

Apple Scanner

Technical Procedures

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Apple Scanner

Section 1 – Basics

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□ PRODUCT DESCRIPTION

Overview

The Apple® Scanner is an optical image reader designed to support the Macintosh® family of CPUs. The scanner is a 300-dot-per-inch (dpi), 8.5-by-14-inch flat-bed device. 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 scanner is capable of detecting 16 different shades of gray, from absolute white to absolute black.

The scanner, along with the software application AppleScan™, allows you to make quality reproduction 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, an item (original) is placed on the glass bed of the scanner and covered with the lid. The start of the scan is selected from the AppleScan application on the host computer. 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.

As an 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 the 300-dpi rate. The array is called a bit map and contains a digitized image of the original document. Depending upon other parameters specified by the user, each dot in the bit map 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 will record what the scanner detects in one of three ways (called composition types): line art, halftone, or grayscale composition.

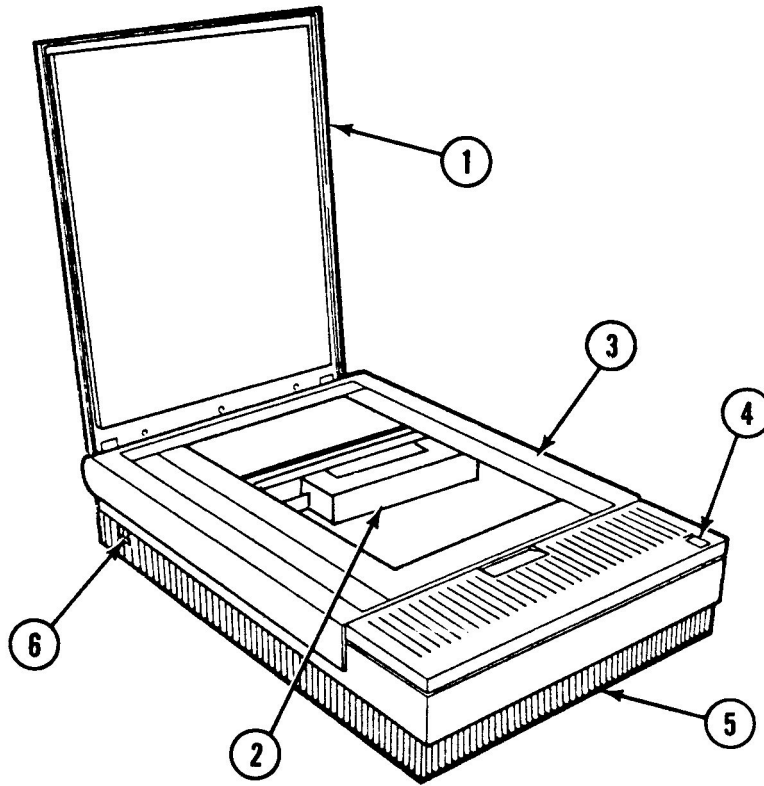
Line art composition: each point scanned is recorded as either black or white, depending on a threshold value you set.

Halftone composition: each point scanned is recorded as either black or white, depending on the particular halftone pattern and the contrast and brightness values you set.

Grayscale composition: each point scanned is recorded 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.

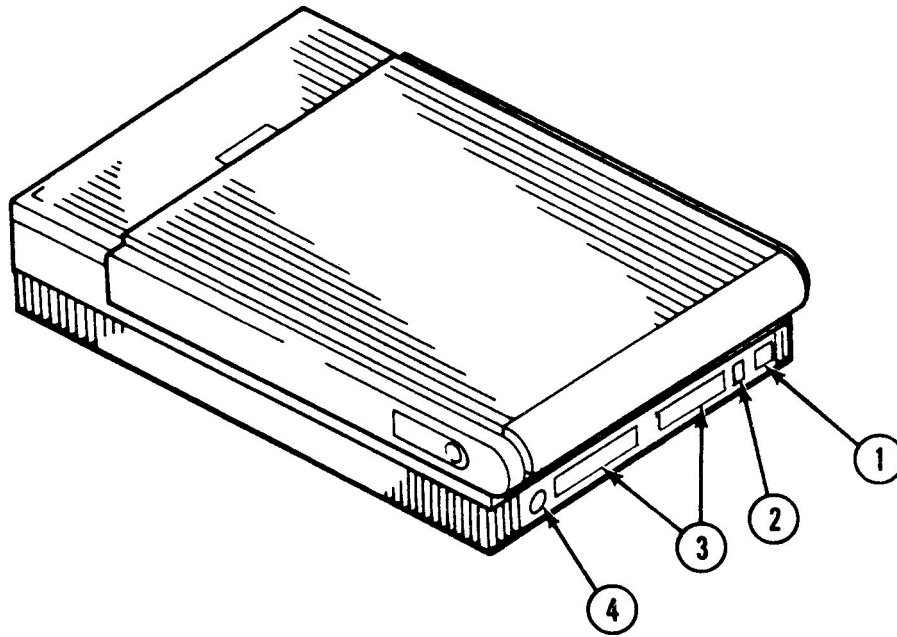
The figures on the following pages point out the major assemblies and components of the scanner.



Front View

- | | |
|------------------|------------------------|
| 1. Top Lid | 4. Scan Switch |
| 2. Optical Block | 5. Bottom Case |
| 3. Top Case | 6. On/Off Power Switch |

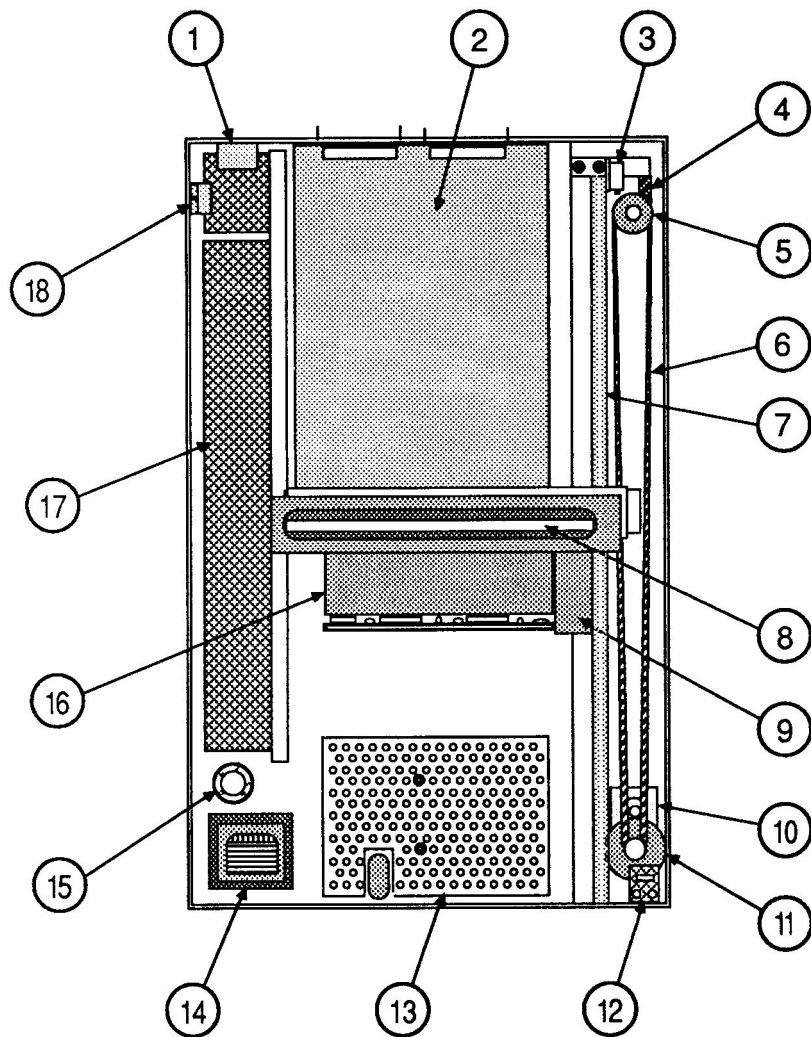
FIGURE 1: PARTS OF PRINTER



Rear View

- | | |
|----------------|--------------------|
| 1. AC Plug | 3. SCSI Connectors |
| 2. SCSI Switch | 4. Not Used |

FIGURE 2: PARTS OF PRINTER



- | | |
|---------------------------|---|
| 1. AC Power Plug Assembly | 10. Pulley Gear |
| 2. Main Logic PCB | 11. Carrier Motor |
| 3. Limit Switch | 12. Scan Start Sw PCB |
| 4. Interlock Switch | 13. Interior Cover |
| 5. Pulley | 14. Transformer |
| 6. Drive Belt | 15. Voltage Selector Switch (Universal Models Only) |
| 7. Carrier Shaft | 16. Optical Assembly |
| 8. Fluorescent Lamp | 17. Power Supply PCB |
| 9. Inverter Assembly | 18. On/Off Power Switch |

FIGURE 3: MAJOR ASSEMBLIES

□ SPECIFICATIONS

Dimension (maximum)	Depth	545 mm
	Width	340 mm
	Height	110 mm
Weight	20 lbs	9.07 kg
Power supply line voltage	USA model:	120 V AC +/-10% 58-62 Hz
	Universal model (user-selectable):	100/120/200/220/240 V AC +/- 10% 48-62 Hz
Power Consumption	Standby	35 Watts
	Scanning	65 Watts
Paper Size	Maximum width	8.50" (215.9 mm)
	Maximum length	14.00" (355.6 mm)
Noise	Standby	<30 dB
	Scanning	<55 dB
Environmental	Operating temperature:	+10° to +40° C
	Storage (6 months):	-40° to +47° C
	Transit (period of 72 hours)	-40° to +65° C
	Noncondensing humidity: Storage (6 months):	20% to 95% RH
Scanning Method	Flat-bed optical image scanning type. Scans any object laid flat on glass scanning bed. Image document is stationary; scanning mechanism moves.	
Sensor	A flat-bed scanning charged coupled device (CCD) along with focusing lenses is used to capture line images. The CCD contains 2592 cells to capture the line images at a maximum rate of 300 dpi.	
Scan Time	Defined as the time to capture and process the image, plus the time to transmit the data to the host computer.	

**SCSI Scan Time
(Per Line)**

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

Scanning Density

Horizontal and vertical density 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

□ THEORY OF OPERATION

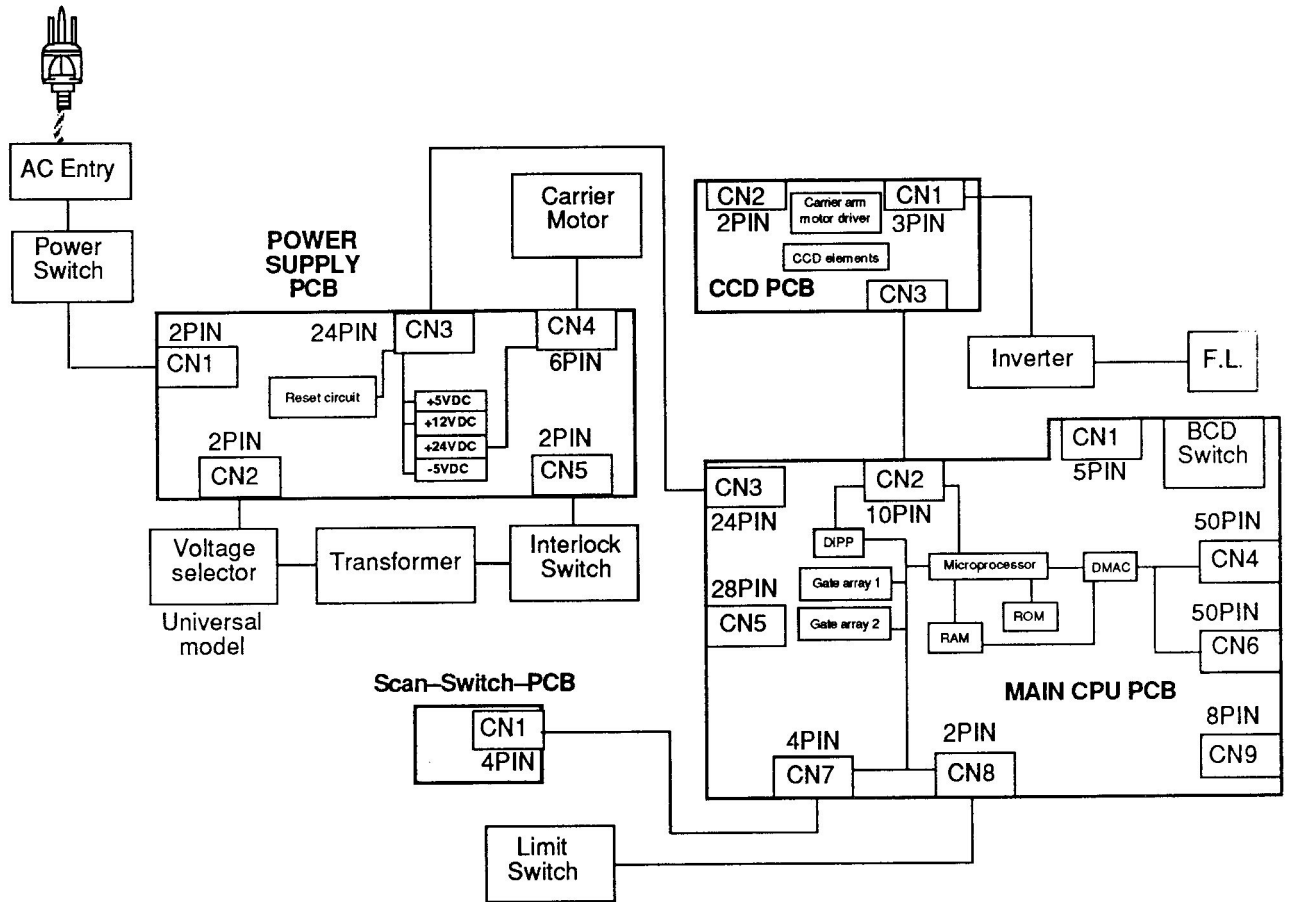


FIGURE 4

Overview

Refer to the block diagram, Figure 4, when reading this section.

Initial reset of the devices is done 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 turned on.

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

As the light scans along the document, the reflected light is gathered (through a series of mirrors and lens) into the light-sensitive charged-coupled device (CCD) arrays. Three layers of CCD elements are used for each pixel. 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, 3 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 2552 pixels wide by one pixel (approximately 1/300 inch by 8-1/2 inches). The other 2 layers are used to buffer the picture elements (called a bit map image) before the elements are transferred to the image-processing circuitry.

From the CCD array, the bit map 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 data is processed by the CPU and sent through the interface circuitry back to the host computer where the document is reformed on the host computer screen.

Power Circuit

The internal power circuit (Figure 5) 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 then the transformer. The power transformer steps down the voltage and provides 28 V AC. This voltage is fed through the interlock (top cover interlock) to the switching power supply. The switching power supply provides the following DC voltages:

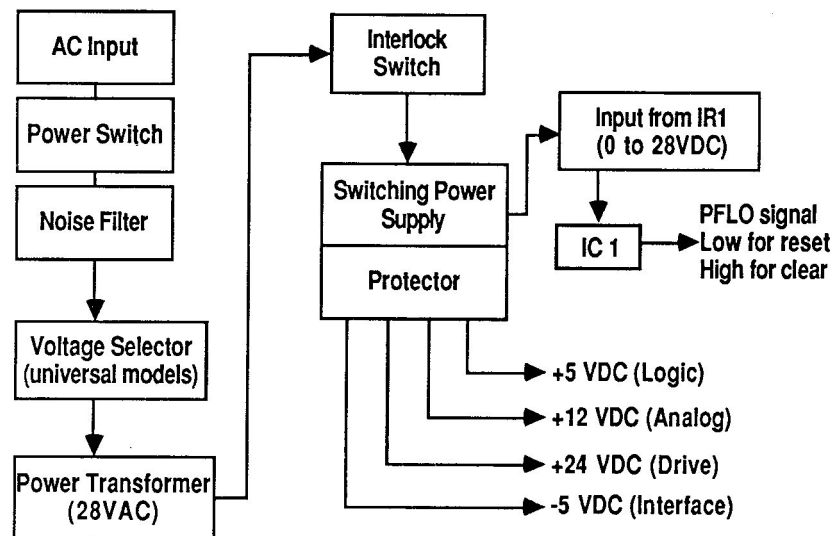


FIGURE 5

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

Reset Circuit

The reset circuit (Figure 5) consists mainly of IC1 and supporting circuitry. When the unit is turned on, the reset is held 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. When this voltage level is reached, the reset IC changes states, which clears the reset.

Carrier Motor

The carrier motor drive circuit (Figure 6) consists of gate array 2 and gate array 1 on the main logic PCB, and IC5 on the power supply board. The drive signals and speed control signals are generated in gate array 2 (IC20). The enable signal is generated in gate array 1 (IC16). These signals are sent through connector CN3 to IC5 on the power supply board. From this device the signals are sent to the 4-2 phase excitation stepping motor through CN4.

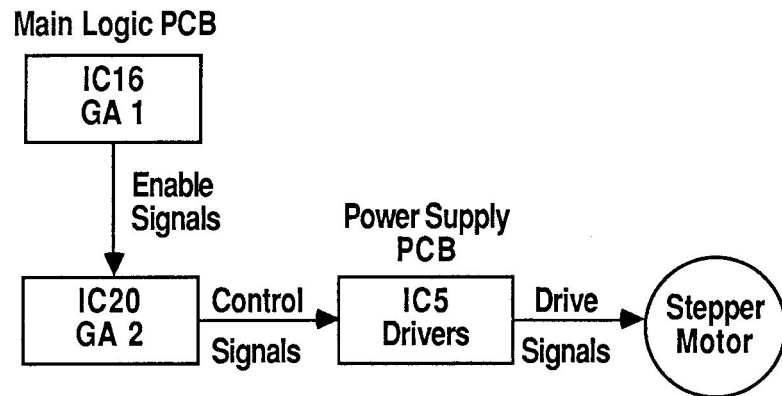


FIGURE 6

CCD PCB

The charge-coupled device (CCD) PCB (Figure 7) contains the image-sensing logic and the carrier arm motor driver.

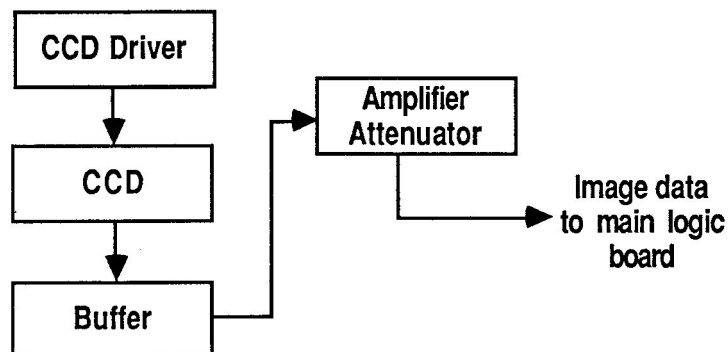


FIGURE 7

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 down to the second layer and then down 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

The main logic board (Figure 8) consists of the following circuits:

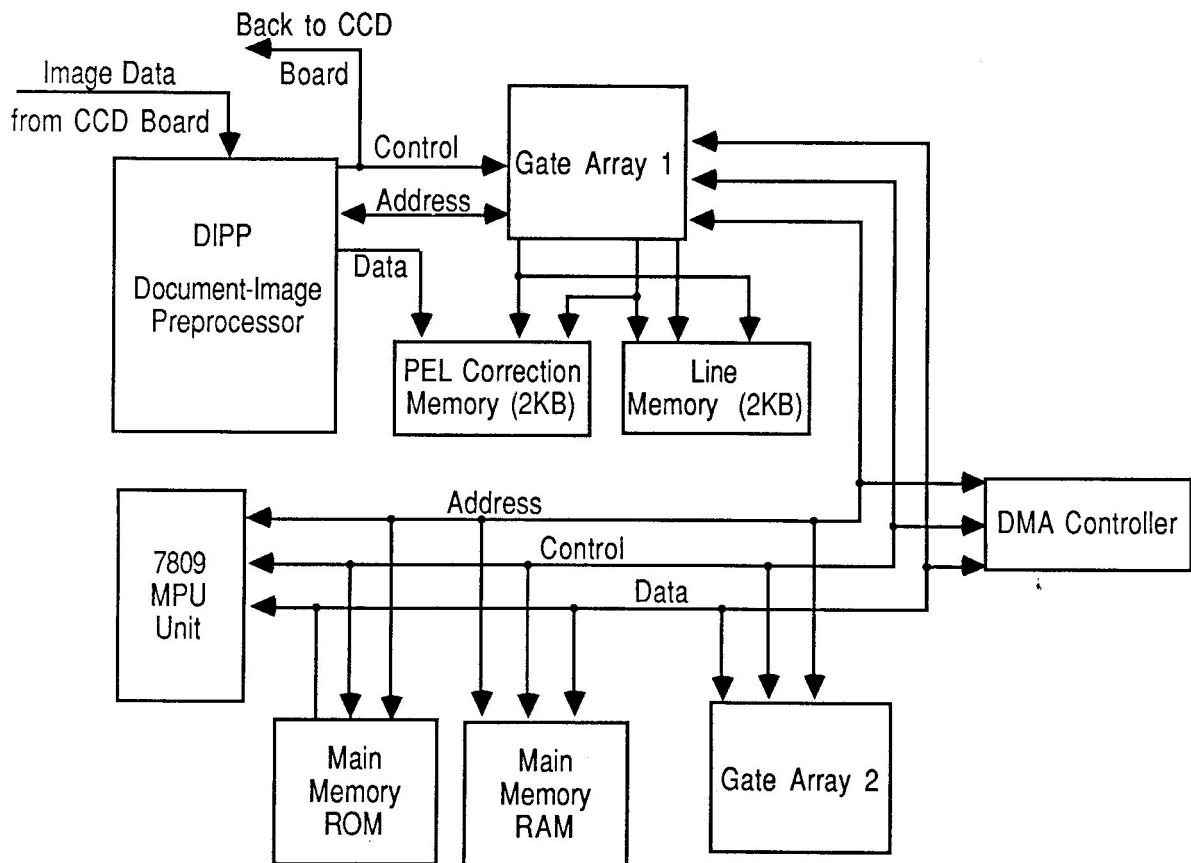


FIGURE 8

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 is used for buffering 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 then transfers the digital data to main memory.

Gate arrays 1 and 2 are used to support the DIPP. Gate array 1 specifically is used to support reduction options by controlling the line memory. If an image requires reduction, it is sent to the line memory for buffering prior to being transferred to the main memory. Some of the other functions that gate array 1 performs are: address generation, memory control, bus interface, gray-scale horizontal-resolution conversion, and CCD control.

Gate array 2 is used for 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 2-KB RAM chips that are used to 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.

□ 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 top cover.
2. Clean the underside of the glass as in step 3 above.

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Section 2 – Take-Apart

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- 2.4 Top Case
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- 2.17 Optical Inverter Assembly
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- 2.28 Power Supply PCB
- 2.32 AC Switch Plate and Plug Assembly
- 2.33 Main Logic PCB

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Section 2 - Take-Apart

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2.49	Carrier Motor
2.17	Optical Encoder Assembly
2.6	Scanning Contact Assembly—Optical Block
2.4	Top Case
2.4	Top Lid

□ TOP LID

The following take-apart procedures were done using references to left side, right side, front, or back. It is important that you use the same reference when performing these procedures. Figure 1 below has been labeled to reflect the orientation used for most of the graphics used in these procedures. If a view is changed or reversed, the graphic will show the new orientation.

Remove

To remove the top lid:

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

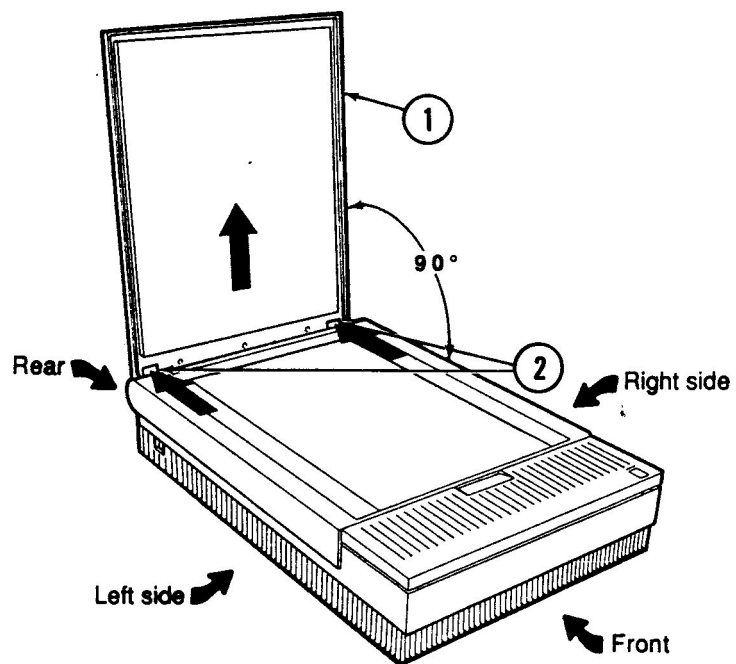


FIGURE 1

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 indented clips snap into the open cutouts.

□ TOP CASE

Remove

To remove the top case:

1. Remove the top lid.
2. Locate the three screws (Figure 2, #1) that are along the top back of the scanner, and unscrew them half way.

Note: These screws do not come out all the way. Unscrewing them until they are loose is enough to release the top case.

3. Using both hands, grasp the top case from the back (where the screws were removed, Figure 2, #2) and carefully pry the top case loose.
4. Swing the case up and forward toward the front of the scanner (Figure 2, #3).
5. When the case gets to the top of the swing (90°), remove the scan switch cable from the LED circuit board (Figure 2, #4) located at the right-front side of the case.
6. Continue pulling forward and up to remove the case completely.

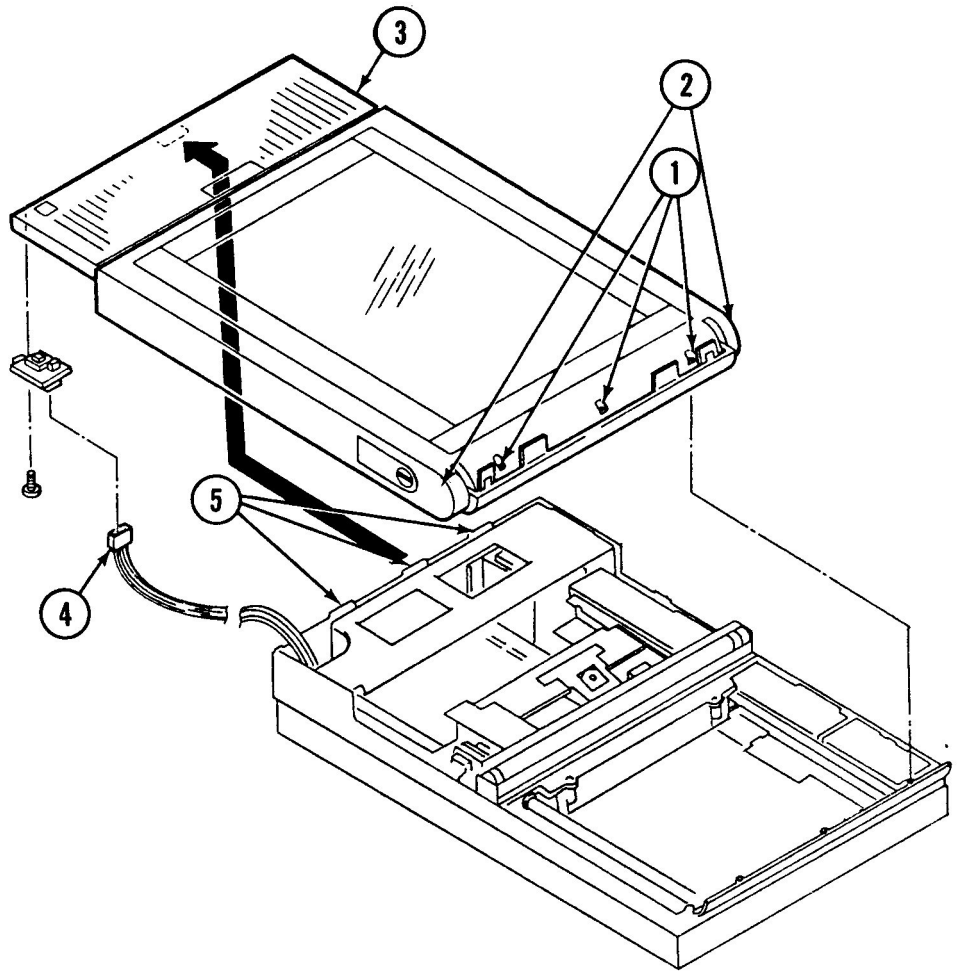


FIGURE 2

Replace

1. Stand the top case 90° to the front of the bottom case. Align the front of the top cover with the front of the bottom cover, making sure that the three tabs (Figure 2, #5) align with the three slots in the bottom case. Also, make sure the LED is aligned with the cutout on the bottom case. Hold the case in this position until the next step is performed.
2. Attach the scan switch cable to the PCB on the right front side of the case (Figure 2, #4).
3. Slowly lower the top case, swinging it toward the back end of the bottom case until the top fits completely on the bottom case.
4. Secure the top cover with the three screws (Figure 2, #1).

□ SCANNING CARRIAGE ASSEMBLY—OPTICAL BLOCK

Remove

The carriage assembly consists of the optical block, light, drive belt, and shaft. To remove the optical block:

1. Remove the top lid and the top cover.
2. Remove the light assembly by first unscrewing the Phillips screw (Figure 3, #1). This screw does not come out, but it has to be completely loose.
3. Raise the wire hook (Figure 3, #2) on the right side of the optical block to a horizontal position and then pull it straight out. The light assembly (Figure 3, #3) will disengage from the electrical connector (Figure 3, #4) and will slide out.

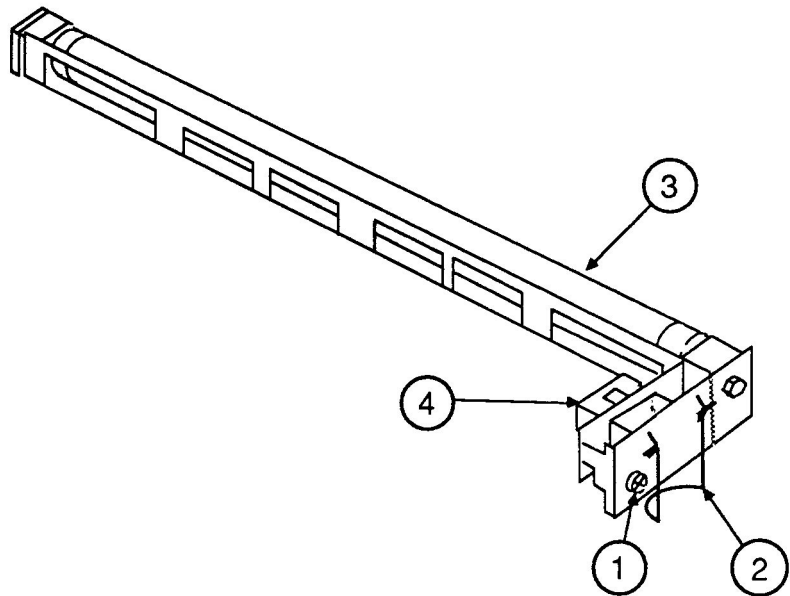


FIGURE 3

4. Position the optical block in the center of the scanner so that the left side of the optical block is aligned with the cutout on the left-side rail (Figure 4).

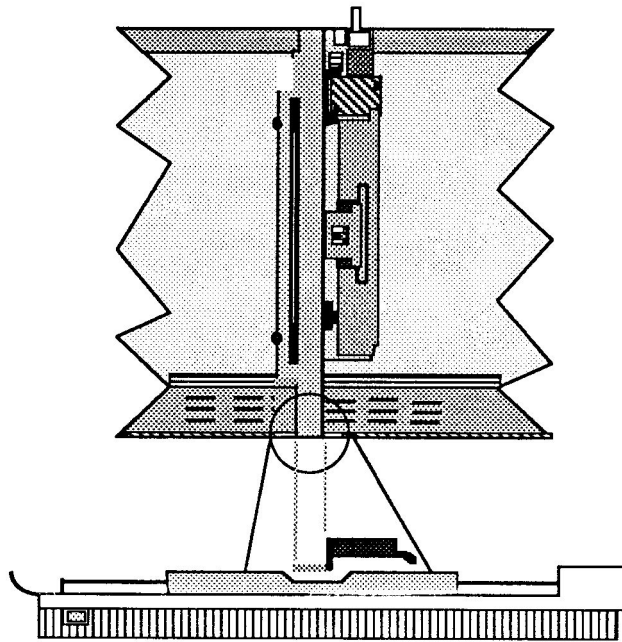


FIGURE 4

5. Remove the two screws (Figure 5, #1) holding the front plate (Figure 5, #2).

Note: The screw on the left side (by the transformer) is secured to the bottom of the case. To get to it, you will need a long Phillips screwdriver.

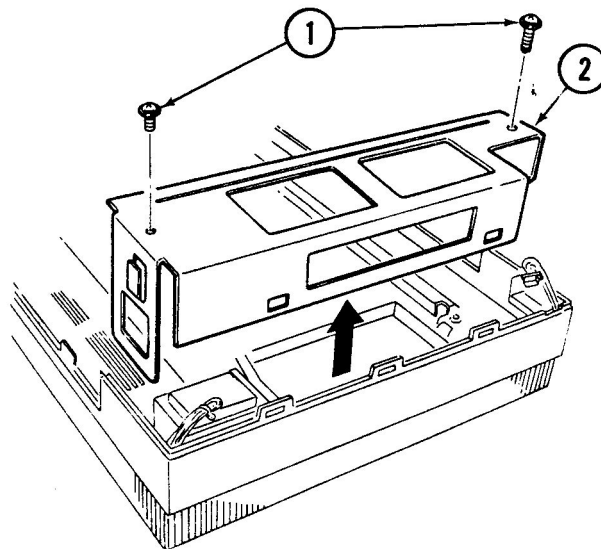


FIGURE 5

6. Lift out the front plate.
7. Remove the two screws (Figure 6, #1) that secure the back-side shaft bracket. The bracket can then be moved slightly to the side.
8. Remove the two screws (Figure 6, #2) that secure the front-side shaft holder bracket. This bracket is removable.
9. Loosen the screw (Figure 6, #3) on the carrier motor plate that holds the belt pulley tight.

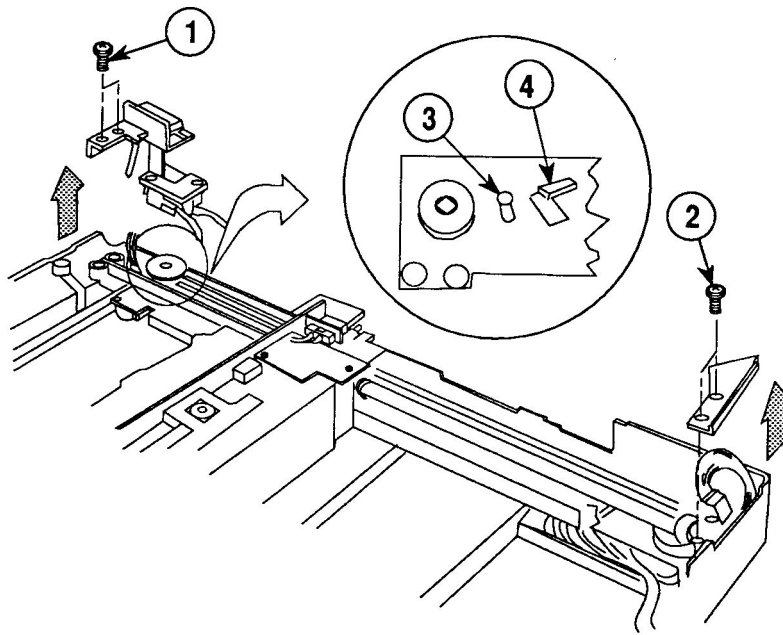


FIGURE 6

10. Loosen the tension on the belt by swinging the pulley lever (Figure 6, #4) toward the front, and remove the belt from the pulley gear.
11. Gently lift up on both sides of the shaft. Be careful not to raise the optical block too high. When the shaft clears the bracket mounts, pull the whole assembly toward you (toward the right side of the unit). The left side of the scanner assembly is riding on a rail. The movement will dislodge the assembly from the rail (Figure 7, #1). Once the optical block is loose from the rail, do not try to lift it up all the way until after you do the next step.

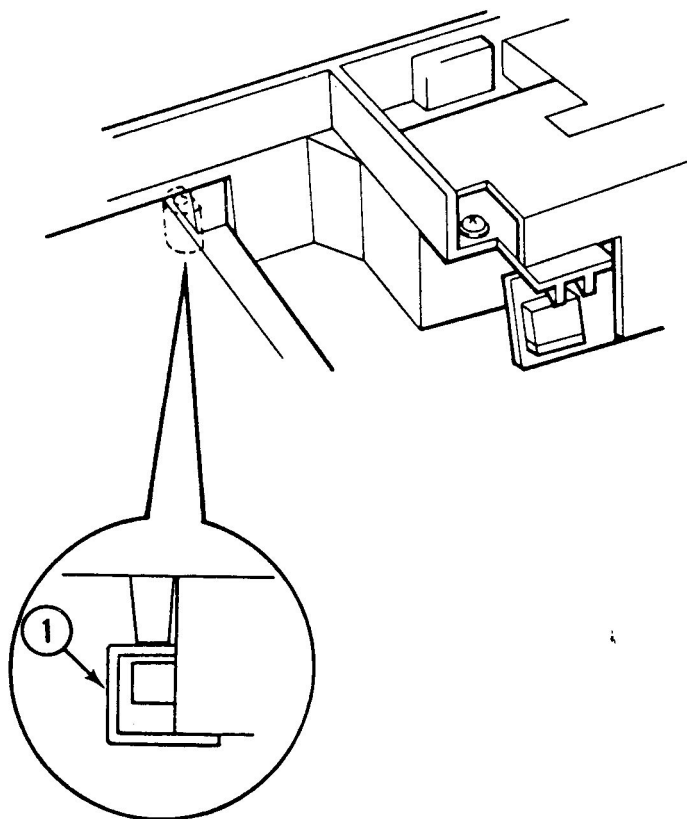


FIGURE 7

12. Disconnect the flexible cable (Figure 8, #1) from connector CN1 (Figure 8, #2) of the CCD PCB by gently pulling down on the bottom part of the connector (Figure 8, #3) and then pulling out the cable (Figure 8, #4). Remove the cable by sliding the cable to the open side.

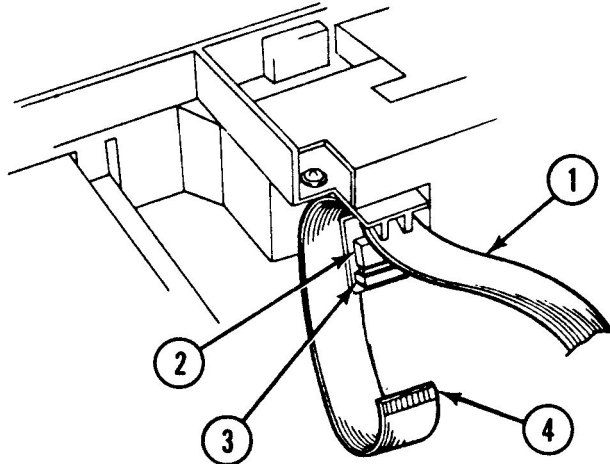


FIGURE 8

13. Remove the drive belt (Figure 9, #1) from the forward pulley gear (Figure 9, #2) and from the rear pulley (Figure 9, #3).

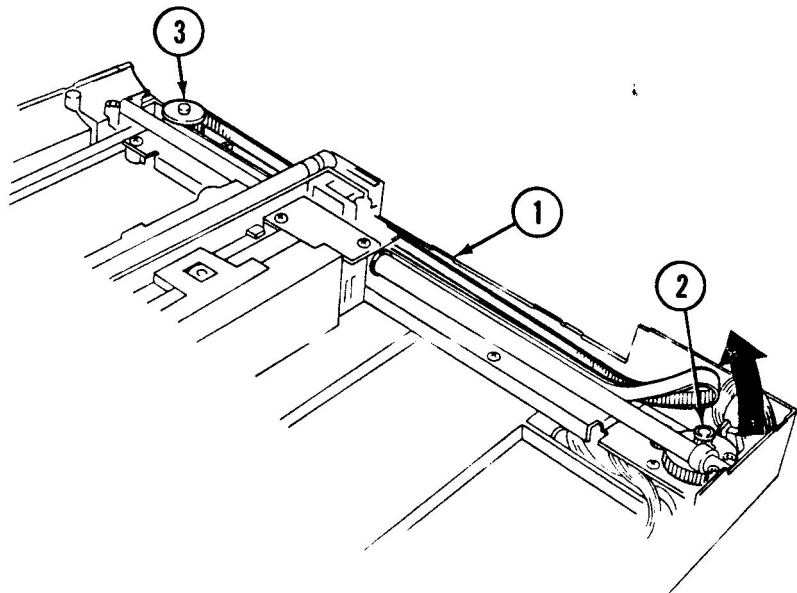


FIGURE 9

14. Lift out the optical assembly (Figure 10, #1).

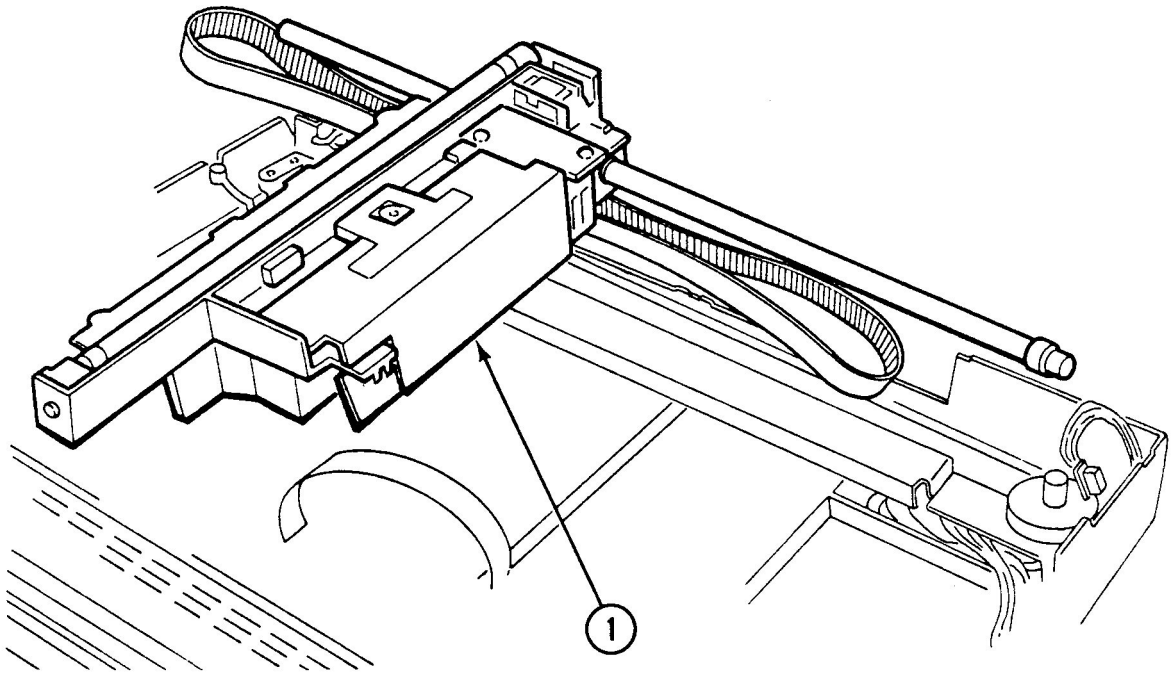


FIGURE 10

15. Remove the shaft from the optical assembly by pulling it out from right to left (Figure 11, #1).

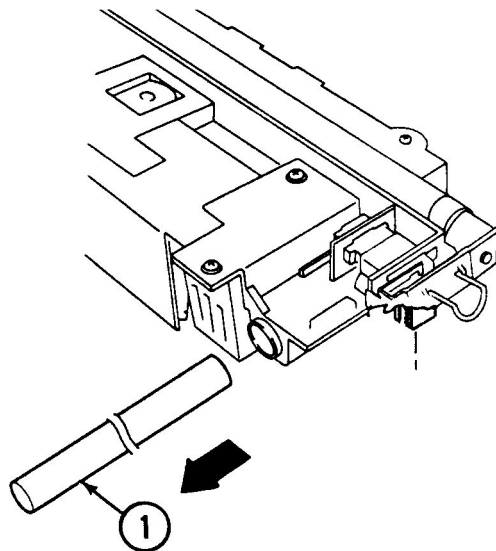


FIGURE 11

16. Remove the belt from the optical assembly as follows:
 - a) Remove the clip (Figure 12, #2) that covers where the belt (Figure 12, #3) is attached to the optical block. Use a flat-blade screwdriver, if necessary, to pry the clip loose.
 - b) Pull the belt straight out. The plastic slot (Figure 12, #4) is molded with ridges that match the grooves on the belt (Figure 12, #3).

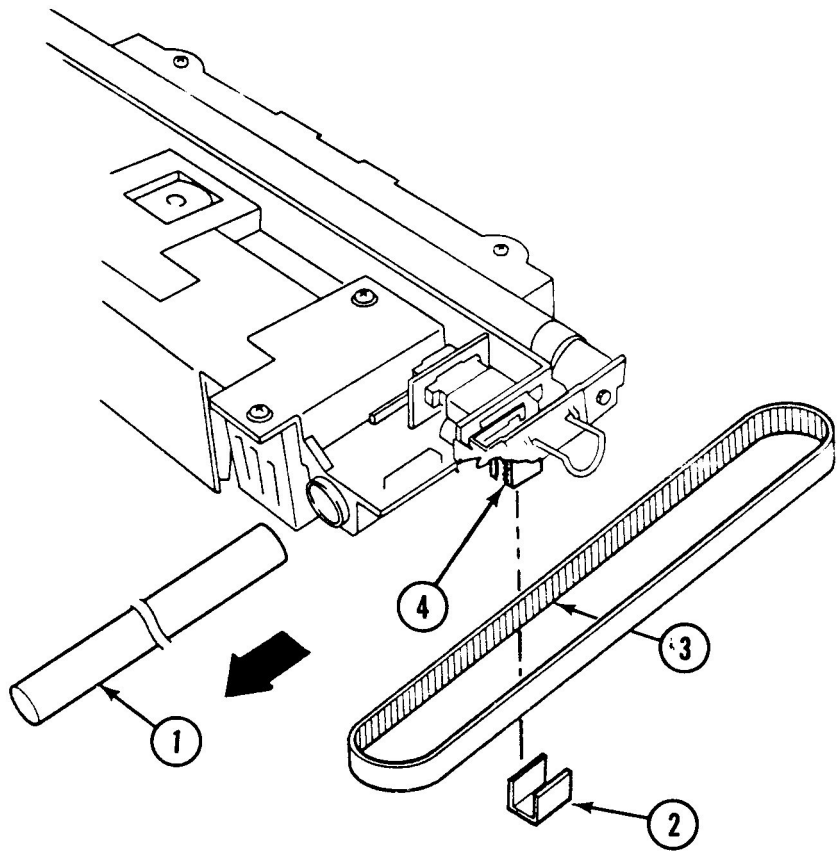


FIGURE 12

Replace

1. Attach the belt to the optical block. The grooves in the belt (Figure 12, #3) fit into the molded grooves on the block (Figure 12, #4). The belt is then secured with the clip (Figure 12, #2).

2. Turn the optical block to the upright position and insert the shaft into the brass bushing, from left to right.
3. Lay the whole optical assembly on the top of the scanner bed and attach the flexible cable to connector CN1 (Figure 13, #1) on the CCD PCB. Make sure the cable (Figure 13, #2) is looped around the connector.

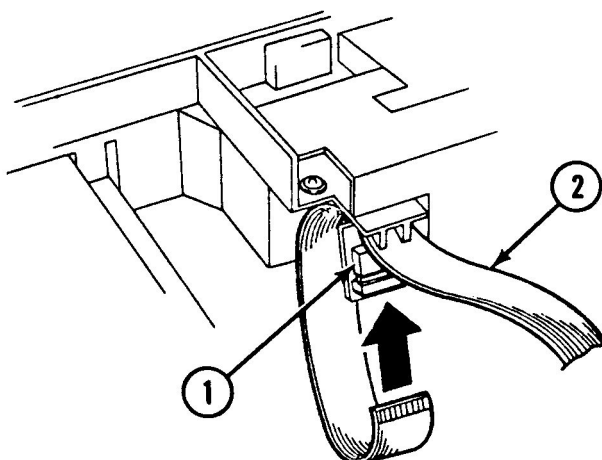


FIGURE 13

4. Position the optical block across the center of the scanner, lining up the left side of the optical block with the cutout on the left-side rail.

5. Slip the left side of the optical block under the left rail while making sure that the block engages under the rail (Figure 14, #1).

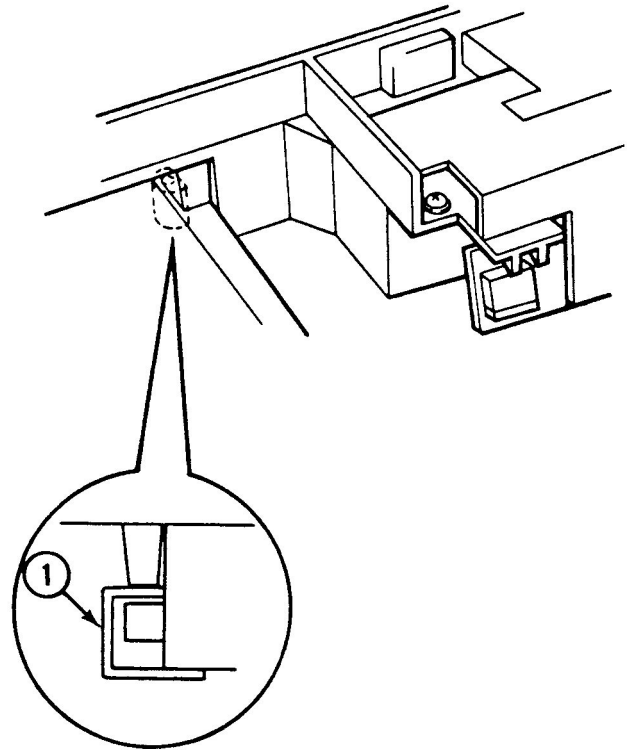


FIGURE 14

6. Lower the right side of the optical block into the scanner unit, making sure you get the shaft into the shaft holders, on both the front and back ends.
7. Connect the belt around the gear pulley, toward the front of the scanner.
8. Connect the other end of the belt over the other pulley. (If this pulley is not free so that you can easily place the belt on it, you will have to loosen the screw on the pulley bracket to get the pulley to move.)
9. 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.

- Put the two shaft plates on each end of the shaft and secure them with the four screws (Figure 15, #1). Make sure that the scanner 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 top case.

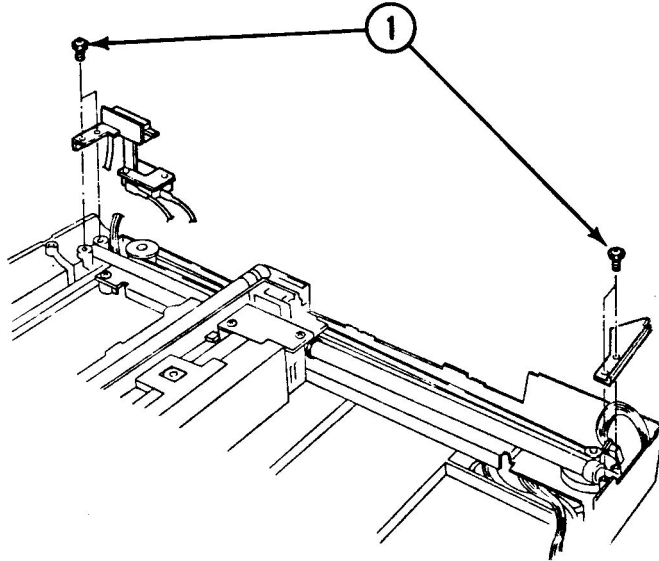


FIGURE 15

- Put the front plate back on and secure the plate with two screws.

12. Slide the light and light holder (Figure 16, #1) onto the optical block, and push the assembly all the way in. Make sure that the light holder assembly's bottom edge slips under the tab on the optical block slot (Figure 16, #2).
13. Engage the electrical connector (Figure 16, #3) by screwing the Phillips screw (Figure 16, #4) all the way in. (This action pulls the two connectors together.)
14. Attach the top cover and then the lid.

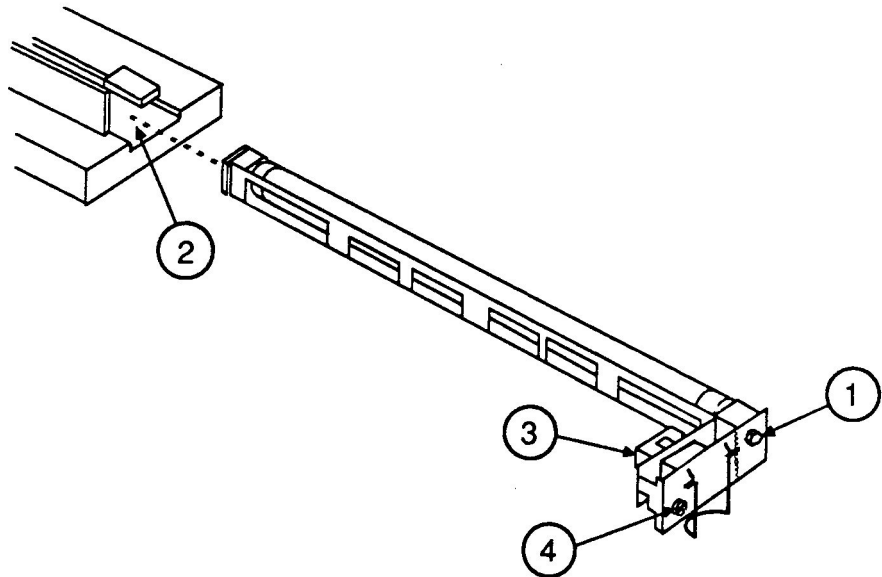


FIGURE 16

□ OPTICAL INVERTER ASSEMBLY

Remove

To remove the inverter assembly:

1. Remove the lid and top cover.
2. Remove the optical block.

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

3. Put the optical block down on a flat surface.
4. Using both hands, grasp the top lid (Figure 17, #1) of the optical block by putting your index fingers on the front part of the top lid (Figure 17, #2) and your thumbs on the back part of the lid (Figure 17, #3).

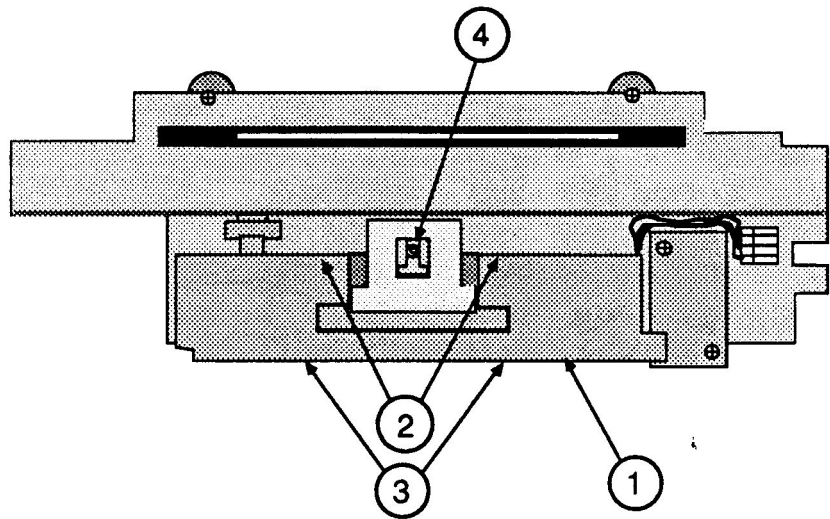


FIGURE 17

5. Gently pry up and out on the back part of the lid with your index fingers, using your thumbs for leverage, until the front part of the lid pulls up from the optical block, and the entire lid comes off.

CAUTION: In the middle top of the optical block is a set screw (Figure 17, #4). This screw holds the CCD chips and mirror alignment. Do not attempt to loosen this screw. If the screw is loosened, the entire optical block must be replaced.

6. Unplug connector CN1 (Figure 18, #1) from the CCD PCB.
7. Unscrew the two screws (Figure 18, #2) that hold the inverter assembly. As you remove the last screw, the inverter assembly will come off.

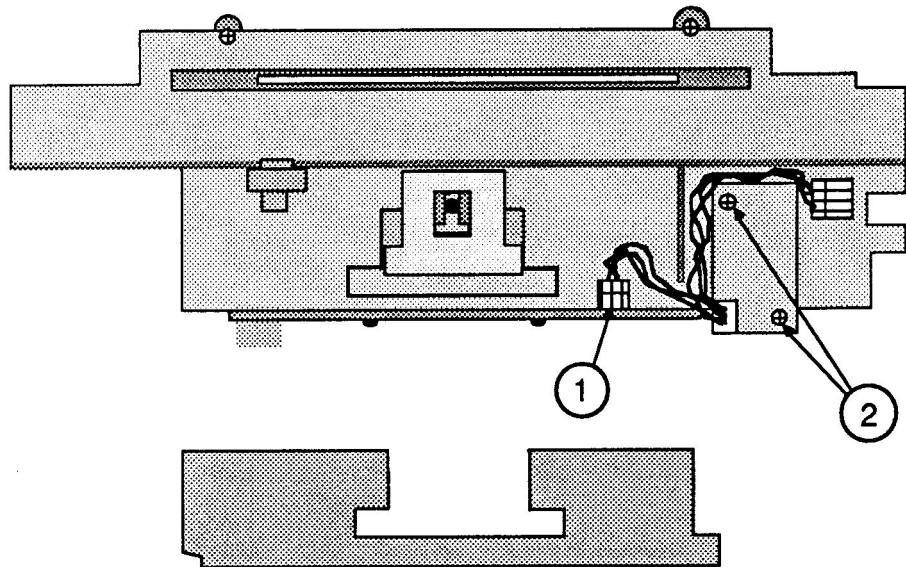


FIGURE 18

Replace

To replace the inverter assembly:

1. Install the new inverter assembly and secure it with the two top screws (Figure 18, #2).
2. Plug the connector into connector socket CN1 (Figure 18, #1) on the CCD PCB.
3. Replace the top lid by aligning it in place and pressing down until it snaps into place.

□ CARRIER MOTOR

Remove

To remove the carrier motor:

1. Remove the lid and top cover.
2. Remove the optical carriage assembly.
3. Remove the two screws from the front inside cover (Figure 19, #1), and remove the cover.
4. Remove the left guide rail (Figure 19, #2) by removing the three screws that secure it to the case. This action will allow access to the power supply board.

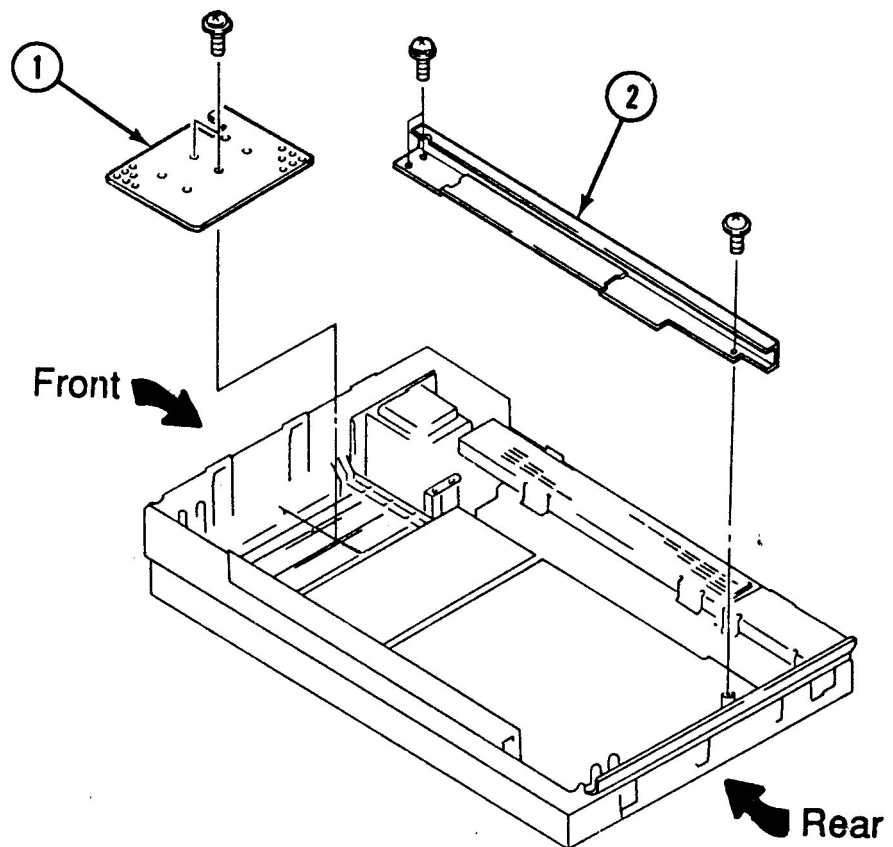


FIGURE 19

5. Remove the pulley bracket on the right side (Figure 20, #1) by removing the four screws with black washers (Figure 20, #2).
6. Locate the metal ground strap (Figure 20, #3) that comes from the left side of the case and is attached to the pulley bracket. Remove the screw (Figure 20, #4). The bracket will not come out.

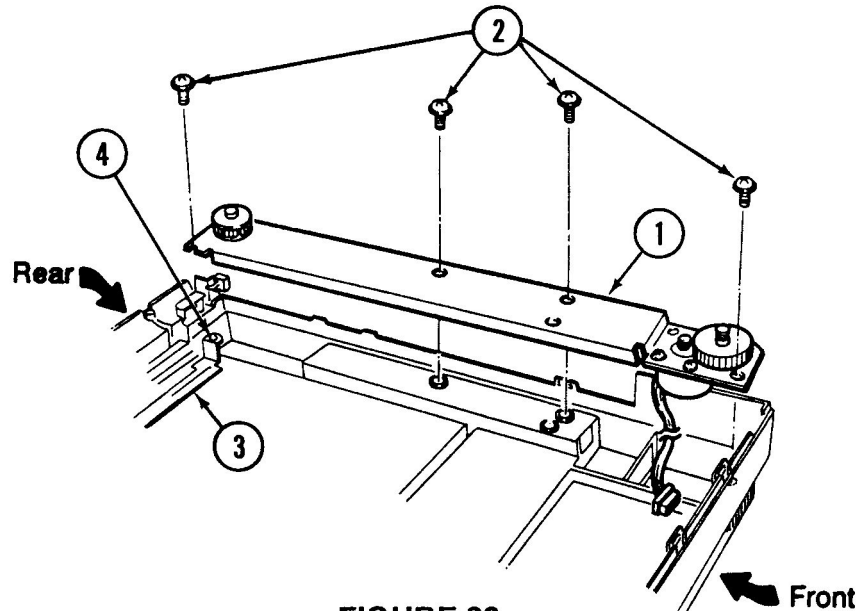


FIGURE 20

7. Carefully pull out the carrier motor connector that is connected to CN4 (Figure 21, #1) on the power supply board (Figure 21, #2). Then remove the wires from the wire harness clips.

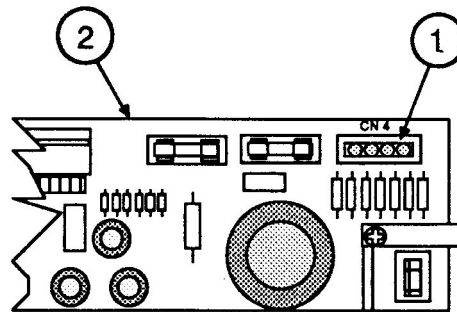


FIGURE 21

8. Remove the pulley and carrier motor plate assembly (Figure 22, #1) by lifting them out of the bottom case.
9. Using a jeweler's screwdriver, remove the E-clip and washer (Figure 22, #2) from the gear pulley and pull off the gear pulley.
10. Remove the three screws (Figure 22, #3) that hold the carrier motor to the carrier plate assembly and remove the motor.

Note: You can also remove the pulley at this time by removing the large E-clip (Figure 22, #4), and pulling off the pulley. Also, if the pulley tension spring (Figure 22, #5) needs to be replaced, you can reach it on the bottom of the pulley bracket.

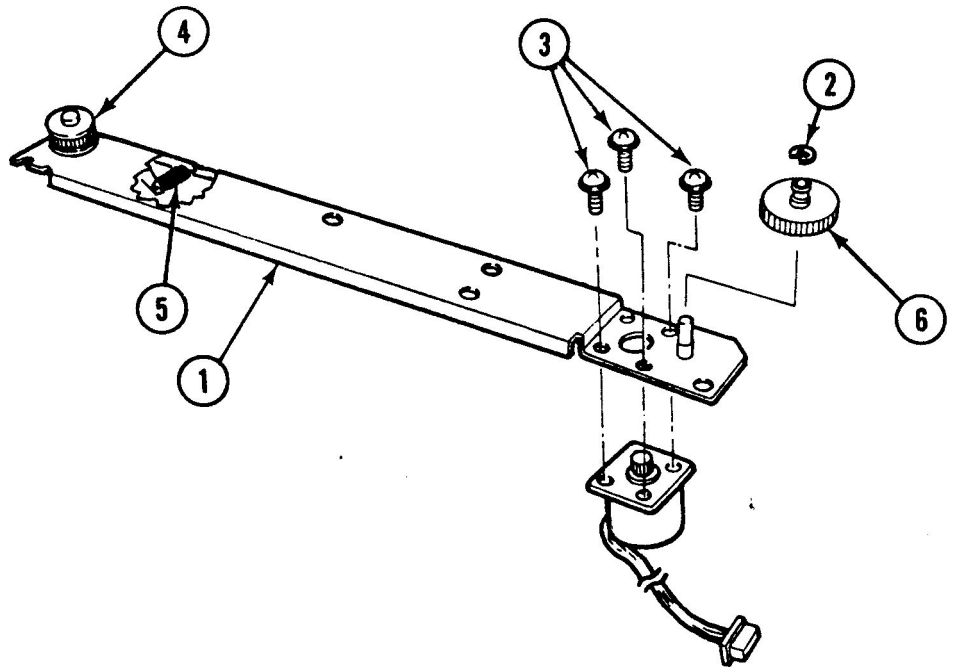


FIGURE 22

Replace

To replace the carrier motor:

1. Place the motor on the underside of the carrier plate so that the wires face toward the front of the case. Attach the motor with the three screws (Figure 22, #3). Tighten the screws.

2. Place the gear pulley (Figure 22, #6) on its shaft and make sure that the gear on the pulley engages with the gear on the motor shaft.
3. Replace the plastic washer (Figure 23, #1), flange side (Figure 23, #2) down, on the gear pulley shaft (Figure 23, #3) and secure the washer with the small E-clip (Figure 23, #4).

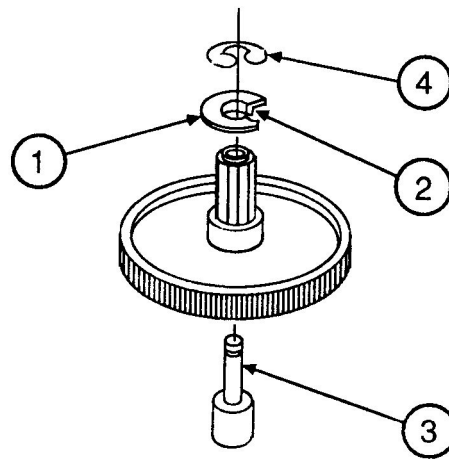


FIGURE 23

4. If the pulley (Figure 24, #4) was removed, replace it at this time, securing it with the large E-clip.
5. Place the pulley and carrier motor assembly (Figure 24, #1) back into the bottom case. Use the four screws with the black washers (Figure 24, #2) to secure the motor assembly. Make sure that the interlock switch assembly is loose but tucked in along the case, and that the carrier motor assembly fits into the middle part of the switch assembly.
6. 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 harness clips.
7. Replace the ground strap (Figure 24, #3) and secure it with a screw.

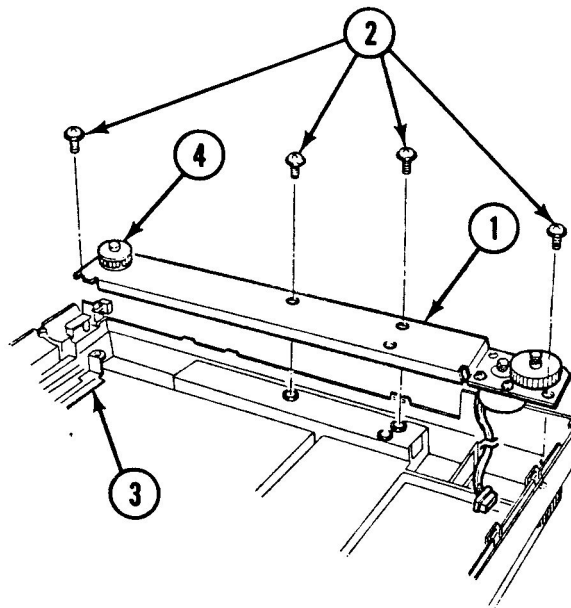


FIGURE 24

8. Replace the left rail (Figure 25, #2) and secure it with the two screws.
9. Replace the inside cover (Figure 25, #1) and secure it with two screws.

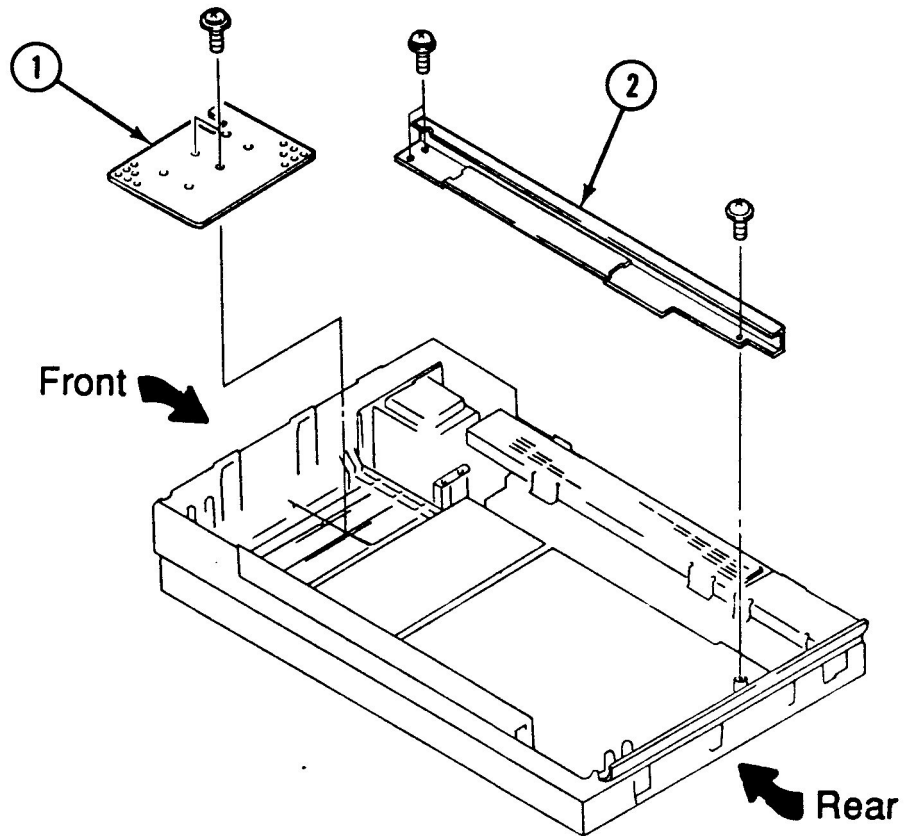


FIGURE 25

10. Replace the optical block.
11. Replace the top cover and lid.

□ TRANSFORMER

Remove

To remove the power transformer:

1. Remove the lid and top cover.
2. Remove the carriage assembly.
3. Remove the pulley and carrier motor assembly.
4. Remove the left-side guide rail (Figure 26, #1) next by removing the three screws. When the rail is removed, the inside housing cover will come with it (Figure 26, #2).
5. Unscrew the one screw from the black shield plate (Figure 26, #3), and remove the plate by sliding it to the right side and then up.

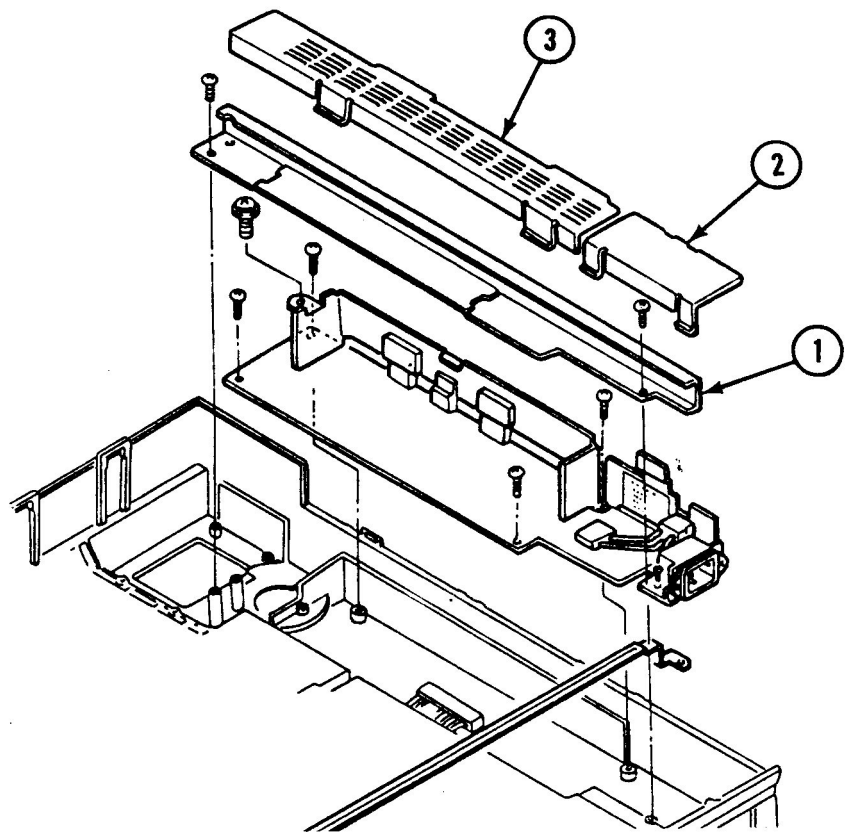


FIGURE 26

6. Remove connectors CN2 and CN5 from the power supply board.

7. Remove the two screws that hold the ground bracket (Figure 27, #1) that connects the transformer base plate and the power supply.
8. Remove the four screws (Figure 27, #2) from the mounting plate that holds the transformer to the bottom case.
9. Pull out the transformer assembly along with the long wire that runs along the right side of the bottom case. Undo the wires from the wire harness clips as needed.
10. Remove the interlock switch assembly at the right rear of the scanner. If you are replacing the transformer, this switch assembly is part of the transformer assembly.
11. To remove the transformer from the base plate, unscrew the two mounting screws (Figure 27, #3) that hold the transformer to the mounting plate, and remove the transformer.

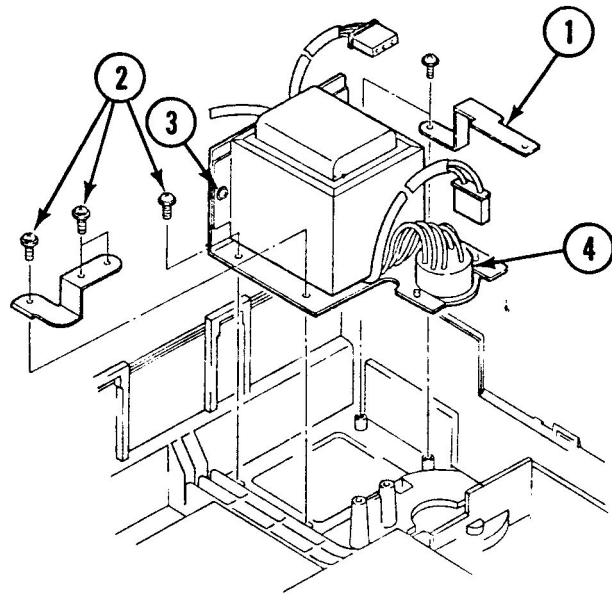


FIGURE 27

Universal Models

On universal transformers you must also remove the power selector switch (Figure 27, #4) by removing the two Phillips screws that hold it to the plate.

Replace

1. Secure the transformer to the mounting plate using the two screws (Figure 27, #3).

Note: On universal transformers, secure the power selector switch (Figure 27, #4) with the two Phillips screws.

2. Using four screws (Figure 27, #2), secure the transformer plate assembly to the bottom case.
3. Using the two screws, secure the ground bracket (Figure 27, #1) that connects the mounting plate to the power supply board.
4. Locate the long set of wires that are attached to the interlock switch, and run the wires across the front section of the bottom case and along the right side. The wires should be tucked into the wire harness clips along the case.

Note: If the interlock switch (Figure 28, #1) was removed from the bracket (Figure 28, #2), attach the switch to the bottom side of the bracket using one screw (Figure 28, #3). The switch button should be facing out toward the side of the case.

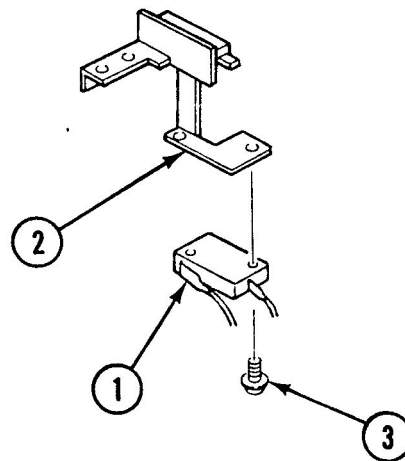


FIGURE 28

5. The black-and-white shielded wire should be run along the left side of the case so that it will reach connector CN2 on the power supply board.
6. Replace the left rail and power supply shield.

□ POWER SUPPLY PCB

Remove

To remove the power supply PCB:

1. Remove the lid and top cover.
2. Remove the carrier assembly.
3. Remove the left-side guide rail (Figure 29, #1) by removing the three screws. When the rail is removed, the black plastic inside housing cover will come with it (see Figure 29, #2).
4. Unscrew the one screw from the black shield plate (Figure 29, #3), and remove the plate by sliding it to the right side and then up.

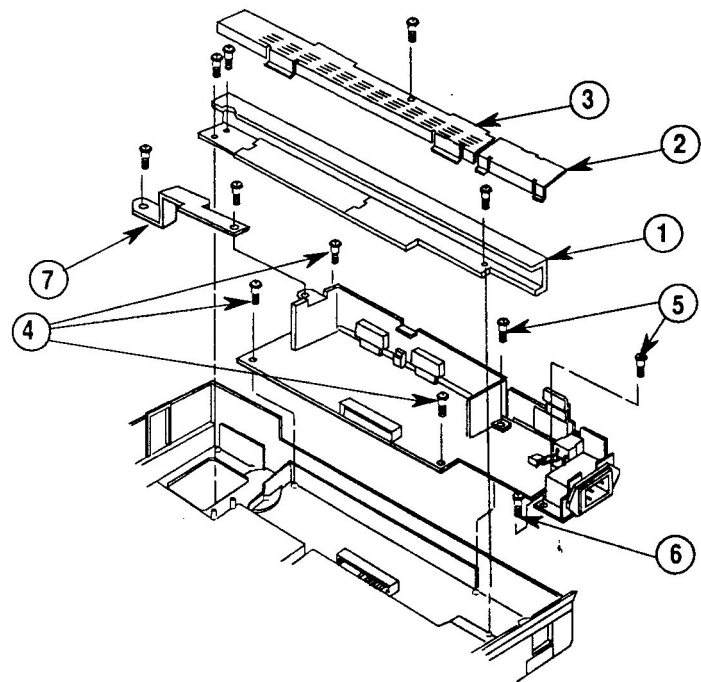


FIGURE 29

5. Disconnect the five connectors—CN1, CN2, CN3, CN4, and CN5—from the power supply board.
6. Remove the three self-tapping screws (Figure 29, #4) and the two machine screws (Figure 29, #5) that hold the power supply board to the housing. Remove the ground wire screw (Figure 29, #6).

7. Remove the ground strap bracket (Figure 29, #7) and remove the board.

Replace

1. Before putting in the power supply board completely, line up connector CN3 (Figure 30, #1) on the power supply board with the connector (Figure 30, #2) coming from the main logic PCB, and connect them together.
2. Place the power supply board in the case and secure it with the three self-tapping screws (Figure 30, #3) and the one ground screw (Figure 30, #4).

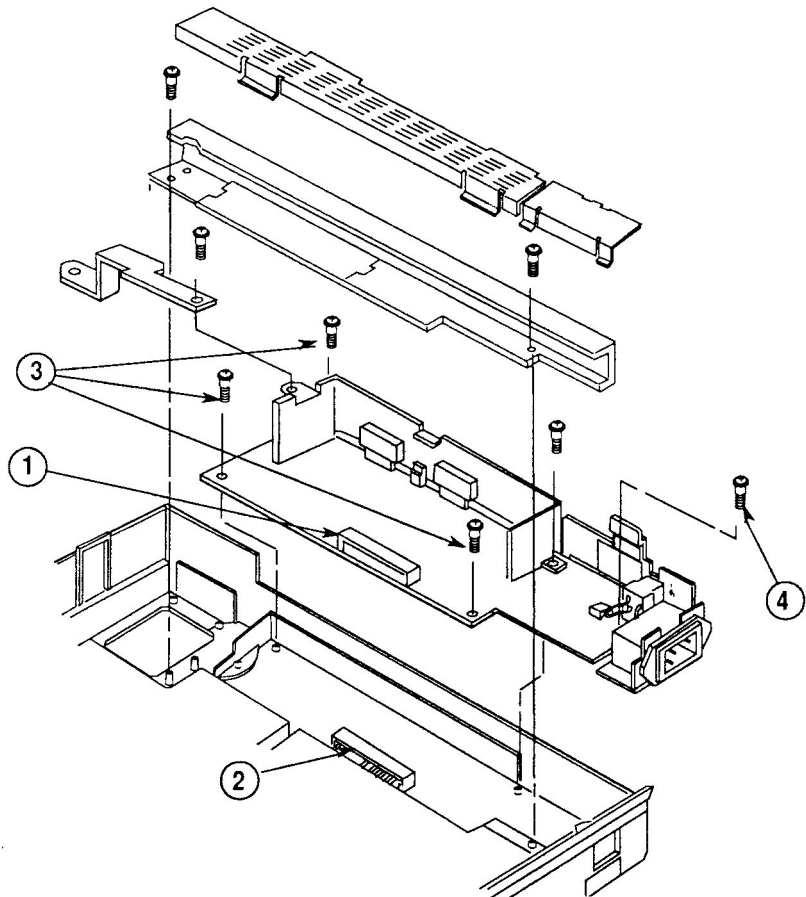


FIGURE 30

3. Connect the remaining four connectors—CN1, CN2, CN4, and CN5—to the power supply board.

4. Connect the ground strap bracket (Figure 31, #1) from the transformer plate to the power supply board.

Note: If the transformer is out of the unit, do not replace the black shield or the left rail at this time.

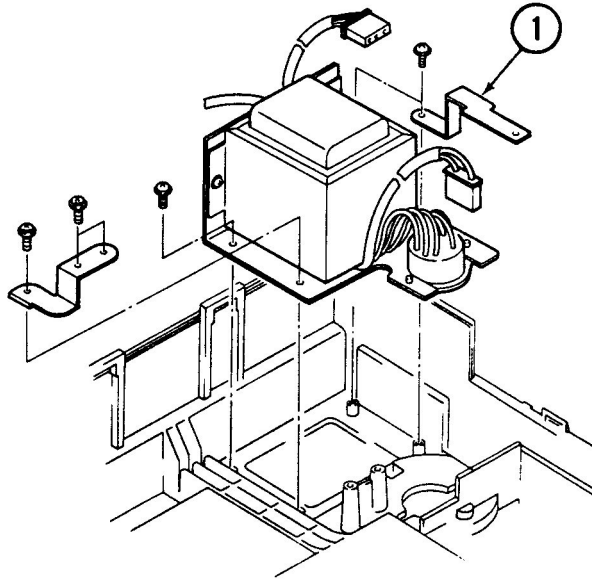


FIGURE 31

5. Replace the left-side guide rail (Figure 32, #1) with three screws.
6. Replace the black shield plate (Figure 32, #3) and secure it with one screw.
7. Attach the inside housing (Figure 32, #2). Make sure that the tabs snap into the slots on the left guide rail.
8. Secure the ground strap (Figure 32, #4) with its screw.

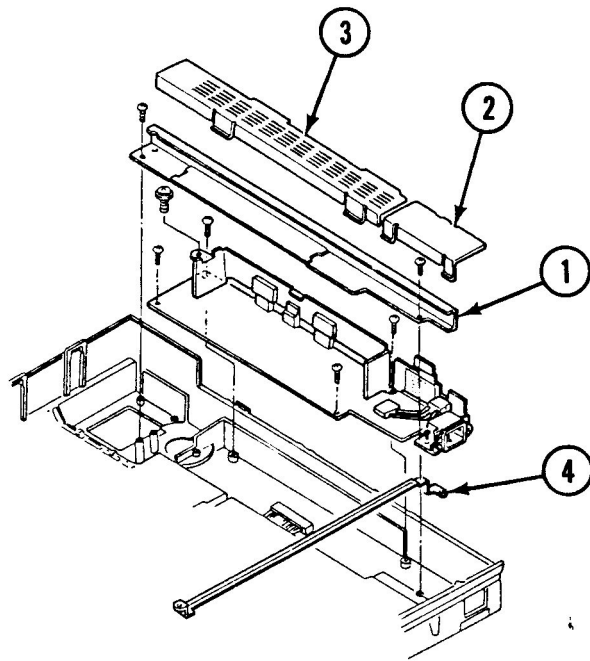


FIGURE 32

9. Replace the carriage assembly.
10. Replace the top cover and lid.

□ AC SWITCH PLATE AND PLUG ASSEMBLY

Remove

To remove the switch plate assembly:

1. Remove the lid and top cover.
2. Remove the power supply board.
3. Remove the one screw that holds the switch to the case (Figure 33, #1), and remove the switch plate and plug assembly.

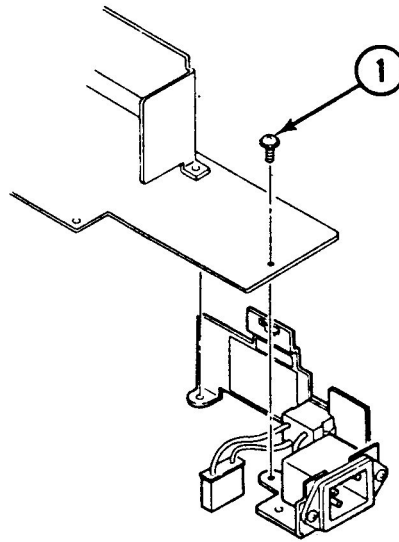


FIGURE 33

Replace

1. Replace the switch plate assembly on the case and secure it with the one screw (Figure 33, # 1) plus the ground wire screw from the power supply board.
2. Replace the power supply board.
3. Replace the top cover and lid.

□ MAIN LOGIC PCB

Remove

To remove the main logic PCB:

1. Stand the scanner on its left side (Figure 34).
2. Loosen the three screws on the bottom panel (Figure 34, #1). (The screws will not come out, but make sure they are loosened all the way.) The panel will come off.

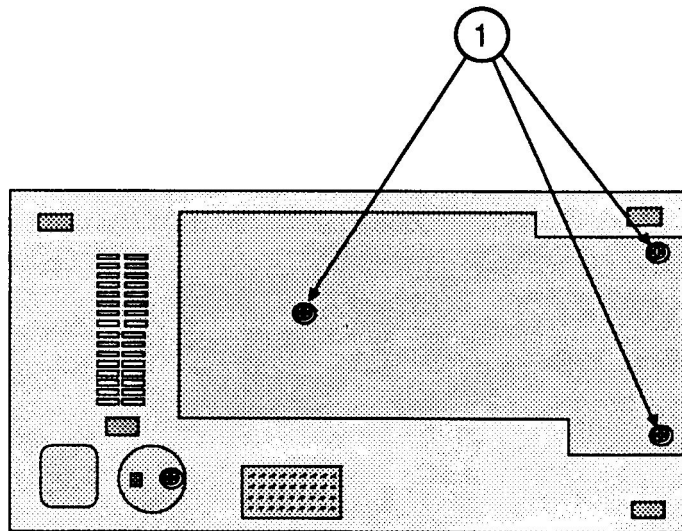


FIGURE 34

3. Remove the four screws (Figure 35, #1) that hold the PCB to the case.

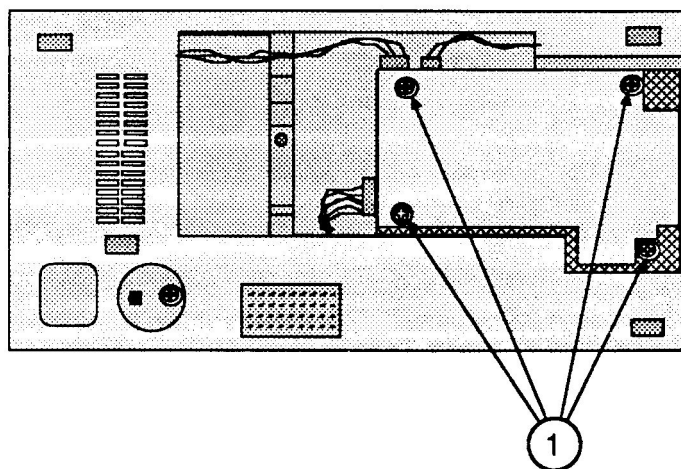


FIGURE 35

4. 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—(Figure 36, #1).

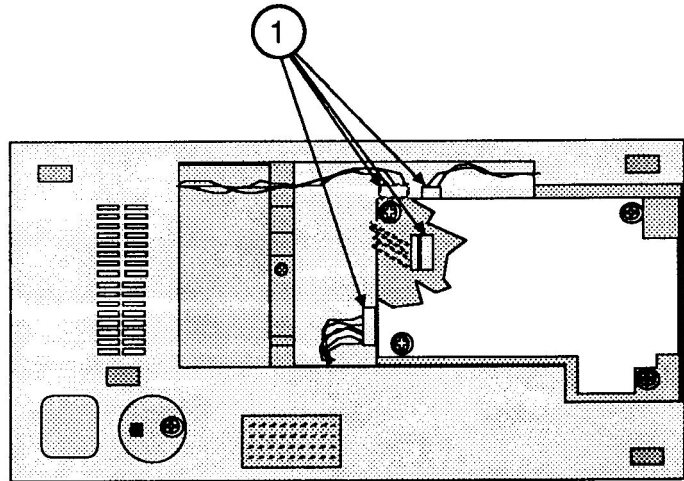


FIGURE 36

Replace

1. Attach the four cables to connectors CN2, CN3, CN7, and CN8 (Figure 37, #1).
2. Line up the four screw holes on the corners of the board with the four holes on the case.
3. Screw in the four screws (Figure 37, #2).

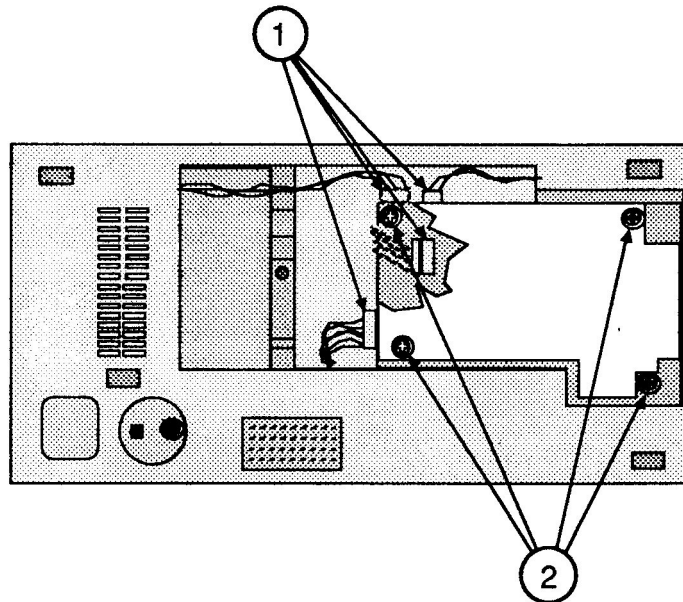


FIGURE 37

4. Use the three screws to install the bottom panel (Figure 38 #1).

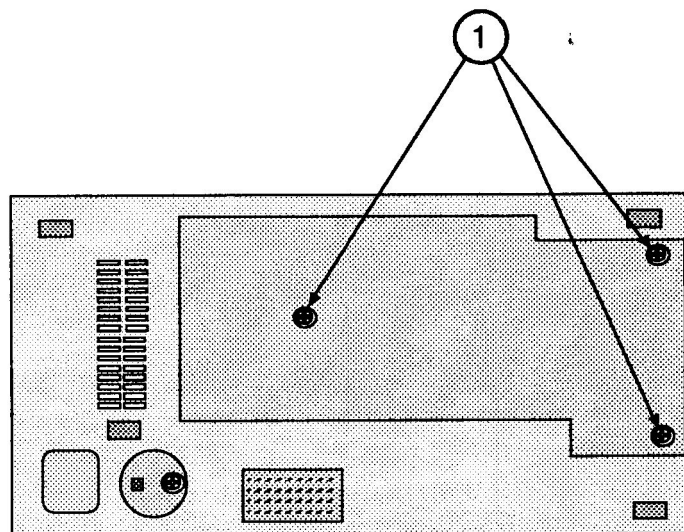


FIGURE 38

Apple Scanner

Section 3 – Diagnostics

□ CONTENTS

3.2	Introduction
3.4	Test Descriptions
3.4	Accuracy Test
3.4	Image Halftone Test
3.5	Image Grayscale Test
3.5	Image Resolution Test
3.6	Using ScanTest
3.6	Materials Required
3.7	Procedure
3.10	Immediate Mode
3.10	Startup Screen
3.11	Configuration

□ INTRODUCTION

ScanTest™ 4.4 is a diagnostic program that verifies whether the Apple Scanner is working correctly. ScanTest provides a built-in self test and three user-selectable tests:

- Accuracy Test
- Image Greyscale Test
- Image Resolution Test

The built-in self-test executes prior to the start of the user-selectable tests. The built-in self-test includes the following:

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

To run ScanTest, you must use the *Apple Scanner Service Test Chart*. The chart is shown in Figure 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: ScanTest may be run from the diagnostic disk or may be copied to your hard disk and launched from there. If you are running ScanTest from a hard disk, make sure that you use Macintosh system software 6.0.5 or later.

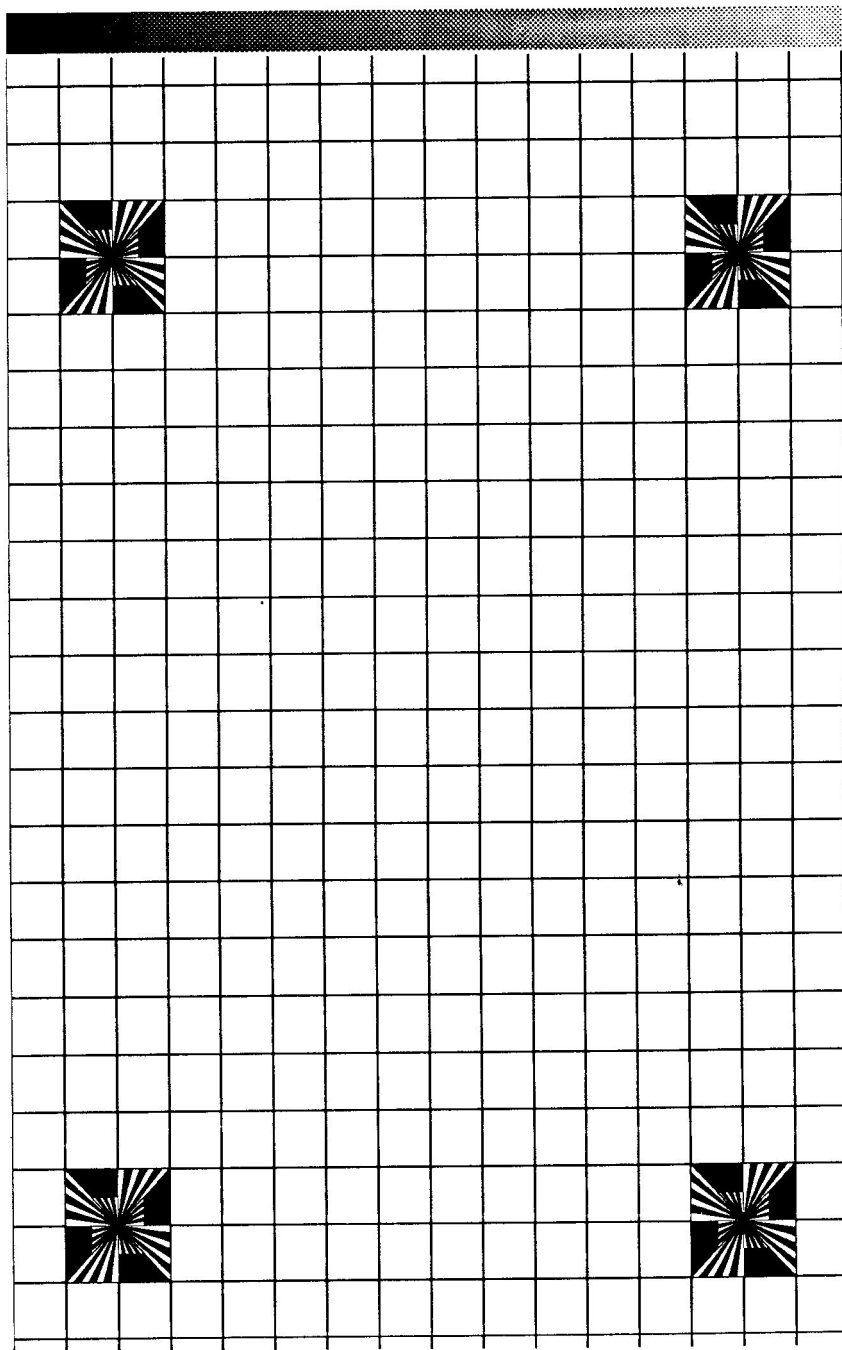


FIGURE 1

□ TEST DESCRIPTIONS

The following is a brief description of the three tests that are available in ScanTest. If a failure occurs during any test, a message window appears on the monitor screen.

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 location of intersections from one scan should be the same as those from the second scan. If not, the test fails.

Image Grayscale Test

The image Grayscale test uses the gray-scale strip at the bottom of the test chart. The strip has 36 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 ± 1 gray scale fails the test.

Image Resolution Test

The 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. It 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
Apple Scanner Service Test Chart

IMPORTANT: *Before you run ScanTest, 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 switch turned on.*
- *The glass must be completely clean, outside and inside.*
- *There must be no debris between the 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 glass (see Figure 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.

Procedure

1. Place the test chart on the Apple Scanner as shown in Figure 2.

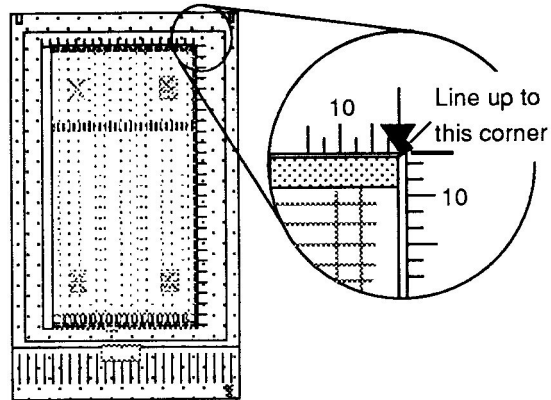


FIGURE 2

2. **Carefully** close the top lid, without moving the test chart.
3. Start ScanTest by double-clicking on the ScanTest application icon (from the hard disk or from the floppy disk). If the startup screen is not disabled, the screen shown in Figure 3 will display. (Refer to "Startup Screen" later in this section.) This information window reminds you of certain conditions that must be present before ScanTest can run correctly.

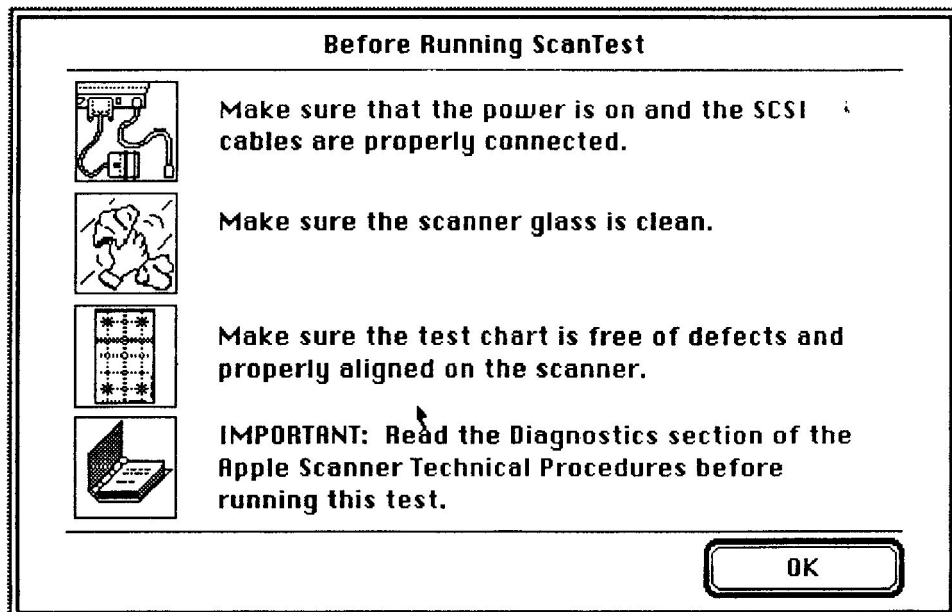


FIGURE 3

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

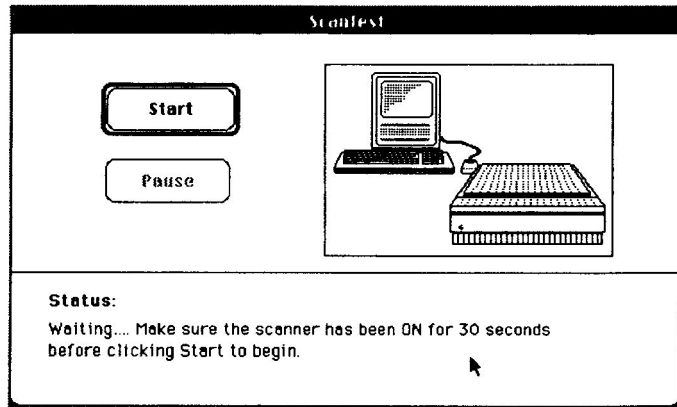


FIGURE 4

- Pull down the Options menu and select **Test Selections** (see Figure 5), or hold down the <Command> key while typing **T**.

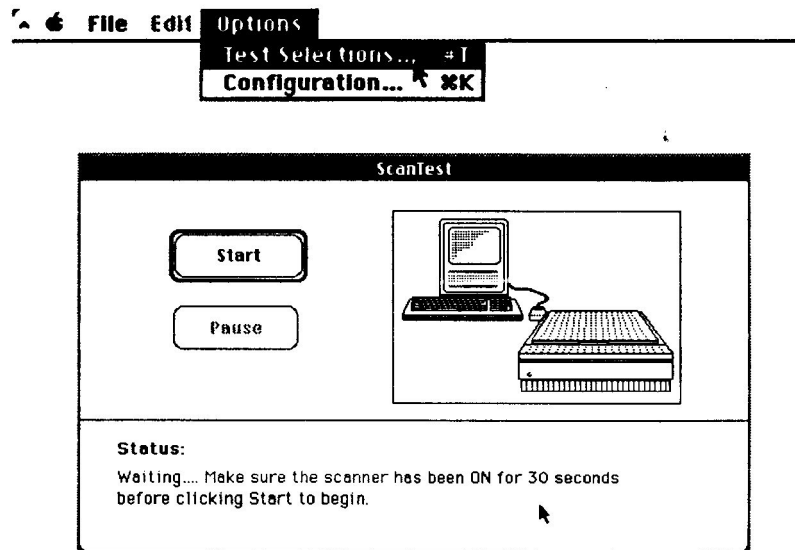


FIGURE 5

6. The test selection window (Figure 6) will appear. You can select any of the three tests—one at a time or in any combination.

Test Selections	Immediate Mode
<input checked="" type="checkbox"/> Accuracy Test <input checked="" type="checkbox"/> Image GreyScale Test <input checked="" type="checkbox"/> Image Resolution Test	<input type="button" value="Turn Lamp On"/> <input type="button" value="Move Carriage"/> <input type="button" value="Reset Scanner"/>
<input type="checkbox"/> Disable Startup Screen	<input type="button" value="Cancel"/> <input type="button" value="OK"/>

FIGURE 6

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 ScanTest. 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.

8. Click the Start button.

9. The diagnostic runs the tests you have selected. If any test fails, the test stops and gives you an information window (as in Figure 7).

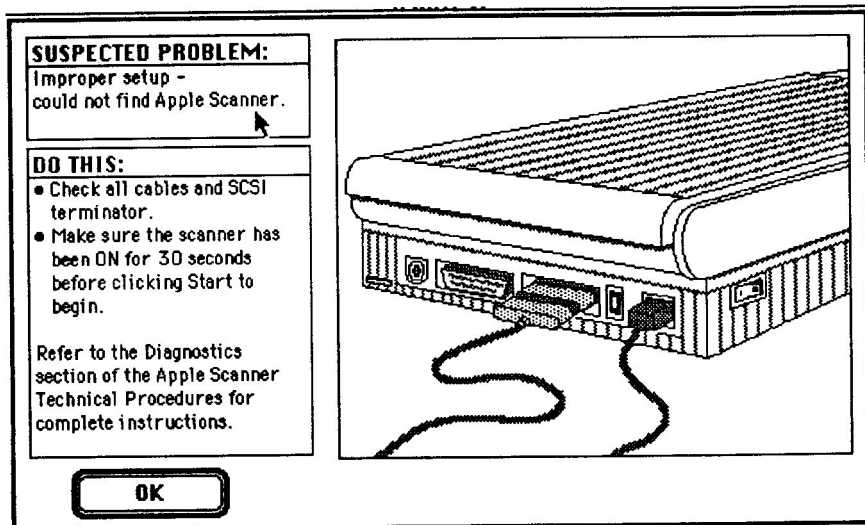


FIGURE 7

Immediate Mode

ScanTest provides an **immediate mode** to reset the scanner, control the movement of the carriage, and turn the lamp on and off. Functions are selected 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 ScanTest. If you do not want the startup screen displayed each time ScanTest is run, select **Disable Startup Screen**.

Configuration

The Configuration selection displays a variety of information that can aid in troubleshooting:

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

Additional Information

Additional self-test information can be displayed 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.

Apple Scanner

Section 4 – Troubleshooting

□ CONTENTS

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

□ RUNNING SELF-TEST

The Apple Scanner has built-in self-test diagnostics that test various functions of the scanner. Functions being tested are:

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

The self-test can be activated by two different methods; the first is by turning on the scanner and holding the start scan button down (hardware method). The second way of running the self-test is by running the ScanTest diagnostic. This second method is covered in the diagnostic section.

Self-Test Results

In order to see the results of the self-test, you must either have the AppleScan application running when you start the self-test, or you must have ScanTest running.

In either case, as long as the application is up and running on the Macintosh and the computer is connected to the scanner, if one of the self-test functions fails, a dialog box will be displayed on the Macintosh screen, giving you some indication of what part of the self-test failed.

If you run self-test and are not connected to a Macintosh or are not running one of the programs mentioned above, you will not get results for the test.

□ SYMPTOM / CURE CHART

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

- *Fluorescent lamp won't light or is dim*
 1. Check the lamp holder connector for secure connection.
 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 traces are open.
 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. Check to make sure that the SCSI cable is terminated correctly.
 4. Check the fuse on the main logic PCB. Replace the fuse if it is bad.
 5. Replace the main logic PCB.

- *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 PCB. Replace the fuse if it is blown.
 4. Replace the main logic PCB.

- *Incorrect image on host screen*
 - Use the test chart. If image is incorrect, clean the glass first; if cleaning does not help, then change the optical assembly.

Apple Scanner

Section 5 – Additional Procedures

□ CONTENTS

- 5.2 Power Supply Fuses
- 5.4 Main Logic PCB Fuse—FU1 (SCSI Line Fuse)
- 5.5 Selecting Correct Voltage
- 5.6 Bulb Replacement
 - 5.6 Remove the Bulb Assembly
 - 5.8 Install the Fluorescent Bulb
 - 5.9 Replace the Bulb Assembly
- 5.10 Voltage Conversion
 - 5.10 Comparison
 - 5.12 110 Volt to Universal
 - 5.12 Universal to 110 Volt
- 5.12 Main Logic Board Modification

□ POWER SUPPLY FUSES

Remove

To remove Fuse 1, 2, or 3, do the following:

1. Make sure power is turned off, and remove the power cord.
2. Remove the lid and top case.
3. Remove the left guide rail housing (Figure 1, #1) from the guide rail (Figure 1, #2) by pulling up on the center of the housing with your forefinger. This will expose fuses 2 and 3 on the power supply board.
4. Remove the black plastic housing (Figure 1, #3) by squeezing on the inside part of the housing and lifting it out from the rail guide. This exposes fuse number 1.

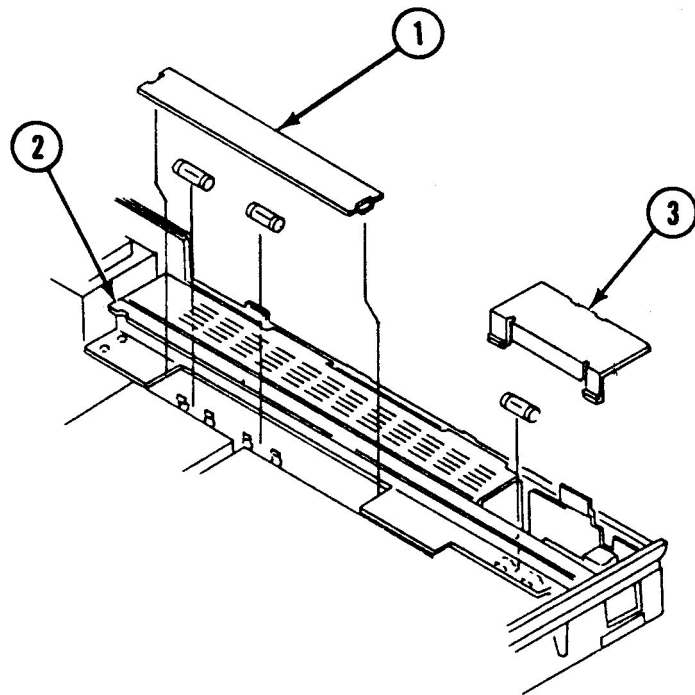


FIGURE 1

5. Remove Fuse 1 (Figure 2, #1) using a fuse removal tool, or carefully pry up one end using a small flat-blade screwdriver and pull the fuse out.
6. Remove the other two fuses—2 (Figure 2, #2) and 3 (Figure 2, #3)—the same way as in step 5.

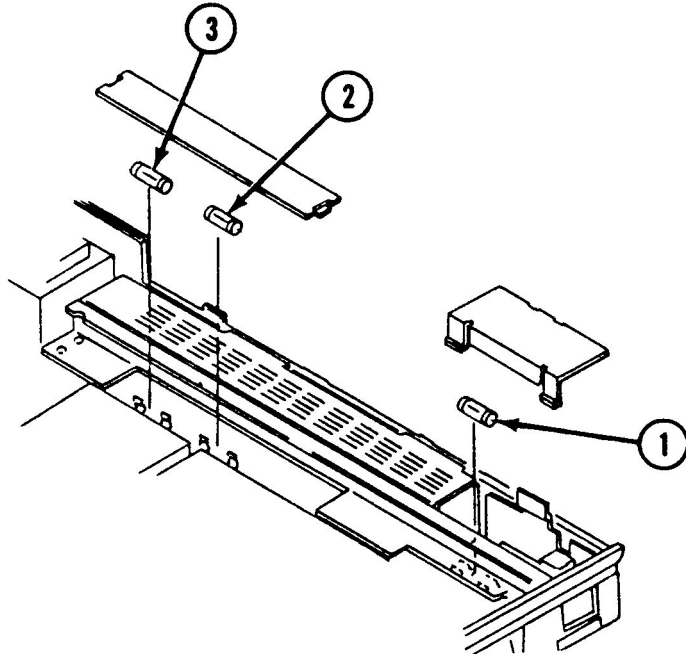


FIGURE 2

Replace

1. Replace any of the fuses by pressing the ends of the fuse into the holder.
2. Replace the plastic housing (Figure 1, #1) into the left rail guide by inserting one end and then slightly bowing the housing so that the tab on the other end fits into the rail.
3. Replace the black plastic housing (Figure 1, #3) by inserting the one tab into the bracket slot and then squeezing the other two tabs on the housing and slipping them into the slots on the guide rail.

□ MAIN LOGIC PCB FUSE —FU1 (SCSI LINE FUSE)

Replace

To replace fuse FU1:

1. Remove the main PCB.
2. Locate fuse FU1 (Figure 3, #1). Remove the fuse with a fuse removal tool or carefully pry up one end of the fuse with a small screwdriver.

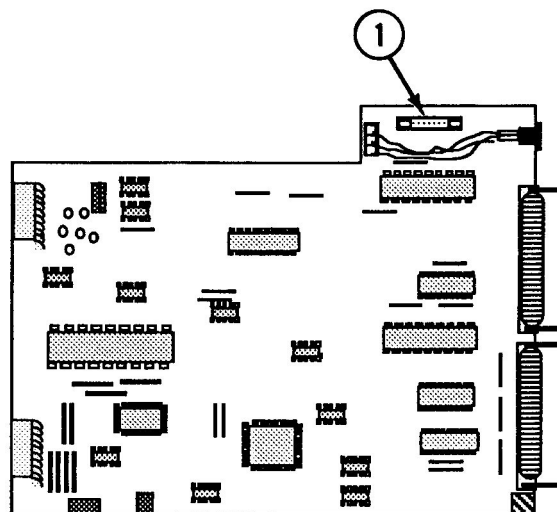


FIGURE 3

3. You can test the fuse with an ohmmeter as follows:
 - a) Set 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, then 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. Locate the cover plate on the bottom of the scanner (Figure 4, #1).

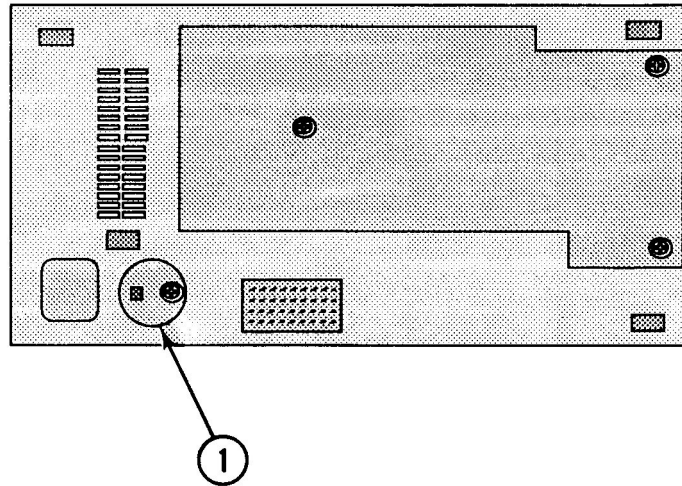


FIGURE 4

2. 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

To remove the old bulb without taking off the top cover glass assembly:

1. Raise the top cover to the vertical position (Figure 5, #1).

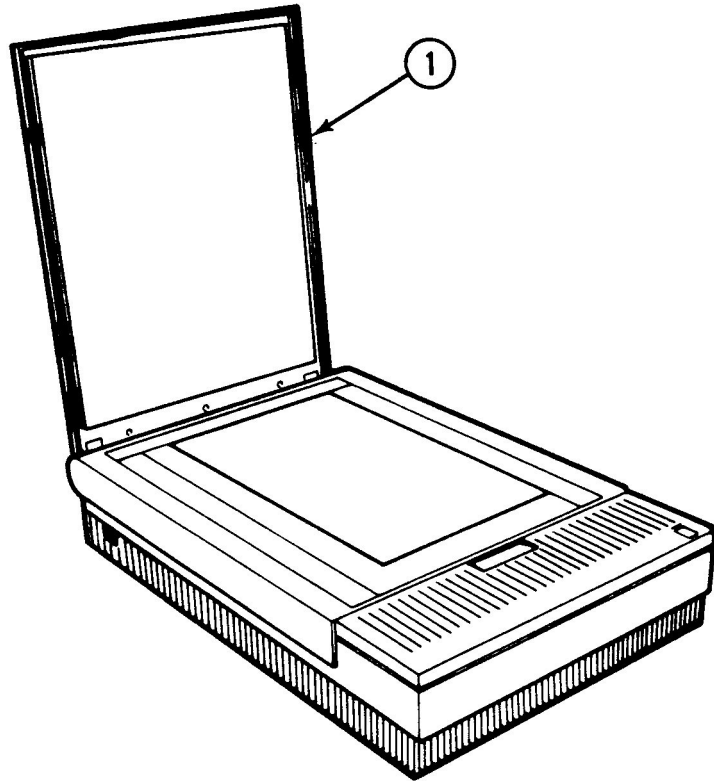


FIGURE 5

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; it will set itself to the home position.

Note: The side door on the right side of the scanner must be closed and the latch must be locked completely (turned all the way to the right) in order 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 is deactivated and the scanner will not power on.

- Using a large flat-blade screwdriver or a coin, unscrew (counterclockwise) the latch (Figure 6, #1) on the side door (Figure 6, #2) on the right side of the scanner.

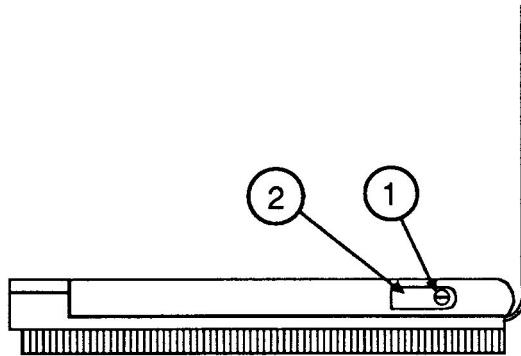


FIGURE 6

- Once the side door is opened, use a Phillips screwdriver to loosen the screw (Figure 7, #1) that holds the light bulb assembly to the optical block. (The screw does not come out.)
- Flip up the wire hook (Figure 7, #2) from the vertical position to the horizontal position.

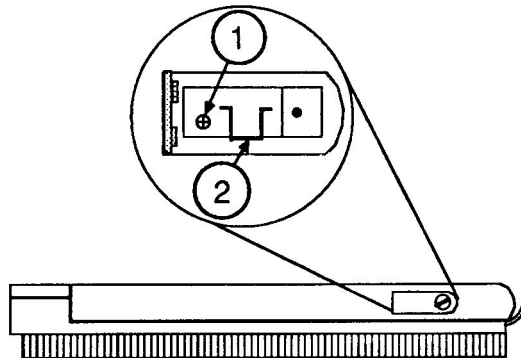


FIGURE 7

6. Grasp the wire hook with your forefinger and gently pull the bulb assembly out from the optical block. (If the bulb assembly offers resistance in coming out, then 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. Use a small or medium-size flat-blade screwdriver to 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, you can disengage the other side using the same method.
3. To insert the new bulb, first position the bulb so that the printing on the bulb is facing down, or into the holder. Then line up 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 cause injury.

Note: If the bulb has been handled (fingers on the glass), wipe the glass with a dry soft cloth before inserting in the assembly. Be sure not to touch the glass again, to avoid getting oil from your fingers on it.

Replace the Bulb Assembly

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

1. Insert the far end of the bulb assembly through the side door, making sure that the bottom frame of the bulb assembly fits into the groove slots (Figure 8, #1) on the optical block.

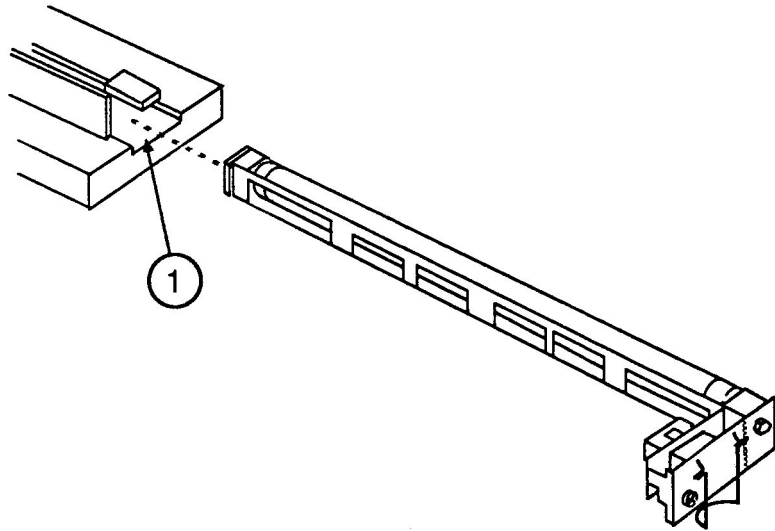


FIGURE 8

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. (This 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 reseal it.
4. Close the side door and tighten the latch to the right, using the screwdriver or coin.
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 and the interlock switch is deactivated.

□ VOLTAGE CONVERSION

To convert a 110V scanner (without the universal-voltage selector) to a universal voltage model, the transformer and bracket plate assembly must be removed and the universal model transformer and bracket plate assembly installed.

Materials Needed

Screwdriver
Phillips screwdriver
Universal transformer assembly (see illustrated parts)

Comparison

Figure 9 shows the 110V version of the transformer assembly. The assembly consists of the transformer (Figure 9, #1), the bracket plate (Figure 9, #2), the attached connectors (Figure 9, #3), the attached interlock switch (Figure 9, #4), and the two ground brackets (Figure 9, #5 and #6).

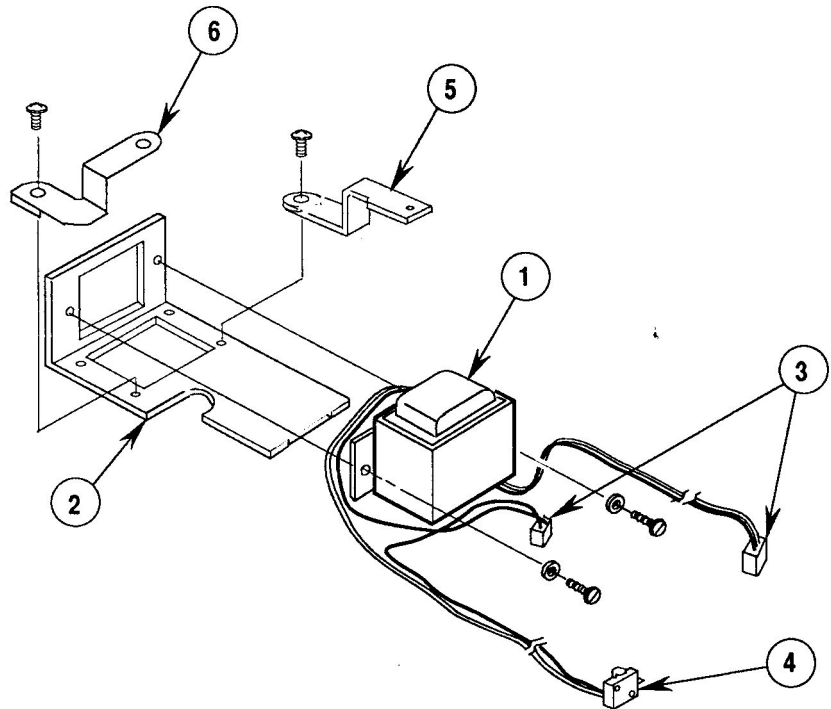


FIGURE 9

Figure 10 shows the universal (adjustable voltage) transformer assembly. The assembly consists of the transformer (Figure 10, #1), the bracket plate (Figure 10, #2; notice the cut-out for the voltage selector switch), the attached connectors (Figure 10, #3), the interlock switch (Figure 10, #4), the voltage selector switch (Figure 10, #5) and the two ground brackets (Figure 10, #6 and #7).

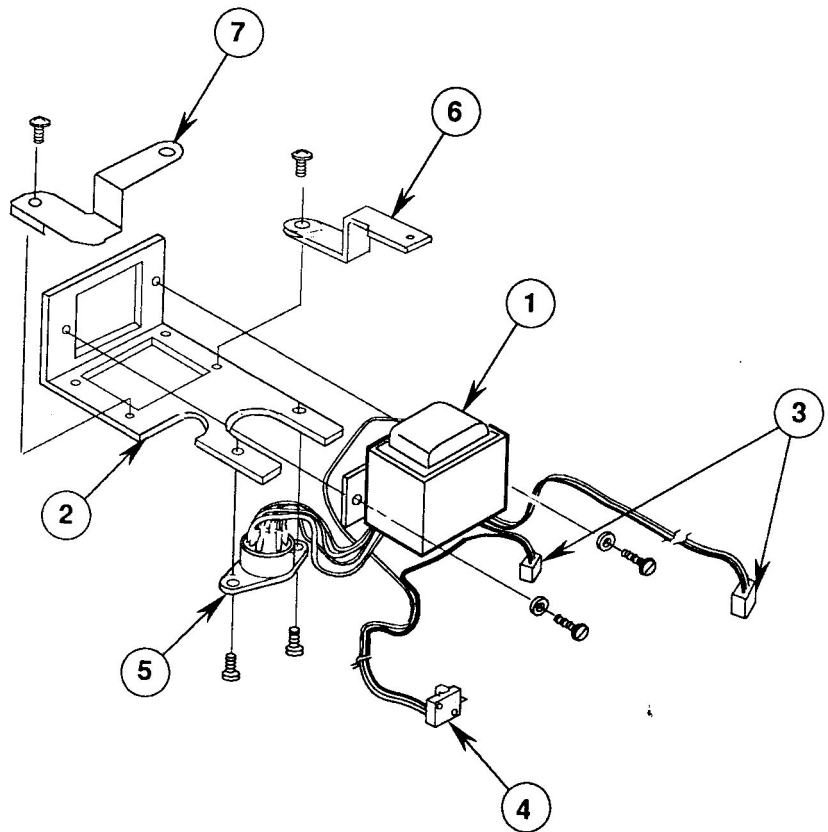


FIGURE 10

The main differences between the two assemblies are the transformers, the bracket plates, and the voltage selector switch on the universal version. 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 110V version to a universal-voltage model, do the following:

Remove

Follow the removal procedure in the Take-Apart section of this technical procedure.

Install

To install the universal model, follow the installation procedures in the Take-Apart section. 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

When an Apple Scanner is connected to a Macintosh SE/30, Macintosh IIfx, or Macintosh IIfx—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 PCB. 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 PCB, perform the procedure described below.

Materials Required

Medium Phillips screwdriver
Small needlenose pliers
Small diagonal cutters

Procedure

1. Remove the main logic PCB.
2. Place the main logic PCB on a grounded workbench pad and put on your grounding wriststrap.
3. Locate the three capacitors at locations CA4, CA5, and CA6 (Figure 11, #1) on the main logic PCB, next to the SCSI connector at CN6 (Figure 11, #2).

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

4. Using either your fingers or needlenose pliers, remove the three capacitors from the main logic PCB. 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.

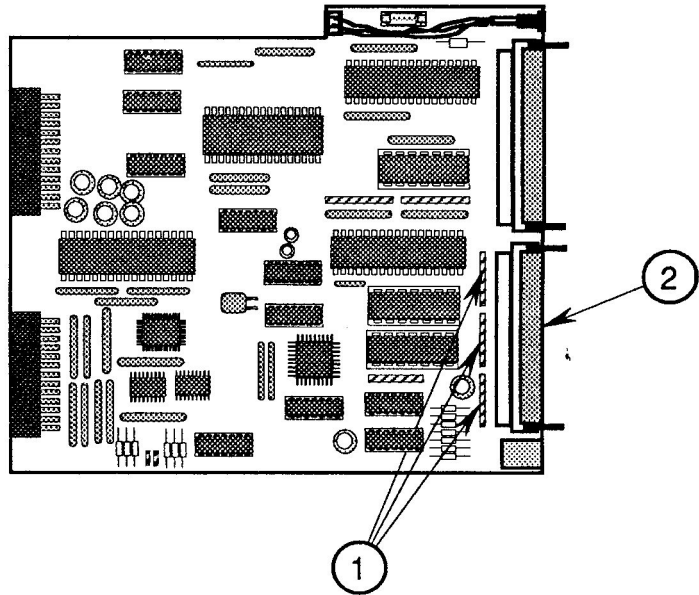


FIGURE 11

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 PCB.

Apple Scanner

Illustrated Parts List

□ CONTENTS

- 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 Power Supply and PCB (Main, PS) Assemblies
(Figure 5)
- IPL.15 Cables (Figure 6)

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.

□ MISCELLANEOUS HARDWARE KIT

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

Certain piece parts shown on the following pages are available in this Miscellaneous Hardware Kit. The parts included are listed below.

<u>Part No.</u>	<u>Description</u>	<u>See Figure #</u>
076-0277	Screw, Pan Head, 3 x 15 (10/pk)	Figure 2
076-0286	Screw 2, Cover (10/pk)	Figure 2 and 5
076-0273	Rubber Foot (10/pk)	Figure 2
076-0301	Screw, Tapping 3 x 8 (10/pk)	Figure 2 and 5
076-0298	Ribbon Cable Holder (5/pk)	Figure 2
076-0272	Button Lamp Lock (5/pk)	Figure 2
076-0312	Belt Tension Spring (10/pk)	Figure 3
076-0292	Screw, Double Sems 3 x 10 (20/pk)	Figure 4
076-0313	Carrier Stopper (10/pk)	Figure 4
076-0283	Fuse, 2A, 250V-2.0A (10/pk)	Figure 5
076-0293	Screw, Double Sems 3 x 6 (10/pk)	Figure 5
076-0284	Fuse, 1A, 250V-1.0A (10/pk)	Figure 5
076-0285	Fuse, 3A, 250V-3.0A (10/pk)	Figure 5
076-0294	Screw, Sems 4 x 6 (10/pk)	Figure 5
076-0325	Screw, Double Sems 4 x 8 (10/pk)	Figure 5

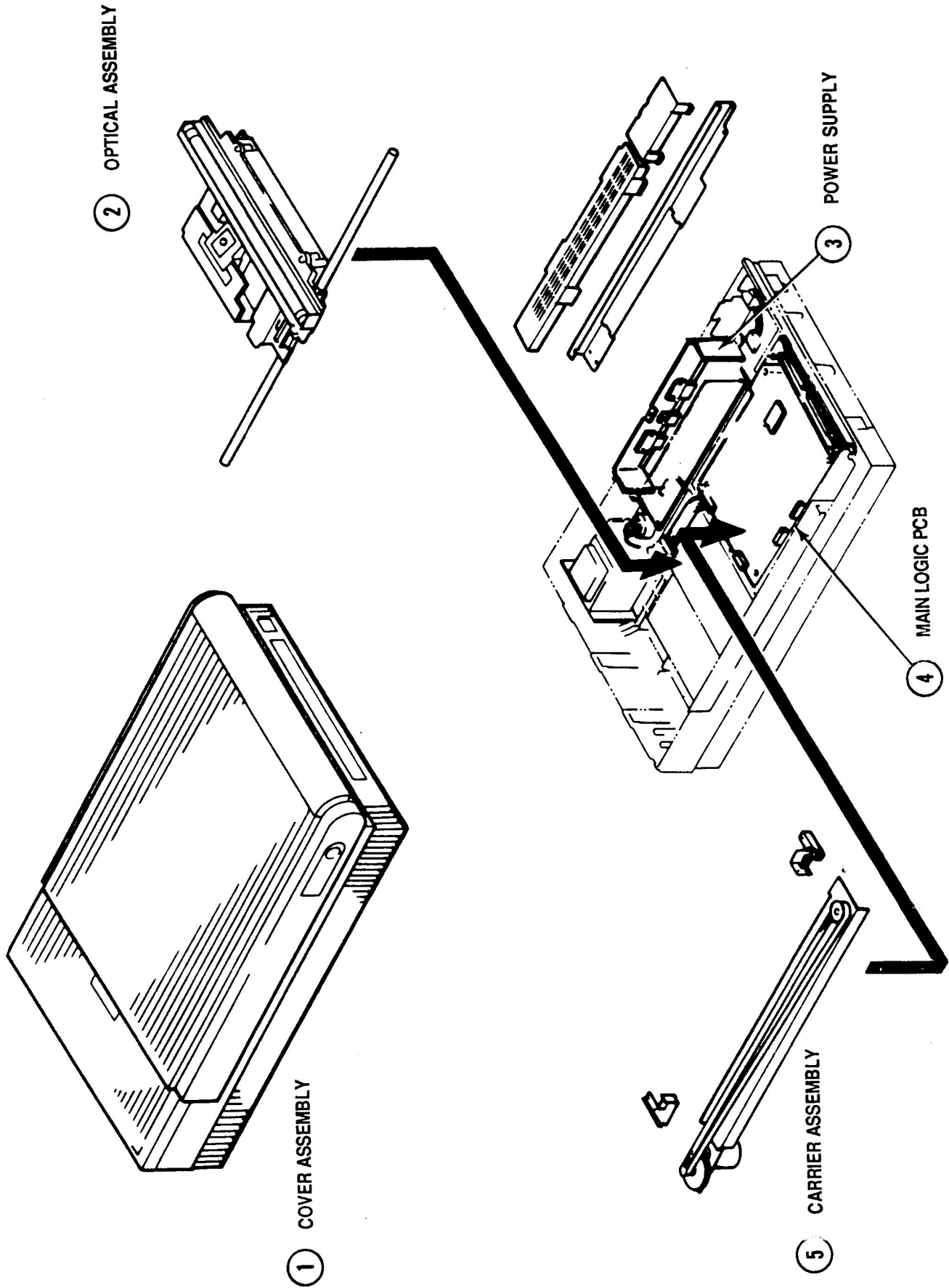


FIGURE 1

□ PARTS LOCATION (Figure 1)

<u>Item</u>	<u>Description</u>	<u>See Figure #</u>
1	Cover Assembly	Figure 2
2	Optical Assembly	Figure 4
3	Power Supply	Figure 5
4	Main Logic PCB	Figure 5
5	Carrier Assembly	Figure 3

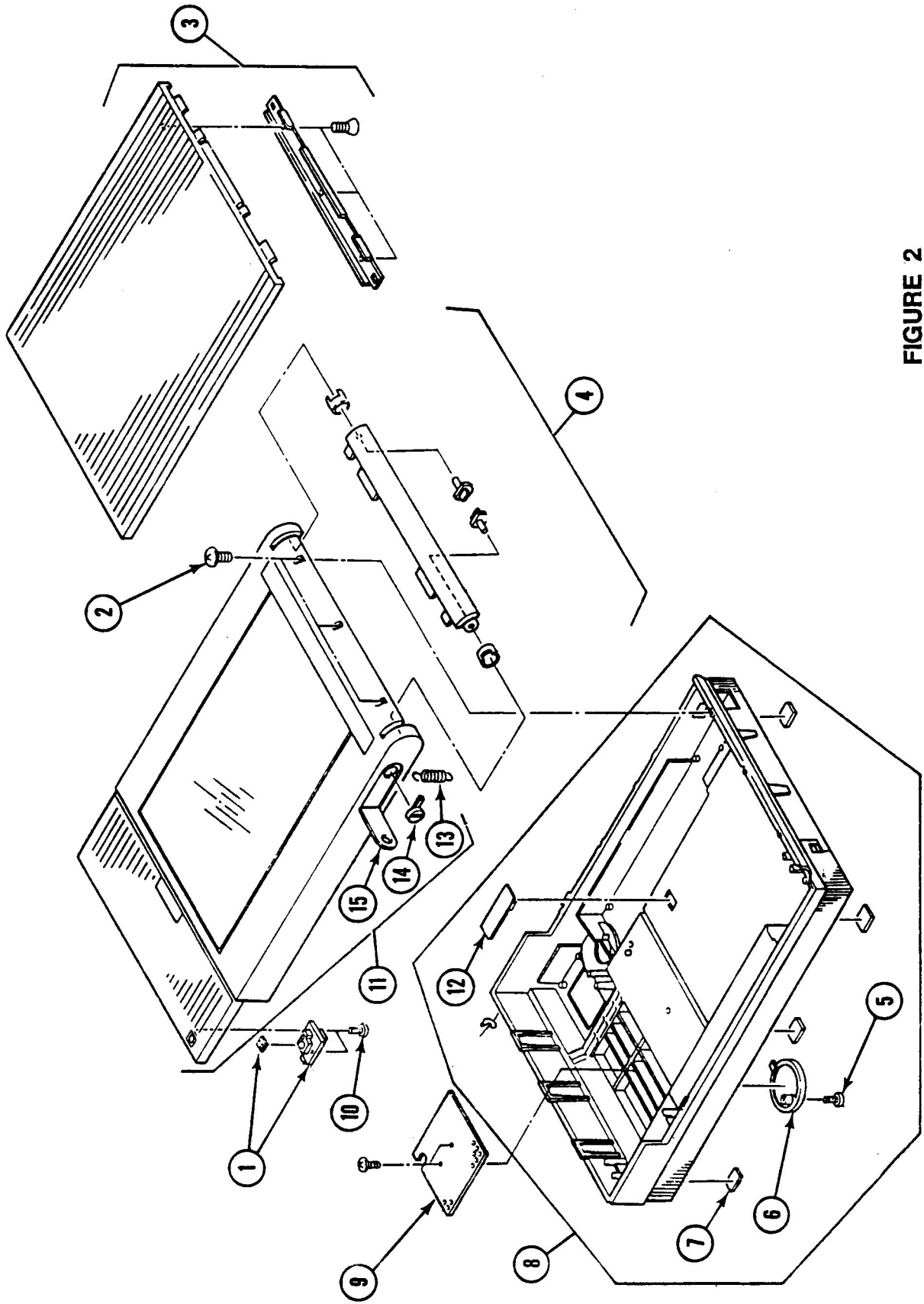


FIGURE 2

□ COVER ASSEMBLY (Figure 2)

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

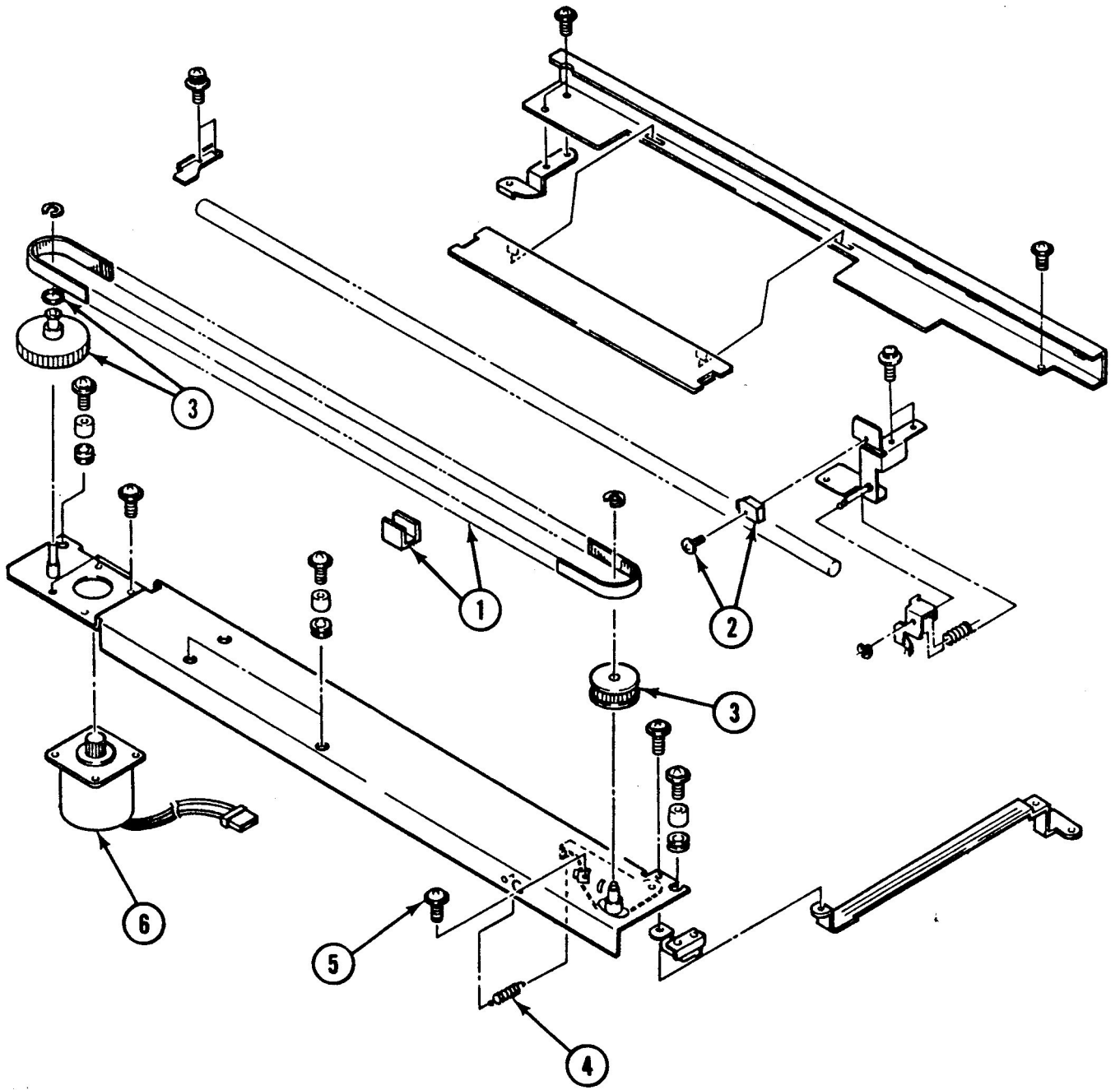


FIGURE 3

□ CARRIER ASSEMBLY (Figure 3)

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

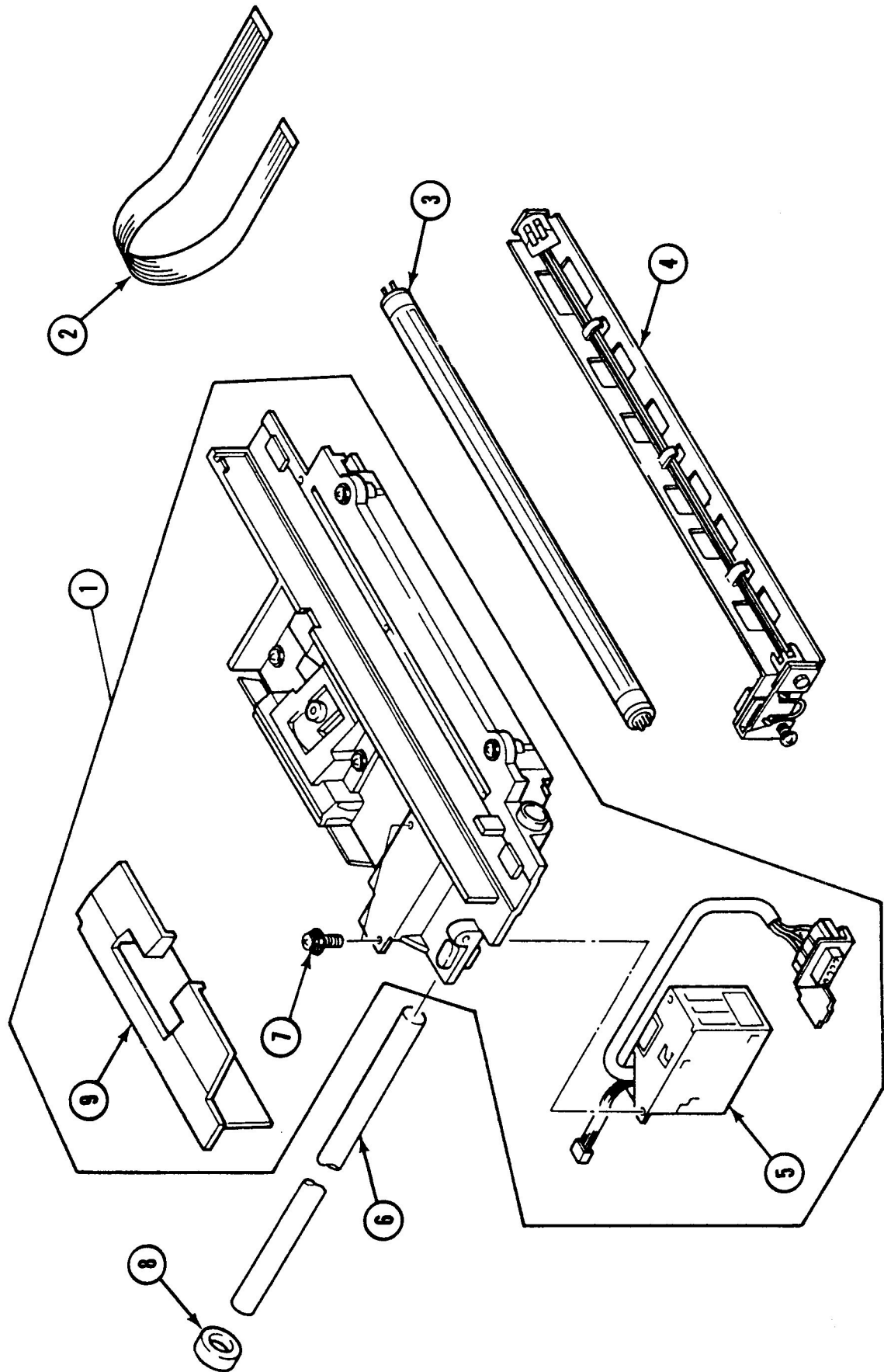


FIGURE 4

□ OPTICAL ASSEMBLY (Figure 4)

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

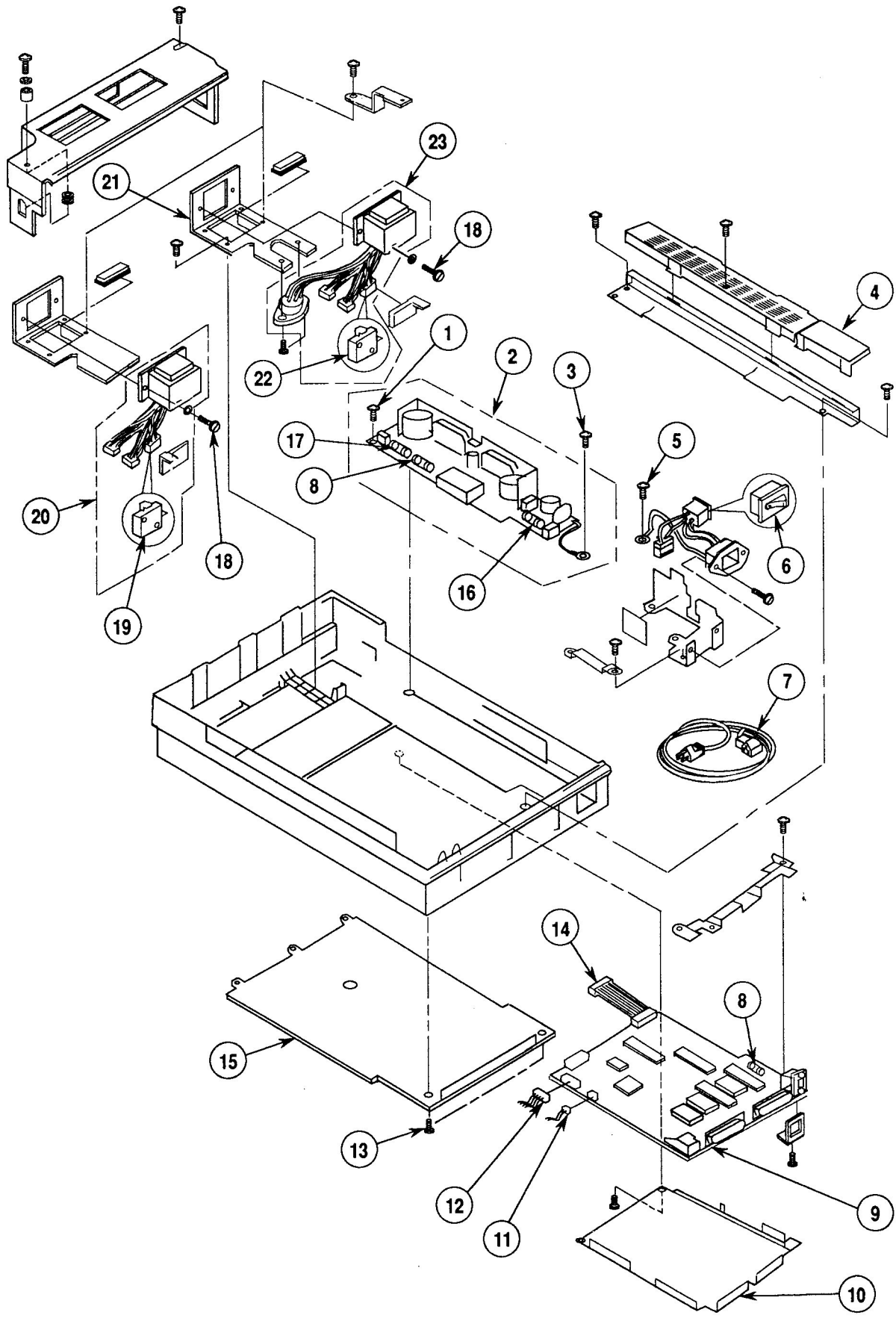


FIGURE 5

□ POWER SUPPLY & PCB (MAIN, PS) ASSEMBLIES (Figure 5)

<u>Item</u>	<u>Part No.</u>	<u>Description</u>
1	076-0301	Screw, Tapping 3 x 8 (10/pk)
2	661-0431	Power Supply Board
3	076-0293	Screw, Double Sems 3 x 6 (10/pk)
4	949-0214	AC Inlet Cover
5	076-0294	Screw, Sems 4 x 6 (10/pk)
6	937-0032	Switch, On/Off Assembly
7	590-0380	Cord, Power AC, Smoke, 110 V
8	076-0284	Fuse, 1A, 250V-1.0A (10/pk)
9	661-0534	Main Logic Board—Rev. B
10	948-0128	Shield, Main Logic Board
11	936-0045	Cable, Limit Switch Assembly
12	936-0044	Cable, Scan Switch Assembly
13	076-0286	Screw 2, Cover (10/pk)
14	936-0047	Cable, Power Supply Board
15	948-0037	Cover, Main Logic Board
16	076-0283	Fuse, 2A, 250V-2.0A (10/pk)
17	076-0285	Fuse, 3A, 250V-3.0A (10/pk)
18	076-0325	Screw, Double Sems 4 x 8 (10/pk)
19	076-0300	Switch, Cover Interlock, 110 V
20	915-0038	Transformer Assembly, 110 V
21	948-0134	Transformer Bracket, 100/240 V
22	076-0315	Cover Interlock Switch, 220/240 V
23	915-0039	Transformer Assembly, 100/240 V

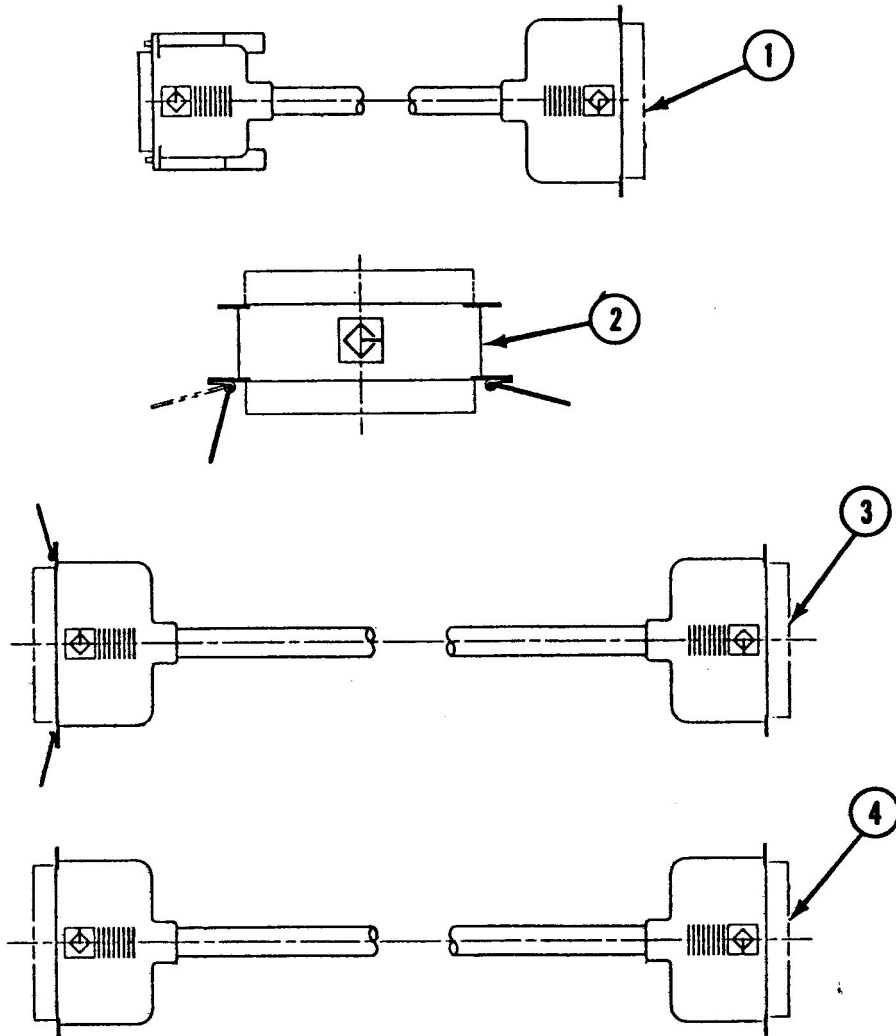


FIGURE 6

□ **CABLES (Figure 6)**

<u>Item</u>	<u>Part No.</u>	<u>Description</u>
1	658-8031	System Cable
2	658-8032	Terminator Cable
3	658-8033	Extender Cable
4	658-8034	Peripheral I/F Cable