

*Liquid Crystal Displays*

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**TC-73**  
**UC-380**

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*features:*

TN colour

3.8 inch size

Integrated fluorescent backlight tube

Cased or Uncased versions

Runs from standard composite video signal

PAL / SECAM or NTSC types

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## PAL/SECAM mode display

## TC73 cased colour video module

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1	Signal frequency:	Horizontal Vertical	15.625KHz 50Hz
2	Display type:	TN LCD (Twisted Nematic Liquid Crystal) Transmissive negative display with colour filter Optimum viewing angle: perpendicular	
3	Number of pixels:	720 dots (horizontal) 130 dots (vertical)	
4	Pixel shape:	Rectangle	
5	Driving method:	$\frac{1}{65}$ duty multiplex	
6	Screen size:	73.8 mm (height), 55.5 mm (vertical)	
7	Input signal:	Composite video signal, 2.0v peak-to-peak Analogue RGB (no sync on RGB). 1.4v p-t-p	
8	Input impedance:	High impedance	
9	Supply voltage:	<del>5.0V DC <math>\pm 2.5\%</math></del> 6V-9V.	
10	Current consumption:	Full brightness: 400mA or less	
11	Operating range:	+5°C to +40°C	
12	Storage temperature:	-20°C to +60°C	
13	Overall Dimensions:	See mechanical specifications	
14	Weight:	Approx 160 g	
15	Power jack:	1.1 mm internal, 3.0 mm external	

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# DISASSEMBLY AND ASSEMBLY PROCEDURE

## A. Rear Case

### Disassembly

1. Set Monitor to the face downwards.  
Fig. 1
2. Remove the four screws (601) fixing rear case, Fig. 1
3. Hold rear case (200) side and pull out front case (100) in the vertical direction to remove from front case, Fig. 2

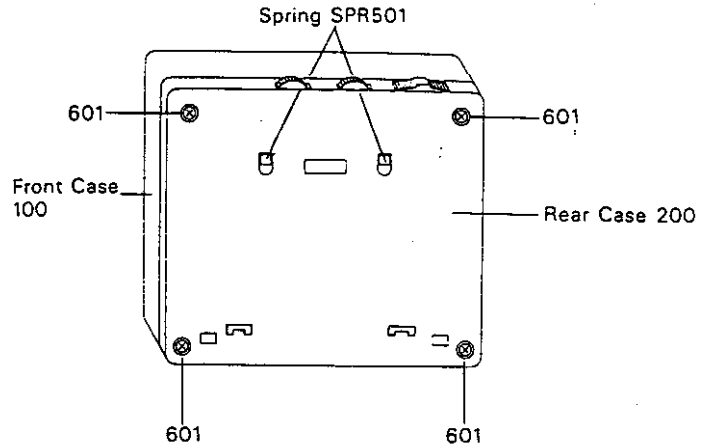


Fig. 1

### Assembly

Perform assembly by reversing the procedure outlined for disassembly.

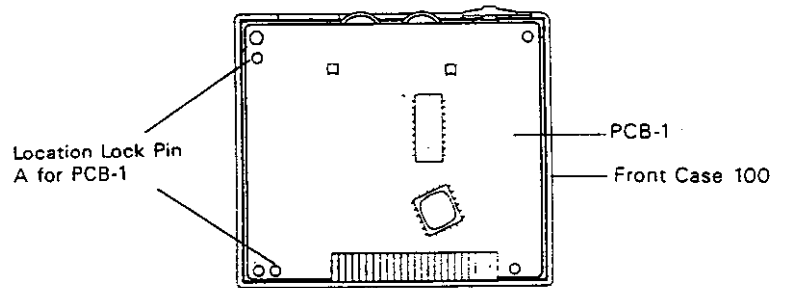


Fig. 2

## B. Video Circuit PCB(PCB-1)

1. Remove the Video Circuit PCB(PCB-1) from the two location lock pin (A), Fig. 2
2. As illustrated in Fig. 3, hold Front case (100) side and pull out PCB-1 in the direction of up slant to remove – (A)DC Power Jack (J451) from Front Case (100), (B) Colour Potentiometer (VR701) from Colour Nob (102), (C) Earphone Jack (J351) from Front Case (100), (D) AV Jack (J251) from Front Case (100), (E) Power Switch (SW451) Power Switch Nob (101).
3. Press the hook of Colour Nob (102), and remove the Colour Nob (102) from Front Case (100).

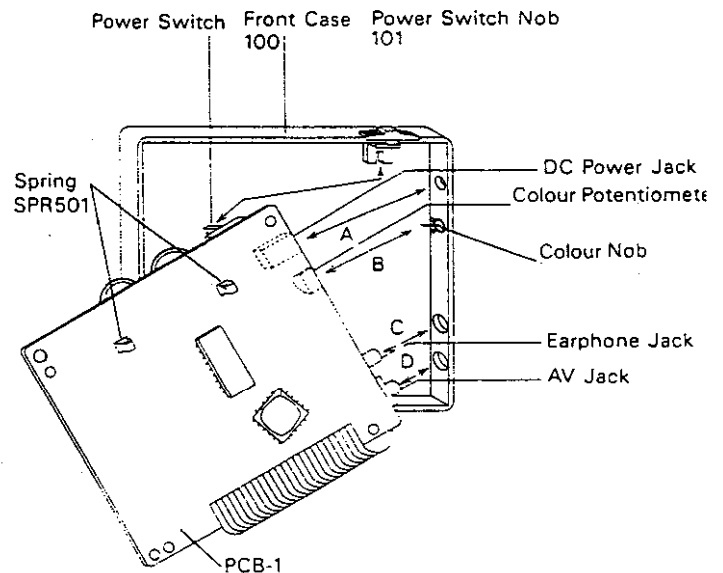


Fig. 3

## Assembly

1. Install the PCB-1 into the Front Case (100)
2. Install the Colour Nob(102)into the Front Case(100),and joint the Colour Potentiometer(VR701)into the Colour Nob(102).

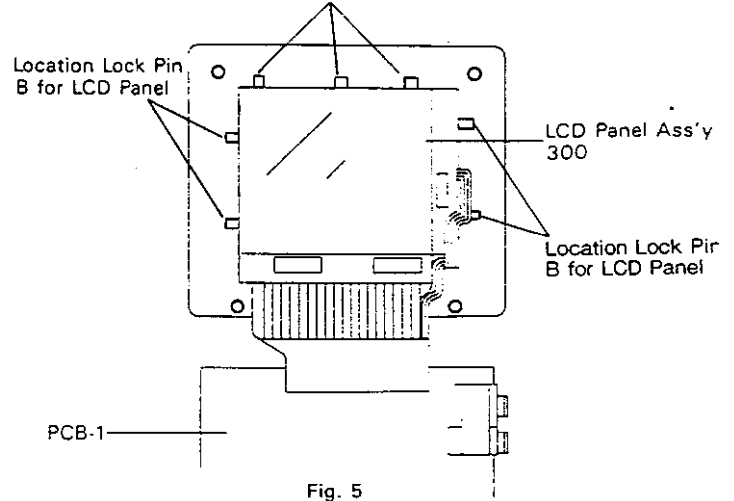
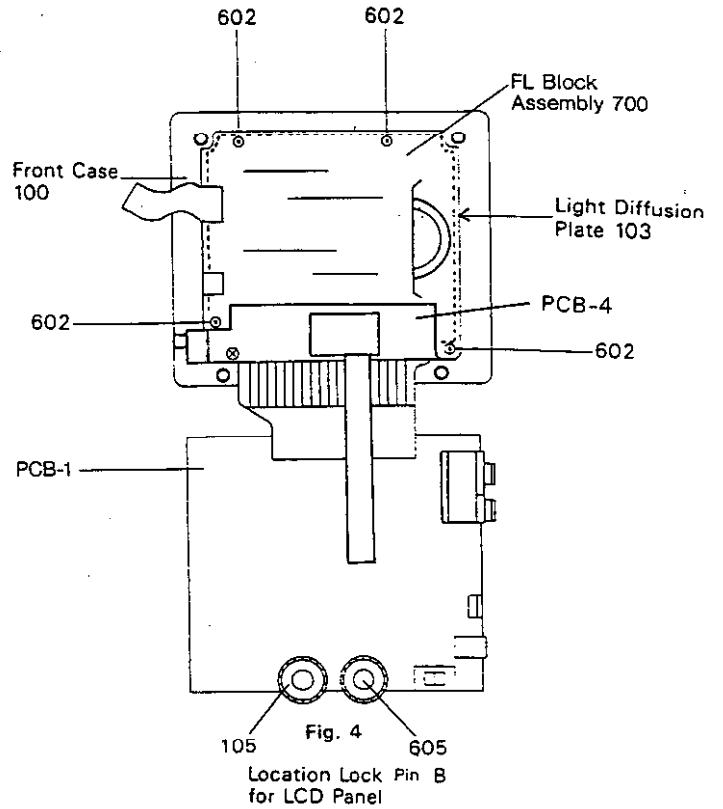
## C. LCD Panel Ass'y(300)

### Disassembly

1. As illustrated in Fig. 4, set the Monitor.
2. Remove the four screws (602)fixing FL Block Assembly(700)and Light Diffusion Plate(103)Fig. 4
3. Remove the Light Diffusion Plate(103) from the Front Case(100). Fig. 4
4. Remove the LCD Panel Ass'y(300)from the Front Case(100). Fig. 5

### Assembly

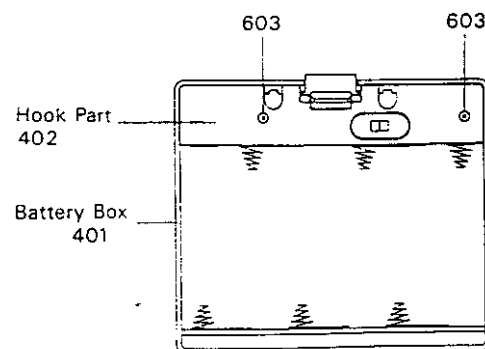
Install the LCD Panel Ass'y(300)into the seven location lock Pin (B)for Panel. Fig. 5  
 Perform assembly by reversing the procedure outlined for disassembly.



## D. Battery Box(400)

### Disassembly

1. Remove the two screws(603)fixing the Hook Part(402). Fig. 6
2. Hold the Hook Part(402)and pull out the Battery Box case(401)in the vertical direction. Fig. 6



3. Remove the two screws(604)fixing the PCB-2. Fig. 7
4. Remove the PCB-2 from the Hook Part (402). Fig. 7, Fig. 8

### Assembly

Perform assembly by reversing the procedure outlined for disassembly.

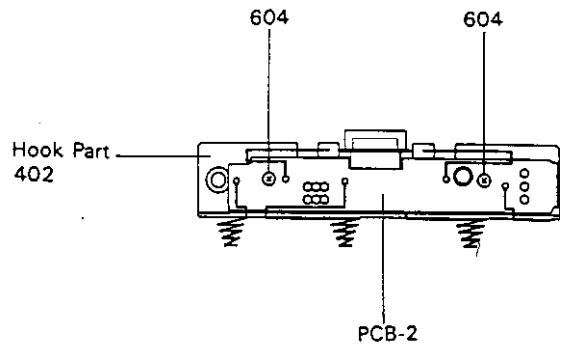


Fig. 7

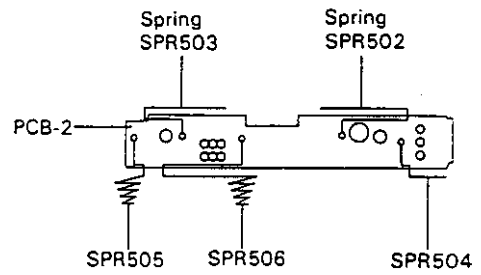


Fig. 8

# BLOCK DIAGRAM

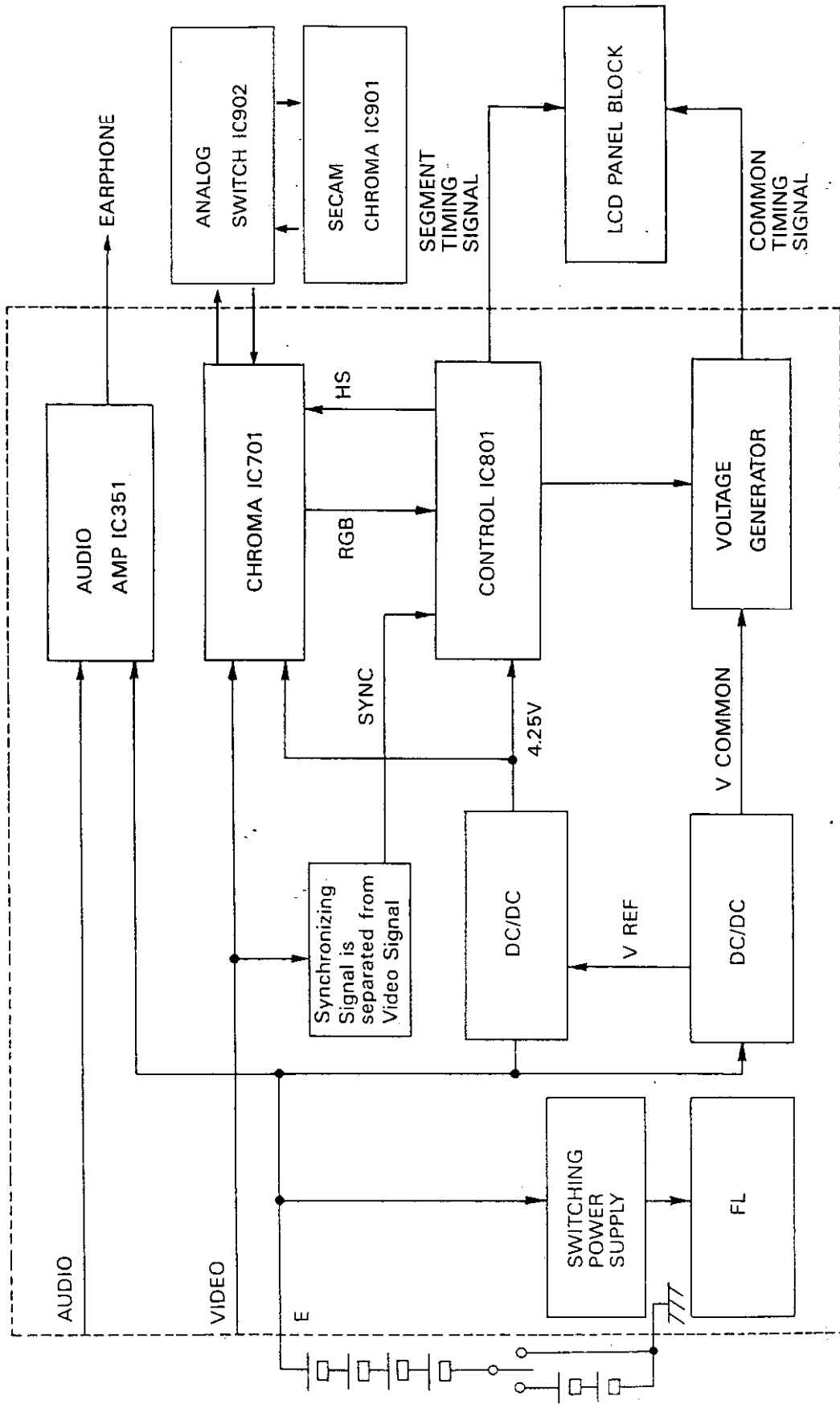


Fig. 9

# LCD Driver and Controller Block Diagram

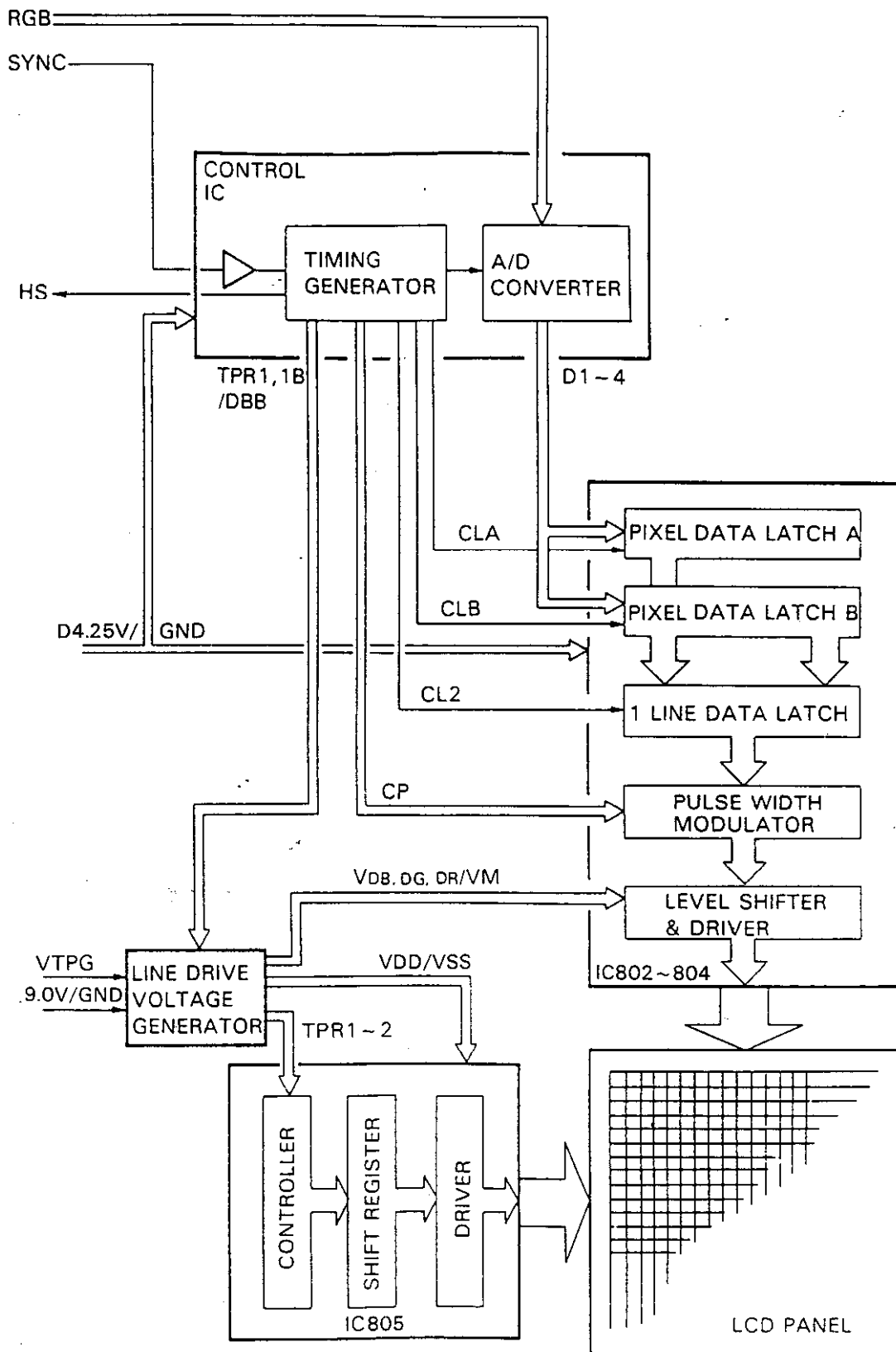


Fig. 10



# OPERATION PRINCIPLE

## CHROMA CIRCUIT(IC701,IC901)

CHROMA(IC701) and SECAM-IC(IC901) make the colour signals(R,G,B,signals) from the composite video signal.

## CONTROLLER(IC801)

Controller(IC801) operates based on the oscillation frequency of a quartz oscillator circuit and outputs signal which controls the segment drivers(IC802,IC803,IC804) and timing pulse generator(IC805). The colour signals(R,G,B,signals) from IC701 are transferred into IC801.IC801 produces 4-bit digital data signals with the A-D converters in IC801.

The converted 4-bit digital data signals are weighted according to the gradation of each colour.IC801 has a synchronous discrimination circuit which detects horizontal and vertical synchronizing pulse by composite synchronizing signals.The synchronous discrimination circuit distinguishes the width and synchronism of synchronizing pulse. If the synchronizing pulse cannot be distinguished due to an incomplete signal of synchronizing signal or noise,a free-running synchronizing pulse is output from the free-running frequency generation circuit in IC801.IC801 has also a PLL(Phase Locked Loop)circuit which automatically adjusts frequency by horizontal synchronizing pulse of composite synchronizing signal.

## TIMING PULSE GENERATOR(TPG)

Timing pulse generator IC(IC805)is mounted on the glass of LCD and connected to the line electrode. It drives the horizontal line electrodes of LCD with control signals from controller(IC801).The frequency is 3.9kHz. The height of pulse depending on VTPG, and the pulse width is 255 micro-second.

## SEGMENT DRIVER(SGD-IC802, IC803,IC804)

Segment driver IC's(IC802,IC803,IC804) are mounted on another glass of the LCD and connected to the vertical segment electrode. They have two shift registers(A,B) and latch to memorize the content of shift register. The digital data signals obtained from A-D converter of IC801 are stored in the registers A and B alternately per one horizontal signal. After digital data signals of two horizontal are stored,the data in these registers are read into latches to generate drive signals for the vertical line electrodes of LCD.The pulse width modulator generates signals having pulse width determined by the value of data in these latches, from which gradation can be produced.These driving signals have electric potential of VDR, VDG,VDB and its wave form is rectangular.

## LCD(LIQUID CRYSTAL DISPLAY) PANEL

LCD panel is composed of two sheets of glass facing each other with a gap of about 100  $\mu$ m. Nematic liquid crystal material is filled in the gap between them and two sheets of polarizer cover the outside of glass. On the inside of the lower glass, 146 horizontal transparent line electrodes are patterned, and on the inside of the upper glass, there are 720 vertical transparent line electrodes.Molecules of liquid crystal are arranged horizontally to the glass and twisted about 90 degrees between upper and lower glass and then do not let the light through when the voltage between vertical electrode and horizontal electrode is lower than the threshold voltage (about 2.0V) of liquid crystal.When the voltage is higher than the threshold voltage,the molecules are arranged vertically between upper and lower glass and let the light through.

Full colour of liquid crystal could be realized by adoption of colour filters which are made of very thin (about  $2\mu\text{m}$ ) organic materials and are placed in the transparent electrode of the glass. The primary three colours (R,G, B) consist of three pixels.

### **AUDIO AMPLIFIER CIRCUIT(IC351)**

The audio signal output from IC351 is amplified and then the speaker is driven.

### **QUAD ANALOG SWITCH CIRCUIT(IC902)**

When the Enable input(cont) to "H" level. Switch condition is ON and "L" level is OFF.

### **ILLUMINATION**

A hot cathode fluorescent tube which generates approximately  $10.000\text{cd/m}^2$  at its center is used for illumination. A thermal fuse of the surface of the fluorescent tube cuts off the high voltage circuit and suspends operation when abnormal heating occurs.

# ADJUSTMENT AND ALIGNMENT

## GENERAL DESCRIPTION

NOTE :

Monitor : After replacement of PCB-1

No.	Item	PCB	Adjustment	Remarks	Measuring Equipment
1	Contrast Alignment	PCB-1	VR702 VR801	Monitor	● Pattern Generator
2	Colour Alignment	PCB-1	TC701	Monitor	● Pattern Generator

### 1. CONTRAST ALIGNMENT AND BRIGHTNESS ALIGNMENT (PCB-1)

1. Short the solder bridge SR55 1. See PCB ASSEMBLY (PCB-1) BOTTOM VIEW.
2. Set Pattern Generator to obtain the black/white display at the monitor.
3. Input DC power supply (9.0V) to J45 1
4. Input Video signal to AV jack of Monitor.
5. Adjust the brightness control (VR401) on the right top of cabinet to obtain the suitable brightness.
6. Connect the equipment as shown in Fig. 11

Input Equipment	Input Point	Input Signal	Step	Adjust	Output Connection	Output Point	Adjust For
● Pattern Generator	AV Jack	Luminance	1	VR801	Monitor	TP825	Adjust VR801 and VR702 as shown in Fig. 12 · 13
				VR702	Oscilloscope	-	

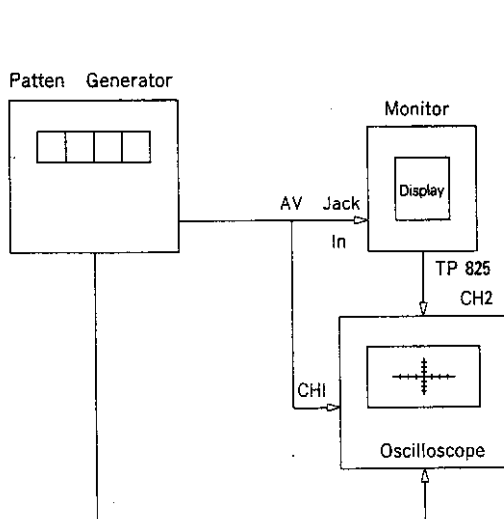


Fig. 11

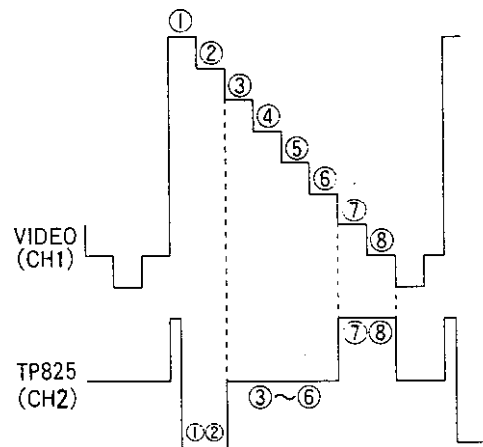
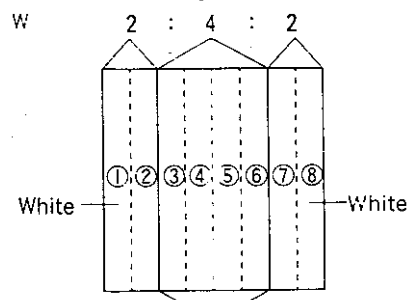


Fig. 12



(Middle colour in black & white)

Fig. 13

## 2. COLOUR ALIGNMENT (PCB-1)

1. Connect a jack(J451)to 9.0VDC external power supply.
2. Connect appartus as Shown in Fig. 1 1
3. Set the power Switch of the monitor to ON.
4. Input video signal of the Pattern Generator to monitor.
5. Adjust brightness control to obtain the suitable brightness.
6. Turn the colour Konob of monitor to obtain the max colour.

Input Connection	Input Point	Input Signal	Step	Adjust	Output Connection	Output Point	Adjust For
• Pattern Generator	AV Jack	Colour Bar	2	TC701	Oscilloscope	TP710	Adjust TC701 at shown in Fig. 14

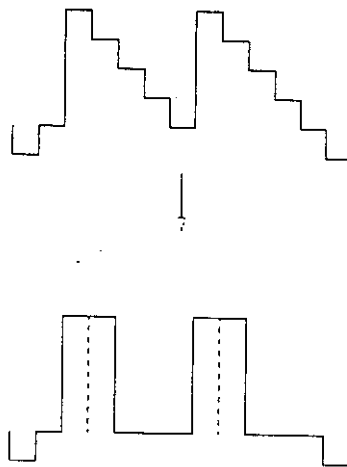


Fig. 14

### 3. COLOUR ALIGNMENT (PCB-4)

1. Connect a jack (J451) to 9.0VDC external power supply.
2. Connect apparatus as shown in Fig. 15.
3. Set the power Switch of the monitor to ON.
4. Input video signal of the Pattern Generator to monitor.
5. Adjust brightness control to obtain the suitable brightness.
6. Turn the colour Knob of monitor to obtain the max colour.

Input Connection	Input Point	Input Signal	Step	Adjust	Output Connection	Output Point	Adjust For
• Pattern Generator	AV Jack	Colour Bar	1	LC901	Oscilloscope	TP901	Adjust LC901 as shown in Fig. 16
			2	LC902	Oscilloscope	TP902	Adjust LC902 as shown in Fig. 17
			3	LC903	Oscilloscope	TP704	Adjust LC903 as shown in Fig. 18
			4	LC904	Oscilloscope	TP703	Adjust LC904 as shown in Fig. 18

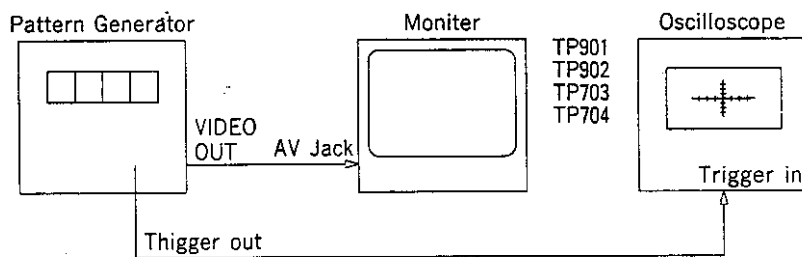


Fig. 15

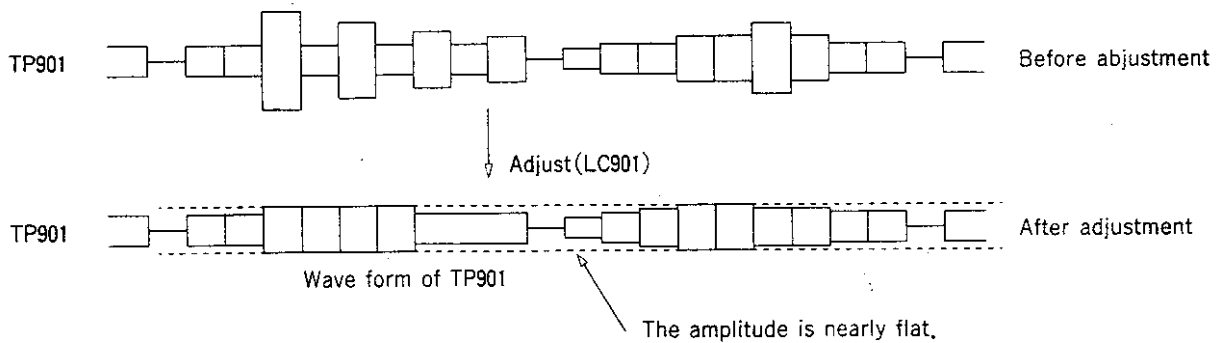


Fig. 16

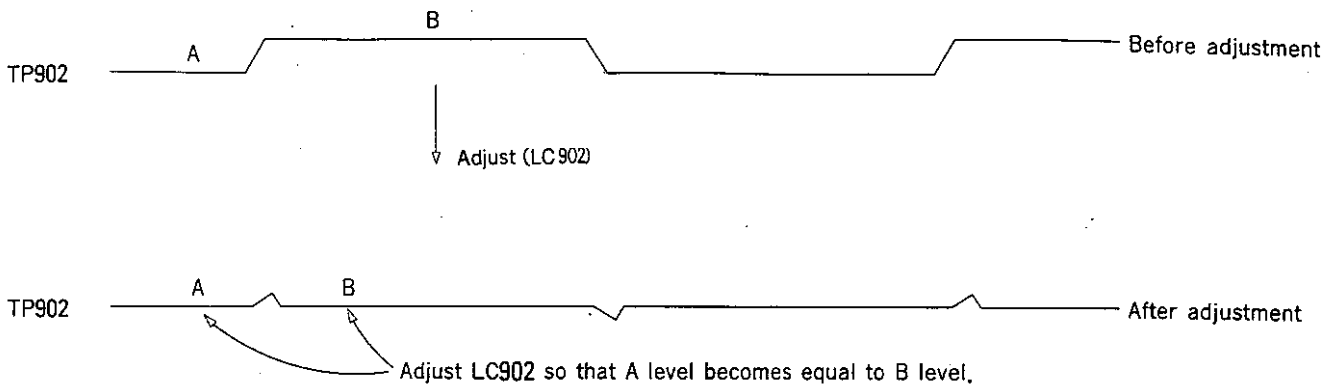


Fig. 17 (Step2)

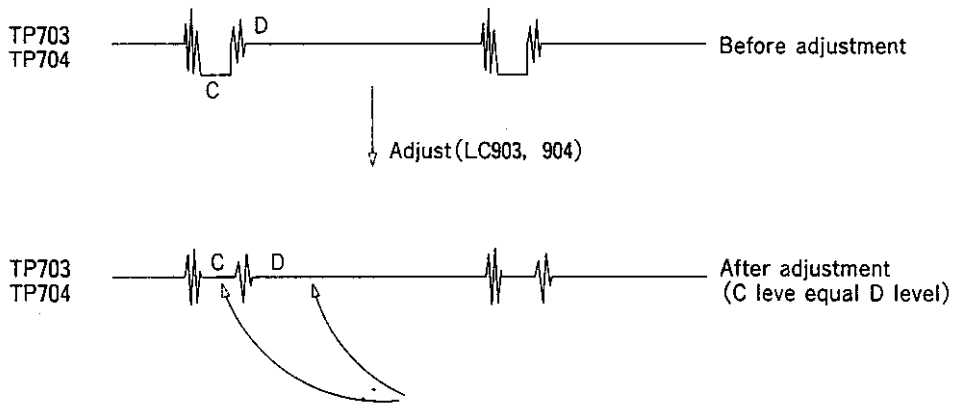


Fig. 18 (Step3, 4)

# TROUBLE SHOOTING CHART

## 1. NO PICTURE

- Supply 9.0V DC at J451
- Connect A/V signal to A/V jack(J251).

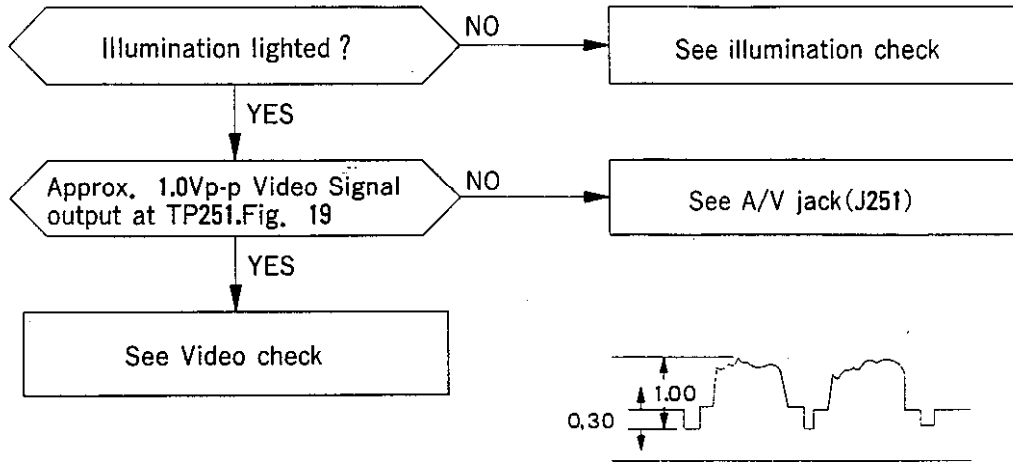
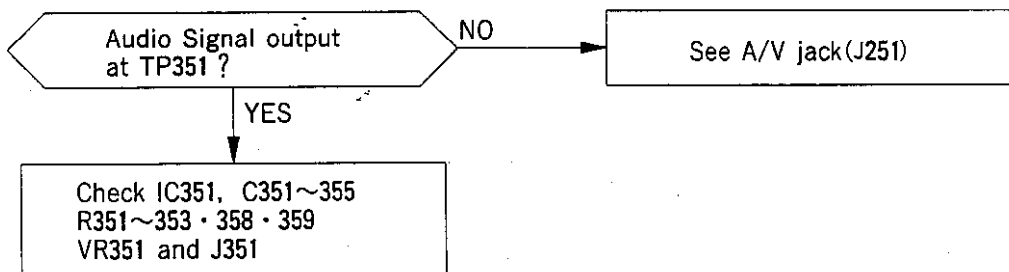


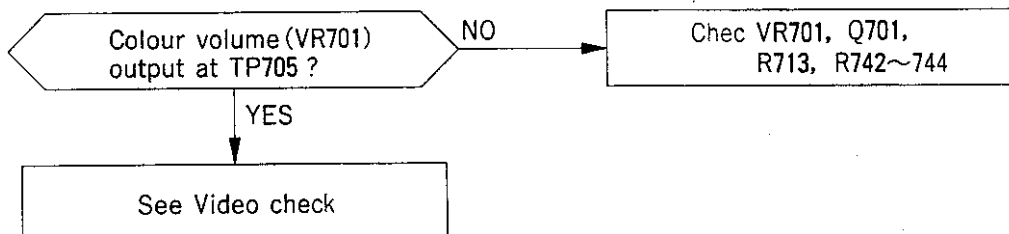
Fig. 19

## 2. NO SOUND

- Connect earphone to phone jack(J351)



## 3. NO COLOUR



#### 4. SINGLE LINE

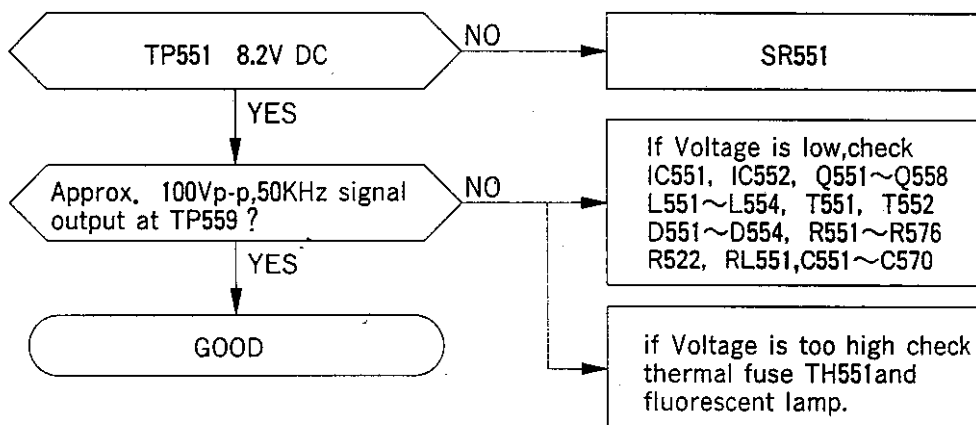
Change the LCD Panel.

#### 5. WHITE OR BLACK SPOT ON LCD PANEL

Change the LCD Panel.

#### 6. ILLUMINATION CHECK

• Supply 9.0V DC at J451

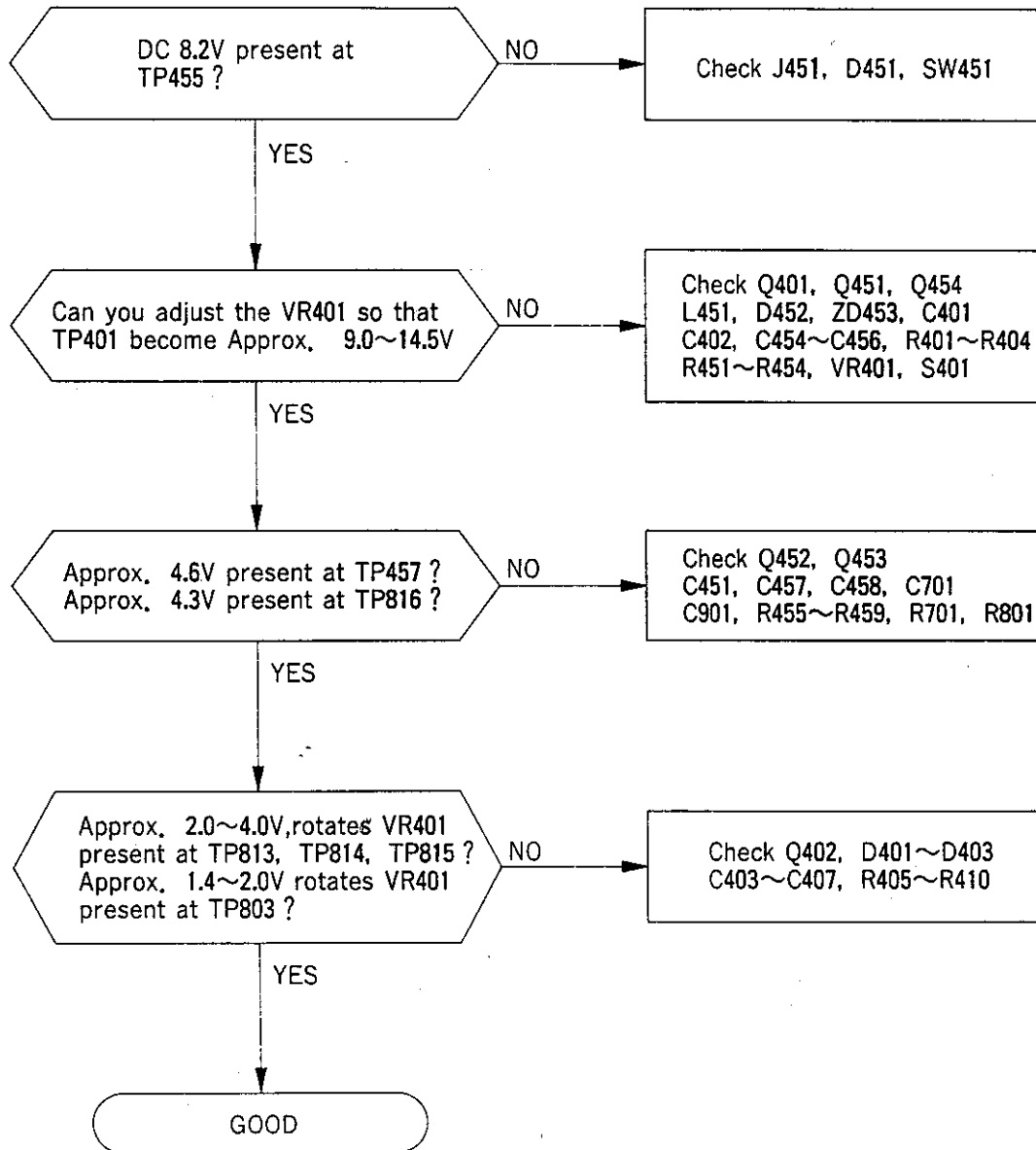




## 7. VIDEO CHECK

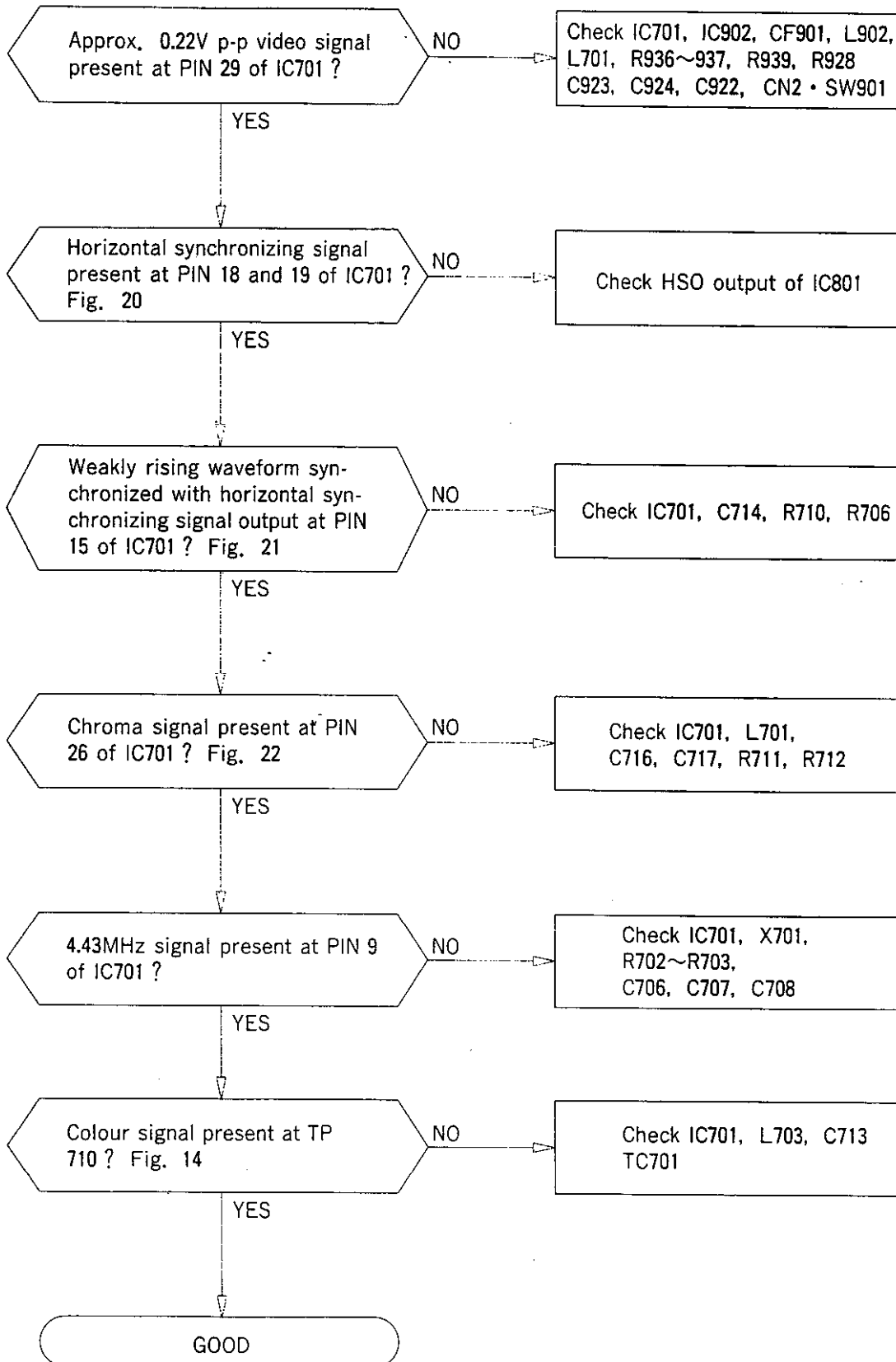
### 7-1. Power Supply Check

- Supply 9.0V DC at J451



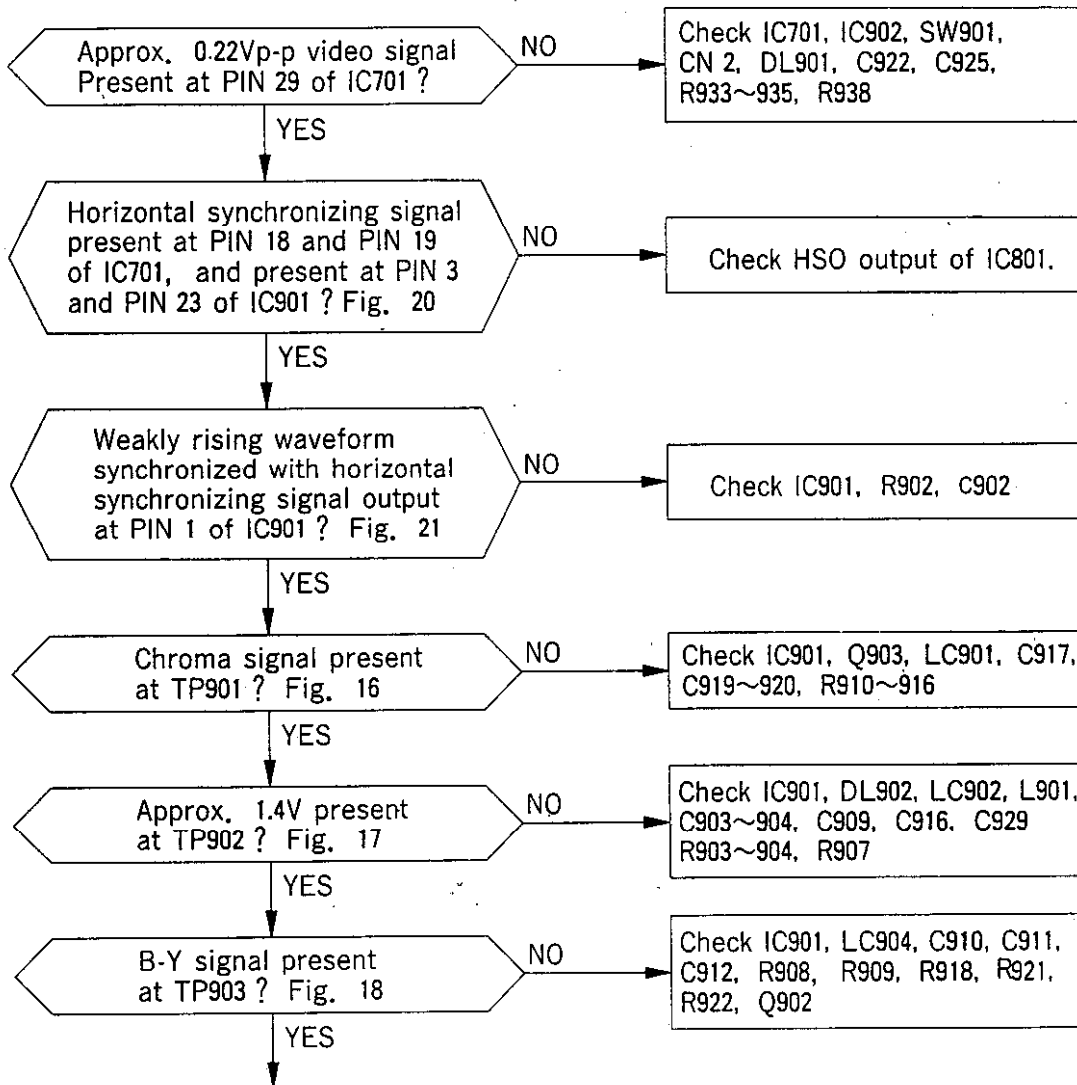
7-2. Chroma check (PAL)

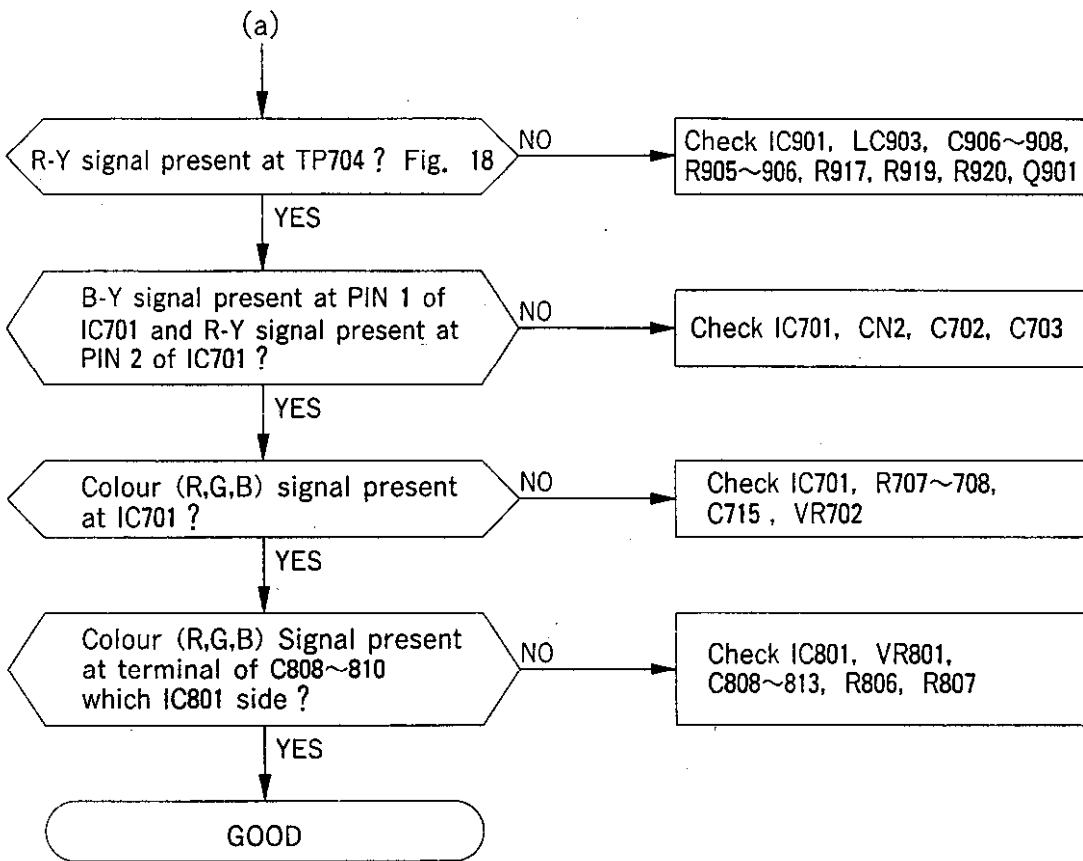
- Connect A/V signal at A/V jack(J251)
- Supply 9.0V DC at J451



7-3. Chroma check (SECAM)

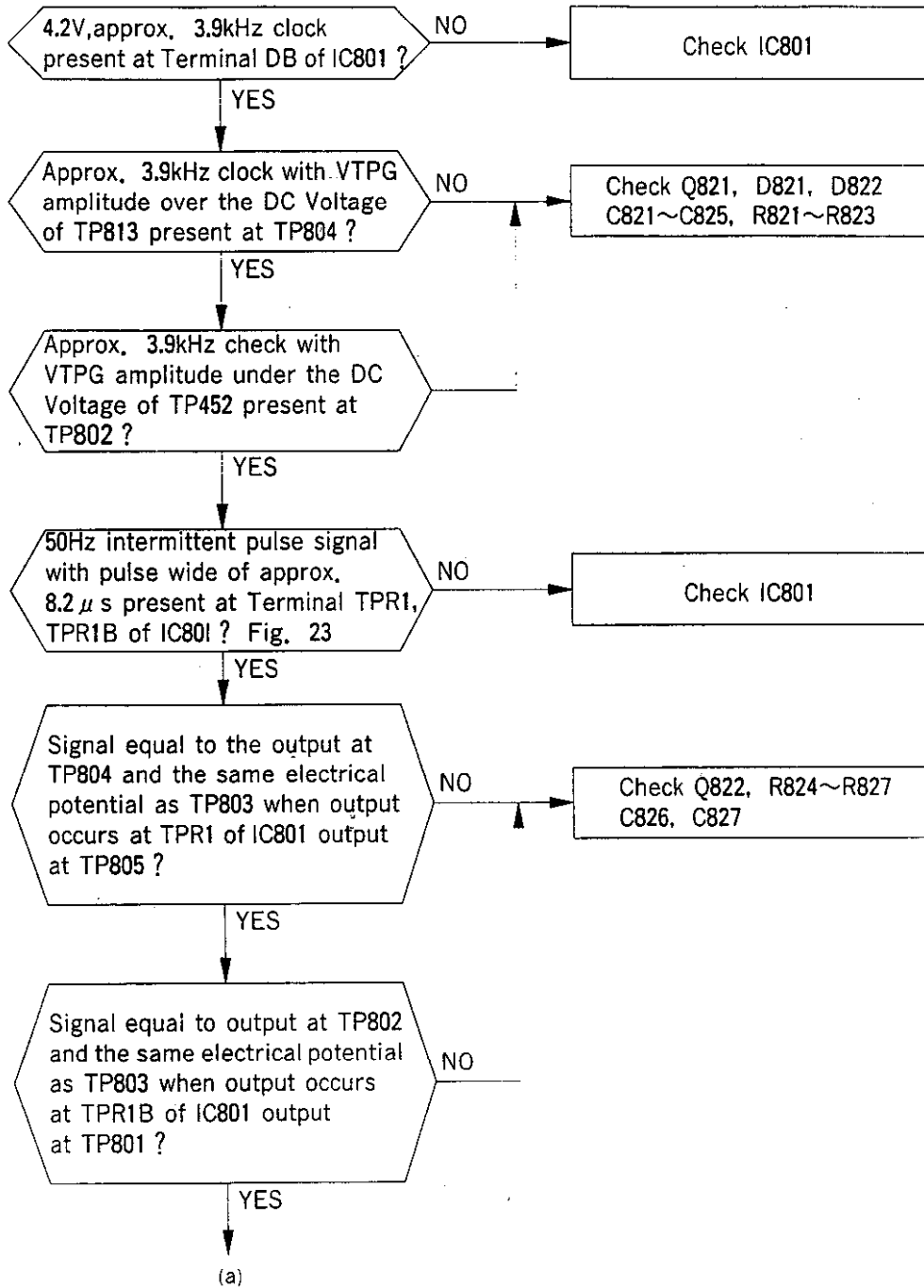
- Connect A/V signal at A/V jack(J251)
- Supply 9.0V DC at J451

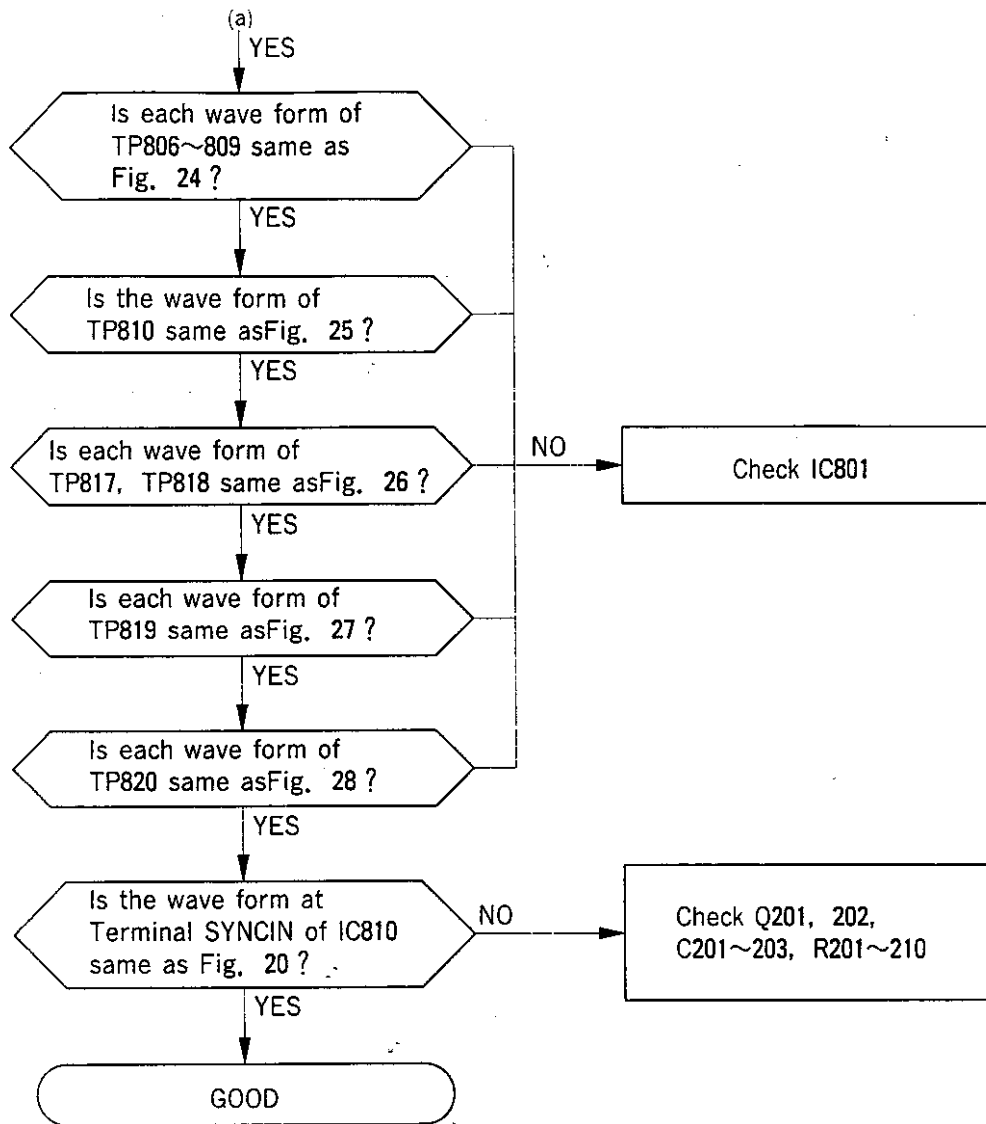




7-4 Control circuit check

- Connect AV signal at AV jack(J251)
- Supply 9.0V DC at J451





IC701  
PIN 18-19 Horizontal Synchronizing Signal

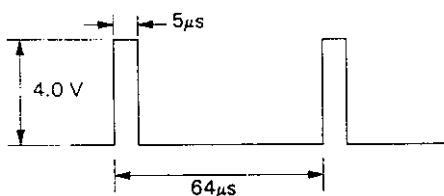


Fig. 20

IC701  
PIN 15 Horizontal Synchronizing Signal

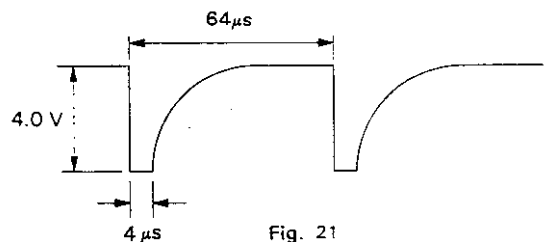


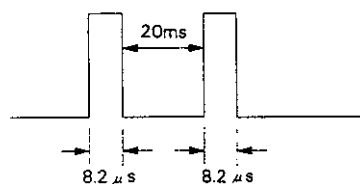
Fig. 21

IC701  
PIN 26 Chroma Signal



Fig. 22

IC801  
TPR1



TPR1B

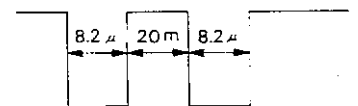


Fig. 23

IC801  
TP806~TP809 (D1~D4)



Fig. 24

IC801 TP817 (CLA), TP818 (CLB)

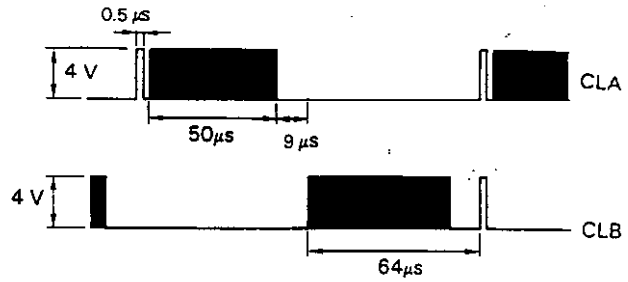


Fig. 26

IC801  
TP810 (REST B)

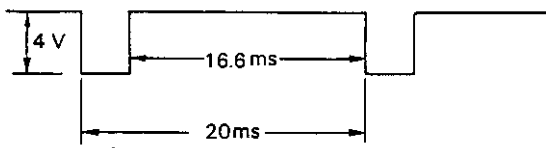


Fig. 25

IC801 TP819 (CL2)

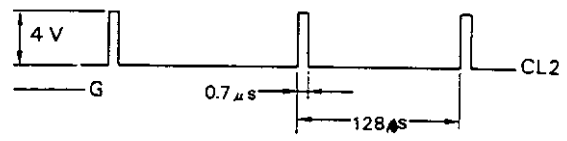


Fig. 27

96µs

IC801 TP820 (CP)

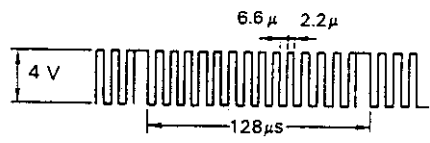
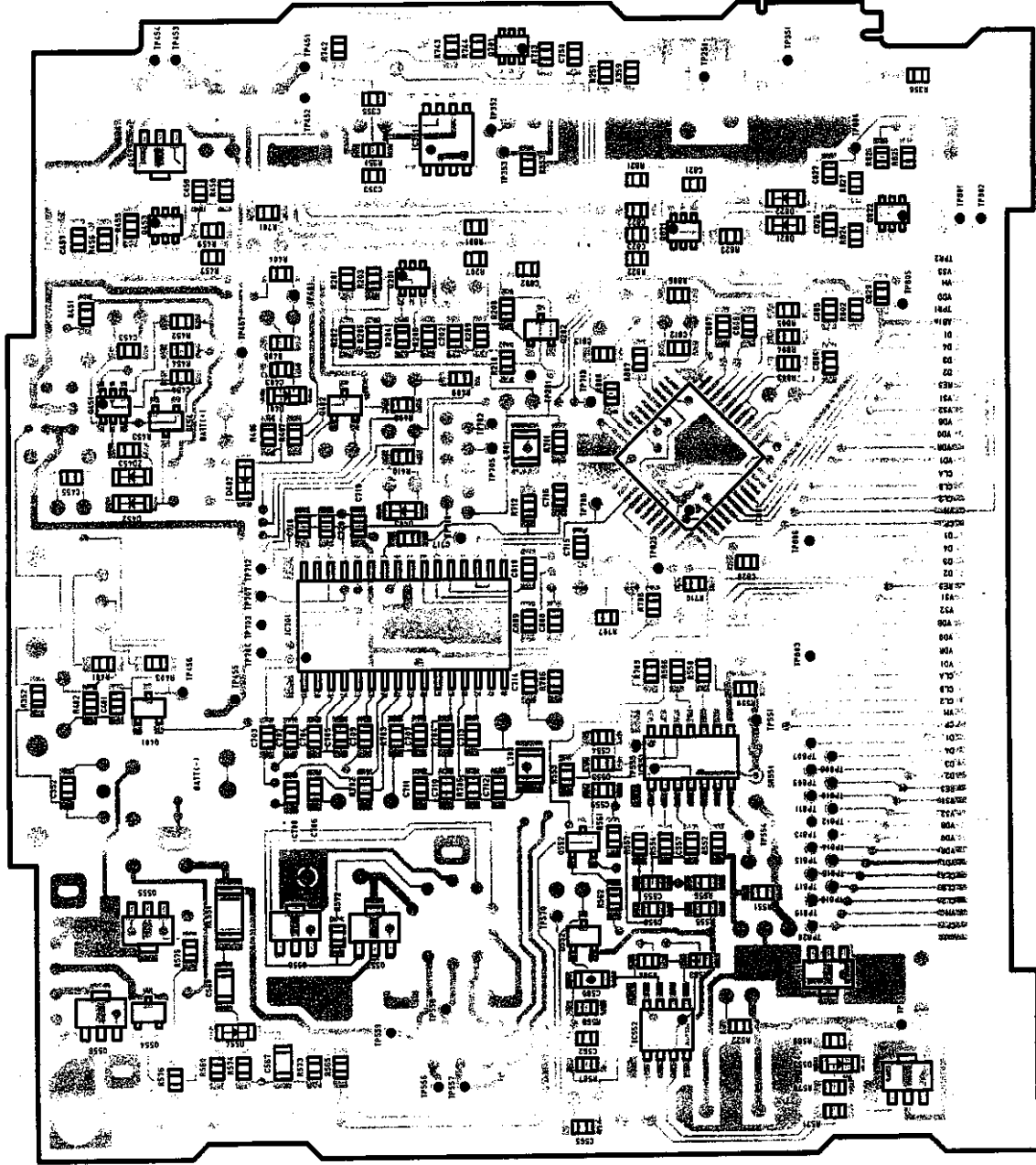


Fig. 28

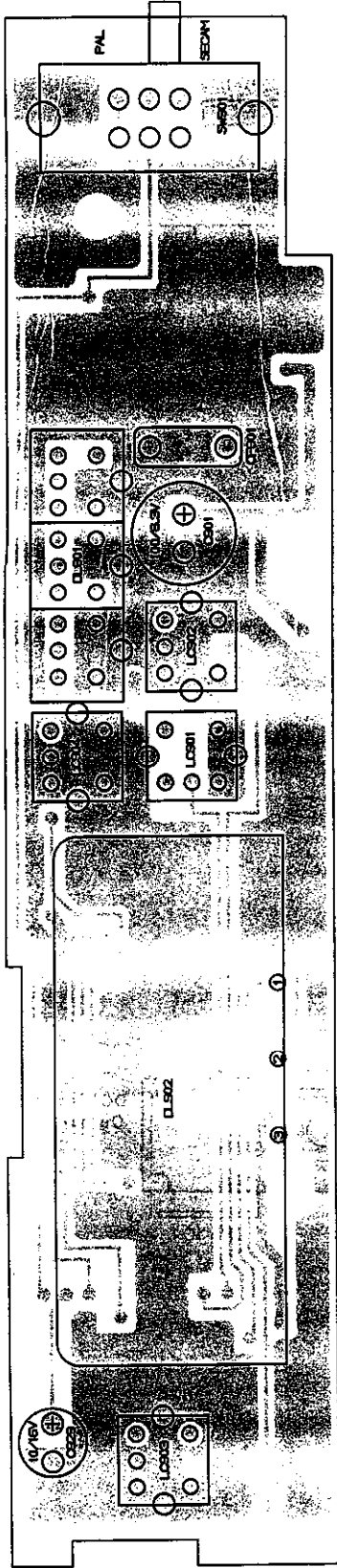




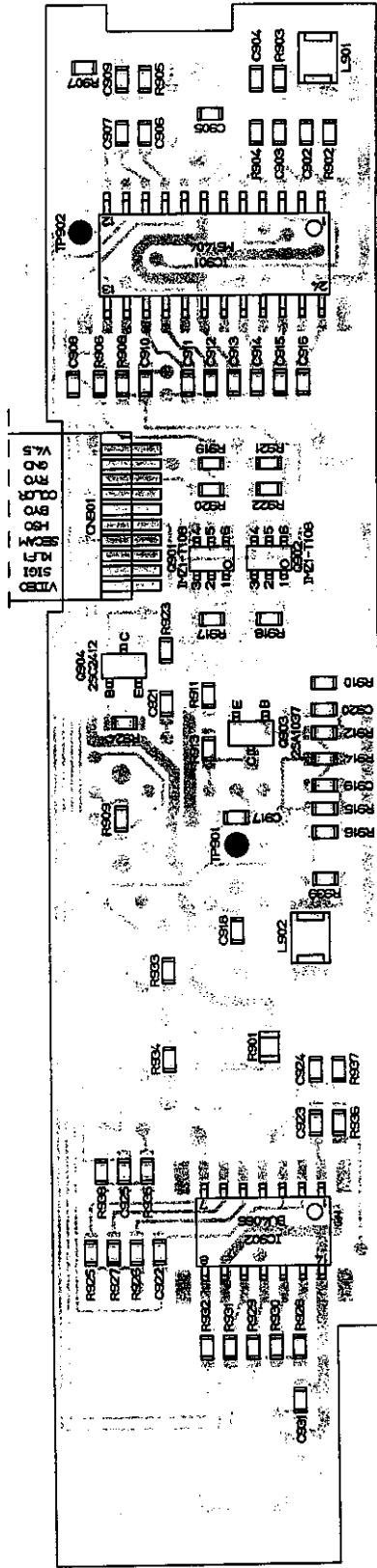
VIDEO CIRCUIT PCB ASSEMBLY (PCB-1)  
BOTTOM VIEW



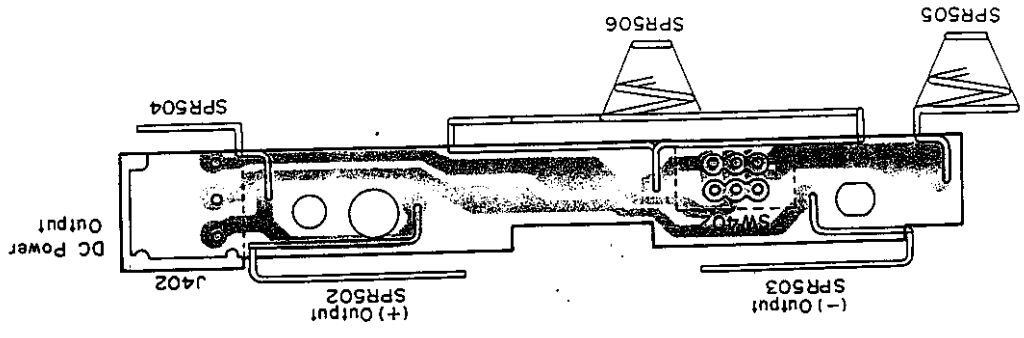
SECAM VIDEO CIRCUIT ASSEMBLY (PCB-4)  
TOP VIEW



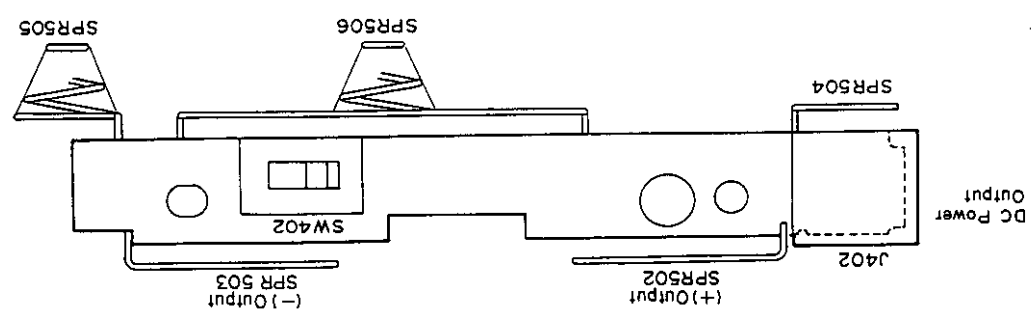
BOTTOM VIEW



BOTTOM VIEW



BATTERY BOX PCB ASSEMBLY (PCB-2)  
TOP VIEW



# ELECTRICAL PARTS LIST

## VIDEO PCB ASSEMBLY(PCB-1)

Ref. No.	DESCRIPTION				Parts No.
PCB-1	Assembly(PCB-1) Video PCB Consists of the following :				A51-3540
Capacitor					
C201	Electrolytic	1 $\mu$ F	50WV	$\pm 20\%$	A86-0010
C202	Ceramic	100pF	50WV	$\pm 5\%$	W52-1011
C203	Electrolytic	3.3 $\mu$ F	50WV	$\pm 20\%$	A86-0060
C204-350	Not used				
C351	Electrolytic	100 $\mu$ F	16WV	$\pm 20\%$	A86-0410
C352	Ceramic	1500pF	25WV	$\pm 10\%$	W32-1527
C353	Ceramic	0.1 $\mu$ F	25WV	+80/-20%	W42-1049
C354	Electrolytic	100 $\mu$ F	16WV	$\pm 20\%$	A86-0410
C355	Ceramic	0.1 $\mu$ F	25WV	+80/-20%	W42-1049
C356-400	Not used				
C401	Ceramic	0.1 $\mu$ F	25WV	+80/-20%	W42-1049
C402	Electrolytic	4.7 $\mu$ F	35WV	$\pm 20\%$	A86-0580
C403	Ceramic	0.1 $\mu$ F	25WV	+80/-20%	W42-1049
C404	Electrolytic	22 $\mu$ F	6.3WV	$\pm 20\%$	A86-0400
C405	Electrolytic	22 $\mu$ F	6.3WV	$\pm 20\%$	A86-0400
C406	Electrolytic	47 $\mu$ F	6.3WV	$\pm 20\%$	A86-0040
C407	Electrolytic	22 $\mu$ F	6.3WV	$\pm 20\%$	A86-0400
C408-450	Not used				
C451	Electrolytic	100 $\mu$ F	16WV	$\pm 20\%$	A86-0410
C452	Electrolytic	100 $\mu$ F	16WV	$\pm 20\%$	A86-0410
C453	Ceramic	0.1 $\mu$ F	25WV	+80/-20%	W42-1049
C454	Ceramic	100pF	50WV	$\pm 5\%$	W52-1011
C455	Ceramic	0.1 $\mu$ F	25WV	+80/-20%	W42-1049
C456	Electrolytic	33 $\mu$ F	25WV	$\pm 20\%$	A86-0500
C457	Ceramic	0.1 $\mu$ F	25WV	+80/-20%	W42-1049
C458	Ceramic	0.1 $\mu$ F	25WV	+80/-20%	W42-1049
C459	Electrolytic	100 $\mu$ F	6.3WV	$\pm 20\%$	A86-0050
C460-550	Not used				
C551	Electrolytic	220 $\mu$ F	16WV	$\pm 20\%$	A86-0600
C552	Electrolytic	47 $\mu$ F	16WV	$\pm 20\%$	A86-0080
C553	Ceramic	100pF	50WV	$\pm 5\%$	W52-1011
C554	Ceramic	0.047 $\mu$ F	25WV	+80/-20%	W42-4739
C555	Ceramic	0.1 $\mu$ F	25WV	+80/-20%	W42-1049
C556	Ceramic	0.1 $\mu$ F	25WV	+80/-20%	W42-1049
C557	Ceramic	180pF	50WV	$\pm 5\%$	W52-1811
C558	Electrolytic	100 $\mu$ F	16WV	$\pm 20\%$	A86-0410
C559	Ceramic	0.033 $\mu$ F	25WV	+80/-20%	W42-3339
C560	Ceramic	0.33 $\mu$ F	25WV	+80/-20%	W43-3349
C561	Electrolytic	10 $\mu$ F	16WV	$\pm 20\%$	A86-0030
C562	Ceramic	0.033 $\mu$ F	25WV	+80/-20%	W42-3339
C563	Electrolytic	10 $\mu$ F	16WV	$\pm 20\%$	A86-0030
C564	Electrolytic	3.3 $\mu$ F	50WV	$\pm 20\%$	A86-0060

Ref. No.	DESCRIPTION				Parts No.
C565	Ceraamic	0.1 $\mu$ F	25WV	+80/-20%	W42-1049
C566	Film	0.1 $\mu$ F	25WV	$\pm$ 5%	A88-0020
C567	Ceramic	0.22 $\mu$ F	25WV	+80/-20%	W43-2249
C568	Ceramic	0.22 $\mu$ F	25WV	+80/-20%	W43-2249
C569	Ceramic	100pF	2KWV	$\pm$ 5%	A88-0290
C570	Film	0.22 $\mu$ F	50WV	$\pm$ 5%	A88-0120
C571-700	Not used				
C701	Electrolytic	100 $\mu$ F	6.3WV	$\pm$ 20%	A86-0050
C702	Ceramic	0.01 $\mu$ F	25WV	$\pm$ 10%	W32-1037
C703	Ceramic	0.01 $\mu$ F	25WV	$\pm$ 10%	W32-1037
C704	Ceramic	1000pF	25WV	$\pm$ 10%	W32-1027
C705	Ceramic	1000pF	25WV	$\pm$ 10%	W32-1027
C706	Ceramic	22pF	50WV	$\pm$ 5%	W52-2201
C707	Ceramic	5pF	50WV	$\pm$ 0.5pF	W52-0502
C708	Ceramic	68pF	50WV	$\pm$ 5%	W52-6801
C709	Ceramic	0.1 $\mu$ F	25WV	+80/-20%	W42-1049
C710	Ceramic	0.1 $\mu$ F	25WV	+80/-20%	W42-1049
C711	Ceramic	1500pF	25WV	$\pm$ 10%	W32-1027
C712	Ceramic	0.1 $\mu$ F	25WV	+80/-20%	W42-1049
C713	Ceramic	0.01 $\mu$ F	25WV	$\pm$ 10%	W32-1037
C714	Ceramic	82pF	50WV	$\pm$ 5%	W52-8201
C715	Ceramic	0.1 $\mu$ F	25WV	+80/-20%	W42-1049
C716	Ceramic	68 $\mu$ F	50WV	$\pm$ 5%	W57-6801
C717	Ceramic	0.01 $\mu$ F	25WV	$\pm$ 10%	W32-1037
C718	Ceramic	180pF	50WV	$\pm$ 5%	W52-1811
C719	Ceramic	0.1 $\mu$ F	25WV	+80/-20%	W42-1049
C720	Ceramic	0.1 $\mu$ F	25WV	+80/-20%	W42-1049
C721	Electrolytic	4.7 $\mu$ F	35WV	$\pm$ 20%	A86-0580
C722-749	Not used				
C750	Ceramic	0.1 $\mu$ F	25WV	+80/-20%	W42-1049
C751-800	Not used				
C801	Electrolytic	100 $\mu$ F	6.3WV	$\pm$ 20%	A86-0050
C802	Ceramic	0.1 $\mu$ F	25WV	+80/-20%	W42-1049
C803	Electrolytic	22 $\mu$ F	6.3WV	$\pm$ 20%	A86-0400
C804	Ceramic	0.1 $\mu$ F	25WV	+80/-20%	W42-1049
C805	Ceramic	0.1 $\mu$ F	25WV	+80/-20%	W42-1049
C806	Ceramic	12pF	50WV	$\pm$ 5%	W52-1201
C807	Ceramic	20pF	50WV	$\pm$ 5%	W52-2001
C808	Ceramic	1000pF	25WV	$\pm$ 10%	W32-1027
C809	Ceramic	1000pF	25WV	$\pm$ 10%	W32-1027
C810	Ceramic	1000pF	25WV	$\pm$ 10%	W32-1027
C811	Electrolytic	22 $\mu$ F	6.3WV	$\pm$ 20%	A86-0400
C812	Ceramic	0.1 $\mu$ F	25WV	+80/-20%	W42-1049
C813	Ceramic	0.1 $\mu$ F	25WV	+80/-20%	W42-1049
C814-820	Not used				
C821	Ceramic	0.1 $\mu$ F	25WV	+80/-20%	W42-1049
C822	Ceramic	0.1 $\mu$ F	25WV	+80/-20%	W42-1049

Ref. No.	DESCRIPTION				Parts No.
C823	Ceramic	0.1 $\mu$ F	25WV	+80/-20%	W42-1049
C824	Electrolytic	4.7 $\mu$ F	35WV	$\pm$ 20%	A86-0580
C825	Electrolytic	4.7 $\mu$ F	35WV	$\pm$ 20%	A86-0580
C826	Ceramic	100pF	50WV	$\pm$ 5%	W52-1011
C827	Ceramic	100pF	50WV	$\pm$ 5%	W52-1011
C828	Ceramic	0.1 $\mu$ F	25WV	+80/-20%	W42-1049
C829	Ceramic	0.1 $\mu$ F	25WV	+80/-20%	W42-1049
<b>Resistor</b>					
R201	Metal Oxide	100K $\Omega$	0.1W	$\pm$ 5%	W22-1043
R202	Metal Oxide	100K $\Omega$	0.1W	$\pm$ 5%	W22-1043
R203	Metal Oxide	5.1K $\Omega$	0.1W	$\pm$ 5%	W22-5123
R204	Metal Oxide	1K $\Omega$	0.1W	$\pm$ 5%	W22-1023
R205	Metal Oxide	1K $\Omega$	0.1W	$\pm$ 5%	W22-1023
R206	Metal Oxide	1K $\Omega$	0.1W	$\pm$ 5%	W22-1023
R207	Metal Oxide	150K $\Omega$	0.1W	$\pm$ 5%	W22-1543
R208	Metal Oxide	150K $\Omega$	0.1W	$\pm$ 5%	W22-1543
R209	Metal Oxide	1M $\Omega$	0.1W	$\pm$ 5%	W22-1053
R210	Metal Oxide	2.2K $\Omega$	0.1W	$\pm$ 5%	W22-2223
R211-250	Not used				
R251	Metal Oxide	75 $\Omega$	0.1W	$\pm$ 5%	W22-7503
R252-350	Not used				
R351	Metal Oxide	39 $\Omega$	0.1W	$\pm$ 5%	W22-3903
R352	Metal Oxide	10K $\Omega$	0.1W	$\pm$ 5%	W22-1033
R353	Metal Oxide	51 $\Omega$	0.1W	$\pm$ 5%	W22-5103
R354-357	Not used				
R358	Metal Oxide	1K $\Omega$	0.1W	$\pm$ 5%	W22-1023
R359	Metal Oxide	15K $\Omega$	0.1W	$\pm$ 5%	W22-1533
R360-400	Not used				
R401	Metal Oxide	51K $\Omega$	0.1W	$\pm$ 5%	W22-5133
R402	Metal Oxide	51K $\Omega$	0.1W	$\pm$ 5%	W22-5133
R403	Metal Oxide	33K $\Omega$	0.1W	$\pm$ 5%	W22-3333
R404	Metal Oxide	51 $\Omega$	0.1W	$\pm$ 5%	W22-5103
R405	Metal Oxide	68K $\Omega$	0.1W	$\pm$ 5%	W22-6833
R406	Metal Oxide	27K $\Omega$	0.1W	$\pm$ 5%	W22-2733
R407	Metal Oxide	51 $\Omega$	0.1W	$\pm$ 5%	W22-5103
R408	Metal Oxide	270 $\Omega$	0.1W	$\pm$ 5%	W22-2713
R409	Metal Oxide	2.2K $\Omega$	0.1W	$\pm$ 5%	W22-2223
R410	Metal Oxide	2.4K $\Omega$	0.1W	$\pm$ 5%	W22-2423
R411-450	Not used				
R451	Metal Oxide	10 $\Omega$	0.1W	$\pm$ 5%	W22-1003
R452	Metal Oxide	330 $\Omega$	0.1W	$\pm$ 5%	W22-3313
R453	Metal Oxide	4.7K $\Omega$	0.1W	$\pm$ 5%	W22-4723
R454	Metal Oxide	470K $\Omega$	0.1W	$\pm$ 5%	W22-4743
R455	Metal Oxide	180K $\Omega$	0.1W	$\pm$ 2%	W22-1842
R456	Metal Oxide	27K $\Omega$	0.1W	$\pm$ 2%	W22-2732
R457	Metal Oxide	2.2K $\Omega$	0.1W	$\pm$ 5%	W22-2223
R458	Metal Oxide	24K $\Omega$	0.1W	$\pm$ 2%	W22-2432

Ref. No.	DESCRIPTION				Parts No.
R459	Metal Oxide	30k $\Omega$	0.1W	$\pm 2\%$	W22-3032
R460-521	Not used				
R522	Metal Oxide	5.1K $\Omega$	0.1W	$\pm 5\%$	W22-5123
R523-550	Not used				
R551	Metal Oxide	75 $\Omega$	0.1W	$\pm 5\%$	W22-7503
R552	Metal Oxide	100 $\Omega$	0.1W	$\pm 5\%$	W22-1013
R553	Metal Oxide	7.5K $\Omega$	0.1W	$\pm 5\%$	W22-7523
R554	Metal Oxide	15K $\Omega$	0.1W	$\pm 5\%$	W22-1533
R555	Metal Oxide	33K $\Omega$	0.1W	$\pm 5\%$	W22-3333
R556	Metal Oxide	1K $\Omega$	0.1W	$\pm 5\%$	W22-1023
R557	Metal Oxide	12K $\Omega$	0.1W	$\pm 5\%$	W22-1233
R558	Metal Oxide	47K $\Omega$	0.1W	$\pm 5\%$	W22-4733
R559	Metal Oxide	10 $\Omega$	0.1W	$\pm 5\%$	W22-1003
R560	Metal Oxide	10K $\Omega$	0.1W	$\pm 5\%$	W22-1033
R561	Metal Oxide	100K $\Omega$	0.1W	$\pm 5\%$	W22-1043
R562	Metal Oxide	100K $\Omega$	0.1W	$\pm 5\%$	W22-1043
R563	Metal Oxide	10K $\Omega$	0.1W	$\pm 5\%$	W22-1033
R564	Metal Oxide	1M $\Omega$	0.1W	$\pm 5\%$	W22-1053
R565	Metal Oxide	220K $\Omega$	0.1W	$\pm 5\%$	W22-2243
R566	Metal Oxide	1K $\Omega$	0.1W	$\pm 5\%$	W22-1023
R567	Metal Oxide	100K $\Omega$	0.1W	$\pm 5\%$	W22-1043
R568	Metal Oxide	100K $\Omega$	0.1W	$\pm 5\%$	W22-1043
R569	Metal Oxide	220K $\Omega$	0.1W	$\pm 5\%$	W22-2243
R570	Metal Oxide	1K $\Omega$	0.1W	$\pm 5\%$	W22-1023
R571	Metal Oxide	2.2K $\Omega$	0.1W	$\pm 5\%$	W22-2223
R572	Metal Oxide	1K $\Omega$	0.1W	$\pm 5\%$	W22-1023
R573	Metal Oxide	100K $\Omega$	0.1W	$\pm 5\%$	W22-1043
R574	Metal Oxide	12K $\Omega$	0.1W	$\pm 5\%$	W22-1233
R575	Metal Oxide	1K $\Omega$	0.1W	$\pm 5\%$	W22-1023
R576	Metal Oxide	1K $\Omega$	0.1W	$\pm 5\%$	W22-1023
R577-700	Not used				
R701	Metal Oxide	10 $\Omega$	0.1W	$\pm 5\%$	W22-1003
R702	Metal Oxide	390 $\Omega$	0.1W	$\pm 5\%$	W22-3913
R703	Metal Oxide	1.5K $\Omega$	0.1W	$\pm 5\%$	W22-1523
R704	Metal Oxide	10K $\Omega$	0.1W	$\pm 5\%$	W22-1033
R705	Metal Oxide	220K $\Omega$	0.1W	$\pm 5\%$	W22-2243
R706	Metal Oxide	51K $\Omega$	0.1W	$\pm 5\%$	W22-5133
R707	Metal Oxide	100K $\Omega$	0.1W	$\pm 5\%$	W22-1043
R708	Metal Oxide	22K $\Omega$	0.1W	$\pm 5\%$	W22-2233
R709	Metal Oxide	330K $\Omega$	0.1W	$\pm 5\%$	W22-3343
R710	Metal Oxide	10K $\Omega$	0.1W	$\pm 5\%$	W22-1033
R711	Metal Oxide	100 $\Omega$	0.1W	$\pm 5\%$	W22-1013
R712	Metal Oxide	220 $\Omega$	0.1W	$\pm 5\%$	W22-2213
R713	Metal Oxide	10K $\Omega$	0.1W	$\pm 5\%$	W22-1033
R714-741	Not used				
R742	Metal Oxide	470K $\Omega$	0.1W	$\pm 5\%$	W22-4743
R743	Metal Oxide	10K $\Omega$	0.1W	$\pm 5\%$	W22-1033

Ref. No.	DESCRIPTION				Parts No.
R744	Metal Oxide	10K $\Omega$	0.1W	$\pm 5\%$	W22-1033
R745-800	Not used				
R801	Metal Oxide	22 $\Omega$	0.1W	$\pm 5\%$	W22-2203
R802	Metal Oxide	10 $\Omega$	0.1W	$\pm 5\%$	W22-1003
R803	Metal Oxide	10K $\Omega$	0.1W	$\pm 5\%$	W22-1033
R804	Metal Oxide	1K $\Omega$	0.1W	$\pm 5\%$	W22-1023
R805	Metal Oxide	1.5K $\Omega$	0.1W	$\pm 5\%$	W22-1523
R806	Metal Oxide	10 $\Omega$	0.1W	$\pm 5\%$	W22-1003
R807	Metal Oxide	2.2K $\Omega$	0.1W	$\pm 5\%$	W22-2223
R808	Metal Oxide	4.7K $\Omega$	0.1W	$\pm 5\%$	W22-4723
R809-820	Not used				
R821	Metal Oxide	68K $\Omega$	0.1W	$\pm 5\%$	W22-6833
R822	Metal Oxide	39K $\Omega$	0.1W	$\pm 5\%$	W22-3933
R823	Metal Oxide	1M $\Omega$	0.1W	$\pm 5\%$	W22-1053
R824	Metal Oxide	22K $\Omega$	0.1W	$\pm 5\%$	W22-2233
R825	Metal Oxide	22K $\Omega$	0.1W	$\pm 5\%$	W22-2233
R826	Metal Oxide	22K $\Omega$	0.1W	$\pm 5\%$	W22-2233
R827	Metal Oxide	22K $\Omega$	0.1W	$\pm 5\%$	W22-2233
RL551	Metal Oxide	1M $\Omega$	0.5W	$\pm 5\%$	W21-1053
<b>Diode</b>					
D401	Silicon	RLS-73			A73-0340
D402	Silicon	RLS-73			A73-0340
D403	Silicon	RLS-73			A73-0340
D451	Silicon	1 SR139			A73-0410
D452	Silicon	RLS-71			A73-0360
D551	Silicon	SB20-03P			A73-0320
D552	Silicon	DAP202K	Twin		A73-0550
D553	Silicon	RLS-73			A73-0340
D554	Silicon	RLS-73			A73-0340
D821	Silicon	RLS-73			A73-0340
D822	Silicon	RLS-73			A73-0340
ZD453	Silicon	RLS20A	Zener		A73-0250
<b>IC</b>					
IC351	NJM386M	Audio IC			A71-0080
IC551	BA9700AF	Down Voltage IC			A71-0680
IC552	NJM2903M	Comparator IC			A71-1570
IC701	M51403FP	Chroma IC			A71-0710
IC801	A71-2060	Controller IC			A71-2060
<b>Jack</b>					
J251	HSJ0861-01-410	AV Input			A62-0030
J351	HSJ0836-01-310	Earphone			A62-0020
J451	EX403	DC Power Input			A62-0110
<b>Coil</b>					
L451	5 TAN0349Z	2.2mH	Fixed Chipe		A79-0560
L551	622LYF-101K	100 $\mu$ H	Choking Coil	$\pm 10\%$	A79-0420
L552	622LYF-101K	100 $\mu$ H	Choking Coil	$\pm 10\%$	A79-0420
L553	622LYF-101K	100 $\mu$ H	Choking Coil	$\pm 10\%$	A79-0420



Ref. No.	DESCRIPTION			Parts No.
L554	622LYF-101K	100 $\mu$ H	Choking Coil $\pm 10\%$	A79-0420
L701	LFC32TE220K	22 $\mu$ H	Fixed Chipe $\pm 10\%$	A90-0500
L703	LFC32TE470K	47 $\mu$ H	Fixed Chipe $\pm 10\%$	A90-0510
<b>Transistor</b>				
Q201	IMZ1	PNP, NPN		A72-0190
Q202	2SA1037K	PNP		W01-1037
Q401	2SC2412K	NPN		W03-2412
Q402	2SC2412K	NPN		W03-2412
Q451	IMZ1	PNP, NPN		A72-0190
Q452	2SB1132	PNP		W02-1132
Q453	IMX2	NPN, NPN		A72-0180
Q454	2SC2411K	NPN		W03-2411
Q551	2SB1184Q	PNP		W12-1184
Q552	2SA1037K	PNP		W01-1037
Q553	2SB1132	PNP		W02-1132
Q554	2SC2412K	NPN		W03-2412
Q555	2SD2150	NPN		W04-2150
Q556	2SD2150	NPN		W04-2150
Q557	2SD2150	NPN		W04-2150
Q558	2SD2150	NPN		W04-2150
Q701	IMZ1	PNP, NPN		A72-0190
Q821	IMZ1	PNP, NPN		A72-0190
Q822	IMZ1	PNP, NPN		A72-0190
<b>Potentiometer</b>				
VR351	VO9LN5.5T15A20K	20K $\Omega$	Rotary Volume Control	A83-0550
VR401	VO9LN5.5TB50K	50K $\Omega$	Rotary Brightness Control	A83-0510
VR701	RH0632C100K-B	100K $\Omega$	Rotary Color Control	A83-0810
VR702	EVN-D8AA03B100K	100K $\Omega$	Semifixed	A83-0520
VR801	EVN-D8AA03B100K	100K $\Omega$	Semifixed	A83-0520
<b>Ceramic Trimmer</b>				
TC701	VCT51F 30pF			A89-0070
<b>Miscellaneous</b>				
S401	NTH5D104KA		Thermistor	A84-0040
SW451	SDL-22-451		Slide Switch Power ON/OFF	A61-0260
T551	ST-093		High Voltage Transformer	A78-0350
T552	D02			A78-0380
X701	TR-49	4.43MHz		A75-0650
X801	CSA-309			A75-1210
CN1	06FEST		Connector	A54-1250
CN2	10FM-1.0BT		Connector	A54-1260
SPR501	Spring		DC Power Input	A12-0720
105	Knob		Volume Control	A05-0920
602	B1.7 $\times$ 4mm			Y13-0401
500	Shield Case (A)			A12-0730
501	Insulator Sheet			A25-0710
502	Shield Case (B)			A12-0750
503	Shield Sheet (A)			A55-0780
504	Caution Ladel			A04-3560

## SECAM VIDEO PCB ASSEMBLY (PCB-4)

Ref. No.	DESCRIPTION	Parts No.
PCB-4	Assembly (PCB-4) Secam Video PCB Consists of the following :	A51-3550
Capacitor		

C901	Electrolytic	100 $\mu$ F	6.3WV	$\pm 20\%$	A86-0050
C902	Ceramic	100pF	50WV	$\pm 5\%$	W51-1011
C903	Ceramic	1000pF	25WV	$\pm 10\%$	W31-1027
C904	Ceramic	0.01F	25WV	$\pm 10\%$	W31-1037
C905	Ceramic	0.1 $\mu$ F	25WV	+80/-20%	W41-1049
C906	Ceramic	15pF	50WV	$\pm 5\%$	W51-1501
C907	Ceramic	22pF	50WV	$\pm 5\%$	W51-2201
C908	Ceramic	820pF	25WV	$\pm 5\%$	W31-8211
C909	Ceramic	1500pF	25WV	$\pm 10\%$	W31-1527
C910	Ceramic	820pF	25WV	$\pm 10\%$	W31-8211
C911	Ceramic	22pF	50WV	$\pm 5\%$	W51-2201
C912	Ceramic	15pF	50WV	$\pm 5\%$	W51-1501
C913	Ceramic	0.1 $\mu$ F	25WV	+80/-20%	W41-1049
C914	Ceramic	1000pF	25WV	$\pm 10\%$	W31-1027
C915	Ceramic	1000pF	25WV	$\pm 10\%$	W31-1027
C916	Ceramic	0.01 $\mu$ F	25WV	$\pm 10\%$	W31-1037
C917	Ceramic	2200pF	25WV	$\pm 10\%$	W31-2227
C918	Ceramic	0.01 $\mu$ F	25WV	$\pm 10\%$	W31-1037
C919	Ceramic	1000pF	25WV	$\pm 10\%$	W31-1027
C920	Ceramic	0.1 $\mu$ F	25WV	+80/-20%	W41-1049
C921	Ceramic	330pF	25WV	$\pm 5\%$	W51-3311
C922	Ceramic	0.1 $\mu$ F	25WV	+80/-20%	W41-1049
C923	Ceramic	0.1 $\mu$ F	25WV	+80/-20%	W41-1049
C924	Ceramic	82pF	50WV	$\pm 5\%$	W51-8201
C925	Ceramic	330pF	25WV	$\pm 5\%$	W51-3311
C926-928	Not used				
C929	Electrolytic	10 $\mu$ F	15WV	$\pm 20\%$	A86-0030
C931	Ceramic	0.1 $\mu$ F	25WV	+80/-20%	W41-1049

### Resistor

R901	Metal Oxide	10 $\Omega$	0.1W	$\pm 5\%$	W22-1003
R902	Metal Oxide	47K $\Omega$	0.063W	$\pm 5\%$	W23-4733
R903	Metal Oxide	560 $\Omega$	0.063W	$\pm 5\%$	W23-5613
R904	Metal Oxide	560 $\Omega$	0.063W	$\pm 5\%$	W23-5613
R905	Metal Oxide	4.7K $\Omega$	0.063W	$\pm 5\%$	W23-4723
R906	Metal Oxide	820 $\Omega$	0.063W	$\pm 5\%$	W23-8213
R907	Metal Oxide	2.7K $\Omega$	0.063W	$\pm 5\%$	W23-2723
R908	Metal Oxide	820 $\Omega$	0.063W	$\pm 5\%$	W23-8213
R909	Metal Oxide	4.7K $\Omega$	0.063W	$\pm 5\%$	W23-4723
R910	Metal Oxide	220 $\Omega$	0.063W	$\pm 5\%$	W23-2213
R911	Metal Oxide	1.2K $\Omega$	0.063W	$\pm 5\%$	W23-1223
R912	Metal Oxide	6.8K $\Omega$	0.063W	$\pm 5\%$	W23-6823
R913	Metal Oxide	10K $\Omega$	0.063W	$\pm 5\%$	W23-1033
R914	Metal Oxide	3.3K $\Omega$	0.063W	$\pm 5\%$	W23-3323
R915	Metal Oxide	1K $\Omega$	0.063W	$\pm 5\%$	W23-1023

Ref. No.	DESCRIPTION				Parts No.
R916	Metal Oxide	2.2K $\Omega$	0.063W	$\pm 5\%$	W23-2223
R917	Metal Oxide	2.2K $\Omega$	0.063W	$\pm 5\%$	W23-2223
R918	Metal Oxide	2.2K $\Omega$	0.063W	$\pm 5\%$	W23-2223
R919	Metal Oxide	1K $\Omega$	0.063W	$\pm 5\%$	W23-1023
R920	Metal Oxide	1K $\Omega$	0.063W	$\pm 5\%$	W23-1023
R921	Metal Oxide	1K $\Omega$	0.063W	$\pm 5\%$	W23-1023
R922	Metal Oxide	1K $\Omega$	0.063W	$\pm 5\%$	W23-1023
R923	Metal Oxide	10K $\Omega$	0.063W	$\pm 5\%$	W23-1033
R924	Metal Oxide	10K $\Omega$	0.063W	$\pm 5\%$	W23-1033
R925	Metal Oxide	100K $\Omega$	0.063W	$\pm 5\%$	W23-1043
R926	Metal Oxide	1K $\Omega$	0.063W	$\pm 5\%$	W23-1023
R927	Metal Oxide	1K $\Omega$	0.063W	$\pm 5\%$	W23-1023
R928	Metal Oxide	1K $\Omega$	0.063W	$\pm 5\%$	W23-1023
R929	Metal Oxide	100K $\Omega$	0.063W	$\pm 5\%$	W23-1043
R930	Metal Oxide	1K $\Omega$	0.063W	$\pm 5\%$	W23-1023
R931	Metal Oxide	1K $\Omega$	0.063W	$\pm 5\%$	W23-1023
R932	Metal Oxide	1K $\Omega$	0.063W	$\pm 5\%$	W23-1023
R933	Metal Oxide	470 $\Omega$	0.063W	$\pm 5\%$	W23-4713
R934	Metal Oxide	680 $\Omega$	0.063W	$\pm 5\%$	W23-6813
R935	Metal Oxide	220 $\Omega$	0.063W	$\pm 5\%$	W23-2213
R936	Metal Oxide	470 $\Omega$	0.063W	$\pm 5\%$	W23-4713
R937	Metal Oxide	1K $\Omega$	0.063W	$\pm 5\%$	W23-1023
R938	Metal Oxide	1K $\Omega$	0.063W	$\pm 5\%$	W23-1023
R939	Metal Oxide	220 $\Omega$	0.063W	$\pm 5\%$	W23-2213

#### IC

IC901	M51404AFP	Chroma IC	A71-1020
IC902	BU4066BF	Quad Analog Switch IC	A71-2210

#### Transistor

Q901	IMZ1	PNP, NPN	A72-0190
Q902	IMZ1	PNP, NPN	A72-0190
Q903	2SA1037K	PNP	W01-1037
Q904	2SC2412K	NPN	W03-2412

#### LC Filter

LC901	332PC-1822X	A80-0110
LC902	332PC-1818Y	A80-0120
LC903	332PC-2832Z	A80-0140
LC904	332PC-2831Z	A80-0150

#### Delay Line

LC901	H288LNMS-4691TWD	A79-0480
LC902	ADL-CP1345Z	A79-0470

#### Coil

L901	LFC32TE150K	15 $\mu$ H	Fixed Chipe $\pm 10\%$	A90-0220
L902	LFC32TE150K	15 $\mu$ H	Fixed Chipe $\pm 10\%$	A90-0220

#### Ceramic Filter

CF901	TP4.43MJ	Ceramic Trap	A75-0150
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Ref. No.	DESCRIPTION			Parts No.
SW901	SSSF122-P06N-0	Slide Switch	PAL/SECAM	A61-0270
352	FFC	1.0 $\times$ 10 $\times$ 8		A53-0440

## FL BLOCK ASSEMBLY

Ref. No.	DESCRIPTION	Parts No.
700	FL BLOCK Assembly Consists of the following :	A11-1620
351	FFC 1.25 × 6	A53-0430
TH551	SM095B0 Thermofuse	A84-0050
PCB- 3	Assembly PCB- 3 . FL Block Consists of the following :	A52-2300
505	Earth Spring	A12-0710
104	Second Reflector	A34-0360
302	Fifst Reflector	A34-0350
FL551	Tubr Fluorescent FLE81U3096P4	A35-0260
506	Shield Sheet(B)	A55-0790

## BATTERY BOX PCB ASSEMBLY(PCB-2)

Ref. No.	DESCRIPTION	Parts No.
PCB- 2	Assembly PCB- 2 . Battery Box Consists of the following :	A51-3330
<b>Jack</b>		
J402	HEC0779-01-030 DC Power Output	A62-0170
<b>Spring</b>		
SPR502	Spring, DC Power, (+)Output	A20-0310
SPR503	Spring, DC Power, (-)Output	A20-0320
SPR504	Spring, Battery, Positive	A20-0280
SPR505	Spring, Battery, Positive	A20-0290
SPR506	Spring, Battery, Positive & Negative	A20-0300
<b>Switch</b>		
SW402	S5SS 9 - 2 - 2 -A	A61-0130

## EXPLODED VIEW PARTS LIST

Ref. No.	DESCRIPTION	Parts No.
100	Case Ass'y, Front	A01-6890
101	Knob, Slide, Power	A05-0910
102	Knob, Color Control	A05-0580
103	Light Diffusion Plate	A02-1470
105	Knob, Volume Control	A05-0920
200	Case Ass'y, Rear	A01-6910
300	LCD Panel Assembly	A11-1600
SPR501	Spring, DC Power	A12-0720
400	Battery Box Ass'y	A11-1420
401	Case Ass'y	A01-6670
402	Hook Part	A02-0880
SPR507	Spring, Battery	A20-0160
SPR508	Spring, Battery	A20-0170
PCB-2	Assembly(PCB- 2)	A51-3330
SPR502	Spring, DC Power	A20-0310
SPR503	Spring, DC Power	A20-0320
SPR504	Spring, Battery	A20-0280
SPR505	Spring, Battery	A20-0290
SPR506	Spring, Battery	A20-0300
601	B 2 × 12 <sub>mm</sub>	A22-0360
602	M1.7 × 4 <sub>mm</sub>	Y13-0401
603	B 2 × 8 <sub>mm</sub>	Y23-6801
604	B 2 × 5 <sub>mm</sub>	Y23-6501
605	B 2 × 8 <sub>mm</sub>	Y23-6806
606	B 2 × 5 <sub>mm</sub>	Y24-6506
350	Prism Sheet	A13-0860
700	FL BLOCK Assembly	A11-1620

EXPLODED VIEW

