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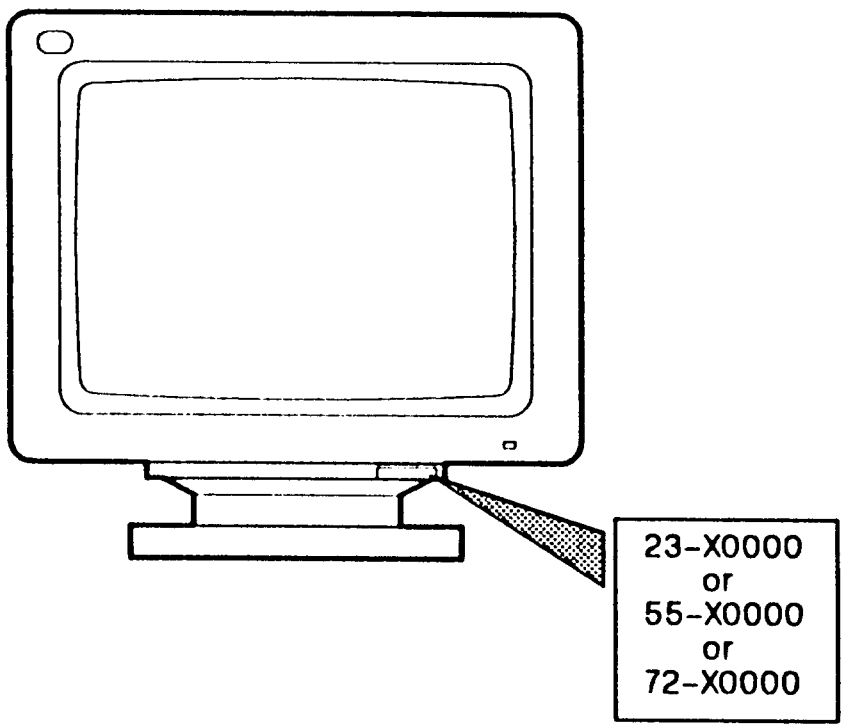
Scheme Service Manual Monitoare PC

IBM. 8513 VER002FM
IBM. 8513 VER00IFM
IBM. 8513 VER003FM

Preface

This manual contains maintenance information for the IBM Color Display 8513, Models 001, 002, 003 and 102. This information is intended for service engineers. It describes how to isolate a fault to a failing field replaceable unit (FRU), and how to remove and replace a failing FRU. The information is presented as follows:

- Chapter 1 is a general introduction to the 8513 Color Graphics Display.
- Chapter 2 contains information for Version 1 of Models 001 and 002. Version 1 displays have serial numbers beginning with '23' or '55'.
- Chapter 3 contains information for Version 2 of Models 001 and 002, and Model 003. Version 2 and Model 003 displays have serial numbers beginning with '72'.
- Chapter 4 contains information for a Model 102 Very Low Magnetic Field (VLMF) display, whose serial number (beginning with '55') is also on the back of the display.

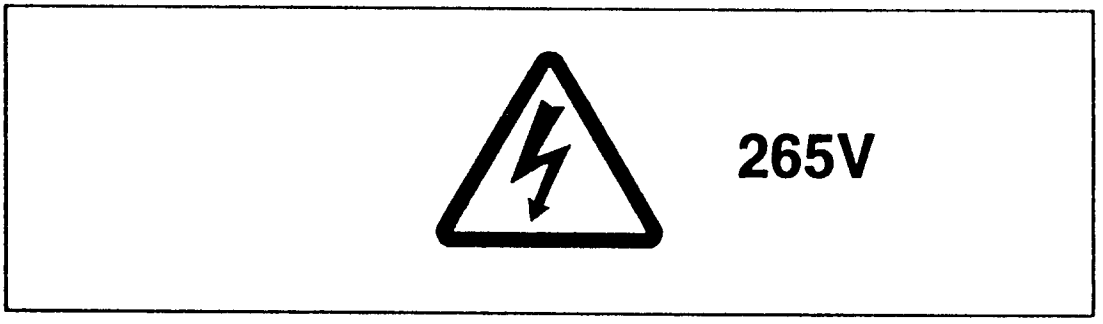


IBM reserves the right to change, modify, or discontinue the equipment without notice.

Safety Notices

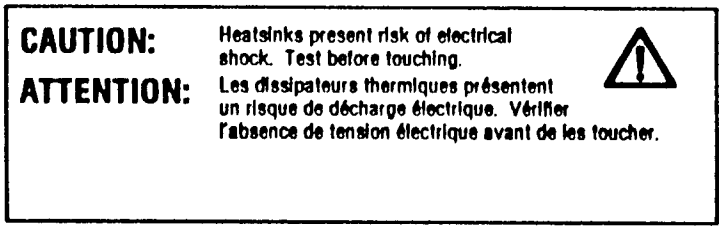
The color display has the following safety labels attached.

This label is located on the underside of the rear cover, and means that only trained personnel should remove the cover and attempt repair of the display:



These labels are located inside the display, attached to the metal shield on the back of the CRT base card:

(Model 001 only) These labels are located inside the display, attached to the metal shield on the back of the CRT base card:



WARNING: This product includes critical mechanical and electrical parts which are essential for x-radiation safety. For continued safety replace critical components indicated in the service manual only with exact replacement parts given in the parts list. Operating high voltage for this product is 25 kV at minimum brightness. Refer to service manual for measurement procedures and proper service adjustments.

Safety

The Color Display 8513, in common with all color displays, contain hazardous voltages and energies. Exercise the utmost care and attention when servicing the display with power applied. It is *not* safe to touch any components, including heatsinks.

To avoid electrical shock, switch off power and disconnect the power plug before exchanging any field replaceable unit(s) (FRUs).

The power attachment cable plug (when supplied) is approved for use with this workstation and meets the relevant testing laboratory, country, or test-house standards. For your safety, the plug must be connected to a correctly wired and grounded socket. An incorrectly wired socket can place a hazardous voltage on the accessible metal parts of the workstation.

Cathode Ray Tubes (CRTs)

Cathode ray tubes present a hazard from flying glass as a result of implosion. To minimize this risk, observe the following guidelines:

1. Storage

    a. Cathode ray tubes should be fully enclosed when received, transported, or otherwise moved from area to area.

    If they are shipped out in a carton, replace them in the original carton or one of equivalent strength, and securely seal the carton to prevent accidental opening. In addition, place the original, or equivalent, packing materials or forms, or both, in the carton to give the tube proper support and protection.

    b. Follow the directions on the manufacturer's carton when CRTs are to be stacked. When in doubt, stack with the faceplate (viewing surface) down. Do not stack more than two cartons high.

    c. Store CRTs away from the normal flow of material handling equipment and pedestrian traffic. In addition, storage areas must be dry to ensure that the cartons do not absorb moisture, causing them to collapse.

2. Maintenance and Installation

   a. No one should install, adjust, maintain, replace, or handle high-vacuum tubes (such as a CRT), without first having reviewed these guidelines or received otherwise appropriate instructions or training.

   b. Ensure that all nonessential personnel vacate the immediate area whenever a CRT is being exchanged.

   c. When handling CRTs, wear the following safety equipment at all times:

      1) Safety glasses
      2) Long-sleeved garment.

   d. Do not allow high-vacuum tubes to remain out of their special cartons unless they are under test or inspection.

   e. Do not scratch or bump any part of the tube as this can weaken the glass and possibly cause it to implode.

   f. Before removing a high-vacuum tube, discharge all stored potential that may exist on the tube's anode button, base socket pins, and the capacitor in the high-voltage supply.

      CAUTION:
      A second capacitive charge can build up after the original discharge. It is therefore important to discharge each tube a second time immediately before removal.

   g. Do not handle CRTs by the neck alone. The neck is the weakest part of the tube and is easily broken. Always handle tubes with two hands.

   h. When inserting or removing tubes from equipment, support them at the large end while carefully guiding the neck in or out of position.

   i. Do not place the tube on a table or bench where there is any possibility of the tube rolling. If it is necessary to place a tube anywhere except in its special carton, put a piece of felt or other soft material under it to prevent scratching the glass.

3. Disarming Cathode Ray Tubes

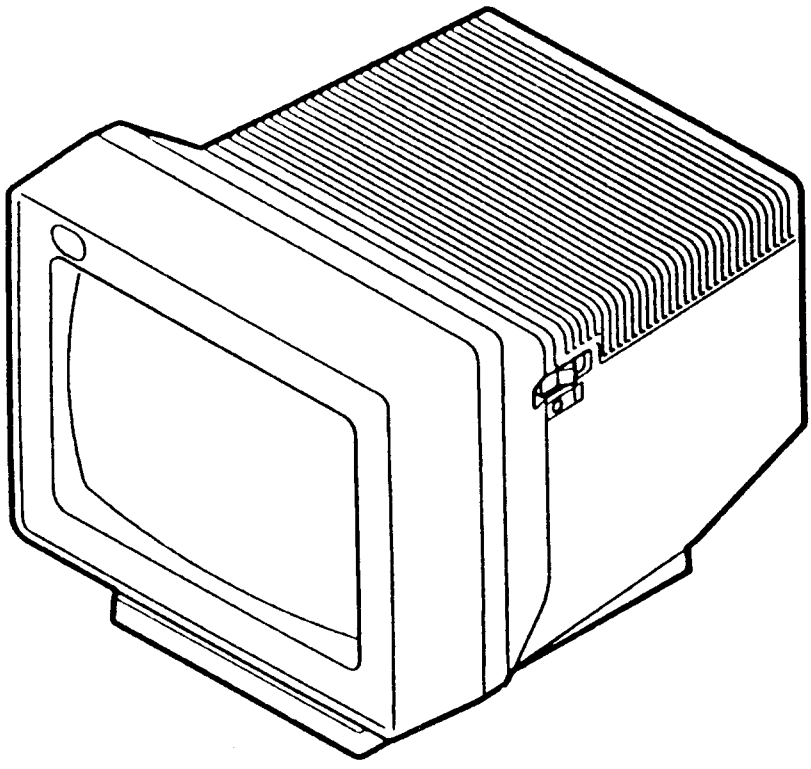
   Do not disarm cathode ray tubes.

4. Disposal of Cathode Ray Tubes

   Dispose CRTs in accordance with country, corporate, or local branch practices.

Chapter 1. Color Display 8513

Description



The IBM* Personal System/2* 8513 Color Display is a non-interlaced, infinite color, direct drive, analog display with externally selected vertical modes. The display has a power switch, power-on indicator, and controls for brightness and contrast, and is supplied with a detachable tilt and swivel stand.

Models:

- Model 001: Low Voltage ('23' and '72' serial numbers)
- Model 002: High Voltage, Northern Hemisphere ('55' and '72' serial numbers)
- Model 003: High Voltage, Southern Hemisphere ('72' serial number)
- Model 102: High Voltage, Very Low Magnetic Field, Northern Hemisphere ('55' serial number).

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* Trademark of IBM Corporation. For a complete list of trademarks, see page iii.

Characteristics:

- Vertical addressability of 350, 400, or 480 lines
- Self-test with a white screen test pattern
- 75-ohm direct-drive analog video input, 0.0 V dc – 0.7 V dc
- 305 mm (12 in.) cathode ray tube
- Etched, non-reflective, dark faceplate
- Type P-22 phosphor
- Horizontal deflection rate of 31.5 kHz ± 0.5 kHz
- Horizontal blanking time of 5.7 µs
- Vertical deflection rate of 50 to 70 Hz (50 to 60 Hz for 480 scan line mode)
- Vertical blanking time of 0.88 ms
- Automatic degaussing
- 1.8 m (6 ft) signal cable with miniature 15-pin D-shell connector
- 1.8 m (6 ft) detachable power cable.

Vertical Modes

The display monitors the polarity of the synchronizing pulses from the video controller and then selects the number of scan lines as follows:

Polarity		Data	Data and Border
HSync	VSync	Scan Lines	Scan Lines
+	-	350	362
-	+	400	414
-	-	480	496
+	+	Reserved	Reserved

Signals

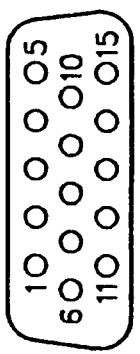
When the display is disconnected from its personal computer, a self-test pattern is displayed. The self-test pattern is a full white raster, extending beyond the display bezel at the top and bottom, and with a vertical black bar on the left or right edges, or both.

The display receives the video signals from a current source with a 150-ohm termination:

- The signal input impedance is 75 ohms
- The video signal has a range from 0.0 to 0.7 V dc
- The vertical synchronizing pulse width is 63.556 µs
- The horizontal synchronizing pulse width is 3.813 µs
- The self-test signal enables the full raster test.

Signal Connector

The signal assignment names and pin numbers for the display signal connector are:



Display Side

Pin	Signal Name	Pin	Signal Name
1	Video Red	9	Reserved
2	Video Green	10	Ground
3	Video Blue	11	Monitor Sense (Ground)
4	Reserved	12	Monitor Sense (Open)
5	Self Test	13	Horizontal Sync.
6	Video Red Return	14	Vertical Sync.
7	Video Green Return	15	Reserved
8	Video Blue Return		

Technical Information

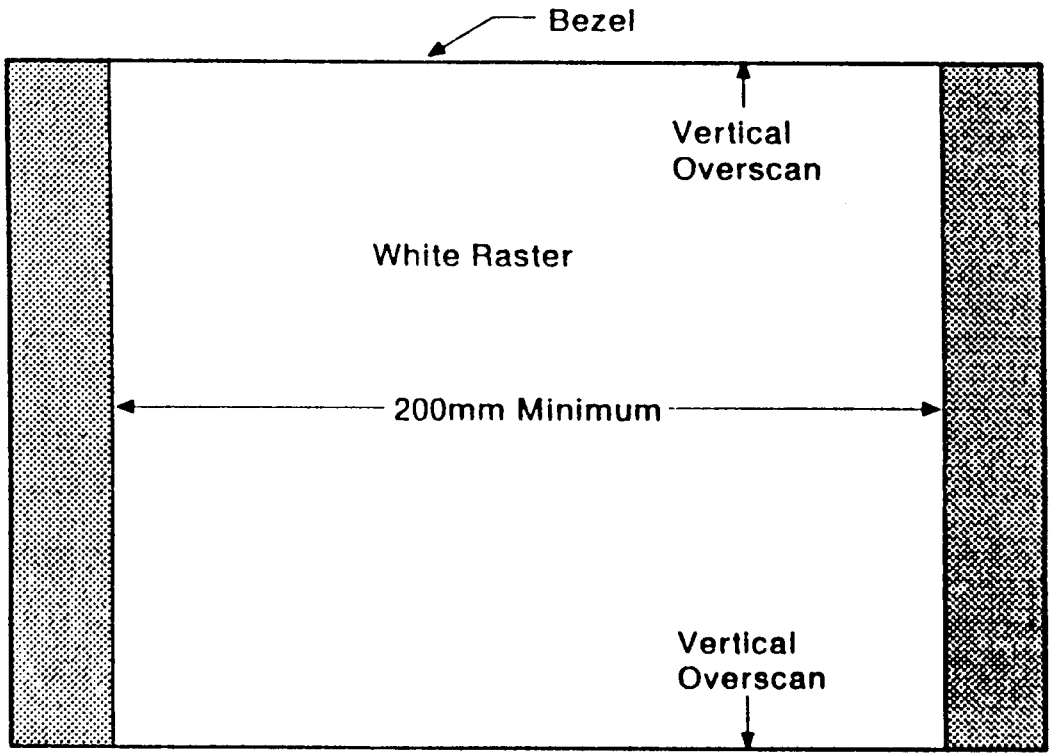
Mains voltage	90 – 137 V ac	Low voltage (Model 001)
	180 – 264 V ac	High voltage (Models 002, 003, and 102)
Input current	1 amp	Low voltage (Model 001)
	0.5 amp	High voltage (Models 002, 003, and 102)
CRT dot pitch	0.28 mm	Nominal
Data area dimensions	207x155 mm	350/480 line mode
	207x150 mm	400 line mode
Linearity	≤ ±5%	
Vertical frequency	50 – 70 Hz	
Horizontal frequency	31.5 kHz	
Vertical modes	350/400/480 lines (determined by polarity of vertical and horizontal synchronizing signals)	
Horizontal resolution	720 pels maximum	
White color coordinates	x = 0.313	y = 0.309
Operating temperature range	15° to 33°C	
Weight	12 kg	

Chapter 2. 8513 – Models 001 & 002 – Version 1

This chapter is for displays with serial numbers beginning with '23' or '55'.

Diagnostic Guide

The following procedures can be used with the display disconnected from its system unit, in which case the following test raster is displayed:



Note: *White central raster with black bar(s) on right or left edge, or both.*

If adjustments are required, see "Focus and Cut-Off Adjustment" on page 2-6.

Problem/Symptom	Failure Check/FRU Replacement
All problems	Before replacing any FRUs, check all connections and associated items for continuity.
Raster missing and green LED not lit	Replace card assembly
Raster missing, but green LED flashes during attempt to power on	Replace card assembly
Raster missing, but green LED lit	Check if CRT heater is glowing: • **No** – replace card assembly, but if fault persists replace CRT • **Yes** – turn G2 potentiometer clockwise. If a raster appears, readjust the video gain, and cut-off potentiometer if possible, otherwise replace card assembly. If no raster appears, replace the CRT.
Raster visible but one or two colors missing	Turn the video 'cut-off' or 'gain' controls for the missing color(s) clockwise. If the color(s) reappear, readjust the video gain and cut-off potentiometer if possible, otherwise replace the card assembly. If the colors do not appear, replace the CRT.
Raster visible but is too narrow, or does not fill the bezel vertically.	Replace card assembly.

If the raster is the correct size, additional checks must be made. Connect the display to the IBM PS/2* system unit and load the Alignment Diskette, as described on page 2-5. Select the required pattern to suit the adjustment.

Problem/Symptom	Failure Check/FRU Replacement
No E-W pincushion correction.	Turn RV201 to check whether readjustment is possible, otherwise, replace the card assembly.
Data does not center horizontally.	Turn RV200 H.PHASE to check whether readjustment is possible, otherwise, replace the card assembly. NOTE: On units with a metal card tray, first adjust RV203 to center the background raster, then RV200. If the fault persists, replace the CRT.
Data does not synchronize horizontally.	Replace the interface cable. If the fault persists, replace the card assembly.
Data has insufficient width.	Turn RV202 WIDTH to check whether readjustment is possible, otherwise replace the card assembly.
Data does not synchronize vertically.	Replace the interface cable. If the fault persists, replace the card assembly.
Data has insufficient height.	Turn RV300 HEIGHT to check whether readjustment is possible, otherwise, replace the card assembly.
Data does not center vertically.	Turn RV301 V.CENT to check whether readjustment is possible, otherwise, replace the card assembly. If the fault persists, replace the CRT.
Vertical linearity poor.	Turn RV302 V.LIN to check whether readjustment is possible, otherwise, replace the card assembly.
Horizontal linearity poor.	Replace the card assembly.
Color(s) missing.	Replace the interface cable. If the fault persists, replace the card assembly. If the fault still persists, replace the CRT.
Maximum white point poor.	Make sure the brightness control is in the center detent position. Readjust RV700 G.GAIN, RV701 R.GAIN, and RV702 B.GAIN, to determine whether the correct white color can be obtained, otherwise replace the card assembly.

Problem/Symptom	Failure Check/FRU Replacement
Minimum white point poor.	Make sure the brightness control is in the center detent position. Readjust RV800 G.CUT-OFF, RV801 R.CUT-OFF and RV802 B.CUT-OFF, to determine whether the correct white color can be obtained. If not, replace the card assembly.
Convergence poor.	Replace the CRT.
Focus poor.	Turn the focus potentiometer to see if readjustment is possible. If not, replace the card assembly. If the fault persists, replace the CRT.

Alignment Procedure

You need the following for these alignment procedures:

- IBM Personal System/2 Model 8550 or equivalent (with full VGA support)
- IBM Model 8503/8512/8513 Alignment Diskette, IBM part number 07F6788, shipped with this manual
- IBM Model 8513 Alignment Mask, IBM part number 59X6487
- Minolta** TV Color Analyzer.

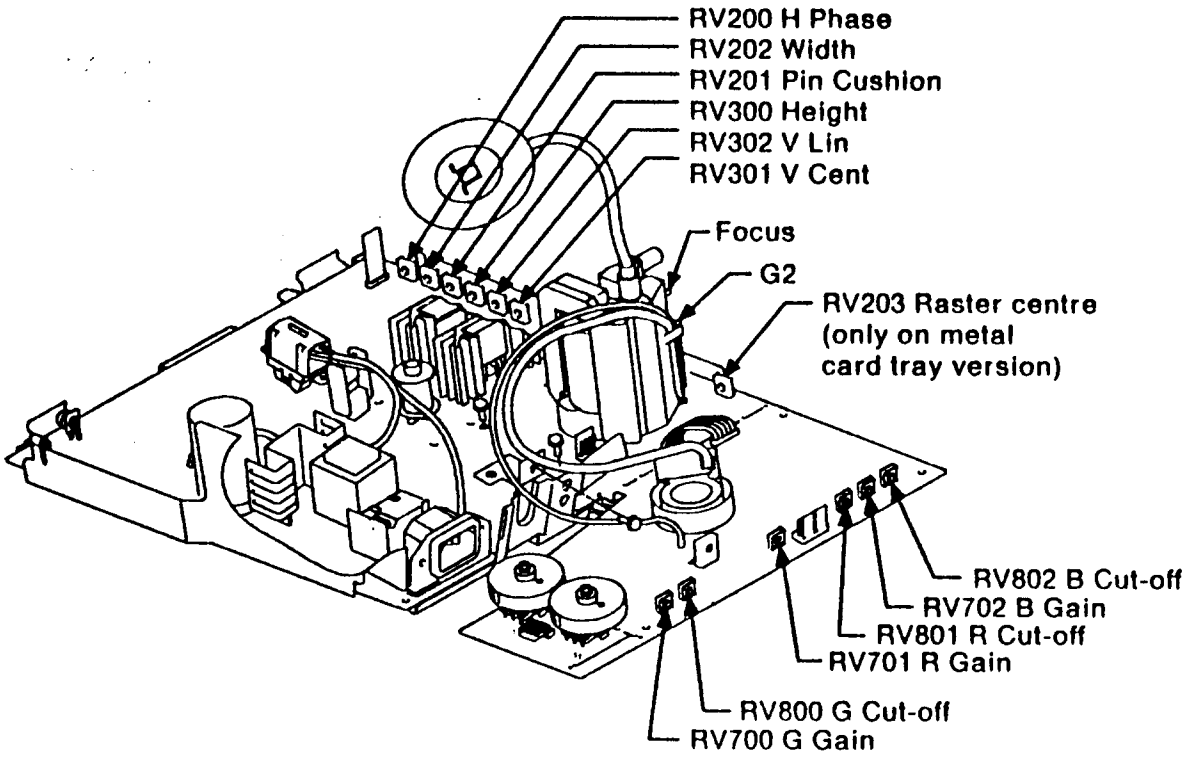
  Note: Each repair center should instigate a procedure to ensure that the Minolta TV Color Analyzer used for setup has been calibrated for the particular type of CRT being measured.

1. Ensure that the system unit is connected to the display.
2. Power-on the system unit and the display.
3. Allow 20 minutes warm-up time for the display before checking or adjusting any electrical specification or function.

   Note: Degaussing is always required before aligning the screen.

4. Insert the diskette in the system unit.
5. Type **PS2IBM40** and press Enter.

Focus and Cut-Off Adjustment



1 Set the brightness control to maximum.

2 Set the contrast control to maximum.

3 Turn RV800 G.CUT-OFF, RV801 R.CUT-OFF, and RV802 B.CUT-OFF fully clockwise.

4 Press the **F10** function key (on the PS/2 keyboard) to select a blank screen pattern on the display.

5 Turn the G2 potentiometer on the EHT transformer slowly clockwise until the first color appears. Turn the associated cutoff potentiometer fully counterclockwise.

6 Continue turning the G2 potentiometer clockwise until the second color appears. Turn the associated cutoff potentiometer fully counterclockwise also.

7 Continue turning the G2 potentiometer clockwise until the third color appears.

8 Readjust the first and second cutoff potentiometers and G2 to get the following white luminance and chromaticity:

cd/m^2	x	y	(CIE COORDS)
2+1.0/-0	0.245+/-0.010	0.263+/-0.010	

Notes:

a. Green cutoff potentiometer (RV800) clockwise predominantly increases y.
b. Red cutoff potentiometer (RV801) clockwise predominantly increases x.
c. Blue cutoff potentiometer (RV802) clockwise predominantly decreases both x and y.

9 Set the brightness control to center detent. Turn RV700 G.GAIN, RV701 R.GAIN, and RV702 B.GAIN to mid position.

10 To set Focus, press the **F3** key, then press and hold the **ALT** and the **F1** keys (then release both) to get a 5 x 5 grid. Adjust Focus control on flyback transformer for the sharpest image.

11 Press the **F3** key, then the **F4** key, then the **F8** key, to select a white raster pattern and by using RV700 G.GAIN, RV701 R.GAIN, and RV702 B.GAIN only, set the center screen luminance and chromaticity with the Minolta TV Color Analyzer to:

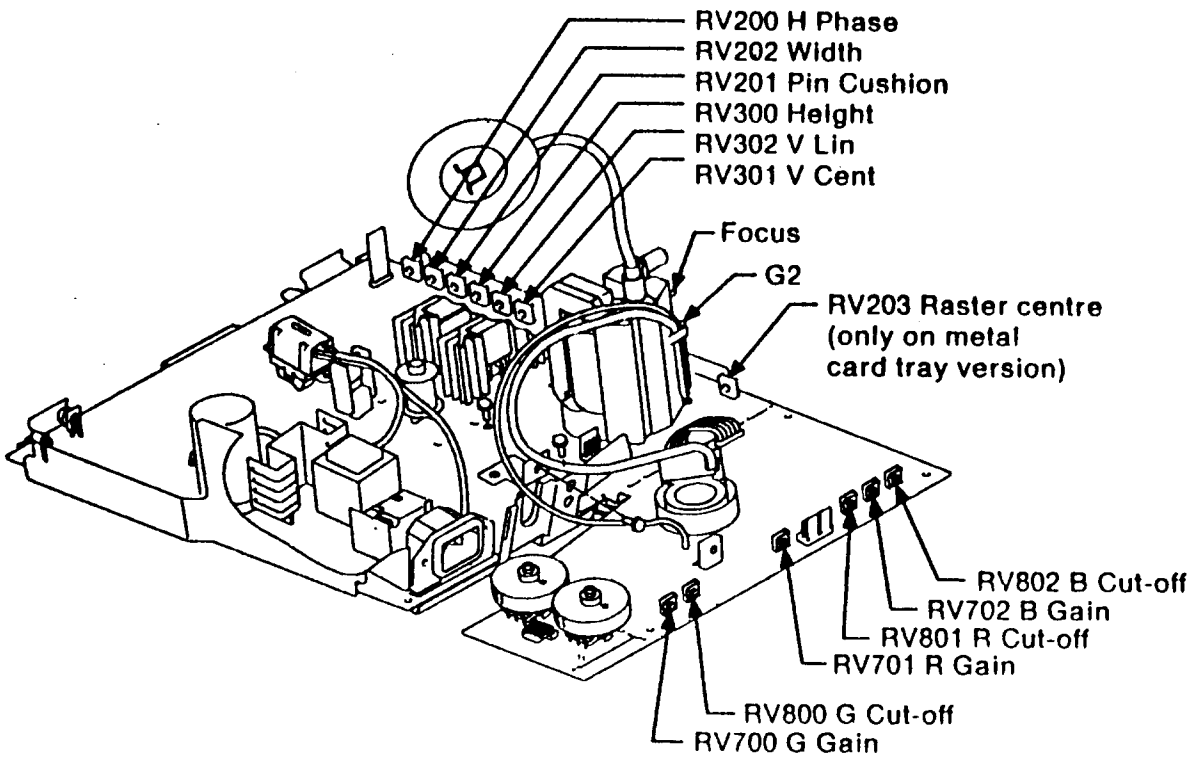
cd/m^2	x	y	(CIE COORDS)
120 to 150	0.313+/-0.010	0.329+/-0.010	

Notes:

a. Red gain potentiometer clockwise predominantly increases x.
b. Green gain potentiometer clockwise predominantly increases y.
c. Blue gain potentiometer clockwise predominantly decreases both x and y.
d. Clockwise rotation of all gain potentiometers increases Y (brightness).

12 Press the **F3** key, then press and hold the **SHIFT** and the **F5** keys (then release both keys) to select a white crosshatch pattern again. Set the center screen brightness to 70 cd/m^2 using the contrast control. Check the dimensions and adjust if necessary.

Geometry Adjustments



Note: If the geometry is reset, it may be necessary to readjust the brightness setting.

Pincushion

1. Press the **F2** function key, then press the **ALT** and **F1** keys (then release both keys).

2. Adjust the SIDE-PINCUSHION potentiometer RV201 to get a geometrically regular square.

Horizontal Centering

1. Press the **F2** function key, then press and hold the **SHIFT** and **F5** keys (then release both keys).

2. **Note:** Before doing this step, if you are servicing a display with a metal card tray, adjust RV203 first to centralize the raster in the bezel.

   Adjust the 'RV200 H.PHASE' potentiometer to centralize the pattern horizontally on the screen.

Vertical Linearity

1. Press the **F2** function key, then press and hold the **ALT** and **F1** keys (then release both keys).

2. Adjust the 'RV302 V.LIN' potentiometer to get squares of equal width.

Horizontal Width

1. Press the **F2** function key, then press and hold the **SHIFT** and **F5** keys (then release both keys).

2. Adjust the 'RV202 WIDTH' to get a horizontal width of 207 mm.

Vertical Centering

1. Press the **F2** function key, then press and hold the **SHIFT** and **F5** keys (then release both keys).

2. Adjust the 'RV301 V.CENT' potentiometer to centralize the pattern vertically on the screen.

Vertical Height

1. Press the **F3** function key, then press and hold the **SHIFT** and **F5** keys (then release both keys).

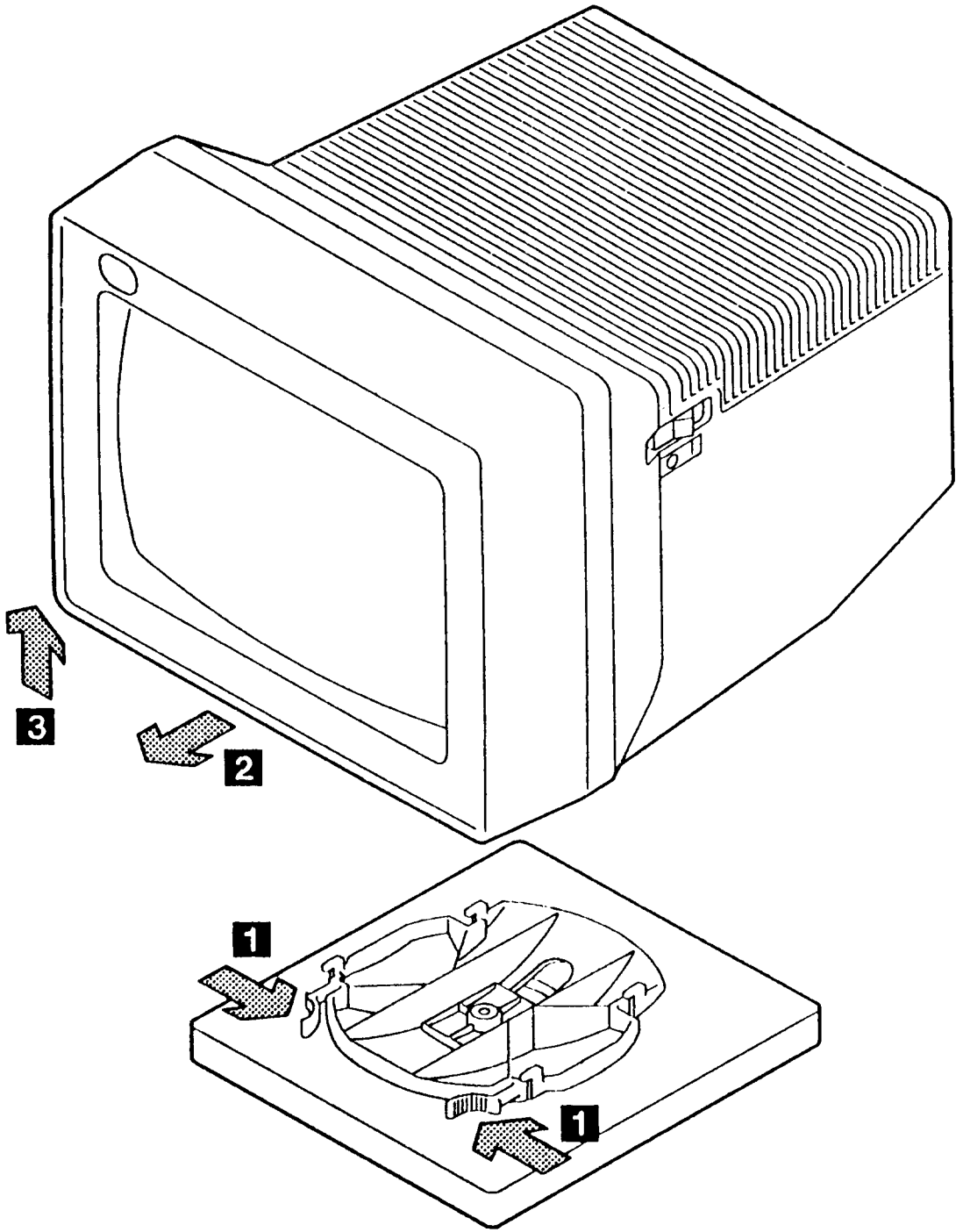
2. Adjust the 'RV300 HEIGHT' potentiometer to get a height of 155 mm.

Parts Catalog

FRU Number	Description
75X8924	CRT/Yoke assembly (Northern Hemisphere), degaussing coil/DAG strap assembly
75X8925	Card assembly (110/120 volt) (Brightness and contrast controls, switch assembly, power supply 110/120 volt)
75X8926	Card assembly (220/240 volt Northern Hemisphere) (Brightness and contrast controls, switch assembly, power supply 220/240 volt)
75X8927	Cover set complete - exchange basis only
75X8928	Control bridge
75X8929	Signal cable for plastic card tray
44F5069	Signal cable for metal card tray
75X8930	Signal cable cover blank (quantity 1)
75X8931	Feet (quantity 2)
68X3061	Tilt/swivel stand
72X7871	Shipping material (box, front cushion, rear cushion, poly bag, dryer)
68X3088	Display assembly 110/120 volt
72X7870	Display assembly 220/240 volt (Northern Hemisphere)
72X7877	Display assembly 220/240 volt (Southern Hemisphere)

Mechanical Assembly

Tilt and Swivel Stand



Tilt and Swivel Stand

Warning

1. **Power-off the display, system unit, and any attached devices.**
2. **Remove all power plugs from the power supply sockets.**

Proceed as follows:

1 Place the display on a flat surface, ensuring that there is sufficient space to put down the display when it is removed from the tilt and swivel stand.

2 Press the two release clips **1**.

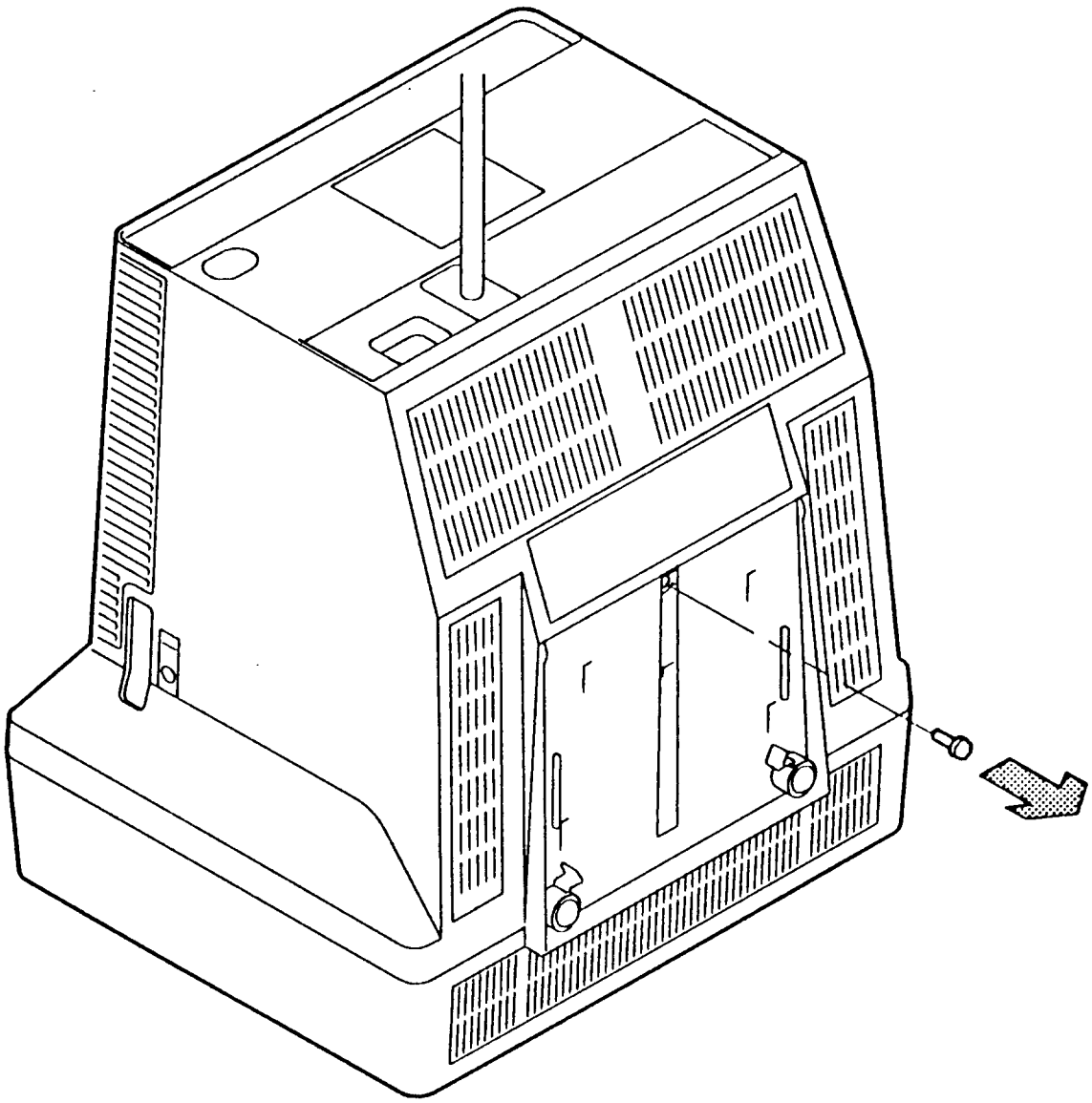
3 Pull the display forward from the tilt and swivel stand **2**.

4 Lift the display from the tilt and swivel stand **3** and place it on a flat surface.

Installing the Tilt and Swivel Stand

Install using the above instructions in reverse order.

Rear Cover



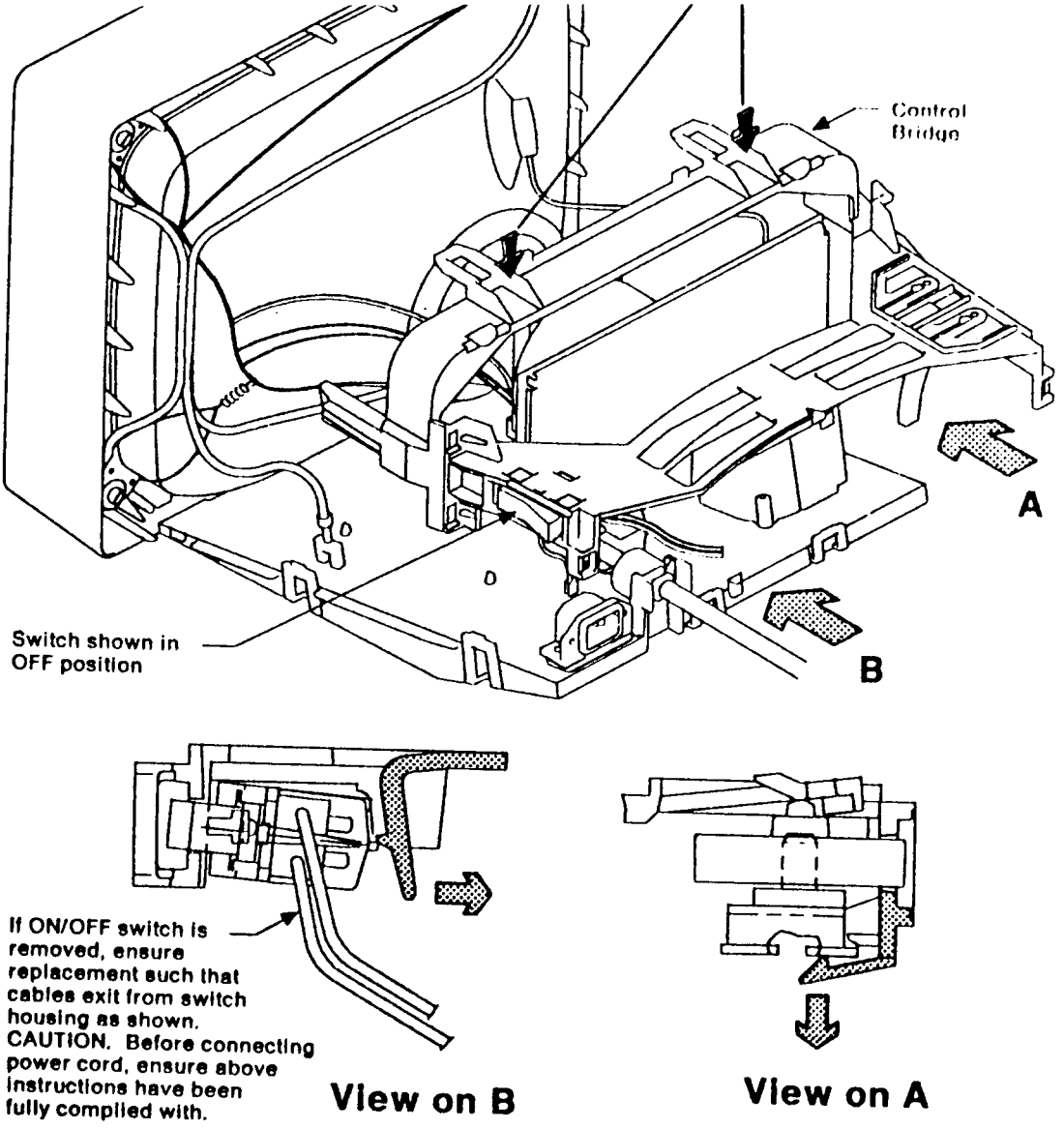
1 Remove the tilt and swivel assembly as described on page 2-12.

2 Unclip the two plastic closing plates from the interface cable, to allow the plug to pass through the cover.

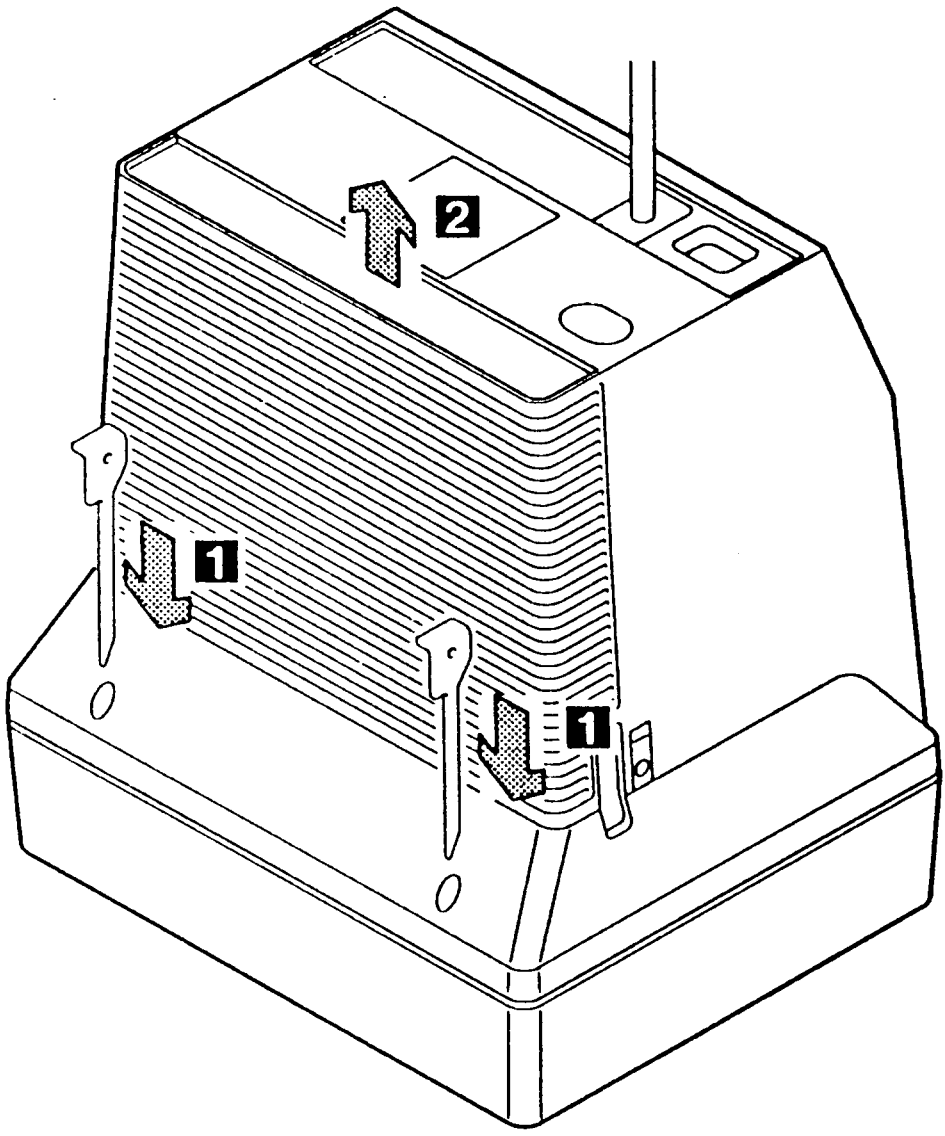
3 Remove the hex head screw, shown above.

4 Delatch the 2 retention clips **1** with the removal tool (shown in Figure 2-1) and lift the cover from the assembly **2**.

Installing the Rear Cover
Install using the above instructions in reverse order.


Control Bridge
A
B
Switch shown in OFF position
If ON/OFF switch is removed, ensure replacement such that cables exit from switch housing as shown.
CAUTION. Before connecting power cord, ensure above instructions have been fully complied with.
View on B
View on A

Rear Cover



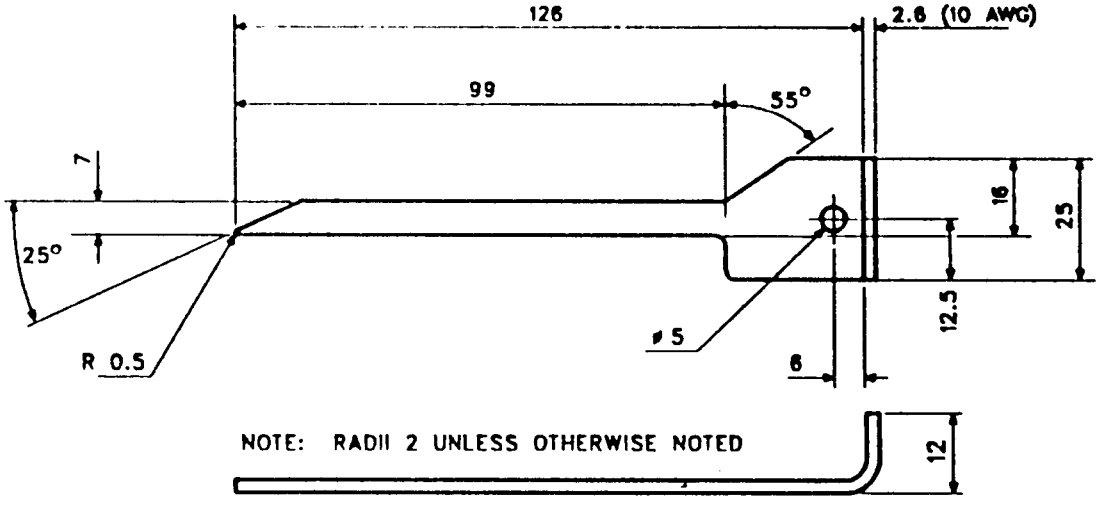


Figure 2-1. Removal Tool (Dimensions in mm)

Control Bridge Assembly

Control Bridge Assembly

1 Unclip and remove the user controls from the control bridge, as shown in View A.

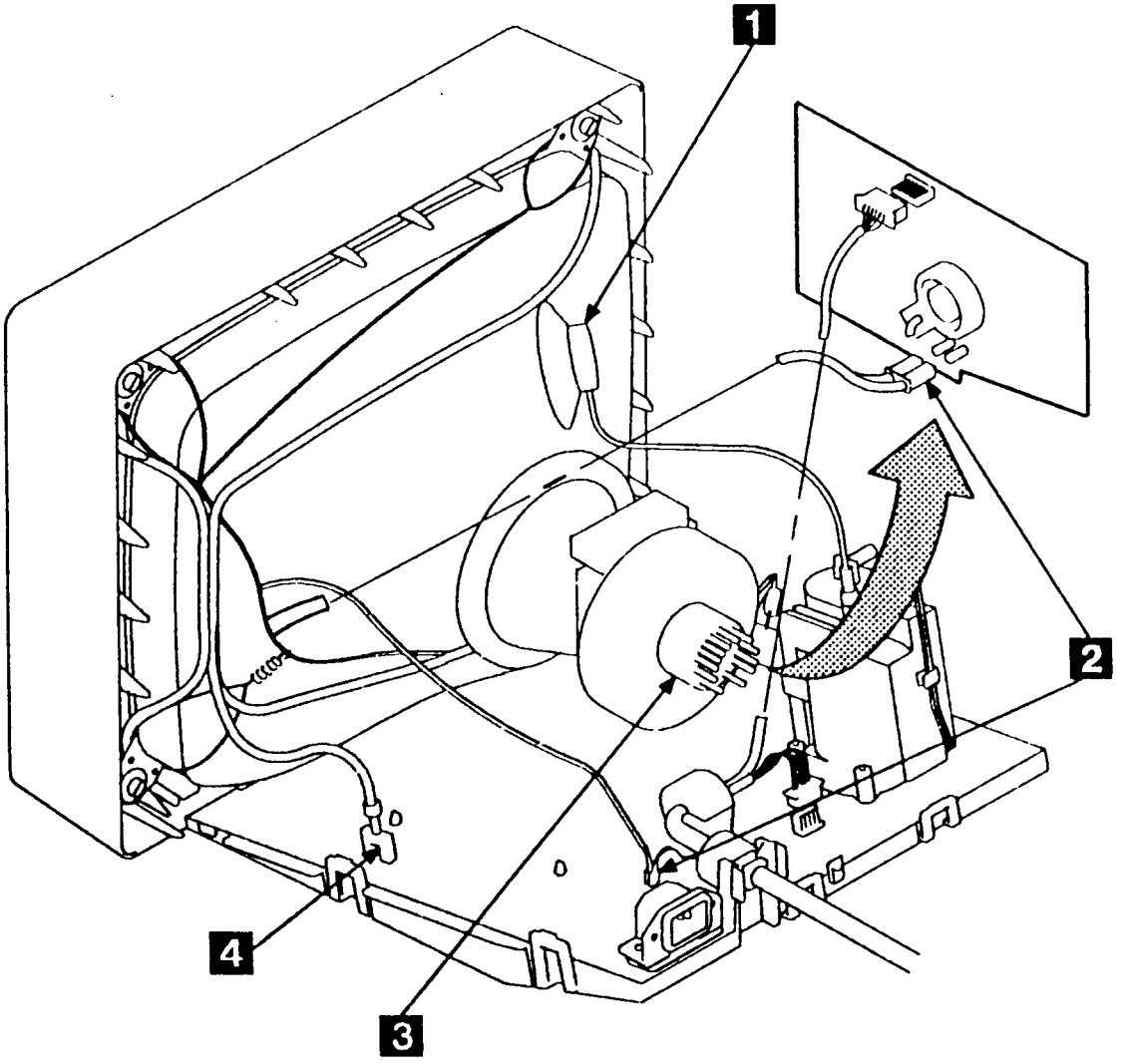
2 Remove the On/Off switch by pushing down the tab and withdrawing the switch downward, as shown in View B.

3 Disengage the two latches, and pull the Control Bridge assembly away from the front bezel.

Installing the Control Bridge Assembly

Install using the above instructions in reverse order.

Card Assembly



Card Assembly

Warning

Refer to "Safety Notices" on page vii before attempting any of the steps to Remove/Install the Card Assembly.

1 Remove the anode cap **1**.

2 Remove the DAG connectors **2** from the video card and the mains socket.

3 *Metal Card Tray Versions only:* Remove the short DAG ground leads from the metal card tray.

4 Unplug the scan connector **3**.

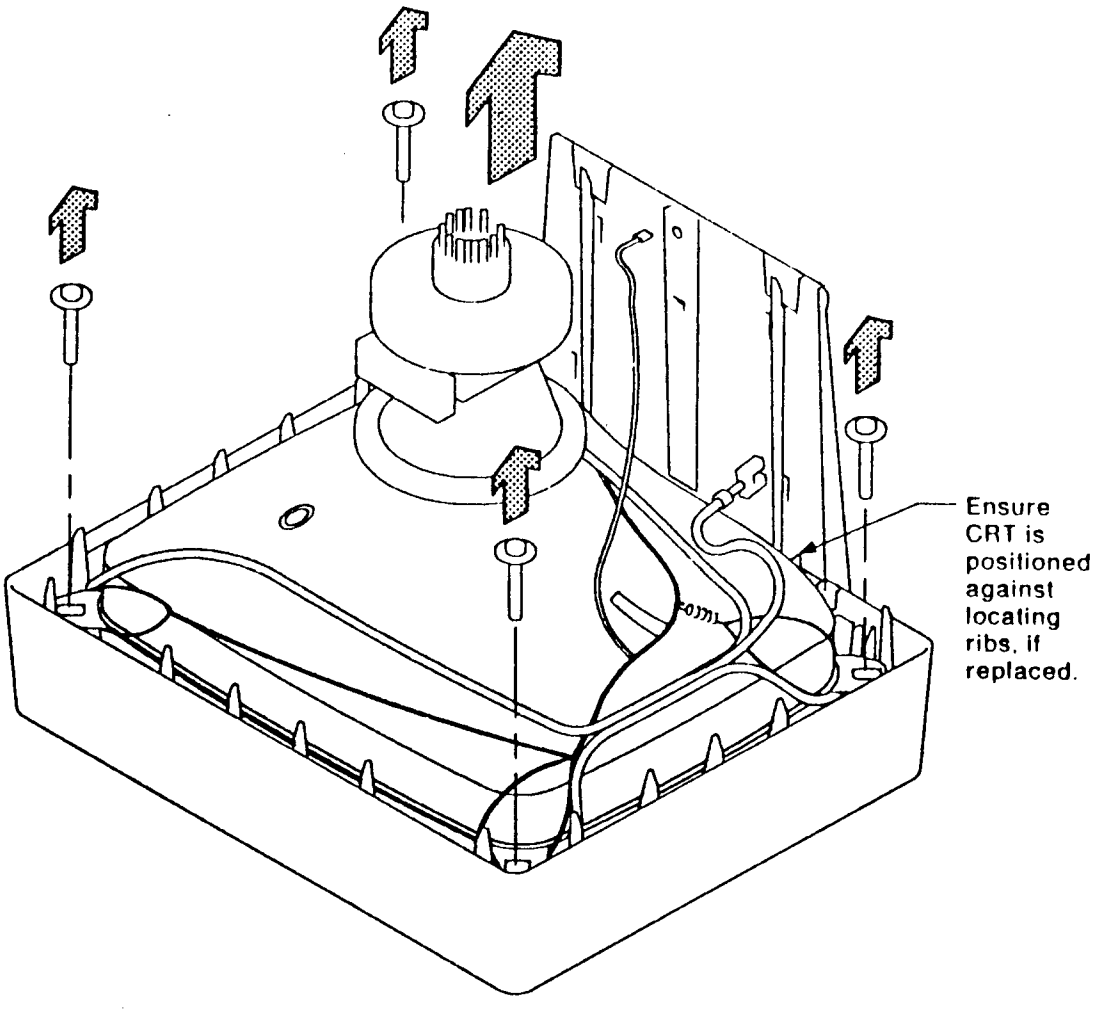
5 Unplug the degauss connector **4**.

6 Place the display front downward on a table and lift the main card assembly away.

Installing the Card Assembly

Install using the above instructions in reverse order.

Integrated Tube Component (ITC) Assembly



Integrated Tube Component (ITC) Assembly

Warning

Refer to "Safety Notices" on page vii before attempting any of the steps to Remove/Install the CRT.

1 Remove the tilt and swivel stand as described on page 2-12.

2 Remove the rear cover as described on page 2-14.

3 Remove the card assembly as described on page 2-18.

4 Remove the four CRT screws.

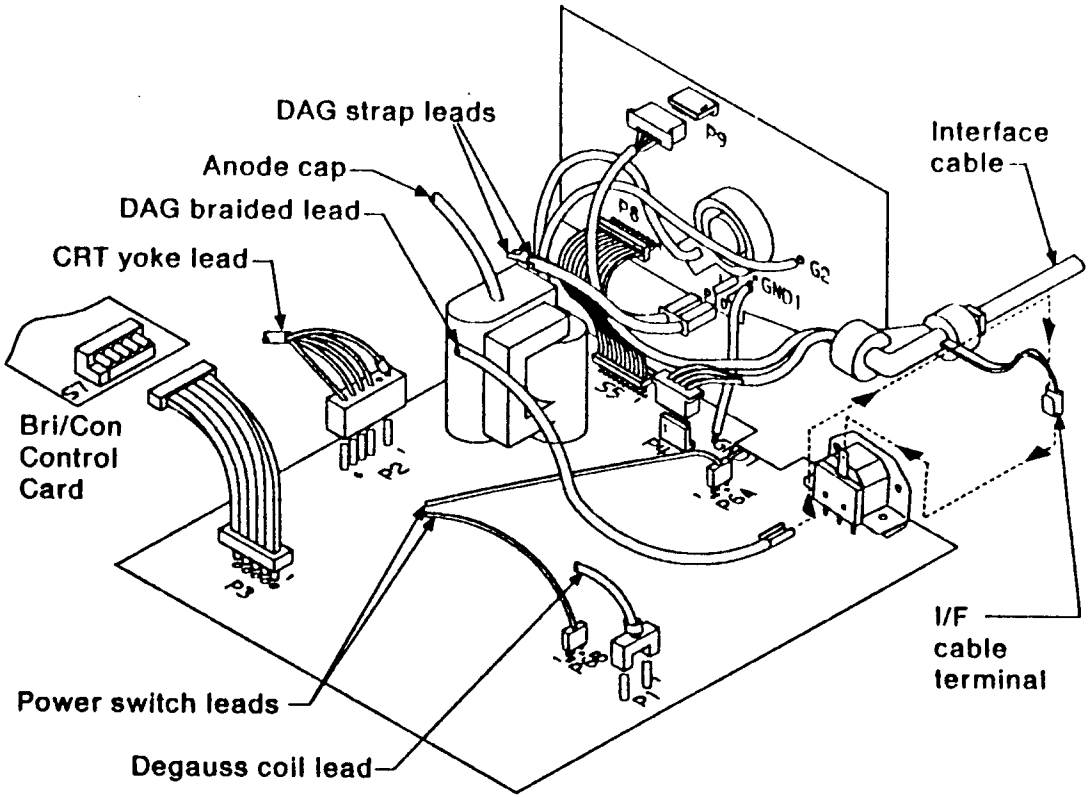
5 Remove the CRT.

Installing the CRT

Install using the above instructions in reverse order.

Ensure that the DAG contact is not obscured by the labels.

Cable Connections

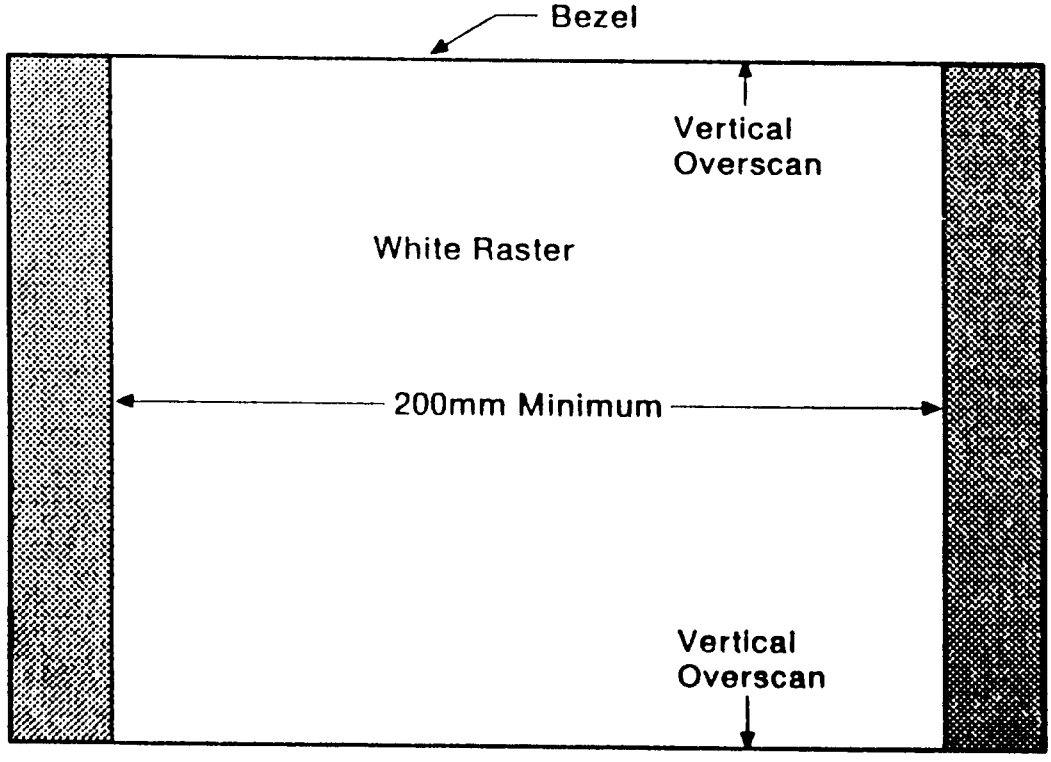


Chapter 3. 8513 – Models 001 & 002 – Version 2, & Model 003

This chapter is for displays with serial numbers beginning with '72'.

Diagnostic Guide

The following procedures can be used with the display disconnected from its system unit, in which case the following test raster is displayed:



If adjustments are required, see "Focus and Cut-Off Adjustment" on page 3-6.

Problem/Symptom	Failure Check/FRU Replacement
All problems.	Before replacing any FRUs, check all connections and associated items for continuity.
Raster missing and green LED not lit.	Exchange the power supply. If problem persists, exchange the main PC board assembly.
Raster missing, but green LED flashes during attempt to power on.	Exchange the main PC board assembly. If problem persists, exchange the video amplifier assembly.
Raster missing, but green LED lit.	Check if CRT heater is glowing: • **NO** – Exchange the main PC board assembly. If problem persists, exchange the CRT. • **YES** – Turn G2 potentiometer clockwise. If a raster appears, readjust the video gain and the cutoff potentiometer. Otherwise, exchange the video amplifier assembly. If no raster appears, exchange the CRT.
Raster visible but one or two colors missing.	Turn cutoff or gain controls, for the missing color(s), clockwise. If the color(s) reappear, try to readjust the video gain and cutoff potentiometer if possible; otherwise, install a new video amplifier assembly. If the colors do not appear, exchange the CRT.
Raster visible but is too narrow, or does not fill the bezel vertically.	Install a new main PC board assembly.

If the raster is the correct size, then additional checks should be carried out. Connect the display to the IBM PS/2 system unit, and load the Alignment Diskette as described on page 3-5. Select the required pattern to suit the adjustment.

Problem/Symptom	Failure check/FRU replacement
No E-W pincushion correction.	Turn PCC AMP R327 (AMPLITUDE) and PCC R328 (PHASE) to see if readjustment is possible. If not, install a new main PC board assembly.
Data not centered horizontally.	Turn H Cent R415 to see if readjustment is possible. If not, install a new main PC board assembly.
Data will not sync horizontally.	Check the signal cable for bent or broken pins. If any pins are broken, exchange the interface cable. Turn H Hold R405 to see if readjustment is possible. If not, install a new main PC board assembly.
Data has insufficient width.	Turn Width L402 with a non-metallic tool to see if readjustment is possible. If not, install a new main PC board assembly.
Data will not sync vertically.	Check the signal cable for bent or broken pins. If any pins are broken, exchange the interface cable. Turn V Hold R314 to see if readjustment is possible. If not, install a new main PC board assembly.
Data has insufficient height.	Turn V SIZE3 R315 (mode3), V SIZE2 R208 (mode2) and V SIZE1 R211 (mode1) to see if readjustment is possible. If not, install a new main PC board assembly.
Data not centered vertically.	Turn V Cent R338 to check whether readjustment is possible, otherwise install a new main PC board assembly.
Vertical linearity poor.	Turn V Lin R316 to check whether readjustment is possible; otherwise, install a new main PC board assembly.
Color(s) missing.	Check the signal cable for bent or broken pins. If any pins are broken, exchange the interface cable. If the fault still persists, install a new main PC board assembly. If the fault still persists, exchange the CRT.
Maximum white color point is poor.	Make sure the brightness control is in the center detent position. Readjust R502, R532, and R562, to determine whether the correct white color can be obtained. If the fault still persists, install a new main PC board assembly.

Problem/Symptom	Failure check/FRU replacement
Minimum white color point is poor.	Make sure the brightness control is in the center detent position. Readjust R910 R BLK, R940 G BLK, and R970 B BLK, to determine whether the correct white color can be obtained. If the fault still persists, install a new main PC board assembly.
Convergence poor.	Exchange the CRT.
Focus poor.	Turn the focus potentiometer to determine if readjustment is possible;, otherwise, install a new main PC board assembly. If the fault persists, install a new CRT.
Colors change or flicker	Install a new signal interface cable, then proceed as for 'Color(s) missing' above.

Alignment Procedure

You will need the following for these alignment procedures:

- IBM Personal System/2 Model 8550 or equivalent (with full VGA support)
- IBM 8503/8512/8513 Alignment Diskette, IBM part number 07F6788, shipped with this manual
- IBM Model 8513 Alignment Mask, IBM part number 59X6487
- Minolta TV Color Analyzer.

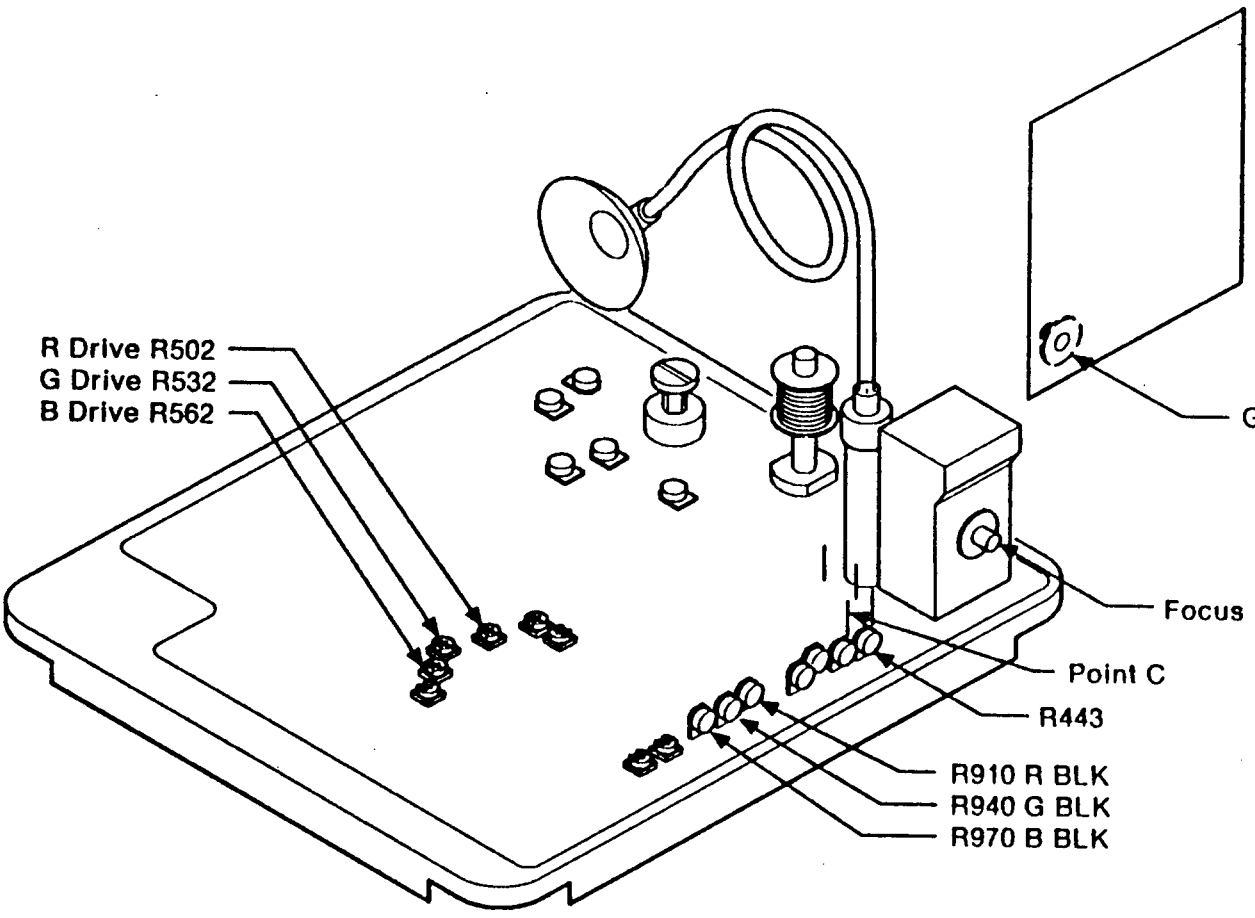
  Note: Each repair center should instigate a procedure to ensure that the Minolta TV Color Analyzer used for setup has been calibrated for the particular type of CRT being measured.

1. Ensure that the system unit is connected to the display.
2. Power-on the system unit and the display.
3. Allow 20 minutes warm-up time for the display before checking or adjusting any electrical specification or function.

   Note: Degaussing is always required before aligning the screen.

4. Insert the diskette in the system unit.
5. Type **PS2IBM40** and press Enter.

Focus and Cut-Off Adjustment



1 Press **F10** to get no video.

2 Set the SUB-BRIGHTNESS control (R 443) to mid position.

3 Set the CONTRAST control to maximum.

4 Set the BRIGHTNESS control to center detent.

5 Collapse scan through 18K resistor to ground at Point C.

6 Decrease G2 until line just disappears - *note the color for Step 12.*

7 Enable scan.

8 Press **F1** to set mode to 1.

9 Press **F10** to get a blank picture.

10 Increase brightness until the Minolta TV Color Analyzer reading is stable and consistent.

11 Set chromaticity to x = 0.313 y = 0.329.

12 Use the 2 color controls (R910 R BLK, R940 G BLK, or R970 B BLK) for the two colors (red, green, or blue) **not** corresponding to Step 6.

13 Reset the brightness control to center detent.

14 Press **F3**, then press the **ALT** and **F1** keys (then release both keys) to select a 5 x 5 crosshatch pattern. Adjust vertical linearity (V Lin R316) and vertical centering (V Cent R338) – see page 3-8 – until the displayed horizontal lines are evenly spaced.

15 Adjust the focus control (on the body of the flyback transformer).

16 Set up the contrast with the keys sequence **F3, F4, then F8.**

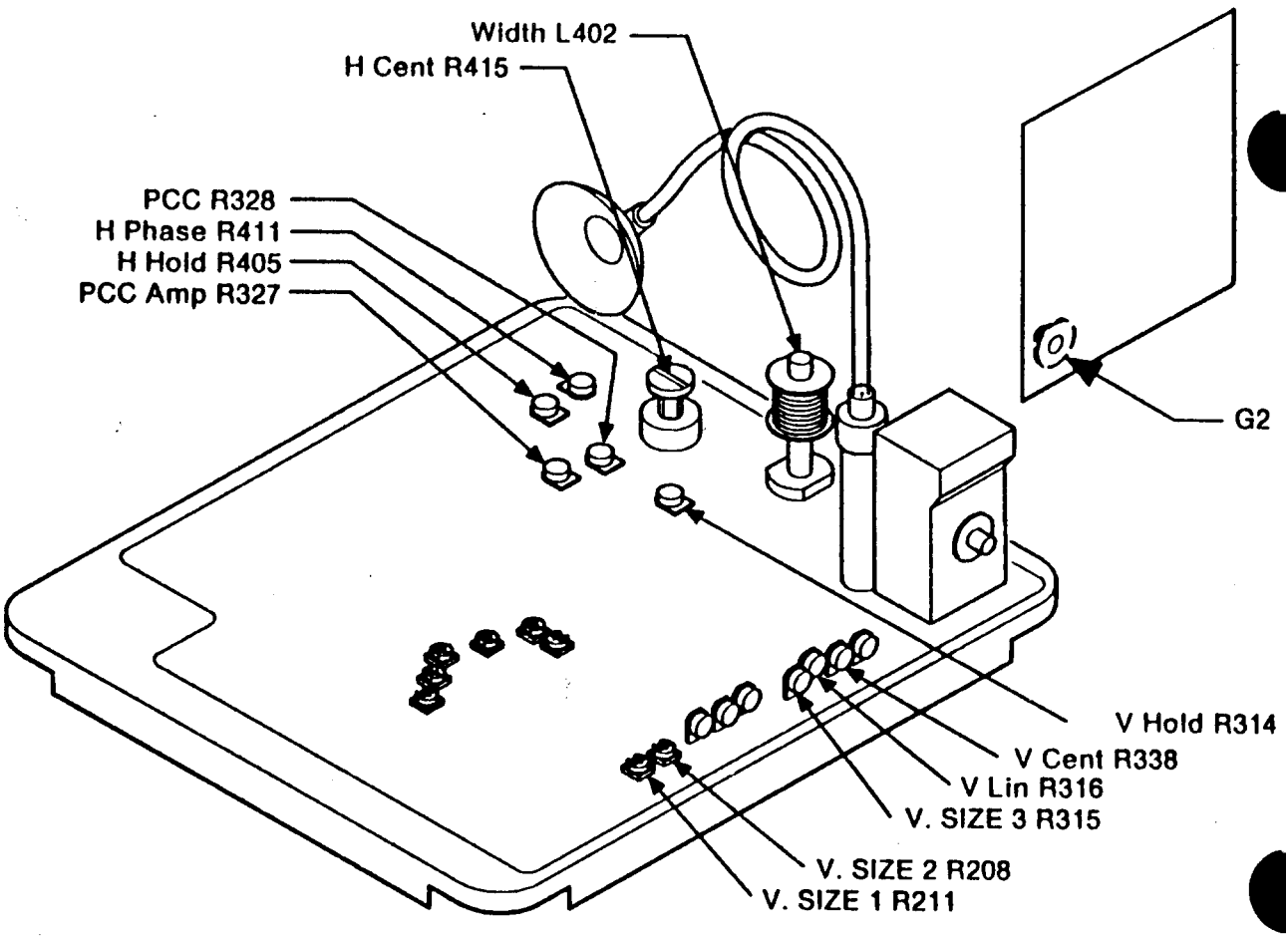
17 Adjust the contrast and chromaticity by using R502, R532, R562 for red, green, and blue respectively, to achieve the following luminance and chromaticity settings:

Brightness = 120 to 150 cd/m²
x = 0.313
y = 0.329

18 Press **F4** to check the maximum brightness.

Luminance > 230 cd/m²

Geometry Adjustments



Note: If the geometry is reset, it may be necessary to readjust the brightness setting.

Pincushion

1. Press the **F2** function key, then press the **ALT** and **F1** keys (then release both keys).

2. Adjust the SIDE-PINCUSHION potentiometers R327 and R328 to get a geometrically regular square.

Horizontal Centering

1. Press the **F2** function key, then press and hold the **SHIFT** and **F5** keys (then release both keys).

2. Adjust the 'H.Phase R411' potentiometer to centralize the data on the background raster.

3 Adjust the 'H.Cent R415' potentiometer to centralize the raster horizontally on the screen.

Vertical linearity

1 Press the **F2** function key, then press and hold the **ALT** and **F1** keys (then release both keys).

2 Adjust the 'V Lin R316 ' potentiometer to get squares of equal width.

Horizontal Width

1 Press the **F2** function key, then press the **SHIFT** and **F5** keys (then release both keys).

2 Adjust the 'Width L402' adjustment to obtain a horizontal width of 207 mm.

Vertical centering

1 Press the **F2** function key, then press and hold the **SHIFT** and **F5** keys (then release both keys).

2 Adjust the 'V Cent R338' potentiometer to centralize the pattern vertically on the screen.

Horizontal Hold

1 Press and release the **F3** function key.

2 Adjust the 'H.Hold R405 ' potentiometer until the horizontal sync is stabilized.

Vertical Height

1 Press the **F3** function key, then press the **SHIFT** and **F5** keys (then release both keys).

2 Adjust the 'V.SIZE 3 R315' potentiometer to obtain a height of 155 mm.

3 Press the **F2** function key, then press and hold the **SHIFT** and **F5** keys (then release both keys).

4 Adjust the 'V.SIZE 2 R208' potentiometer to get a height of 150 mm.

5 Press the **F1** function key, then press and hold the **SHIFT** and **F5** keys (then release both keys).

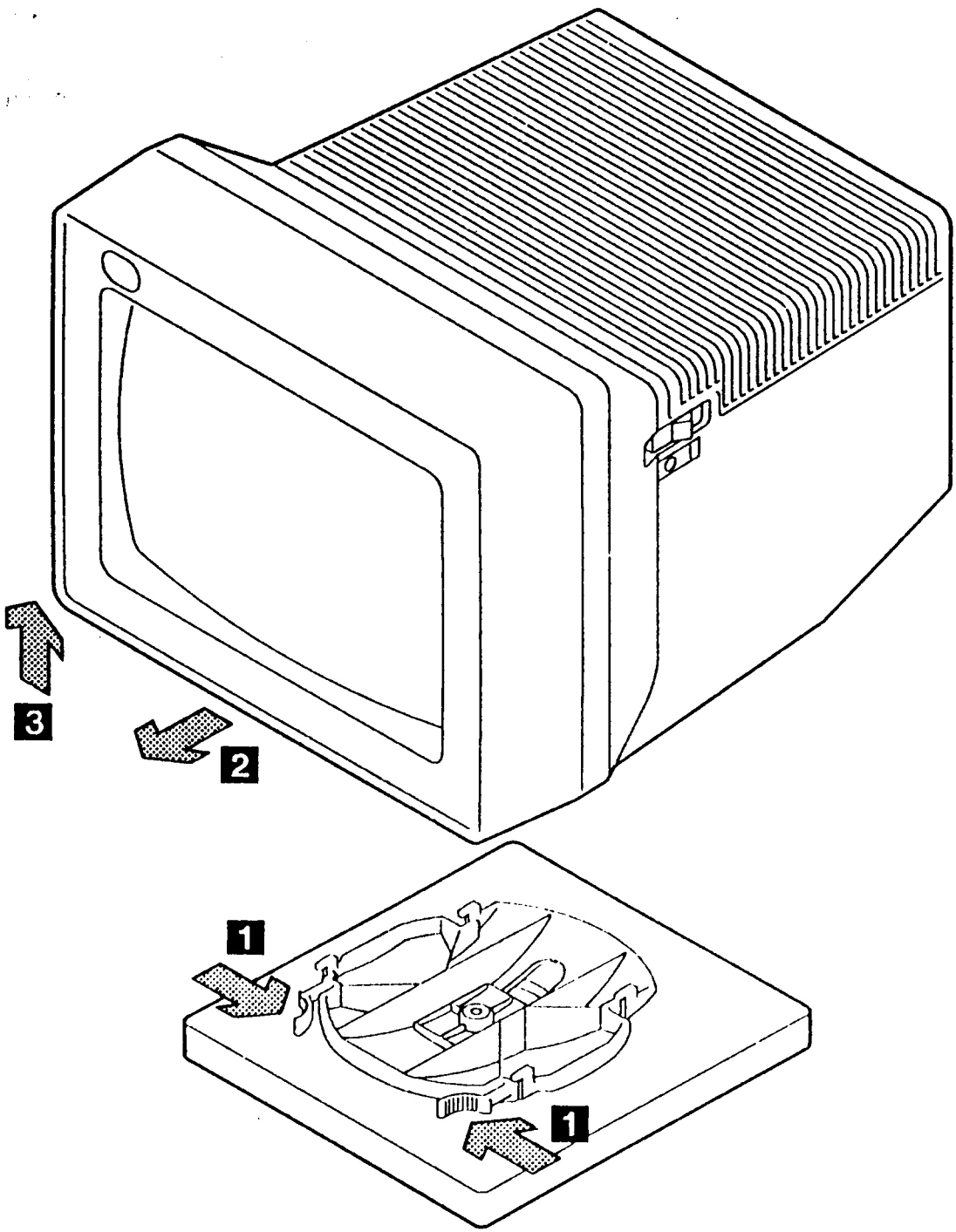
6 Adjust the 'V.SIZE 1 R211' potentiometer to obtain a height of 155 mm.

Parts Catalog

FRU Number	Description
68X3063	CRT /YOKE /DAG strap assembly 110/120 volt, 220/240 volt (Northern Hemisphere)
68X3064	CRT /YOKE /DAG strap assembly 220/240 volt (Southern Hemisphere)
68X3065	Power supply assembly (110/120 volt) (Signal Cable, Strain Relief)
68X3066	Power supply assembly (220/240 volt) (Signal Cable, Strain Relief)
68X3067	Contrast/brightness control assembly
68X3068	Power-on LED
68X3069	Main circuit board/video driver board/metal chassis
68X3070	Signal cable
68X3072	Cover set complete 110/120 volt – exchange basis only)
72X7868	Cover set complete 220/240 volt (Northern Hemisphere) – exchange basis only
72X7869	Cover set complete 220/240 volt (Southern Hemisphere) – exchange basis only
68X3073	Power switch assembly
68X3075	Rubber feet (quantity 2)
68X3061	Tilt/swivel stand
72X7871	Shipping material (box, front cushion, rear cushion, poly bag, dryer)
68X3098	Degaussing coil (110/120 volt)
72X7865	Degaussing coil (220/240 volt)
68X3088	Display assembly (110/120 volt)
72X7870	Display assembly 220/240 volt (Northern Hemisphere)
78X7877	Display assembly 220/240 volt (Southern Hemisphere)

Mechanical Assembly

Tilt and Swivel Stand



Tilt and Swivel Stand

Warning

1. **Power-off the display, system unit, and any attached devices.**
2. **Remove all power plugs from the power supply sockets.**

Proceed as follows:

1 Place the display on a flat surface, ensuring there is sufficient space to put down the display when it is removed from the tilt and swivel stand.

2 Press the two release clips **1**.

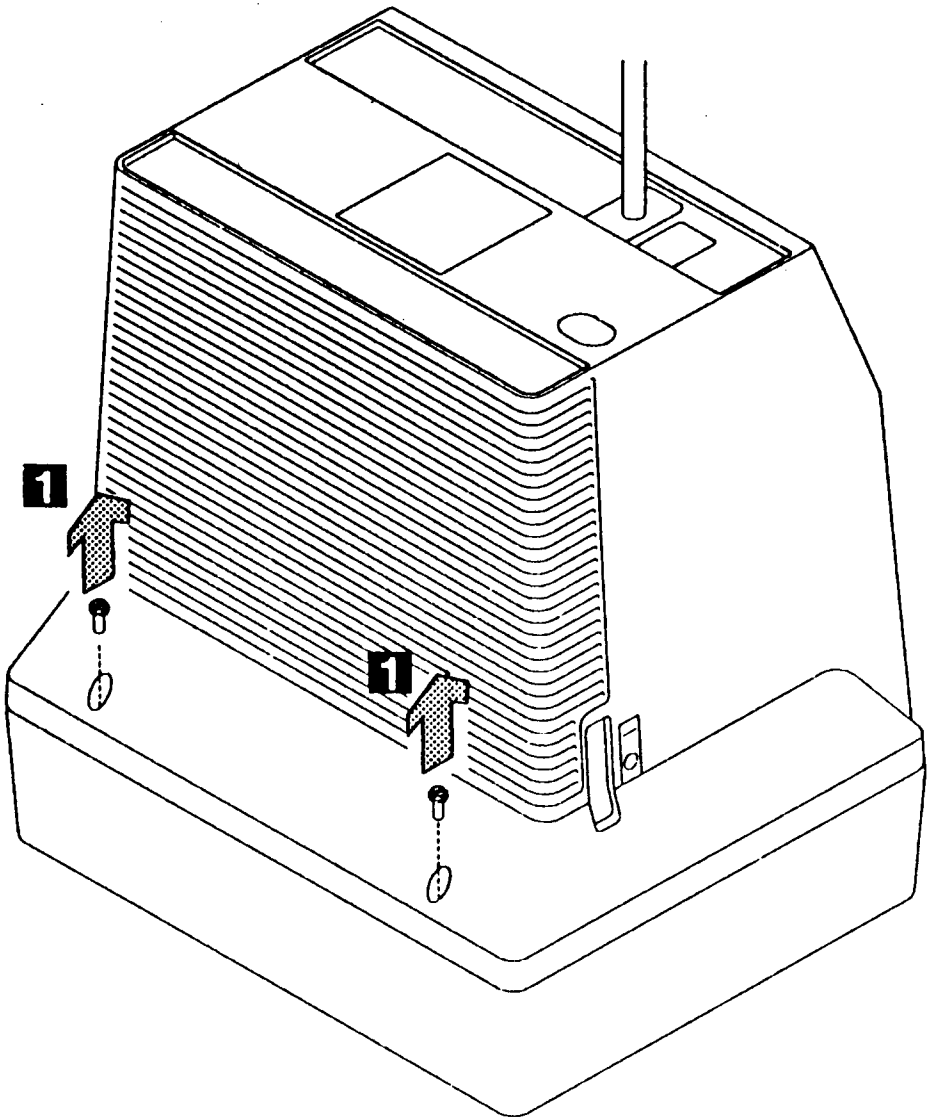
3 Pull the display forward from the tilt and swivel assembly **2**.

4 Lift the display from the tilt and swivel assembly **3** and place it on a flat surface.

Installing the Tilt and Swivel Stand

Install using the above instructions in reverse order.

Rear Cover



1 Remove the tilt and swivel assembly as described on page 3-12.

2 Unclip the two plastic cable cones around the interface cable, to allow the plug to pass through the cover.

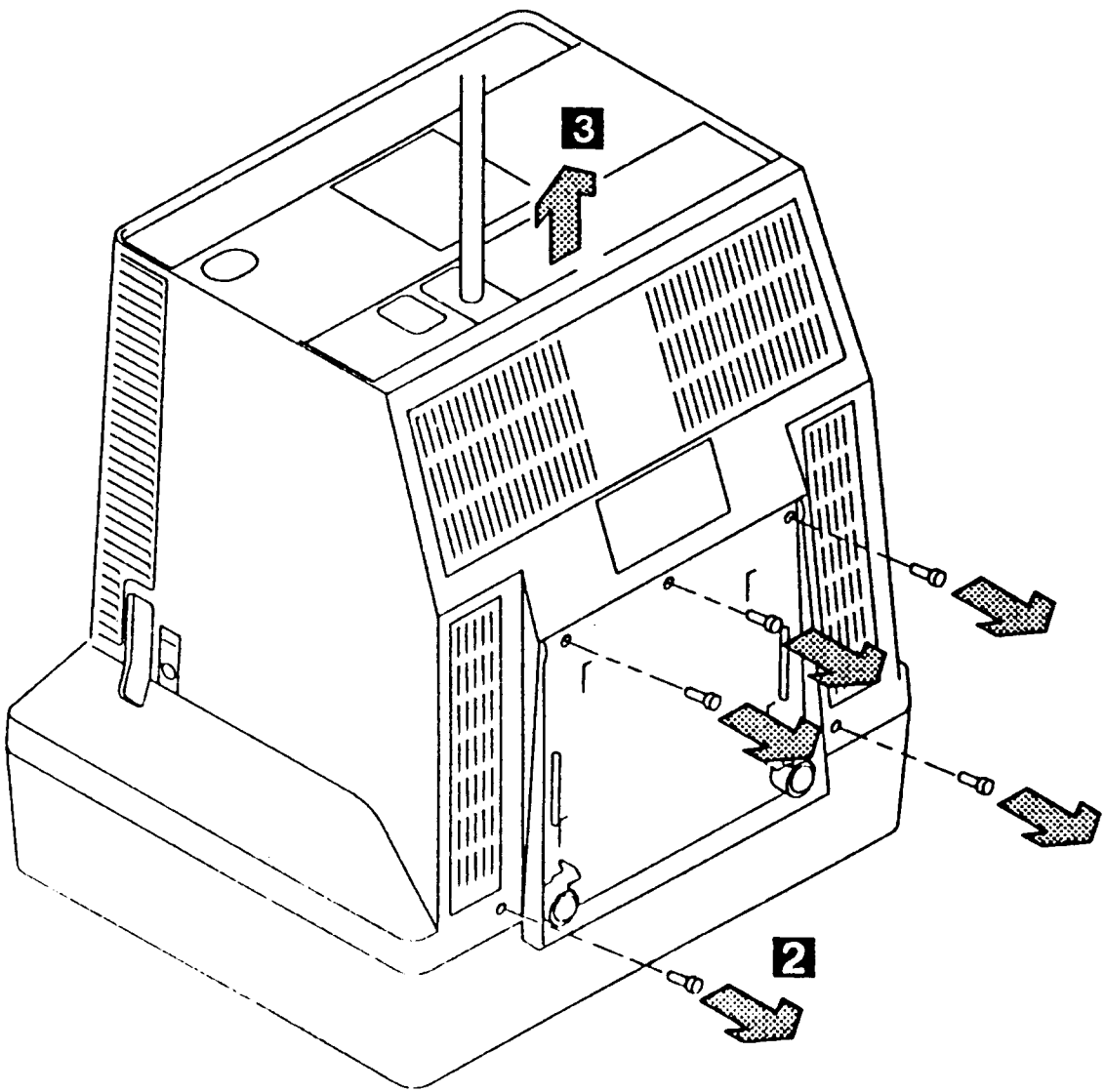
3 Remove the two screws **1** using a hollow splined tool.

4 Remove the five screws **2** using a cross-head driver.

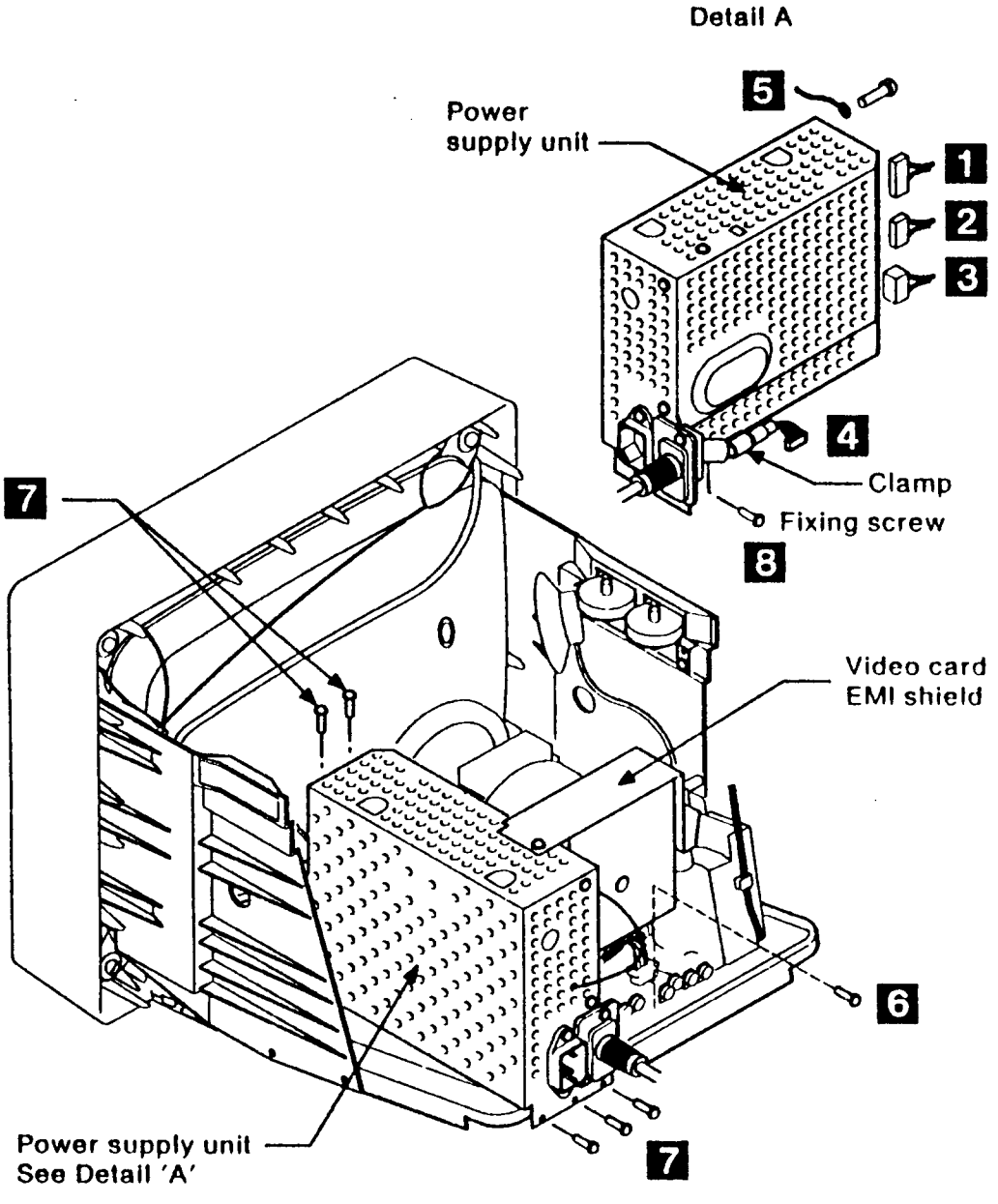
5 Lift the cover from the assembly **3**.

Installing the Rear Cover

Install using the above instructions in reverse order.



Power Supply Unit and Signal Cable



Power Supply Unit and Signal Cable

1 Remove the tilt and swivel assembly as described on page 3-12.

2 Remove the rear cover as described on page 3-14.

3 Undo the two screws that hold the video card EMI shield (see page 3-16) and remove it.

4 Remove the ON/OFF switch ac input connector **1** from the power supply unit.

5 Remove the degaussing coil connector **2** from the power supply unit.

6 Remove the dc output connector **3** from the power supply unit.

7 Remove the signal cable connector **4** from the main printed circuit board.

8 Remove the ON/OFF switch ground strap fixing screw **5**.

9 Remove the video card shield ground strap fixing screw **6**.

10 Remove the five power supply unit fixing screws **7**.

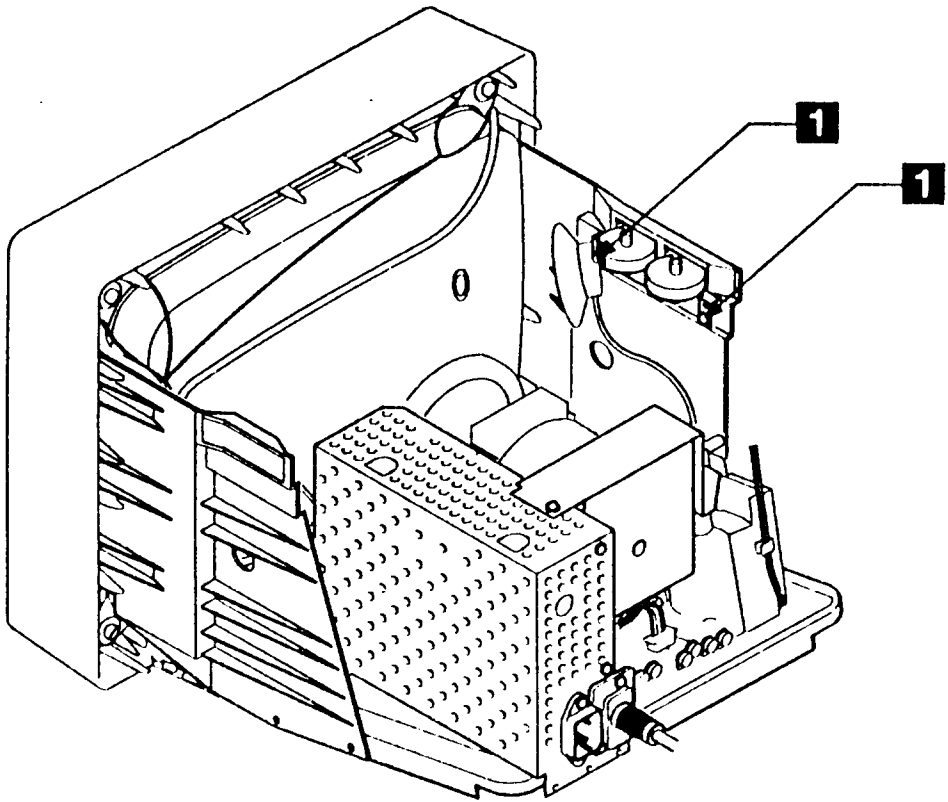
11 Lift the power supply unit away from the main chassis, unscrew the signal cable clamp fixing screw **8**, and remove the power supply unit.

Installing the Power Supply Unit and Signal Cable

Install using the above instructions in reverse order.

Ensure that the ground connections are correct.

Brightness/Contrast Assembly



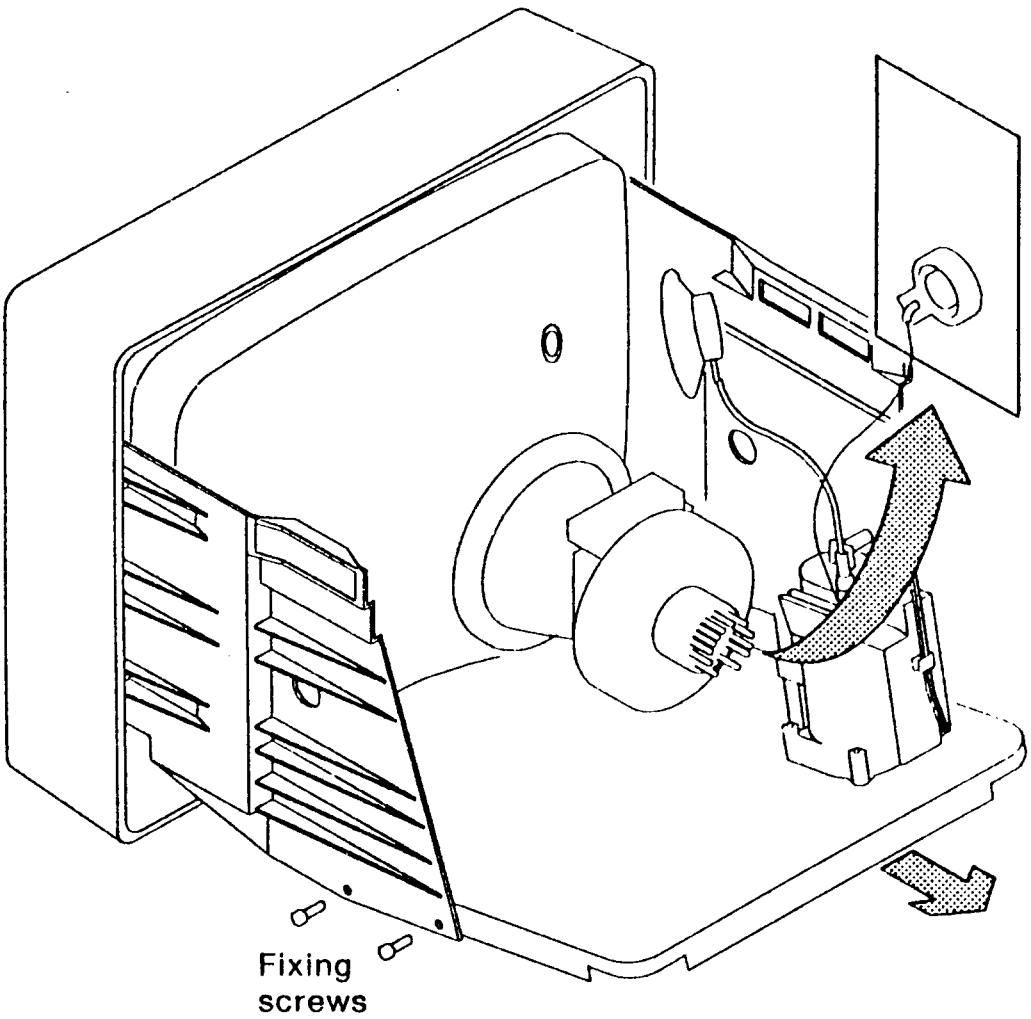
Brightness/Contrast Assembly

1. Remove the tilt and swivel assembly as described on page 3-12.
2. Remove the rear cover as described on page 3-14.
3. Remove the contrast connector ('C' on page 3-26) from the main printed circuit board.
4. Remove the brightness connector ('E' on page 3-26) from the main printed circuit board.
5. Remove the two fixing screws **1**.
6. Remove the brightness/contrast assembly.

Installing the Brightness/Contrast Assembly

Install using the above instructions in reverse order.

Main Printed Circuit Board and Video Card



Main Printed Circuit Board and Video Card

1 Remove the tilt and swivel assembly as described on page 3-12.

2 Remove the rear cover as described on page 3-14.

3 Remove the power supply unit as described on page 3-16.

Warning

EHT voltages may be present; discharge anode cap to ground. (Care must be taken – high voltages may remain for a number of days, even if the display is switched off.)

For cable connection locations, see page 3-26.

4 Remove the anode cap from the CRT.

5 Remove the signal (SIG CA) connector (A) from the main PCB.

6 Remove the LED connector (L) from the main PCB.

7 Remove the yoke connector (Y) from the main PCB.

8 Remove the contrast connector (C) from the main PCB.

9 Remove the brightness connector (E) from the video card.

10 Desolder the two CRT DAG wires from the video card (connector GND).

Use a knife blade to cut through the compound that secures the video card to the CRT.

Remove the video card from the CRT.

11 Remove the four fixing screws in the side plates (two each side).

12 Remove the main PCB and video card assembly.

Installing the Main Printed Circuit Board and Video Card

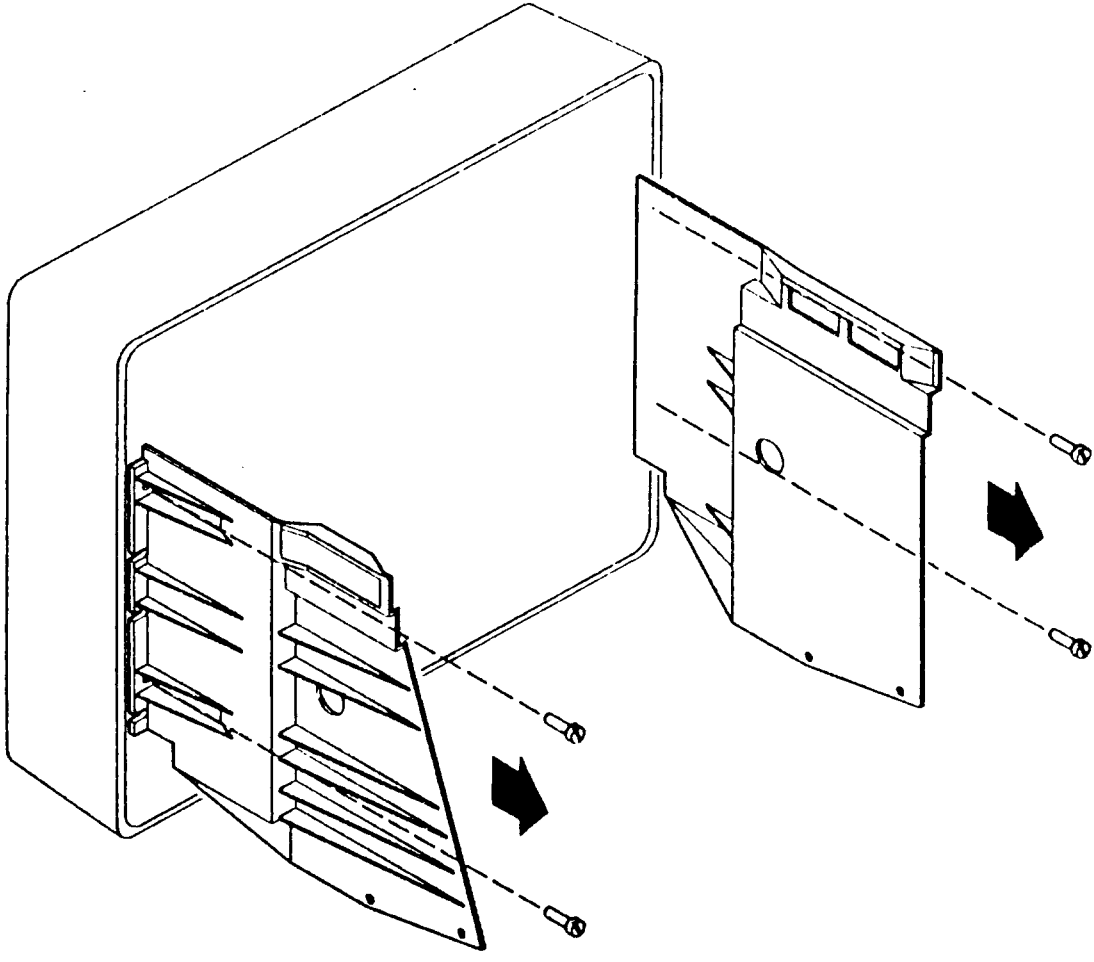
Warning

Refer to "Safety Notices" on page vii before attempting to install the main printed circuit board or video card.

Install using the above instructions in reverse order.

Use an RTV-type compound to secure the video card to the CRT. Ensure that all traces of the compound are removed.

Side Plates



Side Plates

1 Remove the tilt and swivel assembly as described on page 3-12.

2 Remove the rear cover as described on page 3-14.

3 Remove the power supply unit as described on page 3-16.

4 Remove the brightness/contrast assembly as described on page 3-18.

5 Remove the main printed circuit board and video card assembly as described on page 3-20.

6 Remove the four fixing screws in the side plates (two each side).

7 Remove the side plates.

Note: The On/Off switch is still attached to the left-hand side plate.

8 To remove On/Off switch, unscrew the two fixing screws.

Installing the Side Plates

Install using the above instructions in reverse order.

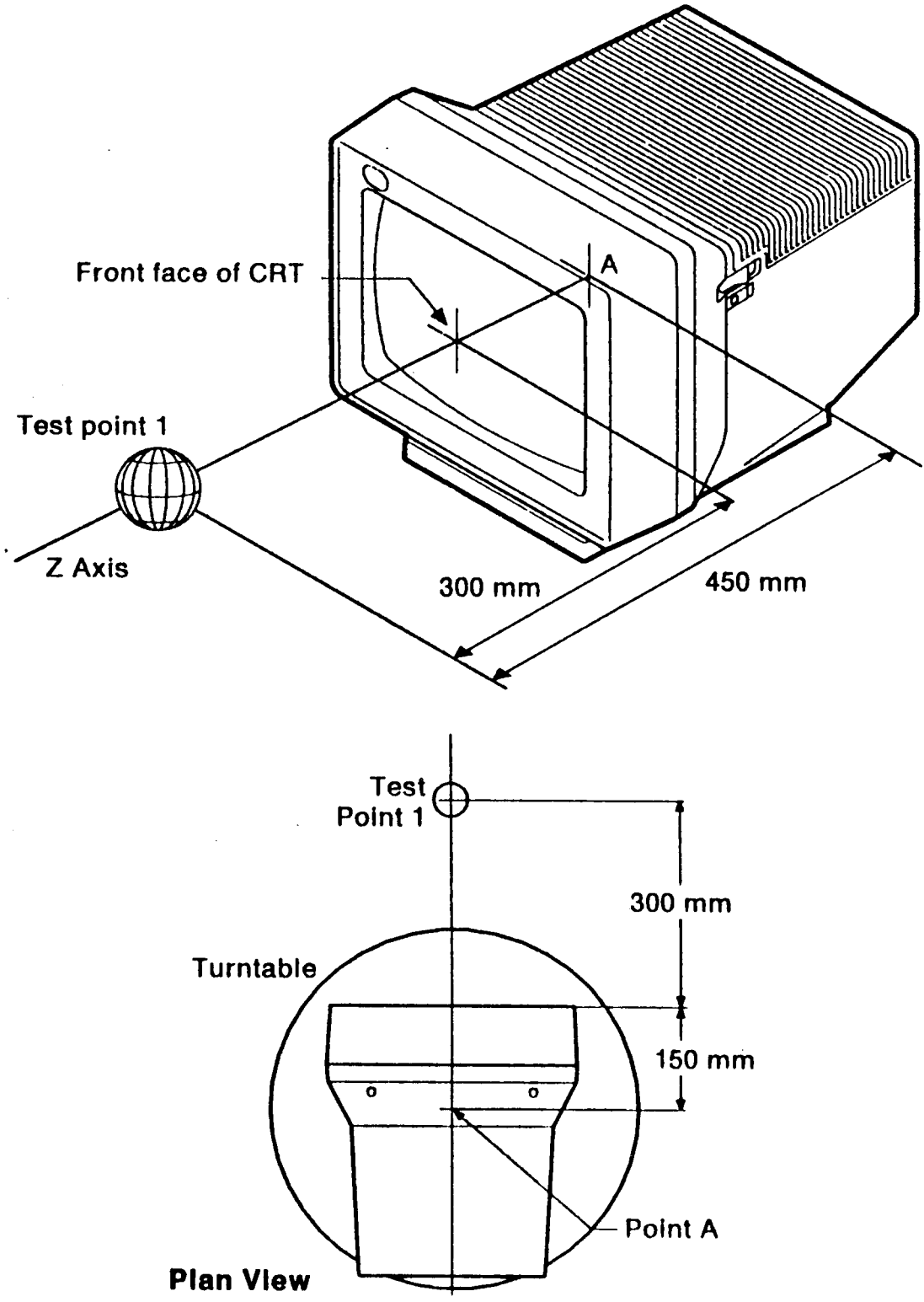
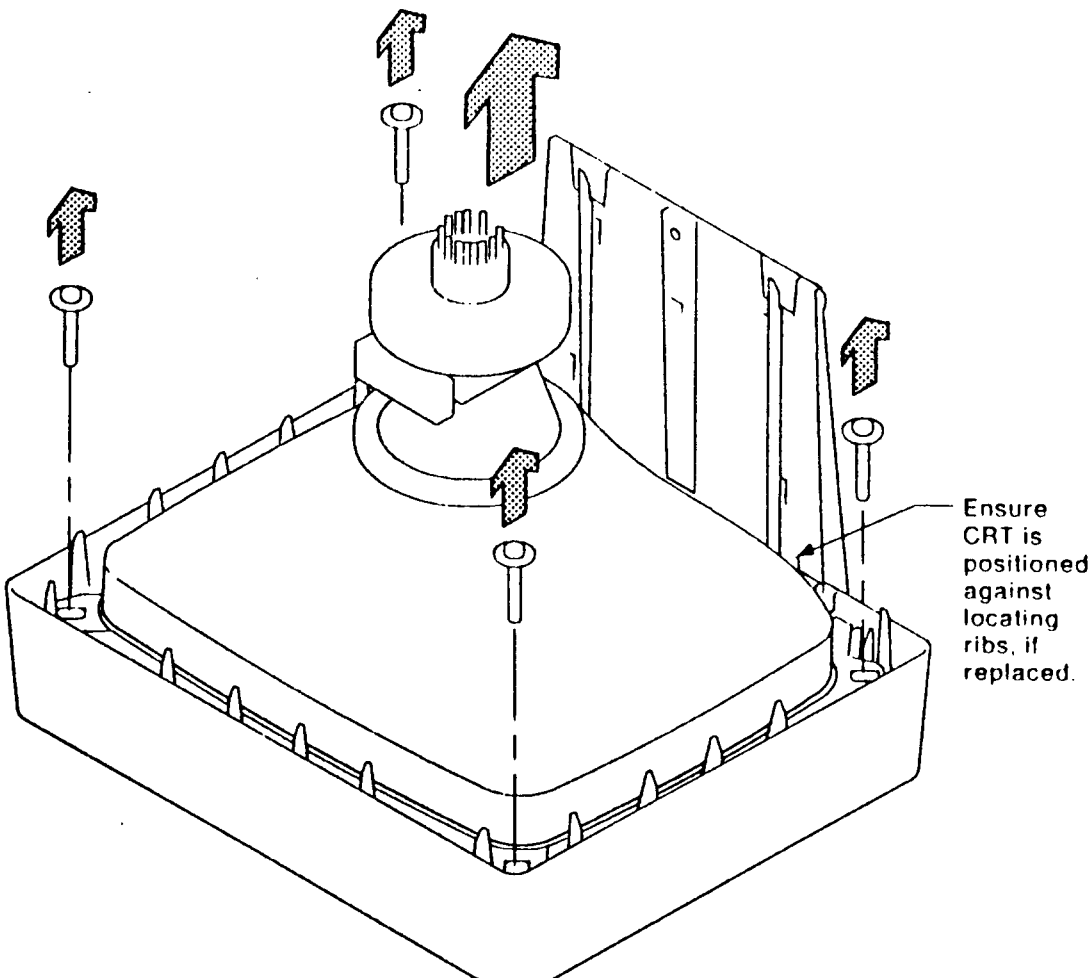


Figure 4-4. Test Point 1

Integrated Tube Component (ITC) Assembly



Integrated Tube Component (ITC) Assembly

1 Remove the tilt and swivel assembly as described on page 3-12.

2 Remove the rear cover as described on page 3-14.

3 Remove the main printed circuit board and video card assembly as described on page 3-20.

4 Removing the side plates as described on page 3-22.

5 Remove the four CRT fixing screws.

6 Remove the CRT.

Installing the CRT

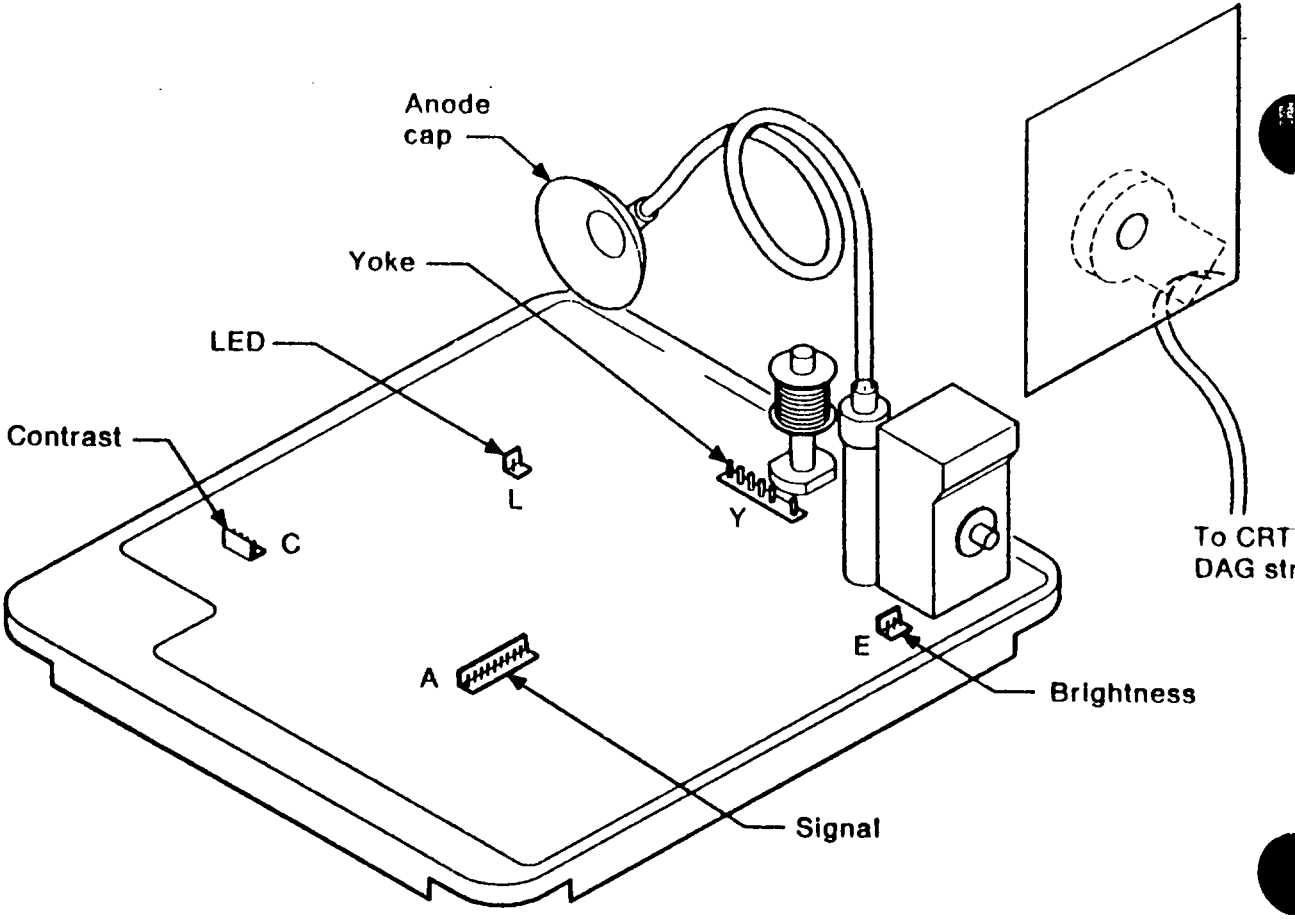
Warning

Refer to "Safety Notices" on page vii before attempting any of the steps to install the CRT.

Install using the above instructions in reverse order.

Ensure that the DAG contact is not obscured by the labels.

Cable Connections



Chapter 4. 8513 – Model 102 – VLMF

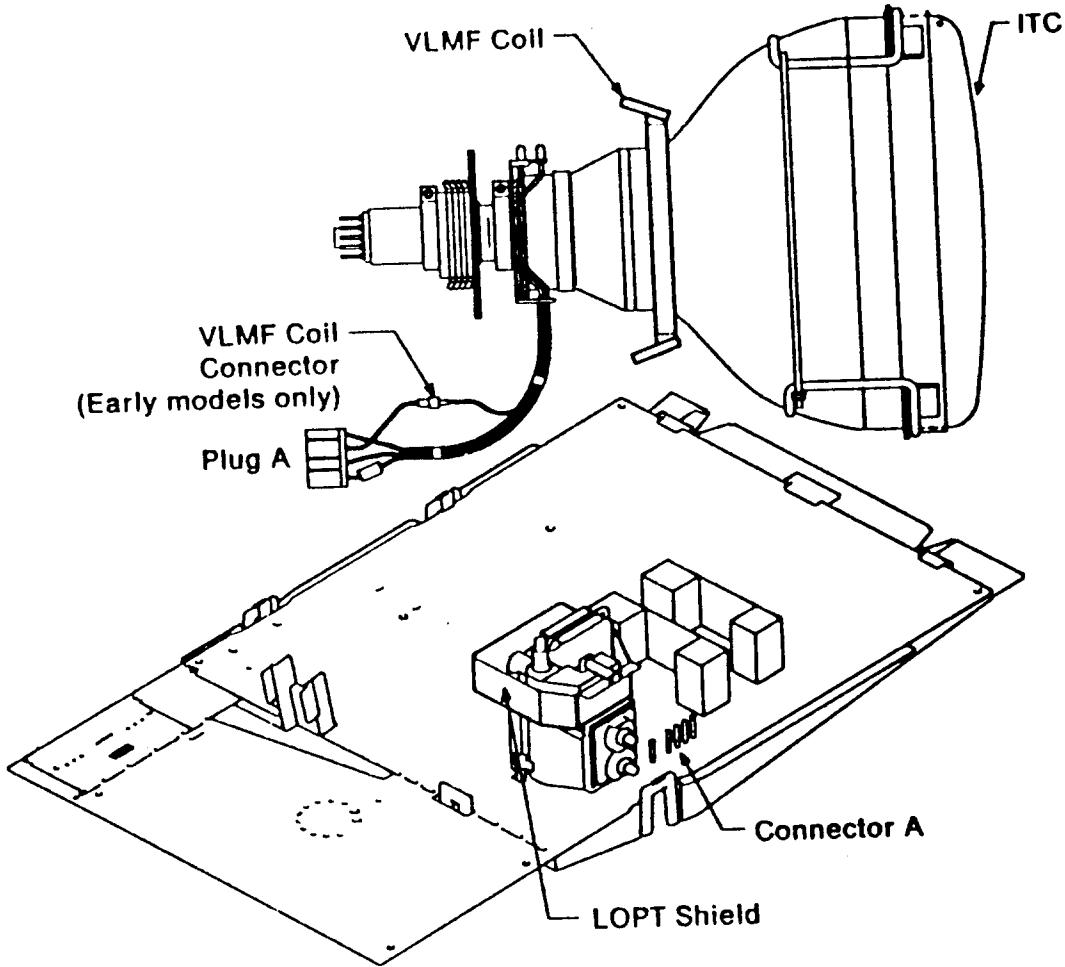
Description

This information enables you to identify a Very Low Magnetic Field (VLMF) display, to determine the cause of failure, and order and replace the part.

Identification

The VLMF display is identified by:

1. The label fixed to the back cover of the 8513 VLMF display.
2. The presence of the parts shown in the following diagram:



Warning

Refer to "Safety Notices" on page vii before servicing a VLMF display.

Diagnostic Guide

The procedures for Version 1 (see "Diagnostic Guide" on page 2-1) are used for a VLMF display.

Note: For VLMF displays, the voltage at P11.1, should be set to 87 volts with respect to ground.

Parts Catalog

A special card assembly and Integrated Tube Component (ITC), is installed. Also, the Model 102 is fitted with a unique cover set, metal-coated on the inside.

Use the following parts if the Card Assembly or the ITC require replacement:

FRU Number	Description
07F6594	Cover set
07F6591	ITC plus 3 cable ties
07F6592	Special card assembly
5420242	Cable tie

The card assembly and cover set should be fitted using the procedures described from page 2-12 onwards.

ITC Replacement Procedure

- Figure 4-2 shows a replacement ITC
- Fit the ITC to the front cover, as described on page 2-20.
- Fit the bridge to the bezel.
- Use the cable ties supplied with the ITC to secure the insulated wire link to the bridge. (See Figure 4-3 on page 4-4.)
- Some displays have an in-line connector in the blue wire of the ITC yoke lead; these connectors *must* be plugged together.
- When either the Card Assembly or the ITC is replaced, the display must be tested to ensure that the VLMF performance has not been degraded. (See "Test Procedures" on page 4-4.)

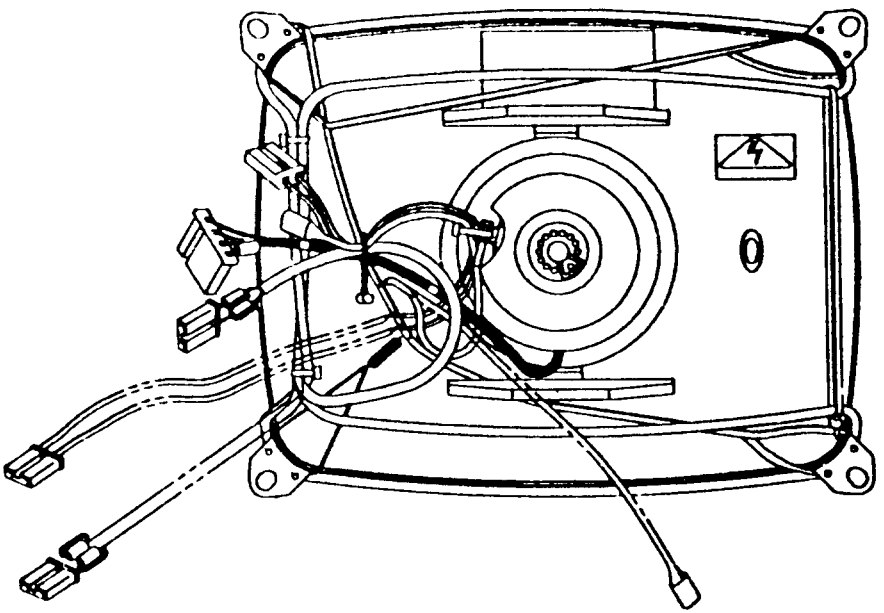


Figure 4-2. Replacement ITC (Supplied as shown)

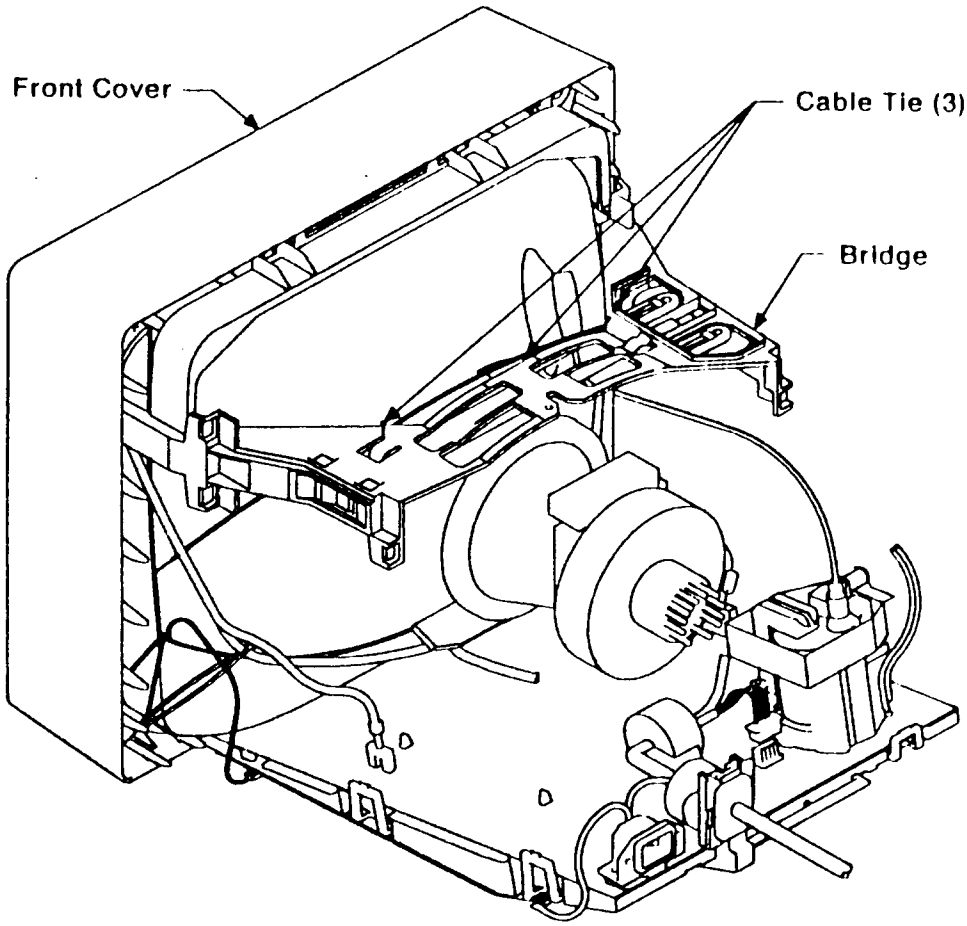


Figure 4-3. ITC Cable Ties

Test Procedures

Before doing this test, adjust the display as described on page 2-5.

The Combinova** Magnetic Field Meter 1000, or its equivalent, is required to complete these procedures.

1. Position the display on the turntable so that point "A", in Figure 4-4 on page 4-6, is directly above the center of the turntable.
2. Switch on the display, then show any test pattern containing text or graphics. Allow the display to warm up for five minutes, before continuing.
3. Position the Combinova Magnetic Field Meter 1000, so that the center of the measuring head, is positioned 300 mm in front of the center of the screen (Figure 4-4 on page 4-6 shows this position).

Note on the use of the Combinova Magnetic Field Meter 1000:

Measurements should be made, with the Combinova Magnetic Field Meter 1000 set to 'External Sync Mode', and the measuring head pointing toward the display. For more information on the operation of the meter, refer to the operating instructions.

4. Measure dB/dT, and B (to measure the rate of change of the magnetic field and the field strength) at Test Point 1.
5. Reposition the Combinova Magnetic Field Meter 1000, to take a reading at Test Point 2 (see Figure 4-5 on page 4-7), so that the center of the measuring head is positioned 310 mm in front of the center of the screen on the z axis.
6. Move the Combinova Magnetic Field Meter 1000 vertically upward 460 mm, so that the meter is positioned as shown in Figure 4-5 on page 4-7.
7. Rotate the turntable 202.5 degrees counterclockwise.
8. Take a measurement of dB/dT, and B, at this position (Test Point 2).
9. Check that the values obtained for dB/dT do not exceed 20 mT/sec, or for B, do not exceed 80 nT.

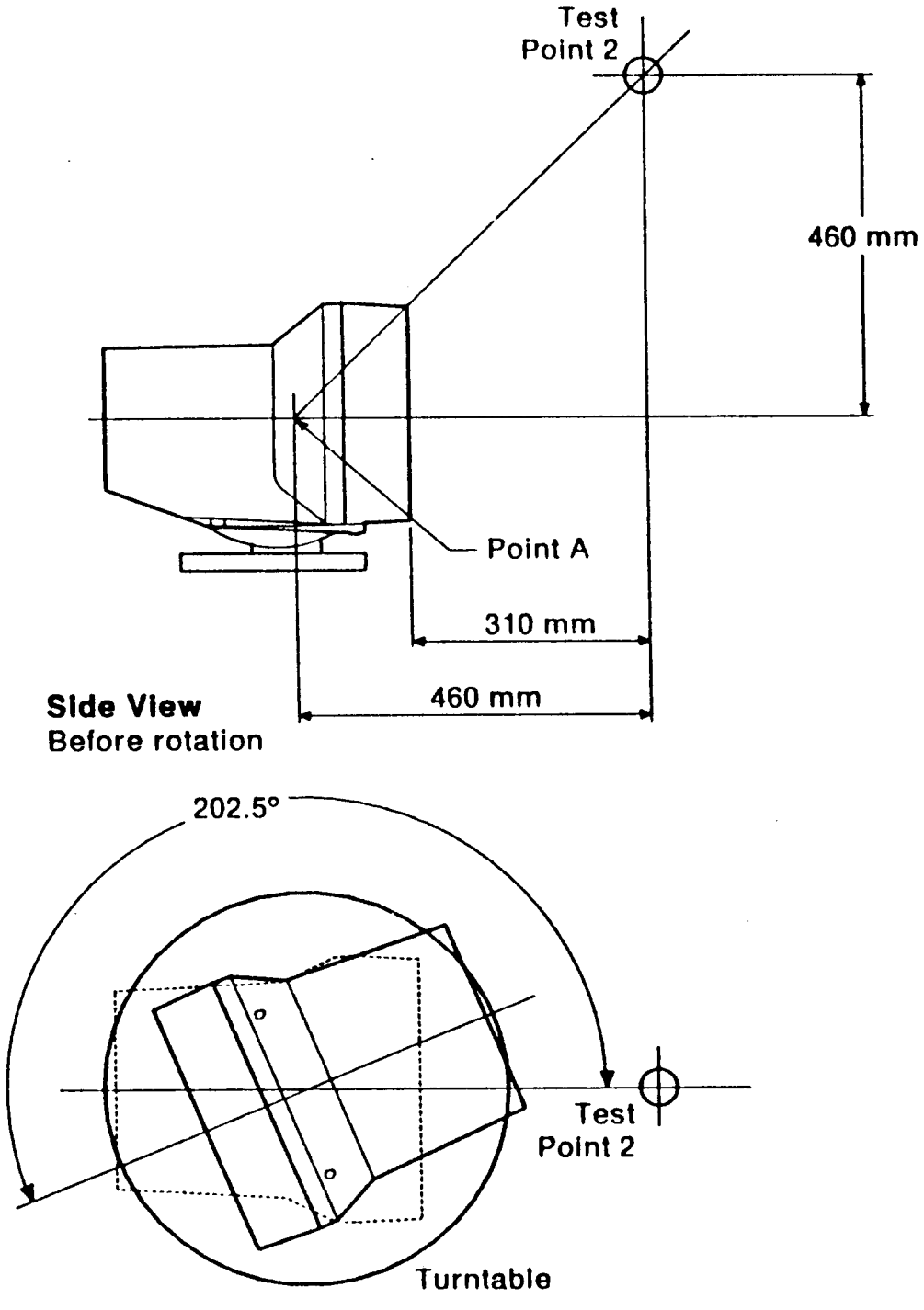


Figure 4-5. Test Point 2

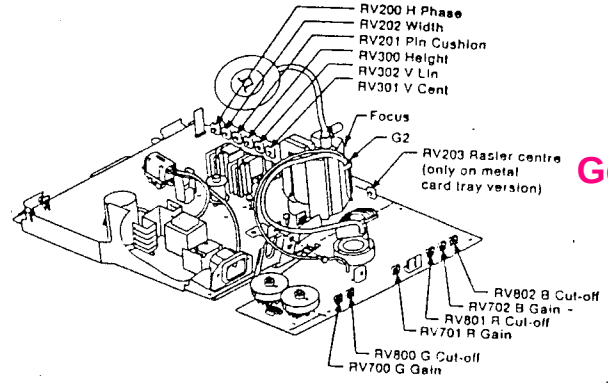
8513 Version 001 From Serial No 72xx onwards.
8513 Version 002 From Serial No 72xx onwards.
8513 Version 003 From Serial No 72xx onwards.

Problem/Symptom	Failure Check/FRU Replacement
All problems	Before replacing any FRUs, check all connections and associated items for continuity.
Raster missing and green LED not lit	Replace card assembly.
Raster missing, but green LED flashes during attempt to power on	Replace card assembly.
Raster missing, but green LED lit	Check if CRT heater is glowing: • No – replace card assembly, but if fault persists replace CRT. • Yes – turn G2 potentiometer clockwise. If a raster appears, readjust the video gain, and cut-off potentiometer if possible, otherwise replace card assembly. If no raster appears, replace the CRT.
Raster visible but one or two colors missing	Turn the video 'cut-off' or 'gain' controls for the missing color(s) clockwise. If the color(s) reappear, readjust the video gain and cut-off potentiometer if possible, otherwise replace the card assembly. If the colors do not appear, replace the CRT.
Raster visible but is too narrow, or does not fill the bezel vertically.	Replace card assembly.

Problem/Symptom	Failure Check/FRU Replacement
No E-W pincushion correction.	Turn RV201 to check whether readjustment is possible, otherwise, replace the card assembly.
Data does not center horizontally.	Turn RV200 H.PHASE to check whether readjustment is possible, otherwise, replace the card assembly. NOTE: On units with a metal card tray, first adjust RV203 to center the background raster, then RV200. If the fault persists, replace the CRT.
Data does not synchronize horizontally.	Replace the interface cable. If the fault persists, replace the card assembly.
Data has insufficient width.	Turn RV202 WIDTH to check whether readjustment is possible, otherwise replace the card assembly.
Data does not synchronize vertically.	Replace the interface cable. If the fault persists, replace the card assembly.
Data has insufficient height.	Turn RV300 HEIGHT to check whether readjustment is possible, otherwise, replace the card assembly.
Data does not center vertically.	Turn RV301 V.CENT to check whether readjustment is possible, otherwise, replace the card assembly. If the fault persists, replace the CRT.
Vertical linearity poor.	Turn RV302 V.LIN to check whether readjustment is possible, otherwise, replace the card assembly.
Horizontal linearity poor.	Replace the card assembly.
Color(s) missing.	Replace the interface cable. If the fault persists, replace the card assembly. If the fault still persists, replace the CRT.
Maximum white point poor.	Make sure the brightness control is in the center detent position. Readjust RV700 G.GAIN, RV701 R.GAIN, and RV702 B.GAIN, to determine whether the correct white color can be obtained, otherwise replace the card assembly.

Problem/Symptom	Failure Check/FRU Replacement
Minimum white point poor.	Make sure the brightness control is in the center detent position. Readjust RV800 G.CUT-OFF, RV801 R.CUT-OFF and RV802 B.CUT-OFF, to determine whether the correct white color can be obtained. If not, replace the card assembly.
Convergence poor.	Replace the CRT.
Focus poor.	Turn the focus potentiometer to see if readjustment is possible. If not, replace the card assembly. If the fault persists, replace the CRT.

Focus and Cut-Off Adjustment



Note: If the geometry is reset, it may be necessary to readjust the brightness setting.

Pincushion

1 Press the F2 function key, then press the ALT and F1 keys (then release both keys).

2 Adjust the SIDE-PINCUSHION potentiometer RV201 to get a geometrically regular square.

Horizontal Centering

1 Press the F2 function key, then press and hold the SHIFT and F5 keys (then release both keys).

2 **Note:** Before doing this step, if you are servicing a display with a metal card tray, adjust RV203 first to centralize the raster in the bezel.

Adjust the 'RV200 H.PHASE' potentiometer to centralize the pattern horizontally on the screen.

8513 Version 001 From Serial No 72xx onwards.
8513 Version 002 From Serial No 72xx onwards.
8513 Version 003 From Serial No 72xx onwards.

Vertical Linearity

1 Press the F2 function key, then press and hold the ALT and F1 keys (then release both keys).

2 Adjust the 'RV302 V.LIN' potentiometer to get squares of equal width.

Horizontal Width

1 Press the F2 function key, then press and hold the SHIFT and F5 keys (then release both keys).

2 Adjust the 'RV202 WIDTH' to get a horizontal width of 207 mm.

Vertical Centering

1 Press the F2 function key, then press and hold the SHIFT and F5 keys (then release both keys).

2 Adjust the 'RV301 V.CENT' potentiometer to centralize the pattern vertically on the screen.

Vertical Height

1 Press the F3 function key, then press and hold the SHIFT and F5 keys (then release both keys).

2 Adjust the 'RV300 HEIGHT' potentiometer to get a height of 155 mm.

1 Set the brightness control to maximum.

2 Set the contrast control to maximum.

3 Turn RV800 G.CUT-OFF, RV801 R.CUT-OFF, and RV802 B.CUT-OFF fully clockwise.

4 Press the F10 function key (on the PS/2 keyboard) to select a blank screen pattern on the display.

5 Turn the G2 potentiometer on the EHT transformer slowly clockwise until the first color appears. Turn the associated cutoff potentiometer fully counterclockwise.

6 Continue turning the G2 potentiometer clockwise until the second color appears. Turn the associated cutoff potentiometer fully counterclockwise also.

7 Continue turning the G2 potentiometer clockwise until the third color appears.

8 Readjust the first and second cutoff potentiometers and G2 to get the following white luminance and chromaticity:

cd/m²	x	y	(CIE COORDS)
2+1.0/-0	0.245+/-0.010	0.263+/-0.010	

Notes:

a. Green cutoff potentiometer (RV800) clockwise predominantly increases y.
b. Red cutoff potentiometer (RV801) clockwise predominantly increases x.
c. Blue cutoff potentiometer (RV802) clockwise predominantly decreases both x and y.

9 Set the brightness control to center detent. Turn RV700 G.GAIN, RV701 R.GAIN, and RV702 B.GAIN to mid position.

10 To set Focus, press the F3 key, then press and hold the ALT and the F1 keys (then release both) to get a 5 x 5 grid. Adjust Focus control on flyback transformer for the sharpest image.

11 Press the F3 key, then the F4 key, then the F8 key, to select a white raster pattern and by using RV700 G.GAIN, RV701 R.GAIN, and RV702 B.GAIN only, set the center screen luminance and chromaticity with the Minolta TV Color Analyzer to:

cd/m²	x	y	(CIE COORDS)
120 to 150	0.313+/-0.010	0.329+/-0.010	

Notes:

a. Red gain potentiometer clockwise predominantly increases x.
b. Green gain potentiometer clockwise predominantly increases y.
c. Blue gain potentiometer clockwise predominantly decreases both x and y.
d. Clockwise rotation of all gain potentiometers increases Y (brightness).

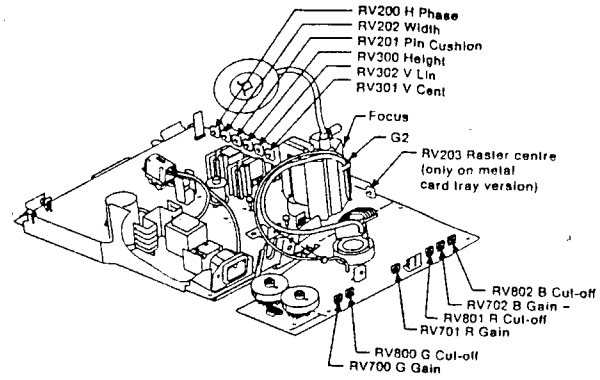
12 Press the F3 key, then press and hold the SHIFT and the F5 keys (then release both keys) to select a white crosshatch pattern again. Set the center screen brightness to 70 cd/m² using the contrast control. Check the dimensions and adjust if necessary.

Problem/Symptom	Failure Check/FRU Replacement
All problems	Before replacing any FRUs, check all connections and associated items for continuity.
Raster missing and green LED not lit	Replace card assembly
Raster missing, but green LED flashes during attempt to power on	Replace card assembly
Raster missing, but green LED lit	Check if CRT heater is glowing: • No – replace card assembly, but if fault persists replace CRT • Yes – turn G2 potentiometer clockwise. If a raster appears, readjust the video gain, and cut-off potentiometer if possible, otherwise replace card assembly. If no raster appears, replace the CRT.
Raster visible but one or two colors missing	Turn the video 'cut-off' or 'gain' controls for the missing color(s) clockwise. If the color(s) reappear, readjust the video gain and cut-off potentiometer if possible, otherwise replace the card assembly. If the colors do not appear, replace the CRT.
Raster visible but is too narrow, or does not fill the bezel vertically.	Replace card assembly.

Problem/Symptom	Failure Check/FRU Replacement
No E-W pincushion correction.	Turn RV201 to check whether readjustment is possible, otherwise, replace the card assembly.
Data does not center horizontally.	Turn RV200 H PHASE to check whether readjustment is possible, otherwise, replace the card assembly. NOTE: On units with a metal card tray, first adjust RV203 to center the background raster, then RV200. If the fault persists, replace the CRT.
Data does not synchronize horizontally.	Replace the interface cable. If the fault persists, replace the card assembly.
Data has insufficient width.	Turn RV202 WIDTH to check whether readjustment is possible, otherwise replace the card assembly.
Data does not synchronize vertically.	Replace the interface cable. If the fault persists, replace the card assembly.
Data has insufficient height.	Turn RV300 HEIGHT to check whether readjustment is possible, otherwise, replace the card assembly.
Data does not center vertically.	Turn RV301 V.CENT to check whether readjustment is possible, otherwise, replace the card assembly. If the fault persists, replace the CRT.
Vertical linearity poor.	Turn RV302 V.LIN to check whether readjustment is possible, otherwise, replace the card assembly.
Horizontal linearity poor.	Replace the card assembly.
Color(s) missing.	Replace the interface cable. If the fault persists, replace the card assembly. If the fault still persists, replace the CRT.
Maximum white point poor.	Make sure the brightness control is in the center detent position. Readjust RV700 G.GAIN, RV701 R.GAIN, and RV702 B.GAIN, to determine whether the correct white color can be obtained, otherwise replace the card assembly.

Problem/Symptom	Failure Check/FRU Replacement
Minimum white point poor.	Make sure the brightness control is in the center detent position. Readjust RV800 G.CUT-OFF, RV801 R.CUT-OFF and RV802 B.CUT-OFF, to determine whether the correct white color can be obtained. If not, replace the card assembly.
Convergence poor.	Replace the CRT.
Focus poor.	Turn the focus potentiometer to see if readjustment is possible. If not, replace the card assembly. If the fault persists, replace the CRT.

Focus and Cut-Off Adjustment



Note: If the geometry is reset, it may be necessary to readjust the brightness setting.

Pincushion

1 Press the F2 function key, then press the ALT and F1 keys (then release both keys).

2 Adjust the SIDE-PINCUSHION potentiometer RV201 to get a geometrically regular square.

Horizontal Centering

1 Press the F2 function key, then press and hold the SHIFT and F5 keys (then release both keys).

2 **Note:** Before doing this step, if you are servicing a display with a metal card tray, adjust RV203 first to centralize the raster in the bezel.

Adjust the 'RV200 H.PHASE' potentiometer to centralize the pattern horizontally on the screen.

Vertical Linearity

1 Press the F2 function key, then press and hold the ALT and F1 keys (then release both keys).

2 Adjust the 'RV302 V.LIN' potentiometer to get squares of equal width.

Horizontal Width

1 Press the F2 function key, then press and hold the SHIFT and F5 keys (then release both keys).

2 Adjust the 'RV202 WIDTH' to get a horizontal width of 207 mm.

Vertical Centering

1 Press the F2 function key, then press and hold the SHIFT and F5 keys (then release both keys).

2 Adjust the 'RV301 V.CENT' potentiometer to centralize the pattern vertically on the screen.

Vertical Height

1 Press the F3 function key, then press and hold the SHIFT and F5 keys (then release both keys).

2 Adjust the 'RV300 HEIGHT' potentiometer to get a height of 155 mm.

1 Set the brightness control to maximum.

2 Set the contrast control to maximum.

3 Turn RV800 G.CUT-OFF, RV801 R.CUT-OFF, and RV802 B.CUT-OFF fully clockwise.

4 Press the **F10** function key (on the PS/2 keyboard) to select a blank screen pattern on the display.

5 Turn the G2 potentiometer on the EHT transformer slowly clockwise until the first color appears. Turn the associated cutoff potentiometer fully counterclockwise.

6 Continue turning the G2 potentiometer clockwise until the second color appears. Turn the associated cutoff potentiometer fully counterclockwise also.

7 Continue turning the G2 potentiometer clockwise until the third color appears.

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9 Set the brightness control to center detent. Turn RV700 G.GAIN, RV701 R.GAIN, and RV702 B.GAIN to mid position.

10 To set Focus, press the F3 key, then press and hold the **ALT** and the **F1** keys (then release both) to get a 5 x 5 grid. Adjust Focus control on flyback transformer for the sharpest image.

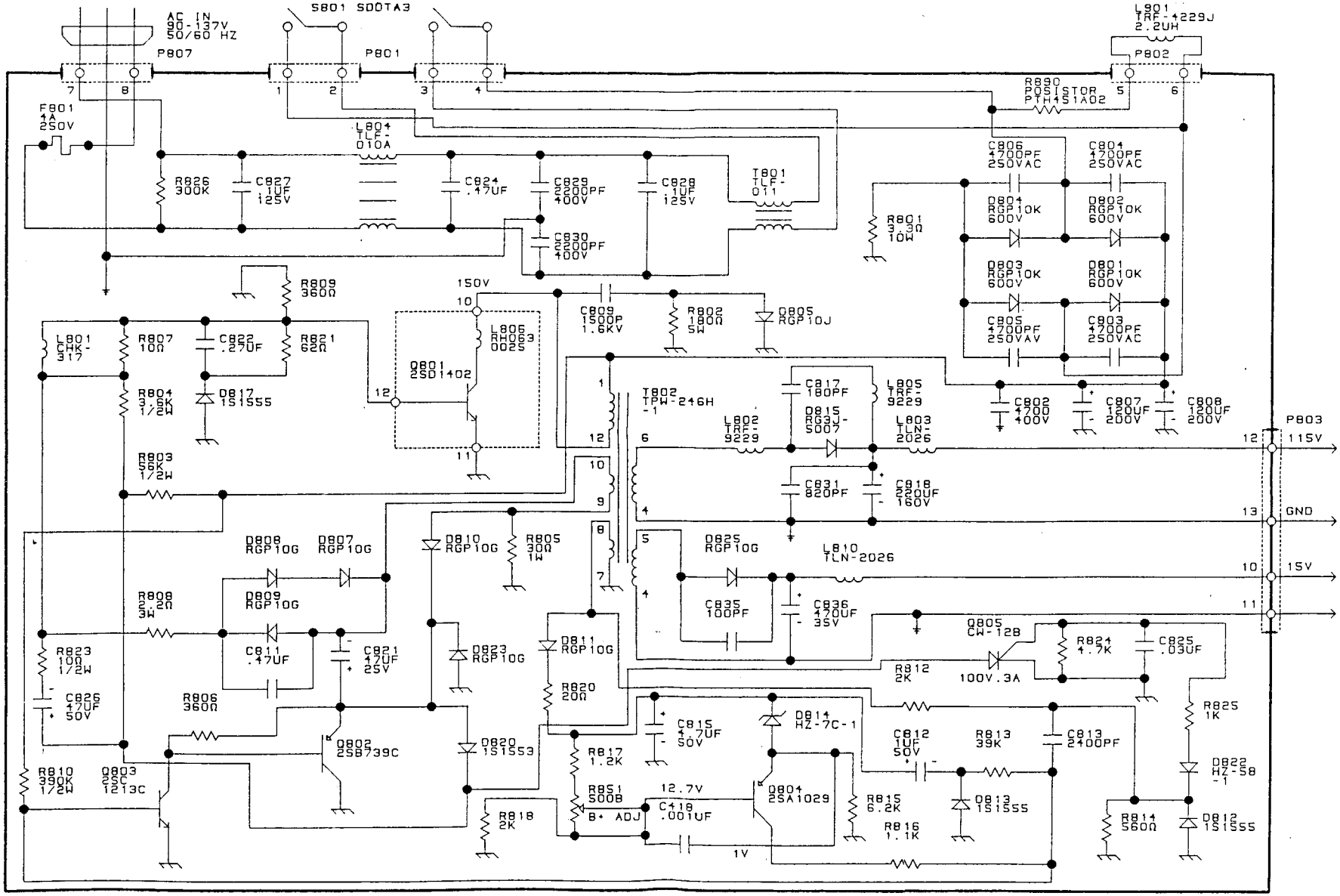
11 Press the F3 key, then the **F4** key, then the **F8** key, to select a white raster pattern and by using RV700 G.GAIN, RV701 R.GAIN, and RV702 B.GAIN only, set the center screen luminance and chromaticity with the Minolta TV Color Analyzer to:

cd/m²	x	y	(CIE COORDS)
120 to 150	0.313+/-0.010	0.329+/-0.010	

Notes:

a. Red gain potentiometer clockwise predominantly increases x.
b. Green gain potentiometer clockwise predominantly increases y.
c. Blue gain potentiometer clockwise predominantly decreases both x and y.
d. Clockwise rotation of all gain potentiometers increases Y (brightness).

12 Press the F3 key, then press and hold the **SHIFT** and the **F5** keys (then release both keys) to select a white crosshatch pattern again. Set the center screen brightness to 70 cd/m² using the contrast control. Check the dimensions and adjust if necessary.


AC IN
90-137V
50/60 HZ
P807
S801 SDDTA3
P801
L801
TRF-1229J
2.2UH
P802
R890
POSISTOR
PTH41A02
F801
4A
250V
L804
TLF-
010A
R826
300K
C827
.1UF
125V
C824
.47UF
C829
2200PF
400V
C828
.1UF
125V
T801
TLF-
011
C830
2200PF
400V
C806
4700PF
250VAC
C804
4700PF
250VAC
D804
RGP10K
600V
D802
RGP10K
600V
D803
RGP10K
600V
D801
RGP10K
600V
C805
4700PF
250VAV
C803
4700PF
250VAC
R801
3.3Ω
10W
R809
360Ω
150V
C809
1500P
1.6KV
R802
180Ω
5W
D805
RGP10J
L801
CHK-
317
R807
10Ω
C822
.27UF
R821
62Ω
L806
RH063
002S
D801
2SD1402
R804
3.6K
1/2W
D817
1S1555
T802
TPW-246H
-1
C817
180PF
L805
TRF-
9229
L802
TRF-
9229
D815
RG3J-
S007
L803
TLN-
2026
C802
4700
400V
C807
1200UF
200V
C808
1200UF
200V
P803
11SV
R803
56K
1/2W
C831
820PF
C818
220UF
160V
GND
D808
RGP10G
D807
RGP10G
D810
RGP10G
R805
30Ω
1W
D825
RGP10G
L810
TLN-2026
15V
R808
2.2Ω
3W
D809
RGP10G
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100PF
C836
470UF
35V
Q805
CW-128
100V.3A
R824
4.7K
C825
.03UF
R823
10Ω
1/2W
C826
47UF
50V
C811
.47UF
C821
47UF
25V
D823
RGP10G
D811
RGP10G
R820
20Ω
R812
2K
R806
360Ω
D802
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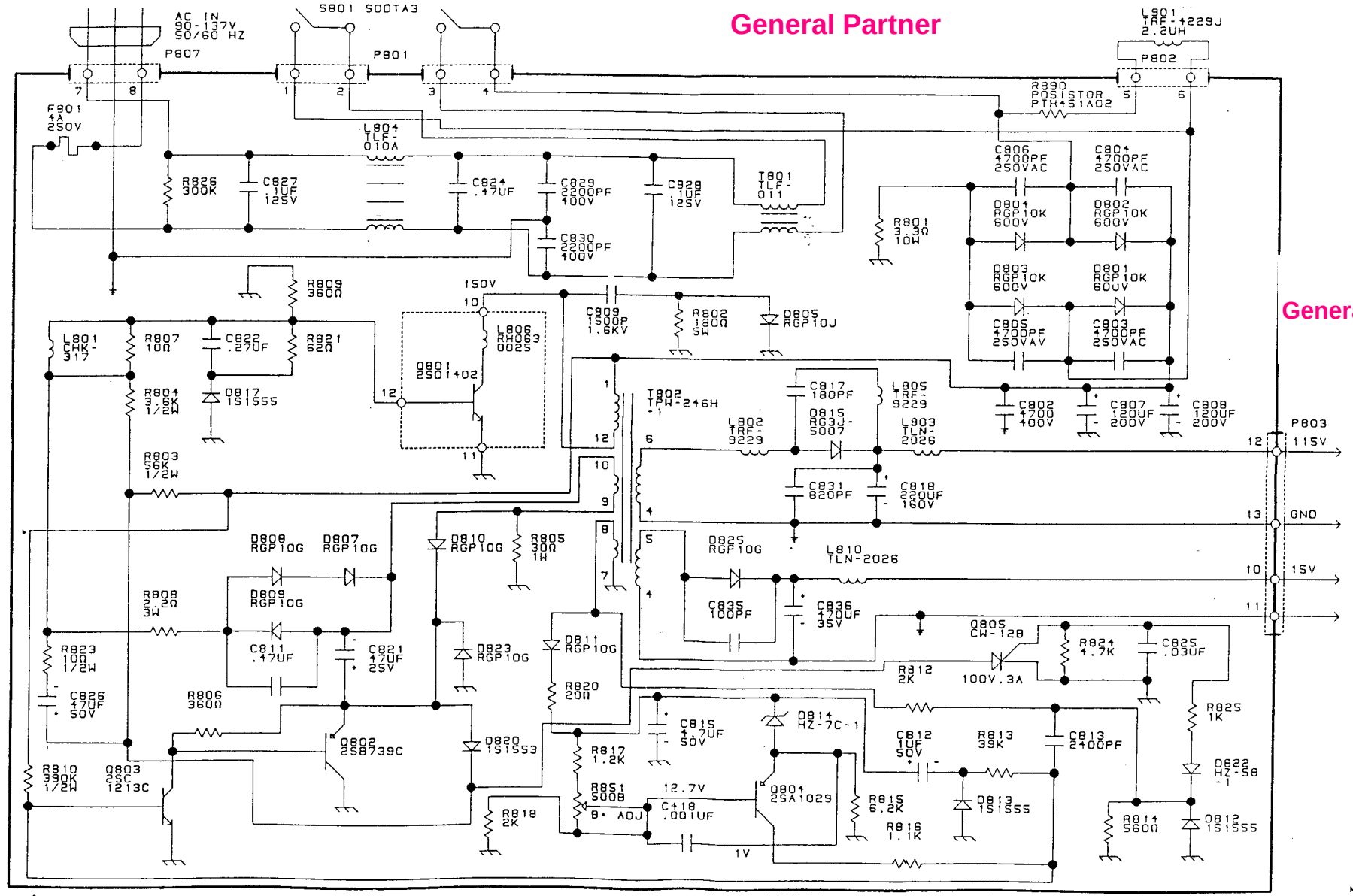
D820
1S1553
C815
4.7UF
50V
D814
HZ-7C-1
C812
1UF
50V
R813
39K
C813
2400PF
R825
1K
D822
HZ-58
-1
R810
390K
1/2W
Q803
2SC
1213C
R817
1.2K
R851
500B
B+ ADJ
12.7V
C418
.001UF
Q804
2SA1029
R815
6.2K
D813
1S1555
R816
1.1K
R818
2K
1V
R814
560Ω
D812
1S1555

8513 Version 001 From Serial No 72xx onwards.
8513 Version 002 From Serial No 72xx onwards.
8513 Version 003 From Serial No 72xx onwards.

IBM

8513 Version 001 From Serial No 72xx onwards.
8513 Version 002 From Serial No 72xx onwards.
8513 Version 003 From Serial No 72xx onwards.

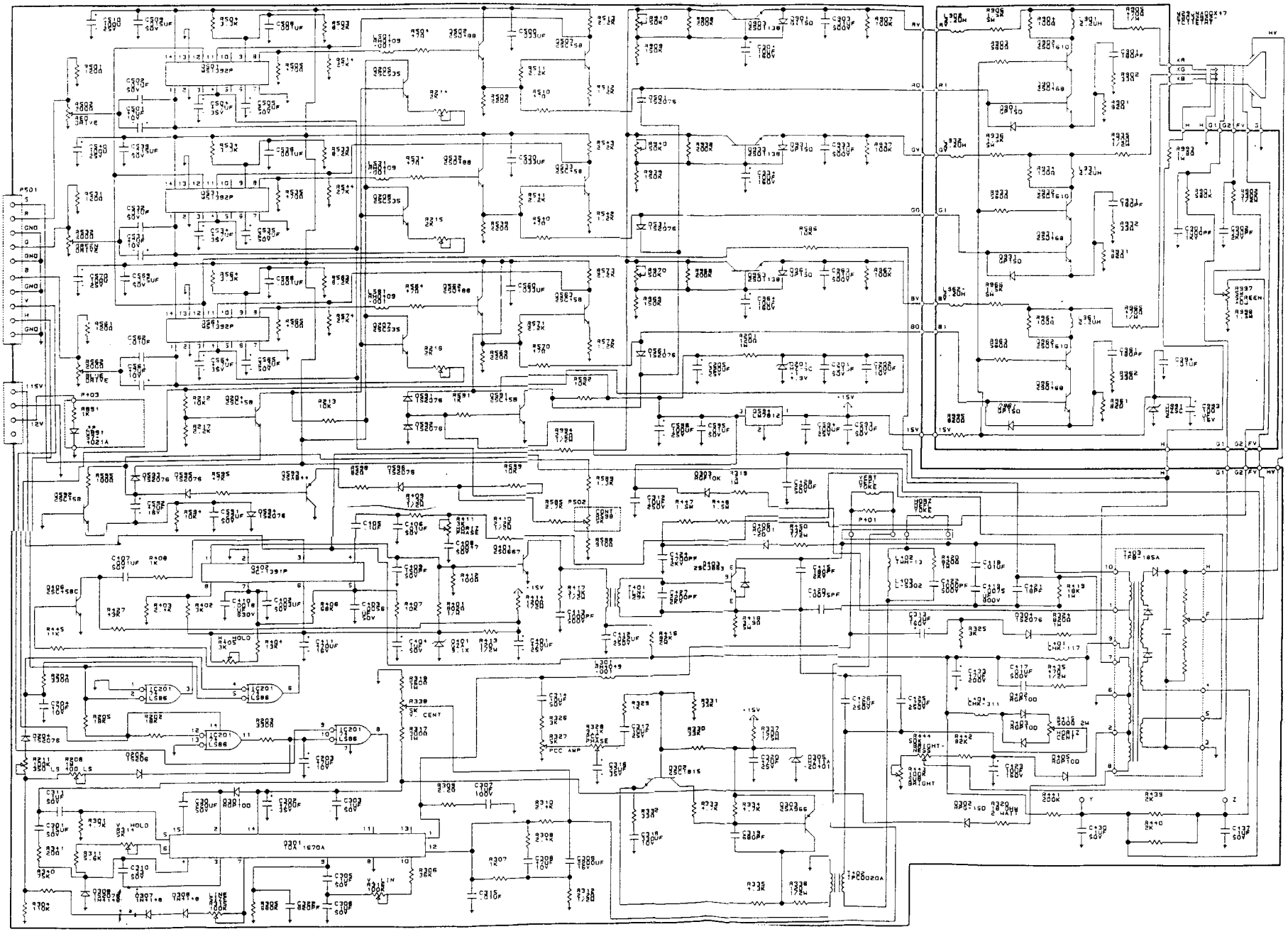


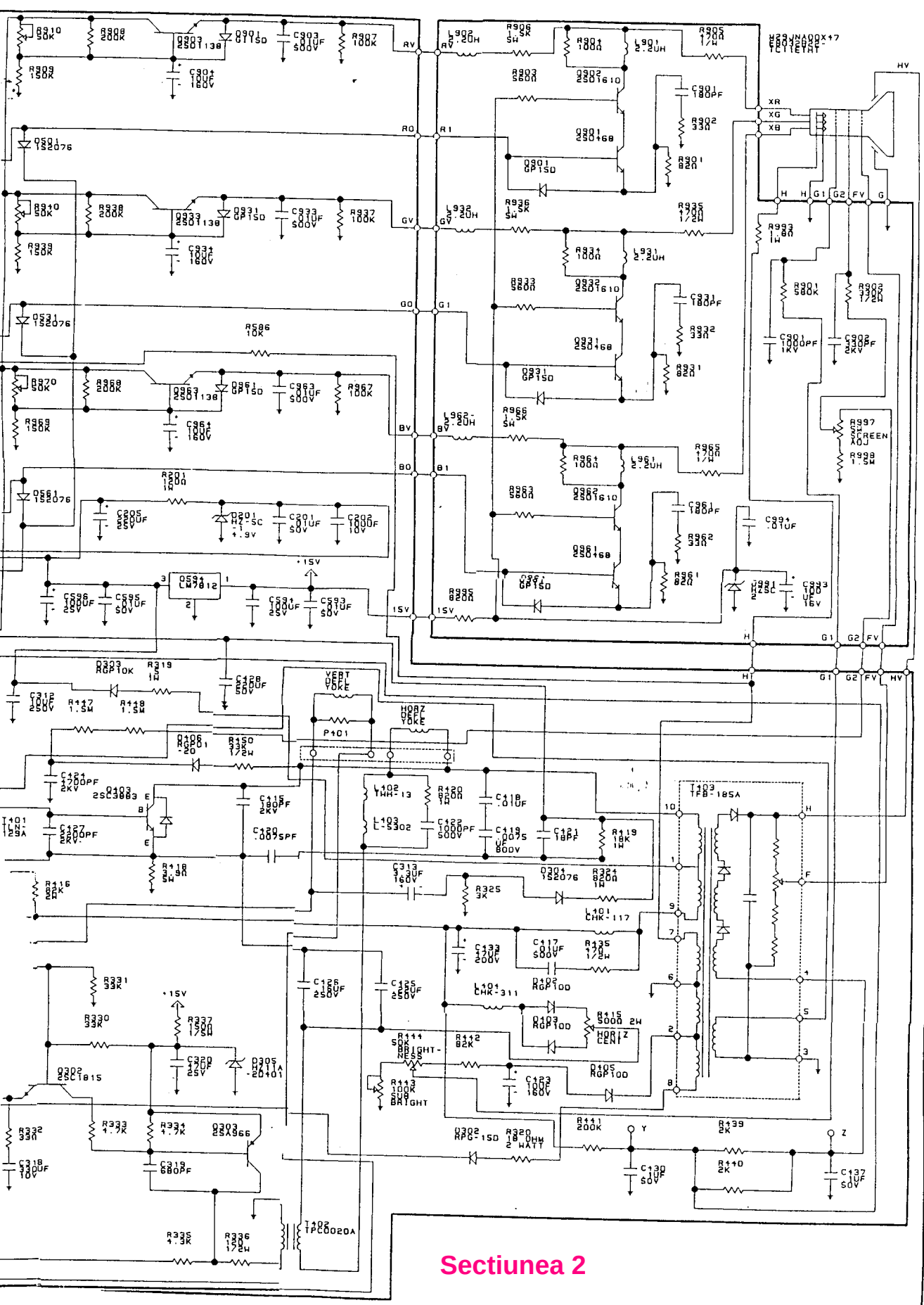
General Partner

MAURITRON
79
01844-351694

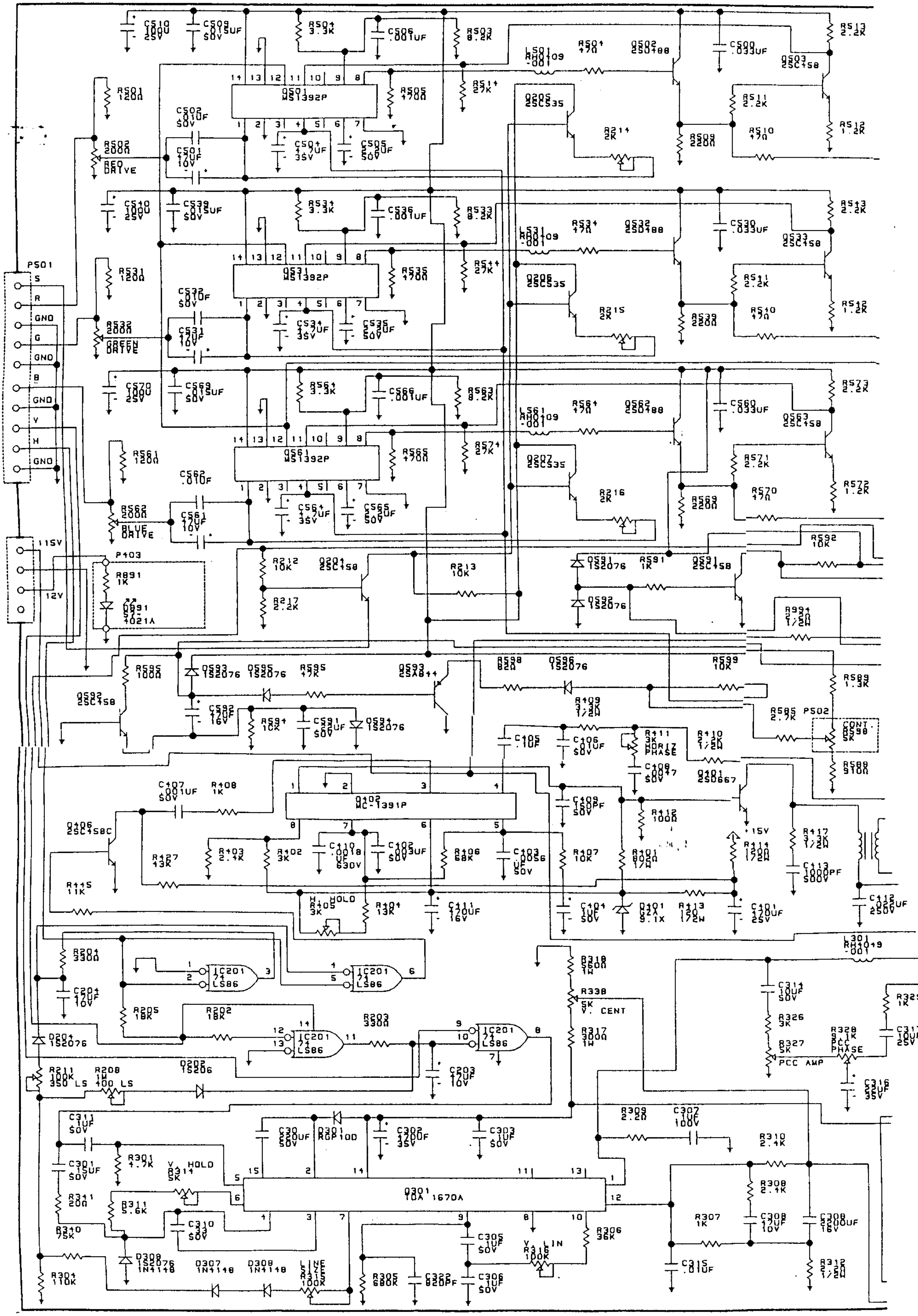
Sectiunea 1

Sectiunea 2





Sectiunea 2



C510 100U 25V
C508 .015UF 50V
R504 3.3K
C506 .001UF
R503 8.2K
R507 47Ω
Q502 2SD488
C500 .033UF
R513 2.2K
Q503 2SC458
LS01 RH0109 -001
Q501 M51392P
R505 470Ω
R514 27K
R501 120Ω
C502 .010UF 50V
C501 47UF 10V
C504 4.7UF 35V
C505 220UF 50V
R502 200Ω
RED DRIVE
Q205 2SC535
R214 2K
R511 2.2K
R512 1.2K
R509 220Ω
R510 47Ω
C540 100U 25V
C539 .015UF 50V
R534 3.3K
C536 .001UF
R533 8.2K
L531 RH0109 -001
R537 47Ω
Q532 2SD488
C530 .033UF
R543 2.2K
Q533 2SC458
Q531 M51392P
R535 470Ω
R544 27K
P501
S
R
GND
G
GND
B
GND
V
H
GND
R531 120Ω
C532 .010UF 50V
C531 47UF 10V
C534 4.7UF 35V
C535 220UF 50V
R532 200Ω
GREEN DRIVE
Q206 2SC535
R215 2K
R541 2.2K
R542 1.2K
R539 220Ω
R540 47Ω
C570 100U 25V
C569 .015UF 50V
R564 3.3K
C566 .001UF
R563 8.2K
L561 RH0109 -001
R567 47Ω
Q562 2SD488
C560 .033UF
R573 2.2K
Q563 2SC458
Q561 M51392P
R565 470Ω
R574 27K
R561 120Ω
C562 .010UF
C561 47UF 10V
C564 4.7UF 35V
C565 220UF 50V
R562 200Ω
BLUE DRIVE
Q207 2SC535
R216 2K
R571 2.2K
R572 1.2K
R569 220Ω
R570 47Ω
115V
12V
P403
R891 1K
Q891 4021A
R212 10K
Q201 2SC458
R213 10K
R217 2.2K
D591 1S2076
R591 1K
Q591 2SC458
R592 10K
D592 1S2076
R594 2.2Ω 1/2W
R595 100Ω
D593 1S2076
D595 1S2076
R595 47K
Q593 2SA844
R598 82Ω
D596 1S2076
R599 10K
R589 1.3K
Q592 2SC458
C582 470UF 16V
R594 10K
C591 47UF 50V
D594 1S2076
R409 3.3K 1/2W
R585 2.7K
P502
CONT. R590 5K
C405 .1UF
C406 .01UF 50V
R411 3K HORIZ PHASE
R410 2.2K 1/2W
C408 .0047 50V
R588 910Ω
C407 .001UF 50V
R408 1K
Q402 MC-1391P
Q401 2SD667
Q406 2SC458C
C409 150PF 50V
R412 100Ω
+15V
R403 2.4K
R402 3K
C410 .0018 UF 630V
C402 .003UF 50V
R406 68K
C403 .0056 UF 50V
R407 10K
R401 800Ω 7W
R414 150Ω 7/2W
R417 3.3K 1/2W
C413 1000PF 500V
R427 43K
R415 11K
H. HOLD R405 3K
R404 13K
C411 470UF 16V
C404 1UF 50V
D401 QZX 9.1X
R413 120 7/2W
C401 470UF 25V
C412 .022UF 250V
L301 RH1049 -001
R204 330Ω
C204 47UF 10V
IC201 74 LS86
R205 18K
R202 18K
R203 330Ω
R318 560Ω 1W
R338 5K V. CENT
R317 300Ω 1W
C314 10UF 50V
R326 3K
R327 5K
PCC AMP
R328 5.1K PCC PHASE
R329 1K
C317 10UF 25V
C316 22UF 35V
D204 1S2076
C203 47UF 10V
R211 100K 350 LS
R208 1W 100 LS
D202 1S206
C311 1UF 50V
C301 .15UF 50V
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V. HOLD R314 5K
C301 220UF 50V
D301 RGP10D
C302 1200UF 35V
C303 1UF 50V
R309 2.2Ω
C307 1UF 100V
R310 2.4K
Q301 TDA 1670A
R341 20Ω
R311 5.6K
R310 75K
C310 .33UF 50V
R308 2.4K
R307 1K
C308 47UF 10V
C309 2200UF 16V
D303 1S2076 1N4148
D307 1N4148
D308 1N4148
LINE SIZE R315 100K
R304 110K
R305 680K
C322 820PF
C305 1UF 50V
C306 1UF 50V
V. LIN R316 100K
R306 36K
C315 .01UF
R312 2.2Ω 1/2W