

NEC

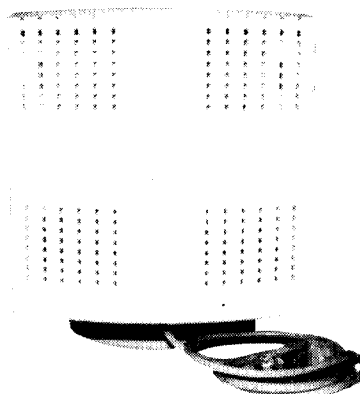
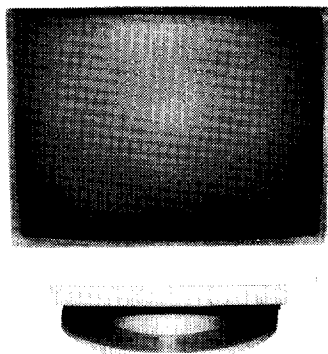
MODELS JC-1404HME/EE/R /ED

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

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)

Display Colors TTL Input: 8/16/64 colors
Analog Input: Unlimited colors

Synchronization Horizontal: 15.5 kHz to 38 kHz (Automatically)
Vertical: 50 Hz to 90 Hz (Automatically)

Resolution Horizontal: 1024 dots
Vertical: 768 lines (interlaced)

Video Band Width 45 MHz

Active Display Area Horizontal: 240 mm (Active display area is changed)
Vertical: 180 mm (by signal timing.)

Misconvergence Less than 0.6 mm

Power Supply AC 220V, 240V 50/60 Hz

Power Consumption 82W

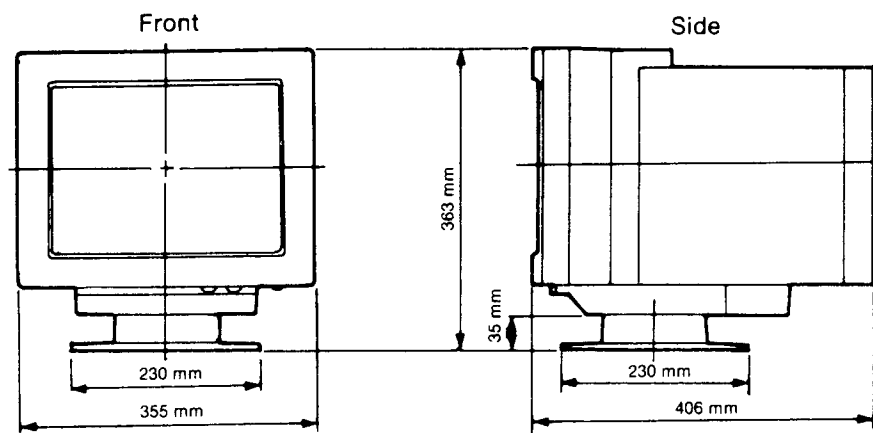
Environmental Considerations Operating Temperature 0° to +40°C
Humidity 30% to 80%
Storage Temperature -20°C to +60°C
Humidity 10% to 90%

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

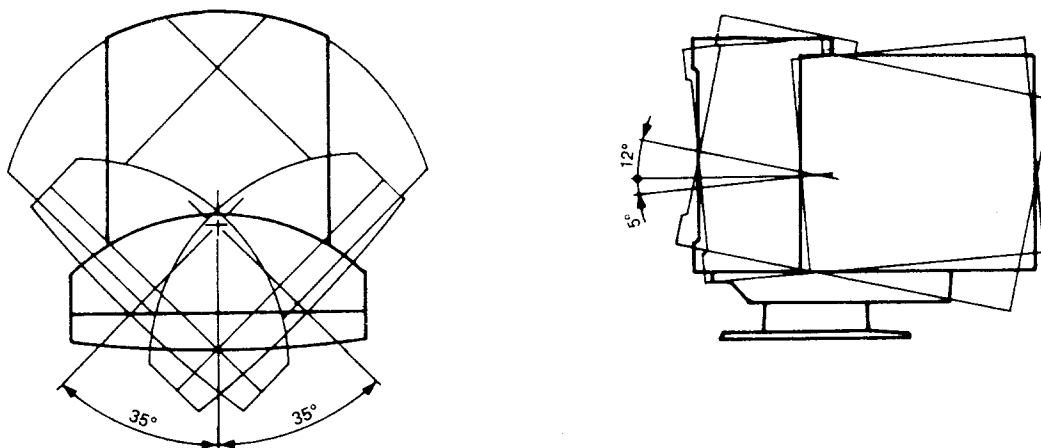
NEC Corporation
TOKYO, JAPAN

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



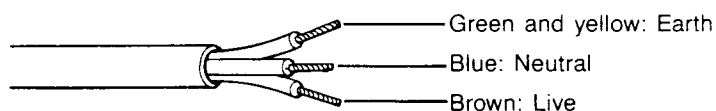
3. Tilt Swivel Range



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.

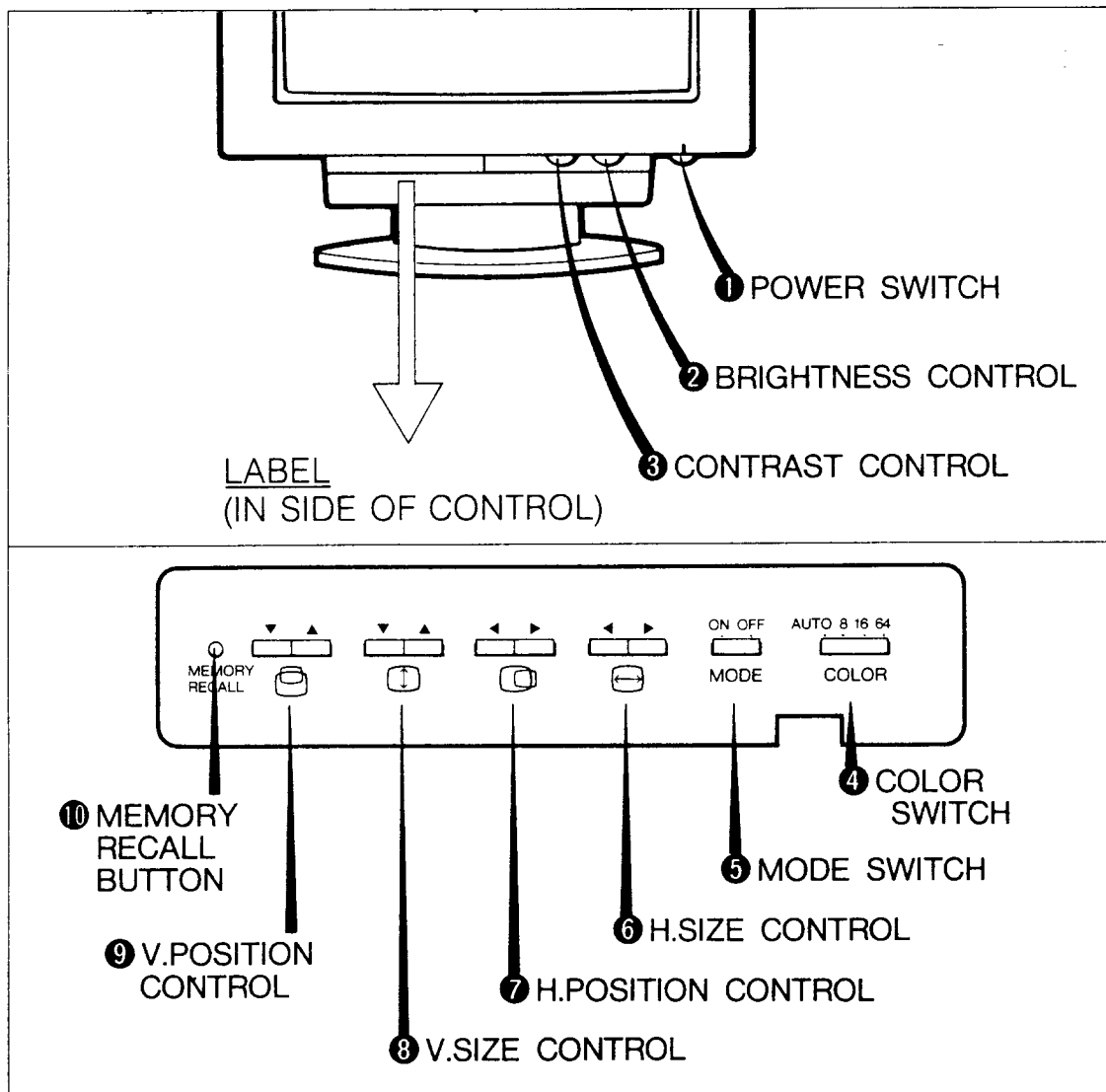
- The MultiSync 3D Color Monitor's wide compatibility makes it possible to upgrade adapters or software without purchasing a new monitor.
- The MultiSync 3D Color Monitor has a maximum horizontal resolution of 1024 dots and a maximum vertical resolution of 768 lines for superior clarity of display.
- 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



❶ 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.

❷ BRIGHTNESS CONTROL

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

❸ 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.

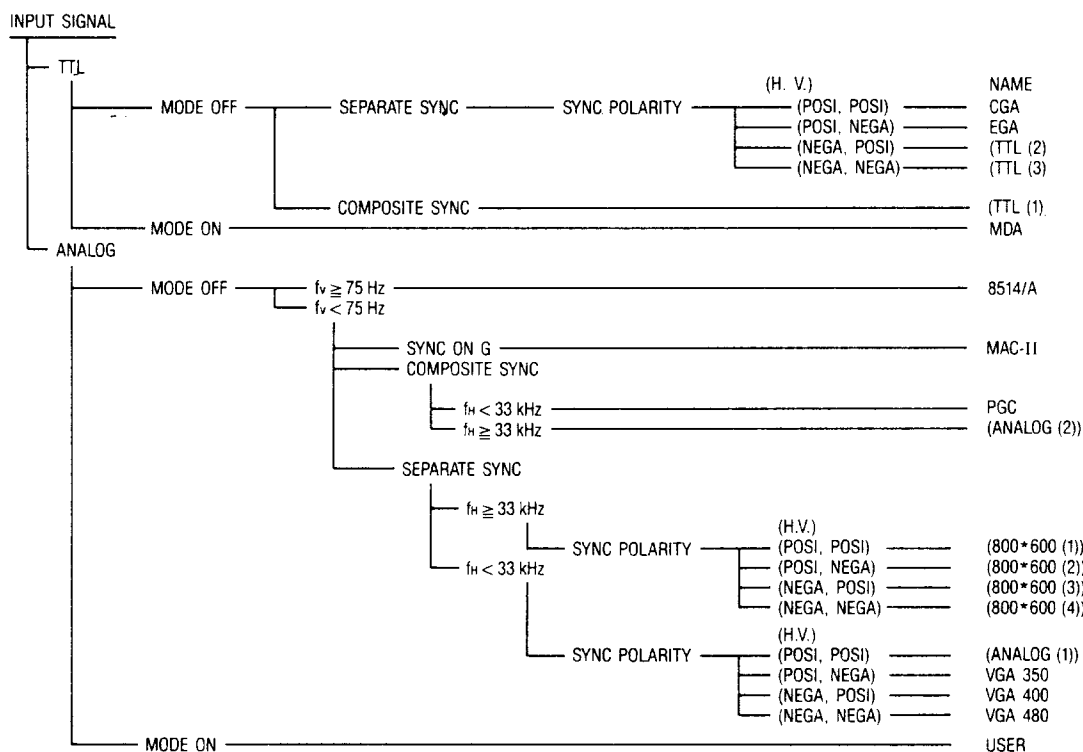
A few seconds after the user adjust the size and/or the position, the monitor's CPU will save the new control data into it's memory automatically.

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

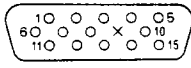
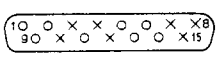
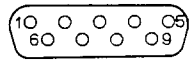
⑩ MEMORY RECALL BUTTON

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				

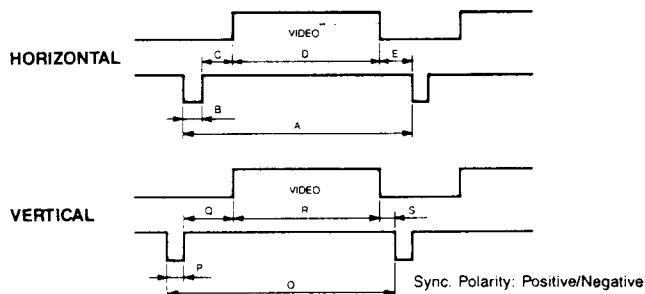
*15 Pin mini D-sub male connector is on the captive signal cable, for use with the IBM VGA, 8514/A or compatible graphics adapters.

**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.

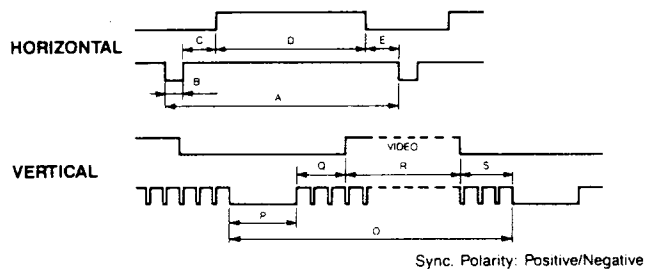
***9 Pin D-sub male connector is on the 15 Pin mini to 9 Pin D-sub adapter, for use with the IBM MDA, CGA, EGA, PGC or compatible graphics adapters.

TIMING CHARTS

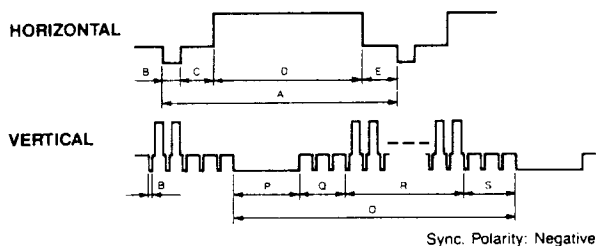
SEPARATE SYNC.



COMPOSITE SYNC.



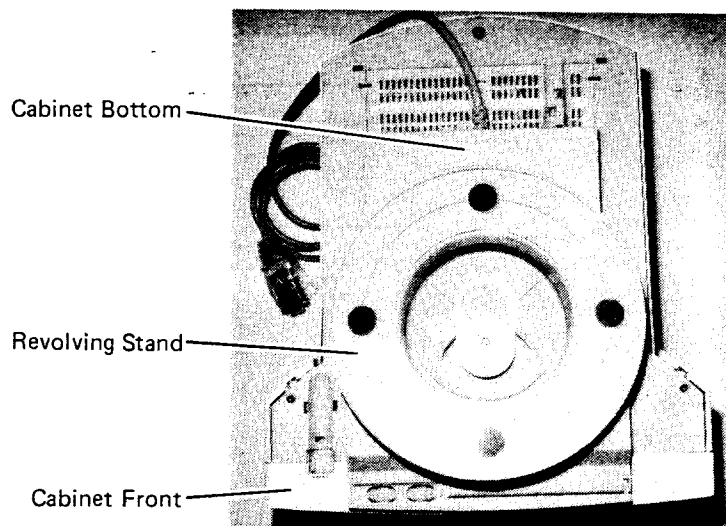
COMPOSITE SYNC. & VIDEO (SYNC. ON GREEN)



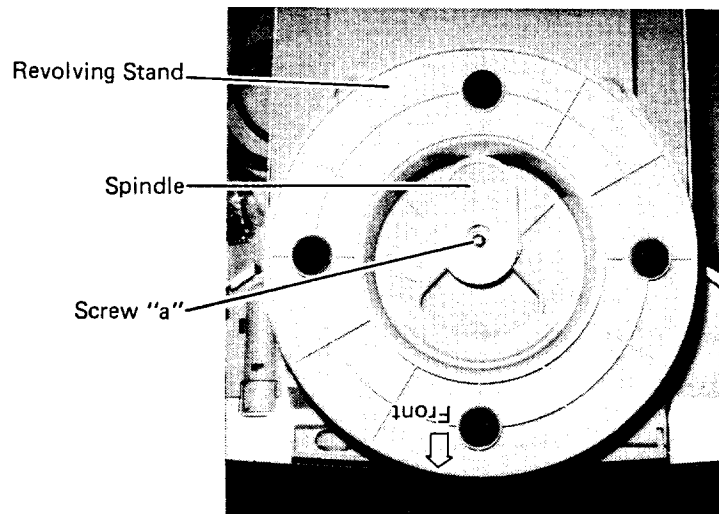
PRESET TIMING

	MDA Compatible	CGA Compatible	EGA Compatible	PGC Compatible	VGA/MCGA Compatible			8514/A Compatible	Macintosh II Video Card	800 × 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

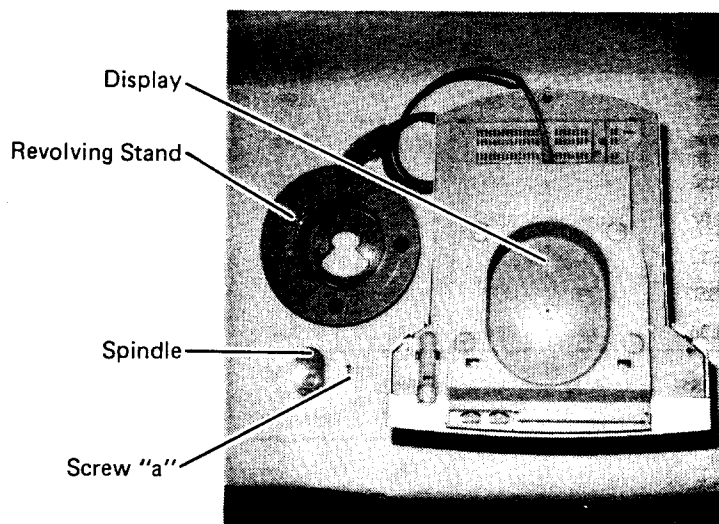


1. Turn the monitor set upside down as shown. (Top VIEW)



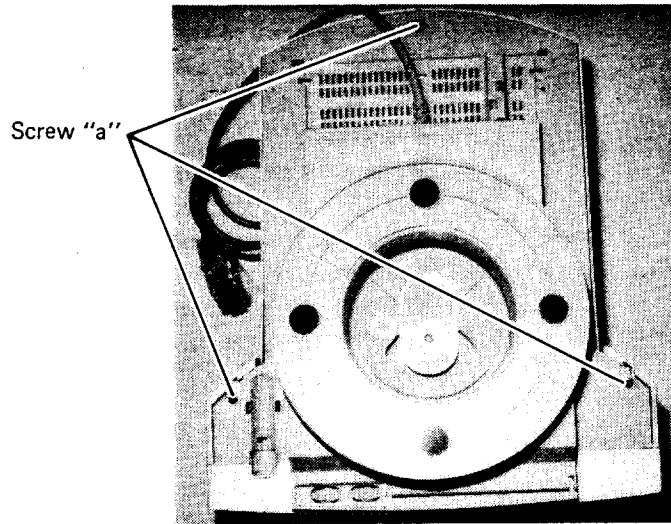
2. Move the revolving stand so that a "↑ FRONT" mark comes to the cabinet front side.

3. Remove the Screw "a", then remove both spindle and revolving stand from the display.



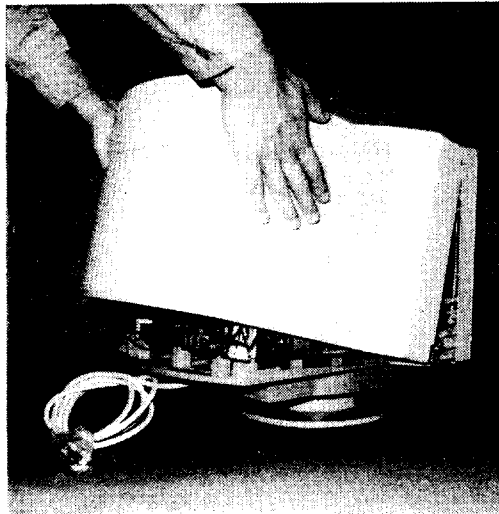
4. The removed parts consist of a display, revolving stand, spindle and screw "a" as shown.

DISASSEMBLY

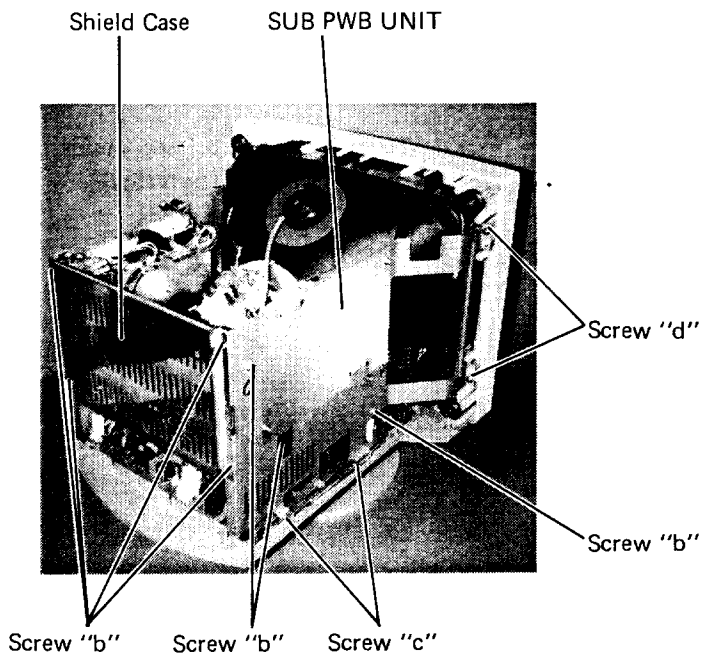


1. Turn the monitor set upside down as shown. (Top VIEW)

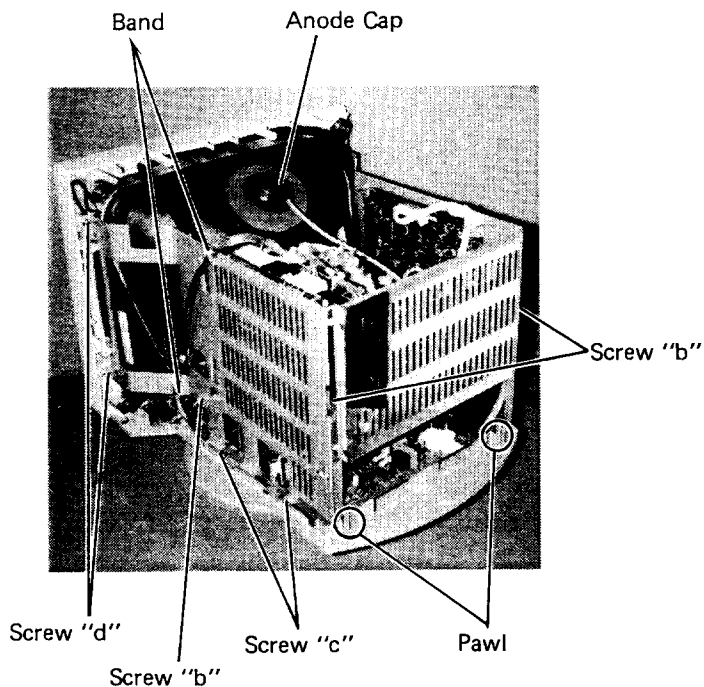
2. Remove three screws "a" from the cabinet bottom.



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

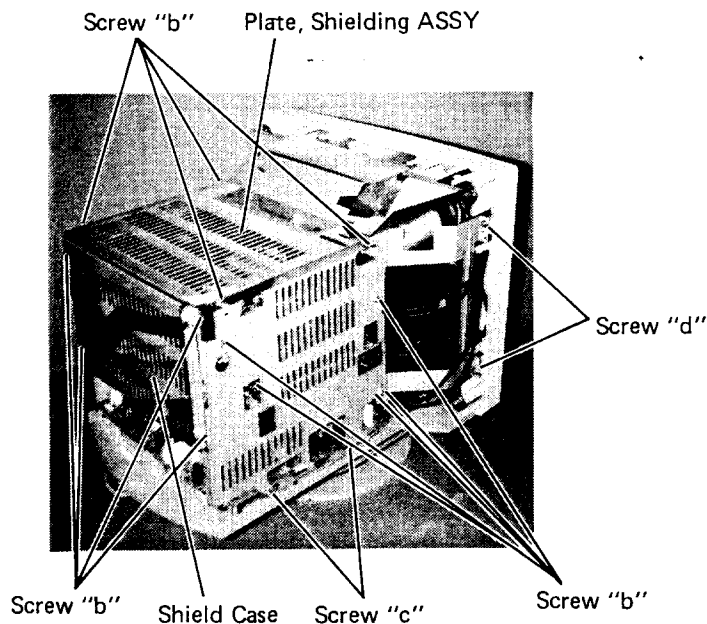


4. Remove the four screws "b" the shield case and remove the shield case.
5. Remove the two screws "c".
Remove the three screws "b" of the SUB PWB UNIT and the screw "b" (under the shield case).
Remove the two screws "d".
6. Disconnect the connectors "CN-A", "CN-M" and "CN-S". (from SUB PWB UNIT).
Disconnect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

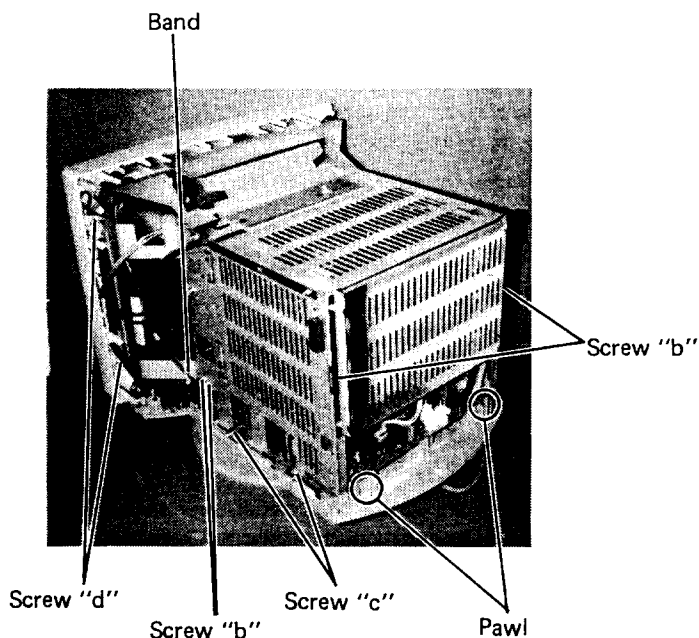
Remove the four screws "b" of the shield case and remove the shield case.

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".

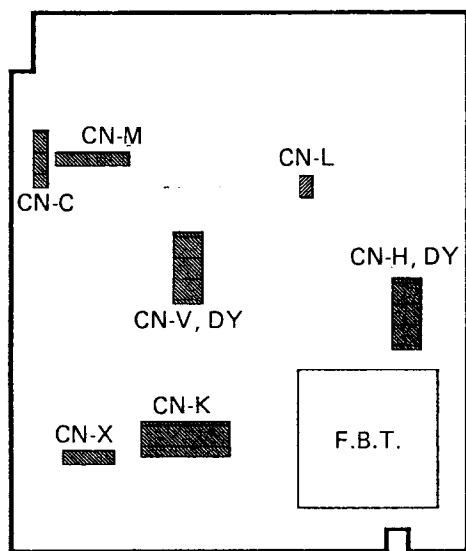
Remove the two screws "d".

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

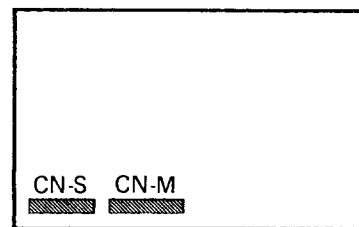
8'. Disconnect the connector "CN-K" (from MAIN PWB ASSY).

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

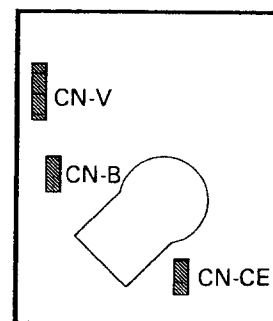
Lift up the SW. REG. UNIT.



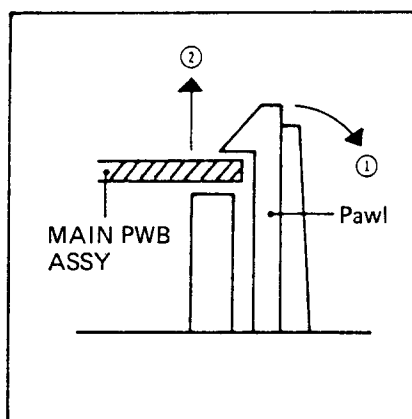
MAIN PWB



SUB PWB



CRT PWB

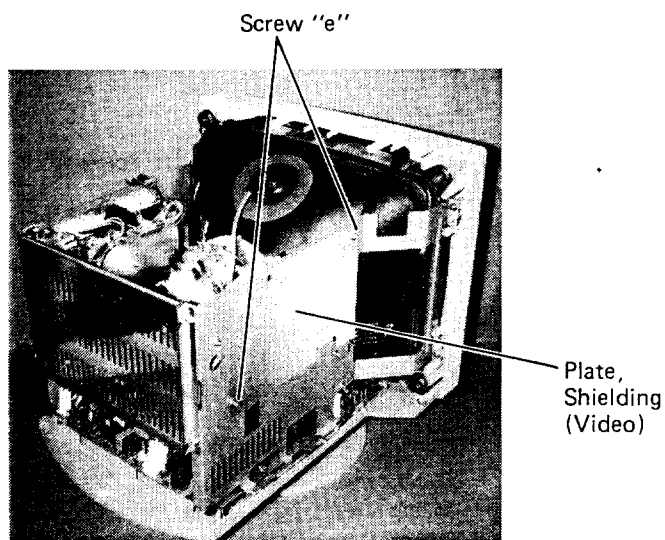


9. Disconnect the connector "CN-B" and "CN-CE" (from CRT PWB ASSY).
Disconnect the connector "CN-X" (from MAIN PWB ASSY).
Remove the Anode Cap from CRT.
Disconnect the CRT PWB ASSY.

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

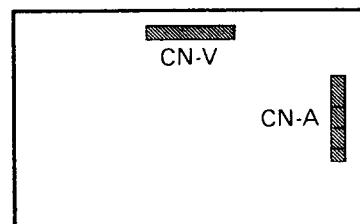
10. Disconnect the Connectors "CN-H, DY", "CN-V, DY", "CN-C", "CN-M" and "CN-L" (from MAIN PWB ASSY).
Disengage pawls at two places, then slide and lift up the MAIN PWB ASSY.

SUB PWB UNIT DISASSEMBLY

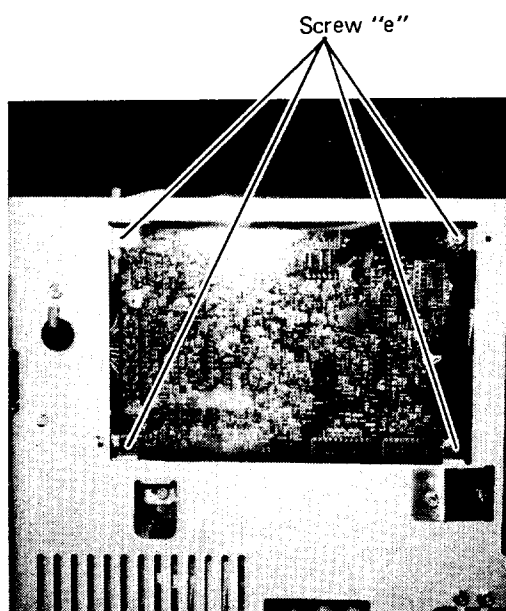


1. Remove the two screws "e" and the plate, shielding (Video).

Disconnect the connectors "CN-V" and "CN-A" (from SUB PWB UNIT).

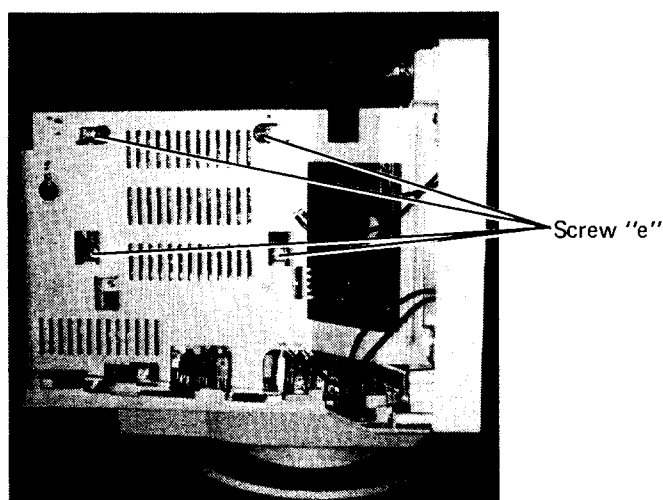


SUB PWB UNIT



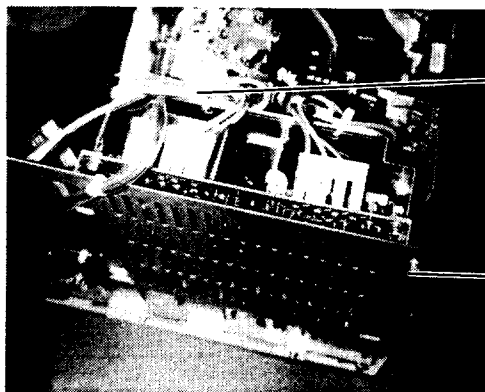
2. Remove the four screws "e".
Lift up the SUB PWB UNIT.

As for model JC-1404HMED



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

SW. REG. UNIT DISASSEMBLY

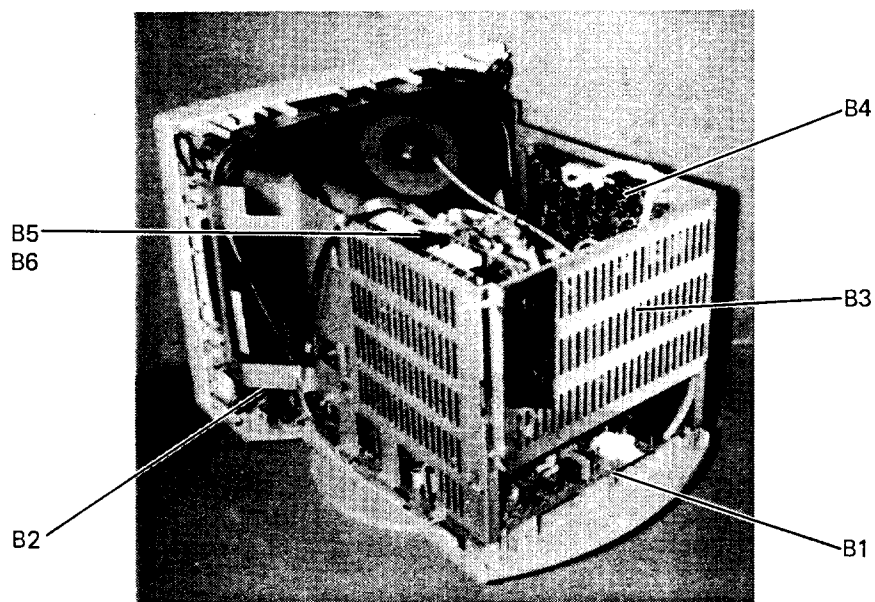


Band

Screw "c"

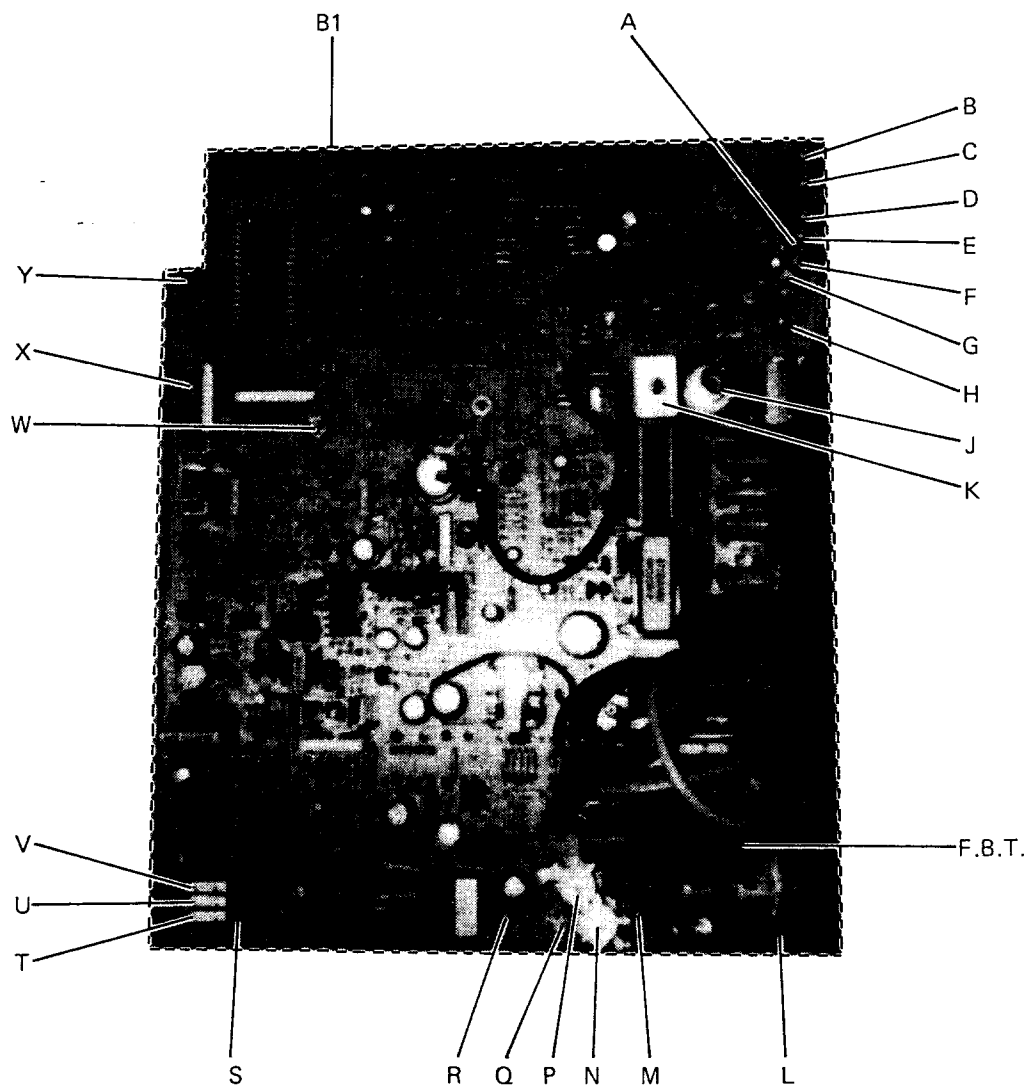
Cut the band and remove the screw "c".
Remove the SW. REG. UNIT.

PARTS LOCATION DIAGRAMS



BOARDS

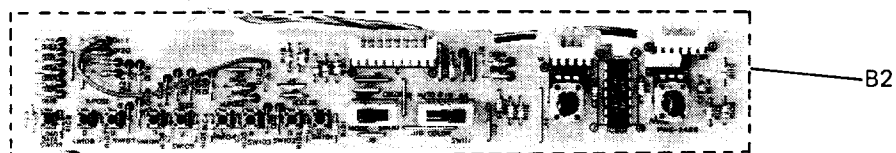
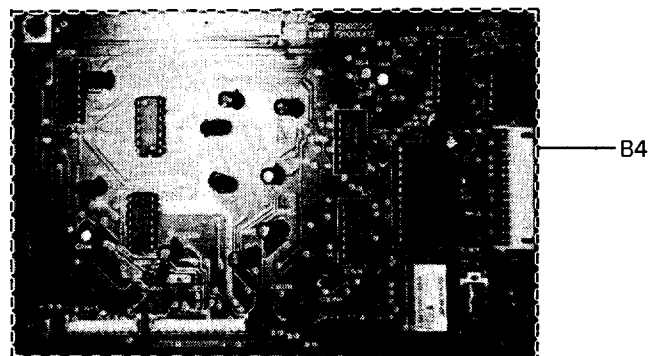
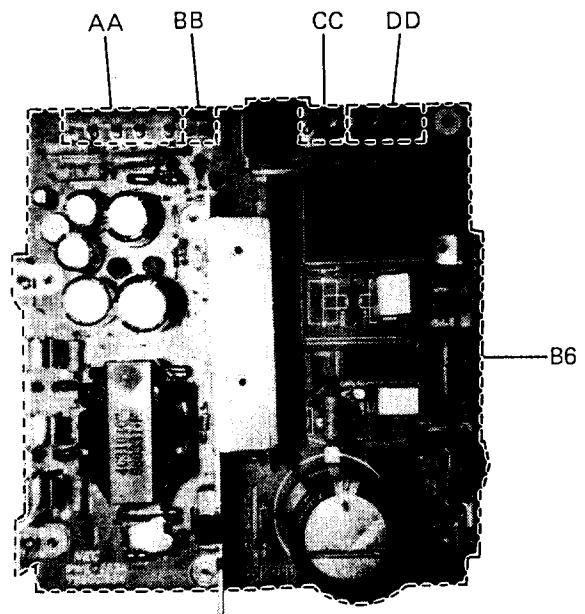
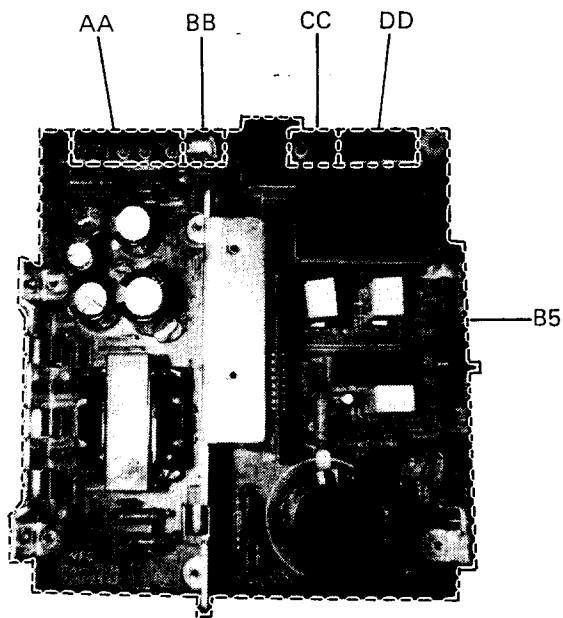
B1	MAIN PWB ASSY	PWE-248A	
B2	CONTROL PWB ASSY	PWE-248B	
B3	VIDEO/CRT PWB ASSY	PWE-249	
B4	SUB PWB UNIT	PWE-250	
B5	SW. REG. PWB ASSY	PWE-253	JC-1404HME/EE/R
B6	SW. REG. PWB ASSY	PWE-270	JC-1404HMED



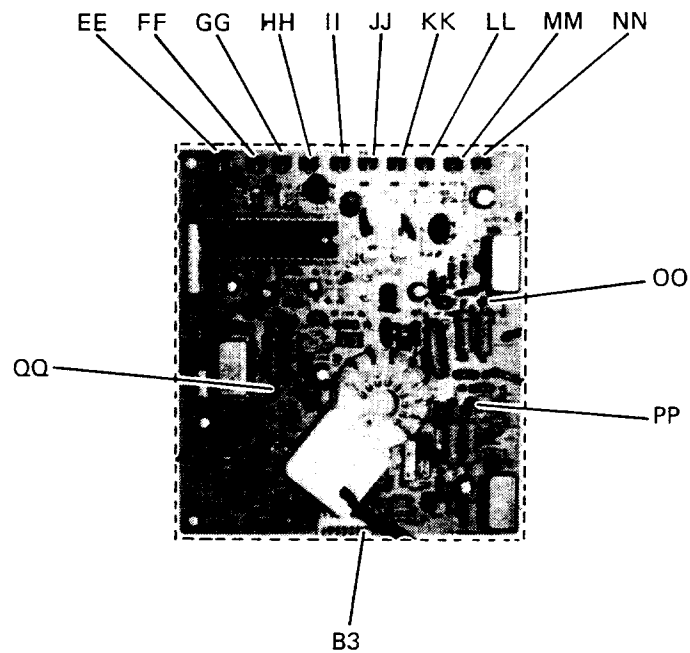
A	VR501 H. HOLD (1)	Q	VR504 H. V. ADJ
B	TP501	R	TP551
C	TP401	S	VR503
D	TP2005	T	RH3
E	TP2006	U	RH2
F	TP502	V	RH1
G	VR502 H. HOLD (2)	W	VR402 SIDE PIN ADJ
H	VR505	X	TP151
J	L503 H. WIDTH COIL	Y	TP152
K	L504 H. LIN COIL		
L	TP2001		
M	TP2003		
N	VR2002		
P	VR2001	B1	MAIN PWB ASSY (PWE-248A)

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

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

(2) High Voltage Adjustment

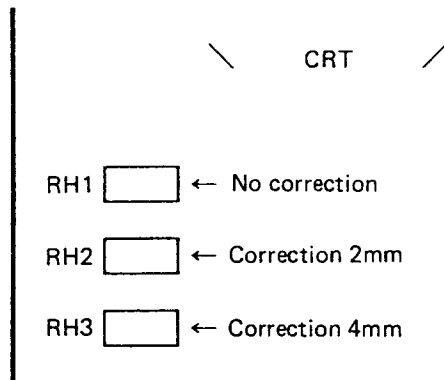
Receive signal 8 (31.5kHz) and adjust high voltage adjustment VR504 so that the high voltage is 23.5kV with the CRT anode current cut off.

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

- a) Short TP151 and TP152.

- b) Receive signal 8 (31.5kHz) and adjust width coil L503 for a horizontal screen size of $240 \pm 2\text{mm}$.

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.

- 1. High Voltage Adjustment
- 2. Width Coil Adjustment
- 3. 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

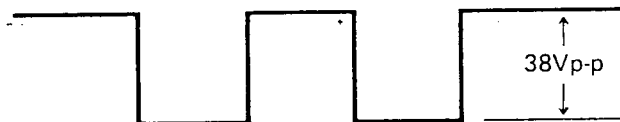
VR901~903 GAIN VR : Fully counterclockwise (MIN)
VR904 SUB CONT. VR : Fully clockwise (MAX)
VR906, 908, 910 BIAS VR : Fully clockwise (cathode voltage rising)
VR905, 907, 909 SUB BRIGHT VR : Mechanical Center
SCREEN VR : Fully counterclockwise (MIN)

(2) Video Contrast Adjustment (Window pattern)

a) GAIN VR adjustment

- 1 Receive the window pattern (the video area of $1/3 \sim 1/2 H \times 1/2 V$ 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 ± 0.1 V).
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.

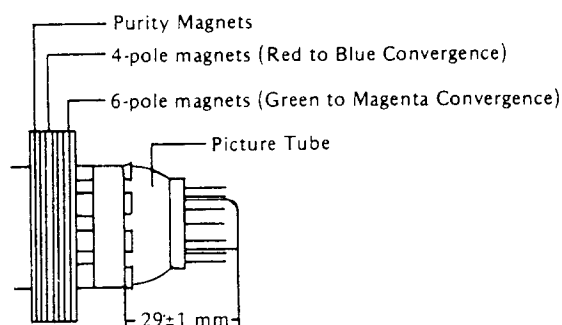
 - a) Receive signal 8 (VGA 400 lines) H. gray scale (16 gradations).
 - b) Contrast control : Fully counterclockwise
Brightness control : Fully clockwise
Check that the white balance is proper for all gradations.
If not, fine adjust to make it white with SUB BRIGHT VR for the other color than the reference 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

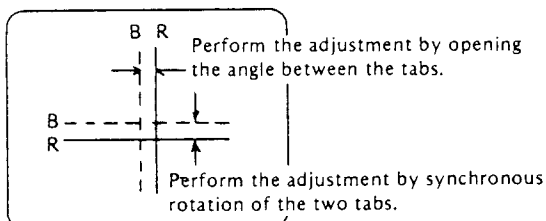
- a) Receive signal 12 (all white "%" or 4-dots missing signal)
Contrast control : Fully clockwise
Brightness control : At a point where no back raster appears
- b) Turn the focus control and adjust for the optimum focus.

(7) Purity Adjustment

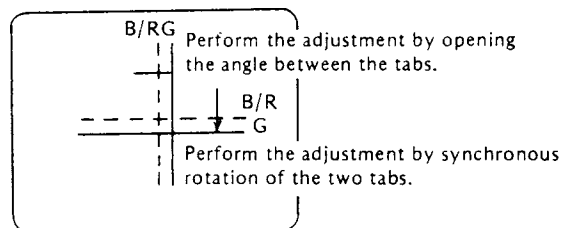
- a) Be sure that the display is not being exposed to any external magnetic fields.
- b) Ensure that the spacing between the Purity, Convergence Magnet, (PCM), assembly and the CRT stem is $29\text{mm} \pm 1\text{mm}$. (See below diagram)
- c) Produce a complete, red pattern on the display. Adjust the 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 15kHz	2 38kHz	3 CGA	4 MDA	5 EGA	6 PGC	7 VGA 350	8 VGA 400	9 VGA 480	10 8514A	11 MAC II	12 800 x 600
H O R I Z O N T A L	DOT	896	1024	896	882	744	824	900	900	900	1264	864	1024
R A T E	KHz	15.0000	38.0000	15.8500	18.4300	22.0000	30.4800	31.4700	31.4700	31.4700	35.5200	35.0000	35.1600
D o t s / C h a r a c t e r	DOT	8	8	8	9	8	8	9	9	9	8	8	8
C h a r a c t e r s	CHR	80	100	80	80	80	80	80	80	80	128	80	100
D r i v e D e l a y	DOT	736	824	736	729	640	640	738	738	738	1032	656	824
D r i v e W i d t h	DOT	56	72	56	135	80	48	108	108	108	176	64	72
V E R T I C A L	RASTER	250	626	260	370	366	508	449	449	525	409	525	626
R A T E	Hz	60.0000	60.7000	60.9600	49.8100	60.1100	60.0000	70.0900	70.0900	59.9400	43.4800	66.6700	56.2400
L i n e s / C h a r a c t e r	RASTER	10	15	10	14	10	10	14	16	16	8	16	15
R o w s	RASTER	200	600	200	350	350	480	350	400	480	384	480	600
D r i v e D e l a y	RASTER	228	601	225	350	351	481	387	412	490	384	483	601
D r i v e W i d t h	RASTER	2	2	3	15	13	2	2	2	2	4	3	2
Dot Rate	MHz	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											
Patten 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 Parameters												
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	0 P	—	0 P	1 N	1 N	0 P	1 N	0 P
Vertical Drive	0 P	0 P	0 P	1 N	1 N	—	1 N	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)

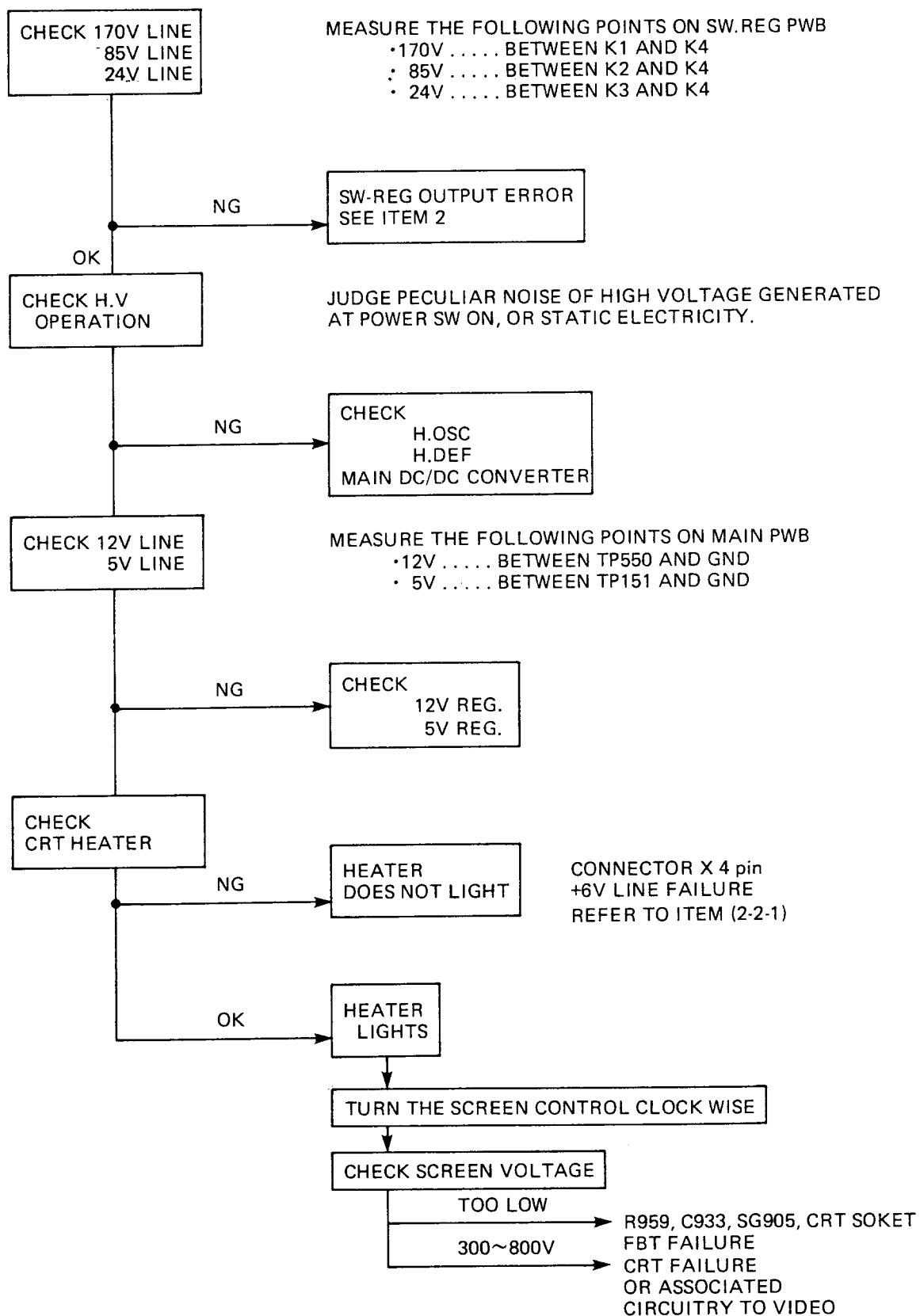
TROUBLE SHOOTING

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

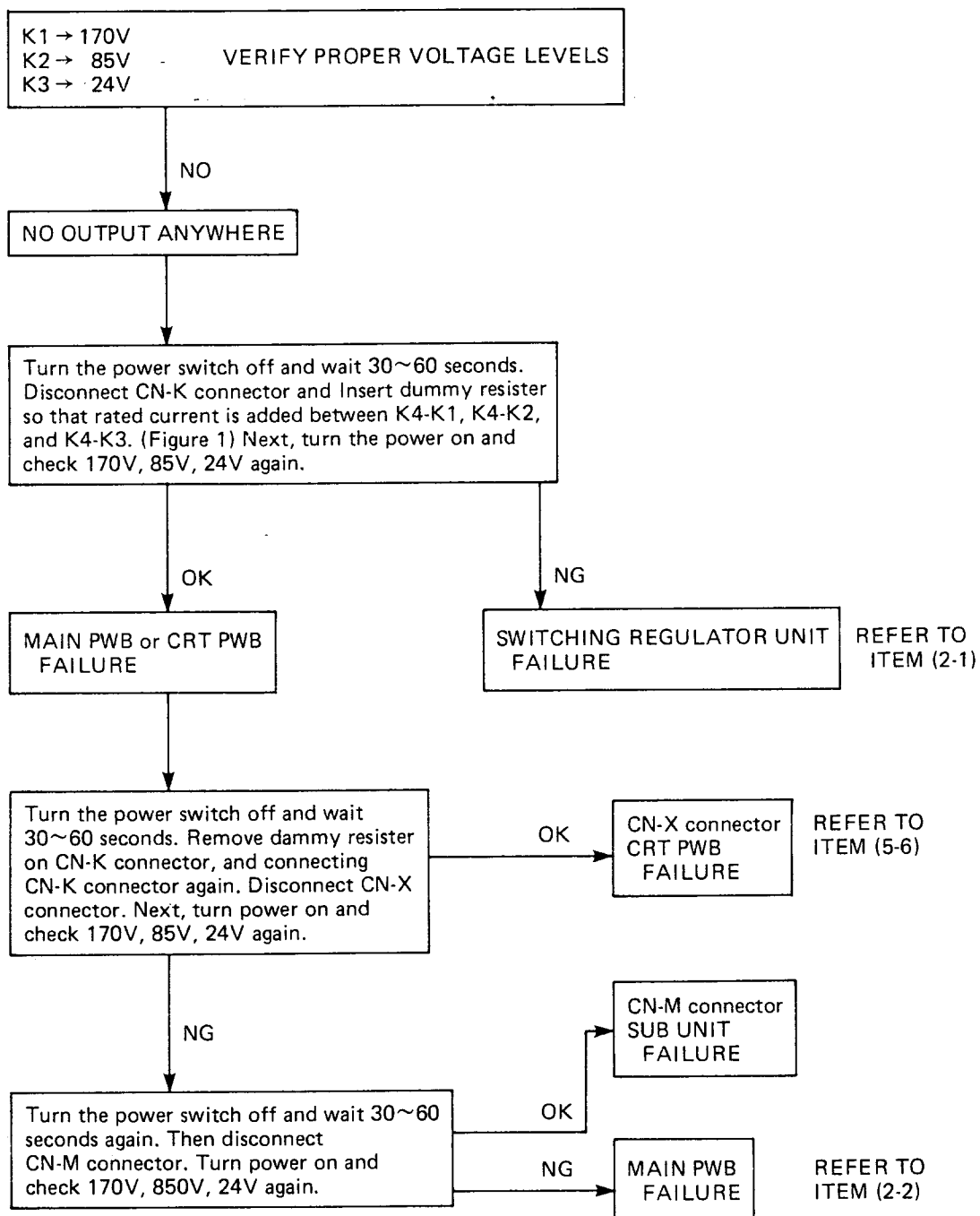
TABLE OF CONTENTS

1. NO RASTER
2. SWITCHING REGULATOR UNIT OUTPUT ERROR
 - (2-1) SWITCHING REGULATOR UNIT FAILURE
 - (2-2) MAIN PWB +B line FAILURE
 - (2-2-1) + 24V line FAILURE
 - (2-2-2) + 85V line FAILURE
 - (2-2-3) +170V line FAILURE
3. LACK OF SYNCHRONIZATION
 - (3-1) HORIZONTAL
 - (3-2) VERTICAL
4. DIGITAL CONTROL ERROR
 - (4-1) DIGITAL CONTROL ERROR
 - (4-2) USER CONTROL ERROR
 - (4-3) MEMORY ACCESS ERROR
5. ABNORMAL PICTURE
 - (5-1) ABNORMAL HORIZONTAL WIDTH
 - (5-2) ABNORMAL VERTICAL SIZE
 - (5-3) ABNORMAL HORIZONTAL POSITION
 - (5-4) ABNORMAL VERTICAL POSITION
 - (5-5) ABNORMAL VERTICAL SCAN
 - (5-6) ABNORMAL VIDEO
 - (5-7) SIDE PIN CUSHION DISTORTION FAILURE
 - (5-8) POOR FOCUS
 - (5-9) IMPURITY ON CRT SCREEN

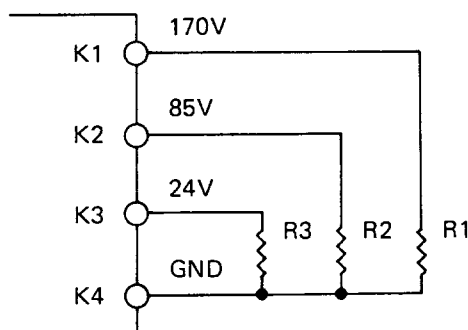
1. NO RASTER



2. SWITCHING REGULATOR UNIT OUTPUT ERROR

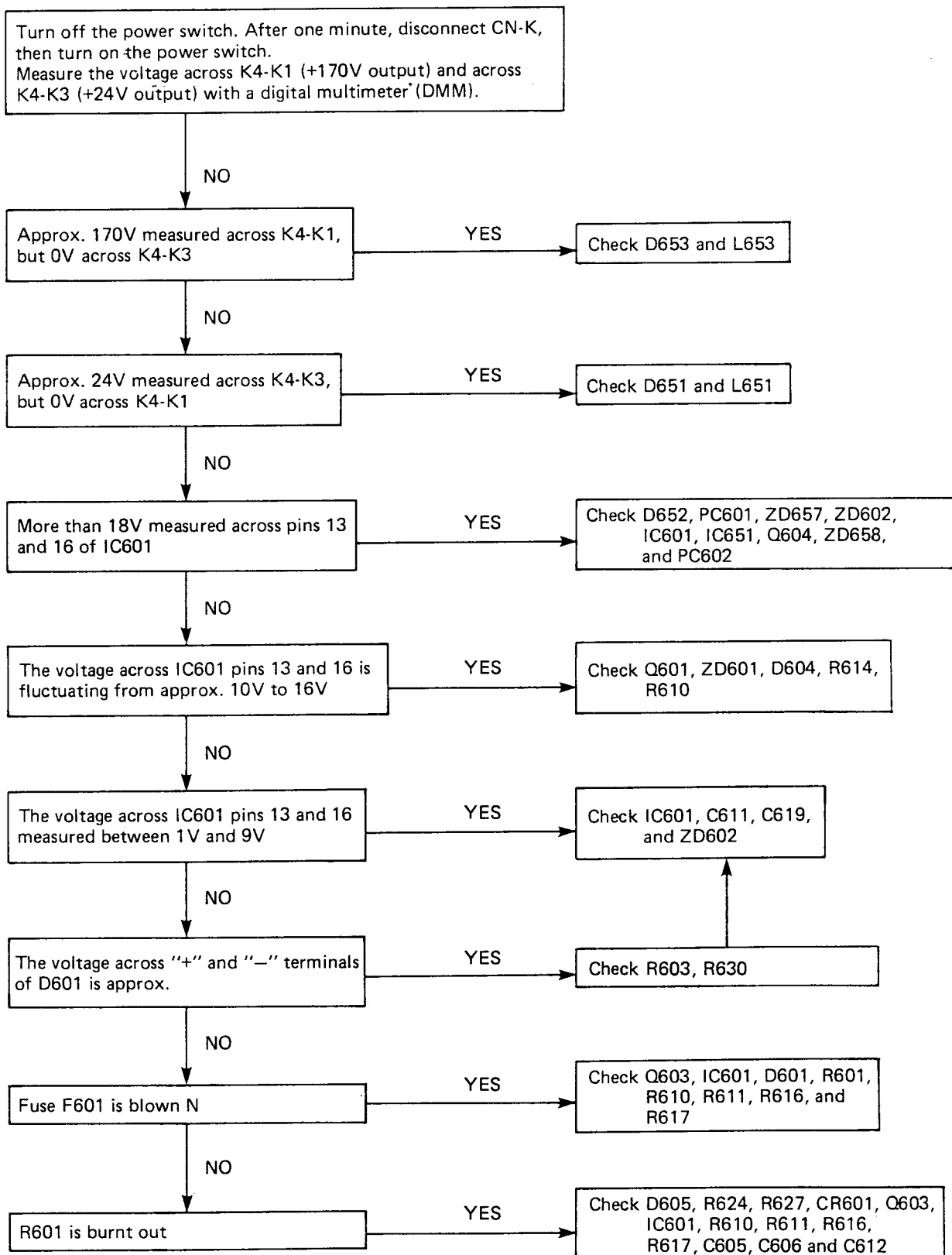


(Fig. 2-1-1) Rated load current at K1, K2, K3



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

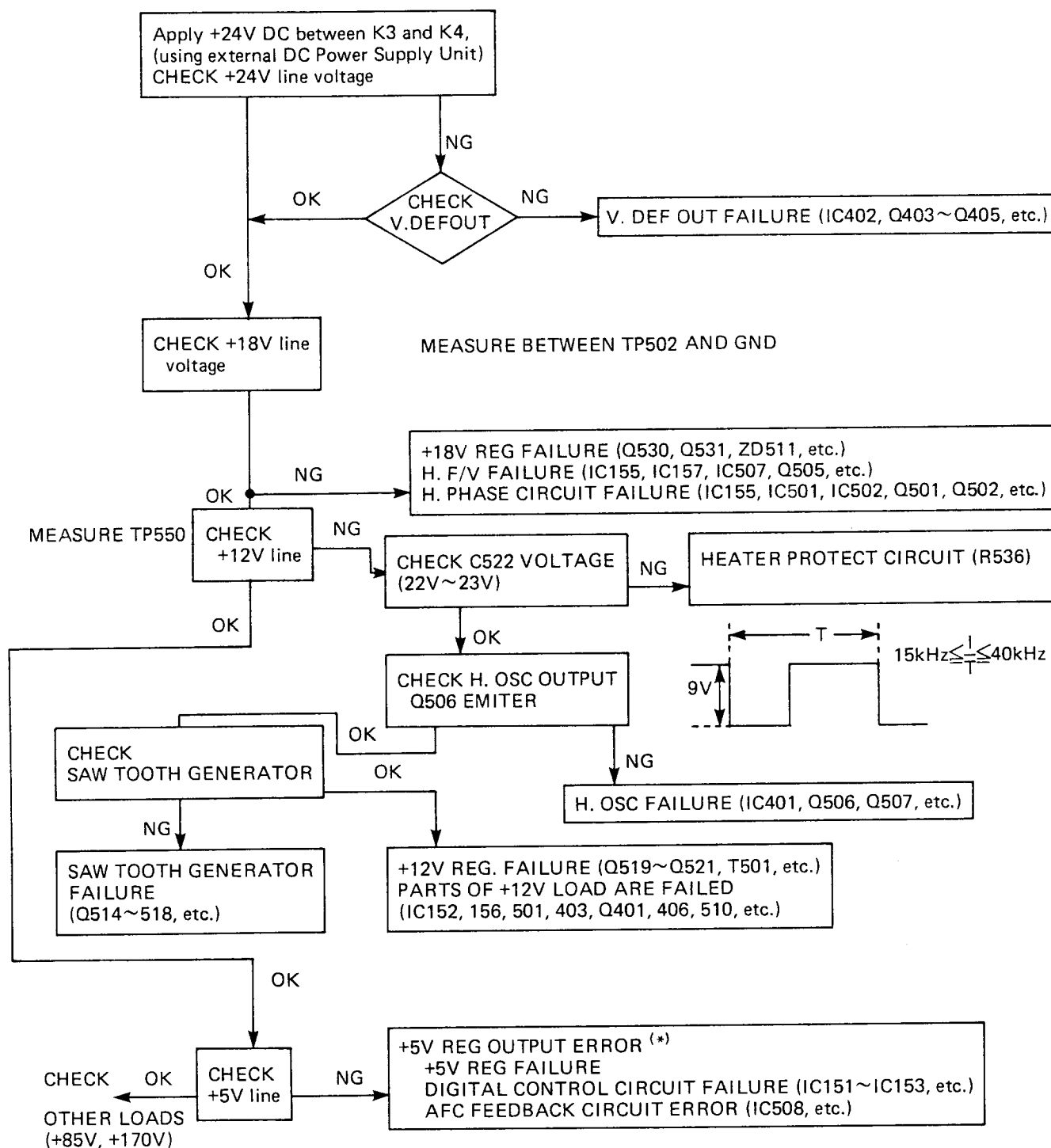


(2-2) MAIN PWB +B line FAILURE

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

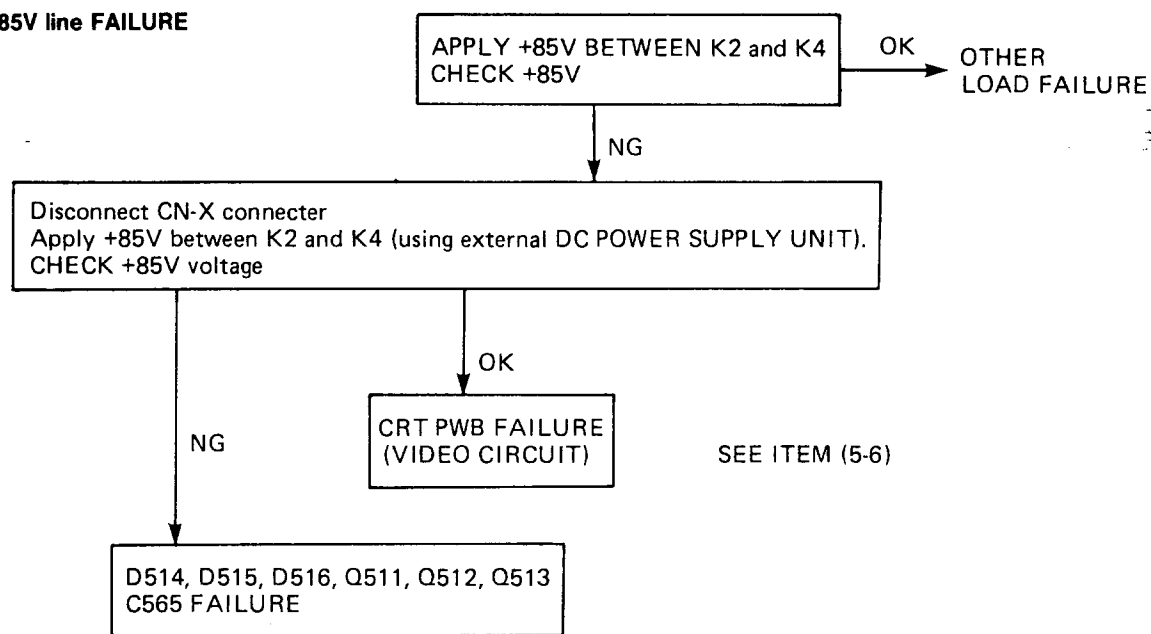
- (2-2-1) +24V line load
- (2-2-2) +85V line load
- (2-2-3) +170V line load

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

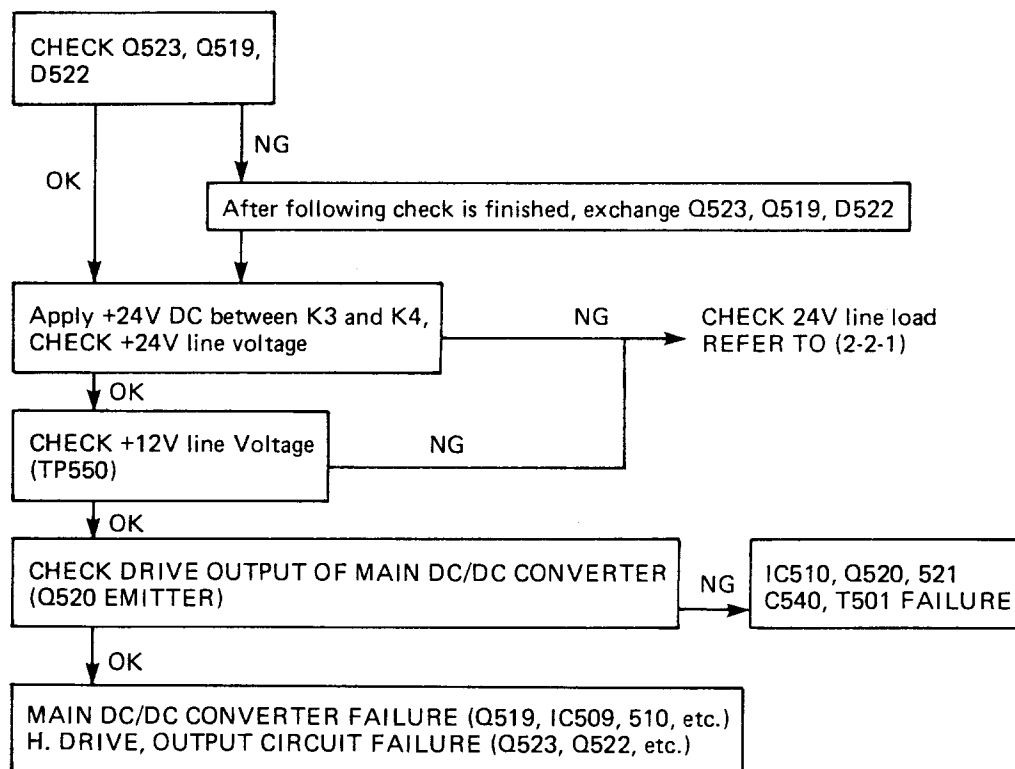


(*) If short mode at +5V line has occurred, you must check Impedance of R567. (8.2Ω 3W)

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

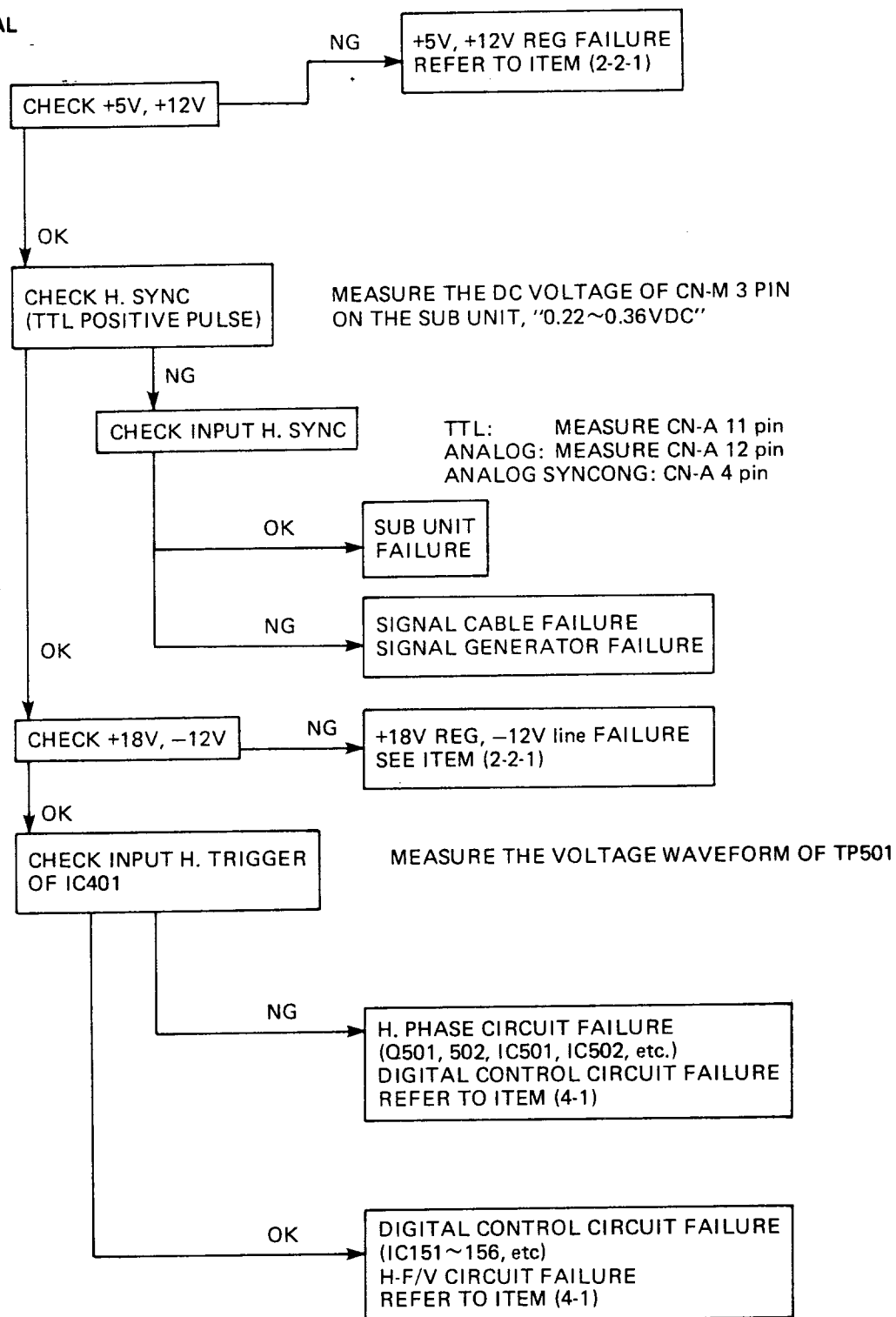


(2-2-3) +170V line FAILURE

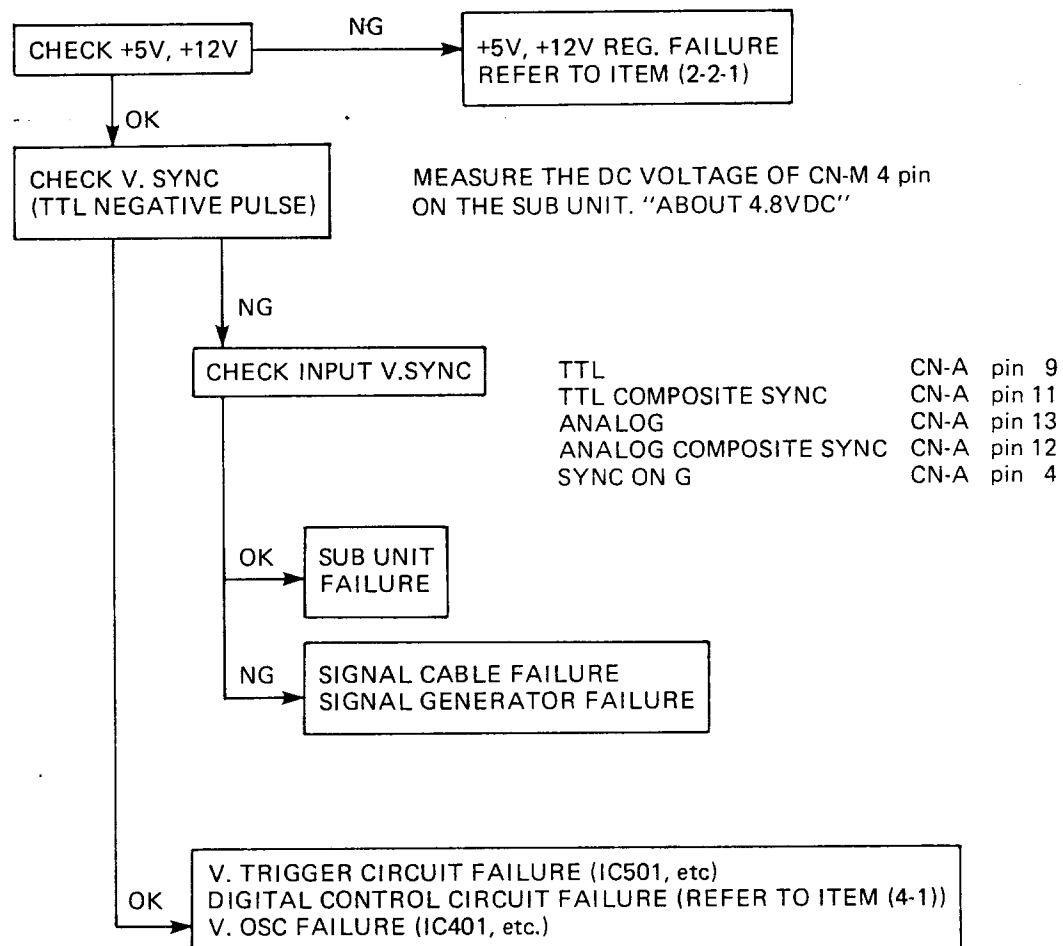


3. LACK OF STABLE SYNCHRONIZATION

(3-1) HORIZONTAL

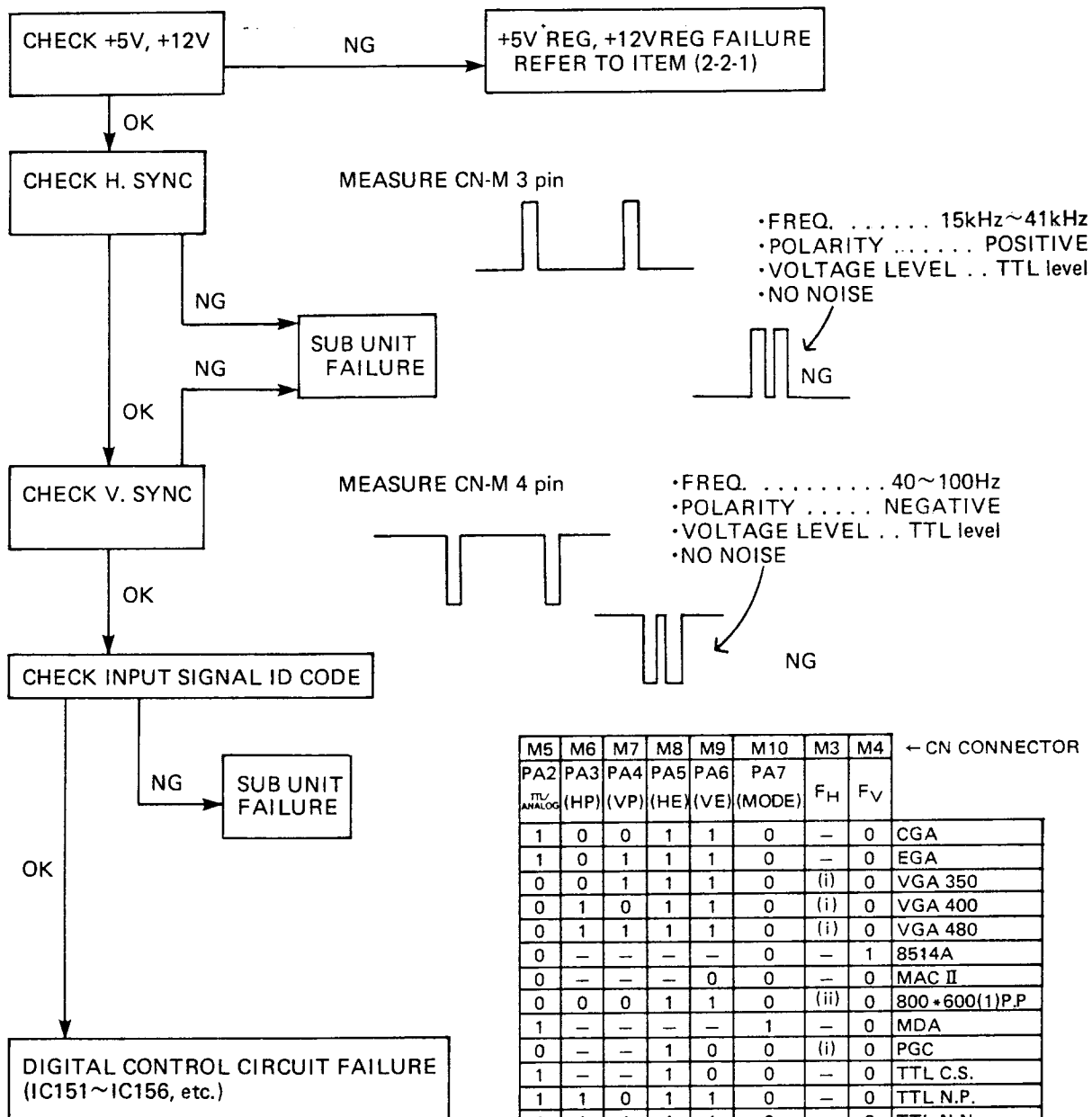


(3-2) VERTICAL



4. DIGITAL CONTROL ERROR

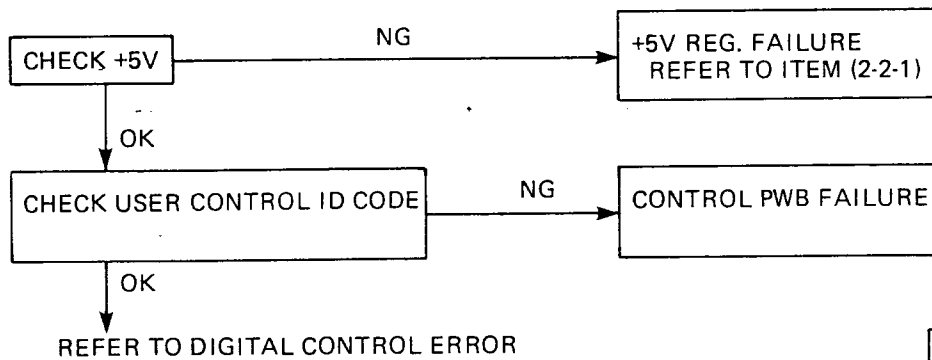
(4-1) DIGITAL CONTROL ERROR



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

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

(4-2) USER CONTROL ERROR

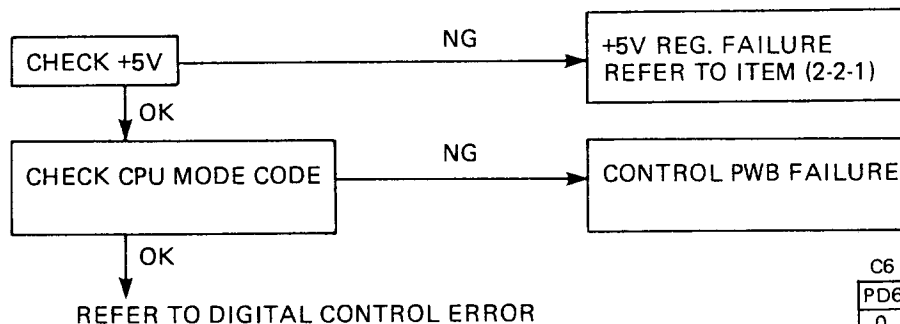


(Cf). If two switches are pushed at the same time, the monitor will be disabled, and the user controls will not function when pressed simultaneously.

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



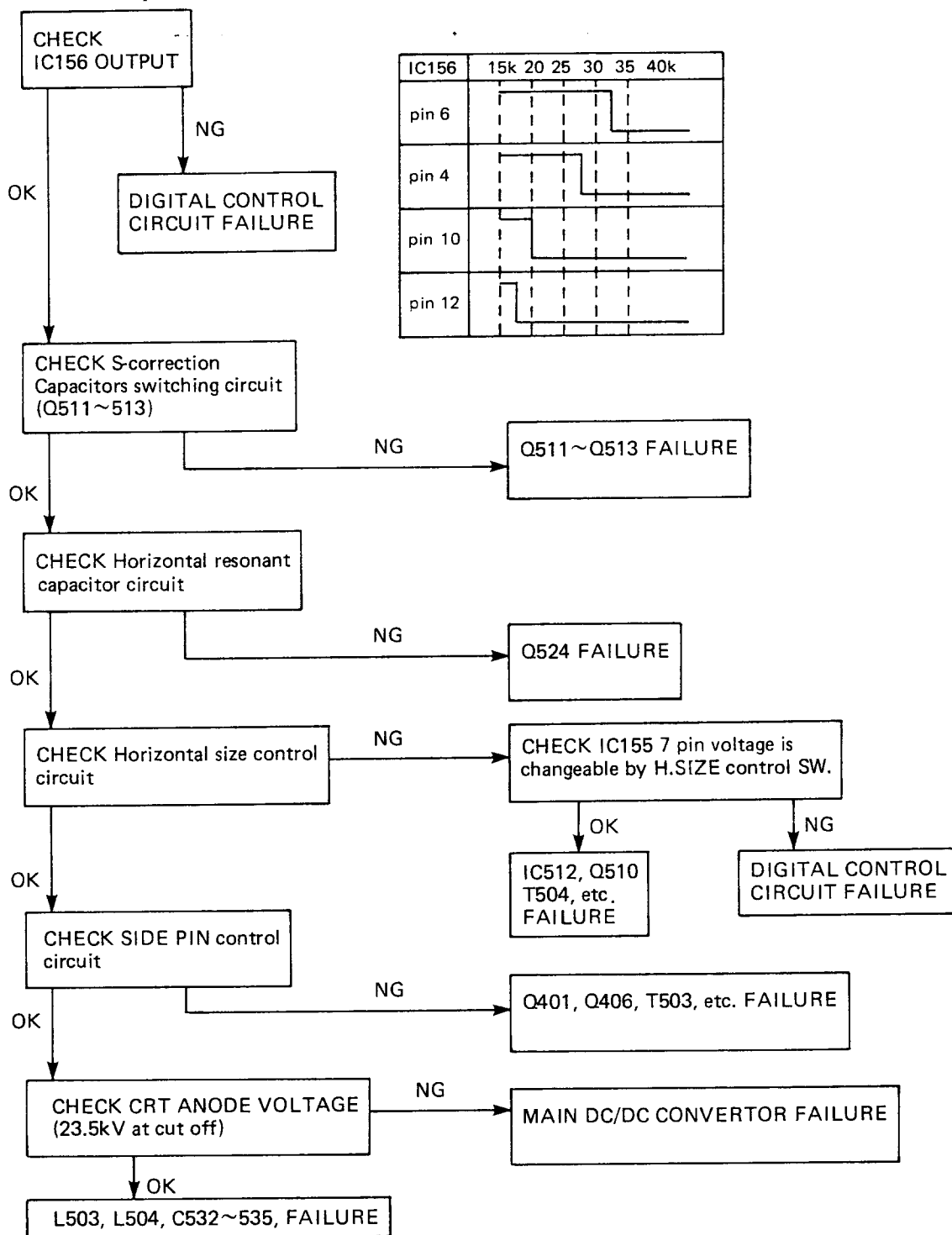
C6	C7	
PD6	PD7	
0	0	USER CONTROL MODE
0	1	FACTORY ADJ. MODE
1	0	DATA LOAD
1	1	FACTORY DATA WRITING

(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

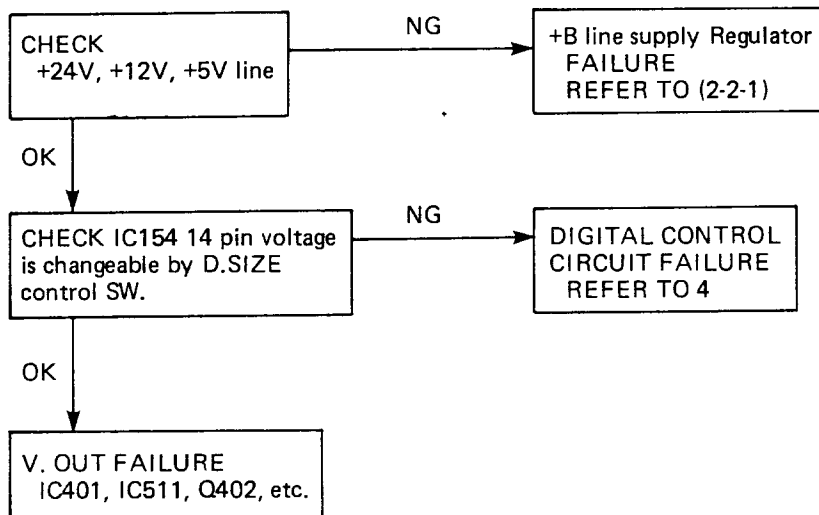
5. ABNORMAL PICTURE

(5-1) ABNORMAL HORIZONTAL WIDTH

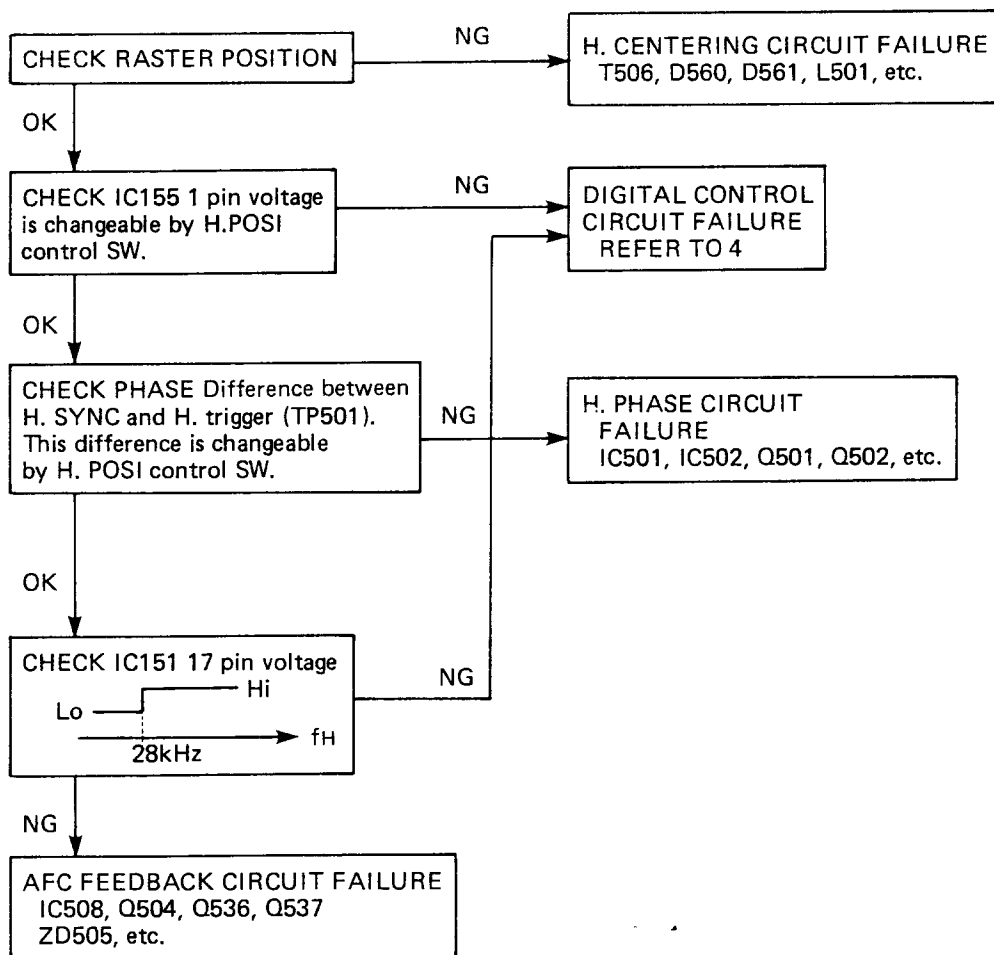


(Cf). In the case of Factory adjustment at Horizontal width.
If it occurs abnormal size by using width coil, please check
Input signal conditions. It must be setted VGA mode, Analog.

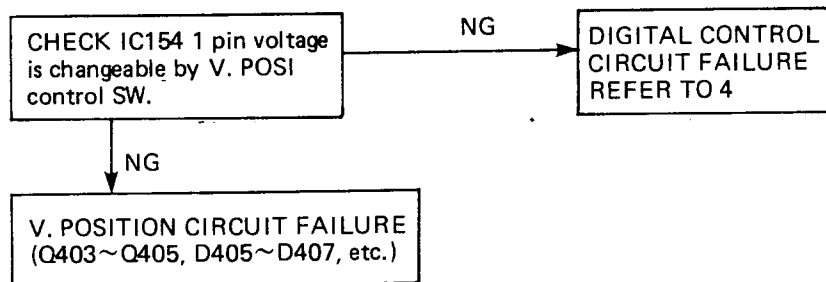
(5-2) ABNORMAL VERTICAL SIZE



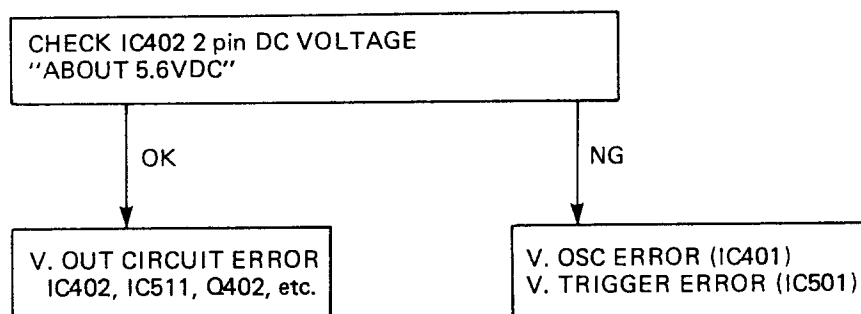
(5-3) ABNORMAL HORIZONTAL PICTURE POSITION



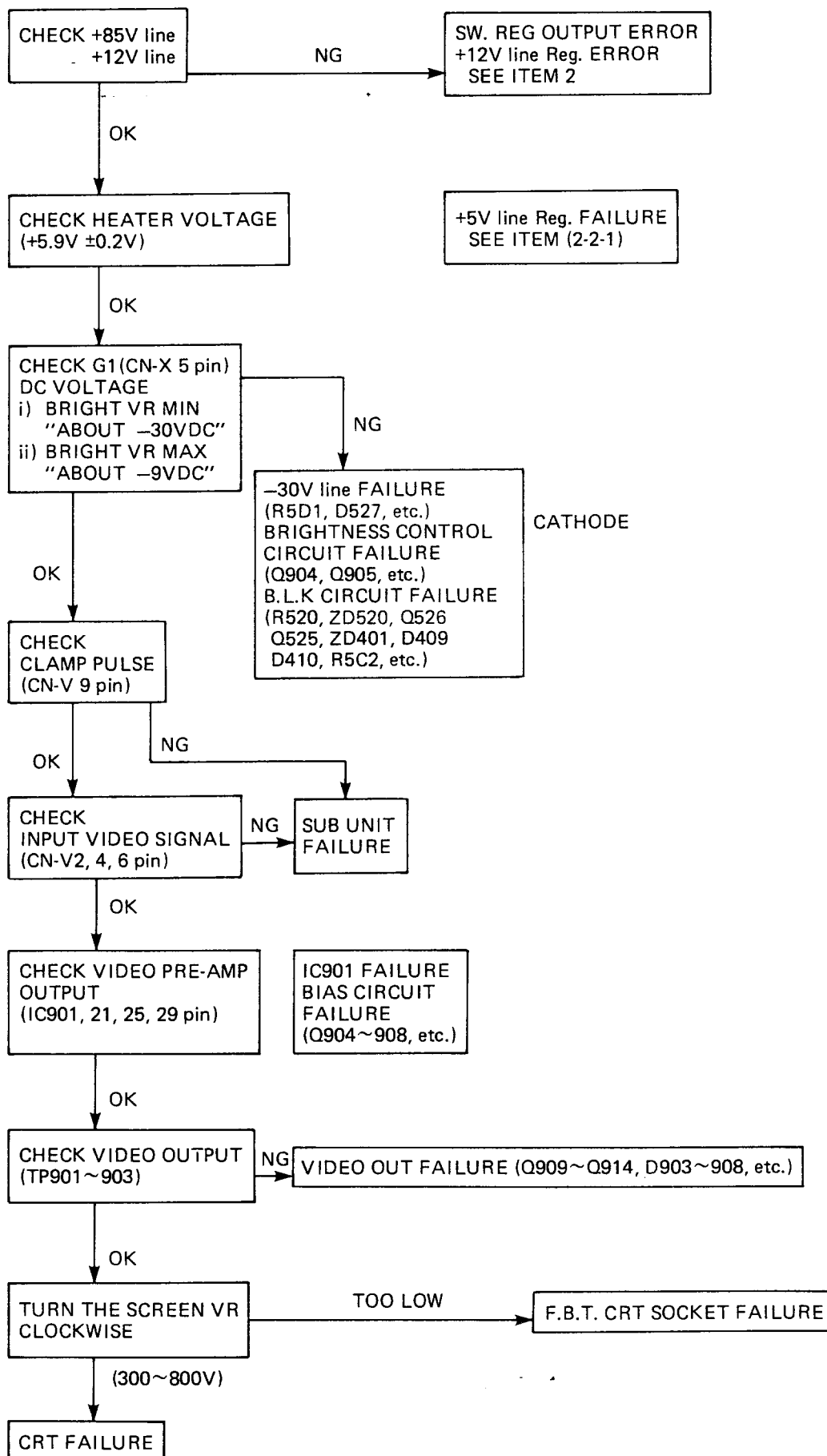
(5-4) ABNORMAL VERTICAL PICTURE POSITION



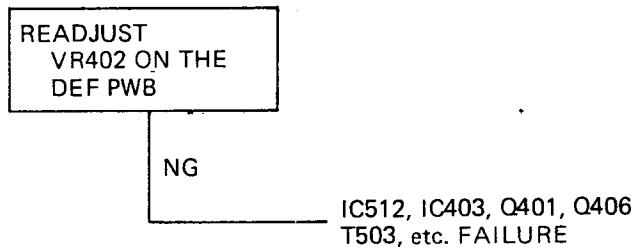
(5-5) ABNORMAL VERTICAL SCAN



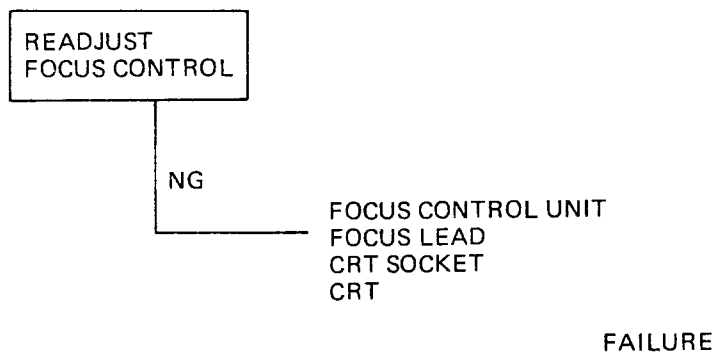
(5-6) ABNORMAL VIDEO



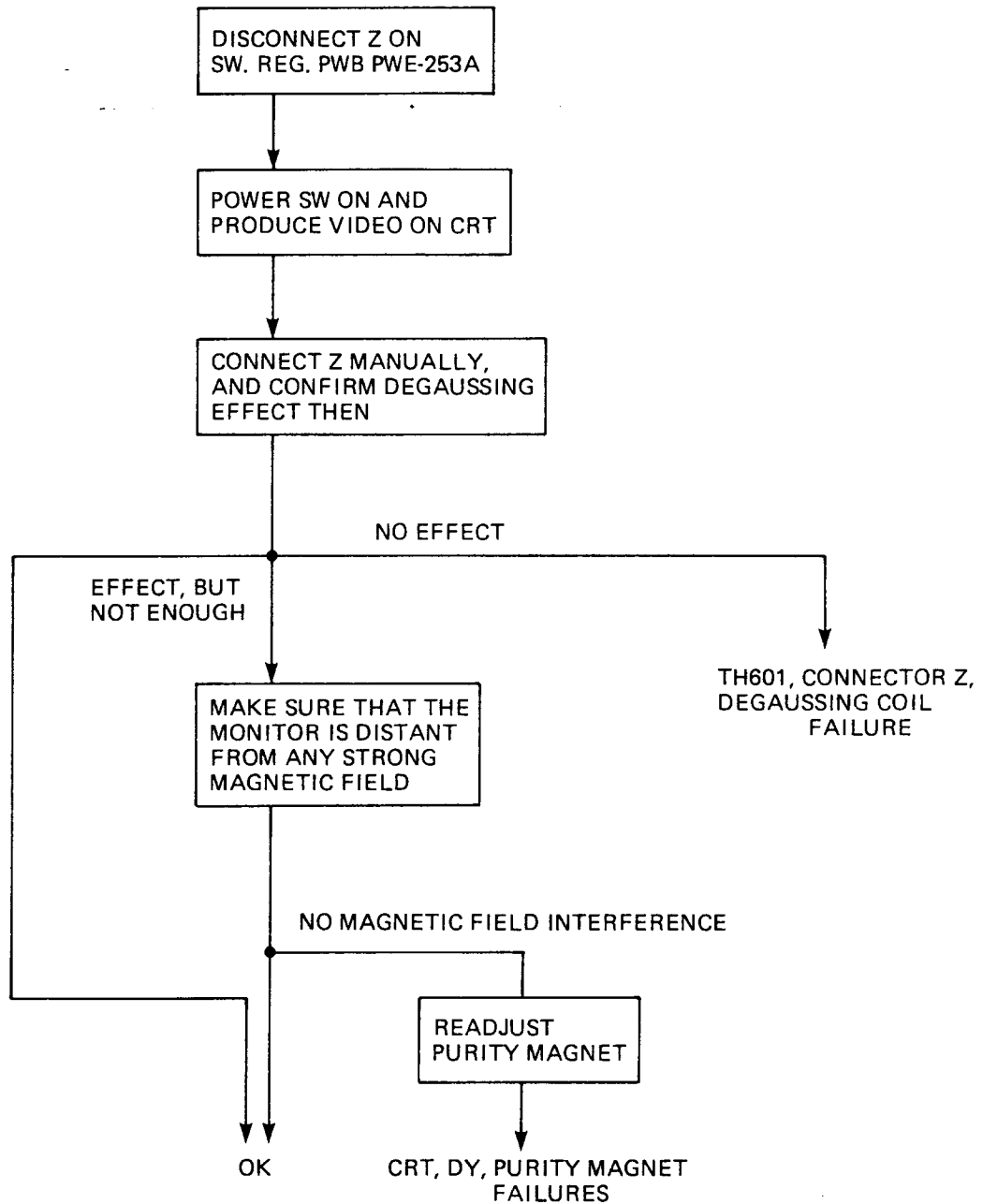
(5-7) SIDE PIN CUSHION DISTORTION FAILURE



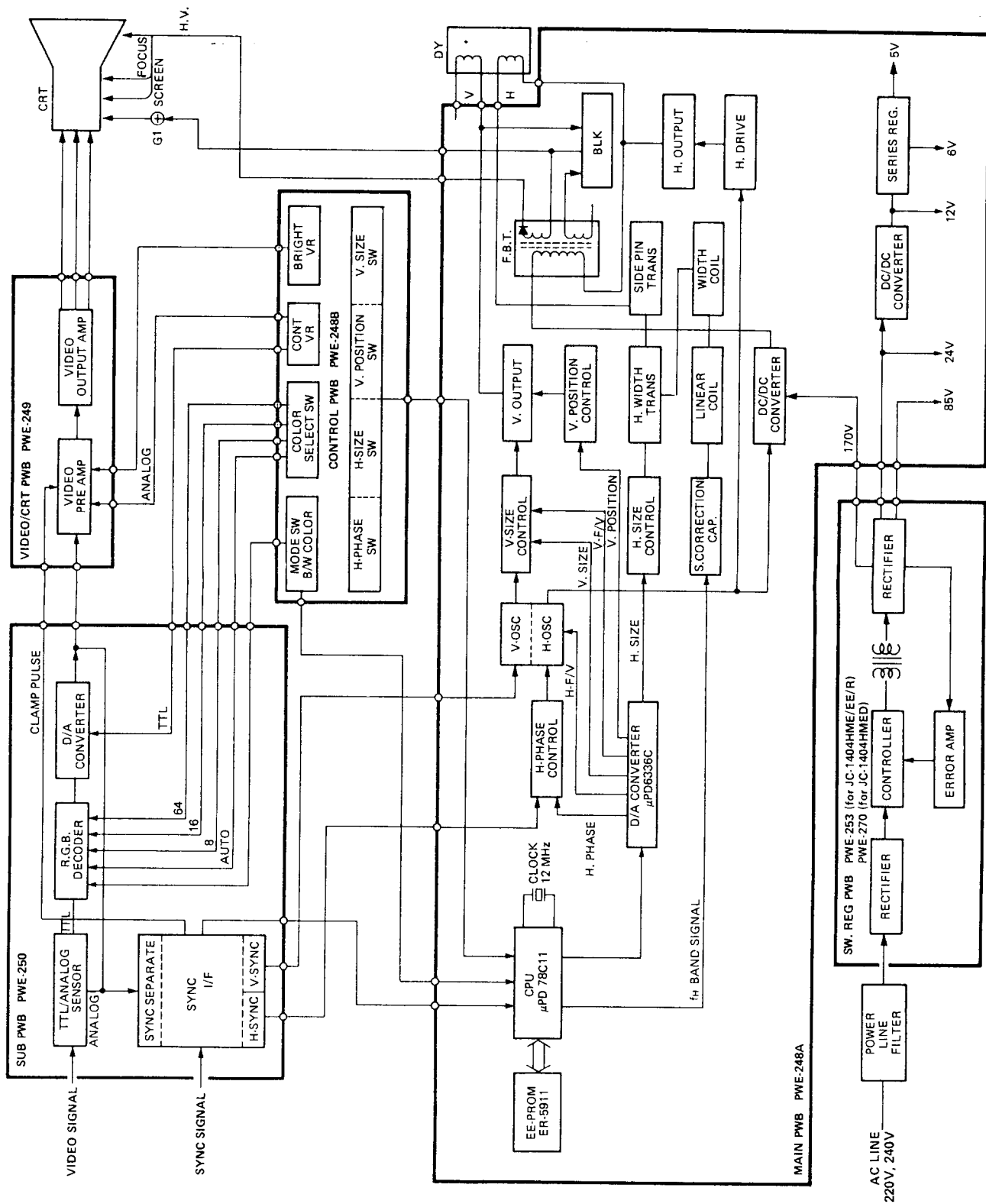
(5-8) POOR FOCUS

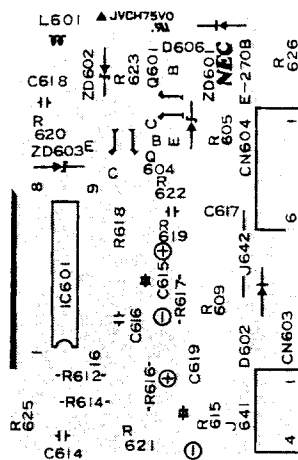
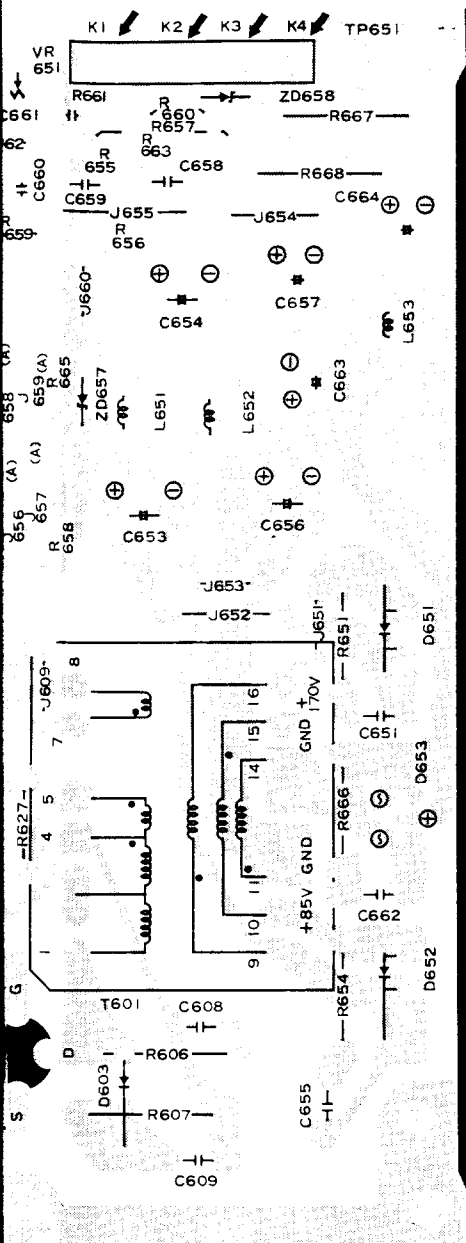


(5-9) IMPURITY ON CRT SCREEN



BLOCKDIAGRAM



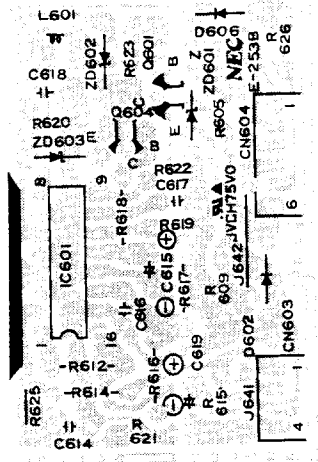


SW. REG. PWB ASSY (PWE-270B)

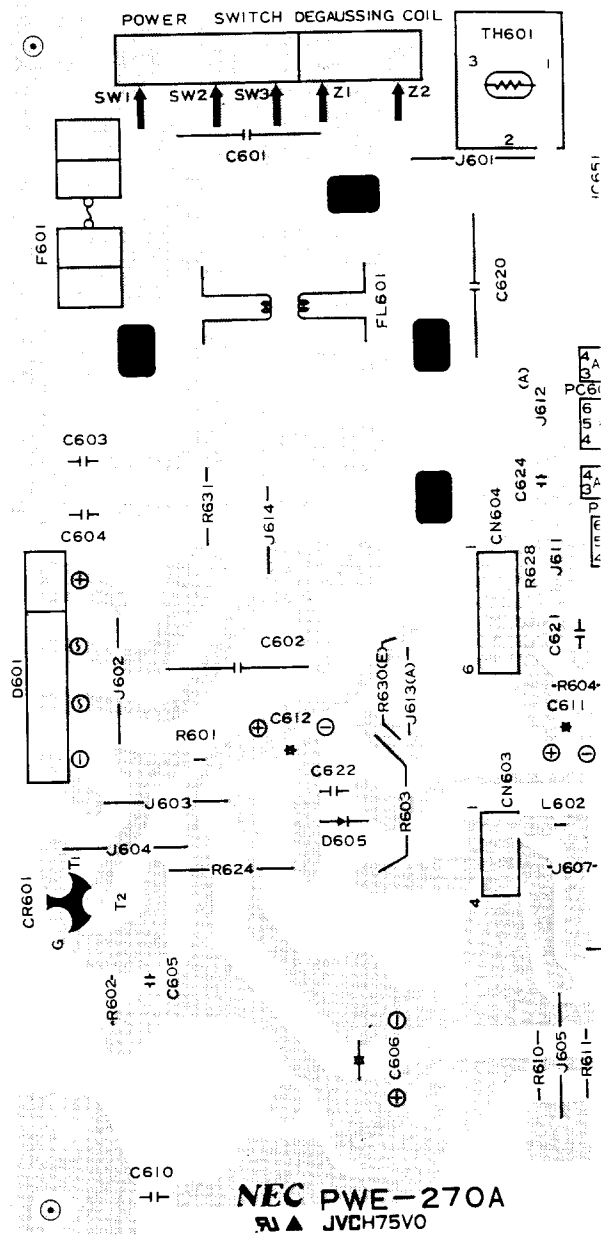
— Solder side —

model JC-1404HMED

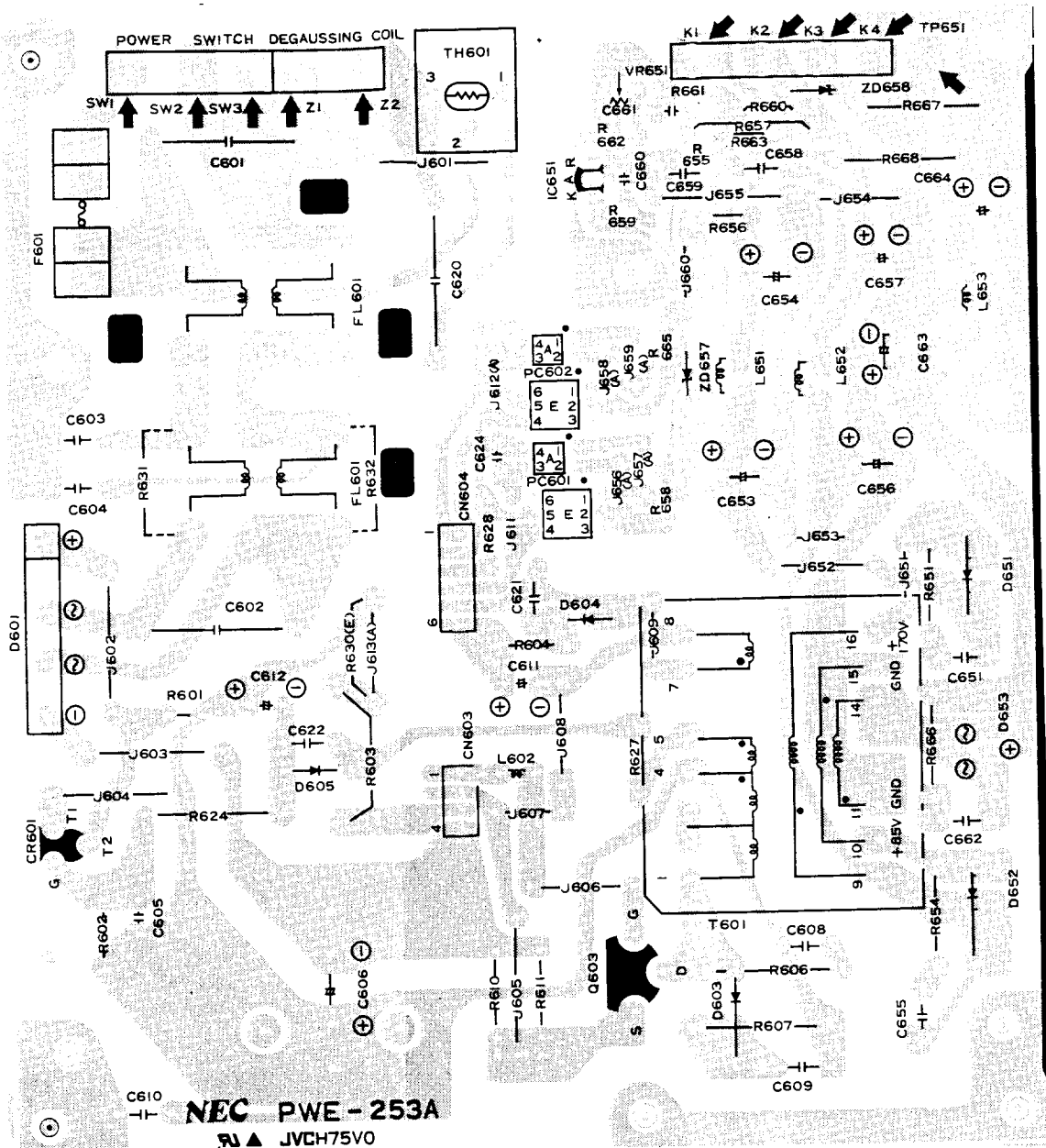
270A)



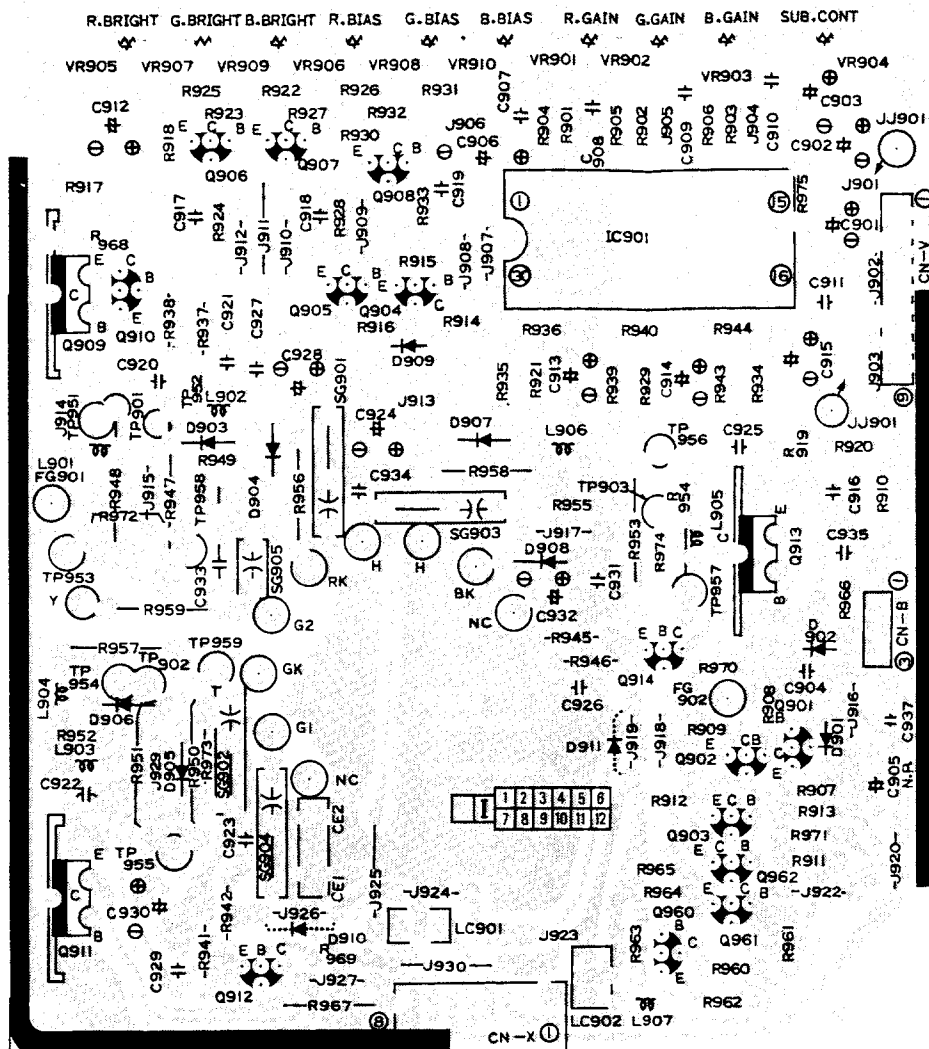
SW. REG. PWB ASSY (PWE-253B)
 — Solder side —
 models JC-1404HME/EE/R



SW. REG. PWB ASSY
 — Solder side
 model JC-1404H

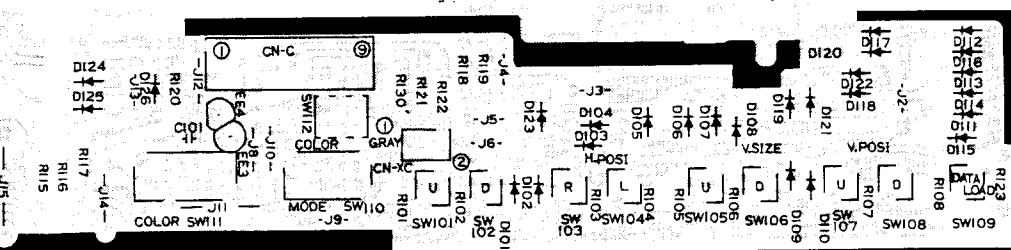


SW. REG. PWB ASSY (PWE-253A)
 — Solder side —
 models JC-1404HME/EE/R



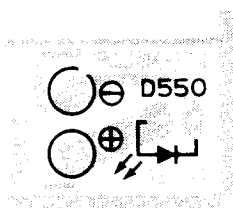
VIDEO/CRT PWB ASSY (PWE-249)

— Solder side —



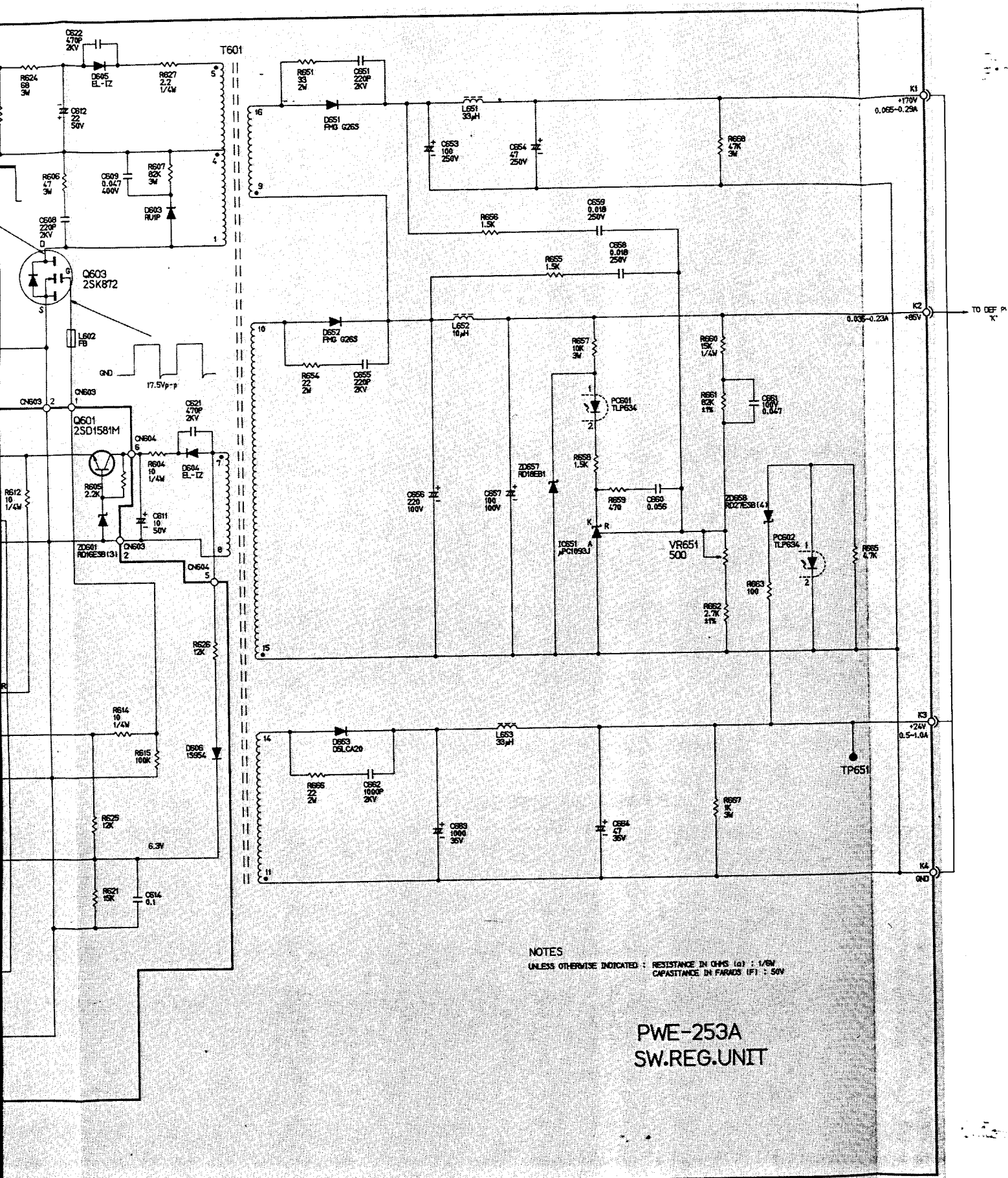
CONTROL PWB ASSY (PWE-248B)

— Solder side —



LED PWB ASSY (PWE-248C)

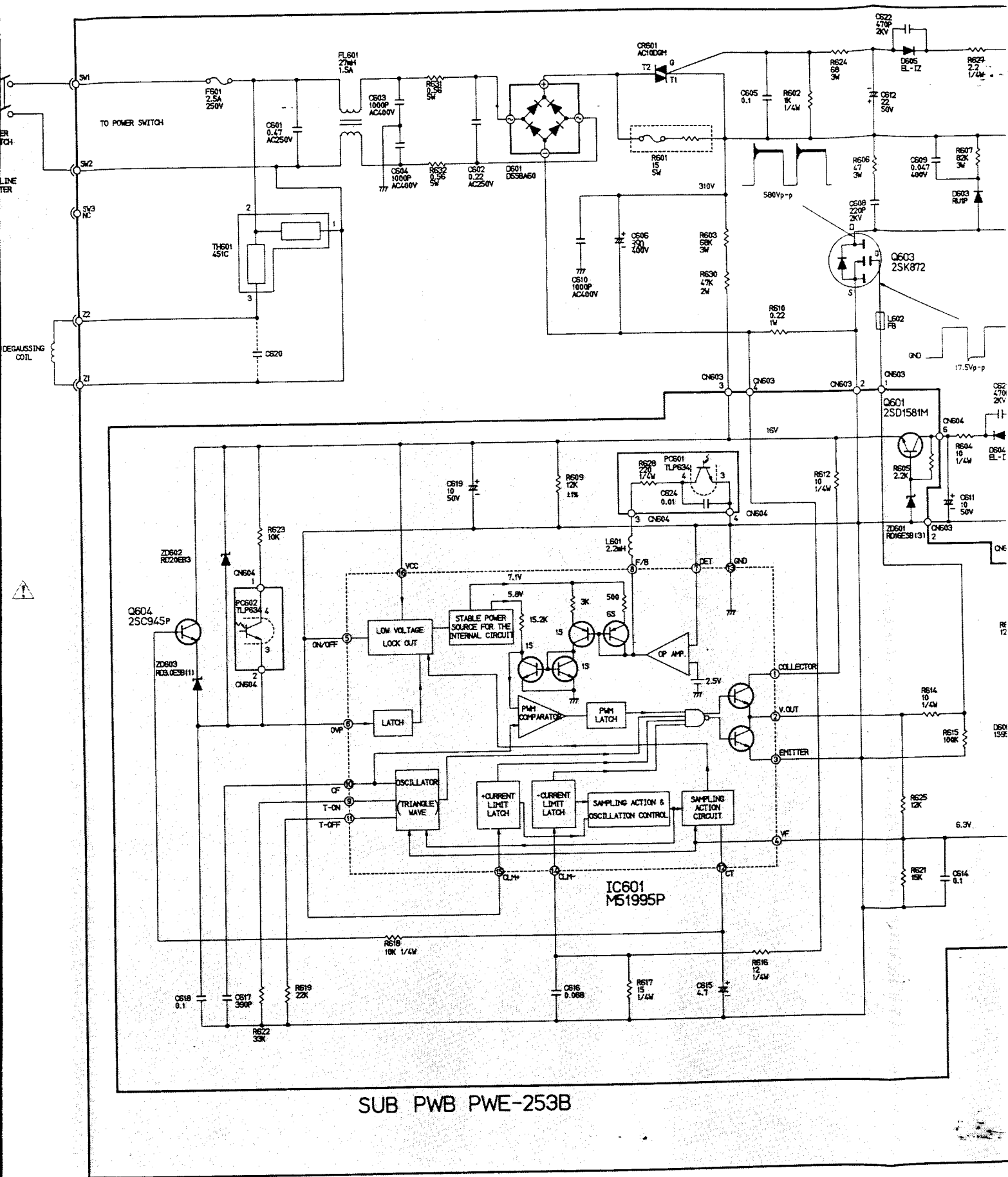
— Solder side —



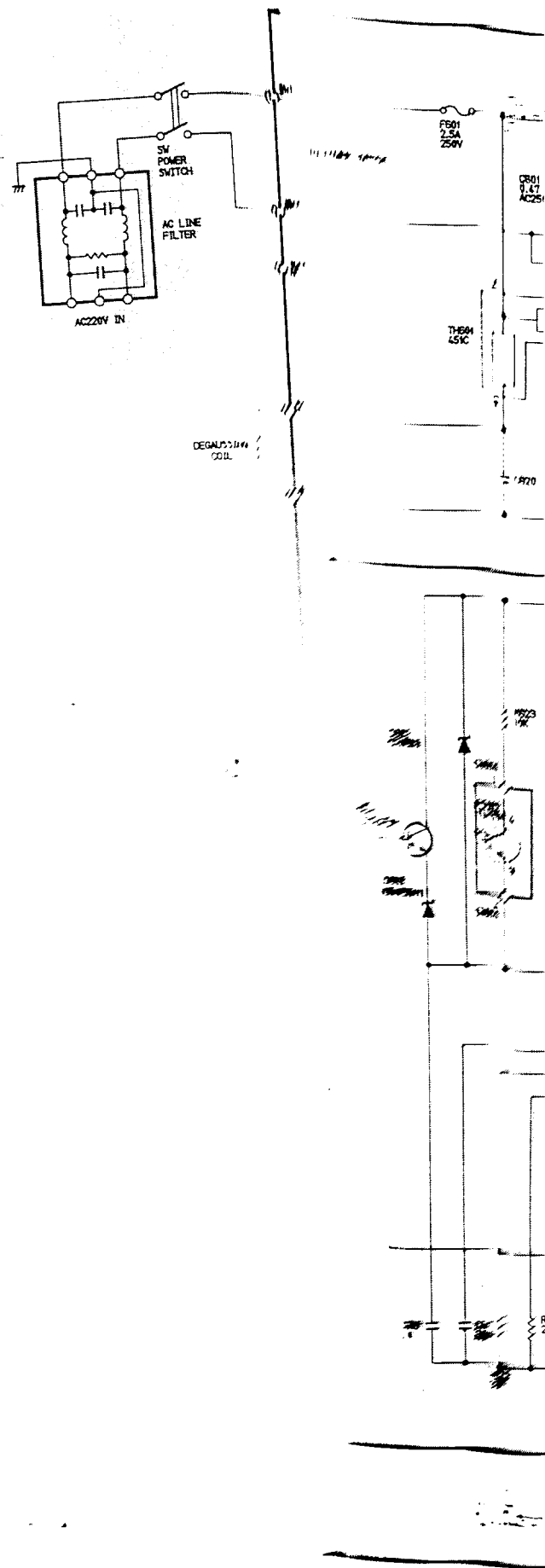
NOTES

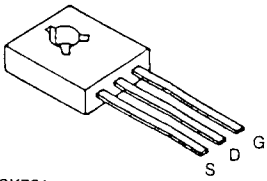
UNLESS OTHERWISE INDICATED : RESISTANCE IN OHMS (Ω) : 1/6W
CAPACITANCE IN FARADS (F) : 50V

PWE-253A
SW.REG.UNIT

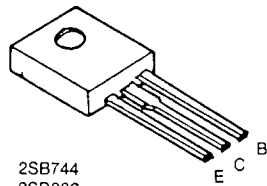


MODEL JC-1404HME/EE/R SCHEMATIC DIAGRAM 1

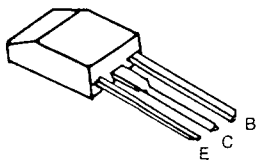




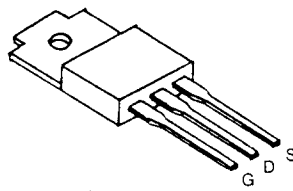
2SK701



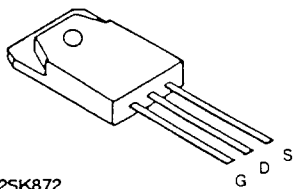
2SB744
2SD882
2SD986



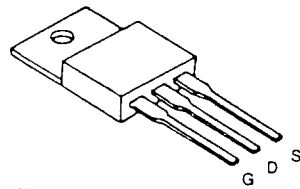
2SD1581



2SK703
2SK752
2SK758



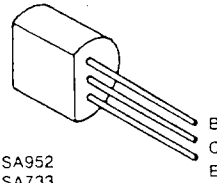
2SK872



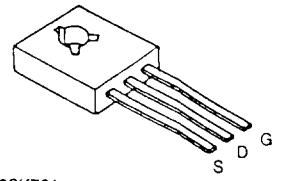
2SK854

NOTE:

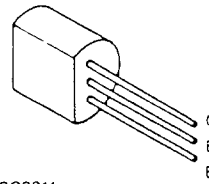
E: EMITTER
B: BASE
C: COLLECTOR
G: GATE
D: DRAIN
S: SOURCE



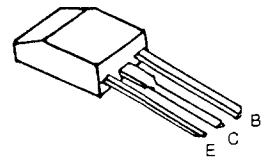
2SA952
2SA733
2SC945
2SC2002
AA1A4M
AA1L4M
2SC1473
2SA1018



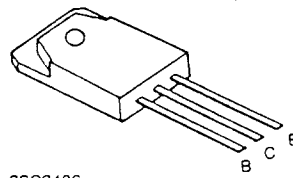
2SK701



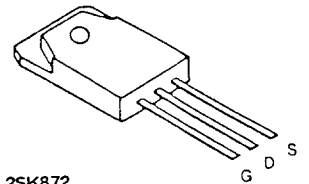
2SC3811



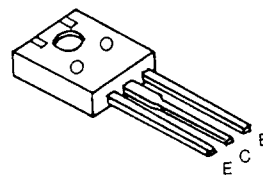
2SD1581



2SC3486

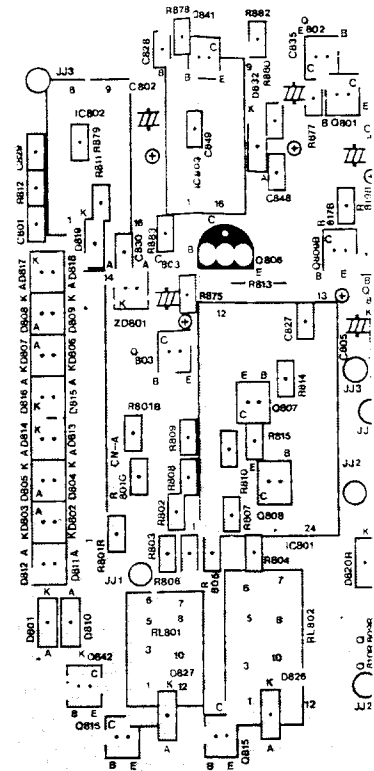
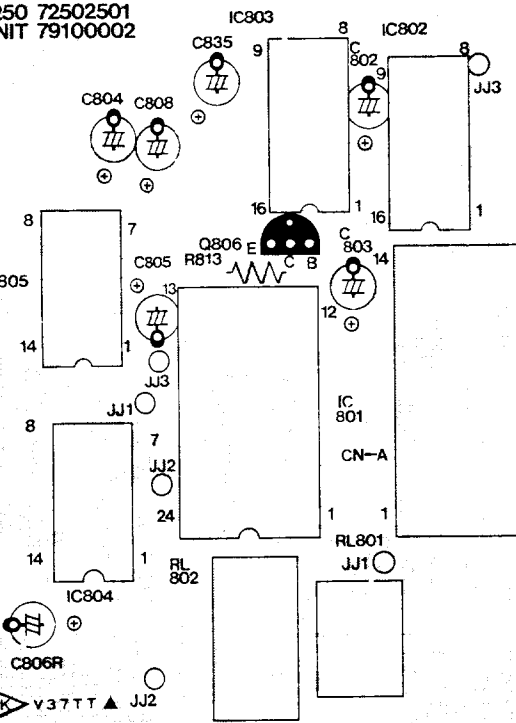


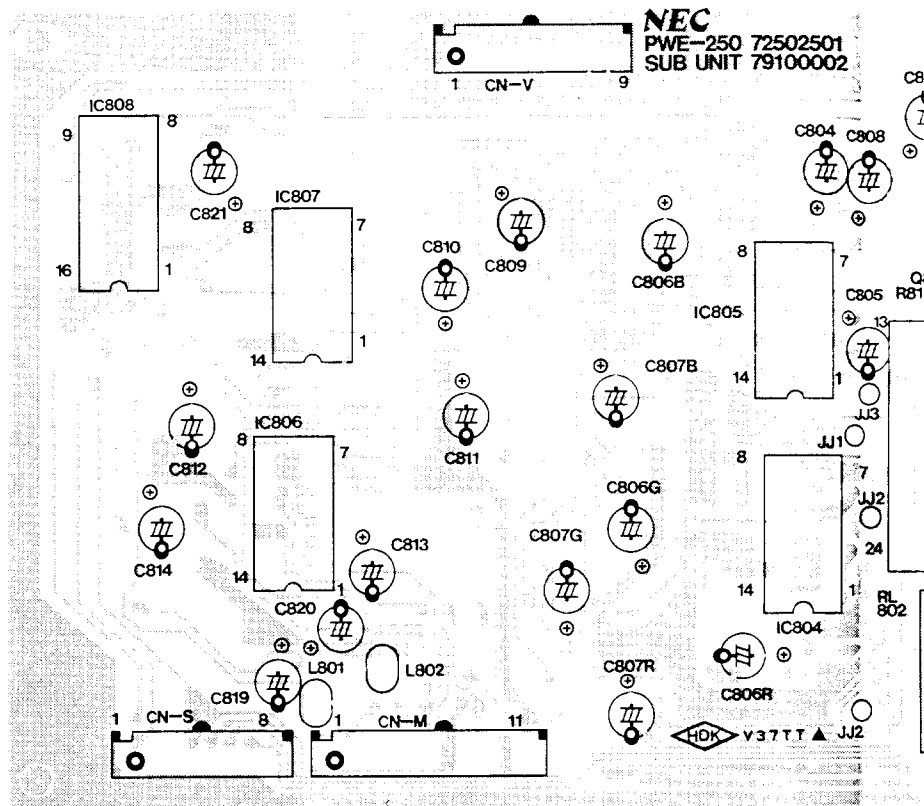
2SK872



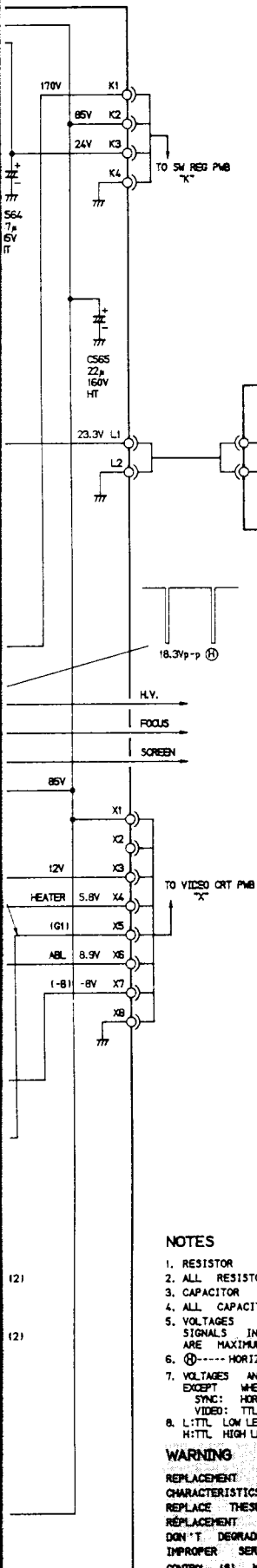
2SC3953

50 72502501
NIT 79100002





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



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

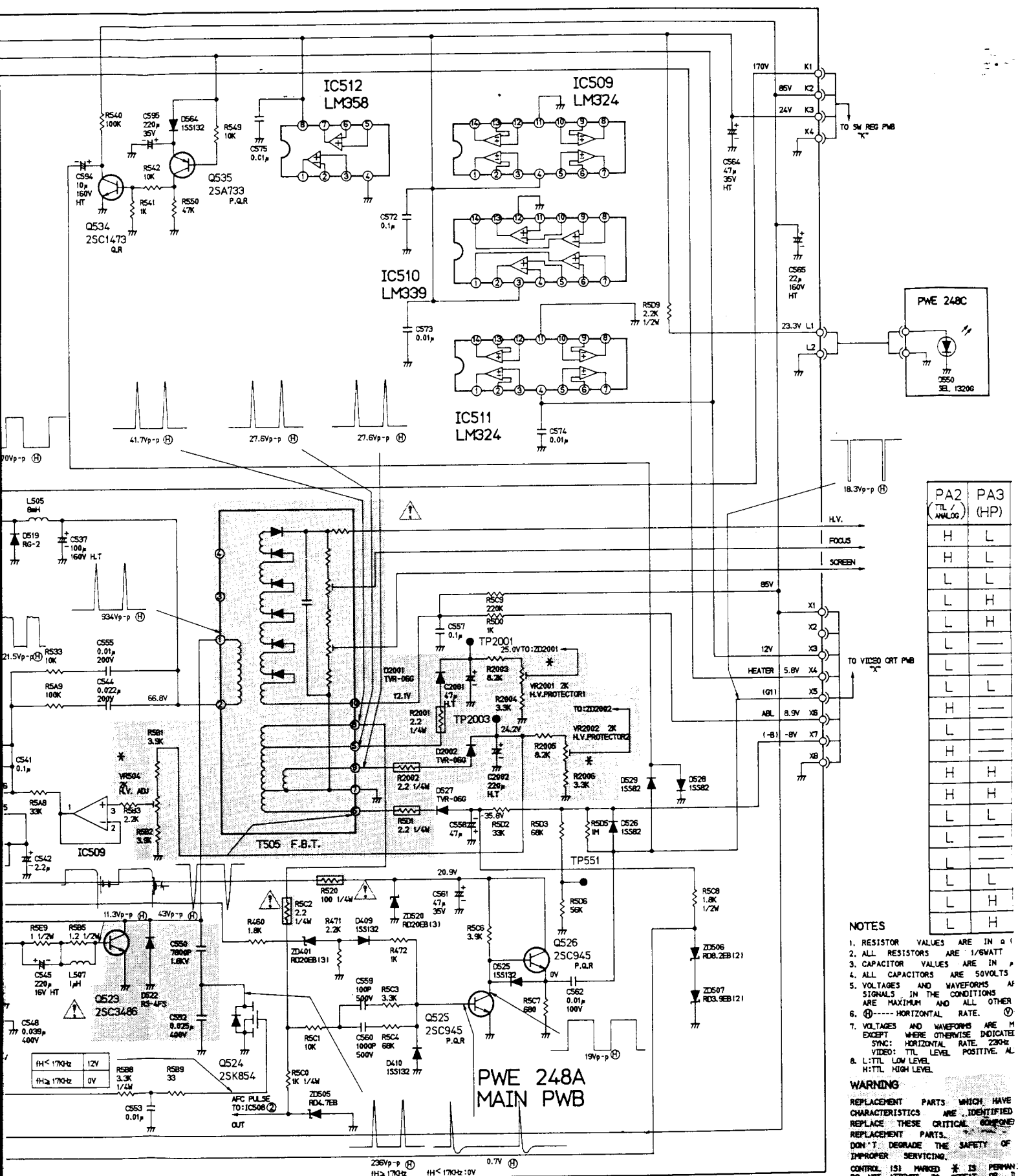
PA2 (TTL / ANALOG)	PA3 (HP)	PA4 (VP)	PA5 (HE)	PA6 (VE)	PA7 (MODE)	F _H	F _V	
H	L	L	H	H	L	—	0	CGA
H	L	H	H	H	L	—	0	EGA
L	L	H	H	H	L	(1)	0	VGA 350
L	H	L	H	H	L	(1)	0	VGA 400
L	H	H	H	H	L	(1)	0	VGA 480
L	—	—	—	—	L	—	1	8514A
L	—	—	—	L	L	—	0	MAC II
L	L	L	H	H	L	(11)	0	800 * 600(1)P.P
H	—	—	—	—	H	—	0	MDA
L	—	—	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 = 1,000 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. \oplus ----- 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_H \leq 330Hz
(11): F_H > 330Hz
10. F_V 0: F_V \leq 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 (3) MARKED * IS PERMANENTLY FROZEN. DO NOT ATTEMPT TO DEFEAT OR IMPROPERLY REPLACE.

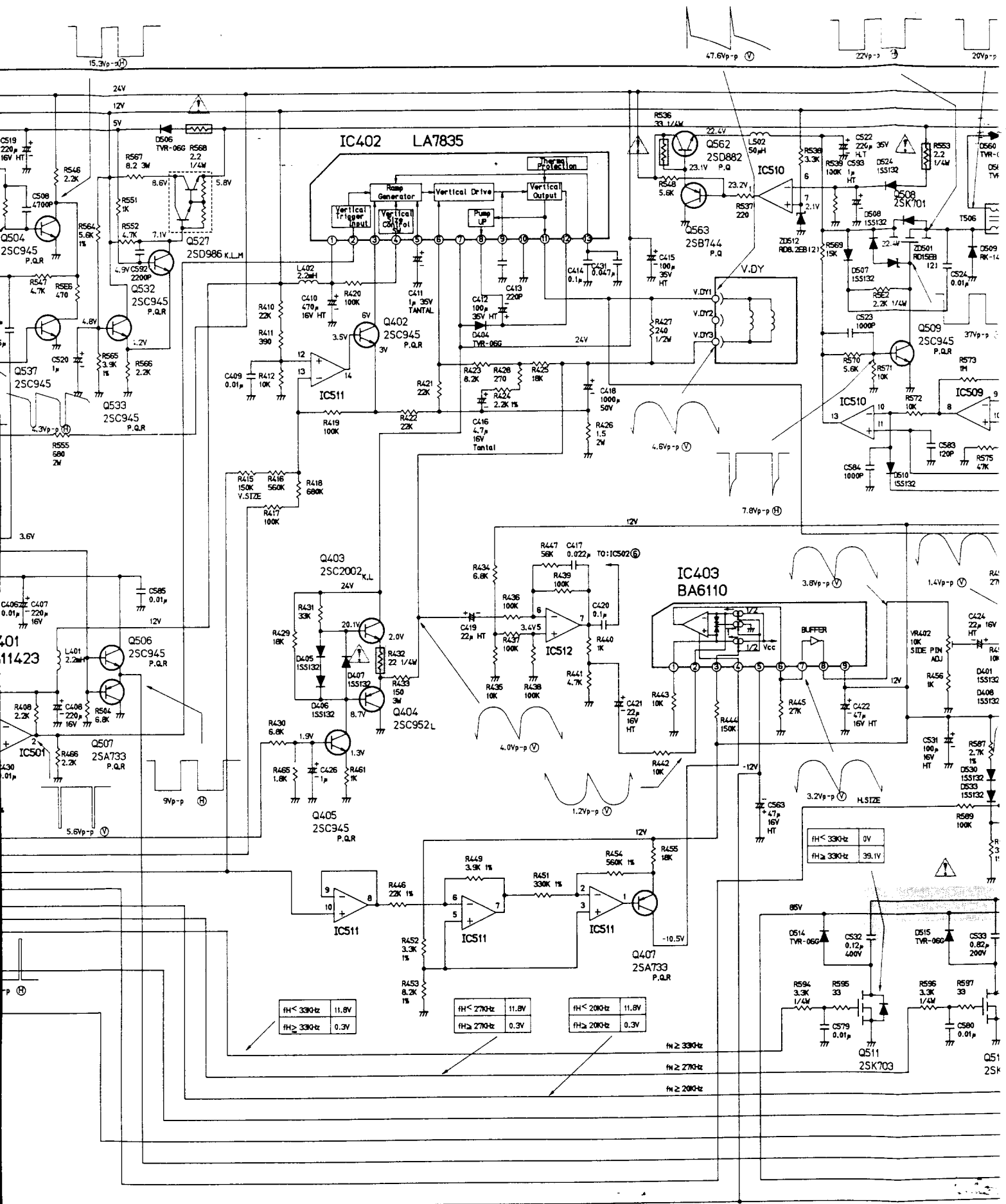


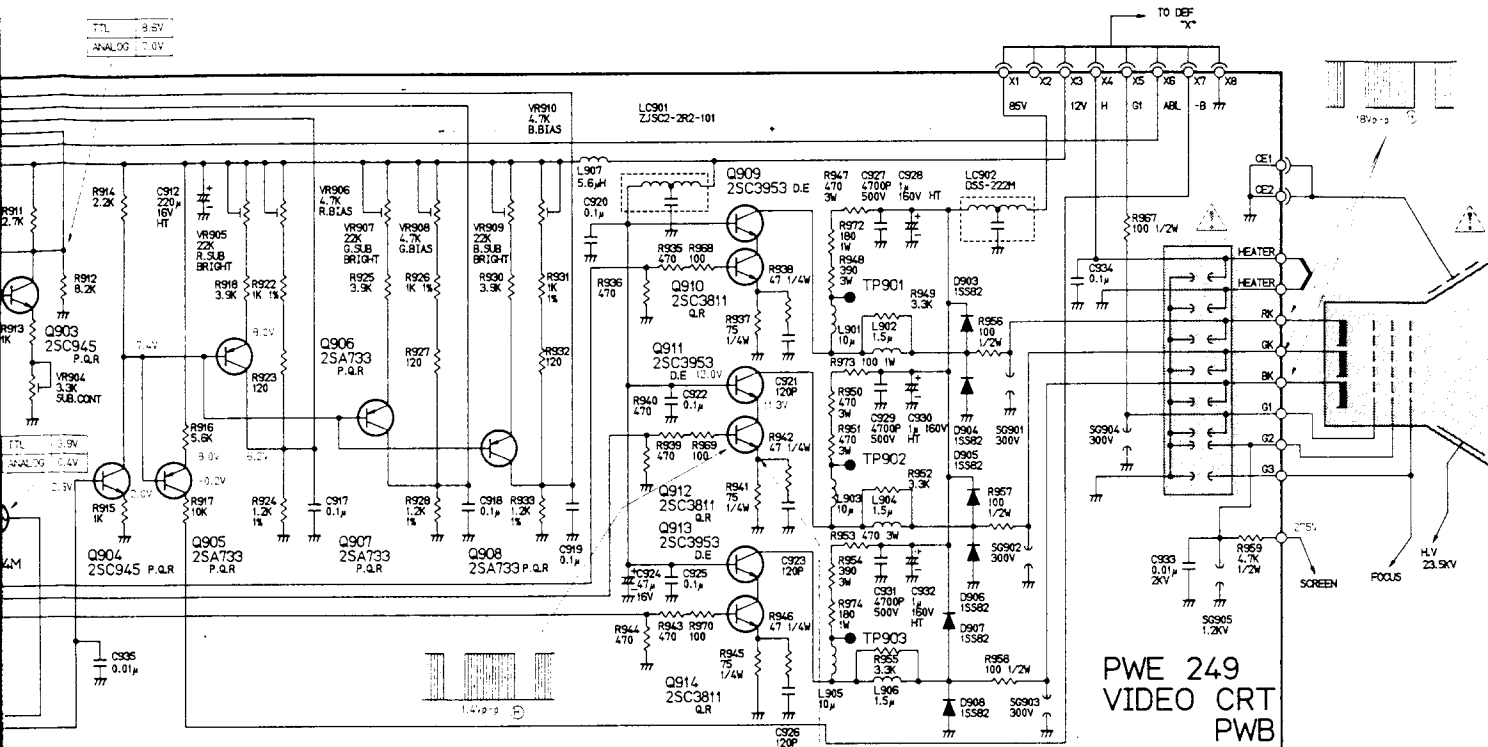
NOTES

1. RESISTOR VALUES ARE IN Ω
2. ALL RESISTORS ARE $1/8$ WATT
3. CAPACITOR VALUES ARE IN μ
4. ALL CAPACITORS ARE 50VOLTS
5. VOLTAGES AND WAVEFORMS OF SIGNALS IN THE CONDITIONS ARE MAXIMUM AND ALL OTHER
6. \oplus -----HORIZONTAL RATE. \ominus
7. VOLTAGES AND WAVEFORMS ARE M EXCEPT WHERE OTHERWISE INDICATED
 SYNC: HORIZONTAL RATE 220HZ
 VIDEO: TTL LEVEL POSITIVE. AL
8. L: TTL LOW LEVEL
 H: TTL HIGH LEVEL

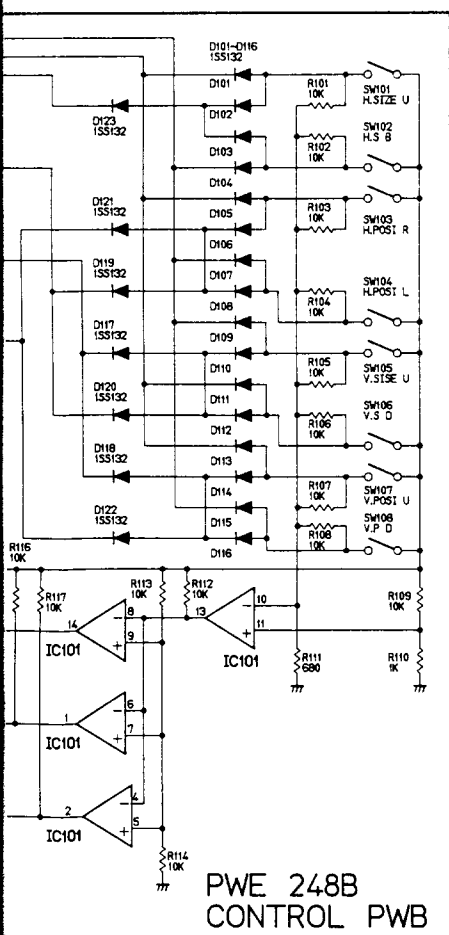
WARNING

REPLACEMENT PARTS WHICH HAVE CHARACTERISTICS ARE IDENTIFIED
REPLACE THESE CRITICAL COMPONENTS
REPLACEMENT PARTS.
DON'T DEGRADE THE SAFETY OF
IMPROPER SERVICING.
CONTROL IS! MARKED * IS PERMANENT OR II
DO NOT ATTEMPT TO DEFEAT OR II





PWE 249
VIDEO CRT
PWB



PWE 248B
CONTROL PWB

ON-A P.W.	P/S NO.	VGA	MAC- II	PGC	TTL/EGA CONV
1	1	R	R	R	RA GND
2	6	R.GND	R.GND		
3	2	G	G (W/SYNC)	G	r
4	7	G.GND	B. G.GND		
5	3	B	B	B	R
6	8	B.GND	B.GND		
7	4	ID (BSI4)			
8	5	GND (S.T)		GND	B
9	10	GND	GND	GND	V.D
10	11	ID (TO GREEN)			
11	12	ID (TO OPEN)		GND	H.D
12	13	HLD	GND	C.SYNC	G
13	14	V.D		MODE	B
14	15	N.C		GND	b

LC801				
COLOR	AUTO	B	16	64
MODE	AUTO	B	16	64
41	V.S.P.	L	H	
42	L	H	L	
43	L	L	L	H

ON-M		
16	POST	NEGA
4.9V	0V	
V.P		
17	POST	NEGA
4.9V	0V	
18	SEPA	COMP
4.9V	4.9V	0V
19	SEPA	COMP
4.9V	0V	0V

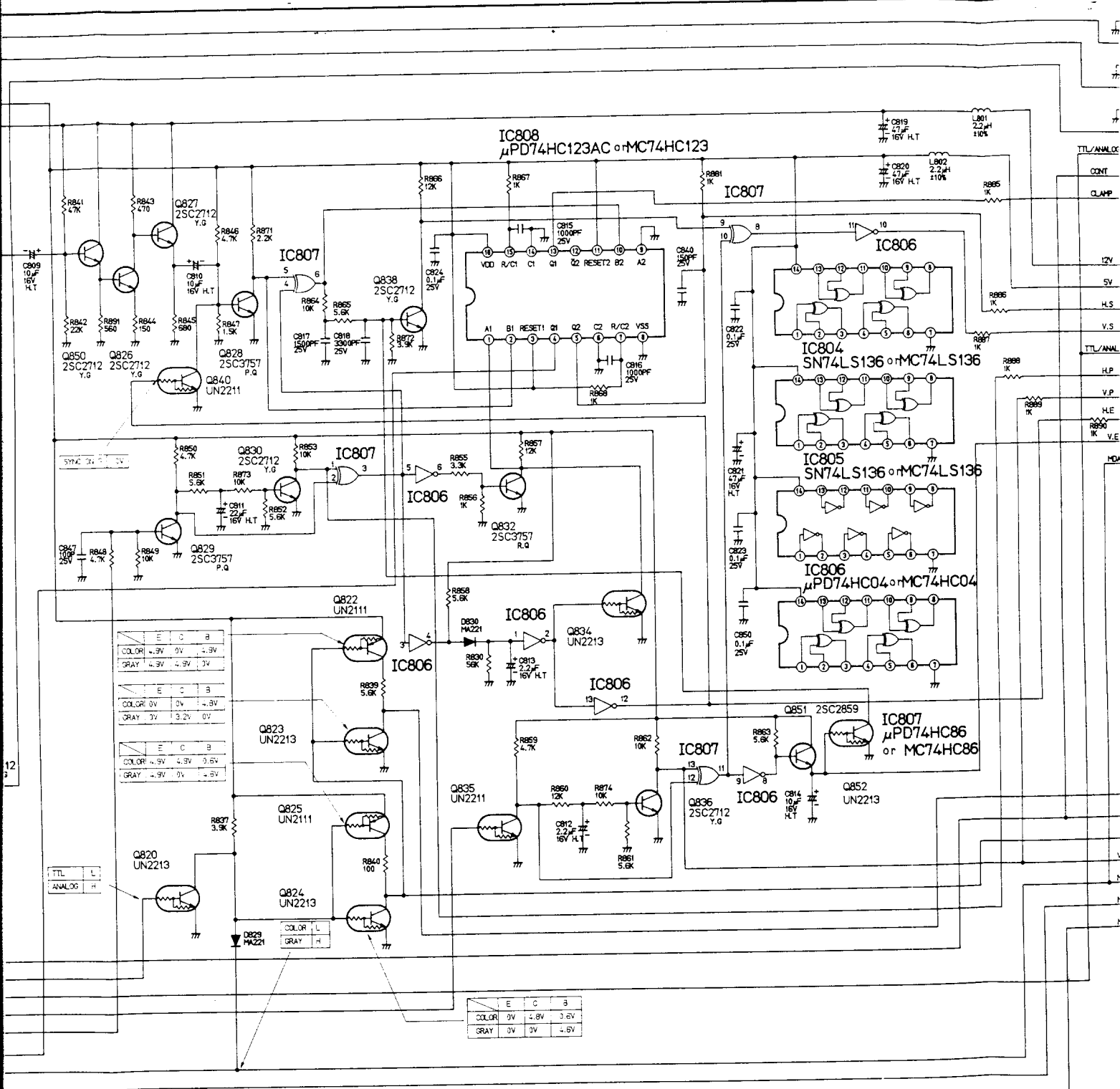
NOTES

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. \oplus -----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

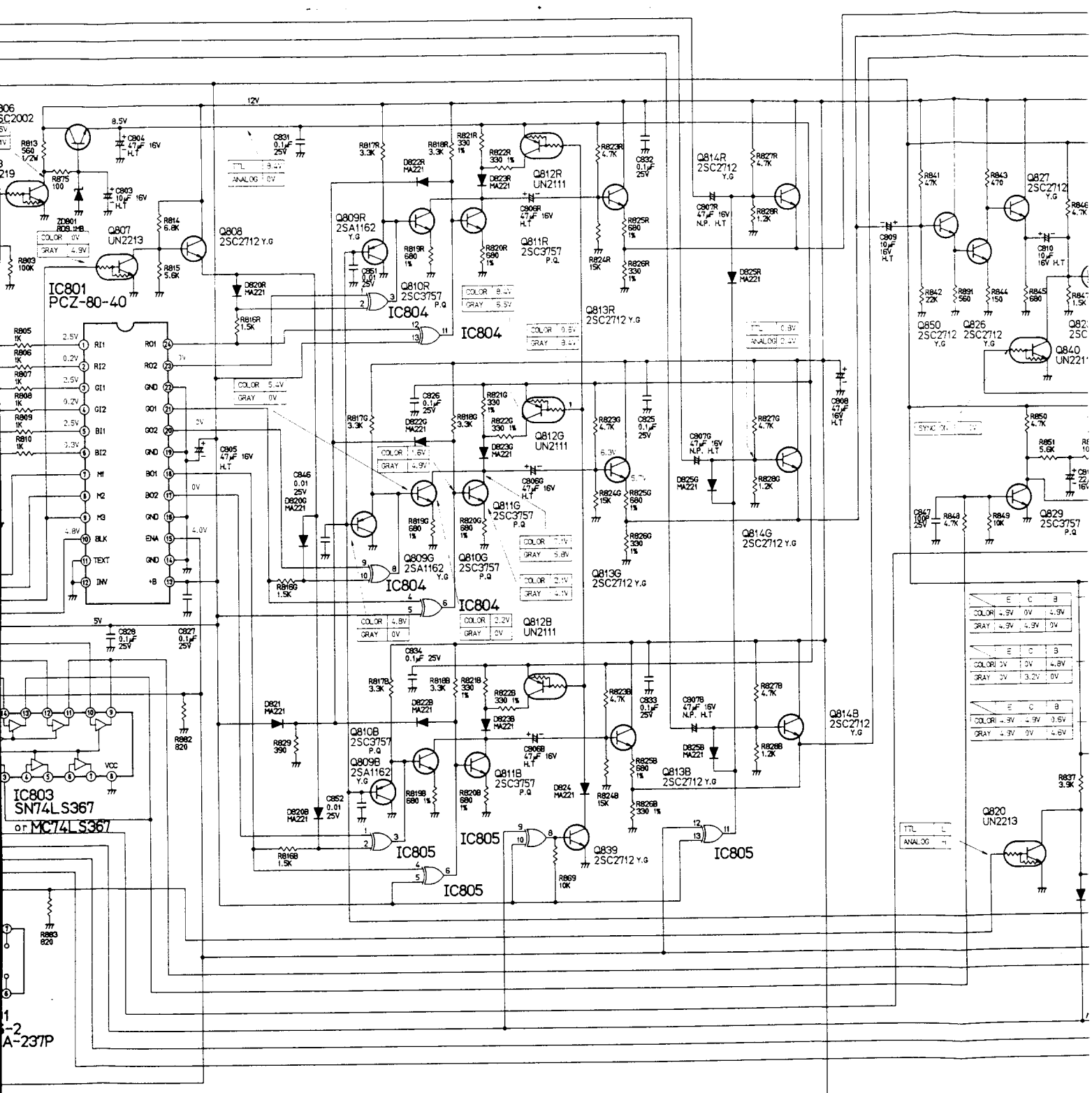
WARNING

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



PWE 250
SUB UNIT PW



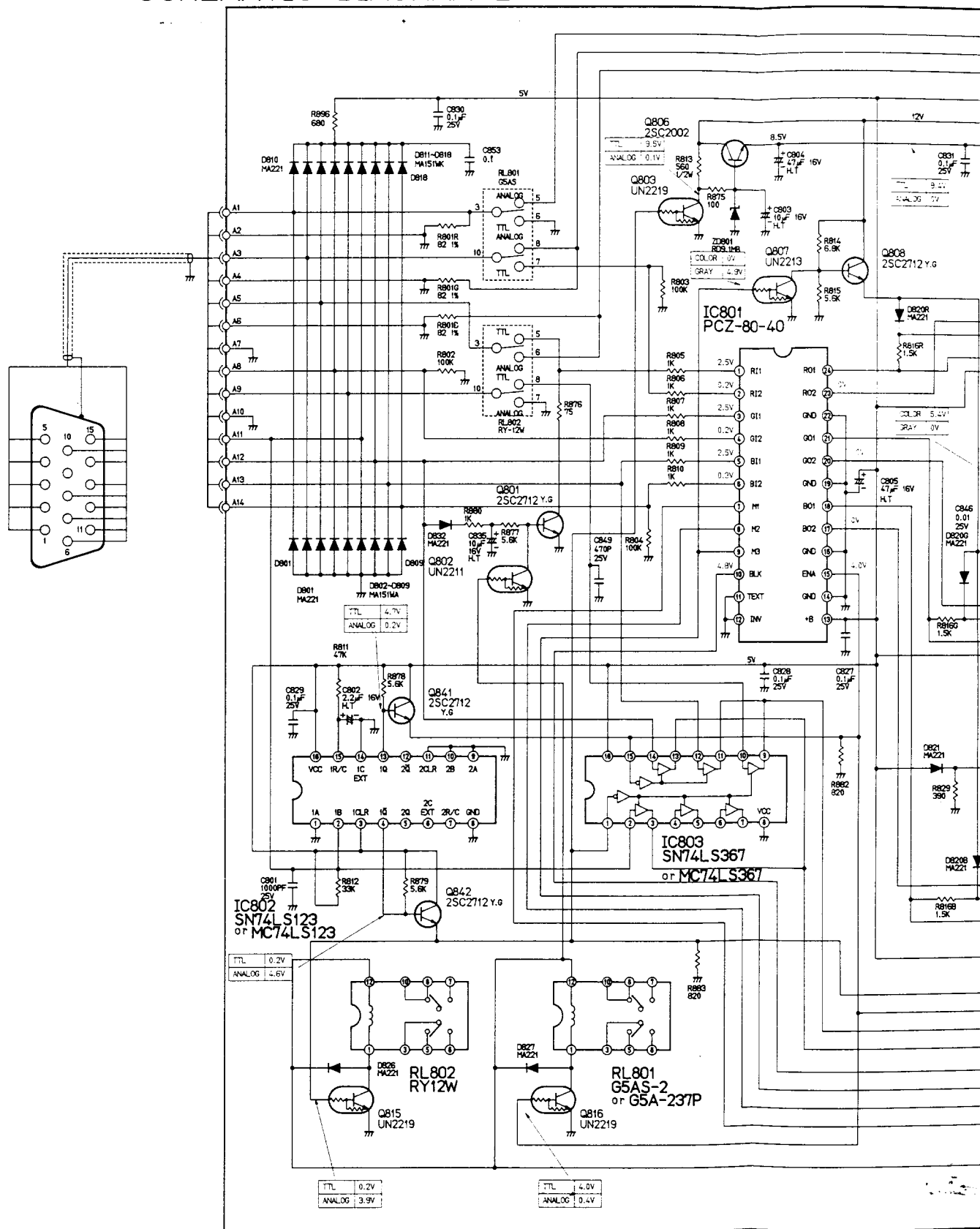
	E	C	B
COLOR	4.5V	0V	4.5V
GRAY	4.5V	4.5V	0V

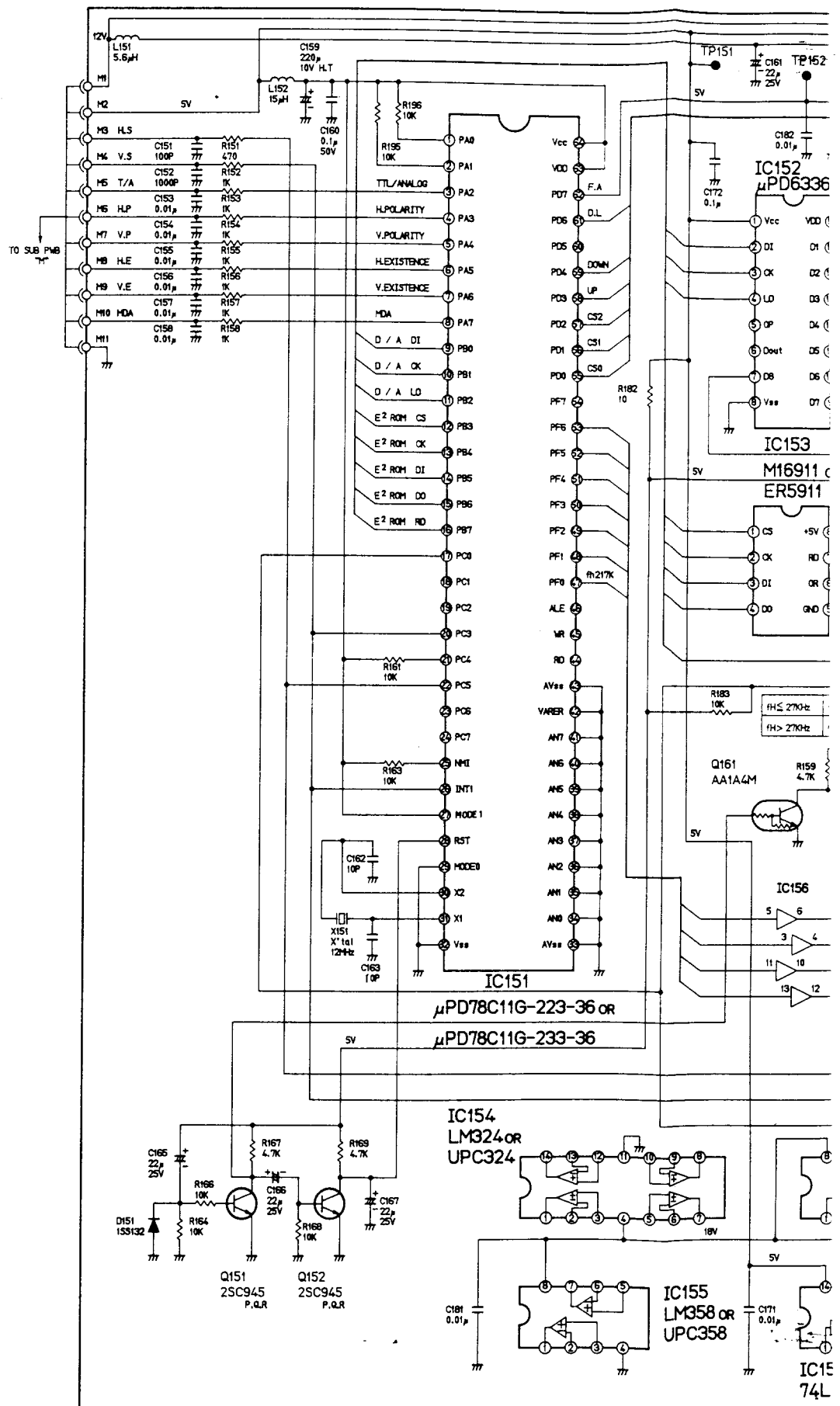
	E	C	B
COLOR	5V	0V	4.5V
GRAY	5V	3.2V	0V

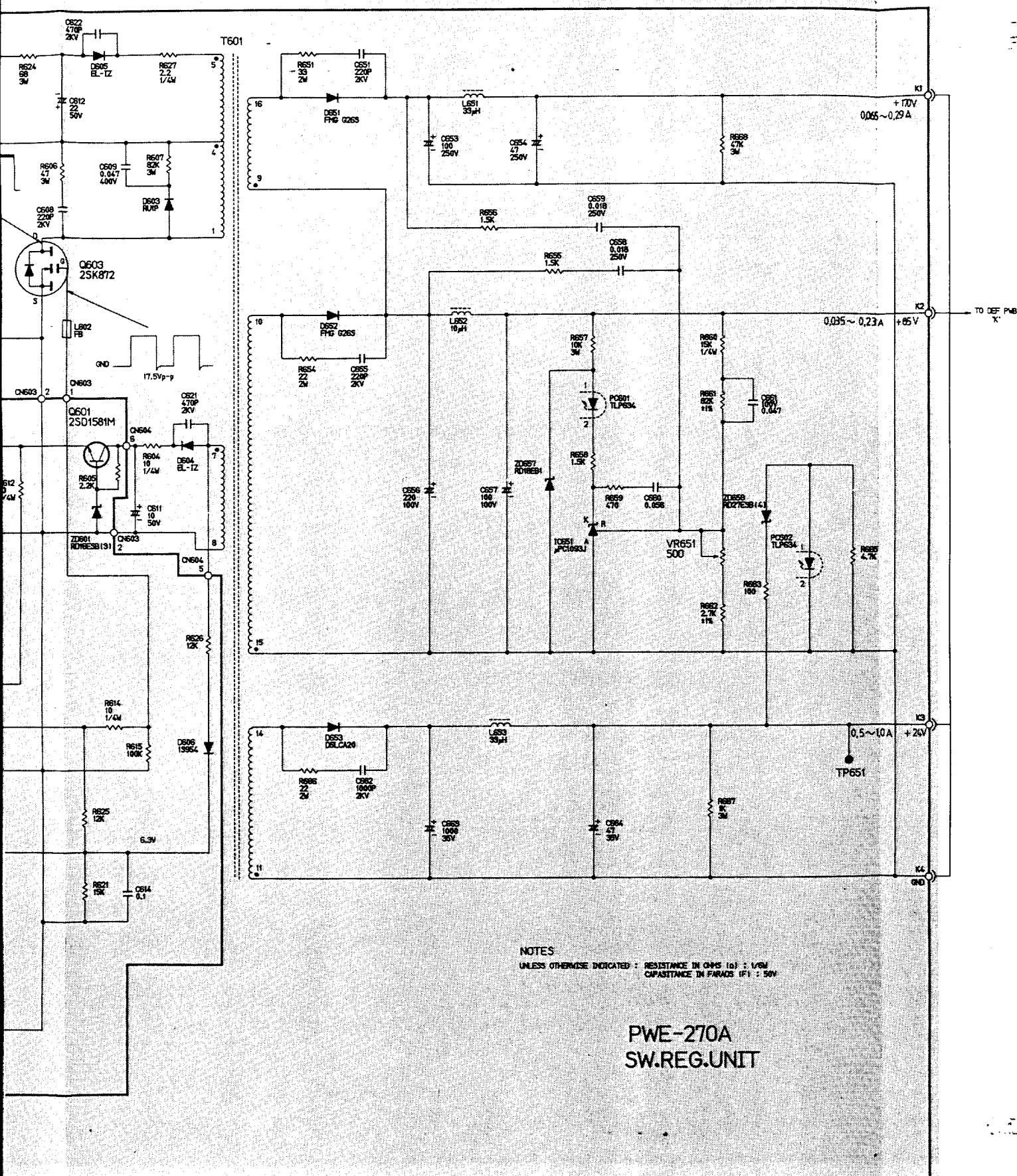
	E	C	B
COLOR	4.5V	4.5V	3.5V
GRAY	4.5V	0V	4.5V

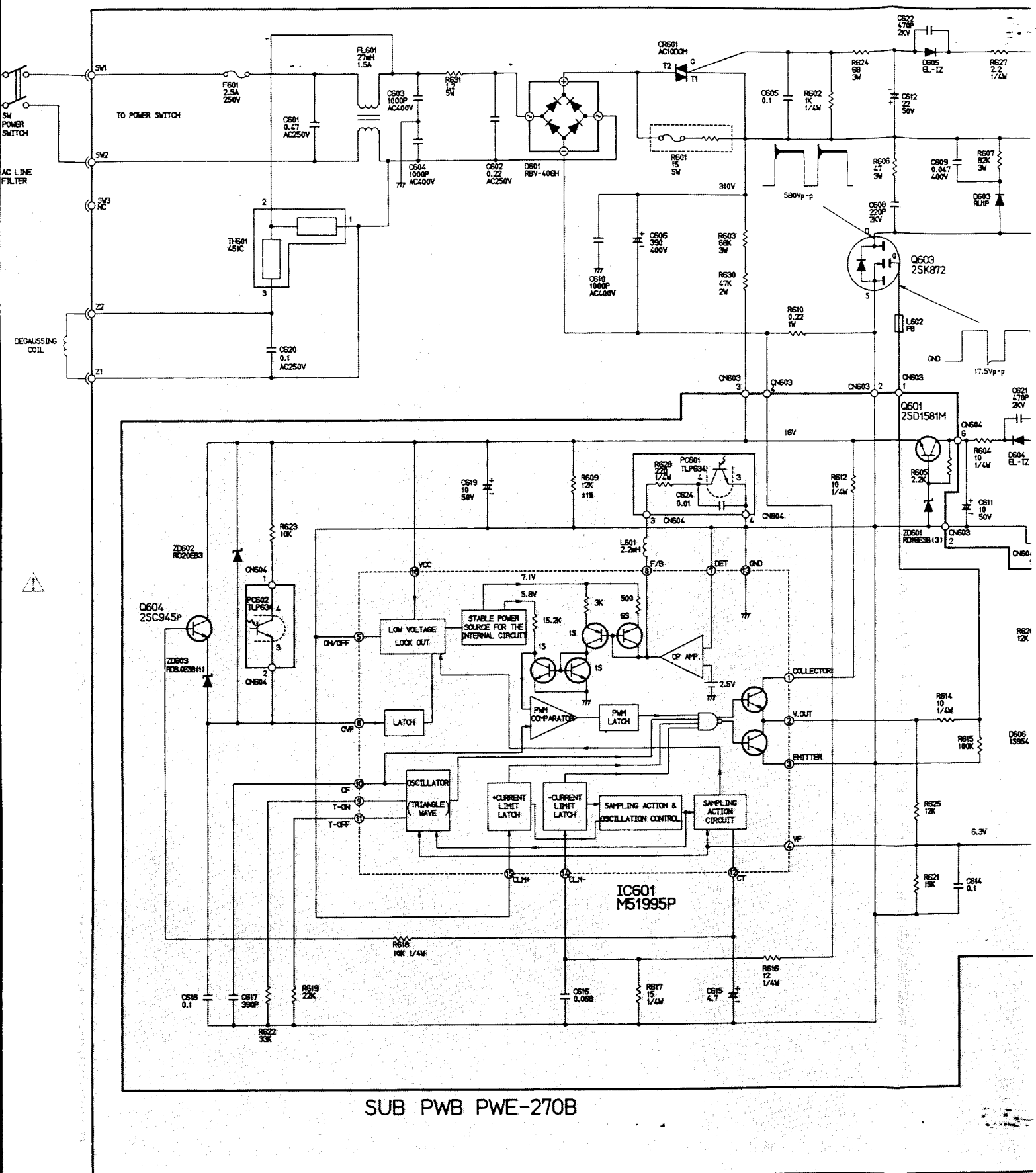
1
2
A-237P

SCHEMATIC DIAGRAM 2



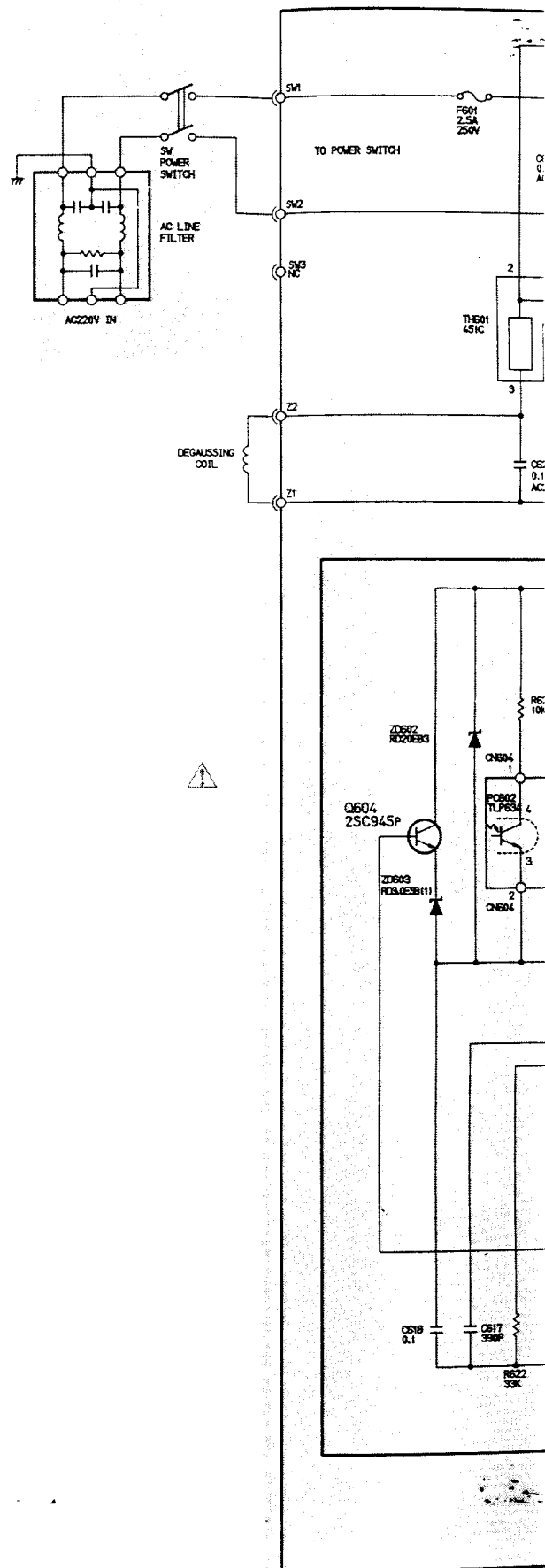


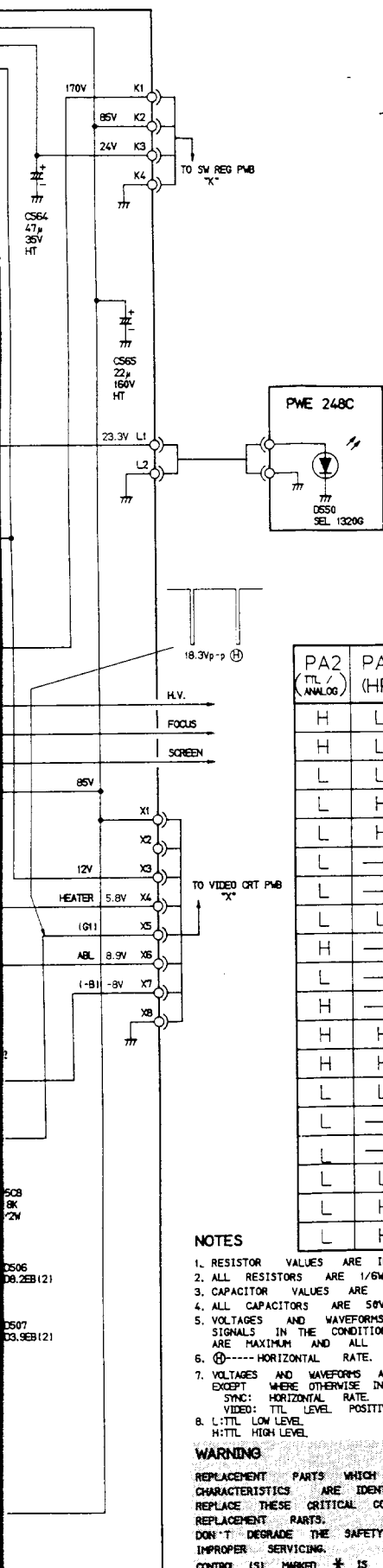




SUB PWB PWE-270B

MODEL JC-1404HMED SCHEMATIC DIAGRAM 1





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 (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)

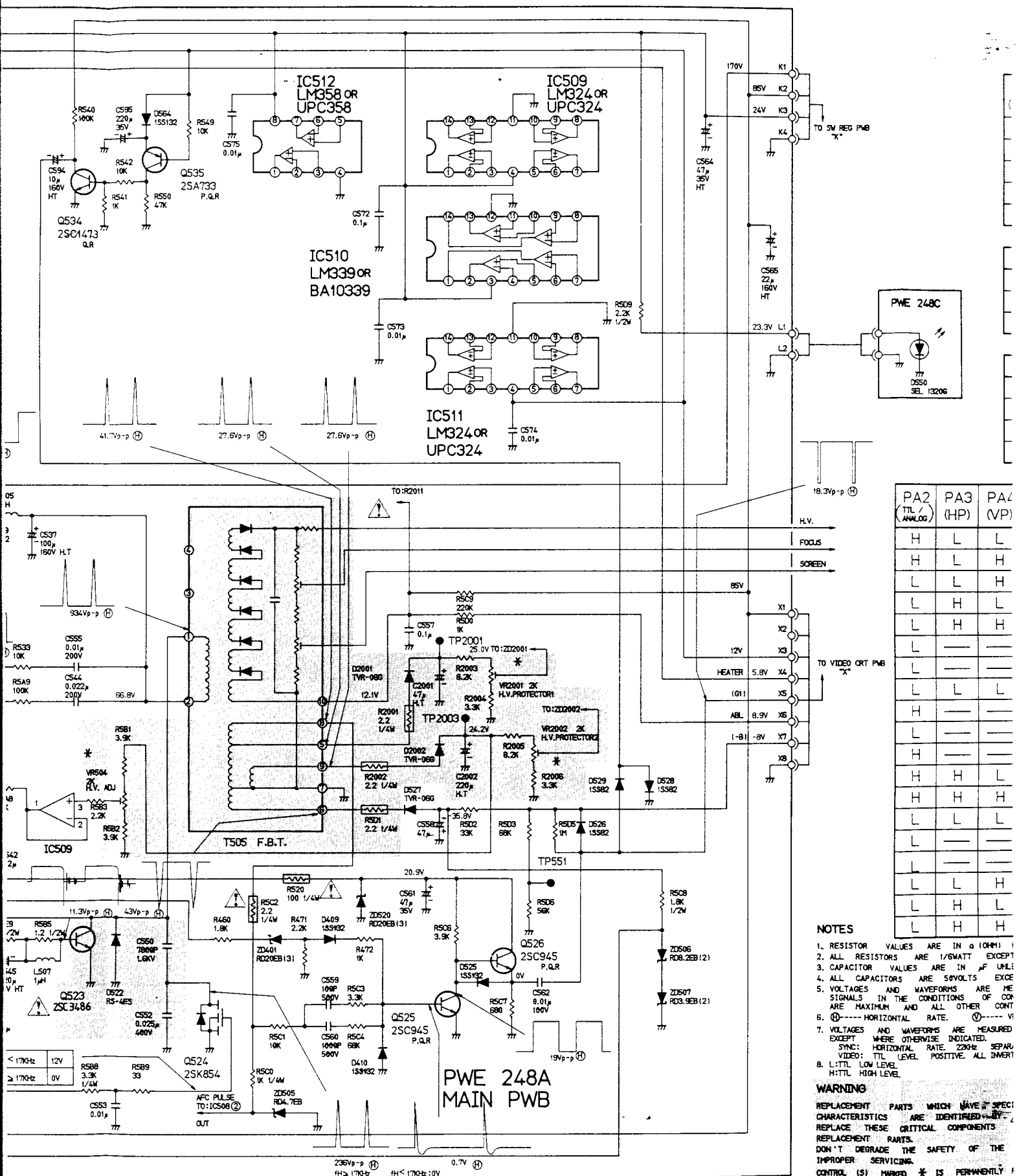
NOTES

1. RESISTOR VALUES ARE IN Ω (OHM) K = 1,000 Ω M = 1,000,000 Ω
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

9. (1): F_V ≤ 330Hz
(11): F_V > 330Hz
10. F_V 0:F_V ≤ 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.

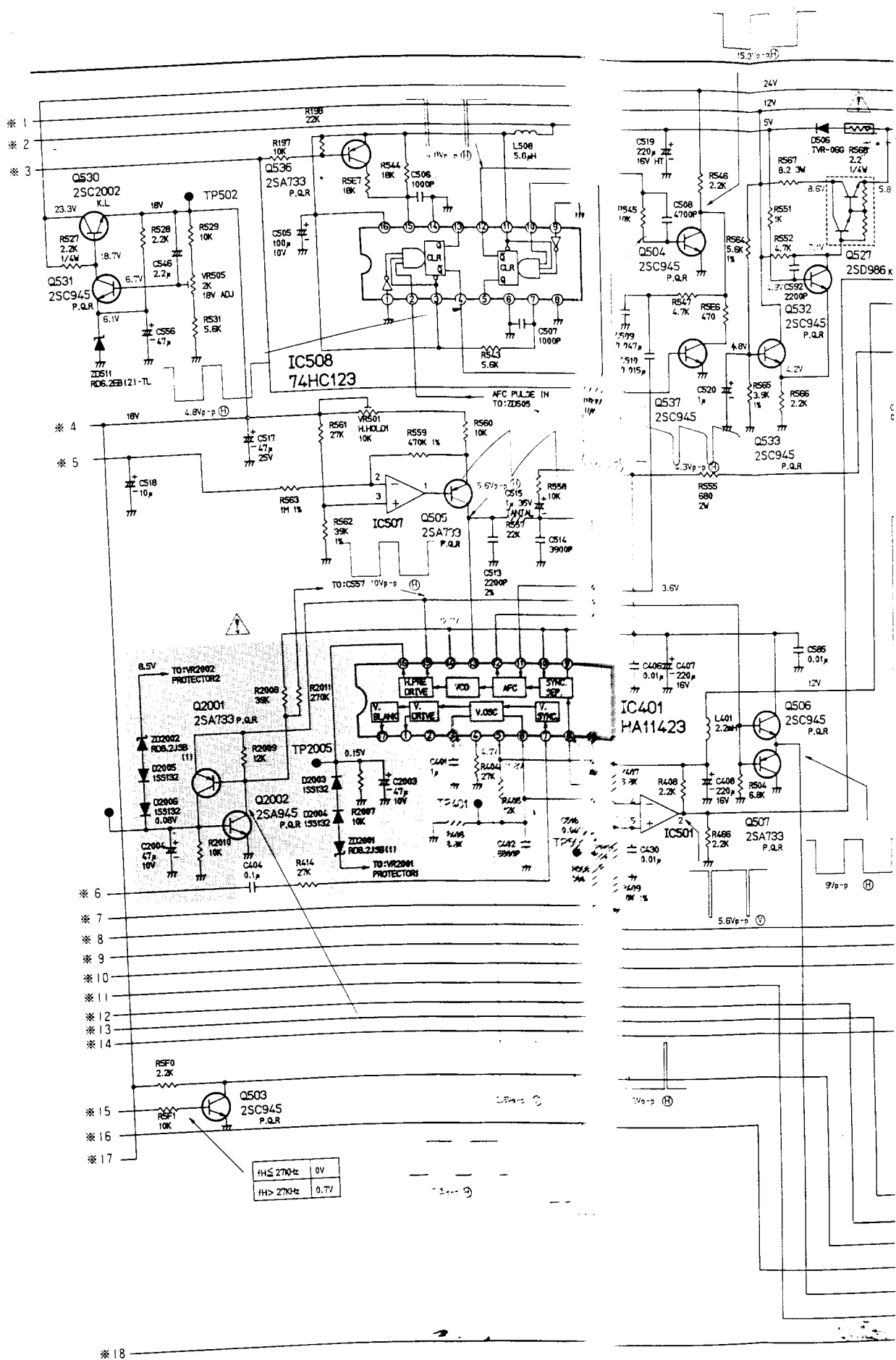


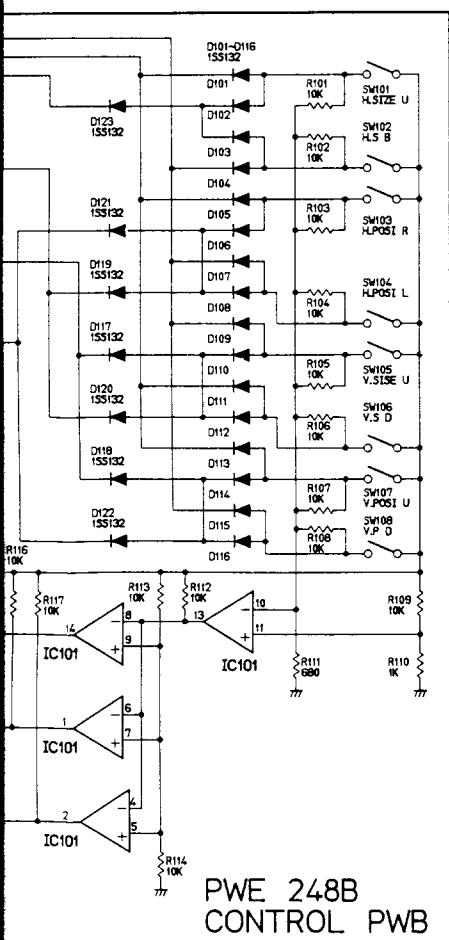
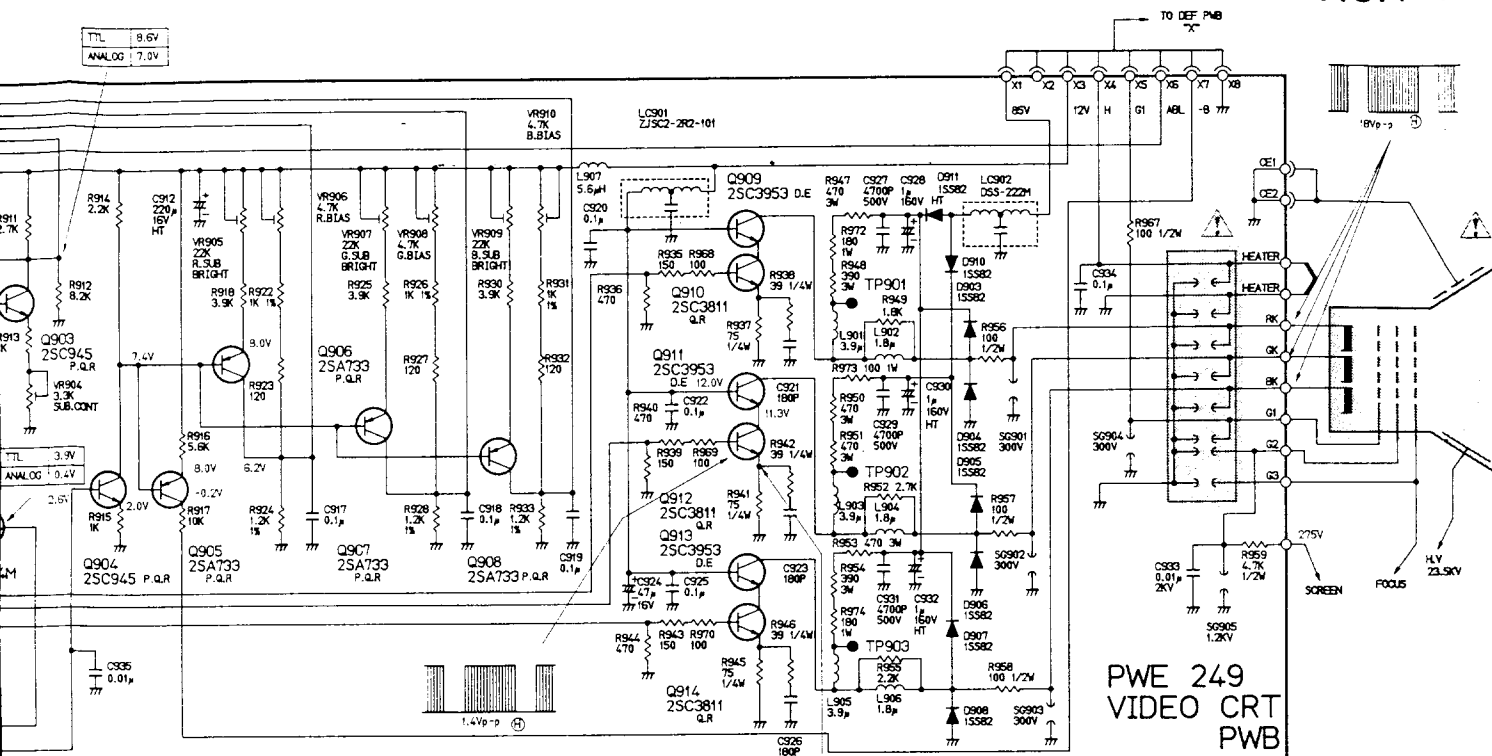
NOTES

1. RESISTOR VALUES ARE IN Ω (OHM) I
2. ALL RESISTORS ARE 1/8WATT EXCEPT
3. CAPACITOR VALUES ARE IN μF UNLESS
4. ALL CAPACITORS ARE 50VOLTAGE EXCEPT
5. VOLTAGES AND WAVEFORMS ARE MEASURED
SIGNALS IN THE CONDITIONS OF CON-
6. ARE MAXIMUM AND OTHER CONT.
7. ϕ -----HORIZONTAL RATE. ϕ -----V-
8. VOLTAGES AND WAVEFORMS ARE MEASURED
EXCEPT WHERE OTHERWISE INDICATED.
9. HORIZONTAL RATE SEPARATELY
10. VIDEO: TTL LEVEL POSITIVE, ALL OTHERS
11. L: TTL LOW LEVEL
12. H: TTL HIGH LEVEL

WARNING

REPLACEMENT PARTS WHICH HAVE SPECIAL CHARACTERISTICS ARE IDENTIFIED BY A *
REPLACE THESE CRITICAL COMPONENTS
REPLACEMENT PARTS.
DON'T DEGRADE THE SAFETY OF THE
IMPROPER SERVICING.
CONTROL (S) MARKED * IS PERMANENTLY
DO NOT ATTEMPT TO DEFEAT OR IMPROPER





Q1-A	PIN	P/S	VGA	MAC-II	POC	TTL/EGA
1	1	R	R	R	RA GND	
2	6	R.GND	R.GND			
3	2	G	G (W/SYNC)	G	r	
4	7	G.GND	G. G.GND			
5	3	B	B	B	R	
6	8	B.GND	B.GND			
7	4	ID(8514)				
8	5	QDIS.TI		GND	S	
9	10	GND	GND	GND	V.D	
10	11	TO GREEN				
11	12	TO OPEN		GND	HL	
12	13	HL	GND	C.SYNC	G	
13	14	V.D		MODE	B	
14	15	N.C		GND	b	

IC801					
MODE	AUTO	B	IS	54	GRAY
M1	V.S.P	L	L	H	
M2		L	H	L	
M3		L	L	L	H

Q1-M			
M5	H.P		
	POST	NEGA	
M7	4.9V	0V	
	V.P		
M8	POST	NEGA	
	4.9V	0V	
M9	SEPA	COMP	SYNC.G
	4.9V	4.9V	0V
M10	SEPA	COMP	SYNC.G
	4.9V	0V	0V

NOTES

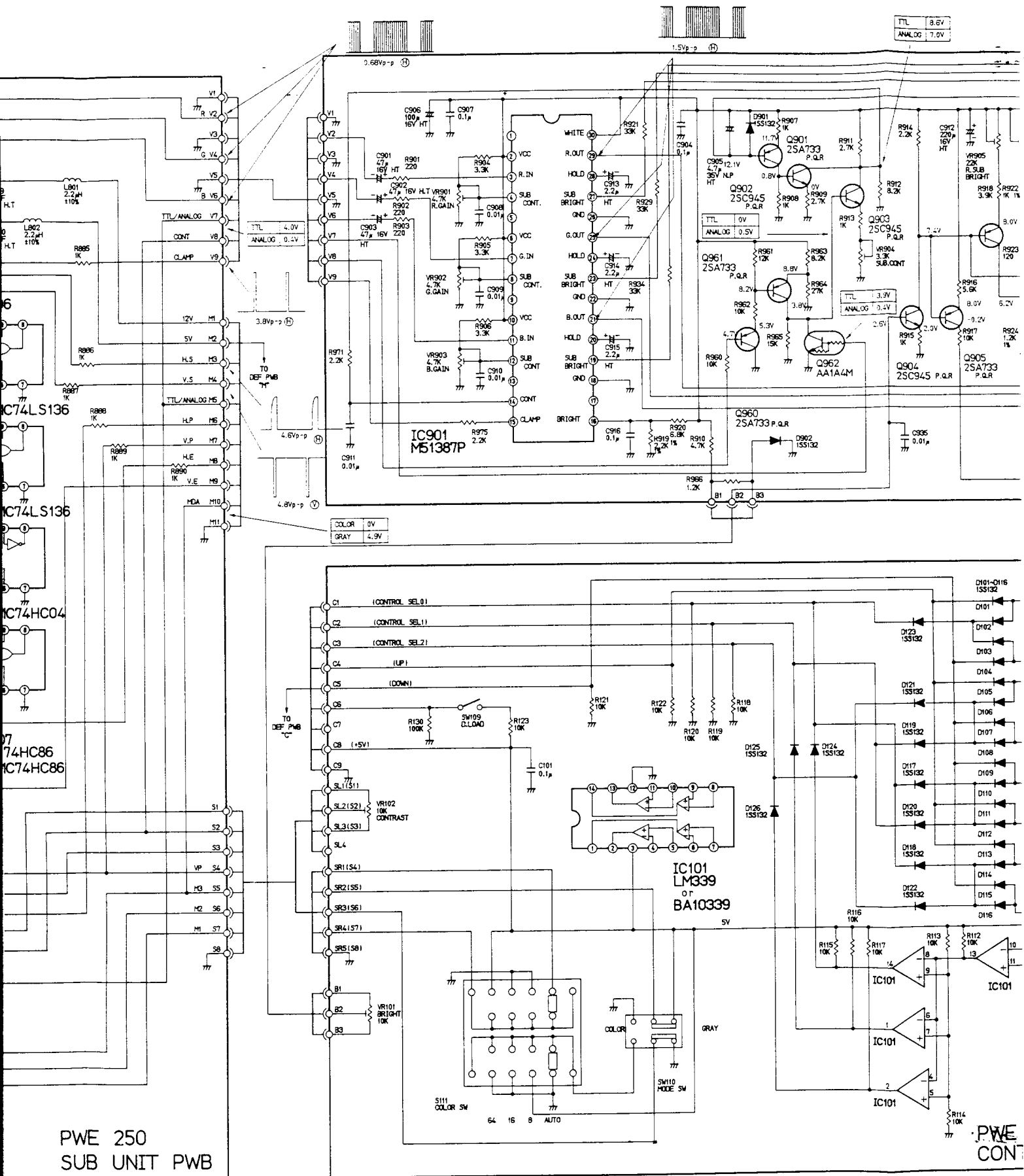
1. RESISTOR VALUES ARE IN Ω OHM $K = 1,000$ $M = 1,000,000$
2. ALL RESISTORS ARE 1/8WATT EXCEPT WHERE OTHERWISE INDICATED.
3. CAPACITOR VALUES ARE IN μF UNLESS OTHERWISE INDICATED. P = PF
4. ALL CAPACITORS ARE 50VOLTS EXCEPT WHERE OTHERWISE INDICATED.
5. VOLTAGES AND WAVEFORMS ARE MEASURED UNDER THE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

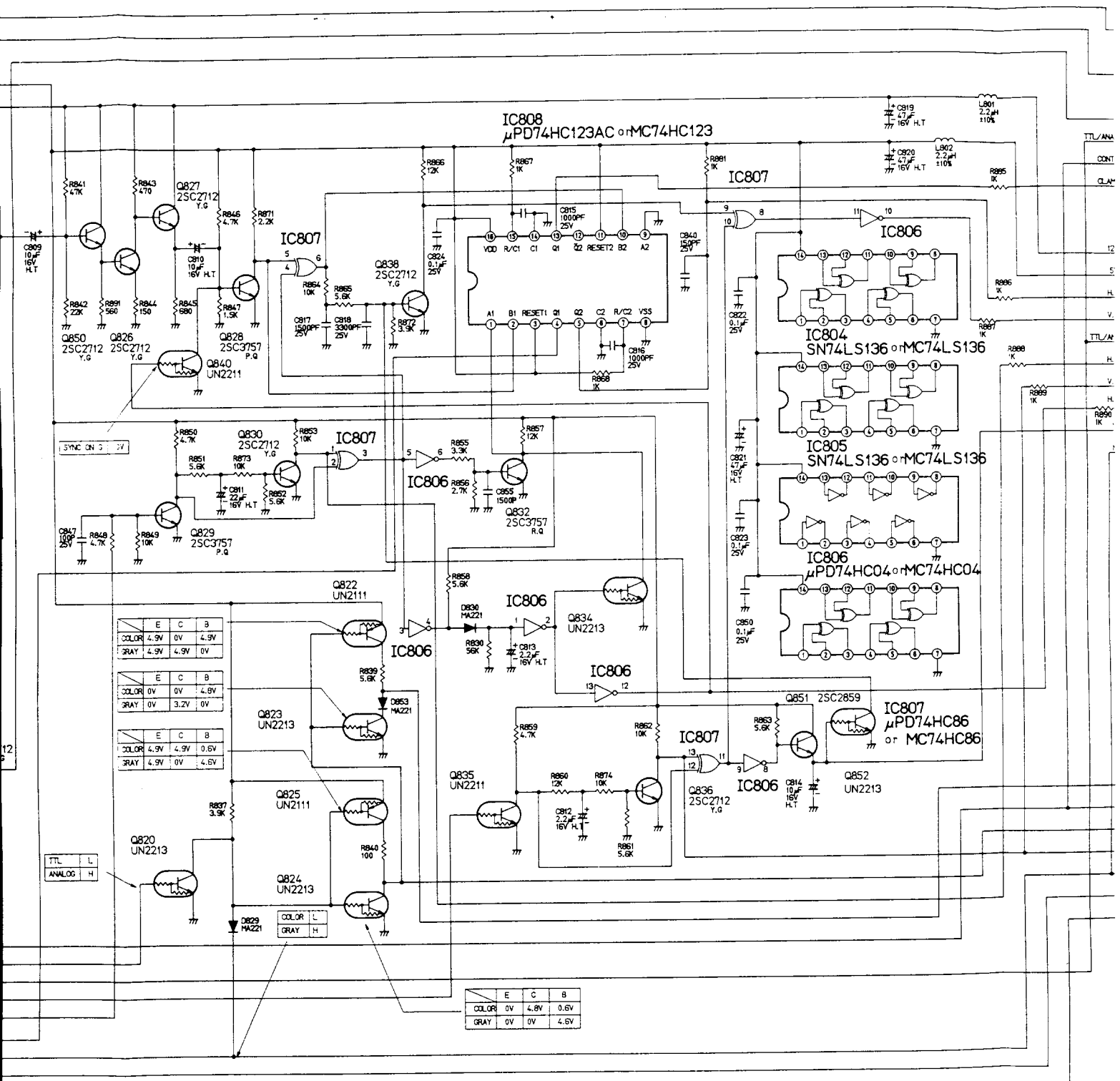
- 8 L: TTL LOW LEVEL
- H: TTL HIGH LEVEL
9. (1) $1\% \pm 330K$
10. Fv 0.1Fv $\pm 75K$
11. Fv $\pm 75K$
12. Fv $\pm 75K$

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





PWE 250
SUB UNIT PA

