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## HP Color LaserJet and Color LaserJet 5/5M Printer (C3100A and C3961A/C3962A)

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#### **WARNING**

Electrical Shock Hazard

To avoid electrical shock,  
use only supplied power  
cords and connect only to  
properly grounded  
(3-hole) wall outlets.

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## Conventions

This manual uses the following conventions:

**Color** is used to emphasize items which are important to the material under discussion.

The names of major printer parts and assemblies are Capitalized.

**Bold** is used for emphasis, particularly in situations where *italic* type would be confusing.

*Italic type* is used to indicate related documents or emphasis.

DISPLAY type indicates text as seen on the printer control panel display.

**Keyface** indicates keys on a computer keyboard or on the printer control panel. Examples include **Form Feed**, **Enter** and **On Line**.

COURIER type indicates text that you type on a computer keyboard exactly as shown.

<b>Note</b>	Notes contain important information set off from the text.
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<b>Caution</b>	Caution messages alert you to the possibility of damage to equipment or loss of data.
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<b>Warning!</b>	Warning messages alert you to the possibility of personal injury.
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# Chapter Descriptions

## 1 Product Information

Printer features, specifications, and regulatory information is discussed. Information on obtaining assistance and warranty is also here.

## 2 Operating Requirements

Here are recommendations pertaining to site and media requirements.

## 3 Installation and Configuration

This chapter has detailed information about unpacking, installing and configuring the computer.

## 4 Maintaining Your Printer

Turn to this chapter for directions about printer cleaning and maintenance.

## 5 Theory of Operation

Here you will find the basic functional overview required to understand the various printer systems and how they function together.

## 6 Removal and Replacement

This chapter contains the step-by-step procedures for replacing printer field replaceable units (FRUs). Assemblies are grouped by location in the printer.

## 7 Troubleshooting

Diagnose printer problems here. A preliminary troubleshooting table is followed by error messages, image defect samples, and diagnostic tools.

## 8 Parts and Diagrams

Look here to find any field replaceable unit (FRU) in the printer. Exploded view drawings are accompanied by complete part number tables.

## Subject Index

Use the subject index to locate any information in the manual.



## List of Figures

Figure 1-1	Printer Model Number Labels (115V/127V and 220V/240V)	1-4
Figure 1-2	Front Printer Assemblies	1-7
Figure 1-3	Rear Printer Assemblies	1-8
Figure 1-4	Sample Laser Safety Label	1-10
Figure 2-1	Printer Space Requirements	2-4
Figure 3-1	Printer Component Inventory	3-4
Figure 5-8	Print Drum Charging Station	5-11
Figure 5-16	Drum Cleaning Station	5-16
Figure 5-28	Solenoid Locations (1 of 2)	5-31
Figure 5-29	Solenoid Locations (2 of 2)	5-31
Figure 5-31	Internal Sensor Locations	5-34
Figure 5-32	Rear Sensor Locations	5-34
Figure 5-33	Fuser Sensor Locations	5-35
Figure 5-35	Drum Wrap Sensor	5-35
Figure 5-38	Switch Locations	5-38
Figure 5-42	Printer Body Motors and Fans	5-42
Figure 5-43	DC Power Supply Fan (HP Color LaserJet printer only)	5-42
Figure 5-44	Laser/Scanner Motor	5-42
Figure 5-49	Toner Feeder Mechanism	5-48
Figure 6-11	Top Cover Screw (1)	6-14
Figure 6-12	Top Cover Screws (2)	6-15
Figure 6-24	Developer Bias Assembly (Inner Section)	6-25
Figure 6-37	Pickup Roller Shaft Keeper Bushing	6-37
Figure 6-38	Gear Cluster	6-38
Figure 6-39	Six Positions of the Transfer Cam	6-39
Figure 7-2	Paper-Out Photosensor (PS8)	7-18
Figure 7-4	Testing the Interlock Switches	7-21
Figure 7-12	Print Drum Reflectance Sensor	7-52
Figure 7-13	Paper Path Sensors	7-55
Figure 7-18	Improperly Sized Image	7-70
Figure 7-19	Developer with Foreign Material Causing White Stripe	7-73
Figure 7-21	Horizontal Lines in All Colors	7-75
Figure 7-26	Leading or Trailing Edge Smear	7-82
Figure 7-28	Ghosting Print Defect	7-84
Figure 7-32	Background Scatter	7-90
Figure 7-33	Speckled Print Defect (toner popping)	7-91
Figure 7-36	Stray Toner	7-96
Figure 7-37	Large Period Print Banding Defect (limit sample)	7-98
Figure 7-38	Dark Yellow Print Defect	7-102

Figure 7-42	Extended Diagnostics Printouts . . . . .	7-121
Figure 7-43	Extended Diagnostics Flowchart . . . . .	7-122
Figure 8-7	Main Motor Assembly . . . . .	8-14

## List of Tables

Table 1-1	Printer Features . . . . .	1-3
Table 1-2	Printer Dimensions . . . . .	1-5
Table 1-3	Performance Specifications . . . . .	1-5
Table 1-4	Environment . . . . .	1-5
Table 1-5	Acoustic Emissions . . . . .	1-6
Table 1-6	Declaration of Conformity . . . . .	1-11
Table 1-7	Related Documentation and Software . . . . .	1-18
Table 2-1	Environmental Requirements . . . . .	2-3
Table 2-2	Power Requirements . . . . .	2-4
Table 2-2	Operating Current Requirements . . . . .	2-5
Table 2-3	Consumables-Environmental Conditions . . . . .	2-5
Table 2-4	Supported Media Sizes . . . . .	2-7
Table 2-5	Paper Specifications . . . . .	2-8
Table 2-6	Transparency Specifications . . . . .	2-10
Table 3-1	Novell NetWare Frame Types (on HP JetDirect EtherNet) . . . . .	3-22
Table 4-1	Approximate Replacement Intervals . . . . .	4-9
Table 5-1	Solenoid Functions . . . . .	5-32
Table 5-2	Sensor Functions . . . . .	5-33
Table 5-3	Switches and Interlocks . . . . .	5-37
Table 5-4	Tray Size Switch Matrix . . . . .	5-39
Table 5-5	Fans and Motors . . . . .	5-41
Table 7-2	Printer Messages . . . . .	7-9
Table 7-3	General Toner Concentration Values . . . . .	7-42
Table 7-4	Target Toner Concentration Table . . . . .	7-43
Table 7-5	Developer Defect Colors . . . . .	7-74
Table 7-6	MIO Configuration Checks . . . . .	7-108
Table 7-7	Self Test Items . . . . .	7-116
Table 7-8	Cold Reset Default Settings . . . . .	7-117
Table 7-9	Error Log Example . . . . .	7-118
Table 7-10	Register Adjust Addresses and Values . . . . .	7-128
Table 7-11	Status/Test Address Table . . . . .	7-130
Table 7-12	Subtest Number Table . . . . .	7-133
Table 8-A	Consumables and Accessories . . . . .	8-4
Table 8-B	Common Fasteners Used in the Printer . . . . .	8-5
Table 8-1	External Covers . . . . .	8-7
Table 8-2	Main Frame Assembly (Page1 of 3) . . . . .	8-8
Table 8-3	Main Frame Assembly (Page 2 of 3) . . . . .	8-9
Table 8-4	Main Frame Assembly Components (Page 3 of 3) . . . . .	8-11
Table 8-5	Control Panel Assembly . . . . .	8-12
Table 8-6	Laser/Scanner Assembly . . . . .	8-13
Table 8-7	Main Motor Assembly . . . . .	8-14

Table 8-8	Developer Drive Assembly . . . . .	8-15
Table 8-9	Toner Hopper Assembly (Page 1 of 2) . . . .	8-16
Table 8-10	Toner Hopper Assembly (Page 2 of 2) . . . .	8-17
Table 8-11	Internal Components . . . . .	8-18
Table 8-12	Paper Feed Assembly (Page 1 of 2) . . . . .	8-19
Table 8-13	Paper Feed Assembly (Page 2 of 2) . . . . .	8-21
Table 8-14	Paper Exit Assembly . . . . .	8-22
Table 8-15	Transfer Assembly . . . . .	8-23
Table 8-16	Paper Tray Assembly . . . . .	8-24
Table 8-17	Fusing Assembly . . . . .	8-25
Table 8-18	Controller Assembly . . . . .	8-26
Table 8-19	Power Supply Drawer . . . . .	8-27
Table 8-20	High Voltage Power Supply . . . . .	8-29
Table 8-21	Rear Feed Unit . . . . .	8-30
Table 8-22	Print Drum Parts . . . . .	8-31
Table 8-23	Developer Assemblies . . . . .	8-32

# Product Information

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## Chapter Contents

Features . . . . .	1-3
Identification . . . . .	1-4
Specifications . . . . .	1-5
Printer Assemblies . . . . .	1-7
Regulatory Information . . . . .	1-9
Laser Safety . . . . .	1-9
Declaration of Conformity . . . . .	1-11
Laser Statement-Finland . . . . .	1-12
Toner Safety . . . . .	1-13
Ozone Safety . . . . .	1-13
FCC RFI Statement . . . . .	1-15
Warranty and Service . . . . .	1-16
Warranty Statement . . . . .	1-16
One Year Limited On-Site Warranty . . . . .	1-16
Exclusions . . . . .	1-16
Service Approach . . . . .	1-17
Technical Assistance . . . . .	1-19
HP ASAP . . . . .	1-19
HP CompuServe Forum . . . . .	1-20
Dealer Response Line . . . . .	1-20
HP Driver Distribution Center . . . . .	1-20
HP Direct . . . . .	1-20
Customer Support Sales Center . . . . .	1-20
Parts Identification . . . . .	1-20
North American Response Center . . . . .	1-21
Other Phone Numbers . . . . .	1-21



## Features

Table 1-1 Printer Features

Features	HP Color LaserJet (C3100A)	HP Color LaserJet 5/5M (C3961A/C3962A)
Print Speed- monochrome printing	10 ppm	10 ppm
Print Speed- color printing	2 ppm	2 ppm
Print Speed- color transparency	1 ppm	1 ppm
Text & Graphics Resolution	300 dpi; plus Resolution Enhancement (REt) for black & white printing	300 dpi; plus Resolution Enhancement (REt) for black & white printing and COLOREt for high quality color printing
Input Tray Capacity (standard)	250	250
Output Bin (face-down, correct order output)	100	100
Optional rear input tray	250 (50 transparencies)	250 (50 transparencies)
Software Selected, face-up output bin	50	50
Paper Sizes Supported	Letter, A4, Executive, Legal, Tabloid, A3	Letter, A4, Executive, Legal, Tabloid, A3
Internal Typefaces	35 scalable Intellefont and 10 TrueType, 2 font cartridge slots	35 scalable Intellefont and 10 TrueType
Standard Memory	8 Mb	20 Mb CLJ5 / 36 Mb CLJ5M
Optional Memory	up to 72 Mb total	84 Mb CLJ5 / 76 Mb CLJ5M
Printer Language Support	PCL 5 Color Extension and Automatic Printer Personality Switching	PCL 5 Color Extension and Automatic Printer Personality Switching
PostScript Level II Support	optional	optional on CLJ5 and standard on CLJ5M
Standard Interfaces	Parallel (Bi-tronics) modular I/O (MIO) slot; automatic I/O switching	Parallel (Bi-tronics) modular I/O (MIO) slot; automatic I/O switching, HP Jet Direct card for EtherNet and LocalTalk (CLJ 5M)

### Note

For a complete list of network printing solutions, see the *HP Peripherals Connectivity Solutions Guide*.

## Identification

The printer model number is in the upper left corner of the label shown in Figure 1-1. This label is located on the lower rear cover of the printer (see Figure 1-3, item 2).

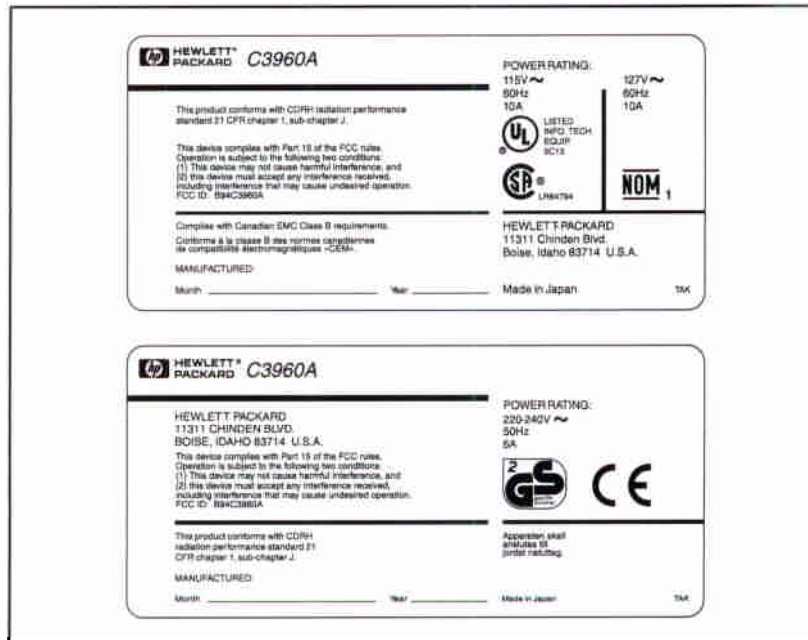


Figure 1-1 Printer Model Number Labels (115V/127V and 220V/240V)

The serial number and printer model option can be found on the barcode label located to the right or above the model number. The serial number is located on the lower portion of the label.

### Caution

Do not attempt to convert the voltage on the printer. Any attempt to convert operating voltages will void the product warranty.



# Specifications

Table 1-2 Printer Dimensions

Height:	378 mm (14.9 in)
Width:	603 mm (23.7 in)
Depth:	504 mm (19.8 in)
Weight:	46.5 kg (102.5 lbs)

Table 1-3 Performance Specifications

Print Speed*	10 pages per minute (monochrome) 2 pages per minute (process color) 1 page per minute (transparencies)
Monthly Usage (Duty Cycle)	Up to 15,000 pages (CLJ***) Up to 30,000 pages (CLJ 5/5M****)
Life Expectancy of toner **	Approximately 2200 pages

\* Actual speed depends on data complexity, software handling efficiency, paper size, and feed source.

\*\* At approximate 5% paper coverage

\*\*\* HP Color LaserJet Printer

\*\*\*\* HP Color LaserJet 5/5M printer

Table 1-4 Environment

Storage Environment	Printer unplugged from the AC outlet Temperature: 32° to 95°F (0° to 35°C) Humidity: 10 to 80% (no condensation)
Operating Environment	Temperature: 50° to 83°F (10° to 28°C) Humidity: 20 to 70% (no condensation)

Table 1-5 Acoustic Emissions

Operation Position	Per ISO 9296, DIN 45635, T.19
Printing	L <sub>PA</sub> , 56 dB(A)
Standby	L <sub>PA</sub> , 42 dB(A)
Bystander 1m	Per ISO 7779, DIN 45635, T.19
Printing	L <sub>PA</sub> , 52 dB(A)
Standby	L <sub>PA</sub> , 35 dB(A)
Sound Power	Per ISO 9296
Printing	L <sub>WAD</sub> , 6.7 bels(A)
Standby	L <sub>WAD</sub> , 5.2 bels(A)

## Printer Assemblies

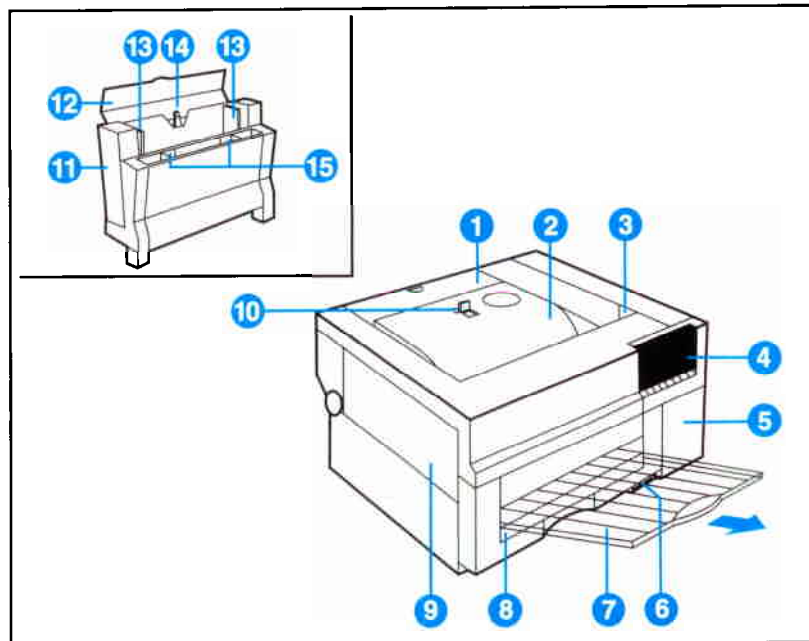
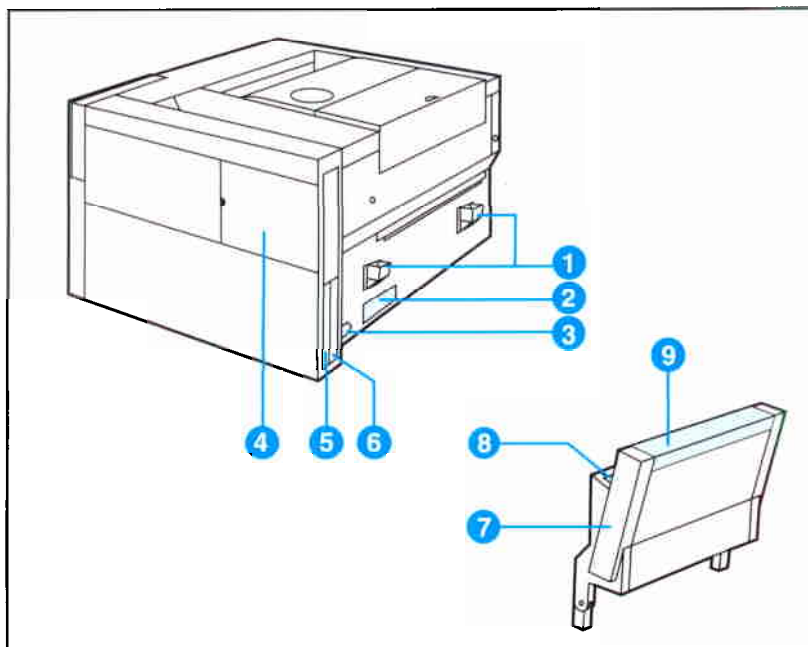


Figure 1-2 Front Printer Assemblies

- |                              |  |
|------------------------------|--|
| 1 Toner Hopper Input Door    | 8 Front Input Tray                                 |
| 2 Face Down Output Bin       | 9 Maintenance Access Door                          |
| 3 Top Cover Release Button   | 10 Flip Up Paper Stop<br>(for A4 and Letter Media) |
| 4 Control Panel              | 11 Optional Rear Feed Unit                         |
| 5 Front Cartridge Door (CLJ) | 12 Rear Tray Paper Access Door                     |
| 5 Access Door (CLJ5/5M)      | 13 Rear Tray Paper Guides                          |
| 6 Power Standby Switch       | 14 Rear Tray Size Selection Lever                  |
| 7 Face Up Output Bin         | 15 Manual Feed Paper Guides                        |



**Figure 1-3 Rear Printer Assemblies**

- |   |                                 |
|---|---------------------------------|
| 1 Mounting Slots for<br>Optional Rear Feed Unit | 6 Bi-Tronics Parallel Connector |
| 2 Serial Number Label                           | 7 Optional Rear Input Tray      |
| 3 Power Plug Connector                          | 8 Manual Feed Input             |
| 4 SIMMs Access Door                             | 9 Rear Tray Paper Access Door   |
| 5 MIO Slot                                      |                                 |

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## Regulatory Information

### Laser Safety

The Center for Devices and Radiological Health (CDRH) of the U.S. Food and Drug Administration implemented regulations for laser products manufactured since August 1, 1976. Compliance is mandatory for products marketed in the United States.

This printer is certified as a "Class 1" laser product under the U.S. Department of Health and Human Services (DHHS) Radiation Performance Standard according to the *Radiation Control for Health and Safety Act of 1968*. Since the radiation emitted inside this printer is completely confined within protective housings and external covers, the laser beam cannot escape during any phase of normal user operation.

---

#### Warning!

Never operate or service the printer with the protective cover removed from the Laser/Scanner assembly. The reflected beam, although invisible, can damage your eyes.

---

**Laser Safety Label**

The laser safety label is located on top of the Laser/Scanner assembly. Access the laser safety label by removing the Top Cover as shown in Chapter 6.

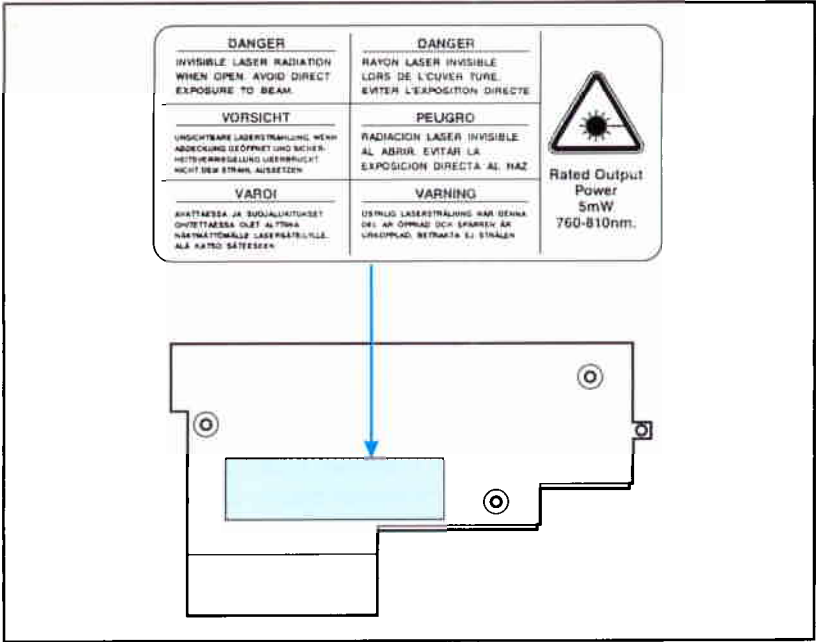


Figure 1-4 Sample Laser Safety Label

## Declaration of Conformity

According to ISO/IEC Guide 22 and EN 45014.

Table 1-6 Declaration of Conformity

Manufacturer:	Hewlett-Packard Company
Manufacturer's Address:	11311 Chinden Boulevard Boise, Idaho 83714-1021 USA
declares, that the product	
Product Name:	HP Color LaserJet Printer / HP Color LaserJet 5/5M Printer
Model Numbers:	C3099A, C3100A , C3101A, C3961A, C3962A
Product Options:	All
conforms to the following Product Specifications:	
Safety:	EN 60950:1988 + A1, A2 IEC 825:1984 + A1:1990 laser class 1
EMC:	CISPR-22:1985 / EN 55022:1988 Class B CISPR-22:1985 / EN 55022:1988 Class AEN 50082-1:1992 IEC 801-2:1991 / prEN55024-2:1992 -3kV CD, 8 kV AD IEC 801-3:1984 / prEN55024-3:1991 - 3V/m IEC 801-4:1988 / prEN55024-4:1992 - 0.5kV Signal Lines, 1 k V Power lines
Supplementary Information:	
<p>These products comply with the requirements of the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC. These LaserJet printers were tested in a typical configuration with Hewlett-Packard Personal Computer and Test Systems. These LaserJet printers meet the requirements of EN 55022 Class B except, when connected in a Local Area Network (LAN) environment, at which time they would meet the requirements of EN 55022 Class A. Note that when the "Appletalk" cable is connected, these printers meet the Class B requirements.</p> <p>Office of Quality Manager Boise, Idaho USA November 17, 1993</p> <p>European Contact: Your Local Hewlett-Packard Sales and Service Office or Hewlett-Packard GmbH, Department ZQ / Standards Europe, Herrenberger Straße 130, D-7030 Böblingen (FAX: + 49-7031-14-3143)</p>	

**LASERTURVALLISUUS**

**LUOKAN 1 LASERLAITE**

**KLASS 1 LASER APPARAT**

HP Color LaserJet laserkirjoitin on käyttäjän kannalta turvallinen luokan 1 laserlaite. Normaalissa käytössä kirjoittimen suojakotelointi estää lasersäteen pääsyn laitteen ulkopuolelle.

Kirjoittimen on hyväksynyt Suomessa laserturvallisuuden osalta Työsuojeluhallitus. Laitteen turvallisuusluokka on määritetty valtioneuvoston päätöksen N:o 472/1985 ja standardin EN 60825 (1991) mukaisesti.

**VAROITUS !**

Laitteen käyttäminen muulla kuin käyttöohjeessa mainitulla tavalla saattaa altistaa käyttäjän turvallisuusluokan 1 ylittävälle näkymättömälle lasersäteilylle.

**VARNING !**

Om apparaten används på annat sätt än i bruksanvisning specificerats, kan användaren utsättas för osynlig laserstrålning, som överskrider gränsen för laserklass 1.

**HUOLTO**

HP Color LaserJet -kirjoittimen sisällä ei ole käyttäjän huollettavissa olevia kohteita. Laitteen saa avata ja huoltaa ainoastaan sen huoltamiseen koulutettu henkilö. Tällaiseksi huoltotoimenpiteeksi ei katsota väriainekasetin vaihtamista, paperiradan puhdistusta tai muita käyttäjän käsikirjassa lueteltuja, käyttäjän tehtäväksi tarkoitettuja ylläpitotoimia, jotka voidaan suorittaa ilman erikoistyneitä työkaluja.

**VARO !**

Mikäli kirjoittimen suojakotelo avataan, olet alttiina näkymättömälle lasersäteilylle laitteen ollessa toiminnassa. Älä katso säteeseen.

**VARNING !**

Om laserprinterns skyddshölje öppnas då apparaten är i funktion, utsättas användaren för osynlig laserstrålning. Betrakta ej strålen.

Tiedot laitteessa käytettävän laserdiodin säteilyominaisuuksista:

Aallonpituus 760-810 nm

Teho 5 mW

Luokan 3B laser



## Toner Safety

Toner is composed of plastic and a small amount of pigment. If toner gets on your clothes, wipe it off with a dry cloth and wash the clothes in *cold* water. Hot water sets the toner into fabric. Avoid breathing toner particles.

A Material Safety Data Sheet (MSDS) for the toner used in HP LaserJet printers is available through Hewlett-Packard.

**By Mail.** To obtain a MSDS for the HP LaserJet toner through the mail, call the Customer Information Center (CIC) at 800-752-0900 between 6 am and 5 pm Pacific Standard Time.

**By Fax.** To obtain a MSDS for the HP LaserJet toner by fax, call HP FIRST at 800-333-1917 and enter document number 1407.

---

### Note

To get documents from HP FIRST by fax, use a group 3 [touch tone] fax machine.

**Outside the U.S.** To obtain a MSDS for the HP LaserJet toner when you are outside the U.S., contact your nearest HP Sales and Service Office.

## Ozone Safety

### Ozone Emission

The corona assemblies found in laser printers and photocopiers generate ozone gas (O<sub>3</sub>) as a by-product of the electrophotographic process. Ozone is only generated while the printer is printing (while the coronas are energized).

### Ozone Standards

Standards for exposure to ozone have been established by the Department of Labor - Occupational Health and Safety Administration (DOL-OSHA) and the American Conference of Governmental Industrial Hygienists (ACGIH). These standards are 0.1 ppm as a time weighted average and a ceiling limit respectively. All LaserJet family printers meet these standards when shipped from the factory.

## Recommendations for Minimizing Ozone Exposure

Some people are extremely sensitive to ozone. In such cases, it is advisable to position the printer away from the sensitive user. Also, a more frequent filter replacement may be necessary.

Almost all ozone concerns arise from abnormal site or operating conditions. The following conditions may generate an ozone complaint:

- Installation of multiple laser printers in a confined area
- Extremely low relative humidity
- Poor room ventilation
- The exhaust port of the printer is directed towards the face of personnel
- The existing ozone filter is in poor condition
- Long, continuous printing combined with any of the above

Inspect your work environment for the operating conditions listed above if you believe ozone emissions are a problem in your area. (The employer is responsible for providing a work environment that is free of these conditions.)

The ozone filter is user-replaceable and is part of the collection box kit. It should be changed at the same time as the collection box. Replacement should be made after the equivalent of 4,000 color pages or 20,000 black and white pages have been printed. See Chapter 4 for information on changing the ozone filter.

### Note

To maximize the life of the ozone filter, set the printer “power save” mode to be initiated after 15 minutes. Since the fan is turned OFF during the power save mode, less dust is deposited onto the ozone filter. The accumulation of dust on the filter will eventually reduce its effectiveness.

## FCC RFI Statement

Note: This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Any changes or modifications not expressly approved by Hewlett-Packard could void the user's authority to operate this equipment.

---

### Note

Use of a shielded cable is required to comply with the Class B limits.

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# Warranty and Service

## Warranty Statement

This warranty gives specific legal rights. There may also be other rights which vary from state to state or province to province.

## One Year Limited On-Site Warranty

Hewlett-Packard warrants the printer against defects in materials and workmanship for a period of one year from receipt by the customer. This includes the maintenance items which come with the printer. During the warranty period, HP will, at its option, either repair or replace products which prove to be defective.

---

### Note

Replacement of a printer does not begin another one year warranty period, but will continue from the date the customer received their original unit.

User maintenance components are not covered under the HP Color LaserJet printer factory warranty. All maintenance items are covered by a 90-day return to HP warranty.

---

## Exclusions

The warranty shall not apply to defects resulting from:

- End of life conditions for maintenance items
- Customer supplied software or interfacing
- Unauthorized modification or misuse
- Operating outside of the environmental specifications for the printer
- Improper site preparation and space requirements
- Use of non-supported print media (See *HP LaserJet Printer Family Paper Specifications Guide*)
- Use of labels in the printer
- Use of envelopes in the printer
- Duty Cycle abuse:
  - 15,000 pages per month maximum (CLJ)
  - 30,000 pages per month maximum (CLJ 5/5M)
- Operating the printer from a mechanical switchbox without a designated surge protector
- Improper or inadequate maintenance by the customer

- Failure to perform the required user maintenance at the designated intervals (see Chapter 4 for intervals)
- Damage resulting from the use of non-HP printer maintenance components, memory, interface boards or font cartridges

## Service Approach

Repair normally begins with using the printer internal diagnostics in conjunction with the troubleshooting procedures in Chapter 7. Once a faulty part is located, replace the defective assembly. PCA component and mechanical subassembly replacement is not supported by HP.

### Ordering Consumables

Consumables may be ordered direct from Hewlett-Packard. The phone numbers for ordering consumables are:

- U.S. 1-800-538-8787
- Canada 1-800-387-3154 (Toronto 1-416-671-8383)
- United Kingdom 0734-441212
- Other local phone numbers may also be available.

### Ordering Field Replaceable Units

The HP Color LaserJet printer is designed to be repaired by replacing Field Replaceable Units. Part numbers are located in Chapter 8 and can be ordered from SMO or SME as shown below.

### Exchange Program

HP offers remanufactured assemblies for some selected parts. These are identified in Chapter 8 and can be ordered through SMO or SME.

#### By Phone:

- SMO (Service Materials Organization) 1-800-227-8164 (U.S. only)
- SME (Support Materials Europe (49 7031) 14-2253

#### By Mail:

Hewlett-Packard Company  
Support Materials Organization  
8050 Foothills Blvd.  
Roseville, CA 95678

Hewlett-Packard Co.  
Support Materials Europe  
Wolf-Hirth Strasse 33  
D-7030 Boeblingen, Germany

## Ordering Related Documentation and Software

Table 1-7 shows where to order related documentation and software. Phone numbers for the various sources are:

- Supports Materials Organization (SMO)  
1-800-227-8164 (U.S. only)
- Support Materials Europe (SME)  
(49 7031) 14-2253
- HP Distribution Center (HPD)  
970-339-7009  
970-330-7553 Fax

Table 1-7 Related Documentation and Software

DESCRIPTION	PART NO.	SMO	SME	HPD
HP LaserJet Printer Family Paper Specifications Guide	5010-3990			X
HP Peripherals Connectivity Solutions Guide	5091-6456E	X	X	
HP JetDirect Server Software Installation Guide*	J2552-90101	X	X	
Technical Reference Package**	5010-3997	X	X	
HP Color LaserJet Printer Drivers Disk***	C2003-13046			X
HP Color LaserJet 5/5M User's Documentation Bundle (User's Guide and Getting Started Guide)***	C3961-90902	X	X	

\* Shipped with CLJ5M only

\*\* Package includes:

HP PCL5 Printer Language Technical Reference Manual,  
HP PCL Color Technical Reference Manual,  
HP Printer Job Language Technical Reference Manual,  
HP PCL Comparison Guide,  
HP PCL/PJL Technical Quick Reference Guide

\*\*\* Shipped with printer

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## Technical Assistance

### HP ASAP

HP ASAP (Automated Support Access Program) provides free technical support information 24 hours a day, 7 days a week. The ASAP system includes HP FIRST and HP AUDIO-TIPS, both explained below. The ASAP service requires a touch-tone phone, and the toll free number (1-800-333-1917) is available only in the U.S.

### HP FIRST

HP FIRST (Fax Information Retrieval Support Technology) is a fax-back service providing technical information for HP LaserJet end-users as well as service personnel. Service-related information includes:

- Service notes (HP Authorized dealers)
- Application notes
- Product Data Sheet
- Material Safety Data Sheets (MSDS)
- Typeface and accessory information
- Printer support software information
- Toner information
- Driver request form and Software Matrix

To access the fax-back service, you need a Group 3 (Touch-tone, 96 baud) facsimile machine or fax card. Call the HP ASAP number and follow the voice prompts to enter HP FIRST.

### HP FIRST, Europe

In Europe, call HP FIRST at one of the following numbers:

- U.K. 0800-96-02-71
- Belgium (Dutch) 078-111906
- Switzerland (German) 155-1527
- Netherlands 06-0222420
- Germany 0130-810061
- Austria 0660-8128

For English service outside the countries listed above call, (31) 20-681-5792

## **HP AUDIO-TIPS**

HP AUDIO-TIPS is an interactive voice response system providing pre-recorded answers to the questions most frequently asked by HP LaserJet printer users. Helpful "System MAPS" to the HP AUDIO-TIPS recordings are available by fax.

## **HP CompuServe Forum**

HP CompuServe Forum is a user's forum that is not monitored by Hewlett-Packard. CompuServe members can download a variety of support materials including product data sheets, software application notes, and printer drivers for many popular software applications. Members may also post and reply to questions in the interactive format. To access HP Forum, type GO HPPER at any prompt. For more information or to join CompuServe, call 1-800-524-3388.

## **Dealer Response Line**

For further technical assistance on Pre/Post Sales and Service Support, HP dealer service-authorized personnel can contact the Dealer Response Line.  
1-800-544-9976 U.S. only, 1-800-363-6594 Canada

## **HP Driver Distribution Center**

(Printer Drivers and Software Application Notes Orders)  
1-900-339-7009

## **HP Direct**

(Supplies and Accessories Orders)  
1-800-538-8787 U.S. only

## **Customer Support Sales Center**

(Authorized Repair Locations, Service Agreements)  
1-800-835-4747 U.S. only

## **Parts Identification**

(Service Part Number Identification)  
1-916-783-0804



## North American Response Center

(On-line Technical Assistance)  
1-800-477-5526 HP Service Personnel only

To receive a fax listing of the supported languages on a country's phone number, call HP FIRST (refer to "HP FIRST," earlier in this section). You can also call the nearest HP sales and service office to obtain the telephone number for the European Support Center. The European Support Center features automated call routing, so you can receive faster service if calling from a touch-tone phone or tone dialer.

## Other Phone Numbers

### Customer Information Centers

For further technical assistance, service-authorized HP and dealer service personnel can contact the nearest Hewlett-Packard Customer Information Center, 1-800-752-0900 in North America.

### Customer Support Center (CSC) Assist Line

The HP Customer Support Center at 208-323-2551 is available to answer technical questions. The CSC Assist Line is available weekdays from 7 am to 6 pm Mountain Time (Wednesdays until 4 pm). Questions regarding operating systems such as MS-DOS, UNIX, or network configurations operating systems cannot be answered by the Customer Support Center, and should be referred to your dealer.

### European Customer Support Center

The HP European Support Center, located in Amsterdam, Holland, is open from 8:30 am, until 6:00 pm, Central European Time (Wednesdays until 4:00 pm). Multilingual customer support representatives can answer questions similar to the U.S. CSC, described above. This service is available at no charge for a period equivalent to the original HP hardware warranty period.

Each time you call the HP European Customer Support Center, you will be asked to provide the printer serial number and the original date of purchase.



# Operating Requirements

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## Chapter Contents

Introduction . . . . .	2-3
Site Requirements . . . . .	2-3
Environmental Requirements . . . . .	2-3
Space Requirements . . . . .	2-4
Power Requirements . . . . .	2-4
Maintenance Unit Storage Requirements . . . . .	2-5
Media Requirements . . . . .	2-6
Supported Media Sizes . . . . .	2-7
Paper . . . . .	2-7
Basic Media Specifications . . . . .	2-8
Non-Supported Media . . . . .	2-10
Transparency Specifications . . . . .	2-10
Glossy Media Specifications . . . . .	2-10

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## 2-2 Operating Requirements

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# Introduction

Follow the various specifications and requirements listed in this chapter to ensure the proper operation of the printer.

---

## Site Requirements

The correct location and placement of the printer is important in maintaining the performance level set at the factory. The environmental specifications listed in this chapter must be adhered to. Consider the following points before installing the printer:

- Install in a well-ventilated, dust-free area.
- Install on a hard, level surface. Do not install on a carpeted or soft surface.
- Install where the temperature and humidity do not change abruptly. Do not install near water sources, humidifiers, air conditioners, refrigerators, or other major appliances.
- Do not expose the printer to direct sunlight, dust, open flames or ammonia fumes. If the printer is placed near a window, make sure the window has a curtain or blind to block any direct sunlight.
- Install the printer away from walls or other objects. There must be enough space around the printer for proper access and ventilation (see Figure 2-1).
- Install the printer away from the direct flow of exhaust from air ventilation systems.

## Environmental Requirements

Keep the printer within the following environmental conditions for optimum performance.

Table 2-1      Environmental Requirements

Item	Operating	Storage
Temperature	10° to 28°C (50° to 83°F)	0° to 35°C (32° to 95°F)
Humidity	20 to 70% RH (with no condensation)	10 to 80% RH (with no condensation)

## Space Requirements

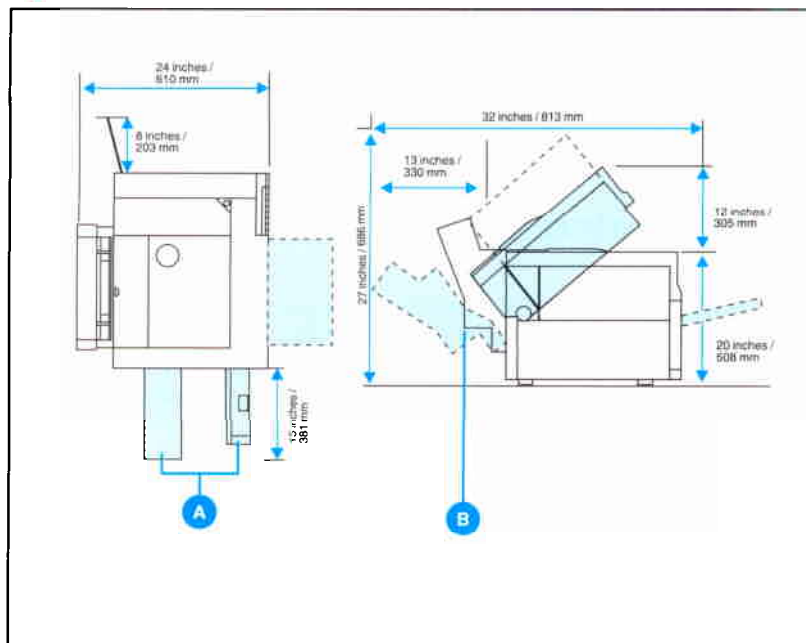


Figure 2-1 Printer Space Requirements

## Power Requirements

Table 2-2 Power Requirements

Power Requirements	110/127 V ( $\pm 10\%$ ) 60 Hz ( $\pm 2$ Hz)	220/240 V ( $\pm 10\%$ ) 50 Hz ( $\pm 2$ Hz)
Power Consumption (typical)	During printing - 400 W (average)	During printing - 450 W (average)
Power Consumption (standby)	During standby 120 W (average) Power save mode <45 W	During standby 140 W (average) Power save mode <45 W
Highest one second average RMS Current	16.0 Amps @ 120V	7.1 Amps @ 220V

## 2-4 Operating Requirements

Table 2-2 Operating Current Requirements

VOLTS	AMPS
110 V/115 V	9.4 Amperes
220 V/240 V	4.5 Amperes
Sleep Mode:	2.3 Amperes

### Maintenance Unit Storage Requirements

The life of consumables is greatly affected by their storage environment. Use the following table to determine shelf life of stored consumables:

Table 2-3 Consumables-Environmental Conditions

Temperature	Normal: Maximum of 2.5 years		0° to 35°C (32° to 95°F)
	Severe:(Maximum of 18 days)	High	35° to 40°C (95° to 104°F)
		Low	0° to -20°C (32° to -68°F)
Maximum Temperature Change Rate	40° to 15°C (104° to 59°F) within 3 minutes		
	-20° to 25°C (-68° to 77°F) within 3 minutes		
Humidity	Normal: (Maximum 2.5 years)		35 to 85% RH
	Severe: (Maximum of 0.05 years)	High	85 to 95% RH
		Low	10 to 35% RH
Atmospheric Pressure			460 to 760 mm Hg

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## Media Requirements

Several types of print media can be used with this printer, provided the media specifications are met. Using media that does not meet the specifications listed in this section may increase the incidence of paper jams, cause premature printer wear, and contribute to repair costs.

---

### Note

Complete background information for print media is contained in *The HP LaserJet Printer Family Paper Specifications Guide*. To order additional copies, refer to Chapter 1, Ordering Related Documentation and Software.

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It is possible that print media can meet all of the general specifications listed and still not print satisfactorily because of the printing environment or other variables over which Hewlett-Packard has no control.

Hewlett-Packard neither warrants nor recommends the use of any particular media brand. Media properties are subject to change by manufacturers and HP has no control over such changes. The operator should test particular media prior to large purchases.



## Supported Media Sizes

The following media sizes are supported by the HP Color LaserJet printer:

Table 2-4 Supported Media Sizes

Media Source	Media Size	Output Color
Front Input Tray	Letter, A4, Executive, Transparencies	Black and White, Monochrome,* Full Color**
Front Input Tray	Legal, Tabloid, A3	Black and White
Rear Feed Unit Tray	Letter, A4, Executive, Transparencies	Black and White, Monochrome,* Full Color**
Rear Feed Unit Manual Feed	Letter, A4, Executive	Black and White, Monochrome,* Full Color**
Rear Feed Unit Manual Feed	Legal, Tabloid, A3	Black and White

\*Monochrome refers to using a single primary color such as cyan, magenta, yellow, black.

\*\*Full color includes any combination of colors.

## Paper

For best results, use conventional white xerographic paper for your print jobs. The paper should be good quality and be free of cuts, nicks, tears, spots, loose particles, dust, wrinkles, voids, perforations, and curled or bent edges.

Table 2-5 lists the basic paper specifications for this printer. For a complete list of paper specifications, see the *HP LaserJet Printer Family Paper Specification Guide*.

## Basic Media Specifications

Table 2-5 Paper Specifications

Basis Weight: Front and Rear Tray	20 to 24 pounds / 75.2 to 90.2 g/m <sup>2</sup>
Furnish ( Fiber Composition)	100% chemical wood pulp. Recycled paper with up to 5% groundwood may be used.
Finish	100 to 190 (Sheffields)*
Fusing Capability	Must not scorch, melt, offset, or release hazardous emissions when heated to 392°F (200°C) for 0.2 seconds.
Moisture Content	4.7% ± 1% by weight.
Grain	Long grain.
Caliper	3.0 to 7.0 mils (0.094 to 0.18 mm).
pH Value	5.5 pH minimum.
Curl	Inream: flat within 0.2 in. (5mm).
Paper Size	Minimum: 3.9 x 5.8 in. (100 x 148 mm)
	Maximum: 11.7 x 17.0 in. (297 x 432 mm)

\*Sheffields is a unit of measurement for paper finish. The lower the number, the smoother the paper.

### Colored Paper

Colored paper should be of the same high quality as white xerographic paper. Pigments must withstand the printer fusing temperature of 390°F (200°C) for 0.2 seconds without deterioration. Do not use paper with a colored coating that was added after the paper was produced.

The printer creates colors by printing a pattern of dots, overlaying and varying their spacing to produce various colors. Since the printer does not have any way to detect the color of paper you are using, varying the shade or color of your paper will vary the shades of your printed colors.

## Pre-printed Forms and Letterhead

Observe the following guidelines to avoid problems with pre-printed forms and letterhead:

- Forms and letterhead must be printed with heat-resistant inks that will not melt, vaporize, or release hazardous emissions when subject to the printer fusing temperature of 392°F (200°C) for 0.2 seconds.
- The inks must be non-flammable and should not adversely affect any printer rollers.
- Forms and letterhead should be sealed in moisture-proof wrapping to prevent moisture changes during storage.
- Inks must be completely dry on forms and letterhead prior to using them in this printer. Ink that is not completely dry may come off the page during the fusing process.

## Recycled Paper

Recycled paper is a combination of waste paper, pre-consumer waste, and post-consumer waste. Printed waste paper is usually washed to remove most of the inks and other contaminants. A recycled sheet of paper may contain dark specks or appear gray or dirty. Choose recycled paper that meets the same specifications, except **brightness**, as standard paper and that has an appearance suitable for your needs. HP recommends that recycled paper contain no more than 5% **groundwood** (see Table 2-5 and the *HP LaserJet Printer Family Specification Guide*).

## Papers to Avoid

Follow these guidelines to avoid poor print quality or damage to your printer:

- Do not use paper that is too rough.
- Do not use paper that contains embossed print or is coated.
- Do not use paper with cutouts or perforations.
- Do not use multi-part forms or carbonless paper.
- Do not use paper with irregularities such as tabs or staples.
- Do not use letterhead paper with low temperature dyes or thermography. Pre-printed forms or letterhead should use inks compatible with the fusing temperature of 392°F (200° C) for 0.2 seconds.
- Do not use paper with a watermark if solid fills are to be printed.
- Do not use paper that has already been printed on, or fed through a photocopier or HP LaserJet printer.

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**Caution**

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Duplex printing causes paper jams, print quality problems, and can damage the printer.

### Non-Supported Media

Labels and envelopes are not supported in this printer. Damage resulting from printing on non-supported media is not covered under warranty.

---

**Caution**

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Printing labels in this printer may damage the Fusing assembly and/or the Print Drum.  
Envelopes do not feed reliably.

### Transparency Specifications

Overhead transparencies used in the printer must be able to withstand the 392°F (200°C) temperatures encountered in the printer fusing process for 1.2 seconds. Suitable transparency film is available through Hewlett-Packard.

**Table 2-6** Transparency Specifications

Caliper	.0048 to .0052 inch (0.120 to 0.132 mm)
Cutting Angle	90° ± 0.2%
Finishing	Precision cut sheet to within 0.03 in. (0.8 mm) of nominal and ± 0.2% of square.
Fusing Compatibility	Overhead transparencies must not discolor, melt, offset material, or release hazardous emissions when heated to 392°F (200°C) for 1.2 seconds.
Electrical Surface Resistivity	2.0 to 15 x 10 <sup>10</sup> ohms per square inch

### Glossy Media Specifications

Use only Hewlett Packard glossy paper in the HP Color LaserJet 5/5M Printer. Glossy media is not supported for use with the HP Color LaserJet Printer.

# Installation and Configuration

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## Chapter Contents

Unpacking the Printer . . . . .	3-3
Package Contents . . . . .	3-4
Installing the Printer . . . . .	3-5
Color Developer . . . . .	3-5
Black Developer . . . . .	3-8
Selecting the Display Language . . . . .	3-11
Installing Toner . . . . .	3-11
Test Printer Operation . . . . .	3-17
Power Save Mode . . . . .	3-17
PCL Menu Map . . . . .	3-18
BiTronics Parallel Connection . . . . .	3-19
Network Connection . . . . .	3-19
Configuring the Printer . . . . .	3-20
Network Configuration Tips . . . . .	3-20
Network Configuration . . . . .	3-21
Disabling Network Protocols . . . . .	3-23
Printer Drivers . . . . .	3-24

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## 3-2 Installation and Configuration

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## Unpacking the Printer

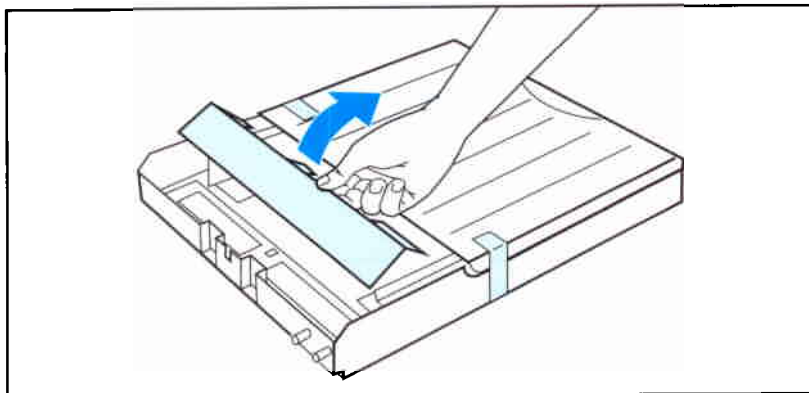
Save all packing material. You may need to repack and transport your printer at a later date.

1. Cut the binding strap and remove the box.
2. Remove the additional packing boxes and plastic bag.

---

### Warning!

This printer weighs 102.5 pounds (46.5 kg). Two or more people are needed to move it.



3. Remove the cardboard and adhesive tape packing materials.
4. Clean the optics glass, transfer corona wire, and drum corona wire (HP Color LaserJet 5/5M printer only), as shown in chapter 4.

## Package Contents

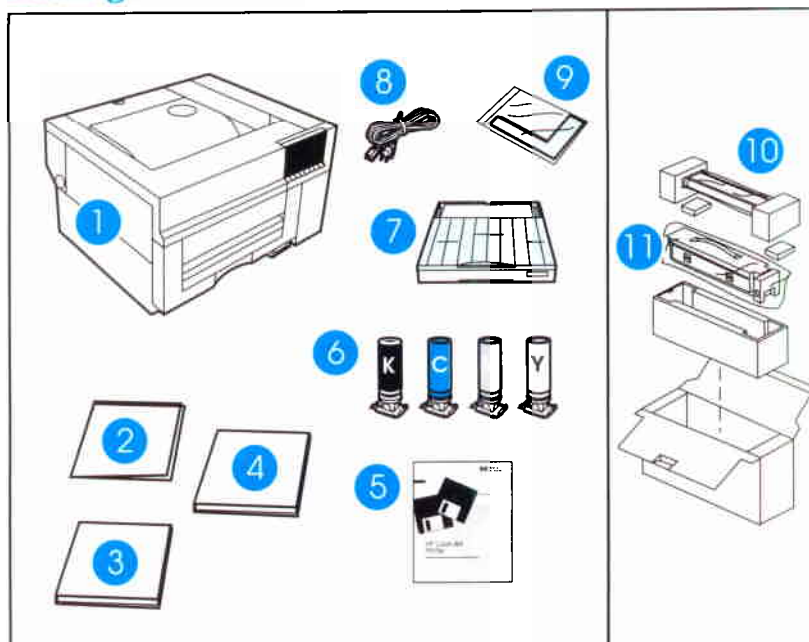


Figure 3-1 Printer Component Inventory

- |   |  |
|---|--|
| 1 Printer                               | 7 Paper Tray                           |
| 2 <i>Getting Started Guide</i>          | 8 Power Cord                           |
| 3 <i>User's Guide</i>                   | 9 Control Panel Overlay (outside U.S.) |
| 4 <i>Printer Reference Manual (CLJ)</i> | 10 Color Developer                     |
| 5 Software for the printer              | 11 Black Developer                     |
| 6 Toner Bottles                         |  |

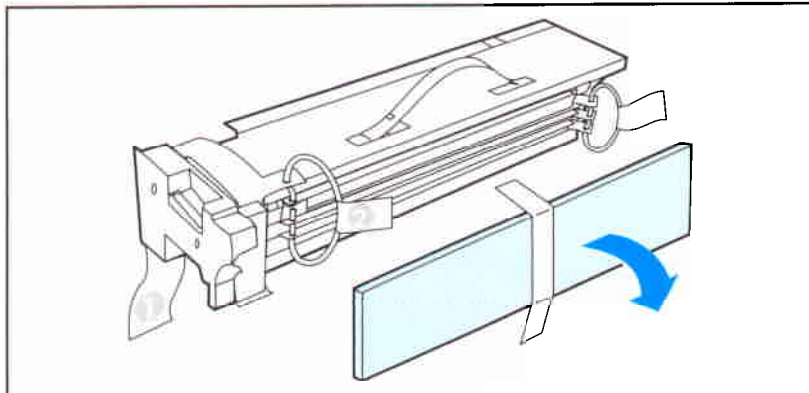


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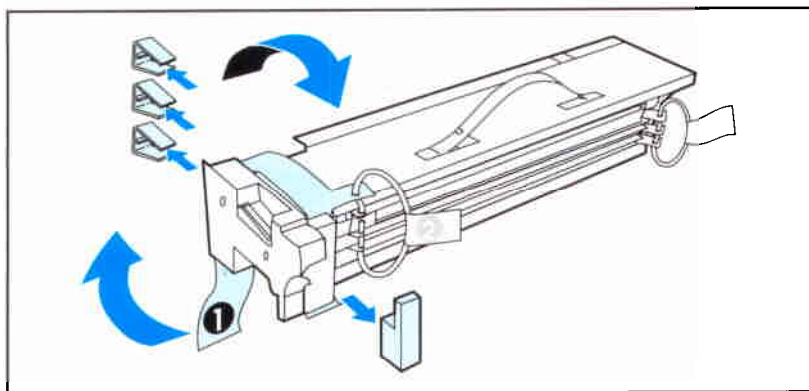
## Installing the Printer

### Color Developer

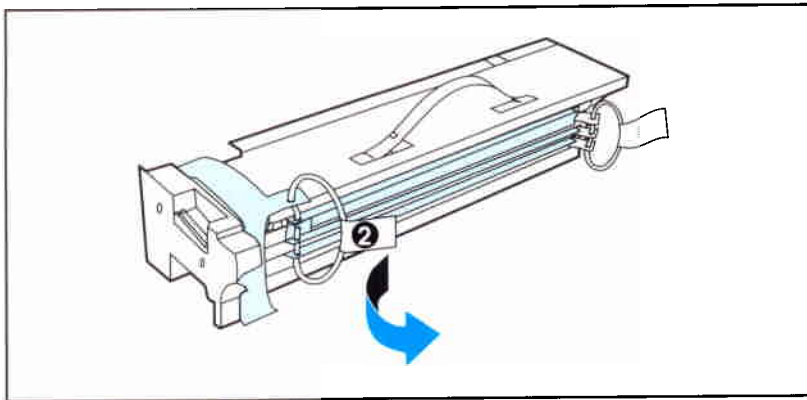
Before installing the print developers, press the top release button to open the top cover. Open the left side cover by grasping its lower edge and lifting it up. Next, follow the steps as illustrated.



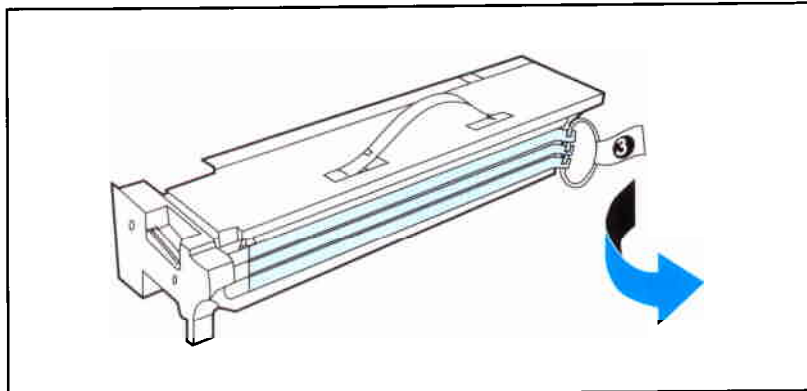
1. Remove the large foam pad and foam spacer from the Color Developer.



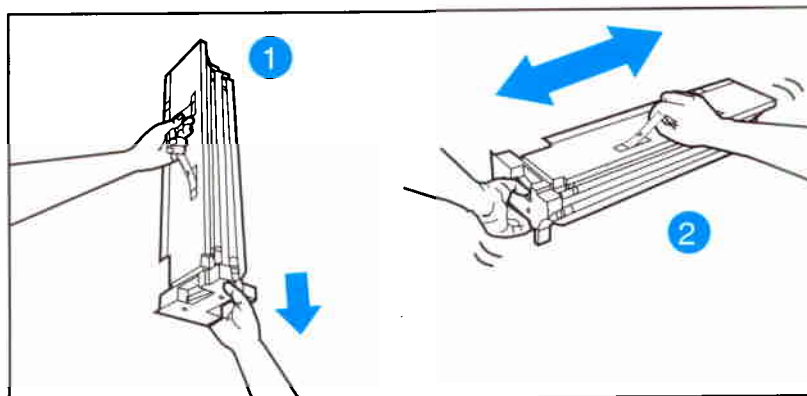
2. Remove the three packing clips and the packing block (item 1).



3. Remove the large white protective strip (item 2).



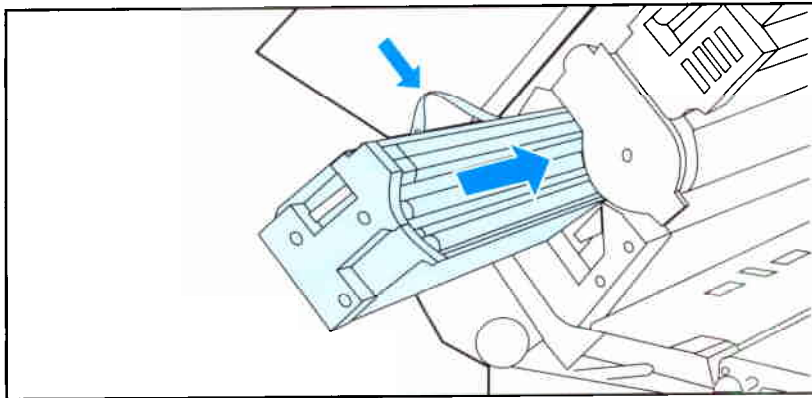
4. Remove the three white protection strips (item 3).



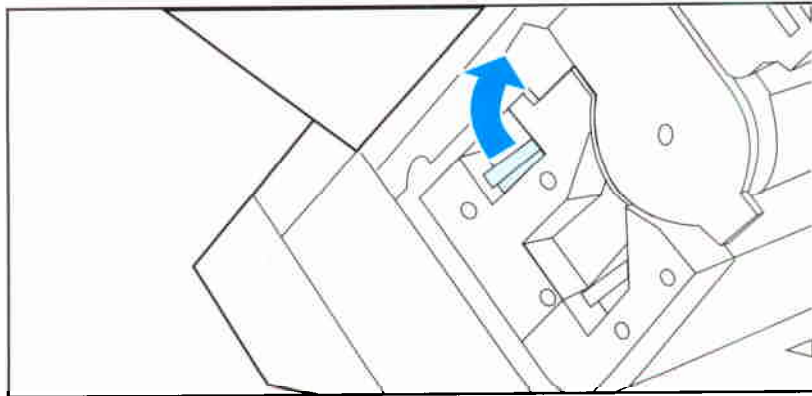
5. Gently shake the developer from top to bottom and side to side.

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### 3-6 Installation and Configuration

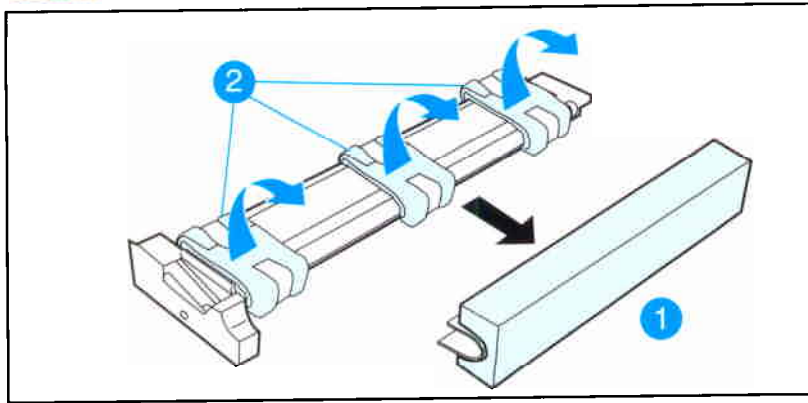


6. Align the developer with the printer and slide it partially in.

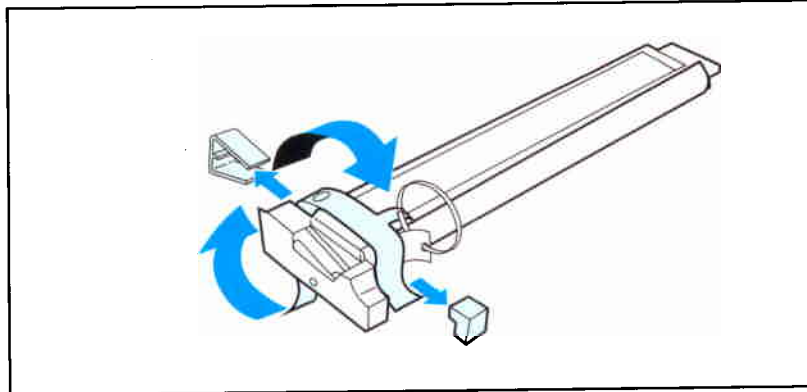


7. Slide the developer into the printer until the release lever clicks into place.

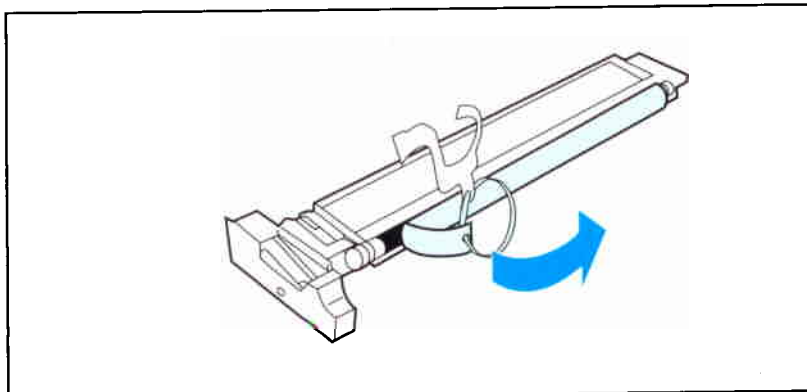
## Black Developer



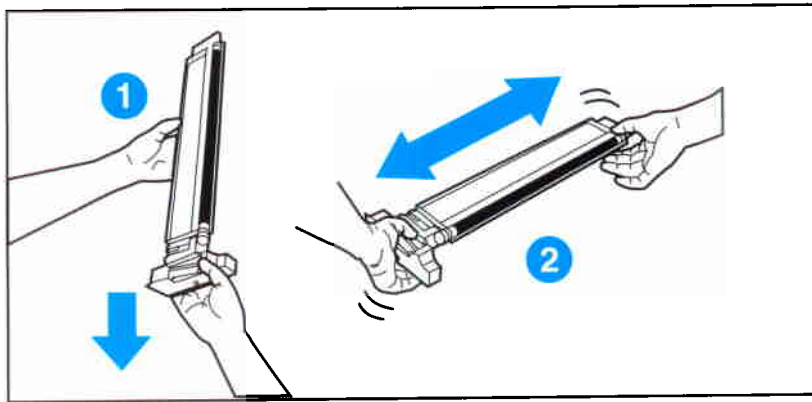
1. Remove the packaging from the Black Developer (item 1), then remove the foam covers (item 2).



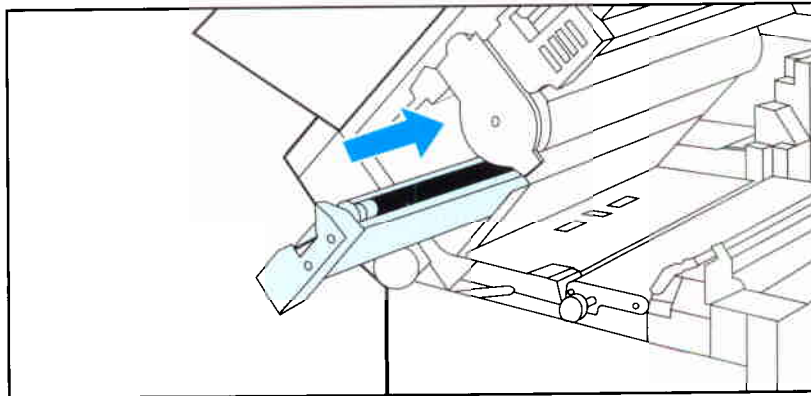
2. Pull the plastic strip to remove the clip and foam spacer.



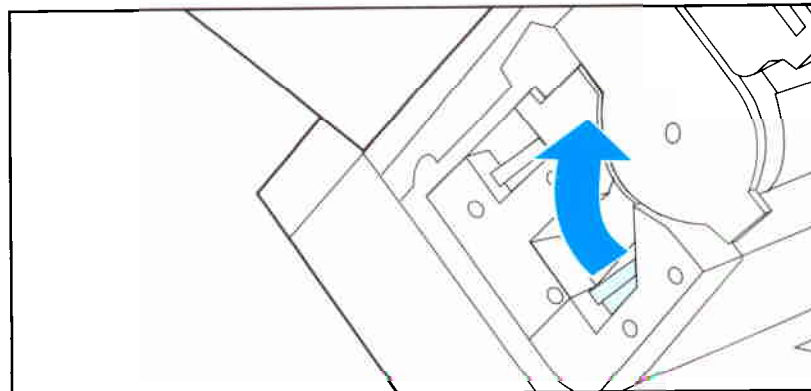
3. Hold the **end** of the developer and pull the plastic loop.



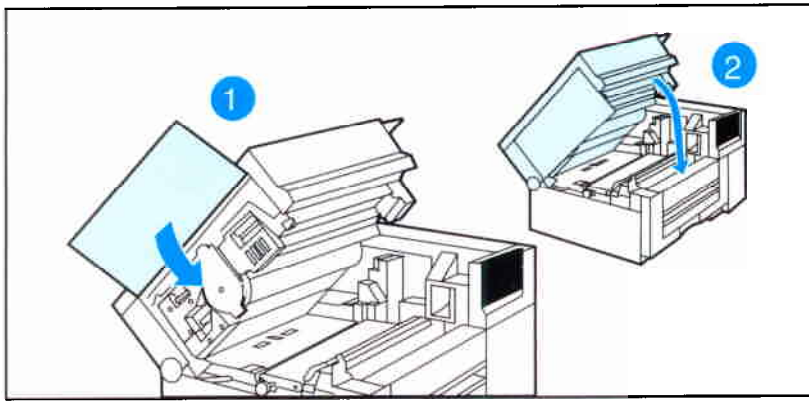
4. Gently shake the developer from top to bottom and side to side.



5. Align the developer with the printer and slide it partially in.



6. Slide the developer into the printer until it clicks into place.



7. Close the developer door and the top cover.

## Selecting the Display Language

1. Hold **Enter** while powering ON the printer. CONFIG LANGUAGE appears. Release **Enter**. 05 SELF TEST appears briefly.
2. Wait for LANG=ENGLISH \* to appear.
3. Press **+** or **-** repeatedly until the desired language appears.
4. Press **Enter** to save your choice. An asterisk (\*) will appear beside your language selection.

### Note

If the new language does not appear in the display, you may not have pressed **Enter** to save your new selection.

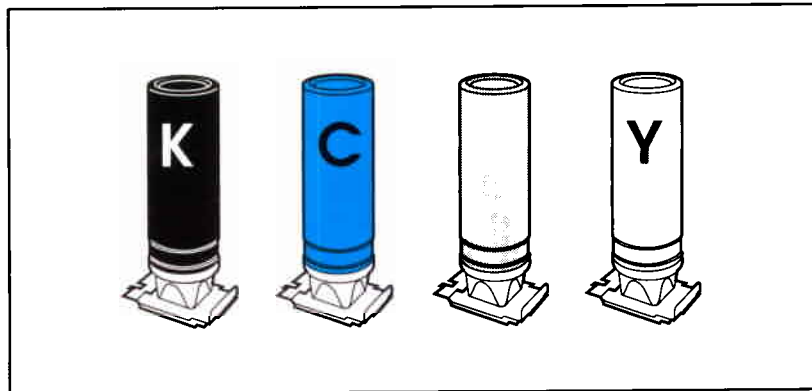
5. Press **On Line** to return the printer on-line.

## Installing Toner

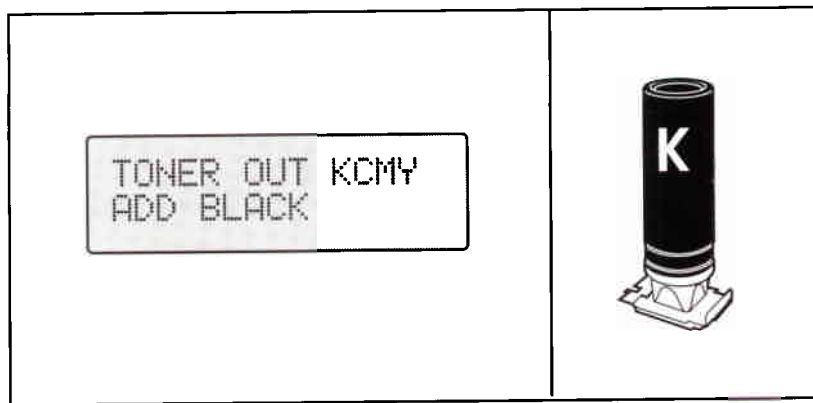
The first time your printer is powered ON you will need to load all four Toner Hoppers in sequence. The sequence is black (K), cyan (C), magenta (M), and yellow (Y).

### Caution

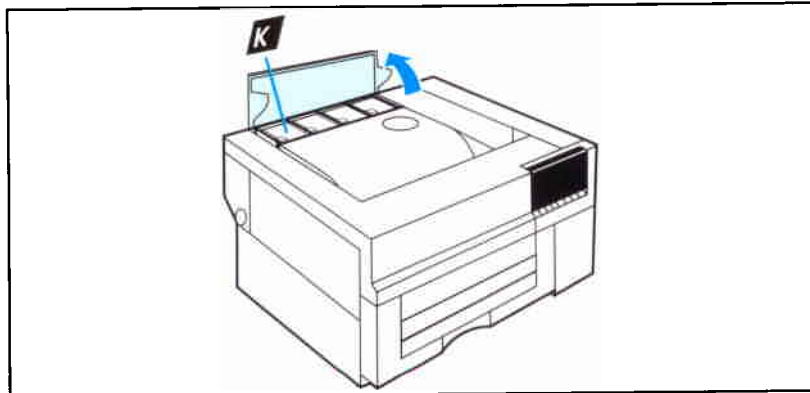
Do not attempt to load any toner unless the control panel displays a message prompting you to load that color of toner. Loading toner before the printer prompts you may damage the printer.



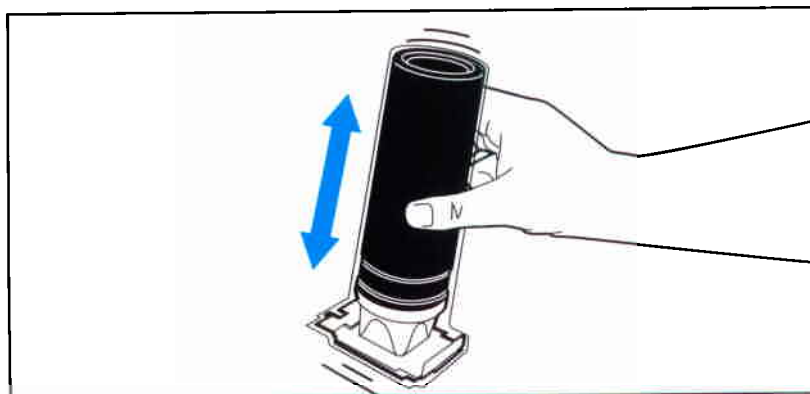
1. The four bottles indicate the toner color they contain.



2. The control panel will indicate which color toner to add.

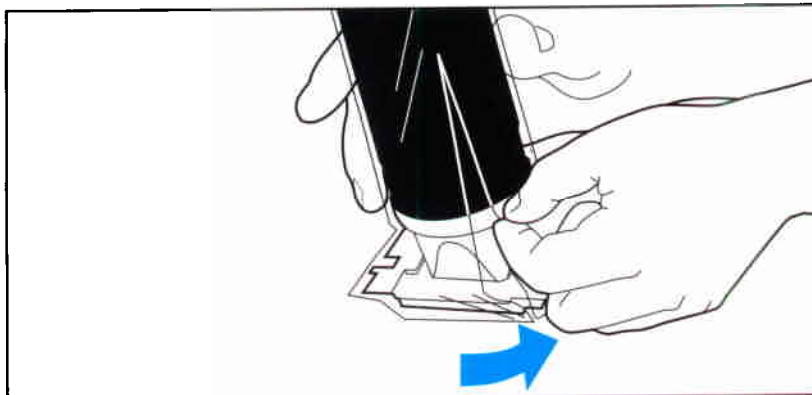


3. Locate the Toner Hopper indicated on the control panel.

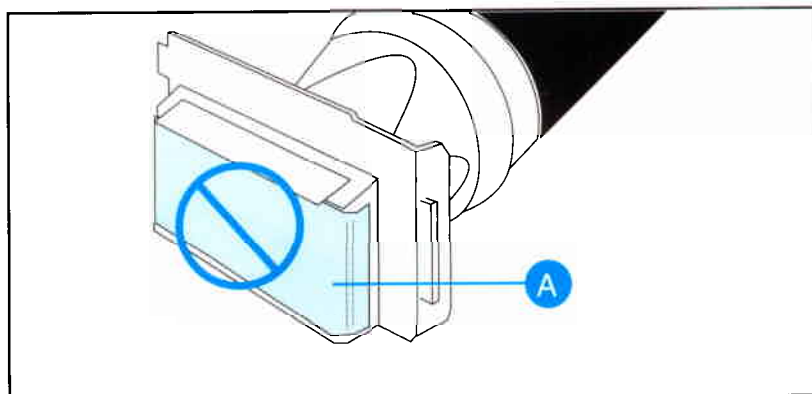


4. Shake the toner bottle up and down vigorously at least ten times.





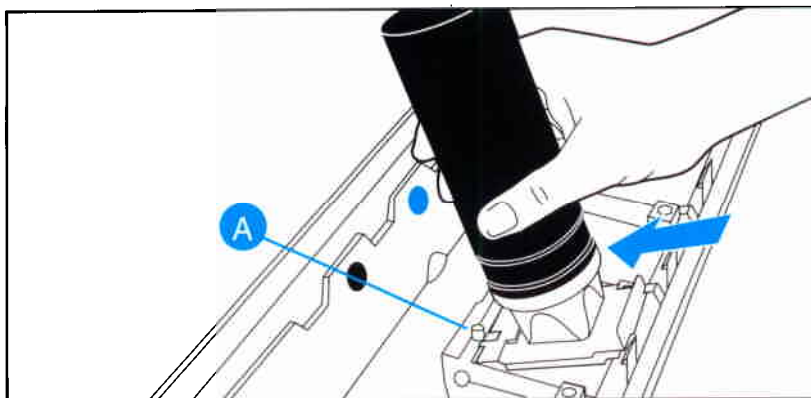
5. Remove the clear plastic wrap from around the toner bottle.



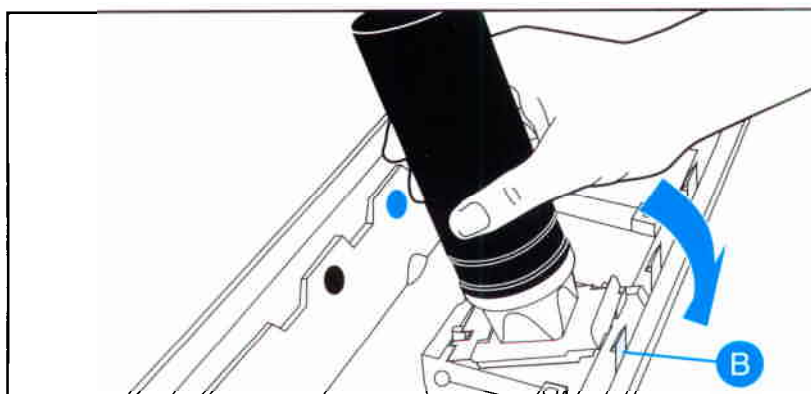
6. Leave the protective strip (A) in place.

**Caution**

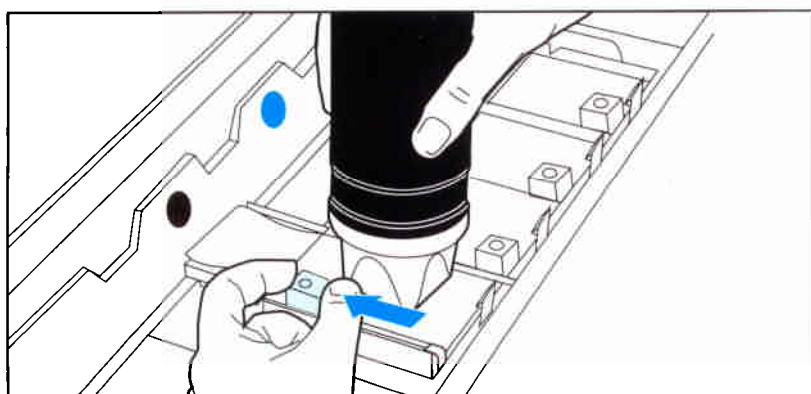
Do not remove the clear plastic strip (A) across the bottom of the toner bottle.



**7.** Align the notched end of the toner bottle with the metal key on the hopper (A).



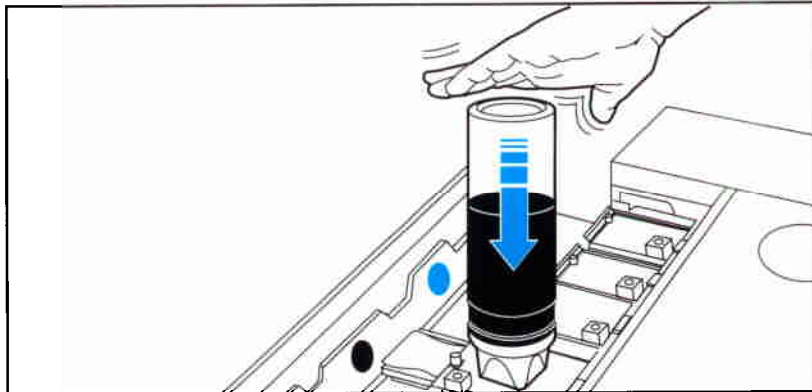
**8.** Push the toner bottle down until it presses in place under the blue tab (B).



**9.** Open the toner door by pushing the blue release handle back.

**Note**

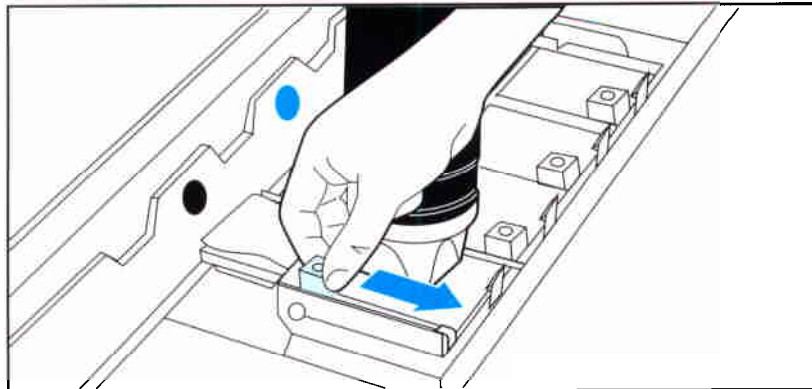
If the toner door does not open, try reinstalling the toner container. Make sure the toner container is properly aligned with the correct hopper.



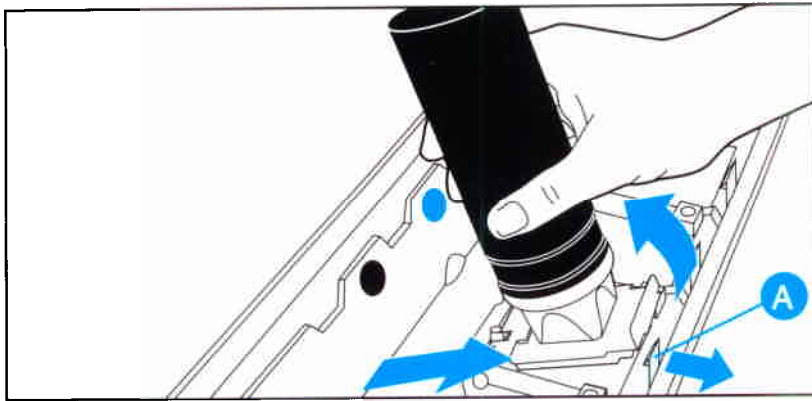
10. Firmly tap the top of the container several times until it is empty.

**Caution**

*Do not squeeze the toner container.* Squeezing the toner container results in spilled toner and printer damage.



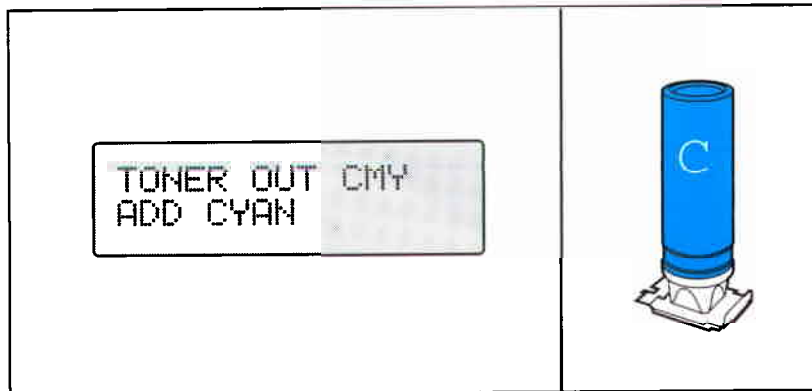
11. Shut the hopper door by sliding the release handle toward the front of the printer.



12. Push the blue tab (A) toward the printer and remove the empty toner bottle.

**Caution**

Do not force the toner container off. If you have trouble removing the toner container, make sure the toner door is completely closed and the toner container is empty.



13. The control panel will now prompt you for the next color in sequence. Repeat these steps for each color.



14. When the last hopper is filled, the developers begin initializing.

## Test Printer Operation

**Note** For a detailed description of the self test, see the “Aids to Troubleshooting” section of Chapter 7.

1. Take the printer off-line.
2. Press **Menu** until PCL TEST MENU appears on the first line.
3. Press **Item** until PCL SELF TEST appears on the second line.  
Press **Enter** to print the self test page.
4. **06 PRINTING TEST** appears briefly before the self test prints.

## Power Save Mode

The Power Save Mode reduces power consumption when the printer does not receive data within the time length chosen.

**Note** This printer meets the Energy Star requirements. The power save mode default is 60 minutes. This value can be changed from the control panel.

## PCL Menu Map

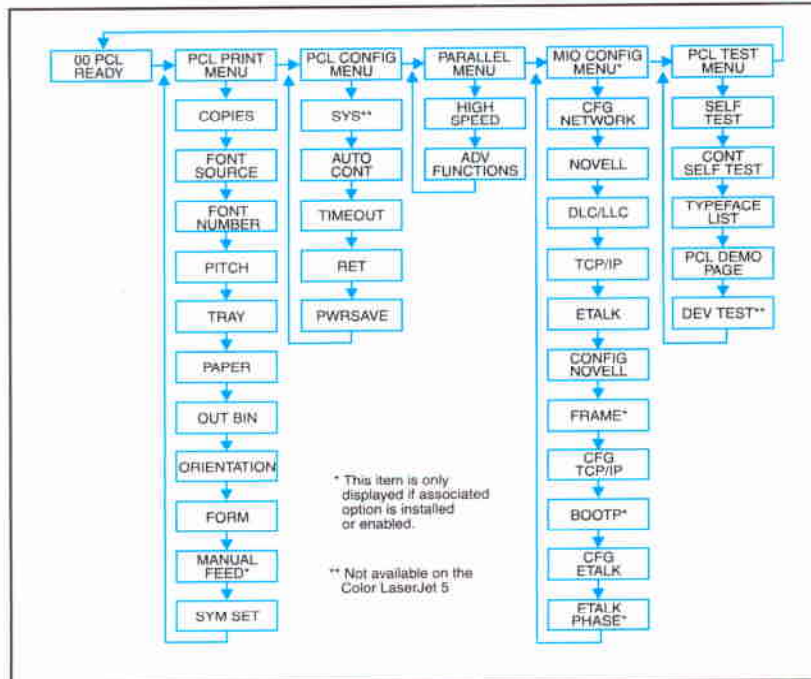


Figure 3-2 PCL Menu Map

## BiTronics Parallel Connection

The BiTronics parallel interface is the default interface for this printer. However, other configurations are available.

For information on configuring your printer with an HP JetDirect Card see the *HP JetDirect Print Server Software Installation Guide* and *HP JetDirect Print Server Hardware Installation Guide* that came with your HP JetDirect card.

## Network Connection

For connection to a LocalTalk network See the *HP JetDirect Print Server Software Installation Guide* and the *HP JetDirect Print Server Hardware Installation Guide* that came with your HP JetDirect card.

### Note

The cable used to connect the printer to the computer is not provided with the printer. It must be purchased separately.

If information about the interface you wish to install is not addressed here, refer to the documentation that came with your interface card.

### Set Up a DOS AUTOEXEC.BAT File

The MODE command prepares MS-DOS for communication with your HP Color LaserJet printer. The MODE command for a BiTronics parallel cable is listed below.

PARALLEL:

```
MODE LPT1: , , P
```

For MS-DOS version 4.0 and above, enter:

```
MODE LPT1: , , B
```

Use a word processing application that saves ASCII text or a text editor such as DOS EDLIN, or DOS EDIT for MS-DOS 5 to enter the appropriate MODE command into your DOS AUTOEXEC.BAT file. (For more information about MODE commands and your AUTOEXEC.BAT file, refer to your DOS manual.)

Re-boot your PC to ensure the new MODE commands take effect.

---

# Configuring the Printer

## Network Configuration Tips

### HP JetDirect Interfaces

Using the optional HP JetDirect interfaces allows higher printer performance on networks. See *HP JetDirect Print Server Software Installation Guide* that came with the interface card for information on installing and initializing the interface card.

### NetWare 3.x-based Products

NetWare 3.x, and HP JetDirect interface in queue server mode provide optimum printer performance.

### NetWare 2.x

If you are using NetWare 2.x, follow these recommendations to ensure optimum performance:

- Configure the HP JetDirect interface card in queue server mode. HP JetDirect cards must be used with dedicated file servers only.
- The print server VAP (value-added process) must be installed on dedicated file servers only. Non-dedicated file servers run competing DOS and NetWare processes which slow printer performance.
- A PC operating as a dedicated print server provides better performance than a print server running as a VAP. If you use full-page raster graphics or frequently download soft fonts, a dedicated print server provides better performance. Refer to your network operating system documentation for more information.

### IBM LAN Server and MicroSoft LAN Manager

Although OS/2 supports virtual memory, better performance may be obtained by increasing server RAM, especially if the SWAPPER.DAT file is large. This is dependent on the number of network printers and the type of printer device driver. Optimum performance for maximum printer configuration (six for OS/2, 1.3, and twelve for OS/2, 2.0) may require 16 Mbytes of RAM.



## Network Configuration

This section covers the installation of the HP JetDirect Network Interface Card. Remove the cover plate over the MIO slot and slide the card onto the printer.

Certain network parameters for Novell NetWare, UNIX (HP-UX, Solaris, or SunOS), and EtherTalk networks may need to be set through the control panel depending on the network configuration. In most cases the default values will suffice since these parameters are capable of being set by the network software. The steps needed to set the parameters through the front panel are listed later in this section.

### Note

The parameters which appear on the control panel are dependent on the interface card installed in the printer.

By factory default, all supported network protocols are enabled in your printer. Disabling network protocols will:

- Remove unwanted broadcast messages from the printer network.
- Provide better control over who prints to the printer.
- Provide only pertinent information on the self test page.
- Allow the display of warning messages on the printer control panel display for protocol-specific error conditions.

Software to allow configuration on supported networks is included with the printer, except for UNIX, (HP-UX, Solaris, or SunOS) which must be purchased separately.

### Novell NetWare Frame Type Parameters

Normally selecting a NetWare frame type is not required. The HP JetDirect card automatically selects a NetWare frame type, and only when this selection is incorrect do you have to set the NetWare frame type through the control panel. The NetWare frame type is displayed on the self test page.

You cannot set the NetWare frame types unless the NetWare protocol is enabled (`NETWORK=NOVELL*` or `NETWORK=AUTO*` was displayed on your control panel). See “Disabling Network Protocols” later in this chapter, to enable Novell NetWare.

Table 3-1 Novell NetWare Frame Types (on HP JetDirect EtherNet)

Frame Type	Description
Auto (default)	All listed Novell frame types are allowed.
EN_8023	Limit frame type to IPX over IEEE 802.3 frames. All others will be counted and discarded.
EN_II	Limit frame type to IPX over EtherNet II frames. All others will be counted and discarded.

### TCP/IP Parameters

The HP JetDirect utility (sold separately) may be used to configure TCP/IP parameters. If you do not have JetAdmin, or you are using a UNIX system other than HP-UX, Solaris, or SunOS, you may use the control panel of your printer to configure the following TCP/IP parameters manually:

- The bootp file for configuration parameters (the default is the bootp file).
- IP address (4 bytes)
- Subnet mask (4bytes)
- Syslog server IP address (4 bytes)
- Default gateway address (4 bytes)
- TCP connection timeout (in seconds)

You will be prompted to configure TCP/IP parameters only if you have manually enabled TCP/IP (TCP/IP=ON\* was displayed on the control panel). See “Disabling Network Protocols” if the TCP/IP is not enabled.

To manually configure TCP/IP parameters:

1. If you have not already done so, enable TCP/IP by following the instructions described in “Disabling Network Protocols”.  
CFG TCP/IP=NO\* appears. If you have also enabled NetWare, it will appear after you have completed the NetWare configurations.
2. Press **+**, **Enter**, then **Item** to manually configure TCP/IP parameters. BOOTP =YES\* or BOOTP=NO\* appears.
3. To maintain the value of the BOOTP= parameter, press **Item**. To change the value of the BOOTP= parameter, press **+**, then **Enter** to save. Press **Item** to continue configuring. If you selected BOOTP=YES\*, the values for the TCP/IP parameters will be provided by the bootp file. No other TCP/IP configuring is

necessary. If you selected `BOOTP=NO*`, you will be prompted to configure each of the TCP/IP parameters. IP BYTE 1 = <value \*> appears.

4. To enter the first byte of the IP address, press **+** until the required value appears in the display. Note that if you press and hold **+**, the value scrolls rapidly. Press **Enter** to save the value, then **Item** to continue. Configure the remaining bytes of the IP address, subnet mask bytes (SM), syslog server IP address, (LG), default gateway (GW), and timeout (TIMEOUT) in the same manner.
5. If no other protocol is enabled, press **On Line**. You are ready to configure the network operating system. Refer to the *HP JetDirect Print Server Software Installation Guide* for configuration instructions.

### Apple EtherTalk Phase Parameter

You will be prompted to configure the EtherTalk phase parameter only if you have enabled EtherTalk (`ETALK=ON*` was displayed). See “Disabling Network Protocols” to enable EtherTalk.

To configure EtherTalk parameters:

1. If you do not want to configure the phase parameter, press **Item**. Press **+**, **Enter**, followed by **Item**, to manually configure EtherTalk. `PHASE =1*` or `PHASE =2*` appears.
2. Press **Item** to keep the same phase value. Press **+** to change the phase parameter, press **Enter** to save the new value.
3. Press **On Line**. See the *HP JetDirect Print Server Software Installation Guide* for further configuration instructions.

### Disabling Network Protocols

1. Press **On Line** to take the printer off-line.
2. Press **Menu** repeatedly until `MIO CONFIG MENU` appears.
3. Press **+**. (`CFG NETWORK =YES` appears.)
4. Press **Enter**. (`CFG NETWORK =YES*` appears.)
5. Press **Item** to scroll through the list of network protocols. (`NOVELL=ON*` appears.)

### Disabling Novell NetWare

1. Press **+** to change `NOVELL=OFF`.
2. Press **Enter** to save the new status. (`NOVELL=OFF*` appears.)
3. Press **Item** to continue configuring. (`DLC/LLC=ON*` appears.)

### Disabling DLC/LLC

1. Press **+** to change DLC/LLC=OFF.
2. Press **Enter** to save the new status. (DLC/LLC=OFF\* appears.)
3. Press **Item** to continue configuring. (TCP/IP=ON\* appears.)

### Disabling TCP/IP

1. Press **+** to change TCP/IP=OFF.
2. Press **Enter** to save the new status. (TCP/IP=OFF\* appears.)
3. Press **Item** to continue configuring. (ETALK=ON\* appears.)

### Disabling Apple EtherTalk

1. Press **+** to change ETALK=OFF.
2. Press **Enter** to save the new status. (ETALKTCP/IP=OFF\* appears.)
3. Press **Item** to continue configuring.

See the *HP JetDirect Print Server Software Installation Guide* for more information on configuring the network.

## Printer Drivers

Obtaining Drivers not included with this Printer	
Your software vendor	Most current software packages include drivers for this printer. You may contact your software vendor to order an updated printer driver for your software.
CompuServe	The fastest way to receive HP printer drivers is by downloading them to your computer from the HP Forum* on CompuServe. To sign up for CompuServe call (800) 848-8199 and ask for Representative #51 (U.S. only).
HP FIRST	For 24 hour access to information on ordering HP printer drivers, call HP FIRST at (800) 333-1917. This information is sent by fax.
HP Distribution Center	To order HP printer drivers by phone, call HP Distribution at (970) 339-7009.

\* The HP Forum on CompuServe is a User's Forum and is not monitored by Hewlett Packard.

### Solving Driver Problems

- For wrong disk size, damaged, or lost software, call the HP Distribution Center at (970) 339-7009.
- For 24 hour automated support answers to common questions, call HP AUDIO-TIPS at (800) 333-1917.

For assistance with technical questions regarding HP printer drivers, call the HP Customer Support Center at (208) 323-2551 from 7 am to 6 pm (MT) Monday through Friday, except Wednesday when the hours are 7 am to 4 pm (MT).

# Maintaining Your Printer

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## Chapter Contents

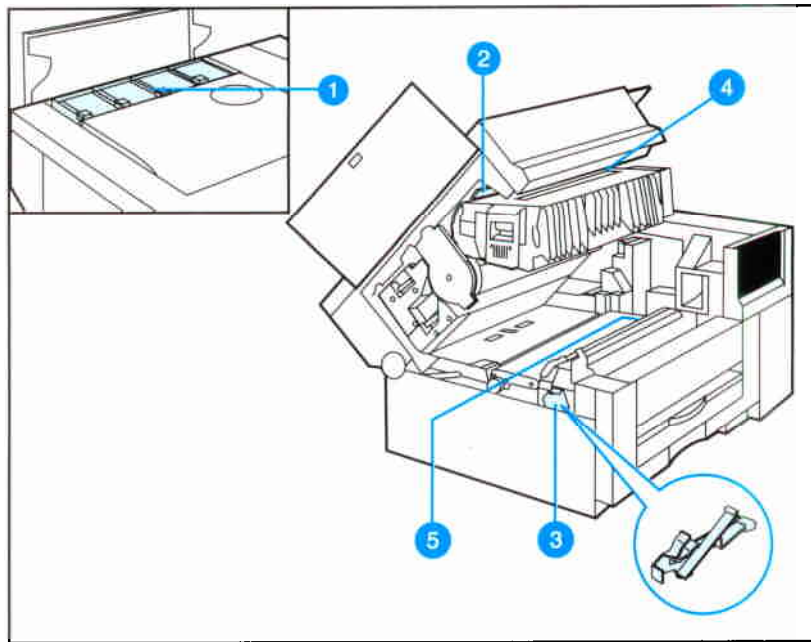
Cleaning Locations & Tool . . . . .	4-3
Regular Maintenance Procedures . . . . .	4-4
Cleaning the Toner Hopper Area . . . . .	4-8
Performing Printer Maintenance . . . . .	4-9
Identifying Maintenance Units . . . . .	4-10
Supplies Compatibility . . . . .	4-11
Environmental Collection Program . . . . .	4-12
Replacing the Collection Kit . . . . .	4-13
Replacing the Toner Collection Box . . . . .	4-13
Replacing the Ozone Filter . . . . .	4-15
Replacing the Coating Pad Kit (CLJ) . . . . .	4-16
Replacing the Coating Pad . . . . .	4-16
Replacing the Cleaning Roller (CLJ) . . . . .	4-18
Replacing the Coating Kit (CLJ5/5M) . . . . .	4-20
Replacing the Cleaning Roller (CLJ 5/5M) . . . . .	4-20
Replacing the Coating Roller . . . . .	4-22
Replacing the Black Developer . . . . .	4-23
Replacing the Color Developer . . . . .	4-25
Replacing the Print Drum . . . . .	4-30
Replacing the Fuser . . . . .	4-33
Replacing the Transfer Assembly . . . . .	4-36



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## Cleaning Locations & Tool

Figure 4-1 shows areas that require periodic cleaning and a provided Laser Optics Cleaning Tool.



**Figure 4-1**      **Areas that Require Periodic Cleaning**

- |                              |                         |
|------------------------------|-------------------------|
| 1 Toner Hopper Area          | 4 Drum Corona Wire *    |
| 2 Laser Optics Glass         | 5. Transfer Corona Wire |
| 3 Laser Optics Cleaning Tool |                         |

\* New Style Drum (C3967A) Only.

---

## Regular Maintenance Procedures

Overall print quality will depend largely on keeping certain critical components of the printer clean. Some of the more sensitive printer components need to be cleaned regularly to ensure the highest possible print quality (approximately every 2,000 pages). The following procedure will clean these three components.

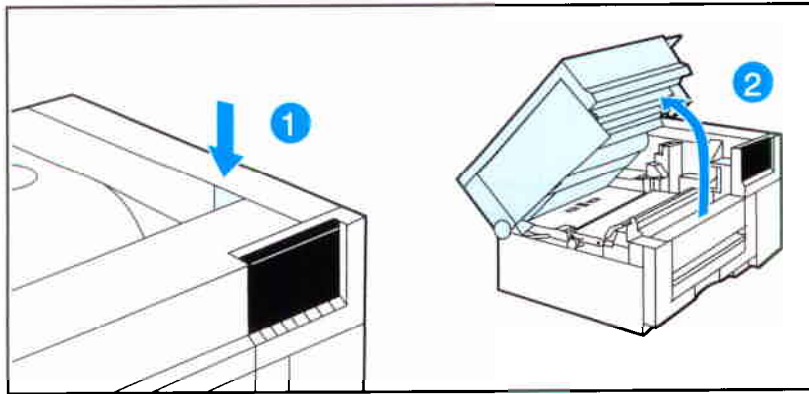
- Optics Glass
- Drum Corona
- Transfer Corona

---

### Caution

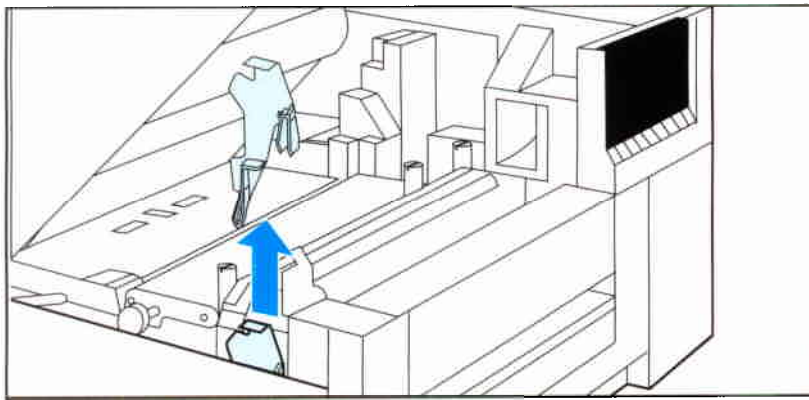
Remove all jewelry and watches before continuing. The drum can be easily scratched, causing damage. Do not expose the print drum to direct light for extended periods of time. Exposure to light can permanently damage the drum.

---

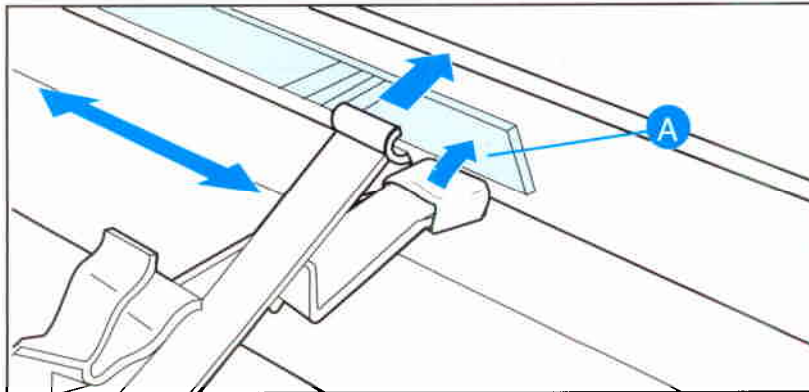


1. Press the top cover release button (item 1) and open the top cover (item 2).
2. Pull the drum lock lever at the left edge of the drum toward you.
3. Lower the drum until it is horizontal.

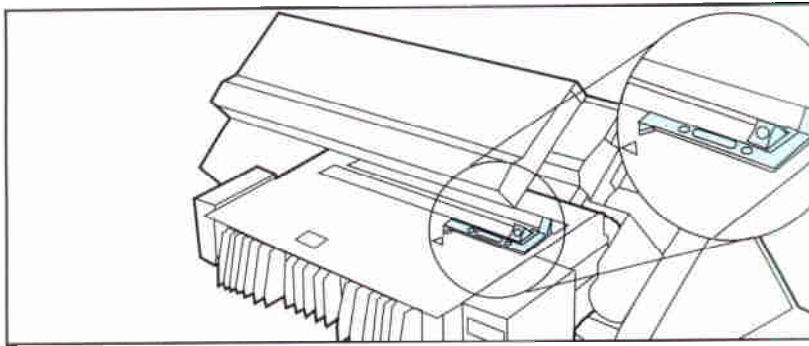




4. Locate the laser optics cleaning tool.



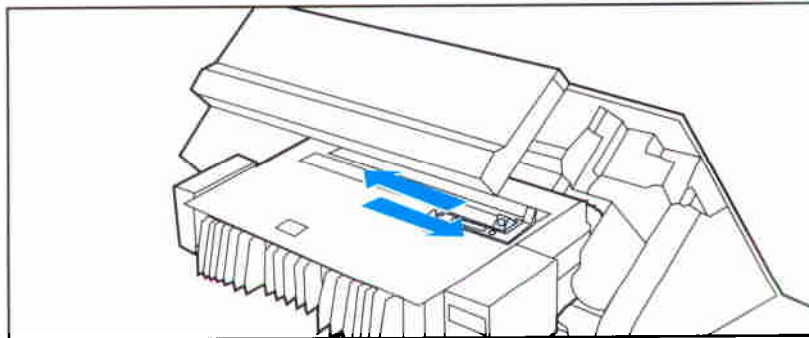
5. Insert the cleaning tool above the drum with the padded portion towards the glass (A). Press the pad on the cleaning tool firmly against the right end of the optics glass. Move the cleaning tool to the left, then back to the right. Return the cleaning tool to its storage place.



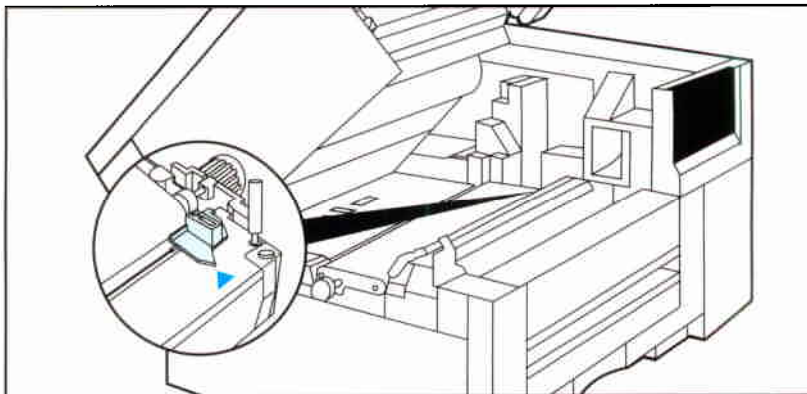
6. Locate the drum corona cleaning handle towards the back right corner of the main drum.

**Note**

The drum corona cleaning handle is only on the new style drum (C3967A).



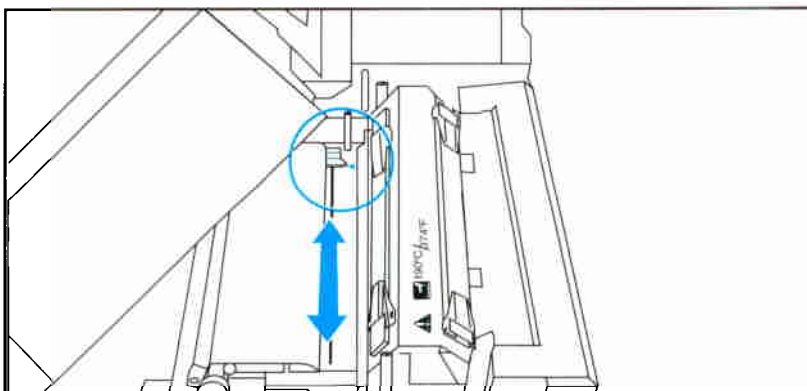
7. Slide the handle to the left end of the drum and back to the right. Repeat once.
8. Raise the drum until it locks into place.



9. Locate the transfer corona cleaning knob located between the transfer belt and the fuser on the right side of the printer.

#### Caution

Do not touch the transfer belt surface. Oil from your hands and debris can reduce the life span of the belt and affect print quality.



10. Slide the cleaning knob to the left end of the printer and back. Repeat once. Close the top cover.

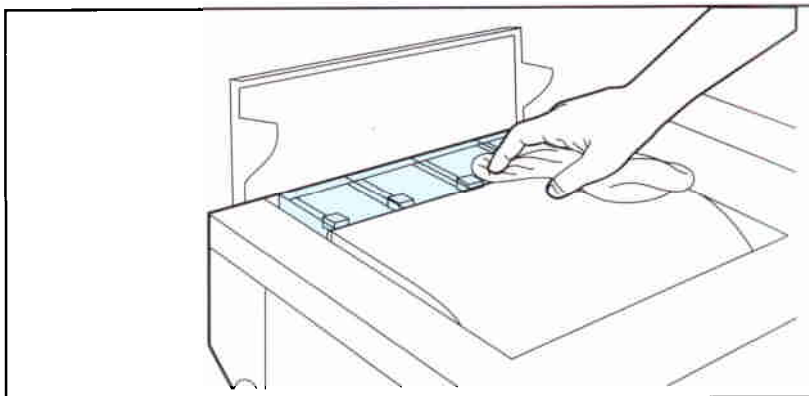
#### Caution

Before closing the printer, be sure the drum corona cleaning handle and transfer corona cleaning knob are seated in the full right position.

---

## Cleaning the Toner Hopper Area

Clean the toner hopper area when you add toner. Add toner only when the control panel requests.



1. Push the optional rear feed unit away from the printer. Open the toner hopper cover and use the cover to hold the rear feed unit back away from the printer.
2. With the cleaning cloth from the toner collection kit, wipe off any dust or toner on the area between the individual toner doors.

---

### Caution

Do not drop excess toner into the manual feed area. Toner in the manual feed area can result in manual feed problems.

3. Close the toner hopper cover. Return the optional rear feed unit to its upright position against the back of the printer.

---

### Note

A cleaning cloth is included with each toner collection kit. The product number for the toner collection kit is listed in Table 8-A.

## Performing Printer Maintenance

This section gives the instructions for replacing maintenance units on the HP Color LaserJet printer. The printer prompts you from the Control Panel when it is time to replace each unit. Table 4-1 lists the approximate time intervals for replacing maintenance units. For proper printer operation, use only Hewlett-Packard maintenance units (see Chapter 8).

Table 4-1 Approximate Replacement Intervals

Unit	Printer Message	Page Count**	Time Period *
Toner	TONER OUT [CMYK] ADD [color]	2200 pages	1 to 2 months
Toner Collection Box Filter	14.5 REPLACE COLLECTION KIT	Varies with toner usage.	4 to 6 months
Coating Pad, Cleaning Roller	14.6 REPLACE (CLJ)*** COATING PAD KIT	Varies with toner usage.	4 to 6 months
Coating Roller, Cleaning Roller	14.6 Replace Coating Kit (CLJ5/5M)****	Varies with Transparency use	4 to 6 months
Black Developer	19.1 BLACK DEVEL. USER MAINTENANCE	40,000 pages	15 months
Color Developer	19.2 COLOR DEVEL. USER MAINTENANCE	40,000 pages	15 months
Transfer Belt	19.5 TRANS BELT USER MAINTENANCE	60,000 pages	30 months
Fuser	19.4 FUSER USER MAINTENANCE	80,000 pages	40 months
Print Drum	19.3 DRUM USER MAINTENANCE	60,000 pages *****	30 months

\* This time period assumes you are printing 2000 pages per month. If your print quantities differ, adjust the time period accordingly.

\*\* Approximate page count based on 5% coverage of individual toner colors.

\*\*\* HP Color LaserJet Printer

\*\*\*\* HP Color LaserJet 5/5M Printer

\*\*\*\*\* The page count for the drum is incremented once for every standard black and white or monochrome page and twice for each multiple color page, legal, tabloid, or A3-size page.

## Identifying Maintenance Units

Figure 4-2 shows the location of each maintenance unit.

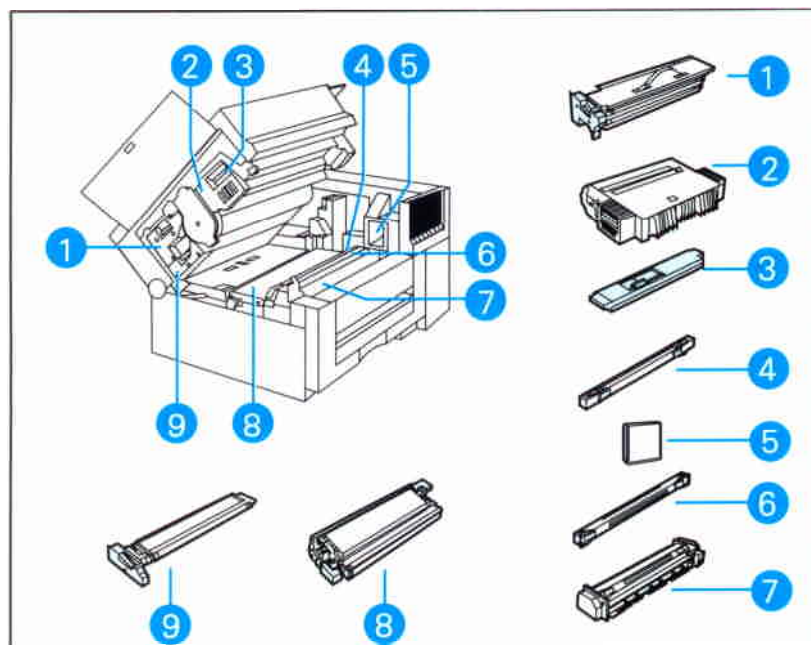


Figure 4-2 Maintenance Units Locations (CLJ 5/5M)

- |                          |                      |                   |
|--------------------------|----------------------|-------------------|
| 1 Color Developer        | 4 Coating Roller **  | 7 Fuser           |
| 2 Print Drum             | 5 Ozone Filter *     | 8 Transfer Belt   |
| 3 Toner Collection Box * | 6 Cleaning Roller ** | 9 Black Developer |

\* The Toner Collection Box and Ozone Filter are included in the Collection Kit.

\*\* The Cleaning Roller and Coating Roller are included in the Coating Kit.

### Note

Do not install old style coating pad kit into new style fuser. See compatibility matrix, Table 4-2.

### Note

All HP Color LaserJet Printer original maintenance items have blue handles and tabs indicating user access or lift points. With the exception of the toner area, the maintenance items in the HP Color LaserJet 5/5M Printer should have purple handles and tabs.

## Supplies Compatibility

With the introduction of the HP Color LaserJet 5 and 5M printers HP is introducing a new set of printer supplies. While all of these new supplies are fully backward compatible with the original HP Color LaserJet printer, the original set of HP Color LaserJet printer supplies should not be used in the new HP Color LaserJet 5 or 5M printer.

Table 4-2 HP Color LaserJet/HP Color LaserJet 5 and 5M

Product Number	Product Number	Comment	Compatible with..	
			HP Color LaserJet	HP Color LaserJet 5/5M
Toner Supplies				
C3105A	Black toner bottle	full compatibility	•	•
C3102A	Cyan toner bottle	full compatibility	•	•
C3103A	Yellow toner bottle	full compatibility	•	•
C3104A	Magenta toner bottle	full compatibility	•	•
C3120A	Toner Collection Kit	full compatibility	•	•
C3106A	Coating Pad Kit	Compatible with C3911A fuser unit only	•	
C3964A	Coating Kit*	Compatible with C3969A fuser unit only	•	•
Imaging Units				
C3107A	Black developer	HP Color LaserJet compatibility ONLY	•	
C3965A	Black developer*	full compatibility	•	•
C3108A	Color developer	HP Color LaserJet compatibility ONLY	•	
C3966A	Color developer*	full compatibility	•	•
C3109A	Print drum	HP Color LaserJet compatibility ONLY	•	
C3967A	Print drum*	full compatibility	•	•
C3110A	Transfer assembly	HP Color LaserJet compatibility ONLY	•	
C3968A	Transfer assembly*	full compatibility	•	•
C31111 Opt 110 or 220A	Fuser (110 = 110V Opt 220 = 220V)	HP Color LaserJet compatibility ONLY	•	
C3969A Opt 110 or 220	Fuser* (Opt 110 = 110V Opt 220 = 220V)	full compatibility	•	•

(\*) Products in **bold-faced type** are new supplies introduced with the HP Color LaserJet 5/5M printers.

---

## Environmental Collection Program

HP encourages responsible disposal of LaserJet printer maintenance units through its Environmental Collection Program. For details on this program, see the brochure enclosed with each maintenance unit.

The following maintenance units can be disposed of through the Environmental Collection Program:

- Color Developer
- Black Developer
- Toner Collection Kit
- Coating Kit
- Transfer Belt
- Print Drum
- Fuser

To order maintenance units, call your HP authorized dealer or the North American Distribution Organization (NADO).



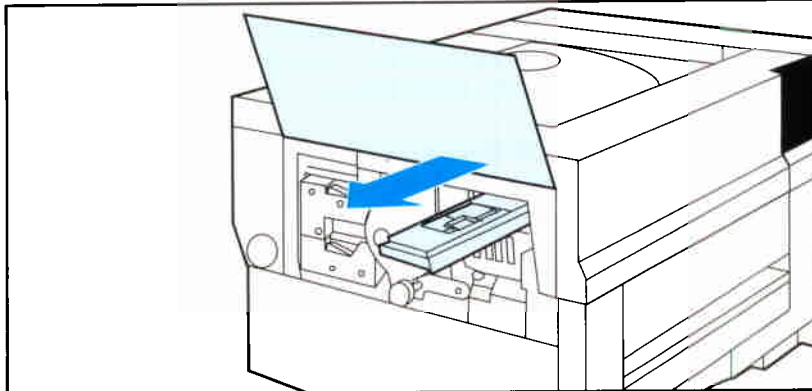
---

## Replacing the Collection Kit

When the message 14.5 REPLACE COLLECTION KIT appears on the Control Panel Display, change the Toner Collection Box and Filter.

### Replacing the Toner Collection Box

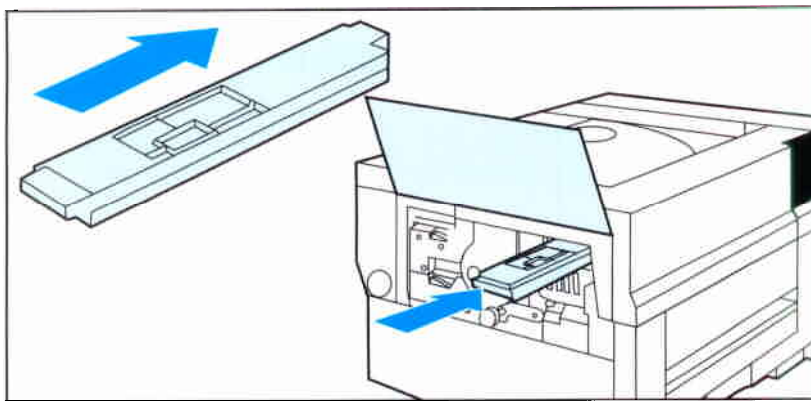
1. Open the left side cover by lifting its bottom edge.



2. Pull out the Toner Collection Box horizontally and set it aside for recycling.

#### Toner Collection Box Considerations

- Do not re-use the Toner Collection Box.
- Keep the collection box horizontal when handling it.
- Handle the collection box carefully to prevent damaging it.
- Do not incinerate the used collection box.
- Remove the new collection box from its packaging.

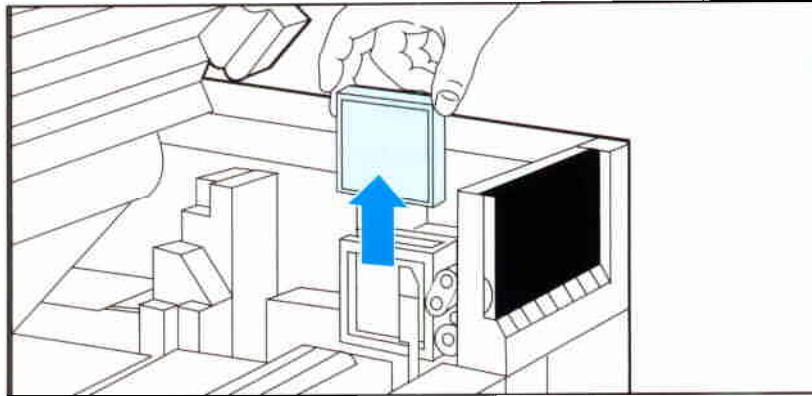


3. Slide the new Toner Collection Box into the printer until it is flush with the side of the Print Drum.
4. Close the Left Cover.
5. Plug in and power ON the printer.
6. The printer will perform a short self test, then display  
00 READY, or 00 POSTSCRIPT READY.

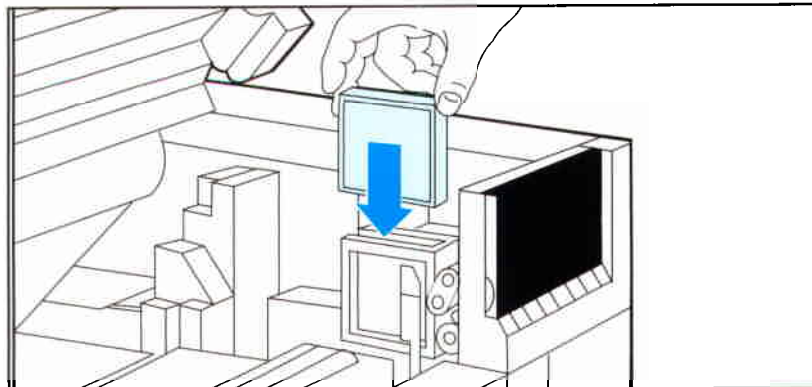
## Replacing the Ozone Filter

The Ozone Filter is replaced as part of the preventive maintenance. Replace the Ozone Filter as follows:

1. Power OFF and unplug the printer.
2. Open the Top Cover.



3. Grasp the filter by its two top corners, then slide it up and out of the printer.
4. Remove the new filter from its packaging.



5. Slide the new filter into the printer.
6. Close the Top Cover, plug in and power ON the printer.

The printer goes through a brief self test sequence, then returns on-line with 00 PCL (or POSTSCRIPT) READY on the Control Panel Display.

---

## Replacing the Coating Pad Kit (CLJ)

When the message 14.6 REPLACE COATING PAD KIT appears on the Control Panel Display, change the Coating Pad and Cleaning Roller if an old style fuser (C3111A) is installed. If a new style fuser (C3969A) is installed, use new coating kit (C3964A) instead. See Replacing the Coating Kit (CLJ5/5M).

### Replacing the Coating Pad

1. Power OFF and unplug the printer.
2. Open the Top Cover.

---

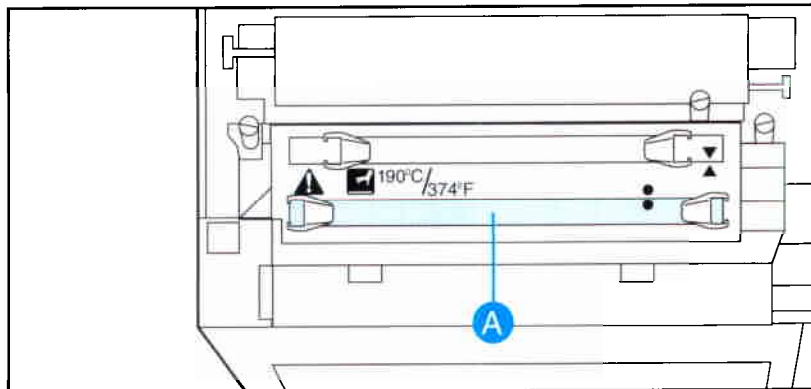
#### Warning!

Wait 30 minutes for the Fuser to cool down before removing the Coating Pad. Continuing before the fuser has cooled down may result in severe burns.

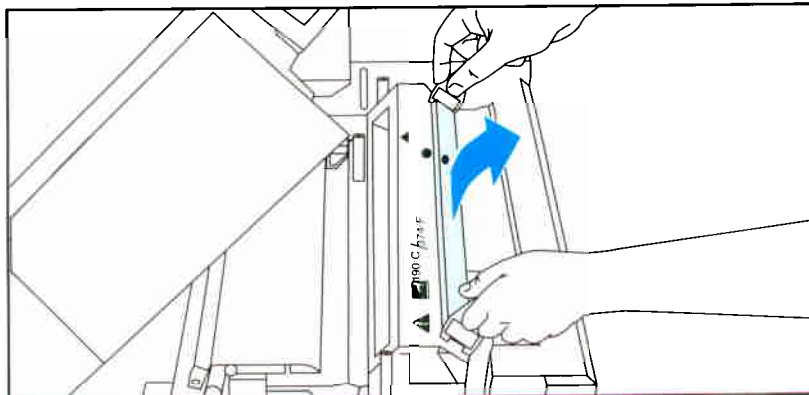
---

#### Caution

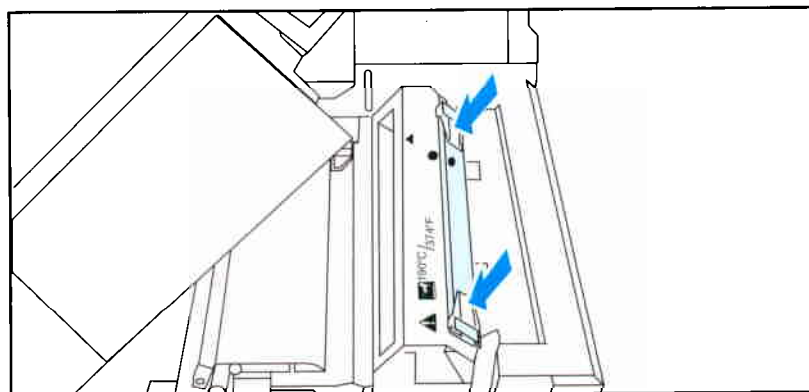
Avoid exposure of the Print Drum to direct light. Exposure to light can permanently damage the drum.



3. Locate the Coating Pad on the Fuser (A).

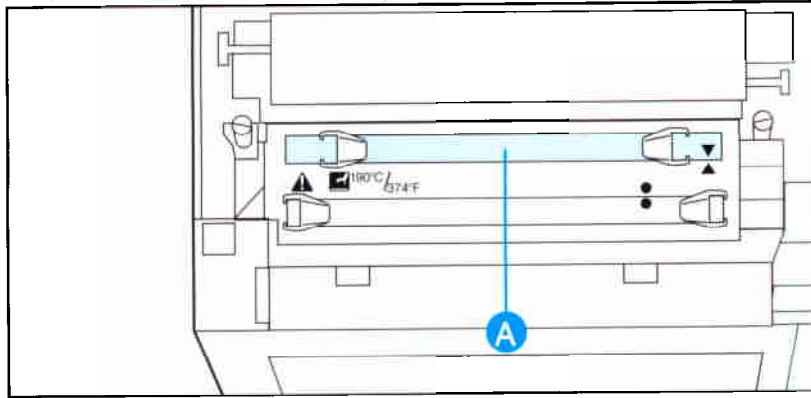


4. Raise the handles on the Coating Pad and remove the pad from the printer. Set the Coating Pad aside for recycling.
5. Remove the new Coating Pad from its packaging.

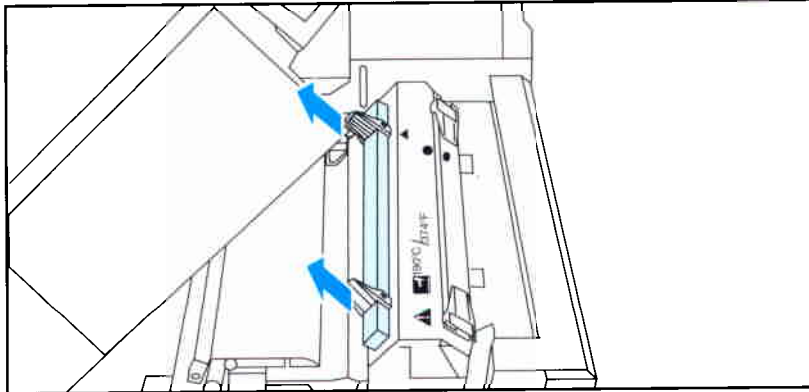


6. Hold the pad with the handles on top and the round dot to the right. Install the pad into the Fuser.
7. Push the Coating Pad down until it presses into place horizontally, then fold down the handles.

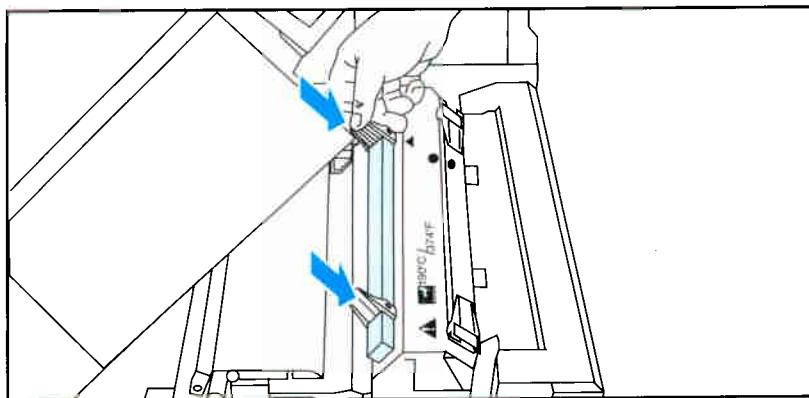
## Replacing the Cleaning Roller (CLJ)



1. Locate the Cleaning Roller on the Fuser (A).



2. Raise the handles on the Cleaning Roller and remove the roller from the printer.
3. Remove the new cleaning roller from its packaging.
4. With the handles on top, and the gear on the left, install the new cleaning roller fully into the Fuser.



5. Push the roller down until it presses into place horizontally, then fold down the handles.
6. Close the Top Cover, plug in and power ON the printer.

The printer goes through a brief self test sequence, then returns on-line with 00 PCL (or POSTSCRIPT) READY on the Control Panel Display.

---

## Replacing the Coating Kit (CLJ5/5M)

When the message 14.6 REPLACE COATING KIT appears on the printer display, change the cleaning roller and coating roller. Print quality will degrade until the kit is replaced.

---

### Caution

Use only maintenance units designed and labeled for the HP Color LaserJet 5/5M printer. Other maintenance units may damage your printer or result in inferior print quality.

---

## Replacing the Cleaning Roller (CLJ 5/5M)

1. Power OFF and unplug the printer.
2. Press the top cover release button, then open the top cover.

---

### Warning

Wait 30 minutes for the Fuser to cool down before removing the Cleaning Roller. Continuing before the fuser has cooled down may result in severe burns.

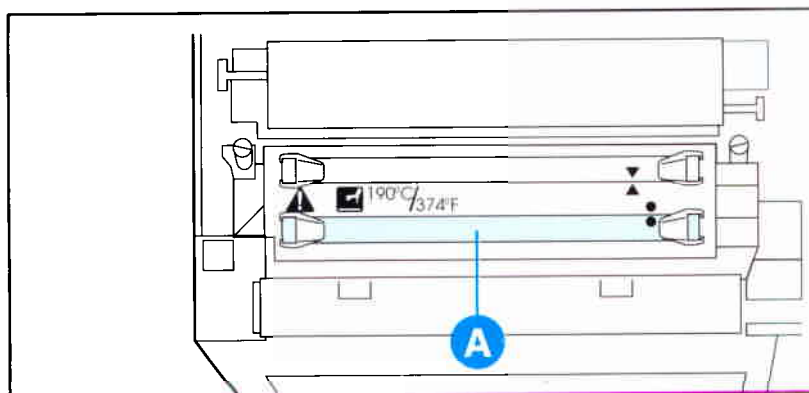
---

---

### Caution

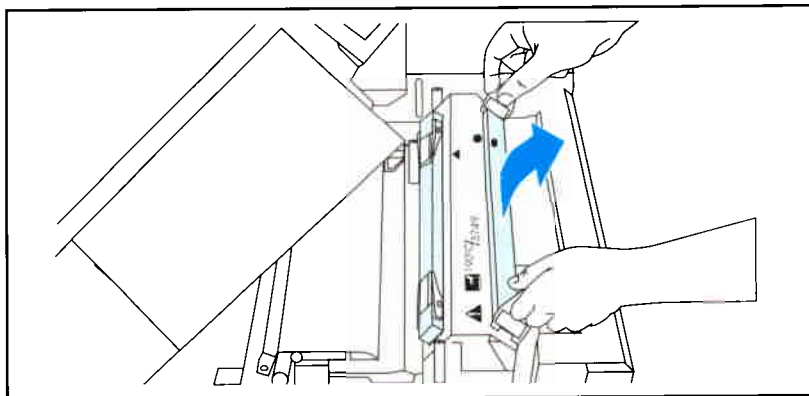
Avoid exposure of the Print Drum to direct light. Exposure to light can permanently damage the drum.

---



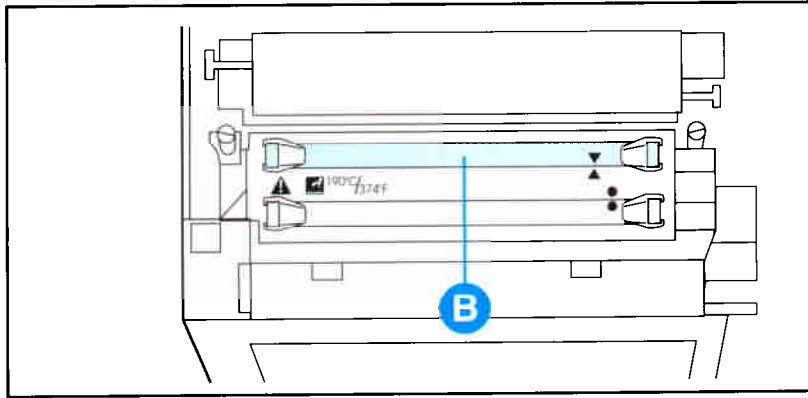
3. Locate the cleaning roller on the fuser (A).



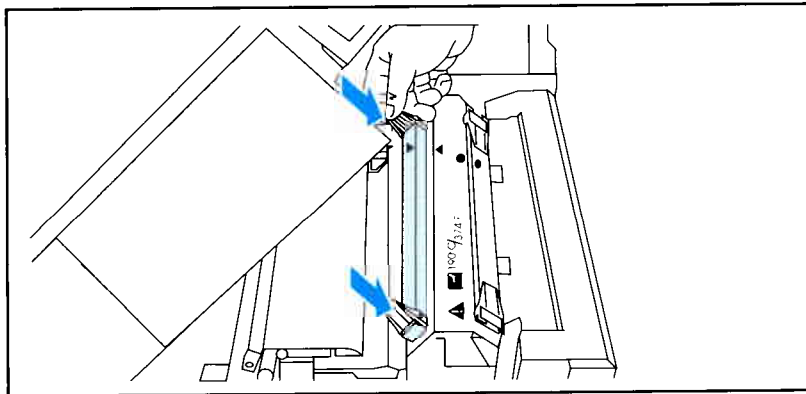


4. Raise the handles on the Cleaning Roller and remove it from the printer. Set the Cleaning Roller aside for recycling.
5. Remove the new Cleaning Roller from its packaging.
6. With the handles on top and the dot to the right, install the new Cleaning Roller.
7. Push the Cleaning Roller down until it clicks into place horizontally, then fold down the handles.

## Replacing the Coating Roller



1. Locate the Coating Roller on the fuser (B).
2. Raise the handles on the Coating Roller and remove it from the printer. Set the coating roller aside for recycling.
3. Remove the new Coating Roller from its packaging.



4. With the handles on top and the triangle alignment mark to the right, install the new Coating Roller.
5. Push the Coating Roller down until it clicks into place horizontally, then fold down the handles.
6. Close the Top Cover, plug in and power ON the printer.

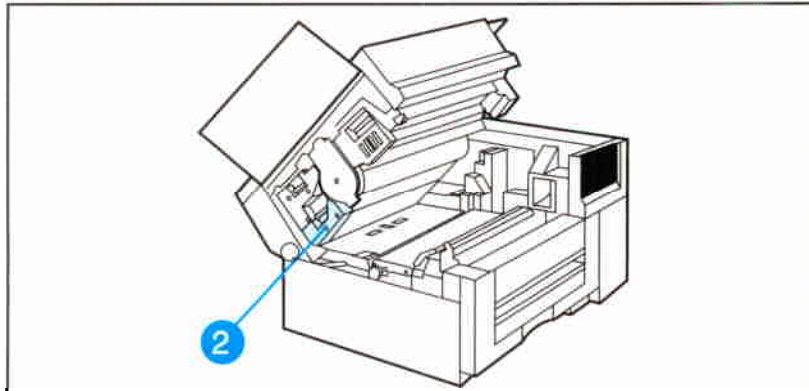
The printer goes through a brief self test sequence, then returns on-line with 00 PCL (or POSTSCRIPT) READY on the Control Panel Display.

---

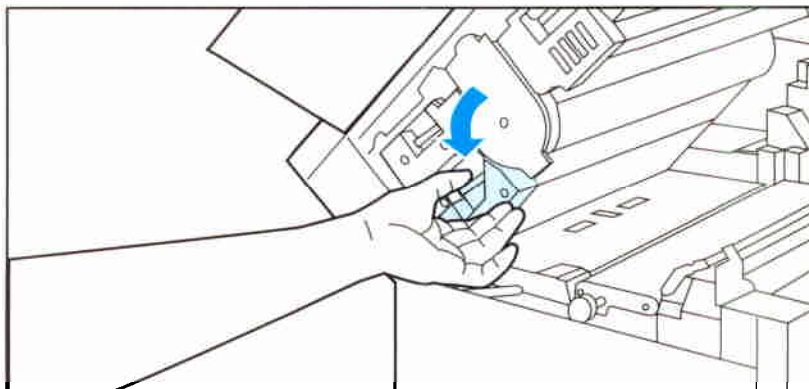
## Replacing the Black Developer

Replace the Black Developer when the message 19.1 BLACK DEVELOPER USER MAINTENANCE appears on the Control Panel Display.

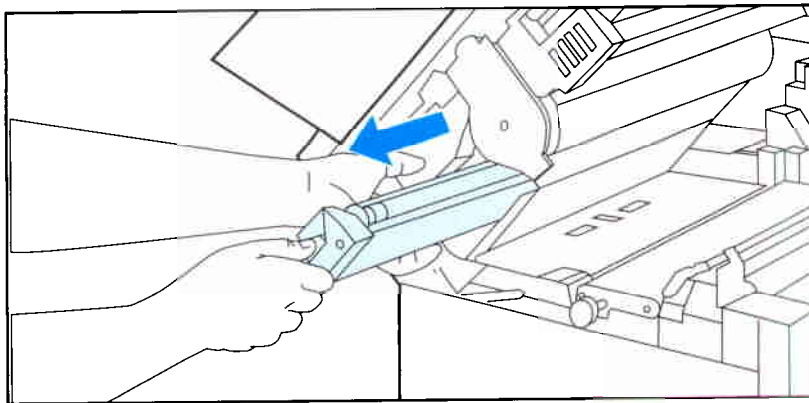
1. Power OFF and unplug the printer.
2. Press the Top Cover release button, then open the Top Cover.
3. Open the Developer Door.



4. Locate the Black Developer (2).



5. Press the release lever on the developer and pull it partially out.



6. Support the developer from the bottom, then pull the developer out of the printer.

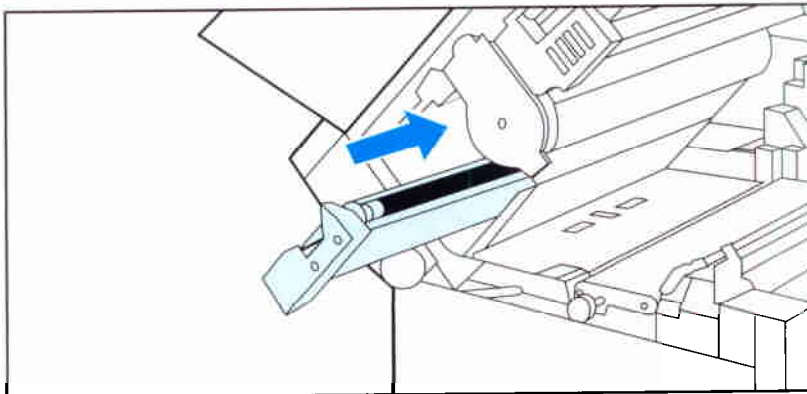
**Caution**

Keep the new developer horizontal during installation. Tilting the developer may cause poor print quality and false error messages.

**Caution**

Do not remove the clear plastic strip from the developer.

7. Remove the new developer from its packaging. Be sure to remove all packaging.



8. Slide the new developer fully into the printer, and close the door.

9. Close the **Top Cover**, plug in, and power ON the printer.

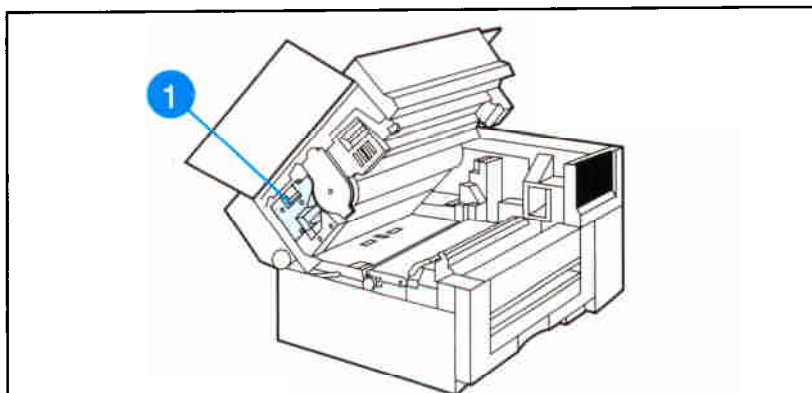
The printer goes through a brief developer setup sequence (three minutes), then returns on-line.

---

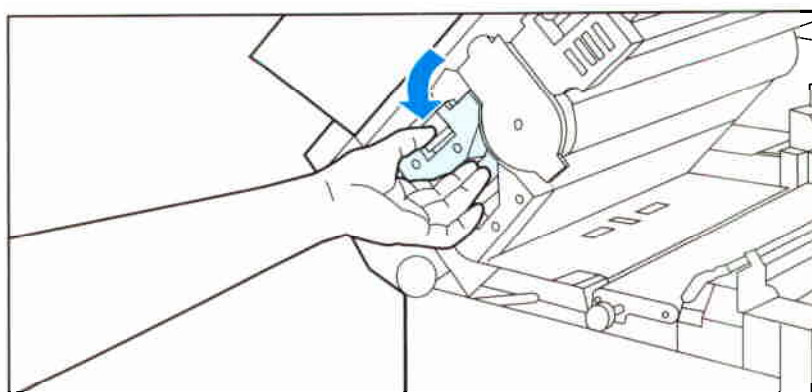
## Replacing the Color Developer

Replace the Color Developer when the message 19.2 COLOR  
DEVEL USER MAINTENANCE appears on the Control Panel Display.

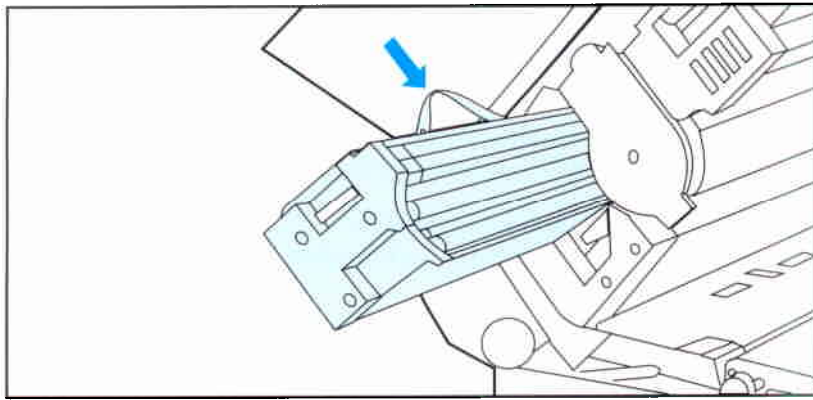
1. Power OFF and unplug the printer.
2. Press the Top Cover release button, then open the Top Cover.
3. Open the Developer Door.



4. Locate the Color Developer (1).



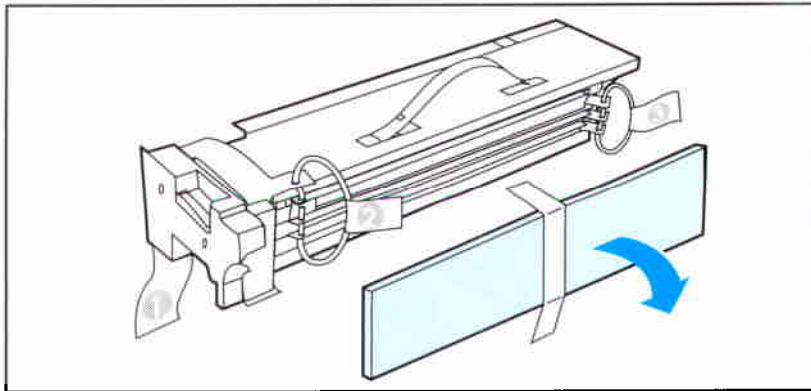
5. Press the release lever on the Color Developer, then lift and pull it partially out of the printer.



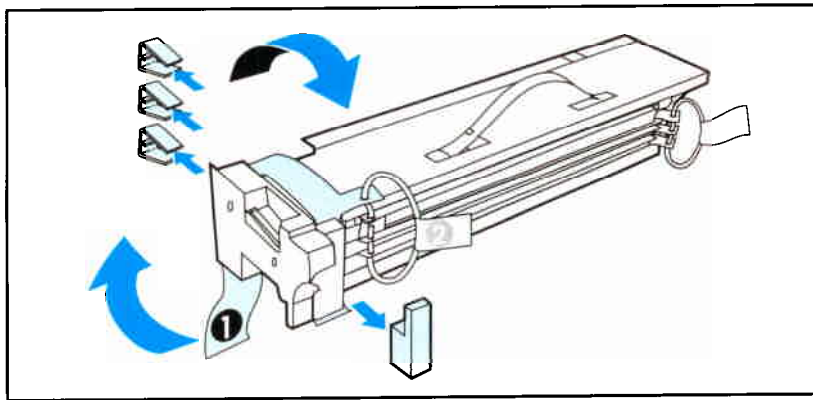
6. Grasp the handle at the top of the developer, and pull the developer out of the printer.

**Caution**

Keep the new developer horizontal during installation. Tilting the developer may cause print defects and error messages.



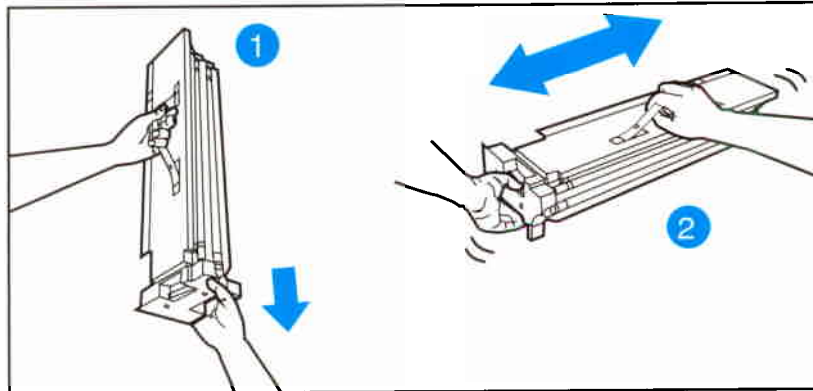
7. Remove the large foam pad covering the side of the new developer.



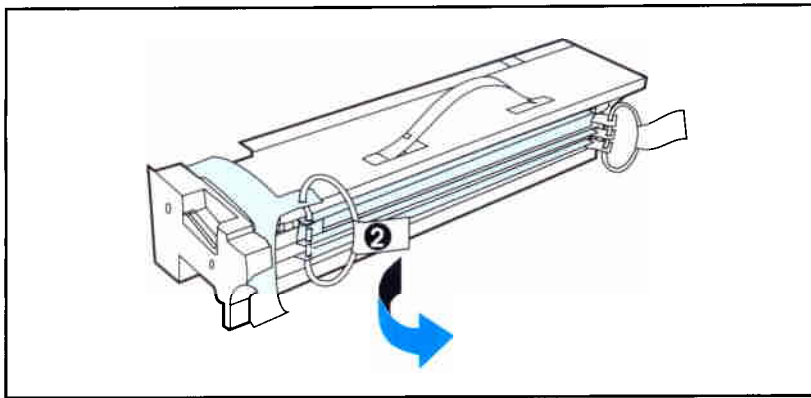
8. Remove all packing material from the developer.

**Caution**

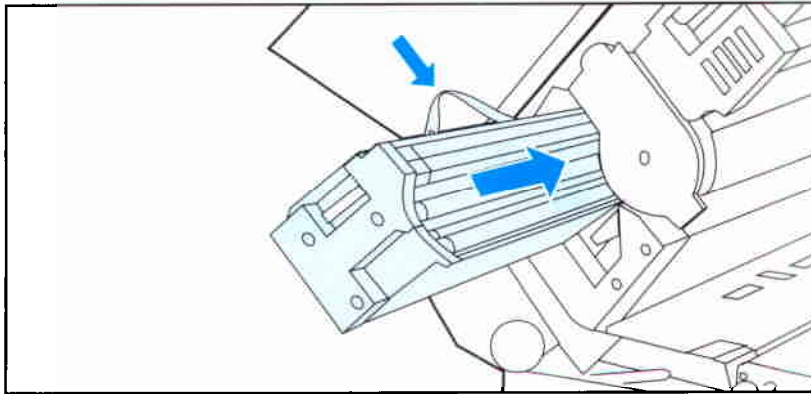
Installing the developer without removing the roller spacers will result in poor print quality and missing colors.



9. Gently shake the developer from top to bottom and side-to-side to distribute the toner.



**10.** Remove the three protective strips from the developer(2 and 3).



**11.** Slide the new developer into the printer. Ensure it latches into place.

**12.** Close the left side door.

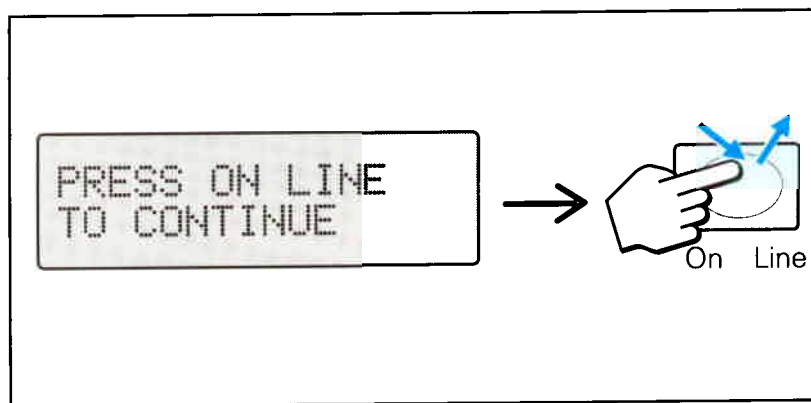
**Note**

If the door does not close properly, make sure the developer is correctly installed.

**13.** Close the Top Cover.

**14.** Plug in, and power ON the printer.





15. When the Control Panel displays PRESS ON LINE TO CONTINUE, press **On Line**.

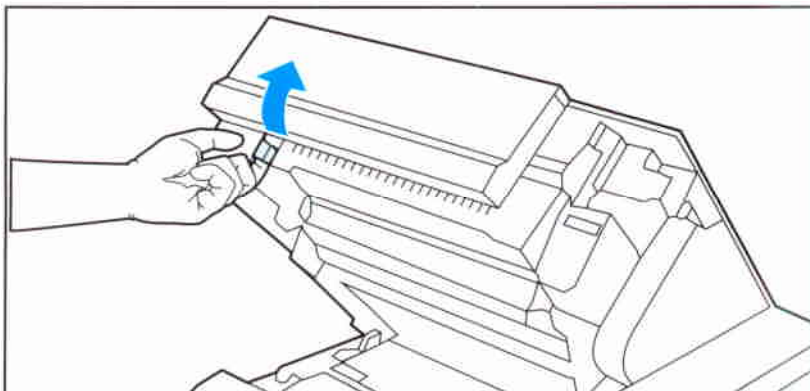
The printer goes through a developer setup sequence (about nine minutes), then returns on-line.

---

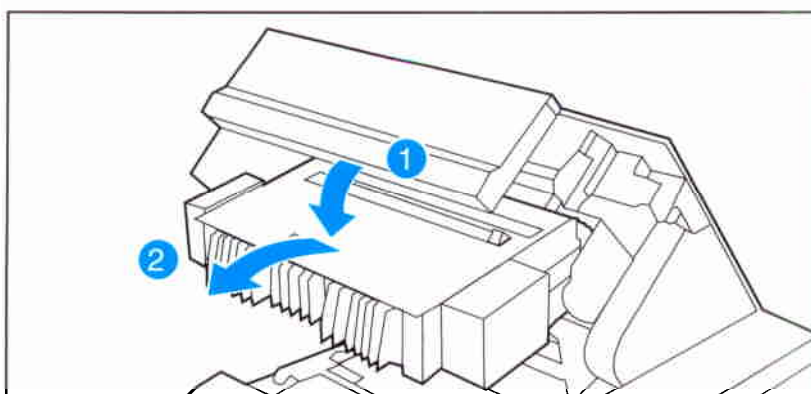
## Replacing the Print Drum

Replace the Print Drum when the message 19.3 DRUM USER MAINTENANCE appears on the Control Panel Display.

1. Power OFF and unplug the printer.
2. Press the Top Cover release button, and open the Top Cover.



3. Locate the drum lock lever at the front left corner of the drum, then pull it towards you.

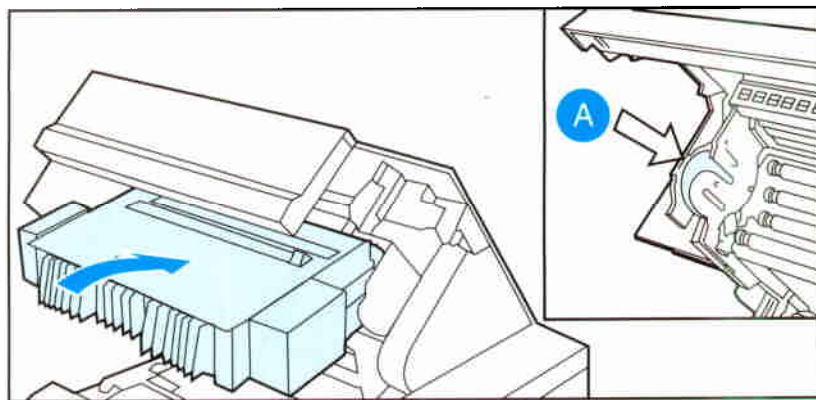


4. Lower the drum until it is horizontal (1), then remove the drum from the printer (2).
5. Remove the new drum from its packaging.
6. Remove all packing spacers from the Print Drum.

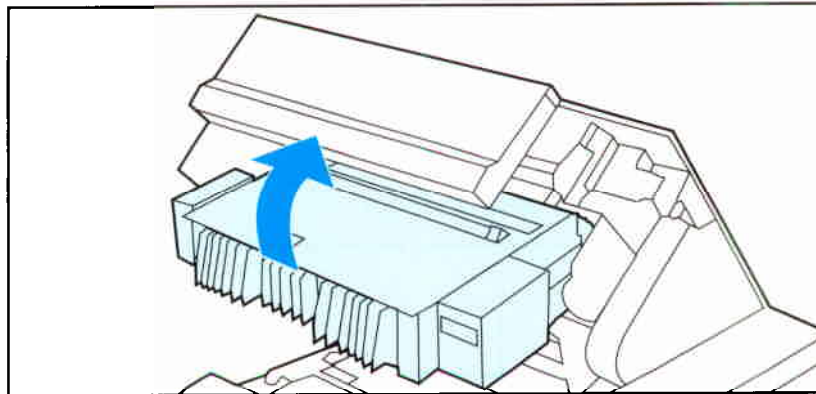
---

### Caution

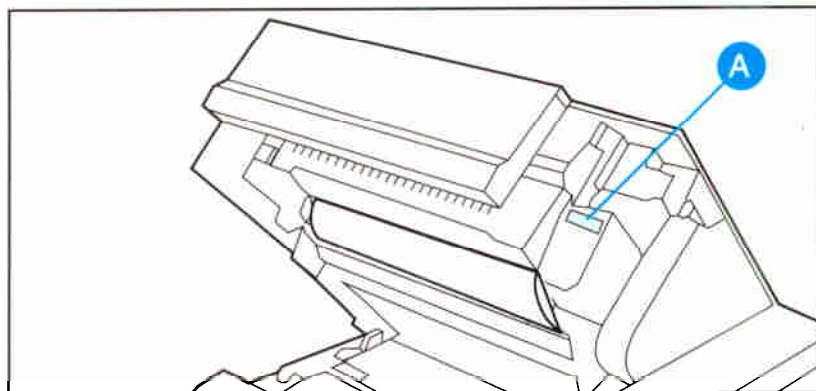
To prevent drum damage, leave the black drum cover in place until the drum is installed.



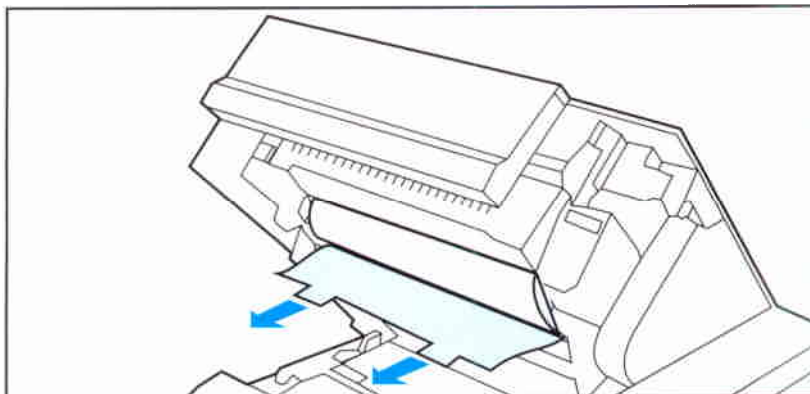
**7.** Install the Print Drum.



**8.** Raise the drum until it locks in place.



**9.** The Print Drum Number is on the upper right corner of the drum (A). Input this number when prompted.

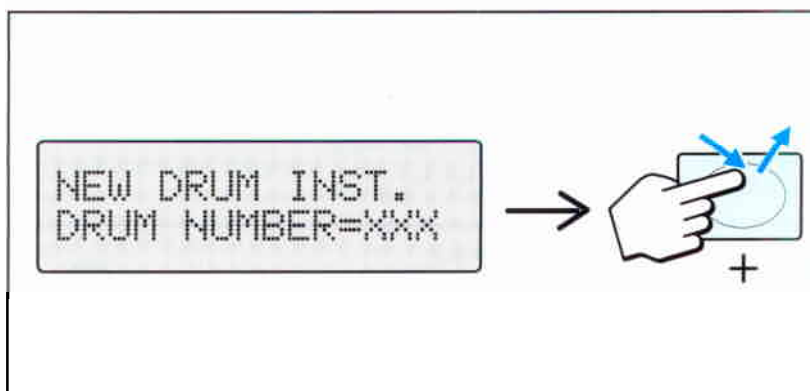


10. Remove the tape from the drum cover, then grasp the two tabs and pull the cover out towards you.

#### Caution

Avoid exposure of the drum to direct light.  
Exposure to light can cause permanent damage.

11. Close the Top Cover.
12. Plug in, and power ON the printer.



13. Input the Drum Number.
14. When the Control Panel displays NEW DRUM INST. DRUM NUMBER=XXX, press **+** to enter the number shown on the drum.
15. Press **-** to view the previous value. Press and hold **+** or **-** to scroll through the possible drum numbers.
16. Press **Enter** to save the number.

---

**Caution**

For maximum print quality, make sure you enter the correct number for the Print Drum.

17. Repeat steps 14, 15, and 16 to verify drum number.

The printer will go through a brief self test sequence, then return on-line with `00 PCL READY` (or `00 POSTSCRIPT READY`) on the Control Panel Display.

---

## Replacing the Fuser

Replace the Fuser when the message `19.4 FUSER USER MAINTENANCE` appears on the Control Panel Display.

1. Power OFF and unplug the printer.

---

**Warning!**

Wait 30 minutes to let the Fuser cool down before replacing. Continuing before the Fuser has cooled down may result in severe burns.

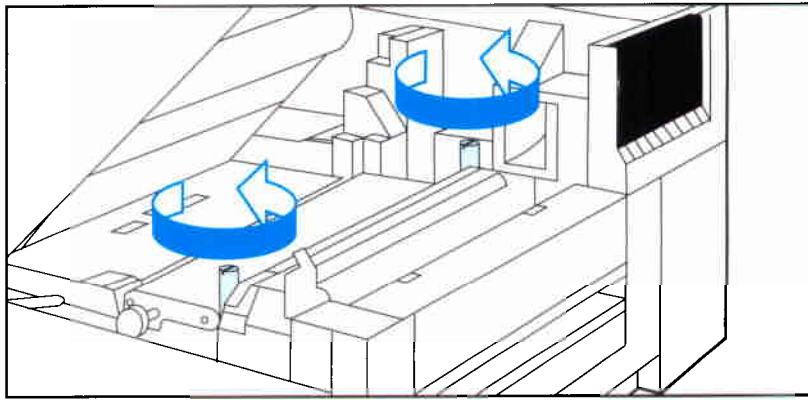
2. Press the Top Cover release button, then open the Top Cover.

---

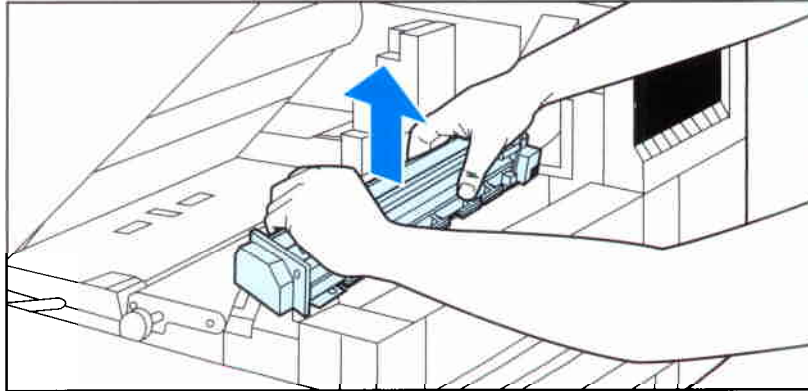
**Note**

The Fusing assembly (C3969A) can be used in the HP Color LaserJet printer, however be sure to use the correct Coating Kit. Use Coating Kit C3964A with Fuser C3969A. Use Coating Pad Kit C3106A with Fuser C3111A.

---

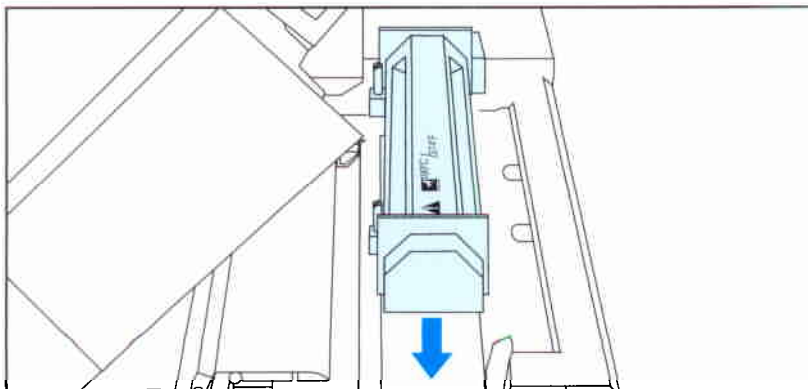


3. Locate and loosen the two captive screws.

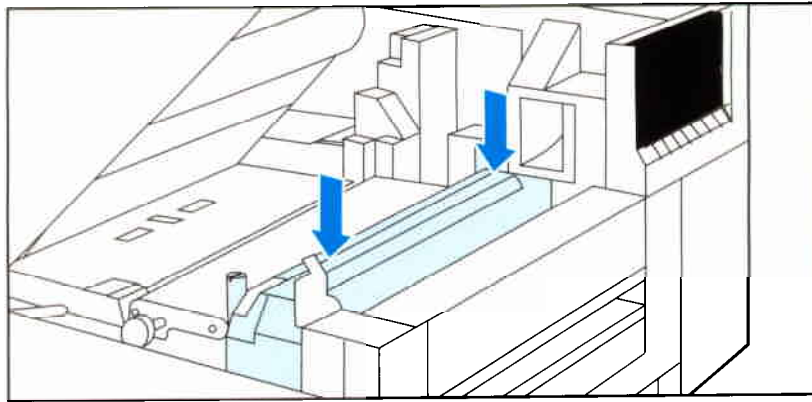


4. Grasp the Fuser with both hands and lift it up and out of the printer. Then set it aside for recycling.

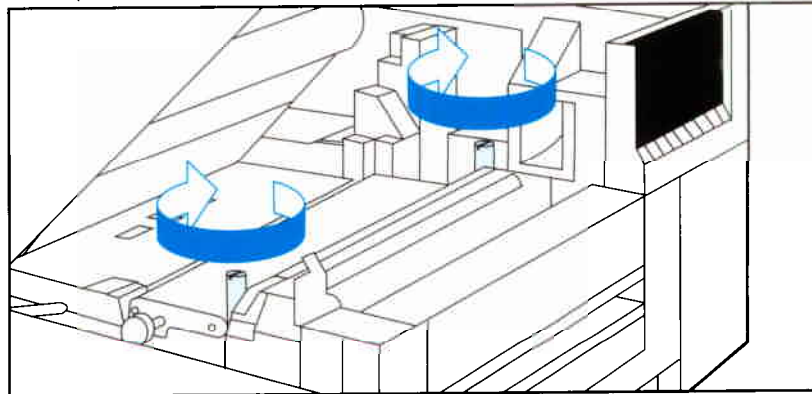
5. Remove the new Fuser from its packaging.



6. Keep the new Fuser horizontal, then install it in the printer.



**7.** Firmly seat the Fuser into the printer. Be sure its fully seated into its connectors.



**8.** Tighten the two captive screws on the Fuser to finger-tight.

**9.** Close the Top Cover of the printer, plug in, and power ON the printer.

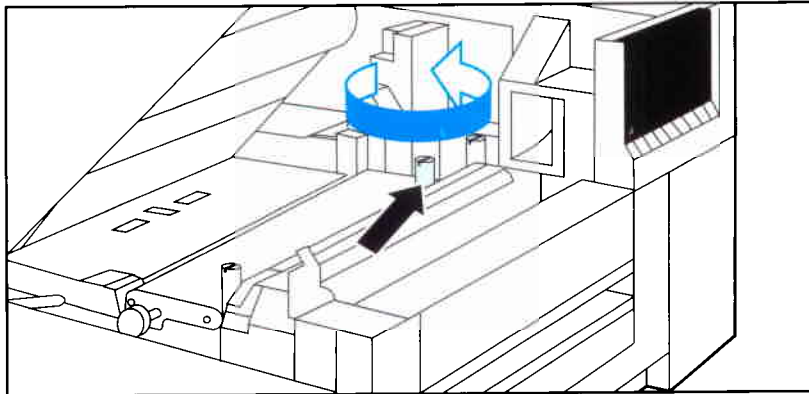
The printer goes through a brief self test sequence, then returns on-line with **PP PCL (or POSTSCRIPT) READY** on the Control Panel Display.

---

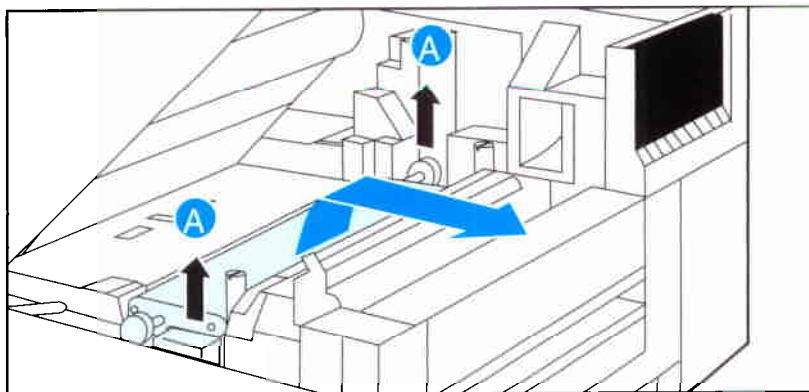
## Replacing the Transfer Assembly

Replace the Transfer Belt when the message 19.5 TRANS BELT USER MAINTENANCE appears on the Control Panel Display.

1. Power OFF and unplug the printer.
2. Press the Top Cover release button, then open the Top Cover.



3. Loosen the captive screw on the right side of the Transfer Belt.



4. Use the handles (A) to lift the Transfer Belt from the printer.

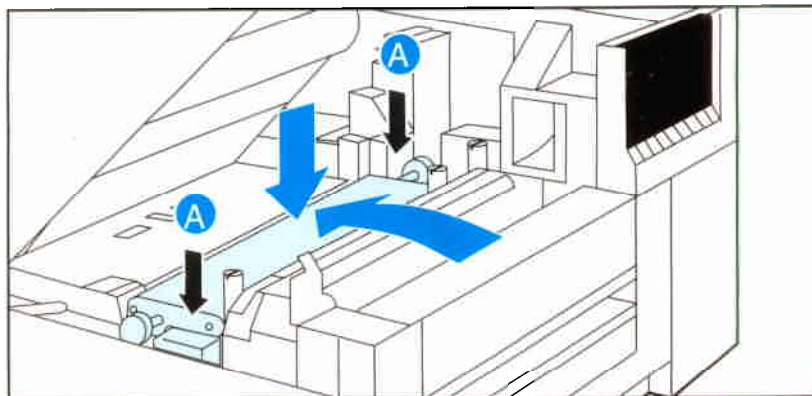
---

### Caution

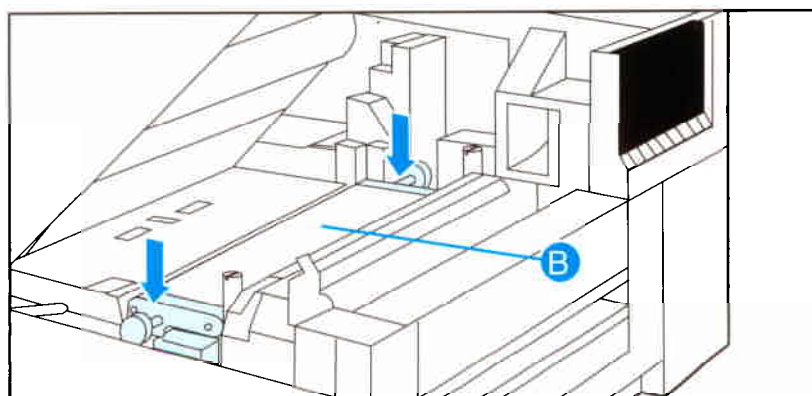
Do not touch the Transfer Belt surface. Oil from your hands and other contaminants can damage the belt, reducing print quality and the life span of the Transfer Belt.

5. Remove the new Transfer Belt from its packaging.

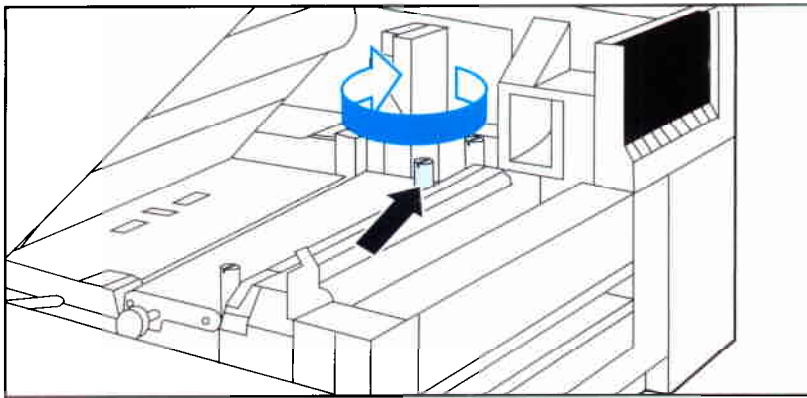




**6.** Use the handles (A) to install the Transfer Belt into the printer.



**7.** Press down on both sides of the Transfer Belt (B) to install it firmly into its connector.



8. Tighten the captive screw.
9. Close the Top Cover, then plug in the printer.
10. Power ON the printer.

The printer goes through a brief self test sequence, then returns on-line with 00 PCL (or POSTSCRIPT) READY on the Control Panel Display.

# Theory of Operation

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## Chapter Contents

Introduction . . . . .	5-3
Color Theory . . . . .	5-4
Color Terminology . . . . .	5-4
Additive Color Theory . . . . .	5-5
Subtractive Color Theory . . . . .	5-6
Image Formation . . . . .	5-9
The Printing Process . . . . .	5-10
Print Drum Charging . . . . .	5-11
Laser Exposure (Writing) . . . . .	5-11
Image Developing . . . . .	5-12
Image Station . . . . .	5-14
Neutralizing and Drum Cleaning . . . . .	5-16
Pre-Charging (Erase Lamp) . . . . .	5-18
Multi-Color Process . . . . .	5-18
Paper Path . . . . .	5-20
Paper Feed Sequence . . . . .	5-20
Paper Jam Detection . . . . .	5-25
Fusing Assembly . . . . .	5-27
Control Board System . . . . .	5-30
Solenoids . . . . .	5-31
Sensors . . . . .	5-33
Switches and Interlocks . . . . .	5-37
Motors and Fans . . . . .	5-40
Mechanical Drive Systems . . . . .	5-44
Main Motor Drive Assemblies . . . . .	5-44
Developer Drive Assemblies . . . . .	5-45
Toner Delivery . . . . .	5-48
Developer Drive Assembly . . . . .	5-52
Formatter System . . . . .	5-53
Formatter Functional Overview . . . . .	5-53

Power Supplies . . . . .	5-56
Power Supply Overview . . . . .	5-56

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## 5-2 Theory of Operation

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## Introduction

This section presents the theory of operation and the functional overview for the HP Color LaserJet printer. It provides the service representative with an understanding of the printing process and with the basic color theory concepts required to service this printer.

This chapter is also the course material for the Service Authorization class and discusses the following printer functions.

- Color Theory
- Image Formation
- Paper Path
- Control Board System
- Mechanical Drive Systems
- Formatter System
- Power Supplies

---

## Color Theory

The following section discusses the two methods used to create color. The *additive process*, used in monitors and television, and the *subtractive process*, used in this printer.

### Color Terminology

- **Primaries** are the colors that will produce any color in the spectrum when combined in certain proportions.
- **Hue** identifies a color family or a color by name, such as red, blue, green, and so on.
- **Saturation** is the vividness or purity of the color. Chroma or intensity are other terms synonymous with saturation.
- **Neutral** is a color with no hue, such as black, gray, or white.

## Additive Color Theory

The additive color theory deals with colors that are produced when *light sources* are mixed. The primary additive colors are red, blue and green. Adding various levels of these colors produces all other colors. Television screens and color monitors are examples of devices that use the additive process.

Color monitors use the additive process by adding the red, green, and blue primaries to a black screen. Because the color monitor is a light source, the colors are still visible when the room lights are off. (The additive process uses colors generated by a light source.)

### Additive Color Mixing

Mixing equal amounts of the additive primary colors produces white light (see Figure 5-1). Equal amounts of red and blue produce magenta, green and blue produce cyan, and red and green produce yellow.

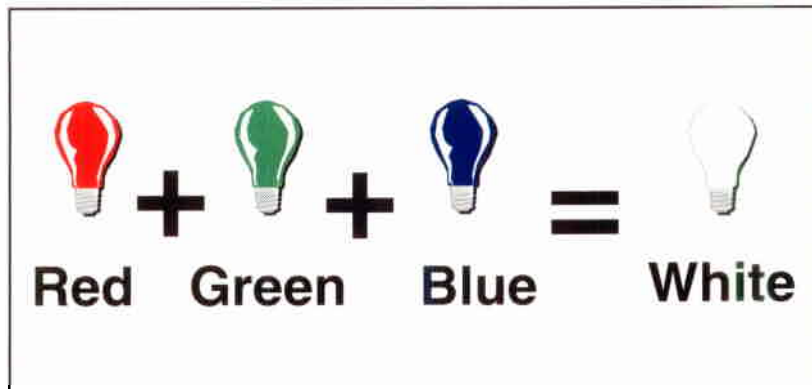


Figure 5-1

Example of the Additive Color Process

## Subtractive Color Theory

The subtractive color theory deals with mixing color pigments (toner, ink, paint, and other media) to produce any color in the spectrum. The subtractive primary colors are cyan, yellow, and magenta. The subtractive process begins with white light reflecting from a white surface (paper, for instance). The key to understanding the subtractive process is to remember that the light source is *external*. Usually this is white light on white paper. The color components of the light are reflected or absorbed by the paper. If the light source is turned off, the colors are no longer visible.

### Subtractive Color Absorption

The subtractive color process uses absorption to produce the color on the page. For example, if magenta is placed on the page, the green component of the white light is absorbed, and the blue and red components are reflected. For yellow, the blue is absorbed, while red and green are reflected. For cyan, red is absorbed, while green and blue are reflected. The term “subtractive” refers to the fact that the perceived color results from subtracting color from white light. White results from all colors being reflected from the page (see Figure 5-2).

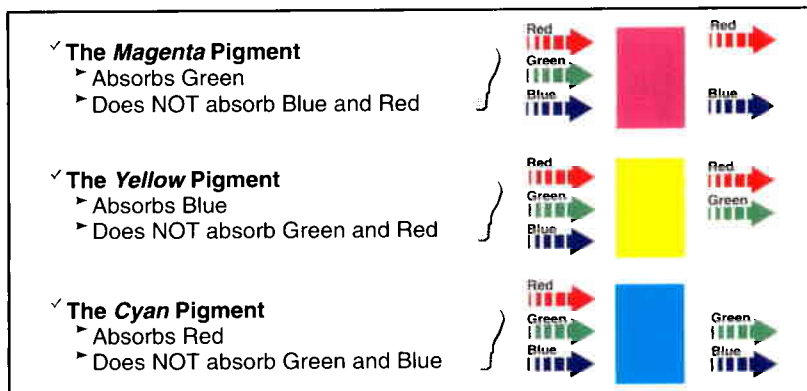


Figure 5-2 The Subtractive Primary and Process Colors



### Subtractive Color Mixing

Mixing equal amounts of the subtractive primary colors produces black. Mixing equal amounts of cyan and yellow produces green. Yellow and magenta produce red, and magenta and cyan produce blue. Figure 5-3 illustrates how mixing cyan, magenta, and yellow produce black.

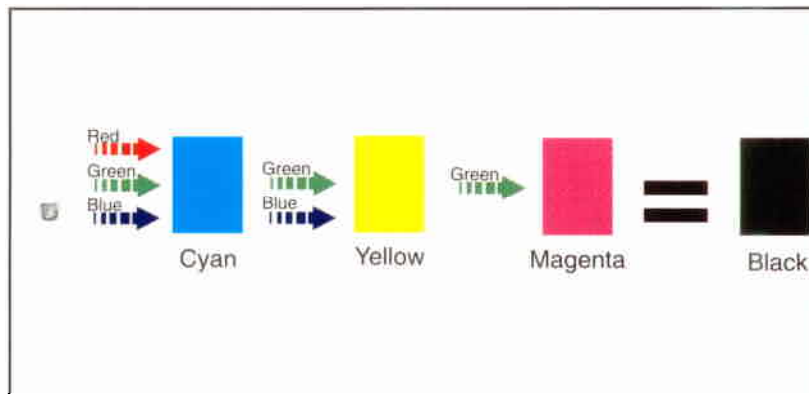


Figure 5-3 Subtractive Color Mixing

### Half toning

Half toning (also called dithering) is the method color printers use to distribute color pigment to create the full spectrum of color. Because this printer places dots of toner on a page to create an image rather than physically mixing the color (like paint), the dots are distributed in selected patterns. Although they are not physically combined on the page, the eye integrates the dots and the viewer perceives them as a solid color (see Figure 5-4).

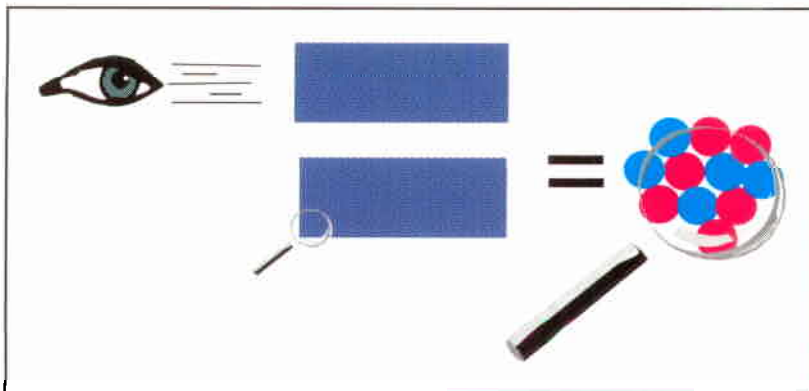


Figure 5-4 The Dither Pattern and Visual Effect

### Process Colors

This printer does not use half toning for every application. Any of the four basic colors (cyan, magenta, yellow, or black) can be printed as a solid color. Also, the additive primary colors (red, green, and blue) are produced as solid colors using the toner-on-toner (or layering) process. Since red, green, and blue are formed by combining two base toner colors, they are called process colors (see Figure 5-5). How the process colors are created on the Print Drum is explained in the “Image Formation” section of this chapter.

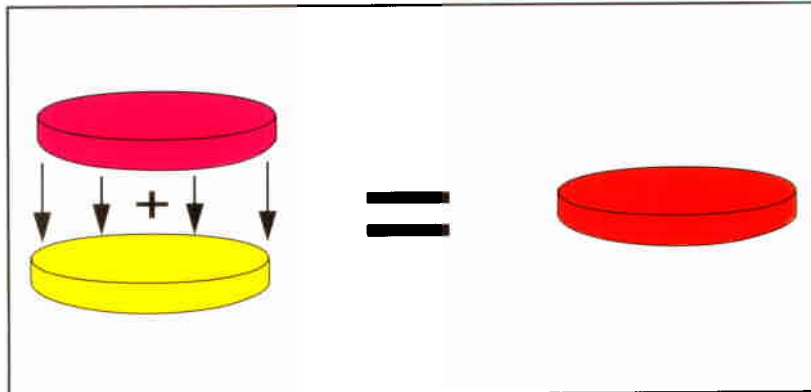


Figure 5-5 Creating Process Colors

## Image Formation

This printer uses an electro-photographic process similar to those found in other Hewlett-Packard LaserJet printers. One of the differences between color and black and white laser imaging is that the color image is created with multiple layers, and is developed with toner and toner carrier.

In the HP Color LaserJet printer, a bank of four toner sources replace the standard toner cartridge and single reservoir of black and white laser printers (see Figure 5-6, item 5).

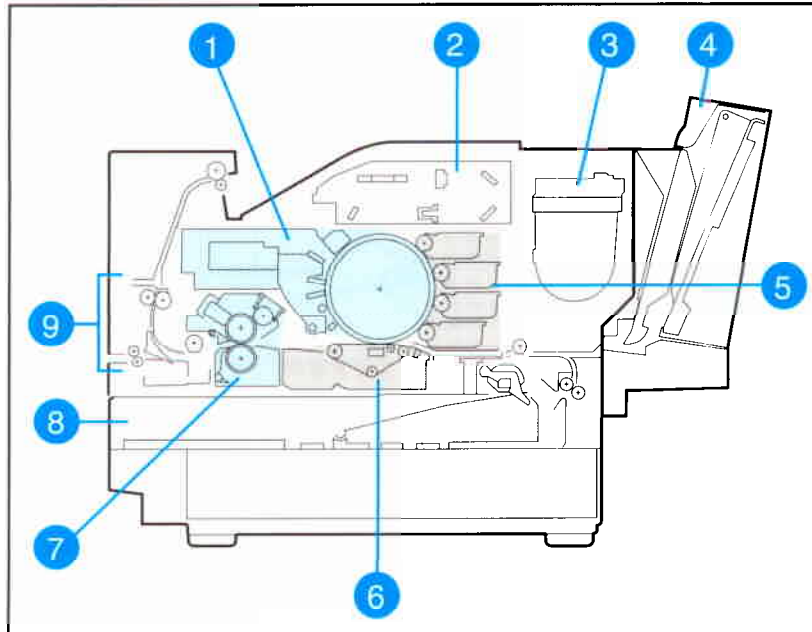


Figure 5-6 Print Path Components

- |   |                          |
|---|--------------------------|
| 1 Print Drum Cartridge                  | 6 Transfer Belt Assembly |
| 2 Laser/Scanner (Image Writing Station) | 7 Fuser                  |
| 3 Toner Hoppers (Toner Supply System)   | 8 Paper Tray             |
| 4 Rear Feed Unit (optional)             | 9 Paper Exit Mechanism   |
| 5 Developers (1 developer per color)    |                          |

## The Printing Process

This section describes the processes of each print station shown in Figure 5-7. The Print Drum rotates through the print cycle as follows:

- Print Drum Charging
- Laser Exposure
- Image Developing
- Image Transfer
- Neutralizing and Drum Cleaning
- Pre-charging (Erase Lamp)

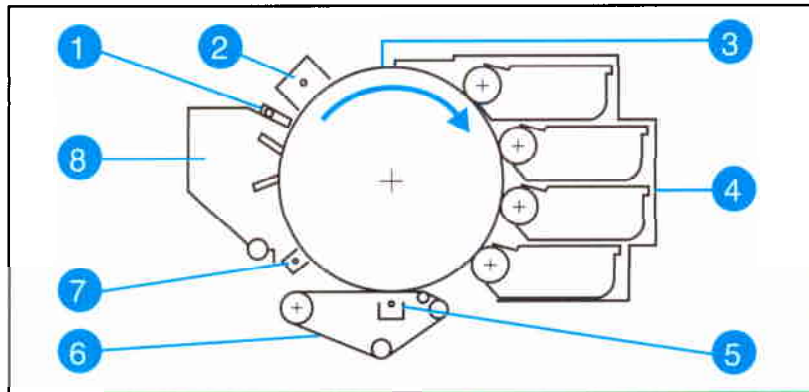


Figure 5-7 Print Stations

- |                                  |   |
|----------------------------------|---|
| 1 Erase Lamp                     | 5 Transfer Corona (part of Transfer assembly)   |
| 2 Charging Corona                | 6 Transfer Belt (part of Transfer assembly)   |
| 3 Laser Exposure (Image Writing) | 7 Neutralizing Corona   |
| 4 Image Developing Station       | 8 Drum Cleaning Station (Erase Lamp, Leveling and Cleaning Blades, and Neutralizing Corona) |

The image is produced by repeating the charging, exposure and developing process for each color of toner required. The transfer process begins when the entire image has been developed on the drum. The toner has a color component and a carrier, each in separate containers, which are mixed in the developers (see “Image Developing,” later in this chapter). The toner supply is replenished in the hoppers. When the carrier is exhausted, the developers must be replaced.

## Print Drum Charging

The Primary Charging Station consists of a corona and grid, located within the Print Drum cartridge. The station charges the drum surface to a fixed negative charge of approximately -750 Vdc. Figure 5-8 shows the basic components.

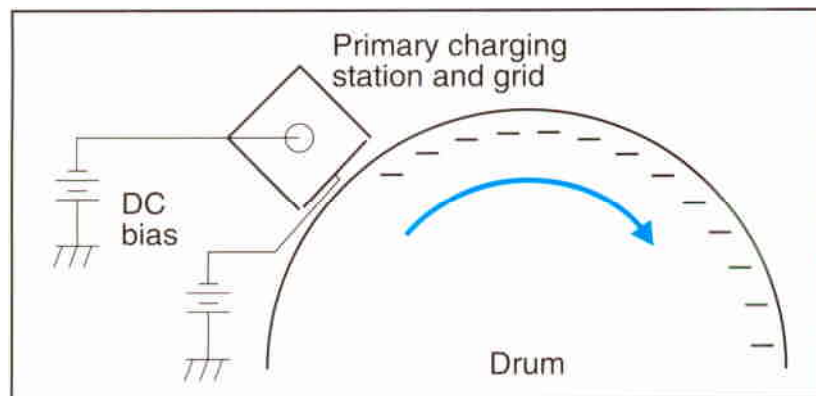


Figure 5-8 Print Drum Charging Station

## Laser Exposure (Writing)

As in all HP electrophotographic products, the laser discharges the drum to create a relatively neutral charge in the desired print areas. The Laser/Scanner assembly consists of the laser diode, scanner, mirrors, and lenses necessary to focus the laser onto the drum surface (see Figure 5-9).

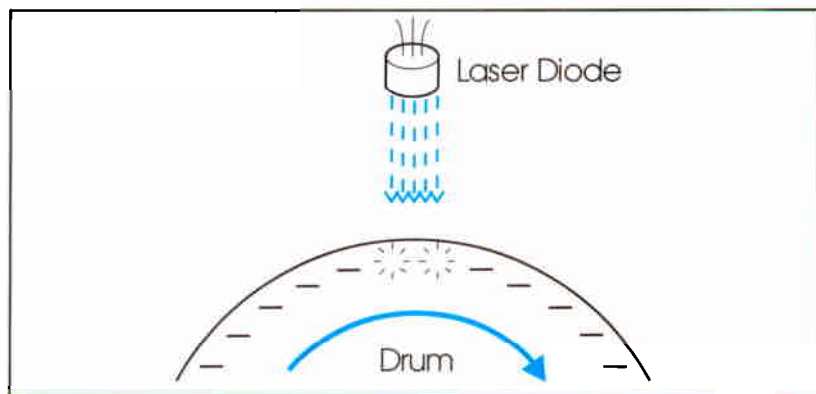


Figure 5-9 Drum Writing Process

## Image Developing

As the drum rotates past the developer, an electrical field is created between the developer and the neutral charge areas of the drum. Toner moves across the field from the developer to the drum in these areas (see Figure 5-10).

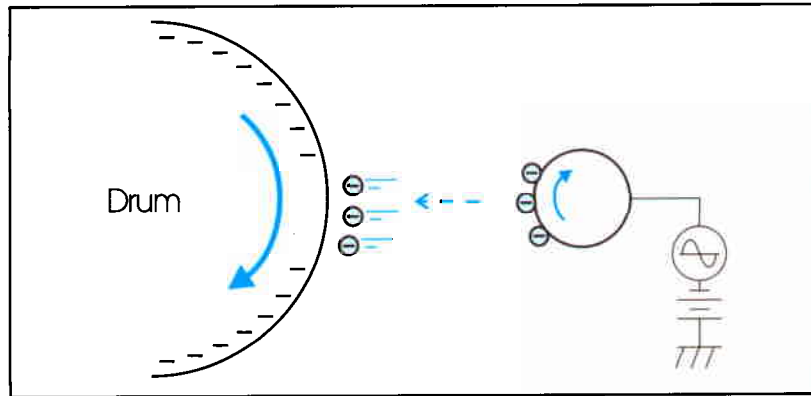


Figure 5-10 Image Development Process

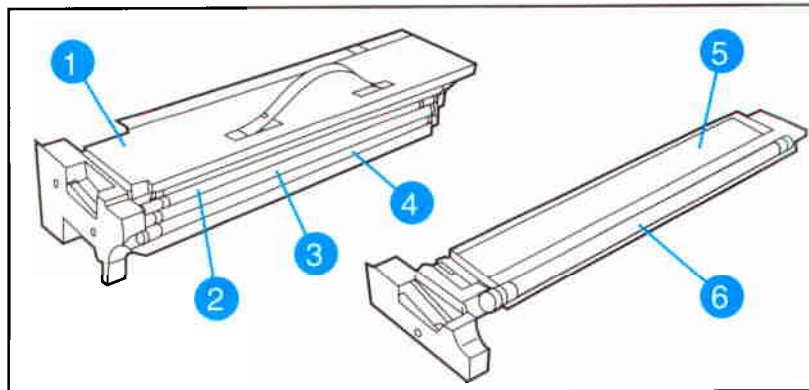


Figure 5-11 Developer Components

- |                            |                            |
|----------------------------|----------------------------|
| 1 Color Developer          | 4 Cyan Developer Sleeve    |
| 2 Yellow Developer Sleeve  | 5 Black Developer Assembly |
| 3 Magenta Developer Sleeve | 6 Black Developer Sleeve   |

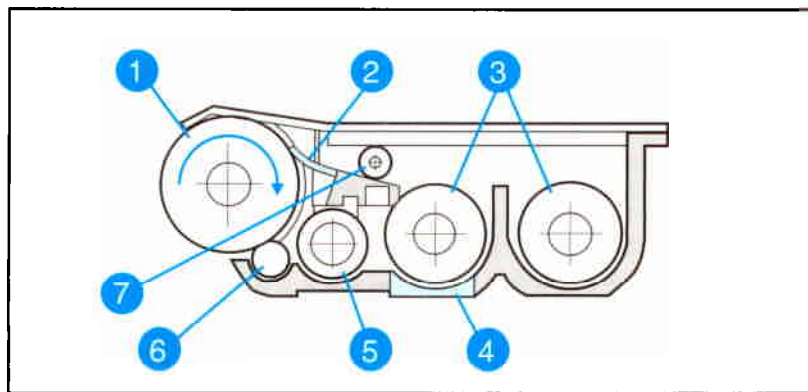
## Developer Function

This printer has one developer for each of the four primary colors. One cartridge houses the Black Developer, the other houses the color developers as shown in Figure 5-11.

During developer operation, toner and carrier are mixed and distributed throughout the developer by two mixing augers and two foam rollers (see Figure 5-12). This mixing action creates a static charge between the carrier and toner which holds them together. From the augers, some of the developer mixture (toner and carrier) moves to the lower foam roller, and then to the magnetic developer sleeve.

The percent of developer mixture on the developer sleeve is limited by the metering rod. The developer sleeve is charged with a negative bias which causes toner to be attracted across an electrical field from the developer to the neutral charge areas of the drum. Carrier is left behind on the developer sleeve. A scraper blade removes residual developer mixture from the developer sleeve and a foam roller returns the mixture to the augers.

The ratio of toner to carrier in the developer mixture is monitored by a toner concentration sensor on each developer. Feedback from this sensor, together with target toner concentration firmware algorithms control when toner is added to the developer from the Toner Hoppers. The ratio of toner to carrier is one factor which controls the optical density of the printed output.



**Figure 5-12**      **Developer Cross Section**

- |                              |  |
|------------------------------|--|
| 1 Developer Sleeve           | 5 Lower Foam Rollers (toner transport) |
| 2 Scraper Blade              | 6 Metering Rod                         |
| 3 Mixing Augers              | 7 Upper Foam Roller                    |
| 4 Toner Concentration Sensor |  |

## Image Station

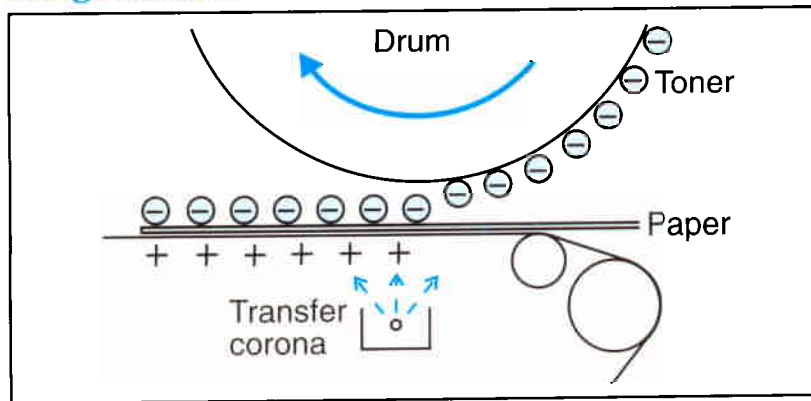


Figure 5-13 Transfer Station Function

The Transfer Corona puts a positive charge on the Transfer Belt (see Figure 5-13). This charge attracts the developed image from the Print Drum to the print media as it passes between the drum and the Transfer Belt. The Transfer assembly has cleaning blades and rollers (Figure 5-14) which clean stray toner from the Transfer Belt. This stray toner is stored in the Transfer assembly and is removed when the Transfer assembly is replaced.

The Transfer assembly is lowered out of the print path to allow for multiple rotations of the Print Drum (during multi-color printing). This prevents smearing when more than one color is being developed.

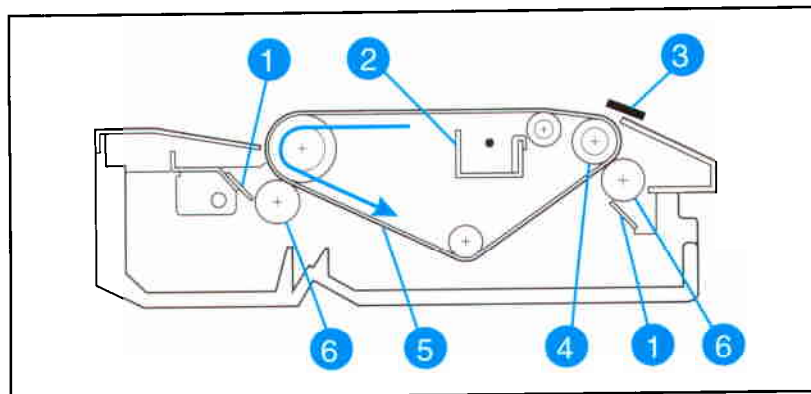


Figure 5-14 Transfer Assembly

- |                                   |                                  |
|-----------------------------------|----------------------------------|
| 1 Transfer Roller Cleaning Blades | 4 Bias Roller                    |
| 2 Transfer Corona                 | 5 Transfer Belt                  |
| 3 Paper Charging Brush            | 6 Transfer Belt Cleaning Rollers |



### Paper Charging

The Paper Charging Brush places a static charge on the media as it enters the Transfer assembly (see Figure 5-15). This static charge attracts media and holds it against the Transfer Belt. This helps ensure uniform image transfer, and helps prevent the media from wrapping on the Print Drum.

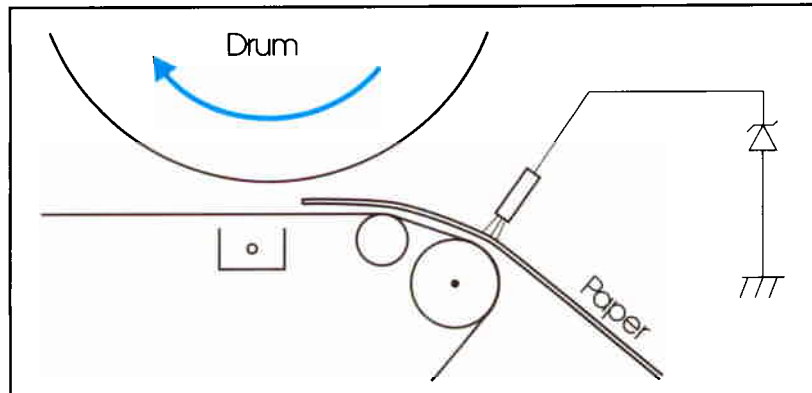


Figure 5-15 Paper Charging Station in the Transfer Assembly

## Neutralizing and Drum Cleaning

The neutralizing corona neutralizes the charge on any residual toner left on the Print Drum after transfer, making the drum easier to clean. The cleaning blade removes any residual toner (see Figure 5-16). When printing any single color, the cleaning blade remains in contact with the drum. In multi-color mode the cleaning blade is raised away from the drum until after the final color is developed. A ridge of toner remains on the drum when the cleaning blade is raised. To prevent developer contamination, a leveling blade smooths down the toner ridge to a point where no contamination occurs. This line of toner is always outside the print zone of the image being formed on the drum.

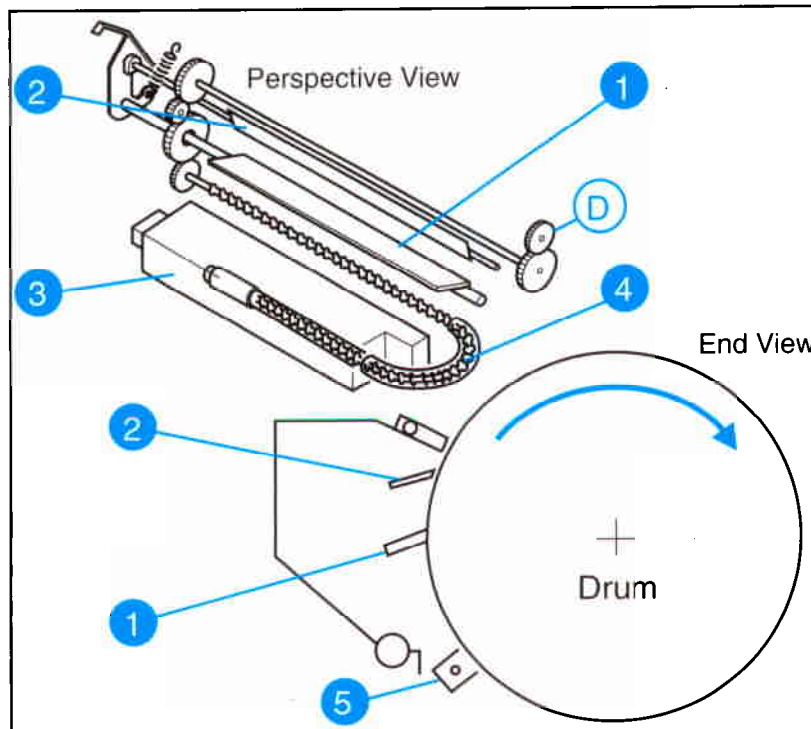


Figure 5-16 Drum Cleaning Station

- |   |                             |   |                     |
|---|-----------------------------|---|---------------------|
| 1 | Cleaning Blade              | 4 | Excess Toner Auger  |
| 2 | Leveling Blade              | 5 | Neutralizing Corona |
| 3 | Excess Toner Collection Box |   |                     |

### Excess Toner Collection

The toner collection system includes a toner auger and a Toner Collection Box which are contained within the Print Drum assembly. PS3 senses the toner level within the collection box. The Control Board monitors PS3 through the Toner Sensor Board. When PS3 indicates the collection box is full, the 16.5 REPLACE COLLECTION KIT message is displayed on the control panel display. Auto-continue mode (or pressing **On Line**) allows the printer to print another 100 pages. The message 14.5 REPLACE COLLECTION KIT then appears. The printer stops printing until the collection box is replaced.

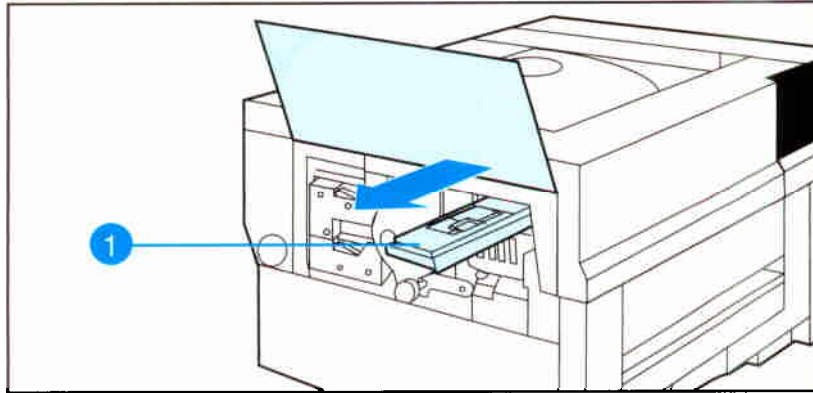


Figure 5-17 Toner Collection Box

### Pre-Charging (Erase Lamp)

A row of LEDs within the Print Drum cartridge is used as the Erase Lamp for the Print Drum. The Erase Lamp removes latent images by neutralizing the remaining charges on the Print Drum (see Figure 5-18).

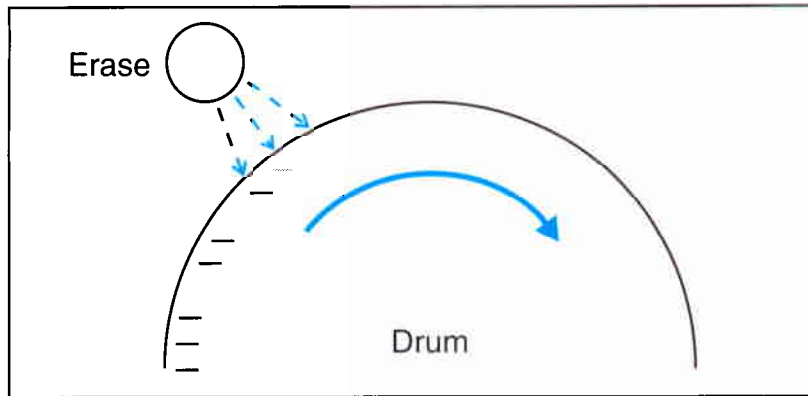


Figure 5-18 Erase Lamp (Pre-Charging)

### Multi-Color Process

When forming the image for a multi-color page, transfer and cleaning steps are delayed by moving the transfer belt, drum cleaning blade and leveling blade away from the drum surface. After the first layer of toner is developed on the drum, the charging, exposure, and developing steps are repeated for the next color. The Charging Corona again charges the entire drum surface. The laser discharges the drum in the desired print areas for the second color through the first layer of toner already on the drum. This multi-step process is shown in Figure 5-19.

The colors are developed in the order: yellow, magenta, cyan, and black. When developing yellow, only the yellow developer is selected and driven (see "Developer Drive Assemblies," later in this chapter). On the next cycle, the magenta developer is selected and driven, and so forth until all colors are developed. Even though there are four colors of toner available, only 2 layers of toner can be developed at any one location on the drum. Additional colors are produced by half toning as described in the "Color Theory" section, at the beginning of this chapter.

After the colors are developed, the Transfer Belt is raised into contact with the drum and the image is transferred to the media. After the image is transferred, the neutralizing corona is turned ON and the cleaning and leveling blades are lowered to remove excess toner from the drum surface.

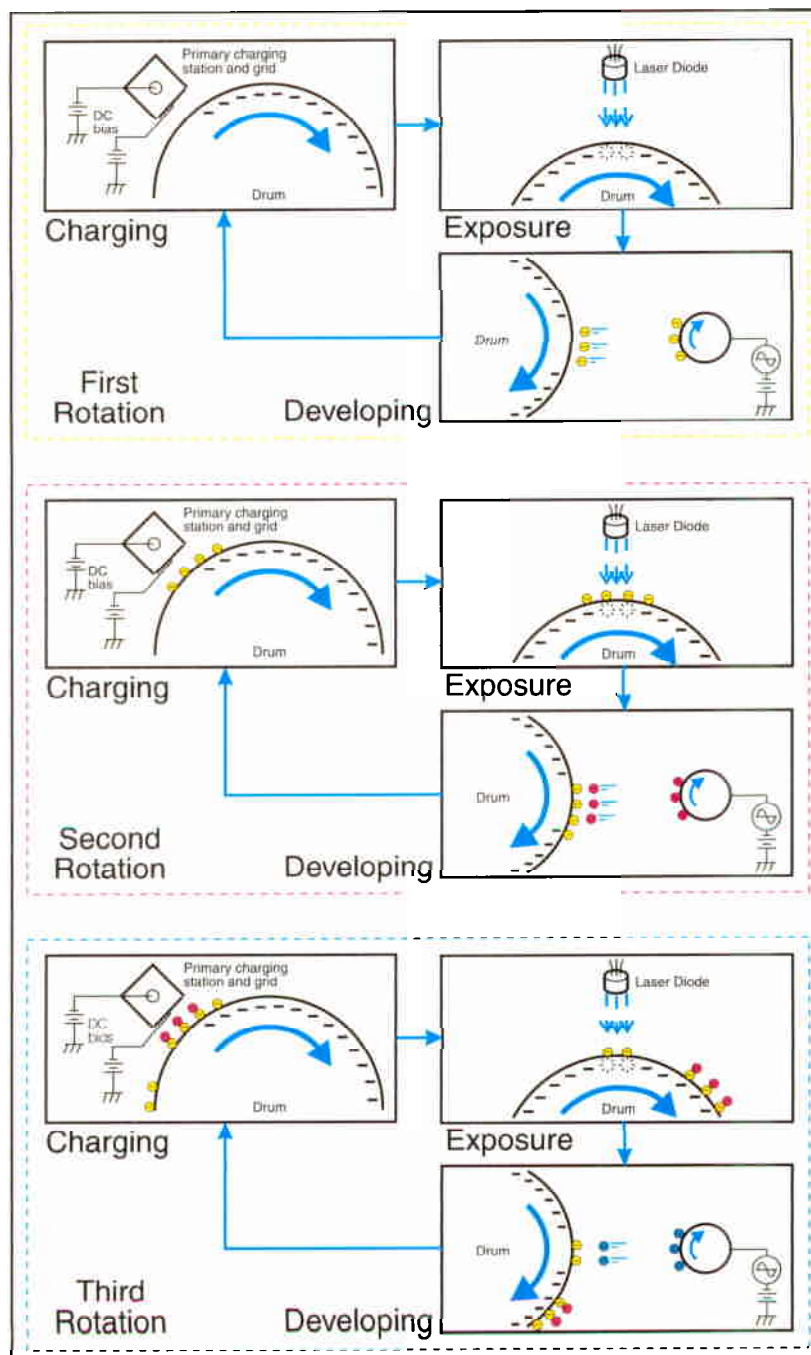
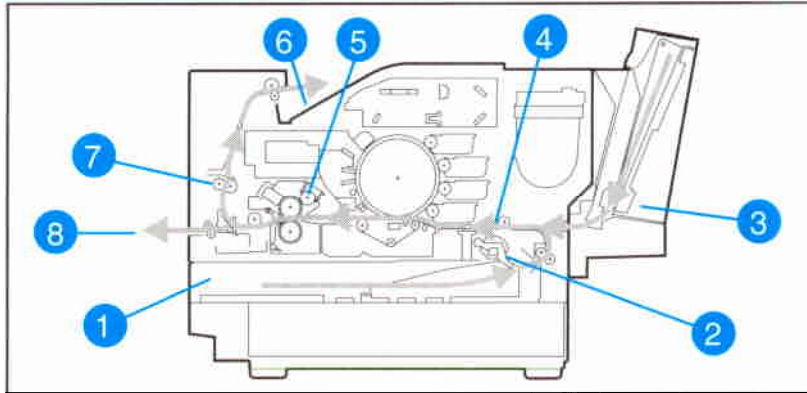


Figure 5-19 The Color Printing Cycle

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## Paper Path

Figures 5-20 through 5-23 show the major paper path components.



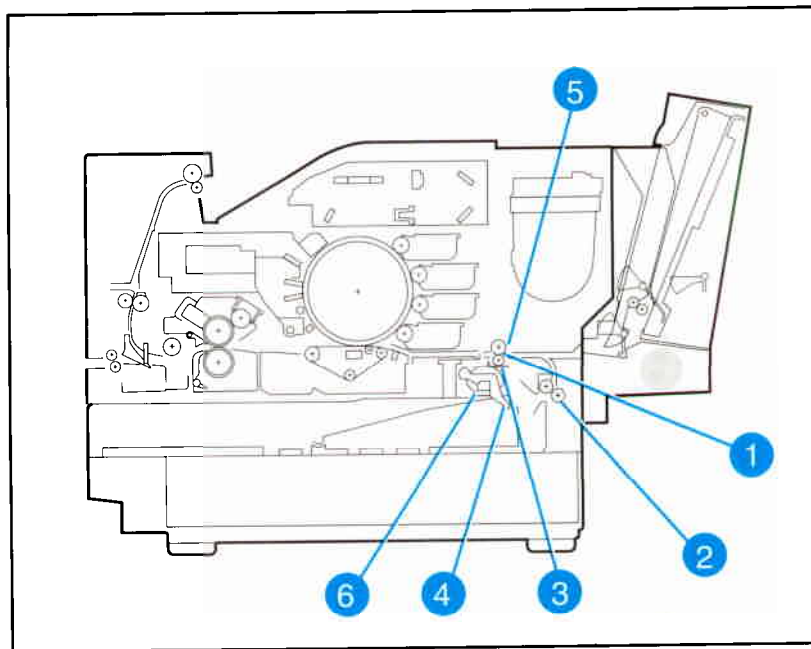
**Figure 5-20** Paper Path Components (1 of 4)

- |  |                        |
|--|------------------------|
| 1 Paper Tray                           | 5 Fusing Assembly      |
| 2 Paper Pick Rollers                   | 6 Face Down Output Bin |
| 3 Rear Feed Unit                       | 7 Paper Exit Mechanism |
| 4 Paper Guide Plate/Registration Plate | 8 Face Up Output Bin   |

### Paper Feed Sequence

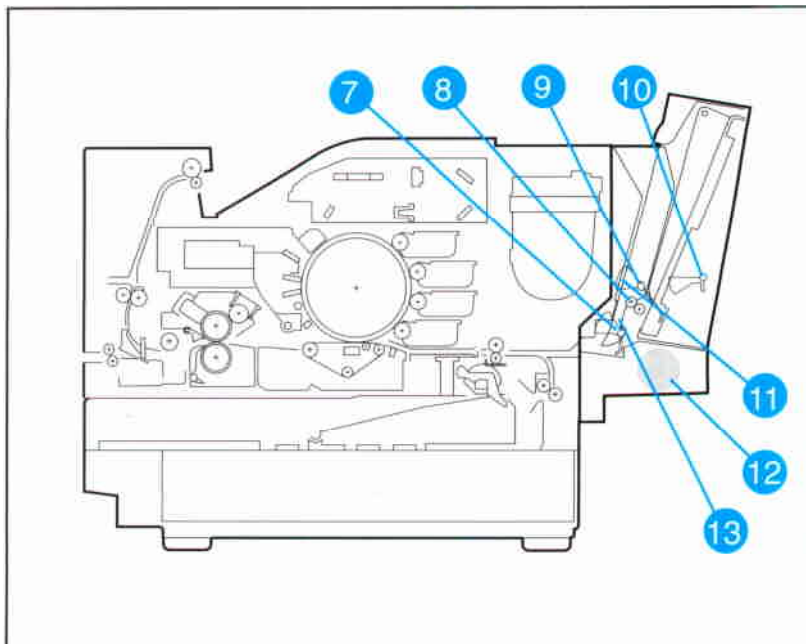
The paper feed solenoid (SL1) engages the gears which drive the paper pick rollers. These rollers pull paper from the tray. The transport rollers deliver the paper to the Registration Plate. The Registration Plate stops the paper before it reaches the Print Drum. When the image on the Print Drum is aligned with the leading edge of the page, the Registration Solenoid drops the Registration Plate. The paper advances to the Transfer Belt assembly where the image is transferred onto the page.

From the Transfer Belt assembly the paper advances to the Fuser where the toner is fused onto the page. The rotation of the Fuser rollers deliver the paper to the exit mechanism. The exit mechanism delivers the paper to either the face up (front) output bin, in reverse order, or the face down (top) output bin, in correct order.



**Figure 5-21** Paper Path Components (2 of 4)

- |                                |                                      |
|--------------------------------|--------------------------------------|
| 1 Registration Rollers         | 4 PS8 Paper-out Sensor               |
| 2 Paper Feed Transport Rollers | 5 PS7 Paper Feed/Registration Sensor |
| 3 Registration Plate           | 6 Paper Tray Paper Pick Rollers      |



**Figure 5-22** Paper Path Components (3 of 4)

- |                             |                                |
|-----------------------------|--------------------------------|
| 7 RFU Paper-in-Path Sensor  | 11 RFU Manual Feed Sensor      |
| 8 RFU Paper Pick Rollers    | 12 Rear Feed/Manual Feed Motor |
| 9 RFU Paper-out Sensor      | 13 Manual Feed Roller          |
| 10 RFU Paper Size Detection |                                |



### Rear Feed Unit Paper Feed Sequence

The optional Rear Feed Unit (RFU) provides a second input source and a manual feed slot. When the rear tray is selected, the Rear Feed Unit motor drives the RFU paper pick rollers which deliver media to the Registration Plate. The paper pick rollers then move away from the media and the paper feed sequence continues as previously described for the paper tray. A clutch ensures that the manual feed rollers are not activated while the media is being fed from the RFU.

When manual feed is selected, the RFU motor turns in the opposite direction, activating the manual feed rollers. Media is delivered to the Registration Plate and the paper feed sequence continues as described for the paper tray. A clutch prevents the RFU paper pick rollers from turning while media is being fed from the manual feed slot.

#### Note

The printer will not automatically feed from the manual feed slot when media is inserted. Manual feed must be selected through the software or the control panel.

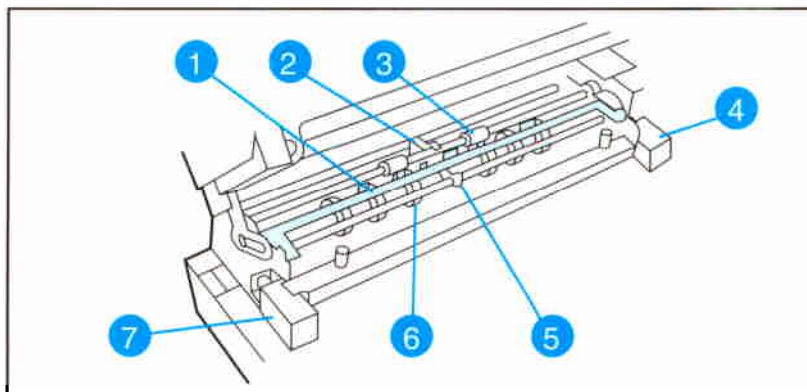


Figure 5-23 Paper Registration Assembly (4 of 4)

- |                             |                                     |
|-----------------------------|-------------------------------------|
| 1 Registration Plate        | 5 PS8 - Paper-out Sensor            |
| 2 PS7 - Paper Feed Sensor   | 6 Paper Pickup Rollers Assembly     |
| 3 Registration Rollers      | 7 SL2 - Registration Plate Solenoid |
| 4 SL1 - Paper Feed Solenoid |                                     |

### Paper Exit Mechanism

The paper exit mechanism, and all rollers past the fuser, are driven by the developing motor (M2) through a belt drive system (see Figure 5-24). See "Mechanical Drive Systems," later in this chapter for further information.

The paper exits the Fuser assisted by guide rollers and a guide plate which prevent paper jams. These guide rollers are raised when printing transparencies. The guide rollers are mounted to the paper exit guide which is raised or lowered by the paper exit guide solenoid (SL7).

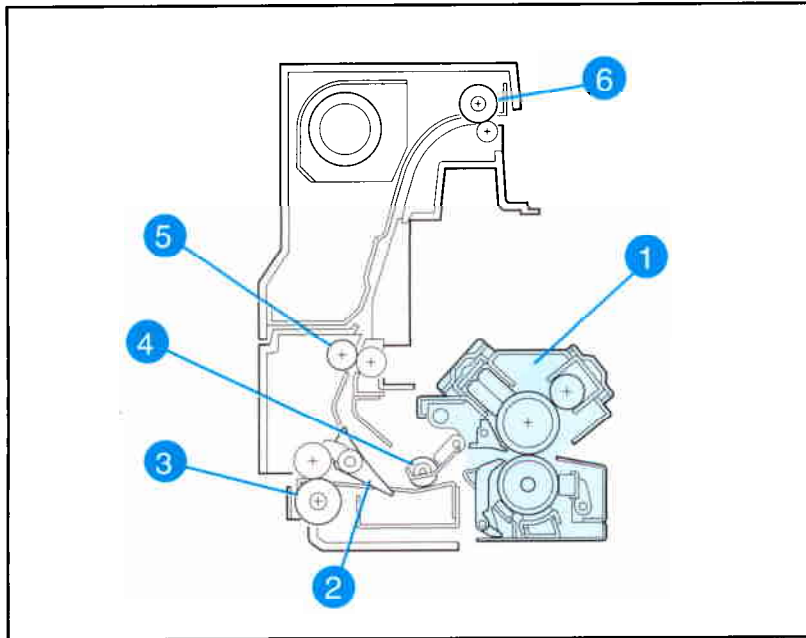


Figure 5-24 Paper Exit Mechanism (with fuser)

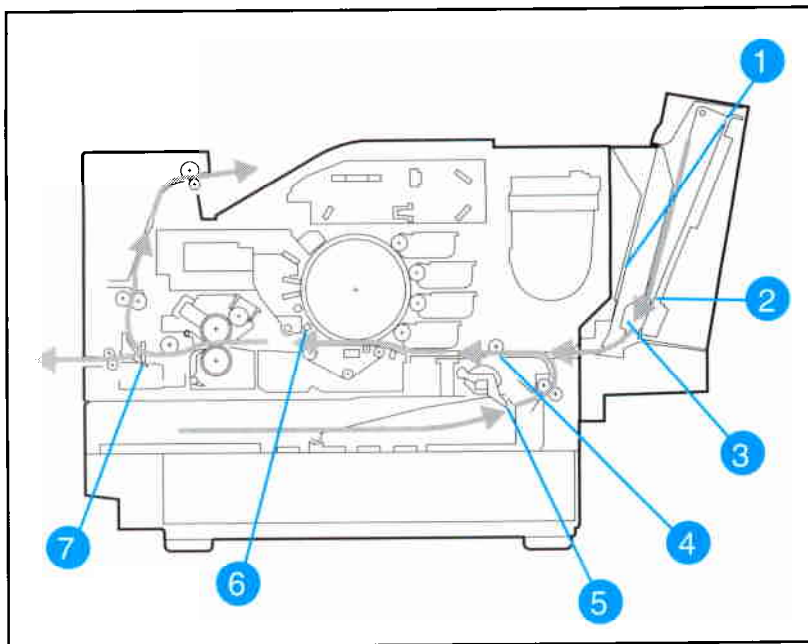
- |                               |                              |
|-------------------------------|------------------------------|
| 1 Fuser                       | 4 Fuser Exit Guide Roller    |
| 2 Face Up/Down Paper Diverter | 5 Face Down Transport Roller |
| 3 Face Up Paper Exit Roller   | 6 Face Down Exit Roller      |

## Paper Jam Detection

Paper jams are posted if paper fails to arrive at, or clear the paper path sensors in the allotted time. When the Control Board detects a paper jam, it immediately stops the printing process and displays the appropriate paper jam message for the sensor that detects paper (see Figure 5-25). At power ON, or after closing the top cover, the printer tries to clear the paper path. If any of the sensors detect paper after this attempt to clear the paper path, the Control Board posts a paper jam message based on the sensor that detects paper.

### Drum Wrap Detection

A sensor on the Jam Detect Board (part of the Print Drum) monitors the Print Drum reflectance. Reflectance change indicates that paper has begun to wrap around the Print Drum. This stops the print process and the Control Board posts a 13.1 CLEAR DRUM WINDING JAM message.



**Figure 5-25 Paper Jam Sensor Locations**

- 1 **RFU Manual Feed Sensor:** Monitors presence of paper in manual feed slot.
- 2 **Paper-out sensor (RFU autofeed):** Senses paper in the RFU.
- 3 **RFU paper in path photosensor (PS4):** Monitors paper movement in the RFU.
- 4 **PS7 input sensor:** Detects paper at the Registration assembly.
- 5 **Paper-out sensor (paper tray - PS8).**
- 6 **Drum wrap sensor board:** Monitors Print Drum for paper in "out of limit" area.
- 7 **PS1 paper exit sensor:** Detects media in the exit area.

## Fusing Assembly

Media passes between the two fuser rollers which apply heat and pressure to fuse the toner to the page (see Figure 5-26). The lower fuser roller is a hard roller with a heat lamp. The upper fuser roller is a soft roller. A wide nip area is created by this soft roller being held against the hard lower roller by spring force. A long fusing time in the high pressure nip area is necessary to fuse the two layers of toner.

### Note

The Fusing assembly (C3969A) can be used in the HP Color LaserJet printer, however be sure to use the correct Coating Kit. Use Coating Kit C3964A with Fuser C3969A. Use Coating Pad Kit C3106A with Fuser C3111A.

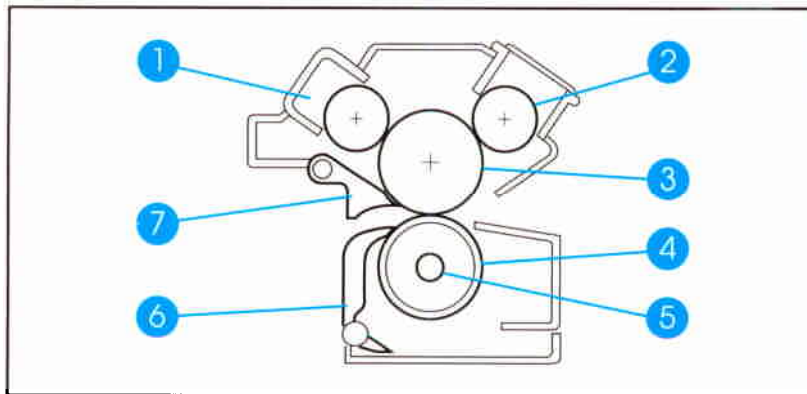


Figure 5-26 Fusing Assembly (Color LaserJet 5/5M)

- |                       |                         |
|-----------------------|-------------------------|
| 1 Cleaning Roller     | 5 Heat Lamp             |
| 2 Coating Roller      | 6 Lower Separation Claw |
| 3 Upper Fusing Roller | 7 Upper Separation Claw |
| 4 Lower Fusing Roller |                         |

## Coating Roller

### Note

The Coating Roller is not compatible for use in the fuser originally equipped in the HP Color LaserJet printer (Fuser C3111A). See compatibility matrix in Chapter 4

Silicon oil is applied to the upper roller by the coating roller. Oil is used to improve the color projection of overhead transparencies. In order to be projected onto a screen, color transparencies require light to pass through the toner. If light is scattered, the colors appear dull or black. The fuser uses temperature, pressure, and oil to melt the toner into a smooth layer that will transmit light without scattering. The oil also keeps the toner and media from sticking to the upper roller.

## Temperature Protection Circuits

Fuser temperature sensing consists of two thermistors which provide feedback to the Control Board (see Figure 5-27).

If the voltage of Thermistor 1 (TH1) rises above 4.94 Vdc (equivalent to -12° C) or falls below 0.49 Vdc (equivalent to 221°C or higher) the main relay (RL1) and the Fuser Heat Lamp (L1) are turned OFF by the comparator circuit on the Control Board. This posts a 50.X FUSER SERVICE error. If the lower fusing roller temperature rises above 220°C the contacts on the fuser over-temperature safety switch open and the current flows through the heat lamp stops.

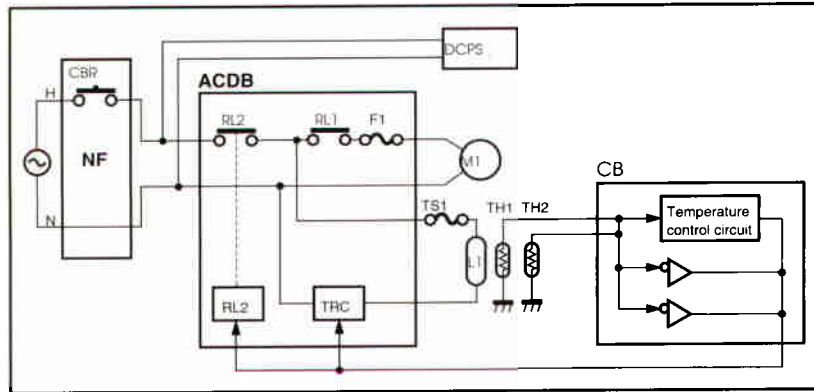


Figure 5-27 Fuser Temp Control and Over-Temp Protection Circuit

## Fuser Temperature Control

When the printer is powered ON, the Control Board turns on the heat lamp through a triac located on the AC Driver Board. Current flows in the heat lamp until the Lower Fusing Roller reaches the set temperature and the heat lamp turns OFF. In addition, the Upper Roller temperature is monitored and the engine does not send a READY signal to the Formatter until the Upper Roller has reached the set temperature or a time limit is reached. Set temperatures for the two rollers depend on the media type and size.

---

## Control Board System

The Control Board is responsible for coordinating the entire printing process. The Control Board enables the drive circuitry for the laser beam, and coordinates print data from the Formatter with paper size, laser beam motion, the high voltage system, fuser temperature, and motors. The Control Board also shares machine status information with the Formatter so that proper diagnostic messages are displayed on the Control Panel.

### Control Board NVRAM

Do not confuse the Control Board NVRAM with the Formatter NVRAM. The Control Board NVRAM contains the information about the printer operating parameters (such as consumable age and associated control algorithms). **If the Control Board is replaced, the *original* NVRAM must be removed and installed on the new Control Board.**

The following systems and functions are controlled or sensed by the Control Board:

- Paper Motion
- Laser/Scanner Drive
- Toner Supply
- Machine Status
- Paper Size and Availability
- Toner Level
- High Voltage Systems
- Fusing Temperature
- All Motor Functions
- Developing Systems
- Transfer Systems
- Printing and Machine Timing



## Solenoids

All solenoids are controlled by the Control Board. Each solenoid enables a specific roller or assembly. Figures 5-28 and 5-29 provide locations and functions for the printer solenoids. The Control Board energizes the solenoids at the correct time based on the input received from the printer sensors. When the side door or top cover is opened the control voltage is removed and the solenoids are disabled.

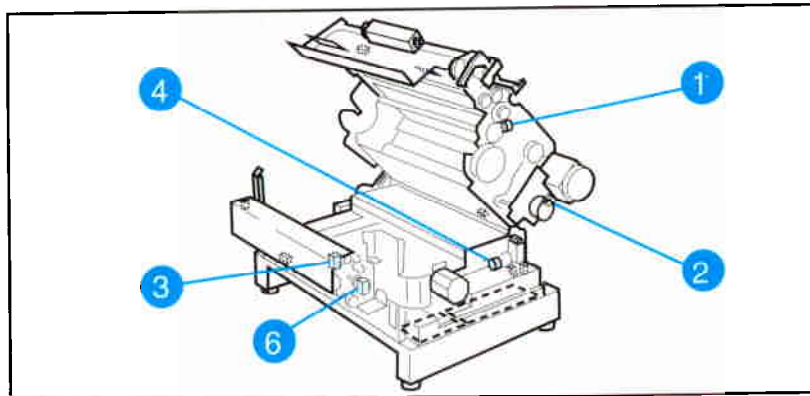


Figure 5-28 Solenoid Locations (1 of 2)

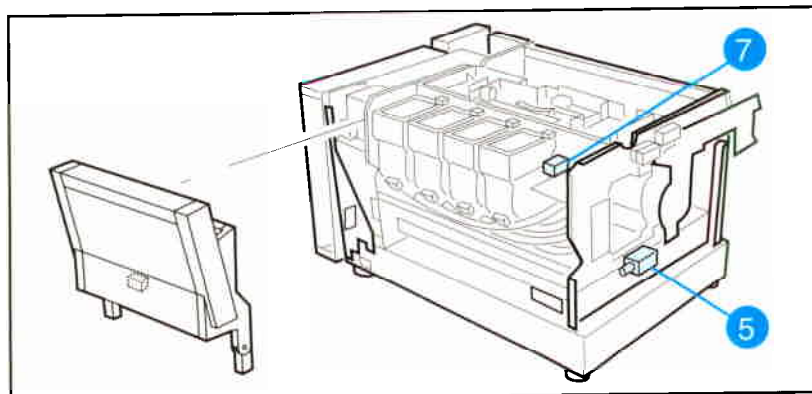


Figure 5-29 Solenoid Locations (2 of 2)

Table 5-1 Solenoid Functions

	Solenoid*	Function
1	Cam Solenoid (SL4)	Engages clutch which causes M2 to rotate cam. This lifts and lowers the transfer assembly and cleaning blade.
2	Toner Supply Solenoid (SL3)	Engages clutch which allows M2 to drive selected toner supply auger.
3	Face Up/Down Solenoid (SL5)	Switches exit claw position for face-up or face-down output.
4	Paper Feed Solenoid (Tray feed SL1)	Actuates clutch to allow paper pick from paper tray.
5	Registration Plate Solenoid (SL2)	Drops the registration plate.
6	Paper Exit Guide Solenoid (SL7)	Lifts the fuser guide when printing transparencies.
7	Toner Hopper Lock Solenoid (SL6)	Unlocks the selected Toner Hopper.

\* See main wiring diagram at the end of Chapter 7 for pin number locations

## Sensors

Sensors, monitored by the Control Board, detect the presence of paper, paper motion, paper jams, developer select clutch position, and the home position of the Transfer assembly cam. Tables 5-2 and Figures 5-30 through 5-35 provide functions and locations for the printer sensors.

Table 5-2 Sensor Functions

(See Figures 5-31 through 5-36 for the items listed below.)		
Item*	Sensor	Function
1	PS2	Belt/Cam Home Position Sensor. Senses Transfer Belt and Drum Cleaning Blade Cam home position.
2	PS3	Collection Box Full Sensor.
3	PS5	Transparency Detection Sensor.
4	PS6	Developer Select Home Sensor. Senses the Developer Select Position.
5	PS7	Paper Feed (registration) Sensor.
6	PS8	Paper-out Sensor.
7	PS1	Paper Exit Sensor. Detects media in the Exit assembly.
9	Black Sensor	Senses black toner empty.
10	Cyan Sensor	Senses cyan toner empty.
11	Magenta Sensor	Senses magenta toner empty.
12	Yellow Sensor	Senses yellow toner empty.
13	PS4	RFU Paper-out Sensor. Senses media in the RFU.
14		Humidity Sensor.
15		Paper Size Sensors, J103, B4-B7.
16/17		Fuser Temperature Sensors (TH2 and TH1).
18		Toner Concentration Sensor (1 for each developer).
19		Drum Wrap Sensor.
20		RFU Paper in Path Sensor.
21		RFU Manual Feed Sensor.

\* See main wiring diagram at the end of Chapter 7 for pin number locations

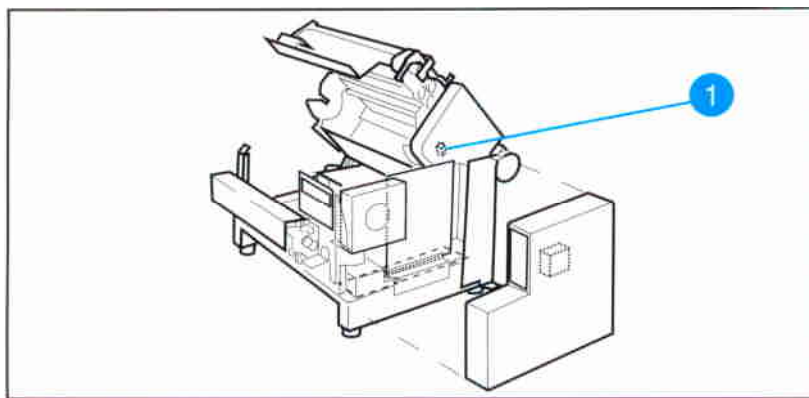


Figure 5-30 Transfer Assembly Cam Home Position Sensor

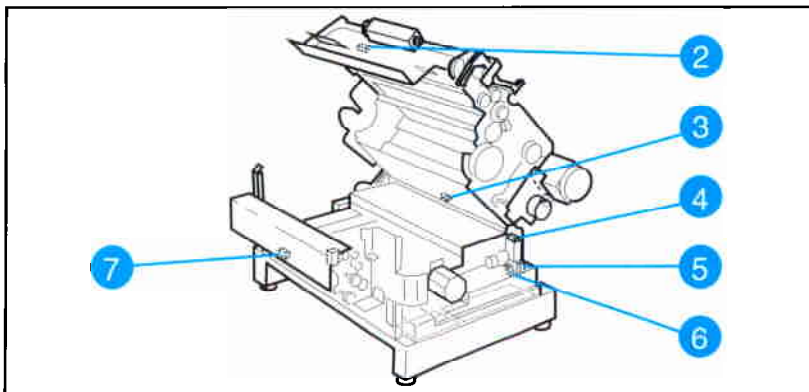


Figure 5-31 Internal Sensor Locations

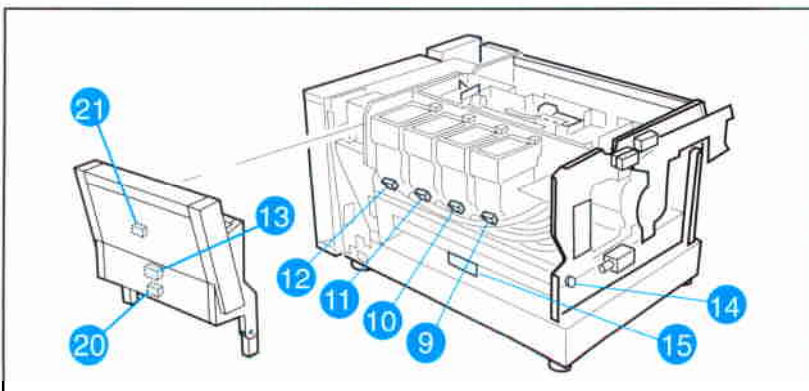


Figure 5-32 Rear Sensor Locations

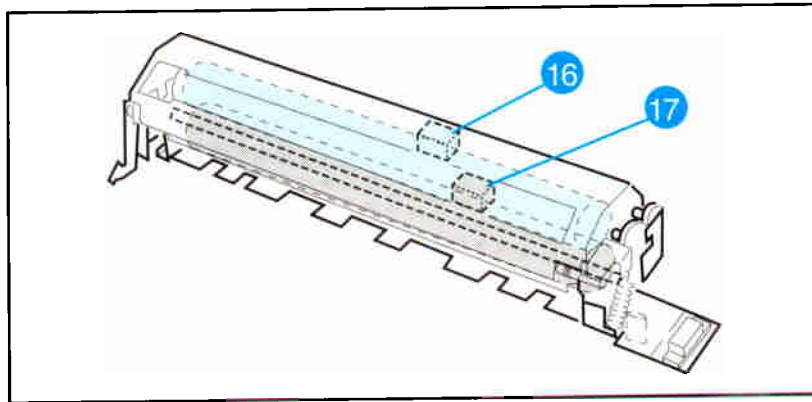


Figure 5-33 Fuser Sensor Locations

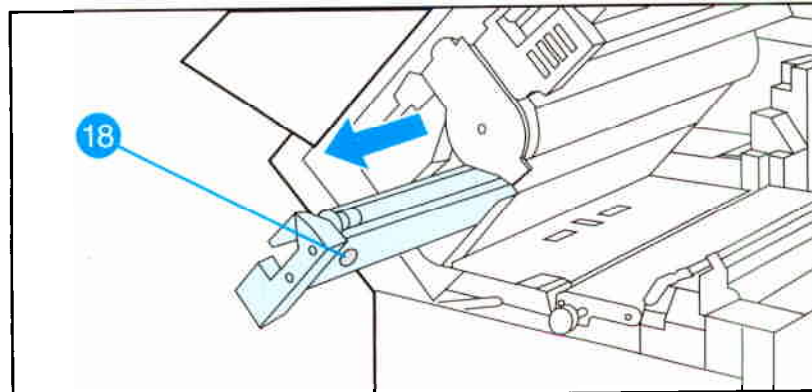


Figure 5-34 Toner Concentration Sensor (1 for each developer)

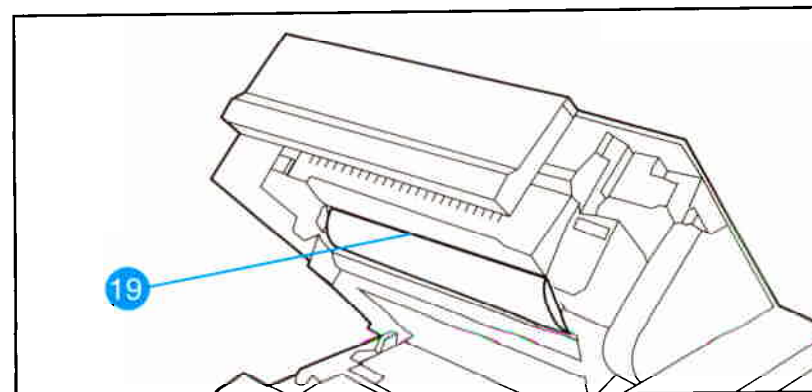


Figure 5-35 Drum Wrap Sensor

### **Humidity Sensor**

This printer uses a humidity sensor to optimize print quality. The humidity sensing system consists of an integrated humidity sensing mechanism with feedback to the Control Board which adjusts one or more of the following for the best print quality over a range of conditions:

- transfer corona current
- laser power
- laser pulse width
- toner concentration
- developer bias

### **Overhead Transparency Sensor**

The overhead transparency sensor monitors the reflectivity of media in the print path. If the sensor does not detect paper it sets the printers parameters to the settings required to print transparencies. This sensor will change the:

- print speed
- fuser temperature
- transfer current
- output bin selection (always on the HP Color LaserJet 5/5M)  
(face-up if colors are being printed on the HP Color LaserJet)

## Switches and Interlocks

Table 5-3 and Figures 5-36 through 5-38 provide functions and locations for the printer switches and interlocks.

### Warning!

Line voltage is present in the printer, even when the main switch is in the STANDBY or OUT position. Unplug the printer before any service procedure.

Table 5-3 Switches and Interlocks

Fig#	Item	Switch Name	Function
5-36	1	Fuser Over-temperature Safety Switch	Disables the fuser when the fuser overheats. The fuser must be replaced when this switch trips.
5-37	2	AC Door Switch SW2	Removes AC from the Fuser and the Developer Drive motor when the top cover is open.
5-37	3	Main Switch SW1	Switches power to all assemblies of the printer except M4, which continues to run for 3 minutes. M4 purges ozone from the printer.
5-38	4	Interlock Switch #1	Disables the 24Vdc to the Formatter PCA when the top cover is open.
5-38	5	Interlock Switch #2*	Disables the 5Vdc to the Laser/Scanner Assembly when the top cover is open.
5-38	6	Interlock Switch #3*	Disables the 5Vdc to the Formatter PCA when the top cover is open.
5-38	7	Paper Tray Size Switches	Detects the size of the installed paper tray.
5-38	8	Engine Test Switch	Runs the Engine Test.
*These switches are in series.			



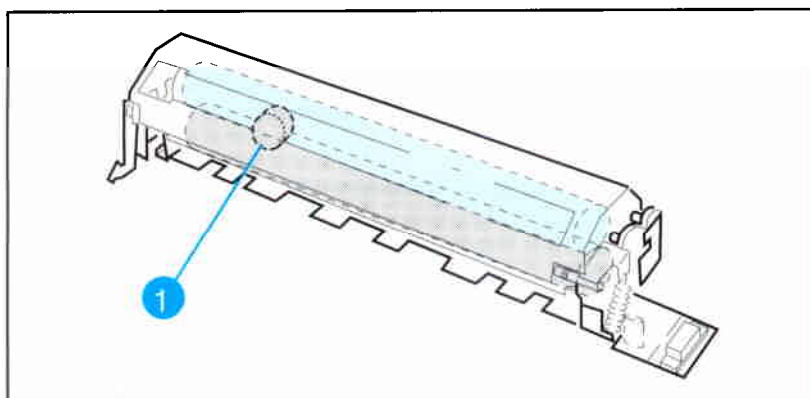


Figure 5-36 Fuser Over-Temperature Safety Switch

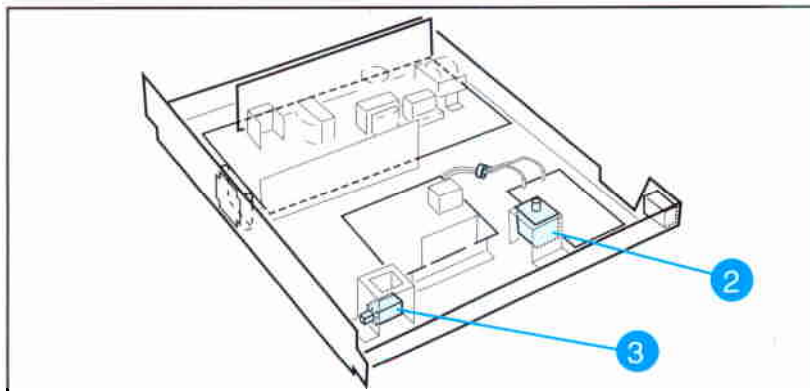


Figure 5-37 DC Power Supply Switch Locations

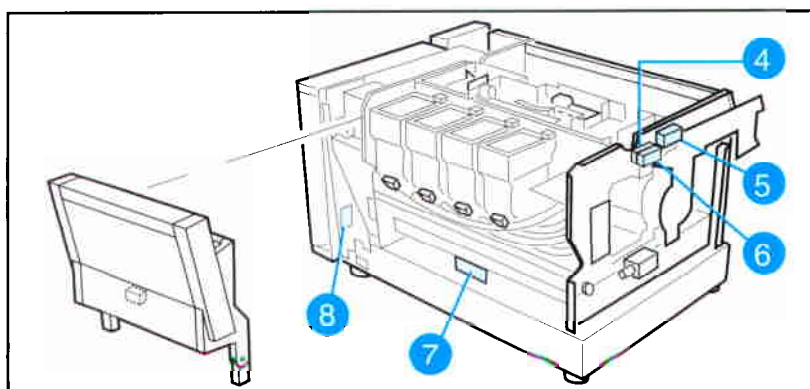


Figure 5-38 Switch Locations



### Paper Tray Size Sensing System

Trays installed in the printer have tabs which engage switches inside the printer as shown in Figure 5-39. The combination of engaged switches tells the Control Board which size tray is installed.

Table 5-4 Tray Size Switch Matrix

Paper Size	Switch 1	Switch 2	Switch 3
A4	ON	OFF	OFF
Executive	ON	ON	OFF
Legal	ON	ON	ON
Letter	ON	OFF	ON
Ledger	OFF	ON	ON
A3	OFF	ON	OFF

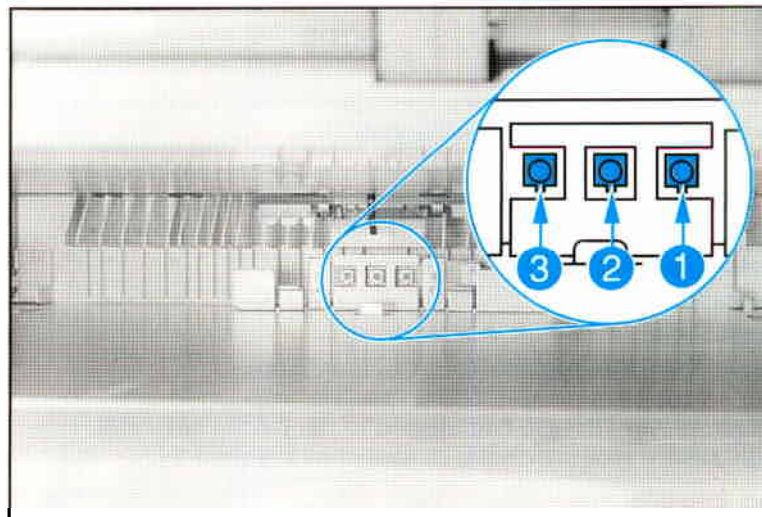


Figure 5-39 Paper Tray Size Sensing Switches

## Motors and Fans

### Main Motor (M1)

The Main Motor (M1) is a 4-phase stepping motor which moves media through the paper path with a linear speed of 74.4 mm/sec in paper mode, or 12.4 mm/sec when printing transparencies. M1 receives its drive voltage from the DC Power Supply which receives the Main Motor Drive command from the Control Board. This relationship is shown in Figure 5-40. Table 5-5 and Figures 5-41 through 5-45 provide functions and locations for the printer motors and fans.

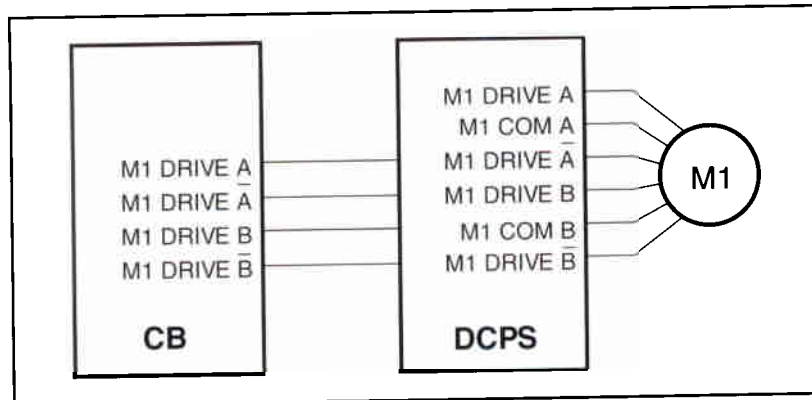


Figure 5-40 Main Motor Block Diagram

The Main Motor drives the following:

- Fusing Assembly.
- Transfer Assembly.
- Print Drum.
- Paper Feed Mechanisms (prior to the drum).

The Main Motor Drive is transferred to the driven assemblies through gear trains and belts, as shown in Figure 5-46.

Table 5-5 Fans and Motors

Fig#	Item#	Motor/ Fan	Function
5-41	1	FM5*	Formatter Fan-Cools the Formatter assembly
5-41	2	FM4	Main Body Fan-Cools the internal printer components
5-42	3	FM9	Exit Assembly Fan
5-42	4	M2	Developer Drive Motor
5-42	5	M3	Developer Select Motor
5-42	6	M1	Main Drive Motor
5-43	7	FM8*	DC Power Supply Fan
5-44	8	M6	Laser/Scanner Motor

\* HP Color LaserJet printer only

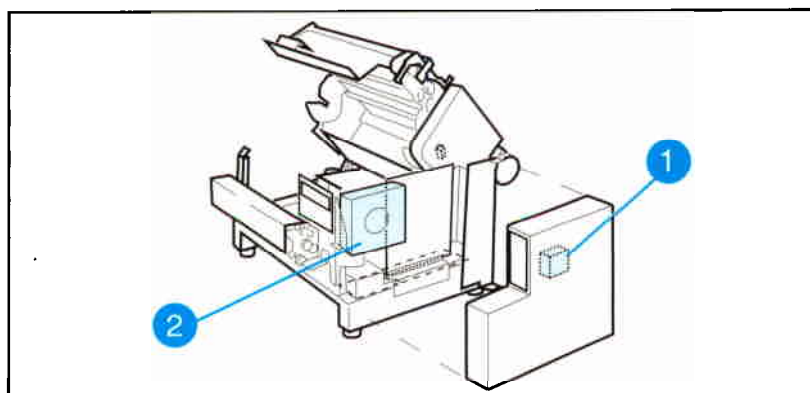


Figure 5-41 Formatter Fan (1) and Main Body Fan (2)

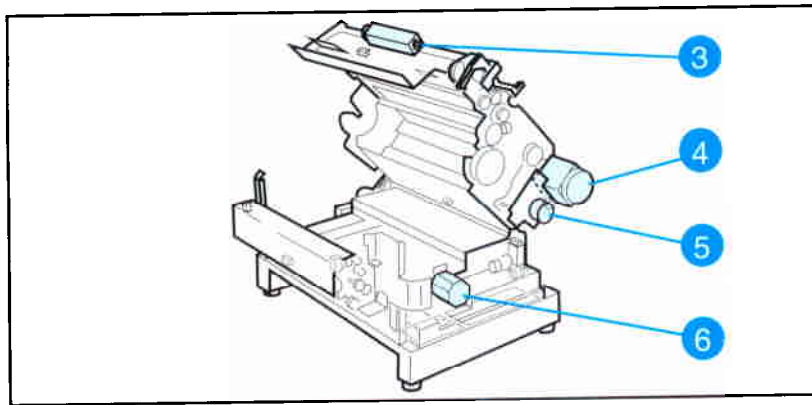


Figure 5-42 Printer Body Motors and Fans

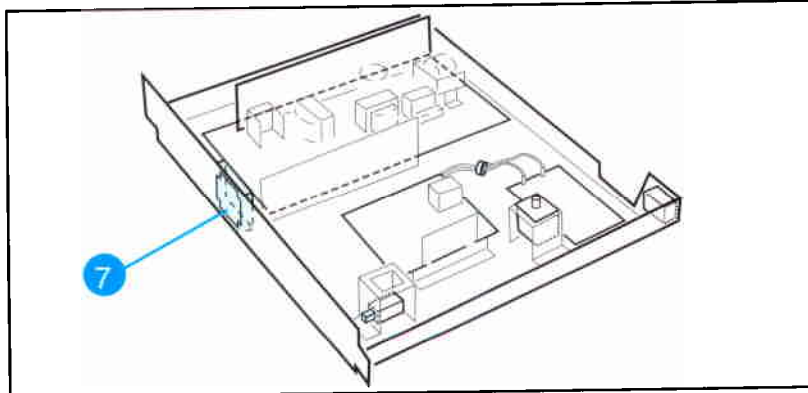


Figure 5-43 DC Power Supply Fan (HP Color LaserJet printer only)

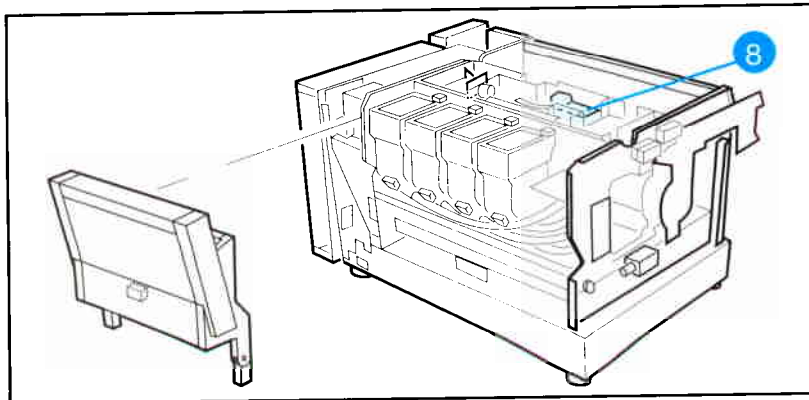


Figure 5-44 Laser/Scanner Motor

### FM4, FM5 , FM8 and FM9 (Cooling Fan Motors)

FM4 and FM5 cool the electronic circuitry. FM4 runs whenever the printer is plugged in, (even if the main power switch is in the STANDBY or OUT position), for a period of up to 5 minutes. FM5 cools the Formatter PCA, and runs whenever the main switch is ON.

FM9 cools the fuser area, and FM8 cools the power supply tray. FM4 and FM9 are dual speed fans. Whenever power is supplied these fans operate at low speed. They run at high speed during printing and for a short time afterward (see Figure 5-45).

#### Note

FM5 and FM8 are found in the HP Color LaserJet printer only.

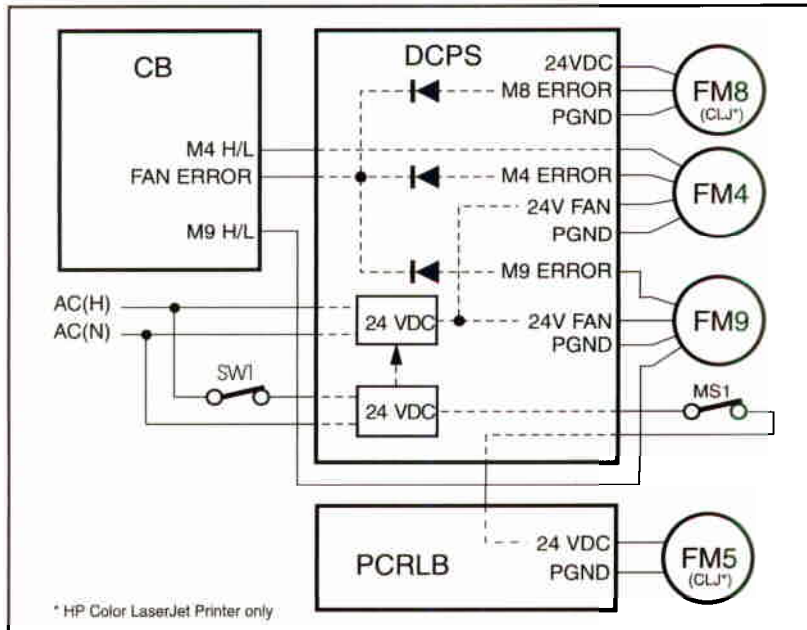


Figure 5-45 Fan Control Circuitry Block Diagram.

## Mechanical Drive Systems

There are two mechanical drive systems within the printer. One is driven by the Main Motor (M1), the other by the Developer Drive Motor (M2) (see Figure 5-46).

### Main Motor Drive Assemblies

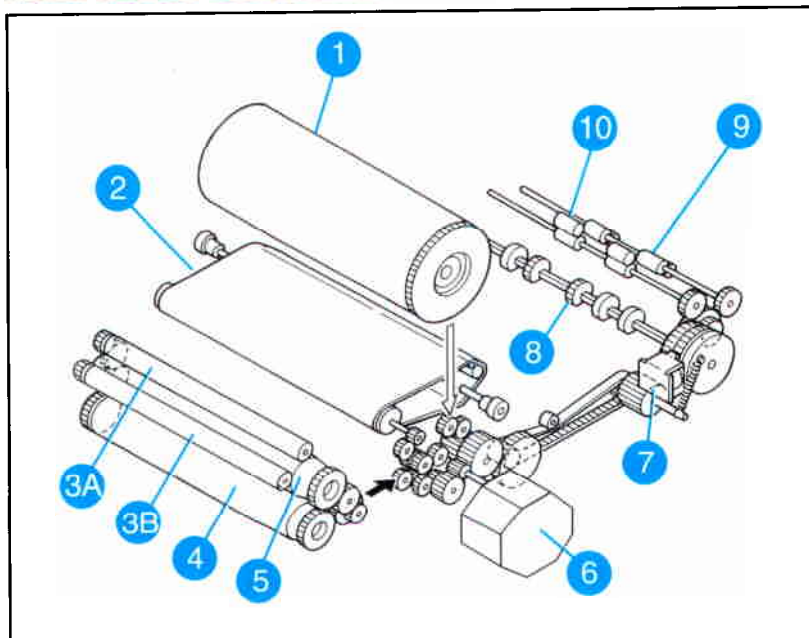


Figure 5-46 Main Motor and Paper Feed Components

- |    |                     |    |                           |
|----|---------------------|----|---------------------------|
| 1  | Print Drum          | 5  | Upper Fusing Roller       |
| 2  | Transfer Belt       | 6  | Main Motor (M1)           |
| 3A | Coating Roller      | 7  | Paper Feed Solenoid (SL1) |
| 3B | Cleaning Roller     | 8  | Paper Pick Rollers        |
| 4  | Lower Fusing Roller | 9  | Paper Transit Rollers     |
|    |                     | 10 | Registration Rollers      |

## Developer Drive Assemblies

The Developer Drive assembly contains two motors, the Developer Drive Motor, and the Developer Select Motor. The discussion of the Developer Drive assembly is separated into two parts, a drive section, and a selection and timing section, each section has its own motor as shown in Figure 5-47.

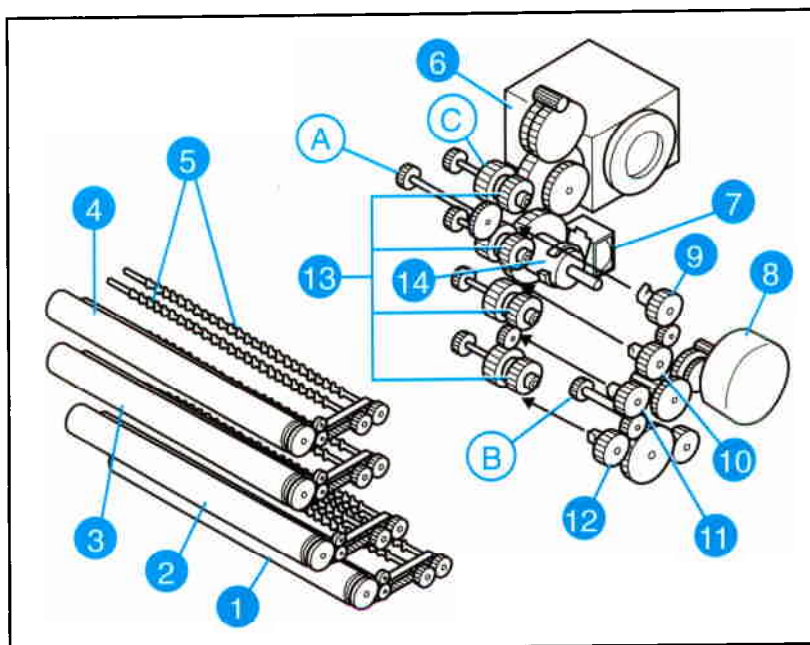


Figure 5-47 M2 and M3 in the Developer Drive Assembly

- |                                  |                                    |
|----------------------------------|------------------------------------|
| 1 Black Developer Sleeve         | 10 Magenta Developer Select Finger |
| 2 Cyan Developer Sleeve          | 11 Cyan Developer Select Finger    |
| 3 Magenta Developer Sleeve       | 12 Black Developer Select Finger   |
| 4 Yellow Developer Sleeve        | 13 Developer Clutches              |
| 5 Toner Mixing Augers            | 14 Toner Supply Clutch             |
| 6 M2 - Developer Drive Motor     | A,B See Figure 5-49                |
| 7 Toner Supply Solenoid          | C See Figure 5-51                  |
| 8 M3 - Developer Selecting Motor |                                    |
| 9 Yellow Developer Select Finger |                                    |



### **Developer Drive Assembly Motor (M2)**

The Developer Drive Motor (M2) drives the Developer assemblies, Toner Hopper assembly, Paper Exit mechanism, and the Transfer assembly/ Drum Cleaning Blade mechanism cams. When M2 is turned on, the Paper Exit mechanism rollers are driven continuously. The developers, Toner Hopper assembly, and Transfer assembly/Drum Cleaning Blade mechanism cams are only driven by M2 when the appropriate clutch is engaged. M2 is an AC motor which is controlled by the Control Board through the AC Power Supply in the Color LaserJet and through the combined DC Power Supply in the Color LaserJet 5/5M.

### **Developer Select Motor (M3)**

The Developer Select Motor (M3) rotates the select fingers used to activate clutches for the appropriate developer, Toner Hopper, or Toner Lockout mechanism. The three mechanisms are selected concurrently for each color. Activation of the selected Toner Hopper and Toner Lockout mechanism also requires a corresponding solenoid to be activated.

The Developer Select Motor (M3) is a stepper motor controlled by the Control Board. Pulses from the Control Board rotate the motor one complete revolution at a rate of 3 degrees per pulse. The Developer Cam Home Position Sensor (PS6) tells the Control Board when the select motor is in the home position.

Figure 5-48 shows the location for each color selection as M3 rotates. From the home position, the motor must rotate 45 degrees, or 15 pulses, to select yellow. Since magenta is the next color, M3 must rotate another 90 degrees, or 30 pulses from the Control Board, to select this color. Another 30 pulses is required for the next color, and so on until home position is sensed. Between each section is a neutral position, for a total of eight positions. The Control Board knows the position of the select motor by detecting home position or by keeping track of the pulses sent to the Select Motor.



## Developer Select Sequence of Operation

The yellow developer is selected as follows: starting from home position, M3 rotates 45 degrees to the yellow position. The yellow developer select claw rotates and locks the clutch for the yellow developer drive roller. This engages the AC motor to the yellow developer. The remaining developers are driven sequentially in a similar manner.

Colors are selected in the following order from Home Position (see Figure 5-48).

Starting Position	pulses	Stopping Position
1. Home	+15	Yellow
2. Yellow	+30	Magenta
3. Magenta	+30	Cyan
4. Cyan	+30	Black
5. Black	+15	Home

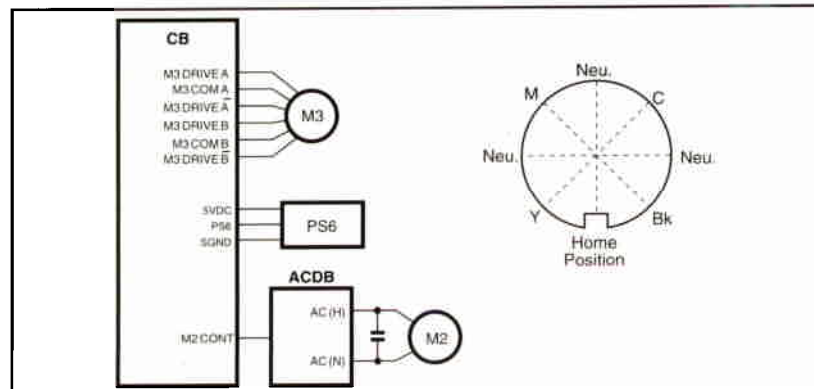


Figure 5-48 Developer Driver Functional Block Diagram

## Developing Drive Assembly Control Mechanism

The Developing Drive assembly has five clutches and one solenoid. There is one clutch for each developer mechanism, and a clutch for the toner supply system. Each developer clutch is activated by a select finger. The select finger activates the clutch by engaging a pawl ring which couples the rotation of M2 to the developer. The Toner Supply Clutch is activated by the Toner Supply Solenoid (SL3). When SL3 is activated by the Control Board, drive force from M2 is supplied to the Toner Hopper assembly. This drive force is used to turn the selected Hopper Stirring Paddles and Toner Supply Auger.

### Toner Supply System

The Toner Supply System is composed of the Toner Hoppers, Toner Supply Augers, and Toner Hopper Lock System (see Figure 5-49). Four Toner Hoppers provide reservoirs for each color of toner. Augers transport toner from the hoppers to the developers. The Toner Hopper Lock System prevents the hoppers from being overfilled.

All rotation force for the hoppers and augers is supplied from M2. M3 controls the toner select shaft which is synchronized to select the same color hopper and developer. On the shaft are the hopper select fingers and the hopper lock cams. The toner select fingers are used to activate the hopper clutches on the toner supply shaft.

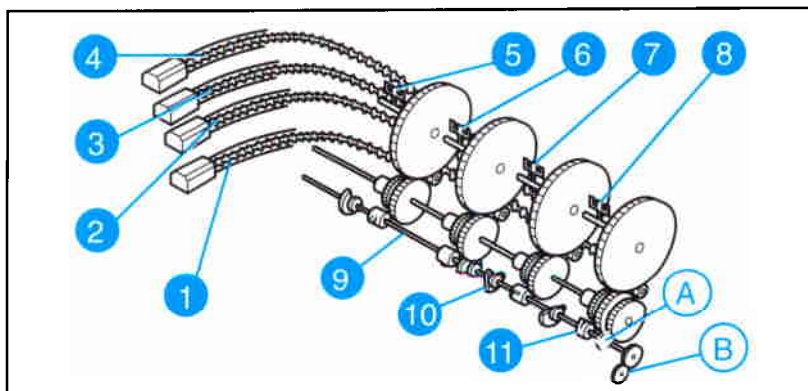


Figure 5-49 Toner Feeder Mechanism

- |                                |                                   |
|--------------------------------|-----------------------------------|
| 1 Black Toner Auger            | 8 Yellow Toner Hopper Paddles     |
| 2 Cyan Toner Auger             | 9 Hopper Select Shaft             |
| 3 Magenta Toner Auger          | 10 Toner Hopper Lock Cam (1 of 4) |
| 4 Yellow Toner Auger           | 11 Toner Select Finger (1 of 4)   |
| 5 Black Toner Hopper Paddles   | A See Figure 5-47.                |
| 6 Cyan Toner Hopper Paddles    | B See Figure 5-47.                |
| 7 Magenta Toner Hopper Paddles |                                   |

## Low Toner Sensing

Piezo-electric Toner Level Sensors are located on each Toner Hopper. The sensors use amplitude feedback from the piezo-electric element to sense the level of toner. As the element is covered and uncovered, the amplitude of the oscillations change.

If the sensor for a particular color sense the change in amplitude while the toner feed auger for the same color tries to convey toner for approximately 3 seconds, a `TONER LOW OFFLINE TO FILL` message is posted. If toner is added to the hopper at this time, the sensor recognizes a change in amplitude and the message clears.

If toner is not added, the printer will still print until the auger tries to transport toner for an accumulative auger time of 15 seconds. Then a `TONER OUT CMYK ADD (COLOR)` is posted. When this message appears, the printer stops printing until toner is added to the correct hopper and the message clears.

The toner low message is a lower priority message than many other attendance and service messages and therefore may be missed by the user.

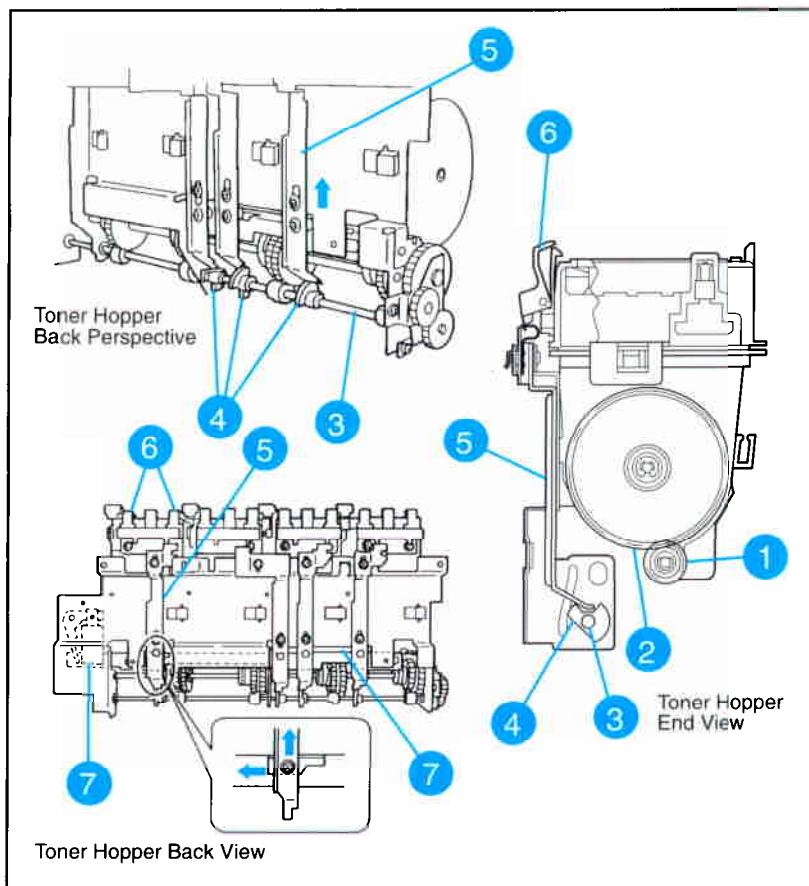
## Toner Hopper Lock System

The Toner Hopper Lock System (see Figure 5-50) prevents the Toner Hoppers from being overfilled. When a low toner condition is sensed, the developing control motor (M3) rotates to select the hopper reporting the low condition. The Toner Hopper select lockout cams determine which fingers retract, allowing toner to be added to the correct hopper. A slide lever, controlled by SL6, together with the Toner Hopper lock cams release the selected Toner Hopper lock.

For example, the select motor must be in the yellow position and SL6 must be actuated to unlock the yellow Toner Hopper. If more than one hopper is empty, the hoppers are unlocked sequentially in the order black, cyan, magenta, yellow. Only one hopper can be unlocked at a time.

### Caution

Defeating the lock system and loading “extra” toner will damage the printer.



**Figure 5-50 Toner Hopper Lock System**

- |                            |  |
|----------------------------|--|
| 1 Toner Auger Gear         | 4 Toner Hopper Lock Cams (1 of 4)        |
| 2 Toner Hopper Paddle Gear | 5 Toner Hopper Lock Actuator             |
| 3 Hopper Select Shaft      | 6 Toner Hopper Lock                      |
|                            | 7 Lock Actuator Slide and Solenoid (SL6) |

### Transfer Assembly and Cleaning Blade Motion

During color image development the drum makes four revolutions (one for each color). During this time the Transfer assembly and Cleaning Blade can not contact the drum. A pair of identical cams at both ends of the drum move both the Transfer assembly, and the Cleaning Blade (inside the Print Drum) in and out of contact with the Print Drum (see Figure 5-51). When SL4 is engaged, the Developer Drive Motor (M2) drives the cam gears through the belt-driven gear train. As the cams turn, they press down, then release, the Transfer assembly. A short time later, the cams move the Cleaning Blade with the cleaning blade press and release lever.

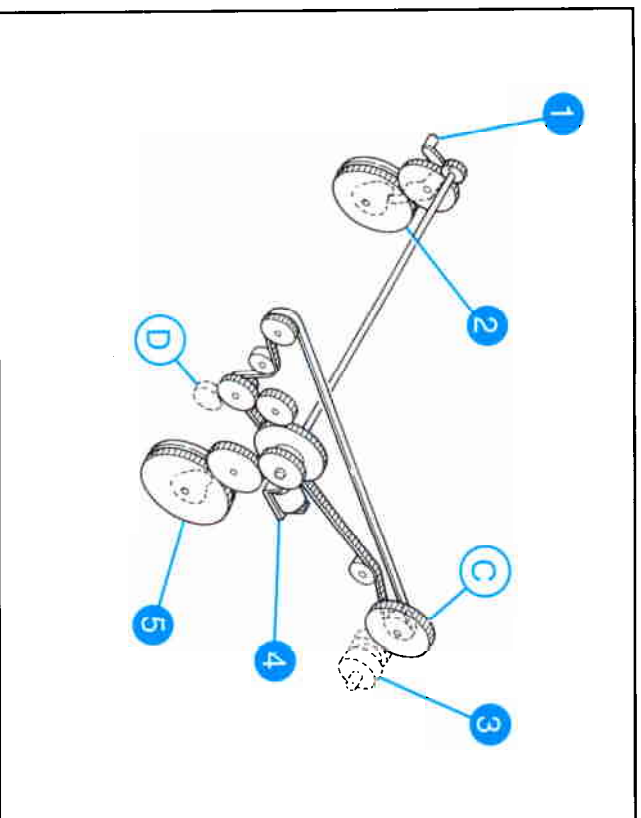
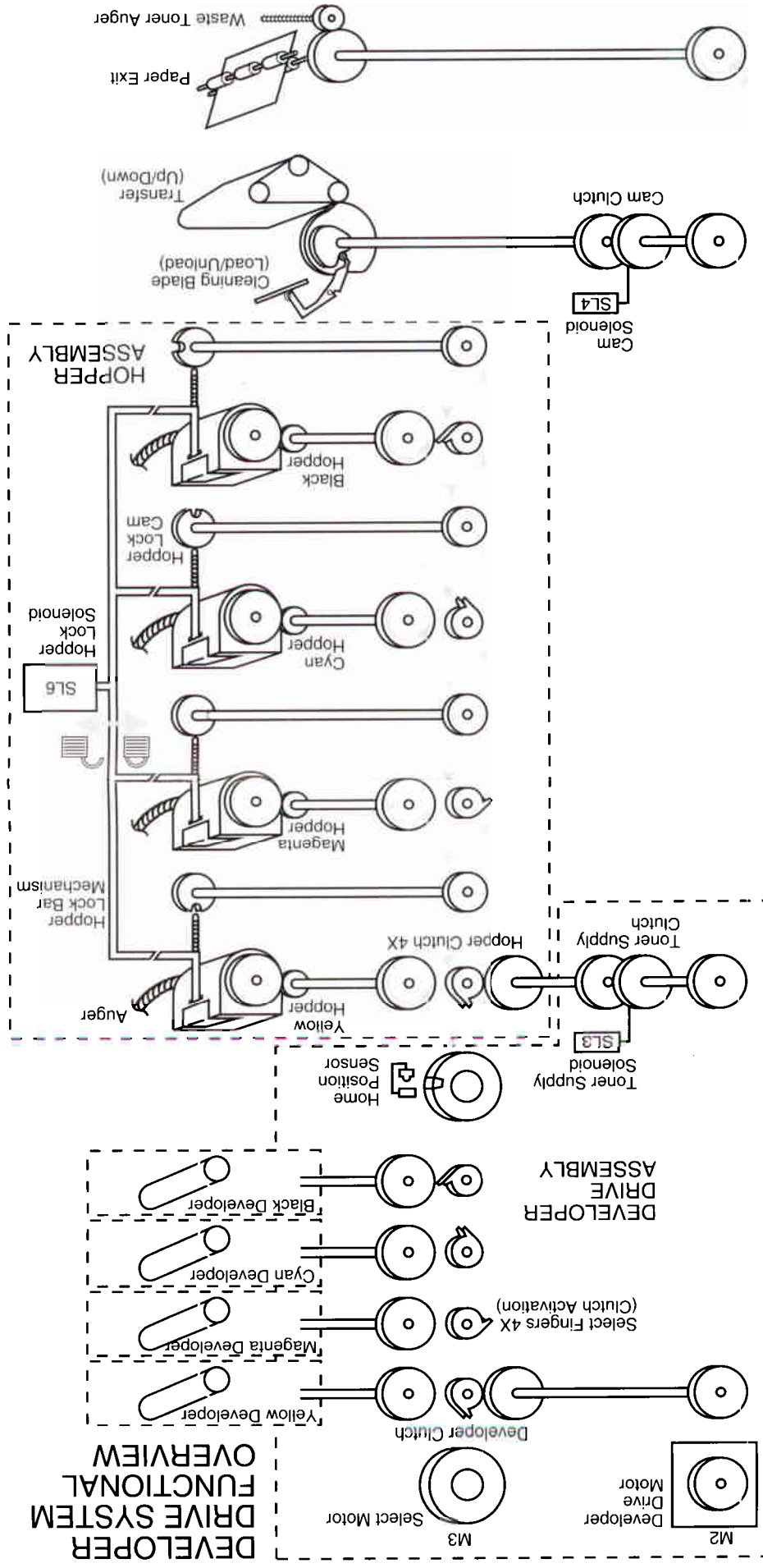


Figure 5-51 Press and Release Levers

- 1 Drum Cleaner Lift
- 2 Transfer Cam (left)
- 3 Yellow Developer Drive Gear/Clutch Assembly
- 4 Cam Solenoid
- 5 Transfer Cam (right)
- C Upper Gear Train Drive Gear (see Figure 5-47)
- D Excess Toner Auger Drive (see Figure 5-16)

# Developer Drive Assembly



## Formatter System

The Formatter (see Figure 5-52) is responsible for:

- Receiving and processing ASCII data from the printer interfaces.
- Splitting the color image data into the four color planes.
- Monitoring control panel input and relaying printer status information (through the control panel and MIO).
- Developing and coordinating data placement and timing with the print engine.
- Storing font information.
- Communicating with the host computer through the bi-directional port, or the MIO card.

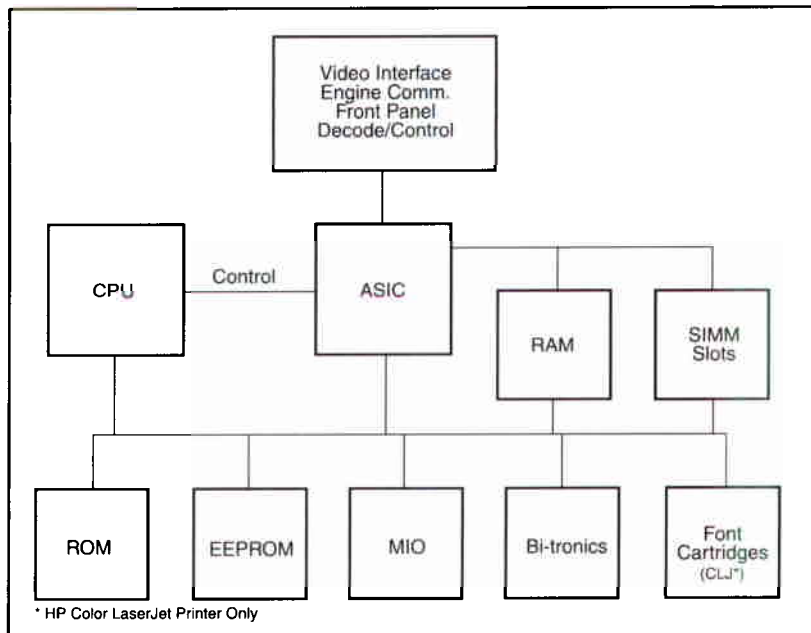


Figure 5-52 Formatter Block Diagram

## Formatter Functional Overview

The Formatter receives ASCII data from an interface and converts it into a dot placement image for each of the four color planes. When the scan buffer is full, or when a form feed

command is received, the Formatter sends a print signal to the Control Board. The Control Board synchronizes the image formation system with the paper feed system and signals the Formatter to send the print image data. The Formatter sends the print image data in the form of a Digital Video Signal to the Control Board which initiates the print process.

### **Application-Specific Integrated Circuit (ASIC)**

The ASIC is the heart of the Formatter, and is used to control the five Formatter functional areas:

- Processor Interface
- DRAM/SIMM Controller
- Engine and control panel serial communications
- Video interface
- Bitronics Controller

### **CPU**

The Formatter uses an AMD 29030, (Color LaserJet), or an AMD 29040, (Color LaserJet 5/5M), microprocessor to execute the functional commands.

### **Read-Only Memory (ROM)**

Besides storing the Formatter programs used by the CPU, the ROM stores the fonts, other print languages (such as PostScript) and color maps.

### **Random Access Memory (RAM)**

RAM stores printing and font information received from the host computer. 8Mbytes of RAM are standard on the Formatter, with four SIMM slots for additional memory. Any memory used in this printer must be rated at 80nS or faster, using 72 pin, 32 bit architecture. 72Mb is the maximum amount of supported memory.

#### **Note**

36 bit architecture will work since the 4 parity bits are ignored by the formatter

### **Non-Volatile Memory (NVRAM)**

NVRAM retains its contents when the printer is powered OFF. The NVRAM on the Formatter is not the same as the NVRAM on the Control Board. The Formatter NVRAM stores configuration information for the I/O and print environment. It does not need to be moved to the new Formatter when the Formatter is replaced.



### **Control Panel**

The Control panel uses a two line by 16 character display, eight buttons, and four LEDs to display the status of the print engine, and provide a user interface. Commands and status are sent and returned through the ASIC on the Formatter.

### **Resolution Enhancement Technology (REt)**

REt is used only when printing black. The Formatter contains circuitry for REt which modifies the standard video dot data to produce “smoothed” black to white boundaries. REt is user adjustable from the control panel, or from some software applications. Available settings are Light, Medium, Dark, or Off. Medium is the default setting.

### **Color Resolution Enhancement Technology (COLOREt)**

Color Resolution Enhancement technology (COLOREt or C-REt) provides the HP Color LaserJet 5/5M printer the ability to print with high definition, producing the appearance of 16.7 million solid colors. C-REt enables the printer to vary the size of the laser “dot” thereby providing the ability to mix various amounts of cyan, magenta, and yellow to produce different colored dots. C-REt can then place the dots on the page using an HP proprietary half-toning method to produce the appearance of 16.7 million solid colors. This half-toning method also provides the ability to print at higher lines per inch (lpi) settings. The HP Color LaserJet 5/5M printer has the ability to print at 100 lpi, 150 lpi, and 300 lpi.

---

# Power Supplies

## Power Supply Overview

There are four power supplies used to power the various sections of this printer. There are two high voltage power supplies, an AC power supply, and a DC power supply. Both the AC and the DC supplies are in the power supply drawer. This drawer is accessible from the front of the printer, under the lower front cover. See Chapter 6 for instruction on accessing the power supplies.

### AC Power Supply

The AC power supply provides power to the fuser heat lamp and the developing motor. The AC Door Switch disables the AC power supply when the top cover is open.

### DC Power Supply

The DC power supply provides 5Vdc, 12Vdc, and 24Vdc to the Control Board. The Main Motor, Laser/Scanner Motor, laser diode, and fan motors 4, 8, and 9 are driven by the DC Power Supply. The Control Board controls the Main Motor and fans through the DC Power Supply.

### Power Supplies (Color LaserJet 5/5M Only)

The AC and DC power supplies are combined into one unit on the Color LaserJet 5/5M printers.

### High Voltage Power Supplies

There are two high voltage power supplies on the right side of the printer. The first is in the lower section of the printer and supplies the corona voltages. The second is in the top section and provides the developer bias voltages.

# Removal and Replacement

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## Chapter Contents

Introduction . . . . .	6-3
Disassembly . . . . .	6-3
Repair Notices . . . . .	6-4
Required Tools . . . . .	6-5
User Installable Maintenance Units . . . . .	6-5
Optional Assemblies . . . . .	6-5
Rear Feed Unit Removal . . . . .	6-6
Rear Feed Unit Holder Replacement . . . . .	6-6
Covers and Doors . . . . .	6-7
Right Side Cover . . . . .	6-7
Control Panel Removal . . . . .	6-9
Toner Hopper Cover Removal . . . . .	6-10
Left Side Cover Removal . . . . .	6-11
Lower Rear Cover Removal . . . . .	6-12
Front Cover Removal . . . . .	6-13
Top Cover Removal . . . . .	6-14
Right Side Assemblies . . . . .	6-16
Formatter Cage Replacement . . . . .	6-17
Main Body Fan (M4) Removal . . . . .	6-18
Control Board Removal . . . . .	6-19
Main Motor and Gear Cluster Removal . . . . .	6-20
Installing the HVPS Terminal Block . . . . .	6-21
High-Voltage Power Supply (HVPS) Removal . . . . .	6-22
SL1 (1st paper feed solenoid) Removal . . . . .	6-23
Top Assemblies . . . . .	6-24
Developer Drive Assembly Removal . . . . .	6-26
Developer Drive Assembly Reinstallation . . . . .	6-27
Transfer Cam Solenoid (SL4) Removal . . . . .	6-28

Toner Hopper Assembly Removal . . . . .	6-29
Toner Hopper Reinstallation . . . . .	6-31
Laser/Scanner Assembly Removal . . . . .	6-32
Upper Cooling Fan Removal . . . . .	6-33
Interlock Switch Assembly Removal . . . . .	6-34
Front Assemblies . . . . .	6-35
Power Supply Tray Removal . . . . .	6-35
Paper Exit Mechanism . . . . .	6-36
Internal Assemblies . . . . .	6-37
Pickup Rollers Removal and Replacement . . . . .	6-37
Miscellaneous Parts Removal . . . . .	6-38
Replacing the Gears . . . . .	6-38
Checking the Cam Timing . . . . .	6-38
Verifying the Cam Timing . . . . .	6-40
Setting the Cam Timing . . . . .	6-40

---

# Introduction

## Disassembly

This chapter guides the service engineer through removal and replacement of major printer components. HP does not support repairing individual subassemblies or troubleshooting to the component level.

This chapter is arranged to describe the complete tear down of the printer in the most orderly manner. These procedures have been tested and found to be the most efficient way to disassemble the printer. Following these procedures assures that the printer can be reassembled and placed back in service quickly. Unless otherwise noted, replacement is the reverse of removal.

### Replacing Maintenance Units

The printer keeps track of use of many of its user-replaceable parts. When new user-replaceable maintenance units are installed, a fusible link is sensed, the link is blown, and the Control Board resets the counter (for that unit) to zero. This means that an expired assembly must be replaced with a new assembly because the printer electronics must sense a fusible link before the firmware algorithm can reset the counter.

---

#### Note

Once a maintenance unit is installed and the printer is powered ON, the unit considered used and cannot be used as a replacement because the fusible link is gone.

---

## Repair Notices

---

### Warning!

Line voltage is present in this printer even when the Main Power Switch is in standby or out position. Power OFF the printer and disconnect the power cord before servicing the printer. Failure to follow this instruction may result in severe injury.

The sheet-metal parts may have sharp edges. Be careful not to cut yourself when handling sheet-metal parts.

---

### Caution

Never exchange print drums or developers between printers.

Never begin printer repair until the fan has stopped, or the top cover is opened to vent the ozone. Unplugging the printer before the fan stops can cause ozone damage to the Print Drum.

Special (shorter) screws appear in several places within the printer, and are called out in the text. Replacing a short screw with a longer one may effect printer operation.

This printer contains many Electro-static (ESD) sensitive parts. Always observe ESD precautions when servicing this printer.

Always protect the Print Drum from light and physical damage when it is removed from the printer.

---

## Required Tools

- 6 and 8-inch #2 Phillips screwdrivers (throughout printer).

---

## User Installable Maintenance Units

The following maintenance units are replaced by the user as part of the periodic maintenance process. The procedures for replacing each of these items are shown in Chapter 4.

- Color Developer
- Black Developer
- Print Drum Cartridge
- Fusing Assembly
- Transfer Belt Assembly
- Toner Collection Box
- Ozone Filter
- Cleaning Roller
- Coating Pad (CLJ Fuser)
- Coating Roller (CLJ 5/5M Fuser)

---

## Optional Assemblies

Remove any optional assemblies (such as Rear Feed Unit) before beginning printer repair.

## Rear Feed Unit Removal

1. With a small screwdriver, release the clips from each support of the Rear Feed Unit.
2. Lift the assembly from the printer.

### Note

The holder on the left in Figure 6-1 contains the connector for the wiring harness. Be careful not to damage this connector.

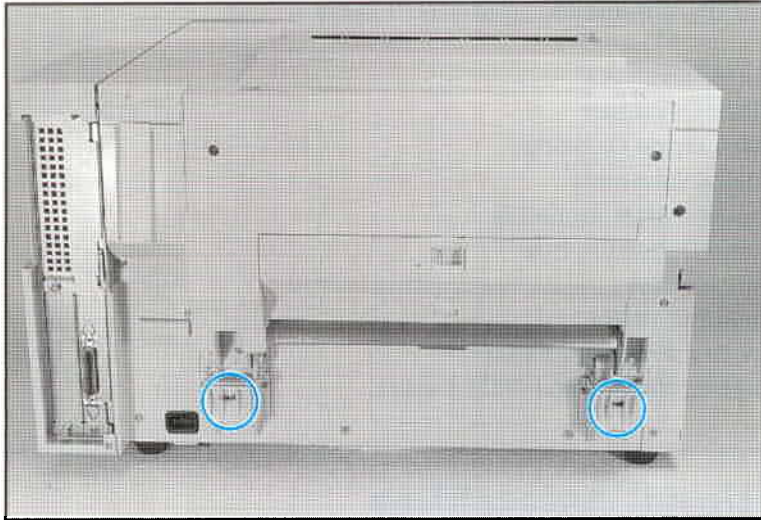


Figure 6-1 Rear Feed Unit Release Latches

## Rear Feed Unit Holder Replacement

The right and left Rear Feed Unit holders are not identical (Figure 6-2). Be certain to replace the holders in the correct locations.

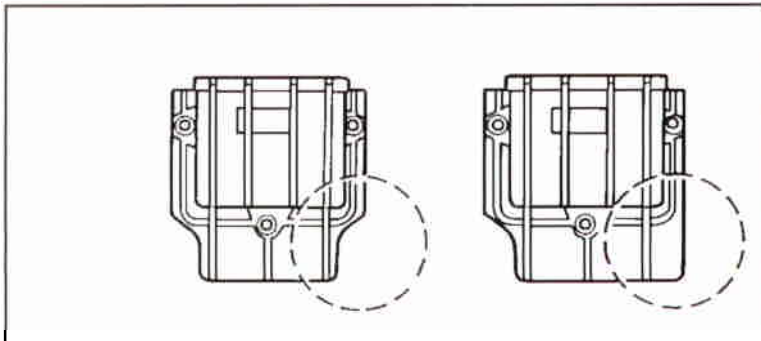


Figure 6-2 Rear Feed Unit Holders



---

## Covers and Doors

All screws are M3X6 Trushead unless otherwise noted.

### Right Side Cover

1. Open the Font Cartridge Door and remove (3) screws shown in Figure 6-3, item 1.
2. Open the Top Cover and remove (2) screws shown in Figure 6-3, item 2.

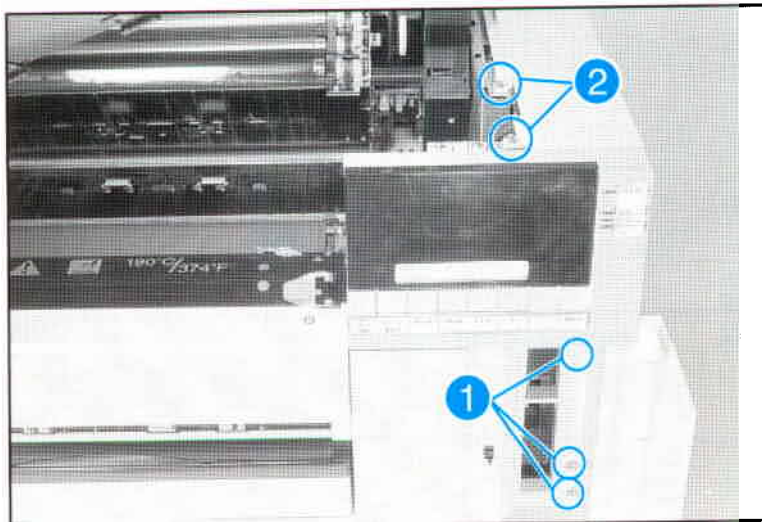


Figure 6-3 Right Side Cover Removal

(continued on next page)

3. From under the SIMM Access Door remove (2) screws shown in Figure 6-4, item 1.
4. From the rear of the printer, remove (1) screw as shown in Figure 6-4, item 2.
5. Lift the Right Side Cover away from the printer.

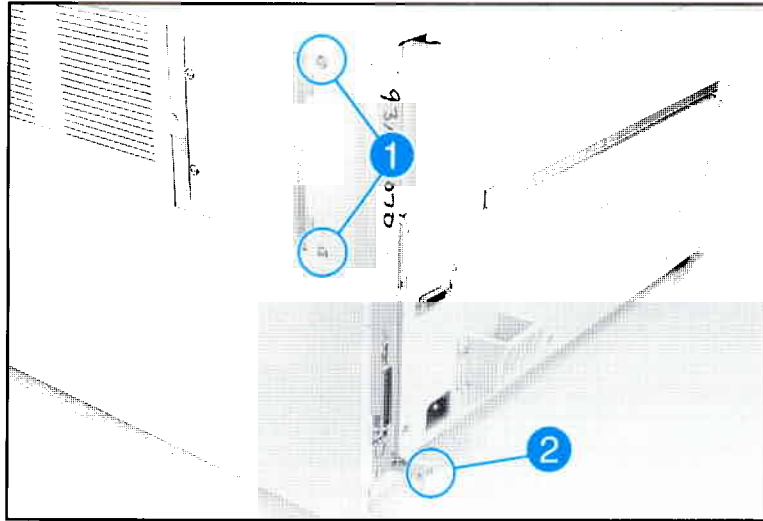


Figure 6-4 Right Side Cover Screws

## Control Panel Removal

1. Remove the Right Side Cover.
2. Open the Top Cover and remove (3) screws circled in Figure 6-5.
3. Remove (1) screw from the lower left rear, and (1) screw from the lower right of the Control Panel (see the arrow in Figure 6-5).
4. Slide the Control Panel Cable out of the Cable Stay on the back of the Control Panel.
5. Unplug the Control Panel Cable from the back of the Control Panel.

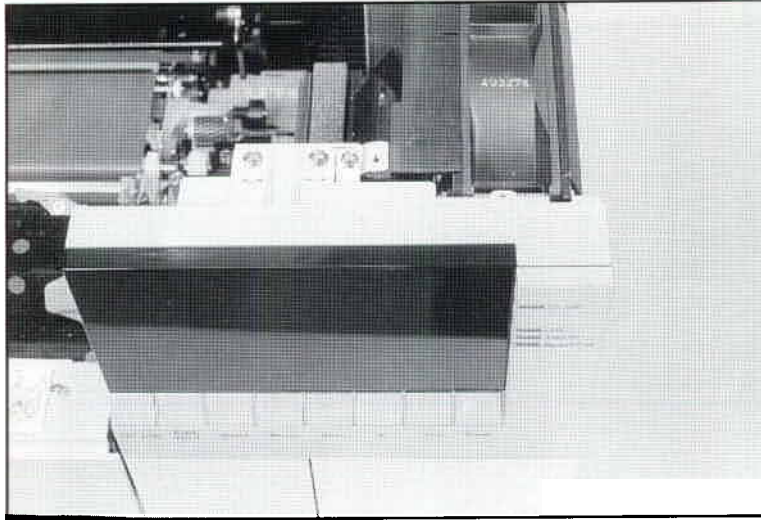


Figure 6-5

Control Panel Display Screws

## Toner Hopper Cover Removal

The Toner Hopper Cover shields the Toner Hoppers. Remove the cover as follows:

1. Remove the Rear Feed Unit (if installed).

### Caution

Removing the Toner Hopper Cover without first removing the Rear Feed Unit (RFU) will damage the Toner Feed Augers.

2. Remove (2) screws from the Toner Hopper Cover (Figure 6-6).
3. Open the Toner Hopper Door and remove the cover by sliding the cover back, then up.

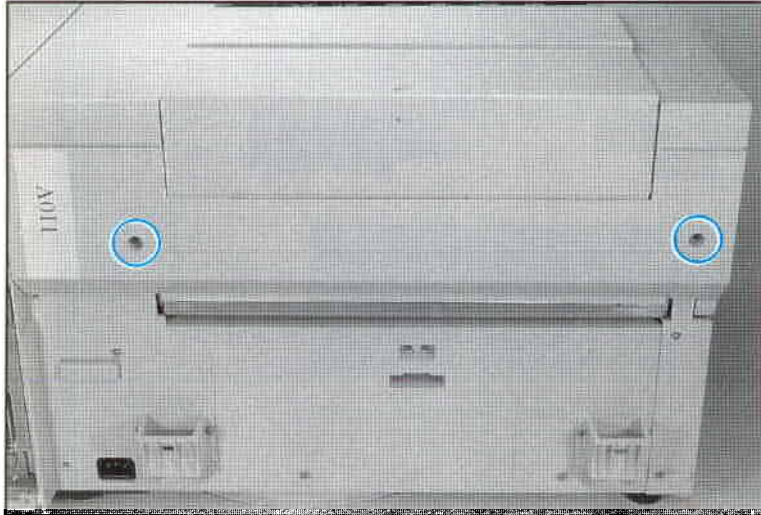


Figure 6-6 Toner Hopper Cover Removal

## Left Side Cover Removal

1. Remove the Toner Hopper Cover
2. From the left rear, remove (2) screws shown in Figure 6-7.
3. Open the Top Cover. From the left front side, remove (1) screw shown in Figure 6-8.
4. Slide the cover toward the rear of the printer.
5. Lower the rear of the cover and with the top of the cover tilted in, gently rock the cover away from the printer.

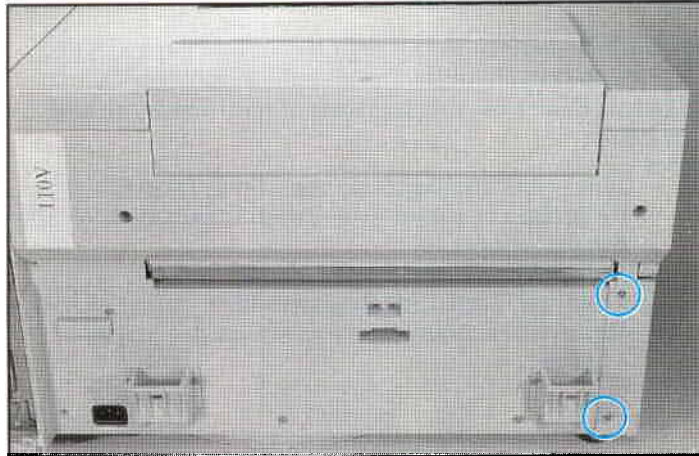


Figure 6-7 Left Side Cover Screws (at rear of printer)

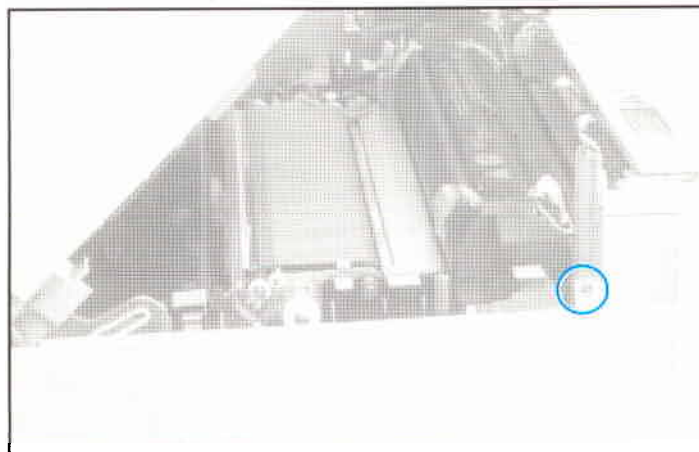


Figure 6-8 Left Side Cover Screw

## Lower Rear Cover Removal

1. Remove the Rear Feed Unit if installed.
2. Remove the Toner Hopper Cover.
3. Remove (3) M3X12 screws from each Rear Feed Unit support brackets and disconnect the cable from the jumper board.

### Note

The inside surfaces of the Lower Rear Cover are paper guides. The Lower Rear Cover must be installed correctly to avoid paper jams.

4. Remove (6) M3X8 screws that retain the Lower Rear Cover (these screws are visible in the lower half of Figure 6-7).
5. Remove Lower Rear Cover, being careful not to lose the test connector cover.

### Note

The serial number is on the Lower Rear Cover. Be certain to replace the Lower Rear Cover on the correct printer.

The Rear Feed Unit Supports have longer screws. Be sure to replace these screws in the proper location.

## Front Cover Removal

1. Remove the paper tray and the Control Panel.
2. Remove the (2) screws shown in Figure 6-9.
3. Remove the Front Cover in three steps.
  - a. Rotate the Paper Diverter upwards.
  - b. Tilt the top of the cover away from the printer (see Figure 6-10).
  - c. Lift the cover to release the retaining tabs.

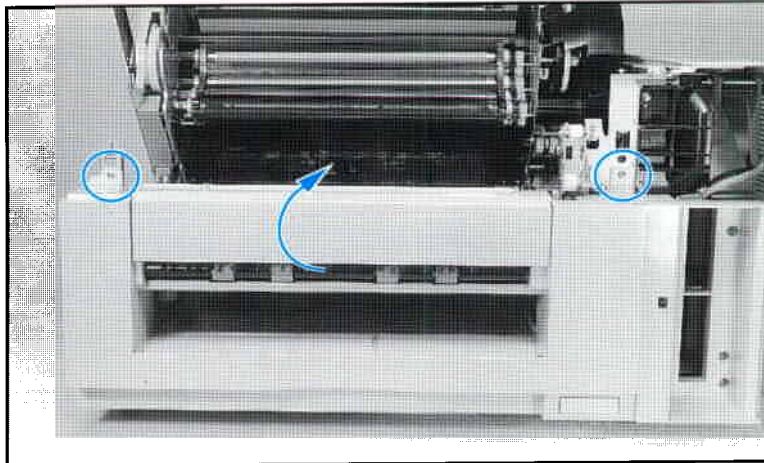


Figure 6-9

Front Cover Removal

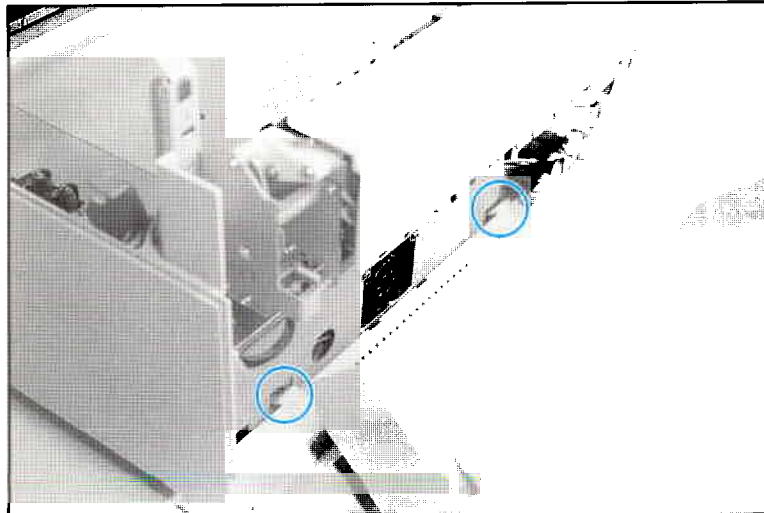


Figure 6-10

Front Cover Retaining Tabs



## Top Cover Removal

1. Remove the Toner Hopper Cover.
2. Open the Top Cover, remove the Print Drum, and put it in a safe place.

### Note

Protect the Print Drum from light and physical damage when it is out of the printer.

3. Remove (1) screw shown in Figure 6-11 .

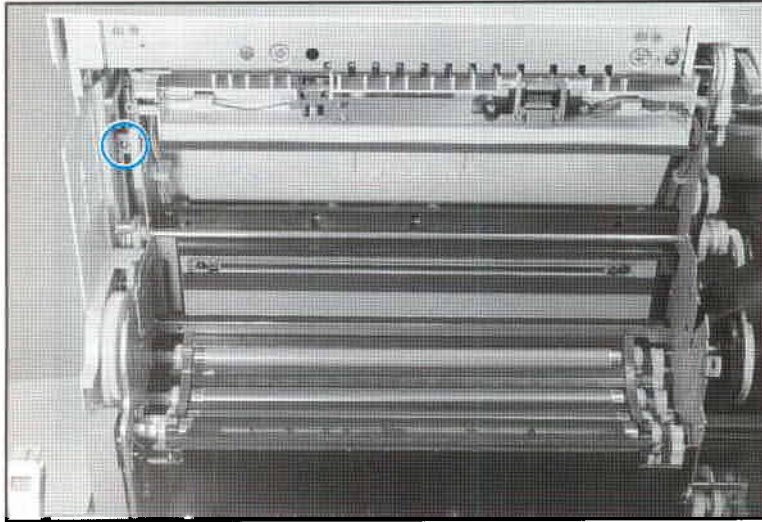


Figure 6-11      Top Cover Screw (1)

*(continued on next page)*



4. From the right side of the printer, remove (3) screws shown in Figure 6-12.
5. Remove the (1) screw shown in Figure 6-13.
6. Remove the Top Cover by opening the Left Side Door then lift up and away from the Printer

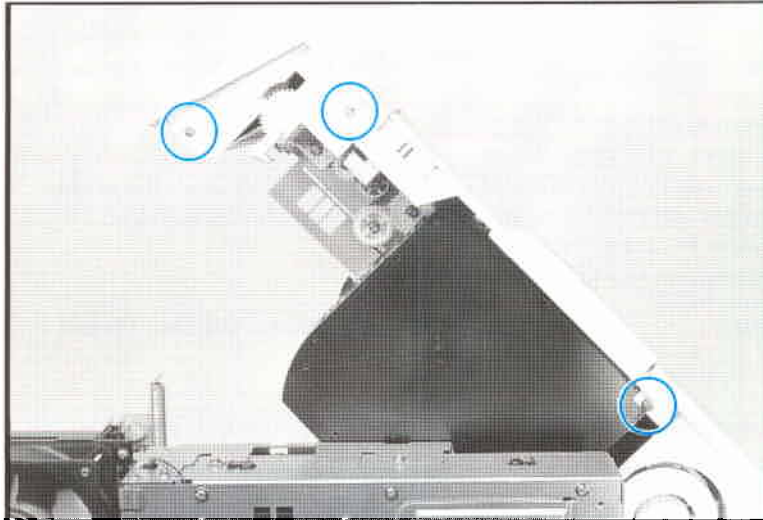


Figure 6-12      Top Cover Screws (2)

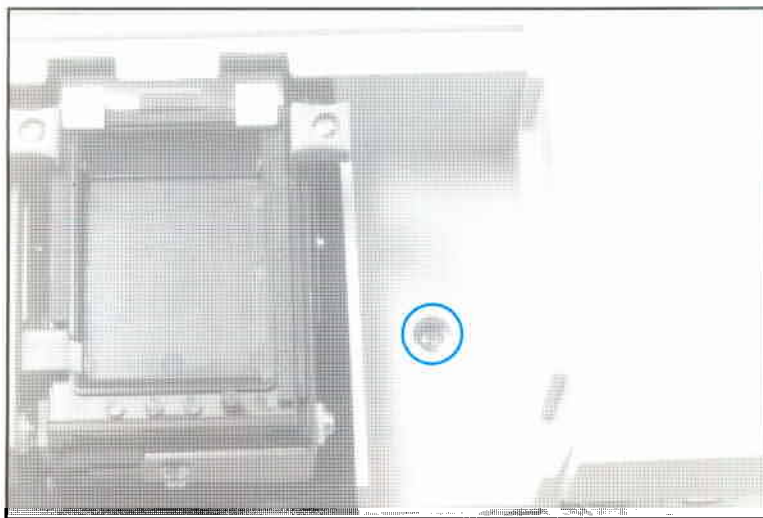


Figure 6-13      Top Cover Screws (3)

---

## Right Side Assemblies

**All Screws are M3X6 Trusheads unless otherwise noted.**

### Formatter Cage Removal

1. Remove the Right Side Cover.
2. Remove (4) screws shown in Figure 6-14, item 1.
3. Remove (1) screw from the sheet-metal tab at the rear of the printer (above and to the right of the parallel connector, Figure 6-14, item 2).
4. Disconnect the fan cable (CLJ only).

#### Caution

Pull the connector to disconnect the fan. Do not pull the wires.

5. Firmly slide the cage towards the rear of the Printer.

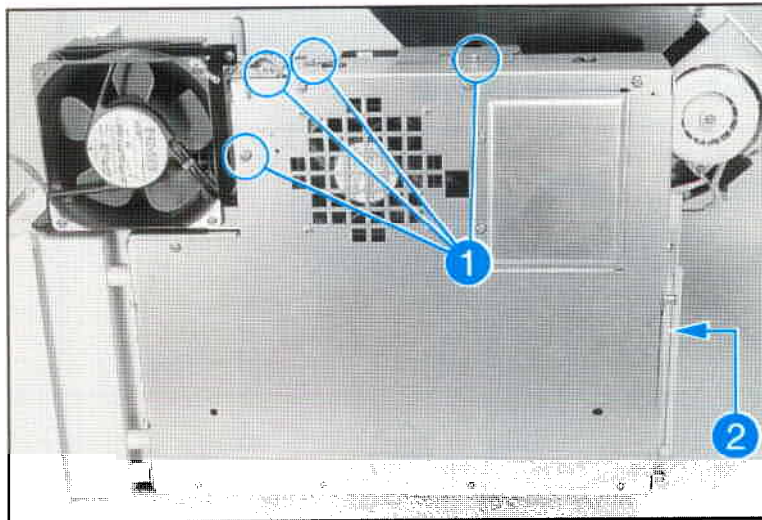


Figure 6-14      Formatter Cage Removal (5 screws)

(continued on next page)

## Formatter Cage Replacement

1. Align locator tabs on the lower rail with the slots on the bottom of the Formatter assembly (see Figure 6-15, item 1).
2. Rotate the Formatter assembly into position, being careful to insert the locator on the back of the assembly into the slots in the printer frame. (See Figure 6-15, item 2.)
3. Slide the Formatter Cage firmly forward to lock the tabs into the slots.

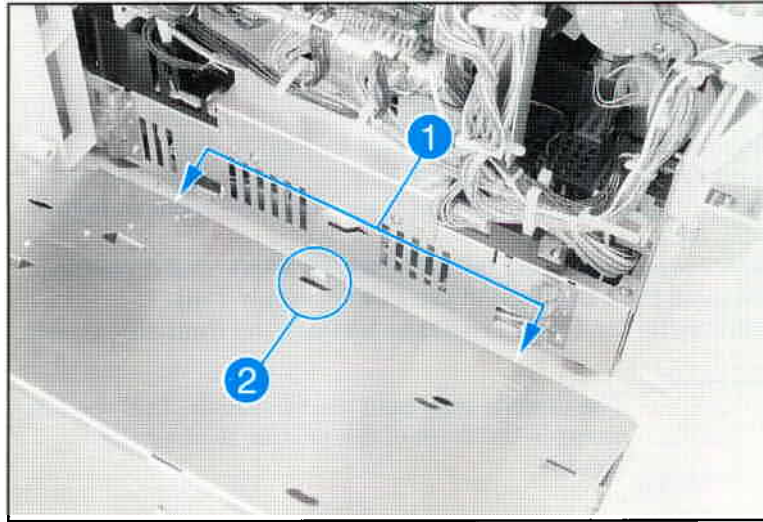


Figure 6-15      Formatter Retaining Slots

## Main Body Fan (M4) Removal

### Note

All screws which hold the main body fan in place are M3X8 Trushead screws except for the one on the lower right corner of the fan. This screw is an M3X12 Trushead.

1. Remove the Right Side Cover, the Control Panel, the Front Cover, and the Formatter Cage.
2. Remove (2) screws from the side of the fan facing the front of the printer, see Figure 6-16.
3. Disconnect the Control Panel cable from the Control Board and remove the M3X6 panhead screw which holds the cable to the printer frame as shown in Figure 6-17, item 2.
4. Remove the (3) (2 M3X8 and 1 M3X12) screws from the side of the fan facing the right side of the printer as shown in Figure 6-17, item 1.
5. Release the fan wiring from the printer frame and disconnect the cable from the front of the Power Supply Tray.
6. Release the fan from (2) detents between the front side screws.

### Note

The detents may hold the fan firmly. Pull the fan towards the front of the printer to clear the detents.

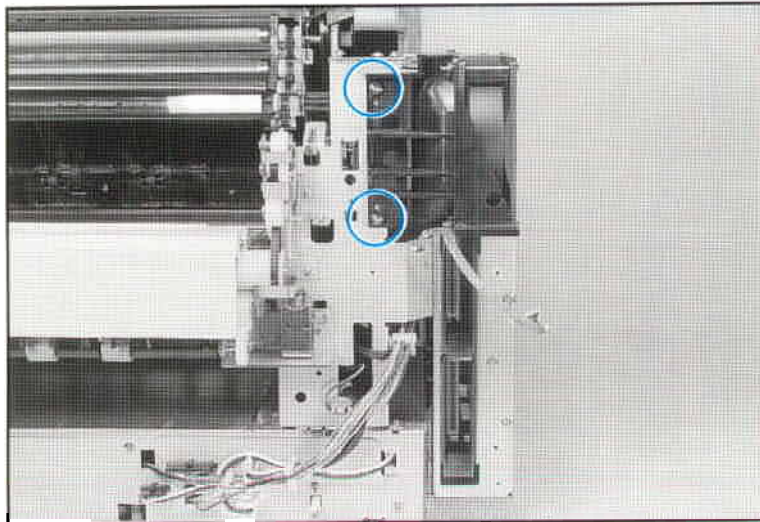


Figure 6-16 Main Fan Screws

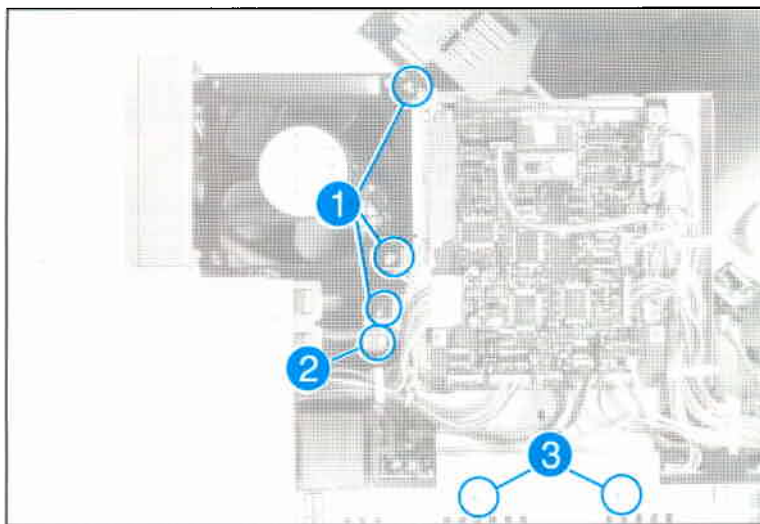


Figure 6-17 Main Fan and Control Board Removal

### Control Board Removal

1. Remove the Right Side Cover, and the Formatter Cage.
2. Remove the connectors from the Control Board, and release the wiring harness from the cable stays.
3. Remove (3) (2 M3X8 and 1 M3X12) screws which hold the Control Board to the Main Body Fan (see Figure 6-17, item 1).
4. Remove (1) M3X6 Panhead screw which holds the Control Panel cable as shown in Figure 6-17, item 2.
5. Remove (2) M3X6 screws that hold the Control Board to the printer frame (See Figure 6-17, item 3).
6. Remove the Control Board.

#### Note

If the original NVRAM is not installed on the new Control Board, all the maintenance units will have to be replaced at the same time. The unique electro-photographic process parameters for each printer are contained on the original NVRAM.

If replacing the Control Board for blown fuses, test the solenoid loads as shown in the Chapter 7 "Aids to Troubleshooting" section. This helps ensure that the new Control Board is not damaged at power up.

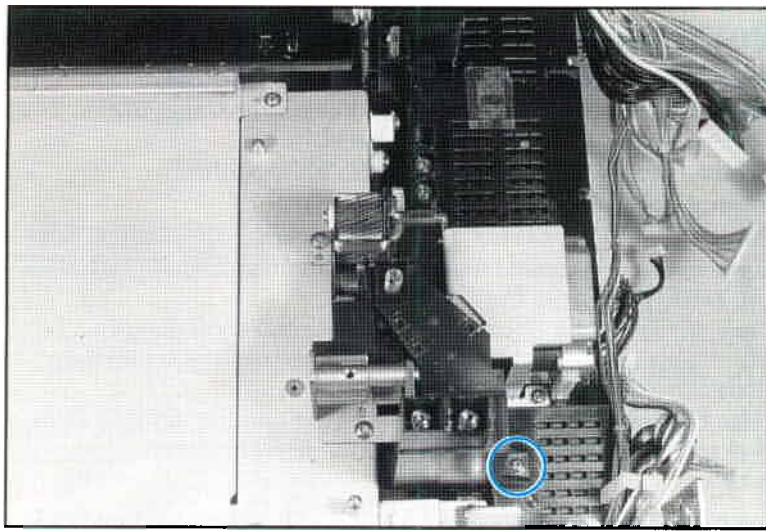
## Main Motor and Gear Cluster Removal

1. Remove the Right Side Cover, the Control Panel, the formatter cage, the Main Body Fan, and the Control Board.
2. Remove the Transfer Assembly and the Fuser.
3. Disconnect the cable from the Main Motor.
4. Remove the (1) M3X4 Panhead screw which holds the HVPS Terminal Block in Place (see Figure 6-19).
5. Slightly tilt the Terminal Block inward then slide it to the right to free it from the HVPS.
6. For the Color LaserJet, remove the (3) M3X4 Panhead screws shown in Figure 6-19, item 2.
7. For the Color LaserJet 5/5M, remove the (2) M3X4 Panhead screws shown in Figure 6-18.



Figure 6-18 Main Motor Removal





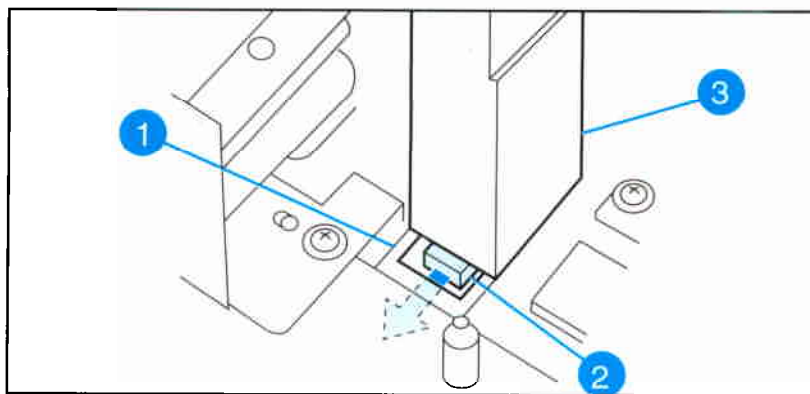
**Figure 6-19** Screw in the HVPS terminal Block

### Installing the HVPS Terminal Block

The High-Voltage Power Supply Terminal Block has a tab that slides into the HVPS.

**Note**

The Top Cover will not close if the HVPS Terminal Block is installed incorrectly. Fully seat the Terminal Block Tab as shown in Figure 6-20.



**Figure 6-20** Installing High Voltage Terminal Block

1. HVPS

2. Tab

3. Terminal Block

## High-Voltage Power Supply (HVPS) Removal

1. Remove the Transfer Belt and the Fusing assembly.
2. Remove the Right Side Cover, the Formatter Cage, the Control Panel, and the Control Board.
3. Remove the Main Body Fan and the Main Motor.
4. Unplug PS6 (see Figure 6-21, item 1).
5. Disconnect the connector on the lower right side of the HVPS.
6. Remove the 2-pin cable from the routing channel of the HVPS and the Cables from the Cable Stays.
7. Remove (3) screws from the High-Voltage Power Supply (see Figure 6-21, item 2). Note that these are longer screws (M3X12 Captive Washer).
8. Slide the HVPS out the right side of the printer, and rotate it to expose the two photosensors. Disconnect the photosensor cables.

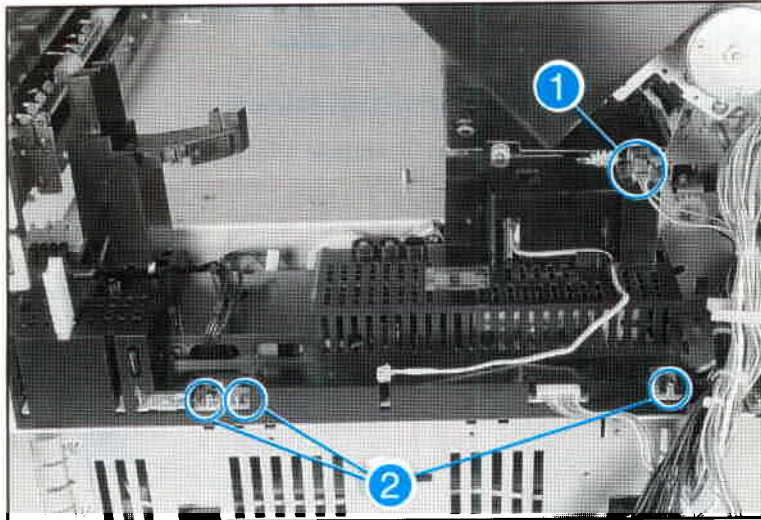


Figure 6-21 High Voltage Power Supply Screws

### Note

The 5-wire high-voltage connector is behind the Control Board. Be careful not to accidentally unplug it when working on the HVPS.



## SL1 (1st paper feed solenoid) Removal

1. Perform all the steps to remove the HVPS.
2. Remove the spring from its post (see Figure 6-22, item 2).
3. Remove (2) M3X4 Panhead screws that hold SL1 (see Figure 6-22, item 1).
4. Carefully remove the paper feed solenoid.

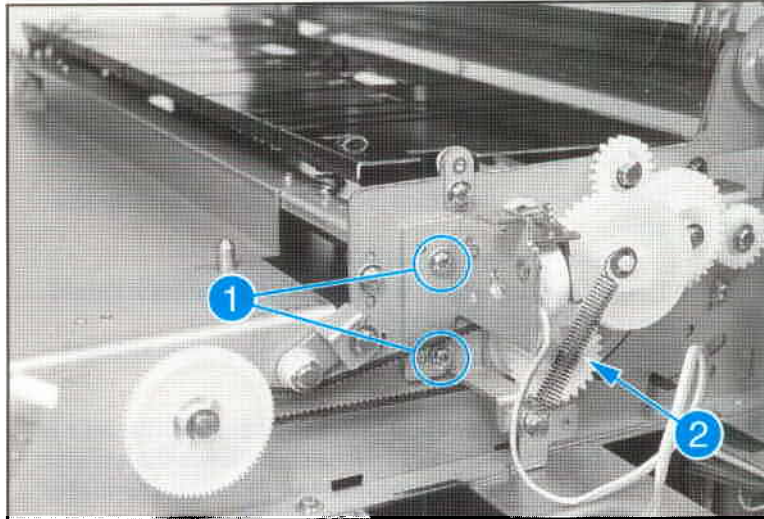


Figure 6-22 SL1 (1st Paper Feed Solenoid) Removal

### Note

Ensure that the belt is routed under the idler roller as shown in Figure 6-22.

---

## Top Assemblies

All screws are M3X6 Trushead screws unless otherwise noted.

### Developer Bias Unit Removal

1. Remove the Developers and the Print Drum.
2. Remove the Formatter Cage and the Control Board.
3. Remove the Top Cover.
4. Release the wiring harnesses on top of the unit, from the two cable stays. Disconnect the white photosensor connector, and the connector to the Developer Bias Unit.
5. Remove the ground screw which holds the green wire to the Printer Frame.
6. Remove (3) screws shown in Figure 6-23.
7. Remove (1) self tapping screw which holds the plastic shield over the gears shown in Figure 6-24.
8. Remove the Developing Bias Unit by sliding it forward and then out.

---

#### Caution

The Developer Bias tabs may break if the unit is not moved forward to free them from the printer frame. Also, be careful not to drop the Developer Bias Unit screws into the HVPS.

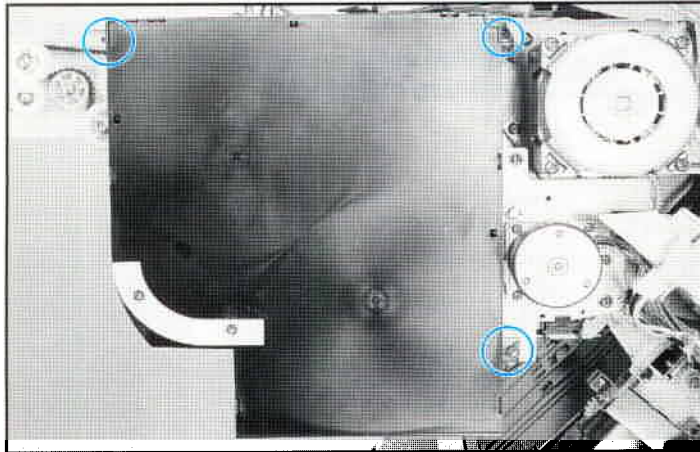


Figure 6-23 Developer Bias Assembly Removal

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**Note**

When replacing the Developer Bias Unit, be certain the plastic support tabs are fully seated into the slots in the sheet metal frame.

---

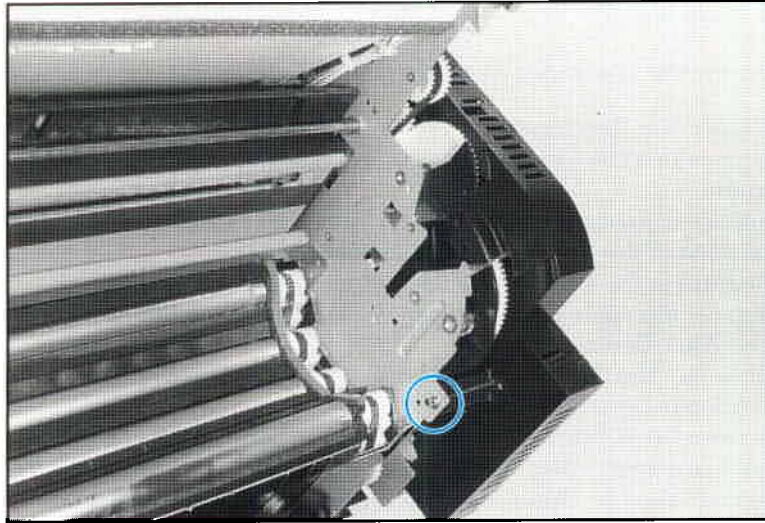


Figure 6-24

Developer Bias Assembly (Inner Section)

---

**Note**

Figure 6-24 shows the location of the Developer Bias Unit screw. The Developers must be removed when installing or removing the Developer Bias Unit.

---

## Developer Drive Assembly Removal

The Developer Drive assembly contains the Developer Drive Assembly Motor (M2), and the Developing Control Motor (M3). Because the Developer Drive Unit is difficult to access, replace it as an assembly.

To remove the Developer Drive assembly:

1. Remove the Developers.
2. Remove the Developer Bias Unit and the high voltage power supply.
3. Remove (2) screws which hold the sheet metal cover plate over the back of the Developer Drive assembly.
4. Disconnect the cables for both motors, and solenoid SL6.
5. Remove the cable harness from the cable stay on the Developer Drive assembly.
6. Close the Top Cover to release the spring pressure on the Developer Drive assembly.
7. Remove (5) M3X4 Trushead screws that hold the Developer Drive assembly. (See Figure 6-25 and 6-26).
8. Support the Developer Drive assembly with both hands and remove the unit.

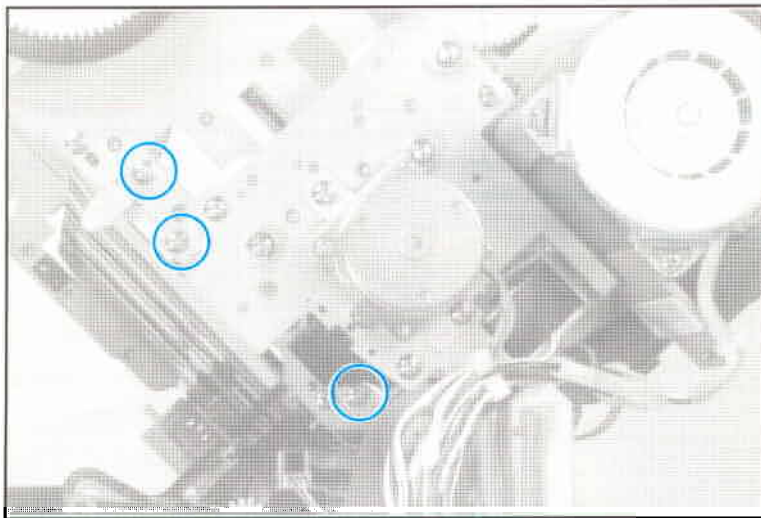


Figure 6-25 Lower Developer Drive Assembly Screws

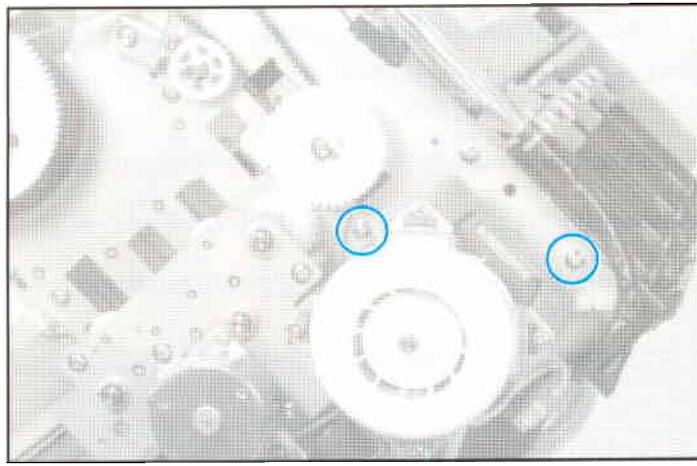


Figure 6-26 Upper Developer Drive Assembly Screws

## Developer Drive Assembly Reinstallation

Note the following checkpoint items when installing the Developer Drive assembly.

1. Remove the Developers when installing the Developer Drive assembly.
2. When installing the Developer Drive assembly, remove the three screws on the Hopper assembly shown in Figure 6-28 and 6-29.
3. Slide the Hopper away from the Developer Drive assembly.
4. Install the Developer Drive assembly making sure it is aligned on the (2) detents and against the Printer Frame before tightening the screws.
5. Slide the Hopper assembly towards the Developer Drive assembly and Install the (3) screws.

### Note

The Developer Drive assembly is spring loaded when the Top Cover is up. Lower the Top Cover when removing or installing the Developer Drive assembly. This removes spring load pressure from the developer gears.

### Caution

Ensure that the bayonet drive for the hopper **select shaft is properly aligned**. If it is **not**, the drive assembly will bind and cause toner supply problems.

## Transfer Cam Solenoid (SL4) Removal

The Transfer Cam Solenoid is behind the Developer Bias Unit. To remove the Transfer Cam Solenoid:

1. Remove the Control Board, the Formatter, and the Developer Bias Unit.
2. Remove the spring from the idler roller shown in Figure 6-27, item 2.
3. Remove (1) M3X4 screw that holds the solenoid (see Figure 6-27, item 1). Remove the solenoid.

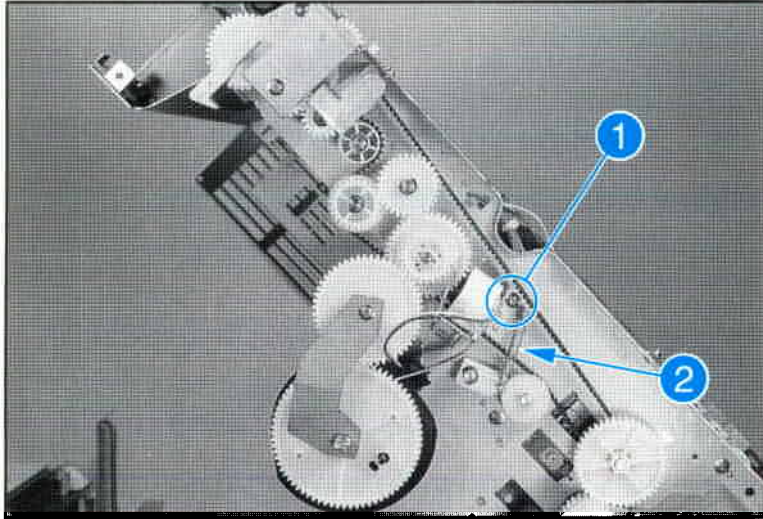


Figure 6-27      Transfer Cam Solenoid (SL4) Removal



## Toner Hopper Assembly Removal

### Caution

Be careful not to kink the feed augers when performing this procedure.

### Note

Wash toner out of your clothes with cold water. Warm water may melt the toner into the fabric.

The Toner Hopper assembly is held with (4) M3X4 Trushead screws as shown in Figures 6-28 and 6-29.

1. Remove the Developers.
2. Remove the Top Cover and the Toner Hopper Cover.
3. Disconnect all the Hopper Sensor Connectors and the Toner Hopper Lock Solenoid Connector.
4. Remove (1) screw from the metering mechanism as shown in Figure 6-28, item 1.
5. Remove (2) screws from the right side of the Hopper assembly as shown in Figure 6-28, item 2.

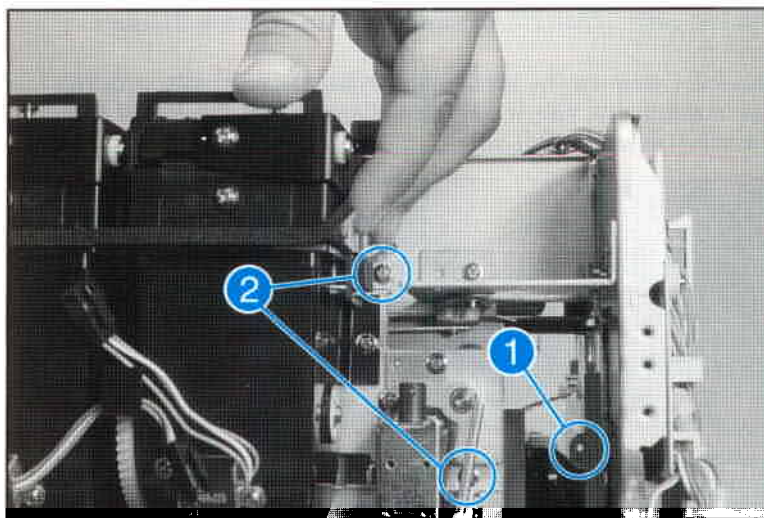
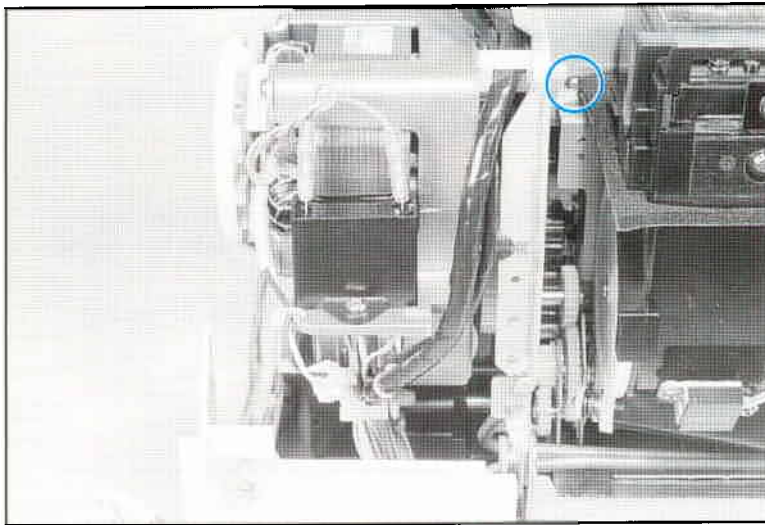


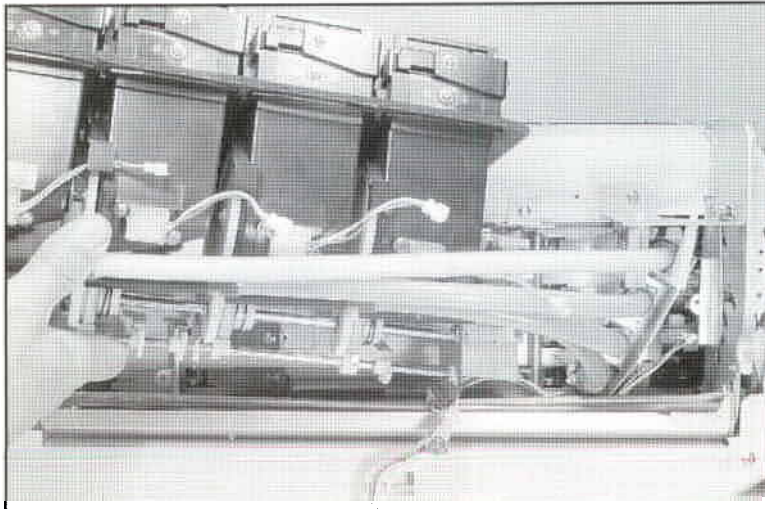
Figure 6-28

Toner Hopper Removal



**Figure 6-29**      **Right Hopper Retaining Screw**

6. Remove (1) screw from the left side of the Hopper assembly, as shown in Figure 6-29.
7. Slide the assembly to the right (the left side of the printer) to free the gears, then lift up and out to remove the Hopper assembly.
8. Carefully remove the metering mechanism. Do not kink the feed augers, and check that the idler gear on the left of the assembly does not fall off.



**Figure 6-30**      **Removing the Hopper Assembly**



## Toner Hopper Reinstallation

1. Carefully insert the metering mechanism.
2. Insert the tabs on the back of the hopper into the slots in the frame of the printer.
3. Gently slide the Hopper assembly to the left (the right side of the printer) being careful not to damage the gear cluster which contacts the Developer Driver assembly.

### Caution

There is a guide pin on the Developer Drive assembly which inserts into a hole on the gear cluster sheet metal. If the guide hole is not aligned with the pin when the Toner Hopper assembly is slid into position, damage to the gear cluster sheet metal will occur.

## Laser/Scanner Assembly Removal

1. Remove the Top Cover.
2. Remove (4) connectors as shown in Figure 6-31, item 1.
3. Remove (4) M3X8 screws that hold the Laser/Scanner assembly (Figure 6-31, item 2.)
4. Remove (1) M3X4 grounding tab as shown in Figure 6-31, item 3.
5. Remove the Laser/Scanner.

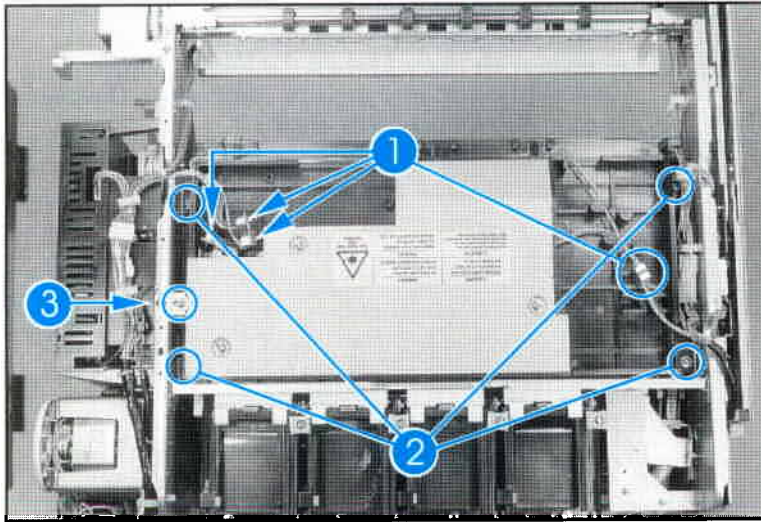


Figure 6-31 Laser/Scanner Removal

## Upper Cooling Fan Removal

1. Remove the the Top Cover.
2. Remove the wiring from the wiring stays in the printer frame, and unplug the cooling fan connector.
3. Remove (2) Trushead screws and (2) self-tapping screws (see Figure 6-32, items 1 and 2).

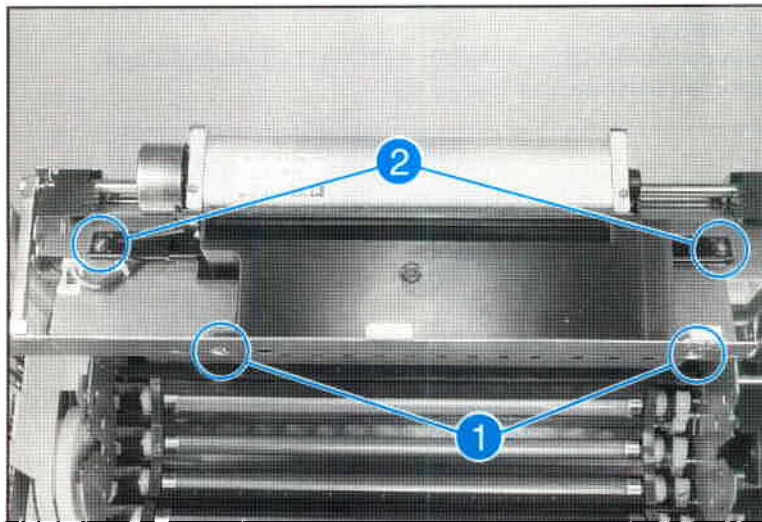


Figure 6-32 Upper Cooling Fan Removal

### Note

The Upper Cooling Fan connector runs inside the upper printer frame. Follow the 3 wires from the fan to the connector.

### Note

When reinstalling the Upper Cooling Fan make sure the fan cable is properly routed. If it is not the Drum will not latch properly.

## Interlock Switch Assembly Removal

Replace the interlock switches as follows:

1. Remove the Top Cover and Color Developer assembly.
2. Remove (4) screws that hold the cam cover as shown in Figure 6-33.
3. Unplug switch connector and remove the switch wiring from the cable guides.
4. Remove (3) M3X4 screws that hold the Interlock Switch assembly as shown in Figure 6-34.



Figure 6-33 Cam Cover Screws

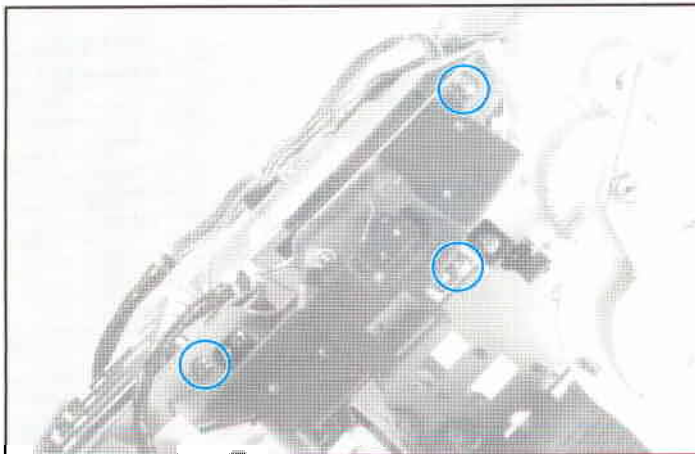


Figure 6-34 Interlock Switch Assembly Screws

---

## Front Assemblies

### Power Supply Tray Removal

1. Remove the Lower Front Cover.
2. Unplug the connectors from the front of the Power Supply Tray and remove the cables from the cable stays. (See Figure 6-35.)
3. Remove (3) screws shown in Figure 6-35.
4. Slide the tray out the front of the printer to access and unplug (4) remaining connectors (only 2 on the Color LaserJet 5/5M).
5. Remove the Power Supply Tray.

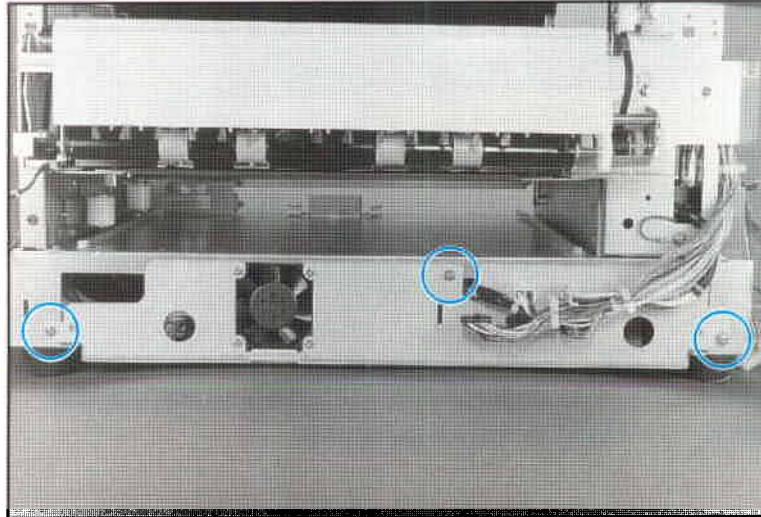


Figure 6-35 DC Power Supply Screws

## Paper Exit Mechanism

To remove the Paper Exit Mechanism:

1. Remove the Control Panel Display.
2. Remove the front cover.
3. Remove (4) M3X4 screws and connector from the Paper Exit assembly (see Figure 6-36).
4. Finally, remove the Paper Exit Mechanism by sliding it up, then out from the printer frame.

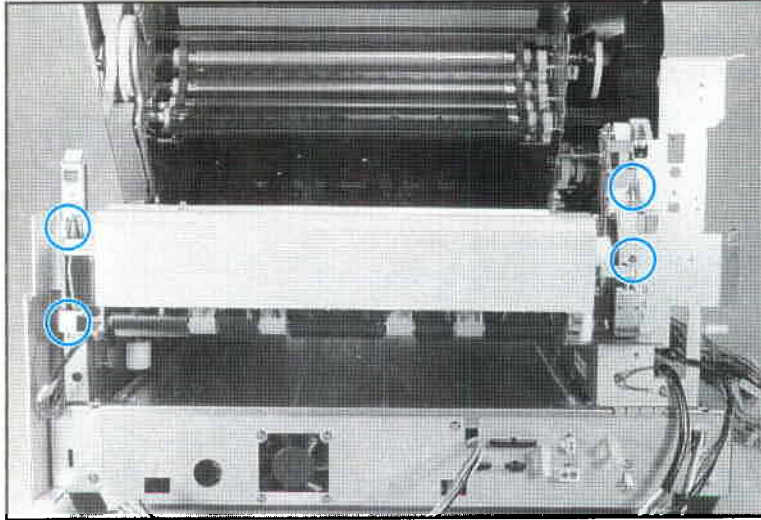


Figure 6-36 Paper Exit Mechanism Removal

### Note

The Paper Exit Mechanism is mounted in slots. Lift the mechanism to free it from the slots.

---

## Internal Assemblies

### Pickup Rollers Removal and Replacement

1. Remove the Right Side Cover.
2. Remove the Control Panel and the Main Body Cooling Fan.
3. Remove the right side assemblies including the High Voltage Power Supply (HVPS).
4. From the right side of the printer, remove the return spring from the first Paper Feed Solenoid, SL1, (see Figure 6-22, item2).
5. Lift the tab for the Keeper Bushing, and remove the Paper Pick Drive gears.
6. From the left side of the printer, release the Keeper Bushing (see Figure 6-37).
7. Shift the Pickup Roller Bar to the right and remove the entire roller assembly with the rollers in place on the bar.

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#### Note

Replace the Roller assembly as a unit. Do not replace individual rollers.

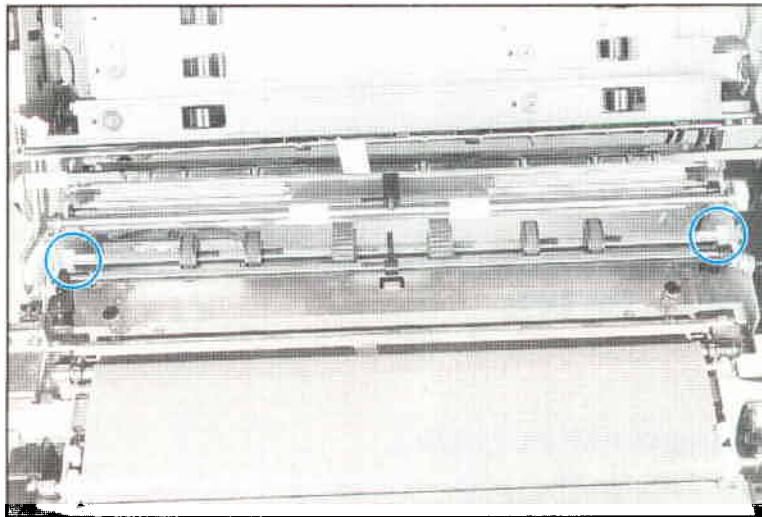


Figure 6-37 Pickup Roller Shaft Keeper Bushing



---

## Miscellaneous Parts Removal

### Replacing the Gears

Most of the gears are individually replaceable, and except for Transfer Cam timing, have no special replacement procedure (see Figure 6-38).

---

#### Caution

Changing the Transfer Cam Drive Gears removes the cam timing. Set the cam timing as shown in the following section before returning the printer to service.

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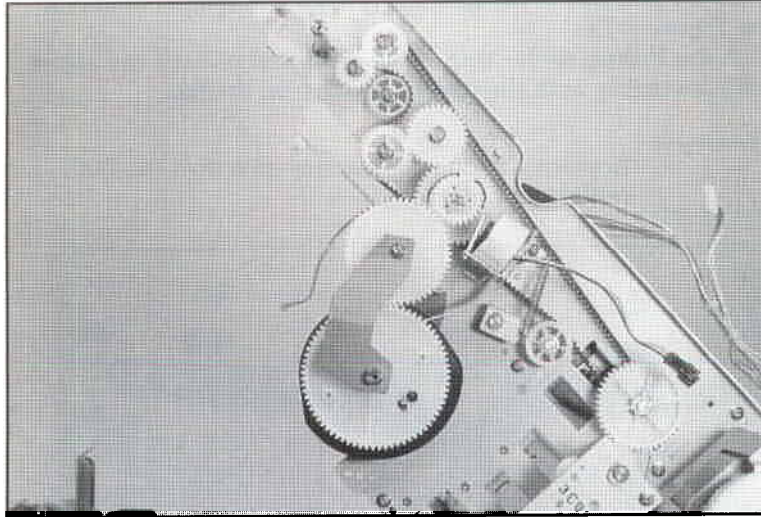


Figure 6-38      Gear Cluster

### Checking the Cam Timing

1. Enter the Status/Test mode as described in “Aids to Troubleshooting” in Chapter 7. The printer should go to the position shown in Figure 6-39, position 1.
2. Trip the solenoid manually. The printer should go to the position shown in Figure 6-39, position 2.
3. With each successive tripping of the solenoid, the printer should advance to each of the stations shown in Figure 6-39.



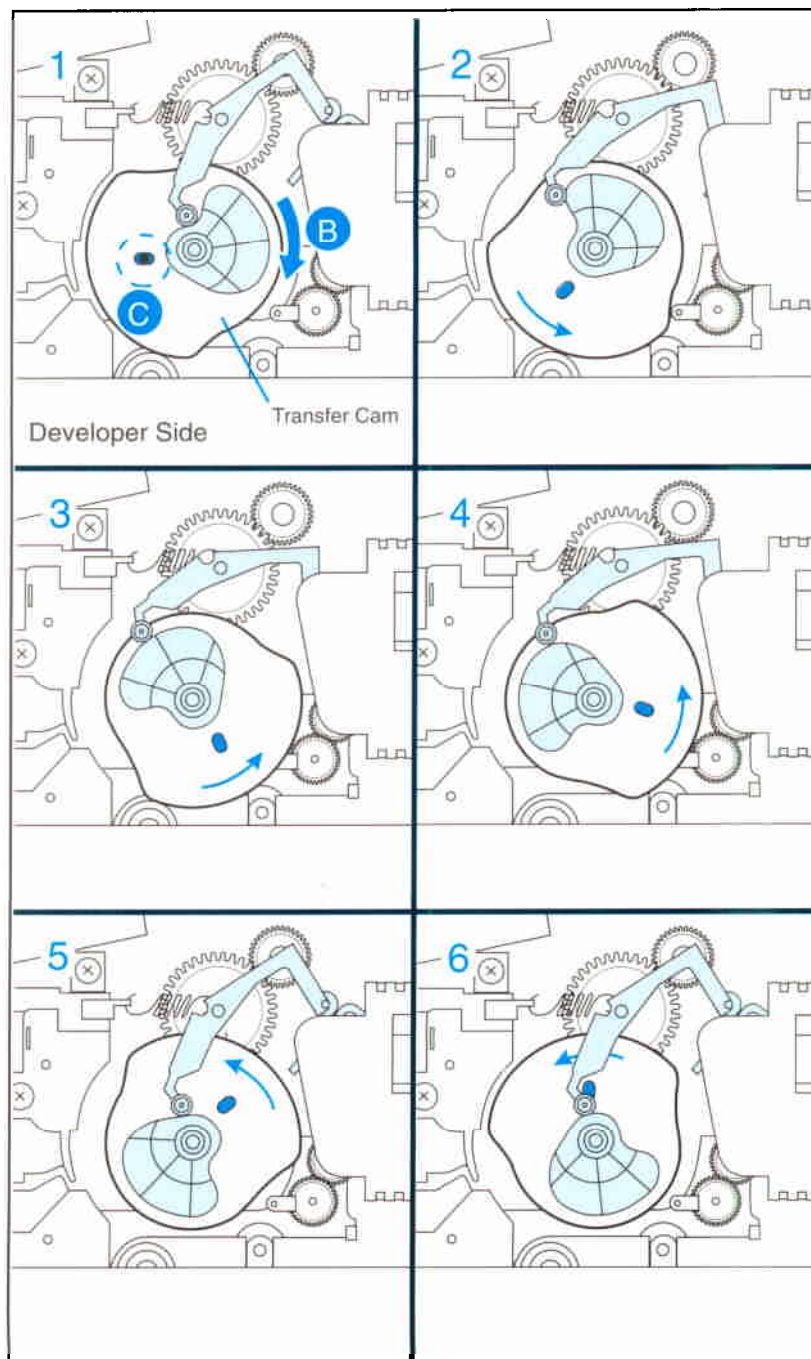


Figure 6-39 Six Positions of the Transfer Cam

## Verifying the Cam Timing

### Developer Side

1. Assure Cam solenoid is in proper position.
2. Remove the backlash (free play) by rotating the Transfer Cam clockwise (Figure 6-39, item B) and verify hole alignment (Figure 6-39, item C).

### Power Supply Side

1. Rotate AC Motor manually while releasing the Clutch Solenoid by hand until the holes are aligned to the nearest possible position.
2. Ensure the Cam Solenoid is engaged with the short lobe of the Cam Clutch (Figure 6-40, item A).
3. If not, briefly disengage the solenoid arm from the Cam Clutch and rotate the motor counterclockwise until this position is achieved and the holes are as closely aligned as possible.
4. Remove the backlash (free play) by rotating the Transfer Cam counterclockwise (Figure 6-40, item B).
5. The hole in the Transfer Cam should align perfectly with the hole in the sheet metal (Figure 6-40, item C).

## Setting the Cam Timing

If the gears are not properly timed perform the following:

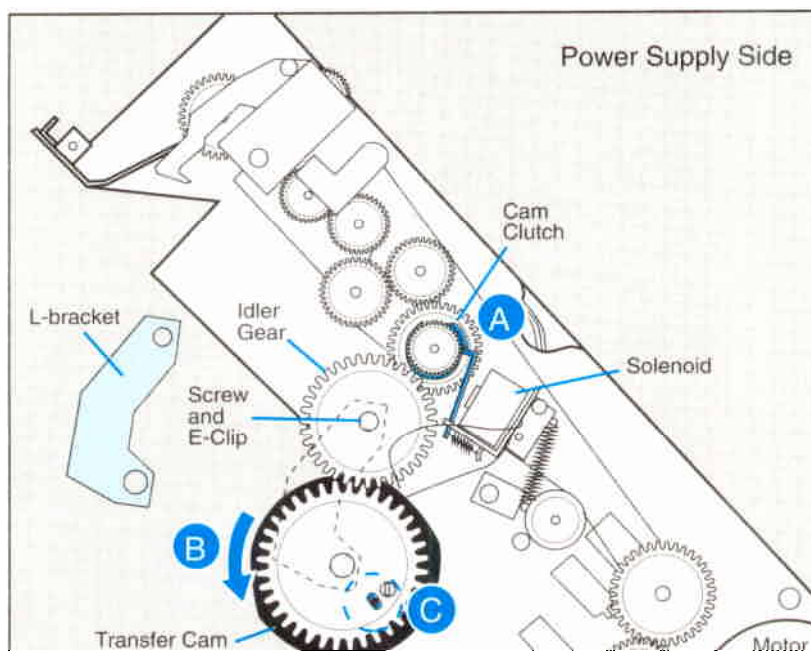
### Power Supply Side

1. Assure Cam solenoid is in proper position.
2. Remove the screw from the idler gear shaft and lift off the L-bracket.
3. Take off the e-clip retaining the idler gear and carefully slide it outward until the teeth disengage.
4. Slowly rotate the Transfer Cam until the holes align and slide the idler gear back into position.
5. Take out the backlash and verify alignment.
6. Replace the e-clip, L-bracket and screw.

### Developer Side

1. Assure Cam solenoid is in proper position.
2. Remove the e-clip retaining the transfer cam.
3. Carefully slide the Transfer Cam outward until the teeth disengage.
- 4.
- 5.

6. Slowly rotate the Transfer Cam until the holes align and slide it back into position.
7. Take out the backlash and verify alignment. Replace the e-clip when complete.



**Figure 6-40**      **Setting the Cam Timing**



# Troubleshooting

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## Chapter Contents

Introduction . . . . .	7-5
Pre-Troubleshooting Checklist . . . . .	7-6
Basic Troubleshooting Process . . . . .	7-7
Printer Error Troubleshooting . . . . .	7-9
Printer Messages . . . . .	7-9
Blank Display . . . . .	7-18
11.4 Front Tray Empty . . . . .	7-18
12 Close Top or Side Door . . . . .	7-20
14.6 Replace Coating Pad Kit (CLJ) . . . . .	7-25
14.6 Replace Coating Kit (CLJ5/5M) . . . . .	7-25
17.1 and 17.2 Install Developer . . . . .	7-25
17.4 Install Fuser . . . . .	7-26
17.6 Install Collection Box . . . . .	7-27
17.7 Remove Drum Cover . . . . .	7-27
17.8 Reinstall Drum . . . . .	7-28
17.9 Reinstall Fuser . . . . .	7-29
18.1 Clean Transfer Corona Wire . . . . .	7-29
18.2 Reinstall Drum . . . . .	7-30
18.3 Reinsert Developers . . . . .	7-31
18.4 Clean Transfer Corona . . . . .	7-32
18.5 and 18.6 Reinsert Developers . . . . .	7-32
19.X User Maintenance . . . . .	7-35
24 Busy Moving Toner . . . . .	7-37
50.X Fuser Service . . . . .	7-38
52.1 Engine NVRAM Error . . . . .	7-38
52.2 Engine NVRAM Error . . . . .	7-38
53 Laser Error . . . . .	7-39
54.X Engine Error/Service Error . . . . .	7-39
54.4 Cam Home Position Sensor . . . . .	7-44
54.5 Developer Home Position Sensor . . . . .	7-47

55.X Engine Cmd Service Error . . . . .	7-47
56 Laser Index Service . . . . .	7-48
57 Fan Motor Service Error . . . . .	7-48
59 Alternate Feed Service . . . . .	7-48
60.X SIMM Service . . . . .	7-49
61.X SIMM Compatibility . . . . .	7-49
62.X Internl ROM Service . . . . .	7-50
63.0 DRAM Service . . . . .	7-50
63.X SIMM Error . . . . .	7-50
64.X DMA Timeout Error . . . . .	7-51
66.1 Jam Sensor Service . . . . .	7-51
68 NVRAM Error . . . . .	7-53
68 NVRAM Service Error . . . . .	7-53
68 Cold Reset . . . . .	7-53
79 Service (XXXX) . . . . .	7-53
80 Service (0XXX) . . . . .	7-54
89 Service (XXXX) . . . . .	7-54
Paper Path Troubleshooting . . . . .	7-55
Paper Jams . . . . .	7-55
Print Media Checklist . . . . .	7-57
Image Formation Troubleshooting . . . . .	7-59
Print Density Test and Color Checks . . . . .	7-59
Understanding Color Variations . . . . .	7-59
Common Causes of Color Variation . . . . .	7-60
Carry-Out (loose carrier) . . . . .	7-62
Image Defects . . . . .	7-63
Incorrect Registration (Late or Early Print) . . . . .	7-64
Improperly Sized Image (PostScript only) . . . . .	7-69
Blank or Partially Blank Page . . . . .	7-71
Horizontal White Lines (in one color) . . . . .	7-73
Horizontal Lines (all colors) . . . . .	7-75
Ring Marks . . . . .	7-76
Wavy Characters . . . . .	7-78
Cleaning Blade Failure . . . . .	7-79
Leading or Trailing Edge Smear . . . . .	7-82
Poor Fusing . . . . .	7-83
Ghosting . . . . .	7-84
Black or Dark Brown/Orange Page . . . . .	7-85
Black/Brown/Orange Bands . . . . .	7-85
Yellow or Black Streaks . . . . .	7-87
Background Toner Scatter . . . . .	7-89
Speckled Print . . . . .	7-91
Mottled Process Colors (Poor Transfer) . . . . .	7-92

Stray Toner . . . . .	7-95
Large Period Banding . . . . .	7-97
Medium Period Print Banding . . . . .	7-97
Small Period Print Banding . . . . .	7-97
Overhead Transparency Defects . . . . .	7-99
Dark Yellow Print . . . . .	7-101
Repetitive Defects . . . . .	7-103
Repetitive Defect (Paper) . . . . .	7-105
Repetitive Defect (Transparency) . . . . .	7-106
Communications Troubleshooting . . . . .	7-107
HP Network Interface Support . . . . .	7-107
Testing Network Configurations . . . . .	7-108
Verifying Communication with a BiTronics Connection . . . . .	7-109
Verifying PostScript Printing . . . . .	7-109
PJL commands . . . . .	7-110
Aid to Troubleshooting . . . . .	7-113
Troubleshooting by Part Swapping . . . . .	7-113
Voltage Checks . . . . .	7-114
Understanding the Self Test Printout . . . . .	7-115
Cold Reset . . . . .	7-117
Error Log . . . . .	7-118
Extended Diagnostics . . . . .	7-119
Service Mode . . . . .	7-123
Register Adjust Mode . . . . .	7-126
Status/Test Mode . . . . .	7-129
Humidity Sensor Test . . . . .	7-134
15 Engine Test . . . . .	7-135
Half Self Test . . . . .	7-137
Drum Rotation Functional Test . . . . .	7-138
Color Balance Adjustment	
(Color LaserJet 5/5M) . . . . .	7-140
Solenoid and Sensor Locations . . . . .	7-143
Solenoid . . . . .	7-144
Sensors . . . . .	7-145
Main Wiring Diagram (CLJ) . . . . .	7-150
Main Wiring Diagram (CLJ 5/5M) . . . . .	7-151





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## Introduction

This troubleshooting section assumes basic understanding of the color laser printing process. Chapter 5 explains each of the mechanical assemblies of the printer, and their relation to the color laser printing process. Do not perform any of these troubleshooting processes without fully understanding the function of each mechanism.

This chapter contains the following sections:

- **Pre-troubleshooting Checklist** contains information on common items which may inhibit proper printer operation.
- **Printer Error Troubleshooting** explains each control panel display message, and suggests recommendations for clearing the cause of each message. When the printer message indicates a failure whose root cause is not obvious, use this section, together with the “Aids to Troubleshooting,” later in this chapter to solve the problem.
- **Paper Jam Troubleshooting** provides techniques to solve paper feed problems. This section explains print media checks, troubleshooting jams, and the differences between jams caused by media and those caused by the printer.
- **Image Formation Troubleshooting** provides print samples to help identify print defects, and suggests methods for solving the problem.
- **Communications Troubleshooting** helps isolate the problem to the printer hardware, printer or network configuration, or to the software application.
- **Aids to Troubleshooting** provides tools to help isolate the cause of many printer failures. This section details Extended Diagnostics, Service Mode, and other troubleshooting tools and techniques.

---

## Pre-Troubleshooting Checklist

Before troubleshooting any specific printer problem ensure that:

- Any overdue maintenance is performed.
- The maintenance units are within their rated life.

---

### Note

The customer is responsible for ensuring the maintenance units are in good condition.

- The printer has been maintained on a regular basis as described in Chapter 4. Note the location of spilled or accumulated toner before troubleshooting. Toner contamination may be an indication of another problem.
- The customer is using media as specified in the *User's Manual*.
- The media is stored correctly and within environmental limits.
- The printer is installed on a solid, level surface.
- The line voltage does not vary more than 20% from the nominal rated value specified on the Power Rating Label. Suspect this problem if large motors are used near the printer such that they might cause temporary voltage changes.
- The operating environment is within the specified parameters listed in Chapter 1 of this manual.
- The printer is not exposed to ammonia gas such as that produced by diazo copiers or office cleaning materials.
- The printer is never exposed to direct sunlight.
- Any non-HP components (toner, typeface cartridges, memory boards, and MIO cards) are removed from the printer.
- Printer hardware or software configuration has not changed, or that the problem is not associated with any specific software. Contact the Customer Support Center for software-related problems (see Chapter 1).
- The problem is not related to any network configuration changes. Remove the printer from the network and ensure the failure is associated with the printer before beginning troubleshooting.

---

### Warning!

**Always unplug the printer before service.** Current is present in the Main Body Cooling Fan (M4), the Noise Filter Board, the AC Driver Board, and the DC Power Supply whenever the printer is plugged in.

---

## Basic Troubleshooting Process

The troubleshooting flowchart shown in Figure 7-1 highlights the process which most quickly solves printer hardware problems. During its power ON sequence, the printer verifies that its components are operating correctly. If the printer fails to power ON correctly, use the steps shown to troubleshoot the failure.

Aids to Troubleshooting

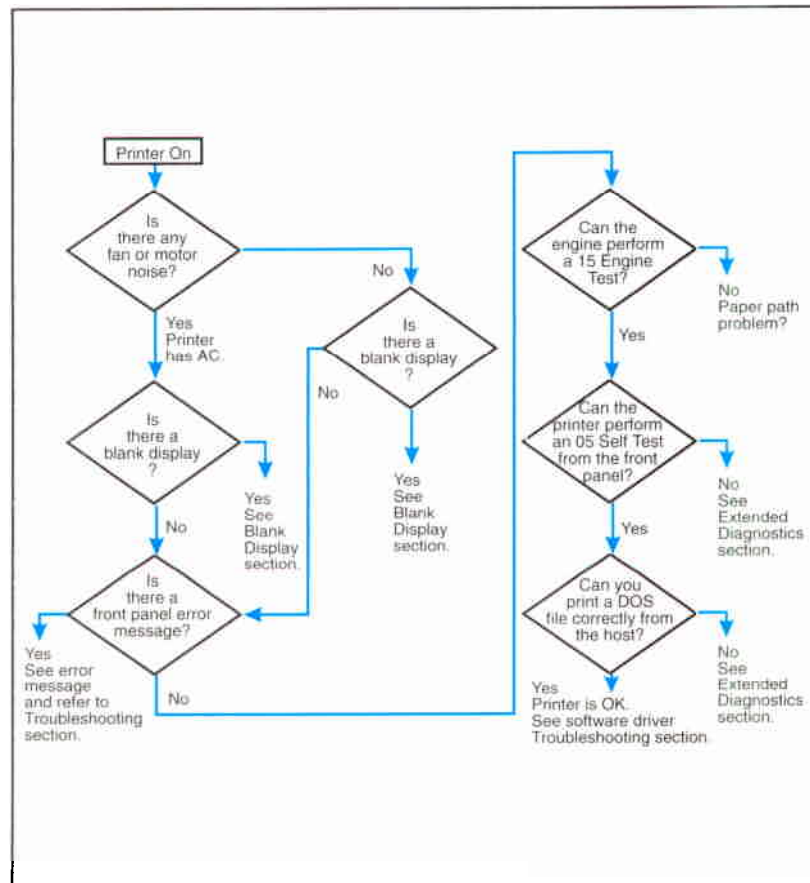


Figure 7-1 Basic Troubleshooting Flowchart

The following table identifies the fuses on the Control Board for both the HP Color LaserJet printer and the HP Color LaserJet 5/5M printer. The table also lists what is in line with the fuse and the most likely failure if one is blown (open). Use an ohmmeter to check the status of these fuses. Since the fuses cannot be replaced individually, ensure that the root cause of the blown fuse is identified and resolved before replacing the Control Board.

**Table 7-1 Control Board Fuses**

Name	Drives	Fault Indicators
F1	5V to and from the control board	
F2	24V to and from the control board	
ICP1	Cam Solenoid (SL4) and 1st Paper Feed Solenoid (SL1)	13.4 Clear Front Tray Input Jam (will not pick paper from paper tray)
ICP2	Toner Supply Solenoid (SL3) and Registration Plate Solenoid (SL2)	Will generate either a 54.5 Developer Home Position Error or 13.5 Paper Jam.
ICP3	Rear Feed Unit Motor (M7)	13.6 Clear Rear Tray Input Jam
ICP4	Developing Control Motor (M3)	54.5 Developer Home Position Sensor Error
ICP5	Face Up/Down Solenoid (SL5) and Toner Hopper Lock Solenoid (SL6)	Paper will only exit to either the top or bottom tray, or toner hopper lock fingers will not open.
ICP6	Paper Exit Guide Solenoid (SL7)	May cause smearing on transparencies or wrinkled paper as they exit fuser

# Printer Error Troubleshooting









## Printer Messages

The following table lists the display messages for the printer. The messages are listed in ascending order. Generally service messages are indicated by numbers greater than 50, but many service calls (such as paper jams which are 13.X errors) are due to lower numbered messages.

Use this table for quick information about the printer message and failure. Hardware failures are described in greater detail after the printer message table. Some hardware failures can be isolated with the Service Mode. This table, together with the detailed information on the specific failure, provide the first steps in troubleshooting.

Table 7-2 Printer Messages

Display Message	Display Message Meaning/Suggested Action
[Blank Display]	This indicates the 5Vdc may be missing or the vacuum in the display is lost. Check the fuses, connectors and listen for running fans. Check the voltage at the test connector as shown in "Aids to Troubleshooting." Reseat the Formatter.
TONER OUT CMYK ADD [color]	The printer is out of a specific color toner and will not print. Load <i>only</i> the toner color indicated on the display.
INSTALLING NEW DEVELOPER	This message indicates that the new developer sequence has started. The installation sequence lasts about three minutes for the Black Developer, and nine minutes for the Color Developer.
INITIALIZING NVRAM	This message occurs when NVRAM must be initialized because one or more values are incorrect. After the initialization is complete, the printer self test message appears. NOTE: This message should only appear at power ON. It should never appear during normal printer operation.
TONER LOW OFF LINE TO FILL	The printer detected a low toner condition for one or more colors of toner. Take the printer off-line to display which color is low and to fill the Toner Hopper.
TONER LOW OPENING INTERLOCK	The printer is opening the interlock mechanism for the empty Toner Hopper.
CONFIG LANGUAGE	This message occurs when <b>Enter</b> is held while powering ON the printer. When the power ON self test completes, the display language menu is available for configuration. This message is not localized.
ERROR LOG	This message is displayed when <b>Form Feed</b> is held while power-cycling the printer. When the power ON self test completes, the error log is available for use. See the "Aids to Troubleshooting" section for instructions on entering the Error Log Mode. This message is not localized.

Display Message	Display Message Meaning/Suggested Action
DRUM INST. DRUM NUMBER={XXX}	This message indicates that the printer has detected a new drum and is waiting for the user to input the number stamped on the drum unit. Use the  and  keys to input this information. This number [XXX] is a whole number between 1 and 127.
PLEASE VERIFY DRUM NUMBER={XXX}	This message indicates the user pressed  after inputting the drum number. The number [XXX] may be corrected if necessary, by using the  and  keys to change the displayed number.
DEMO MODE	This message is displayed when  is held while power-cycling the printer. When the power ON self test completes, and the demo SIMM is installed, the printer will be in demo mode. This message is not localized.
EXTENDED DIAGNOSTICS	The Extended Diagnostic test exercises the Formatter's ability to communicate across the MIO and with the memory.
POWERSAVE MODE	This message indicates the printer is in the reduced energy consumption (sleep) mode.
FE FONT CART ERR CYCLE POWER CLJ ONLY	This message indicates the font cartridge was removed while the printer was on-line. This error occurs whether or not the cartridge was being accessed. Power cycle the printer to clear this error.
REINSERT TOP/BOTTOM/BOTH FONT CARTRIDGE CLJ	This error indicates that any or all of the font cartridges were removed while the printer was off-line and contained buffered data. Clear this error by reinserting the specified cartridge(s) and pressing  .
SWITCHING TO [personality]	The printer is in the process of switching between printer languages. [Personality] is replaced with PCL or PostScript depending on the language selected from the control panel.
MIO CONFIG MENU	The MIO configuration menu is currently displayed.
NO FONTS TOP/BOTTOM/BOTH FONT CARTRIDGE CLJ	This message indicates that any or all of the indicated cartridge(s) could not be read by the printer. Clear this error by reinserting the specified font cartridge and pressing  . If the message persists, the cartridge(s) are bad and should be replaced.
PCL CONFIG MENU	The PCL Configuration menu is currently displayed.
PCL PRINT MENU	The PCL print menu is currently displayed.
PCL TEST MENU	The PCL test menu is currently displayed.
PRESS ON LINE TO CONTINUE	The printer detected a new developer and is ready to start a new developer installation procedure.
PS CONFIG MENU	The PostScript Configuration Menu is currently displayed.
PS PRINT MENU	The PostScript Print Menu is currently displayed.
PS TEST MENU	The PostScript Test Menu is currently displayed.
00 PCL READY	The printer is ready for use in the PCL mode.
00 PS READY	The printer is ready for use in the PS mode.
02 PCL WARMING UP	The print engine (Fuser) is warming up. This may take up to three minutes.

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## 7-10 Troubleshooting



Display Message	Display Message Meaning/Suggested Action
06 PRINTING PS DEMO PAGE	Printer is printing a PostScript Demo Page. After the Demo Page is printed, the printer returns to the ready state, but remains off-line. Press <b>On Line</b> to return the printer on-line.
06 PRINTING PS SELF TEST	The printer is running a self test in PostScript mode. When the test is complete the printer returns to the ready state, but remains off-line.
06 PRINTING PS TYPEFACES	Printer is printing a PostScript font list. After the font list is printed, the printer returns to the ready state, but remains off-line. Press <b>On Line</b> to return the printer on-line.
10 PRESS RESET TO ACTIVATE	This message appears when the user changes, then exits the menu with buffered data, and/or temporary macros or fonts present in memory. This message also appears when the default system (SYS=) item of the config menu is changed. Press <b>On Line</b> to continue without resetting, or press <b>Reset</b> to activate changes.
11.X FRONT TRAY EMPTY	The paper tray is not installed, or the tray is empty. Load paper. Check the Paper Size Detect Board. Check that switch actuators (on the tray) are not damaged. (10,15)
11.X REAR TRAY EMPTY	The Rear Feed Unit is installed and is empty. Put paper in the Rear Feed Unit. Remove the RFU and check that the connector is not damaged. Remove and reseat the RFU if paper is present. (13)
12 CLOSE TOP OR SIDE DOOR	The printer's Top or Side Door is open or the door sensor has failed. Close the Top or Side Door or replace the door sensor. Any of the door interlock switches may be defective. (41)
13.1 CLEAR DRUM WINDING JAM	The Drum Wrap Sensor detects media wrapped around the Print Drum. The media may fall out of the sensor when the top cover is opened. (47)
13.2 CLEAR OUTPUT JAM	Print media is jammed in the Exit assembly because it failed to clear the Exit Sensor (PS1) in the allotted time. (22)
13.4 CLEAR FRONT TRAY INPUT JAM	The printer detects a paper jam in the front tray area. Paper failed to arrive at PS7 within the allotted time after SL1 (the Paper Feed Solenoid) was engaged. Clear the front tray area or repair the sensor. (20, 25)
13.5 CLEAR FUSER JAM (CLJ) OR 13.5 CLEAR PAPER JAM (CLJ5)	Paper did not arrive at PS1 (exit sensor) in the allotted time. Check that PS1 is free throughout its entire range of travel, and check that the Transfer Assembly is installed correctly. (20, 22, 25)
13.6 CLEAR REAR TRAY INPUT JAM	The printer detects paper in the rear input area. The sensor (PS4) did not activate in the allotted time after M7 started. Clear the Rear Feed Unit or repair the sensor. Check that PS4 is not blocked. (13, 21)
13.7 CLEAR REAR TRAY PAPER JAM	The printer detects a paper jam at the rear input area. This message indicates that the paper was picked, but did not arrive at the Registration Area (PS7), in the allotted time. (20, 21)
13.8 CLEAR PAPER JAM	Paper is jammed in the paper registration area. Open the printer and remove the jammed paper. Paper may be on PS7 at power up. Check that PS7 is free. (20, 25)
14.5 REPLACE COLLECTION BOX	Toner Collection Box is completely full. The printer remains off-line until the Collection Box is replaced. (55)
14.6 REPLACE COATING PAD KIT (CLJ)	The maximum oil pad life has expired. The printer will continue to print when returned on-line. Replace the oil pad as soon as possible. The Fuser and main drive may be damaged if the oil pad and cleaning roller are not replaced. If new style fusing assembly, with purple handles, has been installed, follow instructions for 14.6 replace coating kit. (67)
14.6 REPLACE COATING KIT (CLJ5)	The maximum coating roller life has expired. The printer will continue to print when returned on-line. Replace the coating roller as soon as possible. The Fuser and main drive may be damaged if the coating roller and cleaning roller are not replaced. If new style fusing assembly, with purple handles, has been installed, follow instructions for 14.6 replace coating kit. (67)

Display Message	Display Message Meaning/Suggested Action
16.5 REPLACE COLLECTION BOX	The Excess Toner Collection Box is full. The printer will print a few more pages, but the Collection Box must be changed soon. Clear the message by replacing. (55)
17.1 INSTALL BLACK DEVELOPER	Black Developer is missing or not detected. Install or reinsert the Black Developer.
17.2 INSTALL COLOR DEVELOPER	Color Developer is missing or not detected. Install or reinsert the Color Developer.
17.4 INSTALL FUSER	The Fuser is not installed or is not detected. Install or reseal the Fuser. Check the Fuser connector.
17.6 INSTALL COLLECTION BOX	The drum cartridge or Collection Box is missing or is not detected. Install the drum cartridge or Collection Box. (54)
17.7 REMOVE DRUM COVER	The Print Drum cover is still installed or is detected. Remove the drum cover or clear the drum wrap sensor. If the error persists, use the Status/test checks (shown in the "Aids to Troubleshooting" section) to test the Drum Wrap Sensor. (47)
17.8 REINSTALL DRUM	This message indicates the Drum Winding Sensor output is abnormal while printing. (47)
17.9 REINSTALL FUSER	The Fuser did not warm up correctly. Reseat the Fuser. If the message persists, refer to "17.9 Reinstall Fuser," later in this chapter. (45)
18.1 CLEAN TRANSFER CORONA	The paper charging brush or the bias roller in the transfer assembly is arcing. Power cycle the printer.
18.2 REINSTALL DRUM	The Neutralizing Corona may have arced. Clean the printer. If the message persists, refer to "18.2 Reinstall Drum," later in this chapter.
18.3 REINSERT DEVELOPERS	Developer bias high voltage power supply leak.
18.4 CLEAN TRANSFER CORONA	High voltage leak in the transfer belt, Print Drum, or HVPS. Power cycle the printer.
18.5 REINSERT DEVELOPERS	The Black Developer is not rotating. Reinsert the Black Developer. (08)
18.6 REINSERT DEVELOPERS	The color developer is not rotating. Reinsert the Color Developer. (08)
19.1 BLACK DEVELOPER USER MAINTENANCE	The maximum Black Developer life has expired. The printer will continue to print when put on-line. Replace the developer as soon as possible.
19.2 COLOR DEVELOPER USER MAINTENANCE	The maximum Color Developer life has expired. The printer will continue to print when returned on-line. Replace the developer as soon as possible.
19.3 DRUM USER MAINTENANCE	The maximum Print Drum life has expired. The printer will continue to print when returned on-line. Replace the Print Drum as soon as possible.
19.4 FUSER USER MAINTENANCE	The maximum Fuser life has expired. The printer will continue to print when returned on-line. Replace the Fuser as soon as possible. The Main Drive may be damaged if the Fuser is not replaced.
19.5 TRANS BELT USER MAINTENANCE	The maximum transfer assembly life has expired. The printer will continue to print when put on-line. Replace the transfer assembly soon.

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## 7-12 Troubleshooting



Display Message	Display Message Meaning/Suggested Action
20 MEMORY OVERFLOW	This message indicates that more data has been received from the host than fits in internal memory. Press <a href="#">On Line</a> to continue printing. Only the data that fits in printer memory is printed. If the message persists, install more memory.
21 MEMORY OUT	This message indicates the printer has run out of memory. Imaging the current job cannot continue until the engine clears memory. Press <a href="#">On Line</a> to clear memory. This results in data loss. If this error persists, install additional memory.
21 MIO INITIALIZING	The MIO card cannot accept data because it is initializing. Print the self test page for more information. This message is generated by the MIO card, and may indicate a defective MIO card. If the message persists, reseat, then replace the MIO card.
22 I/O CONFIG ERROR	The computer is not obeying the pacing mechanism of the MIO link. This causes the printer's receiving buffer to overflow during a busy state.
23 MIO NOT READY	The MIO card cannot accept data. Print the self test for more information. This message is generated by the MIO card, and may indicate a defective MIO card. If the message persists reseat the MIO card, and ensure it is properly connected to the network. Finally, replace the MIO card.
24 BUSY MOVING TONER	This message indicates that the printer is moving toner from the hoppers to the developers. This message clears when the developer has the correct toner concentration. If the message persists, see "24 Busy Moving Toner," later in this chapter. (01, 06, 52)
30 POSTSCRIPT ERROR [XX]	The printer encountered a PostScript error indicated by [XX]. Press <a href="#">On Line</a> to continue. The current job is canceled.
30 POSTSCRIPT ERROR 00	An attempt was made to add an item to a dictionary that is full. This may be a driver incompatibility problem. Select a different PostScript driver and re-send the print job.
30 POSTSCRIPT ERROR 01	An attempt was made to place too many dictionaries on the dictionary stack. This may be a driver incompatibility problem. Select a different PostScript driver and re-send the print job.
30 POSTSCRIPT ERROR 02	An attempt was made to remove more dictionaries from the dictionary stack than were available. This may be a driver incompatibility problem. Select a different PostScript driver and re-send the print job.
30 POSTSCRIPT ERROR 03	The execution stack is too large. Procedure invocation is nested deeper than PostScript allows. This may be a driver incompatibility problem. Select a different PostScript driver and re-send the print job.
30 POSTSCRIPT ERROR 04	An attempt was made to access an array, dictionary, file, or string object incorrectly.
30 POSTSCRIPT ERROR 05	An incorrect exit was executed.
30 POSTSCRIPT ERROR 06	An incorrect access string specification to the file operator occurred.
30 POSTSCRIPT ERROR 07	The operand to make font or set font is not a well formed font dictionary.

Display Message	Display Message Meaning/Suggested Action
30 POSTSCRIPT ERROR 08	An incorrect restore was attempted.
30 POSTSCRIPT ERROR 09	An error occurred during the execution of one or more of the file operators.
30 POSTSCRIPT ERROR 10	A PostScript implementation limit was exceeded.
30 POSTSCRIPT ERROR 11	An operator requiring a current point was exceeded while the current path was empty.
30 POSTSCRIPT ERROR 12	A numeric operand's value is out of range.
30 POSTSCRIPT ERROR 13	An attempt was made to push too many objects on the operand stack.
30 POSTSCRIPT ERROR 14	An attempt was made to pop an item from an empty operand stack.
30 POSTSCRIPT ERROR 15	The PostScript scanner encountered text that does not conform to the PostScript syntax rules.
30 POSTSCRIPT ERROR 16	The PostScript interpreter timed-out waiting for the user to manually feed paper, waiting for data from the computer, or because a job took too long to complete.
30 POSTSCRIPT ERROR 17	An operand was encountered that is not the correct type, such as a number being found when a string is required.
30 POSTSCRIPT ERROR 18	A name was encountered that cannot be found since it was not previously defined.
30 POSTSCRIPT ERROR 19	A file identified by a name string operand of the file or run operators cannot be found or opened.
30 POSTSCRIPT ERROR 20	Overflow, underflow, or a meaningless result of a numeric calculation (such as division by zero) occurred.
30 POSTSCRIPT ERROR 21	A cleartomark or counttomark operator could not find the required mark on the stack.
30 POSTSCRIPT ERROR 22	An operator object was executed for which the interpreter has no built in action.
30 POSTSCRIPT ERROR 23	An error occurred in virtual memory.
30 POSTSCRIPT ERROR 24	The systemdict quit operator was executed causing the PostScript interpreter to re-initialize virtual memory. All non-persistent information was lost.
30 POSTSCRIPT ERROR 25	A PostScript firmware failure occurred. Which is associated with normal error handling and not hardware.
30 POSTSCRIPT ERROR 26	A setpagedevice request cannot be satisfied.
30 POSTSCRIPT ERROR 27	An external interrupt request was received by the PostScript interpreter.

---

## 7.14 Troubleshooting

Display Message	Display Message Meaning/Suggested Action
30 POSTSCRIPT ERROR 28	A named resource sought by the findresource operator does not exist.
40 I/O DATA ERROR	This error indicates that a data error has occurred during the reception of data from the computer. Press <b>On Line</b> to continue printing. Check the connection between the printer and computer.
48 INVALID JOB ABORTING JOB	This message indicates the printer does not recognize the language it is being switched to. This message will remain in the display until it receives a valid language.
50.1 FUSER SERVICE ERROR	The Fuser temperature is too high for the application. Leave the power on for 20 minutes while the printer counts down, then power cycle the printer to clear this error or use address 47 in the register adjust section of the service mode to reset this message. Check the Fuser connections. (45)
50.2 FUSER SERVICE ERROR	The Fuser temperature is too low for the application. Leave the power on for 20 minutes while the printer counts down, then power cycle the printer to clear this error or use address 47 in the register adjust section of the service mode to reset this message. Check the Fuser connections.
50.3 FUSER SERVICE ERROR	The Fuser Temperature Sensor is open. Leave the power on for 20 minutes while the printer counts down, then power cycle the printer to clear this error or use address 47 in the register adjust section of the service mode to reset this message. Check the Fuser connections.
50.4 FUSER SERVICE ERROR	Fuser temperature error caused by erratic sensor values. Leave the power on for 20 minutes, then power cycle the printer to clear this error or use address 47 in the register adjust section of the service mode to reset this message.
53 LASER ERROR/SERVICE	Laser error. The laser signal is unstable. First, press <b>On Line</b> to continue, then power cycle the printer. Open, then close the side door. Check the side door interlock.
54.1 ENGINE ERROR/SERVICE	The scanner motor (M6) did not reach the correct speed in the allotted time. First, press <b>On Line</b> to continue, then power cycle the printer.
54.2 ENGINE ERROR/SERVICE	24 volt power supply error. Press <b>On Line</b> to continue, then power cycle the printer.
54.3 ENGINE ERROR/SERVICE	Toner Concentration Sensor error. Open, then close the side door. Power cycle the printer. If the problem persists, Turn to 54.3 Troubleshooting section for more information.
54.4 ENGINE ERROR/SERVICE	Pressure Cam Home Position Sensor (PS2) error. The Pressure Cam did not sense the home position within 4 sec. after the initial rotation of the Pressure Cam. Power cycle the printer. (51, 53)
54.5 ENGINE ERROR/SERVICE	Developer Home Position Sensor (PS6) error. The Developing Switch Position Sensor did not detect the home position within four seconds after the initial motion of the Pressure Cam. (50, 51)
55.X ENGINE CMD ERROR	Communication between the Formatter and the Control Board has failed. Check the Formatter connection and ensure it is seated properly.
56 LASER INDEX SERVICE ERROR	The laser index pulse is absent. Open, then close the side door and power cycle the printer.

Display Message	Display Message Meaning/Suggested Action
57 FAN MOTOR SERVICE ERROR	Cooling fan error. One of the cooling fans is not connected or is defective. (37, 42)
59 MANUAL FEED SERVICE ERROR	This message indicates that the RFU was removed or installed while the power was ON. Power cycle the printer to clear this error.
60.X SIMM ERROR/SIMM SERVICE ERROR	This message indicates the printer detected a bad SIMM as shown in the display. If the SIMM is detected at power ON, the bad SIMM is ignored.
61.X SIMM COMPAT ERROR	This message indicates that a DRAM of the wrong size or speed is installed. The printer still uses the base memory and all memory except that sensed bad. Install the correct size or speed RAM.
62 INTERNAL ROM SERVICE ERROR	This message indicates an error in the internal ROM. Power cycle the printer to clear this error. If the error persists, replace the Formatter.
63.0 DRAM SERVICE ERROR	This message indicates a faulty DRAM (base DRAM). Replace the Formatter.
63.X SIMM ERROR	This message indicates a faulty SIMM expansion memory module. If the error occurs at power ON, press <b>Continue</b> . If this error occurs after power ON, unplug the printer and remove the defective SIMM cards as indicated by the control panel display. NOTE: When a SIMM expansion card is removed, the printer can continue to operate, but may not be able to print all jobs that require greater memory. The printer still uses the base memory plus all the installed SIMMs.
64.X DMA TIMEOUT SERVICE ERROR	This message indicates the printer detected a video DMA error. Power cycle the printer to clear the error. If the error persists, run the Extended Diagnostic tests to determine the root cause.
66.1 JAM SENSOR SERVICE ERROR	This message indicates that an abnormal drum wrap value was detected while the sensor was being calibrated. Clear this error by reinstalling the drum, or power-cycling the printer. (47)
68 NVRAM ERROR	This message indicates that a recoverable error has been detected in the Formatter NVRAM. Press <b>On Line</b> to clear the error, then verify the control panel settings. One or more of the control panel settings may have been reset to the factory defaults during error recovery.
68 NVRAM SERVICE ERROR	This message indicates a general Formatter NVRAM failure. Power cycle the printer to clear the error. If the error persists, run the Extended Diagnostic tests to determine the root cause.
68 COLD RESET	This message indicates that all the control panel values have been reset to their factory defaults. This message occurs when the printer is powered ON while pressing <b>On Line</b> . Check that the <b>On Line</b> key is not stuck. If <b>On Line</b> is okay, replace the Formatter.
79 SERVICE ERROR	An unrecoverable error occurred in the Formatter PCA firmware. Run the Extended Diagnostic tests to get more information about this message. Power cycle the printer to clear this error. Replace the Formatter if the error persists. Be sure to include the failure code which accompanied the message on the control panel when returning the Formatter.
80 SERVICE	An unrecoverable error occurred in the MIO card. Power cycle the printer to clear this error. Replace the MIO card if the error persists. Be sure to include the failure code which accompanied the message on the control panel when returning the MIO card.

---

## 7-16 Troubleshooting



Display Message	Display Message Meaning/Suggested Action
89 Service	An unrecoverable error in the PostScript SIMM. Power cycle the printer to clear this error. Replace the PostScript SIMM if the error persists. Be sure to include the failure code which accompanied the message on the control panel when returning the PostScript SIMM.

## Blank Display

When troubleshooting the blank display:

1. Remove the cover over the display and look in the upper right hand corner. The dot should be dark colored. If white, the vacuum in the display has been lost. Replace the front panel.
2. Unplug, then plug in the printer.
3. Check the 5Vdc as shown in "Voltage Checks" under "Aids to Troubleshooting," earlier in this chapter.
4. Reseat the display connections.
5. Reseat the Formatter.
6. Replace formatter

## 11.4 Front Tray Empty

The 11.4 FRONT TRAY EMPTY message indicates the Paper-Out photosensor (PS8) senses an empty tray. If paper is in the tray, the sensor arm may be stuck or broken. PS8 is shown in Figure 7-2, item 1.

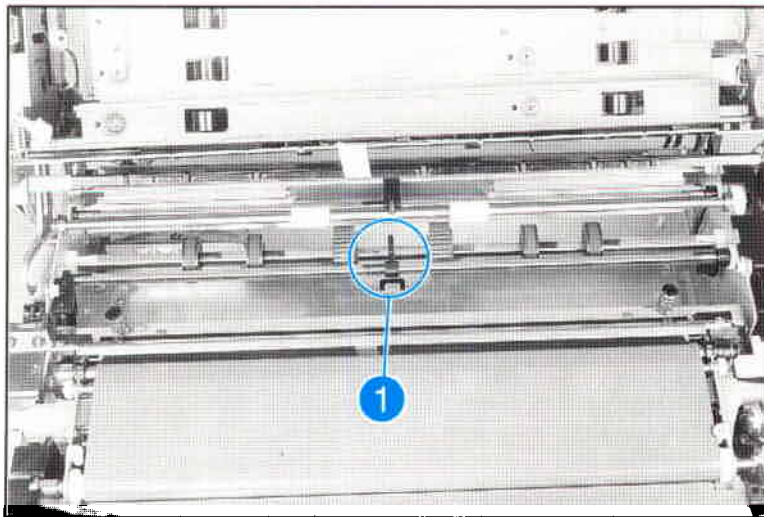


Figure 7-2 Paper-Out Photosensor (PS8)

### Troubleshoot the PS8 photosensor as follows:

1. Remove the paper tray and open the Top Cover.
2. Check that the paper size switch actuators on the tray are not damaged.
3. Check that PS8 is free throughout its entire range of travel, and is properly located in its mount.
4. Check that connector 802 (on the Control Board) is fully seated.
5. If the error persists, perform the PS8 Service Mode test as described below.

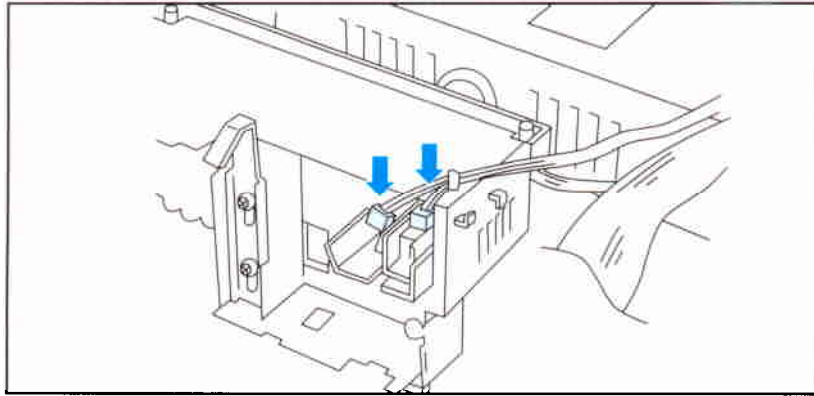


Figure 7-3 Photosensor PS8 Connections on HVPS (HVPS inverted)

### PS8 Service Mode Test

PS8, the Paper-out photosensor can be tested within Service Mode as follows:

1. Enter the Service Mode as described in the “Aids to Troubleshooting” section, and select the Status Test mode.
2. Enter the PS8 test address (10) and press **Enter**.
3. With no tray installed, the display will read zero for paper tray empty.
4. Open the printer, lift the Paper Guide, and move the sensor shaft through its range of motion.
5. The display should change from low to high (zero to one) as the photosensor is activated. If it does not change, check that the PS8 connector on the High Voltage Power Supply are fully seated, as shown in Figure 7-3. (The connectors are on the back of the HVPS.).
6. Finally, replace the photosensor.

## 12 Close Top or Side Door

A false Top or Side Door message may be caused by the failure of either of two interlock switches. (MS2, or MS3, shown on the wiring diagram). The switches are ganged together and are operated by a single mechanism on the left side of the printer, under the Developer Access Cover. The printer logic cannot differentiate between these switches. If the following tests prove the switches are defective, replace the switch assembly as shown in Chapter 6.

### Note

Power cycle the printer and re-close both doors to confirm the message before troubleshooting.



## Interlock Switch Test

Test the Interlock Switch assembly as follows:

1. Open and close the Top Cover. If the message remains in the display, open and close the Side Door.
2. Open the side door and, using a flat blade screw drive, push the interlock mechanism, as shown in Figure 7-4, while running test 41 in service mode.
3. If the message persists, remove the Top Cover and check that the switch linkage is not bent.
4. Check that the switch connectors are in good repair. Toggle the switches by pressing down on the metal tab over the switches.
5. If the linkage is not damaged, remove the switch assembly and test it with an ohmmeter.
6. Replace the assembly if defective.

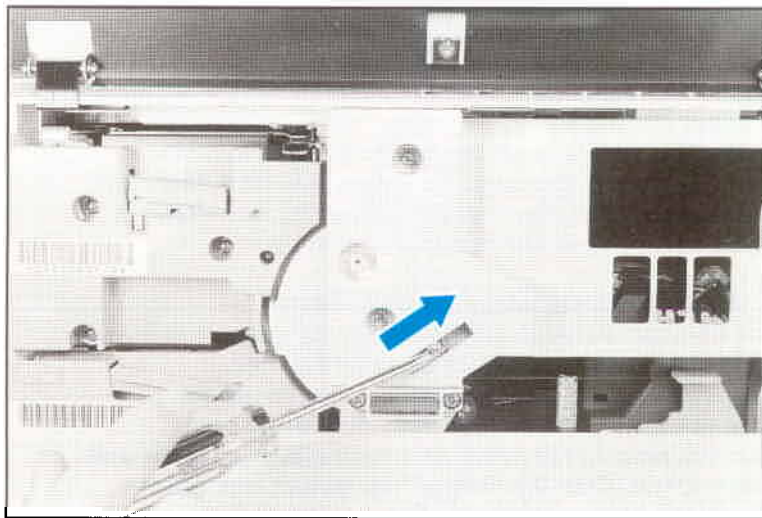


Figure 7-4

Testing the Interlock Switches

### Warning!

Do not inhibit the free movement of the Interlock Switch. Voltage may be present when the Top Cover is open if this mechanism is blocked.

### 13.1 Clear Drum Winding Jam

Paper is detected in the “out of limit” area of the Print Drum. The Drum Winding Jam Sensor Board indicates that paper is beginning to wrap around the print drum. Turn the paper stack over and end-for-end.

1. Check that the paper meets the specifications for this printer.
2. Check that media is not being re-fed into the printer.
3. Check that the Drum Wrap Sensor is not blocked by opening the side door and checking for paper wrapped around the drum.
4. If no paper is seen, run the Drum Winding Jam Sensor calibration routine by entering into service mode and running test 47 in the Status/Test section (see Aids to Troubleshooting at the end of this chapter).

### 13.2 Clear Output Jam

Sensor PS1, the Paper Exit Sensor detected paper at an incorrect time, or failed to clear in the allotted time.

1. Check that the sensor flag moves freely and the sensor is free of paper dust.
2. Check that media is not in the sensor at power ON.
3. Test the sensors operation by entering Service Mode and running test 22 in the Status/Test section (see Aids to Troubleshooting at the end of this chapter).

### 13.4 Clear Front Tray Input Jam

Sensor PS7, the Paper Registration Sensor sensed that media failed to arrive at the sensor in the allotted time.

1. Inspect the input and registration area for media. Transparencies can be especially difficult to see.
2. Test the sensors operation by entering Service Mode and running test 20 in the Status/Test section (see Aids to Troubleshooting at the end of this chapter).

### 13.5 Clear Fuser Jam (CLJ) or 13.5 Clear Paper Jam (CLJ5)

Sensor PS1, the Paper Exit Sensor, failed to detect the presence of media within the allotted time. The top cover must be opened and closed with the power ON to clear this message.

1. Check that the sensor is free, and that media is not at the sensor during power ON. Check for paper dust in the sensor.
2. Check to see if media has cleared the registration plate. If media is present, check the operation of the registration plate solenoid by running test 25 in the Status/Test section under Service Mode.

3. Test PS1 by entering Service Mode and running test 22 in the Status/Test section (see Aids to Troubleshooting at the end of this chapter).
4. Paper may be jammed in the Fuser. Remove the Fuser to check for jammed paper.

### **13.6 Clear Rear Tray Input Jam**

Sensor PS4, the Rear Feed Unit Paper Sensor, failed to detect paper media within the allotted time.

1. Check that the sensor is not stuck.
2. Check if media has been picked from the tray.

### **13.7 Clear Rear Tray Paper Jam**

Media was picked but failed to arrive at the Rear Tray Input Sensor in the allotted time.

1. Clear the jam and check the paper feed rollers.
2. Check that sensor PS4 is not defective and that it is free throughout its travel.

### **13.8 Internal Paper Jam During Warm Up**

Media was detected in the printer during warm-up. Open the top cover and clear any media found inside the printer.

### **14.5 and 16.5 Replace Collection Box**

The Excess Toner Collection Box is monitored by PS3. Perform the sensor checks below to isolate the problem.

### Collection Box Full Sensor tests

Perform the following tests to troubleshoot 14.5 and 16.5 messages.

1. Power cycle the printer.
2. Open the Top Cover and lower the Print Drum.
3. Pull the Collection Box out and check that the toner full flag is free (see Figure 7-5).
4. Check that the PS3 sensor is fully seated, clean, and connected properly.
5. If these tests are not effective, perform the PS3 Service Mode test, described in the next section.

#### Note

If the Collection Box is overfilled, the printer may need a thorough cleaning. In addition, the excess toner auger (inside the Print Drum) may be compacted or broken. The Print Drum may have to be replaced.

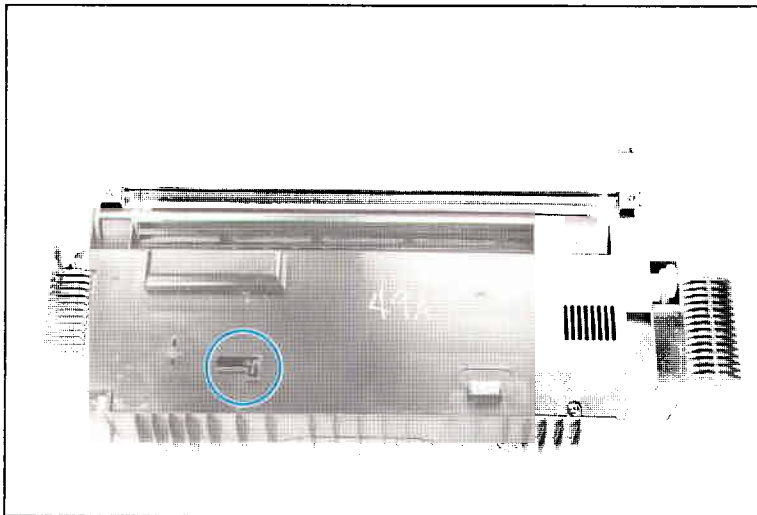


Figure 7-5 Toner Full Flag

### PS3 Service Mode Test

#### Note

The PS3 sensor flag is not accessible to toggle by hand, you must have an empty Collection Box to perform this test.

1. Power cycle the printer and enter the Service Mode as shown in the “Aids to Troubleshooting” section.

2. Select the Status/Test mode of the Engine Service Menu.
3. Enter the PS3 test address (55), and press **Enter**.
4. Install the empty Collection Box. If the display is high (1), the sensor is stuck or defective.
5. If the display is low (0), pull the Collection Box out about an inch to make the sensor flag rise. If the display does not change from 0 to 1, the sensor flag is stuck or broken, or the sensor (PS3) is dislodged or defective.
6. Check connector CN904 on the Toner Sensor Board (CLJ).

#### 14.6 Replace Coating Pad Kit (CLJ)

If this message does not clear when the Coating Pad Kit is replaced, the fusible link in the Coating Pad is not contacting the leaf spring in the Fusing assembly. Reseat the coating pad.

If a new style Fusing Assembly has been installed, then the Cleaning Roller is not contacting the leaf spring in the Fusing assembly. Reseat the Cleaning Roller.

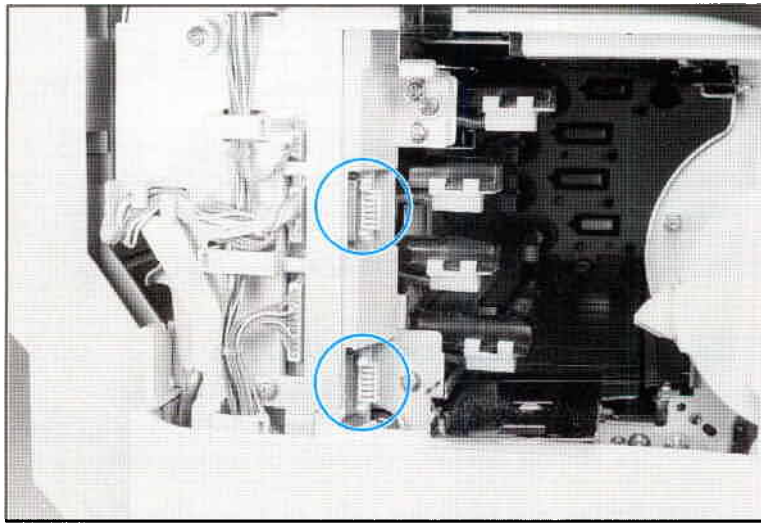
#### 14.6 Replace Coating Kit (CLJ5/5M)

If this message does not clear when the Coating Kit is replaced, the fusible link in the Cleaning Roller is not contacting the leaf spring in the Fusing assembly. Reseat the Cleaning Roller.

### 17.1 and 17.2 Install Developer

This message indicates that the printer failed to detect either the Black Developer (for the 17.1 message), or the Color Developer (for the 17.2 message). Troubleshoot this message as follows:

1. Power cycle the printer.
2. If the message persists, remove the suspected developer and inspect the blade connectors that insert into the Toner Sensor Board. Check that they are clean and straight. Also check the Toner Sensor Board connectors.
3. Install the Developer and check that the blade connectors fully seat into the Toner Sensor Board plug (see Figure 7-6).
4. Check all the connectors on the Toner Sensor Board. Ensure they are all fully seated.
5. Check the wiring behind the power supply drawer for nicks or cuts which may cause the signal line to short to ground. Reseat the connectors if any are suspect.
6. Replace the Toner Sensor Board if necessary.



**Figure 7-6**      **Toner Sensor Board Connections**

### **17.4 Install Fuser**

This message indicates the Fuser is not installed, or the printer failed to detect the Fuser. Troubleshoot the 17.4 error as follows:

1. Power cycle the printer.
2. If the message persists, remove and reseal the Fuser.
3. Check that the Fuser connectors are not damaged (no bent or broken pins).
4. Check that nothing prevents the Fuser from fully seating into its plug.
5. Check the connector (CN105) at the Control Board.
6. Replace the Fuser.
7. Replace the Control Board if necessary.

## 17.6 Install Collection Box

This message indicates the Toner Collection Box, or Print Drum, is not installed or is not detected. The switches that post this message are inside the Print Drum Cartridge and cannot be tested directly. Troubleshoot this message as follows:

1. Power cycle the printer to clear the message.
2. With the printer unplugged and powered OFF, inspect the Print Drum Connector (see Figure 7-7, item 1). Ensure that the connections are not bent and that both the male and female ends are in good repair, and are clean.
3. Ensure that nothing inhibits the Print Drum from fully seating into the connection.
4. Check that connectors 101 on the Control Board, and 254 on top of the Developer Bias Supply are fully seated.
5. Reseat the Collection Box and listen for an audible click.
6. If the Collection Box does not click into place, the leaf spring inside the housing may be defective. Replace the Print Drum.

## 17.7 Remove Drum Cover

This message indicates the Drum Cover is installed or is detected. Be sure the Print Drum Cover is removed. Instructions for removing the Drum Cover are located in Chapter 4. If this message appears when a new Print Drum is installed, remove and reinstall the Print Drum. If the message persists, perform the Drum Reflectance Calibration (Service Mode Status/Test address 47). Also see the procedures for the 66.1 JAM SENSOR Service message.

## 17.8 Reinstall Drum

This message indicates the Drum Winding Sensor output is abnormal during printing (see 66.1 JAM SENSOR service message). This may be caused by a broken or defective jam sensor or loose connections. When this message appears:

1. Remove the Print Drum and inspect both sides of the connector shown in Figure 7-7, item 1.
2. Power cycle the printer.
3. Install the Print Drum.
4. Check that nothing prevents the Print Drum from being fully seated into the printer.
5. Run test 47 in service mode.

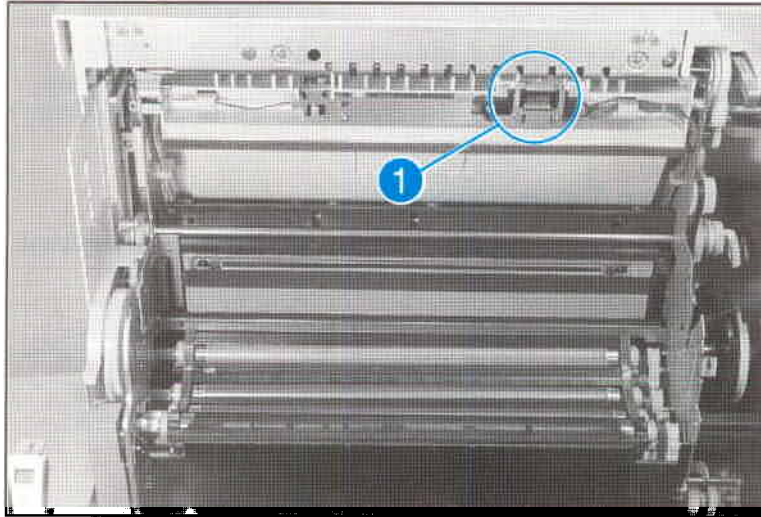


Figure 7-7 Print Drum Connector

### Note

Ensure that the Corona Clean Lever on the drum is fully seated to the right.



## 17.9 Reinstall Fuser

This message indicates that the Fuser connection is not stable.

### Warning!

The Fuser is HOT. Power OFF the printer to allow the Fuser to cool for at least 30 minutes before beginning this procedure.

Power cycle the printer to clear the message. If the message persists:

1. Remove the Fuser. Check that all the connectors are straight and clean.
2. Reseat the Fuser, being certain that all the connectors make contact.
3. If the message persists, replace the Fuser.

## 18.1 Clean Transfer Corona Wire

The paper-charging brush, or the bias roller in the Transfer Belt assembly has arced. Power cycle the printer to clear this error. If the error persists:

1. Clean the Transfer Corona Wire
2. Check connectors CN 701 on the Control Board, and CN 702 on the High Voltage Power Supply.
3. If the error persists, replace the Transfer assembly, and try another test print.
4. If the error persists, replace the High Voltage Power Supply.

## 18.2 Reinstall Drum

The printer sensed a high-voltage leak in the Print Drum Neutralizing Corona. Power cycle the printer to clear this error. If the message persists:

1. Remove and reinstall the Print Drum. Try a test print.
2. Check connectors CN 731 on the Control Board, and CN 730 on the High Voltage Power Supply.
3. If the message persists, check the Neutralizing Corona contact for damage or contamination (see Figure 7-8, item 1).
4. Replace the Print Drum.
5. Replace the High Voltage Power Supply.

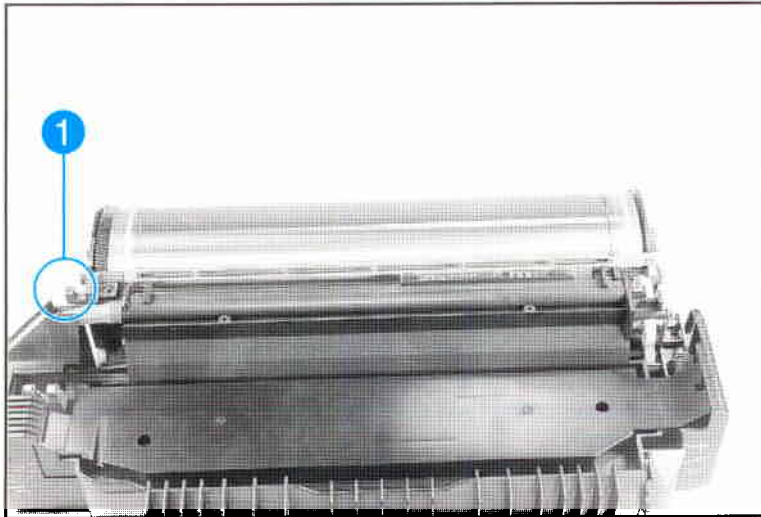


Figure 7-8 Neutralizing Corona Contacts

### 18.3 Reinsert Developers

The printer detected a high voltage leak in the Developer Bias Power Supply. (Although this is a Developer Bias fault, the Print Drum is often the root cause of this failure.) Power cycle the printer to clear this error. If the error persists:

1. Remove each developer and check their pin contacts (see Figure 7-9, item 1).
2. Check that each of the high voltage contacts on the Developer Bias assembly are clean and located correctly.
3. Print several self tests and look for repetitive defects. Replace the Print Drum if repetitive defects appear.
4. Remove the Print Drum and check its surface for any bright metallic spots, dents, or defects, that may indicate an arcing point (anywhere in the green area). Replace the Print Drum if any defects are found.
5. Check connectors CN601 (on the Developer Bias Supply) and CN600 (on the Control Board).
6. Try a test print. If the message persists, replace the Print Drum, followed by the Color Developer, and the Black Developer, if necessary.
7. Replace the Developer Bias Power Supply.

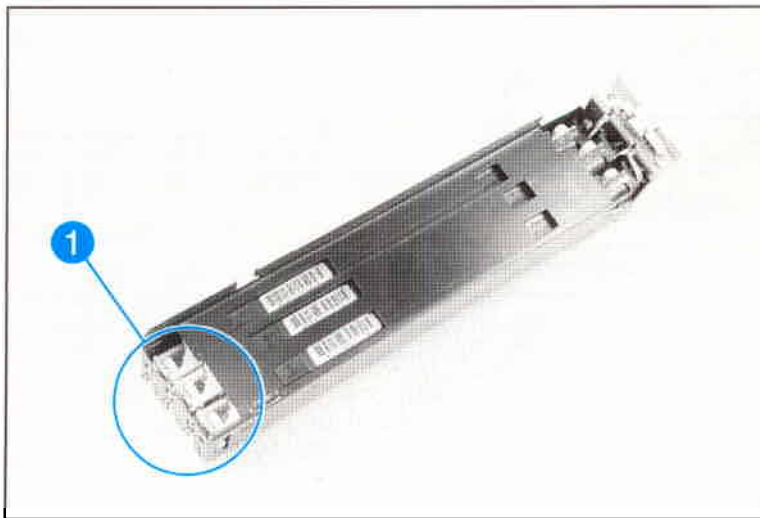


Figure 7-9 Developer Bias Contact Pins

## 18.4 Clean Transfer Corona

This message indicates the printer detected a high voltage leak associated with the Transfer Belt, Print Drum, or the High Voltage Power Supply. Usually paper is present in the paper path when this message is posted. Users may interpret this as a paper jam.

### Note

If the problem will not repeat dependably, print transparencies in color. Transparencies print at a slower speed, with higher transfer current.

Troubleshoot this error as follows:

1. Clean the Transfer Corona as shown in Chapter 4.
2. Check that the Print Drum contacts are clean.
3. Remove the Transfer Belt assembly and print a test page.
4. If a 13.X PAPER JAM message appears when printing without the Transfer assembly installed, the high voltage leak is associated with the Transfer assembly. Check the Transfer assembly contacts before replacing.
5. If the error persists, reseal, then replace the Print Drum, followed by the High Voltage Power Supply, if necessary.

## 18.5 and 18.6 Reinsert Developers

### Note

Do not replace developers until actual cause has been identified. Only replace developers if they are proven defective.

The 18.5 (for black) and 18.6 (for color) REINSERT DEVELOPERS message indicates the printer does not sense a changing output from the toner concentration sensor as should occur with normal toner movement within the developers. This message appears when:

- Toner compaction within the developers prevents toner movement across the toner concentration sensor.
- The developer is not selected.
- The Developer Drive gears are not engaging the developer.
- The Developer Drive gears do not rotate.

---

**Note**

If new developers are installed in the printer, toner compaction may cause the toner concentration sensor to output an abnormal reading. Remove the new developer, shake it as described in Chapter 4, and reinstall.

---

Perform the following checks to troubleshoot the 18.5 and 18.6 message:

1. Remove the Developers and check that the drive and gears are not worn, and that no teeth are missing.
2. Remove the Developer assemblies, and Print Drum. Move the Top Cover up and down. Check that the Developer Drive Gears extend and retract and are free throughout their travel. With the Top Cover partially closed, press each Developer Drive Gear and check that each has firm spring pressure (see Figure 7- 10).
3. Rotate the gears on each Developer assembly by hand (this requires some force). Check that they all have similar resistance. Replace any developer whose gears will not turn.
4. Shake the developer as shown in Chapter 4. Toner may be compacted inside the developer.
5. Examine the connectors on the developer and the Toner Sensor Board for damaged pins or connectors.
6. If symptoms still persist, follow the procedures listed on the next pages.



Figure 7-10

Checking the Developer Drive Gear Spring Pressure

## Service Mode Tests

Use Service Mode to check that the developers are rotating. This test is especially useful because the status mode displays the toner concentration value during rotation of the developer augers.

1. Enter Service Mode as described in “Aids to Troubleshooting” at the end of this chapter.
2. In the Status/Test mode, select address 08.
3. Select subtest 0 for the 18.5 message, or address 1, 2, or 3 for the 18.6 message. Once selected, press **On Line** to start the test.
4. When the test starts, the control panel displays the toner concentration value for the selected developer. If the developer drive gear rotates, the toner concentration sensor value displayed on the control panel should fluctuate slightly.
5. If the gears do not rotate, check the developer rotation as follows:
  - a. Remove the Rear Feed Unit, if installed.
  - b. Remove the Toner Hopper Cover.
  - c. Run the Service Mode test again.
  - d. Watch the developer drive gears at the rear of the printer. They should turn when the test is started. Make sure you are looking at the developer drive gear and the developer gear during this test (The black drive gear is the most difficult to see ).
  - e. If the gears do not rotate, perform the mechanism alignment checks.
6. If the gears rotate, and the toner concentration sensor value does not fluctuate, check the electrical connections between the developer and the Control Board.
7. If the electrical connections are OK, replace the developer.

### Caution

Do not perform this test with the Rear Feed Unit installed. Performing this test with the RFU installed and the Toner Hopper cover removed will damage the toner feed augers.

## 18.5 and 18.6 Mechanism Alignment Checks

Misalignment between the Developer Drive assembly, the Toner Hopper assembly and the printer frame may cause 18.5 and 18.6 errors. Check the following items for alignment when **troubleshooting this error**:

1. Remove the developer and check to see if the developer casing is bent. Do this by:

- a. Placing the developer on a flat surface with the back of the developer towards you.
  - b. Push the developer forward inside the casing.
  - c. If the developers do not move forward until the bias contact pin is against the casing on the left side, the casing is bent. Replace the developer assembly.
2. The printer frame has detents which position the Developer Drive assembly correctly on the printer frame. Ensure the assembly is properly seated on these detents. Improper seating will misalign the Developer Drive assembly with the developers and the Toner Hopper assembly. If misaligned, loosen the screws and align the Developer Drive assembly on the detents, then tighten the screws.
3. The Developer Drive assembly aligns with the Toner Hopper assembly through an alignment pin located on the Developer Drive assembly. Check that the alignment pin is straight, and the toner hopper is fully seated. If the alignment pin is bent, replace the Developer Drive assembly.
4. If the alignment pin is not damaged, remove the screws which hold the toner hopper in place, then:
  - a. Slide the toner hopper towards the left side of the printer.
  - b. Check the gear cluster on the toner hopper for bent sheet metal. A good indicator is if the toner hopper select shaft is out of its bushing or the bushing is not mounted correctly in the sheet metal. If the gear cluster is damaged, replace the Toner Hopper assembly.
  - c. Check to see if the activation arms for the toner hopper lockout fingers are against the select cams. If the arms are on the cams, check the toner hopper lock solenoid (SL6), located on the left side of the toner hopper, for binding and correct operation.
  - d. If the Toner Hopper assembly is functioning correctly, slide the assembly back into position. Align it with the Developer Drive assembly being careful not damage the gear cluster. Reinstall the toner hopper screws.

## 19.X User Maintenance

These messages indicate that a printer consumable has exceeded its maximum life. Press **On Line** to continue from this message. For each of these messages the printer will continue to print, but print quality will degrade until the indicated consumable is replaced.

---

**Caution**

---

The main drive gears may be damaged if the Fuser is allowed to remain in the printer past its maximum life.

If the indicated component has been replaced:

1. Reseat the consumable.
2. Check both sides of the connector for bent pins.
3. Power cycle the printer.
4. Try another of the indicated consumable.



## 24 Busy Moving Toner

This message indicates the printer is adding toner to the developers. If this message is displayed frequently, check for faint print. If many pages of heavy toner coverage are being printed, this message may not indicate an error. If the message persists, the toner feed auger may not be turning or a toner sensor may be defective. Troubleshoot this message as follows:

1. Power cycle the printer.
2. Check the toner level in the Toner Hopper assembly by manually opening each hopper. If any of the hoppers are completely empty the toner sensor for the empty hopper may be defective. Use the Service Mode Status/Test (address 01) to test the toner level sensors.

### Note

The toner sensors on the hoppers are piezo-electric. When the toner falls below the level of the sensor, the sensor output is audible. However, the high-pitched sound may be out of hearing range for some people.

3. If the hoppers have enough toner to cover the sensor, and the message persists, check the Toner Hopper auger operation as follows:
  - a. Remove the RFU, manually open the hoppers, and watch the paddles while printing the demo page.
  - b. If paddles turn, the problem is in the hopper augers. Replace the Toner Hopper assembly.
  - c. If the paddles do not turn: print the demo page 10 times. Watch that the Toner Hopper supply shaft rotates, that the hopper select shaft engages the hopper clutch, and that the toner supply augers turn.
4. If the Toner Supply Shaft does not rotate: perform the Toner Supply Solenoid Test as described below.

### Toner Supply Solenoid Test

Test the Toner Supply Solenoid (SL3) and supply augers as follows:

1. Enter the Service Mode as shown in "Aids to Troubleshooting," at the end of this chapter, and select test address 52.
2. Remove the RFU and the back cover. Listen for the solenoid to actuate.

## 50.X Fuser Service

This error indicates that the printer senses the Fuser temperature is too high for the application. The voltage read at the upper fusing roller thermistor momentarily exceeded the limit. Leave the printer on for 20 minutes (this gives the internal clock time to count down and reset) then power cycle the printer to clear this message. This message can also be reset by going into the Service Mode, Register Adjust, and setting address 47 to 00. If the message persists:

1. Check that the Fuser connector is in good repair (no bent or broken pins).
2. Open and close both doors during the warm-up period. If the message appears immediately, replace the Fuser.
3. Make certain the Fuser can be fully seated into the printer and that toner has not accumulated around the Fuser area.
4. Check that connectors CN105, CNJ410. CN105 is shown in Chapter 5, and is labeled on the Control Board.
5. Replace the Fusing assembly.

## 52.1 Engine NVRAM Error

This error indicates a failure to read the NVRAM on the Control Board. To troubleshoot this problem:

1. Power cycle the printer.
2. If for some reason the NVRAM was removed from its socket, ensure that there are no bent pins and that they are all in their correct position.
3. If the error persists, contact your local response center.

## 52.2 Engine NVRAM Error

This error indicates that a developer with a blown fuse is being installed into a new printer. The printer checks an address in NVRAM for the status of the engine. If the status returned is NEW then the printer checks the developers to see if the fuses are new (closed). If the fuses have been blown then the 52.2 error is displayed. To check if the fuses are blown on the developers use an ohm meter across pins 5 and 6 on the color developer, and pins 4 and 6 on the black developer (refer to the main wiring diagram at the end of chapter 7). If either developer has a blown fuse, replace the developer.

## 53 Laser Error

This message indicates the printer detected a laser diode error. Troubleshoot this message as follows:

1. Power cycle the printer.
2. If the error persists, reseal connectors 300 and 101. (See the [Main Wiring Diagram](#) for the locations of these connectors.)
3. If the connectors are in good repair, replace the Laser/Scanner assembly.

## 54.X Engine Error/Service Error

This message indicates the engine reported one of five types of failures or errors as listed below. Try to clear the errors by pressing [On Line](#). If the message persists, perform the appropriate procedure described below.

### 54.1 Scanner Error

The scanner motor (M6) did not reach the correct speed in the allotted time. Power cycle the printer. If the motor spins up and the error persists, perform the following procedures.

1. Check connectors 104 and 350 on the optics assembly.
2. Inspect the wires behind the power supply drawer for nicks or cuts on the insulation.
3. Measure the 24Vdc as shown in “Aids to Troubleshooting,” earlier in this chapter.
4. Replace the Laser/Scanner assembly.
5. Replace the Control Board.

### 54.2 24V Power Supply Error

This message indicates that the printer detected an error in the 24Vdc supply. Power cycle the printer to clear the error. If the error persists:

1. Check the 24Vdc line as shown in the Aids to Troubleshooting. If the 24Vdc voltage is missing, replace the DC Power Supply. (Note: The actual measured voltage should be approximately 22Vdc.)
2. A defective or misaligned interlock switch can also cause this error. Use a screwdriver to push the interlock mechanism in the direction shown in Figure 7-4.
3. If the message goes away, adjust the tab on the side door which operates the interlock mechanism.
4. If the message persists, power off the printer and check the interlock mechanism, connectors, and cabling.
5. Check fuse F5 on the DC Power Supply and F2 on the Control Board.

## 54.3 Toner Concentration Error

### Note

Do not replace developers until the cause of the error is identified. Replacing developers without identifying the root cause of the error will only mask the problem and cause another service call from the customer.

A toner concentration error occurs when the toner concentration sensor reading is at a minimum or maximum value. This error can be caused by a defective toner concentration sensor, toner hopper sensor, toner supply mechanism failure, too much or too little toner in the developer, or incorrect NVRAM values.

Incorrect NVRAM values can be caused by not installing the correct NVRAM on the Control Board, installing the NVRAM incorrectly, a defective NVRAM or installing a used developer. Incorrect NVRAM values usually cause too much toner to be delivered to the developer. Failure of the toner hopper sensor or toner supply mechanism is usually associated with not enough toner being delivered to the developer. To determine the cause of this error:

1. Power cycle the printer.
2. Run a number of self tests to see if the error returns. You should be able to print at least one selftest page before the 54.3 error message reappears.
3. If the error returns, look at the selftest page and check for faded or bold colors.
4. If a color looks faded, the problem will most likely be associated with a defective toner hopper sensor or the toner supply mechanism. If any color looks bold, then too much toner has been added to a developer.
5. To identify which developer is reporting the error, follow the procedures for running the Toner Concentration Test shown on page 7-42 . A value of 127 or 63 on the front panel is an indicator for the developer reporting the error.
6. Refer to "Faint Print" in the Image defects section for the procedure to troubleshoot a faded color problem.
7. If a color looks bold on the self test page, the problem can be caused by an incorrect NVRAM value, the wrong NVRAM was installed on the Control Board, or a developer which was not initialized by the printer has been installed.
8. If the wrong developer was installed, reinstall the correct developer.
9. If the wrong NVRAM was installed, reinstall the correct NVRAM.
10. For other NVRAM associated problems, contact your local Hewlett-Packard Company Response Center.

---

**Note**

Since the new NVRAM will require reprogramming, you will need access to Hewlett-Packard escalation support. Otherwise, all high-end maintenance items will need to be replaced with the new NVRAM.

---

## **Toner Level Correction Techniques**

### **Low Toner Level**

Once the problem which caused low toner has been identified and resolved, the printer can recover with a little help. To recover:

1. If the Toner Hopper Assembly was replaced, make sure the toner auger tubes are full. To fill the tubes use test 19 in Service Mode to unlock the hoppers and install toner. Rotate by hand the large white gear on the side of each hopper to fill the auger tubes.
2. Since the developer which generated the error is known from running the Toner Concentration Test, turn the large gear on the hopper for that color one full revolution.
3. Run the Toner Concentration Test again allowing it to run for about 30 seconds before checking the level on the front panel. Remember, it takes some time for the toner just placed in the developer to work its way through the developer.
4. If the value displayed on the front panel is holding between 0 and 100, the printer will recover from this point on its own.
5. If the value displayed is greater than 100, repeat steps 2 and 3.

### **High Toner Level**

The recovery from this toner condition is not as easy. It is very important the root problem for this condition has been clearly identified, otherwise the problem will only be masked for a short time and the original problem will eventually occur again.

1. Print a solid fill page for the color generating the error.  
Continue to print this page until the error no longer appears.
2. If far too much toner is in the developer, the developer will need to be replaced.

### Toner Concentration Test

1. Print a self test page to check the relative humidity reading.
2. Power cycle the printer and enter the Service Mode as shown in the “Aids to Troubleshooting” section. Select the Register Adjust function of the Service Mode.
3. Use the addresses in the “Register Adjust” section to find the page count for each developer.
4. Power cycle the printer and enter the Service Mode as shown in the “Aids to Troubleshooting” section. Select the Status and Test function of the Service Mode.
5. Input the developer rotation address (08), and press **Enter**. Use **On Line** to select the specific developer to rotate. The developer selection addresses and subtest numbers are listed in Tables 7-11 and 7-12.
6. Press **Enter** after inputting the developer subtest number.
7. Use the following table to convert the number displayed on the Control Panel to the actual concentration value.

Table 7-3 General Toner Concentration Values

Displayed Value	Actual Toner Concentration Value
Less than 64	Same as displayed value
64 or larger	64 <i>minus</i> the displayed value

8. Using the relative humidity from the self test page, and the page count for the developer, find the target toner concentration value for each developer from Table 7-4.
9. Compare the actual toner concentration value to the target toner concentration value. The difference between the two values should be less than 12. If the actual toner concentration is less than the target value, the toner level in the developer mixture is low.
10. If the actual toner concentration value is more than 12 points from the target value, the toner level in the developer is high.

Table 7-4

Target Toner Concentration Table

Developer Count	Relative Humidity									
	20% or less		20-29%		30-39%		40-59%		>60%	
	K	Y M C	K	Y M C	K	Y M C	K	Y M C	K	Y M C
>0	4	4	3	3	2	2	2	1	2	0
>40	8	8	6	6	4	4	4	2	4	0
>80	12	12	9	9	6	6	6	3	6	0
>120	15	15	11	11	8	8	8	4	8	0
>160	18	18	13	14	9	9	9	5	9	0
>200	21	21	15	16	11	10	11	6	11	0
>240	24	24	17	18	12	12	12	6	12	0
>280	27	27	19	20	14	13	14	7	14	0
>320	30	30	22	23	16	14	16	8	16	0
>360	33	33	24	25	17	16	17	9	17	0
>400	36	36	26	27	19	17	19	9	19	0
>440	39	39	28	29	20	19	20	10	20	0
>480	42	42	30	32	22	20	22	11	22	0
>520	45	45	32	34	23	22	23	12	23	0
>560	48	48	35	36	25	23	25	13	25	0
>600	50	50	38	36	26	24	26	11	26	0
>640	47	47	34	35	24	23	24	10	24	0
>680	44	44	32	33	23	21	23	9	23	0
>720	41	41	30	31	21	20	21	8	21	0
>760	38	38	27	29	20	18	20	6	20	0
>800	35	35	25	26	18	17	18	4	18	-2
>840	32	32	23	24	17	15	17	2	17	-4
>880	28	28	20	21	16	13	16	0	16	-6
>920	28	28	20	18	15	12	15	-2	15	-8
>960	28	28	20	18	15	10	14	-4	14	-10
>1000	28	28	20	18	15	8	13	-6	13	-12
>1040	28	28	20	18	15	8	12	-6	12	-14
>1080	28	28	20	18	15	8	11	-6	11	-16
>1120	28	28	20	18	15	8	10	-6	10	-18
>1160	28	28	20	18	15	8	9	-6	9	-20

## 54.4 Cam Home Position Sensor

This message indicates the Cam Sensor (PS2) did not detect home position. This message can also occur with general printer disassembly involving the Control Board or the Developer Bias Supply. Since PS2 is located on the back of the Developer Bias Supply, make sure it was reconnected if the Developer Bias Supply was removed. Also check the connector (J802) on the Control Board is fully seated.

### Other symptoms include:

- Complete or partially blank pages.
- Smeared vertical line on the front of the page.
- Smeared toner image on the back of the page.

### Note

This message may appear as a result of the drive gears being installed incorrectly such that the Cam Timing is lost. Follow the Cam Timing procedure listed in back of Chapter 6 to correct the Cam Timing problem.

### To troubleshoot the 54.4 message:

1. Open the top cover and look for the tab which activates the AC interlock switch. The tab is located to the right and below the black developer and is part of the developer drive assembly. If the tab is bent, bend the tab until it is aligned with the plunger.
2. If the tab is straight, power on the printer while checking the 24V at the test connector located on the rear of the printer (Note: The actual measured voltage will be approximately 22Vdc).
3. If no voltage is present, check the interlock switches on the left side of the printer and verify they are working correctly. Replace the switch mechanism if defective.
4. If the switch mechanism is OK and the voltage does not reach 22V during power on, replace the DC Power Supply.
5. If the DC voltage is OK remove the right side cover and watch the AC motor (M2) to see if it turns as you power on the printer.
6. If M2 does not turn, power off the printer and unplug the power cord. Disconnect the connector to M2 and connect a voltmeter.



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**Warning!**

With the printer turned ON, there is 120/240V AC at this connector. Do not cross the leads of your meter or touch them with your hand. Doing so will cause damage to the printer or result in electrical shock.

---

7. Plug the power cord into the printer and turn the printer on. Watch to see if the AC voltage is supplied.
8. If power is available replace M2.
9. If no power is available, replace the AC Power Supply. In the Color LaserJet or the DC Power Supply in the Color LaserJet 5/5M.
10. If the power supply does not solve the problem, follow the procedures for the Cam Service Mode Test to verify if the sensor is operating correctly.
11. Run test 53 in service mode to verify if the solenoid is operating. You should be able to hear when the solenoid turns on/off. Replace the solenoid if defective. A good solenoid should have a resistance value of approximately 56 ohms.
12. If the solenoid is OK when the resistance is measured and everything else above has been checked, replace the Control Board.

### Cam Service Mode Test

1. Enter the Status/Test section of the Service Mode as shown in "Aids to Troubleshooting," at the end of this chapter.
2. Select address 51.
3. Open the Top Cover, remove the Print Drum, and release the Cam Solenoid (SL4), as shown in Figure 7-11.
4. Turn the gear train slowly, and watch the Control Panel Display. The status display will change from 000 to 001 when the Cam Home sensor is activated.

If the home sensor reading does not change, check that:

1. The Developer Bias Supply is fully seated.
2. The Cam Home Sensor is mounted in the printer frame correctly.
3. The sensor connector is in good repair.
4. If all of the above are OK, replace the sensor PS2.
5. When checking the Cam Home Solenoid, run a Demo page, and with the Top Cover removed, check that the solenoid releases. If it does not, replace the solenoid (SL4), and its clutch, then check the cam timing as shown in Chapter 6.

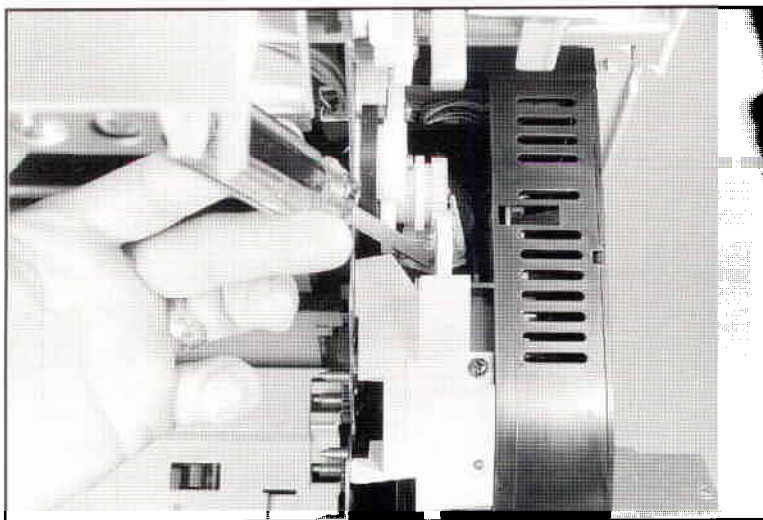


Figure 7-11 Releasing the Pressure Cam Home Solenoid

## 54.5 Developer Home Position Sensor

This message indicates the printer failed to detect the Developer Cam Home Position signal, or the sensor (PS6) is defective.

### Note

If this message occurs after general printer disassembly around the Control Board, the sensor PS6 may be disconnected. See Chapter 5 to locate PS6, and check that it is plugged in both at the sensor and at the Control Board (J802).

## 54.5 Service Mode Test

1. Select the Service Mode Status/Test address 51, and check that the Developer Drive Motor rotates.
2. If the Developer Drive Motor (M2) does not rotate, check the connectors, then replace the motor.
3. If the Developer Drive Motor rotates, use the status mode test (50) to test the Developer Home Sensor. (It may be necessary to turn the gear train by hand to activate this sensor.) The display changes from 00 to 01 when the sensor is activated.
4. If the sensor does not activate, check that the sensor is properly connected at both ends.
5. If the connections are correct and the sensor is properly mounted, replace the sensor, PS6.

## 55.X Engine Cmd Service Error

All 55.X messages indicate the Formatter and the Control Board have failed in some aspect of their communication. When troubleshooting this message:

1. Reseat the Formatter into its connector and perform a test print.
2. If the message persists, remove the Formatter, and check that none of the Formatter connector pins are bent or broken. (This is not a probable cause if the Control Board or Formatter have never been removed.)
3. Check the 5 volt fuse on the Control Board. If the fuse is blown, attempt to determine why the fuse blew, then correct the condition.
4. If the message persists, replace the Formatter, followed by the Control Board if necessary.

## 56 Laser Index Service

This message indicates the printer failed to register the Beam Detect Pulse, or the Beam Detect Pulse was missing. Power cycle the printer to clear this error. Check the wiring harness behind the power supply drawer for nicks and cuts. Wrap with insulation tape to prevent wires from grounding. If the error persists, replace the Laser/Scanner assembly, followed by the Control Board if necessary.

## 57 Fan Motor Service Error

This message indicates either the Main Body Fan, Formatter Cooling Fan, DC Power Supply Fan, or Fuser Cooling Fan, is not running, or is running at some incorrect speed. Power cycle the printer to clear this error. If the error persists:

1. Reseat all fan connectors on the Relay Board.
2. Ensure the wiring harness is in good condition, and the wires are fully seated into the connector.
3. Check that nothing inhibits the fan rotation.
4. Replace the defective fan assembly.

## 59 Alternate Feed Service

1. This message occurs when the Rear Feed Unit is installed or removed while the printer was powered ON. Power cycle the printer to clear this error.
2. Installing or removing the Rear Feed Unit with the printer powered ON may damage the electronics within the unit. If the message persists after power cycling, replace the Rear Feed Unit.
3. When troubleshooting the 59 Service message, always check the blade connectors on the Rear Feed Unit, and inspect their matching connectors on the printer. Check that the pins are straight and that none of the connectors are damaged. If the printer has been disassembled, ensure that none of the wires are damaged (pinched).

## 60.X SIMM Service

### Note

The 60.X through 63.X Service Errors occur only during the power ON sequence.

This message indicates that the firmware detected a bad CRC (Cyclical Redundancy Check) in a SIMM. (The bad SIMM is indicated by the X.) The printer completes its power ON sequence without initializing (and therefore using) the defective SIMM, but uses all base RAM, and usable SIMMs. The 60.X message appears in the display when the power ON sequence is complete. Full memory capability is not available.

This message also appears when multiple ROMs (such as two PostScript ROMs, or two Epson ROMs) are installed. Troubleshoot this message as follows:

1. Power cycle the printer to clear this error.
2. If the error persists, reseal the indicated SIMM and try to print.
3. Replace the indicated SIMM.

## 61.X SIMM Compatibility

This message indicates that a SIMM is installed whose size or speed is incompatible with the Formatter. If this SIMM is detected at power ON, the printer does not use the incompatible SIMM, but does use all base RAM as well as usable SIMMs. The 61.X message appears in the display when the power ON sequence is complete. Full memory capability is not available. Troubleshoot this message as follows:

1. Power cycle the printer to clear this error.
2. If the message persists, reseal the indicated SIMM and try to print.
3. Finally, if the message persists, replace the indicated SIMM.

## 62.X Internal ROM Service

This message indicates checksum error has occurred in the ROM. The X indicates which ROM generated the error. If X=0, the error is in the code ROMs. If X=1, the error is in the lower 4M ROMs. If X=2, the error is in the upper 4M ROMs. Power cycle the printer to clear this error. If the error persists, replace the Formatter. The individual ROMs are not replaceable.

### Note

Indicate the failure mode on the return slip when exchanging the Formatter PCA.

## 63.0 DRAM Service

This message indicates the printer detected an error in the base DRAM. Power cycle the printer to clear this error. If the error persists, replace the Formatter PCA. When this error message is displayed, pressing any Control Panel key displays more information about this error.

### Note

Indicate the failure mode on the return slip when exchanging the Formatter PCA.

## 63.X SIMM Error

This message indicates the printer detected a faulty SIMM expansion card, where X indicates the suspected card. The printer will not use the defective SIMM, but uses all base RAM, and usable SIMMs. The 63.X message appears in the display, and full memory capability is not available. The error may be cleared by removing the faulty SIMM. (The SIMM indicated by the X.) Pressing **Continue** allows the user to continue the print job with the failure message in the background.

## 64.X DMA Timeout Error

This message indicates the printer detected a video direct access error. Power cycle the printer to clear this error. If the error persists:

1. Run the job that caused the error, then wait about 3 minutes for the timeout to repeat.
2. If the error message reappears, run a self test, and wait another three minutes. If the message persists, reseal, then replace the Formatter PCA, followed by the Control Board, if necessary.
3. If, after running the users job, no error appeared, run the error log to see the occurrence rate. If the error occurs frequently:
  - a. Reseat, then replace the Formatter.
  - b. Check the 5Vdc line for noise.
  - c. Check the 5Vdc voltage at the Control Board.
  - d. Replace the Control Board, if necessary.

## 66.1 Jam Sensor Service

### Drum Reflectance Calibration Procedure

This printer must initially and periodically calibrate the electronics against the value of Print Drum reflectance. The sensor on the Jam Detect Board together with sensing media wrapping on the drum senses the value of Print Drum reflectance. The Print Drum reflectance changes over time. False jams may occur if the Print Drum reflectance is not recalibrated. This message occurs when the printer calibrates the Print Drum reflectance during new drum installation, or during the course of normal, periodic Print Drum recalibration. To troubleshoot this error:

1. Power cycle the printer and enter the Engine Service Mode as shown in the “Aids to Troubleshooting” section.
2. Input test code (47) and press **Enter**. The printer will begin the drum calibration process.
3. If the message persists after performing the drum reflectance calibration, the drum reflectance is out of specification. This may be caused by a faulty yellow developer. Ensure that a solid yellow strip is being deposited on the drum during the calibration process. (Hard stop the printer during the calibration process to check the yellow strip.)
4. Clean the Drum Wrap Sensor as described below.
5. Replace the Print Drum.

### Cleaning the Drum Wrap Sensor

The Drum Wrap Sensor may be cleaned if necessary. Perform this task only if the printer has become very dirty through neglect of the periodic maintenance.

#### Caution

Be careful not to damage the Print Drum. Place the Print Drum on the cleaning cloth provided in the Collection Kit to prevent its being scratched. Also, do not blow on the Print Drum.

1. Remove the Print Drum from the printer and place it on the cleaning cloth provided in the Collection Kit.
2. Place a sheet of paper between the Print Drum and the sensor.
3. Remove the screw (see Figure 7-12, item 1).
4. Remove the Print Drum Neutralizing Corona housing (see Figure 7-12, item 2).
5. Release the sensor board from its retainers, being careful not to damage the Print Drum.
6. Ensure connectors CN970 and CN971 are fully seated.
7. Use a toner cloth (provided in the Toner Collection Box Kit) to clean the sensor.

#### Note

Run the Reflectance Calibration Service Mode Status/Test (address 47) procedure after cleaning the Drum Wrap Sensor.

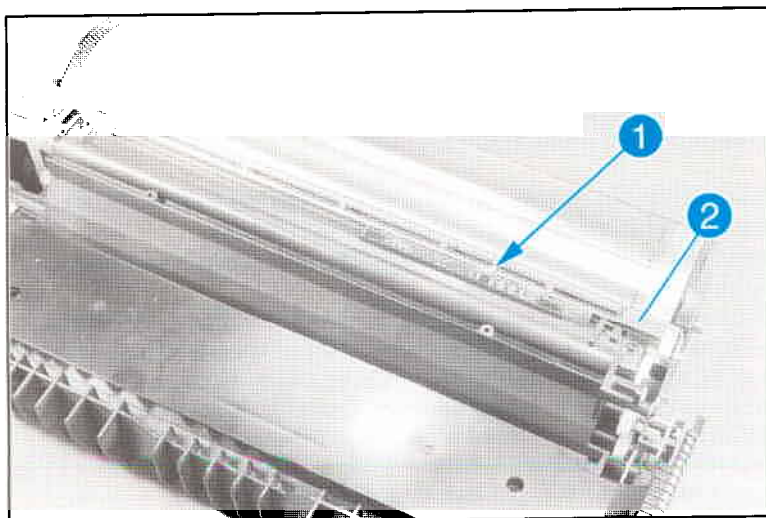


Figure 7-12 Print Drum Reflectance Sensor



## 68 NVRAM Error

This message indicates a recoverable error has been detected in the Formatter NVRAM. Press **On Line** to clear this message, then check the control panel settings. It is possible that one or more of the user-selectable settings may have returned to their factory settings during error recovery. Run the Extended Diagnostic tests before replacing any components. Replace the Formatter if the error occurs at every power ON.

## 68 NVRAM Service Error

This message indicates a hard Formatter NVRAM failure has occurred. Run the Extended Diagnostic tests before replacing any components.

## 68 Cold Reset

This message indicates that all control panel values have been reset to their factory defaults. If this message appears at each power on, part of the Formatter NVRAM is defective. Run the Extended Diagnostic tests before replacing any components. If the message persists, replace the Formatter.

## 79 Service (XXXX)

If this error is associated with a specific user's job, there may be a defect (bug) in the software code that created the job. Run a self test to check that the error is not generated by the printer. If the error is isolated to the user's print job, refer the user to the software manufacturer. If the error occurs while running the self test, replace the Formatter. Be sure to include the failure codes with the returned Formatter.

### 80 Service (0XXX)

This error indicates an unrecoverable MIO error has occurred. The XXX meaning is listed in the *Technical Reference Manual* that came with the MIO card. Power cycle the printer to clear this error. If the error persists, replace the MIO card. Run the Extended Diagnostic tests before replacing any components. Be sure to put the entire error code (including the numbers in parentheses) on the return slip when returning the MIO card.

### 89 Service (XXXX)

This message indicates an unrecoverable error has occurred in the PostScript firmware. Power cycle the printer to clear this message. Run the Extended Diagnostic tests before replacing any components. If the message persists, replace the PostScript SIMMs.

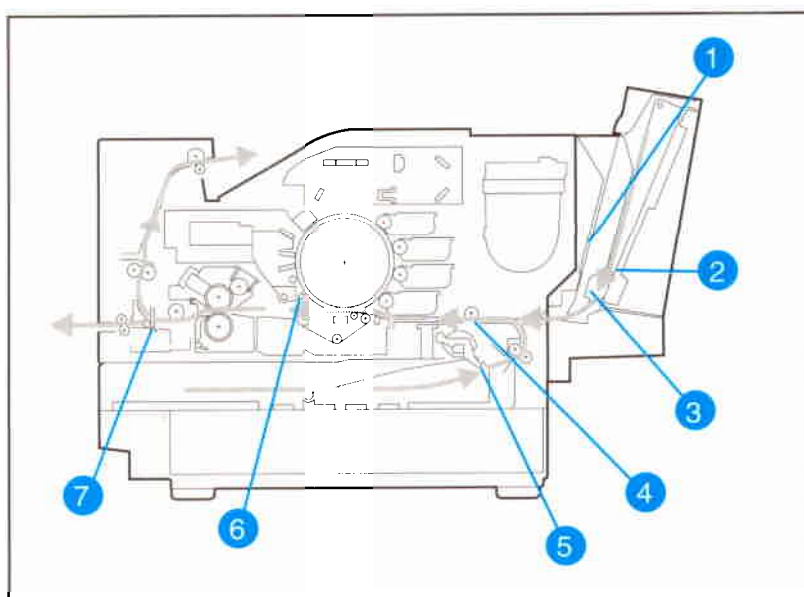
# Paper Path Troubleshooting

## Paper Jams

When troubleshooting paper jams, remember that jams are posted as a result of timing errors. That is, paper fails to arrive at, or fails to clear the paper path sensor in the allotted time. The paper path timing is set by the Control Board. Stuck or defective sensors will cause the paper path timing to post a jam message at power ON, as will scraps of paper caught in the paper path. Use Figure 7-13 to locate the paper path sensors. The paper jam message code identifies the sensor which failed to change state in the required time.

### Note

Check that the paper path sensors are free throughout their full range of travel.  
All interlock switches must be operational in order for the printer to clear paper jam messages.



**Figure 7-13** Paper Path Sensors

- |                                   |                                    |
|-----------------------------------|------------------------------------|
| 1 Manual Feed Sensor (RFU)        | 5 PS8 Paper-out Sensor (main tray) |
| 2 Paper-out Sensor (RFU autofeed) | 6 Drum Wrap Sensor Board           |
| 3 RFU Paper in Path Sensor        | 7 PS1 Paper Exit Sensor            |
| 4 PS7 Paper Registration Sensor   |                                    |

- Check that the Transfer Corona cleaner is pushed all the way to the right. Paper jams occur when this knob is out of place.
- Clean the printer. Toner and paper dust in the paper path inhibits free movement of media through the printer, and blocks the sensors.
- Vary the input and output selections of the printer to determine if the problem is associated with a particular area of the printer.
- Worn separation pads on the paper tray cause last page multi-feeds. Check the condition of the pickup rollers and separation pads when troubleshooting multifeeds. Bent separation tabs cause misfeeds, and multifeeds. Replace the tray if necessary.
- Defective paper tray switches may cause paper jams by indicating the wrong size paper to the Formatter.
- Scraps of paper left in the paper path may cause intermittent paper jams. Always check that the paper path is clear when cleaning the printer, and when clearing paper jams. also, remove the Fuser and carefully check it for jammed paper.
- If the optional Rear Feed Unit is installed, check that the paper is loaded correctly. Check that the correct paper size is selected, and that the paper is not slumped.
- Curl on the trailing edge of transparencies is caused by improper face up output bin position. Make sure the face up output bin is pulled out all the way. It tilts up slightly when in its proper position.
- Reduce curl of black-only transparencies by:
  - Placing the transparencies in a presentation sleeve.
  - Printing to the face up output bin.

#### Caution

Duplexing (printing on both sides of the page), causes paper jams at the input and exit areas. Duplex printing is not supported, and will damage the printer.

## Print Media Checklist

Many print problems are caused by printing on media that does not meet specifications. *The HP LaserJet Printer Family Paper Specifications Guide* is included with this manual, but the following list helps to quickly check common media-related printing problems:

- Rough paper causes poor transfer and smeared print problems. Check that the paper meets specifications for smoothness.
- Printing on glossy (shiny) paper or HP Glossy Media is specifically not supported on the Color LaserJet. Glossy paper cannot tolerate the temperatures required to fuse the toner.

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### Note

HP Glossy Media is supported on the Color LaserJet 5/5M.

- Printing envelopes is specifically not supported.
- The printer handles only 20 to 24 pound media, and 5-mil transparencies.
- Paper that has absorbed moisture causes paper feed problems. If the printer is used in a humid area, suspect wet paper as a cause of recurring paper feed problems.
- More than 50 transparencies should not be loaded into any tray.
- This printer does not support duplexing. Do not attempt to re-feed paper or to print on both sides of a page.
- Damaged paper, paper with ragged edges, or paper whose edges stick together will cause paper jams.

---

### Note

Transparencies created on this printer appear darker when used on reflective-type transparency projectors.

---

### Caution

Duplexing (printing on both sides of the page) or feeding paper that has been through a laser printer or a copier, causes paper jams. Duplex printing is not supported and will damage the printer.

### **Multi-feeds from the Front Input Tray**

If multi-feeds occur when feeding from the Front Input Tray:

1. Check that the media meets the specifications for this product. Specifically, rough paper and light weight media multi-feed more frequently. Ensure that the media is not sticking together in the paper stack. Poor edge conditions (ragged edges) can cause this.
2. Check the Paper Stack Tabs in the paper tray (see Figure 7-17). Replace the paper tray if the tabs are bent or burred.
3. Check the paper size adjustment lever to ensure that it is snug against the media without pinching.
4. Check that the media is fully under the Paper Stack Tabs. Multi-feeds are likely if the paper tray is overloaded, or the media is not underneath the tabs.

### **Feed Problems from the Rear Feed Unit (RFU)**

Using unsupported media, or incorrectly operating the RFU causes feed problems. The following checklist helps solve many RFU feeding problems.

1. Check that the media meets the specifications for this product.
2. Check that the RFU is not overloaded. The RFU can hold 250 sheets of 20 pound paper (a 1 inch stack).
3. Check the paper size adjustment for the rear input tray and the manual feed input. The guides should be snug against the media, but not so tight that the media is pinched. The paper adjustment knob for the rear input tray should be set for the correct media before the media is loaded. If necessary, fine adjustment can be made after the media is in the tray.
4. Check that media is not slumped forward in the rear input tray. The top cover, or the rear tray must be fully opened when loading media. Moist paper is more likely to slump.
5. Check that the media is neatly stacked in the rear input tray. When adding media to an existing stack, be sure the two stacks are closely aligned before replacing them in the tray.
6. When manually feeding, push the media slightly into the pickup roller nip. This is especially helpful with legal and tabloid size paper.

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# Image Formation Troubleshooting

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## Note

Before beginning image formation troubleshooting, check that the media meets the specifications listed in the *HP LaserJet Printer Family Paper Specifications Guide*.

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## Print Density Test and Color Checks

Use the self test page to check the print density (the black levels). The self test page has solid black-filled areas that demonstrate the ability to print black at full density. The self test page also tests the ability to print each primary and process color. To print the self test page:

1. Take the printer off-line.
2. Press **Menu** until PCL TEST MENU appears.
3. Press **Item** until PCL SELF TEST appears.
4. Press **Enter** to start the self test.

In addition to items listed above, the self test:

- Helps isolate the problem to the software or the printer.
- Shows that all colors print.
- Checks that the room humidity is within specifications.

The following media-related items are responsible for many image formation and print quality defects:

- Rough paper.
- Heavy paper.
- Transparencies out of the specified thickness range.
- Paper that has absorbed moisture from the atmosphere.
- Room environment (humidity too high or low).

## Understanding Color Variations

The printed output may not match the computer screen, and the colors printed on successive pages may not match. While color variations are inherent in this printing method, they also may indicate changes in the printing environment, print media, or printer components.

## Common Causes of Color Variation

The following list outlines the major causes of color variations between computers, applications, and output devices.

- Halftone patterns produced on monitors, and the types of patterns used in the print jobs are different. The differences in the halftone patterns may cause variations in the printed output.
- The printed output differs from the image on the monitor because the monitor and the print media have different reference values of black and white. The monitor screen has charcoal gray for the black level, and the white on the monitor screen is actually blue. Black on print media is limited only by the fill capability of the printer, and most good quality paper has a very high white level. In addition, phosphor (used in color monitors) and toner have entirely different spectral characteristics and different color rendering capabilities. Differences between the display and the printed output are common. Blues generally match better than reds.
- The color of the ambient light changes the perception of color. Fluorescent light lacks many colors present in incandescent light, and the color range of natural light is broader than any artificial light. When comparing color, choose a standard light source for reference and understand that the perceived color will change as the light changes.
- Long term color variations occur as the paper ages. The color of the page may change with time. Use high quality paper and protect the paper from sunlight to help minimize discoloration.
- Environmental changes can cause color variation. The development process places a high potential across an air gap to attract toner to the Print Drum. Changes in relative humidity vary the point at which the toner travels to the Print Drum. The printer has a humidity sensor which adjusts operating parameters as the humidity changes. This humidity sensor minimizes the effect of environmental changes.
- Print components become fatigued. All consumable components have a finite life span. As these items reach the end of their useful life, their ability to produce consistent print quality diminishes.



## Color Selection Process

The actual color is selected in the software application, but the operating system may convert or modify some characteristics of the color before sending the information to the driver. Some applications will bypass the Printer Driver altogether.

The driver may modify color characteristics depending upon the selected output mode.

Any color characteristics not addressed by the driver or software applications are set to the printer default. The default color may not match the selection.

## Matching Screen Colors

Matching input, on-screen, and output colors is a very sophisticated process. The input device (scanner, keyboard, or mouse), software application, and output device each influence or limit the ability to select and produce printed color output.

To improve color matching between the printed output and the monitor:

- Turn OFF any color matching features in the software application.
- Avoid light colors which the software application may interpret as white.
- Avoid dark colors which the software application may interpret as black.
- Select the custom colors option in the driver (manual color) and change the halftoning options to vary the shading and quality of the colors.
- Use the color calibration system in the printer driver to match the printer to the characteristics of the monitor. This is available through the manual colors option.

### **Inconsistent Colors**

If the color of successive printouts is inconsistent:

- Verify the same colors are selected for each printout.
- Verify the software application is working correctly by printing a color file from another application.
- Verify that the same paper is used for each printout. Differences in paper may affect color output.
- Verify the printer is working correctly by Printing a self test page and verifying the colors are not faded or bold.

### **Carry-Out (loose carrier)**

Carry-out (loose carrier on the page) can be diagnosed by feeling the page for the gritty feeling carrier. Loose carrier on the page indicates a poor connection to the Print Drum charging grid. Check the drum contacts. Pull the spring contacts up to within 1mm of the top of the plastic housing. If the carry-out persists, replace the Print Drum.

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## Image Defects

In this section, all references to horizontal (Figure 7-14, item 1) and vertical (Figure 7-14, item 2) directions of print quality problems either in text or graphics refer to problems found on letter, A4, or executive-size media.

If you are using legal, A3, or tabloid-size media, the media is fed into the printer in a different direction, so references to the horizontal (Figure 7-14, item 1) will appear in the vertical direction (Figure 7-14, item 3) on legal, A3, and tabloid-size media. Also, references to vertical (Figure 7-14, item 2) will appear in the horizontal direction (Figure 7-14, item 4) on these media sizes.

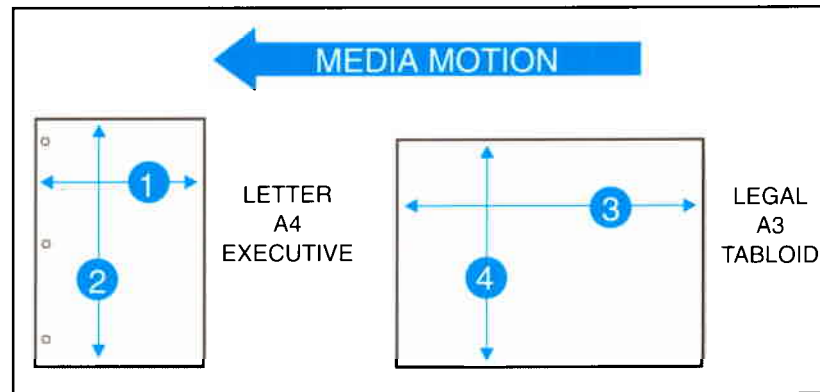


Figure 7-14 Image Orientation and Direction of Travel

## Incorrect Registration (Late or Early Print)

Incorrect registration is characterized by the image being offset from the left side of the page.

1. This defect is caused by problems in the paper registration mechanisms. See the “Paper Path Troubleshooting” section for information on registration mechanism problems.
2. Cam timing can also cause this problem. Refer to Chapter 6 for information on cam timing.
3. If the registration error is small, and consistent on every page, small changes in registration can be made with the REGIST ADJUST feature of the Service Mode. Refer to the “Aids to Troubleshooting” and “Paper Path Troubleshooting” sections for information on REGIST ADJUST.

---

### Note

The REGIST ADJUST function should not be used until all other causes are eliminated and the offset is consistent on every page.

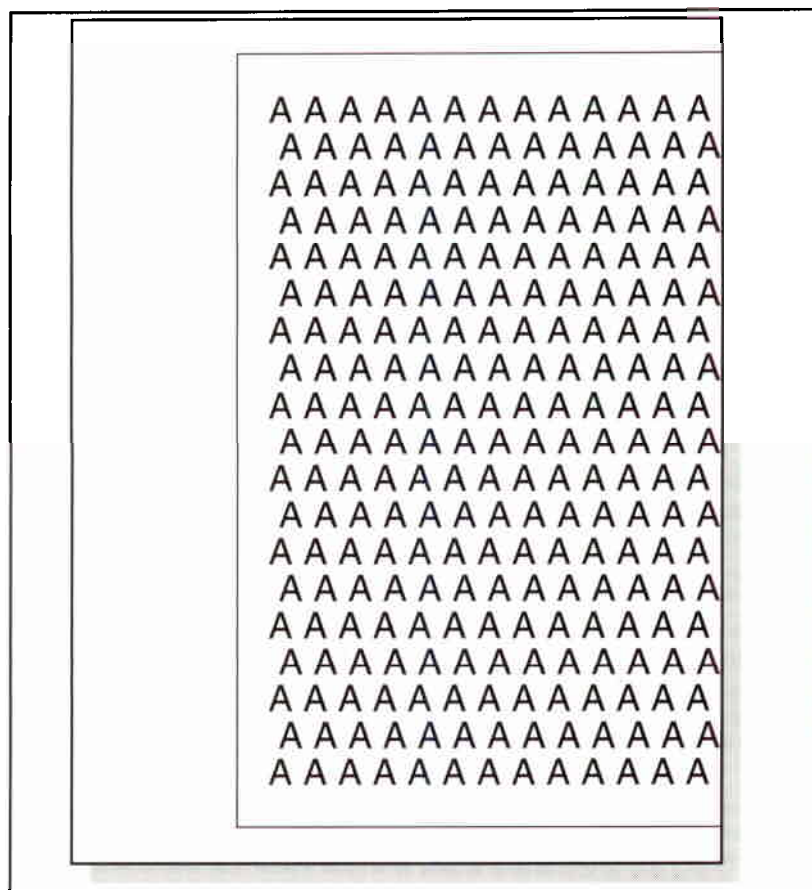


Figure 7-15 Incorrect Registration (Late Print)

## Incorrect Registration

Incorrect registration is characterized by the entire image being offset from the leading edge of the page. This will be the left edge for letter, A4, and executive media. It will be the top of the page for legal, tabloid, and A3. Before troubleshooting incorrect registration as an engine problem, check the margins and image placement in the software application. If the same file consistently prints in the wrong location on the page, suspect a software problem. If the file is a PostScript file, see “Improperly Sized Image” under the “Image Defects” section.

If the image is late on the page, the paper is arriving at the drum/transfer interface too soon. Troubleshoot this problem as follows:

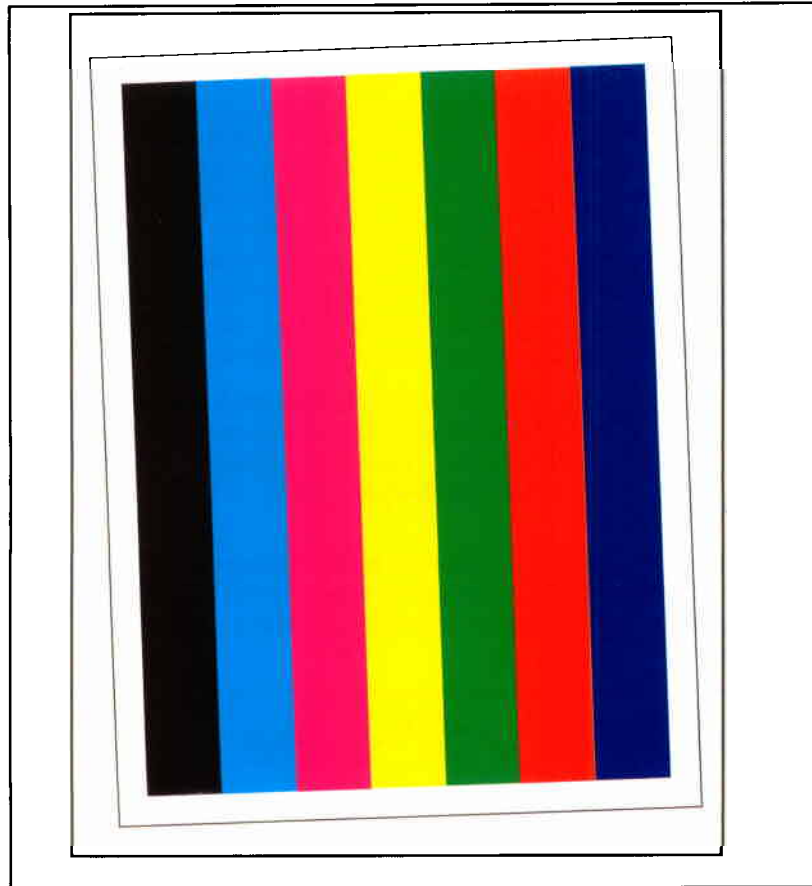
1. Inspect the Registration Plate for burrs.
2. Ensure that the Registration Plate moves freely throughout its range of motion. If the Registration Plate sticks anywhere in its motion, check the solenoid linkage. Replace the solenoid and linkage if necessary.
3. Check that the Registration Plate moves all the way up. If it moves only part way up, the paper can cross the Registration Plate too soon. When the solenoid plunger is released from the solenoid it should touch the rubber stopper behind the linkage and the Registration Plate will be in the uppermost position.

If the incorrect registration is very small, and is off by the same amount on each page, small adjustments are possible. Enter the REGISTER ADJUST mode of the Service Mode (as described in “Aids to Troubleshooting”) and proceed as follows:

1. Enter the desired Register Adjust address from Table 7-2. Addresses 74 and 76 control the leading edge margin for each of the paper sources. The allowable range for values is 35 to 65. For each one count change, the leading edge of the print moves .74 mm relative to the media. Higher values move the image closer to the leading edge of the media.
2. Address 75, 77, and 79 control the start of the laser scan. The allowable range of values is 01 to 99. For each increment of one, the start of the laser scan moves 0.088 mm relative to the media (the scan starts at the left side of the printer). Higher values move the print closer to the top of a letter, A4, or executive page. For legal, tabloid, or A3 size paper, the print starts closer to the right.

### **Image Skew**

The specification for image skew is less than 1.5 mm over a 250 mm span. Image skew may be caused by burrs on the Paper Registration Plate, or paper not feeding from the paper tray correctly.



**Figure 7-16**      **Image Skew**

## Image Skew

- Media condition is a factor in image skew problems. Check that media does not stick together at the edges. Ensure that it meets the media specifications.
- Ensure the paper tray side adjustment lever is adjusted properly against the edge of the Media.
- Check the paper stack tabs in the paper tray (see Figure 7-17).
- Carefully examine the printed output for signs of nicking or folding. These marks may indicate problems elsewhere in the print path. For instance, the inside surface of the Lower Rear Cover is a paper guide. Imperfections in this guide may stop the page inside the printer. Remove the cover and examine the guides. Ensure the cover is properly installed.
- Check the paper pickup rollers for signs of wear, such as glazing and cracking. Replace the pickup rollers, if necessary.
- Check the Paper Tray Transport Roller for wear, proper spring position, and even pressure from side-to-side.

### Note

There are two sets of Transport Rollers which should be checked. One set is accessed from the lower rear cover. The other is next to the OHT sensor and registration plate.

- Check the Registration Plate for burrs. Ensure that it is not bent or damaged. Ensure that it moves freely up and down. Replace the Registration Plate if any of these defects are found.

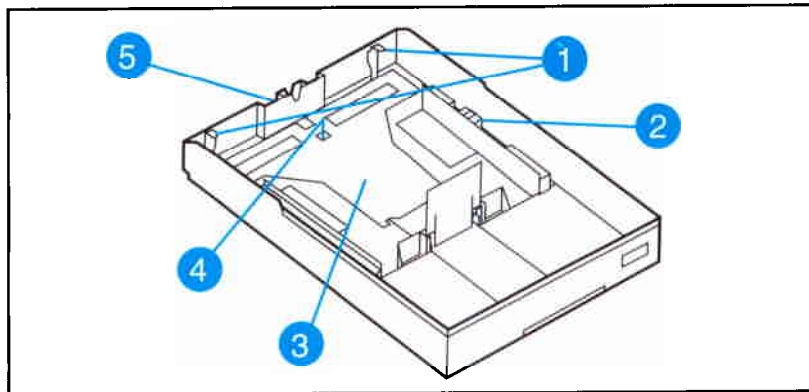


Figure 7-17 Paper Tray Components

- |                         |                              |
|-------------------------|------------------------------|
| 1 Paper Stack Tabs      | 4 Tray Locking Mechanism     |
| 2 Side Adjustment Lever | 5 Tray Size Switch Actuators |
| 3 Counterbalance Plate  |                              |



## Improperly Sized Image (PostScript only)

Improperly sized images may be caused by defective paper tray microswitches. The paper tray microswitches tell the Formatter what size media is installed. This information is used to format the print image to the installed paper size. If the paper tray microswitches are defective, the PostScript image will be formatted incorrectly. See Chapter 5 for the location of the paper tray microswitches, and perform the tray size functional test as shown below.

### Paper Tray Size Functional Test

Use the Status/Test feature of the Service Mode to check the function of the Paper Tray Size Switches. See the Status/Test address table in this chapter for information on this test. To test the Paper Tray Switches:

1. Power cycle the printer and enter the Service Mode as shown in the “Aids to Troubleshooting” section.
2. Select the Status/Test mode function of the Service Mode.
3. Input the Paper Size Switch test code (15 for tray, 16 for the RFU), and press **Enter**.
4. The logic state of the switches is displayed on the Control Panel.
5. Remove the paper tray and depress each of the Paper Tray Size Switches. The Control Panel Display should change as shown in the Status/Test address table of the “Aids to Troubleshooting” section.
6. Check the paper tray size indicator tabs on the paper tray.

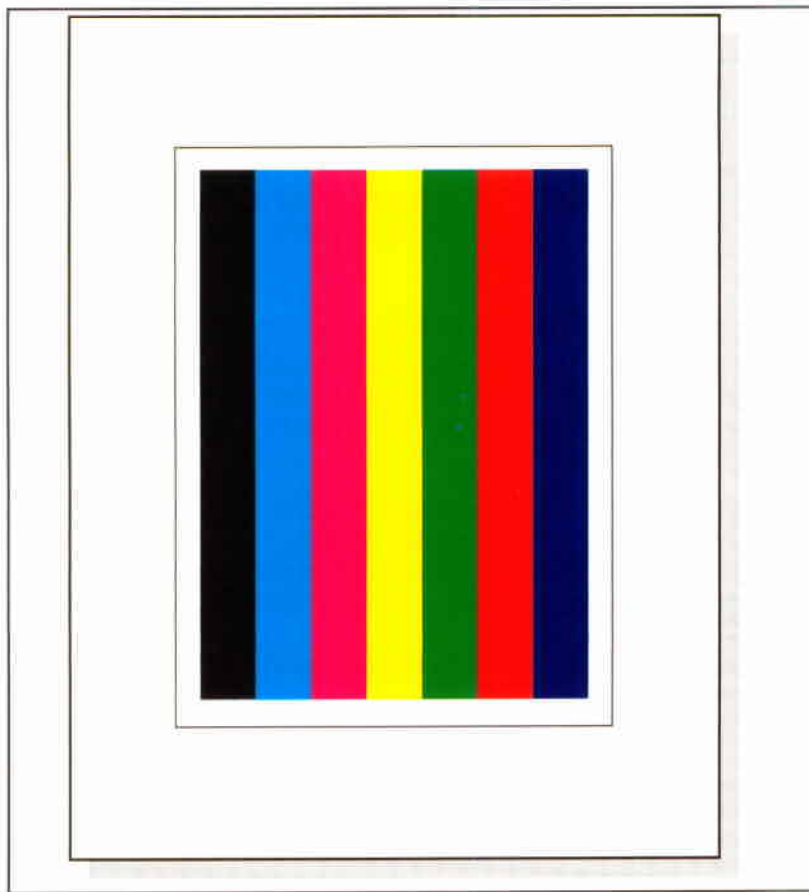


Figure 7-18 Improperly Sized Image

## Blank or Partially Blank Page

Partially blank pages may result when the Developer Spacing Rollers do not seat firmly against the Print Drum. When the Top Cover is closed the load springs press the Developer the Print Drum. If this spacing is incorrect, less toner is attracted to the Print Drum, resulting in faint print. Check that the developers move freely (front to back) in the developer housing. The Developer Spacing Rollers are visible in Figure 7-19.

Also check that the cam timing is correct (as shown in Chapter 6). If the gear train has not been disassembled, check that none of the gears are broken, such that the timing may have changed.

Check the Print Drum drive gear engagement. Listen for the sound of slipping (grinding) gears. Inspect the Print Drum drive gears for signs of wear. See the Drum rotation Functional test shown in the “Aids to Troubleshooting” section. Replace the Print Drum and the drive gears if necessary.

Check for 18.5 and 18.6 Reinsert Developer errors. These errors indicate that the developer is not rotating.

If the page is completely blank, the Transfer Cam Solenoid may be stuck or broken. In this case, the image will not be transferred to the media. Use the Service Mode test address (53) to test the Transfer Cam Solenoid.

In addition watch for the following:

- **Media meets the specifications** listed in the *HP LaserJet Printer Family Paper Specification Guide*.
- **Media multifeeds.** Use the continuous self test to prove the printer feeds paper reliably. Rough media or light media may multi-feed, resulting in blank output.
- **Host communications problems**, or problems in network configuration.
- **Banner pages and form feed commands** in the software.
- **Number of lines per page is correct.** Too many lines per page result in “creeping text.” In this condition, each successive page begins its print further down the page. Part of each page will be blank.
- **Laser/Scanner failure.** (This will have an associated message.)
- **High Voltage failure.**

### Sequence of Blank Page Tests

To troubleshoot blank pages, perform the following (in order):

1. Run a half self test as shown in the “Aids to Troubleshooting” section of this chapter. If the image is developed on the Print Drum, the Laser/Scanner and developer systems are working. Check that:
  - a. The Transfer assembly is functional.
  - b. The cam timing is correct.
  - c. The High Voltage Power Supply is operational.
2. If no image is present, refer to the High-Voltage Checks section for information on troubleshooting Developer high-voltage failures. Also check that:
  - a. The Print Drum rotates correctly.
  - b. No 18.5 or 18.6 errors have occurred.
  - c. The Developer Spacers are free.
3. With the Service Mode (test address 53), check that the Transfer assembly Cam Solenoid is working.
4. If the image is developed on the Print Drum, and the output is blurry, or very faded, the Transfer Corona voltage may be missing. Replace the HVPS followed by the Transfer assembly if necessary.

### Horizontal White Lines (in one color)

Horizontal White lines on black and white printed output occur when relatively large foreign particles become stuck between the Black Developer sleeve and the metering rod. The foreign matter prevents toner from coating the developer roller. Remove The developer to see if it has a clean stripe where the foreign matter is wedged (see Figure 7-19, item 2). To remedy this problem, remove the developer from the printer. Locate the drive gear for the failing developer and turn the gear counter-clockwise as you face it (see Figure 7-19, item 1). If the failure persists, replace the developer.

Horizontal lines in colored output occur for the same reason as described for black output. The lines occur in primary and process color. For example, a particle in the magenta developer will create a white (or light) line in magenta areas. In colors that use magenta, the magenta will be missing leaving a yellow line in a red area, or a cyan line in what should be a blue area. Figure 7-20 shows the result of a defect in each of the four developers.

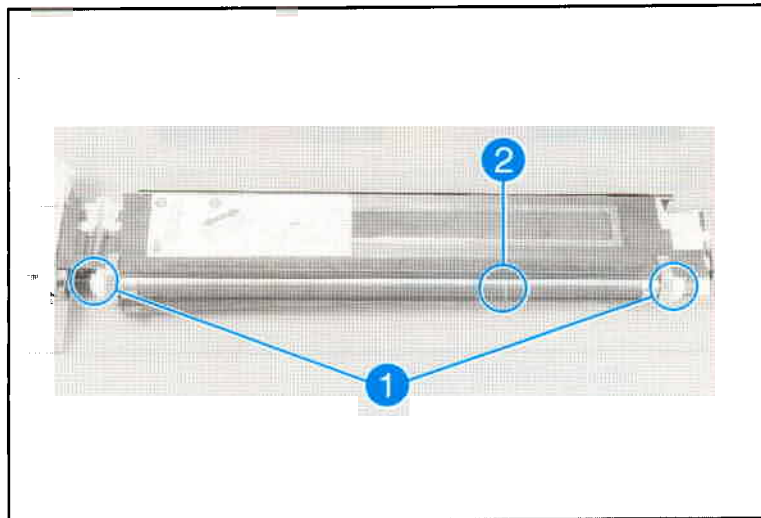


Figure 7-19 Developer with Foreign Material Causing White Stripe

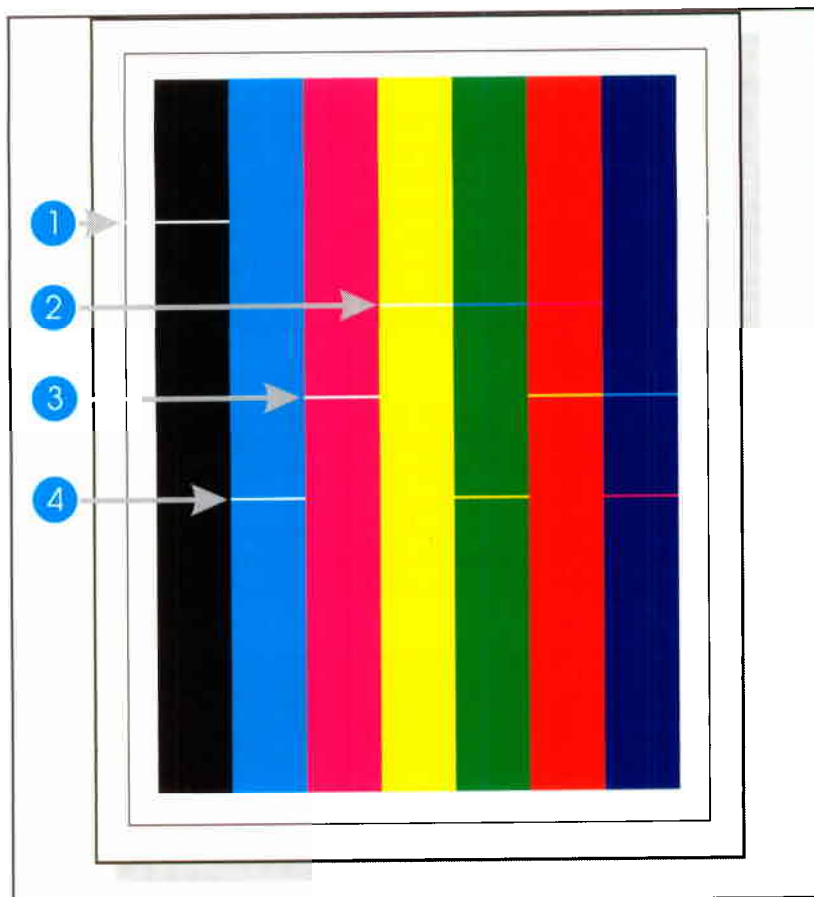


Figure 7-20 Horizontal White Stripe

Table 7-5 Developer Defect Colors

#/Developer	Black	Yellow	Magenta	Cyan	Red	Green	Blue
1 Black	X						
2 Yellow		X			X	X	
3 Magenta			X		X		X
4 Cyan				X		X	X

## Horizontal Lines (all colors)

- Poorly defined (fuzzy) horizontal lines in all colors result from toner dust on the Laser/Scanner window (see Figure 7-21). Clean the Laser/Scanner window as shown in Chapter 3.
- Charging Corona/Grid contamination. Sharp, crooked, or random horizontal lines indicate contamination. Clean the Print Drum Corona Wire (only on new style drum).
- Horizontal lines also occur when debris is in the fusing assembly.
- Contamination of the Transfer assembly. Clean the Transfer Corona Wire. Replace the Transfer assembly.

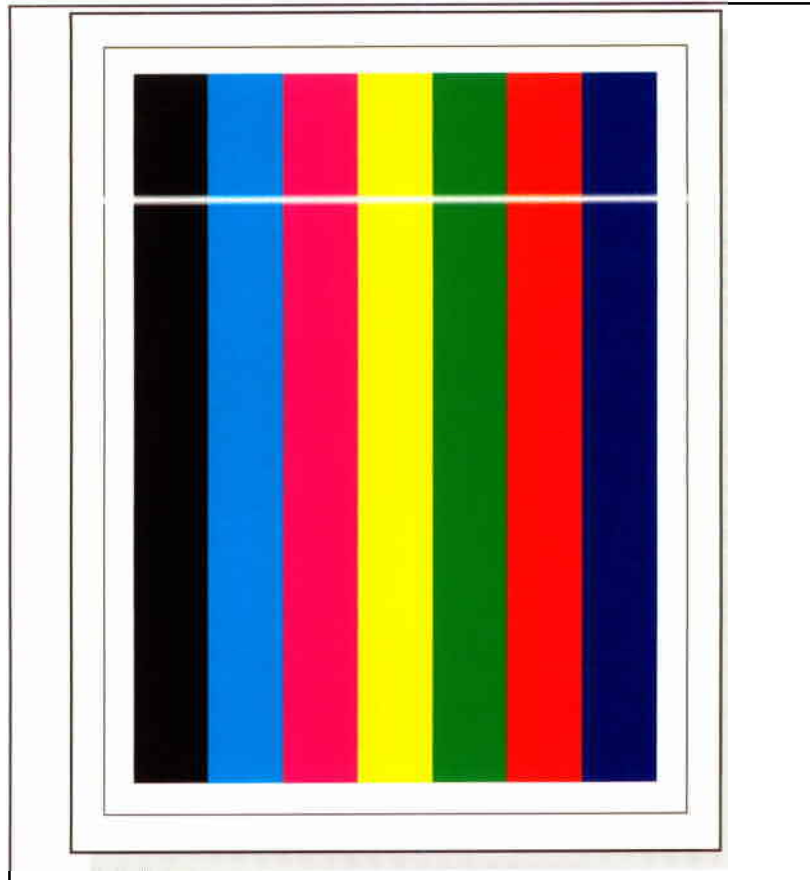


Figure 7-21 Horizontal Lines in All Colors

## Ring Marks

This defect appears as small rings, or circles on the printed page. Ring marks may be caused by small particles in the developer.

1. Run the demo page for 20 to 30 pages to isolate the problem to a specific color. Replace the appropriate developer which exhibits the problem.
2. Check the environment for sources of contamination. For instance, printing in an area that is subject to fine metal particulates, metal filings, or metallic debris will cause ring marks.
3. Sudden rises in ring mark frequency may indicate wear in a component. Keep this in mind when troubleshooting ring mark defects in printers that have no history of ring marks.
4. Check the age of the developers, and replace any that are past their maximum life.



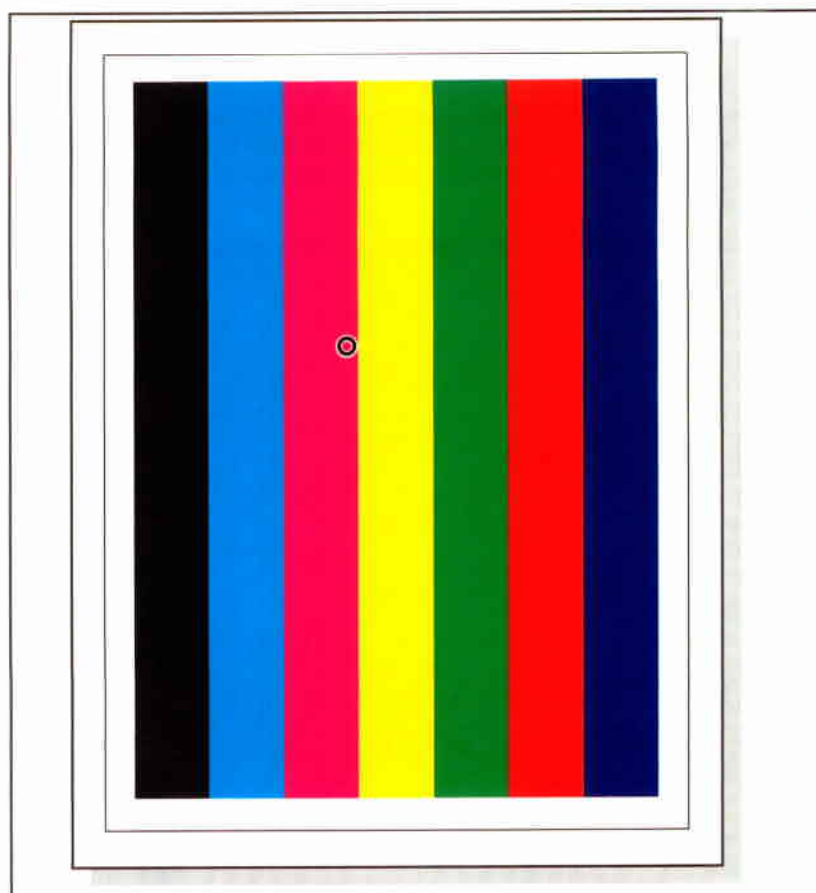


Figure 7-22 Ring Mark Print Defect

## Wavy Characters

Wavy characters are caused by scanner wobble. Mechanical instability in the scanner mechanism or the optics can cause wavy characters. Reprint the job to ensure that the problem persists. If the failure remains, replace the Laser/Scanner assembly.

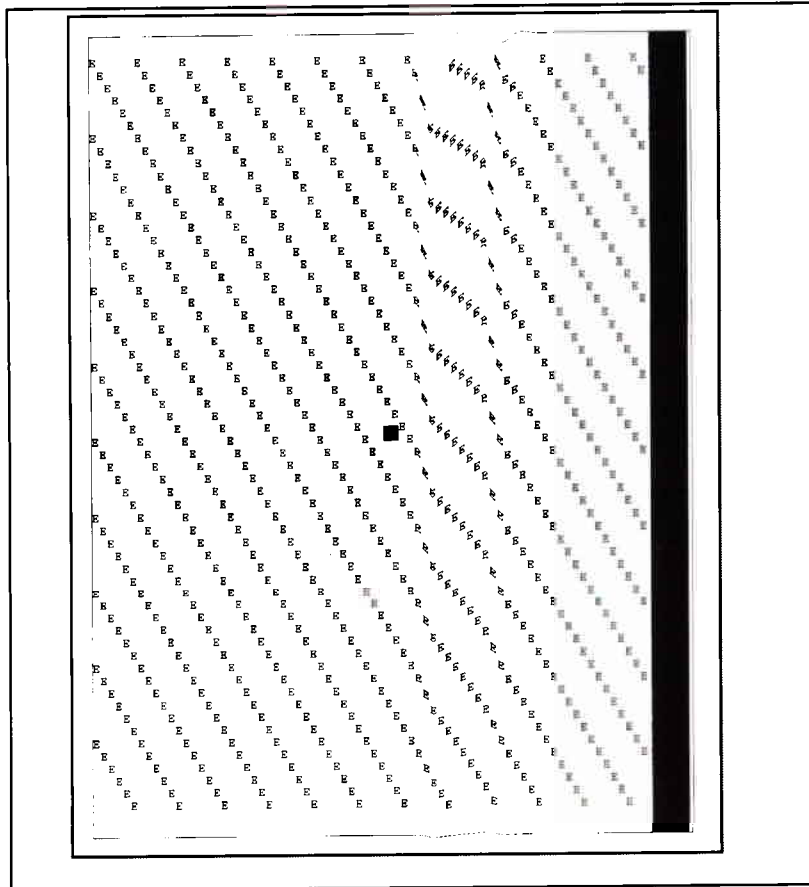


Figure 7-23 Wavy Characters

## Cleaning Blade Failure

(See also, "Smeared Print.")

Cleaning Blade failures are characterized by light smears in the horizontal axis of the page. This failure is more pronounced on heavy toner filled, and multi-color pages. If this defect occurs, replace the Print Drum.

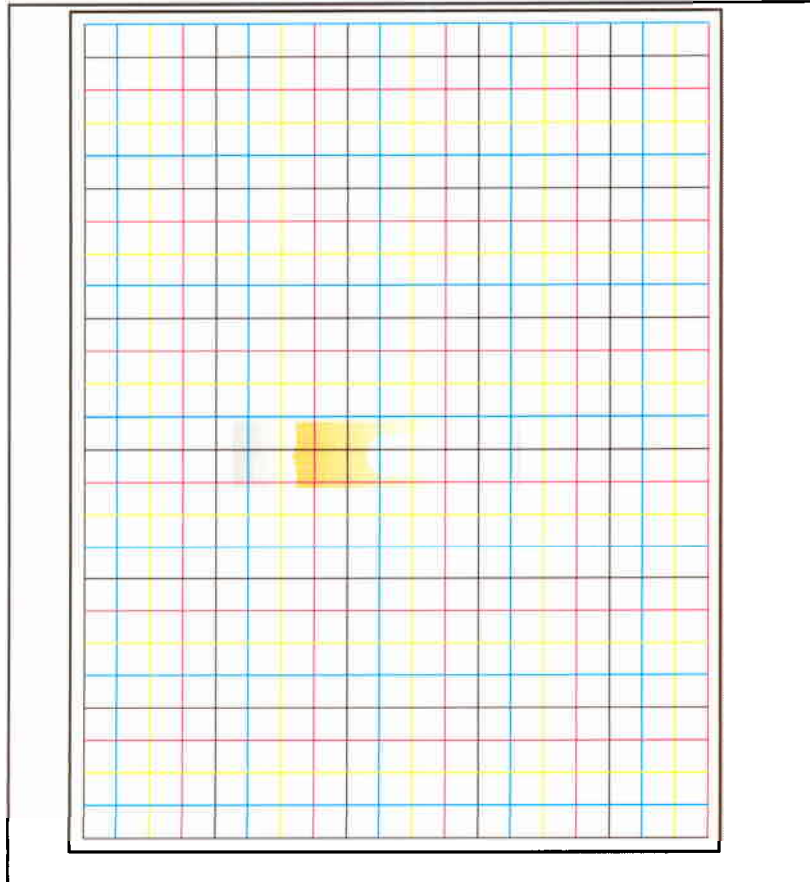


Figure 7-24 Cleaning Blade Failure

## Smeared Print

(See also “Cleaning Blade Failure,” and “Leading/Trailing Edge Smear.”)

1. Check that the paper path is clean.
2. Smeared print can result from bent corners on the page.  
During the paper pick, particularly on rough media, the corner of the page may be bent. If the page retains the bend as it enters the Fuser, print in the area of the bend may smear. Ensure that the paper is correctly loaded in the paper tray. If the defect persists, turn the paper stack over and end-for-end. Finally, try another media type.
3. Check that the media meets the specifications listed in Chapter 2. Rough media is most likely to show this defect.
4. Check that the Fuser does not have toner build-up on the inputs. Clean any loose toner accumulated around the Fuser.
5. Inspect the pre-transfer brush, and replace it if it has any toner build-up.

### Note

Severely smeared print may indicate that media is stuck under the cleaning blade, inside the Print Drum. If this is the case, the Drum Wrap sensor is defective and the surface of the Print Drum may be damaged. Run the half self test. If the print is smeared on the drum surface, replace the drum.

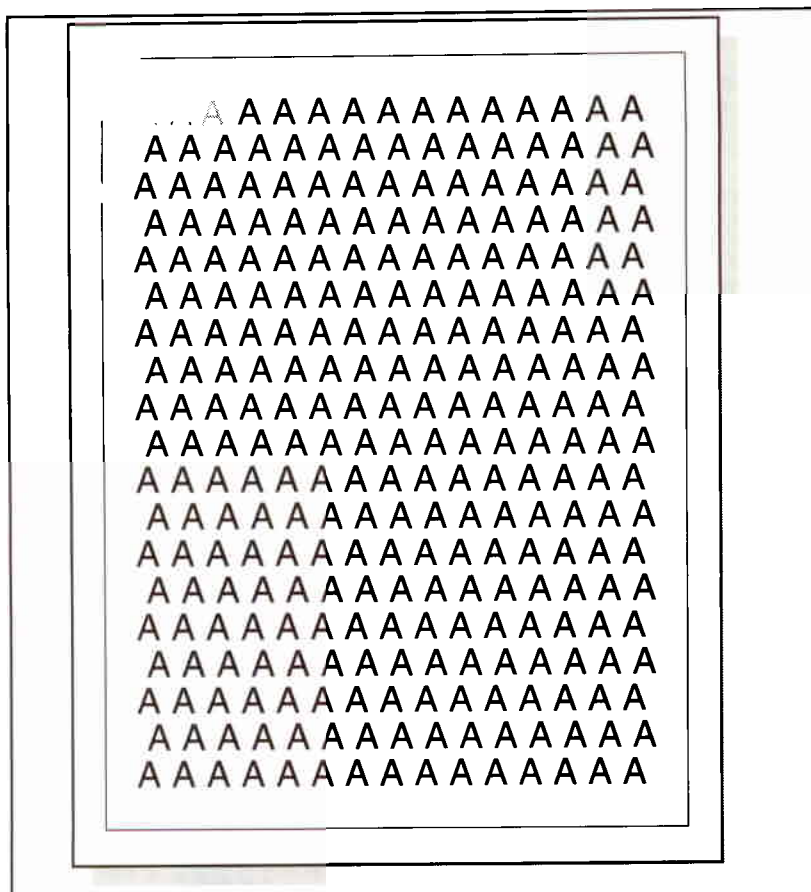


Figure 7-25      Smearred Print

## Leading or Trailing Edge Smear

Toner accumulation on the paper charging brush causes the leading and trailing edge of the printed output to be smeared with loose toner.

1. Thoroughly clean the printer (including the paper-charging brush).
2. If the media size has been changed (such as from legal or executive to letter) print 5 to 10 pages to clear the smearing.
3. If a paper jam has occurred recently, or the printer had a multi-feed, print 5 to 10 pages to clear the smearing.
4. Replace the paper-charging brush if this defect persists. Print 20 to 30 self test pages to prove the repair.

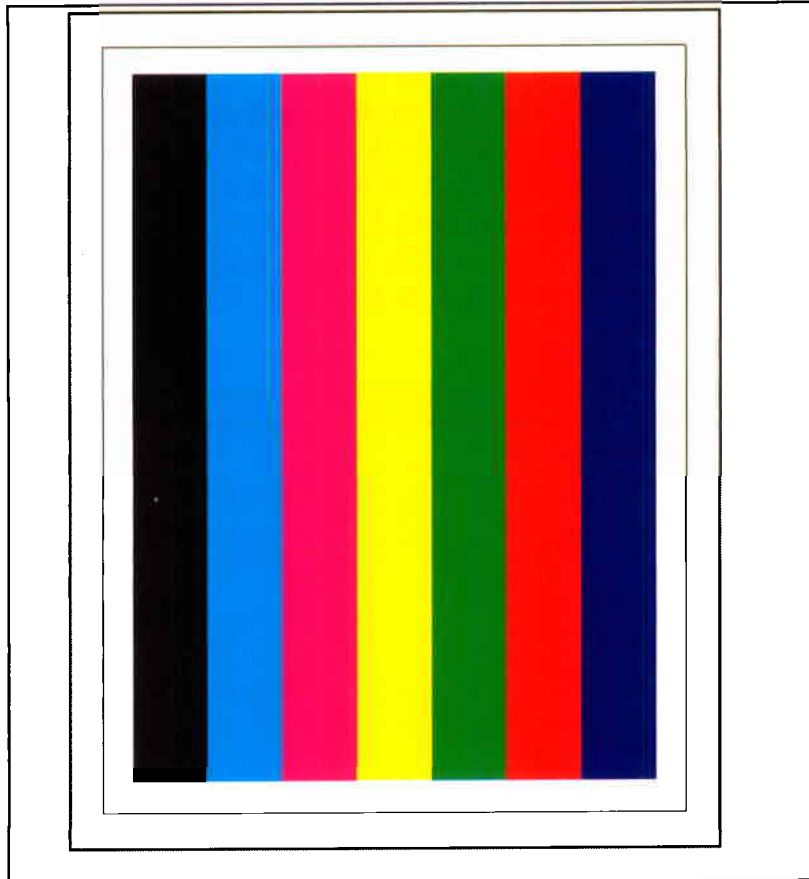


Figure 7-26      Leading or Trailing Edge Smear

## Poor Fusing

(See also “Background Scatter.”)

Poor fusing is characterized by loose toner on the printed output. Unfused or poorly fused toner can be easily wiped off the page. This is usually most obvious on the trailing edge (the right side) of the page. When troubleshooting this problem:

1. Check that the media is within the weight and smoothness specifications listed in the *HP LaserJet Printer Family Paper Specifications Guide*.
2. Check that printer does not multi-feed. If more than one sheet enters the Fuser, toner on the top sheet may not fuse. (See the multi-feed information in “Paper Path Troubleshooting.”)

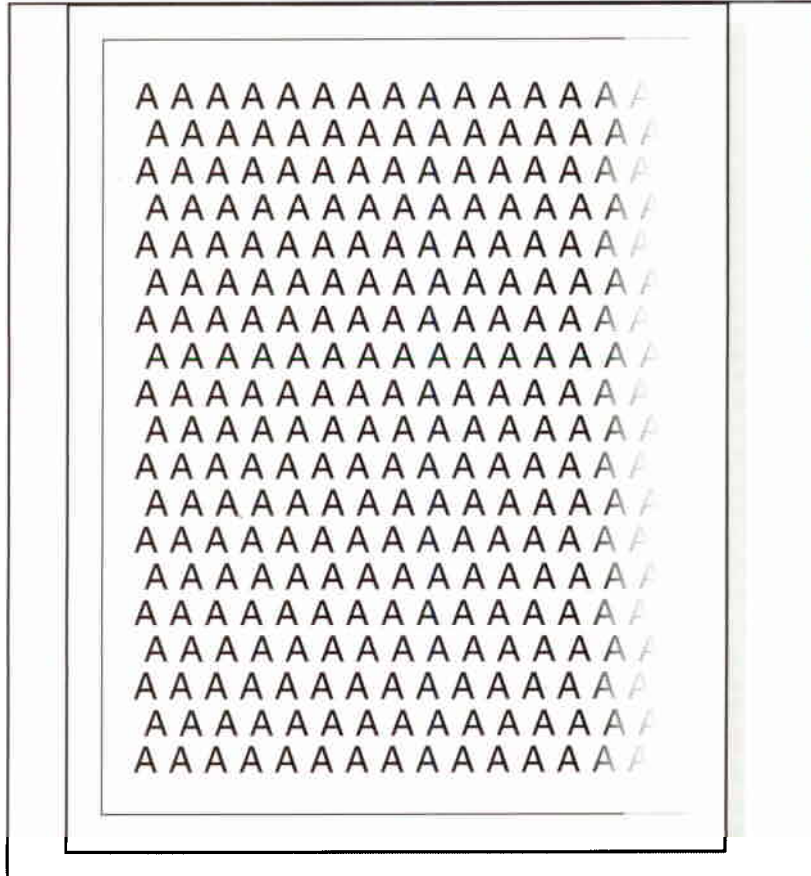


Figure 7-27 Poor Fusing

## Ghosting

Ghosting appears as a latent image of previously printed material on the page with the currently printed text or graphic. It also may look like a repetitive defect. This defect occurs when using a Print Drum past its maximum life. Consumable life information appears on the self test page.

If the Print Drum is within its maximum life, thoroughly clean the printer. If it is past its maximum life, replace the Print Drum.

### Note

Check that the user is not printing the same pattern repeatedly. Repeat patterns shorten the life of the Print Drum.

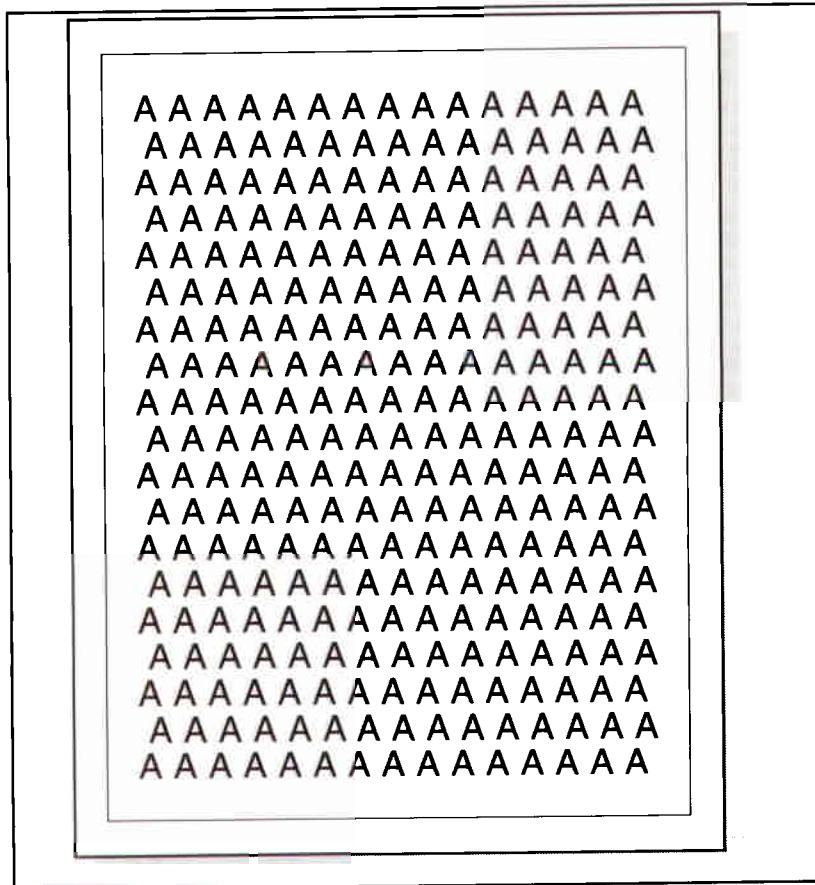


Figure 7-28

Ghosting Print Defect



## Black or Dark Brown/Orange Page

Totally black (or brown/orange pages in color applications) may result from failure of the Print Drum charging system. If the page is not totally black, and/or the image clears up in a few pages, the Print Drum charging system may be shorting intermittently. The HVPS may also be failing. Also, the page may be streaked with color, with the text readable through the color.

1. Check that the Print Drum does not have toner accumulated under the housing. Carefully clean the housing if necessary. (Use the cloth provided in the Collection Kit.)
2. Check that the Transfer assembly is clean, with no areas contaminated to the point of shorting. Carefully clean the Transfer assembly area if necessary.
3. Run at least 10 pages of the self test. If the defect persists, replace the Print Drum.
4. Check the HVPS connections. Ensure they are clean and in good repair. Stretch the high voltage spring contacts to within 1 mm of the top of the plastic housing.
5. Loose carrier on the page indicates a poor ground connection on the Print Drum high voltage circuit. Clean the printer and reinstall the Print Drum. If the carryout persists, replace the Print Drum.
6. Check the connectors between the formatter and Control Board for bent or misaligned pins.

## Black/Brown/Orange Bands

Black, brown and/or orange stripes (horizontally or vertically) across the page are caused by light leaking into the printer, and onto the Print Drum. This happens while the covers are off, such as when servicing the printer. Generally the Print Drum will recover from exposure to room light, but the useful life of the Print Drum may be reduced. This defect is usually gradated along the page, with no clear starting or stopping point. If the brown/orange defect is not limited to a definite horizontal stripe, it may be necessary to replace the Print Drum. Print Drum failure is also characterized by a black page.

### Caution

Ambient room light can permanently damage the Print Drum. Store the Print Drum in total darkness to protect the photosensitive coating.

### Note

The Black/Brown/Orange band defect may also indicate a High Voltage Power Supply problem.

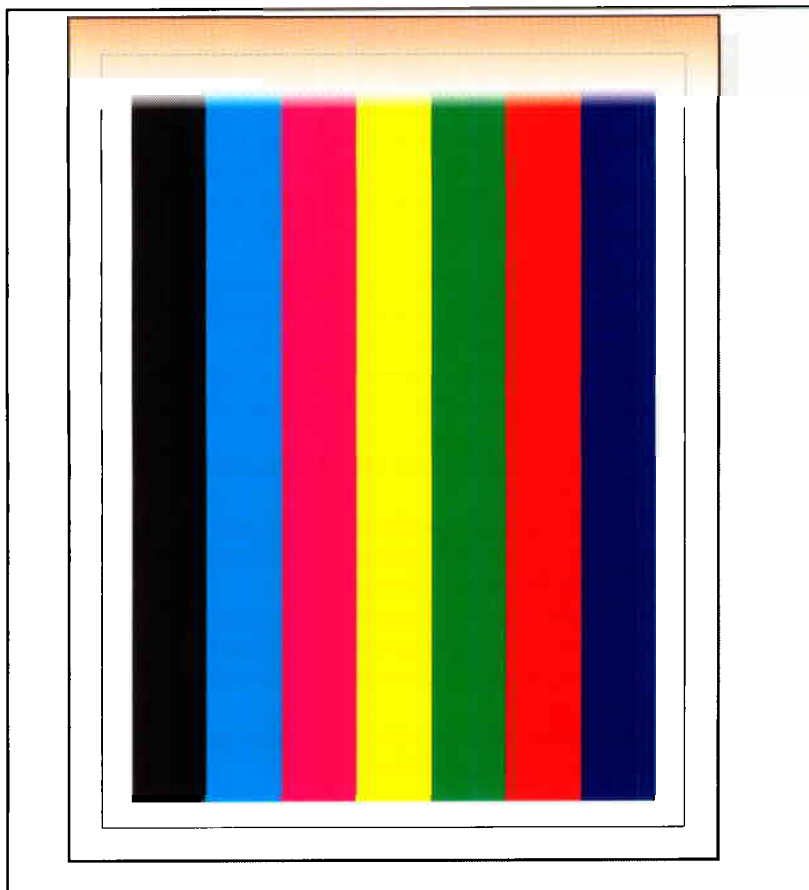


Figure 7-29 Brown and Orange Print Sample

## Yellow or Black Streaks

(See also “Horizontal Lines.”)

Yellow and black streaks on the printed output are caused by:

- A Print Drum that is past its maximum life.
- Printing in a low humidity environment for extended periods of time.
- Oxide buildups on the Print Drum Charging Corona Wire.  
Clean the Charging Corona if a new style drum is installed.

Replace the Print Drum if this problem persists.

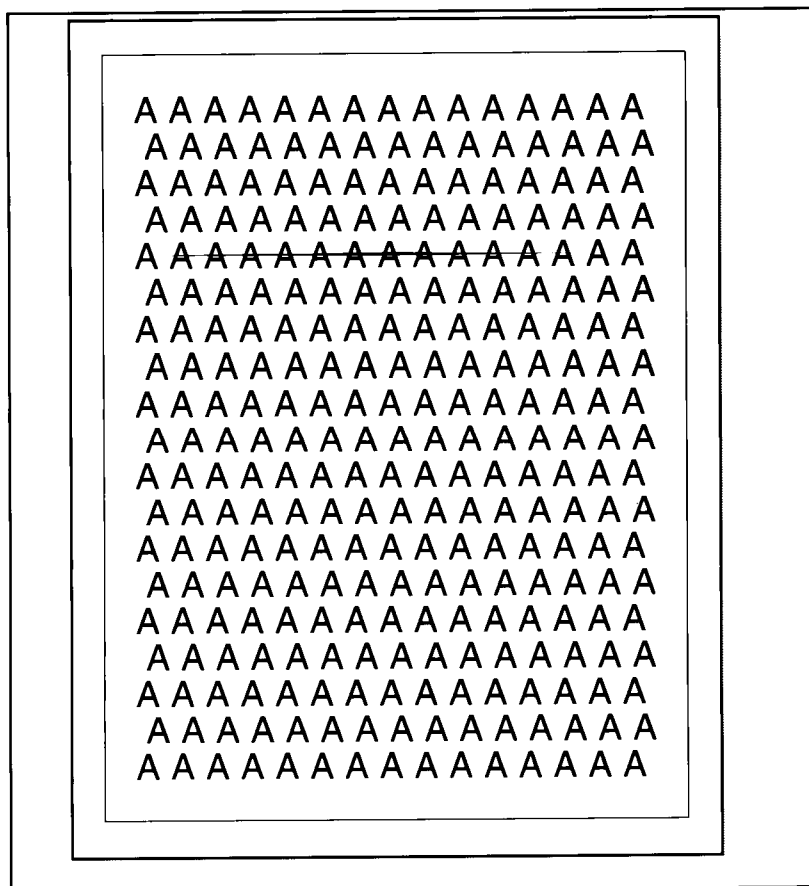


Figure 7-30 Black Streak Sample

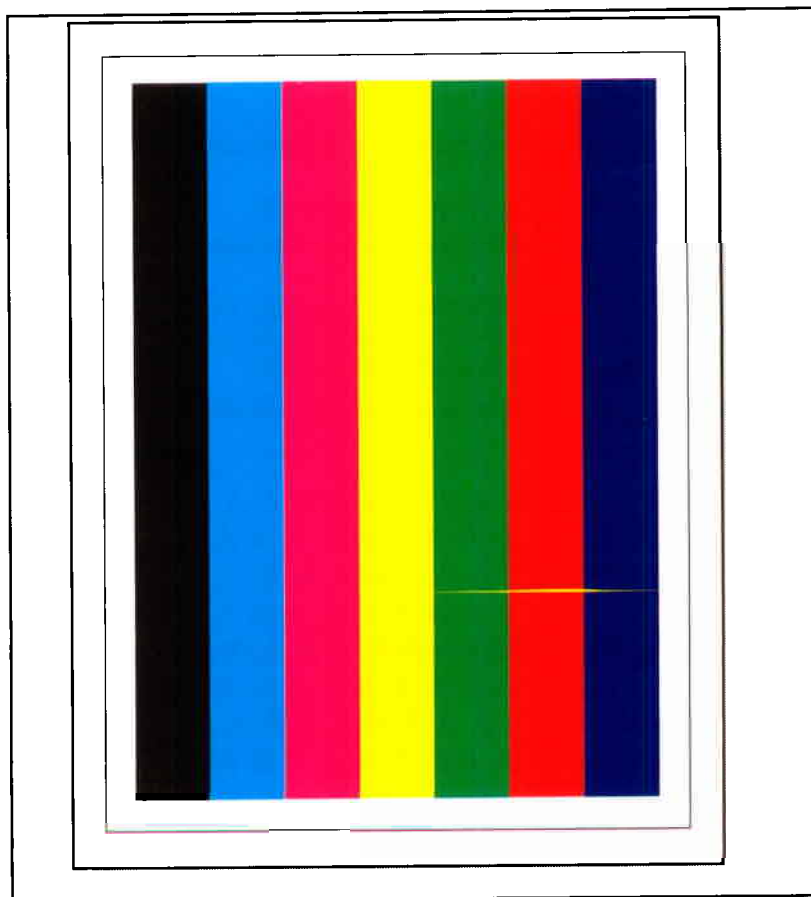


Figure 7-31 Yellow and Black Print Sample

## Background Toner Scatter

This defect appears as haze around text and graphics. It may occur with any color. Thoroughly clean the printer, and ensure the defect persists before troubleshooting. See the Toner Contamination information in the “Aids to Troubleshooting” section. To troubleshoot background scatter:

1. Ensure that the media meets the specifications in Chapter 2. Some papers (especially recycled paper) have specks in them as manufactured. Compare printed and unprinted media for pre-existing specks.
2. Check that the humidity reading shown on the self test is within the specification listed in Chapter 3. Refer to the “Aids to Troubleshooting” section for the Humidity Sensor Test procedure.
3. Check connection between drum and high voltage power supply for contamination.
4. Replace any developer past its maximum life.
5. The toner concentration is temporarily too high. This can happen if both the Fuser and developer are new. This condition corrects itself after about 100 pages. If it does not, refer to the Developer Rotation and Toner Concentration information listed under “Faint Print,” earlier in this chapter.
6. The Transfer Belt is not fully engaged with the Print Drum. See “Checking the Cam Timing” in Chapter 6.
7. Replace the HVPS.

---

### Note

Feel the page for gritty carrier. Loose carrier on the page indicates a poor connection to the Print Drum charging grid. Check the Print Drum connectors. Pull the spring contacts up to within 1 mm of the top of the plastic housing. If the problem persists, replace the Print Drum.

---

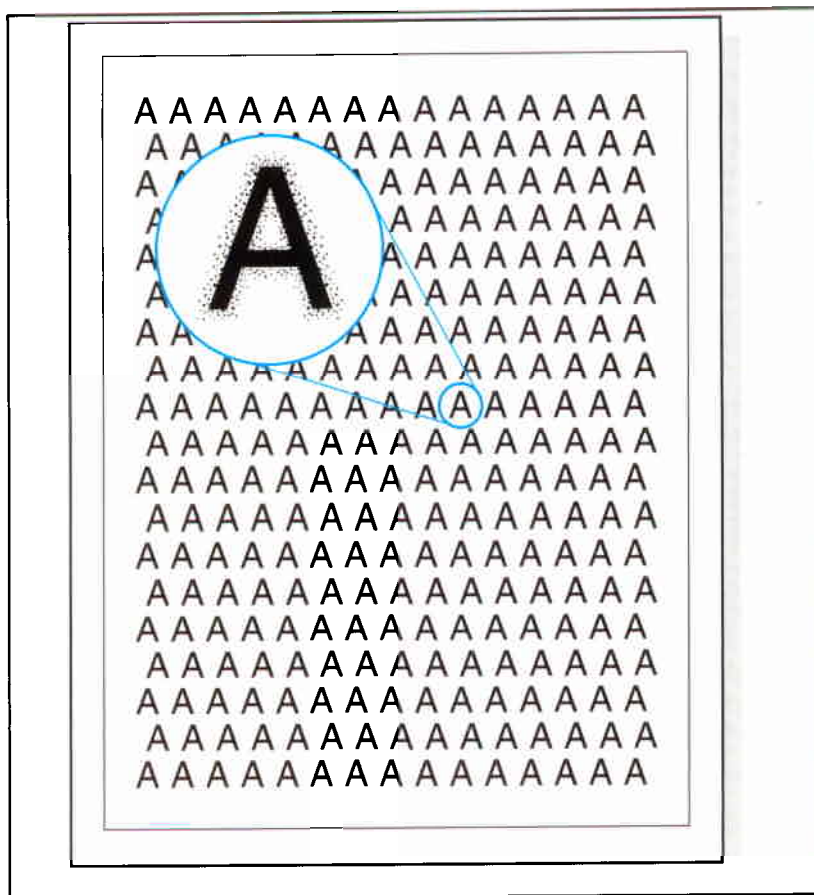


Figure 7-32 Background Scatter

## Speckled Print

Speckled print (or toner popping) defects are characterized by small speckles caused by missing toner. This may be caused by excess moisture in the print media. Prove the cause of this defect by printing with a properly stored ream of paper. Check that the media is stored in a dry area, and is not opened until its ready to be used. Be sure that the printer is not in a humid area. If the defect persists, run a self test page and check the humidity sensor reading. Refer to the Humidity Sensor test in the “Aids to Troubleshooting” section for information.

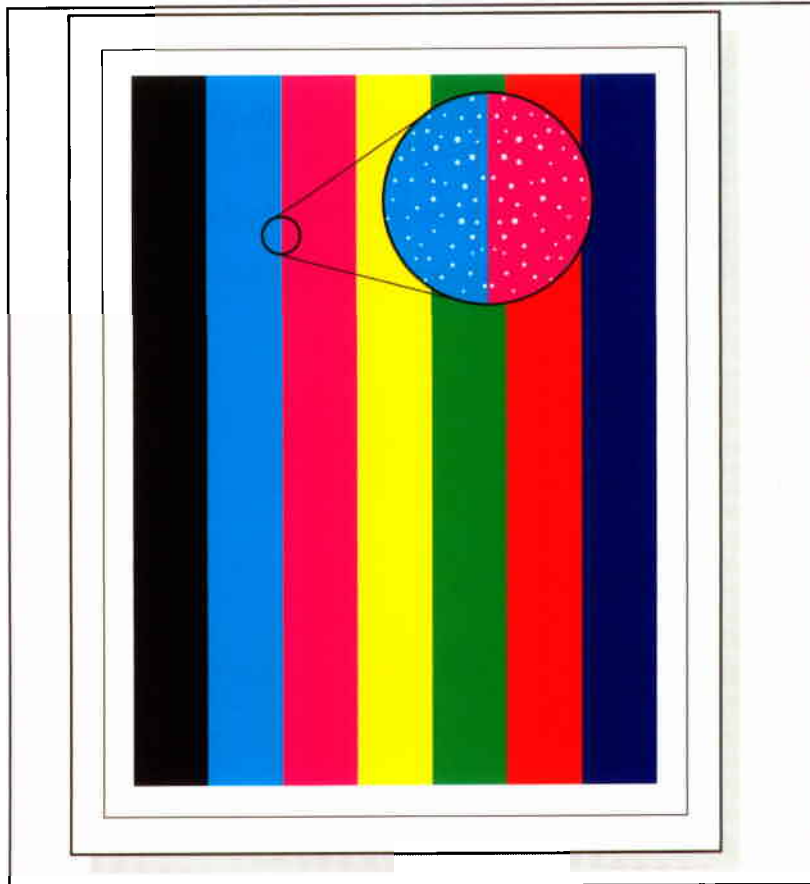


Figure 7-33 Speckled Print Defect (toner popping)

## Mottled Process Colors (Poor Transfer)

(See also “Speckled Print.”)

This defect appears as splotchy light areas in dark colors:

1. Check that the media is within specification. Rough paper, heavy paper, or moist paper can cause this problem.
2. Printing in low humidity also causes poor transfer. Perform the Humidity Sensor tests listed in the “Aids to Troubleshooting” section.
3. Clean the Transfer Corona Wire as shown in Chapter 3, and reseal the Transfer assembly. Oxide build-up on the Transfer Corona Wire adversely affects how the printer transfers the developed image to the page.
4. Select ColorSmart from the driver menu. Business Blue, included in the ColorSmart menu, has more constant transfer characteristics.
5. Change halftone patterns. Some halftone patterns make poor transfer more visible.
6. If the defect persists, replace the Transfer assembly.



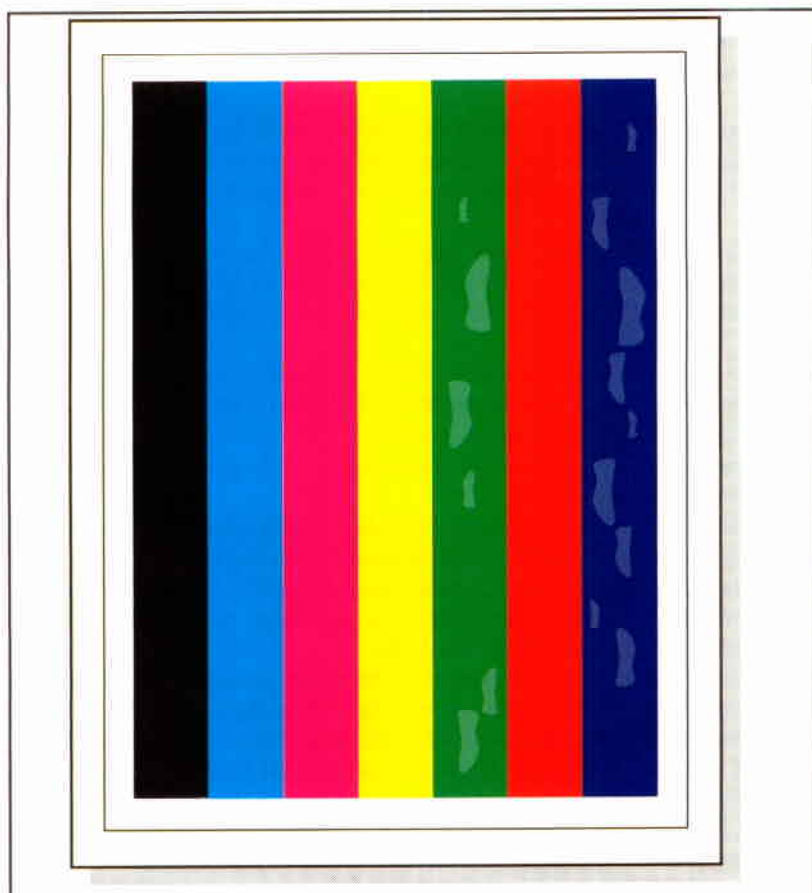


Figure 7-34 Mottled Process Colors

## Faint Print

(See also, Mottled Print and Poor Transfer.)

The Faint Print image is a defect characterized by the image being developed at a reduced print density in any of the primary colors (CMYK). The following steps help to troubleshoot this defect:

1. Manually check the toner hoppers to see if any are empty. An empty toner hopper without the message to add toner is an indication of a failed toner hopper sensor. Replace the sensor and add toner.
2. If all the toner hoppers have toner in them, check the toner supply augers for correct operation. To do this:
  - a. Remove the toner hopper cover.
  - b. Inspect the augers from the hopper to the developers for kinks or bulges.
  - c. Rotate the large gear on the side of each hopper one turn checking to make sure the auger inside the tube turns.
  - d. Remove the developers and check the ends of each auger tube for clogged toner. Remove any toner which may be packed into the end of the tube.
  - e. Check the toner hopper select mechanism and the toner supply mechanism for correct operation by running multiple demo pages while watching these mechanisms.
  - f. If either mechanism fails to operate, see 18.5 and 18.6 Mechanism Alignment Checks earlier in this chapter.
3. The Print Drum may not be fully discharged during the writing process, due to accumulated toner on the Laser/Scanner assembly window. This reduces the laser power that discharges the Print Drum, causing faint print in all colors. Lower the Print Drum and clean the optics window with the tool provided. See Figure 7-35 for location of the laser window.
4. Poor transfer causes faint print in irregular areas of the output. Remove the Transfer assembly and ensure that the connections are clean and that nothing inhibits the Transfer assembly from fully seating. The “half self test” (described in the “Aids to Troubleshooting” section) is useful for determining whether the failure is associated with the Transfer assembly. If the image is fully developed on the drum, then the problem is shown to be in the Transfer assembly.
5. If none of the above items clears the faint print defect, replace the Print Drum.

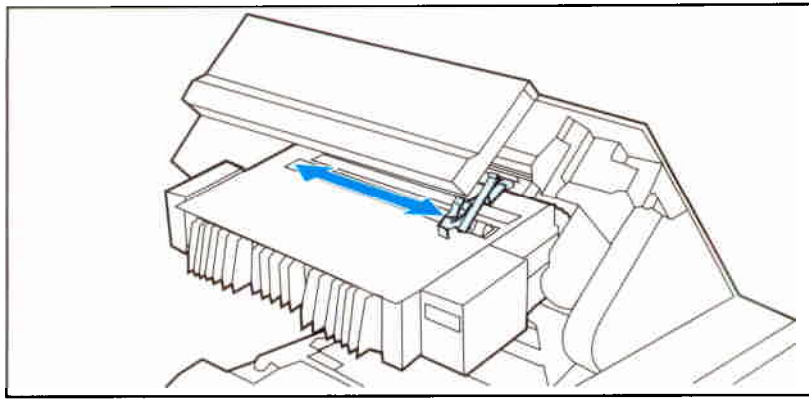


Figure 7-35      Cleaning the Laser/Scanner Window

### Stray Toner

Stray toner, or irregular raised spots, on the printed output occurs when excess toner accumulates around the Fuser and eventually is deposited on the media during fusing. Check for toner accumulation around the Fusing assembly, and clean the assembly if necessary. This defect is differentiated from repetitive defects by:

- Random occurrences.
- Raised pieces of irregularly shaped, poorly fused toner on the page that can sometimes be removed by wiping, or with a fingernail.

Perform the following checks in order:

1. Check the paper weight and smoothness. Rough paper may stick together causing multi-feeds. The extra thickness of multiple sheets of paper can cause poor fusing which deposits toner on the Fuser rollers. This toner comes off on later pages as stray toner. Poor fusing may also occur when printing on heavy paper.
2. Check the coating roller seating. Clean any accumulated toner off the pad and the corresponding position on the Fuser pressure roller.
3. Run a self test and check the age of the coating roller. Replace if necessary.
4. Reseat the cleaning roller and the coating roller.

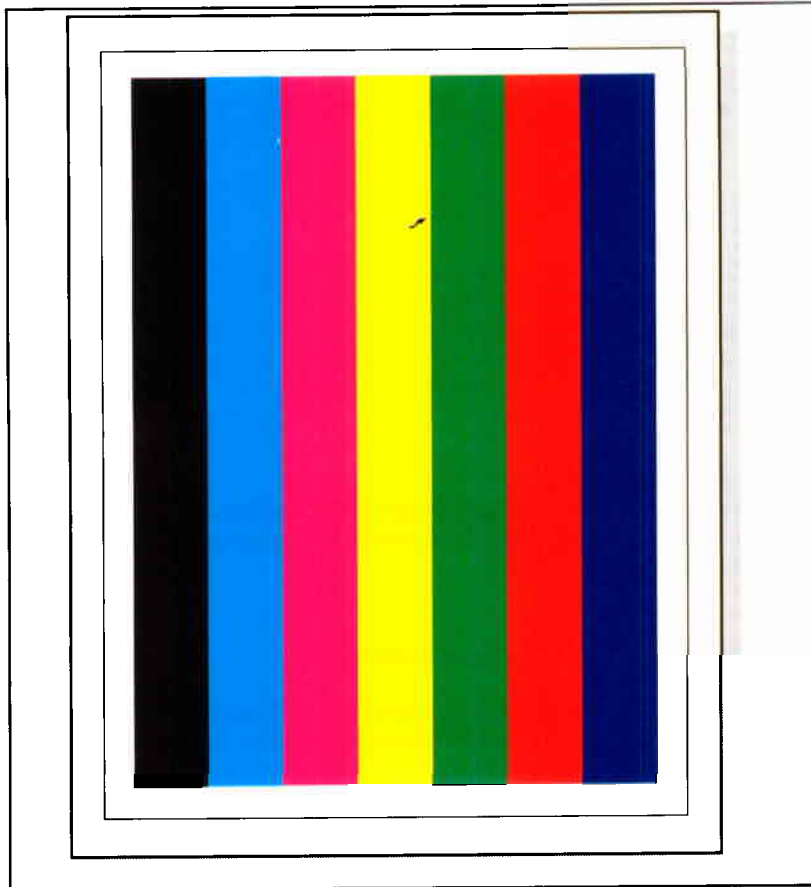
5. Check the error log for fusing errors. If the Fuser does not heat properly, the unfused toner accumulates around the Fuser and is deposited on the page as stray toner.

---

**Note**

If many multi-feeds have occurred, or the printer consistently prints on heavy paper (over 24 pounds, or 90 g/m<sup>2</sup>) it may be necessary to replace the Fuser.

---



**Figure 7-36**      **Stray Toner**

## Large Period Banding

Banding can be caused by old maintenance units, and by worn or damaged contaminated gears.

1. Check the age of the maintenance units. Replace any that have exceeded their maximum life.
2. Clean the Transfer Belt gears and the Main Motor gears.
3. Use a halftone pattern such as the one provided in the ColorSmart selection in the printer driver. Banding is more apparent in some halftone patterns than others.

## Medium Period Print Banding

Medium period banding is caused by developer sleeve runout. slipping of the Developer Drive Clutch in the Developer Drive assembly can generate medium period banding.

## Small Period Print Banding

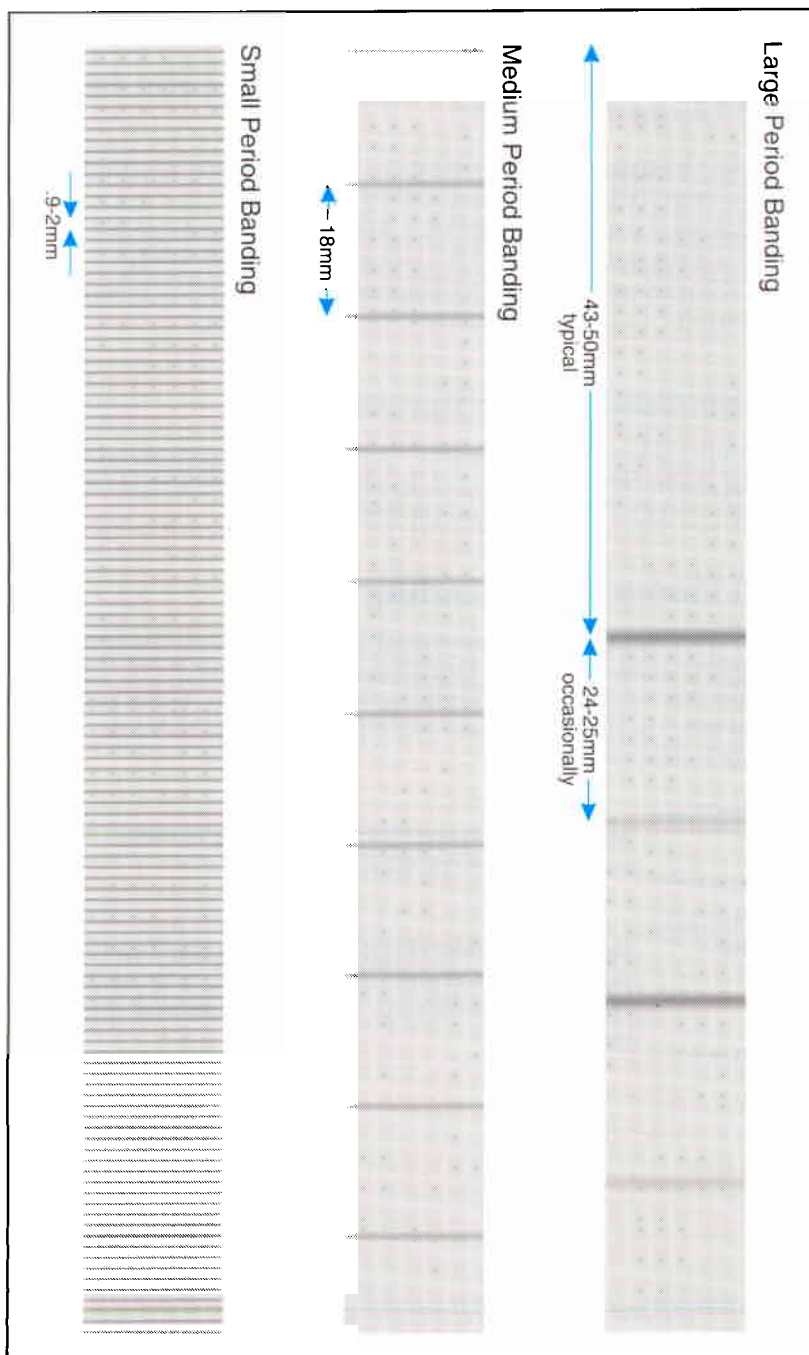
Small period banding may be caused by gear noise in the main drive gears, or in the spring loaded gear (see Figure 7-50). Clean the main drive gears, and the spring loaded pinion. If the problem persists after performing these procedures, change halftone patterns in the graphic.

### Note

Medium and small period banding is more pronounced in process colors.

### Caution

Reinstalling the drum and closing the Top Cover without the Corona Cleaning Knob fully seated to the right will damage the drum gear and cause banding.



**Figure 7-37 Large Period Print Banding Defect (limit sample)**

## Overhead Transparency Defects

Overhead transparencies may display any of the image quality defects shown in the previous samples. In addition, because transparencies are pliable while in the print path, they are subject to being marked by the media handling components.

1. If transparencies show lines and creases in the media and/or the printed output, compare the defect against the template to help isolate the cause to a particular component.
2. If horizontal streaks appear on the output (when viewed in portrait orientation) run a self test to check the age of the coating roller. Replace if necessary.
3. Check that the transparencies meet the specifications listed in the Paper Specifications Guide. Also check that they are the supported HP part number (C2934A for letter, and C2936A for A4).
4. Dark transparency output may be caused by a defective transparency sensor (PS5). Use the Service Mode Status/Test (address 59) to test the OHT sensor. If this sensor is defective, the printer will not recognize transparencies and will print at paper speed.
5. If the transparencies have spots or smudges, reprint them being careful not to touch the surface of the media. Skin oils can contaminate transparencies, causing spots and smudges.
6. Small random dark areas on the trailing edge of solid fill pages may be caused by transparencies sticking together in the face up bin. Try printing the job in smaller batches.

### Note

Allow transparencies to cool at least 30 seconds before handling them.

Transparencies created on the printer cannot be used on reflective-type (portable) transparency projectors.

### Causes of Transparency Curl

1. Ensure that the face up bin is pulled completely out, and is tilted up. If the bin is pulled only partially out, the transparencies are subject to curling.
2. If the curl of black-only transparencies printed to the face down bin is unacceptable, these transparencies may be printed to the face up bin by changing the media output selection from the software or from the Control Panel.

## Repetitive Defects on Transparencies

Overhead transparencies that have repetitive defects spaced about 94 mm (3.7 in.) apart indicate a defect on the upper Fuser roller.

1. Power OFF and unplug the printer, allow 30 minutes for the Fuser to cool, and remove the Fuser.
2. Remove the leveling roller and the oil pad.
3. Turn the Fuser gears and inspect the surface of the upper fusing roller. If the roller has surface defects (gouges) replace the Fusing assembly.

### Note

Lengthwise wrinkles on the roller surface are normal.

## Specific Marks on Page

Marks may appear at specific locations on transparencies as follows:

1. **Upper Registration Roller Marks.** These marks always occur at the top of a landscape letter page. They appear only on transparencies, almost never on paper. This defect is caused as the registration rollers rotate on the media when it is pressed against the registration shutter. The friction and pressure of the rollers on the media leave lightly scuffed areas that transfer color differently.
  - a. Ensure that the Registration Rollers are not damaged or abraded. Replace if necessary.
  - b. Check that the Upper Registration Rollers have equal spring pressure on the right and left sides.
  - c. If no problem is found with the rollers or springs, and the marks are very light, take no further action. Changing the spring force will cause paper path errors, registration problems, and paper jams.
2. **Second Feed Roller Marks.** These marks occur in the same location around the center of the page. They sometimes occur on the back of the page. Perform the checks listed in the previous list.
3. **Star Wheel Marks.** Small dots or dashes sometimes appear in one or both of the locations shown on the Print Defect Template. These defects occur when the trailing edge of the page touches the small spurs on the lower surface of the Print Drum housing. They are normally small and intermittent. Replacing maintenance units, such as the Fuser or Transfer assembly sometimes increases the frequency of this defect.



4. Exit roller mark. These are four lines on the back of the transparency. These lines can be eliminated by cleaning the four exit rollers with a damp cloth. The lines on the back of the transparencies are easily wiped away with a dry cloth.

### **Dull or Dark Transparencies**

If the transparency colors are dull or dark:

1. Ensure the transparencies meet the specifications for this printer (part number C2934A for letter, and C2936A for A4).
2. Dark transparency output may be caused by a defective transparency sensor (PS5). Service Mode Status/Test (address 59) tests the OHT sensor. If this sensor is defective, the printer does not recognize transparencies. Therefore color transparencies print at paper speed (10 pages per minute). See the “Aids to Troubleshooting” section for more information.

### **Dark Yellow Print**

This defect may be caused by black toner being deposited on yellow areas. Black developers used past their maximum life may contaminate color developers. Check the following items when troubleshooting this problem:

1. Check that the printer is not in an environment outside the specifications listed in Chapter 2.
2. Print a self test page to check that the humidity is within the specification listed in Chapter 2. (Refer to “Humidity Sensor Test” under “Aids to Troubleshooting,” in this chapter.) If possible, verify the humidity sensor reading. Replace the humidity sensor (located on the toner sensor board) if necessary.
3. Check the developer age as shown on the self test page. Change the developers, if necessary.
4. Print a solid yellow page, followed by a page with black and yellow print. If the problem appears on the second page, perform the Toner Concentration test, for yellow, listed under 5.3 Toner Concentration Error. If the value is within range, Replace the black developer then run at least 10 pages of solid yellow.

#### **Note**

If dark yellow print occurs in transparencies only, refer to “Overhead Transparency Defects.”

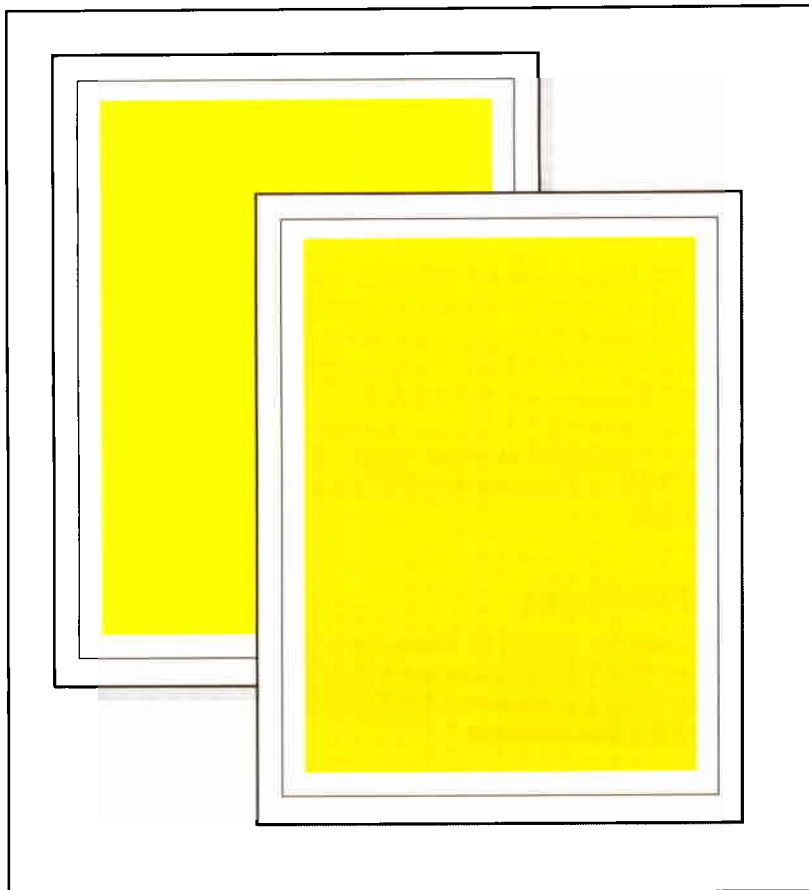


Figure 7-38 Dark Yellow Print Defect

## Repetitive Defects

Most repetitive defects are caused by imperfections in the Print Drum or Fuser roller. Print drum defects occur in the same vertical position on the page, but may not appear on each consecutive page. Defects caused by Print Drum imperfections appear as black or white marks on the page. Run at least four consecutive test pages to determine if the defect repeats in the same vertical orientation. Inspect the Print Drum for damage. Replace the Print Drum if it is scratched or dented.

Many repetitive defects result from paper dust adhering to the Print Drum. These defects usually appear as white marks in the dark printed areas of the page. Remove this dust with 70% isopropyl alcohol applied with the cloth supplied in the Collection Box Kit. Try this *only* if the print defect is unacceptable, and the only other alternative is replacing the Print Drum.

### Caution

Do not expose the Print Drum to strong light, and be careful not to scratch, or get fingerprints on the drum surface during cleaning. Do not blow on the Print Drum.

Repetitive defects may also result from exposing portions of the Print Drum to light. Light on sections of the Print Drum cause dark sections in the printed output. If the exposure was minimal, these defects may clear up over time. The life of the Print Drum is shortened by exposure to strong light.

Overhead transparencies that have repetitive defects spaced about 94 mm (3.7 in.) apart indicate a defect on the upper Fuser roller.

1. Power OFF the printer, allow 30 minutes for the Fuser to cool, and remove the Fuser.
2. Remove the Cleaning roller and the Coating Roller.
3. Turn the Fuser gears and inspect the surface of the upper fusing roller. If the roller has surface defects (gouges) replace the Fusing assembly.

### Note

Lengthwise wrinkles on the roller surface are normal. Uniform lines and creases in transparencies may be caused by rollers or other print path components. Use the template provided in the “Overhead Transparency Defects” section to isolate the defect to a specific print path component.

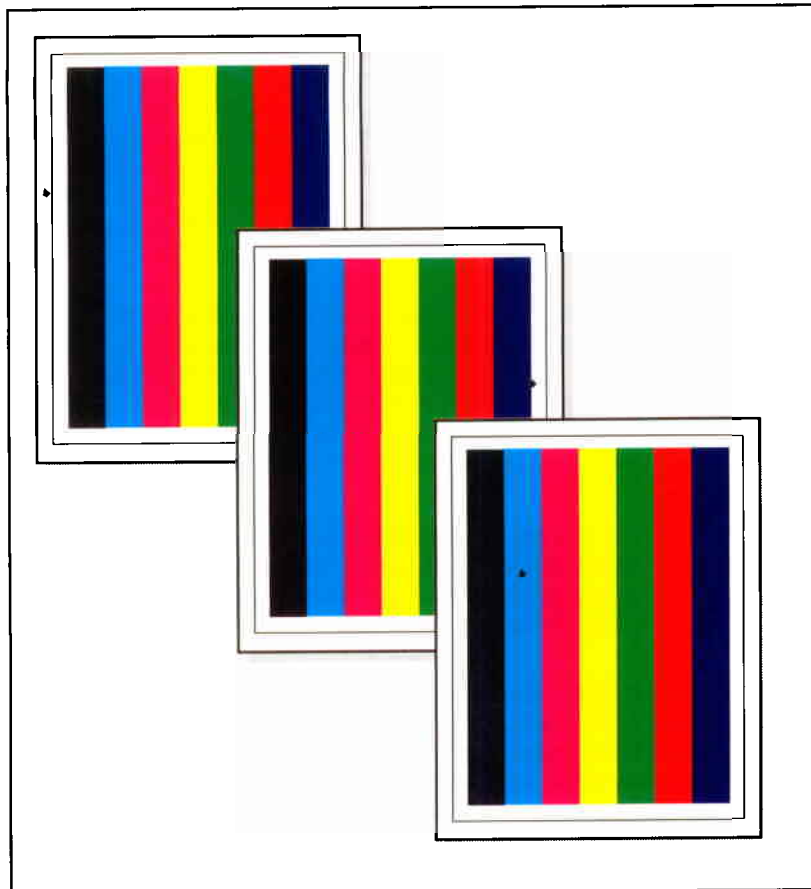


Figure 7-39 Repetitive Defects (caused by the Print Drum)

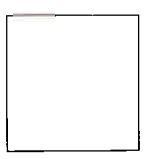
#### **Repetitive Defects caused by the Transfer Belt**

Repetitive defects may also be caused by defects in the Transfer Belt. Remove the Transfer assembly and inspect the entire belt surface. Use the Transfer assembly gears to rotate the belt throughout its travel.



Fuser  
Thermistor

Flapper Bar  
Upper Rollers  
(Idle)

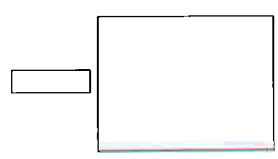
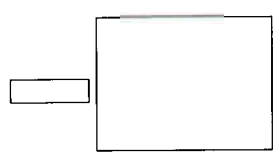
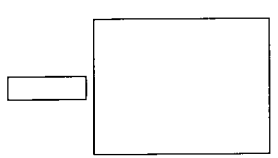


Paper  
Exit  
Deflection  
Claws



Face Up  
Exit Rollers

Lower  
(Drive)  
Upper  
(Idle)



Midway Face Down  
Exit Rollers

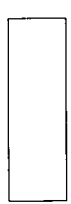
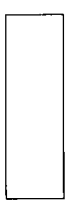
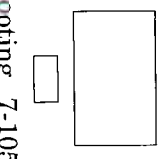
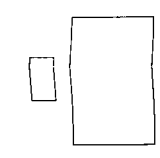
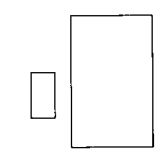
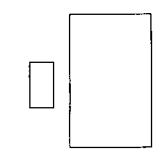
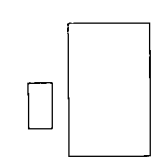


Image Side (Idle)  
Non-Image Side (Drive)

Drum / Paper Path Ribs (Face Down Only)

Lower  
(Idle)  
Upper  
(Drive)

Face Down  
Exit Rollers



**Repetitive Defect  
(Paper)**

Upper (Third Feed)  
Registration Roller Marks

Repetitive Defect  
(Transparency)

Second Feed  
Roller Marks

---

# Communications Troubleshooting

## HP Network Interface Support

Follow the procedures listed in the “Testing Network Configurations” section to isolate the failure to a network.

---

**Note** Unless you are experienced with the particular network under repair, seek the help of a qualified network professional before changing any configuration settings of the network.

---

If the printer is configured with a HP network interface card (such as HP JetDirect) the Response Center is available to help with any problems. Their number is (800) 633-3600. Additional information is available from the *HP JetDirect Printer Server Software Installation Guide* (part number J2552-90101).

---

**Caution** Network interface cards are not directly interchangeable. Do not exchange interface cards without understanding and performing the configuration process for each of the exchanged cards and the network.

---

### Third-Party Network Interface Support

When troubleshooting communications problems involving third-party network interface solutions, follow the procedures listed in the “Testing Network Configurations” section to isolate the failure to a network. If the problem is associated with the third-party network interface card, refer to the documentation that came with the card, and the vendor support organization, for help in troubleshooting.

## Testing Network Configurations

Use these checks to determine whether or not the printer can communicate on the network. Run two self tests, powering OFF the printer between each test. The results of the test are shown in the MIO Configuration section of the self test printout. The items listed in the following table indicate the printer power ON condition. Check that the power ON condition matches the actual configuration.

Table 7-6 MIO Configuration Checks

Self Test Message	Possible Cause
Port Select BNC	The JetDirect card outputs a link beat which is detectable on the the 10BASE-T connector. If the link beat is not detected, the printer defaults to the BNC port. If the printer is connected through the 10BASE-T port and this message appears, check that the cable is not damaged.
Status Message: I/O Card Not Ready	Cables are the primary cause of this message. This problem may be addressed with the 03 Loopback test. Refer to the <i>HP JetDirect Print Server Software Installation Guide</i> for information on this message.
Packets Reserved/Transmitted	This reports the results of the printer MIO function on the network. This number should change with each self test, because the printer polls the MIO each time.



## Verifying Communication with a BiTronics Connection

Printing a file is the first step in checking the printer connection to the host. The following procedure tests the ability to communicate with the host by printing the directory file. Print the directory as follows:

1. Power ON the printer and host computer. Be sure the printer is on-line.
2. At the root directory (C:\>) type DIR>PRN and press **Enter**.
3. Press **On Line** to take the printer off-line.
4. If the data light is ON, press **Form Feed** to print the page.
5. Press **On Line** to put the printer back on line.
6. If the directory listing prints, the printer setup is OK.

If the directory listing does not print, check that the printer is configured as described in Chapter 3 of this manual, or the *Getting Started Guide*.

## Verifying PostScript Printing

1. Turn the printer and host computer ON. Make sure the printer is on-line.
2. At the DOS prompt (C:\>), type EDLIN TEST.PS and press [Enter]. Then perform the following steps:
  - a. At the asterisk (\*), type li (the number "one" and the letter "i") and press **Enter**.
  - b. At the 1: \*, type CLIPPATH STROKE SHOWPAGE and press **Enter**.
  - c. At the 2: \*, hold **CTRL** and type **D**.
  - d. At the asterisk (\*), type E and press **Enter**.
  - e. At the DOS prompt : \>, type COPY TEST.PS LPT1: and press **Enter**.

The Form Feed indicator will flash to indicate the printer has received this data. A page with a border surrounding the image area will print.

## PJL commands

See the *HP Printer Job Language Technical Reference Manual* for a complete description of PJL commands. This manual is available with the Technical Reference Package, part number 5010-3997.

### @PJL [Enter]

This command enables the specified printer language. If the printer does not receive this command it enables the default language. This ensures that applications that do not support PJL print correctly. The command syntax is:

@PJL |Enter| LANGUAGE = {PCL/PostScript} |<CR>| <LF>

### UEL

This command (also referred to as the Universal Exit Language command) terminates the current printer language and returns control to PJL. It performs the following actions:

- Prints all data received before this command.
- Performs a reset: <esc>E in PCL, <cntrl>D in PostScript.
- Turns control over to PJL.

This command is also a valid HP-GL/2 terminator.

The UEL command must be immediately followed by the “@PJL” command prefix. Characters or control codes other than @PJL (such as <CR> or <LF>), enable the default language and process the print job in that language. All jobs must begin and end with the UEL command. Besides entering PJL, the UEL command has the same effect as the <esc>E command. However, the <esc>E command should always be included to ensure backward compatibility.

### @PJL COMMENT

This command designates the current line as a comment, which is ignored. The syntax is:

@PJL COMMENT <words> |<CR>| <LF>

**@PJL INFO CONFIG**

This command solicits a response to describe the installed options. This command allows the printer to automatically configure the installed options as the applications require.

**@PJL INFO ID**

This command identifies the printer type to the host for reference when selecting printer drivers for automatic installation. The command syntax is:

@PJL INFO ID <CR> <LF>

**@PJL INFO USTATUS**

This command queries the state of unsolicited status variables. This printer supports only unsolicited JOB status. PAGE and TIMED status are not supported. The syntax is:

@PJL INFO USTATUS <CR> <LF>

**@PJL INFO PAGECOUNT**

This command returns the number of pages printed by the *engine*.

**@PJL JOB**

This command informs the printer of the start of a PJL job and synchronizes the job status information. The printer counts print jobs, including nested jobs, incrementing the job counter for the @PJL JOB command and decrementing it for @PJL EOJ.

The printer accepts the NAME= parameter and returns the name string in the unsolicited JOB start status message (if unsolicited job status is enabled). The printer transmits the unsolicited JOB status message to every I/O channel which has enabled this function. This message's format is:

```
@PJL USTATUS JOB <CR><LF>
START <CR><LF>
|NAME=<job name><CR><LF>|
<FF>
```

The printer resets the nested job counter whenever it switches the source to a different I/O channel. This prevents a corrupt job on one channel from disrupting the activities on another channel.

**@PJL EOJ**

This command identifies the end of a print job and is a hint for the I/O switching algorithm. The printer counts nested jobs and recognizes job boundaries when the counter decrements to zero. The printer ignores isolated EOJ commands. Each EOJ must be preceded by a JOB command.

**@PJM ECHO**

This printer supports the ECHO command which transmits its parameters over the I/O channel to the host that issued the command.

**@PJM USTATUS JOB=ON/OFF**

This command enables or disables the JOB status for the I/O channel that delivers the command.

**@PJM USTATUS DEVICE=ON/OFF**

This command enables or disables the unsolicited DEVICE status for the I/O channel that issued the command.

**@PJM USTATUSOFF**

This command disables the unsolicited JOB status for the I/O channel that delivered the command. For this printer, it duplicates the function of @PJM USTATUS JOB=OFF, AND @PJM USTATUS DEVICE=OFF.

**Note**

All commands not supported by this printers PJL command set are returned with the message @PJM XXXX<CR><LF>?<CR><LF>.

---

# Aid to Troubleshooting

## Troubleshooting by Part Swapping

This printer records the age of most of the user-replaceable maintenance units. All new maintenance units, (except the Toner Collection Kit), have fusible links. When a new maintenance unit is installed, the printer senses its fusible link and blows the fuse. The Control Board resets the counter for that maintenance unit to zero. When the developers or Print Drum are replaced, the Control Board restarts the page-dependent firmware algorithms which control the printer operating point. Also, when the Print Drum is replaced, the Drum Winding Sensor is calibrated.

The fusible links and the associated firmware algorithms affect service and troubleshooting strategy as follows:

- The maintenance units can not be removed and used as a new unit in another printer.
- If a new maintenance unit is installed the Control Board resets its counters and determines the optimum operating point for the installed unit. *If another unit with no fusible link (such as a Print Drum or Developer from another printer) is installed, the operating point will not be correct.* The correct operating point is especially critical for the Print Drum and developers.

### Part Swapping Process

The following procedures use known good maintenance units to help troubleshoot maintenance units problems. Ensure that the original,(or a new) maintenance unit is installed after performing each procedure. *Do not leave a test unit installed.*

#### Print Drum

A test Print Drum which has the fusible link already blown can be installed to verify failures such as repetitive print defects. *Do not print more than 50 pages with the test drum.* The test Print Drum may cause 13.1 CLEAR DRUM WINDING JAM errors. If this occurs, use the Service Mode Status/Test address 47 to calibrate the Drum Winding Sensor. It is necessary to recalibrate this sensor when installing the original drum. If the print defect is **confirmed, and a new Print Drum is installed, the drum winding calibration process is automatically performed as part of the installation algorithm.** See the installation procedures in Chapter 4 for information on installing the Print Drum. *Do not leave the test Print Drum installed after troubleshooting.*

## Developer

A test Developer which has the fusible link already blown can be used to troubleshoot print problems such as white lines. *Do not print more than 50 pages with the test developer.* If the print defect is shown to be not related to the developer, be sure to reinstall the original developer. If a defect is related to the original developer, use the installation procedures shown in Chapter 4 to install the new developer. *Do not leave the test Developer installed after troubleshooting.*

## Transfer Belt, Fuser, and Coating Kit

Test units which have the fusible link already blown can be installed briefly to verify print defects. *Do not print more than 200 pages with these units.* If a print defect is not verified, reinstall the original unit. If a defect is verified, replace the defective unit as described in Chapter 4. *Do not leave the test components installed after troubleshooting.*

## Voltage Checks

Figure 7-40 shows the most readily accessible voltage test points of this printer.

### Caution

Be careful not to damage the printer when inserting test probes in the connector.

### Note

The actual voltage measured for 24V will be approximately 22V.

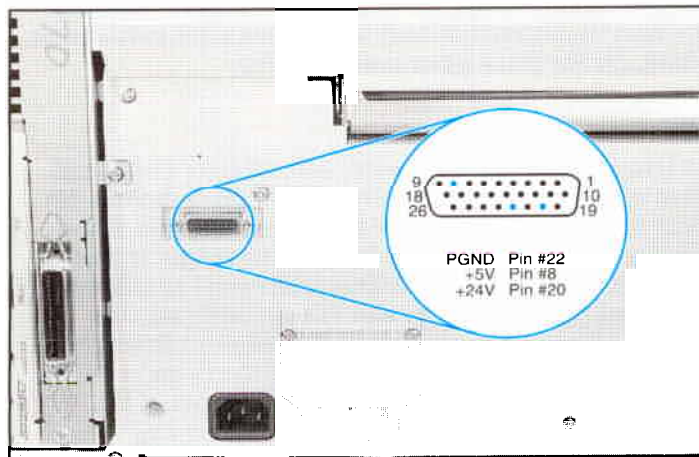


Figure 7-40

## Figure 7-41 Self Test Printout

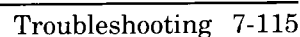




Table 7-7 Self Test Items

1	PRINTING MENU: This section shows the configuration of the print menu.
2	CONFIG MENU: This section lists the current printer configuration.
3	PARALLEL MENU: This menu lists the configuration for the Parallel I/O port. This is not the same as the MIO configuration. The Advanced Functions feature enables the bi-directional I/O.
4	CONSUMABLE LIFE: This section lists the percent of maximum life used by each of the printer maintenance units. Use this section when performing printer maintenance, and when deciding how to troubleshoot specific printer failures. The consumable counters show how many of each maintenance units have been installed in the printer throughout its life.
5	MIO CONFIGURATION: This section shows the configuration of the MIO.
6	INSTALLED MEMORY and PAGE COUNT: This section displays the memory recognized by the printer, and the page count. Black pages and color pages are listed separately. Add the numbers to get the total page count.
7	SERIAL NUMBER and FIRMWARE DATECODE: The serial number is used when replacing the Formatter PCA. If possible, run the self test before replacing the Formatter. The firmware datecode is used by HP to identify the printer's program level.
8	OPTIONS: This section shows the installed and recognized optional printer components.
9	PRINT TEST PATTERN: This pattern tests the Print Drum for random defects.
10	REt SETTING: This section shows the current REt setting. Use the lines to adjust the REt setting such that the horizontal and vertical lines match. Inaccurate REt settings cause horizontal or vertical bands in the lines.
11	COLOR BARS: These colors prove that each of the primary and process colors are enabled.
12	INTERNAL HUMIDITY: Shows the humidity inside the printer as read by the internal humidity sensor.



## Cold Reset

Cold Reset clears all data from the print buffer and returns the Printing Menu and the Configuration Menu to the factory default settings (see Table 7-8).

### To perform a Cold Reset:

1. Press **On Line** while powering ON the printer.
2. Release **On Line** when the control panel lights are on. The display will read 08 COLD RESET.
3. The Cold Reset is complete when the display reads 05 SELFTEST.

Table 7-8 Cold Reset Default Settings

PCL Print Menu	PostScript Menu	PCL Config Menu	PostScript Config Menu
copies: 1	copies: 1	sys: auto	sys: HP-PCL
font source: int (internal)	tray: front	timeout: 15	auto continue: off
font number: 0	ft media: paper	REt: medium	timeout: 15
pitch: 10.00	rt media: paper	pwrsave: 60 min.	REt: medium
pt. size:12.00	mf media: paper		pwrsave: 60 min
tray: front	out bin: upper		startpage: 60 min.
paper: letter			jam recovery: off
out bin: upper			PostScript error printing: off
orientation: P (portrait)			
60 lines (VMI: 8)			
Symbol set: Roman-8			

## Error Log

The printer retains the last fifty errors in its error log. These errors are limited to service errors (50-89) and paper jam entries.

### Error Log Mode

Error Log Mode displays the error log as one of the menu items, and makes the error log available for immediate review.

#### To place the printer in Error Log Mode:

1. Hold down **Form Feed** while powering ON the printer.
2. The printer will go through its normal boot cycle, and display the 00 PCL READY message.
3. Take the printer off-line to view the error log entries.
4. Press **Menu** until ERROR LOG appears (the first error log entry is displayed) then press **+/-** to scroll through the error log entries, or press **Enter** to print the error log.

The first example shown in Table 7-9 displays a 50.1 error as it appears in the error log. The code appears on the Control Panel display as 01 500001 000561. The order of information displayed is the same as the table. The first error in the list is the most recent.

Table 7-9 Error Log Example

Error Number	Error Type	Sub- Error	Page Count (total)
01	50	0001	000561
02	54	0001	000320

## Extended Diagnostics

Extended Diagnostics is a troubleshooting program which tests the MIO, Formatter PCA, memory, and communication channels. Use Extended Diagnostics to test the printer when Formatter, memory (DRAM only), and MIO-related errors persist. These tests should be run in all cases where one of the PCAs listed above is suspected as the cause of control panel error messages. These tests quickly isolate the problem to a specific PCA and will help reduce printer downtime.

### Note

Extended Diagnostics are especially effective for isolating intermittent communication failures. Extended Diagnostics also verify suspected failures in Formatters, MIO cards, or memory. Run Extended Diagnostics whenever a failure code associated with one of these assemblies appears.

The results of Extended Diagnostics appear in an error log separate from the log kept for running hardware errors such as paper jams. This log is only available in the Extended Diagnostics mode, and all entries are lost when the printer is powered OFF.

### Note

Completion of extended Diagnostic test indicates the test passed.

### Initiating the Extended Diagnostic test

1. Power the printer OFF.
2. Press and hold **Reset**, **Menu**, and **+** (all at the same time), while powering ON the printer. (The control panel will be blank if this is done correctly.)
3. Press **Item**, followed by **Enter**.
4. The control panel reads EXTENDED DIAGNOSTICS.

EXTENDED DIAGNOSTICS MODE is displayed briefly, all the lights turn off, and EXT DIAG MENU is displayed.

### Note

The printer must be fully warmed-up (ready to print) and have a paper tray (with paper) installed, in order to successfully complete these tests.

Color LaserJet Printers with A4 size paper must have the printing portion of the Extended Diagnostics disabled. If the printing portion is enabled, Extended Diagnostics will fail.

## Extended Diagnostic Test Options

Each test selection can be enabled or disabled. Selected tests can be run once or continuously. The On Line light flashes while the tests are running. Flashing indicator lights indicate an error was detected and logged. The Extended Diagnostic test selections are listed in the flowchart of Figure 7-43. The options are:

- Repeat Y/N\* Use this selection for continuously repeat the test suite. It is especially useful when troubleshooting intermittent failures in any of the tested assemblies.
- ON FAULT=BREAK\*/CONT/PAUSE This selection sets the interrupt mode when failures occur.
  - BREAK logs the first detected failure and stops the tests.
  - CONT logs all failures and continues testing until **Reset** is pressed. When repeat is set to no, CONT continues testing until all selected tested have executed. When the test in process completes, if errors were detected, (as indicated by a flashing ERROR light), the FAULT LOG MENU is displayed. If no errors occurred, the Extended Diagnostics Menu is displayed.
  - PAUSE logs the failure and stops the test. The tests continue when **Enter** is pressed.
- MODE=FIELD\*/PRODUCTION Do not use the production mode.
- CACHE=AUTO\*/OFF/ON Do not change the default setting. The auto mode tests the cache with a separate test and automatically turns the cache ON when it passes its test.
- Printing=ON\*/OFF The printing subtests test all primary and process colors, then turns off one color at a time. These test prints are shown in Figure 7-42. The tests exercise the Formatter's ability to control the print engine.
- FORMATTER=Y\*/N The default (Y) tests Formatter functionality. This is the recommended mode.
- MIO CMN=Y\*/N - N (ND\*), Y (ND) The MIO CMN (common) test is the default. N disables this test. MIO common means these tests are generic to any MIO configured for this printer. (ND) indicates that no MIO was detected at power ON, however the test may still be enabled to run by selecting Y (ND).
- MIO DPT= N\*/Y - N(ND), Y(ND) This selection enables the MIO dependent tests. (ND) indicates that no MIO was detected at power ON, however the test may still be enabled by selecting Y (ND). This test **requires a loopback connector**.
- SIMM=Y\*/N - N(ND), Y(ND). This selection enables the DRAM tests. (ND) indicates that no DRAM was detected at power ON. If ND appears in the display at power ON, and DRAM is installed, the memory may be defective. Before replacing the memory, check that the Formatter connectors are fully seated and in good repair.

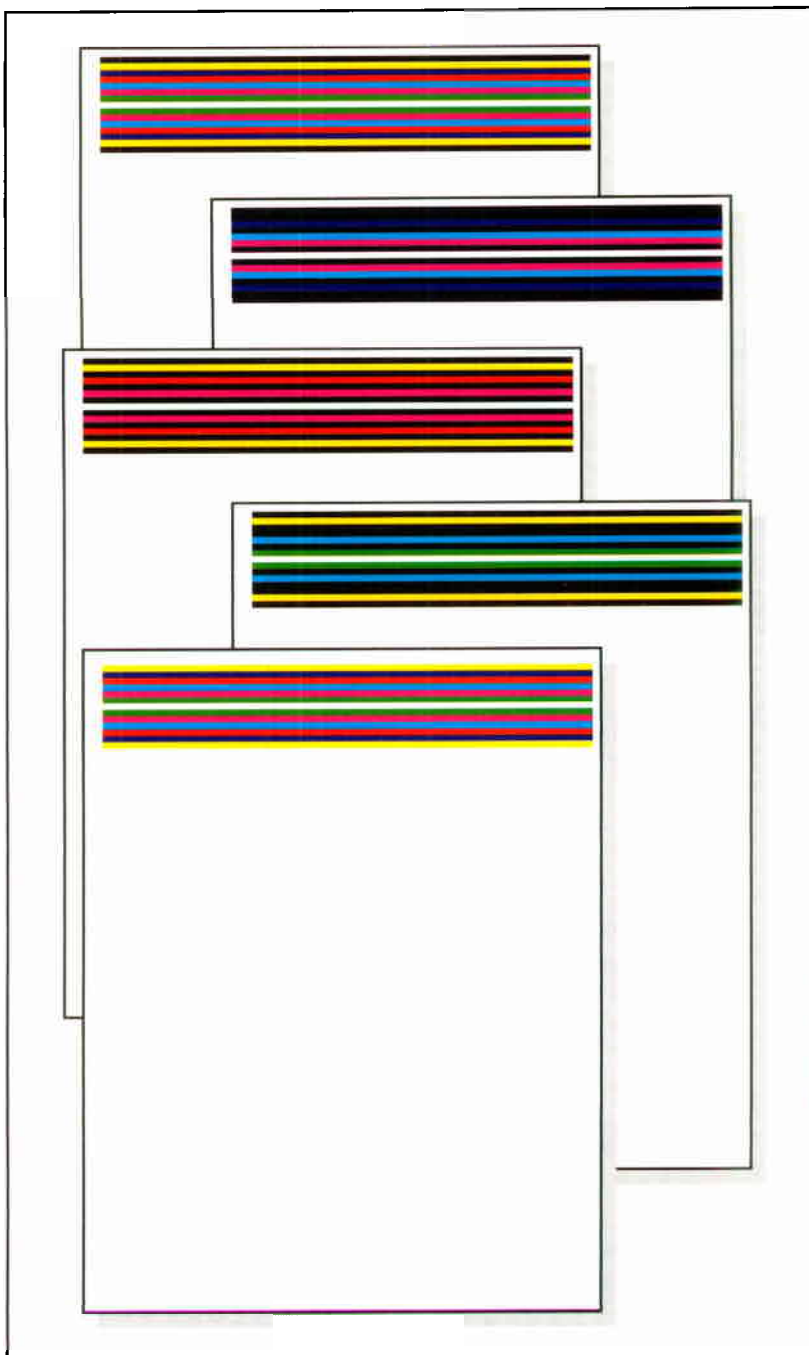


Figure 7-42 Extended Diagnostics Printouts

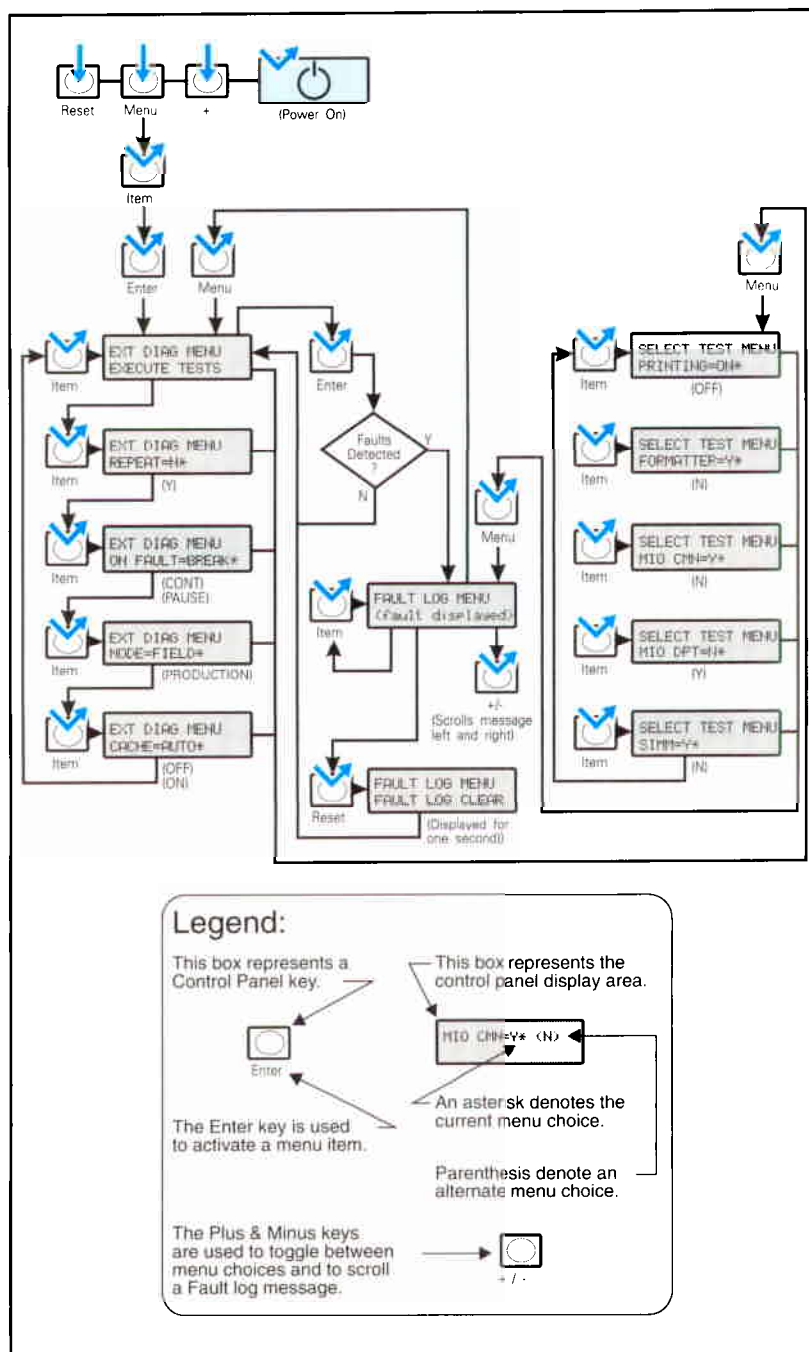


Figure 7-43 Extended Diagnostics Flowchart

## Service Mode

Service Mode is used to test printer functions by issuing commands to the Control Board through the control panel. The menu items are:

- **Register Adjust** allows the service engineer to change the factory-set NVRAM values which control the placement of the image on the page. This compensates for small differences in paper registration between printers. Detailed developer counter information is also available in this mode. Use developer counter information to troubleshoot toner concentration problems. Enter this mode as shown in Figures 7-45 and 7-46, later in this section. Register Adjust addresses and values are listed in Table 7-10.
- **Status Requests** indicates the state of an *input* to the Control Board. Generally, this test applies to sensors requests and switches. These commands have a control panel indication (or digital value, either high or low) of the state of the selected input. Inputs which can be checked with the Service Mode are listed in Table 7-11.
- **Operation commands** control the *output* of the Control Board to the selected component (motors and developers are examples of selectable components). The command addresses are listed in Table 7-11. Issuing an output command starts the function shown in the output list.

### Note

Some outputs will automatically stop after a preset time.

- **Subtests** Components with multiple assemblies, functions, or modes use a sub-test of the operation command, identified by a subtest number. Subtest numbers select a particular item (such as a *Black Developer*) when several selections are possible. For instance, selecting the Toner Level Detect function (01) and pressing **Enter**, brings a prompt requesting the subtest number. The subtest number (selected from the subtest number list) identifies the specific Toner Hopper sensor to be exercised. This test checks the input and performs the output for the particular function. The subtest numbers are listed in Table 7-12, later in this chapter.

### Accessing the Service Mode

1. Power OFF the printer.
2. Press and hold **On Line**, **Form Feed** and **Item** (all at the same time) while powering ON the printer. Continue holding the keys until all the Control Panel lights are illuminated and the Control Panel display is blank.
3. Press **Item**, followed by **Enter**.
4. The display will flash SERVICE MODE. Allow the printer to complete its self test and boot cycle.

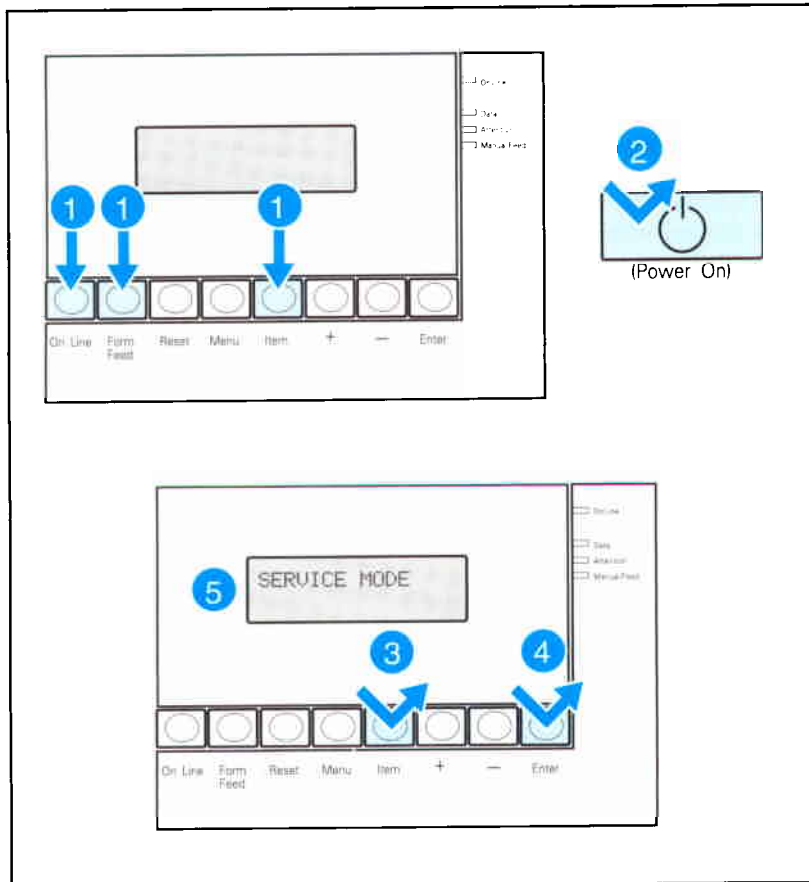


Figure 7-44 Keystroke Sequence to enter Service Mode



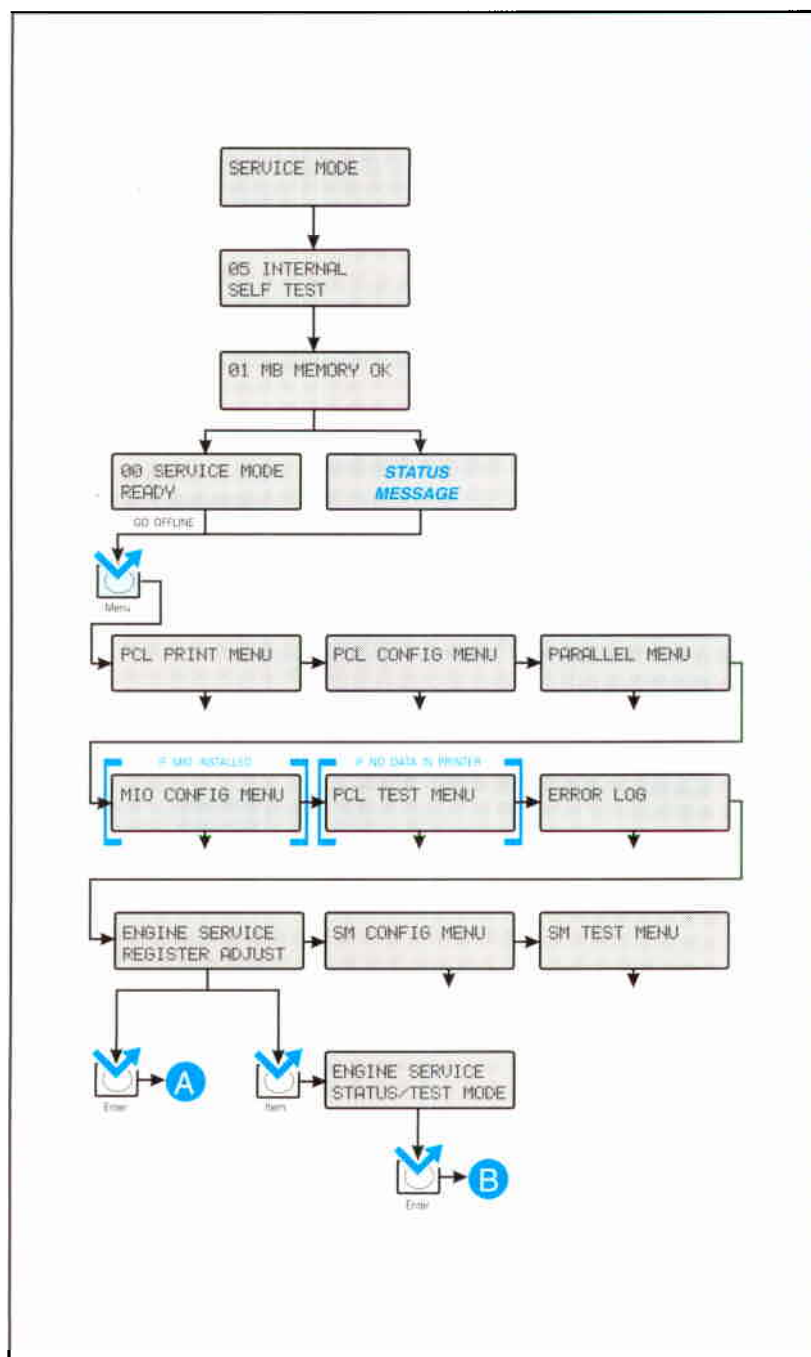


Figure 7-45 Service Mode Flow Chart

## Register Adjust Mode

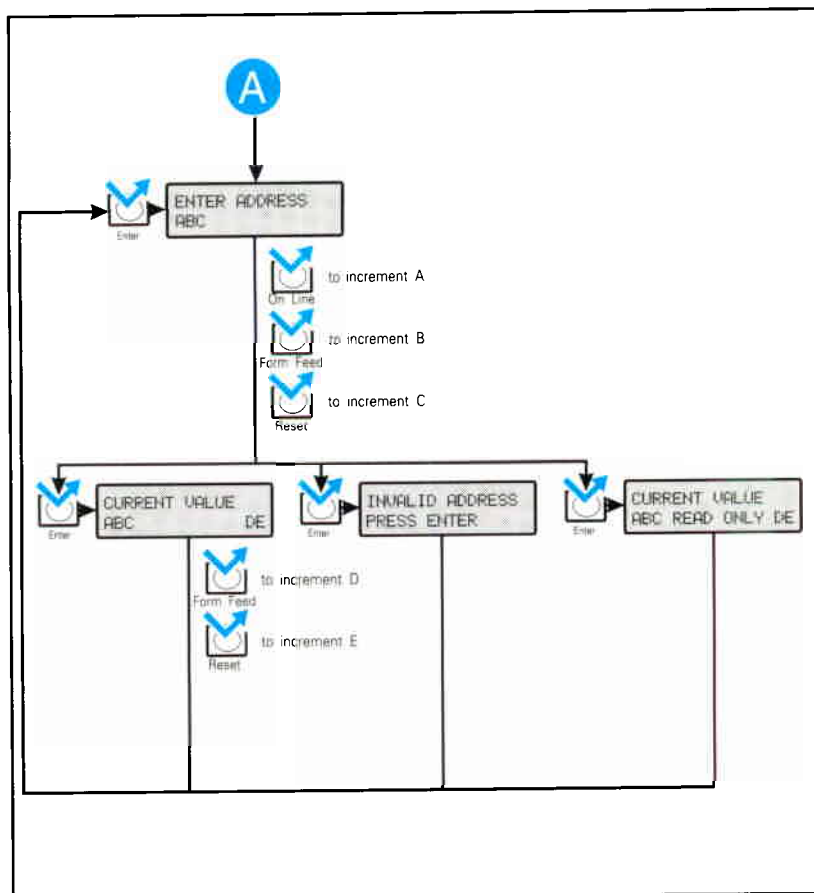
The Register Adjust Mode allows the service engineer access to the NVRAM address that controls the paper registration parameters. Changing the values of this address allows the paper registration to be adjusted. Detailed developer counter information is also available in this mode. Counter information is needed for toner concentration troubleshooting.

### Note

This mode does not effect the operation of solenoids or sensors. Use the Status and Test mode to monitor and test the solenoids and sensors.

### Accessing the Register Adjust Mode

1. Enter the Service Mode as described in the previous section.
2. Repeatedly press **Menu** to display ENGINE SERVICE.
3. Press **Item** to display REGISTER ADJUST.
4. Press **Enter** to activate the register adjust mode.
5. Use **On Line**, **Form Feed**, and **Reset** to increment the address digits until the desired address is displayed.
6. Press **Enter** to obtain the address value.
7. Use the **Form Feed** and **Reset** to change the address value to the desired value.
8. Press **Enter** to save the new value.
9. If the address is invalid or read-only, press **Enter** to select a new address.
10. Power cycle the printer to continue normal operation.



**Figure 7-46**      **Keystroke Sequence to enter Register Adjust Mode**

## Register Adjust Addresses

This table lists the accessible addresses in the Control Board NVRAM.

Table 7-10 Register Adjust Addresses and Values

Address	Initial value	Function
28	00*	Black Developing Unit Counter (10s & 1s digit). Range = 00-99
29	00*	Black Developing Unit Counter (1000s & 100s digit). Range = 00-99
30	00*	Black Developing Unit Counter (100,000s & 10,000s digit). Range = 00-99
31	00*	Yellow Developing Unit Counter (10s & 1s digit). Range = 00-99
32	00*	Yellow Developing Unit Counter (1000s & 100s digit). Range = 00-99
33	00*	Yellow Developing Unit Counter (100,000s & 10,000s digit). Range = 00-99
34	00*	Magenta Developing Unit Counter (10s & 1s digit). Range = 00-99
35	00*	Magenta Developing Unit Counter (1000s & 100s digit). Range = 00-99
36	00*	Magenta Developing Unit Counter (100,000s & 10,000s digit). Range = 00-99
37	00*	Cyan Developing Unit Counter (10s & 1s digit). Range = 00-99
38	00*	Cyan Developing Unit Counter (1000s & 100s digit). Range = 00-99
39	00*	Cyan Developing Unit Counter (100,000s & 10,000s digit). Range = 00-99
47	00**	Fuser Error Code (00 - 01)
74	48***	Leading edge margin adjustment for RFU auto-feed. Range = 35-65
75	43***	Side margin (start of scan) adjustment for RFU auto-feed. Range = 01-99
76	48***	Leading edge margin adjustment for manual feed. Range = 35-65
77	43***	Side margin (start of scan) adjustment for manual feed. Range = 01-99
78	48***	Leading edge margin adjustment for main tray. Range = 35-65
79	43***	Side margin (start of scan) adjustment for main tray. Range = 01-99

\*These are read-only values.

\*\*This register can be reset to 00 to clear 50.X Fuser errors without waiting for the Fuser error timeout.

\*\*\*These are default values. Refer to "Paper Path Troubleshooting," later in this chapter for information on the proper setting for these values.

## Status/Test Mode

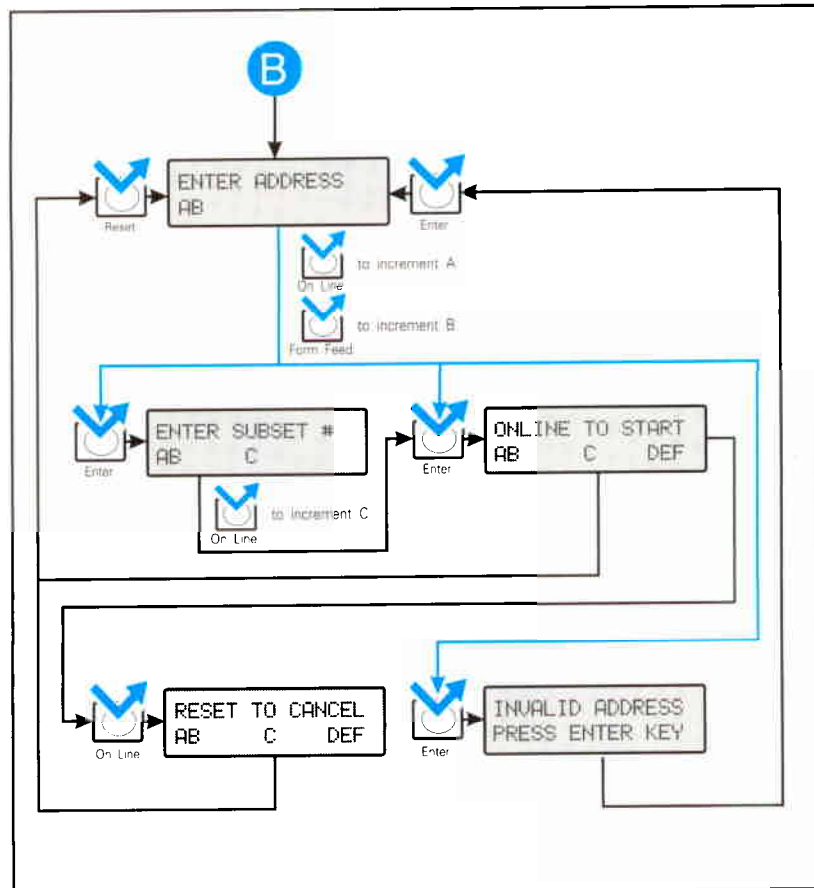


Figure 7-47 Selecting the Status and Test Addresses

The Status and Test Mode allows the service engineer access to individual printer components. Access the Status and Tests from the Service Mode Menu. Enter the Service Mode as shown earlier in this section and:

1. Repeatedly press **Menu** to display ENGINE SERVICE. The first selection is REGISTER ADJUST.
2. Press **Item** to select Status and Test mode.
3. Press **Enter** to activate the Status and Test mode.
4. Use **On Line** and **Form Feed** to increment the address digits until the desired address is displayed.
5. Press **Enter** to activate the displayed address.
6. If necessary, input the subtest number by pressing **On Line** until the desired subtest number is displayed.

7. When ONLINE TO START is displayed, the printer is in the Status mode. The number on the right is the status value for the address that was entered in step 5. This value is updated once every second.
8. Press **Reset** to cancel the Status Mode.
9. Press **On Line** to activate the Test Mode. The printer starts the test for the address entered in step 5.
10. Press **Reset** to cancel the Test Mode.

### Status and Test Addresses

Addresses listed in Table 7-11 select the function shown in the *Status* column, or enable the test listed in the *Test* column. Status shows the state of the switch, sensor, or other component to which the Control Board responds. Subtest numbers also apply to some of the tests (such as developer tests). Subtest numbers select a particular subtest (such as *Black Developer*) when more than one function is possible. Subtest numbers are listed separately in Table 7-12.

#### Note

Status and Test codes are not coded together, and therefore may not match. Many status outputs and test functions share an address. For instance, when address 20 is entered, the display shows the status of the Registration sensor. Pressing **On Line** activates the Paper Feed Solenoid.

Table 7-11 Status/Test Address Table

Address	Status	Test
01	Toner level detection. Shows logic of the toner level detect sensor for the selected color. 1=toner present 0=toner empty	
08	Toner concentration sensor signal for the selected color. The initial value is 63. Starting the test displays the current concentration offset value.	Rotates the developing unit for the selected color. You should hear the developer rotate when this test is run.
10	Paper empty (main tray). Indicates the state of the paper-out sensor (PS8). 1=paper present 0=paper empty	
13	Rear input empty sensor (RFU). 1=paper empty 0=paper present	
14	Paper empty sensor (RFU manual feed). 1=paper not present 0=paper present	

Address	Status	Test
15	Paper size signal (tray). Indicates the detected tray size. lgl=0, ledger (tabloid)=1, Ltr=2, Exec=4, A3=5, A4=6, No tray=7.	
16	Paper size signal (RFU). Indicates the state of the RFU paper size sensor. 1=A4, 2=exec, 3=ltr	
19*		Unlocks all Toner Hoppers.
20*	Registration sensor signal. (PS7) Indicates the state of the Registration sensor. 1=paper detected 0=paper not detected	Turns ON the Paper Tray Solenoid.
21	Rear feed unit paper-in-path sensor. Detects media in the Rear Feed Unit.	
22	Paper exit sensor signal. Indicates the logic states of the Paper Exit sensor. (PS1) 1=paper not detected 0=paper detected	
25*		Turns ON the Registration solenoid.
28		Turns ON the RFU Drive motor.
29*		Turns ON the Face Up/Down solenoid.
30*		Turns ON the Exit Roller Position Select solenoid.
37		Changes the Fuser Fan to high speed.
40		Turns ON the Main Motor. (Top Cover must be closed.)
41	Door switch signal. Indicates the state of both the door switches (Top Cover and Side Door). 1=door closed 0=door open	
42		Changes the Main Fan rotation to high speed.
45		Turns ON the Fuser heat lamp (monitors the Fuser thermistor voltage value). A cold Fuser should display a value of about 120 +/- 8. A fully heated Fuser should be about 25 +/- 8.
47		Calibrates the Drum Wrap sensor.
50	Developer select sensor signal. Indicates the state of the developer select sensor signal. 1=home position detected 0=home position not detected	Turns ON the Developer Select motor. The Developer Select motor turns to the home position. 1 is briefly displayed when the home position is sensed.
51	Pressure cam home position sensor signal. Indicates the state of the pressure cam home position sensor. 1=home position detected 0=home position not detected	Turns ON the Developer Drive motor.



Address	Status	Test
52*	RFU installation signal. Indicates the state of the RFU installation signal. 1=not installed 0=installed	Turns ON the Toner Supply solenoid.
53*	Displays the Engine ROM version.	Turns ON the Pressure Cam solenoid.
54	Excess Toner Collection Box installed. Indicates the state of the Collection Box and drum cartridge installed sensor. 1=not installed 0=installed	Releases the cleaning blade from the Print Drum.
55	Excess Toner Collection Box full. Indicates the state of the Collection Box sensor signal. 1=Collection Box full 0=Collection Box not full	
56	Drum Cartridge NEW detect signal. Indicates the state of the Drum Cartridge NEW sensor. 1=used 0=new.	
57	Black Developer unit NEW detect signal. Indicates the state of the Black Developer unit NEW sensor. 1=used 0=new	
58	Color developer unit NEW detect signal. Indicates the state of the Color Developer unit NEW signal. 1=used 0=used	
59	OHT sensor signal. Indicates the level of the OHT sensor signal in 128 levels.	Turns ON the Overhead Transparency Sensor LED.
62	Transfer Assembly Unit NEW detect signal. Indicates the state of the Transfer Assembly NEW signal. 1=used 0=new.	
63	Fuser Unit NEW detect signal. Indicates the state of the Fuser Unit NEW signal. 1=used 0=new	
67 (CLJ)	Oil Pad NEW detect signal. Indicates the state of the Oil Pad NEW signal. 1=used, 0=new	
67 (CLJ5)	Cleaning Roller NEW detect signal. Indicates the state of the Cleaning Roller NEW signal. 1=used, 0=new	
*This address has an auto shut off to protect the component from extended use.		



## Subtest Number List

The Subtests allow the service engineer to check both the input and outputs of the listed components and sub assemblies. When using this mode, first enter the test address, then the subtest number.

Table 7-12 Subtest Number Table

Address	Subtest #	Status/Response
01	0	Checks the state of the black toner level sensor.
	1	Checks the state of the yellow toner level sensor.
	2	Checks the state of the magenta toner level sensor.
	3	Checks the state of the cyan toner level sensor.
08	0	Shows the <i>current</i> level of the black toner concentration sensor. Rotates the Black Developing Unit.
	1	Shows the <i>current</i> level of the yellow toner concentration sensor. Rotates the Yellow Developing Unit.
	2	Shows the <i>current</i> level of the magenta toner concentration sensor. Rotates the Magenta Developing Unit.
	3	Shows the <i>current</i> level of the cyan toner concentration sensor. Rotates the Cyan Developing Unit.
19	0	Unlocks the black Toner Hopper.
	1	Unlocks the yellow Toner Hopper.
	2	Unlocks the magenta Toner Hopper.
	3	Unlocks the cyan Toner Hopper.
28	1	Turns ON the RFU motor.
40	0	Rotates the Main Motor at full speed. The Main Motor is driven by index pulses (locked to the scanner).
	1	Rotates the Main Motor at half speed. The Main Motor is driven by index pulses (locked to the scanner).
	2	Rotates the Main Motor at 1/6 speed. The Main Motor is driven by index pulses (locked to the scanner).
	3	Rotates the Main Motor at full speed. The Main Motor is driven by CPU pulses.
	4	Rotates the Main Motor at half speed. The Main Motor is driven by CPU pulses.
	5	Rotates the Main Motor at 1/6 speed. The Main Motor is driven by CPU pulses.

## Humidity Sensor Test

The humidity sensor controls several operating parameters. It is important to know the room humidity in order to test that the sensor is working properly. Note that air-conditioned areas have different humidity levels (probably lower) than the air outside. Run the humidity test as follows:

1. Perform a Control Panel Self Test. Check the "Internal Humidity" line (see Figure 7-41) to determine if the printer's internal humidity is close to the room humidity.

### Note

Printer humidity is usually 2%-5% lower than the room humidity. If the variation is larger than this, the humidity sensor may be defective.

2. Remove the the Toner Hopper cover to expose the humidity sensor mounted on the Toner Sensor Board.
3. Print another self test.
4. Power OFF the printer.
5. Breathe on the humidity sensor. This should raise the humidity at the sensor above the room humidity.
6. Immediately power ON the printer and print another self test.
7. Compare the two humidity values. If the second value is not higher, replace the humidity sensor.

## 15 Engine Test

The 15 ENGINE TEST prints a color grid pattern page, independent of the Formatter PCA. This test can be printed even if the Formatter or control panel is not working. Use this test to help isolate functional problems. Figure 7-48 shows the location of the test print switch. To perform an Engine Test, use a non-metallic object to press in the test switch. Figure 7-49 shows the 15 ENGINE TEST printout.

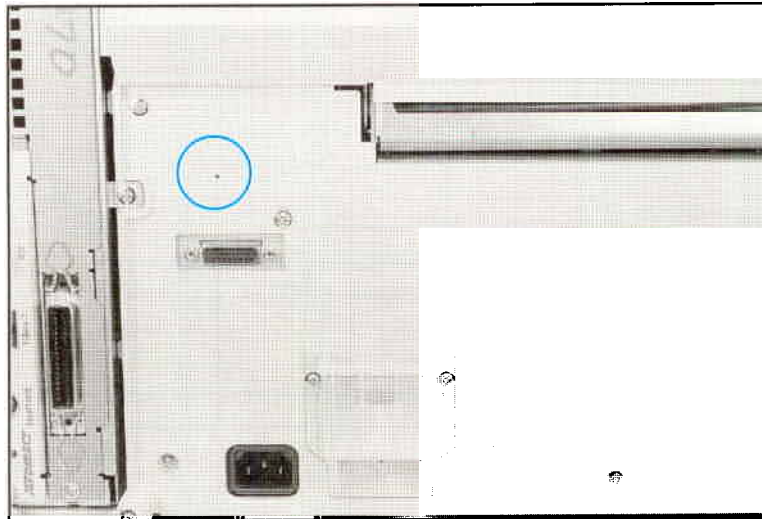


Figure 7-48 15 Engine Test Print Switch

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**Note** The Formatter must be installed to run the Engine Test on the HP Color LaserJet Printer.

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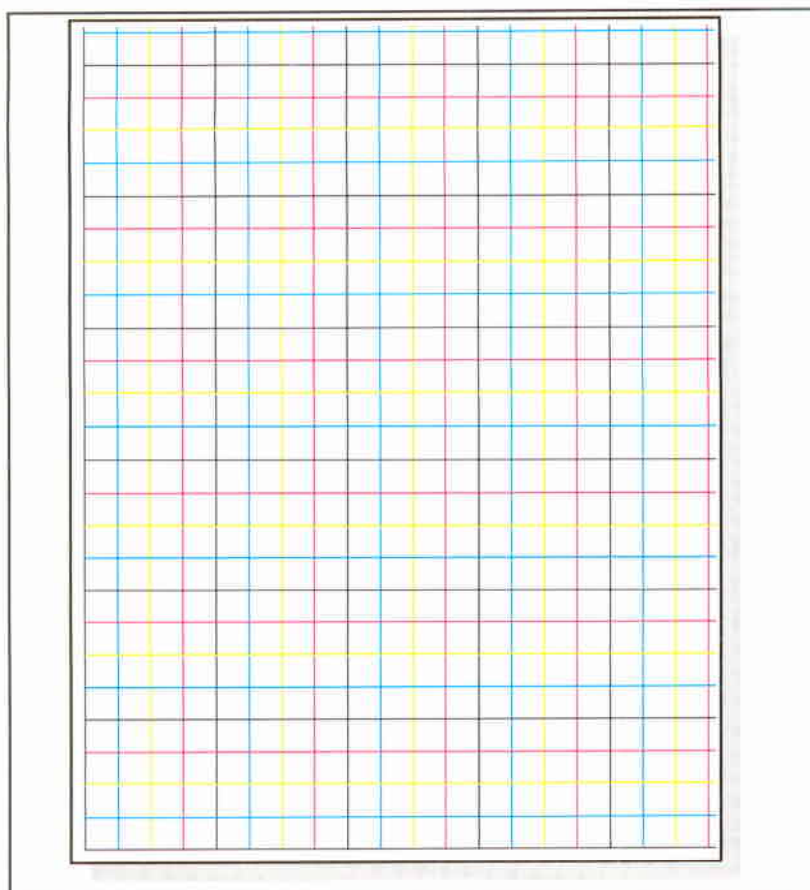


Figure 7-49 15 Engine Test Printout

## Half Self Test

The electrophotographic process can be divided into the following stages:

- Charging (charge corona)
- Exposing (laser modulation)
- Developing (formation of the toner image on the drum)
- Transferring (toner placement on the page)
- Fusing
- Cleaning (physical and electrostatic)

The Half Self Test checks that the image is being written and developed onto the Print Drum before it is transferred to the page. This test determines whether image formation problems are associated with development of the image or in a later process.

### **Perform the Half Self Test as follows:**

1. Perform a 05 Self Test.
2. Listen for the Registration Solenoid engaging, and wait one second before powering OFF, or opening the printer. The leading edge of the page should be on the transfer belt.
3. Open the printer and inspect the image on the Print Drum.

If a sharp and clear image is fully developed on the Print Drum, assume the first four steps of the image formation process are working. Troubleshoot the failure as a transfer problem, or a problem that occurs later (such as a Fuser problem).

If no image is developed on the drum or the image is poorly developed, perform the Drum Rotation Functional Test (see next page).

#### **Note**

It may take several test attempts to stop the page at the correct moment.

## Drum Rotation Functional Test

The Print Drum must turn for the print process to work. The Print Drum receives its drive from the Main Motor assembly. If the drive gears are worn, or the gears do not mesh correctly, the Print Drum may not turn. Check the drum rotation as follows:

1. With the printer ON, open the Top Cover.
2. With a fine-point felt pen, mark the silver area of the aluminum cylinder of the Print Drum. Note the position of the mark.
3. Close the Top Cover. The start-up sequence should rotate the drum and move the mark.
4. Open the printer about one second after start-up, and check that the mark has moved. If it has not, the problem is either gear engagement or main motor rotation.
5. The spring loaded drum drive gear (shown in Figure 7-50), may be stuck in the retracted position. Check that the spring is not broken, and the gear is free throughout its full range of travel. Toner may accumulate around the gear and spring, inhibiting the gear from engaging. Find the cause of any accumulated toner before returning the printer to service. Thoroughly clean the printer, and replace the spring if necessary.

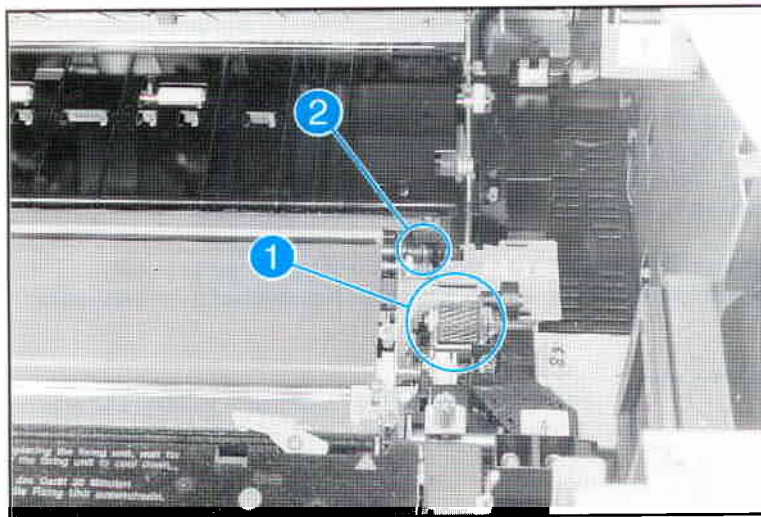


Figure 7-50 Spring Loaded Drum Drive Gear

### **Toner Contamination in the Transfer Area**

If a large amount of toner is accumulated in the transfer area, you must identify the source of the toner as soon as possible.

#### **Note**

Accumulated toner causes print quality problems, and may lead to additional service calls.

If toner is accumulated in the transfer area:

1. Ensure that all maintenance units are within their rated life. Replace any that have exceeded their maximum life as listed on the self test page.
2. Check the Transfer Corona Cleaner position. Ensure it is all the way to the right.
3. Examine the Transfer Belt (do not touch it). If it is contaminated with toner, the transfer belt's internal cleaning system may not be working.
  - a. Check the High Voltage contacts (the springs in the plastic housing). They should be within 1 mm of the top of the housing.
  - b. Replace the Transfer assembly if it is excessively dirty.
4. Examine the developers. Replace any developer that shows signs of excessive leakage.
5. Examine the Toner Collection Box. Check the auger and seals. Replace the Print Drum and the Toner Collection Box if toner is leaking here. If the Toner Collection Box is overfilled refer to the 14.5 and 16.5 Replace Collection Box procedures.
6. Perform a self test and examine the Print Drum. Replace the drum if toner is being developed in the background or the non-image areas.

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## Color Balance Adjustment (Color LaserJet 5/5M)

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### Note

Adjusting the color balance will change your printer hardware. Perform all of the troubleshooting methods before attempting the following procedure.

---

#### 1. Print a self test page.

The self test page will display the last set of saved color settings and provides a record of your initial settings before any adjustments. The factory setting for each color is 0 (other possible settings include -2, -1, and 2).

#### 2. Turn the printer off.

#### 3. Print a color balance test page.

While holding down the **Menu** and **Enter** keys on the front panel, turn the printer back on. The printer display will read, COLOR BALANCE TEST PAGE. (If this is not shown in the display, press the **Item** key until it is.) Press the **Enter** key to print the Color Balance Test Page. The test page will consist of two color bars (black and cyan) and a box of color balance circles (see Figure 7-51).

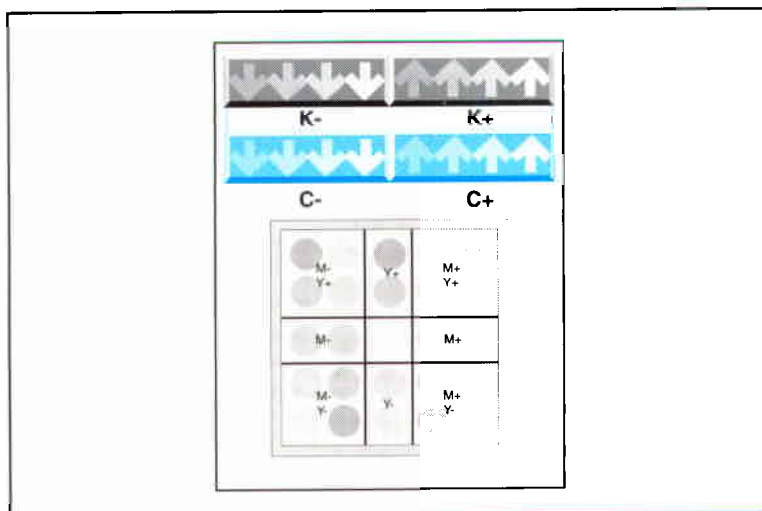


Figure 7-51 Color Balance Test Page



#### 4. Adjust the black (K=/K-) density setting.

Examine the black bar from a distance of 6 feet (2m). If the two center arrows (Figure 7-52, item 1) blend into the background of the black bar, the black density does not need to be adjusted (continue with the cyan setting). If one set of arrows (left corner or right of center) is more visible on the black bar, do the following:

- Press the **Item** key to get the K density display.
- If the four arrows on the right (Figure 7-52, callout 2) are more visible, the density needs to be increased. Press the **+** key once.
- If the four arrows on the left (Figure 7-52, callout 3) are more visible, the density needs to be decreased. Press the **-** key once.
- Press the **Enter** key when finished.

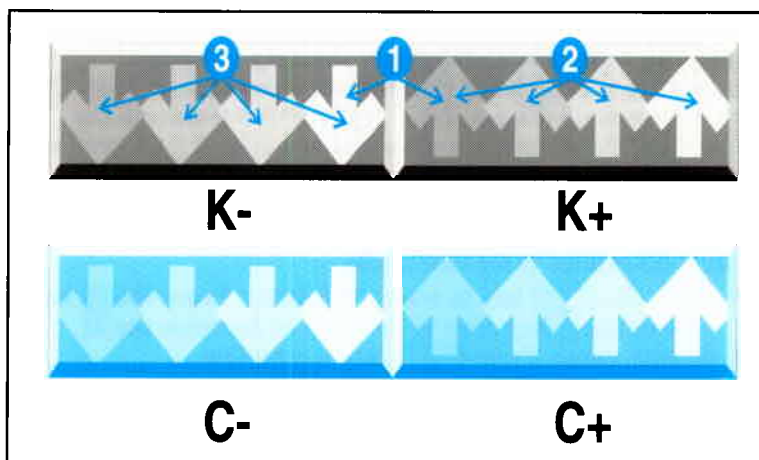


Figure 7-52 Adjusting Black and Cyan Density Settings

#### 5. Adjust the cyan (C+/C-) density setting.

- Press the **Item** key to get the C density display.
- Repeat the last three steps in 4, this time using the cyan bar.

#### 6. Reprint the color balance test page.

Press the **Item** key until COLOR BALANCE TEST PAGE is displayed on the front panel. Press the **Enter** key. A new test page will print. Examine the black and cyan bars. If the two center arrows blend into their respective backgrounds, go to step 9, otherwise repeat steps 4 and 5 (the maximum color density setting is +2 and the minimum is -2).

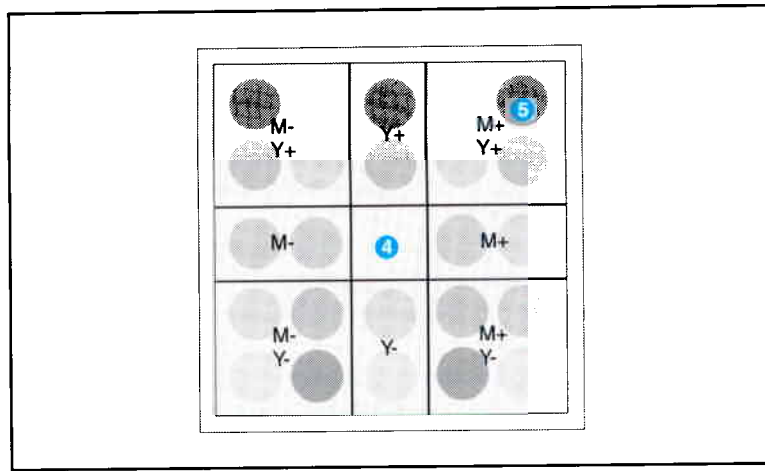


Figure 7-53 Adjusting Magenta and Yellow Density Setting

**7. Adjust the magenta and yellow density settings.**

Examine the color balance circles from a distance of 6 feet (2). If the center circle (Figure 7-53, callout 4) blends into the background, the magenta and yellow densities do not need to be adjusted (go to step 9). Determine which circle blends in best with the background. Make note of the magenta (M) and yellow (Y) density adjustments (for example, M+, Y+ for Figure 7-53 callout 5) for that circle.

- Press the **Item** key to select M density. Press the **+** key once or the **-** key once to increase or decrease the M density value. Press **Enter** when complete.
- Press the **Item** key to select Y density. Press the **+** key once or the **-** key once to increase or decrease the Y density value. Press **Enter** when complete.

**8. Reprint the color balance test page.**

Press the **Item** key until COLOR BALANCE TEST PAGE is displayed on the front panel. Press the **Enter** key. A new test page will print.

**9. Press **On Line** to continue** (the maximum density setting is +2 and the minimum is -2).

## Solenoid and Sensor Locations

Table 7-13 Solenoid Functions

Solenoid		Function
1	Cam Solenoid (SL4)	Engages clutch which cause M2 to rotate cam. This lifts and lowers the transfer assembly and cleaning blade..
2	Toner Supply Solenoid (SL5)	Engages clutch which allows M2 to drive selected toner supply auger.
3	Face Up/Down Solenoid (SI5)	Switches exit claw position for face-up or face-down output.
4	Paper Feed Solenoid (Tray feed SL1)	Actuates clutch to allow paper pick from paper tray.
5	Registration Plate Solenoid (SL2)	Drops the registration plate.
6	Paper Exit Guide Solenoid (SL7)	Lifts the Fuser guide when printing transparencies.
7	Toner Hopper lock Solenoid (SL6)	Unlock the selected Toner Hopper.

## Solenoid

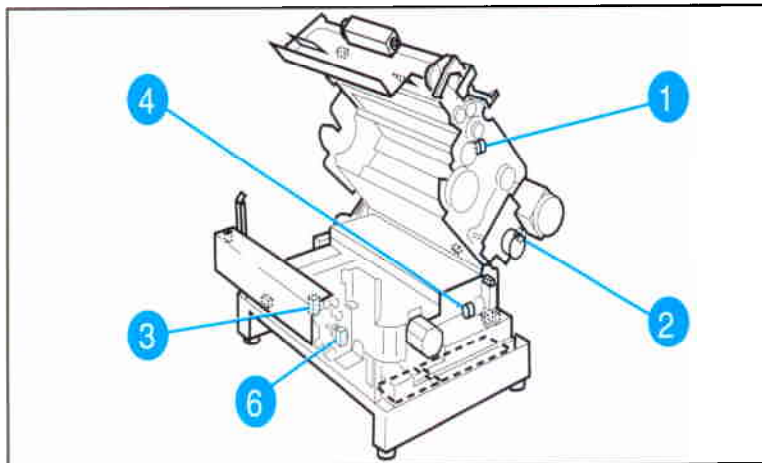


Figure 7-54 Solenoid Locations (1 of 2)

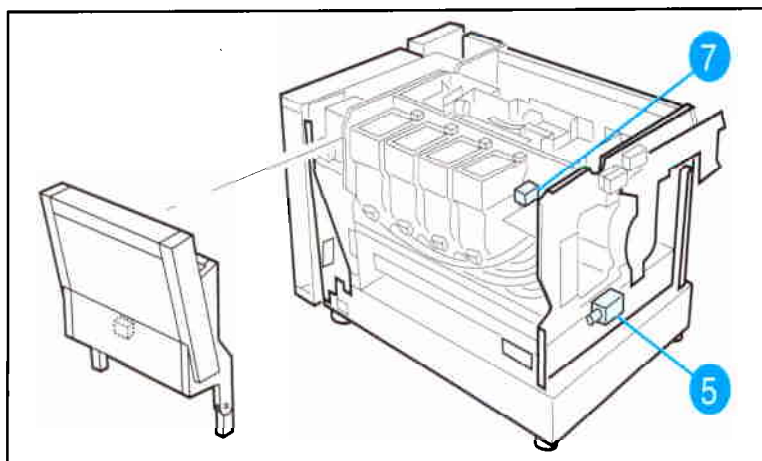


Figure 7-55 Solenoid Locations (2 of 2)

Table 7-14 Sensor Functions

(see Figure 5-31 through 5-36 for the items listed below)		
Item	Sensor	Function
1	PS2	Belt/Cam Home Position Sensor. Senses Transfer Belt and Drum Cleaning Blades home position.
2	PS3	Collection Box Full Sensor.
3	PS5	Transparency Detection Sensor.
4	PS6	Developer Select Home Sensor. Senses the Developer Select Position.
5	PS7	Paper Feed (registration) Sensor.
6	PS8	Paper-out Sensor.
7	PS1	Paper Exit Sensor. Detects media in the Exit assembly.
9	Black Sensor	Senses black toner empty.
10	Cyan Sensor	Senses cyan toner empty.
11	Magenta Sensor	Senses magenta toner empty.
12	Yellow Sensor	Senses yellow toner empty.
13	PS4	RFU Paper-out Sensor. Senses media in the RFU.
14		Humidity Sensors.
15		Paper Size Sensors, J103, B4-B7.
16/17		Fuser Temperature Sensors (TH2 and TH1).
18		Toner Concentration Sensor (1 for each developer).
19		Drum Wrap Sensor.
20		RFU Paper in Path Sensor.
21		RFU Manual Feed Sensor.

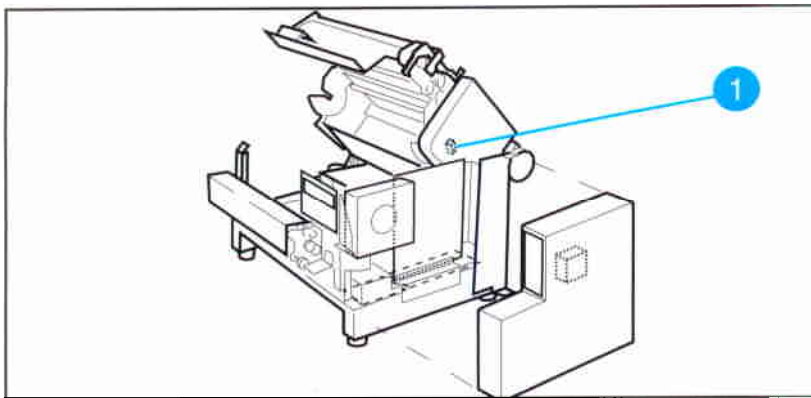


Figure 7-56 Belt Cam Home Position Sensor

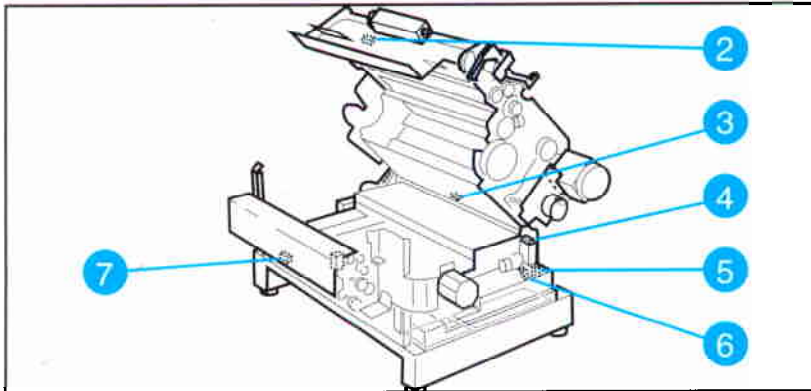


Figure 7-57 Internal Sensor Locations

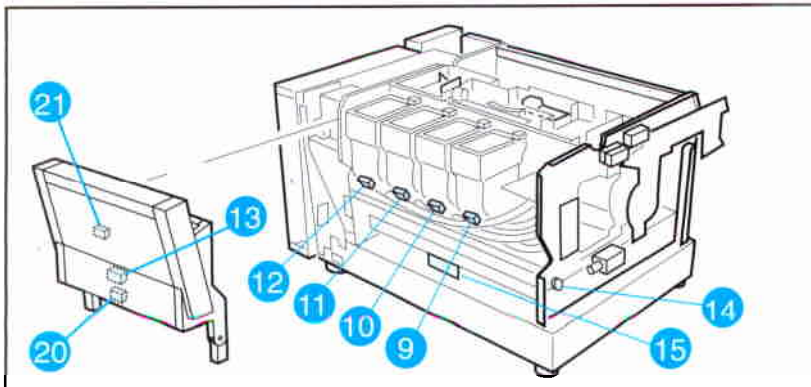


Figure 7-58 Rear Sensor Locations



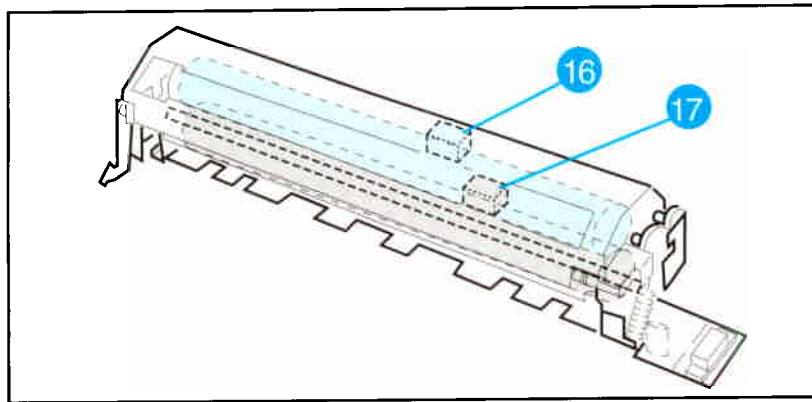


Figure 7-59 Fuser Sensor Location

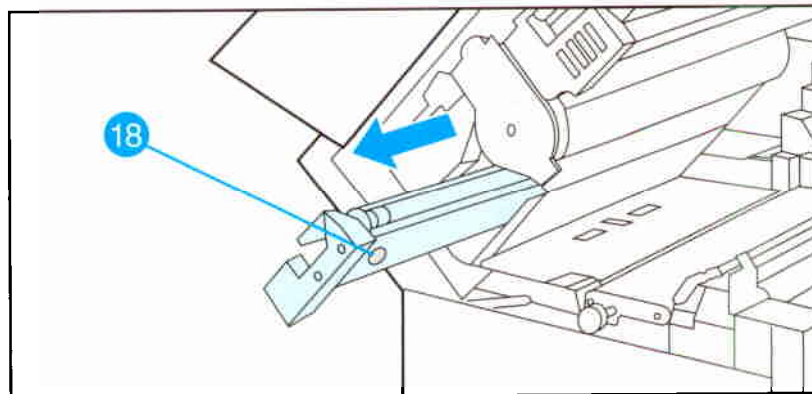


Figure 7-60 Toner Concentration Sensor (1 for each developer)

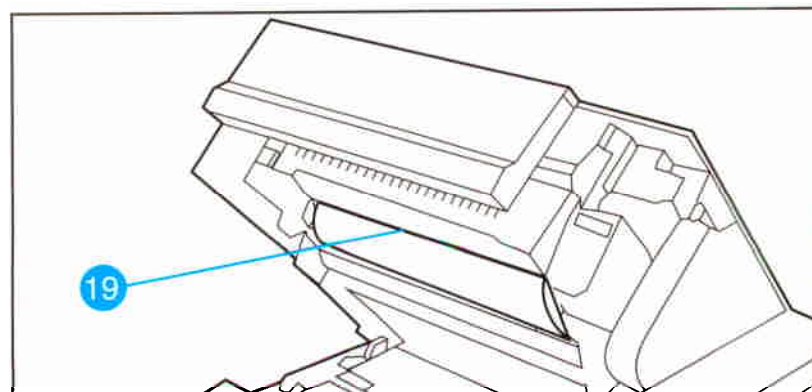
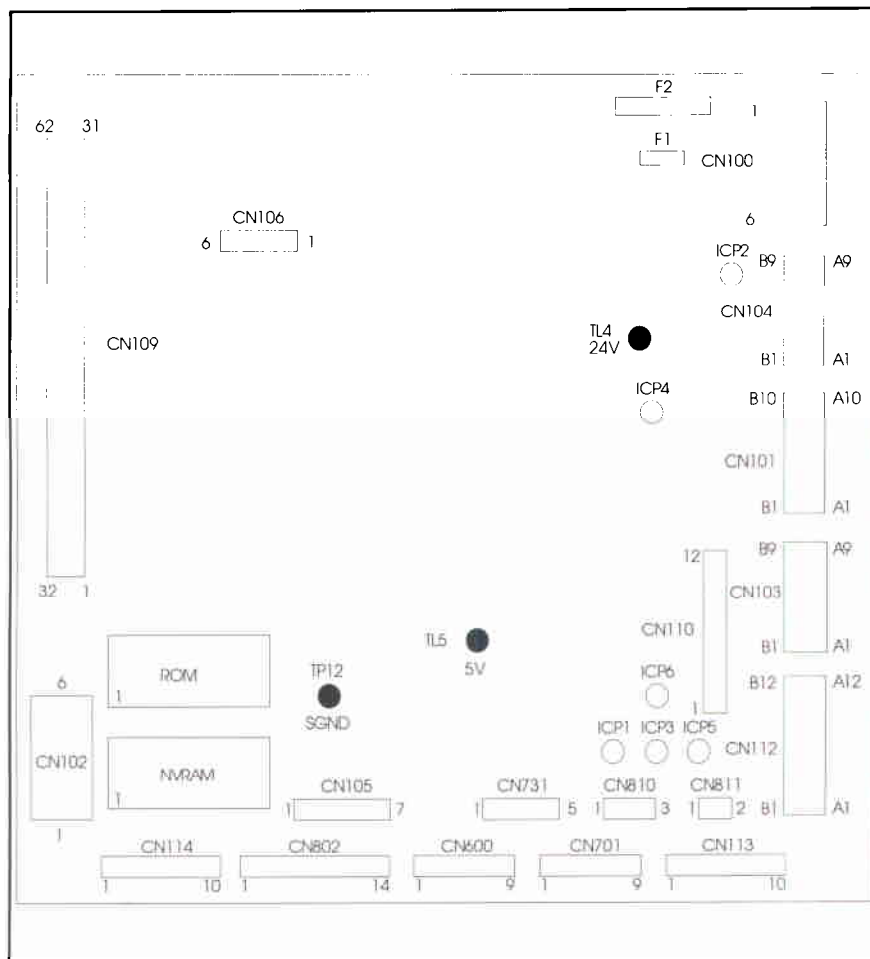


Figure 7-61 Drum Wrap Sensor



**Figure 7-62** Color LaserJet Control Board Connector Layout



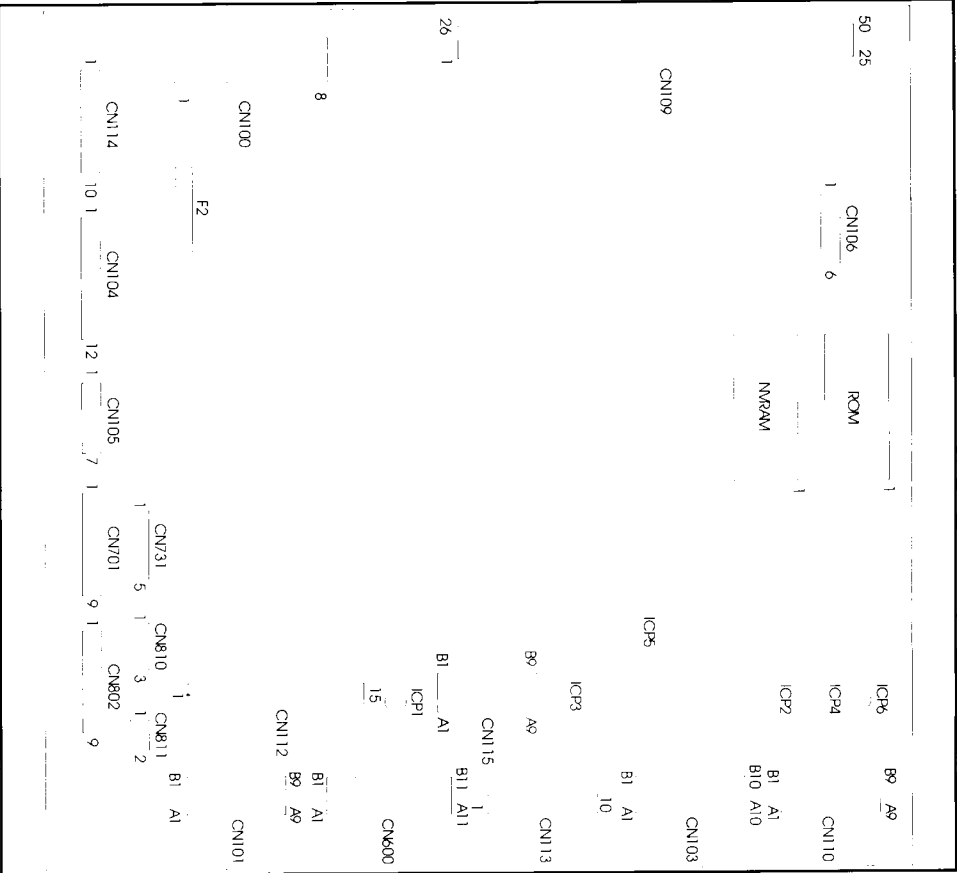
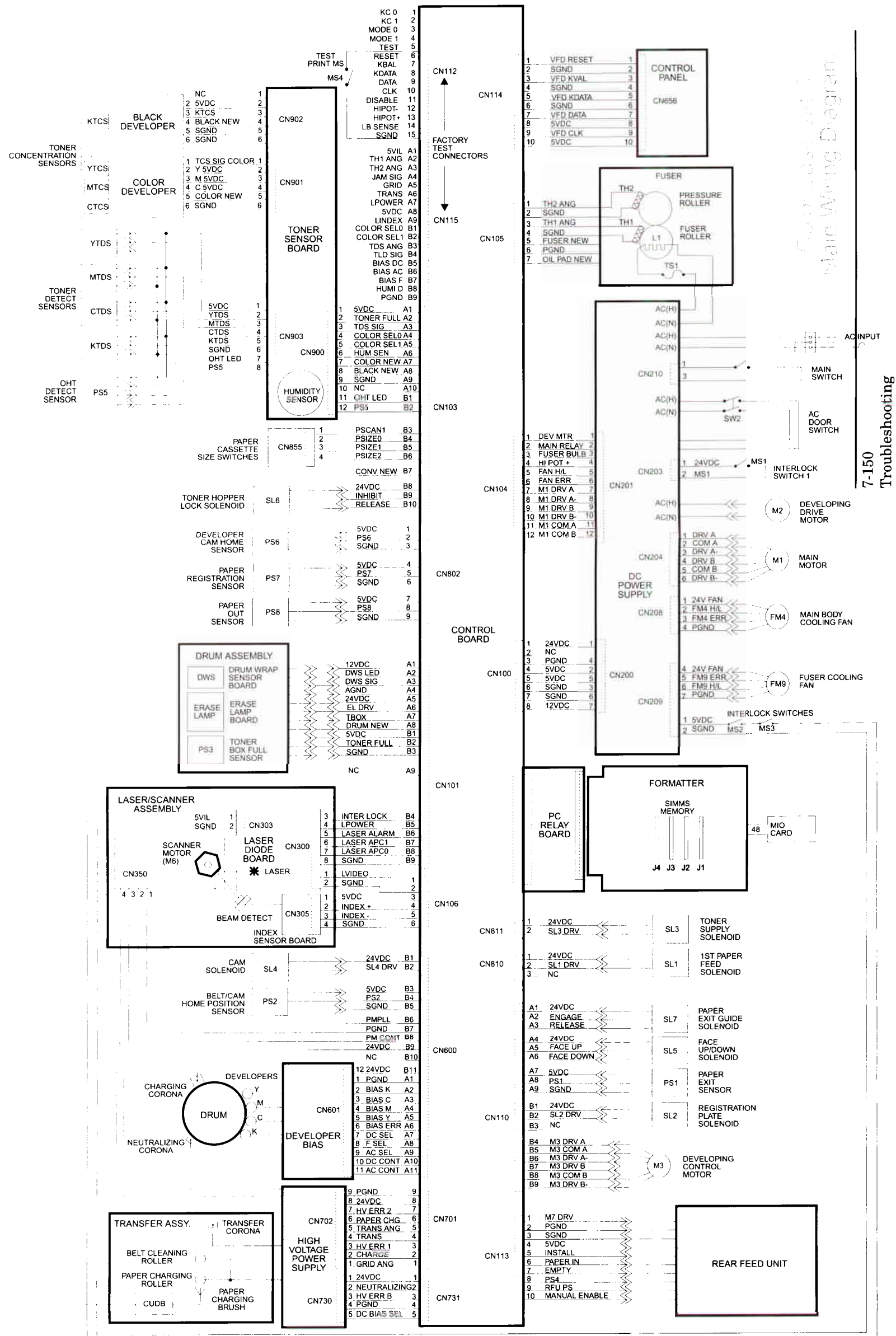
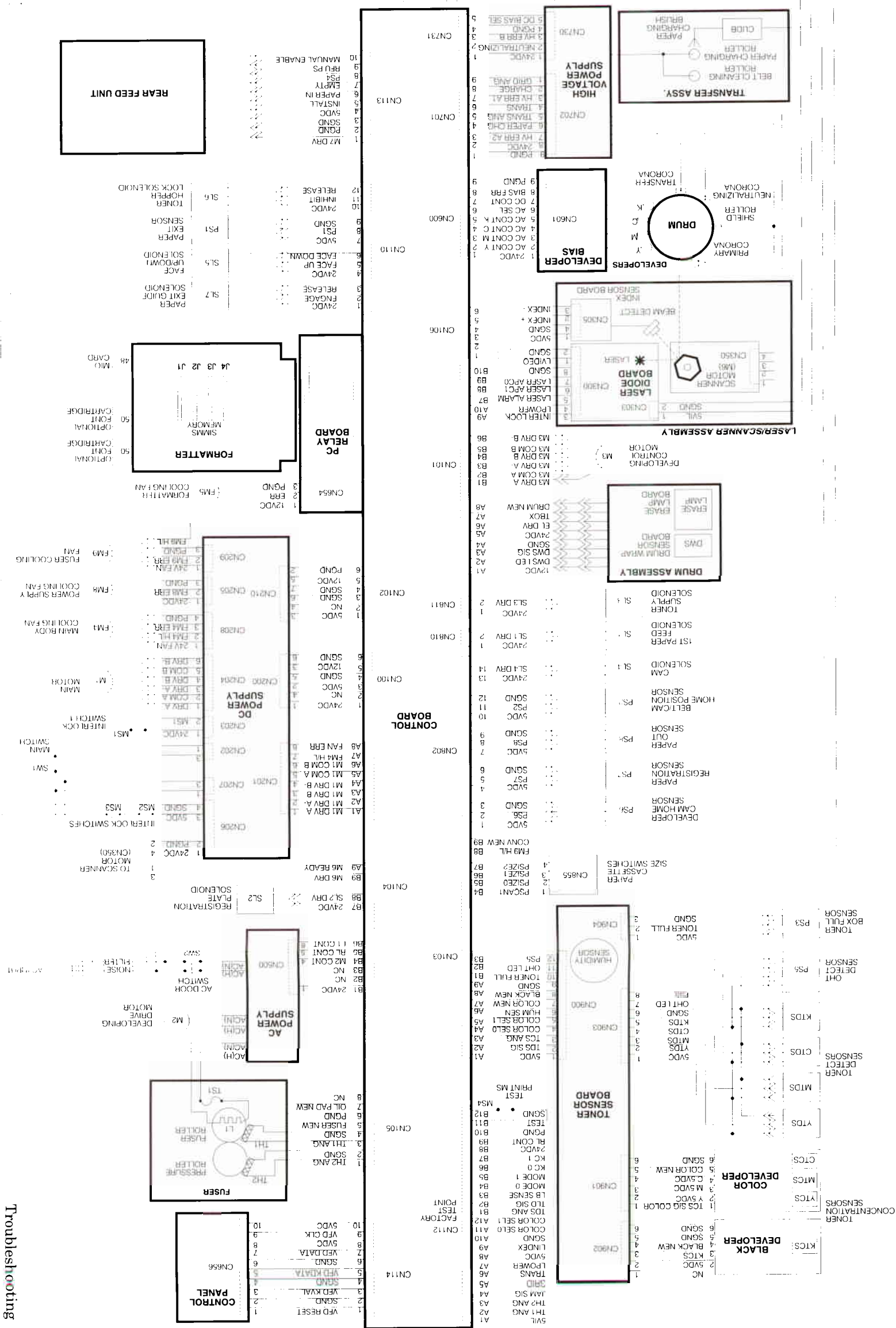


Figure 7-63 Color LaserJet 5 Control Board Connector Layout







# Parts and Diagrams

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## Chapter Contents

Introduction . . . . .	8-3
Ordering Parts . . . . .	8-3
Maintenance Units, Accessories, and Supplies . . . . .	8-4
Common Hardware . . . . .	8-5
Miscellaneous Parts . . . . .	8-6



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## Introduction

The figures in this chapter illustrate the major subassemblies in the printer and their component parts. A table (material list) follows each exploded assembly diagram. Each table lists the reference designator (item number) for each part, the associated part number, quantity, and description of the part.

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### Note

When looking for a part number, pay careful attention to the voltage listed in the description column to ensure that the part number selected is for the correct model of printer.

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## Ordering Parts

All standard part numbers are stocked and may be ordered from Support Materials Organization (SMO), or Support Materials Europe (SME).

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### Note

Parts that have no reference designator or part number are not field replaceable and cannot be ordered.

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<p>Hewlett-Packard Co. Support Materials Organization 8050 Foothills Blvd. Roseville, CA 95678 Parts Direct Ordering: 1-800-227-8164 (U.S. only)</p>
<p>Hewlett-Packard Co. Support Materials, Europe Wolf-Hirth Strasse, 33 D-7030 Boeblingen, Germany (49 7031) 14-2253</p>

## Maintenance Units, Accessories, and Supplies

The following items are available through your local authorized HP dealer. To find a dealer near you (or if your local dealer is temporarily out of stock) call the HP Customer Information Center at 1-800-752-0900.

**Note** Refer to “Ordering Related Documentation” in Chapter 1 for documentation part numbers.

Consumable parts and accessories are available directly from Hewlett-Packard at the following numbers:

- U.S.: 1-800-538-8787
- Canada: 1-800-387-3154, (Toronto) 416-671-8383
- United Kingdom: 0734-441212

Contact your local HP Parts Coordinator for other local phone numbers.

**Table 8-A** Consumables and Accessories

PRODUCT NO.	DESCRIPTION	PRODUCT NO.	DESCRIPTION
C3967A	Drum Cartridge	C3112A	PostScript Level II (C3100A only)
C3966A	Color Developer	C3963A	PostScript Level II (C3961A only)
C3965A	Black Developer	C3130A	1Mbyte SIMM
C3968A	Transfer Assembly	C3131A	2 Mbyte SIMM
C3969A	Fusing Assembly (110V)	C3132A	4 Mbyte SIMM
C3969A	Fusing Assembly (220V)	C3133A	8 Mbyte SIMM
*C3964A	Coating Kit	C3146A	16 Mbyte SIMM
C3120A	Toner Collection Kit	D2298A	32 Mbyte SIMM
C3102A	Cyan Toner	J2550A	Ethernet (10Base-T)
C3103A	Yellow Toner	J2552A	EtherNet Combo
C3104A	Magenta Toner	J2374B	UNIX SW/HP-UX
C3105A	Black Toner	J2375B	UNIX SW/SunOS
C3119A	Rear Feed Unit	J2341B	HP JetDirect LocalTalk

\*Compatible with Fusing Assembly C3969A only.

table continued next page



Table 8-A cont. Consumables and Accessories

PRODUCT NO.	DESCRIPTION	PRODUCT NO.	DESCRIPTION
C3113A	Letter size tray	J2371A	EtherNet MPS (10Base-T Only)
C3114A	Legal size tray	J2372A	EtherNet MPS (10Base-T & BNC)
C3115A	A4 size tray	J2373A	Token Ring
C3116A	Executive size tray	J2555A	Token Ring
C3117A	A3 size tray		
C3118A	11x17 size (tabloid) tray		

## Common Hardware

Table 8-B Common Fasteners Used in the Printer

DRAWING	DESCRIPTION	SIZE	PART NO.
	Pan Head	M3X4 M3x6	00Z183041KC 00Z183061KC
	Trus Head	M3X4 M3X6 M3x8 M3X12	00Z193041KC 00Z193061KC 00Z193081KC 00Z193122KC
	Captive Washer	M3X12 M4x6	00Z163121KC 00Z164061KC
	Bind Head Self-tap	M3x6	00Z253061KC

6mm 8mm 10mm 12mm M3 M4



## Miscellaneous Parts

Table 8-C Miscellaneous Parts

PART NO.	QTY	DESCRIPTION
C3112-69001	1	PostScript Level II SIMM (CLJ only*)
C3963-69001	1	PostScript Level II SIMM (CLJ 5/5M only**)
D2150-69001	1	1 Mbyte SIMM
D2381-63001	1	2 Mbyte SIMM
D2156-69001	1	4 Mbyte SIMM
D2152-69001	1	8 Mbyte SIMM
C2747-69501	1	16 Mbyte SIMM
D2298-69001	1	32 Mbyte SIMM
J2550-69001	1	Ethernet (10Base-T)
J2552-69001	1	Ethernet Combo
J2555-69002	1	Token Ring
J2371-69001	1	Ethernet MPS (10Base-T only)
J2372-69001	1	Ethernet MPS (10Base-T & BNC)
J2373-69001	1	Token Ring
J2341-69001	1	HP JetDirect LocalTalk
07BA12640KC	2	RFU Bracket Cover
C3099-60102	1	Shipping Material (need C3100-67905)
C3100-67905	1	Shipping Preparation Kit
07BA-1380KC	1	Optics Cleaning Tool
C3100-40003	1	Name Plate (CLJ*)
C3961-40001	1	Name Plate (CLJ 5***)
C3962-40001	1	Name Plate (CLJ 5M****)

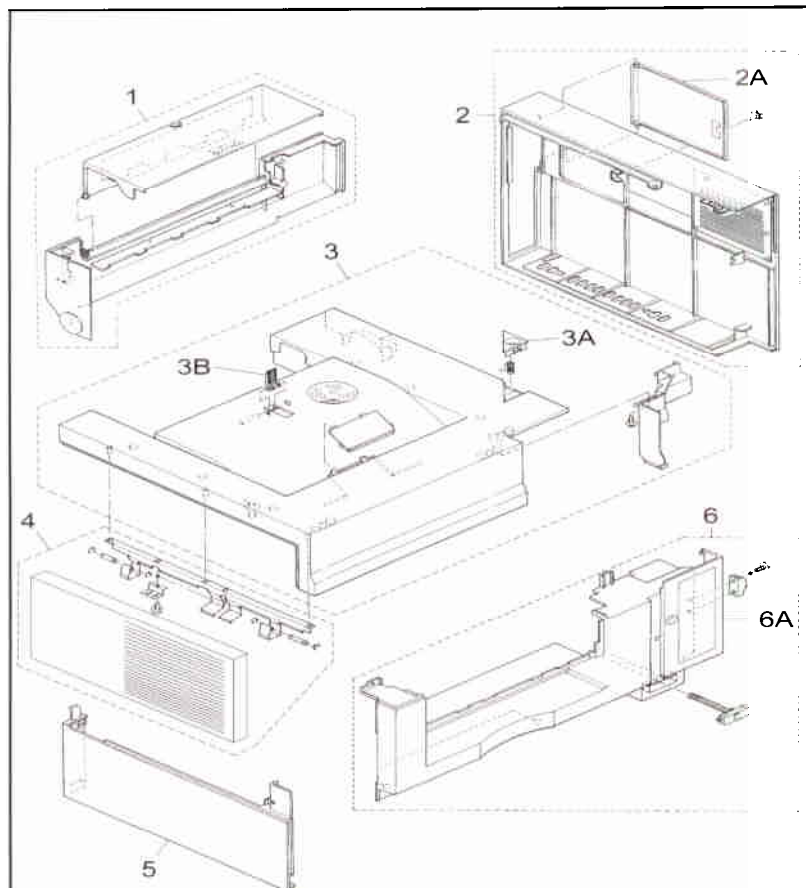
\* HP Color LaserJet Printer

\*\* HP Color LaserJet 5/5M Printer

\*\*\* HP Color LaserJet 5 Printer

\*\*\*\* HP Color LaserJet 5M Printer

## 8-6 Parts and Diagrams



**Figure 8-1 External Covers**

**Table 8-1 External Covers**

REF	PART NO.	QTY	Description
1	07BA-1161KC	1	Cover, Toner Hopper
2	07BA-1150KC	1	Cover, Right Side
2A	07BA-1450KC	1	Door, SIMM Access
3	07BA-1440KC	1	Cover, Top
3A	07BA12134KC	1	Top Cover Button
3B	07BA12581KC	1	Paper Stop
4	07BA-3160KC	1	Door, Developer Access
5	07BA-1370KC	1	Cover, Left Side
6	07BA-1130KC	1	Cover, Front
6A	07BA-1430KC	1	Door, Front

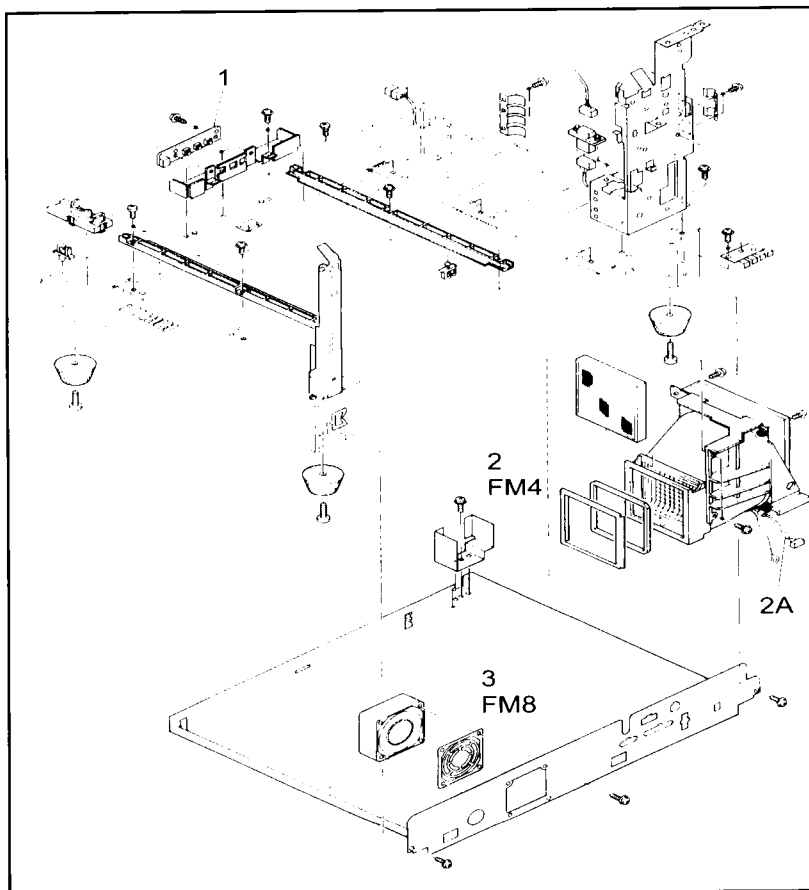
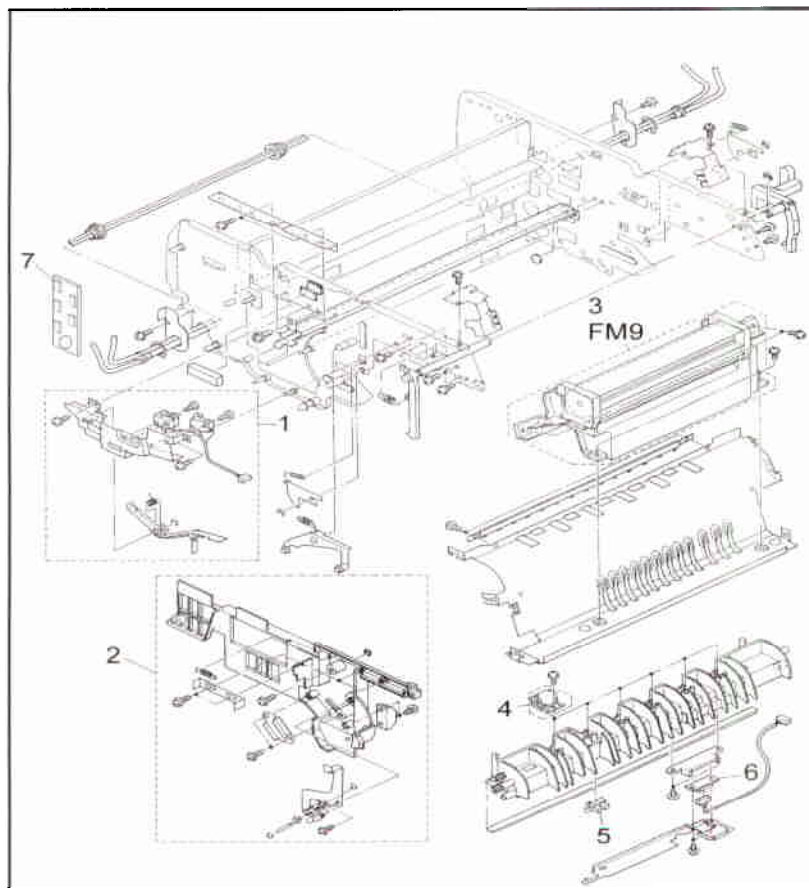


Figure 8-2 Main Frame Assembly (Page 1 of 3)

Table 8-2 Main Frame Assembly (Page 1 of 3)

REF	PART NO.	QTY	DESCRIPTION
1	07BA-9601KC	1	Paper Size Detect Assembly
2	07BA-1082KC	1	Fan, Main Assembly (FM4)
2A	07BA90074KC	1	Cable, Control panel
3	07BA80522KC	1	Fan, Power Supply Drawer (FM8)



**Figure 8-3** Main Frame Assembly (Page 2 of 3)

**Table 8-3** Main Frame Assembly (Page 2 of 3)

REF	PART NO.	QTY	DESCRIPTION
1	07BA-1070KC	1	Interlock Assembly
2	07BA-1410KC	1	Cam Cover Assembly
3	07BA-1340KC	1	Fan, Fuser Cooling (FM9)
4	07BA-1701KC	1	Exit Roller
5	684285520KC	1	Photosensor
6	07AA87331KC	1	Drum Connector PCA
7	07BA-9692KC	1	Toner Detect PCA

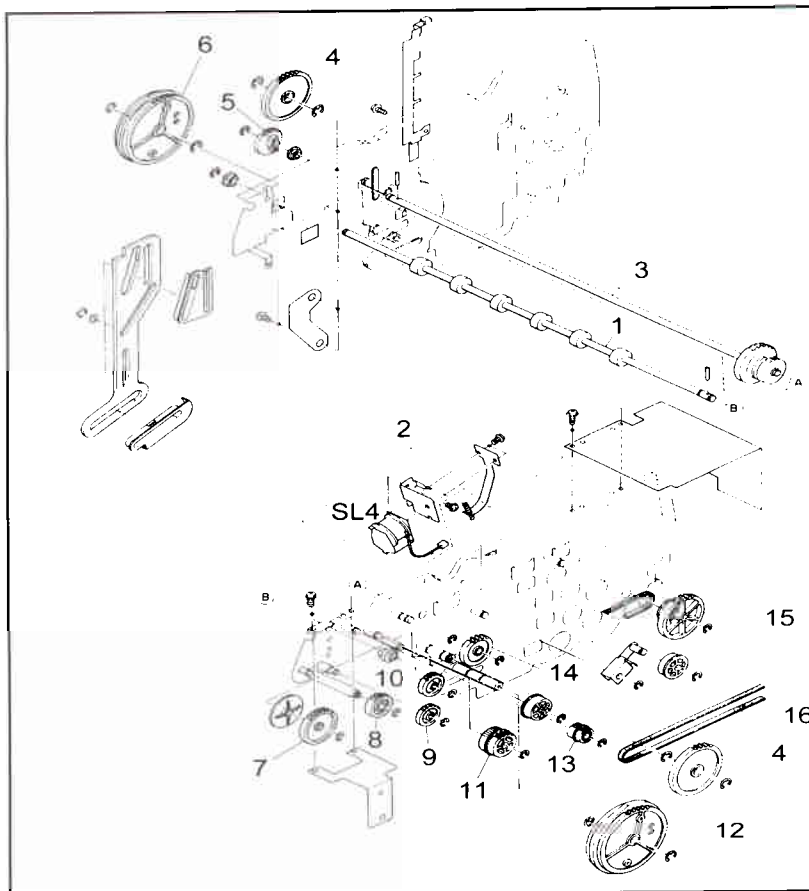


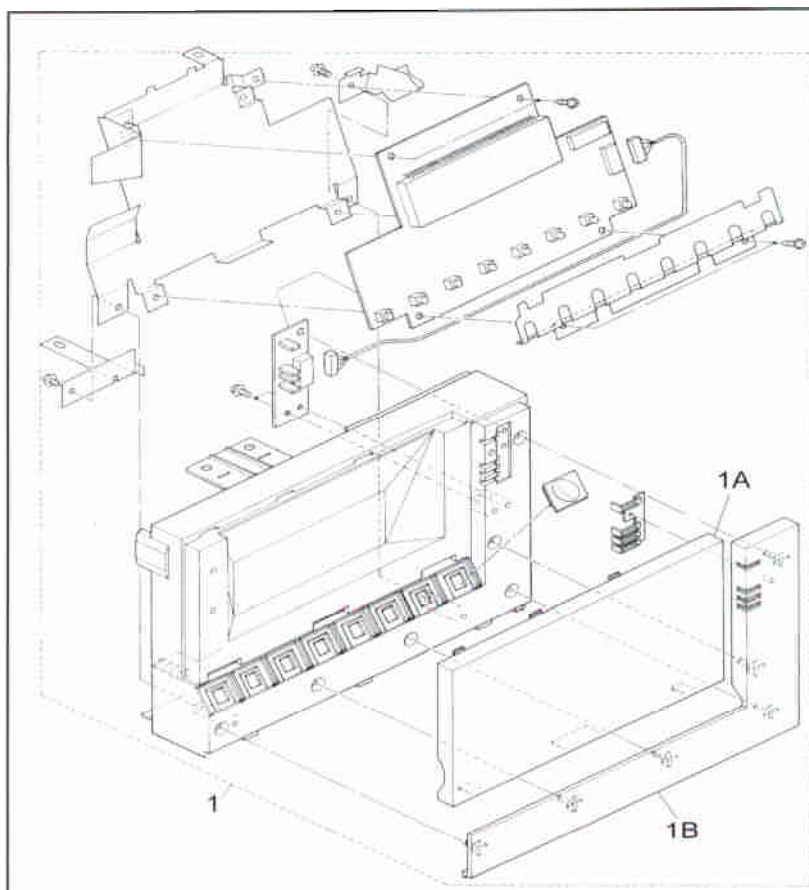
Figure 8-4 Main Frame Assembly Components (Page 3 of 3)

Table 8-4

Main Frame Assembly Components (Page 3 of 3)

REF	PART NO.	QTY	DESCRIPTION
1	07AA15083KC	1	Upper Paper Exit Rollers
2	07BA-1640KC	1	Cam Solenoid (SL4)
3	07BA-1100KC	1	Cam Clutch Assembly
4	07AA77302KC	1	Gear, 52T
5	07AA77310KC	1	Gear, 24T
6	07BA-1670KC	1	Cam Unit (Left)
7	07BA77860KC	1	Gear, 36T
8	07BA77990KC	1	Gear, 23T
9	07BA78010KC	1	Gear, 19T
10	07BA77850KC	1	Gear, 25T
11	07AA77280KC	1	Gear, 24T
12	07BA-1660KC	1	Cam Unit (Right)
13	07AA77271KC	1	Gear, 20T
14	07AA77290KC	1	Gear, 30T
15	07AA77260KC	1	Gear, 44T
16	07AA77620KC	1	Drive Belt





**Figure 8-5**      **Control Panel Assembly**

**Table 8-5**      **Control Panel Assembly**

REF	PART NO.	QTY	DESCRIPTION
1	07BM-7000KC	1	Control Panel Assembly
1A	07BA70030KC	1	Cover, Control panel
1B	07BA70024KC	1	Label Plate, (English)



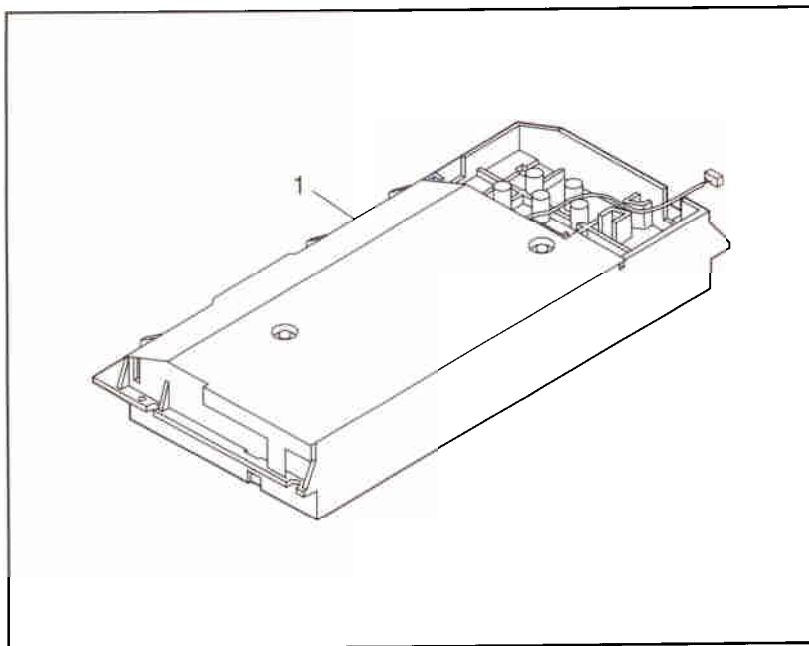
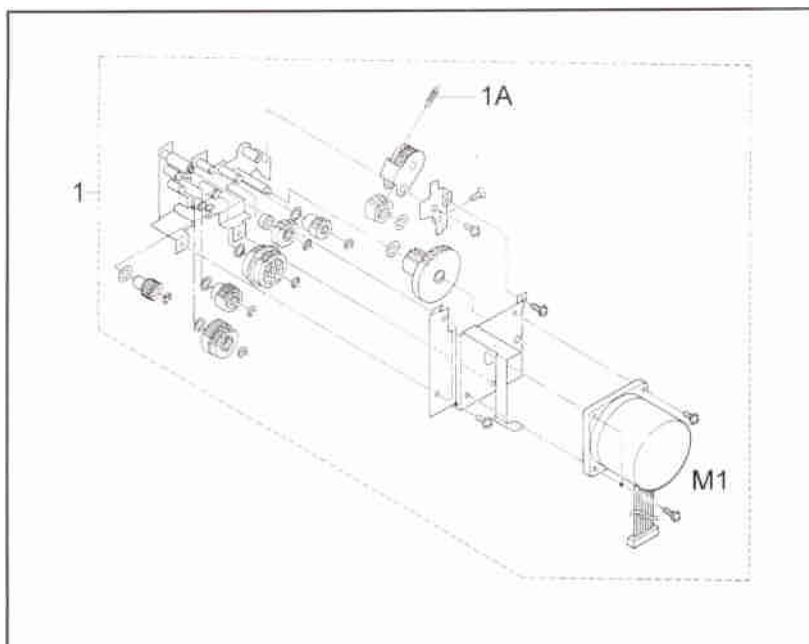


Figure 8-6 Laser/Scanner Assembly

Table 8-6 Laser/Scanner Assembly

REF	PART NO.	QTY	DESCRIPTION
1	07BA-6500KC	1	Laser/Scanner Assembly



**Figure 8-7 Main Motor Assembly**

**Table 8-7 Main Motor Assembly**

REF	PART NO.	QTY	DESCRIPTION
1	07BM-1500KC	1	Main Motor Assembly (M1)
1A	07BM15210KC	1	Spring, Drum Drive Gear

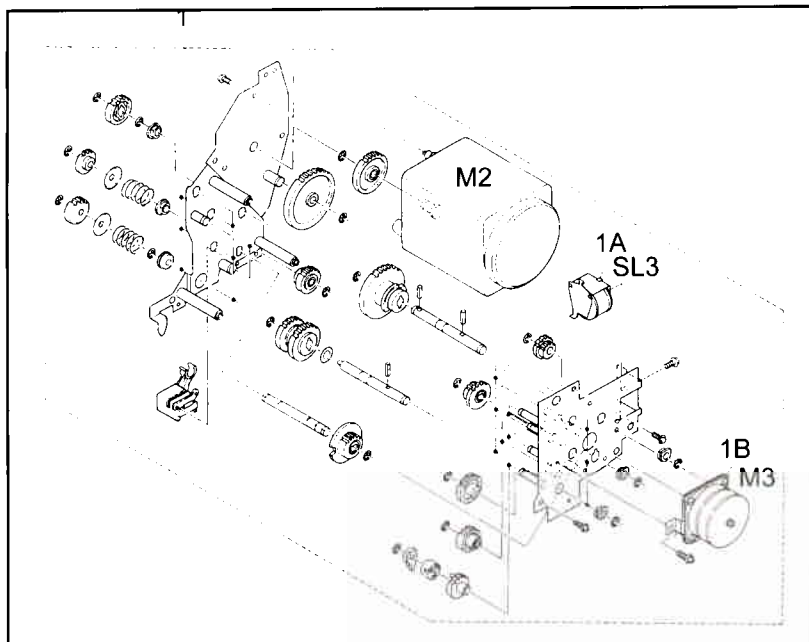
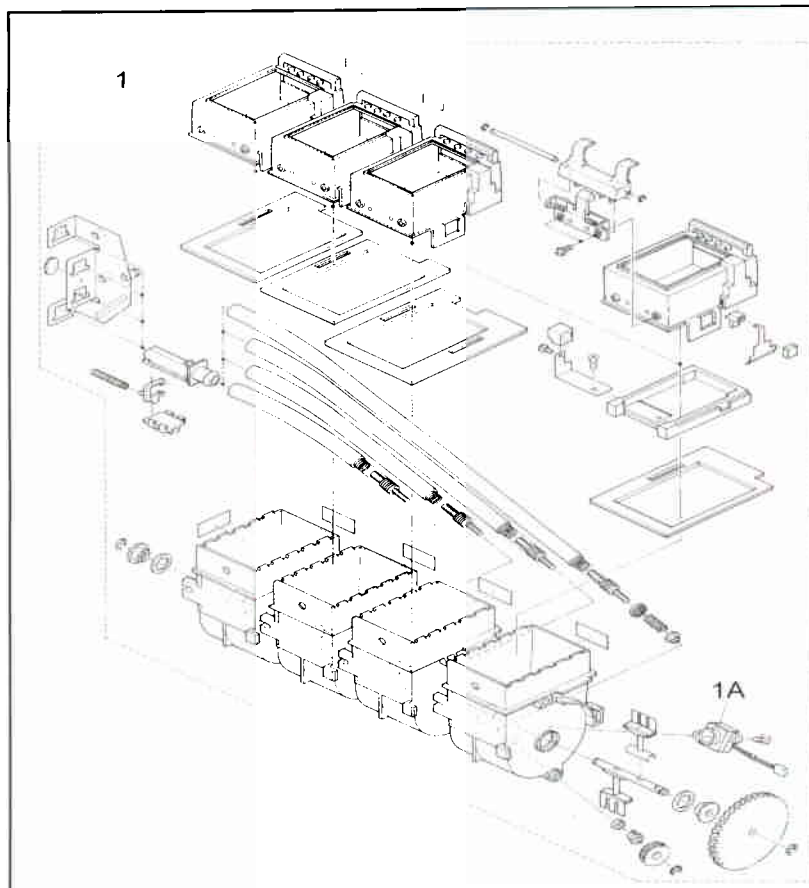


Figure 8-8 Developer Drive Assembly

Table 8-8 Developer Drive Assembly

REF	PART NO.	QTY	DESCRIPTION
1	07BM-1550KC	1	Developer Drive Assembly (110V)
1	07BP-1550KC	1	Developer Drive Assembly (220V)
1A	07AA82532KC	1	Solenoid, Toner Supply (SL3)
1B	07BA-1610KC	1	Motor, Developer Control (M3)



**Figure 8-9**      **Toner Hopper Assembly (Page 1 of 2)**

**Table 8-9**      **Toner Hopper Assembly (Page 1 of 2)**

REF	PART NO.	QTY	DESCRIPTION
1	07BA-3603KC	1	Toner Hopper Assembly
1A	07AA88222KC	4	Toner Sensor

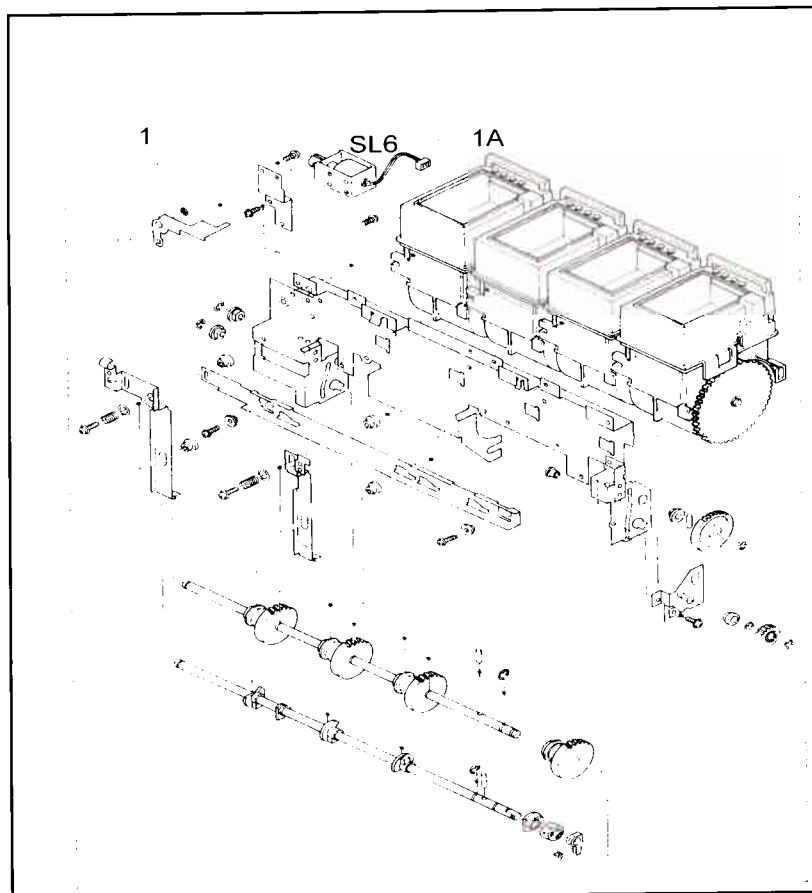
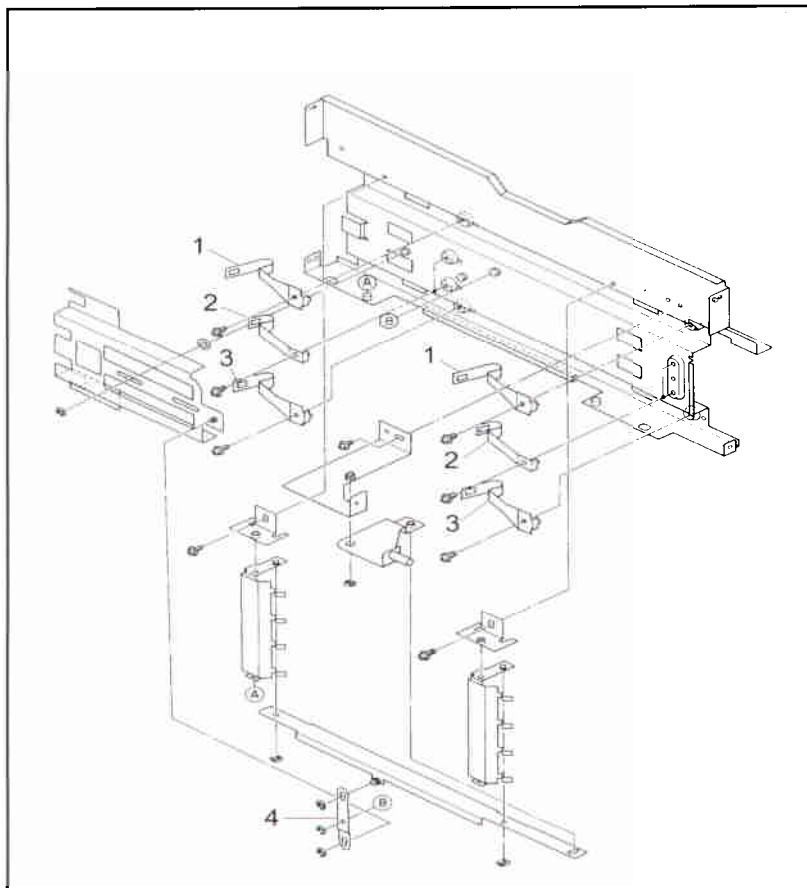


Figure 8-10 Toner Hopper Assembly (Page 2 of 2)

Table 8-10 Toner Hopper Assembly (Page 2 of 2)

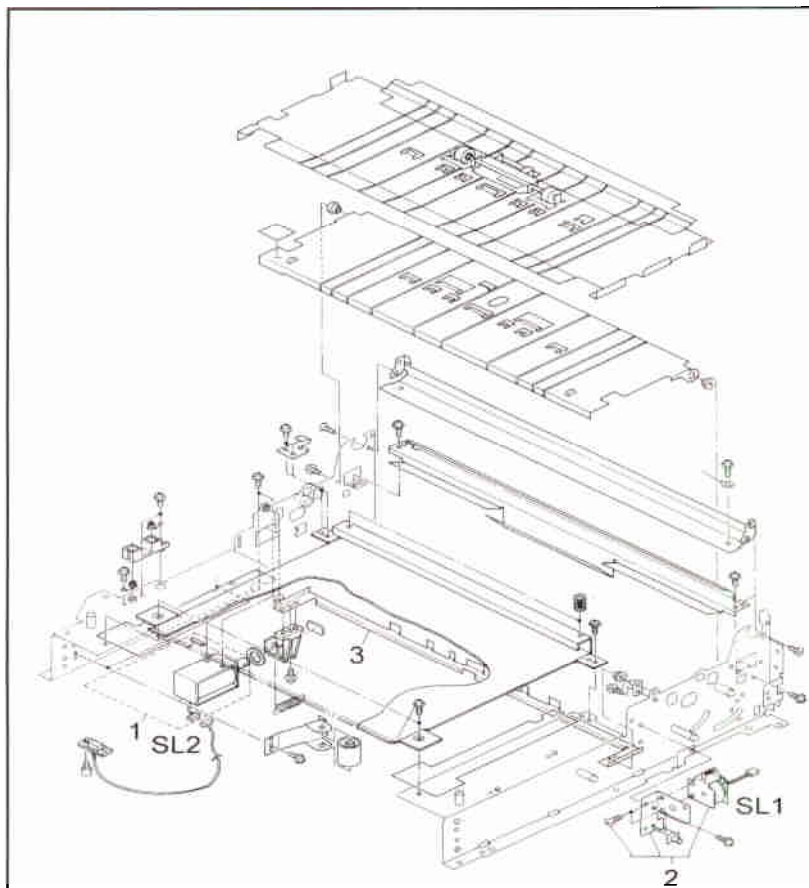
REF	PART NO.	QTY	DESCRIPTION
1	07BA-3603KC	1	Toner Hopper Assembly
1A	07BA-3520KC	1	Solenoid, Toner Supply (SL6)



**Figure 8-11**      **Internal Components**

**Table 8-11**      **Internal Components**

REF	PART NO.	QTY	DESCRIPTION
1	07AA32564KC	2	Spring, Developer Pressure (top)
2	07AA32582KC	2	Spring, Developer Pressure (middle)
3	07AA32573KC	2	Spring, Developer Pressure (bottom)
4	07AA32510KC	1	Drive Release Lever



**Figure 8-12**      **Paper Feed Assembly (Page 1 of 2)**

**Table 8-12**      **Paper Feed Assembly (Page 1 of 2)**

REF	PART NO.	QTY	DESCRIPTION
1	07BA-4140KC	1	Solenoid, Registration (SL2)
2	07BA-4180KC	1	Solenoid, Pick Rollers (SL1)
3	07AA40114KC	1	Registration Plate
4	07AA40341KC	1	Spring, Registration Plate
5	07BA85545KC	1	OHT Sensor

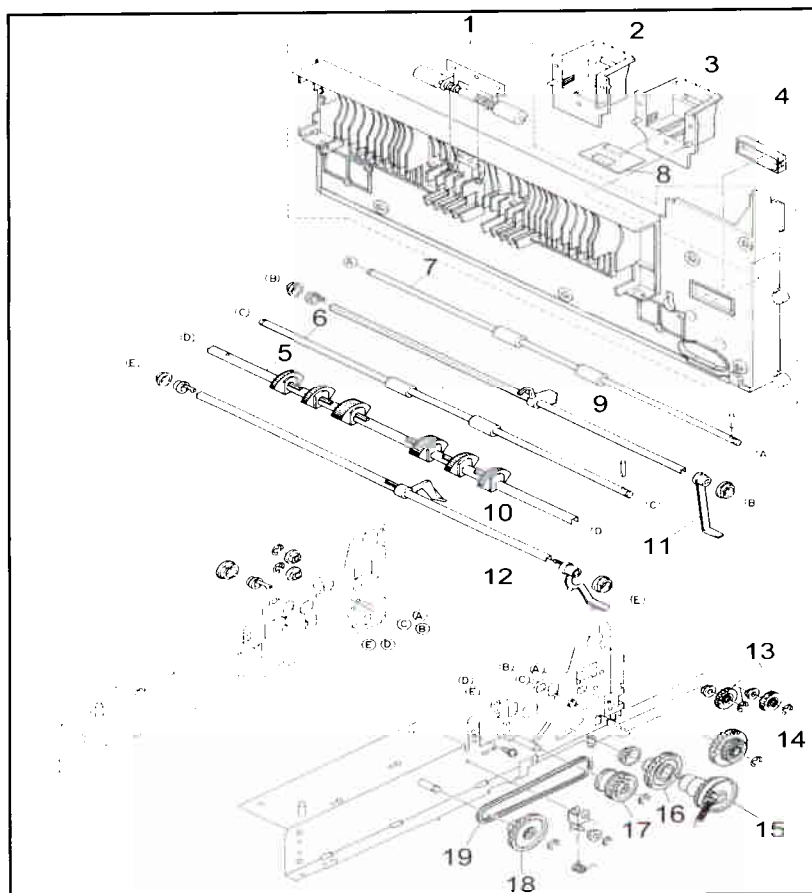
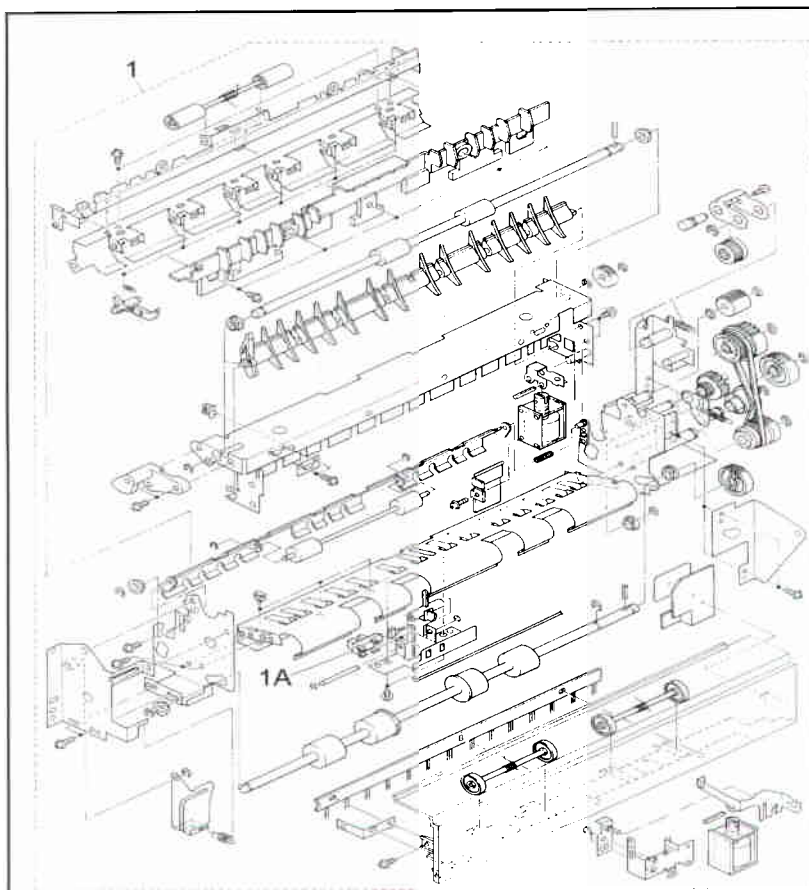


Figure 8-13 Paper Feed Assembly (Page 2 of 2)



Table 8-13 Paper Feed Assembly (Page 2 of 2)

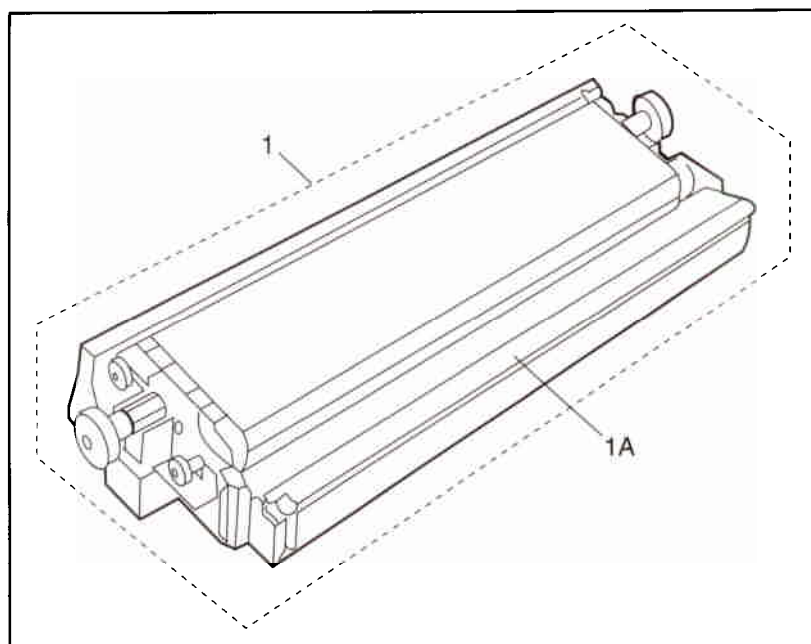
REF	PART NO.	QTY	DESCRIPTION
1	07BA-4121KC	1	Cover, Lower rear
2	07BA12441KC	1	RFU Support Bracket (small)
3	07BA12414KC	1	RFU Support Bracket (large)
4	07BA12420KC	1	Cover, Factory Connect
5	07BA-4062KC	1	Paper Pick Rollers
6	07AA40142KC	1	Registration Feed Rollers
7	07AA40136KC	1	Lower Feed Rollers
8	07BA-9525KC	1	RFU Connector PCA
9	07AA40171KC	1	Paper Detect (Registration Plate)
10	07AA40183KC	1	Paper Detect (Paper Tray)
11	07AA40153KC	1	Paper Detect Flag (Registration Plate)
12	07AA40163KC	1	Paper Detect Flag (Paper Tray)
13	07AA77350KC	1	Gear, 18T
14	07AA77360KC	1	Gear, 36/24T
15	07BA-4072KC	1	Paper Feed Gear
16	392040140KC	1	Gear, 36T
17	07AA77331KC	1	Gear, 25T
18	07BA77320KC	1	Gear, 74T
19	07AA77611KC	1	Drive Belt



**Figure 8-14**      **Paper Exit Assembly**

**Table 8-14**      **Paper Exit Assembly**

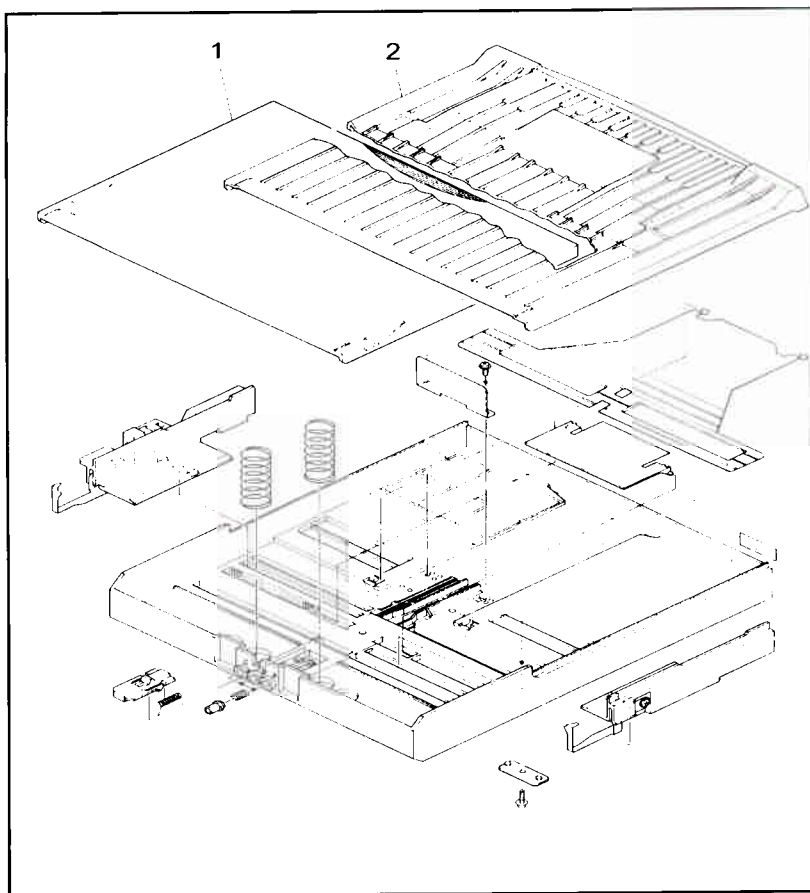
REF	PART NO.	QTY	DESCRIPTION
1	07BM-5005KC	1	Paper Exit Assembly
1A	684285520KC	1	Photosensor



**Figure 8-15**      **Transfer Assembly**

**Table 8-15**      **Transfer Assembly**

REF	PART NO.	QTY	DESCRIPTION
1	C3968-67901	1	Transfer Assembly
1A	07AA45567KC	1	Paper Charging Brush



**Figure 8-16**      **Paper Tray Assembly**

**Table 8-16**      **Paper Tray Assembly**

REF	PART NO.	QTY	DESCRIPTION
1	05AA47025KC	1	Cassette Cover (exec, ltr, A4)
2	05AA-4740KC	1	Cassette Cover (lgl, tab, A3)

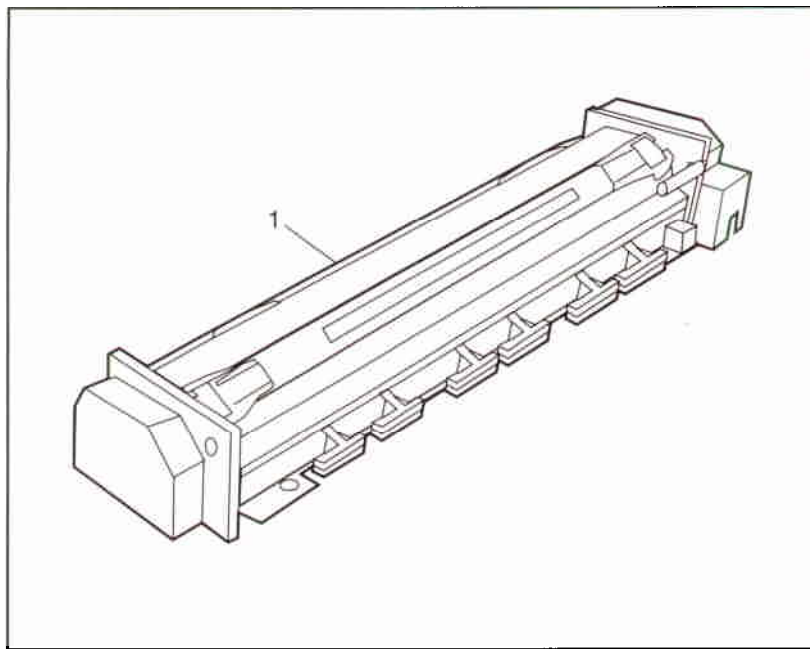
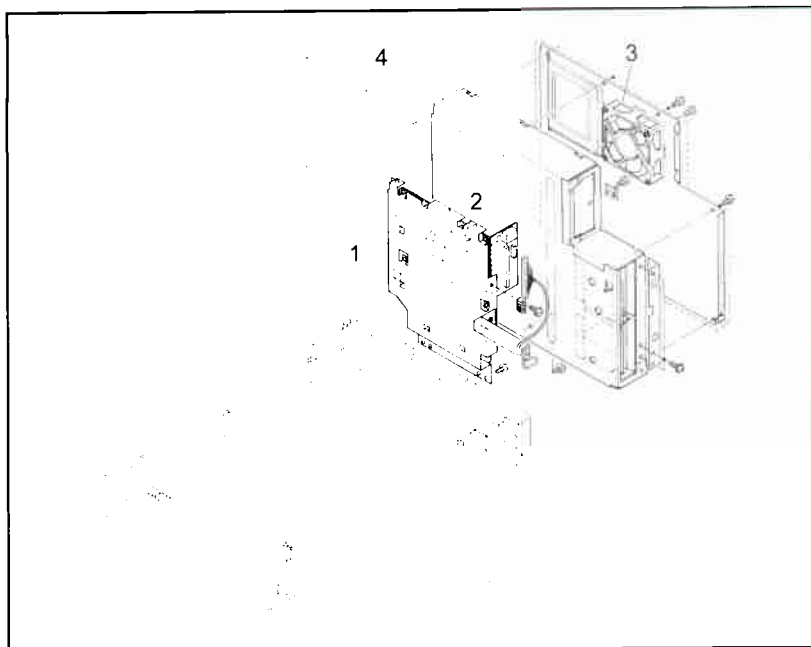


Figure 8-17 Fusing Assembly

Table 8-17 Fusing Assembly

REF	PART NO.	QTY	DESCRIPTION
1	C3969-67901	1	Fusing Assembly (110V)
1	C3969-67902	1	Fusing Assembly (220V)



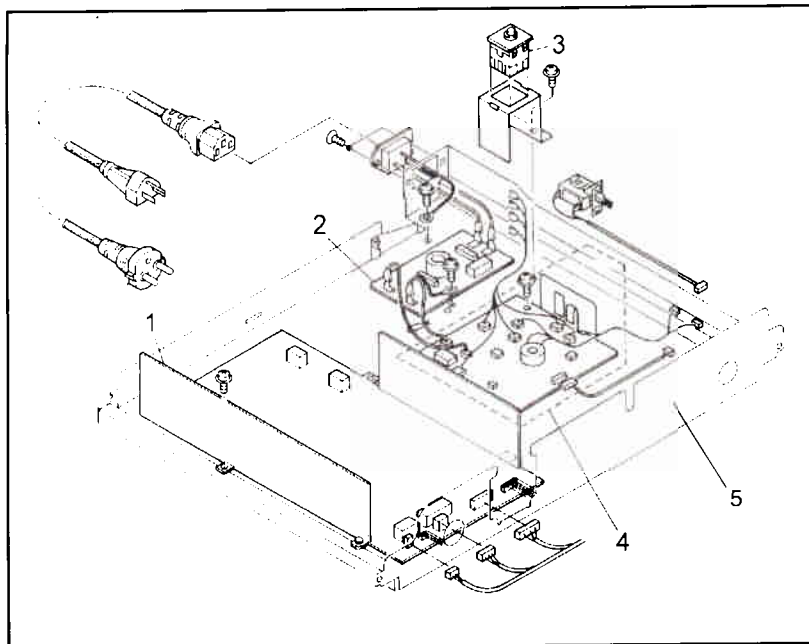
**Figure 8-18**      **Controller Assembly**

**Table 8-18**      **Controller Assembly**

REF	PART NO.	QTY	DESCRIPTION
1	C3100-69003	1	Control Board (CLJ only*)
1	C3961-69001	1	Control Board (CLJ 5/5M only**)
2	07BA-9330KC	1	NVRAM
3	07BA80534KC	1	Fan, Formatter Cooling (FM5-CLJ only*)
4	C3100-69002	1	Formatter (CLJ only*)
4	C3960-69001	1	Formatter (CLJ 5/5M only*)

\* HP Color LaserJet Printer

\*\* HP Color LaserJet 5/5M Printer



**Figure 8-19**      **Power Supply Drawer**

**Table 8-19**      **Power Supply Drawer**

REF	PART NO.	QTY	DESCRIPTION
1	07BA84517KC	1	DC Power Supply (110V) (CLJ only*)
1	07BB84517KC	1	DC Power Supply (220V) (CLJ only*)
1	07BM84510KC	1	DC Power Supply (110V) (CLJ 5/5M only**)
1	07BP84510KC	1	DC Power Supply (220V) (CLJ 5/5M only**)
2	07BA84525KC	1	Noise Filter (110V) (CLJ only*)
2	07BB84525KC	1	Noise Filter (220V) (CLJ only*)
3	07BA86010KC	1	Door Switch (AC)
4	07BA-9204KC	1	AC Power Supply (110V) (CLJ only*)
4	07BB-9204KC	1	AC Power Supply (220V) (CLJ only*)
5	07BM-1011KC	1	Power Supply Drawer Assembly (110V) (CLJ 5/5M only**)
5	07BP-1011KC	1	Power Supply Drawer Assembly (220V) (CLJ 5/5M only**)

\* HP Color LaserJet Printer

\*\* HP Color LaserJet 5/5M Printer

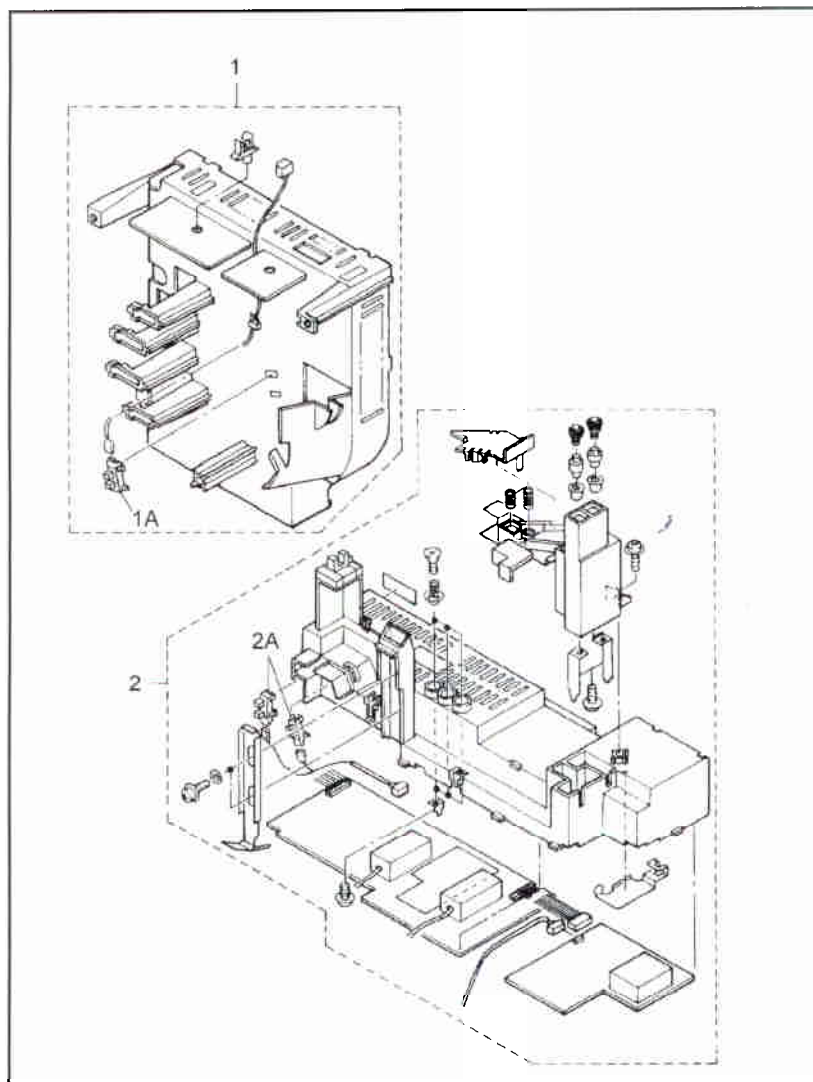


Figure 8-20 High Voltage Power Supply

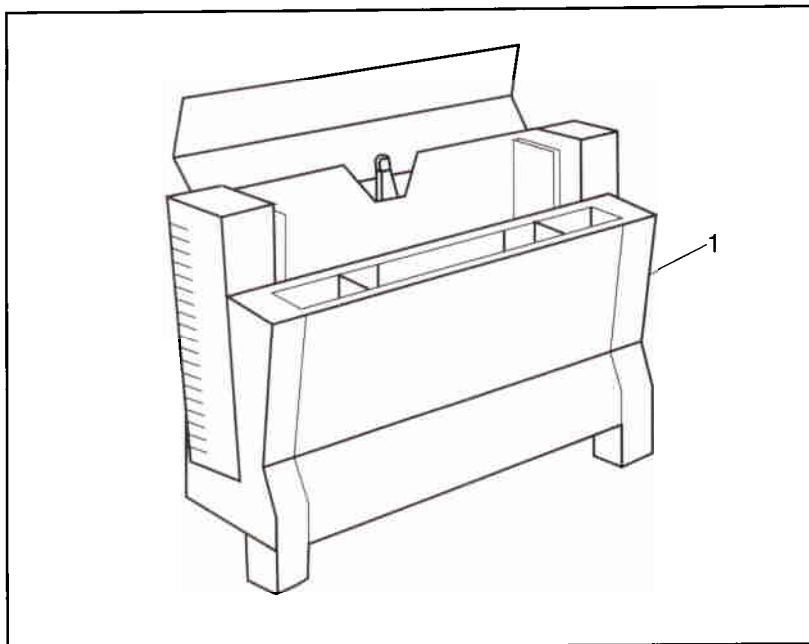


Table 8-20 High Voltage Power Supply

REF	PART NO.	QTY	DESCRIPTION
1	07BA-7323KC	1	Developer Power Supply (CLJ only*)
1	07BM-7320KC	1	Developer Power Supply (CLJ 5/5M only**)
2	07BA-7313KC	1	High Voltage Power Supply (CLJ only*)
2	07BM-7310KC	1	High Voltage Power Supply (CLJ 5/5M only**)
1A	684285520KC	1	Photosensor
2A	684285520KC	2	Photosensor

\* HP Color LaserJet Printer

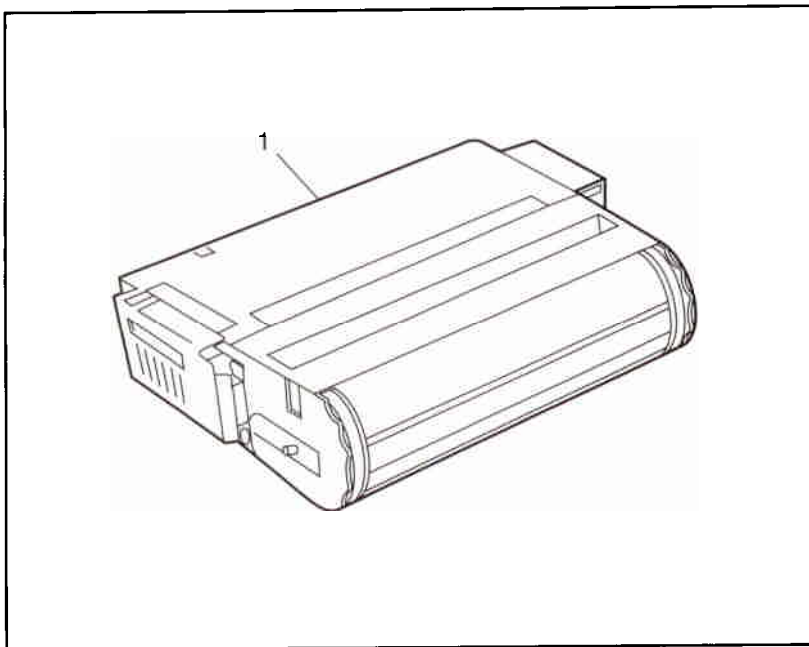
\*\* HP Color LaserJet 5/5M Printer



**Figure 8-21**      **Rear Feed Unit**

**Table 8-21**      **Rear Feed Unit**

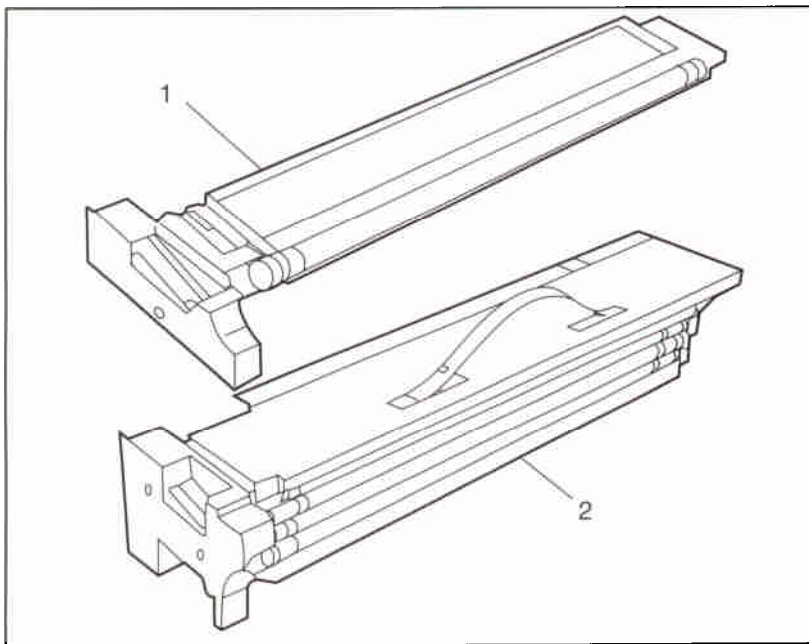
REF	PART NO.	QTY	DESCRIPTION
1	C3119-60001	1	Rear Feed Unit (optional)



**Figure 8-22**      **Print Drum Parts**

**Table 8-22**      **Print Drum Parts**

REF	PART NO.	QTY	DESCRIPTION
1	C3967-67901	1	Print drum cartridge



**Figure 8-23**      **Developer Assemblies**

**Table 8-23**      **Developer Assemblies**

REF	PART NO.	QTY	DESCRIPTION
1	C3965-67901	1	Black Developer
2	C3966-67901	1	Color Developer

## A

- AC power supply 5-56
- accessories 8-4
- acoustic emissions 1-6
- additive color
  - mixing 5-5
  - process 5-5
  - theory 5-5
- Apple EtherTalk 3-23 - 3-24
- Application-Specific Integrated Circuit (ASIC) 5-54
- Assist Line
  - Customer Support Center 1-21
- autoexec.bat
  - mode command 3-19

## B

- background scatter 7-89
- banding
  - large period 7-97
  - medium period 7-97
  - small period 7-97
- BiTronics parallel interface 3-19, 7-109
- black
  - bands 7-85
  - streaks 7-87
- black developer
  - locating 4-10, 4-23
  - removal and replacement 4-23
  - setup sequence 4-24
- blank display 7-18
- blank page 7-71
  - partial 7-71
- brown bands 7-85

## C

- cam
  - service mode test 7-46
  - timing 6-38
- captive screw
  - transfer belt 4-36
- carbonless paper 2-9
- carry-out 7-62
- CDRH 1-10
- charging
  - drum 5-11
  - paper 5-15
- class A requirements 1-11
- class B requirements 1-11
- cleaning
  - drum 5-16
  - drum corona wire 4-6
  - laser optics 4-5

- locations 4-3
- printer 4-3
- toner hopper area 4-8
- transfer corona wire 4-7
- cleaning blade
  - failure 7-79
  - motion 5-51
- cleaning roller (CLJ 5/5M)
  - locating 4-10
  - removal and replacement 4-20
- cleaning roller (CLJ)
  - removal and replacement 4-18
- coating kit (CLJ 5/5M)
  - removal and replacement 4-20
- coating pad
  - kit, removal and replacement 4-16
- coating roller
  - locating 4-10
  - removal and replacement 4-22
- cold reset
  - troubleshooting 7-117
- collection box
  - locating 4-10
  - removal and replacement 4-13
  - sensor testing 7-24
- collection kit
  - removal and replacement 4-13
- color
  - additive theory 5-5
  - checks 7-59
  - inconsistent 7-62
  - printing cycle 5-19
  - process 5-8
  - selection 7-61
  - terminnology 5-4
  - theory 5-4 - 5-5
  - variations 7-59 - 7-60
- color absorbtion, subtractive 5-6
- color balance adjustment 7-140
- color developer
  - locating 4-10, 4-25
  - removal and replacement 4-25
  - setup sequence 4-29
- color mixing
  - additive 5-5
  - subtractive 5-6 - 5-7
- color resolution enhancement technology
  - (COLOREt, C-REt) 5-55
- colored paper 2-7 - 2-8
- common fasteners 8-5
- common hardware 8-5

- communications troubleshooting 7-107
- compatibility matrix 4-11
- configuration
  - printer 3-1 - 3-24
- consumable assemblies 4-10
  - removal and replacement 6-3
- consumables 6-5, 8-4
  - compatibility matrix 4-11
  - ordering 1-17
  - paper 2-7 - 2-8
  - recycled paper 2-9
  - removal and replacement 6-3
  - replacement intervals 4-9
  - storage 2-5
- contamination
  - toner 7-139
- control board 5-30
  - connector layout 7-148 - 7-149
  - fuses 7-8
  - removal and replacement 6-19
  - system 5-30
- control panel 5-55
  - assembly 8-12
  - components 8-12
  - removal and replacement 6-9
- controller assembly 8-26
  - components 8-26
- cooling fan motors 5-43
- covers
  - external 8-7
  - removal and replacement 6-7, 6-9 - 6-14
- CPU 5-54
- Customer Information Center 1-21
- Customer Support Center
  - Assist Line 1-21
  - European 1-21
  - Sales 1-20
- D**
  - dark brown page 7-85
  - dark yellow print 7-101
  - DC power supply 5-56
    - fan 5-42
    - switch locations 5-38
  - Dealer Response Line 1-20
  - declaration of conformity 1-11
  - developer
    - assemblies 8-32
    - cam home sensor 5-46
    - components 5-12
    - cross section 5-13
    - drive block diagram 5-47
    - function 5-13
    - home sensor testing 7-47
    - locating 4-10, 4-23, 4-25
    - removal and replacement 4-23, 4-25
    - select motor 5-46
    - select sequence 5-47
    - setup sequence 4-24, 4-29
  - developer bias unit
    - removal and replacement 6-24
  - developer drive assembly 5-45
    - components 8-15
    - motor 5-46
    - removal and replacement 6-26 - 6-27
  - developers
    - exchanging 6-4
    - troubleshooting 7-114
  - diagrams and parts 8-1 - 8-32
  - dimensions
    - printer 1-5
  - disabling network protocols 3-23
  - disassembly theory 6-3
  - display language
    - selecting 3-11
  - dithering 5-7
  - documentation 1-18
    - ordering 1-18
  - doors
    - removal and replacement 6-7, 6-9 - 6-14
  - driver request form
    - ordering 1-19
  - drivers, printer 3-24
    - problems 3-24
  - drum
    - charging 5-11
    - corona wire cleaning 4-6
    - locating 4-10
    - lock lever 4-30
    - reflectance calibration 7-51
    - removal and replacement 4-30
    - rotation test 7-138
    - winding sensor 7-113
    - wrap detection 5-25
    - wrap sensor 5-35, 7-11
    - writing process 5-11
  - drum cleaning
    - station diagram 5-16
  - drum cover
    - removal and replacement 4-32
  - drum wrap sensor
    - cleaning 7-52
    - testing 7-12
  - dull or dark transparencies 7-101
  - duplex printing 2-10
  - dyes, paper 2-9
- E**
  - emissions
    - acoustic 1-6
    - ozone 1-13 - 1-14
  - energy star requirements 3-17
  - envelopes 2-10
  - environment
    - operating 1-5
    - requirements 2-3

- storage 1-5
- environmental collection program 4-12
- erase lamp 5-18
- error log
  - mode 7-118
  - troubleshooting 7-118
- error messages
  - See printer messages
- EtherTalk 3-21, 3-23 - 3-24
- European Customer Support Center 1-21
- exchanging
  - developers 6-4
  - print drums 6-4
- exposure
  - ozone 1-14
- exposure, laser 5-11
- extended diagnostics
  - testing 7-119 - 7-120
  - troubleshooting 7-119
- external covers 8-7
- F**
- fan
  - DC power supply 5-42
  - formatter 5-41
  - main body 5-41
- fan control circuitry 5-43
- fan motors 5-42 - 5-43
- FCC RFI statement 1-15
- filter, ozone 4-10
- formatter
  - block diagram 5-53
  - fan 5-41
  - functional overview 5-53
  - system 5-53
- formatter cage
  - removal and replacement 6-16 - 6-17
- front assemblies
  - removal and replacement 6-35 - 6-36
- front cover
  - removal and replacement 6-13
- full flag
  - toner 7-24
- fuser
  - locating 4-10
  - over-temperature safety switch 5-38
  - removal and replacement 4-33
  - sensor locations 5-35
  - temperature control 5-29
  - troubleshooting 7-114
  - warning 4-33
- fusing assembly 5-27, 8-25
  - components 8-25
  - damage caused by paper 2-10
  - removal and replacement 4-33

- fusing unit
  - function 5-27
  - theory 5-27
- G**
- gear cluster
  - removal and replacement 6-20
- gears
  - removal and replacement 6-38
- ghosting 7-84
- glossy media 2-10
- groundwood
  - recycled paper 2-9
- H**
- half self test 7-137
- halftoning 5-7
- hardware, common 8-5
- high voltage components supplies 8-28
- high voltage power supply 5-56
  - components 8-29
- hopper cover
  - removal and replacement 6-29
- hopper sensor connectors 6-29
- horizontal lines 7-75
  - white 7-73
- HP ASAP 1-19
- HP AUDIO-TIPS 1-20
- HP Compuserve Forum 1-20
- HP Direct 1-20
- HP Driver Distribution Center 1-20
- HP FIRST 1-13, 1-19
- HP FIRST, Europe 1-19
- HP JetDirect 3-20 - 3-21, 3-23
  - interface 3-20
- HP-UX 3-21 - 3-22
- humidity sensor 5-36, 7-60
  - test 7-134
- HVPS
  - removal and replacement 6-21 - 6-22
- I**
- IBM Lan Server 3-20
- image
  - defects 7-63
  - development process 5-12
  - skew 7-67 - 7-68
- image formation 5-9
  - troubleshooting 7-59
- indentification 1-4
- inks
  - compatibility 2-9
- installation, printer 3-1 - 3-24
- interlock switch assembly
  - removal and replacement 6-34
- interlock switch test 7-21
- interlocks 5-37
- internal assemblies
  - removal and replacement 6-20, 6-37
- internal components 8-18

- L**
  - labels 2-10
  - lamp, erase 5-18
  - large period banding 7-97
  - laser exposure 5-11
  - laser optics cleaning 4-5
  - laser safety 1-9
    - label 1-10
  - laser statement, Finland 1-12
  - laser/scanner
    - assembly 8-13
    - components 8-13
    - motor 5-42
    - removal and replacement 6-32
  - leading edge smear 7-82
  - left side cover
    - removal and replacement 6-11
  - light
    - print drum 6-4
  - low toner sensing 5-49
  - low voltage directive requirements 1-11
  - lower rear cover
    - removal and replacement 6-12
- M**
  - main body fan 5-41
    - removal and replacement 6-18
  - main frame
    - assembly 8-8 - 8-10
    - components 8-8 - 8-9, 8-11
  - main motor 5-40
    - assembly 8-14
    - assembly components 8-14
    - block diagram 5-40
    - fusing rollers 5-44
    - paper feed components 5-44
    - print drum 5-44
    - removal and replacement 6-20
    - transfer belt 5-44
  - main wiring diagram 7-150 - 7-151
  - maintenance
    - intervals 4-9
    - printer 4-1 - 4-38
    - units 4-10
  - maintenance units 6-19, 8-4
    - storage requirements 2-5
  - matching screen colors 7-61
  - Material Safety Data Sheet (MSDS) 1-13, 1-19
  - mechanical drive system 5-44
    - overview 5-44
  - media
    - supported sizes 2-7
  - medium period banding 7-97
  - memory, printer
    - NVRAM 5-30, 5-54, 6-19, 7-9, 7-53, 7-123, 7-126, 7-128
    - RAM 3-20, 5-54, 7-49 - 7-50
    - ROM 5-54, 7-49 - 7-50

- messages
  - See printer messages
- Microsoft Lan Manager 3-20
- miscellaneous parts
  - removal and replacement 6-38
- model number 1-4
- motors 5-40
  - developer drive 5-46
  - developer select 5-46
  - fan 5-43
  - laser/scanner 5-42
  - main 5-40
  - printer body 5-42
- mottled process colors 7-92
- MSDS (Material Safety Data Sheet) 1-13, 1-19
- multi-color process 5-18
- multi-part forms 2-9
- N**
  - NetWare 386 3-20
  - network
    - configuration 3-21
    - configuration tips 3-20
    - disabling protocols 3-23
    - HP interface support 7-107
    - interface cards 7-107
    - JetDirect 3-20 - 3-21
    - LocalTalk 3-19
    - testing configurations 7-108
    - third-party interface support 7-107
  - neutralizing 5-16
  - North American Response Center 1-21
  - Novell NetWare 3-21 - 3-23
  - NVRAM 5-30, 5-54, 6-19, 7-9, 7-38, 7-53, 7-123, 7-126, 7-128
    - control board 5-30, 7-128
    - errors 7-38, 7-53
    - factory settings 7-123
    - formatter 5-30, 5-54, 7-53
    - formatter failure 7-53
    - initializing 7-9
    - installing 6-19
    - original 6-19
    - paper registration 7-126
    - removal and replacement 5-30
- O**
  - on-site warranty 1-16
  - operating
    - current requirements 2-5
    - environment 1-5
    - requirements 2-1 - 2-10
    - theory 5-1 - 5-56
  - optional assemblies
    - removal and replacement 6-5 - 6-6
  - orange
    - bands 7-85
    - page 7-85
    - stripes 7-85



- ordering
  - consumables 1-17
  - documentation 1-18
  - parts 8-3
  - software 1-18
- over-temperature protection circuit 5-29
- overhead transparency
  - See transparency
- ozone
  - emission 1-13 - 1-14
  - exposure recommendations 1-14
  - safety 1-13
  - standards 1-13
- ozone filter 1-14
  - locating 4-10
  - removal and replacement 4-15
- P**
- package contents 3-4
- paper 2-7
  - carbonless 2-9
  - colored 2-7 - 2-8
  - compatible inks 2-9
  - consumables 2-7 - 2-8
  - cutouts 2-9
  - envelopes 2-10
  - fusing assembly damage 2-10
  - labels 2-10
  - low temperature dyes 2-9
  - multi-part forms 2-9
  - perforations 2-9
  - print drum damage 2-10
  - recycled 2-9
  - specifications 2-8 - 2-9
  - staples 2-9
  - tabs 2-9
  - watermark 2-9
- paper charging 5-15
  - station 5-15
- paper exit assembly 8-22
  - components 8-22
- paper exit mechanism 5-24
  - removal and replacement 6-36
- paper feed
  - assembly 8-19 - 8-20
  - assembly components 8-19, 8-21
- paper feed sequence 5-20
  - rear feed unit 5-23
- paper jam 7-55
  - detection 5-25
  - sensor 5-26
- paper path 5-20
  - components 5-20
  - front input 7-58
  - rear feed unit 7-58
  - station 5-21 - 5-22
  - troubleshooting 7-56
- paper registration
  - assembly 5-23
- paper tray
  - size sensing switch 5-39
  - size sensors 5-39
  - size test 7-69
- paper tray assembly 8-24
  - components 8-24
- paper, thermography 2-9
- parallel interface 3-19, 7-109
- part swapping, troubleshooting 7-113
- parts and diagrams 8-1 - 8-32
- Parts Identification 1-20
- performance
  - specifications 1-5
- phone numbers 1-21
- pickup rollers
  - removal and replacement 6-37
- PJL commands 7-110
- poor fusing 7-83
- PostScript
  - printing verification 7-109
- power requirements 2-4
- power save 1-14, 2-4, 3-17
  - default 3-17
  - message 7-10
- power save mode 3-17
- power supplies
  - overview 5-56
- power supply drawer 8-27
  - components 8-27
- power supply tray
  - removal and replacement 6-35
- pre-charging lamp 5-18
- pre-troubleshooting checklist 7-6
- press and release levers 5-51
- print density test 7-59
- print developers
  - installing 3-5
- print drum
  - charging station 5-11
  - coating pad kit 7-114
  - damage caused by paper 2-10
  - exchanging 6-4
  - exposing to light 6-4
  - locating 4-10
  - parts 8-31
  - protection 6-4
  - reflectance sensor 7-52
  - removal and replacement 4-30
  - troubleshooting 7-113
- print media checklist 7-57
- print path components 5-9
- print stations 5-10
- printer
  - configuration 3-1 - 3-24
  - dimensions 1-5
  - driver problems 3-24
  - drivers 3-24
  - installation 3-1 - 3-24
  - maintenance 4-1 - 4-38
  - unpacking 3-3

- printer assemblies 1-7
  - front 1-7
  - location 1-7 - 1-8
  - rear 1-8
- printer body motors 5-42
- printer messages 7-9 - 7-17
  - 11.4 Front Tray Empty 7-18
  - 12 Close Top Or Side Door 7-20
  - 14.5 Replace Collection Box 7-23
  - 14.5 Replace Collection Kit 4-13
  - 14.6 Replace Coating Pad Kit 4-16
  - 15 Engine Test 7-135
  - 16.5 Replace Collection Box 7-23
  - 17.4 Install Fuser 7-26
  - 17.6 Install Collection Box 7-27
  - 17.7 Remove Drum Cover 7-27
  - 17.8 Reinstall Drum 7-28
  - 17.9 Reinstall Fuser 7-29
  - 17.x Install Developer 7-25
  - 18.1 Clean Transfer Corona Wire 7-29
  - 18.2 Reinstall Drum 7-30
  - 18.x Mechanism Alignment Checks 7-34
  - 18.x Reinsert Developers 7-32
  - 18.x Service Mode Tests 7-34
  - 19.1 Black Devel User Maintenance 4-23
  - 19.2 Color Devel User Maintenance 4-25
  - 19.3 Drum User Maintenance 4-30
  - 19.4 Fuser User Maintenance 4-33
  - 19.5 Trans Belt User Maintenance 4-36
  - 19.x User Maintenance 7-35
  - 24 Busy Moving Toner 7-37
  - 30 Postscript Error 7-14
  - 50.x Fuser Service 7-38
  - 53 Laser Error 7-39
  - 54.1 Scanner Error 7-39
  - 54.5 Service 7-47
  - 54.5 Service Mode 7-47
  - 54.x Engine Error/Service Error 7-39
  - 55.x Engine CMD Service Error 7-47
  - 56 Laser Index Service 7-48
  - 57 Fan Motor Service Error 7-48
  - 59 Alternate Feed Service 7-48
  - 60.x SIMM Service 7-49
    - 61.x SIMM Compatibility 7-49
  - 62.x Internl ROM Service 7-50
  - 63.0 DDRAM Service 7-50
  - 63.x SIMM Error 7-50
  - 64.x DMA Timeout Error 7-51
  - 66.1 Jam Sensor Service 7-51
  - 68 Cold Reset 7-53
  - 68 NVRAM Error 7-53
  - 68 NVRAM Service Error 7-53
  - 79 Service (xxxx) 7-53
  - 80 Service (xxxx) 7-54
  - 89 Service (xxxx) 7-54
  - Clean Transfer Corona 7-32
  - Powersave 7-10
  - Reinsert Developers 7-31
- printing process 5-10
- process colors 5-8
  - mottled 7-92
- product information 1-1 - 1-21
- protection circuits
  - temperature 5-29
- PS3 service mode test 7-24
- PS8 service mode test 7-19
- R**
  - RAM (random access memory) 3-20, 5-54, 7-49 - 7-50
  - read-only memory (ROM) 5-54
  - rear feed unit 8-30
    - removal and replacement 6-6
  - rear feed unit holder
    - removal and replacement 6-6
  - rear feed unit paper feed sequence 5-23
  - recycled paper 2-9
    - groundwood 2-9
  - register adjust addresses 7-128
  - register adjust mode
    - selecting 7-126
  - registration, incorrect 7-64
  - removal and replacement 6-1 - 6-41
    - black developer 4-23
    - cleaning roller 4-18
    - coating pad kit 4-16
    - collection box 4-13
    - collection kit 4-13
    - color developer 4-25
    - consumables 6-3
    - control board 6-19
    - control panel 6-9
    - covers 6-7, 6-9 - 6-14
    - developer 4-25
    - developer bias unit 6-24
    - developer drive assembly 6-26 - 6-27
    - doors 6-7, 6-9 - 6-14
    - drum 4-30
    - drum cover 4-32
    - formatter cage 6-16 - 6-17
    - front assemblies 6-35 - 6-36
    - front cover 6-13
    - fuser 4-33
    - fusing assembly 4-33
    - gear cluster 6-20
    - gears 6-38
    - hopper cover 6-29
    - HVPS 6-22
    - HVPS terminal block 6-21
    - interlock switch assembly 6-34
    - internal assemblies 6-20, 6-37

- laser/scanner assembly 6-32
  - left side cover 6-11
  - lower rear cover 6-12
  - main body fan 6-18
  - main motor 6-20
  - miscellaneous parts 6-38
  - NVRAM 5-30
  - optional assemblies 6-5 - 6-6
  - ozone filter 4-15
  - paper exit mechanism 6-36
  - pickup rollers 6-37
  - power supply tray 6-35
  - print drum 4-30
  - rear feed unit 6-6
  - rear feed unit holder 6-6
  - right side assemblies 6-16 - 6-19, 6-21 - 6-23
  - right side cover 6-7
  - SL1 6-23
  - toner collection box 4-13
  - toner container 3-16
  - toner hopper assembly 6-29
  - toner hopper cover 6-10
  - top assemblies 6-24, 6-26 - 6-29, 6-32 - 6-34
  - top cover 6-14
  - transfer belt 4-36
  - transfer cam solenoid 6-28
  - upper cooling fan 6-33
  - repair notices 6-4
  - repetitive defects 7-103
    - paper 7-105
    - transfer belt 7-104
    - transparency 7-106
  - replacement intervals 4-9
  - required tools 6-5
  - requirements
    - class A 1-11
    - class B 1-11
    - energy star 3-17
    - environmental 2-3
    - low voltage directive 1-11
    - operating 2-1 - 2-10
    - operating current 2-5
    - power 2-4
    - site 2-3
    - space 2-4
    - storage 2-5
  - Resolution Enhancement technology (REt) 5-55
  - RFU (rear feed unit) 5-23
  - right side assemblies
    - removal and replacement 6-16 - 6-19, 6-21 - 6-23
  - right side cover
    - removal and replacement 6-7
  - ring marks 7-76
  - ROM (read only memory) 5-54, 7-49 - 7-50
  - ROM (read only memory)
    - control board locations
- S**
- safety
    - information 1-9
    - label 1-10
    - laser 1-9
    - ozone 1-13
    - toner 1-13
  - screws, used in printer 8-5
  - self test printout 7-115
    - item descriptions 7-116
  - sensor locations 5-26, 5-34, 7-145 - 7-147
    - fuser 5-35
    - rear 5-34
  - sensor test
    - humidity 7-134
  - sensors 5-33
    - cleaning drum wrap 7-52
    - developer cam home 5-46
    - drum winding 7-113
    - drum wrap 5-35, 7-11
    - functions 7-145
    - fuser temperature 5-33
    - hopper connector 6-29
    - humidity 5-36, 7-60
    - paper jam 5-26
    - paper path 5-25, 7-55
    - paper size 5-33
    - print drum reflectance 7-52
    - register adjust mode 7-126
    - status 7-123
    - testing 7-12, 7-23 - 7-24, 7-47, 7-126
    - toner concentration 5-13
    - toner level 5-49, 7-37
    - transparency 5-36
  - serial number 1-4, 1-21, 6-12, 7-116
  - service 1-16 - 1-17
    - ordering consumables 1-17
    - ordering documentation 1-18
    - ordering software 1-18
  - service messages
    - See printer messages
  - service mode
    - accessing 7-124
    - operation commands 7-123
    - register adjust 7-123
    - register adjust addresses 7-128
    - register adjust mode 7-126
    - status requests 7-123
    - status/test addresses 7-130
    - status/test mode 7-129
    - subtest number list 7-133
    - subtests 7-123
    - troubleshooting 7-123
  - service notes
    - ordering 1-19
  - site requirements 2-3
  - SL1

- removal and replacement 6-23
- small period banding 7-97
- software 1-18
  - network 3-21
  - ordering 1-18
- Solaris 3-21 - 3-22
- solenoid 5-31
  - control 5-31
  - disabling 5-31
  - functions 7-143
  - locations 5-31, 7-144
  - register adjust mode 7-126
  - testing 7-126
- space requirements 2-4
- specific marks 7-100
- specifications 1-5
  - environmental 1-16, 2-3, 7-59, 7-101
  - media 2-6, 2-10, 7-58 - 7-59, 7-68, 7-71, 7-80, 7-83, 7-89
  - paper 2-7 - 2-9, 7-57 - 7-58, 7-99, 7-101
  - performance 1-5
  - transparencies 2-10, 7-99, 7-101
- speckled print 7-91
- status/test addresses 7-130
- status/test mode
  - selecting 7-129
- storage environment 1-5
- storage requirements 2-5
- stray toner 7-95
- subtest number list 7-133
- subtractive color
  - absorbion 5-6
  - mixing 5-6 - 5-7
  - process 5-6
- SunOS 3-21 - 3-22
- supplies 8-4
- switch 5-37
  - information 5-37
  - locations 5-38
- T**
- TCP/IP 3-22 - 3-23
  - disabling 3-24
- technical assistance 1-19, 1-21
- temperature control, fuser 5-29
- temperature protection circuits 5-29
- terminology color 5-4
- test printer operation 3-17
- thermography
  - paper 2-9
- toner
  - adding 3-12
  - background scatter 7-89
  - busy moving message 7-37
  - clutch 5-47
  - concentration sensor 5-13, 5-35
  - concentration table 7-43
  - concentration test 7-42
  - concentration values 7-42
  - delivery 5-48
  - excess collection 5-16 - 5-17
  - feeder mechanism 5-48, 5-50
  - full flag 7-24
  - hopper lock system 5-49
  - hopper removal 6-29
  - image formation 5-9
  - installing 3-11
  - level sensor 5-49
  - low message 5-49
  - popping print defect 7-91
  - printer damage 5-49
  - safety 1-13
  - sensor 5-49
  - sensor board 7-26
  - stray 7-95 - 7-96
  - supply solenoid 5-47
  - supply solenoid test 7-37
  - supply system 5-48
- toner and carrier 5-13
- toner collection box 4-13, 5-17
  - locating 4-10
  - removal and replacement 4-13
- toner container 3-11
  - removal and replacement 3-16
- toner hopper
  - assembly 8-16 - 8-17
  - removal and replacement 6-29
- toner hopper area
  - cleaning 4-8
- toner hopper cover
  - removal and replacement 6-10
- toner, contamination 7-139
- top assemblies
  - removal and replacement 6-24, 6-26 - 6-29, 6-32 - 6-34
- top cover
  - removal and replacement 6-14
- trailing edge smear 7-82
- transfer assembly 5-14, 5-51, 8-23
  - components 8-23
- transfer belt
  - captive screw 4-36
  - locating 4-10
  - removal and replacement 4-36
  - troubleshooting 7-114
- transfer cam solenoid
  - removal and replacement 6-28
- transfer cam timing 6-38 - 6-41
- transfer corona wire
  - cleaning 4-7
- transfer station 5-14
  - function 5-14
- transparency
  - curl 7-99
  - defects 7-99
  - dull or dark 7-101
  - repetitive defects 7-100
  - sensor 5-36

- specifications 2-10
- tray size switch matrix 5-39
- troubleshooting 7-1 - 7-152
  - 15 Engine Test 7-135
  - background toner scatter 7-89
  - black bands 7-85
  - black page 7-85
  - black streaks 7-87
  - blank display 7-18
  - brown bands 7-85
  - brown page 7-85
  - cam service mode test 7-46
  - cleaning blade failure 7-79
  - coating pad kit 7-114
  - cold reset 7-117
  - color test 7-59
  - color variation 7-59 - 7-60
  - communications 7-107
  - dark yellow print 7-101
  - developers 7-114
  - drum reflectance calibration 7-51
  - drum rotation test 7-138
  - dull or dark transparencies 7-101
  - engine test 7-135
  - error log 7-118
  - error log mode 7-118
  - extended diagnostics 7-119 - 7-120
  - flowchart 7-7
  - fuser 7-114
  - ghosting 7-84
  - half self test 7-137
  - horizontal lines 7-75
  - horizontal white lines 7-73
  - image formation 7-59
  - image skew 7-67 - 7-68
  - improperly sized image 7-69
  - incorrect registration 7-64, 7-66
  - interlock switch test 7-21
  - large period banding 7-97
  - leading edge smear 7-82
  - medium period banding 7-97
  - mottled process colors 7-92
  - orange bands 7-85
  - orange page 7-85
  - paper jam 7-55
  - paper path 7-56
  - paper tray size test 7-69
  - part swapping 7-113
  - PJL commands 7-110
  - poor fusing 7-83
  - print density test 7-59
  - print drums 7-113
  - print media checklist 7-57
  - See also printer messages
  - PS3 service mode test 7-24
  - PS8 service mode test 7-19
  - repetitive defects 7-103 - 7-104
  - ring marks 7-76
  - self test printout 7-115
  - service mode 7-123
  - small period banding 7-97
  - smear print 7-80
  - specific marks 7-100
  - speckled print 7-91
  - stray toner 7-95
  - toner concentration test 7-42
  - toner supply solenoid test 7-37
  - trailing edge smear 7-82
  - transfer belt 7-104, 7-114
  - transparency curl 7-99
  - transparency defects 7-99
  - transparency repetitive defects 7-100
  - voltage checks 7-114
  - wavy characters 7-78
  - yellow streaks 7-87
- troubleshooting process 7-7
- troubleshooting, pre-checklist 7-6
- U**
  - UEL (Universal Exit Language) 7-110
- UNIX 1-21, 3-21 - 3-22
- upper cooling fan
  - removal and replacement 6-33
- user installable assemblies 6-5
- V**
  - voltage checks, troubleshooting 7-114
- W**
  - warranty
    - exclusions 1-16
    - on-site 1-16
    - statement 1-16
  - wavy characters, troubleshooting 7-78
  - wiring diagram, main 7-150 - 7-151
- Y**
  - yellow
    - dark print 7-101
    - print defect 7-102
    - streaks 7-87

