SAMSUNG
Electronics

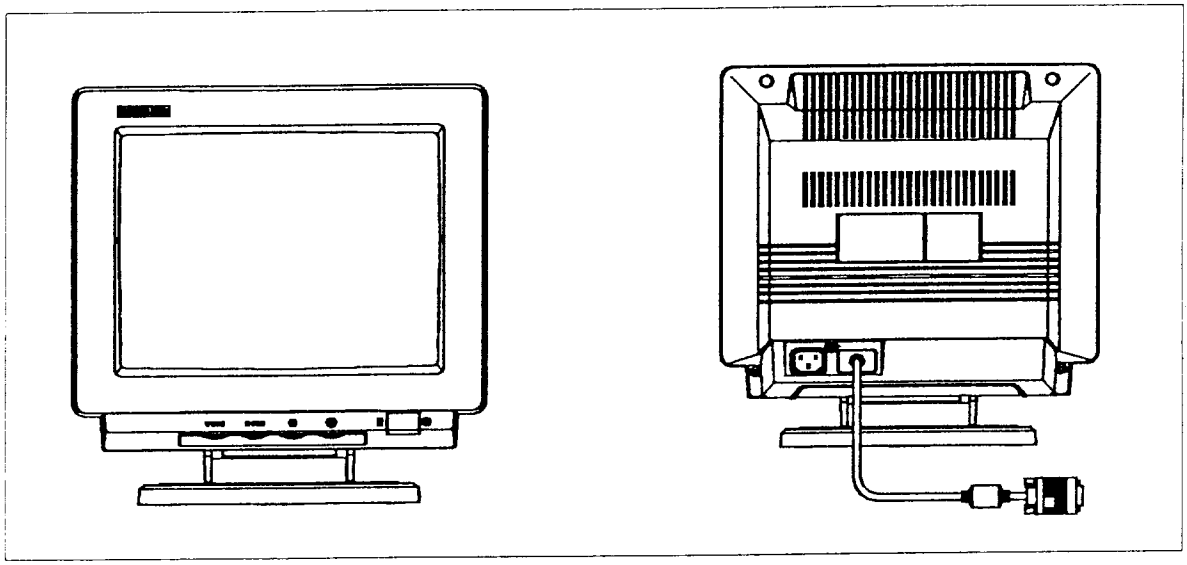
SAMTRON

PERICOM

SERVICE MANUAL

VGA COLOR MONITOR

MODEL NO. : CVL495*



SPECIFICATION

1. Power Input	1) AC108 - 132 V 60 Hz (120V VERSION) 2) AC198 - 264 V 50 Hz (220V-240V VERSION)	
2. Power consumption	65W	MAX : 80W
3. Input signal		
a)Video	R,G,B Analog separated	
b)Sync	Mode 1 : H:positive V:negative Mode 2 : H:negative V:positive Mode 3 : H:negative V:negative	TTL Level
4. Frequency		
a)Horizontal	31.5 KHz	
b)Vertical	60/70 Hz	
5. CRT	14" 90 deflection non-glare 0.31 dot pitch	CVL4951
	14" 90 deflection non-glare 0.39 dot pitch	CVL4953
	14" 90 deflection glare 0.41 stripe	CVL4954
	14" 90 deflection non-glare 0.41 stripe	CVL4955
	14" 90 deflection glare 0.52 stripe	CVL4956
6. Resolution	Mode 1 : 720 dots x 350 lines Mode 2 : 720 dots x 400 lines Mode 3 : 640 dots x 480 lines	
7. Display size	9 9/20" x 7 1/12" (240 x 180 mm)	+4/-2 mm
8. Dimension(W x D x H)	356 x 382 x 352 mm (with stand)	
9. Weight	11.5 Kg(with stand)	

THEORY OF OPERATION

GENERAL

CVL495 * is a high resolution 14inch VGA compatible color monitor using a 14" 90° deflection CRT.
It uses R,G,B analog input signals and separate (TTL) sync signals.
It can operate in 350,400, and 480 line mode. The switching is automatic and irrespective of on the polarity of horizontal and vertical sync.

POWER CIRCUIT

The power supply circuit is a synchronizing type switching power circuit and substantially consists of the rectifier/smoother, synchronizing, control and output rectifier/smoother circuits.
The AC voltage is full wave rectified by the rectifier smoother circuit and then changed on the smoothing capacitor as a DC voltage.
When the power is turned ON, a small current flows to the base of output transistor (included in IC601) via the start up resistor (R603,R604), as a result,the collector current flows through the primary windings pin 4 and pin 3 of the converter transformer (T601) which produces an electromagnetic force between those windings, resulting in a voltage induced between the driving windings pin 7 and pin 6 of the transformer.
The induced voltage is positively feedback to the base of the output transistor (Q611) to increase the base current of this transistor, resulting in a further increase in the collector current.
The above operation occurs instantaneously to impress sufficient base current on Q611.
The synchronization is done by the pulse induced at the coil of T602.
The horizontal trigger for synchronization is put into the base of Q611, making the oscillation frequency of IC601 same as the H-frequency.
The control circuit always applies to the error amplifier circuit a voltage induced in the detecting winding situated at the primary side of the converter transformer.
The small signal transistor (Q601) and detecting resistor (R607) protect IC601 from surge current which may be caused by power ON/OFF and output short circuit.

IMPORTANT : When replacing the fuse, make sure that the fuse is the same type and rating as the original.

MODE DETECTING CIRCUIT

This monitor has 3 different resolution modes depending on the polarity of sync signals. Mode detecting circuit is composed of IC201 and its related circuits.
IC201 is an EXCLUSIVE-OR gate.
For detailed information refer to table1.

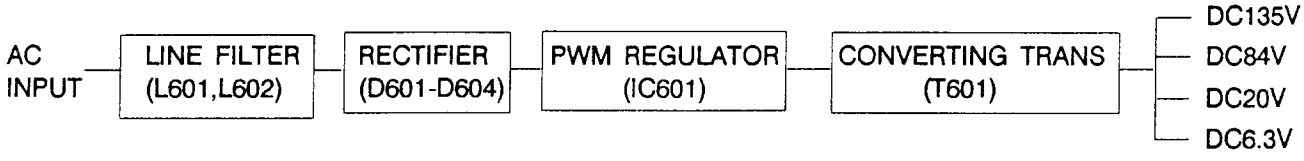


Figure 1. BLOCK-DIAGRAM OF SMPS

VERTICAL DEFLECTION CIRCUIT

Vertical deflection circuit is composed of IC201 (74LS86), IC401, IC301, and its related circuits.The vertical sync signal (only negative pulse) is applied to pin 19 of IC401.
The frequency of the oscillator is controlled by the voltage of pin18 which can be varied by vertical frequency VR (VR301).
The sawtooth signal is fed via a buffer stage to pin 16 of IC401 and drives of the pre-amplifier (pin 2).

An electrolytic capacitor (C309) between pin 8 and pin12 and a diode (D302) between pin 7 and pin 12 should be connected for proper operation of the flyback generator.
The vertical deflection coil is connected to pin 11 of IC301.
The pin 4 of IC301 is negative supply (ground) and the pin 1 of IC301 is positive supply (12V).
The supply voltage at pin 7 is used to supply the flyback generator, voltage stabilizer, blanking pulse generator and buffer stage in IC301.

RESOLUTION	H-SYNC POLARITY	V-SYNC POLARITY	CONTROL LEVEL (IC201)		REMARK
			PIN 4	PIN 12	
720 x 350	POSITIVE	NEGATIVE	H	L	
720 x 400	NEGATIVE	POSITIVE	L	H	
680 x 480	NEGATIVE	NEGATIVE	L	L	

Table 1. TRUTH TABLE OF IC201

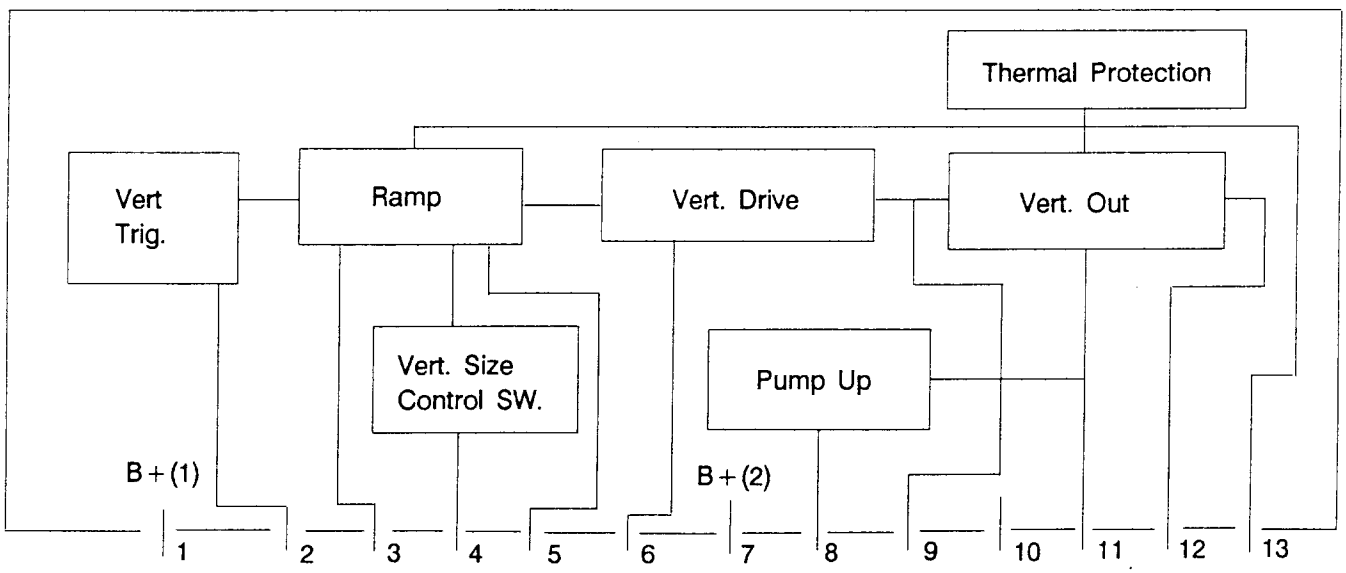


Figure 2. BLOCK-DIAGRAM OF IC301 (LA7835)

HORIZONTAL DRIVE CIRCUIT

The horizontal sync signal is applied to pin 1 of IC401.

The output from the flyback transformer (T402) is integrated and connected to pin 4 of IC401. The horizontal oscillation frequency is controlled by H-frequency VR (VR402) connected to pin 8 and horizontal phase is controlled by H-position VR (VR401) connected to pin 2.

The pulse switching mode between drive and output stage is a reverse polarity type; that is, when the transistor Q401 is ON, the output transistor Q402 is OFF.

HORIZONTAL OUTPUT CIRCUIT

Horizontal drive voltage developed at pin 12 of the horizontal integrated circuit (IC401) is applied through the horizontal drive stage (Q401) and drive transformer (T401).

The horizontal output circuit generates the horizontal scan and high voltage to be applied to the picture tube. The function of horizontal output stage (Q402) is to serve as a switch for the horizontal output circuits. The high voltage required to the anode of the picture tube is generated by boosting the pulse from the collector of the Q402 through T402 during the flyback (retrace) period and applying this boosted pulse to a series of silicon rectifiers. The high voltage regulation is accomplished internally in T402 (FBT).

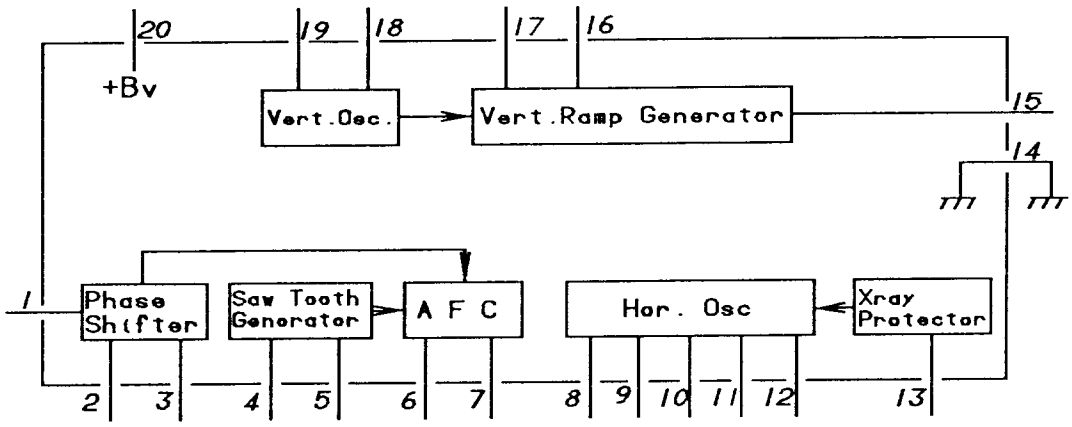


Figure 3. BLOCK-DIAGRAM OF IC401 (LA7851) or (KA2138)

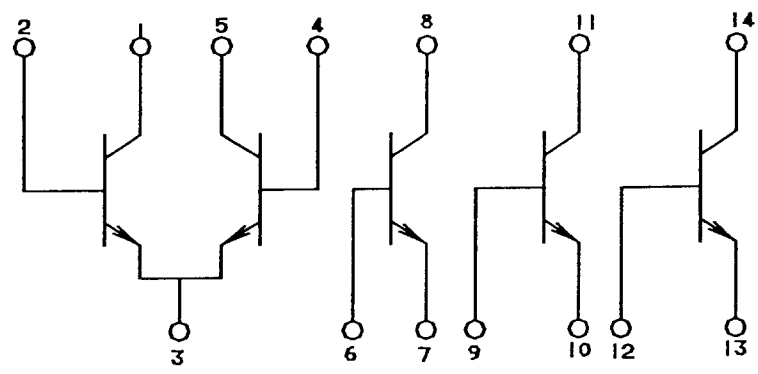


Figure 4. BLOCK-DIAGRAM OF IC101, 131, 161 (CA3046) or (KA2169)

VIDEO CIRCUIT

The R,G,B analog signals are applied to IC101, IC131, and IC161. The collectors of these transistors are then connected to pin 7 of IC101, IC131, and IC161 which is used as differential amplifier and buffer.
The output of IC101, IC131, and IC161 is applied to the video output stage (Q101, Q131, Q161). Q103, Q104, Q133, Q134, Q163, and Q164 are buffers which are used to reduce transmission loss of the video signal to the cathode of CRT.
The R,G,B output signals are provided to the cathode of CRT.
The R,G,B output gains are controlled respectively by VR101, VR131, and VR161.
The R,G,B cutoff voltages are controlled respectively by VR102, VR132, and VR162.

SIGNAL CABLE INPUT CONNECTION

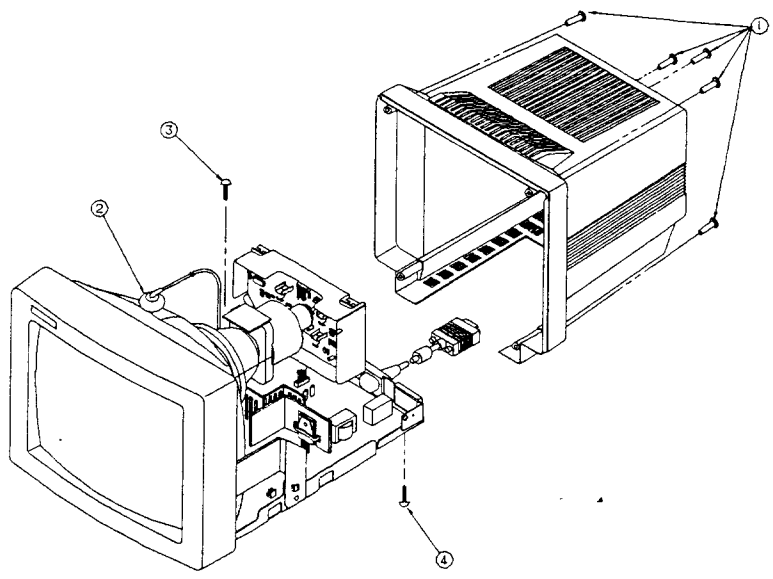
The connection which interfaces with the VGA video board is a sub-miniature 15pin D-shell connector.

PIN NO.	FUNCTION
1	RED
2	GREEN
3	BLUE
4	NO CONNECTION
5	SELF RASTER
6	RED RETURN
7	GREEN RETURN
8	BLUE RETURN
9	NO CONNECTION
10	DIGITAL GND
11	DIGITAL GND
12	NO CONNECTION
13	H-SYNC
14	V-SYNC
15	NO CONNECTION

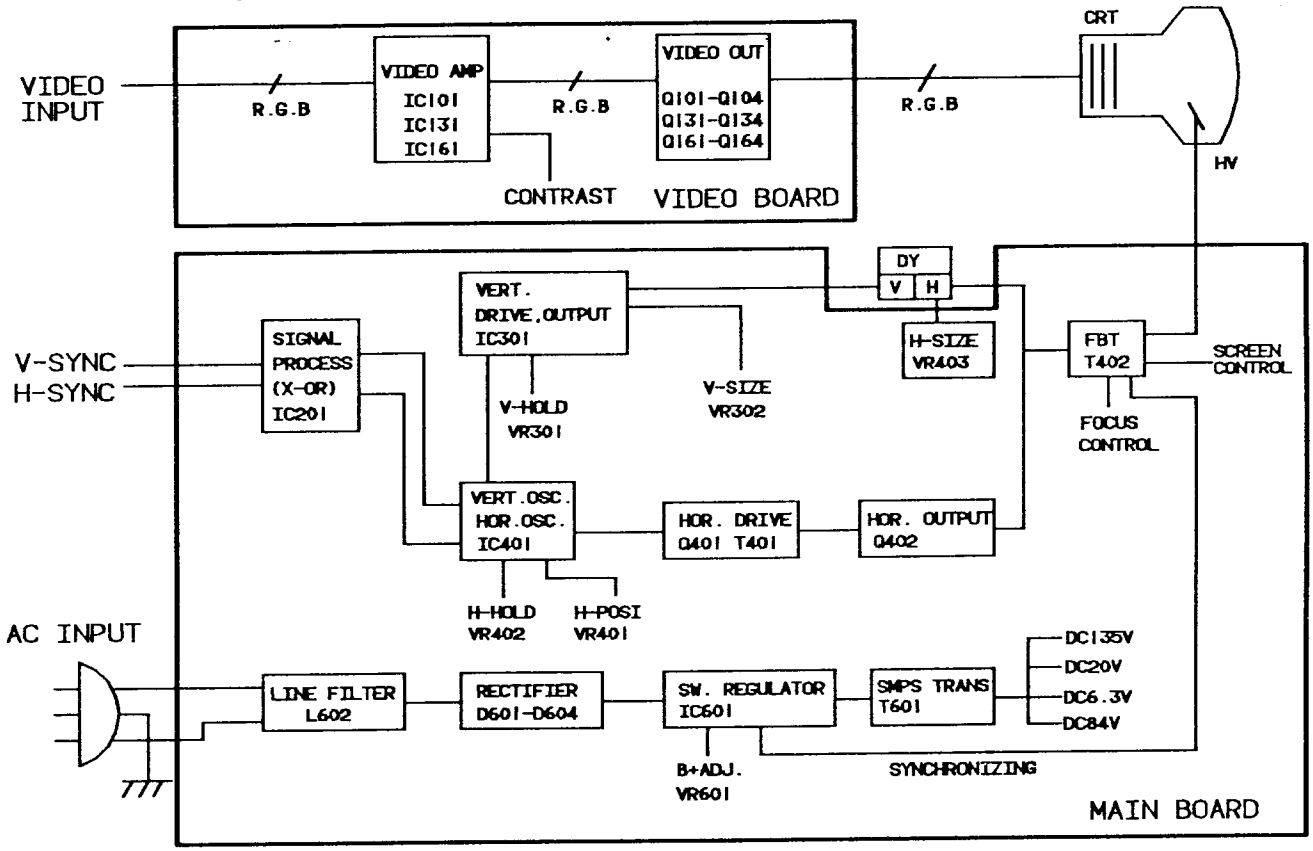
DISASSAMBLY INSTRUCTION

1. Remove the 5 screws (①) retaining the rear cabinet.
2. Remove the 2 screws (③, ④) retaining the main PCB & rear pannel ass'y.
3. (1) Pull the main PCB & rear pannel ass'y out of the CRT & main frame ass'y.
   (2) During pulling it out, disconnect the "CN602" & "GND" connectors from the main PCB.
   (3) Remove the CRT PCB Ass'y from the CRT.
   (4) Disconnect the anode cap (②), "CN401" (DY CONN.) & "CRT GND" connectors.

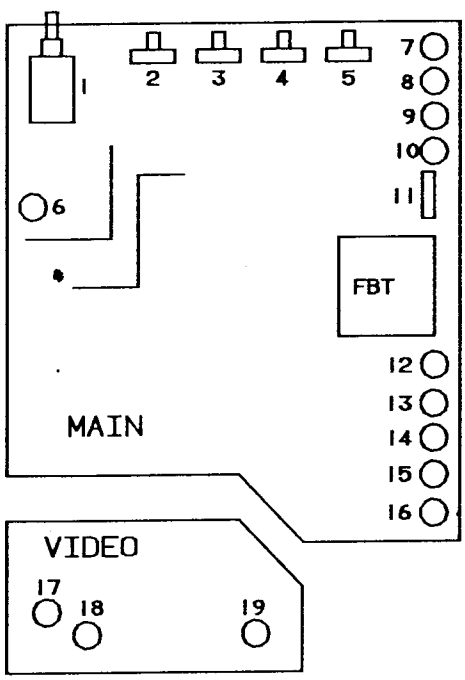
NOTE: Refer to the EXPLODED VIEW (page 22-23) for a more detailed disassembly procedure.



BLOCK DIAGRAM



PART LOCATIONS AND CONTROL FUNCTIONS



NO	REF NO.	CONTROL FUNCTION
1	SW601	POWER-S/W
2	VR501	BRIGHTNESS-VR
3	VR191	CONTRAST-VR
4	VR401	H-POSITION(PHASE)
5	VR304	V-POSITION
6	VR601	B+ ADJUST VR
7	VR403	H-SIZE VR
8	VR402	H-HOLD VR
9	VR301	V-HOLD VR
10	VR305	SIDE-PIN CONTROL VR
11	SW401	H-CENTERING S/W
12	VR303	V-LIN. VR
13	VR302	V-SIZE VR
14	VR101	R-GAIN
15	VR131	G-GAIN
16	VR161	B-GAIN
17	VR132	G-BIAS (CUT-OFF)
18	VR102	R-BIAS (CUT-OFF)
19	VR162	B-BIAS (CUT-OFF)

ADJUSTMENT PROCEDURES

1. B+ ADJUSTMENT

(1) Operate the monitor.
(2) Connect the plus pole of DVM(Digital Multi Meter) to the cathode of D624 and connect the other pole (GND) to chassis GND.
(3) Rotate the B+ voltage adjusting control (VR601) to provide 84V DC.

Condition : brightness, contrast VR max in white pattern.

2. 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) At self raster (disconnect the signal cable), adjust the horizontal frequency conntrol (VR402) so that the horizontal frequency is 31.5KHz.
(Free running frequency: 31.5KHz +/- 100Hz)

3. HORIZONTAL (POSITION) ADJUSTMENT

Adjust horizontal phase control (VR401) so that the image (or test pattern) is placed on the center of the raster.

4. VERTICAL FREQUENCY ADJUSTMENT

(Instrument in use: frequency counter, scope probe)

(1) Connect the GND pole of the scope probe to chassis frame and the scope probe to DY pin connected to yellow wire.
(2) At self raster, adjust VR301 so that the vertical frequency is 52Hz (Free running frequency: 52 +/-1Hz)

5. 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.

6. SIDE PINCUSHION ADJUSTMENT

Adjust the side pincushion control (VR305) until the side lines become straight in mode 3.

7. VERTICAL LINEARITY ADJUSTMENT

Adjust the vertical linearity control (VR303) until the vertical linearity is best in mode 3.

8. HORIZONTAL CENTERING ADJUSTMENT

Adjust SW401 until the horizontal center is set at screen center. (Horizontal centering tolerance is +/- 3mm)

9. VERTICAL CENTERING ADJUSTMENT

Adjust VR304 until the vertical center is set at screen center. (Vertical centering tolerance is +/- 3mm)

10. WIDTH ADJUSTMENT

Adjust the horizontal size VR(VR403) so that the horizontal size of displayed pattern is 240mm.(Tolerance: +4/-4 mm)

11. VERTICAL SIZE ADJUSTMENT

Adjust the vertical size control (VR302) so that the vertical size of displayed pattern is 180mm in mode 3. (Tolerance: +4/-2mm)

12. SCREEN ADJUSTMENT

Operate the monitor to display the full white pattern on screen and warm up for more than 15 minutes.

Adjust screen VR(in FBT) so that back raster appears clearly at brightness and contrast VR max, but disappears at brightness VR center (detent position) and contrast VR max.

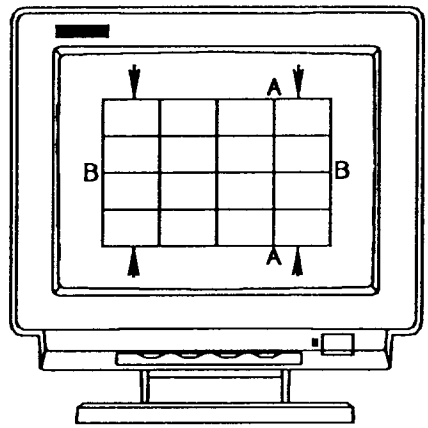
13. WHITE BALANCE ADJUSTMENT

(Instrument in use: color analyzer)

(1) Operate the computer to display the full white 60mm square pattern of the mode 3 centered on the screen.
(2) Set the brightness control (VR501) to the maximum position of the VR and adjust the VR102 (R-BIAS) and VR162 (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 (center detent) and the contrast control (VR191) to the max position.
(4) Change the video signal to the full green 60mm square pattern of the mode 3.
(5) Adjust the VR131(G-GAIN) so that the luminance of the green pattern is 40+/-2 F/L.
(6) Change the video signal to the full white 60mm square pattern of the mode 3.
(7) Adjust the VR101 (R-GAIN) and VR161 (B-GAIN) for the display color to be white.
(Use the color analyzer: X=0.281 +/-0.03, Y=0.311 +/-0.03)
(8) Adjust the contrast control (VR191) so that the luminance is 3 F/L.
(9) Adjust slightly VR102 (R-BIAS) and VR162 (B-BIAS) for the display color to be white.
(10) Check the color coordinates at 20 F/L luminance. If there is some error, adjust the VR101 (R-GAIN) and VR161 (B-GAIN) for the display color to be white.
(11) Recheck the color coordinates at 3 F/L luminance and check the white color with rotating the contrast control (VR191).
If there is some error, retry the adjustment from (2).

14. CRT TILT ADJUSTMENT

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



15. 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 0.4 0.5	0.31,0.39 0.41 0.52	CVL4951,CVL4953 CVL4954,CVL4955 CVL4956
CORNER	0.5 0.7 0.8	0.31,0.39 0.41 0.52	CVL4951,CVL4953 CVL4954,CVL4955 CVL4956

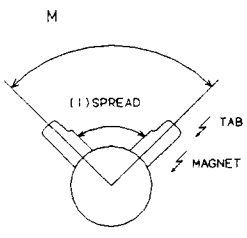
Proceed as follows.

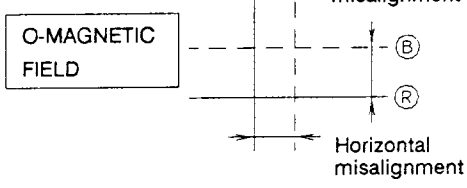
(1) Locate the pair of four pole magnet rings.
(2) Rotate the individual rings (change spacing between tabs) to converge the vertical red and blue lines.
(3) Rotate the pair of rings (maintaining spacing between tabs) to converge the horizontal red and blue lines.
(4) After completing the red and blue 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
HITACHI and SED(CRT maker) 4pole / 6pole / 2pole (from the front of CDT).
(8) Don't rotate the 2pole magnet because its object is to adjust the purity.

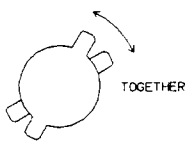
A. Alignment of (R) and (B) with the 4-pole magnet

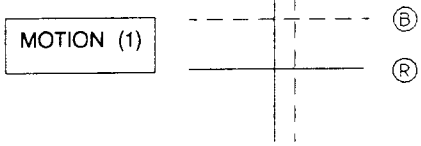
Movable in spread condition



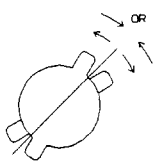


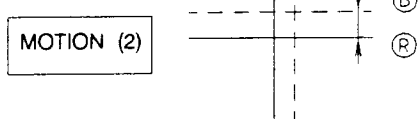
Vertical direction



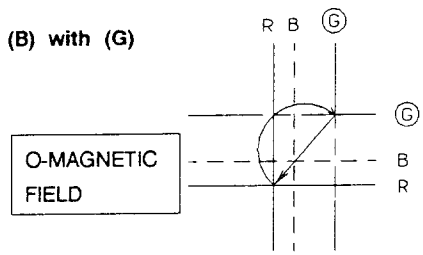


Horizontal direction



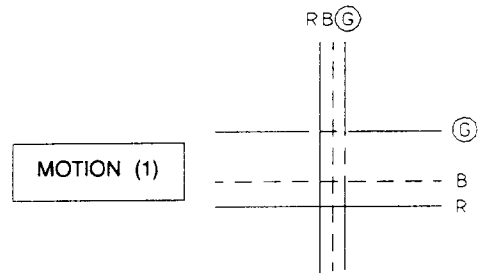


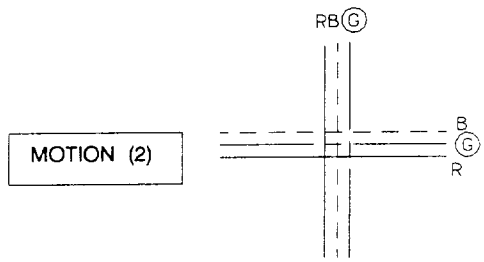
B. Alignment of (R) and (B) with (G) (6-pole magnet)



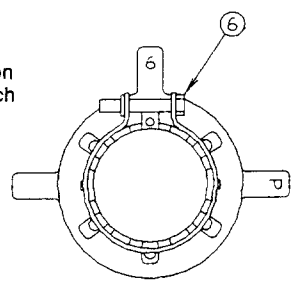
16. DYNAMIC CONVERGENCE

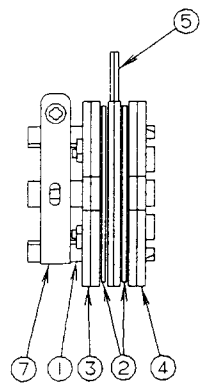
Dynamic convergence (convergence of the three color fields at the edge of the CRT screen) is accomplished by the proper insertion and positioning of the three wedges between the edge of deflection yoke and the funnel of the CRT.





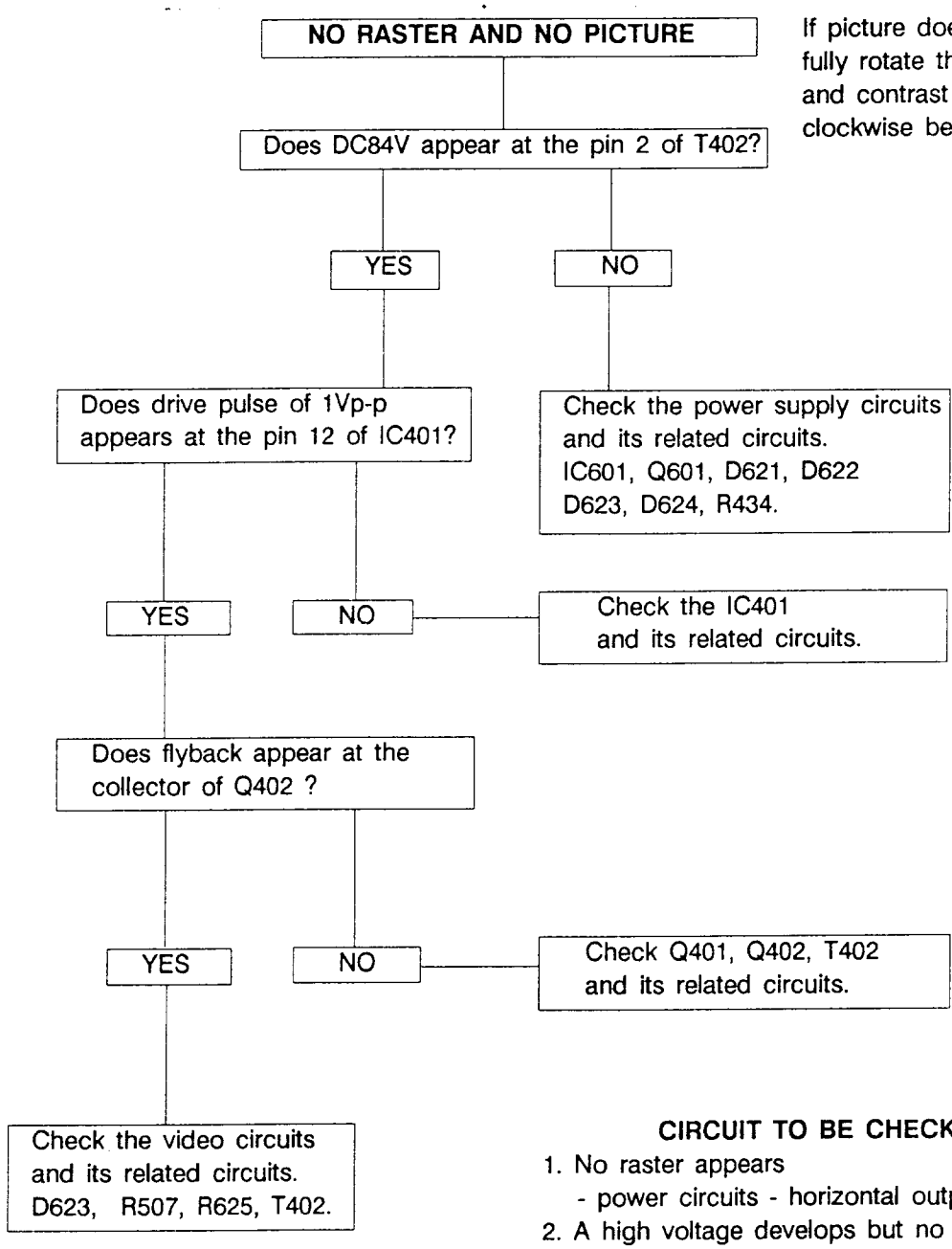
Convergence Purity Magnet





1. Holder
2. Spacer
3. Purity magnet
4. 4Pole magnet
5. 6Pole magnet
6. Set up bolt
7. Band

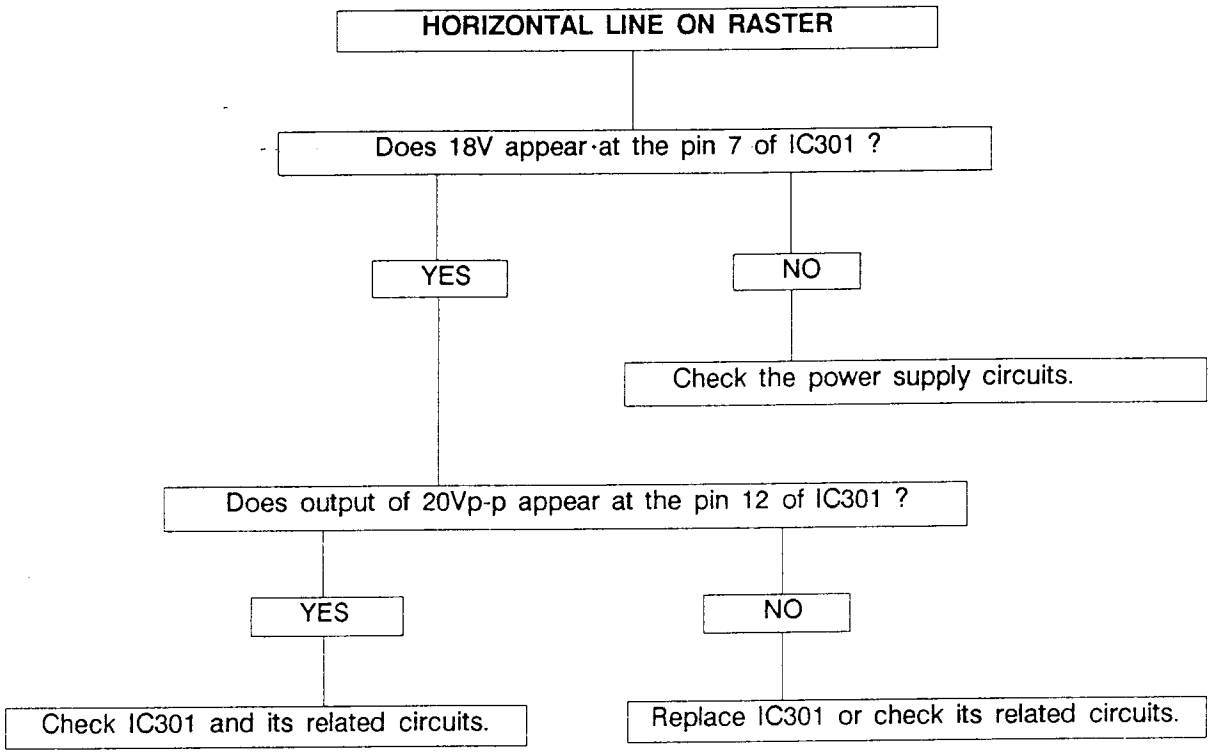
TROUBLESHOOTING GUIDE

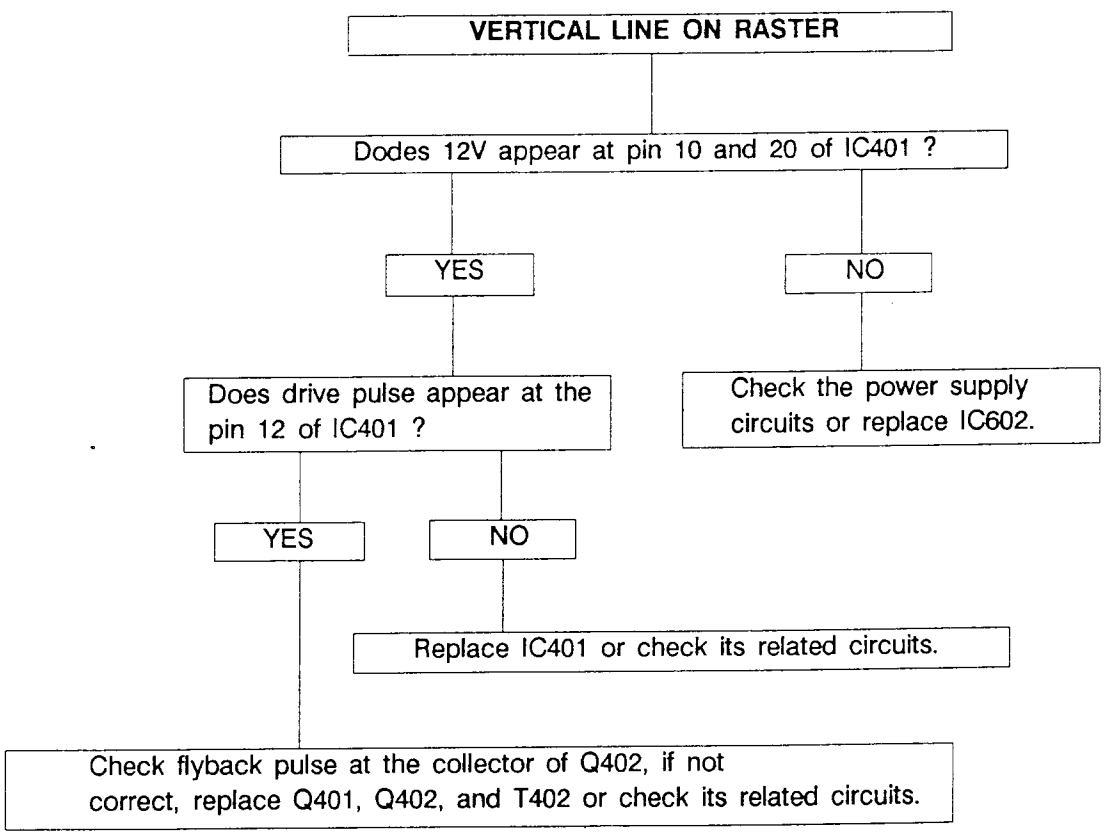


If picture does not appear, fully rotate the brightness and contrast control clockwise before inspection.

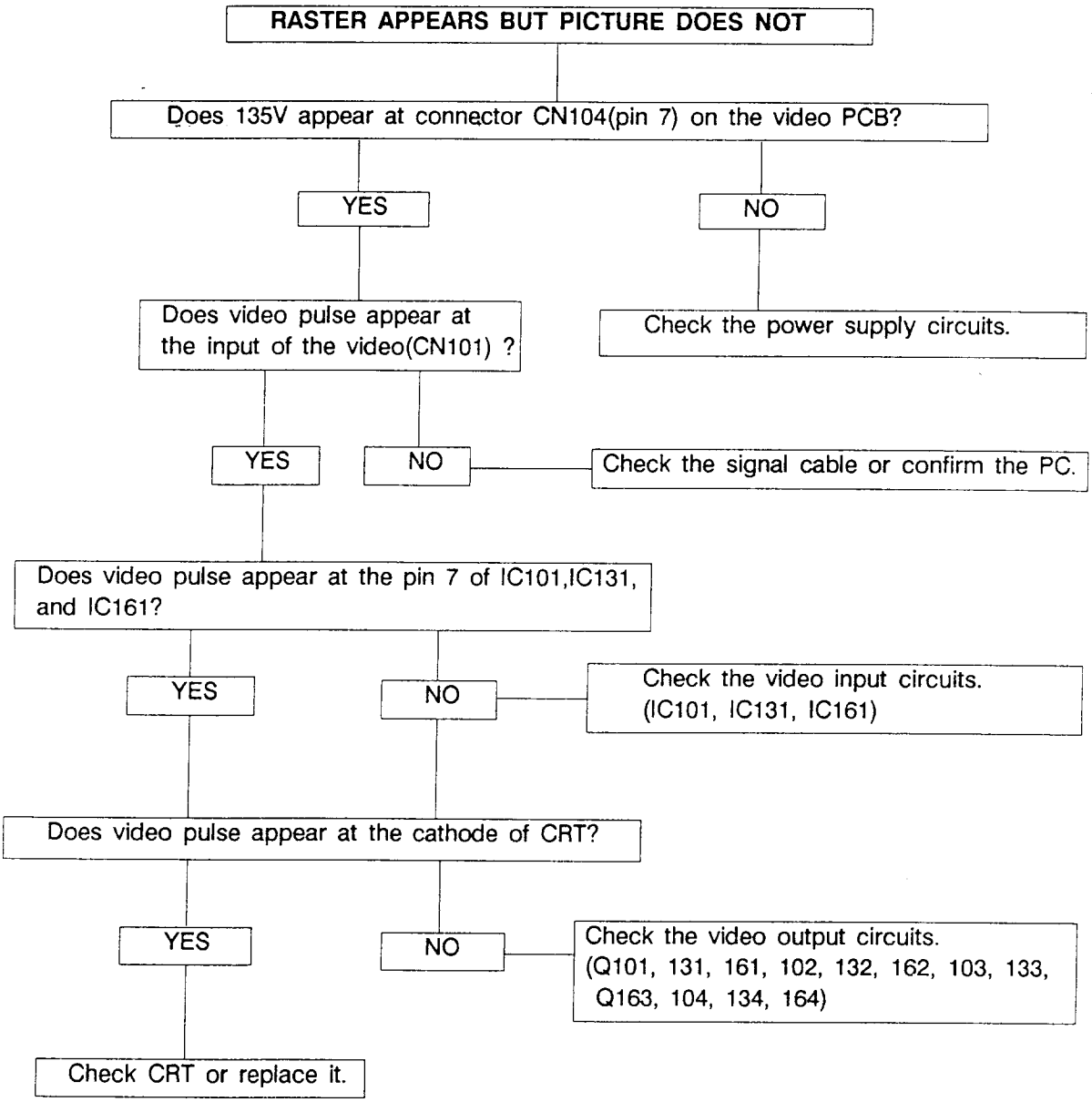
CIRCUIT TO BE CHECKED

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.

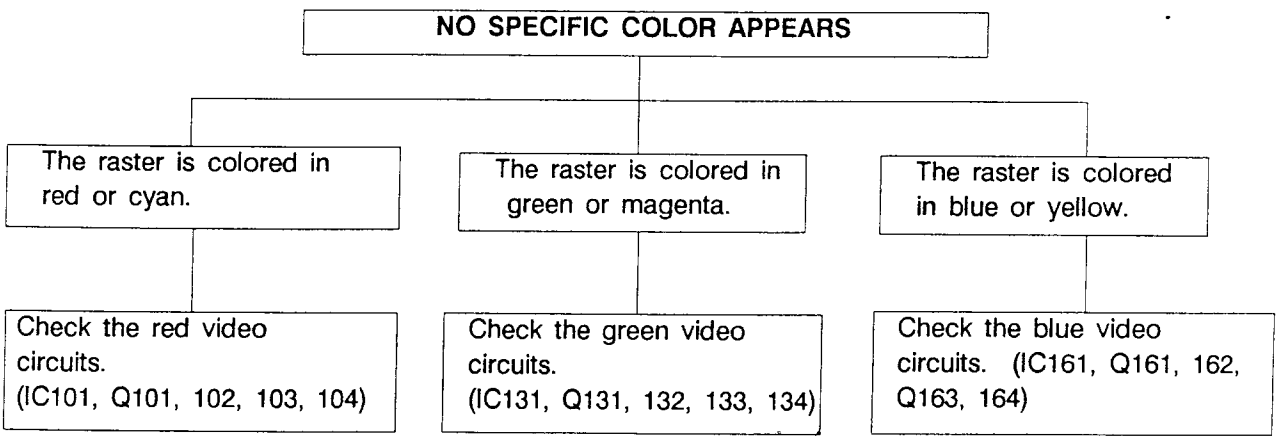

HORIZONTAL LINE ON RASTER
Does 18V appear at the pin 7 of IC301 ?
YES
NO
Check the power supply circuits.
Does output of 20Vp-p appear at the pin 12 of IC301 ?
YES
NO
Check IC301 and its related circuits.
Replace IC301 or check its related circuits.

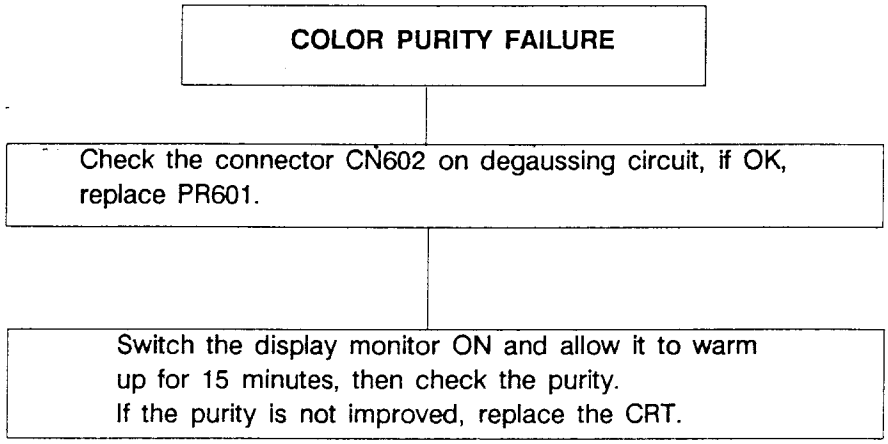

VERTICAL LINE ON RASTER
Dodes 12V appear at pin 10 and 20 of IC401 ?
YES
NO
Does drive pulse appear at the pin 12 of IC401 ?
Check the power supply circuits or replace IC602.
YES
NO
Replace IC401 or check its related circuits.
Check flyback pulse at the collector of Q402, if not correct, replace Q401, Q402, and T402 or check its related circuits.

RASTER APPEARS BUT PICTURE DOES NOT

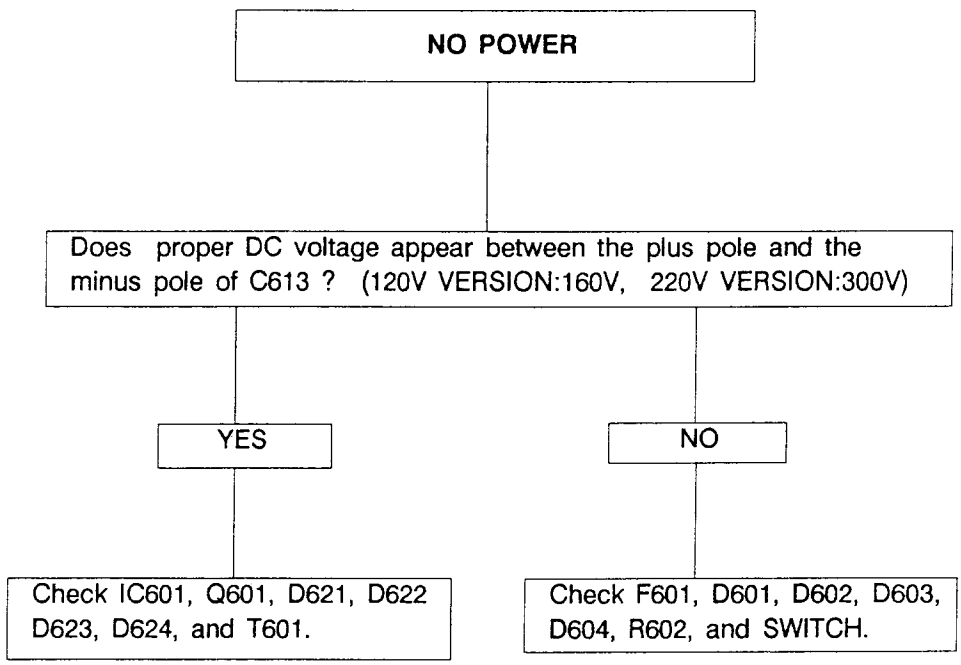


NO SPECIFIC COLOR APPEARS

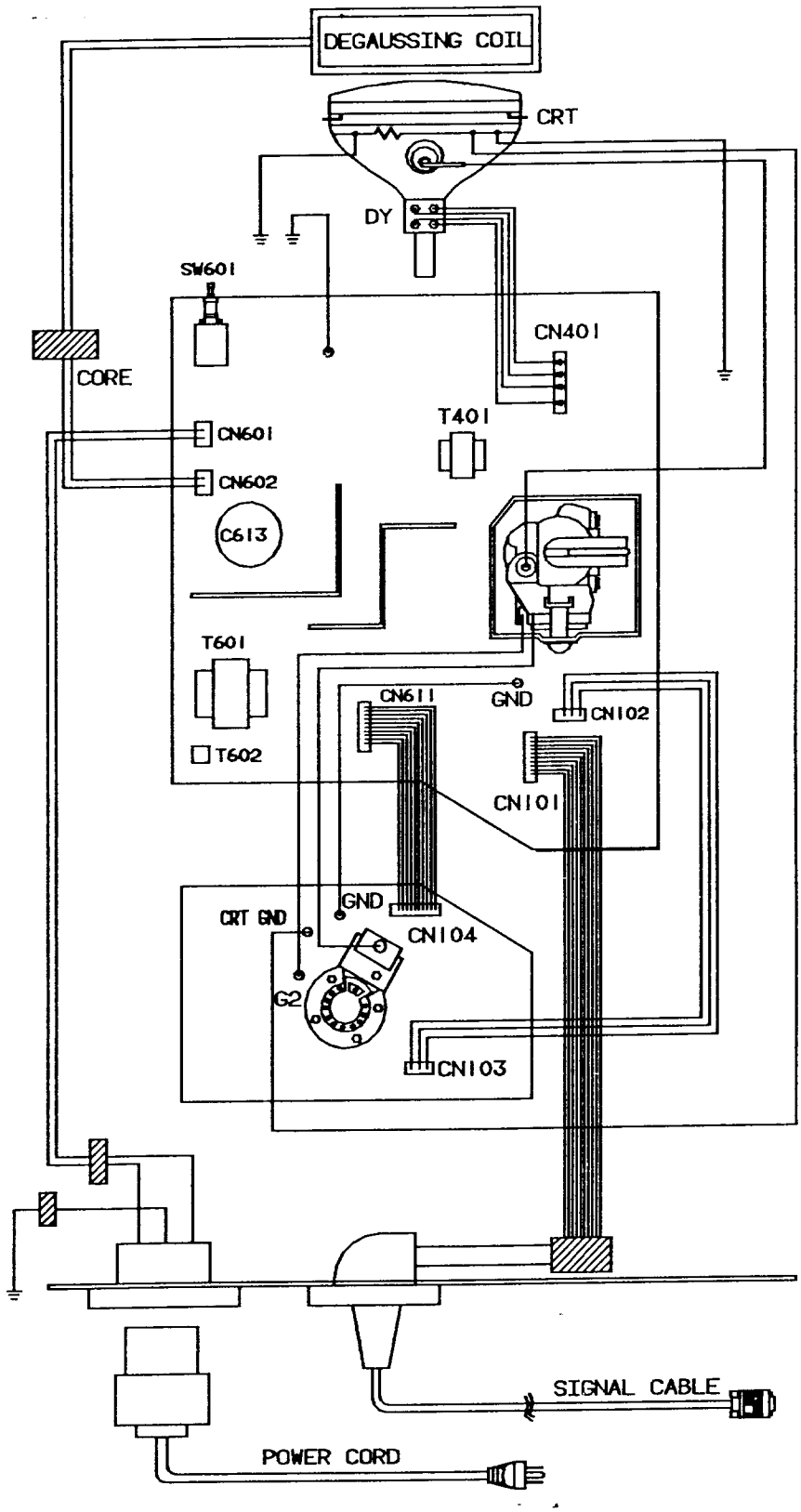




NOTE: If color purity is not normal, manual degaussing should be done by mandatory method using the manual degaussing coil before inspection.

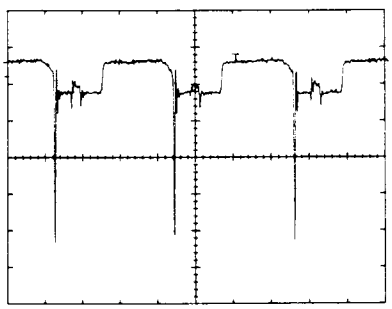


WIRING DIAGRAM

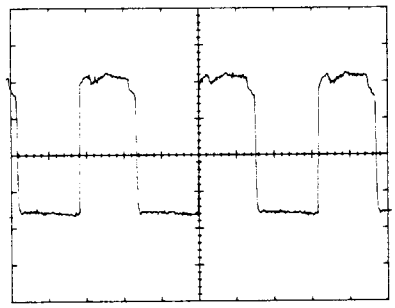


WAVEFORMS

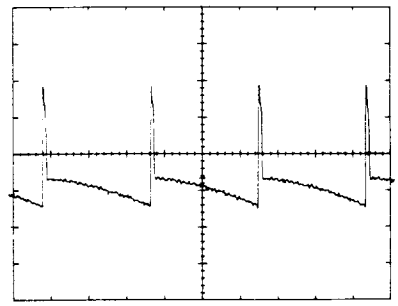
Check condition : The voltage level and waveform at each point is given below on AC120V when this set is connected to a personal system II with the video signal input of the full white pattern.



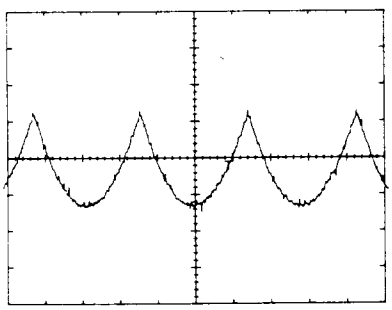
(1) 10 Vp-p (H-period)



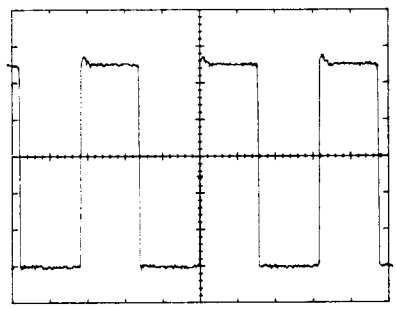
(2) 0.8 Vp-p (H-period)



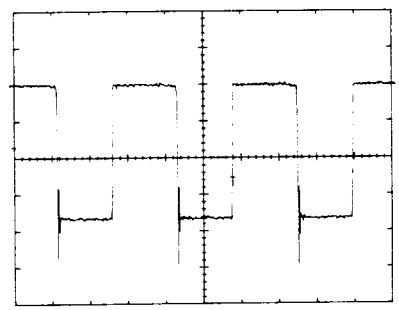
(3) 34 Vp-p (H-period)



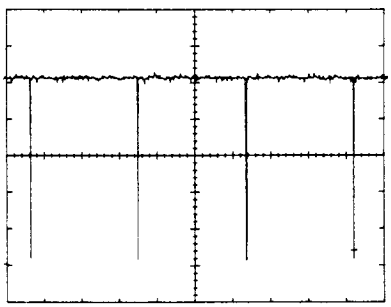
(4) 2.7 Vp-p (V-period)



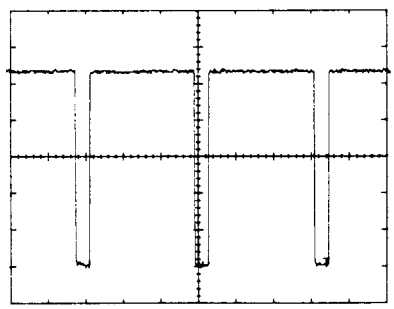
(5) 298 Vp-p (H-period)



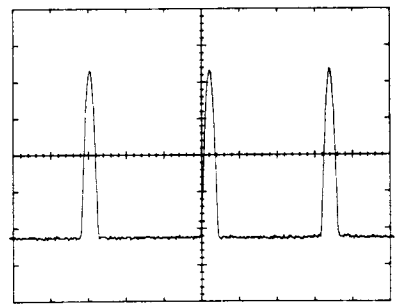
(6) 180 Vp-p (H-period)



(7) 5.6 Vp-p (V-period)



(8) 5.4 Vp-p (H-period)



(9) 944 Vp-p (H-period)

IC AND TRANSISTOR VOLTAGES

IC VLOTAGE

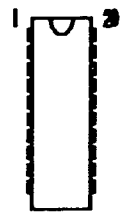
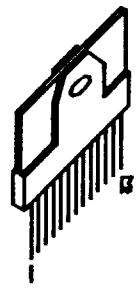
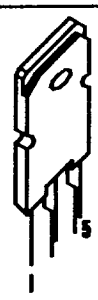
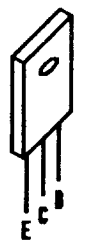
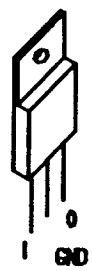
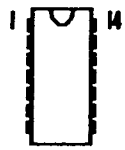
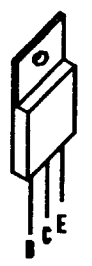
- CONDITION : MODE 3
- VIDEO INPUT SIGNAL : FULL WHITE
- BRIGHTNESS, CONTRAST : MAX POSITION

IC PIN NO.	INPUT : 120V AC / 220V AC					
	(1) IC101,131,161 CA3046(KA2619) TR ARRAY	(2) IC201 KS74HCTLS86 EX-OR GATE	(3) IC301 LA7835	(3)' IC301 LA7838	(4) IC401 LA7851(KA2138) OSC. & H-OUT	(5) IC601 STR53041/STR54041 POWER CONTROL
1	10.9	3.4	12.0	12.2	4.3	-41.9 / -41.9
2	5.7	5.1	10.6	10.8	8.2	0.5 / 0.4
3	5.0	0.6	6.1	6.0	8.4	140.0 / 280.0
4	5.7	0.6	0.0	6.2	-0.2	0.1 / 0.1
5	10.7	3.4	6.2	0.0	3.7	-35.0 / -35.3
6	10.7	4.7	5.7	6.3	3.0	-
7	10.0	0.0	17.9	5.8	3.5	-
8	12.2	0.0	1.0	21.0	6.3	-
9	0.6	5.1	1.4	10.0	5.7	-
10	-0.1	5.1	0.0	1.4	12.0	-
11	5.0	5.1	10.5	0.0	6.0	-
12	0.0	0.2	17.6	11.7	0.4	-
13	-0.7	5.1	5.1	20.8	0.0	-
14	7.7	5.1	-	-	0.0	-
15	-	-	-	-	2.5	-
16	-	-	-	-	10.6	-
17	-	-	-	-	0.7	-
18	-	-	-	-	6.0	-
19	-	-	-	-	6.0	-
20	-	-	-	-	12.0	-

TRANSISTOR VOLTAGE

REF NO.	TRANSISTOR SPEC.	FUNCTION	DC VOLTAGE		
			B	C	E
Q101, 131, 161	2N5401C-Y	VIDEO AMP	10.0	1.3	10.6
Q102, 132, 162	KSC3503-E	VIDEO AMP	12.2	55.2	11.5
Q103, 133, 163	2N5551C-Y	VIDEO OUTPUT BUFFER	56.7	80.4	56.3
Q104, 134, 164	2N5401C-Y	VIDEO OUTPUT BUFFER	55.2	0.0	56.0
Q186	KSA733-Y	A.B.L. CONTROL	4.4	0.0	5.0
Q187	KSA733-Y	CONTRAST	5.2	0.0	5.8
Q201	KSA733-Y	SELF RASTER	11.5	12.1	12.2
Q202	KSA733-Y	SELF RASTER	12.1	-26.3	2.6
Q301	KSC945-Y	MODE CONTROL	0.0	1.1	0.0
Q302	KSC945-Y	MODE CONTROL	0.1	1.1	0.0
Q303	KSC945-Y	VERT. SIZE CONTROL	2.7	6.1	2.1
Q304	KSC945-Y	VERT. S.P.C.	1.6	7.9	1.0
Q305	KSA733-Y	VERT. S.P.C.	2.6	0.0	3.2
Q306	KSC1008-Y	VERT. POSITION	9.9	18.6	9.5
Q307	KSA708-Y	VERT. POSITION	8.8	0.0	9.5
Q308	KSA733-Y	S.P.C. MODE CONTROL	0.3	0.0	0.8
Q401	KSC3503-E	HORZONTAL DRIVE	0.4	43.8	0.0
Q402	2SC3686	HORIZONTAL OUTPUT	-0.0	63.6	0.0
Q403	KSA614	S.P.C. & H-SIZE CONTROL	4.4	0.0	5.0
Q404	KSA733-Y	S.P.C. & H-SIZE CONTROL	3.8	0.3	4.4
Q501	KSC945-Y	VERT. BLANKING	-27.4	-0.7	-26.3
Q601	KSC1008	CURRENT LIMIT	0.1	0.5	0.0

SEMICONDUCTOR LEAD IDENTIFICATION

PARTS	TYPE NO.	REF NO.	PARTS	TYPE NO.	REF NO.
	KSC945-Y KSC1008-Y KSA708-Y KSA733-Y	Q186,187,201 202,301,302 303,304,305 306,307,308 404,501,601		LA7851(KA2138)	IC401
	2N5401C-Y 2N5551C-Y	Q101,104,131 134,161,164 103,133,163		LA7835	IC301
	2SC3686 2SC4762 BU1008AF BUH515D	Q402		STR53041 (USA VERSION) STR54041 (EUROPE VERSION)	IC601
	KSC3503E	Q102,132,162 401		MC7812C	IC602
	KS74HCTLS86N CA3046(KA2619)	IC101,IC131 IC161,IC201		KSA614	Q403

SCHEMATIC DIAGRAM

MODEL NO: CVL495*

CHASSIS NO: TSF

WARNING : BEFORE SERVICING THIS CHASSIS, READ X-RAY RADIATION PRECAUTION, 'SAFETY PRECAUTION, PRODUCT SAFETY NOTICE '

CAUTION

1. THE SHADED AREAS AND ⚠ MARKS IN THE SCHEMATIC DIAGRAM AND THE PARTS LIST DESIGNATE COMPONENTS WHITCH HAVE SPECIAL CHARACTERISTICS IMPORTANT FOR SAFETY AND SHOULD BE REPLACED ONLY WITH TYPES IDENTICAL TO THOSE IN THE ORIGINAL CIRCUIT OR SPECIFIED IN THE PARTS LIST. BEFORE REPLACING ANY OF THESE COMPONENTS, READ CAREFULLY THE 'PRODUCT SAFETY NOTICE
2. DURING A NUMEROUS MEASUREMENT OF THIS MONITOR MATTERS THAT DEMAND SPECIAL ATTENTION IS FOLLOWING
   1) DO NOT USE YOUR INSTRUMENT BETWEEN PRIMARY GROUND (SYMBOL ⏚) AND SECONDARY CIRCUIT
   2) DO NOT USE YOUR INSTRUMENT BETWEEN SECONDARY GROUND (SYMBOL ⏚) AND PRIMARY CIRCUIT
3. IN THE EUROPEAN VERSION, SOME COMPONENTS MARKED BY '*' SHOULD BE CHANGED AS THIS 'COMPARISON CHART FOR EUROPEAN VERSION' THE RATINGS & THE SPECIFICATION ON THE SCHEMATIC DIAGRAM ARE THE STANDARD VALUES FOR THE USA VERSION.

COMPARISON CHART FOR EUROPEAN VERSION

LOC. NO.	DESCRIPTION	SPECIFICATION
C602	C-M POLY. AC	CQS922M 250V 0.47UF
C613	C-ELECTROLYTIC	CE04W 400V 220UF
R602	R-CEMENT. WIRE	RP 7P 5.8 OHM
R606	R-CEMENT. WIRE	RW 5W 47 OHM
R607	R-WIRE. WOUND	RW 2W 0.8 OHM
IC601	IC-POWER	STR 54041
L601	COIL-LINE FILTER	15 MH
F601	FUSE	5QT 250V 2.5A 20MM
T601	TRANS-S/W MODE	CVL495IU. 220~240VAC

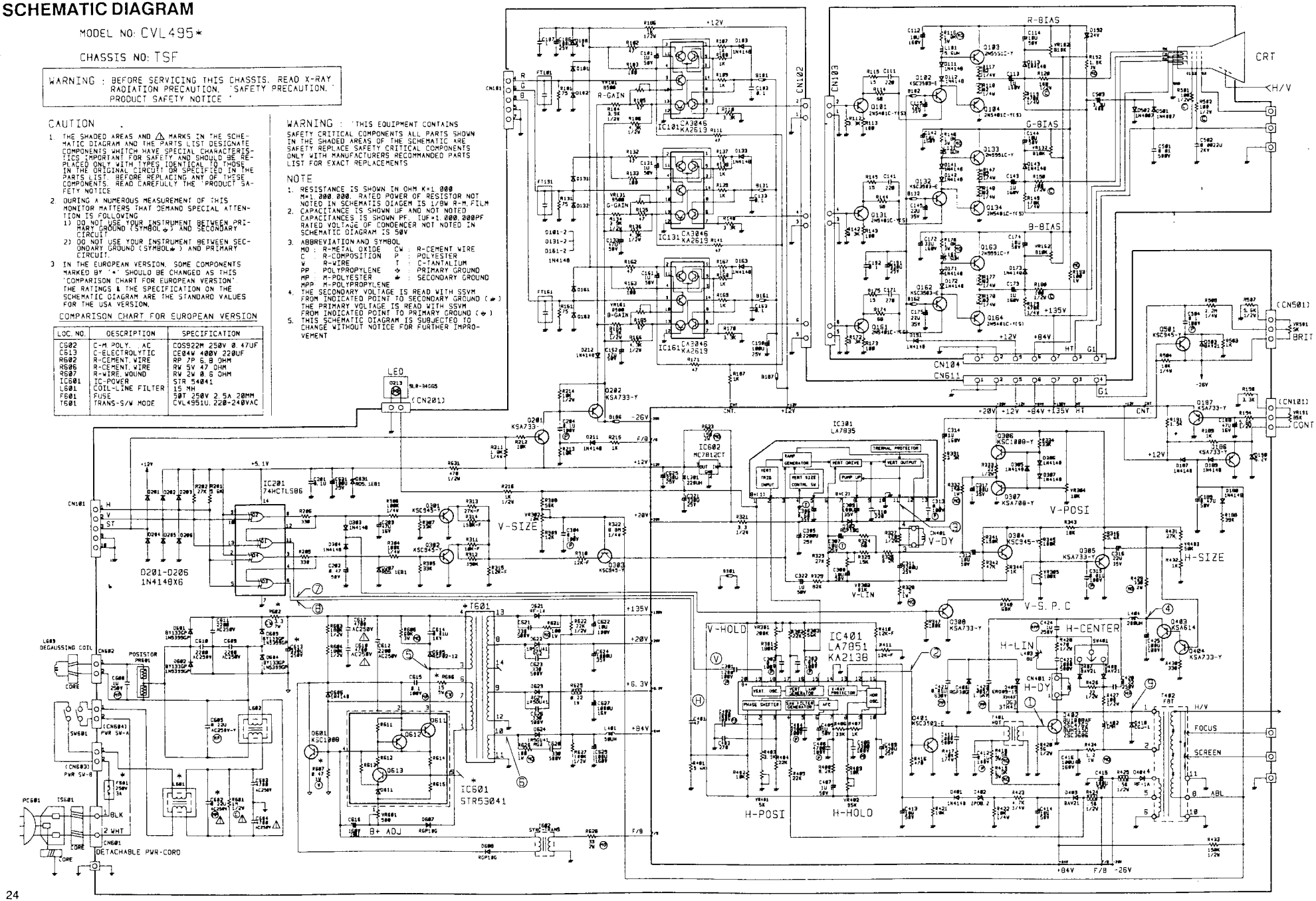
WARNING : THIS EQUIPMENT CONTAINS SAFETY CRITICAL COMPONENTS ALL PARTS SHOWN IN THE SHADED AREAS OF THE SCHEMATIC ARE SAFETY REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURERS RECOMMANDED PARTS LIST FOR EXACT REPLACEMENTS

NOTE

1. RESISTANCE IS SHOWN IN OHM K=1,000 M=1,000,000. RATED POWER OF RESISTOR NOT NOTED IN SCHEMATIS DIAGEM IS 1/8W R-M. FILM
2. CAPACITANCE IS SHOWN UF AND NOT NOTED CAPACITANCES IS SHOWN PF 1UF=1,000,000PF RATED VOLTAGE OF CONDENCER NOT NOTED IN SCHEMATIC DIAGRAM IS 50V
3. ABBREVIATION AND SYMBOL

MO : R-METAL OXIDE	CW : R-CEMENT WIRE		
C : R-COMPOSITION	P : POLYESTER		
W : R-WIRE	T : C-TANTALIUM		
PP : POLYPROPYLENE	⏚ : PRIMARY GROUND		
MP : M-POLYESTER	⏚ : SECONDARY GROUND		
MPP : M-POLYPROPYLENE			

4. THE SECONDARY VOLTAGE IS READ WITH SSVM FROM INDICATED POINT TO SECONDARY GROUND (⏚) THE PRIMARY VOLTAGE IS READ WITH SSVM FROM INDICATED POINT TO PRIMARY GROUND (⏚)
5. THIS SCHEMATIC DIAGRAM IS SUBJECTED TO CHANGE WITHOUT NOTICE FOR FURTHER IMPROVEMENT



CHEMATIC DIAGRAM

MODEL NO: CVL495*

CHASSIS NO: TSF

WARNING : BEFORE SERVICING THIS CHASSIS, READ X-RAY RADIATION PRECAUTION, 'SAFETY PRECAUTION,' PRODUCT SAFETY NOTICE.'

CAUTION

1. THE SHADED AREAS AND ⚠ MARKS IN THE SCHEMATIC DIAGRAM AND THE PARTS LIST DESIGNATE COMPONENTS WHITCH HAVE SPECIAL CHARACTERISTICS IMPORTANT FOR SAFETY AND SHOULD BE REPLACED ONLY WITH TYPES IDENTICAL TO THOSE IN THE ORIGINAL CIRCUIT OR SPECIFIED IN THE PARTS LIST. BEFORE REPLACING ANY OF THESE COMPONENTS, READ CAREFULLY THE 'PRODUCT SAFETY NOTICE
2. DURING A NUMEROUS MEASUREMENT OF THIS MONITOR MATTERS THAT DEMAND SPECIAL ATTENTION IS FOLLOWING
   1) DO NOT USE YOUR INSTRUMENT BETWEEN PRIMARY GROUND (SYMBOL ⏚) AND SECONDARY CIRCUIT.
   2) DO NOT USE YOUR INSTRUMENT BETWEEN SECONDARY GROUND (SYMBOL ★) AND PRIMARY CIRCUIT.
3. IN THE EUROPEAN VERSION, SOME COMPONENTS MARKED BY '*' SHOULD BE CHANGED AS THIS 'COMPARISON CHART FOR EUROPEAN VERSION'. THE RATINGS & THE SPECIFICATION ON THE SCHEMATIC DIAGRAM ARE THE STANDARD VALUES FOR THE USA VERSION.

COMPARISON CHART FOR EUROPEAN VERSION

LOC. NO.	DESCRIPTION	SPECIFICATION
C602	C-M. POLY. . AC	COS922M 250V 0.47UF
C613	C-ELECTROLYTIC	CE04W 400V 220UF
R602	R-CEMENT. WIRE	RP 7P 6.8 OHM
R606	R-CEMENT. WIRE	RW 5V 47 OHM
R607	R-WIRE. WOUND	RW 2W 0.6 OHM
IC601	IC-POWER	STR 54041
L601	COIL-LINE FILTER	15 MH
F601	FUSE	50T 250V 2.5A 20MM
T601	TRANS-S/W MODE	CVL4951U. 220-240VAC

WARNING

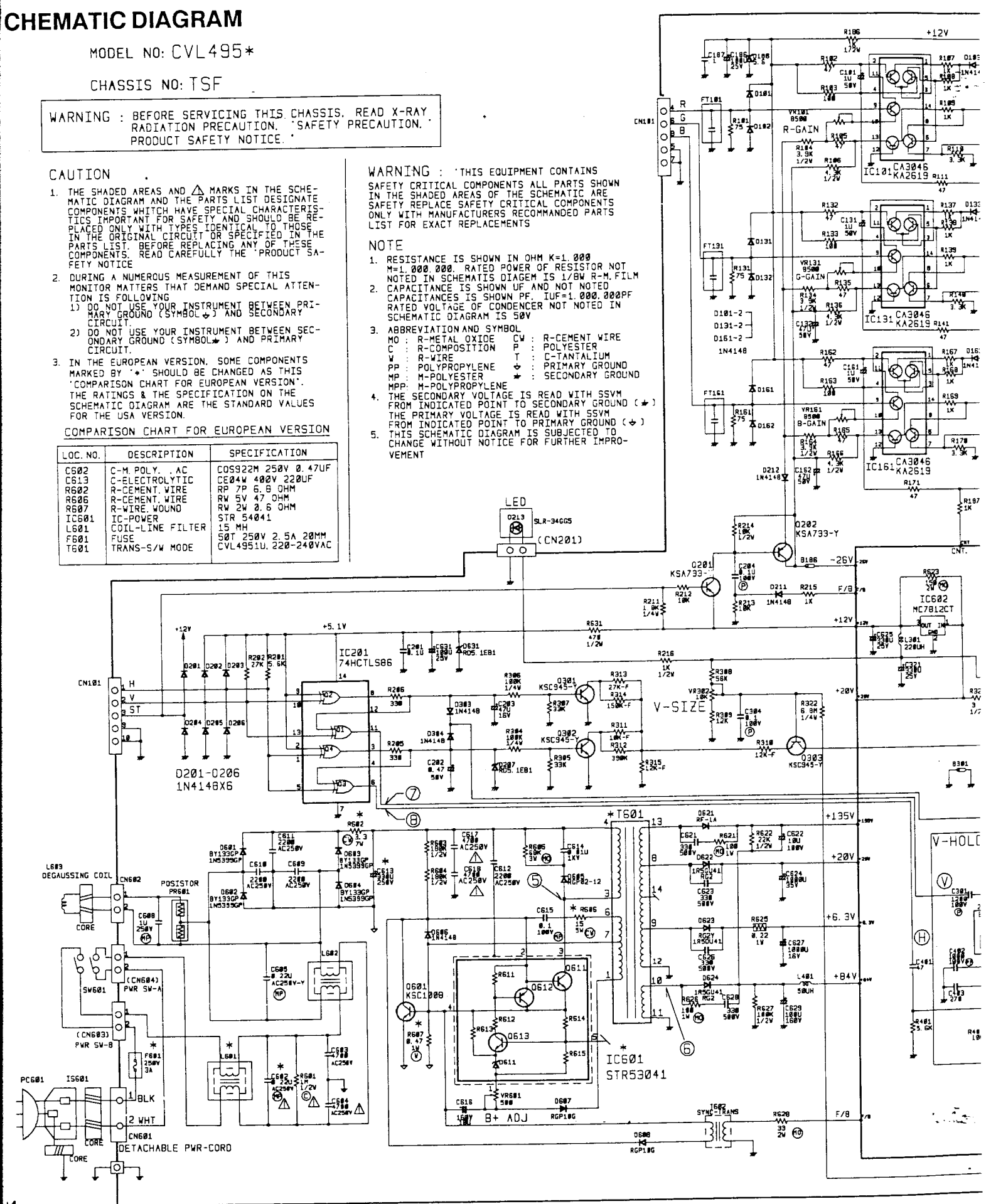
'THIS EQUIPMENT CONTAINS SAFETY CRITICAL COMPONENTS ALL PARTS SHOWN IN THE SHADED AREAS OF THE SCHEMATIC ARE SAFETY REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURERS RECOMMANDED PARTS LIST FOR EXACT REPLACEMENTS

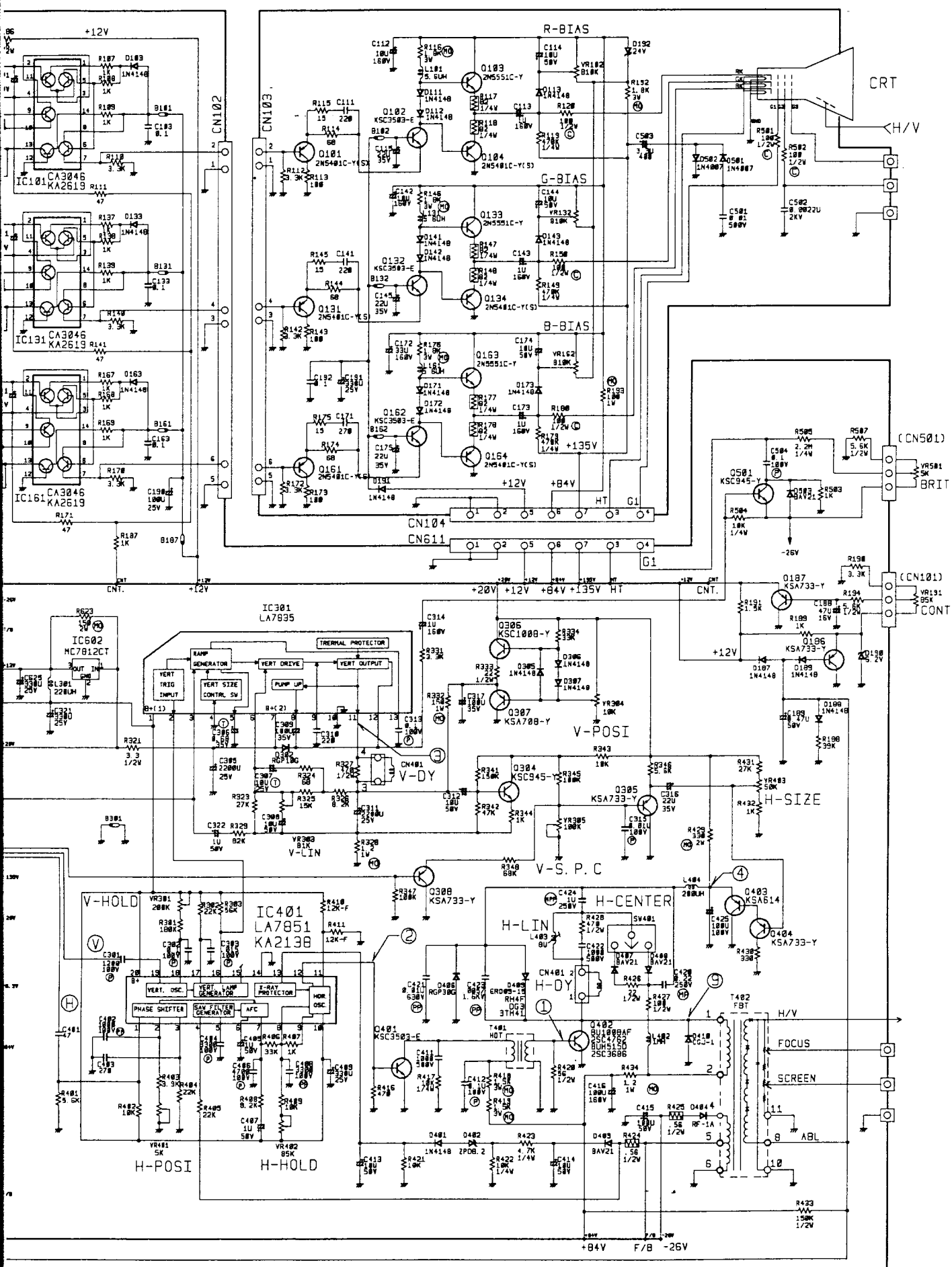
NOTE

1. RESISTANCE IS SHOWN IN OHM K=1,000 M=1,000,000. RATED POWER OF RESISTOR NOT NOTED IN SCHEMATIS DIAGEM IS 1/8W R-M. FILM
2. CAPACITANCE IS SHOWN UF AND NOT NOTED CAPACITANCES IS SHOWN PF. IUF=1,000,000PF RATED VOLTAGE OF CONDENCER NOT NOTED IN SCHEMATIC DIAGRAM IS 50V
3. ABBREVIATION AND SYMBOL

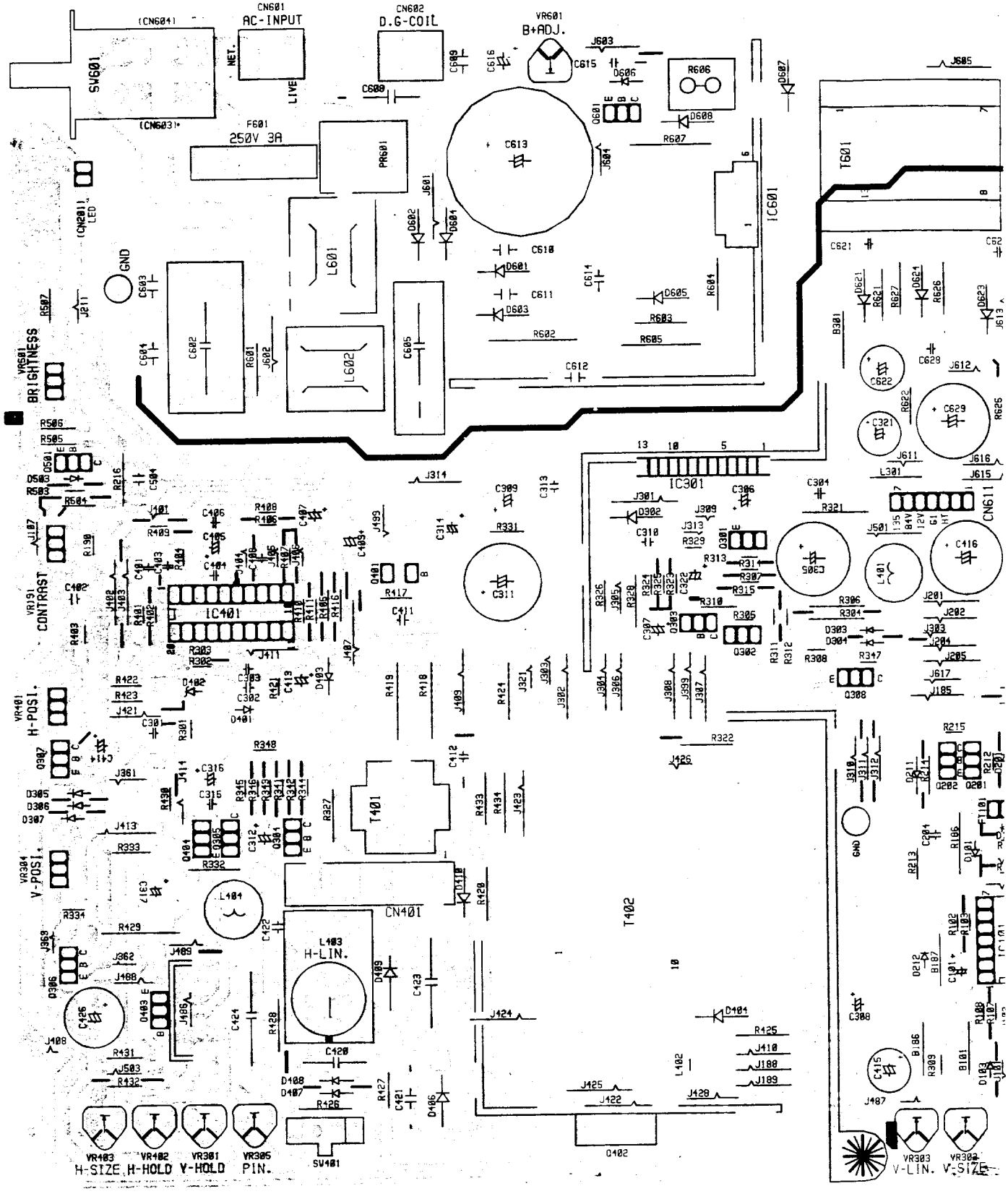
MO : R-METAL OXIDE		CW : R-CEMENT WIRE	
C : R-COMPOSITION		P : POLYESTER	
W : R-WIRE		T : C-TANTALIUM	
PP : POLYPROPYLENE	⏚	: PRIMARY GROUND	
MP : M-POLYESTER	★	: SECONDARY GROUND	
MPP: M-POLYPROPYLENE			

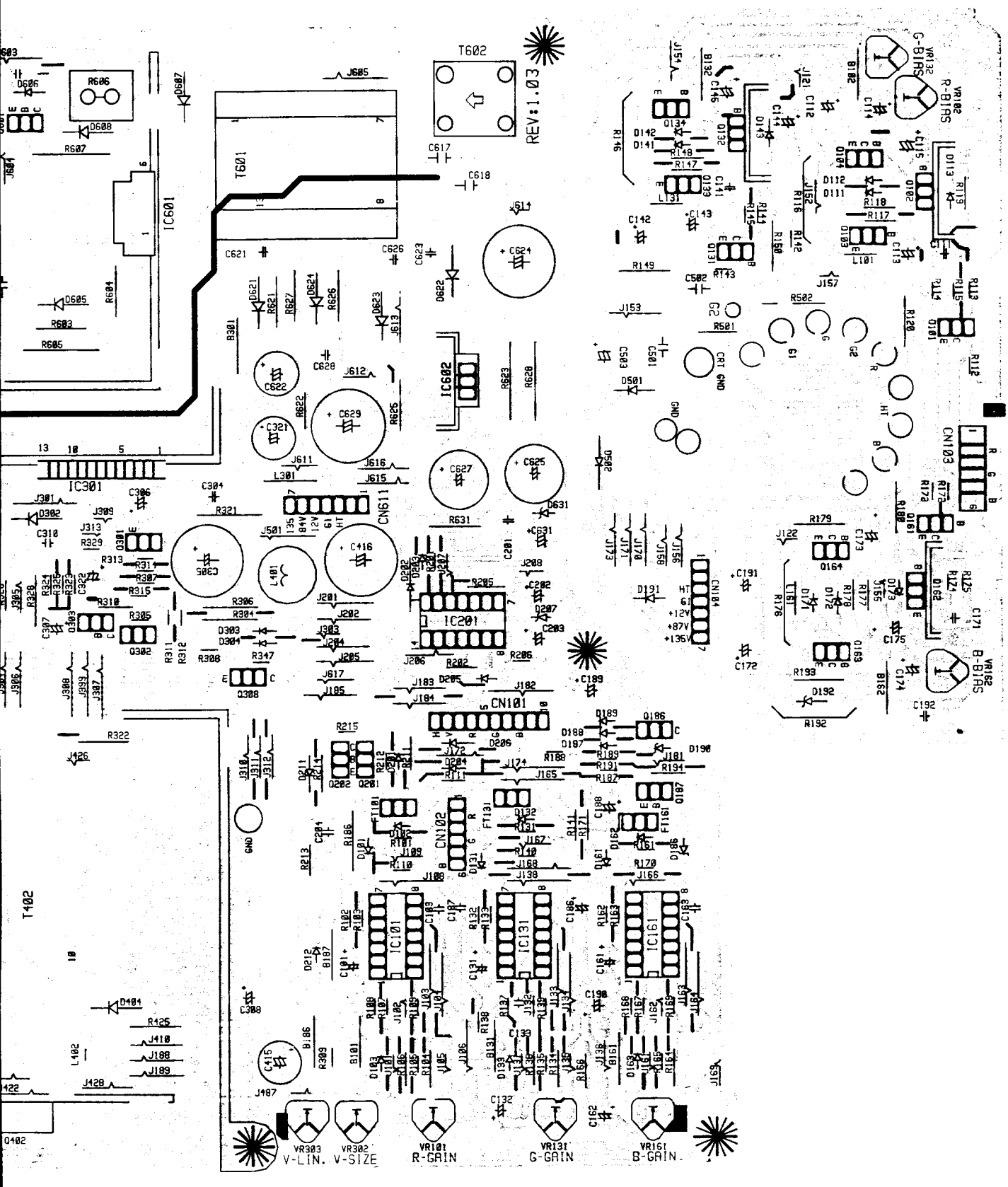
4. THE SECONDARY VOLTAGE IS READ WITH SSVM FROM INDICATED POINT TO SECONDARY GROUND (★) THE PRIMARY VOLTAGE IS READ WITH SSVM FROM INDICATED POINT TO PRIMARY GROUND (⏚)
5. THIS SCHEMATIC DIAGRAM IS SUBJECTED TO CHANGE WITHOUT NOTICE FOR FURTHER IMPROVEMENT




+12V
CN102
CN103
R-BIAS
G-BIAS
B-BIAS
CRT
H/V
IC101 CA3046 KA2619
IC131 CA3046 KA2619
IC161 CA3046 KA2619
Q103 2N5551C-Y
Q104 2N5401C-Y(S)
Q133 2N5551C-Y
Q134 2N5401C-Y(S)
Q163 2N5551C-Y
Q164 2N5401C-Y(S)
Q102 KSC3503-E
Q132 KSC3503-E
Q162 KSC3503-E
Q101 2N5401C-Y(S)
Q131 2N5401C-Y(S)
Q161 2N5401C-Y(S)
+135V
+84V
HT
G1
CN104
CN611
CN501
Q501 KSC945-Y
BRIT
-26V
CN101
Q187 KSA733-Y
Q186 KSA733-Y
CONT
CNT.
+20V
+12V
+84V
+135V
IC602 MC7812CT
IC301 LA7835
THERMAL PROTECTOR
RAMP GENERATOR
VERT DRIVE
VERT OUTPUT
VERT TRIG INPUT
VERT SIZE CONTRL SW
PUMP UP
Q306 KSC1008-Y
Q307 KSA708-Y
V-POSI
CN401
V-DY
Q304 KSC945-Y
Q305 KSA733-Y
H-SIZE
V-LIN
V-S.P.C
Q308 KSA733-Y
V-HOLD
IC401 LA7851 KA2138
VERT. OSC.
VERT. LAMP GENERATOR
X-RAY PROTECTOR
HOR. OSC.
PHASE SHIFTER
SAW FILTER GENERATOR
AFC
H-POSI
H-HOLD
H-CENTER
H-LIN
H-DY
Q403 KSA614
Q404 KSA733-Y
Q401 KSC3503-E
Q402 BU1008AF 2SC4762 BUH150 2SC3686
T401 HOT
T402 FBT
FOCUS
SCREEN
ABL
F/B
+84V
-26V

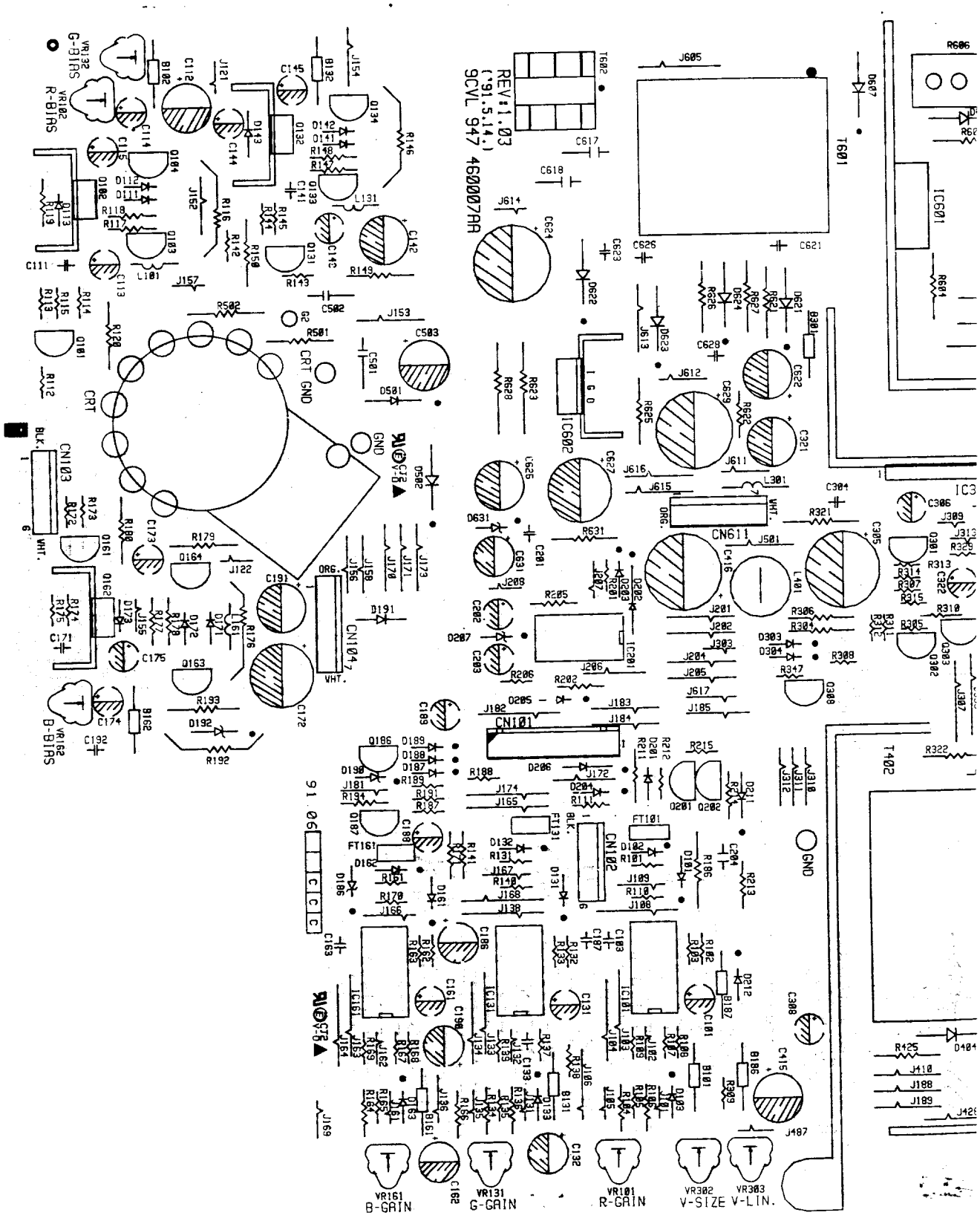
VIEW

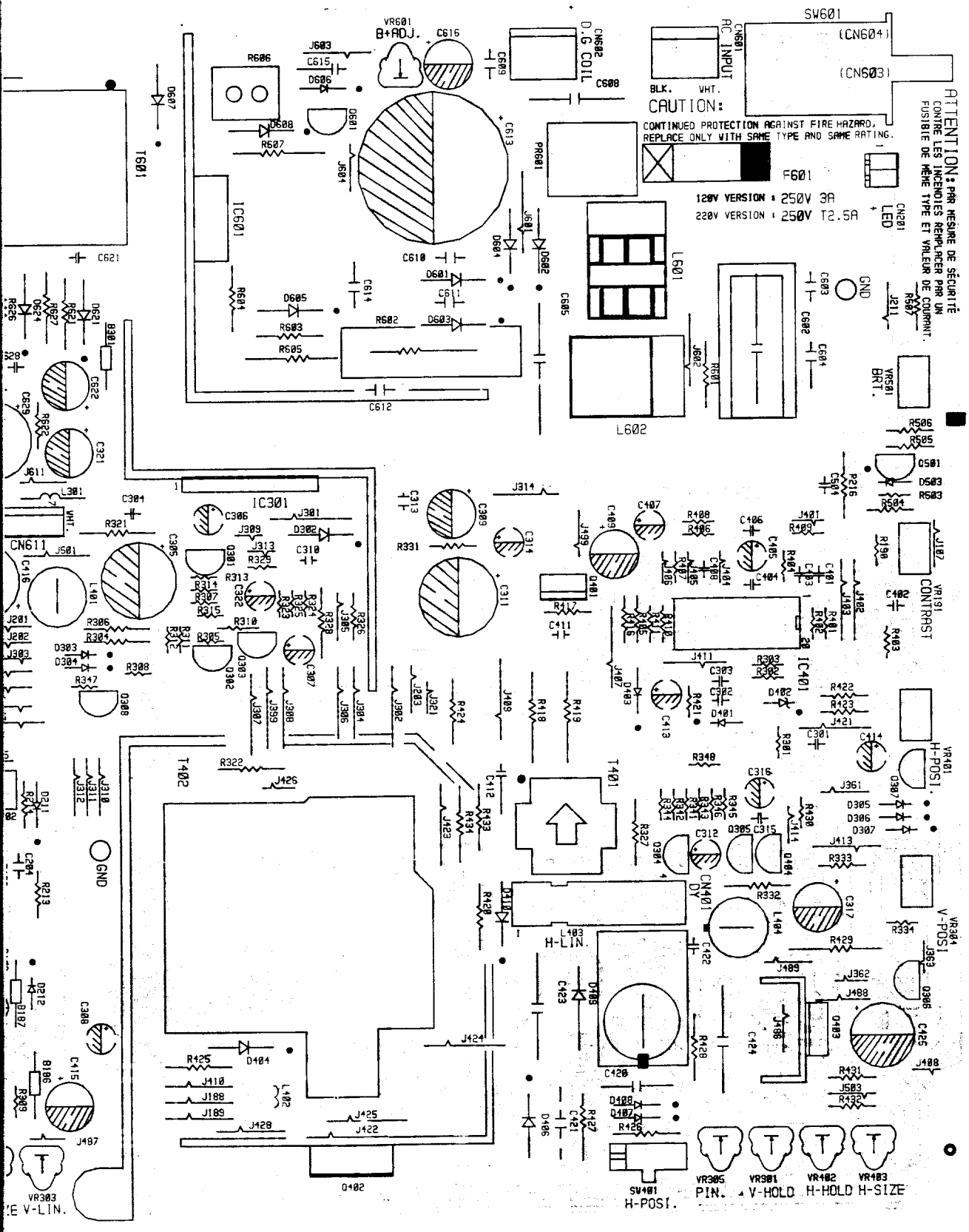

CN601
AC-INPUT
CN602
D.G-COIL
VR601
B+ADJ.
SV601
F601
250V 3A
PR601
T601
IC601
L601
L602
IC301
IC401
CN611
T401
T402
CN401
L403
H-LIN.
VR401
H-POSI.
VR304
V-POSI.
VR501
BRIGHTNESS
VR191
CONTRAST
VR403
H-SIZE
VR402
H-HOLD
VR301
V-HOLD
VR305
PIN.
VR303
V-LIN.
VR302
V-SIZE
SV401
LIVE
NET.
GND


T602
REV:1.03
T601
IC601
IC602
IC301
CN611
IC201
CN101
CN102
IC101
IC131
IC161
CN103
CN104
T402
VR303
V-LIN.
VR302
V-SIZE
VR101
R-GAIN
VR131
G-GAIN
VR161
B-GAIN.
VR132
G-BIAS
VR102
R-BIAS
VR162
B-BIAS
CRT GND
GND
HT
+12V
+87V
+135V

NTED CIRCUIT BOARD

VIEW




VR601
B+ADJ.
D.G COIL
CN602
AC INPUT
CN601
SW601
(CN604)
(CN603)
BLK.
WHT.
CAUTION:
CONTINUED PROTECTION AGAINST FIRE HAZARD,
REPLACE ONLY WITH SAME TYPE AND SAME RATING.
F601
120V VERSION : 250V 3A
220V VERSION : 250V T2.5A
CN201
LED
ATTENTION: POUR MESURE DE SÉCURITÉ
CONTRE LES INCENDIES REMPLACER PAR UN
FUSIBLE DE MÊME TYPE ET VALEUR DE COURANT.
VR501
BRT.
GND
T601
IC601
L601
L602
IC301
CN611
VHT.
T402
T401
IC401
CN401
DY
H-LIN.
VR401
H-POSI.
VR191
CONTRAST
VR301
V-POSI.
VR303
V-LIN.
SW401
H-POSI.
VR305
PIN.
VR381
V-HOLD
VR402
H-HOLD
VR403
H-SIZE