

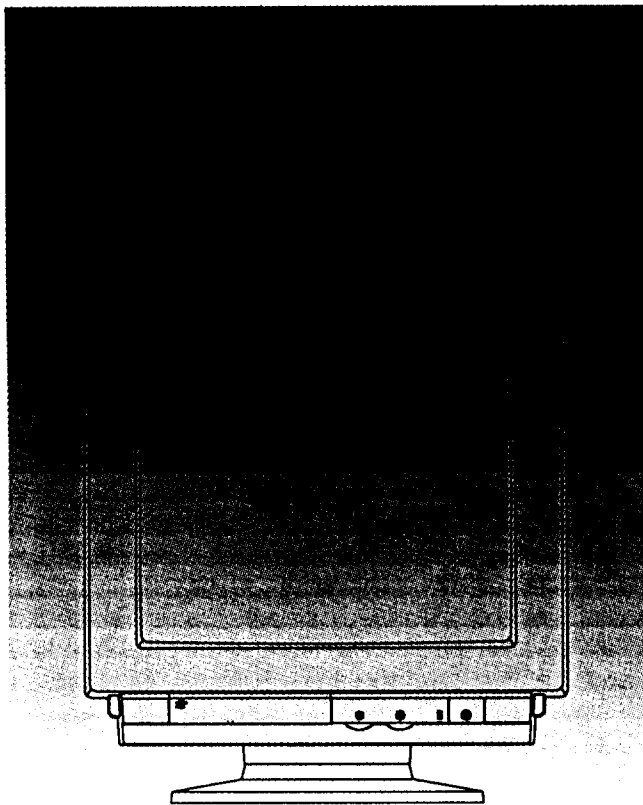
SAMSUNG

COLOR MONITOR

CVM496*P, CVM478*P

SERVICE *Manual*

COLOR MONITOR



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SPECIFICATION

Classification	Specifications
Picture Tube	14", 90° Deflection, 0.28 / 0.39 mm (See page 3-1), Non-glare or Glare (See page 3-1).
Scanning Frequency Horizontal / Vertical	31.47kHz/70Hz, 31.47kHz/60Hz, 35.52kHz/87Hz, 37.86kHz/72.8Hz, 35.16kHz/56Hz, 37.88kHz/60.3Hz.
Display Colors Analog Input	Unlimited Colors.
Maximum Resolution (Interlace Mode) Horizontal x Vertical	1024 Dots x 768 Lines.
Input Signal Video Signal Separate Sync	Analog 0.714Vpp Positive at 75 Ω Terminated. TTL level Positive / Negative.
Video Band Width (Pixel Time)	45 MHz (MAX.).
Power Supply Power consumption	AC 90-264 Volt 60/50 Hz \pm 3 Hz. 80 Watts (MAX.).
Dimension Unit (HxWxD) Carton (HxWxD)	14.3 x 14 x 15 Inches (362.5 x 356 x 380 mm). 18.2 x 18 x 15.7 Inches (462 x 457 x 398 mm).
Weight Approximately) Net Gross	25 Lbs 5.6 oz (11.5 kg). 28 Lbs 10.6 oz (13 kg).
Environmental Considerations Operating Temperature Humidity Storage Temperature Humidity	32° F to 104° F (0° C to 40° C). 10 % to 80 %. -4° F to 113° F (-20° C to 45° C). 5 % to 95 %.
MPRII compliance	Model numbers with a "L" suffix comply with SWEDAC(MPRII) recommendations for reduced electric and magnetic fields.

NOTE : DESIGNS and SPECIFICATIONS are subjected to change without prior NOTICE.

SAFETY PRECAUTIONS

Service work should be performed only by qualified service technicians who are thoroughly familiar with all of the following safety checks and servicing guidelines:

1. Warning

- 1) For continued safety, do not attempt to modify the circuit.
- 2) Disconnect the AC power before servicing.
- 3) Semiconductor heat sinks are potential shock hazards when the chassis is operating.

2. Servicing the High Voltage System and Picture Tube

When servicing the high voltage system, remove the static charge by connecting a 10kohm resistor in series with an insulated wire (such as a test probe) between the chassis and the anode lead. (The AC line cord should be disconnected from the AC outlet.)

- 1) The picture tube in this display monitor employs integral implosion protection.
- 2) Replace with a tube of the same type and number for continued safety.
- 3) Do not lift the picture tube by the neck.
- 4) Handle the picture tube only when wearing shatter proof goggles and after discharging the high voltage anode completely.

3. X-Radiation and High Voltage Limits

- 1) Be sure all service personnel are aware of the procedures and instructions covering X-radiation. The only potential source of X-ray in a current solid state display monitor is the tube. However, the picture tube does not emit measurable X-ray radiation if the high voltage is as specified in the "high voltage check" instruction. It is only when high voltage is excessive that X-radiation is capable of penetrating the shell of the picture tube, including the lead in glass material. The important precaution is to keep the high voltage below the maximum level specified.
- 2) It is essential that serviceman have available at all times an accurate high voltage meter. The calibration of this meter should be checked periodically.
- 3) High voltage should always be kept at the rated value-no higher. Operation at high voltages may cause a failure of the picture tube or high voltage circuitry and, also under certain conditions, may produce radiation in excess of desirable levels.

- 4) When the high voltage regulator is operating properly there is no possibility of an X-radiation problem. Every time a color chassis is serviced, the brightness should be tested while monitoring the high voltage with a meter to be certain that the high voltage does not exceed the specified value and that it is regulating correctly.
- 5) Do not use a picture tube other than that specified, or make un recommended circuit modifications to the high voltage circuitry.
- 6) When troubleshooting taking test measurements on a display monitor with excessively high voltage, avoid being unnecessarily close to the display monitor. Do not operate the display monitor longer than is necessary to locate the cause of excessive voltage.

4. Fire and Shock Hazard

Before returning the display monitor to the user, perform the following safety checks:

- 1) Inspect all lead dress to make certain that the leads are not pinched or that hardware is not lodged between the chassis and other metal parts in the display monitor.
- 2) Inspect all protective devices such as nonmetallic control knobs, insulating materials, cabinet backs, adjustment and compartment cover or shields, isolation resistor-capacitor networks, mechanical insulators, etc.
- 3) To be sure that no shock hazard exists, checks for leakage current in the following manner:
 - ① Plug the AC line cord directly into a 120volt AC outlet. (Do not use an isolation transformer for this test)
 - ② Using two clips leads, connect 1.5 kohm, 10 watt resistor paralleled by a 0.15uF capacitor in series with all exposed metal cabinet parts and a known earth ground, such as electrical conduct or electrical ground connected to earth ground.
 - ③ Use a SSVM or VOM with 1000 ohms per-volt or higher sensitivity to measure the AC voltage drop across the resistor. (See Figure 1.)

SAFETY PRECAUTIONS

- ④ Connect the resistor to all exposed metal parts having a return path to the chassis (metal cabinet, screw heads, knobs and shafts, escutcheon, etc.) and measure the AC voltage drop across the resistor.
- ⑤ Any reading of 5.25volt RMS (this corresponds to 3.5milliampere AC) or more is excessive and indicates a potential shock hazard which must be corrected before returning the display monitor to the user.

5. Product Safety Notices

Some electrical and mechanical parts have special safety-related characteristics which are often not evident from visual inspection, nor can the protection they give necessarily be obtained by replacing them with components rated for higher voltage, wattage, etc. Parts that have special safety characteristics are identified by (Δ) on schematics and parts lists. Use of a substitute replacement that does not have the same safety characteristics as the recommended replacement part might create shock, fire and / or other hazards. Product safety is under review continuously and new instructions are issued whenever appropriate.

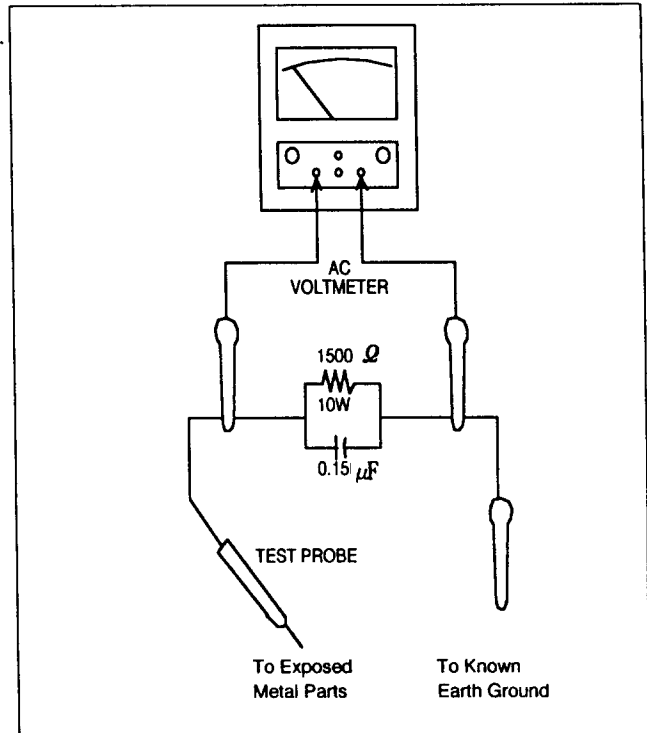


Figure1. Leakage Current Test Circuit

GENERAL INFORMATION

1. Features

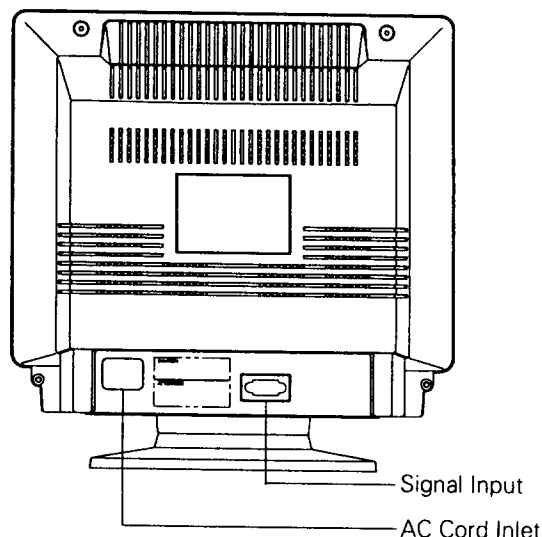
- 1) 14 inch (13.5 inch visual) high performance CRT.
- Available in 0.28 / 0.39 mm dot pitch
- 2) Automatically scans frequencies from 31.47kHz / 70Hz,
31.47kHz / 60Hz, 35.52kHz / 87Hz, 37.86kHz / 72.8Hz,
35.16kHz / 56Hz, 37.88kHz / 60.3Hz.
- 3) Compatible with a wide variety of video standards
including VGA, IBM 8514/4(XGA), and Super VGA.
- 4) Supports VESA flicker-free modes.
- 5) Size and position controls are located up front for easy
and accurate adjustment.
- 6) The optional tilt and swivel stand may be attached to
provide a variety of viewing angles, or not attached if
limited workspace is a consideration.
- 7) Power supply operates on AC 100-240 Volt 60/50 Hz for
use all over the world.
- 8) Your display has been designed to operate on all power
systems, including "IT" power systems.
- 9) Power Management System
Power management circuit, when signaled by the
computer system, will reduce power consumption when
the computer system is not in use.

Note: This manual cover the following models

CRT Screen	CRT Dot Pitch	1423 Cabinet	
Non Glare	0.28mm 0.39mm	CVM4967P CVM4963P	CVM4967PL CVM4963PL
Glare	0.28mm 0.39mm	CVM496PP CVM4962P	CVM496PPL CVM4962PL
Remark	—	—	MPRII

CRT Screen	CRT Dot Pitch	1486 Cabinet	
Non Glare	0.28mm 0.39mm	CVM4787P CVM4783P	CVM4787PL CVM4783PL
Glare	0.28mm 0.39mm	CVM478PP CVM4782P	CVM478PPL CVM4782PL
Remark	—	—	MPRII

2. Installation



This monitor can be connected to any IBM compatible analog display adapter. Such adapters include VGA, 8514/A, XGA, and the built-in video system of IBM PS/2 computers and compatibles.

To attach the monitor to your system, use the following instructions:

- 1) Turn off the power to the computer.
- 2) Insert AC power cord into monitor and then into an AC power outlet.
- 3) Connect the 9 pin side of the signal cable to the 9 pin D-SUB connector on the rear side of the monitor.
- 4) Connect the 15 pin side of the signal cable to the video output port of your video controller.

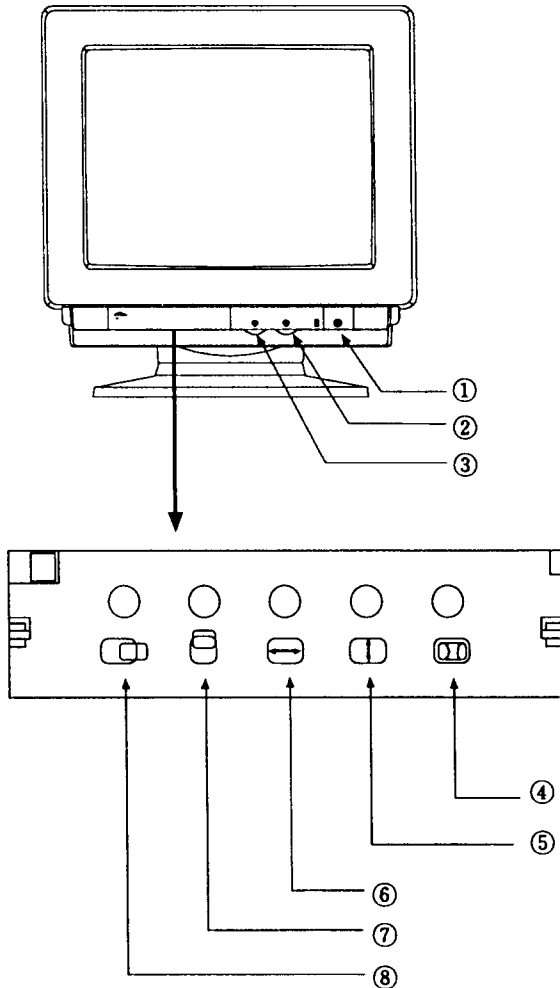
Note: Please see the connector pin assignment chart for the video controller (video controller manual) and the connector pin assignment chart for the monitor (Page 3-3 this manual) if the video controller does not have a standard 15 pin D-SUB connector.

- 5) Before turning on the power to the monitor and computer, check your computer's owner's manual for instructions about turning on equipment connected to the computer. Also, check for any instructions for your video system when using a multi-sync monitor. In some cases, jumper or switch settings may be required for the video board to output extended resolution modes.
- 6) To turn on the monitor, push the power switch. The power indicator LED will light. To turn the monitor off, push the power switch once again. The power indicator LED will also turn off.

GENERAL INFORMATION

3. Control Location & Functions

3-1. Front View



1	Power Switch (PUSH)
2	Brightness Control
3	Contrast Control
4	Side Pincushion Control
5	Vertical Size Control
6	Horizontal Size Control
7	Vertical Position Control
8	Horizontal Position Control

3-2. Basic Controls and LED Indicator Functions

1) Power Switch



Use to turn monitor power on and off. Push switch once to turn monitor power on. LED power on indicator will also turn on. Push switch once again to turn monitor power off.

2) Brightness Control



Use to adjust the overall brightness of the displayed image.

3) Contrast Control



Use to adjust the contrast level of the displayed image. Contrast controls the difference between dark and light areas of the displayed image.

4) Side Pincushion Control



Adjust this control, to correct the vertical sides of the display from bowing out (barrel distortion) or bowing in (pincushion distortion).

5) Vertical Size Control



Adjust this control for the desired vertical size of the display.

6) Horizontal Size Control



Adjust this control for the desired horizontal size (width) of the display.

7) Vertical Position Control



Adjust this control for the proper vertical position (centering) of the display.

8) Horizontal Position Control



Adjust this control for the proper horizontal position (centering) of the display.

GENERAL INFORMATION

5. Power Management System (Power Saving Function)

If your computer system features a display power management function, this monitor, when signaled, will enter power savings modes. The purpose of power management is to automatically reduce power consumption when the computer system is inactive. This monitor can enter 3 different power savings modes as described below.

Note1: This monitor is energy star compliant when used with a computer equipped with DPMS (VESA).

Table : Display Power Management Signaling(DPMS) standard

State Sync	Normal operation	Power saving function mode		
		Stand-by mode	Suspend mode	Power Off mode
Horizontal	Active	Inactive	Active	Inactive
Vertical	Active	Active	Inactive	Inactive
Video	Active	Blanked	Blanked	Blanked
Remark (LED color)	Green	Orange	Orange/Green Blinking (0.5 sec interval)	Orange Blinking on-off (1 sec interval)
Power Consumption	70W (MAX)	60W (MAX)	Less than 15W	Less than 5W

Note2: This monitor automatically returns to normal operation state when horizontal and vertical sync returns. When you turn power off in power off mode, LED indicator may continuously blink on-off about for 2 to 15 seconds. When power off mode is changed to normal mode in this monitor it takes about 10 seconds until all function of the image operate completely normal.

6. Signal Connections & Pin Assignments

D-Sub Connector

The 9 pin D-SUB connector can be used with the supplied 9 -15 pin cable. The 15 pin side connects to any IBM compatible VGA video port, the 9 pin side to the monitor's connector.

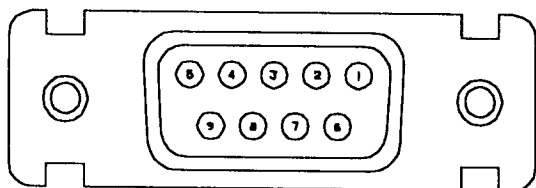


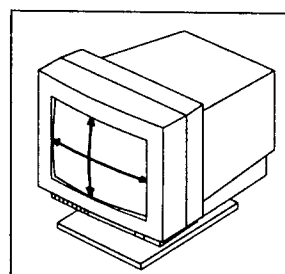
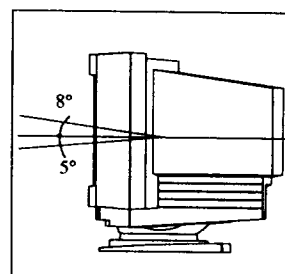
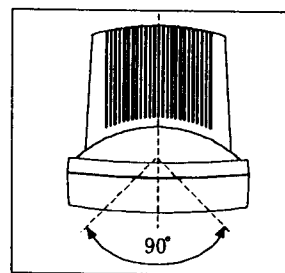
Figure (Female Type)

Pin Assignment	Signals
1	Red
2	Green
3	Blue
4	H-Sync
5	V-Sync
6	Gnd-R
7	Gnd-G
8	Gnd-B
9	Gnd-Sync

Table1. D-SUB signal input

7. Use of the Tilt-Swivel

With the tilt-swivel, this unit can be adjusted to be viewed at your desired angle within 90° horizontally and 13° vertically. To turn the unit horizontally, hold it at its bottom with you both hands as illustrated below.



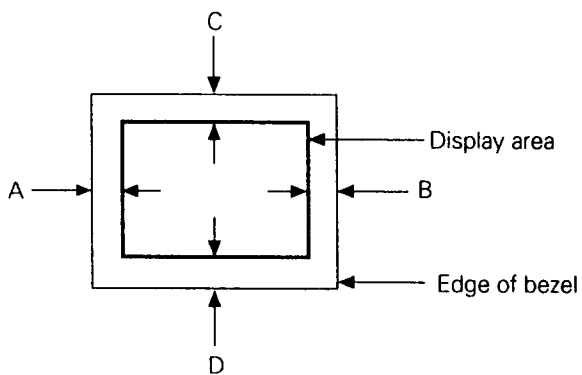
DISPLAY PERFORMANCE

1. Display Area

- 1) Width : $250 \pm 3\text{mm}$
- 2) Height : $187.5 \pm 3\text{mm}$

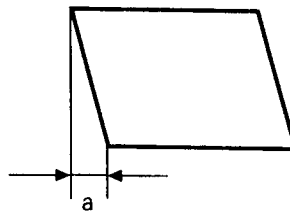
2. Centering

- $$|A - B| \leq 4.0\text{mm}$$
- $$|C - D| \leq 4.0\text{mm}$$



2) Parallelogram

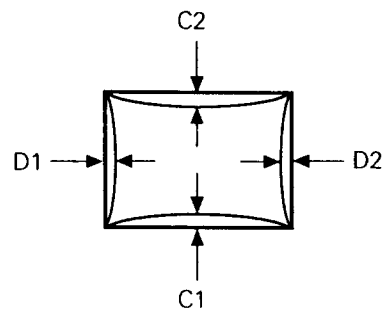
$$|a| \leq 2.0\text{mm}$$



3) Pincushion

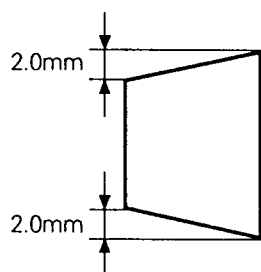
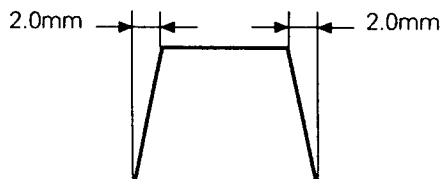
$$|C1|, |C2| \leq 2.0\text{mm}$$

$$|D1|, |D2| \leq 2.0\text{mm}$$



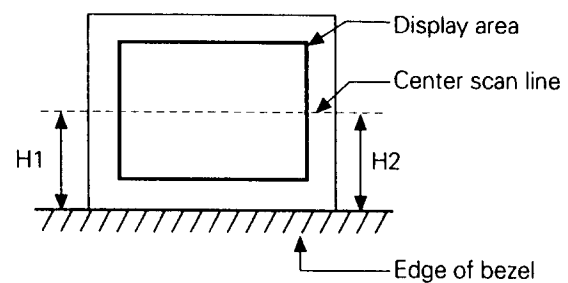
3. Distortion

1) Trapezoid



4) Rotation

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



4. Linearity

1) Standard Mode : 37.8kHz/60Hz

Horizontal Linearity (HL) :

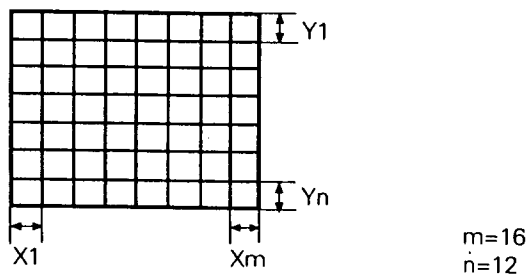
$$\frac{X_{\max} - \bar{X}}{\bar{X}} \times 100 \text{ or } \frac{\bar{X} - X_{\min}}{\bar{X}} \times 100 \leq 5\%$$

Vertical Linearity (VL) :

$$\frac{Y_{\max} - \bar{Y}}{\bar{Y}} \times 100 \text{ or } \frac{\bar{Y} - Y_{\min}}{\bar{Y}} \times 100 \leq 5\%$$

2) Other Modes

HL, VL \leq 7% for Other Mode : VGA, 8514A,
640/72Hz, 800/56Hz, 800/72Hz, 1024/60Hz



3) Conditions

Display image : Crosshatch pattern

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

Xmax is maximum value among X1 ~ Xm

Xmin is minimum value among X1 ~ Xm

$$\bar{X} = \frac{X1 + X2 \dots X_m}{m} \quad (m=16)$$

Ymax is maximum value among Y1 ~ Yn

Ymin is minimum value among Y1 ~ Yn

$$\bar{Y} = \frac{Y1 + Y2 \dots Y_n}{n} \quad (n=12)$$

5. Brightness Uniformity

Value	70% (Min) Variation = $\frac{C}{A}$
Conditions	Display Image : White flat field Luminance : 20f/L at the center of display area A : Luminance at position of the highest C : Luminance at position of lowest brightness

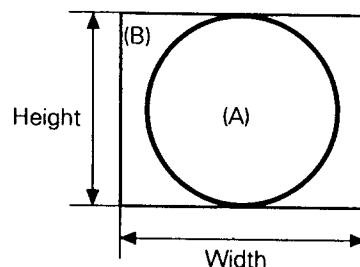
6. Color Point

Value	9300 °K X = 0.283 \pm 0.02, Y = 0.298 \pm 0.02
Conditions	Display Image : White flat field at the center of display area. Luminance Min : 5fL, Max : 20fL

7. Misconvergence

Center area of display ("A" circle is 187.5mm (A) : 0.3mm

Peripheral area of display (B) : 0.4mm



1) Conditions

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

8. Purity

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

1) Conditions

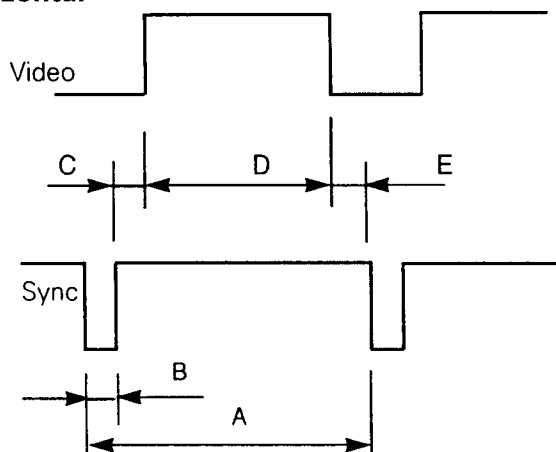
Display image : White flat field

Luminance : 15fL at the center of display area.

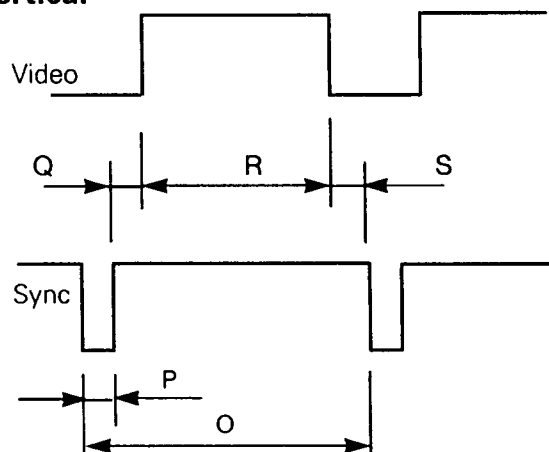
SIGNAL TIMING CHART

Mode Timing	IBM				VESA		
	VGA1/70	VGA2/70	VGA3/60	XGA/87i	640/72	800/60	800/56
	640X350	720X400	640X480	1024X768	640X480	800X600	800X600
fH (kHz)	31.469	31.469	31.469	35.522	37.861	37.879	35.156
A μ sec	31.778	31.777	31.778	28.151	26.413	26.400	28.444
B μ sec	3.813	3.813	3.813	3.920	1.270	3.200	2.000
C μ sec	1.907	1.907	1.907	1.247	4.064	2.200	3.556
D μ sec	25.422	25.422	25.422	22.806	20.317	20.000	22.222
E μ sec	0.636	0.636	0.636	0.178	0.762	1.000	0.667
fV (Hz)	70.087	70.087	59.940	86.958	72.809	60.317	56.250
O msec	14.268	14.268	16.683	11.500	13.735	16.579	17.778
P msec	0.064	0.064	0.064	0.113	0.079	0.106	0.057
Q msec	1.907	1.080	1.048	0.563	0.739	0.607	0.626
R msec	11.122	12.711	15.253	10.810	12.678	15.840	17.067
S msec	1.176	0.413	0.318	0.014	0.237	0.026	0.028
Clock Fre. (MHz)	25.175	28.322	25.175	44.900	31.500	40.000	36.000
Polarity							
H. Sync.	Positive	Negative	Negative	Positive	Negative	Positive	Neg./Pos.
V. Sync.	Negative	Positive	Negative	Positive	Negative	Positive	Neg./Pos.
Remark	—	—	—	Interlaced	—	—	—

Horizontal

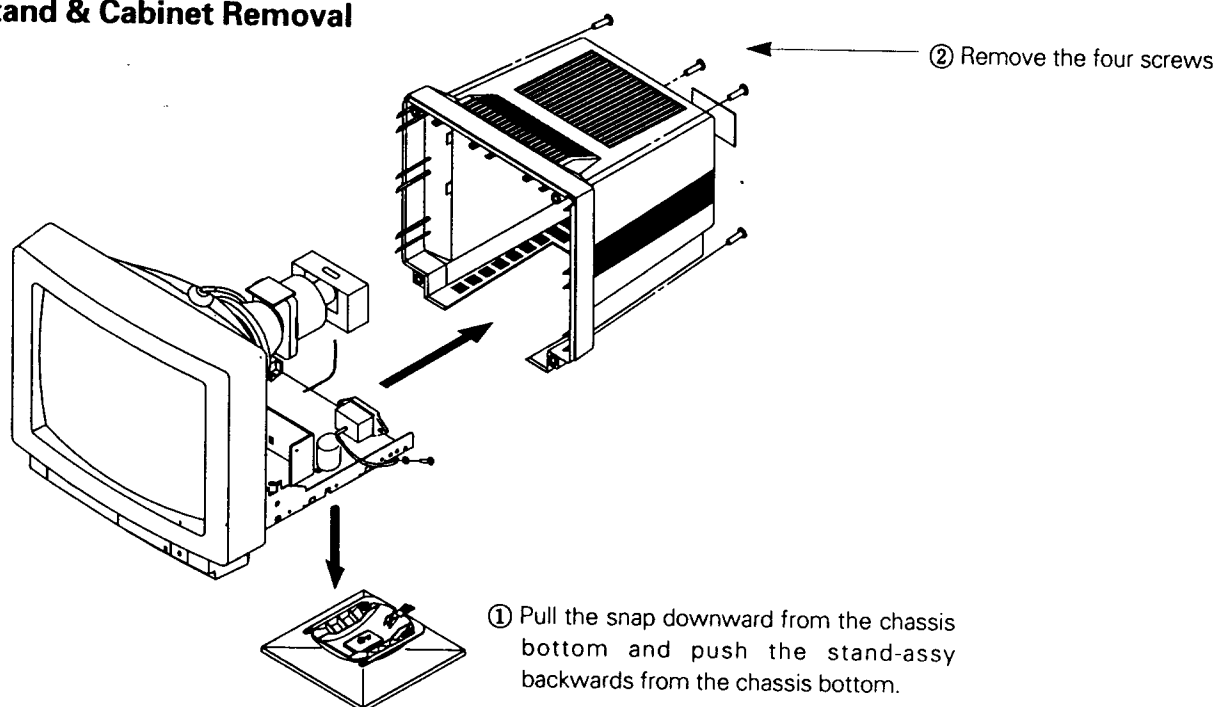


Vertical

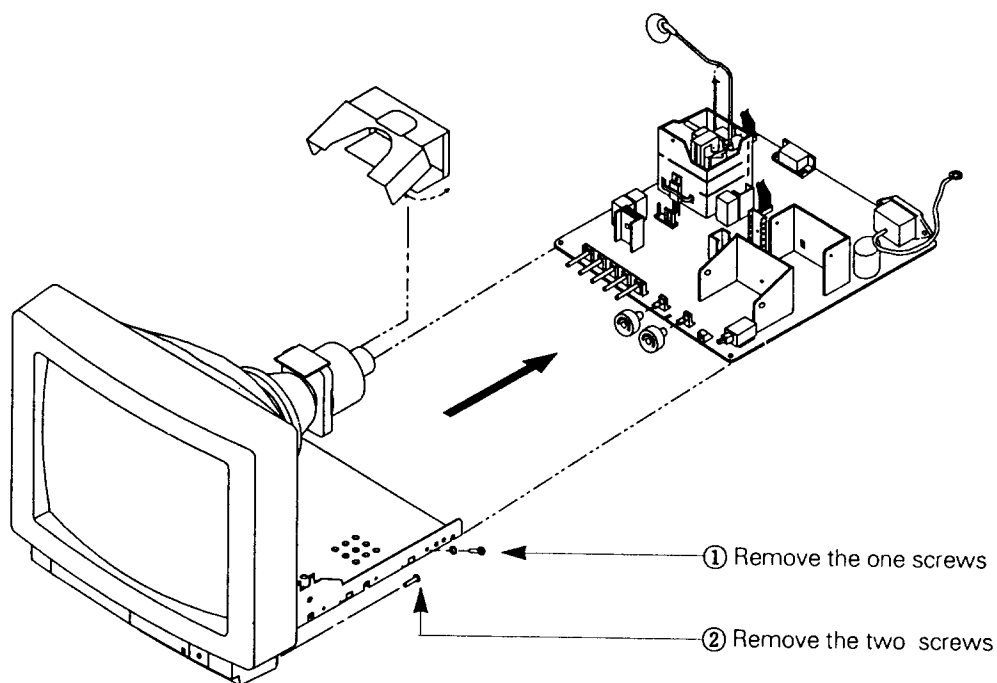


DISASSEMBLY

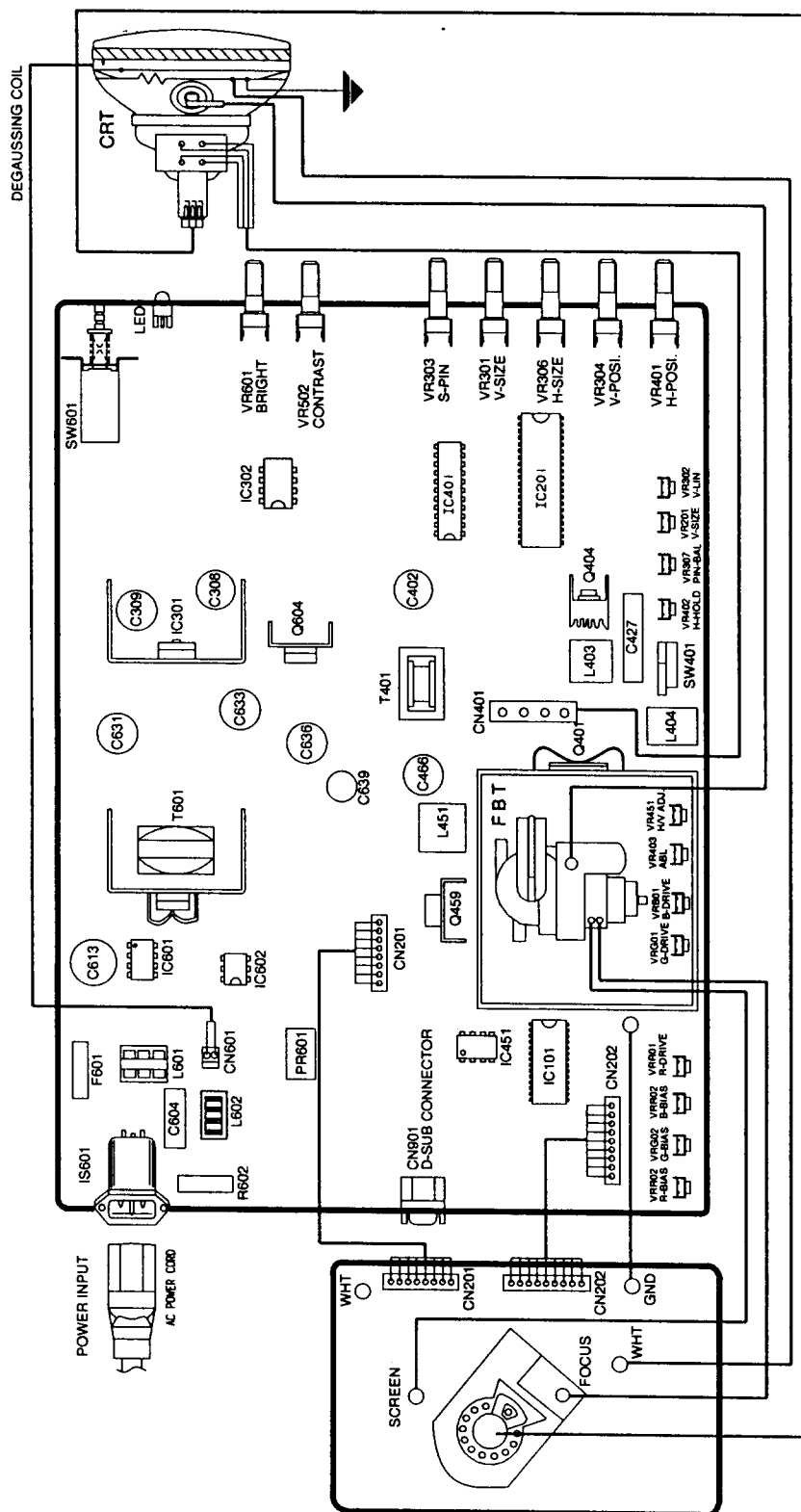
5-1. Stand & Cabinet Removal



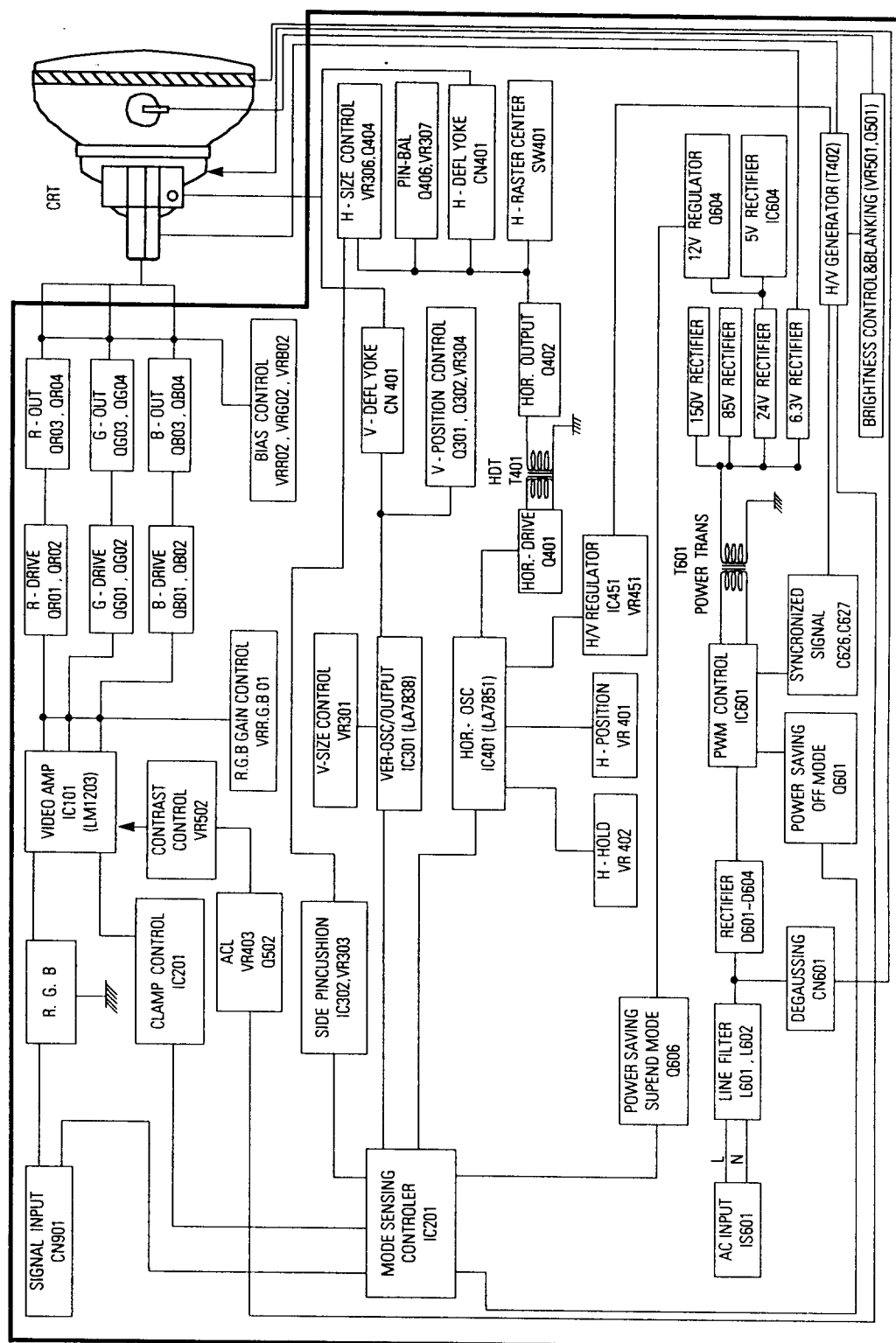
5-2. Bottom Shield Removal



7-1



BLOCK DIAGRAM



ALIGNMENT PROCEDURE

1. Adjustment Conditions and Precautions

- 1) Power supply voltage
AC 100 - 240Volt (60/50Hz)
- 2) Warm up time
The display must be on for 30 minutes before starting alignment. This is especially critical in color temperature and white balance adjustments.
- 3) Signal
Video analog 0.714vp-p positive at 75ohm terminated.
Sync : TTL level negative / positive
 separate
- 4) Scanning frequency (Horizontal / Vertical)
31.47kHz/70Hz, 31.47kHz/60Hz, 35.52kHz/87Hz,
37.86kHz/72.8Hz, 35.16kHz/56Hz, 37.88kHz/60.3Hz.

2. Main PWB Prepare Adjustment

- 1) Operate the monitor.
- 2) Connect the plus pole of DVM(Digital Multi Meter) to the TP1, +150V beside of T402 (FBT) and connect the other pole (GND) to chassis gnd.
- 3) Rotate the B+ voltage adjusting control (VR601) to provide 150V DC.

Condition: Brightness, contrast VR MAX in white pattern.

3. Horizontal Frequency Adjustment

(Instrument in use: frequency counter, scope probe)

- 1) Connect the plus pole of the scope probe to RED wire jacket of DY and the minus pole to chassis frame.
- 2) Push SW602 down for disconnecting power saving function.
- 3) At self raster (disconnect the signal cable), adjust the horizontal frequency control (VR402) so that the horizontal frequency is 31.5kHz.

4. Horizontal Position Adjustment

Adjust horizontal phase control (Located at the front panel) so that the image (or test pattern) is placed on the center of the raster.

5. Horizontal Raster Center

Adjust SW401 so that back raster position is placed the center of the CRT when signal of 48kHz/60Hz.

6. Focus Adjustment

- 1) Operate the monitor to display the full white pattern on the screen.
- 2) Set the brightness & contrast control at maximum position.
- 3) Change the pattern into "H" character pattern on the screen.
- 4) Rotate the focus adjusting control in FBT for the best focus.

7. FBT B+ Adjustment (High Voltage)

- 1) Connect the plus pole of DVM to the TP2, FBT B+ point and connect the other pole to the chassis GND.
- 2) Rotate the B+ voltage adjusting control (VR451) to provide $90 \pm 0.3V$ DC.

Condition : Brightness, contrast VR MAX 48kHz/60Hz.

8. Side Pincushion Adjustment

Adjust the side pincushion control VR303 (Located at the front panel) until the side lines become straight in 48kHz/60Hz.

9. Vertical Linearity Adjustment

Adjust the vertical linearity control (VR302) until the vertical linearity is best in 48kHz/60Hz.

10. Pin Balance Adjustment

Adjust VR307 (Located at the left side) for balance side pincushion at the 48kHz/60Hz.

11. Vertical Centering Adjustment

Adjust VR304 (Located at the front panel) until the vertical center is set at screen center.

(Vertical centering tolerance is $\pm 2.5mm$)

ALIGNMENT PROCEDURE

12. Width Adjustment

Adjust the horizontal size VR306 (Located at the front panel) so that the horizontal size of displayed pattern is 250mm.

(Tolerance: $\pm 5\text{mm}$)

13. Vertical Size Adjustment

Adjust the vertical size control (VR201) so that the vertical size of displayed pattern is 187.5mm is 48kHz/60Hz at the center position of VR301. (Tolerance: $187.5 \pm 5\text{mm}$)

(In this case, VR203 (Located at the front panel) is set at mechanical center VR301)

14. Screen Adjustment

Operate the monitor to display the full white pattern on screen and warm up for more than 30 minutes. Adjust screen VR (in FBT) so that back raster appears clearly at brightness and contrast VR MAX, but disappears at brightness VR min and contrast VR MAX.

15. White Balance Adjustment

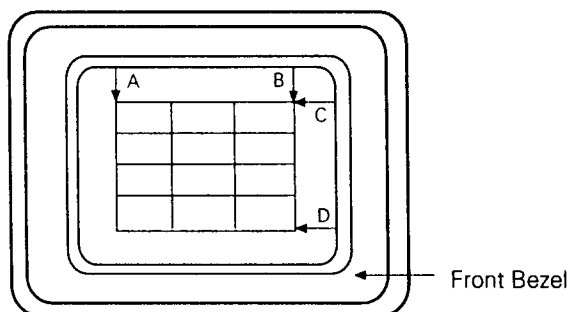
(Instrument in use: color analyzer)

- 1) Operate the computer to display the full white 60mm square pattern of the VGA 3 centered on the screen.
- 2) Set the brightness control (VR501) to the maximum position of the VR and adjust the VRR02 (R-BIAS) and VRB02 (B-BIAS) so that the back raster color to be white with unaided eye.
- 3) Set the brightness control (VR501) to the mechanical center position and the contrast control (VR502) to the MAX position.
- 4) Change the video signal to the full green 60mm square pattern of the VGA3.
- 5) Adjust the VRG01 (G-GAIN) so that the luminance of the green pattern is $33\text{F/L} \pm 2\text{F/L}$.
- 6) Change the video signal to the full white pattern of the VGA3.
- 7) Adjust the VRR01 (R-GAIN) and VRB01 (B-GAIN) for the display color to be white. (Use the color analyzer: $X=0.283 \pm 0.03$, $Y=0.298 \pm 0.03$)
- 8) Adjust the contrast control (VR502) so that the luminance is 3F/L .
- 9) Adjust slightly VRR02 (R-BIAS) and VRB02 (B-BIAS) for the display color to be white.
- 10) Check the color coordinates at 20F/L luminance. If there is some error, adjust the VRR01 (R-GAIN) and VRB01 (B-GAIN) for the display color to be white.
- 11) Recheck the color coordinates at 3F/L luminance and check the white color with rotating the contrast control (VR502). If there is some error, retry the adjustment from (2).

ALIGNMENT PROCEDURE

16. CRT Tilt Adjustment

Reassembly the CRT with fastening screws so that the dimension A, B and C, D are separately equal.



Proceed as follows:

- 1) Locate the pair of four pole magnet rings.
- 2) Rotate the individual rings (change spacing between tabs) to converge the vertical red and blue lines.
- 3) Rotate the pair of rings (maintaining spacing between tabs) to converge the horizontal red and blue lines.
- 4) After completing the red and blue center convergence, locate the pair of six pole magnet ring.
- 5) Rotate the individual rings (change spacing between tabs) to converge the vertical red and blue (magenta) and green lines.
- 6) Rotate the pair of rings (maintaining spacing between tabs) to converge the horizontal red and blue (magenta) and green lines.
- 7) Magnet position is 2pole / 4pole / 6pole (from the front of CRT).
- 8) Don't rotate the 2pole magnet because it's object is to adjust the purity.

17. Static(Center) Convergence

Switch the monitor on and warm up for 15 minutes. Operate the computer in such a way that the cross hatch pattern is displayed on screen. Convergence error should not be over than following table.

Position	Error In (mm)	CRT Dot Pitch	Model No.
Center	0.3	0.28	CVM4967P, CVM4967PL, CVM4787P, CVM4787PL, CVM496PP, CVM496PPL, CVM478PP, CVM478PPL
	0.3	0.39	CVM4963P, CVM4963PL, CVM4783P, CVM4783PL, CVM4782P, CVM4782PL, CVM4782P, CVM4782PL
Corner	0.45	0.28	CVM4967P, CVM4967PL, CVM4787P, CVM4787PL, CVM496PP, CVM496PPL, CVM478PP, CVM478PPL
	0.45	0.39	CVM4963P, CVM4963PL, CVM4783P, CVM4783PL, CVM4782P, CVM4782PL, CVM4782P, CVM4782PL

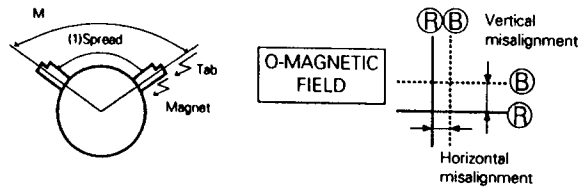
ALIGNMENT PROCEDURE

18. Dynamic Convergence

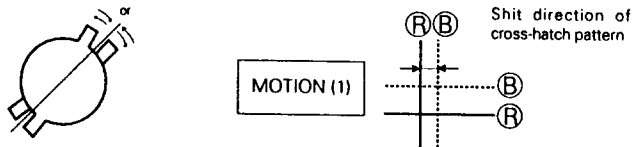
Dynamic convergence (convergence of the three color fields at the edge of the CRT screen) is accomplished by the proper insertion and positioning of the three wedges between the edge of deflection yoke and the funnel of the CRT.

18-1. Alignment of (R) and (B) with the 4pole magnet

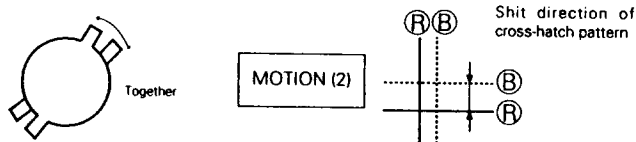
Movable in spread condition



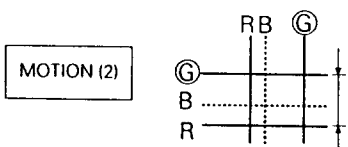
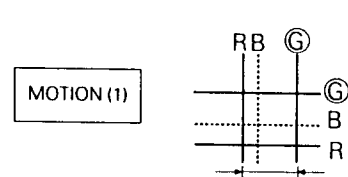
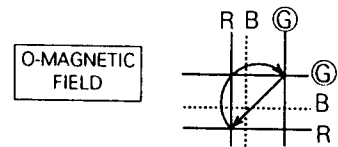
Vertical direction



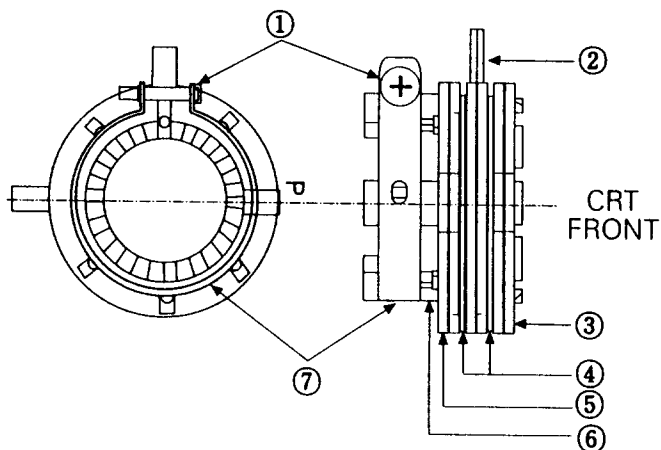
Horizontal direction



18-2. Alignment of (R) and (B) with (G) (6 pole magnet)



※ Convergence Purity Magnet



- ① Setup Bolt ② 4pole Magnet ③ Purity Magnet ④ Spacers
- ⑤ 6pole Magnet ⑥ Holder ⑦ Band

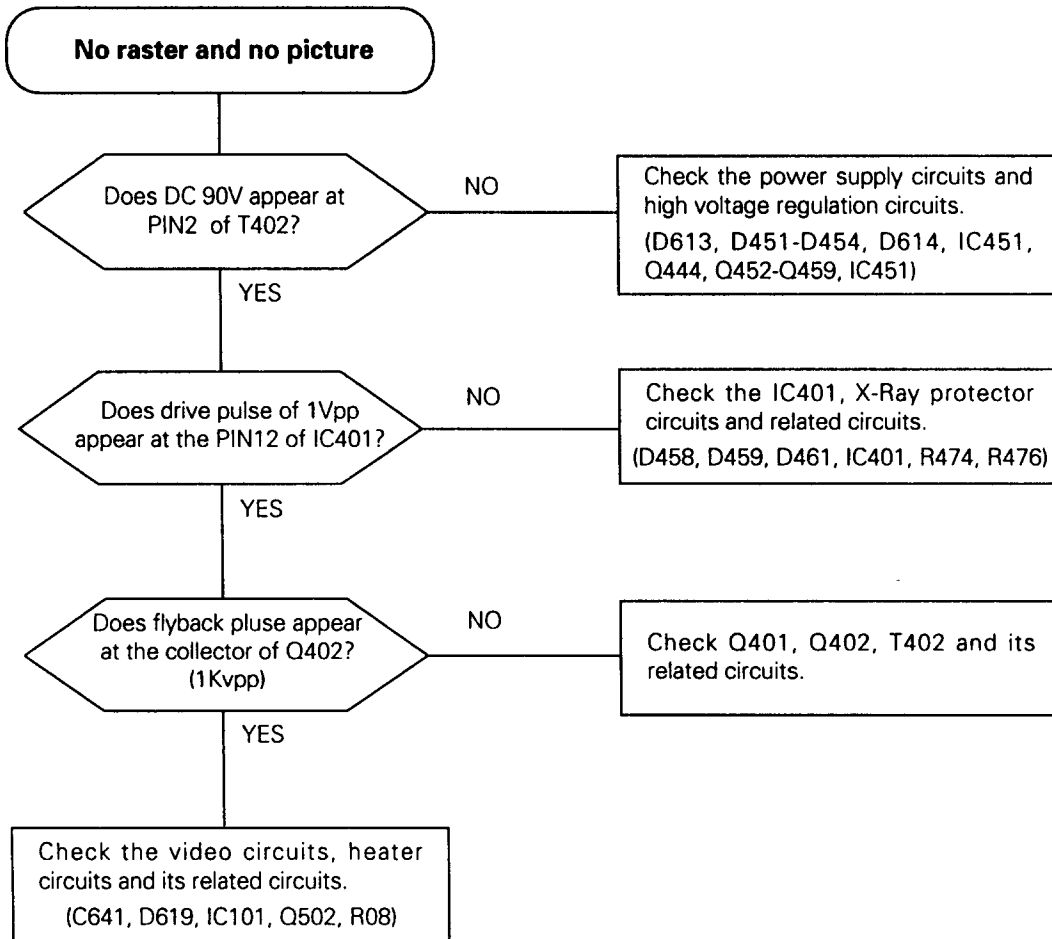
TROUBLESHOOTING GUIDE

Note :

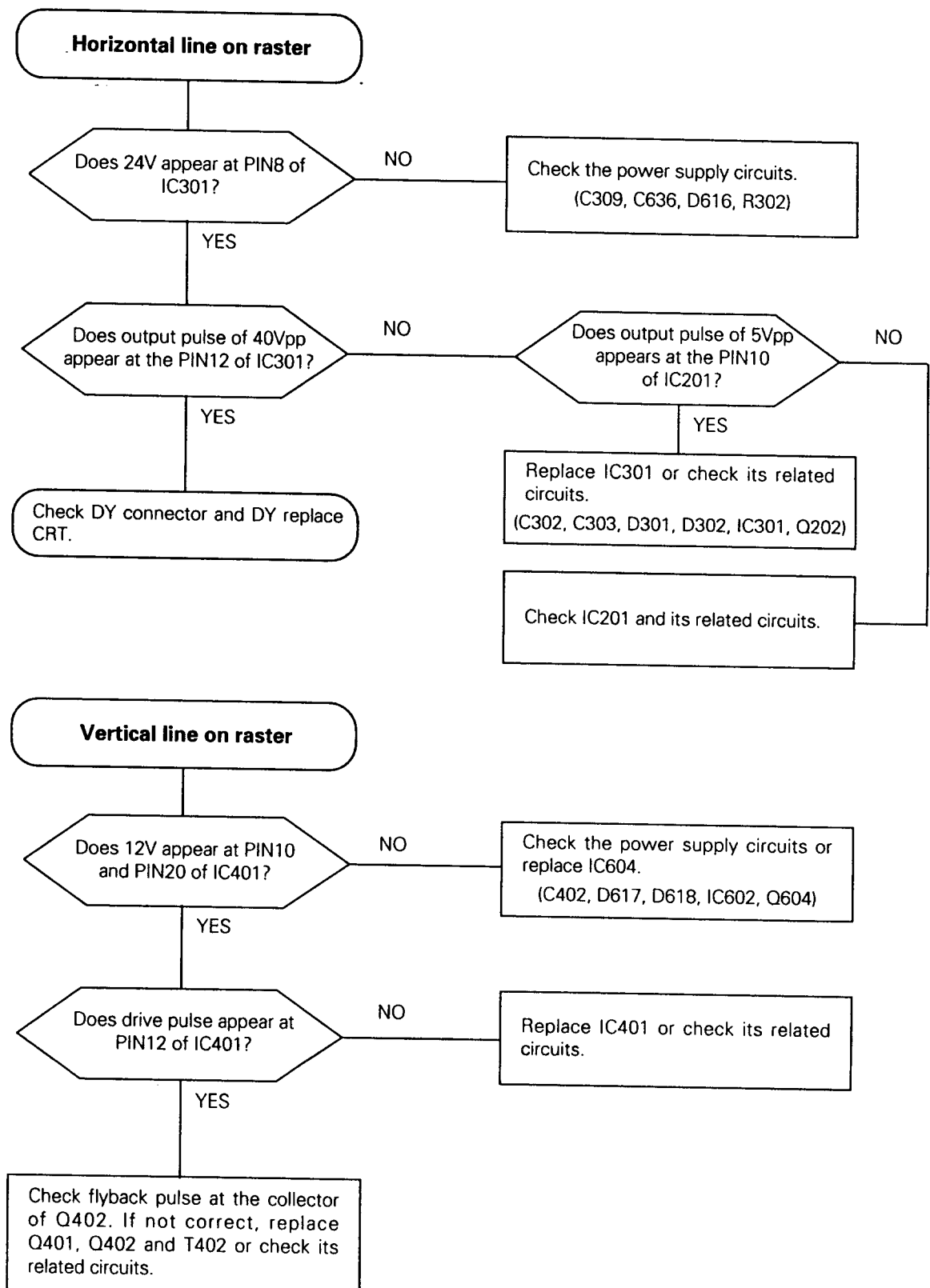
1. If picture does not appear, fully rotate the brightness and contrast control clockwise before inspection.

2. Circuit to be checked

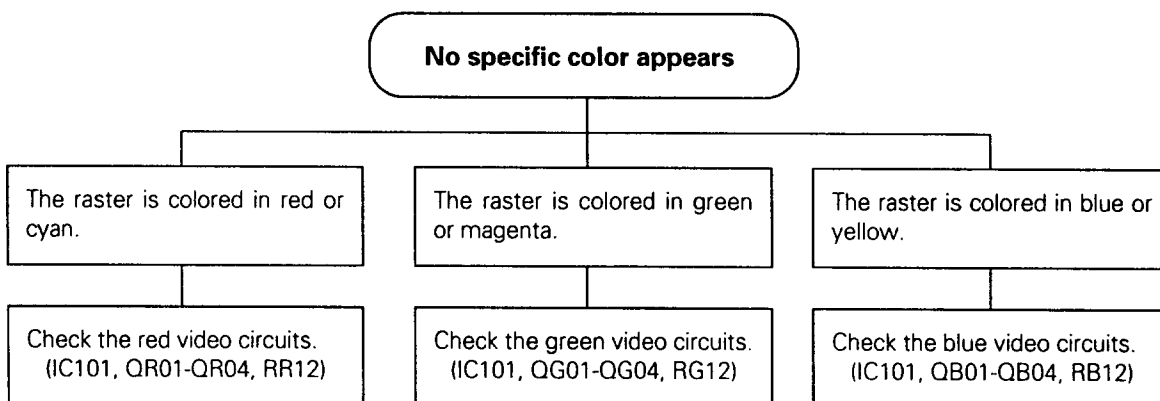
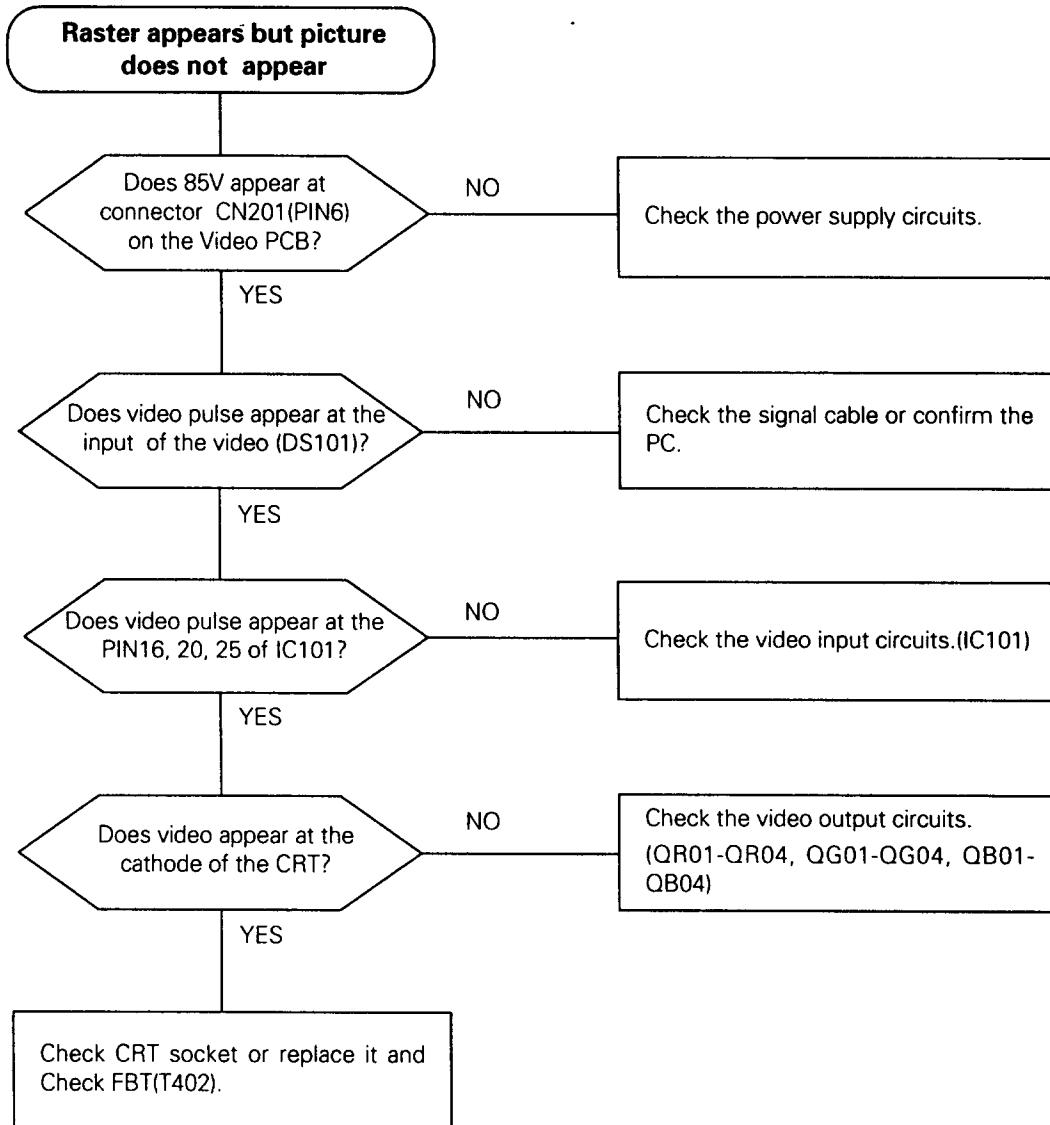
- ① No raster appears : Power circuits, Horizontal output circuits
- ② A high voltage develops but no raster appears : Video output circuits
- ③ A high voltage is not developed : Horizontal output circuits.



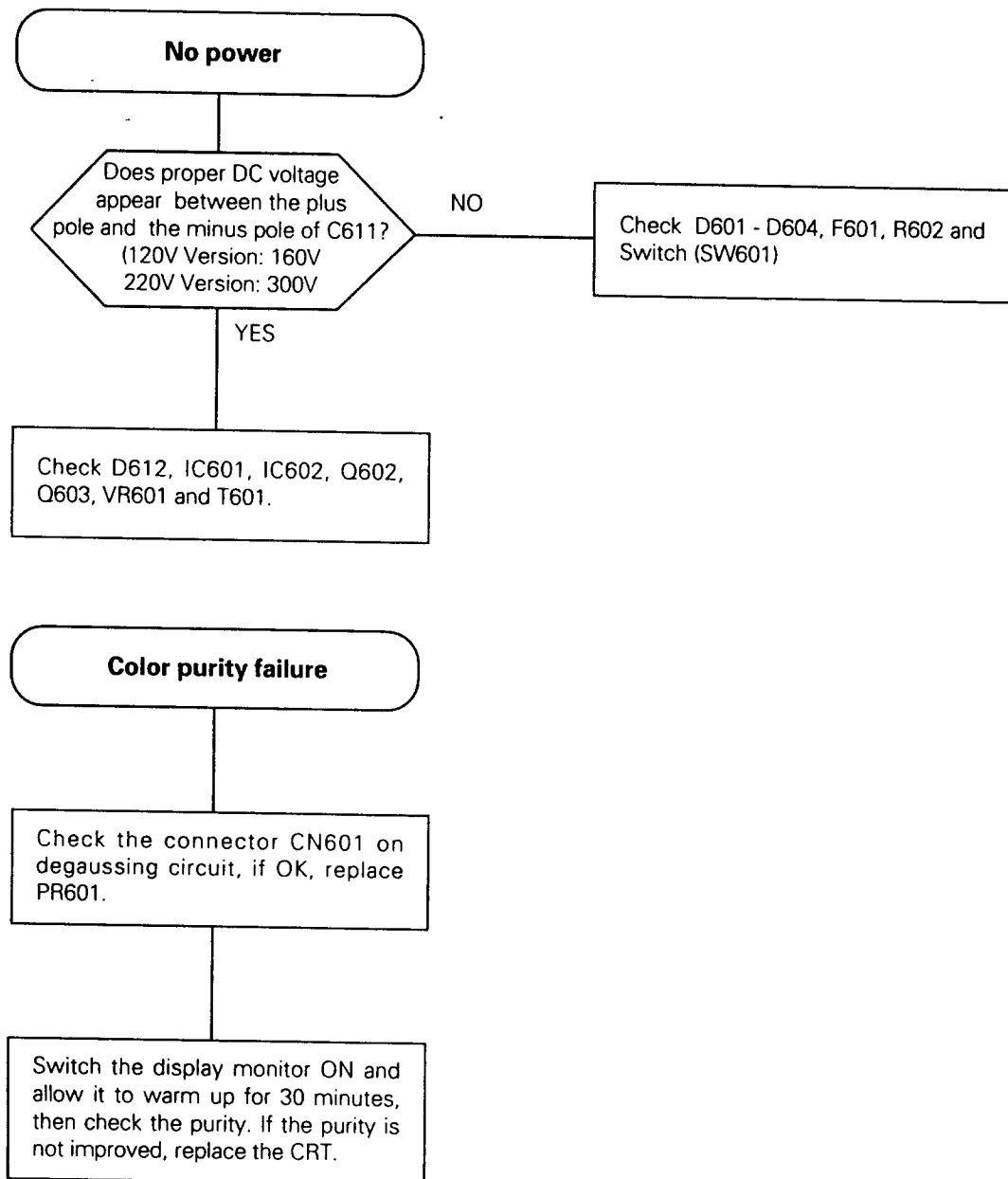
TROUBLESHOOTING GUIDE



TROUBLESHOOTING GUIDE

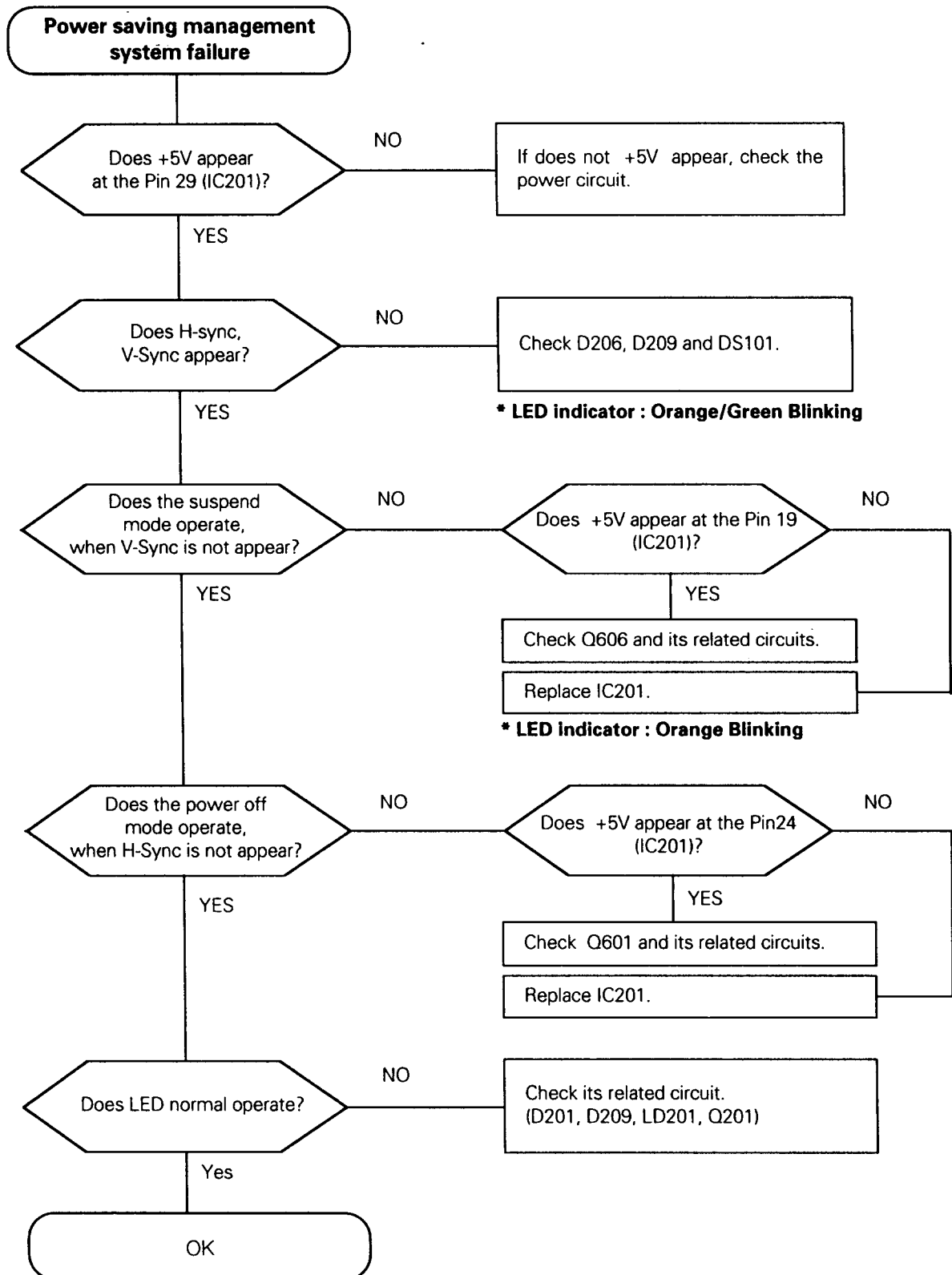


TROUBLESHOOTING GUIDE

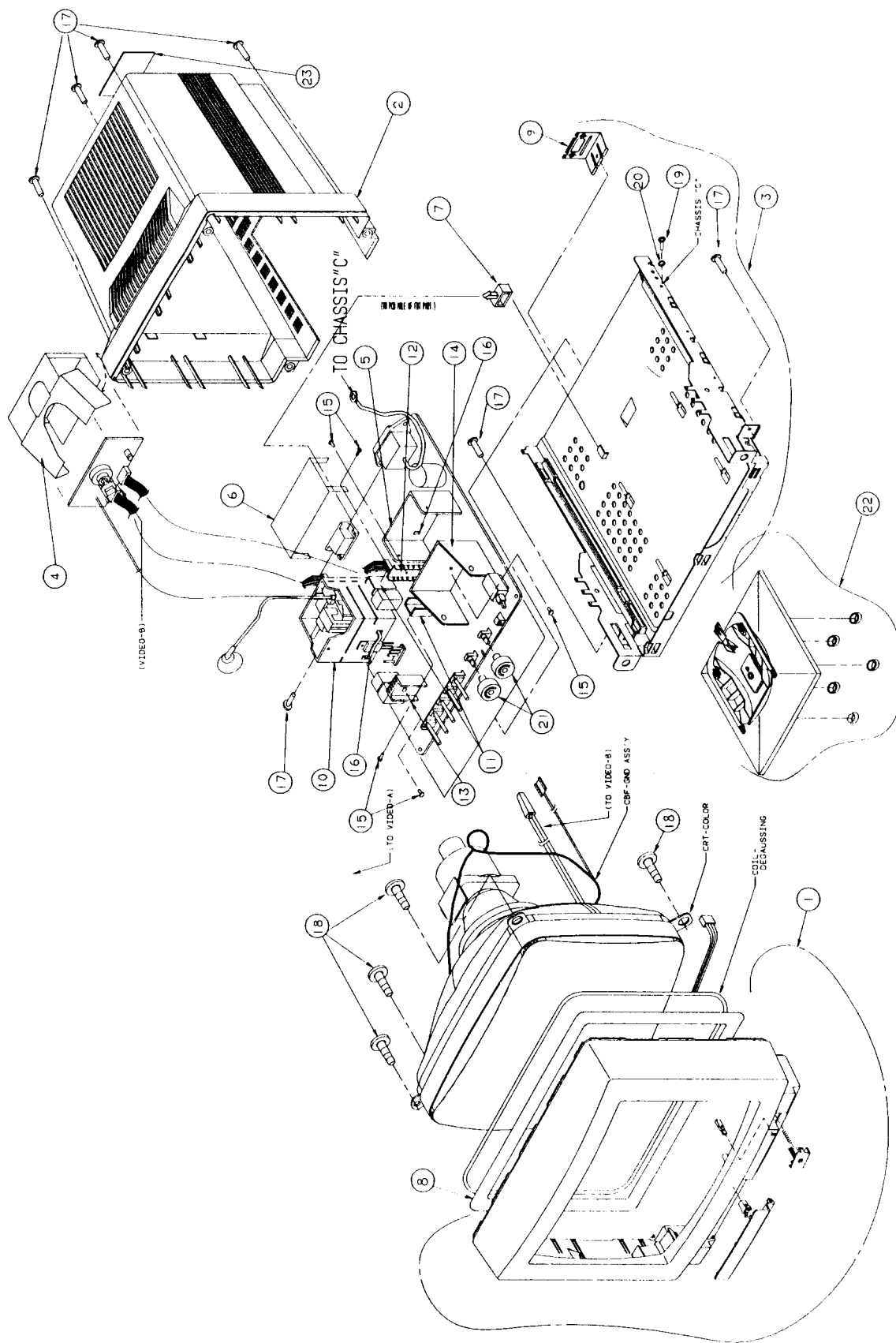


Note: If color purity is not normal, manual degaussing should be done by mandatory methode using the manual degaussing coil before inspection.

TROUBLESHOOTING GUIDE



EXPLODED VIEW AND PARTS LIST



11-2

11-1

EXPLODED VIEW AND PARTS LIST

NO	DESCRIPTION	CODE NO.	SPECIFICATION	QTY	REMARK
1	COVERFRONT ASSY	811 462121AK	ABS VH-0800S #7262	1	CVK/CVX4237
2	COVERFRONT ASSY	811 468018AF	ABS VH-0800S #7262	1	CVK/CVX4867
3	REAR COVER	821 460346AA	ABS VH-0800S #7262	1	CVK/CVX4237
4	REAR COVER	821 460356AA	ABS VH-0800S #7262	1	CVK/CVX4867
5	CHASSIS ASSY	811 466026AA	SECC-1 T1.0	1	
6	SHIELD CASE PCB	813 464206AA	SPTT T0.3	1	
7	HEATSINK POWER	831 513523EA	A1050S T2.0	1	
8	SHIELD MAIN PCB	815 464124AA	SPTT T0.3	1	
9	PCB MOUNT	857 170054AB	NYLONE 66	1	
10	SHIELD FRONT	811 466020AA	SPTT T0.3	1	
11	BRKT D-SUB	815 460007AA	PBS T0.3	1	
12	HEATSINK FBT	831 514510AA	A1050S	1	
13	HEATSINK TR	831 513523AA	A1050S	2	
14	HEATSINK REQ	831 513023AA	A1050S	1	
15	H/S HORIZONTAL	831 511012CC	A1050S	1	
16	H/S VERTICAL	831 513523CA	A1050S	1	
17	SPECIAL, TAPTITE	847 502005AA	B.BH.+M3.L10.ZPC3.SWCH	5	
18	SPRING TR	813 468062AC	SUS-304 1/2H T0.17/T0.5	2	
19	SPECIAL, TAPTITE	847 501007FC	B.BH.+M4.L16.ZPC3.SWCH	7	
20	TAPPING, BH	842 840023BA	BH.+2.M5.L30.ZPC3.WW	4	
21	SPECIAL, TAPTITE	847 501007FA	S.BH.+M4.L10.ZPC3.SWCH	1	
22	WASHER, SPRING	855 124001BB	M4.ID4.1.0D7.6.T1.ZPC3	1	
23	KNOB-VR	831 171037BC	ABS VH-0800S #7262	2	
24	STAND ASSY	811 460046BC	CVK/CVX CHASSIS	1	
25	LABEL RATING	825 139473fe	PE T0.07	1	

SCHEMATIC DIAGRAM

WARNING: THIS EQUIPMENT CONTAINS SAFETY CRITICAL COMPONENTS ALL PARTS SHOWN IN THE SHADED AREAS OF THE SCHEMATIC ARE SAFETY REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER RECOMMENDED PARTS LIST FOR EXACT REPLACEMENTS.

1. THE SHADED AREAS AND MARKS IN THE SCHEMATIC DIAGRAM AND THE PARTS LIST DESIGNATE COMPONENTS THAT HAVE SPECIAL CHARACTERISTICS. USE IMPORTANT INFORMATION FROM THE PARTS LIST TO IDENTIFY ONLY THOSE IDENTICAL TO THOSE IN THE ORIGINAL CIRCUIT OR SPECIFIED IN THE PARTS LIST BEFORE REPLACING IN THE PRODUCT. SAFETY NOTICE: REPLACE THE PRODUCT SAFELY.
2. DURING A MENERGUS MEASUREMENT OF THIS MONITOR, WATERS THAT DEMAND TO BE USED TO TEST THE INSTRUMENT, DO NOT USE YOUR INSTRUMENT. USE ONLY PRIMARY GROUND (SYMBOL*) AND SECONDARY GROUND (SYMBOL*).
21. SECONDARY GROUND (SYMBOL*)
22. PRIMARY GROUND (SYMBOL*)
3. THE SHADED AREAS IS A PRIMARY

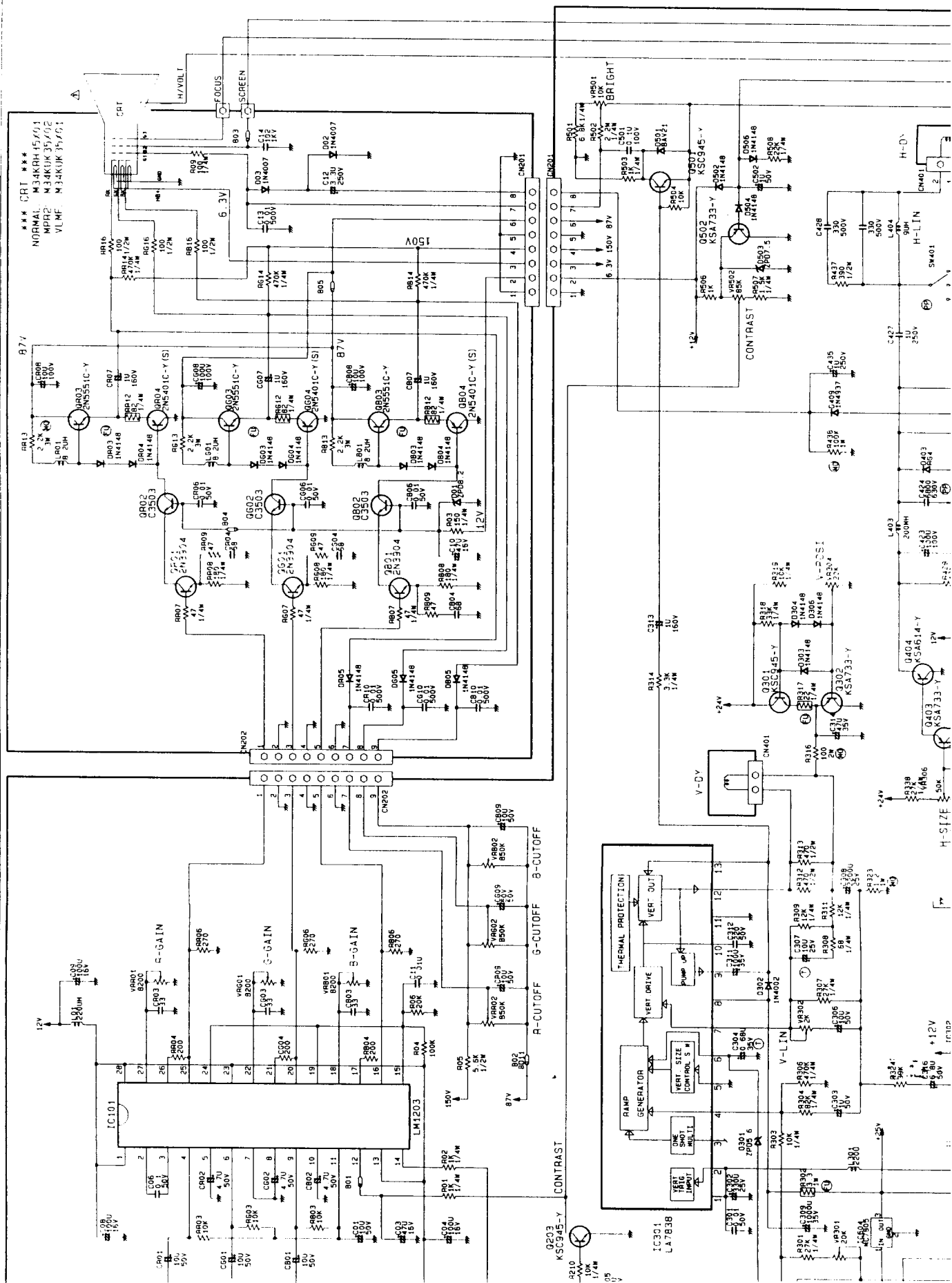
AVERTISSEMENT: "CE RECEPTEUR EST EQUIPE DE COMPOSANTS CRITIQUES POUR LA SECURITE. TOUTES LES PIECES INDIQUEES DANS LES ZONES OMBREES DU SCHEMA SONT CRITIQUES POUR LA SECURITE POUR ASSURER LE DEGRE DE SECURITE POUR OBTENIR LE MEILLEUR NIVEAU D'ABSENCE D'EMMISSIONS ELECTROMAGNETIQUES. QUE LES PIECES RECOMMANDEES PAR LE FABRICANT CONSULTER LA NOMENCLATURE DES PIECES POUR TROUVER LES PIECES DE RECHANGE EXACTES."

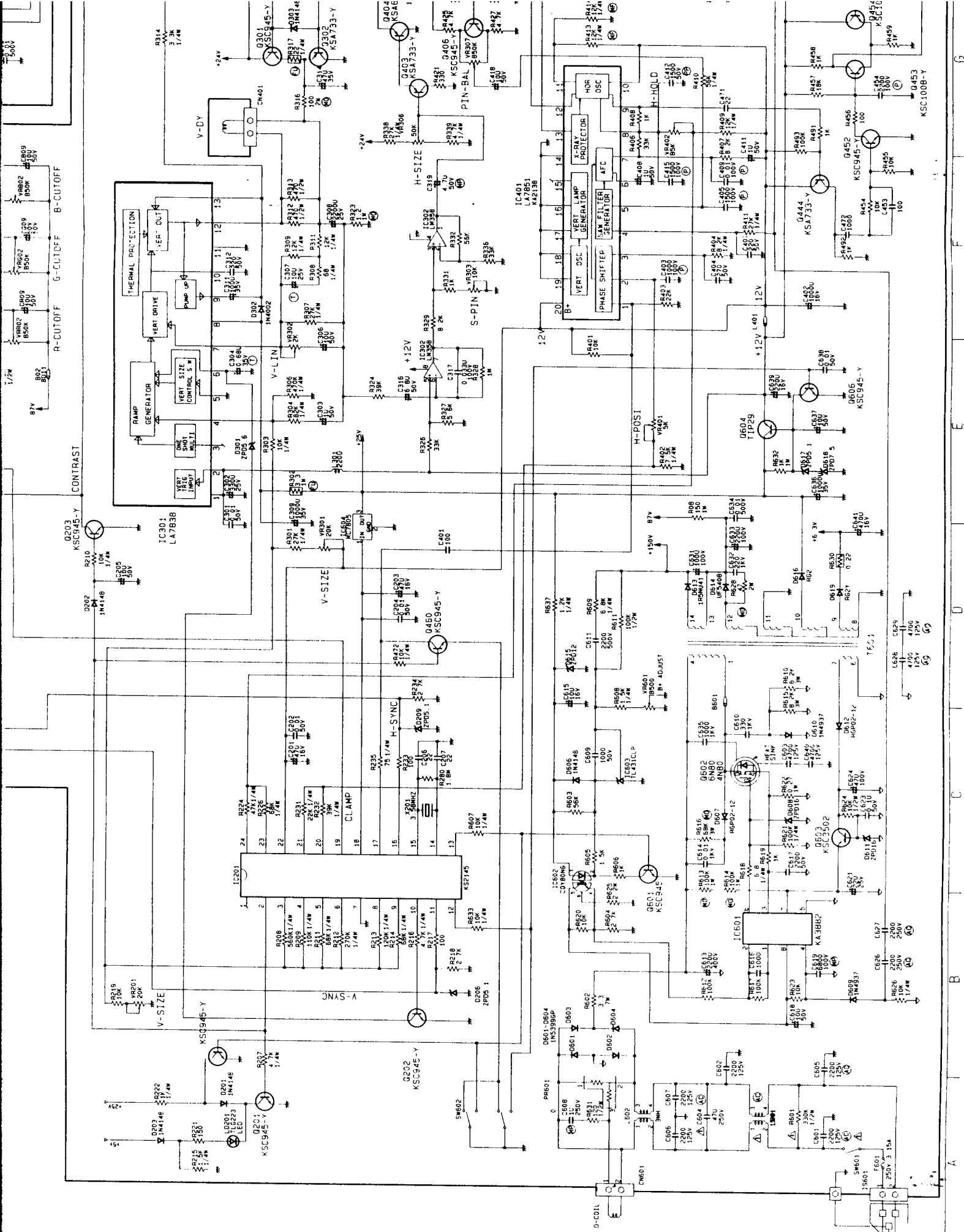
NOTE
1. RESISTANCE IS SHOWN IN OHM K=1,000
M=1,000,000. RATED POWER OF RESIS-

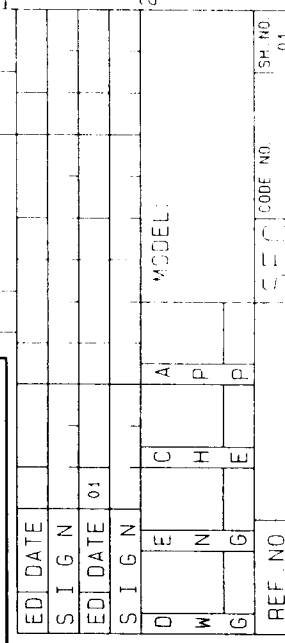
- [illegible]



*** CRT ***
NORMAL M34RH15/01
MPR2 M34KUK35/02
VLME M34KUK35/03



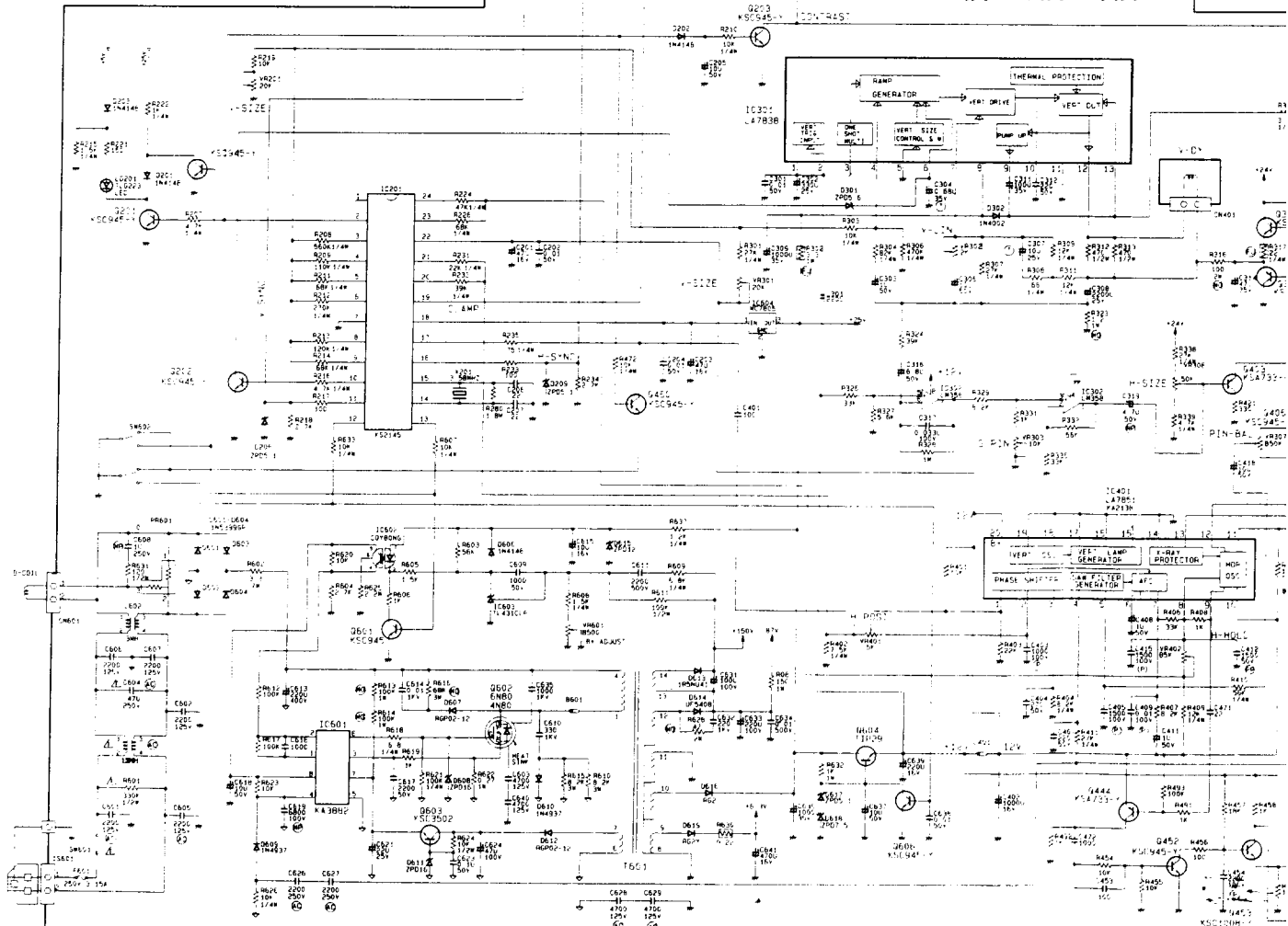
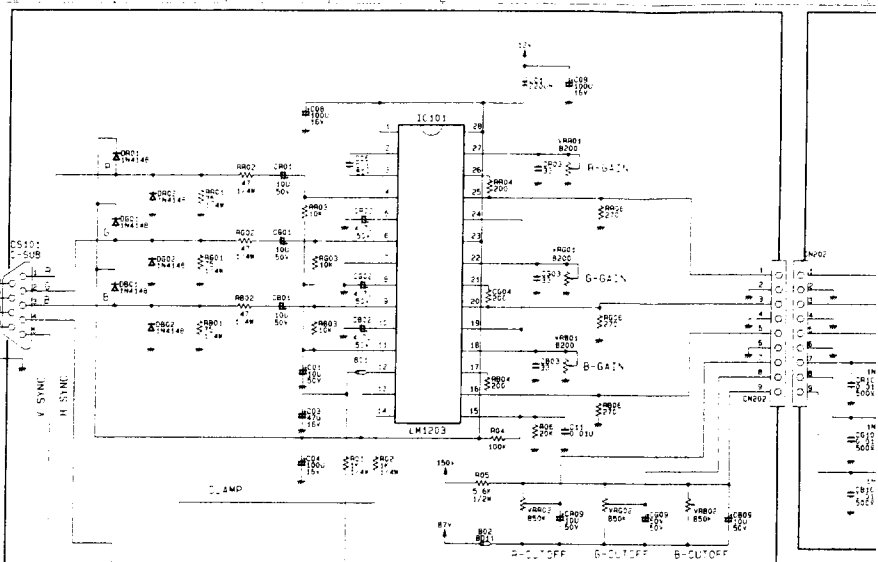


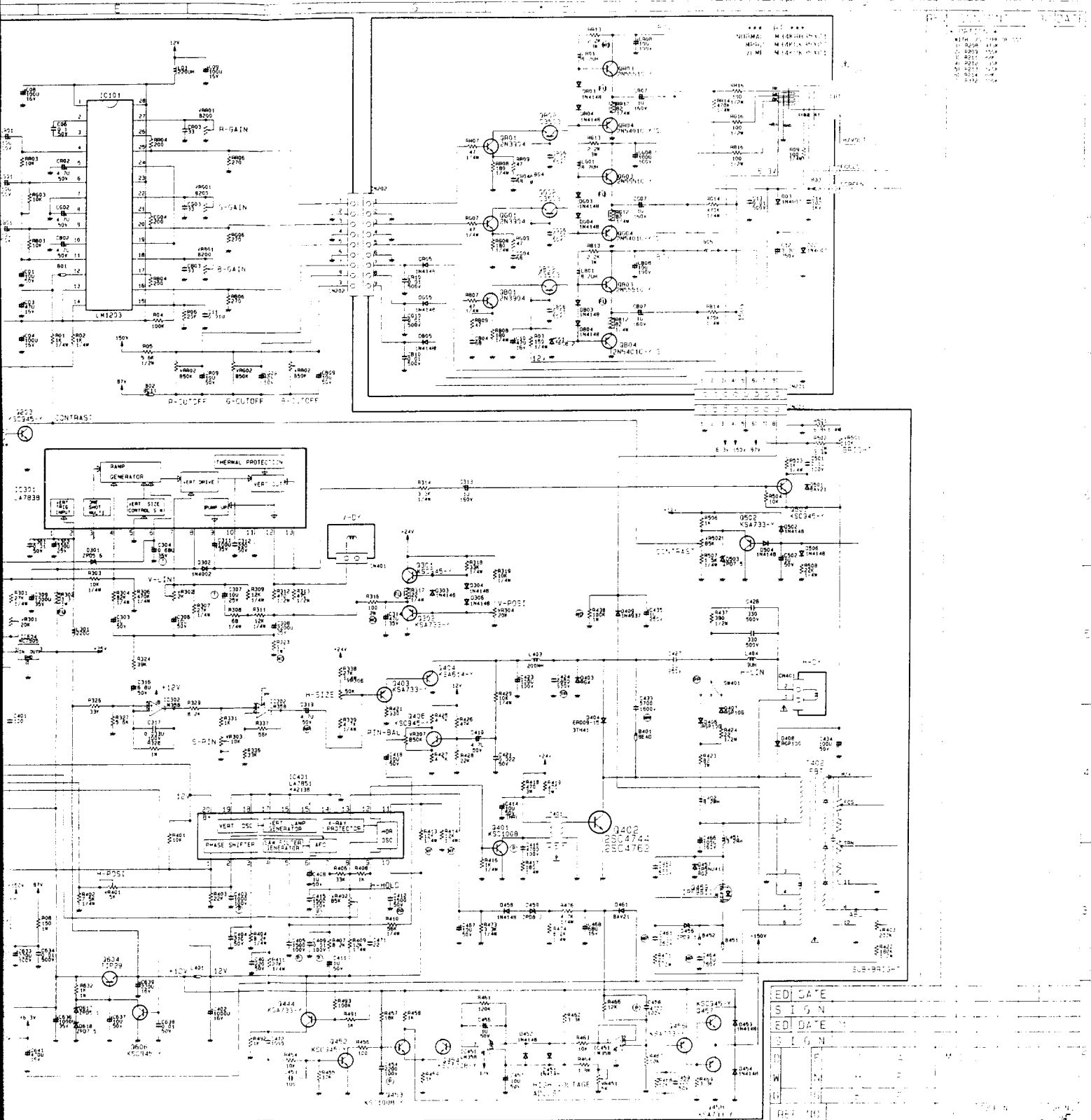


12-2

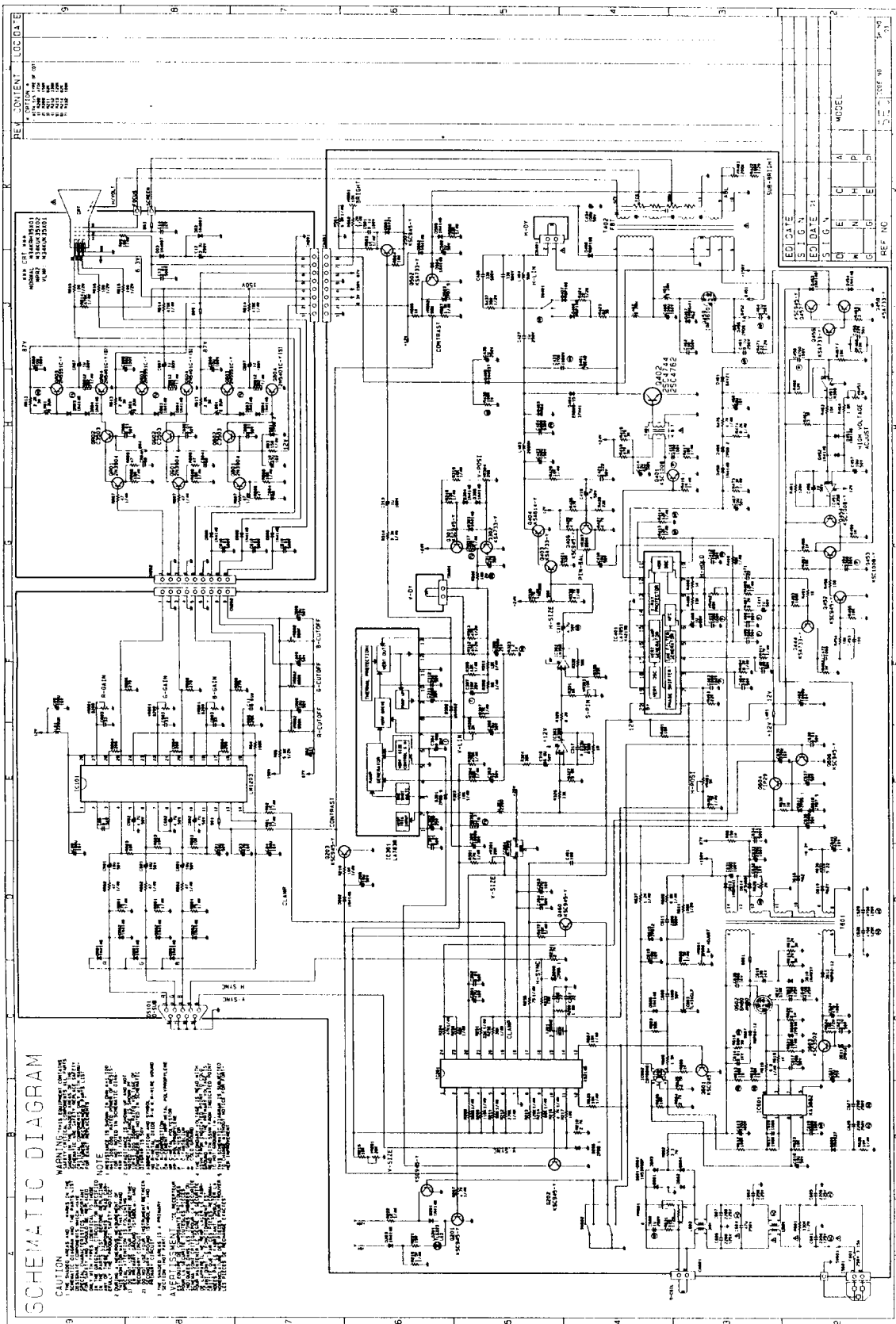
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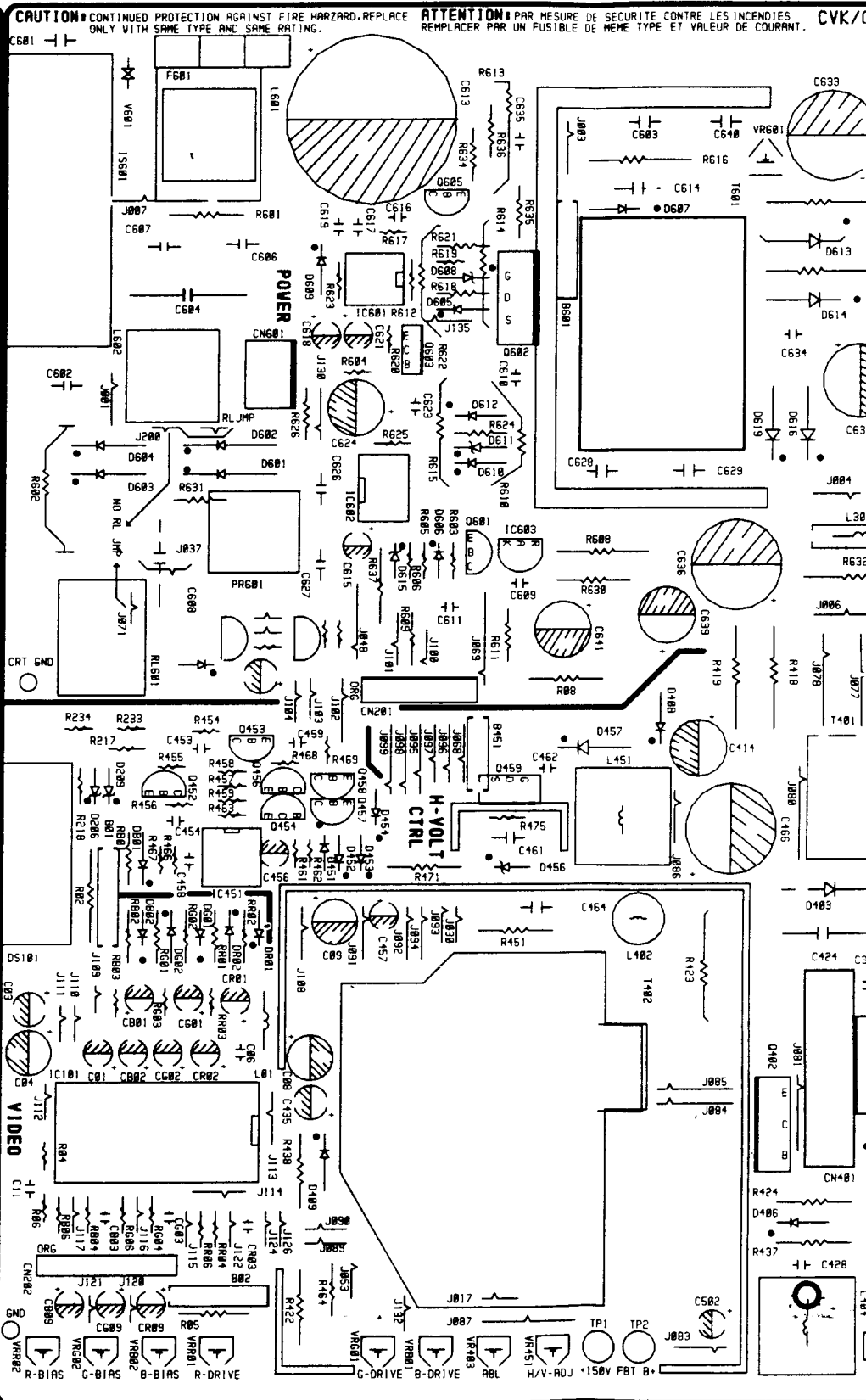
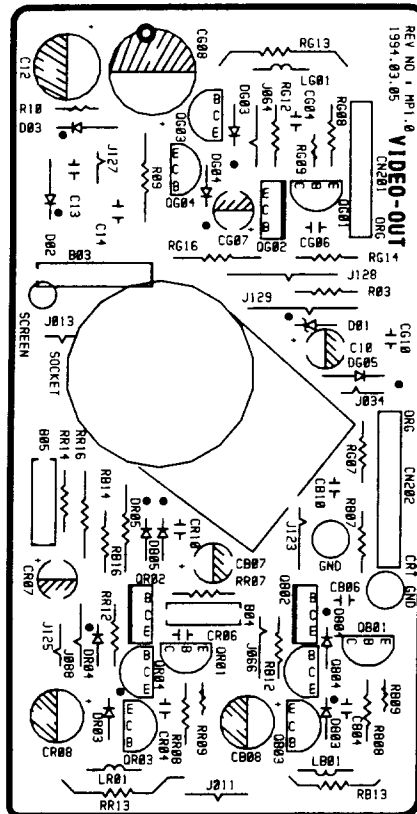


SCHEMATIC DIAGRAM



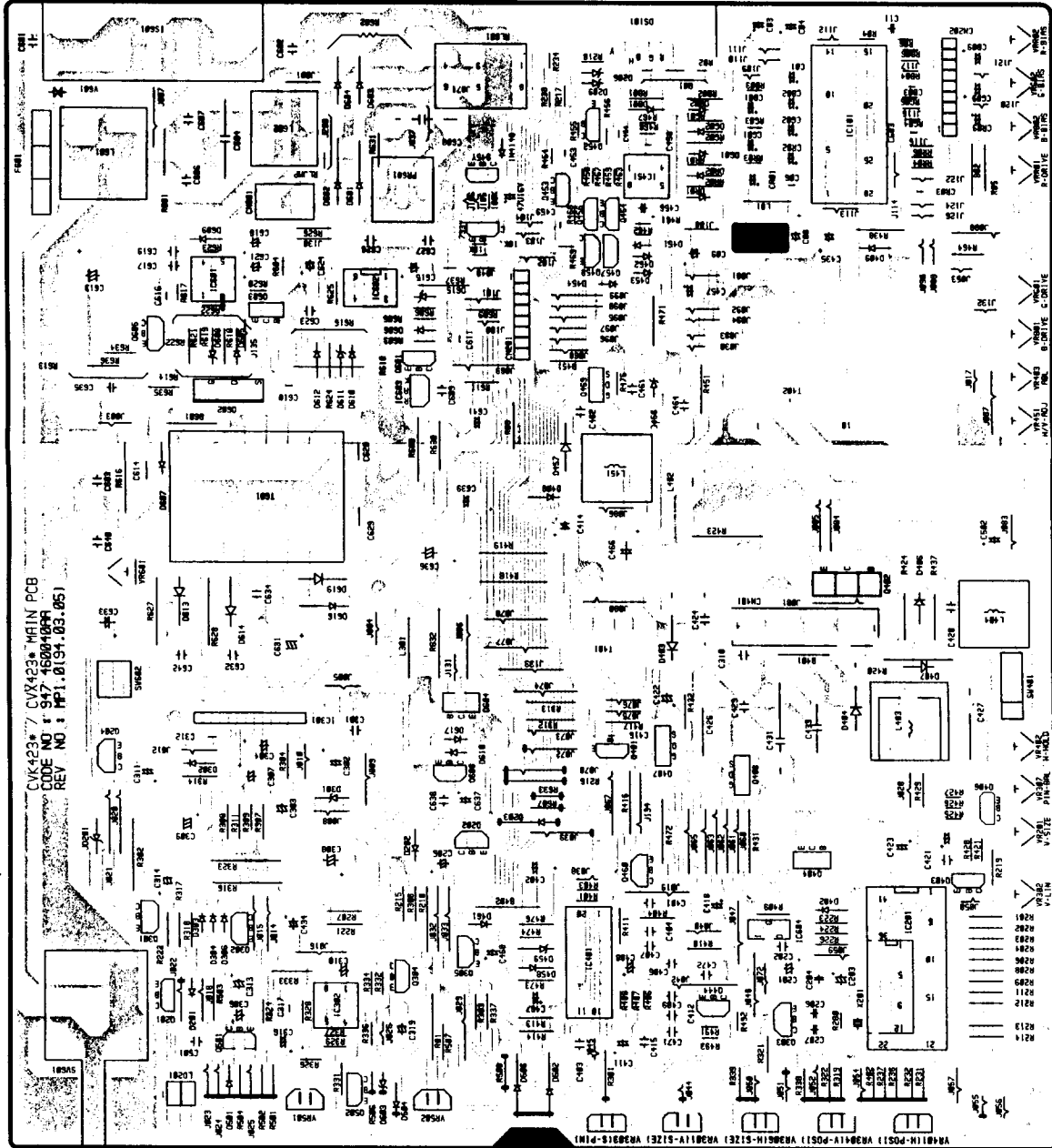
PRINTED CIRCUIT BOARD

MAIN & CRT SOCKET PCB (TOP VIEW)



PRINTED CIRCUIT BOARD

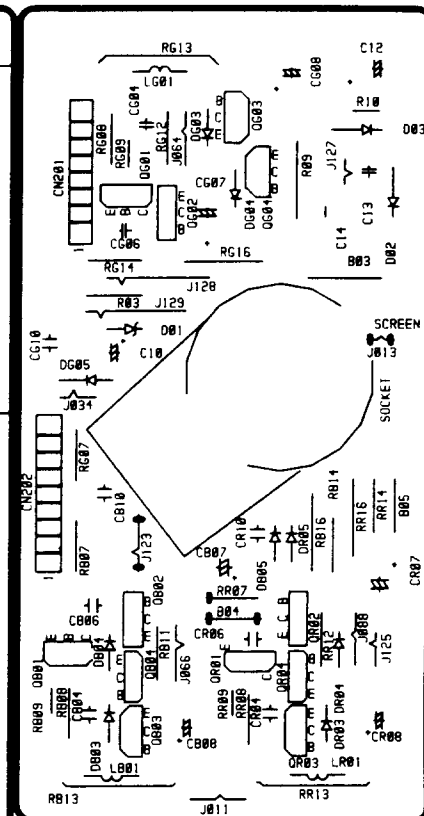
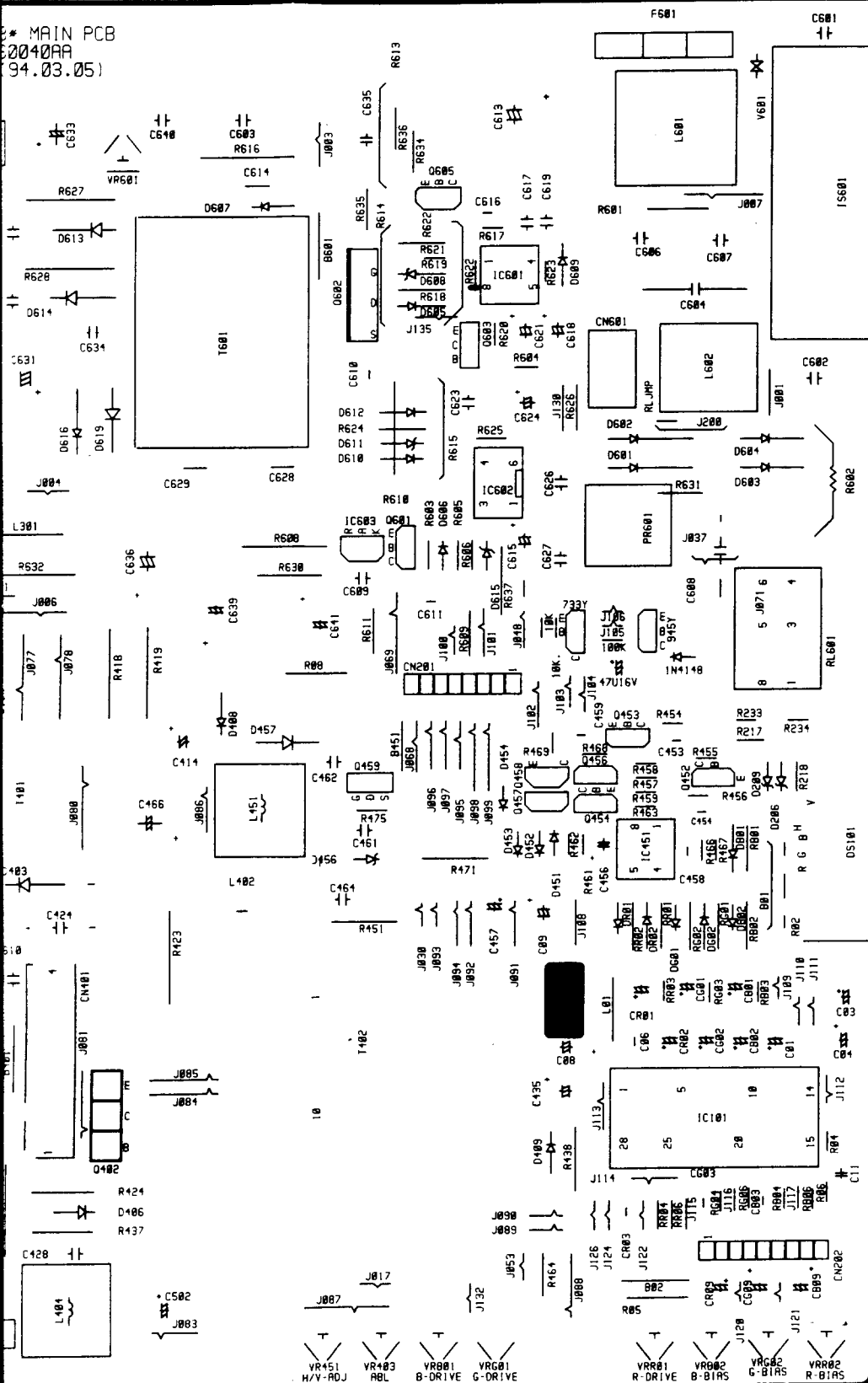
MAIN & CRT SOCKET PCB (BOTTOM VIEW)



MAIN & CRT SOCKET PCB(BOTTOM VIEW)

CKV423* / CVX423* MAIN PCB
CODE NO : 947 460040RA
REV NO : MP1.0(94.03.05)

* MAIN PCB
0040AA
(94.03.05)



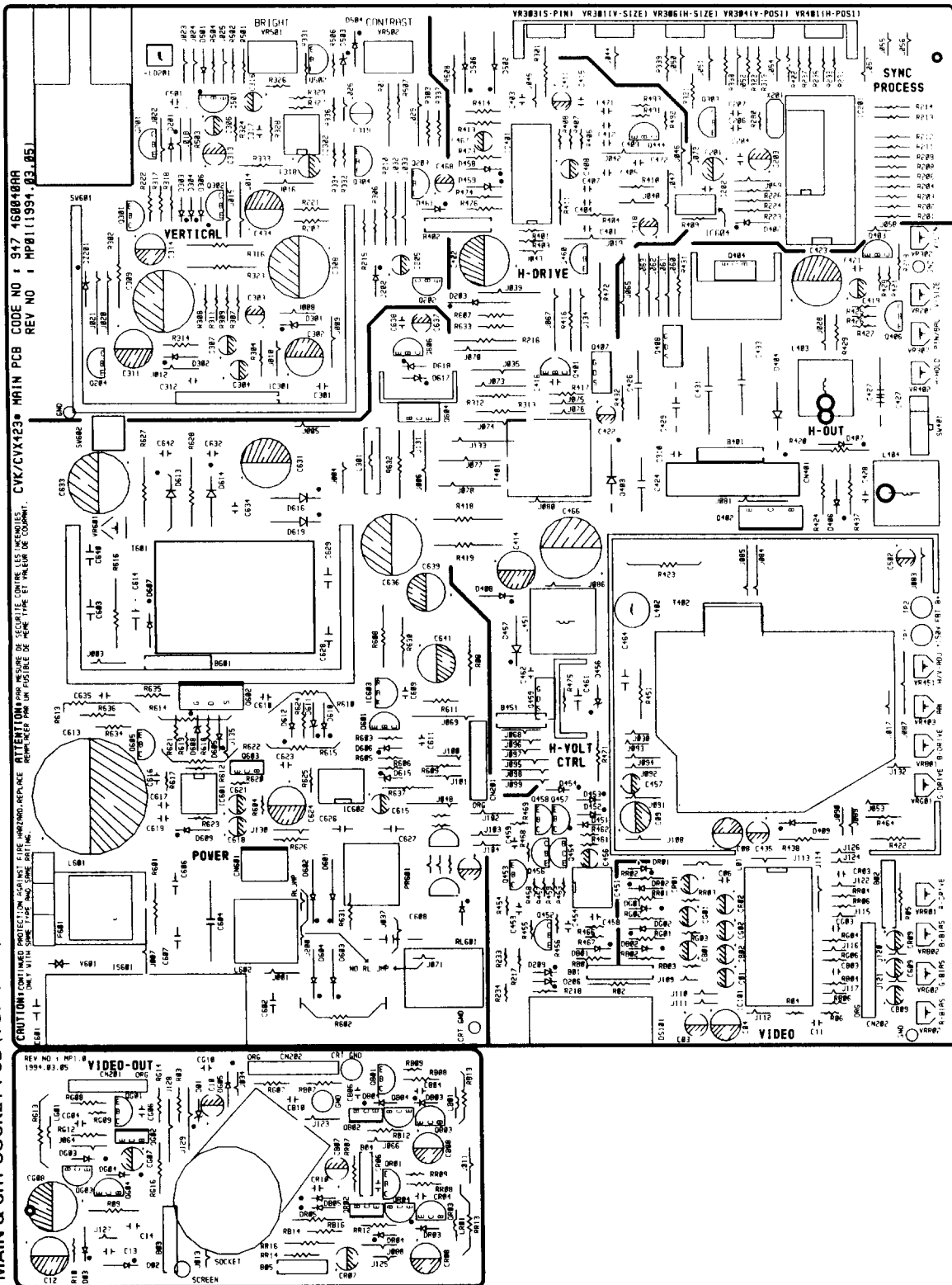
MAIN & CRT SOCKET PCB (TOP VIEW)

CODE NO : 947 460040AA
REV NO : MP01(1994.03.05)

CAUTION: CONTINUED PROTECTION AGAINST FIRE HAZARD, REPLACE
IMMEDIATELY WITH SAME TYPE AND SOME ORBITAL.


ATTENTION: PAR MESURE DE SECURITE CONTRE LES INCENDIES
REEMPLACER PAR UN FUSIBLE DE MEME TYPE ET VALEUR DE COURANT.

CVK/CSVX423 MAIN PCB CODE NO : 947 458048AA

R
1

ELECTRICAL PARTS LIST

IMPORTANT SAFETY NOTICE

Component identified by the symbol  have special characteristic important to safety. When replacing any of these components, use only manufacturer's specified parts.



NOTE

- Tolerance : F; $\pm 1\%$, J; $\pm 5\%$, K; $\pm 10\%$, M; $\pm 20\%$, P; $+100\sim 0\%$, Z; $+80\sim -20\%$
- Rated Voltage
 0J: 6.3V, 1A:10V, 1C:16V, 1D:20V, 1E:25V, 1F:35V, 1G:40V, 1H:50V, 1J:63V, 1K:75V, 2A:100V, 2B:125V, 2C:160V, 2D:200V, 2E:250V, 2V:350V, 2G:400V, 2W:450V, 2H:500V, 2J:630V, 3A:1KV, 3C:1.6KV, 3D:2KV.

LOC. NO	DESCRIPTION	CODE NO	REMARK
CAPACITORS			
C01	CAP-AL.ELEC,106M,1H	917 122100HM	
C03	CAP-AL.ELEC,476M,1C	917 122470CM	
C04	CAP-AL.ELEC,107M,1C	917 123100CM	
C06	CAP-CERAMIC,102K,1H,Y5P	915 324100HKPH	
C08	CAP-AL.ELEC,107M,1C	917 123100CM	
C09	CAP-AL.ELEC,107M,1C	917 123100CM	
C10	CAP-AL.ELEC,476M,1C	917 122470CM	
C11	CAP-CERAMIC,103Z,1H,Y5V	915 325100HZVH	
C12	CAP-AL.ELEC,335M,2E	917 121330QM	
C13	CAP-CERAMIC,103Z,2H,DISC	915 325100VZVH	
C14	CAP-CERAMIC,102K,3A,DISC	915 324100XKPH	
C201	CAP-AL.ELEC,476M,1C	917 122470CM	
C202	CAP-CERAMIC,103Z,1H,Y5V	915 325100HZVH	
C203	CAP-AL.ELEC,476M,1C	917 122470CM	
C204	CAP-CERAMIC,103Z,1H,Y5V	915 325100HZVH	
C205	CAP-AL.ELEC,106M,1C	917 122100CM	
C206	CAP-CERAMIC,220J,1H,SL	915 312220HJHH	
C207	CAP-CERAMIC,220J,1H,SL	915 312220HJHH	
C301	CAP-CERAMIC,103Z,1H,Y5V	915 325100HZVH	
C302	CAP-AL.ELEC,337M,1E	917 123330EM	
C303	CAP-AL.ELEC,105M,1H	917 121100HM	
C304	CAP-TA.ELEC,684J,1V	917 310680FJ	
C306	CAP-AL.ELEC,106M,1H	917 122100HM	
C307	CAP-TANTAL,106K,1E	917 312100EK	
C308	CAP-AL.ELEC,228M,1E,16X25	917 844220EMXH	
C309	CAP-AL.ELEC,108M,1V,16X25	917 124100FMXH	
C310	CAP-CERAMIC,561K,2H,Y5P	915 323560VKPH	
C311	CAP-AL.ELEC,107M,1V	917 123100FMAX	

LOC. NO	DESCRIPTION	CODE NO	REMARK
C312	CAP-CERAMIC,221J,1H,SL	915 313220HJHH	
C313	CAP-AL.ELEC,105M,2C	917 121100NM	
C314	CAP-AL.ELEC,476M,1H	917 122470HM	
C316	CAP-AL.ELEC,685M,1H	917 121680HM	
C317	CAP-MYLAR,333K,2A,5P	916 165330LKAH	
C319	CAP-AL.ELEC,475M,1H,105°C	917 241470HM	
C401	CAP-CERAMIC,101J,1H,SL	915 313100HJHH	
C402	CAP-AL.ELEC,108M,1C	917 124100CM	
C403	CAP-MYLAR,102J,2A,5P	916 164100LJAH	
C404	CAP-CERAMIC,271J,1H,SL	915 313270HJHH	
C405	CAP-MYLAR,152J,2A,3P	916 164150LJAH	
C406	CAP-AL.ELEC,336M,1C	917 122330CM	
C407	CAP-CERAMIC,221J,1H,SL	915 313220HJHH	
C408	CAP-AL.ELEC,105M,1H	917 121100HM	
C409	CAP-MYLAR,103J,2A,5P	916 165100LJAH	
C411	CAP-AL.ELEC,105M,1H	917 121100HM	
C412	CAP-PE/PPF,152J,1H	916 934150HJAH	
C414	CAP-AL.ELEC,106M,1H	917 122100HMAX	
C415	CAP-MYLAR,152J,2A,3P	916 164150LJAH	
C416	CAP-MYLAR,472J,2A,5P	916 164470LJAH	
C418	CAP-AL.ELEC,106M,1H	917 122100HM	
C419	CAP-AL.ELEC,475M,1H	917 121470HM	
C421	CAP-CERAMIC,223Z,1H,Y5V	915 325220HZVH	
C422	CAP-AL.ELEC,106M,1H	917 122100HM	
C423	CAP-AL.ELEC,107M,2A	917 123100LM	
C424	CAP-PPF,682J,2J,15.5P	916 364680WJAX	
C427	CAP-MPPF,105J,2E	916 657100QJAX	
C428	CAP-CERAMIC,331K,2H,Y5P	915 323330VKPH	
! C433	CAP-MPE/PP,572J,3C,20P	916 944570YJAH	
C434	CAP-AL.ELEC,107M,1H	917 123100HM	
C435	CAP-AL.ELEC,105M,2E	917 121100QM	
C453	CAP-CERAMIC,101J,1H,SL	915 313100HJHH	
C454	CAP-MYLAR,222J,2A,5P	916 164220LJAH	
C456	CAP-AL.ELEC,105M,1H	917 121100HM	
C456	CAP-AL.ELEC,106M,1H	917 122100HM	
C457	CAP-AL.ELEC,106M,1H	917 122100HM	
C458	CAP-MYLAR,472J,2A,5P	916 164470LJAH	
C459	CAP-CERAMIC,221J,1H,SL	915 313220HJHH	
C461	CAP-MPETP,104J,2E,7.5P	916 556100QJAL	
C464	CAP-MPPF,104J,2E,7.5P	916 556100QJAL	
C466	CAP-AL.ELEC,107M,2C	917 123100NM	
C467	CAP-AL.ELEC,106M,1H	917 122100HM	
C468	CAP-AL.ELEC,105M,1H	917 121100HM	

LOC. NO	DESCRIPTION	CODE NO	REMARK
C471	CAP-CERAMIC,220J,1H,SL	915 312220HJHH	
C472	CAP-CERAMIC,102K,1H,Y5P	915 324100HKPH	
C501	CAP-MYLAR,104J,2A,5P	916 166100LJAH	
C502	CAP-AL.ELEC,105M,1H	917 121100HM	
⚠ C601	CAP-CERAMIC,222M,2B,DISC	915 344220MMVH	
⚠ C602	CAP-CERAMIC,222M,2B,DISC	915 344220MMVH	
⚠ C604	CAP-MPAPER,474K,250VAC	918 146470QK	
⚠ C606	CAP-CERAMIC,222M,2B,DISC	915 344220MMVH	
⚠ C607	CAP-CERAMIC,222M,2B,DISC	915 344220MMVH	
C608	CAP-MPETP,105K,2E,7.5P	916 557100QKAL	
C609	CAP-CERAMIC,102K,1H,Y5P	915 324100HKPH	
C610	CAP-CERAMIC,331K,3A,DISC	915 323330XKPX	
C611	CAP-CERAMIC,222K,2H,Y5P	915 324220VKPH	
C613	CAP-AL.ELE,227M,2G,30X35	917 793220TMFX	
C614	CAP-CERAMIC,103K,3A,Y5P	915 325100XKPX	
C615	CAP-AL.ELEC,105M,1H	917 121100HM	
C616	CAP-CERAMIC,102K,1H,Y5P	915 324100HKPH	
C617	CAP-CERAMIC,222Z,1H,Y5V	915 324220HZVH	
C618	CAP-AL.ELEC,106M,1H	917 122100HM	
C619	CAP-MYLAR,682J,2A,5P	916 164680LJAH	
C621	CAP-AL.ELEC,226M,1E	917 122220EM	
C623	CAP-CERAMIC,104Z,1H,Y5V	915 336100HZVH	
C624	CAP-AL.ELEC,106M,2A,105C	917 122100NM	
⚠ C626	CAP-CERAMIC,222M,2B,DISC	915 344220MMVH	
⚠ C627	CAP-CERAMIC,222M,2B,DISC	915 344220MMVH	
⚠ C628	CAP-CERAMIC,472M,2B,DISC	915 344470MMVH	
⚠ C629	CAP-CERAMIC,472M,2B,DISC	915 344470MMVH	
C631	CAP-AL.ELEC,107M,2A	917 123100LM	
C632	CAP-CERAMIC,221K,3A,Y5P	915 323220XKPH	
C633	CAP-AL.ELEC,227M,2A	917 123220LM	
C634	CAP-MYLAR,104J,2A,9P	916 166100LJAH	
C635	CAP-CERAMIC,102K,3A,DISC	915 324100XKPH	
C635	CAP-CERAMIC,103Z,2H,DISC	915 325100VZVH	
C636	CAP-AL.ELEC,108M,1V,16X25	917 124100FMXH	
C637	CAP-AL.ELEC,106M,1H	917 122100HM	
C638	CAP-CERAMIC,103Z,1H,Y5V	915 325100HZVH	
C639	CAP-AL.ELEC,227M,1C	917 123220CM	
⚠ C640	CAP-CERAMIC,472M,2B,DISC	915 344470MMVH	
C641	CAP-AL.ELEC,477M,1C	917 123470CM	
CB01	CAP-AL.ELEC,106M,1H	917 122100HM	
CB02	CAP-AL.ELEC,475M,1H	917 121470HM	
CB03	CAP-CERAMIC,330J,1H,SL	915 312330HJHH	

LOC. NO	DESCRIPTION	CODE NO	REMARK
CB04	CAP-CERAMIC,680J,1H,NPO	915 312680HJXH	
CB06	CAP-CERAMIC,103Z,1H,Y5V	915 325100HZVH	
CB07	CAP-AL.ELEC,105M,2C	917 121100NM	
CB08	CAP-AL.ELEC,106M,2A	917 122100LM	
CB09	CAP-AL.ELEC,106M,1H	917 122100HM	
CB10	CAP-CERAMIC,103Z,2H,DISC	915 325100VZVH	
CG01	CAP-AL.ELEC,106M,1H	917 122100HM	
CG02	CAP-AL.ELEC,475M,1H	917 121470HM	
CG03	CAP-CERAMIC,330J,1H,SL	915 312330HJHH	
CG04	CAP-CERAMIC,680J,1H,NPO	915 312680HJXH	
CG06	CAP-CERAMIC,103Z,1H,Y5V	915 325100HZVH	
CG07	CAP-AL.ELEC,105M,2C	917 121100NM	
CG08	CAP-AL.ELEC,107M,2A	917 123100LM	
CG09	CAP-AL.ELEC,106M,1H	917 122100HM	
CG10	CAP-CERAMIC,103Z,2H,DISC	915 325100VZVH	
CR01	CAP-AL.ELEC,106M,1H	917 122100HM	
CR02	CAP-AL.ELEC,475M,1H	917 121470HM	
CR03	CAP-CERAMIC,330J,1H,SL	915 312330HJHH	
CR04	CAP-CERAMIC,680J,1H,NPO	915 312680HJXH	
CR06	CAP-CERAMIC,103Z,1H,Y5V	915 325100HZVH	
CR07	CAP-AL.ELEC,105M,2C	917 121100NM	
CR08	CAP-AL.ELEC,106M,2A	917 122100LM	
CR09	CAP-AL.ELEC,106M,1H	917 122100HM	
CR10	CAP-CERAMIC,103Z,2H,DISC	915 325100VZVH	
COILS			
L01	INDUCTOR-AXIAL,220UH	925 001001AN	
L301	INDUCTOR-AXIAL,220UH	925 001001AN	
L402	COIL-PEAKING,8.2MH(T)	925 460125DC	
L403	COIL-CHOKE,200UH(ROBOT)	925 460125AB	
L404	COIL-H/LINEARITY,9UH	925 460188AA	
L451	COIL-CHOKE,3.2MH,ROBOT	925 460181SA	
 L601	COIL-LINE FILTER,15MH	925 460178JA	
 L602	COIL-LINE FILTER,3mH	925 460185CA	
LB01	INDUCTOR-AXIAL,8.2UH	925 001002AT	
LG01	INDUCTOR-AXIAL,8.2UH	925 001002AT	
LR01	INDUCTOR-AXIAL,8.2UH	925 001002AT	
CONNECTORS			
CN201	CBF-CONN,ASSY 200MM,9P	955 460523AAAA	
CN202	CBF-CONN,ASSY 200MM, 8P	955 460527AAAA	
CN601	COIL-DEGAUSSING,13 OHM	925 460189AA	

LOC. NO	DESCRIPTION	CODE NO	REMARK
DIODES			
D01	DIODE-ZEN,UZ-8.2BL,DO-35	893 290031AA	AC 220V ONLY
D02	DIODE-REC,1N4007,DO-41	893 314007AANC	
D201	DIODE-SIG,1N4148,DO-35	893 114148AANM	
D203	DIODE-SIG,1N4148,DO-35	893 114148AANM	
D206	DIODE-ZEN,UZ-5.1B,DO-35	893 290031FB	
D209	DIODE-ZEN,UZ-5.1B,DO-35	893 290031FB	
D301	DIODE-ZEN,BZX79C5V6,DO35	893 299004AE	
D302	DIODE-REC,1N4002,DO-41	893 314002AB	
D303	DIODE-SIG,1N4148,DO-35	893 114148AANM	
D304	DIODE-SIG,1N4148,DO-35	893 114148AANM	
D306	DIODE-SIG,1N4148,DO-35	893 114148AANM	
D403	DIODE-REC,RG4,-	893 399017AA	
D404	DIODE-REC,ERD09-15	893 390915AA	
D406	DIODE-REC,RGP10G,DO-41	893 390010AD	
D407	DIODE-REC,RGP10G,DO-41	893 390010AD	
D408	DIODE-REC,RGP10G,DO-41	893 390010AD	
D409	DIODE-REC,1N4937,DO-41	893 314937AB	
D451	DIODE-SIG,1N4148,DO-35	893 114148AANM	
D452	DIODE-SIG,1N4148,DO-35	893 114148AANM	
D453	DIODE-SIG,1N4148,DO-35	893 114148AANM	
D454	DIODE-SIG,1N4148,DO-35	893 114148AANM	
D456	DIODE-ZEN,UZ-9.1,DO-41	893 290002BC	
D457	DIODE-REC,1R5NU41	893 399032AA	
D458	DIODE-SIG,1N4148,DO-35	893 114148AANM	
D459	DIODE-ZEN,UZ-8.2BL,DO-35	893 290031AA	
D461	DIODE-SIG,BAV21,DO-35	893 190021AANA	
D501	DIODE-SIG,BAV21,DO-35	893 190021AANA	
D502	DIODE-SIG,1N4148,DO-35	893 114148AANM	
D503	DIODE-ZEN,UZ7.5BM,DO-35	893 290031KBNA	
D504	DIODE-SIG,1N4148,DO-35	893 114148AANM	
D506	DIODE-SIG,1N4148,DO-35	893 114148AANM	
D601	DIODE-REC,1N5399GP,DO-15	893 315399AA	
D602	DIODE-REC,1N5399GP,DO-15	893 315399AA	
D603	DIODE-REC,1N5399GP,DO-15	893 315399AA	
D604	DIODE-REC,1N5399GP,DO-15	893 315399AA	
D605	1N4148	893 114148AANM	
D606	DIODE-SIG,1N4148,DO-35	893 114148AANM	
D607	DIODE: RGP02-12(GI)	02169-206-297	
D608	DIODE-ZEN,UZ-16BM,DO-35	893 290031HB	
D609	DIODE-REC,1N4937,DO-41	893 314937AB	
D610	DIODE-REC,1N4937,DO-41	893 314937AB	
D611	DIODE-ZEN,UZ-16BM,DO-35	893 290031HB	

LOC. NO	DESCRIPTION	CODE NO.	REMARK
D612	DIODE-RGP02-12(GI)	02169-206-297	
D613	DIODE-REC,1R5NU41	893 399032AA	
D614	DIODE-REC,UF5408,DO201AD	893 395408AA	
D615	DIODE-ZEN,UZ-12BM,DO-35	893 290031BB	
D616	DIODE-REC,RG2,-	893 399016AA	
D617	DIODE-ZEN,UZ-5.1B,DO-35	893 290031FB	
D618	DIODE-ZEN,UZ7.5BM,DO-35	893 290031KBNA	
D619	DIODE-REC,RG2YV(T),-	893 399016AF	
DB01	DIODE-SIG,1N4148,DO-35	893 114148AANM	
DB02	DIODE-SIG,1N4148,DO-35	893 114148AANM	
DB03	DIODE-SIG,1N4148,DO-35	893 114148AANM	
DB04	DIODE-SIG,1N4148,DO-35	893 114148AANM	
DB05	DIODE-SIG,1N4148,DO-35	893 114148AANM	
DG01	DIODE-SIG,1N4148,DO-35	893 114148AANM	
DG02	DIODE-SIG,1N4148,DO-35	893 114148AANM	
DG03	DIODE-SIG,1N4148,DO-35	893 114148AANM	
DG04	DIODE-SIG,1N4148,DO-35	893 114148AANM	
DG05	DIODE-SIG,1N4148,DO-35	893 114148AANM	
DR01	DIODE-SIG,1N4148,DO-35	893 114148AANM	
DR02	DIODE-SIG,1N4148,DO-35	893 114148AANM	
DR03	DIODE-SIG,1N4148,DO-35	893 114148AANM	
DR04	DIODE-SIG,1N4148,DO-35	893 114148AANM	
DR05	DIODE-SIG,1N4148,DO-35	893 114148AANM	
FERRITE-CORES			
B01	FERRITE-CORE: 1.5MH+-20%	02429-048-017	
B02	FERRITE-CORE: 1.5MH+-20%	02429-048-017	
B03	FERRITE-CORE: 1.5MH+-20%	02429-048-017	
B04	FERRITE-CORE: 1.5MH+-20%	02429-048-017	
B05	FERRITE-CORE: 1.5MH+-20%	02429-048-017	
B401	FERRITE-CORE: 1.5MH+-20%	02429-048-017	
B451	FERRITE-CORE: 1.5MH+-20%	02429-048-017	
B601	FERRITE-CORE: 1.5MH+-20%	02429-048-017	
ICS			
IC101	IC-LIN,1203,VIDEO AMP(RGB	881 101203AA	
IC201	IC-CUS,2145,MODE-CONTROL	885 460006AA	
IC301	IC-LIN,7838,VERTICAL	881 707838SA	
IC302	IC-LIN,358,OP AMP	881 100358AANA	
IC401	IC-LIN,2138,DEFLECTION	881 702138AA	
IC451	IC-LIN,358,OP AMP	881 100358AANA	

LOC. NO	DESCRIPTION	CODE NO.	REMARK
⚠ IC601	IC-LIN, KA3882,PWM	981 903882AA	
⚠ IC602	OPT-COUPPL,TR,CQY80NG	895 520080AA	
IC603	IC-LIN,431,REGULATOR	881 300431TANB	
IC604	IC-LIN,7805,REGULATOR	881 307805KANE	
⚠ IS601	CON-SOCKET,AC,INLET	935 710008GA	
RESISTORS			
R01	REF-CF,1K,5%,1/4W	911 141007DA	
R02	REF-CF,1K,5%,1/4W	911 141007DA	
R03	REF-CF,150,5%,1/4W	911 131507DA	
R04	REF-CF,100K,5%,1/6W	911 16007YA	
R05	REF-CF,5.6K,5%,1/2W(S)	911 145607FF	
R06	REF-CF,20K,5%,1/6W	911 152007YA	
R08	REF-MO,150,5%,1W(S)	911 331507GF	
R09	REF-CF,100,5%,1/4W	911 131007DA	
R207	REF-CF,4.7K,5%,1/4W	911 144707DA	
R208	REF-CF,560K,5%,1/6W	911 165607YA	
R209	REF-MF,110K,1%,1/4W	911 461105DA	
R210	REF-CF,10K,5%,1/6W	911 151007YA	
R210	REF-CF,10K,5%,1/6W	911 151007YA	
R211	REF-CF,68K,5%,1/4W	911 156807DA	
R212	REF-CF,270K,5%,1/4W	911 162707DA	
R213	REF-CF,120K,5%,1/4W	911 161207DA	
R214	REF-CF,68K,5%,1/4W	911 156807DA	
R216	REF-CF,4.7K,5%,1/4W	911 144707DA	
R217	REF-CF,100,5%,1/6W	911 131007YA	
R218	REF-CF,2.7K,5%,1/6W	911 142707YA	
R219	REF-CF,15K,5%,1/4W	911 151507DA	
R221	REF-CF,150,5%,1/4W	911 131507DA	
R222	REF-CF,1K,5%,1/4W	911 141007DA	
R224	REF-CF,47K,5%,1/4W	911 154707DA	
R226	REF-CF,68K,5%,1/4W	911 156807DA	
R231	REF-CF,15K,5%,1/4W	911 151507DA	
R231	REF-CF,22K,5%,1/4W	911 152207DA	
R232	REF-CF,39K,5%,1/4W	911 153907DA	
R233	REF-CF,100,5%,1/6W	911 131007YA	
R234	REF-CF,2.7K,5%,1/6W	911 142707YA	
R280	REF-CF,1.8M,5%,1/6W	911 171807YA	
R301	REF-CF,27K,5%,1/4W	911 152707DA	
R302	REF-FUSIBLE,3.3,5%,1W	911 813307GA	
R303	REF-CF,10K,5%,1/4W	911 151007DA	
R304	REF-CF,82K,5%,1/4W	911 158207DA	

LOC. NO	DESCRIPTION	CODE NO.	REMARK
R306	REF-CF,470K,5%,1/4W	911 164707DA	
R307	REF-CF,27K,5%,1/4W	911 152707DA	
R308	REF-CF,68,5%,1/6W	911 126807YA	
R309	REF-CF,12K,5%,1/4W	911 151207DA	
R311	REF-CF,12K,5%,1/4W	911 151207DA	
R312	REF-CF,470,5%,1/2W	911 134707FA	
R314	REF-CF,3.3K,5%,1/4W	911 143307DA	
R316	REF-MO,100,5%,2W(S)	911 331007JF	
R317	REF-FUSIBLE,22,5%,1/4W	911 822207DA	
R318	REF-CF,33K,5%,1/4W	911 153307DA	
R319	REF-CF,10K,5%,1/4W	911 151007DA	
R323	REF-MO,1.2,5%,1W(S)	911 311207GF	
R324	REF-CF,39K,5%,1/6W	911 153907YA	
R326	REF-CF,33K,5%,1/6W	911 153307YA	
R327	REF-CF,5.6K,5%,1/6W	911 145607YA	
R328	REF-CF,1M,5%,1/6W	911 171007YA	
R329	REF-CF,8.2K,5%,1/6W	911 148207YA	
R331	REF-CF,1K,5%,1/6W	911 141007YA	
R332	REF-CF,56K,5%,1/6W	911 155607YA	
R338	REF-CF,12K,5%,1/4W	911 151207DA	
R339	REF-CF,4.7K,5%,1/4W	911 144707DA	
R401	REF-CF,10K,5%,1/6W	911 151007YA	
R402	REF-CF,7.5K,5%,1/4W	911 147507DA	
R403	REF-CF,22K,5%,1/6W	911 152207YA	
R404	REF-CF,8.2K,5%,1/6W	911 148207YA	
R406	REF-CF,33K,5%,1/6W	911 153307YA	
R407	REF-CF,8.2K,5%,1/6W	911 148207YA	
R408	REF-CF,1K,5%,1/6W	911 141007YA	
R410	REF-CF,56K,5%,1/4W	911 155607DA	
R411	REF-CF,27K,5%,1/4W	911 152707DA	
R412	REF-CF,10K,5%,1/6W	911 151007YA	
R413	REF-MF,12K,1%,1/4W	911 451205DA	
R414	REF-MF,12K,1%,1/4W	911 451205DA	
R416	REF-CF,1K,5%,1/4W	911 141007DA	
R417	REF-CF,180,5%,1/4W	911 131807DA	
R418	REF-MO,470,5%,3W	911 334707LA	
R419	REF-MO,470,5%,3W	911 334707LA	
R421	REF-CF,330,5%,1/6W	911 133307YA	
R422	REF-CF,180K,5%,1/2W	911 161807FA	
R423	REF-MO,82,5%,3W(S)	911 328207LF	
R424	REF-CF,22,5%,1/2W(S)	911 122207FF	
R425	REF-CF,4.7K,5%,1/6W	911 144707YA	
R426	REF-CF,47K,5%,1/6W	911 154707YA	

LOC. NO	DESCRIPTION	CODE NO	REMARK
R427	REF-CF,4.7K,5%,1/6W	911 144707YA	
R428	REF-CF,22K,5%,1/6W	911 152207YA	
R429	REF-CF,10K,5%,1/4W	911 151007DA	
R437	REF-CF,220,5%,1/2W(S)	911 132207FF	
R438	REF-MO,100K,5%,1W	911 361007GA	
R454	REF-CF,10K,5%,1/6W	911 151007YA	
R455	REF-CF,10K,5%,1/6W	911 151007YA	
R456	REF-CF,100,5%,1/6W	911 131007YA	
R457	REF-CF,18K,5%,1/6W	911 151807YA	
R458	REF-CF,1K,5%,1/6W	911 141007YA	
R459	REF-CF,1K,5%,1/6W	911 141007YA	
R461	REF-CF,120K,5%,1/6W	911 161207YA	
R462	REF-CF,3.3K,5%,1/6W	911 143307YA	
R463	REF-CF,10K,5%,1/6W	911 151007YA	
R464	REF-CF,1.8K,5%,1/6W	911 141807YA	
R466	REF-CF,12K,5%,1/6W	911 151207YA	
R467	REF-CF,10K,5%,1/6W	911 151007YA	
R468	REF-CF,10K,5%,1/6W	911 151007YA	
R469	REF-CF,3.3K,5%,1/6W	911 143307YA	
R471	REF-CF,22,5%,1/2W	911 122207FA	
R472	REF-CF,10K,5%,1/4W	911 151007DA	
R473	REF-CF,3.3K,5%,1/4W	911 143307DA	
R474	REF-CF,8.2K,5%,1/4W	911 148207DA	
R476	REF-CF,4.7K,5%,1/4W	911 144707DA	
R491	REF-CF,1K,5%,1/6W	911 141007YA	
R492	REF-CF,1K,5%,1/6W	911 141007YA	
R493	REF-CF,100K,5%,1/6W	911 161007YA	
R501	REF-CF,6.8K,5%,1/4W	911 146807DA	
R502	REF-CF,2.2M",5%,1/4W	911 172207DA	
R503	REF-CF,1K,5%,1/4W	911 141007DA	
R504	REF-CF,10K,5%,1/6W	911 151007YA	
R506	REF-CF,1K,5%,1/6W	911 141007YA	
R507	REF-CF,1.5K,5%,1/4W	911 141507DA	
R508	REF-CF,22K,5%,1/4W	911 152207DA	
R601	REF-CF,330K,5%,1/2W	911 163307FA	
R602	REF-WW,3.3,5%,7W	911 613307QZ	
R603	REF-CF,56K,5%,1/6W	911 155607YA	
R604	REF-CF,2.7K,5%,1/6W	911 142707YA	
R605	REF-CF,1.5K,5%,1/6W	911 141507YA	
R606	REF-CF,910,5%,1/6W	911 139207YA	
R607	REF-CF,10K,5%,1/4W	911 151007DA	
R608	REF-CF,1.5K,5%,1/4W	911 141507DA	
R609	REF-CF,6.8K,5%,1/4W	911 146807DA	

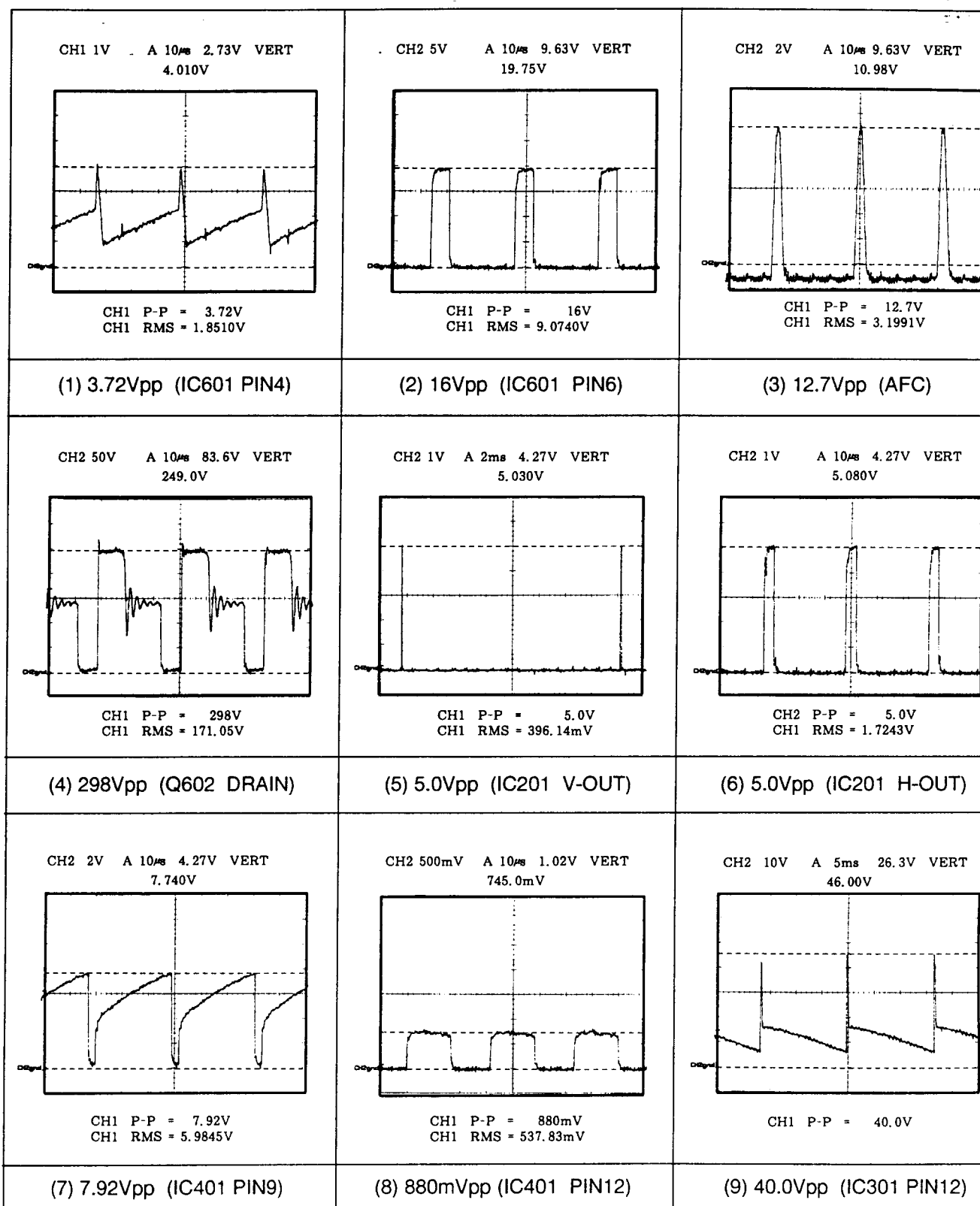
LOC. NO	DESCRIPTION	CODE NO	REMARK
R610	REF-MO,8.2K,5%,3W(S)	911 348207LF	AC 220V ONLY AC 220V ONLY AC 220V ONLY
R611	REF-CF,100K,5%,1/2W(S)	911 161007FF	
R612	REF-CF,100K,5%,1/6W	911 161007YA	
R613	REF-MO,100K,5%,1W(S)	911 361007GF	
R614	REF-MO,100K,5%,1W(S)	911 361007GF	
R615	REF-MO,8.2K,5%,3W(S)	911 348207LF	
R616	REF-MO,68K,5%,3W(S)	911 356807LF	
R617	REF-CF,100K,5%,1/6W	911 161007YA	
R618	REF-CF,6.8,5%,1/4W	911 116807DA	
R619	REF-CF,1K,5%,1/6W	911 141007YA	
R620	REF-CF,10K,5%,1/6W	911 151007YA	
R621	REF-CF,100K,5%,1/4W	911 161007DA	
R622	REF-WW,0.27,5%,1W	911 602707GU	
R623	REF-CF,10K,5%,1/6W	911 151007YA	
R624	REF-CF,10K,5%,1/2W(S)	911 151007FF	
R625	REF-CF,2.2M,5%,1/6W	911 172207YA	
R626	REF-CF,10K,5%,1/4W	911 151007DA	
R627	REF-MO,47K,5%,1W	911 354707GA	
R628	REF-MO,47,5%,1W	911 324707GA	
R632	REF-MO,1K,5%,1W(S)	911 341007GF	
R633	REF-CF,10K,5%,1/4W	911 151007DA	
R634	REF-CF 100K 1/4	911 161007DA	
R635	REF-CF 560K 1/4	911 165607YA	
R636	REF-OF 560K 1/4	911 165607YA	
R637	REF-CF,1.2K,5%,1/4W	911 141207DA	
RB01	REF-CF,75,5%,1/4W	911 127507DA	
RB02	REF-CF,47,5%,1/4W	911 124707DA	
RB03	REF-CF,10K,5%,1/6W	911 151007YA	
RB04	REF-CF,200,5%,1/6W	911 132007YA	
RB06	REF-CF,270,5%,1/6W	911 132707YA	
RB07	REF-CF,47,5%,1/4W	911 124707DA	
RB08	REF-CF,180,5%,1/4W	911 131807DA	
RB09	REF-CF,47,5%,1/6W	911 124707YA	
RB12	REF-FUSIBLE,82,5%,1/4W	911 828207DA	
RB13	REF-MO,2.2K,5%,3W(S)	911 342207LF	
RB14	REF-CF,470K,5%,1/4W	911 164707DA	
RB16	REF-CC,100,10%,1/2W	911 231008FA	
RG01	REF-CF,75,5%,1/4W	911 127507DA	
RG02	REF-CF,47,5%,1/4W	911 124707DA	
RG03	REF-CF,10K,5%,1/6W	911 151007YA	
RG04	REF-CF,200,5%,1/6W	911 132007YA	
RG06	REF-CF,270,5%,1/6W	911 132707YA	
RG07	REF-CF,47,5%,1/4W	911 124707DA	
RG08	REF-CF,180,5%,1/4W	911 131807DA	
RG09	REF-CF,47,5%,1/6W	911 124707YA	

LOC. NO	DESCRIPTION	CODE NO.	REMARK
RG12	REF-FUSIBLE,82,5%,1/4W	911 828207DA	
RG13	REF-MO,2.2K,5%,3W(S)	911 342207LF	
RG14	REF-CF,470K,5%,1/4W	911 164707DA	
RG16	REF-CC,100,10%,1/2W	911 231008FA	
RR01	REF-CF,75,5%,1/4W	911 127507DA	
RR02	REF-CF,47,5%,1/4W	911 124707DA	
RR03	REF-CF,10K,5%,1/6W	911 151007YA	
RR04	REF-CF,200,5%,1/6W	911 132007YA	
RR06	REF-CF,270,5%,1/6W	911 132707YA	
RR07	REF-CF,47,5%,1/4W	911 124707DA	
RR08	REF-CF,180,5%,1/4W	911 131807DA	
RR09	REF-CF,47,5%,1/6W	911 124707YA	
RR12	REF-FUSIBLE,82,5%,1/4W	911 828207DA	
RR13	REF-MO,2.2K,5%,3W(S)	911 342207LF	
RR14	REF-CF,470K,5%,1/4W	911 164707DA	
RR16	REF-CC,100,10%,1/2W	911 231008FA	
TRANSISTORS			
Q201	TR-NPN,KSC945,TO-92	891 390006XB	
Q202	TR-NPN,KSC945,TO-92	891 390006XB	
Q203	TR-NPN,KSC945,TO-92	891 390006XB	
Q301	TR-NPN,KSC945,TO-92	891 390006XB	
Q302	TR-PNP,KSA733,TO-92	891 190733XC	
Q401	TR-NPN,KSC1008,TO-92	891 391008XA	
⚠ Q402	TR-NPN,2SC4762,2-16E3A	891 464762AA	
Q403	TR-PNP,KSA733,TO-92	891 190733XC	
Q404	TR-PNP,KSA614,TO-220	891 290614AB	
Q406	TR-NPN,KSC945,TO-92	891 390006XB	
Q444	TR-PNP,KSA733,TO-92	891 190733XC	
Q452	TR-NPN,KSC945,TO-92	891 390006XB	
Q453	TR-NPN,KSC1008,TO-92	891 391008XA	
Q454	TR-NPN,KSC1008,TO-92	891 391008XA	
Q456	TR-PNP,KSA733,TO-92	891 190733XC	
Q457	TR-NPN,KSC945,TO-92	891 390006XB	
Q458	TR-PNP,KSA733,TO-92	891 190733XC	
⚠ Q459	FET-P,IRF9610,TO-220	891 799610AA	
Q460	TR-NPN,KSC945,TO-92	891 390006XB	
Q501	TR-NPN,KSC945,TO-92	891 390006XB	
Q502	TR-PNP,KSA733,TO-92	891 190733XC	
Q601	TR-NPN,KSC945,TO-92	891 390006XB	
⚠ Q602	FET-N,SSH6N80,TO-3P	891 890680AA	
Q603	TR-NPN,KSC1507,TO-220	891 491507AB	

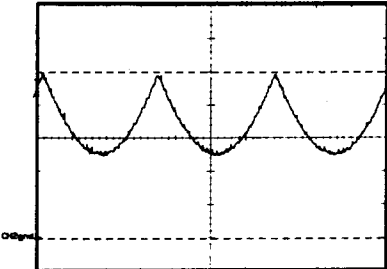
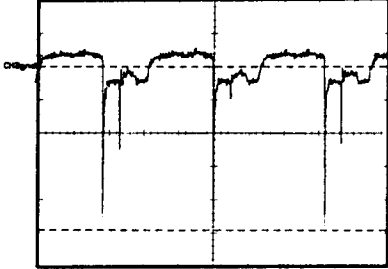
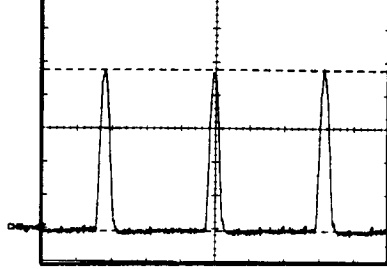
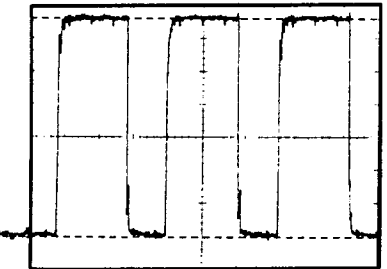
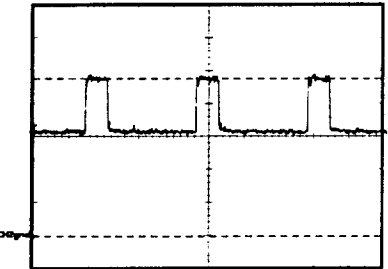
LOC. NO	DESCRIPTION	CODE NO	REMARK
Q605	TR-NPN, MPSA45	891 390045XANA	AC 220V ONLY
Q606	TR-NPN,KSC945,TO-92	891 390006XB	
QB01	TR-NPN,2N3904,TO-92	891 323904XANC	
QB02	TR-NPN,KSC3503,TO-126	891 493503AA	
QB03	TRANSISTOR:2N5551C-Y(T)	02139-301-488	
QB04	TRANSISTOR:2N5401C-Y(T)	02139-101-158	
QG01	TR-NPN,2N3904,TO-92	891 323904XANC	
QG02	TR-NPN,KSC3503,TO-126	891 493503AA	
QG03	TRANSISTOR:2N5551C-Y(T)	02139-301-488	
QG04	TRANSISTOR:2N5401C-Y(T)	02139-101-158	
QR01	TR-NPN,2N3904,TO-92	891 323904XANC	
QR02	TR-NPN,KSC3503,TO-126	891 493503AA	
QR03	TRANSISTOR:2N5551C-Y(T)	02139-301-488	
QR04	TRANSISTOR:2N5401C-Y(T)	02139-101-158	
VARIABLE RESISTORS			
VR ARRY	RES-VAR,ARRAY,ROTARY,25MM	913 910011AB	
VR201	RES-VAR,SF-ROUND,20KOHM	913 452008BF	
VR302	RES-VAR,SF-ROUND,2K	913 442008BF	
VR307	RES-VAR,SF-ROUND,50KOHM	913 455008BF	
VR402	RES-VAR,SF-ROUND,5KOHM	913 445008BF	
VR403	RES-VAR,SF-ROUND,200K	913 462008BF	
VR451	RES-VAR,SF-ROUND,5KOHM	913 445008BF	
VR501	RES-VAR,ROTARY,10K	913 151007YANA	
VR502	RES-VAR,ROTARY,5K	913 145007YA	
VR601	RES-VAR,SF-ROUND,500OHM	913 435008BH	
VRB01	RES-VAR,SF-ROUND,200OHM	913 432008BF	
VRB02	RES-VAR,SF-ROUND,50KOHM	913 455008BF	
VRG01	RES-VAR,SF-ROUND,200OHM	913 432008BF	
VRG02	RES-VAR,SF-ROUND,50KOHM	913 455008BF	
VRR02	RES-VAR,SF-ROUND,50KOHM	913 455008BF	
OTHERS			
X201	C-RESO,3.58M,0.5%	941 210011TA	
AC/GND	WASHER,SPRING,M4	855 124001BB	
⚠ CRT	CRT-COLOR:M34KRH35X01	02019-238-710	
CHA- BOTTOM	PLT,GUIDE-SUB,PCB	821 469105AA	
CHA- BOTTOM	TAPTITE,B,BH,+,M3,L8,ZPC3	847 501007EG	
CN601	CON-WALL HEADER,3P,3.96	935 240903DLSA	
DS101	CON-D-SUB,9P,RECEPTACLE	935 100109AL	

LOC. NO	DESCRIPTION	CODE NO	REMARK
⚠ F601	FUSE-CERMIC TUB,3.15A,250	949 115105THNA	
FCLIP	FUSE-CLIP,5.2X20,30MOHM	953 260023BC	
GND1	CBF-LUG TERMINAL,250MM	955 460465AAAA	
GND2	CBF-LUG TERMINAL,80MM	955 460474AAAA	
GND3	CBF-LUG TERMINAL,80MM	955 460474AAAA	
GT-PIN	PIN-GT:14.2MM 2.35PI	03124-700-810	
H/S FBT	ASSY-H/SINK FBT	257 213000AJAU	
H/S HI-V	ASSY-H/SINK H/VOLT	257 213000AJAY	
H/S HOR	ASSY-H/SINK HORIZONTAL	257 213000AJBA	
H/S POWER	ASSY-H/SINK POWER:CVK423*	257 213000AJAT	
H/S REG2	ASSY-H/SINK REQ2:CVK423*	257 213000AJAZ	
H/S VER	ASSY-H/SINK VERTICAL:CVK4	257 213000AJAV	
JUMPER	CBF-JUMPER WIRE,43MM	955 005001AAAA	
LD201	LED,G/Y,ROUND,4.8MM	895 110048DA	
P/C	CBF-POWER CORD,1850MM,UC	955 001434AAAA	
⚠ PR601	POSI,20,SQUARE	897 110007AA	
PWA-MAIN	PCB-MAIN:CVX/CVK	947 460040AA	
SIG/C	CBF-SIGNAL CABLE,1200,IVR	955 460512AAAA	
SOCKET	CON-JACK CRT SOCKET	935 720901AESA	
SW401	SWITCH-TOGGLE,SP3T	933 110034TC	
⚠ SW601	SWITCH-KEY,SPST	933 217007AB	
SW602	SWITCH-PUSH	933 210080AA	
⚠ T401	TRANS-HOR DRIVE(CVM4967)	923 460136AA	
T402	TRANS-FBT (FCO-14A042)	923 460164DA	
⚠ T601	TRANS-POWER S/W,60HZ	923 460164BA	





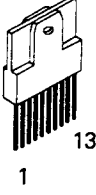

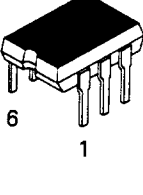

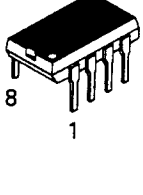

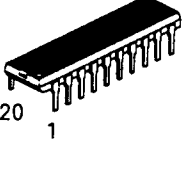
WAVEFORMS



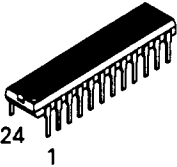
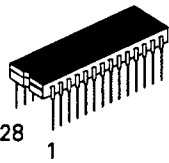
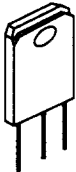
WAVEFORMS

<p>CH2 1V A 5ms 9.55V VERT 5.030V</p>  <p>CH1 P-P = 2.52V</p>	<p>CH2 1V A 10μs -18.1V VERT 9.840V</p>  <p>CH1 P-P = 10.9V</p>	<p>CH2 1V A 10μs 367V VERT 970.0V</p>  <p>CH1 P-P = 1.02kV CH2 RMS = 263.01V</p>
<p>(10) 2.52Vpp (Q404 EMITTER)</p>	<p>(11) 10.9Vpp (Q402 BASE)</p>	<p>(12) 1.02KV (Q402 COLLECTOR)</p>
<p>CH2 20V A 10μs 72.5V VERT 150V</p>  <p>CH1 P-P = 150V</p>	<p>CH2 20V A 10μs 72.5V VERT 150V</p>  <p>CH1 P-P = 150V</p>	
<p>(13) 150V (Q459 DRAIN)</p>	<p>(14) 38.4Vpp (VIDEO GAIN)</p>	

SEMICONDUCTOR LEAD IDENTIFICATION

PARTS	TYPE NO.	REF. NO.	PARTS	TYPE NO.	REF. NO.
 E B C	KSC945-Y	Q201, Q202, Q203 Q301, Q406, Q452, Q457, Q501, Q460 Q601, Q606	 B C E	KSA614 TIP29 KSC1507	Q404 Q603 Q604
	KSC1008-Y	Q401, Q453, Q454			
	KSC733-Y	Q302, Q403, Q404, Q444, Q458, Q502	 G D S	IRF9610	Q459
	2N3904	QR01, QG01, QB01			
 E C B	2N5410C-Y	QR04, QG04, QB04	 1 13	LA7838	IC301
	2N5551C-Y	QR03, QG03, QB03			
 B C E	2SC4744	Q402	 6 1	CQY80-NG	IC602
	2SC4762 KSC5086 2SC5149				
 E C B	KSC3503	QR04, QG04, QB04	 8 1	LM358 KA3882	IC601 IC302, IC451
 I G O	MC7805 KA7805	IC604	 20 1	LA7851 (KA2138)	IC401

SEMICONDUCTOR LEAD IDENTIFICATION

PARTS	TYPE NO.	REF. NO.	PARTS	TYPE NO.	REF. NO.
	KA2145	IC201		LM1203 KA2139	IC101
	6N80 2SK1358	Q602			