



LaserWriter Printers
Volume I Addendum

Service Guide

September 1993

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Introduction

This addendum provides errata information for Volume 1 of the *Apple Service Guide for LaserWriter Printers* (published in January 1992) and includes additional information on the Personal LaserWriter LS/L and NTR printers. This addendum is divided into the following three sections:

- LaserWriter II SC/NT/NTX/IIf/IIg
- Personal LaserWriter SC/NT/NTR/LS and LS/L
- Ports & Cables

These sections correspond to tab sections in Volume 1 of the *Apple Service Guide for LaserWriter Printers*. For example, the "LaserWriter II SC/NT/NTX/IIf/IIg" section of this addendum contains corrections to the LaserWriter II SC/NT/NTX/IIf/IIg tab of Volume 1. The page number for which the corrections apply is given in parenthesis after the section title.

To get the most out of this addendum, Apple recommends that you:

- Review the errata information and update your *Apple Service Guide for LaserWriter Printers*, Volume 1 with the corrections.
- File this addendum in the back pocket of your *Apple Service Guide for LaserWriter Printers*, Volume 1 for future reference to Personal LaserWriter LS/L and NTR information.

LaserWriter II SC/NT/NTX/II/IIg

Following are updates to the LaserWriter II SC/NT/NTX/II/IIg section of the *Apple Service Guide for LaserWriter Printers*, Volume 1. The page numbers in the section titles correspond to the page(s) in Volume 1 where the information originally appeared.

Parts List (Pages 4–6)

Following is the updated parts list for the LaserWriter II SC/NT/NTX/II/IIg printers:

Bottom Case

Bottom Panel	949-0152
Bottom Panel Cap.....	949-0154
Grounding Bracket.....	948-0132

Cassette Holder Assembly

Auxiliary Guide	949-0165
Left Hook	949-0159
Left Lifter	949-0163
Main Body Block	949-0247
Paper Pickup Gear, 19-tooth	939-0023
Paper Pickup Gear, 57-tooth	939-0024
Paper Sensing Arm.....	949-0166
Right Hook.....	949-0160
Right Hook Guide.....	949-0162
Right Lifter	949-0164

Cleaning Brush	970-0047
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Connector PCA	971-0008
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Controller-I/O Board, LW II NTX.....	661-0429
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IC, ROM, LL0, LW II NTX.....	342-0560
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IC, ROM, LL1, LW II NTX.....	342-0562
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IC, ROM, LM0, LW II NTX	342-0564
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IC, ROM, LM1, LW II NTX	342-0566
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IC, ROM, HM1, LW II NTX.....	342-0567
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IC, ROM, HM0, LW II NTX.....	342-0565
------------------------------	----------

IC, ROM, HH1, LW II NTX.....	342-0563
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IC, ROM, HH0, LW II NTX.....	342-0561
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Controller-I/O Board, LW II NTX (Rev 3)	661-1605
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IC, ROM, LL0, LW II NTX.....	341-0711
IC, ROM, LL1, LW II NTX.....	341-0713
IC, ROM, LM0, LW II NTX	341-0715
IC, ROM, LM1, LW II NTX	341-0717
IC, ROM, HM1, LW II NTX.....	341-0718
IC, ROM, HM0, LW II NTX.....	341-0716
IC, ROM, HH1, LW II NTX.....	341-0714
IC, ROM, HH0, LW II NTX.....	341-0712
Controller-I/O Board, LW II NT	661-0438
IC, ROM, L0, LW II NT	342-0545
IC, ROM, L1, LW II NT	342-0547
IC, ROM, L2, LW II NT	342-0549
IC, ROM, L3, LW II NT	342-0551
IC, ROM, H0, LW II NT	342-0546
IC, ROM, H1, LW II NT	342-0548
IC, ROM, H2, LW II NT	342-0550
IC, ROM, H3, LW II NT	342-0552
Controller-I/O Board, LW IIf (shipped w/o SIMMs).....	661-0776
Assy, LW IIf Controller-I/O Board Bracket.....	076-0418
IC, ROM, UU, LW IIf and IIfg, Rev 1.0	076-0863
IC, ROM, UM, LW IIf and IIfg, Rev 1.0.....	076-0862
IC, ROM, LM, LW IIf and IIfg, Rev 1.0	076-0861
IC, ROM, LL, LW IIf and IIfg, Rev 1.0.....	076-0860
SIMM, 256K, 80ns.....	661-0519
Controller-I/O Board, LW IIfg (shipped w/o SIMMs)	661-0775
Assy, LW IIfg Controller-I/O Board Bracket.....	076-0417
IC, ROM, UU, LW IIf and IIfg, Rev 1.0	076-0863
IC, ROM, UM, LW IIf and IIfg, Rev 1.0.....	076-0862
IC, ROM, LM, LW IIf and IIfg, Rev 1.0	076-0861
IC, ROM, LL, LW IIf and IIfg, Rev 1.0.....	076-0860
SIMM, 1 MB, 80 ns.....	661-0520
SIMM, 256K, 80 ns.....	661-0519
Controller-I/O Board, LW II SC	661-0428
Controller-I/O Board, ROM Kit, LW IIf and IIfg, Rev 2.0 ...	076-0452
IC, ROM, UU, LW IIf and IIfg, Rev 2.0	922-0524
IC, ROM, UM, LW IIf and IIfg, Rev 2.0.....	922-0525

IC, ROM, LM, LW IIf and IIg, Rev 2.0	922-0513
IC, ROM, LL, LW IIf and IIg, Rev 2.0.....	922-0512
DC Controller PCA.....	661-0426
DC Power Supply, 110/115 V.....	661-0424
DC Power Supply, 220/240 V.....	661-0442
Fuse, 125 V 6.3	941-0005
Fuse, Medium Time Lag 3.15 A, 250 V.....	740-0061
Delivery Assembly	971-0023
Distribution PCA	971-0028
External Panels	
Front Panel	949-0219
Lower-Right Panel.....	949-0003
Rear Panel	949-0218
Status Panel	971-0005
Upper Panel.....	949-0144
Upper-Front Panel.....	949-0148
Upper-Right Panel.....	949-0004
Fan, Lower	959-0021
Fan, Upper	959-0022
Feeder Assembly	971-0018
Fuser Assembly, 110/115 V	661-0440
Fuser Assembly, 220/240 V	661-0444
Delivery Sensing Lever	949-0186
Fuser Heater, 100 V, 620 W.....	938-0003
Fuser Heater, 220 V, 570 W.....	938-0004
Fuser Roller Cleaner.....	970-0049
Paper Fuser Guide	949-0240
High-Voltage Power Supply	661-0425
Laser/Scanner Assembly	661-0423
Main Motor Assembly	971-0014
Ozone Filter	961-0003
Ozone Filter (for Case with Door).....	961-0007
Ozone Filter Case with Door	971-0038
Paper Feed Drive Assembly.....	971-0015
Paper Feed Roller Assembly.....	971-0017
Power Supply Block, 110/115 V.....	661-0427

Power Supply Block, 220/240 V.....	661-0443
Release Button.....	949-0142
Shutter Assembly.....	971-0016
Status Panel Cable.....	936-0041
Transfer Corona Assembly.....	971-0026
Transfer Guide Assembly.....	971-0019
Upper Main Body	
Auxiliary Tray.....	949-0146
Copy Tray.....	949-0147
Delivery Assembly.....	971-0023
Heater Cover.....	949-0143
Main Tray.....	949-0145
Mirror Assembly.....	971-0007
Paper Deflector.....	971-0006
Preconditioning Assembly Arm.....	949-0184
Preconditioning Exposure Lamp Assembly.....	971-0025
Static Charge Eliminator.....	970-0046
Upper Panel.....	949-0144
Upper Front Panel.....	949-0148

Controller-I/O Board Identification (Page 9)

The LaserWriter IIf and IIg controller-I/O boards are labeled incorrectly on page 9 of Volume 1. The top figure is labeled as the IIg board, but it is actually the IIf board. The bottom figure is labeled as the IIf board, but is actually the IIg board.

Test Pages (Page 13)

The LaserWriter II engine self-test page (also referred to as a service test page) prints as a series of black vertical lines, as shown in Figure 1 below.

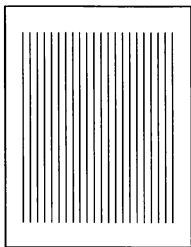


Figure 1 LaserWriter II Engine Self-Test Page

Note If you are printing test pages with the printer cover removed, guard against bright light reaching the photosensitive drum. Excessive light can affect the quality of the prints.





IIf/g Diagnostic Chart (Page 15)

Replace the introductory paragraph and diagnostic chart on page 15 with the following paragraph and updated chart:

To use the LaserWriter IIf or IIfg status LEDs for diagnostic purposes, set the rotary switch on the back of the printer to 4 and connect the LaserWriter II Test Connector to the DB-25 serial port. (If you don't have a Test Connector, jumper pins 4 and 22 on the DB-25 connector.)

Switch on the printer and observe the status LEDs. If an error condition exists, replace the component indicated.

Note There is no LED diagnostic available for the LaserWriter II NT/NTX/NTR printers.

Status LEDs				Error Condition/Action
				
off	on	flash	flash	Diagnostic executing.
flash	flash	flash	flash	No error.
on	on	flash	flash	Fuser assembly. Refer to Table D
on	off	flash	flash	Laser/scanner assembly. Refer to Table K.
off	off	flash	flash	Laser/scanner assembly. Refer to Table K.
off	on	off	off	Replace ROM #1.
off	on	off	on	Replace ROM #2.
off	on	on	off	Replace ROM #3.
off	on	on	on	Replace ROM #4.
on	off	off	off	Replace SIMM #1.
on	off	off	on	Replace SIMM #2.
on	off	on	off	Replace SIMM #3.
on	off	on	on	Replace SIMM #4.
on	on	off	off	Replace SIMM #5.
on	on	off	on	Replace SIMM #6.
on	on	on	off	Replace SIMM #7.
on	on	on	on	Replace SIMM #8.

Troubleshooting – Functional Check (Page 17)

The following note pertains to the troubleshooting flowchart on page 17:

Note If you notice print quality problems on the startup test page that are *definitely* not present on the engine self-test page, you most likely have a faulty I/O board. If the print quality problems occur on both the user test page and engine self-test page, this points to a problem with the print engine.

Troubleshooting Tables (Pages 24–54)

Following are corrections to specific steps in the LaserWriter II troubleshooting tables.

Table A – No Power (Page 24)

Replace Steps 6–9 with the following:

6.	Remove the right support plate and locate fuse F1 in the DC power supply. Is fuse F1 open?	Yes	Replace fuse F1. Use a 125-volt, 6.3 amp replacement.
7.	Unplug the printer and remove the DC power supply. Plug in the printer, close the top cover, and switch on the printer. Measure the voltage across the outer two pins of connector J502. Is the reading approximately 118 VAC?	No	Replace the power supply block.
8.	Replace the DC power supply. Measure the voltage across DC controller PCA connector pins J212-4 (+5 VDC) and J212-1 (GND). Does the DC power supply generate +2.5 to +5 VDC?	No	Replace the DC power supply.
9.	Measure the voltage across DC controller PCA connector pins J212-7 (REMOTE*) and J212-1 (GND). Does the voltage drop from approximately 3 VDC to 0 VDC when you switch on the power?	Yes No	Replace the DC power supply. Replace the DC controller PCA.

Table D – Heater Bulb Does Not Operate (Page 31)

Replace Steps 1-3 with the following:

1.	Remove the fuser assembly and measure the resistance between the two pins at connector J103. (J103 is the white receptacle at the gear end of the fuser assembly.) Is there continuity?	No	<p>Check for continuity at the heater bulb and the thermoprotector (TP1), and replace these modules as necessary.</p> <p>Note: To check for continuity at the thermoprotector, remove the front, black plastic cover from the fuser assembly and measure the resistance between the two screws (not the copper connectors) that are on either side of the thermoprotector.</p>
2.	Measure the resistance across the thermistor by connecting the multimeter to fuser PCA connector pins J331-4 (FSRTH) and J331-5 (GND). Is the resistance at room temperature between 1 and 1.6 megohms?	No	Replace the fuser assembly. If the problem persists, check the cable connections between the fuser PCA (J331) and the DC controller PCA (J206). If the connections are secure, replace the DC-controller-to-fuser cable.
3.	Step 3 has been deleted. Go to Step 4.		

Table H – Paper-Out LED Lights When There is Paper (Page 33)

Replace Step 4 with the following:

4.	Are the paper cassette microswitches (SW201, SW202, or SW203) on the DC controller PCA damaged?	Yes	Unbend the levers or replace the DC controller board.
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Replace Step 6 with the following:

6.	When you remove and insert the paper cassette, does the voltage between DC controller pins J213-8 (PEMP*) and J213-6 (GND) toggle from +5 VDC (inserted) to 0 VDC (removed)? * To locate pins 8 and 6, count from pin 1, which is nearest the motor.	No Yes	Replace the distribution PCA. Replace the DC controller PCA.
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Table M1 – Light Image/Faded Print: Whole Print (Page 38)

Replace Step 2 with the following:

2.	Is the low-toner LED on the status panel on?	Yes	First verify that the screw holding down the ground wire on the HVPS is in the correct position. If the problem persists, install a new Apple toner cartridge.
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Table M3 – All-Blank Print (Page 41)

Replace Steps 1–3 with the following:

1.	Have you removed the toner cartridge sealing tape?	No	Remove the sealing tape.
2.	Is the Low-Toner LED on the status panel on?	Yes	Replace the toner cartridge.
3.	Are the Paper-Out and Paper Jam LEDs flashing?	Yes	Replace the laser/scanner assembly.

Table M4 – Black Image (Page 42)

Replace Step 2 with the following:

2.	Is the HV connector assembly mounted properly to the chassis with the correct screws?	No	Reseat the HV connector assembly and make sure you are using the correct screws.
3.	Remove the high-voltage power supply, install a toner cartridge, and close the top cover. Connect the multimeter across high-voltage power supply connector pins J601-3 (HV10N) and J607-7 (GND). Switch on the printer. Does the voltage drop from +16 VDC to 0 VDC one second after the main motor starts to rotate?	Yes No	Verify that high-voltage connector pin TB603-2 is making good contact with the toner cartridge primary corona. If it is, replace the high-voltage power supply. Verify that the high-voltage power supply cable is securely attached to DC controller connector J211. If it is, replace the DC controller PCA.

Table M5 – Stained Print/Repetitive Defects (Page 43)

Replace Step 5 with the following:

5.	Is the pickup roller dirty?	Yes	Clean the pickup roller.
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Table M14 – Faulty Registration (Page 47)

Replace Step 3 with the following:

3.	Is the pickup roller dirty, worn, or damaged?	Yes	Clean or replace the pickup roller.
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Table M19 – Foggy Print (Page 49)

Replace Step 4 with the following:

4.	Is the pickup roller dirty?	Yes	Clean the pickup roller.
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Table M20 – Horizontal Banding (Page 49)

Replace Step 4 with the following:

4.	Is the pickup roller dirty?	Yes	Clean the pickup roller.
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Table N2 – Jams in Pickup/Transfer Area (Page 52)

Replace Step 6 with the following:

6.	Is the pickup roller dirty, worn, or damaged?	Yes	Clean or replace the pickup roller.
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Replace Step 9 with the following:

9.	Connect the multimeter to DC controller PCA pins J213-4 (CPUD) and J213-6 (GND). Perform an engine self-test. Does the voltage change from 0 VDC to about +5 VDC two seconds after the main motor starts to rotate?	No	Replace the DC controller PCA.
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Table N4 – Jams in Fuser/Delivery Area (Page 53)

Replace Steps 6 and 7 with the following three steps:

6.	Remove the left contact cap from the fuser assembly. Switch on the printer. Connect the multimeter between pins J331-6 and J331-7 on the solder side of the fuser PCA (the two pins closest to the hinge end of the printer). Does the voltage change from +5 VDC to 0 VDC as you move the delivery sensing lever back and forth?	Yes	Verify that the cabling is intact. If it is, replace the DC controller PCA.
7.	Is the fuser assembly defective?	Yes	Replace the fuser assembly.
8.	Are the delivery rollers worn or damaged?	Yes	Replace the delivery rollers, or replace the fuser assembly.

Personal LaserWriter SC/NT/NTR/LS and LS/L

Following are updates to the Personal LaserWriter SC/NT/LS section of the *Apple Service Guide for LaserWriter Printers*, Volume 1. The page numbers in the section titles correspond to the page(s) in Volume 1 where the information originally appeared.

Also included in this section is new information on the Personal LaserWriter NTR and LS/L printers that was not previously included in the Volume 1 manual. The Personal LaserWriter SC, NT, NTR, LS, and LS/L all use the same print engine.

The Personal LaserWriter LS/L is a cost-reduced version of the LS but is sold and packaged under the same LS name. Parts are not necessarily interchangeable between the two models. You can distinguish between the LS and LS/L printers as follows:

- **LS**—The power switch is on the left rear of the printer; the rear cover has an opening for an I/O board bracket and displays the family number M2000.
- **LS/L**—The power switch is on the right rear of the printer; the rear cover is solid plastic and displays the family number M2002.

The Personal LaserWriter NTR is a high-performance, networkable PostScript printer that can print documents 3 to 5 times faster than the Personal LaserWriter NT. It features RS-232 and RS-422 (LocalTalk) serial ports and a 36-pin Centronics parallel port.

Unless specified otherwise in this addendum, the Personal LaserWriter LS information in Volume 1 also applies to the LS/L printer and the Personal LaserWriter NT information in Volume 1 also applies to the NTR printer.

Exploded View (Page 3)

The part referred to as the Fuser AC Connector Cable on the exploded view drawing is labeled incorrectly. The correct name for this part is the Fuser PCB Assembly.

Parts List (Pages 4–5)

Cassette Feeder Assembly	
Bottom Left Cover	949-0284
Bottom Right Cover	949-0285
Cassette Feeder PCB Assembly	982-0035
Cassette Stop	949-0274
Controller PCB, LS/L	661-0669
Covers	
Bottom Cover, Platinum, LS*	949-0313
Front Cover	949-0293
LED Cover	949-0294
Left Cover	949-0281
Rear Cover	949-0280
Top Cover	949-0283
DC Controller PCB, LS	661-0650
DC Controller PCB, NT, SC, and NTR	661-0567
DC Controller PCB Mounting Plate, NT, SC, NTR, and LS	948-0138
Deflector	971-0048
Density-Adjusting PCB Assembly, NT, SC, NTR, and LS	982-0039
DRAM, 256K x 4, 80 ns	334-0114
Drive Assembly	890-0608
Drum Drive Assembly	890-0609

*Some Personal LaserWriter LS printers have a solid bottom cover and some have a hollow center or “picture frame” bottom cover. Use the solid bottom cover, part number 949-0313, to replace either version of the bottom cover. The solid bottom cover fits all Personal LaserWriter LS printers; the “picture frame” version does not.

End Plate, LS	949-0328
End Plate, NT, SC, and NTR	949-0139
Face-Down Delivery Assembly	971-0043
Face-Up Cover Assembly	949-0276
Face-Up Delivery Drive Assembly.....	971-0049
Face-Up Tray Assembly.....	922-0200
Face-Up Tray (A)	949-0289
Face-Up Tray (B).....	949-0288
Face-Up Tray (C).....	949-0287
Left Tray Lock	949-0265
Right Tray Lock.....	949-0266
Fan.....	720-0513
Fan and Sensor PCB, LS/L	981-0030
Feeder Assembly.....	971-0044
Front Access Door	949-0295
Fuser AC Connector Cable.....	569-0049
Fuser Assembly, 110/115 V.....	661-0568
Fuser Assembly, 220/240 V.....	661-0575
Fuser PCB Assembly.....	982-0045
High-Voltage Contact Assembly	890-8608
High-Voltage Power Supply PCB.....	661-0573
I/O Board Bracket, LS.....	949-0314
I/O Board, NT	661-0565
RAM SIMM, 1 MB	661-0520
ROM SIMM, 1 MB (location J2)	661-0570
ROM SIMM, 256K (location J3)	661-0602
I/O Board, NTR.....	661-0725
ROM Upgrade Kit, 4.0.....	076-0685
I/O Board, SC	661-0566
SIMM, 256K	661-0402
I/O Shield, LS.....	949-0326
I/O Shield, NT and SC	
I/O Board Rail	949-0292
Lower I/O Shield.....	949-0268
Upper I/O Shield.....	949-0267
Interconnect PCB, NT and SC.....	982-0048

Laser Assembly	661-0571
Lens Assembly	971-0041
Main Motor (Stepping DC Motor)	890-0426
Multipurpose Cable Assembly	890-8605
Multipurpose Tray, 50 sheet.....	949-0279
Multipurpose Tray, 70 sheet.....	949-0341
Paper Support Plate, LS	949-0332
Paper Support Plate, NT and SC.....	949-0273
PCB Duct Plate, LS/L	948-0155
PCB Mounting Plate, LS/L	948-0048
PCB Shield, LS/L.....	949-0379
Photo Interrupter.....	353-7816
Pickup Roller Assembly.....	971-0045
Power Supply Unit, LS, 110/115 V	661-0636
Power Supply Unit, LS, 220/240 V	661-0637
Power Supply Unit, LS/L, 110/115 V	661-0668
Power Supply Unit, LS/L, 220/240 V	661-0667
Power Supply Unit, NT and SC, 110/115 V	661-0569
Power Supply Unit, NT and SC, 220/240 V	661-0574
Rod Assembly	971-0046
Scanner Assembly	661-0572
Scanner Cover.....	971-0040
Sensor Mounting Plate.....	890-1200
Separation Pad	870-0295
Serial I/O Board, LS	661-0631
Stackability Guide, NT and SC.....	949-0261
Transfer Roller	870-0103
Transfer Roller Mount Assembly, Left Side.....	890-8603
Transfer Roller Mount Assembly, Right Side	890-0607

I/O Board Identification (Page 8)

Figure 2 shows the I/O board for the Personal LaserWriter NTR printer.

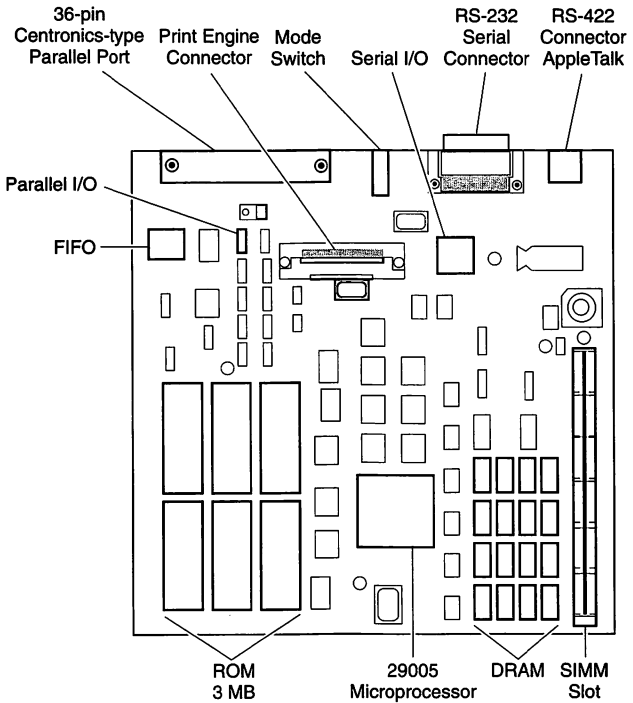


Figure 2 I/O Board for the Personal LaserWriter NTR

Figure 3 shows the serial controller board for the Personal LaserWriter LS/L printer.

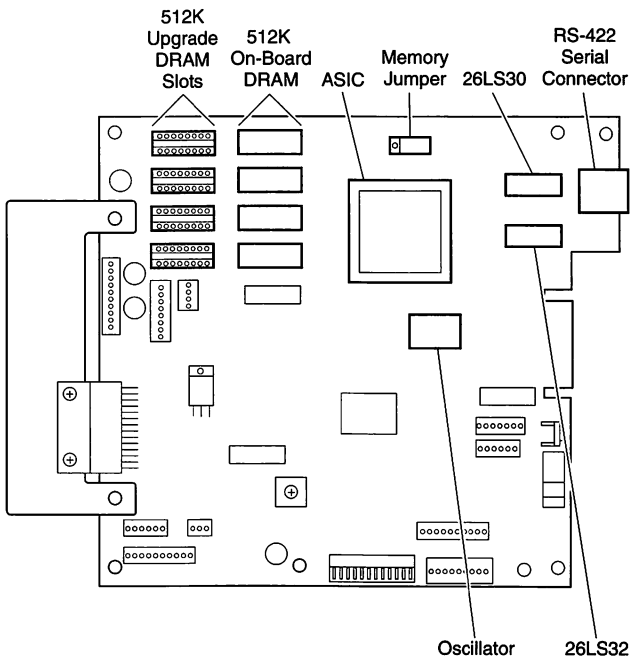


Figure 3 Serial Controller Board for the Personal LaserWriter LS/L

I/O Board Specifications (Page 9)

The following chart shows the I/O board specifications for the Personal LaserWriter NTR and LS/L printers.

I/O Board Specifications		
	NTR	LS/L
Processor	N/A	N/A
ROM	3 MB	N/A
RAM	3 MB, expandable to 4 MB	512K, expandable to 1 MB
Interfaces	LocalTalk, RS-232, RS-422, Centronics parallel	RS-422
Printing Protocols	PostScript, HP LaserJet Plus, and a subset of Diablo 630	QuickDraw
Built-in Fonts	Courier, Gothic, Helvetica, Helvetica Narrow, IBM PC Graphics Extended Character Set (ECS), ITC Avant Garde, ITC Bookman, ITC Zapf Chancery, ITC Zapf Dingbats, New Century Schoolbook, Palatino, Symbol, and Times	N/A

Test Prints (Page 12)

To initiate a service test print from the LS/L printer, first remove the test button cover on the rear panel of the printer. You can then access the test button through the opening in the rear panel.

Troubleshooting Tables (Pages 24–47)

Following are updates to the troubleshooting tables for the Personal LaserWriter series of printers.

Table G—Laser/Scanner Malfunction (Page 31)

When you perform Steps 2 and 3 in this table, switch on the printer before measuring the voltage.

Table H—Print Quality Problems (Page 32)

Figure 4 below provides a better illustration of the Faulty Registration print quality problem.



Bad Registration
See Table H12

Figure 4 Bad Registration

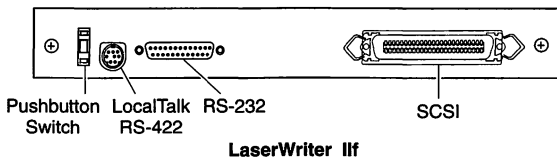
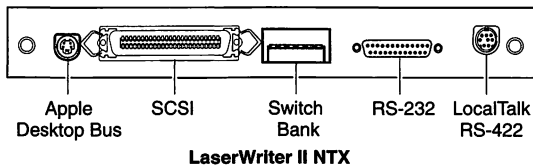
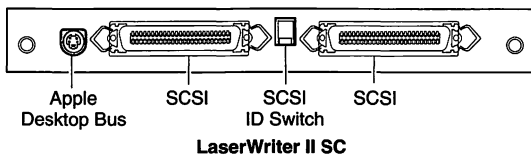
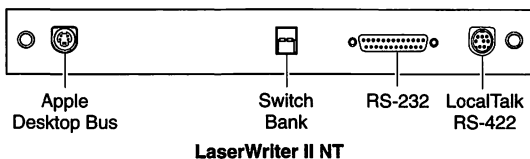
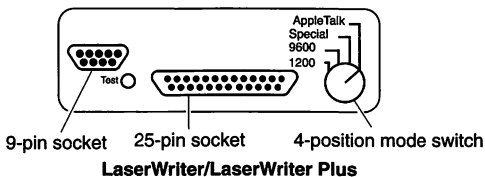
The following information should be added to the Print Quality Troubleshooting section:

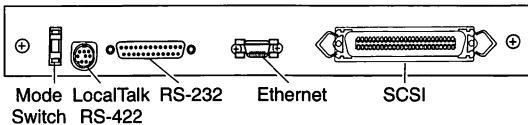
Note If you are troubleshooting a Personal LaserWriter NT that only prints on the top half of the page and leaves the bottom half of the page blank, replace the fuser bulb or the fuser assembly. If you are troubleshooting a Personal LaserWriter NTR with this problem, upgrade the ROMs to version 4.0.

Ports & Cables

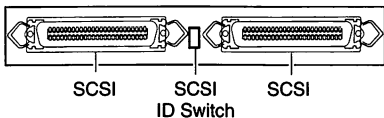
Following are updates to the Ports & Cables section of Volume 1. The page numbers in the section headers correspond to the page(s) in Volume 1 where the information originally appeared.

External Connectors (Page 3)

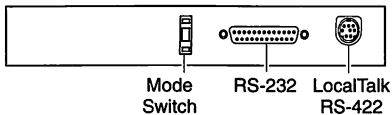




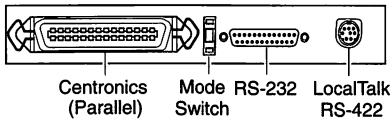
LaserWriter IIg



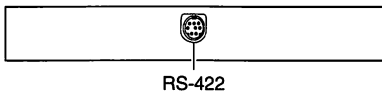
Personal LaserWriter SC



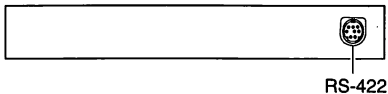
Personal LaserWriter NT



Personal LaserWriter NTR



Personal LaserWriter LS



Personal LaserWriter LS/L

External Connectors—Pinouts (Page 6)

The following correction is for the Personal LaserWriter SC, LaserWriter II SC, NTX, IIf, and IIg—SCSI Port table on page 6 of Volume 1:

The signal description listed for pin 38 should read Term Power (not +5 Volts).

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