

# **Apple II Family**

## **Volume Two**

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## **APPLE MONITOR II/MONOCROME MONITOR IIe TECHNICAL PROCEDURES**

The platinum version of the Monitor II is called the Apple Monochrome Monitor IIe. Except for the name and the color, the monitors are identical and all procedures are the same for both.



# Monitor II / Monochrome Monitor IIe

## Technical Procedures

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- IPL.3 Monitor II/Monochrome Monitor IIe

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# Monitor II / Monochrome Monitor IIe

## Section 1 – Basics

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### □ CONTENTS

- 1.2 Product Description
- 1.3 Setup Procedure

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***WARNING:*** Some older Monitor IIs have the fuse connected to the neutral side of input power. This condition should be corrected. Refer to the "Power Cord Upgrade Procedure" in Section 5, Additional Procedures, to identify and correct this condition.

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## □ PRODUCT DESCRIPTION

The Apple® Monitor II/Monochrome Monitor IIe is a 12-inch CRT display monitor that is used with Apple II or IIe computers. The monitor has a built-in handle for easy carrying. The screen tilts up or down to help reduce screen glare. When the power is on, the power switch (located at the upper-right corner) remains depressed and the green LED is lit.

The contrast control, at the right front, is the only adjustment knob on the front of the monitor. Other user-accessible controls are on the back. They are:

- Brightness
- Vertical hold
- Vertical size, which lengthens or shortens the vertical height of the picture

The internal controls, used for service adjustments, are:

- Horizontal width
- Horizontal linearity, which assures that the characters are of uniform width on both sides of the screen
- Horizontal hold, which controls horizontal rolling or tearing on the screen
- Vertical linearity, which assures that the top and bottom characters are the same size
- Focus, which is used to maintain the best overall image on the screen

The Apple Monitor II/Monochrome Monitor IIe contains a cathode-ray tube (CRT), which operates at very high voltages and contains a high vacuum. If cracked or broken, the CRT can implode (collapse into itself), scattering glass in all directions.

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***WARNING: Before working inside this monitor, read Section 8, CRT Safety, under the You Oughta Know tab.***

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## □ SETUP PROCEDURE

Follow the steps below to set up the Apple Monitor II/ Monochrome Monitor IIe for use with the Apple II or IIe:

1. Connect one end of the video cable phono plug to the phono jack on the back of the monitor. Connect the other end to the computer's video output phono jack. (Both ends of the cable are the same.)
2. Plug the power cable into a three-hole grounded wall socket.
3. Start up a program that displays some text on the screen.
4. Turn the contrast control clockwise to its maximum. (The contrast control is located on the right-front edge of the monitor.)
5. Turn the brightness control clockwise until the fine lines that form the background of the display are clearly visible.
6. Turn the brightness control counterclockwise until the fine lines of the background are just extinguished.
7. Adjust the contrast control to give a pleasing level of text illumination.
8. Adjust the tilt of the screen so that it is perpendicular to your line of vision.



# Monitor II / Monochrome Monitor IIe

## Section 2 – Take-Apart

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

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***WARNING:*** *Due to a change in the line filter board design, some older versions of the Monitor II may not be properly grounded. As a result, some users may be exposed to electrical shock. Whenever you service a Monitor II, check the resistance of the grounding system to verify that the monitor is properly grounded. (Refer to "Line Filter Board Modification" in Section 5, Additional Procedures, for instructions in checking resistance and replacing a deleted ground.)*

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***WARNING:*** *In older versions of the Monitor II, the power cord conductor wires are not connected to the line filter board in the correct sequence. Whenever you open a Monitor II for repair, first check the power cord wiring to see if you need to replace the cord. (For identification of wiring and installation instructions, see "Power Cord Upgrade Procedure" in Section 5, Additional Procedures.)*

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## □ BACK CASE

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**WARNING:** *The Monitor II / Monochrome Monitor IIe contains high voltage and a high-vacuum picture tube. To prevent serious personal injury and property damage, be sure you read and understand the safety precautions in Section 8, CRT Safety, under the You Oughta Know tab before you remove the back cover. Failure to follow the safety rules could result in serious injury.*

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### Materials Needed

Medium Phillips screwdriver (magnetic)

### Remove

1. Disconnect the AC power cord from the wall outlet.
2. Place the monitor on its side and remove the five Phillips screws from the bottom of the case.
3. Set the monitor upright and remove the two screws from the handle recess.
4. Slide the back case away from the frame.
5. Pull the power cord through the opening in the back case. (If the plug is too large to fit through the opening in the back case, go on to step 6.)

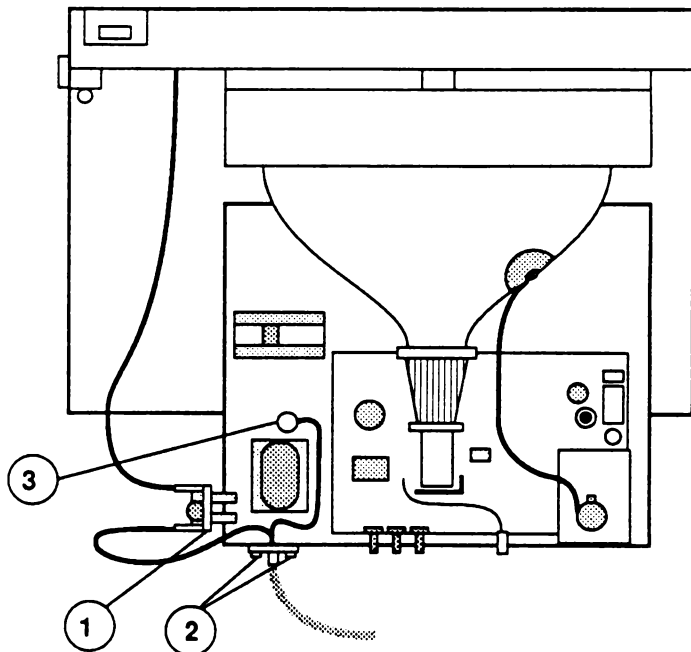


**FIGURE 1**

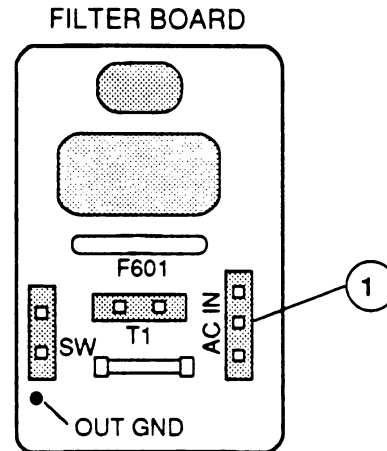


**FIGURE 2**

6. Discharge the CRT (see procedure next page).
7. The power cord does not have to be removed except in the following cases:
  - The monitor is an older version that does not have power cord wiring connected to the line filter board in the correct sequence (see "Power Cord Upgrade Procedure" in Section 5, Additional Procedures).
  - The monitor is an older version that does not allow the plug of the cord to fit through the opening in the back case—and you need to take the case completely off.
  - The power cord has failed.

If you need to remove the cord, locate the line filter board (Figure 1, #1), disconnect the AC IN connector (Figure 2, #1) from the board, remove the two screws from the cord mounting plate (Figure 1, #2), remove any tie wraps, and (for platinum monitors only) remove the power cord's green ground wire from the chassis screw and nut (Figure 1, #3). Then withdraw the power cord wires through the hole in the chassis.

## Replace

To reinstall the back case and power cord, follow the above procedure in reverse order. (If you are replacing the power cord, see the "Power Cord Upgrade Procedure" in Section 5, Additional Procedures.)

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## □ DISCHARGING THE CATHODE-RAY TUBE (CRT)

### Materials Required

Safety goggles  
Foam pad (ungrounded)  
Needlenose pliers  
Alligator lead  
New CRT discharge tool (part number **076-0381**)

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**WARNING:** Before starting, read the safety precautions and the CRT discharge procedure in Section 8, CRT Safety, under the You Oughta Know tab. Alternative instructions for discharging the CRT using the older version of the discharge tool (and/or a screwdriver) are given in that section.

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### Discharge Procedure

1. Remove your grounding wriststrap and jewelry and put on safety goggles before beginning!
2. Remove the rear cover.
3. Set the monitor upright on the ungrounded foam pad, with the back facing you.

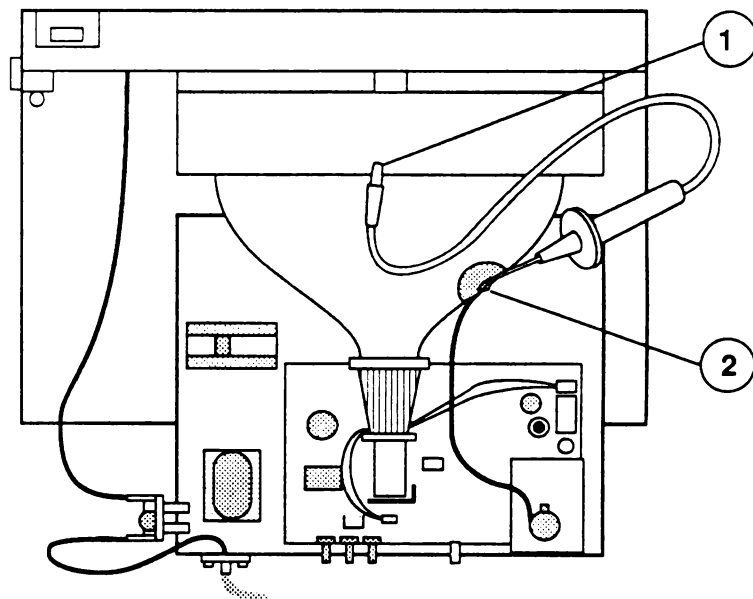


**FIGURE 3**

4. Attach the clip of the CRT discharge tool to any metal part of the chassis (Figure 3, #1).
5. Put one hand behind your back, and grasp the handle of the discharge tool with your other hand.

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***WARNING:*** Use only one hand when discharging the CRT to prevent forming a path of current through your body should your hand slip and touch the metal part of the discharge tool during the discharge procedure.

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6. Hold the CRT discharge tool to the tube surface, and insert its probe under the anode cap (Figure 3, #2) until it touches the anode ring.
7. Remove the probe of the CRT discharge tool from under the anode cap and detach its clip from the metal chassis.

**Note:** If the bleeder resistor fails, a secondary charge could build up over time, even after you have discharged the CRT. To dissipate any residual charge, establish an ongoing ground by clipping one end of an alligator lead to the chassis frame and the other end to the anode ring or aperture.

## **Anode Cap**

For some procedures, you may have to remove the anode cap. After you have discharged the CRT, peel back the anode cap until you can see the anode "ring" (or connector) at the center. Using needlenose pliers, compress the two prongs on the connector to free it from the anode aperture.

To replace the anode cap, press together the two prongs of the anode connector so that you can insert it into the aperture. Tug on the anode wire to make sure it is firmly seated, and then press down around the edges of the rubber anode cap to ensure a firm seal.

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## □ LINE FILTER BOARD

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**WARNING:** Due to a change in the line filter board design, some older versions of the Monitor II may not be properly grounded. As a result, some users may be exposed to electrical shock. Whenever you service a Monitor II, check the resistance of the grounding system to verify that the monitor is properly grounded. (Refer to "Line Filter Board Modification" in Section 5, Additional Procedures, for instructions in checking resistance and replacing a deleted ground.)

---

### Materials Required

Medium Phillips screwdriver (magnetic)  
Medium long-nose pliers  
Small wire cutters  
Soldering iron and solder

### Remove

1. Remove the back case.
2. Discharge the CRT.

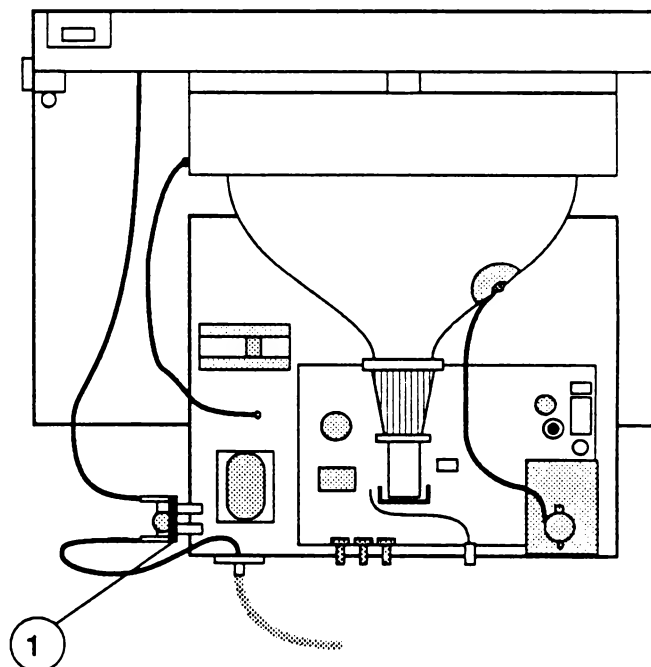


**FIGURE 4**

3. Locate the line filter board (Figure 4, #1).

4. Disconnect the following three connectors from the line filter board:

- AC IN (Figure 5, #1)
- T1 (Figure 5, #2)
- SW (Figure 5, #3)

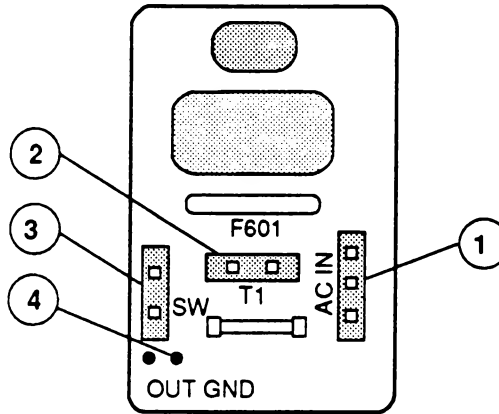


**FIGURE 5**

5. Remove the Phillips screw that holds the line filter board to the chassis. (Hold the hex nut on the back side of the screw with the long-nose pliers.)
6. Unsolder the green ground wire (Figure 5, #4) from the line filter board at the marking "OUT GND."

## Replace

There are two versions of the Monitor II line filter board, and the replacement procedure is different for each version. Because of this, you must first identify which version of the filter board you are going to install.

Locate the AC IN connector pins on the line filter board (Figure 6, #1).

If there are only **two** AC IN connector pins at the markings **W** (white) and **B** (black) on the line filter board, the board is a new version with the ground pin deleted. For instructions on how to install the new line filter board, see "New Line Filter Board Installation."

If there are **three** AC IN connector pins at the markings **W** (white), **B** (black), and **G** (green) on the line filter board, the filter board is an old version. For instructions on how to install the old line filter board, see "Old Line Filter Board Installation."

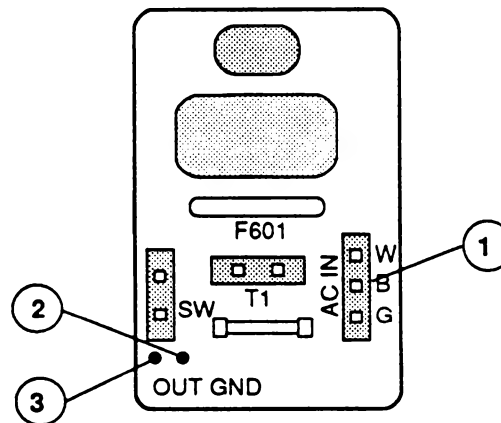


**FIGURE 6**

### *New Line Filter Board Installation*

1. Locate the AC IN connector (Figure 7, #1) that you removed from the line filter board.

If the AC IN connector has only **two** wires (white and black), the monitor power cord is a new version and the ground wire attaches directly to the monitor chassis. Proceed to step 2 of the procedure.

If **three** wires (white, black, and green) are wired into the AC IN connector, the monitor power cord is an older version, and you **must** connect the power cord ground to the line filter board grounding circuitry as follows:

- a) Using small wire cutters, clip off the green AC IN ground wire close to the connector (Figure 7, #2).
- b) On the component side of the new filter board, locate the two solder points above the marking "OUT GND" (Figure 6, #2 and #3). Desolder to remove any solder present at either solder point.
- c) Solder the green AC IN ground wire to the solder point (Figure 6, #3) above the marking "OUT GND" on the filter board.

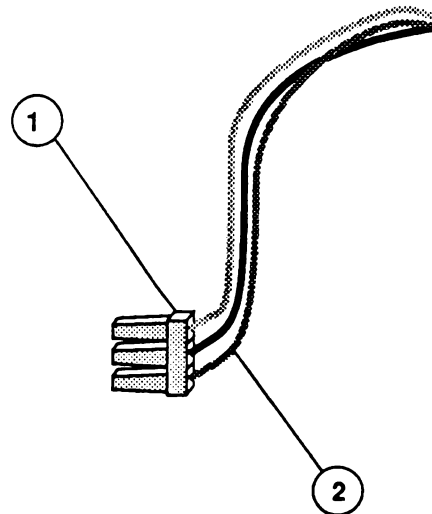


**FIGURE 7**

2. Locate the green ground wire that you desoldered from the customer's filter board, and solder the wire to the new filter board at the solder point (Figure 6, #2) above the marking "OUT GND."

3. Remount the line filter board to the chassis using the Phillips screw and hex nut.

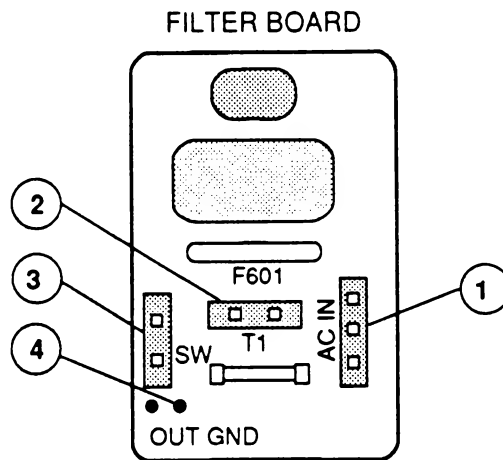


**FIGURE 8**

4. After reading the note below, plug in the three connectors to the line filter board:

- AC IN (Figure 8, #1)
- T1 (Figure 8, #2)
- SW (Figure 8, #3)

**Note:** Be careful with SW and T1—both are two-hole connectors and can be put on the wrong posts. T1 comes from the transformer and SW comes from the power switch. Be sure to orient T1 correctly: the board is marked B (black) and W (white) for this connector.

5. Replace the back case.

*Old Line Filter  
Board Installation*

1. Locate the green ground wire that you desoldered from the customer's filter board, and solder the wire to the replacement filter board at the solder point (Figure 7, #4) above the marking "OUT GND."
2. Remount the line filter board to the chassis using the Phillips screw and hex nut.
3. After reading the note below, plug in the three connectors to the line filter board:
  - AC IN (Figure 8, #1)
  - T1 (Figure 8, #2)
  - SW (Figure 8, #3)

**Note:** Be careful with SW and T1—both are two-hole connectors and can be put on the wrong posts. T1 comes from the transformer and SW comes from the power switch. Be sure to orient T1 correctly: the board is marked B (black) and W (white) for this connector.

4. Replace the back case.

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## □ MAIN ELECTRONICS ASSEMBLY

### Materials Needed

Medium Phillips screwdriver (magnetic)  
Medium long-nose pliers  
Diagonal cutters  
Exacto knife  
Soldering iron and solder

### Remove

1. Remove the back case.
2. Discharge the CRT.

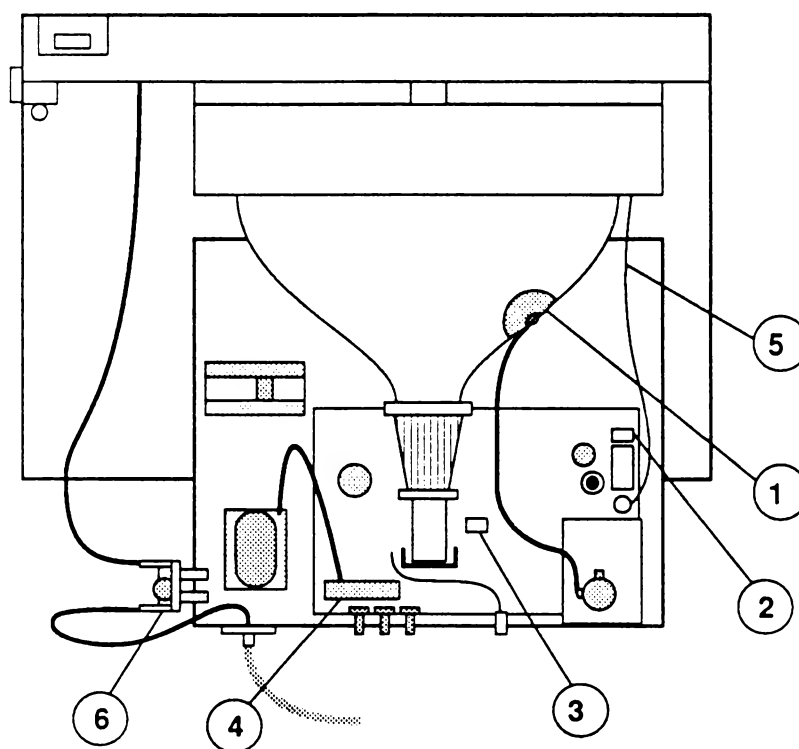


**FIGURE 9**

3. Remove the anode wire (Figure 9, #1) by peeling back the rubber cap, compressing the prongs of the anode connector clip (using long-nose pliers, if necessary), and pulling the connector out of the anode aperture.

4. Place the monitor on a grounded workbench pad and put on your grounding wriststrap. (Never do this until after the monitor has been discharged.)
5. Pull the chassis tray back as far as the wires will allow.
6. Disconnect the brown/gray wire from position H-DY (Figure 9, #2) and the green/white wire from position V-DY (Figure 9, #3) on the main electronics assembly. Using diagonal cutters, carefully cut all the tie wraps along these wires.
7. Disconnect the two red leads at location T2 near the left-rear edge of the main electronics assembly (Figure 9, #4).
8. To free the main electronics assembly ground wire (Figure 9, #5), remove the screw from the mounting tab at the upper-right corner of the CRT. (The antistatic shield finger plate, which is also held in place by this screw, will come off.)

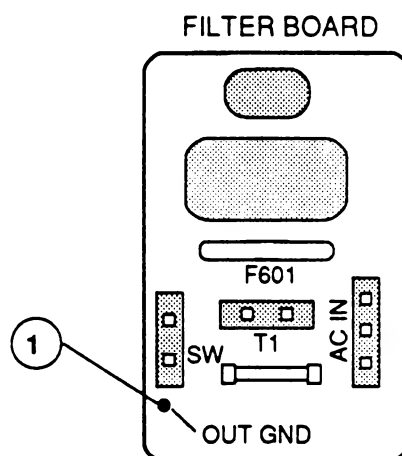


**FIGURE 10**

9. Locate the line filter board (Figure 9, #6). Unsolder the green ground wire from the line filter board at "OUT GND" (Figure 10, #1).

**Note:** It may be easier to reach the solder on the back of the line filter board if you first remove the board from the chassis (see "Line Filter Board," earlier in this section).

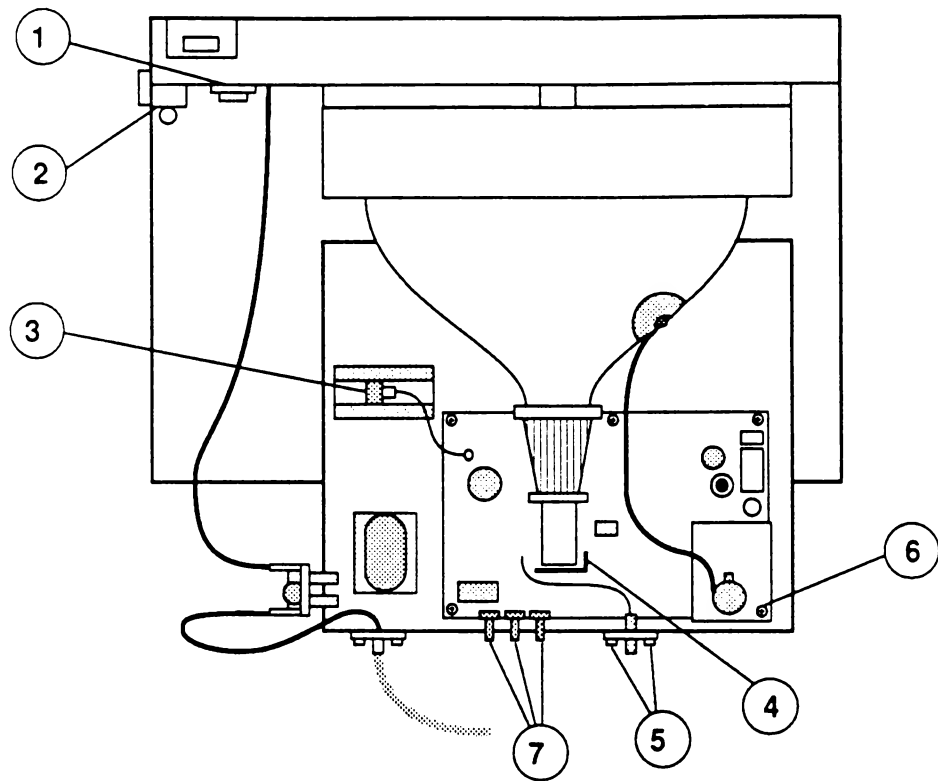


**FIGURE 11**

10. Remove the LED mounting screw (Figure 11, #1) and the two mounting screws that secure the contrast control (Figure 11, #2). The LED assembly and the contrast control assembly will remain attached to the main electronics assembly. Using diagonal cutters, carefully cut all tie wraps along these wires.
11. Disconnect the 3-wire connector (Figure 11, #3) from the transistor on the bottom of the metal chassis.
12. Disconnect the socket (Figure 11, #4) from the neck of the CRT.
13. Remove the two screws (Figure 11, #5) that attach the video jack to the chassis.

14. Remove the five mounting screws from the main electronics assembly.
15. The right-rear mounting screw (Figure 11, #6) also holds the flyback transformer shield. The connection between this corner of the main electronics assembly and the undermounting has been strengthened with glue. After removing the screw, remove the transformer shield, then loosen the glue by sliding an exacto knife between the main electronics board and the undermounting. Attempting to lift the board before the glue has been loosened will break the corner and make the main electronics assembly worthless.
16. The main electronics assembly can now be removed by sliding it forward to allow the rear control knobs (Figure 11, #7) to clear the chassis, and then lifting the board up and out.

## **Replace**

1. Mount the main electronics assembly on the chassis, fitting the three rear control knobs (Figure 11, #7) through the holes in the chassis. Secure the board with the five mounting screws, making sure the flyback transformer shield also is secured with the right-rear mounting screw (Figure 11, #6).
2. Replace the two screws that secure the video jack (Figure 11, #5).
3. Replace the CRT socket (Figure 11, #4).
4. Connect the 3-wire connector to the transistor (Figure 11, #3) on the bottom of the chassis. Make sure the red wire is toward the back of the monitor. (A reversed connection results in a wavy screen and overheating of the regulator.)
5. Replace the screws that secure the LED assembly (Figure 11, #1) and the contrast control assembly (Figure 11, #2) to the inside of the bezel.

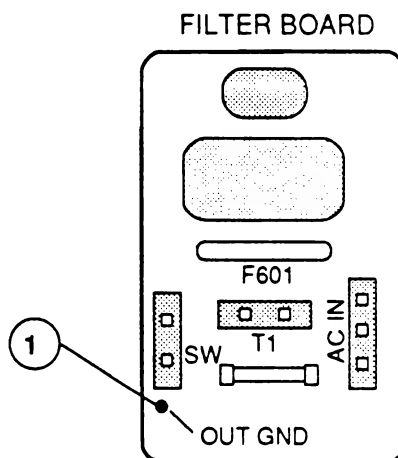


**FIGURE 12**

6. Locate the green ground wire (Figure 13, #6) from the main electronics assembly and solder it to the line filter board at the marking "OUT GND" (Figure 12, #1). (If you removed the line filter board from the chassis, remount it with its screw and reconnect any wires that you removed.)
7. Connect the two red leads from the transformer to connector T2 (Figure 13, #1) on the main electronics assembly.
8. Connect the brown/gray wire to the H-DY connector (Figure 13, #2) and the green/white wire to the V-DY connector (Figure 13, #3) on the main electronics assembly.
9. Replace the mounting screw that secures the main electronics assembly ground wire (Figure 13, #4) to the upper-right corner of the CRT. (Be sure to replace the antistatic shield finger plate, which is also held in place by this screw.)

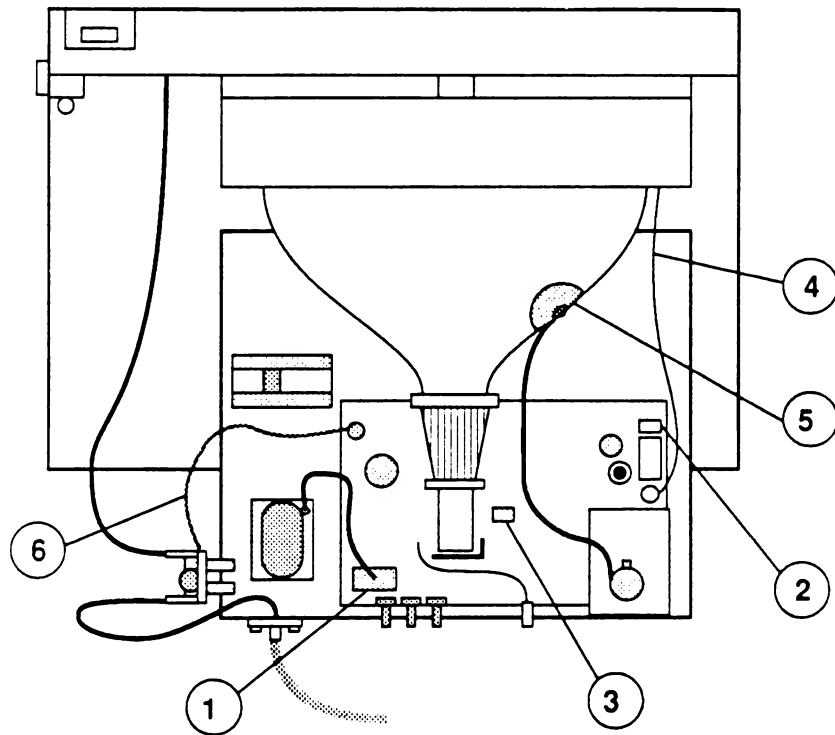


**FIGURE 13**

10. Tiewrap the wires that are in groups, making sure that the chassis tray can slide all the way in and out without binding.
11. Reconnect the anode cap to the anode of the CRT (Figure 13, #5), making sure that both metal clips are settled in securely.

---

**IMPORTANT:** When a new main electronics assembly is installed, the horizontal or vertical circuits may need adjustment (see "Main Electronics Assembly Adjustments" in Section 3, Adjustments).

---

12. Replace the back case.

---

## □ CATHODE-RAY TUBE (CRT)

### Materials Needed

Medium Phillips screwdriver (magnetic)  
Medium long-nose pliers  
Exacto knife

### Remove

1. Remove the back case.
2. Discharge the CRT.

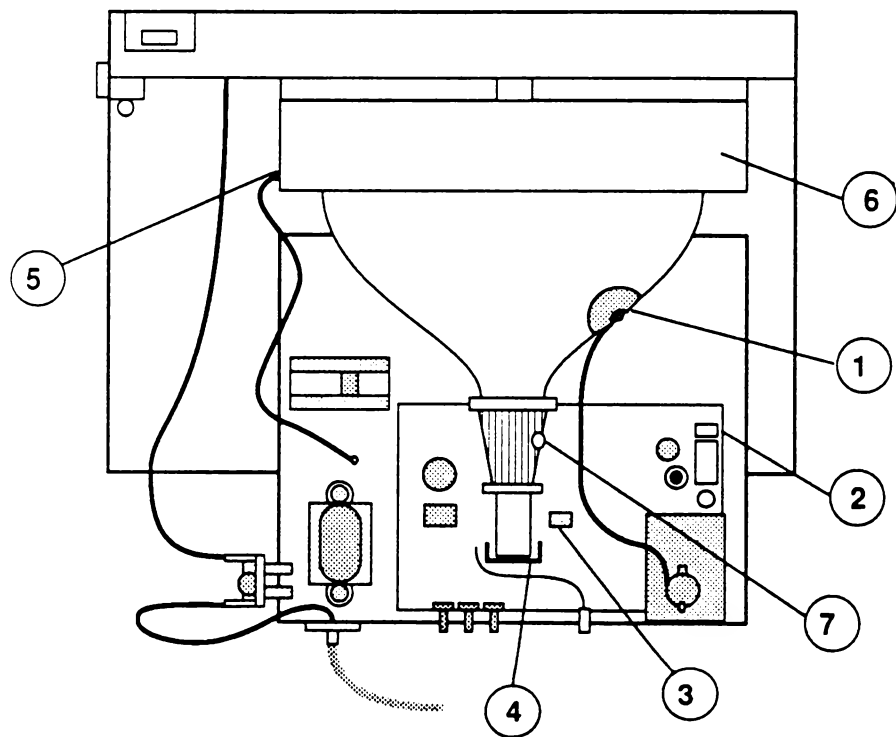


**FIGURE 14**

3. Remove the anode wire (Figure 14, #1) by peeling back the rubber cap, compressing the prongs of the anode connector clip (using long-nose pliers, if necessary), and pulling the connector out of the anode aperture.

4. Place the discharged monitor on a grounded workbench pad and put on your grounding wriststrap. (Never put on the wriststrap until after the monitor is discharged.)
5. Pull the chassis tray back as far as the wires will allow.
6. Disconnect the brown/gray wire from position H-DY (Figure 14, #2) and the green/white wire from position V-DY (Figure 14, #3) on the main electronics assembly. Using diagonal cutters, carefully cut all the tie-wraps along these wires.
7. Disconnect the socket (Figure 14, #4) from the neck of the CRT.
8. Remove the screw (Figure 14, #5) that secures the chassis ground wire to the left side of the top ground shield.
9. Remove the five screws that hold the upper shield (Figure 14, #6) to the front bezel, and remove the shield.
10. Remove the two bottom CRT mounting screws (one at each lower corner).
11. Supporting the CRT with one hand, remove the two top CRT mounting screws. The antistatic shield finger plate on the top-right will come off.
12. When all four mounting screws have been removed, gently lift out the CRT. (If the CRT is hard to remove, support the bottom of the CRT with one hand and gently push on the front of the tube with the other hand.)
13. If you need to remove the yoke assembly from the CRT, loosen the clamp screw (Figure 14, #7) and slide the yoke off to the rear of the CRT. (If necessary, cut through the adhesive at the front of the yoke with a scalpel knife.)

---

***WARNING:*** If you intend to dispose of the CRT, refer to "Disposing of the Cathode-Ray Tube" in Section 8, CRT Safety, under the You Oughta Know tab.

---

## Replace

1. Place the front bezel face down and insert the CRT into the bezel with the anode aperture oriented toward your right, aligning the four corner mounting tabs with the bezel screw holes.

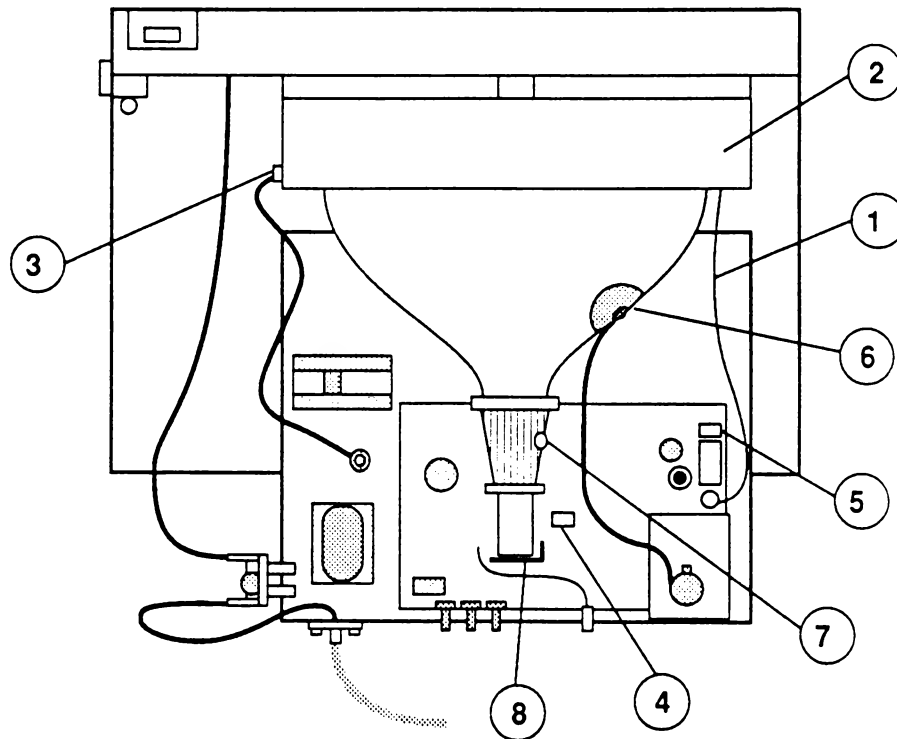


**FIGURE 15**

2. Replace the top-left mounting screw first, then the top-right screw, making sure that the antistatic shield finger plate is in place (it should touch the CRT) and that the black ground wire (Figure 15, #1) from the right side of the main electronics assembly is also attached to the same screw. Then replace the two bottom mounting screws.
3. Slide in the chassis tray.
4. Reinstall the top ground shield (Figure 15, #2) with its five mounting screws.
5. Replace the screw (Figure 15, #3) that secures the chassis ground wire to the left side of the top shield.

6. Connect the green/white wire from the yoke to the V-DY connector (Figure 15, #4) and the brown/gray wire to the H-DY connector (Figure 15, #5) on the main electronics assembly.
7. Replace the anode cap (Figure 15, #6).
8. If the yoke has been removed, replace it by sliding the new yoke over the neck of the CRT and tightening the yoke screw (Figure 15, #7).
9. Reinstall the CRT socket (Figure 15, #8).
10. Tiewrap the wires that are in groups, making sure that the chassis tray can slide all the way in and out without binding.

---

***IMPORTANT:*** *If the yoke was removed or replaced, a yoke adjustment will probably be necessary (see Section 3, Adjustments).*

---

11. Replace the back case.

---

## □ FUSE

---

**IMPORTANT:** *Newer models of the monitor have clip-in fuse holders and do not require unsoldering or removal of the filter board to change the fuse.*

---

### Materials Needed

Medium Phillips screwdriver (magnetic)  
Medium long-nose pliers  
Soldering iron and solder

### Replace

If the fuse is open (the wire inside is broken), it must be replaced. To replace the fuse:

1. Remove the back case.
2. Discharge the CRT.
3. Locate the line filter board (Figure 16, #1).

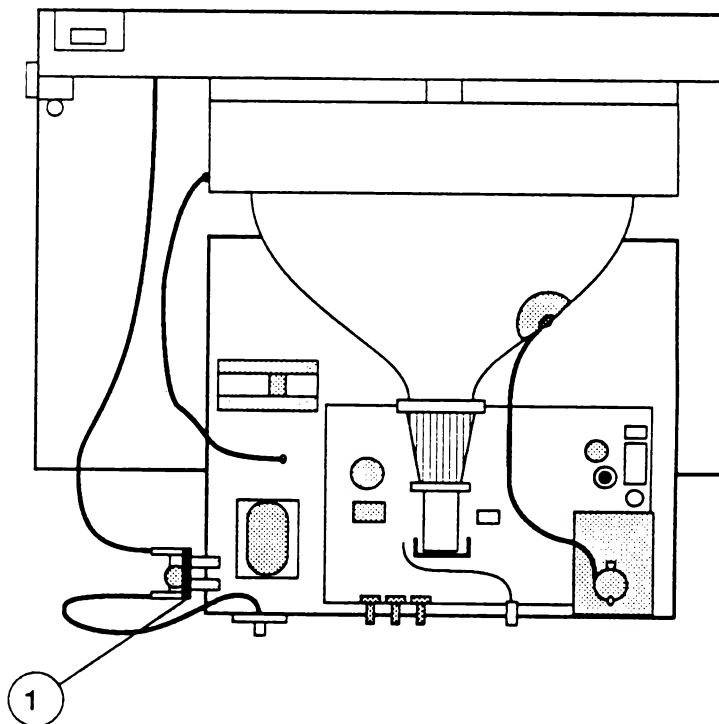


**FIGURE 16**

4. Remove the following three connectors from the line filter board:

- AC IN (Figure 17, #1)
- T1 (Figure 17, #2)
- SW (Figure 17, #3)

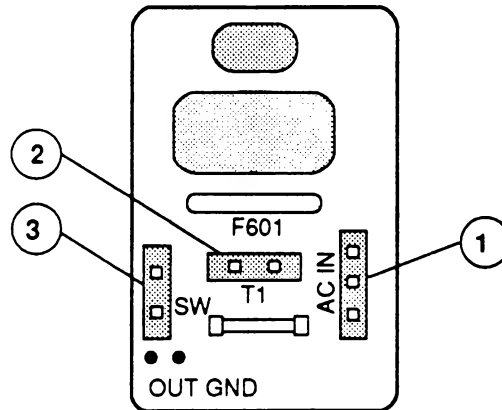


**FIGURE 17**

5. Remove the Phillips screw that holds the line filter board to the chassis. (Hold the hex nut steady with long-nose pliers.)
6. Unsolder both ends of the fuse wires from the board and lift the fuse from the board. (This type of fuse is called a "pigtail" fuse.)

**Note:** This step is easier if you use a solder sucker to remove the excess solder and some kind of holder (such as vise grips) to hold the board while you're working on it.

7. Select the correct fuse: For a 115V unit, use a .5-amp fuse; for a 230V unit, use a 1-amp slow-blow fuse. Install the fuse into the wire holes and resolder the leads. Clip off any excess from the leads after soldering.
8. Remount the line filter board to the chassis using the Phillips screw and hex nut.

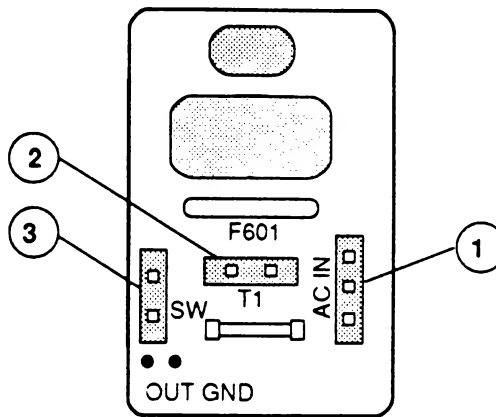


**FIGURE 18**

9. After reading the note below, reconnect the following three connectors to the line filter board:

- AC IN (Figure 18, #1)
- T1 (Figure 18, #2)
- SW (Figure 18, #3)

**Note:** Be careful with SW and T1—both are two-hole connectors and can be put on the wrong posts. T1 comes from the transformer and SW comes from the power switch. Be sure to orient T1 correctly: the board is marked B (black) and W (white) for this connector.

10. Replace the back case.

---

## ❑ POWER SWITCH

### Materials Needed

Medium Phillips screwdriver (magnetic)  
Exacto knife

### Remove

1. Remove the back case.
2. Discharge the CRT.
3. Remove the two screws that mount the power switch to the upper-left inside of the bezel.
4. Using diagonal cutters, carefully cut any tie wraps on the switch wires.

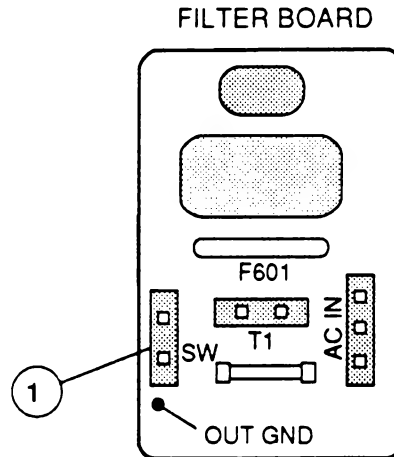


**FIGURE 19**

5. Disconnect the power switch connector from SW on the line filter board (Figure 19, #1).

### Replace

To install the power switch, follow the above procedure in reverse order.

---

## ❑ POWER TRANSFORMER

### Materials Needed

Medium Phillips screwdriver (magnetic)  
Exacto knife

### Remove

1. Remove the back case.
2. Discharge the CRT.

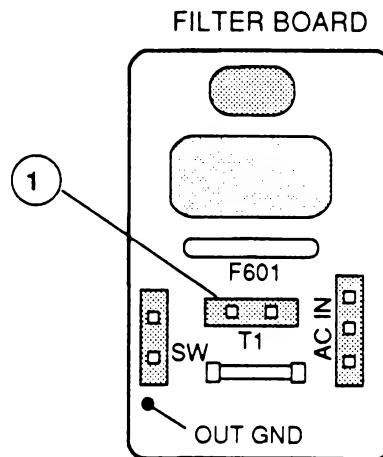


**FIGURE 20**

3. Disconnect the black-and-white pair of wires from T1 on the line filter board (Figure 20, #1).

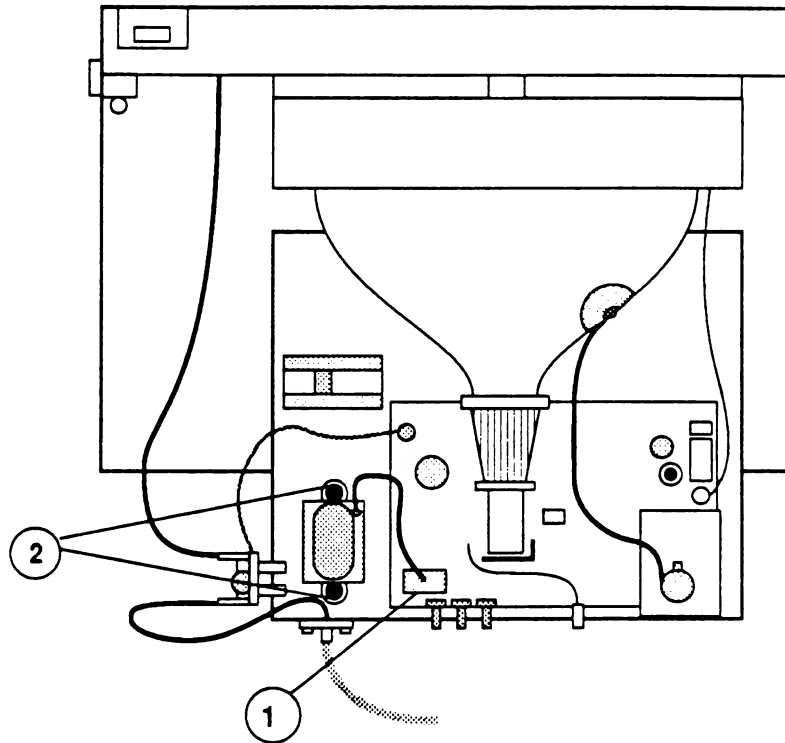


**FIGURE 21**

4. Disconnect the red pair of wires from T2 on the main electronics assembly (Figure 21, #1).
5. Using diagonal cutters, carefully cut any tie wraps on the transformer wires.
6. Remove the two transformer mounting screws (Figure 21, #2) and lift off the transformer.

### **Replace**

To install the power transformer, follow the above procedure in reverse order.



## Monitor II Technical Procedures

### Section 3

#### Adjustments

##### Contents:

|                                            |      |
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| Materials Needed.....                      | 3.3  |
| Set-Up Procedure.....                      | 3.5  |
| Tilt Adjustment.....                       | 3.9  |
| Ring Adjustment.....                       | 3.11 |
| Geometric Adjustments.....                 | 3.13 |
| Pincushion/Barrel Correction.....          | 3.13 |
| Trapezoidal Correction.....                | 3.13 |
| Main Electronics Assembly Adjustments..... | 3.17 |
| Materials Needed.....                      | 3.17 |
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**WARNING:** Some older Monitor II's have the fuse connected to the neutral side of input power. This condition should be corrected.

Refer to the Power Cord Upgrade Procedure in **Section 0, Service Notes**, to identify and correct this condition.

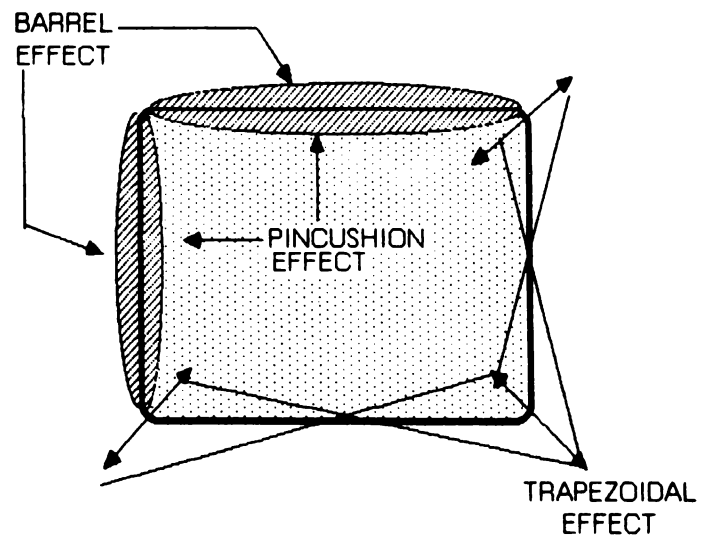


FIGURE 1

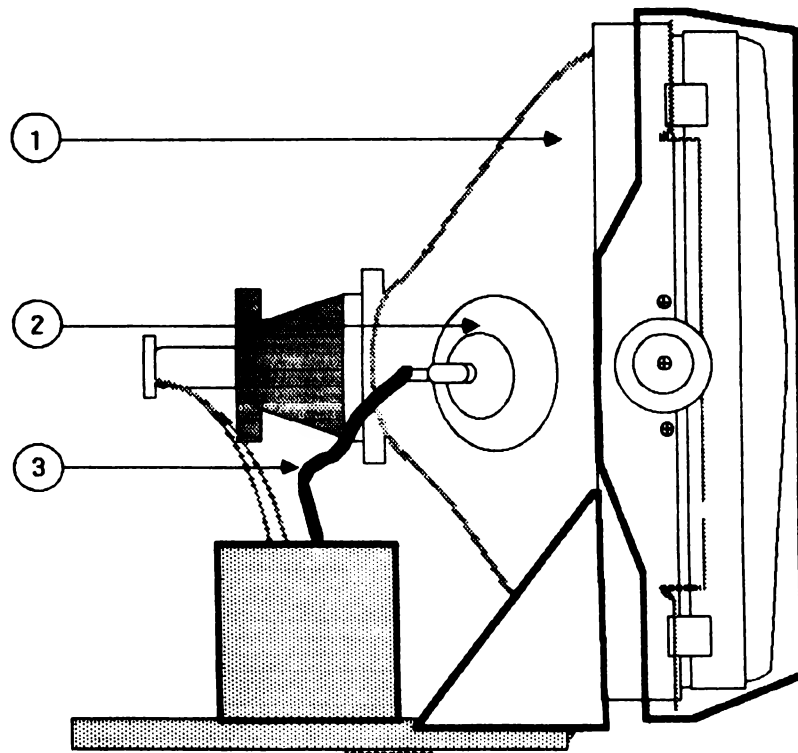


FIGURE 2



## GENERAL INFORMATION

**NOTE:** The Monitor II should be tested with the Apple II Peripherals Diskette. (See **Multi-Product Diagnostics Technical Procedures, Section 1.**)

One source of test patterns is not necessarily better than another. The advantage of the Peripherals Diskette is that it can be used with a greater number of systems.

## YOKE ADJUSTMENTS

The following procedures are used to adjust the yoke assembly, when necessary, after yoke or CRT replacement. There are three major adjustments that might be needed, depending on whether the picture is tilted, not centered, or geometrically distorted (see Figure 1). They are the tilt adjustment, the centering adjustment, and the geometric adjustment. In some cases, all three adjustments might be needed.

### Materials Needed

Monitor II  
Apple II, II Plus, or IIe  
Medium Phillips screwdriver  
Flexible 12-inch ruler  
Apple II Peripherals Diskette  
or IIe Diagnostic ROM card.  
Washable fine point marking pen

**CAUTION:** THERE ARE EXTREMELY HIGH VOLTAGES ON THE TUBE, THE ANODE, AND THE ANODE LEAD. IN THESE ADJUSTMENTS YOU WILL BE PUTTING YOUR HAND NEAR THESE VOLTAGES. YOU MUST WATCH WHAT YOU ARE TOUCHING OR ADJUSTING ON THE YOKE ASSEMBLY OR INJURY CAN RESULT. AVOID TOUCHING THE TUBE, ANODE, AND ANODE LEAD (SEE FIGURE 2, #1, 2, AND 3). NEVER HOLD ON TO THE CHASSIS WITH YOUR OTHER HAND WHILE MAKING THESE ADJUSTMENTS. PUT YOUR OTHER HAND IN YOUR POCKET OR BEHIND YOUR BACK WHILE MAKING THESE ADJUSTMENTS.

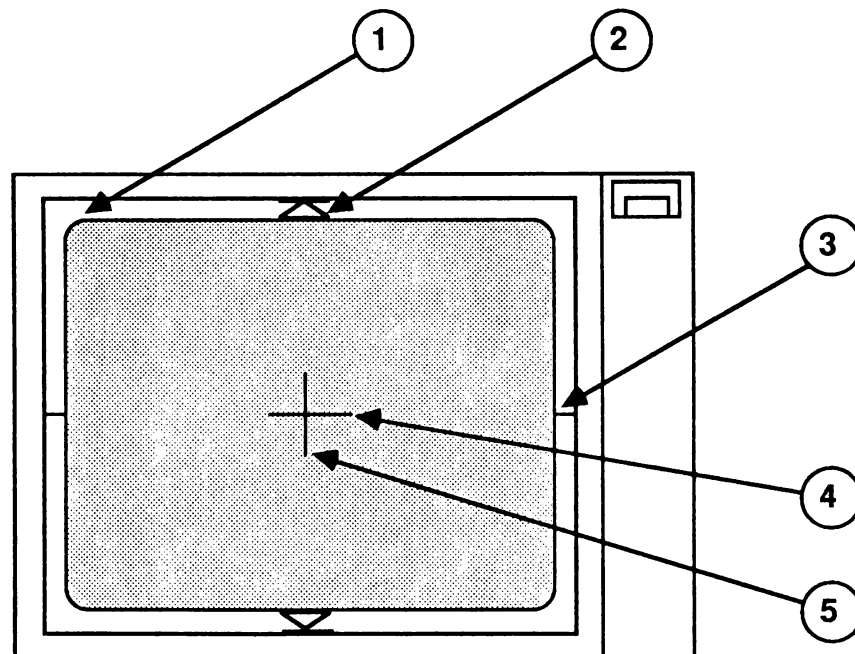


FIGURE 3



## Set-Up Procedure

1. In order to have some point of reference for centering the image, mark the screen with a washable marker in the following manner:
  - a) On the edge of the bezel (the movable part that holds the CRT and tilts up and down - Figure 3, #1), measure half way down from the top (approximately 4 1/4 inches) and make a pencil mark on each side of the bezel (see Figure 3, #3).
  - b) Take the flexible ruler and put each end of it on the marks on the bezel. Push the center of the ruler onto the screen and make a 2-inch line on the center of the screen (see Figure 3, #4).
  - c) Next, find the two molded markings on the top and bottom of the bezel that look like triangles (see Figure 3, #2). These lines mark the vertical center of the screen.
  - d) Put the ruler ends on the center of the triangles and push the center of the ruler against the middle of the screen.
  - e) Make a vertical line along the edge of the ruler (see Figure 3, #5); it should intersect with the horizontal line you drew earlier, resulting in a cross (+) on the screen.
2. Remove the Monitor II case (see **Take-apart** section).
3. Connect the video cable from the Monitor II to the Apple II, II Plus, or IIe.
4. If you are using the Apple II Peripherals Diskette, do the following:
  - a) Insert the diskette in the disk drive.
  - b) Power up the system.
  - c) Select "Monitor Tests" from the menu, and choose Test #1 (Dot Pattern).

CONTINUED ON NEXT PAGE





5. If you are using the IIfx Diagnostic ROM card, do the following:

- a) Insert the ROM card into slot 1 or 2 of the IIfx.
- b) Make sure the switch on the top of the card is pointing to the rear of the system.
- c) Power up the system.
- d) Select the Video Tests (V) from the menu.

**NOTE:** If the menu does not appear when the power is turned on, and the disk drive continues to whirl, the switch on the Diagnostic ROM card is in the wrong position. Power off the system, change the switch, and turn the power on.

6. Determine if the pattern on the screen is tilted, centered incorrectly, or geometrically distorted; then proceed to the correct adjustment section as follows:

- a) Picture tilted:                      Tilt adjustment
- b) Picture not centered:              Ring adjustment
- c) Geometric distortion:              Geometric adjustment

7. If you are not sure what adjustment is needed, or if all of them seem needed, do all three adjustments in sequence (a, b, and c).

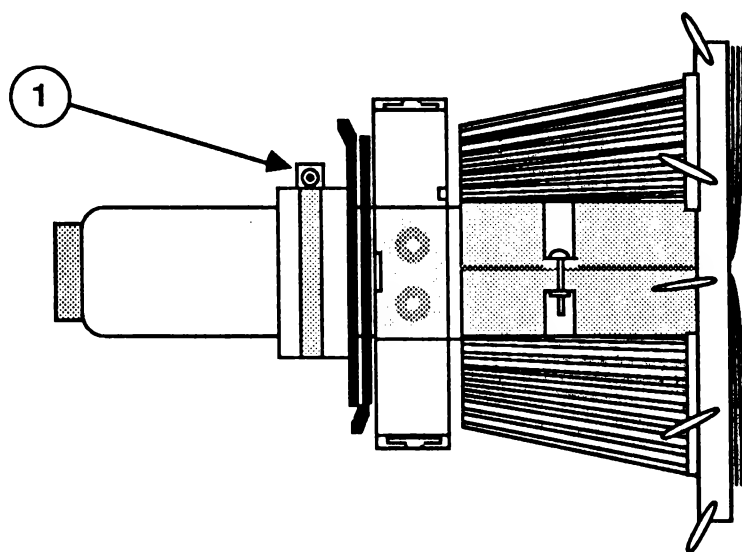


FIGURE 4



## Tilt Adjustment

**CAUTION: THERE ARE HIGH VOLTAGES ON THE YOKE ASSEMBLY; HANDLE ONLY THE PLASTIC PARTS OF THE YOKE. DO NOT TOUCH THE WIRES.**

1. If using the Apple II Peripherals Diskette, select "Monitor Tests" from the menu; then select "Test #1" (Dot Pattern). If using the ROM card, select Video Pattern (V).
2. Locate the yoke on the stem of the CRT (see Figure 4).
3. Locate and loosen the Phillips screw that holds the C-ring on the yoke. The screw is toward the back part of the yoke (see Figure 4, #1). Do not remove the screw; just loosen it enough to make the yoke mobile.

**NOTE:** If the yoke is tacked to the CRT with RTV glue, you will have to cut the glue before you can move the yoke. Power off the monitor and **DISCHARGE THE ANODE** before attempting to make these cuts. (See the discharge procedure under **Main Electronics Assembly** in the **Take-Apart** section.) When the yoke assembly is loose, power on the monitor again.

4. Turn the yoke assembly clockwise and counterclockwise and watch the whole picture tilt. Then gently move the assembly backward and forward on the stem and see how the whole raster can be made smaller or larger.
5. Push the yoke forward on the stem as far as it will go to obtain the largest raster possible. The ideal size raster would fill up most of the screen, leaving a 1/2 inch border on all four sides. You may need to do the main electronics assembly height and width adjustments to get the proper size.
6. Adjust the yoke so that the image is level with the line you drew on the screen or with the top of the screen. If it is hard to tell if it's level, press <ESC> to go back to the menu and choose "Test #2" (Grid Pattern).
7. Retighten the C-ring screw. Be careful not to overtighten, as that could cause damage to the tube stem. Just tighten it enough to be snug.
8. Tack the yoke to the CRT using some RTV glue.

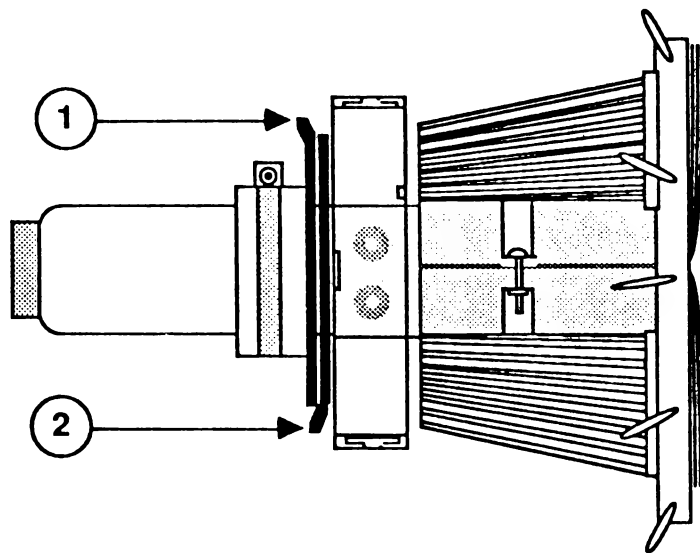


FIGURE 5



## Ring Adjustment

This adjustment is made when the image is not centered. The final result should be that the center of the pattern lines up with the cross lines on the screen.

1. If using the Apple II Peripherals Diskette, select "Test #1" (Dot Pattern) from the menu. If using the ROM card, select Video Pattern (V).
2. Locate the two front and rear ring magnets on the rear part of the yoke (see Figure 5).
3. The ring that is closest to the rear of the yoke (see Figure 5, #2) is the coarse adjustment. Rotate this ring and observe the effect it has on the centering of the image. Position it so that the image is as close to center as possible.
4. Now rotate the front ring (see Figure 5, #3). This is the fine adjustment. Rotate it until the image is centered on the cross lines you put on the screen. It might be necessary to hold the rear ring steady as you move the front one.

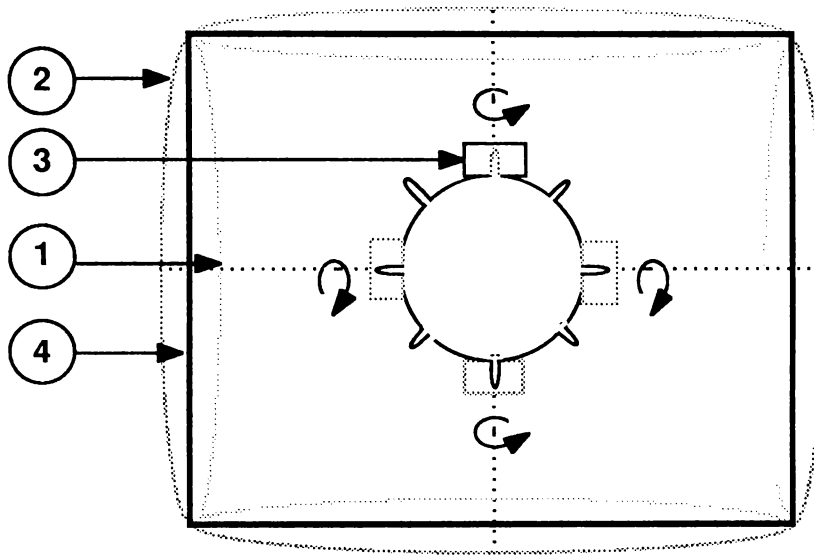


FIGURE 6

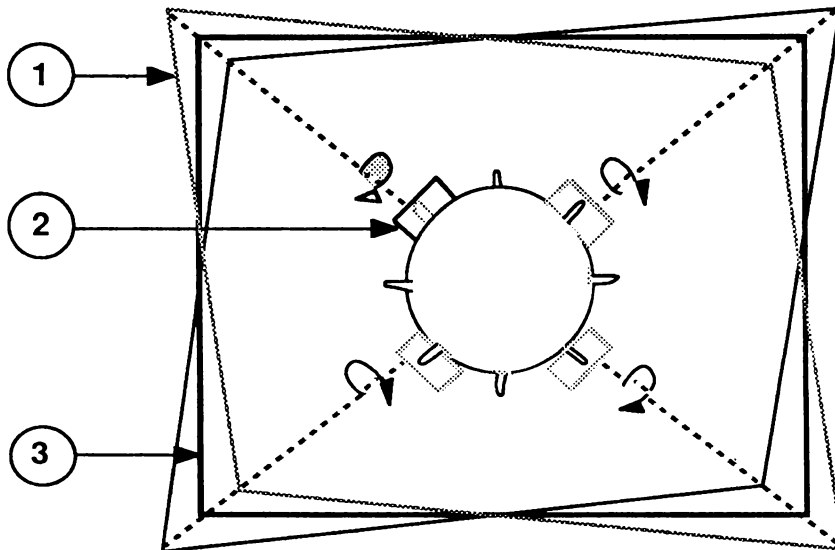


FIGURE 7

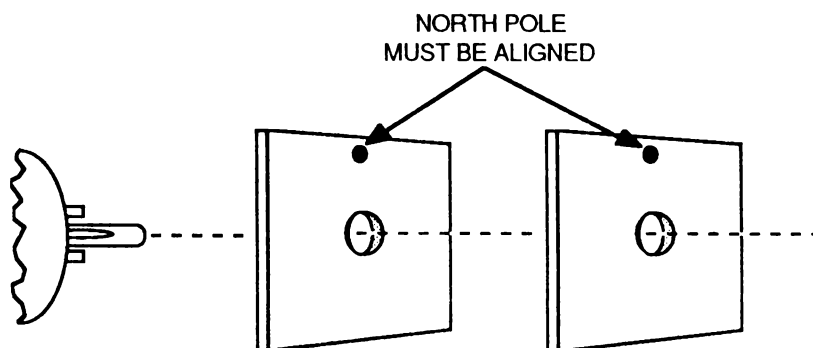


FIGURE 8



## **Geometric Adjustments**

There are two different geometric distortions that can be seen on the screen. One is called pincushioning and barreling (see Figure 6, #1 and #2). The other is the trapezoidal effect (see Figure 7, #1). Both are adjusted for with the rotary magnets; however, each adjustment is done separately.

### **Pincushion/Barrel Correction**

If the image shows either distortion shown in Figure 6, #1 or #2, correct it by doing the following:

1. If using the Apple II Peripherals Diskette, select "Test #1" (Dot Pattern) from the menu. If using the ROM card, select Video Pattern (V).
2. Push a magnet on the yoke mounting pin as shown in Figure 6, #3. A magnet should be placed only on the pin that corresponds to the affected area.
3. Rotate the magnet to obtain the desired raster (see Figure 6, #4).
4. If the desired raster cannot be obtained, add a second magnet to the same yoke mounting pin. Both magnets must be aligned as in Figure 8, and then rotated simultaneously.
5. Adjust all the sides with magnets until they all line up correctly.

### **Trapezoidal Correction**

Figure 7, #1 shows the trapezoidal effect. Look at your screen and see if any of the corners exhibit the trapezoidal effect. If any do, then perform the following adjustment:

1. If you are using the Apple II Peripherals Diskette, select "Test #1" (Dot Pattern) from the menu. If using the ROM card, select Video Pattern (V).
2. Push a magnet onto the yoke mounting pin as shown in Figure 7, #2. The magnet should be placed only on the pin that corresponds to the affected area.

**CONTINUED ON NEXT PAGE**

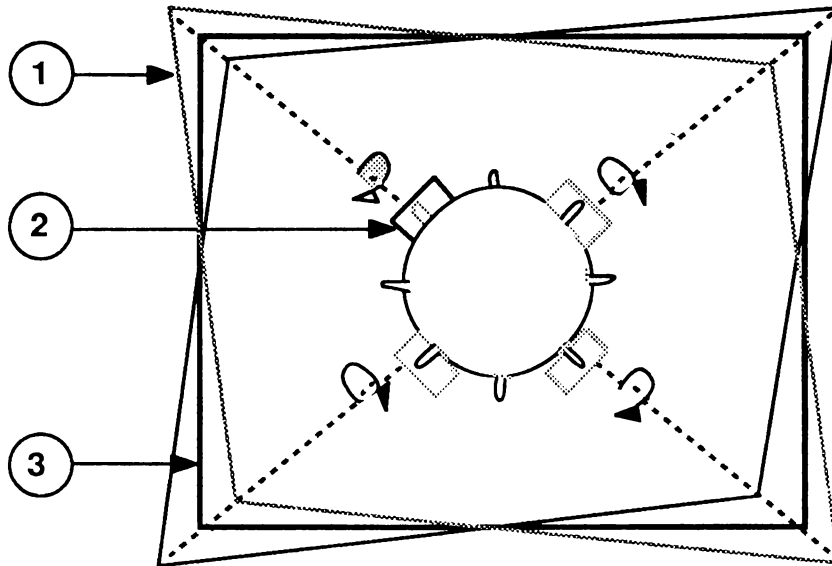


**FIGURE 9**

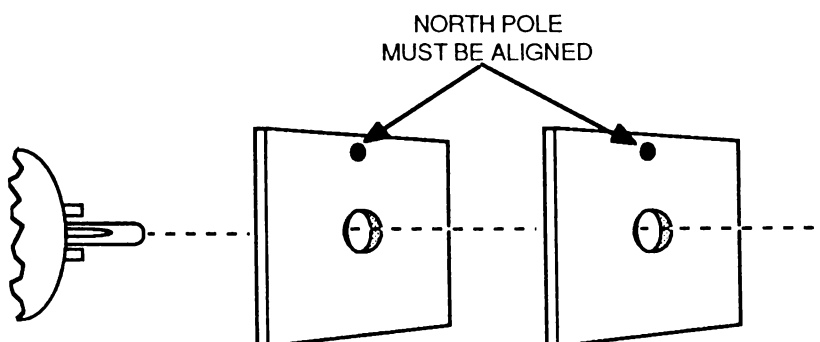


**FIGURE 10**



3. Rotate the magnet to obtain the desired raster, see Figure 9, #3.
4. If the desired raster cannot be obtained, add a second magnet to the same pin. Both magnets must be aligned as in Figure 10, then rotated simultaneously.
5. Do the adjustment until all the corners appear normal.

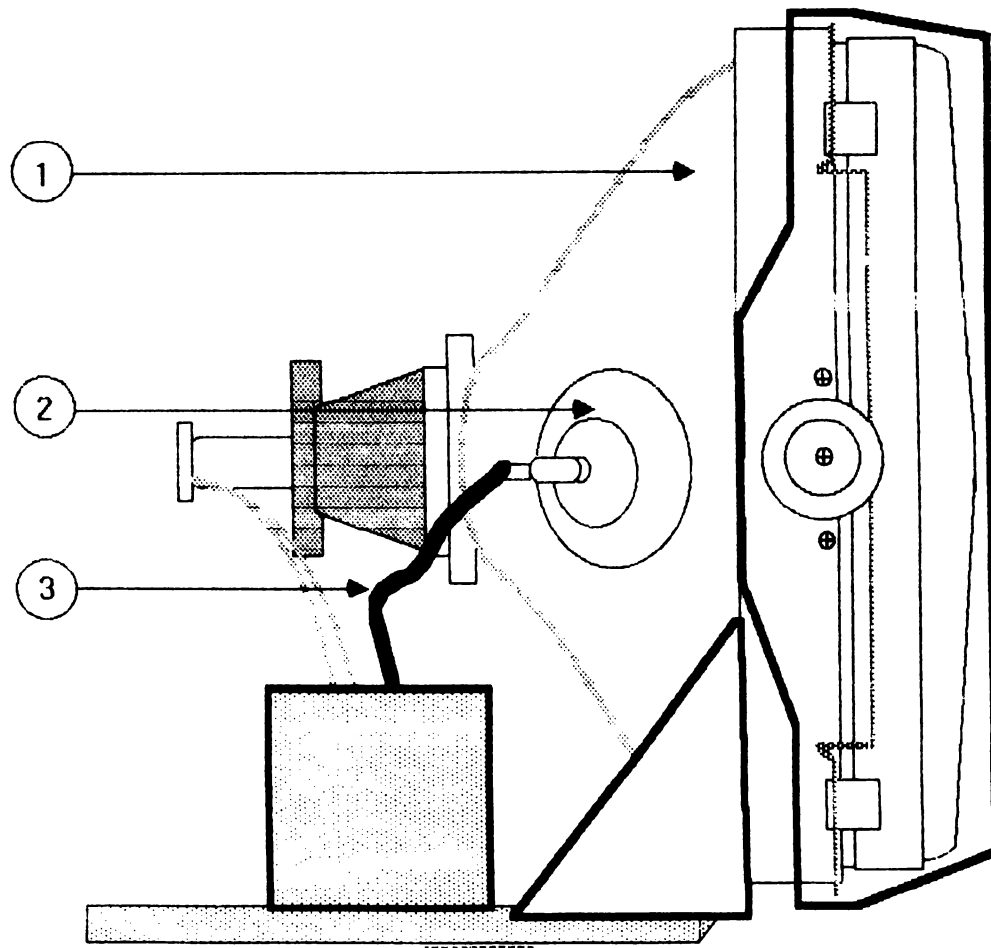


FIGURE 11



## MAIN ELECTRONICS ASSEMBLY ADJUSTMENTS

After replacement of the Main Electronics Assembly on the Monitor II, the horizontal or vertical alignment may need adjustment. This procedure covers these adjustments. It is important that you read all the steps completely before beginning the adjustments, as several of them interact with each other. If it looks as if a step is not working, it is possible that another step will correct the problem.

### Materials Needed

Monitor II  
Apple II, II Plus, or IIe  
Apple II Peripherals Diskette  
or the Apple IIe Diagnostic ROM Card  
Plastic hex tip iron core adjustment tool (size 0.100)  
Plastic square-tip coil adjustment tool (size 1/8" square);  
one manufacturer is Spectrol.  
Small plastic flatblade screwdriver (tweaker)

**CAUTION: YOU WILL BE WORKING WITH A LIVE HIGH VOLTAGE PICTURE TUBE. HIGH VOLTAGE IS PRESENT ON THE ANODE OF THE PICTURE TUBE, THE ANODE CAP, AND ANODE LEAD, (SEE FIGURE 11, #1, 2, AND 3, RESPECTIVELY). DO NOT TOUCH THE TUBE, ANODE CAP, OR ANODE LEAD: EXTREME SHOCK CAN OCCUR. DO NOT TOUCH OR HOLD ON TO THE CHASSIS WITH THE OTHER HAND -- KEEP IT BEHIND YOUR BACK OR IN YOUR POCKET WHEN MAKING THE ADJUSTMENTS.**



## Set-Up Procedure

1. Remove the Monitor II case (see **Section 2, Take-Apart**).
  2. Connect the video cable from the monitor to the Apple II, II Plus, or IIfx video output phono jack.
  3. If you are using the Apple II Peripherals Diskette, do the following:
    - a) Insert the diskette in the disk drive.
    - b) Power up the system.
    - c) Select "Test #1" (Dot Pattern) from the menu.
  4. If you are using the IIfx Diagnostic ROM card, do the following:
    - a) Insert the ROM card into slot 1 or 2 of the IIfx.
    - b) Make sure the switch on the top of the card is pointing to the rear of the system.
    - c) Power up the system.
    - d) Select the Video Tests (V) from the menu.
- NOTE:** If the menu does not appear when the power is turned on, and the disk drive continues to whirl, the switch is in the wrong position. Power off the system, change the switch, and turn the power on.
5. View the screen and evaluate the vertical and horizontal alignment and linearity. Determine which one needs correction, and proceed to the correct adjustment. Remember that there is interaction between the two adjustments and that you might have to do both to correct any problems.



When evaluating the pattern, do not use the dots or grid boxes in the corners as examples: use the middle of the rows. If the corners look incorrect even after adjustments have been made, there may be a yoke alignment problem and you should proceed to that section. Other guidelines to follow for evaluating the vertical and horizontal alignments are as follows:

Vertical:

Do the dots or grid boxes in the top and bottom rows have the same linearity?

Are the dots or grid boxes stretched out or compressed?

Is the picture rolling?

Is the image pushed more to the top or bottom?

Horizontal:

Is the linearity of the dots or grid boxes on both sides of the screen the same?

Is the width of the characters or boxes the same?

Is the picture tearing?

Is the picture rolling in a diagonal movement on the horizontal plane?

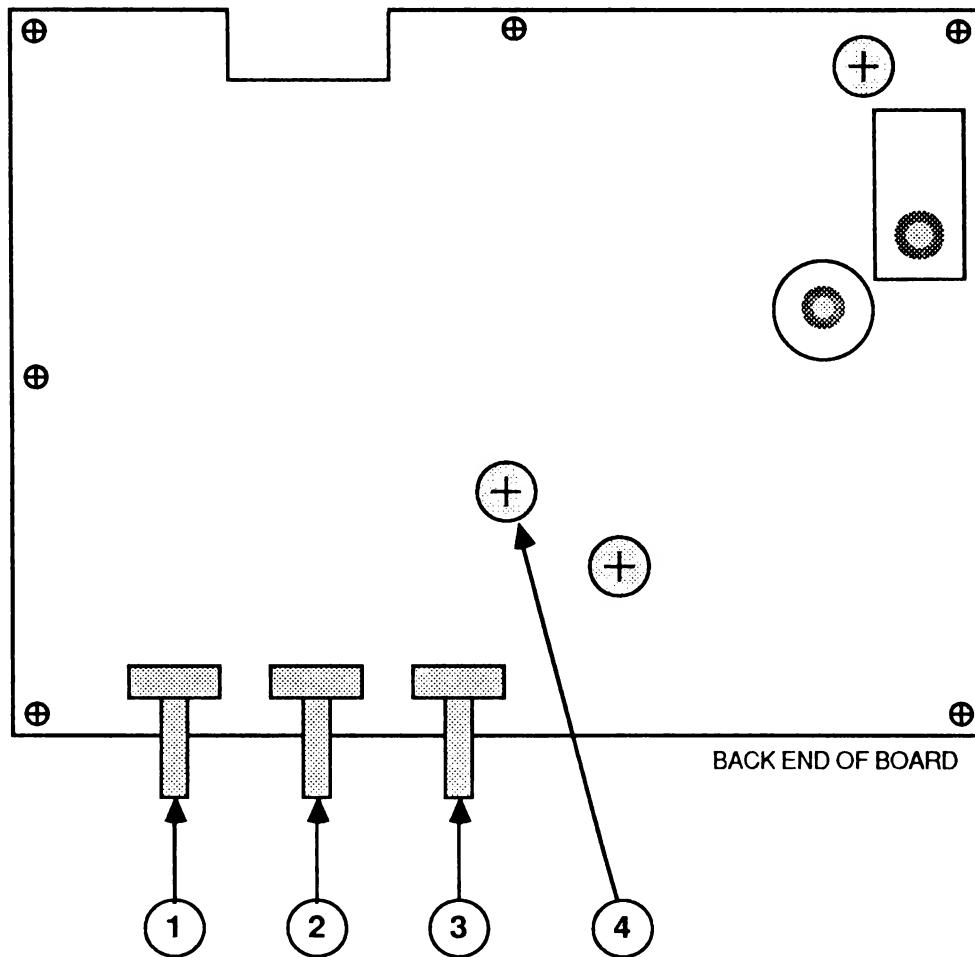


**FIGURE 12**



## Vertical Adjustments

1. Set the vertical hold control R302 (see Figure 12, #1) near the mechanical center of its rotation. This should lock the picture on the screen and prevent any rolling. ||
2. **Linearity:** If the vertical linearity is off, adjust R307 (see Figure 12, #4) until the best linearity is found. Compare top and bottom characters or grid boxes and try to get them even. It's possible to reach the end of the adjustment range of the pot and find that the linearity is still not correct. That's because the height adjustment can affect the linearity. If this happens, leave the pot at the end of its range and proceed to step 3. ||
3. **Height:** If the vertical height of the image is incorrect, adjust R305 (see Figure 12, #2) until the desired height is obtained. A good method is as follows: ||
  - a) Turn height control R305 counterclockwise to the end of the pot. The image will compress on the screen but still be legible.
  - b) Turn the brightness control R506 (see Figure 12, #3) clockwise until you can see black edges at the top and bottom of the screen. If you don't see black edges on the top and bottom, turn the height pot R305 counterclockwise until the pattern is squeezed and the black area appears. If the pattern becomes blurred, then the brightness control is turned too far. ||
  - c) Adjust the height control R305 so that the black edges just disappear on the top and bottom of the screen. That will make the whole screen green in color and the dots or grid boxes just about the correct height. You can go a little further if you prefer larger characters.
  - d) Turn the brightness control R506 counterclockwise until the background on the screen goes black and the pattern is bright.

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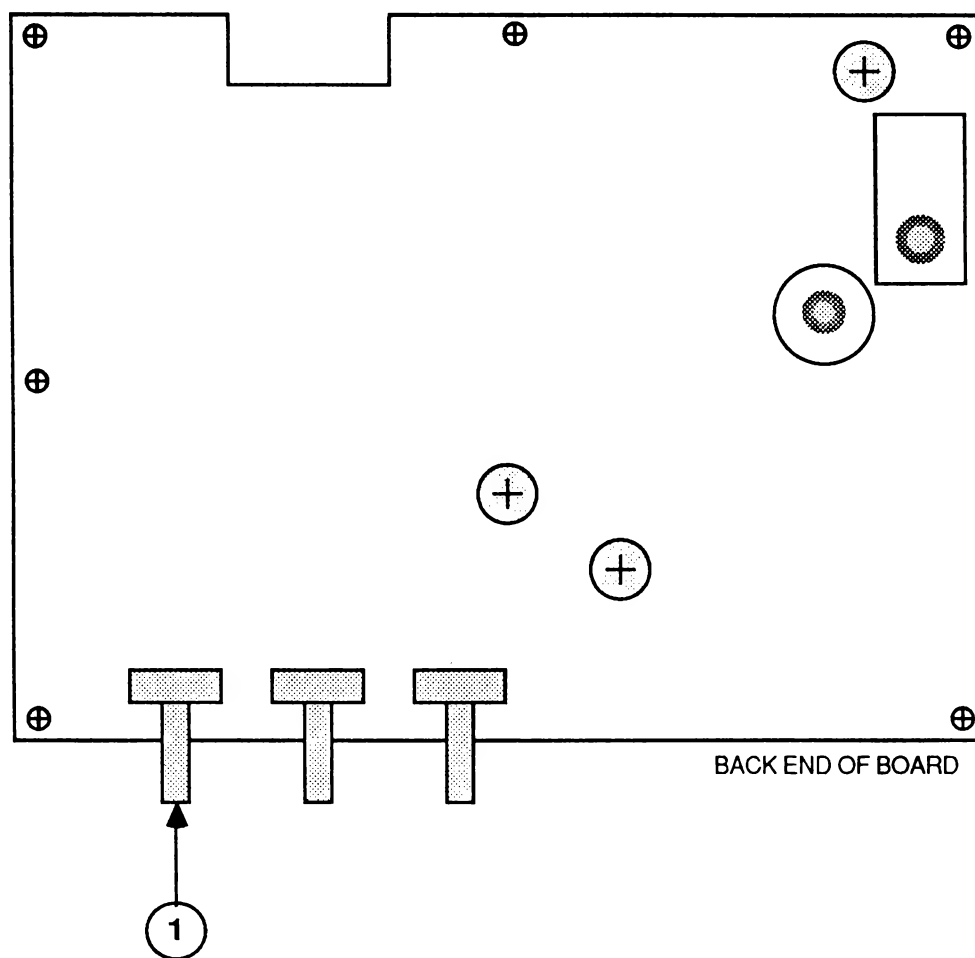


**FIGURE 13**



4. Re-evaluate the vertical linearity of the characters or boxes, as adjusting the height can affect the linearity. If the linearity has changed, repeat step 2 above. However, once adjusted, do not repeat steps 3 and 4 again. Proceed to step 5.
5. If necessary, readjust the vertical hold control R302 (Figure 13, #1) until the picture locks (stops rolling) on the vertical sync.
6. Turn the monitor off and on and see if the picture rolls. If it does, repeat steps 5 and 6 until it stops rolling.

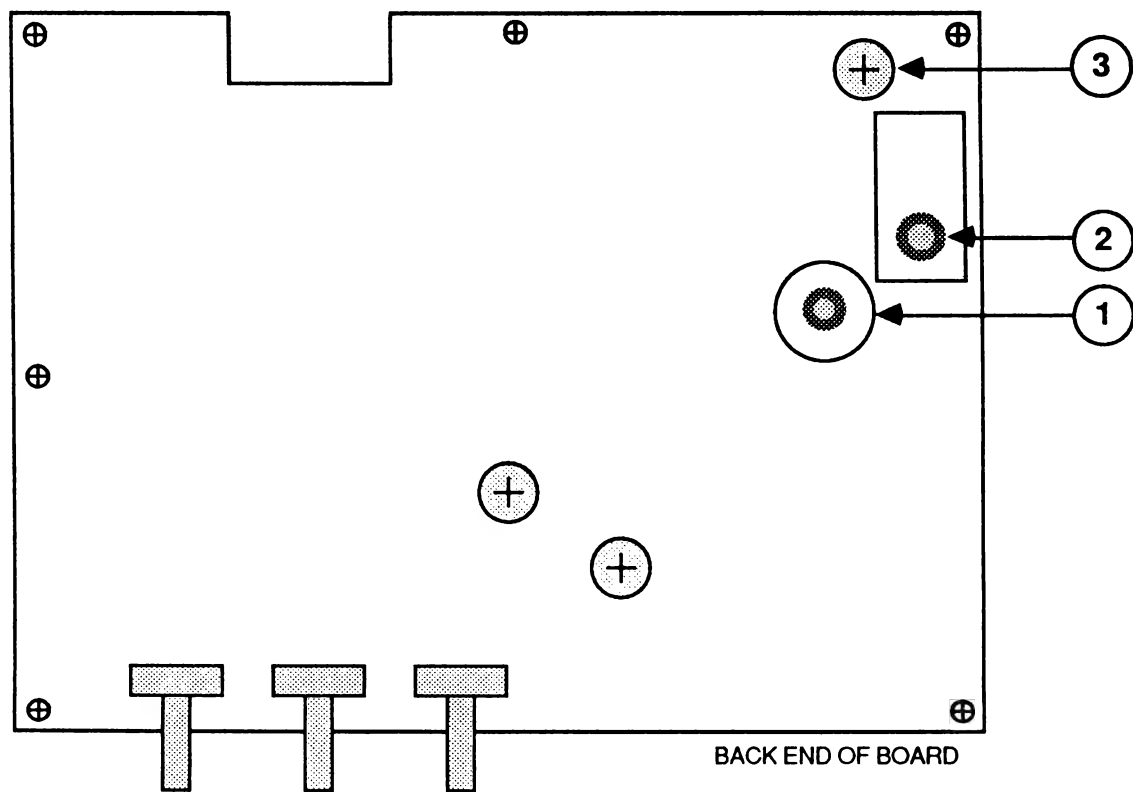


**FIGURE 14**



## HORIZONTAL ADJUSTMENTS

1. If the picture on the tube is not locked and centered, or if it is tearing, adjust pot R406 (see Figure 14, #3). Be careful on this adjustment, as you will be physically close to the anode and anode lead in reaching the pot.
2. If the raster will not lock in after adjusting the pot R406 to both ends, it is possible there is a problem with the DC power supply.
3. Observe one row of characters or grid boxes and look for width variations on both sides of the screen. If they are all the same width throughout the row, the linearity is OK, and you can proceed to step 5. If they are not, then adjust the linearity (step 4).
4. **Linearity:** In most units, the coil L402 (see Figure 14, #2) will be preadjusted and sealed at the factory and you won't be able to change it. In this case, proceed to step 5 and see if the width adjustment will help the linearity. If you do have a unit with an adjustable coil, use the square plastic adjustment tool and turn it until the linearity looks correct. If you have adjusted the coil as far as it will go and the linearity is still wrong, proceed to the width adjustment, step 5.
5. **Width:** Check the width of the image on the screen. If it looks too narrow or too wide, then use the hex adjustment tool and adjust L401 (see Figure 14, #1) until the desired width is obtained. The image should be an equal distance (approximately 1/2 inch) from each side of the screen, and yet not squeezed together. If the linearity is wrong on one side, this adjustment might correct it. Remember that this is not a centering adjustment; don't squeeze the image just to get it centered.
6. If the unit has an adjustable linearity coil, see if the linearity has changed after step 5. If it has, touch up L402 until the linearity is correct.
7. If all the adjustments have been made and the linearity is still incorrect, suspect a problem with the components on the Main Electronics Assembly.





## HORIZONTAL ADJUSTMENTS

1. If the picture on the tube is not locked and centered, or if it is tearing, adjust pot R406 (see Figure 9.5). Be careful on this adjustment, as you will be physically close to the anode and anode lead in order to get to the pot.
2. If the raster will not lock in after adjusting the pot R406 to both ends, then it is possible there is a problem with the DC power supply.
3. Observe one row of characters or grid boxes and look for width variations on both sides of the screen. If they are all the same width through out the row then the linearity is O.K., proceed to step 5. If they are not, then adjust the linearity (step 4).
4. Linearity: In most units the coil L402 (see Figure 9.6) will be preadusted and sealed at the factory so you won't be able to change it. In this case proceed to step 5 and see if the width adjustment will help the linearity. If you do have a unit with an adjustable coil, use the square plastic adjustment tool and turn it until the linearity looks correct. If you have adjusted the coil as far as it will go and the linearity is still wrong, then proceed to the width adjustment, step 5.
5. Width: Check the width of the image on the screen. If it looks too narrow or too wide, then use the hex adjustment tool and adjust L401 (see Figure 9.7) until the desired width is obtained. The image should be an equal distance (approximately 1/2 inch) from each side of the screen, and yet not squeezed together. If the linearity is wrong on one side, this adjustment might correct it. It must be remembered that this is not a centering adjustment; don't squeeze the image just to get it centered.
6. If the unit has an adjustable linearity coil then see if the linearity has changed after step 5, if it has, then touch up L402 until the linearity is correct.
7. If all the adjustments have been made and the linearity is still incorrect then suspect a problem with the components on the PC board.



## Monitor II Technical Procedures

### Section 4

#### Troubleshooting

##### Contents:

|                                                                       |     |
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| Raster deformed abnormally.....                                       | 4.3 |
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| Vertical linearity bad.....                                           | 4.5 |
| Won't focus.....                                                      | 4.5 |
| Wavy display.....                                                     | 4.6 |

**WARNING:** Some older Monitor II's have the fuse connected to the neutral side of input power. This condition should be corrected.

Refer to the Power Cord Upgrade Procedure in **Section 0, Service Notes**, to identify and correct this condition.





## INTRODUCTION

This section contains a symptom chart, showing common problems and the actions to be taken to rectify them. Find the symptom that best describes how the defective monitor appears, and then try the recommended action.

| SYMPTOM                                  | ACTION                                                                                                                                                                                                                                                                                                                                                                                |
|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NO RASTER                                | <ol style="list-style-type: none"><li>1. Check fuse on filter board, replace if blown.</li><li>2. Check that all connectors are secure on the filter board and the main electronics assembly.</li><li>3. Replace power switch.</li><li>4. Replace filter board.</li><li>5. Replace main electronics assembly.</li><li>6. Replace power transformer.</li><li>7. Replace CRT.</li></ol> |
| ONE HORIZONTAL<br>RASTER LINE<br>APPEARS | <ol style="list-style-type: none"><li>1. Replace main electronics assembly.</li><li>2. Replace yoke.</li></ol>                                                                                                                                                                                                                                                                        |
| ONE VERTICAL<br>RASTER LINE<br>APPEARS   | <ol style="list-style-type: none"><li>1. Replace main electronics assembly.</li><li>2. Replace yoke.</li></ol>                                                                                                                                                                                                                                                                        |
| RASTER DEFORMED<br>ABNORMALLY            | <ol style="list-style-type: none"><li>1. Adjust yoke.</li><li>2. Replace yoke.</li></ol>                                                                                                                                                                                                                                                                                              |

CONTINUED ON NEXT PAGE



| SYMPTOM                                                                              | ACTION                                                                                                |
|--------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
| ABNORMAL RASTER<br>WITH WINDING OR<br>EXCESSIVE PICTURE<br>FLUCTUATION               | - Replace main electronics<br>assembly.                                                               |
| SPOT REMAINS<br>WITH UNIT OFF                                                        | - Replace main electronics<br>assembly.                                                               |
| BRIGHTNESS RANGE<br>ABNORMAL                                                         | 1. Replace main electronics<br>assembly.<br>2. Replace filter board.<br>3. Replace power transformer. |
| RASTER SIZE SMALL,<br>PICTURE ABNORMALLY<br>BRIGHT (HIGH VOLTAGE<br>ABNORMALLY HIGH) | - Replace main electronics<br>assembly.                                                               |
| NO VERTICAL<br>SYNCHRONIZATION                                                       | - Replace main electronics<br>assembly.                                                               |
| RASTER NOT<br>CENTERED                                                               | - Turn yoke centering magnets.<br>(See <b>Yoke Adjustment.</b> )                                      |
| NO PICTURE,<br>NO CONTRAST                                                           | - Replace main electronics<br>assembly.                                                               |
| PICTURE/<br>CHARACTERS<br>INCLINED                                                   | - Turn deflection yoke.<br>(See <b>Yoke Adjustments.</b> )                                            |

CONTINUED ON NEXT PAGE



| SYMPTOM                                            | ACTION                                                                                                                                      |
|----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| FINE NOISES IN<br>PICTURE,<br>CHARACTERS<br>SHIVER | - Replace main electronics.<br>assembly.                                                                                                    |
| 15 OR MORE<br>SECONDS FOR<br>PICTURE TO<br>APPEAR  | - Change CRT.                                                                                                                               |
| PICTURE APPEARS,<br>DISAPPEARS                     | 1. Replace main electronics.<br>assembly.<br><br>2. Replace CRT.                                                                            |
| HORIZONTAL<br>LINEARITY BAD                        | 1. Check horizontal adjustment.<br>(See <b>Main Electronics Assembly<br/>Adjustments.</b> )<br><br>2. Replace main electronics<br>assembly. |
| VERTICAL<br>LINEARITY BAD                          | - Check vertical adjustment.<br>(See <b>Main Electronics Assembly<br/>Adjustments.</b> )                                                    |
| WON'T FOCUS                                        | 1. Replace main electronics<br>assembly.<br><br>2. Replace CRT.                                                                             |

CONTINUED ON NEXT PAGE



## SYMPTOM

## ACTION

---

WAVY DISPLAY

- Mounting screw on the heat sink is loose.\*
- 

\* If a Monitor II starts to exhibit a wavy display, it may be caused by the overheating of the voltage regulator (IC 601). The regulator is mounted on the heat sink near the power transformer.

If the failure occurs after the unit has had time to heat up, it indicates that the mounting screw that secures the voltage regulator to the heat sink is loose. This results in inadequate heat transfer between the two components.

If you must replace the voltage regulator, be sure to use thermal compound or an insulator pad between the voltage regulator and the heat sink.

# Monitor II / Monochrome Monitor IIe

## Section 5 – Additional Procedures

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### □ CONTENTS

- 5.2 Power Cord Upgrade Procedure
- 5.4 Line Filter Board Modification
  - 5.4 Materials Required
  - 5.4 Resistance Check

---

## ❑ POWER CORD UPGRADE PROCEDURE

In older versions of the Monitor II, the power cord conductor wires are not connected to the line filter board connector in the correct sequence. Whenever you open a Monitor II for repair, first check the power cord wiring, as directed below, to see if you need to replace the cord.

1. Disconnect the power cord from the wall outlet and remove the back case (see Section 2, Take-Apart).
2. **Discharge the CRT** (see "Discharging the CRT" in Section 1, Basics).

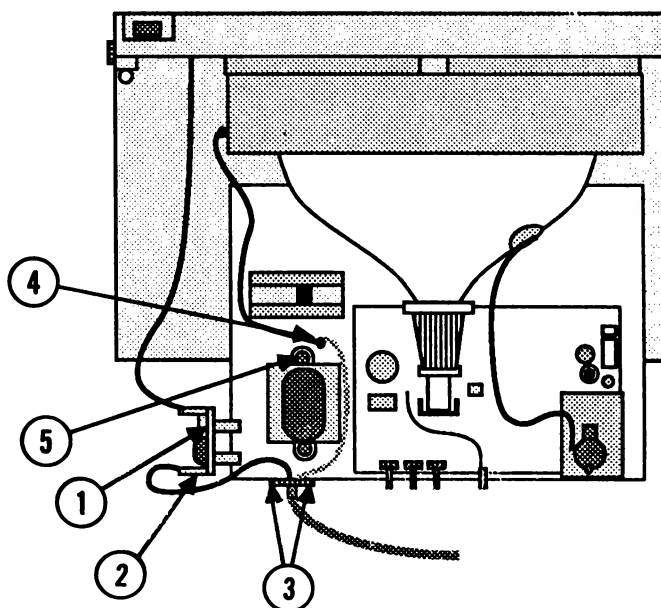


**FIGURE 1**

3. Locate the line filter board (Figure 1, #1) and AC IN connector (Figure 1, #2).

If the AC IN connector has only **two** wires (white and black), the monitor is a newer version and does not need a new power cord.

If **three** conductors (white, black, and green) are wired into the AC IN connector, check the sequence of wires. If the sequence from top to bottom is **black-white-green**, the wiring is incorrect and you must continue to step 4.

4. First, remove the power cord:
  - a) Disconnect the AC IN connector from the line filter board.
  - b) Remove the two screws (Figure 1, #3) that secure the power cord bracket to the rear of the chassis.
  - c) Pull the wires out through the hole in the rear of the chassis.
5. Notice that the new power cord has a tab on the green ground wire (the system's primary ground). In this power cord design, the ground wire attaches to the chassis of the monitor (rather than to the AC IN connector). Follow the steps below to prepare an adequate ground site on the chassis for the power cord ground tab:
  - a) Holding the hex nut steady with the long-nose pliers, remove the main chassis ground screw (Figure 1, #4) that secures the black bezel ground wire to the floor of the metal chassis.
  - b) Attach the tab of the black bezel ground wire to an alternate site—the screw and nut (Figure 1, #5) that secure the transformer to the metal chassis.
6. Next, install the new power cord:
  - a) Thread the wires of the new power cord through the hole in the rear of the chassis.
  - b) Replace the two screws (Figure 1, #3) that secure the power cord bracket to the rear of the chassis.
  - c) The new version of the power cord has only two conductors (black and white) wired into the AC IN connector. Connect the AC IN connector to the line filter board **with the white wire toward the top**. (If the letters B and W on the line filter board indicate that the black wire should be on top, scratch out the letters and ink in the proper sequence.)
  - d) Position the tab of the power cord green ground wire at the main chassis ground site (Figure 1, #4) and replace the screw and nut.

---

## □ LINE FILTER BOARD MODIFICATION

Due to a change in the line filter board design, some older versions of the Monitor II may not be properly grounded. As a result, some users may be exposed to electrical shock. Whenever you service a Monitor II, check the resistance of the grounding system, as directed below, to verify that the monitor is properly grounded.

### Materials Required

Multimeter  
Medium Phillips screwdriver (magnetic)  
Medium long-nose pliers  
Small wire cutters  
Soldering iron and solder

### Resistance Check

1. Turn the monitor off and disconnect the power cord from the wall outlet.
2. Set up a multimeter to measure resistance (ohms) within the 200-ohm range.
3. Touch the black lead of the multimeter to the AC power cord ground pin (Figure 2, #1).
4. Touch the red lead of the multimeter to the metal casing of the video connector (Figure 2, #2) at the rear of the monitor. (Repeat this procedure several times to be sure you are getting a consistent reading.)

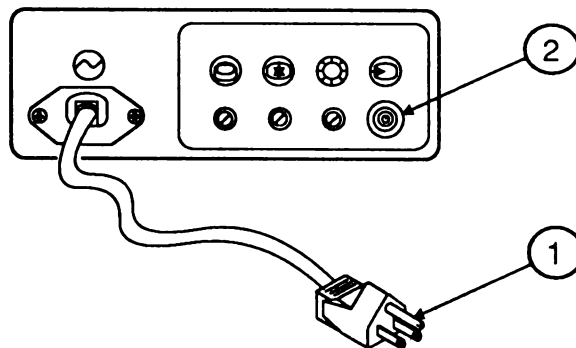


**FIGURE 2**

5. If the resistance measures between zero and 1 ohm, the monitor is properly grounded, and no further action is required.
6. If the resistance reading is greater than 1 ohm, the monitor is not properly grounded, and you must open the monitor to check the installation of the line filter board.
7. Remove the back case (see Section 2, Take-Apart).
8. **Discharge the CRT** (see "Discharging the CRT" in Section 1, Basics).

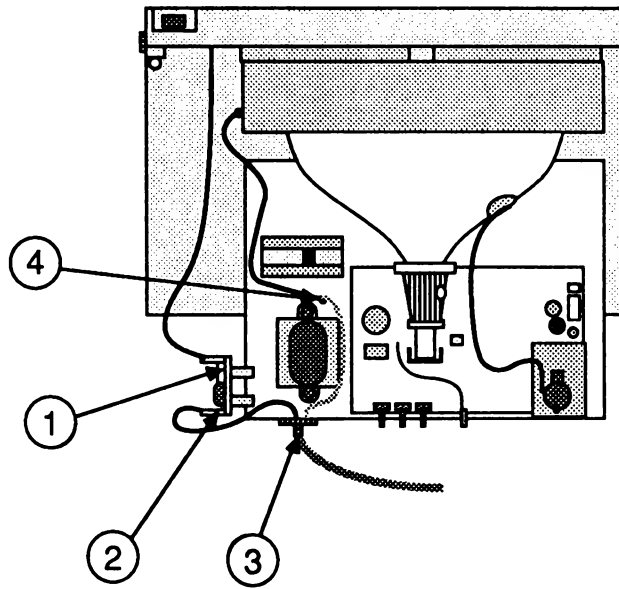


**FIGURE 3**

9. Locate the line filter board (Figure 3, #1), the AC IN connector (Figure 3, #2), and the monitor power cord (Figure 3, #3).
  - a) If the power cord's green ground wire attaches directly to the monitor chassis (Figure 3, #4), the monitor is properly grounded. Proceed to step 19.

*...Continued on next page*

- b) If the power cord's green ground wire is wired into the AC IN connector, you must check the number of AC IN connector pins on the line filter board.
10. Disconnect the AC IN connector (Figure 4, #1) from the line filter board.
- a) If there are **three** AC IN connector pins at the markings **W** (white), **B** (black), and **G** (green) on the filter board, the power cord ground wire is connected to the line filter board circuitry, and the monitor is properly grounded. Reconnect the AC IN connector (Figure 4, #1) to the line filter board, and proceed to step 19.
  - b) If only **two** AC IN connector pins are on the filter board at the markings **W** (white) and **B** (black), the ground pin is deleted, and the monitor is not grounded when used with the three-wire AC IN connector. Follow the steps beginning on the next page to replace the deleted ground.

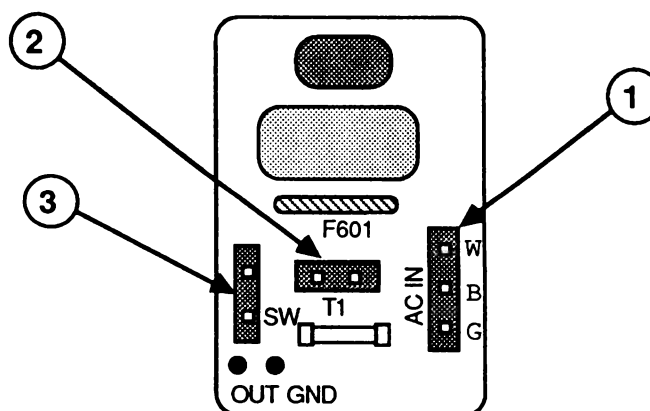


**FIGURE 4**

11. Disconnect the following two connectors from the line filter board:
  - T1 (Figure 4, #2)
  - SW (Figure 4, #3)
12. Remove the Phillips screw that holds the line filter board to the chassis. (Hold the hex nut on the back side of the screw with the long-nose pliers.)

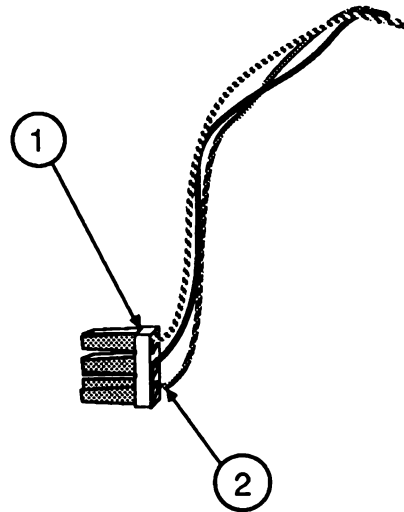


**FIGURE 5**

13. Locate the three-wire AC IN connector (Figure 5, #1) that you removed from the line filter board.
14. Using small wire cutters, clip off the green AC IN ground wire close to the connector (Figure 5, #2).

15. On the line filter board, locate the solder point (Figure 6, #4) next to the green ground wire at the marking "OUT GND" (Figure 6, #5), and desolder if there is solder present.
16. Solder the green AC IN ground wire that you just clipped to the filter board at the solder point (Figure 6, #4) next to the green ground wire (Figure 6, #5) at the marking "OUT GND."
17. Remount the line filter board to the chassis using the Phillips screw and hex nut.

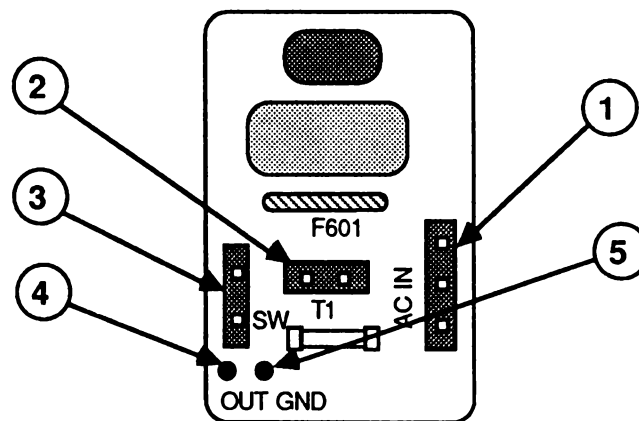


**FIGURE 6**

18. After reading the note below, reconnect the following three connectors to the line filter board:

- AC IN (Figure 6, #1)
- T1 (Figure 6, #2)
- SW (Figure 6, #3)

**Note:** Be careful with SW and T1—both are two-hole connectors and can be put on the wrong posts. T1 comes from the transformer, and SW comes from the power switch. Be sure to orient T1 correctly: the board is marked B (black) and W (white) for this connector.

19. Replace the back case (see Section 2, Take-Apart).

# Monitor II / Monochrome Monitor Iie

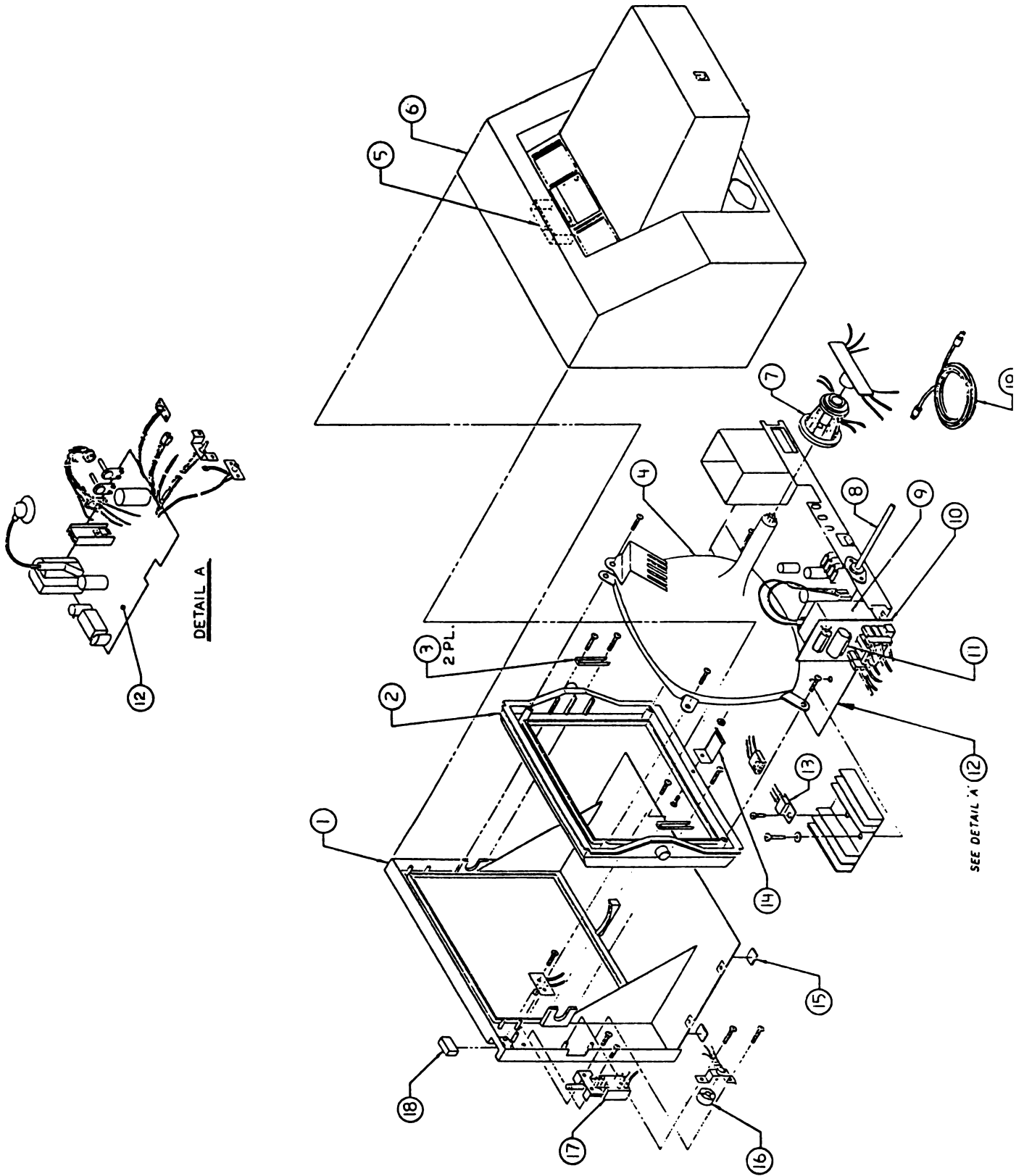
## Illustrated Parts List

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### ❑ CONTENTS

IPL.3      Monitor II/Monochrome Monitor Iie

The figures and lists below include all piece parts that can be purchased separately from Apple for the Monitor II/Monochrome Monitor Iie, along with their part numbers. These are the only parts available from Apple. Refer to your *Apple Service Programs* manual for prices.



## □ MONITOR II / MONOCHROME MONITOR IIe

| <u>Item</u> | <u>Part No.</u> | <u>Description</u>                                            |
|-------------|-----------------|---------------------------------------------------------------|
| 1           | 815-0779        | Bezel Enclosure, Beige                                        |
|             | 815-1049        | Bezel Enclosure, Platinum                                     |
| 2           | 815-0780        | Mask Enclosure, Beige                                         |
|             | 815-1050        | Mask Enclosure, Platinum                                      |
| 3           | 805-0200        | Pivot Retaining Plate                                         |
| 4           | 076-0099        | Monitor II CRT Module                                         |
| 5           | 815-0786        | Handle Cavity Filler, Beige                                   |
|             | 815-0559        | Handle Cavity Filler, Platinum                                |
| 6           | 815-0778        | Rear Housing Enclosure, Beige                                 |
|             | 815-1048        | Rear Housing Enclosure, Platinum                              |
| 7           | 970-0453        | Deflection Yoke                                               |
| 8           | 970-0629        | Power Cord                                                    |
| 1-0448 → 9  | 970-0447        | Power Transformer, 115V                                       |
| 40 VOLT 10  | 699-0211        | Line Filter PCB                                               |
| 11          | 740-0106        | Quick Acting Fuse, .5A, 250V<br>(Domestic, 110V only)         |
|             | 740-0011        | Quick Acting Pigtail Fuse, .5A, 250V<br>(Domestic, 110V only) |
|             | 740-0200        | Slow Blow Fuse, 1A, 250V<br>(Euro/Intl only)                  |
|             | 740-0070        | Slow Blow Pigtail Fuse, 1A, 250V<br>(Euro/Intl only)          |
| 12          | 661-75134       | Main Electronics Assembly                                     |
| 13          | 353-7815        | IC, 7815, 15V POS. Volt Reg. IC601                            |
| 14          | 805-0202        | Ratchet Spring                                                |
| 15          | 865-0020        | Foot, .81 In Sq, .35 In Thk, Black                            |
| 16          | 815-0781        | Contrast Knob, Beige                                          |
|             | 815-1051        | Contrast Knob, Platinum                                       |
| 17          | 970-0445        | Power Switch Assembly, 120V                                   |
| 18          | 815-0787        | Power Switch Knob, Beige                                      |
|             | 815-1052        | Power Switch Knob, Platinum                                   |
| 19          | 590-0539        | Video Cable, Smoke                                            |