

NEC

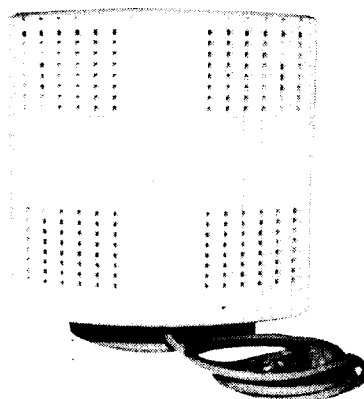
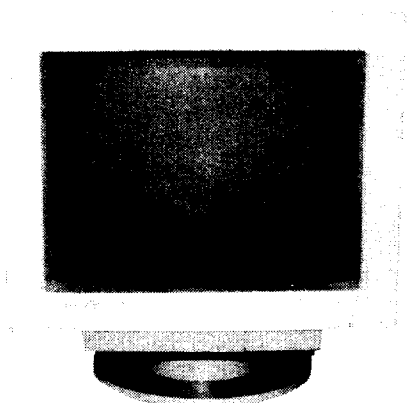
MODELS JC-1404HME/EE/R /ED

COLOR MONITOR **MultiSync 3D** SERVICE MANUAL

PARTS NO. 599910285



**Better Service
Better Reputation
Better Profit**



SPECIFICATIONS

A. Electrical Description

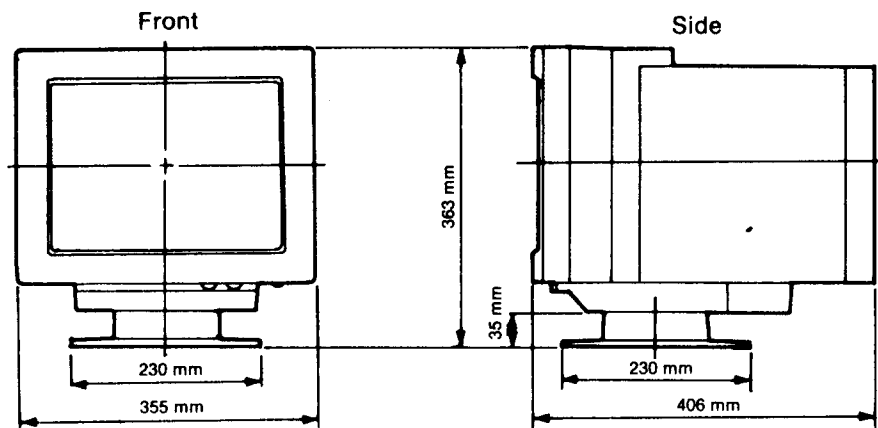
Picture Tube	13 Visual inches diagonal 90 degree deflection, 0.28mm dot pitch Dot type black matrix, Not-long persistence phosphor, Dark bulb, Direct etch	Synchronization	Horizontal: 15.5 kHz to 38 kHz (Automatically) Vertical: 50 Hz to 90 Hz (Automatically)
Input Signal	Video: TTL Level Positive : ANALOG 0.7 Vp-p/75Ω Positive Sync.: Separate sync. TTL Level Horizontal sync. Positive/Negative Vertical sync. Positive/Negative : Composite sync. TTL Level Positive/Negative : Composite sync. on Green Video sync. 0.3Vp-p Negative (Video 0.7Vp-p Positive)	Resolution	Horizontal: 1024 dots Vertical: 768 lines (interlaced)
Display Colors	TTL Input: 8/16/64 colors Analog Input: Unlimited colors	Video Band Width	45 MHz
		Active Display Area	Horizontal: 240mm (Active display area is changed) Vertical: 180mm (by signal timing.)
		Misconvergence	Less than 0.6mm
		Power Supply	AC 220V, 240V 50/60 Hz
		Power Consumption	82W
		Environmental Considerations	Operating Temperature 0° to +40°C Humidity 30% to 80% Storage Temperature -20°C to +60°C Humidity 10% to 90%

NOTE: The above specifications are subject to change without notice for further improvement.

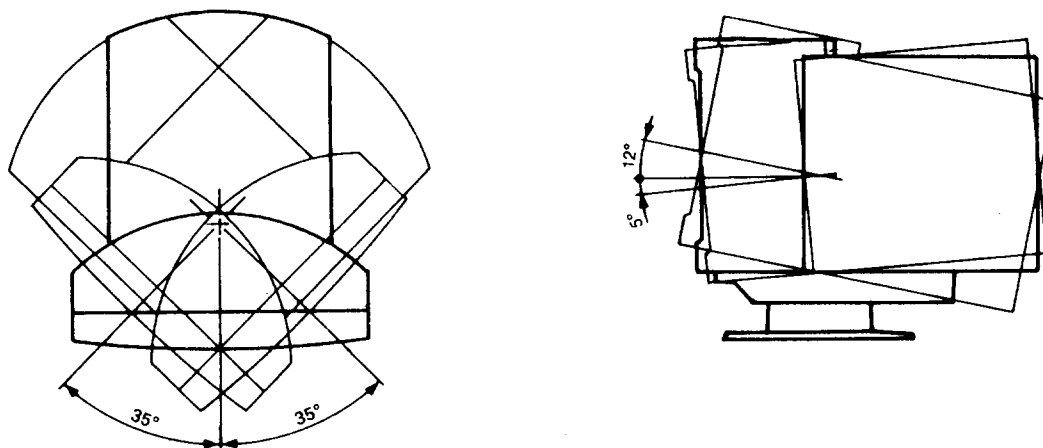
NEC Corporation
TOKYO, JAPAN

B. Mechanical Description (See below diagrams)

1. Cabinet: Molded plastic cabinet with detachable tilt swivel base.
2. Dimensions: 355(W) × 363(H) × 406(D) mm



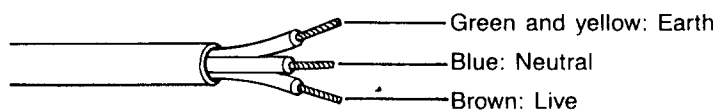
3. Tilt Swivel Range



4. Weight: 16 kg
5. Controls:
 - POWER SWITCH
 - BRIGHTNESS CONTROL
 - CONTRAST CONTROL
 - COLOR SWITCH
 - MODE SWITCH
 - H. SIZE CONTROL
 - H. POSITION CONTROL
 - V. SIZE CONTROL
 - V. POSITION CONTROL
 - MEMORY RECALL BUTTON

6. Input Signal Terminal: 15 PIN MINI D-SUB CONNECTOR (MALE)
(SEE PAGE 6 FOR PIN ASSIGNMENTS)

7. Power cord
In case of JC-1404HMEE, the end of power cord is as follows.



GENERAL

The MultiSync 3D Color Monitor, an Intelligent Monitor from NEC, is a microprocessor based, digital controlled multiple frequency Color Monitor. The MultiSync 3D Color Monitor automatically adjusts to graphics adapter scanning frequencies between 15.5 kHz and 38 kHz (Horizontal), and between 50 Hz and 90 Hz (Vertical).

As you can see, "design" was the top priority with the MultiSync 3D Color Monitor. Besides the dramatic cabinet design, the MultiSync 3D Color Monitor was designed with microprocessor based intelligence, allowing it to operate at each mode with the precision of a fixed frequency monitor.

The MultiSync 3D Color Monitor gives IBM PC, PC/XT, PC/AT, Personal System/2 (PS/2), Apple Macintosh II and compatible users crisp text and vivid color graphics displays when using the following graphics adapters (the MDA, CGA, EGA, PGC, MCGA, VGA and 8514/A) and Apple Macintosh II Video Card.

The MultiSync 3D Color Monitor can also be used with other "non-standard" graphics adapters to provide users with an extremely wide range of color monitor compatibility.

FEATURES

- The MultiSync 3D Color Monitor is microprocessor controlled with a resident memory base of pre-programmed screen and input configurations and also digital controls.
- The MultiSync 3D Color Monitor automatically scans all horizontal frequencies between 15.5 kHz and 38 kHz, and all vertical frequencies between 50 Hz and 90 Hz.
- The MultiSync 3D Color Monitor is compatible with the IBM PC, PC/XT, PC/AT, PS/2, the Apple Macintosh II and compatibles.
- The MultiSync 3D Color Monitor is compatible with the IBM Monochrome Display Adapter, the IBM Color Graphics Adapter, the IBM Enhanced Graphics Adapter, the IBM Professional Graphics Controller, the IBM MultiColor Graphics Array, the IBM Video Graphics Array, the IBM 8514/A, the Apple Macintosh II Video Card and other compatible graphics adapters.

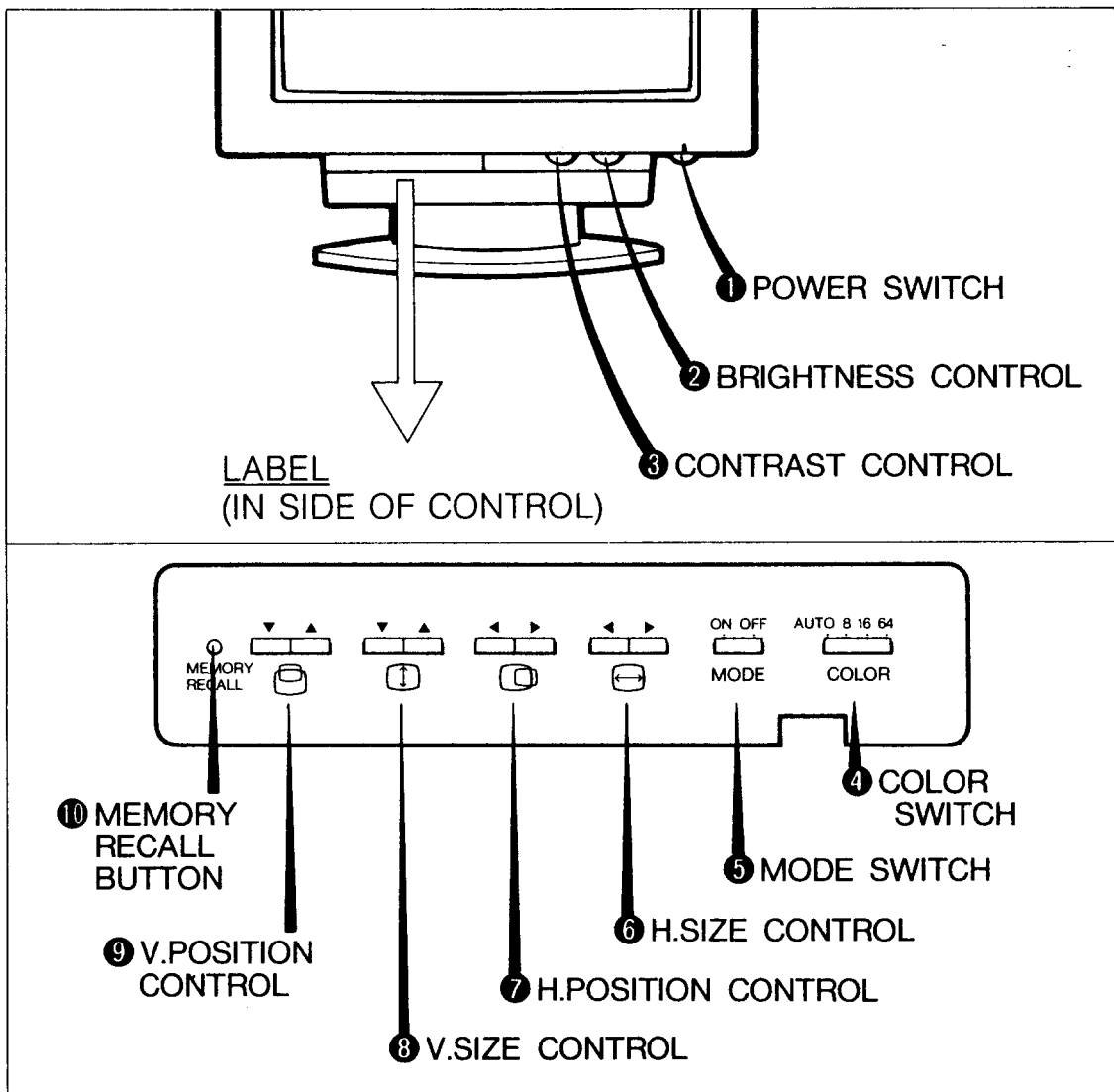
- The MultiSync 3D Color Monitor's wide compatibility makes it possible to upgrade adapters or software without purchasing a new monitor.
- The MultiSync 3D Color Monitor has a maximum horizontal resolution of 1024 dots and a maximum vertical resolution of 768 lines for superior clarity of display.
- The MultiSync 3D Color Monitor offers both TTL and ANALOG signal inputs, and in the ANALOG mode can display an unlimited palette of colors depending on the graphics adapter and software being used. The MultiSync 3D Color Monitor automatically adjust to either a TTL signalinput or an ANALOG signalinput.
- The MultiSync 3D Color Monitor has a 14" diagonally measured, non-glare CRT that yields a 13" viewing area.
- A captive signal cable is included with a 15 Pin mini D-sub connector that is configured for IBM's MCGA, VGA and 8514/A graphics adapters.
- Signal cable adapters for graphics adapters with 9 Pin D-sub connector and Macintosh II Video Card are included.

CAUTIONS

When setting up and using your MultiSync 3D Color Monitor, pay special attention to the following:

- To eliminate eye fatigue, do not use your MultiSync 3D Color Monitor against a bright background or where sunlight or other light sources will shine directly on the monitor.
- Your MultiSync 3D Color Monitor should be placed just below eye level for optimum viewing.
- Allow adequate ventilation around the monitor so that heat from the monitor can properly dissipate.
- Neither the monitor itself, not any other heavy object, should rest on the power cord. Damage to a power cord can cause fire or electrical shock.
- Keep the monitor away from high capacity transformers, electric motors and other strong magnetic fields.
- Your MultiSync 3D Color Monitor should not be used in damp, dusty or dirty areas.
- Handle your MultiSync 3D Color Monitor with care when transporting it.

ADJUSTING THE FRONT CONTROLS



1 POWER SWITCH

Used to turn the power ON or OFF. When the power is ON, the LED power indicator, located on the front of the monitor, is lit.

2 BRIGHTNESS CONTROL

Used to adjust the display's brightness preferred by the user.

3 CONTRAST CONTROL

Used to adjust display's contrast preferred by the user.

④ COLOR SWITCH

When the monitor receives a TTL color video signal, one of the four color configurations (AUTO, 8, 16, 64) must be selected.

COLOR SWITCH	COLOR MODE
Auto	IBM CGA, EGA or Compatible Graphics adapter
8	8 Colors
16	16 Colors with IBM Brown
64	64 Colors

This switch works with preset TTL modes that the monitor identifies automatically.

⑤ MODE SWITCH

This switch selects either the monochrome mode or color mode with a TTL video signal input.

With an Analog video signal input and MODE SWITCH ON, the monitor will give the user an additional user programmable memory area.

MODE SWITCH	Input Video Signal	MODE
OFF	TTL	General Color Mode (CGA, EGA)
	ANALOG	General Analog Mode (VGA, PGC, etc)
ON	TTL	Monochrome Mode (MDA)
	ANALOG	User Programmable Memory Area

For more detail, see the signal identification flowchart.

⑥ H. SIZE CONTROL

Adjust these controls for the preferred horizontal size of the display

⑦ H. POSITION CONTROL

Adjust these controls for the proper horizontal position of the display.

⑧ V. SIZE CONTROL

Adjust these controls for the vertical size of display preferred.

⑨ V. POSITION CONTROL

Adjust these controls for the proper vertical position of the display.

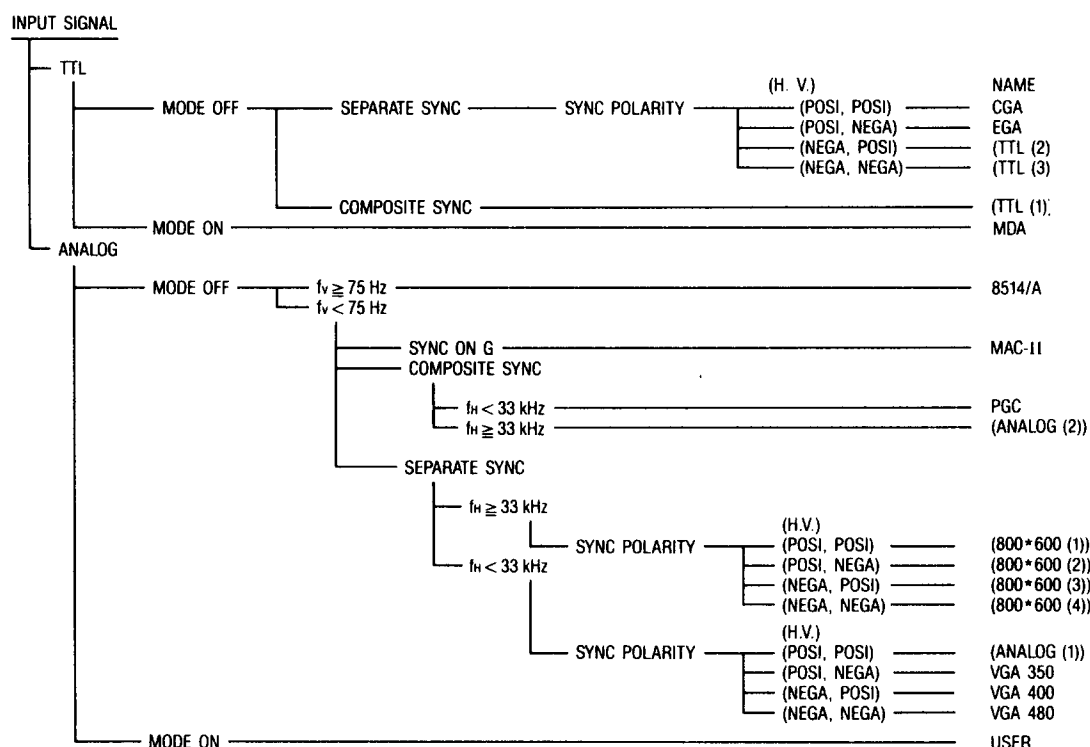
A few seconds after the user adjust the size and/or the position, the monitor's CPU will save the new control data into it's memory automatically.

NOTE: The monitor will display the screen configuration that was saved last.

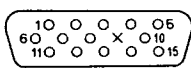
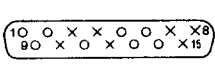
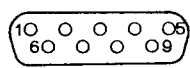
⑩ MEMORY RECALL BUTTON

This button resets the data of user changeable memory and recalls the factory preset data.

SIGNAL IDENTIFICATION FLOWCHART



PIN ASSIGNMENTS

 *15 pin mini D-sub male		 **15 pin D-sub male	 ***9 pin D-sub male			
			IBM MDA	IBM CGA	IBM EGA	IBM PGC
1	RED VIDEO	RED GROUND	GROUND	GROUND	GROUND	RED
2	GREEN VIDEO	RED	NO-CONNECTION	GROUND	SECONDARY RED	GREEN
3	BLUE VIDEO	NO-CONNECTION	NO-CONNECTION	RED	PRIMARY RED	BLUE
4	GROUND	NO-CONNECTION	NO-CONNECTION	GREEN	PRIMARY GREEN	COMPOSITE SYNC
5	GROUND	GREEN WITH SYNC	NO-CONNECTION	BLUE	PRIMARY BLUE	NO-CONNECTION
6	RED GROUND	GREEN GROUND	INTENSITY	INTENSITY	SECONDARY GREEN	RED GROUND
7	GREEN GROUND	NO-CONNECTION	VIDEO	NO-CONNECTION	SECONDARY BLUE	GREEN GROUND
8	BLUE GROUND	NO-CONNECTION	H. SYNC	H. SYNC	H. SYNC	BLUE GROUND
9	NO-CONNECTION	BLUE	V. SYNC	V. SYNC	V. SYNC	GROUND
10	GROUND	NO-CONNECTION				
11	GROUND	GROUND				
12	NO-CONNECTION	NO-CONNECTION				
13	H. SYNC	BLUE GROUND				
14	V. SYNC	GROUND				
15	NO-CONNECTION	NO-CONNECTION				

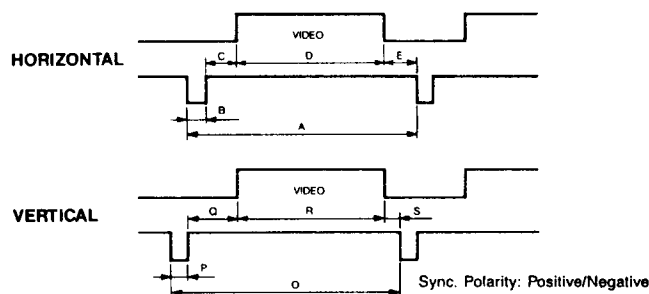
*15 Pin mini D-sub male connector is on the captive signal cable, for use with the IBM VGA, 8514/A or compatible graphics adapters.

**15 Pin D-sub male connector is on the 15 Pin mini to 15 Pin D-sub adapter, for use with the Apple Macintosh II Video Card.

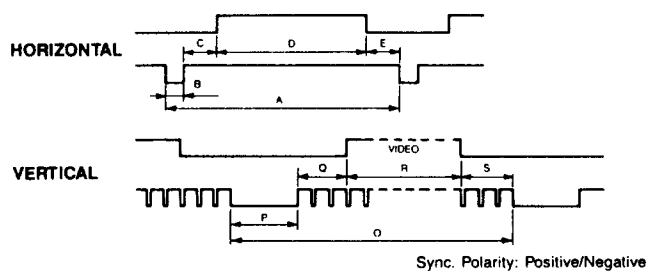
***9 Pin D-sub male connector is on the 15 Pin mini to 9 Pin D-sub adapter, for use with the IBM MDA, CGA, EGA, PGC or compatible graphics adapters.

TIMING CHARTS

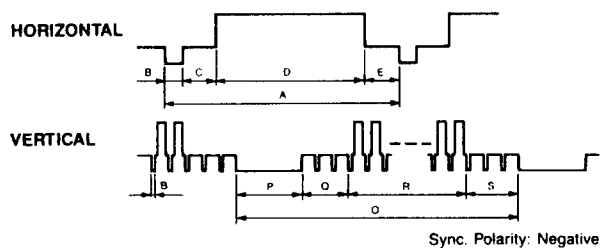
SEPARATE SYNC.



COMPOSITE SYNC.



COMPOSITE SYNC. & VIDEO (SYNC. ON GREEN)



PRESET TIMING

	MDA Compatible	CGA Compatible	EGA Compatible	PGC Compatible	VGA/MCGA Compatible			8514/A Compatible	Macintosh II Video Card	800 x 600
f_H	18.43 kHz	15.85 kHz	22 kHz	30.48 kHz	31.47 kHz			35.52 kHz	35 kHz	35.16 kHz
$A_{\mu s}$	54.3	63	45.5	33	31.78			28.15	28.57	28.44
$B_{\mu s}$	8.3	4.2	4.9	4.5	3.81			3.92	2.1	2
$C_{\mu s}$	1.1	7.2	1.6	2.8	1.91			1.25	3.2	3.56
$D_{\mu s}$	44.3	45	39	25.6	25.42			22.8	21.5	22.22
$E_{\mu s}$	0.6	6.6	0	0.1	0.64			0.18	2.1	0.67
f_V	50 Hz	60.5 Hz	60 Hz	60 Hz	70.08 Hz		59.95 Hz	87 Hz	67 Hz	56 Hz
O_{ms}	20.1	16.52	16.68	16.6	14.27	14.27	16.68	11.5	15	17.78
P_{ms}	0.9	0.19	0.6	0.07	0.06	0.06	0.06	0.113	0.086	0.06
Q_{ms}	0.2	2.15	0.08	2.12	1.91	1.11	1.05	0.563	1.12	0.63
R_{ms}	19.0	12.6	16	13.05	11.12	12.71	15.25	10.81	13.7	17.07
S_{ms}	0	1.58	0	1.36	1.18	0.38	0.32	0.014	0.086	0.03
Remarks	TTL Video	TTL Video	TTL Video	Analog Video	Analog Video	Analog Video	Analog Video	Analog Video Interface	Analog Video	Analog Video

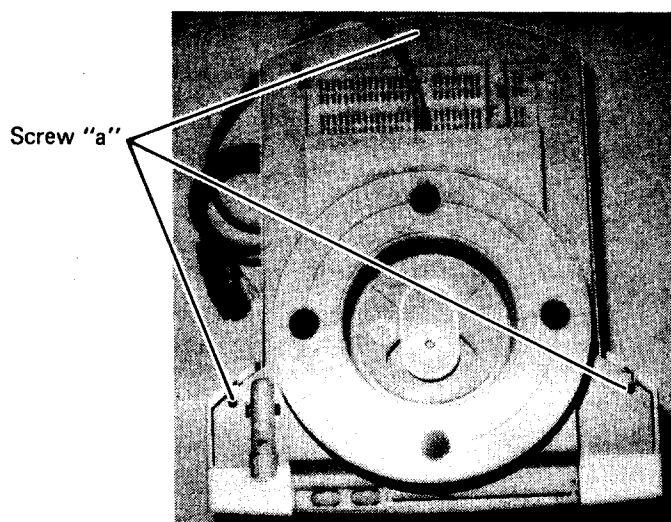
THE METHOD FOR REMOVING THE TILT SWIVEL BASE

Cabinet Bottom

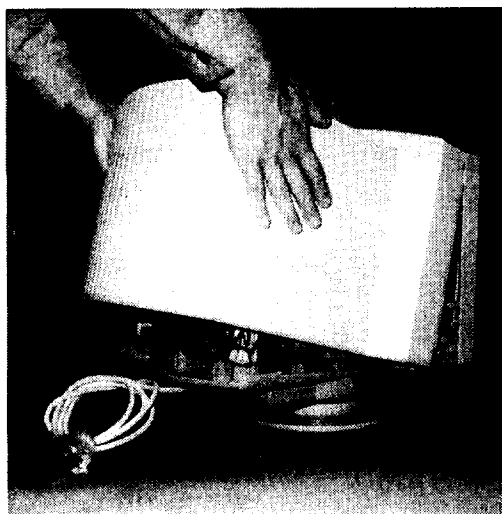


1. Turn the monitor set upside down as shown. (Top VIEW)

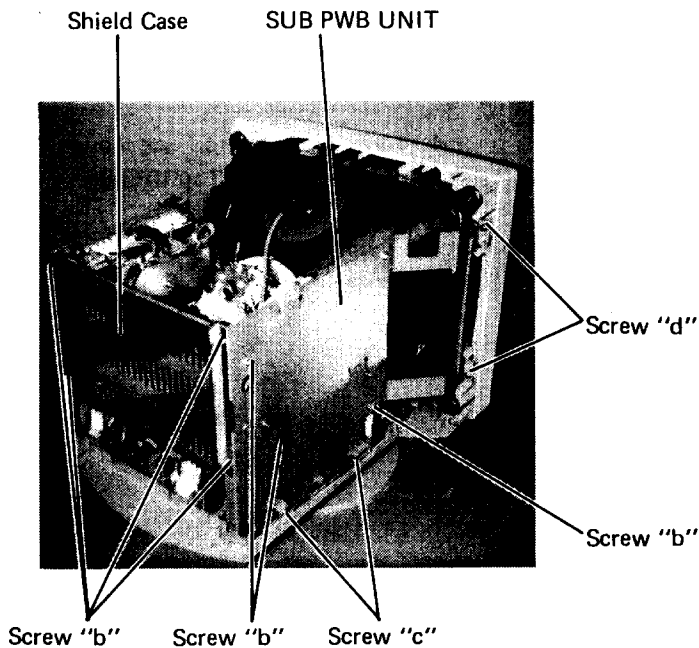
DISASSEMBLY



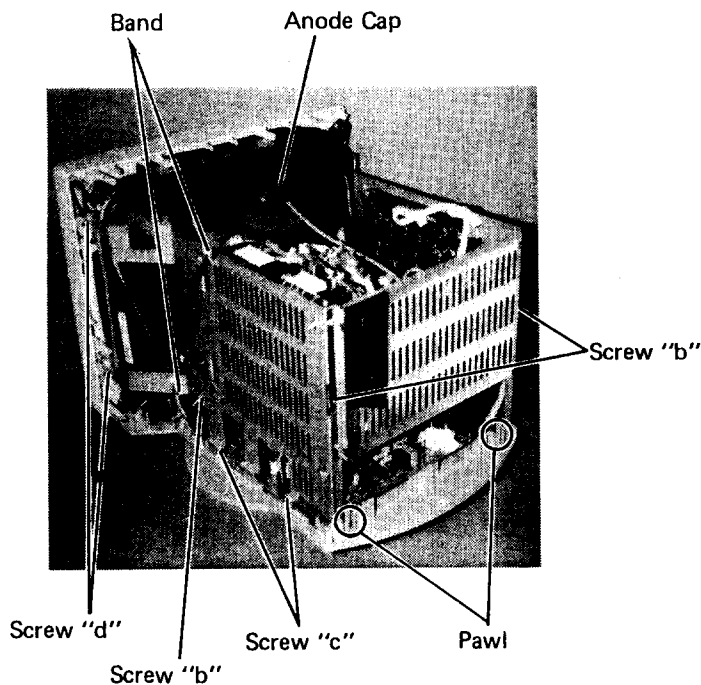
1. Turn the monitor set upside down as shown. (Top VIEW)
2. Remove three screws "a" from the cabinet bottom.



3. Invert the monitor set as normal, then remove the cabinet back.

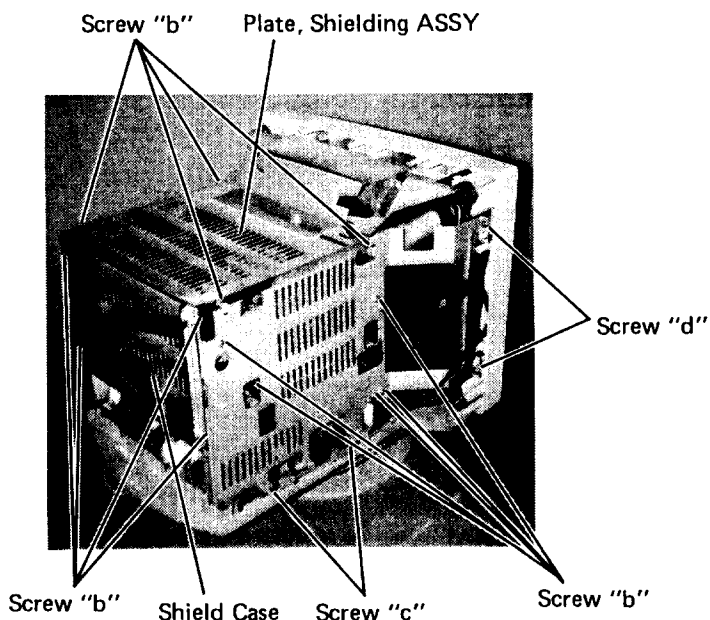


4. Remove the four screws "b" the shield case and remove the shield case.
5. Remove the two screws "c".
Remove the three screws "b" of the SUB PWB UNIT and the screw "b" (under the shield case).
Remove the two screws "d".
6. Disconnect the connectors "CN-A", "CN-M" and "CN-S". (from SUB PWB UNIT).
Disconnect the connectors "CN-V" (from CRT PWB ASSY) and lift up the SUB PWB UNIT.



7. Remove the two screws "c".
Remove the two screws "d".
Remove the two screws "b" of the SW. REG. UNIT and the two screws "b" (under the shield case).
8. Disconnect the connector "CN-K" (from MAIN PWB ASSY).
Cut the two bands and disconnect the connectors "CN-SW" and "CN-Z" (from SW. REG. UNIT).
Lift up the SW. REG. UNIT.

As for model JC-1404HMED



4'. Remove the four screws "b" of the plate, shielding ASSY and remove the plate, shielding ASSY.

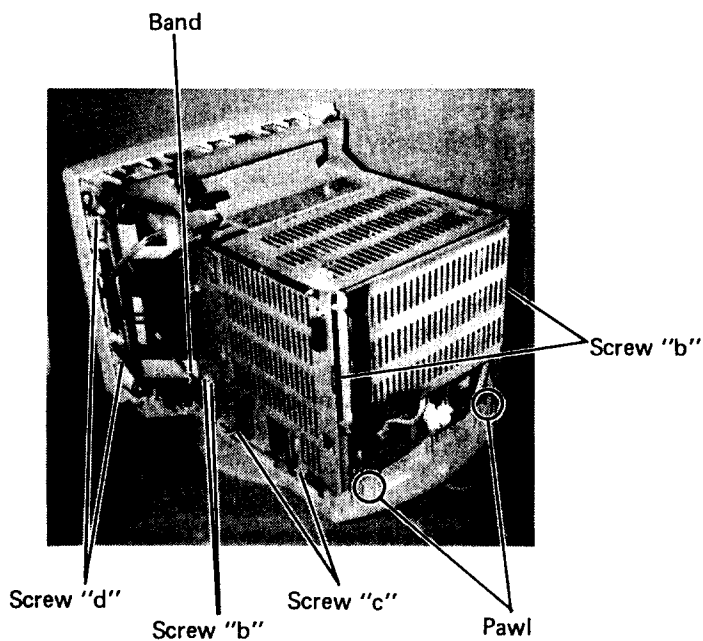
Remove the four screws "b" of the shield case and remove the shield case.

5'. Remove the two screws "c".

Remove the five screws "b" of the SUB PWB UNIT and the screw "b" (under the shield case).

6'. Disconnect the connectors "CN-A", "CN-M" and "CN-S" (from SUB PWB UNIT).

Disconnect the connectors "CN-V" (from CRT PWB ASSY) and lift up the SUB PWB UNIT.



7'. Remove the two screws "c".

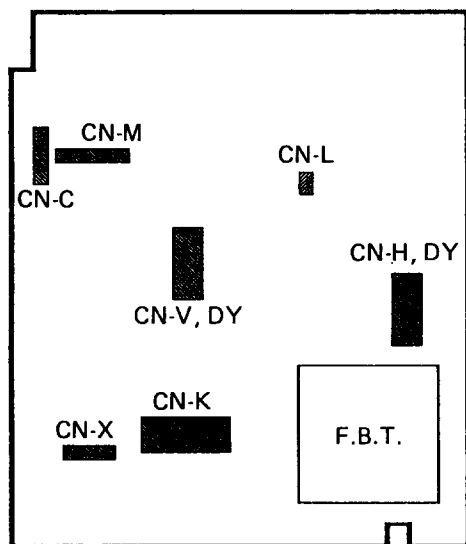
Remove the two screws "d".

Remove the two screws "b" of the SW. REG. UNIT and the two screws "b" (under the shield case).

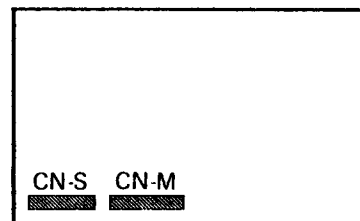
8'. Disconnect the connector "CN-K" (from MAIN PWB ASSY).

Cut the band and disconnect the connectors "CN-SW" and "CN-Z" (from SW. REG. UNIT).

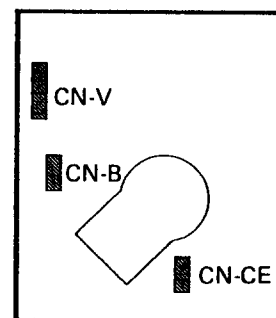
Lift up the SW. REG. UNIT.



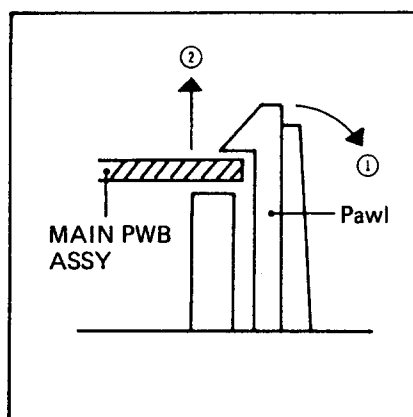
MAIN PWB



SUB PWB



CRT PWB

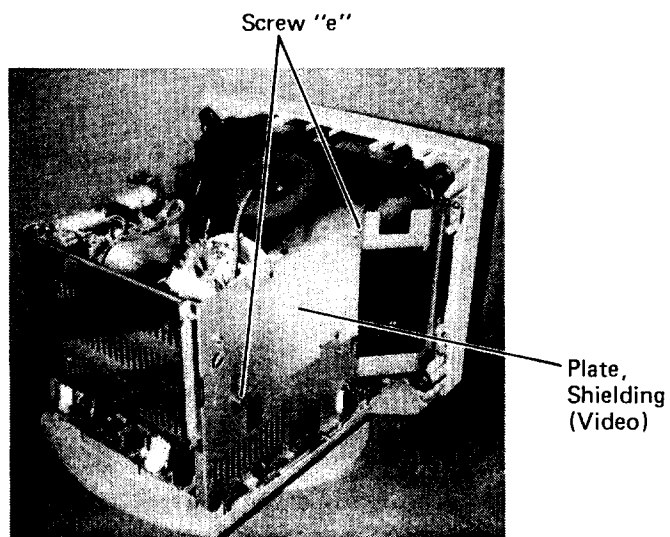


9. Disconnect the connector "CN-B" and "CN-CE" (from CRT PWB ASSY).
Disconnect the connector "CN-X" (from MAIN PWB ASSY).
Remove the Anode Cap from CRT.
Disconnect the CRT PWB ASSY.

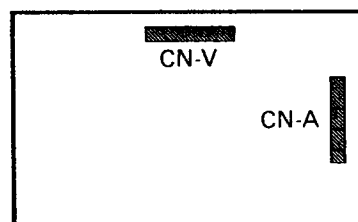
NOTE: When the anode cap is removed, shorting the CRT's anode to ground before touch it.

10. Disconnect the Connectors "CN-H, DY", "CN-V, DY", "CN-C", "CN-M" and "CN-L" (from MAIN PWB ASSY).
Disengage pawls at two places, then slide and lift up the MAIN PWB ASSY.

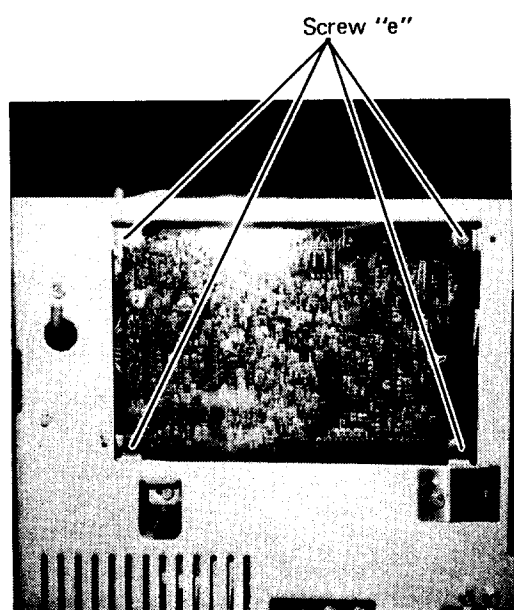
SUB PWB UNIT DISASSEMBLY



1. Remove the two screws "e" and the plate, shielding (Video).
Disconnect the connectors "CN-V" and "CN-A" (from SUB PWB UNIT).

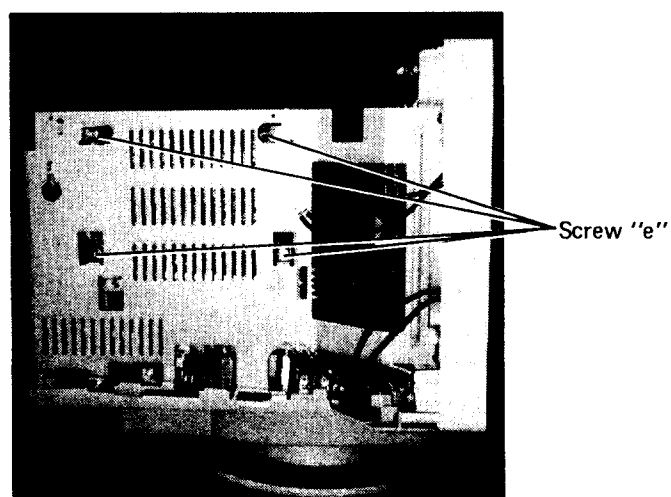


SUB PWB UNIT



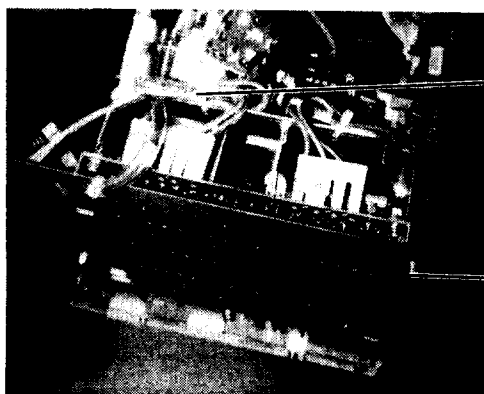
2. Remove the four screws "e".
Lift up the SUB PWB UNIT.

As for model JC-1404HMED



- 1'. Remove the four screws "e".
Lift up the SUB PWB UNIT.

SW. REG. UNIT DISASSEMBLY

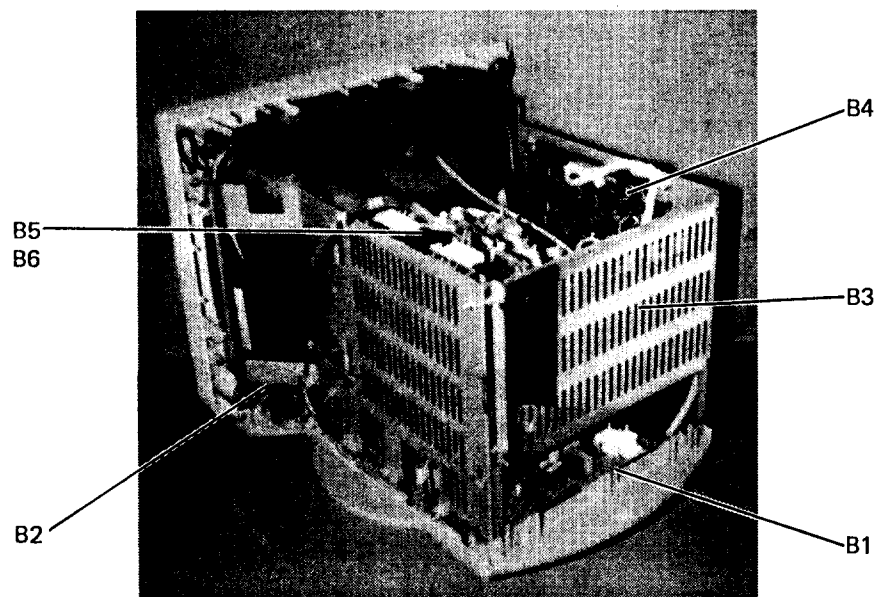


Band

Screw "c"

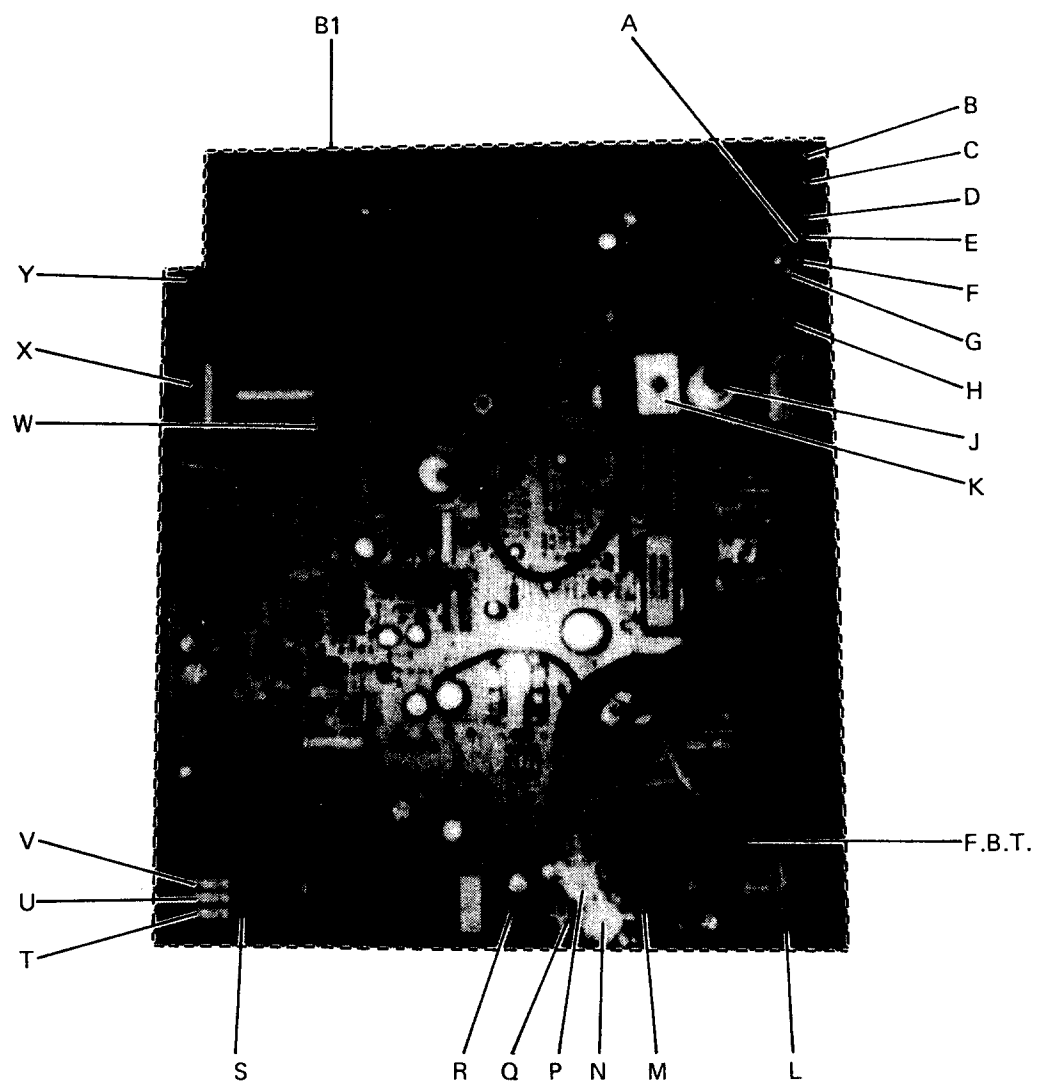
Cut the band and remove the screw "c".
Remove the SW. REG. UNIT.

PARTS LOCATION DIAGRAMS



BOARDS

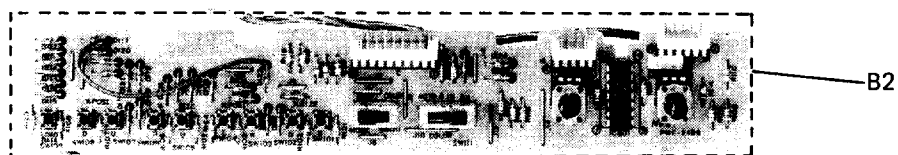
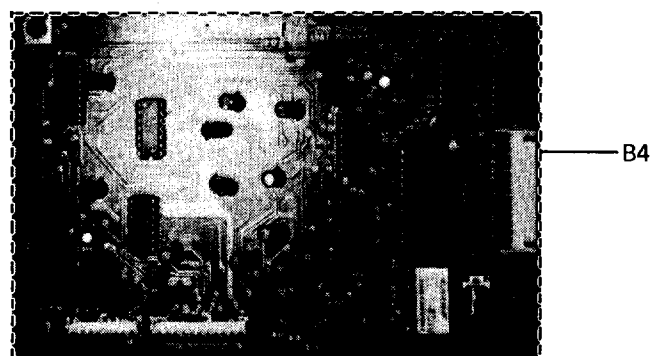
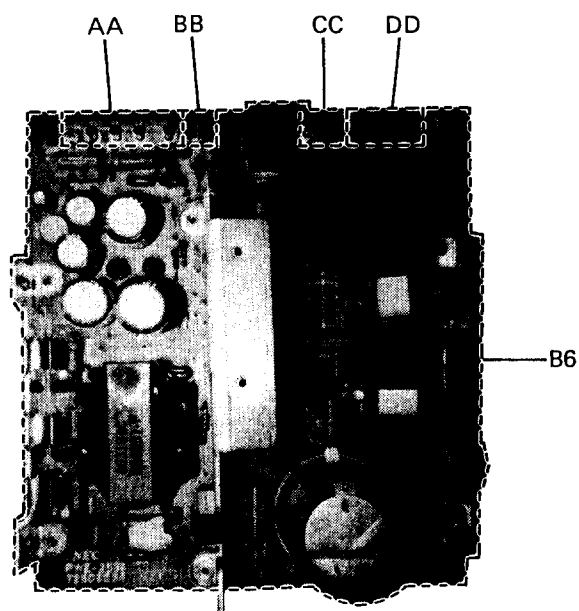
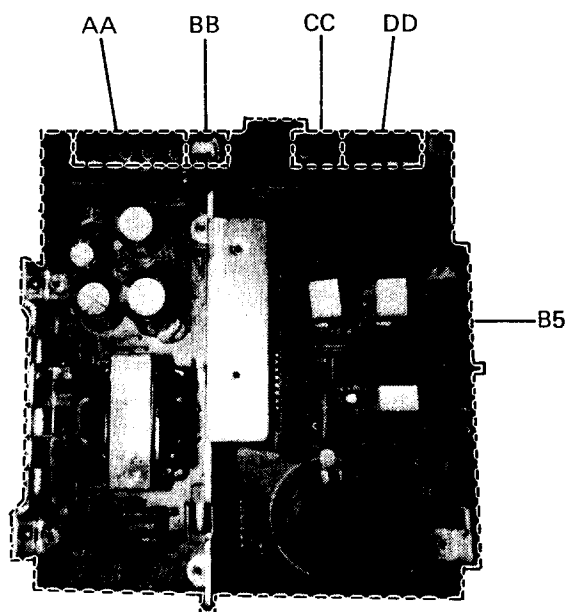
B1	MAIN PWB ASSY	PWE-248A	
B2	CONTROL PWB ASSY	PWE-248B	
B3	VIDEO/CRT PWB ASSY	PWE-249	
B4	SUB PWB UNIT	PWE-250	
B5	SW. REG. PWB ASSY	PWE-253	JC-1404HME/EE/R
B6	SW. REG. PWB ASSY	PWE-270	JC-1404HMED



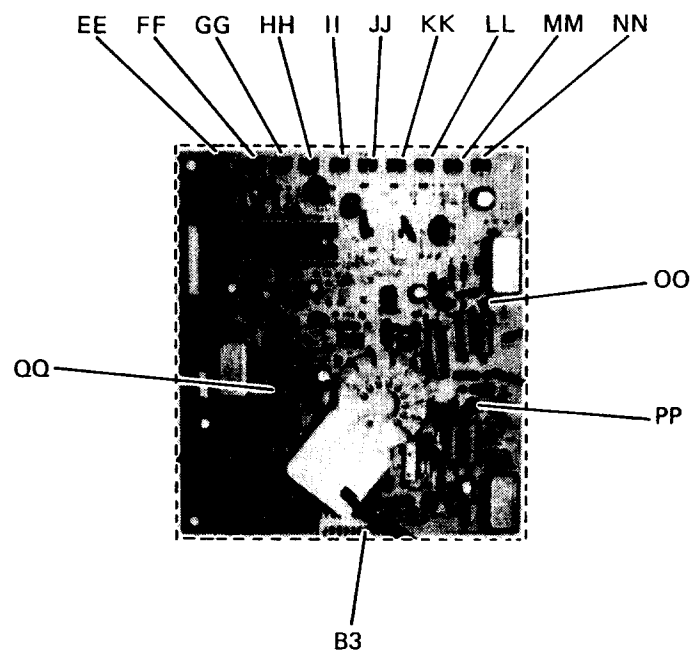
A	VR501 H. HOLD (1)	Q	VR504 H. V. ADJ
B	TP501	R	TP551
C	TP401	S	VR503
D	TP2005	T	RH3
E	TP2006	U	RH2
F	TP502	V	RH1
G	VR502 H. HOLD (2)	W	VR402 SIDE PIN ADJ
H	VR505	X	TP151
J	L503 H. WIDTH COIL	Y	TP152
K	L504 H. LIN COIL		
L	TP2001		
M	TP2003		
N	VR2002		
P	VR2001	B1	MAIN PWB ASSY (PWE-248A)

model JC-1404HME/EE/R

model JC-1404HMED



AA	CONNECTOR K	B2	CONTROL PWB ASSY (PWE-248B)
BB	VR651	B4	SUB PWB UNIT (PWE-250)
CC	CONNECTOR Z	B5	SW. REG. PWB ASSY (PWE-253)
DD	CONNECTOR SW	B6	SW. REG. PWB ASSY (PWE-270)



EE	VR904 SUB CONT
FF	VR903 GAIN-B
GG	VR902 GAIN-G
HH	VR901 GAIN-R
II	VR910 BIAS-B
JJ	VR909 BIAS-G
KK	VR908 BIAS-R
LL	VR907 SUB BRIGHT-B
MM	VR906 SUB BRIGHT-G
NN	VR905 SUB BRIGHT-R
OO	TP901
PP	TP902
QQ	TP903
B3	VIDEO CRT PWB ASSY (PWE-249)

ADJUSTMENT PROCEDURE

Standard Adjustment Conditions

- 1) Power source voltage: AC220V, 240V 50 Hz/60 Hz
- 2) Aging: Adjust after leaving power on for a minimum twenty minutes.
- 3) Signals:
 - Video : Analog 0.7Vp-p 75 Ω terminal positive polarity
 - Analog sync. on green
 - Video : 0.7Vp-p
 - Synchronizing : 0.3Vp-p
 - Synchronizing : TTL level Negative polarity/positive polarity
 - Separate/composite
 - Deflection frequency : H. 15kHz~38kHz
 - V. 50Hz~90Hz

1. SW. REG. UNIT

+85V LINE
Adjust VR651 to be 85V DC

2. Pre-adjustment of DEF PWB

Apply 23.5V DC between K3 and K4 (GND).

1) +18V adjustment

Adjust VR505 for $18V \pm 0.05V$ DC between TP502 and the ground.

2) +12V adjustment

Apply a resistance load of 15 Ω 7W between X4 and X8 (GND).

Adjust VR503 for $12 \pm 0.05V$ DC between TP550 and the ground.

3) High voltage protector setting (For JC-1404HME/EE/R)

High voltage protector 1

With $25.8 \pm 0.1V$ DC applied between TP2001 and the ground, adjust VR2001 for $0.3 \pm 0.05V$ DC between TP2005 and the ground.

High voltage protector 2

With $24.5 \pm 0.1V$ DC applied between TP2003 and the ground, adjust VR2002 for $0.3 \pm 0.05V$ DC between TP2006 and the ground.

Due to DHHS, after adjusting VR2001 and VR2002, seal with an adhesive (TSE-385RTV) and cap (74004891).

3) High voltage protector setting (For JC-1404HMED)

High voltage protector 1

With $25.6 \pm 0.1V$ DC applied between TP2001 and the ground, adjust VR2001 for $0.3 \pm 0.05V$ DC between TP2005 and the ground.

High voltage protector 2

With $26.1 \pm 0.1V$ DC applied between TP2003 and the ground, adjust VR2002 for $0.3 \pm 0.05V$ DC between TP2006 and the ground.

Due to DHHS, after adjusting VR2001 and VR2002, seal with an adhesive (TSE-385RTV) and cap (74004891).

3. Main Adjustment

Set the external VRs and switches as follows unless otherwise specified.

Front controls (as seen from front)

VR101 BRIGHTNESS : At point where back raster disappears.

VR102 CONTRAST : Max. (fully clockwise)

SW110 MODE SWITCH : Off (right side)

SW111 COLOR SWITCH : Auto (left end)

3-1) DEF PWB Adjustment

A) Analog Adjustment

(1) Horizontal Hold

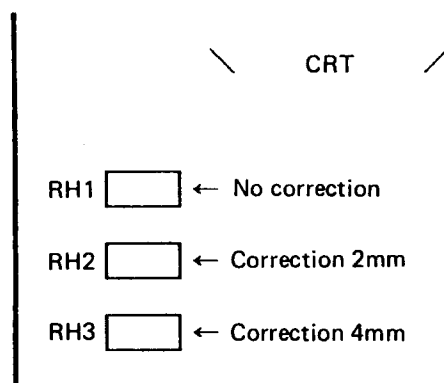
- Short TP501 and the ground.
- Receive signal 1 (15kHz) and adjust horizontal hold (1) VR501 so that there is one screen.
- Receive signal 2 (38kHz) and adjust horizontal hold (2) VR501 so that there is one screen.
- Receive the signal 1 and confirm that there is nearly one screen. If not, re-perform b) and c).
- Remove the short between TP501 and the ground.

(2) High Voltage Adjustment

Receive signal 8 (31.5kHz) and adjust high voltage adjustment VR504 so that the high voltage is 23.5kV with the CRT anode current cut off.
Due to DHHS, after adjusting, seal with an adhesive (TSE-385RTV) or cap (74004891).

(3) Horizontal Raster Centering

Receive signal 8 (31.5kHz) and check that the horizontal linearity is suitable. If it is extremely bad, adjust to a suitable point with L504 (H. LIN. COIL).
Turn the brightness control fully clockwise so that back raster appears, then reinsert connector RH so that the back raster is in the center of the CRT screen.



For horizontal correction, set with the direction of the connector.

(4) Side Pin Cushion

Receive signal 8 (31.5kHz) and adjust VR403 for the optimum side pin cushion distortion.
Adjust so that pin distortion is zero (straight) at one side or both sides.

(5) Horizontal Linearity

Receive Signal 5 (22.0kHz) and adjust L504 for the optimum horizontal linearity.
(Reference: Optimum is that the magnet is turned about 45° clockwise or counterclockwise.)

(6) Horizontal Width

- Short TP151 and TP152.
- Receive signal 8 (31.5kHz) and adjust width coil L503 for a horizontal screen size of 240±2mm.

NOTE: Do not touch the Horizontal Size Control Switch of the front panel until Horizontal Width Coil Adjustment is finished. Because the microcomputer's output voltage for the Horizontal width adjustment will change once the test pins have been shorted.
Adjust after that video area is nearly center of the raster with Horizontal Position Switch and Vertical amplitude is less than over scan (about 18mm) with Vertical Size Switch.
If Horizontal Size Control Switch is pushed by mistake, turn off the power switch and re-adjust.

B) Digital Memory Adjustment

Confirm that the adjustments as shown below are finished before performing this adjustment.

- High Voltage Adjustment
- Width Coil Adjustment
- Horizontal Raster Centering Adjustment

4. Horizontal Hold Adjustment
5. Horizontal Linearity Adjustment
6. Side Pin Adjustment

This adjustment is user control to adjust with the signal 3~12.

This condition is memorized and the signal pattern is reversed cross hatch.

(1) Setting

BRIGHT VR : Max

CONTRAST VR : Min

(2) Procedure of adjustment

1 Short TP151 and TP152.

2 Receive Signal 3 (CGA).

3 Adjust so that the screen is in the center of the back raster with User Control Horizontal Position Switch.

4 Adjust so that the horizontal screen size is $240\text{mm} \pm 2\text{mm}$ with User Control Horizontal Size Switch.

5 Adjust so that vertical position of the screen is in the center of CRT with User Control Vertical Position Switch.

6 Adjust so that the vertical screen size is $180\text{mm} \pm 2\text{mm}$ with User Control Vertical Size Switch.

7 Push the Memory Recall Switch. (over 5 sec.)

8 Receive Signal 4 (MDA).

9 Turn on the Mode Switch.

10 Perform the shown above 3~7.

11 Turn off the Mode Switch.

12 Receive Signal 5 (EGA).

13 Perform the shown above 3~7.

14 In the same way, perform the shown above 3~7 with signal 6~12.

However, adjust so that the horizontal screen size is $250\text{mm} \pm 2\text{mm}$ and the vertical screen size is $187\text{mm} \pm 2\text{mm}$ with signal 10 (8514A).

15 Remove the test pin short after confirm that the adjustments with signal 3~12 are finished.

16 Confirm by watching that the screen size position is correct on the all mode.

If not, re-adjust on the mode only and re-confirm on the all mode.

3-2) VIDEO CRT PWB (Adjustment of Video Amplitude and White Balance)

NOTE: Check that the video signals are as shown below before performing the main adjustment. In particular, for LVG-1603, the video signal output level varies according to the signal pattern, so check the level with the signal to be adjusted.

Video : Analog 0.7Vp-p

Synchronizing : H.V Separate TTL level

(1) Initial Setting of Adjustment VRs

VR901~903 GAIN VR : Fully counterclockwise (MIN)

VR904 SUB CONT. VR : Fully clockwise (MAX)

VR906, 908, 910 BIAS VR : Fully clockwise (cathode voltage rising)

VR905, 907, 909 SUB BRIGHT VR : Mechanical Center

SCREEN VR : Fully counterclockwise (MIN)

(2) Video Contrast Adjustment (Window pattern)

a) GAIN VR adjustment

- 1 Receive the window pattern (the video area of $1/3 \sim 1/2\text{H} \times 1/2\text{V}$ in which there is no ABL even with contrast at maximum is preferable) (Signal 12)

- 2 Contrast control : Fully clockwise
Brightness control : Fully counterclockwise
- 3 Adjust VR901, VR902 and VR903 so that the output voltage is 38Vp-p.
After Adjusting, check the Vp-p again and readjust if they do not confirm to the settings.



- b) SUB CONT. VR adjustment
 - 1 Contrast control : Fully counterclockwise
Brightness control : Fully counterclockwise
 - 2 Adjust VR904 so that TP902 (GREEN OUT) output is 10Vp-p.
After adjusting, check that TP901 (RED OUT) and TP903 (BLUE OUT) outputs are 10Vp-p ± 0.5 Vp-p.
If not, fine-adjust VR904 so that the R, G and B outputs are within the range of 10Vp-p ± 0.5 Vp-p.
- (3) Cut-off Adjustment (All Black Signal)

Contrast control : Fully counterclockwise
Brightness control : Fully counterclockwise

 - a) 1 Short TP551 and the ground. (chassis)
2 Short TP401 and the ground. (chassis)
3 As the screen VR is turned gradually clockwise, a single color will appear as a horizontal line.
This color is the reference color for the cut-off adjustment.
 - b) Turn the bias VRs for the other color than the reference color until bright as the reference color.
 - c) 1 Remove the short between TP401 and the ground. (chassis)
Otherwise, replace VR401 original position (voltage of pin 4 IC501 is $6V \pm 0.1V$).
2 Remove the short between TP551 and the ground. (chassis)

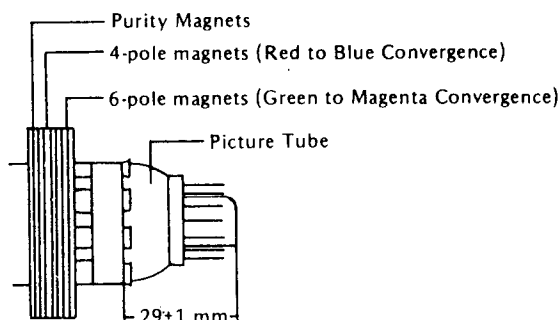
NOTE: Perform the cut-off adjustment in as dark a place as possible to make the white tracking which follows better.
- (4) SUB BRIGHT VR Adjustment
 - a) Receive signal 8 (All black signal).
Contrast control : Fully counterclockwise
Brightness control : Fully clockwise, so that there is only back raster on the screen.
 - b) Turn SUB BRIGHT VR for the other color than the reference color of (3) Cut-off Adjustment and adjust so that back raster become to be white.
- (5) Fine Adjustment of White Balance
Color temperature: Center X = 0.310
Y = 0.325
The color should be white with a slightly blue tinge.
 - a) Receive signal 8 (VGA 400 lines) H. gray scale (16 gradations).
 - b) Contrast control : Fully counterclockwise
Brightness control : Fully clockwise
Check that the white balance is proper for all gradations.
If not, fine adjust to make it white with SUB BRIGHT VR for the other color than the reference color.
 - c) Contrast control : Fully clockwise
Brightness control : At a point where no back raster appears
Check that the white balance is proper for all gradations.
If not, fine adjust to make it white with GAIN VR for the other color than the reference color.

(6) Focus Adjustment

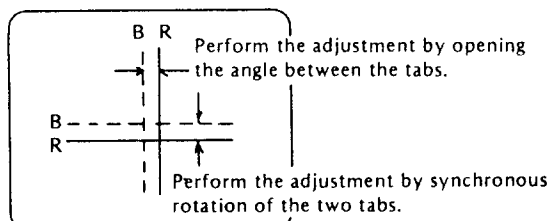
- a) Receive signal 12 (all white "" or 4-dots missing signal)
Contrast control : Fully clockwise
Brightness control : At a point where no back raster appears
- b) Turn the focus control and adjust for the optimum focus.

(7) Purity Adjustment

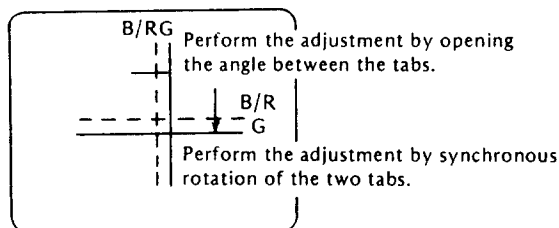
- a) Be sure that the display is not being exposed to any external magnetic fields.
- b) Ensure that the spacing between the Purity, Convergence Magnet, (PCM), assembly and the CRT stem is $29\text{mm} \pm 1\text{mm}$. (See below diagram)
- c) Produce a complete, red pattern on the display. Adjust the Purity magnet rings on the PCM assembly to obtain a complete field of the color red. This is done by moving the two tabs in such a angle between the two tabs, which should be approximately 180° .
- d) Check the complete blue and complete green patterns to observe their respective color purity. Make minor adjustment if needed.



Purity, Convergence Magnet Assembly (PCM)



Red to Blue Convergence
(Magenta)



Green to Magenta Convergence
(White)

(8) Convergence Adjustment

- a) Produce a magenta crosshatch on the display.
- b) Adjust the focus for the best overall focus on the display.
Also adjust the brightness to the desired condition.
- c) Vertical red and blue lines are converged by varying the angle between the two tabs of the 4-pole magnets on the PCM assembly. (See above diagrams)
- d) Horizontal red and blue lines are converged by varying the two tabs together, keeping the angle between them constant.
- e) Produce a white crosshatch pattern on the display.
- f) Vertical green and magenta lines are converged by varying the angle between the two tabs of the 6-pole magnets.
- g) Horizontal green and magenta lines are converged by varying the two tabs together, keeping the angle between them constant.

TIMING OF REFERENCE SIGNALS

SIGNALS FOR USING LVG-1603

Abbreviation	Unit	1	2	3	4	5	6	7	8	9	10	11	12
		15kHz	38kHz	CGA	MDA	EGA	PGC	VGA 350	VGA 400	VGA 480	8514A	MAC II	800 x 600
H O R I Z O N T A L	Total	896	1024	896	882	744	824	900	900	900	1264	864	1024
	Rate	15.0000	38.0000	15.8500	18.4300	22.0000	30.4800	31.4700	31.4700	31.4700	35.5200	35.0000	35.1600
	Dots/Character	8	8	8	9	8	8	9	9	9	8	8	8
	Characters	80	100	80	80	80	80	80	80	80	128	80	100
	Drive Delay	736	824	736	729	640	640	738	738	738	1032	656	824
V E R T I C A L	Drive Width	56	72	56	135	80	48	108	108	108	176	64	72
	Total	250	626	260	370	366	508	449	449	525	409	525	626
	Rate	60.0000	60.7000	60.9600	49.8100	60.1100	60.0000	70.0900	70.0900	59.9400	43.4800	66.6700	56.2400
	Lines/Character	10	15	10	14	10	10	14	16	16	8	16	15
	Rows	200	600	200	350	350	480	350	400	480	384	480	600
P A T T E R N	Drive Delay	228	601	225	350	351	481	387	412	490	384	483	601
	Drive Width	2	2	3	15	13	2	2	2	2	4	3	2
	Dot Rate	13.4400	38.9120	14.2016	16.2553	16.3680	25.1155	28.3230	28.3230	28.3230	44.8973	30.2400	36.0038
Scan Mode		0											
Character Font		0											
Character Code		48											
Pattern Key Code		—											
Video Output		—											
Add Sync/Inverse		0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0100	0000
Dot Duty/Set		00	00	00	00	00	01	00	00	00	00	00	00
Polarity		11	11	11	10	10	11	10	01	00	11	00	11

DATA FORMAT FOR USING Quantum 801C

TIMING PARAMETERS:

Real Time Parameters

Dot Rate	MHz
Horizontal Rate	KHz
Vertical Rate	Hz

Non-Real Time Parameters

Horizontal	Vertical
Dots/Character	Lines/Character
Total	Total
Characters	Rows
Drive Delay	Drive Delay
Drive Width	Drive Width
	Step Width

OPTION PARAMETERS

Signal Gating

Composit Sync.	OP 1.—0=off	1=on
Vertical Step	OP 2.—0=off	1=on
Horizontal Drive	OP 3.—0=off	1=on
Vertical Drive	OP 4.—0=off	1=on

Signal Polarity

Composite Sync.	OP 5.—0=non-inverted	1=inverted
Vertical Step	OP 6.—0=non-inverted	1=inverted
Horizontal Drive	OP 7.—0=non-inverted	1=inverted
Vertical Drive	OP 8.—0=non-inverted	1=inverted
Video	OP 13.—0=non-inverted/positive	1=inverted/positive
		2=non-inverted/negative
		3=inverted/negative

Interlace Mode

OP 9.—0=non-interlace
1=interlaced sync only
3=interlaced sync & video

Video Mode

OP 10.—0=monochrome 1=color

Duty Cycle

OP 11.—0=50% 1=100% (OP 12.0)
0 or 1=100% (OP 12.2)

Character Clocking Mode

OP 12.—0=single-phase
2=dual-phase

Horizontal Skew

OP 14.—skew right 0-3 dots

Vertical Skew

OP 15.—skew down 0-9 lines

Cursor

OP 16.—0=off
1=fast blink
2=slow blink
3=on continuous

SIGNALS for using QUANTUM 801C

	1	2	3	4	5	6	7	8	9	10	11	12			
Real Time Parameters	*														
Dot Rate (MHz)	13.440	29.184	14.202	16.255	16.368	25.116	28.324	28.324	28.324	22.449	30.246	27.003			
Horizontal Rate (kHz)	15.000	38.000	15.850	18.430	22.000	30.480	31.470	31.470	31.470	35.520	35.000	35.160			
Vertical Rate (Hz)	60.000	60.700	60.960	49.810	60.110	60.000	70.000	70.000	59.943	86.960	66.667	56.000			
Non-Real Time Parmeters	*														
H: Dots/Character	8	6	8	9	8	8	9	9	9	8	8	6			
Total	112	128	112	98	93	103	100	100	100	79	108	128			
Characters	80	100	80	80	80	80	80	80	80	64	80	100			
Drive Delay	92	103	92	81	80	80	82	82	82	64	88	103			
Drive Width	7	9	7	15	10	6	12	12	12	11	8	9			
V: Lines/Character	10	15	10	14	10	10	14	16	16	16	16	15			
Total	250	626	326	370	366	508	449	449	525	409	525	626			
Rows	20	40	20	25	35	48	25	25	30	24	48	40			
Drive Delay	22	40	22	25	35	48	28	26	31	24	48	40			
Drive Width	2	2	3	15	13	2	2	2	2	4	3	2			
Step Width	—	—	—	—	—	—	—	—	—	—	—	—			
Signal Gating															
Composite Sync	0	0	0	0	0	1	0	0	0	0	1	0			
Vertical Step	0	0	0	0	0	0	0	0	0	0	0	0			
Horizontal Drive	1	1	1	1	1	0	1	1	1	1	0	1			
Vertical Drive	1	1	1	1	1	0	1	1	1	1	0	1			
Signal Polarity															
Composite Sync	0	P				0	P				1	N			
Vertical Step	—														
Horizontal Drive	0	P	0	P	0	P	—	0	P	1	N	0	P		
Vertical Drive	0	P	0	P	0	P	—	1	N	0	P	1	N	0	P
Video	0														
Interlace Mode	0														
Video Mode	1														
Duty Cycle	0														
Character Clocking Mode	0														
Horizontal Skew	—														
Vertical Skew	—														
Cursor	15kHz	38kHz	CGA	MDA	EGA	PGC	VGA 350	VGA 400	VGA 480	8514A	MacII	800 x 600			

NOTE: "*" marked signals put down the dot rate. Because, the dot rate may not exceed 32.76 MHz while in the color mode (0 P 10.1) or the signal-phase character clocking mode (0 P 12.0)

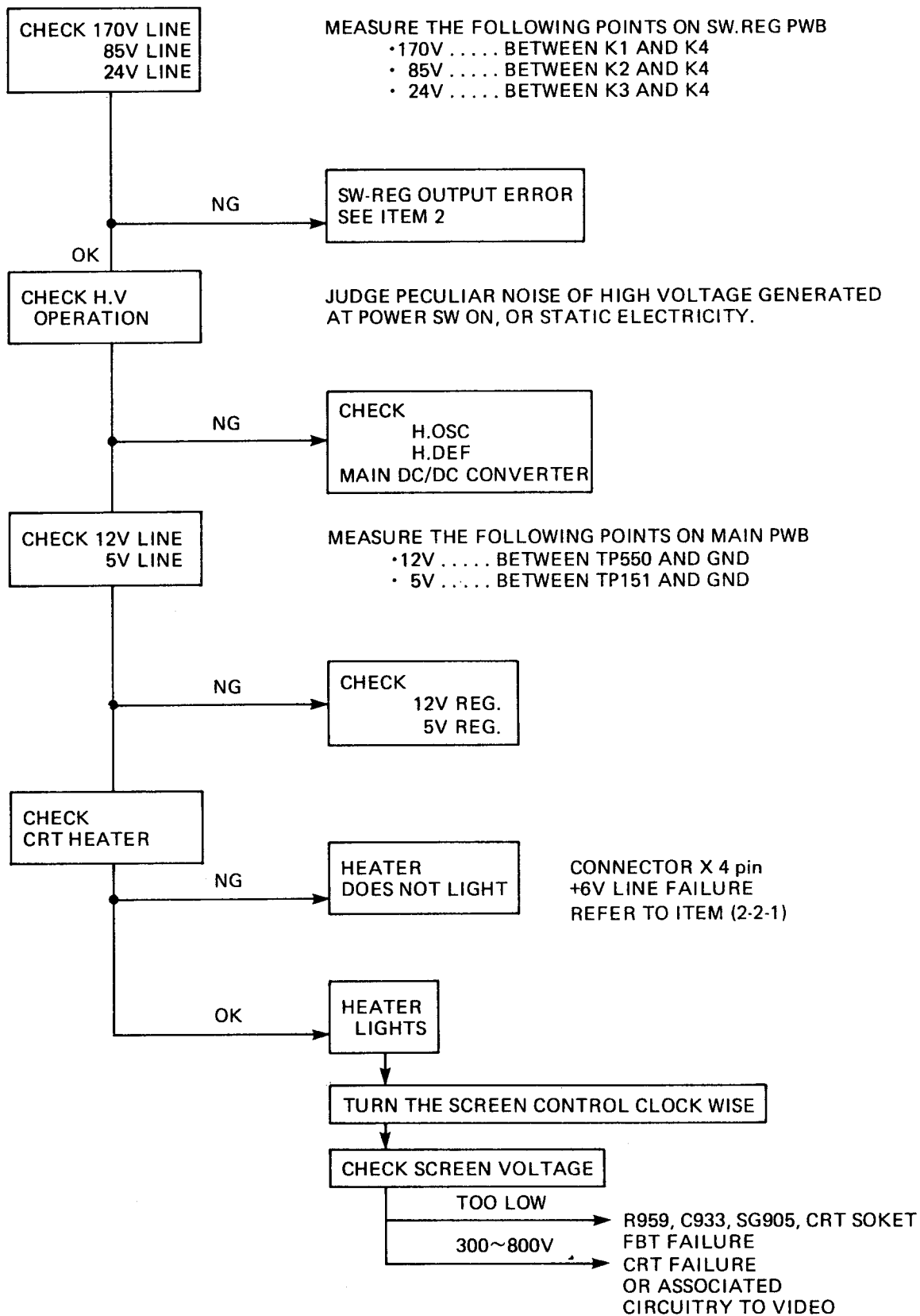
TROUBLE SHOOTING

Before using this chart, please refer to the trouble shooting in the user's manual.

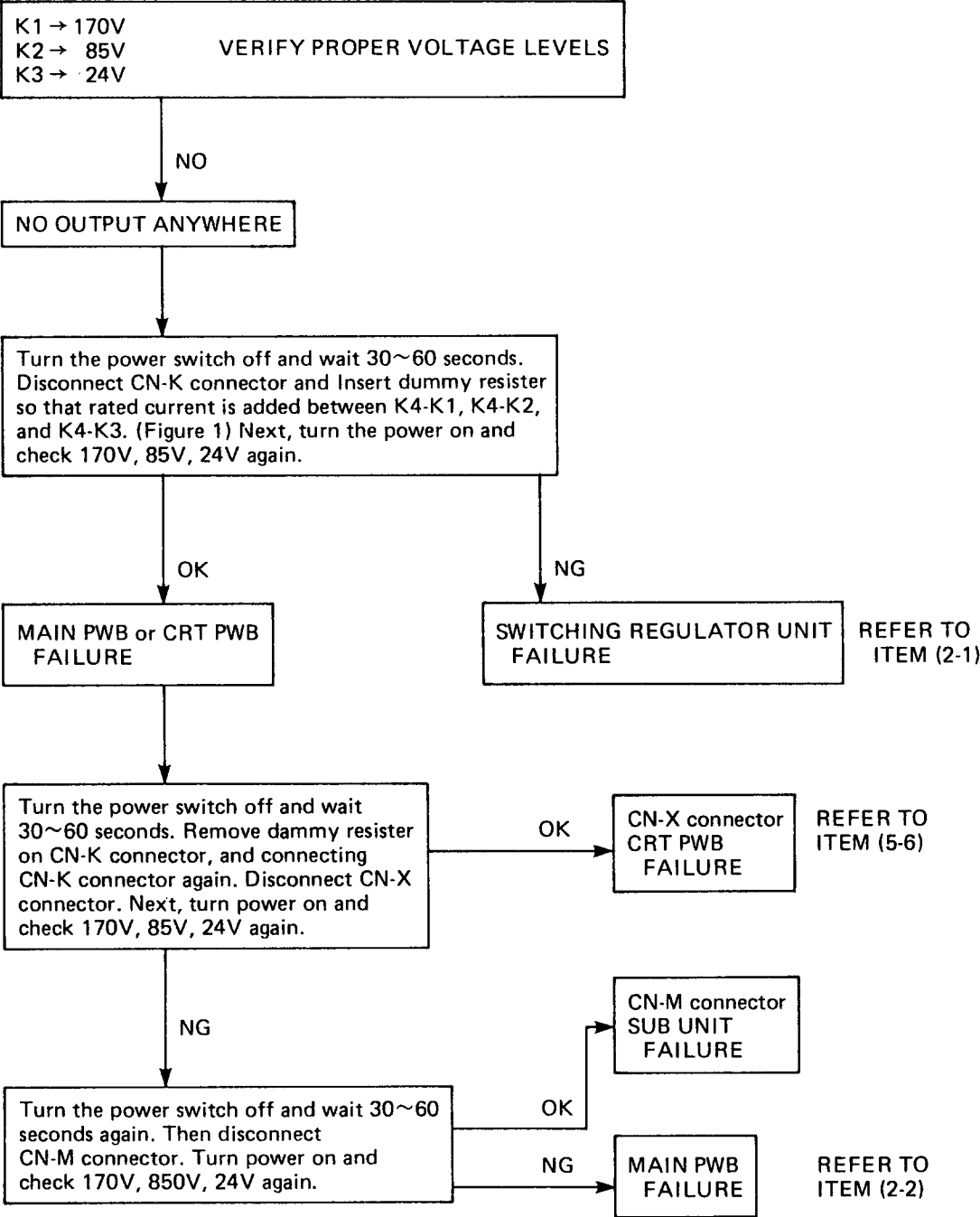
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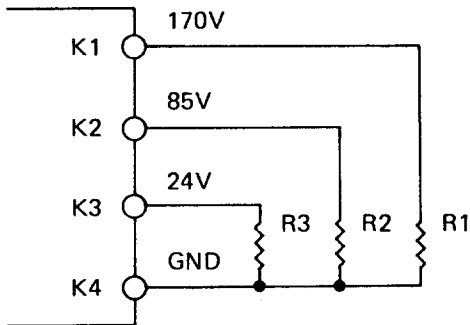
1. NO RASTER



2. SWITCHING REGULATOR UNIT OUTPUT ERROR

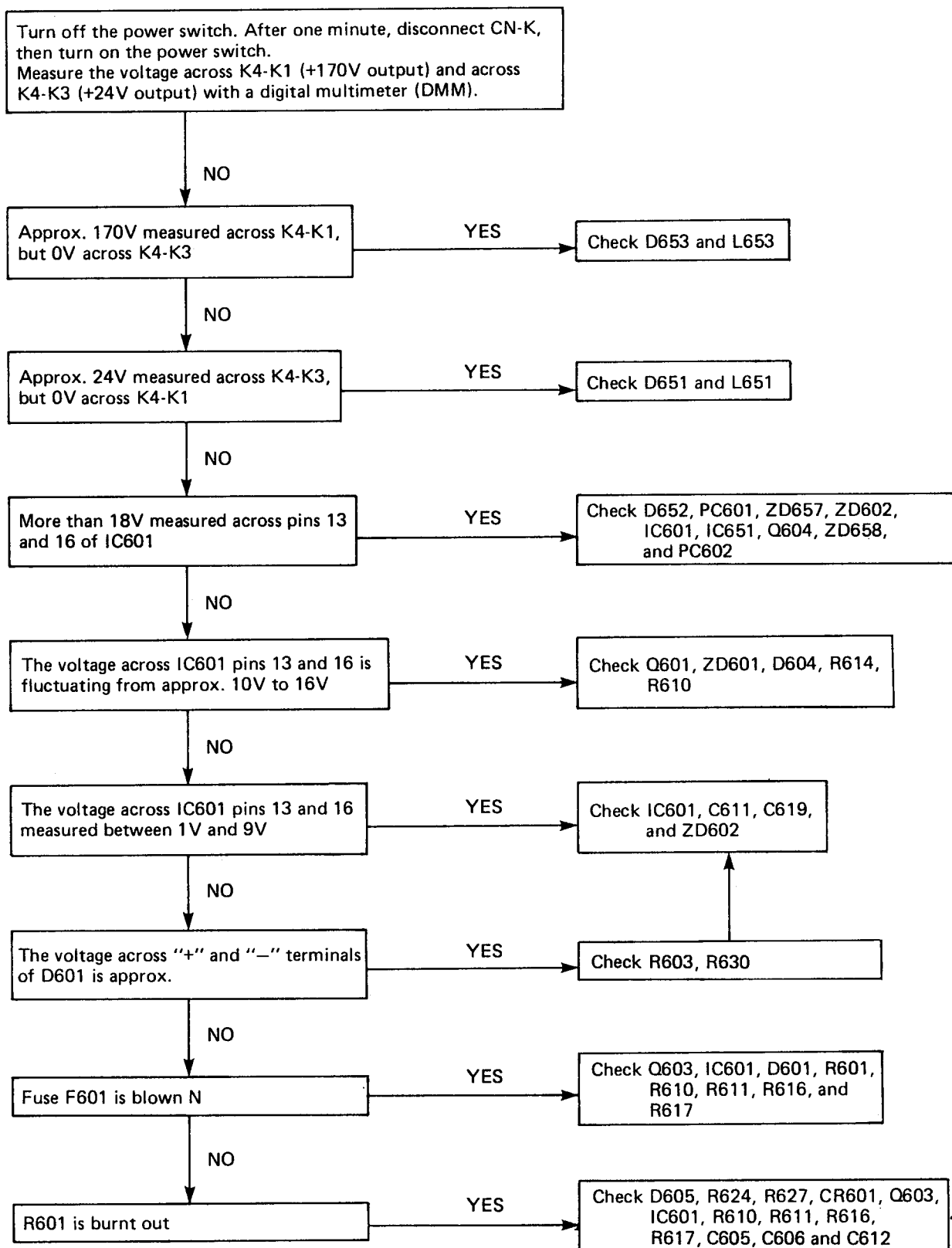


(Fig. 2-1-1) Rated load current at K1, K2, K3



170V	65~290mA (2.6kΩ~586.2Ω)
85V	35~230mA (2.4kΩ~369.5Ω)
24V	0.5~1.0A (48~24Ω)

(2-1) THE SWITCHING REGULATOR UNIT FAILURE

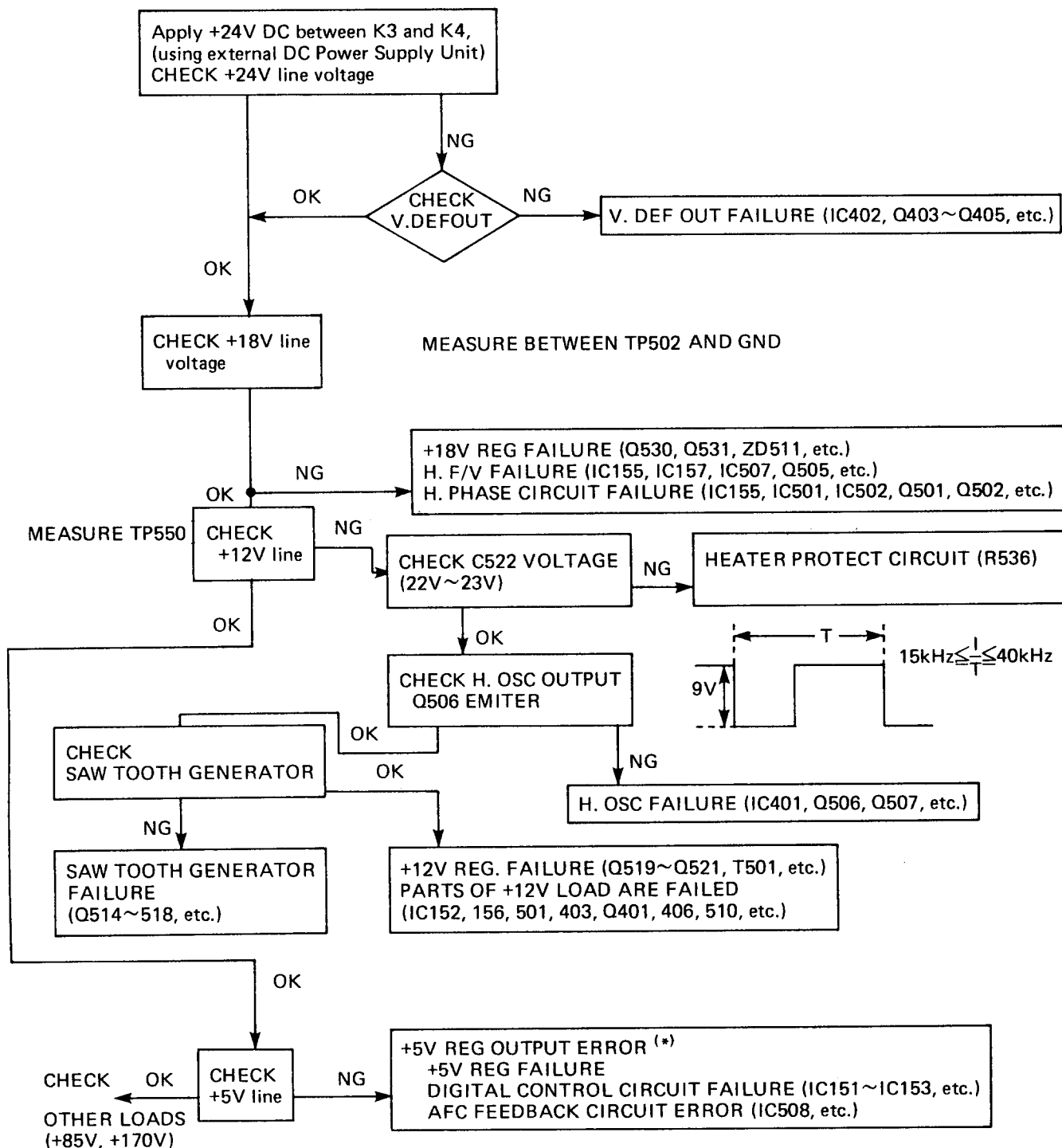


(2-2) MAIN PWB +B line FAILURE

Remove MAIN PWB from chassis-then
You should check following +B line loads.

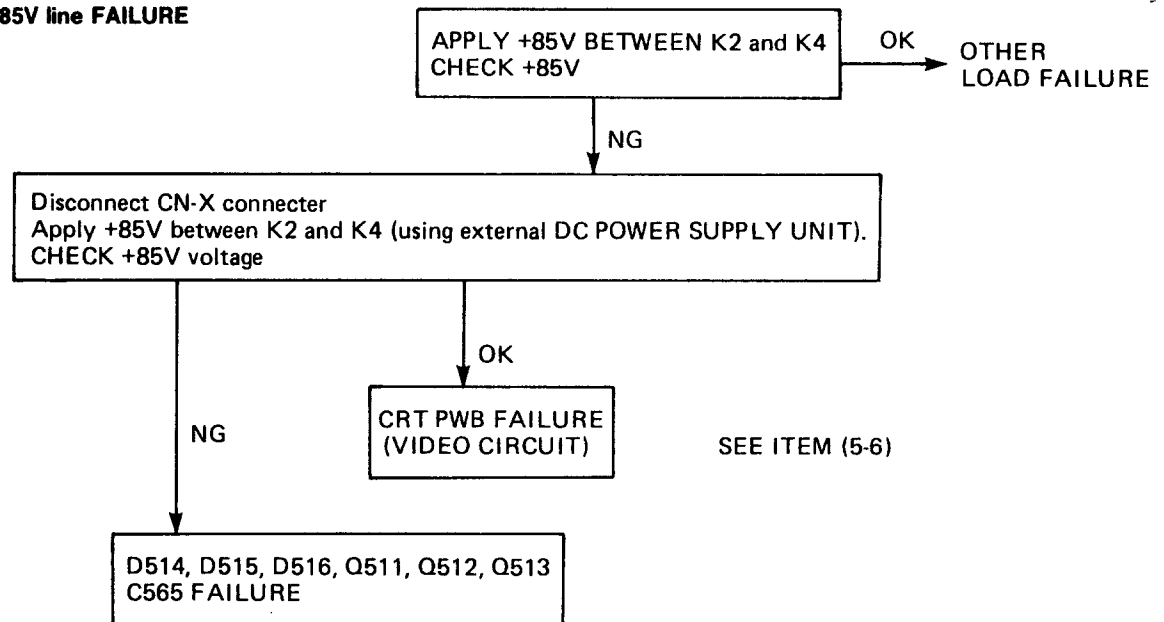
- (2-2-1) +24V line load
- (2-2-2) +85V line load
- (2-2-3) +170V line load

(2-2-1) +24V line FAILURE

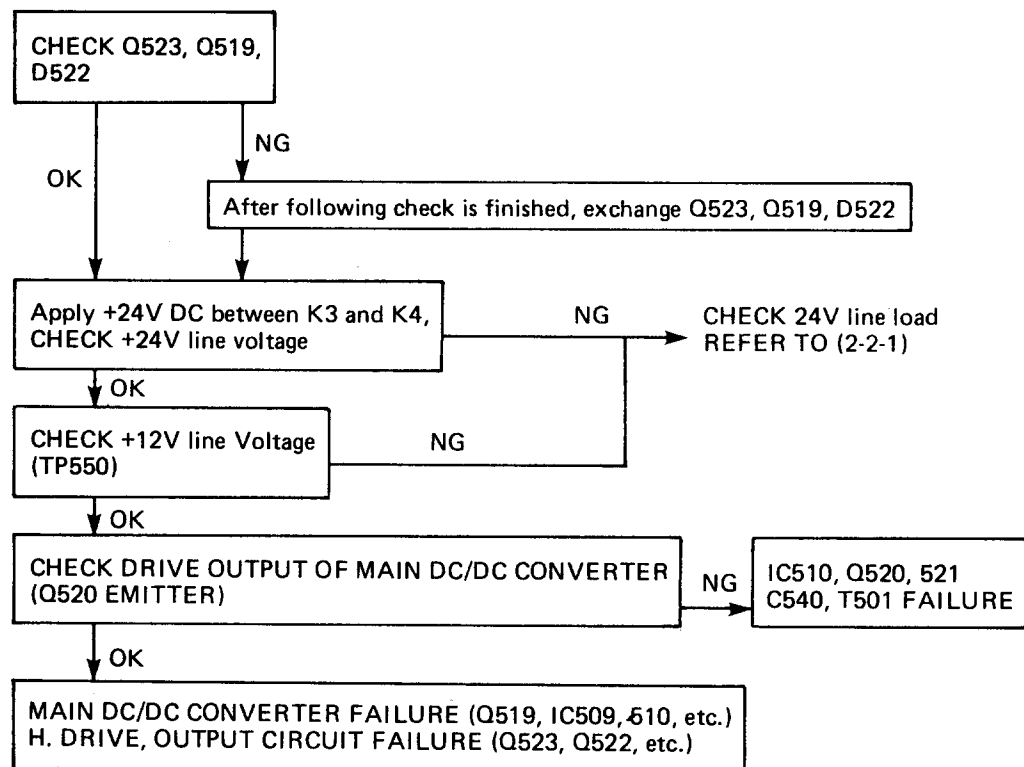


(*) If short mode at +5V line has occurred, you must check Impedance of R567. (8.2Ω 3W)

(2-2-2) +85V line FAILURE

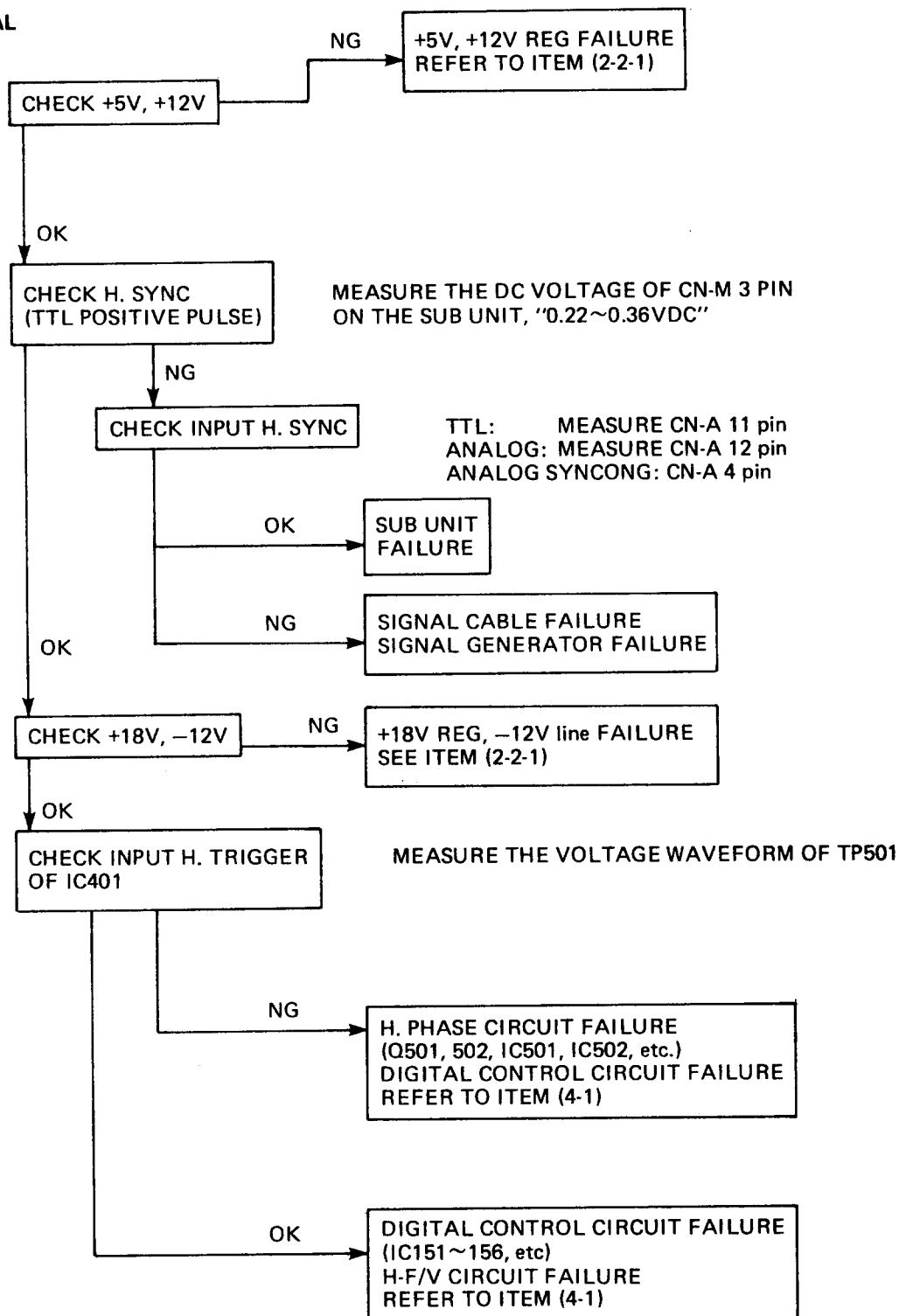


(2-2-3) +170V line FAILURE

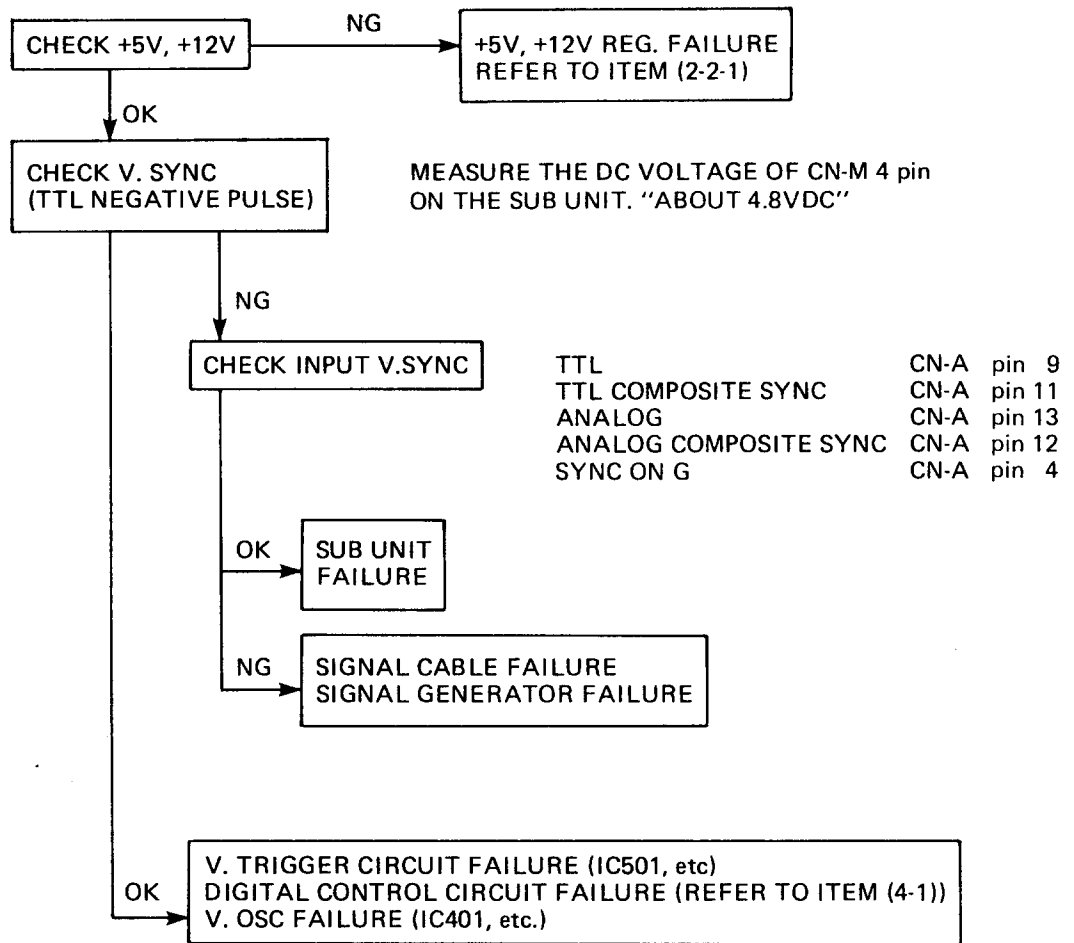


3. LACK OF STABLE SYNCHRONIZATION

(3-1) HORIZONTAL

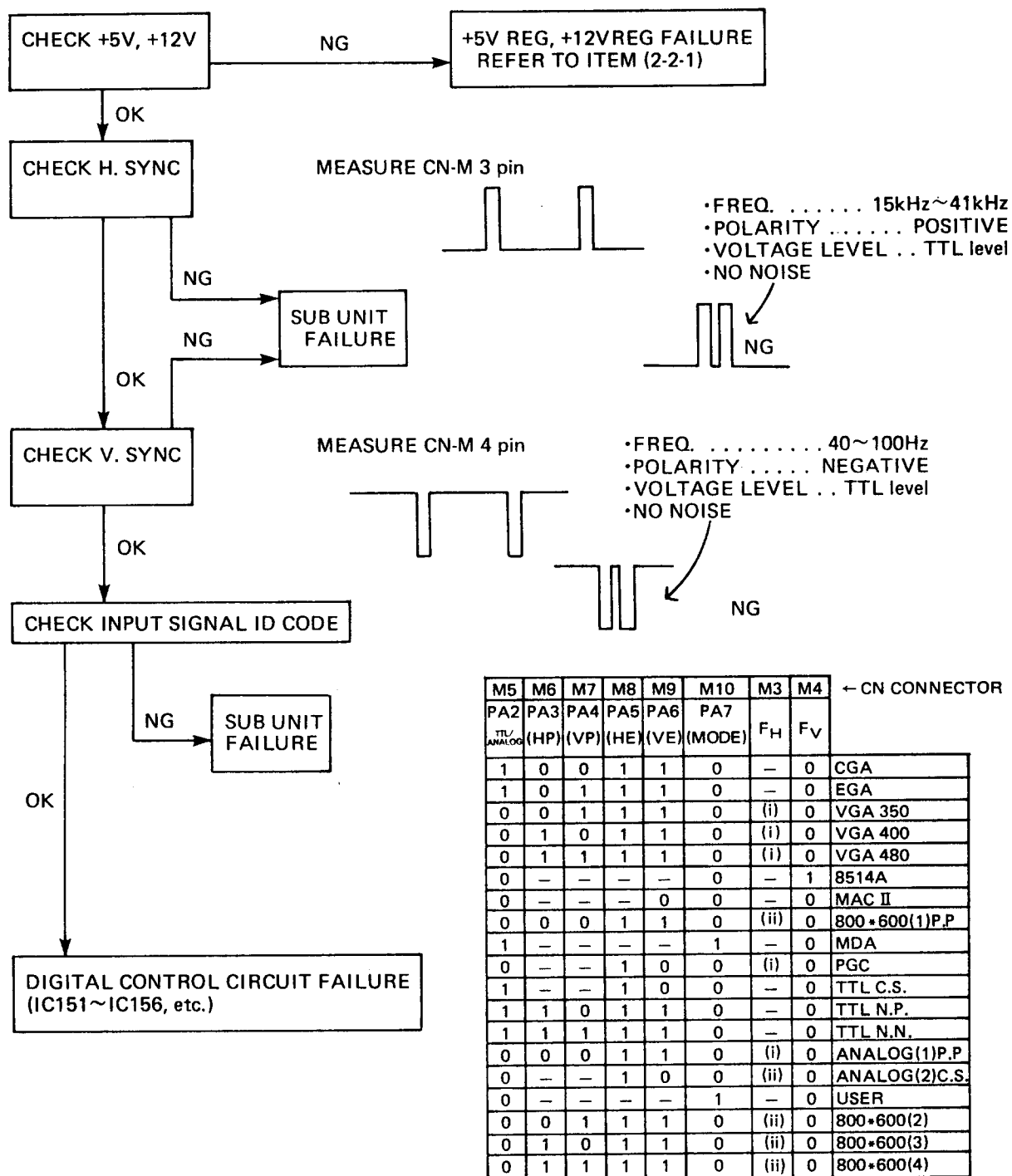


(3-2) VERTICAL



4. DIGITAL CONTROL ERROR

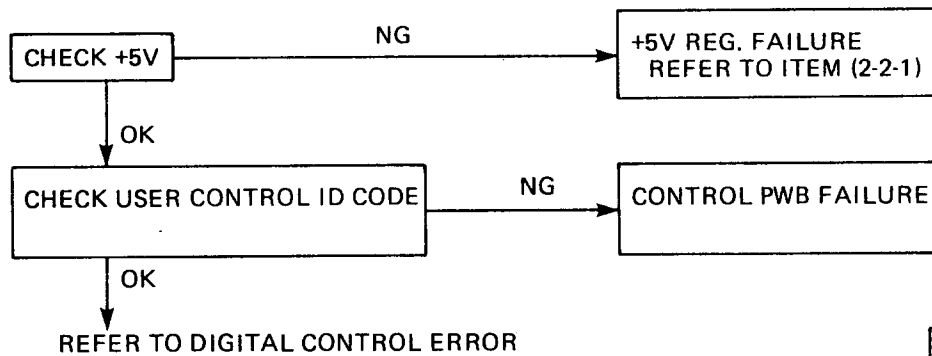
(4-1) DIGITAL CONTROL ERROR



F_H { (i) 15kHz~33kHz
(ii) 33kHz~40kHz

F_V { 0 40~75Hz
1 75~100Hz

(4-2) USER CONTROL ERROR

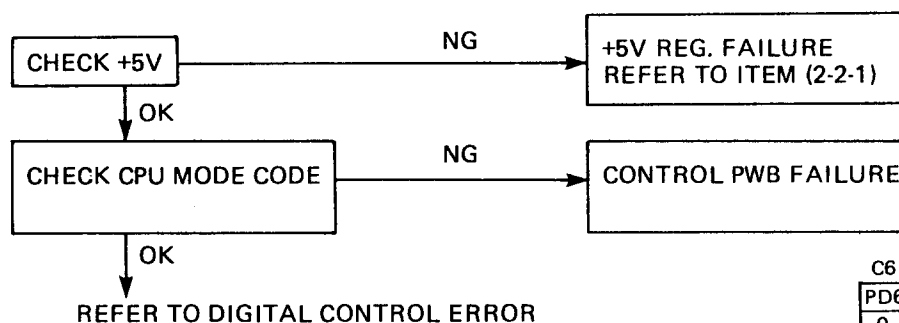


(Cf). If two switches are pushed at the same time, the monitor will be disabled, and the user controls will not function when pressed simultaneously.

C1	C2	C3	
PD0 (CS0)	PD1 (CS1)	PD2 (CS2)	
0	0	0	—
0	0	1	BRIGHT
0	1	0	CONT
0	1	1	H.POSI
1	0	0	H.SIZE
1	0	1	V.POSI
1	1	0	V.SIZE
1	1	1	DISABLE

C4	C5	
PD3	PD4	
1	0	UP
0	1	DOWN
1	1	DISABLE

(4-3) MEMORY ACCESS ERROR



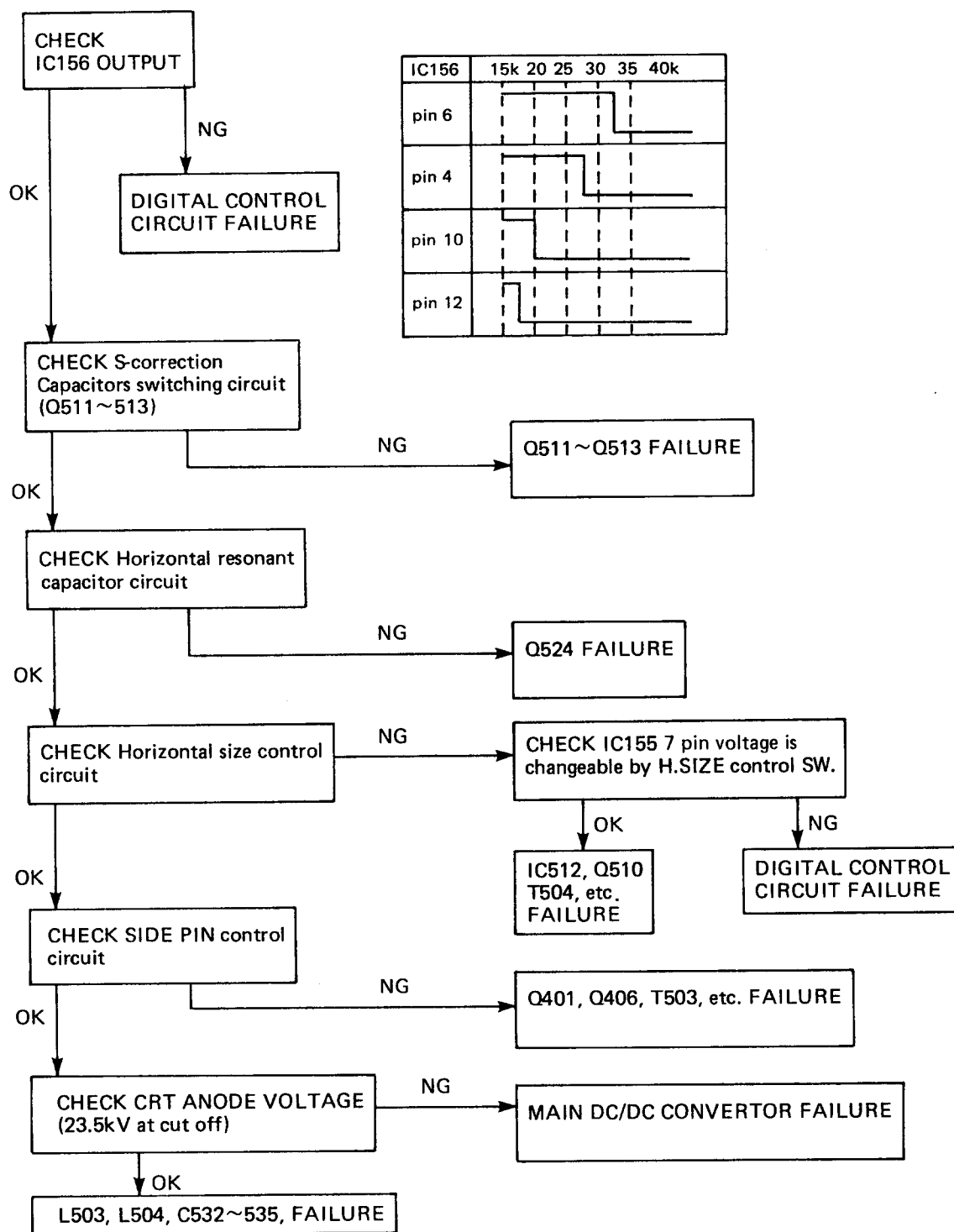
C6	C7	
PD6	PD7	
0	0	USER CONTROL MODE
0	1	FACTORY ADJ. MODE
1	0	DATA LOAD
1	1	FACTORY DATA WRITING

(Cf). If two different signals are put into the same memory location, the most recent signal will be written to this memory and the previous signal erased. Therefore, an error could occur when the microprocessor will have the same ID code for two different signals.

MDA TTL, MODE SW → ON
 PGC ANALOG, COMPOSITE SYNC, MODE SW → OFF
 MACII ANALOG, SYNC ON G, MODE SW → OFF

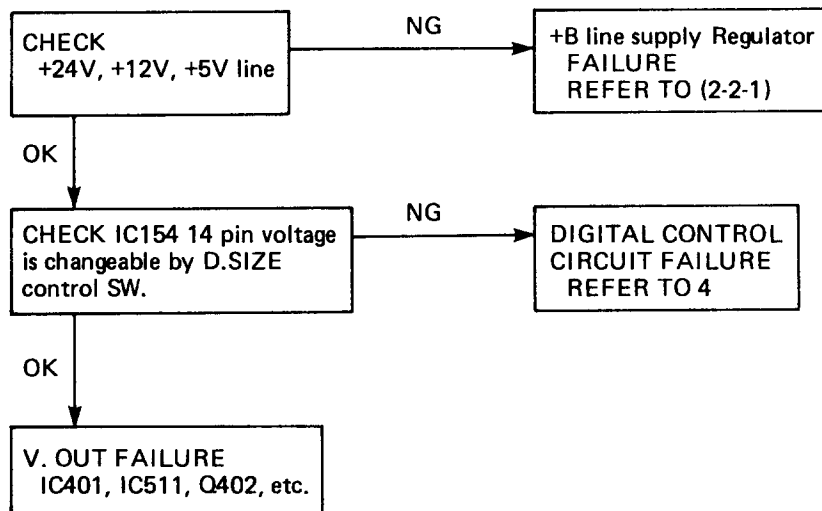
5. ABNORMAL PICTURE

(5-1) ABNORMAL HORIZONTAL WIDTH

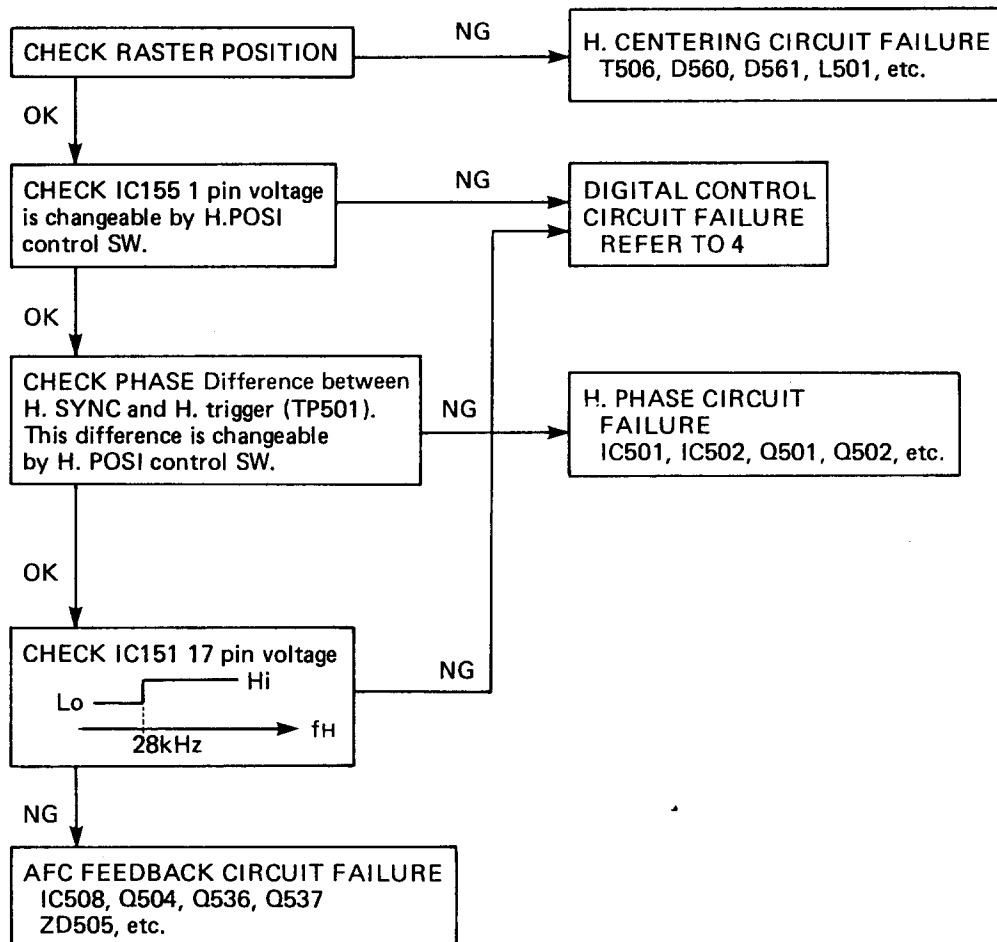


(Cf). In the case of Factory adjustment at Horizontal width.
If it occurs abnormal by using width coil, please check
Input signal conditions. It must be setted VGA mode, Analog.

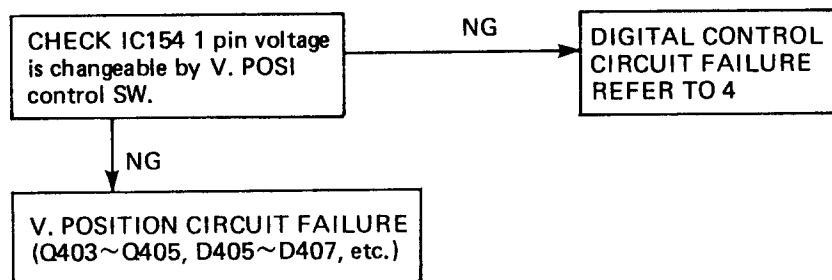
(5-2) ABNORMAL VERTICAL SIZE



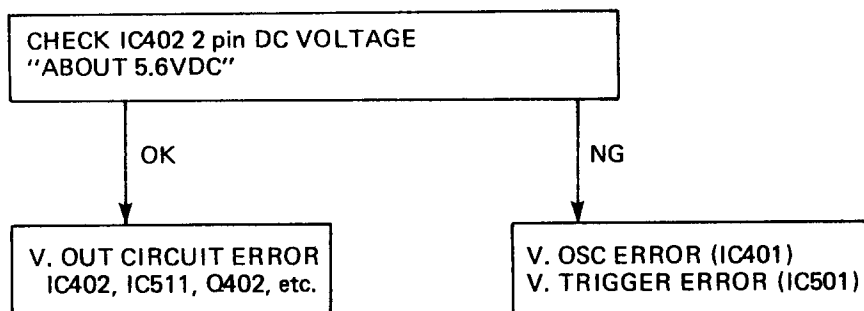
(5-3) ABNORMAL HORIZONTAL PICTURE POSITION



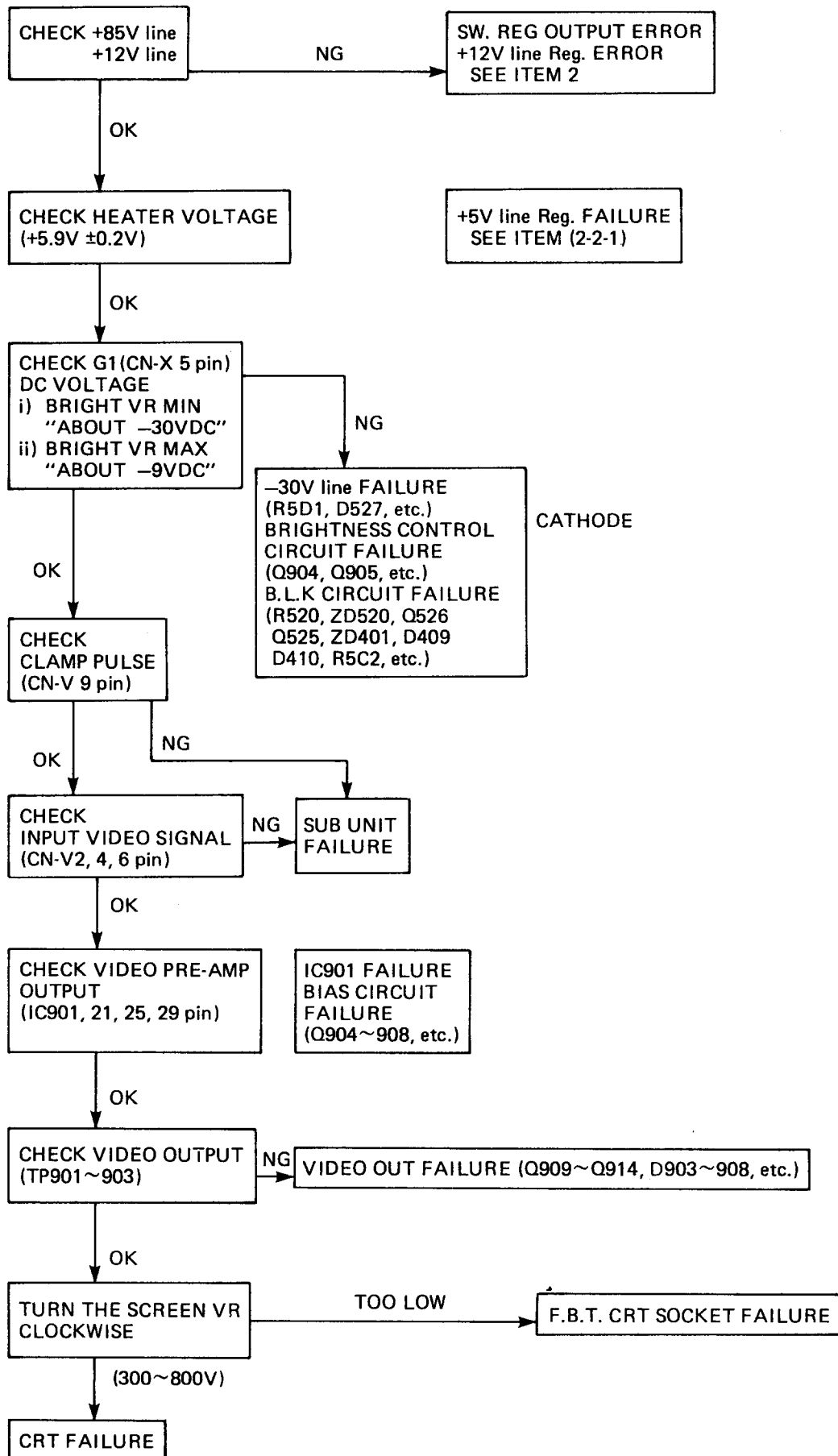
(5-4) ABNORMAL VERTICAL PICTURE POSITION



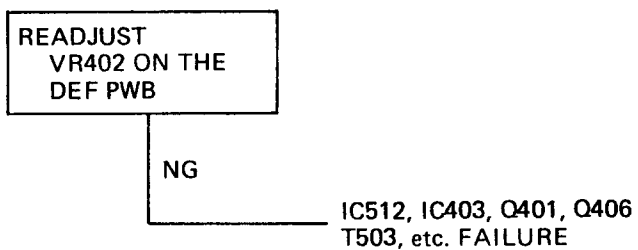
(5-5) ABNORMAL VERTICAL SCAN



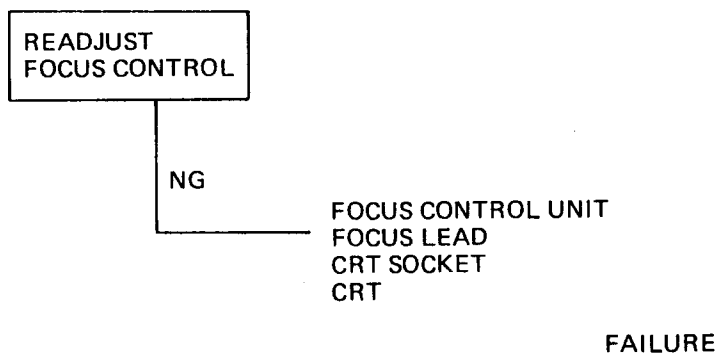
(5-6) ABNORMAL VIDEO



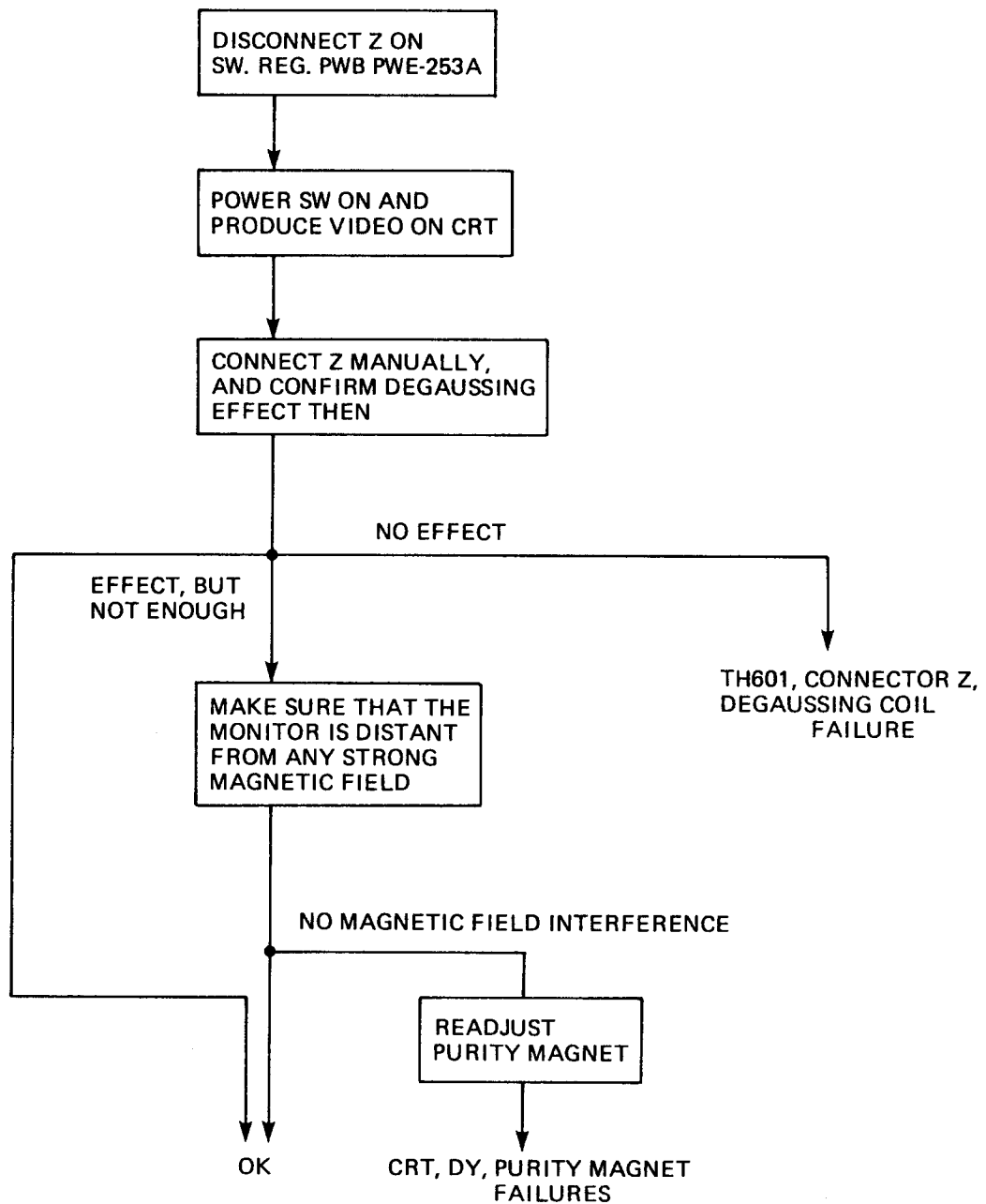
(5-7) SIDE PIN CUSHION DISTORTION FAILURE



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THEORY OF OPERATION

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1. CONSTRUCTION

Multisync 3D consists of six major modules:

- (1-1) CRT
- (1-2) Power supply module
- (1-3) Deflection module
- (1-4) Interface module
- (1-5) Video module
- (1-6) Digital control module

(1-1) CRT

The CRT is a Vacuum Tube which generates focus beams of electrons that are deflected by the deflection yoke. These beams contact with the phosphor surface of the CRT produce light.

The fluorescent surface of the CRT has three different colors of phosphors. An electron gun which consist of the metal coil heater, a cathode, and five grids all mounted in line (on the same horizontal axis) on the same shaft. The three beams (Red, Green, and Blue) of the electron gun pass thru the shadow mask before striking the phosphorus surface of the CRT. The shadow mask ensures that the beams will strike only their corresponding phosphor colors on the screen.

A combination of Red, Green, and Blue phosphor dots struck with the correct amplitude can produce any color.

(1-2) Power Supply Circuit

Many different D.C. power supply voltages are produced in the MS-3D.

The following is listing of them:

- a) +170V
- b) +85V
- c) +24V
- d) Variable main DC/DC converter output (+B line for H.OUT module)
- e) +18V
- f) +12V
- g) +6V
- h) +5V
- i) -12V
- j) -30V

Voltages a) thru c) are supplied by the Switching Regulator Unit (PWE-253A) and Voltages d) thru j) are generated on the MAIN PWB (PWE-248A) by using Voltages a) and c) line power as the source.

(1-3) Deflection Circuit

Consists of the following three circuits:

- a) Horizontal deflection
- b) Vertical deflection
- c) High voltage circuit for the CRT (Flyback Trans)

(1-4) Interface Circuit (SUB UNIT PWE-250)

It has the following three functions:

- a) VIDEO Interface to the Video circuit
- b) SYNC Interface for the Deflection circuit and the Digital control circuit
- c) Digital Interface for the Digital control circuit

The sub unit sends an identification signal to the digital control circuit as to the type of PC or video graphics card to which the monitor is currently interfaced with.

(1-5) Video Circuit

The video signal sent by the Interface circuit is amplified by this circuit and supplied to the cathode of the CRT.

(1-6) Digital Control Circuit

The digital control circuit has the following functions: For a more detailed information please refer to the circuit description (2-5).

- | | |
|--|-----------------------------------|
| a) Automatic synchronization | |
| b) Management of the displaying proper picture | — Automatic signal identification |
| c) Management of user controls | — Automatic sizing |
| d) Management of factory adjustment | — Automatic centering |
| | — Management of picture data |

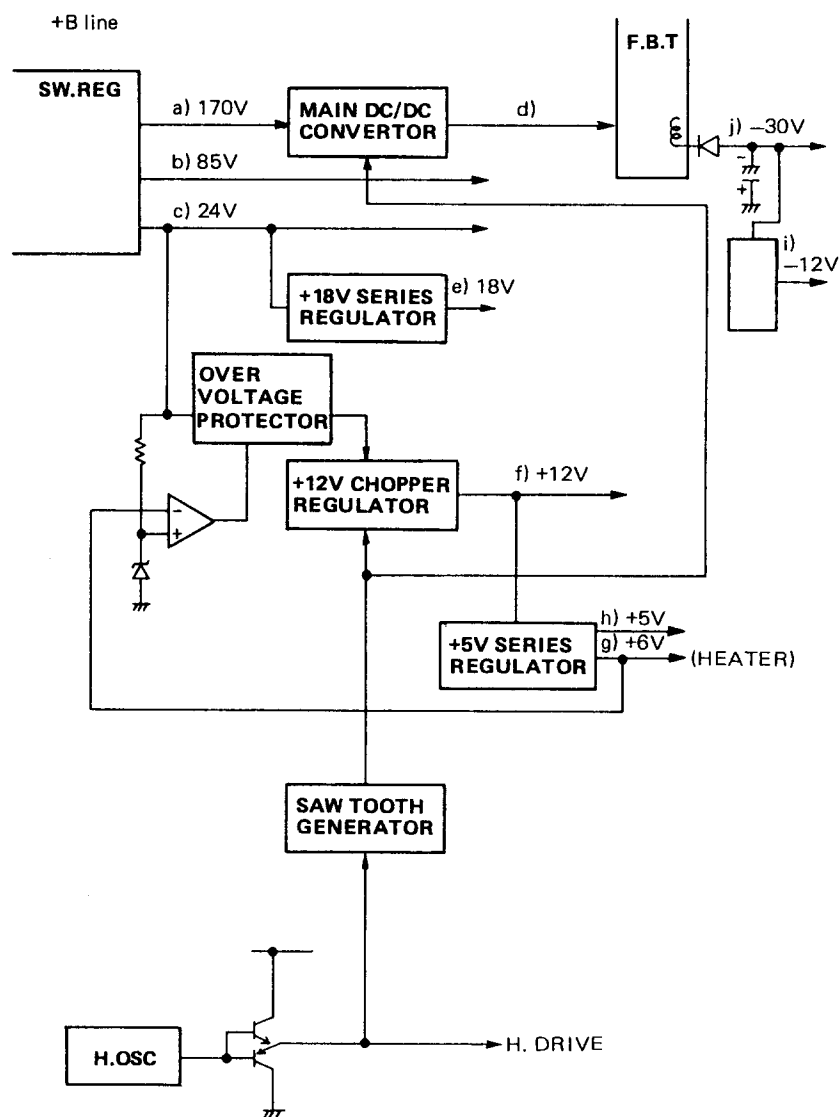
The following outputs are produced by the D/A (Digital to Analog) Converter (μ PD6336C).

- e) H-F/V converter output
- f) V-F/V converter output
- g) Horizontal size control output
- h) Horizontal position control output
- i) Vertical size control output
- j) Vertical position control output

2. CIRCUIT DESCRIPTION

(2-1) Power Supply Circuit

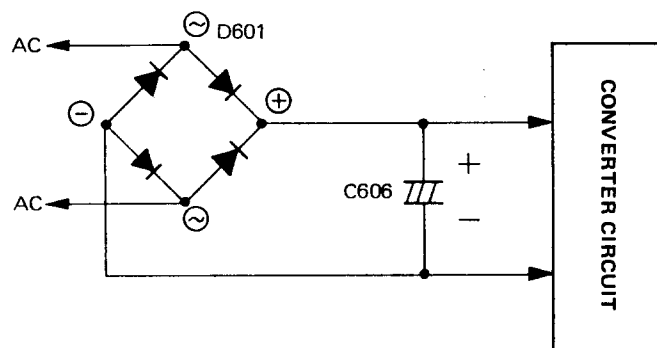
(Fig. 2-1) Block Diagram of the D.C. Power Supply of the MS-3D.



(2-1-1) SWITCHING REGULATOR UNIT

(a) Rectifying & filtering circuit

AC input is rectified by D601. Then, it is filtered by C606. The resulting DC voltage is supplied to the converter circuit.

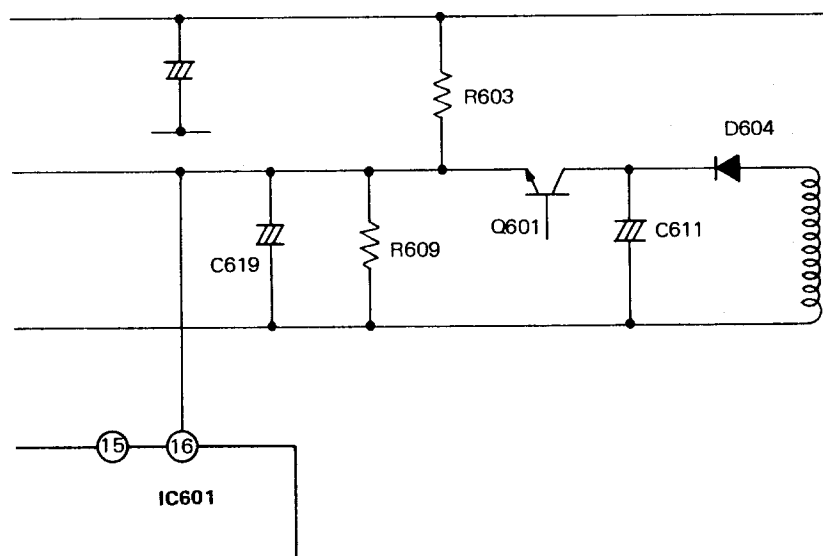


(Fig. 2-1-1) Rectifying & Filtering Circuit

(b) Auxiliary power supply circuit

The auxiliary power supply circuit is needed to activate IC601. At the time of power ON, charging current flows into the capacitor C619 via R603. Oscillation starts when the voltage of IC601 pin 16 reaches 17V by this charging operation.

After the start of oscillation, the forward voltage of the auxiliary coil for the switching transformer is rectified and filtered by D604 and C611, and regulated by Q601. The resultant DC voltage is supplied to IC601.

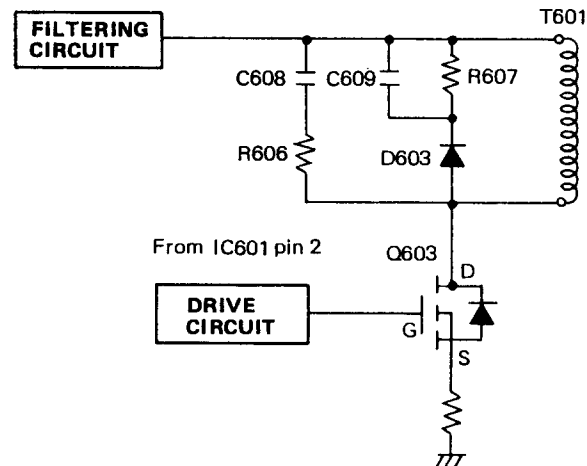


(Fig. 2-1-2) Auxiliary Power Supply Circuit

(c) Converter circuit

The converter circuit consists of the primary winding of the switching transformer T601, a switching device Q603, and surge absorbers (C608, R606, C609, D603, and R607) that are connected in serial to the primary winding.

The oscillating signal from IC601 pin 2 is applied to the gate of Q603 causing the drain-source to be turned on and off so that oscillating voltage is applied to the primary winding of T601.

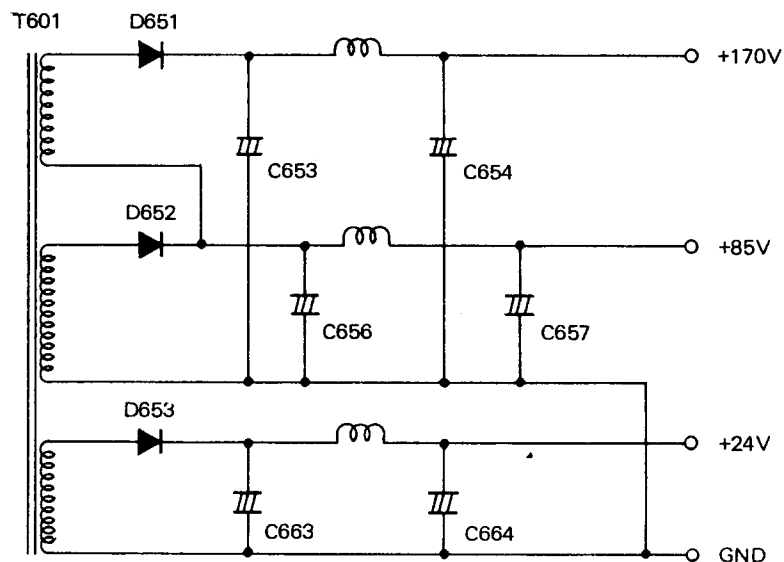


(Fig. 2-1-3) Converter Circuit

(d) Output filtering circuit

The fly-back voltage generated at the secondary windings of the switching transformer T601 are rectified by D651, D652, and D653. The, it is filtered by C653, C654, C656, C657, C663, and C664 so that rectified DC voltages are obtained.

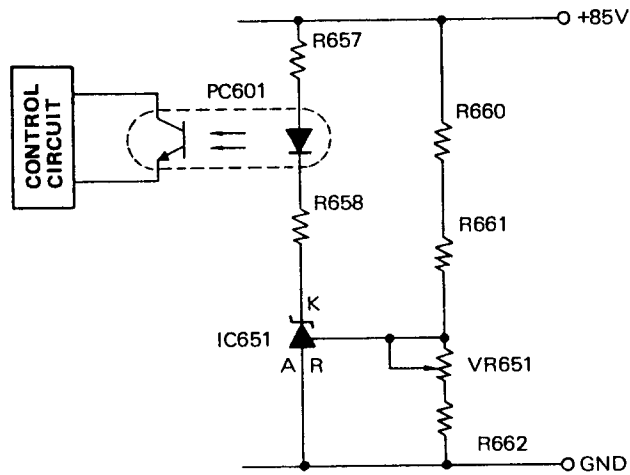
The fly-back voltage is constantly maintained by controlling the ON period duty cycle of Q603 in the converter circuit.



(Fig. 2-1-4) Output Smoothing Circuit

(e) Error detection amplifier circuits

The output voltage 85V is divided by the network resistors. This divided voltage is compared to the reference voltage at the error amplifier IC651. An error signal is applied to the control circuit via the photocoupler PC601.



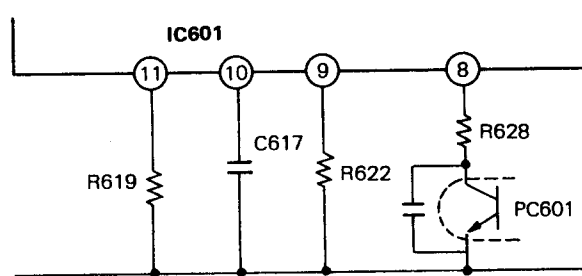
(Fig. 2-1-5) Error Detection Amplifier Circuit

(f) Oscillating circuit, control circuit, and drive circuit

The oscillating, control, and drive circuits are comprised in IC601.

IC601 has a built-in oscillator whose frequency is determined by R622, C617, and R619 connected to pins 9, 10, and 11, respectively.

The output of the error detection amplifier circuit is fed back to the control circuit from pin 8 via PC601 to control the duty cycle of Q603 so that output voltage is kept constant.

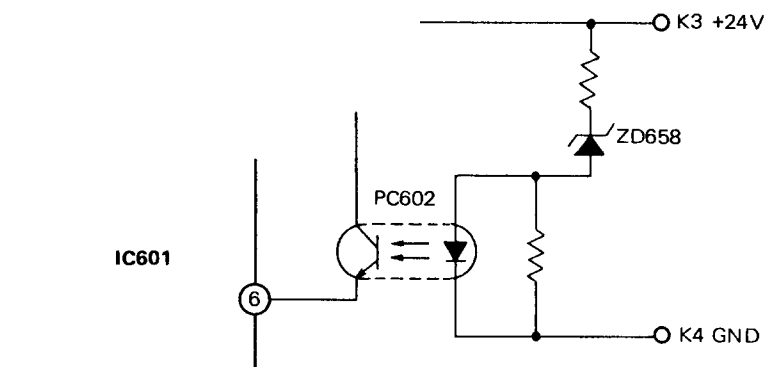


(Fig. 2-1-6) Oscillating & Control Circuits

(g) Overvoltage protection

If some failure occurs and the 24[V] line output increases beyond 29[V], the voltage at the output is sensed by the Zener Diode ZD658.

This Diode (ZD658) will activate the LED within the photocoupler PC602, turning on the transistor within it. Once the transistor is on, pin 6 of IC601 will go high, stopping the oscillation within this IC.



(Fig. 2-1-7) Overvoltage Protection Circuit

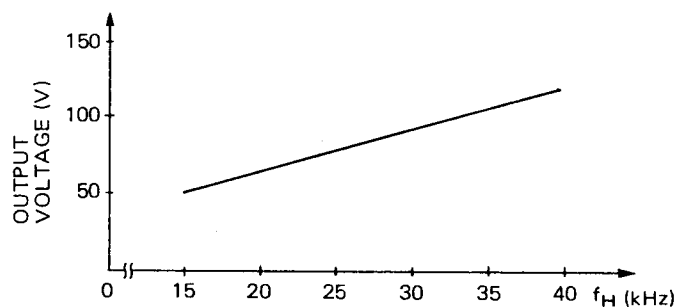
(2-1-2) MAIN DC/DC CONVERTER (d)

This converter's output is the power source for the Flyback Transformer. It is controlled by PWM method and synchronized by the Horizontal OSC. output.

Output voltage of this converter is varied in respect to Horizontal OSC. frequency so that the voltage level of the Flyback pulse is constant for any frequency. This Constant Voltage level will also produce a constant Horizontal Raster size for any frequency. If H.OSC. stops the output of this converter will become low (in order to protect the CRT beam spot).

The relationship between Output Voltage and H.OSC. frequency is shown in Fig. 2-1-2a.

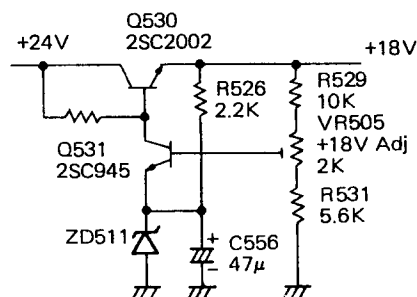
BLOCK DIAGRAM of this regulator is shown in Fig. 2-1-2b.



(Fig. 2-1-2 a) Relationship between the Output Voltage and the H.OSC. Frequency.

(2-1-4) +18V regulator (e)

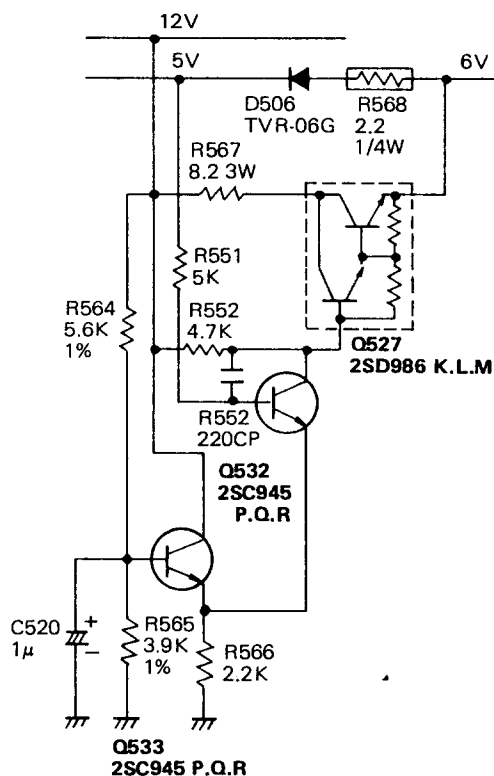
The H-F/V converter, the H.OSC., and the H.HOLD circuit are supplied by this voltage line. Therefore, this line requires an exact voltage of $18V \pm 0.1V$.



(2-1-5) +5V regulator (g and h)

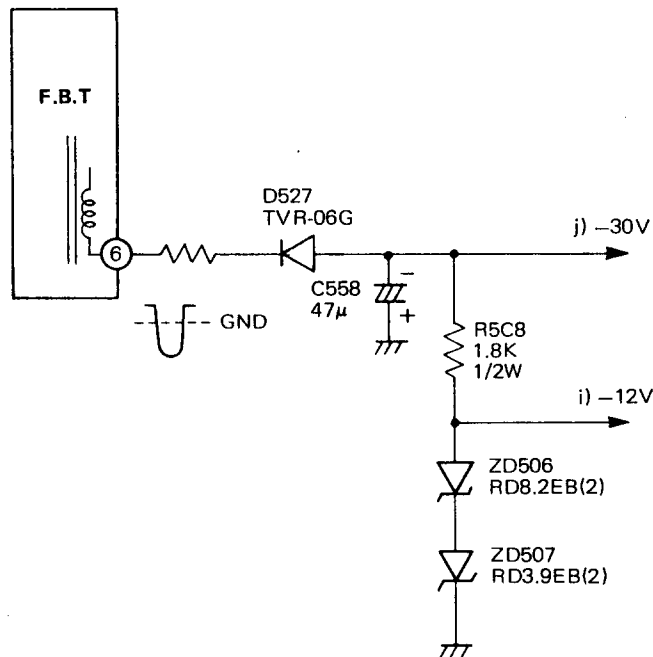
This circuit generates a +6V and a +5V from the +12V line.

The +6V is used for the CRT heater, and the +5V is for the digital control and the AFC feedback circuits.



(2-1-6) -12V and -30V lines (i and j)

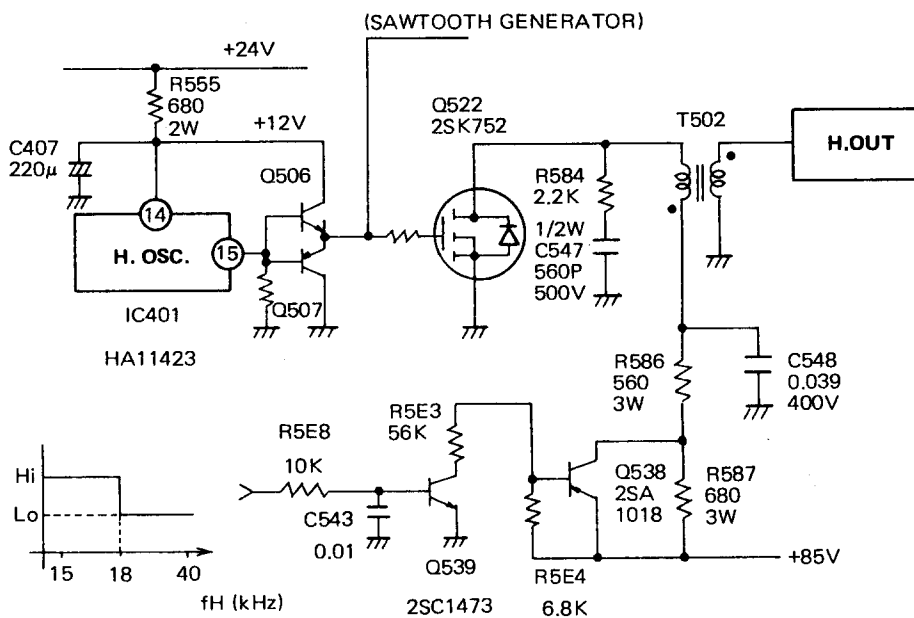
The -30V is produced by rectifying the flyback pulse. The -12V is produced by the reverse biasing of the zener diode.



(2-2) Deflection Circuit

(2-2-1) HORIZONTAL DEFLECTION UNIT

(a) Horizontal drive circuit



The horizontal pre-drive pulse produce at IC401 pin 15 is applied to Q522. Then, it is amplified by T502 to turn on the horizontal output transistor Q523.

NOTE: When the horizontal frequency is less than 28 kHz, the power is supplied to T502 via R586 from the +85V line. And, when horizontal frequency is more than 28 kHz, the power is supplied via R586 and R587 from the +85V line.

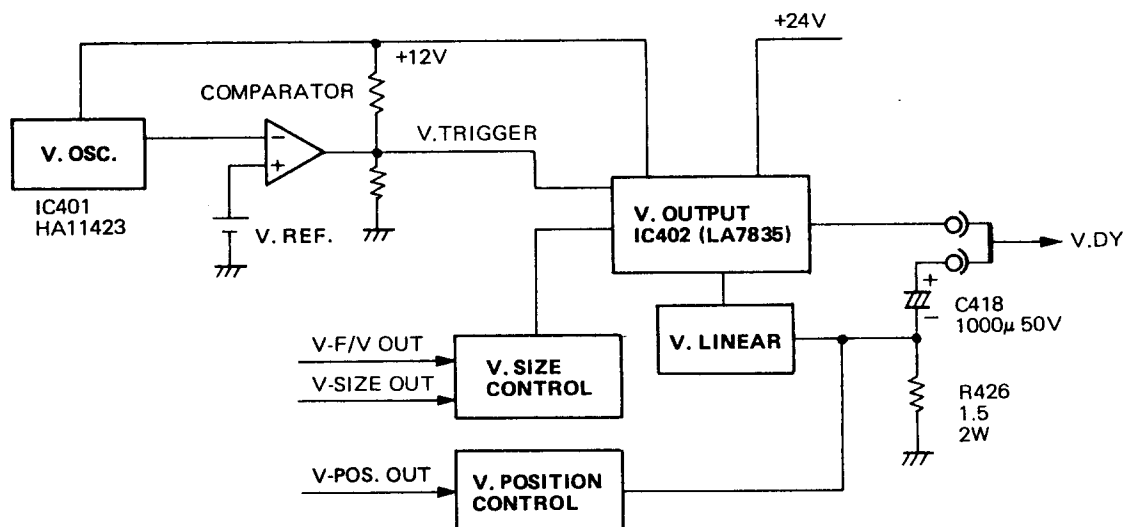
(b) Horizontal output circuit

This circuit produces a sawtooth current waveform to the Horizontal DY by switching Q523 and D522 ON and OFF. In order to meet wide a range of frequencies (15~38 kHz), several circuit and changed in corresponding frequency bands.

- Horizontal resonant capacitor 17 kHz
- S-correction capacitor $\begin{cases} f_H \leq 20 \text{ kHz} \\ 20 < f_H \leq 27 \text{ kHz} \\ 27 < f_H \leq 33 \text{ kHz} \\ 33 < f_H \leq 38 \text{ kHz} \end{cases}$
- Drive circuit of Q523 28 kHz

Due to this switching circuit and multiple DC outputs from the DC to DC converter circuit, the MS 3D can practically the same size raster and linearity for a wide range of frequencies.

(2-2-2) Vertical deflection circuit



(Fig. 2-2-2) BLOCK DIAGRAM of vertical deflection

The vertical deflection circuit produces a sawtooth current waveform to the vertical D.Y. The output of IC402 (LA7835) is suited for multi-scanning monitors because it easily controls the vertical size (by DC control) and is also easy to synchronize.

(2-2-3) H.V. circuit

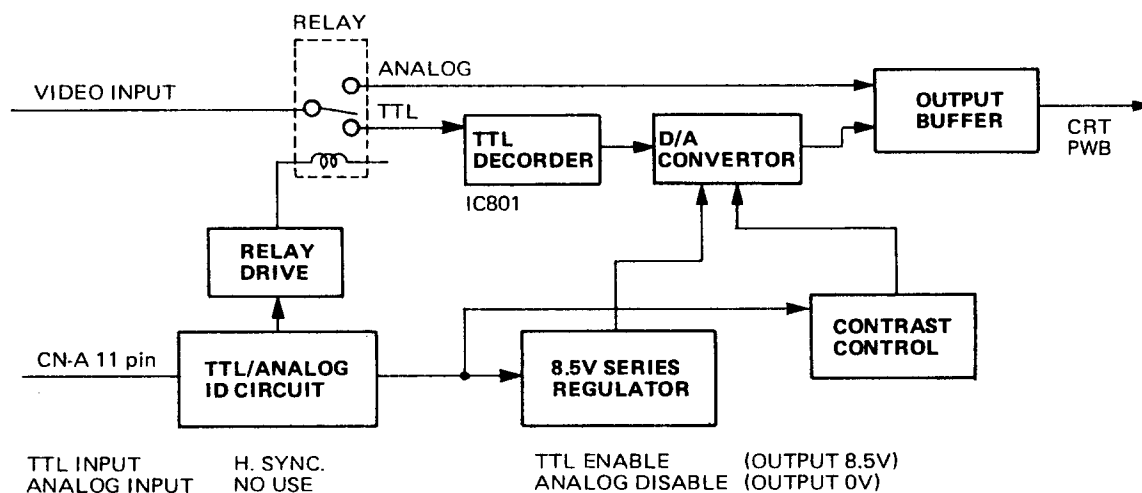
The H.V. circuit supplies high voltage (23.5 kV) to the anode of the CRT. This circuit is composed of the fly-back transformer and the H. out circuit. The energy is stopped on the primary coil of F.B.T. when the H. output transistor Q523 is turned ON. This energy is transformed through the F.B.T. when it is turned OFF. The high voltage generated by the secondary coil is rectified 23.5 kV. This voltage is controlled by VR504. The high voltage circuit has two high voltage protection circuits to meet the D.H.H.S. standards.

The first circuit is IC401's (HA11423) internal protection circuit. If the high voltage increase, the voltage at TP2005 increase. When TP2005 voltage exceeds 0.7V, IC401's protection circuit turns ON and the H. OSC. is stopped.

The second circuit's operation is similar to the one described.

(2-3) Interface Circuit (PWE-250)

(2-3-1) Video Interface Circuit



(Fig. 2-3-1) BLOCK DIAGRAM of the Video Interface

- TTL/ANALOG identification circuit

This circuit monitors the signal on pin 11 of CN-A. If there is a Horizontal pulse, the MS 3D assume that TTL Video is connected to it. The TTL/ANALOG ID output controls relays RL801 and RL802 and the 8.5V series regulator.

In case of ANALOG video input, the relays enable the ANALOG circuit and the 8.5V line, and disables the TTL enable circuit.

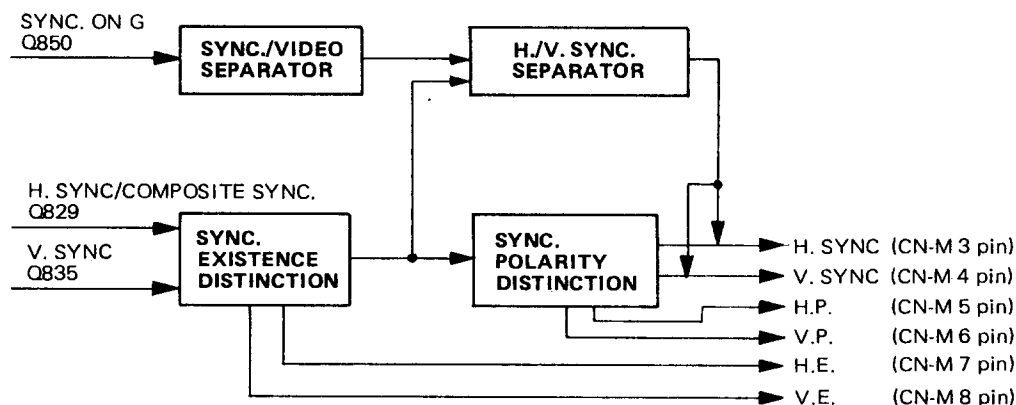
In case of TTL video input, the relays enable the TTL circuit, the video information is passed to the TTL decoder (IC801). This TTL decoder IC produces signals based on the MODE and color switch settings.

The maximum output of the D/A converter is 0.7 Vp-p.

The output level of the D/A converter is controlled by the CONTRAST VR only when a TTL video signal is the video source.

(2-3-2) Sync Interface Circuit

- (a) The outputs of this circuit are positive H. SYNC. and V. SYNC. for the following inputs:
- | | |
|----------------------|----------------------------|
| (i) SEPARATE SYNC | POSITIVE/NEGATIVE polarity |
| (ii) COMPOSITE SYNC | POSITIVE/NEGATIVE polarity |
| (iii) SYNC. ON GREEN | NEGATIVE polarity |



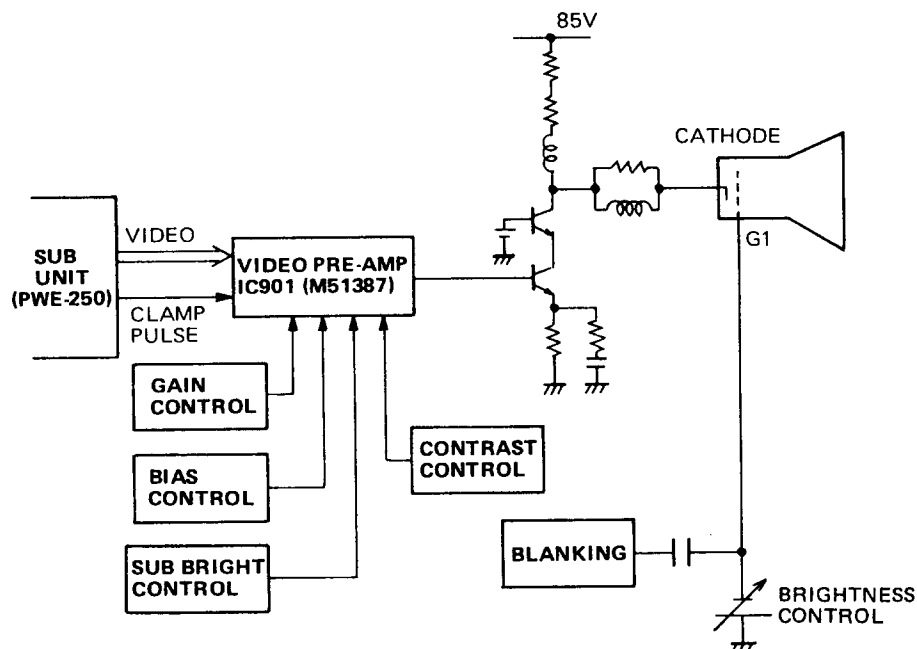
(Fig. 2-3-2) BLOCK DIAGRAM of the Sync. Interface Circuit

- (i) For the separate sync. mode, the horizontal and vertical synchronization signals are supplied to the SYNC. EXISTENCE DISTINCTION and to the SYNC. POLARITY DISTINCTION circuits. The outputs after these circuits are a positive H. sync. and a negative V. sync.
 - (ii) For the composite sync. mode, the composite synchronization signal is applied to the H./V. SYNC SEPARATOR circuit from the SYNC. EXISTENCE DISTINCTION circuit.
 - (iii) For the sync. on green analog mode, the green signal is applied to the SYNC./VIDEO SEPARATOR circuit which produces a composite synchronization signal. And then, it is the same as for the composite sync. mode.
- (b) The outputs of the distinction circuit are as follows:
These outputs are applied to IC151 (CPU) on the main PWB.

- | | |
|--|--|
| ● TTL/ANALOG Identification signal
(CN-M 5 pin) | { L: ANALOG
H: TTL |
| ● H. SYNC. signals's polarity
(CN-M 6 pin) | { L: POSITIVE POLARITY
H: NEGATIVE POLARITY |
| ● V. SYNC. signal's polarity
(CN-M 7 pin) | { L: POSITIVE POLARITY
H: NEGATIVE POLARITY |
| ● H. SYNC. availability
(CN-M 8 pin) | { L: NONE
H: AVAILABLE |
| ● V. SYNC. availability
(CN-M 9 pin) | { L: NONE
H: AVAILABLE |
| ● Mode signal
(CN-M 10 pin) | { L: NORMAL
H: MDA/USER MODE |

NOTE: L . . . Low level of TTL
H . . . High level of TTL

(2-4) Video Circuit



(Fig. 2-4-1) BLOCK DIAGRAM of the Video Module

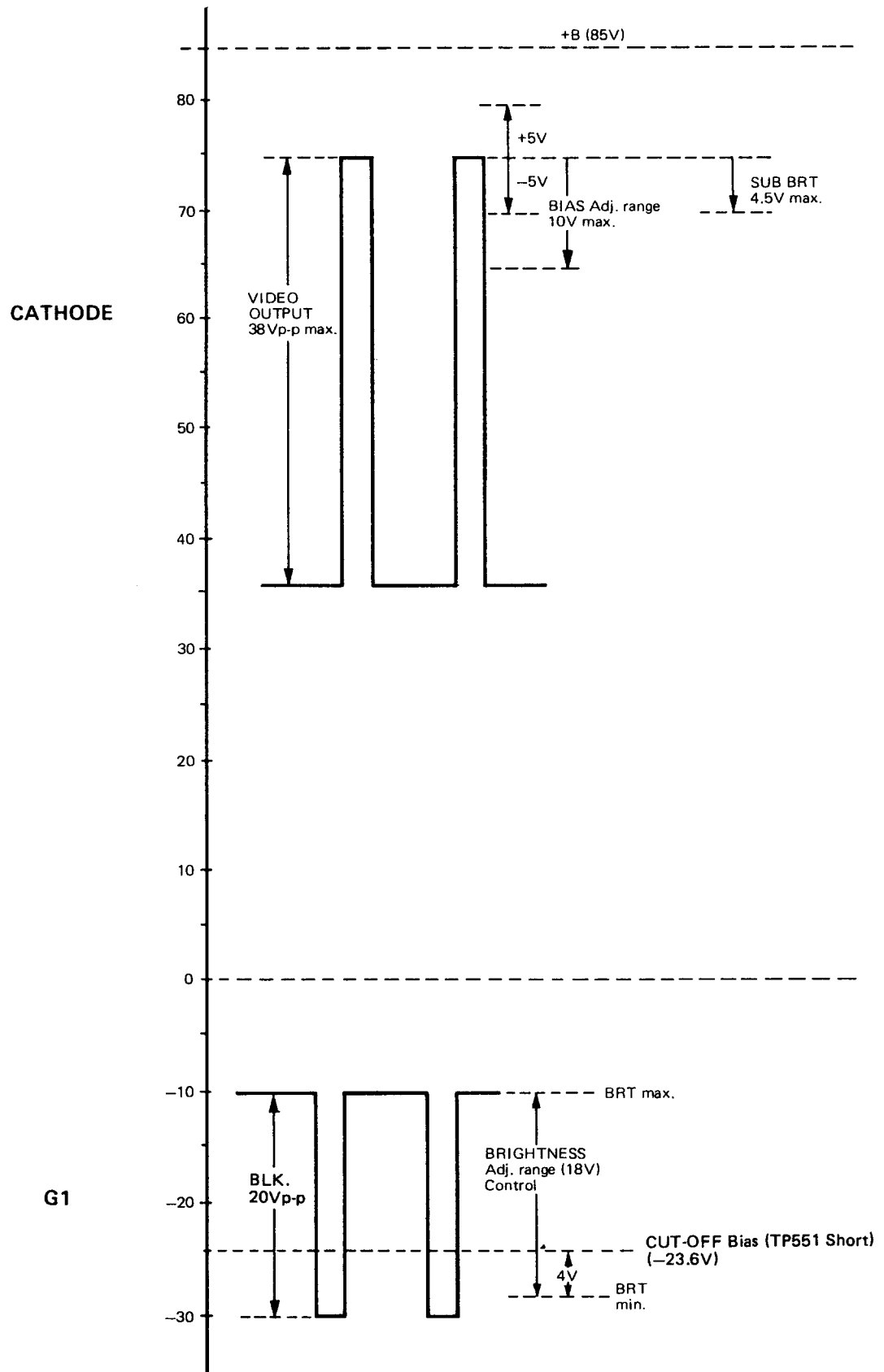
The video pre-amplifier consists of the pre-amp IC901 (M51387), the gain control, the bias control circuit, the sub-brightness control circuit, and the contrast control circuit.

This pre-amplifier has two functions. The first is to control the video signal output level by the gain, the contrast, and sub-brightness controls. After the gain and the contrast controls have been adjusted, the video signal output levels at the CRT cathodes are 38 Vp-p for the contrast control at the maximum position and 10 Vp-p for the contrast control at the minimum position.

For the TTL video signal mode, the contrast control and the video pre-amp gain are fixed and cannot be adjusted.

The second function is the alignment of the cut-off for the CRT by the adjustment of the Bias and Sub-Brightness controls. By adjusting these controls properly, the raster color will be white for any position of the Brightness control (the Sub-Brightness control is controlled by the Brightness control).

(Fig. 2-4-2) CRT G1-Cathode Bias Condition



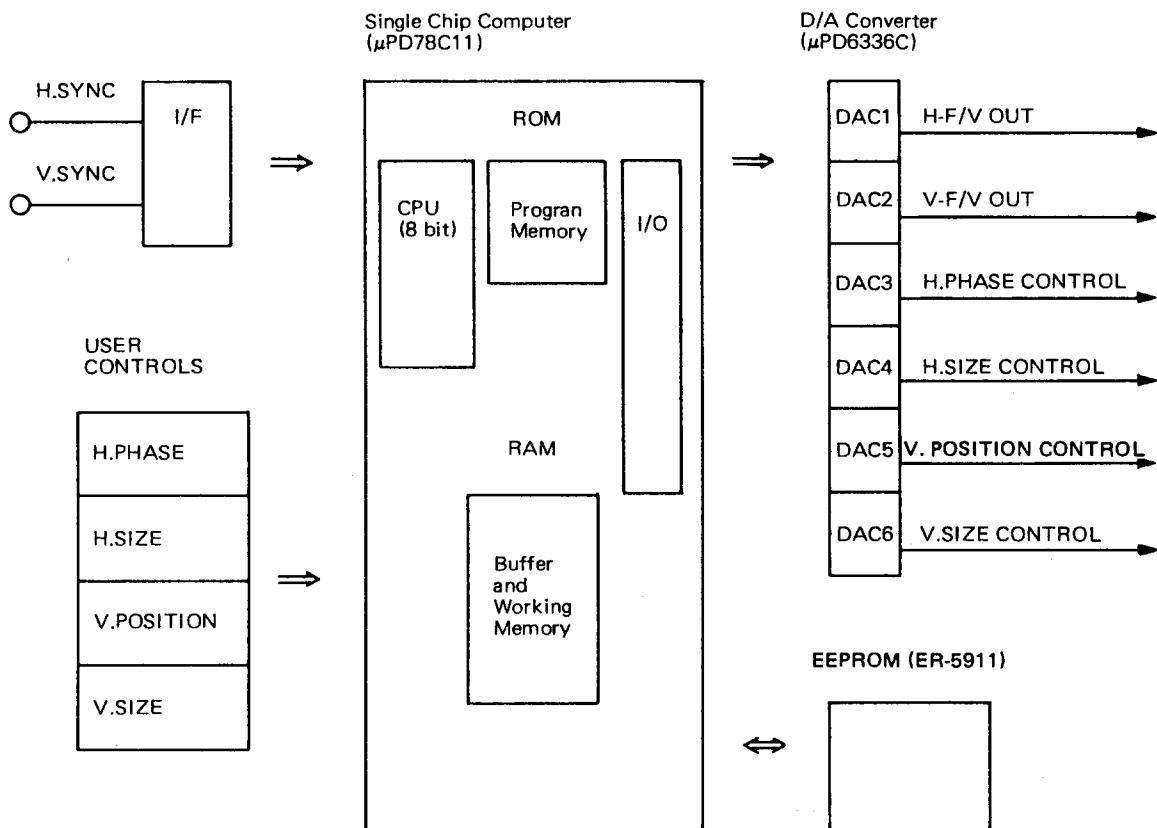
(2-5) Digital Control Circuit

(2-5-1) Digital Control Unit

Digital Control System

- Automatic Synchronization
- Management of displaying proper picture
- Management of user controls
- Management of factory Adjustment
- Automatic signal identification
- Automatic Sizing
- Automatic Centering
- Management of Picture Data

(Fig. 2-5-1) The BLOCK DIAGRAM of Digital Control System



1. Automatic Synchronization

The monitor automatically synchronizes for the following frequency range.

Fh: 15.5 kHz to 38.0 kHz

Fv: 50.0 Hz to 90.0 Hz

The CPU counts the horizontal pulses during a given period of time and vertical period. After these measurements, the corresponding digital data are produced and converted by the DAC to analog voltage. This combination of the CPU and DAC produce frequency to voltage (F/V) converter. The analog voltage is used as the control signal for the automatic synchronizing circuitry.

2. Automatic Display

a. Automatic signal identification

The CPU checks the input signal (TTL or ANALOG video, separate or composite SYNC, SYNC polarity, and etc.) and automatically identifies this input signal.

*See the Fig. 2-5-2 for the Signal Identification Flowchart.

b. Automatic centering and sizing

After the CPU identifies the input signal, the CPU send the stored digital data from the corresponding memory block in the EE-PROM. The EE-PROM has several memory blocks which consist of the control data for horizontal and vertical, centering and sizing. The control data is converted to the analog voltage by the DAC and is used by control signal.

The EE-PROM data is adjusted for the several standard signals (see Fig. 2-5-4) at the factory to get the optimum video display area. When the end user connects a standard signal (i.e. VGA, EGA etc.), the monitor will display the centered active video area with suitable size automatically.

c. User controls

The user can change the control data (display size and location) by pushing the proper user control buttons. After a few seconds, the CPU will automatically store data in the EE-PROM. The user can reset the data of the memory area and recall the initial data.

In case the user has a 3rd party's compatible board, small adjustments by the user control buttons may be needed at the initial start up. This data information is again stored in the memory. No adjustments are necessary after initial start up, if the same video signal is re-used.

In case a completely different video signal is applied to the monitor, the CPU will identify the signal and select a memory block accordingly. If the display size and location are not satisfactory, the user can adjust the display and after 5 seconds the CPU will again store the control data into the memory.

d. Factory Adjustment

In order to simplify the display adjustments, the CPU has the PRESET factory data in its ROM. At the beginning of the adjustment process, the CPU writes the PRESET factory data from the ROM to the buffer RAM and then outputs them to the D/A converter. Then, the monitor is roughly adjusted for the display size and location.

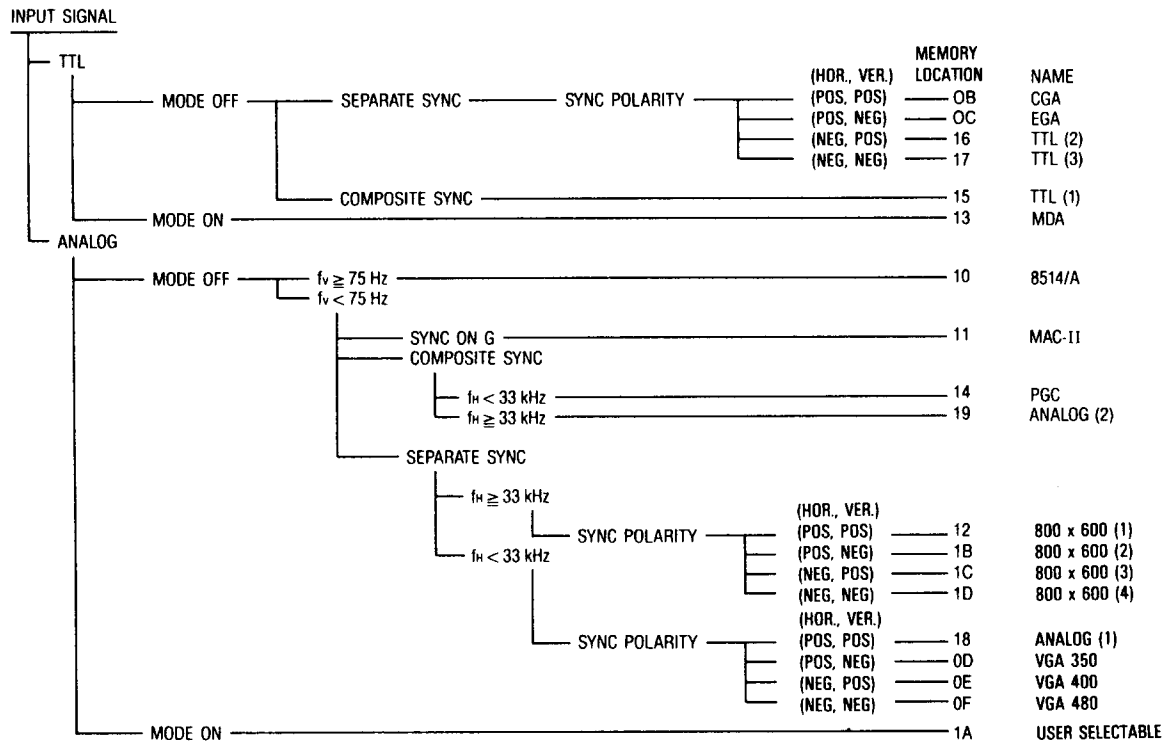
The fine adjustments are then made by adjusting the user controls by the factory personnel.

*Final adjustment process for the display size and location.

1. Prepare for the adjustment mode by shorting TP151 and TP152. The CPU applies the PRESET factory data to the buffer RAM and then to the D/A converter.

2. Adjust the active video area to the center and the specified size by pushing the user control buttons changing the data of the buffer RAM.
3. Store these control data to the EE-PROM by pushing the memory recall button.

(Fig. 2-5-2) SIGNAL IDENTIFICATION FLOW of the MS-III



(Fig. 2-5-3) METHOD OF SIGNAL IDENTIFICATION

MEMORY LOCATION	TTL/ANALOG 0: ANALOG 1: TTL	H.S.POLARITY 0: POS 1: NEG	V.S.POLARITY 0: POS 1: NEG	H. SYNC 0: NO SYNC 1: AVAILABLE	V. SYNC 0: NO SYNC 1: AVAILABLE	MODE 0: OFF 1: ON	f _H BandSelect f _V			Band Select	NAME
							15k	33k	38k		
0B	1	0	0	1	1	0	0	0	0	0	CGA
0C	1	0	1	1	1	0	0	0	0	0	EGA
0D	0	0	1	1	1	0	0	0	0	0	VGA 350
0E	0	1	0	1	1	0	0	0	0	0	VGA 400
0F	0	1	1	1	1	0	0	0	0	0	VGA 480
10	0	X	X	X	X	0	X	X	0	0	8514A
11	0	X	X	0	0	0	X	X	0	0	MAC-II (ANALOG/ SYNC. ON G
12	0	0	0	1	1	0	0	0	0	0	800 x 600(1)
13	1	X	X	X	X	1	0	0	0	0	MDA
14	0	X	X	1	0	0	0	0	0	0	PGC (ANALOG CS f _H < 33kHz)
15	1	X	X	1	0	0	0	0	0	0	TTL (1)
16	1	1	0	1	1	0	0	0	0	0	TTL (2)
17	1	1	1	1	1	0	0	0	0	0	TTL (3)
18	0	0	0	1	1	0	X	X	0	0	ANALOG (1)
19	0	X	X	1	0	0	0	0	0	0	ANALOG (2)
1A	0	X	X	X	X	1	0	0	0	0	USER SELECT SELECTABLE
1B	0	0	1	1	1	0	0	0	0	0	800 x 600(2)
1C	0	1	0	1	1	0	0	0	0	0	800 x 600(3)
1D	0	1	1	1	1	0	0	0	0	0	800 x 600(4)

(Fig. 2-5-4) EE-PROM MEMORY MAP

Memory type: 128 word x 8 bit (1k byte)

SERIAL EE-PROM

Address

MEMORY Block- LOCATION	NAME	H. PHASE	H. SIZE	V. POSITION	V. SIZE
01	CGA	00	01	02	03
02	EGA	04	05	06	07
03	VGA 350	08	09	0A	0B
04	VGA 400	0C	0D	0E	0F
05	VGA 480	10	11	12	13
06	8514A	14	15	16	17
07	MAC-II	18	19	1A	1B
08	800 x 600	1C	1D	1E	1F
09	MDA	20	21	22	23
0A	PGC	24	25	26	27
Factory set data for the standard SIGNALS (Back up memory data stored in the ROM) Can be changed only by the service person					
(INITIAL DATA)					
0B	CGA	30	31	32	33
0C	EGA	34	35	36	37
0D	VGA 350	38	39	3A	3B
0E	VGA 400	3C	3D	3E	3F
0F	VGA 480	40	41	42	43
10	8514A	44	45	46	47
11	MAC-II	48	49	4A	4B
12	800 x 600(1)	4C	4D	4E	4F
13	MDA	50	51	52	53
14	PGC	54	55	56	57
15	TTL (1)	58	59	5A	5B
16	TTL (2)	5C	5D	5E	5F
17	TTL (3)	60	61	62	63
18	ANALOG (1)	64	65	66	67
19	ANALOG (2)	68	69	6A	6B
1A	USER SELECTABLE	6C	6D	6E	6F
1B	800 x 600(2)	70	71	72	73
1C	800 x 600(3)	74	75	76	77
1D	800 x 600(4)	78	79	7A	7B
Pre-set to the same data as memory blocks locations 01 to 0A by the factory and can be changed by user controls. These data can be reset to the initial data by using the standard data load switch. Can be changed only by the user controls					

TTL (1): TTL COMPOSITE SYNC

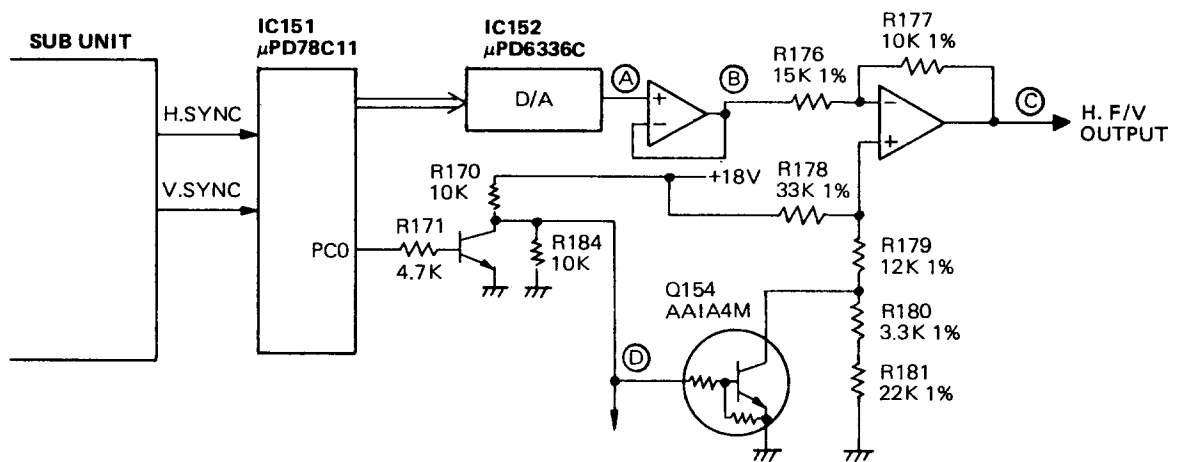
TTL (2): TTL H-SYNC NEGATIVE and V-SYNC POSITIVE

TTL (3): TTL H-SYNC NEGATIVE and V-SYNC NEGATIVE

ANALOG (1): $f_H < 33\text{kHz}$, ANALOG, H-SYNC POSITIVE, and V-SYNC POSITIVEANALOG (2): ANALOG COMPOSITE SYNC $f_H \leq 33\text{kHz}$

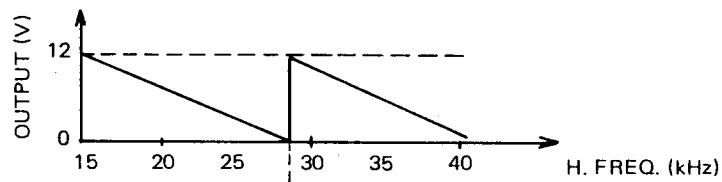
(2-5-2) H. F/V Converter

1. BLOCK DIAGRAM

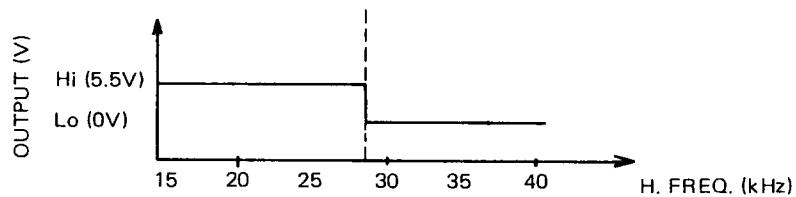


(Fig. 2-5-5) BLOCK DIAGRAM of H. F/V Converter

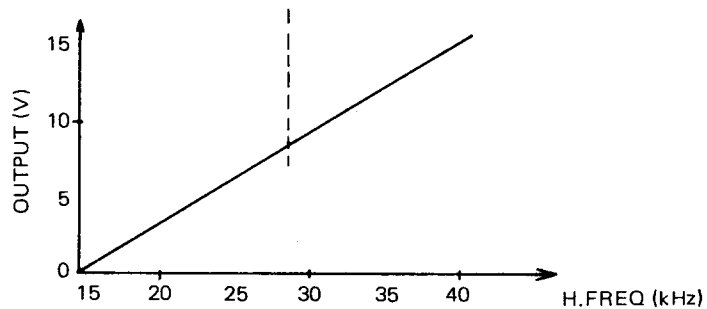
2. Relationship between voltage and horizontal frequency



(Fig. 2-5-6) Relationship between Points A and B

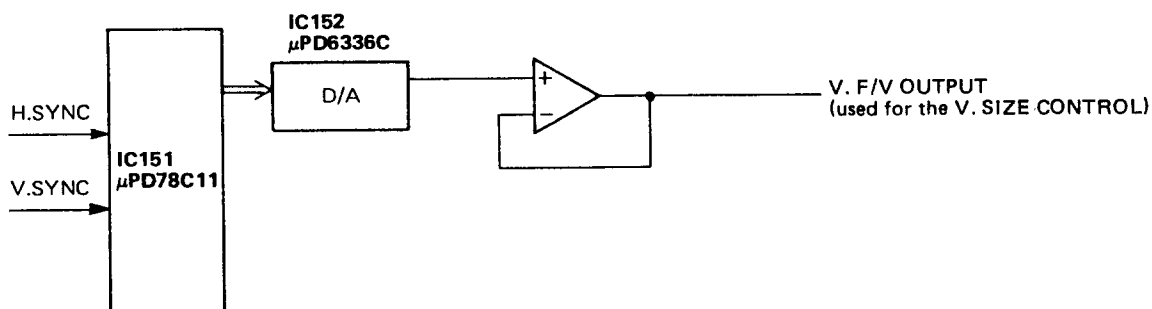


(Fig. 2-5-6) Relationship between Point D and H. Frequency

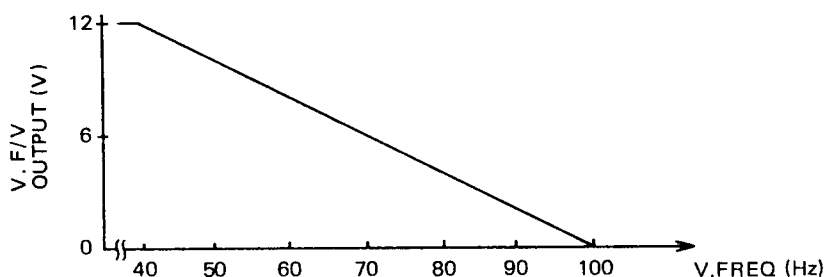


(Fig. 2-5-7) H. F/V Output (Point C)

(2-5-3) V-F/V converter



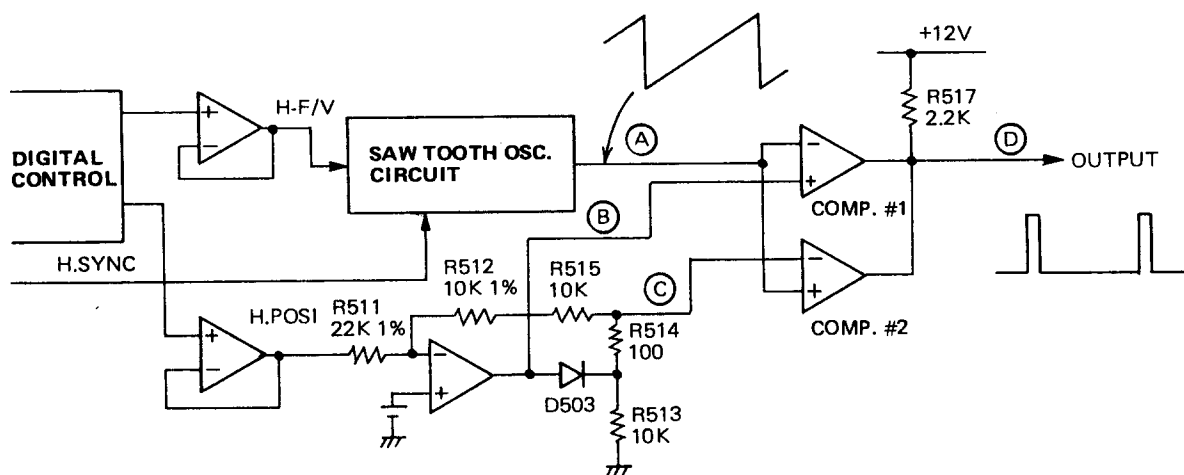
(Fig. 2-5-8) BLOCK DIAGRAM of V. F/V converter



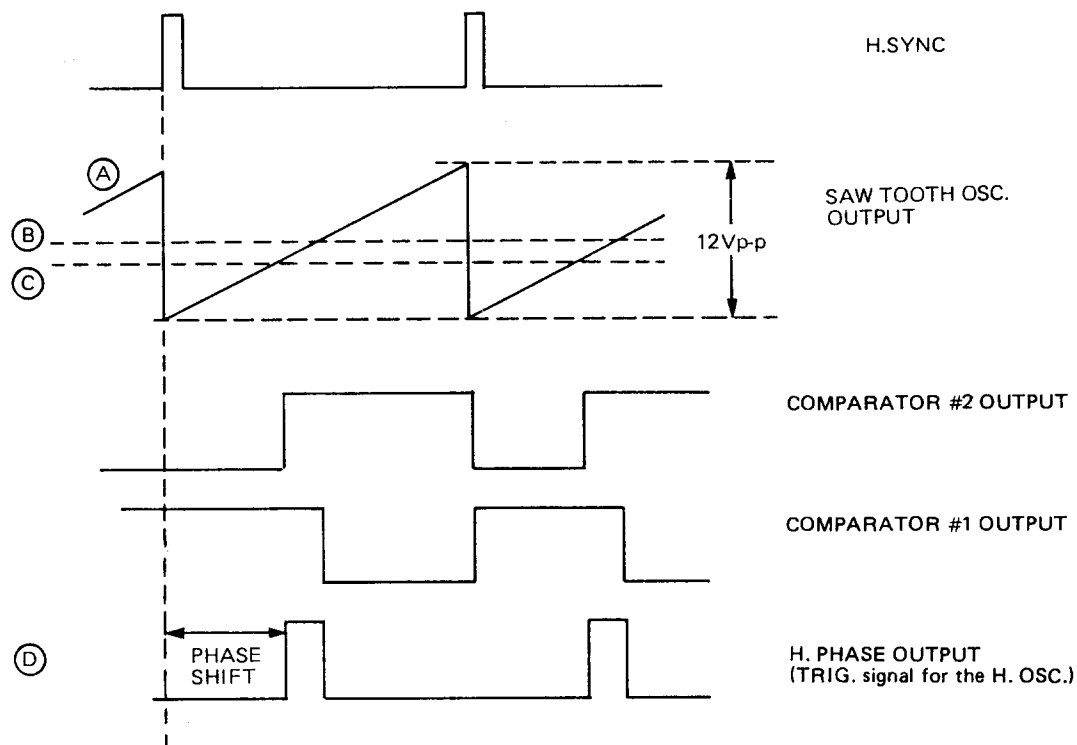
(Fig. 2-5-9) Relationship between output voltage and V. Frequency

(2-5-4) H. Phase circuit

1. BLOCK DIAGRAM

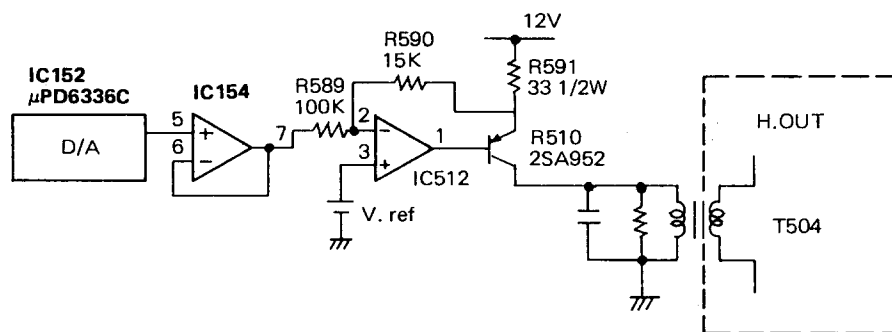


(Fig. 2-5-10) BLOCK DIAGRAM of the H. Phase Circuit



(Fig. 2-5-11) Voltage Waveform

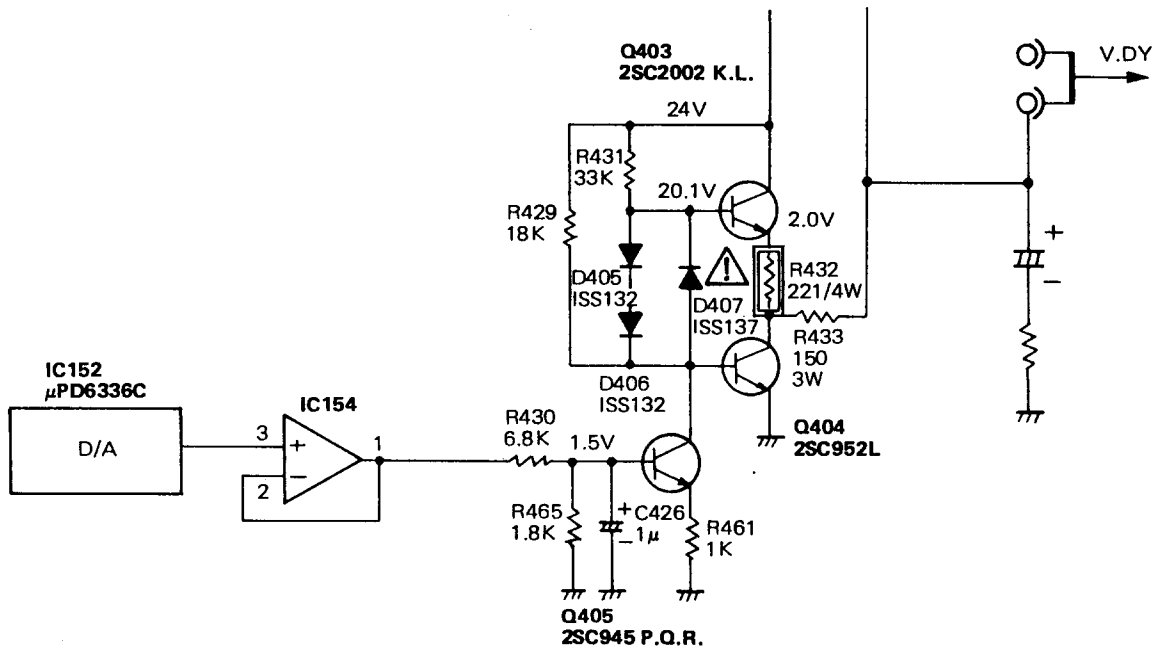
(2-5-5) H. Size Circuit



(Fig. 2-5-12) BLOCK DIAGRAM of the SIZE CIRCUIT

The H. size control voltage (IC154 pin 7) controls the DC bias level of Q510 and the primary current of T504. The primary current of T504 controls the secondary coil induction value. So, the H. size signal modulates the Horizontal D.Y current, i.e. the H. size of the raster.

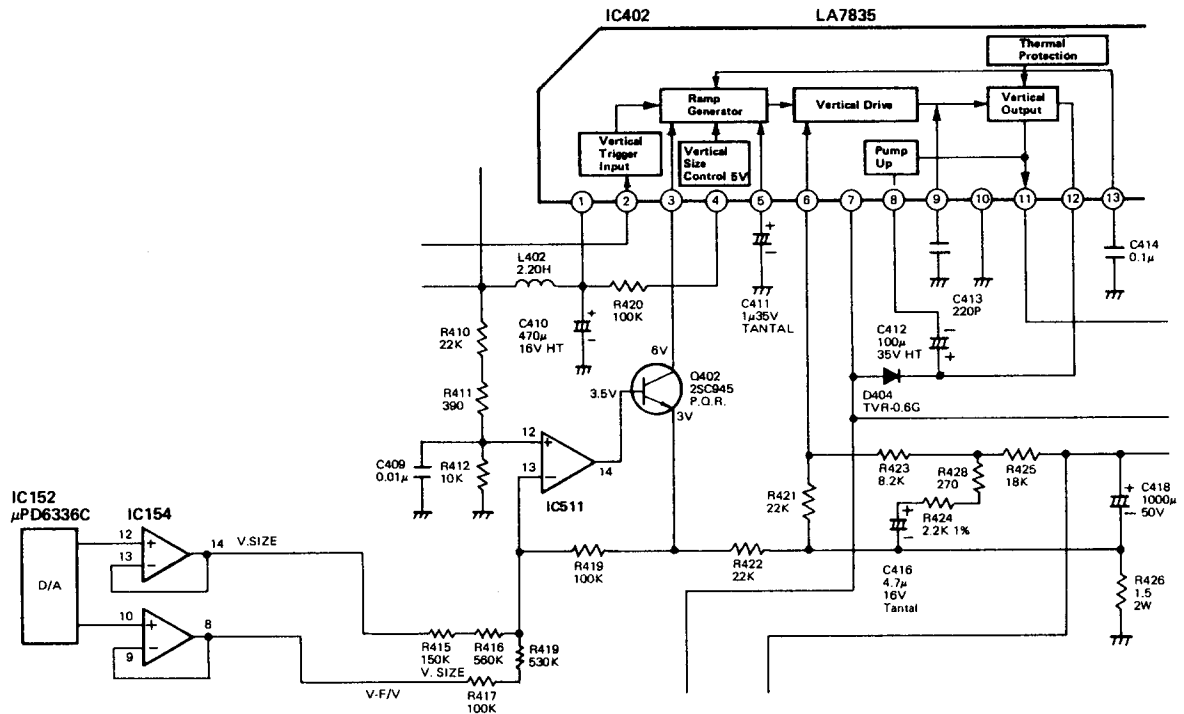
(2-5-6) V. Position Circuit



(Fig. 2-5-13) BLOCK DIAGRAM of V. POSITION CIRCUIT

The V. position control voltage (IC154 pin 1) manipulates the push-pull transistor's (Q403 and Q404) output DC level and also the V. DY DC biasing current.

(2-5-7) V. Size Circuit



(Fig. 2-5-14) BLOCK DIAGRAM of V. SIZE CIRCUIT

The vertical raster size is controlled by the sink current of IC402 pin 3 (collector current of Q402). Therefore, it can be controlled by changing the DC base voltage of Q402. The parameters which decide the vertical video size are the vertical frequency and the signal timing. To keep a constant vertical raster size, the V. F/V (IC154 pin 8) output signal controls the Q402 base voltage. And, to also keep this vertical raster size constant for the pre-set signals, the V. size control voltage (IC154 pin 14) controls the base voltage of Q402.

REPLACEMENT PARTS LIST

The component specified for models JC-1404HME/EE/R

Note: The components identified by Δ mark are critical for safety.
Replace only with parts Number specified.

SYMBOL	PARTS NO	DESCRIPTION
*** CRT & TUNER ***		
Δ CRT (JC-1404HME/EE)	33014166	CRT M34KBG23XX193(2)
Δ CRT (JC-1404HMR)	33014167	CRT M34KBG23XX193(2) (R)
*** ICS ***		
IC156	37052179	IC SN74LS07N
IC508	37053122	MOS UPD74HC123AC
IC152	37053266	MOS UPD6336C (D/A CONVERT
IC153	37055216	EEPROM MSM16911RS E-094
IC901	37056245	IC M51387P
Δ IC651	37056273	IC UPD1093J
Δ IC401	37056408	IC HA11423DP-18
IC155	37056415	IC LA7835
IC507	37056583	IC LM358N
IC101	37056584	IC LM339N
IC154	37056585	IC LM324N
IC403	37056618	IC BA6110
Δ IC601	37056644	IC M51995P
IC151	37056645	MOS UPD78C11G-223-36
IC801	37056421	MOS PC280-40
IC802	37051179	IC SN74LS123N (MONO MLT)
IC803	37051096	IC SN74LS367AN (BUFF)
IC804	37052011	IC SN74LS136N (EX-OR)
IC805	79PC0018	MOS UPD74HC04C
IC806	79PC0018	MOS UPD74HC04C
IC807	37053241	MOS UPD74HC86C
IC808	37053122	MOS UPD74HC123AC
*** TRANSISTORS ***		
Q151	35007217	TR 2SC945-T Q
Δ Q2002	Q153	Q153
Q401	Q401	Q401
Q405	Q502	Q503
Q504	Q506	Q509
Δ Q514	Q516	Q517
Q520	Q525	Q526
Q531	Q532	Q533
Q537	Q902	Q903
Q904	Q406	Q530
Q403	Q539	Q910
Q910	Q912	Q914
Δ Q2001	Q407	Q501
Q505	Q507	Q515
Q518	Q521	Q535
Q536	Q901	Q905
Q906	Q907	Q908
Q960	Q961	
Q404	Q510	
350E3212		
350H4417		
350H5017		
350K3517		
TR, 2SC2002-T, L		
TR, 2SC1473-TA Q		
TR, 2SC3811-TA Q		
TR, 2SA733/2SA733A-T Q		
350K4412		
TR, 2SA952 L, AT		

SYMBOL	PARTS NO	DESCRIPTION
*** TRANSISTORS ***		
Q538	350K5217	TR, 2SA1018-TA Q
Q563	35025516	TR, 2SB744 P
Δ Q604	35047216	TR, 2SC945 P
Q562	35065416	TR, 2SD882 P
Q806	35053212	TR, 2SC2002 L
Q527	35068112	TR, 2SD986 L
Δ Q601	35069713	TR, 2SD1581 M
Q523	35082401	TR, 2SC3486-YB
Q909	35086004	TR, 2SC3953-RA D
Q161	351G0501	TR, AA1A4M-T
Q154	351G0531	TR, AA1L4M-T
Q522	35121900	TR, 2SK752
Q511	35122100	TR, 2SK703
Q524	35122200	TR, 2SK854
Δ Q603	35122220	TR, 2SK872
Q519	35122500	TR, 2SK758
Q508	35122600	TR, 2SK701
Δ CR601	35595014	TRIAC AC100GM
*** DIODES ***		
D101	D102	D103
D104	D105	D106
D107	D108	D109
D110	D111	D112
D113	D114	D115
D116	D117	D118
D119	D120	D121
D122	D123	D124
D125	D126	D151
D152	D155	Δ D2003
Δ D2004	Δ D2005	Δ D2006
D401	D405	D406
D407	D408	D409
D410	D502	D503
D507	D508	D510
D511	D512	D513
D517	D518	D520
D521	D524	D525
D530	D533	D564
D901	D902	
D526	D528	D529
D531	D532	D903
D904	D905	D906
D907	D908	
ZD401	ZD520	
ZD501		
Δ ZD2001	Δ ZD2002	
Δ ZD502	ZD506	ZD512
ZD511		
Δ ZD503	Δ ZD504	ZD507
Δ D606		
Δ ZD602		
360K1027		DIODE 1SS132
360K1032		DIODE 1SS82-TA
360K1032		DIODE 1SS82-TA
360K3123		DIODE RD20EB(3)
360K3134		DIODE RD15EB(2)-T4
360K3143		DIODE, RD8, 2JSB(1)-T4
360K3160		DIODE RD8, 2EB(2)-T4
360K3169		DIODE RD6, 2EB(2)-T4
360K3188		DIODE RD3, 9EB(2)-T4
36001528		DIODE, 1SS54
36003123		DIODE, RD20EB(3)

SYMBOL	PARTS NO	DESCRIPTION
*** DIODES ***		
Δ ZD657	36003147	DIODE RD18EB(1)
Δ ZD603	36003614	DI RD3 OESB(1)/ESAB(1)
Δ ZD601	36003684	DIODE RD16ESB (3)
Δ ZD658	36003707	DIODE RD27ESB (4)
D404	D506	RECTIFIER,S1. TVR-06G G23
D560	D561	
Δ D2001	Δ D2002	DIODE EGP10G G23
D514	D515	RECTIFIER,S1. TVR-06G
Δ D603	36107160	RECTIFIER,S1. RU1P
D509	36107293	RECTIFIER,S1. RK14
Δ D651	Δ D652	DIODE FMG-G26S
Δ D604	Δ D605	DIODE EL1Z
D519	36107322	RECTIFIER,S1. RG2
D522	36107518	DIODE RS4FS
Δ D653	36107530	D.NETWORK D5LCA20
Δ D601	36108072	
ZD505	36108090	D.NETWORK D5SBA60
D550	367K0017	DIODE RD4.7EB-T4
Δ TH601	36801023	DIODE, LIGHT-E SEL1320G
Δ PC601	38112031	THERMISTOR, POSITIVE
Δ PC602	38200233	IC TLP634 (NHE-LF2)
*** TRANSFORMERS ***		
T502	45803010	TRANS, H.DRIVE
T501	46302102	TRANS FERRITE
Δ T601	46304105	FERRITE TRANS
Δ T505	46310407	TRANS, SWITCHING
	47105649	F. B. T.
Δ T503	47502060	TRANS
*** VARIABLE RESISTORS ***		
VR101	VR102	R, VARIABLE B10K-V
VR904	41011211	R, VARIABLE B3.3K
VR901	41071160	R, VARIABLE B4.7K
VR908	41071161	
VR905	41071165	R, VARIABLE B22K
VR505	41085006	R, VARIABLE B2K
VR501	41085009	R, VARIABLE B10K
VR503	41085010	R, VARIABLE B20K
VR402	41085059	R, VARIABLE B10K
Δ VR651	41505003	R, VARIABLE B500
Δ VR2001	Δ VR2002	R, VARIABLE B2K
Δ VR504	41505005	
*** RELAYS & SWITCHES ***		
SW110	65161045	SWITCH, SLIDE
SW111	65161046	SWITCH, SLIDE
Δ SW101	65260002	SWITCH, SEE-SAW
SW104	65360016	SWITCH, PUSH BUTTON
SW107		
SW108		
SW103		
SW105		
SW109		
RL801	65602551	RELAY G5A-237P
RL802	65699012	RELAY RY12W (2T)

SYMBOL	PARTS NO	DESCRIPTION
*** COILS & FILTERS ***		
LC901	390J9015	FILTER ZJSC-2R2-101TA
Δ T504	60906202	WIDTH CHOKE
Δ L503	60908043	COIL, VARIABLE WIDTH
Δ L504	60918108	COIL, H. LIN
L902	610E1707	COIL, FILTER
L151	610E1714	COIL, FILTER 5.6UH
L901	610E1717	COIL, FILTER 100HA.T (S)
L152	610E1719	COIL, FILTER 15UH
L508	610E7514	COIL, FILTER 5.6UH
Δ	610E2075	POWER LINE FILTER
Δ FL601	61062107	COIL, LINE FILTER
L502	61064006	COIL, FILTER 50UH
L401	61064051	COIL, FILTER 2200UH
Δ L602	61065002	FERRITE BEADS
L507	61067005	COIL, FILTER 1.0UH
L801	61051709	COIL, FILTER L2R2KBS
L506	61070127	FILTER CHOKE
L505	61070128	COIL, CHOKE
L651	61099011	COIL, CHOKE 33UH
Δ L653	61099014	COIL, CHOKE 33UH
L501	61099019	COIL, CHOKE
L652	61099023	FILTER, CHOKE
Δ L601	61099044	SHIELDING COIL 222K
Δ DEG	61314209	COIL, DEGAUSSING
LC902	61606022	NOIZE FILTER DSS-222M
*** PWB ASSYS ***		
	84K90A01	SW REG PWB ASSY
	84K90C01	VIDEO-CRT PWB ASSY
	84K90D01	MAIN PWB ASSY
	79100002	SUB PWB UNIT
*** ELECTRICAL PARTS & MISCELLANEOUS PARTS ***		
HS3	31709103	INSULATOR
HS402	31709202	SHEET, INSULATOR
HS1	31709204	SHEET, HEAT SINK
HS523	31709503	SHEET, INSULATOR
SG901	32990047	ARRESTER
SG904		
SG902	SG903	
X151	64099072	CRYSTAL RESONATOR
F601	66699018	FUSE ET T2.5A 250-S.B SOC
SG905	66708001	SPARK GAP 1.2KV
Δ	70032026	SG/CRT SOCKET
Δ	70800039	LINE CORD (JC-1404HME)
Δ	708000323	LINE, POWER (JC-1404HME)
Δ	75513032	LINE CORD (JC-1404HMR)
Δ	70599111	ADAPTER
Δ	70599129	ADAPTER
Δ	71205037	HOLDER, FUSE
Δ	73893056	CABLE, SIGNAL

SYMBOL	PARTS NO	DESCRIPTION
*** APPEARANCE PARTS ***		
(JC-1404HME) (JC-1404HMEE) (JC-1404HMR)	24514792 25310471 25310491 25409732 25409732 25310672 25769591 25769861 25769871	COIL SPRING CABINET FRONT ASSY CABINET BACK ASSY REVOLVING STAND ASSY SPINDLE CABINET BOTTOM ASSY NAME PLATE, INSTRUCTION NAME PLATE, INSTRUCTION NAME PLATE, INSTRUCTION
*** KNOBS & PUSH BUTTONS ***		
	25452771 25452791 25452911 25452921	KNOB, CONTROL KNOB, SLIDE KNOB (A), SLIDE PUSH BUTTON
*** PRINTED & PACKING MATERIALS ***		
(JC-1404HME/R) (JC-1404HME/EE/R)	24806961 24813191 599910285 25605881 25804551 25815061 25804991 25816341 25816351 25817641 25817791 25817801 78043392 78034401 78122562	BAG, POLYETHYLENE (270x370) BAG, POLYETHYLENE (150x370) S/M JC-1404HME/EE/R/ED FOOT (A), RUBBER BAG, POLYETHYLENE (150x230) BAG, POLYETHYLENE (270x370) BAG, POLYETHYLENE (85x110) FILLER, CARTON (T) FILLER, CARTON (R) CARTON BOX CARTON BOX CARTON BOX WARRANTY CARD MONITOR SALES OFFICE LIST INSTRUCTION BOOK
(JC-1404HME) (JC-1404HMEE) (JC-1404HMR)		
*** RESISTORS ***		
△R604 △R628 △R5C0 △R618 △R660 R514 R969	△R612 △R602 R5C0 R660 △R663 R970	R, CARBON 10H 5% 1/4W R, CARBON 220H 5% 1/4W R, CARBON 1.0K 5% 1/4W R, CARBON 10K 5% 1/4W R, CARBON 15K 5% 1/4W R, CARBON 100H 5% 1/6W
R151 R935 R940 R943	R5E6 △R659 R939 R944	R, CARBON 470H 5% 1/6W
R508 R1A0 R1A3 R1A5 R153 R156 R172 R175 R461 R5F3	△R583 R1A2 R1A4 R1A5 R110 R152 R155 R157 R158 R174 R440 R456 R5D0 R541	R, CARBON 560H 5% 1/6W R, CARBON 1.0K 5% 1/6W

SYMBOL	PARTS NO	DESCRIPTION
*** RESISTORS ***		
R551 R908 R502 △R658	△R582 R913 △R655 R966	R, CARBON 1.5K 5% 1/6W
R403 R466 R5E5 R518 R546 R914	R408 R471 R5B3 R517 R528 △R605	R, CARBON 2.2K 5% 1/6W
△R2004 R538 R906 R955	△R2006 R904 R905 R952	R, CARBON 3.3K 5% 1/6W
△R5B1 R918 R441 R547 R910	△R582 R925 R930 R519 R522 △R665	R, CARBON 3.9K 5% 1/6W R, CARBON 4.7K 5% 1/6W
△R2003 R554 R963	△R2005 △R581 R101	R, CARBON 8.2K 5% 1/6W
R1A7 R103 R106 R109 R114 R117 R120 R123 R164 R170 R195	R102 R105 R108 R113 R116 R119 R122 R163 R168 R184 R197	R, CARBON 10K 5% 1/6W
△R2007 R435 R458 R5F1 R515 R533 R549 R571 △R584 R917 △R2009 △R625	△R2010 R442 R5C1 R5E8 R5C1 R5P2 R532 R545 R558 R560 R574 △R623 R960 △R579 R405 △R626	R, CARBON 12K 5% 1/6W
R590 R198 R421 R557 △R622 R934 △R2008	△R621 R401 R422 △R580 R921 R929 R419 R437 R438 R5A9 R539 R540 △R615	R, CARBON 15K 5% 1/6W R, CARBON 22K 5% 1/6W R, CARBON 33K 5% 1/6W R, CARBON 39K 5% 1/6W R, CARBON 100K 5% 1/6W

SYMBOL	PARTS NO	DESCRIPTION
*** RESISTORS ***		
△ R614	40175125	R,CARBON 10H 5% 1/4W
△ R616	40175127	R,CARBON 12H 5% 1/4W
△ R617	40175129	R,CARBON 15H 5% 1/4W
△ R618	40175133	R,CARBON 22H 5% 1/4W
△ R525	40178166	R,CARBON 510H 5% 1/2W
△ R521	40178177	R,CARBON 1.5K 5% 1/2W
△ R631	40216273	R,WIRE 56H 5% 5W
△ R601	40299107	R,WIRE 15H 10% 5W
R5E0	40371135	R,METAL 27H 5% 1W
R5E1	40371143	R,METAL 56H 5% 1W
△ R610	40371329	R,METAL 0.22H 5% 1W
R426	40372105	R,METAL 1.5H 5% 2W
△ R654	40372133	R,METAL 22H 5% 2W
△ R651	40372137	R,METAL 33H 5% 2W
R555	40372169	R,METAL 680H 5% 2W
△ R630	40372213	R,METAL 47K 5% 2W
R567	40373123	R,METAL 8.2H 5% 3W
△ R606	40373141	R,METAL 47H 5% 3W
△ R624	40373145	R,METAL 68H 5% 3W
R433	40373153	R,METAL 150H 5% 3W
R586	40373167	R,METAL 560H 5% 3W
R587	40373169	R,METAL 680H 5% 3W
△ R667	40373173	R,METAL 1.0K 5% 3W
△ R657	40373197	R,METAL 10K 5% 3W
△ R668	40373213	R,METAL 47K 3W 5%
△ R603	40373217	R,METAL 68K 5% 3W
△ R607	40373219	R,METAL 82K 5% 3W
△ R948	40399037	R,METAL 390H 5% 3W
R947	40399038	R,METAL 470H 5% 3W
R953	40399039	R,METAL 180H 5% 1W
R972	40399040	R,METAL 100H 5% 1W
R973	404C1683	R,METAL 2.7K 1% 1/6W
R587	404C1699	R,METAL 12K 1% 1/6W
R179	404C1711	R,METAL 39K 1% 1/6W
△ R562	404C1719	R,METAL 82K 1% 1/6W
△ R661	40405109	R,METAL 2.2H 5% 1/4W
△ R2001	R5C2	
△ R501	R568	
△ R627		
△ R536	40405137	R,METAL 33H 5% 1/4W

SYMBOL	PARTS NO	DESCRIPTION
*** CAPACITORS ***	***	
△ C654	4302J559	C.ELEC 250V 47UF
△ C653	4302J560	C.ELEC 250V 100UF
C418	43026073	C.ELEC 50V 1000UF
C537	43041013	C.ELEC 160V 100UF
△ C606	43109577	C.ELEC 400V 390UF
C905	4339J031	C.ELEC 35V 4.7UF
C416	435A8153	C.TANTLM 16V 4.7UF
C411 C515	435A8307	C.TANTALM 35V 1UF

SYMBOL	PARTS NO	DESCRIPTION
*** CAPACITORS ***	***	
C562	42754163	C.FILM 100V 0.01UF
C555	42754207	C.FILM 200V 0.01UF
C544	42754267	C.FILM 200V 0.022UF
C548	42754470	C.FILM 400V 0.039UF
△ C660	4282C010	C.METAL 50V 0.056UF
△ C616	4282C011	C.FILM 50V 0.068UF
△ C605	4282C013	C.ELEC 50V 0.1UF
△ C401	4282C025	C.METAL FILM 50V 1UF
△ C602	42824329	C.FILM 250V 0.22UF
△ C661	42840009	C.METAL FILM 100V 0.047UF
△ C658	42840084	C.METAL 250V 0.018UF
△ C809	42840169	C.METAL 400V 470000PF
△ C617	42842004	C.METAL 50V 390PF
C549	42842506	C.METAL 1600V 7800PF
C552	42842507	C.METAL 400V 0.025UF
△ C533	42843501	C.FILM 200V 0.82UF
△ C534	42843508	C.METAL 160V 0.47UF
△ C532	42843509	C.METAL 400V 0.12UF
△ C535	42899014	C.METAL FILM 400V 0.39UF
△ C601	42899097	C.METAL 250V 0.47UF
C545	43083051	C.ELEC 16V 220UF
C522	43083071	C.ELEC 25V 220UF
△ C2002	43083091	C.ELEC 35V 220UF
C928	43083182	C.ELEC 160V 1UF
C565	43083187	C.ELEC 160V 22UF
C912	43085051	C.ELEC 16V 220UF
C410	43085053	C.ELEC 16V 470UF
C419	43085107	C.ELEC 50V 22UF
△ C2003	43086015	C.ELEC 10V 47UF
C505	43086016	C.ELEC 10V 100UF
C512	43086017	C.ELEC 10V 220UF
C161	43086039	C.ELEC 25V 22UF
C517	43086041	C.ELEC 25V 47UF
C561	43086053	C.ELEC 35V 47UF
C595	43086055	C.ELEC 35V 220UF
C426	43086061	C.ELEC 50V 1UF
C542	43086062	C.ELEC 50V 2.2UF
C518	43086065	C.ELEC 50V 10UF
C540	43086066	C.ELEC 50V 22UF
C556	43086068	C.ELEC 50V 47UF
C593	43089061	C.ELEC 50V 1UF
C913	43089062	C.ELEC 50V 2.2UF
C536	43089556	C.ELEC 250V 10UF
△ C664	4302J053	C.ELEC 35V 47UF
△ C663	4302J058	C.ELEC 35V 1000UF
△ C615	4302J064	C.ELEC 50V 4.7UF
△ C611	4302J065	C.ELEC 50V 10UF
△ C612	4302J066	C.ELEC 50V 22UF
△ C657	4302J102	C.ELEC 100V 100UF
△ C656	4302J103	C.ELEC 100V 220UF
C594	4302J516	C.ELEC 160V 10UF

REPLACEMENT PARTS LIST

The components specified for Model JC-1404HMED.

Note: The components identified by Δ mark are critical for safety.
Replace only with parts Number specified.

SYMBOL	PARTS NO	DESCRIPTION
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*** CRT & TUNER ***

Δ	33014168	CRT M34K8G23XX204
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*** ICS ***

IC156	37052179	IC SN74LS07N
IC508	37053122	MOS UPD74HC123AC
IC152	37053266	MOS UPD6336C (O/A CONVERT
IC153	37055216	EEPROM MSM16911RS E-094
IC901	37056245	IC M51387P
Δ IC651	37056273	IC UPC1093J
Δ IC401	37056408	IC HA11423DP-18
IC402	37056415	IC LA7835
IC155	37056583	IC LM358N
IC507		
IC101	37056584	IC LM339N
IC154	37056585	IC LM324N
IC403	37056618	IC BA6110
Δ IC601	37056644	IC M51995P
IC151	37056645	MOS UPD78C11G-223-36
IC801	37056421	MOS PCZ80-40
IC802	37051179	IC SN74LS123N (MONO MLT)
IC803	37051096	IC SN74LS367AN (BUFF)
IC804	37052011	IC SN74LS136N (EX-OR)
IC806	79PC0018	MOS UPD74HC04C
IC807	37053241	MOS UPD74HC86C
IC808	37053122	MOS UPD74HC123AC

*** TRANSISTORS ***

Q151	Q152	Q153	35007217	TR 2SC945-T Q
Δ Q2002	Q401	Q402		
Q405	Q502	Q503		
Q504	Q506	Q509		
Δ Q514	Δ Q516	Q517		
Q520	Q525	Q526		
Q531	Q532	Q533		
Q537	Q902	Q903		
Q904	Q406	Q530	350E3212	TR, 2SC2002-T L
Q403	Q534	Q539	350H4417	TR, 2SC1473-TA Q
Q910	Q912	Q914	350H5017	TR, 2SC3811-TA Q
Δ Q2001	Q407	Q501	350K3517	TR, 2SA733/2SA733A-T Q
Q505	Q507	Δ Q515		
Q518	Q521	Q535		
Q536	Q901	Q905		
Q906	Q907	Q908		
Q960	Q961			
Q404	Q510		350K4412	TR, 2SA952 L, AT
Q538			350K5217	TR, 2SA1018-TA Q
Q563			35025516	TR, 2SB744 P
Δ Q604			35047218	TR, 2SC945 P
Q562			35065416	TR, 2SD882 P
Q806			35053212	TR, 2SC2002L

SYMBOL	PARTS NO	DESCRIPTION
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*** TRANSISTORS ***

Q527	35068112	TR 2SD986 L
Δ Q501	35069713	TR 2SD1581 M
Δ Q523	35082401	TR 2SC3486-YB
Q509	35086004	TR, 2SC3953-RA D
Q161	351G0501	TR, AA1A4M-T
Q154	351G0531	TR, AA1A4M-T
Q522	35121900	TR 2SK752
Q511	35122100	TR 2SK703
Q524	35122200	TR 2SK854
Δ Q603	35122220	TR 2SK872
Q519	35122500	TR 2SK758
Q508	35122600	TR 2SK701
Δ CR601	35595014	TRIAC AC10DGM

*** DIODES ***

D101	D102	D103	360K1027	DIODE 1SS132
D104	D105	D106		
D107	D108	D109		
D110	D111	D112		
D113	D114	D115		
D116	D117	D118		
D119	D120	D121		
D122	D123	D124		
D125	D126	D151		
D152	D155	Δ D2003		
Δ D2004	Δ D2005	Δ D2006		
D401	D405	D406		
D407	D408	D409		
D410	D502	D503		
D507	D508	D510		
D511	D512	D513		
D517	D518	D520		
D521	D524	D525		
D530	D533	D564		
D901	D902	D909		
D526	D528	D529		
D531	D532	D903		
D904	D905	D906	360K1032	DIODE 1SS82-TA
D907	D908	D910	360K1032	DIODE 1SS82-TA
D911				
ZD401	ZD520			
ZD501				
Δ ZD2001	Δ ZD2002			
Δ ZD502	ZD506	ZD512		
ZD511				
Δ ZD503	Δ ZD504	ZD507		
Δ D606				
Δ ZD602			360K3123	DIODE RD20EB (3)
Δ ZD657			360K3134	DIODE RD15EB (2) -T4
Δ ZD603				
Δ ZD601			360K3143	DIODE RD8.2JSB (1) -T4
Δ ZD658			360K3160	DIODE RD8.2EB (2) -T4
			360K3169	DIODE RD6.2EB (2) -T4
			360K3188	DIODE RD3.9EB (2) -T4
			36001528	DIODE, 1S954
			36003123	DIODE RD20EB (3)
			36003147	DIODE RD18EB (1)
			36003614	DI RD3.0ESB (1) /ESAB (1)
			36003684	DIODE RD18ESB (3)
			36003707	DIODE RD27ESB (4)

SYMBOL	PARTS NO	DESCRIPTION
*** DIODES ***		
D404 D506 D561 ΔD2001 D514 ΔD503 D509 ΔD651 ΔD652 ΔD604 D519 ΔD522 ΔD601 ΔD653 ZD505 D550 ΔT601 ΔPC601 ΔPC602	D527 361K7160 361K7562 36107160 36107174 36107293 36107320 36107322 36107518 36107530 36107585 36108072 367K0017 36801023 38112031 38200233	RECTIFIER,SI. TVR-06G G23 DIODE EGP10G G23 RECTIFIER,SI. TVR-06G RECTIFIER,SI. RUIP RECTIFIER,SI. RK14 DIODE FMG-G26S DIODE EL12 RECTIFIER,SI. RG2 DIODE RS4FS DIODE RBV-406H D.NETWORK D5LCA20 DIODE RD4.7EB-T4 DIODE LIGHT-E SEL1320G THERMISTOR,POSITIVE IC TLP634(NHE-LF2)
*** TRANSFORMERS ***		
T502 T501 T506 ΔT601 ΔT505 ΔT503	45803010 46302102 46304105 46310407 47105651 47502060	TRANS. H. DRIVE TRANS. FERRITE FERRITE TRANS TRANS. SWITCHING F.B.T. (Q) TRANS
*** VARIABLE RESISTORS ***		
VR101 VR904 VR901 VR906 VR905 VR505 VR501 VR502 VR503 VR402 VR651 ΔVR2001 ΔVR2002 ΔVR504	41011211 41071160 41071161 41071165 41085006 41085009 41085010 41085059 41505003 41505005	R.VARIABLE B10K-V R.VARIABLE B3.3K R.VARIABLE B4.7K R.VARIABLE B22K R.VARIABLE B2K R.VARIABLE B10K R.VARIABLE B20K R.VARIABLE B10K R.VARIABLE B500 R.VARIABLE B2K
*** RELAYS & SWITCHES ***		
SW110 ΔSW111 SW101 SW102 SW103 SW104 SW105 SW107 SW108 SW109 RL801 RL802	65161045 65161046 65260002 65360016 65602551 65699012	SWITCH,SLIDE SWITCH,SLIDE SWITCH,SEE-SAW SWITCH,PUSH BUTTON RELAY G5A-23TP RELAY RY12W (2T)

SYMBOL	PARTS NO	DESCRIPTION
*** COILS & FILTERS ***		
LC901 ΔT504 ΔL503 ΔL504 ΔL902 L901 L151 L152 L508 Δ ΔFL601 L502 L401 ΔL602 L507 L506 L505 ΔL651 L801 ΔL653 L501 ΔL652 ΔL601 ΔDEG LC902	390J9015 60906202 60908062 60918108 610E1708 610E1712 610E1714 610E1719 610F7514 610F82076 61062107 61084006 61084051 61085002 61087005 61070127 61070128 61099011 61051709 61099014 61099019 61099023 61099044 61314212 61606022	FILTER ZJSC-2R2-101TA WIDTH CHOKE COIL,VARIABLE COIL,H.LIN COIL,FILTER,L1R8K,BT(S) COIL,FILTER 3.9UH COIL,FILTER 5.6UH COIL,FILTER 15UH COIL,FILTER 5.6UH POWER LINE FILTER COIL,LINE FILTER COIL,FILTER 50UH COIL,FILTER 2200UH FERRITE BEADS COIL,FILTER 1.0UH FILTER,CHOKC COIL,CHOKE COIL,CHOKE 33UH COIL,FILTER L2R2KBS COIL,CHOKE 33UH COIL,CHOKE FILTER,CHOKE SHIELDING COIL 222K COIL,DEGAUSSING NOIZE FILTER DSS-222M
*** PWB ASSYS ***		
	84L07A01 84L07C01 84L07D01	SW,REG.PWB ASSY VIDEO-CRT PWB ASSY MAIN PWB ASSY
*** ELECTRICAL PARTS & MISCELLANEOUS PARTS ***		
HS3 HS402 HS1 HS523 SG901 SG904 X151 ΔF601 SG905 Δ CN-RH CN-RH3 CN-L	31709103 31709202 31709204 31709503 32990047 64099072 66699018 66706001 70032026 70800039 73893067 70599111 70599129 71205037 73721003 73729006	INSULATOR SHEET,INSULATOR SHEET,HEAT SINK SHEET,INSULATOR ARRESTER CRYSTAL RESONATOR FUSE ET T2.5A 250-S.B SOC SPARK GAP 1.2KV SG/CRT SOCKET LINE CORD CABLE SIGNAL ADAPTER ADAPTER HOLDER,FUSE CONNECTOR P IN 2P POST 2P

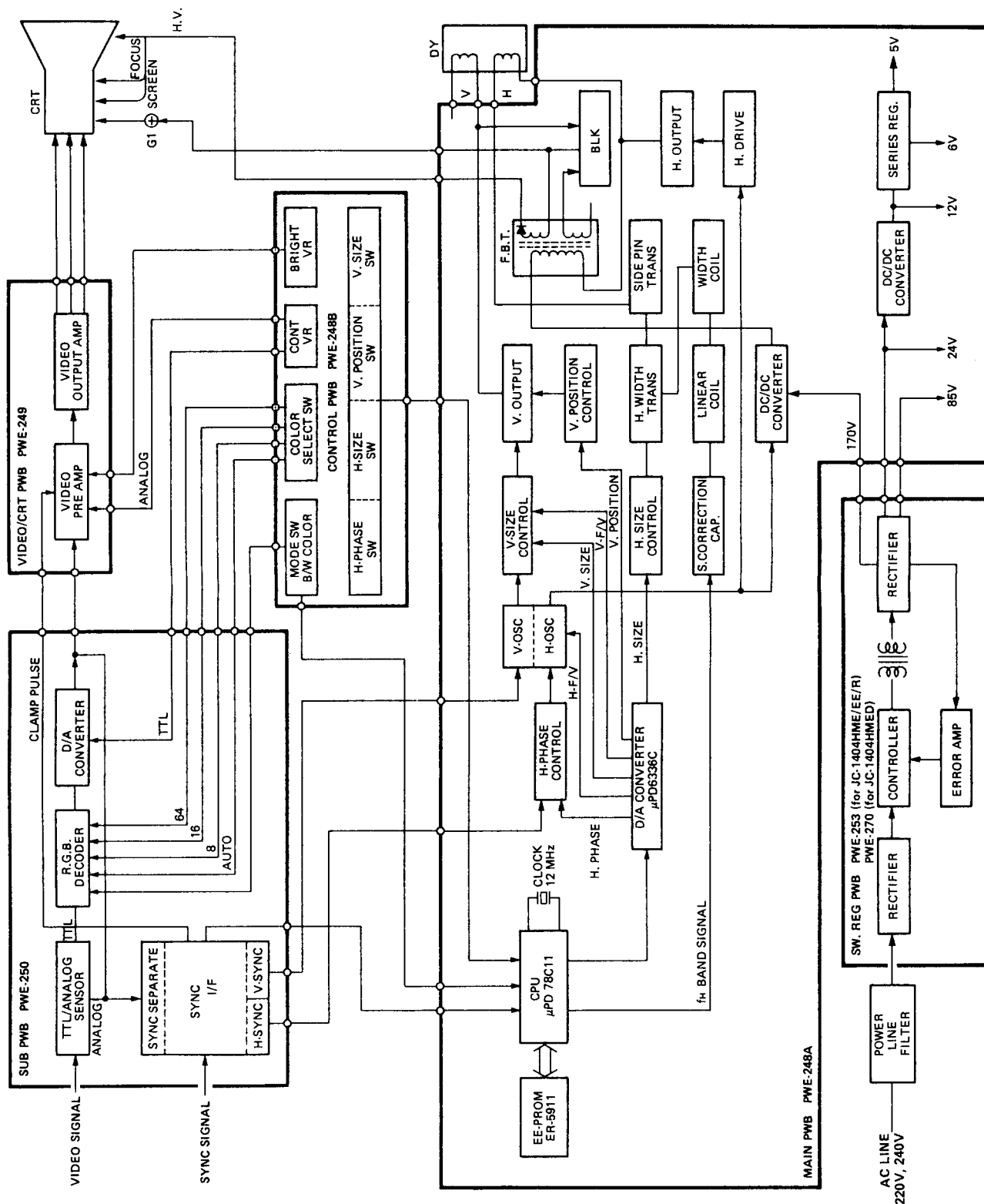
SYMBOL	PARTS NO	DESCRIPTION
*** APPEARANCE PARTS ***		
	24514792 25310471 25310492 25310672 25409732 25409751 25770091	COIL SPRING CABINET FRONT ASSY CABINET BACK ASSY CABINET BOTTOM ASSY REVOLVING STAND ASSY SPINDLE NAME PLATE, INSTRUCTION
*** KNOBS & PUSH BUTTONS ***		
	25452771 25452791 25452911 25452921	KNOB, CONTROL KNOB, SLIDE KNOB(A), SLIDE PUSH BUTTON
*** PRINTED & PACKING MATERIALS ***		
	24806961 24813191 599910285 25605881 25804551 78034401 25804991 25816341 25816351 25818361 78122531	BAG, POLYETHYLENE (270*370) BAG, POLYETHYLENE (150*370) S/M JC-1404HME/EE/R/ED FOOT(A), RUBBER BAG, POLYETHYLENE (150*230) MONITOR SALES OFFICE LIST BAG, POLYETHYLENE (85*110) FILLER, CARTON(T) FILLER, CARTON(R) CARTON BOX(JC-1404HME) INSTRUCTION BOOK
*** RESISTORS ***		
R604 R628 R500 R618 R660 R514 R663 R969 R151 R936 R508 R1A0 R1A3 R1A6 R153 R156 R172 R175 R461 R5F3 R551 R908 R966 R502 R558 R403 R466	R612 R602 R663 R970 R5E6 R940 R944 R583 R1A1 R1A4 R1A5 R152 R155 R158 R174 R456 R500 R541 R507 R582 R913 R655 R408 R471	R, CARBON 10H 5% 1/4W R, CARBON 220H 5% 1/4W R, CARBON 1.0K 5% 1/4W R, CARBON 10K 5% 1/4W R, CARBON 15K 5% 1/4W R, CARBON 100H 5% 1/6W R, CARBON 470H 5% 1/6W R, CARBON 560H 5% 1/6W R, CARBON 1.0K 5% 1/6W R, CARBON 1.2K 5% 1/6W R, CARBON 1.5K 5% 1/6W R, CARBON 2.2K 5% 1/6W

SYMBOL	PARTS NO	DESCRIPTION
*** RESISTORS ***		
R5E5 R5F0 R517 R524 R528 R546 R566 R914 R955 R971 R975 R2004 R2006 R5C3 R538 R904 R905 R906 R5B1 R5B2 R5C6 R918 R930 R930 R159 R167 R169 R171 R402 R441 R519 R522 R547 R552 R665 R910 R2003 R2005 R554 R581 R912 R963 R1A7 R101 R102 R103 R104 R105 R106 R107 R108 R109 R112 R113 R114 R115 R116 R117 R118 R119 R120 R121 R122 R123 R161 R163 R164 R166 R168 R170 R183 R184 R195 R196 R197 R409 R435 R442 R412 R458 R5C1 R5F1 R5F2 R529 R513 R533 R542 R545 R549 R558 R560 R571 R572 R585 R574 R584 R917 R960 R962 R2009 R405 R579 R625 R626 R961 R569 R576 R577 R590 R621 R965 R198 R401 R410 R5A4 R557 R580 R619 R404 R414 R445 R622 R921 R929 R934 R2008 R130 R417 R436 R420 R438 R439 R5A9 R539 R589 R615 R2011 R616 R617 R432	401K5685 401K5687 401K5689 401K5695 401K5697	R, CARBON 3.3K 5% 1/6W R, CARBON 3.9K 5% 1/6W R, CARBON 4.7K 5% 1/6W R, CARBON 8.2K 5% 1/6W R, CARBON 10K 5% 1/6W R, CARBON 12K 5% 1/6W R, CARBON 15K 5% 1/6W R, CARBON 22K 5% 1/6W R, CARBON 27K 5% 1/6W R, CARBON 39K 5% 1/6W R, CARBON 100K 5% 1/6W R, CARBON 270K 5% 1/6W R, CARBON 12H 5% 1/4W R, CARBON 15H 5% 1/4W R, CARBON 22H 5% 1/4W

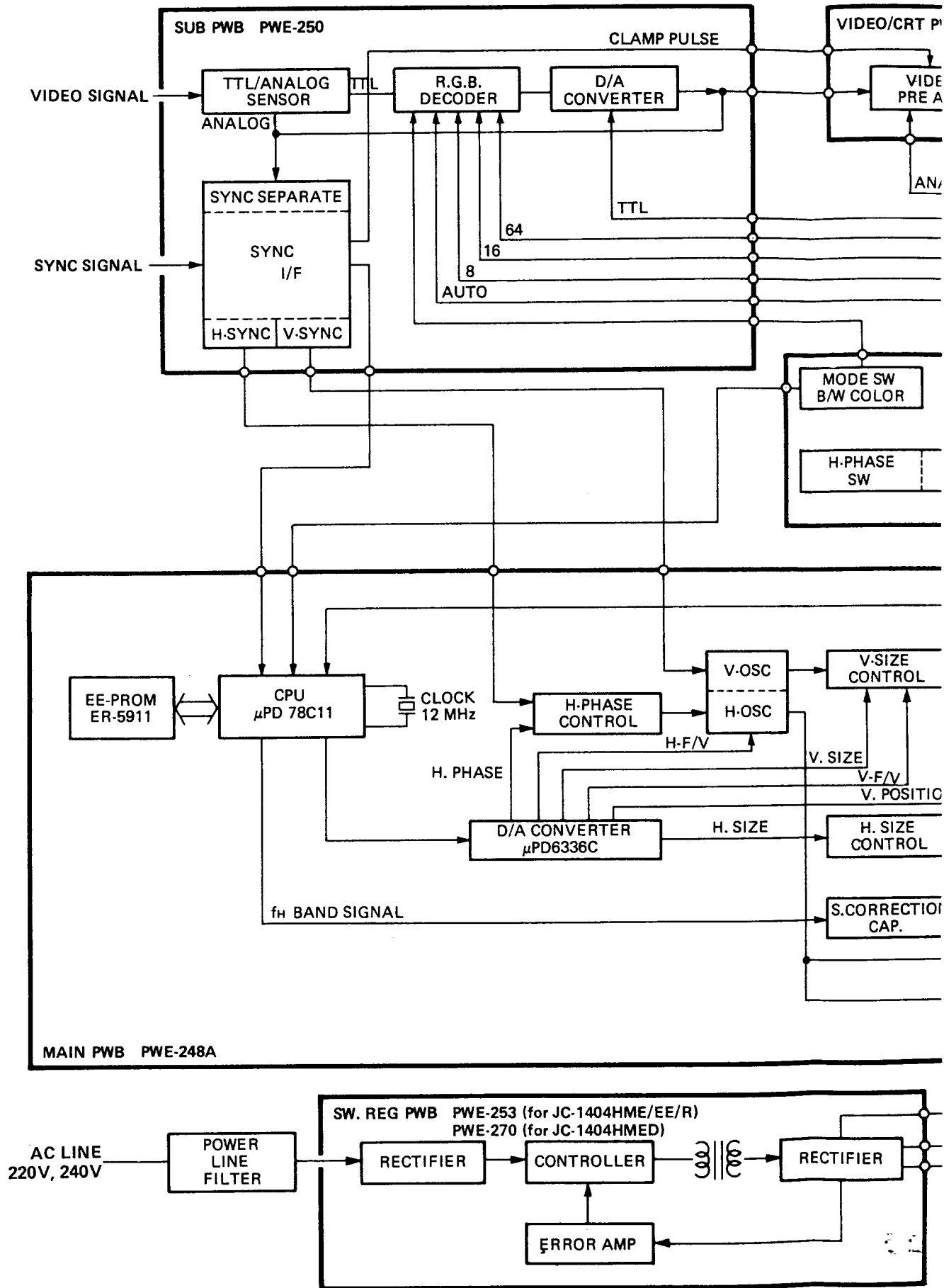
SYMBOL	PARTS NO	DESCRIPTION	SYMBOL	PARTS NO	DESCRIPTION
*** RESISTORS ***			*** CAPACITORS ***		
Δ R525 ΔR592	40178166	R. CARBON 510H 5% 1/2W	C169	C171	C. CERAMIC 50V 390PF
Δ R521	40178177	R. CARBON 1.5K 5% 1/2W	C174	C175	C. CERAMIC 50V 1000PF
Δ R631	40216274	R. WIRE 1.2H 5% 5W	C177	C178	C. CERAMIC 50V 0.0022UF
Δ R601	40299107	R. WIRE 15H 10% 5W	C180	C181	C. CERAMIC 50V 100PF
Δ R5E0	40371135	R. METAL 27H 5% 1W	C409	C425	C. CERAMIC 50V 0.1UF
Δ R5E1	40371143	R. METAL 56H 5% 1W	C543	C553	
Δ R610	40371329	R. METAL 0.22H 5% 1W	C568	C569	
Δ R426	40372105	R. METAL 1.5H 5% 2W	C574	C575	
Δ R654 ΔR666	40372133	R. METAL 22H 5% 2W	C580	C581	
Δ R651	40372137	R. METAL 33H 5% 2W	C908	C909	
Δ R555	40372169	R. METAL 680H 5% 2W	C911	C935	
Δ R630	40372213	R. METAL 47K 5% 2W	C501	C554	
Δ R567	40373123	R. METAL 8.2H 5% 3W	C152		
Δ R606	40373141	R. METAL 47H 5% 3W	C592		
Δ R624	40373145	R. METAL 68H 5% 3W	Δ C528		
Δ R433	40373153	R. METAL 150H 5% 3W	C101	C160	
Δ R586	40373167	R. METAL 560H 5% 3W	C172	C557	
Δ R587	40373169	R. METAL 680H 5% 3W	C304	C907	
Δ R667	40373173	R. METAL 1.0K 5% 3W	C917	C918	
Δ R657	40373197	R. METAL 10K 5% 3W	C920	C922	
Δ R668	40373213	R. METAL 47K 3W 5%	C334	C925	
Δ R603	40373217	R. METAL 68K 5% 3W	C162	C163	
Δ R607	40373219	R. METAL 82K 5% 3W	C151	C403	
Δ R948	40399037	R. METAL 390H 5% 3W	C583	C923	
Δ R947	40399038	R. METAL 470H 5% 3W	C321	C926	
Δ R953	40399039	R. METAL 180H 5% 1W	C413	C513	
Δ R947	40399039	R. METAL 180H 5% 1W	C502		
Δ R973	40399040	R. METAL 100H 5% 1W	Δ C529	C584	
Δ R587	404C1683	R. METAL 2.7K 1% 1/6W	C530	C538	
Δ R179	404C1699	R. METAL 12K 1% 1/6W	C324		
Δ R562	404C1711	R. METAL 39K 1% 1/6W	C417		
Δ R661	404C1719	R. METAL 82K 1% 1/6W	C431		
Δ R2001	40405109	R. METAL 2.2H 5% 1/4W	C539	C541	
Δ R501	40405109	R. METAL 2.2H 5% 1/4W	C523		
Δ R527	40405137	R. METAL 33H 5% 1/4W	C514		
Δ R536	40405149	R. METAL 100H 5% 1/4W	C508		
Δ R520	40405149	R. METAL 100H 5% 1/4W	C402		
Δ R559	420C9551	C. CERAMIC 500V 100PF	Δ C624		
Δ R577	420C9557	C. CERAMIC 500V 330PF	C510		
Δ R547	420C9560	C. CERAMIC 500V 560PF	C509	C516	
Δ R560	420C9563	C. CERAMIC 500V 0.001UF	C562		
Δ R571	420C9567	C. CERAMIC 500V 2200PF	C555		
Δ R404	420J9069	C. CERAMIC 50V 0.1UF	C544		
Δ R927	420J9071	C. CERAMIC 500V 4700PF	C548		
Δ R933	42040108	C. CERAMIC 2KV 0.01UF	C506	C507	
Δ R603	42053013	C. CERAMIC 400V 1000PF	Δ C660		
Δ R662	42099086	C. CERAMIC 2KV 1000PF	Δ C616		
Δ R608	42099088	C. CERAMIC 2KV 220PF	Δ C605	Δ C614	Δ C618
Δ R621	42099096	C. CERAMIC 2000V 470PF	C401		
Δ R153	421A0425	C. CERAMIC 50V 0.01UF	Δ C620		
Δ R156			Δ C602		
			Δ C661		
			Δ C658	Δ C659	
			Δ C609		

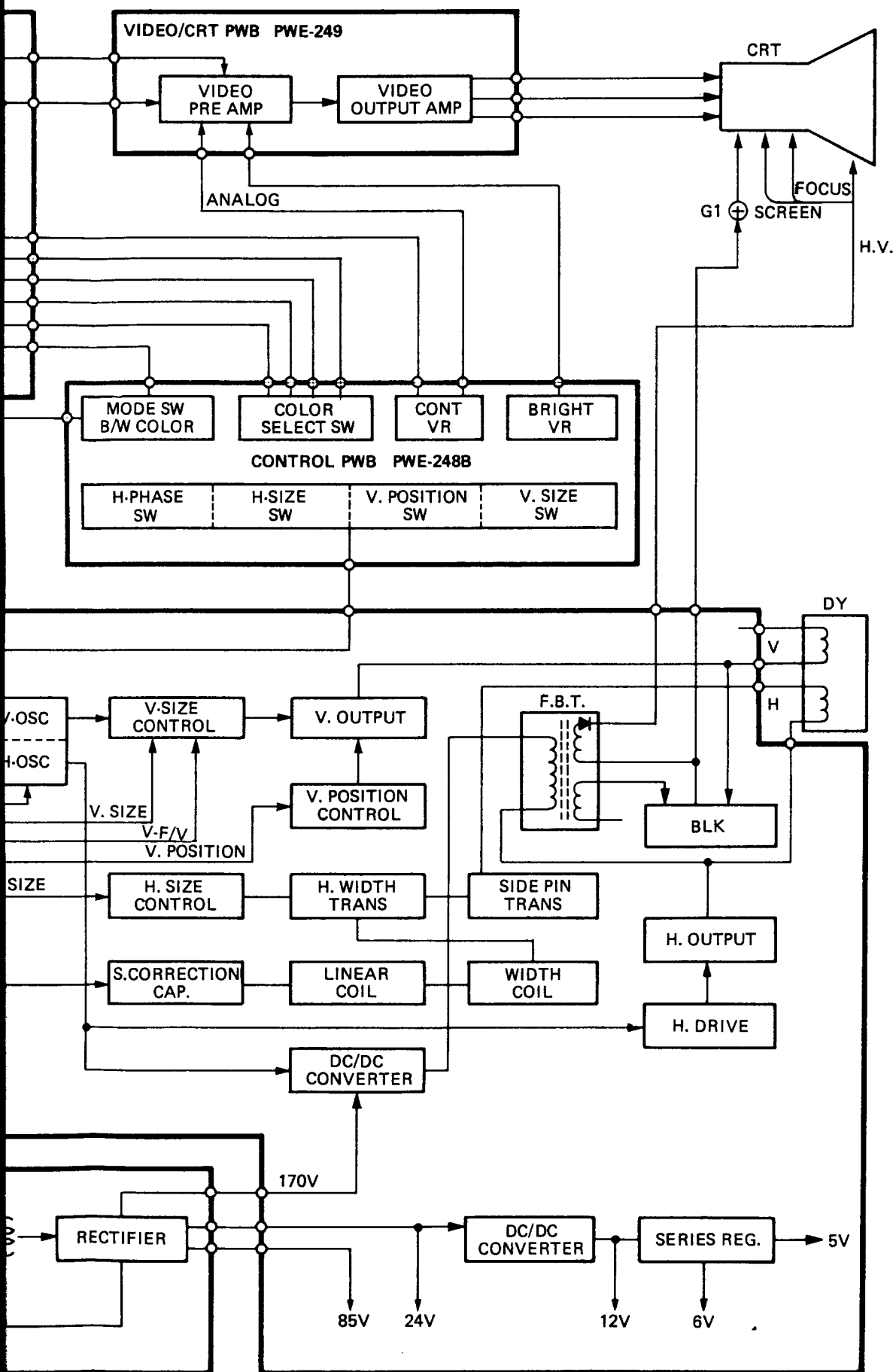
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*** CAPACITORS ***	***	
Δ C617	42842004	C. METAL 50V 390PF
Δ C649	42842506	C. METAL 1600V 1800PF
Δ C652	42842507	C. METAL 400V 0.025UF
Δ C633	42843501	C. FILM 200V 0.82UF
Δ C534	42843508	C. METAL 160V 0.47UF
Δ C532	42843509	C. METAL 400V 0.12UF
Δ C535	42899014	C. METAL FILM 400V 0.39UF
Δ C601	42899097	C. METAL 250V 0.47UF
C545	43083051	C. ELEC 16V 220UF
Δ C2002	43083091	C. ELEC 35V 220UF
C928	43083182	C. ELEC 160V 1UF
C565	43083187	C. ELEC 160V 22UF
C419	43085107	C. ELEC 50V 22UF
Δ C2003	43086015	C. ELEC 10V 47UF
C161	43086039	C. ELEC 25V 22UF
Δ C526	43086061	C. ELEC 50V 1UF
C426		
C598		
C542	43086062	C. ELEC 50V 2.2UF
C518	43086065	C. ELEC 50V 10UF
C540	43086066	C. ELEC 50V 22UF
C556	43086068	C. ELEC 50V 47UF
Δ C2001	43089053	C. ELEC 35V 47UF
C593	43089061	C. ELEC 50V 1UF
C913	43089062	C. ELEC 50V 2.2UF
C536	43089556	C. ELEC 250V 10UF
C537	4302C190	C. ELEC 160V 100UF
Δ C664	4302J053	C. ELEC 35V 47UF
Δ C663	4302J058	C. ELEC 35V 1000UF
Δ C815	4302J064	C. ELEC 50V 4.7UF
Δ C611	4302J065	C. ELEC 50V 10UF
Δ C612	4302J066	C. ELEC 50V 22UF
Δ C657	4302J102	C. ELEC 100V 100UF
Δ C556	4302J103	C. ELEC 100V 220UF
C594	4302J516	C. ELEC 160V 10UF
Δ C654	4302J559	C. ELEC 250V 47UF
Δ C653	4302J560	C. ELEC 250V 100UF
Δ C418	43026073	C. ELEC 50V 1000UF
Δ C606	43109577	C. ELEC 400V 390UF
C905	4339J031	C. ELEC 35V 4.7UF
C416	435A8153	C. TANTLM 16V 4.7UF
C411	435A8307	C. TANTALM 35V 1UF
	C515	

BLOCKDIAGRAM

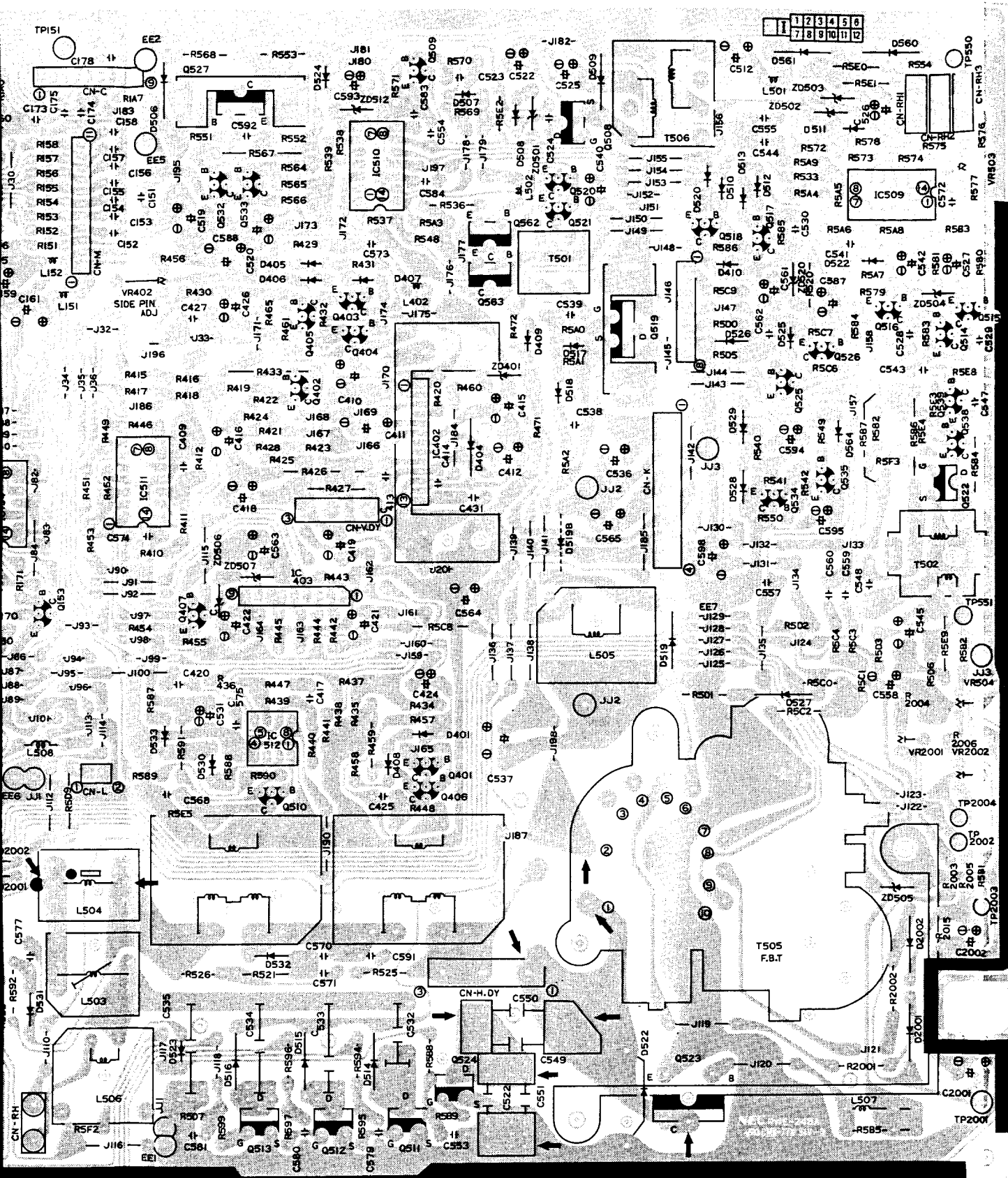


BLOCKDIAGRAM



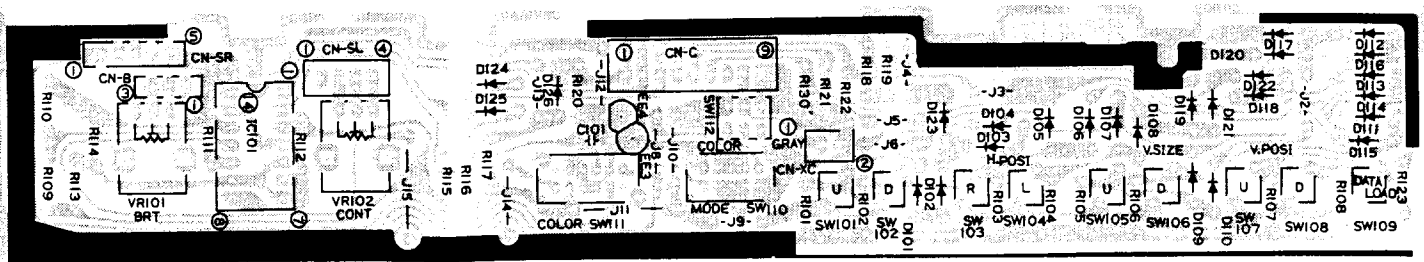


— Solder side —



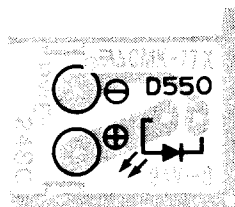
MAIN PWB ASSY (PWE-248A)

— Solder side —



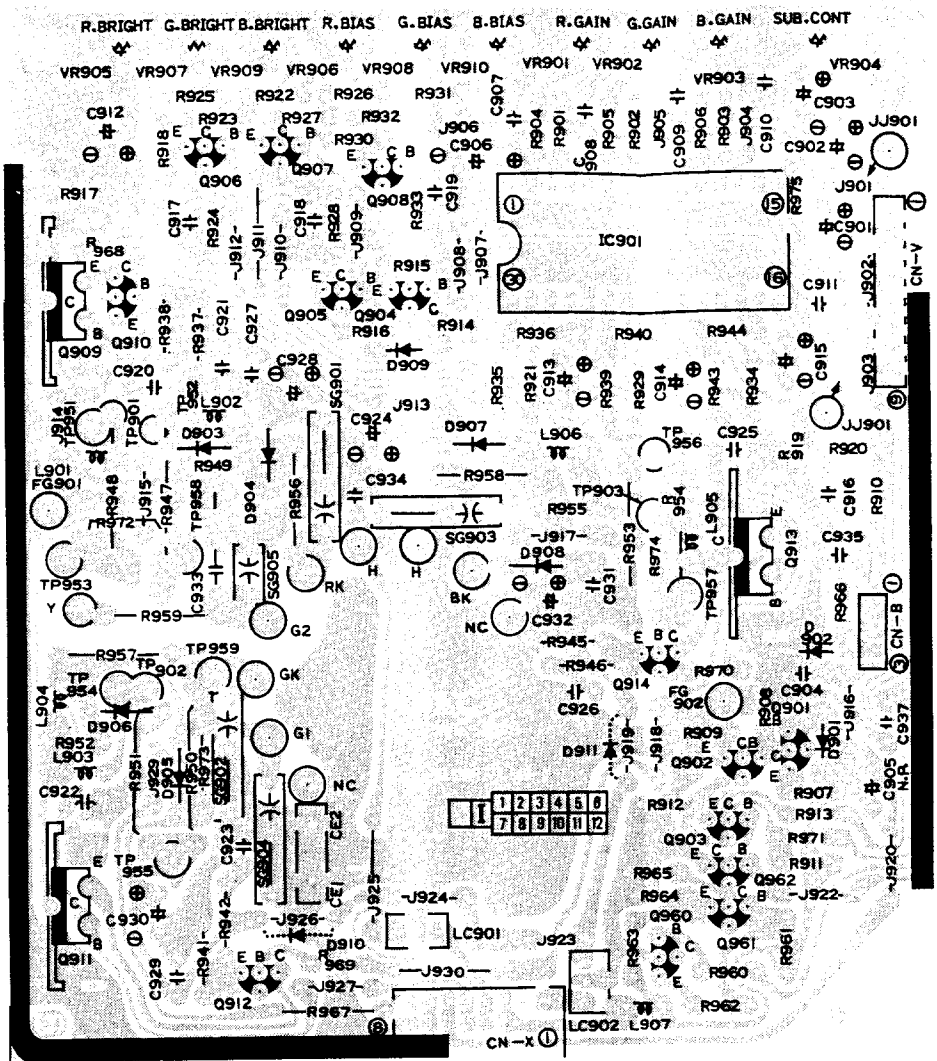
CONTROL PWB ASSY (PWE-248B)

— Solder side —



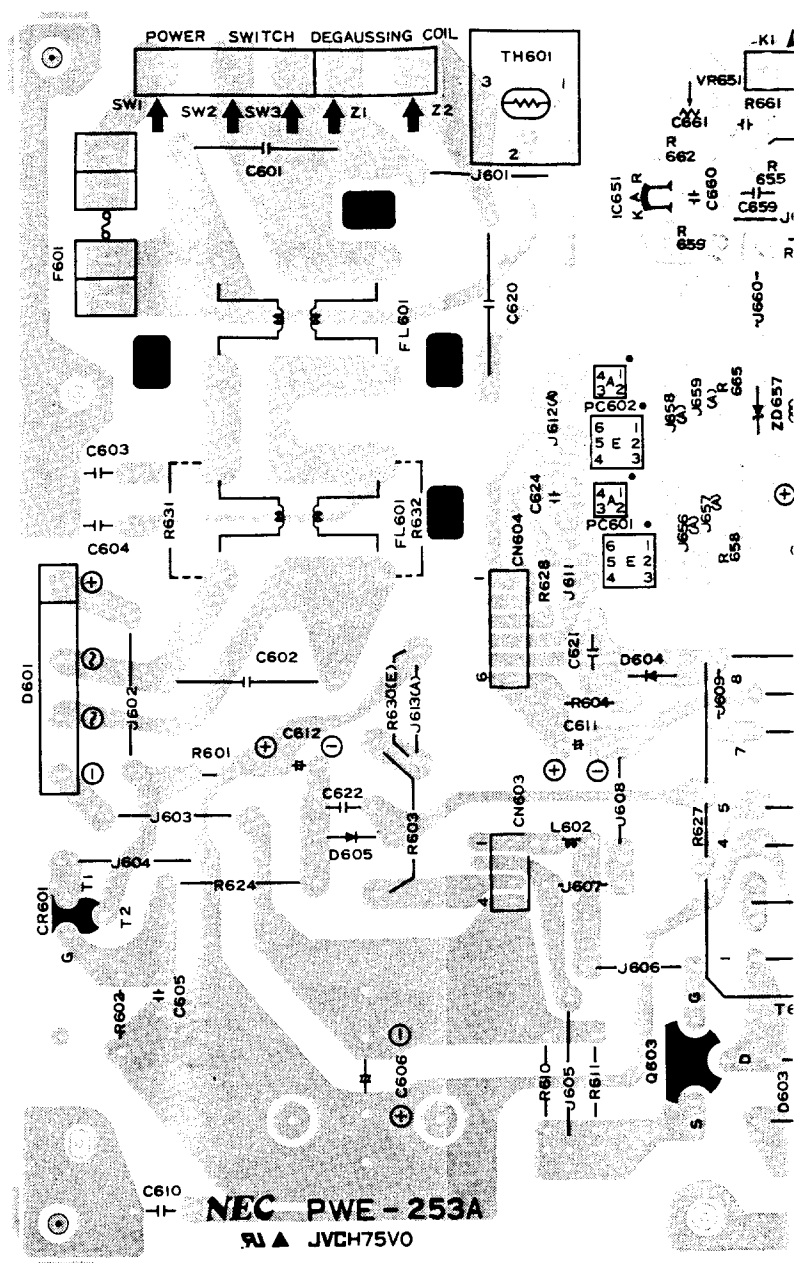
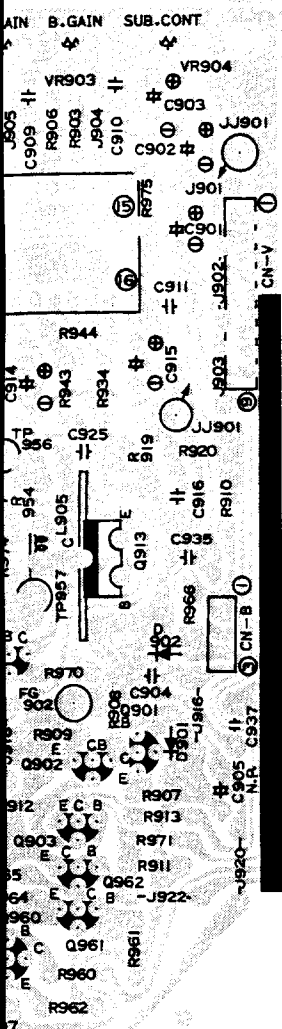
LED PWB ASSY (PWE-248C)

— Solder side —



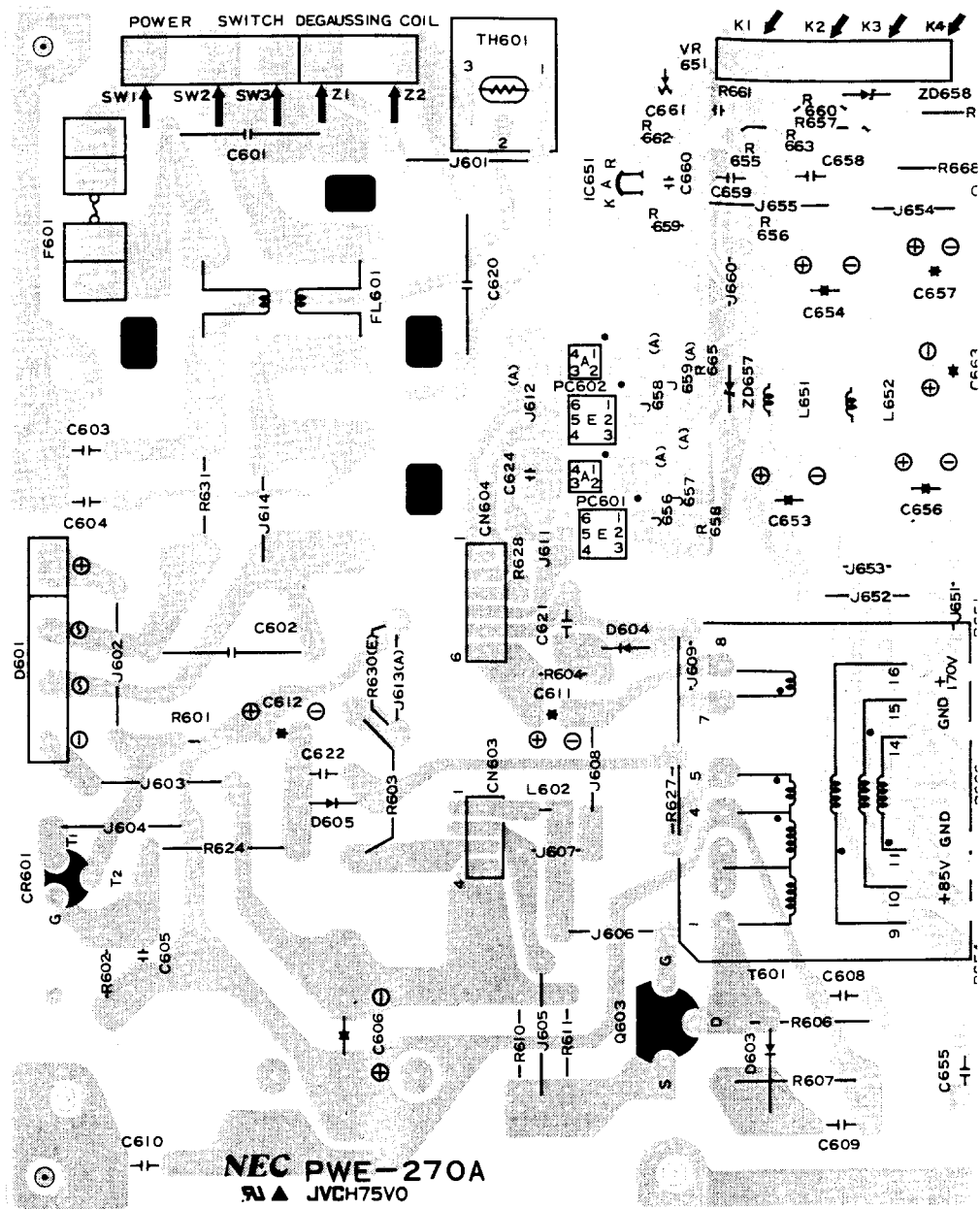
VIDEO/CRT PWB ASSY (PWE-249)

— Solder side —

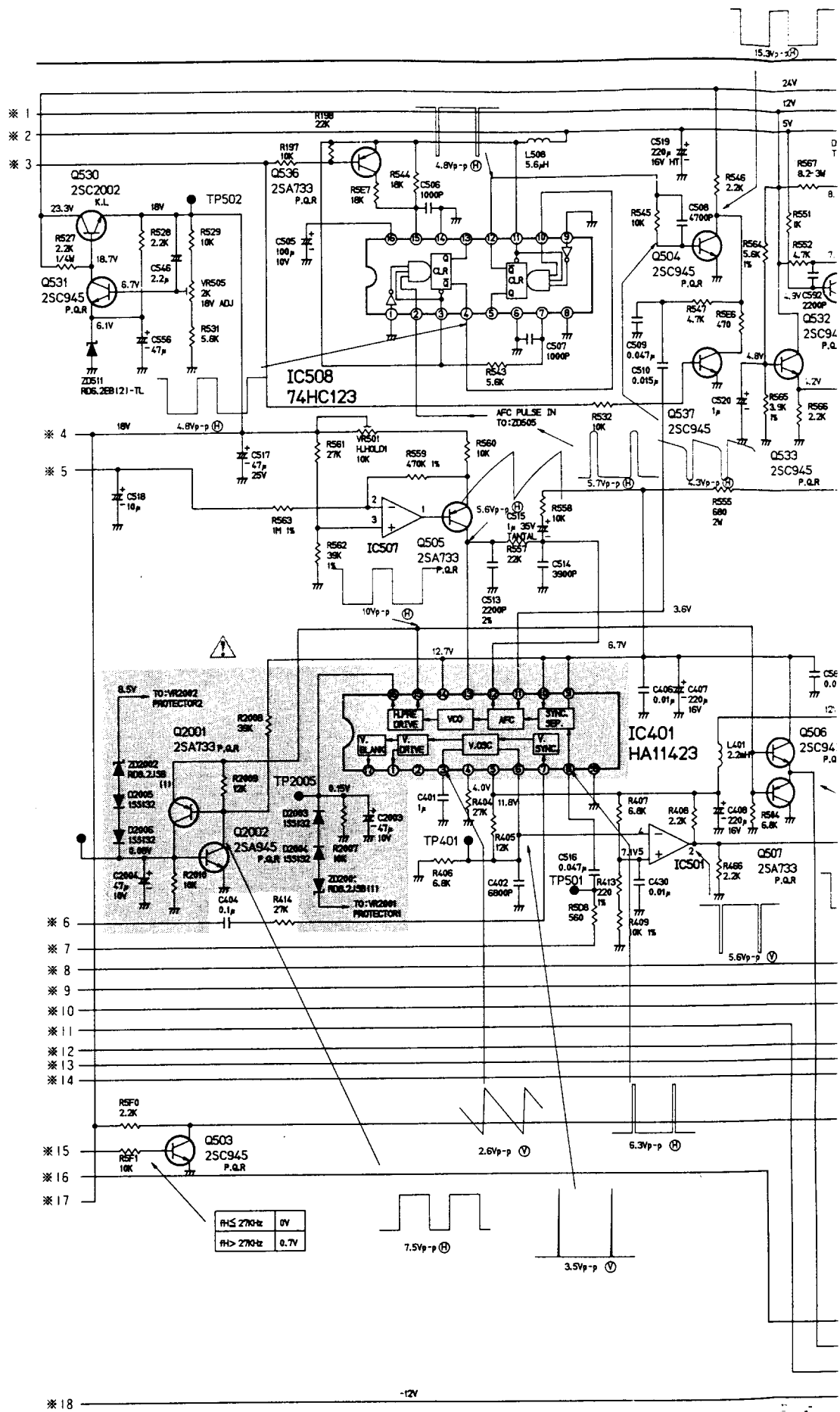


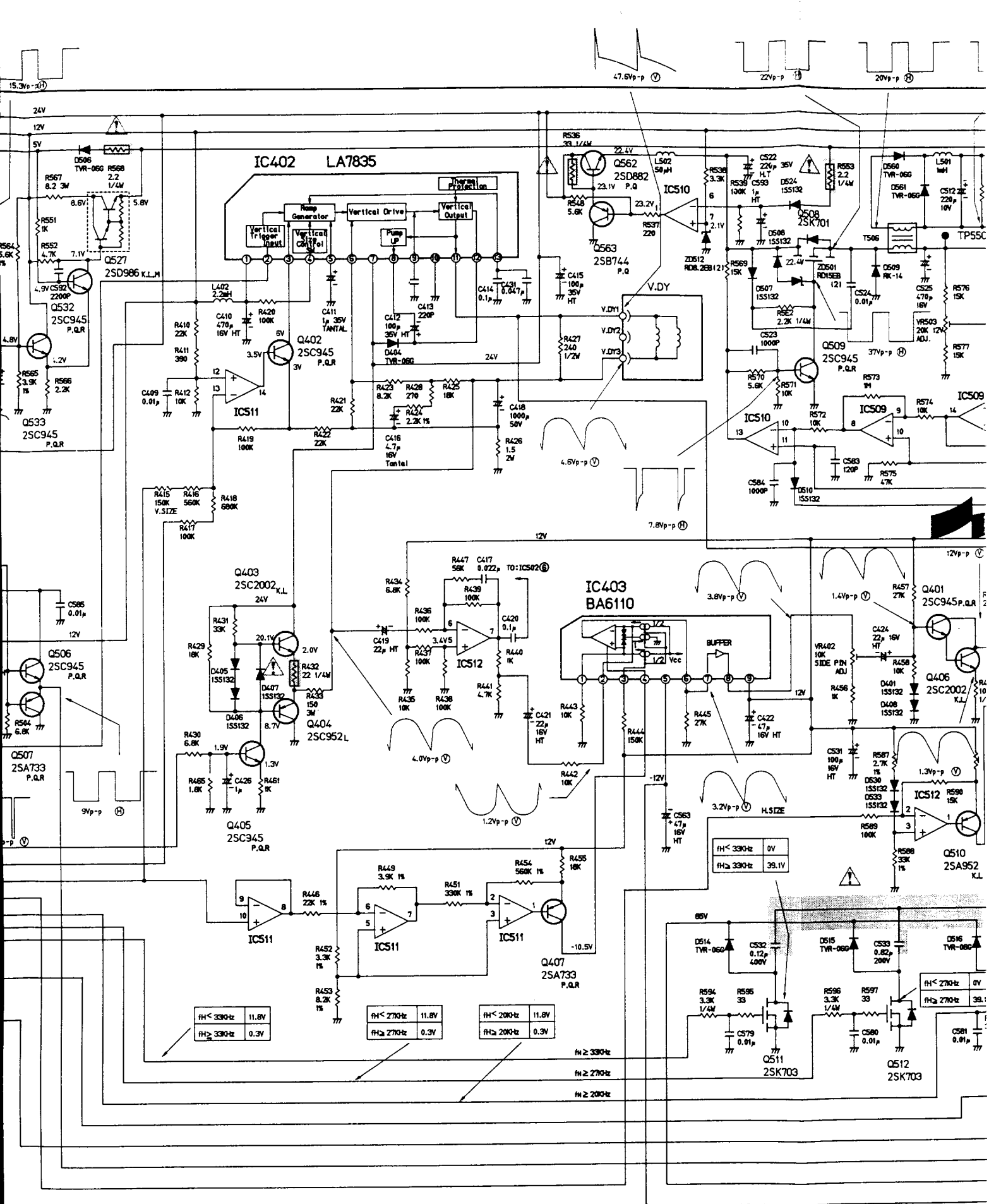
SW. REG. PWB ASSY (PWE-253A)
 — Solder side —
 models JC-1404HME/EE/R

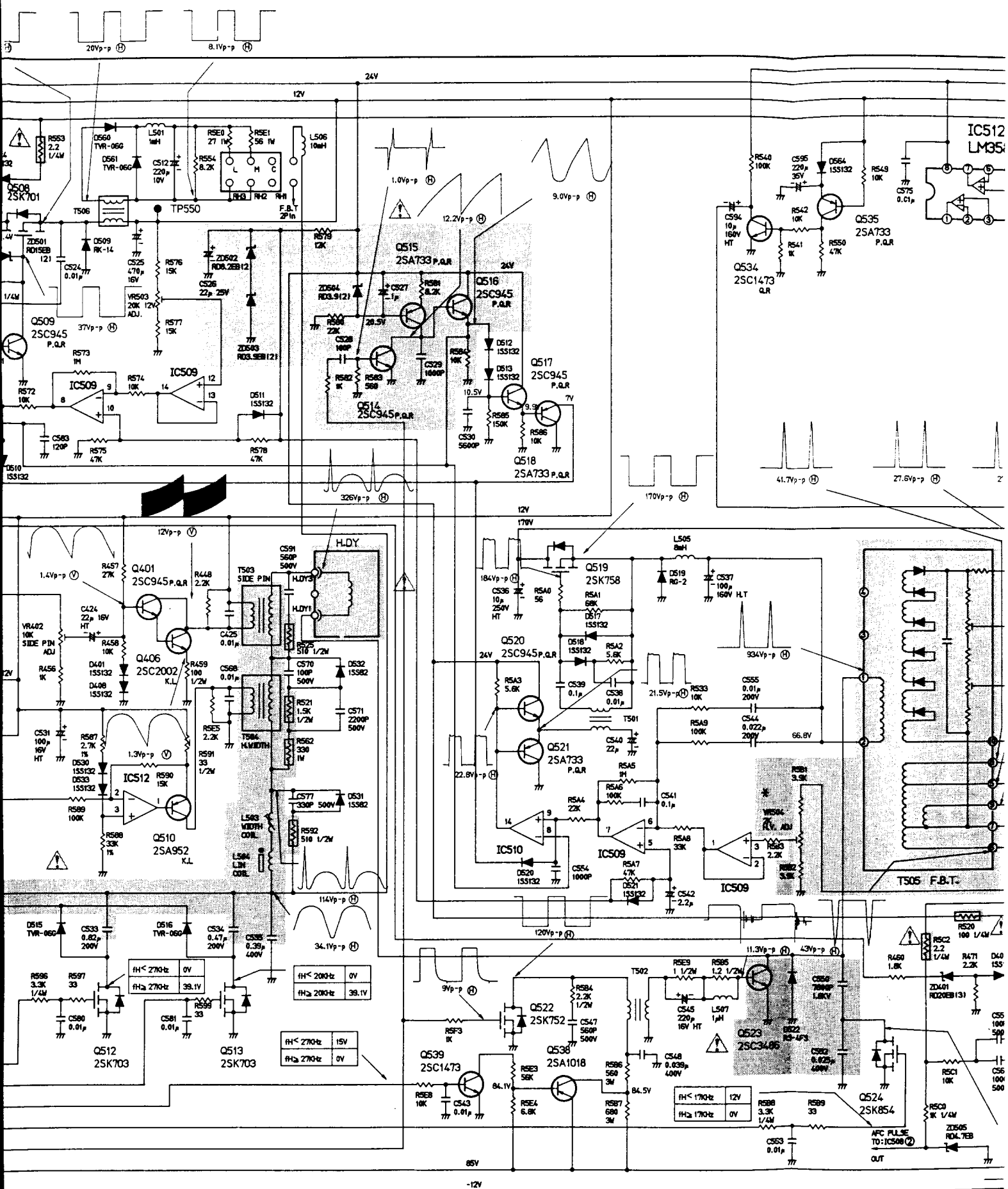
7B ASSY (PWE-253B)
 Solder side —
 -1404HME/EE/R

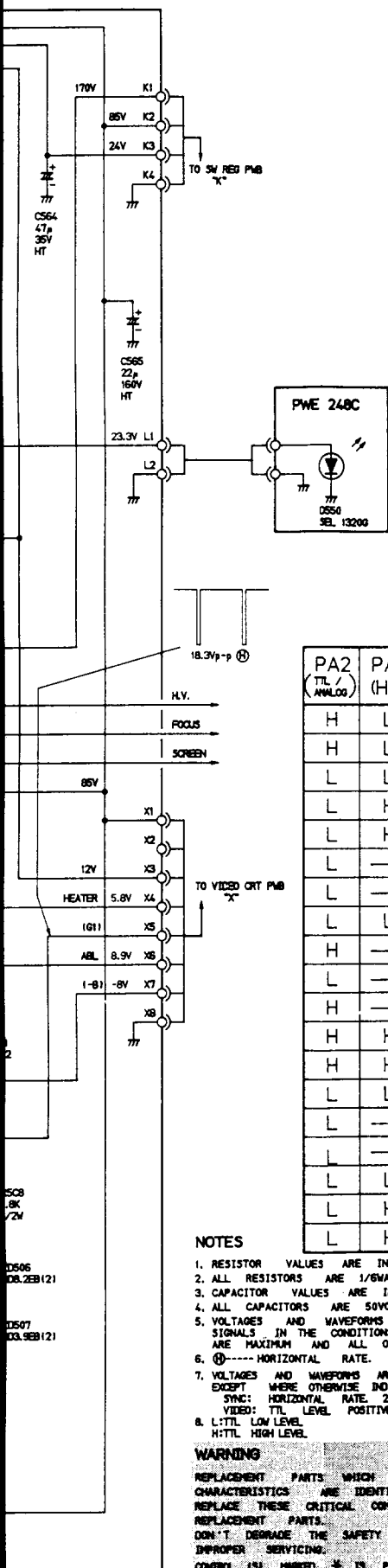


SW. REG. PWB ASSY (PWE-270A)
 — Solder side —
 model JC-1404HME









PD0 (CS0)	PD1 (CS1)	PD2 (CS2)	
L	L	L	
L	L	H	BRIGHT
L	H	L	CONT
L	H	H	H.POSI
H	L	L	H.SIZE
H	L	H	V.POSI
H	H	L	V.SIZE
H	H	H	DISABLE

PD3	PD4	
H	L	UP
L	H	DOWN
H	H	DISABLE

PD6	PD7	
L	L	USER CONTROL MODE
L	H	FACTORY ADJ.MODE
H	L	DATA LOAD
H	H	FACTORY DATA WRITING

PA2 (TTL / ANALOG)	PA3 (HP)	PA4 (VP)	PA5 (HE)	PA6 (VE)	PA7 (MODE)	F _H	F _V	
H	L	L	H	H	L	—	0	CGA
H	L	H	H	H	L	—	0	EGA
L	L	H	H	H	L	(1)	0	VGA 350
L	H	L	H	H	L	(1)	0	VGA 400
L	H	H	H	H	L	(1)	0	VGA 480
L	—	—	—	—	L	—	1	8514A
L	—	—	—	L	L	—	0	MAC II
L	L	L	H	H	L	(11)	0	800*600(1)P.P
H	—	—	—	—	H	—	0	MDA
L	—	—	H	L	L	(1)	0	PGC
H	—	—	H	L	L	—	0	TTL C.S.
H	H	L	H	H	L	—	0	TTL N.P.
H	H	H	H	H	L	—	0	TTL N.N.
L	L	L	H	H	L	(1)	0	ANALOG(1) PP
L	—	—	H	L	L	(11)	0	ANALOG(2) CS
L	—	—	—	—	H	—	0	USER
L	L	H	H	H	L	(11)	0	800*600(2)
L	H	L	H	H	L	(11)	0	800*600(3)
L	H	H	H	H	L	(11)	0	800*600(4)

NOTES

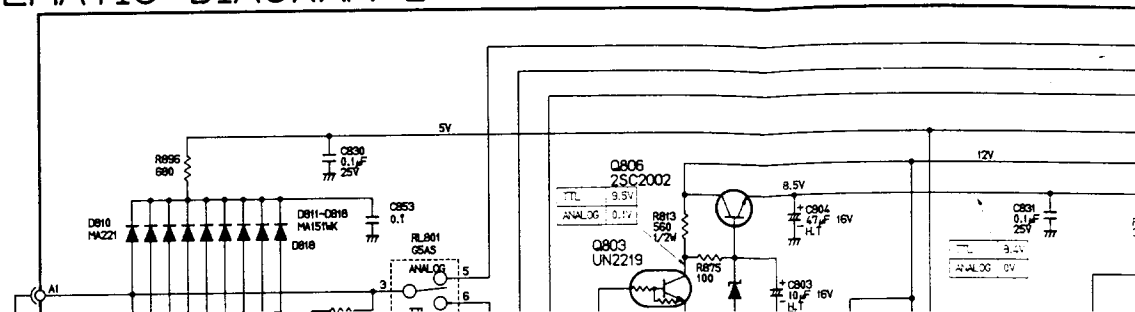
1. RESISTOR VALUES ARE IN Ω (OHM) K = 1,000Ω M = 1,000,000Ω
2. ALL RESISTORS ARE 1/6WATT EXCEPT WHERE OTHERWISE INDICATED.
3. CAPACITOR VALUES ARE IN μF UNLESS OTHERWISE INDICATED. P = PF
4. ALL CAPACITORS ARE 50VOLTS EXCEPT WHERE OTHERWISE INDICATED.
5. VOLTAGES AND WAVEFORMS ARE MEASURED UNDER THE CHARACTER SIGNALS IN THE CONDITIONS OF CONTRAST AND BRIGHTNESS CONTROLS ARE MAXIMUM AND ALL OTHER CONTROLS ARE NORMAL OPERATION.
6. Ⓜ----- HORIZONTAL RATE. Ⓜ----- VERTICAL RATE.
7. VOLTAGES AND WAVEFORMS ARE MEASURED UNDER THE FOLLOWING SYNC. AND VIDEO. EXCEPT WHERE OTHERWISE INDICATED.
 SYNC: HORIZONTAL RATE, 220Hz SEPARATE SYNC. TTL LEVEL POSITIVE
 VIDEO: TTL LEVEL POSITIVE. ALL INVERTED "H" PATTERN
8. L: TTL LOW LEVEL
 H: TTL HIGH LEVEL

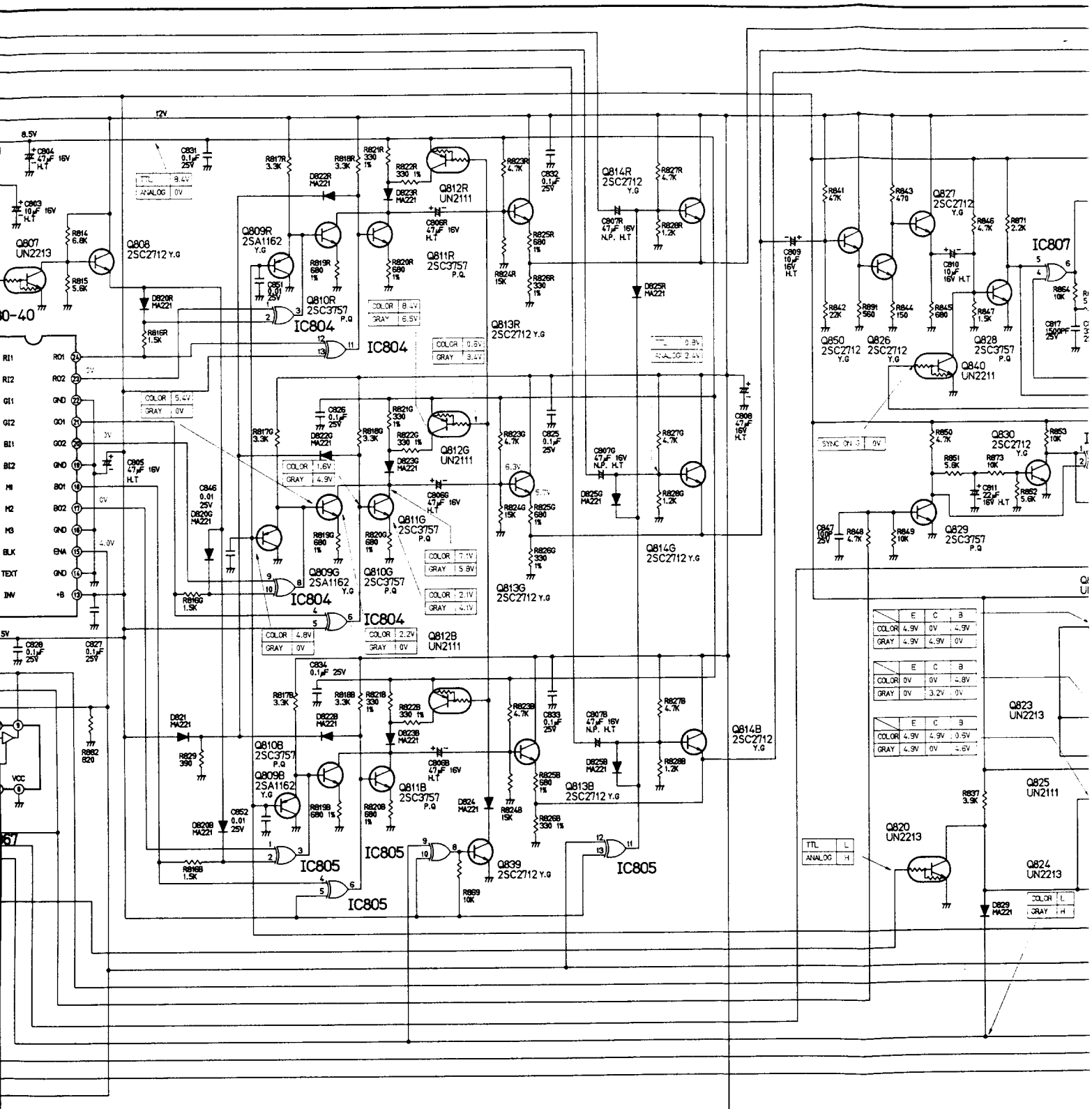
WARNING

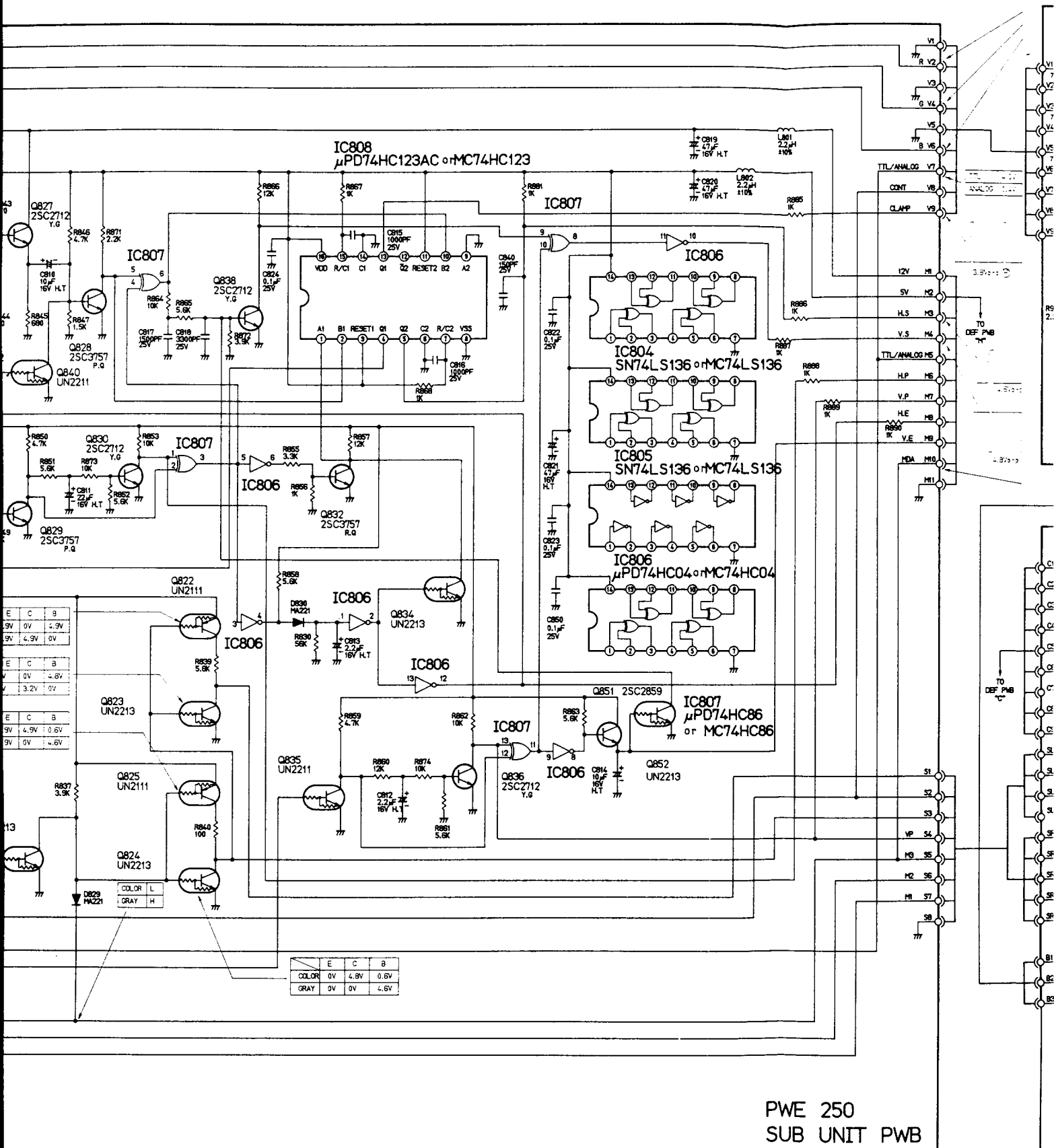
REPLACEMENT PARTS WHICH HAVE SPECIAL SAFETY CHARACTERISTICS ARE IDENTIFIED BY ⚠ SHADING ON THE SCHEMATICS. REPLACE THESE CRITICAL COMPONENTS WITH RECOMMENDED REPLACEMENT PARTS. DON'T DEGRADE THE SAFETY OF THE SET THROUGH IMPROPER SERVICING. CONTROL (S) MARKED ⚠ IS PERMANENTLY FROZEN. DO NOT ATTEMPT TO DEFEAT OR IMPROPERLY REPLACE.

NEC JC-1404HME/EE/R

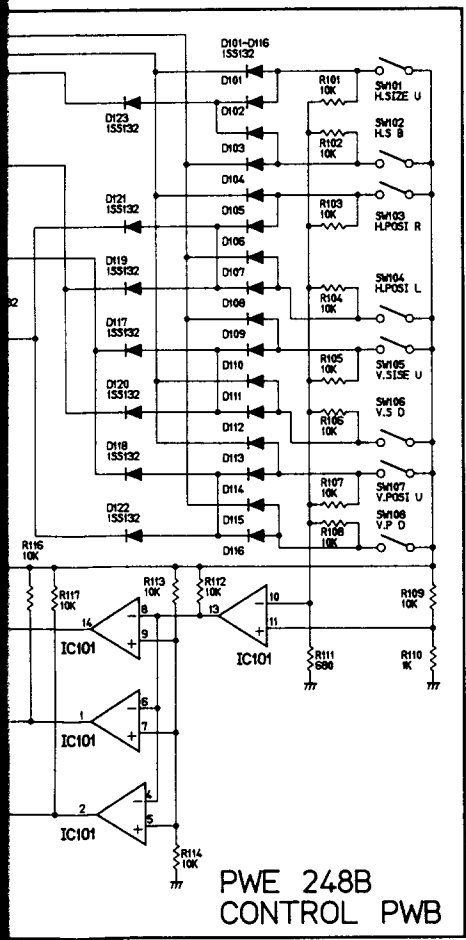
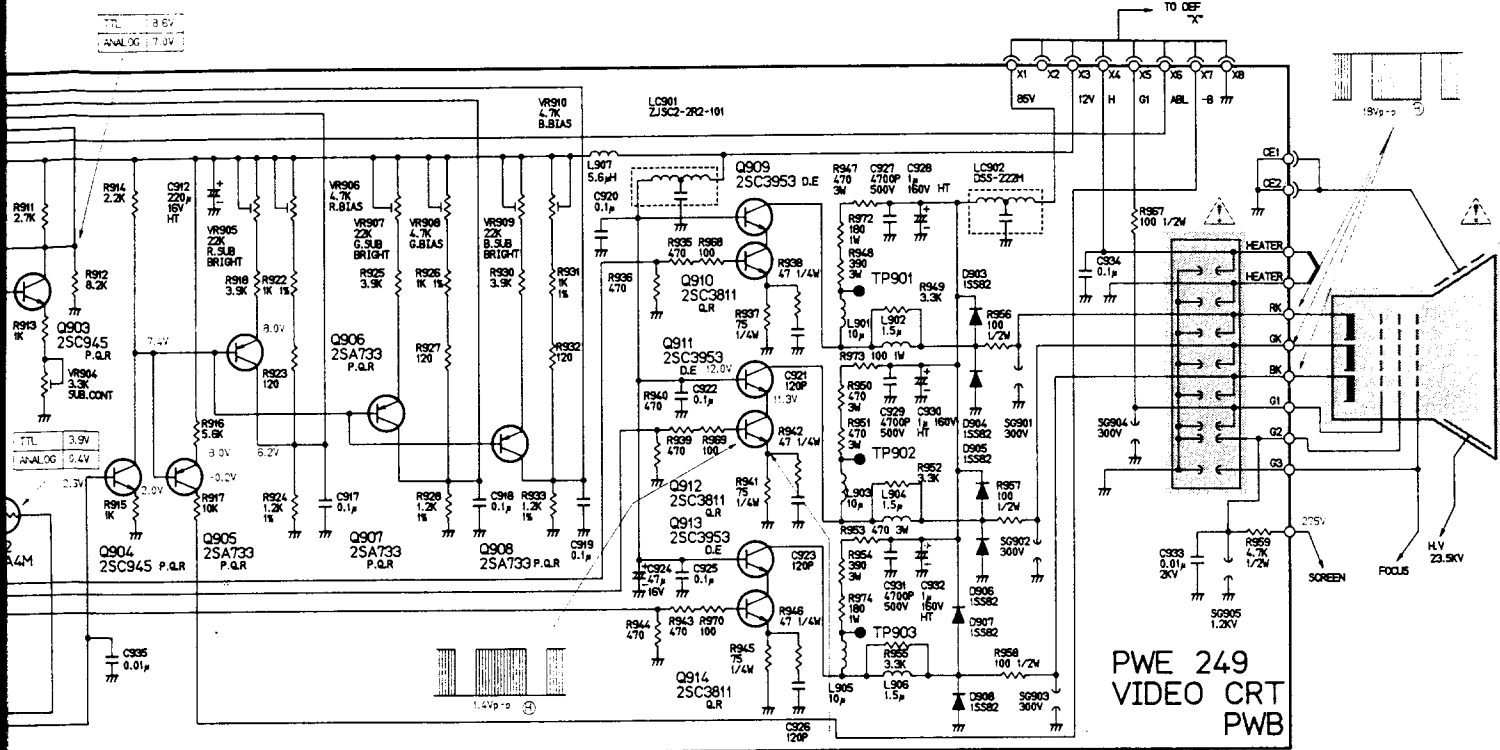
SCHEMATIC DIAGRAM 2







PWE 250
SUB UNIT PWB



ON-A	PIN	P/S	VGA	MAC- II	POC	TTL (E8A)
NO.	NO.	NO.	NO.	NO.	NO.	NO.
1	1	R	R	R	RA	GND
2	6	R.GND	R.GND			
3	2	G	(V SYNC)	G	F	
4	7	G.GND	G.GND			
5	3	B	B	B	R	
6	8	B.GND	B.GND			
7	4	ID (8514)				
8	5	GND (S.T)		GND	g	
9	10	GND	GND	GND	V.D	
10	11	ID (TO GREEN)				
11	12	ID (TO OPEN)		GND	H.D	
12	13	H.D	GND	C.SYNC	G	
13	14	V.D		MODE	B	
14	15	N.C		GND	b	

ON-M	MODE	MODE	MODE	MODE	MODE
1	AUTO	B	B	B	GRAY
2	V.S.P	L	L	H	
3	L	H	L	L	
4	L	L	L	L	H

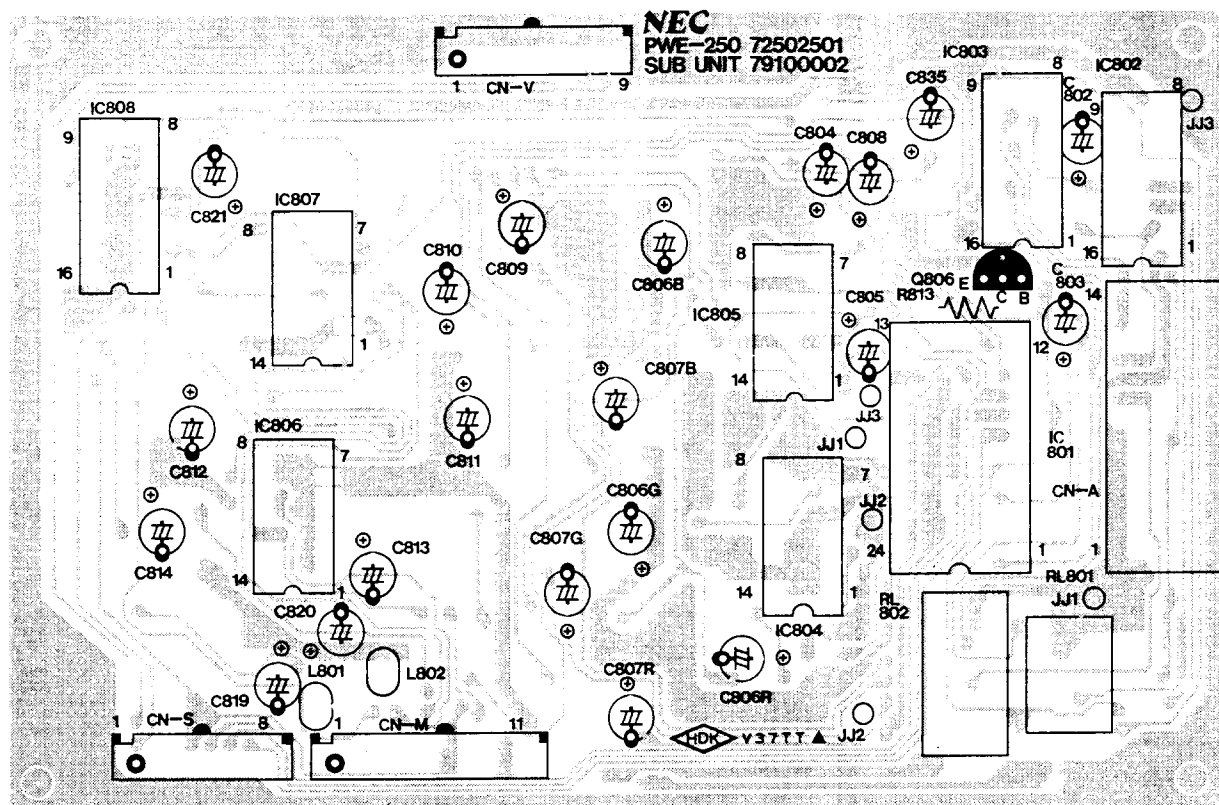
ON-M	MODE	MODE	MODE	MODE	MODE
1	H.P				
2	POST	NEGA			
3	4.9V	3V			
4	V.P				
5	POST	NEGA			
6	4.9V	0V			
7	SEPA	COMP	SYNC	G	
8	4.9V	4.9V	0V		
9	SEPA	COMP	SYNC	G	
10	4.3V	0V	0V		

- NOTES
1. RESISTOR VALUES ARE IN Ω (OHM) K = 1,000 Ω M = 1,000,000 Ω
 2. ALL RESISTORS ARE 1/8WATT EXCEPT WHERE OTHERWISE INDICATED.
 3. CAPACITOR VALUES ARE IN μ F UNLESS OTHERWISE INDICATED. P = PF
 4. ALL CAPACITORS ARE 50VOLTS EXCEPT WHERE OTHERWISE INDICATED.
 5. VOLTAGES AND WAVEFORMS ARE MEASURED UNDER THE CHARACTER SIGNALS IN THE CONDITIONS OF CONTRAST AND BRIGHTNESS CONTROLS ARE MAXIMUM AND ALL OTHER CONTROLS ARE NORMAL OPERATION.
 6. $\odot$ HORIZONTAL RATE. $\odot$ VERTICAL RATE.
 7. VOLTAGES AND WAVEFORMS ARE MEASURED UNDER THE FOLLOWING SYNC AND VIDEO. EXCEPT WHERE OTHERWISE INDICATED.
SYNC: HORIZONTAL RATE 220Hz SEPARATE SYNC. TTL LEVEL POSITIVE
VIDEO: TTL LEVEL POSITIVE. ALL INVERTED "H" PATTERN
8. L: TTL LOW LEVEL
H: TTL HIGH LEVEL
9. (1) $F_v \neq 330Hz$
(11) $F_v > 330Hz$
10. F_v 0: $F_v \neq 75Hz$
1: $F_v > 75Hz$

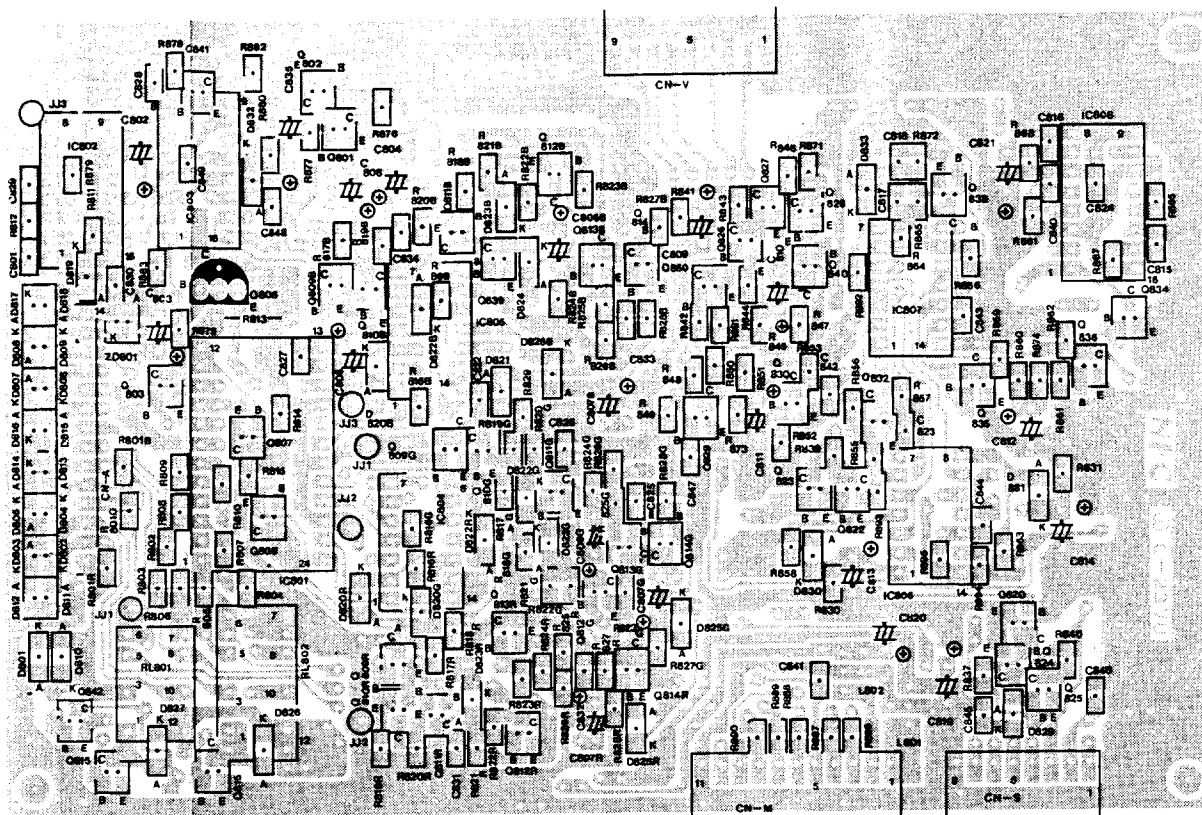
WARNING

REPLACEMENT PARTS WHICH HAVE SPECIAL SAFETY CHARACTERISTICS ARE IDENTIFIED BY SHADING ON THE SCHEMATICS. REPLACE THESE CRITICAL COMPONENTS WITH RECOMMENDED REPLACEMENT PARTS. DON'T DEGRADE THE SAFETY OF THE SET THROUGH IMPROPER SERVICING.

CONTROL (S) MARKED * IS PERMANENTLY FROZEN. DO NOT ATTEMPT TO DEFEAT OR IMPROPERLY REPLACE.

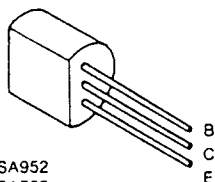


SUB PWB ASSY (PWE-250)
— Component side —

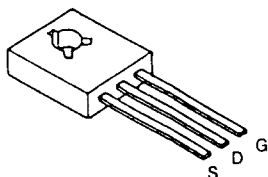


SUB PWB ASSY (PWE-250)

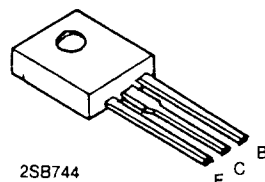
— Solder side —



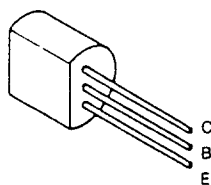
2SA952
2SA733
2SC945
2SC2002
AA1A4M
AA1L4M
2SC1473
2SA1018



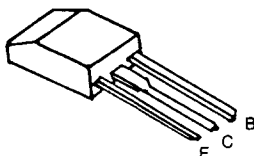
2SK701



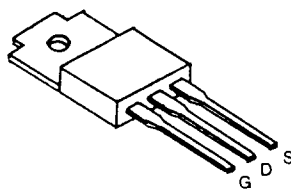
2SB744
2SD882
2SD986



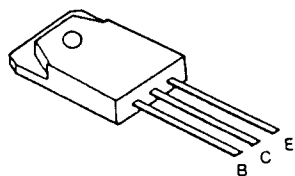
2SC3811



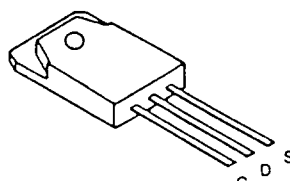
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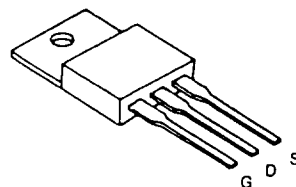
2SK703
2SK752
2SK758



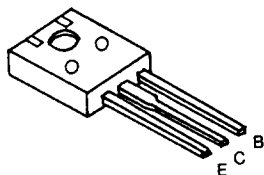
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2SK872



2SK854

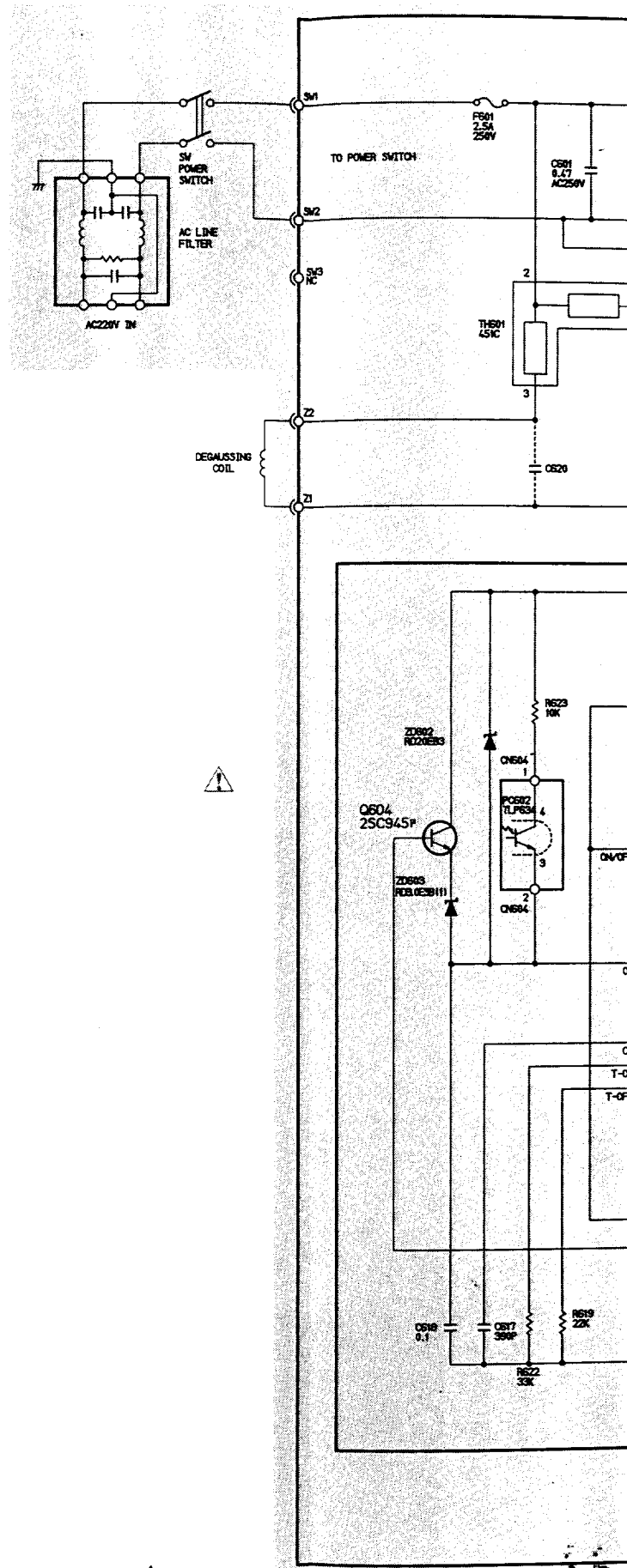


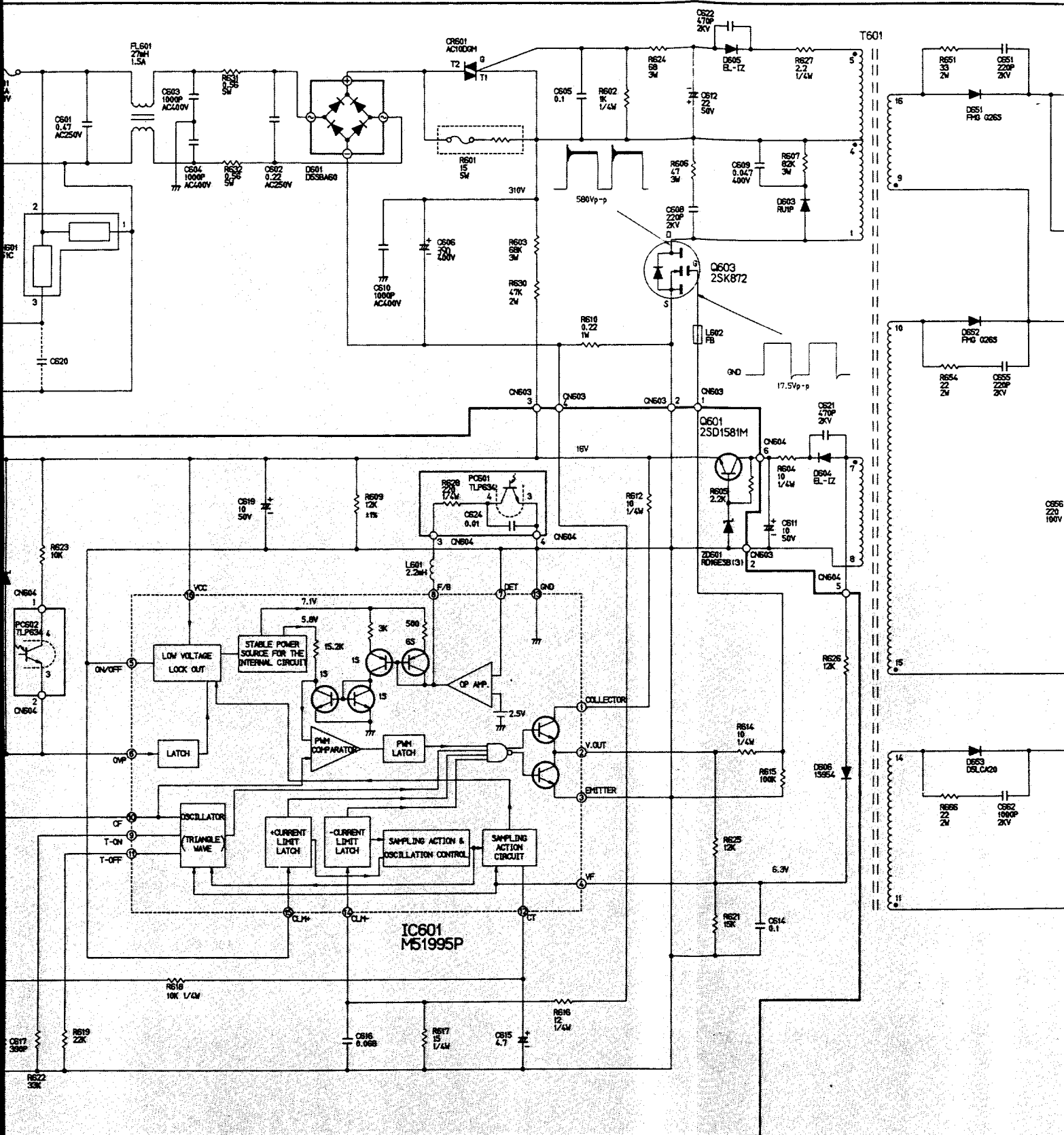
2SC3953

NOTE:

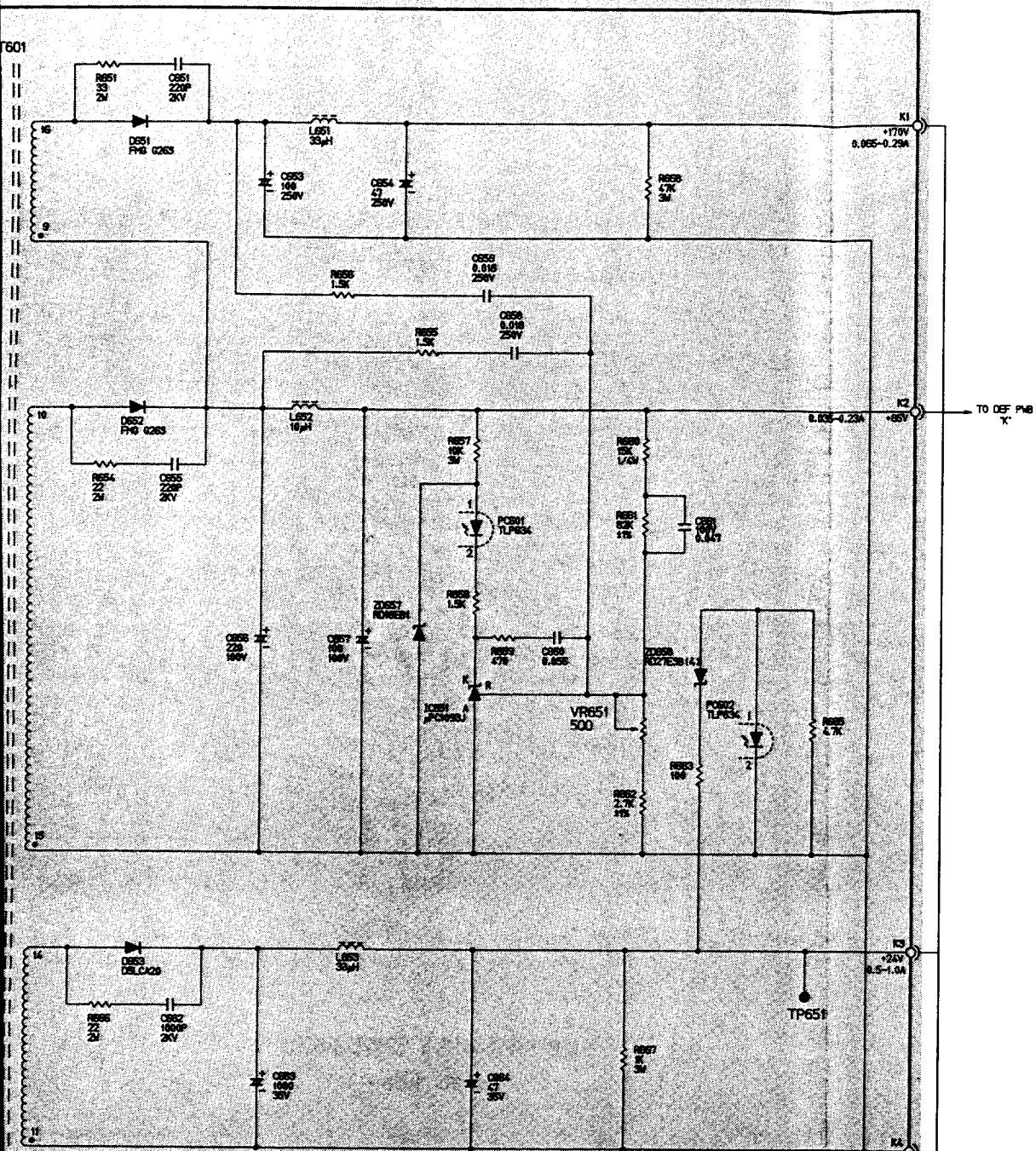
E: EMITTER
B: BASE
C: COLLECTOR
G: GATE
D: DRAIN
S: SOURCE

MODEL JC-1404HME/EE/R SCHEMATIC DIAGRAM 1





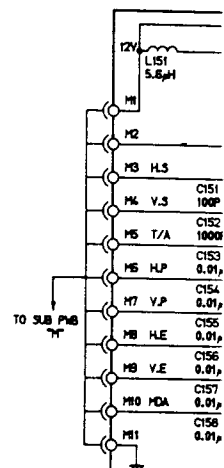
SUB PWB PWE-253B



NOTES

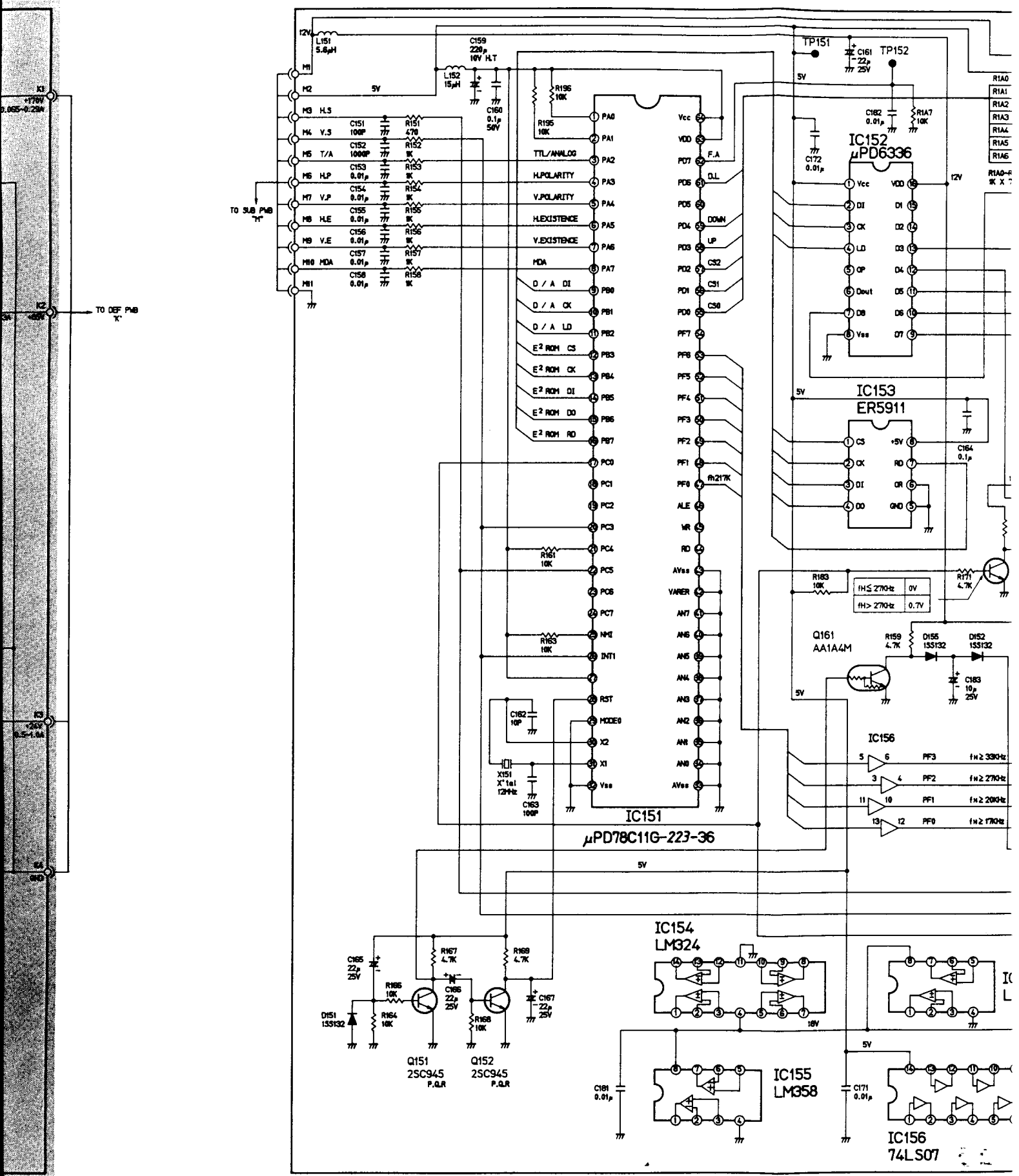
UNLESS OTHERWISE INDICATED : RESISTANCE IN OHMS (Ω) : 1/100
CAPACITANCE IN FARADS (F) : 50V

PWE-253A
SW.REG.UNIT

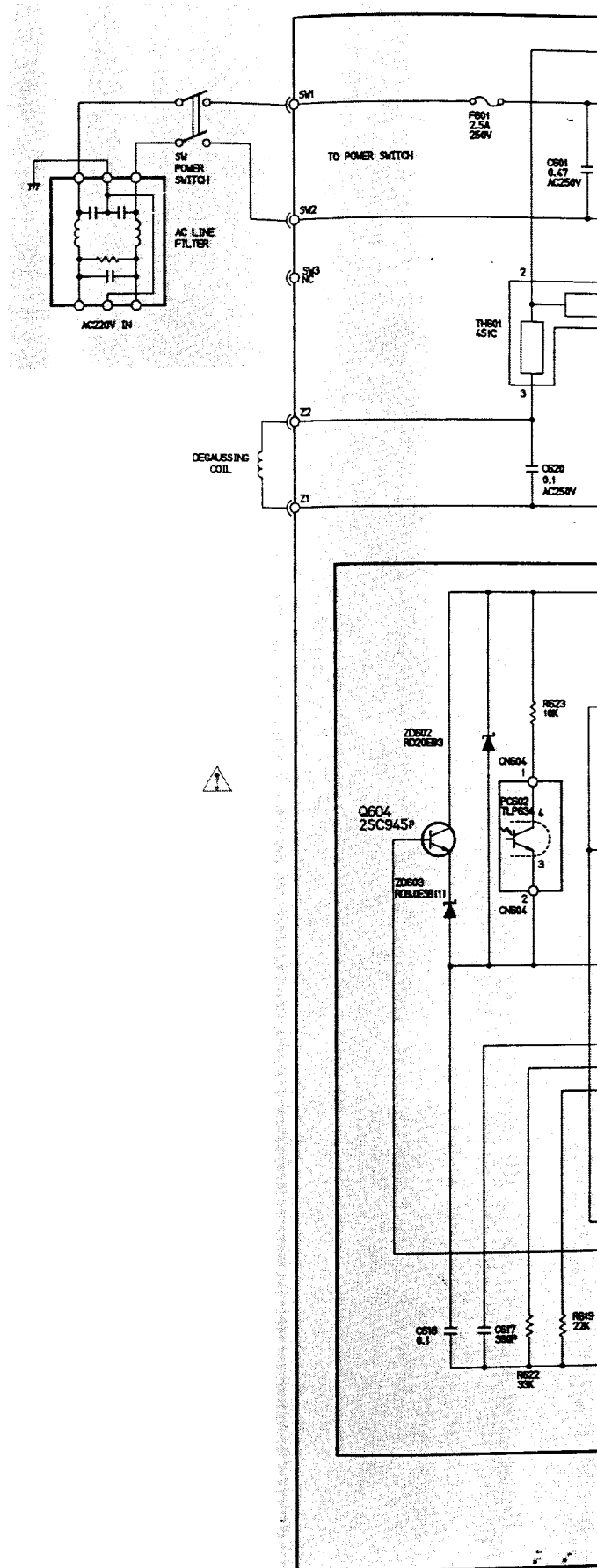


C155
22μ
25V

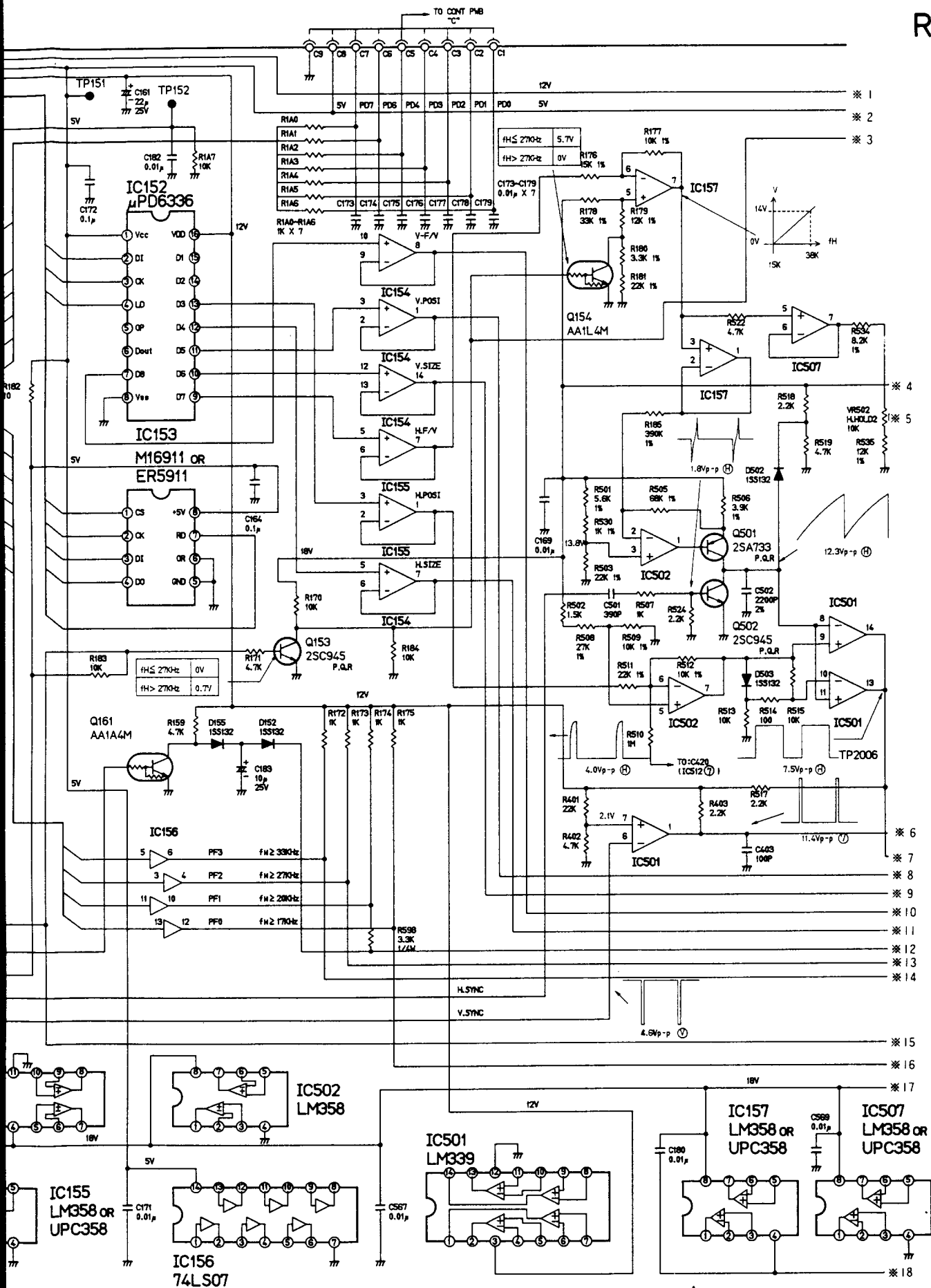
D151
133K32
77 7

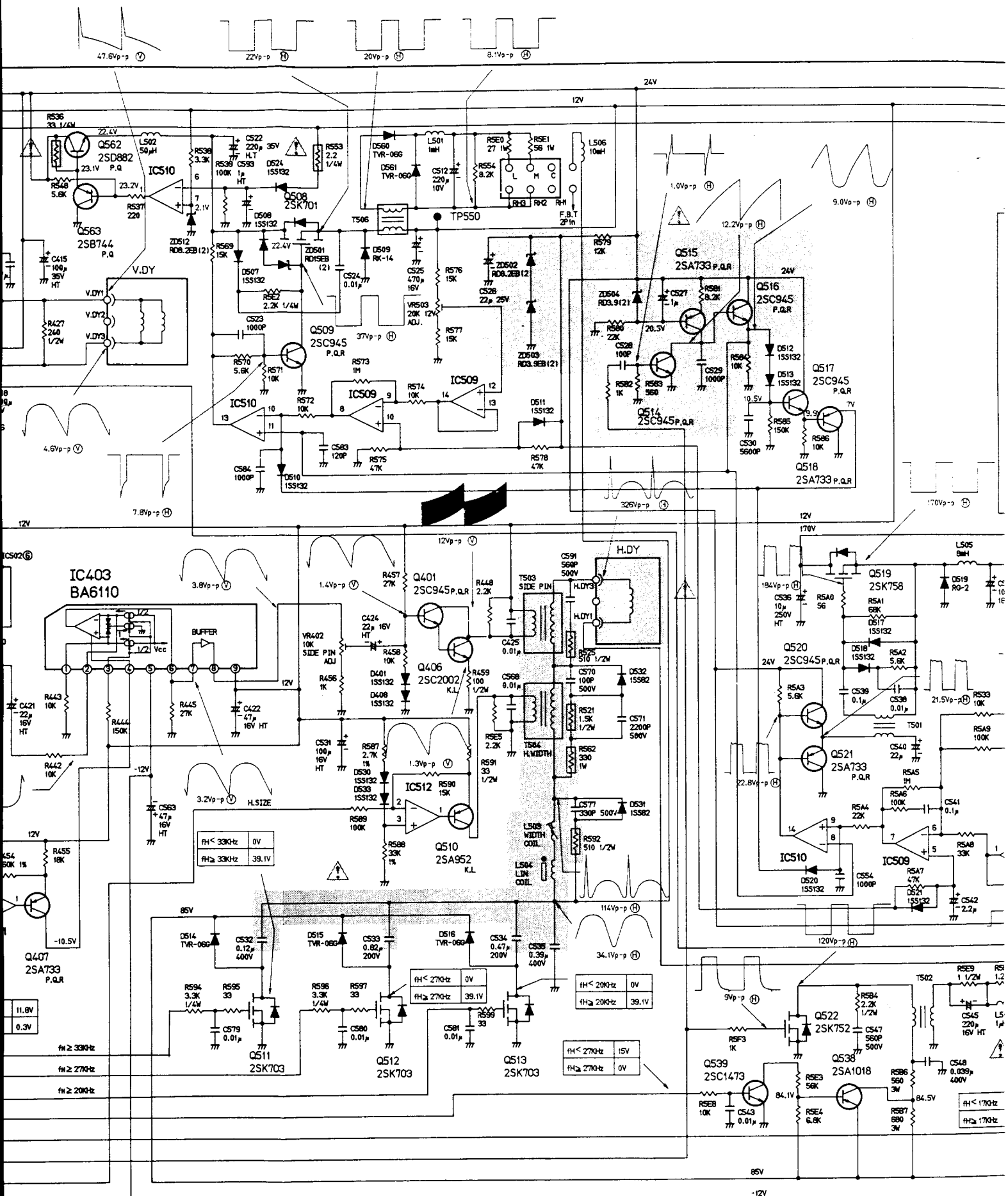


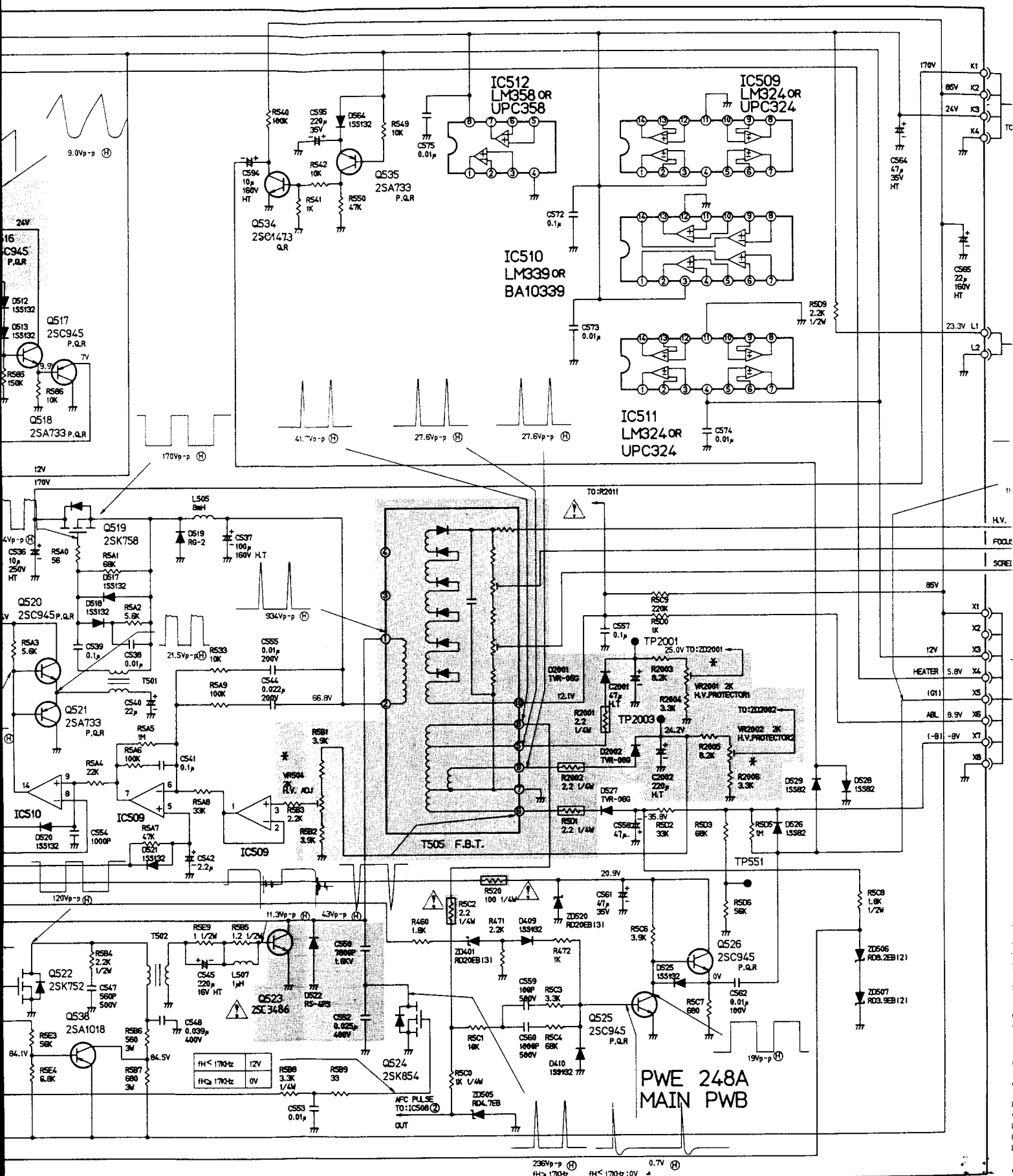
MODEL JC-1404HMED
SCHEMATIC DIAGRAM 1

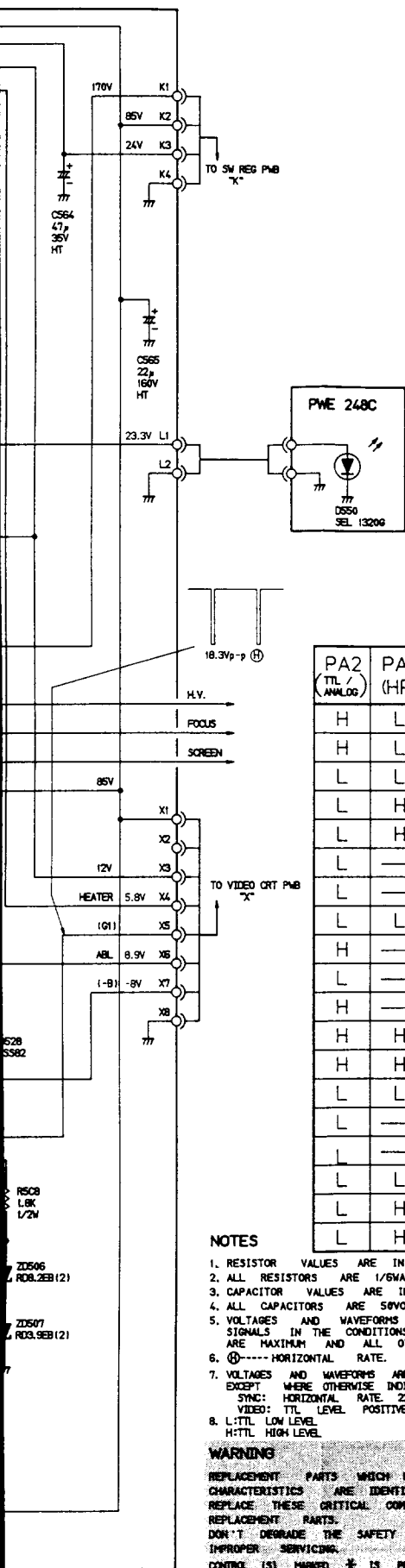


7816344□









PD0 (CS0)	PD1 (CS1)	PD2 (CS2)	
L	H	H	H.POSI
H	L	L	H.SIZE
H	L	H	V.POSI
H	H	L	V.SIZE
H	H	H	DISABLE

PD3	PD4	
H	L	UP
L	H	DOWN
H	H	DISABLE

PD6	PD7	
L	L	USER CONTROL MODE
L	H	FACTORY ADJ. MODE
H	L	DATA LOAD
H	H	FACTORY DATA WRITING

PA2 (TL / ANALOG)	PA3 (HP)	PA4 (VP)	PA5 (HE)	PA6 (VE)	PA7 (MODE)	F _H	F _V	
H	L	L	H	H	L	—	0	CGA
H	L	H	H	H	L	—	0	EGA
L	L	H	H	H	L	(1)	0	VGA 350
L	H	L	H	H	L	(1)	0	VGA 400
L	H	H	H	H	L	(1)	0	VGA 480
L	—	—	—	—	L	—	1	8514A
L	—	—	—	L	L	—	0	MAC II
L	L	L	H	H	L	(11)	0	800*600(1)P.P
H	—	—	—	—	H	—	0	MDA
L	—	—	H	L	L	(1)	0	PGC
H	—	—	H	L	L	—	0	TTL C.S.
H	H	L	H	H	L	—	0	TTL N.P.
H	H	H	H	H	L	—	0	TTL N.N.
L	L	L	H	H	L	(1)	0	ANALOG(1) PP
L	—	—	H	L	L	(11)	0	ANALOG(2) CS
L	—	—	—	—	H	—	0	USER
L	L	H	H	H	L	(11)	0	800*600(2)
L	H	L	H	H	L	(11)	0	800*600(3)
L	H	H	H	H	L	(11)	0	800*600(4)

NOTES

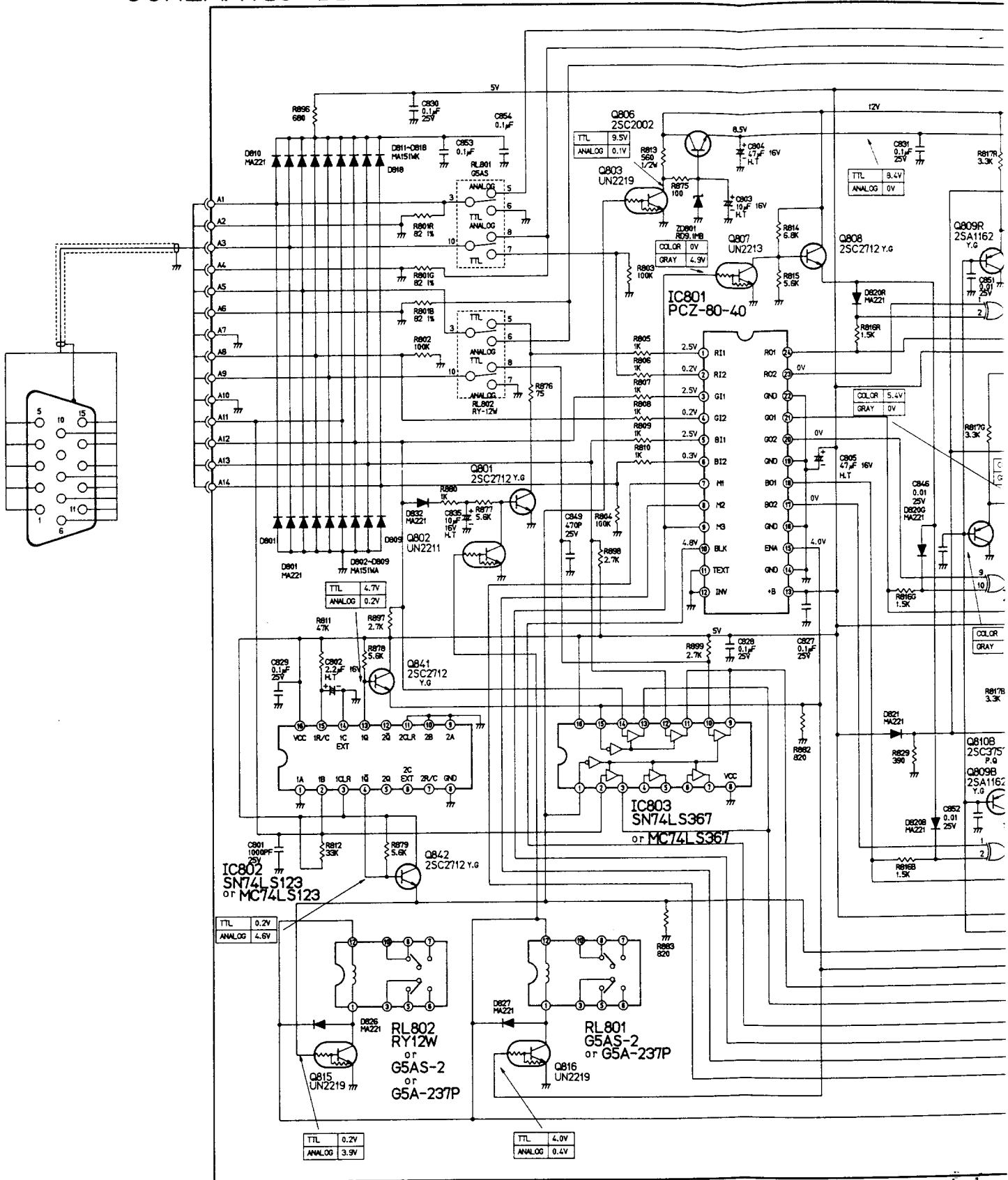
1. RESISTOR VALUES ARE IN Ω (OHM) K = 1,000 Ω M = 1,000,000 Ω
2. ALL RESISTORS ARE 1/6WATT EXCEPT WHERE OTHERWISE INDICATED.
3. CAPACITOR VALUES ARE IN μ F UNLESS OTHERWISE INDICATED. P = PF
4. ALL CAPACITORS ARE 50VOLTS EXCEPT WHERE OTHERWISE INDICATED.
5. VOLTAGES AND WAVEFORMS ARE MEASURED UNDER THE CHARACTER SIGNALS IN THE CONDITIONS OF CONTRAST AND BRIGHTNESS CONTROLS ARE MAXIMUM AND ALL OTHER CONTROLS ARE NORMAL OPERATION.
6. H ----- HORIZONTAL RATE. V ----- VERTICAL RATE.
7. VOLTAGES AND WAVEFORMS ARE MEASURED UNDER THE FOLLOWING SYNC. AND VIDEO. EXCEPT WHERE OTHERWISE INDICATED.
 SYNC: HORIZONTAL RATE: 220Hz SEPARATE SYNC: TTL LEVEL POSITIVE
 VIDEO: TTL LEVEL POSITIVE. ALL INVERTED "H" PATTERN
8. L: TTL LOW LEVEL
 H: TTL HIGH LEVEL
9. (1): F_H at 330Hz
 (11): F_H > 330Hz
 10. F_V 0.3Fv at 75Hz
 13Fv > 75Hz

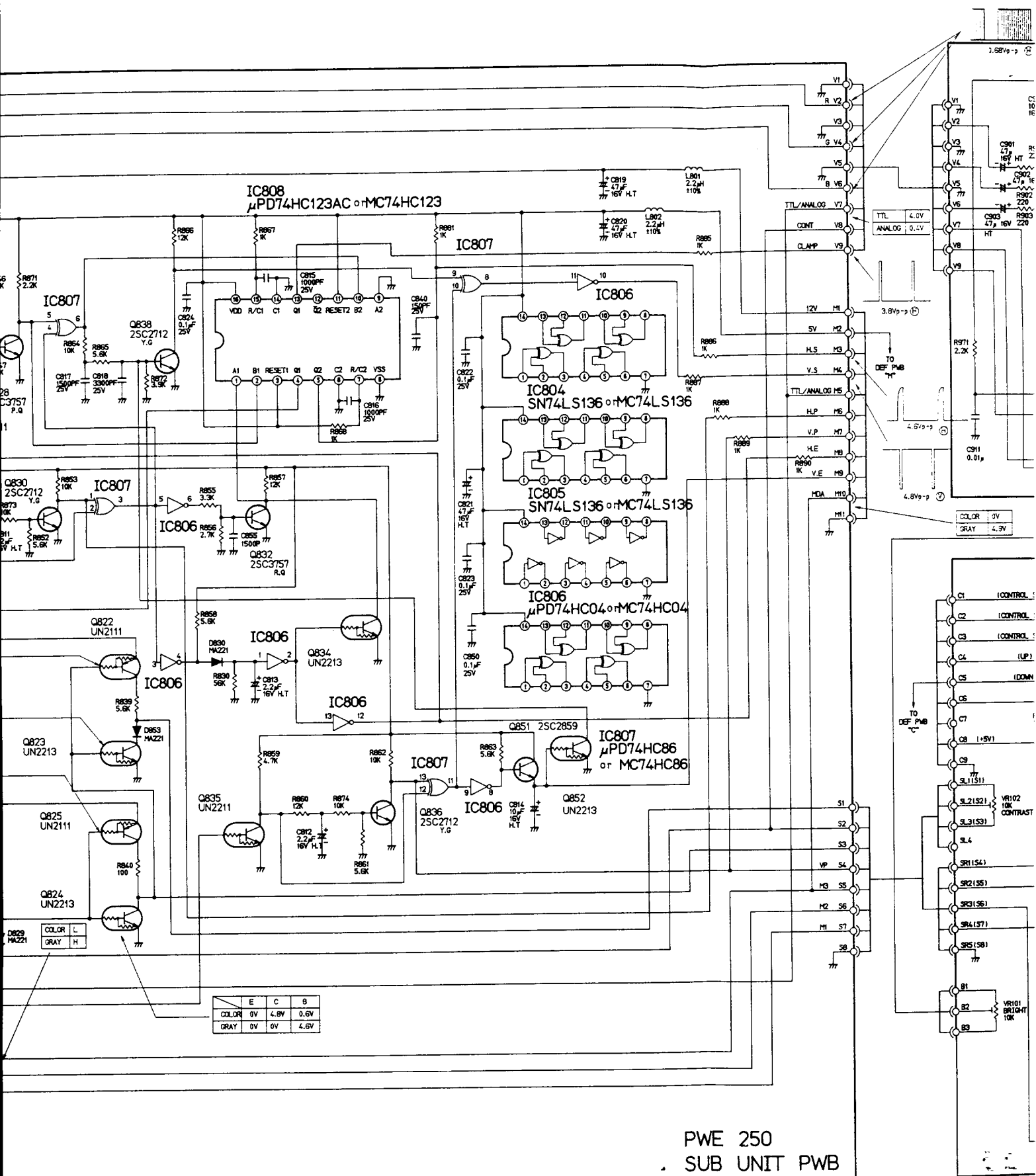
WARNING

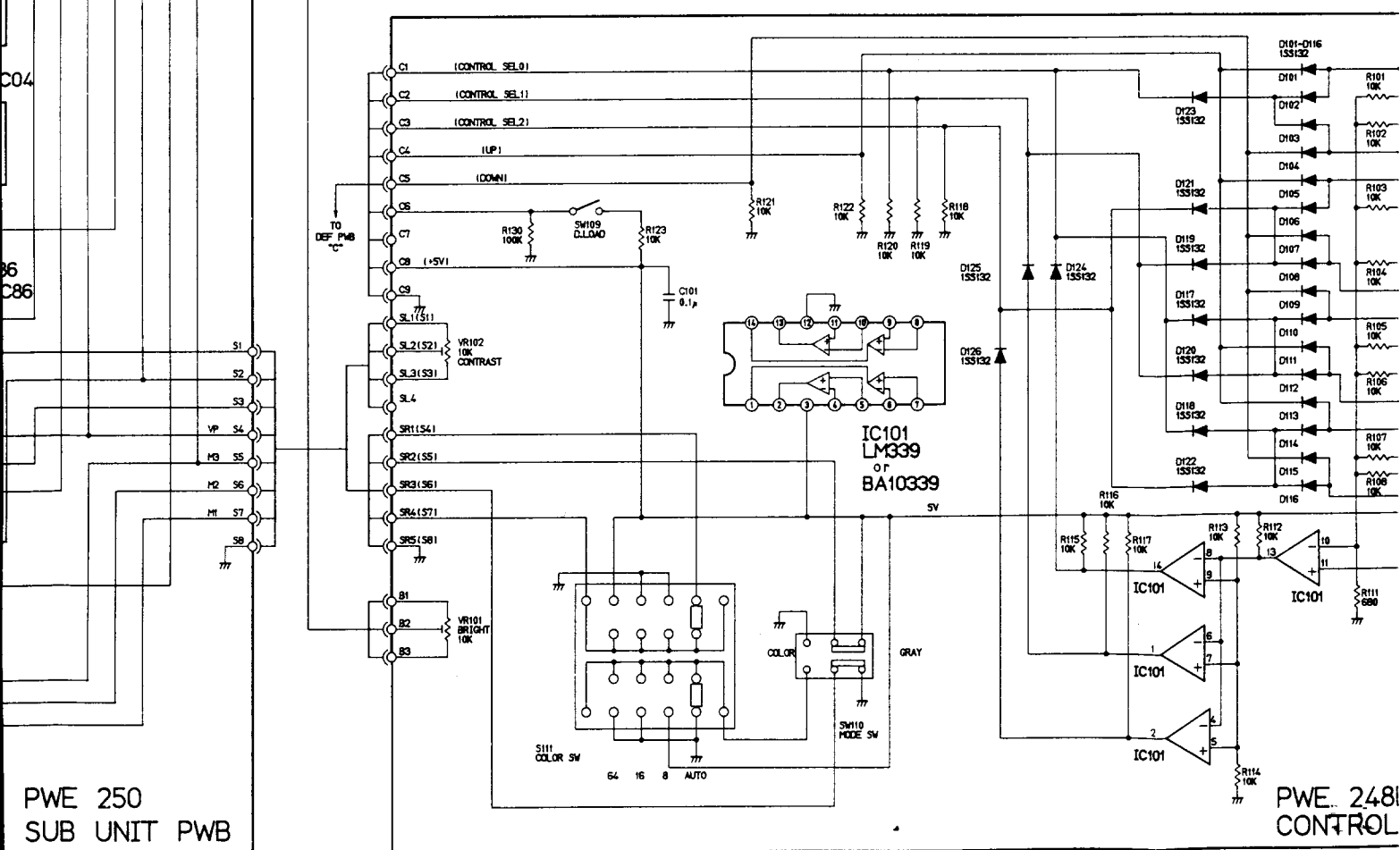
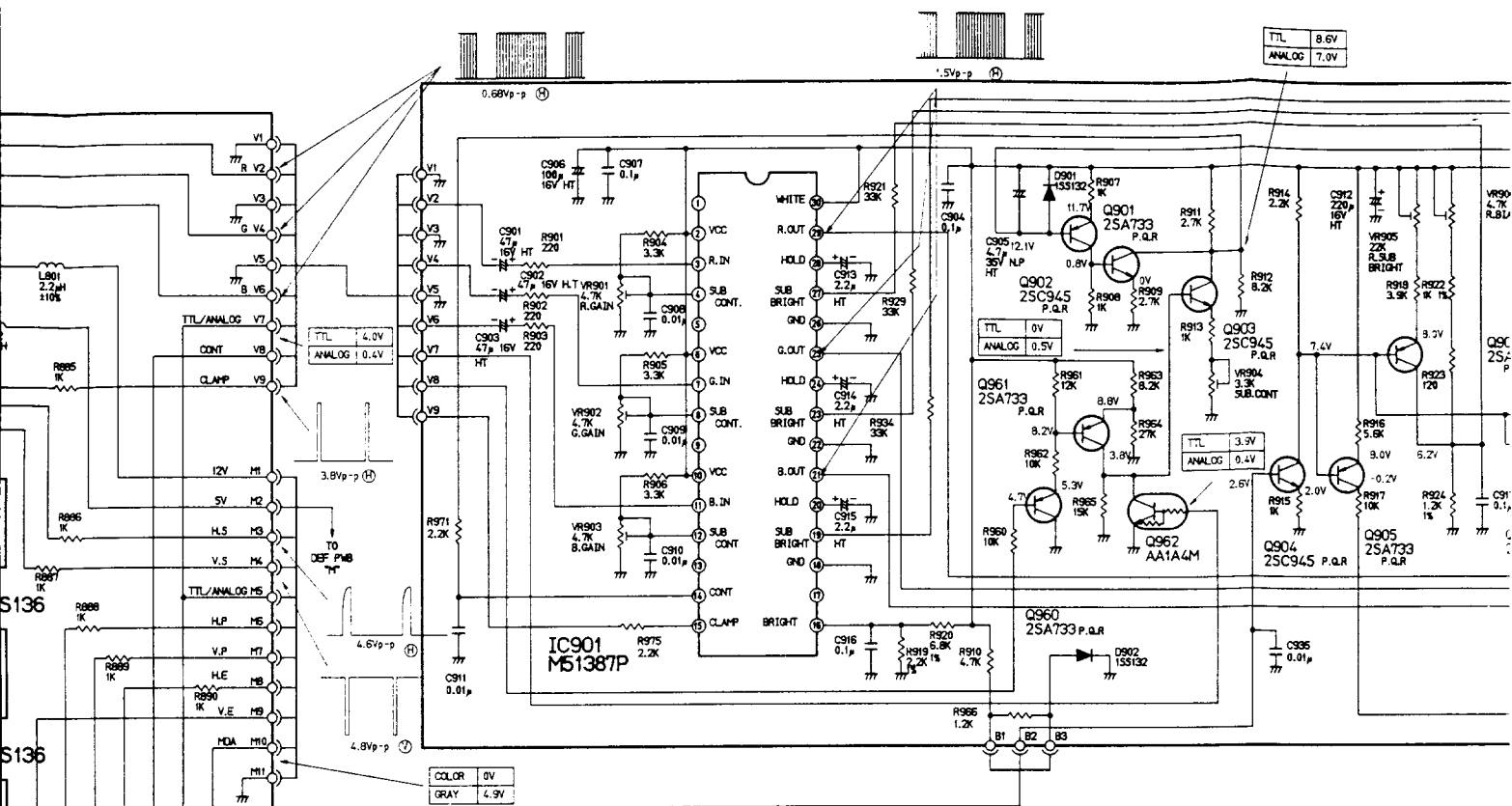
REPLACEMENT PARTS WHICH HAVE SPECIAL SAFETY CHARACTERISTICS ARE IDENTIFIED BY Δ SHADING ON THE SCHEMATICS. REPLACE THESE CRITICAL COMPONENTS WITH RECOMMENDED REPLACEMENT PARTS. DON'T DEGRADE THE SAFETY OF THE SET THROUGH IMPROPER SERVICING. CONTROL IS HARMED * IS PERMANENTLY FROZEN. DO NOT ATTEMPT TO DEFECT OR IMPROPERLY REPLACE.

NEC

JC-1404H MED SCHEMATIC DIAGRAM 2







PWE 250
SUB UNIT PWB

PWE 248I
CONTROL



Q/A PIN NO.	P/A PIN NO.	VGA	MAC - II	POC	TTL (50A CDA)
1	1	R	R	R	RA GND
2	6	R.GND	R.GND	—	—
3	2	G	(I ₁ SYNC)	G	r
4	7	G.GND	S. G.GND	—	—
5	3	B	B	B	R
6	8	S.GND	S.GND	—	—
7	4	ID(854)	—	—	—
8	5	GND(S.T)	—	GND	g
9	10	GND	GND	GND	V.D
10	11	TO GREEN	—	—	—
11	12	TO OPEN	—	GND	H.D
12	13	H.D	GND	C.SYNC	g
13	14	V.D	—	MODE	B
14	15	N.C	—	GND	b

IC801					
MODE	AUTO	8	16	64	GRAY
M1	V.S.P	L	L	H	-
M2	L	H	L	L	-
M3	L	L	L	L	H

ON-M			
M6	H.P		
	POST	NEGA	
	4.9V	0V	
M7	V.P		
	POST	NEGA	
	4.9V	0V	
M8	SEPA	COMP	SYNC.
	4.9V	4.9V	0V
M9	SEPA	COMP	SYNC.
	4.9V	0V	0V

```

1. RESISTOR VALUES ARE IN OHMS EXCEPT WHERE OTHERWISE INDICATED.
2. ALL RESISTORS ARE 1/8WATT EXCEPT WHERE OTHERWISE INDICATED.
3. CAPACITOR VALUES ARE IN PF UNLESS OTHERWISE INDICATED. P = PF
4. ALL CAPACITORS ARE 50VOLTS EXCEPT WHERE OTHERWISE INDICATED.
5. VOLTAGES AND WAVEFORMS ARE MEASURED UNDER THE CHARACTER
   CONDITIONS OF LOWEST AND HIGHEST BRIGHTNESS CONTROLS
   ARE MAXIMUM AND ALL OTHER CONTROLS ARE NORMAL OPERATION.
6. @----- HORIZONTAL RATE. @----- VERTICAL RATE.
7. VOLTAGES AND WAVEFORMS ARE MEASURED UNDER THE FOLLOWING SYNC. AND VIDEO.
   EXCEPT WHERE OTHERWISE INDICATED.
   SYNC: HORIZONTAL RATE 220HZ. SEPARATE SYNC. TTL LEVEL POSITIVE
   VIDEO: TTL LEVEL POSITIVE. ALL INVERTED TTL PATTERN

```

- 8 L:TTL LOW LEVEL
H:TTL HIGH LEVEL
9. (I) : $F_H \leq 330\text{Hz}$
(II) : $F_H > 330\text{Hz}$
10. F_V 0: $F_V \leq 75\text{Hz}$
1: $F_V > 75\text{Hz}$

REPLACEMENT PARTS WHICH HAVE SPECIAL SAFETY CHARACTERISTICS ARE IDENTIFIED BY SHADING ON THE SCHEMATICS. REPLACE THESE CRITICAL COMPONENTS WITH RECOMMENDED REPLACEMENT PARTS. DON'T DEGRADE THE SAFETY OF THE SET THROUGH IMPROPER SERVICING.

CONTROL (3) MARKED * IS PERMANENTLY FROZEN.
DO NOT ATTEMPT TO DEFEAT OR IMPROPERLY REPLACE.