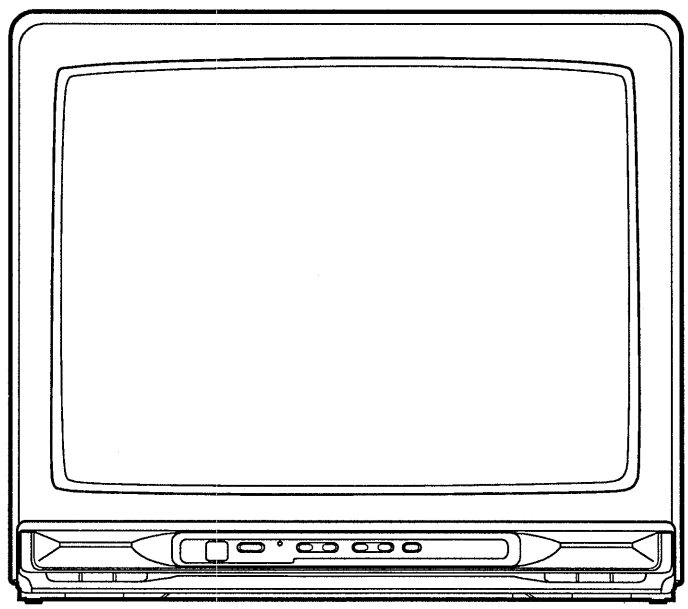
FUNAI

SERVICE MANUAL

20" COLOR TELEVISION

TV-2000T MK10 HYPER



APR. 10. 1997

ELECTRICAL ADJUSTMENT INSTRUCTIONS

NOTE:

Electrical adjustments are required after replacing circuit components. It is important to perform these adjustments only after all repairs and replacements have been completed. Also, do not attempt these adjustments unless the proper equipment is available.

TEST EQUIPMENT REQUIRED:

1. IF Sweeper
2. DC Volt Meter
3. Oscilloscope: Dual Trace with 10:1 probe
4. PAL Pattern Generator
5. Monoscope
6. Color Analyzer

SYSTEM CONTROL IC DATA AND INITIAL VALUE

Following DATA are shown on the TV picture when the unit is in the Service mode and select Specified ITEM only.

To set the unit in service mode, short test point (TP) marked FACTORY MODE which is indicated on the main schematic diagram, until appear red F on screen. To escape service mode, push function key on the Remote control Unit.

Note: Showing DATA values are only reference as INITIAL and these values are not match any Alignment Voltages which are described in this ELECTRICAL ADJUSTMENT INSTRUCTIONS.

* KEY NO. --- Use 10 Key Number on the Remote Control Unit.

ITEM	*KEY NO.	DATA	REMARK
BRIGHT (CENTER)	0 (Changes Cyclical)	61	DATA Values will be changed by press the CH UP/DOWN button on the Remote control Unit
CONTRAST (70%)		62	
COLOR (CENTER)		46	
TINT (CENTER)		48	
SHARPNESS (CENTER)		32	
SERVICE MODE	1		
AGC	2	32	DATA Values will be changed by press the CH UP/DOWN button on the Remote control Unit
VCO	3	32	
H. POSITION	4	8	
P-SELECT (H/L) H-STEP (R)	5	-1	
STEP (B) H-STEP (B)		+6	
L-STEP (R)		+1	
L-STEP (B)		-4	
STATIC CONV. ADJ	6		
PURITY CHECK MODE	7		
CUT OFF (R)	8	80	
CUT OFF (G)		80	
CUT OFF (B)		80	
DRIVER (R)	9	32	
DRIVER (B)		32	

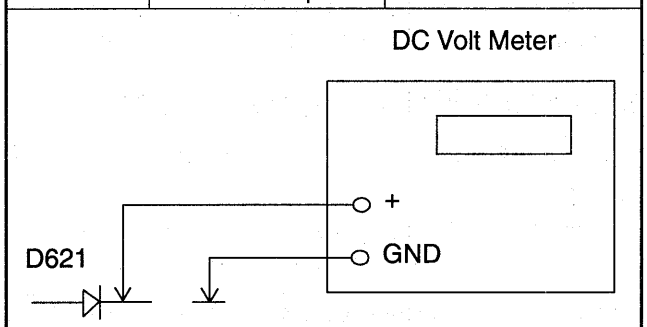
All adjustment procedures must be performed in order of numbering.

1. POWER SUPPLY DC VOLTAGE ADJUSTMENT

Purpose: To get correct voltage.

Symptom of Misadjustment: If voltage is incorrect, picture is dark.

Test Point	Adjustment Point	Mode	Input
D621	VR621		Monoscope Pattern
Tape	**Measurement Equipment**	**Spec.**	
	DC Volt Meter Monoscope	+112±0.5V	



Reference Notes: D621, VR621 --- Power Supply CBA

1. Connect the equipment as shown in the above table.
2. Adjust VR621 so that the DC Volt becomes +112±0.5V on the DC Volt Meter.

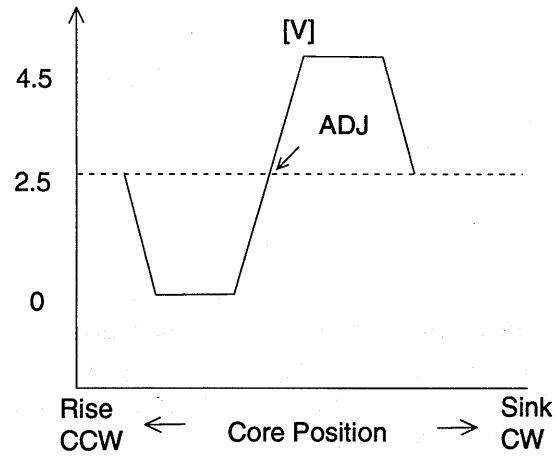
2. AFT ADJUSTMENT

Purpose: To operate AFT correctly.

Symptom of Misadjustment: AFT does not work correctly and/or synchronization is faulty.

Test Point	Adjustment Point	Mode	Input
TP 7 GND	L35		38.0MHz 90dBμV
Tape	**Measurement Equipment**	**Spec.**	
	PAL Pattern Generator, DC Volt Meter	+2.5±0.2V	

Figure



Reference Notes: TP 7, L35 --- Main CBA

1. Input the 38.0MHz signal to Q31 (Base).(Input level 90dBμV Non-Modulation)
2. Connect the Digital volt meter to the TP 7 and GND.
3. Turn the core of L35 fully counterclockwise
4. Turn the core of L35 clockwise and find the point where the voltage drops from approximately 4.5V to 0V immediately on the Digital volt meter.
5. turn core of L35 little by little and find the point whereDC +2.5±0.2V is obtained between the area mentioned in step3.

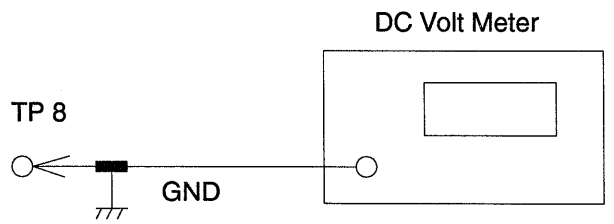
3. RF AGC ADJUSTMENT (for TUNER)

Purpose: Set AGC (Auto Gain Control) Level.

Symptom of Misadjustment: AGC does not synchronize correctly when RF Input Level is weak and distortion may cause on the picture when it is strong.

Test Point	Adjustment Point	Mode	Input
TP 8 GND	Service Mode No.2		PAL Color Bar
Tape	**Measurement Equipment**	**Spec.**	
	PAL Pattern Generator, DC Volt Meter	+3.0±0.1V	

Figure



Reference Notes: TP 8, GND --- Main CBA

1. Receive the PAL Color Bar signal for 2ch (62.25MHz). (RF input level 80dBμV at the best synchronized point)
2. Connect the equipment as shown in the above table. Enter the Service mode then press No.2 button on the Remote Control Unit.
3. Press CH UP/DOWN button on the Remote Control so that the DC Volt Becomes +3.0±0.1V on the DC Volt Meter.

4. V. SIZE ADJUSTMENT

Purpose: To get correct vertical size of screen image.

Symptom of Misadjustment: Vertical size of screen image may not be properly displayed.

Test Point	Adjustment Point	Mode	Input
Screen	VR541		Monoscopic Pattern
Tape	**Measurement Equipment**	**Spec.**	
	Monoscope	90±2%	

Reference Note: VR541 --- Main CBA

1. Operate the unit more than 20 minutes.
2. Input the Monoscopic Pattern.
3. Adjust VR541 so that the vertical size will be 90±5% of Monoscopic Pattern and the circle is round.

5. H. POSITION ADJUSTMENT

Purpose: To get correct horizontal position of screen image.

Symptom of Misadjustment: Horizontal position of screen image may not be properly displayed.

Test Point	Adjustment Point	Mode	Input
Screen	Service Mode No.4		Monoscopic Pattern
Tape	**Measurement Equipment**	**Spec.**	
	Monoscope	90+5/-2%	

Reference Note:

1. Operate the unit more than 20 minutes.
2. Input the Monoscopic Pattern.
3. Enter the Service mode . then press No.4 button on the Remote Control Unit.
4. Press CH UP/DOWN button so the the right and left picture will be equal.

5. V. POSITION ADJUSTMENT

Purpose: To get correct vertical position (Center) of screen image.

Symptom of Misadjustment: Vertical position of screen image may not be properly displayed.

Test Point	Adjustment Point	Mode	Input
Screen	VR542		Monoscopic Pattern
Tape	**Measurement Equipment**	Spec.	
	PAL Pattern Generator	Center	

Reference Note:

1. Operate the unit more than 20 minutes.
2. Input the Monoscopic Pattern.
3. Adjust VR542 so that the Monoscopic Pattern will stay on the center of screen.

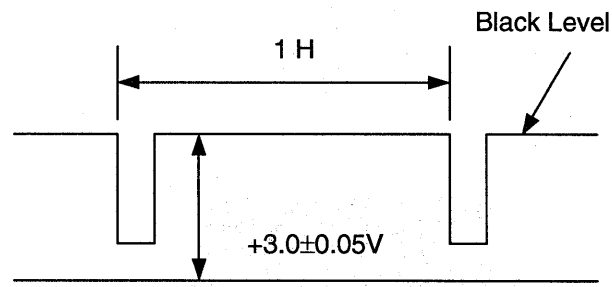
6. BLACK LEVEL ADJUSTMENT

Purpose: To obtain optimum picture quality.

Symptom of Misadjustment: Black color may not be properly displayed (lighter or darker)

Test Point	Adjustment Point	Mode	Input
TP 501	Service Mode No. 0 (Bright)		Black Raster
Tape	**Measurement Equipment**	**Spec.**	
	Oscilloscope	+3.0±0.05V	

Figure



Reference Notes: TP501, GND --- Main CBA

1. Enter the Service Mode and Press "0" button on the Remote control Unit. Then Set screen to "Bright".
2. Connect the Oscilloscope to the TP501(Blue output).
3. Press CH Up/Down Key so that the Voltage of TP501 becomes +3.0±0.05V.

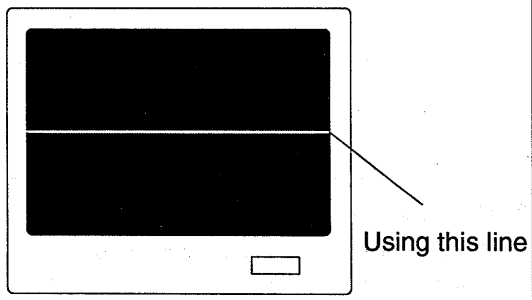
7. CUT OFF ADJUSTMENT

Purpose: To adjust the beam current of R, G, B and screen voltage.

Symptom of Misadjustment: White color may be reddish, greenish or bluish.

When the screen voltage is too high, the scanning line is appeared on the screen.

Test Point	Adjustment Point	Mode	Input
Screen	Service Mode No.8 Screen Control (FBT)		Service Mode No.1
Tape	**Measurement Equipment**	**Spec.**	
	PAL Pattern Generator,	See below	
Figure			



Reference Notes: Screen Control --- H/V CBA

1. Operate the unit more than 20 minutes.
2. Degauss the CRT using Degaussing Coil.
3. Input the Black Raster.
4. Turn the Screen Control (FBT) fully counterclockwise.
5. Enter the Service Mode. then press No. 8 button on the Remote Control Unit.
6. Press Red button for Red adjustment. Press Green button for Green adjustment. Press Blue button for Blue adjustment.
7. In each color mode, Press CH UP / DOWN button to adjust the values of colors.
8. Mixing Red, Green and Blue colors so that the Holizontal Line becomes Dim and White.
9. Turn power off and on again to return to normal mode.

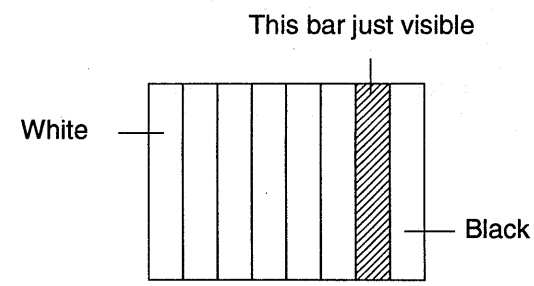
Note: Confirm that White Balance Adj. is correct after this adjustment, and attempt
White Balance Adj. if needed.

8. SUB BRIGHT ADJUSTMENT

Purpose: To get proper brightness.

Symptom of Misadjustment: Proper brightness cannot be obtained by adjusting the Bright Control.

Test Point	Adjustment Point	Mode	Input
Screen	Screen Control (FBT)		Gray Scale Pattern
Tape	**Measurement Equipment**	**Spec.**	
	PAL Pattern Generator,	See below	
Figure			



Reference Notes: Screen Control (FBT) --- Main CBA

1. Operate the unit more than 20 minutes.
2. Input the 8-step Gray Scale pattern.
3. Adjust Screen Control so that the bar is just visible. (See above figure)

9. FOCUS ADJUSTMENT

Purpose: To get correct focus.

Symptom of Misadjustment: Blurred image is shown on the display.

Test Point	Adjustment Point	Mode	Input
Screen	Focus Control (FBT)		Monoscopic Pattern
Tape	**Measurement Equipment**	**Spec.**	
	Monoscope	See below	

Reference Note: Focus-VR (FBT) --- Main CBA

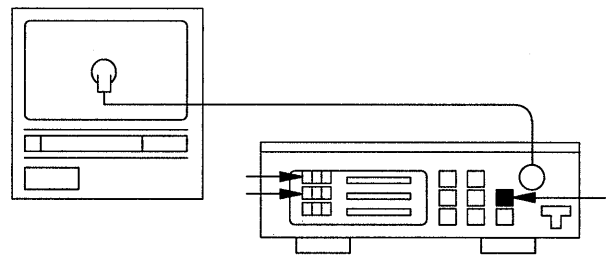
1. Operate the unit more than 20 minutes.
2. Input the Monoscopic Pattern.
3. Adjust Focus Control (FBT) to be obtained clear picture.

10. WHITE BALANCE ADJUSTMENT

Purpose: To mix red, green and blue beams correctly for pure white.

Symptom of Misadjustment: White becomes bluish or reddish.

Test Point	Adjustment Point	Mode	Input
Screen	Service Mode No.9		White Raster (APL 100%)
Tape	**Measurement Equipment**	**Spec.**	
	PAL Pattern Generator, Color Analyzer	See below	
Connections of Equipment			



Spectrum Analyzer

Reference Notes:

1. Operate the unit more than 20 minutes.
2. Face the unit to east. Degauss the CRT using Degaussing Coil.
3. Input the White Raster (APL 100%).
4. Set the color analyzer to the CHROMA mode and after zero point calibration, bring the optical receptor to the center on the tube surface (CRT).
5. Enter the Service Mode. then Press No. 9 button on the Remote Control Unit.
6. Press Red button for Red adjustment. Press Blue button for Blue adjustment.
7. In each color mode, Press CH UP/DOWN button to adjust the values of color.
8. Adjusting Red and Blue color so that the tempreture becomes 8000K-10MPCD (x : 300 / y : 290) ±4%.
9. At this time, Re-check that Holizontal line is white. If not, Re-adjust Cut-off Adjustment until the Holizontal Line becomes pure white.
10. Turn off and on again to return to normal mode. Receive APL 100% white signal and Check Chroma temperatures become 8000K-10MPCD (x : 300 / y : 290) ±4%.

Note: Confirm that Cut Off Adj. is correct after this adjustment, and attempt Cut Off Adj. if needed.

VOLTAGE CHART

(Unit: Volt)

Pin No.	IC101	Pin No.	IC101	Pin No.	IC301	Pin No.	IC371
1	3.9	39	0.0	34	1.0	1	1.8
2	4.1	40	0.0	35	3.0	2	1.8
3	0.0	41	0.0	36	2.2	3	8.0
4	0.03	42	0.0	37	0.0	4	4.2
5	3.0	**Pin No.**	IC301	38	2.4	5	0.01
6	0.03	1	4.0	39	3.3	6	0.0
7	8.0	2	0.0	40	6.6	7	3.8
8	0.0	3	8.3	41	2.3	8	4.2
9	2.3	4	0.4	42	1.5	9	2.2
10	4.4	5	0.0	43	2.3	10	2.3
11	0.0	6	1.4	44	2.9	11	4.1
12	0.02	7	1.4	45	2.9	12	5.0
13	4.7	8	5.0	46	2.6	13	5.0
14	0.0	9	8.3	47	8.4	14	4.2
15	0.0	10	1.4	48	3.0	15	0.6
16	4.0	11	4.3	49	4.1	16	0.0
17	2.6	12	0.6	50	4.1	**Pin No.**	IC302
18	0.0	13	1.3	51	3.0	1	4.0
19	1.6	14	4.4	52	5.2	2	-----
20	2.1	15	4.2	**Pin No.**	IC701	3	0.0
21	0.0	16	5.2	1	0.1	4	-----
22	4.8	17	0.0	2	2.9	5	0.6
23	0.0	18	5.9	3	0.1	6	-----
24	0.0	19	8.4	4	0.1	7	-----
25	4.3	20	8.4	5	0.1	8	-----
26	0.0	21	2.8	6	0.0	9	4.7
27	4.7	22	2.7	7	0.0	10	0.0
28	4.7	23	5.0	8	0.0	11	2.6
29	4.7	24	5.0	9	0.0	12	2.6
30	4.7	25	2.3	10	0.0	13	3.0
31	4.7	26	3.4	11	3.6	14	0.5
32	0.0	27	2.3	12	4.8	15	-----
33	0.0	28	7.5	13	4.8	16	0.5
34	0.0	29	2.3	14	3.5		
35	0.0	30	1.7	15	2.9		
36	0.0	31	0.0	16	8.3		
37	4.3	32	3.1				
38	4.3	33	2.4				

Input: PAL Color Bar Signal (with 1KHz Audio Signal)

Receiving Ch.: E4 ch (62.25MHz)

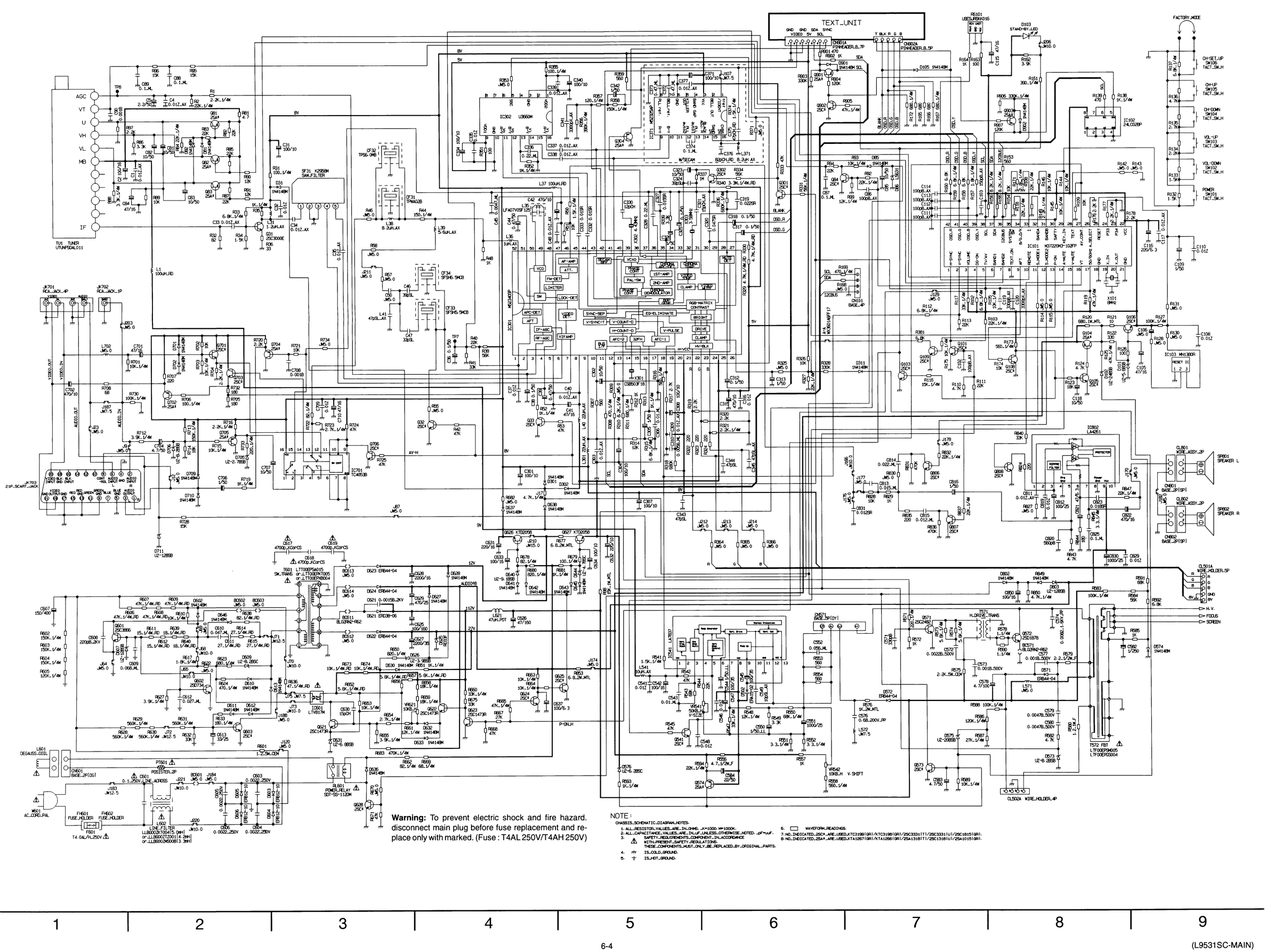
Preset Mode: Press Picture Select button on the remote control unit, then press the number "1" button.

Brightness--- Center
Color--- Center
Contrast--- Approx 70%

Pin No.	IC541
1	8.9
2	5.5
3	4.5
4	4.6
5	0.03
6	4.3
7	4.4
8	25.0
9	1.8
10	1.8
11	0.0
12	0.0
13	15.0
14	25.0
Pin No.	IC802
1	9.1
2	0.2
3	19.4
4	0.0
5	0.0
6	0.6
7	9.9
8	0.0
9	19.1
10	18

TR No.	B	C	E
Q31	1.14	7.0	0.4
Q33	0.62	0.04	0.0
Q81	8.80	0.0	9.0
Q82	8.75	0.0	9.0
Q83	8.80	0.0	9.0
Q84	0.64	0.04	0.0
Q101	0.0	3.8	0.0
Q103	0.0	3.66	0.0
Q104	26.4	6.90	27.0
Q105	5.46	6.70	4.74
Q106	0.67	0.0	0.0
Q107	0.0	4.32	0.0
Q301	0.6	0.03	0.0
Q302	0.02	0.67	0.0
Q304	2.5	0.0	3.09
Q621	7.48	4.60	0.69
Q622	0.10	112.0	4.43
Q623	0.57	0.09	0.0
Q624	0.63	0.06	0.0
Q625	0.06	9.33	0.0
Q626	9.84	13.50	9.20
Q627	5.52	13.50	9.20
Q628	0.08	1.90	0.0
Q701	4.17	8.39	3.60
Q702	4.0	0.0	4.62
Q703	4.65	8.37	3.90
Q704	2.30	0.0	2.98
Q705	1.19	0	1.87
Q706	0.60	0.02	0.0
Q541	0.55	0.03	0.0
Q573	0.0	4.67	0.0
Q574	27.40	0.10	0.0
Q601	112.0	0.21	-0.51
Q602	0.56	0.07	0.0
Q603	-8.40	0.80	0.0

Main Schematic Diagram

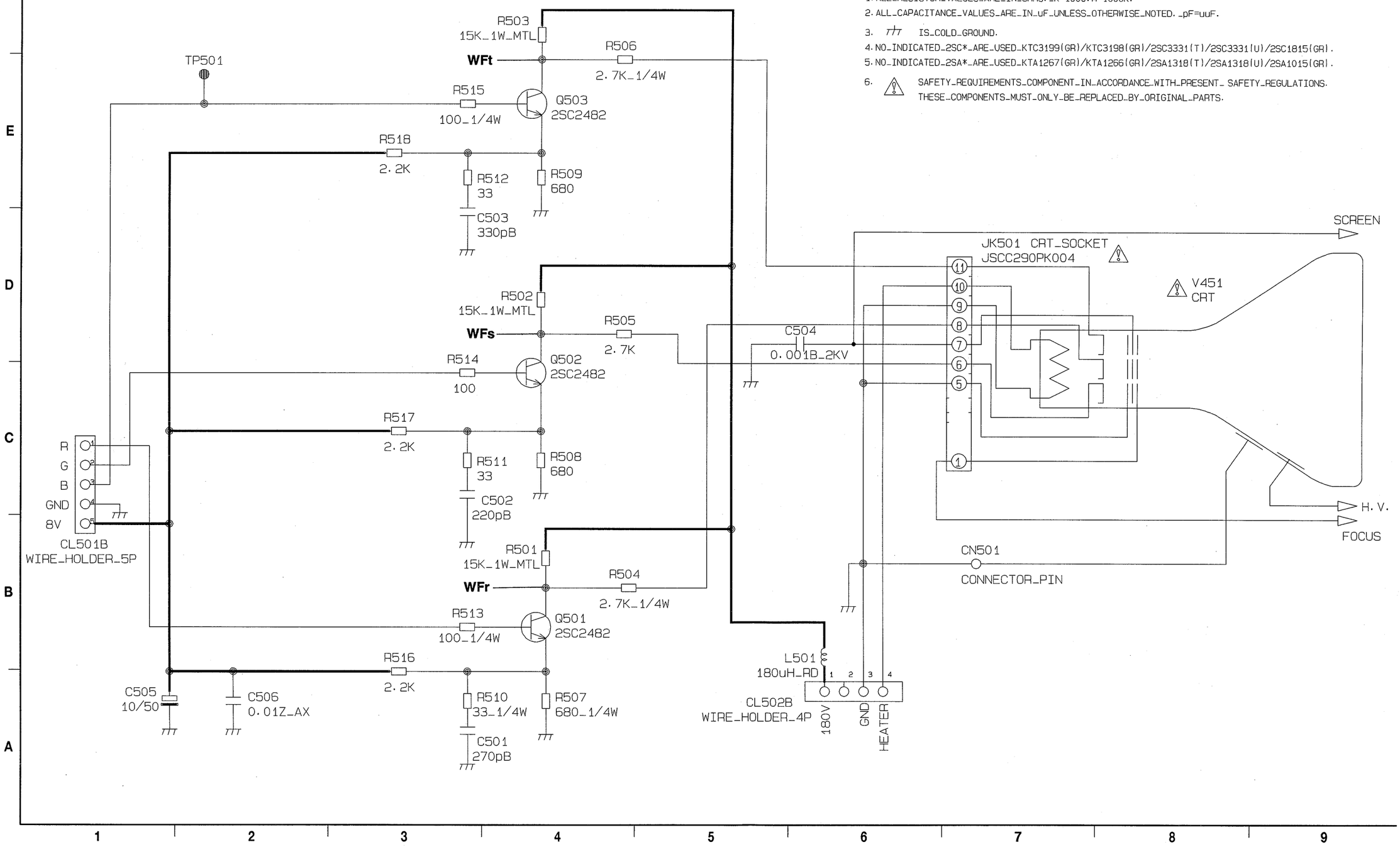


CRT Schematic Diagram

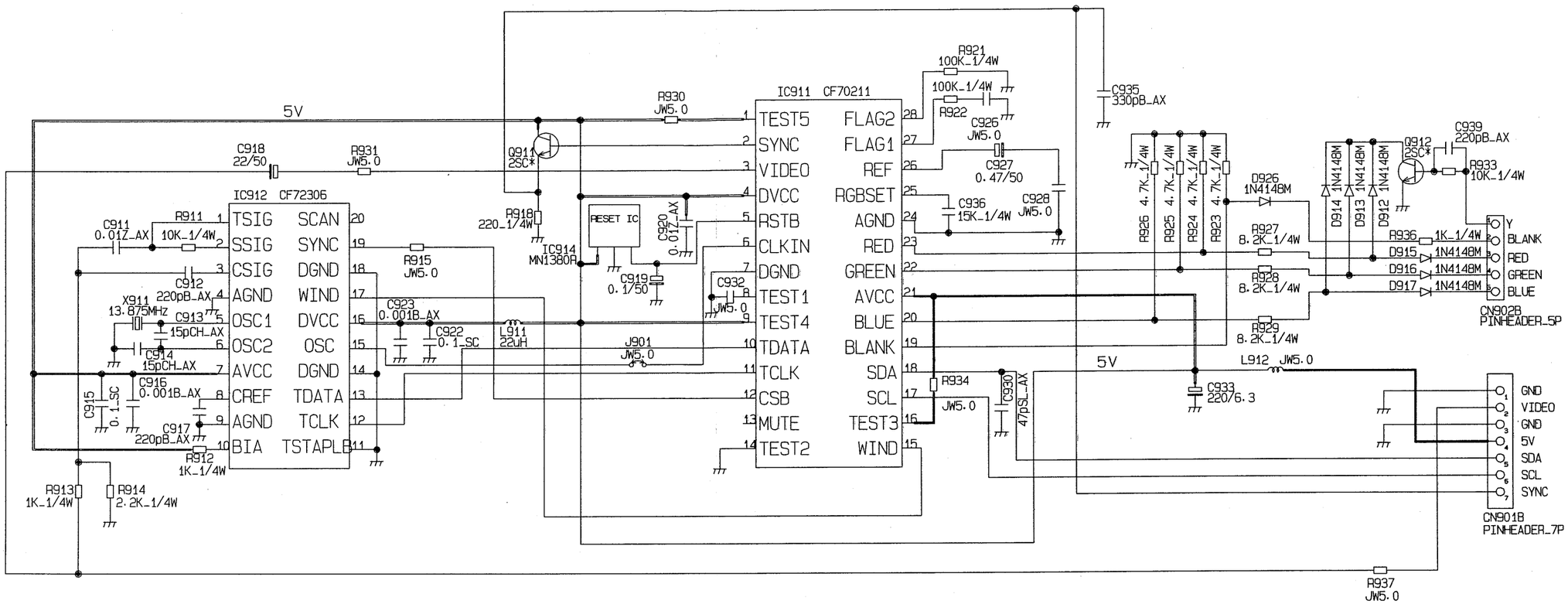
NOTES:

CHASSIS_SCHEMATIC_DIAGRAM_NOTES.

1. ALL_RESISTOR_VALUES_ARE_IN_OHMS. _K=1000. M=1000K.
2. ALL_CAPACITANCE_VALUES_ARE_IN_uF_UNLESS_OTHERWISE_NOTED. _pF=uuF.
3. ⏚ IS_COLD_GROUND.
4. NO_INDICATED_2SC*_ARE_USED_KTC3199(GR)/KTC3198(GR)/2SC3331(T)/2SC3331(U)/2SC1815(GR).
5. NO_INDICATED_2SA*_ARE_USED_KTA1267(GR)/KTA1266(GR)/2SA1318(T)/2SA1318(U)/2SA1015(GR).
6. ⚠ SAFETY_REQUIREMENTS_COMPONENT_IN_ACCORDANCE_WITH_PRESENT_ SAFETY_REGULATIONS. THESE_COMPONENTS_MUST_ONLY_BE_REPLACED_BY_ORIGINAL_PARTS.



Teletext Schematic Diagram



NOTES:

CHASSIS_SCHEMATIC_DIAGRAM_NOTES.

1. ALL_RESISTOR_VALUES_ARE_IN_OHMS. _K=1000, M=1000K.
2. ALL_CAPACITANCE_VALUES_ARE_IN_uF_UNLESS_OTHERWISE_NOTED. _pF=uuF.
3. ⏚ IS_COLD_GROUND.
4. NO_INDICATED_2SC*_ARE_USED_KTC3199(GR)/KTC3198(GR)/2SC3331(T)/2SC3331(U)/2SC1815(GR).
5. NO_INDICATED_2SA*_ARE_USED_KTA1267(GR)/KTA1266(GR)/2SA1318(T)/2SA1318(U)/2SA1015(GR).

(L9531SC-TEXT)

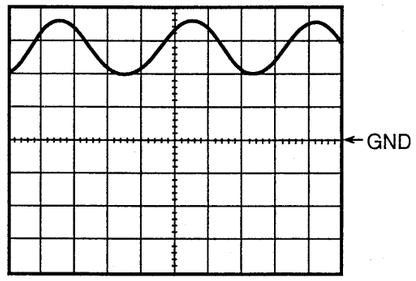
WAVEFORMS

Input: PAL Color Bar Signal (with 1KHz Audio Signal)

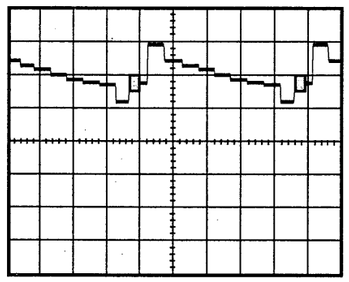
Receiving Ch.: E2 ch (62.25MHz)

Preset Mode: Press Picture Select button on the remote control unit, then press the number "1" button.
(Brightness---Center Color---Center Contrast---Approx 70%)

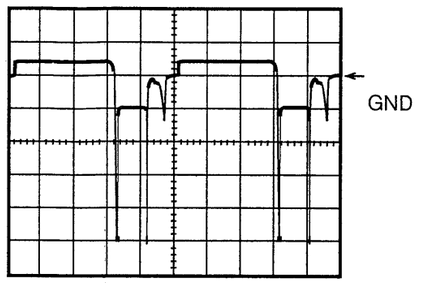
WFa ~ WFt = Waveforms to be observed at Waveform check points.
(Shown in Schematic Diagram.)



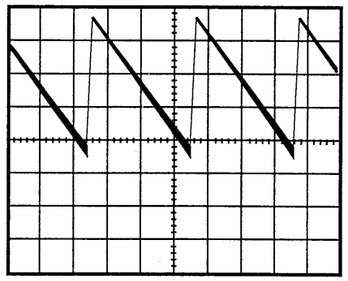
WFa 1DIV: 1V 0.2msec



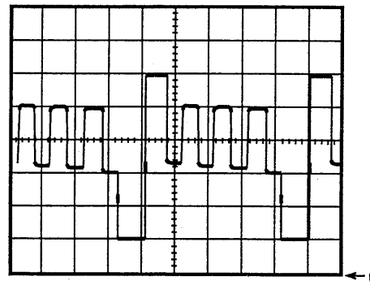
WFe 1DIV: 0.5V 10µsec



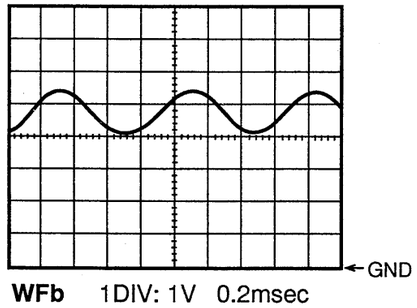
WFi 1DIV: 2V 10µsec



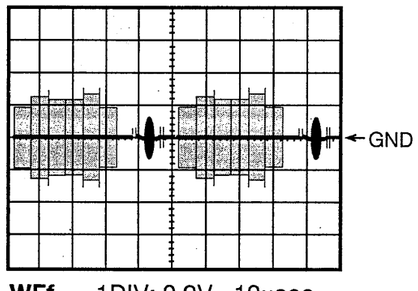
WFm 1DIV: 0.5V 5msec



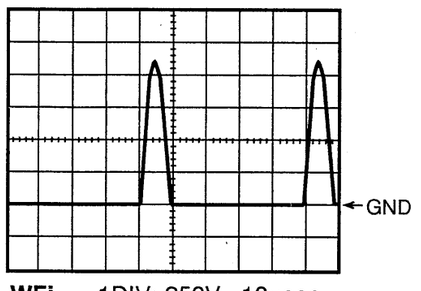
WFq 1DIV: 1V 10µsec



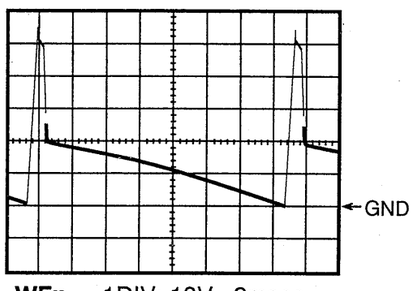
WFb 1DIV: 1V 0.2msec



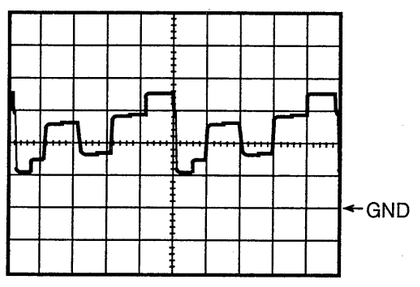
WFf 1DIV: 0.2V 10µsec



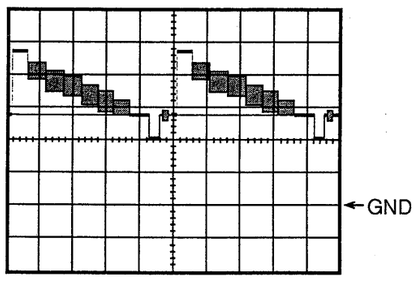
WFj 1DIV: 250V 10µsec



WFn 1DIV: 10V 2msec



WFr 1DIV: 50V 10µsec



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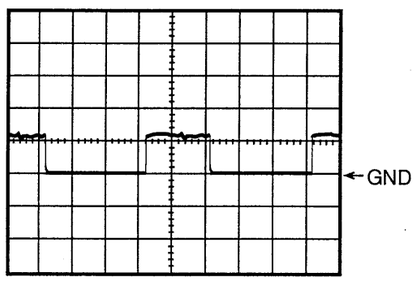

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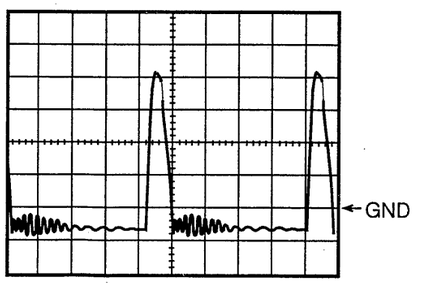

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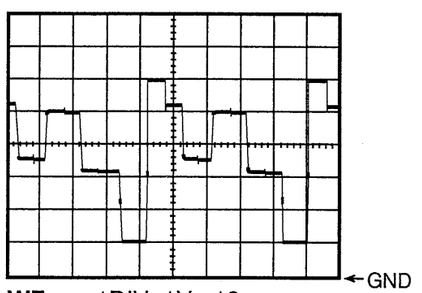

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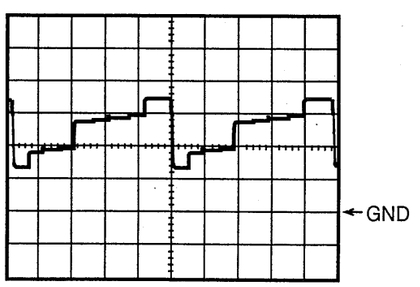

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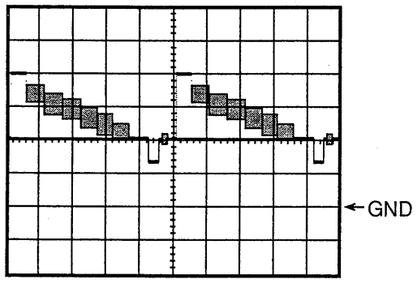

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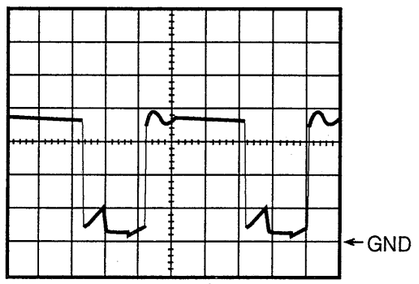

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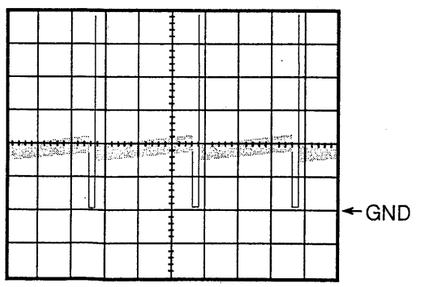

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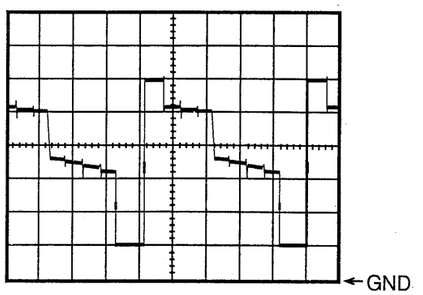
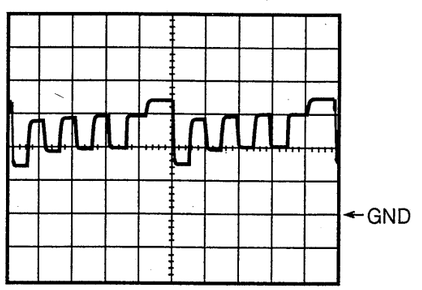


WFp 1DIV: 1V 10µsec



WFt 1DIV: 50V 10µsec

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