

# Apple Scanner

## Technical Procedures

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# Apple Scanner

## Section 1 – Basics

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## □ PRODUCT DESCRIPTION

### Overview

The Apple® Scanner and OneScanner™ are optical image readers designed to support the Macintosh® family of CPUs. These scanners are 300-dot-per-inch (dpi), 8.5-by-14-inch flat-bed devices. Features include halftone support for desktop publishing, Grayscale (1 bit/16 levels), variable scanning resolutions of 75 to 300 dpi, and high-speed data transfer using the built-in SCSI port. The Apple Scanner is a 4-bit scanner that can detect 16 shades of gray, from absolute white to absolute black. The Apple OneScanner is an 8-bit scanner that can detect 256 shades of gray, from absolute white to absolute black.

**Note:** Throughout this documentation, we refer to these two scanners as one. Whenever we need to distinguish between the two, we refer to them as the *4-bit scanner* (Apple Scanner) or the *8-bit scanner* (Apple OneScanner).

The scanner, along with the software application AppleScan™, allows you to make quality reproductions of the items you scan. The scanner is capable of digitizing any document, whether it is a graphics image or a page of text.

### How It Works

To begin a scan, place an item (original) on the glass bed of the scanner and close the lid. From the host computer, start the AppleScan application. The host computer sends commands and parameters to the scanner. These commands and parameters set scanning values within the scanner or instruct the scanner to perform some specific function.

The light of the scanner reflects off the original as the light moves down the scanner bed. The scanner detects variations in the light reflected from the gray shades in the original. The particular shade of gray at any particular point in the original is called its reflection density, or simply density.

For example, the scanner handles an 8.5-inch-by-11-inch document as an array of more than 8,000,000 dots when scanning at 300-dpi. The array, called a bitmap, is a digitized image of the original document. Depending upon other parameters specified by the user, each dot in the bitmap is either black, white, or a shade of gray.

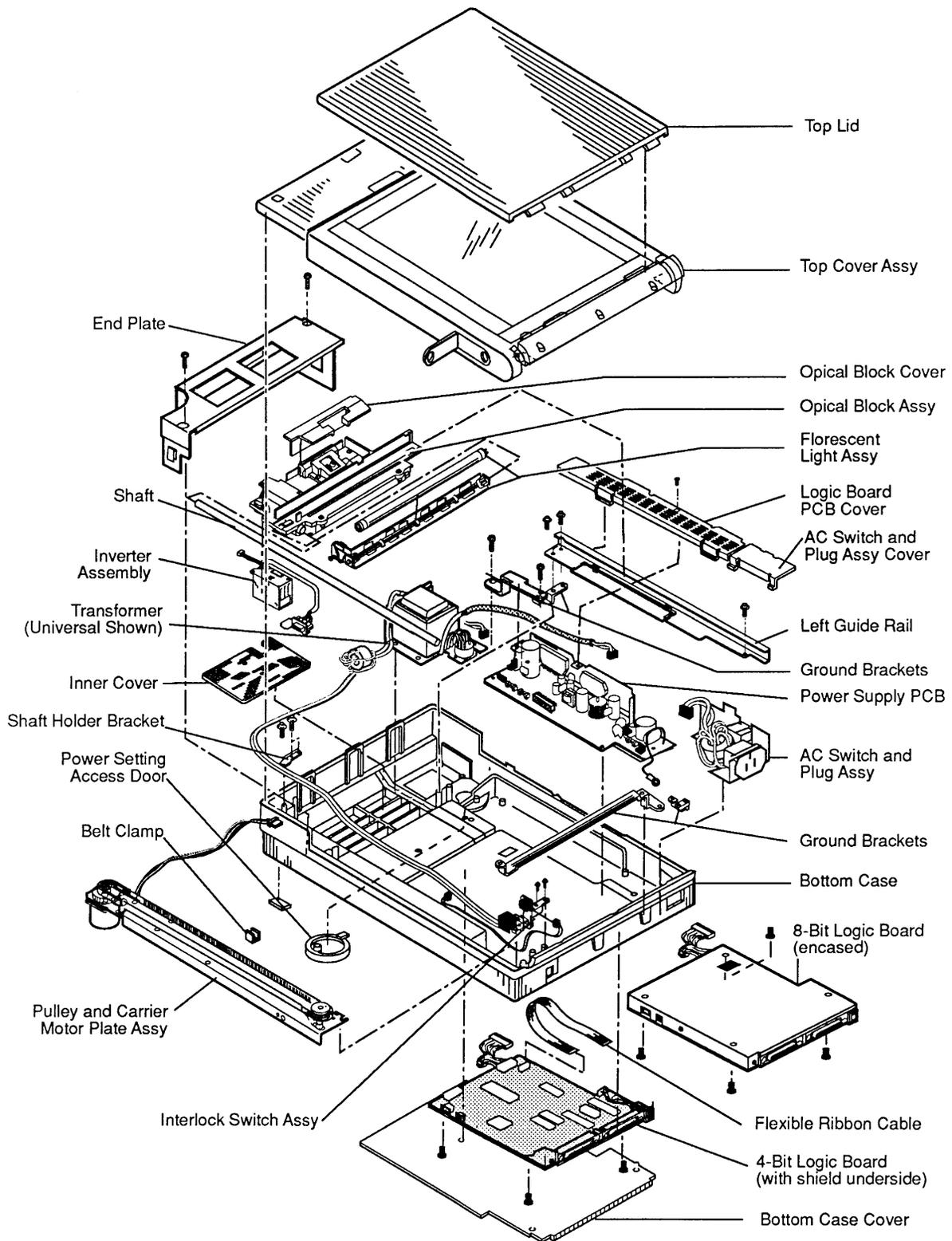
The scanner records in digital format (in memory and on disk) what you instruct it to record with your AppleScan application. Depending on the kind of original you scan and on the purpose you have in mind for the image, the application records what the scanner detects in one of three ways (called composition types): line art, halftone, or grayscale composition.

- Line art composition – The scanner records each point scanned as either black or white, depending on a threshold value you set.
- Halftone composition – The scanner records each point scanned as either black or white, depending on the particular halftone pattern and the contrast and brightness values you set.
- Grayscale composition – The scanner records each point scanned at the exact level of gray the scanner detects. You can display grayscale composition images on certain monitors. You can convert grayscale composition images to halftone or line art images as well.

After the image is saved, you can use any of several different programs to reproduce the image as a printed version or as a screen display. AppleScan files work with page-layout programs and other graphics programs. You can also print the image directly from the AppleScan application.

### **Major Assemblies and Components**

Figure 1-1 shows the major assemblies and components of the scanner.



**Figure 1-1 Major Assemblies and Components of the Scanner**

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## □ SPECIFICATIONS

<b>Dimension (maximum)</b>	Depth	545 mm	
	Width	340 mm	
	Height	110 mm	
<b>Weight</b>	4-bit scanner	20 lbs (9.07 kg)	
	8-bit scanner	23 lbs (10.43 kg)	
<b>Power Supply Line Voltage</b>	USA model:	120 VAC ±10% 58–62 Hz	
	Universal model:	100/120/200/220/240 VAC ±10% 58–62 Hz	
<b>Power Consumption</b>	Standby	4-bit scanner <35 Watts	8-bit scanner <22 Watts
	Scanning	<65 Watts	<45 Watts
<b>Paper Size</b>	Maximum width	8.50" (215.9 mm)	
	Maximum length	14.0" (355.6 mm)	
<b>Noise</b>	Standby	<30 dB	
	Scanning	<55 dB	
<b>Environmental</b>	Operating temperature:	+10° to +40° C	
	Storage (6 months):	-40° to +47° C	
	Transit (72 hours):	-40° to +65° C	
	Noncondensing humidity in storage (6 months):	20% to 95% RH	
<b>Scanning Method</b>	Flat-bed optical image scanning type. Scans any object laid flat on glass scanning bed. Document is stationary; scanning mechanism moves.		
<b>Sensor</b>	A flat-bed scanning charge coupled device (CCD) and focusing lenses capture line images. The CCD contains 2592 cells to capture the line images at a maximum rate of 300 dpi.		

**Scan Time  
(4-Bit Scanner)**

B/W mode	Halftone or Grayscale mode	B/W Halftone mode
5 ms per line	8 ms per line	16 ms per line

**Scan Time  
(8-Bit Scanner)**

In high-speed mode:

B/W	Halftone	4-bit gray	8-bit gray
10 s per page	10 s per page	21 s per page	37 s per page

(High-speed mode is the default setting; you can also choose normal speed, in which the carriage moves a little slower, or fast speed, in which the carriage moves a little faster.)

**Scanning Density  
(4-Bit Scanner)**

The following horizontal and vertical densities can be selected independently:

B/W or Halftone mode	300, 285, 270, 255, 240, 225, 210, 200, 195, 180, 165, 150, 135, 120, 105, 100, 85, 75 dpi
Grayscale mode	300, 200, 150, 100, 75 dpi

**Scanning Density  
(8-Bit Scanner)**

Horizontal and vertical density can be selected independently and can be set anywhere between 72 and 300 dpi.

**Clock Speed**

12 MHz

**Memory**

16K RAM  
32K ROM

## □ THEORY OF OPERATION

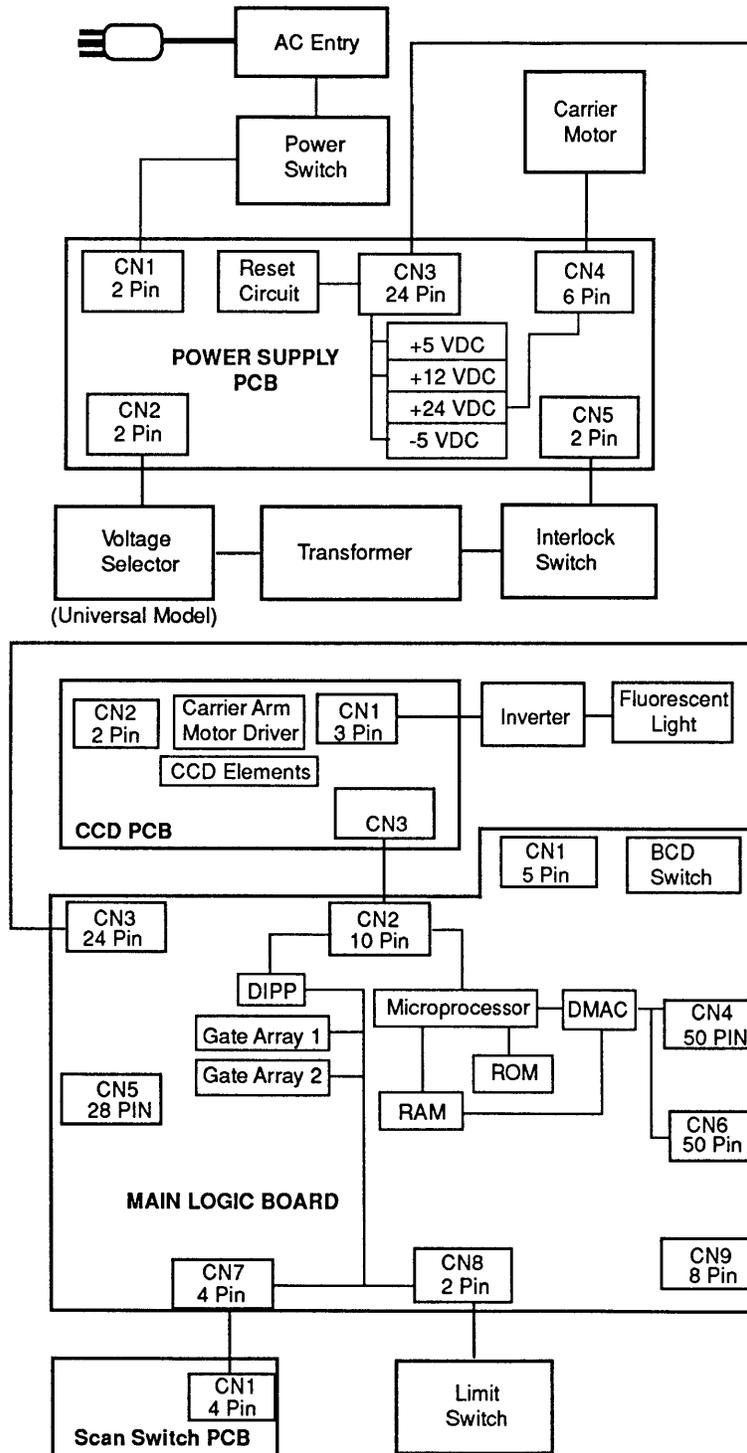


Figure 1-2 Scanner Block Diagram

## Overview

Refer to the block diagram, Figure 1-2, when reading this section.

Initial reset of the devices is through the reset circuit on the power supply PCB. This reset circuit assures that all the components on the main logic PCB are in a known state after the power is on.

When the scanner receives a command to start a scan, the microprocessor activates the light source (a green fluorescent lamp) in the scanning carrier assembly and activates the carrier assembly motor (which sets the carrier assembly in motion).

As the light scans the document, a series of mirrors and lenses gathers the reflected light into the light-sensitive charge coupled device (CCD) arrays. Each pixel uses three layers of CCD elements. The CCD array is on the CCD PCB, which is mounted on the carrier assembly. The array is a 1-pixel-by-2592-pixel matrix, three layers deep. Each of the 2592 CCD elements in the top layer holds one picture element (pixel) of a scan line. A scan line is defined as 2592 pixels wide by one pixel (approximately 1/300 inch by 8-1/2 inches). The other two layers buffer the picture elements (called a bitmap image) until the elements are transferred to the image-processing circuitry.

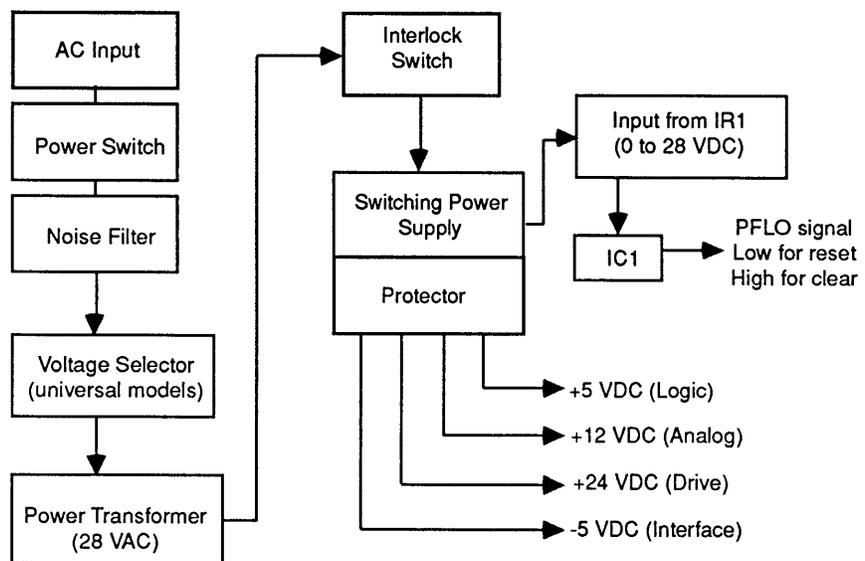
From the CCD array, the bitmap image is transferred to the preprocessing circuit on the main PCB for waveform reformation and then analog-to-digital conversion.

Once the data is in a digital format on the main PCB, the CPU processes the data and sends the data through the interface circuitry back to the host computer, where the document reforms on the host computer screen.

## Power Circuit

The internal power circuit (see Figure 1-3) for the scanner consists of an AC line filter, a voltage selector (for universal models), a power transformer, a switching power supply with protector circuit, and a reset circuit. The AC power passes through the power on/off switch, the noise filter, and the transformer. The power transformer steps down the voltage and provides 28 VAC. This voltage flows through the interlock (top cover interlock) to the switching power supply. The switching power supply provides the following DC voltages:

- +5 VDC for the main logic board circuits
- +12 VDC for the analog scanning circuitry
- +24 VDC for the stepper motor that drives the scanning unit across the glass bed
- -5 VDC for the SCSI devices



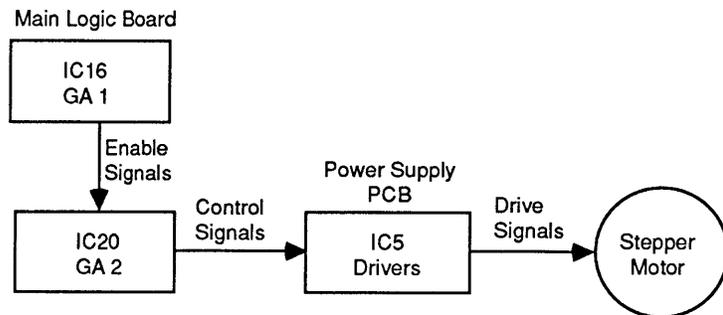
**Figure 1-3 Power Circuit Block Diagram**

## Reset Circuit

The reset circuit (Figure 1-3) consists mainly of IC1 and supporting circuitry. When you switch the unit on, the reset stays on (low state) while the logic voltage is below 4.75 VDC. This voltage keeps all the devices on the main logic PCB in a reset state until the logic voltage rises above 4.75 VDC. Above this voltage level, the reset IC changes states, which clears the reset.

## Carrier Motor

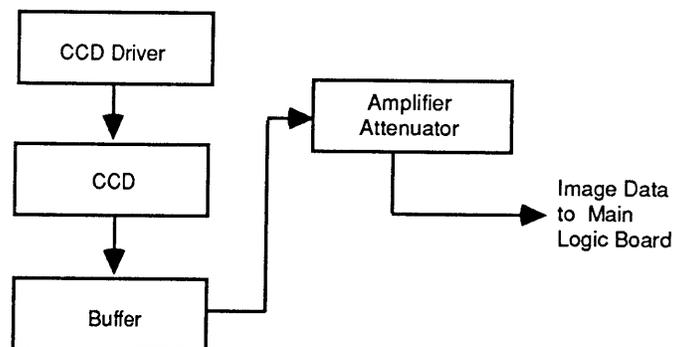
The carrier motor drive circuit (Figure 1-4) consists of gate array 2 and gate array 1 on the main logic PCB, and IC5 on the power supply board. Gate array 2 (IC20) generates the drive signals and speed control signals. Gate array 1 (IC16) generates the enable signal. These signals pass through connector CN3 to IC5 on the power supply board. From IC5 the signals move to the 4-2 phase excitation stepping motor through CN4.



**Figure 1-4 Carrier Motor Block Diagram**

## CCD PCB

The charge coupled device (CCD) PCB (Figure 1-5) contains the image-sensing logic and the carrier arm motor driver.



**Figure 1-5 CCD PCB Block Diagram**

## Image Sensing

As the reflected light falls on the CCD array elements, each element in the top layer is charged. Once charged, the element shifts its charge to the second layer and then to the third layer of CCD elements. From the third layer the contents are serially shifted, one pixel at a time, to the image-processing circuitry for cleanup and amplification. The analog charge values pass through an attenuator and then to the main logic board for image processing, distortion correction, and analog-to-digital conversion.

## Main Logic Board

Figure 1-6 is a block diagram of the circuits on the main logic board.

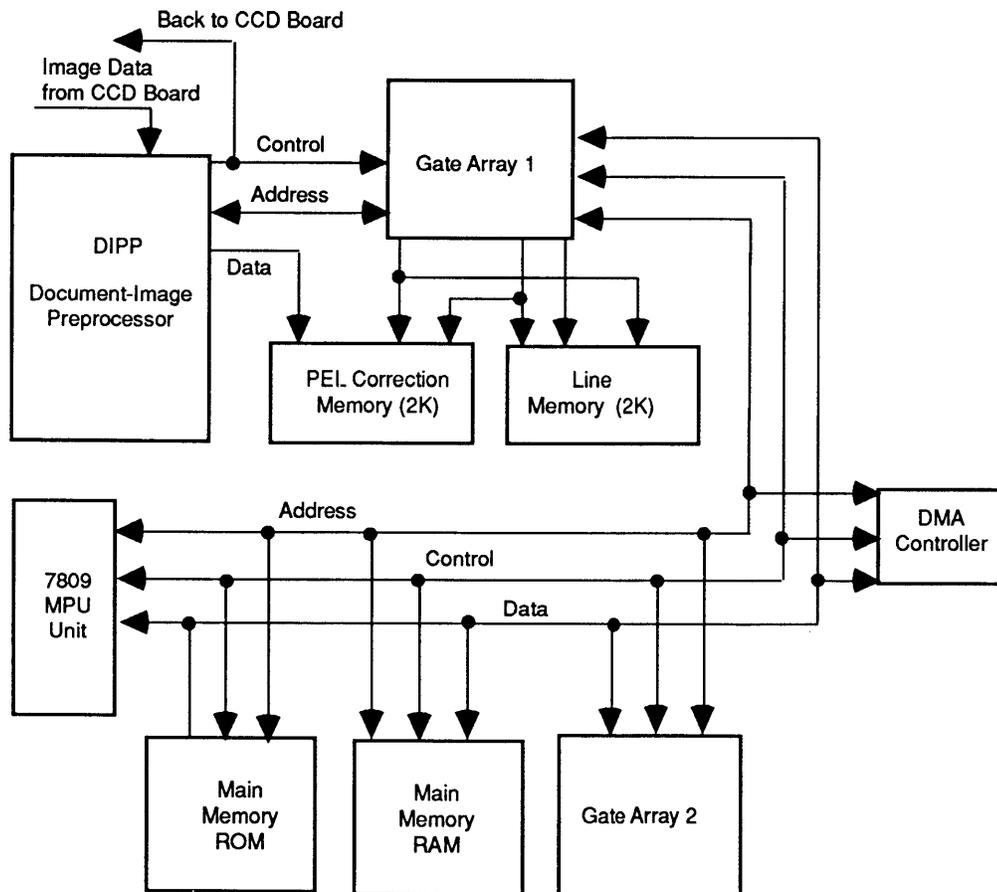


Figure 1-6 Main Logic Board Block Diagram

## Microprocessor

The scanner uses an 8-bit 7809 microprocessor running on a 12-MHz clock. The microprocessor controls the functions of the gate arrays, the DMAC, and the carriage motor.

### *Main Memory*

The main memory consists of 16K of RAM and 32K of ROM. The ROM contains the firmware to control the scanner. The RAM buffers the image data and also provides the microprocessor with working memory space for parameter information. Of the 16K available, 10K is used specifically to buffer the image data between scanning and transfer to the host computer.

### *Image Processing*

The image-processing circuitry consists of the document-image preprocessor (DIPP), gate array 1, gate array 2, line memory, and the picture element (PEL) correction memory. The DIPP is the main device used in image processing and is supported by the other parts of the circuit.

The DIPP is an image signal processor that takes the analog image data from the CCD array, corrects any distortion, digitizes the corrected analog data, and transfers the digital data to main memory.

Gate arrays 1 and 2 support the DIPP. Gate array 1 supports reduction options by controlling the line memory. If an image requires reduction, it passes to the line memory for buffering before transferring to the main memory. Other functions of gate array 1 include address generation, memory control, bus interface, gray-scale horizontal-resolution conversion, and CCD control.

Gate array 2 supports the following functions: direct memory access control, bus arbitration, interrupt control, carrier motor control, address latching, and chip select control.

The line memory and PEL correction memory are two 2K RAM chips that buffer data from the DIPP before sending the data to main memory. Image correction and other processing take place in this memory, line-by-line.

### *DMAC*

Once the data is corrected, digitized, and stored in memory, the direct memory access controller (DMAC) circuit, working in conjunction with the CPU, controls the transfer of image data to the host computer. While working along with the microprocessor, this circuit executes a faster data transfer.

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## □ PREVENTIVE MAINTENANCE

### **Glass Top**

To clean the glass top

1. Make sure the power is off.
2. Lift the lid to the open position.
3. Wipe the glass with water or a light detergent and a clean, soft, lint-free cloth. Do not use benzene, thinner, or any other volatile chemicals.

### **Underside of Glass**

To clean the underside of the glass

1. Remove the lid and the case top (see Section 2, Take-Apart).
2. Clean the underside of the glass as in step 3 above.

# Apple Scanner

## Section 2 – Take-Apart

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- 2.23 Power Supply PCB
- 2.26 AC Switch Plate and Plug Assembly
- 2.28 Main Logic PCB

**Note:** If a step is underlined, detailed instructions for that step can be found elsewhere in this section.

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## □ INTRODUCTION

The Take-Apart procedures refer to the left side, right side, front, or back of the scanner, as shown in Figure 2-1. You must use the same orientation when you perform these procedures. If a view is different, the graphic will show the new orientation.

### **Materials Required**

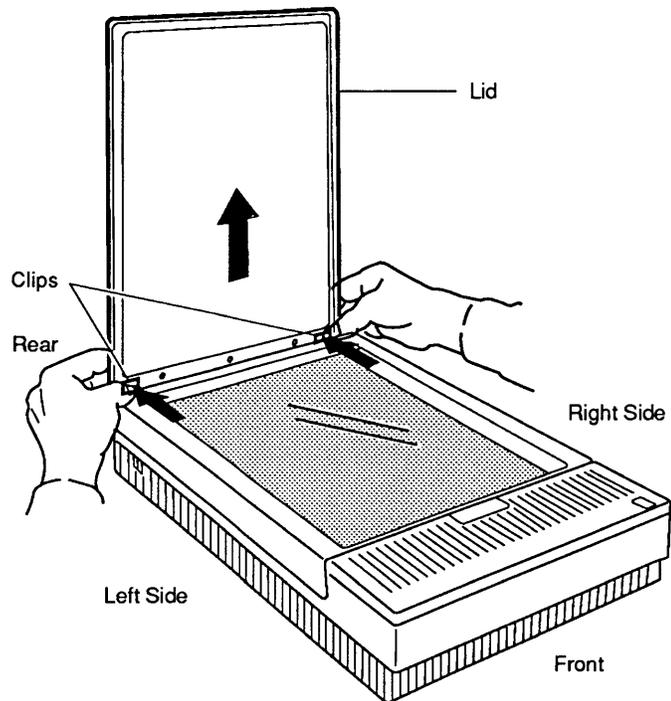
Flat-blade screwdriver  
Long Phillips screwdriver  
Jeweler's screwdriver

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## □ LID

### Remove

1. **Figure 2-1.** Lift the lid up all the way to 90°.
2. **Figure 2-1.** Press the two indented clips near the bottom of the lid on both sides. As you press in the clips, gently pull up on the lid and remove it.



**Figure 2-1 Lid**

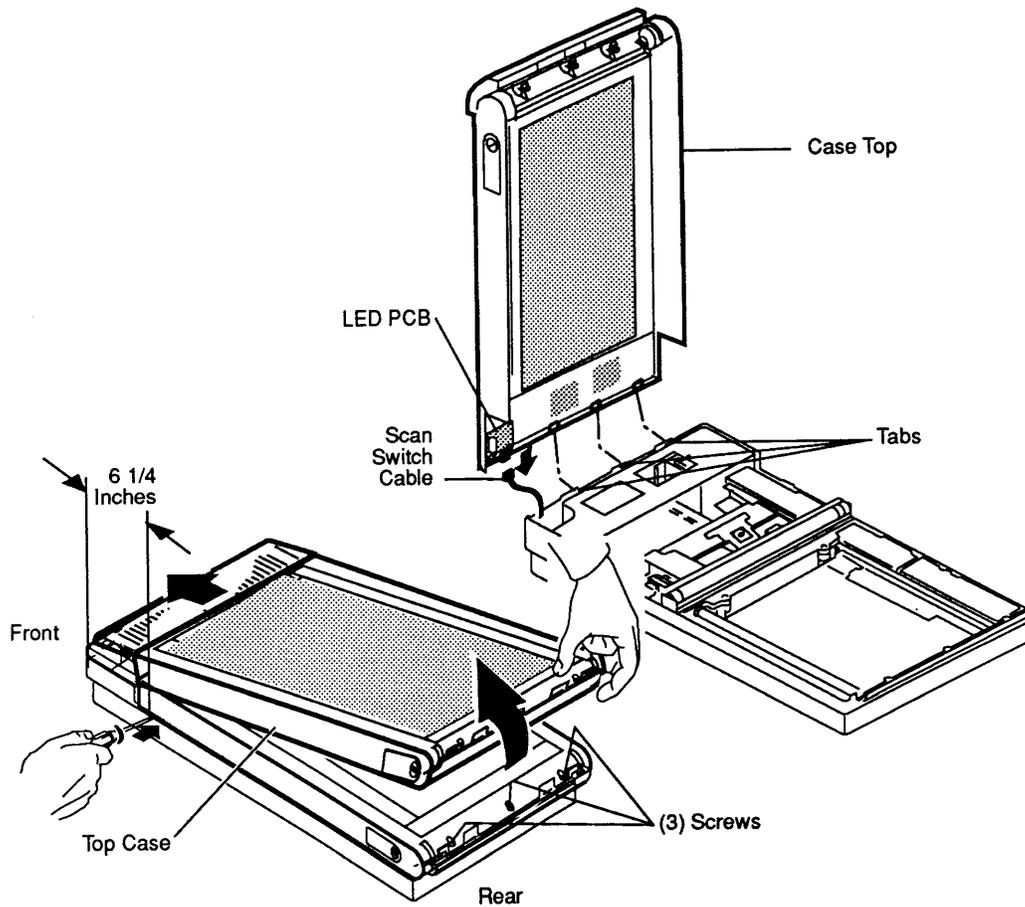
### Replace

Line up the slots on the lid with the tabs on the scanner, and gently push the lid down so that the tabs fit into the slots. Also make sure that the clips snap into the cutouts.

## □ CASE TOP

### Remove

1. Remove the lid.
2. **Figure 2-2.** Loosen the three Phillips screws along the top rear of the scanner. These screws do not come out all the way. Unscrew them until they are loose enough to release the case top.



**Figure 2-2 Top Case**

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**CAUTION:** *Be careful of the LED PCB, which has parts that project and can snag and bend.*

---

3. The case top is held in place by two clips (one on the right side and one on the left) located 6-1/4 inches from the front of the unit. (You can view these clips under the glass plate.) While lifting the case top from the rear, press in with a flat-blade screwdriver to release these clips. Do not twist the screwdriver or you may mar the case.
4. **Figure 2-2.** Swing the case top up and forward toward the front of the scanner.
5. **Figure 2-2.** When the case top reaches the top of the swing (90°), remove the scan switch cable from the LED PCB located at the right-front side of the case top.
6. If you are replacing a defective case top, remove the LED PCB.

## Replace

1. If necessary, replace the LED PCB.
2. Place the case top 90° to the front of the bottom case. Align the front of the case top with the front of the bottom case and make sure that the three tabs align with the three slots in the bottom case. Also make sure that the LED is aligned with the cutout on the bottom case. Hold the case in this position until you complete the next step.
3. **Figure 2-2.** Attach the scan switch cable to the LED PCB on the right front side of the case.
4. Slowly lower the case top. Swing the top toward the back of the bottom case until the top fits completely on the bottom case.
5. **Figure 2-2.** Secure the case top with the three screws.
6. Replace the lid.

## □ SCANNING CARRIER ASSEMBLY—OPTICAL BLOCK

The carrier assembly consists of the optical block, light assembly, drive belt, and shaft.

### Remove

1. **Figure 2-3A.** Use a coin or a flat-blade screwdriver to open the light assembly access door, which is located on the right side of the case top.
2. **Figure 2-3B.** Loosen the Phillips screw on the light assembly. This screw does not come out, but it has to be completely loose.

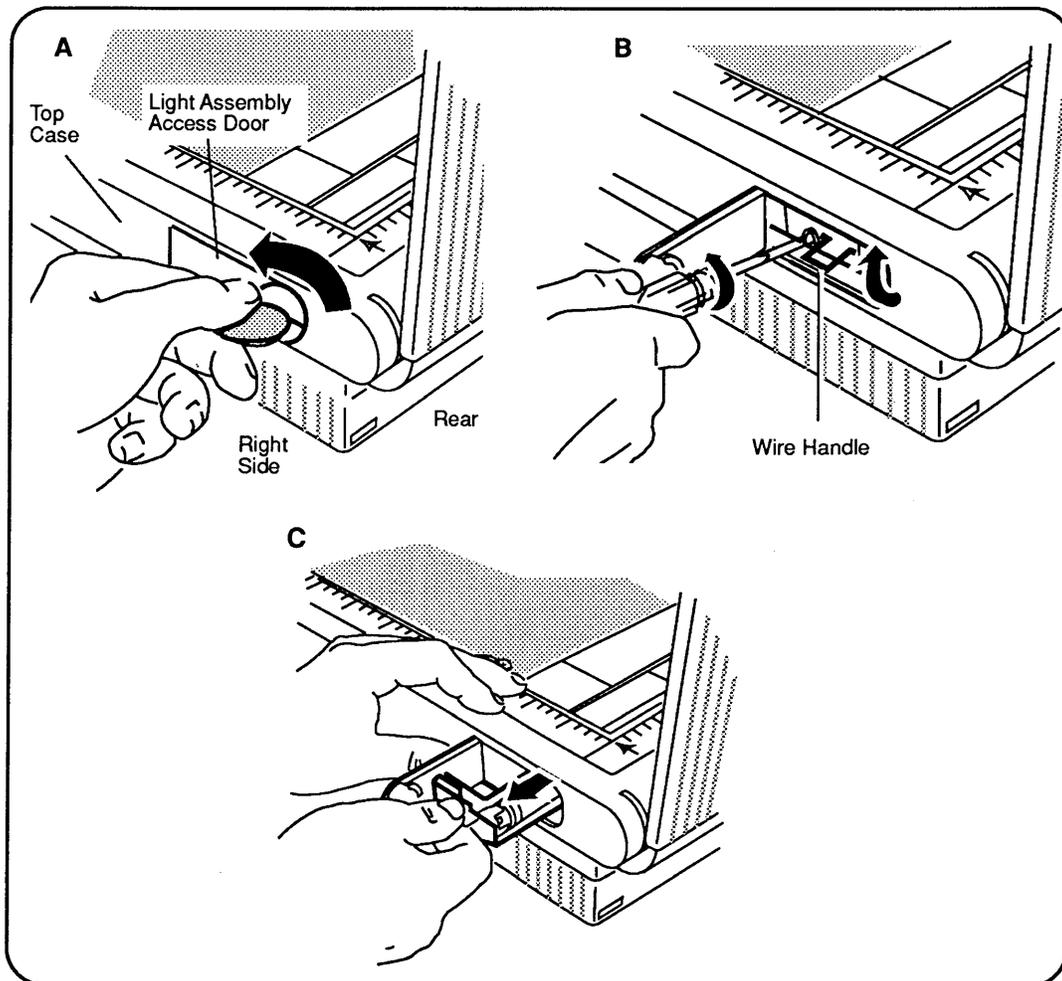
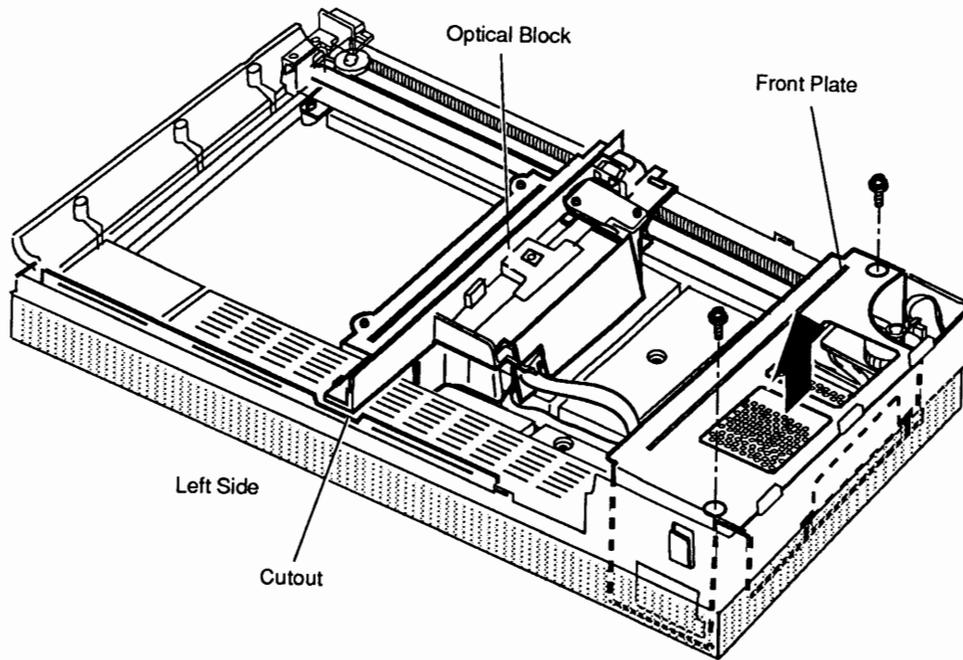


Figure 2-3 Light Assembly

3. **Figure 2-3B and C.** Raise the wire handle to a horizontal position and then pull straight out. The light assembly will disengage from the electrical connector and slide out.
4. Remove the lid and the case top.



**Figure 2-4 Optical Block and Front Plate**

5. **Figure 2-4.** Slide the optical block to the center of the scanner (you will have to push fairly hard) so that the left side of the optical block aligns with the cutout on the left-side rail.
6. **Figure 2-4.** Remove the two screws holding the front plate in place.

**Note:** The screw on the left side (near the transformer) is secured to the bottom of the case. To reach it, you will need a #1 Phillips screwdriver with a four-inch shaft.

7. Firmly pull up and lift out the front plate.

8. **Figure 2-5A.** Remove the two screws that secure the interlock assembly and shaft holder bracket. Move the bracket slightly to the side.
9. **Figure 2-5B.** Loosen the tension lock screw on the carrier.
10. **Figure 2-5B.** Loosen the tension on the belt by swinging the pulley lever toward the front, and remove the belt from the rear pulley gear.
11. **Figure 2-5C.** Remove the belt from the front pulley gear.
12. **Figure 2-5D.** Remove the two screws that secure the front shaft holder bracket. This bracket is removable.
13. Release the shaft from the rear bracket and gently lift up on both sides of the shaft. Be careful not to raise the optical block too high.
14. When the shaft clears the bracket mounts, nudge the left side of the assembly (which is riding on a rail) with your thumb. This movement dislodges the assembly from the rail (**Figure 2-5E**). Once the optical block is loose from the rail, do not try to lift the assembly up all the way until after you do the next step.

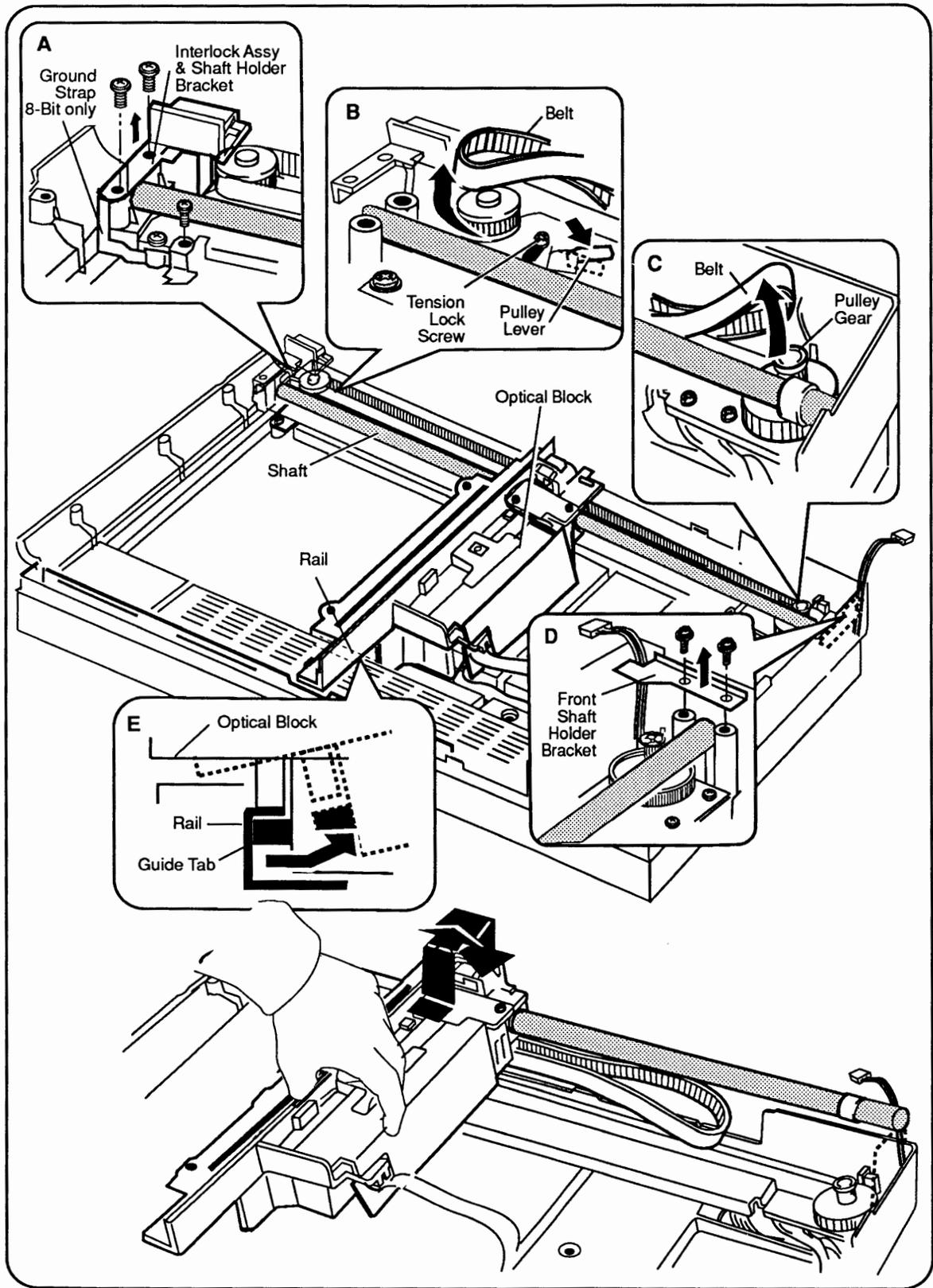


Figure 2-5 Optical Block and Drive Belt

15. **Figure 2-6A/B.** Disconnect the flexible cable from connector CN1 on the optical block assembly by gently pulling down on the bottom part of the connector. The cable will fall loose.
16. 4-bit scanner: Remove the cable by sliding the cable to the open side.  
  
8-bit scanner: Use your fingers or a flat-blade screwdriver to open the ferrite bead retainer. Slide the ferrite bead (with the flexible cable) free from the optical assembly.
17. **Figure 2-6C.** Lift out the optical block assembly.
18. Remove the shaft from the optical assembly by pulling it out as shown in **Figure 2-6D.**
19. **Figure 2-6E.** Remove the belt from the optical block assembly as follows:
  - a) Remove the clip that covers where the belt attaches to the optical block. Use a jeweler's screwdriver, if necessary, to pry the clip loose.
  - b) Pull the belt straight out. The plastic slot is molded with ridges that match the grooves on the belt.

## Replace

1. **Figure 2-6E.** Attach the belt to the optical block. The grooves in the belt fit into the molded grooves on the block. Secure the belt with the clip. (You may need use a screwdriver to pry the clip apart.)
2. Insert the shaft into the optical block as shown in the **Figure 2-6D.**
3. Lay the optical assembly on the top of the scanner.
4. **Figure 2-6A.** 4-bit scanner: Attach the flexible cable to connector CN1 on the CCD PCB. Make sure the cable is looped around the connector.

**Figure 2-6B.** 8-bit scanner: Place the ferrite bead (with the flexible cable attached) in the ferrite bead retainer. Place the cable in connector CN1 and push up on the bottom of the connector to latch the cable in place.

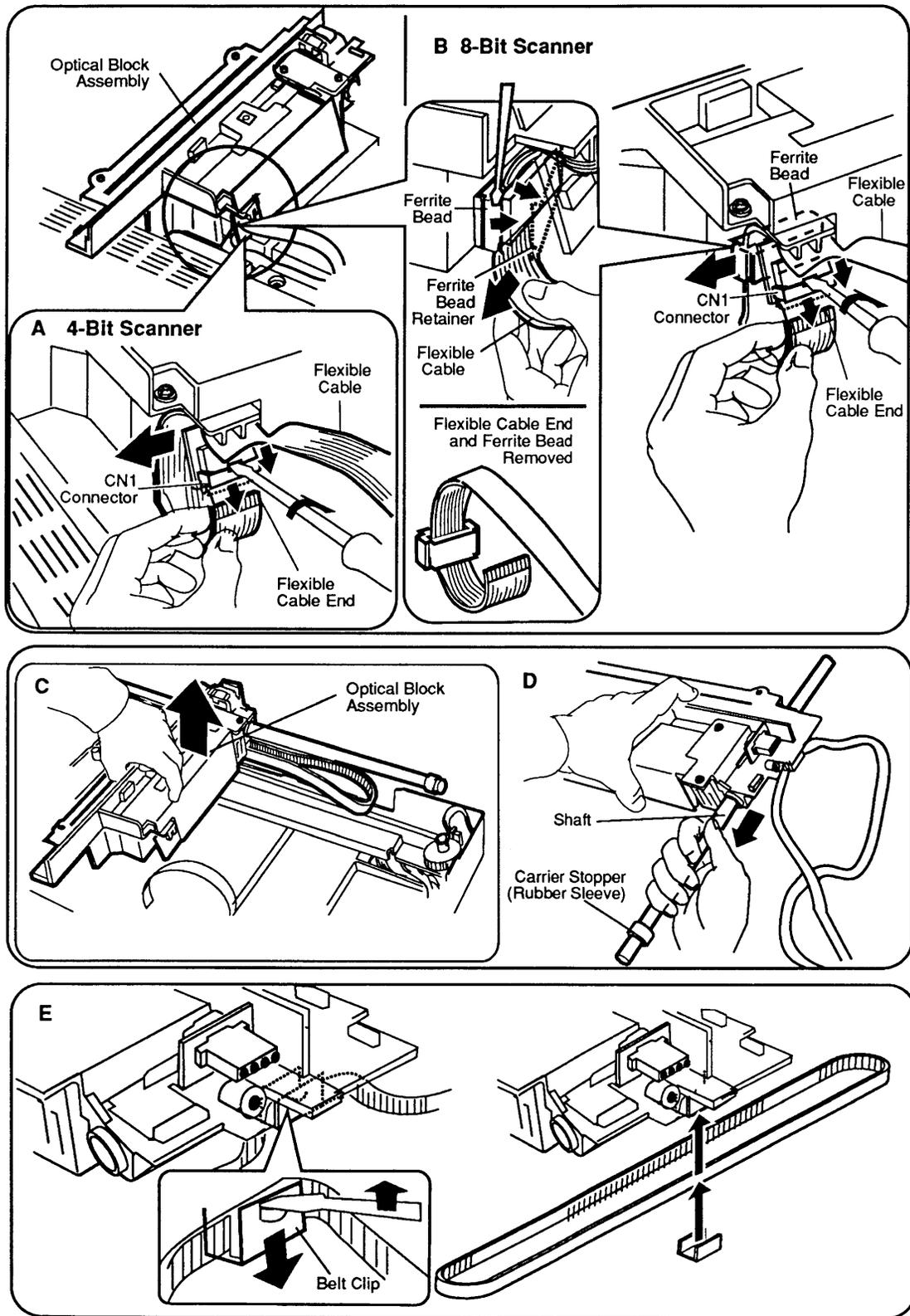


Figure 2-6 Flexible Ribbon Cable

5. Position the optical block across the center of the the scanner. Align the left side of the optical block with the cutout on the left-side rail.
6. **Figure 2-7A.** Slip the left side of the optical block under the left rail while making sure that the block engages under the rail.
7. **Figure 2-7B/E.** Lower the right side of the optical block into the scanner unit, making sure you fit the shaft into the shaft holders on both the front and back ends.
8. **Figure 2-7B/E.** Put the two shaft plates on each end of the shaft and secure them with the four screws. Make sure that the scan switch cable and connector are sticking out at the front corner of the front plate, so that the connector can be attached later to the case top.
9. **Figure 2-7D.** Connect the belt around the gear pulley at the front of the scanner.
10. **Figure 2-7C.** Connect the other end of the belt over the rear pulley. (If this pulley is not free so that you can easily install the belt, you will have to loosen the screw on the pulley bracket to allow the pulley to move.)
11. **Figure 2-7C.** Once the belt is on both pulleys, pull back on the rear pulley to increase the tension on the belt, and tighten the screw on the rear pulley bracket.
12. Put the front plate back on and secure the plate with two screws (see **Figure 2-4** if necessary).
13. Slide the light assembly onto the optical block, and push the assembly all the way in (see **Figure 2-3** if necessary).
14. Engage the light assembly electrical connector by screwing the Phillips screw all the way in. (This action pulls the two connectors together.)
15. Replace the case top and the lid.

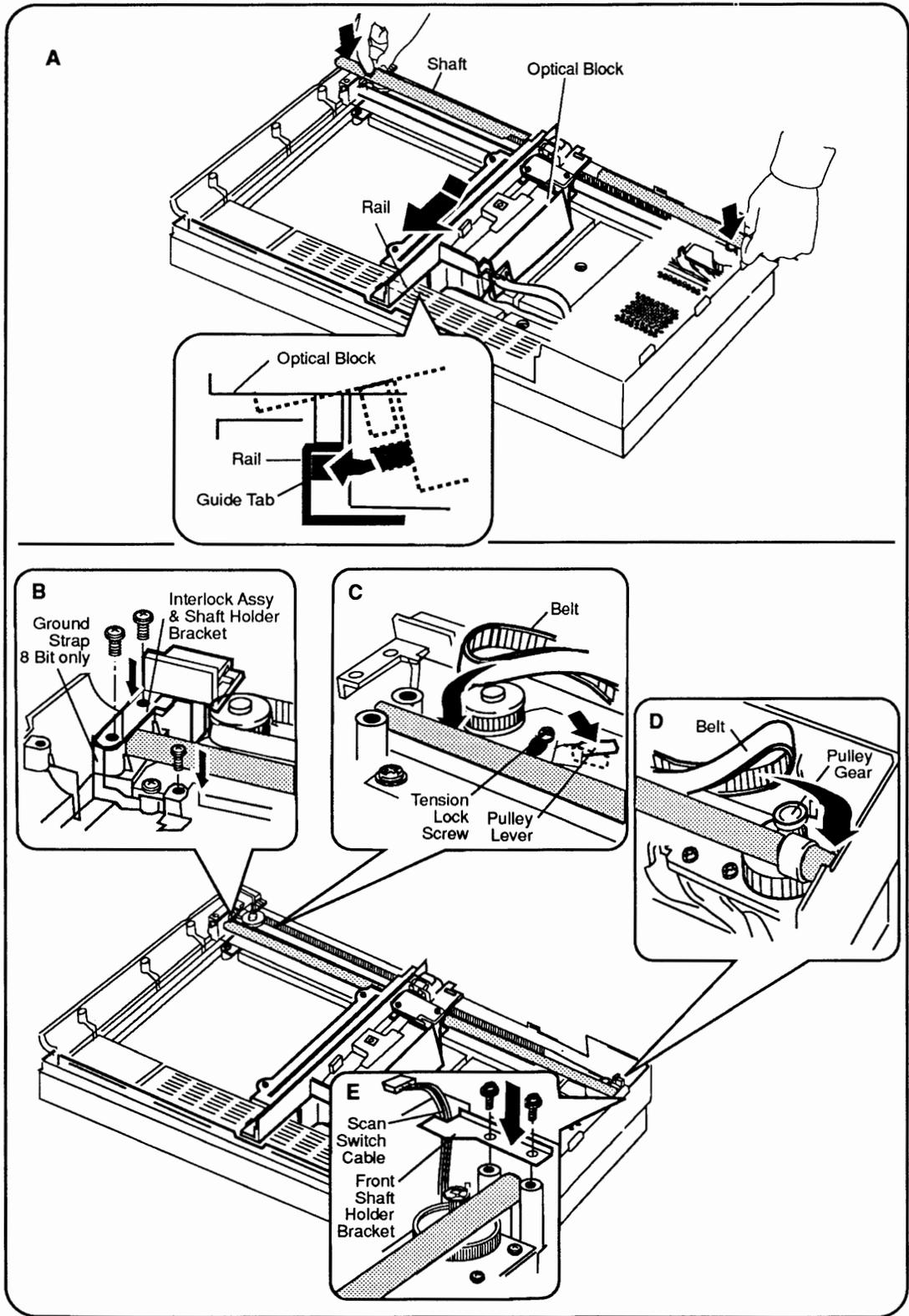


Figure 2-7 Flexible Ribbon Cable

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## □ INVERTER ASSEMBLY

### Remove

1. Remove the lid, case top, and optical block.

**Note:** You do not have to remove the drive belt from the optical block in order to remove the inverter assembly.

2. The optical block cover is held in place by two catches. Slide a flat-blade screwdriver under one side of the optical block cover (as shown in **Figure 2-8A**) until you hear a snap. Repeat this step on the other side and set the cover aside.
3. Put the optical block on a flat surface.

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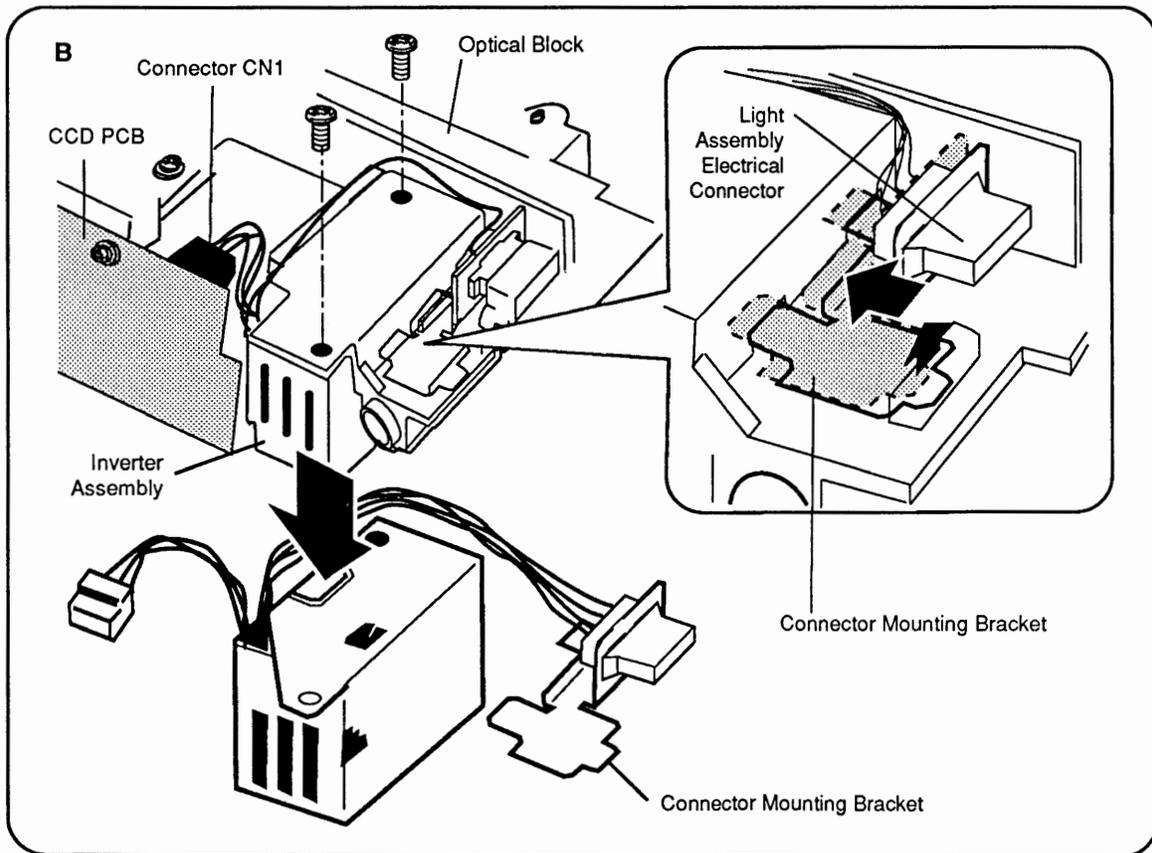
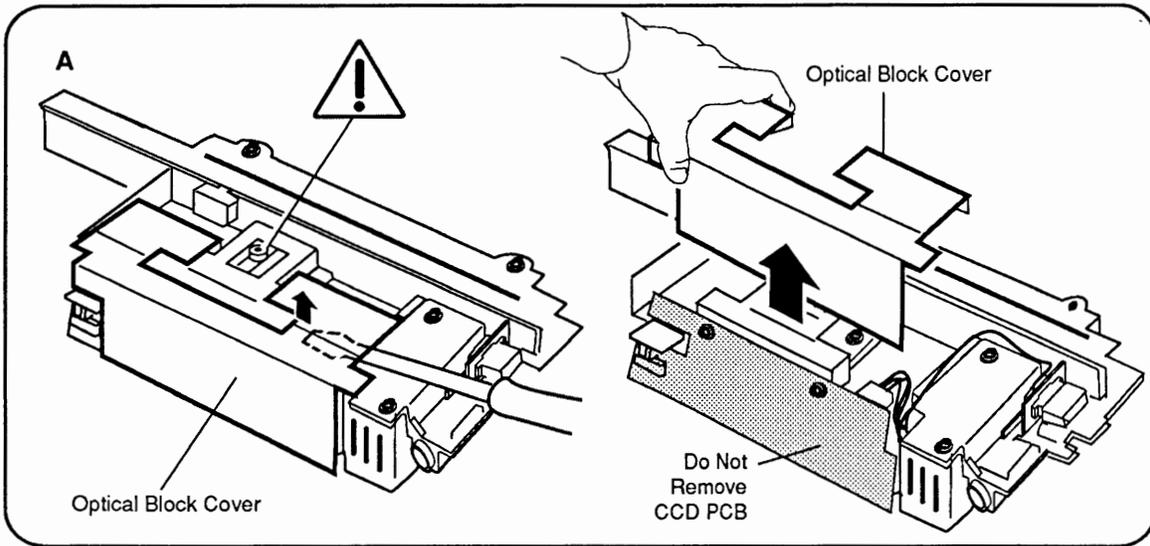
**CAUTION:** *In the middle top of the optical block is a Torx set screw (Figure 2-8A). This screw holds the CCD chips and mirror alignment. Do **not** attempt to loosen this screw. If the screw is loosened, you must replace the entire optical block.*

---

4. **Figure 2-8B.** Unplug connector CN1 from the CCD PCB.
5. **Figure 2-8B.** Unscrew the two screws that hold the inverter assembly.
6. Lift up on the end of the optical block so that the inverter assembly dangles loosely.
7. Push the connector mounting bracket toward the inverter assembly and lift the bracket and light assembly electrical connector free.

### Replace

1. **Figure 2-8B.** Set the connector mounting bracket (with the light assembly electrical connector attached) in place.
2. **Figure 2-8B.** Install the inverter assembly and secure it with the two screws.
3. **Figure 2-8B.** Plug the connector into connector CN1 on the underside of the CCD PCB.
4. **Figure 2-8A/B.** Route the cables around the inverter assembly and under the cover. Align the optical block cover. Press down until it snaps into place.



**Figure 2-8 Inverter Assembly**

---

## □ CARRIER MOTOR

### Remove

1. Remove the lid, case top, and scanning carrier assembly—optical block.
2. **Figure 2-9A.** Remove the two screws from the front inside cover, and remove the cover.
3. **Figure 2-9B.** Remove the left guide rail by removing the three screws that secure it to the case. This action allows you to access the power supply board.
4. **Figure 2-9D.** Remove the four screws with black washers on the pulley and carrier motor plate assembly.
5. **Figure 2-9E.** Locate the metal ground strap that comes from the left side of the case and is attached to the pulley and carrier motor plate assembly. Remove the screw.
6. **Figure 2-9C.** Disconnect CN4 from the power supply and release the cables from the cable clamp.
7. Carefully lift the pulley and carrier motor plate assembly out of the bottom case.
8. **Figure 2-9F.** Using a jeweler's screwdriver, remove the E-clip and washer from the gear pulley and pull off the gear pulley.
9. **Figure 2-9F.** Remove the three screws that hold the carrier motor to the carrier plate assembly and remove the motor.

**Note:** You can also remove the rear pulley at this time by removing the large E-clip and pulling off the pulley. Also, if the pulley tension spring needs to be replaced, you can reach it on the bottom of the pulley and carrier motor plate assembly.

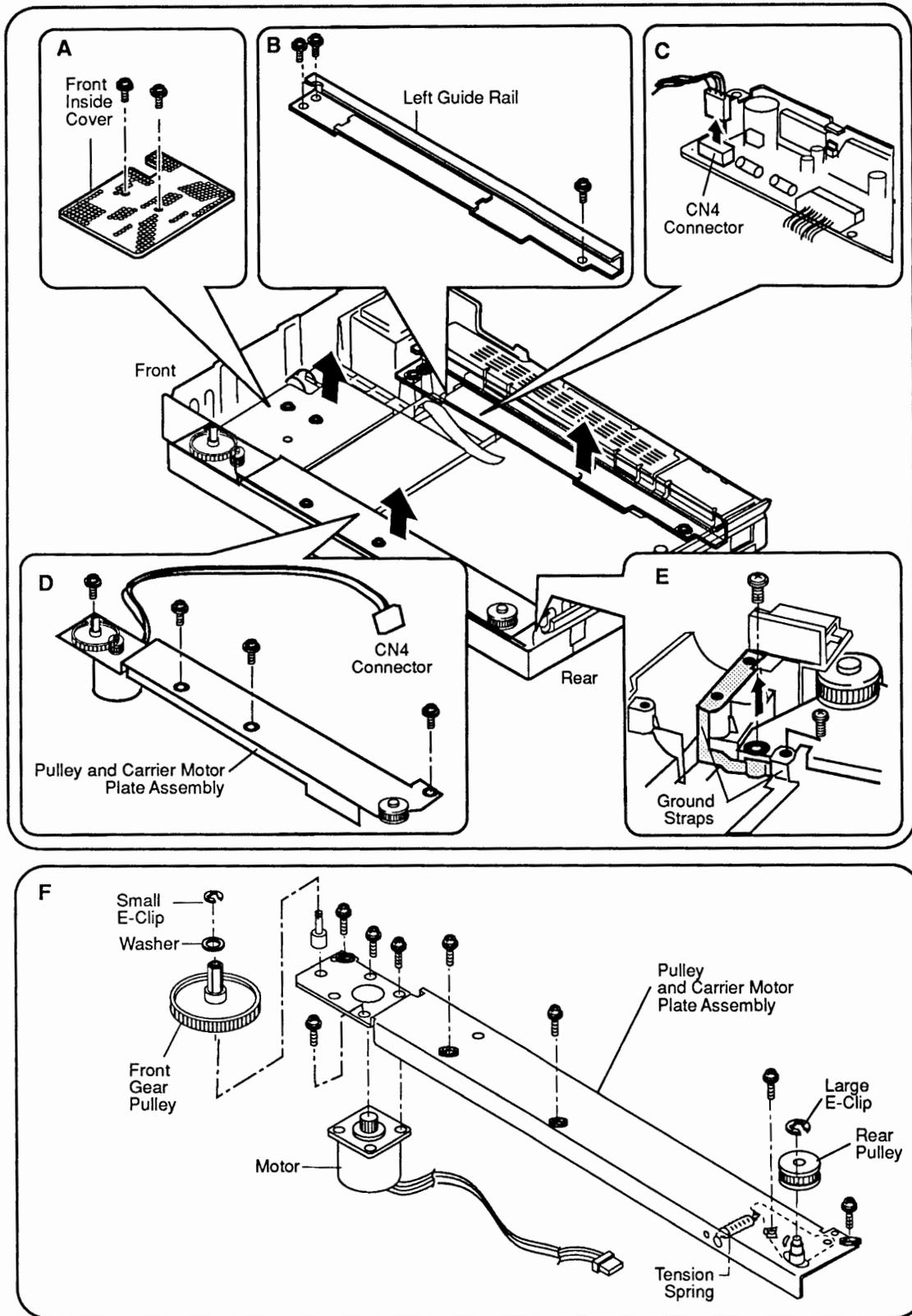
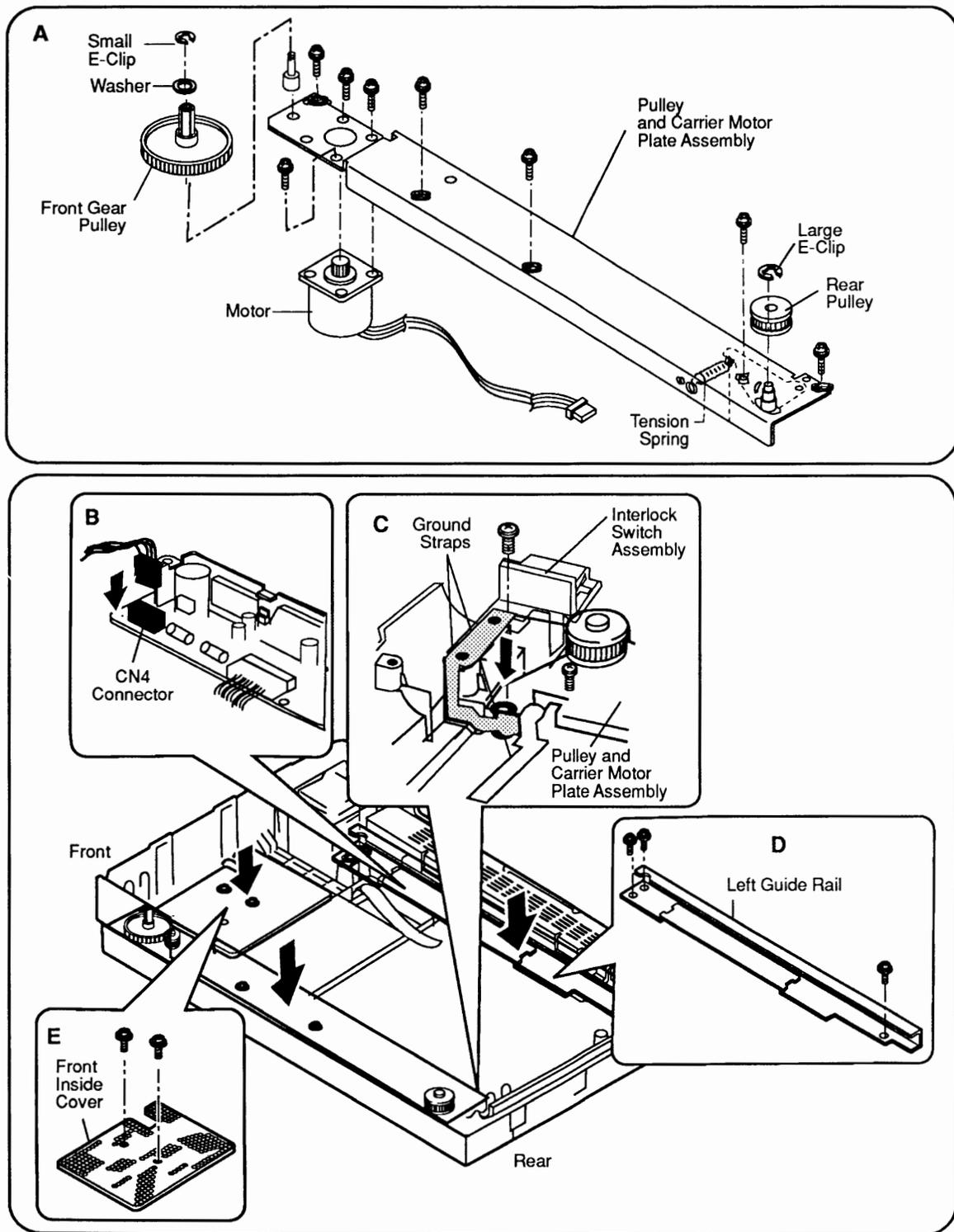


Figure 2-9 Carrier Motor

## Replace

1. **Figure 2-10A.** Place the motor on the underside of the pulley and carrier motor plate assembly so that the wires face toward the front of the case. Attach the motor with the three screws. Tighten the screws.
2. **Figure 2-10A.** Place the gear pulley on its shaft and make sure that the gear on the pulley engages with the gear on the motor shaft.
3. **Figure 2-10A.** Replace the plastic washer flange-side-down on the gear pulley shaft, and secure the washer with the small E-clip.
4. **Figure 2-10A.** If you removed the rear pulley, replace it now. Reinstall the large E-clip.
5. Place the pulley and carrier motor plate assembly in the bottom case. Use the four screws with the black washers to secure the assembly. Make sure that the interlock switch assembly is loose but tucked in along the case.
6. **Figure 2-10B.** Connect the connector from the motor to CN4 on the power supply board. Guide the wires along the front bottom of the case and through the cable retainers.
7. **Figure 2-10C.** Replace the ground straps and secure them with screws.
8. **Figure 2-10D.** Replace the left guide rail and secure it with the three screws.
9. **Figure 2-10E.** Replace the front inside cover and secure it with two screws.
10. Replace the optical block, the case top, and the lid.



**Figure 2-10 Carrier Motor**

---

## □ TRANSFORMER

### Remove

1. Remove the lid, the case top, the optical block, and the carrier motor assembly.
2. **Figure 2-11A.** Unscrew the one screw from the black shield plate, and remove the plate by sliding it to the right side and then up.
3. **Figure 2-11A.** Remove connectors CN2 and CN5 from the power supply board.
4. **Figure 2-11A.** Remove the screws that secure the ground brackets.
5. **Figure 2-11B.** Remove the four screws from the mounting plate that holds the transformer to the bottom case.
6. **Figure 2-11B.** Pull out the transformer assembly along with the long wire that runs along the right side of the bottom case to the interlock switch. Undo the wires from the wire harness clips as needed.
7. **Figure 2-11A.** Remove the interlock switch assembly at the right rear of the scanner. Disconnect the two-wire connector from the interlock switch assembly. If you are replacing the transformer, this switch assembly is part of the transformer assembly.
8. **Figure 2-11D.** Unscrew the two mounting screws that hold the transformer to the mounting plate, and remove the transformer.

**Note:** On universal transformers, remove the power selector switch (**Figure 2-11C**) by removing the two Phillips screws that hold it in place.

### Replace

1. **Figure 2-11D.** Secure the transformer to the mounting plate using the two screws.

**Note:** On universal transformers, secure the power selector switch with the two Phillips screws.

2. **Figure 2-11B.** Using four screws, secure the transformer plate assembly to the bottom case.

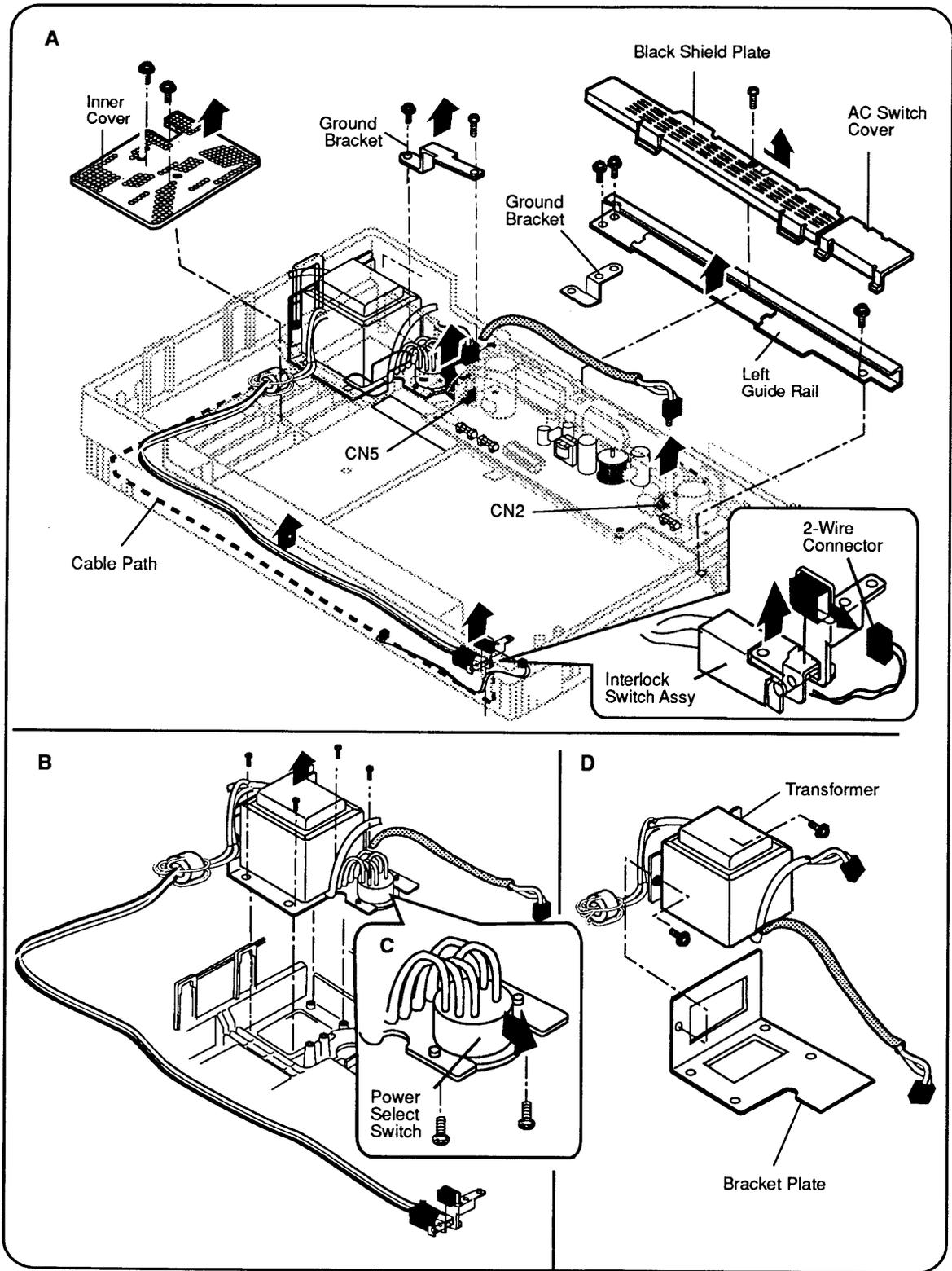
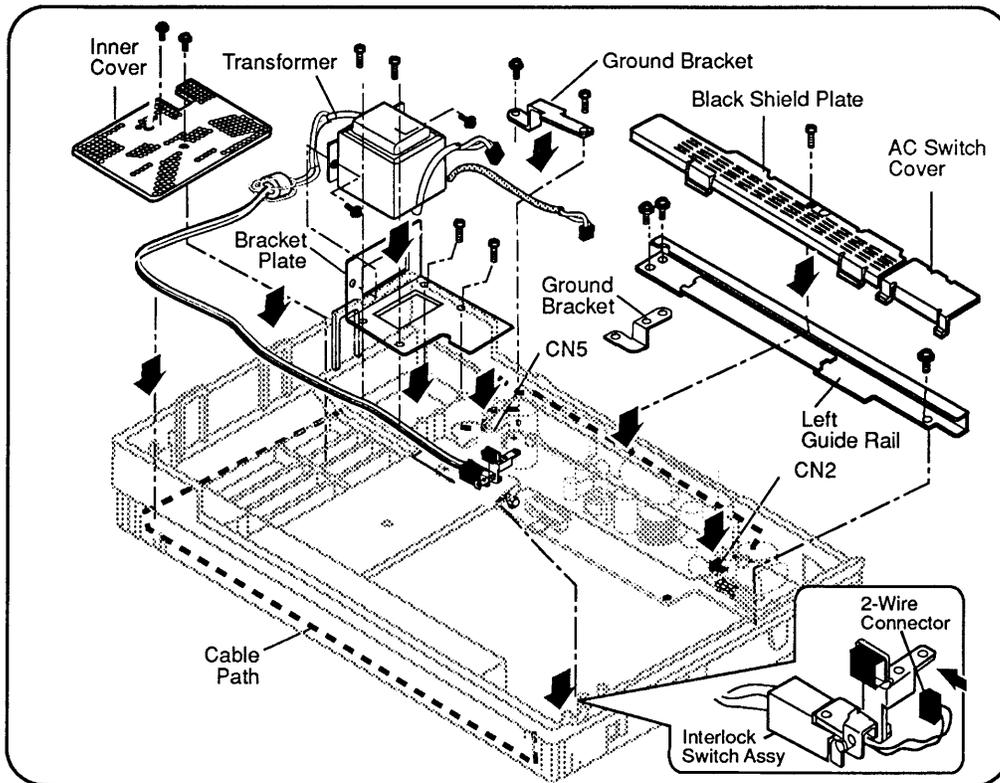


Figure 2-11 Transformer

3. Secure the ground brackets that connect the transformer mounting plate to the power supply board.
4. **Figure 2-12.** Run the set of long wires (attached to the interlock switch) across the front section of the bottom case and along the right side. Tuck the wires into the cable retainers. Reconnect the two-wire connector to the interlock switch.

If the interlock switch was removed from the bracket, attach the switch to the bottom side of the bracket using one screw. The switch button should face the side of the case.

5. **Figure 2-12.** Run the shielded wire along the left side of the case to CN2 on the power supply board. Connect CN5 and CN4 to the power supply board.
6. Replace the left guide rail, power supply shield, carrier motor, optical block, case top, and lid.



**Figure 2-12 Transformer**

## □ POWER SUPPLY PCB

### Remove

1. Remove the lid, the case top, and the scanning carrier assembly—optical block.
2. **Figure 2-13A.** Unscrew the one screw from the black shield plate and remove the plate by sliding it to the right side and then up.
3. **Figure 2-13B.** Disconnect the five connectors—CN1, CN2, CN3, CN4, and CN5—from the power supply board. (On the 8-bit scanner, you will need to remove the logic board, in its metal case, before you can disconnect CN3.)
4. **Figure 2-13B and C.** Remove the three self-tapping screws and the two machine screws that hold the power supply board to the housing. Remove the ground strap screw.
5. **Figure 2-13B.** Remove the ground strap bracket and remove the board.

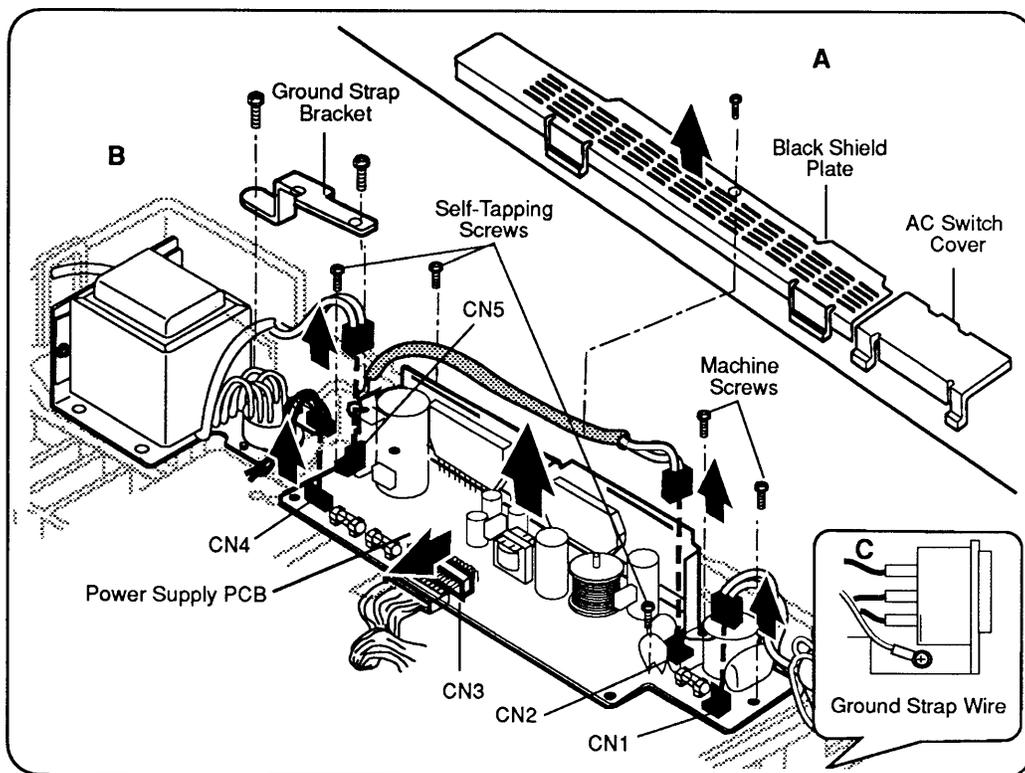


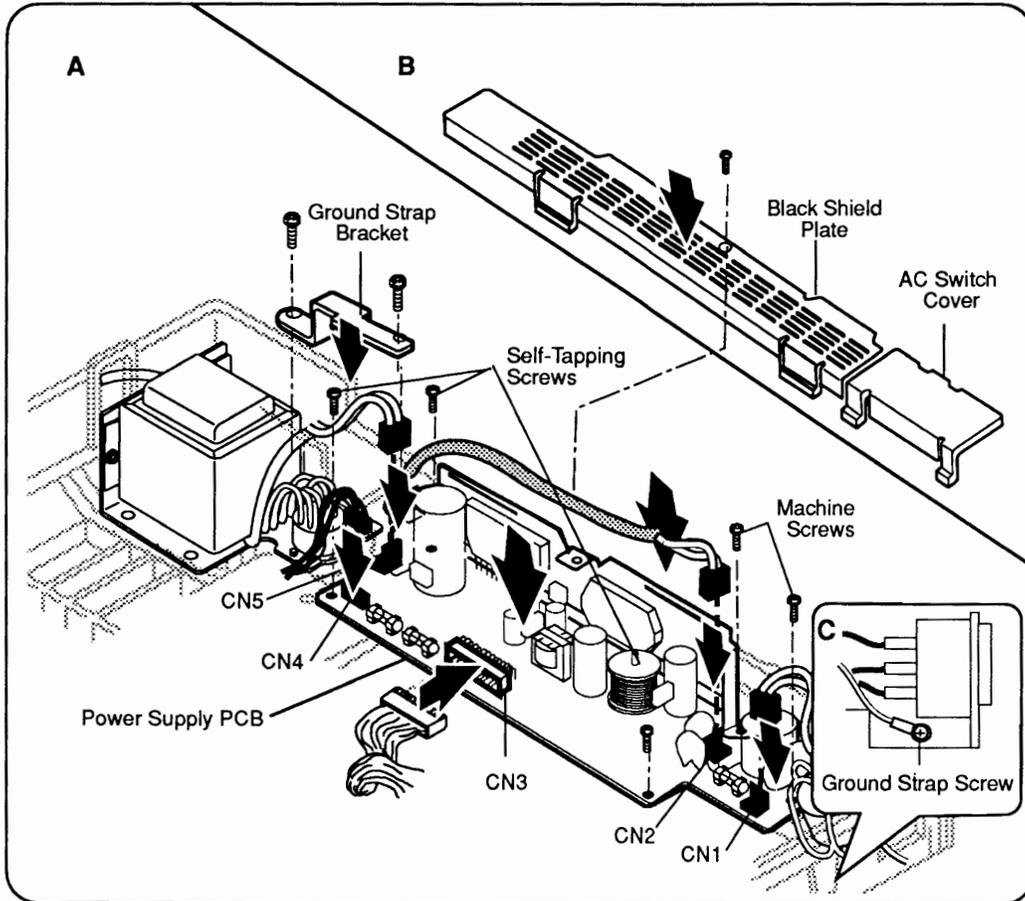
Figure 2-13 Power Supply PCB

## Replace

1. **Figure 2-14A.** Before installing the power supply board completely, align connector CN3 on the power supply board with the connector from the main logic PCB, and connect them.
2. **Figure 2-14A.** Place the power supply board in the case and secure it with the three self-tapping screws and the two machine screws.
3. **Figure 2-14A.** Connect the remaining four connectors—CN1, CN2, CN4, and CN5—to the power supply board.
4. **Figure 2-14A.** Connect the ground strap bracket from the transformer plate to the power supply board.

**Note:** If the transformer is out of the unit, do not replace the black shield plate or the left rail at this time; skip steps 5 and 6.

5. Replace the left-side guide rail with three screws.
6. **Figure 2-14B.** Replace the black shield plate and secure it with one screw.
7. Attach the AC switch cover. Make sure that the tabs snap into the slots on the left guide rail.
8. **Figure 2-14C.** Secure the ground strap with its screw.
9. Replace the carrier assembly, the case top, and the lid.



**Figure 2-14 Power Supply PCB**

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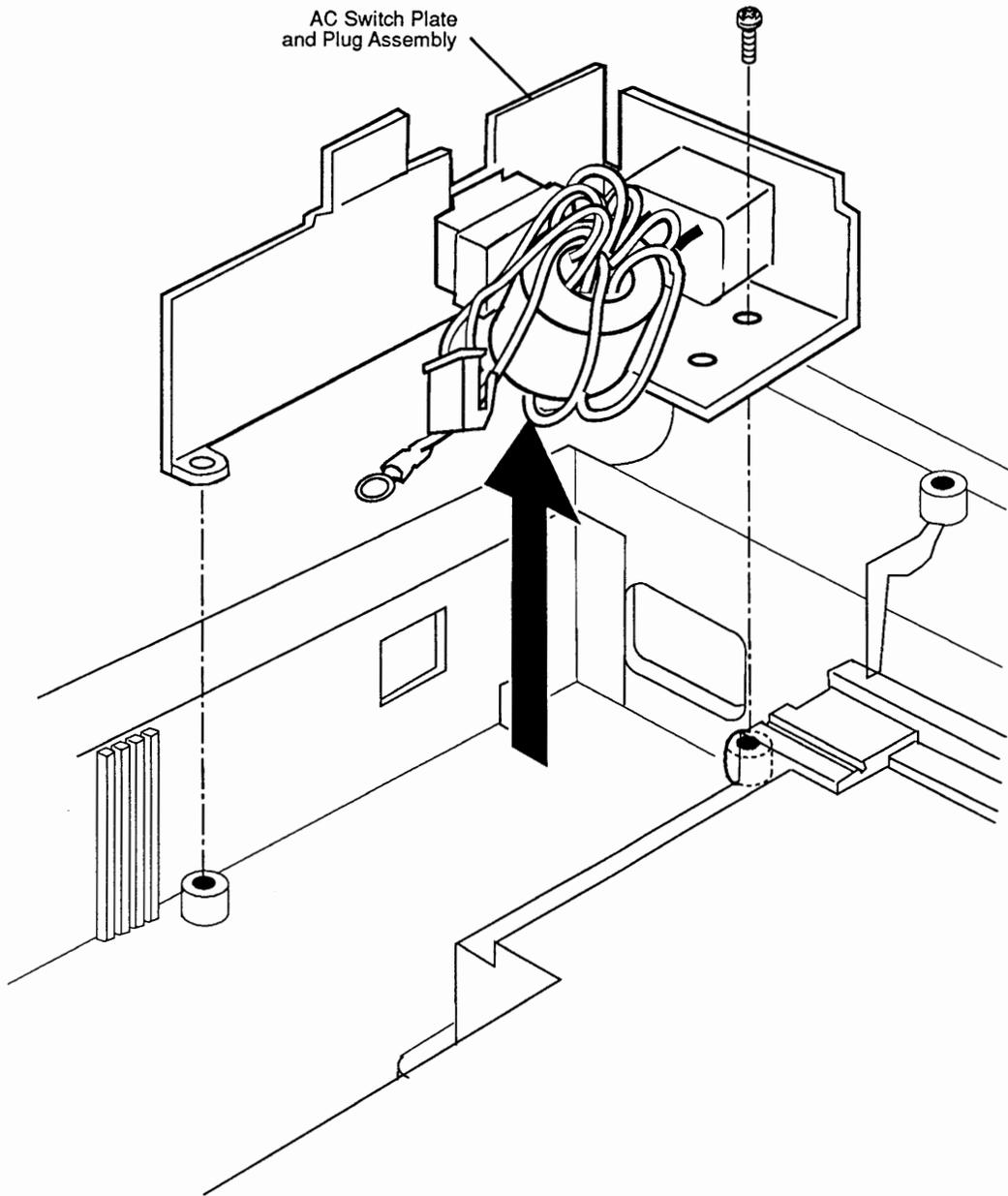
## □ AC SWITCH PLATE AND PLUG ASSEMBLY

### Remove

1. Remove the lid, the case top, and the power supply board.
2. **Figure 2-15.** Remove the one screw that holds the AC switch plate and plug assembly to the case.
3. **Figure 2-15.** Remove the switch plate and plug assembly.

### Replace

1. **Figure 2-15.** Replace the switch plate assembly on the case and secure it with the one screw.
2. Replace the power supply board, the case top, and the lid.



**Figure 2-15 AC Switch Plate and Plug Assembly**

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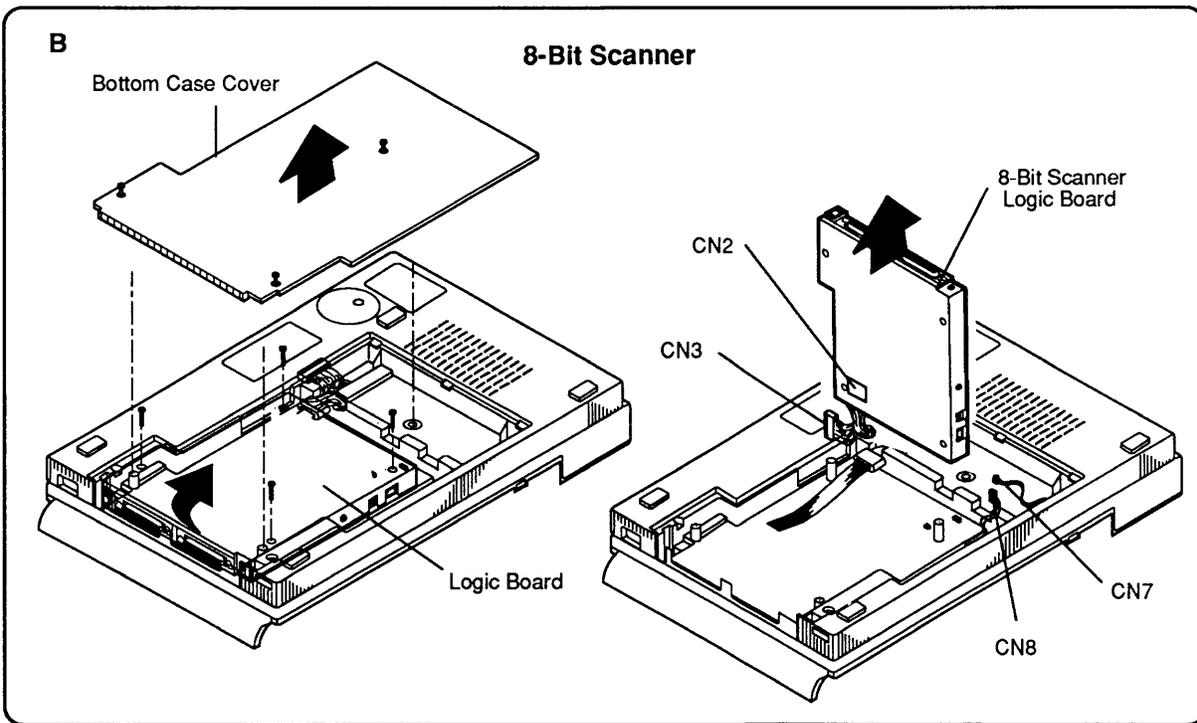
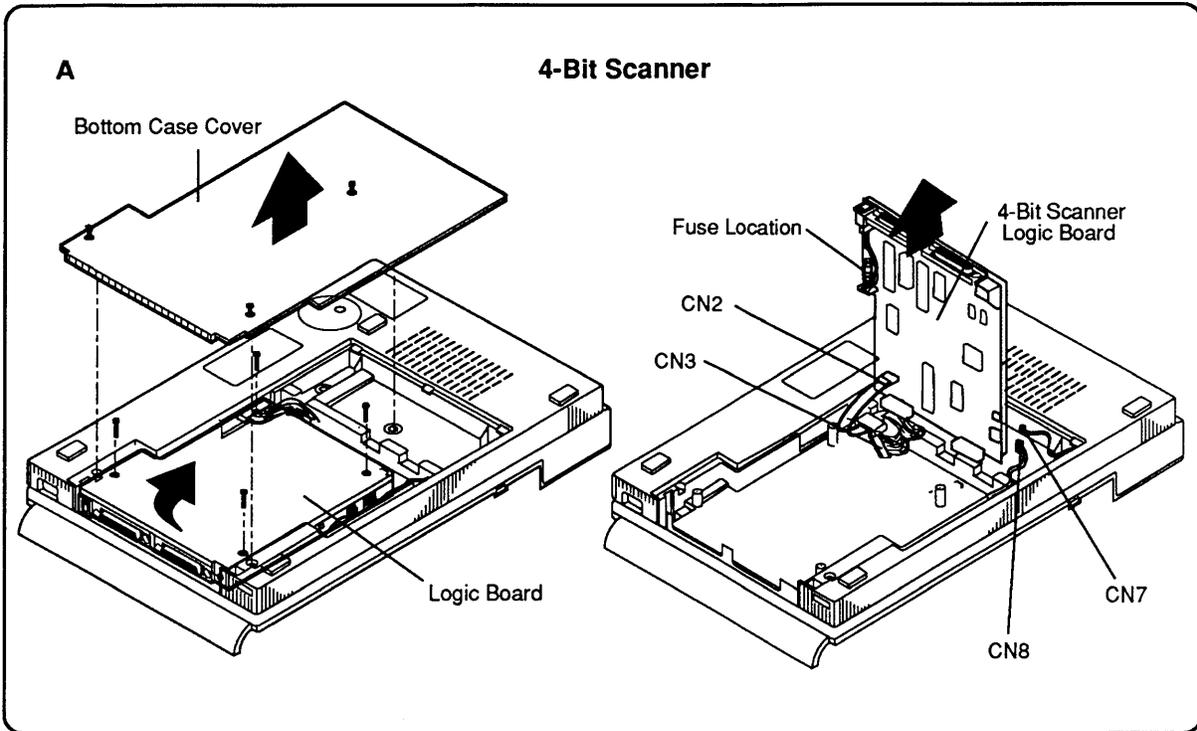
## □ MAIN LOGIC PCB

### Remove

1. Stand the scanner on its left side.
2. **Figure 2-16A/B.** Loosen the three screws on the bottom panel. (The screws will not come out, but make sure they are loosened all the way.) The panel will come off.
3. 4-bit scanner: **Figure 2-16A.** Remove the four screws that hold the PCB to the scanner bottom. Once the screws are removed, the board will be loose and you can pull it out easily. Before pulling the board all the way out, reach around and remove the four connectors—CN2, CN3, CN7, and CN8  
  
8-bit scanner: **Figure 2-16B.** Remove the four screws that hold the PCB case to the scanner bottom. Once the screws are removed, the board will be loose and you can pull it out easily. Before pulling the board all the way out, reach around and remove the connectors. Do not remove the 8-bit PCB from the metal case.

### Replace

1. Attach the cables to connectors CN2, CN3, CN7, and CN8 (**Figure 2-16A/B**).
2. Align the four screw holes on the corners of the board with the four holes on the case.
3. Install the four screws.
4. Use the three screws to install the bottom panel.



**Figure 2-16 Main Logic PCB**

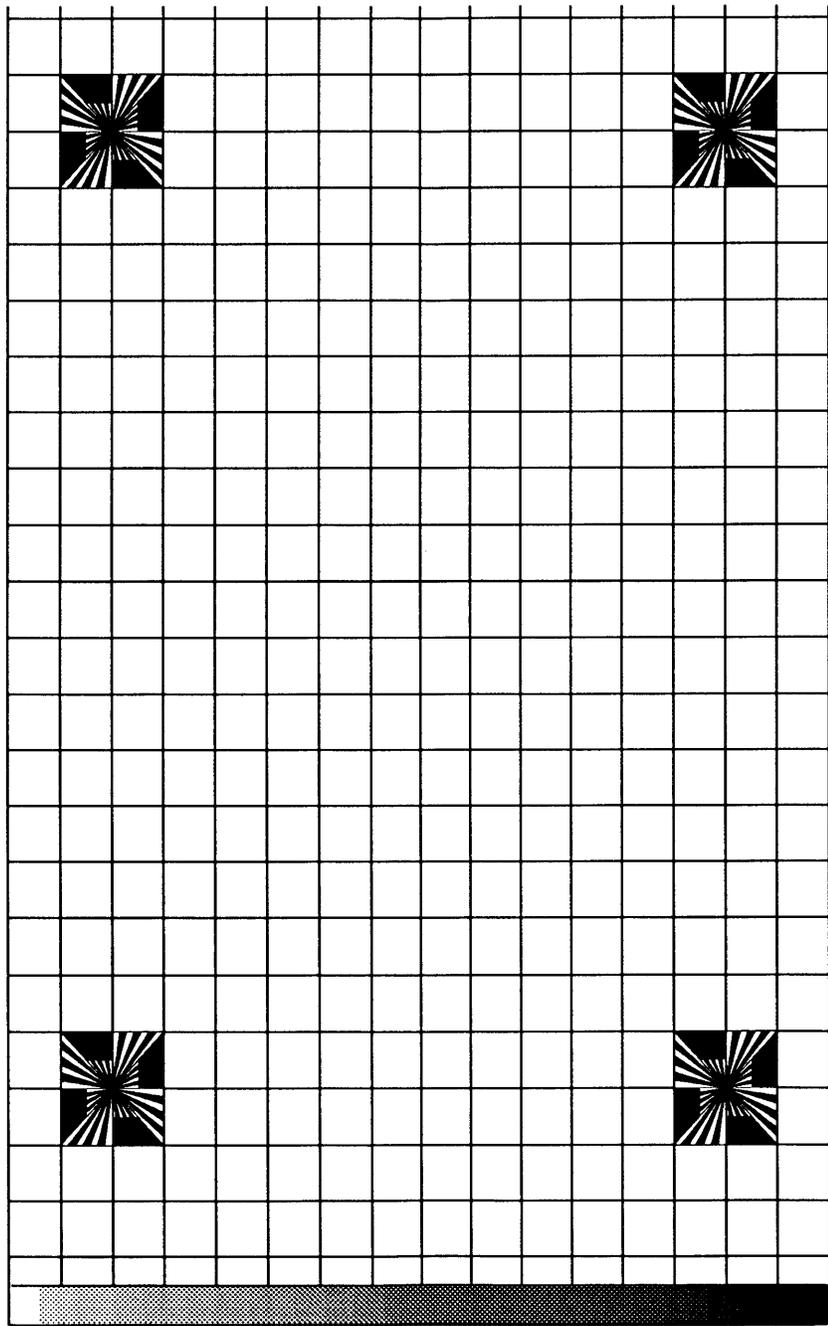


Figure 3-1 Test Chart

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## □ TEST DESCRIPTIONS

### **ScanTest (4-Bit Scanner)**

The following is a brief description of the tests available in *ScanTest*. All tests except the self-test are user-selectable.

### *Self-Test*

The self-test runs automatically everytime you run *ScanTest*. The built-in self-test includes the following:

- ROM test
- RAM tests
- Lamp tests (checks for no light or dim light)
- Home position test (detects optical block in home position)
- Shade error test (tests for shading errors)
- CPU port, DIPP, DMA, and GA1 and GA2 component tests
- Limit switch test

### *Accuracy Test*

In the accuracy test, the scanner scans the test chart for reference points and creates a table based on these points. The test then compares the actual intersection points against this table. If the intersection points deviate from the table specifications, the test fails. Next, the scanner scans the test chart again and compares the first set of data with the data from the second scan. The data from both scans should be identical (meaning that the intersections from one scan should be the same as those from the second scan). Otherwise, the test fails.

### *Image Greyscale Test*

This test uses the gray-scale strip at the bottom of the test chart. The strip has 37 zones of gray. Each zone has a value. When the scanner scans the strip, the test compares the values to preset values. A deviation of  $\pm 1$  gray scales fails the test.

### *Image Resolution Test*

The image resolution test uses the upper-left and lower-right targets on the test chart. The test is the same for each target. The test detects the top, bottom, left, and right edges of the wedge and then counts the pixels from the center of the target to the edge. The software calculates a pixel average and applies a formula to calculate the resolution. If the resolution is not within specifications, the test fails.

# Apple Scanner

## Section 3 – Diagnostics

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### ☐ CONTENTS

3.2	Introduction
3.4	Test Descriptions
3.4	ScanTest (4-Bit Scanner)
3.5	Scan8Test (8-Bit Scanner)
3.6	Using ScanTest
3.6	Helpful Hints
3.7	Procedure
3.11	Immediate Mode
3.11	Startup Screen
3.11	Configuration (4-Bit Scanner)
3.12	Configuration (8-Bit Scanner)

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## □ INTRODUCTION

*ScanTest*<sup>®</sup> 4.4 (for the 4-bit scanner) and *Scan8Test* (for the 8-bit scanner) are diagnostic programs that verify whether the scanner is working correctly. These diagnostics provide the following tests:

<i>ScanTest</i> (4-bit scanner)	<i>Scan8Test</i> (8-bit scanner)
Self-Test	Self-Test
Accuracy Test	Accuracy Test
Image Greyscale Test	Repeatability Test
Image Resolution Test	Image Greyscale Test
	Resolution Test

To run the diagnostic, you must use the *Apple Scanner Service Test Chart*. The chart is shown in Figure 3-1.

Before using the test chart, examine the chart for the following conditions, any of which could cause a test to fail:

- There should be no folds, bends, or scratches anywhere on the chart.
- The chart should be completely clean—no smudges, spots, or stains.

If it becomes necessary to clean the test chart, use only a clean and dry lint-free cloth. **Do not** use any solvents or cleansers as these could ruin the test chart.

When the test chart is not in use, it should not be exposed to sunlight or any source of ultraviolet light. To protect the chart from dirt and other possible damage, store it in its supplied protective folder and envelope or other flat container.

**Note:** You can run the diagnostic from the diagnostic disk or from a hard disk. If you run the diagnostic from a hard disk, make sure that you use Macintosh system software 6.0.5 through 6.0.7 for the 4-bit scanner, or Macintosh system software 6.0.7 for the 8-bit scanner. (Do not run the diagnostic with System 7.)

## **Scan8Test (8-Bit Scanner)**

The following is a brief description of the tests available in *Scan8Test*. All tests are user-selectable.

### *Self-Test*

The self-test includes the following:

- ROM test
- RAM tests (tests correction RAM, buffer RAM, and scanner RAM)
- Lamp tests (checks for no light or dim light)
- Home position test (detects optical block in home position)
- Limit switch test (detects whether scanner can locate the limit switch position)
- CPU component tests
- CCDCG test (tests the CCD SCSI clock generator)

### *Accuracy Test*

In the accuracy test, the scanner scans the test chart for reference points and creates a table based on these points. The test then compares the actual intersection points against this table. If the intersection points deviate from the table specifications, the test fails.

### *Repeatability Test*

In the repeatability test, the scanner scans the test chart twice and compares the first set of data with the data from the second scan. The data from both scans should be identical (meaning that the intersections from one scan should be the same as those from the second scan). Otherwise, the test fails.

### *Greyscale Test*

This test uses the gray-scale strip at the bottom of the test chart. The strip has 37 zones of gray. Each zone has a value. When the scanner scans the strip, the test compares the values to preset values. A deviation of  $\pm 1$  gray scales fails the test.

### *Resolution Test*

The image resolution test uses the upper-left and lower-right targets on the test chart. The test is the same for each target. The test detects the top, bottom, left, and right edges of the wedge and then counts the pixels from the center of the target to the edge. The software calculates a pixel average and applies a formula to calculate the resolution. If the resolution is not within specifications, the test fails.

---

## □ USING SCANTEST

### Materials Required

*ScanTest* 4.4 diagnostic program (for 4-bit scanner)  
*Scan8Test* diagnostic program (for 8-bit scanner)  
Apple Scanner Service Test Chart

---

**IMPORTANT:** *Before you run the diagnostic, you must check for the following conditions:*

- *The scanner must be attached correctly to the computer through the SCSI connector. The power cord must be plugged in and the power switched on.*
- *The scanner glass must be completely clean, outside and inside.*
- *There must be no debris between the scanner glass and the test chart.*
- *The test chart must be placed face-down on the scanner window, with the black strip along the rear edge of the window and the edge of the chart against the right edge of the scanner glass (see Figure 3-2).*
- *The scanner SCSI address must not be set to 7 or to the address of any other device connected to the SCSI bus.*
- *The SCSI bus must be properly terminated. If you need assistance, refer to the Apple SCSI Cable System manual.*

*Failure to meet these conditions will cause the diagnostic tests to fail and may give you false information about the scanner.*

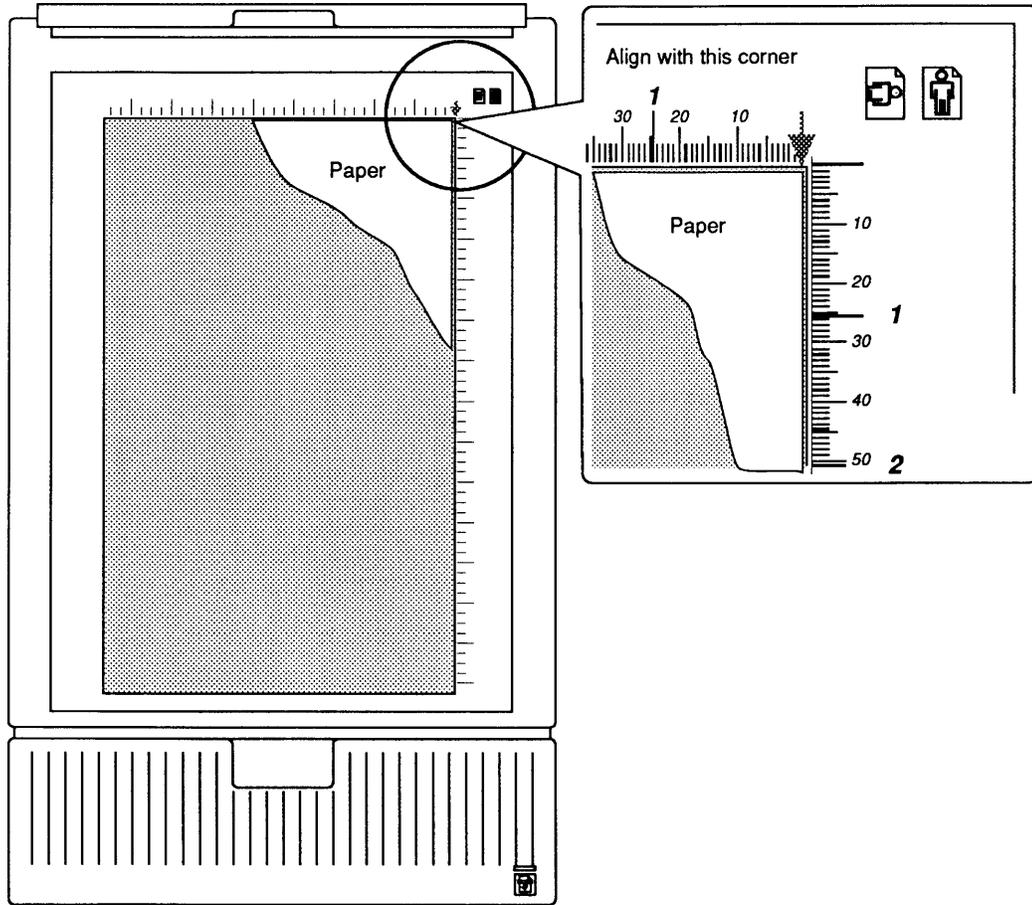
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### Helpful Hints

- You can run the diagnostic from the diagnostic disk or from a hard disk. If you run the diagnostic from a hard disk, make sure that you use Macintosh system software 6.0.5 through 6.0.7 for the 4-bit scanner, or Macintosh system software 6.0.7 for the 8-bit scanner. (Do not run the diagnostic with System 7.0 software.)
- Turn MultiFinder<sup>®</sup> off before running the diagnostic.

**Procedure**

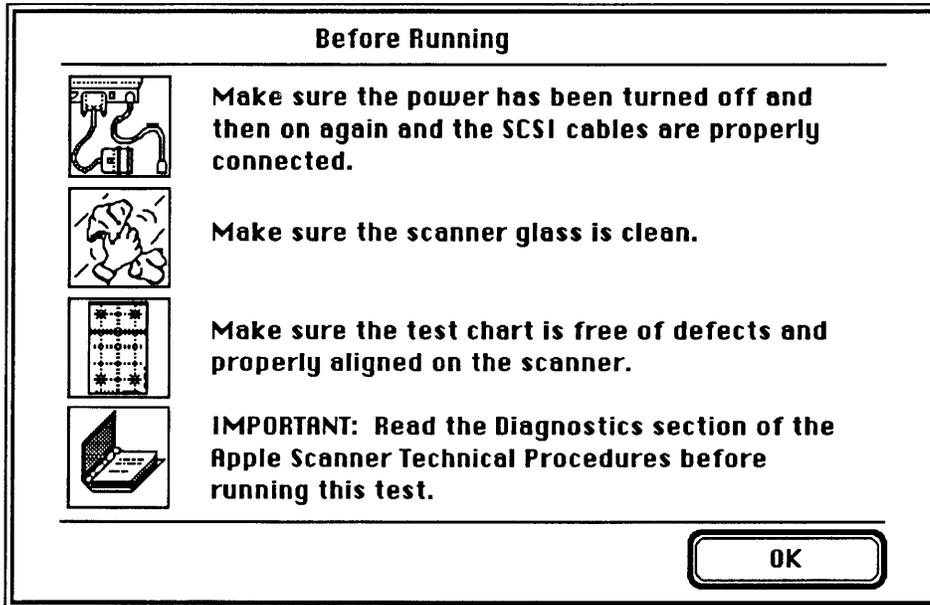
1. Align the test chart with the upper-right corner of the scanner as shown in Figure 3-2.



**Figure 3-2 Placing the Test Chart on the Scanner**

2. Carefully close the lid without moving the test chart.

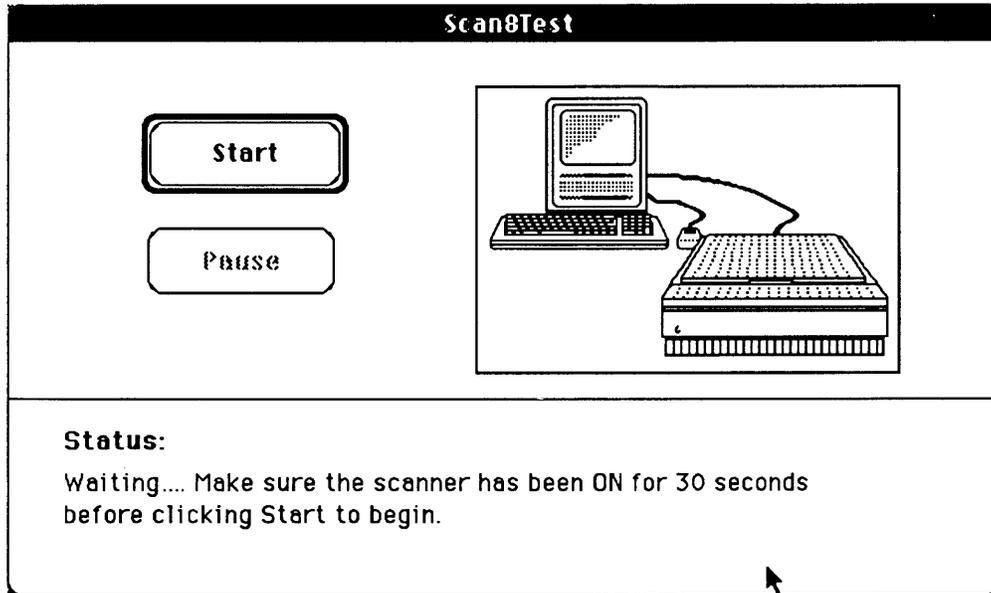
3. Double-click on the diagnostic (*ScanTest* or *Scan8Test*) application icon. If the startup screen is not disabled, the screen shown in Figure 3-3 appears. (Refer to "Startup Screen" later in this section.) This information window reminds you of conditions that must be present for the diagnostic to run correctly.



**Figure 3-3 Startup Screen**

**Note:** The art in this section depicts *Scan8Test* screens. *ScanTest* screens will vary slightly.

4. When you have read the screen and made sure these conditions are correct, click **OK**. The status screen (shown in Figure 3-4) appears.



**Figure 3-4 Status Screen**

5. Pull down the Options menu and select **Test Selections**, or hold down the <Command> key while typing **T**.
6. The test selection window (Figure 3-5) appears. You can select any of the tests—one at a time or in any combination.

**Note:** *ScanTest* lists three test selections, while *Scan8Test* lists the five tests shown in Figure 3-5.

7. Select the tests you want to run by clicking in the box next to the test. When you have selected all the tests you want, click **OK**.

**Note:** Once you have selected the tests you want to run, you can set these tests to run whenever you start the diagnostic. To set tests, select **Save Test Selections** from the Edit menu. You will still have the option to change your selection whenever you want by redoing steps 5, 6, and 7.

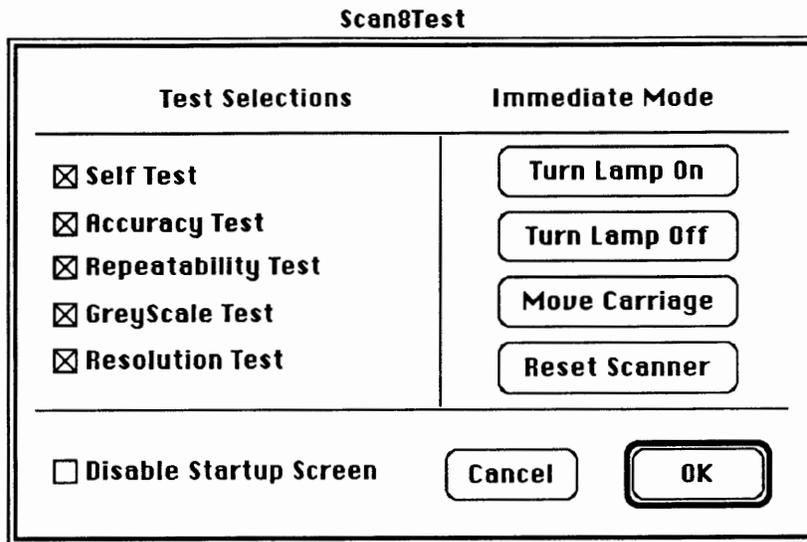


Figure 3-5 Test Selection Window

- Click the Start button to begin the tests. If any test fails, the diagnostic stops and gives you an information window as shown in Figure 3-6.

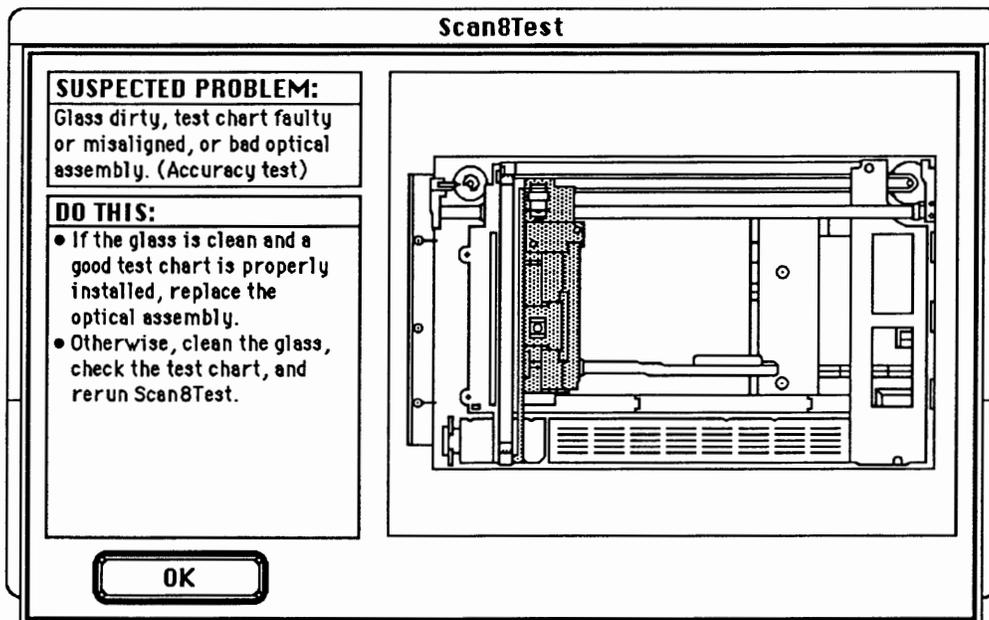


Figure 3-6 Sample Information Window

## **Immediate Mode**

The diagnostic provides an **immediate mode** to reset the scanner, control the movement of the carriage, and turn the lamp on and off.

Select the functions you want by clicking on the appropriate button at the right side of the test selections window.

## **Startup Screen**

The startup screen displays setup information important to obtaining good results with the diagnostic. If you do not want the startup screen displayed each time you run the diagnostic, select **Disable Startup Screen**.

## **Configuration (4-Bit Scanner)**

The Configuration selection in *ScanTest* displays the following information that can aid you in troubleshooting the 4-bit scanner:

- **Vendor ID** – Identifies Apple as the manufacturer
- **Product ID** – Displays the scanner model number
- **Revision** – Displays the version of the firmware
- **SCSI Port** – Displays the SCSI device address for the scanner

You can display additional self-test information by clicking on the Additional Info button at the bottom of the Configuration window. This information provides additional detail as to the nature of a failure.

## Configuration (8-Bit Scanner)

The Configuration selection in *Scan8Test* displays the following information that can aid you in troubleshooting the 8-bit scanner:

- **Vendor ID** – Identifies Apple as the manufacturer
- **Product ID** – Displays the scanner model number
- **Revision** – Displays the version of the firmware
- **SCSI Port** – Displays the SCSI device address for the scanner
- **Type** – Identifies whether the scanner is 4-bit or 8-bit
- **System RAM** – Displays the size of the scanner memory
- **Buffer RAM** – Displays the size of the buffer memory
- **C RAM** – Displays the size of the correction memory
- **System ROM** – Displays the size of the scanner ROM

# Apple Scanner

## Section 4 – Troubleshooting

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### □ CONTENTS

- 4.2 Running Self-Test
- 4.2 Self-Test Results
- 4.3 Symptom/Cure Chart

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## □ RUNNING SELF-TEST

The Apple Scanner has built-in self-test diagnostics that test the following functions of the scanner:

### 4-Bit Scanner

Fluorescent lamp  
Limit switch searching  
Home position searching  
ROM  
RAM  
CPU port  
SCSI controller  
Digital image preprocessor  
DMA controller  
Gate array 1  
Gate array 2  
Shading check

### 8-Bit Scanner

Fluorescent lamp  
Limit switch searching  
Home position searching  
ROM  
RAM (scanner, correction,  
and buffer RAM)  
CPU port  
SCSI controller  
CCDCG

You can activate the self-test in two ways: 1) switch on the scanner while holding down the Start Scan button (hardware method) or 2) run the *ScanTest* or *Scan8Test* diagnostic. Section 3, Diagnostics, contains directions for running the diagnostic.

### Self-Test Results

To see the results of the self-test, you must have the *AppleScan*, *ScanTest*, or *Scan8Test* application running when you start the self-test.

If the application (*AppleScan*, *ScanTest*, or *Scan8Test*) is running on a Macintosh computer that is connected to the scanner and one of the self-test functions fails, a dialog box displays on the monitor screen and indicates what part of the self-test failed.

If you run the self-test when the scanner is not connected to a Macintosh computer running *AppleScan*, *ScanTest*, or *Scan8Test*, you will not obtain results for the test.

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## □ SYMPTOM / CURE CHART

Problems	Solutions
<ul style="list-style-type: none"><li>• <i>Power lamp not on; machine dead</i></li></ul>	<ol style="list-style-type: none"><li>1. Check that the power cord is plugged in.</li><li>2. Check that the light assembly access door is closed and turned fully clockwise.</li><li>3. Check for correct setting of the voltage selector (on universal models).</li><li>4. Check the interlock switch with a multimeter and replace if the switch is not opening and closing when depressed.</li><li>5. Check fuses FU1, FU2, and FU3 on the power supply board and replace any that are blown.</li><li>6. (4-bit scanner only) Check fuse 1 on the main logic board. Replace the fuse if it is bad.</li><li>7. Replace the main logic board.</li><li>8. Replace the power supply.</li><li>9. Replace the transformer.</li></ol>
<ul style="list-style-type: none"><li>• <i>Optical assembly does not move</i></li></ul>	<ol style="list-style-type: none"><li>1. Check for damage or foreign matter on the belt, and clean or replace the belt if necessary.</li><li>2. Check the belt tension. The belt should be tight with no slack. Correct the tension if necessary.</li><li>3. Check the gears for damage or buildup of foreign material, and remove the blockage or replace the gears as necessary.</li></ol>
<ul style="list-style-type: none"><li>• <i>Optical assembly moves once, then does not move</i></li></ul>	<ul style="list-style-type: none"><li>– Check the limit switch for continuity, and replace if necessary.</li></ul>
<ul style="list-style-type: none"><li>• <i>System does not boot or locks up during transfer of data over the SCSI bus</i></li></ul>	<ul style="list-style-type: none"><li>– (4-bit scanner only) Perform the "Main Logic Board Modification" described in Section 5, Additional Procedures.</li></ul>
<ul style="list-style-type: none"><li>• <i>AppleScan program crashes during middle of scanning operation, or computer hangs</i></li></ul>	<ol style="list-style-type: none"><li>1. Make sure you have the latest version of <i>AppleScan</i>.</li><li>2. Replace the power supply PCB.</li><li>3. Replace the main logic board.</li></ol>

- *Fluorescent lamp won't light or is dim*
  1. Check that the lamp holder connector is secure.
  2. Check that the label of the fluorescent lamp faces down (into the lamp holder); if not, rotate the lamp.
  3. Replace the lamp.
  4. Check the flexible cable from the optical unit for damage, and replace the cable if necessary. Check the continuity of the cable with an ohmmeter; replace the cable if any wires are broken.
  5. Replace the inverter (or optical head).
  
- *Scan command not executed*
  1. Check for secure connection of cable from host computer.
  2. Reset the SCSI select switch on the scanner to a device number not used. (Factory preset at 2.) Do not use 7 or 8.
  3. Verify that the SCSI cable is terminated correctly.
  4. (4-bit scanner only) Check the fuse on the main logic board. Replace the fuse if it is bad.
  5. Replace the main logic board.
  
- *Image not clean; dark or light spots*
  1. Clean the glass (see "Preventive Maintenance" in the Basics section).
  2. If the contrast or threshold in the *AppleScan* program is set too high or low, adjust the program settings.
  3. Replace the lamp.
  4. Replace the main logic board.
  5. Replace the optical assembly.
  
- *Scanning performed, but image is not sent to host computer*
  1. Check for loose or damaged interface connector, and repair or replace as necessary.
  2. Replace the optical assembly.
  3. Check the fuse on the main logic board. Replace the fuse if it is blown.
  4. Replace the main logic board.
  
- *Incorrect image on host screen*
  - Use the test chart. If image is incorrect, clean the glass first; if cleaning does not help, change the optical assembly.

# Apple Scanner

## Section 5 – Additional Procedures

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### □ CONTENTS

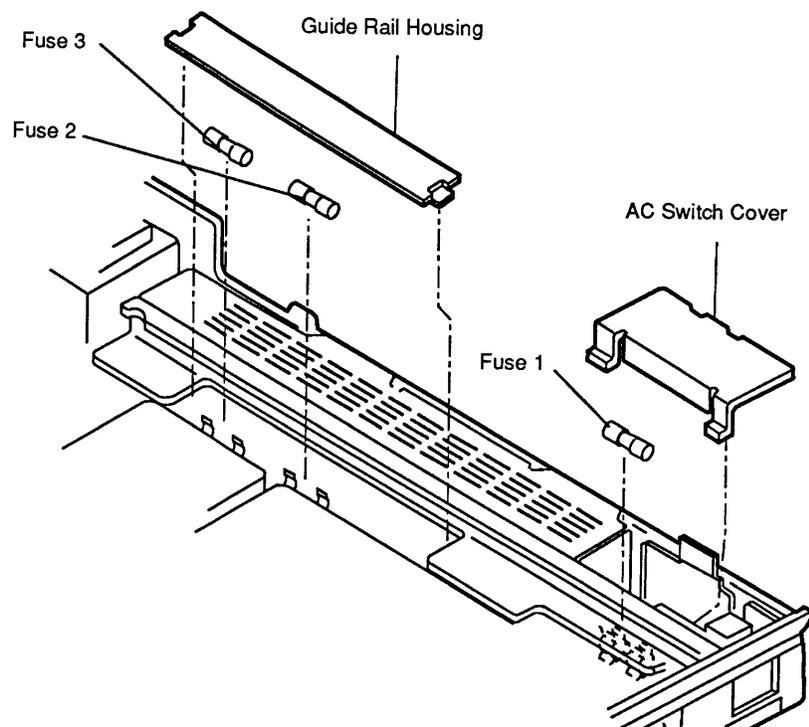
- 5.2 Power Supply Fuses
- 5.3 Main Logic Board Fuse
- 5.4 Selecting Correct Voltage
- 5.5 Bulb Replacement
  - 5.5 Remove the Bulb Assembly
  - 5.6 Install the Fluorescent Bulb
  - 5.7 Replace the Bulb Assembly
- 5.8 Voltage Conversion
  - 5.8 Comparison
  - 5.9 110 Volt to Universal
  - 5.9 Universal to 110 Volt
- 5.10 Main Logic Board Modification

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## □ POWER SUPPLY FUSES

### Remove

1. Make sure power is switched off, and remove the power cord.
2. Remove the lid and the case top.
3. **Figure 5-1.** Remove the left guide rail housing from the guide rail by pulling up on the center of the housing with your forefinger. This exposes fuses 2 and 3 on the power supply.
4. **Figure 5-1.** Remove the AC switch cover by squeezing on the inside part of the housing and lifting it out from the rail guide. This exposes fuse 1 on the power supply.



**Figure 5-1 Power Supply Fuses**

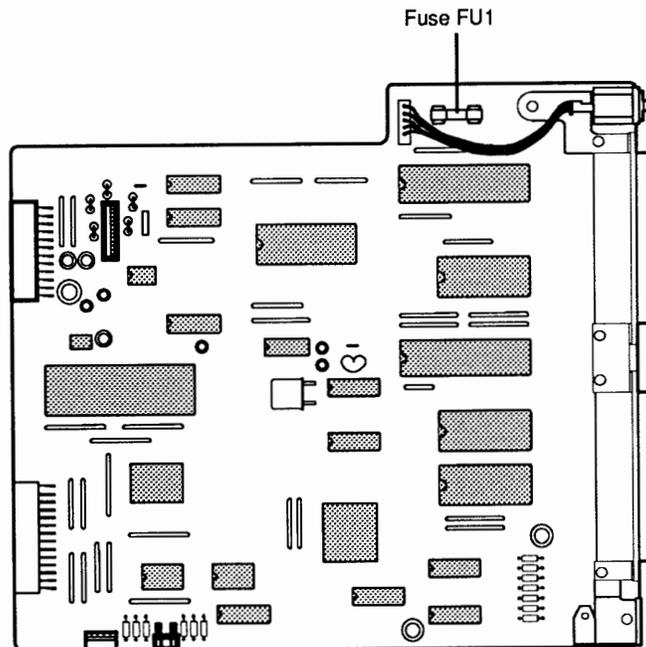
5. **Figure 5-1.** To remove a fuse, use a fuse removal tool or carefully pry up one end of the fuse with a small flat-blade screwdriver. Pull the fuse out.

## □ MAIN LOGIC BOARD FUSE

**Note:** This procedure applies only to the 4-bit scanner. The main logic board on the 8-bit scanner is totally encased in a metal shield. Do not open this shield.

### Replace

1. Remove the main logic board.
2. **Figure 5-2.** Locate the main logic board fuse (FU1). Remove the fuse with a fuse removal tool or carefully pry up one end of the fuse with a small screwdriver.



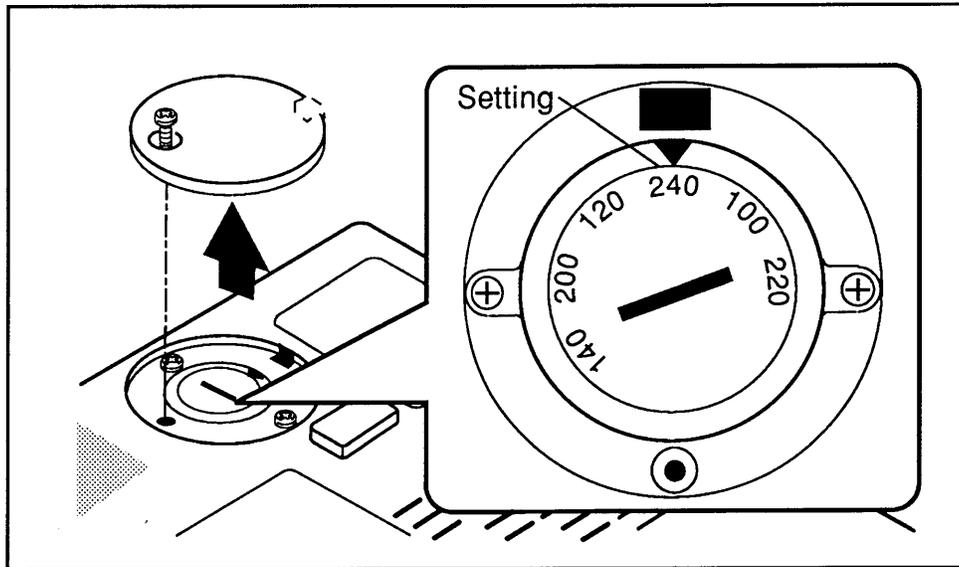
**Figure 5-2 Main Logic Board Fuse on 4-Bit Scanner**

3. Test the fuse with an ohmmeter as follows:
  - a) Set the meter to the times-1 scale or to the continuity range if the meter has one.
  - b) Put the leads across the fuse. If the meter reads *short* (zero on the scale, or the continuity beeper sounds), the fuse is good. If the meter reads *open* or the continuity beeper does not sound, the fuse is bad.
4. Replace the fuse if defective (see specifications or owner's manual for correct fuse replacement).

## □ SELECTING CORRECT VOLTAGE

To change the incoming voltage selector (on units supplied with universal selector switch):

1. Turn the scanner upside down and locate the cover plate on the bottom of the scanner.



**Figure 5-3 Voltage Selection**

2. **Figure 5-3.** Remove the Phillips screw and remove the cover plate.
3. Using a large flat-blade screwdriver or a coin, turn the voltage selector to match the correct incoming voltage.
4. Using the screw, reinstall the cover plate.

## □ BULB REPLACEMENT

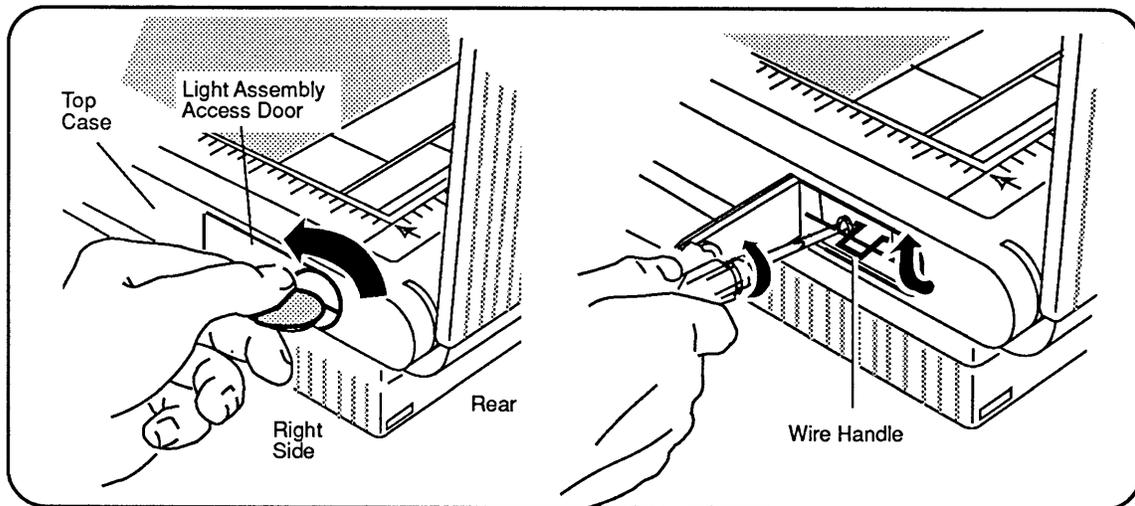
### Remove the Bulb Assembly

Follow the instructions below to remove the bulb without removing the case top.

1. Raise the lid to the vertical position.
2. Make sure the optical block (under the glass) is in the home position (the position closest to the back of the scanner). You can do this by powering on the scanner; the scanner will set the optical block to the home position.

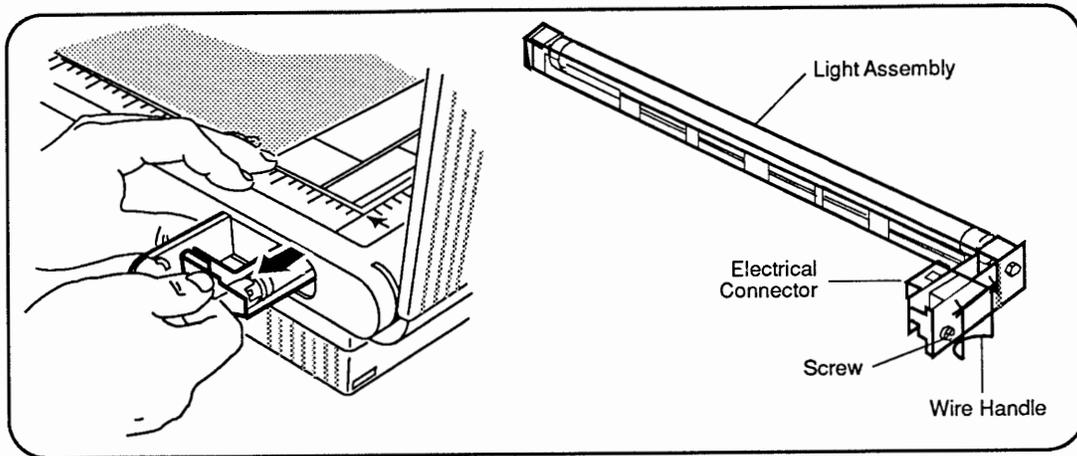
**Note:** The side door on the right side of the scanner must be closed and the latch must be fully locked (turned clockwise) for the scanner to power on and the optical block to reset to the home position. The latch activates an interlock switch. As soon as the latch is unscrewed (to the left), the interlock switch deactivates and the scanner will not power on.

3. **Figure 5-4A.** Using a large flat-blade screwdriver or a coin, unscrew (counterclockwise) the latch on the side door on the right side of the scanner.



**Figure 5-4 Removing the Bulb Assembly**

4. **Figure 5-4B.** Once the side door is opened, use a Phillips screwdriver to loosen the screw that holds the light bulb assembly to the optical block. (The screw does not come out.)



**Figure 5-5 Removing the Bulb Assembly**

5. **Figure 5-5.** Grasp the wire handle and gently pull the bulb assembly from the optical block. (If the bulb assembly offers resistance, it is possible that the screw is not loose enough. Try loosening the screw farther and pulling on the hook at the same time.)

---

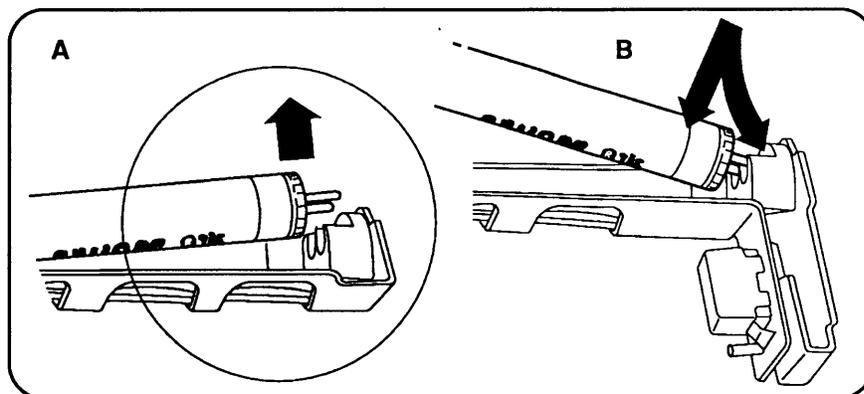
**WARNING:** When replacing the fluorescent bulb, do not pull or pry the bulb anywhere on the glass area. The glass can shatter and cause serious injury.

---

### Install the Fluorescent Bulb

1. **Figure 5-6A.** Using a flat-blade screwdriver, carefully pry, on the metal ends only, one side of the fluorescent bulb until the two pins disengage from the socket.
2. Once one side of the bulb is loose, disengage the other side using the same method.
3. **Figure 5-6B.** To insert the new bulb, position the bulb so that the printing on the bulb faces down, or into, the holder. Then align the two pins on each end with the sockets on the bulb holder and press each end in, using firm but steady pressure. Do not press on the glass area of the bulb; the bulb can break and injure you.

**Note:** If the bulb has fingerprints on the glass, wipe the glass with a dry soft cloth before inserting the bulb in the assembly. Do not touch the glass again.



**Figure 5-6 Removing the Florescent Bulb**

#### **Replace the Bulb Assembly**

After the bulb has been replaced in the bulb assembly, replace the assembly into the optical block.

1. Insert the bulb assembly through the side door and make sure that the bottom frame of the bulb assembly fits into the groove slots on the optical block.
2. Push the assembly all the way in until the electrical connector makes contact with the socket on the optical block and the screw is lined up with the screw hole on the optical block.
3. Tighten the Phillips screw. (Tightening also draws the two connectors together.) If the assembly does not seem to be drawing into the optical block and the screw doesn't seem to be getting tighter, you may have to pull the assembly partly out and push it in again to reseat it.
4. Close the side door and turn the latch clockwise until the latch is fully tightened.
5. Turn the scanner on and make sure it activates to the home position. If it does not, then it is possible that the side door latch is not turned all the way to the right, thus deactivating the interlock switch.

---

## □ VOLTAGE CONVERSION

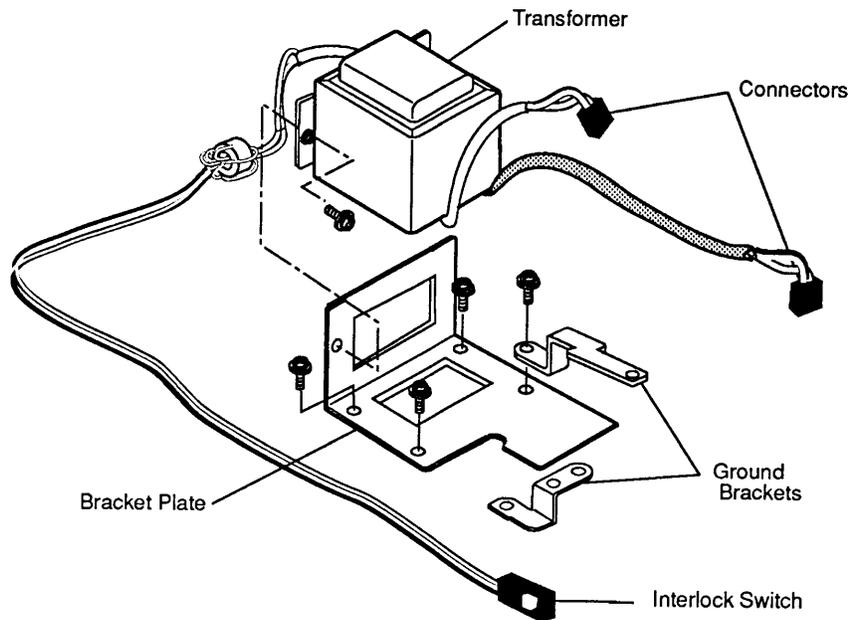
To convert a 110-volt scanner to a universal-voltage model, you must replace the 110-volt transformer assembly with the universal transformer assembly.

### Materials Required

Flat-blade screwdriver  
Phillips screwdriver  
Universal transformer assembly

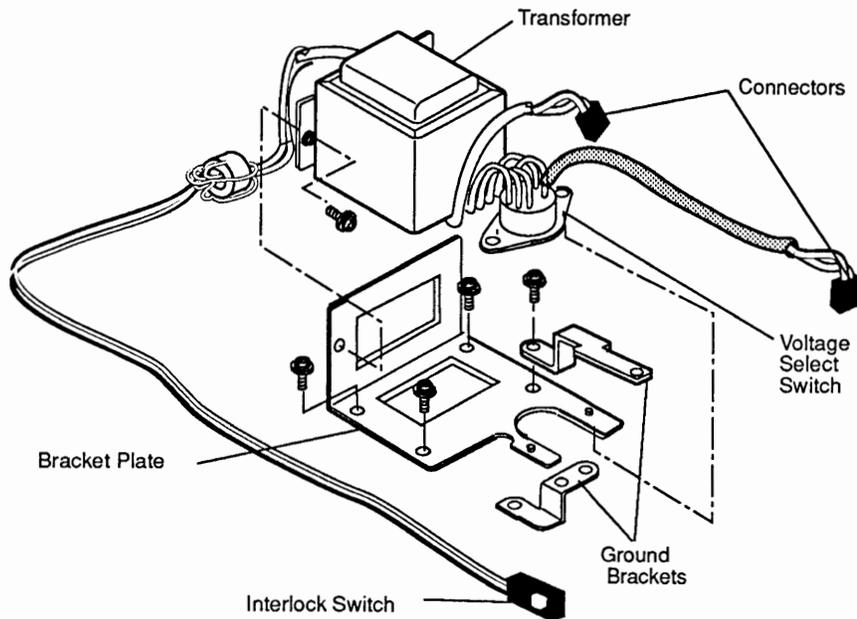
### Comparison

**Figure 5-7** shows the 110-volt version of the transformer assembly. The assembly consists of the transformer, the bracket plate, the attached connectors, the attached interlock switch, and two ground brackets.



**Figure 5-7 110-Volt Transformer Assembly**

**Figure 5-8** shows the universal transformer assembly. The assembly includes the transformer, the bracket plate (notice the cutout for the voltage selector switch), the attached connectors, the interlock switch, the voltage selector switch, and two ground brackets.



**Figure 5-8 Universal Transformer Assembly**

After installing the universal assembly, you must set the voltage selector switch to the correct input voltage.

**110 Volt  
to Universal**

To convert from the 110-volt version to a universal-voltage model, follow the procedure in "Transformer," in the Take-Apart section. Then set the voltage selector switch to the correct input voltage.

**Universal  
to 110 Volt**

You do not need to change any hardware; just change the voltage selector switch to the correct input voltage.

---

## □ MAIN LOGIC BOARD MODIFICATION

**Note:** This procedure applies only to the 4-bit scanner. The main logic board on the 8-bit scanner is encased in a metal shield. Do not open this shield.

When an Apple Scanner is connected to a Macintosh SE/30, Macintosh Iix, or Macintosh IICx in combination with other SCSI devices (such as internal or external hard disks or the AppleCD SC), the following intermittent system problems may occur:

- The system will not boot.
- The system locks during transfer of data over the SCSI bus.

These system problems are the result of a scanner SCSI bus timing error caused by three capacitors on the main logic board. Removing the capacitors from the board eliminates the timing problem and has no effect on the scanner's performance. To remove the capacitors from the main logic board, perform the procedure described below.

### Materials Required

Medium Phillips screwdriver  
Small needlenose pliers  
Small diagonal cutters

## Procedure

1. Remove the main logic board.
2. Place the main logic board on a grounded workbench pad and put on your grounding wriststrap.
3. **Figure 5-9.** Locate the three capacitors at locations CA4, CA5, and CA6 on the main logic board, next to the SCSI connector at CN6.

---

**CAUTION:** *When removing the capacitors, be careful not to touch other components on the main logic board.*

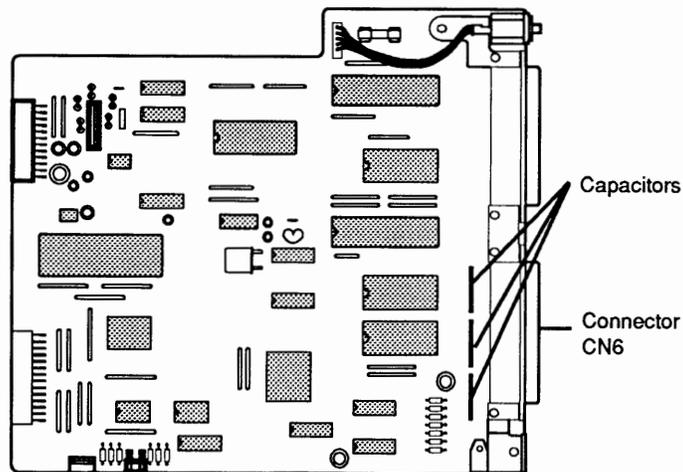
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4. Using your fingers or needlenose pliers, remove the three capacitors from the main logic board. Grasp each capacitor gently and bend back and forth until the connector pins are loose. Break or pull the capacitor off the board.

---

**CAUTION:** *Be careful not to break the capacitor by grasping it too tightly.*

---



**Figure 5-9 Main Logic Board (4-Bit Scanner)**

5. Using the small diagonal cutters, trim off any remaining capacitor pins.
6. Inspect and remove any debris from the board.
7. Replace the main logic board.

# Apple Scanner

## Illustrated Parts List

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- IPL.3 Miscellaneous Hardware Kit
- IPL.5 Parts Location (Figure 1)
- IPL.7 Cover Assembly (Figure 2)
- IPL.9 Carrier Assembly (Figure 3)
- IPL.11 Optical Assembly (Figure 4)
- IPL.13 Cables, Power Supplies, and Logic Boards  
(Figure 5)

**Note:** The figures and lists in this section include all piece parts that can be purchased separately from Apple for the Apple Scanner, along with their part numbers. These are the only parts available from Apple. Refer to your *Apple Service Programs* manual for prices.

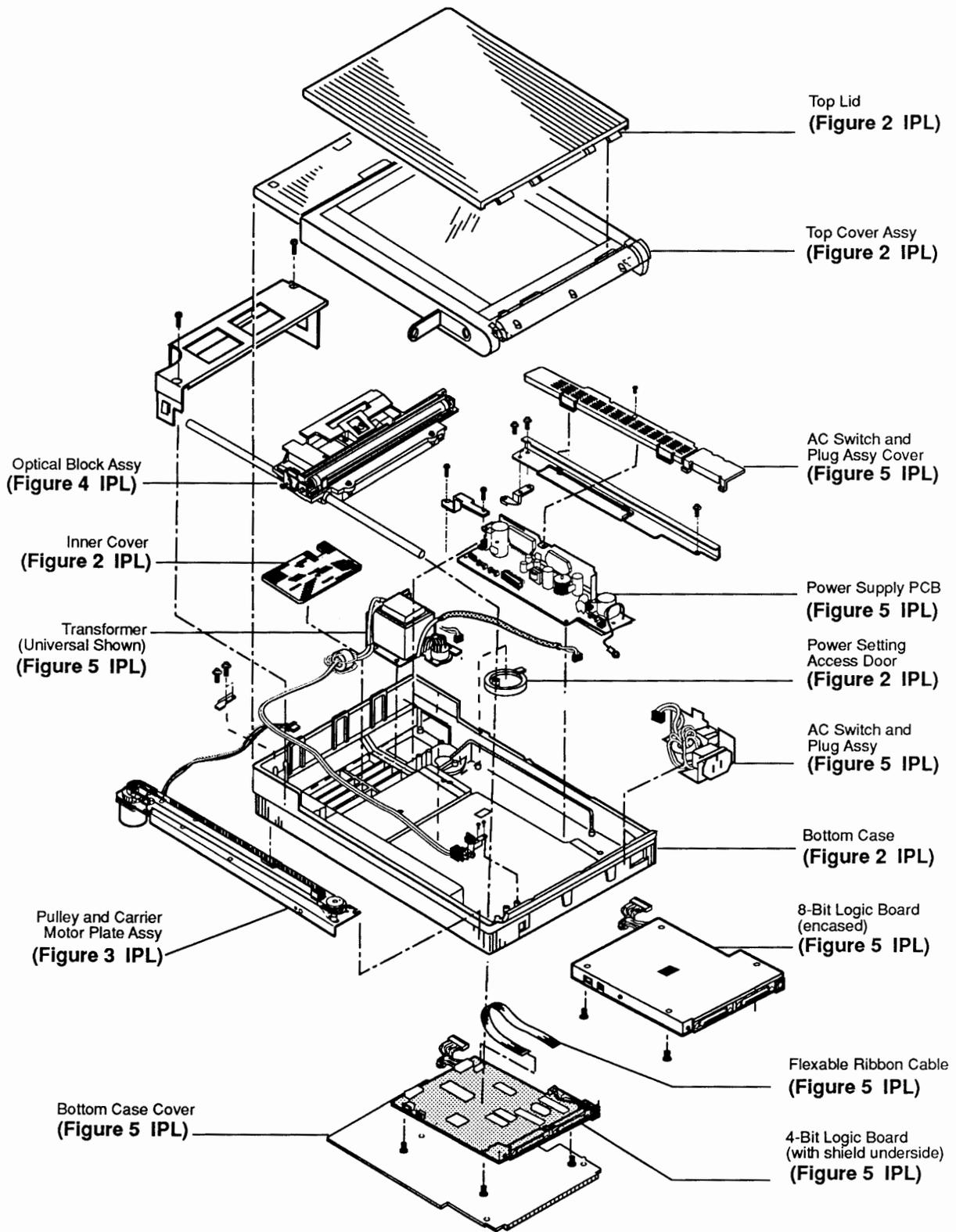
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## □ MISCELLANEOUS HARDWARE KIT

<u>Part No.</u>	<u>Description</u>
076-0289	Miscellaneous Hardware Kit

The following piece parts are available in the Miscellaneous Hardware Kit:

<u>Part No.</u>	<u>Description</u>	<u>See Figure No.</u>
076-0277	Pan Head Screw 3 x 15 (10/pk)	Figure 2
076-0286	Screw 2, Cover (10/pk)	Figures 2 and 5
076-0273	Rubber Foot (10/pk)	Figure 2
076-0301	Tapping Screw 3 x 8 (10/pk)	Figures 2 and 5
076-0298	Ribbon Cable Holder, 4-bit (5/pk)	Figure 2
076-0272	Button Lamp Lock (5/pk)	Figure 2
076-0312	Belt Tension Spring (10/pk)	Figure 3
076-0292	Double Sems Screw 3 x 10 (20/pk)	Figure 4
076-0313	Carrier Stopper (10/pk)	Figure 4
076-0283	Fuse, 2 A, 250 V (10/pk)	Figure 5
076-0293	Double Sems Screw 3 x 6 (10/pk)	Figure 5
076-0284	Fuse, 1 A, 250 V (10/pk)	Figure 5
076-0285	Fuse, 3 A, 250 V (10/pk)	Figure 5
076-0294	Sems Screw 4 x 6 (10/pk)	Figure 5
076-0325	Double Sems Screw 4 x 8 (10/pk)	Figure 5

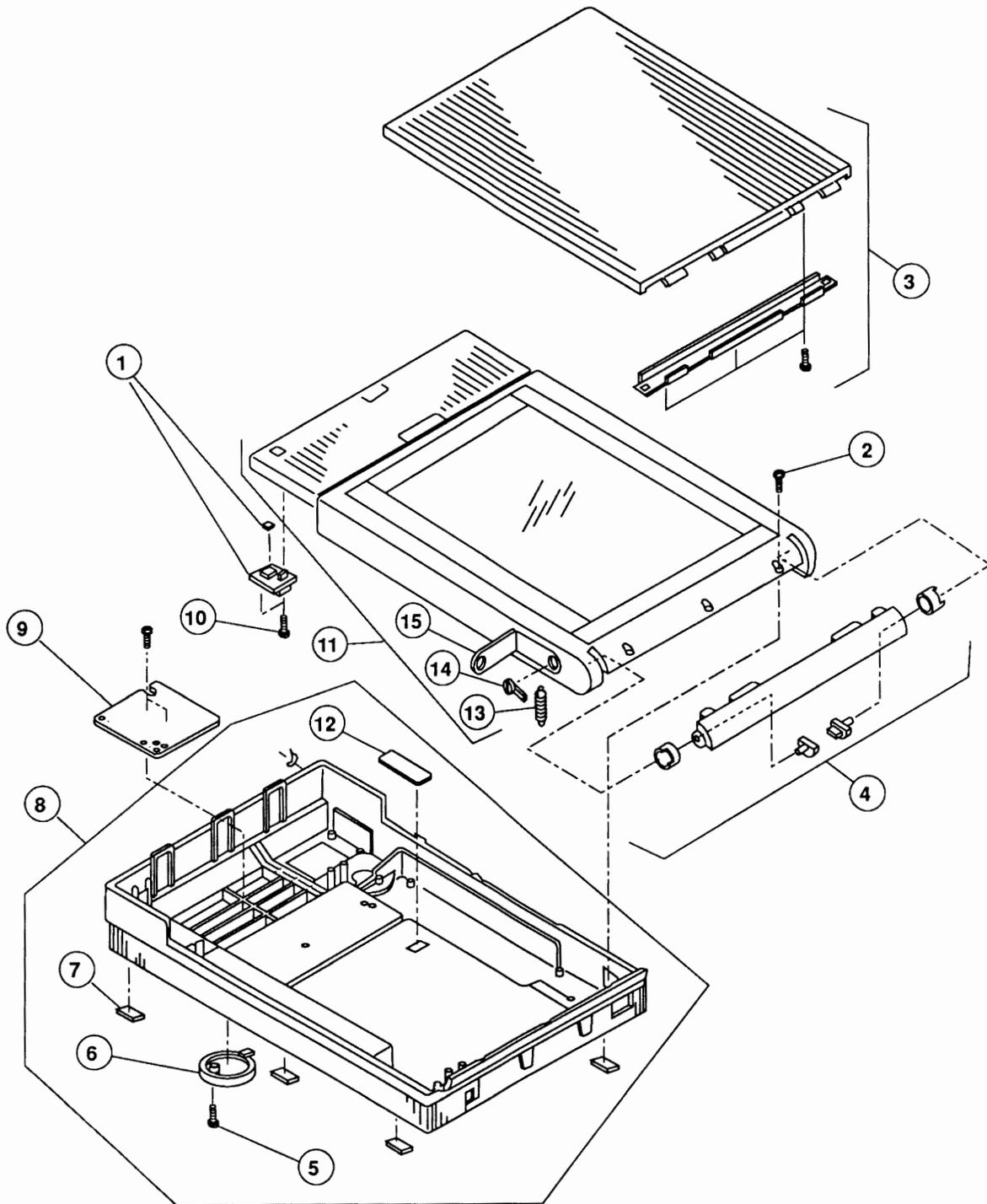


**Figure 1 Parts Location**

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**□ PARTS LOCATION (Figure 1)**

<u>Description</u>	<u>See Figure No.</u>
Lid	Figure 2
Top Cover Assembly	Figure 2
AC Switch and Plug Assembly Cover	Figure 5
Power Supply PCB	Figure 5
Power Setting Access Door	Figure 2
AC Switch and Plug Assembly	Figure 5
Bottom Case	Figure 2
Main Logic Board	Figure 5
Cable, Optical Assy to Main Logic Board	Figure 4
Bottom Case Cover	Figure 5
Pulley and Carrier Motor Assembly	Figure 3
Transformer	Figure 5
Inner Cover	Figure 2
Optical Assembly	Figure 4

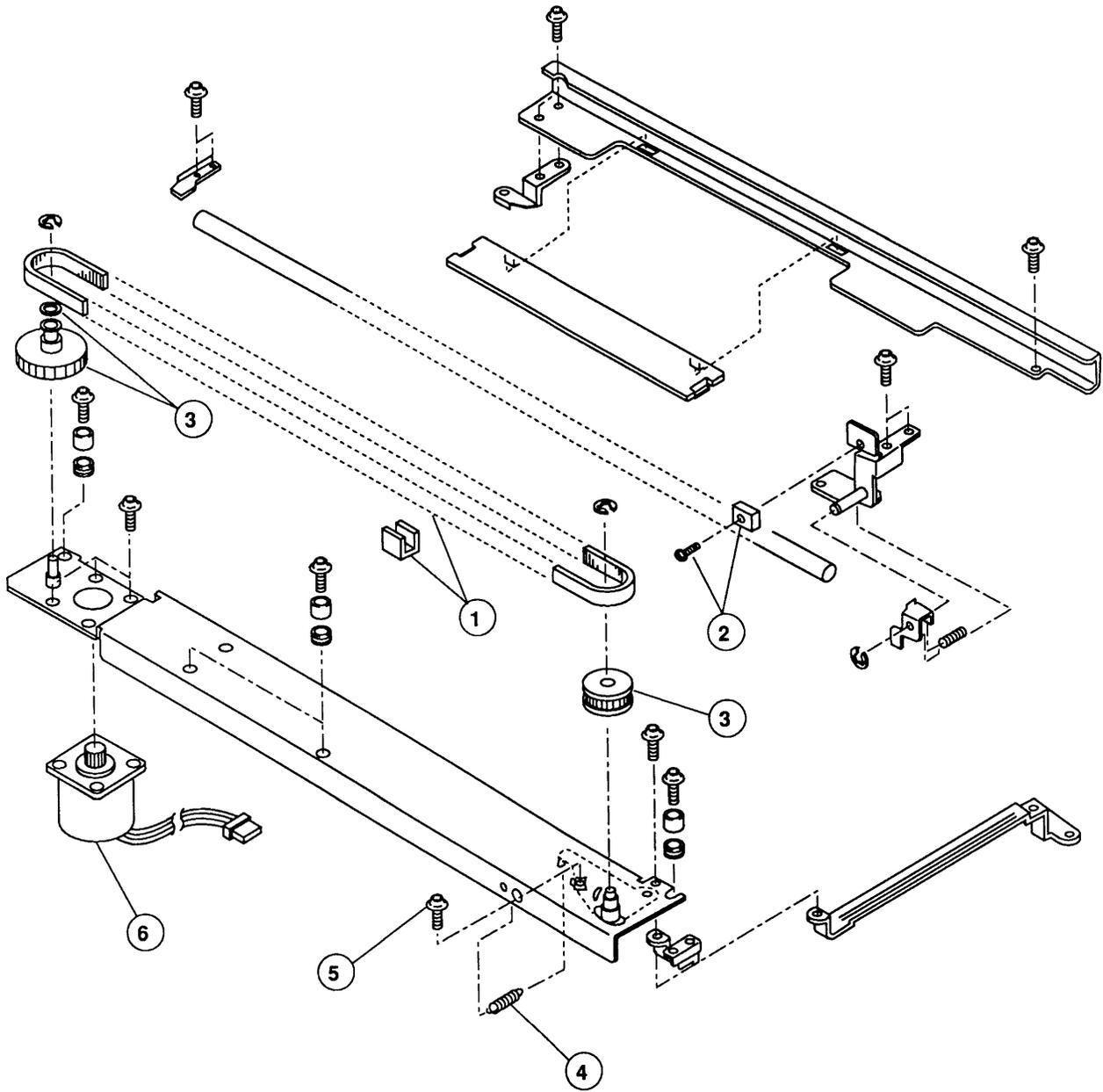


**Figure 2 Cover Assembly**

---

**□ COVER ASSEMBLY (Figure 2)**

<u>Item</u>	<u>Part No.</u>	<u>Description</u>
1	076-0278	Start Scan PCB Assembly
2	076-0277	Screw, Pan Head, 3 x 15 (10/pk)
3	949-0210	Lid
4	076-0275	Lid Hinge Assembly
5	076-0286	Cover Screw 2 (10/pk)
6	949-0209	Cover Switch (10/pk)
7	076-0273	Rubber Foot (10/pk)
8	949-0208	Bottom Case Assembly (4-bit scanner)
-	949-0315	Bottom Case Assembly (8-bit scanner)
9	949-0226	Interior Cover
10	076-0301	Tapping Screw 3 x 8 (10/pk)
11	949-0206	Top Case Assembly with Glass
12	076-0298	Ribbon Cable Holder (5/pk) (4-bit scanner)
13	076-0322	Slide Spring (10/pk)
14	076-0272	Lamp Lock Button (5/pk)
15	076-0314	Lamp Cover (5/pk)



**Figure 3 Carrier Assembly**

---

□ **CARRIER ASSEMBLY (Figure 3)**

<u>Item</u>	<u>Part No.</u>	<u>Description</u>
1	076-0323	Drive Belt Assembly
2	076-0291	Limit Assembly Switch
3	076-0290	Carrier Block, Gears/Pulleys (5/pk)
4	076-0312	Belt Tension Spring (10/pk)
5	076-0293	Double Sems Screw 3 x 6 (10/pk)
6	959-0037	Carrier Motor Assembly

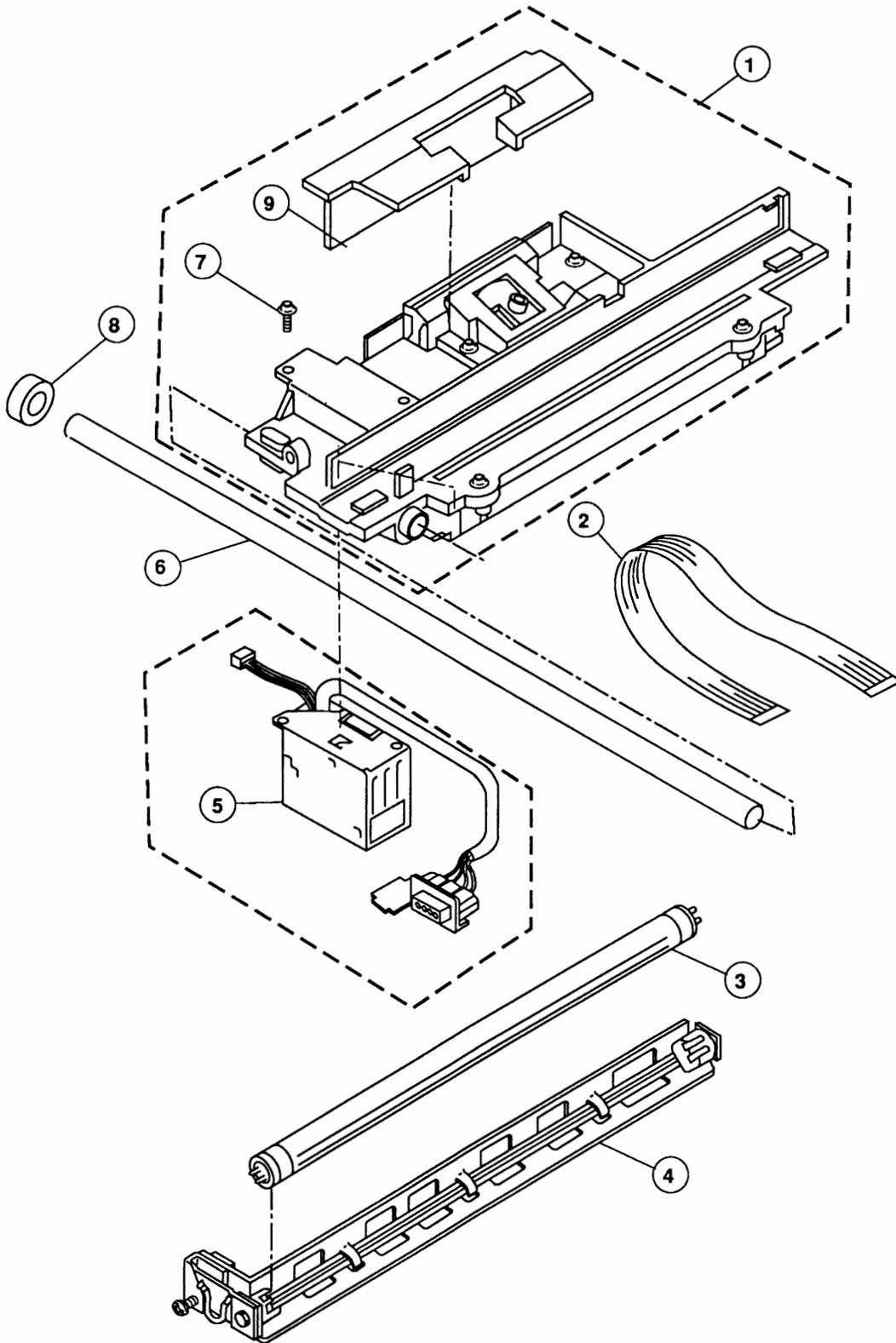


Figure 4 Optical Assembly

---

**□ OPTICAL ASSEMBLY (Figure 4)**

<u>Item</u>	<u>Part No.</u>	<u>Description</u>
1	661-0449	Optical Assembly (4-bit scanner)
	661-0634	Optical Assembly (8-bit scanner)
2	936-0043	Cable, Optical Assembly to Main Logic Board (4-bit scanner)
-	590-0525	Cable, Optical Assembly to Main Logic Board (8-bit scanner)
3	938-0005	Lamp
4	983-0008	Lamp Holder
5	076-0280	Inverter Assembly
6	699-0514	Optical Assembly Shaft
7	076-0292	Double Sems Screw 3 x 10 (20/pk)
8	076-0313	Carrier Stopper (10/pk)
9	949-0211	CCD PCB Cover

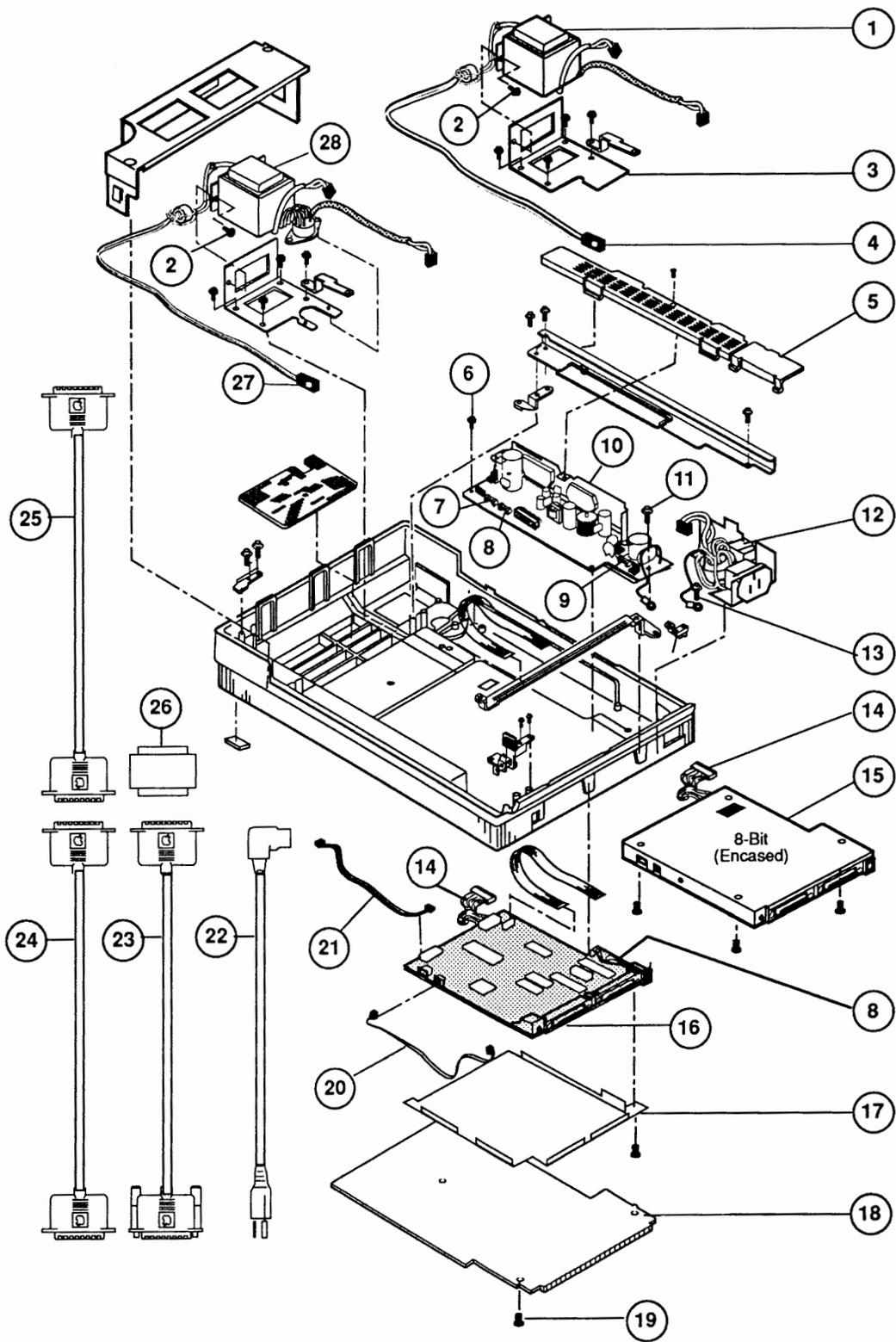


Figure 5 Cables, Power Supplies, and Logic Boards

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**□ CABLES, POWER SUPPLIES, AND LOGIC BOARDS (Figure 5)**

<u>Item</u>	<u>Part No.</u>	<u>Description</u>
1	915-0039	Transformer Assembly, 100/240 V
2	076-0325	Double Sems Screw, 4 x 8 (10/pk)
3	948-0134	Transformer Bracket, 100/240 V
4	076-0315	Cover Interlock Switch, 220/240 V
5	949-0214	AC Switch Cover
6	076-0301	Tapping Screw 3 x 8 (10/pk)
7	076-0285	Fuse, 3 A, 250 V (10/pk)
8	076-0283	Fuse, 1 A, 250 V (10/pk)
9	076-0284	Fuse, 2 A, 250 V (10/pk)
10	661-0431	Power Supply Board
11	076-0293	Double Sems Screw 3 x 6 (10/pk)
12	937-0032	AC Switch Assembly
13	076-0294	Sems Screw 4 x 6 (10/pk)
14	936-0047	Cable, Power Supply Board to Main Logic Board
15	661-0635	Main Logic Board (8-bit scanner)
16	661-0534	Main Logic Board—Rev. B (4-bit scanner)
17	948-0128	Shield, Main Logic Board (4-bit scanner)
18	948-0037	Cover, Main Logic Board
19	076-0286	Cover Screw 2 (10/pk)
20	936-0045	Cable, Limit Switch Assembly
21	936-0044	Cable, Scan Switch Assembly
22	590-0380	AC Power Cord, Smoke, 110 V
23	658-8031	System Cable
24	658-8033	Extender Cable
25	658-8034	Peripheral Interface Cable
26	658-8032	Terminator
27	076-0300	Cover Interlock Switch, 110 V
28	915-0038	Transformer Assembly, 110 V

# StyleWriter

## Technical Procedures

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- 3.8 Reseating the Right-Margin Sensor

**Illustrated  
Parts List**

- IPL.3 Exploded View (Figure 1)

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# StyleWriter

## Section 1 – Basics

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## □ INTRODUCTION

### Features

The StyleWriter® printer, which is compatible with all Macintosh® computers (except the Macintosh 128K, 512K and XL), is designed with thermal ink jet technology. The features of this new, low-cost printer for the Macintosh family are listed below.

### *Ink Jet Technology*

Ink jet technology utilizes a disposable print cartridge that contains the ink jet print head and ink. The contact points between the cartridge and the cartridge carrier on the printer frame assembly transmits the information to the ink jets and controls their outflow of ink. The quick-drying black ink and the printer's high resolution (360 dots per inch) provide a fine quality printed output. The ink cartridge can print up to 500 pages.

### *Two Print Methods*

From the print menu, the user chooses one of two print qualities:

- **Best** – about 1/3 page per minute with 360 dots per inch
- **Faster** – about 2/3 page per minute with 180 dots per inch; includes an ink-saving mode

The actual speed depends upon the complexity of the images on the page—graphics, especially complex ones, take longer to print than text.

### *Background Printing*

Revision B of the StyleWriter offers background printing to allow you to use your computer while printing.

### *TrueType Fonts*

The StyleWriter requires TrueType™ fonts for high-quality printouts. The installation disks that come with the printer include the fonts, which the user installs on the computer that he or she will use with the StyleWriter.

TrueType fonts require a Macintosh computer with system software 6.0.7 (or higher). The StyleWriter TrueType fonts include Times®, Helvetica®, and Courier (with plain, italic, bold, and bold italic styles available), plus the Symbol font, which is useful in writing mathematical and scientific notations. TrueType fonts are "scalable" or "outline" fonts.

Each font contains detailed coordinate information that enables the computer system to scale the font to any size. The user does not have to install different sizes of the font—it's "one size fits all."

The StyleWriter printer can also use fixed-size ("bitmapped") fonts; if there is a bitmapped font with the same name as a TrueType font installed on the system, the printer defaults to the TrueType font.

### ***Cut Sheet Feeder***

The cut sheet feeder attaches to the printer to automatically feed a cut sheet from the tray to the printer. Up to 50 sheets (of 20 lb paper) can be placed on the tray. (Single sheets may be fed into the printer manually through the front feed slot. Envelopes, labels, and transparencies must be fed manually through the rear feed slot.)

### ***Built-in Diagnostics***

The printer has a built-in self-diagnostic function to analyze logic and hardware failures. The status lights indicate the results. The printer also performs test prints when directed to do so. The diagnostic tests and prints are:

- Power-up Logic Test – Checks circuitry on the logic board. This test runs automatically after power-up.
- Serial Loopback Test – Checks the serial interface circuitry. The servicing technician initiates this test.
- User Test Print – Provides a visual aid for diagnosing print quality. The user initiates this print.
- Technician Print Quality Test Print – Provides a detailed and calibrated visual aid for diagnosing print quality. The servicing technician initiates this print.

(See "Power-On, Self-Tests, and Test Prints," later in Basics, for instructions on performing the serial loopback test and the test prints.)

## □ SPECIFICATIONS

Printing Method	On-demand serial thermal ink jet: Replaceable ink cartridge, which contains the print head with 64 ink jet nozzles. Cartridge contains approx. 20 grams (0.9 oz.) of black ink.
Cartridge Capacity	Prints up to 500 pages
Print Resolution	360 dpi (dots per inch) in Best mode 180 dpi in Faster mode
Printing Speed	1/3 page per minute in Best mode 1/2 page per minute in Faster mode (actual speed depends on images printed)
Line Feed Speed	200 milliseconds/line at 1/6" line
Printing Direction	Unidirectional in Best mode Bidirectional in Faster mode
Image Utility	Allows conversion of 300 dpi halftone images (PICT format) for printing at 360 dpi
Printing Characters (not part of printer, but provided on installation disks for the computer)	TrueType font families: Times (plain, bold, italic, bold italic) Helvetica (plain, bold, italic, bold italic) Courier (plain, bold, italic, bold italic) Symbol (supports additional TrueType fonts from Apple and other suppliers; also supports bitmapped fonts)
Printer RAM	64K (8K used for buffer)
Input Buffer	8K
Interface	Apple-style RS-422/RS-423 asynchronous serial (1 start bit, 8 data bits, 1 stop bit), 57.6K baud
Acoustic Noise Level	Under 50 dB(A) from operator position

Paper Feed Method	Manual: Front feed for single or heavy (24 lb) sheets; Rear feed for labels, envelopes, & transparencies Automatic: Cut sheet feeder (up to 50 sheets)
Paper Capacity	Cut sheet feeder tray: 50 cut sheet input (20 lb paper) Output tray: 25 cut sheet output
Print Width & Height	Maximum printable line: 203.2 mm (8.0 inches) Minimum top & bottom margins: 6.35 mm (0.25 inch) Minimum left & right margins: 6.35 mm (0.25 inch)
Paper Sizes (printable area)	US letter: 8" x 10.5" Legal: 8" x 13.5" A4: 98 mm x 285 mm (7.8" x 11.2") #10 envelope: 8" x 3.6"
Paper Specifications	Weight: 16 lb (52 g/m <sup>2</sup> ) to 24 lb (90 g/m <sup>2</sup> ) Recommended: 20 lb (75 g/m <sup>2</sup> ); Thickness: 0.2 mm max. Accepts most letterhead and colored stock and medium-weight photocopier transparencies & labels (Recommended: 3M™ CG3480 transparency film)
Operating Environment	Temperature: 15°C to 30°C (59°F to 86°F) Humidity: 20% to 70% RH, noncondensing (Keep printer away from wind, fans, and heat)
Power Supply	AC adapter delivering 9.5 VDC
Input Electrical Requirements	USA/Canada: AC 120 VAC 60 Hz Japan: AC 100 VAC 50/60 Hz UK/Australia: AC 240 VAC 50 Hz Europe: AC 220 VAC 50 Hz
Power Consumption	23 W maximum at 120 V 25 W maximum at 220 V
Physical Dimensions	Height with rod support installed: 32 cm (12.5 in.) Width: 33.6 cm (13.25 in.) Depth with output tray closed: 23 cm (9 in.) Weight with sheet feeder attached: 3.4 kg (7.5 lbs)

## □ PARTS IDENTIFICATION

**CAUTION:** StyleWriter exists in two revisions, A and B. Revision A and Revision B main logic board and printer frame modules are not interchangeable.

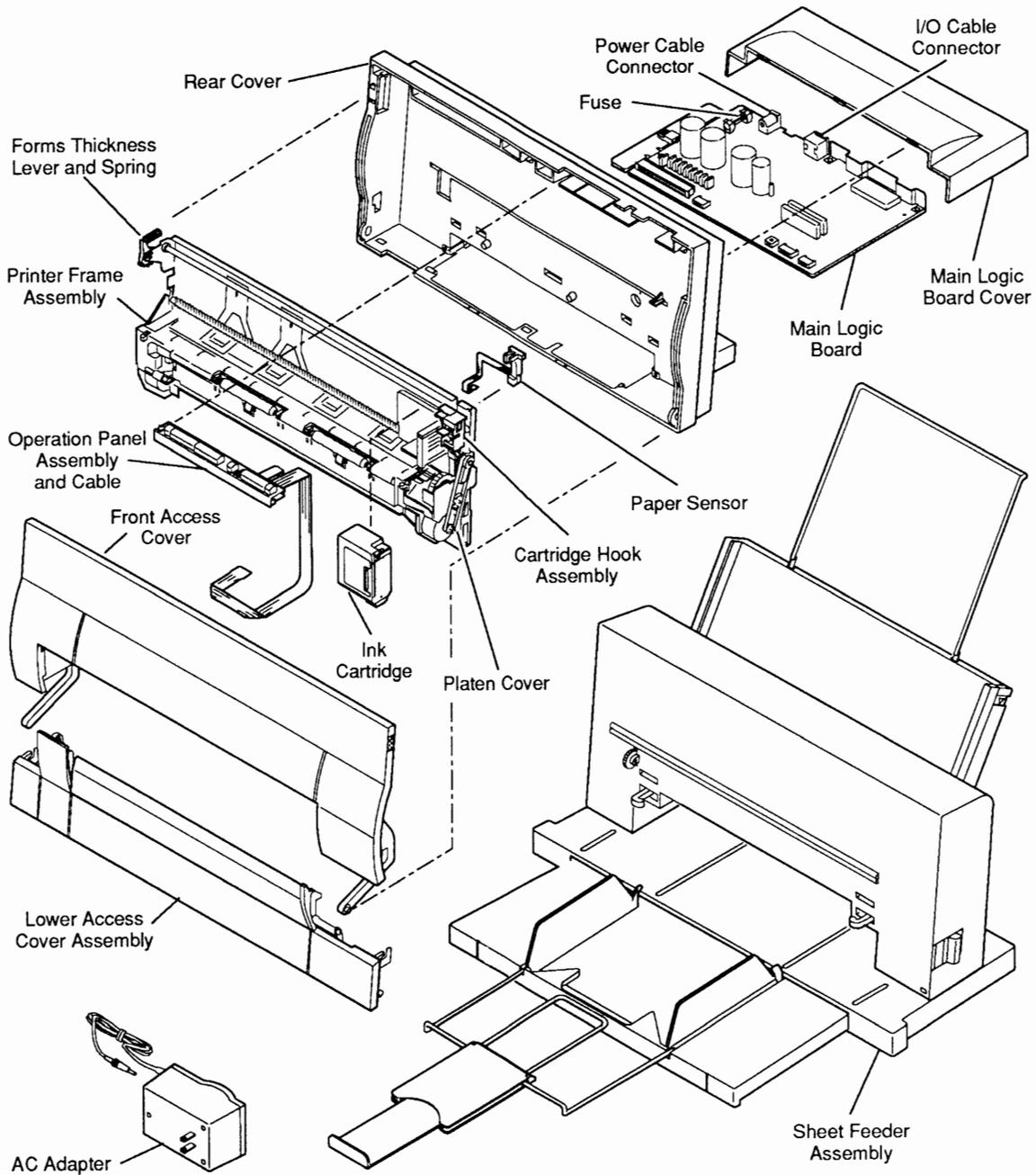


Figure 1-1 Major Modules and Assemblies

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## □ SUMMARY OF PARTS FUNCTIONS

Ink Cartridge	The replaceable ink cartridge contains the ink and the thermal jet print head with its 64 nozzles.
Logic Board	The logic board controls all the operations of the printer.
Printer Frame Assembly	<p>The printer frame contains all of the components necessary to move the carriage and the paper. The carriage holds the print head (in the ink cartridge) and moves it over the paper as printing progresses. The printer frame components are listed below:</p> <ul style="list-style-type: none"><li>• Cartridge carriage – Provides the mount for the ink cartridge and connects the ink cartridge electrical circuits to the logic board.</li><li>• Carriage motor – Moves the carriage horizontally along the carriage shaft and drives the purge unit.</li><li>• Cartridge hook assembly – Secures the ink cartridge to the carriage, and allows the user to remove and replace the ink cartridge.</li><li>• Forms thickness lever – Adjusts to accommodate paper thickness.</li><li>• Paper sensor – Detects when the paper has arrived in the proper position for printing. If the sensor detects no paper, the sensor sends a signal and the Error light on the operations panel turns on.</li></ul>
Operation Panel Assembly	The operation panel contains the control buttons and status lights, which enable the user to produce a test print, start and stop the printing process, and interpret error conditions.
AC Adapter	The AC adapter delivers 9.5 VDC power to the logic board. Different types of AC adapters are available to suit the voltages in different regions.
Cut Sheet Feeder	The cut sheet feeder attaches to the printer and feeds single-sheet paper automatically through the printer. The extendable output tray on the cut sheet feeder receives the pages as they come out of the printer and keeps them neatly stacked.

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## □ THEORY OF OPERATION

### Introduction

Troubleshooting Apple products can be approached in different ways; Apple usually recommends both logical troubleshooting and sequential module swapping (a trial-and-error approach). But random module swapping is not recommended for the StyleWriter printer because of the fragility of its parts. So, to troubleshoot this printer, use logical trouble-shooting to identify the defective module before you remove it. This section will help you understand how the StyleWriter printer works—so that you can more easily diagnose and repair problems.

### Print Cycle

When the user gives the Print command, the Macintosh sends a bitmap of each page through the serial connection to the printer. A bitmap is a dot-by-dot guide to each letter or image on the page. The bitmap is created in Quick-Draw™, the computer's internal graphics language. The StyleWriter printer reconstructs the bitmap and activates the ink cartridge nozzles to match the bitmap, dot for dot. The StyleWriter can address 360 dot positions per inch (130,000 dots per square inch), or about 10.7 million dot positions per page.

The following list describes the basic operation of the StyleWriter printer as a total unit, from the time the user initiates a print command. (Note that many of these operations occur simultaneously.)

1. The user gives the Print command to the computer, which sends a printer initialization command to the printer.
2. The printer checks for ready status: if no error condition is detected, the paper sensor checks for the presence of paper; if paper is present, the printer gives the computer a Ready signal.
3. The purge unit cleans the ink cartridge before printing begins (and once every minute during printing).
4. The computer sends a bitmap of each page through the serial connection to the printer logic board, where the bitmap is interpreted and sent to the print head via the logic board ribbon cable.

5. The sheet feed motor rotates the rollers to advance the paper one line at a time. The carriage motor moves the print head across the paper and transfers ink to the paper to reproduce the bitmap.
6. When the printing signals stop, the carriage motor takes the ink cartridge to its home position and activates the purge unit, which cleans and caps the ink cartridge nozzles.

The following sections explain in more detail how each system in the printer performs its function.

## Power Supply

The external power supply is an AC adapter with an attached power cord. This adapter provides 9.5 VDC to the logic board of the printer.

After passing through a 2.5-amp fuse and noise filter on the logic board, the 9.5 volts of DC input power goes to two DC/DC converters and a voltage regulator for generation of the required internal power supply voltages. This internal power supply area on the logic board provides:

- +5 VDC (Vcc) – Provides power for all the printer digital logic, including the CPU and the power-on reset IC. The Vcc also provides power for the power switch pull-up—even when the power is off (this power provision is necessary since the power switch must be read even when the power is off).
- +14 VDC (Vpp) – Supplies power to the carriage motor driver and paper feed motor. The Vpp reference voltage returns to the DC/DC converter IC, which regulates Vpp voltage.
- A heater voltage (VH) output – Operates the print head by supplying power to the SEG driver IC, the COM driver transistors, and the ink jet cartridge warm-up heater transistor. The exact VH voltage—+22.2 VDC, +23.0 VDC, +23.8 VDC, or +24.6 VDC—is selectable, based on the status of jumpers on the printhead itself. The voltage selection feature compensates for variances in manufacturers' tolerances for the cartridge. The DC/DC converter control IC determines which VH voltage to use, based on a reference voltage provided by the ink jet cartridge.
- -5 VDC (Vee) – Produces power for use in the interface IC.

## Main Logic Board

The main logic board is the heart of the printer. Besides distribution of the voltages, the logic board also handles the logic that controls the printer and creates the drive signals for the ink jet cartridge. All signals that affect the operation of the printer go to the logic board.

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***CAUTION:*** *StyleWriter exists in two revisions, A and B. Use the logic board designed for Revision A only with StyleWriter Revision A; use the logic board designed for Revision B only with StyleWriter Revision B.*

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The logic board has the following circuitry:

- ROM (Read-Only Memory) – The ROM contains all the CPU instructions necessary to operate the printer, including the built-in start-up and self-test routines.
- RAM (Random-Access Memory) – The two 64K X 4-bit DRAMs provide a 10K receive buffer, a two-line print buffer, and a work area.
- CPU (Central Processing Unit) – The 8-bit CPU operates the printer and has a 10 MHz clock. The CPU provides paper drive and head positioning signals and communicates with the printer controller ICs via a 20-bit address bus and an 8-bit data bus. The CPU reads head-positioning signals and monitors some switch functions and a temperature sensor.
- Printer Controller – The printer controller contains the following:
  - Interface controller
  - DRAM (Dynamic Random-Access Memory) controller
  - Print head controller
  - H-V (Horizontal-Vertical) converter
  - Address decoder

A 20 MHz crystal clocks the printer controller independently to provide proper timing for the interface and DRAM bus. A 2.5 MHz clock in the CPU controls CPU bus timing.

**Interface**

Serial port interfacing is through 26LS32/26LS30 receiver/transmitter ICs.

**Data Flow**

The data flow in the StyleWriter printer is as follows:

1. The printer controller receives a bitmap of each page from the host computer over the RS-422/423 interface and stores it in the receive buffer area of the DRAM.
2. The MPU (Main Processing Unit) analyzes, decompresses, and edits the bitmap data and stores the edited data in the work area of DRAM.
3. Next, the MPU converts the bitmap data from horizontal to vertical in the H-V (Horizontal-Vertical) conversion section of the printer controller and stores the converted data in the print buffer area of DRAM.
4. While the H-V conversion is taking place, the MPU determines the number of each print dot and supplies that number to the heater control circuit for the print head.
5. From DRAM, a printer initialize signal (INIT) goes to the printer controller and CPU, and the printer controller signals the busy status to the operations panel.
6. The CPU initializes the printer and sends the bitmap data in the DRAM print buffer to the print head via the printer controller.
7. The print head controller converts the bitmapped print data to COM and SEG head drive signals that activate the 8 x 8 (64) nozzle matrix.

## Ink Jet Cartridge

The ink jet cartridge contains all the components required for the generation of the ink dot pattern used in printing. These components include the ink sponge and ink jet head unit, along with the cartridge body and covers. The ink jet printing system prints characters and graphics by firing ink drops at the paper from thin nozzles. Heating the ink in these nozzles produces bubbles that quickly expand and eject the ink. The heat is generated by applying electrical pulses to the heating elements built into each nozzle.

The structure of the ink cartridge is shown below (Figure 1-2).

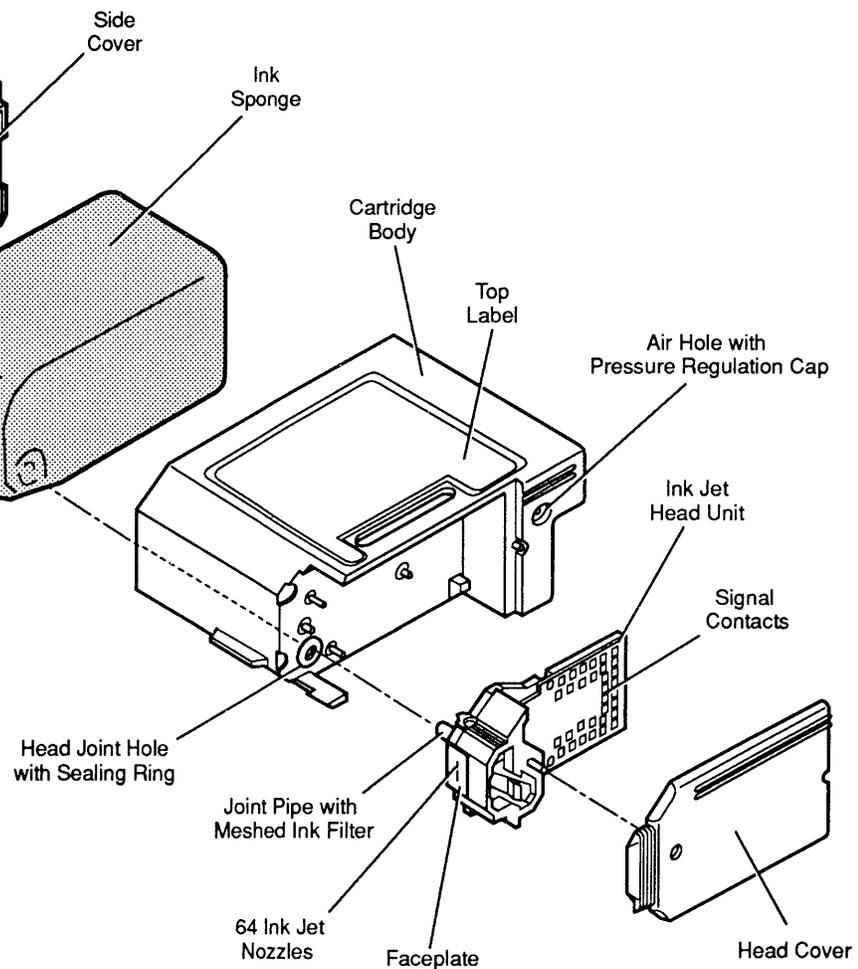
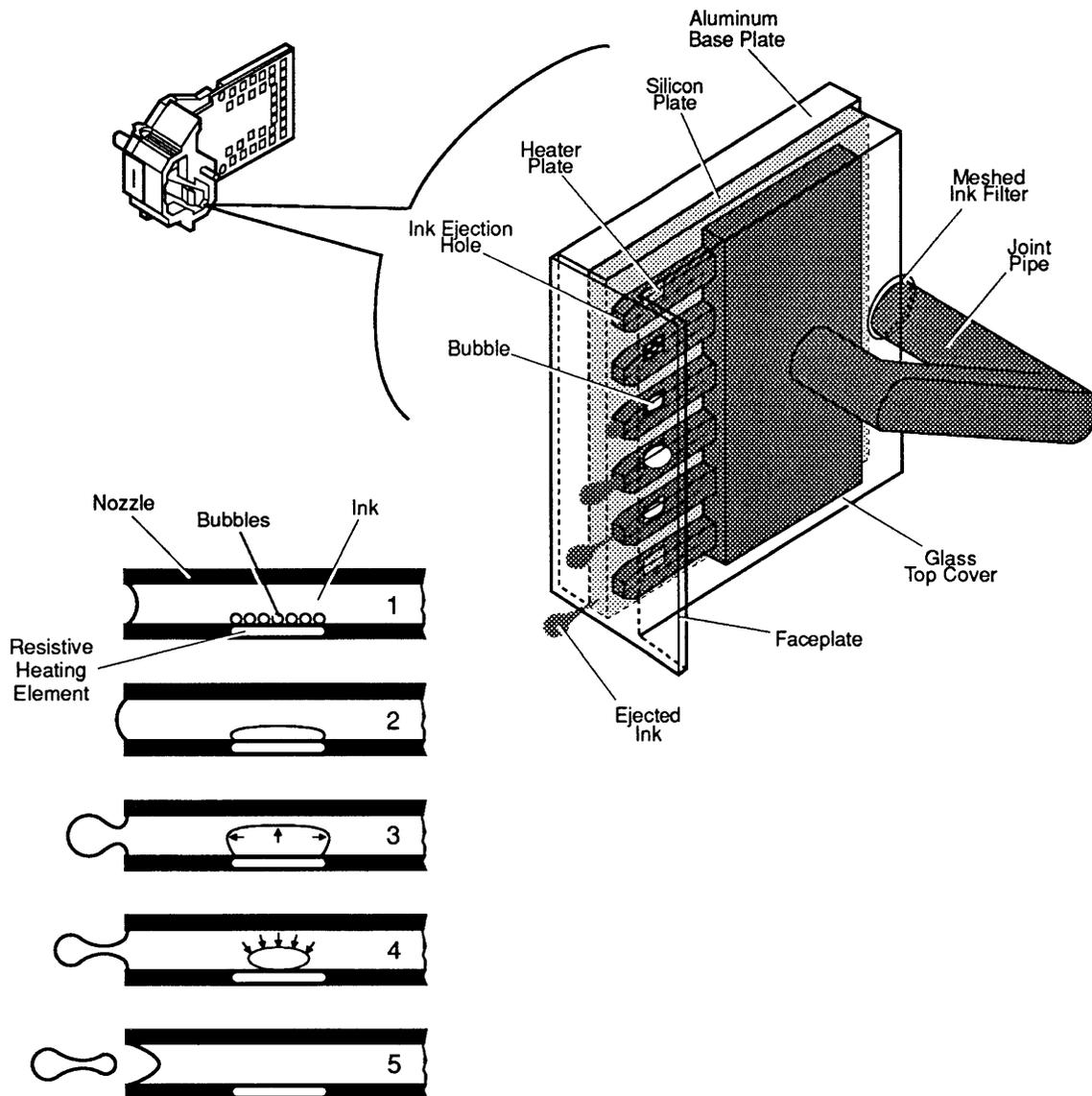


Figure 1-2 Ink Cartridge Structure

**Ink Jet  
Head Unit  
Structure**

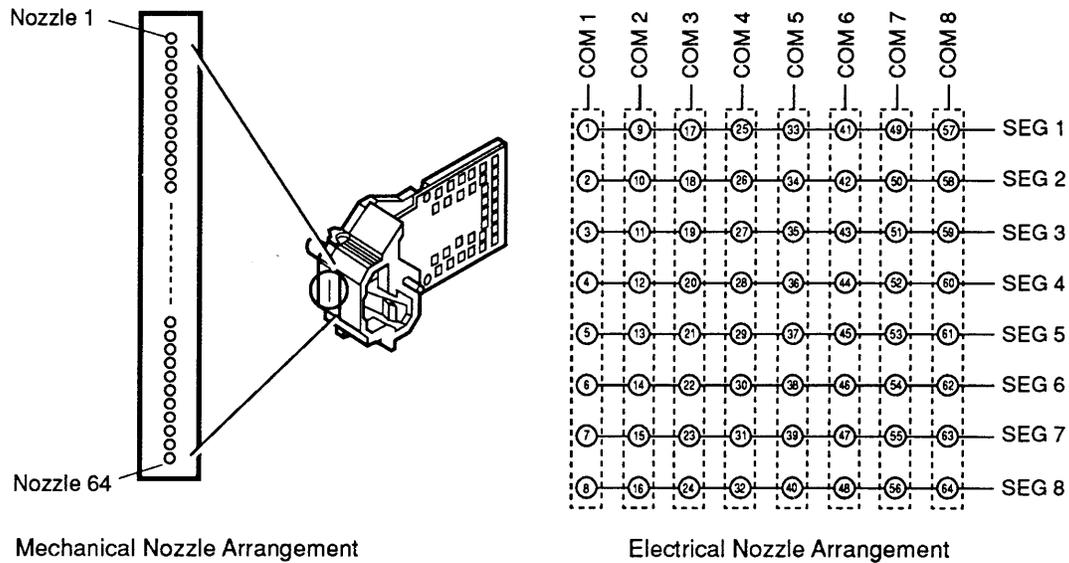
The ink in the ink sponge passes through a mesh ink filter to remove dust and flows to the ink jet nozzles through a joint pipe. When the head drive current flows through the heater plate of a nozzle, the ink boils and many small bubbles accumulate into a large bubble. The head drive current shuts off before the drop of ink ejects from the nozzle, but the bubble continues to grow due to latent heat on the heater—and the drop of ink ejects from the nozzle at about 12 meters/second. The loss of the ink creates a vacuum that draws fresh ink from the ink sponge (Figure 1-3).



**Figure 1-3 Ink Jet Operation**

## Nozzle Arrangement

The ink jet nozzles are arranged in the print head in a vertical line of 64 nozzles spaced at 1/360th of an inch. The 64 head-heater plates are controlled by the matrix of 8 COM and 8 SEG signals from the logic board (**Figure 1-4**).



**Figure 1-4 Nozzle Arrangement**

## Printing Signals

The COM signal connects circuits COM1 to COM8 to the head drive power supply (VH) so the 64 nozzles are ready to print in groups of eight. While the COM signal connects to the head drive power (VH), which applies heater voltages to the heater plate, the SEG signal connects the SEG1 to SEG8 circuits to ground. The combination of SEG and COM signals creates the 8 X 8 matrix, which equates to the 64 print head drive signals.

## Heater Voltage

The printer corrects any manufacturing variations in the ink cartridges by selecting one of the four heater voltages (used to determine ink jet speed). A pattern of contacts on the printed circuit area of the print head indicates the heater voltage ID for any specific print head unit.

## Temperature Control

The optimum temperature of the ink jet cartridge for high-quality printing is 73.4°F (23°C). The print head has temperature sensors and warm-up heaters on the silicon plate. A sensor on the printer logic board determines the temperature of the cartridge from the ambient room temperature. When the sensor detects a temperature lower than 68°F (20°C), the print head nozzles are warmed by the applying the heater voltage to the head unit, which in turn heats the nozzles.

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## □ SAFETY AND HANDLING

### High-Temperature Components

The temperature of the regulator IC (Q14) and transistor (Q13) that produce the logic circuit Vcc rises to about 140°F (60°C) when the printer is on. Do not touch these components when the printer is on.

### Fragile Plastic Parts

The StyleWriter printer has many plastic parts. Be careful not to bend or break any of the plastic tabs when taking apart the printer. Most of the plastic parts are made of a hard plastic that contains glass fiber; the viscosity is low to increase the precision of the tooling. As a result, the plastic tabs are very easy to break. Use precision screwdrivers or tweezers for take-apart and do not apply excessive force when releasing a tab.

### Ink Stains

The ink used in the ink cartridge is not toxic but contains isopropyl alcohol 67-63-0, which means the ink must be kept out of mouths and eyes. Keep the ink cartridge out of the reach of children.

The ink contains an indelible dye that stains clothing. To avoid getting ink stains on your hands, clothing, tools, and work area, do not shake the ink cartridge or touch anything in the printer path.

After the printer has been used for several months, ink mist may coat the insides of the front access and lower access covers. To avoid getting ink on your hands, use a damp cloth to wipe away any accumulated ink before you begin servicing the printer.

The ink conducts electricity. If ink leaks onto a mechanical part or the logic board, turn off the printer and disconnect the AC power adapter. Wipe the ink off mechanical parts with a soft cloth. Use tissue paper to clean ink completely from the bottoms of logic board components.

---

**CAUTION:** *To avoid circuit damage, wipe away all ink before switching the power on.*

---

If the printer is picked up, moved, or stored without an ink cartridge in it, the ink remaining in the purge unit may flow backwards and stain the inside of the printer. If the printer has no cartridge, perform the purge operation (under "Purging the Ink Cartridge") three times to clear any remaining ink from the purge unit.

### **Electrostatic Discharge (ESD) Prevention**

The StyleWriter printer carriage contacts and logic circuitry are sensitive to damage from static electricity that may discharge from your body or clothing. If static electricity is discharged at the carriage contact points, the characteristics of the chip resistors (R4, R5, R6, and R7) and chip capacitor (C30) used in the heater voltage select circuit on the logic board may change, and the correct heater voltage for the ink cartridge may not be generated. If the voltage is incorrect, the print quality deteriorates. To prevent such damage, wear a grounding wriststrap or heelstrap and work on a grounded workbench mat when servicing the printer. (For ESD prevention rules, see Section 6, Electrostatic Discharge, under the *You Oughta Know* tab).

### **Additional Safety Tips**

Follow these additional safety tips to avoid harm to the printer:

- Don't move the carriage manually—you could damage delicate mechanical parts.
- Don't attempt to print anything when the front access door is open—you could cause a paper jam.
- Don't oil the inside of the printer.
- Don't use ammonia-based cleaners on or around the printer—they may react with the plastic.
- Before you unplug the printer, be sure it is switched off—switching the printer off ensures the print head will be capped.

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## □ INK CARTRIDGE

### **Protective Functions of the Printer**

The disposable ink cartridge contains the print head and ink. Both the Apple and the Canon versions of the ink cartridge work in the StyleWriter printer. The printer has automatic maintenance functions (priming, purging, wiping, and capping) that protect the ink cartridge.

### *Priming Function*

To prevent the nozzles from clogging, the printer has a priming function that ejects ink from all the nozzles of the cartridge. The priming function works automatically

- When you switch on the Power button
- Before the printing starts
- Every 12 seconds during printing

### *Purging Function*

To ensure optimum print quality, the printer also has a purging function that draws 0.1 ml of ink through the ink nozzles to fill them with fresh ink. A purge, with the wiping function (see below), is performed under two conditions: 1) every time the machine is switched on after the AC adapter is connected, and 2) when the printer sits idle for more than 72 hours while switched on and connected to the adapter.

The user can also perform a manual purge, which is necessary to prepare a new ink cartridge for operation. (See "Purging the Ink Cartridge" later in Basics.)

### *Wiping Function*

A wiping function, which wipes dust and ink off the cartridge nozzle surfaces with a rubber head wiper, occurs automatically

- After priming or purging
- Every 60 seconds during printing
- Before capping (see below)

### *Capping Function*

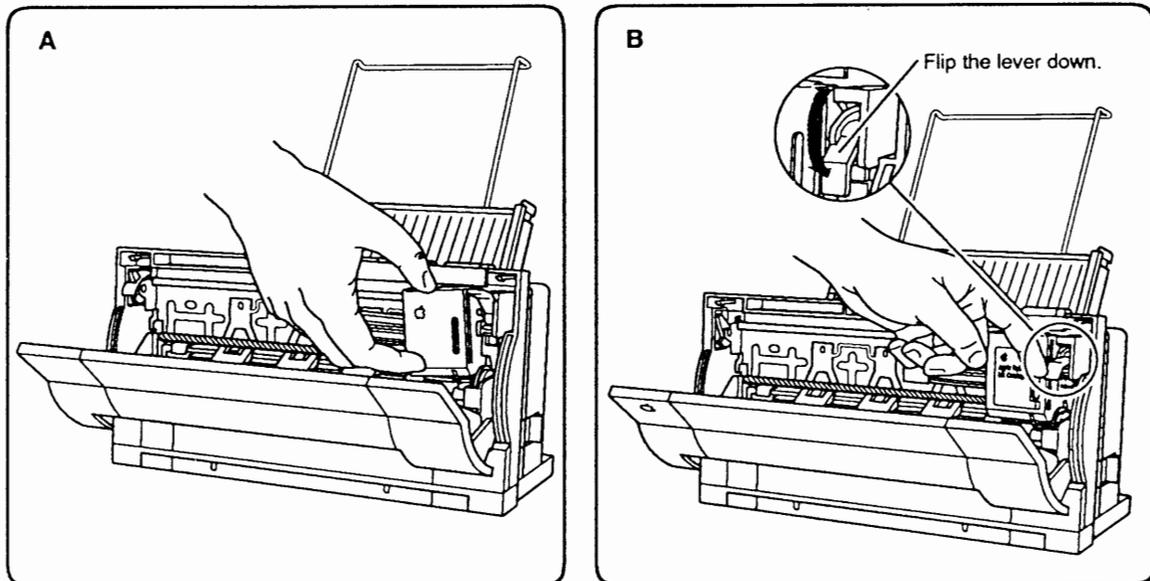
The printer caps the cartridge nozzles with the purge unit cap after the carriage returns in front of the purge unit. The cap prevents the cartridge from drying up, leaking ink, or collecting dust. The nozzles are capped automatically

- When the printer has not received a print start command in the last five seconds while on-line
- When the printer goes off-line
- Three seconds after you switch off the Power button

## Installing the Ink Cartridge

Do not open the ink cartridge package before you are ready to install the cartridge. After opening the package, carefully remove the head cover and tape that protect the nozzles during shipping and storage. Do not touch or wipe the nozzles. The cartridge cannot be cleaned. Do not leave the cartridge outside the printer without the head cover and sealing tape.

1. Make sure the printer power is off.
2. Open the front access cover.
3. Place the ink cartridge over the mounting post (**Figure 1-5A**), and push down on the cartridge until it snaps into place (**Figure 1-5B**).



**Figure 1-5 Installing the Ink Cartridge**

4. Close the front access cover.
5. **Perform the manual purge operation before you attempt to print** (see Purging the Ink Cartridge).

## Purging the Ink Cartridge

Always do a manual purge after you install a new cartridge. Also purge the ink cartridge five times whenever the printer exhibits print quality problems. Purging the cartridge forces air out of the ink nozzles. Follow these steps to perform a manual purge:

1. Switch off the Power button (the printer must be off before you begin).

2. Press and hold the Ready button.
3. Press the Power button once and release both buttons at the same time.

When finished printing, **always switch the power off using the power button.** After the power is switched off for three seconds, the printer caps the ink cartridge automatically to prevent ink leakage and nozzle clogging. **If you turn off power to the printer by pulling the power adapter cord, the cartridge will not be capped.** If the nozzles are not capped, they may become clogged with dry ink, or ink may leak from the cartridge.

### Removing the Ink Cartridge

**Leave the cartridge in place when the printer is not in use.** Also leave the cartridge in place when moving the printer. If the ink cartridge is taken out of the printer, the ink nozzles may dry up and become unusable. Remove the cartridge only to replace it or to service the printer. To remove the ink cartridge,

1. Make sure the power is off.
2. Open the front access cover.
3. Lift the cartridge lever and pull the cartridge off the mounting post.

The print head must be sealed and capped immediately after removal from the printer. Even if the ink cartridge is ready for replacement, the ink may leak out if you do not seal the print head. When installing a new ink cartridge, save the orange tape and end cap to use on the replaced ink cartridge. If you will be using the removed cartridge again, be especially careful to seal the cartridge to prevent the ink from drying and clogging the nozzles. Cellophane tape will not work—the adhesive may clog the nozzles.

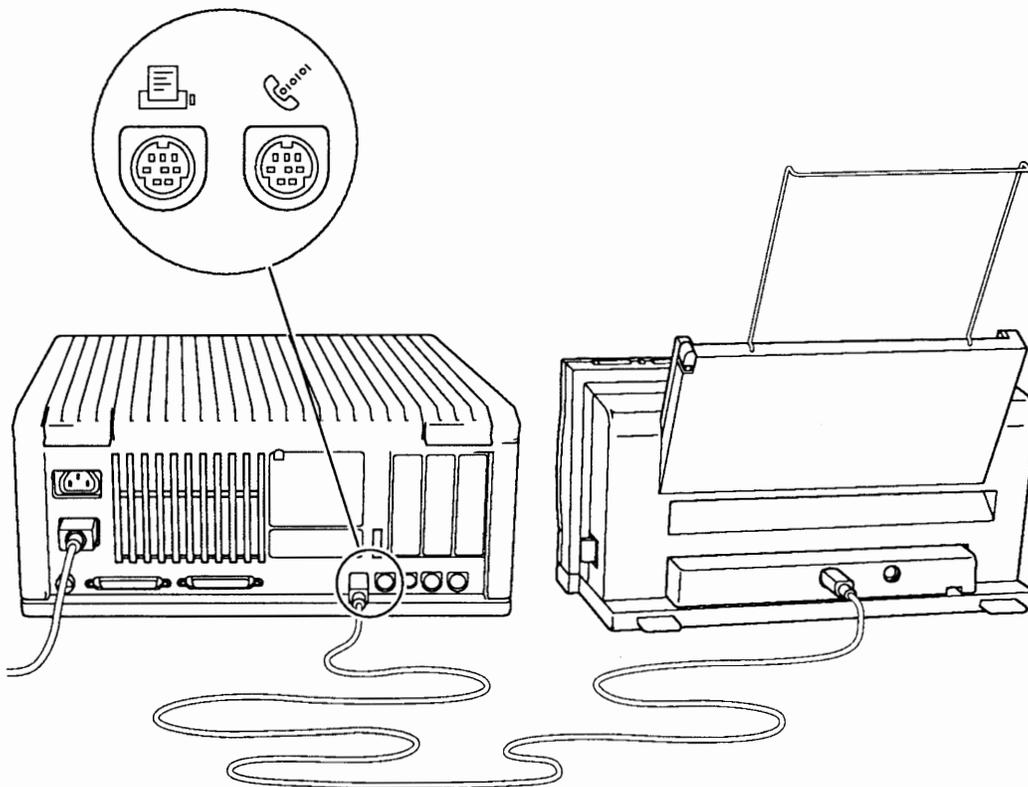
### Cartridge Shelf Life

The StyleWriter printer ships with a cartridge installed. Cartridge shelf life is approximately six months once you open the cartridge and install it in the printer, and 18 months while in the package. Expired cartridges will not damage the printer, but may require extensive purging to get good prints.

## □ PRINTER HARDWARE SETUP

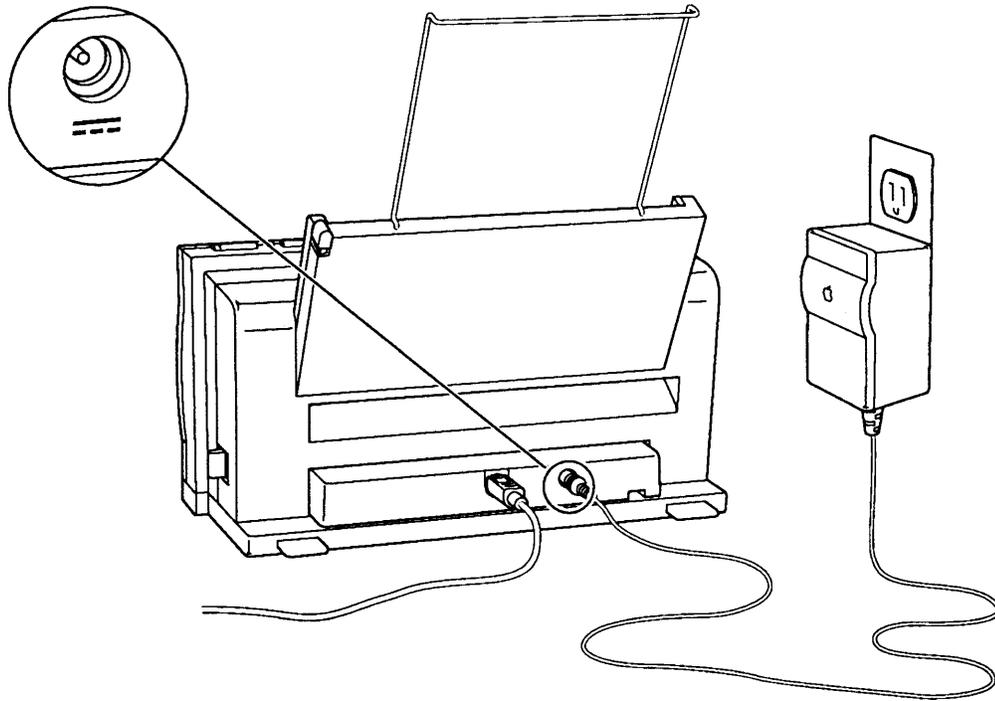
The *StyleWriter Owner's Guide* contains detailed instructions to the user for setting up and operating the StyleWriter printer. Since you may see problems that are the result of incorrect software installation, we have summarized some important elements of the owner's guide here for your information.

To connect the StyleWriter to a Macintosh computer, make sure the computer is switched off. Attach one end of the peripheral-8 cable to the printer or modem port on the computer. Connect the other end to the serial port on the back of the printer, as shown in **Figure 1-6**.



**Figure 1-6 Making the Serial Connection**

Connect the power cord to the StyleWriter; then plug the adapter into a wall outlet as shown in **Figure 1-7**. (Adapters for countries other than the U.S and Japan use a different configuration; the adapter sits between two segments of power cord.)



**Figure 1-7 Making the AC Power Connection**

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## □ SOFTWARE INSTALLATION

The disks that come with the printer accessory kit contain the printer driver, the Installer program, and the TrueType fonts. The StyleWriter can use TrueType and fixed-size (bitmapped) fonts—in fact, the user can have fixed-size and TrueType versions of the same font installed in the system. Keeping both versions of a font takes up more space, but it has two advantages. First, it allows the Macintosh computer to display and print the font correctly, even when memory is low. Second, it prevents old documents that use the fixed-size font from repaginating.

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**IMPORTANT:** *The Macintosh computer used with the StyleWriter printer must have system software 6.0.7 or later. If the customer has an earlier version of the system software, perform a system upgrade before you proceed.*

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The Installer program on the *StyleWriter Installation* disk makes the process easy for the user:

1. Boot the installation disk and double-click the Installer icon. Make sure the disk named on the screen is the one on which you want to install the software (if not, click **Switch Disk**).

The Installer has a custom feature that allows the installation of software that supports other printers besides the StyleWriter. If you click the **Customize** button, you'll see a list of specific items you can select for installation.

Click **Install** to launch the program. The Easy Install status box appears to keep you informed of progress during the installation.

2. When the *StyleWriter Installation* disk ejects, insert the *TrueType Fonts* disk. (If the Macintosh computer has no hard disk and you are installing on floppy disks, you will have to swap disks a number of times before the process is finished.)
3. When the *TrueType Fonts* disk ejects, follow the instructions and insert the *StyleWriter Installation* disk again. When you see a message reporting that the installation was successful, click **Restart**.
4. Open the Chooser and identify the port (printer or modem) to which you have the printer connected.

## □ PAPER SETUP

### Connecting the Cut Sheet Feeder

Make sure the latches on the side of the cut sheet feeder are unlocked (pushed toward the rear of the feeder) (**Figure 1-8A**). Slide the printer in as far as it will go (**Figure 1-8B**) and push the latches forward to lock the sheet feeder in place (**Figure 1-8C**). To unlock the sheet feeder, push back the latches and slide the printer out.

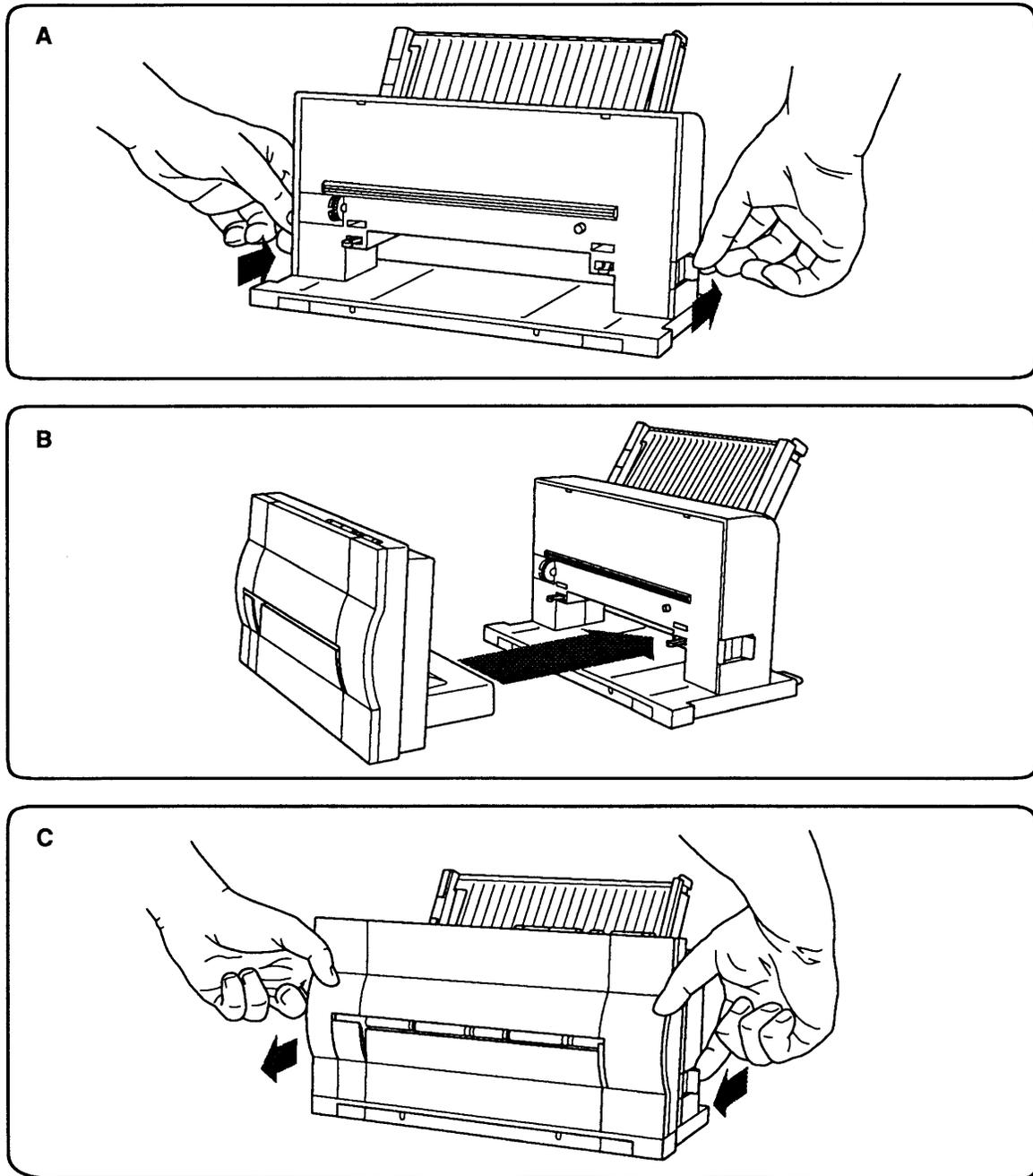


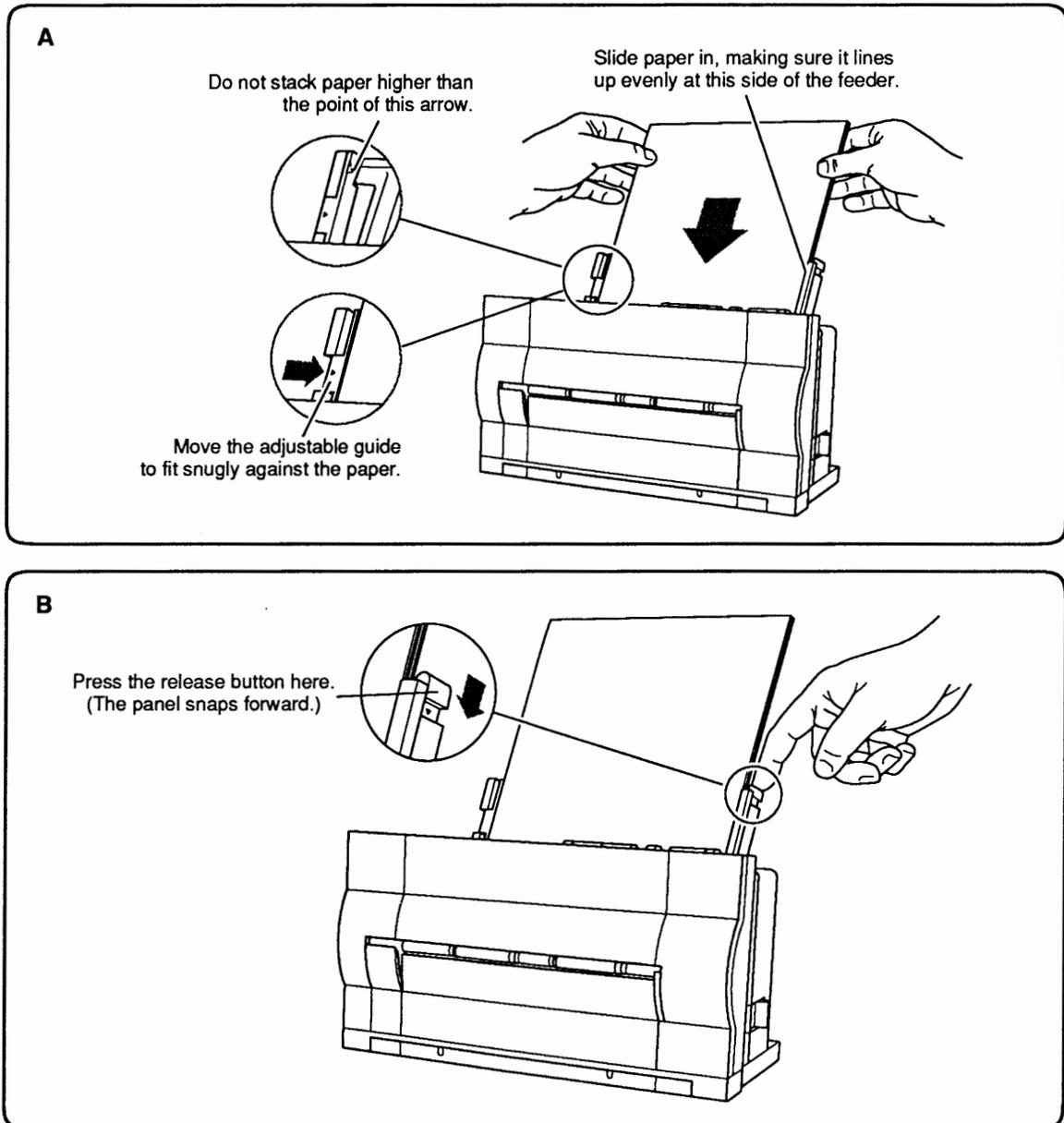
Figure 1-8 Connecting the Cut Sheet Feeder

## Loading Paper

To ensure optimum print quality, use 16 lb to 24 lb plain cotton bond, typewriter-quality paper without curls, folds, or damaged edges. Paper thickness should be under 0.2 mm. Paper should be stored at 18°C to 24°C (64°F to 75°F) at 40% to 60% relative humidity.

## Automatic Feed

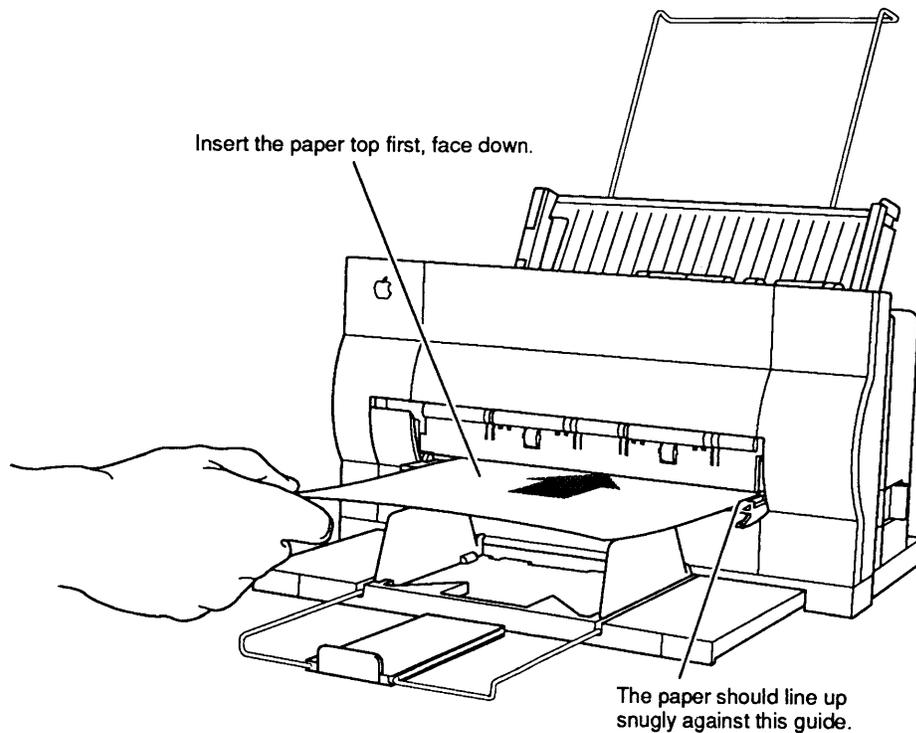
**Figure 1-9** shows how to load paper into the cut sheet feeder.



**Figure 1-9** Loading Paper into the Cut Sheet Feeder

**Manual Feed  
For Single Sheets  
(Using Front Slot)**

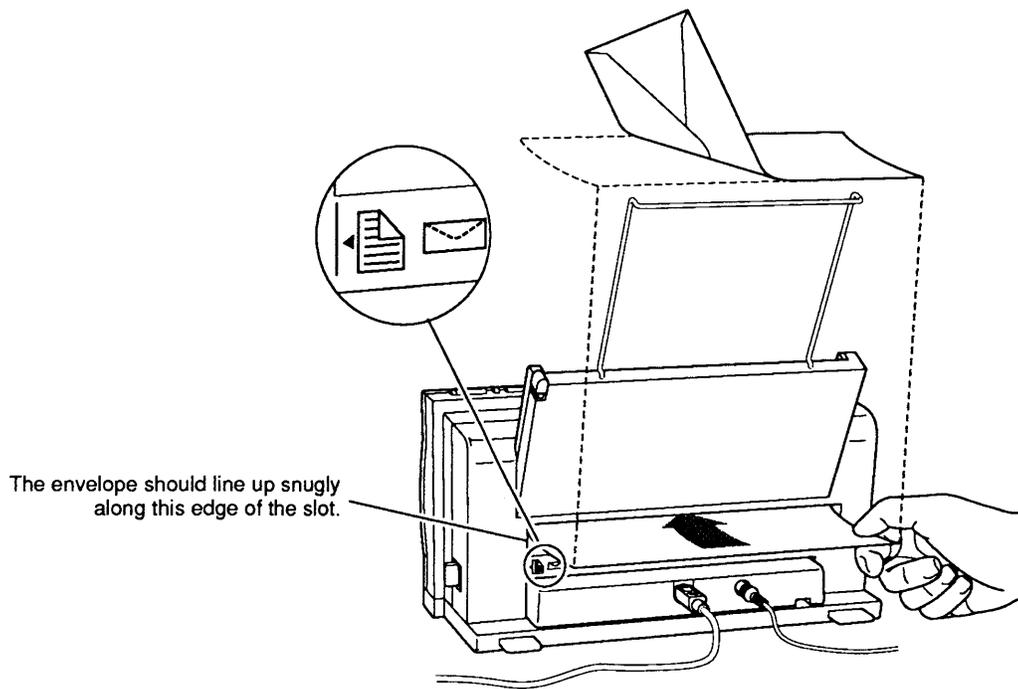
1. Lower the manual feed tray.
2. In the Page Setup box (under the File menu), identify the size of paper you will be using.
3. Choose Print from the File menu and click **Manual** in the Print dialog box.
4. Press the Ready button to turn off the Ready light.
5. Insert the sheet of paper as far as it will go into the front slot of the printer. (**Figure 1-10**).
6. Holding the paper positioned in the slot, press and release the Form Feed button. This action feeds the paper around the platen to the first print line.
7. Make sure the paper aligns correctly. If not, pull down the paper release lever, remove the paper from the slot, close the release lever, and repeat steps 5 and 6.
8. Press the Ready button to turn on the Ready light.
9. Click OK in the dialog box on your screen. The printing begins.



**Figure 1-10 Manual Feed (Front Slot)**

**Manual Feed  
for Envelopes, etc.  
(Rear Slot)**

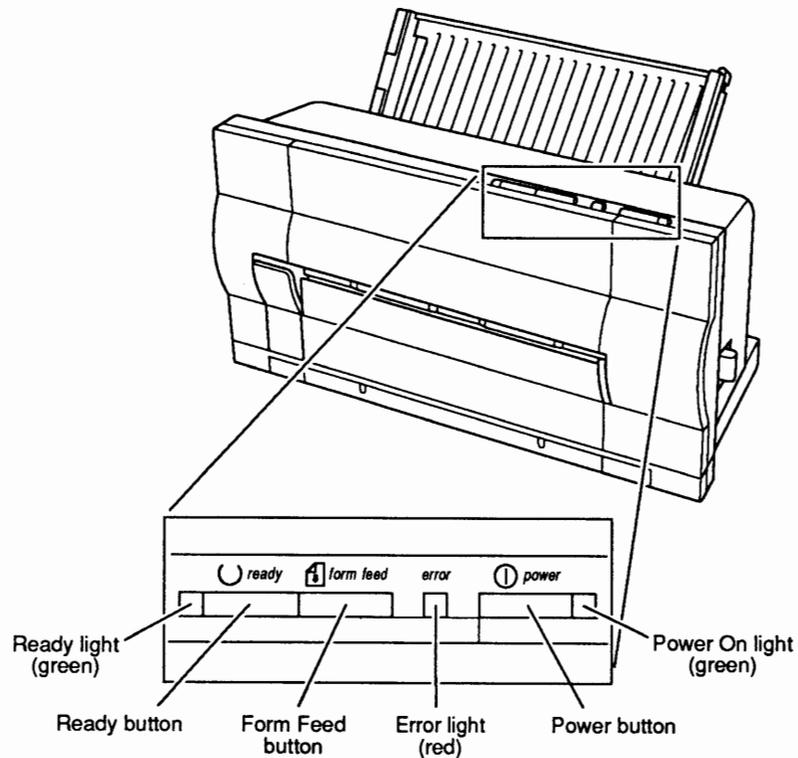
1. Open the front access door and flip the forms thickness lever down. Close the front access door.
2. In the Page Setup box (under the File menu), identify the size of paper or envelope to be used.
3. Choose **Print** from the File menu and click **Manual** in the Print dialog box.
4. Press the Ready button to turn off the Ready light.
5. Insert the envelope, sheet of labels, heavy sheet, or transparency as far as it will go into the rear slot of the cut sheet feeder (**Figure 1-11**). Insert envelopes top first, address side up. Insert sheets of labels, transparencies, or paper top first and face up. When the material is inserted far enough, the printer grasps the material and draws it in.
6. Make sure the paper aligns correctly. If not, pull down the paper release lever, remove the paper from the slot, close the release lever, and repeat step 5.
7. Press the Ready button to turn on the Ready light.
8. Click OK in the dialog box on your screen. The printing begins.



**Figure 1-11 Manual Feed (Rear Slot)**

## □ OPERATION PANEL

**Figure 1-12** shows the operation panel, which contains the operating buttons and indicator lights.



**Figure 1-12 Operation Panel**

### **Buttons**

The operating buttons enable you to control the printer.

#### **Power Button**

The Power button switches the printer on and off.

#### **Ready Button**

The Ready button allows you to toggle between an on-line (ready) state and an off-line state. The Ready button also signals manual-feed printing.

#### **Form Feed Button**

The Form Feed button does not function unless the printer is in an off-line (deselected) state. When you press the Form Feed button, the printer feeds paper until the printer reaches the top of the next form.

## Indicator Lights

The indicators are lights that let you know what state the printer is in.

### Power

When lit, the green Power light indicates that power is on.

### Ready

When the green Ready light is lit, the printer is on-line, in a ready state so that a transmission can take place. The Ready light is on during warm-up and while printing. If the Ready light is off, the printer is not ready to print.

### Error

The red Error light has three ways of indicating an error condition in the printer:

- If the Error light shines steadily (and the Ready light goes off), the printer is out of paper.
- If the Error and Ready lights blink while the Power light remains steady, paper has jammed.
- If the Error light and Power light both blink (while the Ready light is off), the carriage (containing the ink cartridge) is jammed.

To ensure that the printer is not in an error condition, the printer driver performs a general reset of the printer before beginning each print job.

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## □ POWER-ON, SELF-TESTS, AND TEST PRINTS

### Power-On

1. Connect one end of the power cord to the printer and the other end to the AC adapter. Connect the AC adapter to the wall outlet.

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***CAUTION:*** *The AC adapter supplies 9.5 VDC to the printer. The AC adapter accommodates the voltage used in the geographical region to which the StyleWriter is shipped. Use only the AC adapter supplied with the printer and do not use the printer AC adapter for any other equipment. Be sure to tell customers that the AC adapters for the Macintosh Portable and the StyleWriter fit interchangeably, but their polarities are reversed. The incorrect adapter will blow the input fuse on either device.*

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2. Press the Power button.
3. Check the operations panel. Make sure the Power light comes on.

### Logic and Serial Loopback Self-Tests

The printer performs an automatic logic self-test with every power-up; the flashing red Error light on the operations panel indicates an error.

The StyleWriter printer also performs a serial loopback test if you install a serial loopback plug on the serial port and follow the directions for performing the test print (below). If the serial communications are OK, the test print page prints. If not, the red Error light on the operations panel flashes.

### User Test Print

The StyleWriter printer produces a user test print if you do the following:

1. Press and hold the Form Feed button.
2. Press the Power button once, and then release both the Form Feed and the Power button at the same time.

The test print is not really a test—it is simply a visual aid in determining print quality. If the power-up logic test and the serial loopback test (if performed) pass, the test print page will print.

## Print Quality Test Print

A second test print for print quality is available to the servicing technician. This print allows you to diagnose specific problems with the ink jets. To obtain this test print, do the following:

1. Press and hold the Form Feed button and the Ready button.
2. Press the Power button once, and then release the Form Feed, the Ready, and the Power button at the same time.

**Figure 1-13** shows (smaller than actual size) a reproduction of the test quality print. The numbers on the reproduction (which do not appear on the test print) are useful in diagnosing the following:

- Nozzle position – Look for straight columns and an even diagonal line.
- Extraneous dots – Look between the bars for extraneous printing.
- Nozzle position – Look for missing or misplaced dots. Each cluster contains 64 dots (one from each nozzle); the line represents one pass across the paper.
- Nozzle position – Look for straight, parallel columns and even column divergence.
- Optical density – Look for white lines across the bars, which could indicate a clogged or misplaced nozzle.
- Nozzle and print head position – Look for straight, parallel lines and uniformity and squareness in the boxes. Skewness can indicate either print head misalignment or faulty nozzles, depending on the scale of the skew.

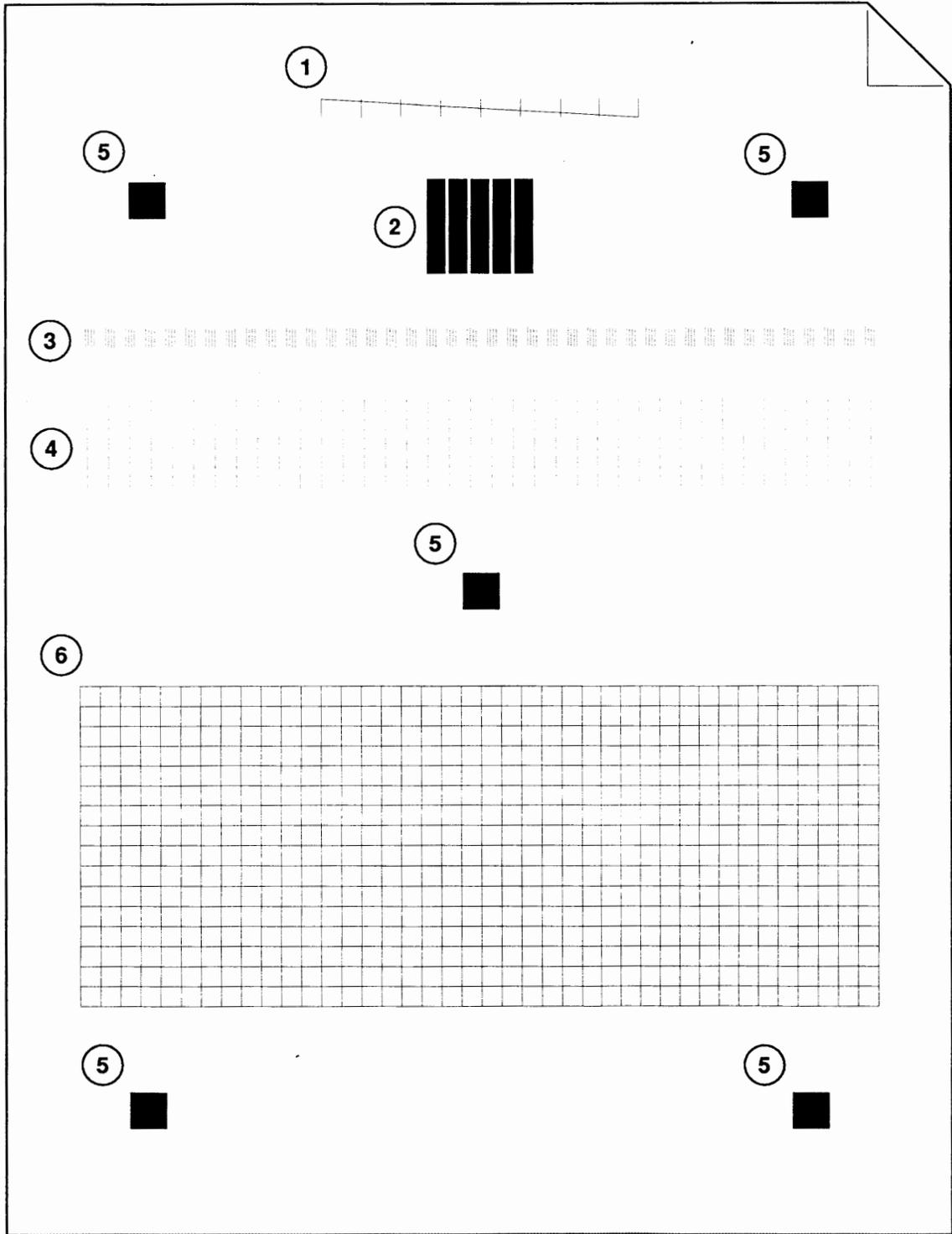


Figure 1-13 Print Quality Test Print



# StyleWriter

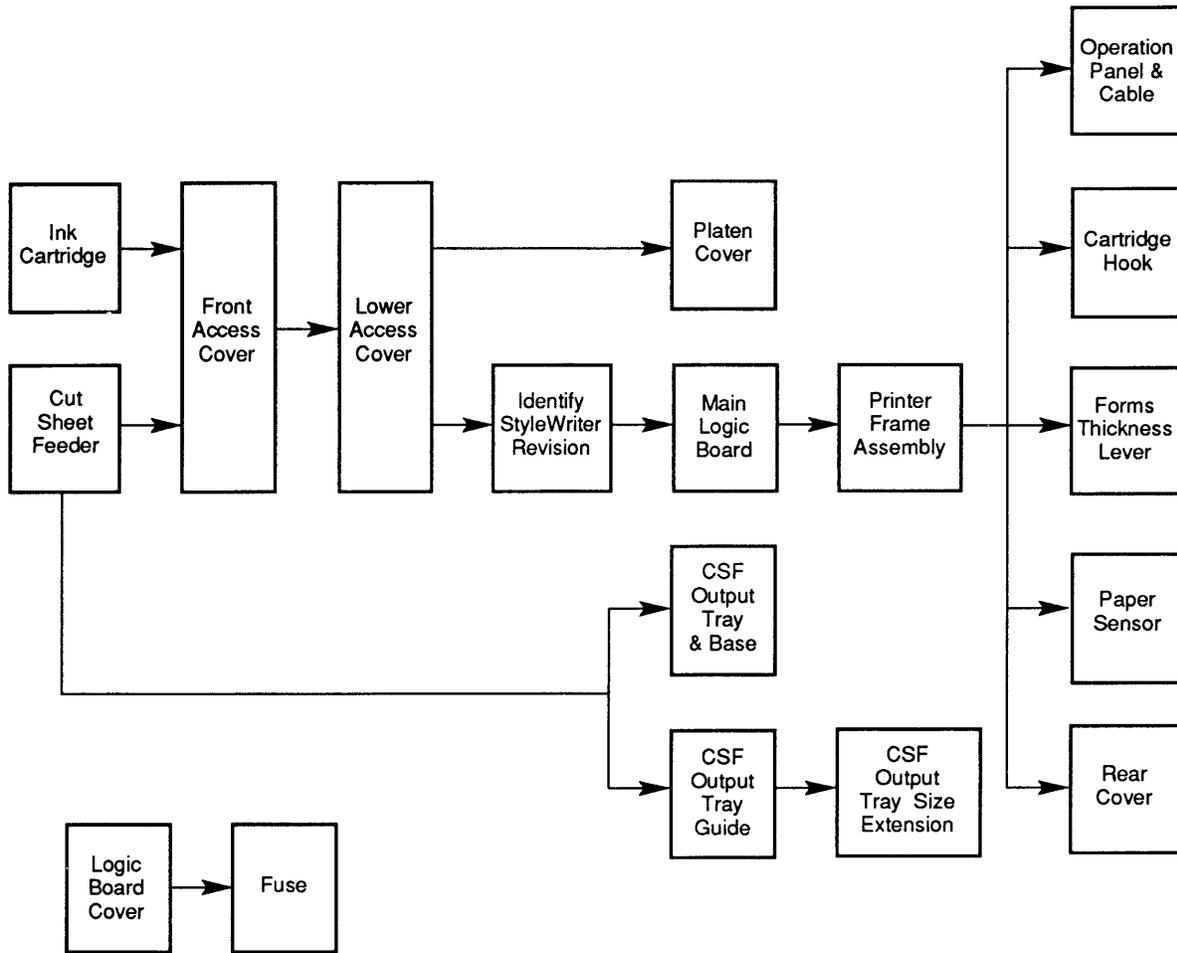
## Section 2 – Take-Apart

---

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2.2	Take-Apart Flowchart
2.3	Introduction
2.3	About This Section
2.3	Materials Required
2.5	Front Access Cover
2.7	Lower Access Cover
2.9	Main Logic Board
2.11	Printer Frame Assembly
2.13	Operation Panel Assembly and Cable
2.15	Cartridge Hook
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2.22	Rear Cover
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2.26	Cut Sheet Feeder Output Tray and Base
2.27	StyleWriter Revision Identification

**Note:** If a step is underlined, detailed instructions for that step can be found elsewhere in this section.



**StyleWriter Take-Apart Flowchart**

---

## □ INTRODUCTION

### **About This Section**

The flowchart on the left has a left-to-right, top-to-bottom flow. The chart is designed so that you can see quickly what modules have to be removed before you can work on the module you want.

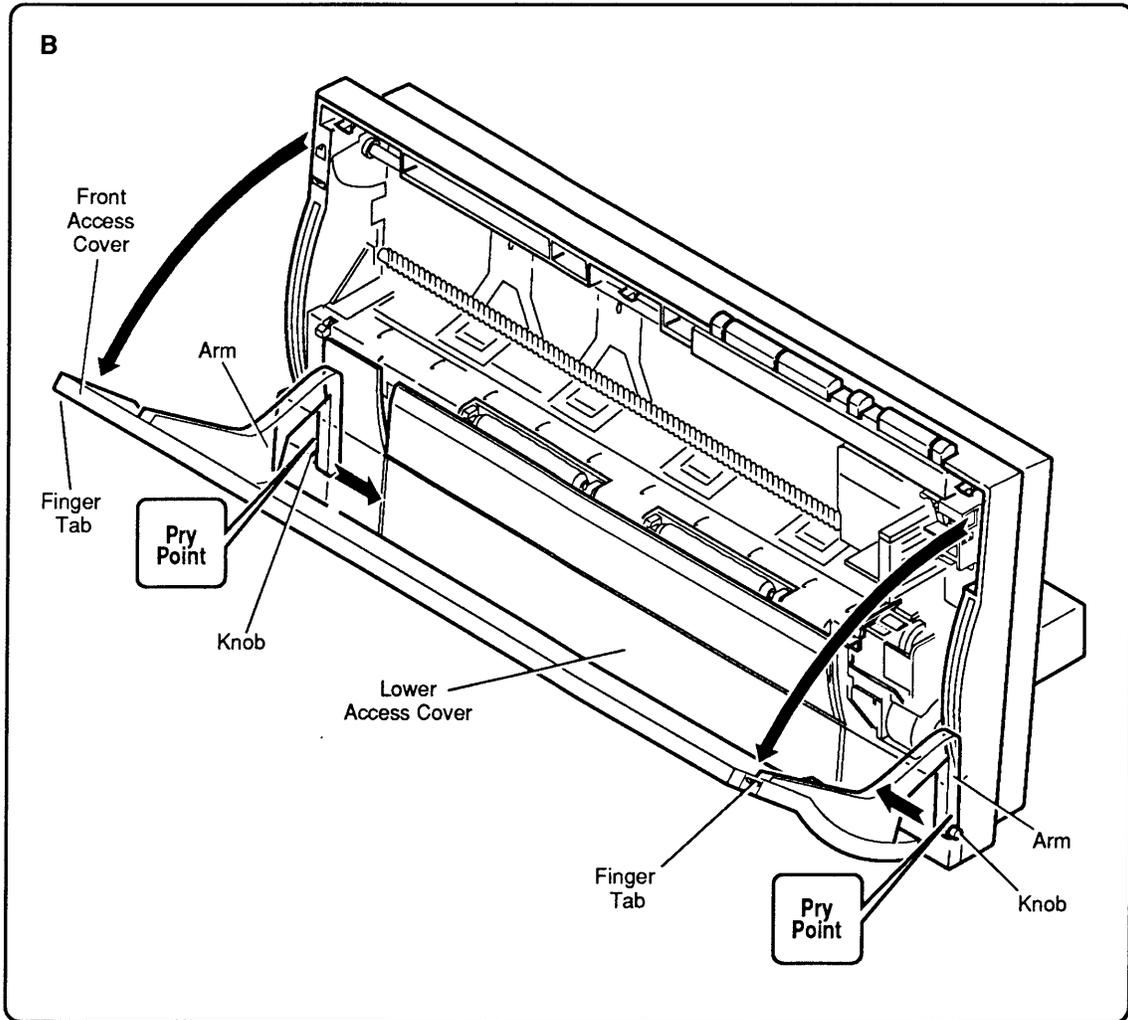
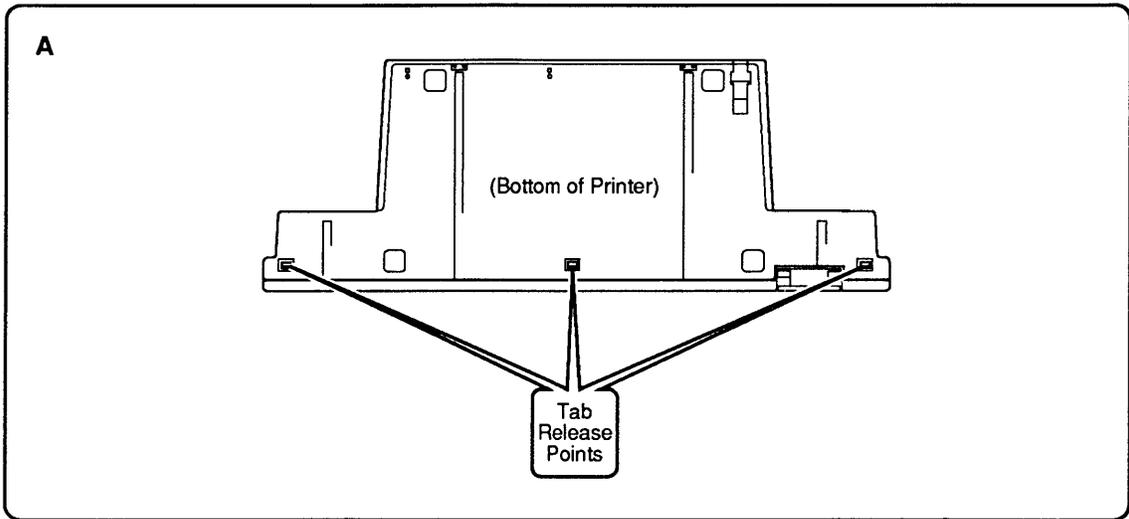
If a step is underlined in the procedures that follow, detailed instructions for that step can be found in other procedures in the section. You will have to refer to the earlier procedures and remove those modules before you can continue.

The materials required for the entire take-apart are listed below. This list will give you an idea of what tools you need when taking apart the StyleWriter printer.

The graphics are designed to give you maximum assistance. When you look at the graphics, pay attention to details, captions, and arrows.

### **Materials Required**

Magnetized #2 Phillips screwdriver  
Small, flat-blade screwdriver  
Precision (jeweler's) flat-blade screwdriver set  
Tweezers (optional)  
Grounded workbench pad  
Grounding wriststrap



**Figure 2-1 Front Access Cover**

---

## □ FRONT ACCESS COVER

---

**CAUTION:** *The StyleWriter printer is built with many plastic parts. Be careful not to bend or break any of the plastic tabs when taking apart the printer. Most of the plastic parts are made of a hard plastic that contains glass fiber, and the viscosity is low to increase the precision of the tooling. As a result, the plastic tabs are easy to break. Use precision screwdrivers or tweezers for take-apart and do not apply excessive force when releasing a tab.*

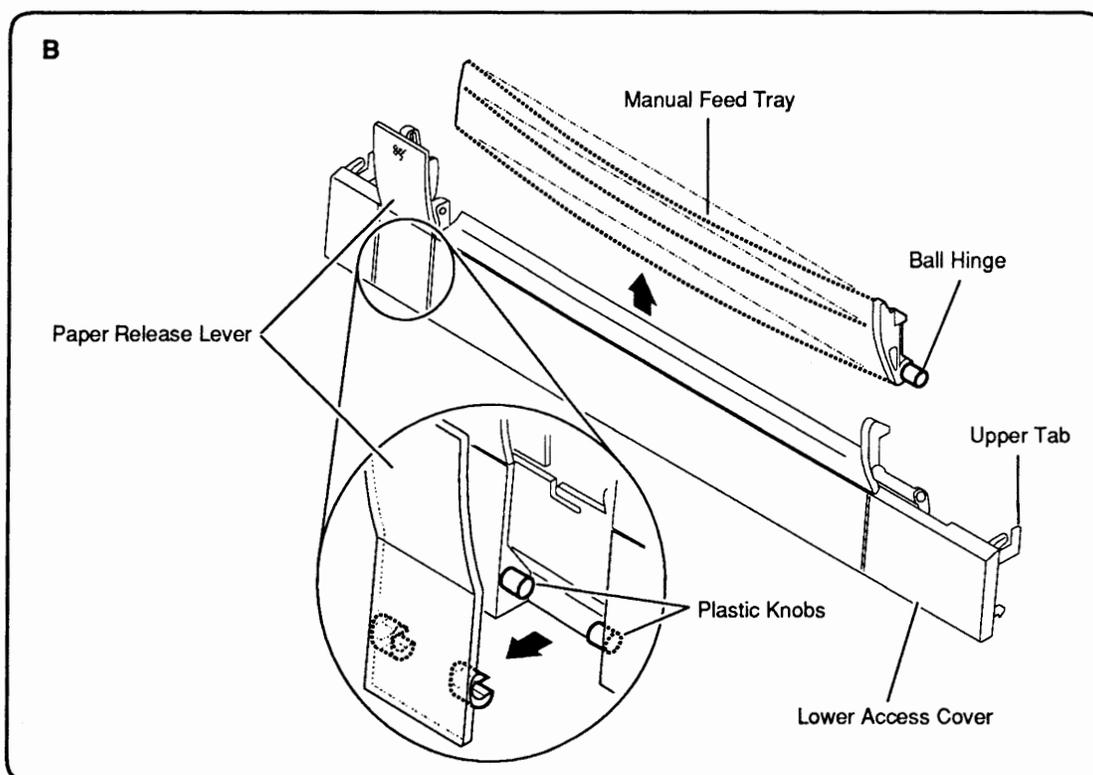
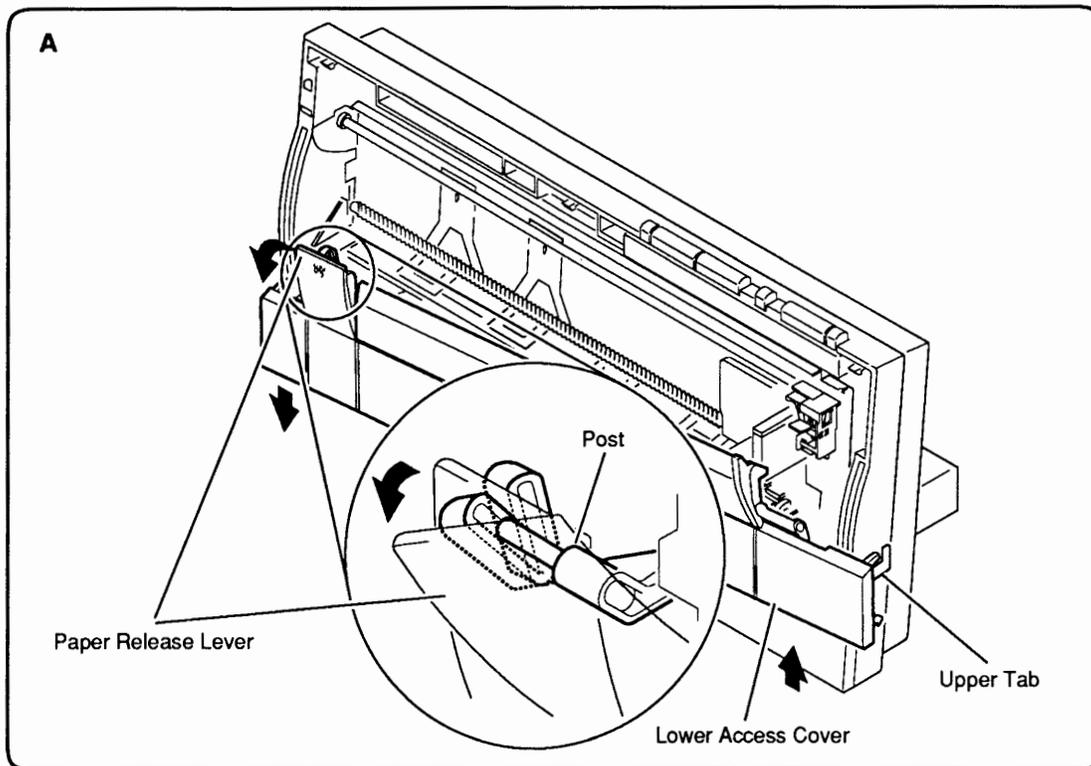
---

### Remove

1. Before taking apart the StyleWriter, remove the ink cartridge (if present) and separate the printer from the cut sheet feeder (see Section 1, Basics).
2. Turn the printer so that you can see the bottom. Using a small, flat-blade screwdriver, release the three tabs along the bottom of the rear cover (**Figure 2-1A**). Releasing these tabs will loosen the lower access cover enough for you to remove the upper (front access) cover more easily. (Don't try to remove the lower access cover yet—you will do that in the procedure on the following page.)
3. Open the front access cover by pushing out on the finger tabs at the two upper corners (**Figure 2-1B**). You will see that the front access cover is held in place by two arms that function as hinges. Plastic knobs at the end of the arms fit into holes on the inside of the rear cover. Using a small, flat-blade screwdriver, press the end of each arm in (toward the center of the printer) to free the arm's knob from the hole in the rear cover (**Figure 2-1B**).
4. When both arms are free of the rear cover, lift off the front access cover.

### Replace

1. Be sure the lower access cover is in place, but with the lower tabs loose (as directed in step 2 above).
2. Slide the two front access cover arms down into the rear cover until the knobs snap into their corresponding holes on the rear cover (**Figure 2-1B**).
3. Snap down the lower access cover tabs (**Figure 2-1A**).
4. Replace the customer's ink cartridge.



**Figure 2-2 Lower Access Cover**

---

## □ LOWER ACCESS COVER

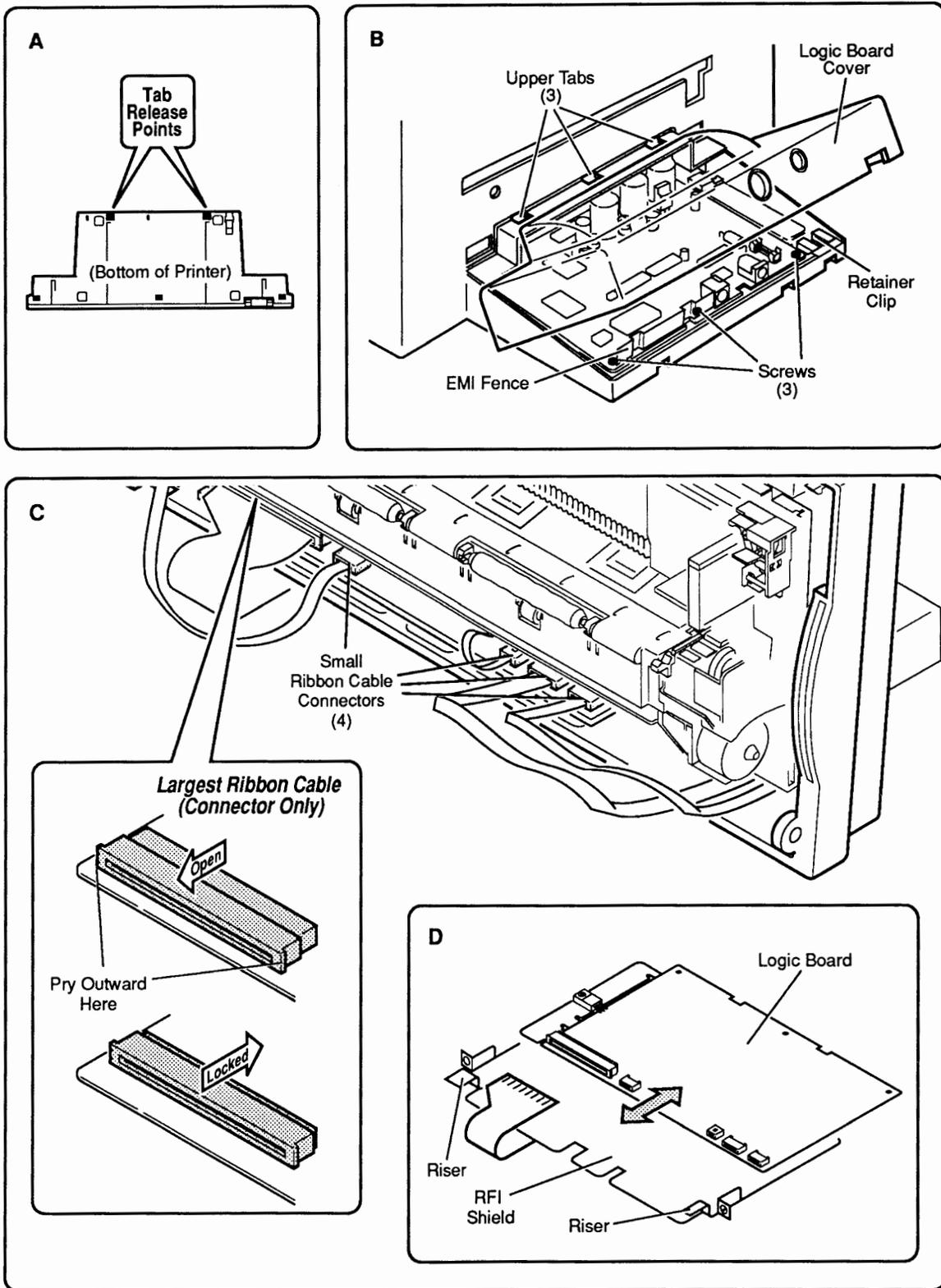
This procedure includes instructions for replacing the lower access cover, the paper release lever, and the manual feed tray.

### Remove

1. Remove the front access cover.
2. In removing the front access cover, you loosened the three tabs that hold the lower access cover in place on the bottom of the printer. Now maneuver the lower access cover free at the upper tabs (**Figure 2-2A**).
3. The lower access cover is now free except at the paper release lever. Pull the paper release lever down as far as it will go. Angle the paper release lever so that you can slip it off the paper release post on the frame (**Figure 2-2A**).
4. If you need to remove the paper release lever from the lower access cover, rotate the lever away from the cover until the lever's plastic hinges can be freed from the holders on the lower access cover. (**Figure 2-2B**).
5. If you need to remove the manual feed tray, simply flex it enough to free its plastic hinges from the lower access cover (**Figure 2-2B**).

### Replace

1. If you removed the paper release lever and/or the manual feed tray, replace them by slipping their plastic ball hinges into place on the lower access cover (**Figure 2-2B**).
2. Angle the paper release lever (now attached to the lower access cover) over the post on the frame (**Figure 2-2A**).
3. Snap the upper tabs of the lower access cover into the frame (leave the lower tabs loose to make replacement of the front access cover easier).
4. Close the paper release lever (**Figure 2-2A**).
5. Replace the front access cover (in that procedure you are instructed to snap down the bottom tabs of the lower access cover).



**Figure 2-3 Main Logic Board**

---

## □ MAIN LOGIC BOARD

### Remove

1. Remove the front access cover and lower access cover. Identify StyleWriter rev. A or rev B.

---

**CAUTION:** See "StyleWriter Revision Identification" later in this section to identify StyleWriter revisions.

---

2. Release the two lower tabs that secure the logic board cover to the printer bottom (**Figure 2-3A**).
3. Lift the rear of the logic board cover and free the cover at its upper tabs (**Figure 2-3B**).

---

**CAUTION:** In the following steps, you will disconnect five fragile ribbon cables. **Handle cables with great care and do not disconnect them except when necessary.**

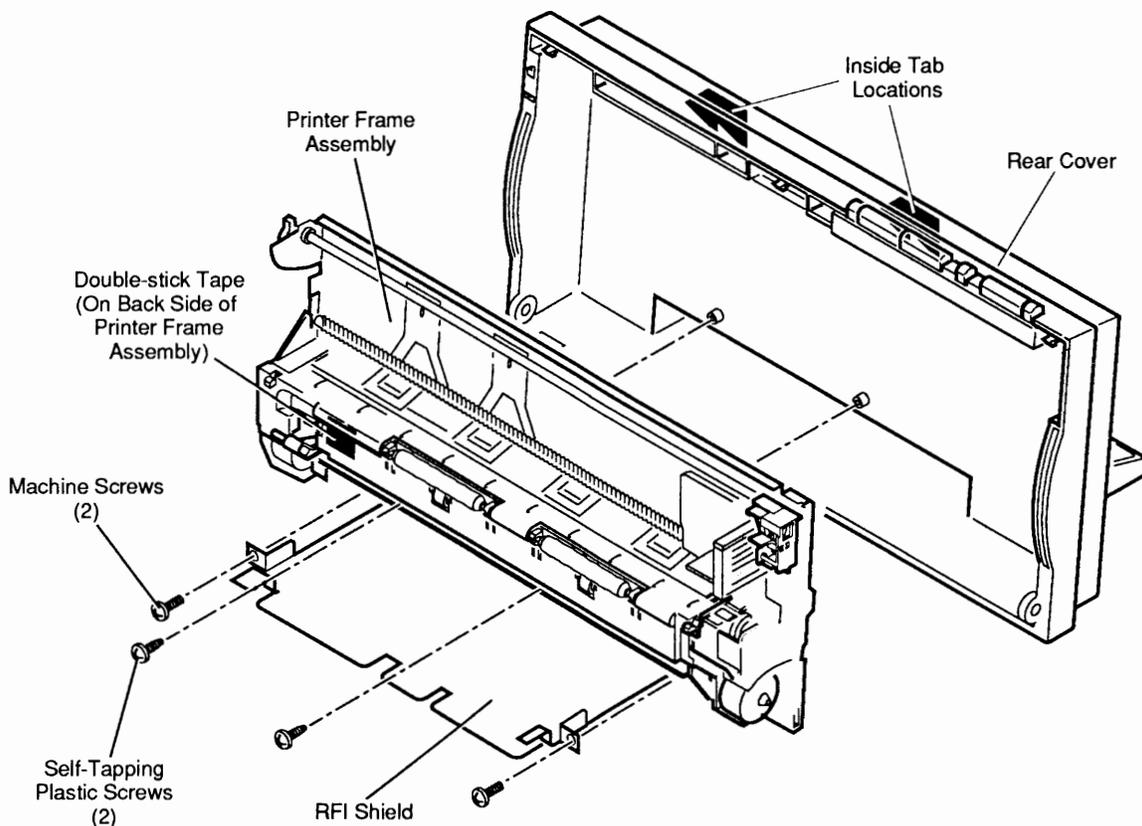
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4. Disconnect the four small ribbon cables from the logic board by pulling gently on the tab ends (**Figure 2-3C**).
5. To disconnect the largest connector, slide the front half of the connector toward you to unlock the connector. Gently pull out the cable (**Figure 2-3C**).
6. Remove the three screws at the rear of the logic board (**Figure 2-3B**), set aside the EMI fence, and slide the logic board out of the frame from the rear. Be sure not to lose the retainer clip.

### Replace

1. Slide the logic board into place from the rear of the printer. Be sure the front edge of the logic board rests on top of the risers at the front edge of the metal RFI shield (**Figure 2-3D**).
2. Align the screw holes on the rear of the logic board with the screw holes on the RFI shield and on the bottom cover. Place the two holes of the EMI fence over the two left holes of the logic board, as shown in **Figure 2-3B**. Replace the three screws.
3. Open the largest ribbon cable connector by sliding the front half of the connector toward you. Insert the ribbon cable into the connector so that the cable's metal contact points are pointing up. To lock the cable in place, push the front half of the connector back (**Figure 2-3C**).

4. Tuck the fold of the large ribbon cable under the RFI shield (**Figure 2-3D**).
5. Insert the four remaining ribbon cables into their connectors on the logic board (**Figure 2-3B**). Be sure the metal contact points are visible on the upper side and that the paper tabs are facing down.
6. Turn the printer so you can see the logic board. Check to be sure the retainer clip is in place.
7. To replace the logic board cover, insert the top three tabs into their holes on the back of the rear cover (**Figure 2-3B**). Push down on the logic board cover until the bottom tabs snap into place.
8. Replace the lower access cover and front access cover.



**Figure 2-4 Printer Frame Assembly**

---

## □ PRINTER FRAME ASSEMBLY

### Remove

1. Remove the front access cover and lower access cover, identify the StyleWriter revision, and remove the main logic board.

---

**CAUTION:** *Printer frame assemblies for StyleWriter Revisions A and B are not interchangeable. See "StyleWriter Revision Identification" later in this section.*

---

2. Remove the four screws that secure the printer frame assembly to the rear cover (**Figure 2-4**).
3. Slide the RFI shield from the front of the printer. Take care that the retainer (security) clip at the rear corner of the bottom cover does not fall out. (see **Figure 2-3B** on the previous page).
4. Lift the printer frame assembly down and out to free it from the tabs on the upper inside of the rear cover (**Figure 2-4**).

---

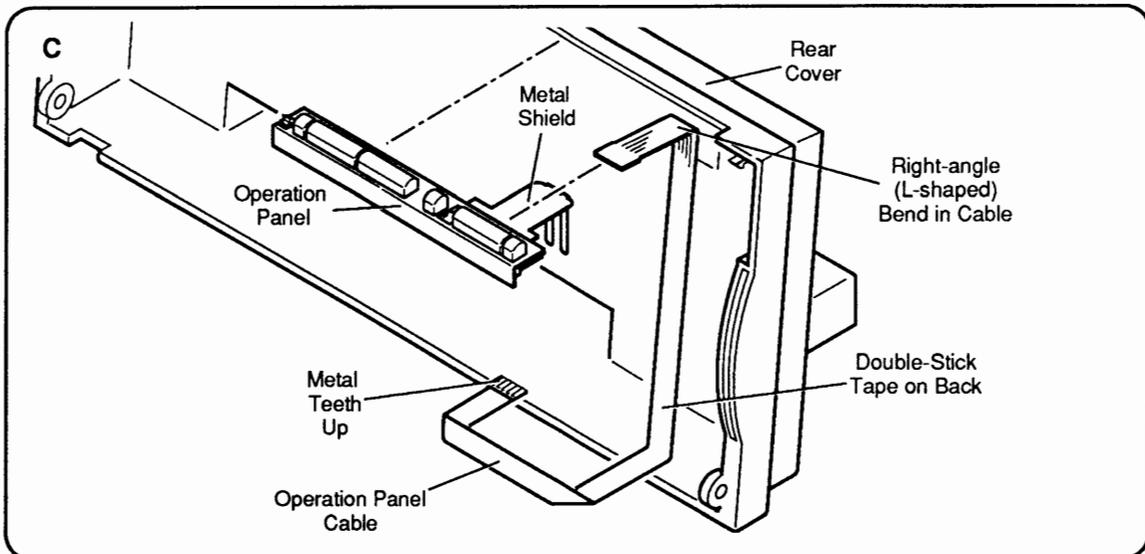
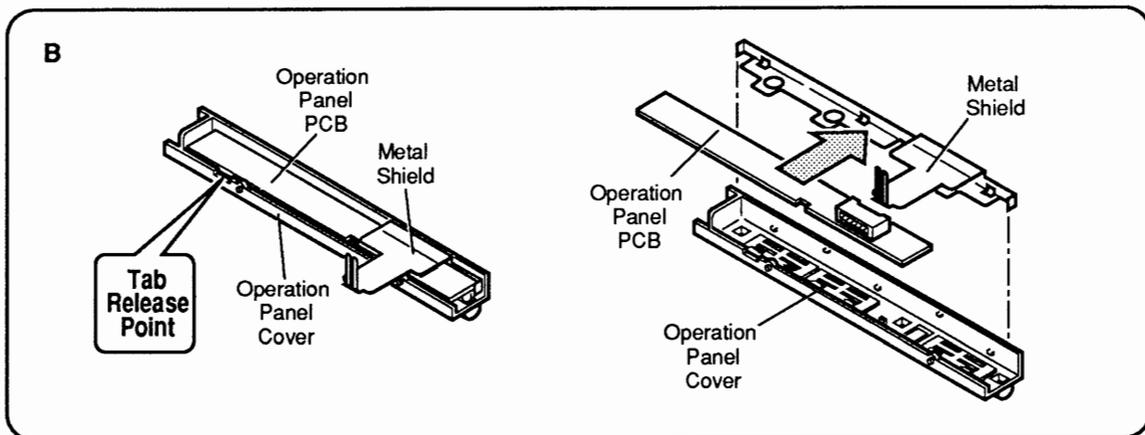
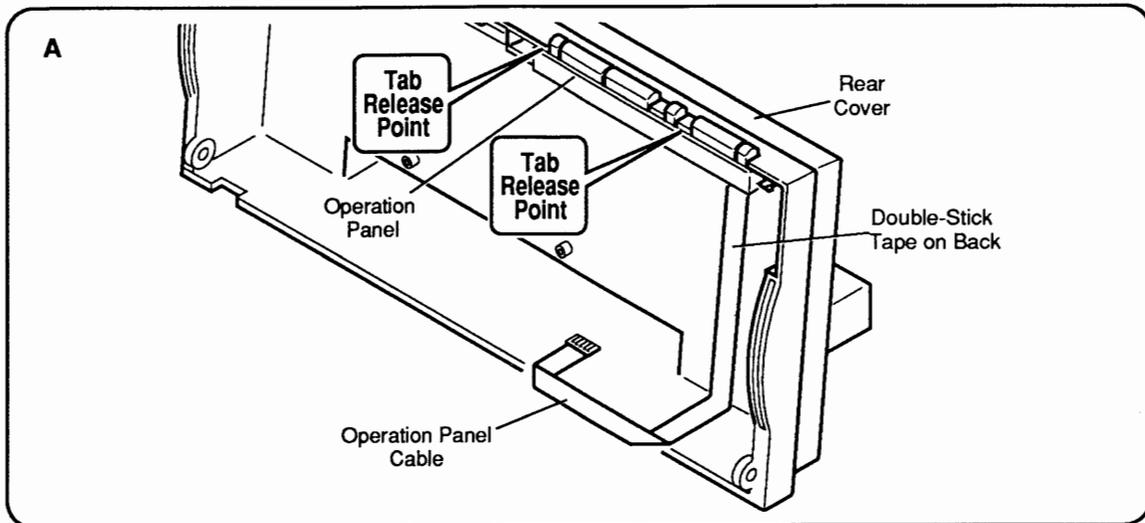
**IMPORTANT:** *The printer frame assembly comes with the platen cover, paper sensor, cartridge hook, and forms thickness lever installed, so do not remove these parts prior to returning a printer frame to Apple.*

---

### Replace

**Note:** Ribbon cables on replacement printer frame assemblies are taped to the assembly for shipping. Remove the tape carefully and press the cable onto the double-stick tape in the bottom-left corner of the assembly (**Figure 2-4**).

1. Slide the printer frame assembly up into the rear cover so that the metal top of the frame fits behind the plastic tabs on the top inside of the cover (**Figure 2-4**). Make certain that the connector ends of the operations panel cable and paper sensor cable are visible and hanging freely below the assembly.
2. Slide the RFI shield into place from the front of the printer (**Figure 2-4**). Route the large ribbon cable under the RFI shield and out the front.
3. Align the two screw holes on the printer frame with the two screw holes on the RFI shield and the two screw holes on the rear cover. Replace the four screws (**Figure 2-4**).
4. Replace the main logic board, lower access cover, and front access cover.



**Figure 2-5 Operation Panel Assembly and Cable**

---

## □ OPERATION PANEL ASSEMBLY AND CABLE

The operation panel assembly includes the panel cover (with buttons) and the PCB. The metal shield and the operation panel cable are available separately.

### Remove

1. Remove the front access cover, lower access cover, main logic board, and printer frame assembly.
2. Pull up carefully on the ribbon cable, which is fastened to the inside of the printer rear cover with double-stick tape (**Figure 2-5A**).
3. Using a precision screwdriver (and being careful not to mar the plastics), release the two tabs that hold the operation panel assembly to the printer rear cover (**Figure 2-5A**). Slide the operations panel toward you to free it from the printer rear cover.
4. To remove the operations panel cable, pull gently on the cable connector to free it from its connector.
5. To remove the metal shield, turn the assembly over so that you can see the PCB on the bottom (**Figure 2-5B**). Release the tabs that hold the PCB to the cover and lift out the PCB and the metal shield.

### Replace

1. Replace the metal shield in the operations panel assembly cover as shown in **Figure 2-5B**. Then slide the PCB into place on the bottom of the cover and press down until you hear the tabs snap into place.
2. To replace the operation panel cable, determine which end of the cable has a right-angle (L-shaped) bend about 1 inch from the connector—connect that end to the connector on the panel (the L-shaped bend fits into the top inside of the printer rear cover as shown in **Figure 2-5C**). Be sure that the metal teeth of the connector face the bottom side of the connector and that the colored plastic faces up.
3. Remove the protective strip from the double-stick tape. Press on the cable to adhere the double-stick tape to the rear cover. Be sure the cable has sufficient "play" at the right-angle (L-shaped) fold so that the printer frame does not put stress on the cable when the frame is reinstalled (**Figure 2-5C**).
4. Replace the printer frame assembly, lower access cover, and front access cover.

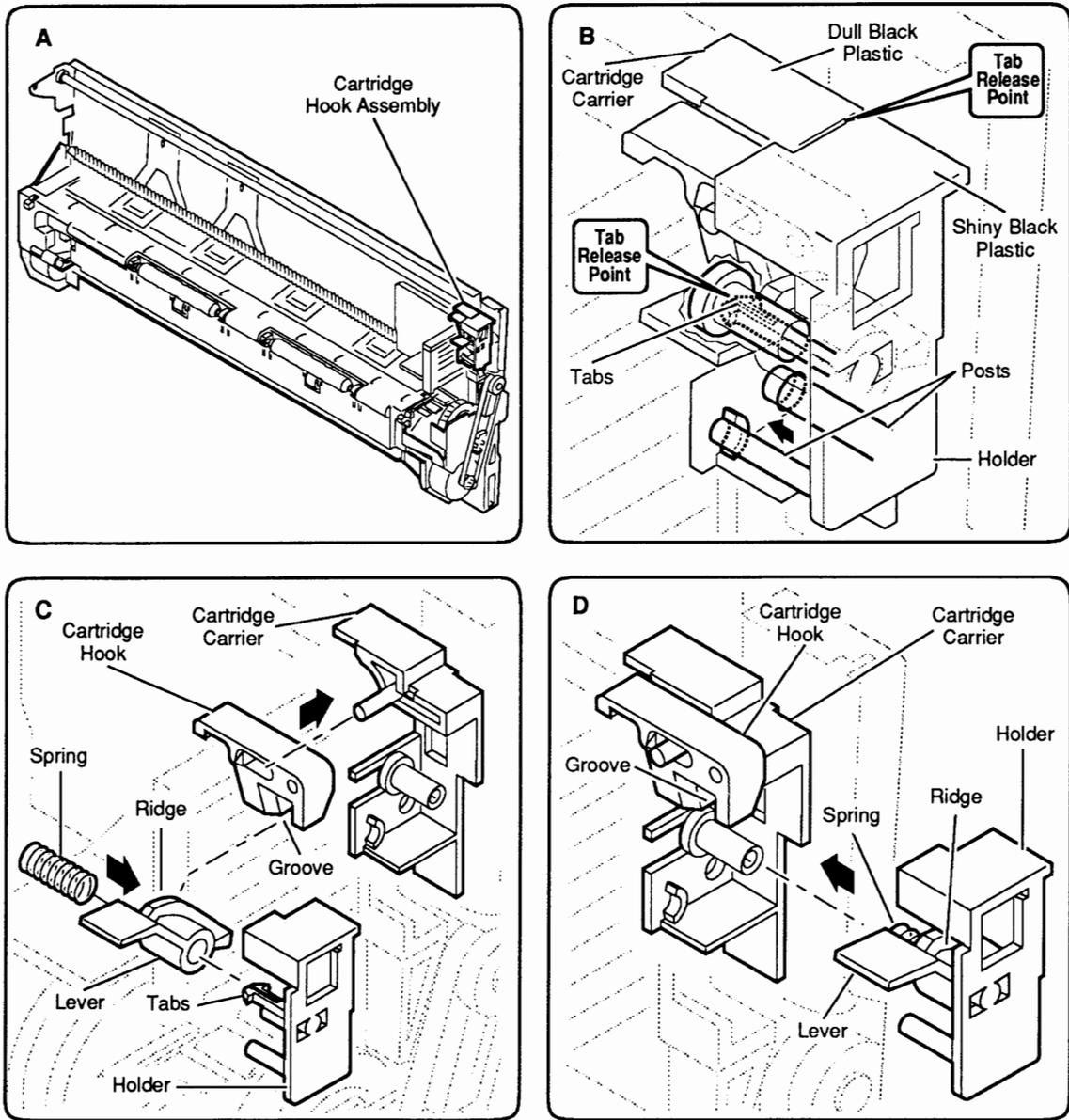


Figure 2-6 Cartridge Hook

---

## □ CARTRIDGE HOOK

The cartridge hook assembly kit contains the cartridge hook, lever, spring, and holder.

### Remove

1. Remove the front access cover, lower access cover, main logic board, and printer frame assembly.
2. Place the printer frame assembly on a padded surface (take care not to crumple the ribbon cables under the frame).
3. Look carefully at the cartridge hook assembly in the upper-right corner of the printer frame assembly (**Figure 2-6A**). Note how the lever and the cartridge hook are positioned in the assembly. Move the lever up and down and watch the cartridge hook operate. Also note that the plastic of the cartridge hook holder is glossy black; the plastic of the adjacent carrier is a dull black (**Figure 2-6B**).
4. Using a precision screwdriver, gently pry between the top of the cartridge hook holder and the adjacent plastic of the cartridge carrier at tab release point **#1** (**Figure 2-6B**). Push the cartridge hook holder toward the right edge of the printer frame. Insert small tweezers into the cartridge carrier post at tab release point **#2** and gently squeeze the tips of the lower tabs inward to release the tabs from the inside of the post.
5. When the cartridge hook holder is loose, pull it off the frame. The four pieces of the cartridge hook assembly (the holder, spring, lever, and hook) will fall into your hand.

### Replace

1. Assemble the cartridge hook assembly pieces as shown in **Figure 2-6C**: put the cartridge hook on its post on the cartridge carrier and put the lever and the spring over the central post of the holder.
2. Slide the cartridge hook assembly into place on the cartridge carrier as you mesh the ridge on the lever with the groove on the bottom of the cartridge hook (**Figure 2-6D**). Be sure the assembly snaps securely into place on the carrier.
3. Replace the printer frame assembly, main logic board, lower access cover, and front access cover.

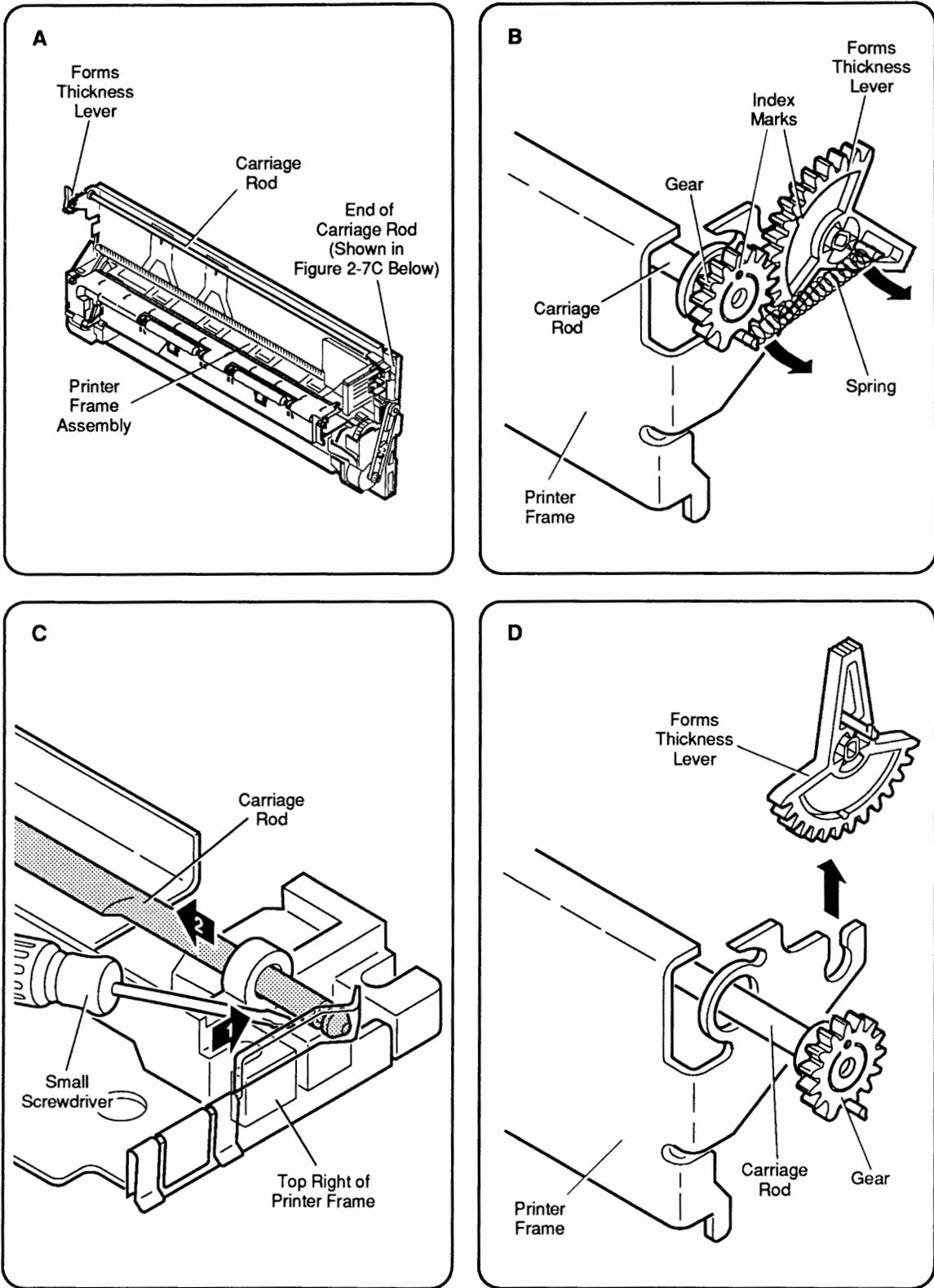


Figure 2-7 Forms Thickness Lever

---

## □ FORMS THICKNESS LEVER

The forms thickness lever kit contains the forms thickness lever and its spring.

### Remove

1. Remove the front access cover, lower access cover, main logic board, and printer frame assembly.
2. Place the printer frame assembly on a padded surface, taking care not to crumple the ribbon cables under the frame.
3. Locate the forms thickness lever in the upper-left corner of the printer frame assembly (**Figure 2-7A**).
4. Remove the spring from the forms thickness lever (**Figure 2-7B**).
5. The forms thickness lever is actually a gear that meshes with a second gear to the rear; the second gear attaches to the carriage shaft that controls the distance of the ink cartridge from the paper. Observe how the two gears fit together. Note the gear index markings (dots) that align when the gears are in the middle of the range (**Figure 2-7B**). You will need to know how these markings line up so you can reassemble the gears correctly.
6. Now look at the other end of the carriage shaft (at the upper-right corner of the printer frame). The notch at the end of the shaft is secured in a tiny black plastic holder (**Figure 2-7C**). In this step, you are going to free the end of the shaft from the holder and push the shaft toward the other end of the printer frame assembly (toward the forms thickness lever) so that the gear attached to the shaft pushes past and separates from the forms thickness lever gear. To do this, use a precision screwdriver to push down on the black plastic holder while you push the shaft to the left (toward the forms thickness lever).
7. Now that the forms thickness lever is free of the rear lever, you can turn the forms thickness lever gear to its full UP or full DOWN position and slide it off the printer frame (**Figure 2-7D**).

## Replace

1. Position the forms thickness lever in the full UP or full DOWN position and slide it onto the printer frame (**Figure 2-7D**).
2. Position the rear gear beside the forms thickness lever gear so that the index markings on the two gears line up (**Figure 2-7B**). Push the rear gear and the carriage shaft toward the right side of the printer frame so that the other end of the carriage shaft snaps into place in its black plastic holder (**Figure 2-7C**). Rotate the forms thickness lever up and down to be sure the gears are synchronized and work freely together.
3. Replace the spring (**Figure 2-7B**).
4. Replace the printer frame assembly, main logic board, lower access cover, front access cover.

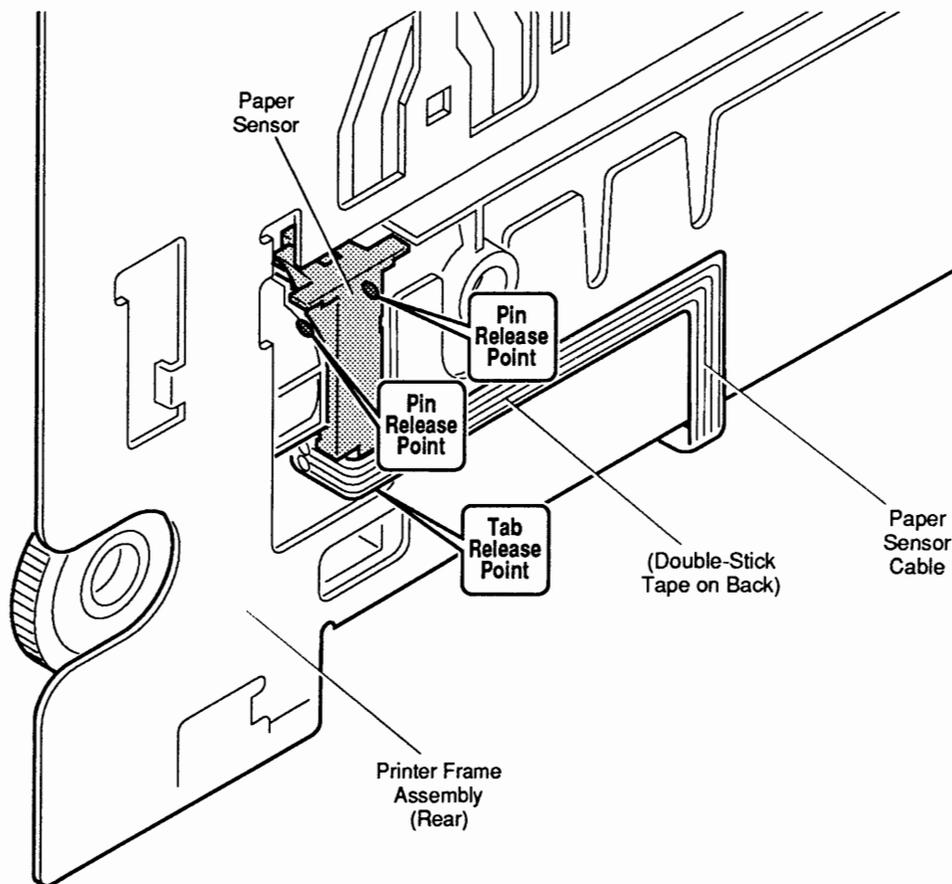


Figure 2-8 Paper Sensor

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## □ PAPER SENSOR

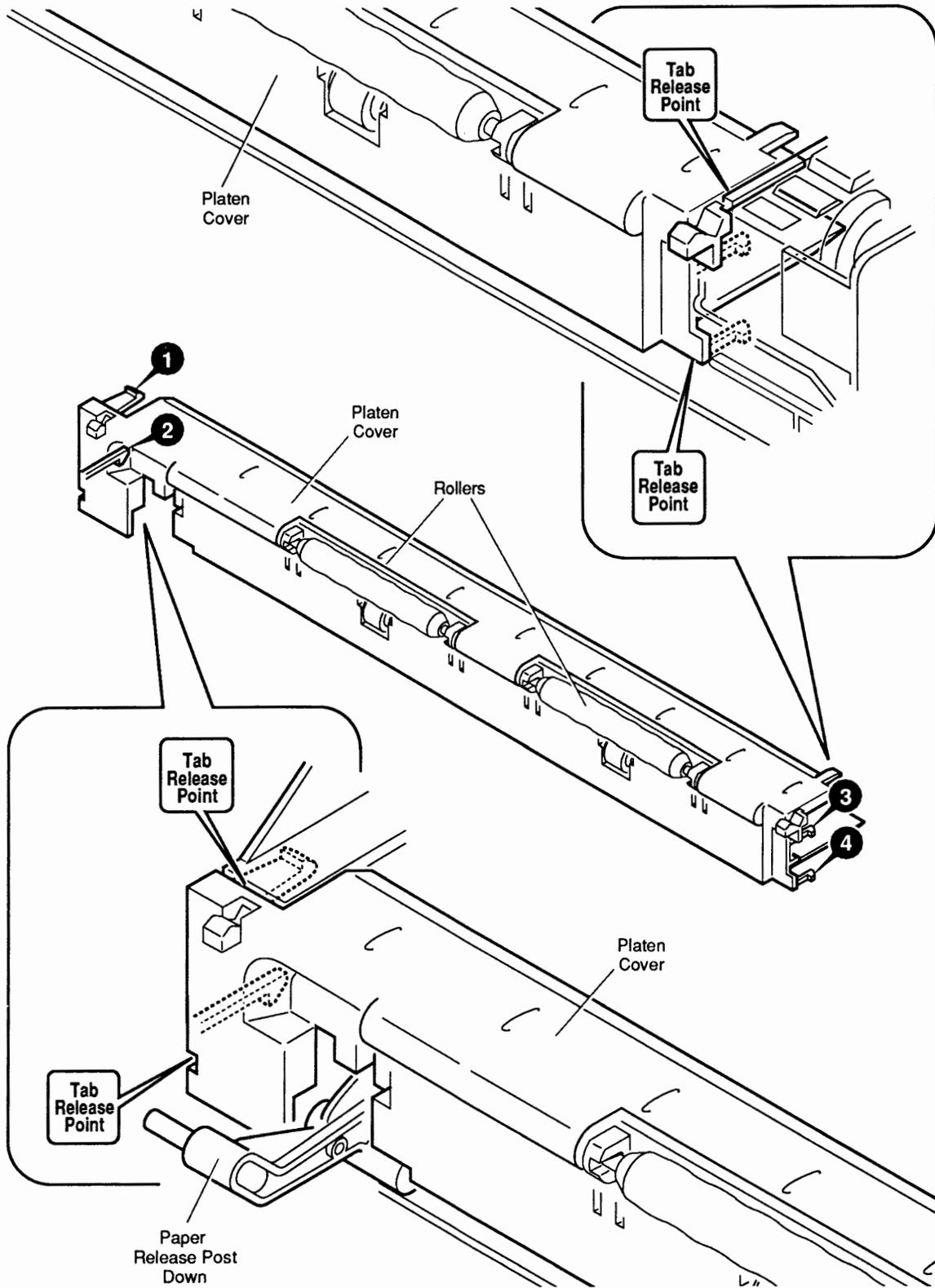
The paper sensor is located on the rear of the printer frame assembly. The paper sensor cable attaches to the front of the logic board.

### Remove

1. Remove the front access cover, lower access cover, main logic board, and printer frame assembly.
2. Turn the printer frame assembly over and locate the paper sensor (**Figure 2-8**). Note that the paper sensor cable is attached to the back of the printer frame with double-stick tape. Carefully peel the cable off the tape, but leave the tape in place on the metal frame.
3. Using a precision screwdriver, carefully release the tab at the bottom of the paper sensor. To loosen the pins that hold the top of the paper sensor in place, carefully insert your precision screwdriver between the paper sensor and the frame at the upper pin release points (**Figure 2-8**). When the paper sensor is free of the frame, lift the sensor out.

### Replace

1. Snap the paper sensor into place on the rear of the printer frame assembly (**Figure 2-8**).
2. Route the paper sensor cable over the double-stick tape and press the cable down to secure it firmly to the tape.
3. Replace the printer frame assembly, main logic board, lower access cover, and front access cover.



**Figure 2-9 Platen Cover and Rollers**

---

## □ PLATEN COVER AND ROLLERS

***CAUTION: Removal of the platen cover is necessary only if it is broken and must be replaced—do not remove it in order to perform other take-apart procedures. Removal of the platen cover is the most painstaking procedure in this section. The plastic tabs are hidden and tiny, and they break very easily. Be very careful not to use force!***

---

### Remove

1. Remove the front access and lower access covers.
2. Pull the paper release post down as far as possible.
3. Before going on, examine **Figure 2-9** to familiarize yourself with the placement of the four tabs (**#1**, **#2**, **#3**, and **#4**) that hold the platen cover in place, and the location of the tab release points on the printer frame (shown in the upper and lower closeups). Only the lower right tab (**#4**) is visible from the outside when the platen cover is in place.
4. Using a precision (jeweler's) screwdriver, **carefully** free the upper-left tab (**#1**) at the tab release point indicated in the lower figure closeup (**Figure 2-9**).
5. Place your screwdriver between the platen cover and the printer frame at the release point for the lower left tab (**#2**) and pry **gently** to free the tab.
6. Now lift up and rotate the cover slightly to free the upper and lower right tabs (**#3** and **#4**)—at the other end of the platen cover—from the printer frame. Lift the platen cover free.

### Replace

1. Be sure the paper release post is down.
2. Carefully move the platen cover into position over the platen and push down gently on the platen cover until the tabs snap into place.
3. Replace the lower access cover and front access cover.

### Rollers

You need not remove the platen cover from the frame in order to replace a roller. Simply grasp the roller with your fingers and pull—its end tabs will slip out of the holes on the platen cover. To replace a roller, simply snap it into place on the platen cover.

## □ REAR COVER

### Remove

1. Remove the front access cover, lower access cover, main logic board, printer frame assembly, and operations panel assembly and cable.
2. Remove the retainer (security) clip from the rear corner of the rear cover (**Figure 2-10A**). Save the retainer clip to install on the replacement rear panel.

### Replace

1. Read the customer's original serial number from the label on the bottom of the old rear cover and record the number with indelible ink on the bottom of the new cover (**Figure 2-10B**).
2. Replace the customer's retainer (security) clip on the rear corner of the rear cover (**Figure 2-10A**).
3. Replace the operations panel assembly and cable, printer frame assembly, main logic board, lower access cover, and front access cover.

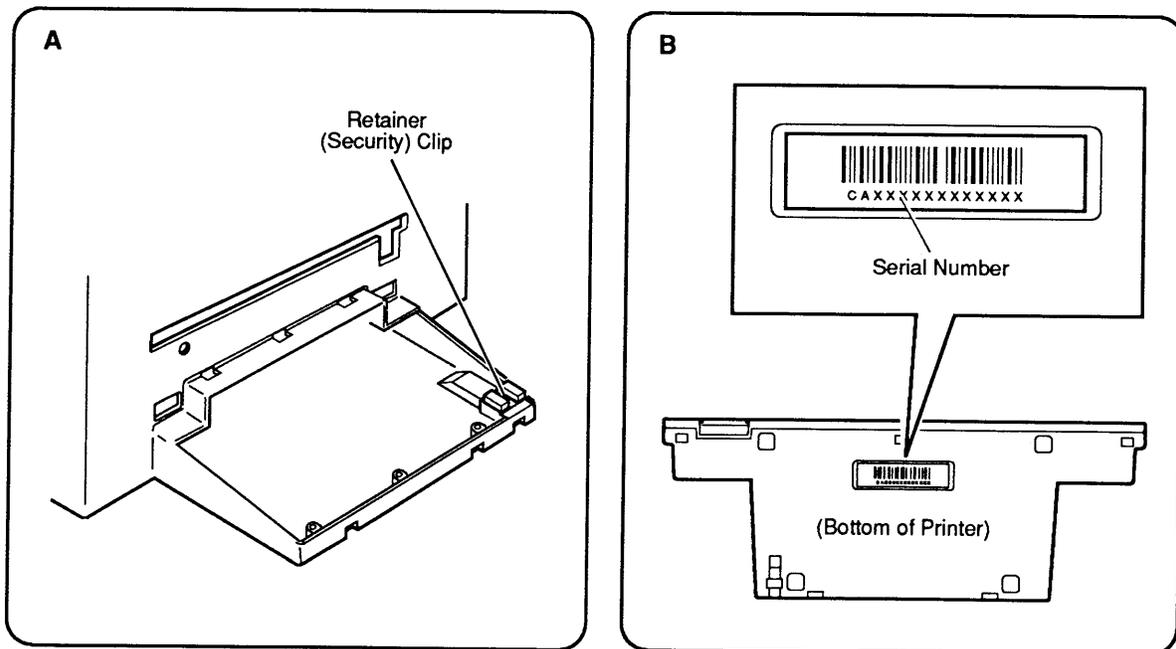


Figure 2-10 Rear Cover

---

## □ FUSE

### Remove and Replace

1. Remove the main logic board cover.
2. Locate the fuse (**Figure 2-11**). Using a precision screwdriver, gently pry the ends of the fuse out of the holder.
3. Carefully snap the replacement fuse into the holder.

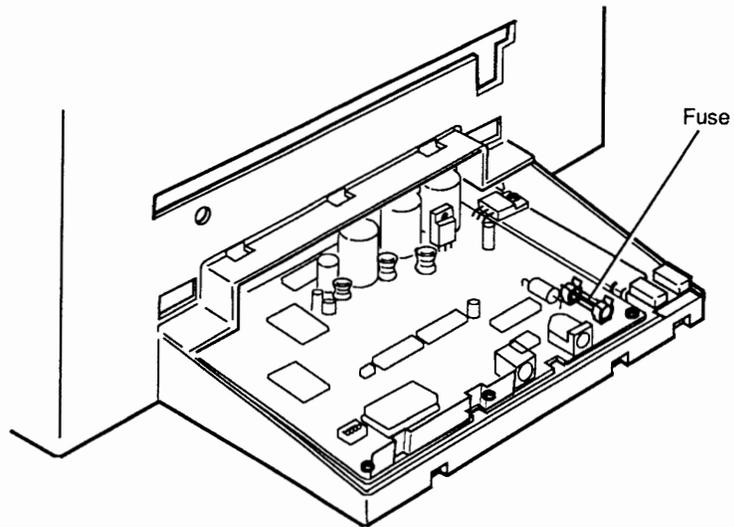


Figure 2-11 Fuse

## □ CUT SHEET FEEDER OUTPUT TRAY SIZE EXTENSION

### Remove

1. Separate the cut sheet feeder from the printer (see Section 1, Basics).
2. Open the output tray on the cut sheet feeder and tip up the extension so that you can see the underside (**Figure 2-12**).
3. Using a precision screwdriver, lift up the tabs on the extension guide and slide the size extension out.

### Replace

- Slide the new size extension into the extension guide until the tabs snap into place.

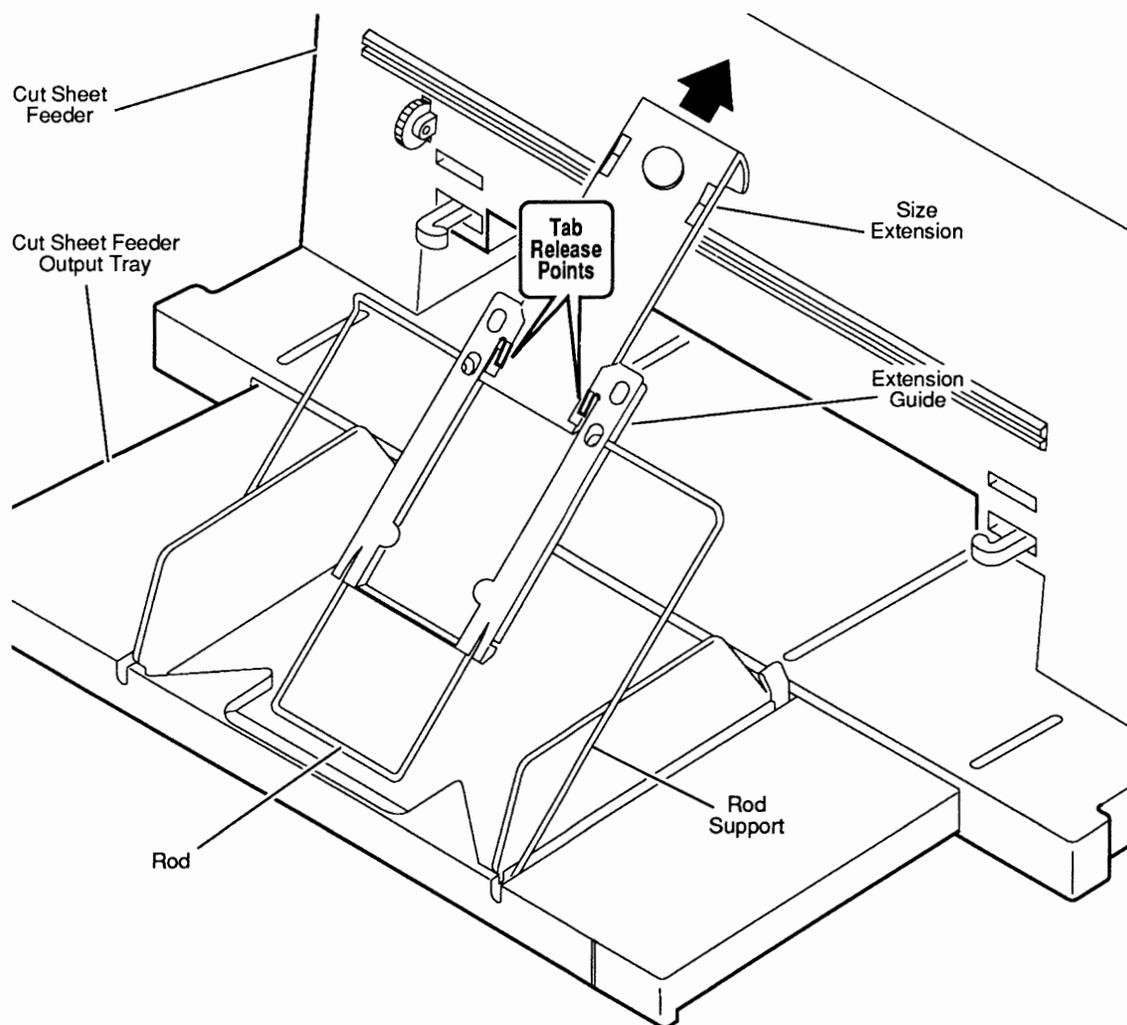


Figure 2-12 Output Tray Size Extension

## □ CUT SHEET FEEDER OUTPUT TRAY EXTENSION GUIDE AND ROD SUPPORT

### Remove

1. Separate the cut sheet feeder from the printer (see Section 1, Basics).
2. Open the cut sheet feeder output tray, and remove the cut sheet feeder output tray size extension.
3. Slide the extension guide to the end of the shaft. Using a precision screwdriver, lift up the tabs to free the extension guide from the rod (**Figure 2-13**).
4. If you wish to remove the rod support, press in on the lower ends of the support to free it from the output tray base.

### Replace

1. To replace the rod support, press in slightly on the ends of the support and insert the ends into the holes on the output tray base.
2. To replace the extension guide, lift the tabs on each side of the guide and slide the guide over the rod.
3. Replace the output tray size extension.

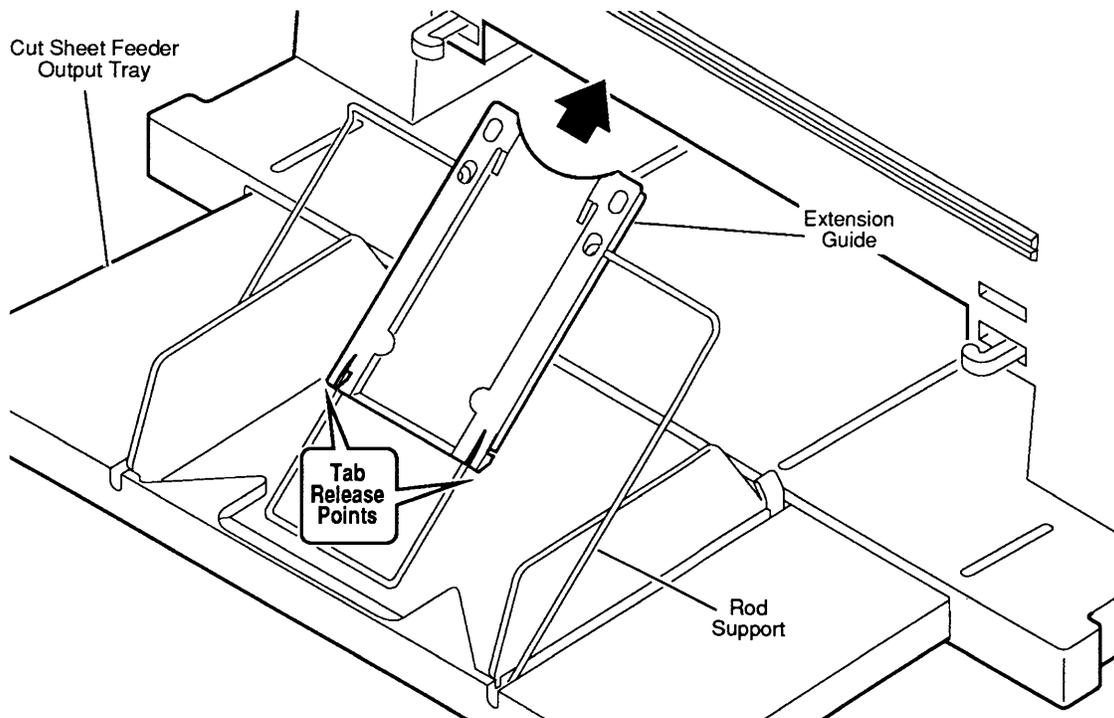


Figure 2-13 Output Tray Extension Guide

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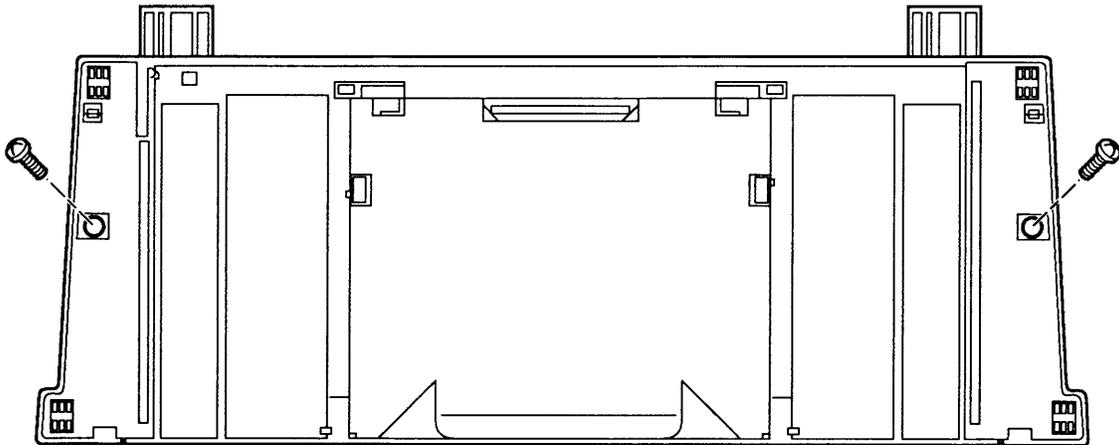
## □ CUT SHEET FEEDER OUTPUT TRAY AND BASE

### Remove

1. Separate the cut sheet feeder from the printer (see Section 1, Basics).
2. Turn the cut sheet feeder so that you can see the bottom.
3. Remove the two screws (**Figure 2-14**) and lift off the output tray and base assembly.

### Replace

Position the output tray and base assembly on the bottom of the cut sheet feeder and replace the two screws.



**Figure 2-14 Output Tray and Base**

---

## □ STYLEWRITER REVISION IDENTIFICATION

The StyleWriter has two different revisions, Revision A and Revision B. The revisions are identical in outward appearance. The identifying feature is the color of a small gear hidden behind the carriage hook assembly. Follow the procedures below to locate the distinguishing gear.

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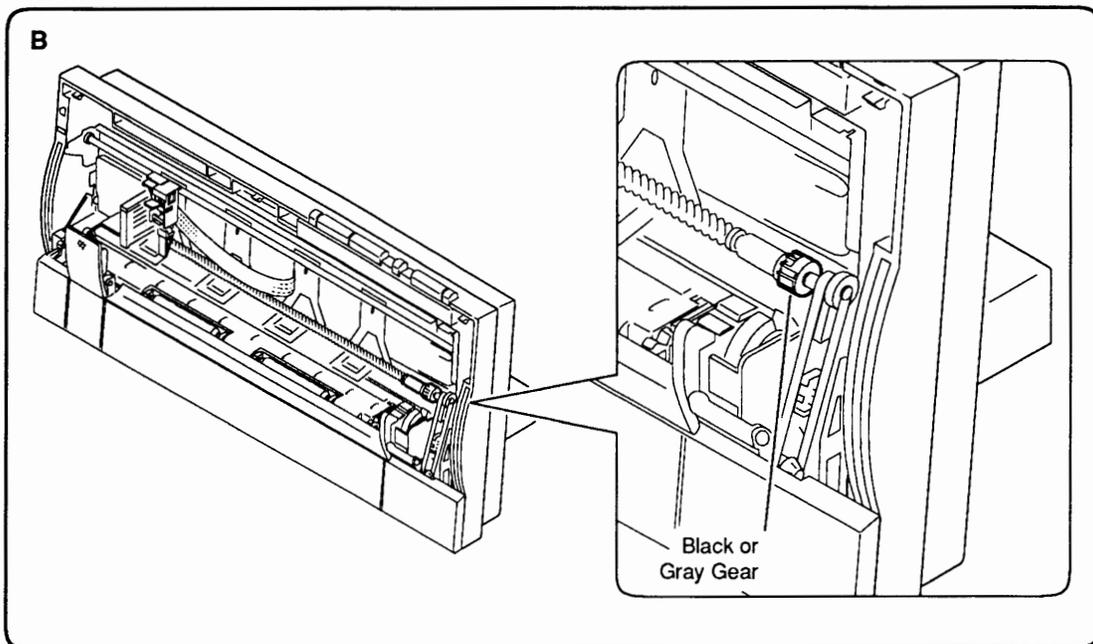
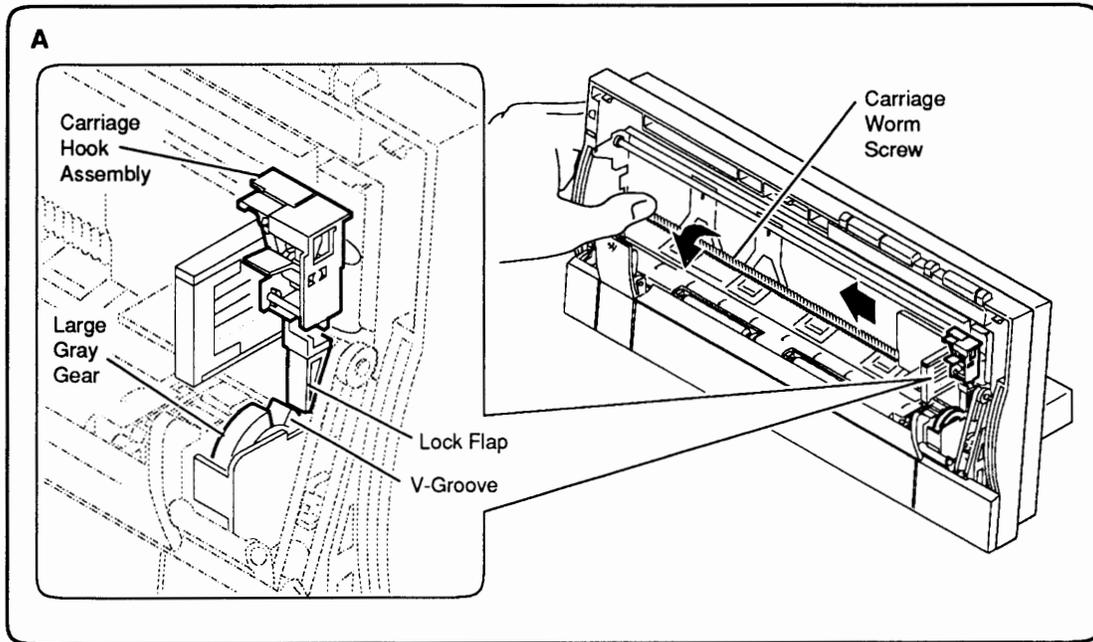
**CAUTION:** *The main logic board and printer frame modules are not interchangeable between StyleWriter Revision A and Revision B.*

---

1. Lower the front access cover if it has not been removed.
2. Locate a large gray gear below the carriage hook assembly. Manually rotate the carriage worm screw until the V-groove of the large gray gear faces up (**Figure 2-15A**).
3. Slide the carriage hook assembly to the left by guiding the lock flap through the V-groove of the large gray gear (**Figure 2-15A**). (It may be necessary to push gently on the carriage hook assembly or to rotate the worm screw slightly to slide the carriage hook assembly.)
4. Notice the gear that is next to the spring and at the right end of the worm screw (**Figure 2-15B**).

If the the gear is black, the printer is a Revision A StyleWriter. Be certain that you use the main logic board and printer frame assembly for Revision A.

If the the gear is gray, the printer is a Revision B StyleWriter. Be certain that you use the main logic board and printer frame assembly for Revision B.



**Figure 2-15 StyleWriter Revision Identification**

# StyleWriter

## Section 3 – Troubleshooting

---

### □ CONTENTS

- 3.2 Introduction
- 3.2 Preliminary Checklist
- 3.3 How to Use the Symptom/Cure Chart
- 3.4 Symptom/Cure Chart
- 3.4 Status Light Problems
- 3.4 Print Problems
- 3.6 Carrier Movement Problems
- 3.6 Paper Feed Problems
- 3.7 Miscellaneous Problems
- 3.8 Reseating the Right-Margin Sensor

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## □ INTRODUCTION

### **Preliminary Checklist**

Some problems may be corrected by simple measures that do not involve taking apart the printer. Before you attempt a repair and before you connect the printer to a computer, attempt to run the test page. If the test page does not run to completion, observe where the process stops working. Also, before you attempt any module replacement, first eliminate all other possible causes for the problem by following the checklist below:

### **Software Problems**

Error messages on the Macintosh screen almost always indicate that the problem is software-related (rather than in the printer hardware).

- If the computer cannot find the printer:
  - Check to see that the StyleWriter driver is installed.
  - Check the serial cable connection.
  - Try swapping the serial cable.
- If you get system bombs, try reinstalling the system and printer files.
- If "what you see is not what you get," try known-good application software.

### **No Lights/ No Movement**

If you get no response from the printer (no status lights, hum of operation, etc.) the problem is in the power function.

- Be sure the printer is plugged into the power adapter, the adapter is plugged into the wall socket, and the printer is turned on.
- Try another electrical outlet.
- Try replacing the AC power adapter.
- Try replacing the logic board 2.5 amp fuse.

### *Print Quality Problems*

If you are seeing problems such as incomplete characters, too much ink, white lines, etc., the problem is almost certainly with the print head (which is contained in the ink cartridge). To correct the problem:

- Use correct paper weight.
- Purge the ink cartridge five times.
- Replace the ink cartridge with a known-good cartridge.
- Verify that the StyleWriter has the correct revision of the main logic board and printer frame assembly. See "StyleWriter Revision Identification" in Section 2, Take-Apart.

### *Mechanical Problems*

If you are seeing paper feed problems, the problem may be in the cut sheet feeder or paper.

- Use correct paper weight.
- Clear any paper jam.
- Verify proper alignment of the cut sheet feeder with the printer.
- Replace the cut sheet feeder.

### **How to Use the Symptom/Cure Chart**

If you cannot solve the problem using the preliminary checklist, use the symptom/cure chart. First, find the symptom that most nearly describes the problem; then perform the first corrective action on the solution list. If that corrective action does not fix the problem, go to the next action. **If you replace a module and find that the problem remains, reinstall the original module before you go on to the next action.**

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## □ SYMPTOM/CURE CHART

### Status Light Problems

### Solutions

- *No status lights*
  1. Check AC adapter connection.
  2. Replace AC adapter.
  3. Replace fuse.
  4. Check operation cable connection to logic board.
  5. Replace main logic board.
  6. Replace operations panel assembly.
  7. Replace operations panel cable.
  
- *Error and power lights blink; ready light off*
  1. Carriage is jammed. Remove anything that obstructs free motion of carriage.
  2. Replace main logic board.
  3. Verify that right-margin sensor is seated properly (see "Reseating the Right-Margin Sensor").
  4. Replace printer frame assembly.
  5. Replace operations panel assembly.
  6. Replace operations panel cable.
  
- *Error light blinks; power light on, ready light off*
  1. Close front cover.
  2. Check to be sure paper is inserted properly.
  3. Check for paper jam; remove jam, then press ready switch. If ready and power lights come on steadily (and error light is off), the problem is resolved.
  4. Replace paper sensor.
  5. Replace main logic board.
  6. Replace printer frame assembly.
  7. Replace operations panel assembly.
  8. Replace operations panel cable.

### Print Problems

### Solutions

- *Garbled printing*
  1. Check interface cable between printer and computer.
  2. Purge ink cartridge five times (see Section 1, Basics).
  3. Replace ink cartridge.
  4. Verify that printer frame assembly and main logic board are compatible with StyleWriter revision. (See "StyleWriter Revision Identification" in Section 2, Take-Apart.)
  5. Replace main logic board.
  6. Replace printer frame assembly.

- *No printing*
  1. Verify that interface cable between printer and computer is tightly connected.
  2. Make sure printer is selected in Chooser.
  3. Purge ink cartridge five times (see Section 1, Basics).
  4. Replace ink cartridge.
  5. Replace paper sensor.
  6. Replace main logic board.
  7. Verify that right-margin sensor is seated properly (see "Reseating the Right-Margin Sensor").
  8. Replace printer frame assembly.
  
- *Overprinting*
  1. Verify that program being used is set for correct line spacing and line length.
  2. Ensure that correct printer driver is installed.
  3. Replace main logic board.
  4. Replace printer frame assembly.
  
- *Image too light or too dark*
  1. Purge ink cartridge five times (see Section 1, Basics).
  2. Use 16 lb to 24 lb cotton bond paper.
  3. Make sure forms thickness lever is set correctly (*up* for standard paper; *down* for envelopes, transparencies, labels, and heavy paper).
  4. Replace ink cartridge.
  
- *White lines in printing*
  1. Purge ink cartridge five times (see Section 1, Basics).
  2. Replace ink cartridge.
  3. Replace main logic board.
  4. Replace printer frame assembly.
  
- *Page prints off center; images out of place*
  1. Use 16 lb to 24 lb cotton bond paper.
  2. Ensure sheet feeder holds no more than 50 sheets.
  3. Set paper correctly in sheet feeder.
  4. Ensure that margins in document and paper size in Page Setup are correct.
  5. Replace main logic board.
  6. Replace printer frame assembly.
  
- *Ink appears on back of paper*
  1. Clean platen with a soft, dry cloth.
  2. Clean platen rollers.
  3. Replace platen rollers.
  4. Replace printer frame assembly.



- *Image wavy, splotchy, or distorted*
  1. Purge ink cartridge five times (see Section 1, Basics).
  2. Replace ink cartridge.
  3. Replace printer frame assembly.

**Carrier Movement Problems**

**Solutions**

- *Erratic carrier motion*
  1. Replace main logic board.
  2. Replace printer frame assembly.
  
- *Power light on, no carrier motion*
  1. Check and, if obstructed, clear carrier area.
  2. Replace main logic board.
  3. Replace printer frame assembly.
  
- *Printer will not perform self-test; ready light on*
  1. Replace main logic board.
  2. Replace operations panel assembly.
  3. Replace printer frame assembly.
  
- *Carrier grinds, hums loudly, or locks up*
  1. Verify that right-margin sensor is seated properly (see "Reseating the Right-Margin Sensor").
  2. Replace printer frame assembly.

**Paper Feed Problems**

**Solutions**

- *No paper feed*
  1. Verify alignment of cut sheet feeder with printer.
  2. Release paper pressure plate on cut sheet feeder.
  3. Clear paper path if it is obstructed.
  4. Replace cut sheet feeder.
  5. Replace main logic board.
  6. Replace printer frame assembly.
  
- *Grinding during paper feed*
  1. Verify that there are no obstructions in paper path.
  2. Make sure forms thickness lever is set correctly (*up* for standard paper; *down* for envelopes, transparencies, labels, and heavy paper).
  3. Verify alignment of cut sheet feeder with printer.
  4. Replace cut sheet feeder.
  5. Replace main logic board.
  6. Replace printer frame assembly.

- *Paper feed difficulties: binding, tearing*

1. Make sure forms thickness lever is set correctly (*up* for standard paper; *down* for envelopes, transparencies, labels, and heavy paper).
2. Check and, if necessary, clear paper path.
3. Verify that paper is correctly installed.
4. Use 16 lb to 24 lb cotton bond paper.
5. Verify alignment of cut sheet feeder with printer.
6. Replace cut sheet feeder.
7. Replace printer frame assembly.

- *Envelope feed problems*

1. Since envelopes generally are thicker than cut sheets, the user must:
  - Make sure to adjust paper thickness lever when printing envelopes.
  - Reset paper thickness lever when printing on cut sheets is resumed.
  - Because of the difference in paper thickness between cut sheets and envelopes, do not run cut sheets and envelopes in the same print job.
2. Replace printer frame assembly.

## **Miscellaneous Problems**

## **Solutions**

- *Operations panel buttons don't work*

1. Make sure operations panel cable is securely connected to main logic board and operations panel.
2. Replace main logic board.
3. Replace operations panel.
4. Replace operations panel cable.

- *Software-specific problem*

1. Try known-good software.
2. Some software is incompatible with TrueType fonts. Check your software application manual.

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## □ RESEATING THE RIGHT-MARGIN SENSOR

One possible cause of a grinding noise or failure to print is that the right-margin sensor has been jarred loose from the cartridge hook assembly. Reseating the right-margin sensor can eliminate the need for replacing the entire printer frame assembly. The reseating procedure is tricky, but may be worth a try. The following will help you find the sensor and, if necessary, reseat it.

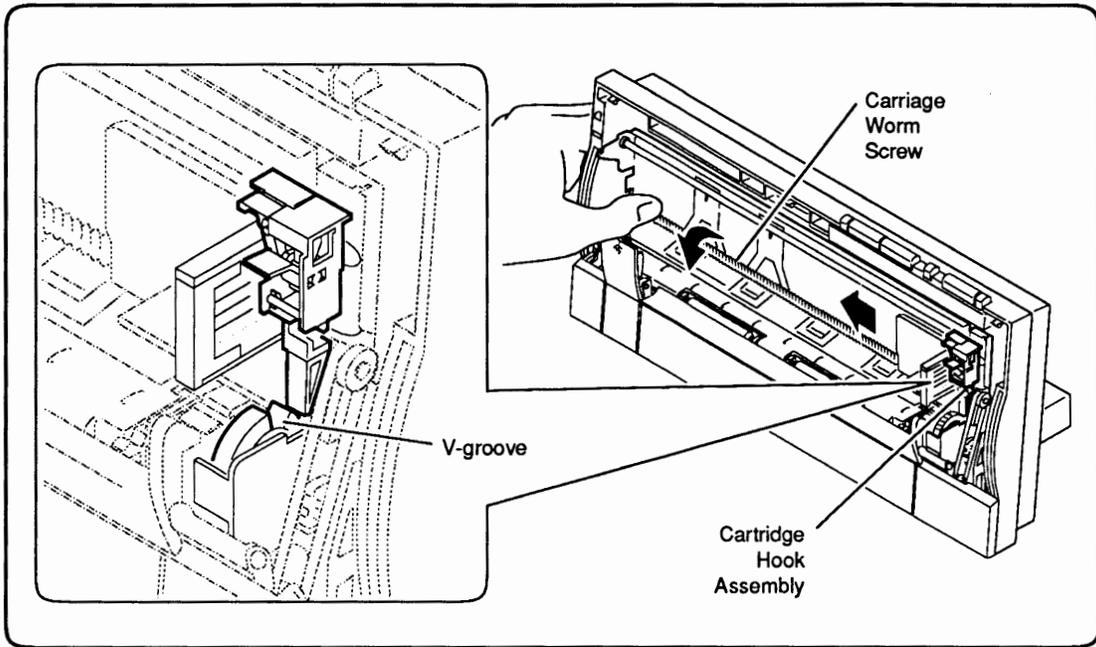
1. Switch off the printer.
2. Remove the front access cover. (Remember to remove the ink cartridge.)
3. Manually rotate the carriage worm screw until the V-groove of the grey gear faces up (**Figure 3-1**).
4. Gently push the cartridge hook assembly toward the back and slide it to the left side of the worm screw.
5. Locate the right-margin sensor behind the cartridge hook assembly (**Figure 3-2**).

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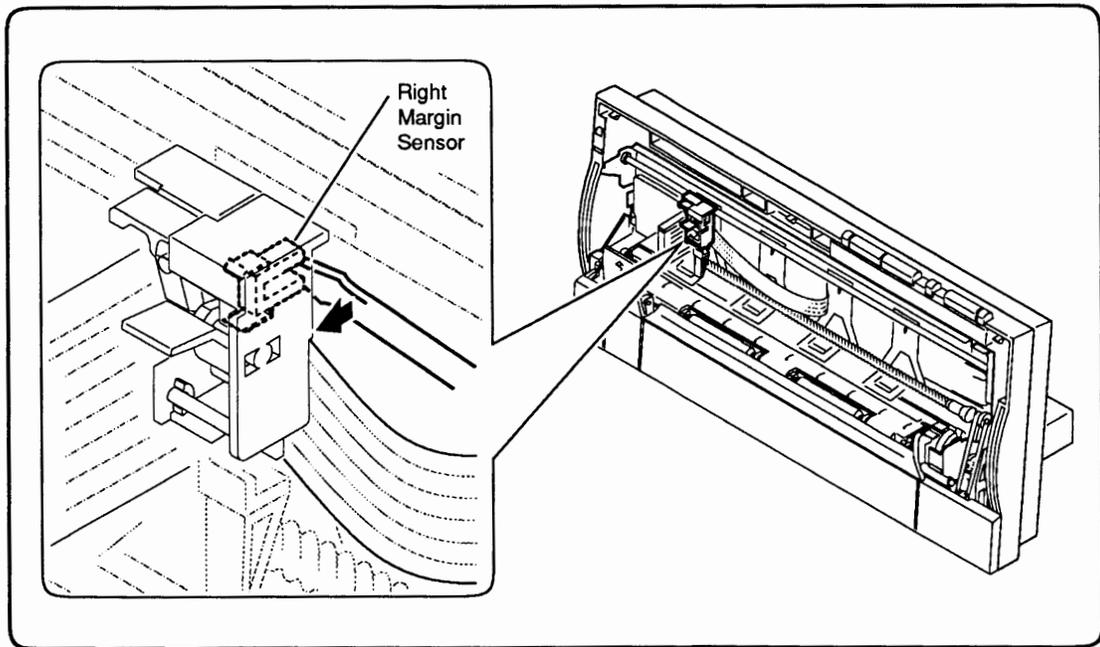
**CAUTION:** *The cable attached to the right-margin sensor is very fragile.*

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6. Check to make sure that right-margin sensor is attached firmly to the cartridge hook assembly.
7. If the sensor is loose, use your fingers, a screwdriver, or needlenose pliers to press the sensor into the cartridge hook assembly (**Figure 3-2**).



**Figure 3-1 Moving the Carriage Hook Assembly**



**Figure 3-2 Reseating the Right-Margin Sensor**

# StyleWriter

## Illustrated Parts List

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### □ CONTENTS

#### IPL.3 Exploded View (Figure 1)

Figure 1 includes all piece parts that can be purchased separately from Apple for the StyleWriter printer, along with their part numbers. These are the only parts available from Apple. Refer to your *Apple Service Programs* manual for prices.

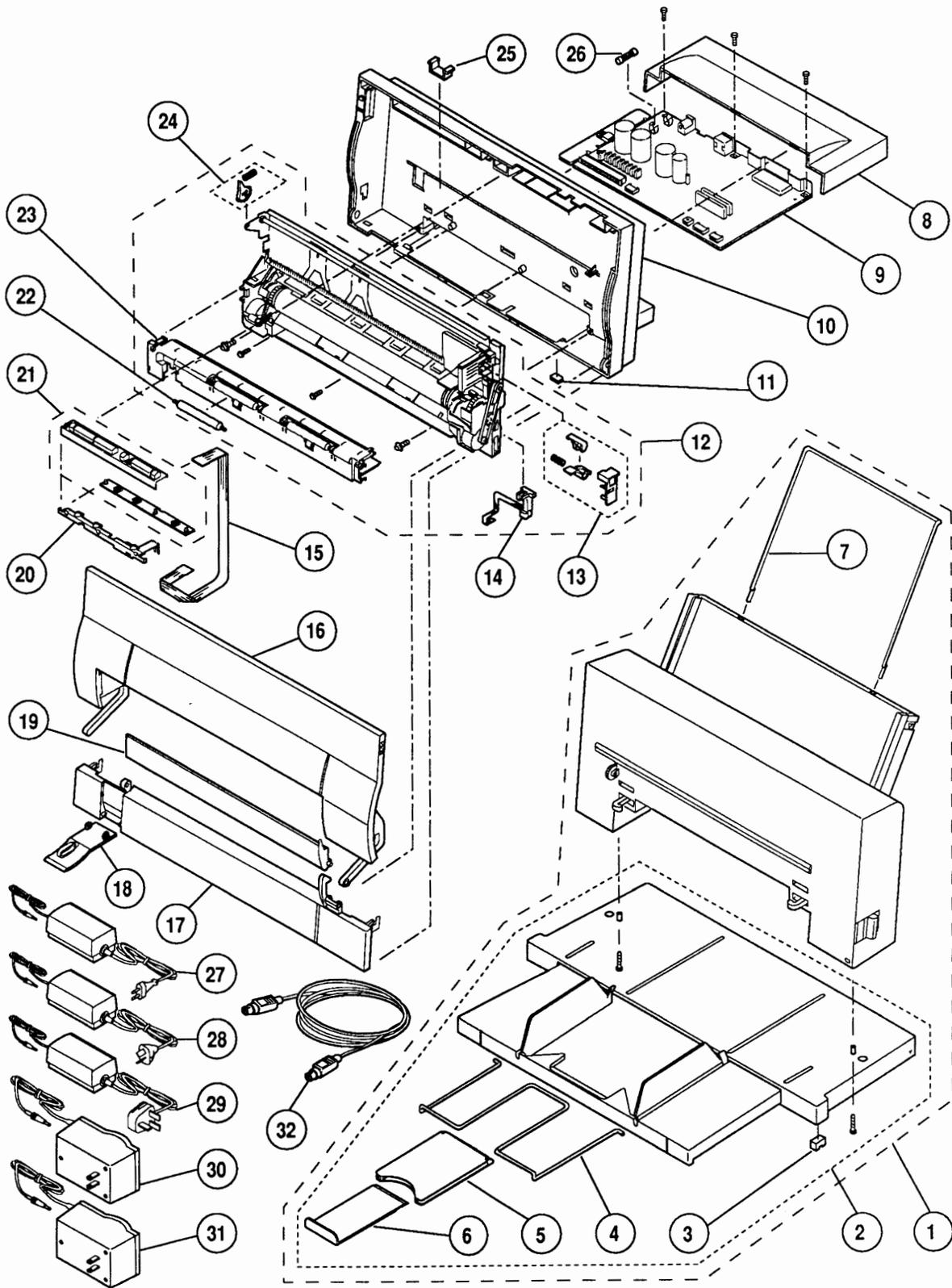


Figure 1 Exploded View

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**□ EXPLODED VIEW (Figure 1)**

<b>Item</b>	<b>Part No.</b>	<b>Description</b>
-	076-0337	Screw Hardware Kit (includes 10 packs for cut sheet feeder base, mounting printer frame, and RFI shield and mounting logic board)
1	661-0628	Cut Sheet Feeder (complete)
2	076-0401	Base & Tray, Cut Sheet Feeder (includes product label, rod support, size extension, and extension guide)
3	076-0334	Foot, Cut Sheet Feeder (10/pack)
4	970-0143	Rod Support, Cut Sheet Feeder Output Tray
5	949-0325	Extension Guide, Cut Sheet Feeder Output Tray
6	970-0269	Size Extension, Cut Sheet Feeder Output Tray
7	970-0142	Rod Support, Paper, Cut Sheet Feeder
8	949-0307	Cover, Main Logic Board
9	661-0629	Main Logic Board (includes fuse), StyleWriter Rev. A
	661-0716	Main Logic Board (includes fuse), StyleWriter Rev. B
10	076-0400	Rear Cover (includes product label)
11	076-0333	Printer Foot (10/pack)
12	661-0630	Printer Frame Assembly, (includes cartridge hook, paper sensor, forms thickness lever, and platen cover with rollers), StyleWriter Rev. A
	661-0718	Printer Frame Assembly, (includes cartridge hook, paper sensor, forms thickness lever, and platen cover with rollers), StyleWriter Rev. B
13	076-0336	Cartridge Hook Kit (contains cartridge hook, spring, lever, and holder)
14	890-0286	Paper Sensor
15	076-0389	Operation Panel Cable
16	949-0308	Front Access Cover
17	949-0311	Lower Access Cover
18	949-0312	Paper Release Lever
19	949-0319	Manual Feed Tray
20	949-0321	Operation Panel Shield
21	982-0062	Operation Panel Assembly (includes PCB and cover)
22	076-0335	Output Feed Roller (10/pack)
23	949-0309	Platen Cover (includes rollers)
24	076-0388	Kit, Forms Thickness Lever (contains forms thickness lever and spring)
25	952-0014	Base Retainer Clip (security)
26	941-5224	Fuse, 2.5 Amp, 250 V (10/pack)
27	Z699-2050	AC Power Adapter, Europe (220 VAC, 48-62 Hz)
28	X699-2050	AC Power Adapter, Australia (240 VAC, 48-62 Hz)
29	B699-2050	AC Power Adapter, UK (240 VAC, 48-62 Hz)
30	J699-2050	AC Power Adapter, Japan (100-105 VAC, 48-62 Hz)
31	699-2050	AC Power Adapter, USA (120 VAC, 58-62 Hz)
32	590-0552	Apple System/Peripheral-8 Cable