invent

hp LaserJet 3200/3200m

printer • fax • copier • scanner

service manual

LaserJet all-in-one

HP LaserJet 3200 product
HP LaserJet 3200M product

Service manual

Copyright Information

© 2001 Hewlett-Packard Company

All Rights Reserved. Reproduction, adaptations, or translation without prior written permission is prohibited except as allowed under copyright laws.

Part number C7052-90930
First edition, February 2001

Warranty

The information contained in this document is subject to change without notice.

Hewlett-Packard makes no warranty of any kind with respect to this information. HEWLETT-PACKARD SPECIFICALLY DISCLAIMS THE IMPLIED WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

Hewlett-Packard shall not be liable for any direct, indirect, incidental, consequential, or other damage alleged in connection with the furnishing or use of this information.

NOTICE TO U.S. GOVERNMENT USERS: RESTRICTED RIGHTS COMMERCIAL COMPUTER SOFTWARE: “Use, duplication, or disclosure by the Government is subject to restrictions as set forth in subparagraph (c) (1)(ii) of the Rights in Technical Data Clause at DFARS 52.227-7013.”

Hewlett-Packard Company
11311 Chinden Boulevard
Boise, Idaho 83714 U.S.A.

Trademark Credits

Microsoft, Windows, and MS-DOS are U.S. registered trademarks of Microsoft Corporation.

ENERGY STAR is a U.S. registered service mark of the U.S. EPA.

All other products mentioned herein may be trademarks of their respective companies.

This product is approved for use only in the country in which it was purchased.

Local country laws may prohibit the use of this product outside of the countries specified. It is strictly forbidden by law in most countries to connect nonapproved telecommunications equipment (fax machines) to public telephone networks.

Safety Information

WARNING!

Potential Shock Hazard

Always follow basic safety precautions when using this product to reduce risk of injury from fire or electric shock.

1. Read and understand all instructions in the user guide.
2. Observe all warnings and instructions marked on the product.
3. Use only a grounded electrical outlet when connecting the product to a power source. If you don’t know whether the outlet is grounded, check with a qualified electrician.
4. Do not touch the contacts on the end of the telephone cord or any of the sockets on the product. Replace damaged cords immediately.
5. Never install telephone wiring during a lightning storm.
6. Unplug this product from wall outlets and telephone jacks before cleaning.
7. Do not install or use this product near water or when you are wet.
8. Install the product securely on a stable surface.
9. Install the product in a protected location where no one can step on or trip over the line cord and the line cord will not be damaged.
10. If the product does not operate normally, see the online user guide.
11. Refer all servicing questions to qualified personnel.

Information regarding FCC Class B, Parts 15 and 68 requirements can be found in the *user guide*.

Contents

1 Product information

Introduction 14
Hardware description 14
Firmware description 15
Product specifications 16
Model and serial numbers 19
Product overview 20
Warranty statement 23
Hewlett-Packard limited warranty statement 23
Declaration of Conformity 25
Toner cartridge information 26
Additional product stewardship 27
Environmental conformity 27

2 Installation and operation

Operating environment 30
Identifying product components 31
Control panel lights and keys 31
Using the control panel menu structure 33
Control panel error messages 35
Selecting media 43
Selecting media to print 43
Selecting media to fax, copy, or scan 44
Loading media 45
Loading media to fax, copy, or scan 45
Loading media to be printed 48
Selecting the output path 50

3 Maintenance

Life expectancies of consumables 52
Cleaning and maintaining the equipment 53
Cleaning the product 54
Cleaning the scanner path 57
Recalibrating the scanner 59
User-replaceable parts 60

4 Operational overview

Basic functions 62
Optical system 63
Formatter system 65
Control panel 66
Draft mode 66
MEt 66
Enhanced I/O 66
Page Protect 67
PJL Overview 67
Printer functions 68
Engine control unit/power system 69
Image formation system 74
Printer paper feed system 77
Basic sequence of operation (formatter-to-printer) 82

5 Removal and replacement

Removal and replacement strategy 87
Required tools 87
Parts removal order 88
Covers 89
DIMMs 89
Back cover 90
Right side cover 91
Left side cover 93
Internal paper guide 94
Top cover 95
Document scanner assemblies 96
Printer door 96
Document scanner assembly 100
Contact image sensor 103
Document scanner pickup roller 105
Document scanner separation pad 106
Document scanner motor 107
Upper guide assembly 108
Control panel/scanner board 112
Internal assemblies 113
Laser/scanner assembly 113
Output roller 114
Delivery assembly 116
Paper exit-sensor flag 118
Fusing element 119

Gear train motor 124
Solenoid 127
Pressure roller 128
Transfer roller 130
Pickup roller 131
Paper-pickup assembly 132
Kick plate 134
Separation pad 135
Bottom assemblies 137
Formatter pan 137
Formatter and LIU 138
ECU pan 139
Paper-feed assembly 141

6 Troubleshooting

Basic troubleshooting 146
Errors 149
Image formation troubleshooting 155
Checking the toner cartridge 155
Solving image-quality problems 156
Solving paper feed problems 162
Functional checks 165
Engine test 165
Half-self-test functional check 166
Drum rotation functional check 167
Heating element check 168
High-voltage power supply check 169
Paper path check 171
Service mode functions 172
Secondary service menu 172
Developer’s menu 173
Diagnostic mode 181
NVRAM init 183
PJL software commands 183
Troubleshooting tools 186
Internal reports 186
Printing all fax reports at once 187
T.30 protocol trace 188
Repetitive image defect ruler 207
Document scanner recalibration 208
Main wiring 210
Locations of connectors 212

7 Parts and diagrams

Ordering parts and supplies 216
Parts 216
Parts exchange program 217
Related documentation and software 217
Consumables 217
Accessories 218
How to use the parts lists and diagrams 219
Common hardware 220
Assembly locations 221
Covers 222
Trays and bins 223
External covers and panels 225
Document scanner assemblies 226
Document scanner assemblies 227
Document feeder 229
Upper guide assembly 231
Internal assemblies 232
Internal components (1 of 4) 233
Internal components (2 of 4) 235
Internal components (3 of 4) 237
Internal components (4 of 4) 239
Feed assembly 241
Electrical components 243
Alphabetical parts list 244
Numerical parts list 249

Figures

Figure 1. Model and serial number label 19
Figure 2. Front and side view 20
Figure 3. Top view 21
Figure 4. Rear view 22
Figure 5. Product dimensions (in North America) 30
Figure 6. Product dimensions (outside of North America) 30
Figure 7. Control panel 31
Figure 8. Basic configuration 62
Figure 9. Document scanner path 64
Figure 10. Printer unit functional block diagram 68
Figure 11. ECU loads 70
Figure 12. Overview of laser/scanner operation 71
Figure 13. High-voltage power supply circuit 73
Figure 14. Image formation block diagram 74
Figure 15. Printer path 78
Figure 16. Solenoid, photosensors, and switches 80
Figure 17. General timing diagram 83
Figure 18. DIMMs removal 89
Figure 19. Back cover removal 90
Figure 20. Right side cover removal (1 of 2) 91
Figure 21. Right side cover removal (2 of 2) 92
Figure 22. Internal paper guide removal 94
Figure 23. Top cover removal 95
Figure 24. Printer door removal (1 of 4) 96
Figure 25. Printer door removal (2 of 4) 97
Figure 26. Printer door removal (3 of 4) 98
Figure 27. Printer door removal (4 of 4) 99
Figure 28. Document scanner assembly removal (1 of 3) 100
Figure 29. Document scanner assembly removal (2 of 3) 101
Figure 30. Document scanner assembly removal (3 of 3) 102
Figure 31. Contact image sensor removal (1 of 2) 103
Figure 32. Contact image sensor removal (2 of 2) 104
Figure 33. Document scanner pickup roller removal 105
Figure 34. Document scanner separation pad removal 106
Figure 35. Document scanner motor 107
Figure 36. Upper guide assembly removal (1 of 4) 108
Figure 37. Upper guide assembly removal (2 of 4) 109
Figure 38. Upper guide assembly removal (3 of 4) 110
Figure 39. Upper guide assembly removal (4 of 4) 111
Figure 40. Control panel/scanner board 112
Figure 41. Laser/scanner assembly removal 113

Figure 42. Output roller removal (1 of 2) 114
Figure 43. Output roller removal (2 of 2) 115
Figure 44. Delivery assembly removal (1 of 2) 116
Figure 45. Delivery assembly removal (2 of 2) 117
Figure 46. Paper exit-sensor flag removal 118
Figure 47. Fusing element removal (1 of 4) 119
Figure 48. Fusing element metal clips reinstallation 120
Figure 49. Fusing element removal (2 of 4) 121
Figure 50. Fusing element removal (3 of 4) 122
Figure 51. Fusing element removal (4 of 4) 123
Figure 52. Gear train motor (1 of 3) 124
Figure 53. Gear train motor (2 of 3) 125
Figure 54. Gear train motor (3 of 3) 126
Figure 55. Solenoid removal 127
Figure 56. Pressure roller removal (1 of 2) 128
Figure 57. Pressure roller removal (2 of 2) 129
Figure 58. Transfer roller removal 130
Figure 59. Paper-pickup assembly removal (1 of 2) 132
Figure 60. Paper-pickup assembly removal (2 of 2) 133
Figure 61. Kick plate removal 134
Figure 62. Separation pad removal (1 of 2) 135
Figure 63. Separation pad removal (2 of 2) 136
Figure 64. Formatter pan removal 137
Figure 65. Formatter and LIU 138
Figure 66. ECU pan removal (1 of 2) 139
Figure 67. ECU pan removal (2 of 2) 140
Figure 68. Paper-feed assembly removal (1 of 3) 141
Figure 69. Paper-feed assembly removal (2 of 3) 142
Figure 70. Paper-feed assembly removal (3 of 3) 143
Figure 71. Engine test switch 165
Figure 72. Toner cartridge high-voltage connection points 169
Figure 73. High-voltage connector assembly 170
Figure 74. Overriding SW301 171
Figure 75. NVRAM PJL factory variables 184
Figure 76. Example of a successfully sent fax 205
Figure 77. Example of a successfully received fax 206
Figure 78. Repetitive image defect ruler 207
Figure 79. Main wiring (1 of 2) 210
Figure 80. Main wiring (2 of 2) 211
Figure 81. Locations of connectors (1 of 3) 212
Figure 82. Locations of connectors (2 of 3) 213
Figure 83. Locations of connectors (3 of 3) 213
Figure 84. Assembly locations 221
Figure 85. Trays and bins 222
Figure 86. External covers and panels 224
Figure 87. Document scanner assemblies 226
Figure 88. Document feeder 228

Figure 89. Upper guide assembly 230
Figure 90. Internal components (1 of 4). 232
Figure 91. Internal components (2 of 4). 234
Figure 92. Internal components (3 of 4). 236
Figure 93. Internal components (4 of 4). 238
Figure 94. Feed assembly 240
Figure 95. Electrical components 242

Tables

Table 1. Physical specifications 16
Table 2. Environmental specifications 16
Table 3. Power specifications 17
Table 4. Performance 17
Table 5. Operating acoustical emissions (per ISO 9296) specifications 18
Table 6. Skew specifications 18
Table 7. Control panel error messages 35
Table 8. Media types 43
Table 9. Life expectancies of consumables 52
Table 10. Basic troubleshooting 146
Table 11. Control panel error messages 149
Table 12. Solving image-quality problems 156
Table 13. Solving paper feed problems 162
Table 14. Country codes 174
Table 15. Parameter ID numbers (Fall, 2000 release) 175
Table 16. Parameter ID numbers (Spring, 2001 release) 178
Table 17. Diagnostic mode key sequences 181
Table 18. Fax receive error codes 189
Table 19. Fax send error codes 194
Table 20. Fax phase sequence 201
Table 21. Appropriate responses 202
Table 22. Fax abbreviations 203
Table 23. Authorized parts resellers in the United States 216
Table 24. Technical support websites 217
Table 25. Accessories 218
Table 26. Common fasteners 220
Table 27. Trays and bins 223
Table 28. External covers and panels 225
Table 29. Document scanner assemblies 227
Table 30. Document feeder 229
Table 31. Upper guide assembly 231
Table 32. Internal components (1 of 4) 233
Table 33. Internal components (2 of 4) 235
Table 34. Internal components (3 of 4) 237
Table 35. Internal components (4 of 4) 239
Table 36. Feed assembly 241
Table 37. Electrical components 243
Table 38. Alphabetical parts list 244
Table 39. Numerical parts list 249

1 Product information

Chapter contents

Introduction 14
Hardware description 14
Firmware description 15
Product specifications 16
Model and serial numbers 19
Product overview 20
Warranty statement 23
Declaration of Conformity 25
Toner cartridge information 26
Additional product stewardship 27
Environmental conformity 27

Introduction

The HP LaserJet 3200 product and HP LaserJet 3200M product are powerful business tools with the capabilities of a full range of office equipment. With the product, you can:

- **Print**—Print documents easily with the laser quality you have come to expect from an HP LaserJet printer.
- **Fax**—Use the product as a standalone fax machine to send and receive faxes, as well as perform advanced tasks such as forwarding faxes to other locations. Use the software to send faxes from and receive them to your computer.
- **Copy**—Make superior laser-quality copies. You can make up to 99 copies of a 30-page original. You can also enlarge, reduce, adjust contrast, and collate.
- **Scan**—Scan important documents to create electronic files.
- **Use software**—Use the software to print, fax, copy, or scan. Also use the software to store and organize scanned documents.

Hardware description

The product provides 1200 dot-per-inch (dpi) printing, plus scanning capabilities. The scanner scans at 600 dpi/24 bits per pixel (bpp) and contains a document feeder that holds up to 30 pages.

The product prints nine pages per minute (ppm). It provides an excellent Windows printing solution, ease of use, and higher performance. With 1200 dpi printing resolution, the product has exceptional text and graphics print quality. The simplified control panel and improved paper handling make this product very simple to use.

There is one main media input tray with a 125-sheet capacity for continuous, multiple-page printing. Manual, single-sheet printing is possible through the single-sheet input tray. Both trays are center-justified for all supported paper sizes. The output tray holds up to 100 sheets.

The product has a very fast first-page-out, at less than eighteen seconds. The formatter board contains 12 MB of ROM on a DIMM, 8 MB of RAM on a DIMM in the third DIMM slot (or 16 MB on a DIMM in the second DIMM slot for the "M" version), and a 32-bit MCF5202 chip. There is one DIMM slot available for DIMM expansion

(supporting an 8 MB, 16 MB, 32 MB, or 64 MB DIMM). The engine has a 1,000 average (10,000 peak) page-per-month duty cycle and has no fan. The toner life is 2,500 pages.

Firmware description

Product firmware includes:

- Enhanced PCL 6 with status readback
- 45 fonts in Intellifont format, plus Cyrillic
- Full-page 600 dpi bitmap
- Pixel placement, mosaic characters
- Memory Enhancement technology (MEt) with hardware compression/decompression

The firmware also has REt and EconoMode functionality. Scan capability includes 600 dpi and 24-bit color.

Product specifications

Table 1. Physical specifications

Category	Specification
Height	272 mm (10.71 inches) without supports attached; 404 mm (15.91 inches) with supports attached
Depth	390 mm (15.36 inches) without supports attached; 598 mm (23.55 inches) with supports attached
Width	384 mm (15.12 inches)
Weight (cartridge installed)	10.6 kilograms (23.37 pounds)

Table 2. Environmental specifications

Category	Specification
Operating environment	Printer plugged into an AC outlet: • Temperature: 15 to 32.5 degrees Celsius (C); 59 to 90.5 degrees Fahrenheit (F) • Humidity: 20 to 80 percent relative humidity (no condensation)
Storage environment	Printer unplugged from an AC outlet: • Temperature: 0 to 40 degrees C (32 to 104 degrees F) • Humidity: 10 to 90 percent relative humidity (no condensation)

Table 3. Power specifications

Category	Specification
Power requirements	• 100 to 120 Volts alternating current (Vac), 50/60 Hz (± 2%); 127 Vac, 60 Hz NOM -Or- • 220 Vac (± 10%), 50/60 Hz (± 2 Hz) • 220-240 Vac (± 10%), 50 Hz (± 2 Hz) **Note** Power sources are not interchangeable.
Power consumption (in continuous copy mode)	200 watts
Power consumption (idle)	6 watts
Minimum recommended circuit capacity	4.5 amps at 115 V 2.5 amps at 230 V

Table 4. Performance

Category	Specification
Print resolution	1200 dpi
Scan resolution	600 dpi optical, with 256 levels of gray and 24-bit color
Fax resolution	Standard: 203 by 98 dpi Fine: 203 by 196 dpi Superfine: 300 by 300 dpi (no halftone) Photo: 300 by 300 dpi (halftone enabled)
Print speed	9 ppm
Copy speed	9 ppm

Table 5. Operating acoustical emissions (per ISO 9296) specifications

Category	Specification
Sound Power Level, L_{WAd} (1 bel = 10 decibels)	6.3 bels (B)
Sound Pressure Level, L_{pAm} (operator position)	57 decibels (dB)
Sound Pressure Level, L_{pAm} (bystander position)	48 dB

Table 6. Skew specifications

Category	Specification
Print skew—left	0.6% (1.5 mm over 250 mm in length)
Print skew—right angle accuracy	0.64% (1.2 mm over 190 mm in width)
Scan skew	1.2%

Model and serial numbers

The model number and serial number are listed on an identification label located on the back of the printer.

The serial number contains information about the country of origin, the revision level, the production code, and production number.

The label also contains power rating and regulatory information.

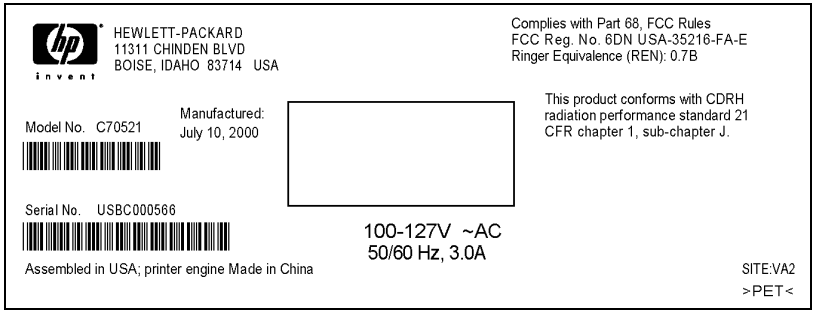


Figure 1. **Model and serial number label**

Product overview

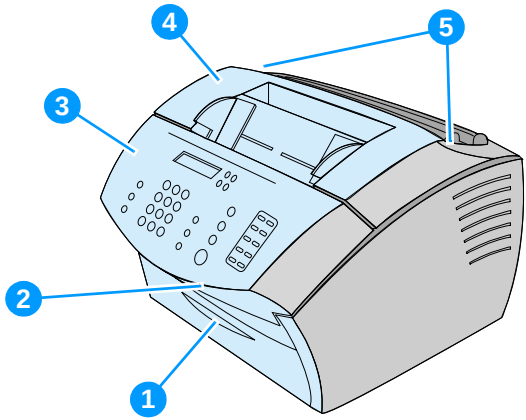


Figure 2. **Front and side view**

1 Front paper path door

2 Document output slot

3 Control panel/document release door

4 Printer door

5 Printer door release latches

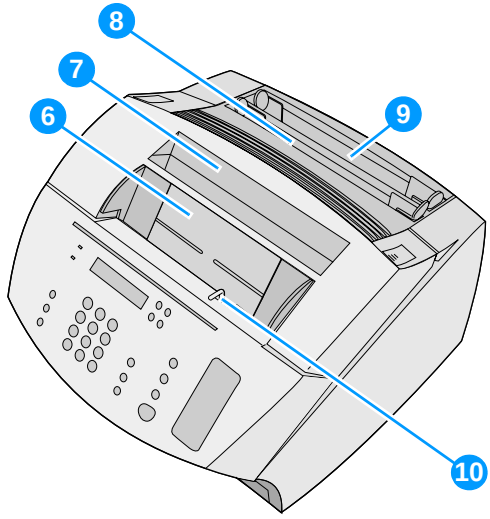


Figure 3. **Top view**

6 Document feeder tray

7 Paper output bin

8 Single-sheet input tray

9 Paper input tray

10 Special media lever

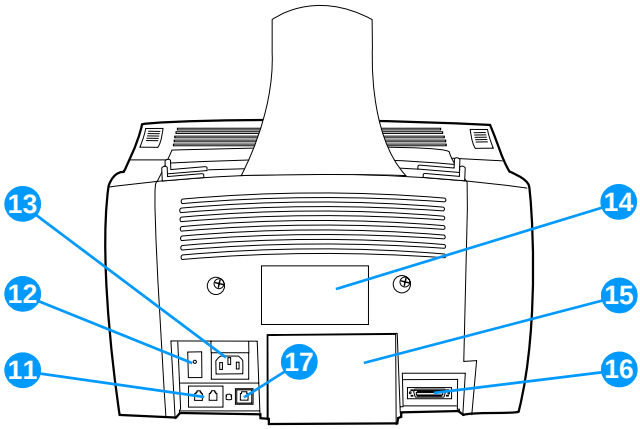


Figure 4. **Rear view**

11 Phone line connectors

12 On/off switch (on 220 V models only)

13 Power cable connector

14 Model and serial number label

15 Memory door

16 Parallel cable connector

17 USB connector

Warranty statement

This warranty gives specific legal rights. There may also be other rights which vary from area to area. See the user guide for further warranty information or see the warranty card included with the printer.

Hewlett-Packard limited warranty statement

HP LaserJet 3200 product ONE-YEAR LIMITED WARRANTY

1. HP warrants to you, the end-user customer, that HP hardware, accessories, and supplies, will be free from defects in materials and workmanship after the date of purchase, for the period specified above. If HP receives notice of such defects during the warranty period, HP will, at its option, either repair or replace products which prove to be defective. Replacement products may be either new or like-new.
2. HP warrants to you that HP software will not fail to execute its programming instructions after the date of purchase, for the period specified above, due to defects in material and workmanship when properly installed and used. If HP receives notice of such defects during the warranty period, HP will replace software media which does not execute its programming instructions due to such defects.
3. HP does not warrant that the operation of HP products will be uninterrupted or error free. If HP is unable, within a reasonable time, to repair or replace any product to a condition as warranted, you will be entitled to a refund of the purchase price upon prompt return of the product.
4. HP products may contain remanufactured parts equivalent to a new in performance or may have been subject to incidental use.
5. Warranty does not apply to defects resulting from (a) improper or inadequate maintenance or calibration, (b) software, interfacing, parts or supplies not supplied by HP, (c) unauthorized modification or misuse, (d) operation outside of the published environmental specifications for the product, or (d) improper site preparation or maintenance.
6. **HP MAKES NO OTHER EXPRESS WARRANTY OR CONDITION WHETHER WRITTEN OR ORAL**. TO THE EXTENT ALLOWED BY LOCAL LAW, ANY IMPLIED WARRANTY OR CONDITION OR MERCHANTABILITY, SATISFACTORY QUALITY, OR FITNESS FOR A PARTICULAR

PURPOSE IS LIMITED TO THE DURATION OF THE EXPRESS WARRANTY SET FORTH ABOVE. Some countries, states or provinces do not allow limitations on the duration of an implied warranty, so the above limitation or exclusion might not apply to you. This warranty gives you specific legal rights and you might also have other rights that vary from country to country, state to state, or province to province.

7 TO THE EXTENT ALLOWED BY LOCAL LAW, THE REMEDIES IN THIS WARRANTY STATEMENT ARE YOUR SOLE AND EXCLUSIVE REMEDIES. EXCEPT AS INDICATED ABOVE, IN NO EVENT WILL HP OR ITS SUPPLIERS BE LIABLE FOR LOSS OF DATA OR FOR DIRECT, SPECIAL, INCIDENTAL, CONSEQUENTIAL (INCLUDING LOST PROFIT OR DATA), OR OTHER DAMAGE, WHETHER BASED IN CONTRACT, TORT, OR OTHERWISE. Some countries, states or provinces do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

8 (AUSTRALIA and NEW ZEALAND ONLY) THE WARRANTY TERMS CONTAINED IN THIS STATEMENT, EXCEPT TO THE EXTENT LAWFULLY PERMITTED, DO NOT EXCLUDE, RESTRICT OR MODIFY AND ARE IN ADDITION TO THE MANDATORY STATUTORY RIGHTS APPLICABLE TO THE SALE OF THIS PRODUCT TO YOU.

Declaration of Conformity

Declaration of Conformity
according to ISO/IEC Guide 22 and EN 45014

Manufacturer's Name:	Hewlett-Packard Company
Manufacturer's Address:	11311 Chinden Boulevard Boise, Idaho 83714-1021, USA

declares, that the product

Product Name:	HP LaserJet 3200 product
Model Number:	C7052A, 7053A, 7055A (Printer/Fax/Scanner/Copier)
Product Options:	ALL

conforms to the following Product Specifications:

Safety: IEC 950:1991+A1+A2+A3+A4/EN 60950:1992+A1+A2+A3+A4+A11
IEC60825-1:1993+A1/EN 60825-1:1994+A11 Class 1 Laser/LED Product

EMC: CISPR 22:1997/EN 55022:1998 Class B[1]
CISPR 24:1997/EN 55024:1998
IEC 61000-3-2:1995/EN61000-3-2:1995
IEC61000-3-3:1994/EN61000-3-3:1995
FCC Title 47 CFR, Part 15 Class B[2] / ICES-003, Issue 2
AS / NZS 3548:1995

Supplementary Information:
The product herewith complies with the requirements of the Low Voltage Directive 73/23/EEC, the EMC Directive 89/336/EEC, and the R&TTE Directive 1999/5/EC (Annex II) and carries the CE-marking accordingly.

1) The product was tested in a typical configuration with Hewlett-Packard Personal Computer Systems.

2) This Device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

April 18, 2000

For Compliance Information ONLY, contact:
Australia Contact: Product Regulations Manager, Hewlett-Packard Australia Ltd., 31-41 Joseph Street, Blackburn, Victoria 3130, Australia
European Contact: Your Local Hewlett-Packard Sales and Service Office or Hewlett-Packard Gmbh, Department HQ-TRE / Standards Europe, Herrenberger Strasse 130, D-71034 Böblingen (FAX: +49-7031-14-3143)
USA Contact: Product Regulations Manager, Hewlett-Packard Company, PO Box 15, Mail Stop 160, Boise ID, 83707-0015 (Phone: 208-396-6000)

Toner cartridge information

The toner cartridge is designed to simplify replacement of the major consumable parts. The toner cartridge contains the printing mechanism and a supply of toner.

At five percent page coverage, a toner cartridge will print approximately 2,500 pages. However, a toner cartridge should print more pages if it regularly prints pages with less coverage, such as short memos. The cartridge might print fewer pages if heavy or bold print is used.

Note For best results, always use a toner cartridge before the expiration date stamped on the toner cartridge box.

Refilled toner cartridges

While Hewlett-Packard does not prohibit the use of refilled toner cartridges during the warranty period or while the printer is under a maintenance contract, it is not recommended for the following reasons:

- Repairs resulting from the use of refilled toner cartridges are not covered under Hewlett-Packard warranty or maintenance contracts.
- Hewlett-Packard has no control or process to ensure that a refilled toner cartridge functions at the high level of reliability of a new HP LaserJet toner cartridge. Hewlett-Packard also cannot predict the long term reliability effect on the printer from using different toner formulations found in refilled cartridges.
- The print quality of HP LaserJet toner cartridges influences the customer's perception of the printer. Hewlett-Packard has no control over the actual print quality of a refilled toner cartridge.

Recycling toner cartridges

In order to reduce waste, Hewlett-Packard offers a recycling program. Cartridge components that do not wear out are recycled. Plastics and other materials are recycled. Hewlett-Packard pays the shipping costs from the user to the recycling plant. To join this recycling effort, follow the instructions inside the toner cartridge box.

Additional product stewardship

Environmental conformity

The design of this HP LaserJet product facilitates the recycling of:

Printer and parts

Design for recycling has been incorporated into this printer and its accessories. The number of materials has been kept to a minimum while ensuring proper functionality and high product reliability. Dissimilar materials have been designed to separate easily. Fasteners and other connections are easy to locate, access, and remove with common tools. High-priority parts have been designed to be accessed quickly for efficient disassembly and repair. Plastic parts have been primarily designed in two colors to enhance recycling options. A few small parts are colored specifically to highlight customer access points. The plastics used in the printer housing and chassis are technically recyclable.

HP provides a product return system for customers in Germany. Many of the functional parts are recovered, tested, and reused as fully warranted service parts. Used parts are not placed into new products. Remaining product parts are recycled, if possible. For product return information, contact the address below:

Hewlett-Packard GmbH
Wertstoffzentrum
Fronackerstr.30
71063 Sindelfingen

2 Installation and operation

Chapter contents

Operating environment 30
Identifying product components 31
    Control panel lights and keys 31
    Using the control panel menu structure 33
Control panel error messages 35
Selecting media 43
    Selecting media to print 43
    Selecting media to fax, copy, or scan 44
Loading media 45
    Loading media to fax, copy, or scan 45
    Loading media to be printed 48
    Selecting the output path 50

Operating environment

Place the product on a sturdy, level surface in a well-ventilated area that meets the following environmental requirements:

- temperature: 15 to 32.5 degrees C (59 to 90.5 degrees F)
- humidity: 20 to 80 percent relative humidity (no condensation)
- away from direct sunlight, open flames, and ammonia fumes
- sufficient space around the product to allow for proper access and ventilation, as shown in the figure below:

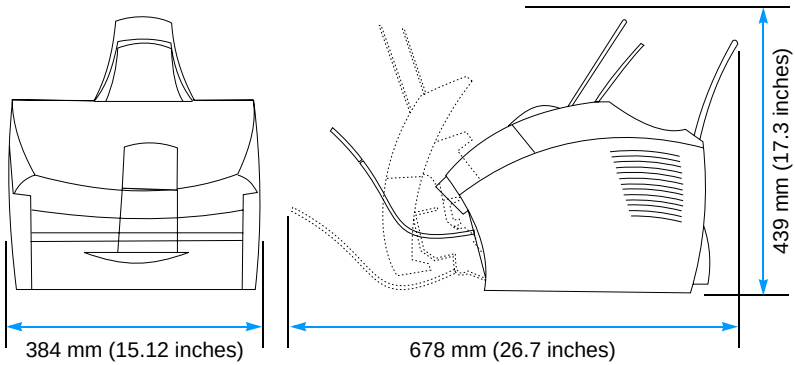


Figure 5. **Product dimensions (in North America)**

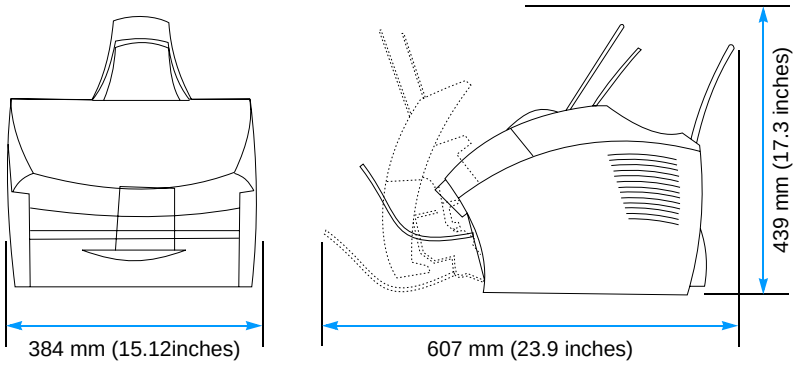


Figure 6. **Product dimensions (outside of North America)**

Identifying product components

Control panel lights and keys

The lights on the control panel provide status of the product and the keys are used to fax paper-based documents, make copies, scan documents, and adjust settings for the product. See “Using the control panel menu structure” on page 33 for more information about menu settings.

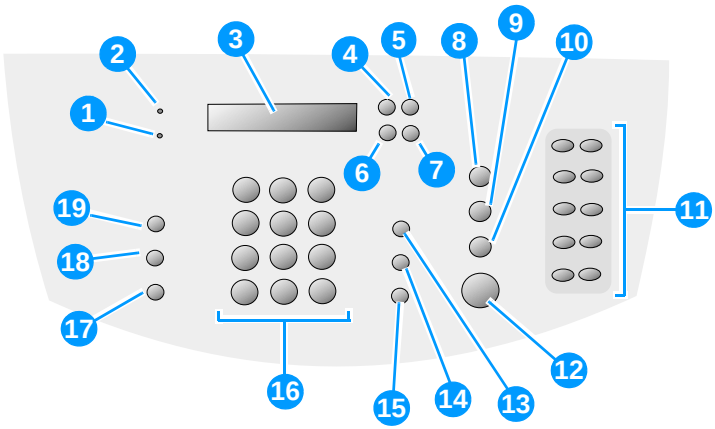


Figure 7. **Control panel**

1 **Error** light—when solid, indicates an error condition.

2 **Ready** light—when solid, indicates the product is ready and has no error conditions; when blinking, indicates that the product is processing a job.

3 **Control panel display**—displays messages or Menu settings.

4 **Enter/Menu**—use to gain access to the Menu, save a selection, or go down one level in the Menu settings.

5 **Back space**—use to go up one level in the Menu settings or to backspace when typing text.

6 **<** (back arrow)—use to scroll back through items at the same Menu level, move back through text.

7 **>** (forward arrow)—use to scroll forward through items at the same Menu level; also use to insert a space when typing text or scroll forward.

8 **Stop/Clear**—stops or clears any action in progress or exits the Menu settings.

9 **Scan**—starts scanning documents loaded in the document feeder.

10 **Copy**—starts the copy function.

11 **One-touch keypad**—use the keys on the one-touch keypad to store frequently dialed fax numbers.

12 **Fax/Send**—use to start sending paper faxes.

13 **Volume**—use to adjust the line monitor volume for incoming and outgoing fax connection sounds.

14 **Speed-Dial**—press this key, plus a one-, two- or three-digit code to fax to previously stored fax numbers.

15 **Redial/Pause**—press to redial the last fax number or use to insert a pause into a fax number.

16 **Numeric** keys—use to enter fax numbers. Also use to add letters when typing a name in the fax header or for speed-dials.

17 **Reduce/Enlarge**—use to adjust the size of the current copy job.

18 **Resolution**—use to adjust the resolution, or sharpness, for the current fax or copy job.

19 **Contrast**—use to adjust the contrast, or difference between light and dark areas, for the current fax or copy job.

Using the control panel menu structure

What follows is a hierarchical diagram of the control panel menu structure. Refer to this menu structure when you make changes to settings and features.

To print a copy of the menu structure, see “Internal reports” on page 186. To see which settings are currently selected, print a configuration report. See “Internal reports” on page 186 for instructions. The following is a general procedure for using the control panel menu.

To use the control panel keys:

1. Press ENTER/MENU to begin.
2. Use the < or > key to select one of the choices from the main Menu, and then press ENTER/MENU.
3. Use the < or > key to select one of the choices from the Submenu and press ENTER/MENU.
4. If applicable, use the < or > key to select one of the choices from the second Submenu and press ENTER/MENU.

To print the control panel menu structure

1. Press ENTER/MENU.
2. Use the < or > key to select REPORTS and then press ENTER/MENU.
3. Use the < or > key to select MENU STRUCTURE and then press ENTER/MENU. The product exits the Menu settings and prints the report.

Main Menu	Submenu	Submenu
Fax job status		
Fax functions	Send fax later	
	Stop receive to PC	
	Reprint last faxes	
	Polling receive	
	Clear stored faxes	
Time/date, header	Time/date	
	Fax header	
Copy setup	Default quality	
	Default contrast	
	Default collation	
	Default # of copies	
	Default reduce/enlarge	
Reports	Demo page	
	Fax activity log	Print fax log now
		Auto. log printing
	Fax call report	Print fax log now
		Print report
		Include first page
	Speed dial report	
	Menu structure	
	Configuration report	
	Block fax list	
	PCL font list	
	All fax reports	
Fax setup	Speed dials	Individual setup
		Group setup
		Delete all entries
	Fax send setup	Default resolution
		Default contrast
		Dialing mode
		Redial on busy
		Redial on no answer
		Dial prefix
		Detect dial tone
		Billing codes
	Fax receive setup.....	Answer mode
		Rings to answer
		Answer ring pattern
		Extension phone
		Silence detection
		Fit to page
		Stamp received faxes
		Forward fax
		Block faxes
	All faxes	Error correction
		V. 34
Common settings.....	Language	
	Default paper size	
	Print density	
	Volume settings	Alarm volume
		Ring volume
		Key press volume
Service.....	Scan calibration	
	Print T.30 trace	
	Restore defaults	
	Cleaning mode	

Control panel error messages

These control panel error messages are listed alphabetically. Messages are accompanied by the cause of the message and steps to resolve the problem.

Table 7. Control panel error messages

Message	Cause	Solution
###: [GROUP NAME] ONE-TOUCH/SPEED DIAL	The product is waiting for you to press a programmed one-touch key or enter a speed-dial code to a group-dial code.	Begin adding fax numbers to the group-dial code. See "Programming group-dial codes" in the online user guide.
### NOT PROGRAMMED [ENTER] TO PROGRAM	The one-touch key or speed-dial code has not been programmed and therefore cannot be added to a group.	Press ENTER/MENU to program the one-touch or speed-dial. If you want to program a group-dial, press STOP/CLEAR and use the control panel menu to create a new group. Press STOP/CLEAR if you do not want to program the one-touch or speed-dial.
50 FUSER ERROR	The product has experienced an internal hardware error.	Disconnect the power cable from the product, wait at least 30 seconds, then reconnect the power cable and wait for the product to initialize. If the message does not clear, see chapter 6, "Troubleshooting."
51 LASER ERROR	The product has experienced an internal hardware error.	Disconnect the power cable from the product, wait at least 30 seconds, then reconnect the power cable and wait for the product to initialize. If the message does not clear, see chapter 6, "Troubleshooting."
52 SCANNER ERROR	The product has experienced an internal hardware error.	Disconnect the power cable from the product, wait at least 30 seconds, then reconnect the power cable and wait for the product to initialize. If the message does not clear, see chapter 6, "Troubleshooting."
53 PRINTER ERROR	The product has experienced an internal hardware error.	Disconnect the power cable from the product, wait at least 30 seconds, then reconnect the power cable and wait for the product to initialize. If the message does not clear, see chapter 6, "Troubleshooting."

Table 7. Control panel error messages (continued)

Message	Cause	Solution
54 PRINTER ERROR	The product has experienced an internal hardware error.	Disconnect the power cable from the product, wait at least 30 seconds, then reconnect the power cable and wait for the product to initialize. If the message does not clear, see chapter 6, “Troubleshooting.”
55 DC CONTROLLER ERROR	The product has experienced an internal hardware error.	Disconnect the power cable from the product, wait at least 30 seconds, then reconnect the power cable and wait for the product to initialize. If the message does not clear, see chapter 6, “Troubleshooting.”
62.X PRINTER ERROR	The product has experienced an internal hardware error.	Disconnect the power cable from the product, wait at least 30 seconds, then reconnect the power cable and wait for the product to initialize. If the message does not clear, see chapter 6, “Troubleshooting.”
79 SERVICE (#####)	The product has experienced an internal hardware error.	Disconnect the power cable from the product, wait at least 30 seconds, then reconnect the power cable and wait for the product to initialize. If the message does not clear, see chapter 6, “Troubleshooting.”
80 SERVICE (#####)	The product has experienced an internal hardware error.	Disconnect the power cable from the product, wait at least 30 seconds, then reconnect the power cable and wait for the product to initialize. If the message does not clear, see chapter 6, “Troubleshooting.”
81 SERVICE (#####)	The product has experienced an internal hardware error.	Disconnect the power cable from the product, wait at least 30 seconds, then reconnect the power cable and wait for the product to initialize. If the message does not clear, see chapter 6, “Troubleshooting.”
CANCELED COPY. CLEAR DOCUMENT FEEDER	The STOP/CLEAR key was pressed to cancel the current job while pages were feeding from the document feeder. The cancel process will not automatically clear the document feeder.	Pull the document release door open, remove the jammed item, and close the door. Then, clear the items in the document feeder tray and start over.

Table 7. Control panel error messages (continued)

Message	Cause	Solution
CANCELED FAX. CLEAR DOCUMENT FEEDER.	The STOP/CLEAR key was pressed to cancel the current job while pages were feeding from the document feeder tray. The cancel process will not automatically clear the document feeder.	Pull the document release door open, remove the jammed item, and close the door. Then, clear the items in the document feeder tray and start over.
CANCELED SCAN. CLEAR DOCUMENT FEEDER	The STOP/CLEAR key was pressed to cancel the current job while pages were feeding from the document feeder. The cancel process will not automatically clear the document feeder.	Pull the document release door open, remove the jammed item, and close the door. Then, clear the items in the document feeder tray and start over.
COMMUNICATION ERROR	Fax communication error occurred between the product and the sender or receiver.	Allow the product to retry sending the fax. Unplug the product telephone cord from the wall, plug in a telephone, and try making a call. Plug the product phone cord into a jack for another phone line. See chapter 6, “Troubleshooting.”
COPY COUNT SET TO 1	The product does not have enough memory to complete the collated copy job.	Continue completing the collated copy job.
DEVICE BUSY. TRY AGAIN LATER	The product is currently in use.	Wait for the product to finish the current job.
DEVICE ERROR. PRESS [ENTER] TO RESUME	There was an internal error in the product.	Press ENTER/MENU to resume the job.
DOCUMENT FEEDER JAM	A piece of media is jammed in the document feeder tray.	Open the document release door, clear the jam, close the document release door, and reload the paper into the document feeder tray.
DOCUMENT FEEDER MISPICK. RELOAD MEDIA	Media in the document feeder tray was not picked up.	Remove and reload the media into the document feeder tray.

Table 7. Control panel error messages (continued)

Message	Cause	Solution
FAX DOES NOT ANSWER CANCELED SEND	Attempts to redial a fax number failed or the redial on no answer option was turned off.	Call the recipient to ensure that fax machine is on and ready. Check that you are dialing the correct fax number. Check that the redial option is enabled. Unplug the telephone cord from both the product and the wall and replug the cord. Unplug the product telephone cord from the wall, plug in a telephone, and try making a call. Plug the product phone cord into a jack for another phone line. See chapter 6, “Troubleshooting.”
FAX DOES NOT ANSWER REDIAL PENDING	You tried to send a fax, but the receiving fax line did not answer. The product attempts to redial after a few minutes.	Allow the product to retry sending the fax. Call the recipient to ensure that fax machine is on and ready. Check that you are dialing the correct fax number. Check that the redial on no answer option is enabled. Unplug the product telephone cord from the wall, plug in a telephone, and try making a call. Plug the product phone cord into a jack for another phone line. See chapter 6, “Troubleshooting.”
FAX MEMORY FULL CANCELING RECEIVE	During the fax transmission, the product ran out of memory. Only the pages that fit into memory will be printed.	Print all of the faxes and have the sender resend the fax. Cancel all fax jobs or clear the faxes from memory (see “Clearing faxes from memory” in the online user guide).
FAX MEMORY FULL CANCELING SEND	During the fax job, the memory filled. All pages of the fax have to be in memory for a fax job to work correctly. Only the pages that fit into memory were sent.	Print all received faxes or wait until all pending faxes are sent. Cancel all fax jobs or clear the faxes from memory (see “Clearing faxes from memory” in the online user guide).

Table 7. Control panel error messages (continued)

Message	Cause	Solution
FAX RECEIVE ERROR	An error occurred while trying to receive a fax.	Ask the sender to resend the fax. Try faxing back to sender or another fax machine. Check that the telephone cord is securely connected by unplugging and replugging the cord. Check for a dial tone on the phone line by pressing FAX/SEND. Make sure the phone is working by disconnecting the product, plugging in a telephone to the phone line, and making a voice call. Connect the product to a different phone line.
FAX SEND ERROR	An error occurred while trying to send a fax.	Try resending the fax. Try faxing to another fax number. Check that the telephone cord is securely connected by unplugging and replugging the cord. Check for a dial tone on the phone line by pressing FAX/SEND. Make sure the phone is working by disconnecting the product, plugging in a telephone to the phone line, and making a voice call. Connect the product to a different phone line.
GROUP DIAL NOT ALLOWED IN GROUP	The speed-dial code you entered is programmed for a group. Adding a group-dial to another group-dial is not allowed.	Enter one-touch keys (programmed as an individual speed dial) or speed-dial codes to a group-dial
GROUP IS FULL. [FAX] TO START	The maximum number of fax numbers that can be added to an ad hoc group is 20.	Resend to the ad hoc group using less fax numbers.
IN CLEANING MODE. PLEASE WAIT 1-3 MIN.	The product is running an internal cleaning cycle.	Wait for the product to finish the cleaning cycle. The message will clear when the cycle is finished.
INVALID DATE	An invalid date was entered, such as June 35.	Reenter the date.
INVALID TIME	An invalid time was entered, such as 25:99 P.M.	Reenter the time.
JOB SETTINGS CLEARED	The product has cleared job settings.	Reenter any desired job settings.

Table 7. Control panel error messages (continued)

Message	Cause	Solution
MEMORY LOW. ONLY 1 COPY. PRESS [STOP]	The product completed making one copy. The remaining copies have been canceled because of low product memory.	Press STOP/CLEAR to clear the error. Use the HP LaserJet Director to make multiple copies of large documents, or break the job into smaller jobs containing fewer pages.
MEMORY LOW. [STOP] TO CANCEL.	The product memory has been almost completely filled.	Allow the product to finish the job or press STOP/CLEAR to cancel the job.
NO DIAL TONE.	The product could not detect a dial tone.	Unplug the telephone cord from both the product and the wall and replug the cord. Unplug the product telephone cord from the wall, plug in a telephone, and try making a call. Plug the product phone cord into a jack for another phone line. See “Changing the detect dial tone setting” in the online user guide. Also see chapter 6, “Troubleshooting.”
NO DOCUMENT SENT	The fax forwarding setting is on and the product unsuccessfully received a fax because of low memory or some other reason. The product deleted the incomplete received data before attempting to forward the deleted data.	Print the faxes in memory and have the sender resend the missing page(s) of the document.
NO FAX DETECTED	The product answered the incoming call but could not determine that the caller was a fax machine.	Allow the product to retry sending the fax. Unplug the product telephone cord from the wall, plug in a telephone, and try making a call. Plug the product phone cord into a jack for another phone line. See chapter 6, “Troubleshooting.”
NO FAX PAGES IN MEMORY TO REPRINT	The product attempted to execute “Reprint Last Fax” when nothing was in memory.	Receive a fax before attempting to use this option.
NOT ENOUGH MEMORY. TRY AGAIN LATER	There is not enough memory to start a new job.	Wait until the current job is finished before starting a new job.

Table 7. Control panel error messages (continued)

Message	Cause	Solution
POWER FAIL RECOVERY. CHECKING SYSTEM	The product has detected a power failure and is performing a self-test.	The product should go back to the ready state on its own. If this message does not go away in a couple of minutes, disconnect the power cable from the product, wait at least 30 seconds, then reconnect the power cable and wait for the product to initialize.
POWER FAIL RECOVERY. FAX SETTING RESET	The product has detected a power failure and the last update to the fax settings was corrupted. The product is resetting all fax settings to the factory default settings.	Press STOP/CLEAR to clear the error. The product should return to the ready state.
POWER FAIL RECOVERY. PRINTING FAXES	The product has detected a power failure and is printing all of the faxes that it did not previously print.	The product prints all of the received faxes that it did not previously print. Once the faxes are printed, the product will return to the ready state.
POWER FAIL RECOVERY. SEND:[FAX NUMBER]	The product has detected a power failure and has also detected unsent faxes and will try to resend them.	The product resents the unsent faxes. Once the faxes are sent, the product will return to the ready state.
POWER OFF. CHECK DIMM #[1-3]	The DIMM in the indicated slot has failed.	Turn off the product and check the indicated DIMM.
PRINTER PAPER JAM CLEAR PAPER PATH	The product has detected that a jam has occurred.	Clear the jam. The job should continue to print. If it does not, try reprinting the job.
PRINTER DOOR OPEN OR NO TONER CARTRIDGE	The printer door is open or the toner cartridge is not installed properly.	Make sure the printer door is closed. Check the toner cartridge for proper installation.
PRINTER PAPER TRAY IS EMPTY. ADD PAPER	The paper input tray is empty.	Load media. If media is already loaded, remove it. Check for and remove any jam, and then reload the stack of media in the paper input tray.
PRINTER TRAY MISPICK. [ENTER] TO RESUME	The print engine has failed to pick up a piece of media.	Reload the paper in the paper input tray and press ENTER/MENU to continue the job.

Table 7. Control panel error messages (continued)

Message	Cause	Solution
RECEIVING FAX BUSY CANCELED FAX	The fax line to which you were sending a fax was busy. The product has cancelled sending the fax.	Call the recipient to ensure that fax machine is on and ready. Check that you are dialing the correct fax number. Check that the redial on busy option is enabled. Unplug the product telephone cord from the wall, plug in a telephone, and try making a call. Plug the product phone cord into a jack for another phone line. See chapter 6, "Troubleshooting."
RECEIVING FAX BUSY REDIAL PENDING	The fax line to which you were sending a fax was busy. The product automatically redials the busy number. (See "Changing how the product redials" in the online user guide.)	Allow the product to retry sending the fax. Call the recipient to ensure that fax machine is on and ready. Check that you are dialing the correct fax number. Unplug the product telephone cord from the wall, plug in a telephone, and try making a call. Plug the product phone cord into a jack for another phone line. See chapter 6, "Troubleshooting."
SCANNER RESERVED FOR PC SCAN	The product is being used to create a scan by a computer.	Wait until the PC scan has finished, or cancel the scan from the computer software, or press STOP/CLEAR.
SCANNING ERROR. CANNOT CONNTECT TO PC	The product cannot transmit scan information to a computer.	Check the connection cable and try the scan again.

Selecting media to print

You can use paper with up to 100 percent recycled fiber content if it meets HP's specifications. To order HP paper or the *Print Media Guide* for HP LaserJet printers, see "Ordering parts and supplies" on page 216.

Highly textured stock might not print evenly. Very glossy papers might jam or repel toner. Multipart forms can wrinkle or get jammed in the product. And paper in poor condition, such as paper with tears, wrinkles, or bent edges, can jam.

Avoid envelopes that have a very slick finish, ones that have self-stick adhesives, or those with clasps or windows. Also avoid envelopes with thick, irregular, or curled edges, or areas that are wrinkled, torn, or otherwise damaged.

Use a sturdy envelope of approximately 7.25 to 12.25 kg (16- to 27-pound) weight. Use tightly constructed envelopes and make sure the folds are sharply creased.

The paper input tray can hold up to 125 sheets of 75 g/m^2 (20 lb) print media. The single-sheet input tray is designed for one sheet. Both can be adjusted to hold media measuring from 76.2 by 127 mm (3 by 5 inches) to 216 by 356 mm (8.5 by 14 inches). This includes, but is not limited to, the following paper and envelope sizes:

Table 8. Media types

Paper type	Metric	English
Letter	216 by 279 mm	8.5 by 11 in
Legal	216 by 356 mm	8.5 by 14 in
Executive	184 by 267 mm	7.25 by 10.5 in
A4	210 by 297 mm	8.25 by 11.75 in
COM10 Envelopes	105 by 241 mm	4.125 by 9.5 in
DL Envelopes	110 by 220 mm	4.33 by 8.67 in
C5 Envelopes	162 by 229 mm	6.4 by 9 in
B5 Envelopes	176 by 250 mm	6.9 by 9.85 in
Monarch Envelopes	98.5 by 190.5 mm	3.875 by 7.5 in
Other custom size media	custom	custom

Selecting media to fax, copy, or scan

The product can scan items of various sizes, from 2 by 3.5 inches (51 by 89 mm) (the size of a business card) to 8.5 by 14 inches (215 by 356 mm). The product can fax and copy items ranging from 2 by 3.5 inches (51 by 89 mm) to 8.5 by 35 inches (215 by 889 mm).

The product accepts bond paper, onionskin paper, newspaper pages, magazine pages, recycled paper, transparencies, and photographs, and accepts other items in carrier sheets. Coarse papers scan more easily than smooth items. Slick papers can go through the product, although they can be more difficult to feed through. For best results, feed slick sheets one at a time, and set the special media lever correctly.

Perform the following actions to minimize the possibility of jams:

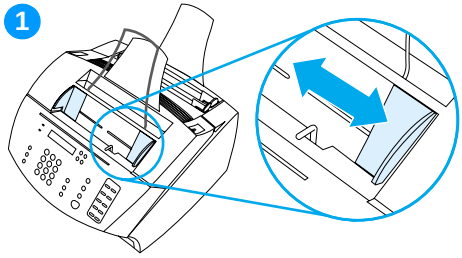
- Remove self-stick notes.
- Remove staples and paper clips.
- Straighten any curls or wrinkles in documents before putting them into the document feeder tray.
- Do not insert any document with glue, correction fluid, or wet ink on it.
- Do not insert gum-backed paper or labels.
- Place documents with tears, perforations, or punch holes in a carrier sheet, which you can buy or make. (See “To load special items” on page 46.)
- Avoid multiple-copy forms.

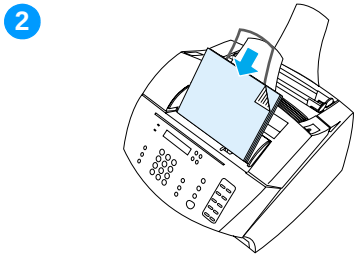
Loading media

The following sections explain how to load media for sending and receiving faxes, copying, scanning, and printing.

Loading media to fax, copy, or scan

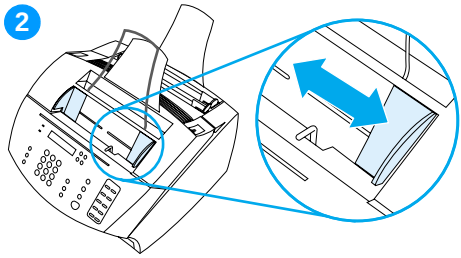
Whether you want to fax, copy, or scan, the procedure for loading the document is the same. If your document is on a regular-weight paper (from 12 to 28 lb, or 46 to 105 g/m^2), see "To load normal media" below. If your document is a transparency, is in a carrier sheet, or is not on regular-weight paper, use the directions for “To load special items” on page 46.





To load normal media

1. Adjust the guides in the document feeder tray to fit the size of the item you are loading.
2. Place up to 30 pages leading edge first, face down, into the document feeder tray.



To load special items

When loading items to be faxed, copied, or scanned, you need to protect small, fragile, lightweight (less than 12 lb. or 46 g/m^2), or irregularly sized items such as receipts, newspaper clippings, photographs, and old or worn documents.

1 Do one of the following:

- Place the item in a carrier sheet. You can buy a carrier sheet, or you can make one by taping a transparency and piece of paper together along one of the short sides. Insert the item to be faxed, copied, or scanned into the carrier, and insert the carrier into the document feeder tray, taped edge first.

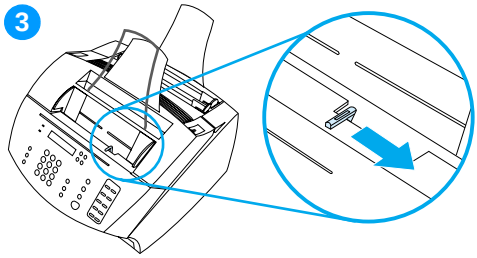
  - Or -

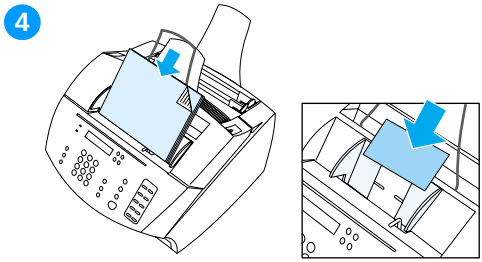
- Using clear tape, tape the leading and trailing edges of the item to a sheet of letter- or A4-size paper. If the item is not square or rectangular, tape all edges of the item to the paper.

  - Or -

- If you have use of a full-size copier, copy the item first and then send the copy through the scanner.

2 Adjust the guides in the document feeder tray to fit the size of the item you are loading.





3 Locate the special media lever (see figure 3 on page 21) on the top edge of the control panel and move it to the right. The special media lever opens the document feeder mechanism, allowing you to feed thick items, one at a time, into the document scanner.

Note

Move the special media lever back to the left after special items have been fed. A stack of regular pages sent with the lever to the right feed in multiples and cause jams.

CAUTION

Do not move the lever after the product has begun sending the page.

4 Load only one sheet at a time, leading edge first, face down, into the document feeder tray.

Note

If you are loading a business card, load it *long* edge first.

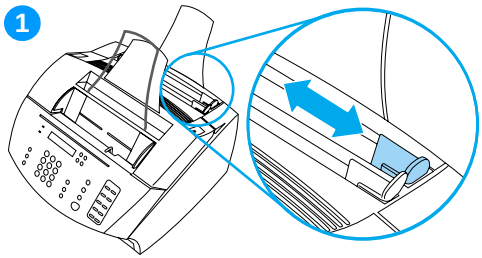
Loading media to be printed

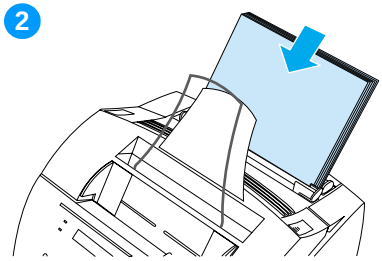
Loading the paper input tray

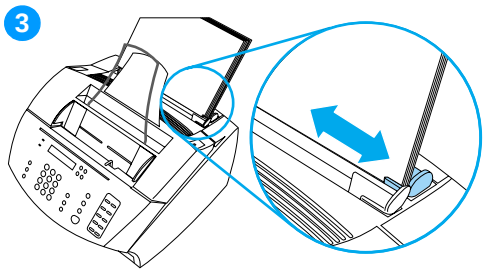
You can load up to 125 sheets of 20 lb (75 g/m^2) media into the paper input tray or feed one sheet at a time into the single-sheet input tray.

Note

Insert all media vertically (portrait orientation) into the paper input tray or single-sheet input tray. If you want to print horizontally (landscape orientation), make this selection through your software. Do not print on paper smaller than 3 by 5 inches (76.2 by 127 mm).







To load the paper input tray

The product prints, copies, and prints received faxes using media from the paper input tray (or the single-sheet input tray).

1. Adjust the guides on the paper input tray to fit the size of media you are loading.
2. Insert up to 125 sheets of paper into the paper input tray. Be careful not to overfill the bin.

Note

When adding media to an existing stack in the paper input tray, always remove the existing media and realign it with the new media before loading to reduce multiple feeds or jams.

Note

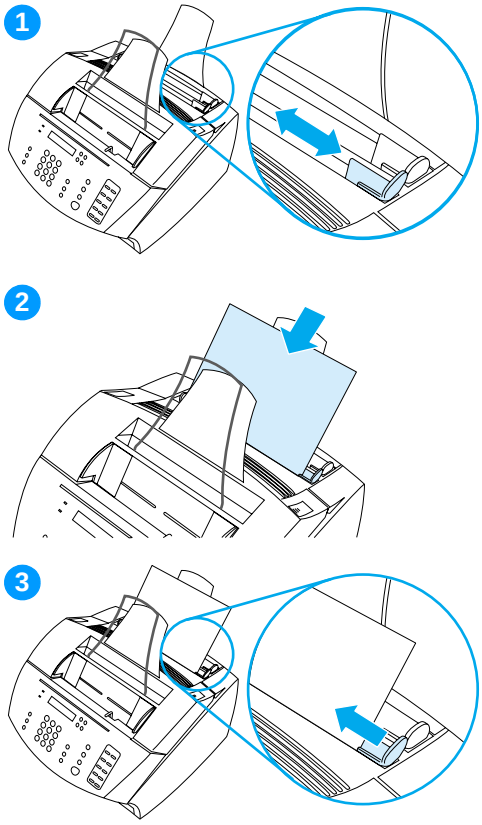
If you have loaded special media, make sure to choose the lower paper output path. See “To select the output path” on page 50.

3. Readjust the guides to center the stack.

Using the single-sheet input tray

Using the single-sheet input tray, you can print one sheet of media at a time without using the paper input tray. The product takes media loaded in the single-sheet input tray before it takes from the paper input tray.

Note The single-sheet input tray is helpful when the first page of your job is different from the rest. For example, you might want the first page of your print job on letterhead, or you may want to print an envelope first.



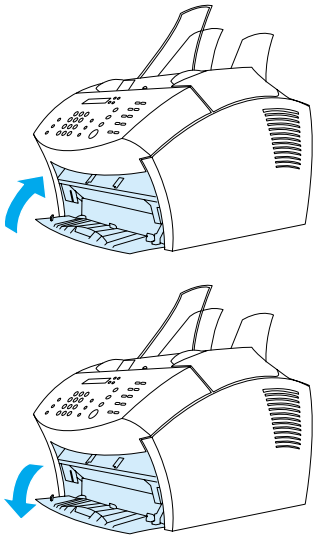
To print using the single-sheet input tray

1. Adjust the guides to the approximate size of the sheet you are using.
2. Insert one sheet of media into the single-sheet input tray. If loading special media or letterhead, insert media top first, facing forward.
3. Readjust the guides to center the sheet.

Note
If you have loaded special media, make sure to choose the lower paper output path. See “To select the output path” on page 50.

Selecting the output path

Use this procedure to determine if printed pages should come out of the paper output bin or the front paper output slot. Choose the front paper output slot if you are printing on special media, such as 28 lb (100 g/m^2) or heavier weight paper, envelopes, transparencies, or labels. This prevents wrinkling and paper curl.



To select the output path

- To use the paper output bin, make sure that the front paper path door is closed.

  - Or -

- To use the front paper output slot, open the front paper path door. All printed media coming out of the front paper output slot will be in reverse order. If you open the front paper path door and media does not go through the front paper output slot, make sure the front paper path door is all the way open.

Note
Keep the area in front of the front paper output slot clear so that media can easily exit the slot.

3 Maintenance

Chapter contents

Life expectancies of consumables 52
Cleaning and maintaining the equipment 53
Cleaning the product 54
Cleaning the scanner path 57
Recalibrating the scanner 59
User-replaceable parts 60

Life expectancies of consumables

Inspect the consumables when servicing the product. Replace consumables as needed, based on failures or wear, not strictly on usage.

The following table lists approximate schedules for replacing consumables.

Table 9. Life expectancies of consumables

Description	Part number	Estimated life (pages)	Remarks
Toner cartridge (user replaceable)	C4092A	2,500*	When print becomes faint, redistribute toner in the cartridge by gently shaking the cartridge from side to side.
Printer transfer roller	RB5-4657-000CN	25,000	Can affect print quality and/or paper movement.
Printer pickup roller	RG2-4026-000CN	25,000	Look for glazing and/or cracks.
Printer separation pad	RF5-2886-000CN	25,000	Can affect paper movement.
Printer subpads	RY7-5050-000CN	25,000	Can affect paper movement.
Fusing element	RG5-4589-000CN (110V) RG5-4590-000CN (220V)	25,000	Can affect print quality and paper movement.
Pressure roller	RF5-2823-020CN	25,000	Can affect print quality and paper movement.
Document scanner pickup roller assembly	RG5-5401-000CN	10,000	Look for glazing or cracks.
Document scanner separation pad kit	RY7-5055-000CN	10,000	Can affect document movement.
Document scanner feed roller and document scanner delivery roller	RG5-5399-000CN (Document scanner assembly)	10,000	Can affect document movement.

* The estimated toner cartridge life is based on letter- or A4-sized paper with an average of five percent toner coverage and a medium density setting. Toner cartridge life can be extended further by conserving toner using draft mode settings.

Cleaning and maintaining the equipment

WARNING! Before you perform these steps, unplug the printer to avoid shock hazard.

To maintain quality, thoroughly clean the product:

- any time a new toner cartridge is installed.
- after printing approximately 2,500 pages.
- whenever print quality problems appear.

Clean the outside of the printer with a water-dampened cloth. Clean the inside with only a dry, lint-free cloth (such as lens tissue).

To avoid permanent damage to the toner cartridge, do not use ammonia-based cleaners on or around the product.

WARNING! When cleaning around the printer door area, avoid touching the heating element. It might be very hot and can cause burns.

CAUTION Do not touch the surface of the transfer roller. Contaminants on the roller can cause print quality problems.

Note Be careful not to touch the glass surface of the image sensor. If you inadvertently touch the glass, clean it according to the instructions on the following pages.

Cleaning the product

Use this process if you discover toner specks or dots on printouts. This process produces a page with toner debris, which should be discarded.

To clean the print path

Note This process requires copier-grade paper to remove dust and toner from the print paper path. Do not use bond or rough paper.

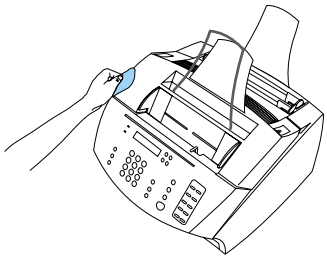
1. Place the copier grade paper into the document feeder tray.
2. Ensure that the product is in the READY state, and then press ENTER/MENU.
3. Use the < or > key to select SERVICE, and then press ENTER/MENU.
4. Use the < or > key to select CLEANING MODE, and then press ENTER/MENU.
5. Press ENTER/MENU to start the cleaning mode.

The device displays the message IN CLEANING MODE until this process is completed.

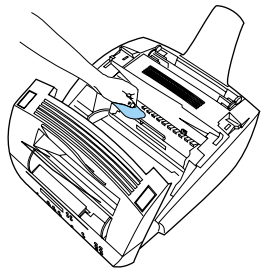
Note If toner spills on carpets or upholstery, remove it using a clean cloth dipped in cold water. Hot water can set toner into fabric.

WARNING! Before cleaning the product and replacing the pickup roller, disconnect it from the power source.

1



2



To clean the product and replace the pickup roller

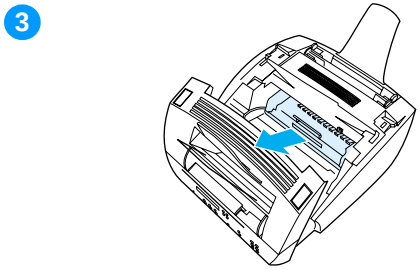
1 Clean the outside of the device with a slightly damp cloth (use only water).

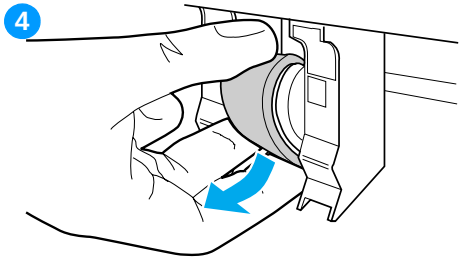
CAUTION
Using ammonia-based cleaners on or around the product can cause damage to it. Also, do not touch the long black sponge roller in the bottom. Touching it can reduce the print quality of output.

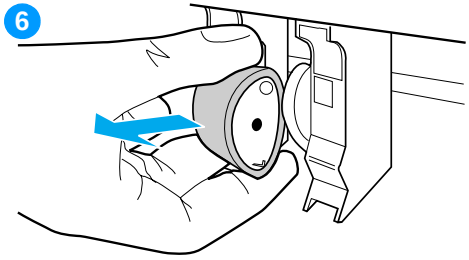
2 Use the two latches on the printer door to open it. Clean the inside of the product with a dry, lint-free cloth. Remove all dust, spilled toner, and particles of paper.

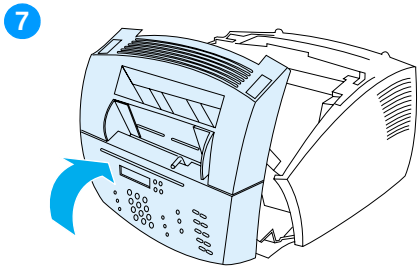
Note
Only use a dry, lint-free cloth to remove dust and toner. Using a vacuum or other device to clean inside the product can damage it.

Note
If toner gets on your clothing, wipe it off with a dry cloth and wash clothing in cold water. Hot water and the heat of the dryer sets toner into the fabric.









3 Remove the toner cartridge.

Note
If you notice excessive amounts of toner inside the product, the toner cartridge might be defective. Use HP LaserJet toner cartridges to ensure high quality printing and to reduce incidents of excessive toner.

4 Locate the light gray pickup roller near the center in the opening and then rotate the bottom of the pickup roller towards the front of the printer.

CAUTION
Do not touch the long black sponge roller inside the product. Touching it can reduce the print quality of output.

5 Gently pull the pickup roller straight out.

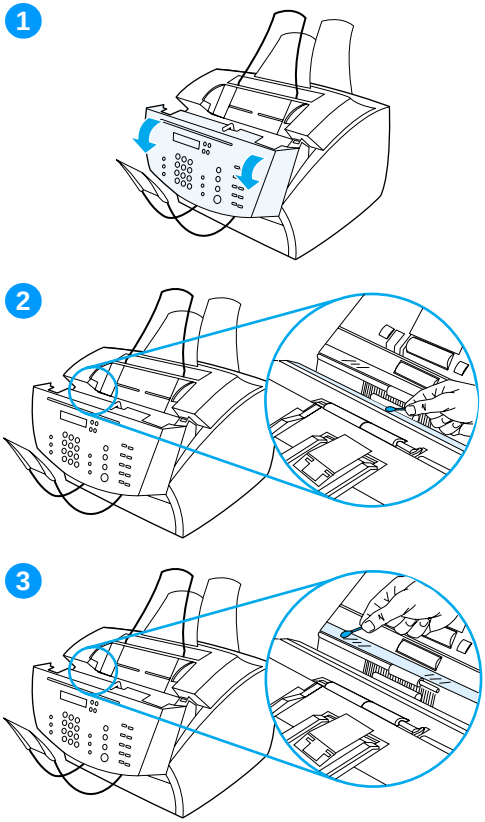
6 Replace the pickup roller with a new roller (part number RG2-4026-000CN).

7 Replace the toner cartridge and close the printer door.

Cleaning the scanner path

You might have to clean parts of the scanner if the ink on items you are scanning can be smudged with your hand or if the items have excessive amounts of dust or dirt on them. You might also have to clean parts if there are smudges or other marks on documents or scans of documents.

WARNING! Before cleaning the product, disconnect it from the power source.



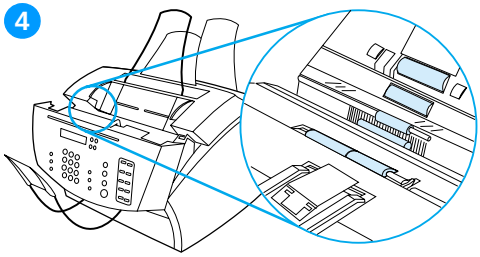
To clean the scanner path

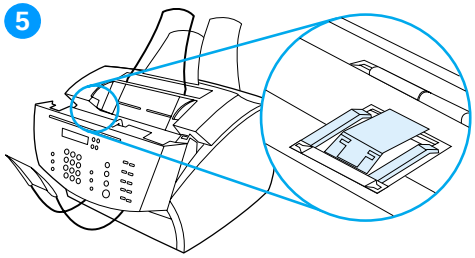
1. Press the two printer door release latches and open the printer door.
2. If the long, white strip on the inside of the document release door is dirty, clean it with a dry cotton swab. If there is still something on the strip, dab a swab in a small amount of isopropyl alcohol and gently clean the strip.

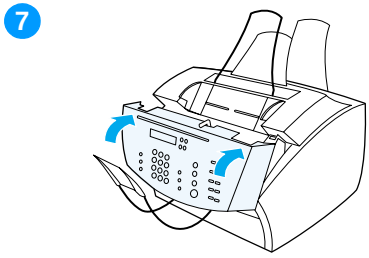
WARNING!
Alcohol is flammable. Keep it away from open flame. Allow the alcohol to dry completely before closing the printer and plugging in the power cord.

CAUTION
If you must use alcohol, only use a very small amount. Exposing internal parts to dripping alcohol can damage them.

3. If the long strip of glass opposite the long, white strip is dirty, clean it with a dry cotton swab. If there is still something on the glass strip, dab a swab in a small amount of isopropyl alcohol and gently clean the glass.







4 Inspect each of the six rollers in the scanner area for dirt or debris. Clean any dirty rollers with a lint-free cloth (such as lens tissues) dampened with a small amount of isopropyl alcohol.

CAUTION
Do not spray alcohol or any other liquid directly into the product. Doing so can damage the product.

CAUTION
As much as possible, avoid touching the white strip and glass strip with alcohol.

5 Near the top, inside edge of the document release door, inspect the two pressure feet and pad for dirt or debris. If they are dirty, clean them with a lint-free cloth sprayed with a small amount of alcohol.

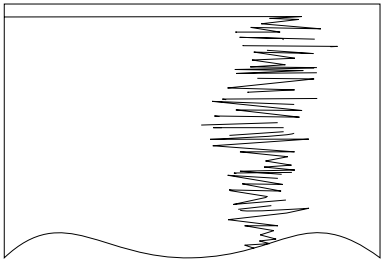
6 Using a dry, lint-free cloth, wipe rollers, pads, and feet in a side-to-side motion to remove loosened dirt.

7 After alcohol inside the scanner area has dried completely, close the document release door.

Every time you clean the scanner path, you should recalibrate the scanner. See “Recalibrating the scanner” on page 59.

Recalibrating the scanner

The product was calibrated at the factory. However, you might have to recalibrate the scanner if you notice that sent faxes, copies, or items scanned to the computer have black or white lines running through them.

4 

To recalibrate the scanner

1. Clean the product before recalibrating the scanner. (See “Cleaning the product” on page 54 and “Cleaning the scanner path” on page 57.)
2. On the control panel, press ENTER/MENU.
3. Press the < button once to display SERVICE and press ENTER/MENU.
4. Use the < and > buttons to select SCAN CALIBRATION and press ENTER/MENU.
   The product begins recalibration and prints a recalibration test page.
5. For information about interpreting the recalibration test page, see “Document scanner recalibration” on page 208.

User-replaceable parts

End-users can replace the printer pickup roller, printer separation pad, and document scanner separation pad when the parts near the end of their life expectancies or when users notice an increase in misfeeds in the printer path or document scanner path.

Instructions for replacing the printer pickup roller and document scanner appear in chapter 5, “Removal and replacement.”

- For instructions about replacing the printer pickup roller, see “Pickup roller” on page 131.
- For instructions about replacing the document scanner separation pad, see “Document scanner separation pad” on page 106.

Instructions for installing a new printer separation pad are contained with the pad itself. When you receive a new separation pad (part number RF5-2886-000CN), you also receive an HP Separation Pad Installation Guide.

4 Operational overview

Chapter contents

Basic functions 62
Optical system 63
Formatter system 65
- Control panel 66
- Draft mode 66
- MEt 66
- Enhanced I/O 66
- PJL Overview 67
- Page Protect 67

Printer functions 68
- Engine control unit/power system 69
- Image formation system 74
- Printer paper feed system 77

Basic sequence of operation (formatter-to-printer) 82

Basic functions

This chapter presents a functional overview of processes. The following systems are discussed:

- optical system (document scanner)
- formatter
- printer functions
  - ECU (engine controller unit) system/power system
  - image formation system
  - paper-feed system (printer) and document-feed system (document scanner)

The product consists of the printer and the document scanner. Operation sequences of the printer are controlled by the ECU. Operation sequences of the document scanner are controlled by the formatter.

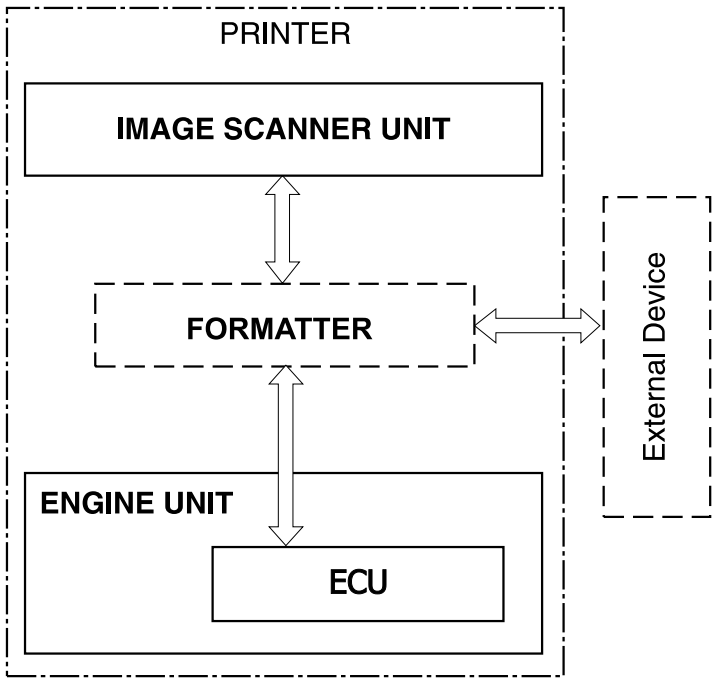


Figure 8. **Basic configuration**

Optical system

The document scanner system consists of the optical system and document pickup and feed systems.

The optical system, also known as the contact image sensor, contains the following:

- light-emitting diode (LED) array
- contact glass
- rod lens array
- sensor array

The light source has three LEDs (red, green, and blue) and is controlled by the formatter. Light reflected from documents passes through the rod lens array and focuses on the sensor array.

The sensor array consists of 5,160 phototransistors: 15 driver circuits amplify the light reception output in units of 344 phototransistors. The image data is converted and sent from the driver circuits to the formatter.

The document pickup and feed systems contain a pickup roller, feed roller, and delivery roller, all of which are driven by the document scanner motor (M101).

The following figure shows the document scanner path.

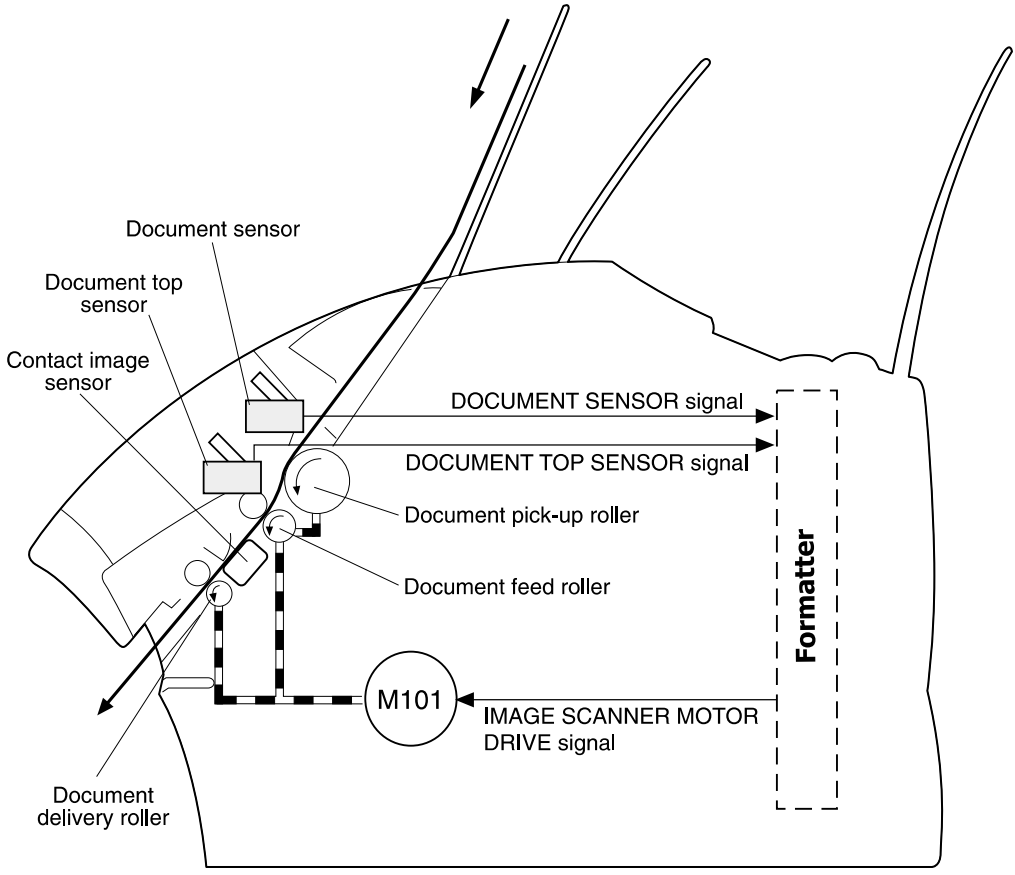


Figure 9. **Document scanner path**

Formatter system

The formatter is responsible for the following:

- controlling the document scanner
- formatting and controlling faxes
- formatting and controlling copies
- receiving and processing print data from the printer interface
- monitoring the control panel and relaying printer status information
- developing and coordinating data placement and timing with the print engine
- communicating with the host computer through the bidirectional interface

The formatter receives print data from the bidirectional Extended Capabilities Port (ECP) mode interface or USB interface and converts it into a dot image. The ECU 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 (dots) in the form of a video signal and the printing process begins.

Central processing unit

The formatter incorporates an MCF5202 custom microprocessor operating at 35 MHz.

RAM

- One bank of Non-Volatile RAM (NVRAM) stores parameters
- DRAM provides temporary storage of copy, scan, and print data

Parallel interface or Universal Serial Bus (USB) interface

The formatter receives incoming data through its bidirectional ECP or USB interface. This interface provides high speed and two-way communication between the printer and the host, allowing the user to change printer settings and monitor printer status from the host computer.

Control panel

- two front panel status lights
- control panel keyboard
- control panel display

Draft mode

Depending on which printer driver is used, selecting draft or EconoMode from the printer driver allows the product to use approximately 50 percent less toner, extending the life of the toner cartridge.

MEt

The Hewlett-Packard Memory Enhancement technology effectively doubles the standard memory through a variety of font and data-compression methods.

Enhanced I/O

The Enhanced I/O feature allows printer memory to be used for storing data received from the host computer. When Enhanced I/O is enabled, you can send more data to the printer in shorter amounts of time, which allows you to return to your application sooner. Enhanced I/O has the following options:

- **Auto**—allows the printer to use Enhanced I/O memory allocation to increase the speed of data transfer from the host computer to the printer, if necessary.
- **Off**—uses the minimum amount of printer memory for storing data sent from the host computer.

Page Protect

Page complexity (ruling lines, complex graphics, or dense text) can exceed the printer's ability to create the page image fast enough to keep pace with the image formation process. If Page Protect is disabled and a page is too complex, the page might print in parts (for example, the top half on one page and the bottom half on the next page). Some print-data loss is likely in these instances, and the printer will display an error message.

Page Protect allows the formatter to create the entire page image in page buffer memory before physically moving the paper through the printer. This process ensures that the entire page will be printed. The default setting is Auto.

PJL Overview

Printer Job Language (PJL) is an integral part of configuration, in addition to the standard Printer Command Language (PCL). With standard ECP cabling, PJL allows the printer to perform functions such as:

- **Two-way communication** with the host computer through a bidirectional parallel or USB connection. The printer can tell the host such things as the control panel status.
- **Isolation of print environment settings** from one print job to the next. For example, if a print job is sent to the printer in landscape mode, the subsequent print jobs print in landscape only if they are formatted for landscape printing.

Printer functions

Printer functions are divided into three groups:

- engine control
- image formation
- pickup and feed

The following figure is a block diagram of the printer unit:

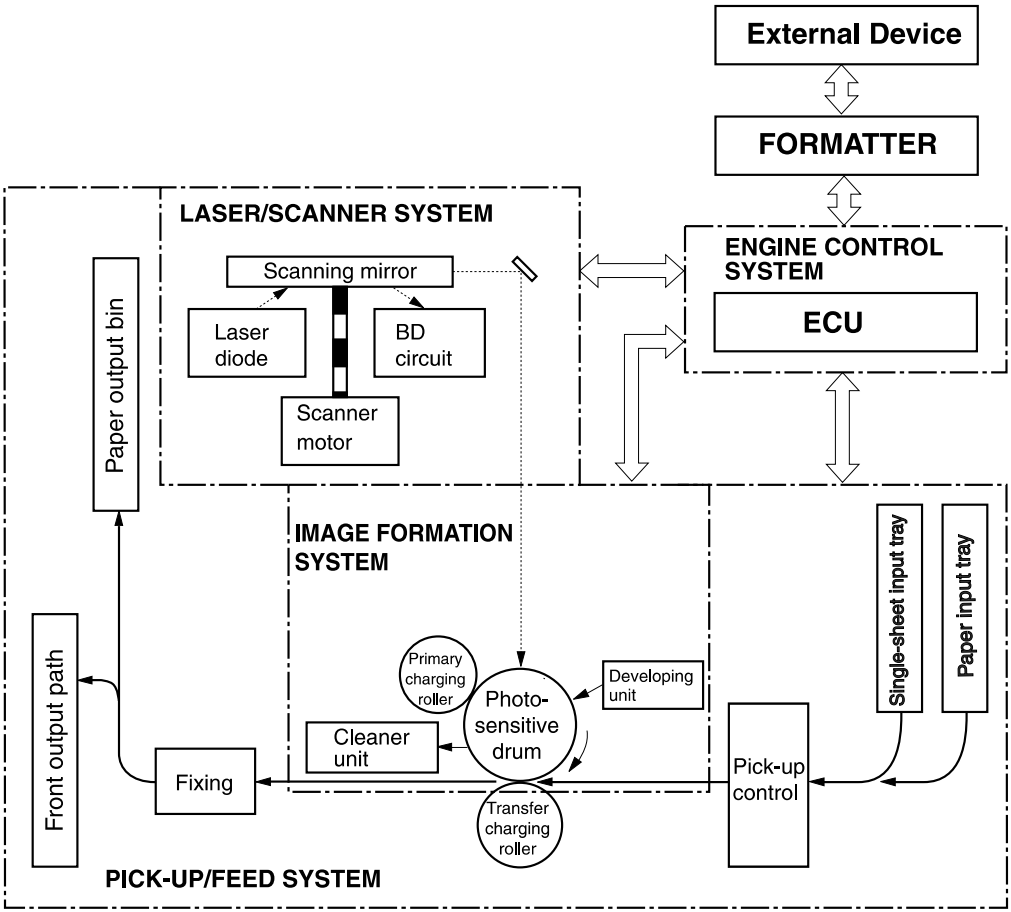


Figure 10. **Printer unit functional block diagram**

Engine control unit/power system

The ECU coordinates all print engine activities, drives the laser, and coordinates print data from the formatter with the image formation process. The ECU also includes power supply and distribution circuitry.

Note

In several other HP LaserJet products, the ECU is also known as the controller PCA or the DC controller PCA.

The ECU controls the following systems and functions:

- **Printer engine control**
  - paper motion monitoring and control (printing)
  - motor
- **Printer laser/scanner**
- **Power system**
  - AC power distribution
  - DC power distribution
  - overvoltage/undervoltage protection
  - high-voltage power distribution

The following figure shows the various ECU loads:

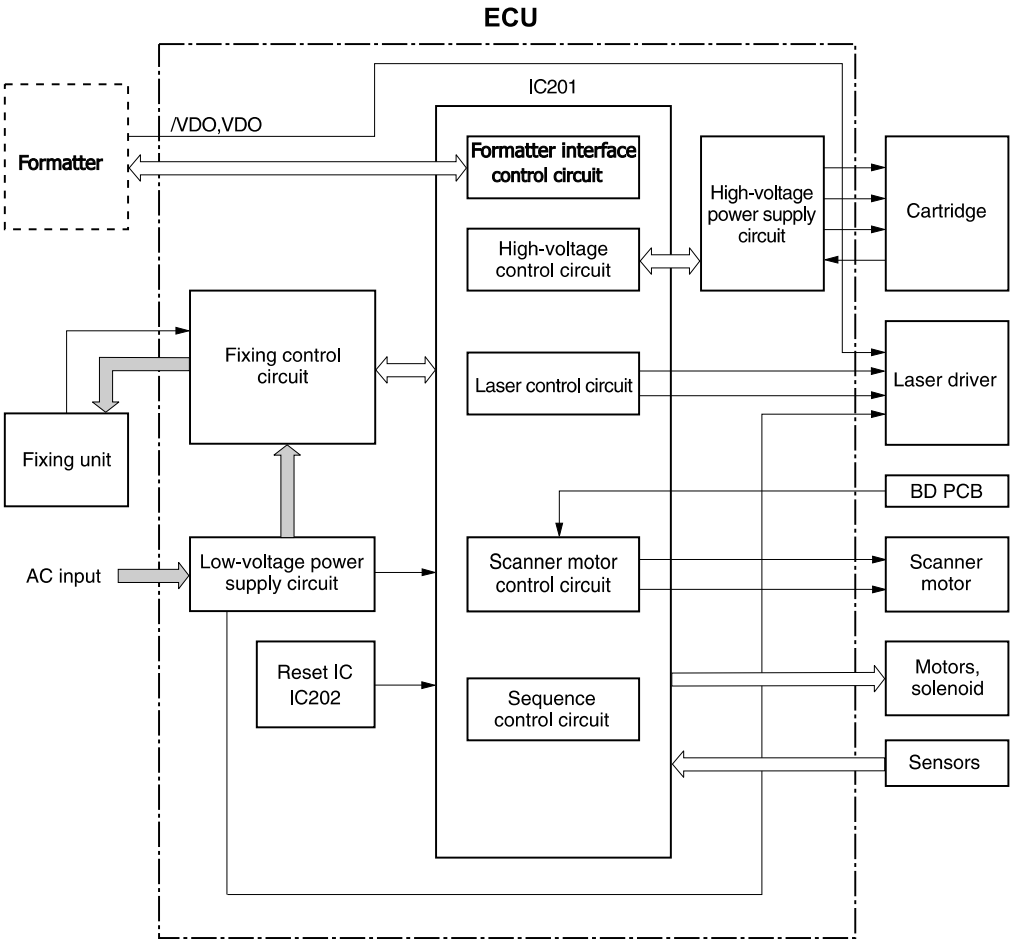


Figure 11. ECU loads

Printer engine control system

Paper motion monitoring and control (printing)

The ECU controls paper motion in the printer by continuously monitoring the various paper sensors and coordinating the timing with the other print processes.

For a detailed explanation of paper movement and the interaction of photosensors and solenoid with the paper movement process, see “Printer paper feed system” on page 77.

Motor

The motor is controlled by the ECU. The motor provides all of the printer's paper movement.

Printer laser/scanner drive

The ECU sends signals to the laser/scanner assembly to modulate the laser diode “on” and “off” and to drive the laser/scanner motor.

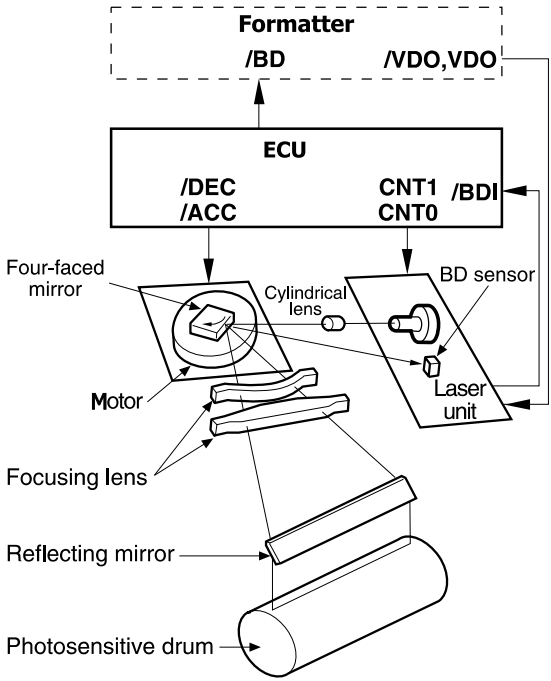


Figure 12. Overview of laser/scanner operation

Power system on ECU

The AC, DC, and high-voltage power supply circuits are all contained within the ECU.

AC power distribution

The AC power circuitry supplies AC voltage whenever the power cord is connected to the AC power source. AC voltage is distributed to the DC power supply circuitry and to the AC driver circuitry, which controls AC voltage to the fusing assembly's heating element.

DC power distribution

The DC power distribution circuitry, located on the ECU, distributes +3.3 Vdc, +5 Vdc, and +24 Vdc as follows:

- +3.3 Vdc:
  - Formatter
  - Laser/beam detect circuitry ECU
- +5 Vdc:
  - Formatter
  - Photosensors
  - ECU
  - Laser/beam detect circuitry
- +24 Vdc:
  - Motor
  - Laser scanner motor
  - Document scanner motor
  - Solenoid
  - Formatter
- +24VAdc:
  - High voltage power supply

Overcurrent/overvoltage

There are two overvoltage devices in this printer:

- Fuse F101 provides overcurrent protection for the fusing system circuitry. Checking or replacing the fuse requires the removal of the ECU. Fuse F102 (found only on 110V units) provides overcurrent protection to the printer DC power supply circuitry.
- In addition, the +24Vdc, +3.3 Vdc, and +5Vdc power circuitry contains an overcurrent protection circuit that automatically shuts off the output voltage when an overcurrent condition occurs as a result of a short or an abnormal voltage on the load side.

High-voltage power distribution

The high-voltage power supply PCA applies an overlap of DC and AC voltage to the primary charging roller and the developing roller. This circuit also applies a positive or negative DC voltage to the transfer roller according to the instructions from the ECU.

This circuit also controls the image density by changing the primary AC voltage and the developing AC bias according to the print density setting.

High voltage is disabled when the printer door is open.

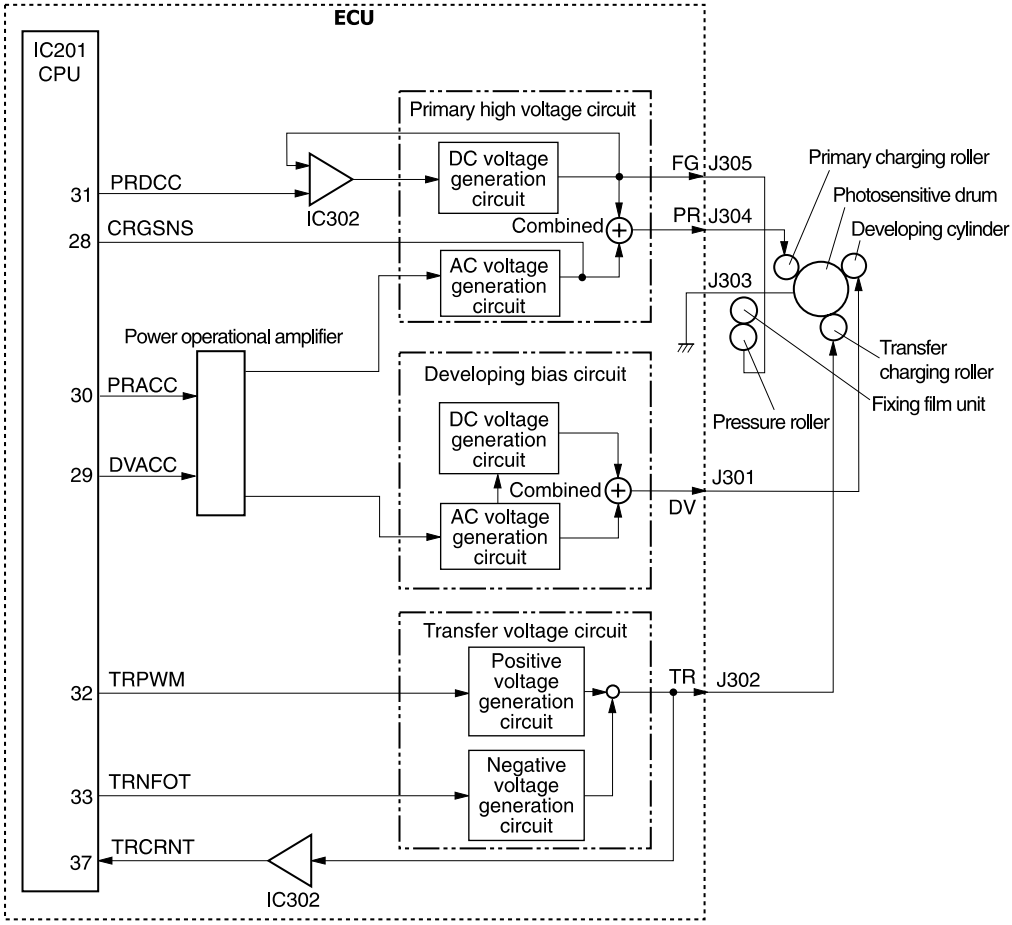


Figure 13. **High-voltage power supply circuit**

Image formation system

Laser printing requires the interaction of several different technologies including electronics, optics, and electrophotographics to provide a printed page. Each process functions independently and must be coordinated with the other printer processes. Image formation consists of seven processes:

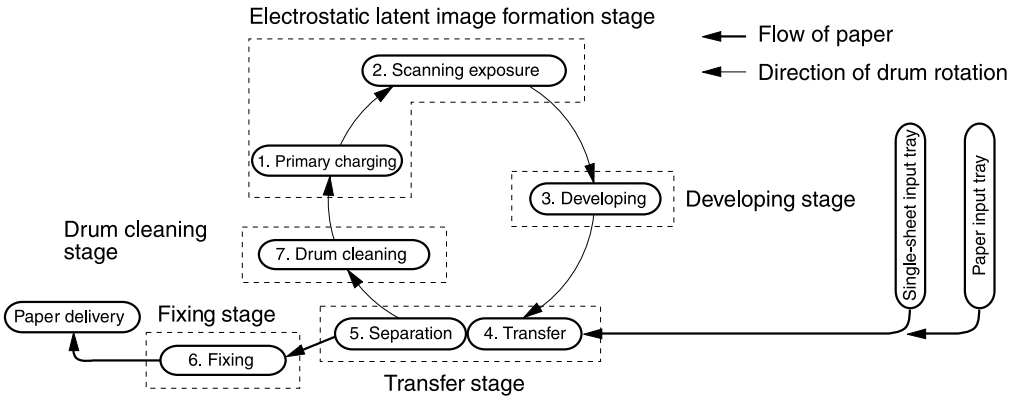


Figure 14. **Image formation block diagram**

Toner cartridge

As the heart of the image formation system, the toner cartridge houses the cleaning, conditioning, and developing steps of the process. The toner cartridge contains the photosensitive primary charging roller, developing station, toner cavity, and cleaning station. Including these components (which wear, degrade, or are consumed) in the replaceable toner cartridge eliminates the need for a service call when replacement is required. The special photosensitive properties of the drum allow an image to be formed on the drum surface and then transferred to paper.

CAUTION The printer's toner cartridge does not include a light-blocking shutter. Be careful to avoid exposing the drum to light, which can permanently damage the drum. Protect the toner cartridge whenever removing it from the printer.

Breakdown of the seven image formation processes

Step 1 **Conditioning** (primary charging). This process consists of applying a uniform negative charge to the surface of the drum with the primary charging roller located in the toner cartridge. The primary charging roller is coated with conductive rubber. An AC bias is applied to the roller to erase any residual charges from any previous image. In addition, a negative DC bias is applied by the charging roller to create a uniform negative potential on the drum surface. The amount of DC voltage is modified by the print density setting.

Step 2 **Writing** (scanning exposure). During this process, a modulated laser diode projects the beam onto a rotating scanning mirror. As the mirror rotates, the beam reflects off the mirror, first through a set of focusing lenses, then off a mirror, and finally through a slot in the top of the toner cartridge, and onto the photosensitive drum. The beam sweeps the drum from left to right, discharging the negative potential wherever the beam strikes the surface. This creates a latent electrostatic image, which later is developed into a visible image.

Because the beam is sweeping the entire length of the drum and the drum is rotating, the entire surface area of the drum can be covered. At the end of each sweep, the beam strikes the beam detect lens, generating the beam detect signal (BD signal). The BD signal is sent to the ECU where it is converted to an electrical signal used to synchronize the output of the next scan line of data.

Step 3 **Developing.** At this stage of the process, the latent electrostatic image is present on the drum. The toner particles obtain a negative surface charge by rubbing against the developing cylinder which is connected to a negative DC supply. The negatively charged toner is attracted to the discharged (exposed, grounded) areas of the drum, and repelled from the negatively charged (unexposed) areas.

Step 4 **Transfer.** During the transferring process, the toner image on the drum surface is transferred to the paper. A positive charge applied to the back of the paper by the transfer roller causes the negatively charged toner on the drum surface to be attracted to the paper. After separation, the drum is cleaned and conditioned for the next image.

Step 5 **Separation.** During the separating process, the paper separates from the drum. To stabilize the feed system and prevent dropouts on the printed image at low temperature and humidity, the charge on the back of the paper is reduced by the static charge eliminator.

Step 6 **Fixing.** During the fixing process, the toner is fused into the paper by heat and pressure to produce a permanent image. The paper passes between a heated fusing element and a soft pressure roller. This melts the toner and presses it into the paper.

Step 7 **Drum cleaning.** The cleaning blade is in contact with the surface of the drum at all times. As the drum rotates during printing, excess toner is wiped off and stored in the waste toner receptacle.

Printer paper feed system

The paper input tray and the single-sheet input tray merge into one, main input area. Paper placed in either of these areas enables the paper-out sensor (PS001), which informs the ECU that paper is present. The following steps occur when the printer receives a print job:

Step 1 The ECU enables the laser/scanner assembly and the motor. Paper motion begins when the ECU energizes the solenoid (SL001).

Step 2 The paper pickup roller rotates once. The paper kick plate pushes the paper against the pickup roller.

Step 3 The pickup roller grabs the top sheet and advances it to the feed assembly drive rollers. To ensure that only one sheet is fed, a main separation pad and two subpads hold the remainder of the stack in place.

Step 4 The feed assembly drive rollers advance the paper to the paper top photosensor (PS002). This sensor informs the ECU of the exact location of the paper's leading edge, so that the image being written on the photosensitive drum can be precisely positioned on the page.

Step 5 The feed assembly drive rollers then advance the paper to the transfer area where the toner image on the photosensitive drum is transferred to paper.

Step 6 After the image is transferred, the paper enters the fusing assembly where heat from the fuser and pressure from the pressure roller permanently bond the toner image to paper. The paper exit sensor (PS201) determines that paper has successfully moved out of the fusing area.

Step 7 The fusing assembly exit rollers deliver paper to either the paper output bin or the front paper output slot, depending upon the position of the front paper path door.

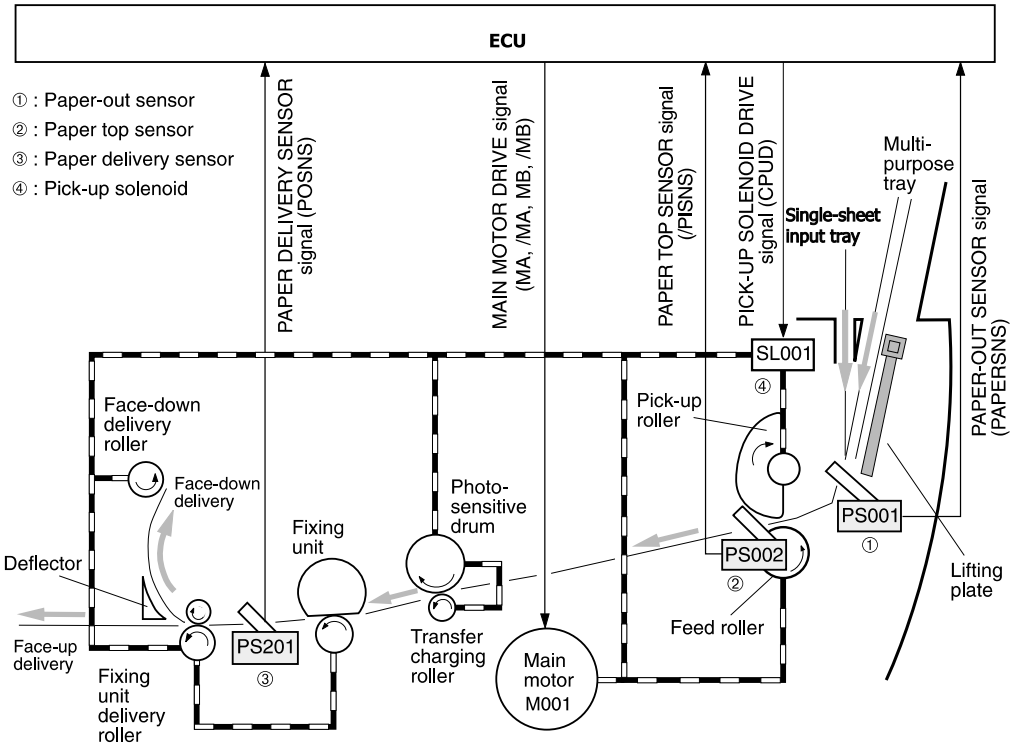


Figure 15. Printer path

Jam detection

The paper-out sensor (PS001) detects the presence of media in either the single-sheet input tray or the paper input tray. The paper top sensor (PS002) and the paper delivery sensor (PS201) detect media moving through the product. If a jam is detected, the ECU immediately stops the printing process and displays a jam message on the control panel.

A jam can be detected under any of the following conditions:

- **Pickup delay jam.** Media does not reach the paper top sensor after the pickup solenoid (SL001) has been turned on three times (the initial pickup attempt plus two retries) within 7.9 seconds.
- **Pickup stationary jam.** The paper top sensor does not detect the trailing edge of media within 7.8 seconds of detecting the leading edge.
- **Delivery-delay jam.** The paper delivery sensor does not detect the leading edge of media within 3.2 seconds after the paper top sensor detects the leading edge.
- **Wrapping jam.** The paper delivery sensor does not detect the trailing edge of media within 2.4 seconds after the paper top sensor detects the trailing edge.
- **Delivery-stationary jam.** The paper delivery sensor detects media for three seconds after the paper top sensor detects the trailing edge of the media.
- **Initial residual-paper jam.** The paper delivery sensor or the paper top sensor detect media in the initial rotation period.

Solenoid, photosensors, and switches

The following figure shows the locations of the solenoid, photosensors, and switches.

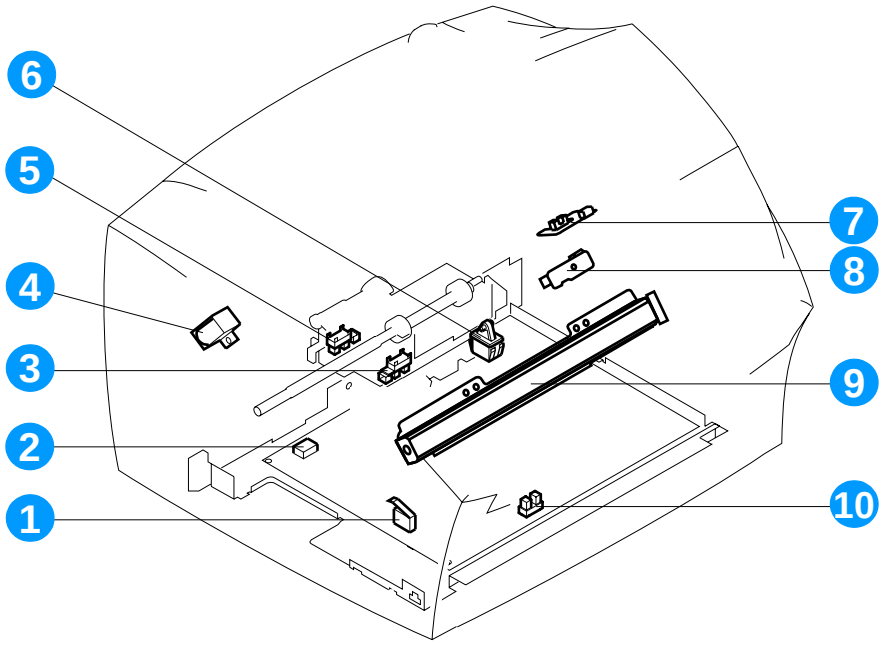


Figure 16. **Solenoid, photosensors, and switches**

1 Door-open switch (SW301) detects whether or not the printer door is closed and the toner cartridge is present. Printing cannot continue until the printer door is closed and the toner cartridge is in its correct position.

2 Engine-test switch (SW201); see “Engine test” on page 165 for an explanation of the switch.

3 Paper-top sensor (SL001) detects the leading and trailing edges of the paper. Synchronizes the photosensitive drum and the top of the paper.

4 Pickup solenoid (SL001) enables the pickup roller.

5 Paper-out sensor (PS001) senses whether or not media is loaded in the paper input tray. Paper must be loaded before printing can resume.

6 Power switch

Note Products sold in North America do not have power switches.

7 Document sensor (PS1) detects the presence of a document in the document feeder.

8 Document-top sensor detects the leading edge of a document in the document path.

9 Contact image sensor.

10 Paper-delivery sensor (PS201) senses when paper has successfully moved out of the fusing area.

Basic sequence of operation (formatter-to-printer)

The formatter and the ECU share information during printer operation. The ECU-to-formatter connector (J201) forms a link that operates as a serial data bus. This allows printer status, command information, and dot-image data to be passed between the two. The following events take place during normal printer operation:

Period	Purpose	Remarks
WAIT From the power-ON until the end of the main motor initial rotation.	To clear the drum surface of potential and to clean the transfer charging roller.	Detects whether or not the cartridge is installed.
STBY (Standby) From the end of the WAIT period or the LSTR period until the pickup command is input from the formatter. Or, from the end of the LSTR period until power-OFF.	To keep the printer ready to print.	
INTR (Initial Rotation Period) After the pickup command has been input from the formatter until the paper reaches the paper top sensor.	To stabilize the photosensitive drum sensitivity in preparation for printing. Also to clean the transfer charging roller.	
PRINT (Print) From the end of the initial rotation until the primary voltage goes OFF.	To form images on the photosensitive drum based on the VIDEO signals (/VDO, VDO) input from the formatter and to transfer the toner image onto the paper.	
LSTR (Last Rotation Period) After the primary voltage goes OFF until the main motor stops rotating.	To delivery the last page. Also to clean the transfer charging roller.	When the pickup command is input from the formatter, the printer enters the INTR period immediately after the end of the LSTR period.

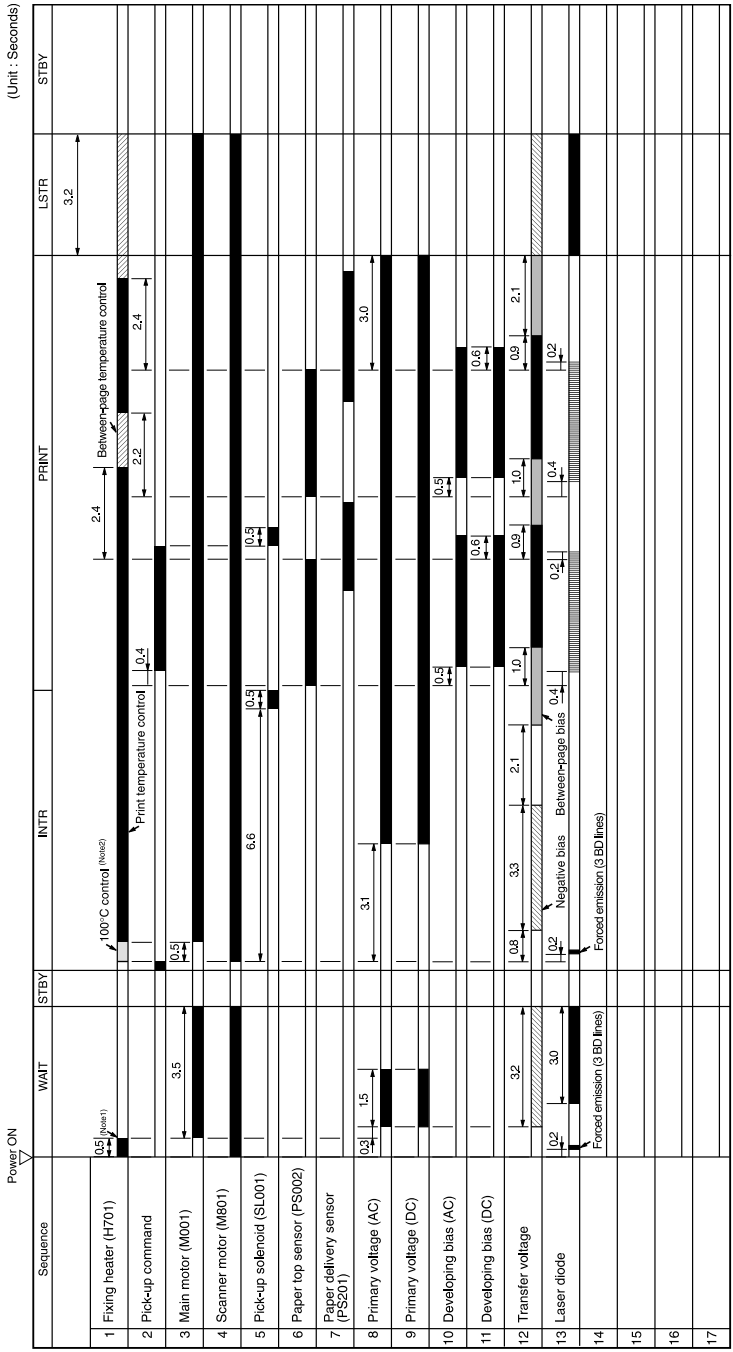


Figure 17. General timing diagram

5 Removal and replacement

Chapter contents

Removal and replacement strategy 87
Required tools 87
Covers 89
DIMMs 89
Back cover 90
Right side cover 91
Left side cover 93
Internal paper guide 94
Top cover 95
Document scanner assemblies 96
Printer door 96
Document scanner assembly 100
Contact image sensor 103
Document scanner pickup roller 105
Document scanner separation pad 106
Document scanner motor 107
Upper guide assembly 108
Control panel/scanner board 112
Internal assemblies 113
Laser/scanner assembly 113
Output roller 114
Delivery assembly 116
Paper exit-sensor flag 118
Fusing element 119

Gear train motor 124
Solenoid. 127
Pressure roller 128
Transfer roller 130
Pickup roller. 131
Paper-pickup assembly 132
Kick plate 134
Separation pad 135
Bottom assemblies 137
Formatter pan 137
Formatter and LIU 138
ECU pan 139
Paper-feed assembly. 141

Removal and replacement strategy

This chapter documents removal and replacement of field replaceable units (FRUs) only.

Replacement is generally the reverse of removal. Occasionally, notes are included to provide directions for difficult or critical replacement procedures.

WARNING! Unplug the power cord from the power outlet before attempting to service the product. If this warning is not followed, severe injury can result. Certain functional checks during troubleshooting must be performed with power supplied to the product. However, the power supply should be disconnected during removal.

Never operate or service the product with the protective cover removed from the laser/scanner assembly. The reflected beam, although invisible, can damage your eyes.

Sheet metal edges can be sharp. Use caution when working on the product.

CAUTION The product contains parts that are electrostatic discharge (ESD) sensitive. Always perform service work at an ESD-protected workstation.

Note To install a self-tapping screw, first turn it counterclockwise to align it with the existing thread pattern, then carefully turn clockwise to tighten. Do not overtighten. If a self-tapping screw-hole becomes stripped, repair the screw-hole or replace the affected assembly.

Always remove the toner cartridge before removing or replacing parts.

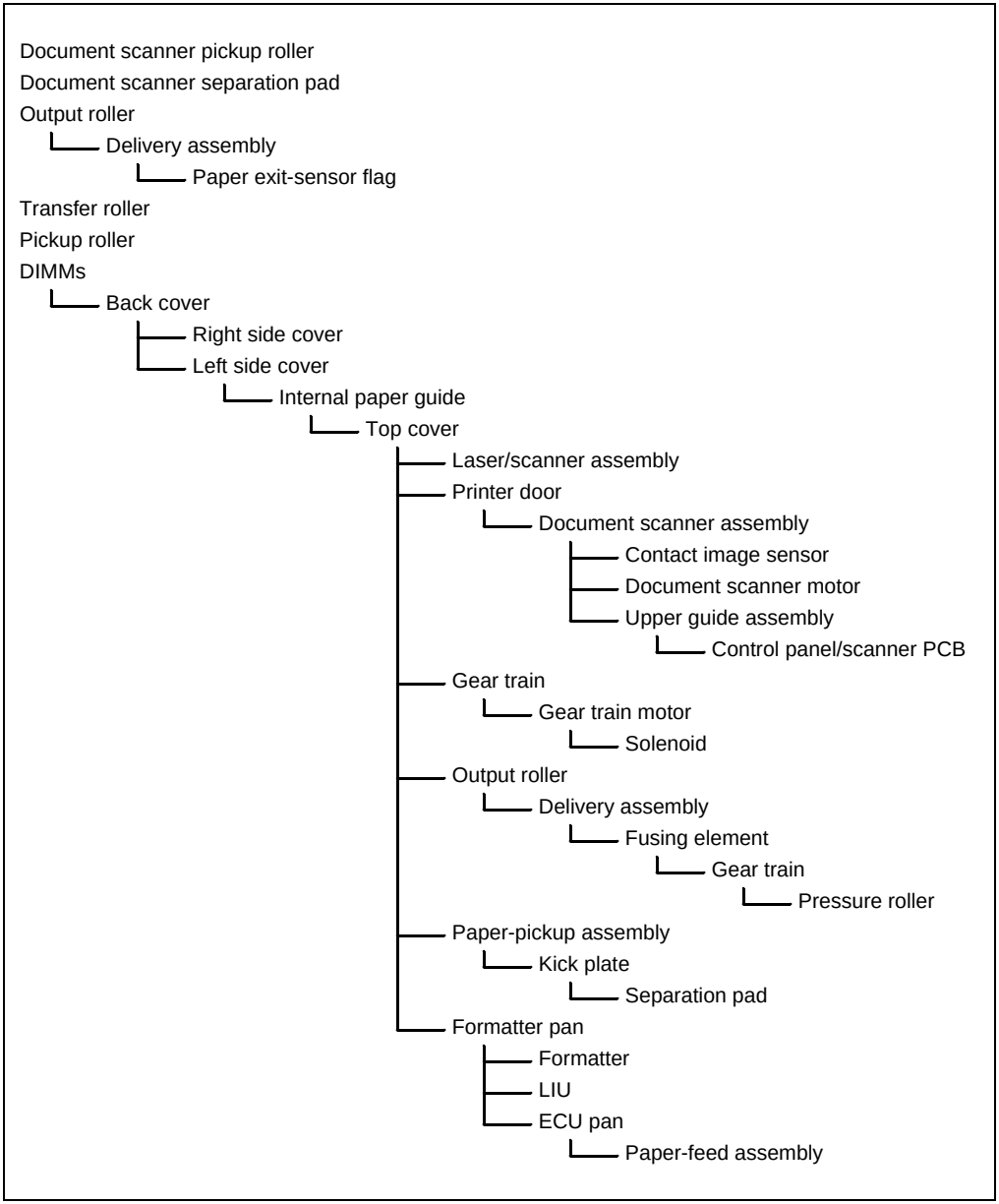
Required tools

- #2 Phillips screwdriver with magnetic tip
- Small flatblade screwdriver
- Needle nose pliers
- ESD mat

CAUTION A Posidriv screwdriver will damage screw heads. Use Phillips screwdriver only.

Parts removal order

Use the following diagram to determine which parts must be removed before removing other parts:



DIMMs

1 Turn the product so that you face the back.

2 Lift open the door at the back of the product.

3 Push the anchors on each side away from the DIMMs.

Figure 18. **DIMMs removal**

4 If there is a DIMM in slot 1, lift it straight up to remove it, and then place it on an ESD mat.

5 Repeat step 4 for the DIMM in slot 2 (memory DIMM) and slot 3 (ROM DIMM).

Note

When reinstalling DIMMs, they must be reinstalled to the slots from which they were removed.

6 After you remove the DIMMs, press the anchors back to their closed position. If the anchors remain in the open position, they can interfere with smooth removal of the back cover.

Back cover

1. Remove the DIMMs (see page 89).
2. Remove two screws from the deep holes (callout 1) in the back cover.
3. Remove a third screw (callout 2) from inside the door on the rear of the product.

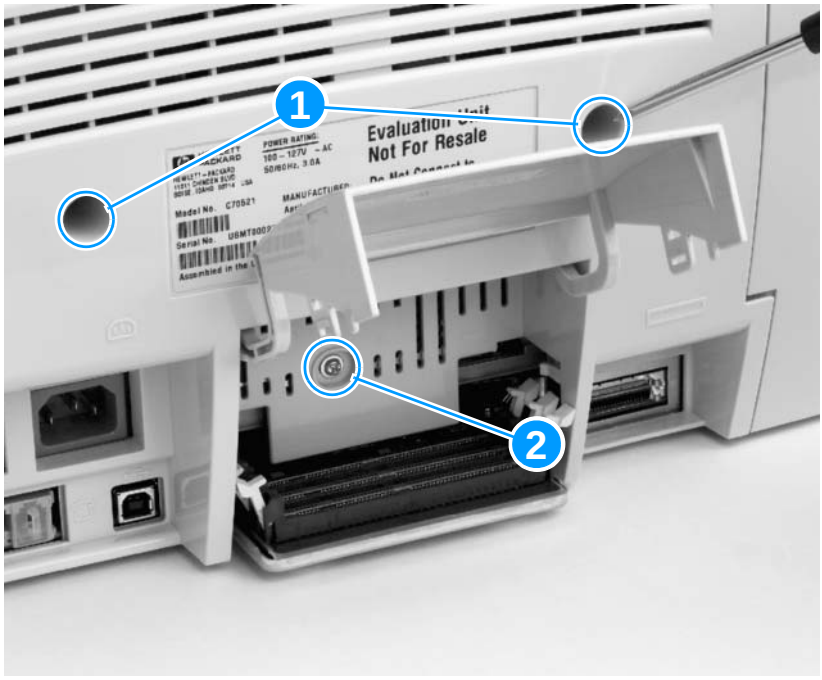


Figure 19. **Back cover removal**

4. In one motion, lift the back cover up and pull it away from the product.

Right side cover

1. Remove the DIMMs and the back cover (see pages 89 and 90).
2. Turn the product so that you face its right side.
3. Press the printer door release latches and open the printer door.
4. Remove one screw (callout 1) from the top of the right side cover.
5. Use a flatblade screwdriver to pop the latch (callout 2) at the top of the cover.

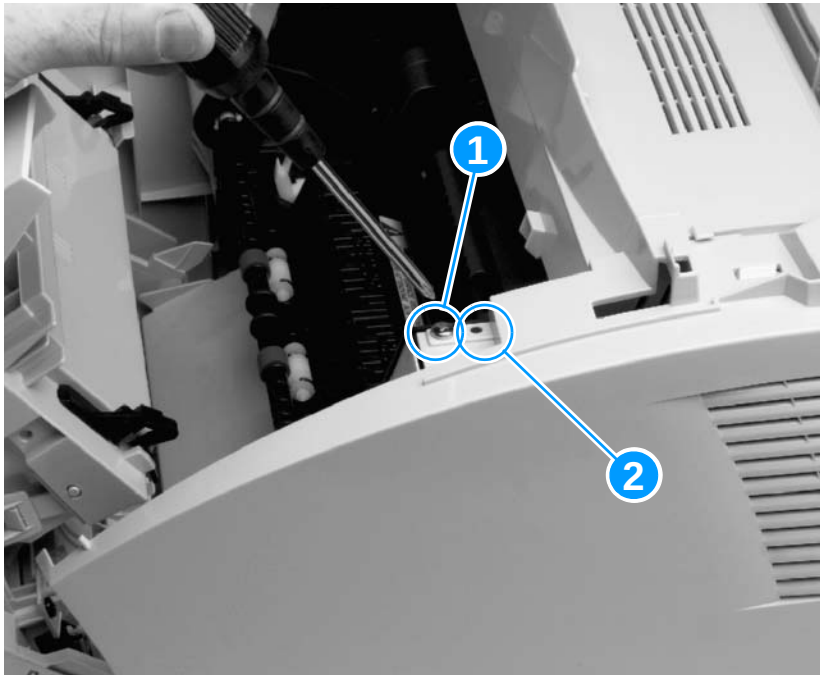


Figure 20. **Right side cover removal (1 of 2)**

6 Release three latches:

- at the top (callout 1)
- at the front (callout 2)
- at the back (callout 3)

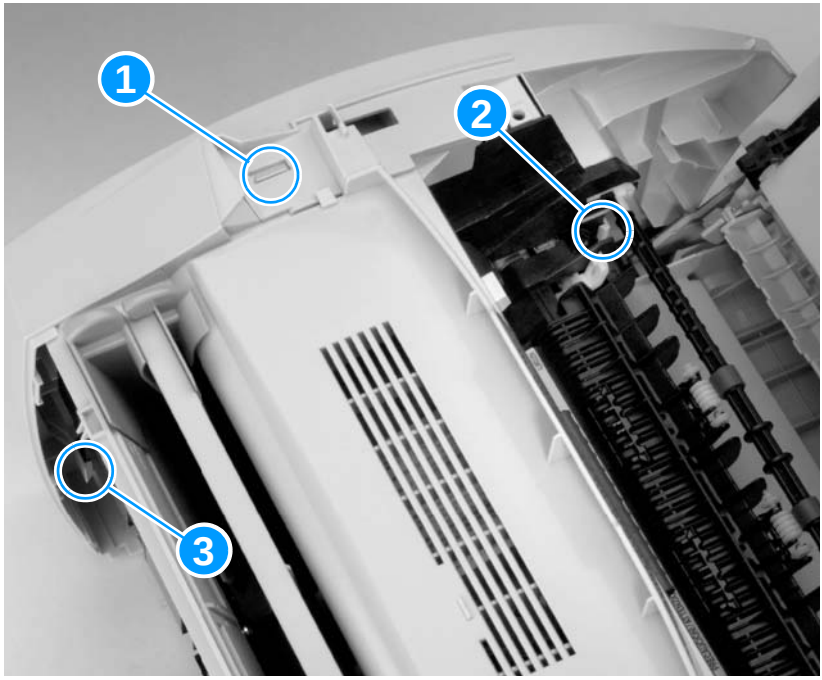


Figure 21. **Right side cover removal (2 of 2)**

7 Rotate the top of the cover away from the product, and then lift the cover off.

Note You might have to lift the right side of the product slightly to remove the cover.

Left side cover

Removal of the left side cover is similar to that of the right side cover.

1. Remove the DIMMs and the back cover (see pages 89 and 90).
2. Turn the product so that you face its left side.
3. Remove one screw from the top of the left side cover.
4. Use a flatblade screwdriver to pop the latch at the top of the cover.
5. Release three latches:
   - at the top
   - at the front
   - at the back
6. Rotate the top of the cover away from the product, and then lift the cover off.

Note You might have to lift the left side of the product slightly to remove the cover.

Internal paper guide

1. Remove the DIMMs and the back, right, and left covers (see pages 89 through 93).
2. There are no screws securing the paper guide. Remove it by pulling it up and out (two small snaps will release as you pull on the paper guide).

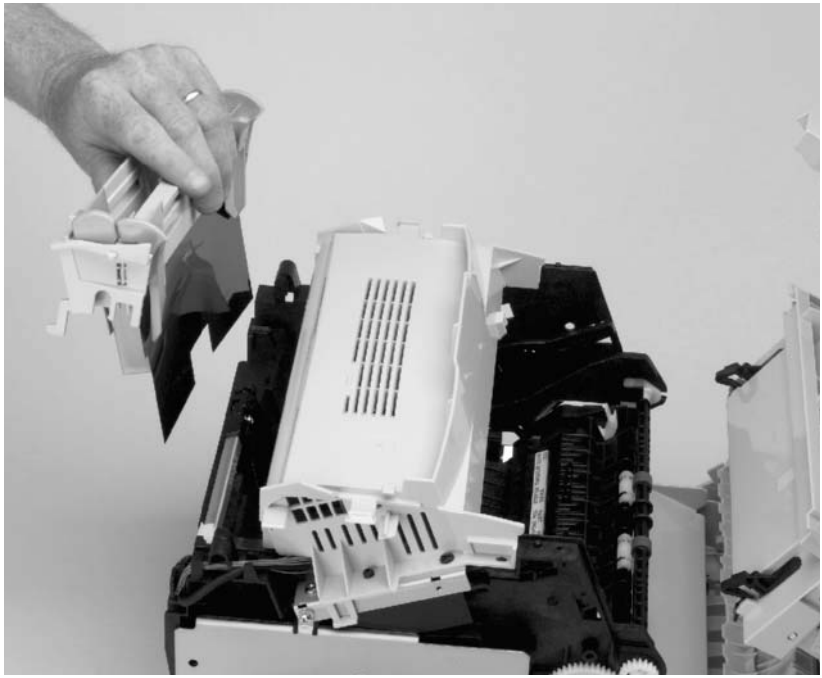


Figure 22. **Internal paper guide removal**

Top cover

1. Remove the DIMMs, the back, right, and left covers, and the internal paper guide (see pages 89 through 94).
2. Remove two screws (callout 1), one from each side of the top cover.
3. Release two latches (callout 2), one at each side of the cover.

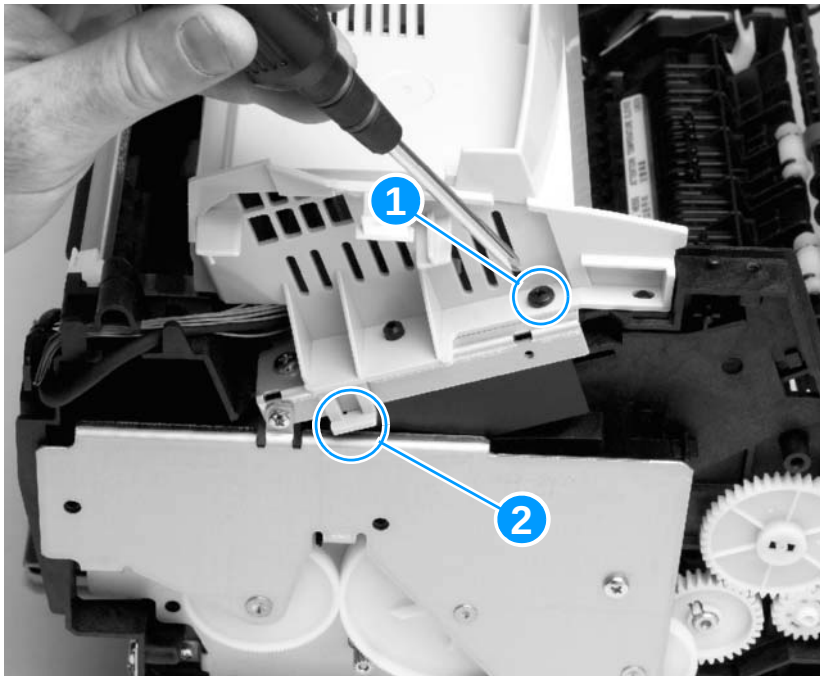


Figure 23. **Top cover removal**

4. Lift the cover straight up and off of the product.

Printer door

Removal of the printer door begins at the bottom of the product. Cables that control the control panel, scanner, and document feeder are attached to the formatter at the bottom of the product.

1. Remove the DIMMs, the back, right, and left covers, the internal paper guide, and the top cover (see pages 89 through 95).
2. Close the printer door.
3. Turn the product so that you face its right side, and then tip the product up so that it rests on its left side.
4. Remove two screws (callout 1) from the bottom of the formatter pan.
5. Remove a third screw from the bottom of the pan (callout 2).

Note Callout 2 also shows a metal clip that helps to hold the formatter pan on the ECU pan.

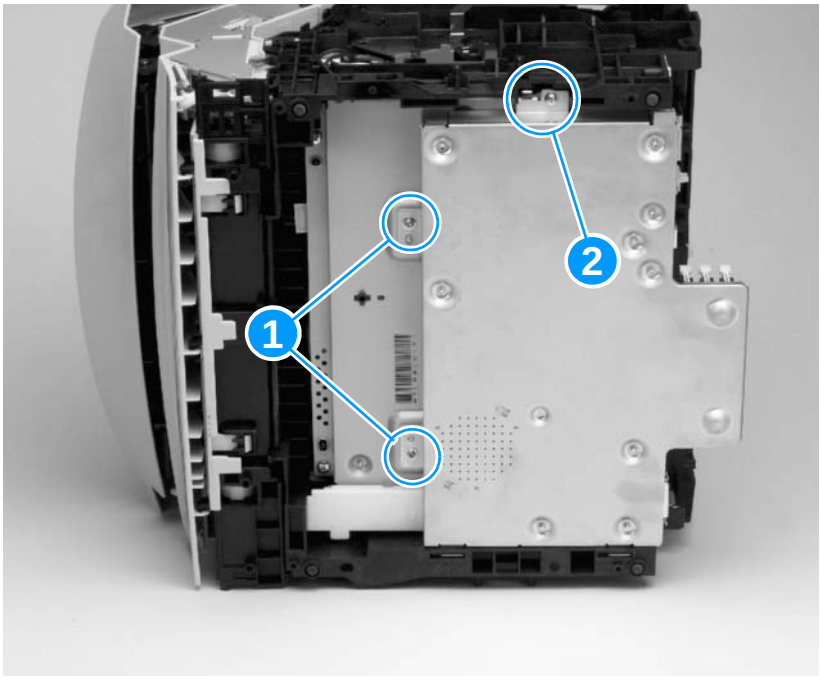


Figure 24. **Printer door removal (1 of 4)**

6 Lift the formatter pan up slightly, toward the right side of the product, and then rotate the formatter pan down so that it rests on the ESD mat.

7 Release the scanner cable cover (callout 1) by pushing it in the direction of the arrow, and then lift the cover away from the product.

8 Release the connector stay, and then pull the flat, flexible cable (callout 2) out of its connector on the formatter.

Note

The cable is “notched” so that it clears the speaker. Make sure the cable is reattached in the correct orientation when you reassemble the product.

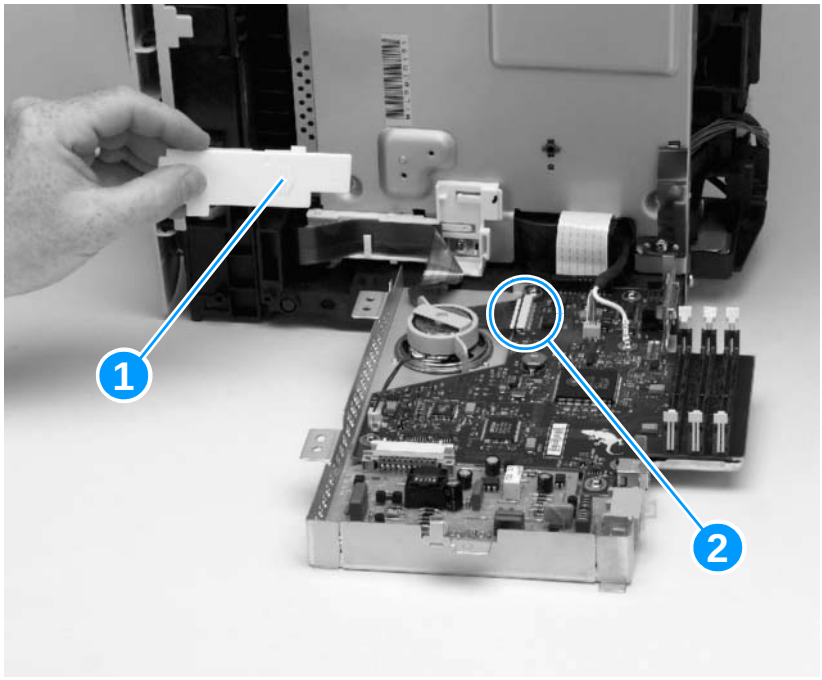


Figure 25. **Printer door removal (2 of 4)**

9 Remove the grounding screw (callout 1) from the flat metal grounding strap.

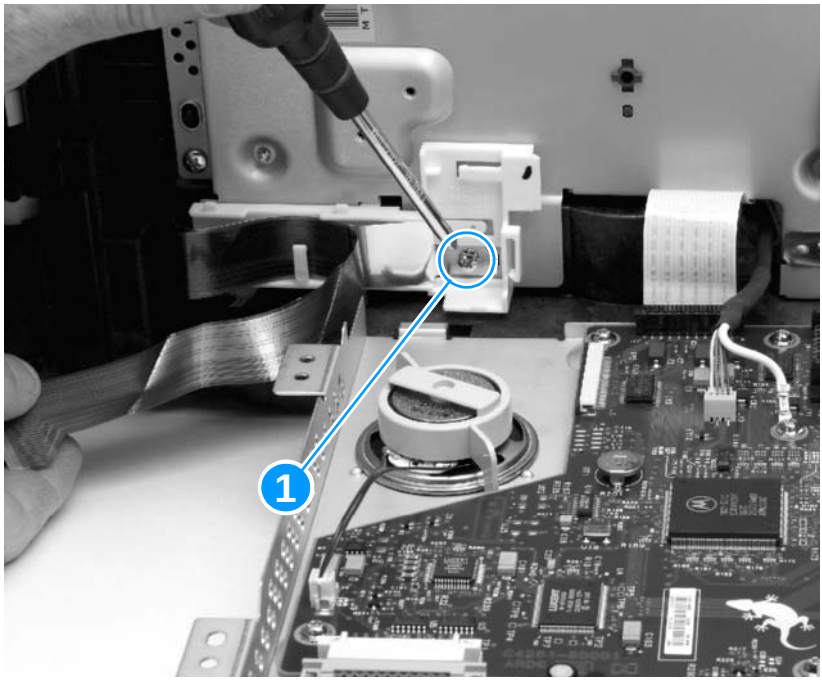


Figure 26. **Printer door removal (3 of 4)**

10 Release the flat cable and the strap together from the cable guide.

11 Lift the formatter pan back into place.

12 Replace the three screws in the formatter pan.

13 Tip the product back down so that it rests on its feet.

14 On the right side of the printer door, pull up on the front output door arm (callout 1) to separate it from the front output door.

15 On each side of the printer door, release the tab securing the hinge clip (callout 2) to the hinge, and pull the clip away from the printer door.

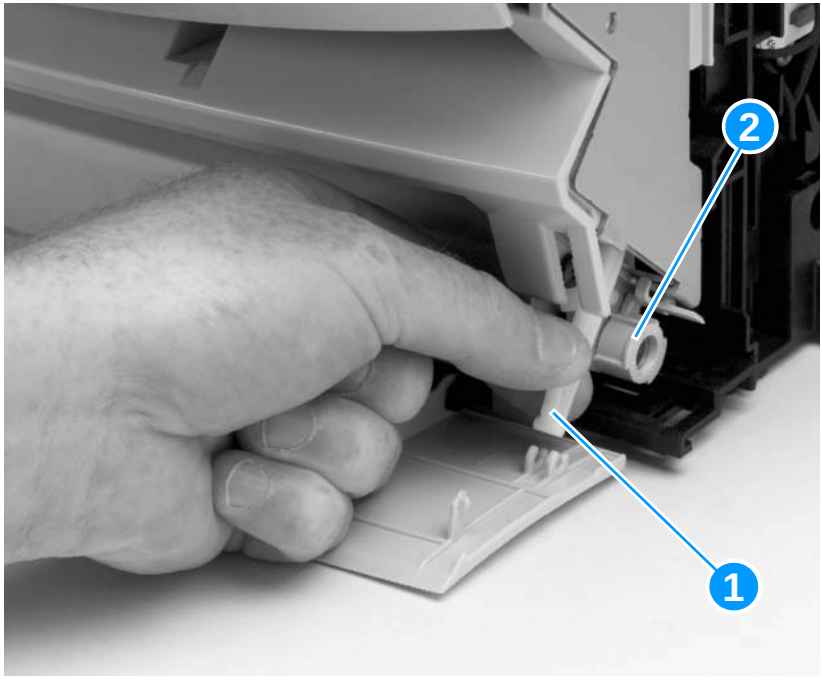


Figure 27. **Printer door removal (4 of 4)**

16 Open the printer door approximately halfway, and then lift the printer door off of its hinges.

Note

As you lift the printer door away from the product, make sure that the flat, flexible cable moves smoothly through the slot in the product.

Document scanner assembly

1 Remove the DIMMs, the back, right, and left covers, the internal paper guide, the top cover, and the printer door (see pages 89 through 99).

2 On the back, towards the left side, of the printer door, remove one grounding screw (callout 1) to release the grounding strap.

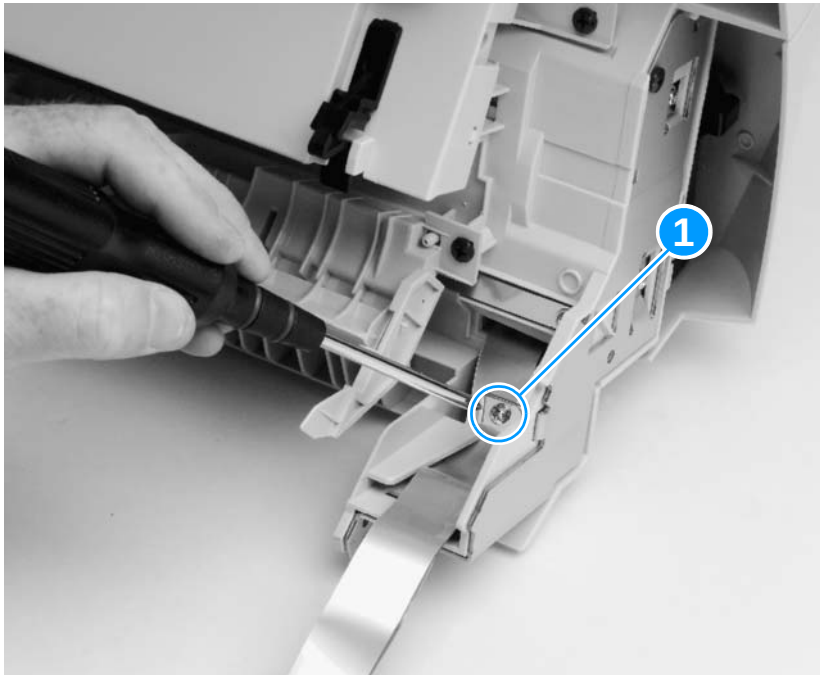


Figure 28. **Document scanner assembly removal (1 of 3)**

3 Open the document release door.

4 Rotate the plastic strap at the left side of the printer door clockwise to release the strap.

To reinstall

Make sure you rethread the grounding strap and cable correctly. Failure to do so can damage the cable.

5 Remove the document scanner guide by lifting it up while pressing the two tabs (callout 1) at the left side of the assembly.

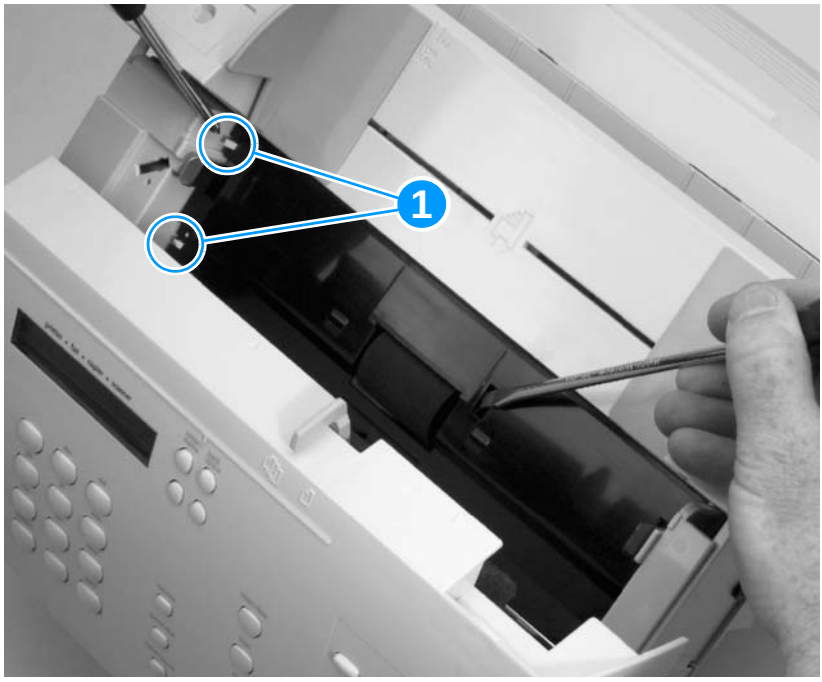


Figure 29. Document scanner assembly removal (2 of 3)

6 Remove two screws (callout 1) from the document scanner assembly.

7 Use a flatblade screwdriver to press the tab (callout 2) at the center of the assembly, and lift the assembly off of the printer door.

Note Make sure the contact image sensor cable, at the left side of the product, moves smoothly through the slot as you remove the document scanner assembly.

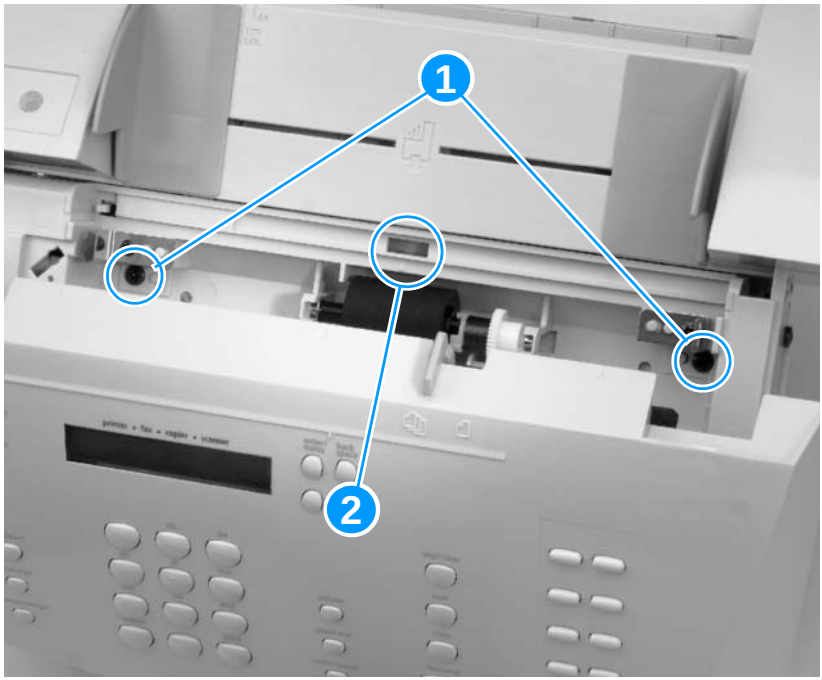


Figure 30. **Document scanner assembly removal (3 of 3)**

Contact image sensor

1. Remove the DIMMs, the back, right, and left covers, the internal paper guide, the top cover, the printer door, and the document scanner assembly (see pages 89 through 102).
2. Use a flatblade screwdriver to pry the two tabs (callout 1) on the cable cover, releasing the cable cover, and then lift the cable cover off of the document scanner assembly.

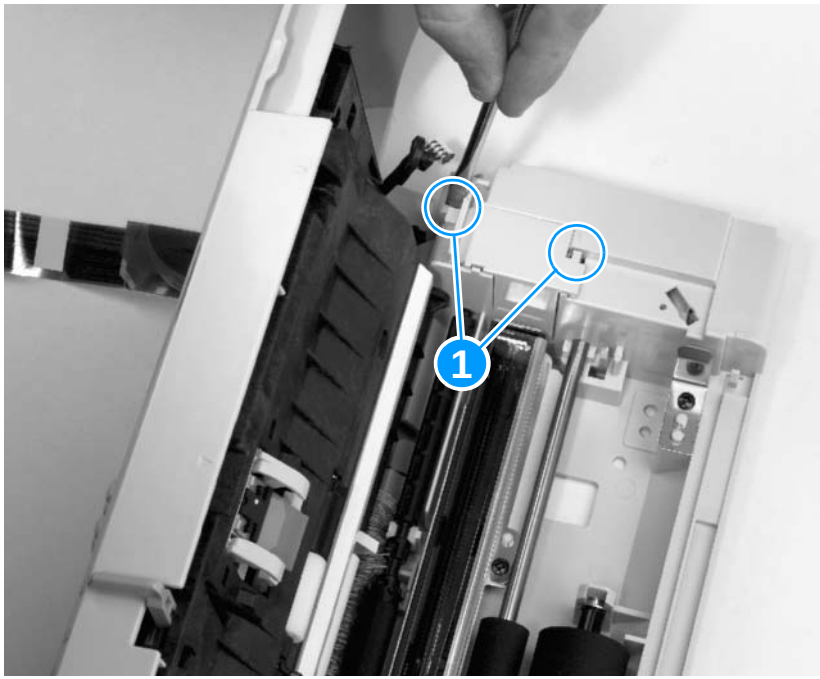


Figure 31. **Contact image sensor removal (1 of 2)**

3 Release the contact image sensor with its mounting plate and cover by removing the two screws (callout 1) from the mounting plate and cover.

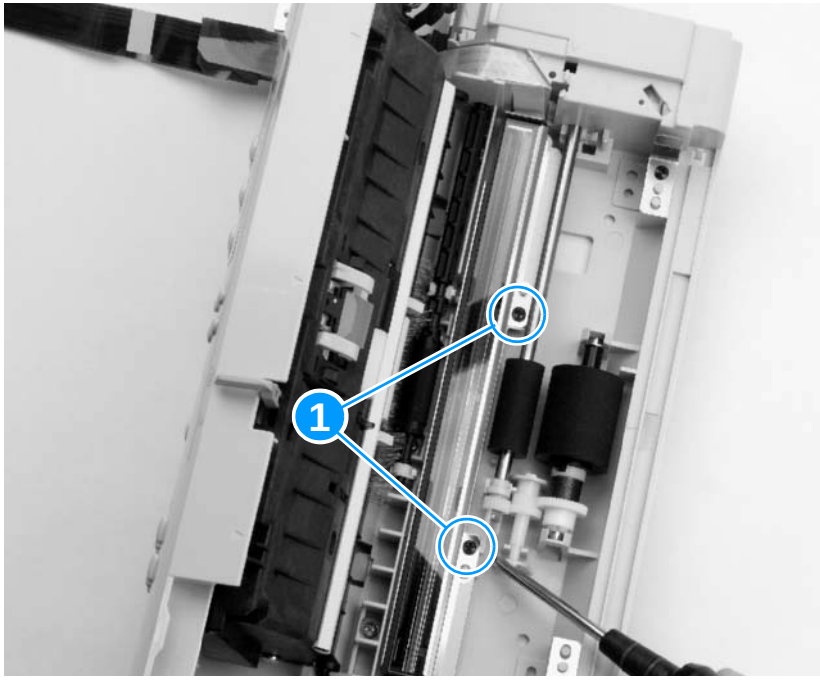


Figure 32. **Contact image sensor removal (2 of 2)**

4 Lift up the contact image sensor together with its mounting plate and cover.

5 Disconnect the cable from the bottom of the contact image sensor.

Note Clean the scanner glass after the contact image sensor is reinstalled.

Document scanner pickup roller

The document scanner pickup roller can be removed and replaced without removing any other parts.

1. Open the document release door.
2. Use the small flatblade screwdriver to pry the right end of the pickup roller shaft from its plastic mounting.

Figure 33. **Document scanner pickup roller removal**

3. Lift the right end of the pickup roller shaft out of its mounting; the left end should follow easily.

Note

Once the pickup roller shaft has been removed, parts can easily fall off of the shaft. Upon reinstallation, make sure that all of the parts have been replaced on the shaft in the correct order.

Document scanner motor

1. Remove the DIMMs, the back, right, and left covers, the internal paper guide, the top cover, the printer door, and the document scanner assembly (see pages 89 through 102).
2. On the left side of the document scanner assembly, disconnect the motor cable (callout 1).
3. Remove two screws (callout 2) to release the motor.

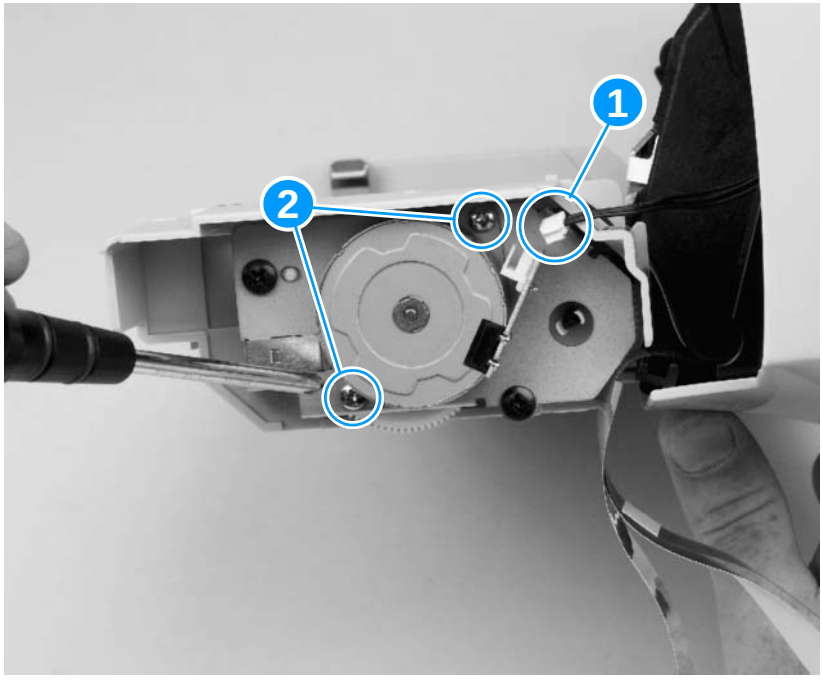


Figure 35. **Document scanner motor**

4. Lift the motor away from the product.

Upper guide assembly

1. Remove the DIMMs, the back, right, and left covers, the internal paper guide, the top cover, the printer door, and the document scanner assembly (see pages 89 through 102).
2. If you have not already done so, disconnect the motor cable.
3. Place the upper guide assembly and contact image sensor assembly at approximately a 90-degree angle, and then lift the upper guide assembly off of its hinges.
4. Remove two screws (callout 1), one on each side of the upper guide assembly.

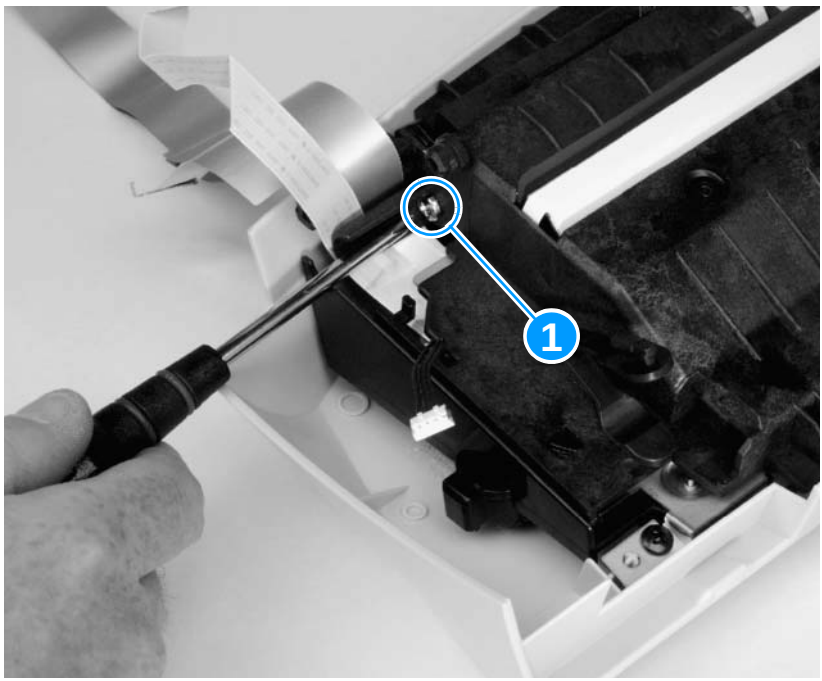


Figure 36. **Upper guide assembly removal (1 of 4)**

5 Place the upper guide assembly on the ESD mat so that the assembly rests on the control panel.

6 Use a flatblade screwdriver to release three tabs (callout 1) on the control panel cover, and then rotate the upper guide assembly up and away from the tabs to separate it from the control panel cover.

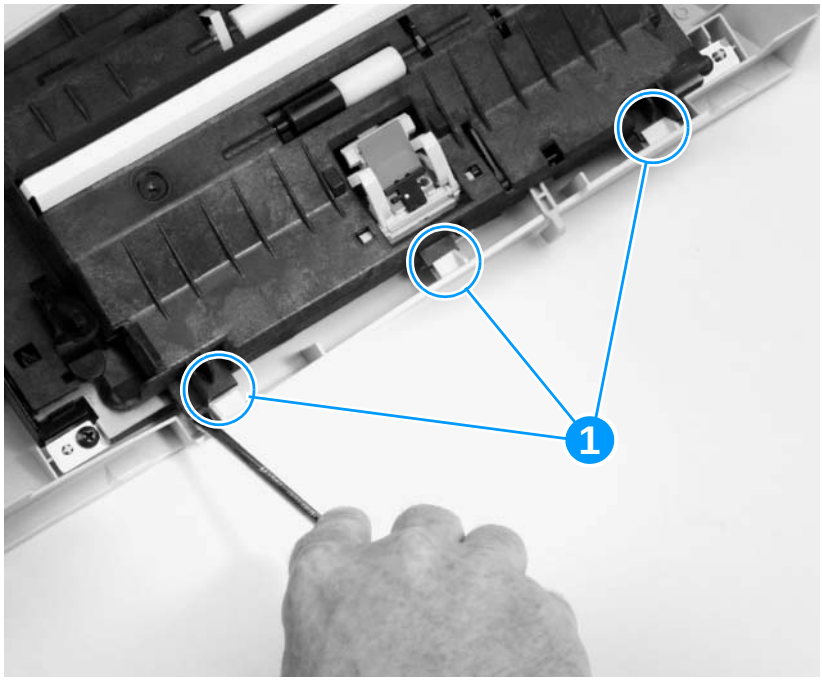


Figure 37. Upper guide assembly removal (2 of 4)

7 Disconnect one cable (callout 1) from the control panel PCB.

8 Remove one screw (callout 2) to release the ground strap.

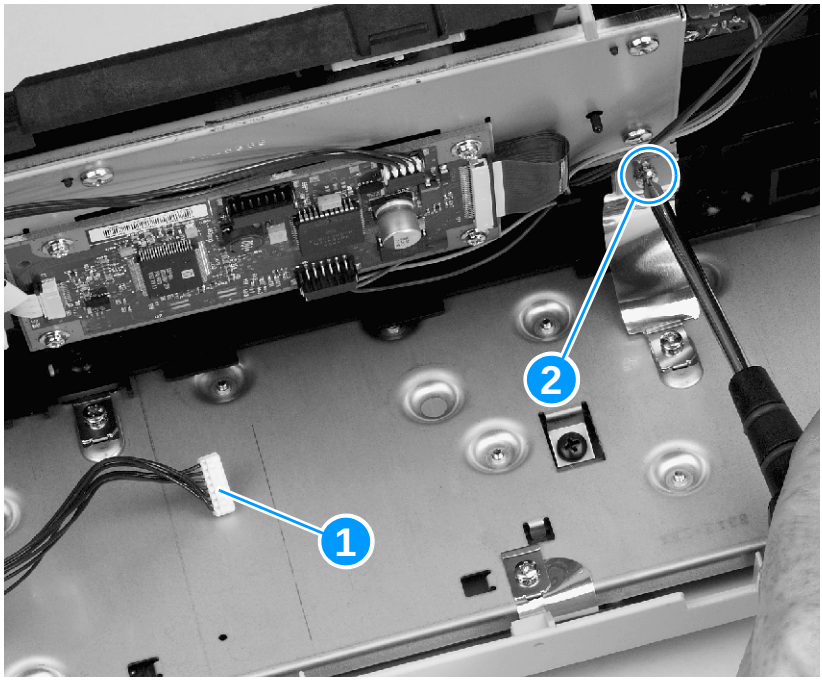


Figure 38. **Upper guide assembly removal (3 of 4)**

9 Press the tab (callout 1) down, and then slide the upper guide assembly to the right to release it from the control panel assembly.

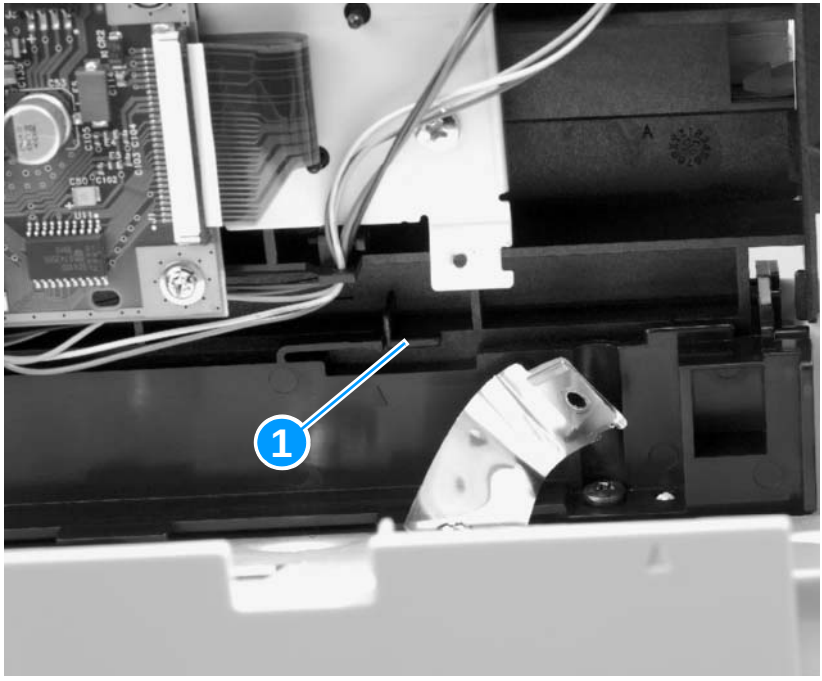


Figure 39. **Upper guide assembly removal (4 of 4)**

Control panel/scanner board

1. Remove the DIMMs, the back, right, and left covers, the internal paper guide, the top cover, the printer door, the document scanner assembly (see pages 89 through 102), and the upper guide assembly (see pages 108 through 111).
2. Disconnect the four remaining cables (callout 1) from the control panel/scanner board.
3. Remove the four screws (callout 2) from the board.

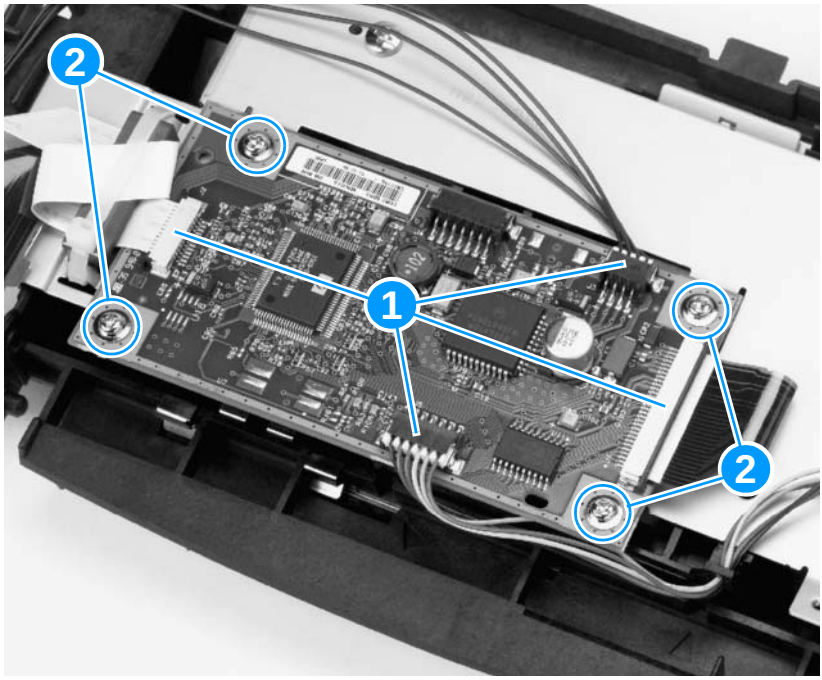


Figure 40. **Control panel/scanner board**

4. Lift the board off of the upper guide assembly.

Note New control panel/scanner boards are not shipped with cables attached. Make sure you keep your cables with the product.

Laser/scanner assembly

1. Remove the DIMMs, the back, right, and left covers, the internal paper guide, and the top cover (see pages 89 through 95).
2. Open the printer door.
3. Remove the small foam cover over the small cable connector (callout 1) and then release the cable.
4. Disconnect two cables and then release the cables from their cable guides.
5. Remove four screws (callout 2) and then lift the assembly free of the printer.

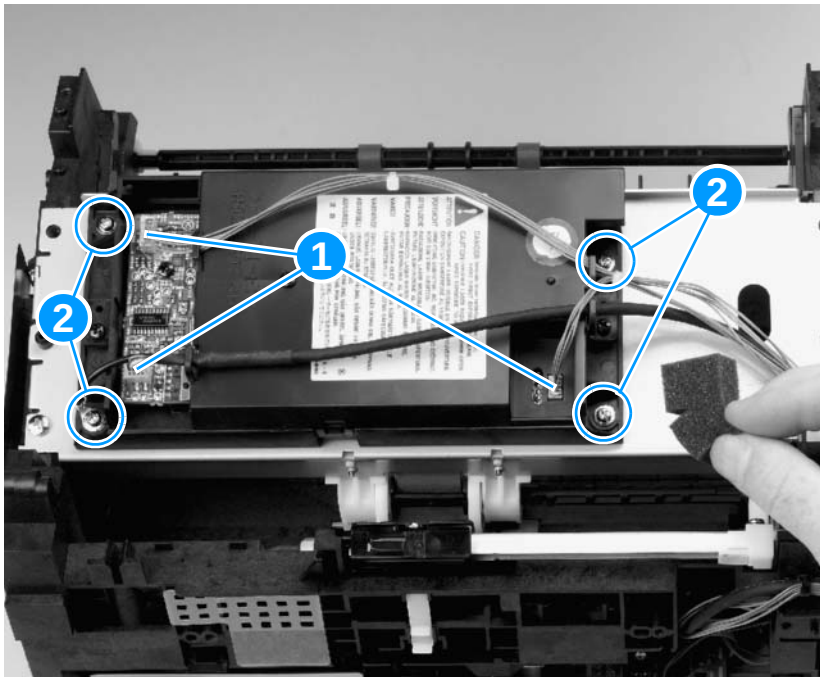


Figure 41. **Laser/scanner assembly removal**

Output roller

Note This part can be removed without disassembling any other product parts.

1. Open the printer door.
2. Using a small flatblade screwdriver, release the plastic snap on the right end of the output roller.

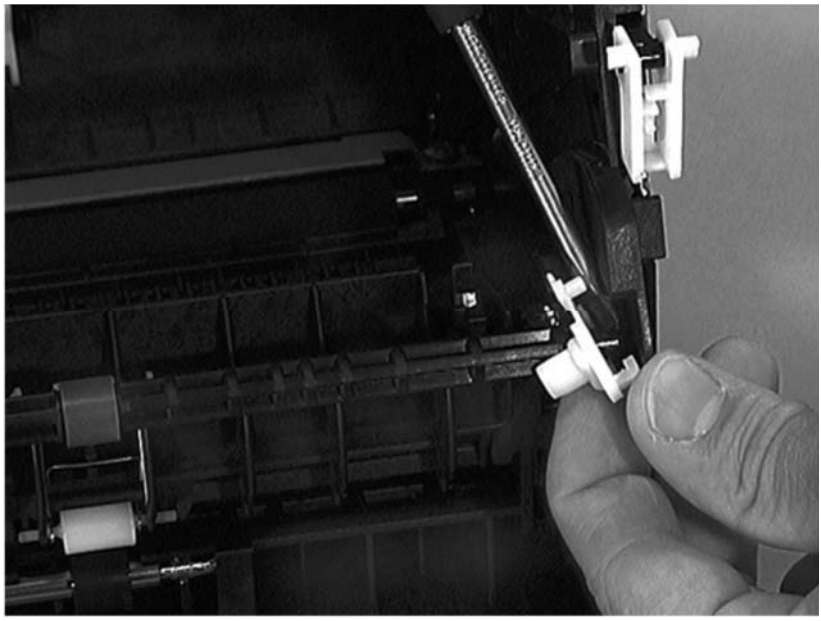


Figure 42. **Output roller removal (1 of 2)**

3 Slide the roller to the right, releasing it from the gear on the left.

4 Lift the roller out of the printer.

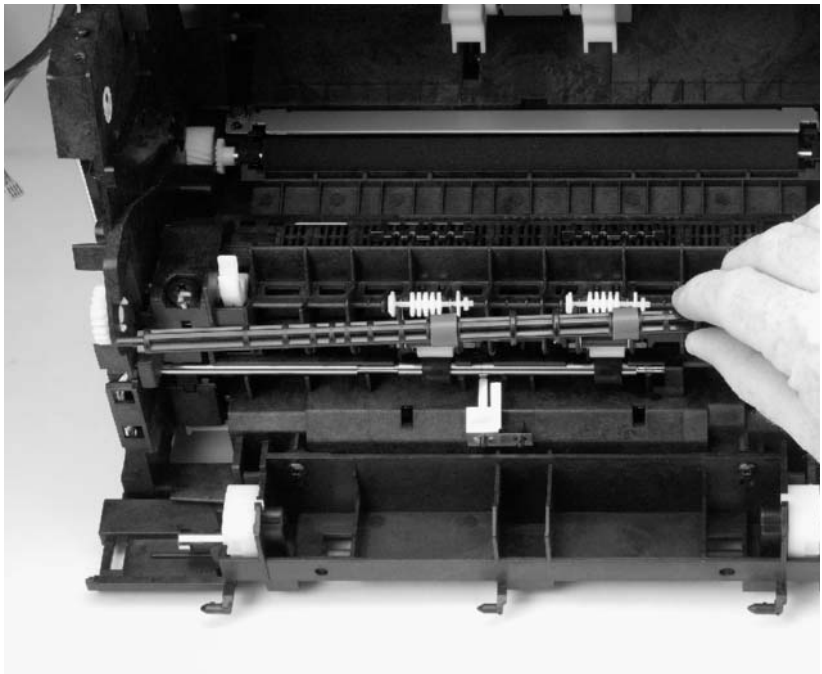


Figure 43. **Output roller removal (2 of 2)**

Delivery assembly

1 Remove the output roller (see pages 114 and 115).

Note

The springs underneath the torsion screws are not attached and can come loose during removal.

2 Remove the two screws (callout 1) in the front of the assembly.

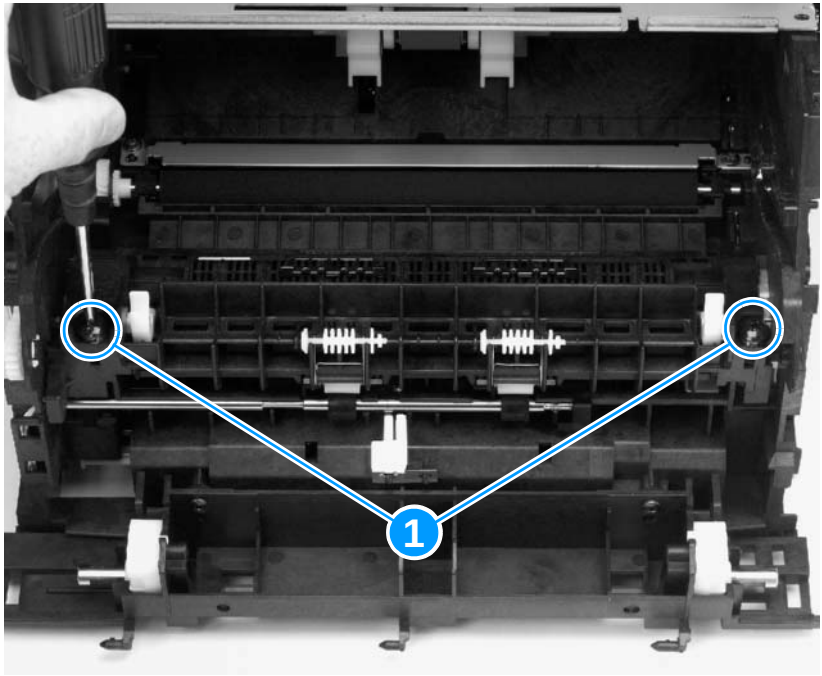


Figure 44. **Delivery assembly removal (1 of 2)**

3 Gently slide the assembly to the right, and lift it out of the printer.

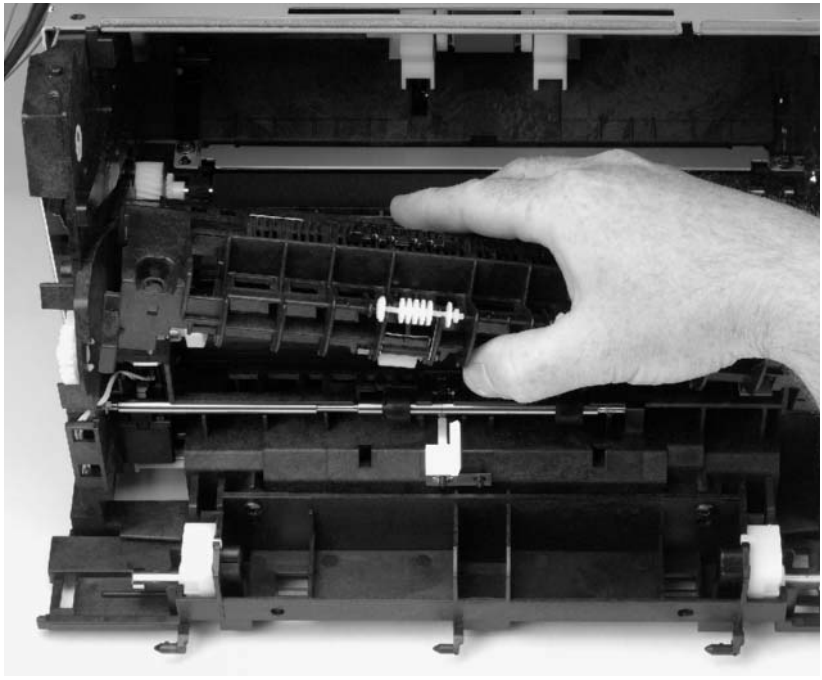


Figure 45. **Delivery assembly removal (2 of 2)**

Paper exit-sensor flag

1 Remove the output roller and the delivery assembly (see pages 114 through 117).

Note

Before proceeding, examine the paper exit-sensor flag. It is important to note the position of the spring mechanism on the flag. The spring must be reinstalled to exactly this position, because installing it incorrectly will cause a control panel error message.

2 Remove the paper exit-sensor flag by pressing down on the left side and pulling up on the right side.

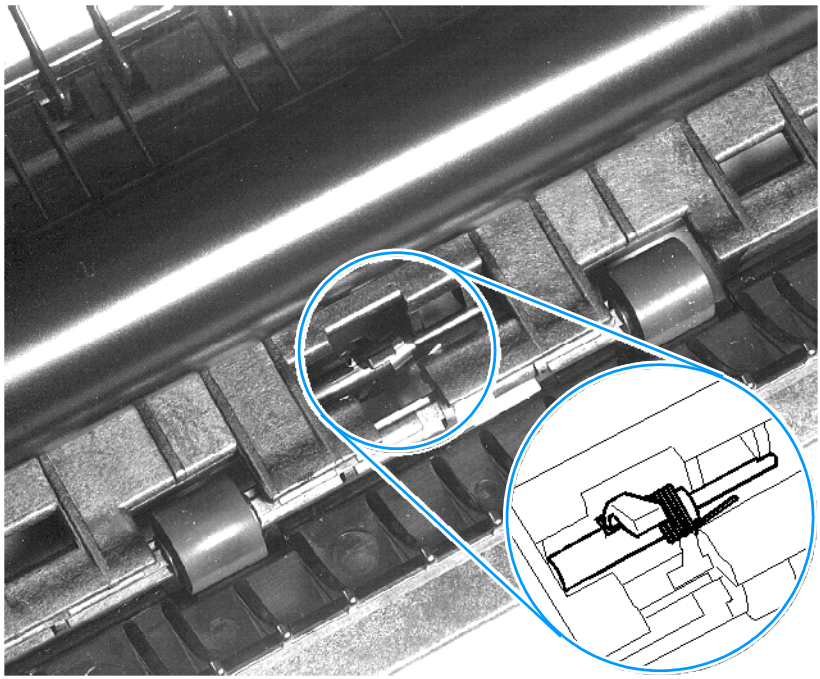


Figure 46. **Paper exit-sensor flag removal**

To reinstall

Place the left side of the flag in the correct position first, then slide the right side into place, making certain the spring is on top of the flag. If the spring exerts no pressure on the flag, it might have to be resprung by giving the spring an extra turn before reinstalling. The flag should fit snugly in place.

Fusing element

1 Remove the DIMMs, the back, right, and left covers, the internal paper guide, and the top cover (see pages 89 through 95).

2 Also remove the output roller and the delivery assembly (see pages 114 through 117).

Note

Pay special attention to the way these metal clips are attached to the printer chassis before you remove them. This will make reassembly easier.

The fusing element is held in place on each end by two metal spring-loaded clips. Each clip has a small white lever next to it. These levers must be in the “up” position.

3 Push each clip down and back, releasing it from the printer chassis.

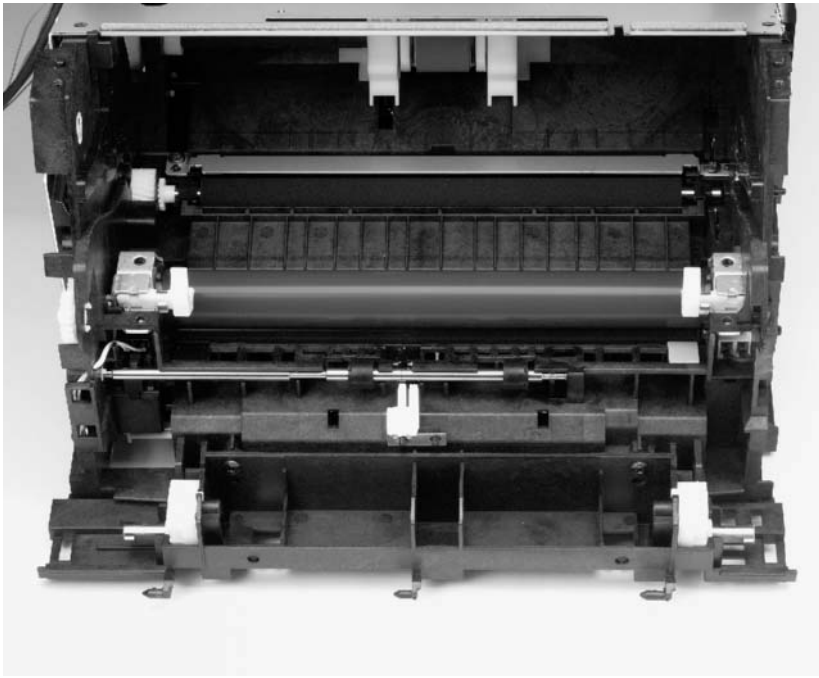


Figure 47. **Fusing element removal (1 of 4)**

To reinstall the fusing element metal clips

Figure 48. **Fusing element metal clips reinstallation**

Note

During reassembly, make sure the metal clips are seated properly.

The front of the metal clip has a small threaded hole. There is a corresponding hole on the printer chassis.

Slide the front of the metal clip underneath the threaded tab on the printer chassis so that the two holes line up.

Push down on the metal clip (you will feel the tension springs pushing against the clip) until the small metal tab on the back of the clip snaps into place.

The fusing element has electronic cable connections on both the left and right ends, outside the printer.

4 Disconnect the small cable on the left side of the product.

Figure 49. **Fusing element removal (2 of 4)**

The larger double cable on the right end is held in place by a plastic snap.

5 Press down on the top of the plastic snap with a flatblade screwdriver.

Figure 50. **Fusing element removal (3 of 4)**

6 Unwind the cable from the cable guides along the side of the printer.

7 After the two cables are disconnected from the right and left sides of the printer, lift the element gently out of the printer.

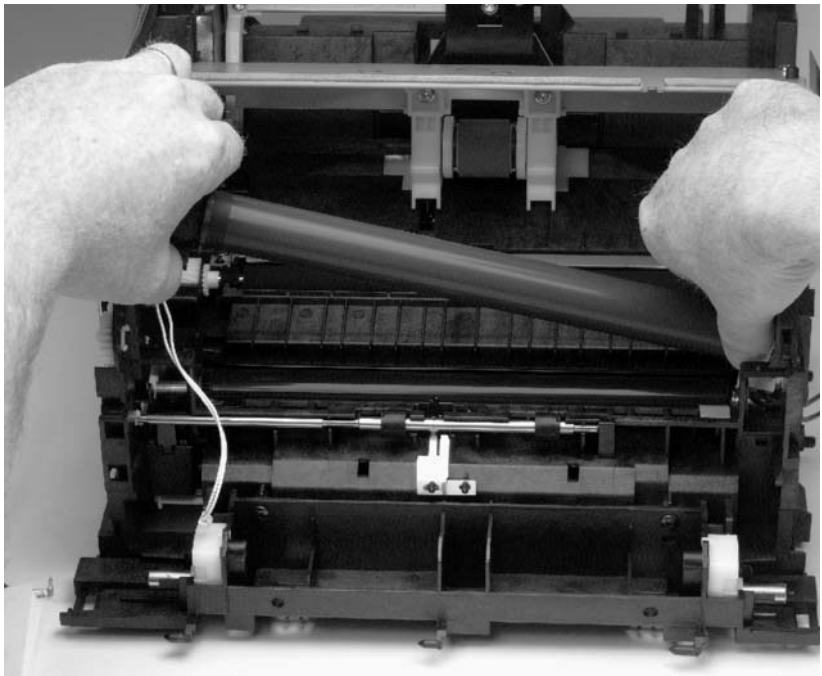


Figure 51. Fusing element removal (4 of 4)

Gear train motor

1 Remove the DIMMs, the back, right, and left covers, the internal paper guide, and the top cover (see pages 89 through 95).

The gear train, located behind the metal plate (gear train cover) on the left side of the printer, must be removed to gain access to the pressure roller.

2 Disconnect the motor cable connection at the back of the printer.

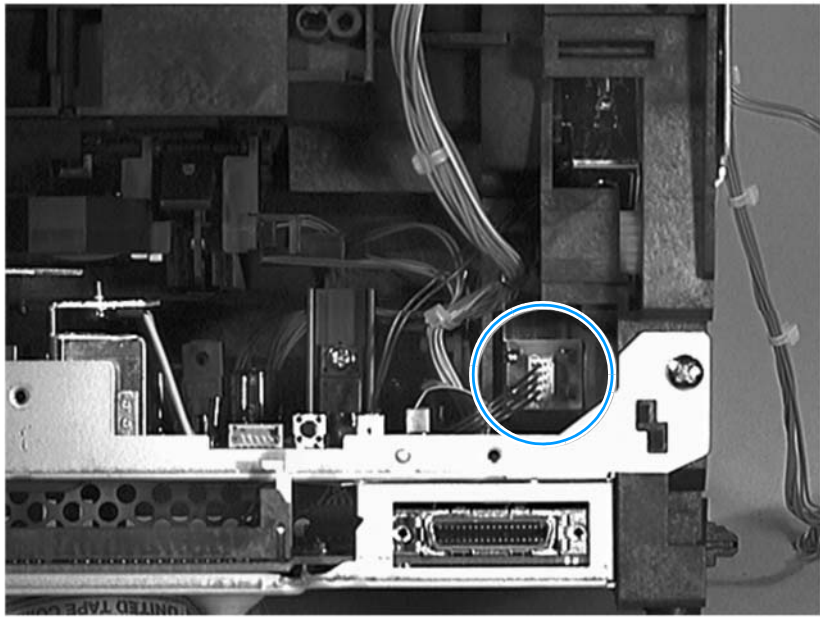


Figure 52. **Gear train motor (1 of 3)**

3 Remove the four screws (callout 1) that secure the metal plate over the gear train, and then very gently release the gear train.

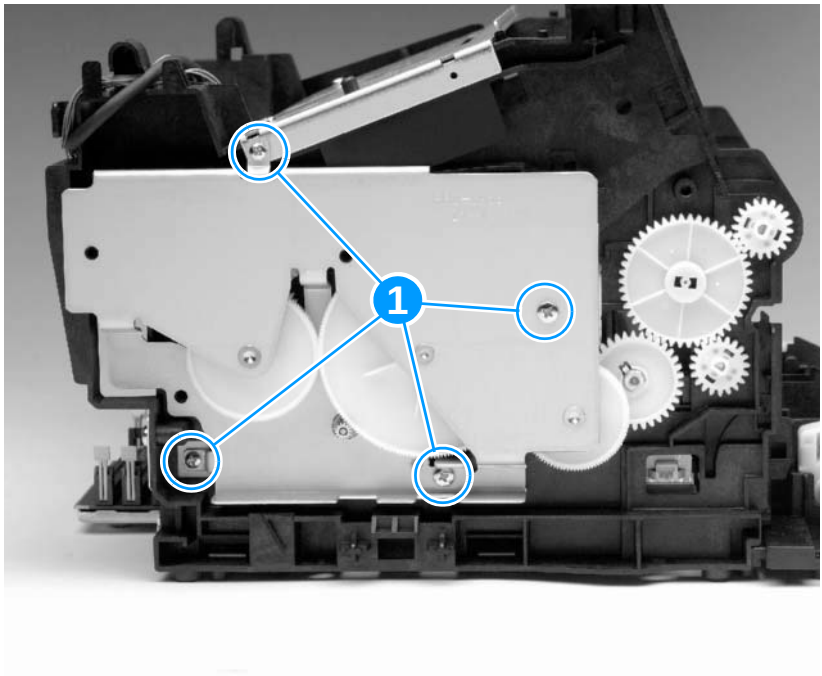


Figure 53. **Gear train motor (2 of 3)**

Note Some gears are not held in place and can come apart during removal.

4 Remove the two screws (callout 1) that secure the gear motor to the gear-plate cover.

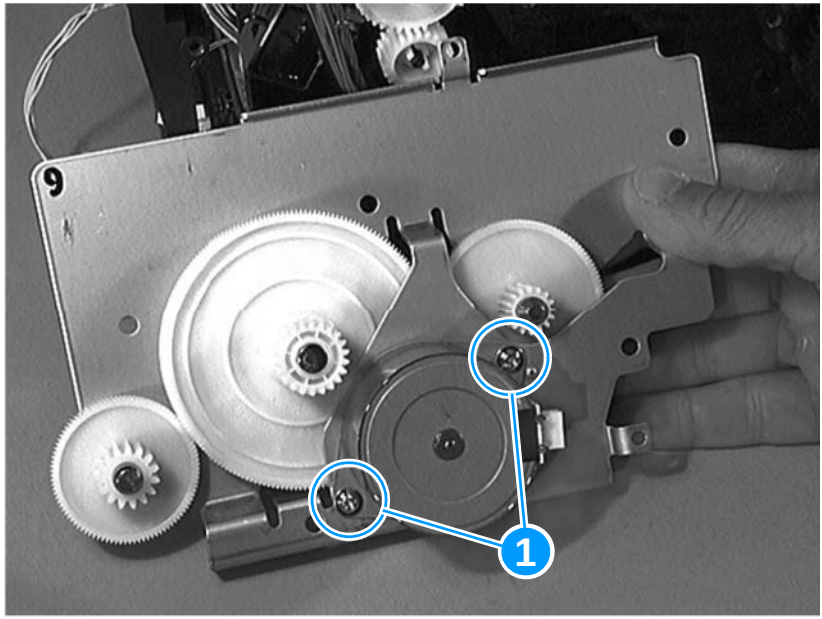


Figure 54. **Gear train motor (3 of 3)**

5 Pull the gear motor out of the gear-plate cover.

Solenoid

1 Remove the DIMMs, the back, right, and left covers, the internal paper guide, the top cover (see pages 89 through 95), and the gear train (see pages 124 and 125).

2 Remove the single screw (callout 1) that secures the solenoid to the printer chassis.

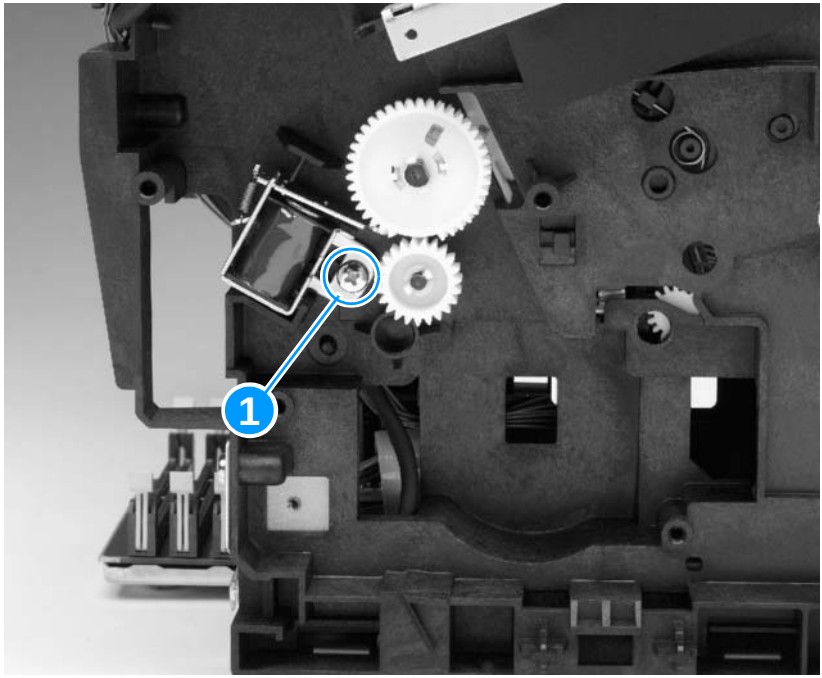


Figure 55. **Solenoid removal**

3 Release the solenoid.

Note

During reassembly, rotate the clutch so that the flat spot on the clutch allows the feed roller (gear) to turn freely.

Pressure roller

1. Remove the DIMMs, the back, right, and left covers, the internal paper guide, and the top cover (see pages 89 through 95).
2. Remove the output roller and the delivery assembly (see pages 114 through 117), and then remove the fusing element and the gear train (see pages 119 through 125).
3. Using a flatblade screwdriver, remove the gear from the end of the pressure roller by gently prying the small plastic tab up from the slot in the end of the roller axles.

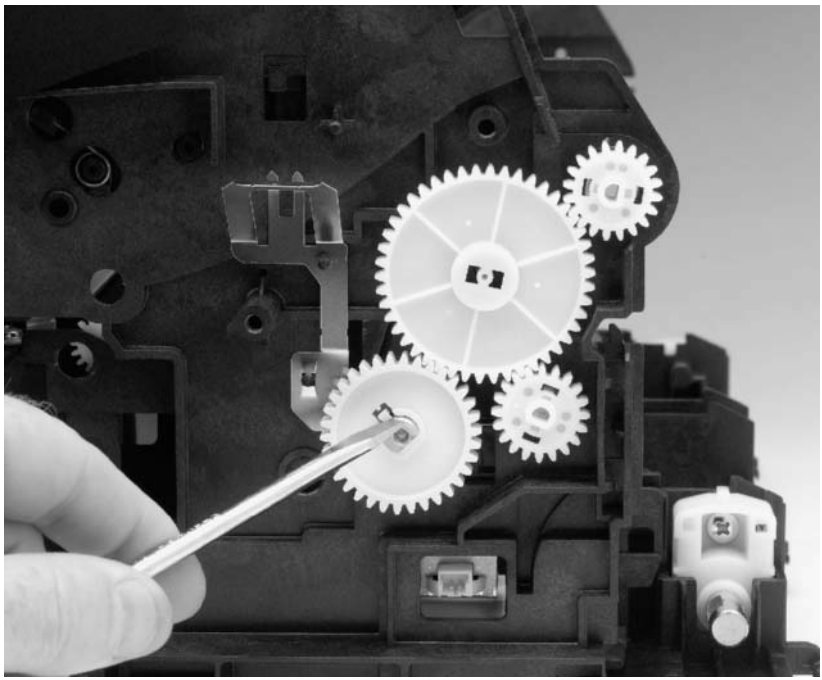


Figure 56. **Pressure roller removal (1 of 2)**

4. Slide the gear off the end of the roller.

CAUTION The pressure roller is covered with light contact grease. Do not get it on your clothes. See chapter 7, “Parts and diagrams,” for information about ordering pressure roller grease.

5 Loosen the two screws in the fusing guide (callout 1).

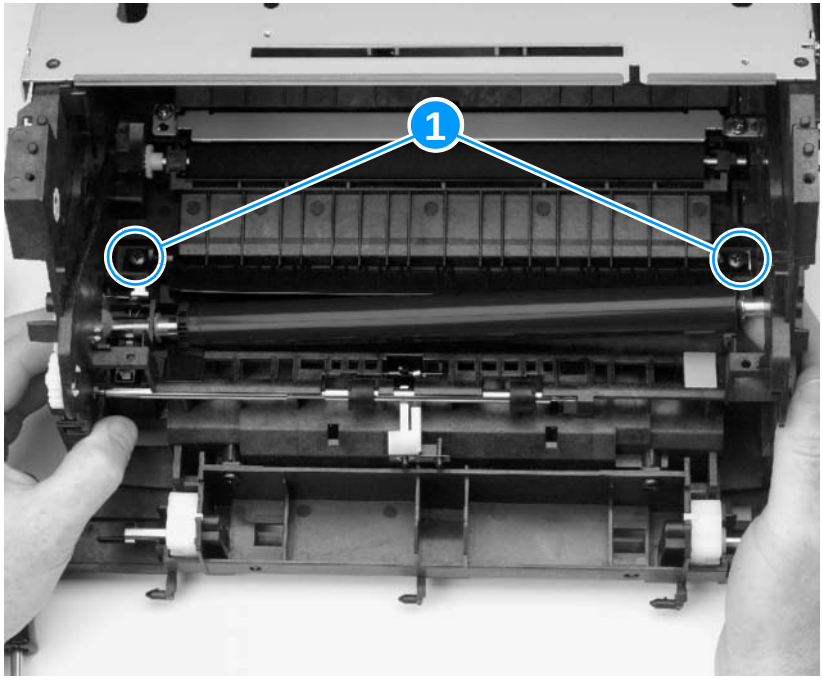


Figure 57. Pressure roller removal (2 of 2)

6 Lift the right end of the pressure roller out of the half-bushing and slowly move the roller to the right, pulling the left end of the roller axle out of the opening on the left side of the printer.

Note

The bushings are not connected to the printer chassis and can come loose during removal.

Transfer roller

The transfer roller can be removed without first removing any other product parts.

CAUTION Do not touch the black portion of the transfer roller.

Note A grounding spring is attached to the bottom of the left end of the transfer roller. This spring can come loose during assembly or removal.

1. Open the printer door.
2. Using needle nose pliers, release the transfer roller by gently squeezing the small plastic snaps on the left end of the roller.

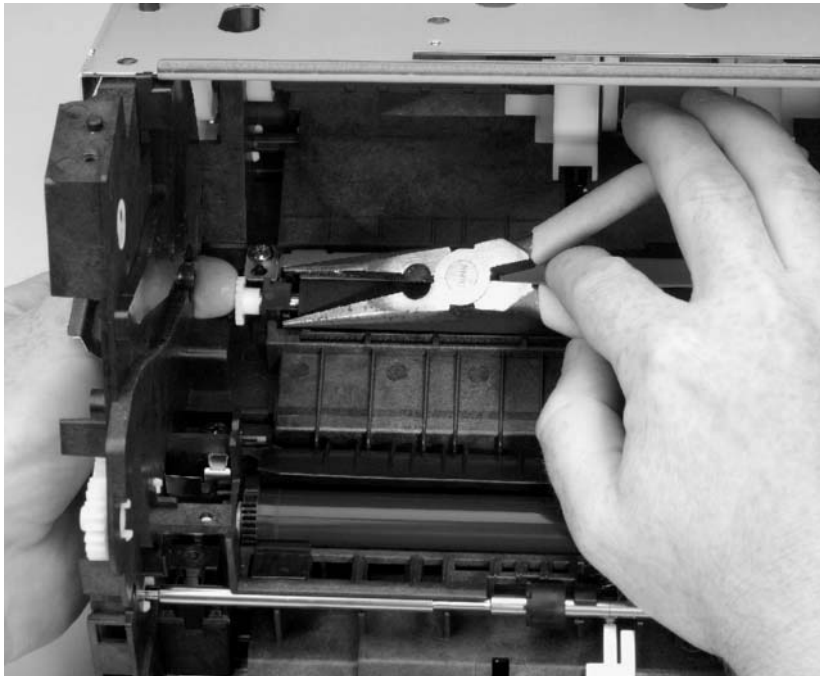


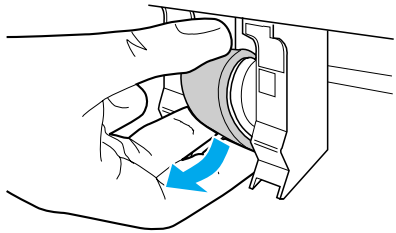
Figure 58. **Transfer roller removal**

3. Lift the transfer roller up and out.

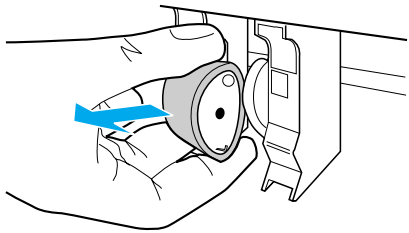
Pickup roller

The pickup roller can be removed without first removing any other product parts.

1. Open the printer door.
2. Rotate the bottom of the pickup roller towards the front of the printer.



3. Gently pull the pickup roller straight out.



To reinstall

It is possible to reinstall the pickup roller upside-down. However, for correct operation of the pickup assembly, make sure you reinstall the pickup roller to its correct position. The more rounded portion of the pickup roller should face the front of the product; the circle tab on the blue plastic should be on top, with the straight tab on the blue plastic on the bottom.

Paper-pickup assembly

1. Remove the DIMMs, the back, right, and left covers, the internal paper guide, and the top cover (see pages 89 through 95).
2. Disconnect the laser/scanner.
3. Remove the screw attached to a bracket at the right end of the cover plate (callout 1).
4. Remove the two top screws attached to the right and left of the plate (callout 2).
5. Remove the two screws located underneath the plate, securing it to the paper-pickup assembly (callout 3).

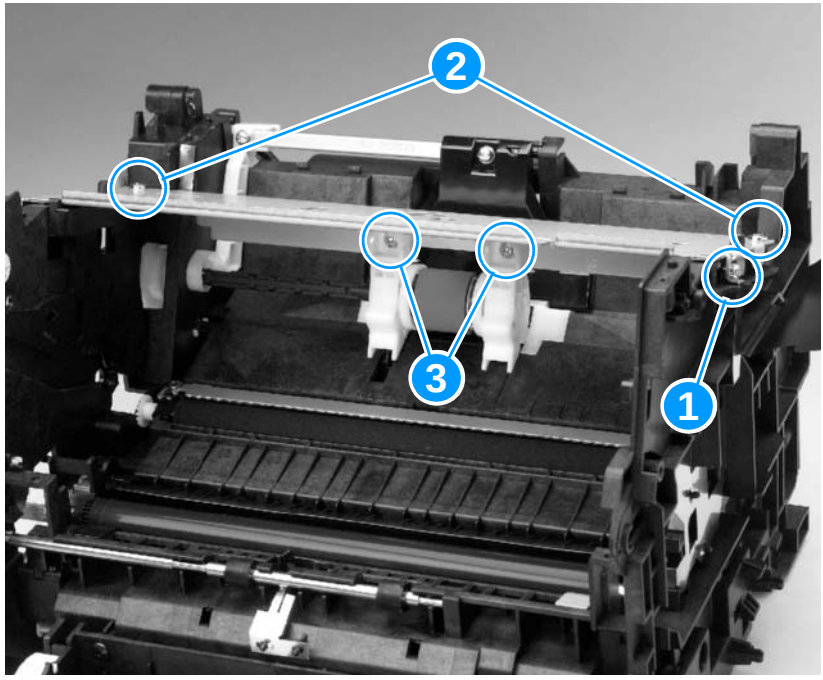


Figure 59. **Paper-pickup assembly removal (1 of 2)**

Note The pickup assembly is in several pieces; these pieces should be kept together. Pay close attention to how the assembly is aligned before removing it (see reassembly note on this page).

6 Lift the metal plate clear of the printer.

7 Remove the paper-pickup assembly.

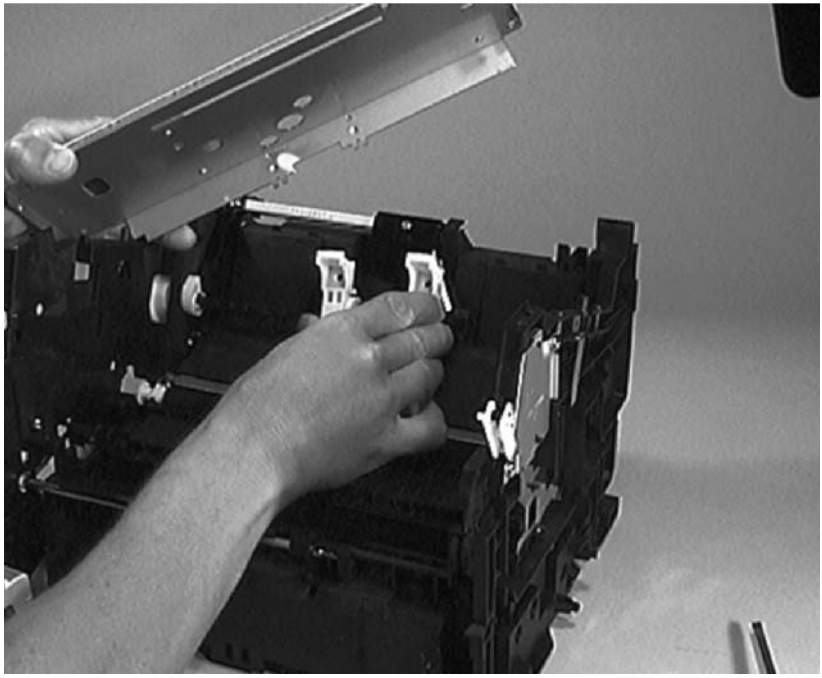


Figure 60. **Paper-pickup assembly removal (2 of 2)**

To reinstall

When reassembling this part, you must correctly align and attach the section of the clutch without teeth to the gear.

Kick plate

1. Remove the DIMMs, the back, right, and left covers, the internal paper guide, and the top cover (see pages 89 through 95).
2. Also remove the paper pickup assembly (see pages 132 and 133).
3. Disconnect the laser/scanner.
4. Rotate the cam to free the kick plate.
5. Rotate the kick plate arm up approximately 45 degrees and lift the left end up and out of the collar shaft that secures it.

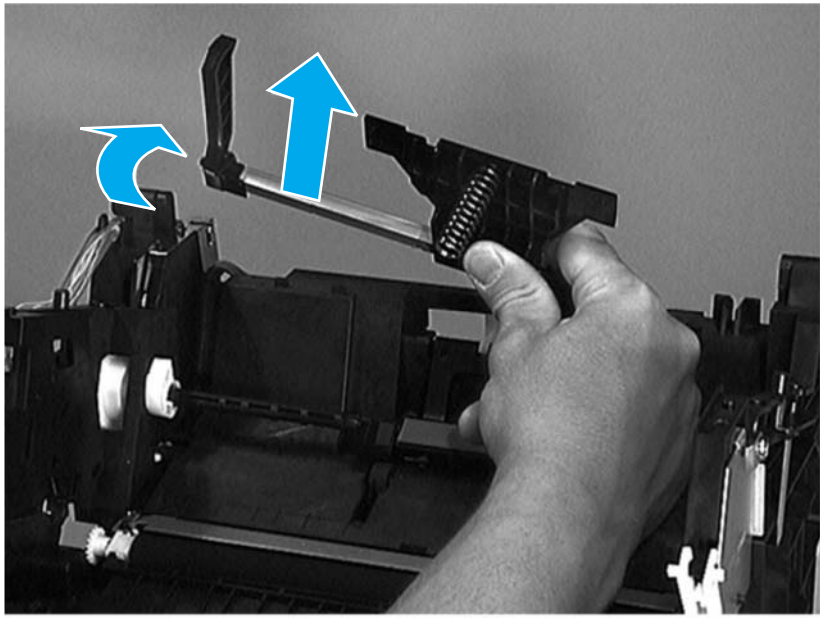


Figure 61. **Kick plate removal**

Separation pad

1. Remove the DIMMs, the back, right, and left covers, the internal paper guide, and the top cover (see pages 89 through 95).
2. Also remove the paper pickup assembly and the kick plate (see pages 132 through 134).
3. Disconnect the laser/scanner.
4. Lift the bottom of the white plastic tab (callout 1) on the rear of the paper-feed frame up slightly and slide it up, toward the top of the paper-feed frame. This will release the separation pad.

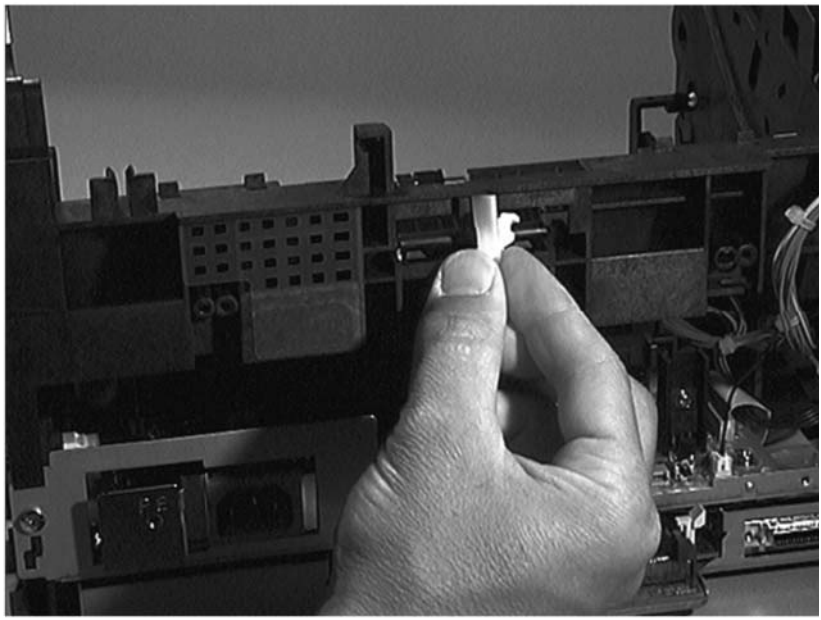


Figure 62. **Separation pad removal (1 of 2)**

5 Slide the separation pad out through the brackets that secure it.

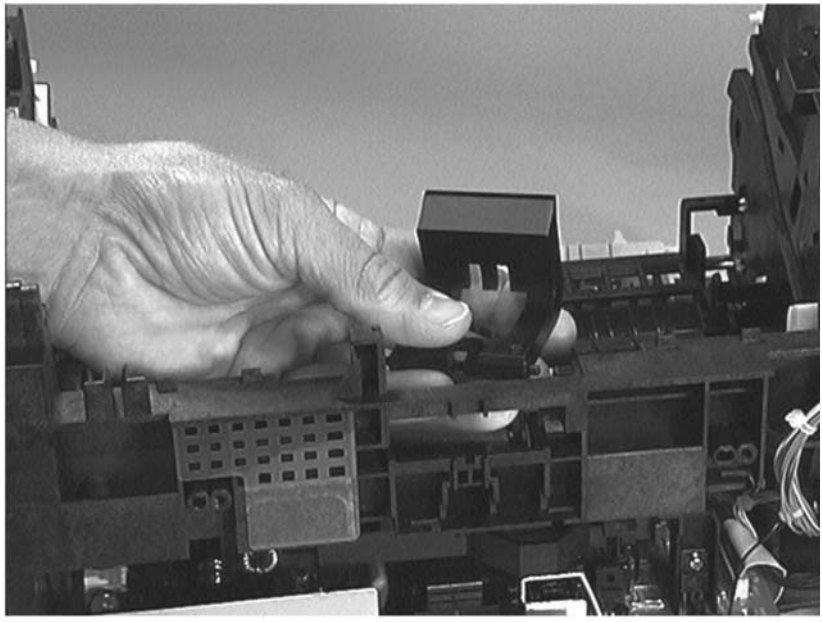


Figure 63. **Separation pad removal (2 of 2)**

Bottom assemblies

Formatter pan

Note The formatter pan, which contains the formatter and the LIU, can be removed without first removing any other product parts.

1 Follow steps 1 through 8 on pages 96 and 97.

Note Be careful not to damage or break the electronic cables and connections underneath the formatter.

2 Remove one grounding screw (callout 1).

3 Pull the flat flexible cable (callout 2) and the small cable (callout 3) out of their connectors.

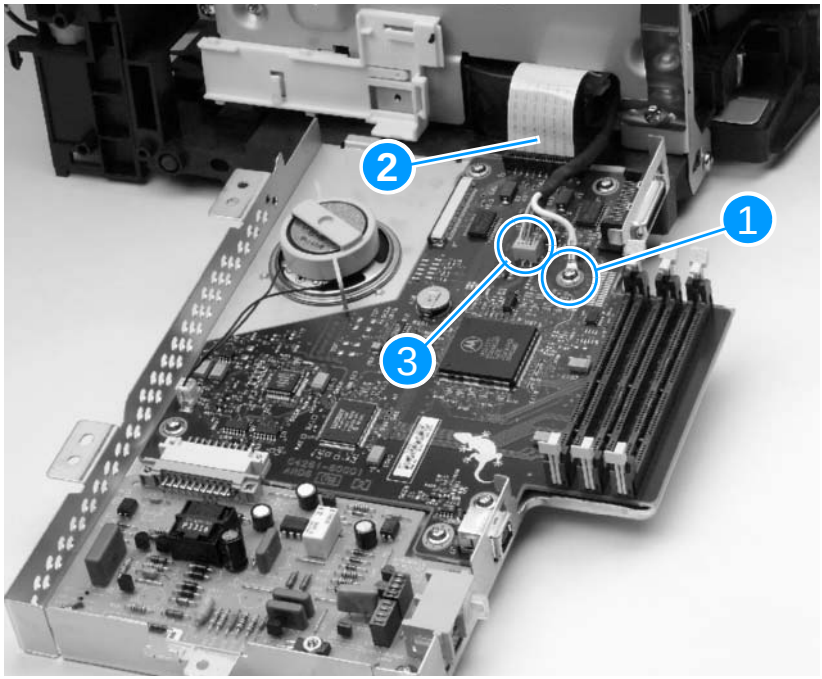


Figure 64. **Formatter pan removal**

4 Slide the formatter pan free of the metal brackets.

Note During reassembly, make sure the pan is reseated in the brackets.

Formatter and LIU

1. Remove the formatter pan (see page 137).
2. To remove the formatter from the formatter pan, remove the five screws (callout 1) securing the formatter.
3. Pull the speaker cable (callout 2) from its connector on the formatter.
4. Gently slide the formatter away from the LIU to unplug the connector between the formatter and the LIU.
5. To remove the LIU from the formatter pan, remove the three screws (callout 3) securing the LIU.

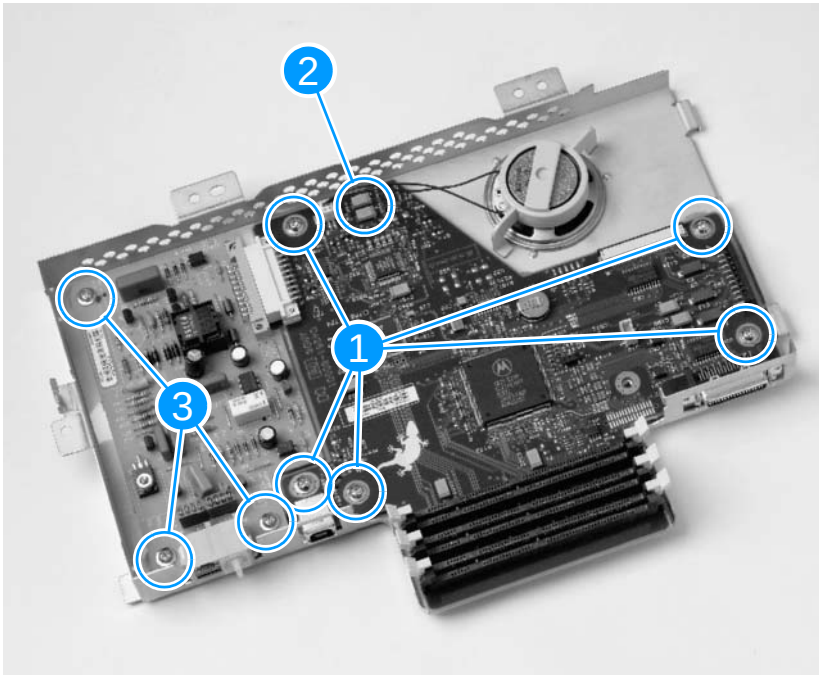


Figure 65. **Formatter and LIU**

ECU pan

1. Remove the DIMMs, the back, right, and left covers, the internal paper guide, and the top cover (see pages 89 through 95).
2. Remove the printer door (see pages 96 through 99), and the formatter pan (see page 137).
3. Disconnect the ECU cable.

Note

If the fusing element cables are connected, disconnect them before removing the ECU pan.

4. Remove the two screws fastened to the brackets on the sides of the pan.
5. Remove the two screws reached through openings in the side of the black plastic printer chassis.

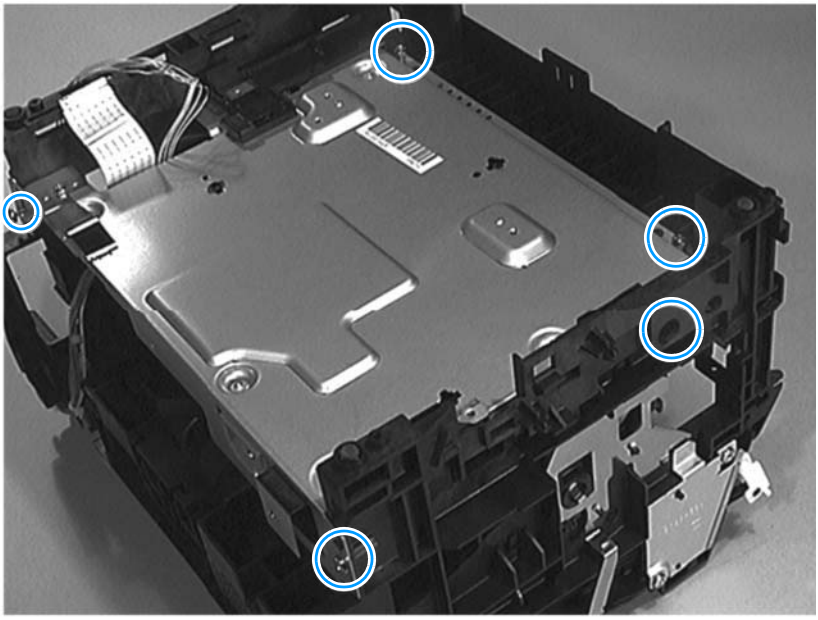


Figure 66. **ECU pan removal (1 of 2)**

6. Disconnect the small solenoid connection from the back of the ECU.

7 Slowly lift the ECU plate away from the printer chassis.

CAUTION Be very careful not to damage or break the connectors underneath the ECU plate as you lift it from the printer chassis.

8 Reach between the plate and the chassis and unwind the cables from their cable guides until there is enough slack in the cables to allow access to the bottom of the ECU plate.

9 Unwind and disconnect all cables until the ECU board is separated from the chassis.

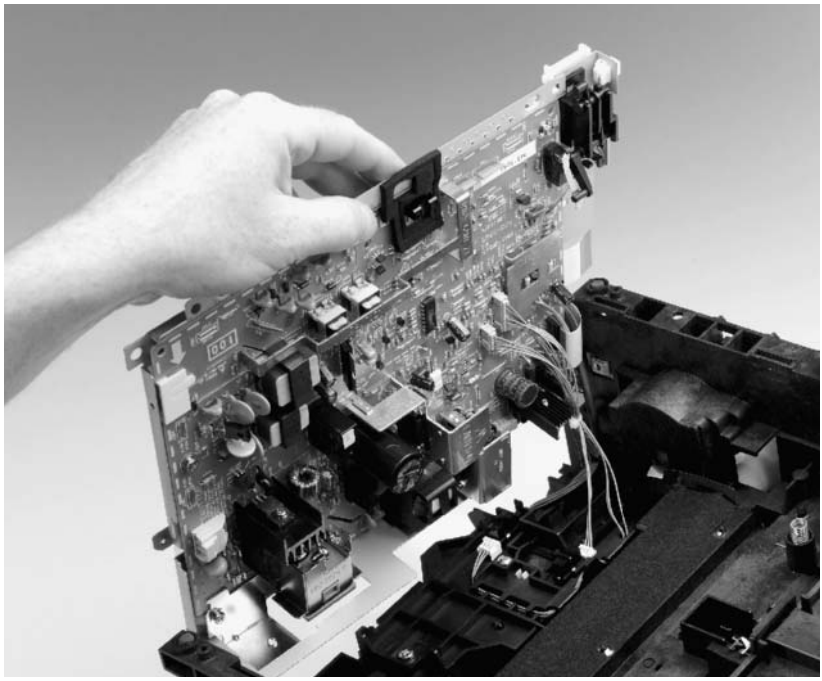


Figure 67. **ECU pan removal (2 of 2)**

Note The entire ECU board can be replaced as a single unit (cables do not ship with the replacement board; if cables are damaged during removal, you will have to purchase new ones).

Paper-feed assembly

1. Remove the DIMMs, the back, right, and left covers, the internal paper guide, and the top cover (see pages 89 through 95).
2. Remove the printer door (see pages 96 through 99), the formatter pan (see page 137) and the ECU pan (see pages 139 and 140).
3. Disconnect the two cable connections (callout 1).
4. Partially unwind the cables from their cable guides.
5. Remove the two screws (callout 2) securing the assembly to the printer chassis.

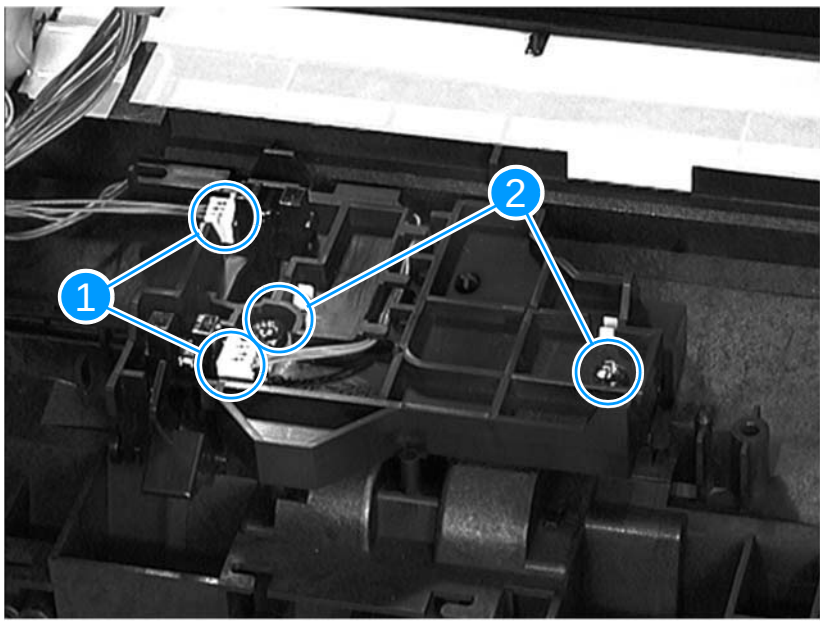


Figure 68. **Paper-feed assembly removal (1 of 3)**

6. Lift the paper-feed frame away from the chassis, being careful not to damage sensor flags.

To reinstall

Be sure to seat the tab into the frame.

7 Release the snap catches inside the gear on the left end of the paper-feed roller shaft.

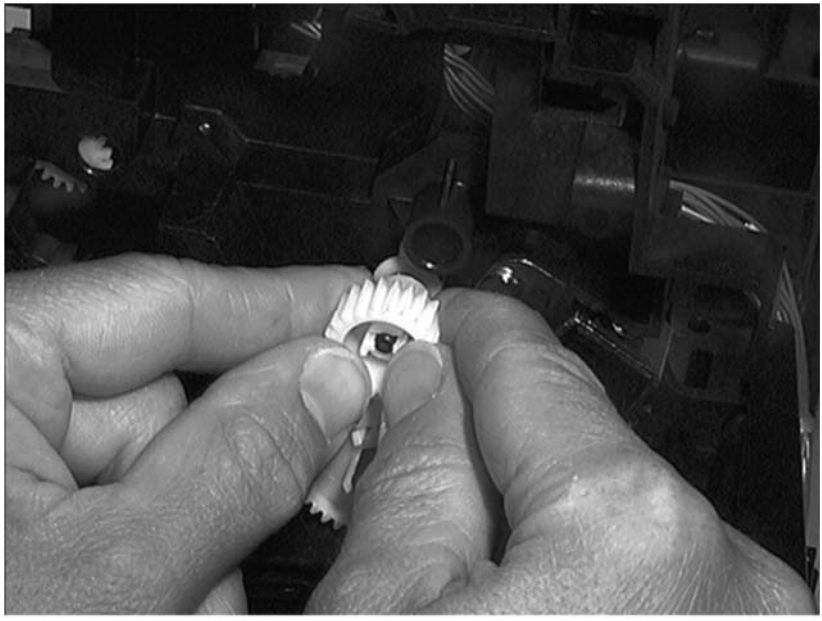


Figure 69. **Paper-feed assembly removal (2 of 3)**

8 Slide the paper-feed roller to the right, and remove it from the printer chassis.

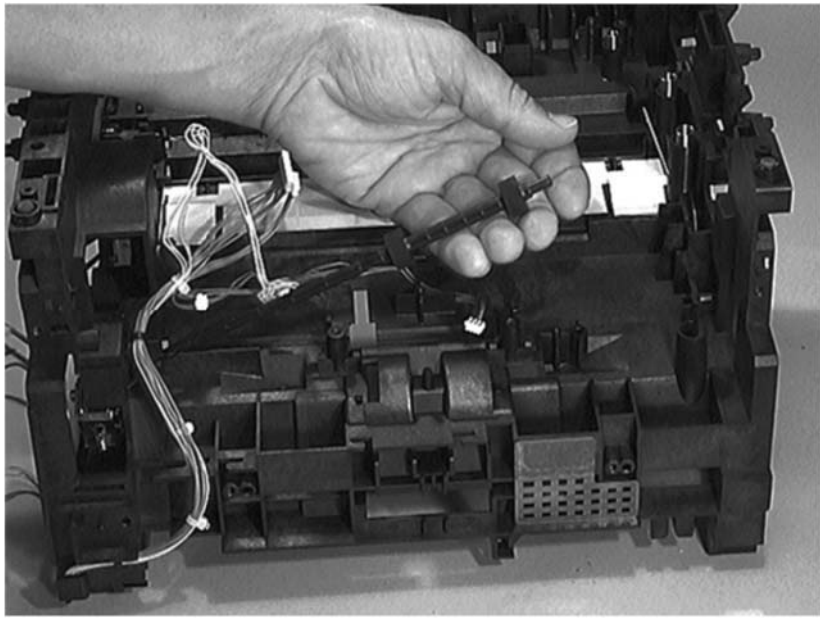


Figure 70. **Paper-feed assembly removal (3 of 3)**

6 Troubleshooting

Chapter contents

Basic troubleshooting 146
Errors 149
Image formation troubleshooting 155
    Checking the toner cartridge 155
    Solving image-quality problems 156
Solving paper feed problems 162
Functional checks 165
    Engine test 165
    Half-self-test functional check 166
    Drum rotation functional check 167
    Heating element check 168
    High-voltage power supply check 169
    Paper curl 168
    Paper path check 171
Service mode functions 172
Troubleshooting tools 186
    Internal reports 186
    Printing all fax reports at once 187
    T.30 protocol trace 188
    Repetitive image defect ruler 207
    Document scanner recalibration 208
    Main wiring 210

Basic troubleshooting

Table 10. Basic troubleshooting

#	Verification steps	Possible problems	Solutions
1	**Is Power On successful?** When the product is connected to a grounded power source, the printer motor should rotate for approximately six seconds and the document scanner motor should rotate for approximately two seconds.	No power.	1. Verify that the product is plugged in. 2. Verify that the power cable is functional and that the power switch is on (220v only). 3. Verify that FU102 on the ECU is not open. 4. If all of these conditions are correct, replace the ECU.
		Printer motor does not rotate.	1. Verify that the toner cartridge is present. 2. Verify that the printer door is closed. 3. Verify that paper is loaded in the paper input tray. 4. Verify that printer path paper sensors are functional. 5. Verify that the motor connector J1 is seated into the ECU. 6. Verify that the motor is correctly mounted to the printer chassis. 7. If all of these conditions are correct, replace the ECU. 8. If, after replacing the ECU, the printer motor still does not rotate, replace the motor.
		Document scanner motor does not rotate.	1. Verify that the document scanner connector is seated in the formatter. 2. Verify that the document scanner motor is correctly mounted in the document scanner assembly. 3. If these conditions are met, replace the document scanner motor. 4. If, after replacing the motor, the document scanner motor still does not rotate, replace the formatter. 5. If, after replacing the formatter, the document scanner motor still does not rotate, replace the ECU.
2	**Is the product ready?** The control panel should function without error messages.	Control panel displays an error.	Consult the list of common messages later in this chapter to correct the error.
		Control panel is not functional.	Verify that the control panel cable is seated into both the control panel and the formatter. If the cable is connected correctly, replace the control panel.

Table 10. Basic troubleshooting (continued)

#	Verification steps	Possible problems	Solutions
3	**Do engine tests and self-tests print?** Print an engine test, which is explained on page 165. The engine test should print without paper-feed problems or print-quality problems. Also print a configuration report (See "Internal reports" on page 186.).	**Note**	The formatter must be connected to perform an engine test.
		Engine test is not successful.	Replace the ECU.
		Control panel displays an error message.	Consult the list of common messages in chapter 3 or the list of error messages in this chapter to correct the error.
		Media does not move smoothly through the printer paper path.	Isolate printer paper-path problems by performing a paper-path check, which is discussed later in this chapter.
		Poor print quality.	See "Solving image-quality problems" on page 156.
4	**Is the copy function operational?** Place the configuration report into the document feeder tray and copy it to the printer. The report should feed smoothly through the document scanner path and copies should print without print-quality problems.	Poor copy quality.	If the print quality from the internal tests was acceptable, but the print quality of the copies is not, clean the contact image sensor and the white roller, and then recalibrate the document scanner. If, after performing the maintenance, the problem persists, replace the contact image sensor or document scanner.
		Media does not move smoothly through the document scanner path.	Clear the document scanner path of obstructions. Check photosensor to make sure that it operates correctly. If the problem persists, replace the document scanner assembly.
5	**Does the product send a fax?** Connect the phone line and verify the dial tone (using a hand set, if necessary). Attempt to send a fax.	The telephone line is not operational or the product is not plugged into the telephone line.	Make sure that the product is plugged into a telephone line that you know works.
		The telephone cable is plugged into the wrong connector.	Try plugging the phone cord into the other connector.
		The product's fax settings are set incorrectly.	Review and reset the product's fax settings.
		The LIU is not operational.	Replace the LIU.
6	**Does the product receive a fax?** Use another fax machine to send a fax to the product.	Too many telephone devices are plugged in, or telephone devices are not connected in the correct order.	Make sure that the product is the only device on the telephone line and try again to receive the fax.
		The product's fax settings are set incorrectly.	Review and reset the product's fax settings.
		The LIU is not operational.	Replace the LIU.

Table 10. Basic troubleshooting (continued)

#	Verification steps	Possible problems	Solutions
7	**Is the software installed correctly?**	Software is not installed or an error occurred during software installation.	Uninstall and then reload the product software. Make sure you use the correct installation procedure and the correct port setting.
8	**Does the product print from the computer?** Connect the parallel cable or USB cable to the product and the computer. Use a word-processing application to send a print job to the printer.	The cable is not connected correctly.	Reconnect the cable.
		An incorrect printer driver is selected.	Reset the printer driver.
		Other devices are connected to the parallel port.	Disconnect the other devices and try again to print.
		There is an LPT port driver problem in Windows 95/NT.	Reset the computer's port settings.
		The formatter has failed.	Replace the formatter.
9	**Does the product scan to the computer?** Initiate a scan from either the computer's basic desktop software or from the product.	Other devices are connected to the parallel port.	Disconnect the other devices and try again to scan.
		The computer's parallel-port hardware is not bidirectional.	Check hardware documentation to see if the port configuration can be changed.
		The BIOS settings for the parallel port are set incorrectly. Polling is turned off in HP LaserJet Director or HP LaserJet Director is not running.	Reset the computer's port settings. If the problem persists, reset the BIOS settings in CMOS. Start HP LaserJet Director and turn on polling.

Errors

These control panel error messages are listed alphabetically. Messages are accompanied by the cause of the message and steps to resolve the error.

Table 11. Control panel error messages

Message	Cause	Solution
50 FUSER ERROR	The product has experienced an internal hardware error.	Disconnect the power cable from the product, wait at least 30 seconds, then reconnect the power cable and wait for the product to initialize. Check the cabling connections to the heating element. Perform the heating element check (see page 168). If the error persists, replace the heating element. If, after replacing the heating element, the error persists, replace the ECU.
51 LASER ERROR	The product has experienced an internal hardware error.	Disconnect the power cable from the product, wait at least 30 seconds, then reconnect the power cable and wait for the product to initialize. Check the cabling connections to the laser/scanner. Try connecting the product to a different power source or surge protector. If the error persists, replace the laser/scanner.
52 SCANNER ERROR	The product has experienced an internal hardware error.	Disconnect the power cable from the product, wait at least 30 seconds, then reconnect the power cable and wait for the product to initialize. Try connecting the product to a different power source or surge protector. If the error persists, replace the contact image sensor. If, after replacing the contact image sensor, the error persists, replace the formatter.

Table 11. Control panel error messages (continued)

Message	Cause	Solution
53 PRINTER ERROR	The product has experienced an internal hardware error.	Disconnect the power cable from the product, wait at least 30 seconds, then reconnect the power cable and wait for the product to initialize. If the error persists, replace the formatter.
54 PRINTER ERROR	The product has experienced an internal hardware error.	Disconnect the power cable from the product, wait at least 30 seconds, then reconnect the power cable and wait for the product to initialize. If the error persists, replace the formatter.
55 DC CONTROLLER ERROR	The product has experienced an internal hardware error.	Disconnect the power cable from the product, wait at least 30 seconds, then reconnect the power cable and wait for the product to initialize. Check the cabling to the ECU. If the error persists, replace the ECU.
62.X PRINTER ERROR	The product has experienced an internal hardware error.	Disconnect the power cable from the product, wait at least 30 seconds, then reconnect the power cable and wait for the product to initialize. If the error persists, replace the formatter.
79 SERVICE (#####)	The product has experienced an internal hardware error.	Disconnect the power cable from the product, wait at least 30 seconds, then reconnect the power cable and wait for the product to initialize. If the error persists, replace the formatter. If, after replacing the formatter, the error persists, replace the DIMMs.
80 SERVICE (#####)	The product has experienced an internal hardware error.	Disconnect the power cable from the product, wait at least 30 seconds, then reconnect the power cable and wait for the product to initialize. If the error persists, replace the formatter.

Table 11. Control panel error messages (continued)

Message	Cause	Solution
81 SERVICE (#####)	The product has experienced an internal hardware error.	Disconnect the power cable from the product, wait at least 30 seconds, then reconnect the power cable and wait for the product to initialize. If the error persists, replace the formatter.
COMMUNICATION ERROR	Fax communication error occurred between the product and the sender or receiver. For descriptions of communication errors see table 18, “Fax receive error codes,” on page 189, and table 19, “Fax send error codes,” on page 194.	Allow the product to retry sending the fax. Unplug the product telephone cord from the wall, plug in a telephone, and try making a call. Plug the product phone cord into a jack for another phone line. If the error persists, replace the LIU.
DOCUMENT FEEDER JAM	A piece of media is jammed in the document feeder tray.	Open the document release door, clear the jam, close the document release door, and reload the paper into the document feeder tray. If the error persists, replace the document scanner separation pad and document scanner pickup roller.
DOCUMENT FEEDER MISPICK. RELOAD MEDIA	Media in the document feeder tray was not picked up.	Remove and reload the media into the document feeder tray. If the error persists, replace the document scanner pickup roller.
FAX DOES NOT ANSWER CANCELED SEND	Attempts to redial a fax number failed or the "Redial on no answer" option was turned off.	Call the recipient to ensure that the fax machine is on and ready. Check that you are dialing the correct fax number. Check that the redial option is enabled. Unplug the telephone cord from both the product and the wall and replug the cord. Unplug the product telephone cord from the wall, plug in a telephone, and try making a call. Plug the product phone cord into a jack for another phone line. If the error persists, replace the LIU.

Table 11. Control panel error messages (continued)

Message	Cause	Solution
FAX DOES NOT ANSWER REDIAL PENDING	You tried to send a fax, but the receiving fax line did not answer. The product attempts to redial after a few minutes.	Allow the product to retry sending the fax. Call the recipient to ensure that the fax machine is on and ready. Check that you are dialing the correct fax number. Check that the redial on no answer option is enabled. Unplug the product telephone cord from the wall, plug in a telephone, and try making a call. Plug the product phone cord into a jack for another phone line. If the error persists, replace the LIU.
NO DIAL TONE.	The product could not detect a dial tone.	Unplug the telephone cord from both the product and the wall and replug the cord. Unplug the product telephone cord from the wall, plug in a telephone, and try making a call. Plug the product phone cord into a jack for another phone line. See “Changing the detect dial tone setting” in the online user guide. If the error persists, replace the LIU. If, after replacing the LIU, the error persists, replace the formatter.
NO FAX DETECTED	The product answered the incoming call but could not determine that the caller was a fax machine.	Allow the product to retry sending the fax. Unplug the product telephone cord from the wall, plug in a telephone, and try making a call. Plug the product phone cord into a jack for another phone line. If the error persists, replace the LIU.

Table 11. Control panel error messages (continued)

Message	Cause	Solution
POWER FAIL RECOVERY. CHECKING SYSTEM	The product has detected a power failure and is performing a self-test.	The product should go back to the ready state on its own. If this message does not go away in a couple of minutes, disconnect the power cable from the product, wait at least 30 seconds, then reconnect the power cable and wait for the product to initialize. If the message reappears frequently, troubleshoot the product by following the steps in “Basic troubleshooting” on page 146.
POWER OFF. CHECK DIMM #[1-3]	The DIMM in the indicated slot has failed.	Unplug or turn off the product and check the indicated DIMM.
PRINTER PAPER JAM CLEAR PAPER PATH	The product has detected a jam.	Clear the jam. The job should continue to print. If it does not, try reprinting the job. If media jams frequently, see chapter 3, “Maintenance.”
PRINTER TRAY MISPICK. [ENTER] TO RESUME	The print engine has failed to pick up a piece of media.	Reload the paper in the paper input tray and press ENTER/MENU to continue the job. If the error persists, replace the printer pickup roller.
RECEIVING FAX BUSY CANCELED FAX	The fax line to which you were sending a fax was busy. The product has cancelled sending the fax.	Call the recipient to ensure that fax machine is on and ready. Check that you are dialing the correct fax number. Check that the redial on busy option is enabled. Press and hold STOP/CLEAR for seven seconds to check for a dial tone. Unplug the product telephone cord from the wall, plug in a telephone, and try making a call. Plug the product phone cord into a jack for another phone line. If the error persists, replace the LIU.

Table 11. Control panel error messages (continued)

Message	Cause	Solution
RECEIVING FAX BUSY REDIAL PENDING	The fax line to which you were sending a fax was busy. The product automatically redials the busy number. (See “Changing how the product redials” in the online user guide.)	Allow the product to retry sending the fax. Call the recipient to ensure that fax machine is on and ready. Check that you are dialing the correct fax number. Unplug the product telephone cord from the wall, plug in a telephone, and try making a call. Plug the product phone cord into a jack for another phone line. If the error persists, replace the LIU.

Image formation troubleshooting

Checking the toner cartridge

Image formation defects are many times the result of problems in the toner cartridge. If there is any doubt, always replace the toner cartridge before troubleshooting image defects.

Use the following checklist to make sure that the toner cartridge is still operable.

- ☐ Make sure that the toner cartridge is seated properly.
- ☐ Inspect the toner cartridge for remaining toner.
- ☐ Check the expiration date stamped on the toner cartridge box.
- ☐ Check the toner cartridge to see if it has been disassembled or refilled.
- ☐ Inspect the cartridge to see if toner is leaking through worn seals.
- ☐ Check the surface of the photosensitive drum in the cartridge to see if it has been damaged or scratched. Touching the drum contaminates the photosensitive surface and can cause spotting and image defects.
- ☐ Blurred areas on printed pages indicate that the photosensitive drum in the cartridge has been overexposed to light. Because overexposure to light causes permanent damage to the photosensitive drum, the cartridge should be replaced.

Note A toner cartridge weighs approximately 702 grams (24.7 ounces) when it is full and approximately 594 grams (20.9 ounces) when it is empty.

To redistribute toner in the cartridge

Before installing a new cartridge or when toner begins to run low, redistribute the toner by rotating the cartridge back and forth five or six times.

Solving image-quality problems

Use the following table to help solve problems with printed pages. See “Solving paper feed problems” in this chapter.

Table 12. Solving image-quality problems

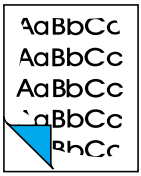
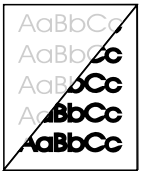
Problem	Cause	Solution
Parts of the page around the edges aren't printing. 	The product cannot print to the edge of the paper. The product has minimum margins on each edge of 6.4 mm (0.25 inch).	To get the image to fit into this printable area, slightly reduce the size of the image.
	If printing or copying, the reduction setting is set incorrectly.	For printing, check the reduction setting in the “Print” or “Setup” window from within the program you are using. Copied images will be clipped if the image on the original is too close to edge of the original.
Images will not print.	The product is not plugged in.	Make sure that the product is plugged into a live wall outlet or power strip.
	The parallel cable is loose.	Check that the parallel cable is securely connected between the product and the computer.
Copies or scanned images are too light or too dark. 	The contrast is not set correctly.	Adjust the contrast and resolution settings from the HP LaserJet Director.
	The product needs to be recalibrated.	Recalibrate the product.
	The original image is very light or very dark.	Adjust the resolution and contrast setting(s) from the toolbox on the HP LaserJet Director.
	The scanned image is too light or too dark because the original was on colored paper.	If the original was on a colored paper, including brown recycled paper, the text might not be clear. Adjust the resolution, contrast, and brightness settings from the toolbox on the HP LaserJet Director.

Table 12. Solving image-quality problems (continued)

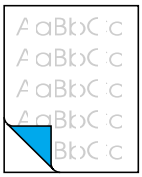
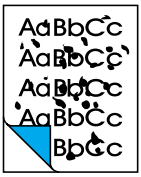
Problem	Cause	Solution
Print is faded or you notice a block of vertically aligned white streaks, 	The toner cartridge is getting low on toner.	Redistribute the toner or replace the toner cartridge.
	The product needs to be cleaned.	See chapter 3, “Maintenance.”
	The media you are using does not meet HP’s specifications (for example, it is too moist or too rough).	Make sure that the media meets the specifications detailed in HP’s media specifications guide.
	The toner density setting is not adjusted correctly.	Adjust the setting from the control panel.
	A part of the product is damaged.	Follow the steps in “Basic troubleshooting” on page 146 to isolate the problem.
	The internal mirror or optics are damaged.	Clean the mirror by blowing air through the laser/scanner to remove any dust particles.
	The laser/scanner is damaged.	Replace the laser/scanner.
	There is a problem in the contact image sensor.	Follow the instructions in chapter 3, “Maintenance,” to recalibrate the document scanner.
	The document scanner needs to be recalibrated.	Replace the contact image sensor.
	There is a problem in the formatter.	Replace the formatter.
Stains or smudges appear as small, round, black dots on the front or back of a page. Sometimes inconsistent stains appear. 	The media you are using does not meet HP’s specifications (for example, it is too moist or too rough).	Make sure that the media meets specifications detailed in HP’s media specifications guide.
	You are printing on the wrong side of the paper.	Remove the paper from the paper input tray and turn it over. (The wrapper on many reams of paper has an arrow indicating the print side.)
	The product needs to be cleaned.	See chapter 3, “Maintenance,” for instructions about cleaning the product and using a cleaning page.
	The toner cartridge is damaged.	Replace the toner cartridge if maintenance procedures do not improve print quality.

Table 12. Solving image-quality problems (continued)

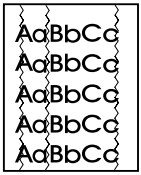
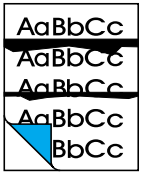
Problem	Cause	Solution
Vertically-aligned black streaks or smears appear on successive pages. 	The product needs to be cleaned.	See chapter 3, “Maintenance.”
	The toner cartridge is damaged.	Replace the toner cartridge if maintenance procedures do not improve print quality.
	There is a problem in the heating element.	Perform the heating element check (see page 168).
	If scanned images have unwanted lines through them:	
	There is ink, glue, white-out, or some other substance on the contact image sensor.	See chapter 3, “Maintenance.”
	Slick paper caused trouble during scanning.	Use a carrier sheet to send the item.
	The product needs to be recalibrated.	Recalibrate the product.
Horizontally aligned black streaks or smears appear. 	The toner cartridge was improperly installed.	Make sure you removed the entire length of the sealing tape from the toner cartridge before you installed it.
	The toner cartridge is defective.	Replace the toner cartridge.
	The product needs to be cleaned.	See chapter 3, “Maintenance.”
	There is a problem in the heating element.	Perform the heating element check (see page 168).
	A gear is damaged.	Perform the drum rotation functional check (see page 167).
	There is a problem in the laser/scanner.	Replace the laser/scanner.
	The product needs to be cleaned.	See chapter 3, “Maintenance.”
	There is a problem in the contact image sensor.	Replace the contact image sensor.
	A roller is damaged.	Use the repetitive image defect ruler (see page 207) to determine which roller is damaged. Replace the roller.
	The product needs to be cleaned.	See chapter 3, “Maintenance.”
	If you are using transparencies, they do not meet HP’s specifications.	Make sure that the media meets specifications detailed in HP’s media specifications guide.
	The paper’s texture is too coarse.	Try changing to a paper with a smoother finish.
	The toner cartridge is damaged, causing a repetitive black flaw on every printout.	Replace the toner cartridge.
	The toner cartridge’s photosensitive drum has been overexposed to bright light, causing repetitive defects (usually a fuzzy black area).	Replace the toner cartridge.

Table 12. Solving image-quality problems (continued)

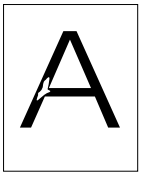
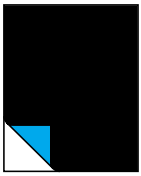
Problem	Cause	Solution
Character voids appear (white areas within the parts of characters that should be solid black). 	The paper or transparencies do not meet HP's specifications.	Make sure that the media meets specifications detailed in HP's media specifications guide.
	You are printing on the wrong surface of the paper.	Remove the paper and turn it over. (The wrapper on many reams of paper has an arrow indicating the print side.)
	Poor fusing.	Check for a wrap jam in the fuser.
Background scatter appears on a printed page.	Bits of toner distributed on the front or back of a printed page can cause background scatter. Background scatter often is isolated to a specific area of the page.	Try changing the print density setting. If that doesn't work, change the paper type, weight, or surface finish. If background scatter occurs on an envelope, try moving the text to an area with no seams. Printing on seams can cause this problem.
	Background scatter can be caused by toner buildup on the pressure roller.	See "To clean the print path" on page 54.
	Toner has spilled inside the product.	See "Cleaning the product" on page 54.
	The pickup roller is dirty.	See "To clean the product and replace the pickup roller" on page 55.
The page is completely black. 	An engine test was performed when the formatter was disconnected.	Reconnect the formatter. The formatter must be connected during an engine test.
	The toner cartridge was improperly installed.	Remove the cartridge and reinstall it.
	The toner cartridge is defective.	Replace the toner cartridge.
	Continuity in the high-voltage contact points is interrupted.	Perform the "high-voltage power supply check" (see page 169).
	There is a problem in the ECU or the laser/scanner.	Follow the steps in "Basic troubleshooting" on page 146 to isolate the problem. Replace the ECU or the laser/scanner, as needed.

Table 12. Solving image-quality problems (continued)

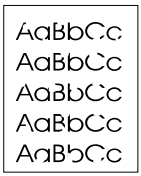
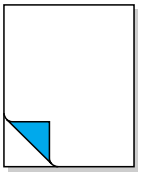
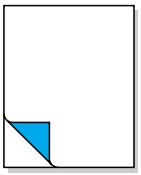
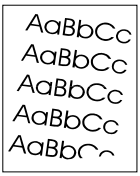
Problem	Cause	Solution
Characters are only partially printed (also referred to as dropouts). 	A single sheet of paper is defective.	Try reprinting the job.
	The print density needs to be adjusted.	Adjust the print density from the control panel.
	The moisture content of the paper is inconsistent or the paper has moist or wet spots on the surface.	Make sure that the media meets HP's specifications.
	The paper was damaged by inconsistent manufacturing processes.	Make sure that the media meets specifications detailed in HP's media specifications guide.
	A "draft mode" or "economy mode" is selected in the software.	Try a "normal" or "best" setting.
Blank pages print occasionally. 	Page length and margins are not set correctly for the paper size.	If you are printing on small-sized paper and the page is blank, try printing on larger paper to see where the image is printing. Adjust the margins accordingly.
	Your product is feeding two or more sheets of paper at a time because the paper is difficult to separate.	Remove the paper from the paper input bin and align the edges of the paper. "Break" the ream of paper by curving it into an upside-down u-shape. Try turning the paper around to feed the other end first, or use a different type of paper. Clean the pickup roller and the separation pad. If the problem persists, replace the separation pad or subpads.
	Your software application is sending an extra page-eject command.	Check your software's printing configuration information. If you are using a word-processing program, check for a natural page break and a forced page break that are close to each other.
Blank pages are always printing. 	The toner cartridge was improperly installed.	Make sure you removed the entire length of the sealing tape from the toner cartridge before you installed it.
	The toner cartridge is completely out of toner.	Replace the toner cartridge.
	Discontinuity exists in the high-voltage contact points.	Perform the high-voltage power supply check (see page 169).
	There is a problem in a part of the product.	Print a self-test page. If the page is blank, follow the steps in "Basic troubleshooting" on page 146 to isolate the problem. Replace the laser/scanner or the ECU as needed.

Table 12. Solving image-quality problems (continued)

Problem	Cause	Solution
Print is misaligned on the page (skewed pages). 	The paper input tray is overfilled.	Remove some of the media.
	The guides are adjusted improperly.	Be sure to center the media with the paper guides. Also, verify that the paper guides are not adjusted too tightly or too loosely against the media.
	The paper's weight or surface finish does not meet HP's specifications.	Make sure that the media meets HP's specifications.
Scanned images have black dots or streaks in top and bottom margins.	There is ink, glue, white-out, or some other substance on the contact image sensor.	See chapter 3, "Maintenance."
	There is a problem in the contact image sensor.	Replace the contact image sensor.
Scanned text is not clear.	The contrast, resolution, or brightness needs to be adjusted before scanning.	Adjust the resolution, contrast and brightness setting(s) from the toolbox on the Document Manager.
	The original is on colored paper.	If the original was on colored paper, including brown recycled paper, the text might not be clear. Try adjusting the resolution, contrast, and brightness settings from the toolbox on the Document Manager.
	There is a problem in the contact image sensor.	Replace the contact image sensor.

Solving paper feed problems

Use the following table to solve problems related to moving paper or documents through the product.

Table 13. Solving paper feed problems

Problem	Cause	Solution
Pages are coming out curled or wrinkled.	Paper is curled or wrinkled when using the paper output bin.	Use the front paper output slot by opening the front paper path door. Reset the fuser mode to the default.
	Paper is not stored properly.	Whenever possible, store paper in its sealed ream at room temperature.
Long pages stop feeding through the document scanner.	The document feeder tray guides are not set correctly, are broken, or are missing.	Check for broken or missing document feeder tray guides and replace as necessary.
	The maximum scannable page length is 889 mm (35 inches). If the page is longer, scanning stops at 889 mm (30 inches).	Do not try to pull the page out because you can damage the document scanner. To remove the page, open the document release door and remove the jammed media.
Print is misaligned on the page (skewed pages).	The paper input tray is overfilled.	Remove some of the media.
	The paper guides are not set correctly, are broken, or are missing.	Be sure to center the paper with the guides. Verify that the guides are not adjusted too tightly or too loosely against the paper. Check for broken or missing paper guides and replace scanner as necessary.
	The paper's weight or surface finish does not meet HP's specifications.	Make sure that the media meets specifications detailed in HP's media specifications guide.
Scanned items are crooked.	The document feeder tray guides are not adjusted properly.	Be sure to center the paper with the guides. Also, verify that the guides are not adjusted too tightly or too loosely against the paper. Check for broken or missing document feeder tray guides and replace the scanner as necessary.

Table 13. Solving paper feed problems (continued)

Problem	Cause	Solution
The product feeds multiple sheets or jams frequently from the paper input bin or single-sheet input slot.	Paper guides are not adjusted properly.	Slide the guides against the sides of the stack in the paper input tray or against the single sheet in the single-sheet input tray to center the paper. Make sure the guides are not adjusted too tightly.
	The special media lever is in the wrong position.	Slide the special media lever back to the normal position. Only slide the special media lever to the right when copying or scanning special media.
	Paper was not removed from the paper input tray before refilling the tray.	Always remove paper from the paper input tray before refilling it.
	The paper input tray is overfilled.	Remove some of the sheets. The paper input tray can hold up to 125 sheets of 75g/m^2 (20 lb) bond weight paper (less for heavier paper) or from 7 to 10 envelopes.
	More than one sheet was placed in the single-sheet input slot.	Place only one sheet at a time in the single-sheet input slot.
	The paper was poorly cut by the manufacturer and is sticking together.	“Break” the ream of paper by curving it into an upside-down u-shape; this can effectively decrease multifeeds. Also try turning the paper around to feed the opposite end first, or use a different type of paper.
	The paper does not meet HP’s specifications for print media.	Make sure that the media meets specifications detailed in HP’s media specifications guide.
	The output capacity was exceeded in the paper output bin or front paper output slot.	Do not allow more than 100 sheets of 75g/m^2 (20 lb) bond weight paper (less for heavier paper) to fill the paper output bin.
	The pickup roller is dirty.	See chapter 3, “Maintenance.”
	The pickup roller is damaged.	Replace the pickup roller.
	The separation pad is dirty.	Clean the separation pad.
	The separation pad is damaged.	Replace the separation pad.
	A sensor is not operating properly.	Check the sensors to make sure that none of them are jammed. If a sensor cannot be “unjammed,” replace the sensor.
	There is a problem in the paper path.	Perform the “paper path check” (see page 171) to determine which parts should be replaced.

Table 13. Solving paper feed problems (continued)

Problem	Cause	Solution
The product feeds multiple sheets or jams frequently from the document feeder tray.	Guides are not adjusted properly.	Remove the document from the document feeder tray. Straighten the item, then reinsert it. Slide the guides against the sides of the item to center it. Make sure the guides are not adjusted too tightly.
	The document feeder tray is overfilled.	Remove some of the sheets. The document feeder tray can hold up to 10 pages, depending on the thickness of the pages.
	The item was too thick, too slick, or otherwise did not meet specifications.	Make sure that the media meets specifications detailed in HP's media specifications guide.
	The document scanner pickup roller or separation pad is dirty and cannot feed the document.	See chapter 3, "Maintenance."
	The document scanner pickup roller or separation pad is damaged or worn.	Replace the scanner.
	The sensor is not operating properly.	Check the sensor to make sure it is not jammed. If a sensor cannot be "unjammed," replace the scanner.
	There is a problem in the document scanner path.	Check the path for obstructions. Readjust as necessary or replace the scanner.
Items loaded in the document feeder tray fall forward out of the tray.	The item is on a very lightweight media.	Do not try to pull the page out because you may damage the document scanner. Open the document release door and remove the jammed media. Then, curl or roll the item in the direction of the printed side, unroll it, and reload the item.

Engine test

The engine test is used to verify that the print engine is functioning correctly. The formatter is bypassed during an engine test, so the engine test is useful for isolating printer problems. The engine test prints vertical lines down the entire printable area of a page and is also useful for checking and adjusting registration.

Printing an engine test

The engine test switch can be reached without removing the covers. It is located on the back of the product under the memory door.

To print an engine test, lift the memory door on the back of the printer and depress the engine test switch. A single test page will print.

Note

The formatter must be connected to the ECU to perform an engine test (see callouts 1, 2, and 3 in figure 64 on page 137). If it is not, the product prints a black page.

Figure 71. **Engine test switch**

Half-self-test functional check

The electrophotographic process can be subdivided into the following stages:

- Image formation stage (charges the drum and writes a latent image to the drum with the laser)
- Development stage (forms a toner image on the drum)
- Transfer stage (transfers the image to paper)
- Cleaning stage (removes excess toner from the drum)
- Fusing stage (applies heat and pressure to make the image on paper permanent)

The purpose of the half-self-test check is to determine which process is malfunctioning. Perform the test as follows:

1. Print a demonstration page (see “To print a demonstration page” on page 186).
2. Open the printer door after the paper advances half-way through the printer (about eight seconds after the motor begins rotation). The leading edge of the paper should have advanced past the toner cartridge.
3. Remove the toner cartridge.
4. Open the toner cartridge drum shield to view the drum surface. If a dark and distinct toner image is present on the drum surface, assume that the first two functions of the electrophotographic process are functioning (image formation and development). Troubleshoot the failure as a transfer or fixing problem.

If there is no image on the photosensitive drum, perform the following functional checks:

1. Make sure you have removed the entire length of the sealing tape from the toner cartridge before you installed the cartridge.
2. Perform a drum rotation functional check.
3. Perform a high-voltage power supply check.

Drum rotation functional check

The photosensitive drum, located in the toner cartridge, must rotate for the print process to work. The photosensitive drum receives its drive from the main drive assembly. To verify that the drum is rotating:

1. Open the printer door.
2. Remove the toner cartridge.
3. Mark the drive gear on the cartridge with a felt-tipped marker. Note the position of the mark.
4. Install the toner cartridge and close the printer door. The start-up sequence should rotate the drum enough to move the mark.
5. Open the printer and inspect the gear that was marked in step 3. Verify that the mark moved.

If the mark did not move, inspect the main drive assembly to make sure that it is meshing with the toner cartridge gears. If the drive gears appear functional and the drum does not move, replace the toner cartridge.

Note This test is especially important if refilled toner cartridges have been used.

Heating element check

Paper passes between the heating element and a soft pressure roller to fuse toner to the paper. To verify that the heating element is functioning correctly:

1. Unplug the product for at least ten minutes.
2. Verify that the thermistor connector is seated into both the printer chassis and the ECU (see figure 49 on page 121).
3. Remove the heating element connector from the ECU (see figure 50 on page 122). To measure the continuity of the heating element, measure the resistance between the two pins at the end of the cable.

Note Normal resistance is 30 ohms +/- 10 ohms.

4. If no resistance is measured, replace the heating element.
5. Remove the thermistor connector (see figure 49 on page 121) and measure the resistance between pins one and two.

Note Normal resistance is 440K ohms +/- 30K ohms at 68° F (20° C).

6. If no resistance is measured, replace the heating element.

Paper curl

Paper curl is inherent to the laser printing processes, and occurs when paper is subjected to heat. Paper curl tends to relax as the paper cools while resting on a flat surface. The specification for maximum paper curl when the paper is lying flat before print is 5 mm (0.2 inches).

High-voltage power supply check

The high-voltage power supply PCA provides the necessary voltages for the electrophotographic processes.

Checking the toner cartridge connection points

Visually inspect the three connection points on the underside, right end of the toner cartridge: charging (callout 1), drum ground (callout 2), and developing roller (callout 3). If they are dirty or corroded, clean the connections, or, if they are damaged, replace the toner cartridge.

Note Use only alcohol to clean the connections.

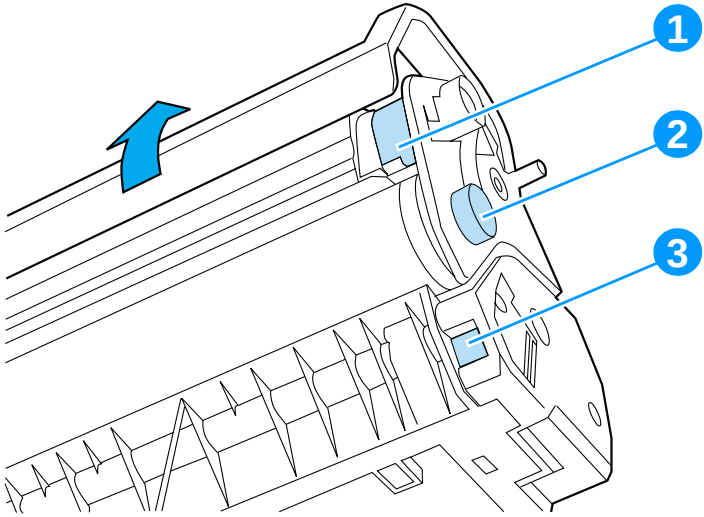


Figure 72. **Toner cartridge high-voltage connection points**

Checking the high-voltage connector assembly

The assembly uses three spring-loaded pins to contact the toner cartridge: charging (callout 1), drum ground (callout 2), and developing roller (callout 3). Verify that the pins are not dirty or corroded and that the spring-loading action is functional. If the pins are dirty, clean them using alcohol only. If they are damaged, replace the high voltage connector assembly.

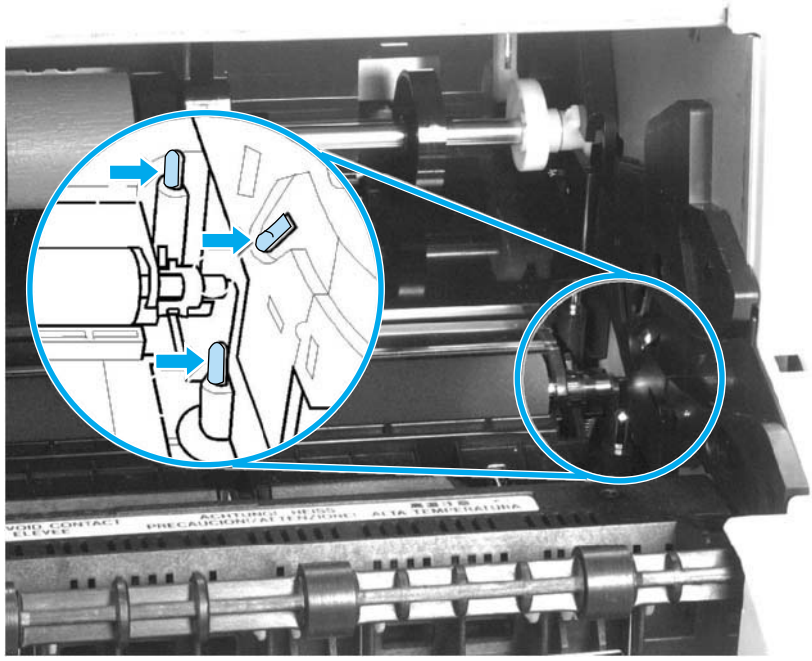


Figure 73. **High-voltage connector assembly**

Paper path check

If paper is not being picked up or is not moving through the paper path, you may want to observe all of the paper motion activities. Overriding SW301 allows you to observe:

- Motor rotation
- Solenoid action
- Kick plate motion
- Paper pickup roller motion
- Drive roller, transfer roller, fuser roller and gear, and delivery roller motion

To override SW301

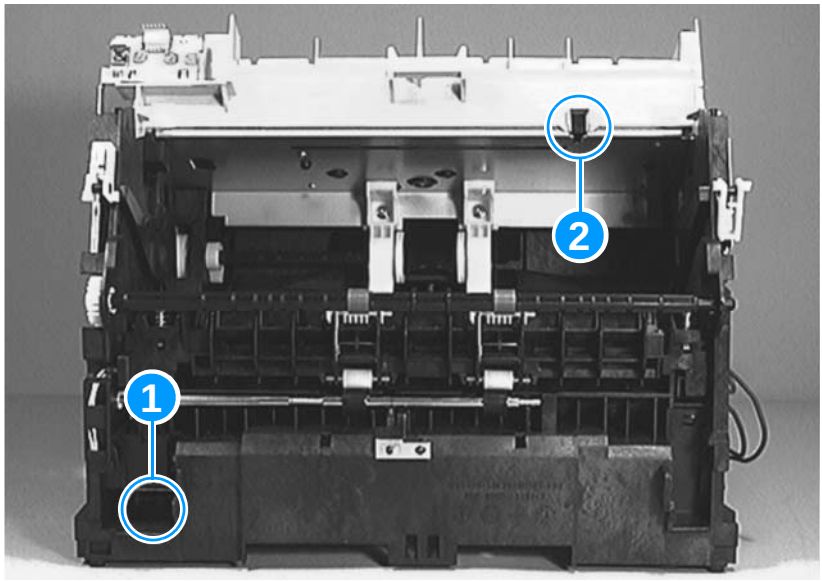


Figure 74. **Overriding SW301**

1 Remove the printer covers

2 Install the toner cartridge.

3 Make sure the fuser levers on the delivery assembly are closed.

4 Press SW301- front door interlock (callout 1).

5 Press laser/scanner interlock switch on laser/scanner (callout 2).

6 While SW301and laser/scanner interlock is engaged, perform an engine test to observe paper motion. (See procedures earlier in this chapter.)

Service mode functions

Secondary service menu

Use the secondary service menu to perform various tests and print service reports. Below is a hierarchical diagram of the secondary service menu:

Main menu	Submenu	Submenu
Secondary service	Secondary reports	Continuous self-test Data store report Ext keypad map
	Scanline data	Red-corrected Blue-corrected Green-corrected Red-uncorrected Blue-uncorrected Green-uncorrected

To gain access to the secondary service menu

1. Make sure that the control panel display reads READY.
2. Press ENTER/MENU.
3. Press 1 on the one-touch keypad.
4. Use the < and > keys to navigate to the secondary service menu.

Developer’s menu

Use the developer’s menu to adjust fax data store parameters and to run various tests. Below is a hierarchical diagram of the developer’s menu:

Main menu	Submenu	Submenu
Developer’s menu	R/W parameter	
	Monitor test	Onhook monitor Offhook monitor Eavesdrop monitor Signal power monitor
	LIU test	LIU inputs LIU ID
	Loopback test	
	Transmit test	

To gain access to the developer’s menu:

1. Make sure that the control panel display reads READY.
2. Press ENTER/MENU.
3. Press * and # simultaneously and then release both keys.
4. Use the < and > keys to navigate to the developer’s menu.

After you enter the developer’s menu, the control panel display should read R/W PARAMETER.

To adjust a country code parameter

Note Changing the country code does not change the language.

1. Make sure that the control panel display reads R/W PARAMETER.
2. Press 3 on the control panel keypad and then press ENTER/MENU.
3. Use the control panel keypad to input the country code (see table 14 below) and then press ENTER/MENU.

CAUTION Changing country code parameters can render the product illegal or inoperable.

Table 14. Country codes

Country	Country code	Country	Country Code
Argentina	16	Malaysia	27
Australia	23	Mexico	13
Austria	34	Netherlands	35
Belgium	45	New Zealand	19
Canada	14	Norway	43
China	6	Poland	56
Denmark	40	Portugal	50
Finland	46	Russia	64
France	47	Singapore	30
Germany	39	Spain	55
Greece	49	Sweden	41
Hong Kong	29	Switzerland	36
Hungary	62	Taiwan	7
Ireland	44	Ukraine	63
Israel	21	United Kingdom	31
Italy	51	United States	15
Korea	4		

4. Power-cycle the product by unplugging (or turning off) the product and then plugging back in (or turning on) the product.

To adjust a fax data store parameter

CAUTION When you adjust fax data store parameters, the product does not alert you to incorrect input values. Changing fax data store parameters can render the product illegal or inoperable.

1 Enter the parameter ID number or use the < and > keys to locate the parameter you want to change. The control panel display shows the current setting.

Note See tables 15 and 16 for complete lists of fax data store parameters.

2 Enter the new value for the fax data store parameter and then press ENTER/MENU.

Table 15. Parameter ID numbers (Fall, 2000 release)

ID#	Parameter name	Default	ID#	Parameter name	Default
2	LIU ID	0	26	Cng tone threshold	350
3	LIU country	15	27	Cng tone bandwidth	60
4	Auto answer	1	28	Sidetone frequency	3
5	Ring cadences	0	29	Sidetone frequency 1	1000
6	Ring cadences count	5	30	Sidetone frequency 2	1350
7	Ring det low freq	15	31	Sidetone freq 1 band	60
8	Ring det high freq	68	32	Sidetone freq 2 band	60
9	Ring env min on	150	33	Silence detect min	3000
10	Ring env max on	8000	34	Silence det noise tm	1000
11	Ring env min off	1000	35	DTMF 1st character	49
12	Ring env max off	8000	36	DTMF 2nd character	50
13	Ring burst min on	100	37	DTMF 3rd character	51
14	Ring burst min off	100	38	Offhook delay	5000
15	Minimum number of rings	1	39	Offhook shunt	0
16	Maximum number of rings	9	40	Modem loop current	0
17	Silence detection	0	41	Modem lp cur min on	0
18	Parallel detection	1	42	Modem lp cur eval tm	0
19	Eavesdrop evaluatn	60	43	Phone loop current	1
20	Cng tone min on	400	44	Phone lp cur min on	50
21	Cng tone max on	600	45	Phone lp cur min off	1000
22	Cng tone min off	2400	46	Line type	0
23	Cng tone max off	3600	47	PSTN pre-dial pause	0
24	Cng tone max dropout	100	48	PBX pre-dial pause	0
25	Cng tone min count	2	49	PSTN blind dial wait	3000

Table 15. Parameter ID numbers (Fall, 2000 release) (continued)

ID#	Parameter name	Default	ID#	Parameter name	Default
50	PBX blind dial wait	2000	88	Open flash	800
51	Pause time	3000	89	Phone inact abort	59
52	Max number of pauses	36	90	Busy tone detect	1
53	PSTN dial tone eval	10000	91	Busy tone frequency	5
54	PSTN dial tone freq	5	92	Busy tone min on	150
55	PSTN dial tn det min	500	93	Busy tone max on	750
56	PSTN dial tn min on	0	94	Busy tone min off	150
57	PSTN dial tn max on	0	95	Busy tone max off	750
58	PSTN dial tn min off	0	96	Complex impedance	0
59	PSTN dial tn max off	0	97	Busy tone freq 1	620
60	PSTN dl tn dt thresh	320	98	Busy tone freq 2	480
61	PSTN dial tn freq 1	350	99	Busy tn freq 1 band	200
62	PSTN dial tn freq 2	440	100	Busy tn freq 2 band	200
63	PSTN dial tn freq 3	0	101	Busy tn detect time	10000
64	PSTN dl tn fq1 band	100	102	CED/busy threshold	470
65	PSTN dl tn fq2 band	100	103	Eavesdrop gain	50
66	PSTN dl tn fq3 band	0	106	Modem equalizer	0
67	Special dial tone eval	0	107	Receive loss	50
68	Special dl tn frequency	0	108	Transmit loss	80
69	Special dl tn det min	0	109	DTMF high group	60
70	Special dial tn min on	0	110	DTMF low group	20
71	Special dial tn max on	0	111	Carrier detect level	440
72	Special dial tn min off	0	112	Tone transmit level	100
73	Special dial tn max off	0	113	Data transmit level	100
74	Special dl tn dt thresh	0	114	V17 14400 eqm thresh	48
75	Special dial tone freq1	0	115	V17 12000 eqm thresh	128
76	Special dial tone freq2	0	116	V17 9600 eqm thresh	440
77	Special dial tone freq3	0	117	V17 7200 eqm thresh	1024
78	Special dl tn fq1 band	0	118	V33 14400 eqm thresh	65535
79	Special dl tn fq2 band	0	119	V33 12000 eqm thresh	65535
80	Special dl tn fq3 band	0	120	V29 9600 eqm thresh	900
81	Tone/pulse	0	121	V29 7200 eqm thresh	1700
82	Pre-shunt	0	122	V29 4800 eqm thresh	65535
83	Post-shunt	0	123	V27 4800 eqm thresh	2400
84	Pulse break	60	124	V27 2400 eqm thresh	5500
85	Pulse make	40	125	Echo protect	0
86	Pulse interdigit	800	126	TCF 0 check	80
87	DTMF duration	70	127	No carrier abort	10000

Table 15. Parameter ID numbers (Fall, 2000 release) (continued)

ID#	Parameter name	Default	ID#	Parameter name	Default
129	V34 block err thresh	9011	165	Receive ecm abort	180
130	T.30 ans inact abort	30	166	Receive non-ecm abrt	13
131	T.30 orig inact abort	59	167	Receive rtn thresh	10
132	T.30 t5 timer	240	168	Send ecm abort	300
133	T.30 bzt	0	169	Send non-ecm abort	300
134	T.30 man dial abort	0	170	Ring noise enable	2
135	Redial on busy	1	171	Key beep enable	2
136	Redial on no answer	0	172	Monitor	0
137	Repeat timer 1	60	173	Ring volume	1
138	Repeat timer 2	300	174	Beep volume	1
139	Repeat count 1	1	175	Monitor volume	96
140	Repeat count 2	4	176	Contrast	0
141	Blacklist	0	178	Resolution	1
142	Paper size	2	179	Number of speed dials	100
143	No answer max redials	1	180	Fax additional wait	0
144	Monitor dial delay	5000	181	Compression factor	0
145	Scan minimum cycle	0	182	Doc memory size	1412
146	Copy minimum cycle	0	183	Auto fax log	1
147	Time format	0	184	Fax fixed reduction	100
148	Date format	0	185	Fax auto reduction	1
149	Language	0	186	Fax mem-out red	90
150	DIS maximum size	255	187	Fax max auto red	60
151	T.30 transmit resolut max	2	188	Fax backup receipt	1
152	T.30 transmit encode max	2	189	Transmit fail – non-jpeg	1
153	T.30 transmit rate max	26	190	Transmit fail – noncolor	0
154	T.30 transmit ecm	1	191	T.30 transmit color	0
155	T.30 transmit bft	0	192	T.30 receive color	1
156	T.30 transmit ecm size	256	193	CIOCA default	12
157	T.30 rcv resolut max	2	194	CIOCA eavesdrop	4
158	T.30 rcv encode max	2	195	CIOCB default us	44828
159	T.30 rcv rate max	26	196	CIOCB eavesdrop us	44830
160	T.30 receive ecm	1	197	CIOCB default euro	44830
161	T.30 receive bft	0	198	CIOCB eavesdrop euro	44830
162	T.30 receive mslt	0	199	CIOCB default row	44830
163	Ignore 1st dis	0	200	CIOCB eavesdrop row	44830
164	Pre-DCS delay	500	201	Fax_rx_disposition	1

Table 16. Parameter ID numbers (Spring, 2001 release)

ID#	Parameter name	Default	ID#	Parameter name	Default
2	LIU ID	*0	38	Offhook delay	*5000
3	LIU country	*15	39	Offhook shunt	*0
4	Auto answer	1	40	Modem loop current	0
5	Ring cadences	0	41	Modem lp cur min on	0
6	Ring cadences count	*5	42	Modem lp cur eval tm	0
7	Ring det low freq	*15	43	Phone loop current	1
8	Ring det high freq	*68	44	Phone lp cur min on	50
9	Ring env min on	*150	45	Phone lp cur min off	1000
10	Ring env max on	8000	46	Line type	0
11	Ring env min off	*1000	47	PSTN pre-dial pause	*0
12	Ring env max off	*8000	48	PBX pre-dial pause	0
13	Ring burst min on	*100	49	PSTN blind dial wait	*3000
14	Ring burst min off	*100	50	PBX blind dial wait	*2000
15	Minimum number of rings	*1	51	Pause time	*3000
16	Maximum number of rings	*9	52	Max number of pauses	36
17	Silence detection	0	53	PSTN dial tone eval	*10000
18	Parallel detection	1	54	PSTN dial tone freq	*5
19	Eavesdrop evaluatn	60	55	PSTN dial tn det min	*500
20	Cng tone min on	400	56	PSTN dial tn min on	0
21	Cng tone max on	600	57	PSTN dial tn max on	0
22	Cng tone min off	2400	58	PSTN dial tn min off	0
23	Cng tone max off	3600	59	PSTN dial tn max off	*0
24	Cng tone max dropout	100	60	PSTN dl tn dt thresh	*320
25	Cng tone min count	2	61	PSTN dial tn freq 1	*350
26	Cng tone threshold	*350	62	PSTN dial tn freq 2	*440
27	Cng tone bandwidth	60	63	PSTN dial tn freq 3	*0
28	Sidetone frequency	3	64	PSTN dl tn fq1 band	*100
29	Sidetone frequency 1	1000	65	PSTN dl tn fq2 band	*100
30	Sidetone frequency 2	1350	66	PSTN dl tn fq3 band	*0
31	Sidetone freq 1 band	60	67	Special dial tone eval	*0
32	Sidetone freq 2 band	60	68	Special dl tn frequency	*0
33	Silence detect min	3000	69	Special dl tn det min	*0
34	Silence det noise tm	1000	70	Special dial tn min on	0
35	DTMF 1st character	49	71	Special dial tn max on	0
36	DTMF 2nd character	50	72	Special dial tn min off	0
37	DTMF 3rd character	51	73	Special dial tn max off	0
* indicates that the default varies.					

Table 16. Parameter ID numbers (Spring, 2001 release) (continued)

ID#	Parameter name	Default	ID#	Parameter name	Default
74	Special dl tn dt thresh	*0	112	Tone transmit level	*100
75	Special dial tone freq1	*0	113	Data transmit level	*100
76	Special dial tone freq2	0	114	V17 14400 eqm thresh	48
77	Special dial tone freq3	0	115	V17 12000 eqm thresh	128
78	Special dl tn fq1 band	*0	116	V17 9600 eqm thresh	440
79	Special dl tn fq2 band	0	117	V17 7200 eqm thresh	1024
80	Special dl tn fq3 band	0	118	V33 14400 eqm thresh	65535
81	Tone/pulse	0	119	V33 12000 eqm thresh	65535
82	Pre-shunt	*0	120	V29 9600 eqm thresh	900
83	Post-shunt	*0	121	V29 7200 eqm thresh	1700
84	Pulse break	*60	122	V29 4800 eqm thresh	65535
85	Pulse make	*40	123	V27 4800 eqm thresh	2400
86	Pulse interdigit	*800	124	V27 2400 eqm thresh	5500
87	DTMF duration	*70	125	Echo protect	0
88	Open flash	*800	126	TCF 0 check	80
89	Phone inact abort	*59	127	No carrier abort	*10000
90	Busy tone detect	1	129	Modem equalizer	9011
91	Busy tone frequency	5	130	Receive loss	*30
92	Busy tone min on	*150	131	Transmit loss	*59
93	Busy tone max on	*750	132	DTMF high group	*240
94	Busy tone min off	*150	133	DTMF low group	*0
95	Busy tone max off	*750	134	Carrier detect level	*0
96	Complex impedance	*0	135	Tone transmit level	1
97	Busy tone freq 1	*620	136	Data transmit level	0
98	Busy tone freq 2	*480	137	V17 14400 eqm thresh	*60
99	Busy tn freq 1 band	*200	138	V17 12000 eqm thresh	300
100	Busy tn freq 2 band	*200	139	V17 9600 eqm thresh	1
101	Busy tn detect time	*10000	140	V17 7200 eqm thresh	*4
102	CED/busy threshold	*470	141	V33 14400 eqm thresh	*0
103	Eavesdrop gain	50	142	V33 12000 eqm thresh	*2
104	pulse dial disable	*0	143	V29 9600 eqm thresh	*1
106	Modem equalizer	0	144	V29 7200 eqm thresh	*5000
107	Receive loss	*50	145	V29 4800 eqm thresh	*0
108	Transmit loss	*80	146	V27 4800 eqm thresh	*0
109	DTMF high group	*60	147	V27 2400 eqm thresh	*0
110	DTMF low group	*20	148	Echo protect	*0
111	Carrier detect level	*440	149	TCF 0 check	0
* indicates that the default varies.					

Table 16. Parameter ID numbers (Spring, 2001 release) (continued)

ID#	Parameter name	Default	ID#	Parameter name	Default
150	No carrier abort	255	176	Contrast	0
151	Modem equalizer	2	178	Resolution	1
152	Receive loss	2	179	Number of speed dials	100
153	Transmit loss	26	180	Fax additional wait	0
154	DTMF high group	1	181	Compression factor	0
155	DTMF low group	0	182	Doc memory size	1412
156	Carrier detect level	256	183	Auto fax log	1
157	Tone transmit level	2	184	Fax fixed reduction	100
158	Data transmit level	2	185	Fax auto reduction	1
159	V17 14400 eqm thresh	26	186	Fax mem-out red	90
160	V17 12000 eqm thresh	1	187	Fax max auto red	60
161	V17 9600 eqm thresh	0	188	Fax backup receipt	1
162	V17 7200 eqm thresh	0	189	Transmit fail – non-jpeg	1
163	V33 14400 eqm thresh	0	190	Transmit fail – noncolor	0
164	V33 12000 eqm thresh	500	191	T.30 transmit color	0
165	Receive ecm abort	180	192	T.30 receive color	1
166	Receive non-ecm abrt	13	193	CIOCA default	12
167	Receive rtn thresh	10	194	CIOCA eavesdrop	4
168	Send ecm abort	300	195	CIOCB default us	44828
169	Send non-ecm abort	300	196	CIOCB eavesdrop us	44830
170	Ring noise enable	2	197	CIOCB default euro	44830
171	Key beep enable	2	198	CIOCB eavesdrop euro	44830
172	Monitor	0	199	CIOCB default row	44830
173	Ring volume	1	200	CIOCB eavesdrop row	44830
174	Beep volume	1	201	Fax_rx_disposition	1
175	Monitor volume	96	201	Receive ecm abort	0

Diagnostic mode

Use diagnostic mode to check the functionality of LEDs, the control panel display LCDs, and to check the firmware version.

Note Diagnostic mode is available for firmware version 2.2 or higher.

To gain access to diagnostic mode

1. Unplug (or turn off) the product from the power source.
2. Press and hold down VOLUME, STOP/CLEAR, and 1 on the one-touch keypad simultaneously.
3. Continue to hold down the keys while you plug back in (or turn on) the product, through the entire power-on sequence.

The table below shows the tests and key sequences to perform in diagnostic mode:

Table 17. Diagnostic mode key sequences

To perform this test . . .	Press these keys . . .
Toggle LED1 on/off	1 or 5 on the one-touch keypad
Toggle LED2 on/off	2 or 6 on the one-touch keypad
Access LCD pattern 1 (solid fill)	1 on the numeric keypad, <, or >
Access LCD pattern 2 (empty fill)	2 or 8 on the numeric keypad
Access LCD pattern 3 (> fill)	3 or 9 on the numeric keypad, or REDUCE/ENLARGE
Access LCD pattern 4 (H fill)	4 on the numeric keypad or 3 or 7 on the one-touch keypad
Access LCD pattern 5 (frame fill)	5 or 0 on the numeric keypad, or RESOLUTION
Access LCD pattern 6 (check fill)	6 on the numeric keypad
Access LCD pattern 7 (ROM check)	7 on the numeric keypad or REDIAL/PAUSE
Access firmware version number	#, *, or 10 on the one-touch keypad

To check keys in diagnostic mode

1. Press 9 on the one-touch keypad.
2. Press all of the keys on the control panel.
3. Press an extra key.

For each key pressed during the test, a "+" character appears on the LCD (initially, five "+" characters appear on the screen to account for the 9 on the one-touch keypad and for four other spaces that have no key correspondence).

When all of the keys have been pressed, the display fills with "+" characters. Pressing any other key after the display is full results in the message "OK" on the control panel display also causes both LEDs to toggle on and off.

To exit diagnostic mode

1. Press VOLUME, ENTER/MENU, and 1 on the one-touch keypad simultaneously.
2. Release the keys.

NVRAM init

NVRAM init sets all default variables stored in NVRAM back to factory default values or to a default ROM value, depending on the variable, and performs a system reset.

CAUTION Performing NVRAM init can cause the product to violate local telephone regulations. Reset the language and country code after performing NVRAM init.

NVRAM init resets the following:

- All menu settings to factory default values, including fax header and company name
- Factory settings such as formatter number, page counts, and factory paper settings
- Fax memory—all faxes in memory are erased
- All localization settings, including lanuage and country code

To perform NVRAM init

1. Unplug (or turn off) the product from the power source.
2. Press and hold down the SYMBOLS key and ENTER/MENU.
3. Continue to hold down the keys while you plug back in (or turn on) the product, through the entire power on sequence.
4. When the control panel display reads `PERMANENT STORAGE INITIALIZE` or `HP LASERJET 3200`, release the keys.
5. Allow the product to return to READY before using the product.

PJL software commands

To set the following NVRAM variables:

Factory printer DEFAULT PAPER, scanner factory default paper size will be set to the same value automatically.

Factory printer DEFAULT LPARM:PCL SYMSET

Factory DEFAULT OEM bit

Factory DEFAULT PRINTPAGECOUNT

Factory DEFAULT SCANPAGECOUNT

Factory DEFAULT COPYPAGECOUNT

Note Default quick copy paper size is also stored in scanner NVRAM but is changed only through the software or when set back to factory default with a NVRAMINIT. Only quick copy image type and contrast have a default value stored in NVRAM; they can only be changed through the software or by NVRAMINIT, which returns them to a ROM default value.

The table below provides a more detailed description of the NVRAM PJL factory variables and commands and shows possible settings for each.

NVRAM PJL Variable or Command	Possible settings
DEFAULT PAPER	"LETTER", "LEGAL, "A4", "EXECUTIVE", "COM10", "MONARCH", "DL", "C5", "B5", "CUSTOM"
DEFAULT LPARM:PCL SYMSET	"ROMAN8", "ISOL1", "ISOL2", "ISOL5", "PC8", "PC8DN", "PC85Ø", "PC852", "PC8TK", "WINL1", "WINL2", "WINL5", "DESKTOP", "PSTEXT", "VNINTL", "VNUS", "MSPUBL", "MATH8", "PSMATH", "VNMATH", "PIFONT", "LEGAL", "ISO4", "ISO6", "ISO11", "ISO15", "ISO17", "ISO21", "ISO6Ø", "ISO69", "WIN3Ø"
DEFAULT OEM	"ON", "OFF"
DEFAULT PRINTPAGECOUNT	0-2147483647
DEFAULT SCANPAGECOUNT	0-2147483647
DEFAULT COPYPAGECOUNT	0-2147483647
CLEARNVRAM	None - Command
NVRAMINIT	None - Command

Figure 75. NVRAM PJL factory variables

To use these commands, you need some method to send PJL commands to the printer, either with a software tool or by copying a binary file that contains the commands from the host using a DOS box. For example, from the DOS prompt:

```
copy /b filename lpt1
```

Here is an example of a file that uses one of the commands:

```
ESC%-12345X@PJL SET SERVICEMODE=HPBOISEID
@PJL ‘command’
@PJL RESET
```

Here is an example of using the NVRAMINIT command:

```
ESC%-12345X@PJL SET SERVICEMODE=HPBOISEID
@PJL NVRAMINIT
@PJL RESET
```

Note Set SERVICEMODE before trying to set the variable or you will not get the desired result. Also reset the PJL to be sure the SERVICEMODE status is cleared.

To create these files, you need an editor that can insert the ESC character or is able to copy it in from a existing file. If a software tool is used, simply send the same strings in the same order as given for the example files.

Troubleshooting tools

Internal reports

Use the control panel to print configuration reports and demonstration pages. The configuration report shows the settings selected from the control panel. The control panel menu structure might be a useful reference as you alter settings in the menu.

To print a configuration report

1. Press ENTER/MENU.
2. Use the < or > key to select REPORTS and then press ENTER/MENU.
3. Use the < or > key to select CONFIGURATION REPORT and then press ENTER/MENU. The product exits the Menu settings and prints the report.

To print a demonstration page

1. Press ENTER/MENU.
2. Use the < or > key to select REPORTS and then press ENTER/MENU.
3. Use the < or > key to select DEMO PAGE and then press ENTER/MENU. The product exits the Menu settings and prints the report.

Printing all fax reports at once

When you print all reports at once, the following reports are printed:

- **Fax activity log**—recent faxes sent and received, and status
- **Billing log** (if enabled)—prints by billing code
- **Block fax list** (if enabled)—fax numbers you have blocked
- **Configuration report**—current control panel settings, including the following sections:
  - System information
  - Reports
  - Fax settings
  - User defaults
  - Service
  - Page counts
- **Speed-dial report**—one-touch, speed dial, and group dial report

To print all fax reports at once

1. Press ENTER/MENU.
2. Use the < and > keys to select REPORTS and press ENTER/MENU.
3. Use the < and > keys to select ALL FAX REPORTS and press ENTER/MENU.

T.30 protocol trace

Use a T.30 protocol trace report to troubleshoot fax transmission issues.

To print a T.30 protocol trace report

1. Press ENTER/MENU.
2. Use the < or > key to select SERVICE and press ENTER/MENU.
3. Use the < or > key to select PRINT T.30 TRACE and press ENTER/MENU.
4. Use the < or > key to select NOW and press ENTER/MENU. The product exits the Menu settings and prints the reports.

To set when the T.30 protocol trace reports prints

1. Press ENTER/MENU.
2. Use the < or > key to select SERVICE and press ENTER/MENU.
3. Use the < or > key to select PRINT T.30 TRACE and press ENTER/MENU.
4. Use the < or > key to select the option for when you want the T.30 protocol trace report to print.
5. Press ENTER/MENU to save the selection.

Use the control panel service menu to choose T.30 Protocol Trace and then select At end of call. Configure another fax machine, preferably another HP LaserJet 3200 or HP LaserJet 3200M product, to the same (or similar) settings.

Send a fax from the product or receive a fax to the product from the other fax machine. The fax trace report prints after the fax prints.

Explanations of some of the report's column heading follow:

- **Date** and **Time** identify when the fax begins. Match it with the fax log of errors.
- **Type** is the type of fax activity, send or receive.
- **Identification** is the phone number to which a fax is sent.
- **Result** explains the status of the fax:
  - "OK" means that the fax was successful.
  - "Pending" faxes are in memory or are printing.
  - For error codes and their meanings, see tables 18 and 19 on pages 189 through 200.

Table 18. Fax receive error codes

Error code	Error definition	Solution
200	The fax session has completed without errors.	None required.
221	User has pressed STOP/CLEAR causing fax session to be prematurely halted.	Allow the product to receive the fax.
222	The local machine has answered a call but has been unable to detect the presence of a calling fax machine. Typically this is caused by the local fax machine answering a voice call. -Or- The remote user canceled the fax transmission by pressing STOP/CLEAR immediately prior to, or just as the local machine answered the call. -Or- The remote machine automatically ended the call immediately prior to, or just as the local machine answered the call. -Or- The remote (calling) fax machine determined there was a feature incompatibility between the two and disconnected immediately before transmitting any further fax tones or T.30 frames. (This is a very rare and non-standard behavior.)	**1** Confirm that the remote caller is a fax machine and not a voice call- (typically we must rely on the remote user informing the caller that the fax session failed). **2** If the remote machine ends the call just as the local machine starts reception, reduce the ring count after which the local machine answers. Alternatively suggest that the remote user manually dials to the local machine and then manually starts the fax session, by pressing START once fax tones have been heard from the local machine. **3** Confirm the remote user is not inadvertently attempting to poll transmit from the local machine, instead of transmitting to the local machine. **4** Reconfigure the local fax machine to use different configuration settings, toggle the ECM state and/or select a slower reception speed.
223 (ECM error)	The local machine has been unable to receive an entire page even after multiple attempts to re-receive the parts of the page that contain errors. This is usually caused by extremely poor line conditions.	Reattempt the fax reception at a different time when telephone line conditions have improved. -Or- Disable ECM. Errors may still occur, and may result in degraded image quality on the received page. However, the ability to receive the entire document will be improved.

Table 18. Fax receive error codes (continued)

Error code	Error definition	Solution
224	The local machine has received one or more pages with excessive errors. This is usually caused by extremely poor line conditions. Error correction is not used during this session so errors are not corrected. It should be noted that some non-HP machines may optionally choose to resend the entire errored pages, but we will be unable to determine if the received page corrects problems with a previously received page.	Reattempt the fax reception at a different time when telephone line conditions have improved.
225	The remote machine has attempted to initiate a remote diagnostic session with this machine, even though remote diagnostic access is locally disabled.	Enable the remote diagnostics capability on the local machine.
226	The remote machine has attempted to initiate a remote diagnostic session with this machine, but the remote diagnostic versions supported by the two machines are incompatible.	None. Remote diagnostics cannot occur between machines with incompatible remote versions.
227	The remote machine has attempted to initiate a fax session at a speed and modulation that is not supported by the local machine.	Reconfigure the local machine to receive at a slower speed.
228	The remote machine has attempted to initiate a poll transmission from the local machine even though the local machine is not configured for poll transmission.	**1** Confirm that polling by the remote user is desired. It is possible that the remote user has inadvertently attempted to poll. If this is the case reattempt a normal transmission from the remote machine. **2** If polling by the remote user was desired, confirm that the local machine was correctly configured for poll transmission.
229	The remote machine has attempted to initiate a secure poll transmission from the local machine but has not provided a valid password.	If the remote user is the desired recipient for the polled document confirm that the remote user has the correct password, and that the local machine is configured with the same password.
230	The remote machine has attempted to initiate an operation that requires error correction but has not selected error correction for the session.	Enable ECM on both the local machine and the remote machine.
231	The remote machine has attempted to initiate a transmission to the local machine even though the capability to receive is disabled at the local machine.	Ensure that the local machine is capable of receiving a document. Check that paper is correctly loaded, paper is not jammed within the machine, and any other system abnormalities have been cleared.

Table 18. Fax receive error codes (continued)

Error code	Error definition	Solution
232 233 234 235 (ECM error) 236 (ECM error) 237	A communication failure has occurred between the two machines. -Or- The user at the remote machine may have pressed STOP/CLEAR. -Or- The power at the remote machine has been interrupted, or deliberately turned off, causing the fax session to be interrupted.	**1** Re-attempt the fax reception at a different time when telephone line conditions have improved. **2** If the error persists, and error correction is in use for the fax session, disable ECM.
238 239 (ECM error) 240 (ECM error) 241 (ECM error)	The sending fax machine sent an unexpected communication.	None. This is a defect in the remote sending machine.
242	The remote fax machine is attempting to receive instead of send. Both machines have attempted to start a reception at the same time. It is possible to accidentally initiate a fax reception after dialing on many machines, if there is no paper in the machine or if the paper is not correctly loaded and cannot be sensed by the appropriate document sensor.	Ensure that a document is ready and correctly loaded in the transmitting fax machine and that the remote machine is attempting to initiate a transmission and not a reception.
243 244	The user of the remote machine has pressed that machine's top key causing the session to be prematurely terminated. -Or- The remote fax machine determined that there was a feature incompatibility between the two machines and has terminated the session. An example would be when the local machine wanted to initiate polling, but the remote machine did not support this mode of operation.	**1** Confirm that the remote user is not inadvertently attempting to poll transmit from the local machine, instead of transmitting to the local machine. This mode of operation must be specially configured on the local machine. If poll transmission from the local machine is the desired mode of operation confirm that the local machine has been configured for this operation. **2** Reconfigure the local fax machine to use different configuration settings, toggle the ECM state and/or select a slower reception speed.
245 246 (ECM error)	The user of the remote machine has pressed that machine's Stop key causing the session to be prematurely terminated. The local machine has been "holding off" the remote machine during reception of a large and/or complex document because of lack of available memory. This hold off time has exceeded the timeout (typically 60 seconds) used by the remote machine and it has terminated the session.	**1** If the document was large, ask the remote user to retransmit the document as two or more smaller documents. **2** Disable ECM and reattempt the fax reception.

Table 18. Fax receive error codes (continued)

Error code	Error definition	Solution
247 - 251	The remote machine appears to be stuck "on."	None.
252	Telephone line conditions were too poor to receive a fax.	**1** Reattempt the fax reception at a later time when line conditions may have improved. **2** Configure the machine to start reception at a lower speed. **3** If the local machine received successfully several pages of a larger document, ask the remote user to transmit the document in several smaller parts.
253	The remote machine has attempted to initiate a page transmission using a page width that is not supported by the local machine.	Ask the remote user to reconfigure their fax machine to transmit using a "normal" (letter/A4 page width).
281	The local machine has not received any data at the start of a page during non-ECM reception although the modem has not detected a remote disconnect. The remote machine is probably transmitting fill bytes instead of data and is either broken or jammed.	Reattempt the fax reception after first requesting that the remote user check his or her machine.
282	The local machine has not received any data at the start of a page during ECM reception although the modem has not detected a remote disconnect. The remote machine is probably transmitting sync frames instead of data and is either broken or jammed.	Reattempt the fax reception after first requesting that the remote user check his or her machine.
283	The local machine has detected that modem carrier has stopped. Either the line has been disconnected or the remote machine has aborted the transmission.	Reattempt the fax reception after first requesting that the remote user check his or her machine.
284	The local machine has not received any data during non-ECM page reception and a timeout failure has occurred. The remote machine is probably transmitting fill bytes instead of data and is either broken or jammed.	Reattempt the fax reception after first requesting that the remote user check his or her machine.
285	The local machine has stopped receiving any data during an ECM page reception although the modem has not detected a remote disconnect. The remote machine is probably transmitting sync frames instead of data and is either broken or jammed.	Reattempt the fax reception after first requesting that the remote user check his or her machine

Table 18. Fax receive error codes (continued)

Error code	Error definition	Solution
286	The remote machine has transmitted invalid data. The local machine has received frames with errors during an ECM reception and requested retransmission of the errored frames. The data that is resent does not correspond to the data that was requested. This is an implementation error from the remote machine.	Disable ECM and reattempt the reception.
290	The remote machine has attempted to renegotiate the session mode from ECM to non-ECM between pages. This operation is not supported, and the session has been abandoned.	Reattempt the fax reception and split the document into two portions corresponding to the ECM and non-ECM portions. Some machines will attempt to use non-ECM for photo mode, so this may be associated with a between page encoding change to support photo mode.
291	This isn't a communication error, and it is not expected that this error will occur under non-development scenarios. Reception has failed because the local unit is unable to open a file to receive data into. May be associated with low memory, although low memory should not, by itself, produce the error.	If the error persists reinitialize the unit.
292	The remote machine has attempted to renegotiate the encoding mode from non-JPEG to JPEG. This operation is not supported, and the session has been abandoned.	Reattempt the fax reception and split the document into two portions corresponding to the JPEG and non-JPEG portions. Some machines will attempt to use JPEG for photo mode, so this may be associated with a between page encoding change to support photo mode.

Table 19. Fax send error codes

Error code	Error condition	Solution
300	Fax session has completed without errors.	None required.
311	The user of the local machine has pressed the Stop key causing the session to be prematurely halted before all pages have been transmitted.	None required.
312	A remote fax device has failed to answer the call. Specifically fax tones or the fax handshake from a remote machine has not been detected. Typically this is caused by the user calling the wrong number, the correct number has been called but the machine has been configured not to answer, or the remote machine has temporarily disabled answering because of a condition such as lack of paper or a paper jam.	Confirm the remote fax machine is ready to receive a document and reattempt the transmission.
313	A busy signal has been detected each time the local machine has attempted to call the remote machine.	Reattempt the fax transmission at a later time when the line is no longer busy.
314	The local machine has attempted to initiate a remote diagnostic session but has detected that remote diagnostics are disabled at the remote machine.	Enable remote diagnostics on the remote machine.
315	The local machine has attempted to initiate a remote diagnostic session but has detected that the remote diagnostic version supported by the remote machine is incompatible.	No solution. Remote diagnostics cannot occur between machines with incompatible remote versions.
316	The local machine is setup to initiate document transmission, but it has detected that the remote machine is not able to receive a document. This error should be very rare since normally a remote machine will not answer if it cannot receive a document. One of the few exceptions to this would occur if the remote machine was configured to poll transmit a document but was unable to receive.	Configure the remote machine for reception. Typically the remote user configure the remote machine, including loading paper, clearing jams, and clearing other system abnormalities.
317	The remote machine cannot support a fax reception at any speed or modulation that is supported by the local machine.	No solution.
318	The remote machine cannot support a fax reception at the page width selected by the local machine.	No solution.

Table 19. Fax send error codes (continued)

Error code	Error condition	Solution
319	The local machine has attempted to initiate a binary file transfer (BFT) but has detected that the remote machine does not support this mode of operation.	**1** Enable the BFT capability on the remote machine if it is supported. **2** Retransmit the document as a normal fax, rather than attempting a BFT transfer.
320	The local machine is set up to initiate poll reception with a remote machine, but it has detected that the remote machine is not configured to do this. Poll transmission from a remote machine is typically configured on a session by session basis.	Confirm that the local user really wants to attempt a poll reception. If not, reconfigure the local machine for a normal fax transmission. -Or- Configure the remote machine for poll transmission. The remote user must load a document to transmit and then configure the machine for polling.
321	There was a communication error with the receiving fax machine caused by poor telephone line conditions.	Reattempt the fax transmission at a different time when telephone line conditions have improved.
322 - 324	Telephone line conditions were too poor to send a fax.	**1** Reattempt the fax transmission at a different time when telephone line conditions have improved. **2** If the session fails after transmitting several pages of a large document, retransmit the document as several smaller documents.
325 - 328 (ECM error)	Telephone line conditions were very poor.	Reattempt the fax transmission at a different time when telephone line conditions have improved. -Or- Disable ECM. Errors may still occur, and may result in a degraded image quality on the received page. However, the ability to transmit the entire document will be improved.
329 - 331	The remote machine has reported that one or more pages have been received (non-ECM mode) with excessive errors. This error does not result in the session being terminated immediately. Subsequent page transmission can still occur and later pages may be received without error.	Reattempt the fax transmission at a different time when telephone line conditions have improved. -Or- Select a lower speed for the initial transmission speed.
332 - 343	There is a defect in the remote fax machine (the other machine) and there is no solution except to send or receive to or from another fax machine.	

Table 19. Fax send error codes (continued)

Error code	Error condition	Solution
344 - 348 349-353 (ECM error) 354-355	The remote machine has failed to respond to a fax command from the local machine because the connection is interrupted. -Or- The remote user has pressed the Stop key while the reception was in progress -Or- Under rare conditions incompatibility between the two machines may cause the remote machine to simply abandon the call.	**1** Reattempt the fax transmission at a different time when telephone line conditions have improved. **2** If the fax session was using error correction, disable ECM.
356 - 361 362-366 (ECM error)	The remote user has pressed the Stop key causing the session to be aborted. -Or- The remote machine has encountered a system problem such as no paper or a paper jam which has inhibited it from receiving any more pages, and which has caused it to terminate the session prematurely. -Or- A feature incompatibility has been encountered by the remote machine causing it to terminate the session.	**1** Configure the remote machine for document reception by clearing any paper jams, loading sufficient paper, and clearing any other system errors. **2** Configure the local fax machine to use different configurations; toggle the ECM state; select a slower reception speed.
367 - 372 373-377 (ECM error) 378-379	The remote machine appears to be stuck "on."	None.
380	The remote machine has failed to issue a valid response to a CTC frame. This occurs during ECM transmission after multiple retransmissions of erroneous data.	None; there is a defect in the remote machine.
381	The remote machine has failed to respond to a fax command from the local machine because the connection is interrupted. -Or- The remote user has pressed the Stop key while the reception was in progress.	**1** Reattempt the fax transmission at a different time when telephone line conditions have improved. **2** Disable ECM.
382	The remote fax machine has been "holding off" the local fax machine from continuing the on-going transmission because of a temporary low memory condition at the remote machine. If this "hold off" period exceeds a machine's specific timeout value, the session will be terminated.	Resend the document as two or more separate fax transmissions. Wait several minutes between the end of one transmission and the start of the next transmission. -Or- Disable ECM.

Table 19. Fax send error codes (continued)

Error code	Error condition	Solution
383	The remote machine has failed to respond to a fax command from the local machine because the connection is interrupted. -Or- The remote user has pressed the Stop key while the reception was in progress.	Reattempt the fax transmission at a different time when telephone line conditions have improved -Or- Disable ECM.
384	The local machine has attempted a black JPEG transmission to a machine that does not support this mode.	Reattempt the fax transmission using a different mode.
386	The local machine has failed to complete phase 3 of the initial V.34 handshake after originating a fax session. This is usually caused by poor line conditions although it may be a compatibility issue with certain machines and/or line conditions.	**1** Reattempt the fax reception at a different time when telephone line conditions have improved. **2** Disable V.34 on the local machine and attempt the transmission using the V.17 mode.
387	The local machine has failed to successfully negotiate the initial V.8 handshake with the remote machine after originating a fax session. Typically this will occur when the remote machine is not fax capable or has disabled reception. It may also be a compatibility issue with certain machines and/or line conditions.	**1** Reattempt the fax transmission at a different time when telephone line conditions have improved. **2** Disable V.34 on the local machine and attempt the transmission using the V.17 mode.
388	The local machine has originated a fax session and detected a remote fax machine but has been unable to detect any T30 frames. If the machine is in V.17 mode it is likely that the connection has been interrupted. In V.34 mode is also possible for this error to occur because of compatibility problems with certain machines and/or line conditions.	**1** Reattempt the fax transmission at a different time when telephone line conditions have improved. **2** Disable V.34 on the local machine and attempt the transmission using the V.17 mode.
389	The local machine has originated a fax session and has reattempted V.8 negotiations multiple times without success.	**1** Reattempt the fax transmission at a different time when telephone line conditions have improved. **2** Disable V.34 on the local machine and attempt the transmission using the V.17 mode.

Table 19. Fax send error codes (continued)

Error code	Error condition	Solution
390	The local machine has originated a fax session using error correction (either V.34 or V.17). Transmission of an image has been abandoned after a timeout when no data has become ready for transmission. This is most likely caused by a low memory condition, although it could be caused by other internal problems that cause generation of data for transmission to stall.	Reattempt the transmission after making sure documents stored in memory are printed, and the unit has paper ready for printing. If the problem persists reinitialize permanent storage.
391	The local machine has originated a fax session without error correction (not V.34). Transmission of an image has been abandoned after a timeout when no data has become ready for transmission. This is most likely caused by a low memory condition although it could be caused by other internal problems that cause generation of data for transmission to stall.	Reattempt the transmission after making sure documents stored in memory are printed, and the unit has paper ready for printing. If the problem persists reinitialize permanent storage.
392	The local machine has answered a fax session and completed the initial V.34 handshake but has been to detect any T30 frames. This failure is either a compatibility problems with certain machines or is caused by line conditions.	**1** Reattempt the fax reception at a different time when telephone line conditions have improved. **2** Disable V.34 on the local machine and attempt the reception using the V.17 mode.
393	The local machine has failed to complete phase 3 of the initial V.34 handshake after answering a fax session. This is usually caused by poor line conditions although it may be a compatibility issue with certain machines and/or line conditions.	**1** Reattempt the fax reception at a different time when telephone line conditions have improved. **2** Disable V.34 on the local machine and attempt the reception using the V.17 mode.
394	The local machine has failed to successfully negotiate the initial V.8 handshake with the remote machine after answering a fax session. Typically this will occur when the calling machine is not fax capable. It may also be a compatibility issue with certain machines and/or line conditions.	**1** Reattempt the fax reception at a different time when telephone line conditions have improved. **2** Disable V.34 on the local machine and attempt the reception using the V.17 mode.
395	An unexpected T.30 frame has been received between pages during a multipage V.34 reception. This is almost certainly a compatibility problem with the remote machine and may be caused by an error with the implementation of the remote machine.	**1** Reattempt the fax reception. If transmission errors are not encountered because line conditions have improved then this error will probably be avoided. **2** Disable V.34 on the local machine and attempt the reception using the V.17 mode.

Table 19. Fax send error codes (continued)

Error code	Error condition	Solution
396-409	An error occurred during a V.34 transmission when the local machine was unable to correctly handshake with the remote machine and was consequently unable to transmit a T.30 frame. This occurs when the line was disconnected or if line conditions degrade during the session.	Reattempt the fax transmission at a different time when telephone line conditions have improved.
410-419	Error occurred during a V.34 reception when the local machine was unable to correctly handshake with the remote machine and was consequently unable to transmit a T30 frame. This occurs when the line is disconnected or if line conditions degrade during the session.	Reattempt the fax reception at a different time when telephone line conditions have improved.
420	V.34 negotiations have failed from the originating machine during phase 4. Phase 4 occurs after V.8 and before the first T.30 frames are exchanged. Compatibility problems have been observed in this area when sending to non-HP units.	Reattempt the fax reception at a different time when telephone line conditions have improved.
421	V.34 negotiations have failed from the originating machine during phase 3. Phase 3 occurs after V.8, before phase4, and before the first T.30 frames are exchanged. Compatibility problems have been observed in this area when sending to non HP units.	Reattempt the fax reception at a different time when telephone line conditions have improved.
422	V.34 negotiations have failed from the answering machine during phase 4. Phase 4 occurs after V.8 and before the first T.30 frames are exchanged.	Reattempt the fax reception at a different time when telephone line conditions have improved.
423	V.34 negotiations have failed from the answering machine during phase 3. Phase 3 occurs after V.8, before phase 4, and before the first T.30 frames are exchanged.	Reattempt the fax reception at a different time when telephone line conditions have improved.
430	The transmitting machine is unable to send continuous ones at the end of the control channel prior to starting the primary channel. This is a V.34 error. This error may be associated with line conditions although it is more likely to be caused by internal problems with the modem.	Reattempt the fax reception at a different time when telephone line conditions have improved.

Table 19. Fax send error codes (continued)

Error code	Error condition	Solution
431	The transmitting machine has not received a response after aborting a transmission. Depending upon when the session is aborted some remote machines may not respond. It should be noted that the local unit always attempts to abort the session in such a way that the remote machine is allowed to respond to the final PPS_EOP.	No action required. The session was aborted.
440-444	Error occurred during a V.34 transmission after one or more partial pages (image data) were transmitted using the primary channel. The transmitting machine was unable to restart the control channel in order to resume the T.30 handshake. This typically occurs when the receiving machine prematurely disconnects during partial page reception, although it is possible it may also be caused by compatibility issues.	Reattempt the fax reception at a different time when telephone line conditions have improved.

Translating the fax trace report

Print a fax log report (see the user guide for instructions). The fax log report contains information about the product's interpretation of the problem.

Read the time sequences, looking for abnormal activity on the fax trace report. See table 20, "Fax phase sequence," on page 201, and table 21, "Appropriate responses," on page 202, to separate normal from abnormal activity. Fax abbreviations appear in table 22 on page 203.

Identify the phase in which the error occurred.

Note ??? is an unidentified command.

Examples of a successfully sent fax and a successfully received fax appear after the tables.

Table 20. Fax phase sequence

Sequence	Calling station	Called station
	Phase A—Call setup sequence	
1	Ring signal	
2	CNG tone beep, 1100Hz 1 second	
3		Transmit CED, 3 seconds, 2100 Hz
4		Transmit NSF
5		Transmit CSI
6		Transmit DIS
7	DIS detected	
	Phase B—Pre-message procedure (negotiate compatible format/protocol)	
8	Transmit TSI	
9	Transmit DCS, select mode	
10		DCS detected
11	Transmit TCF/training	
12	Transmit FSK	
13		Training (synchronize signals), check for errors
14		Transmit CFR
15	Detect CFR	
	Phase C—Message transmission (page/scan transmission)	
16	Transmit message (FSK, followed by date)	
17		Receive message (SCAN), check for errors
18	Transmit FSK	
19	At end of message, send one of the following: ● EOM ● EOP ● MPS ● PRI-Q ● PPS-NULL ● PPS-MPS ● PPS-EOM ● PPS-EOP ● PPS-PRI-Q	
	Phase D—Post-message transmission (next page/end of transmission)	
20		Detect EOM, EOP, MPS, PRI-Q, PPS-NULL, PPS-MPS, PPS-EOM, PPS-EOP, or PPS-PRI-Q
21		Transmit MCF response to confirmation signals of post-message responses
	Phase E—Call release (hangup sequence)	
21	Transmit DCN	
22		Station hangs up

Table 21. Appropriate responses

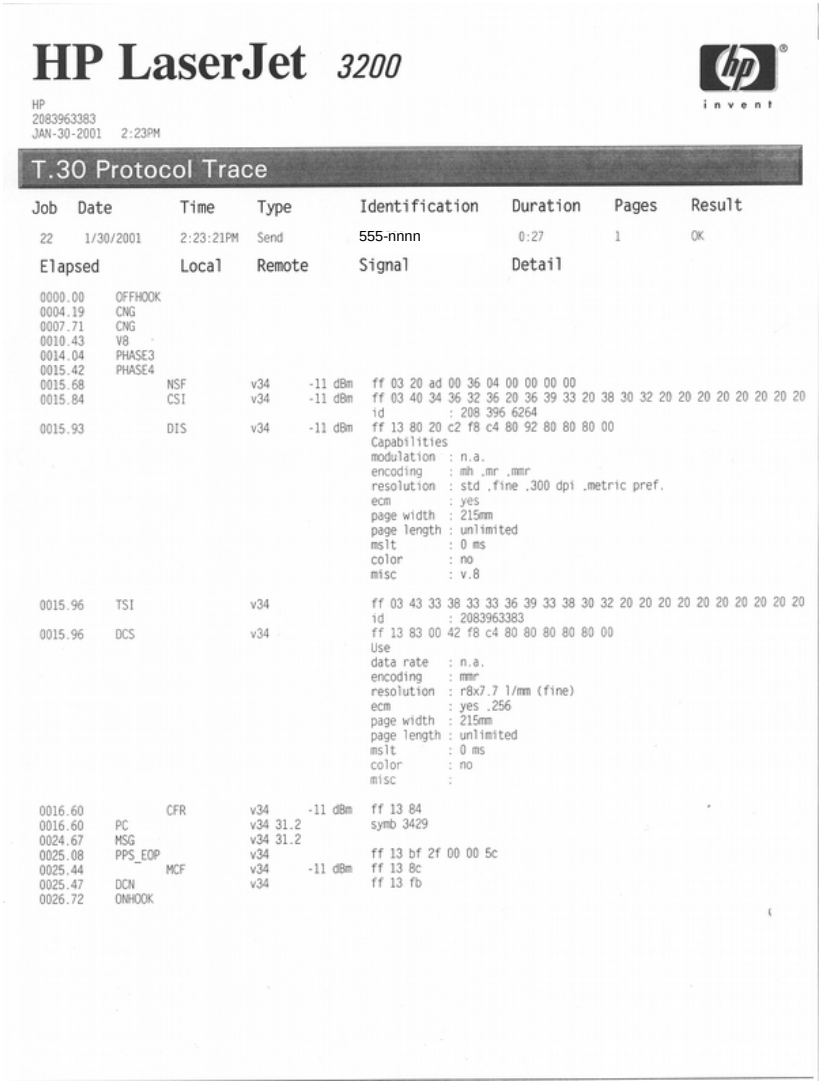
Commands	Comments	Appropriate responses
(NSF) (CSI) DIS	Identifying capabilities: from a manual receiver or an auto-answer unit	(NSC) (CIG) DTC (TSI) DCS (NSF) (CSI) DIS (CRP) (TSI) (NSS) (PWD) (SEP) (CIG) DTC (PWD) (SUB) (TSI) DCS
(NSC) (CIG) DTC	Mode setting command: from calling unit	(TSI) DCS (NSF) (CSI) DIS
(PWD) (SEP) (CIG) DTC	Poll operation	(CRP) (TSI) (NSS)
(TSI) DCS (TSI) (NSS)	Mode setting command: from manual transmitter or automatic receiver	CFR FTT (NSC) (CIG) DTC
(PWD (SUB) (TSI) DCS	This command is always followed by phasing/ training.	(NSC) (CIG) DTC
CTC	Mode setting command: from the transmitter to the receiver	(CTR) (CRP)
(EOR-NULL)	Indicates the next block transmission from the transmitter to the receiver	(ERR) (RNR) (CRP)
Any one of the following: ● (EOR-EOP) ● (EOR-EOM) ● (EOR-PRI-MPS) ● (EOR-PRI-EOP) ● (EOR-PRI-EOM)	The receiver	(ERR) (RNR) PIN (CRP)
Any one of the following: ● MPS ● EOP ● EOM ● (PRI-MPS) ● (PRI-EOP) ● (PRI-EOM)	Post-message commands	MCF RTP RTN PIP PIN (CRP)
(PPS-NULL)	Post-message command for a partial page from the transmitter to the receiver	(PPR) MCF (RNR) (CRP)
Any one of the following: ● (PPS-MPS) ● (PPS-EOP) ● (PPS-EOM) ● (PPS-PRI-MPS) ● (PPS-PRI-EOP) ● (PPS-PRI-EOM)	Post-message commands for a complete page from the transmitter to the receiver	(PPR) MCF (RNR) PIP PIN (CRP)
(RR)	Ask for the status of the receiver: from the transmitter to the receiver	(RNR) (ERR) MCF PIP PIN (CRP)
DCN	Phase E command	None

Table 22. Fax abbreviations

Abbreviation	Function	Signal format (“X”= any #)
CED	Called station identification	2100 Hz
CFR	Confirmation to receive	X010 0001 1850 or 1650 Hz for 3 seconds
CIG	Calling subscriber identification	1000 0010
CNG	Calling tone	1100 Hz for 500 ms
CRP	Command repeat	X101 1000
CSI	Called subscriber identification	0000 0010
CTC	Continue to correct	X100 1000
CTR	Response to continue to correct	X010 0011
DBM	-dBM signal strength detected from sending station (number is deviation from average value)	Range in -10 to -43 (-43 is a weak signal; see explanation below Figure 85, Example of a successfully received fax)
DCN	Disconnect	X101 1111
DCS	Digital command signal	X100 0001
DIS	Digital identification signal	0000 0001
DTC	Digital transmit command	1000 0001
DOM	End of message	X111 0001 1100 Hz
EOP	End of procedure	X111 0100
EOR	End of retransmission	X111 0011
EQM	Eye quality monitor—a measure of the modem signal quality, lower numbers indicate better signals	0-99
ERR	Response for end of retransmission	X011 1000
ECD	Facsimile coded date	0110 0000
FCF	Facsimile	
FCS	Frame check sequence	
FDM	File diagnostics message	X011 1111
FIF	Facsimile information field	
FSK	Frequency shift key. Low-speed command identifier separating commands/scans; precedes command mode.	
FTT	Failure to train. The 1.5 seconds of the Training Check Frame (TCF) indicates line conditions are not good enough for this modulation.	X010 0010
GC	Group command	1300 Hz for 1.5 to 100 seconds 2100 Hz for 1.5 to 100 seconds
GI	Group identification	1650 or 1850 Hz
HDLC	High-level data link control	
LCS	Line conditioning signals	1100 Hz

Table 22. Fax abbreviations (continued)

Abbreviation	Function	Signal format (“X”= any #)
MCF	Message confirmation	X011 0001 1650 or 1850 Hz
MSG	Message received high speed data	
MPS	Multi-page signal	X111 0010
NSF	Non-standard facilities command	1000 0100
NSF	Non-standard facilities	0000 0100
NSS	Non-standard setup	X100 0100
PID	Procedure interrupt disconnect	X011 0110
PIN	Procedural interrupt negative	X011 0100
PIP	Procedural interrupt positive	X011 0101
PIS	Procedural interrupt signal	462 Hz for 3 seconds
PPS	Partial page signal	X111 1101
PPS-EOM	Partial page signal—end of message	X111 1101
PPS-EOP	Partial page signal—end of procedure	X111 1101
PPS-MPS	Partial page signal—multi-page signal	X111 1101
PPS-NULL	Partial page signal—null	X111 1101
PPR	Partial page request	X011 1101
PRI-EOM	Procedure interrupt—end of message	X111 1001
PRI-EOP	Procedure interrupt—end of procedure	X111 1100
PRI-MPS	Procedure interrupt—multi-page signal	X111 1010
RCP	Return to control for partial page	0110 0001
RNR	Receive not ready	X011 0111
RR	Receive ready	X111 0110
RTC	Return to control mode	Six EOLs
RTN	Retrain negative	X011 0010
RTP	Retrain positive	X011 0011
TCF	Training check	Zeroes for 1 5 5
TSI	Transmitting subscriber identification	X100 0010
PWD	Password (for polling	1000 0011
PWD	Password (for transmission	X100 0101
SCAN	Data packets or scan line count	
SEP	Selective polling	1000 0101
SUB	Sub-address	X100 0011
V.xx	Protocol version used (Group 3 only)	V.27 = 4800/2400 V.29 = 9600/7200 V.33 = 14400/12000 V.17 = 14400/12000/9600/7200
XID	Exchange identification procedure	
???	Unidentified command sequence	



HP LaserJet 3200

HP
2083963383
JAN-30-2001 2:23PM

T.30 Protocol Trace

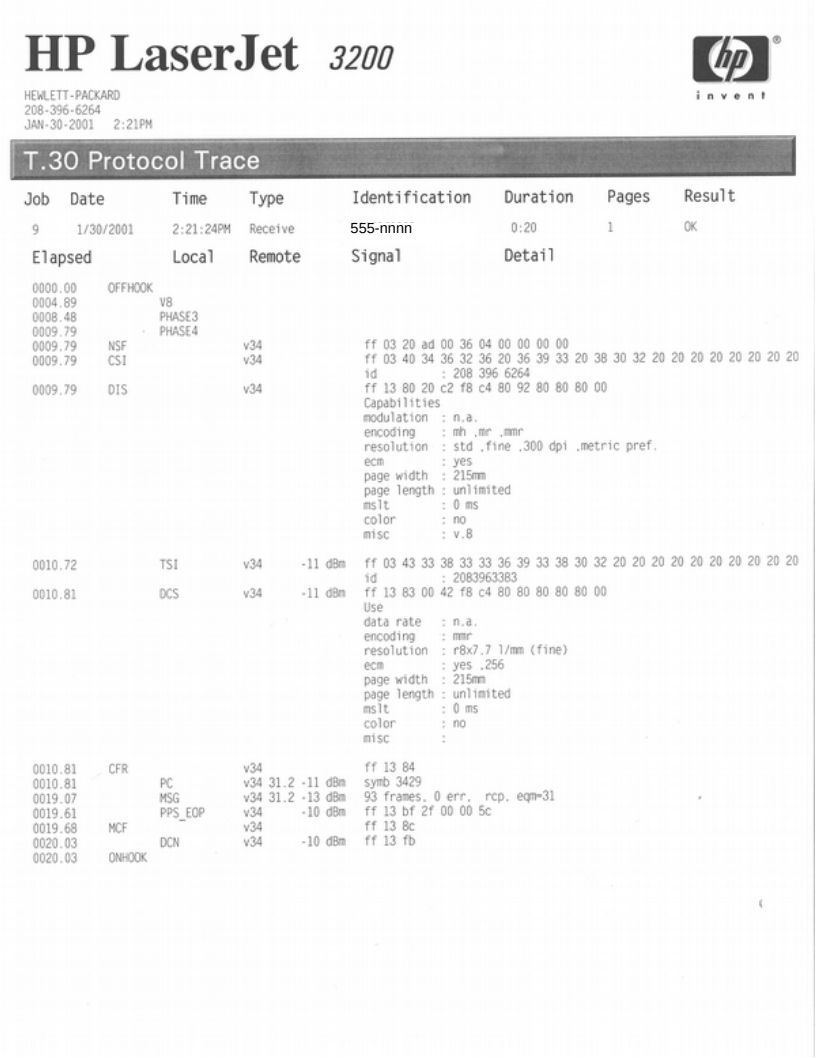
Job	Date	Time	Type	Identification	Duration	Pages	Result
22	1/30/2001	2:23:21PM	Send	555-nnnn	0:27	1	OK

Elapsed		Local	Remote	Signal	Detail
0000.00	OFFHOOK				
0004.19	CNG				
0007.71	CNG				
0010.43	V8				
0014.04	PHASE3				
0015.42	PHASE4				
0015.68		NSF	v34 -11 dBm	ff 03 20 ad 00 36 04 00 00 00 00	
0015.84		CSI	v34 -11 dBm	ff 03 40 34 36 32 36 20 36 39 33 20 38 30 32 20 20 20 20 20 20 20 20	
				id : 208 396 6264	
0015.93		DIS	v34 -11 dBm	ff 13 80 20 c2 f8 c4 80 92 80 80 80 00	
				Capabilities	
				modulation : n.a.	
				encoding : mh ,mr ,mmr	
				resolution : std ,fine ,300 dpi ,metric pref.	
				ecm : yes	
				page width : 215mm	
				page length : unlimited	
				mslt : 0 ms	
				color : no	
				misc : v.8	
0015.96	TSI		v34	ff 03 43 33 38 33 33 36 39 33 38 30 32 20 20 20 20 20 20 20 20 20	
				id : 2083963383	
0015.96	DCS		v34	ff 13 83 00 42 f8 c4 80 80 80 80 00	
				Use	
				data rate : n.a.	
				encoding : mmr	
				resolution : r8x7.7 l/mm (fine)	
				ecm : yes ,256	
				page width : 215mm	
				page length : unlimited	
				mslt : 0 ms	
				color : no	
				misc :	
0016.60		CFR	v34 -11 dBm	ff 13 84	
0016.60	PC		v34 31.2	symb 3429	
0024.67	MSG		v34 31.2		
0025.08	PPS_EOP		v34	ff 13 bf 2f 00 00 5c	
0025.44		MCF	v34 -11 dBm	ff 13 8c	
0025.47	DCN		v34	ff 13 fb	
0026.72	ONHOOK				

Figure 76. **Example of a successfully sent fax**

Note

Phase A, call establishment, does not show up on a trace report. Phase C is the phase in which faxed pages are transferred.



HP LaserJet 3200

HEWLETT-PACKARD
208-396-6264
JAN-30-2001 2:21PM

T.30 Protocol Trace

Job	Date	Time	Type	Identification	Duration	Pages	Result
9	1/30/2001	2:21:24PM	Receive	555-nnnn	0:20	1	OK

Elapsed		Local	Remote	Signal	Detail
0000.00	OFFHOOK				
0004.89		V8			
0008.48		PHASE3			
0009.79		PHASE4			
0009.79	NSF		v34		ff 03 20 ad 00 36 04 00 00 00 00
0009.79	CSI		v34		ff 03 40 34 36 32 36 20 36 39 33 20 38 30 32 20 20 20 20 20 20 20 20
					id : 208 396 6264
0009.79	DIS		v34		ff 13 80 20 c2 f8 c4 80 92 80 80 80 00
					Capabilities
					modulation : n.a.
					encoding : mh ,mr ,mmr
					resolution : std .fine .300 dpi .metric pref.
					ecm : yes
					page width : 215mm
					page length : unlimited
					mslt : 0 ms
					color : no
					misc : v.8
0010.72		TSI	v34	-11 dBm	ff 03 43 33 38 33 33 36 39 33 38 30 32 20 20 20 20 20 20 20 20 20 20
					id : 2083963383
0010.81		DCS	v34	-11 dBm	ff 13 83 00 42 f8 c4 80 80 80 80 80 00
					Use
					data rate : n.a.
					encoding : mmr
					resolution : r8x7.7 l/mm (fine)
					ecm : yes .256
					page width : 215mm
					page length : unlimited
					mslt : 0 ms
					color : no
					misc :
0010.81	CFR		v34		ff 13 84
0010.81		PC	v34 31.2	-11 dBm	symb 3429
0019.07		MSG	v34 31.2	-13 dBm	93 frames, 0 err, rcp, eqm=31
0019.61		PPS_EOP	v34	-10 dBm	ff 13 bf 2f 00 00 5c
0019.68	MCF		v34		ff 13 8c
0020.03		DCN	v34	-10 dBm	ff 13 fb
0020.03	ONHOOK				

Figure 77. **Example of a successfully received fax**

Explanation of DBM

-dBM values should fall into the range of -10 to -43 (with -43 being a weak signal). In the example in figure 77 above, -11 dBm, -13 dBm, and -10 dBm are strong signals.

Repetitive image defect ruler

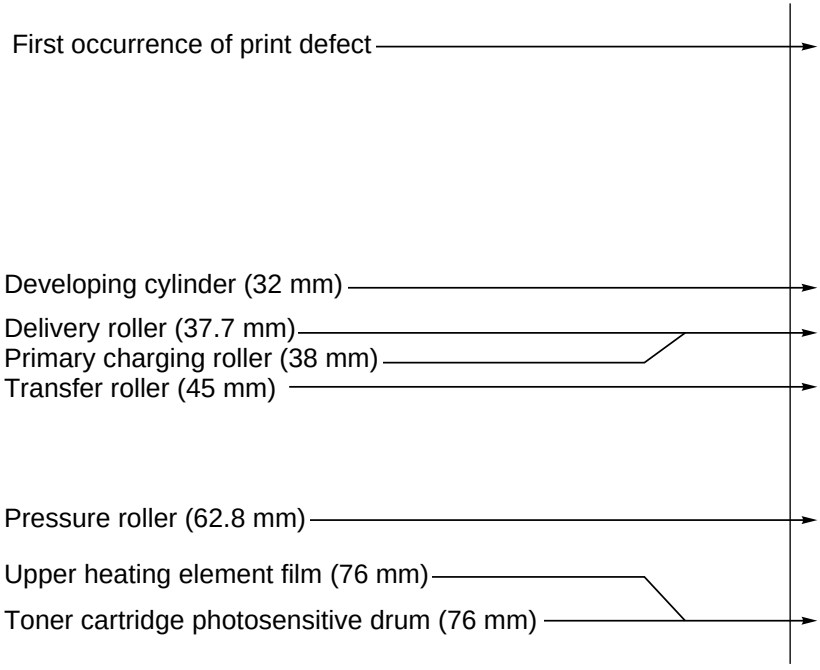
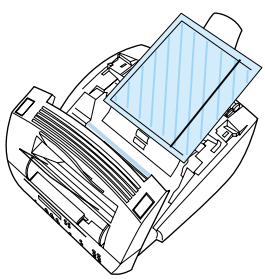


Figure 78. **Repetitive image defect ruler**

Document scanner recalibration



If copies, items scanned to the computer, or faxes you send have vertical black or white lines running through them, recalibration might be necessary.

Recalibrating the document scanner produces a calibration graph. Successful interpretation of the calibration graph is key to solving the problem of vertical black or white lines on scanned images.

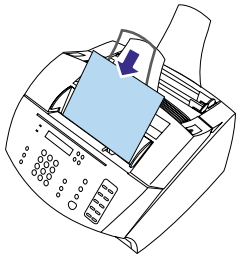
To recalibrate the document scanner and interpret the calibration graph

1. Clean the product as described in chapter 3, “Maintenance.”
2. Before recalibrating the document scanner, open the document scanner and place a page that contains the black or white lines between the guides, just above the contact image sensor glass. The black or white line points to a portion of the glass that requires extra attention.
3. Clean the contact image sensor glass at the point indicated by the black or white line.

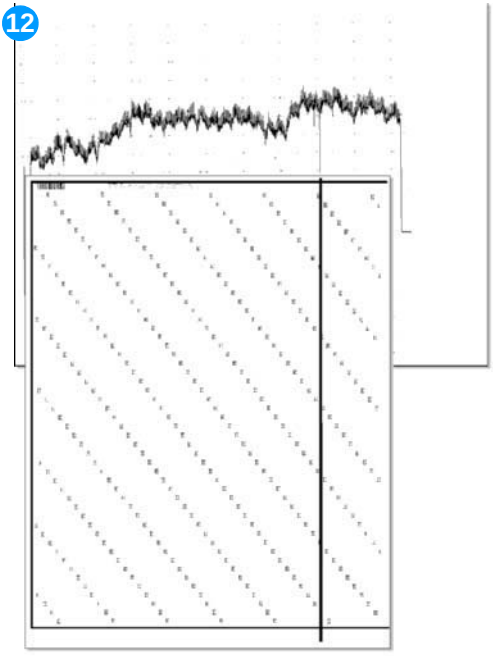
Note
If toner is the contaminant, you might have to scrape it off of the glass. Be careful not to scratch the glass.

4. At the product control panel, press the 10 on the one-touch keypad to print the demonstration page.
5. Copy the demonstration page.

10



12



6 If the vertical black or white line appears on the copy of the demonstration page, continue with steps 7 through 13 below.

7 On the control panel, press ENTER/MENU.

8 Press < once to display SERVICE and press ENTER/MENU.

9 Use the < and > keys to select SCAN CALIBRATION and press ENTER/MENU.

10 Insert a blank, white piece of letter-sized paper into the document feeder tray.

11 Press ENTER/MENU to begin the scan calibration. The product pulls the piece of paper through and then prints a calibration graph.

12 Examine the calibration graph. A dip in the calibration graph can indicate an image defect.

Note
Dips at the ends of the calibration graph are normal.

13 Line up the calibration graph with a newly copied page. If the dip in the calibration graph corresponds to the black or white line, the contaminant is likely internal and the contact image sensor assembly should be replaced.

Main wiring

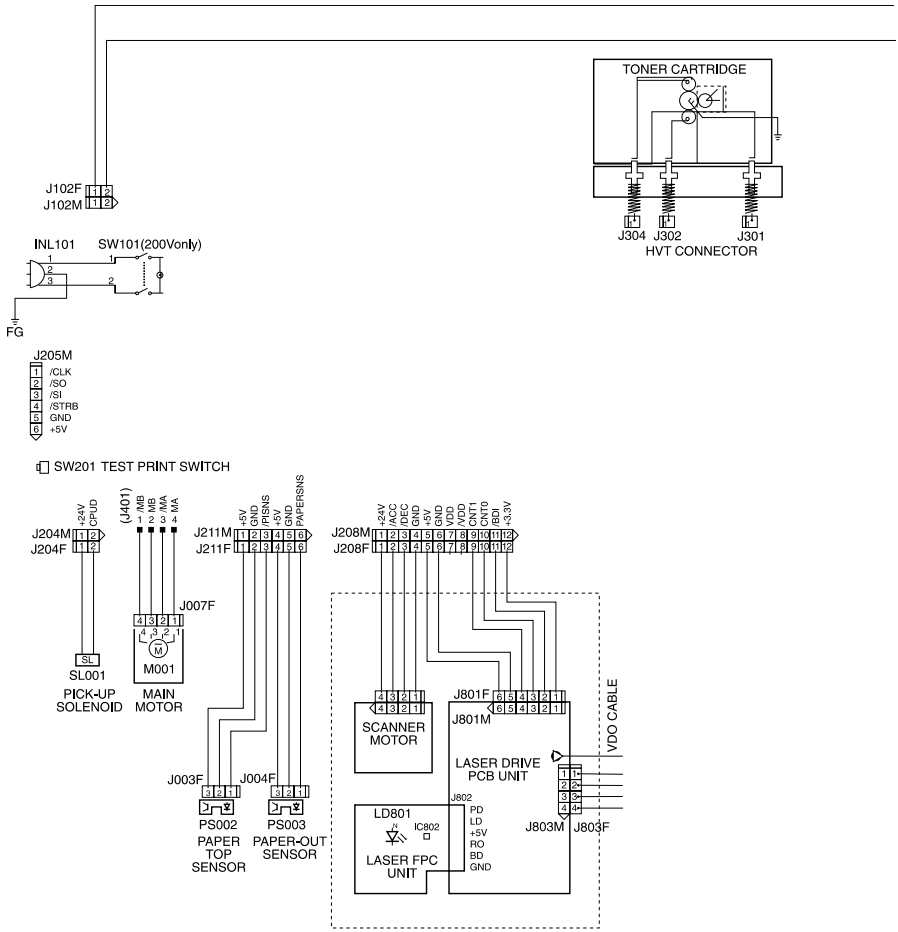


Figure 79. **Main wiring (1 of 2)**

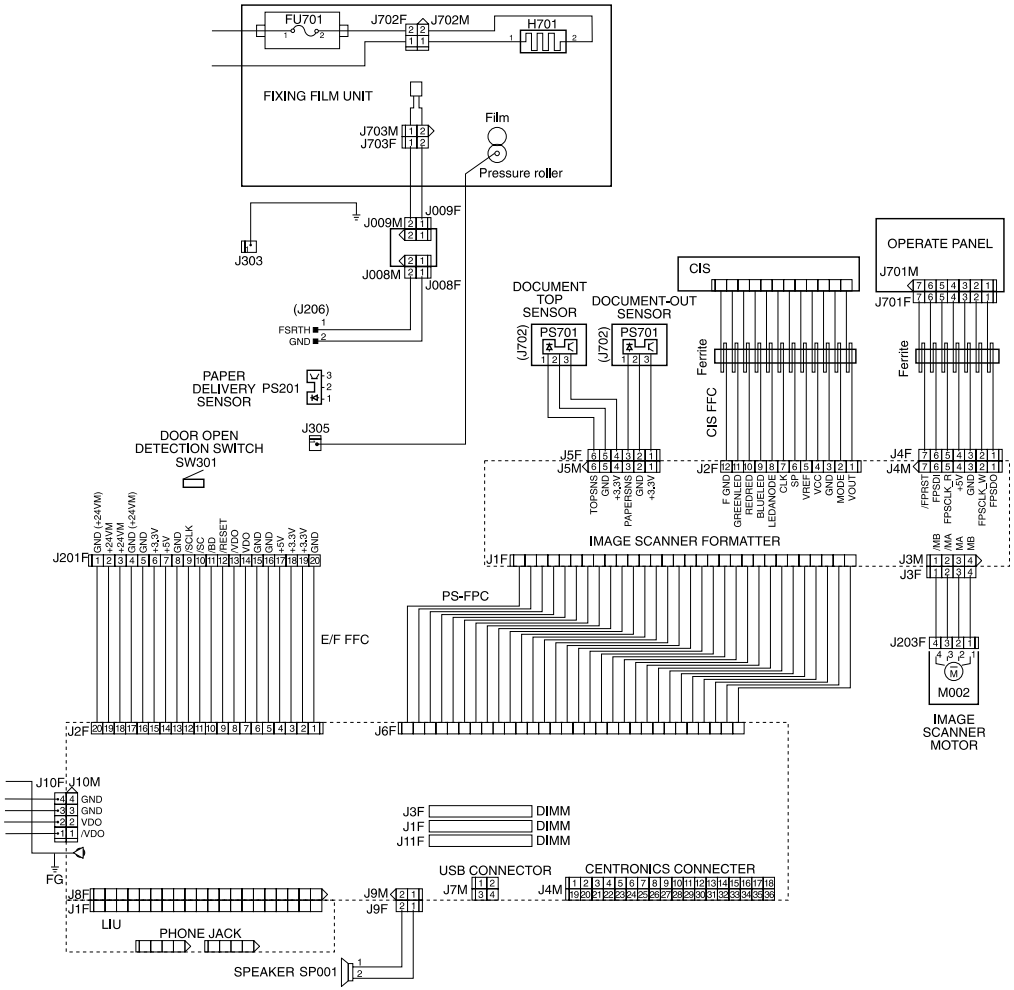


Figure 80. **Main wiring (2 of 2)**

Locations of connectors

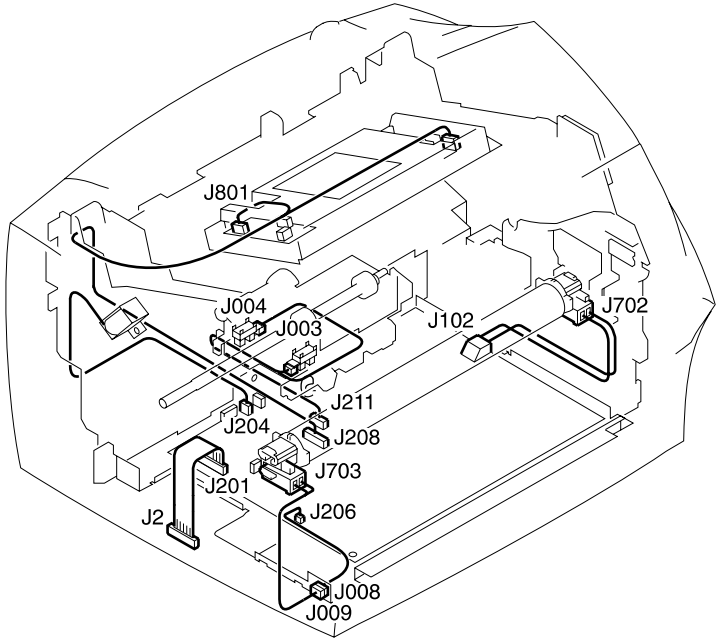


Figure 81. **Locations of connectors (1 of 3)**

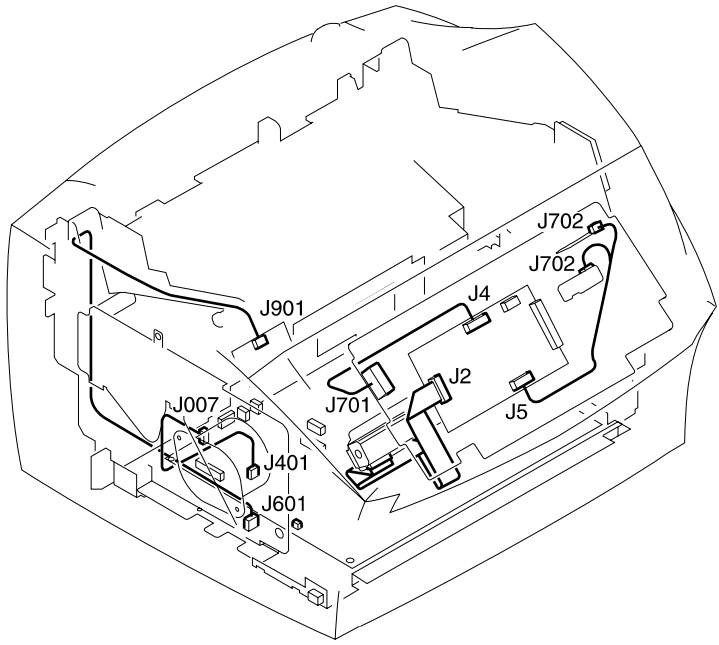


Figure 82. **Locations of connectors (2 of 3)**

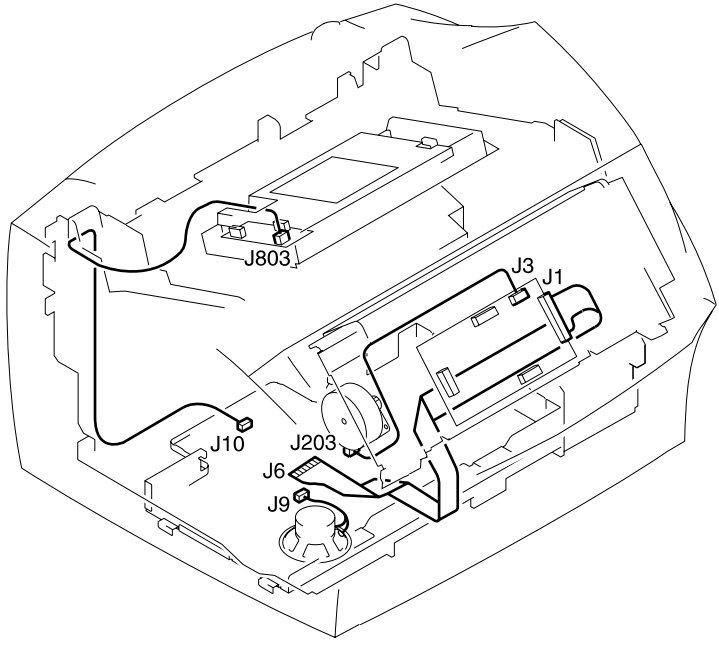


Figure 83. **Locations of connectors (3 of 3)**

7 Parts and diagrams

Chapter contents

Ordering parts and supplies 216
- Parts 216
- Related documentation and software 217
- Consumables 217
- Accessories 218

How to use the parts lists and diagrams 219
Common hardware 220
Assembly locations 221
Covers 222
- Trays and bins 223
- External covers and panels 225

Document scanner assemblies 226
- Document scanner assemblies 227
- Document feeder 229
- Upper guide assembly 231

Internal assemblies 232
- Internal components (1 of 4) 233
- Internal components (2 of 4) 235
- Internal components (3 of 4) 237
- Internal components (4 of 4) 239
- Feed assembly 241
- Electrical components 243

Alphabetical parts list 244
Numerical parts list 249

Ordering parts and supplies

Parts

Order replacement parts from the companies listed in table 23 below:

Table 23. Authorized parts resellers in the United States

Company name and address	Contact information	URL
Computer Parts Unlimited Inc. 3949 Heritage Oak Court Simi Valley, CA 93063	Phone: (805) 306-2500 Fax: (805) 306-2597 Toll free: (800) 817-5957	www.cpumart.com
CHA (C. Hoelzle Associates) 17321 Eastman Street, Irvine, CA 92614-5523	Phone: (949) 251-9000 Toll free: (800) 959-9601	www.chainc.com
Copylite Products Corp. New Town Commerce Centre, 4061 SW 47th Avenue Fort Lauderdale, FL 33314	Phone: (954) 581-2470	
Parts Now! Inc. Headquarters 3517 W. Beltline Hwy. Madison, WI 53713 Southeast Office 1085 SW 15th Ave. #5 Delray Beach, FL 33444	Phone: (608) 276-8688 Fax: (608) 276-9593 Toll free (800) 886-6688 Phone: (561) 279-9280 Fax: (561) 279-9122 Toll free (800) RG1-0939	www.partsnowinc.com
The Printer Works, Inc. 3481 Arden Road Hayward, CA 94545	(800) 832-1400	www.PrinterWorks.com
Vance Baldwin Electronics 2701 West McNab Road Pompano Beach, FL 33069	Phone: (954) 969-1811 Fax: (954) 969-0226 Toll free: (800) 432-8542	

Note The companies listed in table 23 are current as of the publication date of this manual. Updated lists are available at the following website: http://www.hp.com/ssg/parts/direct_order.html

Parts exchange program

HP offers remanufactured assemblies for some selected parts.

Related documentation and software

Order documentation and software from the companies listed on the previous page; some documentation and software is available on the World Wide Web at the following websites:

Table 24. Technical support websites

HP Customer Care Online Software drivers, support documentation, and answers to frequently asked questions	http://www.hp.com/go/support
HP Technical Training (North America) Classes and schedules	http://www.hp.com/go/resellertraining
Parts Parts information	http://outfield.external.hp.com/spi/welcome.htm

Consumables

Consumables are listed in chapter 3, “Maintenance,” in table 9 on page 52. Consumables are available directly from Hewlett-Packard at the following numbers:

- U.S.: (800) 538-8787
- Canada: (800) 387-3154
  in Toronto: (416) 671-8383
- United Kingdom: 0734-441212
- Germany: 0130-3322

Contact your local HP Parts Coordinator for other local phone numbers.

Accessories

Table 25. Accessories

Item	Description	Part number
Dual in-line memory modules (DIMM)	8 MB	C4141A
	16 MB	C4142A
	32 MB	C4143A
	64 MB	C3913A
Toner cartridge		C4092A
Cables and interface accessories	Cable modem/fax, Israel	C5319-80014
	Cable modem/fax, Sweden	C5319-80004
	Cable/fax, Switzerland	C5374-80034
	Parallel cable, 10-meter size C IEEE-1284	C2947A
	Parallel cable, 3-meter size C IEEE-1284	C2946A
	Parallel cable, A-C	8121-0004
	Phone cord, Belgium	C6663-80001
	Phone cord, Denmark	C6663-80007
	Phone cord, France	C2890-80018
	Phone cord, Germany	C3803-80001
	Phone cord, Netherlands	C2890-80020
	Phone cord, Norway	C6663-80008
	Phone cord, RU	C3948-60124
	Phone cord, U.K.	C2890-80023
	Phone cord, U.S.	5040-9078
	Power cable, Australia Opt. 901	8121-0524
	Power cable, Denmark Opt. 912	8121-0518
	Power cable, Europe Opt. 902	8121-0516
	Power cable, Switzerland Opt. 906	8121-0519
	Power cable, U.S.	8120-8382
	Power cable, UK/HK/Singapore	8121-0517
	USB cable, 2-meter A-B, V2.0 *(prev. C6518A)*	8121-0539
HP JetDirect Print Servers	70X 170X 300X 500X (for a Token Ring network connection) 500X (for a BNC, 10Base-T, or 10/100Base-TX network connection)	J4155A J3258B J3263 J3264 J3265

How to use the parts lists and diagrams

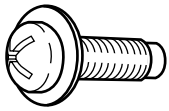
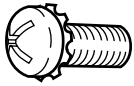
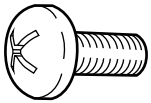
The figures in this chapter illustrate the major subassemblies in the printer and their component parts. A table (material list) follows each exploded assembly diagram. Each table lists the reference designator, the associated part number for the item, and a description of the part.

Parts that have no reference designator or part number are not field replaceable units and cannot be ordered.

While looking for a part number, pay careful attention to the voltage listed in the description column to make sure that the part number selected is for the correct model of printer.

Common hardware

Table 26. Common fasteners

Example	Description
	Screw, machine, truss head
	Screw, star
	Screw, self-tapping

Assembly locations

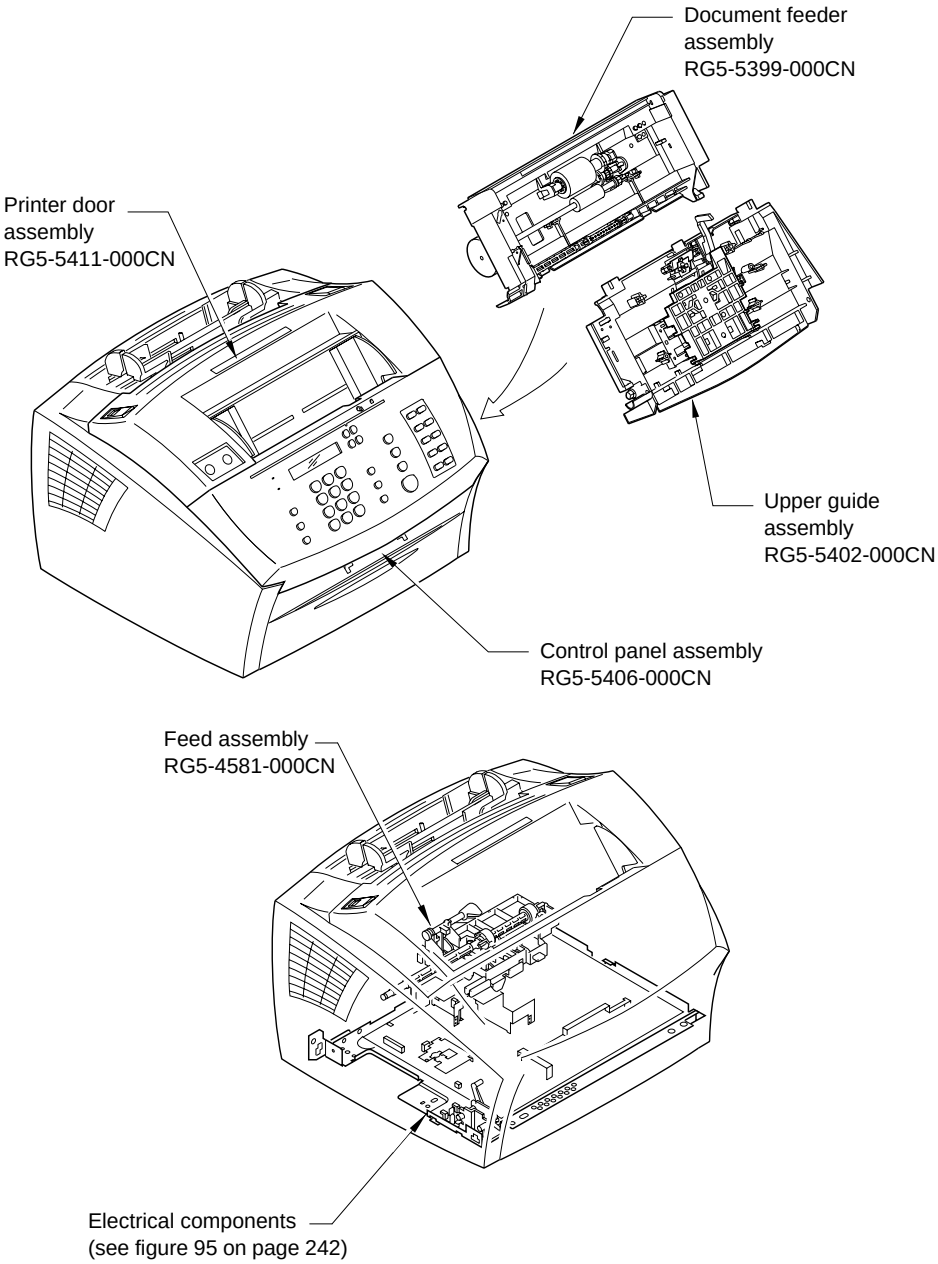


Figure 84. Assembly locations

Covers

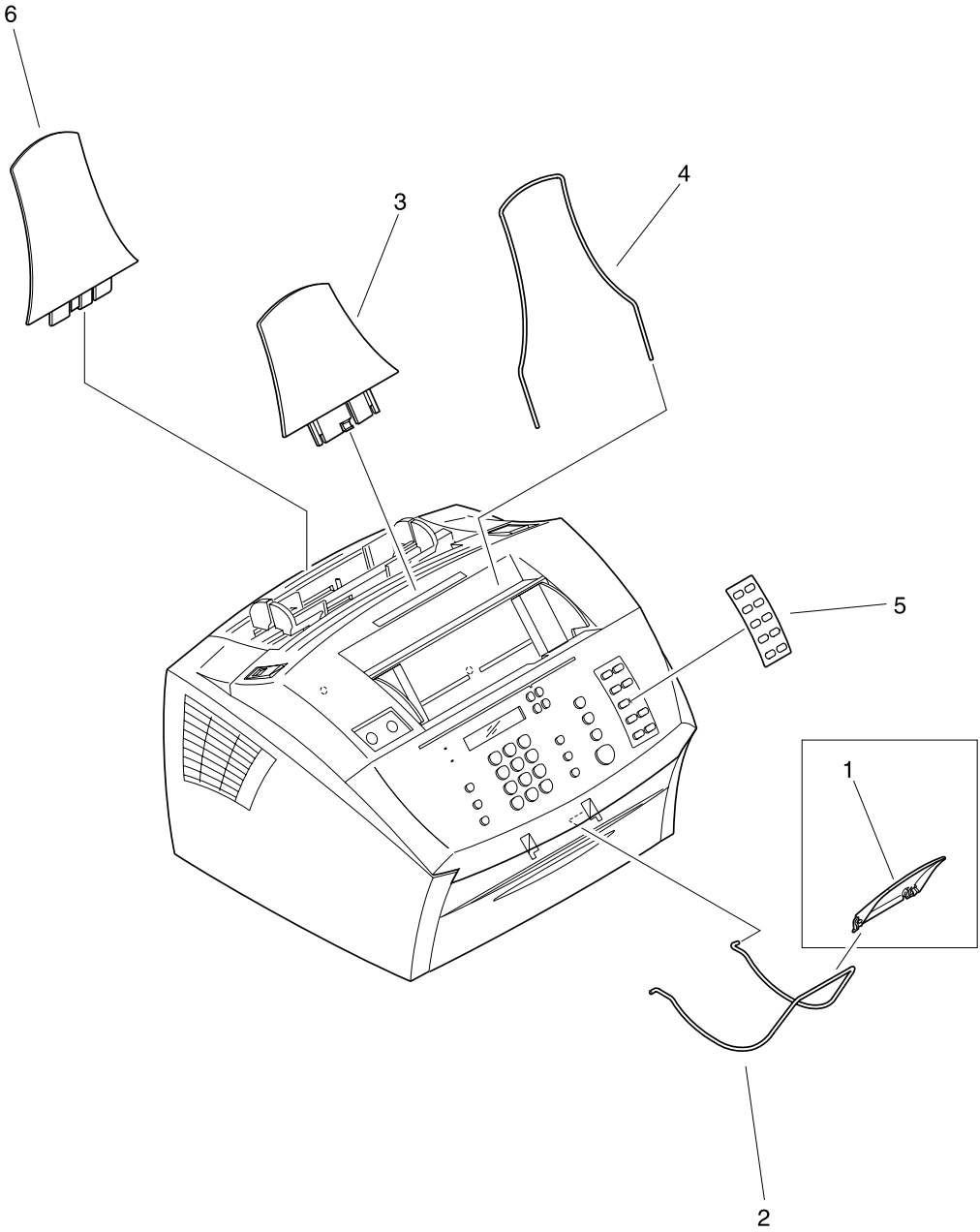


Figure 85. **Trays and bins**

Trays and bins

Table 27. Trays and bins

Reference	Part number	Description
1	RB2-5407-000CN	Support extension, document output
2	RB2-5412-000CN	Support, document output
3	RB2-5423-000CN	Support, paper output
4	RB2-5437-000CN	Support, document feeder
5	RB2-5471-000CN	Overlay (speed-dial template)
6	RB2-5493-000CN	Support, paper input

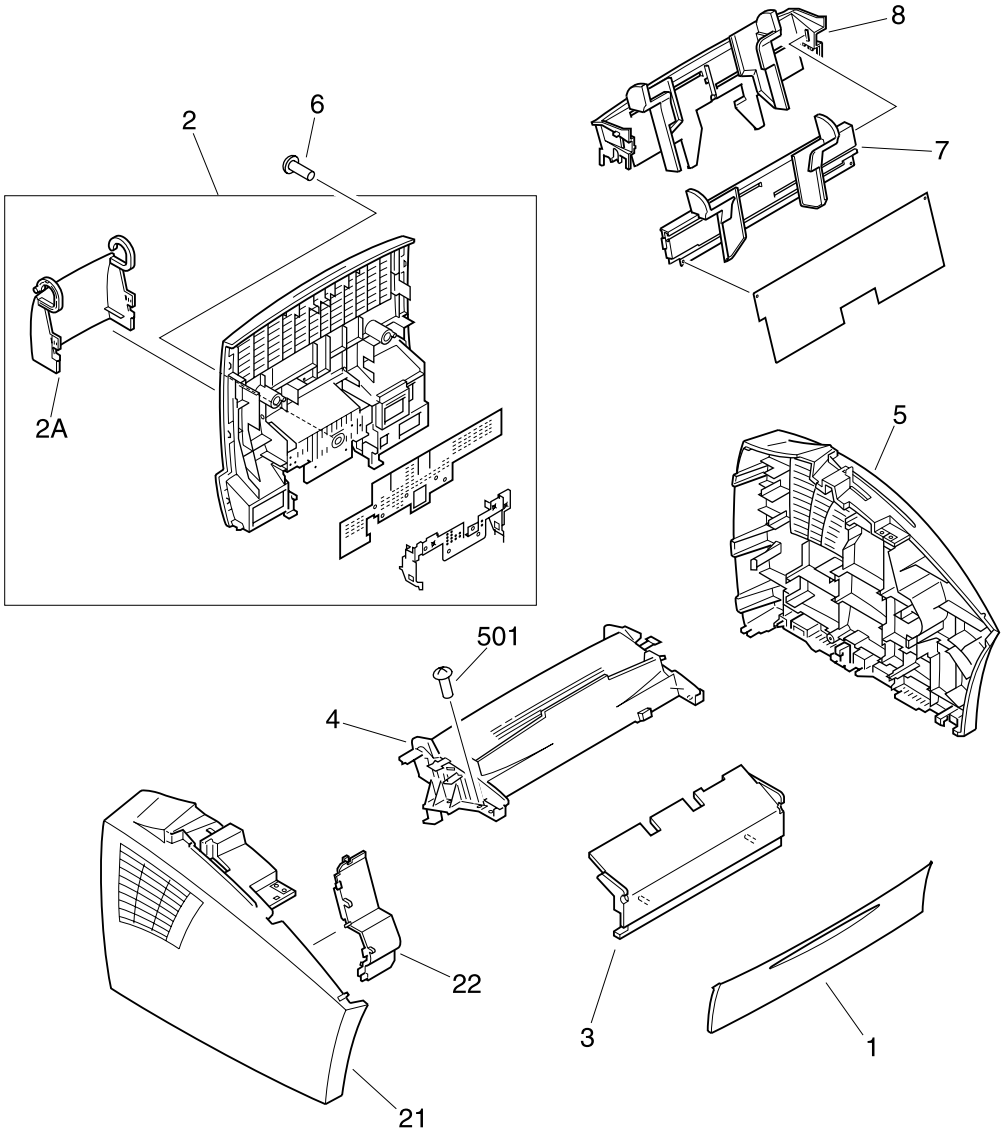


Figure 86. **External covers and panels**

External covers and panels

Table 28. External covers and panels

Reference	Part number	Description
1	RB2-5434-000CN	Cover, face-up
2	RF5-3232-000CN	Cover, rear
2A	RB2-5485-000CN	Cover, DIMM
3	RB2-5488-000CN	Cover, front
4	RB2-5489-000CN	Cover, top
5	RB2-5490-000CN	Cover, right
6	XA9-0302-000CN	Screw, TP, M3x8
7	RG5-4601-000CN	Single-sheet input tray assembly
8	RG5-5391-000CN	Paper input tray assembly
21	RB2-5491-000CN	Cover, left
22	RB2-5498-000CN	Cover, blanking
501	XB4-7401-209CN	Screw, tapping, truss head, M4X12

Document scanner assemblies

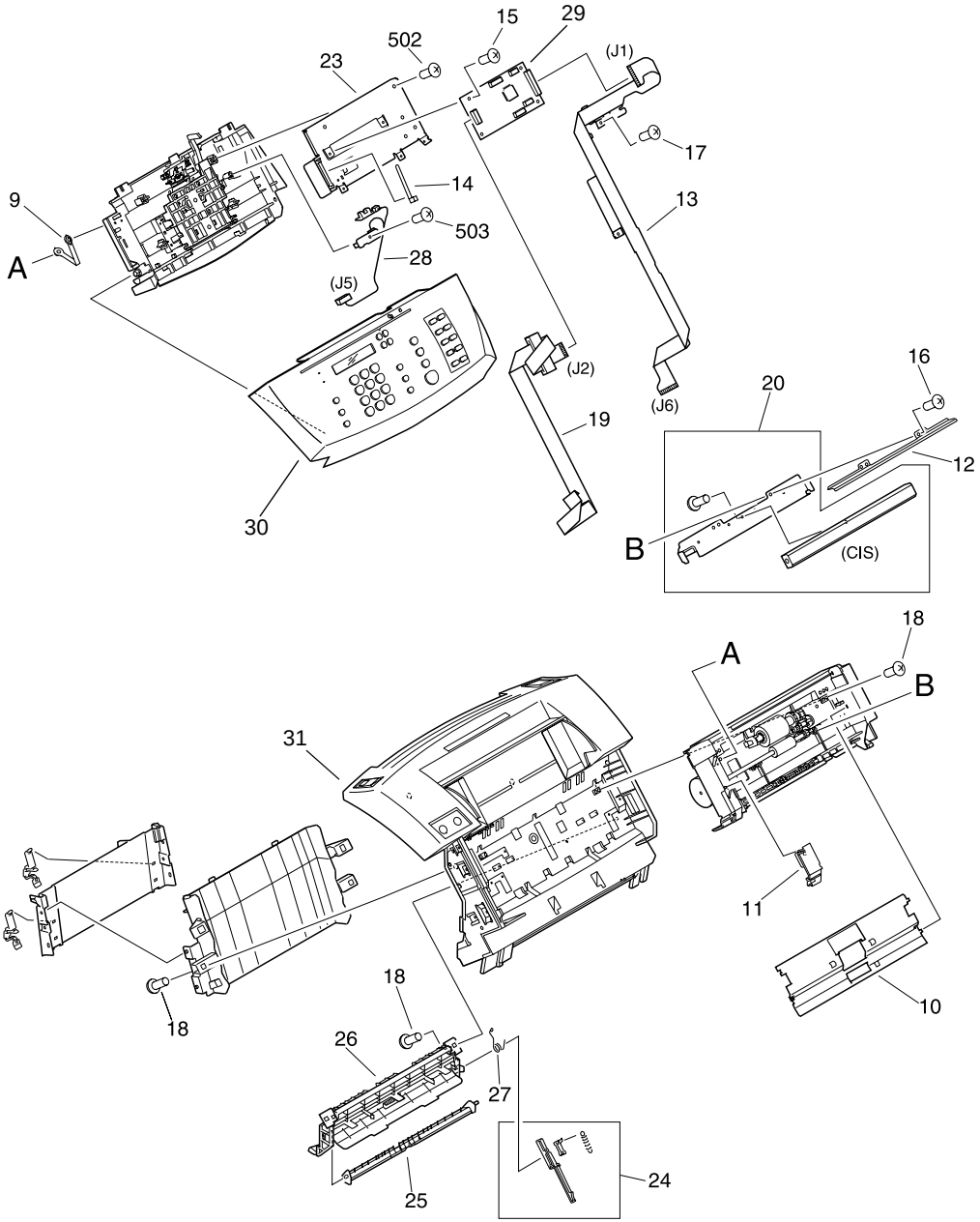


Figure 87. **Document scanner assemblies**

Document scanner assemblies

Table 29. Document scanner assemblies

Reference	Part number	Description
9	RB2-3354-000CN	Strap, plastic
10	RB2-5405-000CN	Guide, document scanner
11	RB2-5406-000CN	Cover, cable
12	RB2-5410-000CN	Cover, contact image sensor
13	RF5-3236-000CN	Cable, flat
14	WT2-0307-000CN	Cable tie
15	XA9-0267-000CN	Screw, TP, M3X6
16	XA9-0591-000CN	Screw, M3X8
17	XA9-0779-000CN	Screw, w/washer, M3X6
18	XA9-0870-000CN	Screw, M4X10
19	RG5-5405-000CN	Cable, flat
20	RG5-5410-000CN	Contact image sensor assembly
23	RB2-5388-000CN	Plate, shield
24	RG5-5412-000CN	Deflector link assembly
25	RB2-4006-000CN	Deflector
26	RB2-5421-000CN	Guide, paper delivery
27	RS6-2276-000CN	Spring, torsion
28	RG5-5464-000CN	Image scanner sensor, PCB assembly
29	C4262A	Control panel PCB
30	RG5-5406-000CN	Control panel assembly
31	RG5-5411-000CN	Printer door assembly
502	XB4-7401-007CN	Screw, tapping, pan head, M4X10
503	XB4-7300-807CN	Screw, tapping, truss, head, M3X8

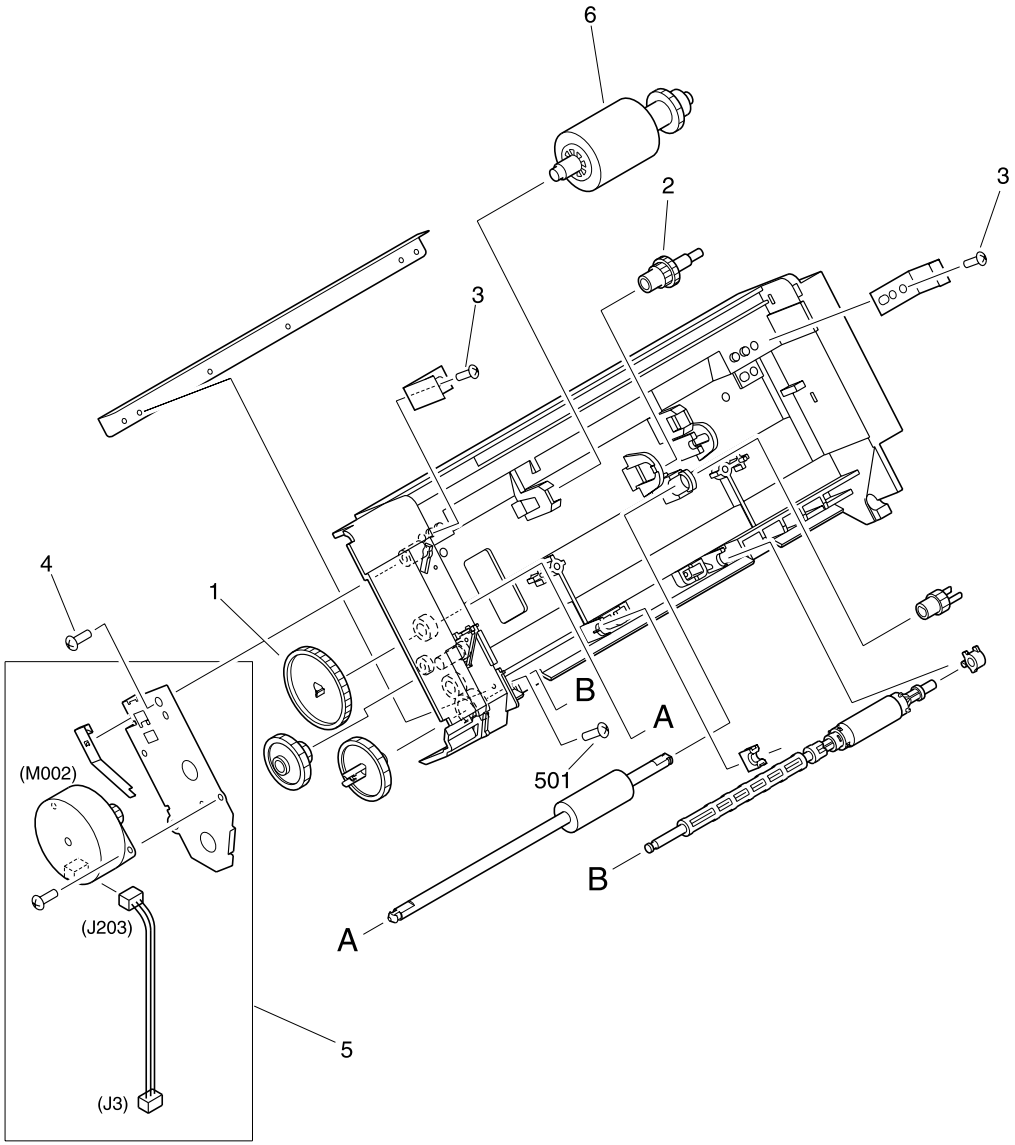


Figure 88. **Document feeder**

Document feeder

Table 30. Document feeder

Reference	Part number	Description
	RG5-5399-000CN	Document feeder assembly
1	HS5-0250-000CN	Gear, 82T
2	HS5-0253-000CN	Gear, 21T/28T
3	XA9-0591-000CN	Screw, M3X8
4	XA9-0870-000CN	Screw, M4X10
5	RG5-5400-000CN	Motor assembly
6	RG5-5401-000CN	Pickup roller assembly
501	XB2-8301-007CN	Screw, w/washer, M3X10

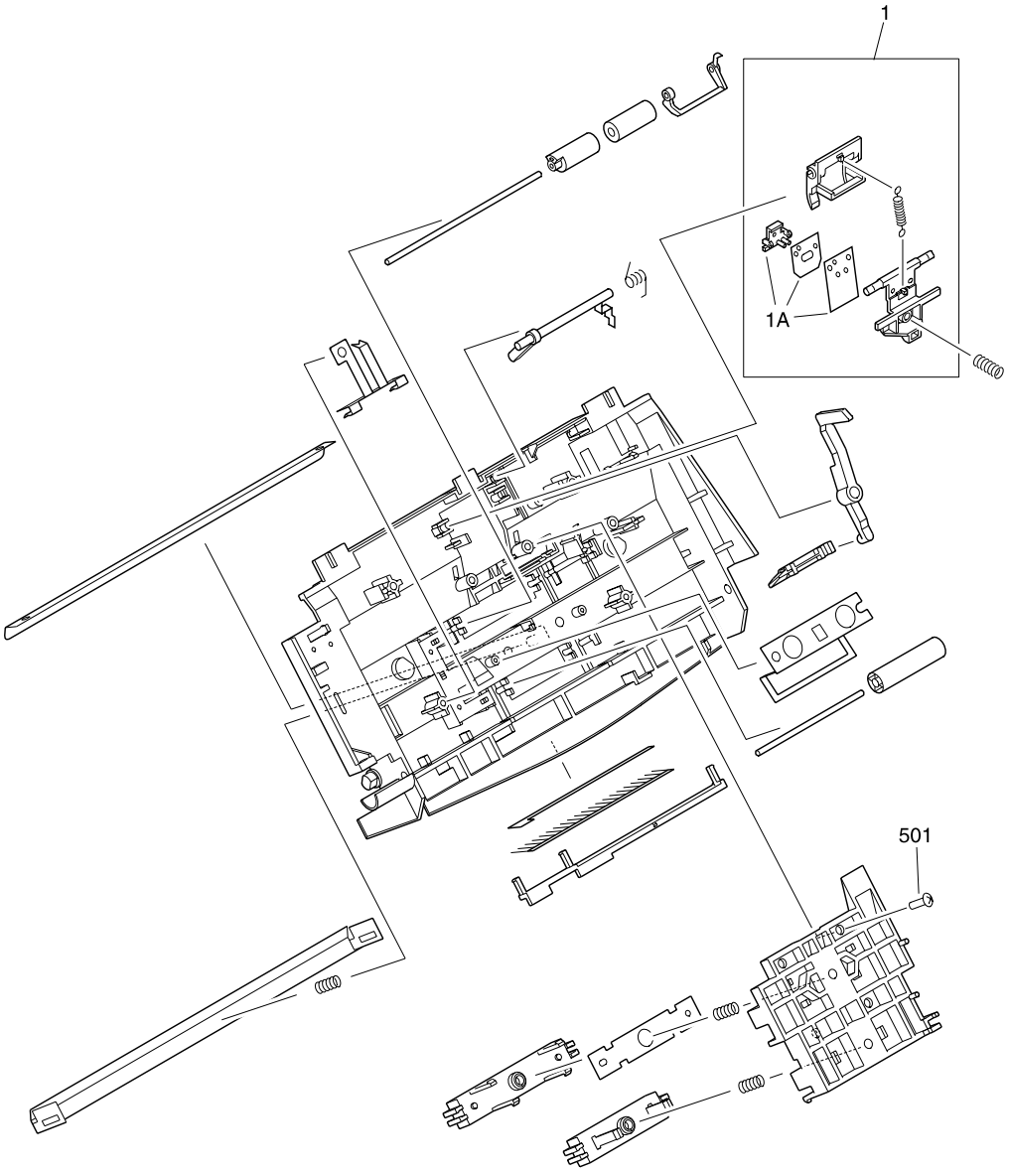


Figure 89. **Upper guide assembly**

Upper guide assembly

Table 31. Upper guide assembly

Reference	Part number	Description
	RG5-5402-000CN	Upper guide assembly
1	RG5-5404-000CN	Separation assembly
1A	RY7-5055-000CN	Separation pad kit
501	XB4-7401-007CN	Screw, tapping, pan head, M4X10

Internal assemblies

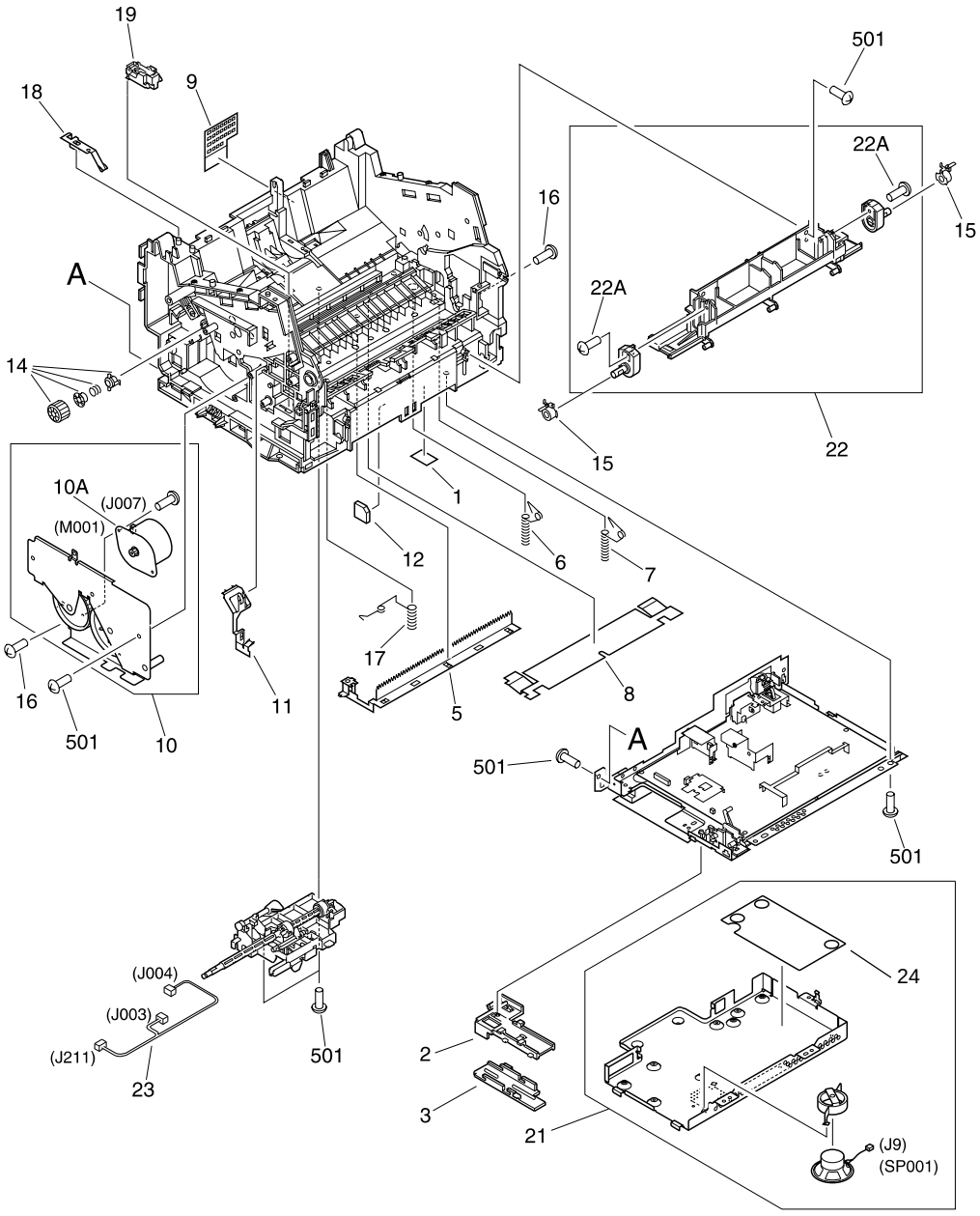


Figure 90. **Internal components (1 of 4)**

Internal components (1 of 4)

Table 32. Internal components (1 of 4)

Reference	Part number	Description
1	RB2-4324-000CN	Sheet
2	RB2-4017-000CN	Cable holder
3	RB2-4030-000CN	Scanner cable cover
5	RB2-3951-000CN	Static charge eliminator
6	RB2-3952-000CN	Spring, torsion
7	RB2-3953-000CN	Spring, torsion
8	RB2-4054-000CN	Sheet, transfer
9	RB2-4055-000CN	Safety cover
10	RG5-4586-000CN	Drive assembly
10A	RH7-1404-000CN	Motor, stepping
11	RB2-3959-000CN	Spring, leaf, left
12	RB2-4329-000CN	Seal, frame, 2
14	RY7-5051-000CN	Clutch kit
15	RB2-5497-000CN	Hinge clip
16	XA9-0779-000CN	Screw, w/washer, M3X6
17	RB2-4042-000CN	Spring, torsion
18	RB9-0538-000CN	Plate, grounding
19	RF5-2880-000CN	Holder, fixing
21	RG5-5393-000CN	Formatter case assembly
22	RG5-5392-000CN	Hinge support assembly
22A	XB4-7401-007CN	Screw, tapping, pan head, M4X10
23	RG5-4617-000CN	Sensor cable
24	C7052-60004	Line interface unit (LIU)
	C4261A	Formatter (not pictured; see figure 65 on page 138)
501	XB4-7401-007CN	Screw, tapping, pan head, M4X10

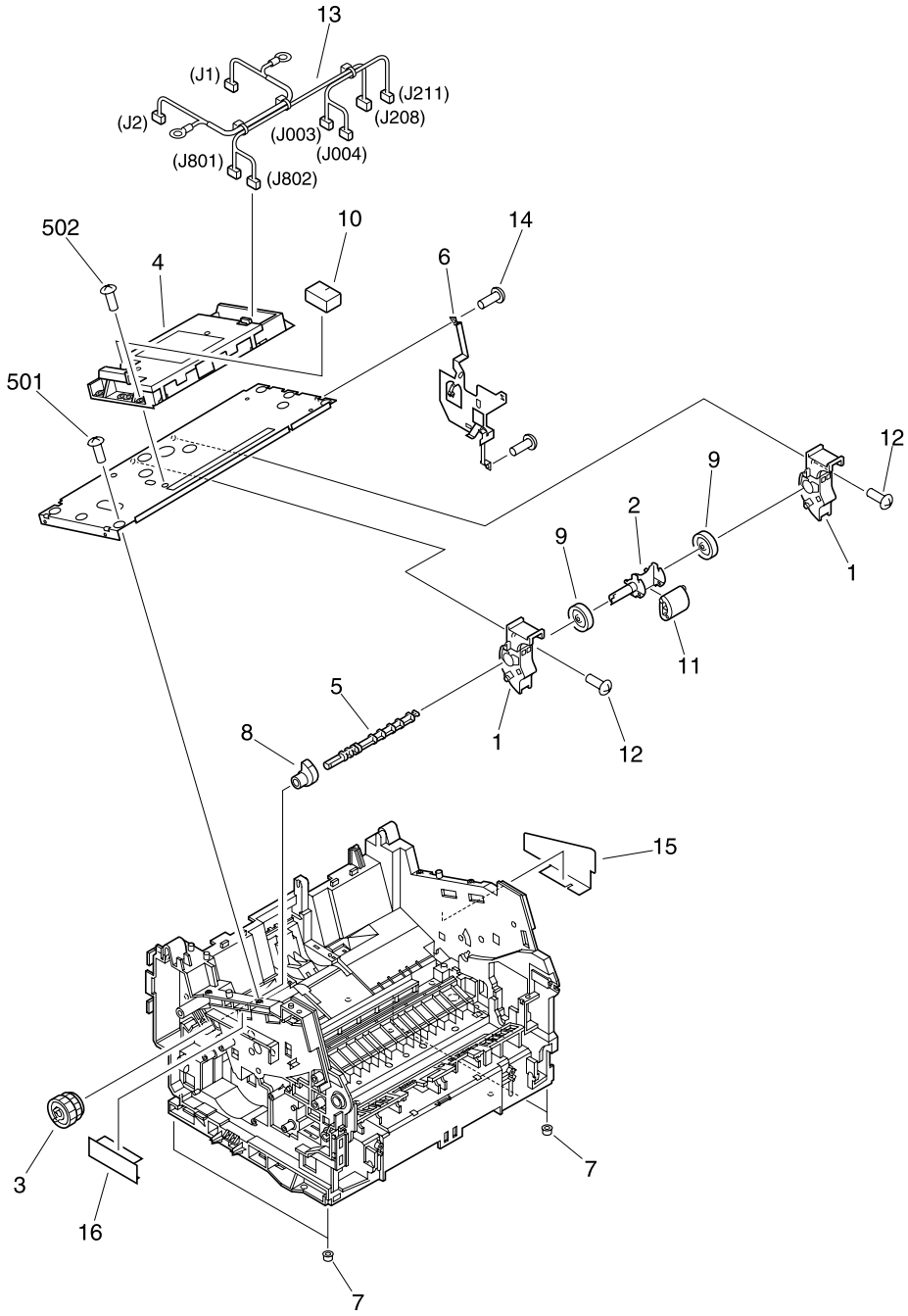


Figure 91. **Internal components (2 of 4)**

Internal components (2 of 4)

Table 33. Internal components (2 of 4)

Reference	Part number	Description
1	RG5-4584-000CN	Roller holder assembly
2	RB2-3930-000CN	Shaft, pickup roller
3	RG5-4585-000CN	Gear assembly
4	RG5-5421-000CN	Laser/scanner assembly
5	RB2-3943-000CN	Shaft
6	RB2-3944-000CN	Spring, leaf
7	RB2-3945-000CN	Foot
8	RB2-3949-000CN	Cam
9	RB2-3931-000CN	Roller
10	RB2-3904-000CN	Cover, foamy
11	RB2-4026-000CN	Roller, pickup
12	XA9-0267-000CN	Screw, TP, M3X6
13	RG5-5415-000CN	Scanner cable
14	XA9-0653-000CN	Screw, w/star washer, M3X6
15	RB2-5501-000CN	Sheet, light-blocking
16	RB2-5500-000CN	Sheet, light-blocking
501	XB4-7401-007CN	Screw
502	XB6-7300-807CN	Screw

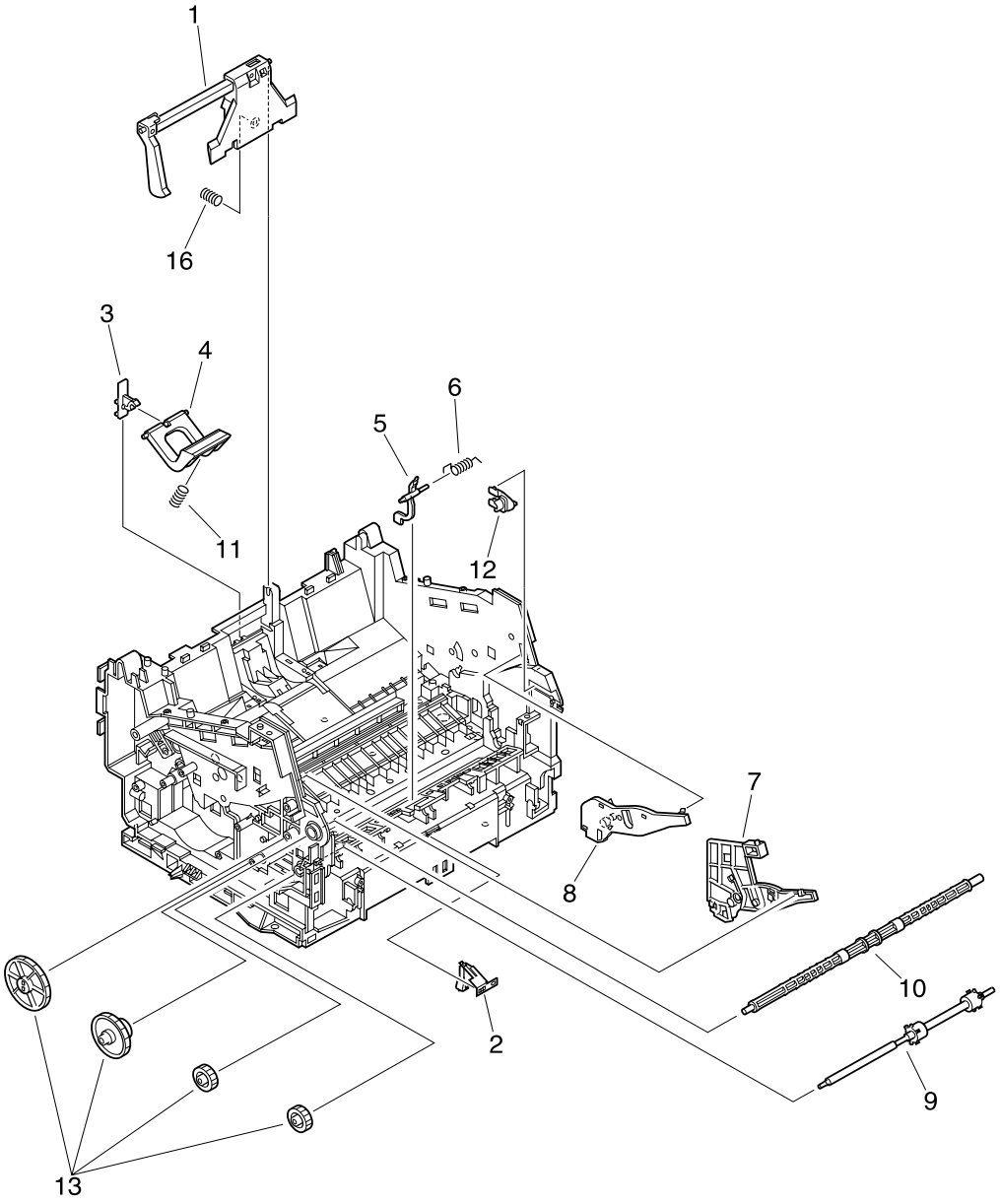


Figure 92. **Internal components (3 of 4)**

Internal components (3 of 4)

Table 34. Internal components (3 of 4)

Reference	Part number	Description
1	RG5-4582-000CN	Paper guide plate assembly
2	RB2-4219-000CN	Plate, grounding
3	RB2-3947-000CN	Holder, pad
4	RF5-2832-000CN	Arm, pad
5	RB2-3960-000CN	Flag, sensor
6	RB2-3961-000CN	Spring, torsion
7	RF5-2818-000CN	Guide, cartridge, left
8	RF5-2819-000CN	Guide, cartridge, right
9	RF5-2822-000CN	Roller, face-up
10	RF5-2830-000CN	Roller, face-down
11	RS5-2502-000CN	Spring, compression
12	RB2-4016-000CN	Stop, slide
13	RY7-5049-000CN	Gear kit
16	RS6-2122-000CN	Spring, compression

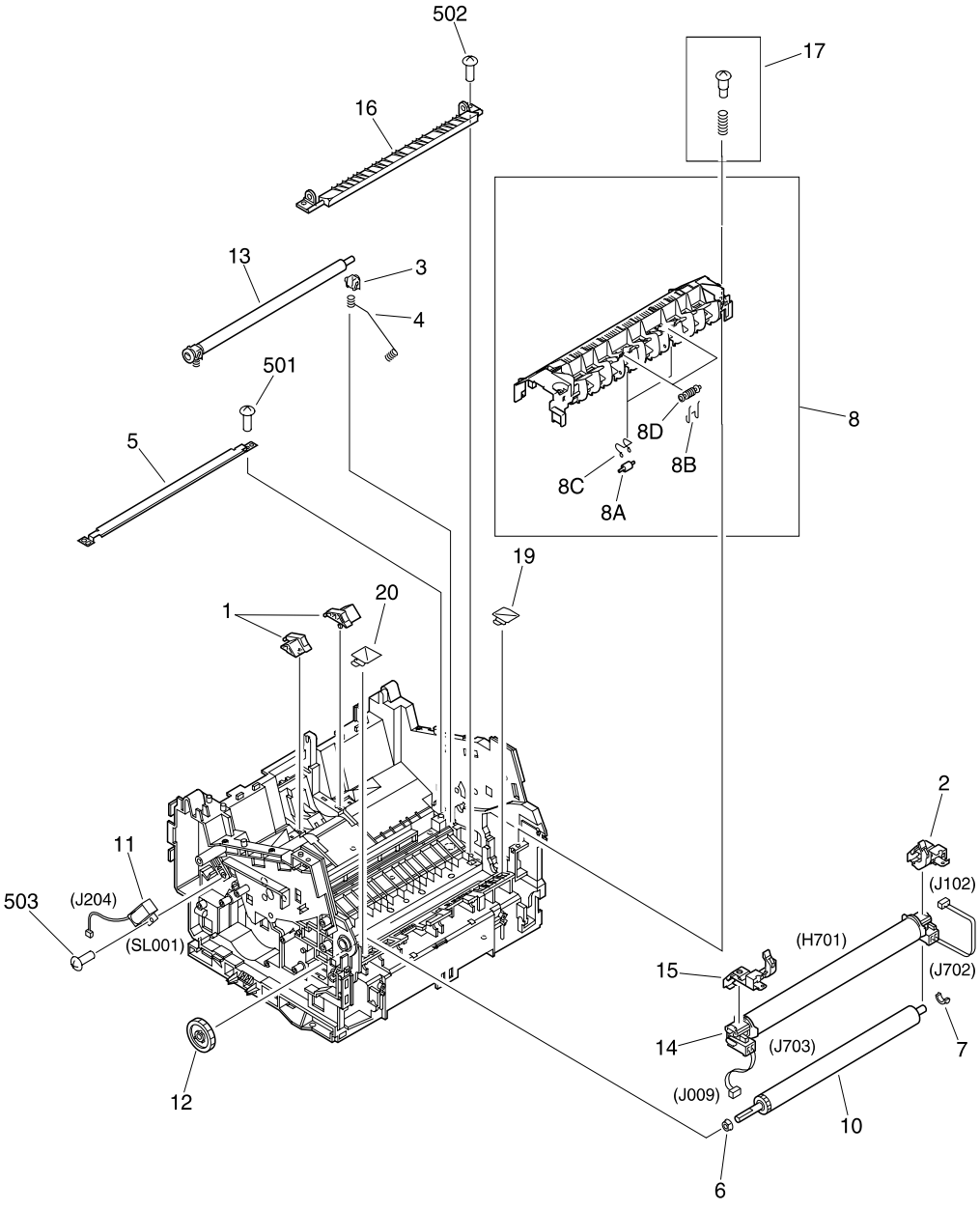


Figure 93. **Internal components (4 of 4)**

Internal components (4 of 4)

Table 35. Internal components (4 of 4)

Reference	Part number	Description
1	RY7-5050-000CN	Subpad kit (includes left and right)
2	RG5-5388-000CN	Metal clip, fusing element (right)
3	RB2-3939-000CN	Bushing, right
4	RB2-3940-000CN	Spring, compression
5	RB2-3950-000CN	Guide, transfer
6	RB2-3956-000CN	Bushing, left
7	RB2-3957-000CN	Bushing, right
8	RG5-4593-000CN	Delivery assembly
8A	RB2-4222-000CN	Roller, face up
8B	RB1-7286-000CN	Spring, wire
8C	RB1-7287-000CN	Spring, wire
8D	RB2-4223-000CN	Roller, face down
10	RF5-2823-000CN	Roller, pressure
11	RH7-5227-000CN	Solenoid
12	Part of gear kit, part number RY7-5049-000CN on page 237.	
13	RG5-4657-000CN	Transfer assembly
14	RG5-4589-000CN	Fusing element (110 V)
14	RG5-4590-000CN	Fusing element (220 V)
15	RG5-5387-000CN	Metal clip, fusing element (left)
16	RB2-3958-000CN	Guide, fusing element
17	RY7-5060-000CN	Screw kit, delivery assembly
19	RB2-4432-000CN	Sub guide, right
20	RB2-4431-000CN	Sub guide, left
501	XB4-7400-805CN	Screw, tapping, truss head, M4x
502	XB4-7401-209CN	Screw, tapping, truss head, M4x12
503	XB4-7401-007CN	Screw, tapping, pan head, M4X10

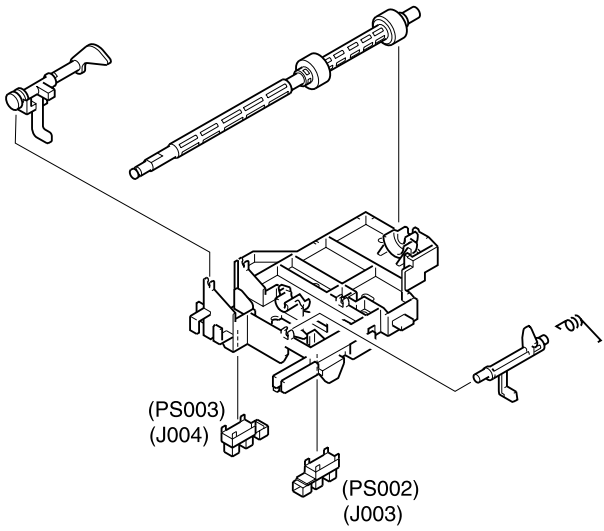


Figure 94. **Feed assembly**

Feed assembly

Table 36. Feed assembly

Reference	Part number	Description
	RG5-4581-000CN	Feed assembly

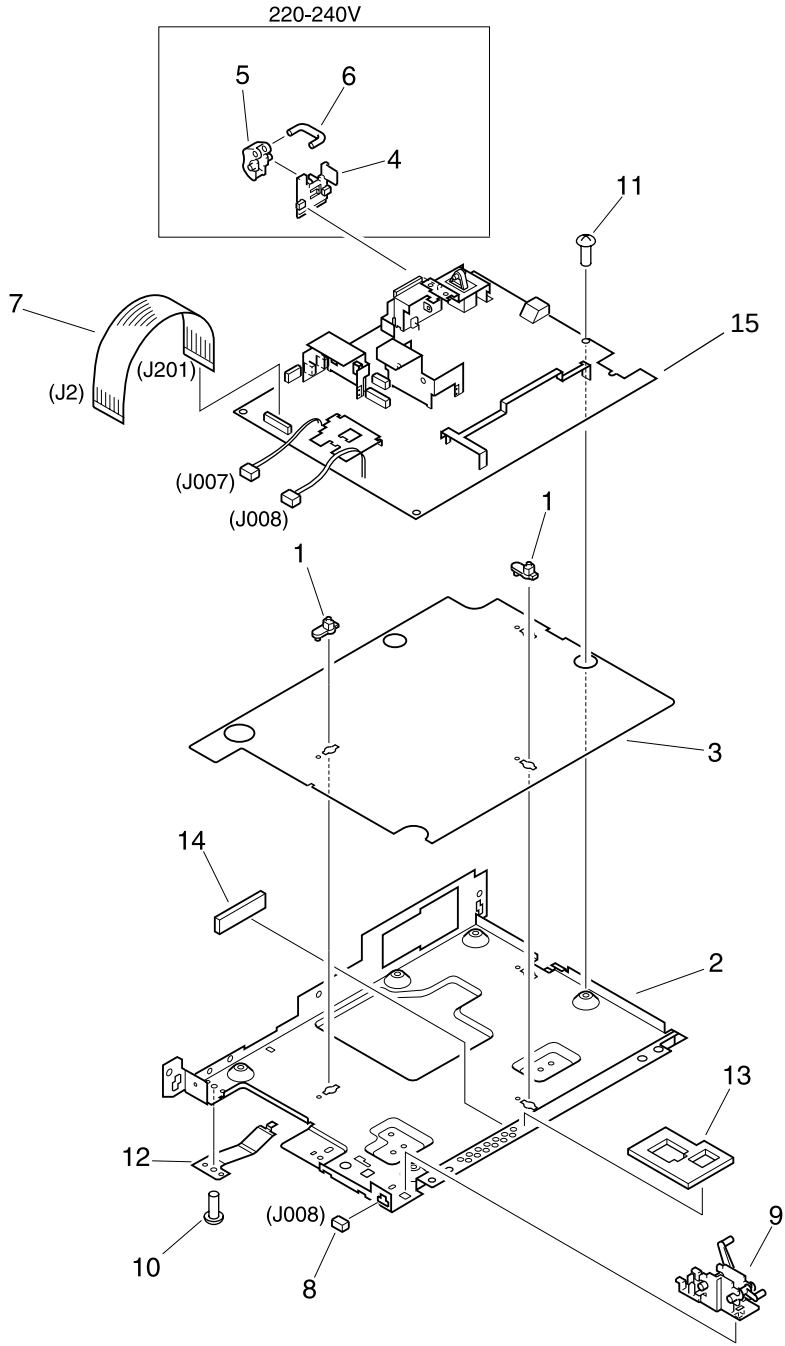


Figure 95. **Electrical components**

Electrical components

Table 37. Electrical components

Reference	Part number	Description
1	RB1-7303-000CN	Spacer
2	RB2-3984-000CN	ECU pan
3	RB2-3985-000CN	Sheet, insulating
4	RB2-3986-000CN	Holder, power switch lever
5	RB2-3987-000CN	Lever, power switch
6	RB2-3988-000CN	Rod, switch
7	RH2-5381-000CN	Cable, flat
8	VS1-5057-002CN	Connector, 2P
9	RG5-4599-000CN	Door sensor assembly
10	XA9-0653-000CN	Screw, w/star washer, M3X6
11	XA9-0951-000CN	Screw, w/washer, M3X8
12	RB2-4049-000CN	Plate, grounding
13	RB2-4327-000CN	Seal, sensor, 1
14	RB2-4328-000CN	Seal, sensor, 2
15	RG5-5395-000CN	ECU (110 v)
15	RG5-5397-000CN	ECU (220 v)

Alphabetical parts list

Table 38. Alphabetical parts list

Description	Part number	Ref.	Figure
Arm, pad	RF5-2832-000CN	4	92
Bushing, left	RB2-3956-000CN	6	93
Bushing, right	RB2-3939-000CN	3	93
Bushing, right	RB2-3957-000CN	7	93
Cable holder	RB2-4017-000CN	2	90
Cable tie	WT2-0307-000CN	14	87
Cable, flat	RF5-3236-000CN	13	87
Cable, flat	RG5-5405-000CN	19	87
Cable, flat	RH2-5381-000CN	7	95
Cam	RB2-3949-000CN	8	91
Clutch kit	RY7-5051-000CN	14	90
Connector, 2P	VS1-5057-002CN	8	95
Contact image sensor assembly	RG5-5410-000CN	20	87
Control panel assembly	RG5-5406-000CN	30	87
Control panel PCB	C4262A	29	87
Cover, blanking	RB2-5498-000CN	22	86
Cover, cable	RB2-5406-000CN	11	87
Cover, contact image sensor	RB2-5410-000CN	12	87
Cover, DIMM	RB2-5485-000CN	2A	86
Cover, face-up	RB2-5434-000CN	1	86
Cover, foamy	RB2-3904-000CN	10	91
Cover, front	RB2-5488-000CN	3	86
Cover, left	RB2-5491-000CN	21	86
Cover, rear	RF5-3232-000CN	2	86
Cover, right	RB2-5490-000CN	5	86
Cover, top	RB2-5489-000CN	4	86
Deflector	RB2-4006-000CN	25	87
Deflector link assembly	RG5-5412-000CN	24	87
Delivery assembly	RG5-4593-000CN	8	93
DIMM-12MB SFlash/base—rev. C	C7867AD		
DIMM-12MB SFlash/E ("M" version)—rev. C	C7867AF		
DIMM-12MB SFlash/SE—rev. C	C7867AE		

Table 38. Alphabetical parts list (continued)

Description	Part number	Ref.	Figure
Document feeder assembly	RG5-5399-000CN		88
Door sensor assembly	RG5-4599-000CN	9	95
Drive assembly	RG5-4586-000CN	10	90
ECU (110 v)	RG5-5395-000CN	15	95
ECU pan	RB2-3984-000CN	2	95
Feed assembly	RG5-4581-000CN		94
Flag, sensor	RB2-3960-000CN	5	92
Foot	RB2-3945-000CN	7	91
Formatter case assembly	RG5-5393-000CN	21	90
Formatter, HP LaserJet 3200 product	C4261-60001		90
Formatter, HP LaserJet 3200M product	C4261-60009		90
Fusing element (110 V)	RG5-4589-000CN	14	93
Fusing element (220 V)	RG5-4590-000CN	14	93
Gear	(see gear kit)	12	93
Gear assembly	RG5-4585-000CN	3	91
Gear kit	RY7-5049-000CN	13	92
Gear, 21T/28T	HS5-0253-000CN	2	88
Gear, 82T	HS5-0250-000CN	1	88
Guide, cartridge, left	RF5-2818-000CN	7	92
Guide, cartridge, right	RF5-2819-000CN	8	92
Guide, document scanner	RB2-5405-000CN	10	87
Guide, fusing element	RB2-3958-000CN	16	93
Guide, paper delivery	RB2-5421-000CN	26	87
Guide, transfer	RB2-3950-000CN	5	93
Hinge clip	RB2-5497-000CN	15	90
Hinge support assembly	RG5-5392-000CN	22	90
Holder, fixing	RF5-2880-000CN	19	90
Holder, pad	RB2-3947-000CN	3	92
Holder, power switch lever	RB2-3986-000CN	4	95
Image scanner sensor, PCB assembly	RG5-5464-000CN	28	87
Laser/scanner assembly	RG5-5421-000CN	4	91
Lever, power switch	RB2-3987-000CN	5	95
Line interface unit (LIU), Europe	C7052-60005	24	90
Line interface unit (LIU), North America	C7052-60004	24	90
Line interface unit (LIU), rare	C7052-60006	24	90

Table 38. Alphabetical parts list (continued)

Description	Part number	Ref.	Figure
Metal clip, fusing element (left)	RG5-5387-000CN	15	93
Metal clip, fusing element (right)	RG5-5388-000CN	2	93
Motor assembly	RG5-5400-000CN	5	88
Motor, stepping	RH7-1404-000CN	10A	90
Overlay (speed-dial template)	RB2-5471-000CN	5	85
Paper guide plate assembly	RG5-4582-000CN	1	92
Paper input tray assembly	RG5-5391-000CN	8	86
Pickup roller assembly	RG5-5401-000CN	6	88
Plate, grounding	RB2-4049-000CN	12	95
Plate, grounding	RB2-4219-000CN	2	92
Plate, grounding	RB9-0538-000CN	18	90
Plate, shield	RB2-5388-000CN	23	87
Printer door assembly	RG5-5411-000CN	31	87
Rod, switch	RB2-3988-000CN	6	95
Roller	RB2-3931-000CN	9	91
Roller holder assembly	RG5-4584-000CN	1	91
Roller, face down	RB2-4223-000CN	8D	93
Roller, face up	RB2-4222-000CN	8A	93
Roller, face-down	RF5-2830-000CN	10	92
Roller, face-up	RF5-2822-000CN	9	92
Roller, pickup	RB2-4026-000CN	11	91
Roller, pressure	RF5-2823-000CN	10	93
Safety cover	RB2-4055-000CN	9	90
Scanner cable	RG5-5415-000CN	13	91
Scanner cable cover	RB2-4030-000CN	3	90
Screw	XB4-7401-007CN	501	91
Screw	XB6-7300-807CN	502	91
Screw kit, delivery assembly	RY7-5060-000CN	17	93
Screw, M3X8	XA9-0591-000CN	16	87
Screw, M3X8	XA9-0591-000CN	3	88
Screw, M4X10	XA9-0870-000CN	18	87
Screw, M4X10	XA9-0870-000CN	4	88
Screw, tapping, pan head, M4X10	XB4-7401-007CN	502	87
Screw, tapping, pan head, M4X10	XB4-7401-007CN	501	89
Screw, tapping, pan head, M4X10	XB4-7401-007CN	501	90

Table 38. Alphabetical parts list (continued)

Description	Part number	Ref.	Figure
Screw, tapping, pan head, M4X10	XB4-7401-007CN	22A	90
Screw, tapping, pan head, M4X10	XB4-7401-007CN	503	93
Screw, tapping, truss head, M4x	XB4-7400-805CN	501	93
Screw, tapping, truss head, M4x12	XB4-7401-209CN	502	93
Screw, tapping, truss head, M4X12	XB4-7401-209CN	501	86
Screw, tapping, truss, head, M3X8	XB4-7300-807CN	503	87
Screw, TP, M3X6	XA9-0267-000CN	15	87
Screw, TP, M3X6	XA9-0267-000CN	12	91
Screw, TP, M3x8	XA9-0302-000CN	6	86
Screw, w/star washer, M3X6	XA9-0653-000CN	14	91
Screw, w/star washer, M3X6	XA9-0653-000CN	10	95
Screw, w/washer, M3X10	XB2-8301-007CN	501	88
Screw, w/washer, M3X6	XA9-0779-000CN	17	87
Screw, w/washer, M3X6	XA9-0779-000CN	16	90
Screw, w/washer, M3X8	XA9-0951-000CN	11	95
Seal, frame, 2	RB2-4329-000CN	12	90
Seal, sensor, 1	RB2-4327-000CN	13	95
Seal, sensor, 2	RB2-4328-000CN	14	95
Sensor cable	RG5-4617-000CN	23	90
Separation assembly	RG5-5404-000CN	1	89
Separation pad kit (document scanner)	RY7-5055-000CN	1A	89
Shaft	RB2-3943-000CN	5	91
Shaft, pickup roller	RB2-3930-000CN	2	91
Sheet	RB2-4324-000CN	1	90
Sheet, insulating	RB2-3985-000CN	3	95
Sheet, light-blocking	RB2-5500-000CN	16	91
Sheet, light-blocking	RB2-5501-000CN	15	91
Sheet, transfer	RB2-4054-000CN	8	90
Single-sheet input tray assembly	RG5-4601-000CN	7	86
Solenoid	RH7-5227-000CN	11	93
Spacer	RB1-7303-000CN	1	95
Spring, compression	RB2-3940-000CN	4	93
Spring, compression	RS5-2502-000CN	11	92
Spring, compression	RS6-2122-000CN	16	92
Spring, leaf	RB2-3944-000CN	6	91

Table 38. Alphabetical parts list (continued)

Description	Part number	Ref.	Figure
Spring, leaf, left	RB2-3959-000CN	11	90
Spring, torsion	RB2-3952-000CN	6	90
Spring, torsion	RB2-3953-000CN	7	90
Spring, torsion	RB2-3961-000CN	6	92
Spring, torsion	RB2-4042-000CN	17	90
Spring, torsion	RS6-2276-000CN	27	87
Spring, wire	RB1-7286-000CN	8B	93
Spring, wire	RB1-7287-000CN	8C	93
Static charge eliminator	RB2-3951-000CN	5	90
Stop, slide	RB2-4016-000CN	12	92
Strap, plastic	RB2-3354-000CN	9	87
Sub guide, left	RB2-4431-000CN	20	93
Sub guide, right	RB2-4432-000CN	19	93
Subpad kit (includes left and right)	RY7-5050-000CN	1	93
Support extension, document output	RB2-5407-000CN	1	85
Support, document feeder	RB2-5437-000CN	4	85
Support, document output	RB2-5412-000CN	2	85
Support, paper input	RB2-5493-000CN	6	85
Support, paper output	RB2-5423-000CN	3	85
Transfer assembly	RG5-4657-000CN	13	93
Upper guide assembly	RG5-5402-000CN		89

Numerical parts list

Table 39. Numerical parts list

Part number	Description	Ref.	Figure
C4261-60001	Formatter, HP LaserJet 3200 product		90
C4261-60009	Formatter, HP LaserJet 3200M product		90
C4262A	Control panel PCB	29	87
C7052-60004	Line interface unit (LIU), North America	24	90
C7052-60005	Line interface unit (LIU), Europe	24	90
C7052-60006	Line interface unit (LIU), rare	24	90
C7867AD	DIMM-12MB SFlash/base—rev. C		
C7867AE	DIMM-12MB SFlash/SE—rev. C		
C7867AF	DIMM-12MB SFlash/E ("M" version)—rev. C		
HS5-0250-000CN	Gear, 82T	1	88
HS5-0253-000CN	Gear, 21T/28T	2	88
RB1-7286-000CN	Spring, wire	8B	93
RB1-7287-000CN	Spring, wire	8C	93
RB1-7303-000CN	Spacer	1	95
RB2-3354-000CN	Strap, plastic	9	87
RB2-3904-000CN	Cover, foamy	10	91
RB2-3930-000CN	Shaft, pickup roller	2	91
RB2-3931-000CN	Roller	9	91
RB2-3939-000CN	Bushing, right	3	93
RB2-3940-000CN	Spring, compression	4	93
RB2-3943-000CN	Shaft	5	91
RB2-3944-000CN	Spring, leaf	6	91
RB2-3945-000CN	Foot	7	91
RB2-3947-000CN	Holder, pad	3	92
RB2-3949-000CN	Cam	8	91
RB2-3950-000CN	Guide, transfer	5	93
RB2-3951-000CN	Static charge eliminator	5	90
RB2-3952-000CN	Spring, torsion	6	90
RB2-3953-000CN	Spring, torsion	7	90
RB2-3956-000CN	Bushing, left	6	93
RB2-3957-000CN	Bushing, right	7	93
RB2-3958-000CN	Guide, fusing element	16	93

Table 39. Numerical parts list (continued)

Part number	Description	Ref.	Figure
RB2-3959-000CN	Spring, leaf, left	11	90
RB2-3960-000CN	Flag, sensor	5	92
RB2-3961-000CN	Spring, torsion	6	92
RB2-3984-000CN	ECU pan	2	95
RB2-3985-000CN	Sheet, insulating	3	95
RB2-3986-000CN	Holder, power switch lever	4	95
RB2-3987-000CN	Lever, power switch	5	95
RB2-3988-000CN	Rod, switch	6	95
RB2-4006-000CN	Deflector	25	87
RB2-4016-000CN	Stop, slide	12	92
RB2-4017-000CN	Cable holder	2	90
RB2-4026-000CN	Roller, pickup	11	91
RB2-4030-000CN	Scanner cable cover	3	90
RB2-4042-000CN	Spring, torsion	17	90
RB2-4049-000CN	Plate, grounding	12	95
RB2-4054-000CN	Sheet, transfer	8	90
RB2-4055-000CN	Safety cover	9	90
RB2-4219-000CN	Plate, grounding	2	92
RB2-4222-000CN	Roller, face up	8A	93
RB2-4223-000CN	Roller, face down	8D	93
RB2-4324-000CN	Sheet	1	90
RB2-4327-000CN	Seal, sensor, 1	13	95
RB2-4328-000CN	Seal, sensor, 2	14	95
RB2-4329-000CN	Seal, frame, 2	12	90
RB2-4431-000CN	Sub guide, left	20	93
RB2-4432-000CN	Sub guide, right	19	93
RB2-5388-000CN	Plate, shield	23	87
RB2-5405-000CN	Guide, document scanner	10	87
RB2-5406-000CN	Cover, cable	11	87
RB2-5407-000CN	Support extension, document output	1	85
RB2-5410-000CN	Cover, contact image sensor	12	87
RB2-5412-000CN	Support, document output	2	85
RB2-5421-000CN	Guide, paper delivery	26	87
RB2-5423-000CN	Support, paper output	3	85
RB2-5434-000CN	Cover, face-up	1	86

Table 39. Numerical parts list (continued)

Part number	Description	Ref.	Figure
RB2-5437-000CN	Support, document feeder	4	85
RB2-5471-000CN	Overlay (speed-dial template)	5	85
RB2-5485-000CN	Cover, DIMM	2A	86
RB2-5488-000CN	Cover, front	3	86
RB2-5489-000CN	Cover, top	4	86
RB2-5490-000CN	Cover, right	5	86
RB2-5491-000CN	Cover, left	21	86
RB2-5493-000CN	Support, paper input	6	85
RB2-5497-000CN	Hinge clip	15	90
RB2-5498-000CN	Cover, blanking	22	86
RB2-5500-000CN	Sheet, light-blocking	16	91
RB2-5501-000CN	Sheet, light-blocking	15	91
RB9-0538-000CN	Plate, grounding	18	90
RF5-2818-000CN	Guide, cartridge, left	7	92
RF5-2819-000CN	Guide, cartridge, right	8	92
RF5-2822-000CN	Roller, face-up	9	92
RF5-2823-000CN	Roller, pressure	10	93
RF5-2830-000CN	Roller, face-down	10	92
RF5-2832-000CN	Arm, pad	4	92
RF5-2880-000CN	Holder, fixing	19	90
RF5-3232-000CN	Cover, rear	2	86
RF5-3236-000CN	Cable, flat	13	87
RG5-4581-000CN	Feed assembly		94
RG5-4582-000CN	Paper guide plate assembly	1	92
RG5-4584-000CN	Roller holder assembly	1	91
RG5-4585-000CN	Gear assembly	3	91
RG5-4586-000CN	Drive assembly	10	90
RG5-4589-000CN	Fusing element (110 V)	14	93
RG5-4590-000CN	Fusing element (220 V)	14	93
RG5-4593-000CN	Delivery assembly	8	93
RG5-4599-000CN	Door sensor assembly	9	95
RG5-4601-000CN	Single-sheet input tray assembly	7	86
RG5-4617-000CN	Sensor cable	23	90
RG5-4657-000CN	Transfer assembly	13	93
RG5-5387-000CN	Metal clip, fusing element (left)	15	93

Table 39. Numerical parts list (continued)

Part number	Description	Ref.	Figure
RG5-5388-000CN	Metal clip, fusing element (right)	2	93
RG5-5391-000CN	Paper input tray assembly	8	86
RG5-5392-000CN	Hinge support assembly	22	90
RG5-5393-000CN	Formatter case assembly	21	90
RG5-5395-000CN	ECU (110 v)	15	95
RG5-5399-000CN	Document feeder assembly		88
RG5-5400-000CN	Motor assembly	5	88
RG5-5401-000CN	Pickup roller assembly	6	88
RG5-5402-000CN	Upper guide assembly		89
RG5-5404-000CN	Separation assembly	1	89
RG5-5405-000CN	Cable, flat	19	87
RG5-5406-000CN	Control panel assembly	30	87
RG5-5410-000CN	Contact image sensor assembly	20	87
RG5-5411-000CN	Printer door assembly	31	87
RG5-5412-000CN	Deflector link assembly	24	87
RG5-5415-000CN	Scanner cable	13	91
RG5-5421-000CN	Laser/scanner assembly	4	91
RG5-5464-000CN	Image scanner sensor, PCB assembly	28	87
RH2-5381-000CN	Cable, flat	7	95
RH7-1404-000CN	Motor, stepping	10A	90
RH7-5227-000CN	Solenoid	11	93
RS5-2502-000CN	Spring, compression	11	92
RS6-2122-000CN	Spring, compression	16	92
RS6-2276-000CN	Spring, torsion	27	87
RY7-5049-000CN	Gear kit	13	92
RY7-5050-000CN	Subpad kit (includes left and right)	1	93
RY7-5051-000CN	Clutch kit	14	90
RY7-5055-000CN	Separation pad kit (document scanner)	1A	89
RY7-5060-000CN	Screw kit, delivery assembly	17	93
VS1-5057-002CN	Connector, 2P	8	95
WT2-0307-000CN	Cable tie	14	87
XA9-0267-000CN	Screw, TP, M3X6	15	87
XA9-0267-000CN	Screw, TP, M3X6	12	91
XA9-0302-000CN	Screw, TP, M3x8	6	86
XA9-0591-000CN	Screw, M3X8	16	87

Table 39. Numerical parts list (continued)

Part number	Description	Ref.	Figure
XA9-0591-000CN	Screw, M3X8	3	88
XA9-0653-000CN	Screw, w/star washer, M3X6	14	91
XA9-0653-000CN	Screw, w/star washer, M3X6	10	95
XA9-0779-000CN	Screw, w/washer, M3X6	17	87
XA9-0779-000CN	Screw, w/washer, M3X6	16	90
XA9-0870-000CN	Screw, M4X10	4	88
XA9-0870-000CN	Screw, M4X10	18	87
XA9-0951-000CN	Screw, w/washer, M3X8	11	95
XB2-8301-007CN	Screw, w/washer, M3X10	501	88
XB4-7300-807CN	Screw, tapping, truss, head, M3X8	503	87
XB4-7400-805CN	Screw, tapping, truss head, M4x	501	93
XB4-7401-007CN	Screw	501	91
XB4-7401-007CN	Screw, tapping, pan head, M4X10	502	87
XB4-7401-007CN	Screw, tapping, pan head, M4X10	501	89
XB4-7401-007CN	Screw, tapping, pan head, M4X10	501	90
XB4-7401-007CN	Screw, tapping, pan head, M4X10	22A	90
XB4-7401-007CN	Screw, tapping, pan head, M4X10	503	93
XB4-7401-209CN	Screw, tapping, truss head, M4x12	502	93
XB4-7401-209CN	Screw, tapping, truss head, M4X12	501	86
XB6-7300-807CN	Screw	502	91

Index

A

abbreviations, fax 203
AC power distribution 72
accessories, ordering 218
acoustical emissions 18
adding paper 48
ADF (automatic document feeder) capacity 14
adjusting
  fax data store parameters 173
alcohol, cleaning with 57, 58
alignment, troubleshooting 161
alphabetical part number list 244
ammonia, avoiding 53
appropriate responses, fax 202
arrays, optical system 63
arrow keys 31
automatic document feeder (ADF) capacity 14

B

back arrow key 31
back cover, removing 90
Back space key 31
background scatter, troubleshooting 159
beam detect (BD) signal 75
beam, laser 75
bias 75
bidirectional communications 66, 67
billing log 187
bins. *See* output bin; input trays
black dots, troubleshooting 157
black pages, troubleshooting 159
blade, cleaning 76
blank pages, troubleshooting 160
block fax list 187
boards
  ECU 140
  scanner 112
breaking paper 163
business cards, loading 47
buttons, control panel 31
buying. *See* ordering

C

cables
  part numbers 218
  power, identifying 22
calibrating scanner 59, 208
capacity
  ADF (automatic document feeder) 14
  circuit 17
  input trays 14
  memory slots 15
  output trays 14
carrier sheets 46
cartridges. *See* toner cartridges
central processing unit. *See* CPU
characters, troubleshooting 159, 160
charge eliminator 75
charging, image formation 75
checks
  drum rotation 167
  engine 165
  half self-test functional 166
  heating element 168
  high-voltage power supply 169
  paper path 171
  toner cartridge connection points 169
circuit capacity 17
cleaning
  alcohol 57, 58
  image formation processes 76
  precautions 53
  print path 54
  scanner path 57
  toner 55
Clear key 32
clips, fusing element 120
clothing, washing toner off 55
commands, PJL 183
complex pages, detecting 67
compliance information 25
conditioning stage 75
configuration report, printing 186
conformity, declaration of 25
connection points, testing 169
connectors, identifying 22
consumables
  life expectancies 52
  ordering 217
contact glass 63
contact image sensor (CIS)
  operations 63
  removing 103
continuous self-test 172

contrast
  key 32
  troubleshooting 156
control panel
  error messages 35
  keys 31
  lights 31
  menu structure 33
  release door 20
  removing 112
  reports, printing 186
  troubleshooting 146
  using 33
Copy key 32
copy setup menu 34
copying
  loading media 45
  selecting media 44
  speed 17
  troubleshooting 147
covers, removing
  back 90
  left side 93
  part numbers 225
  right side 91
  top 95
  tray kits 222
CPU 65
crooked images, troubleshooting 162
curl, paper
  maximum 168
  troubleshooting 162

D

darkness. *See* contrast
data
  Page Protect 67
  sending to formatter 65
  storing 66
data store report 172
date menu 34
DBM 206
DC power distribution 72
declaration of conformity 25
default settings 184
defect ruler 207
delivery assembly, removing 116
delivery delay jam 79
delivery rollers
  life expectancy 52
  testing 171
delivery stationary jam 79
demonstration page, printing 186
depth 16
developer's menu 173
developing stage 75
diagnostic mode 181
diagnostics. *See* checks
dimensions 16, 30
DIMMs
  part numbers 218
  removing 89
  slots 15
diodes, operations 63
display, control panel 31
document feeder tray
  identifying 21
  loading 45
  part numbers 229
document output slot, identifying 20
document release door, identifying 20
document scanner assemblies
  part numbers 226
  removing 100
document scanner motor, removing 107
document scanner pickup roller
  life expectancy 52
  removing 105
document scanner rollers, life expectancies 52
document scanner separation pad
  life expectancy 52
  removing 106
document sensor (PS1) 81
documentation, ordering 216
doors
  cleaning 53
  document release 20
  front paper path 20, 50
  identifying 20
  memory 22
  open sensor (SW301) 80, 171
  printer, identifying 20
  printer, removing 96
DOS, PJL commands 185
dots per inch (dpi). *See* resolution
dots, troubleshooting 157
draft mode 66
DRAM, formatter 65
drive roller, testing 171
dropouts, troubleshooting 160
drum cleaning stage 76
drums
  operations 74, 75
  testing 167
duty cycle
  product 15
  toner cartridges 26

E

EconoMode 66
ECP interface 65

ECU (Engine Control Unit)
  formatter to printer operations 82
  image formation process 75
  motor 71
  operations 69
  pan, removing 139
  paper feeding operations 77
  power system 72
  replacing 140
  troubleshooting 147
edges not printing 156
electrical components, part numbers 243
electrical shocks, avoiding 53
electrical specifications 17
electrostatic discharge (ESD) 87
eliminator, static charge 75
emissions
  acoustical 18
energy consumption 17
Engine Control Unit (ECU)
  formatter to printer operations 82
  image formation process 75
  motor 71
  operations 69
  pan, removing 139
  paper feeding operations 77
  power system 72
  replacing 140
  troubleshooting 147
engine test switch (SW201) 80, 165
Enhanced I/O 66
Enlarge key 32
Enter/Menu 31
envelopes
  printing 49
  selecting 43
environmental specifications 16, 30
Error light 31
error messages 35
exchange program, parts 217
exit sensor (PS201) 77, 81
exit sensor flag, removing 118
Extended Capabilities Port (ECP) interface 65

F

faded print, troubleshooting 157
fans 15
fasteners 220
fax
  abbreviations 203
  appropriate responses 202
  phase sequence 201
fax activity report 187
fax data store parameters 173
fax functions menu 34
fax setup menu 34
fax trace report 188
Fax/Send key 32
faxing
  loading media 45
  resolution 17
  selecting media 44
  T.30 protocol trace report 188
features 14
feed assembly
  drive roller operations 77
  removing 141
feed roller, life expectancy 52
feeder tray
  identifying 21
  loading 45
  part numbers 229
feeding operations, printer 77
feeding problems, troubleshooting 162
  See also jams
field replaceable units (FRUs) 87
fine resolution 17
firmware 15
  version 181
first-page out 14
flags, exit sensor 118
flat-blade screwdrivers 87
formatter
  CPU 65
  memory 65
  operations 65
  Page Protect feature 67
  pan, removing 137
  printer operations 82
  removing 138
  voltage 72
forms, multipart 43
forward arrow key 31
frequent jams, troubleshooting 163
front paper output slot 50
front paper path door
  identifying 20
  using 50
FRUs (field replaceable units) 87
functional check, half self-test 166
fuser
  operations 76
fuser roller, testing 171
fuses 72
fusing element
  life expectancy 52
  removing 119
  testing 168

G

gear train motor, removing 124
glossy paper 44

graph, calibration 208
group dial report 187
guides, removing
  internal 94
  upper assembly 108

H

half self-test functional check 166
halftone resolution 17
hardware capabilities 14
headers, fax
  menu 34
heating element
  life expectancy 52
  removing 119
  testing 168
height 16
high-voltage power supply
  power distribution 73
  testing 169, 170
  voltage 72
horizontal orientation 48
horizontal streaks, troubleshooting 158
HP JetDirect print servers, ordering 218
HP LaserJet paper 43
HP Multipurpose paper 43
humidity 16

I

I/O, Enhanced 66
image formation
  operations 74
  Page Protect 67
image quality, troubleshooting 156
initial residual paper jam 79
initializing 183
ink cartridges. *See* toner cartridges
input trays
  capacity 14
  feeding operations 77
  identifying 21
  loading 45, 48
  media sizes 43
inserting media
  normal 45
  paper input tray 48
  special 46
installation requirements 30
interfaces, formatter 66
internal assemblies
  diagrams and part numbers 232
  removing 113
internal paper guide, removing 94
INTR (Initial Rotation Period) 82
isopropyl alcohol, cleaning with 57

J

jams
  feeding problems, troubleshooting 162
  frequent 163
  preventing 44, 48
  sensors 79
JetDirect print servers, ordering 218

K

keypad, one-touch 32
keys, control panel 31
kick plate
  operations 77
  removing 134
  testing 171
kits, tray 222

L

labels 44
landscape orientation 48
laser beam, operations 75
Laser/Beam Detect Circuitry voltage 72
laser/scanner assembly
  removing 113
  service precautions 87
LaserJet paper 43
latches, printer door release 20
LCD test 181
leading edge, detecting 77
LED test 181
LEDs, operations 63
left side cover, removing 93
lenses 75
letterhead, printing 49
lever, special media
  identifying 21
  using 47
life expectancies, consumables 52
light-emitting diodes (LEDs), operations 63
lightness. *See* contrast
lights, control panel 31
lightweight media
  loading 46
  troubleshooting 164
lines, troubleshooting
  black 158
  calibration graph 208
  white 157
LIU (line interface unit)
  removing 138
loading media
  normal 45
  paper input tray 48
  special 46
long pages, troubleshooting 162

LPT ports, troubleshooting 148
LSTR (Last Rotation Period) 82

M

magnetic screwdrivers 87
maintenance
  cleaning 53
  consumables, life expectancies 52
  recalibrating scanner 59
manual feed 49
margins, minimum 156
media
  lightweight 46, 164
  loading 45
  selecting 43, 44
  special, loading 46
media jams. *See* jams
media lever, special
  identifying 21
  using 47
memory
  door, identifying 22
  Enhanced I/O 66
  formatter 65
  removing 89
  slots 15
Memory Enhancement technology (MEt) 66
menu
  developer's 173
  secondary service 172
menu structure
  entering 31
  printing 33
  using 33
messages, error 35
MEt (Memory Enhancement technology) 66
metal clips, fusing element 120
mirrors 75
misaligned print, troubleshooting 161
model numbers 19
motors
  gear train, removing 124
  scanner, removing 107
  testing 171
  voltage 72
multifeeds, troubleshooting 163
  See also jams
multipart forms 43
Multipurpose paper 43

N

needle nose pliers 87
negative charge 75
network accessories, ordering 218
newspaper clippings 46
noise 18
numbers
  See also phone numbers
  model 19
  part 244, 249
  serial 19
numeric keys 32
numerical list, part numbers 249
NVRAM init 183
NVRAM variables 183
NVRAM, formatter 65

O

one-touch keypad 32
one-touch report 187
online support. *See* web sites
operating environment 16, 30
operations
  Engine Control Unit (ECU) 69
  formatter system 65
  formatter to printer sequence 82
  image formation system 74
  optical system 63
  paper feed system 77
  printer 68
  testing 166
optical system, operations 63
ordering
  accessories 218
  consumables 217
  documentation 216
  parts 216
orientation, landscape 48
output bin, identifying 21
output path, selecting 50
output roller, removing 114
output slot
  identifying 20
  using 50
overcurrent protection 72
overriding switches 171
overvoltage protection 72

P

Page Protect 67
pans, removing
  ECU 139
  formatter 137

paper
  breaking 163
  curl 162, 168
  feeding operations 77
  LaserJet 43
  lightweight 46, 164
  loading 45
  Multipurpose 43
  selecting 43, 44
  slick 44
  special, loading 46
paper exit sensor (PS201) 77, 81
paper exit sensor flag, removing 118
paper feed assembly, removing 141
paper feeding problems, troubleshooting 162
paper guides, internal 94
paper input tray
  feeding operations 77
  identifying 21
  loading 48
  media sizes 43
  troubleshooting 163
paper jams. *See* jams
paper out sensor (PS001) 81
paper output bin, identifying 21
paper path
  diagrams 78
  testing 171
  troubleshooting 186
paper path door, identifying 20
paper pick-up assembly, removing 132
paper pickup roller
  operations 77
  testing 171
paper top sensor (PS002) 77, 80
parallel cable connector 22
parallel ports, troubleshooting 148
parameters 173
part numbers
  alphabetical list 244
  numerical list 249
  subassemblies 219
parts
  ordering 216
  remanufactured 217
  removing and replacing 87
paths
  output, selecting 50
  paper 78, 171, 186
  print, cleaning 54
  scanner, cleaning 57
PCL (Printer Command Language) 67
perforated papers 44
phase sequence, fax 201
Phillips screwdrivers 87
phone line connectors 22
phone numbers
  compliance information 25
  ordering consumables 217
phonebook report 187
photo resolution 17
photographs 46
photosensitive drum
  operations 74, 75
  testing 167
phototransistor array 63
pick-up assembly, removing 132
pickup delay jam 79
pickup roller
  cleaning 56
  life expectancy 52
  operations 77
  removing 105, 131
  testing 171
pickup solenoid (SL001) 77, 80
pickup stationary jam 79
PJL (Printer Job Language) 67, 183
pliers 87
ports, troubleshooting
  LPT 148
  parallel 148
Posidrive screwdrivers, avoiding 87
positive charge 75
power
  consumption 17
  Engine Control Unit (ECU) 72
  requirements 17
  troubleshooting 146
power cable connectors 22
power supplies
  disconnecting 87
  high-voltage 72, 73
  testing 169
pressure roller
  life expectancy 52
  operations 76
  removing 128
preventing jams 44, 48
primary charging stage 75
PRINT 82
print cartridges. *See* toner cartridges
print path, cleaning 54
print servers, ordering 218
printer
  block diagram 68
  Engine Control Unit (ECU) 69
  formatter operations 82
Printer Command Language (PCL) 67
printer door
  cleaning 53
  identifying 20
  removing 96

Printer Job Language (PJL) 67, 183
printer pickup roller
  cleaning 56
  life expectancy 52
  operations 77
  removing 131
printer separation pad
  life expectancy 52
  operations 77
printer subpads
  life expectancy 52
printer transfer roller, life expectancy 52
printing
  complex pages, Page Protect 67
  feeding operations 77
  image formation operations 74
  letterhead 49
  loading media 48
  resolution 17
  selecting media 43
  skew specifications 18
  speed 17
  troubleshooting 148
product overview 14
protocol trace report, printing 188
PS001 (paper out sensor) 81
PS002 (paper top sensor) 77, 80
PS1 (document sensor) 81
PS201 (paper exit sensor) 77, 81
purchasing. *See* ordering

Q

quality, troubleshooting 156

R

RAM. *See* memory
Ready light 31
recalibrating scanner 59, 208
receipts 46
Redial/Pause key 32
redistributing toner 155
Reduce/Enlarge key 32
refilled toner cartridges 26
release latches, printer door 20
remanufactured parts 217
removing parts 87
repetitive image defect ruler 207
replacing
  consumables 52
  parts 87
reports
  continuous self-test 172
  data store 172
  fax trace 188
  menu 34
  printing 186, 187
  secondary service 172
  T.30 protocol trace 188
reset 183
resistance, heating element 168
resolution
  key 32
  maximum 17
right side cover, removing 91
rod lens array 63
rollers
  life expectancies 52
  output, removing 114
  pickup, removing 105, 131
  pressure, removing 128
  testing 171
  transfer, removing 130
ruler, repetitive image defect 207

S

Scan key 32
scanline data 172
scanner
  document path 64
  recalibrating 59, 208
scanner assemblies
  part numbers 226
  removing 100
scanner board, removing 112
scanner motor, removing 107
scanner path, cleaning 57
scanner pickup roller
  life expectancy 52
  removing 105
scanner rollers, life expectancies 52
scanner separation pad
  life expectancy 52
  removing 106
scanning
  image quality, troubleshooting 161
  loading media 45
  operations 63
  resolution 17
  selecting media 44
  skew specifications 18
  troubleshooting 148
scanning exposure stage 75
scattered background, troubleshooting 159
screwdrivers 87

screws
  self-tapping 87
  types of 220
sealing tape removing 166
secondary service menu 172
selecting media 43
self test
  continuous 172
self-tapping screws, installing 87
self-tests. *See* checks
sensors
  contact image (CIS), operations 63
  contact image (CIS), removing 103
  exit flag, removing 118
  feeding operations 77
  jam detection 79
separation pads
  life expectancies 52
  operations 77
  removing 106, 135
separation process 75
serial numbers 19
service menu 34
service mode 183
settings
  isolation, PJL 67
  NVRAM variables 183
sheet metal, precautions 87
shock hazards 53
side covers, removing
  left 93
  right 91
signals, beam detect (BD) 75
single-sheet input slot
  feeding operations 77
  identifying 21
  media sizes 43
  troubleshooting 163
  using 49
sizes, media 43, 44
skew
  specifications 18
  troubleshooting 161
SL001 (pickup solenoid) 77, 80
slick papers 44
slots, memory 15
smears, troubleshooting 158
smudges, troubleshooting 157
software
  installation, troubleshooting 148
  ordering 216
solenoids
  operations 77
  removing 127
  testing 171
  voltage 72
sound emissions 18
space requirements 30
spare parts. *See* parts; consumables
special media lever
  identifying 21
  using 47
special media, loading 46
specifications 16
speed
  copying 17
  first-page out 14
  printing 17
speed dial report 187
Speed-Dial key 32
spring mechanism, paper exit sensor flag 118
stains, troubleshooting 157
standard resolution 17
star screws 220
static charge eliminator 75
static discharge precautions 87
STBY (Standby) 82
Stop/Clear key 32
storing
  data 66
  product 16
streaks, troubleshooting 157, 158
stripes, troubleshooting 157
subpads
  life expectancies 52
superfine resolution 17
supplies
  life expectancies 52
  ordering 217
SW201 (engine test switch) 165
SW301 (door open sensor) 80, 171
switches
  door open (SW301) 80, 171
  engine test (SW201) 165
  overriding 171
system reset 183

T

T.30 protocol trace report, printing 188
tape, removing 166
technical support web sites 217
temperature 16
tests. *See* checks
text, troubleshooting 159, 160
theory of operations. *See* operations
thermistor connector 168
time/date, header menu 34

toner
  fusing process 76
  redistributing 155
  saving 66
  washing off clothing 55
  waste, cleaning operations 76
toner cartridges
  connection points, testing 169
  defects, checking for 155
  life expectancy 52
  operations 74
  recycling 26
  redistributing 155
  refilled 26
  removing 87
  sealing tape, removing 166
tools, required 87
top cover, removing 95
trace report, printing 188
trailing edge, detecting 79
train motor, gear 124
transfer roller
  cleaning 53
  life expectancy 52
  removing 130
  testing 171
transfer stage 75
tray kits 222
trays. *See* input trays
troubleshooting
  control panel 146
  copying 147
  ECU (Engine Control Unit) 147
  feeding problems 162
  half self-test functional test 166
  image quality 156
  LPT ports 148
  power 146
  printing 148
  recalibrating scanner 208
  repetitive image defect ruler 207
  scanning 148
  software installation 148
truss head screws 220

U

Universal Serial Bus. *See* USB
unplugging 53, 87
upper guide assembly
  part numbers 230
  removing 108
USB
  connector 22
  operations 65

V

vacuuming, avoiding 55
variables, NVRAM 183
version,firmware 181
vertical streaks, troubleshooting 158
voids, troubleshooting 159
voltage
  Engine Control Unit (ECU) 72
  overvoltage protection 72
  part numbers 219
  requirements 17
Volume key 32

W

WAIT 82
warranty
  product 23
waste toner, cleaning operations 76
web sites
  technical support 217
weight
  paper 50
  product 16
white pages, troubleshooting 160
white streaks, troubleshooting 157
width 16
wiring diagram 210
wrapping jam 79
wrinkled pages, troubleshooting 162
writing stage 75

copyright © 2001
Hewlett-Packard Company

http://www.hp.com/support/lj3200

C7052-90930