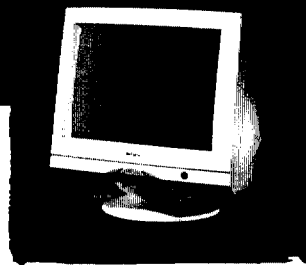


Belnea

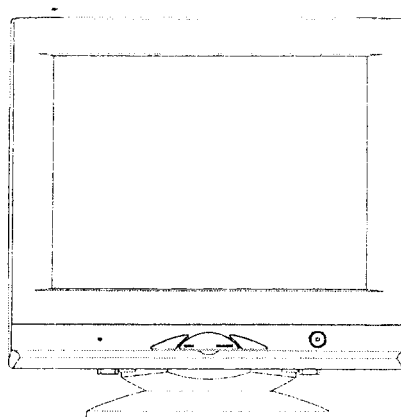


Color Monitor Service Manual

[10 60 95]

Service Manual

OSD Color CRT Display



MODEL :106095
Chassis Family No.VC6

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SAFETY PRECAUTIONS

1. CAUTION

No modification of any circuit should be attempted. Service work should only be performed after you are thoroughly familiar with all of the following safety checks and servicing guide lines.

2. SAFETY CHECK

Care should be taken while servicing this CRT display because of the high voltage used in the deflection circuits. These voltages are exposed in such areas as the associated flyback and yoke circuits.

3. FIRE&SHOCK HAZARD

- 3-1 Insert an isolation transformer between the CRT display and AC power line before servicing the chassis.
- 3-2 In servicing pay attention to original lead dress especially in the high voltage circuit. If a short circuit is found, replace all parts which have been overheated as a result of the short circuit.
- 3-3 All the protective devices must be reinstalled per original design.
- 3-4 Soldering must be inspected for possible cold solder joints, frayed leads, damaged insulation, solder splashes or sharp solder points. Be certain to remove all foreign material.

4. LEAKAGE CURRENT HOT CHECK

- 4-1 Plug the AC cord directly into the AC outlet. Do not use an isolation transformer during this check.
- 4-2 Connect a 1500 ohm, 10 watt resistor, paralleled by a 0.15uF capacitor between each exposed metallic part and a good earth ground(as shown in Fig.1).
- 4-3 Use an AC voltmeter with 1000 ohm/volt or more sensitivity and measure the AC voltage across the combination 1500 ohm resistor and 0.15uF capacitor.
- 4-4 Move the resistor connection to each exposed metallic part and measure the voltage.
- 4-5 Reverse the polarity of the AC plug in the AC outlet and repeat the above measurement.
- 4-6 Voltage measured must not exceed 7.5 volt RMS, from any exposed metallic part to ground A leakage current tester may be used in the above hot check, in which case any current measured must not exceed 5.0 milliamp. In the case of a measurement exceeding the 5.0 milliamp value, a rework is required to eliminate the chance of a shock hazard.

Note: High voltage is present when this CRT display is operating. Always discharge the anode of the picture tube to the display chassis to prevent shock hazard.

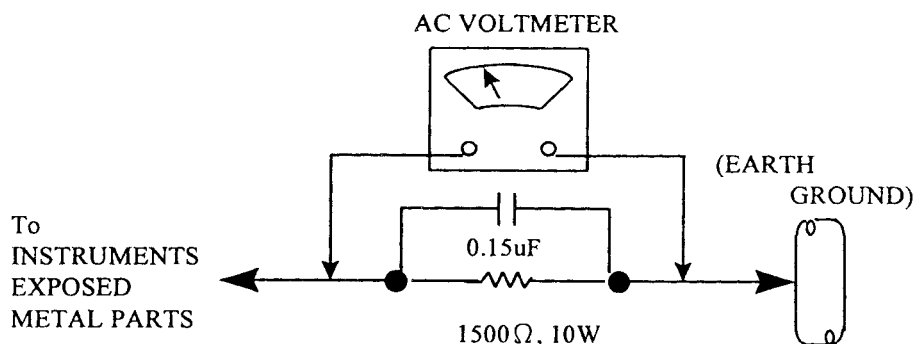


Fig.1

5. IMPLOSION PROTECTION

Picture tubes are equipped with an integral implosion protection system, but care should be taken to avoid damage and scratching during installation. Use only CPT replacement picture tubes.

6. X-RADIATION

WARNING: The only potential source of X-Radiation is the picture tube. However when the high voltage circuitry is operating properly there is no possibility of X-Radiation problem. The basic precaution which must be exercised is to keep the high voltage at the following factory-recommended level .

Note: It is important to use an accurate periodically calibrated high voltage meter.

- 6-1 The procedure for adjustment high voltage is as shown on (page 19).
- 6-2 If can not be adjust 25.5 KV at immediate service is required to prevent the possibility of premature component failure.
- 6-3 To prevent X-Radiation possibility it is essential to use the specified picture tube.

IMPORTANT SAFETY NOTICE

There are special components used in this CRT displays which are important for safety. These parts are identified by the international symbol $\triangle$ on the schematic diagram and on the replacement parts list. It is essential that these critical parts should be replaced with manufacture's specified parts to prevent X-RADIATION, shock, fire or other hazards. Do not modify the original design or this will void the original parts and labor guarantee.

GENERAL INFORMATION

1. OUTLINE

TCO7S is 19 inch (17.95" Viewable) color CRT display with the following nice features. OSD (on screen display) control is newly introduced, which allows easy user adjustment power saving function, which helps saving energy, is also one of the highlights of this model.

2. FEATURES

- 2-1 Power Saving
 - Built in Power Saving function based on VESA-DPMS standard.
 - Power energy shall be saved by controlling the circuit in accordance with power save signal from computer.
- 2-2 OSD (on screen display) function
 - OSD (5 languages) is new and excellent man-machine interface.
 - Anyone is able to set up the picture as he like through OSD menu.
- 2-3 Self Test function
 - Self testing picture comes out by pushing any key in the case of no-connection with computer or power saving operation.
 - This function shows if monitor is alive or not and can be used for self aging test.
- 2-4 Ergonomic design
 - Low emission design to meet TCO99.
- 2-5 Multi scan with digital technology
 - 8 bit micro computer controls the circuit operation to meet with wide range signal of $f_H=30\sim95$ KHz and $f_V=50\sim160$ Hz. So VGA640× 480, VGA720× 400, VGA640× 480, SVGA800× 600, VESA1024× 768 , 1152× 864, 1280 × 1024 and 1600 × 1200 mode(non-interlaced) are applicable.
- 2-6 The product has totally 15 memory modes.
 - 1 standard mode is preset at the factory.
 - 9 modes are reserved at the factory.
 - 6 user memories are available to set the users own timing and display information.
- 2-7 Flat Face and fine dot pitch
 - Flat face CRT with a fine dot pitch of 0.25mm gives a comfortable sight of the screen.
- 2-8 Superior display performance.
 - Good focus by sophisticated gun and dynamic focus circuit.
 - High contrast.
 - Minimized distortion by correction circuit.
 - Good convergence.
 - Users enjoy full scan image for graphic.
- 2-9 Special function
 - VESA DDC 1/2B (Display Date Channel) compatible.
 - Rotation control circuit.

SPECIFICATION

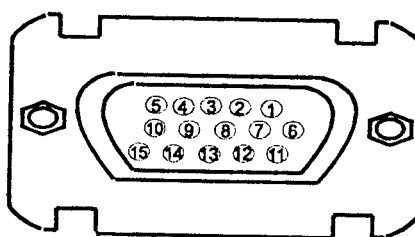
1. MECHANICAL SPECIFICATIONS

.....refer to the attached drawing

- 1-1 Dimension Height :456 mm typ.
 Width :460 mm typ.
 Depth :457 mm typ.
- 1-2 Net Weight :20kg (Net)

2. CONNECTORS

- 2-1 Signal connector:
 15P Mini D-Sub cable



PIN	SIGNAL	PIN	SIGNAL	PIN	SIGNAL
1.	RED	6.	RED RETURN	11.	GROUND
2.	GREEN	7.	GREEN RETURN	12.	SDA(DDC Data)
3.	BLUE	8.	BLUE RETURN	13.	H. SYNC
4.	GROUND	9.	(OPEN)	14.	V.SYNC
5.	GROUND	10.	GROUND	15.	SCL (DDC Clock)

PIN LAYOUT & PIN ASSIGNMENT CHART

3. CRT SPECIFICATIONS

Part No.	M46AJM 53 × 76
Type	19",90° ,29 φ ,In-line gun
Dot Pitch	0.25mm
Phosphor	R,G,B Short Persistence
Coating	Anti-glare & Anti static
Screen treatment	Sputter Coating for TCO
Total Transmission	53%

4. ELECTRICAL SPECIFICATIONS

4-1 Standard conditions...Except special items

Display image	Cross-hatch pattern Video signal:100% duty Display area:350mm× 262mm
Video signal level	Analog 0.7 VPP/75 Ohm, positive
Contrast, Brightness	Contrast: Max., Brightness: 60%
Ambient Temperature	20± 5°C (68± 9°F)
Input Voltage	AC 120V, 60 Hz or 220 V 50Hz
Terrestrial magnetism	Vertical field:northern hemisphere field 43uT (southern hemisphere field-43uT) Horizontal field: no field
Viewing direction	Parallel to the CRT axis
Measurements	After an initial warming up time of more than 30 minutes
Ambient light	200± 50Lux
Resolution	Max.1600× 1200 pixels

4-2 Power

4-2-1 Power supply...Commercial power source

Input voltage	AC 100V-240V AUTO
Power frequency	50 Hz ± 3Hz , 60Hz ± 3Hz
Input current	2.0A Max.(AC 132V)
Inrush current(at 20°C)	50 A Max (AC 264V)
Power consumption	110 W (Max.)

4-2-2 Power Management for Power Saving...

Power saving system is designed based upon
VESA DPMS standard

1) Power consumption and recovery time.

*1 APM State	SIGNALS			MONITOR POWER CONSUMP- TION	RECOVERY TIME TO ON STATE	INDICATOR
	H.Sync	V.Sync	VIDEO			
ON	*3 NORMAL	*3 NORMAL	*2 ACTIVE	110W	-----	Green
STAND- BY	No Sync or *5 <10Hz	>40 Hz	BLANK	< 15W	< 6s	Orange
SUS- PEND	>10 kHz	No Sync or *5 <20Hz	BLANK	< 15W	< 6s	Orange
OFF	No Sync or *5 <10Hz	No Sync or *5 <20Hz	BLANK	<5W	<10s	orange

**The transition time from ON state to each APM state is 5 seconds minimum.

*1:APM:Advanced Power Management.

*2: Means. Condition of power consumption for ON state.

DISPLAY IMAGE: Cross hatch pattern , with a border line(7× 9 dots).

*3: NORMAL: See "Timing chart".

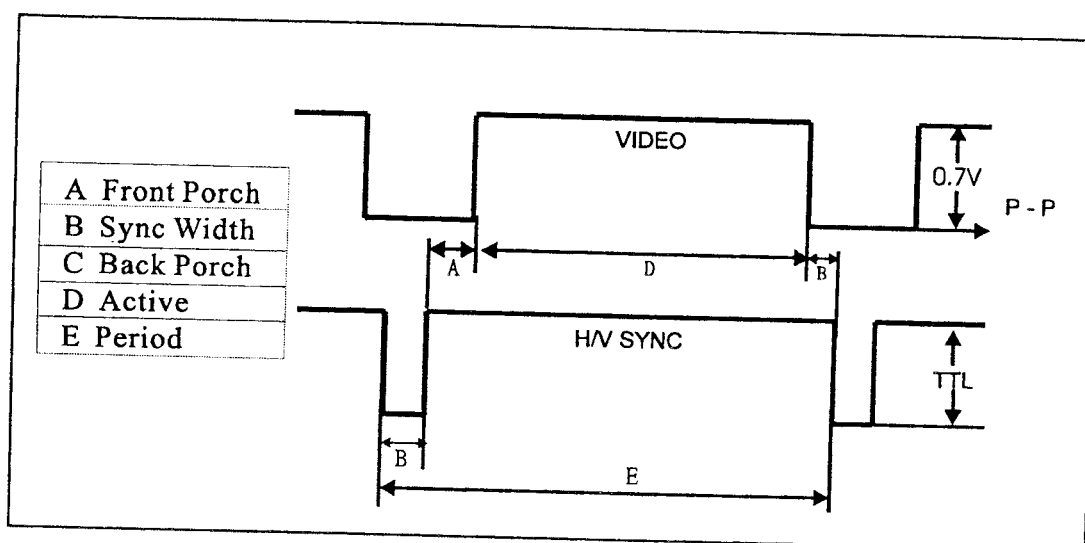
*4: Power Consumption is measured at AC 100-240V.

*5: Power saving operation is done at least less than specified value in the list.

4-3 Standard timing (Standard mode).

- Following 1 mode is preset in the memory as standard timing at the factory and 9 modes are reserved..
- Electrical performance is specified at STD (1024× 768) mode unless otherwise mentioned.

TIMING CHART



Timing	1	2	3	4	5	6	7	8	9
Standard	Industry	VESA	VESA	VESA	VESA	VESA	VESA	VESA	VESA
Data Pixel	640	640	720	800	800	1024	1024	1280	1600
Data Line	480	480	400	600	600	768	768	1024	1200
H-Freq kHz	31.469	37.5	31.467	46.875	53.674	60.023	68.667	91.146	93.75
V-Freq Hz	59.942	75.000	70.082	75.000	85.061	75.029	84.997	85	75
Pix Rate	25.175	31.500	25.175	49.500	56.250	78.750	94.500	157.5	202.5
Hor.A (us)	0.636	0.635	0.636	0.323	0.569	0.203	0.508	0.305	0.316
Hor.B (us)	3.813	2.032	3.813	1.616	1.138	1.219	1.016	1.016	0.948
Hor.C (us)	1.907	3.683	1.907	3.232	2.702	2.235	2.201	1.524	1.501
Hor.D (us)	25.422	20.317	25.422	16.162	14.222	13.003	10.836	8.127	7.901
Hor.E (us)	31.778	26.667	31.778	21.333	18.631	16.660	14.561	10.971	10.667
Vert.A (ms)	0.318	0.027	0.254	0.021	0.019	0.017	0.015	0.011	0.011
Vert.B (ms)	0.064	0.080	0.064	0.064	0.056	0.050	0.044	0.033	0.032
Vert.C (ms)	1.048	0.427	1.111	0.448	0.503	0.466	0.524	0.483	0.491
Vert.D (ms)	15.253	12.800	12.711	12.800	11.179	12.795	11.183	11.235	12.8

Vert.E (ms)	16.683	13.333	14.268	13.333	11.756	13.328	11.765	11.761	13.333
Sync.Pol. H.	-	+/-	-	+/-	+/-	+/-	+/-	+/-	+/-
Sync.Pol. V.	-	+/-	+	+/-	+/-	+/-	+/-	+/-	+/-

4-4 Signal level and input impedance

4-4-1 Video Signal level

- This CRT display is adjusted at the factory using 0.7Vpp Video Signal. Black level is 0 V.

4-4-2 Sync Signal level

- H/V Separate, H/V Mixed: TTL level.

4-4-3 Input impedance

- Video input: 75Ω
- Sync input: $\geq 1k\Omega$

4-5 Display performance

4-5-1 Display area

- Preset Timing

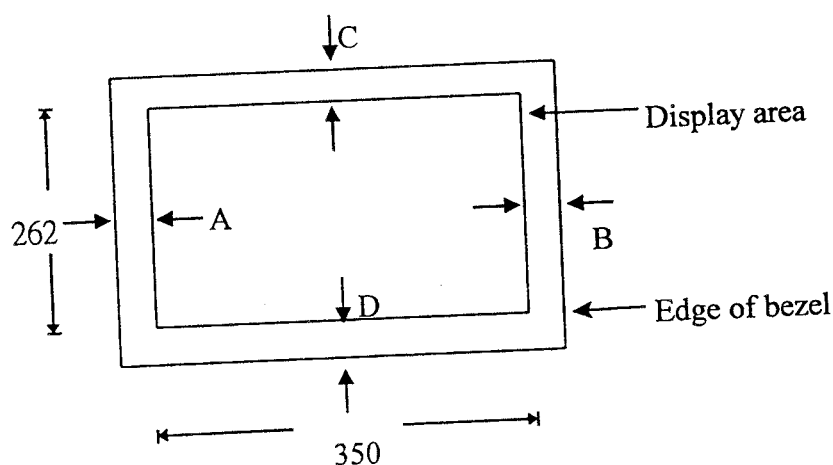
Mode: 7

Width: $350\text{mm} \pm 4\text{mm}$

Height: $262\text{mm} \pm 4\text{mm}$

4-5-2 Centering

- The display centering can be adjusted within the center of bezel by external controls.

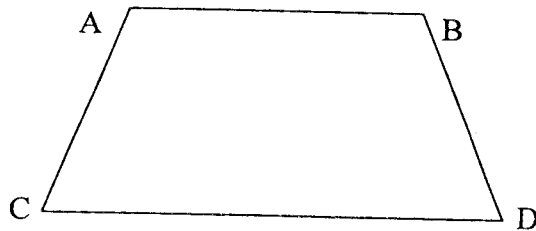


4-5-3 Distortion

• Trapezoid

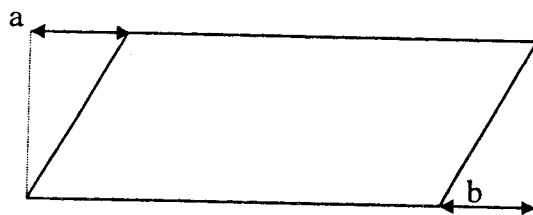
$$|AC-BD| \leq 2.5 \text{ mm}$$

$$|AB-CD| \leq 2.5 \text{ mm}$$



• Parallelogram

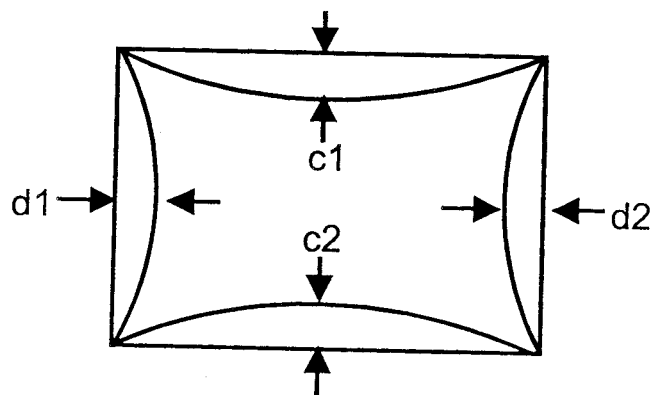
$$a, b \leq 1.5 \text{ mm}$$



• Pincushion and Barrel

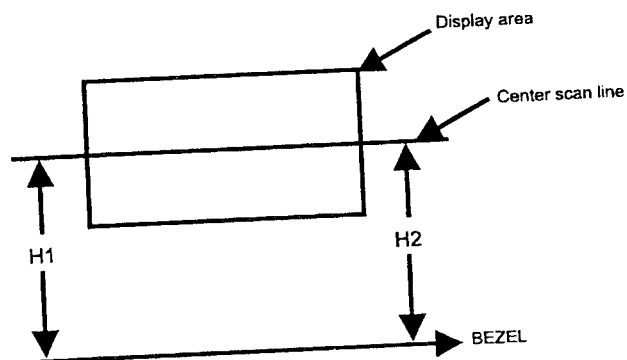
$$|c1|, |c2| \leq 1.5 \text{ mm for Pincushion and Barrel}$$

$$|d1|, |d2| \leq 2.0 \text{ mm for Pincushion and Barrel.}$$

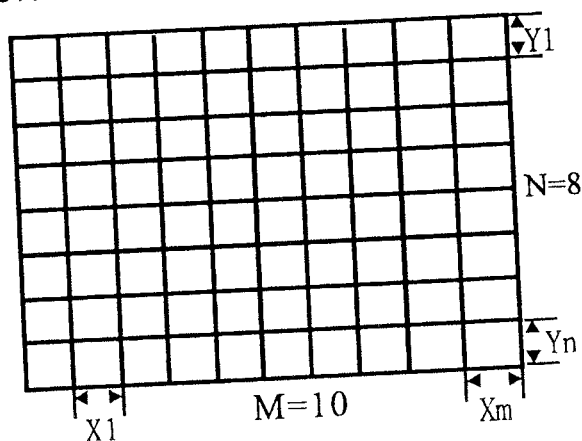


4-5-4 Rotation

$$|H1-H2| \leq 2.0 \text{ mm}$$



4-5-5 Primary Test Mode 1024x 768 at 85Hz

Horizontal Linearity $\leq 5\%$ Vertical Linearity $\leq 5\%$ 

<Conditions>

Display image-----crosshatch pattern

Maximum and minimum values should not be adjacent to each other.

$$\text{Calculation: H/V-Linearity} = \frac{\text{Max} - \text{Min}}{\text{Max} + \text{Min}} \times 100$$

4-6 General performance

4-6-1 Video output

Bandwidth 160MHz (Typ.)

4-6-2 Luminance

Value	Conditions	Display Image
$\leq 0.5 \text{ Ft-L}$	Brightness at max. Contrast at min.	Background
$40 \text{ Fl} \pm 5 \text{ Fl}$	Brightness at cut off. Contrast at max.	50 mm × 50mm in the center of Video pattern
$33 \text{ Fl} \pm 3 \text{ Fl}$	Brightness at cut off. Contrast at max.	White full flat field
Specified by 9300k+27 MPCD		

4-6-3 Luminance uniformity

Luminance uniformity $\geq 75\%$

<Conditions>

Luminance uniformity shall be determined by the following formula:

$$\frac{\text{Luminance of Lowest corner}}{\text{Luminance of Center}} \times 100\%$$

4-6-4 Display area regulation

	Display area variation	Range of variation
Due to Luminance	within 2 mm	Contrast 5 FL-Max (white flat field)
Due to Power Supply	within 0.5%	AC:90-132V or 198-264V
Due to Temperature	within 1.0%	$20^{\circ}\text{C} \pm 2^{\circ}\text{C}$

4-6-5 Color Point

<Conditions>

Display image: White flat field at the center of the display area.

Luminance : Brightness Detent point.

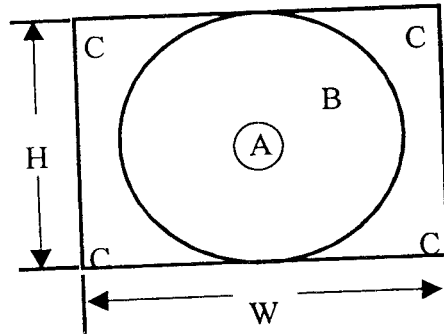
Contrast	20 Ft-L	5 Ft-L
Value	9300K+27MPCD $x=0.283 \pm 0.020$ $y=0.297 \pm 0.020$	9300K+27MPCD $x=0.283 \pm 0.020$ $y=0.297 \pm 0.020$

4-6-7 Misconvergence

Center area display (A):0.15mm (Max.)

Circuit area display (B):0.30mm (Max.)

Corner area display (C):0.35mm (Max)



<Conditions>

Display image : Crosshatch pattern mixed with R,G and B colors.

Convergence gauge: KLEIN CM7AG or equivalent.

Display area : W× H 350× 262mm

4-6-8 Purity

Conspicuous mislanding shall not be visible within display area at a distance of 50 cm from CRT surface.

<Conditions>

Display image: White flat field

Luminance : Contrast max, Brightness Detent Point

Display area : 350× 262mm

4-6-9 White Uniformity

$$x_a - x_c \leq \pm 0.015$$

$$y_a - y_c \leq \pm 0.020$$

$x_a - x_c$: Deviation from center to corner

$y_a - y_c$: Deviation from corner to corner

<Conditions>

Display image: White flat field

Luminance : Brightness: < 0.06 FL

Contrast: Adj. to Max

Display area : 350× 262mm

4-6-10 Jitter

Invisible at a distance of 50 cm from CRT surface.

5. ENVIRONMENTS

5-1 Ambient temperature, humidity and altitude.

	Operating	Storage and shipment
Temperature	0~35 °C	-40°C ~ 70°C
Humidity	10~90 %	10 ~ 100 %
Altitude	3000m(Max.) (700-1060 m bar)	12000m(Max.) (36000ft)

*Non-condensation

6. POWER CORD

TUV approved power cord (Wall Type, HP. VDE MTW)

UK approved power cord (Wall Type, HP UK MTW)

7. SIGNAL CABLE

Mini D-Sub 15 Pin Male connector.

8. REGULATORY STANDARDS**8-1 Safety standards**

The product complies to the following safety guidelines:

☐ EN 60950 and ISO 9241-3,-7,-8**8-2 Power management**

The product complies to the following guidelines:

☐ VESA DPMS☐ Energy (former E-2000)☐ EPA Powermanagement☐ TCO99**8-3 X-Ray**

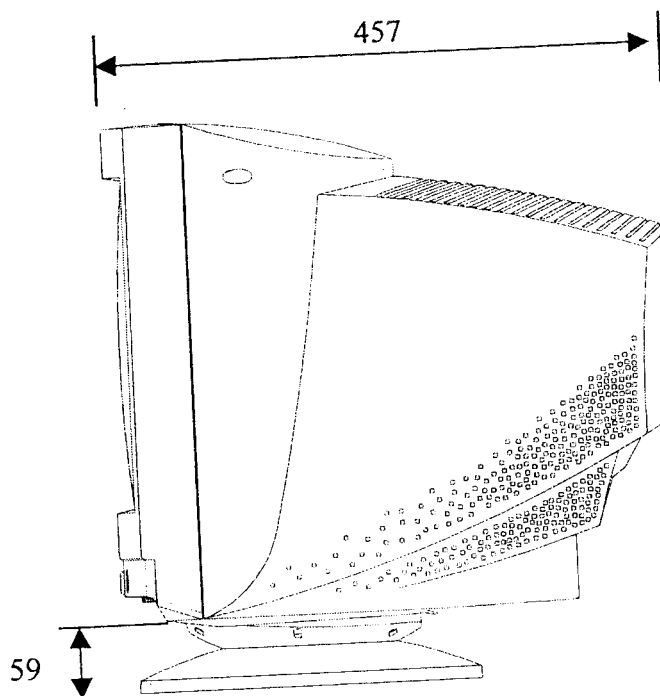
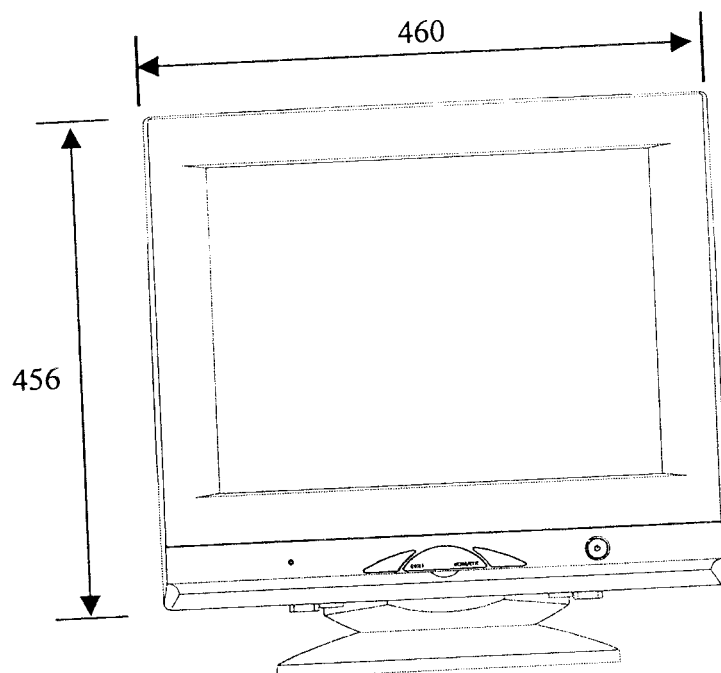
The product complies to the following guidelines:

☐ ROV 1987☐ FDA DHHS 21 CFR Subchapter J**8-4 Ergonomic**

The product complies to the following guidelines:

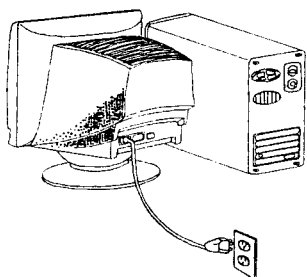
☐ TUV ERGONOMICS (MPRII, ISO9241-3 ,-7,-8)☐ Gost Label☐ TCO 99**8-5 Radiation**☐ MPR 1990:8+MPR 1990:10☐ TCO 99**8-6 EMI**☐ CE (NE55022,EN50082-1,EN55024)☐ FCC part 15 B/Class B

DIMENSIONS

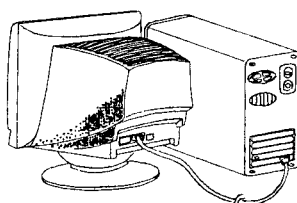
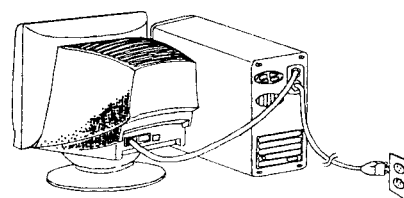


CONNECTING THE SIGNAL CABLE & THE POWER CORD

1. Plug the 15-pin signal cable connector into the video signal connection located at the rear panel of the system. Tighten the two screws on the cable connector.
2. Connect the power cord either into a AC outlet or into your computer's inlet. If the AC outlet in your location does not provide for this type of grounding plug, have the proper adapter installed for safe grounding.



Power Cord to AC Outlet

Signal Cable between
Monitor and PC

Power Cord to PC'S Inlet

USER CONTROL

1. Power Switch

This turns the power on and off. Press to turn the power on, press again to turn the power off.

2. Pilot LED

When the power is turned on, the light is green; when the unit goes into standby, suspend or off, modes, the light turns to orange.

3.4 Operator Key

- 1) Press the **MENU/EXIT** button (4 in figure 1) to display the OSD menu on the screen.
- 2) Select the desired function icon using the OSD dial (3 in figure 1, see the following section "OSD Menu Icons").
- 3) Press the **ENTER** button (5 in figure 1) to activate the function.
- 4) Enter the desired value by turning the OSD dial.
- 5) To store the setting, press the **ENTER** button again.
Repeat steps 2-4 to make further adjustments as needed.
- 6) The OSD menu will automatically disappear if no changes are made for more than 45 seconds (default setting). The current settings will be saved. You can also close it manually by pressing the **MENU/EXIT** button..

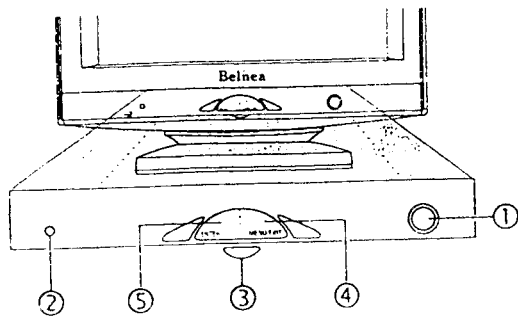


Fig 1

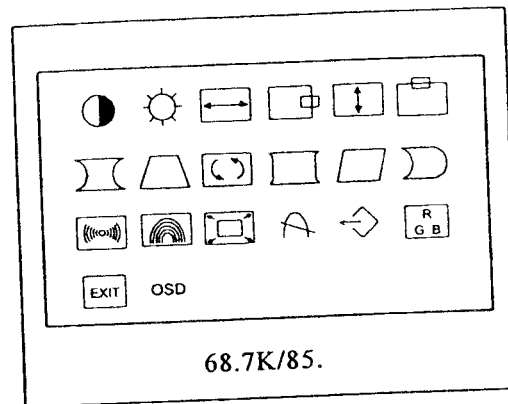


Fig 2

Symbol	Function	Process
	Brightness	Controls the picture brightness
	Contrast	Controls the picture contrast
	Horizontal position	Controls the horizontal position
	Width	Sets the picture width
	Vertical position	Controls the vertical position
	Height	Sets the picture height
	Pincushion	Eliminates pincushion distortion
	Trapezoid	Eliminates trapezoid distortion
	Rotation	Corrects a crooked image
	Corner	Eliminates corner distortion
	Parallel	Eliminates parallel distortion
	Pin. balance	Eliminates Pin-balance distortion
	H.Moire	Eliminates H.Moire
	V.Moire	Eliminates V.Moire
	Zoom	Controls the picture width and height in the meanwhile
	Degauss	Degausses the monitor
	Recall	Recall the preset value of preset mode
	Color temperature	Control the color temperature
	Exit	Exit from OSD menu
	OSD menu control	Control the position, size, color and language of OSD menu
	Change page	Return to main menu

ADJUSTMENT PROCEDURES

Check the monitor according to the Inspection Standards and, if necessary, follow the procedures below to adjust the monitor.

1. Power Supply

1-1 Input Voltage: AC110V~AC240V.

1-2 Input Frequency: 60 +/- 3Hz / 50 +/- 3Hz.

2. Note

2-1 Turn the monitor so the screen of the CDT faces eastward.

2-2 Before adjustments, warm up the monitor for 30 minutes.

2-3 Mode setting refer to table 1.

3. Control Confirmation

3-1 The 1024x 768 68K mode signal will be used to check all display modes of the monitor.

3-2 To adjust the monitor, set the brightness control to its center position and the contrast control to its maximum position.

4. Adjustment Equipment (for reference only)

4-1 Degaussing Coil

4-2 Oscilloscope and Probe

4-3 Digital Voltmeter (Model: Fluke 8050A or equivalent)

4-4 Colour Analyzer (Model: Minolta TV-2030 or CA-100)

4-5 Ruler (45 cm)

4-6 High-Voltage Probe (Model: Fluke 80K-40)

4-7 PC: PII / PIII / P4 or equivalent

4-8 Chroma (Model: 1000, 2000 or 2130, 2135)

4-9 Power meter (model: 2533 or equivalent)

4-10 Screw driver “-“ & “+”

Table 1 for mode setting

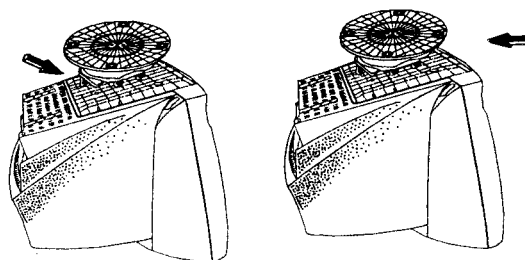
Following thimings are preset:

Mode	Card Item	Freq. H. KHz	Freq. V. KHz	Resolutions
1	VESA	31.469	59.941	640 × 480
2	VESA	37.5	75	640 × 480
3	VESA	31.468	70	720 × 400
4	VESA	46.875	75	800 × 600
5	VESA	53.674	85.061	800 × 600
6	VESA	60.023	75	1024 × 768
7	VESA	68.667	85	1024 × 768
8	VESA	91.146	85	1280 × 1024
9	VESA	93.75	75	1600 × 1200

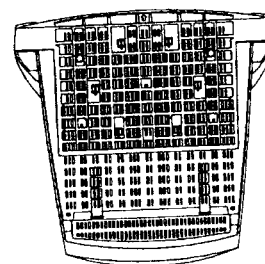
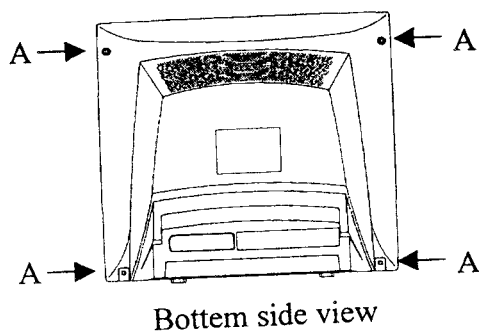
5. Disassembly for Rear Cabinet

5-1 Unloading

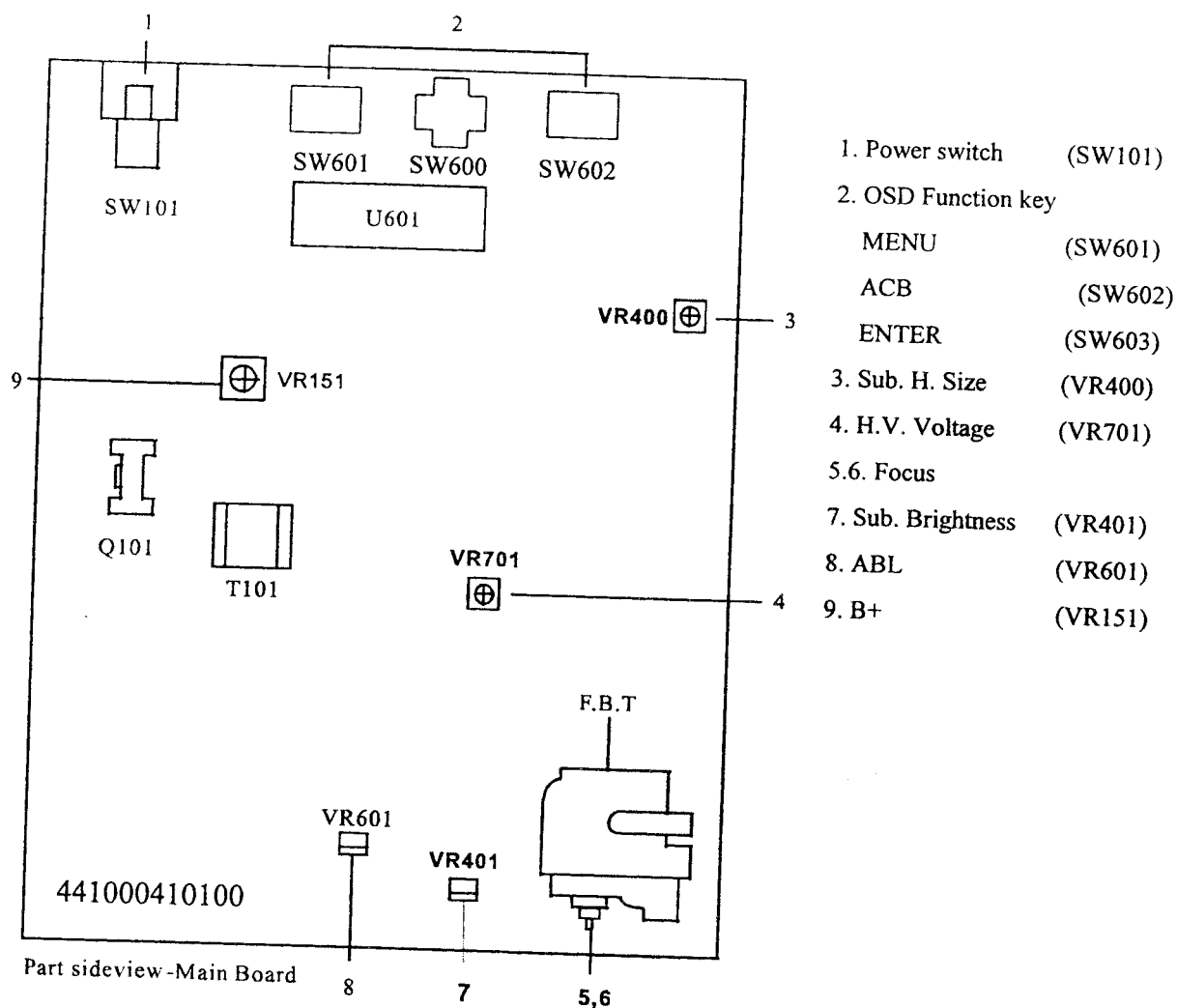
Gently press at the clip with one hand, while pulling the T/S base towards the rear of the cabinet with the other hand. The T/S base should now come off of the monitor.



5-2 Remove 4 screws(A) from the rear cabinet then remove the rear cabinet.



6. Service Adjustment Control Locations

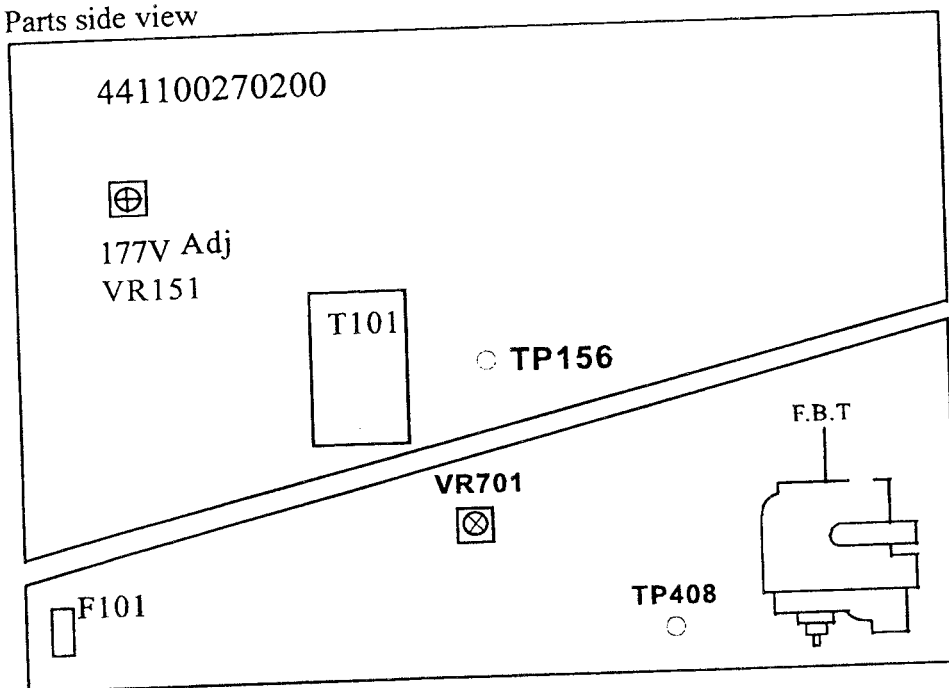


7. Adjustment

7-1 B+ Voltage Adjustment:

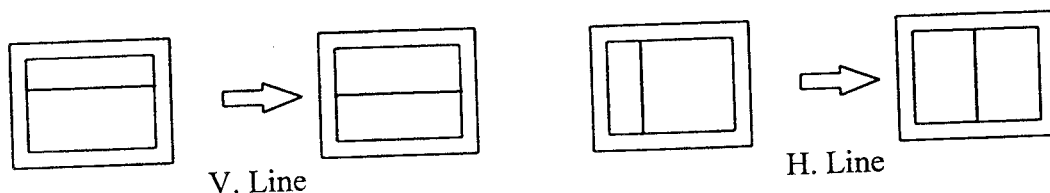
- Apply the mode 1 signal with a full white pattern.
- Apply 220V AC or 110V AC to the unit.
- Set the Brightness and the Contrast to the Max, the H-Width to 350x 262mm.
- Put the DVM probe between TP156 and GND.
- Adjust the VR151 until TP156 reaches 185V VDC +/- 0.1V.
- Confirm the voltage across C171 to be 80 VDC +/- 3V.
- Confirm the voltage across C131 to be 12.5V +/- 1V.
- Confirm the voltage across C151 to be 6.3 VDC +/- 0.2V.
- Put the probe between the TP408 and GND.
- Adjust the VR701 until TP408 reaches -179 VDC +/- 0.5V.

Parts side view



7-3 H. Line and V. Line Adjustment:

- Apply all mode signal with a 10× 8 crosshatch pattern.
- Adjust the Up/Down key to equalize the length of each square from the center to the Right/Top edge and from the center to the right /bottom edge.

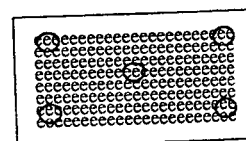


7-4 X-Ray Protection Test:

- Short TP402 and TP404(Install 3k ohm tool), Check if the protection circuit works.
- Remove the tool and Restart the unit.

7-5 Focus Adjustment:

- Apply the mode 5 signal with the text pattern.
- Set the brightness to the raster just disappears.
- Set the contrast to 25FL.
- Make the corner sections of the screen optimum by turning focus VR1 on the F.B.T.
- Make the center sections optimum by turning focus VR2 on F.B.T.
- Repeat 1,2 to make it optimum.

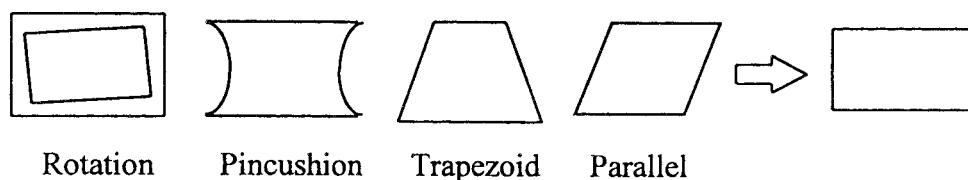


7-6 White Balance Alignment : (Warm Up 30 Minutes)

- Degauss the screen using the degaussing coil.
- Apply the mode 7 signal with the video cut off pattern.
- Set the contrast to the Max, and the brightness to the max.
- Put the color analyzer probe on the screen center, adjust the VR(401) until the "Y" is 0.8~1.0Ft-L.
- Adjust the OSD "g" fix at center(10%),after adjusting the OSD "r","b" to $x=0.283 \pm 0.005$, $y=0.297 \pm 0.005$.
- Apply the white-square-box pattern (50mmx 50mm).
- Set the contrast and the brightness to the 10FL.
- Adjust the R gain and G gain to x,y value at 9300° K , $x=0.283 \pm 0.005$, $y=0.297 \pm 0.005$,and copy the 9300° K value copy to C3 (R.G.B).
- Adjust the sub-contrast to $Y=40FL \pm 5FL$ (Con. Set to Max, Brightness set to OSD value "80").
- Apply the pattern to full white.
- Adjust the brightness VR601 until to $Y=33FL \pm 1FL$.

7-7 Trapezoid & Pincushion & Rotation Adjustment:

- Apply the all mode signal with a crosshatch pattern.
- Adjust the OSD control up / down key.
- Adjust the V-Size to be 262mm and adjust V-Phase to center.
- Adjust the H-Width to be 350mm and adjust the H-Phase to center.
- Adjust the Pincushion for the best result.
- Adjust the Trapezoid for the best result.
- Adjust the Rotation for the best result.
- Adjust the parallel , unbalance and corner for the best.



7-8 Size, Phase, Pincushion, H-Linearity, V-Linearity, Rotation and QC

Check:

- Apply all mode signal with a crosshatch pattern.
- Set the H-size to 350mm, the V-size to 262mm. Check mode 1-6 if the size is off by +/- 5mm, the pincushion +0.5mm and -2mm range, Rotation +/- 1mm, Linearity under 5 %.

7-9 Power Saving Test:

- Standby Mode:Open the H-Sync, check if the power is under 15W.
- Suspend Mode:Open the V-Sync, check if the power is under 15W.
- Off Mode:Open the H-Sync and V-Sync, check if the power is under 5W.

8. PURITY ADJUSTMENT

The CRT is an ITC assembly, however, here is the explanation for readjustment just in case. If color shading is apparent, make the following adjustment.

8-1
8-1-1 Verify that no unusual magnetic fields are near the Display unit (magnetic screwdrivers, table magnets, etc.) If possible, use a wooden workbench for this procedure.

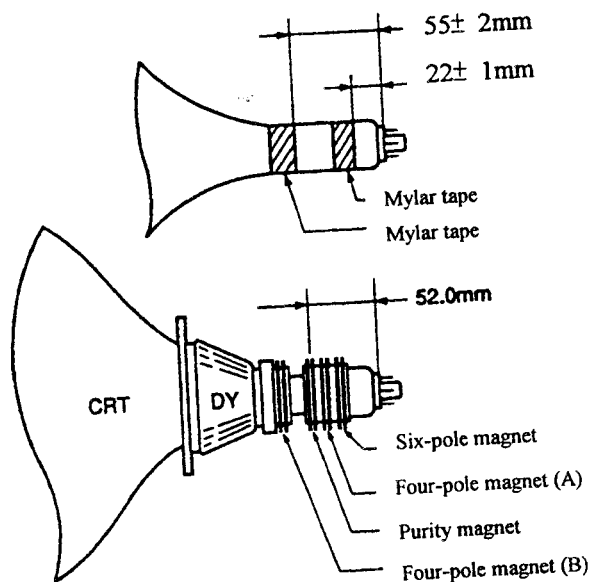
8-1-2 Degauss the magnetism of chassis and CRT with external degaussing coil.

8-1-3 Adjust the purity magnet until each of the red, green and blue channels is free of color shading.

Make the following adjustment if color shading cannot be corrected by the above, or if the CRT or deflection yoke has been replaced.

8-2

8-2-1 Keep the convergence yoke and deflection yoke in the positions shown below.



8-2-2 Make sure that this adjustment is done later than 30 minutes after power on .

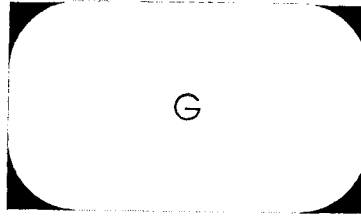
8-2-3 Degauss the magnetism of chassis and CRT with an external degaussing coil.

8-2-4 Verify that static convergence is roughly matched . If it is misaligned, adjust static convergence of Red color and Blue color with Four-pole magnet A. For this adjustment Four-pole magnet B which is with deflection yoke must be put together.

8-2-5 Remove the wedge from the deflection yoke and pull the deflection yoke fully to the front.

8-2-6 Display green color solely with the signal generator.

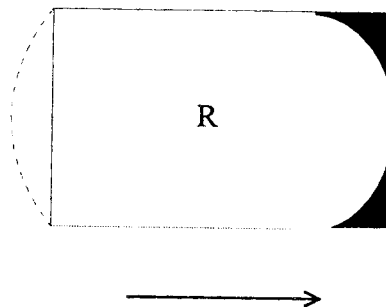
Adjust the purity magnet so that the center of the screen displays a pure green disk. Slide the deflection yoke rearward until the four corners shaded and check its area's uniformity.



- 8-2-7 After the adjustment of step 5, readjust the static convergence if some gap was found.

Static convergence alignment for this step is to be performed with Four-pole magnet A and Six-pole magnet.

- 8-2-8 Display red disk. Adjust the purity magnets so as that red disk is as the center of the screen simultaneously. If red is shifted, move its position in the opposite direction.



- 8-2-9 Display Green again.

Slide the deflection yoke rearward until the screen appears green on the whole, and fasten it there.

- 8-2-10 Confirm purity in each direction by rotating the set to direction of East, West, South and North after degauss by external degaussing coil.

- 8-2-11 If magnetism remains even after the adjustment, use the compensation magnet to obtain purity.

The final confirmation method for purity

In the natural magnetic field, rotate the monitor in the direction of East, West, South and North.

Earth's magnetic field may cause magnetism on the monitor. Confirm that the automatic degaussing circuit built in the monitor can erase the amount of magnetism which was introduced with above rotation.

9. CONVERGENCE ADJUSTMENT

The CRT is an ITC assembly, however, here is the explanation for readjustment just in case.

- 9-1 Make sure that this adjustment is done later than 30 minutes after power on. Check general ability coarse adjustment and purity adjustment finished.
- 9-2 Degauss the magnetism of chassis and CRT with degaussing coil. (CRT board also).
- 9-3 Apply mixed crosshatch signals of red and blue from the signal generator. Nudge the deflection yoke to equal its inclination up and down, right and left with a

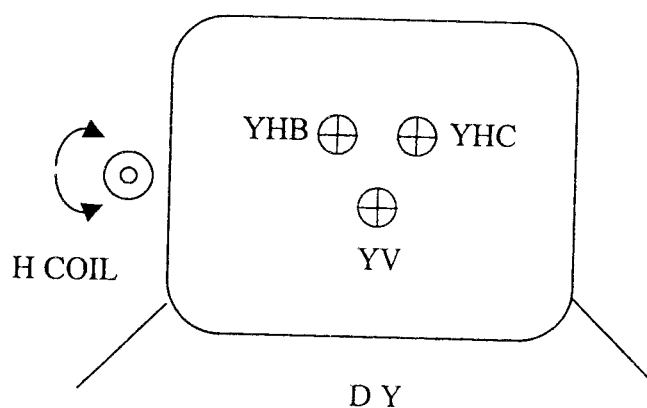
- temporary wedge between CRT and the top of the yoke.
- 9-4 Match the red and blue images at the center of the screen by rotating the Four-pole magnet A (See STEP-1 in figure for examples). For this adjustment Four-pole magnet A should be put together.
 - 9-5 Apply mixed crosshatch signal of red, blue and green from the signal generator.
 - 9-6 Match the red, green and blue images at the center of the screen by rotating the Six-pole magnet. (See STEP-2 in figure for examples).
 - 9-7 If lines are twisted either lefthand or righthand (See the STEP-3 in figure for examples) perform the following:
 - a. Use Four-pole magnet B to shift convergence of horizontal lines by 5 to 6 mm at the center of the screen. (For twisted lefthand lines, shift blue line downward and red line upward. For twisted righthand lines, shift red line downward and blue line upward. Do not shift convergence of vertical lines.)
 - b. Then realign convergence with Four-pole magnet A.
 - 9-8 Loosen the deflection yoke fastening screw and gently nudge the yoke up and down to achieve the best overall convergence on the edges of the screen (See STEP-4 in figure for examples).
Insert wedge at the top of the deflection yoke so that the convergence will not deviate due to an unsteady deflection yoke.
 - 9-9 Gently nudge the yoke from side to side to achieve the best overall convergence on the edges of the screen (See STEP-5 in figure for examples).
Insert wedges at the left side and right side of the deflection yoke so that the convergence will not deviate due to an unsteady deflection yoke. (Do not apply silicon adhesive to the wedges to prevent them from slipping out).
 - 9-10 Check that the image is horizontal.
If needed, rotate the deflection yoke.
 - 9-11 Recheck the purity adjustment. If purity was adversely affected repeat the purity adjustment, then recheck convergence when finished.
 - 9-12 Retighten the deflection yoke fastening screw. Do not overtighten the screw, as this can damage the CRT.
Tightening torque: 20 ± 2 kgf.cm
 - 9-13 Align the horizontal line convergence at the center of the screen with the Differential coil (See STEP-6 in figure for examples).
 - 9-14 Align the horizontal line convergence at the corner and of the screen with the Differential resistor VR-YV. (See STEP-7 in figure for examples.)
 - 9-15 Align the center vertical line convergence at the corner of the screen with the Vertical Isotropic Astigmatism resistor VR-YHC (See STEP-8 in figure for examples).
 - 9-16 Align the center vertical line convergence at the corner of the screen with the vertical ISO tropic astigmatism resister VR-YH (See step-9 in figure for examples).
 - 9-17 Recheck convergence at the center of the screen. If needed, realign with the Four-pole magnet A and the Six-pole magnet.
 - 9-18 Insert wedges as shown is STEP-10 of figure (at the top, bottom, and right side of the deflection yoke). Secure them with silicon adhesive and polyester tape.
Remove any temporary wedges while keeping convergence aligned.
 - 9-19 If the convergence on the fringe areas is still not acceptable, place one or more Permalloys around the funnel to achieve the best effect. Then press these Permalloys onto the funnel. Verify convergence around all edges of the screen.

(See STEP-11 in figure for examples).

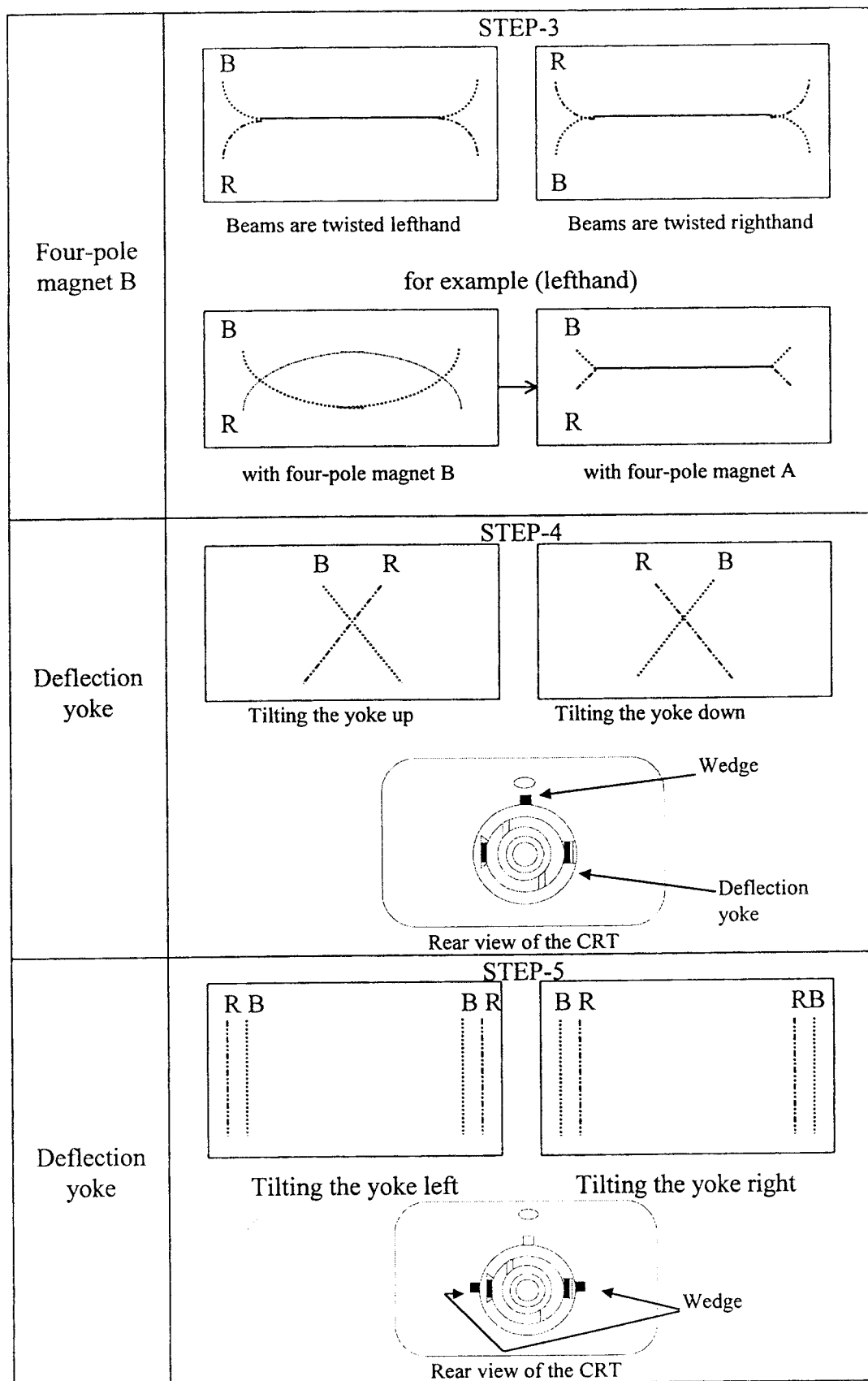
NOTE

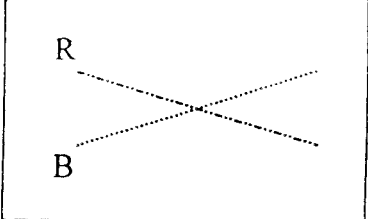
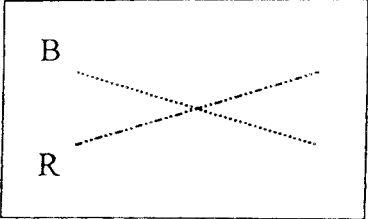
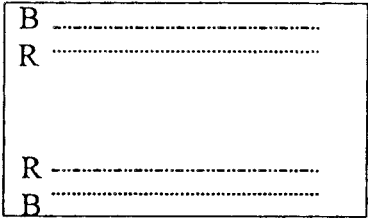
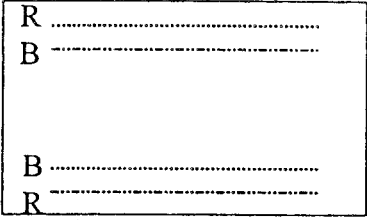
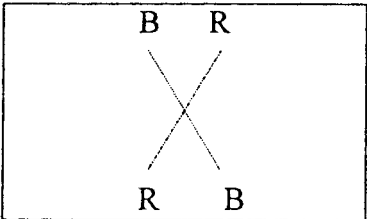
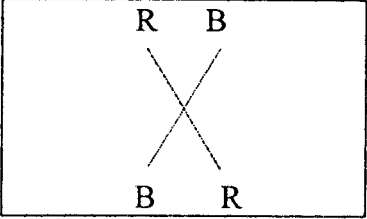
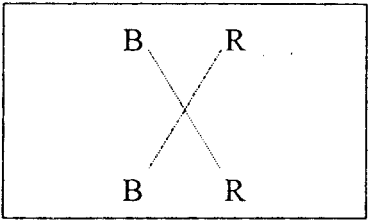
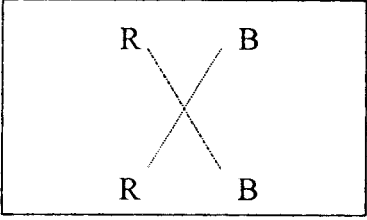
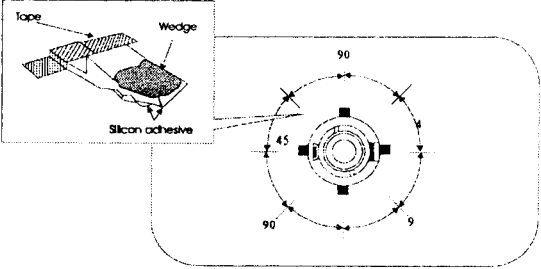
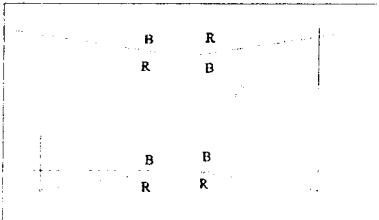
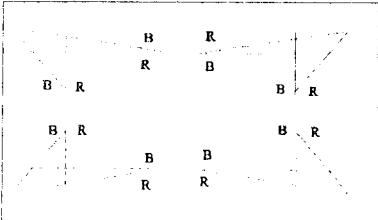
In the above step, do not place the Permalloys closer than 20 mm from the HV anode cap. Do not tape them over any paper labels or secure them with silicon adhesive.

- 9-19 After completion of adjustment, apply locking paint to the movable portions of the deflection and convergence yokes to secure them.
- 9-20 Make adjustment so that the value of white window pattern from the signal generator is below that under the condition of 100 cd/m^2 brightness at the standard condition.



Adjustment part	Misconvergence pattern Wedge inserting position	
Four-pole magnet A	STEP-1	
Six-pole magnet	STEP-2	



Differential coil	STEP-6 
Differential resistor VR-YV	STEP-7 
Differential resistor VR-YHc	STEP-8 
Differential Resistor VR-YHB	STEP-9 
	STEP-10  Wedge spacing and how to tape
Permalloy	STEP-11 

CAUTION FOR SERVICING

When servicing or replacing the CRT, high voltage sometimes remains on the anode. So, completely discharge high voltage before servicing or replacing the CRT so as to prevent a shock to the service person.

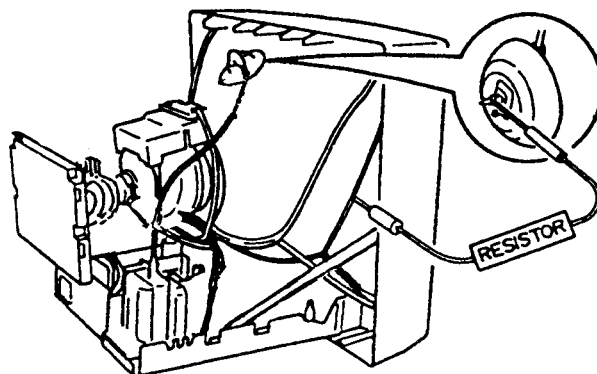
CRT Anode Discharge

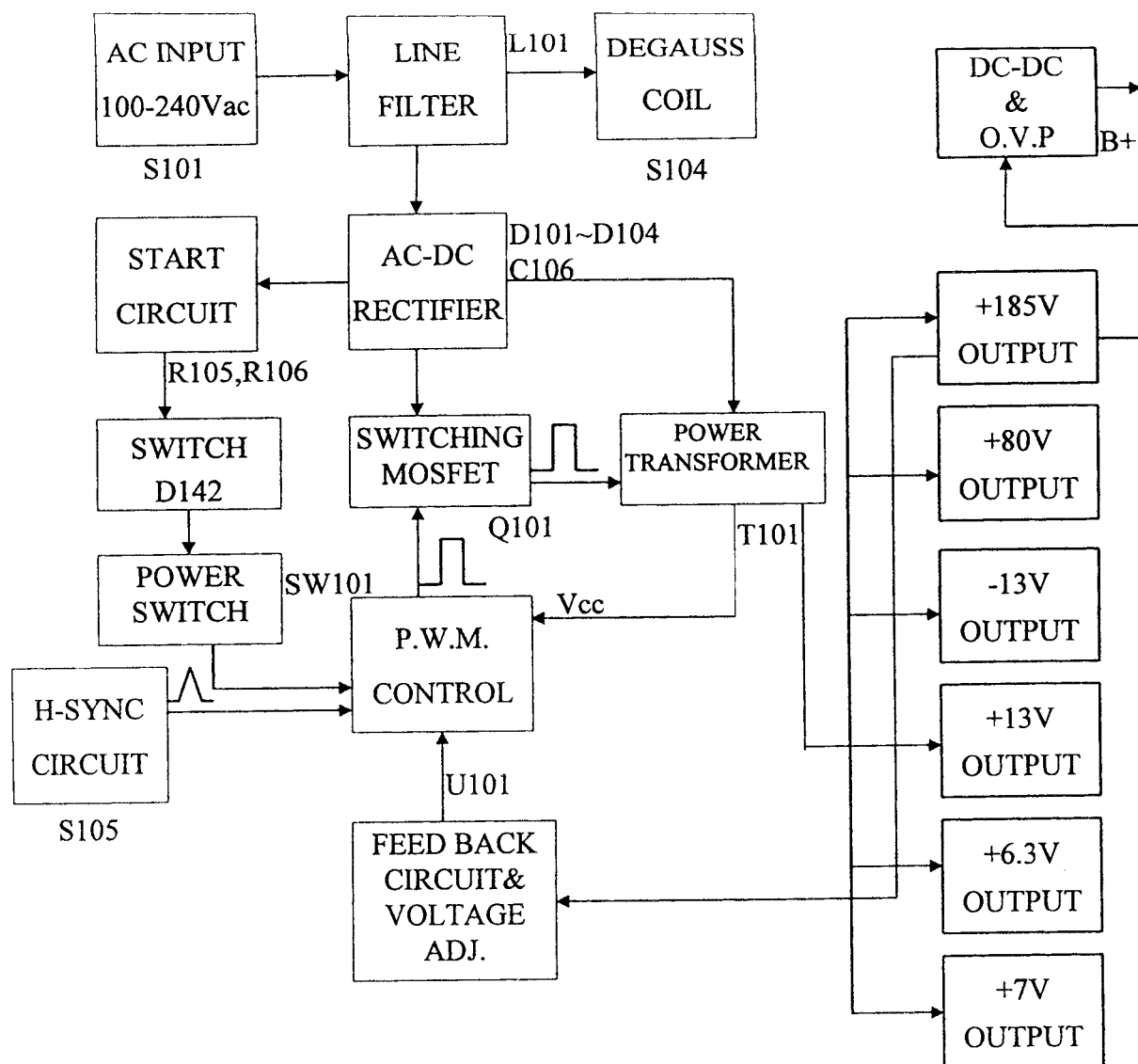
1. When you check the CRT anode or replace the CRT, discharge the CRT anode to the external conductive coating (aquadag) of CRT, especially when checked right after **power turn-off**.
2. Ground one end of a jumper wire which has a resistor ($30\text{ kV} < \text{resisting pressure } 100\text{ M}\Omega$) and connect the other point to the CRT anode.

Note: Grounding must be done first.

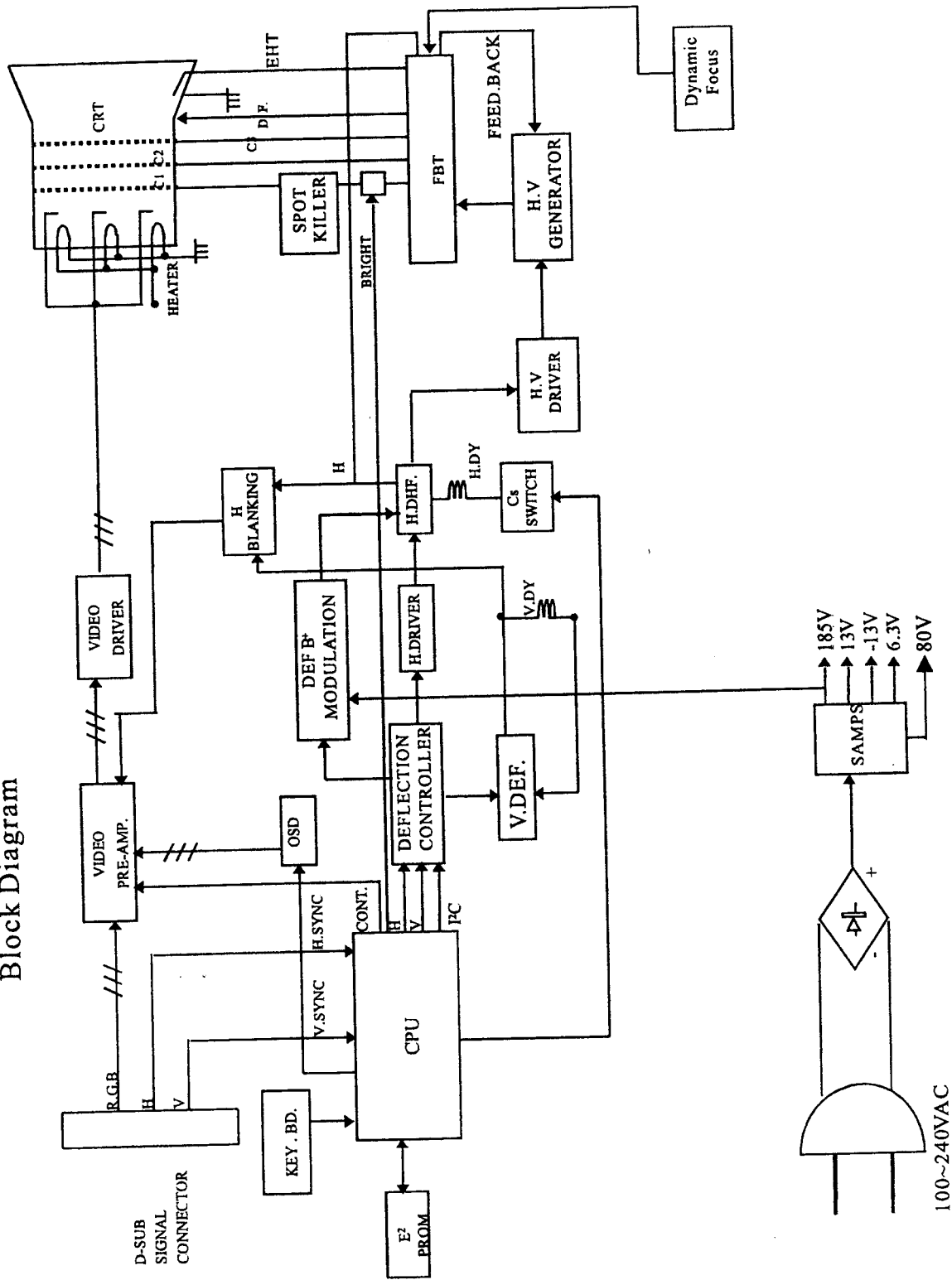
This model has a section that does not share a common ground with the power supply section. The different sections are referred to as the hot section and the cold section in the precautions below.

1. Do not touch the hot section and the cold section at the same time. You may be hit by an electric shock.
2. Do not short the hot section to the cold section. This could blow the fuse or damage parts.
3. Never measure the hot section and the cold section at the same time when using tools such as oscilloscopes or multimeters.
4. Always unplug the unit before beginning any operation such as removing the chassis.



BLOCK DIAGRAM**1. POWER SUPPLY BLOCK DIAGRAM**

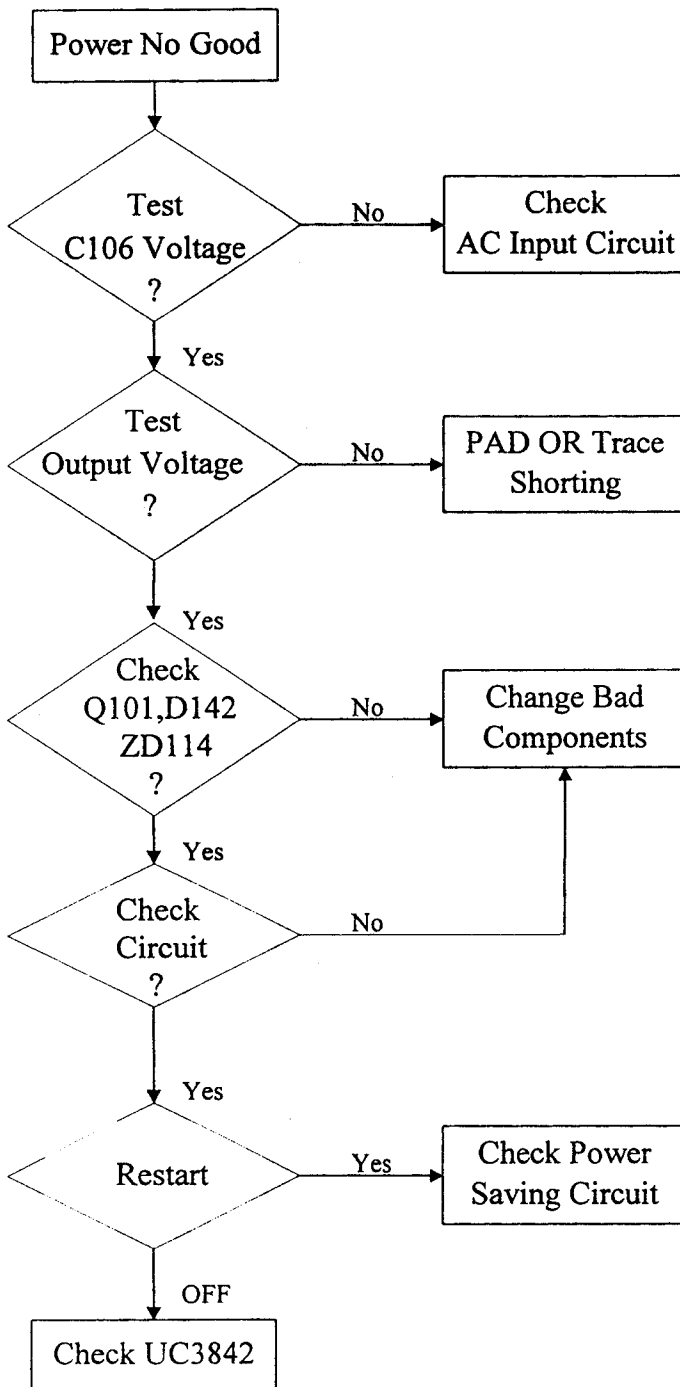
Block Diagram



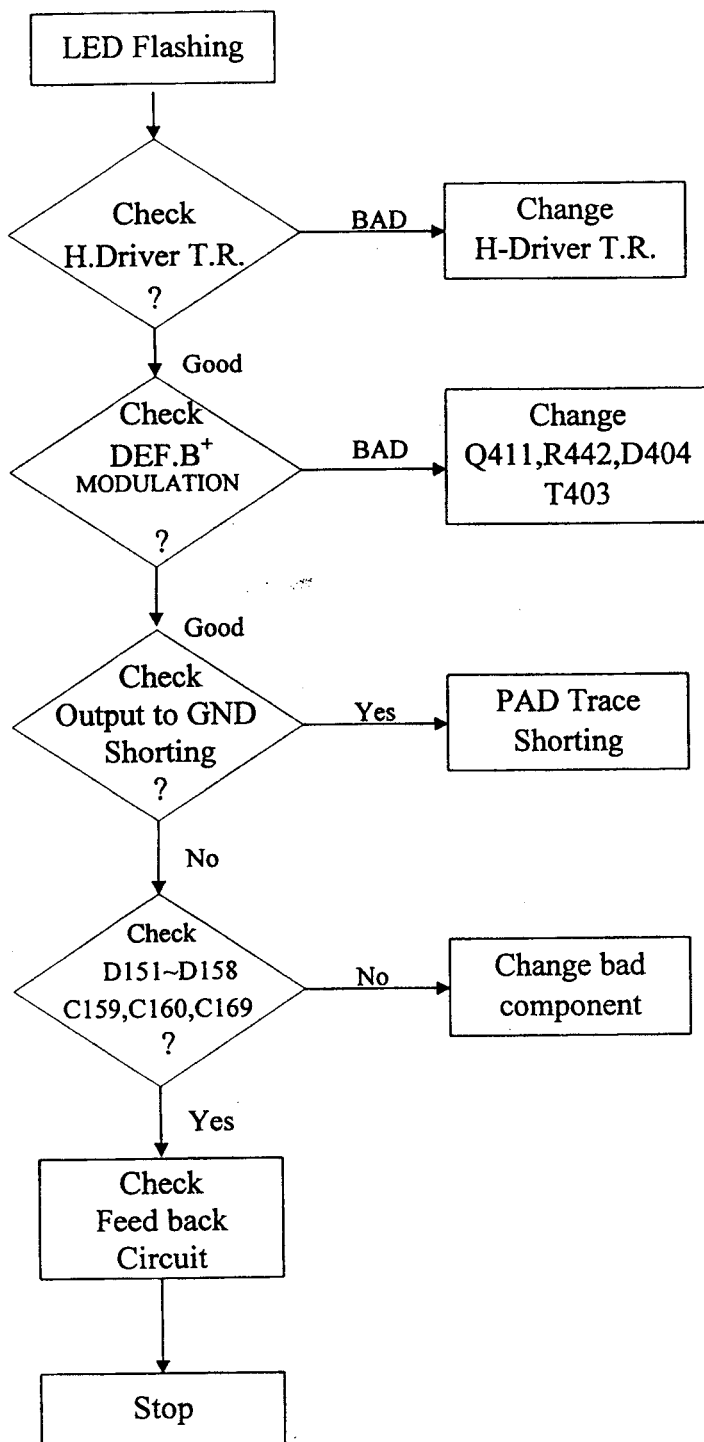
TROUBLE SHOOTING CHART

A. POWER SUPPLY CIRCUITS

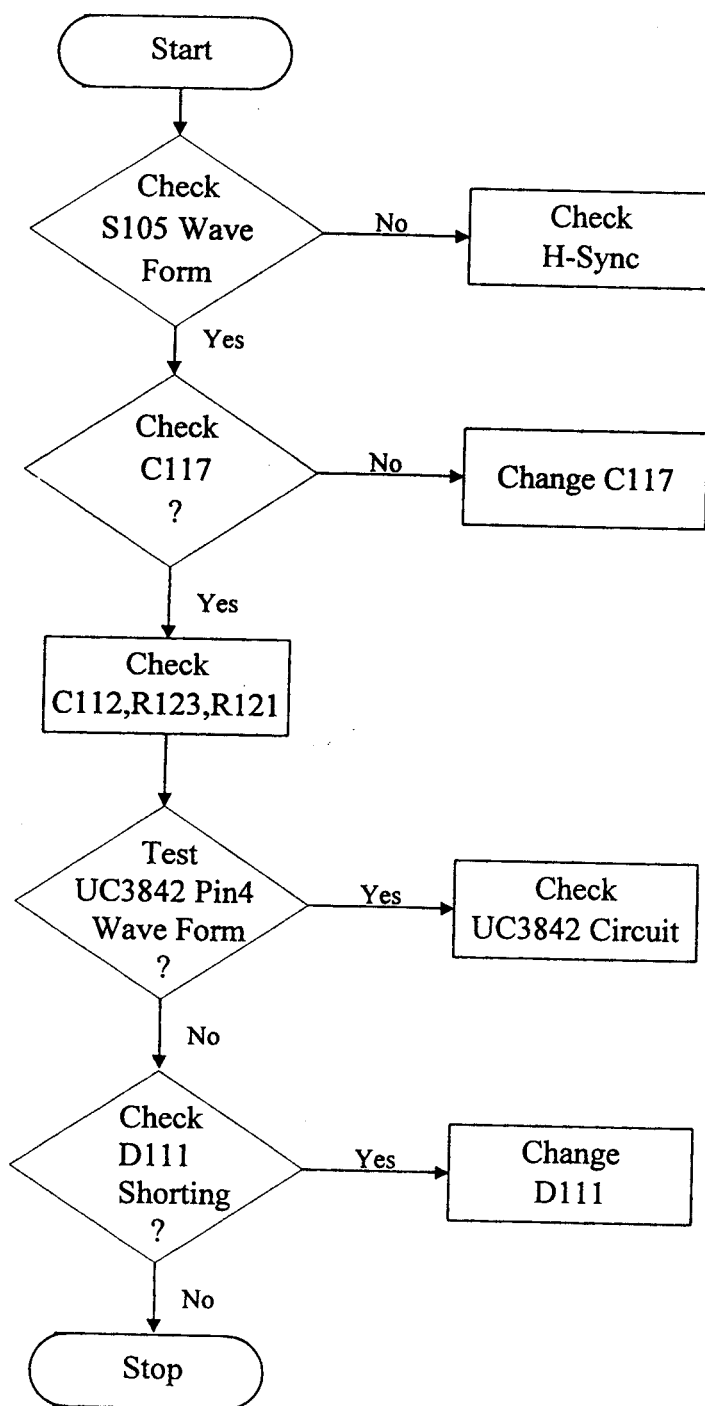
a. POWER NO GOOD

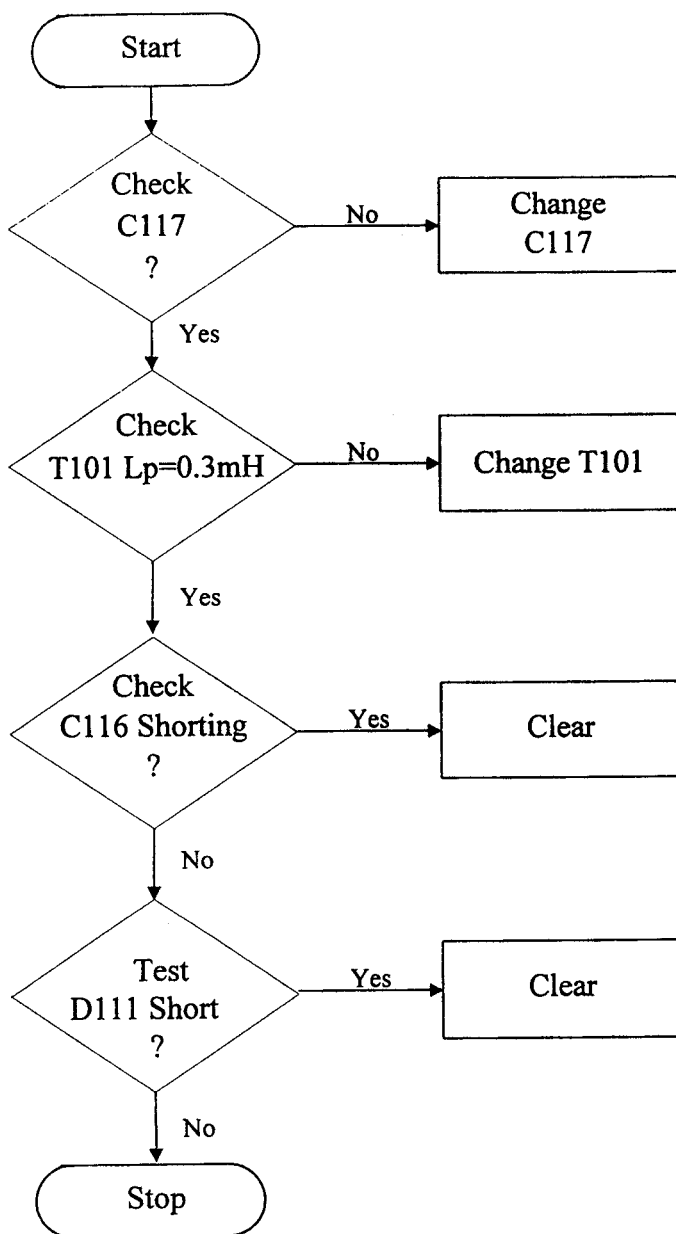


b. LED FLASHING

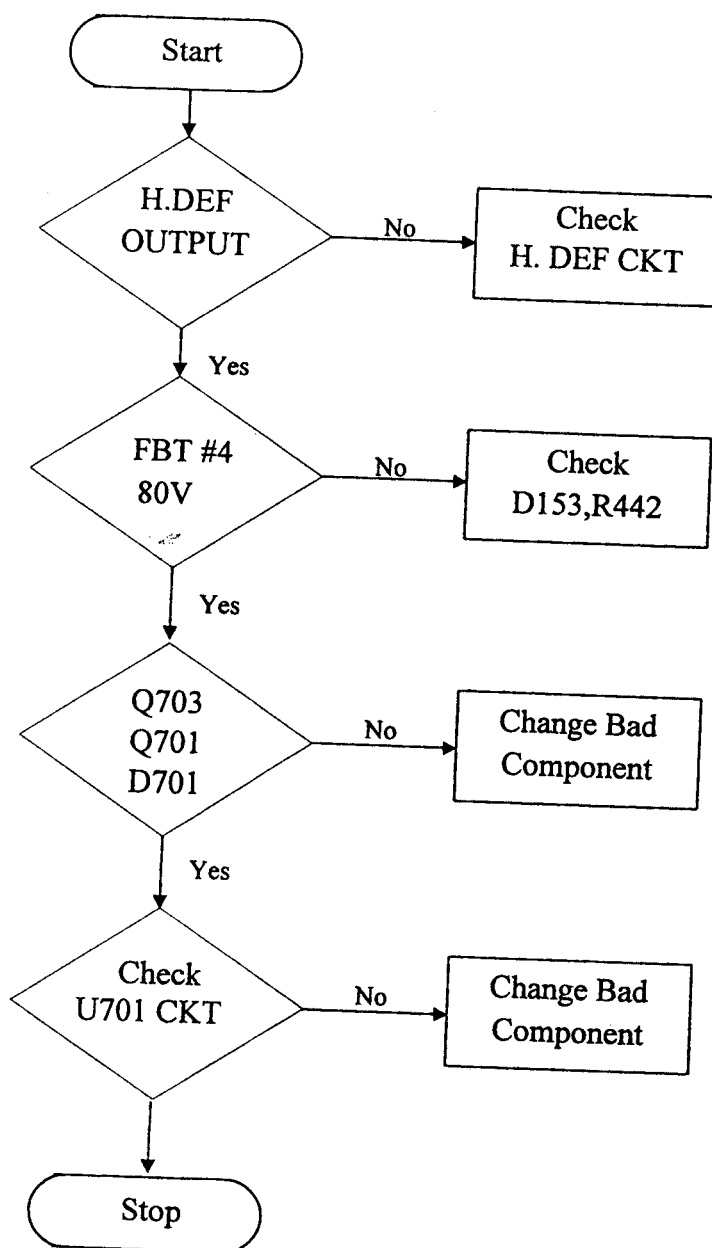


c. H-SYNC Interference



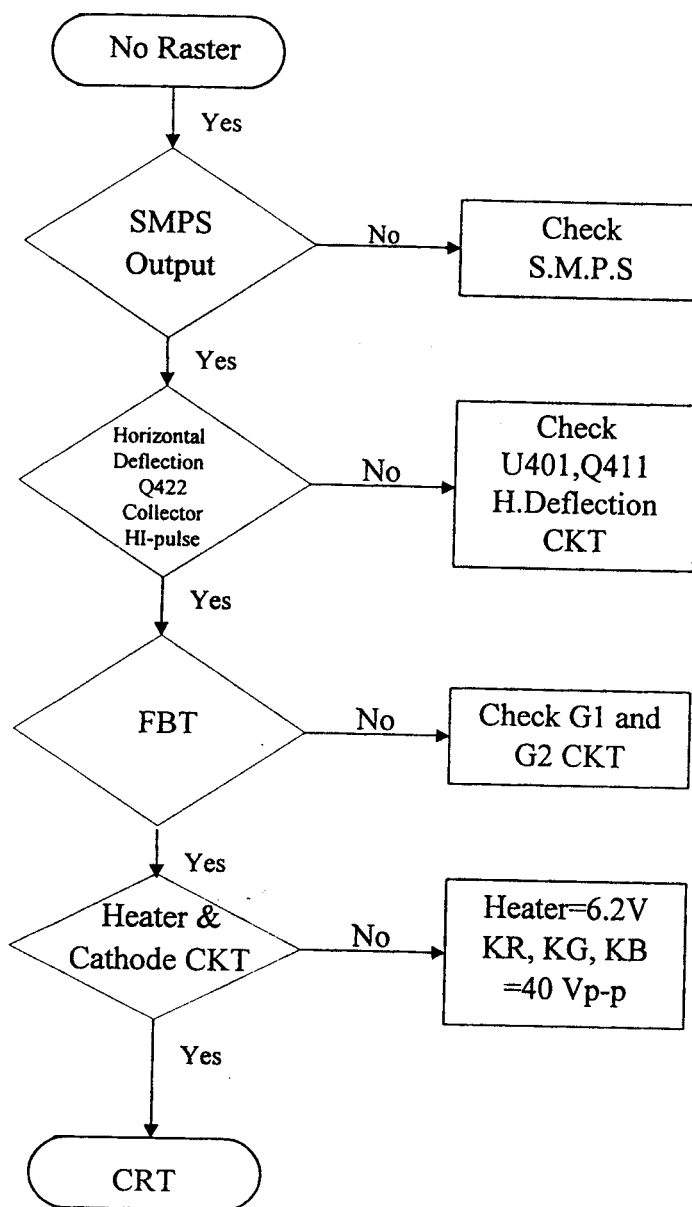


e. NO HIGH VOLATGE

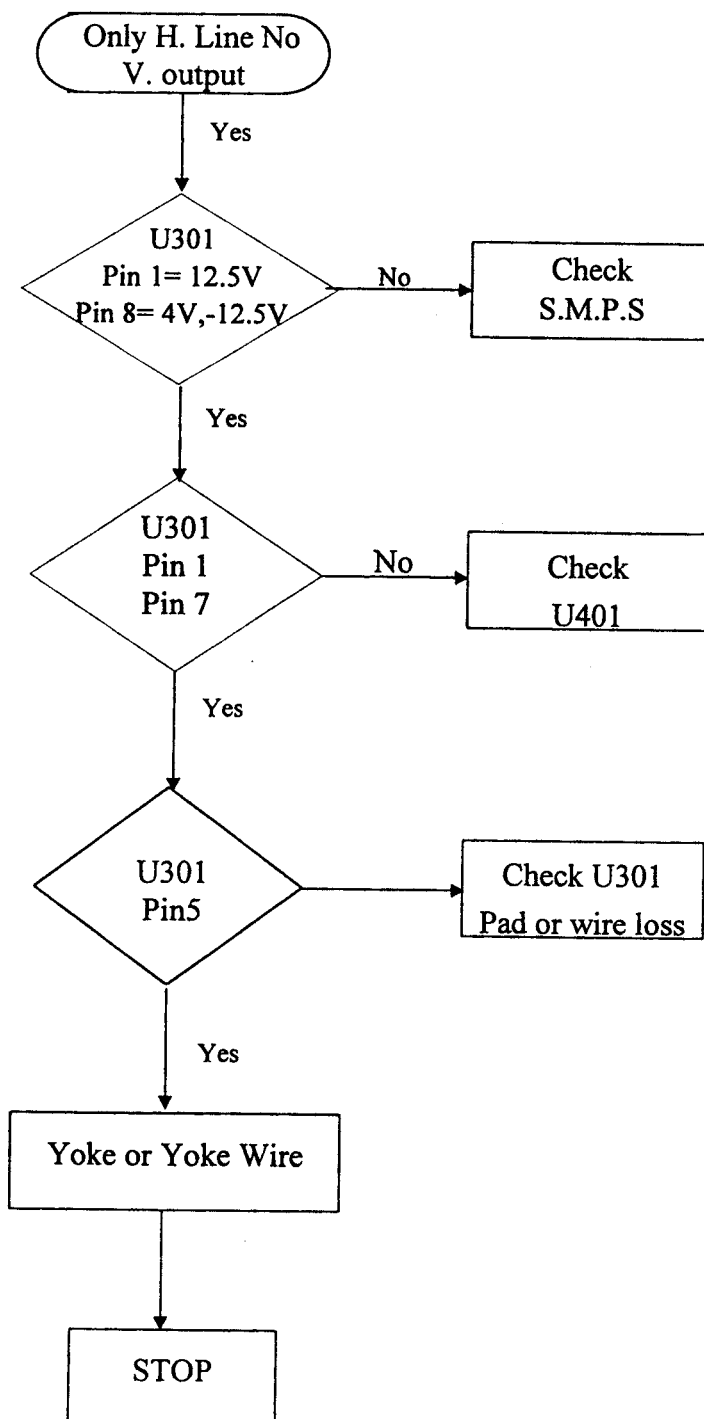


B. VIDEO CIRCUIT

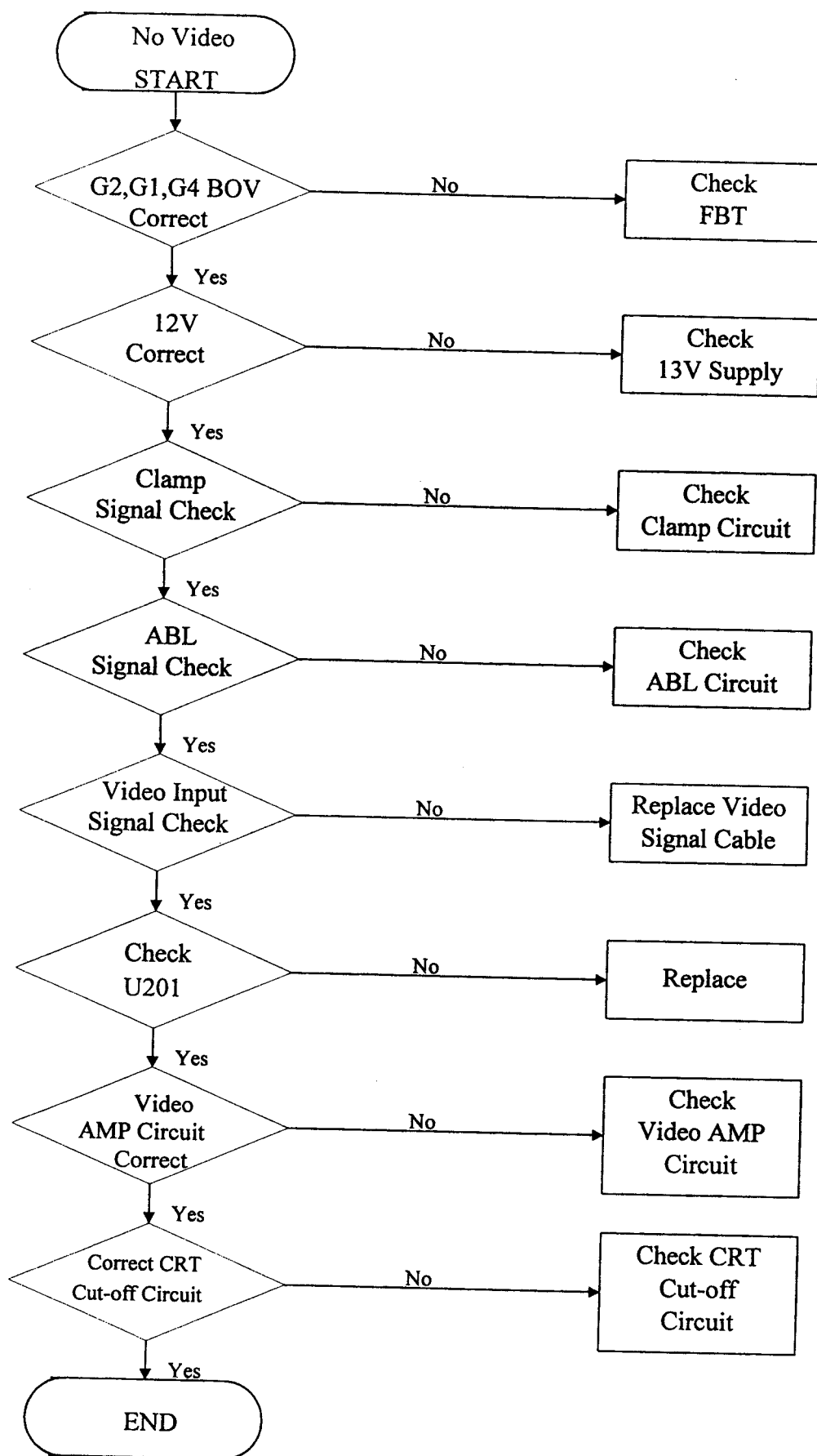
a. NO RASTER



b. ONLY H.LINE NO V. OUTPUT



c. NO VIDEO

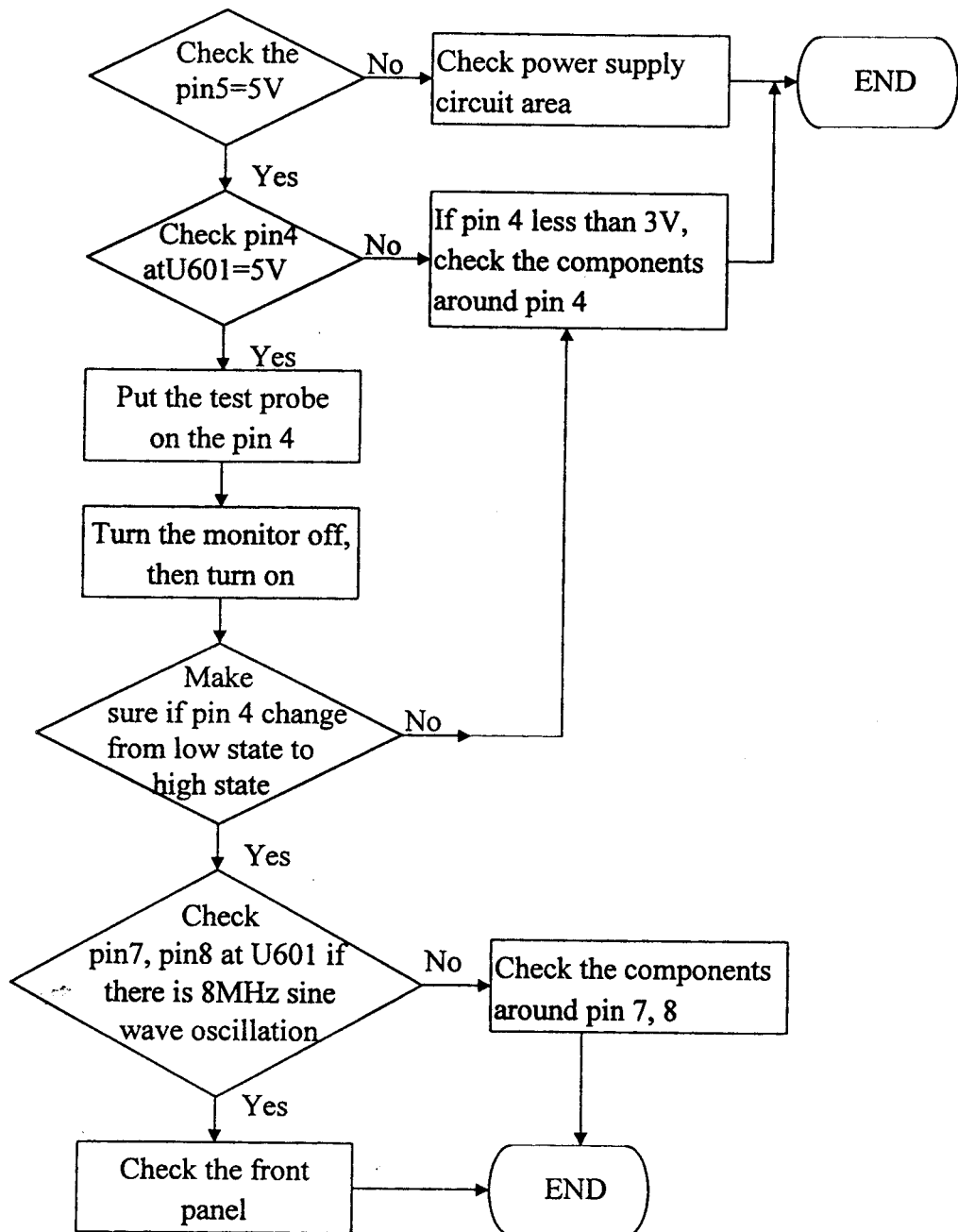


C. CPU Service Procedure

- 1.The CPU is malfunction.
- 2.The OSD is malfunction.
- 3.The data message could not be stored by E2PROM.
- 4.The CS signal from CPU is not working properly.
- 5.During mode change, there is a annoying picture appear on screen.

Solutions:

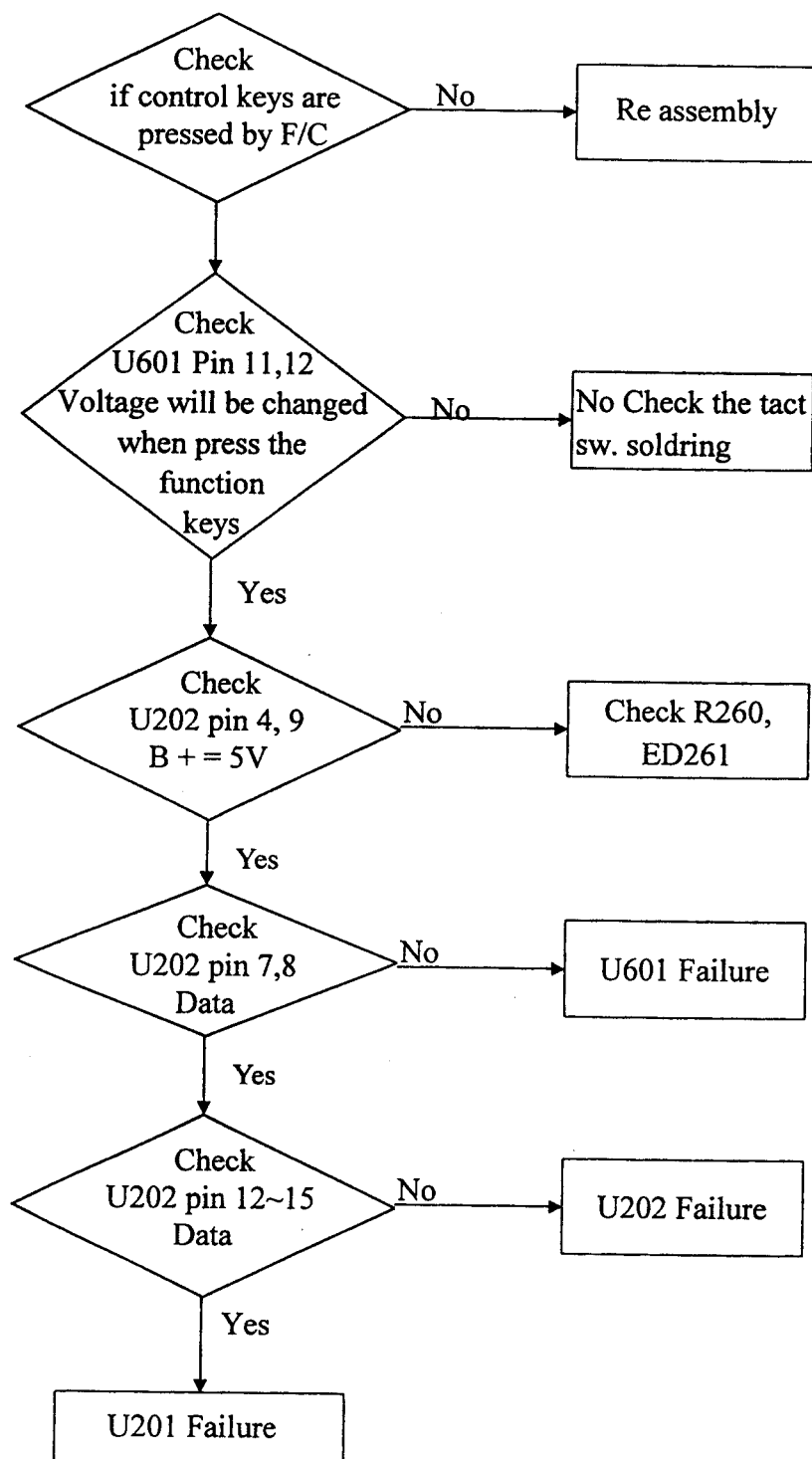
1.The CPU is malfunction



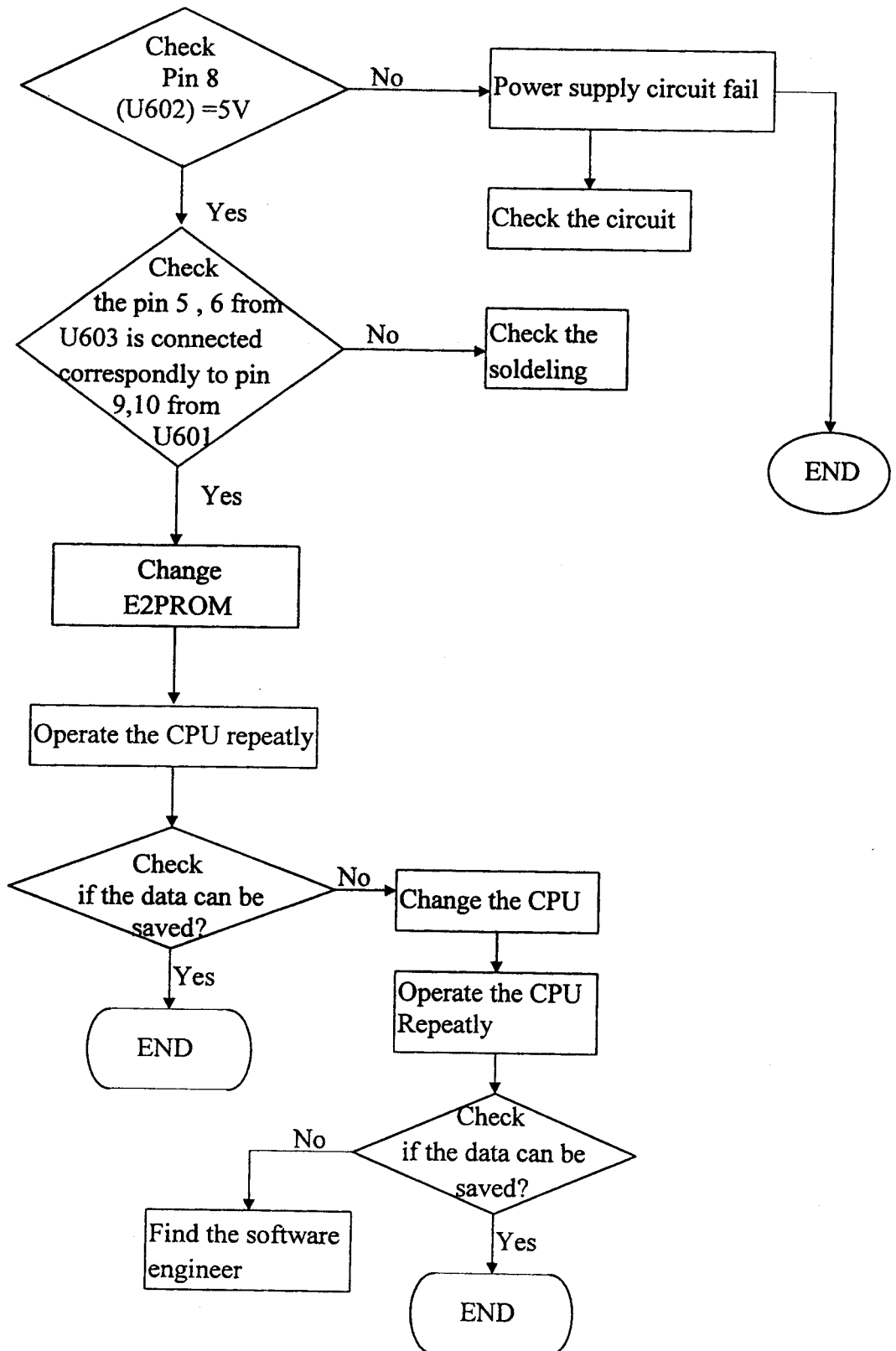
Note:

The CPU mal function is usually caused by the pin 4 not turning to low at power on (this step will initialize the CPU address to ZERO), and then pin 4 return to high state (at least 3V), for the CPU to operate normally.

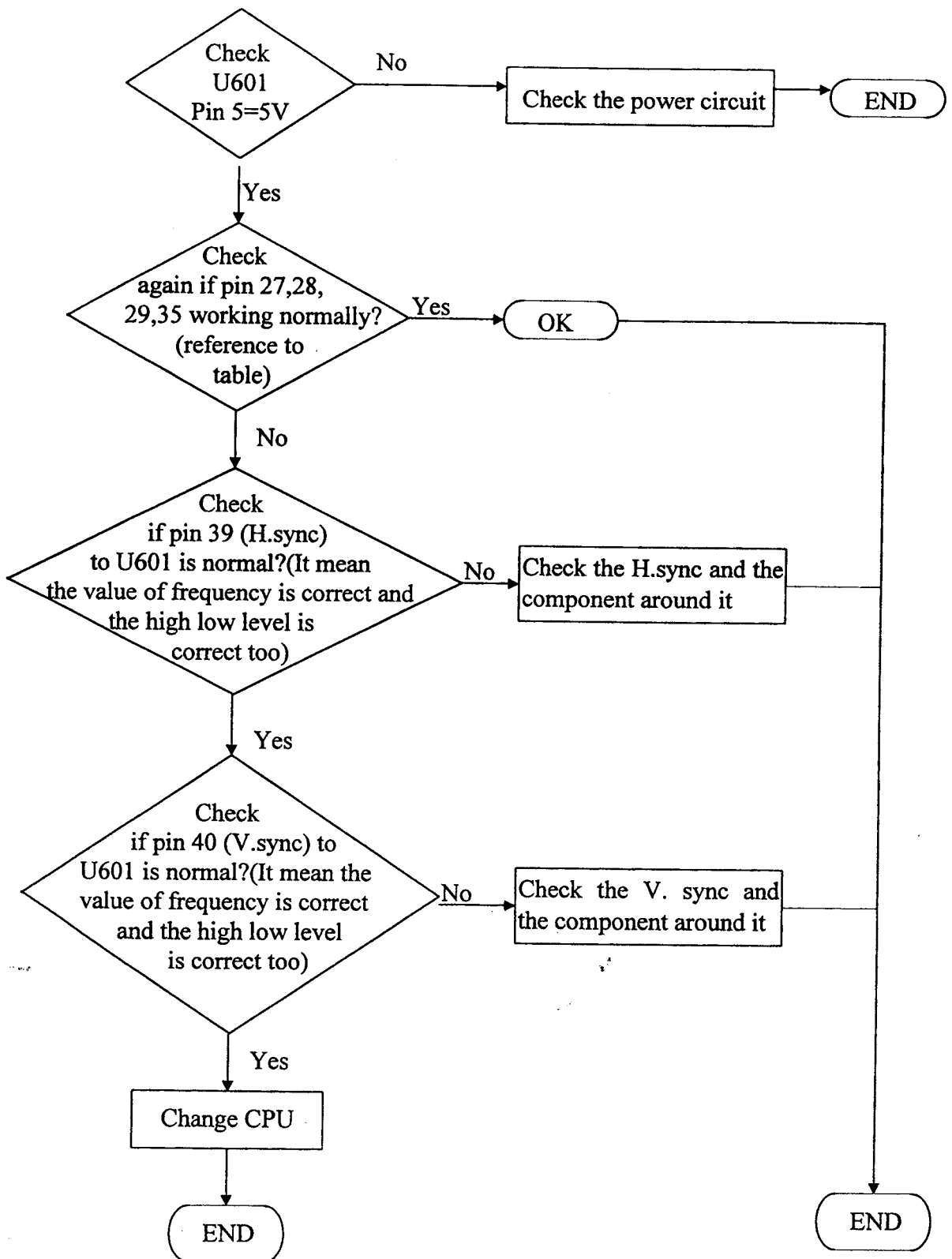
2. The OSD is malfunction



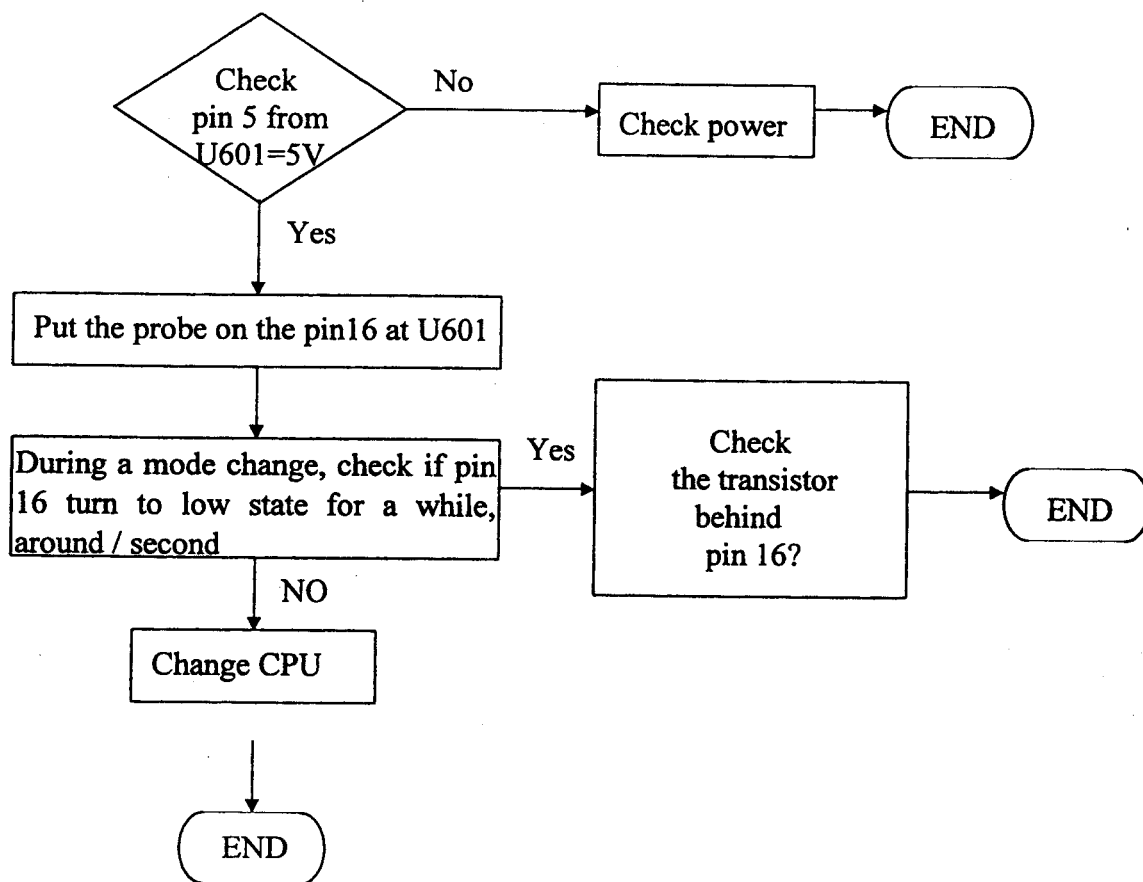
3. The data message could not be stored by E2 PROM



4. The CS signal from monitor is not working properly



5. During mode change, there is a noise picture appear on screen



Note: Pin 16 from U601 is mute signal , active low.

SERVICE COMPONENTS

Important Safety Notice

Components identified by the international symbol  have special characteristics important for safety. When replacing any of these components use only manufacture's specified parts.

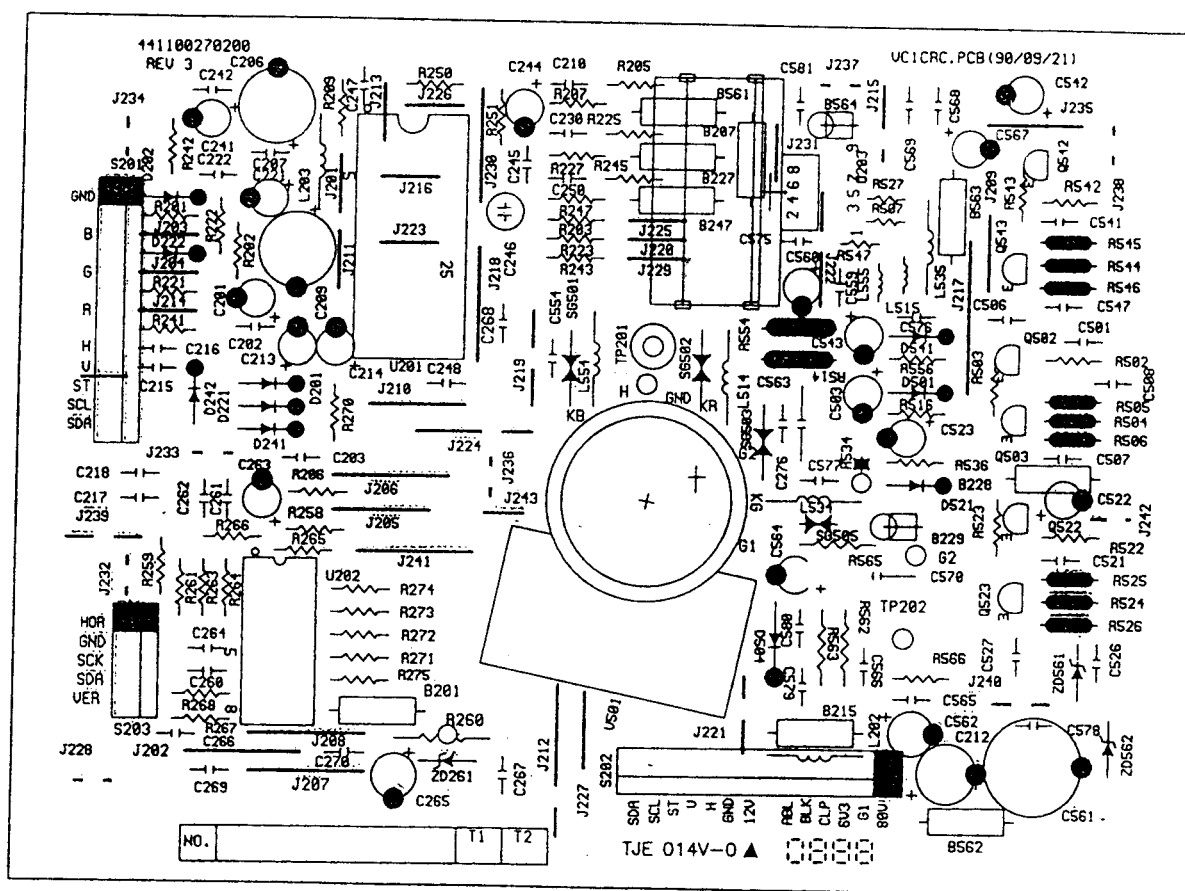
RESISTOR

PART NAME & DESCRIPTION			
TYPE		ALLOWANCE	
C	Carbon	F	$\pm 1\%$
F	Fuse	J	$\pm 5\%$
M	Metal Oxide	K	$\pm 10\%$
S	Solid	M	$\pm 20\%$
W	Wire Wound	G	$\pm 2\%$

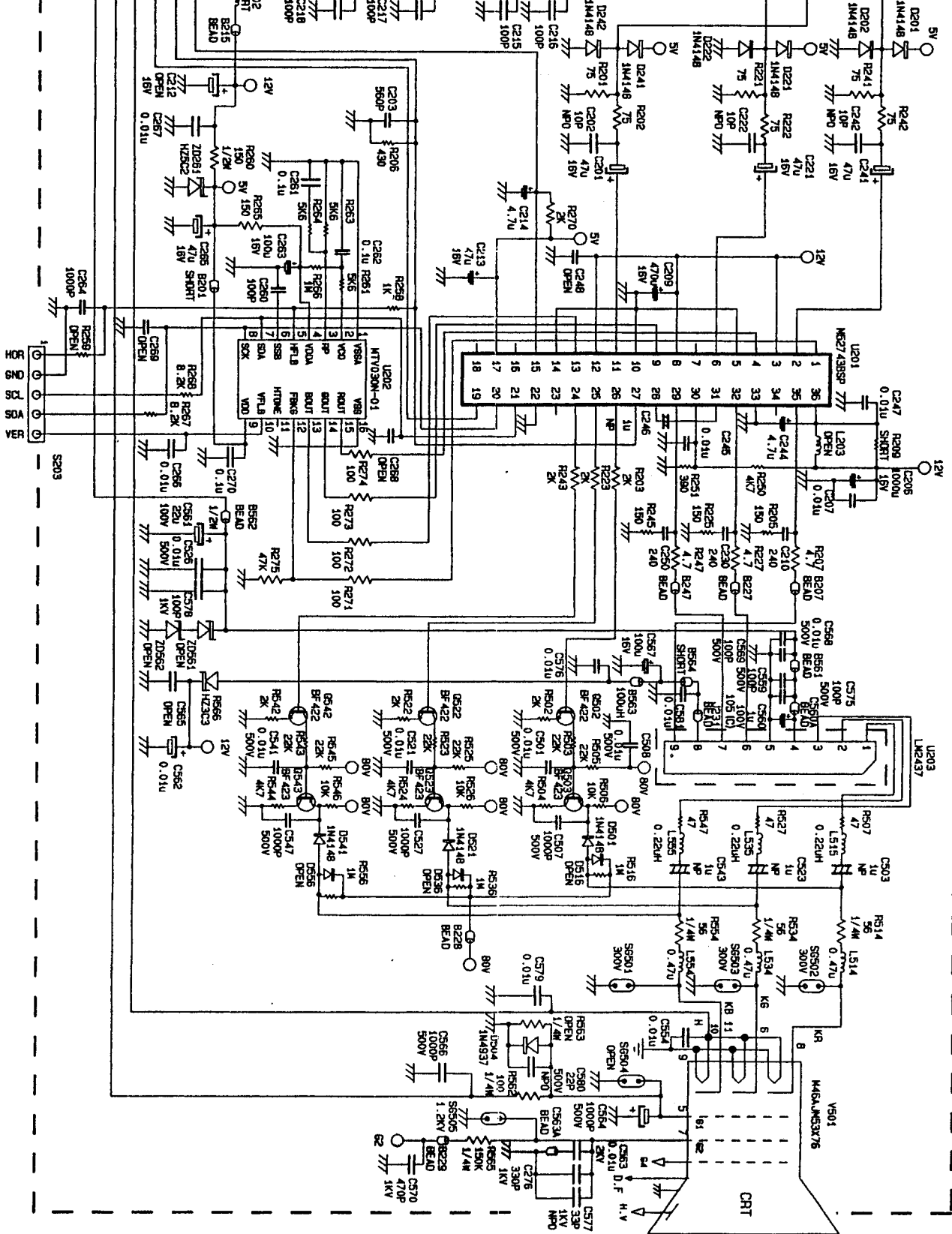
CAPACITOR

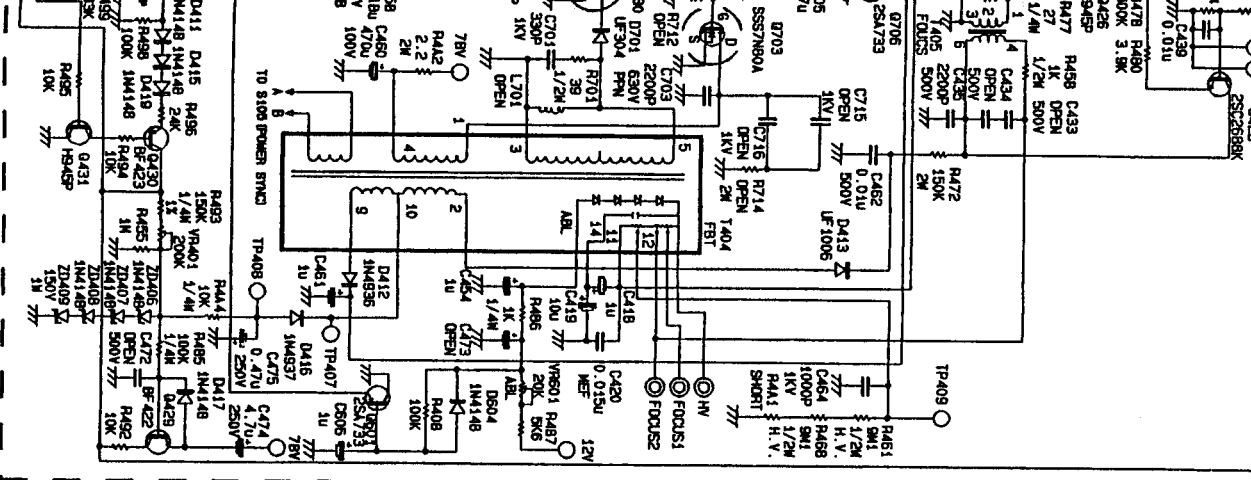
PART NAME & DESCRIPTION			
TYPE		ALLOWANCE	
C	Ceramic	C	$\pm 0.25\text{pF}$
E	Electrolytic	D	$\pm 0.5 \text{ pF}$
P	Polyester	F	$\pm 1 \text{ pF}$
S	Styrol	J	$\pm 5 \%$
T	Tantalum	K	$\pm 10 \%$
PP	Polypropylene	L	$\pm 15 \%$
		M	$\pm 20 \%$
		P	+100%-0%
		Z	+80%-20%

PCB LAYOUT



CRT Drive Components





NOTE: 1. THE UNIT OF RESISTANCE * OHM * IS OMITTED (K-1000 OHMS AND M-1000 OHMS)
 2. ALL RESISTORS ARE * 1/8 W * AND * 5% * UNLESS OTHERWISE NOTED.
 3. ALL CAPACITORS RATING ARE * 50V * UNLESS OTHERWISE NOTED.

CONFIDENTIAL

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 THE PROPERTY OF
 ALL RIGHTS RESERVED.

APPROVALS

DATE

DRAWN L. S. HO 10/08/2001

CHECKED

ISSUED

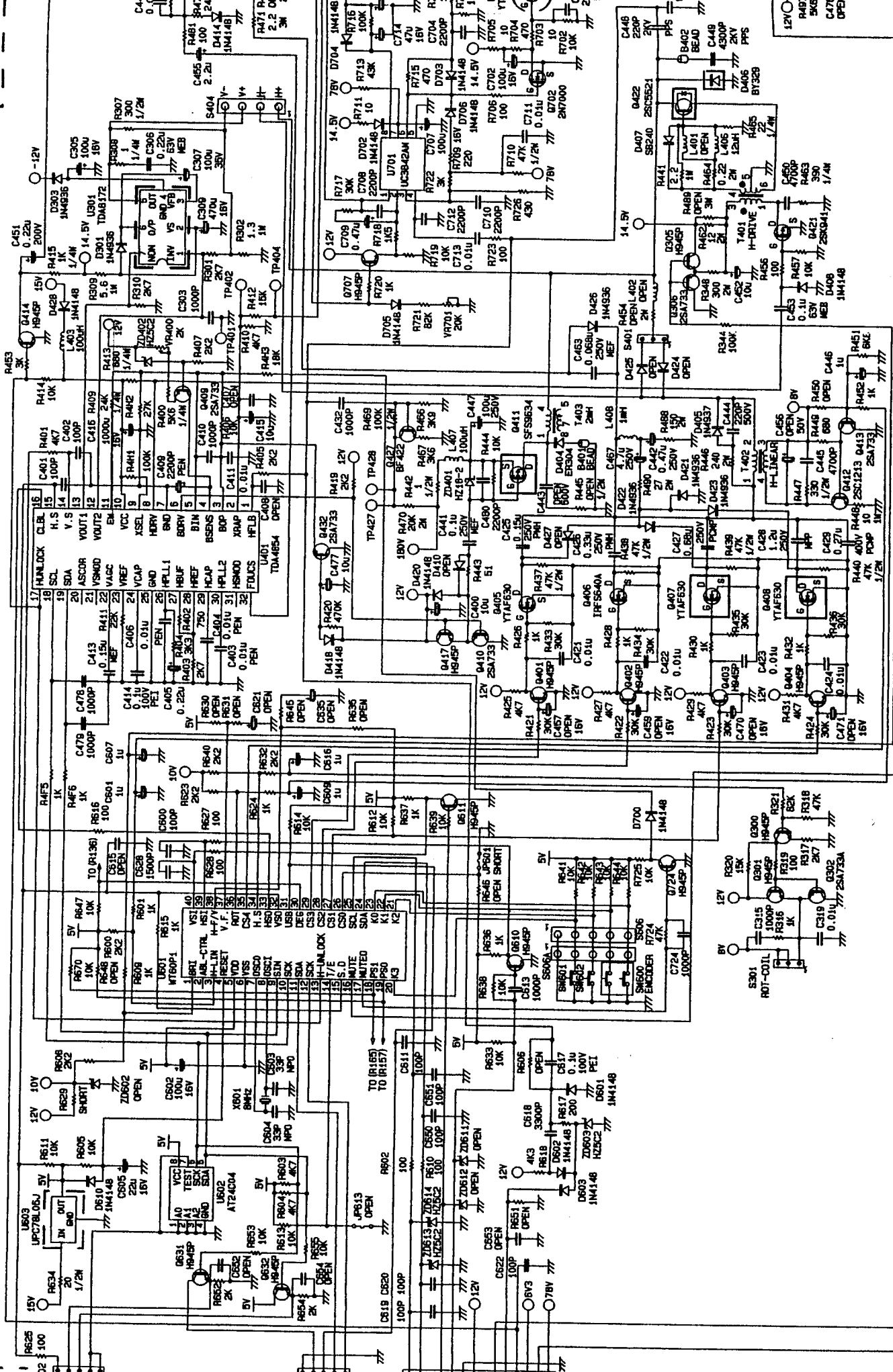
MANAGER

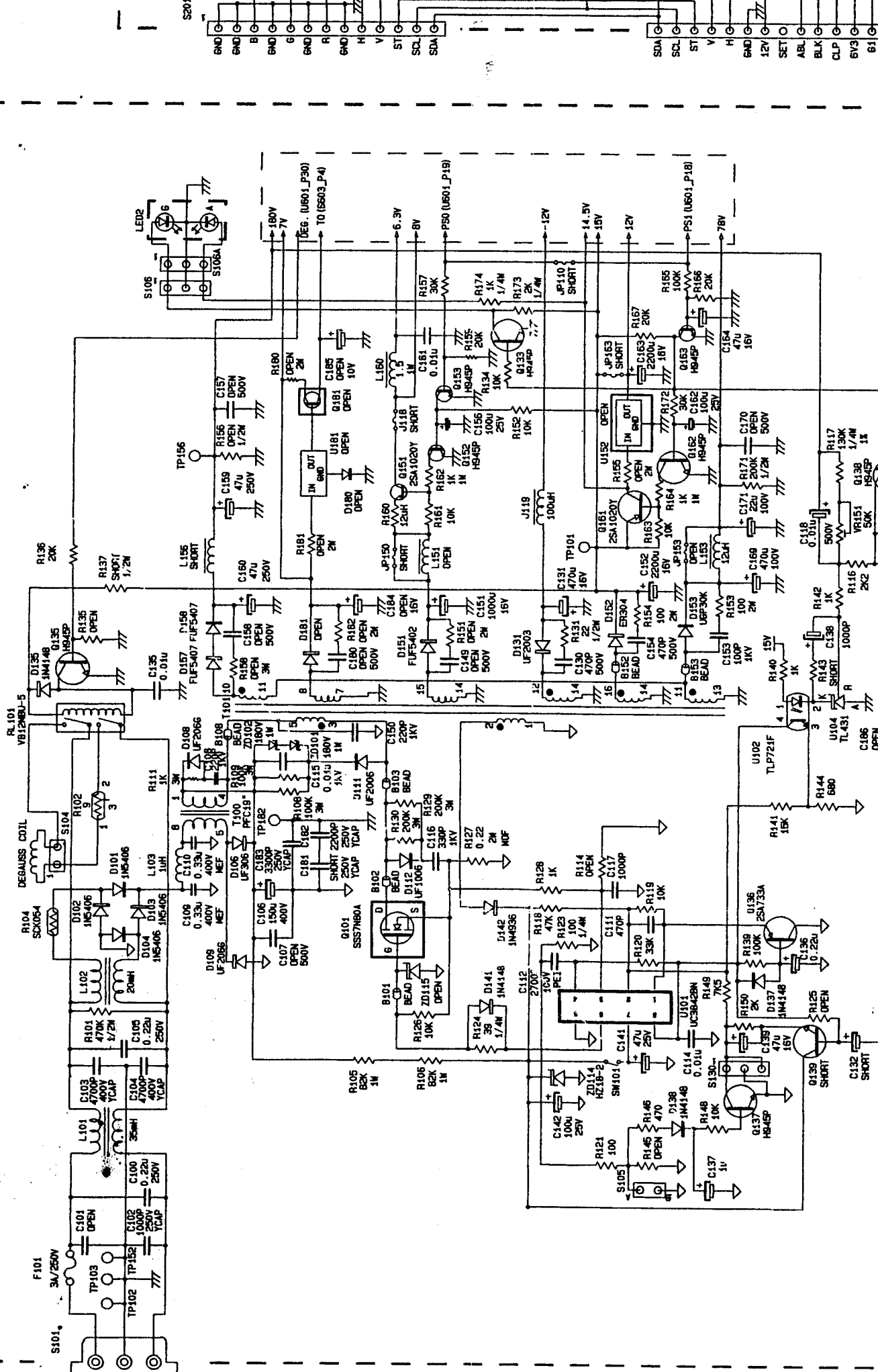
PCAD FILE : VC6MBB.SCH

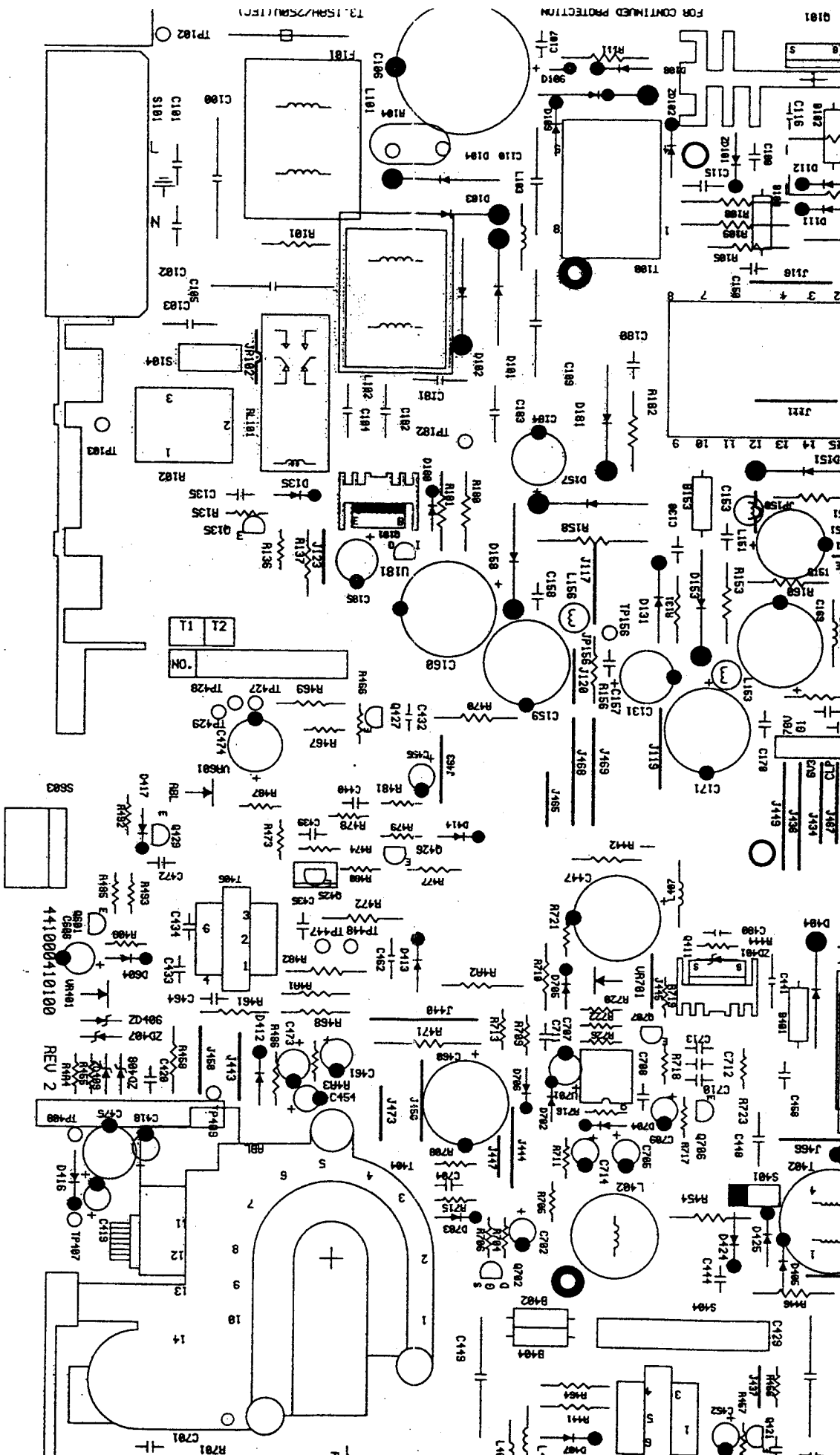
10 60 95

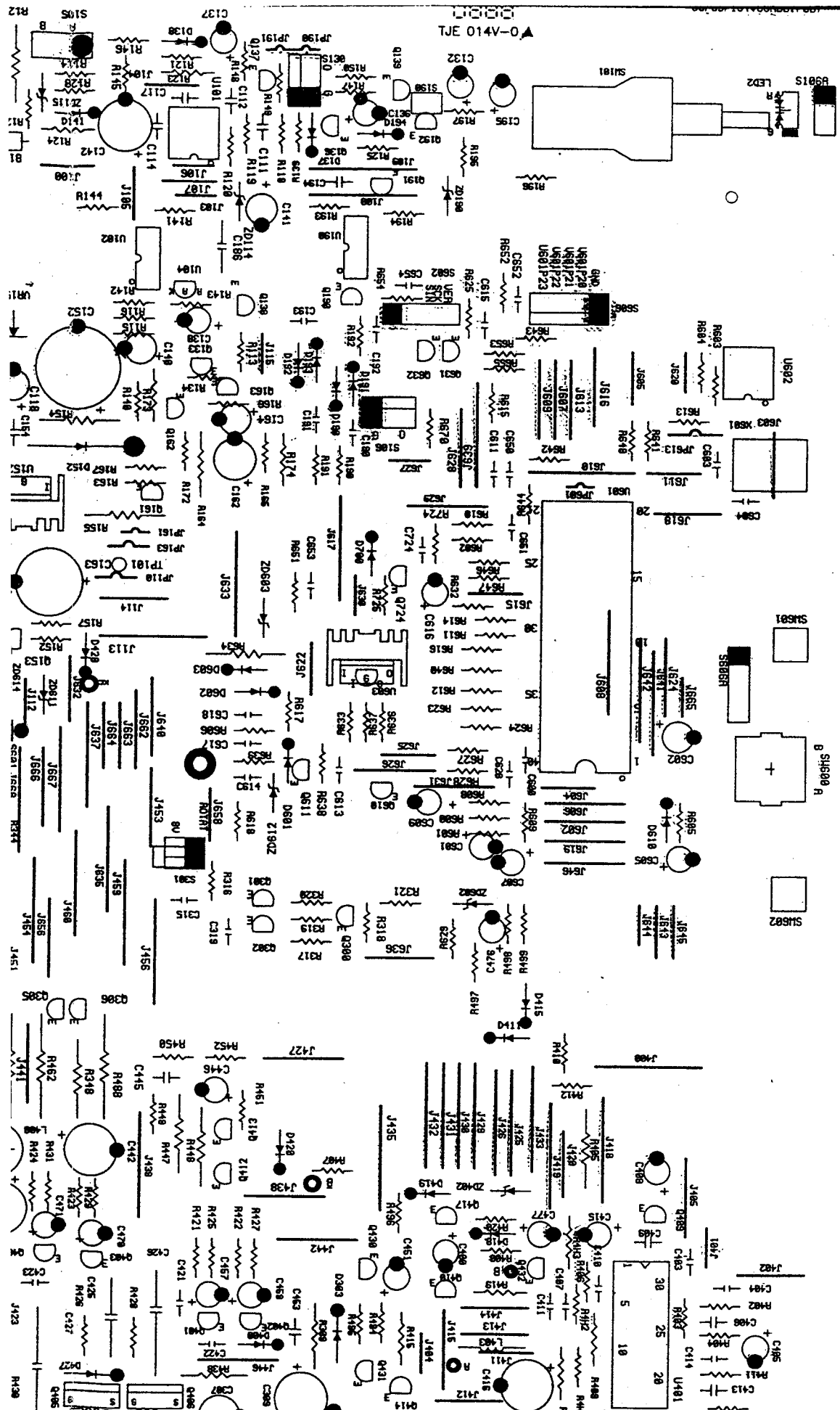
VC6
 MAIN BD & CRT BD SCHEMATIC

SIZE	MODEL	DWG. NO.	REV.
A1	106035	441000410000	B
SCALE	E/PD NO.	SHEET	1 OF 1









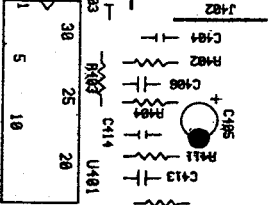
0-4V-10V

8 SH500 A

SH502

SH501

SH504



MAXDATA 19" 7S VC6 MECHANICAL PARTS LIST

NO	PARTS NO.	I.D	DESCRIPTION	QTY	35	771317050201	5901R	SCREW/CPTTR 4X8	1
1	710205300201	8701	FRONT COVER 7S MOUNTING	1	36	773406050201	5902P	SCREW/CITIC 3.0X8 2a	1
2	321400001507	V901D	DEGAUSSING COIL	1	37	773457070201	8700M	SCREW/CITIC 4X12	1
3	771607050201	8701H	SCREW/CPTIC 4.0X8	2	38	440000000600		GROUNDING BOARD	1
4	411903500504	V901	CRT 6.35mm	1	39	711901400101	8902	PCB SUPPORT PS-ORIG	3
5	775318110201	8701M	SCREW/CITIC 8x23	4	40	771608150201	8901U	SCREW/CPTIC 3.0x45	2
6	441100270100		CRT BOARD VC1	1	41	720107500201	8702	SIDE BRACKET(R)	1
7	720303400101	5903	VIDEO SHIELDING/VAI	1	42	773457070201	8702M	SCREW/CITIC 4X12	2
8	773408050201	U903H	SCREW/CITIC 3X8	1	43	720107400101	8708	CRT BRACKET(L)	1
9	730192200102	5902	HEAT SINK MAIN 19"	1	44	720107400201	8708M	CRT BRACKET(R)	1
10	710302100502	8901	BACK COVER TYPE 1 TCO(GE)	1	45	773457070201	8703M	SCREW/CITIC 4X12	1
11	710100400101	8701M	MASK PANEL 19" MAXDATA	1	46	712000300101	8901P	TRANSISTOR WASHER	1
12	711901200101	8901	PCB SUPPORT 19" 7S	2	47	532300005200	W902	CRT GROUNDING WIRE	1
13	711301800101	5901S	HOLDER	1	48	720303300101	8903H	VIDEO SHIELDING COVER	1
14	711805400101	8701P	PUSH BUTTON 7S NO.6(GE)	1	49	771376070201	U301M	SCREW/CPTIC 3.0X12 2a-C	1
15	711807200201	8701R	CONTROL BUTTON	1	50	711901300101	8903	PCB SUPPORT CHS-235M	3
16	711000400101	8701M	LINK SW.	1	51	771106030301	8903P	SCREW/CPW 3.0X5 M	1
17	760300400101	8701M	FOOT	4	52	475000100100	8901T	SILICON INSULATOR	1
18	710901400201	8901	SWIVEL BASE JBS(GE)	1	53	780203010201	8901M	MUT M3.0 3.0X0.5	1
19	720500100201	W201H	CLAMP SIGNAL CABLE	1	54	720800200101	8701L	TM PLATE INSERT	1
20	710701200101	8702	SWIVEL BALL JBS(GE)	1	55	720800200101	8701R	TM PLATE INSERT	1
21	773456050201	5902M	CITIC 3.0x2mm	3	56	720107500101	8703	SIDE BRACKET (L)	1
22	770457050201	5101M	SCREW/CITIC 4.0x2mm	2	57	773457070201	8703M	SCREW/CITIC 4X12	2
23	771376050201	5901T	SCREW/CPTSPB 3x2mm	2	58	440000000700		GROUNDING BOARD	1
24	773457060201	5902N	SCREW/CITIC 4.0x10mm	1	59	711901400101	8904	PCB SUPPORT PS-ORIG	3
25	772306060201	5901U	SCREW/CPW 3.0x10 2a-C	1	60	773456070201	8701M	SCREW/CITIC 3X12	2
26	773356050201	5901R	SCREW/CITIC 3x2mm	1	61	773456070201	8700M	SCREW/CITIC 4X12	1
27	720107300102	5901	FUNCTIONAL BRACKET	1	62	711101900201	8703	KNOW ENCODER	1
28	773457100201	8901T	SCREW/CITIC 4.0x20	2	63	711701500201	8701S	DECORATING (L)	1
29	740328300401	8901M	B/C LABEL	1	64	711701600201	8701T	DECORATING (R)	1
30	730401700301	U903M	HEAT SINK	1	65	720305500101	8701T	SHIELDING COVER FOR M/A	1
31	710800400101	8708	FASTENING RING JYLOH	1	66	720306000101	8701T	SHIELDING BUTTON FOR M/A	1
32	441000410000		MAIN BOARD	1					
33	730400201401	8101M	HEAT SINK	1					
34	720400500101	8701G	SPRING 7.0X14mm	1					

TORQUE = Kgf-cm

DESIGNER:SWAN

