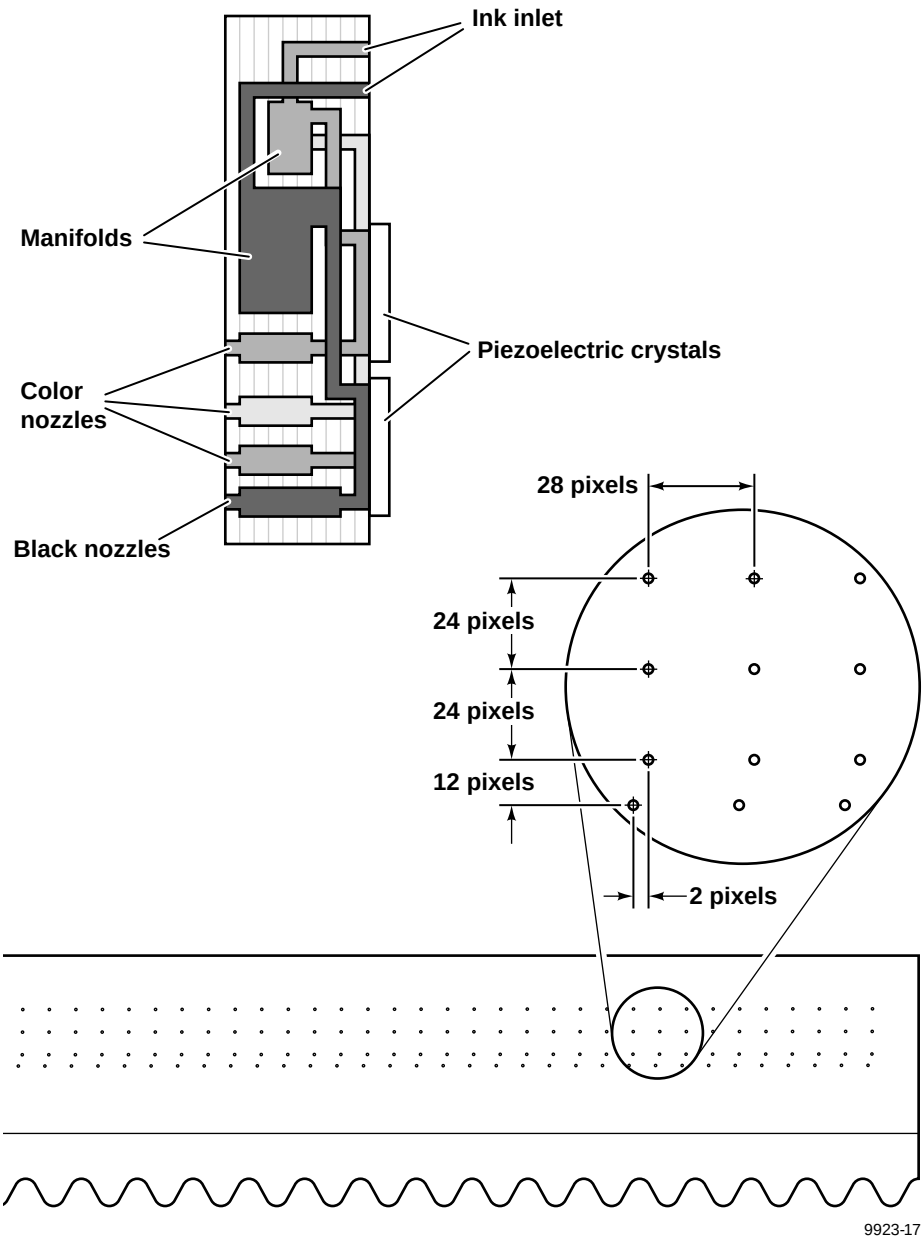


Figure 5-6 The ink-jet array nozzle arrangement and cross-section

X-axis or lateral movement of the printhead is accomplished by a short-pull pulley system. Through a stiff, yet flexible band, the x-axis motor pushes on the end of a lever arm which, in turn, pulls the x-axis shaft. The printhead, mounted to the x-axis shaft, slews laterally across the surface of the drum. An x-axis home sensor indicates when the printhead has been returned to the home position.

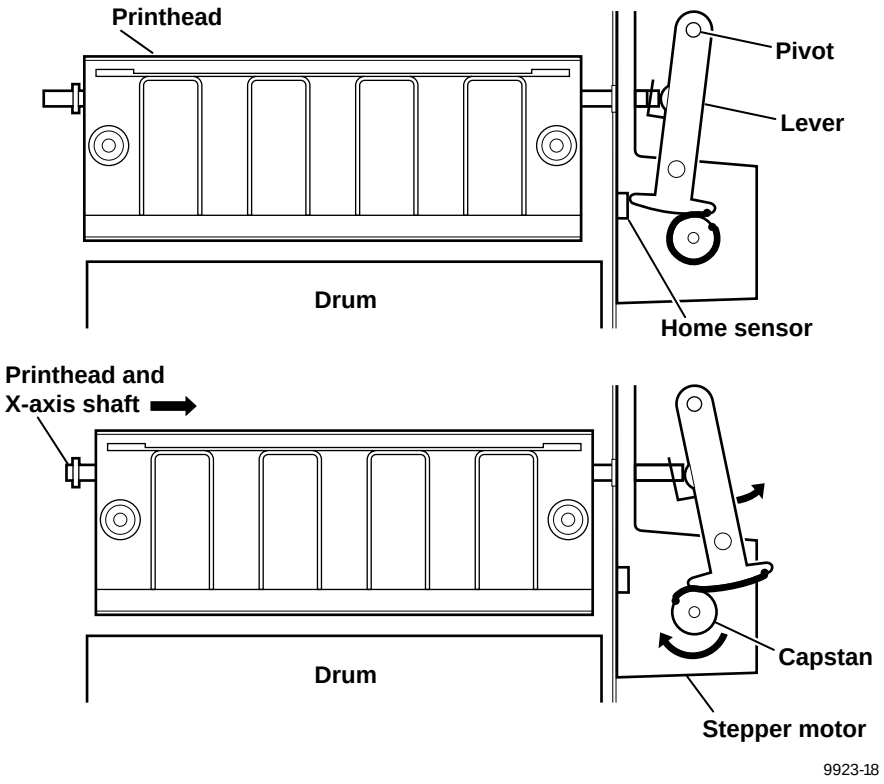


Figure 5-7 X-axis printhead movement during printing

To accommodate printhead maintenance, the printhead can be tilted back away from the drum. This creates room for the cap/wipe/purge assembly to be moved into position in front of the printhead faceplate. The printhead tilts back on its X-axis shaft that it travels on. The x-axis shaft connects to an arm. At the lower end of the arm is a cam-following pin. The pin rides in a cam-shaped groove in the head tilt cam gear. Marks molded on the head tilt cam gear indicate the position of the printhead when each mark lines up with the cam-following pin. As the gear rotates, the arm follows the motion and tilts back the printhead.

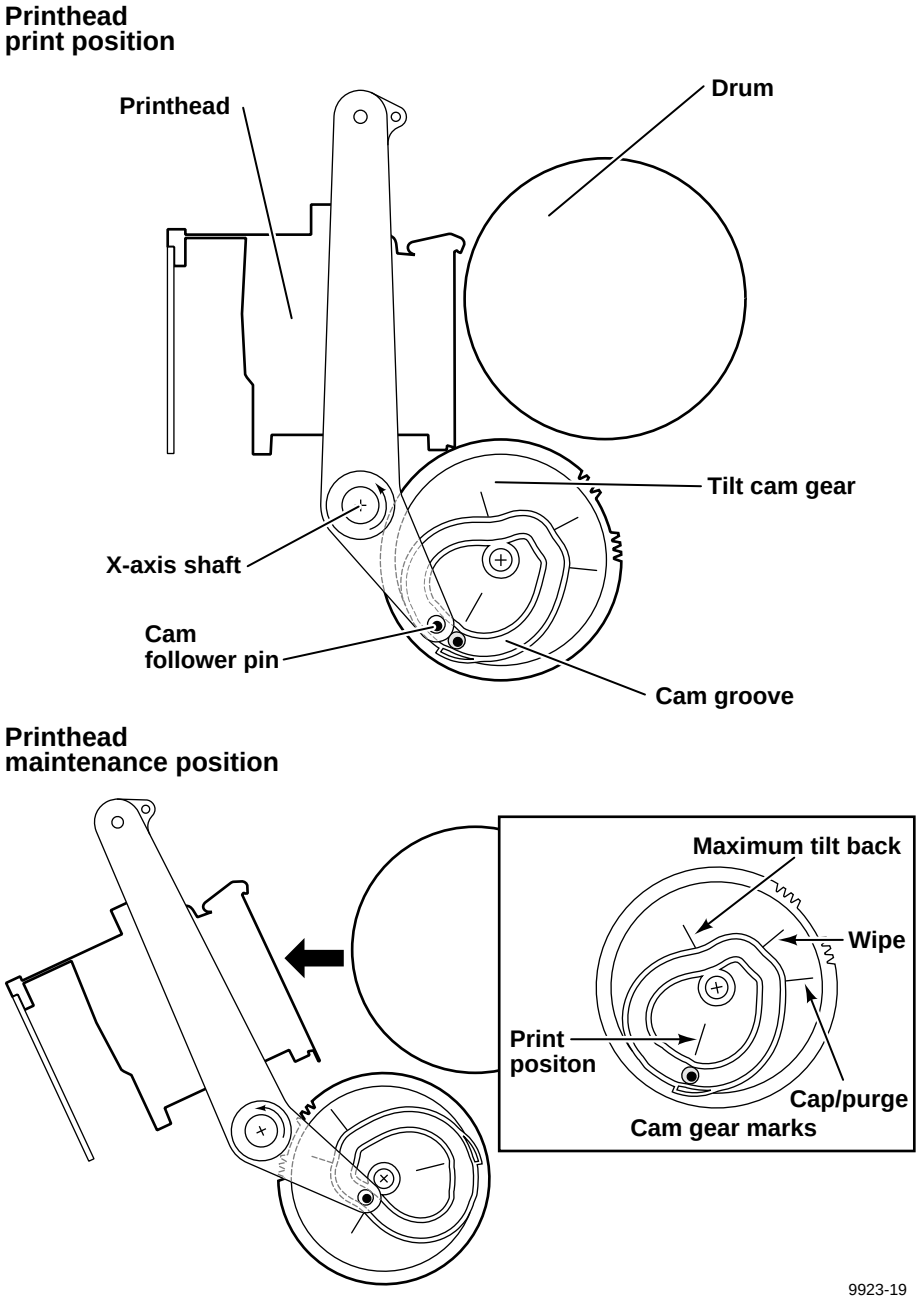


Figure 5-8 The printhead tilting mechanism

Ink loader

The ink loader consists of four parallel channels with an ink melting element at the end of each of the four channels. Ink sticks, one color loaded in each channel, are pressed by coil-spring pressure into the melting elements. As ink is required by the printhead, the appropriate color's melting element is activated and the end of the ink stick is melted. The melted ink drips into the ink reservoirs of the printhead underneath. Sensors in the ink loader alert the customer to install more ink sticks before the current sticks are completely consumed.

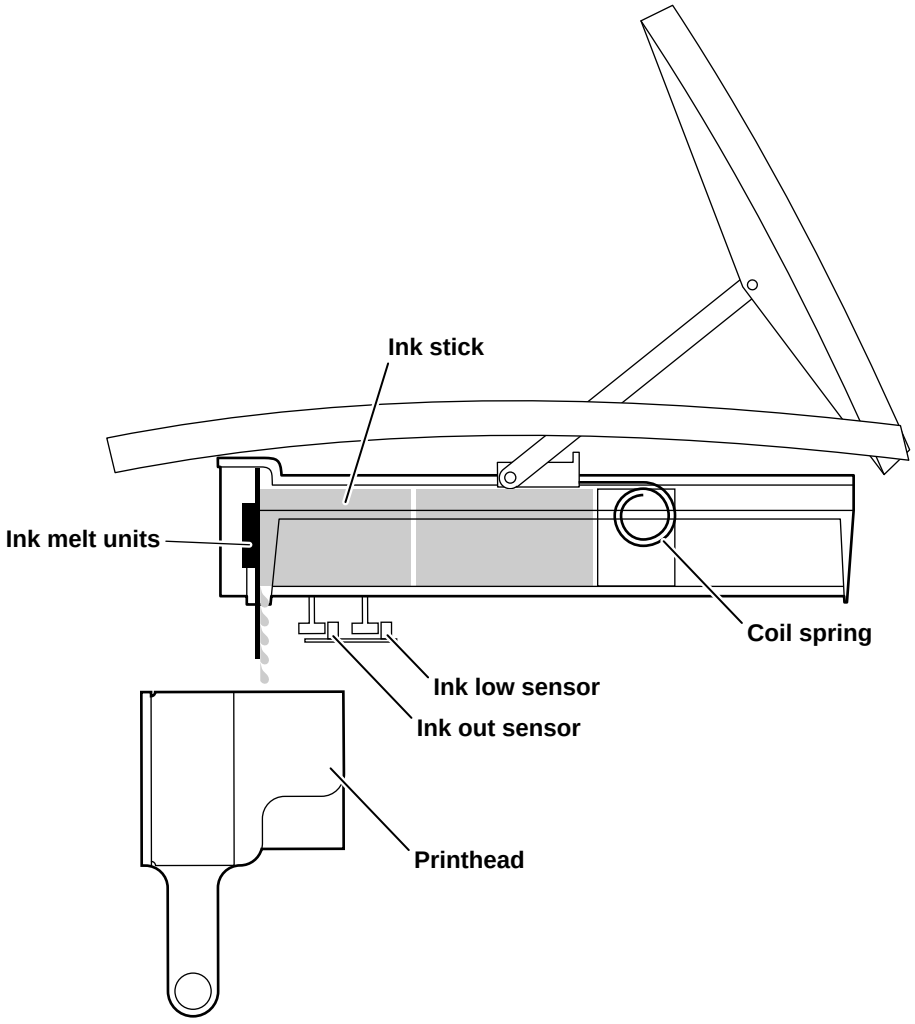


Figure 5-9 The ink loader

Cap/wipe/purge assembly

The cap/wipe/purge assembly is a long, shallow cup with an elastomeric gasket. When raised and pressed against the face of the printhead, it forms an airtight seal. After forming the seal, a vacuum is applied to the faceplate to suck out air bubbles and any debris that may be obstructing the printhead nozzles. Following the vacuum cycle, the cap/wipe/purge assembly performs a wipe operation on the faceplate using its squeegee-like wiper blade. The cap/wipe/purge assembly also receives the ink ejected from the printhead during the flush portion of the printhead maintenance cycle. The flushed ink is routed to the waste tray of the drum maintenance tray. The cap/wipe/purge assembly is heated to keep the waste ink fluid during the wipe and purge operations.

The cap/wipe/purge assembly is attached to a pair of parallel belts on a rotating shaft. To perform a printhead maintenance cycle, the printhead is first tilted away from the drum. Then the cap/wipe/purge assembly motor drives the cap/wipe/purge assembly belts, which pull the attached cap/wipe/purge assembly up to the faceplate of the printhead. The printhead is then tilted forward to seal against the cap/wipe/purge assembly.

When the cap/wipe/purge assembly is in its lowered home position, it unlocks the maintenance tray so it can be removed. If the cap/wipe/purge assembly is away from its home position the drum maintenance tray is locked in place.

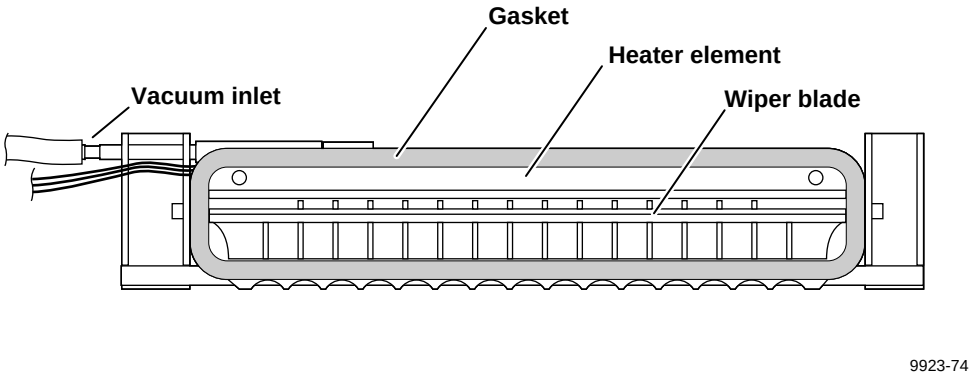


Figure 5-10 The cap /wipe/purge assembly

Warning *When servicing the printer be careful of the cap/wipe/purge assembly as it passes the printhead. If a* damaged *wiper blade of cap/wipe/purge assembly catches on the printhead it could propel hot liquid ink upward into your face.*

Vacuum for the purge cycle is obtained from a vacuum pump and a vacuum accumulator. A small vacuum pump, running for 75 to 90 seconds, creates a strong vacuum in the vacuum accumulator. Then an air valve is energized for a fraction of a second, exposing the printhead faceplate to the strong, accumulated vacuum to suck debris and bubbles out of the printhead nozzles. With the air valve once again de-energized, air is metered through the 7-mil orifice to gradually release the vacuum at the faceplate.

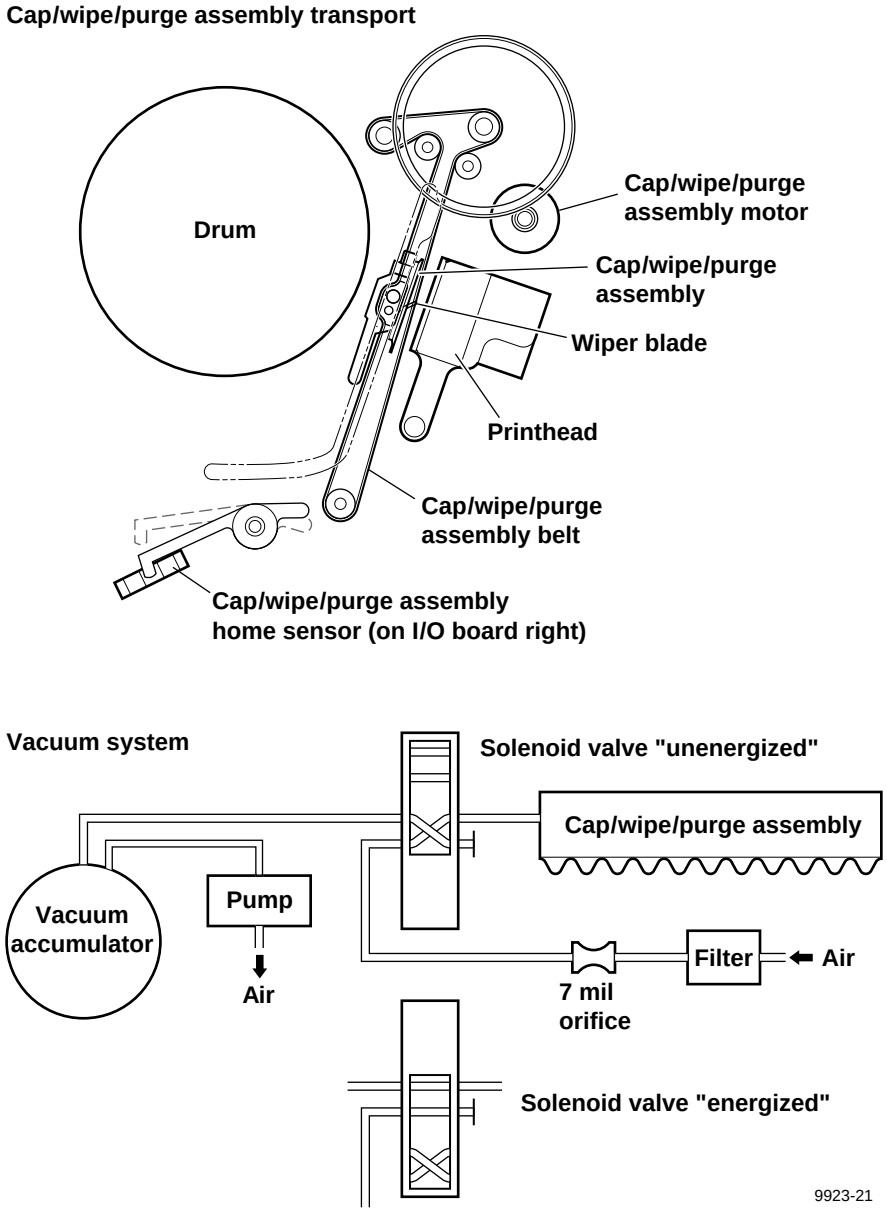


Figure 5-11 The cap/wipe/purge assembly and vacuum system

Power supply

In general, the power supply has two main, yet interrelated sections: the AC section and the DC section. In the AC section, power is routed to 10 opto-isolated triacs which, under main board logic control, supply AC power to the eleven heaters in the printer.

Two fuses provide current protection to the triacs. Fuse F2 and F3 protect the power supply from, most often, a shorted triac. If F2 or F3 fuse blow, 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. Each time the main board turns on a triac to activate a heater, it is turned on for only a fraction of a second. The main board must constantly readdress each heater it wants to remain on. By this means, if the print engine firmware should fail, the heaters automatically shut off. The printer is also protected by five thermal fuses located inside: the drum heater, the printhead's two ink reservoirs, the paper pre-heater and the cap/wipe/purge assembly. A thermal fuse opens in the unlikely event of a "runaway" heater following a firmware failure. If a thermal fuse opens, its unit must be replaced.

The DC power supply generates +5 volts for the printer's logic, + 40 volts for the motors, +54 volts and -40 volts for the printhead drivers, and +12 and -12 volts for serial communication. Fuse F1 provides protection for the switching power supply in the DC section.

Warning *Do not touch the power supply; AC line voltages are present. The power-switch does not interrupt AC power to the power supply, it only signals the supply and the printer logic to begin a shutdown sequence. Even with the power switch in the OFF position, AC line voltages are present on the power supply, heaters and heater wiring.*

There are no field adjustments necessary on the power supply.

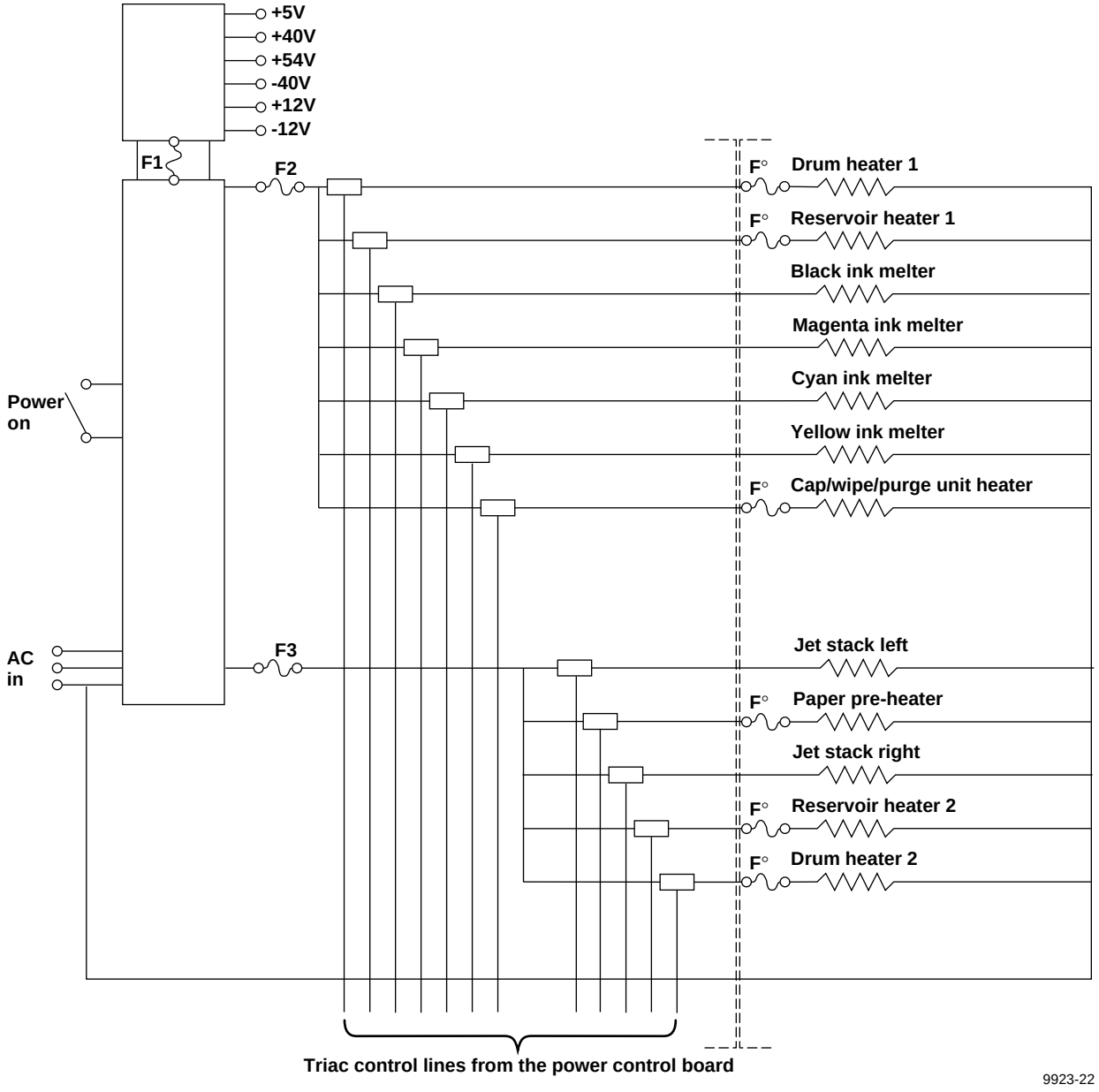


Figure 5-12 Power supply block diagram

Print process in operation

Once a PostScript image has been processed and a printing bitmap created, a print cycle begins. The printhead and drum are brought up to their operating temperatures and the ink levels in the ink reservoir are checked and ink is added from the ink loader, if necessary. Next, the printhead is driven horizontally to its home position and the drum is rotated to its home position.

Warning *Keep your fingers away from the process gear drive system; it uses a closed-loop drive system. A closed-loop servo drive system is inherently dangerous. Since the motor speeds up if it senses the process gears drive system slowing down, fingers caught in the process belts and gears can be severely injured.*

Printhead tilt

The printhead is tilted forward into its print position. The process motor is activated, which drives the process drive belt. The belt, in turn, drives a compound gear. Through a pair of follower gears, the compound gear drives the head tilt cam gear clockwise. A cam follower, mounted on the lower end of the head tilt arm, follows a groove in the rotating cam gear, which tilts the printhead. The cam gear rotates until a set of missing teeth in the cam gear "disengages" it from the cam drive gear. The head tilt solenoid latches the head tilt cam gear in this position. At this point, the printhead is in its upright print position (home position). (The head tilt cam gear is principally rotated in a clockwise direction to tilt the printhead forward and back. It only rotates counterclockwise during some printhead cleaning operations.)

Tilted forward, the missing teeth of the head tilt cam gear allow the process motor and gear train to perform other print functions without affecting the printhead's tilt position. The head tilt solenoid must be energized to allow the head tilt cam gear (with a slight spring assist) to advance forward enough to engage its drive gear and tilt the printhead back.

Caution *When servicing the printer, before turning on the printer, you should **always** make sure that the head tilt cam gear is latched by the head tilt solenoid and that the head tilt cam gear is disengaged (via its missing teeth) to the drive gear. Failure to do so can cause the printhead to be tilted and possibly "crash" into the raised cap/wipe/purge assembly or the head restraint pin.*

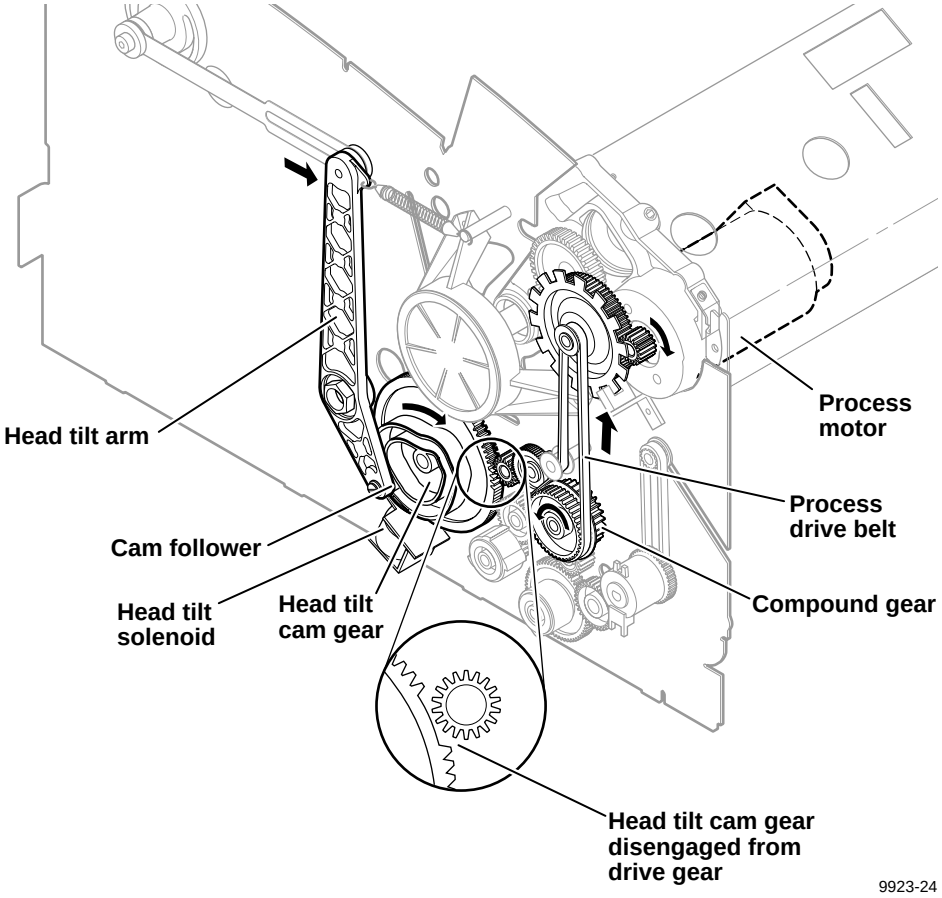


Figure 5-13 Tilting the printhead

Drum preparation

To prepare the drum, a thin intermediate liquid transfer surface is applied to the surface of the drum. First the drum is rotated to a speed of 51 cm per second (20 inches per second). Next, the wick and blade of the maintenance tray are raised into contact with the drum. To accomplish this, the process motor rotates clockwise, driving the process drive belt and the compound gear. Rotating clockwise, the compound gear drives a gear train that drives the maintenance tray's 3-position clutch which, in turn, engages the maintenance tray camshaft. The maintenance tray camshaft solenoid (on I/O board 1) energizes to release the 3-position clutch, allowing it and the camshaft to rotate about one-half revolution to the next stop. The cams on the ends of the camshaft push against followers on each side of the maintenance tray, forcing the wick and blade against the drum. The de-energized solenoid then holds the clutch and camshaft in this position.

As the drum nears the end of its rotation, the solenoid energizes for a moment, allowing the camshaft to rotate further; this lowers the wick but leaves the blade in contact with the drum to smooth out the last of the oil on the drum.

The solenoid energizes for a third time to allow the camshaft to rotate to its home position, and lower the blade. The point at which the blade ends contact with the drum it leaves a bead of oil, called an oil bar. The oil bar defines the edge of a 40 mm (1.5 inch) swath of the drum which is not oiled; this swath is called the deadband. No ink will be deposited on the deadband during the print cycle. Instead, the paper stripper fingers, which lift the paper off of the drum during printing, are lowered into contact with the drum in the deadband. This keeps them from accumulating any oil on their fingertips which would stain the edge of the print as it is stripped off of the drum.

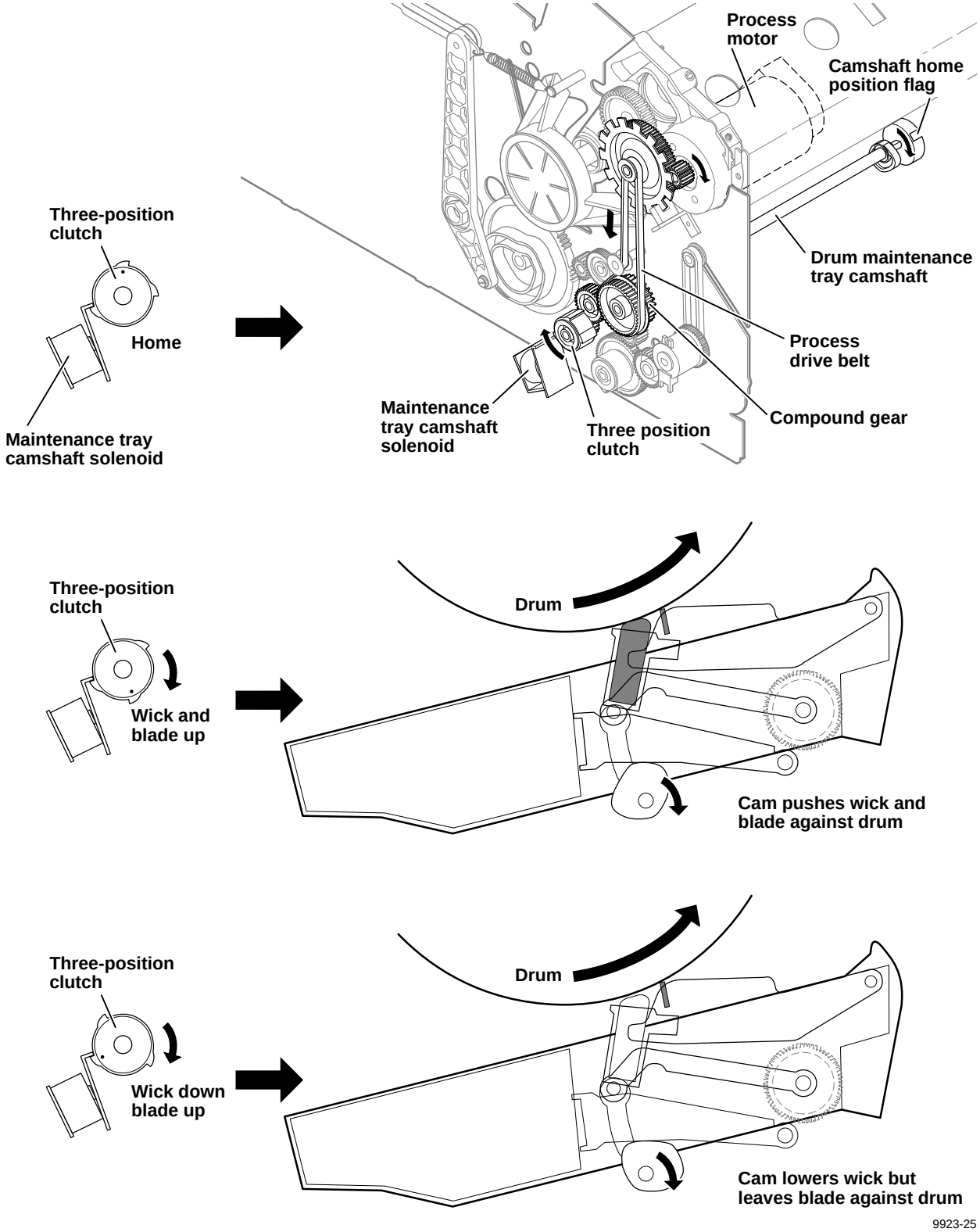


Figure 5-14 Drum preparation for printing

At this point, the drum starts rotating again at 190 rpm. As the drum reaches the correct speed, the ink-jets begin to fire to deposit the image on the oiled portion of the drum. As the jets fire, the printhead slews in the x-axis to complete the image on the drum. When the ink image is about 80% complete, the paper-pick cycle begins. As the jets fire, the printhead slews in the x-axis to complete the image on the drum.

Printing (300 x 300 dpi)

When printing, the printer performs a "four-jet interlace."in which, each jet lays down 28 pixel columns. Each jet lays down one pixel column for each drum rotation (28 revolutions total). Each jet travels horizontally the distance of 117 pixels to lay down its 28 pixel columns within that 117 pixel-wide field. The 117 pixel-wide field of each jet overlaps the 117 pixel-wide field of six other jets; this is where interlacing occurs. To lay down its 28 pixel columns, each jet follows this sequence:

1. Print 1st column, step four columns to the right, print 2nd column, step four columns to the right. Repeat until 7 columns are laid down. The 7th column also includes a four step movement to the right.
2. Step 2 additional columns to the right.
3. Print the 8th column, step 4 columns to the right, print 9th column, step 4 columns to the right. Repeat until 7 columns are laid down (total of 14 so far). The 14th column also includes a four step movement to the right.
4. Step 1 additional column to the right.
5. Print the 15th column, step 4 columns to the right, print the 16th column, step 4 columns to the right. Repeat until another 7 columns are laid down (21 total so far). The 21th column also includes a four step movement to the right.
6. Step 2 additional columns to the right.
7. Print the 22nd column, step 4 columns to the right, print the 23rd column, step 4 columns to the right. Repeat until the last 7 columns are laid down for a total of 28 pixel columns.

The intermediate 2-step, 1-step and 2-step movement between the 7th and 8th pixel columns, the 14th and 15th columns, and the 21st and 22nd columns, respectively, allow the 28 pixels columns of each jet to properly interlace with the 28 pixel columns of the other jets it is combined with. A total of 2,432 columns, each 3,134 dots tall, are laid down.

The advantage of this print method is that variability between jets is "averaged out" by being interlaced with three other jets. As shown in the illustration, of the 28 pixel columns printed by any single jet, only two of its pixel columns are actually ever adjacent. Usually they are separated by three other pixel columns produced by other jets, hence the name *four-jet interlace*. Because of the 28 pixel spacing between jets and the 117 pixel-wide field that each jet travels, the pixel columns of any one jet actually interlaces with the pixel columns of six other jets, although no more than four at any one time.

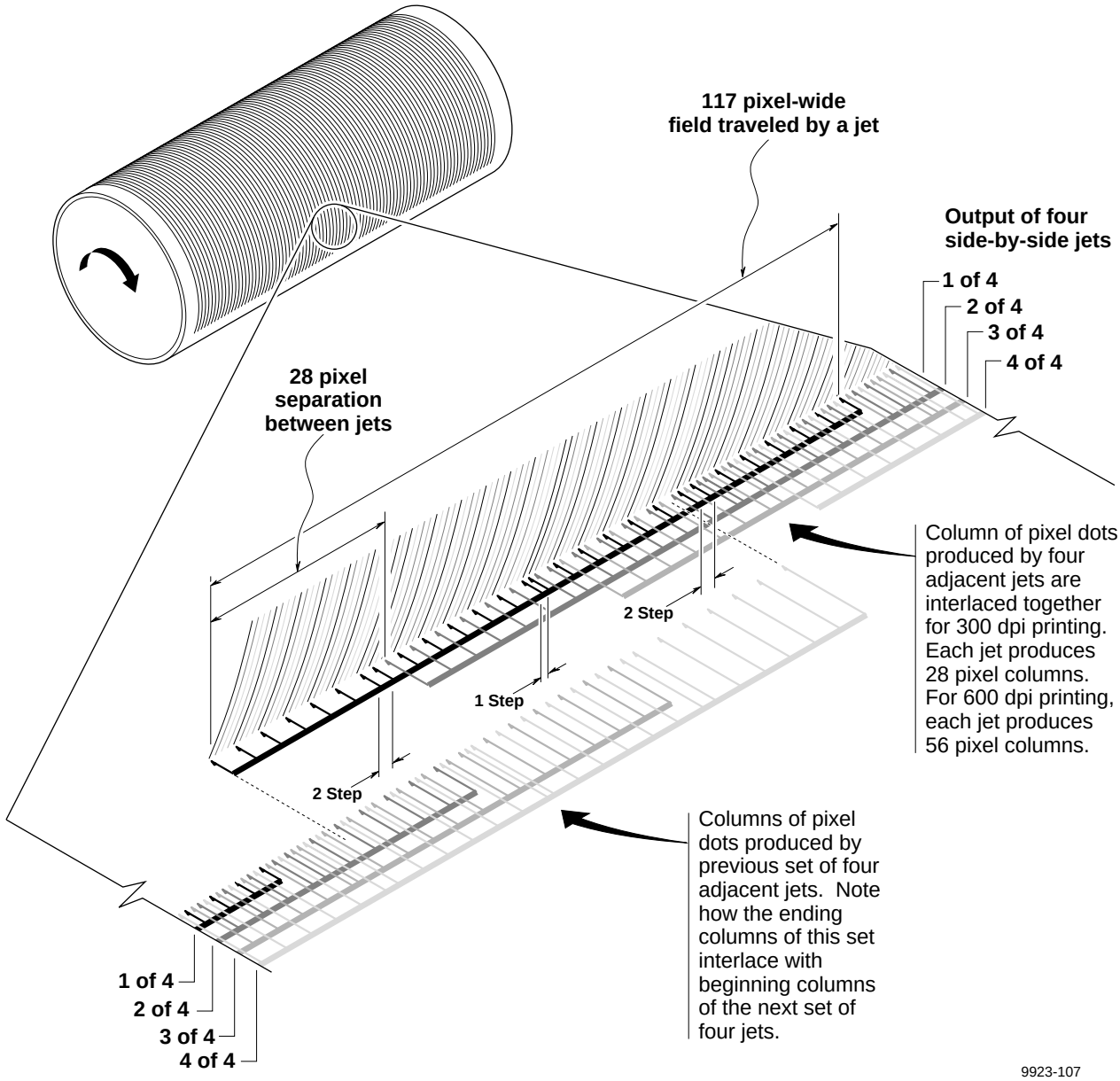


Figure 5-15 Printing the 300 x 300 dpi latent (pre-transfer) image on the drum)

In reality, because of the fixed width of the printhead and inter-jet spacing, the outermost jets cannot interlace completely with their adjacent jets. In this case, the drum rotates for seven extra imaging rotations (14 if both end jets are needed) for the printhead to reposition the end jets so they can fill-in the missing pixel columns that cannot otherwise be interlaced.

For standard mode 300 x 300 transparency printing, the image is printed in the same manner. However, the image is printed twice on the drum; the second image positioned precisely over the first image before being transferred to the sheet of transparency film. This increases the image density of the transparency.

During some diagnostic printing, such as the Cleaning Test Print, the printhead slews to the right and lays down 88 parallel bands of ink. Each band is about 2.3 mm (0.1 inch) wide and is composed of 28 pixel columns of dots from an individual jet. As the printhead slews to the right, the drum rotates 28 times; the number of pixel columns each set of jets deposits on the drum. (A set of jets is one of the 88 vertical arrangements of cyan, magenta, yellow and black jets.) With no interlacing, the test print reveals the deficiencies of a single jet compared to the rest.

Printing (600 x 300 dpi)

600 x 300 dpi printing is nearly identical to the 300 x 300 dpi printing process except the horizontal steps are half the size of 300 dpi steps and each jet prints twice as many pixel columns. When printing, the printer performs a "four-jet interlace."in which, each jet lays down 56 pixel columns. Each jet lays down one pixel column for each drum rotation (56 revolutions total). Each jet travels horizontally the distance of 229 pixels to lay down its 56 pixel columns within that 229 pixel-wide field. The 229 pixel-wide field of each jet overlaps the 229 pixel-wide field of six other jets; this is where interlacing occurs. To lay down its 56 pixel columns, each jet follows this sequence:

1. Print 1st column, step four columns to the right, print 2nd column, step four columns to the right. Repeat until 17 columns are laid down. The 14th column also includes a four step movement to the right.
2. Step 2 additional columns to the right.
3. Print the 15th column, step 4 columns to the right, print 16th column, step 4 columns to the right. Repeat until 17 columns are laid down (total of 28 so far). The 28th column also includes a four step movement to the right.
4. Step 1 additional column to the right.
5. Print the 29th column, step 4 columns to the right, print the 30th column, step 4 columns to the right. Repeat until another 14 columns are laid down (42 total so far). The 42th column also includes a four step movement to the right.
6. Step 2 additional columns to the right.

7. Print the 43nd column, step 4 columns to the right, print the 44th column, step 4 columns to the right. Repeat until the last 14 columns are laid down for a total of 56 pixel columns.

The intermediate 2-step, 1-step and 2-step movement between the 14th and 15th pixel columns, the 28th and 29th columns, and the 42st and 43nd columns, respectively, allow the 56 pixels columns of each jet to properly interlace with the 56 pixel columns of the other jets it is combined with. A total of 4864 columns, each 3,134 dots tall, are laid down.

Printing (450 x 800 dpi)

450 x 800 dpi printing is nearly identical to the 300 x 300 dpi printing process except the horizontal steps are 2/3 the distance of 300 dpi steps and each jet prints 42 pixel columns. When printing, the printer performs a "four-jet interlace" in which, each jet lays down 42 pixel columns. Each jet lays down one pixel column for each drum rotation (42 revolutions total). Each jet travels horizontally the distance of 169 pixels to lay down its 42 pixel columns within that 229 pixel-wide field. The 229 pixel-wide field of each jet overlaps the 229 pixel-wide field of six other jets; this is where interlacing occurs. To lay down its 42 pixel columns, each jet follows this sequence:

1. Print 1st column, step four columns to the right, print 2nd column, step four columns to the right. Repeat until 21 columns are laid down. The 21th column also includes a four step movement to the right.
2. Step 1 additional column to the right.
3. Print the 22nd column, step 4 columns to the right, print the 23th column, step 4 columns to the right. Repeat until the last 14 columns are laid down for a total of 42 pixel columns.

The intermediate 1-step movement between the 22th and 23th pixel columns allow the 42 pixels columns of each jet to properly interlace with the 42 pixel columns of the other jets it is combined with. A total of 3648 columns, each 8357 dots tall, are laid down.

Fast Color printing (193 x 300 dpi)

Fast Color printing is nearly identical to the 300 x 300 dpi printing process except the horizontal steps are wider than the size of 300 dpi steps and each jet prints fewer pixel columns. When printing, the printer performs a "four-jet interlace."in which, each jet lays down 36 pixel columns. Each jet lays down one pixel column for each drum rotation (36 revolutions total). Each jet travels horizontally the distance of 73 pixels to lay down its 36 pixel columns within that 73 pixel-wide field. The 73 pixel-wide field of each jet overlaps the 73 pixel-wide field of six other jets; this is where interlacing occurs. To lay down its 36 pixel columns, each jet follows this sequence:

1. Print 1st column, step four columns to the right, print 2nd column, step four columns to the right. Repeat until 9 columns are laid down. The 9th column also includes a four step movement to the right.

2. Step 2 additional columns to the right.
3. Print the 10th column, step 4 columns to the right, print 11th column, step 4 columns to the right. Repeat until 9 columns are laid down (total of 18 so far). The 18th column also includes a four step movement to the right.
4. Step 1 additional column to the right.
5. Print the 19th column, step 4 columns to the right, print the 10th column, step 4 columns to the right. Repeat until another 9 columns are laid down (27 total so far). The 27th column also includes a four step movement to the right.
6. Step 2 additional columns to the right.
7. Print the 28nd column, step 4 columns to the right, print the 29th column, step 4 columns to the right. Repeat until the last 9 columns are laid down for a total of 36 pixel columns.

The intermediate 2-step, 1-step and 2-step movement between the 9th and 10th pixel columns, the 18th and 19th columns, and the 27st and 28nd columns, respectively, allow the 36 pixels columns of each jet to properly interlace with the 36 pixel columns of the other jets it is combined with. A total of 1565 columns, each 3,134 dots tall, are laid down.

Paper pick

To pick a sheet of paper, the process motor rotates clockwise, driving the process drive belt and the compound gear counterclockwise. Rotating counterclockwise, the compound gear turns and, in turn, engages a gear train that rotates the pick roller clutch gear counterclockwise. The paper pick solenoid 1 (mounted on I/O board 1) energizes for a moment, engaging the paper pick clutch and allowing it to rotate one revolution. The pick roller rotates and pulls a sheet of paper from the paper tray. The sheet of paper trips the paper pick sensor to assure that the paper was picked from the tray. If the paper is not sensed, the pick solenoid is energized, up to six times, to rotate the pick roller again to attempt to recover from the mis-pick and pick the sheet of paper.

With the paper-pick sensed, the paper-feed electric clutch energizes to allow the upper and lower paper-feed rollers to rotate and carry the sheet of paper to the paper pre-heater. At this point, the paper stops at the entry to the paper pre-heater, tripping the paper pre-heater entry sensor on the left end of the paper preheater. The paper also trips the paper width (A/A4-size) sensors on the right end of the paper preheater to verify that the width of the paper is within the printer's specifications. At this point, the process motor is stopped to wait for more ink deposition on the drum.

When ink deposition is about 95% complete, the process motor is activated to bring the sheet of paper through the paper pre-heater and to the transfix position. The paper preheater heats the paper to improve ink transfer. The leading edge of the sheet of paper trips the paper preheater exit sensor as it passes out of the paper preheater.

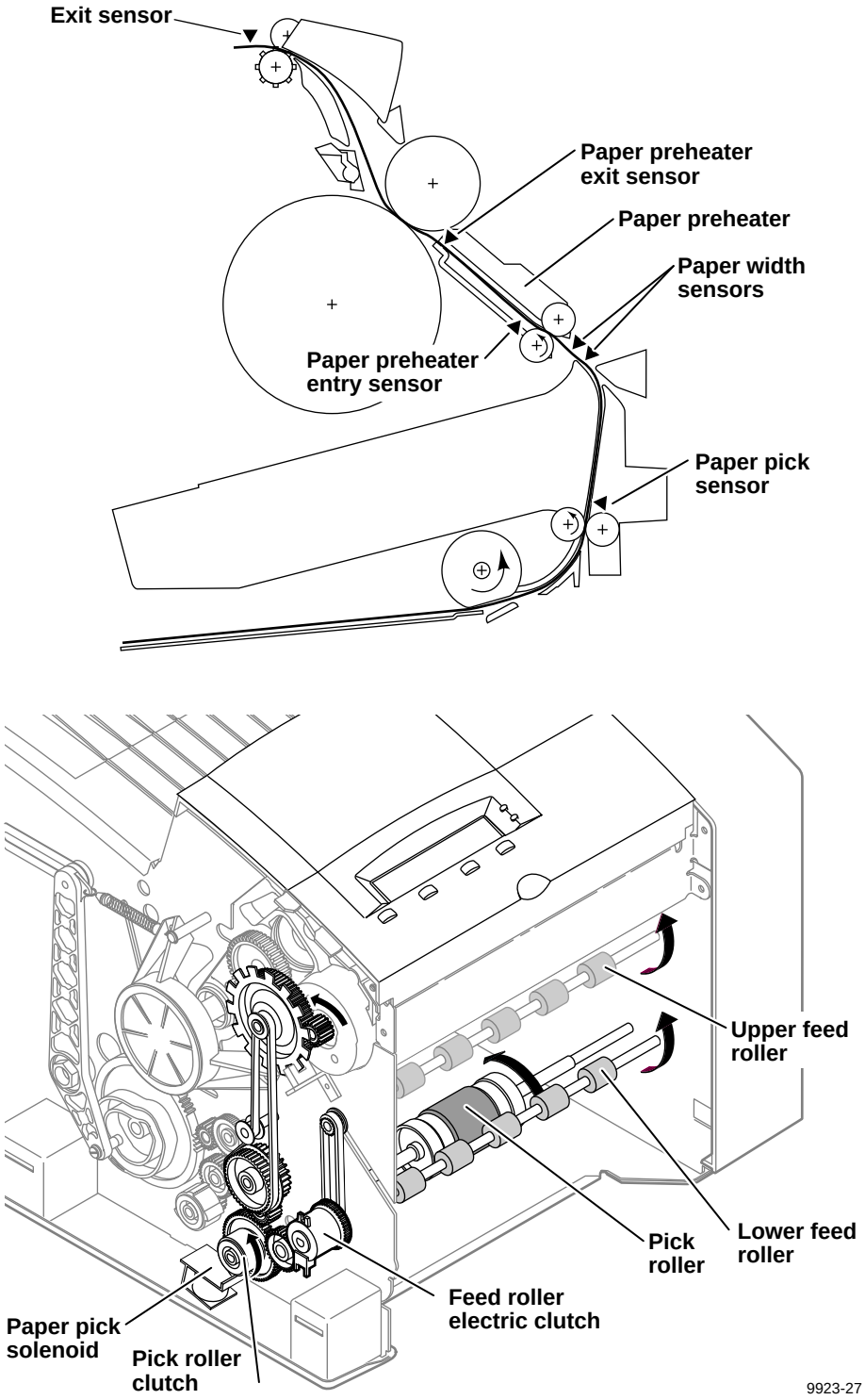


Figure 5-16 Paper picking and positioning for transfixing

Transfixing, stripping and exiting

As the leading edge of the sheet of paper trips the paper preheater exit sensor, it starts the transfix roller being lowered to its transfix position. The process motor rotates clockwise, rotating the process drive compound gear counterclockwise. Fourteen flags on the circumference of the gear represent the fourteen teeth on the small gear, on the back of the compound gear. When the teeth of the small gear are in the proper position, as detected by the compound gear position sensor, the transfix cam solenoid (located on I/O board 3), energizes to release the spring-loaded transfix cam on the right end of the transfix roller shaft. This allows the transfix roller gear (which up to this point in time had missing teeth "disengaged" to the 14-tooth gear of the process drive compound gear), to rotate slightly and engage the small gear of the compound gear. During this time, the drum, rotating at about 24 rpm, positions the deadband to coincide with the arrival of the leading edge of the sheet of paper (which is moving at the same rate as the drum).

The rotating transfix gear rotates the transfix roller shaft about one-half revolution. The transfix roller, which is eccentrically mounted on the transfix roller shaft, rotates into contact with the paper (5 mm behind the leading edge) and then stops. This sandwiches the leading edge of the paper between the transfix roller and the beginning of the image on the drum. The drum's rotation rotates the transfix roller and begins to pull the sheet of paper between them. At this point, the transfix roller shaft rotates slightly so a lobe on the transfix roller cam pushes the exit roller gear train into contact with the ring gear on the right end of the drum. As the drum rotates, the exit rollers rotate. The transfix roller shaft rotates slightly more so a protrusion on the transfix roller cam causes the stripper fingers to momentarily drop down onto the deadband of the drum and catch the leading edge of the sheet of paper and direct the paper to the rotating exit rollers. The transfix roller shaft rotates slightly more to clear the protrusion on the transfix roller cam and raise the stripper fingers so they no longer contact the drum.

The process motor stops, leaving the transfix roller cam in its half-rotated position. Friction from the rotating drum continues to turn the transfix roller, which freely rotates on the transfix roller shaft. The ink on the drum transfers to the sheet of paper pulled by the friction between the drum and the transfix roller. After about 1.8 seconds, the complete image has been transferred to the paper and the transfix roller is lifted off of the drum.

The rotating drum, driving the exit rollers, pushes the remainder of the sheet of paper into the exit tray. The trailing edge of the paper is detected by the exit sensor, ending the print cycle.

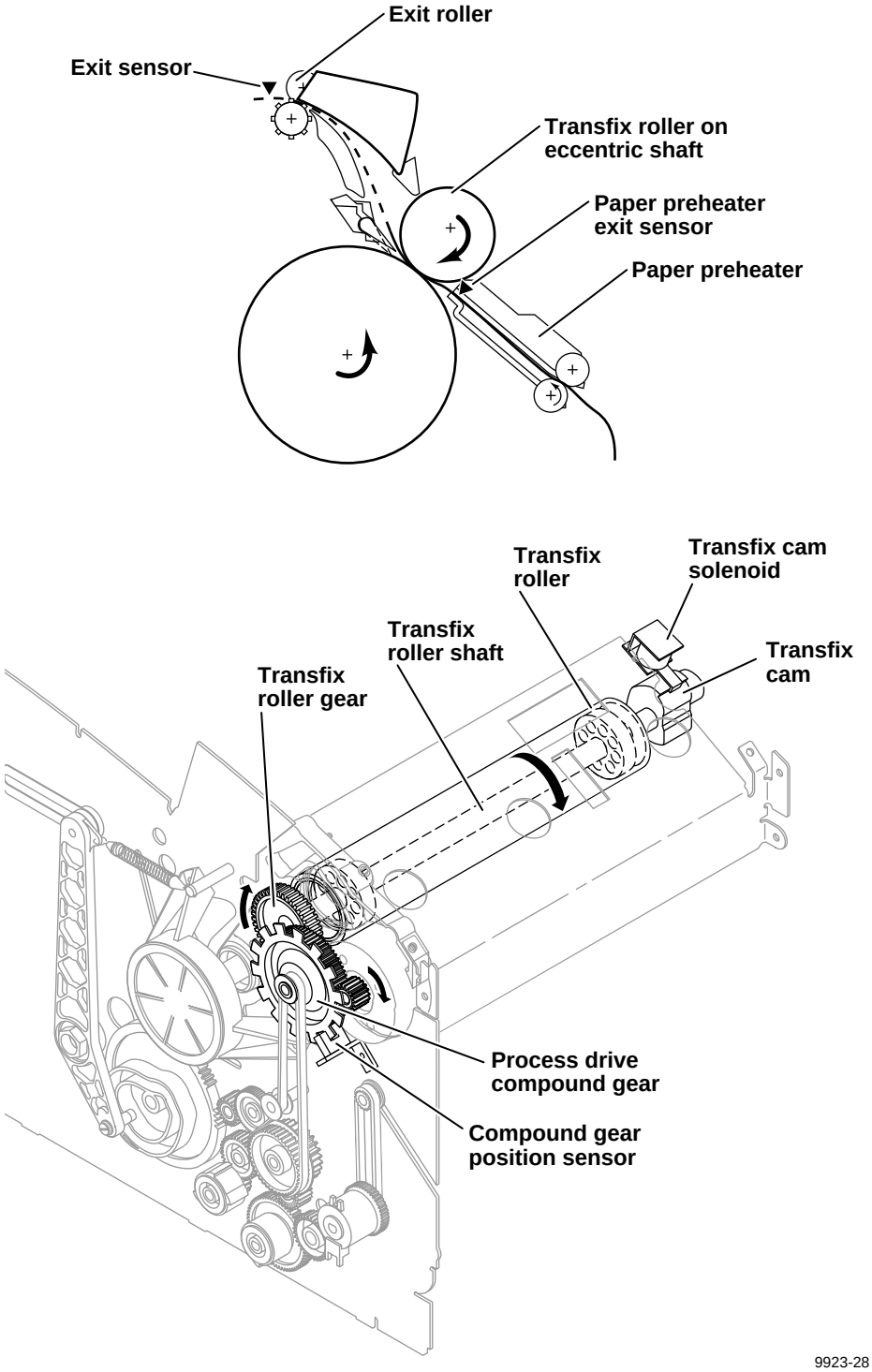


Figure 5-17 Image transfixing, stripping and paper exiting

Printer self-maintenance

To maintain peak operation reliability and print quality, the printer has several automatic or semi-automatic maintenance functions. These functions may be started automatically after a certain number of prints or during printer startup, or they may be started by the customer if a print quality defect is noted.

- Printhead maintenance cycle
- Paper preheater cleaning
- Transfix roller oiling
- Pick roller cleaning
- Drum cleaning (chase page)

Printhead maintenance cycle

This topic describes the cleaning cycles used to clean jets of bubbles or foreign matter that causes a jet to malfunction. Three basic actions take place during a cleaning cycle:

- purging
- wiping
- flushing

These actions are used in different combinations for three different types of cleaning cycles:

- quick wipe
- short cleaning
- long cleaning

The long cleaning is described here. The short cleaning and the quick wipe are basically subsets of the long cleaning cycle.

Preparation. Following printer power-up from a cold start or in response to a front panel menu selection, the print engine begins a printhead long cleaning cycle. The first step is to stop any ink melting operation. The main board starts the vacuum pump, which begins to create a vacuum in the vacuum accumulator. The pressure in the accumulator is lowered to about 10.2 psi. It takes the vacuum pump about 75 to 90 seconds to achieve this vacuum and then the pump is shut off. Meanwhile, the printhead is tilted into the standby position, in an action almost identical to the printhead tilt-to-print action described in the earlier topic "Print process in operation" on page 5-16. In this case, the cam follower follows the groove in the rotating cam gear, tilting the printhead backward. Following the head tilt, the cap/wipe/motor rotates counterclockwise to pull the cap/wipe/purge assembly into its cleaning position. Next, the printhead is tilted forward slightly to seal against the cap/wipe/purge assembly.

Purge. Actual cleaning begins with the air valve solenoid energizing for 0.375 seconds; this momentarily routes the vacuum accumulator to the cap/wipe/purge assembly and exposes the printhead faceplate to the vacuum. The vacuum bleeds off after about 8 seconds through the 7 mil orifice. Then the printhead is tilted backward to break the seal and the printer waits for 10 seconds for the waste ink to drain from the cap/wipe/purge assembly.

Long wipe. The cap/wipe/purge motor slowly rotates clockwise to pull the cap/wipe/purge assembly's wiper blade down the face of the printhead, wiping away ink and debris.

Long flush. The printhead is tilted back slightly and the cap/wipe/purge assembly is raised to bring the wiper blade even with the jet nozzles. All jets are fired for 10 seconds to flush air bubbles and foreign matter out of the jets. The waste ink drips into the waste tray of the drum maintenance tray.

Dab. The cap/wipe/purge assembly is lowered slightly and the printhead is tilted forward to dab the wiper blade against the lower faceplate to clean ink off the wiper. The cap/wipe/purge assembly is successively lowered slightly and the printhead tilted back and forth four more times to dab the wiper blade.

Short wipe. Following the dab, the cap/wipe/purge assembly is raised and the printhead is tilted forward against the wiper blade. The cap/wipe/purge assembly is slowly lowered again to clean the faceplate but stops sooner, before it can run into the debris from the first wipe.

Short flush. The printhead is tilted back slightly and the cap/wipe/purge assembly is raised to bring the wiper blade even with the jet nozzles. All jets are fired again for 0.6 seconds.

Following the second flush, the printhead is tilted back and the cap/wipe/purge assembly is lowered into its standby position. A cap/wipe/purge sensor on I/O board right detects when the cap/wipe/purge assembly is stored in its standby position. Then the printhead is tilted forward into its print position and a cleaning or "mud" page is printed. The cleaning page allows each jet to eject ink that may be slightly contaminated with another ink.

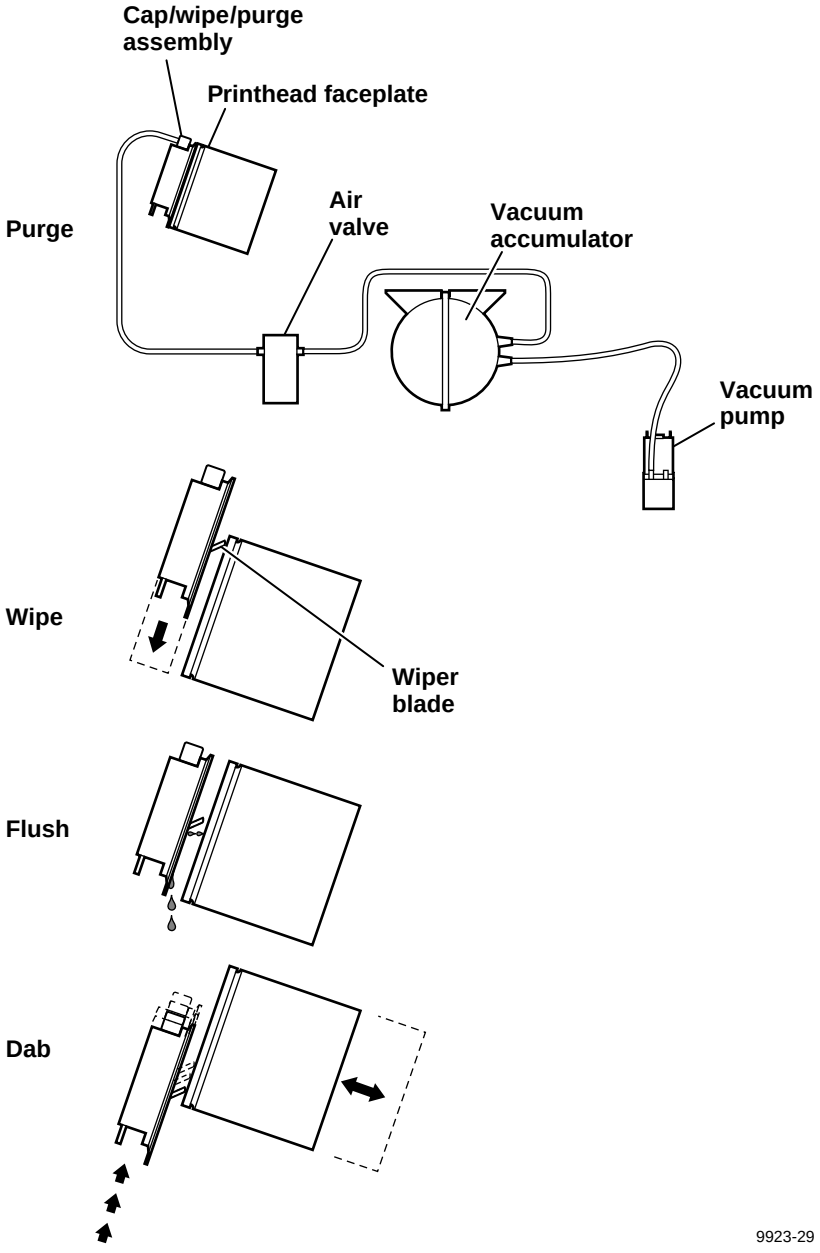


Figure 5-18 The printhead maintenance cycle

Paper preheater cleaning

This is a customer-initiated cleaning procedure, selected through the front panel cleaning menu `Clean: Ink Smears`. The purpose of this cleaning item is to clean ink out of the paper pre-heater that may have been deposited there. Heavier-weight, high-grade quality bond paper works best for this procedure. Ink can be deposited in the paper pre-heater if a sheet of paper with ink on it was rerun through the printer in an attempt at two-sided printing, which is not supported.

Ink can also be deposited if a jammed print, with ink on it, was pulled backwards through the paper preheater. In the paper preheater clean cycle, these events take place:

1. The user starts the `Clean: Ink Smears` menu item.
2. The printer overheats the paper preheater to 110° C, softening ink trapped inside the paper preheater. Ordinarily the paper preheater runs at temperatures of between 90 and 95° C for paper or transparency film printing.
3. The printer picks and passes 10 sheets of paper through the print path. Each sheet absorbs and removes ink from the paper preheater.
4. The printer returns to the `Clean` menu.

Because of the higher temperatures involved, this function can also be used to clean the drum surface of ink deposits caused by a contaminated wick on the drum maintenance cartridge.

Pick roller cleaning

This is a customer-initiated cleaning procedure, selected through the front panel cleaning menu `Clean: Media Tray Jams`. The purpose of this cleaning item is to clean the pick roller. This procedure requires the pick roller cleaning tray. In the pick roller cleaning cycle, these events take place:

1. The user starts the `Clean: Media Tray Jams` menu item.
2. The front panel prompts the user to install the cleaning tray in the paper tray. (The user must remove all media from the paper tray and also soak the cleaning tray's sponge with alcohol.)
3. The user starts the cleaning cycle; the printer responds by rotating the pick rollers eight times.
4. The printer prompts the user to remove the cleaning tray and returns to the cleaning menu.

Transfix roller oiling

At the first opportunity after making 50 prints when no prints are queued and the printer is idle, the printer performs a transfix roller oiling cycle. During this cycle, oil is applied to the drum as it would be during a print cycle. Then the transfix roller is lowered against the drum and the drum rotates; this transfers the oil to the transfix roller, then the transfix roller is raised to its standby position.

Drum cleaning (chase page)

The printer performs a drum cleaning with a chase page automatically anytime a paper jam occurs after an image has been "printed" on the drum. The chase page transfers the image, which may not be complete, off the drum and is usually discarded. The printer then attempts to reprint the print that jammed. The chase page is processed the same as a regular print except the drum is not oiled and no image is printed on the drum (since an image is already printed on the drum).

Chapter

6 Troubleshooting

This chapter discusses troubleshooting the printer. Troubleshooting is discussed with two approaches:

- A step-by-step verification procedure that systematically confirms that particular components of a printer are properly functioning until a problem is found.
- A symptom/cause scheme that lists particular printer failures and error codes and their possible causes.

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.
2. If POST diagnostics pass, the front panel **Power** LED turns on and the rear panel LEDs continue to blink.
3. Front panel **Error** LED is turned off and the LCD display is cleared.
4. **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 tray 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 tray 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 tray 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.

5. The printhead is tilted back to the locked position.

6. The front panel displays a warm up message.

7. The heaters are enabled and the drum begins to rotate.

8. When the ink in the printhead is molten, the cap/wipe/purge assembly is positioned to the purge position.

9. The printhead tilts forward and a purge cycle begins.
10. A cleaning page is printed.
11. The front panel displays a message that the printer is initializing and then ready.

The print engine is initialized.

Print engine troubleshooting

This topic is a step-by-step procedure for systematically verifying particular aspects of a printer's operation. Following this procedure should lead to the cause of a printer's failure.

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 later topic, "Verifying power supply operation" on page 6-6.
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 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. A long flash represents a 5 while a short flash is a one. 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.
3. 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 6-1 Main board power up self-test error codes

Left LED flashes Long flash =5 Short flash=1 2L+1S=11	**Meaning**	**Details**
1	*not used*	
2	DRAM SIMM Presence	This test verifies for the presence of both DRAM SIMMs. If both DRAM SIMMs are missing the resultant error indication is 2 short flashes from the left LED.
3	DRAM SIMM 0	This test verifies the entire DRAM SIMM located at bank 0.

Table 6-1 Main board power up self-test error codes (cont'd.)

Left LED flashes Long flash =5 Short flash=1 2L+1S=11	**Meaning**	**Details**
4	*not used*	
5	DRAM SIMM 1	This test verifies the entire DRAM SIMM located at bank 2.
6	*not used*	
7	*not used*	
8	*not used*	
9	NVRAM	This test does a walking ones and a walking zeroes 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 the Tektronix ethernet address 0x08, 0x00, and 0x11 has been copied into three locations.
11	MCAIII ASIC	This tests reads and verifies the version level of the MCA3 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.
15	PLX Bridge IC	This tests reads and verifies the version level of the PLX Bridge Chip.
none	SCSI	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. ■ Wrong values in script-set scratch registers. ■ Script operation timed-out. ■ Script operation returns wrong exit code. ■ DMA transfer spills outside buffer. ■ DMA transfer data mismatch.
none	10baseT	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. ■ General Failure. ■ MAC internal loopback failure. ■ MII internal loopback failure. (currently disabled)
none	Ethernet 100BaseT Option Card	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. ■ General Failure. ■ MAC internal loopback failure. ■ MII internal loopback failure.

Table 6-1 Main board power up self-test error codes (cont'd.)

Left LED flashes Long flash =5 Short flash=1 2L+1S=11	**Meaning**	**Details**
none	Token Ring Option Card	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. ■ General error ■ Problem with EEPROM ■ Error trying to Bring Up Diags ■ Error initializing device ■ Command completion error ■ Interrupt error ■ Wrong vendor ID ■ Wrong microcode version ■ Wrong version ID
none	Local Talk Option Card	This test verifies the functionality of the Local Talk 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 “Local Talk Option Card: General Error” will be sent to the start page.

Verifying print engine operation by using its test print

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`, press the **`Menu`** button and scroll to the **`Startup page`**. menu item and then press **`Print`.** The printer should print out a start page.

If the printer prints a test page, then the print engine is working correctly. If the printer does not print a test print, then a problem exists with the print engine. Proceed with the topic, “PC-based diagnostics” on page 6-29.

Verifying power supply operation

Required tools

- TORX T-20 screwdriver
- Volt-ohm-meter (VOM)

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 five steps:

- Checking for proper AC voltage.
- Inspecting the power supply fuses.
- Testing DC output voltages.
- 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 VOM 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. Remove the right side cabinet panel to access the wiring harnesses plugged into the print engine control board.
4. Plug in the printer and turn it on.
5. Using the Tektronix DMM 252/254 set for Hz (also, press the blue button), measure the AC sense test point. If the power supply can sense the AC input voltage, you should measure ~8.2 kHz for 115 VAC, or ~16.4 kHz for 220 VAC. The range varies from 6 kHz for 87 VAC to 17 kHz for 250 VAC.
6. **AC Output:** FuseF1 is the AC input fuses for the DC section of the power supply. If it opens, the power supply does not function.

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 F1 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.*

7. Proceed to the step, "Inspecting the power supply fuses" on page 6-9.

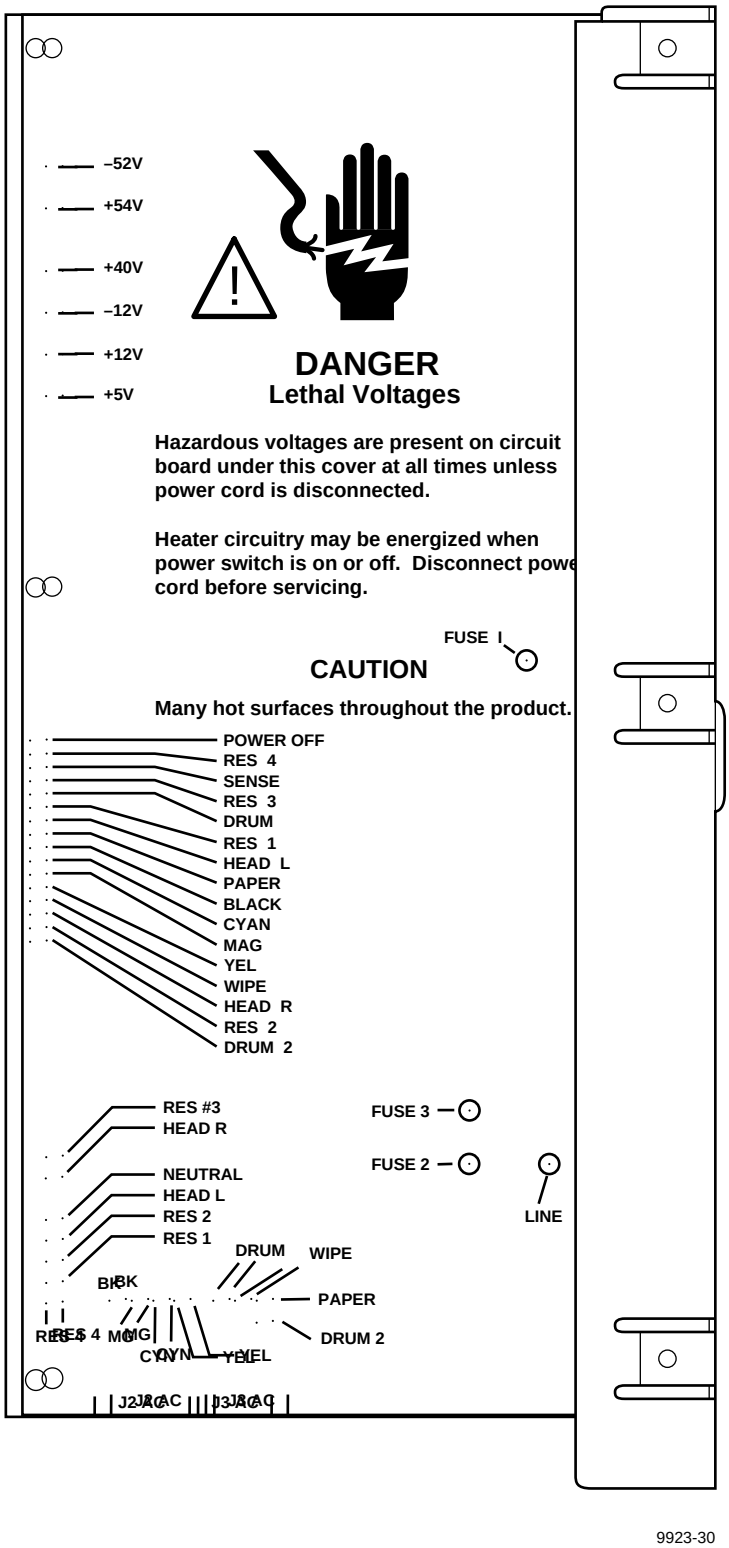
   If a heater shorts, F2 or F3 opens. The power supply does NOT shut down, however, a `Service Required` error code is displayed on the front panel.

   Using the Tektronix DMM 252/254 set for Hz (also, press the blue button), measure the heater triac control lines test points at the bottom of the power supply. When a heater is turned on full, you should measure a 30 Hz digital signal activating that particular heater's triac. If not, then the main board has failed. Note that when the heater is not activated, the reading will be zero. Also, if the heater is being partially activated, the reading will be some fluctuating intermediate value less than 30 Hz.

8. **DC Output:** Refer to Appendix C, "Wiring Diagrams" for more details on other voltage test points. The test points are printed on the power supply's plastic safety cover.

If you do not measure the expected DC voltages, proceed to the next step, "Inspecting the power supply fuses."

If the +5 VDC, ±12 VDC, ±40 VDC and +54 VDC voltages measure correctly proceed to the next topic.



9923-30

Figure 6-1 Measuring the DC voltages (test points) and fuses

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 right side cover to access the power supply and access the fuse test point.
3. With a VOM, determine that the fuses are functional.

If the fuses are good, but the printer's power supply does not output DC voltages, proceed to the topic, "Testing for a shorted motor" on page 6-10.

If the AC power switch is on and there is no mechanical movement or LCD activity after power-up diagnostics, or the LCD indicates that AC power has been lost, check the AC sense signal on the power supply.

Testing for shorted drivers

1. Turn the printer off.
2. Disconnect the DC power cable (J890) from the power control board (this isolates all motors). Turn the printer on. If the rear panel LEDs illuminate (indicating power), the power control board or its loads are current-limiting the power supply. Go to Step 3. If no power is evident (no lit LEDs), go to Step 4.
3. Turn off the printer. Reconnect the power cables to the power control board (J890); then disconnect all load connectors at the top of 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 r 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 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 6-10.
4. Turn the printer off. Disconnect the two I^2C bus cables from the interconnect board. (This isolates all I/O board and their solenoid drivers.) If the rear panel LEDs illuminate, isolate which I/O board is shoring or which I^2C cable is bad.
5. If the power supply still does not work, replace the main board, since it is easier to replace the main board than the power supply. As a last resort, replace the power supply. Refer to the topic, "Power supply" on page 8-10.

Note *The power supply must have a minimum load to operate. The main board provides this loading with four large ballast resistors.*

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 6-10.

If the motors and solenoids are working properly, but the power supply still does not function, replace it. Refer to the topic, "Power supply" on page 8-10.

Testing motor and solenoid resistances

1. Turn off the printer and disconnect the power cord.
2. With a VOM 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 6-2 Motor and solenoid resistances

Motor or solenoid	Resistance (approximately)
Process motor	3 ohms
Y-axis motor	2 ohms
X-axis motor	60 ohms/phase
Cap/wipe/purge assembly motor	80 ohms/phase
Head-tilt solenoid	45 ohms
Maintenance tray camshaft solenoid	45 ohms
Paper-pick solenoid	45 ohms
Transfix cam solenoid	45 ohms

In general, if you measure any low resistance, less than 4 ohms, from a motor winding to ground while the motor is installed, replace that motor.

Media jams and the paper path

Required tools

- TORX screwdriver and tips
- VOM

Jams fall into the following four categories:

- Media-based problems
- Paper-picking 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. Ensure that the correct media is in the correct paper 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.
4. Ensure the correct weight of paper is being used. Use 16 - 32 lb Bond (60 - 120 g/m^2) in the paper trays. For manual feeding use 16 - 32 lb Bond (60 - 120 g/m^2) or 50 - 80 lb Cover (135 - 220 gm^2).

Paper-pick errors

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

1. Clean the interior of the paper 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 mis-positioned as the tray is inserted in the printer.
2. In humid environments, keep paper sealed in packaging until it is needed for printing.
3. Fan the media before inserting it in the paper tray.
4. 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.

5. Ensure that the drum maintenance tray is fully installed by pushing firmly.

6. Check that the pick roller is being rotated. If it is not, go to the topic "Checking the process motor and drive train" on page 6-13. Otherwise, go to Step 5. 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.

7. Clean the pick roller. 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.

8. Refer to the later topic "PC-based diagnostics" on page 6-29. Use the Sensors/Actuators and Paper Path tests to check the operation of the paper pick system.

9. Inspect the wiring harness leading to the paper transport clutch for nicks, cuts or crimped wiring. Ensure the connector is seated.

10. Inspect the paper-feed module for obstructions.

Print transfer jams

1. Test the paper preheater sensors. Refer to the later topic, "PC-based diagnostics" on page 6-29. If the sensor fails the test, replace the paper pre-heater.

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 roller does not rotate when the lower roller rotates.

3. Inspect the idler rollers on the inside of the top-front cabinet panel; they should rotate freely.

4. Check that the feed rollers rotate smoothly and that the front cover is fully closed and seated.

5. Check the paper-eject path for obstructions. Test the sensors i the paper path.

6. Ensure that the transfer roller rotates during the transfix process.

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 4. 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 6-6.

3. Disconnect the motor's wiring harness. Measure the resistance of the motor's windings. The expected resistances are listed in Table 6-2 “Motor and solenoid resistances,” on page 6-10. 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. Ensure that the drum maintenance tray is fully installed.

Printing and print quality problems

Generally, print problems fall into the following five categories:

- Streaks or lines in the prints
- No printing
- Printing too light or too dark
- 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 and the wick of the drum maintenance tray.
2. Possible missing weak jet. Print the Service Test Print 2 "Weak Jet" to determine if a jet is not performing. Perform a printhead cleaning cycle to try to clean a clogged jet.
3. Scroll to the hidden service menu item **Service Support - Head Adjust**. Raise the head voltage value displayed to between 160 and 180. *Never raise the voltage setting above 200.* Set the head voltage value to the minimum setting that assures proper print quality.
4. If necessary, turn off the printer and allow the printhead to cool for 6 hours.
5. Ensure that no wiring harness are interfering with the horizontal slewing of the printhead. In such a case, the streaks or lines should be parallel and evenly spaced.
6. 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.
7. Replace the x-axis drive assembly.
8. Replace the power control board.

Scratches in the transparency parallel to the long axis of printing

1. Usually caused by foreign debris in the paper path. 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 caused by the paper preheater can be caused by debris built up on the heating surfaces. Run the front panel clean procedure `Clean: Ink smears`. Additional, you can manually force a sheet of thick 65 to 80# 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

1. 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 tray may be the problem. Clean the wiper blade and the wick of the drum maintenance tray. If necessary, replace the maintenance tray.

2. Run diagnostics to ensure that printer temperatures are in tolerance.

3. Replace the power control board.

4. Non-functioning printhead data cable. Replace the main board.

5. Replace the printhead.

Color is uneven

1. 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.

2. Clean the wiper blade and the wick of the drum maintenance tray.

3. Perform the procedure, "Adjustments" on page 9-6.

4. Replace the printhead; this is explained in the Chapter 8 topic, "Printhead" on page 8-33.

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. Perform the procedure, "Adjustments" on page 9-6.

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.

Wrinkling

1. Try different media from a sealed package.
2. Replace the drum/transfix assembly.

Oil streaks on top of print

1. Clean the stripper fingers.
2. Run chase pages through the printer to clean the drum. PC diagnostics can help initiate chase pages.
3. Clean or replace the maintenance tray.

Error codes and 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.

Codes from 24,000 through 24,999 are engine failures reported by the PostScript controller. They are not stored in the fault history table of the NVRAM. They are reported when the engine has been stuck in a state for 45 minutes.

Table 6-3 Front panel and fault history log error codes and messages

Error code	Meaning
4,000: PC (process control supervisor)....	
4,001.40 (0x2401): PC_DEV_FAULT_HEAD_READ	Failure reading printhead NVRAM data: check the wiring to the printhead, I^2C 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_CHECK SUM	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.
4,006.45 (0x2406): PC_DEV_FAULT_300DPI_CAL	Calibration failure: Target Volt-Sec Area of 300 dpi could not be achieved. Check the hardware. The printhead may need to be renormalized.
4,007.46 (0x2407): PC_DEV_FAULT_600DPI_CAL:	Calibration Failure: Target Volt-Sec Area of 600 dpi could not be achieved. Check the hardware. The printhead may need to be renormalized.
4,008.47 (0x2408) PC_DEV_FAULT_STUCK_DMC:	Failure to advance the drum maintenance tray sensor interrupt flag. It has been in the new tray state for too long. Check the 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, wick 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.
4,010.40 (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/wick 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.

Table 6-3 Front panel and fault history log error codes and messages (cont'd.)

Error code	Meaning
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/wick 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/wick 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 0.15 inches 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_6x6DPI_CAL	Calibration Failure: 600x600 DPI waveform could not be generated. Check the printhead and its wiring. The printhead may need to be renormalized.
4,015.45 (0x240F) PC_DEV_FAULT_HEAD_ ADJUST_TIMEOUT	The engine spent too much time in 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.
4,017.47 (0x2411) PC_DEV_FAULT_AMBIENT_ TOO_COLD	Ambient temperature has fallen to less than 10^{o} 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.
5,000: Y axis (drum)	
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 is 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

Table 6-3 Front panel and fault history log error codes and messages (cont'd.)

Error code	Meaning
6,000: X axis	
6,000.41 (0x3400): XA_FAULT_MCURRENT	X axis motor over/under current. Indicates that motor coil(s) are open, or shorted, or the x-axis motor fuse has opened.
6,001.42 (0x3401): XA_FAULT_NOHOME	X-axis home position not found. Indicates that the x-axis home sensor has failed, or something has prevented the printhead motion during a home operation.
6,002.43 (0x3402): XA_FAULT_NGHOME	Unexpected x-axis home sensor activation. The sensor has failed, the motor control is moving the printhead in the wrong direction, or the user has engaged the printhead restraint mechanism.
6,003.44 (0x3403): XA_FAULT_LOST	A verify of the home calibration failed. After locating the home sensor transition, the DMC computed x-axis position varied from the home value by more than the acceptable tolerance. Look for obstructions or ink spills.
7,000: Process motor	
7,001.43 (0x3c01): PM_FAULT_AUXILIARY_ MOTOR_ERROR	The electronics report an error while operating the motor in the auxiliary feeder (the optional lower 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 bad, 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 bad or the drum maintenance cam may be jammed.
7,005.47: PM_FAULT_PREHEAT_EXIT_ SENSOR_BAD ().	The preheater exit sensor is not being detected, it is either unplugged or defective. This sensor is located on the left side, above the paper preheater (which must be removed).
8,000: Cap drive and web sensors	
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.
8,002.45 (0x4402): CAP_FAULT_WEB_ SENSORS	A fault is detected in the web sensors. Check the left and right maintenance tray sensors and their wiring harness.
8,003.46 (0x4403): CAP_FAULT_ OVERCURRENT	The cap/wipe/purge assembly stalled. (This fault does not actually occur because the mechanism is loose. When the assembly jams, the motor skips over teeth.)
9,000: Ink loader: ink melters and printhead ink level sensors.	
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.

Table 6-3 Front panel and fault history log error codes and messages (cont'd.)

Error code	Meaning
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.
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.
13,000:printhead thermals	
13,001.40 (0x6c01): TCH_JS_LEFT_OPEN	The thermistor in the left jetstack appears to be open. Replace the printhead.
13,002.41 (0x6c02): TCH_JS_LEFT_SHORT	The thermistor in the left jetstack appears to be shorted. Replace the printhead.
13,003.42 (0x6c03): TCH_JS_LEFT_HOT	The left jetstack heater is running away. Unplug the printer NOW!
13,004.43 (0x6c04): TCH_JS_LEFT_SLOW	The left jetstack 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 jetstack appears to be open. Replace the printhead.
13,018.48 (0x6c12): TCH_JS_RIGHT_SHORT	The thermistor in the right jetstack appears to be shorted. Replace the printhead.
13,019.40 (0x6c13): TCH_JS_RIGHT_HOT	The right jetstack heater is running away. Unplug the printer NOW!
13,020.41 (0x6c14): TCH_JS_RIGHT_SLOW	The right jetstack 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.
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.
15,000: Drum thermals	
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!

Table 6-3 Front panel and fault history log error codes and messages (cont'd.)

Error code	Meaning
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 open connection or open thermistor in power supply.
16,000: Preheater thermals	
16,001.43 (0x8401): TCP_THERMISTOR_OPEN	The preheater thermistor appears to be open. Replace the paper preheater.
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 open connection or open thermistor in power supply.
22,000: Media jams	
22,000.37	Jam -- Media at standard tray, unexpected event standard tray ajar 1.
22,001.38	Jam -- Media at standard tray, unexpected event standard tray A4-size transparency.
22,002.30	Jam -- Media at standard tray, unexpected event standard tray not used.
22,003.31	Jam -- Media at standard tray, unexpected event standard tray ajar 2.
22,004.32	Jam -- Media at standard tray, unexpected event standard tray A-size transparency.
22,005.33	Jam -- Media at standard tray, unexpected event standard tray A4-size paper.
22,006.34	Jam -- Media at standard tray, unexpected event standard tray A-size paper.
22,007.35	Jam -- Media at standard tray, unexpected event standard tray not present.
22,008.36	Jam -- Media at standard tray, unexpected event paper pick sensor TRUE.
22,009.37	Jam -- Media at standard tray, unexpected event paper pick sensor FALSE.
22,010.38	Jam -- Media at standard tray, unexpected event paper A-width sensor FALSE, A4-width sensor FALSE.
22,011.30	Jam -- Media at standard tray, unexpected event paper A-width sensor TRUE, A4-width sensor FALSE.
22,012.31	Jam -- Media at standard tray, unexpected event paper A-width sensor FALSE, A4-width sensor TRUE.
22,013.32	Jam -- Media at standard tray, unexpected event paper A-width sensor TRUE, A4-width sensor TRUE.
22,014.33	Jam -- Media at standard tray, unexpected event paper preheat entry sensor TRUE.
22,015.34	Jam -- Media at standard tray, unexpected event paper preheat entry sensor FALSE.
22,016.35	Jam -- Media at standard tray, unexpected event paper preheat exit sensor TRUE.

Table 6-3 Front panel and fault history log error codes and messages (cont'd.)

Error code	Meaning
22,017.36	Jam -- Media at standard tray, unexpected event paper preheat exit sensor FALSE.
22,018.37	Jam -- Media at standard tray, unexpected event paper exit sensor TRUE.
22,019.38	Jam -- Media at standard tray, unexpected event paper exit sensor FALSE.
22,020.30	Jam -- Media at standard tray, unexpected event paper hand-feed sensor TRUE.
22,021.31	Jam -- Media at standard tray, unexpected event paper hand-feed sensor FALSE.
22,022.32	Jam -- Media at standard tray, unexpected event auxiliary tray not present.
22,023.33	Jam -- Media at standard tray, unexpected event auxiliary tray A-size.
22,024.34	Jam -- Media at standard tray, unexpected event auxiliary tray A4-size.
22,032.33	Jam -- Media at auxiliary tray, unexpected event standard tray ajar 1.
22,033.34	Jam -- Media at auxiliary tray, unexpected event standard tray A4-size transparency.
22,034.35	Jam -- Media at auxiliary tray, unexpected event standard tray not used.
22,035.36	Jam -- Media at auxiliary tray, unexpected event standard tray ajar 2.
22,036.37	Jam -- Media at auxiliary tray, unexpected event standard tray A-size transparency.
22,037.38	Jam -- Media at auxiliary tray, unexpected event standard tray A4-size paper.
22,038.30	Jam -- Media at auxiliary tray, unexpected event standard tray A-size paper
22,039.31	Jam -- Media at auxiliary tray, unexpected event standard tray not present.
22,040.32	Jam -- Media at auxiliary tray, unexpected event paper pick sensor TRUE.
22,041.33	Jam -- Media at auxiliary tray, unexpected event paper pick sensor FALSE.
22,042.34	Jam -- Media at auxiliary tray, unexpected event paper A-width sensor FALSE, A4-width sensor FALSE.
22,043.35	Jam -- Media at auxiliary tray, unexpected event paper A-width sensor TRUE,A4-width sensor FALSE
22,044.36	Jam -- Media at auxiliary tray, unexpected event paper A-width sensor FALSE, A4-width sensor TRUE
22,045.37	Jam -- Media at auxiliary tray, unexpected event paper A-width sensor TRUE, A4-width sensor TRUE
22,046.38	Jam -- Media at auxiliary tray, unexpected event paper preheat entry sensor TRUE
22,047.30	Jam -- Media at auxiliary tray, unexpected event paper preheat entry sensor FALSE

Table 6-3 Front panel and fault history log error codes and messages (cont'd.)

Error code	Meaning
22,048.31	Jam -- Media at auxiliary tray, unexpected event paper preheat exit sensor TRUE.
22,049.32	Jam -- Media at auxiliary tray, unexpected event paper preheat exit sensor FALSE.
22,050.33	Jam -- Media at auxiliary tray, unexpected event paper exit sensor TRUE.
22,051.34	Jam -- Media at auxiliary tray, unexpected event paper exit sensor FALSE.
22,052.35	Jam -- Media at auxiliary tray, unexpected event paper hand-feed sensor TRUE.
22,053.36	Jam -- Media at auxiliary tray, unexpected event paper hand-feed sensor FALSE.
22,054.37	Jam -- Media at auxiliary tray, unexpected event auxiliary tray not present.
22,055.38	Jam -- Media at auxiliary tray, unexpected event auxiliary tray A-size
22,056.30	Jam -- Media at auxiliary tray, unexpected event auxiliary tray A4-size.
22,064.38	Jam -- Media at front cover, unexpected event standard tray ajar 1.
22,065.30	Jam -- Media at front cover, unexpected event standard tray A4-size transparency.
22,066.31	Jam -- Media at front cover, unexpected event standard tray not used.
22,067.32	Jam -- Media at front cover, unexpected event standard tray ajar 2.
22,068.33	Jam -- Media at front cover, unexpected event standard tray A-size transparency.
22,069.34	Jam -- Media at front cover, unexpected event standard tray A4-size paper.
22,070.35	Jam -- Media at front cover, unexpected event standard tray A-size paper.
22,071.36	Jam -- Media at front cover, unexpected event standard tray not present
22,072.37	Jam -- Media at front cover, unexpected event paper pick sensor TRUE.
22,073.38	Jam -- Media at front cover, unexpected event paper pick sensor FALSE.
22,074.30	Jam -- Media at front cover, unexpected event paper A-width sensor FALSE, A4-width sensor FALSE.
22,075.31	Jam -- Media at front cover, unexpected event paper A-width sensor TRUE, A4-width sensor FALSE.
22,076.32	Jam -- Media at front cover, unexpected event paper A-width sensor FALSE, A4-width sensor TRUE.
22,077.33	Jam -- Media at front cover, unexpected event paper A-width sensor TRUE, A4-width sensor TRUE.
22,078.34	Jam -- Media at front cover, unexpected event paper preheat entry sensor TRUE.
22,079.35	Jam -- Media at front cover, unexpected event paper preheat entry sensor FALSE.
22,080.36	Jam -- Media at front cover, unexpected event paper preheat exit sensor TRUE.

Table 6-3 Front panel and fault history log error codes and messages (cont'd.)

Error code	Meaning
22,081.37	Jam -- Media at front cover, unexpected event paper preheat exit sensor FALSE.
22,082.38	Jam -- Media at front cover, unexpected event paper exit sensor TRUE.
22,083.30	Jam -- Media at front cover, unexpected event paper exit sensor FALSE.
22,084.31	Jam -- Media at front cover, unexpected event paper hand-feed sensor TRUE.
22,085.32	Jam -- Media at front cover, unexpected event paper hand-feed sensor FALSE.
22,086.33	Jam -- Media at front cover, unexpected event auxiliary tray not present.
22,087.34	Jam -- Media at front cover, unexpected event auxiliary tray A-size.
22,088.35	Jam -- Media at front cover, unexpected event auxiliary tray A4-size.
22,096.34	Jam -- Media at exit cover, unexpected event standard tray ajar 1.
22,097.35	Jam -- Media at exit cover, unexpected event standard tray A4-size transparency.
22,098.36	Jam -- Media at exit cover, unexpected event standard tray not used.
22,099.37,	Jam -- Media at exit cover, unexpected event standard tray ajar 2.
22,100.38,	Jam -- Media at exit cover, unexpected event standard tray A-size transparency.
22,101.30,	Jam -- Media at exit cover, unexpected event standard tray A4-size paper.
22,102.31,	Jam -- Media at exit cover, unexpected event standard tray A-size paper.
22,103.32	Jam -- Media at exit cover, unexpected event standard tray not present.
22,104.33	Jam -- Media at exit cover, unexpected event paper pick sensor TRUE.
22,105.34	Jam -- Media at exit cover, unexpected event paper pick sensor FALSE.
22,106.35	Jam -- Media at exit cover, unexpected event paper A-width sensor FALSE, A4-width sensor FALSE.
22,107.36	Jam -- Media at exit cover, unexpected event paper A-width sensor TRUE, A4-width sensor FALSE.
22,108.37	Jam -- Media at exit cover, unexpected event paper A-width sensor FALSE, A4-width sensor TRUE.
22,109.38	Jam -- Media at exit cover, unexpected event paper A-width sensor TRUE, A4-width sensor TRUE.
22,110.30,	Jam -- Media at exit cover, unexpected event paper preheat entry sensor TRUE.
22,111.31	Jam -- Media at exit cover, unexpected event paper preheat entry sensor FALSE.
22,112.32	Jam -- Media at exit cover, unexpected event paper preheat exit sensor TRUE.
22,113.33	Jam -- Media at exit cover, unexpected event paper preheat exit sensor FALSE.
22,114.34	Jam -- Media at exit cover, unexpected event paper exit sensor TRUE.

Table 6-3 Front panel and fault history log error codes and messages (cont'd.)

Error code	Meaning
22,115.35	Jam -- Media at exit cover, unexpected event paper exit sensor FALSE.
22,116.36	Jam -- Media at exit cover, unexpected event paper hand-feed sensor TRUE.
22,117.37	Jam -- Media at exit cover, unexpected event paper hand-feed sensor FALSE.
22,118.38	Jam -- Media at exit cover, unexpected event auxiliary tray not present.
22,119.30	Jam -- Media at exit cover, unexpected event auxiliary tray A-size.
22,120.31	Jam -- Media at exit cover, unexpected event auxiliary tray A4-size.
22,128.30	Jam -- Media at exit tray, unexpected event standard tray ajar 1.
22,129.31	Jam -- Media at exit tray, unexpected event standard tray A4-size transparency.
22,130.32	Jam -- Media at exit tray, unexpected event standard tray not used.
22,131.33	Jam -- Media at exit tray, unexpected event standard tray ajar 2.
22,132.34	Jam -- Media at exit tray, unexpected event standard tray A-size transparency.
22,133.35	Jam -- Media at exit tray, unexpected event standard tray A4-size paper.
22,134.36	Jam -- Media at exit tray, unexpected event standard tray A-size paper.
22,135.37	Jam -- Media at exit tray, unexpected event standard tray not present.
22,136.38	Jam -- Media at exit tray, unexpected event paper pick sensor TRUE.
22,137.30	Jam -- Media at exit tray, unexpected event paper pick sensor FALSE.
22,138.31	Jam -- Media at exit tray, unexpected event paper A-width sensor FALSE, A4-width sensor FALSE.
22,139.32	Jam -- Media at exit tray, unexpected event paper A-width sensor TRUE, A4-width sensor FALSE.
22,140.33	Jam -- Media at exit tray, unexpected event paper A-width sensor FALSE, A4-width sensor TRUE.
22,141.34	Jam -- Media at exit tray, unexpected event paper A-width sensor TRUE, A4-width sensor TRUE.
22,142.35	Jam -- Media at exit tray, unexpected event paper preheat entry sensor TRUE.
22,143.36	Jam -- Media at exit tray, unexpected event paper preheat entry sensor FALSE.
22,144.37	Jam -- Media at exit tray, unexpected event paper preheat exit sensor TRUE.
22,145.38	Jam -- Media at exit tray, unexpected event paper preheat exit sensor FALSE.
22,146.30	Jam -- Media at exit tray, unexpected event paper exit sensor TRUE.
22,147.31	Jam -- Media at exit tray, unexpected event paper exit sensor FALSE.
22,148.32	Jam -- Media at exit tray, unexpected event paper hand-feed sensor TRUE.

Table 6-3 Front panel and fault history log error codes and messages (cont'd.)

Error code	Meaning
22,149.33	Jam -- Media at exit tray, unexpected event paper hand-feed sensor FALSE.
22,150.34	Jam -- Media at exit tray, unexpected event auxiliary tray not present.
22,151.35	Jam -- Media at exit tray, unexpected event auxiliary tray A-size
22,152.36	Jam -- Media at exit tray, unexpected event auxiliary tray A4-size.
22,160.35	Jam -- Media at hand-feed, unexpected event standard tray ajar 1.
22,161.36	Jam -- Media at hand-feed, unexpected event standard tray A4-size transparency.
22,162.37	Jam -- Media at hand-feed, unexpected event standard tray not used.
22,163.38	Jam -- Media at hand-feed, unexpected event standard tray ajar 2.
22,164.30	Jam -- Media at hand-feed, unexpected event standard tray A-size transparency.
22,165.31	Jam -- Media at hand-feed, unexpected event standard tray A4-size paper.
22,166.32	Jam -- Media at hand-feed, unexpected event standard tray A-size paper.
22,167.33	Jam -- Media at hand-feed, unexpected event standard tray not present.
22,168.34	Jam -- Media at hand-feed, unexpected event paper pick sensor TRUE.
22,169.35	Jam -- Media at hand-feed, unexpected event paper pick sensor FALSE.
22,170.36	Jam -- Media at hand-feed, unexpected event paper A-width sensor FALSE, A4-width sensor FALSE.
22,171.37	Jam -- Media at hand-feed, unexpected event paper A-width sensor TRUE, A4-width sensor FALSE.
22,172.38	Jam -- Media at hand-feed, unexpected event paper A-width sensor FALSE, A4-width sensor TRUE.
22,173.30	Jam -- Media at hand-feed, unexpected event paper A-width sensor TRUE, A4-width sensor TRUE.
22,174.31	Jam -- Media at hand-feed, unexpected event paper preheat entry sensor TRUE.
22,175.32	Jam -- Media at hand-feed, unexpected event paper preheat entry sensor FALSE.
22,176.33	Jam -- Media at hand-feed, unexpected event paper preheat exit sensor TRUE.
22,177.34	Jam -- Media at hand-feed, unexpected event paper preheat exit sensor FALSE.
22,178.35	Jam -- Media at hand-feed, unexpected event paper exit sensor TRUE.
22,179.36	Jam -- Media at hand-feed, unexpected event paper exit sensor FALSE.
22,180.37	Jam -- Media at hand-feed, unexpected event paper hand-feed sensor TRUE.
22,181.38	Jam -- Media at hand-feed, unexpected event paper hand-feed sensor FALSE.
22,182.30	Jam -- Media at hand-feed, unexpected event auxiliary tray not present.

Table 6-3 Front panel and fault history log error codes and messages (cont'd.)

Error code	Meaning
22,183.31	Jam -- Media at hand-feed, unexpected event auxiliary tray A-size.
22,184.32	Jam -- Media at hand-feed, unexpected event auxiliary tray A4-size.
22,192.31	Jam -- Front access door open.
22,193.32	Jam -- Stripper access door open.
22,194.33	Jam -- Unexpected hand-feed interrupted operation.
22,195.34	Jam -- Y-axis motor (drum motor) stall.
22,196.35	Jam -- Media not present at preheat entry sensor for transfer start.
22,197.36	Jam -- Media trailing edge time-out at paper exit sensor.
22,198.37	Jam -- Media too short to fully transfer image.
22,199.38	Jam -- Media too long.
22,200.30	Jam -- Media leading edge time-out at paper exit sensor.
22,201.31	Jam --A-width expected,A4-width seen at preheat entry media stage.
22,202.32	Jam --A4-width expected, A-width seen at preheat entry media stage.
22,203.33	Jam -- Standard tray media leading edge time-out at paper pick sensor.
22,204.34	Jam -- Media leading edge time-out at A/A4 paper width sensors.
22,205.35	Jam -- Media leading edge time-out at preheat entry sensor.
22,206.36	Jam -- Media leading edge time-out at preheat exit sensor.
22,207.37	Jam -- Auxiliary tray media leading edge time-out at paper pick sensor.
22,208.38	Jam -- During hand-feed stage, media leading edge time-out at preheat entry sensor.
22,209.30	Jam -- A-width sensor TRUE, A4-width sensor FALSE at preheat entry stage.
22,210.31	Jam -- A-width sensor FALSE, A4-width sensor FALSE at preheat entry stage.
22,211.32	Jam -- Media sensed at handfeed
22,212.33	Jam -- Media sensed at exit
22,213.34	Jam -- A width media sensed ar preheat entry
22,214.35	Jam -- A4 width media sensed at preheat entry
22,224.36	Jam -- media location and cause unknown.
24,000 PostScript Errors	
24,000.17	Engine reports power is off.
24,001.18	Engine reports it is running diagnostics.
24,002.10	Engine is stuck in the VxWorks shell.
24,003.11	Engine is stuck in mechanism initialization.
24,004.12	*unused*
24,005.13	Engine is in state Ready but isn't permitting commands.
24,006.14	Engine is stuck, in STANDBY.

Table 6-3 Front panel and fault history log error codes and messages (cont'd.)

Error code	Meaning
24,007.15	Engine is stuck while printing.
24,008.16	Engine is stuck while cleaning the drum.
24,009.17	Engine is stuck while purging the printhead.
24,010.18	Engine is stuck while wiping the printhead.
24,011.10	Engine is stuck while oiling the rollers.
24,012.11	*unused*
24,013.12	Engine has a fault but won't indicate why.
24,014.13	Engine is stuck while powering down.
24,015.14	*unused*
24,016.15	Engine is stuck while oiling the drum.
24,017.16	Engine is stuck while turning the pick rollers.
24,018.17	Engine is stuck while warming up -- thermals won't stabilize.
24,019.18	Engine is stuck while warming up -- thermals are stable.
24,020.10	Engine is stuck while warming up -- it's too cold to warm up.
24,021.11	Engine is stuck while cooling down.
24,022.12	Engine is stuck while in cool state.
24,023.13	Engine is stuck while in printhead adjust state.
24.024.14	Engine is stuck while flushing the printhead.

PC-based diagnostics

The PC-based diagnostics allows you to interactively test and check the operations and functionality of the printer. The diagnostics are provided on a 3-1/2 inch floppy diskette. All of the diagnostic tests are started from the PC and are downloaded to the printer.

The PC diagnostics were developed to run on a PC. The following procedure discusses using the diagnostics with an Apple® PowerBook® running PC emulation software as this is the portable computer in use by the field service organization.

Requirements

- Printer serial cable adapter (level shifter), part number 174-3493-00.
- For PCs use serial null modem cable, part number 012-1313-00. For Apple computers, use serial adapter cable part number 012-1498-00
- IBM PC or PC-clone or compatible i86 operating environment, preferably a 386 or 486; 286-based PCs are intolerably slow. A PowerBook or other Macintosh running SoftPC is acceptable.
- At least 640K of RAM. About 2 Mbytes of disk space to store the diagnostic program and its test suite.
- A mouse is optional, but is not supported by the user interface.
- MS-DOS environment. This may be SoftPC® on a Mac, or Windows® DOS or MS-DOS on a PC.

By convention, each set of diagnostic files is installed into a single directory (for ease of removal and updating); C:\360DIAGS\<*version number*>\ is the default.

The following procedure discusses using the diagnostics with an Apple® PowerBook® running SoftPC as this is the portable computer in use by the field service organization. Soft PC should be set to the *Preferred size* of 10 Mbytes, assuming your PowerBook has enough RAM.

Starting the diagnostics

1. Turn off the printer and the computer the diagnostics will be run from. Connect the serial port of the computer to the special diagnostic, 5-pin serial port of the printer; use the special serial cable adapter. (Pin 1 is the left-most pin of the five pin connector, looking at the back of the printer). Note the Pin 1 polarity mark (the brown wire) on the cable adapter's connector.

   In the case of a Macintosh, plug the serial cable from the printer into the Mac's serial port marked "Modem".

2. Push down the service mode dip-switch. (The switch is the left-most of the four dip-switches on the rear panel of the printer, looking at the back of the printer) The other switches should be up.

3. Turn on both the printer and your computer. In the case of a Apple PowerBook, select AppleTalk Inactive from the file PowerBook control strip menu.

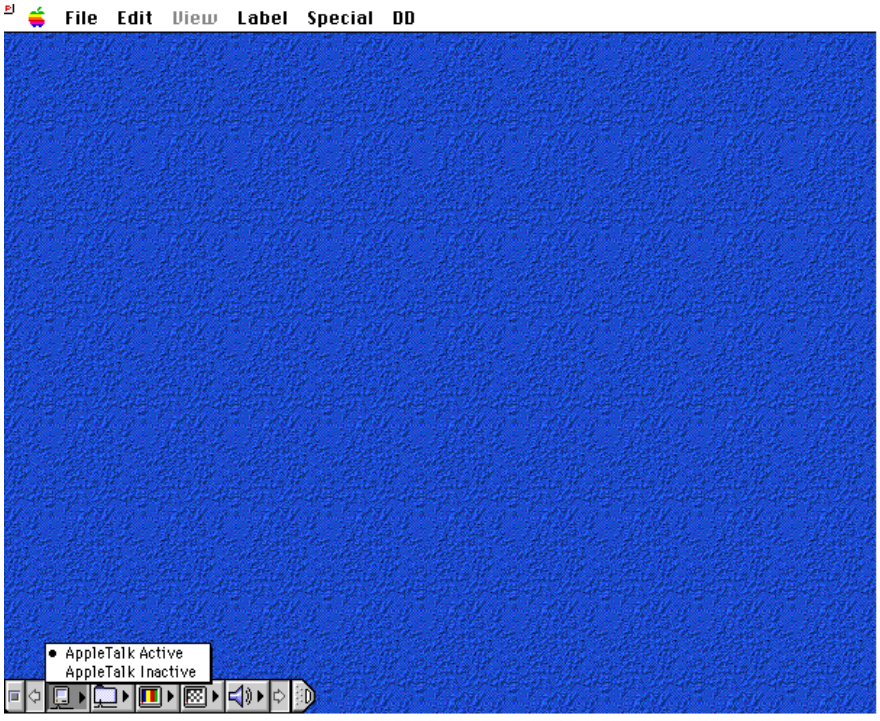


Figure 6-2 Turning off AppleTalk

4. Configure SoftPC's *PC Serial Ports*. Set **COM1** to the *Modem Port*. Flow control does not need to be checked.

5. In the same pull down menu, set *PC Memory* to **Expanded Memory of 0 MB** and an **Extended Memory of 1 MB**.

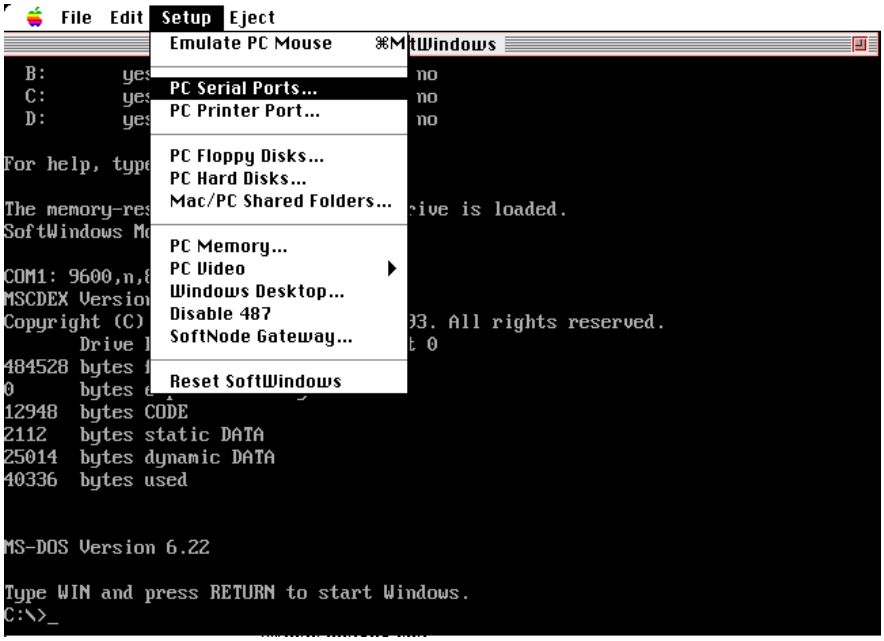


Figure 6-3 Configuring SoftPC's Serial Port

6. To install the diagnostics from the diskette onto your computer: type: **A:INSTALL /all <return>**.

7. Connect to the directory containing the diagnostic software. Launch the diagnostics program by typing **diags *xxx***, where *xxx* is the name of the print engine firmware level. (Typing **diags** lists the available diagnostic versions.) Once launched, the program repeatedly attempts to communicate with the printer. The link status indicator, in the bottom-right corner of the screen, reads "NO" until this link is established; once communication is established, it reads "OK."

8. Once communication with the printer is made, the diagnostics display the following screen on the computer:

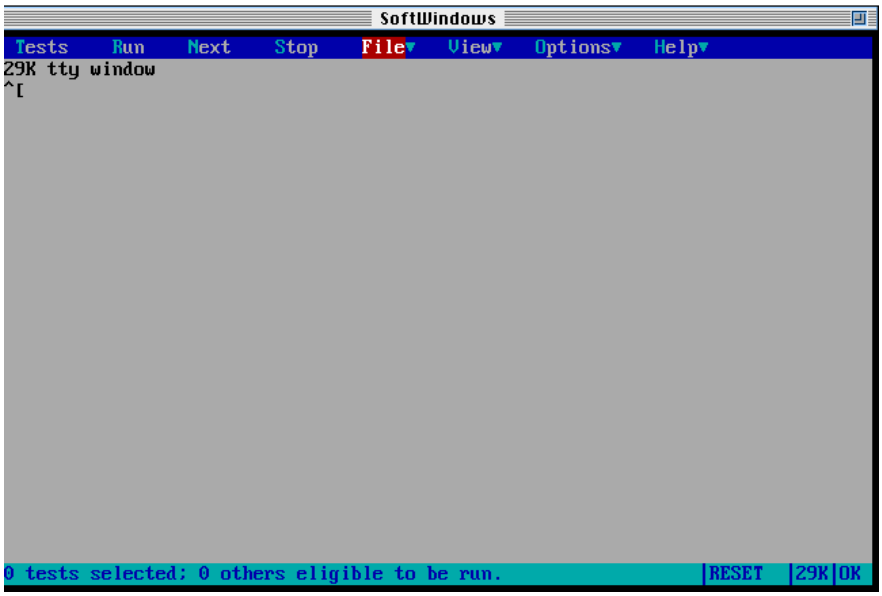


Figure 6-4 PC-based diagnostics screen display

The start-up screen features the following elements:

- A conventional-looking Menu Bar across the top of the screen; all diagnostic functions are accessible via this menu.
- The middle of the screen is a blank gray area; this is a 23x80 “tty” in which all interaction takes place with the tests when they are running.
- The bottom line of the screen gives feedback about the state of the system; it’s divided into four fields:
  - The left-most is the largest field, and it is the “message” field; it contains descriptive text summarizing the operation of tests in progress and of the diagnostics program itself.
  - Next is the completion indicator. When downloading test files to the printer, this field indicates the progress of the operation with a percentage complete display “n%” (where n is 0 to 100). When running a lengthy series of tests, a display “n of N” indicates the test progress.
  - Third is the “view” field. This indicates which “channel” is being viewed in the tty screen. The 29K channel displays information related to the communication line. The 68K channel displays information related to the printer and the diagnostic tests.

- In the very bottom-right-most corner is a tiny field which indicates the status of the communication link between the PC and the printer's processor. It says "OK" when the link is working and "NO" when communication is lost.

Selecting tests

Press **Alt-T (Option T — Mac)** to activate the test selection window.

Use the following keys to navigate the lists of tests. The left column, Test Suites, lists the groups of test. The center column is the individual tests within a selected test suite. The right-most column "Status" indicates if a test is selected. You can select a single test, a series of tests, or all the tests is a test group.

In the Test Suites column:

- **Up/Down arrows** – move the Test Suite selection highlight up or down on the screen. At the top and bottom of the screen, it causes the list to scroll if there are more tests in that direction on the list.

- **Tab** – Activates a suite of tests. The individual tests of the selected test suite are displayed in the Individual test column. The test are preceded with a letter of the alphabet; you can select a test by pressing the Option key and the letter preceding the test.

- **PgUp/PgDn** – move the display of tests one screen-full at a time. The highlight generally stays in place on the screen, so this also changes the highlighted test.

In the Individual Test column:

- **Up/Down arrows** – move the Individual Test selection highlight up or down on the screen. At the top and bottom of the screen, it causes the list to scroll if there are more tests in that direction on the list.

- **Space bar** – toggles the Status of the currently highlighted test: to "Selected" if the test is unselected and to unselected if it is already selected.

- **Alt-S (Control S — Mac)** – toggles the Status of all tests in the Suite which contains the currently highlighted test: all to Selected if the currently highlighted test is not selected and all to unselected if it is anything else. The status of the other tests in the suite are immaterial.

- **Alt-A (Control A — Mac)** – toggles the Status of ALL tests. Like Alt-S, the new setting for all tests is based on the currently highlighted test, regardless of the individual settings of the other tests.

- **Alt-R (Control R — Mac)** – select the currently highlighted test opens the Run window to prepare to execute the currently selected tests.

- **Alt-H (Control H — Mac)** – Opens a small Help window which serves to remind the functions that are available. Escape or Enter make it go away.

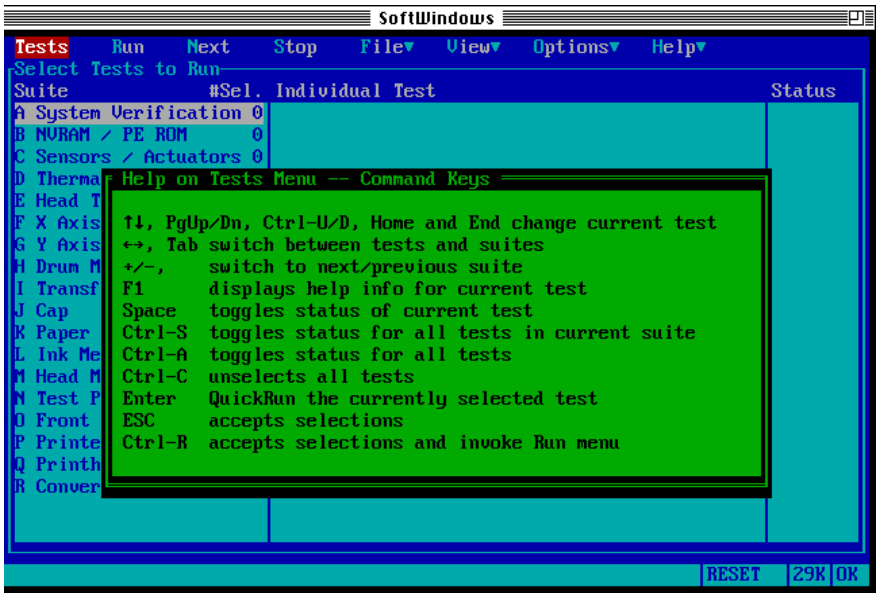


Figure 6-5 The diagnostics global help screen

- **F1** – Brings up a more complete description about the currently highlighted test.

- **Esc** and **Enter (Return)** – either key causes the replaces the selection screen with the current tty window. Any currently selected test remain selected.

Running tests

Tests are downloaded from the PC to the printer. When a downloadable test is selected, it takes a few moments to download the test. While the test is downloading, the message bar indicates this fact and the completion indicator shows how much of the file has been loaded.

1. Press the **Return** key to enter the test group selection window.

2. Use the arrow keys to scroll through the list of tests suites. Press the **Tab** key to select a test suite.

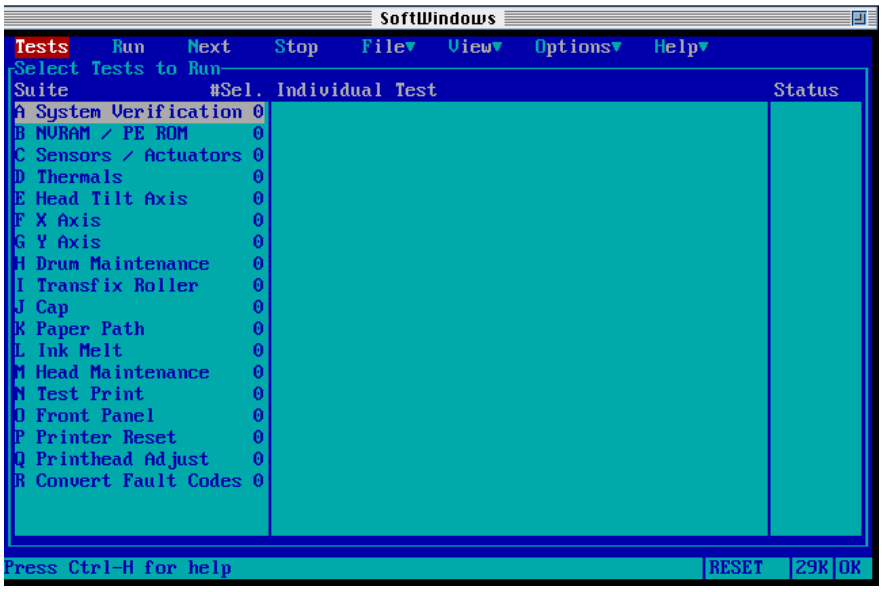


Figure 6-6 The Test Suite list

Once you select a test suite, the individual tests of that suite are displayed.

3. Use the arrow keys to highlight a particular test.

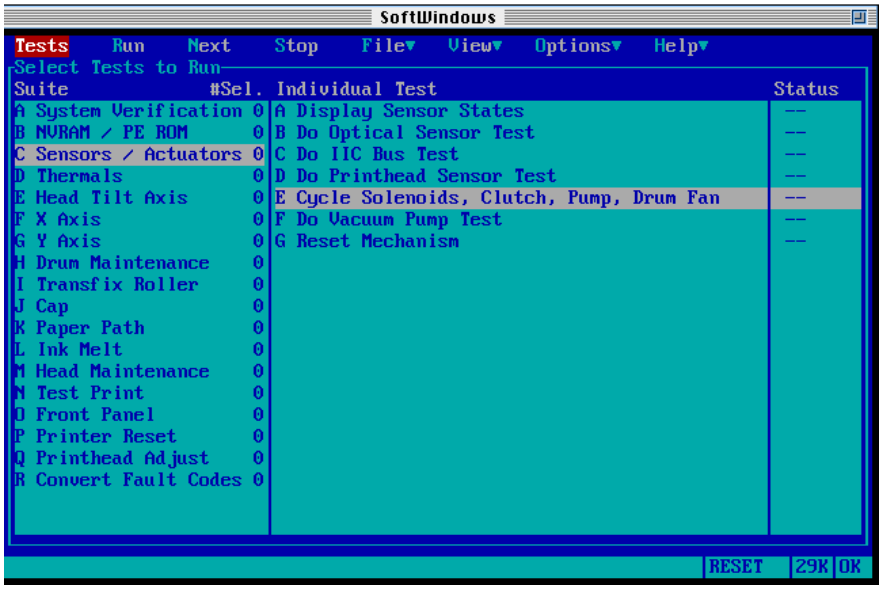


Figure 6-7 The Individual test within a selected test suite

4. To run a highlighted test once time, press return.

   Press the space bar to select or deselect a test. You can select as many tests as you like.

5. Once selected, press **Ctrl-R** to start the test(s) specifying the number of test cycles to run. The tests run in the order they appear in the menu. Depending on the test, a screen may be displayed to modify how the tests run.

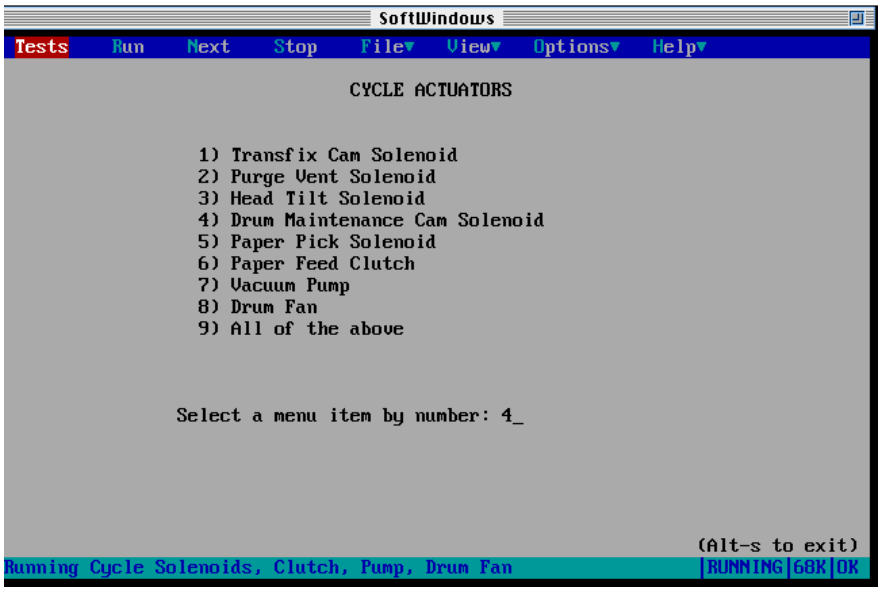


Figure 6-8 Running a test

The solenoid and clutch test, shown above, allows you to selectively actuate a printer solenoid or clutch as well as the drum fan.

Note *Some test groups have a Choices option which allows for specification or selection of parameters which may influence the operation of sucessive test in the current test group. The selections are lost when another test group is loaded.*

Caution *If you actuate the head tilt solenoid, you* **must** *re-engage the head tilt cam gear to the head tilt solenoid. The printer may be damaged upon power-up if the solenoid is not re-engaged to the head tilt cam gear.*

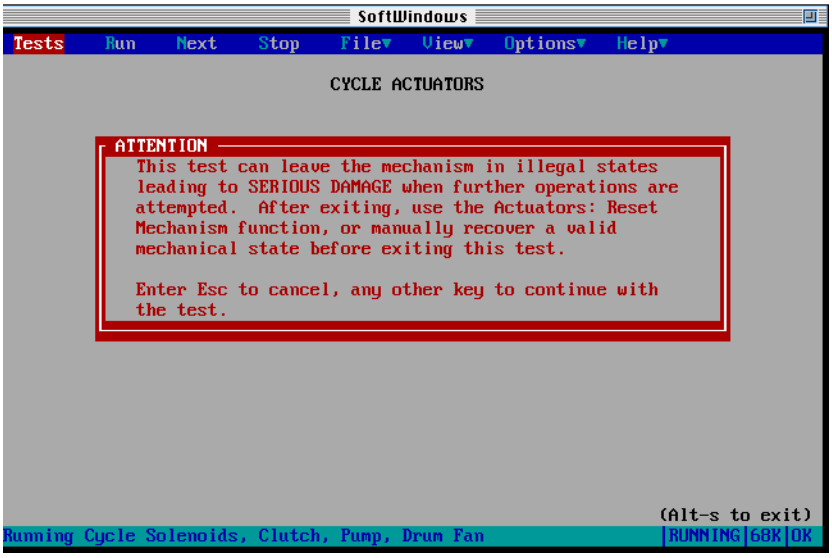


Figure 6-9 Warning regarding some printer tests

If necessary, you can press the **F1** key while highlighting an individual test to display a help message that describes the test.

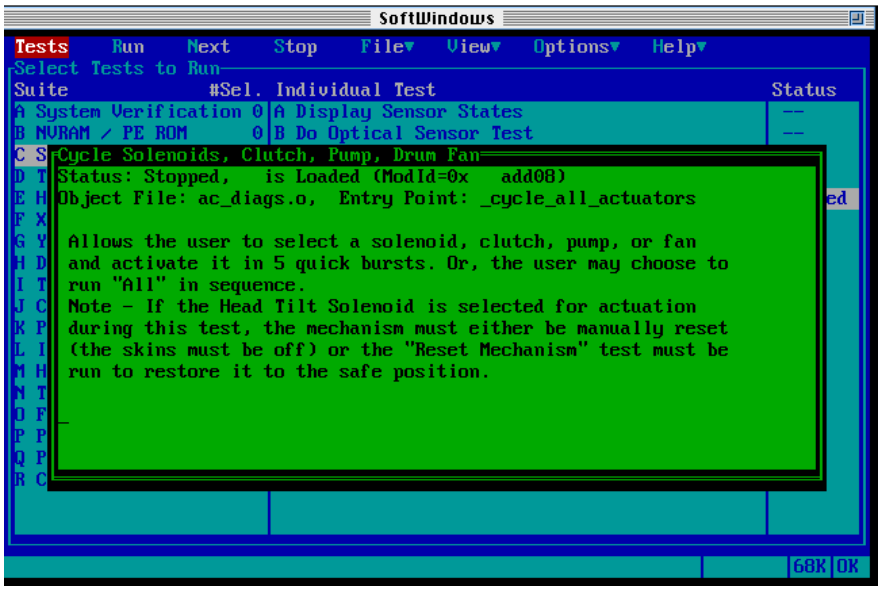


Figure 6-10 An Individual Test help screen

The Sensor Test shows you the real-time state of the printer's sensors. You can manually test the sensors to determine if they operate correctly.

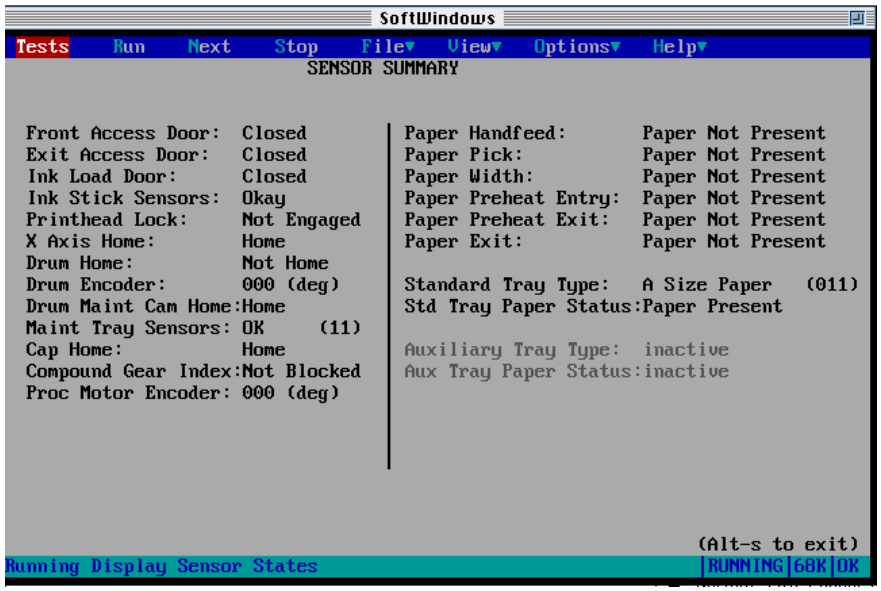


Figure 6-11 Sensor Test summary

The Thermal Tests let you select, start and observe the operation of the printers heaters and determine if they are operational. The test displays the real-time temperature of active heaters. A graphic display illustrates if the heater temperatures are within tolerance.

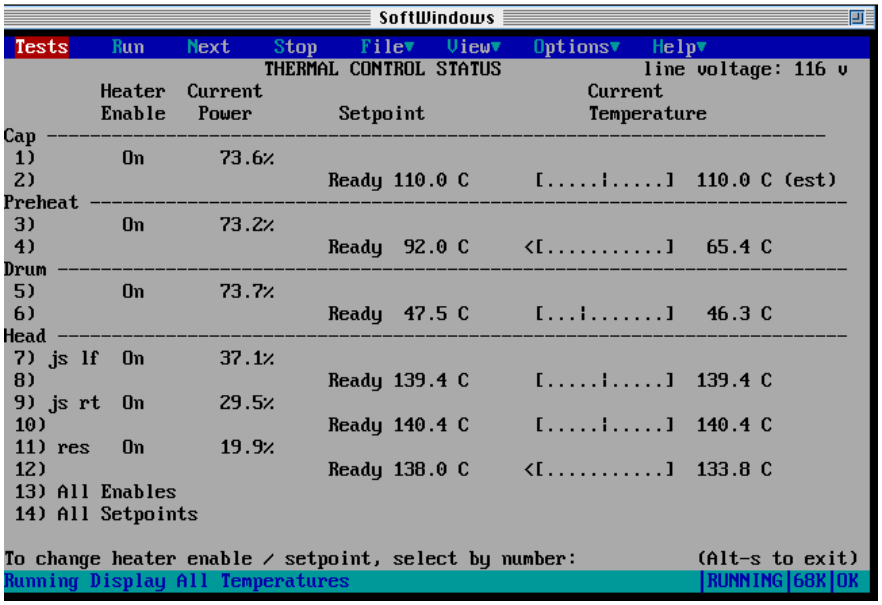


Figure 6-12 The Thermal Test

Note *For accurate thermal regulation and measurement, the printer covers should be in place.*

The Fault History displays faults, as error codes, stored in the printer's NVRAM and the copy count when the fault occurred. Type "y" or "n" to leave the menu.

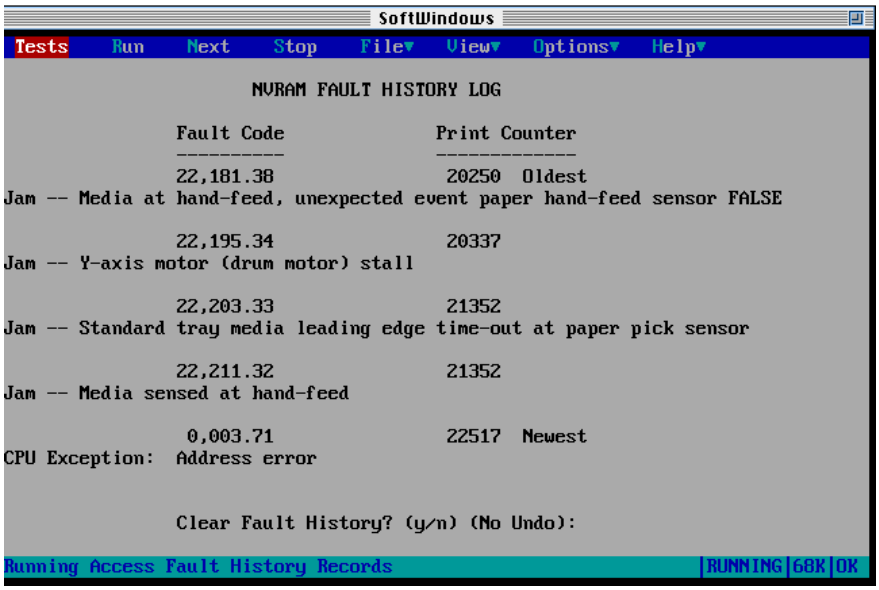


Figure 6-13 The Fault History

Saving and restoring test selections

The current test selection may be saved to a file and later restored, including the completion status of tests which were run earlier. The result of loading a saved test selection file is exactly the same as if the settings were re-specified manually. It provides a way to pre-select tests for particular audiences.

Tests are executed in the order they appear in the menu, not in the order they are selected.

Default file name extensions for saved test selections is **.TSV**.

Saving and restoring other settings

Any user-configurable setting that the program knows about is saved in a configuration file called *DIAGS.INI* and persists from session to session. Presently there is a short list of configurable items, but any program setting you makes need only be done once.

The diagnostic pull-down menus summary

All of the functionality in the user interface is accessible from the menu bar. Some of the functions are additionally available via "accelerator" key (Alt- key) synonyms. The following discusses the pull-down menu left to right.

Test Command (Alt-T)

Opens the test selection window.

View Menu

Provides for changing various screens and major modes of operation for the program.

- "Tests" – switch to the 68K window to show results of test running on the print engine.
- "Erase Screen" – erases all the characters from the currently selected window; it has no affect on the test running.
- "Debug" Check List Item – enables or disables a trace of all I/O between the user interface and the printer; it is off by default.
- "Test Stats" – lists the status of the last test sequence to run

Run Command

Executes a test sequence.

Next Command

Stops the currently running test and immediately starts the next test.

Stop Command

Stops the currently running test and stops the sequence in progress.

File Menu (Alt-F)

This menu controls the saving and loading of test selection sequences, described above.

- **New** – creates a new test selection sequence (deselects all tests and erases their previous completion codes).
- **Open** – opens an existing, previously saved file.
- **Save** – saves the current test selections in the "current" file. If the selection sequences is new (never been saved) the user is prompted to specify a file name.
- **save As** – saves the current test selections in a particular file.
- **eXit** (Alt-X) – exit the diagnostic program.

Options Menu

Provides for customizing of program operation. This menu contains some sub-menus.

- "CommPort" – provide for changing the baud rate of the link and for changing the communication port used. The default baud rate is 19.2 k, which is the maximum rate supported by a Apple PowerBook host. Other diagnostic hosts support rates up to 57k. When ever the printer is reset or power-cycled, it baud rate resets to 19.2 k.

Help Menu

The system includes limited On-line help. Most of the really useful help pertains to the tests themselves and is available via the **Tests** menu.

- About – gives the program version and other statistics about its operation.
- Usage overview – gives the user an overview of the system and explains running the first test.
- F1 – describes an individually highlighted test.

Problems and solutions

Power problems

Table 6-4 Power problems

All front panel indicators remain off.	Check to see if the printer is plugged in. Check the line power fuses inside the power supply.
The printer does not initialize upon power-up.	Check the power on/off switch.

Front panel indications

Table 6-5 Front panel indicators and their meanings

Media tray indicates empty when it is not.	If there is media in the tray, then check the media tray microswitches (on the right side of the tray slot). Check to see if the paper-empty flag is broken. Check the media selection switches on the right side of the paper tray.

Macintosh printing problems

Table 6-6 Macintosh printing problems

Image never prints. Printer acts as if it is receiving data, but nothing comes out of printer or it goes back to "Ready" mode without printing image.	Make sure that the correct Phaser 360 icon was selected in the **Chooser**. Try printing the job again. In the **Chooser**, switch background printing to *off*. Try printing the job again. Enable the Error Handler from the from panel menu **Printer Defaults - Error handler**. If an error page is printed after printing the job again, call the Customer Support Hotline for further assistance. Please have the error page in hand. If available, try printing to a black-and-white PostScript 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 may be application- or network-related. Ensure that the print engine can print by pressing and holding the rear panel **TEST** switch to print an internal test print.

Table 6-6 Macintosh printing problems (cont'd.)

Image prints in black-and-white.	In the print dialog box, make sure the **Color/Grayscale** option has been selected. Make sure that the Phaser 360 icon was selected in the Chooser. Try printing the job again. Check the version of your LaserWriter driver to ensure that it is version 6.0.7 or higher. Earlier versions of the driver do not support color PostScript. The application may require special instructions to print. Check in the *Phaser 360 Drivers and Utilities Printing Reference.*
Image is rotated 90 degrees.	In the application's **Page Setup**, make sure that the image is selected to print in portrait or landscape orientation.

PC DOS printing problems

Table 6-7 PC DOS printing problems

Image never prints. Printer acts as if it is receiving data, but nothing comes out of printer, or the printer goes back to "Ready" mode without printing image.	Make sure that the computer is communicating with the printer. At the DOS prompt, type the following in lowercase letters: **echo showpage >** *port:* *(substitute* **LPT1**:, **LPT2**: or **COM1**, etc., for *port:*) The printer responds by sending a page through the print cycle and ejecting a blank page. If this does not happen, check your cable, or try a different parallel cable. If using the serial port, refer to the serial port configuration. Ensure that the print file ends with a "CTRL-D" character. CTRL-D indicates the end-of-file, which the printer responds to by closing host-to-printer communications and then processing and printing the file. Use a text editor to open and examine the file. On-screen, a "CTRL-D" character appears as a "✥" character. Check and add, if necessary, the following line to the *AUTOEXEC.BAT* file: **mode = LPT1,,p** (If your port is not LPT1, substitute **LPT2:** or **COM1:** for the correct port). This turns on printer retry indefinitely. Is the printer in PostScript mode? Check this by sending the file *TESTHPGL.PLT* (located on the Tektronix Utilities diskette, *HP-GL* directory) to the printer. At the DOS prompt, type the following DOS command: **COPY TESTHPGL.PLT LPT1:** (If your port is not LPT1, substitute **LPT2:** or **COM1:** for the correct port). The PC responds with `1 FILE COPIED`. If this file prints stating that the printer is in HP-GL mode, then the printer needs to be changed back to the PostScript mode. Use the utility located on the Tektronix diskettes to change language emulation. Refer to the *Phaser 360 Drivers and Utilities Printing Reference* for complete instructions. Enable the Error Handler from the front panel menu **Printer Defaults - Error handler**. The printer now has a PostScript error handler present which remains resident until power is cycled on the printer. Resend the image file that was not printing. Any PostScript errors encountered by the printer are recorded on a printout. Call Tektronix Customer Support at 1-800-835-6100 for more assistance (save the print with the error message).

Windows printing problems

Table 6-8 Windows printing problems

Image never prints. Printer acts as if it is receiving data, but nothing comes out of printer or the printer goes back to "Ready" mode with out printing image.	Perform the same troubleshooting ideas suggested in the previous topic "PC DOS printing problems." Under the printer's setup options, set **TRANSMISSION RETRY = 850**
Blue color on the screen is printing too purple.	Many applications describe color as percentages of a video display screen's primary colors: red, green, and blue (RGB). When a printer translates these RGB colors into its own primaries of cyan, magenta, and yellow (CMY), blue is often printed as purple. To adjust blue from within Microsoft Windows: Within the Tektronix PostScript Windows driver you have an option, **Vivid Color**, that alters to blue colors that are appearing purple. To Access this option, select: **Printer Setup** **Options** **Printer Features** **Media Selection** You are now at the **TekColor Options** window; select **Vivid Color**. This TekColor Options window can also be accessed through the Windows Control Panel item Printers.
Printing from Windows produces the message "Problem writing device LPT1: Cancel or Retry".	Option #1: **1.** Select **Printers**, and click **Configure**. **2.** Change the port selection from **LPT1** to **LPT1.OS2**. The **MODE** command disables DOS timeouts. The LPT1.OS2 selection forces Windows to print through DOS instead of directly to the printer. Option #2: The solution above does not allow users to spool documents using the PrintManager. To use the PrintManager as well as correcting time-out problems, edit the following line in the *win.ini* file: `TransmissionRetryTimeout=45` to: `TransmissionRetryTimeout=850` In Windows 3.1: **1.** Follow the above instructions for issuing the **MODE** command in DOS. **2.** Start Windows. **3.** Select the **Control Panel** from the **Main** menu. **4.** Select **Printers** **5.** Select the appropriate printer and click on **Connect**. **6.** Uncheck the **Fast Printing Direct to Port** box.

Workstation printing problems

Table 6-9 Workstation printing problems

Image never prints. Printer acts as if it is receiving data, but nothing comes out of the printer or the printer goes back to "Ready" mode without printing an image.	For serial or parallel printing. Ensure that the print file ends with a "CTRL-D" character. CTRL-D indicates the end-of-file, which the printer responds to by closing host-to-printer communications and then processing and printing the file. Use a text editor to open and examine the file. There is a utility file that you can use to tag or remove a CTRL-D to the end of a print file. TCP/IP and Novell protocols do not accept CTRL-D with the print files. Refer to the network user manual.

Image processor hard and soft error indicators

Hard errors are image processor self-test failures that prevent the printer from printing a page. Hard errors cause the rear panel LEDs to stop blinking and remain *on* or *off*. Hard errors are also any error that occurs during service mode.

Soft errors are errors that occur during the normal power-up self-test that, while limiting the printer, would not stop the printer from printing its startup page. A message regarding the soft error would then be printed on the startup page (even if the startup up page had been turned off). Soft errors include failures of the expansion SIMMs, as well as the SCSI, LocalTalk, parallel, and Ethernet ports and their cabling or connections.

Chapter

7 Cleaning and Maintenance

A Phaser 360 printer requires periodic cleaning to keep it in peak operating condition. Some cleaning procedures, such as purging the ink-jets or feeding clean paper through the paper path, are done automatically when necessary. Other procedures, such as scrubbing the paper-feed rollers with an alcohol-soaked cloth or foam swab, 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.

Most print-quality and media-transport problems can be cured by initiating cleaning procedures available through the printer's front panel menu. Refer to Chapter 9 "Checks and Adjustments," in this manual to review the cleaning menu structure.

Note *Paper jams can also occur when the maintenance tray is not properly latched in the printer. Simultaneously push in on both sides of the maintenance tray to ensure that it is properly seated.*

Cleaning

Supplies required

- Phaser 360 cleaning tray
- Foam swabs
- Alcohol-dampened cloth
- 90% pure isopropyl alcohol

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 360 User Manual*.

Light stripes or missing colors

Problem type	Solution
Missing or light-colored stripes on prints.	Select the automated procedure `Clean: Light stripes` from the front panel `Clean` 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 Clean: `Ink smears` from the front panel `Clean` menu. ■ Check the drum maintenance tray for ink and paper-dust build-up on the wiper blade or the wick.
Oil (drum fluid) on top edge of print.	■ Select the automated procedure Clean: `Ink smears` from the front panel `Clean` menu.

Media jams

Problem type	Solution
Paper-pick or jamming problems at the tray.	Select the automated procedure `Clean: Media tray jams` from the front panel `Clean` menu.
Paper jamming problems at the front door.	Clean the transport rollers. Ensure the drum maintenance tray is correctly installed.
Paper- jamming problems at the exit.	Clean the exit rollers and the stripper fingers

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 `Clean:Light Stripes` automatic cleaning procedure from the front panel.

Vacuum

Vacuum dust from the top cover, metal dust cover and plastic dust cover under the stripper fingers.

Drum temperature sensor

With a dry swap, 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.

Maintenance

Maintenance tray

The printer uses the maintenance tray as part of its self-maintenance routine to coat the print drum with silicone oil before each print. The maintenance tray must be replaced after about 10,000 prints. A front panel message indicates when the maintenance tray oil is low. Printing is still possible when the maintenance tray fluid is low. When a front panel message indicates the maintenance tray is "out of oil," the maintenance tray must be replaced before continued printing is possible. Refer to Chapter 4, "Caring for Your Printer," in the *Phaser 360 User Manua*l for instructions on replacing the maintenance tray.

Note *Once the maintenance tray has been partially used, it leaks drum fluid if tipped. Never ship a partially used maintenance tray. Contact with the drum fluid, a silicon oil, poses no known adverse health effects. Refer to the Material Safety Data Sheet for silicone oil in Appendix D of the* Phaser 360 User Manual *for more information.*

Waste tray

The maintenance tray 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 tray is removed from the printer. Refer to Chapter 4, "Caring for Your Printer," in the *Phaser 360 User Manual* for instructions on removing and emptying the waste tray. Be sure to insert the waste tray into the maintenance tray before reinstalling the maintenance tray 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 oil or 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.
- **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.

Belts: Inspect the belts for wear. There are six rubber belts in the printer: a belt from the process motor to the compound gear, two belt from the y-axis motor drive, and a belt from the lower paper feed roller to the upper paper feed roller, two belts on the cap/wipe/purge drive. 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 feed roller clutch, compound gear clutch and the maintenance tray cam clutch. Symptoms of a malfunctioning clutch are the printer not picking paper from the tray or other paper jams. In such cases, replace the clutch.

Chapter

8 Field Replaceable Unit Disassembly/Assembly

Required tools

- Magnetic tip screwdriver — 8.5 in. 003-0293-00
  - Extension tip 003-1388-00
    T10 TORX tip 003-0814-00
    T15 TORX tip 003-0966-00
    T20 TORX tip 003-0866-00
    T25 TORX tip 003-1462-01
- Phaser 360 Tool Kit 650-3300-00
  - Torque-limiting screwdriver 003-0827-00
  - Printhead-to-drum gap tool 003-1499-00
  - Encoder disk spacer tool 003-1489-00
  - Y-axis belt tensioner 003-1500-00
  - 9/64″ hex balldriver bit, 3 in. 003-1506-00
  - Printhead removal tool 003-1503-00
  - Printhead reservoir plug set 003-1504-00
- Tweezers 003-0236-00
- Hex wrench kit 003-1344-00
- Grease 006-7997-00
- Antistatic mat 006-7056-00
- Flat-blade screwdriver
- Needle-nose pliers
- Spring removal tool 003-1623-00
- Volt-ohm-meter such as a Tektronix DM252/4 Multimeter
- Magnifying lens such as Micronta (Radio Shack) Cat# 63-851

Lower Paper Tray Assembly

The Lower Paper Tray Assembly, sometimes referred to as the second feeder, is serviced and replaced as a unit.

1. Turn off the printer.
2. Unplug the Lower Paper Tray Assembly cable from the rear of the printer.
3. Wait 20 minutes for the printhead to cool.
4. Lift the printer off of the Lower Paper Tray Assembly.

Reverse these steps to reinstall the Lower Paper Tray Assembly making sure that the printer is fully seated over the Lower Paper Tray Assembly's guide pins.

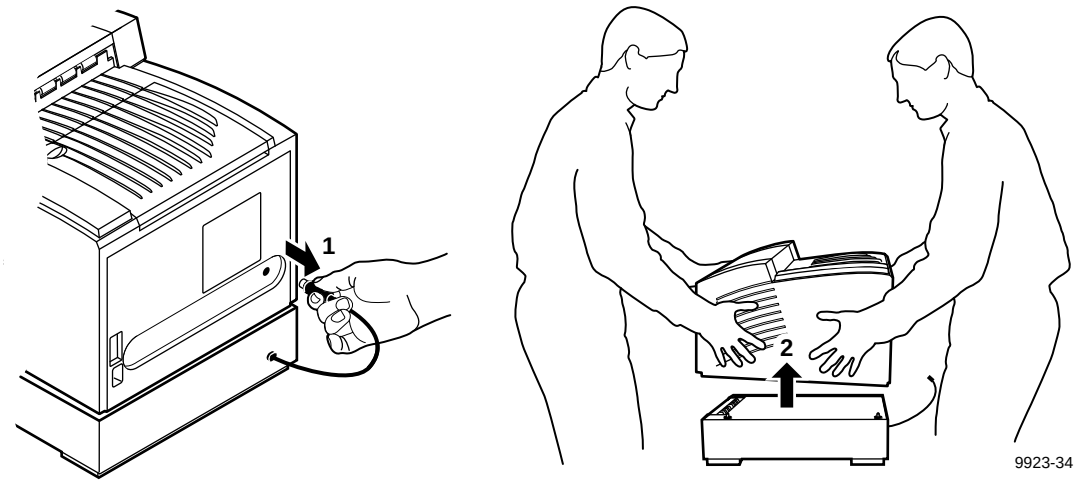


Figure 8-1 Removing the Lower Paper Tray Assembly

Cabinet panels and covers

Tools required

- Magnetic screwdriver
- T-20 TORX tip
- Flat-blade screwdriver

1. Unplug the printer.
2. **Top cover:** *Vacuum dust out of the top cover before you remove it*
   a. Open the ink load door and tilt it back as far as it will travel to unclip its arms from the top panel.
   b. Slide the ink loader's spring crossarm to the rear of the ink loader. Note how pins on the ends of the ink-loader crossarm align with notches in the top panel for removal.
   c. Remove the four screws securing the top panel in place.
   d. Tilt up the rear-end of the top panel and lift and remove the top cover.
3. **Right-side panel:**
   a. Open the front cover.
   b. Remove the two screws securing the right-side cover in place.
   c. Remove the right-side cover.
4. **Left-side panel:** Remove the single screw securing the left-side cover in place.
5. **Rear panel:** With the right and left-side panels removed, remove the single screw securing the rear panel in place.
6. **Front panel:**
   a. Press the front cover release lever to raise its cover retaining pawls.
   b. Slide the front panel forward slightly to clear the pawls. Disconnect the front panel display wiring harness. Remove the front panel.
7. **Front cover:**
   a. With a flat blade screwdriver, press the release lever for each of the two front cover pivots.
   b. Remove the front cover.

8. **Stripper cover:** Gently lift on each end of the stripper cover to unclip it from the exit roller.

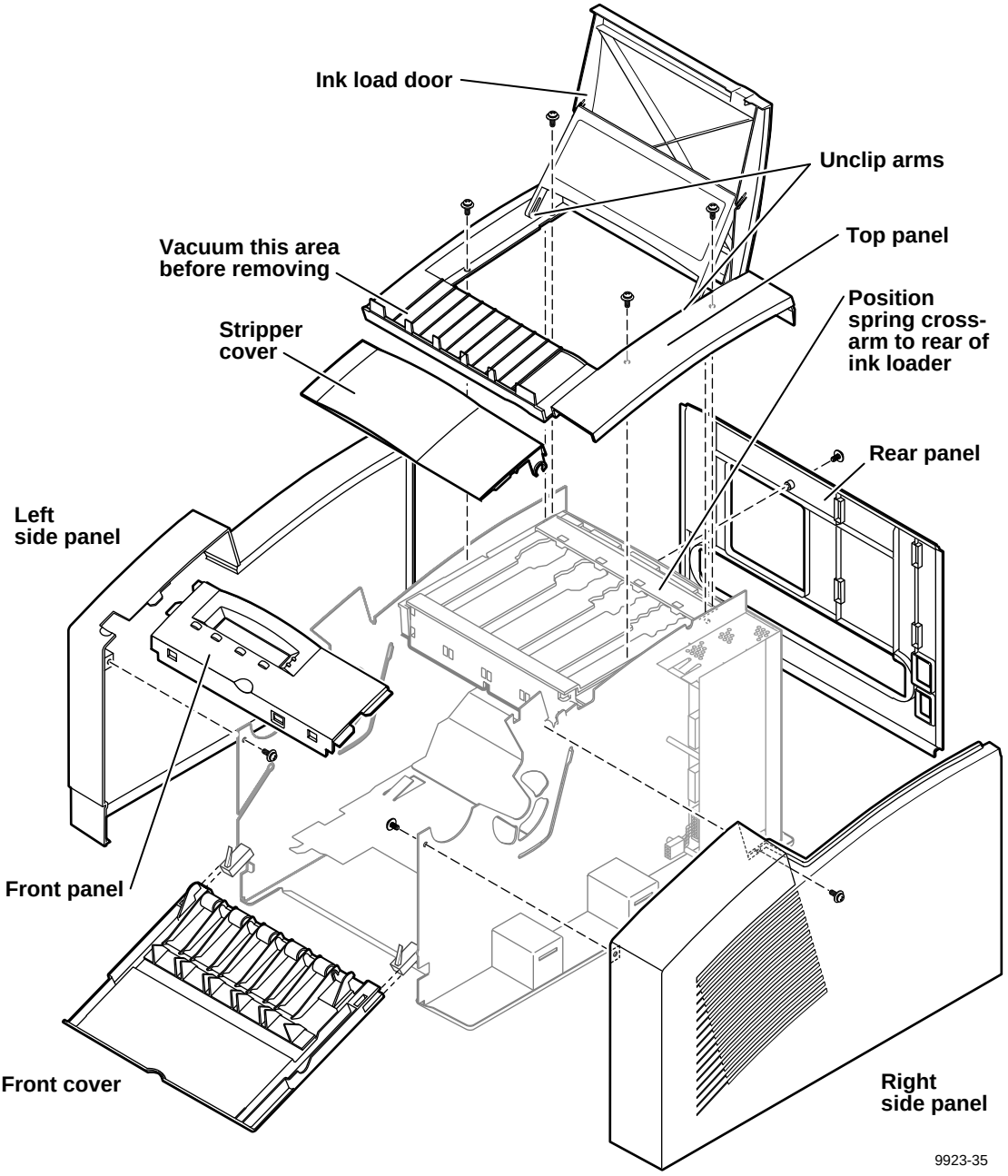


Figure 8-2 Removing the printer panels and covers

Note *When the ink loader is in the printer without resting on the top cover, it may rest in a lower position and consequentially interfere with the horizontal movement of the printhead. Place the ink loader on the upper extrusions in the side frames to keep it elevated above the printhead.*

Ink loader

Tools required

- Magnetic screwdriver
- T-20 TORX tip

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. Turn off the printer and remove the power cord. Allow the ink loader to cool.
2. Remove the top and right-side covers as explained in the earlier topic, "Cabinet panels and covers" on page 8-4.
3. Disconnect the two wiring harnesses leading to the ink loader.

Caution *Be careful not to break the ink-melt elements of the ink loader; they are made of a fragile ceramic material. The ink melt elements may break if you try to remove the ink loader with the printhead in the print position.*

4. Make sure that the printhead is in its full tilt-back position. If it is not, unlatch the tilt cam gear and rotate the process motor clockwise until the printhead is tilted back. (Remove the left-side cover to access the tilt cam gear and process motor.)
5. Lift and remove the ink loader.

Reverse these steps to install the ink loader. Refer to Appendix C "Wiring Diagrams" for illustrations showing how to properly route the ink loader's wiring harness.

Caution *Do not stand the ink loader on end so it heating elements face up. In this position a residual amount of liquid ink may flow down the felt-lined ink stick chutes and damage the felt.*

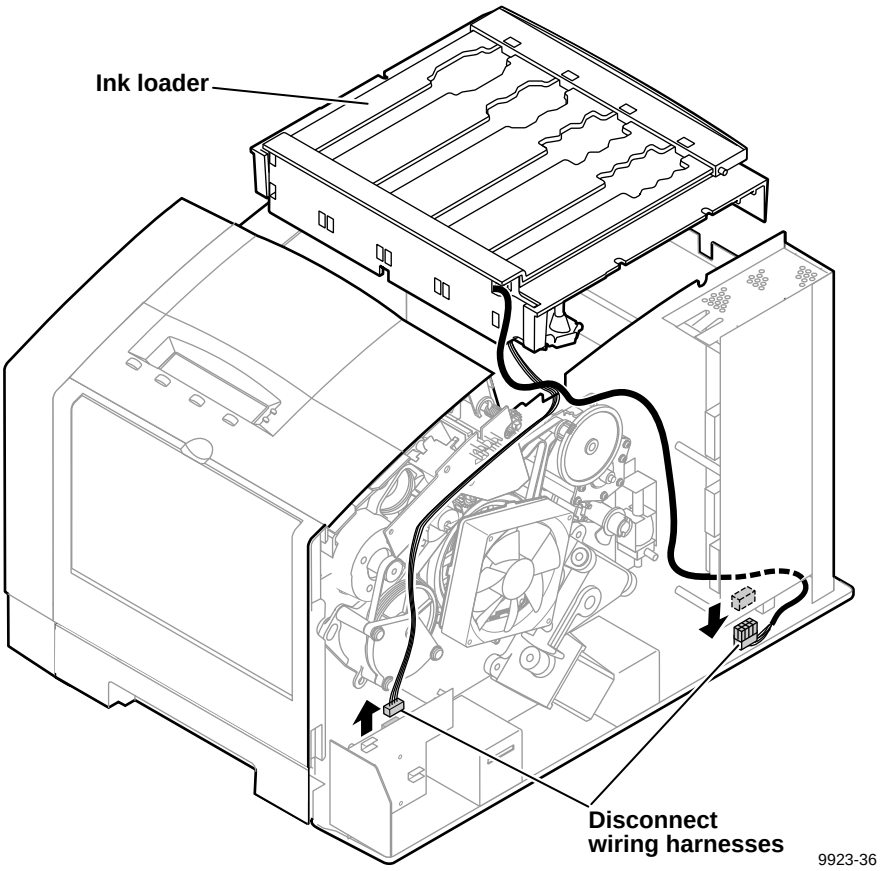


Figure 8-3 Removing the ink loader

Note *When the ink loader is in place in the printer without the top cover, it may rest in a lower position and consequentially interfere with the horizontal movement of the printhead. Place the ink loader on the upper extrusions in the side frames to keep it elevated above the printhead. Reinstall one of the rear top cover screws in the ink loader to secure it in this position.*

Fans

Rear fan

Tools required

- Magnetic screwdriver
- T-20 TORX tip
- T-15 TORX tip

1. Turn off the printer and remove the power cord.
2. Remove the top, left-side and right-side covers as explained in the earlier topic, “Cabinet panels and covers” on page 8-4.
3. Remove the ink loader as detailed earlier in the topic, “Ink loader” on page 8-6.
4. Disconnect the wiring harnesses leading to the rear fan.
5. Remove the 11 screws securing the rear plate to the engine frame.
6. Remove the four screws securing the rear fan to the rear plate. Remove the fan.

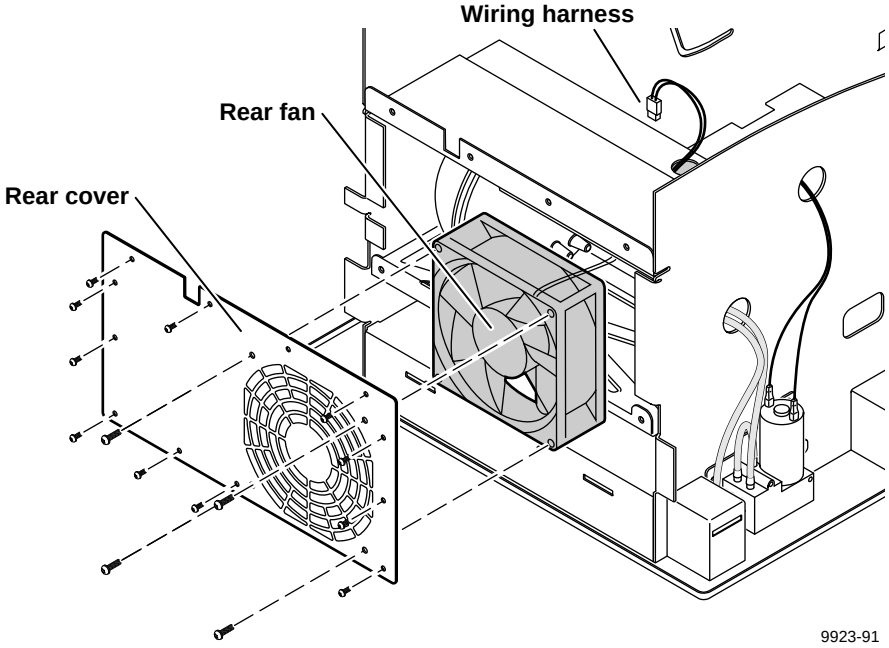


Figure 8-4 Removing the rear fan

Drum fan

Tools required

- Magnetic screwdriver
- T-20 TORX tip
- T-15 TORX tip
-

1. Turn off the printer and remove the power cord.
2. Remove the top and right-side covers as explained in the earlier topic, "Cabinet panels and covers" on page 8-4.
3. Remove the ink loader as detailed in the topic, "Ink loader" on page 8-6.
4. Disconnect the wiring harnesses leading to the drum fan from the power control board's connector J5. Also disconnect the fan sense wiring harness from I/O board Right.
5. Remove the three screws securing the drum fan in place. Remove the fan. *The drum fan, shield and heater should always be replaced as a unit*.

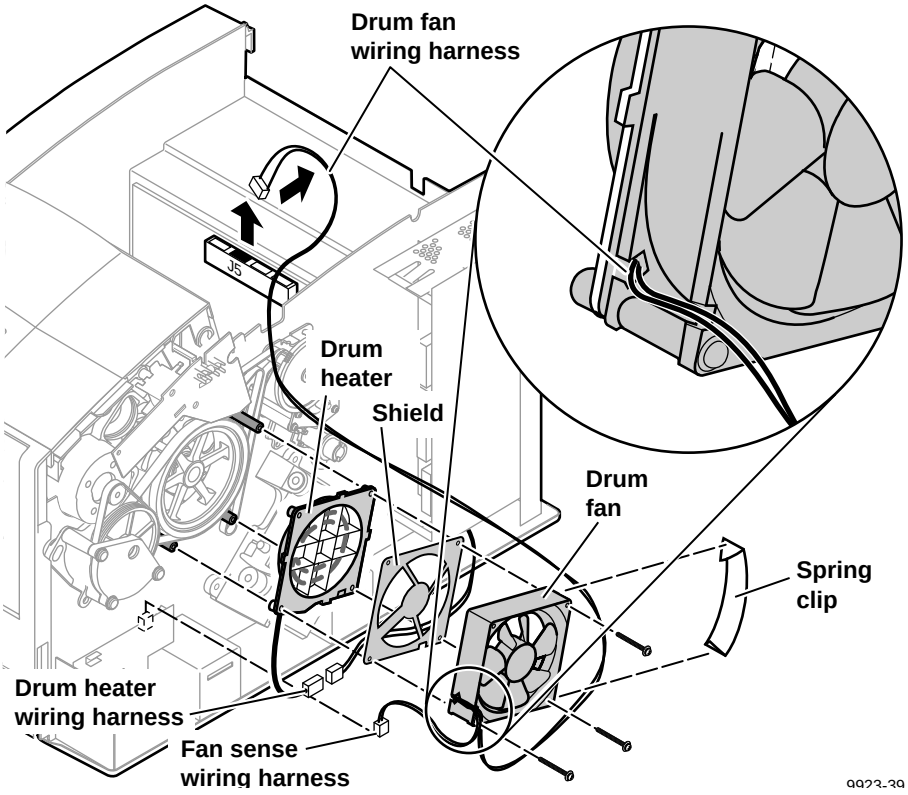


Figure 8-5 Removing the drum fan

- Reverse these steps to install the fan. *Note the orientation notch in the lower right corner of the shield*. Ensure the spring clip is installed on the side of the fan. Refer to Appendix C "Wiring Diagrams" for an illustration showing how to dress the drum fan wiring.

Power supply

Tools required

- Magnetic screwdriver
- T-20 TORX tip
- T-15 TORX tip

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 top and right-side covers as explained in the earlier topic, "Cabinet panels and covers" on page 8-4.
3. Disconnect the five wiring harnesses leading to the power supply.
4. Remove the seven screws securing the power supply in place. Remove the power supply.

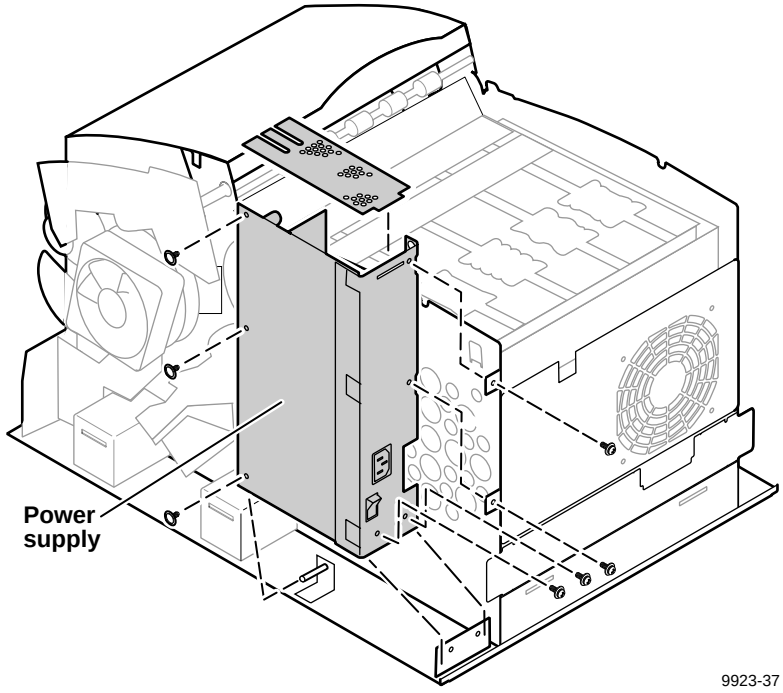


Figure 8-6 Removing the power supply

Reverse these steps to install the power supply. Be sure that the sheet metal alignment guides in the back and bottom of the power supply align with the notches cut out in the power supply circuit board. Install the power supply's rear screw first and then the side screws to secure the power supply in place.

Refer to Appendix C "Wiring Diagrams" for the proper method of routing wiring between the solenoid valve and the power supply.

Vacuum system

Vacuum pump

Tools required

- Magnetic screwdriver
- 5/16-inch nutdriver
- T-20 TORX tip
- T-15 TORX tip

1. Turn off the printer and remove the power cord.
2. Remove the top and left-side covers as explained in the earlier topic, "Cabinet panels and covers" on page 8-4.
3. Disconnect the wiring harnesses leading to the vacuum pump.
4. Disconnect the vacuum hose leading to the accumulator.
5. Remove the three nuts securing the pump assembly to the frame of the print engine.

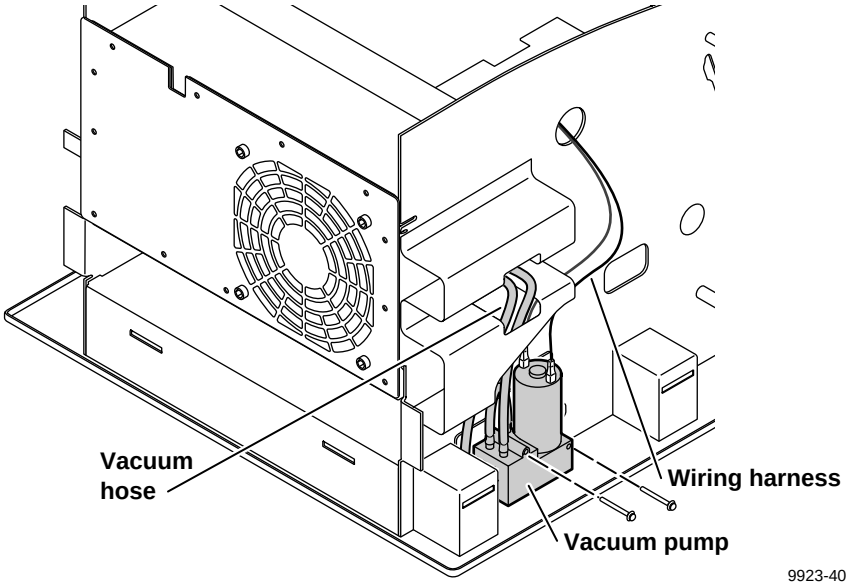


Figure 8-7 Removing the vacuum pump

Accumulator

Tools required

- Magnetic screwdriver
- T-20 TORX tip
- T-15 TORX tip

1. Turn off the printer and remove the power cord.
2. Remove the top, left-side and right-side covers as explained in the earlier topic, “Cabinet panels and covers” on page 8-4.
3. Remove the ink loader as detailed earlier in the topic, “Ink loader” on page 8-6.
4. Disconnect the wiring harnesses leading to the rear fan.
5. Remove the 12 screws securing the rear plate to the engine frame. Set the rear plate and attached rear fan aside.
6. Disconnect the two vacuum hoses leading to the accumulator.
7. Remove the two screws securing the accumulator in place. Remove the accumulator.

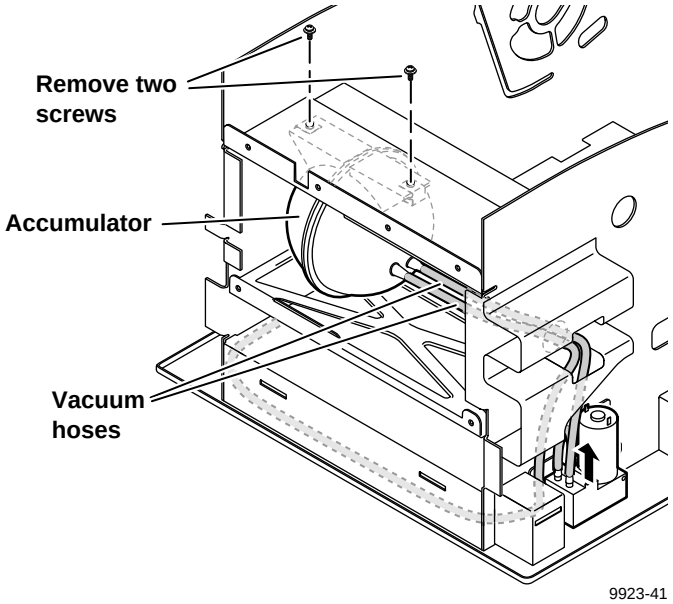


Figure 8-8 Removing the accumulator

Solenoid valve

Tools required

- Magnetic screwdriver
- T-20 TORX tip
- T-15 TORX tip

1. Turn off the printer and remove the power cord.
2. Remove the top and right-side covers as explained in the earlier topic, "Cabinet panels and covers" on page 8-4.
3. Disconnect the wiring harnesses leading to the solenoid valve from I/O board 3.
4. Disconnect the vacuum hoses leading to the solenoid valve.
5. Remove the two screws securing the solenoid valve in place. Remove the solenoid valve.

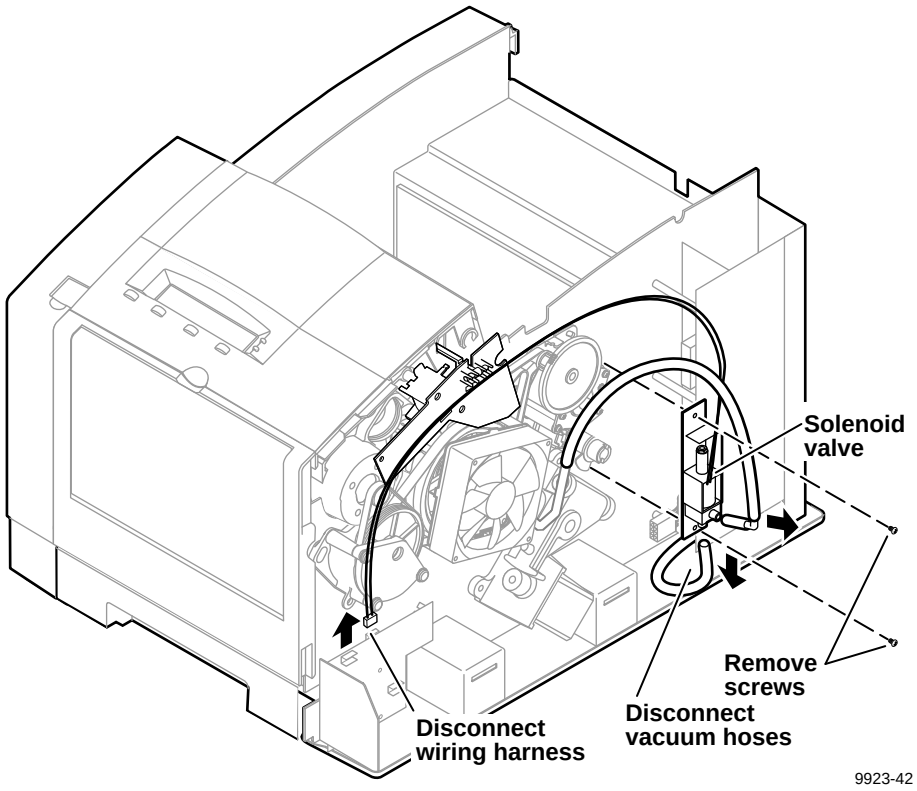


Figure 8-9 Removing the solenoid valve

Reverse these steps to reinstall the solenoid valve. Route its wiring harness between the solenoid valve and the power supply; refer to Appendix C "Wiring Diagrams."

Y-axis belt drive assembly

Tools required

- Magnetic screwdriver
- T-20 TORX tip
- T-15 TORX tip
- T-25 tip

1. Turn off the printer and remove the power cord.
2. Remove the top and right-side covers as explained in the earlier topic, "Cabinet panels and covers" on page 8-4.
3. Disconnect the wiring harness from I/O board 2 leading to I/O board 3 that passes beside the Y-axis belt drive assembly.
4. Remove the drum fan, shield and drum heater which are held in place with three screws.
5. Remove the ring gear attached to the end of the drum. The ring gear is held in place with four screws.
6. Remove the three tension set screws securing the Y-axis belt drive assembly to the engine frame. Remove the assembly with its two belts.

Reverse these steps to reassemble the Y-axis belt drive assembly.

Note *Tension the drive belts using the Chapter 9 procedure, "Y-axis belts tension adjustment" on page 9-7.*

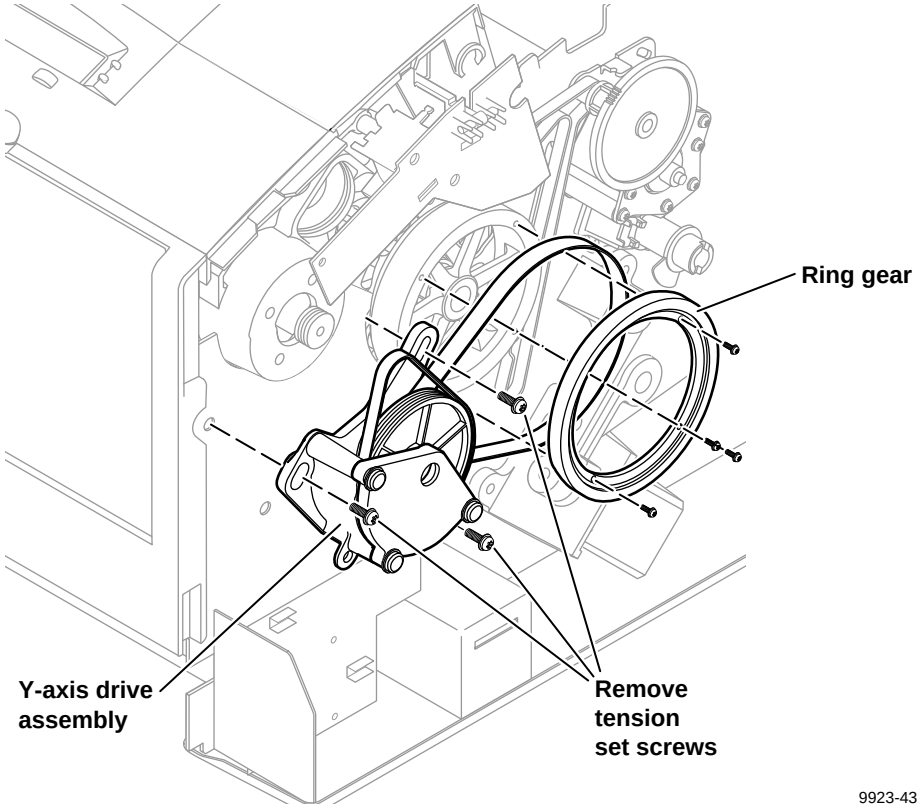


Figure 8-10 Removing the Y-axis belt drive assembly

Heaters

Paper preheater

Tools required

- Magnetic screwdriver
- Needle-nose pliers
- 5/16-inch nut driver
- T-20 TORX tip
- T-15 TORX tip

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. Turn off the printer and remove the power cord.
2. Remove the top, left -side and right-side covers as explained in the earlier topic, "Cabinet panels and covers" on page 8-4.
3. Open the front door and remove the drum maintenance tray.
4. Remove the two screws securing the two ground wires in place to the front of the paper preheater.
5. If the printhead is not in its print position next to the drum, rotate the process motor counter-clockwise to move the printhead to its print position. Make sure that the tilt cam gear is engaged to the tilt cam solenoid.

Caution *If you remove the process motor drive belt without the printhead in the print position, the printhead will quickly travel to the print position and may damage the drum and printhead.*

6. **Left side:** Loosen the process motor drive belt tensioner and remove the drive belt.
   a. Loosen the compound gear position sensor.
   b. Remove the E-ring securing the compound gear in place. Then remove the gear.
   c. Remove the screw (below the compound gear's shaft) securing the left side of the paper preheater to the engine frame.
   d. Remove the paper preheater drive belt from the left end of the paper preheater's feed roller.

7. **Right-side:** Remove the Y-axis belt drive assembly as explained in the previous procedure, "Y-axis belt drive assembly" on page 8-15.

   a. Remove the E-ring and bushing at the right end of the paper preheater's feed roller. (It's not necessary to remove the E-ring, gear and bushing on the left end of the preheater's feed roller.)

   b. Remove the two blue nose-guides from the inside of the printer frame; each is held in place with one screw.

   c. Disconnect the wiring harnesses leading to the paper preheater at the right side of the print engine. Disconnect the paper preheater's ground wire located near the power supply.

8. Slide the feed roller shaft to the left to clear the right side of the engine frame, then slide the paper preheater out of the print engine far enough to expose the wiring harnesses connecting to the top of the paper preheater.

9. Disconnect the three center wiring harnesses connecting to the top of the paper preheater, then remove the paper preheater from the printer.

10. Continue to slide the paper preheater out of the engine frame, feeding its wiring harnesses through the access hole in the right-side frame.

Reverse these steps to reinstall the paper preheater. When sliding the paper preheater into the engine frame, be sure to route the wiring harnesses *above* the right maintenance tray sensor and out the hole on the right side frame.

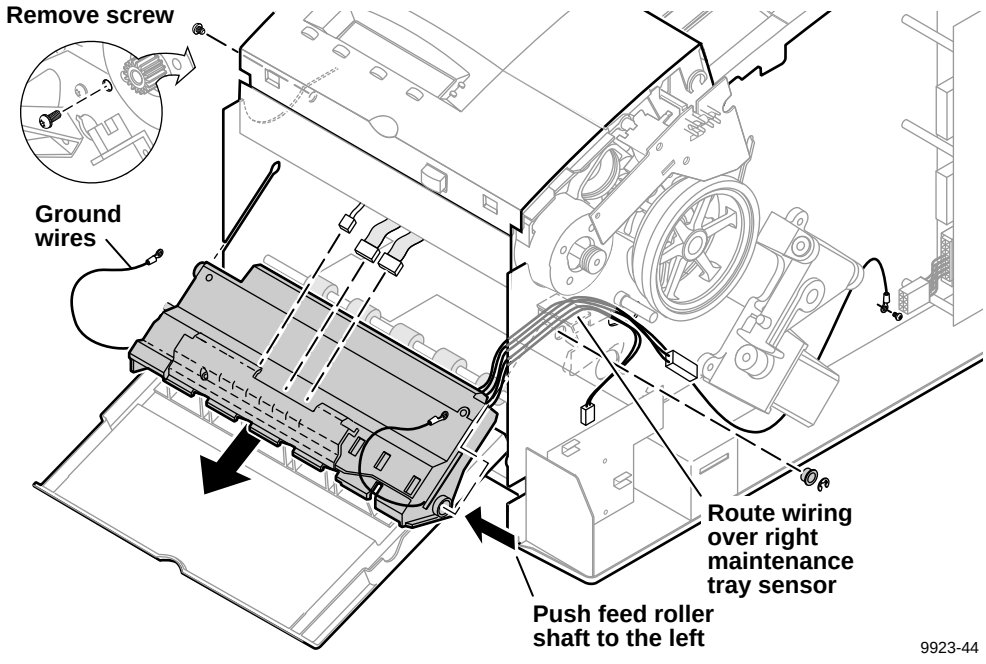


Figure 8-11 Removing the paper preheater

Drum heater

Tools required

- Magnetic screwdriver
- T-20 TORX tip
- T-15 TORX tip

Warning *Even when the printer is turned off, AC line voltages are 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 top, left-side and right-side covers as explained in the earlier topic, "Cabinet panels and covers" on page 8-4.
3. Disconnect the wiring harnesses leading from the drum heater.
4. Remove the three screws securing the drum fan in place. Remove the fan, shield and the drum heater. The drum fan, shield and heater should always be replaced as a unit.

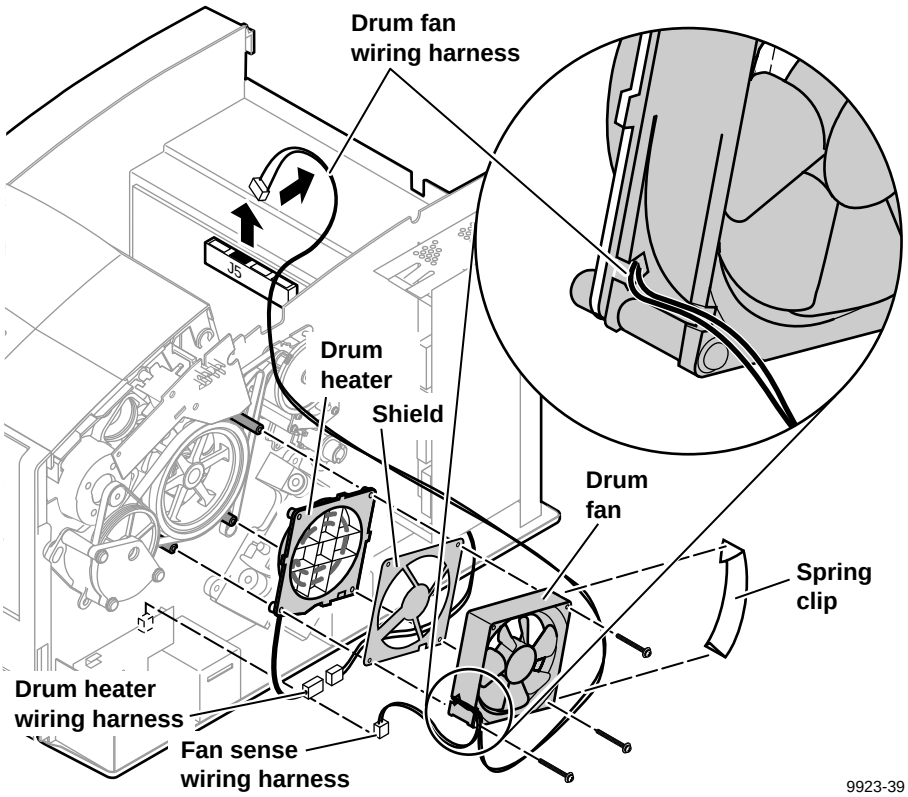


Figure 8-12 Removing the drum heater

Reverse the steps to reinstall the drum heater. Be sure to correctly locate and orient the keyed shield between the fan and heater.

Drum position sensor assembly

Tools required

- Magnetic screwdriver
- T-15 TORX tip
- T-20 TORX tip
- alignment gap tool

Note *A replacement sensor assembly must be precisely reinstalled on the drum shaft in the position of the original sensor assembly. This ensures that the stripper fingers contact the drum in the same location as before; otherwise, serious print artifacts will result.*

1. Turn off the printer and remove the power cord.
2. Remove the top and left -side covers as explained in the earlier topic, "Cabinet panels and covers" on page 8-4.
3. Unloop the drum temperature sensor's wiring harness from its retainer on the side of the drum position sensor assembly.
4. Disconnect the home-position sensor wiring harness from I/O board 1 leading to the drum position assembly. Disconnect the drum position encoder sensor at the drum position assembly.
5. Remove the clear plastic dust cover from the drum position assembly.

6. Precisely mark the end of the drum shaft relative to the drum home flag on the drum position sensor assembly as shown in the illustration; use a straight edge to ensure accuracy; this is not necessary if you are also replacing the drum (as part of the drum/transfix assembly).

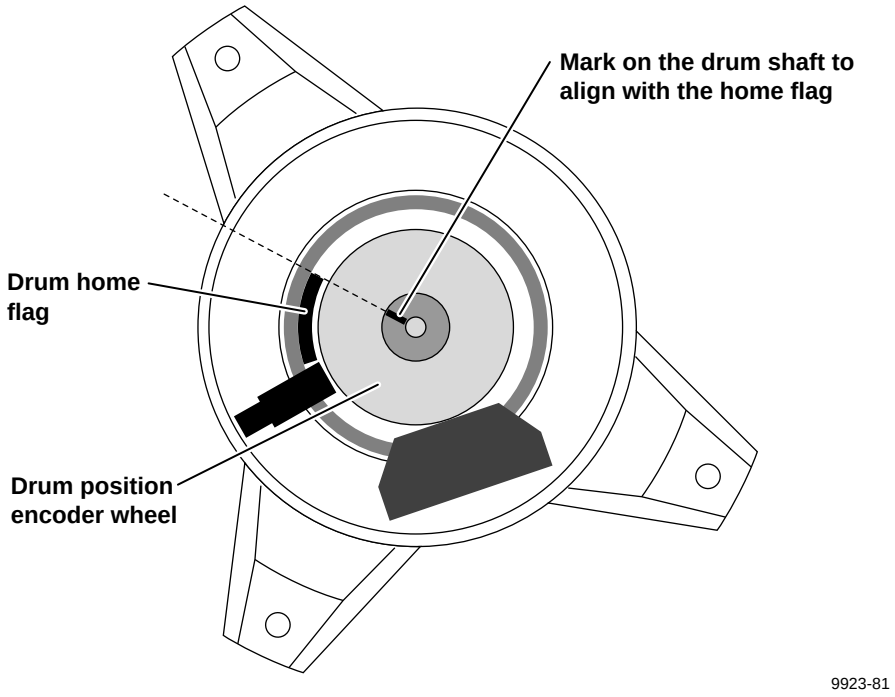


Figure 8-13 Marking the drum-to-drum home flag sensor alignment

7. With a small, flat-blade screwdriver, slide the retaining spring out of the encoder wheel's groove toward the encoder disk; this removes the tension securing the encoder wheel to the drum shaft.

8. Remove the three screws securing the drum position sensor assembly housing to the print engine. 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.

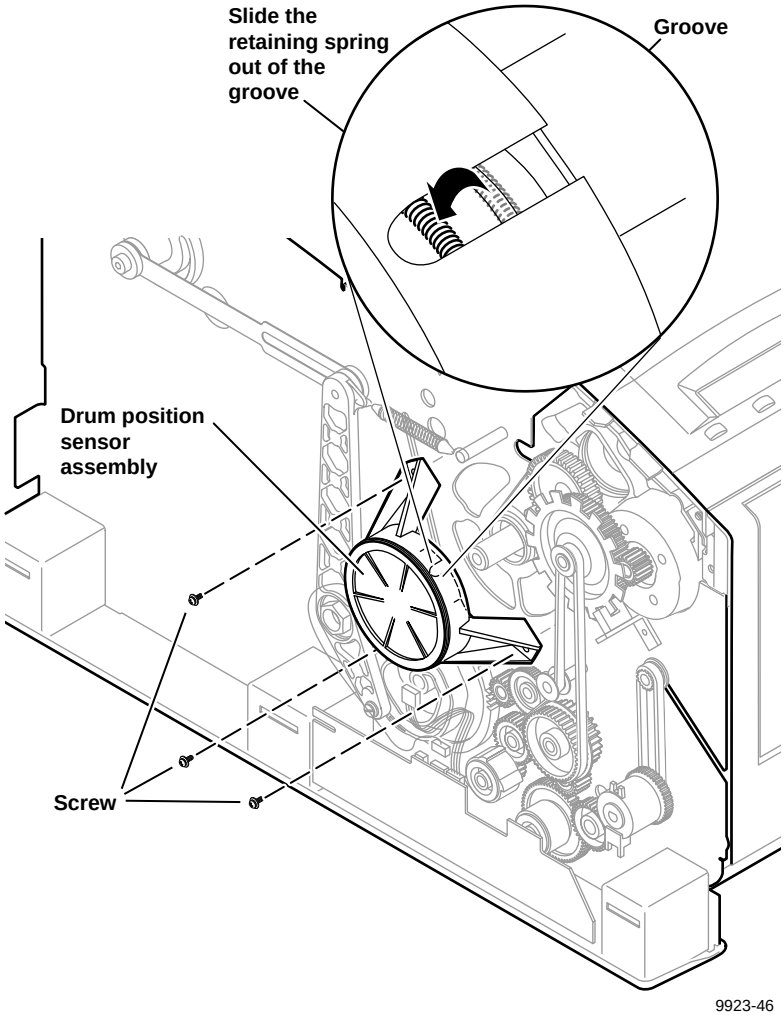


Figure 8-14 Removing the drum position sensor assembly

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.

1. Install the encoder wheel on the drum shaft, *precisely* aligning the home flag to the alignment mark you drew on the shaft.

2. Use the encoder wheel gap tool to properly space the encoder wheel to the drum position sensor as explained in the Chapter 9 procedure, "Drum position encoder gap" on page 9-13.

Drum/transfix assembly

Tools required

- Magnetic screwdriver
- 3/32-inch hex key
- T-20 TORX tip
- T-15 TORX tip

1. Turn off the printer and remove the power cord.
2. Remove the top, front panel, right-side and left-side covers as explained in the earlier topic, “Cabinet panels and covers” on page 8-4.
3. Remove the ink loader as explained in the previous procedure, “Ink loader” on page 8-6.
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.
5. Remove the drum position sensor assembly. If necessary, refer to the previous procedure, “Drum position sensor assembly” on page 8-20.

6. Loosen the compound gear position sensor.

7. Remove the E-ring securing the compound gear in place. Then remove the gear.

8. Remove the screw (below the compound gear's shaft) securing the left side of the paper preheater to the engine frame.

9. Remove the paper preheater drive belt from the left end of the paper preheater's feed roller.

10. 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 hex key.

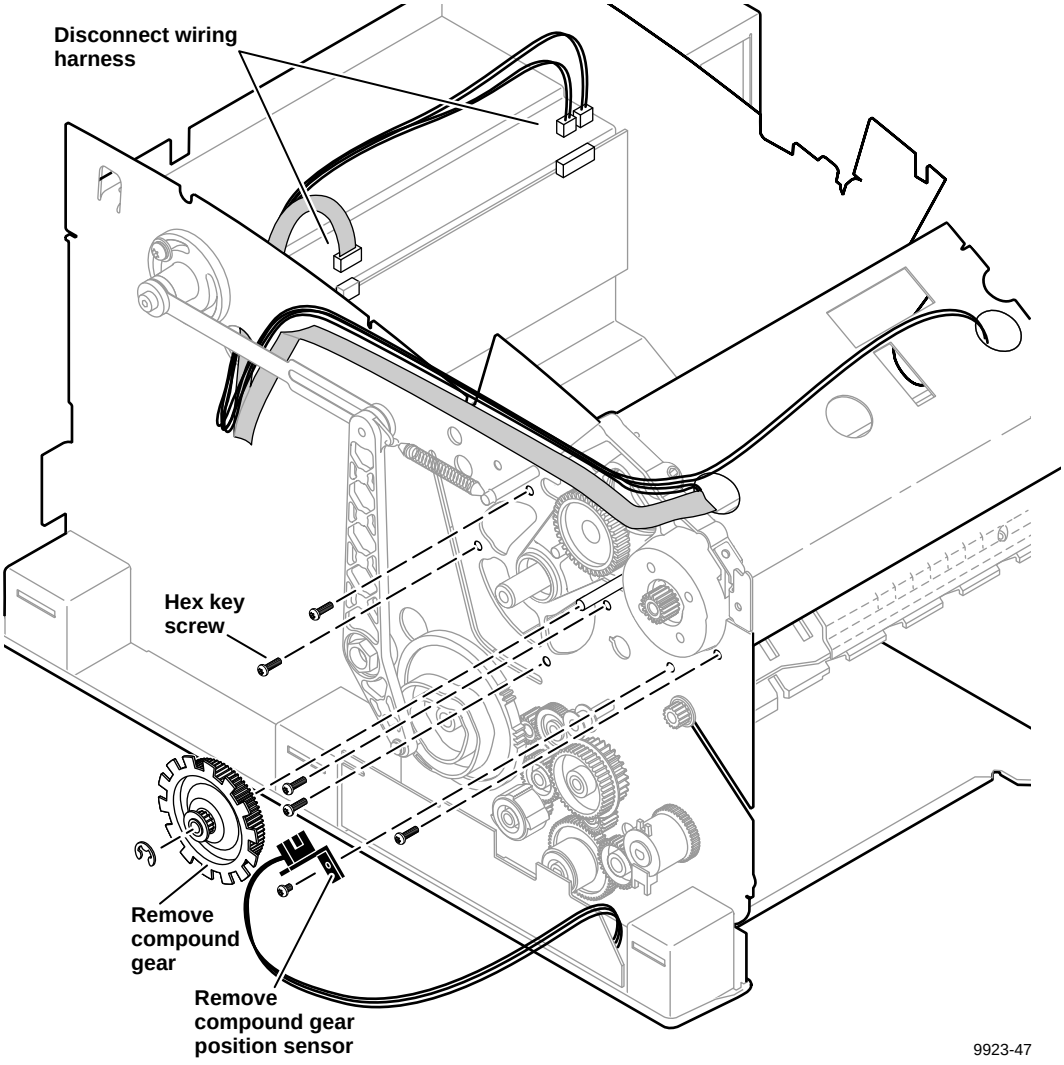


Figure 8-15 Removing the drum/transfix assembly (left side)

11. **Right side.** Remove the drum fan, shield and drum heater and the drum gear.

12. Remove the Y-axis belt drive assembly and its belts. If necessary, refer to the previous procedure, "Y-axis belt drive assembly" on page 8-15.

13. Disconnect the wiring harnesses leading to the transfix solenoid/sensor bracket. Remove the three screws securing the bracket in place and remove the bracket.

14. 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.

15. Remove the exit roller gear train; it is held onto the exit roller shaft by an E-ring.

16. Remove the E-ring and bushing at the right end of the paper preheater's feed roller. (It's not necessary to remove the E-ring, gear and bushing on the left end of the preheater's feed roller.)

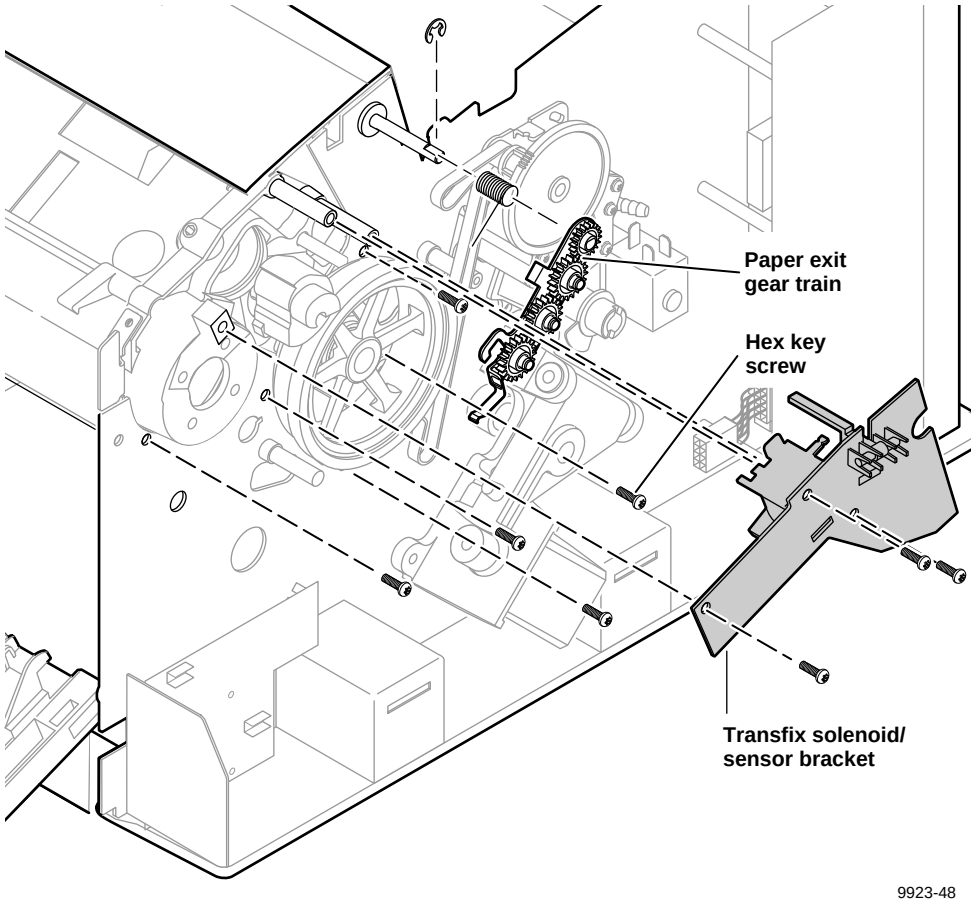


Figure 8-16 Removing the drum/transfix assembly (right side)

17. **Front.** Open the front door and remove the drum maintenance cartridge. Leave the front door open.

18. Remove the two blue nose-guides from the inside of the printer frame; each is held in place with one screw.

19. Remove the two screws securing the drum/transfix cross brace to the chassis.

20. Remove the paper preheater. It is not necessary to unplug the paper preheater wiring. Instead, pull out the paper preheater and set it on the front door.

    a. Slide the feed roller shaft to the left to clear the right side of the engine frame, then slide the paper preheater out of the print engine far enough to expose the wiring harnesses connecting to the top of the paper preheater.

    b. Disconnect the three center wiring harnesses connecting to the top of the paper preheater, then remove the paper preheater from the printer.

    c. Continue to slide the paper preheater out of the engine frame, feeding its wiring harnesses through the access hole in the right-side frame.

    d. Remove the paper preheater alignment guide from the left side of the printer frame.

21. Carefully, lift and remove the drum/transfix assembly. Protect the drum surface.

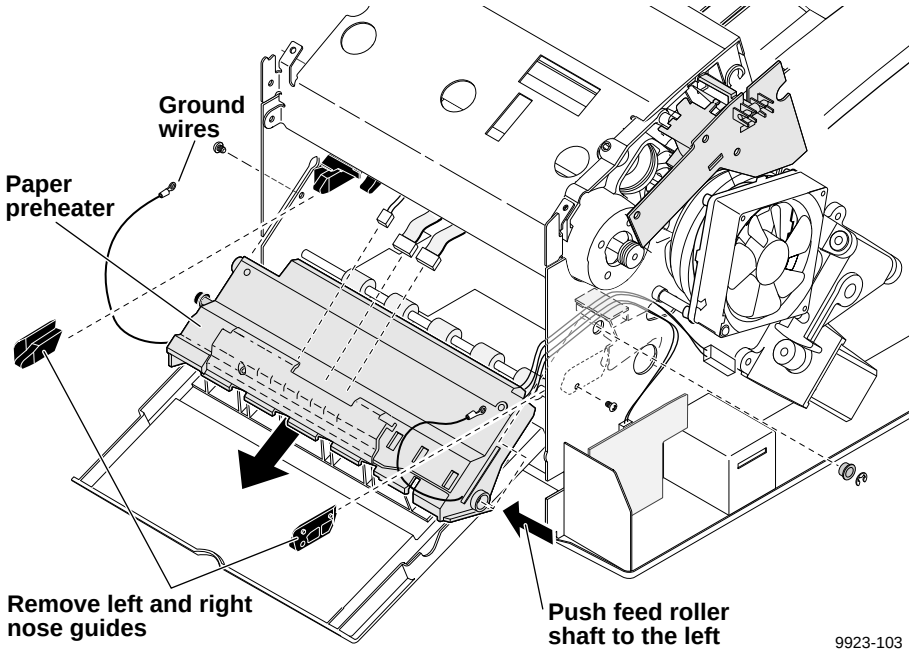


Figure 8-17 Removing the drum/transfix assembly (front)

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 the drum.

- Drum seal treatment (perform this procedure first on a *new* drum).

  a. Power up the printer in Bypass Mode to skip the startup and mud pages (refer to "Bypass mode" on page 9-4).

  b. Select Service Test Print 10 to verify the paper path and that all ink jets operate.

  c. Print Service Test Print 9 to seal the new drum.

- Drum position encoder sensor gap, refer to "Drum position encoder gap" on page 9-13.

- Y-belt tension, refer to "Y-axis belts tension adjustment" on page 9-7.

Motors

Y-axis (drum) motor and process motor

Tools required

- Magnetic screwdriver
- 3/32 in hex key
- T-20 TORX tip
- T-15 TORX tip

1. Turn off the printer and remove the power cord.
2. Remove the top, front panel, right-side and left-side covers as explained in the earlier topic, “Cabinet panels and covers” on page 8-4.
3. Open the front door and remove the drum maintenance cartridge.
4. Remove the ink loader as explained in the earlier topic, “Ink loader” on page 8-6 to access the power control board underneath.
5. Remove the Y-axis belt drive assembly as explained in the previous procedure, “Y-axis belt drive assembly” on page 8-15.
6. Remove the paper preheater as explained in the previous procedure, “Paper preheater” on page 8-17.

7. Remove the four screws securing either motor to the drum/transfix assembly. Remove the motor. Unclip the cable ties retaining the motor's wiring harness. Disconnect the wiring harness from the ink loader.

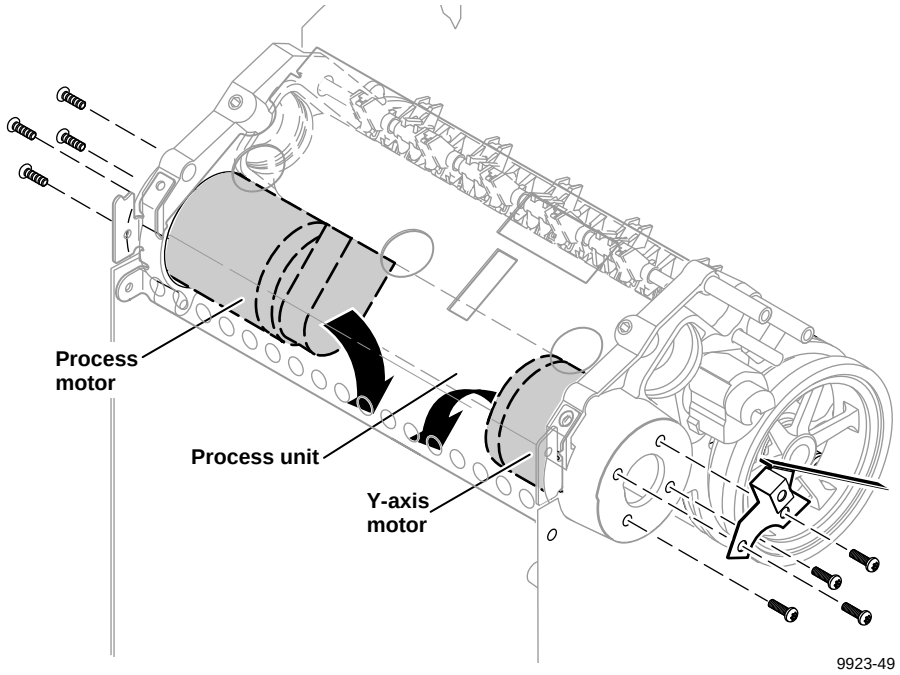


Figure 8-18 Removing the process motor or the Y-axis motor

Cap/wipe/purge drive motor

Tools required

- Magnetic screwdriver
- T-15 TORX tip
- T-20 TORX tip

1. Turn off the printer and remove the power cord.
2. Remove the top, front panel, right-side and left-side covers as explained in the topic, “Cabinet panels and covers” on page 8-4.
3. Unhook the right-side cap/wipe/purge belt tension spring.
4. Remove the two screws securing the cap/wipe purge motor assembly to the printer’s side frame.
5. Remove the plate securing the cap/wipe/purge assembly drive gear. Remove the gear off of its shaft.
6. Disconnect the motor’s wiring harness and free the motor from the cap/wipe/purge drive belt.

Reverse these steps to reinstall the motor. Leave the two screws that secure the motor to the printer's side frame loose until you attach the right-side cap/wipe/purge belt tension spring, then tighten the screws. Following reassembly, perform the adjustment procedure "Cap/wipe/purge assembly belt adjustments" on page 9-11 to assure that the left and right belts are properly aligned to each other.

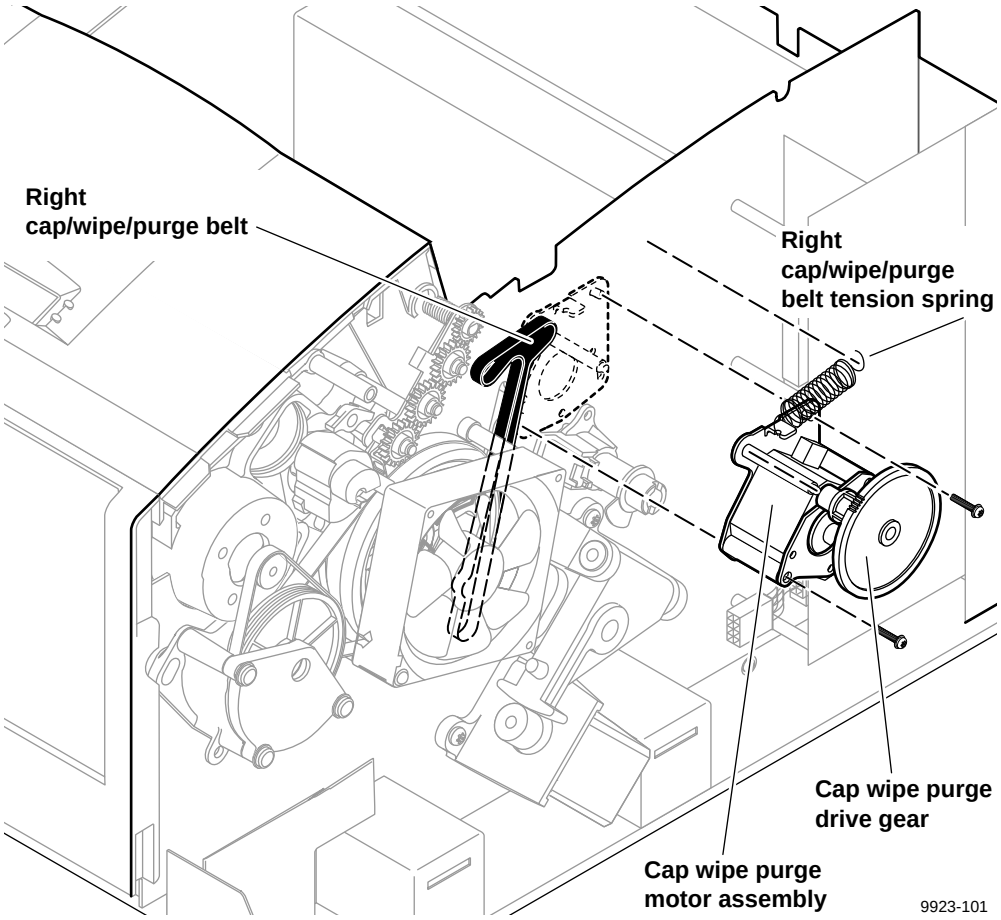


Figure 8-19 Removing the cap/wipe/purge drive motor

X-axis drive assembly

Tools required

- Magnetic screwdriver
- 3/32 hex wrench
- T-20 TORX tip

1. Turn off the printer and remove the power cord.
2. Remove the top and right-side covers as explained in the earlier topic, "Cabinet panels and covers" on page 8-4.
3. Disconnect the wiring harness leading to the X-axis motor.
4. Disconnect the X-axis home sensor from I/O board 2.
5. Remove the three screws securing the assembly in place.
6. Lift the X-axis motor assembly up and to the rear to clear the printhead shaft and then remove the assembly.

Reverse this procedure to reinstall the X-axis drive assembly.

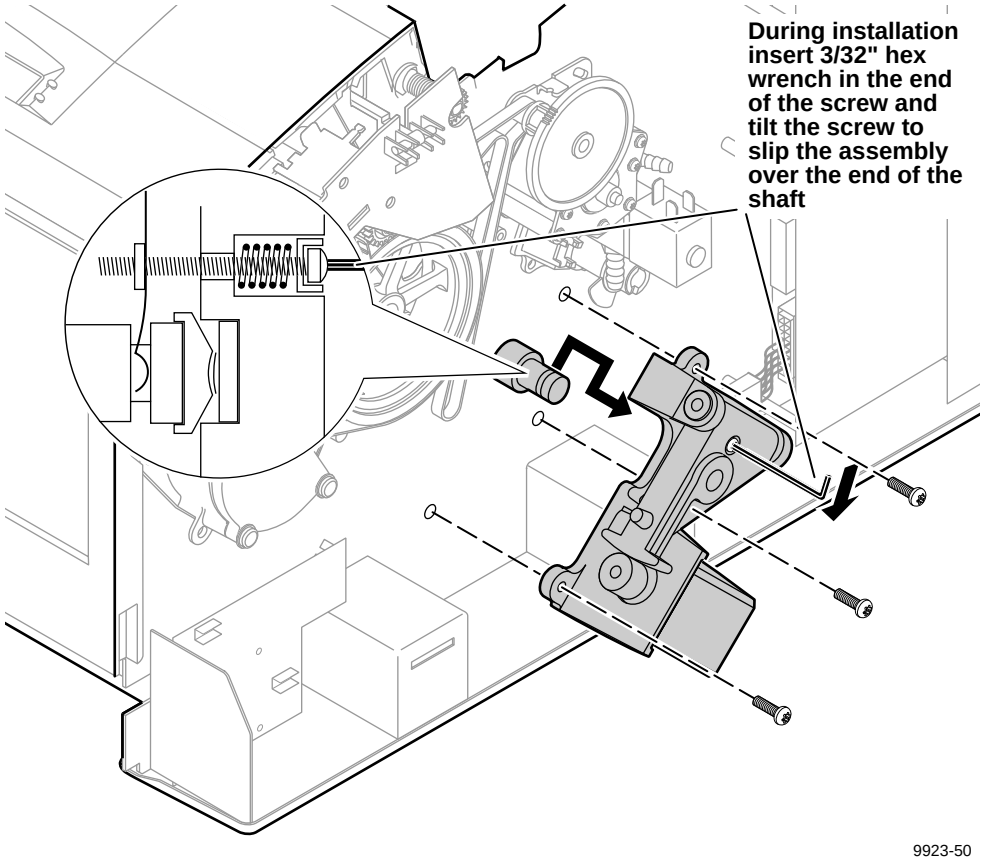


Figure 8-20 Removing the X-axis drive assembly

Printhead

Tools required

- Torque magnetic screwdriver
- Flat blade screw driver
- Printhead removal tool
- Silicon reservoir plugs
- printhead-to-drum gap tool
- T-15 TORX tip
- T-20 TORX extended shank
- POSIDRIV #2 tip
- 9/64-inch hex driver tip

The printhead removal tool, sometimes referred to as the hot head tool, allows you to handle the printhead while it is hot and protects the printhead faceplate.

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. Turn off the printer and remove the power cord.
2. Remove the top and right-side covers as explained in the earlier topic, "Cabinet panels and covers" on page 8-4.
3. Remove the ink loader as explained in the earlier topic, "Ink loader" on page 8-6.
4. Disconnect the power wiring harness and ground wire leading from the printhead to the power supply. Note how the wiring harness is tie-wrapped to the printer frame. Also disconnect the ground cable running from the printhead to the power control board.
5. Tilt the printhead forward to its print position and disconnect the data ribbon cable leading from the printhead to the power control board.

Warning *The printhead is hot.*

6. 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.

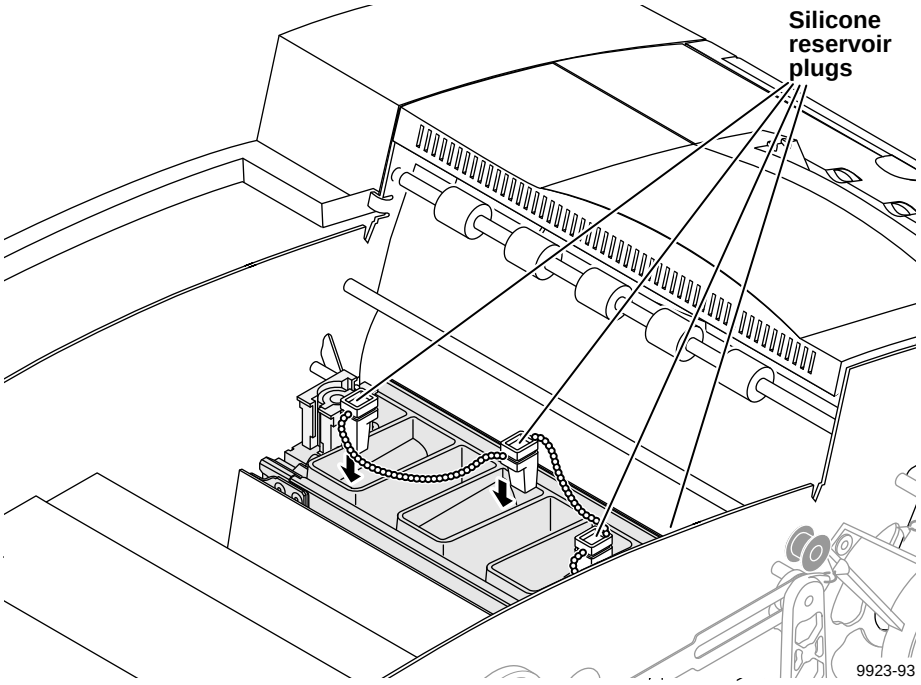


Figure 8-21 Plugging the reservoir holes

7. Manually unlatch the tilt cam solenoid and rotate the process motor to tilt the printhead back to its maximum tilt-back position.

Also, make sure that cap/wipe/purge assembly is in its home position (full down). Rotate the cap/wipe/purge drive gear to force the cap/wipe/purge assembly to its lowest position.

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.

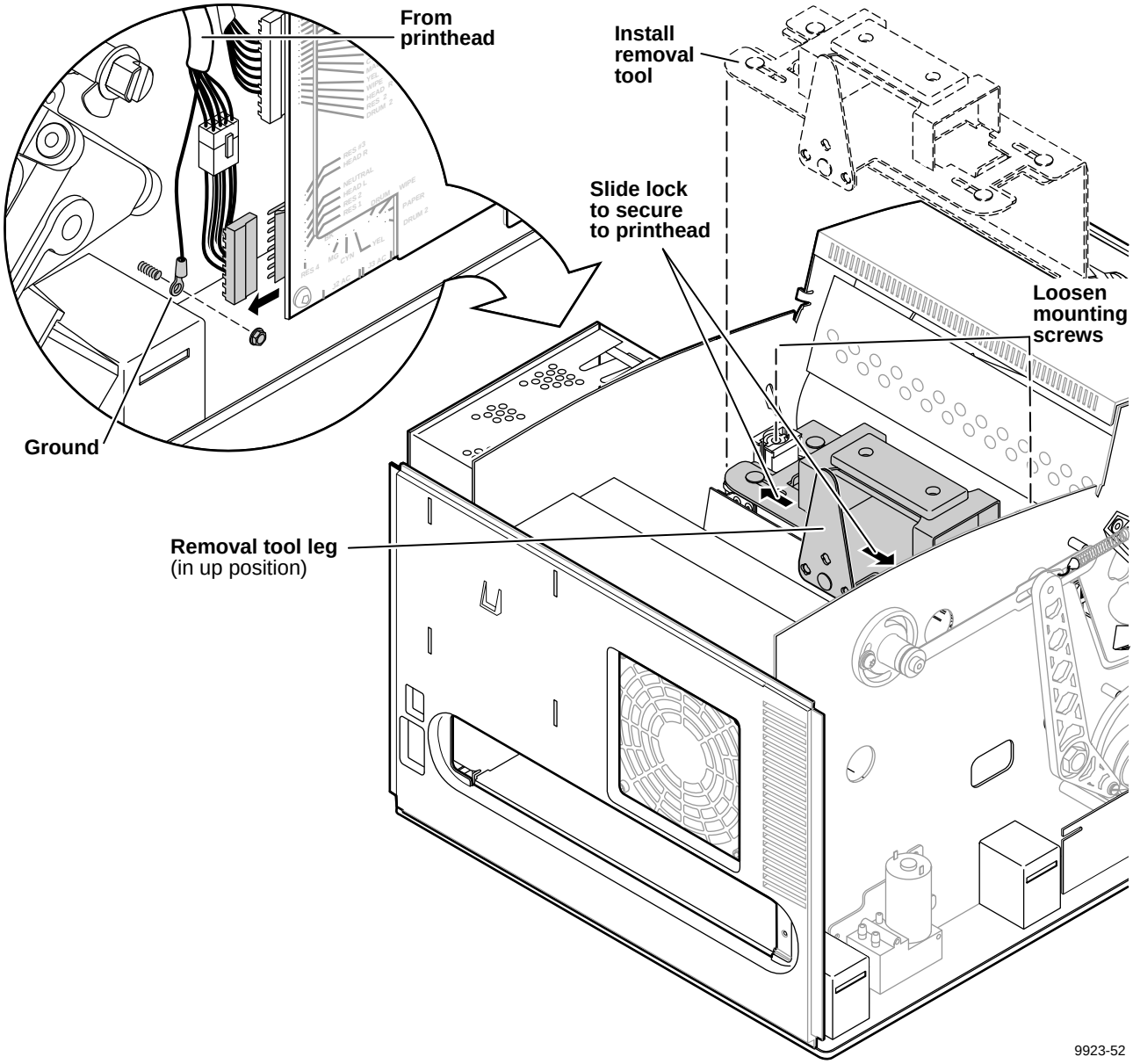


Figure 8-22 Removing the printhead

1. **Reinstallation.** If not already in place, install the printhead's data ribbon cable to the printhead. Secure the ribbon cable in place the cable retainer clip.

2. Using the printhead removal tool, reverse the removal steps to reinstall the printhead.

3. Rotate the printhead to its print position and ensure that the tilt cam gear is engaged with the tilt cam solenoid.

4. At one end of the printhead, slide the printhead gap tool between the printhead and the drum. Align the outside edge of the tool with the inside surface of the printer side-frame. The flat side of the gap tool, marked HEAD, faces the printhead.

   Hold the gap tool so its **4 COLD 5** mark, (which represents a 0.030 inch gap between the printhead and the drum) is level with the notch in the printer side-frame. Adjust the printhead's spacing adjustment screws to hold the gap tool snugly but still allow it to be easily removed. This sets the "cold" printhead-to-drum gap.

5. Torque the mounting screws to 20 in/lbs.

6. Plug the other end of the printhead's data ribbon cable to the power control board. Inspect both ends of the data ribbon cable to ensure they are properly seated.

7. Refer to the topic "Printhead-to-drum spacing adjustment" on page 9-9 to set the correct gap between the "hot" printhead and the drum.

Cap/wipe/purge assembly

Tools required

- Magnetic screwdriver
- Needle-nose pliers
- 3/32 hex key
- T-15 TORX tip
- T-10 TORX tip

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. Turn off the printer and remove the power cord.
2. Remove the top and right-side covers as explained in the earlier topic, "Cabinet panels and covers" on page 8-4.
3. Remove the ink loader as explained in the earlier topic, "Ink loader" on page 8-6.
4. Disconnect the wiring harness leading from the cap wipe/purge assembly to the power supply and I/O board 2. Disconnect the vacuum hose leading to the cap wipe/ purge assembly.
5. Manually rotate the printhead into its retracted position if it's not already there. Press down on the solenoid flapper under the head tilt arm to engage the gear. Rotate the process motor gear clockwise to tilt the printhead back.
6. Rotate the cap wipe drive gear to position the cap wipe/purge assembly 25 mm (1 in.) from the top of its travel; this allows the wiring to be removed through the right guide slot in the engine frame.
7. Place a few sheets of paper between the drum and the cap wipe/ purge assembly to prevent scratching the drum.
8. Remove the three pin screws that hold the cap wipe/ purge assembly in the grooves on each side of the print engine.
9. While holding onto the cap/wipe/purge assembly remove the wiring from the right cap/wipe/purge assembly bracket. Push about 50 mm (2 in.) of the wiring through the print engine's frame so that you can unloop it from the cap/wipe/purge assembly.
10. Remove the metal vacuum line from the assembly and carefully remove the cap/wipe/purge assembly.

Reverse these steps to reinstall the cap/wipe/purge assembly. Upon reassembly, be sure to install the large double-insulated wire into the cap/wipe/purge assembly bracket last; it is used to hold the two smaller wires in place. Secure the wiring to the metal vacuum tube with a twist-tie or tie-wrap. Refer to "Wiring Diagrams" for details on dressing the cap/wipe/purge wiring.

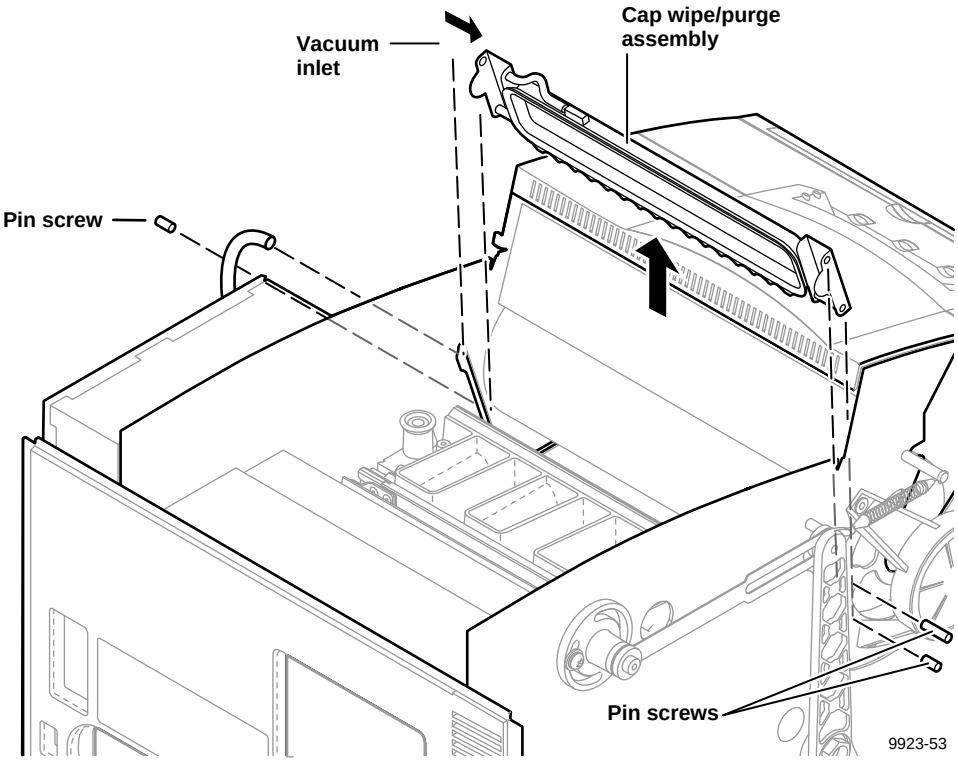


Figure 8-23 Removing the cap/wipe/purge assembly

Stripper finger assembly

Tools required

- Magnetic screwdriver
- 0.05-inch hex key
- 3/32-inch hex key
- T-20 TORX tip
- T-15 TORX tip
- Small screwdriver or E-ring puller

1. Turn off the printer and remove the power cord.
2. Remove the top, front panel, right-side and left-side covers as explained in the topic, "Cabinet panels and covers" on page 8-4.
3. Disconnect the cables from I/O board 3 and then remove it.
4. Remove the E-ring securing the exit gear assembly and then remove the exit gear assembly.
5. Remove the E-ring securing each end of stripper finger assembly shaft. Remove the bushings and spring units from the shaft. Remove the stripper finger assembly.

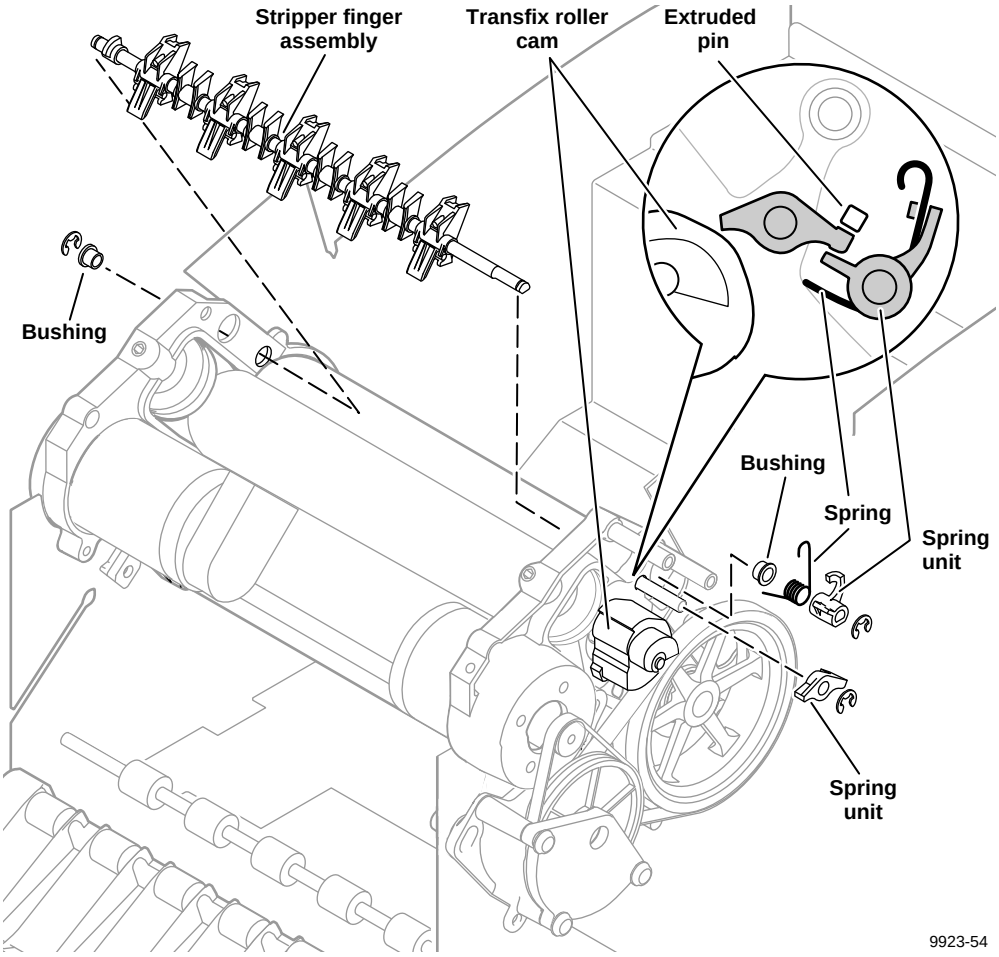


Figure 8-24 Removing the upper and lower stripper finger assemblies

Rollers

Exit roller

Tools required

- Magnetic screwdriver
- T-15 TORX tip
- T-20 TORX tip
- Small screwdriver or E-ring puller

1. Turn off the printer and remove the power cord.
2. Remove the right-side and left-side covers as explained in the earlier topic, "Cabinet panels and covers" on page 8-4.
3. Unclip the stripper cover.
4. Disconnect the cables from I/O board 3 and then remove it.

Note *Later printers have I/O board 3 replaced with a plastic bracket.*

5. Remove the right E-ring securing the exit gear assembly and then remove the exit gear assembly.

6. Remove the left E-ring securing the end of exit roller shaft. Remove the bushings and spring and exit roller gear train from the shaft. Remove the exit roller.

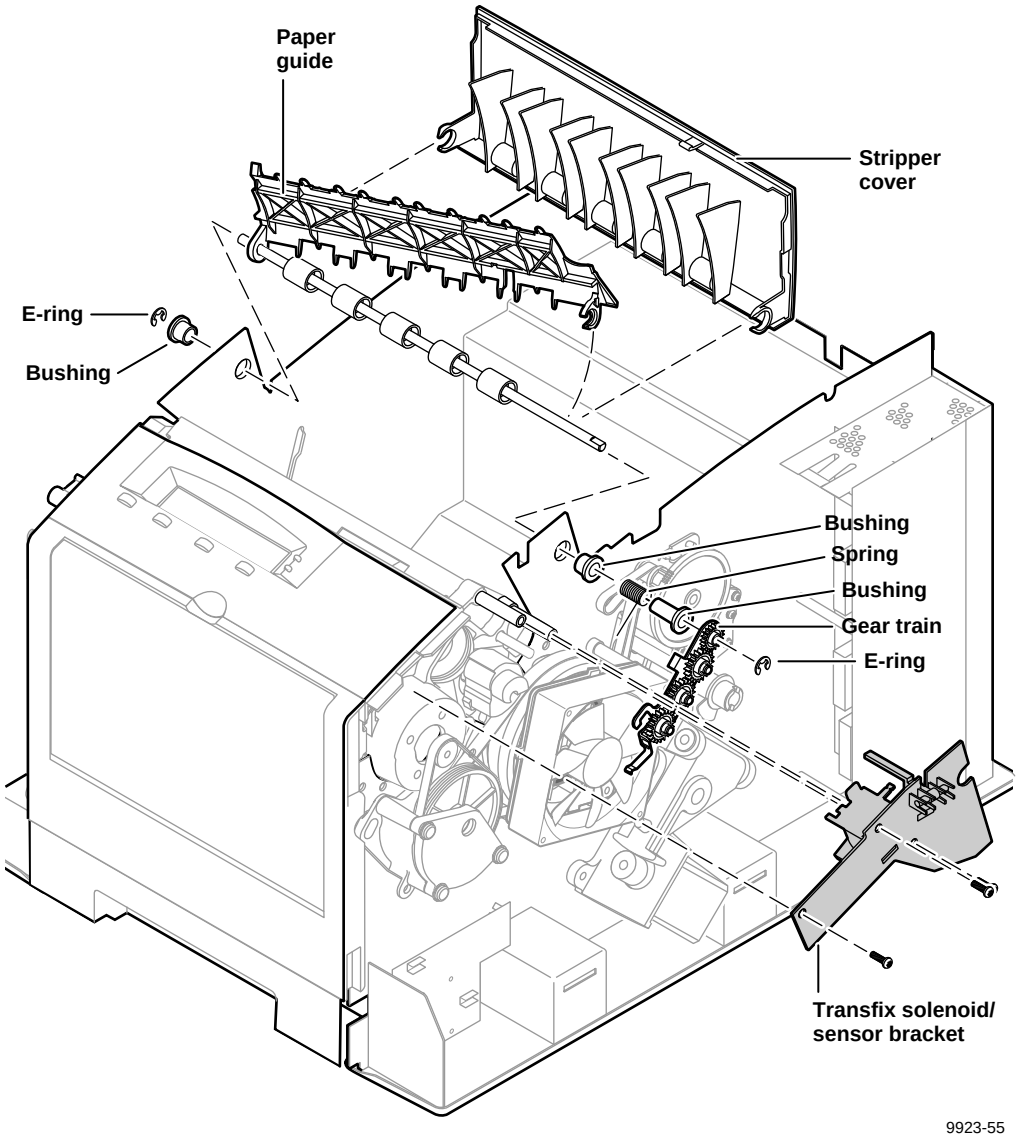


Figure 8-25 Removing the exit roller

Lower feed roller and feed roller magnetic clutch

Tools required

- Magnetic screwdriver
- T-15 TORX tip
- T-20 TORX tip
- Small screwdriver or E-ring puller

1. Turn off the printer and remove the power cord.
2. Remove the right-side and left-side covers as explained in the earlier topic, "Cabinet panels and covers" on page 8-4. Open the front cover.
3. Remove the maintenance tray.
4. Disconnect the wiring harness from the clutch leading to I/O board 1.
5. Remove the E-ring securing each end of feed roller shaft. Remove the feed roller magnetic clutch.
6. Remove the feed roller drive belt and feed roller pulley. Remove the feed roller bushings. Remove the feed roller.

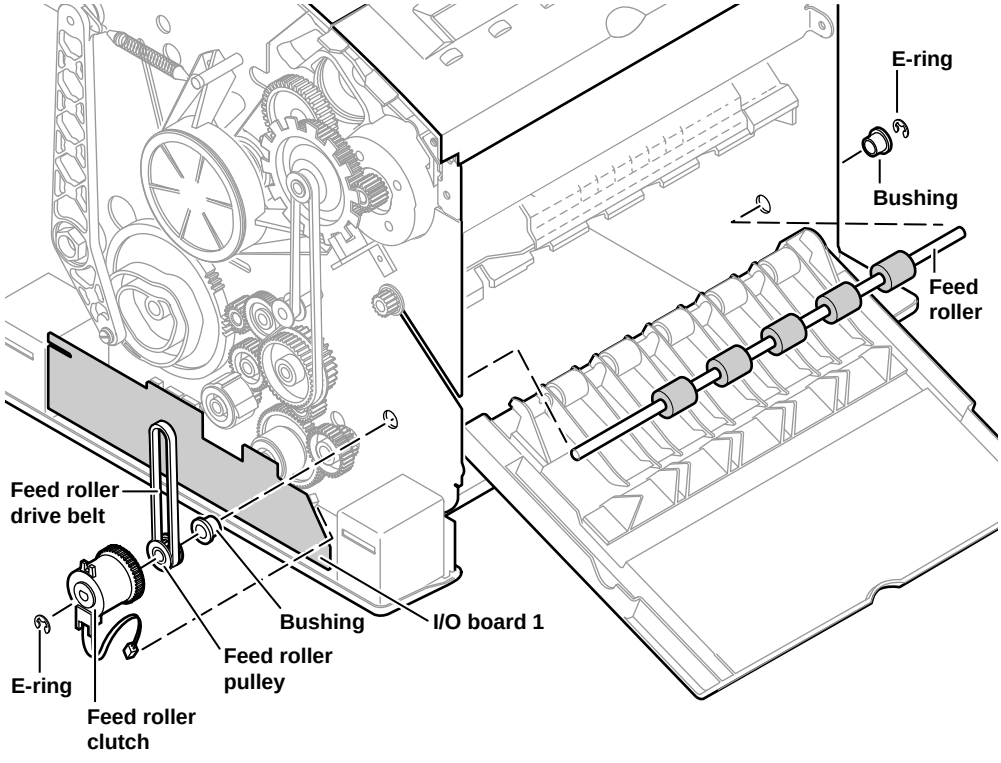


Figure 8-26 Removing the feed roller

Pick roller

Tools required

- Magnetic screwdriver
- T-15 TORX tip
- T-20 TORX tip
- Small screwdriver or E-ring puller

1. Turn off the printer and remove the power cord. Remove the paper tray.
2. Remove the right-side and left-side covers as explained in the earlier topic, "Cabinet panels and covers" on page 8-4. Open the front cover.
3. Disconnect the wiring harnesses leading to I/O board 1. Remove I/O board 1; it is held in place with five screws.

Caution *To avoid damaging the printhead and drum, rotate the process motor clockwise to bring the printhead to the print position. Otherwise, the printhead will be pulled to the print position by the tilt spring and may damage both the printhead and drum.*

4. Remove the feed roller clutch drive gear; it is held in place with an E-ring.
5. Loosen the paper path drive belt. Remove the belt and the paper path drive gear; it is held in place with an E-ring.
6. Remove the pick roller clutch.
7. Remove the E-ring securing the pick roller shaft. The E-ring is located on the inside of the engine side frame.

Caution *Be careful not to scratch the drum when you remove the pick roller.*

8. Slide the pick roller to the left to free the right end of the shaft. Slide the right end of the shaft out the large hole above the maintenance tray guide; you may need to push up on the drum belt to clear it. The left end of the pick roller shaft can be pulled forward to remove the pick roller.

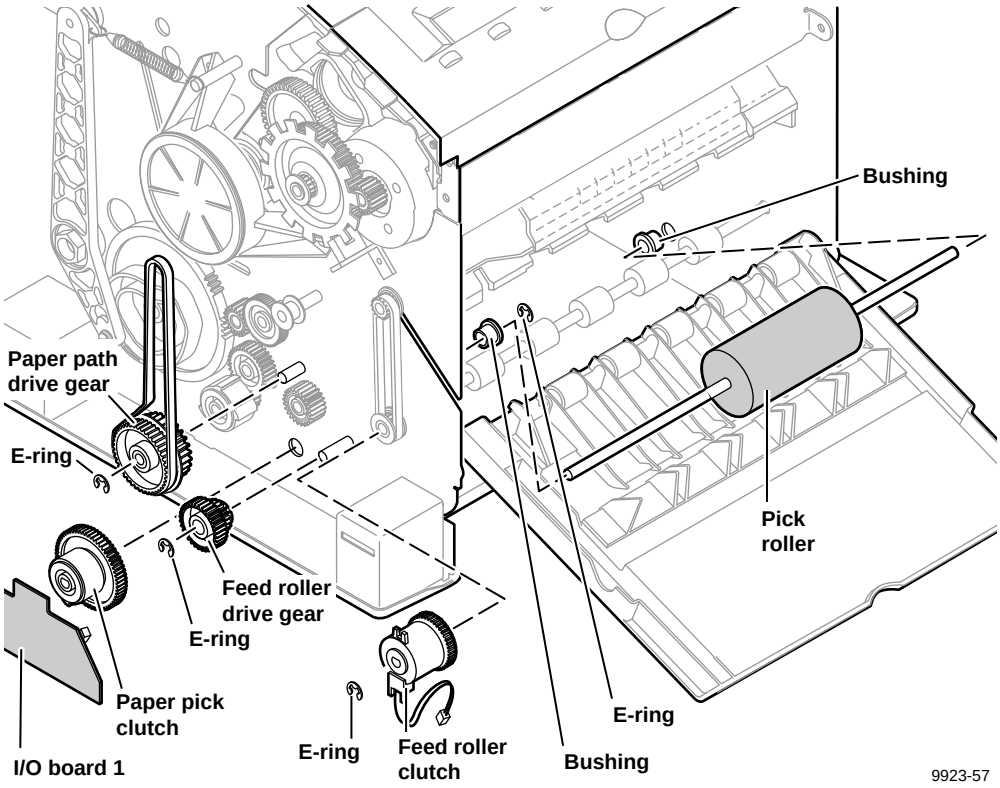


Figure 8-27 Removing the pick roller

Caution *After reinstalling I/O board 1, before turning on the printer, you should **always** make sure that the head tilt cam gear is latched by the head tilt solenoid and that the head tilt cam gear is disengaged (via its missing teeth) to the drive gear.*

Head tilt cam gear

Tools required

- Magnetic screwdriver
- T-15 TORX tip
- T-20 TORX tip
- Small screwdriver or E-ring puller

1. Turn off the printer and remove the power cord.
2. Open the top cover.
3. Remove the top cover and left-side covers.
4. Disconnect the wiring harnesses leading to I/O board 1.
5. Remove I/O board 1 as detailed in the procedure "I/O board 1" on page 8-50.
6. Remove the E-ring securing the head tilt cam gear to the its printer frame shaft.
7. Rotate the process motor gear clockwise to place the printhead in its print position (tilt forward position).
8. Move the printhead's x-axis to the home position. The head tilt arm should be away from the cam.
9. Remove the cam follower pin's securing screw and adjuster from the lower end of the tilt arm.

10. To remove the cam follower pin, push it through the head tilt arm and into the groove of the head tilt cam gear.

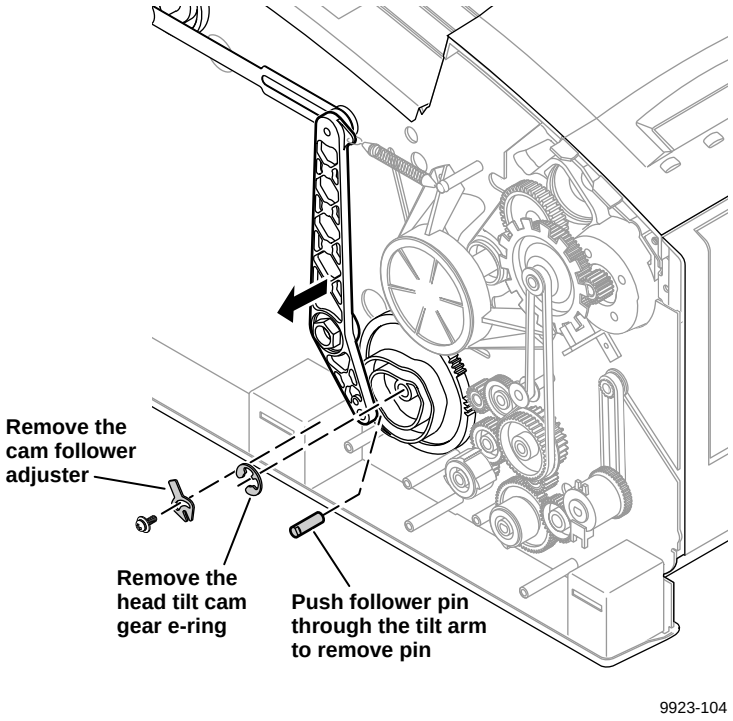


Figure 8-28 Removing the cam follower pin

11. Leaving the tilt arm in its current tilt-forward position, rotate the head tilt cam gear to position the toothless portion of the gear behind the tilt arm. This allows the cam-shaped portion of the gear to clear the tilt arm as you remove the gear.

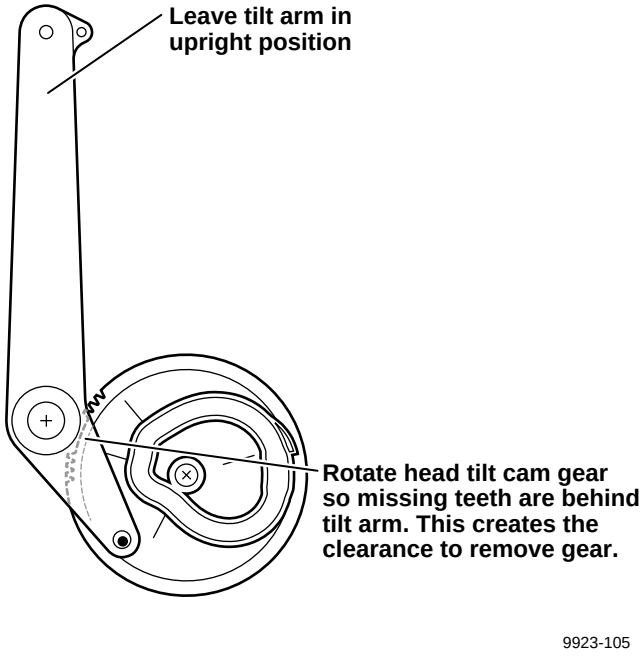


Figure 8-29 Removing the head tilt cam gear

12. Pull on the head tilt cam gear to remove it from its shaft. You may need to pull (5:00 position) and push (11:00 position) on the cam to work it off the shaft.

Replacement

1. Before installing the new head tilt cam gear, lubricate the following points with grease (006-7997-00):

- **a.** the groove that the cam follower pin travels.
- **b.** the cam lobe on the back of the tilt cam gear.
- **c.** the shaft for the tilt cam gear.

2. Position the new tilt cam gear as specified in Step 11 and install it.

3. Rotate the tilt cam gear until it no longer engages with its drive gear.

4. Install the cam follower pin.

5. Adjust the cam follower pin:

   a. Align the center of the cam follower pin to the centerline of the head tilt cam gear's groove.

   b. Slowly rotate the head tilt cam gear clockwise. As the follower pin enters the narrow portion of the gear's groove (printhead in the print position), ensure that the pin enters the narrow groove without striking the groove walls.

   c. If necessary, rotate the cam follower pin's adjuster to align the follower pin to the narrow groove. Tighten the adjuster to secure the follower pin in position.

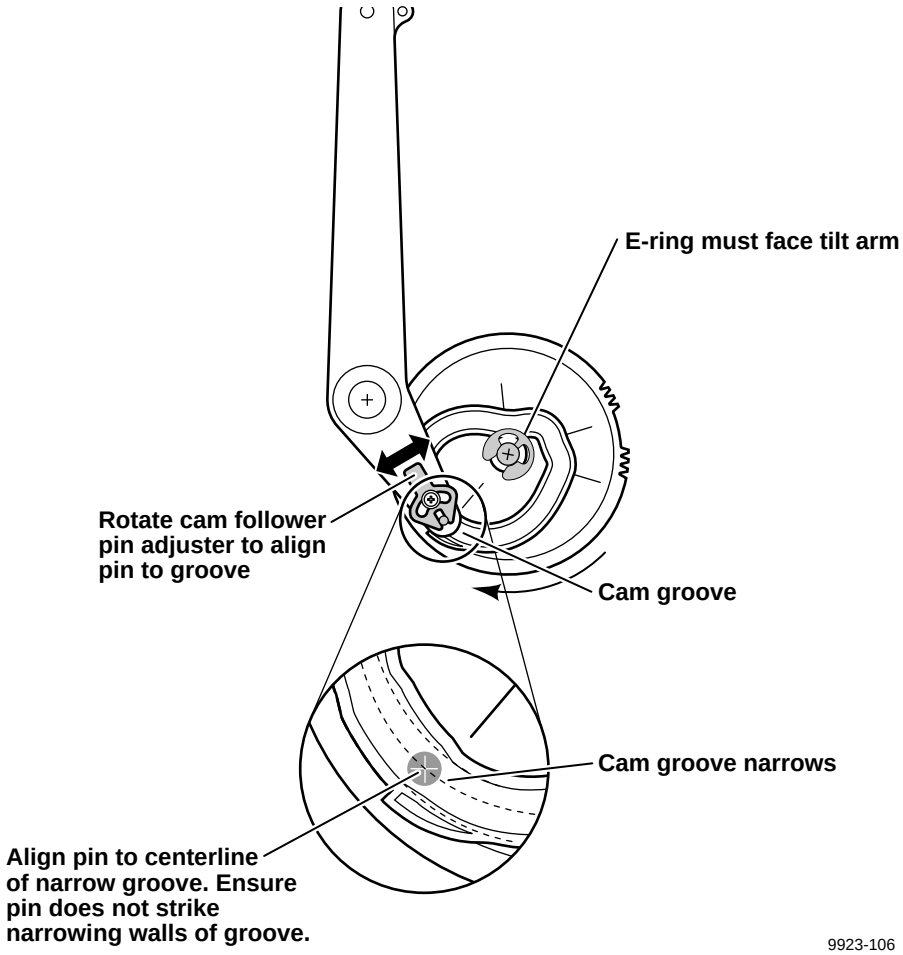


Figure 8-30 Adjusting the cam follower pin

6. Secure the head tilt cam gear with its E-ring. Position the E-ring so its open end faces the cam follower pin.

Caution The E-ring must be positioned so its open end faces the cam follower pin. Otherwise, the tilt arm will strike the e-ring when the printhead tilts to maximum tilt-back position.

7. Rotate the head tilt cam gear to its print position.

8. Reinstall I/O board 1 and reconnect its wiring harnesses.

Caution *After reinstalling I/O board 1, before turning on the printer,* ***always*** *make sure that the head tilt cam gear is latched by the head tilt solenoid and that the head tilt cam gear is disengaged (via its missing teeth) to the drive gear.*

9. Reinstall the printer covers.

10. Power-up the printer and make a test print.

Circuit boards

I/O board 1

Tools required

- Magnetic screwdriver
- T-15 TORX tip
- T-20 TORX tip

1. Turn off the printer and remove the power cord.
2. Remove the left-side cover as explained in the earlier topic, "Cabinet panels and covers" on page 8-4.
3. Disconnect the wiring harnesses leading to I/O board 1.
4. Remove the five screws securing I/O board 1 to the engine frame. Remove the interconnect board.

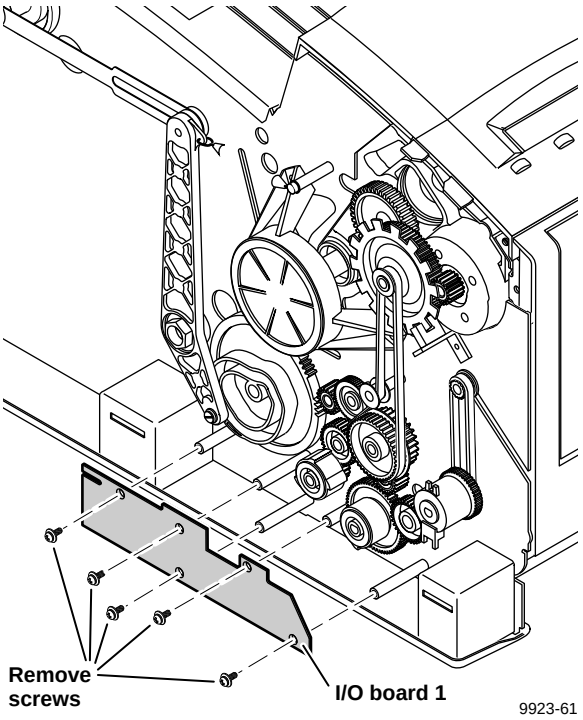


Figure 8-31 Removing I/O board 1

Caution *After reinstalling I/O board 1, before turning on the printer, you should* ***always*** *make sure that the head tilt cam gear is latched by the head tilt solenoid and that the head tilt cam gear is disengaged (via its missing teeth) to the drive gear.*

I/O board right and transfix solenoid/sensor bracket

Tools required

- Magnetic screwdriver
- T-15 TORX tip
- T-20 TORX tip

1. Turn off the printer and remove the power cord.
2. Remove the right-side cover as explained in the earlier topic, "Cabinet panels and covers" on page 8-4.
3. **I/O board right:**
   a. Disconnect the wiring harnesses leading to I/O board right.
   b. Remove the five screws securing I/O board right to the engine frame.
   c. Remove the board.
4. **I/O board 3:**
   a. Disconnect the wiring harness from transfix solenoid/sensor bracket.
   b. Disconnect the remaining wiring harnesses.

5. Remove the three screws securing transfix solenoid/sensor bracket to the engine frame. Remove the bracket.

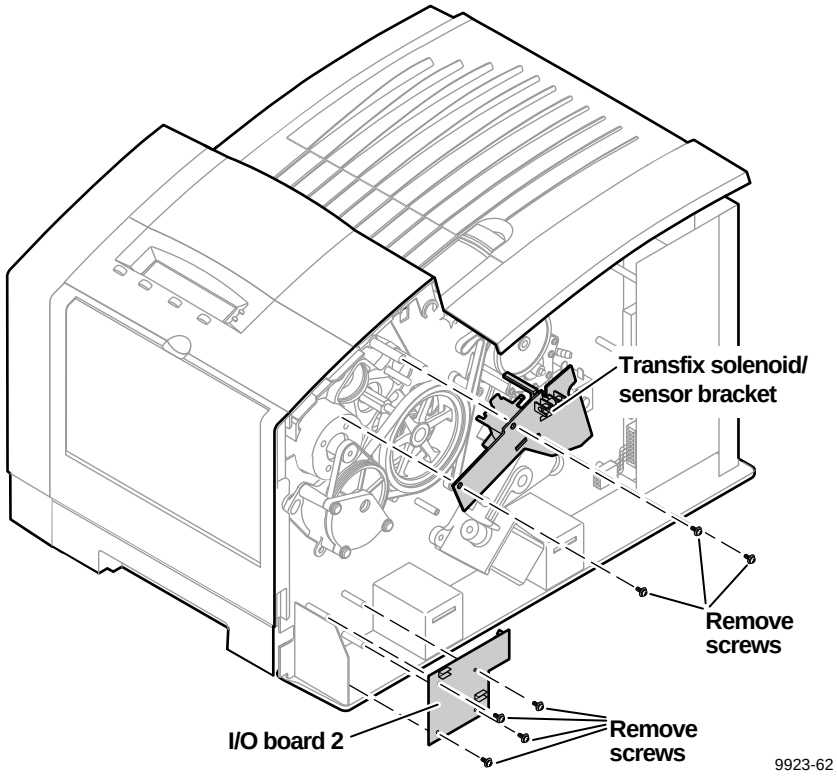


Figure 8-32 Removing I/O board right and the transfix solenoid/sensor bracket

Note *Refer to Appendix C "Wiring Diagrams" for details on where each wiring harness connector plugs into the I/O boards. Additionally, each connector receptacle on the boards is labeled for its wiring harness.*

I/O board 4

I/O board 4 is an integral part of the paper preheater. If I/O board 4 fails and must be replaced, replace the paper preheater. Refer to the earlier topic "Paper preheater" on page 8-17.

Power control board

Tools required

- Magnetic screwdriver
- T-15 TORX tip
- T-20 TORX tip

1. Turn off the printer and remove the power cord.
2. Remove the top, rear, left-side and right-side covers as explained in the earlier topic, “Cabinet panels and covers” on page 8-4.
3. Remove the ink loader as detailed earlier in the topic, “Ink loader” on page 8-6.
4. Remove the 12 screws securing the rear plate to the engine frame. Lift the plate and attached fan out of the way.
5. Disconnect the wiring harnesses leading to the power control board.
6. Remove the two vacuum accumulator securing screws. Remove the vacuum accumulator.

7. Remove the three screws securing the power control board to the engine frame. Lift and remove the power control board.

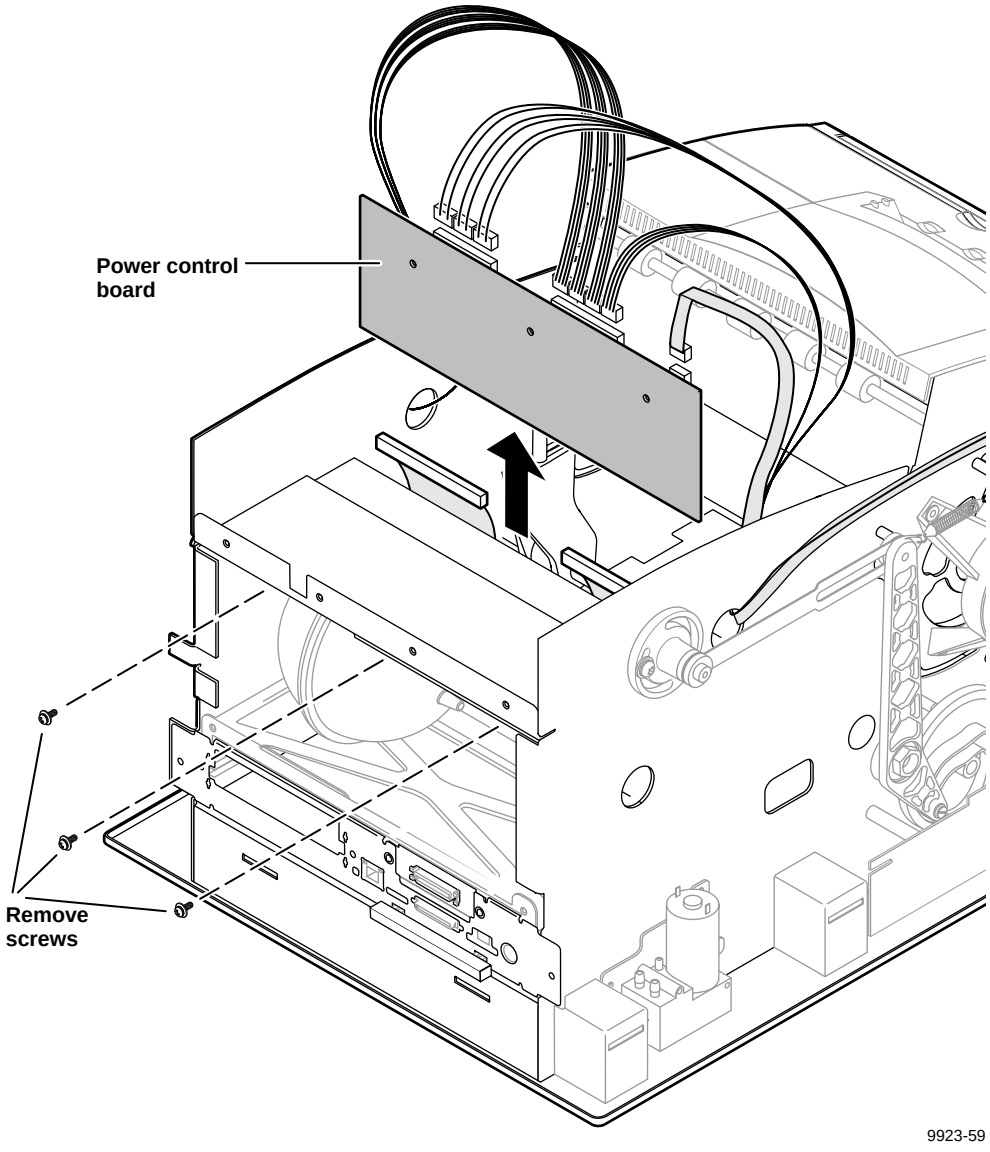


Figure 8-33 Removing the power control board

Interconnect board

Tools required

- Magnetic screwdriver
- T-15 TORX tip
- T-10 TORX tip
- T-20 TORX tip

1. Turn off the printer and remove the power cord.
2. Remove the top, rear, left-side and right-side covers as explained in the earlier topic, “Cabinet panels and covers” on page 8-4.
3. Remove the ink loader as detailed earlier in the topic, “Ink loader” on page 8-6.
4. Remove the printhead as explained in the earlier topic, “Printhead” on page 8-33.
5. Remove the main board as explained in the later topic, “Main board” on page 8-57.
6. Disconnect the wiring harnesses leading to the interconnect board.
7. Remove the drum maintenance cartridge.

8. Remove the seven screws securing the interconnect board to the engine frame. Lift and remove the interconnect board.

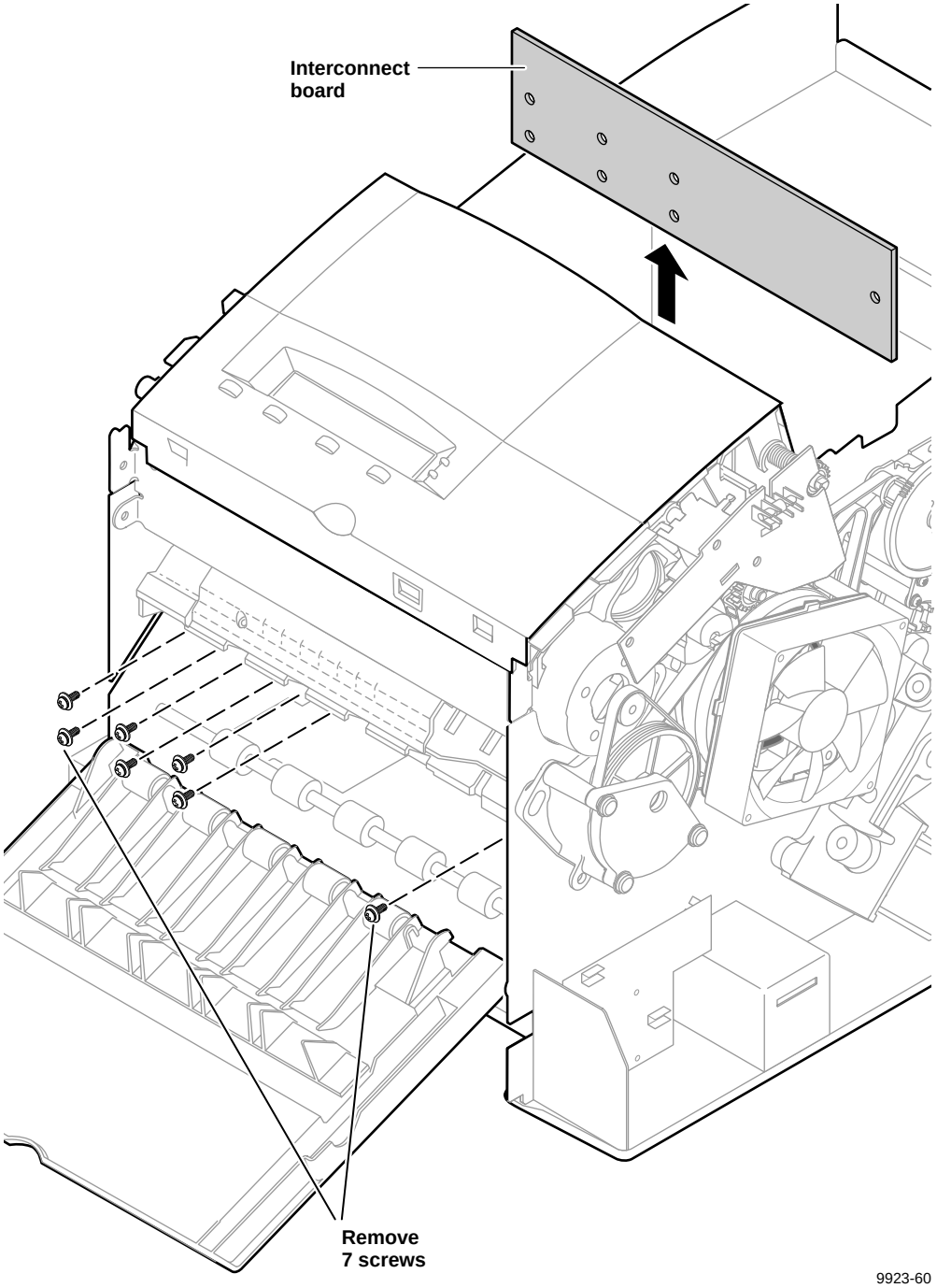


Figure 8-34 Removing the interconnect board

Main board

Tools required

- Magnetic screwdriver
- T-15 TORX tip
- T-20 TORX tip

Caution *After replacing the main board, before turning on the printer, **always** make sure that the head tilt cam gear is latched by the head tilt solenoid and that the head tilt cam gear is disengaged (via its missing teeth) to the drive gear.*

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 image processor board.

Reverse these steps to reinstall the main board. If you are replacing the main board, swap the socketed NVRAM chip and printer ID chip with the new board so the printer's settings and Ethernet address are retained. Also swap the network card, ROM SIMM and the RAM SIMM as described in the following procedures.

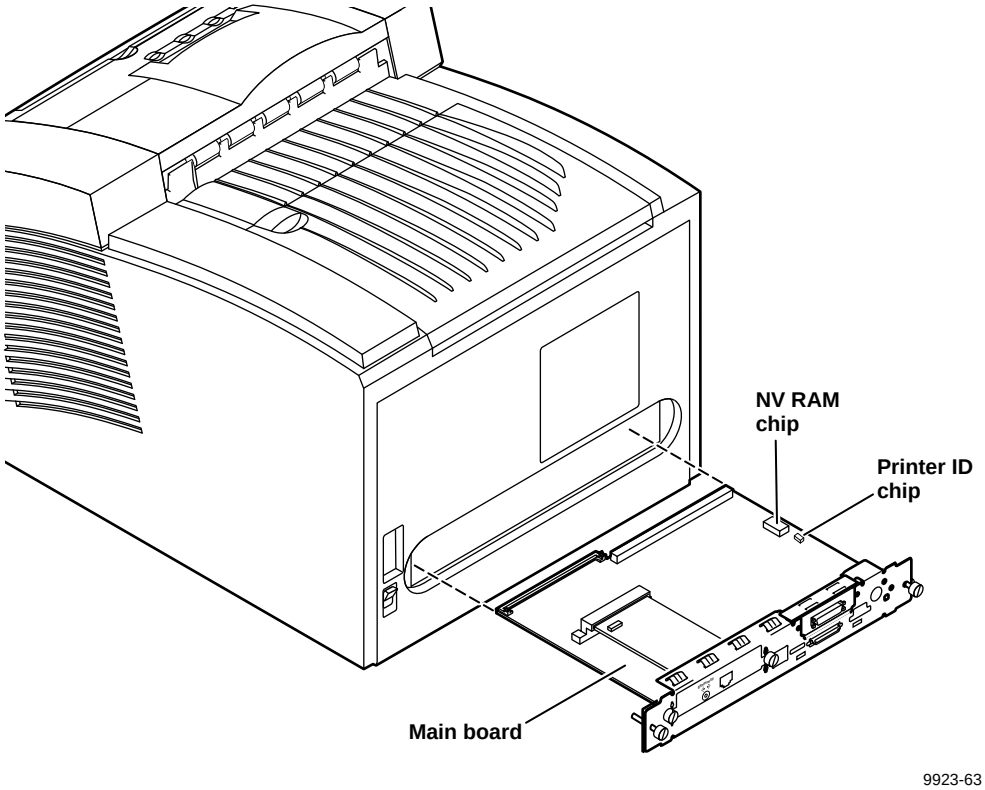


Figure 8-35 Removing the main board

RAM SIMM

The printer accepts either 8-Mbyte, 16-Mbyte and or a 32-Mbyte RAM SIMMs. In the printer with 24-Mbytes of RAM, connector DRAM 0 contains an 16-Mbyte RAM SIMM and connector SIMM 1 contains an 8-Mbyte RAM SIMM. Ram upgrades involve installing 16- or 32-Mbyte RAM SIMMs. The printer recognizes any sizes RAM SIMM in any RAM SIMM slot.

1. Power down the printer. Leave the power cord plugged in to provide a ground path for static discharges.

2. Loosen the two rear panel securing screws.

3. Slide out the main board.

4. Generally, connector DRAM 1 contains the lowest-size RAM SIMM as installed by the factory. For upgrades, verify that you are removing the lowest-size RAM SIMM.

   671-3318-00 8-Mbyte RAM SIMM
   671-3133-00 16-Mbyte RAM SIMM
   671-3138-00 32-Mbytes RAM SIMM

   Release the RAM SIMM installed in connector DRAM 1 by spreading the pawls securing each end of the SIMM in the connector.

5. Insert a memory module (16-Mbyte or 32-Mbyte) in connector DRAM 1 (**a**), and tilt the module down until it locks in place (**b**).

When properly inserted, a tab on each end of the connector slips into a hole on each end of the RAM SIMM. Also, a pawl on each end of the connector latches around each end of the RAM SIMM to lock it in place.

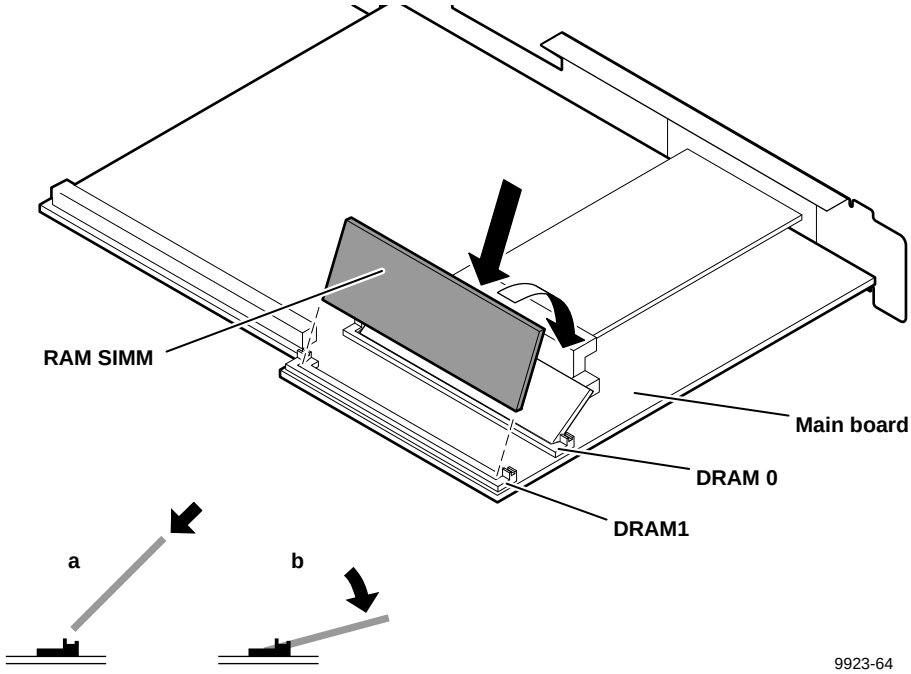


Figure 8-36 Installing the RAM SIMM on the main board

6. Reinstall the main board into the printer.

7. Reconnect the host interface cables. Turn on the printer and print the start page to verify the memory installation.

Code ROM SIMM

The code ROM SIMM contains both print engine and PostScript firmware.

1. Power down the printer. Leave the power cord plugged in to provide a ground path for static discharges.
2. Loosen the two rear panel securing screws.
3. Slide out the main board.
4. Remove the currently installed code ROM SIMM by spreading apart the pawls securing each end of the SIMM in its connector. Remove the SIMM.
5. Insert a replacement code ROM SIMM in connector CODE (**a**), and tilt the SIMM down until it locks in place (**b**).

   When properly inserted, a tab on each end of the connector slips into a hole on each end of the code ROM SIMM. Also, a pawl on each end of the connector latches around each end of the SIMM to lock it in place.

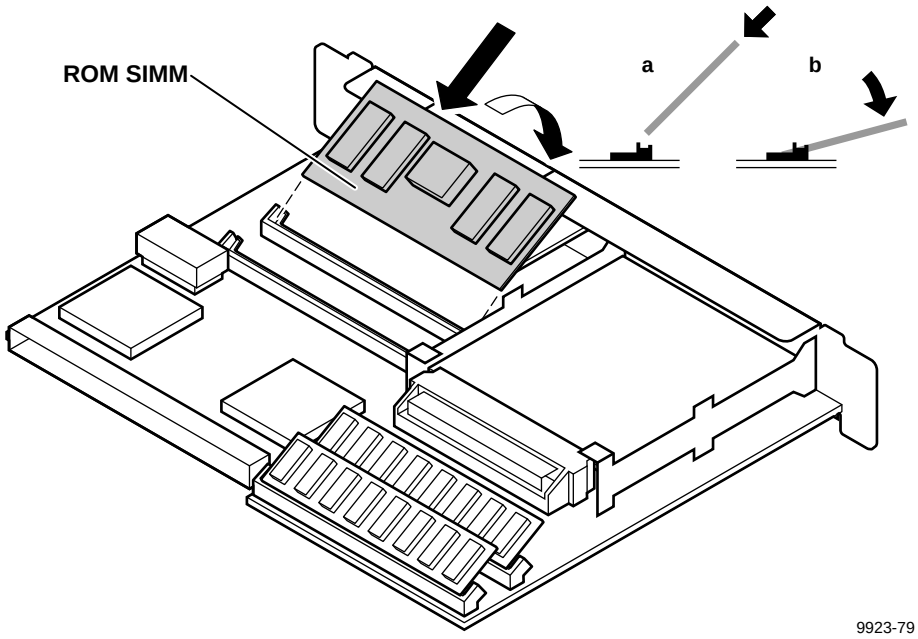


Figure 8-37 Installing the code ROM SIMM on the main board

6. Reinstall the card cage top and the rear cabinet panels.
7. Reconnect the host interface cables. Turn on the printer and make a test print.

Font SIMM

1. Power down the printer. Leave the power cord plugged in to provide a ground path for static discharges.
2. Loosen the two rear panel securing screws.
3. Slide out the main board.
4. If installed, remove the currently installed font SIMM by spreading apart the pawls securing each end of the SIMM in its connector. Remove the SIMM.
5. Insert a replacement font SIMM in connector FONT (**a**), and tilt the SIMM down until it locks in place (**b**).

   When properly inserted, a tab on each end of the connector slips into a hole on each end of the font SIMM. Also, a pawl on each end of the connector latches around each end of the SIMM to lock it in place.

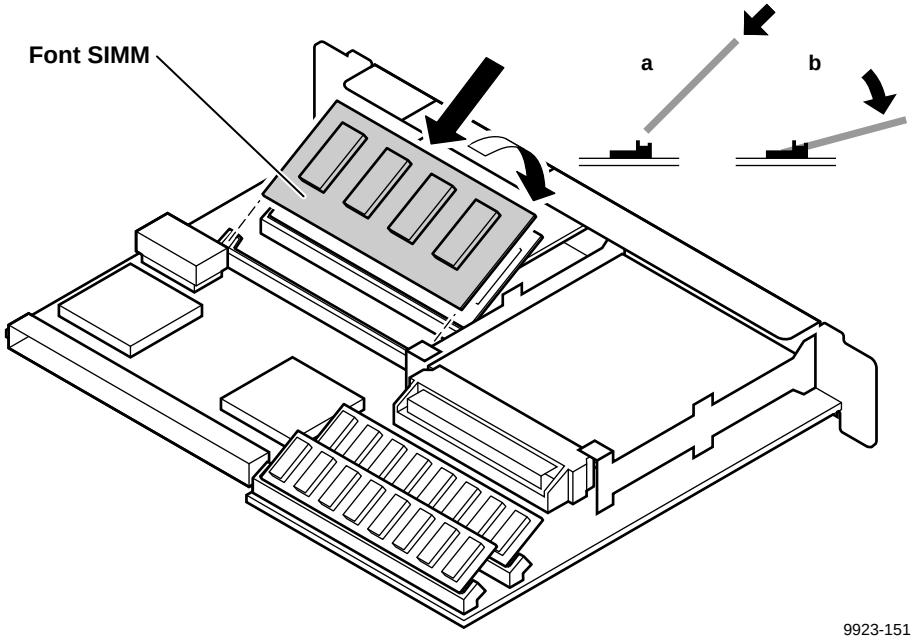


Figure 8-38 Installing the font SIMM on the main board

6. Reinstall the card cage top and the rear cabinet panels.
7. Reconnect the host interface cables. Turn on the printer and make a test print.

Network card

1. Power down the printer. Leave the power cord plugged in to provide a ground path for static discharges. Remove the interface cable.
2. Loosen the two securing screws holding the Phaser Share network card and remove it.
3. Slide in the replacement network card and tighten the two thumb screws.

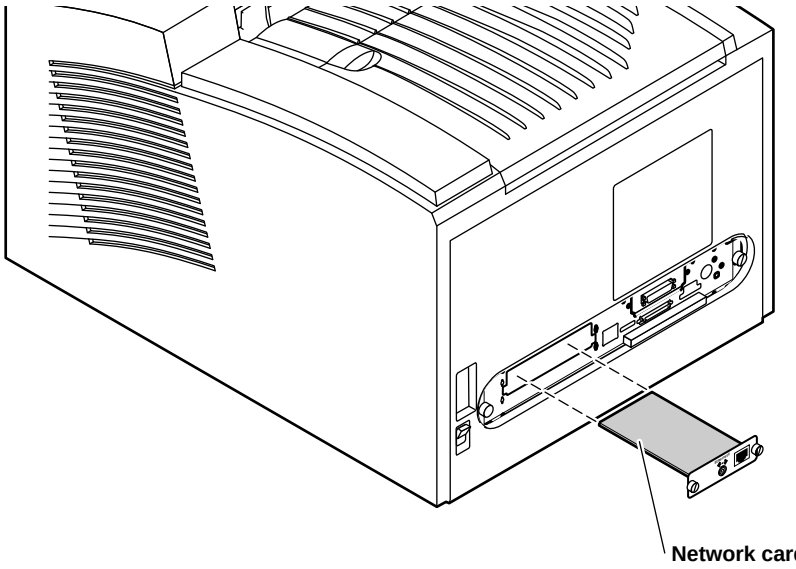


Figure 8-39 Installing the network card in the printer

4. Reconnect the interface cables. Turn on the printer and print the configuration page; it lists information regarding the Ethernet interface.
5. For installations of a new Ethernet card, affix the Ethernet address label to the underside of the top cover where it can easily be accessed.

Chapter

9 Checks and Adjustments

Required tools summary

- Magnetic tip screwdriver — 8.5 in. 003-0293-00
  - Extension tip 003-1388-00
    T10 TORX tip 003-0814-00
    T15 TORX tip 003-0966-00
    T20 TORX tip 003-0866-00
    T25 TORX tip 003-1462-01
- Phaser 360 tool kit 650-3300-00
  - Torque-limiting screwdriver 003-0827-00
  - Printhead-to-drum gap tool 003-1499-00
  - Encoder disk spacer tool 003-1489-00
  - Y-axis belt tensioner 003-1500-00
  - 9/64" hex balldriver bit, 3 in. 003-1506-00
  - Serial cable adapter, level shifter 174-3493-00
  - Mini DIN8-to-DB25M serial cable 012-1498-00
- PC-based diagnostics diskette 063-2295-00
- Hex wrench kit 003-1344-00
- Grease 006-7997-00
- Antistatic mat 006-7056-00
- Flat-blade screwdriver
- Magnifying lens such as Micronta (Radio Shack) Cat# 63-851
- Alternate cables to run diagnostics from a PC:
  - DB9F-to-DB25M serial cable 012-1312-00
  - DB25F-to-DB25M serial cable 012-1313-00

Front panel menu

The print engine features an interactive menu that allows you to review or change the printer's stored parameters as well as initiate test prints and printer service routines.

1. Turn on the printer.

2. Allow the printer to complete its power-up self-tests. The front panel displays this menu:

```
Ready
Info  Clean   Menu
```

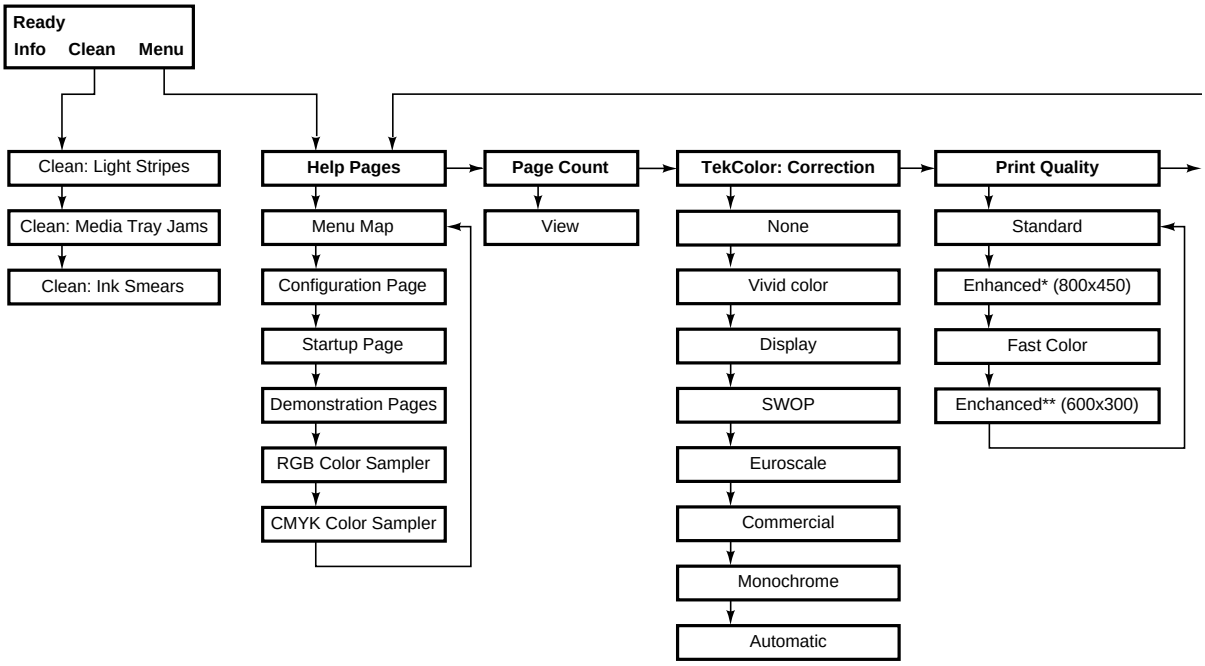


Figure 9-1 Main menu map

3. To access the **`Service Support Menu`**, scroll to the main menu item **`Service Support`** and then press the **`Menu`** and **`Exit`** button together. Pressing **`Menu`** alone allows you to access the printer copy counts, fault history and the printer's altitude setting.

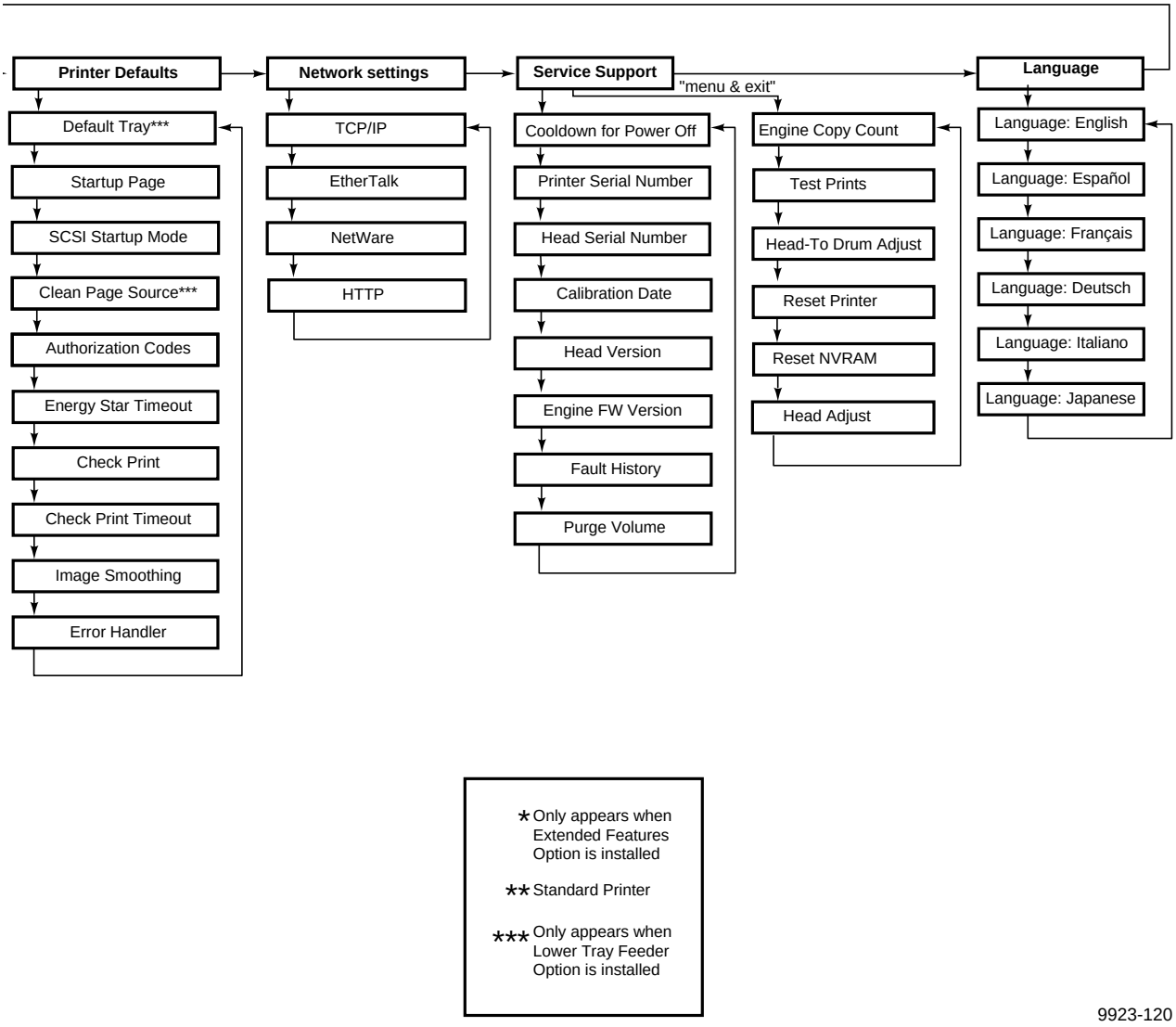


Figure 9-2 Main menu map (cont.)

Bypass 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 switches 2 and 3 into the *down* position. Ensure switches 1 and 4 are up. (Normal operation is all switches up.)

2. Turn on the printer.

The printer will not print a mud page nor a start-up page when placed in Bypass Mode.

Cool down mode

The printer features a menu item that accelerates the cooling down of the printhead.

1. Enter the extended menu by pressing **Menu** and **Exit** together.

2. Scroll to the **Service Suppor**t menu item and press **Menu.**

3. Scroll to the item **Cool-down for Power Off** and press **OK**.

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 informs you the printer can be turned off.

Printing test prints

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
   Info  Clean   Menu
   ```
3. Pressing the **Menu** and **Exit** buttons together to access the extended menu. At this level you can access all the main menu items.
4. Scroll to the main menu item **Service Support** and then press the **Menu** and **Exit** buttons together.
5. Scroll to the menu item **Test Prints** and press the **Menu** button to access the list of test prints.
6. Scroll to the desired test print and press the **Print** button.

Refer to Appendix B *Test Patterns*; it discusses each test print and what printing defect it reveals.

Printing the configuration page

While the printer is idle, press the **Menu** button to enter the printer's menu. Scroll to the *Help pages* menu item. Press the **Print** button to print the configuration page. 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 page 2-14 for an explanation of the configuration page.

Adjustments

Paper-feed belt tension adjustment

1. Turn off the printer and remove the left-side cabinet panel.

2. With a spring scale, press inward on the right side of the paper-feed belt. When properly set you should measure about 1 to 7 ft./lbs. (1/4 to 1/2 inches of deflection, 6 to 12 mm).

   To adjust the belt tension, loosen the paper-feed belt tensioner, adjust its position for proper belt tension and then tighten the tensioner in place. Do not over-tension the belt.

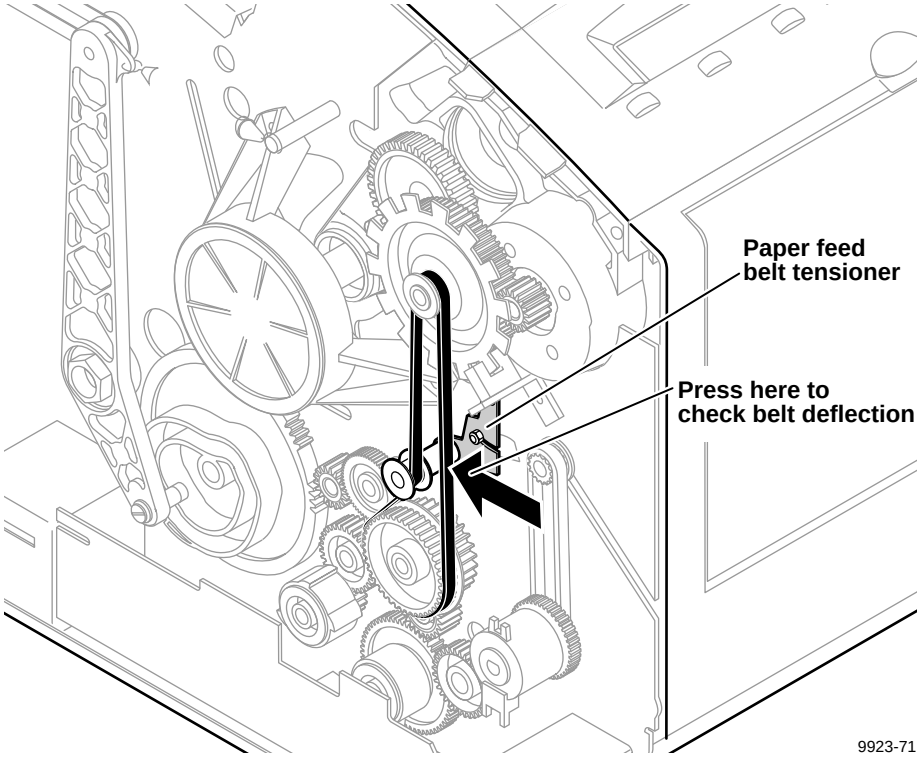


Figure 9-3 Setting paper-feed belt tension

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 screws that secure the Y-axis drive assembly are 1/4 turn loose.

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 Y-axis motor pulley 10 times to rotate the belts and seat them in place.

5. Beginning with the upper-right screw, tighten the three tension set screws to 30 in./lbs. to secure the Y-axis drive assembly in place.

6. Release the tension tool's lever arm and remove the tool.

7. Reassemble the printer and make a test print.

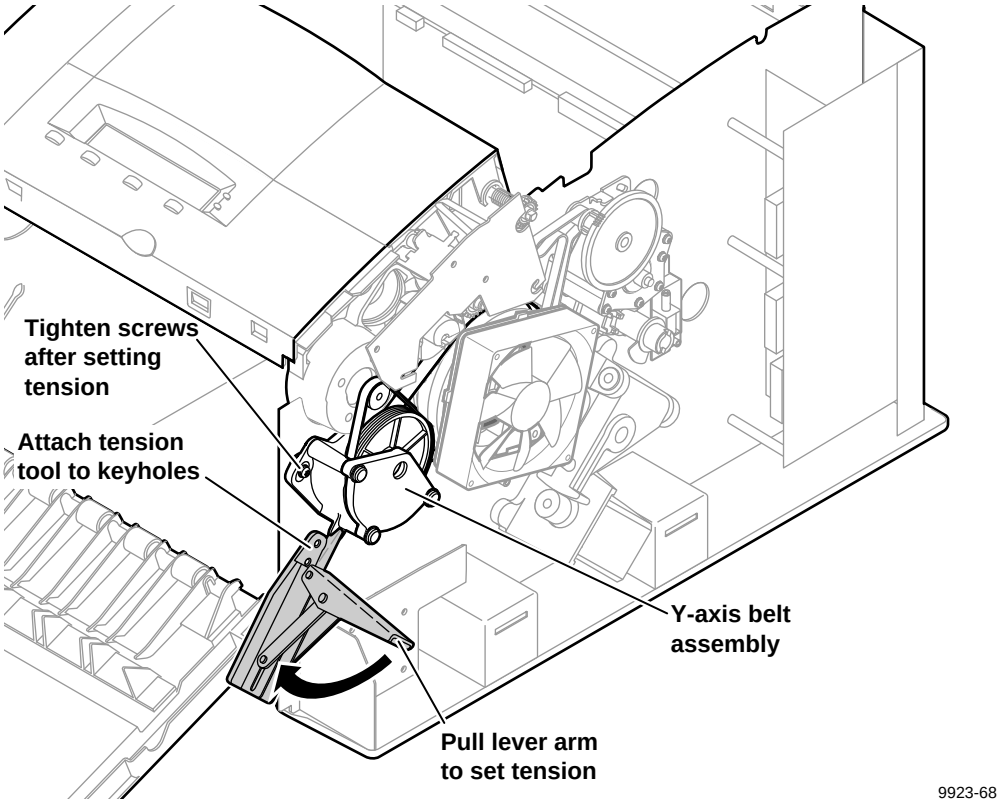


Figure 9-4 Setting the Y-axis belt tension

Printhead-to-drum spacing adjustment

Tool required

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

This procedure assures that the printhead is the proper distance from the drum. Make this adjustment after removing or replacing the printhead. If you cannot use the PC diagnostics to assist with this procedure (due to security restrictions at the customer site), then do the following: During the procedure allow the printer to power up to its `Ready` state and then open the front panel to stop all motor motion (the printhead will start to cool), quickly continue the procedure at Step 4. When you finish the adjustment, close the front door, allow the printhead to warm up and then check the adjustment.

1. Remove the top cover as described in the topic "Cabinet panels and covers" on page 8-4.

2. Start the PC-based diagnostics program. Refer to the topic "PC-based diagnostics" on page 6-29. 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.

3. When the printer is ready, press **Enter** to stop the drum and begin the gap adjustment.

t

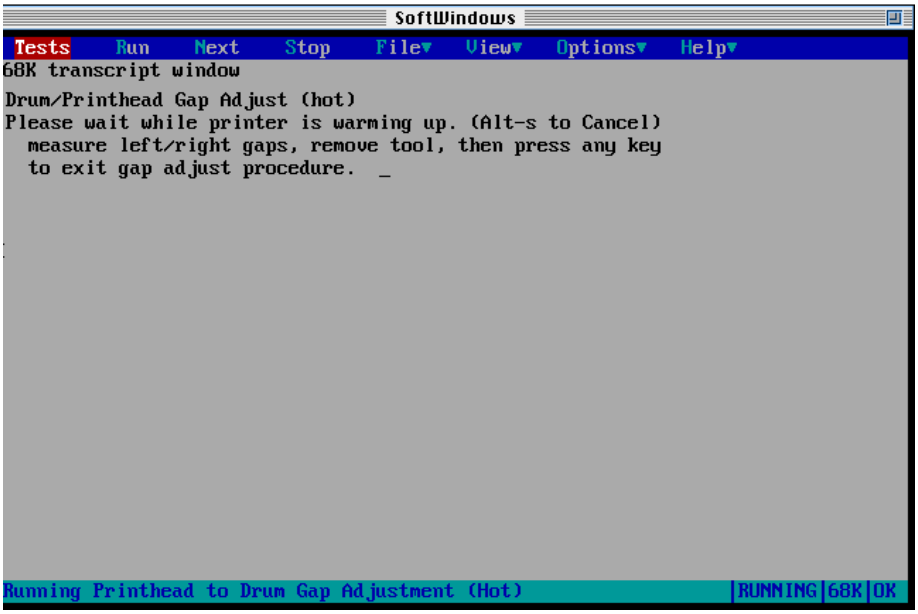


Figure 9-5 Printhead to drum gap adjustment menu

4. If not already tightened, tighten the printhead mounting screws to 20 in. lbs.

5. 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.

6. At one end of the printhead, slide the printhead gap tool, between the printhead and the drum. Align the outside edge of the tool with the inside surface of the printer side-frame. The flat side of the gap tool, marked HEAD, faces the printhead.

   Hold the gap tool so its **2 HOT 3** mark (which represents a 0.024 inch gap between the printhead and the drum) is level with the *bottom* of the notch in the side of the printer frame. With a small, flat-blade screwdriver, minutely move the printhead to hold the gap tool snugly but still allow it to be easily removed. You should not feel any tension or gripping between the printhead and the drum between marks **1** and **2** (which equals a 0.022 inch gap).

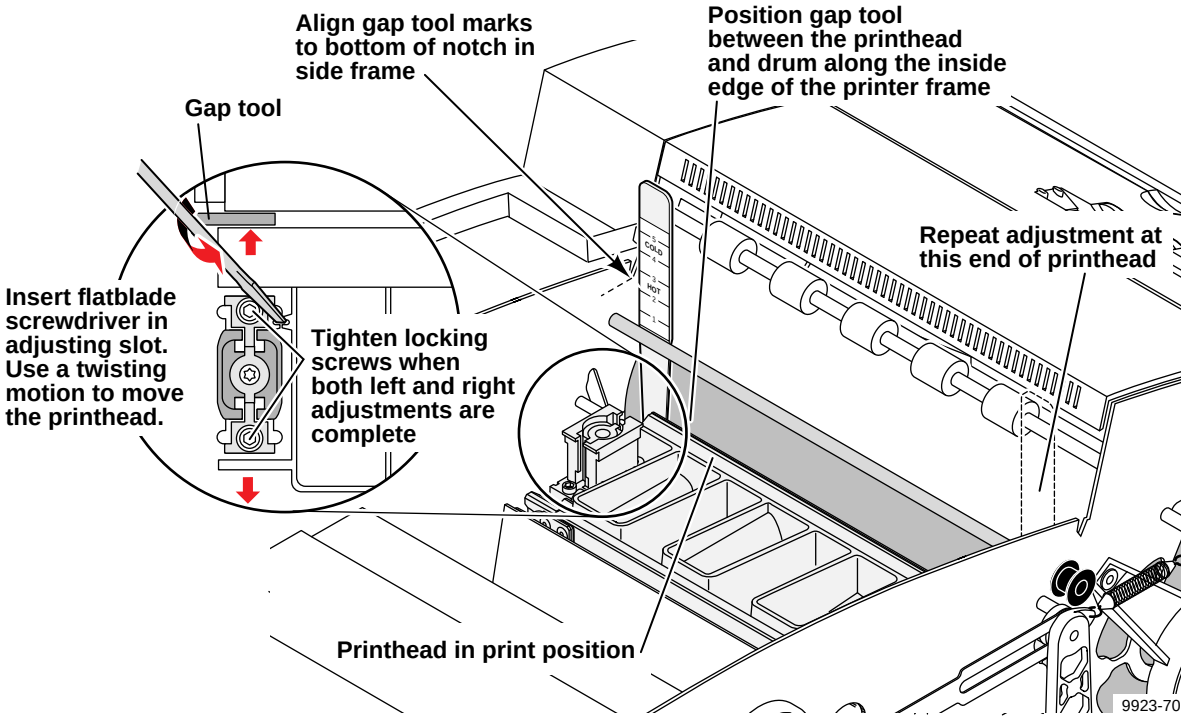


Figure 9-6 Spacing the printhead to the drum

7. Repeat the gap adjustment in Step 7 for the other end of the printhead.

8. Snug the four locking screws using an X-pattern. Then tighten the four screws, using the same X-pattern, to 20 in./lbs.

9. Recheck the gap on both end of the printhead.

10. Print Service Test Print 11 to check alignment. Reinstall the top cover.

Cap/wipe/purge assembly belt adjustments

The tension of the cap/wipe/purge assembly belts is factory-set. Do not adjust them. 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 the belts carry 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. Also ensure that the cap/wipe/purge drive motor is installed in place and that both the left- and right-side drive belt tension springs are hooked in place.

2. Rotate the large drive gear to pull the cap/wipe/purge assembly to the top of its travel in the chassis frame slot.

3. Inspect the left- and right-side brackets of the cap/wipe/purge assembly relative to the top of the left- and right-side chassis frame slots; the gaps should be the same on each end.

4. If the gaps are not the same, unhook the cap/wipe/purge assembly drive belt tension spring on the left side of the printer to relieve tension on the belt. Slip the belt by one tooth over the left-side drive shaft gear. Hook the tension spring back in place and recheck the gap.

5. Repeat until the gaps are the same.

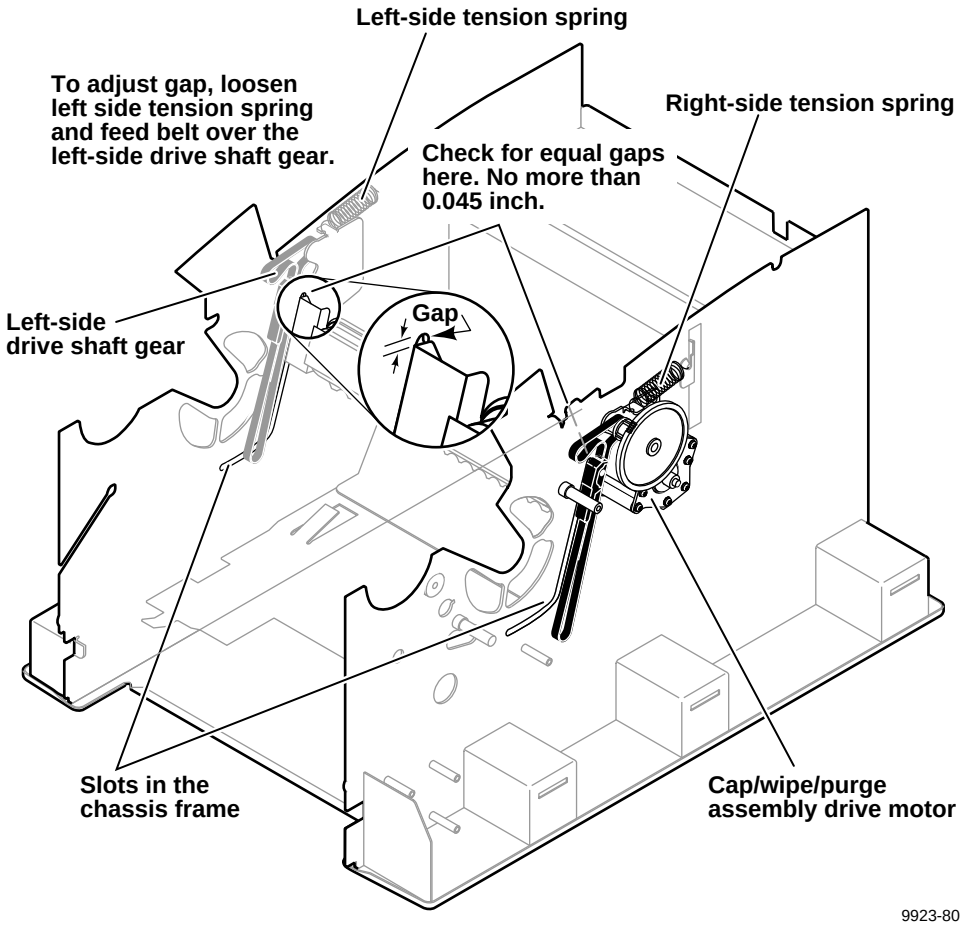


Figure 9-7 Aligning (timing) the cap/wipe/purge assembly drive belts

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, flat-blade screwdriver, slide the encoder wheel's retaining spring into the encoder wheel's groove.

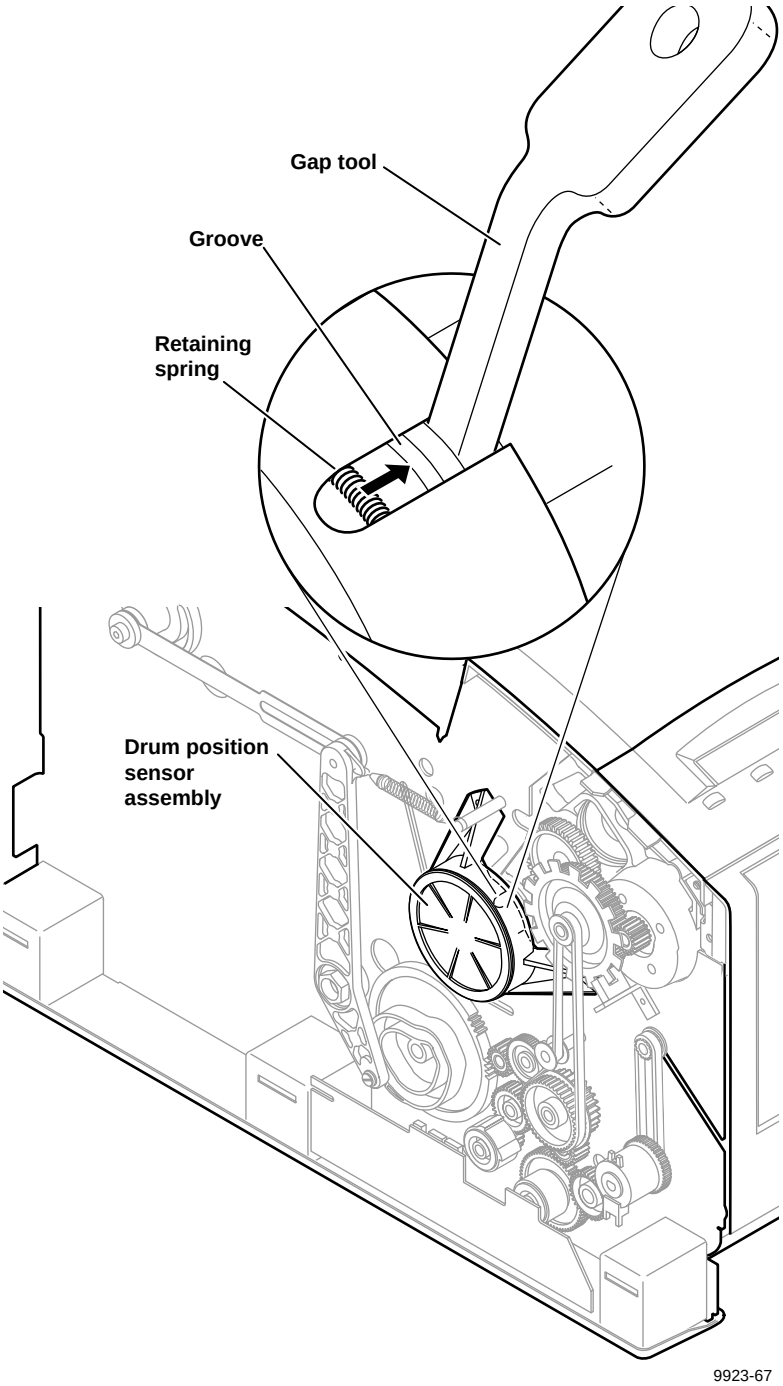


Figure 9-8 Setting the drum position encoder gap

6. Remove the gap tool. Reassemble the printer and make a test print.

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 and remove the power cord.

2. Remove the top and right-side covers as explained in the Chapter 8 topic, "Cabinet panels and covers" on page 8-4.

3. With a T-connector, connect the vacuum gauge to the inlet side of the solenoid valve. This allows you to check the action of the vacuum pump and accumulator.

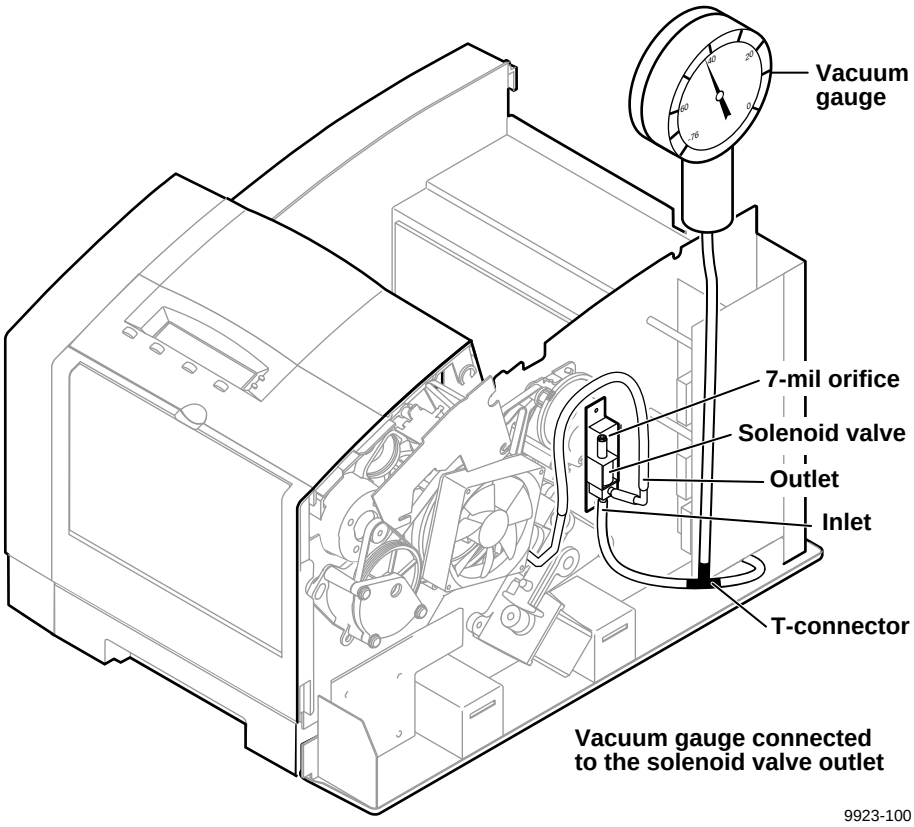


Figure 9-9 Connecting the vacuum gauge to the printer

4. Turn on the printer and enable the PC diagnostics as explained in the Chapter 6 topic "PC-based diagnostics" on page 6-29.

5. Scroll to and select the test suite **`Actuators`**. Select and run the test **`Purge Pump Vacuum Test`**.

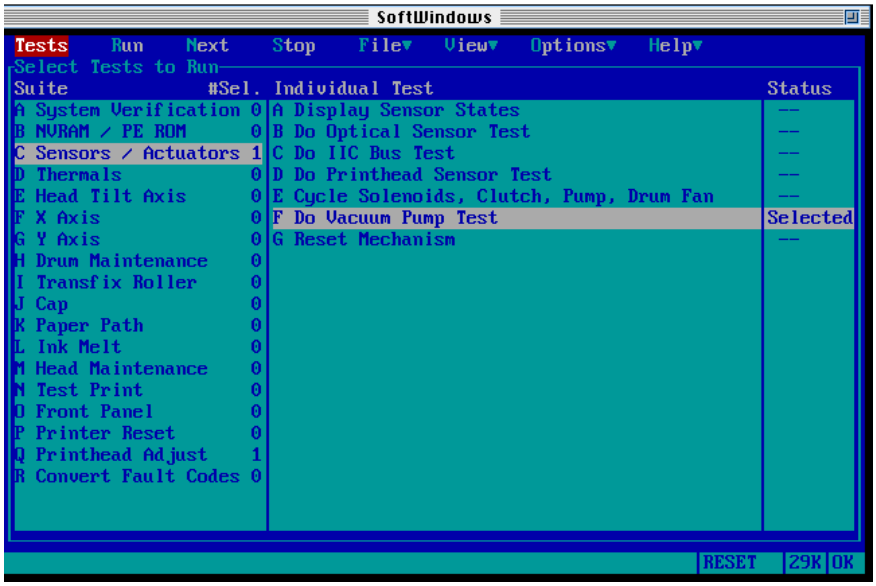


Figure 9-10 Selecting the vacuum check test

6. The test prompts you to measure the vacuum created in the accumulator as it runs the vacuum pump for about 90 seconds. You should see a vacuum of 51 cm Hg (20 in. Hg, 9.8 psi) created. As the solenoid valve is energized the vacuum should bleed off to 0 is about 5.6 seconds. 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.

7. Connect the vacuum gauge to the outlet side of the solenoid valve.

8. 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 the value 51 cm Hg (20 in. Hg, 9.8 psi) and within 5.6 seconds bled off to 0. This 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 at all then the air valve is not opening properly or the 7-mil orifice (a part of the valve solenoid) is blocked. *If the printhead is hot, such a condition can allow ink to be sucked into the vacuum system tubing.* If the vacuum bleeds off too quickly, then the cap/wipe/purge assembly is defective or check for the cap/wipe/purge assembly is not sealing properly to the faceplate. Check the cap/wipe/purge assembly is properly positioned by performing the "Cap/wipe/purge assembly belt adjustments" on page 9-11.

Resetting NVRAM

Resetting NVRAM returns *all* the printers's 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 and the authorization codes.

Caution *When servicing the printer, before turning on the printer, you should* ***always*** *make sure that the head tilt cam gear is latched by the head tilt solenoid and that the head tilt cam gear is disengaged (via its missing teeth) to the drive gear.*

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

1. With the printer in its Ready state, press **Menu**.
2. Scroll to the `Service Support` menu item.
3. Press **Menu** and **Exit** to enter the special service menu.
4. Scroll to the menu item `Reset NVRAM`.
5. 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 illustration

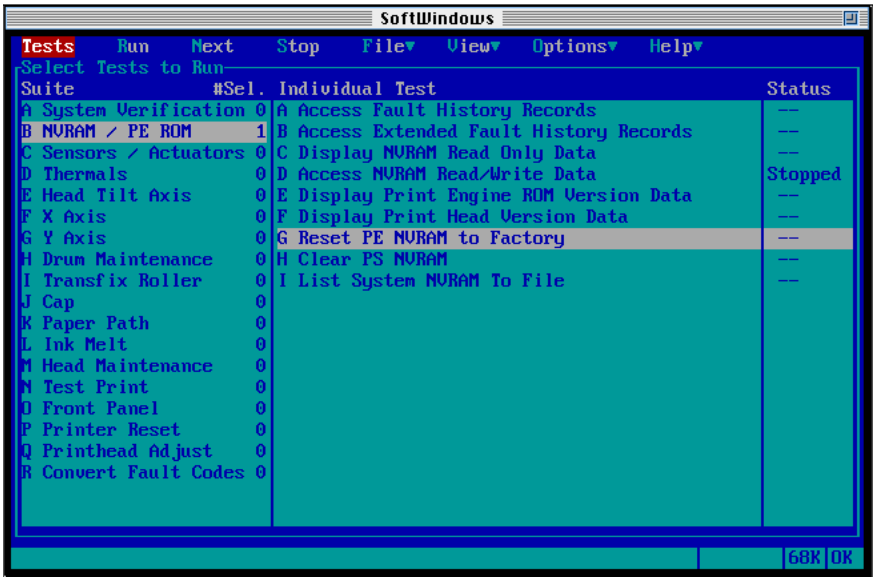


Figure 9-11 NVRAM menu

Viewing NVRAM contents

You can use the PC diagnostics' NVRAM Test menu to select a test item that lets you view the contents of NVRAM.

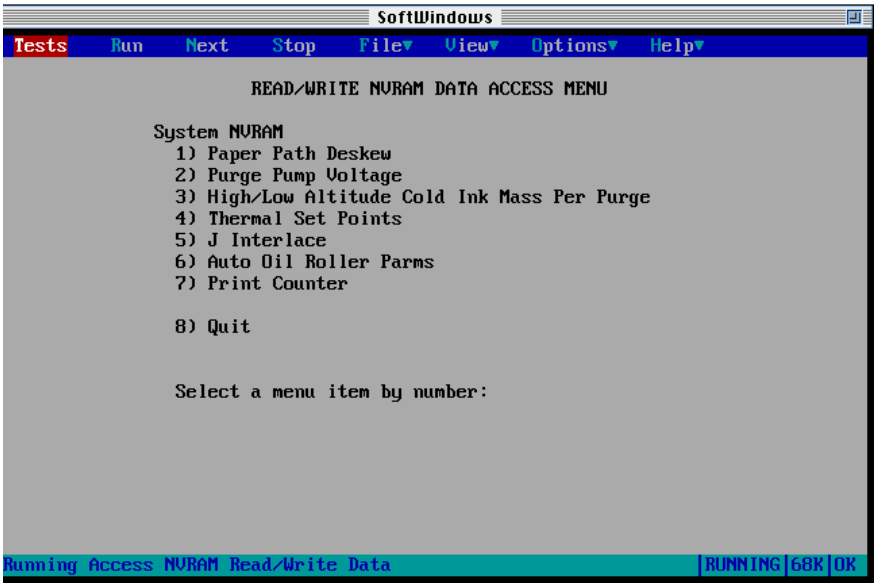


Figure 9-12 Viewing NVRAM contents

Appendix

A Field Replaceable Units List

This appendix provides a list of field replaceable units for the Phaser 360 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:

B*LxxDMY*

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 A-1 FRU exterior parts list

Figure A-1 parts	Part number	Serial number Effective	Discontinued	Quantity	Name and description
1	200-4364-00			1	Cover, Front Jam Access
2	200-4359-00			1	Cover, Stripper Access
3	200-4225-01			1	Cover, Top
4	200-4403-00			1	Cover Side, Right
5	200-4274-00			1	Cover Side, Left
6	200-4404-00			1	Cover, Back
7	367-0454-00			1	Handle, Release Lever
8	214-4639-00			2	Pivot Hinge, Front Cover
9	200-4220-00			1	Cap, Head Restraint
10	200-4402-00			1	Front Panel Cover

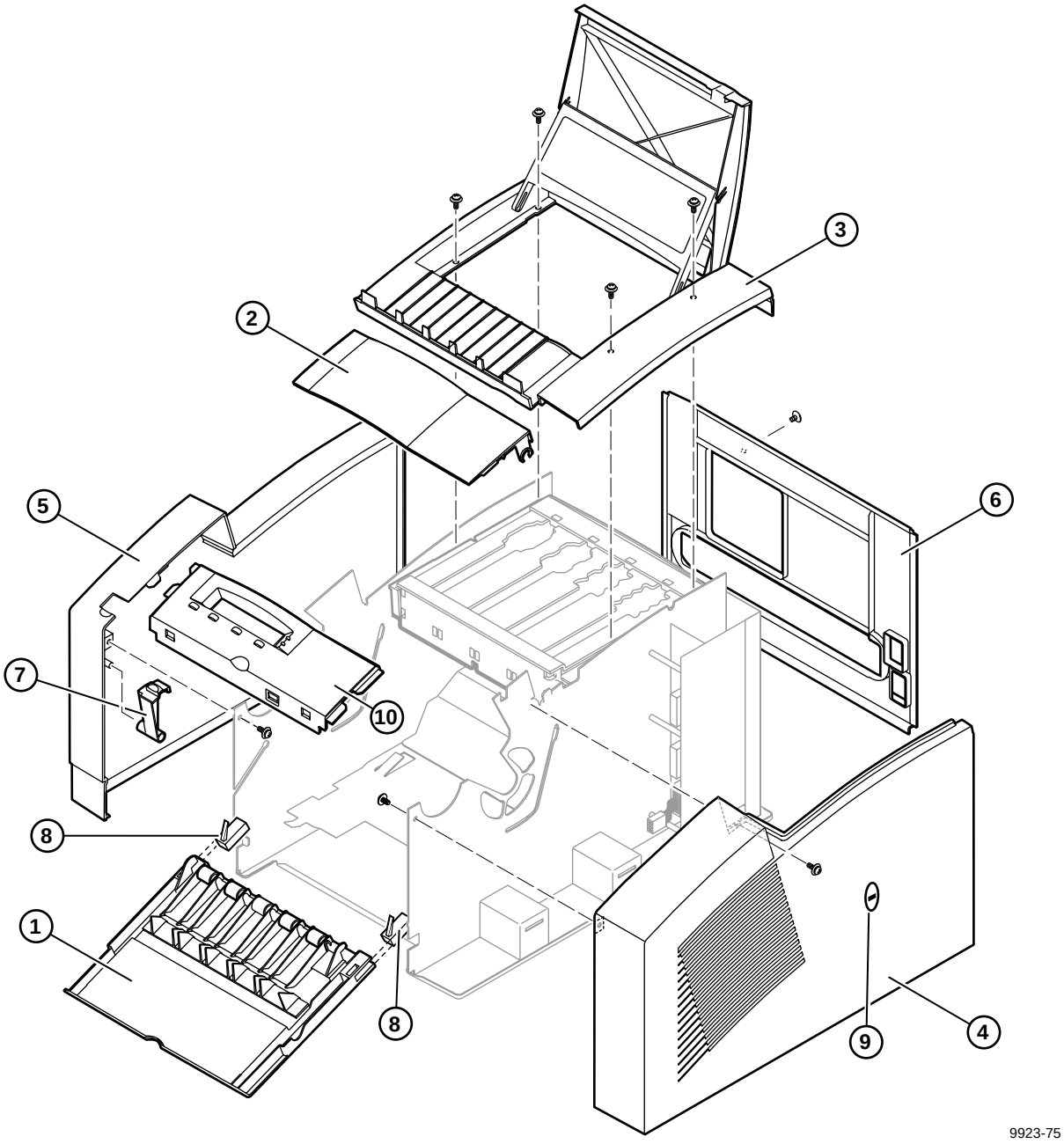


Figure A-1 The printer exterior FRUs

Table A-2 FRU interior parts list

Figure A-2 parts	Part number	Serial number Effective	Discontinued	Quantity	Name and description
	650-3641-00				Print engine w/o Main Board and SIMMs
2	650-3426-00			1	Finger, Stripper, Lower, Assembly
3	650-3752-00			1	Drum Temperature Sensor Assembly
4	650-3632-00			1	Drum/Transfix Assembly
5a, b	650-3299-00			1	Exit Roller and Lower Feed Roller
6	351-0959-00			1	Guide, Exit, Lower
7 7a	650-3645-00 119-5687-00			1 1	Front Panel Assembly with backlit LCD LCD backlit panel
8	650-3185-00			1	Cap/Wipe/Purge Assembly, PTC-regulate
9	650-3633-00			1	Printhead and Install Kit
10	166-0704-00			1	Rigid Vacuum Tube
11	650-3634-00			1	Ink Loader
12	174-3397-00			1	Head Ribbon Cable
13	671-4008-00			1	Circuit Board, Power Control
14	162-0474-00			1	Tube
15	671-4007-00			1	Circuit Board, Interconnect
16	119-4894-00			1	Fan, Rear
17a 17b	671-4302-00 671-4141-00			1	Masked code ROM SIMM Flash code ROM SIMM
18a 18b 18c	671-3318-00 671-3133-00 671-3138-00			1	8 Mbyte RAM SIMM 16 Mbyte RAM SIMM 32 Mbytes RAM SIMM
19	671-4140-80			1	Circuit Board, Main, exch. item
20a 20b 20c 20d 20e	671-3994-00 671-4034-00 671-3932-00 386-6998-00 213-1090-00			1 1 1 1 2	B Network card, Fast Ethernet, ZNBFE B Network card, LocalTalk, ZNBLT B Network card, TokenRing, ZNBTR Blank cover plate (no card installed) Blank cover plate thumbscrews
21	650-3635-00			1	Power Supply
22	650-3261-00			1	Motor, Stepper, Cap/Wipe/Purge Assembly, includes items 23 and 24
23				2	Belt, Cap/Wipe/Purge Drive - part of 650-3268-00 belt kit
24				1	Drive Gear - part of 650-3296-00 kit
25	650-3266-01			1	Solenoid Valve Assembly.
26	343-1580-00			1	Restraint, Printhead Shipping Assembly
27	174-3709-00			1	Cable, Adapter, HVAC, Printhead
28	650-3723-00			1	Transfix Solenoid/Sensor Bracket, Plastic
29	650-3262-00			1	Exit Gear Assembly
31	650-3186-00			1	X-Axis Drive Assembly

Table A-2 FRU interior parts list

Figure A-2 parts	Part number	Serial number Effective	Discontinued	Quantity	Name and description
32	119-4822-00			1	Sensor, Head Restraint
33	401-0732-00			1	Drum Ring Gear
34	650-3263-00			1	Y-Axis Pulley Assembly / with Belts
35	671-4061-02			1	Circuit Board, I/O Right
36	650-3724-00			1	Guide, Paper Tray, Right
37	214-4651-00			2	Drum Maintenance Tray Actuator, Left/Right
38	351-0963-01			1	Guide, Nose, Right
39	351-0969-00			1	Guide, Pick Assembly
40	351-0951-00			1	Guide, Paper Tray, Left
41	343-1566-00			1	Assembly, Spring/Retainer
42	351-0957-00			1	Guide, Nose, Left
43	351-0991-00			1	Guide Drawer Assembly, Right
44	351-0971-02			1	Guide Drawer Assembly, Left
45	401-0701-00			1	Roller, Pick Assembly
46	650-3643-00			1	Cooling Fan Assembly
47	386-6902-00			3	Tray Sense Buttons
48	671-3198-50			1	Paper Preheater Exit Sensor
49	650-3590-00			1	Paper Preheater Assy/ Upper Feed Roller
50	174-3890-00			1	Cable, I/O board 4 to I/O Right
51	174-3655-00			1	Cable w coil, I/O Board 4 to Front Panel
52	650-3639-00			1	Drum Heater Assy; Heater, Shield, Clip
53	147-0108-00			1	Process Motor
54	147-0109-01			1	Y-axis Drive Motor
55	671-3191-53			1	Circuit Board, I/O 1
56	202-0342-01			1	Accumulator
57	156-4691-00			1	NVRAM IC for Main Board
58	671-4275-00 671-4274-00 671-4273-00 671-4212-00				Font SIMM, Kanji, flash Font SIMM, Simplified Chinese, flash Font SIMM, Traditional Chinese, flash Font SIMM, Hangul (Korean), flash
59	671-4053-00			1	Circuit Board, SCSI, Riser
60	174-3707-00			1	Cable, Heater Control
61	174-3708-00			1	Cable, LVDC Power Supply
62	174-3710-00			1	Cable, HVAC, Drum/CWP Unit/Prehater
63	163-1003-00			1	Printer ID chip
64		B8Dxxxx and up		1	Vacuum/pump Assembly

Table A-2 FRU interior parts list

Figure A-2 parts	Part number	Serial number Effective	Discontinued	Quantity	Name and description
	174-3654-00			1	Cable, Extender, AC, Ink Loader
	650-3638-00				Hardware Kit
	650-3267-00				Bushing Kit
	650-3268-00				Belt Kit Belt, Paper Path Transport Belt, Paper Transport Belt, Drum Y-Axis Belt, Motor Y-Axis Belt, Cap/Wipe/Purge Drive, 2 per kit
	650-3289-00				Flag Kit Latch, Flag Flag, Exit Sensor Flag, Paper Out, Sense Flag, Hand Feed Flag, Paper-pick Flag, Paper Tray Sense Flag, Preheat Entrance Flag, A Flag, A-4 Flag, Exit Sensor Flag, Advance Gear / Home
	650-3296-00				Gear Kit Pulley, Lower, Paper Transport Gear, Compound, Paper Transport Gear, Drum Maint Lower Idler Gear, Paper Path Idler Gear, Shaft, Eccentric Gear, Compound, Shaft, Eccentric Gear, #13 Gear, #14 Pulley, Gear, Compound Pulley, Idler Pulley, Left Drive Roller, Maintenance Drive Belt Assembly Gear, Exit Roller Gear, Exit, Drum Pulley Gear, Exit, Idler Gear, DM, First Stage Gear, DM, Second Stage Gear, DM, Third Stage Gear, DM, Idle
	650-3298-00				Spring Kit Spring, Head Tilt Spring, Exit Disengage Spring, Belt Tensioner, Left Spring, Paper Tray Flag Spring, Drum Maintenance, Pivot Spring, Actuator Return, Jam Access Spring, Motor Mount, Right
	650-3299-00				Shaft Roller Kit Roller, Exit Roller, Lower Transport Cam, Drum Maintenance

Figure A-2 The printer interior FRUs

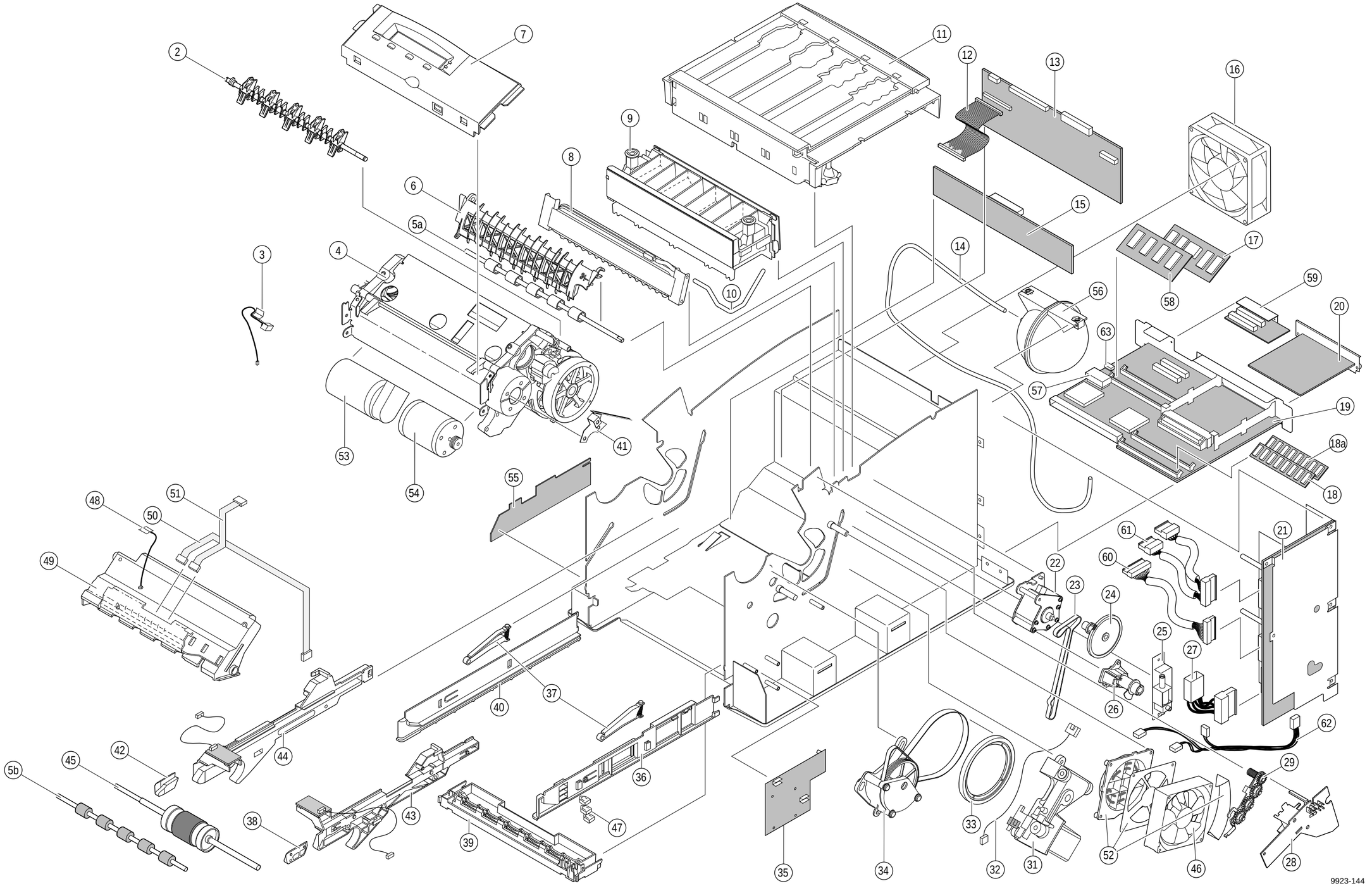


Table A-3 FRU interior part list (left side)

Figure A-3 parts	Part number	Serial number Effective	Discontinued	Quantity	Name and description
1	650-3430-00			1	Vacuum Pump Assembly
2				2	Belt, Cap/Wipe/Purge Drive, 2 Per - part of 650-3268-00 Belt Kit
3	650-3264-00			1	Position Sensing Assembly
4				1	Gear, Compound, Shaft, Eccentric - part of 650-3296-00 Kit
5	119-4968-00			1	Transfix Gear Position Sensor
6				1	Belt, Paper Transport - part of 650-3268-00 Belt Kit
7	650-3721-00			1	Clutch, Electric, Paper Transport
8	401-0706-01			1	Gear, Compound, Paper Path Assembly
9	401-0709-01			1	Clutch, Paper Pick
10	401-0710-00			1	Clutch, Drum Maintenance Cam Shaft
11				1	Belt, Paper Path Transport - part of 650-3268-00 Belt Kit
12	401-0751-00			1	Head Tilt Cam Gear

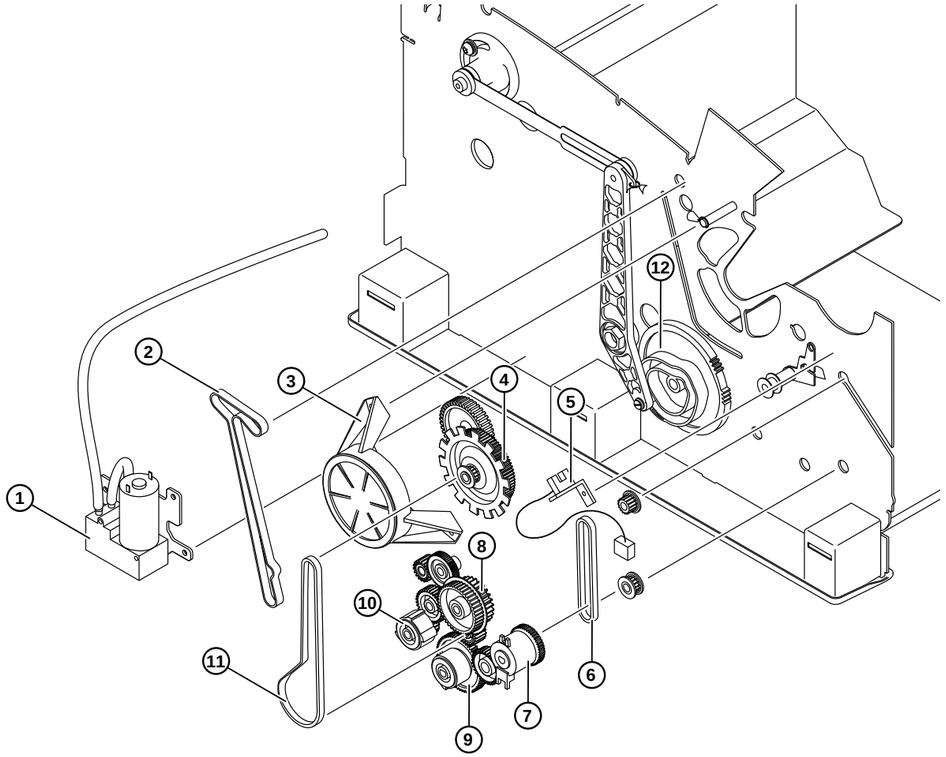


Figure A-3 The printer interior FRUs (left side)

Table A-4 supplies and accessories

	Part number	Serial number Effective	Discontinued	Quantity	Name and description
Supply	016-1341-00			1	Cleaning Kit
Supply	436-0293-01			1	Tray, Paper (A) Letter US, Standard
Supply	436-0292-01			1	Tray, Paper (A4) Metric, Standard
Supply	436-0301-00			1	Tray, Transparency (A) US
Supply	436-0302-01			1	Tray, Transparency (A4) Metric
	105-1058-01			1	Tray paper backstop
	214-4595-00			5	Tray type sense keys
Supply	650-3592-00			1	Paper Separator Pad For Std Tray
Supply	436-0294-03			1	Cartridge, Drum Maintenance
Supply	436-0299-00			1	Tray, Waste Ink

Table A-4 supplies and accessories (cont'd.)

	Part number	Serial number Effective	Discontinued	Quantity	Name and description
Supply	016-1307-00				Black Ink Stix (3 per box)
Supply	016-1308-00				Cyan Ink Stix (3 per box)
Supply	016-1309-00				Magenta Ink Stix (3 per box)
Supply	016-1310-00				Yellow Ink Stix (3 per box)
Supply	016-1359-00				Transparency Film, A-size, Std, 50 sheets
Supply	016-1360-00				Transparency Film, A4-size, Std, 50 sheets
Supply	016-1361-00				Transparency Film, A-size, Prem, 50 sheets
Supply	016-1362-00				Transparency Film, A4-size, Prem, 50 sheet
	119-5788-00				External Hard Disk Drive
	070-9099-01				Printer Tools Reference Manual
	070-9923-00				Service Manual
	070-9924-00				Quick Reference Service Guide
	070-9922-00				Users Manual, English
	070-9922-10				Users Manual, French
	070-9922-20				Users Manual, Italian
	070-9922-30				Users Manual, German
	070-9922-40				Users Manual, Spanish
	070-9789-00				PhaserShare Networking and Printer Management SW Manual
	063-2936-00				SW Drivers and Utilities Diskettes
	063-2937-00				SW Drivers and Utilities CD
	065-0565-00				Carton Kit, Shipping
	013-0299-00			1	Parallel adapter, Centronics 36 Pin to IEEE-1284-C “mini”
	012-1468-00			1	Cable, Parallel IEEE-1284-C to DB25M
	012-1465-00			1	Cable, SCSI-2 to 50 Pin SCSI
Service	174-3493-00			1	Cable, Serial Adapter, Diags, Level Shifter
Service	063-3004-00				Service PC-based Diagnostics SW Diskette
Service	012-1498-00				Cable, Mac, Serial DIN8 to DB25M, Diags
Service	012-1535-00				Cable, PC, Serial DB9F to DB25M, Diags
Service	650-3300-00				Tool Kit - which includes the following:
Service	003-1489-00			1	Tool, Alignment, Encoder disk
Service	003-1499-00			1	Tool, Gap, Head to Drum
Service	003-1500-00			1	Tool, Belt Tensioner, Y-Axis
Service	003-1503-00			1	Hot Head Handler

Table A-4 supplies and accessories (cont'd.)

	Part number	Serial number Effective	Discontinued	Quantity	Name and description
Service	003-1504-00			1	Hot Head Plug Assembly
Service	003-0827-00			1	Screwdriver, torque
Service	006-7824-01				Pack of 10 Alcohol Wipes
Service	161-0066-00				Power cord, Std., USA, Canada, 115V,
Service	161-0066-09				Power cord, Option A1, Universal European, 220V
Service	161-0066-10				Power cord, Option A2, United Kingdom, 240V
Service	161-0066-11				Power cord, Option A3, Australia, 240V
Service	161-0154-00				Power cord, Option A5, Switzerland, 220V
Kit	Z340LTA				Lower Tray Assembly w /A-size Tray
Kit	Z340LTA, Opt 01				Lower Tray Assembly w/ A4-size Tray
Kit	ZMA16				16 Mbyte RAM SIMM
Kit	ZMA32				32 Mbyte RAM SIMM

Lower Paper Tray Assembly

Table A-5 Lower Paper Tray Assembly FRUs

Figure A-4 parts	Part number	Serial number Effective	Discontinued	Quantity	Name and description
1	118-9588-00			1	Tray Backstop
2	118-9590-00			1	Printer Cable Assembly
3	118-9589-00			1	Roller Assembly
4	118-9591-00			1	Arm Assembly
5	436-0288-00			1	Tray, Paper. (A) US letter, For LPTA, includes backstop
5	436-0289-00			1	Tray, Paper, (A4) Metric, For LPTA, includes backstop
	436-0277-00			1	Lower Tray Assembly w/ Letter Tray
	436-0287-00			1	Lower Tray Assembly w/ A4 Tray
	003-1623-00			1	Spring Removal Tool

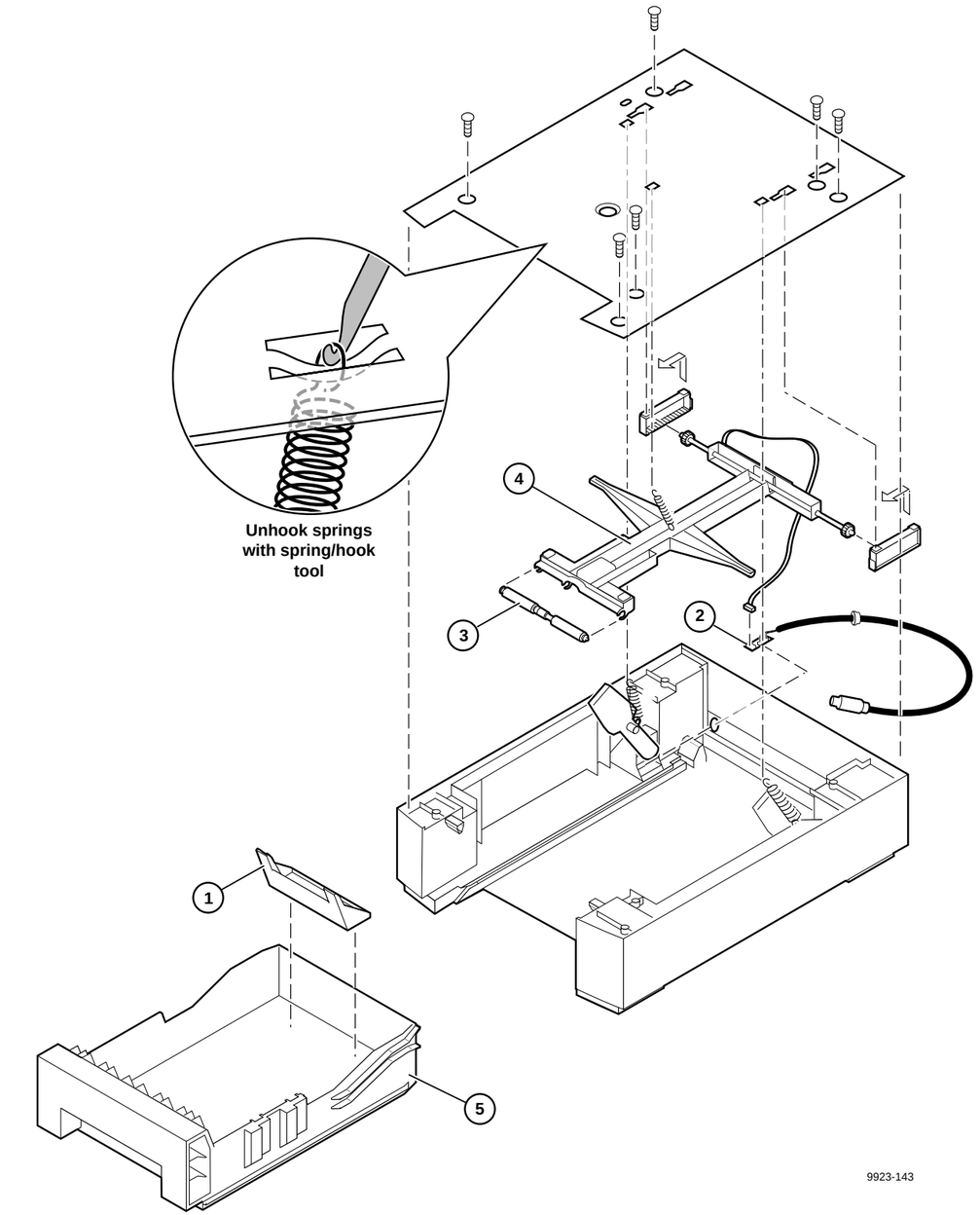


Figure A-4 Lower Paper Tray Assembly FRUs

Appendix

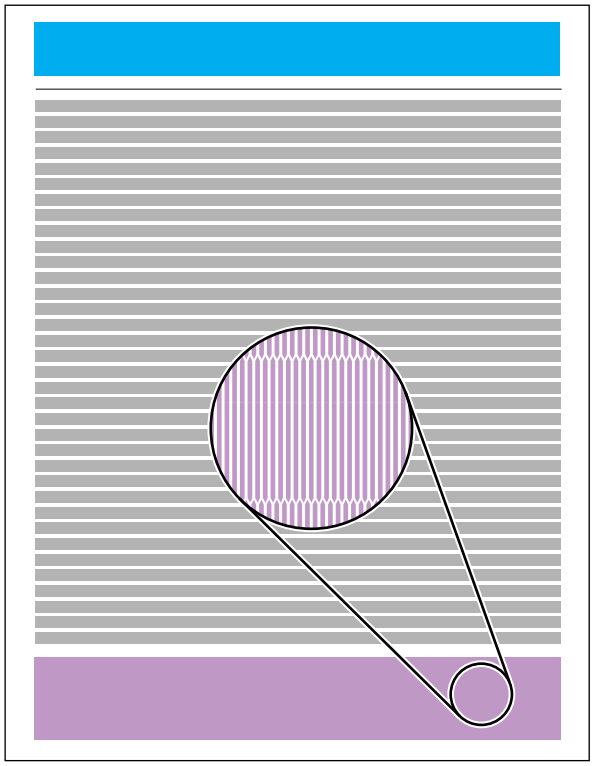
B Test Patterns

This appendix illustrates the service test prints produced by the printer. It shows a number of defective prints and the reason for the defects. Chapter 6 *Troubleshooting* discusses solutions to the problems shown in this appendix. 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.

Service Test Print 1 - X-axis**.** *While this print can be printed in 300 dpi, it should only be printed and interpreted in 450 x 800 dpi.* This print reveals problems with the x-axis motion of the printhead.

Look for: Unusually wide white gaps or thick blue lines between the thin, vertical black lines. The thin lines should be evenly spaced and consistent across the width of the page.

Causes: Gaps could either be caused by a defective x-axis drive or by something, 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

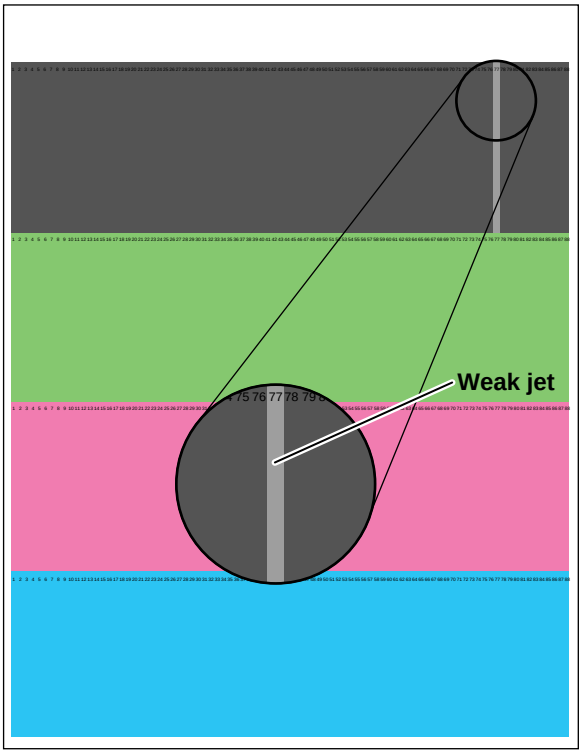


9923-113

Service Test Print 2 - Weak 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. 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.

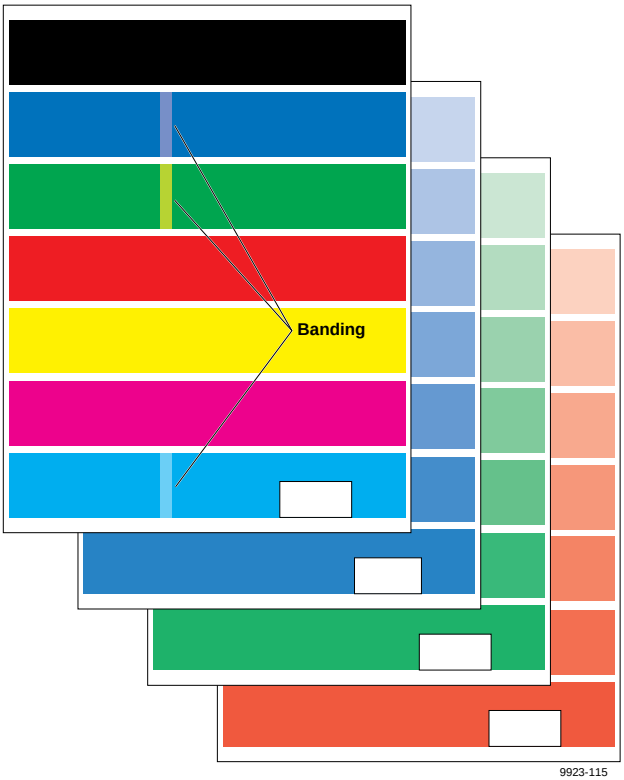


9923-114

Service Test Print 3 - Big bands. 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-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 Test Print 2. 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.



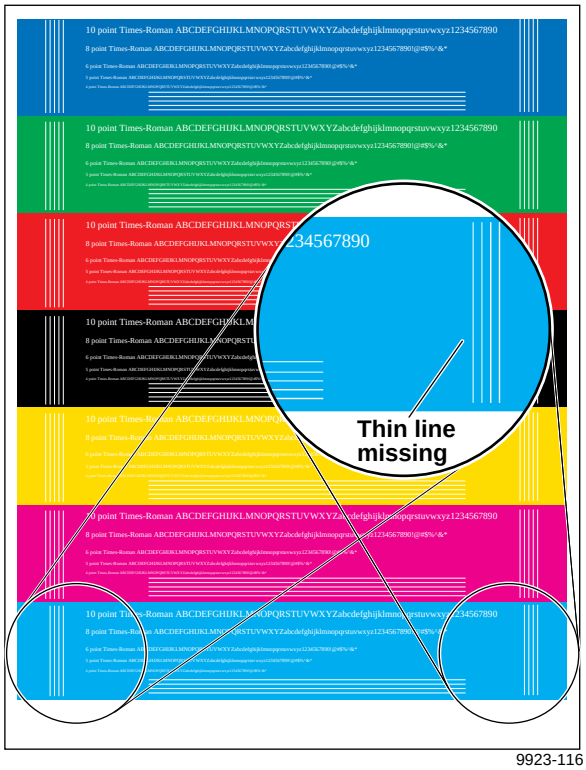
9923-115

Service Test Print 4 - Reverse text. This print in 300 dpi indicates if the printhead is outputting properly-sized drops of ink and that the drum temperature is not too high.

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 to much ink. In a good print you should see **five** vertical parallel lines of different thicknesses on both 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. As a last resort, replace the printhead.

- 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.

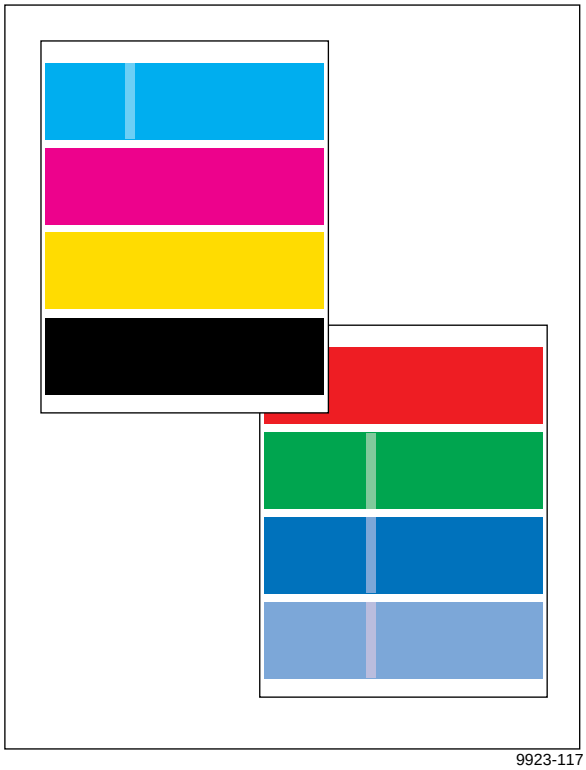


9923-116

Service Test Print 5 - Transparency/manual feed mode. 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 foils.

Look for: 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.



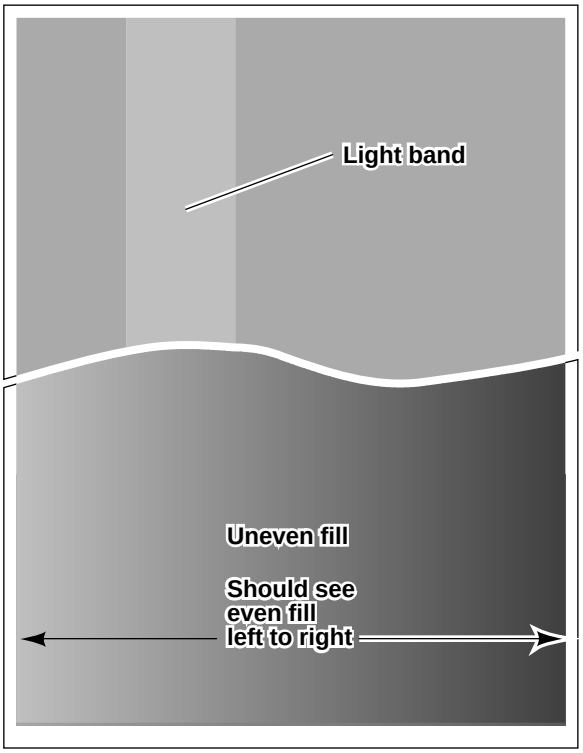
9923-117

Service Test Print 6 - Black dither pattern. 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).

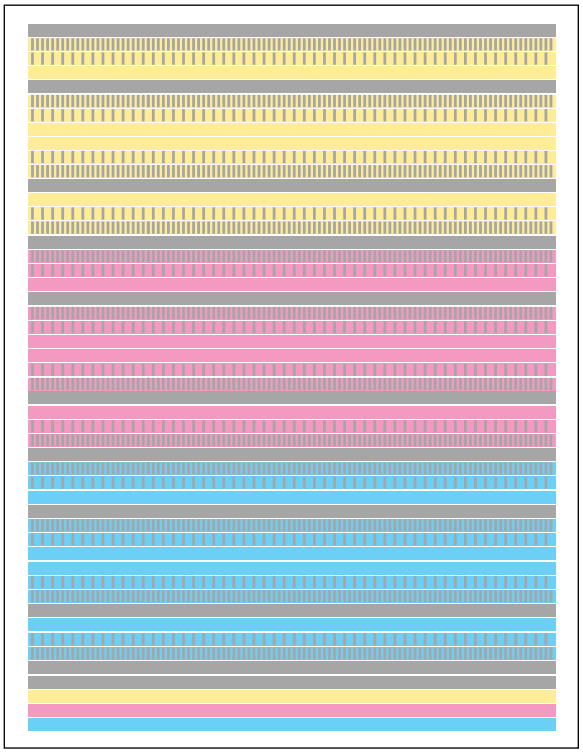
This pattern is sensitive to the density variations in the paper it is printed on. Use a high-quality grade of laser printer paper; otherwise, the print will appear mottled.

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#) though 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 tray; particularly if you observe variations in the glossiness of the print.



9923-88

Service Test Print 7 - Printhead diagnostic. This print is used for manufacturing and engineering evaluation of printhead performance.



9923-118

Service Test Print 8 - Solid fills. These seven prints show uniformity of fill.

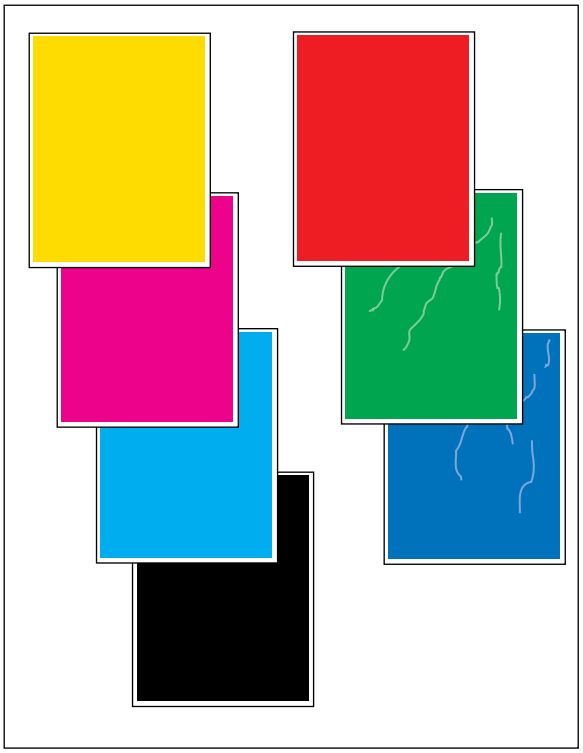
Look for: Even, uniform fills throughout each print. Wrinkles or deformity of the paper itself caused by the print process show up in blue and green prints at 600 dpi before other colors. A slight amount of wrinkling in green fills at 600 dpi is normal. But there should be no wrinkling in 600 dpi blue fills.

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 Test Print 4.

The transfix pressure is incorrect. Replace the drum/transfix assembly.

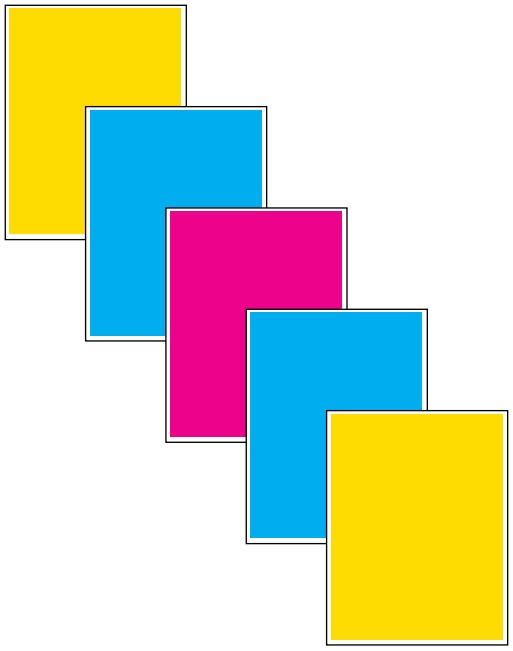


9923-119

Service Test Print 9 - Drum Seal. These five prints are used to treat a newly installed drum.

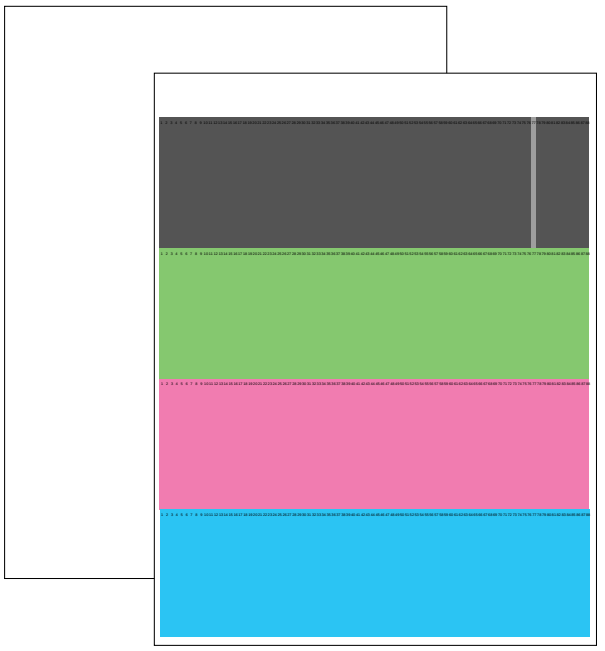
To seal a newly installed drum:

1. Power up the printer in Bypass Mode to skip the startup and mud pages (refer to “Bypass mode” on page 9-4).
2. Select Service Test Print 10 to verify the paper path and that all ink jets operate
3. Print Service Test Print 9 to seal the new drum.



9923-154

Service Test Print 10 - Printer verify. These two prints verify that the paper path works correctly by processing a blank sheet of paper thru 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

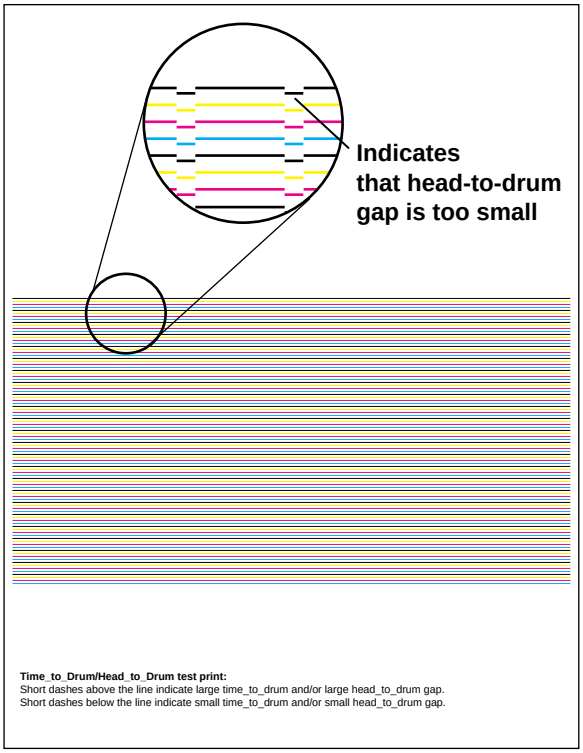
Service Test Print 11 - Head-to-Drum Gap. This print indicates if the gap between the printhead and the drum is correct.

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.

In either case, perform the procedure "Printhead-to-drum spacing adjustment" on page 9-9.

Alternately, the dash being out of alignment may be caused by the time of flight of the ink droplets being too fast or too slow. The head drive voltage, as set in the Service Menu item **Service Support - Head Adjust**, can affect this. Change the value in increments of 20. Do not exceed 200.



9923-152

Service Test Print 12 - X-axis calibration. This print is used for engineering evaluation of printer performance.

Appendix

C Wiring Diagrams

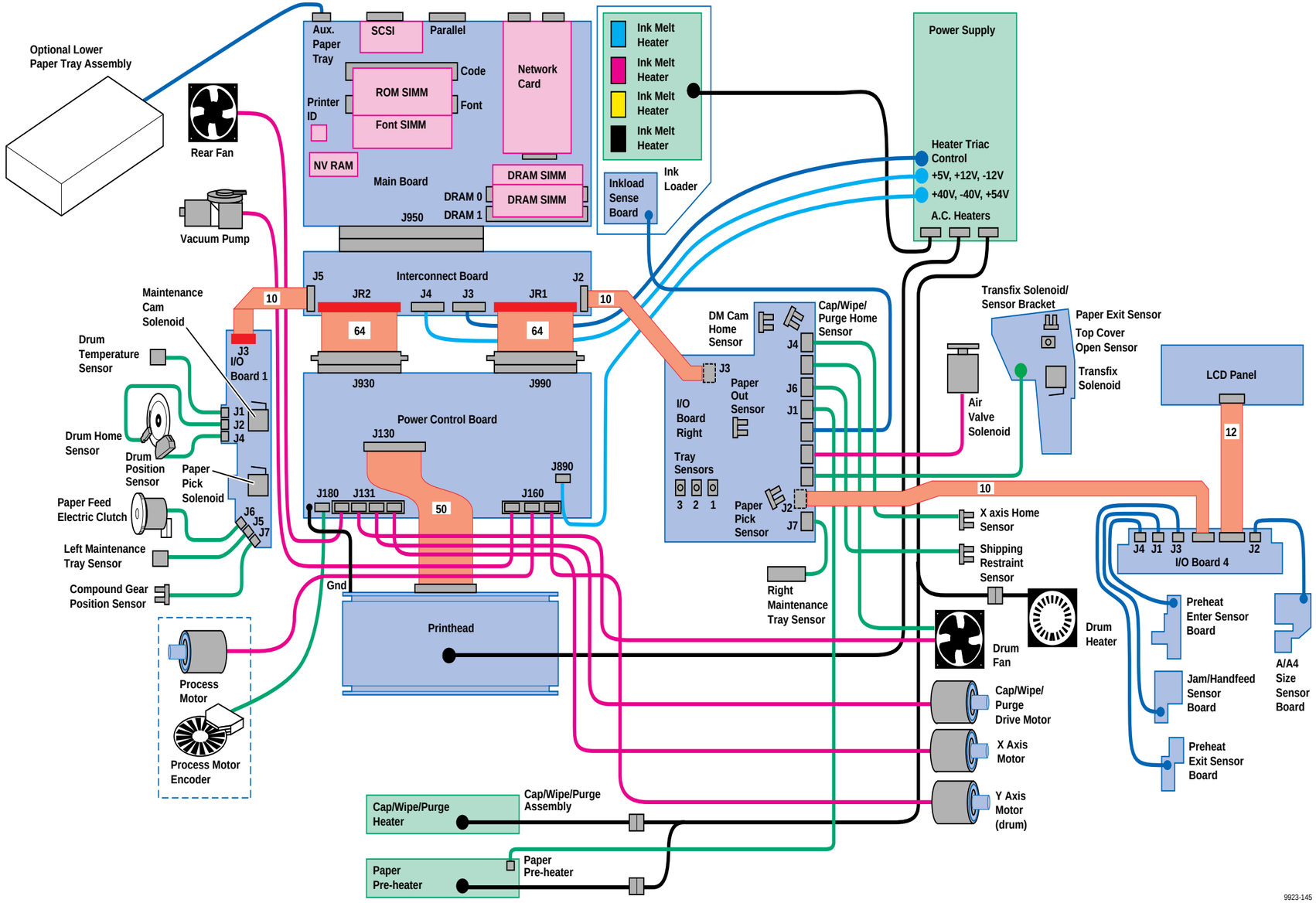


Figure C-1 Print engine wiring diagram

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.

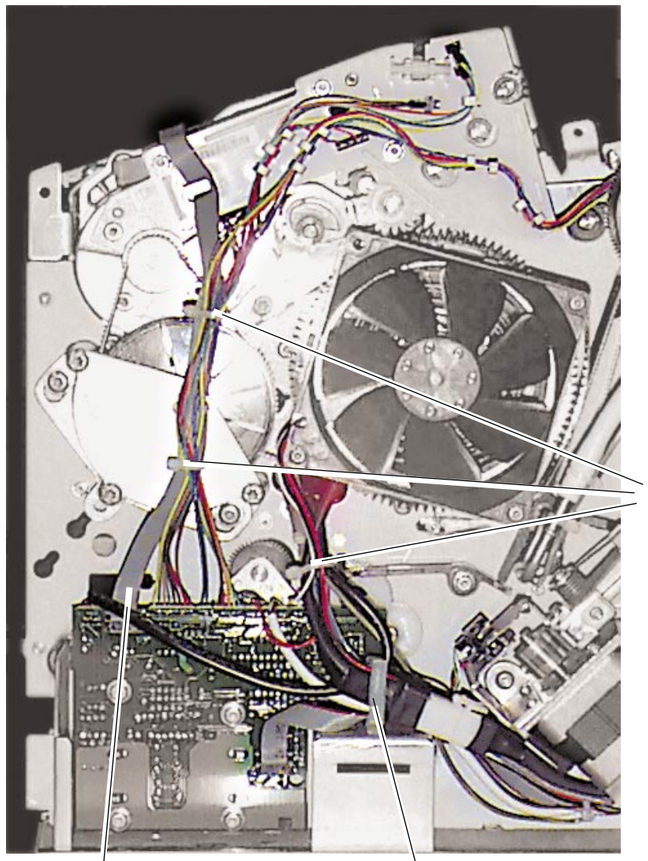


Figure C-2 Wire routing on the right side of the printer near I/O board right

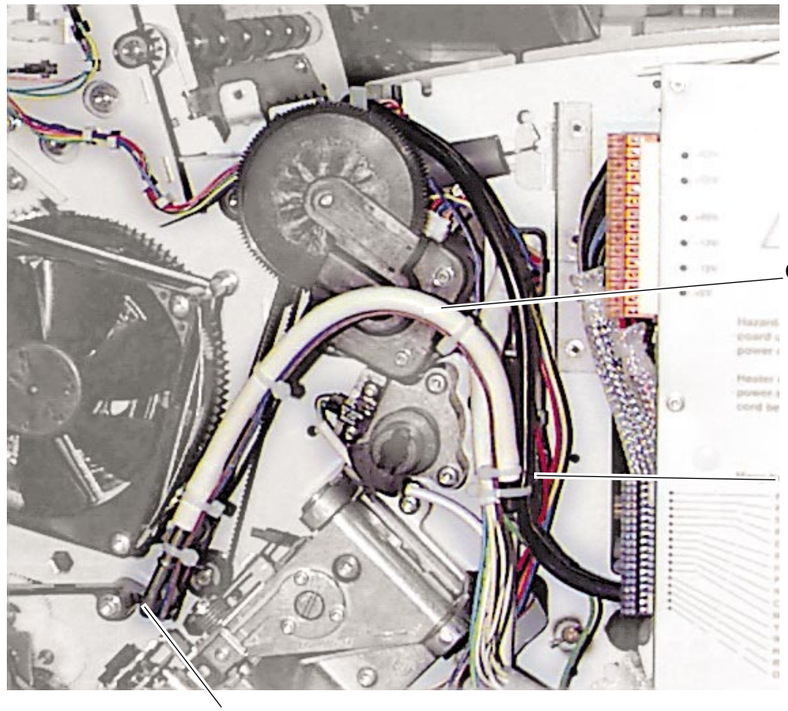
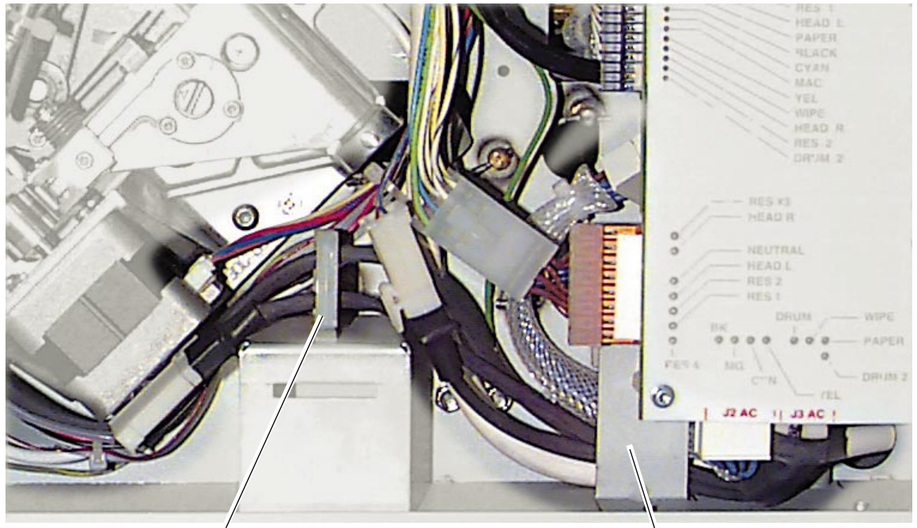


Figure C-3 Wire dressing above the x-axis drive

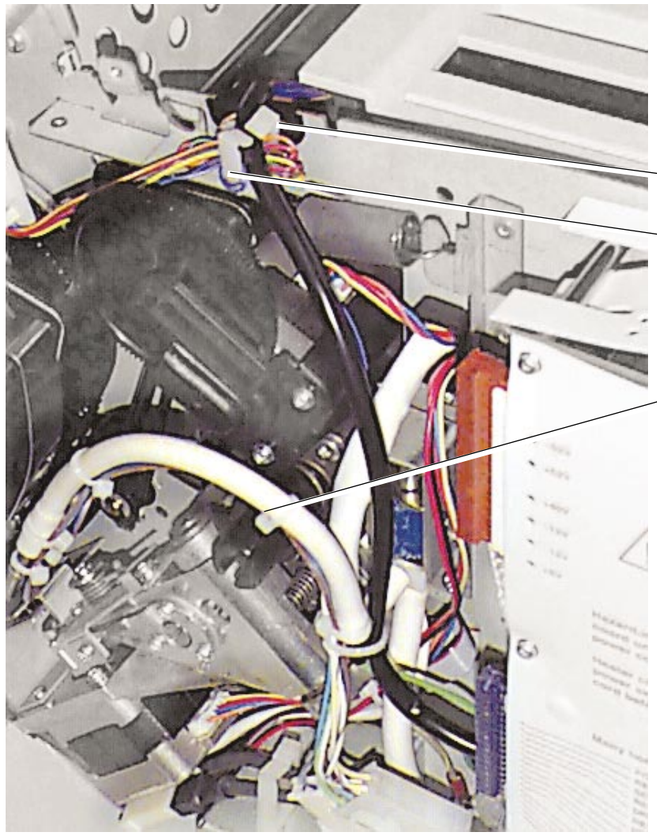


Only AC voltage heater wiring harnesses should be routed thru this restraint

Route AC wiring harnesses behind bracket

Figure C-4 Wire dressing below the x-axis drive

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



Bundle excess ink loader wiring in restraint

Loop air valve solenoid wiring harness around restraint

Bundle cap/wipe/purge heater wiring harness with vacuum hose. Orient knots of ties downward

Figure C-5 Wire dressing the vacuum hose and drum fan

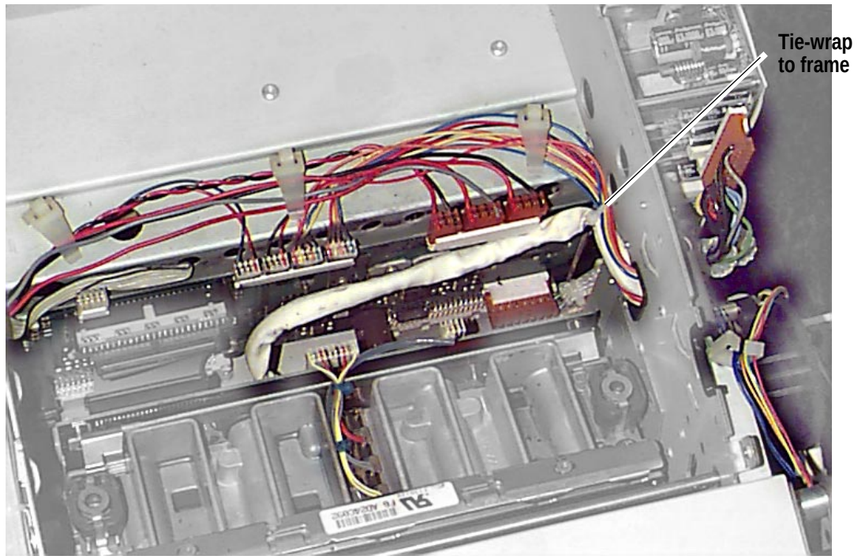


Figure C-6 Wire dressing behind the printhead

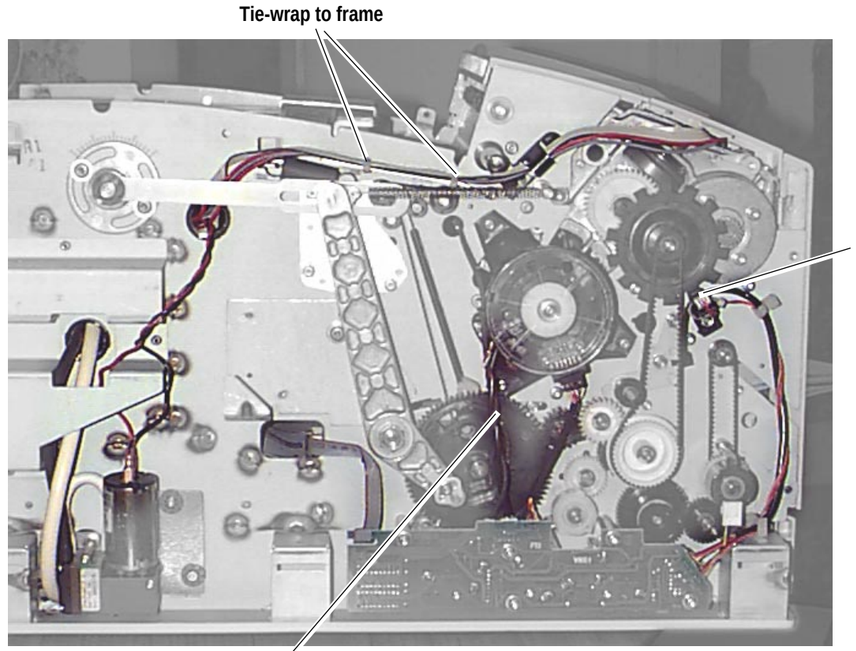


Figure C-7 Routing wiring on the left side of the printer