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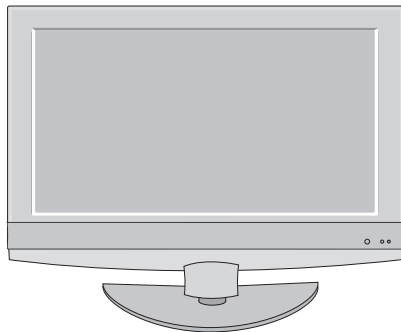
LCD TV SERVICE MANUAL

CHASSIS : LP81A

MODEL : 42LG53FR 42LG53FR-TD

CAUTION

BEFORE SERVICING THE CHASSIS,
READ THE SAFETY PRECAUTIONS IN THIS MANUAL.



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SAFETY PRECAUTIONS

IMPORTANT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These parts are identified by ⚠ in the Schematic Diagram and Replacement Parts List.

It is essential that these special safety parts should be replaced with the same components as recommended in this manual to prevent Shock, Fire, or other Hazards.

Do not modify the original design without permission of manufacturer.

General Guidance

An **isolation Transformer** should always be used during the servicing of a receiver whose chassis is not isolated from the AC power line. Use a transformer of adequate power rating as this protects the technician from accidents resulting in personal injury from electrical shocks.

It will also protect the receiver and its components from being damaged by accidental shorts of the circuitry that may be inadvertently introduced during the service operation.

If any fuse (or Fusible Resistor) in this TV receiver is blown, replace it with the specified.

When replacing a high wattage resistor (Oxide Metal Film Resistor, over 1W), keep the resistor 10mm away from PCB.

Keep wires away from high voltage or high temperature parts.

Before returning the receiver to the customer,

always perform an **AC leakage current check** on the exposed metallic parts of the cabinet, such as antennas, terminals, etc., to be sure the set is safe to operate without damage of electrical shock.

Leakage Current Cold Check(Antenna Cold Check)

With the instrument AC plug removed from AC source, connect an electrical jumper across the two AC plug prongs. Place the AC switch in the on position, connect one lead of ohm-meter to the AC plug prongs tied together and touch other ohm-meter lead in turn to each exposed metallic parts such as antenna terminals, phone jacks, etc.

If the exposed metallic part has a return path to the chassis, the measured resistance should be between $1\text{M}\Omega$ and $5.2\text{M}\Omega$.

When the exposed metal has no return path to the chassis the reading must be infinite.

An other abnormality exists that must be corrected before the receiver is returned to the customer.

Leakage Current Hot Check (See below Figure)

Plug the AC cord directly into the AC outlet.

Do not use a line Isolation Transformer during this check.

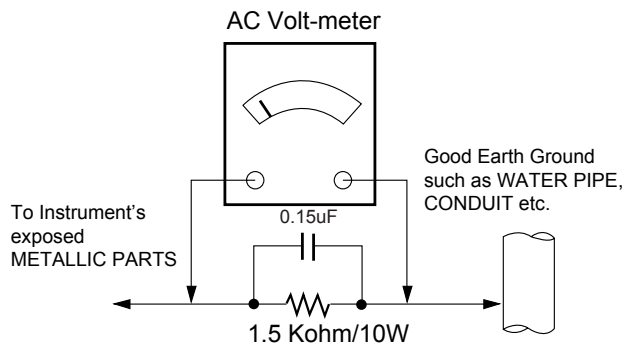
Connect 1.5K/10watt resistor in parallel with a 0.15uF capacitor between a known good earth ground (Water Pipe, Conduit, etc.) and the exposed metallic parts.

Measure the AC voltage across the resistor using AC voltmeter with 1000 ohms/volt or more sensitivity.

Reverse plug the AC cord into the AC outlet and repeat AC voltage measurements for each exposed metallic part. Any voltage measured must not exceed 0.75 volt RMS which corresponds to 0.5mA.

In case any measurement is out of the limits specified, there is possibility of shock hazard and the set must be checked and repaired before it is returned to the customer.

Leakage Current Hot Check circuit



SERVICING PRECAUTIONS

CAUTION: Before servicing receivers covered by this service manual and its supplements and addenda, read and follow the **SAFETY PRECAUTIONS** on page 3 of this publication.

NOTE: If unforeseen circumstances create conflict between the following servicing precautions and any of the safety precautions on page 3 of this publication, always follow the safety precautions. Remember: Safety First.

General Servicing Precautions

1. Always unplug the receiver AC power cord from the AC power source before;
 - a. Removing or reinstalling any component, circuit board module or any other receiver assembly.
 - b. Disconnecting or reconnecting any receiver electrical plug or other electrical connection.
 - c. Connecting a test substitute in parallel with an electrolytic capacitor in the receiver.**CAUTION:** A wrong part substitution or incorrect polarity installation of electrolytic capacitors may result in an explosion hazard.

2. Test high voltage only by measuring it with an appropriate high voltage meter or other voltage measuring device (DVM, FETVOM, etc) equipped with a suitable high voltage probe. Do not test high voltage by "drawing an arc".
3. Do not spray chemicals on or near this receiver or any of its assemblies.
4. Unless specified otherwise in this service manual, clean electrical contacts only by applying the following mixture to the contacts with a pipe cleaner, cotton-tipped stick or comparable non-abrasive applicator; 10% (by volume) Acetone and 90% (by volume) isopropyl alcohol (90%-99% strength)
CAUTION: This is a flammable mixture.
Unless specified otherwise in this service manual, lubrication of contacts is not required.
5. Do not defeat any plug/socket B+ voltage interlocks with which receivers covered by this service manual might be equipped.
6. Do not apply AC power to this instrument and/or any of its electrical assemblies unless all solid-state device heat sinks are correctly installed.
7. Always connect the test receiver ground lead to the receiver chassis ground before connecting the test receiver positive lead.
Always remove the test receiver ground lead last.
8. Use with this receiver only the test fixtures specified in this service manual.

CAUTION: Do not connect the test fixture ground strap to any heat sink in this receiver.

Electrostatically Sensitive (ES) Devices

Some semiconductor (solid-state) devices can be damaged easily by static electricity. Such components commonly are called *Electrostatically Sensitive (ES) Devices*. Examples of typical ES devices are integrated circuits and some field-effect transistors and semiconductor "chip" components. The following techniques should be used to help reduce the incidence of component damage caused by static by static electricity.

1. Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging wrist strap device, which should be removed to prevent potential shock reasons prior to applying power to the

unit under test.

2. After removing an electrical assembly equipped with ES devices, place the assembly on a conductive surface such as aluminum foil, to prevent electrostatic charge buildup or exposure of the assembly.
3. Use only a grounded-tip soldering iron to solder or unsolder ES devices.
4. Use only an anti-static type solder removal device. Some solder removal devices not classified as "anti-static" can generate electrical charges sufficient to damage ES devices.
5. Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ES devices.
6. Do not remove a replacement ES device from its protective package until immediately before you are ready to install it. (Most replacement ES devices are packaged with leads electrically shorted together by conductive foam, aluminum foil or comparable conductive material).
7. Immediately before removing the protective material from the leads of a replacement ES device, touch the protective material to the chassis or circuit assembly into which the device will be installed.
CAUTION: Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.
8. Minimize bodily motions when handling unpackaged replacement ES devices. (Otherwise harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity sufficient to damage an ES device.)

General Soldering Guidelines

1. Use a grounded-tip, low-wattage soldering iron and appropriate tip size and shape that will maintain tip temperature within the range or 500 $^{\circ}$ F to 600 $^{\circ}$ F.
2. Use an appropriate gauge of RMA resin-core solder composed of 60 parts tin/40 parts lead.
3. Keep the soldering iron tip clean and well tinned.
4. Thoroughly clean the surfaces to be soldered. Use a mall wire-bristle (0.5 inch, or 1.25cm) brush with a metal handle. Do not use freon-propelled spray-on cleaners.
5. Use the following unsoldering technique
 - a. Allow the soldering iron tip to reach normal temperature. (500 $^{\circ}$ F to 600 $^{\circ}$ F)
 - b. Heat the component lead until the solder melts.
 - c. Quickly draw the melted solder with an anti-static, suction-type solder removal device or with solder braid.
CAUTION: Work quickly to avoid overheating the circuitboard printed foil.
6. Use the following soldering technique.
 - a. Allow the soldering iron tip to reach a normal temperature (500 $^{\circ}$ F to 600 $^{\circ}$ F)
 - b. First, hold the soldering iron tip and solder the strand against the component lead until the solder melts.
 - c. Quickly move the soldering iron tip to the junction of the component lead and the printed circuit foil, and hold it there only until the solder flows onto and around both the component lead and the foil.
CAUTION: Work quickly to avoid overheating the circuit board printed foil.
 - d. Closely inspect the solder area and remove any excess or splashed solder with a small wire-bristle brush.

IC Remove/Replacement

Some chassis circuit boards have slotted holes (oblong) through which the IC leads are inserted and then bent flat against the circuit foil. When holes are the slotted type, the following technique should be used to remove and replace the IC. When working with boards using the familiar round hole, use the standard technique as outlined in paragraphs 5 and 6 above.

Removal

1. Desolder and straighten each IC lead in one operation by gently prying up on the lead with the soldering iron tip as the solder melts.
2. Draw away the melted solder with an anti-static suction-type solder removal device (or with solder braid) before removing the IC.

Replacement

1. Carefully insert the replacement IC in the circuit board.
2. Carefully bend each IC lead against the circuit foil pad and solder it.
3. Clean the soldered areas with a small wire-bristle brush.
(It is not necessary to reapply acrylic coating to the areas).

"Small-Signal" Discrete Transistor

Removal/Replacement

1. Remove the defective transistor by clipping its leads as close as possible to the component body.
2. Bend into a "U" shape the end of each of three leads remaining on the circuit board.
3. Bend into a "U" shape the replacement transistor leads.
4. Connect the replacement transistor leads to the corresponding leads extending from the circuit board and crimp the "U" with long nose pliers to insure metal to metal contact then solder each connection.

Power Output, Transistor Device

Removal/Replacement

1. Heat and remove all solder from around the transistor leads.
2. Remove the heat sink mounting screw (if so equipped).
3. Carefully remove the transistor from the heat sink of the circuit board.
4. Insert new transistor in the circuit board.
5. Solder each transistor lead, and clip off excess lead.
6. Replace heat sink.

Diode Removal/Replacement

1. Remove defective diode by clipping its leads as close as possible to diode body.
2. Bend the two remaining leads perpendicular y to the circuit board.
3. Observing diode polarity, wrap each lead of the new diode around the corresponding lead on the circuit board.
4. Securely crimp each connection and solder it.
5. Inspect (on the circuit board copper side) the solder joints of the two "original" leads. If they are not shiny, reheat them and if necessary, apply additional solder.

Fuse and Conventional Resistor

Removal/Replacement

1. Clip each fuse or resistor lead at top of the circuit board hollow stake.
2. Securely crimp the leads of replacement component around notch at stake top.
3. Solder the connections.

CAUTION: Maintain original spacing between the replaced component and adjacent components and the circuit board to prevent excessive component temperatures.

Circuit Board Foil Repair

Excessive heat applied to the copper foil of any printed circuit board will weaken the adhesive that bonds the foil to the circuit board causing the foil to separate from or "lift-off" the board. The following guidelines and procedures should be followed whenever this condition is encountered.

At IC Connections

To repair a defective copper pattern at IC connections use the following procedure to install a jumper wire on the copper pattern side of the circuit board. (Use this technique only on IC connections).

1. Carefully remove the damaged copper pattern with a sharp knife. (Remove only as much copper as absolutely necessary).
2. Carefully scratch away the solder resist and acrylic coating (if used) from the end of the remaining copper pattern.
3. Bend a small "U" in one end of a small gauge jumper wire and carefully crimp it around the IC pin. Solder the IC connection.
4. Route the jumper wire along the path of the out-away copper pattern and let it overlap the previously scraped end of the good copper pattern. Solder the overlapped area and clip off any excess jumper wire.

At Other Connections

Use the following technique to repair the defective copper pattern at connections other than IC Pins. This technique involves the installation of a jumper wire on the component side of the circuit board.

1. Remove the defective copper pattern with a sharp knife.
Remove at least 1/4 inch of copper, to ensure that a hazardous condition will not exist if the jumper wire opens.
2. Trace along the copper pattern from both sides of the pattern break and locate the nearest component that is directly connected to the affected copper pattern.
3. Connect insulated 20-gauge jumper wire from the lead of the nearest component on one side of the pattern break to the lead of the nearest component on the other side.
Carefully crimp and solder the connections.
CAUTION: Be sure the insulated jumper wire is dressed so the it does not touch components or sharp edges.

SPECIFICATION

NOTE : Specifications and others are subject to change without notice for improvement.

1. Application Range.

This spec sheet is applied to the 37"/42"/47"/52" LCD TV used LP81A chassis.

2. Specification

Each part is tested as below without special appointment

- 2.1 Temperature : 25±5°C(77±9°F), CST : 40±5°C
- 2.2 Relative Humidity : 65±10%
- 2.3 Power Voltage : Standard input voltage
(100~240V@ 50/60Hz)
 - Standard Voltage of each products is marked by models
- 2.4 Specification and performance of each parts are followed each drawing and specification by part number in accordance with BOM .
- 2.5 The receiver must be operated for about 20 minutes prior to the adjustment.

3. Test method

- 3.1 Performance : LGE TV test method followed.
- 3.2 Demanded other specification
Safety : UL, CSA, IEC specification
- 3.3 EMC : FCC, ICES, IEC specification

4. General Specification(TV)

No	Item	Specification	Measurement	Result	Remark
1.	Display Screen Device	37" wide Color Display Module 42" wide Color Display Module 47" wide Color Display Module 52" wide Color Display Module			Resolution:1366X768(HD) Resolution:1366X768(HD)/1920*1080(FHD) Resolution:1366X768(HD)/1920*1080(FHD) Resolution:1920X1080(FHD)
2.	Aspect Ratio	16:9			
3.	LCD Module	37" TFT WXGA LCD 42" TFT WXGA LCD 47" TFT WXGA LCD 42" TFT WUXGA LCD 47" TFT WUXGA LCD 52" TFT WUXGA LCD			37" HD MAKER :LPL 42" HD MAKER :AUO, LPL 47" HD MAKER :LPL 42" FHD MAKER : LPL 47" FHD MAKER : LPL 52" FHD MAKER : SHARP
4.	Operating Environment	1) Temp. : 0 ~ 40 deg 2) Humidity : 0 ~ 85%			LGE SPEC
5.	Storage Environment	1) Temp. : -20 ~ 60 deg 2) Humidity : 0 ~ 85 %			
6.	Input Voltage	AC100 ~ 240V, 50/60Hz			

No	Item	Specification			Measurement	Result	Remark
7.	Power Consumption	Power on (Blue) : LG30/LG50					Volume: 1/8 volume of sound distortion point
		Power on (White) : LG60					
		≤ TBD	37"	HD			
		≤ 250W	42"	HD			
		≤ 230W		FHD			
		≤ 320W	47"	HD			
		≤ 310W		FHD			
		≤ 350W	52"	FHD			
8	LCD Module (Maker : AUO, CMO, CPT, LPL, SHARP)	St-By (Red) ≤ 1.0 W (All)					LG60:St-by Light condition
		Maker		Inch	(H)x(V)x(D)	unit	Remark
		AUO(HD)	Outline Dimension	42"	983 x 576 x 52.7	mm	[with inverter]
			Pixel Pitch		0.681 x 0.681	mm	
			Back Light		18 CCFL	mm	
		CMO (FHD)	Outline Dimension	42"	-	mm	
			Pixel Pitch		-	mm	
			Back Light		-	mm	
		LPL(HD)	Outline Dimension	37"	877 x 516.8 x 55.5	mm	[with inverter]
			Pixel Pitch		0.200 x 0.600	mm	
			Back Light		16 EEFL	mm	
			Outline Dimension	42"	983 x 576 x 51	mm	[with inverter]
			Pixel Pitch		0.227 x 0.681	mm	
			Back Light			mm	
			Outline Dimension	47"	1096 x 640 x 51	mm	[with inverter]
			Pixel Pitch		0.76125 x 0.76125	mm	
			Back Light			mm	
		LPL(FHD)	Outline Dimension	42"	983 x 576 x 47.3/(51)	mm	[w/o inverter]/(with inverter)
			Pixel Pitch		0.4845 x 0.4845	mm	
			Back Light			mm	
			Outline Dimension	47"	1096 x 640 x 50/(51)	mm	[w/o inverter]/(with inverter)
			Pixel Pitch		0.5415 x 0.5415	mm	
			Back Light			mm	
		SHARP (FHD)	Outline Dimension	52"	1219.0x706.7x64.64	mm	(W) x (H) x (D) (H) x (V)
			Pixel Pitch		0.600 x 0.600	mm	
			Back Light		24CCFL		
		Display Colors			-	-	
		Coating			3H,AG/ 2H, AG		LPL,CMO,AUO / Sharp

5. Chrominance & Luminance Specification

No	Item			Min	Typ	Max	Unit	Maker	Remark
1	Luminance (W/O PC mode)			400	500		cd/m ²	AUO 42" HD	-50cm from the surface
				400	500			LPL 37" HD	- Full White Pattern
				400	500			LPL 42" HD	
				400	450			LPL 47" HD	
				400	500			LPL 42" FHD	
				400	500			LPL 47" FHD	
				360	450			SHARP 52" FHD	
2	Color Coordinate	White	X	Typ.	0.280	Typ.		AUO 42" (HD) T420XW01-VB	42LG30R-TA
			Y	-0.03	0.290	+0.03			
		Red	X		0.640				
			Y		0.330				
		Green	X		0.290				
			Y		0.600				
		Blue	X		0.150				
			Y		0.060				
		White	X	Typ.	0.279	Typ.		LPL 37" (HD) LC370WXN-SAA1	37LG30R/37LG60UR
			Y	-0.03	0.292	+0.03			
		Red	X		0.636				
			Y		0.335				
		Green	X		0.284				
			Y		0.610				
		Blue	X		0.144				
			Y		0.063				
		White	X	Typ.	0.279	Typ.		LPL 42" (HD)	42LG30RA-TA
			Y	-0.03	0.292	+0.03			
		Red	X		0.635				
			Y		0.344				
		Green	X		0.286				
			Y		0.614				
		Blue	X		0.146				
			Y		0.061				
		White	X	Typ.	0.270.	Typ.		LPL47" (HD)	
			Y	-0.03	0.292	+0.03			
		Red	X		0.638				
			Y		0.342				
		Green	X		0.296				
			Y		0.615				
		Blue	X		0.144				
			Y		0.064				

No	Item			Min	Typ	Max	Unit	Maker	Remark																	
		White	X	Typ. -0.03	0.279	Typ. +0.03		LPL 42" (FHD) LC420WUE-SAB1 LC420WUN-SAB1	42LG60FR-TA																	
			Y		0.292				42LG50FR-TA																	
		Red	X	0.640		LPL 47" (FHD) LC470WUE-SAB1 LC470WUN-SAB1			47LG60FR-MA 47LG50FR-TA																	
			Y	0.335																						
		Green	X	0.289							SHARP 52" (FHD) LK520D3LZ17	52LG50FR-TA														
			Y	0.610																						
		Blue	X	0.144										SHARP 52" (FHD) LK520D3LZ17	52LG50FR-TA											
			Y	0.066																						
		White	X	Typ. -0.03				0.279								Typ. +0.03		SHARP 52" (FHD) LK520D3LZ17	52LG50FR-TA							
			Y					0.292																		
		Red	X	0.640				SHARP 52" (FHD) LK520D3LZ17	52LG50FR-TA																	
			Y	0.335																						
		Green	X	0.289								SHARP 52" (FHD) LK520D3LZ17				52LG50FR-TA										
			Y	0.610																						
		Blue	X	0.144											SHARP 52" (FHD) LK520D3LZ17					52LG50FR-TA						
			Y	0.066																						
		White	X	Typ. -0.03														0.272	Typ. +0.03			SHARP 52" (FHD) LK520D3LZ17	52LG50FR-TA			
			Y															0.277								
		Red	X	0.640					SHARP 52" (FHD) LK520D3LZ17									52LG50FR-TA								
			Y	0.330																						
		Green	X	0.280												SHARP 52" (FHD) LK520D3LZ17			52LG50FR-TA							
			Y	0.600																						
		Blue	X	0.150																SHARP 52" (FHD) LK520D3LZ17				52LG50FR-TA		
			Y	0.060																						
3	Contrast ratio (W/O PC mode)			1000:1			1500:1																		AUO 42" (HD)	
				840:1/800:1			1200:1																		LPL 32"/37" (HD)	
				800:1	1200:1													LPL 42" (HD)								
				700:1	1200:1													LPL 47" (HD)								
				TBD	1500:1					LPL 42"/47" (FHD)																
				1000:1	1500:1					SHARP 52" (FHD)																
4	Luminance Variation						1.3 (1.25)			All w/o Sharp 52"			(Sharp 52")													

6. SET Optical Feature

6.1. General feature

- Measurement Condition: Full white/ Vivid => Measure the black luminance after 30 seconds.
- C/R is excepted for PC mode

No	Parameter		Symbol	Value		Unit	Remark
				Min	Typ		
1	37 inch(HD) LPL	Contrast Ratio	Dynamic CR	9000:1	12000:1		
		Surface Luminance, white	LWH (AV/Component/HDMI)	360	450		Cd/m2
			LWH (PC)	250			Cd/m2
2	42 inch(HD) AUO	Contrast Ratio	Dynamic CR	9000:1	12000:1		
		Surface Luminance, white	LWH (AV/Component/HDMI)	360	450		Cd/m2
			LWH(PC)	250			Cd/m2
3	42 inch(HD) LPL	Contrast Ratio	Dynamic CR	9000:1	12000:1		
		Surface Luminance, white	LWH (AV/Component/HDMI)	360	450		Cd/m2
			LWH(PC)	250			Cd/m2
4	47 inch(HD) LPL	Contrast Ratio	Dynamic CR	9000:1	12000:1		
		Surface Luminance, white	LWH(AV/Component/HDMI)	360	450		Cd/m2
			LWH(PC)	250			Cd/m2
5	42 inch(FHD) LPL	Contrast Ratio	Dynamic CR	9000:1	12000:1		
				TBD	15000 : 1		For 50/60/70 Tool
		Surface Luminance, white	LWH(AV/Component/HDMI)	360	450		Cd/m2
			LWH(PC)	250			Cd/m2
6	47 inch(FHD) LPL	Contrast Ratio	Dynamic CR	9000:1	12000:1		
				TBD	15000 : 1		For 50/60/70 Tool
		Surface Luminance, white	LWH(AV/Component/HDMI)	360	450		Cd/m2
			LWH(PC)	250			Cd/m2
7	52 inch(FHD) Sharp	Contrast Ratio	Dynamic CR	9000:1	12000:1		
				TBD	15000 : 1		For 50/60/70 Tool
		Surface Luminance, white	LWH(AV/Component/HDMI)	320	400	Cd/m2	
			LWH(PC)	250		Cd/m2	

7. Component Video Input (Y, Pb, Pr)

No.	Specification				Remark
	Resolution	H-freq(kHz)	V-freq(Hz)	Pixel clock	
1.	720*480	15.73	59.94	13.500	SDTV, DVD 480I(525I)
2.	720*480	15.75	60.00	13.514	SDTV, DVD 480I(525I)
3.	720*576	15.625	50.00	13.500	SDTV, DVD 576I(625I) 50Hz
4.	720*480	31.47	59.94	27.000	SDTV 480P
5.	720*480	31.50	60.00	27.027	SDTV 480P
6.	720*576	31.25	50.00	27.000	SDTV 576P 50Hz
7.	1280*720	44.96	59.94	74.176	HDTV 720P
8.	1280*720	45.00	60.00	74.250	HDTV 720P
9.	1280*720	37.50	50.00	74.25	HDTV 720P 50Hz
10.	1920*1080	28.125	50.00	74.250	HDTV 1080I 50Hz,
11.	1920*1080	33.72	59.94	74.176	HDTV 1080I
12.	1920*1080	33.75	60.00	74.25	HDTV 1080I
13.	1920*1080	56.25	50	148.5	HDTV 1080P
14.	1920*1080	67.432	59.94	148.350	HDTV 1080P
15.	1920*1080	67.5	60.00	148.5	HDTV 1080P

8. RGB Input (Analog PC)

No.	Resolution	H-freq(kHz)	V-freq(Hz)	Pixel clock(MHz)	Proposed	Remark
1.	640*350	31.468	70.80	25.17	EGA	
2	720*400	31.469	70.08	28.32	DOS	
3.	640*480	31.469	59.94	25.17	VESA(VGA)	
4	800*600	37.879	60.31	40	VESA(SVGA)	
5	1024*768	48.363	60	65	VESA(XGA)	
6	1280*768	47.776	59.87	79.5	VESA(WXGA)	
7	1360*768	47.72	59.799	84.75	VESA(WXGA)	
8	1366*768	47.7	60	84.62	VESA(WXGA)	
9	1280*1024	63.668	59.895	109.00	SXGA	Only FHD
10	1400*1050	65.317	59.978	121.75	SXGA	Only FHD
11	1600*1200	74.537	59.869	161.00	UXGA	Only FHD
12	1920*1080	66.587	59.934	138.50	WUXGA (Reduced Blanking)	Only FHD

9. HDMI Input (PC-Spec. out but display correctly at only HDMI/DVI IN 1 via DVI to HDMI cable)

No.	Resolution	H-freq(kHz)	V-freq(Hz)	Pixel clock(MHz)	Proposed	Remark
1.	720x400	31.468	70.08	28.32		
2.	640x480	31.469	59.94	25.17	VESA(VGA)	
3.	800x600	37.879	60.31	40.00	VESA(SVGA)	
4	1024x768	48.363	60.00	65.00	VESA(XGA)	
5	1280x768	47.776	59.87	79.5	VESA(WXGA)	
6	1360x768	47.72	59.799	84.62	VESA(WXGA)	
7	1366x768	47.7	60	84.62	VESA(WXGA)	
8	1280x1024	63.595	60.0	108.875	SXGA	Only FHD
9	1400x1050	65.160	60.0	122.50	SXGA	Only FHD
10	1600x1200	74.077	60.0	130.375	UXGA	Only FHD
11	1920x1080	66.647	59.988	138.625	WUXGA	Only FHD

10. HDMI input (DTV)

No.	Resolution	H-freq(kHz)	V-freq(Hz)	Pixel clock(MHz)	Proposed	Remark
1	720*480	31.47	59.94	27	SDTV 480P	Support(not spec)
2	720*480	31.5	60	27.027	SDTV 480P	support(not spec)
3	720*576	31.25	50	27	SDTV 576P	support(not spec)
4	1280*720	44.96	59.94	74.176	HDTV 720P	
5	1280*720	45	60	74.25	HDTV 720P	
6	1280*720	37.5	50	74.25	HDTV 720P	
7	1920*1080	28.125	50	74.25	HDTV 1080I	
8	1920*1080	33.72	59.94	74.176	HDTV 1080I	
9	1920*1080	33.75	60	74.25	HDTV 1080I	
10	1920*1080	56.25	50	148.5	HDTV 1080P	
11	1920*1080	67.432	59.94	148.350	HDTV 1080P	
12	1920*1080	67.5	60.00	148.5	HDTV 1080P	
13	1920*1080	27	24	74.25	HDTV 1080P	
14	1920*1080	33.75	30	74.25	HDTV 1080P	

ADJUSTMENT INSTRUCTION

1. Application Range

These instructions are applied to all of the LCD TV, LP81A Chassis.

2. Notice

- 2.1 Because this is not a hot chassis, it is not necessary to use an isolation transformer. However, the use of isolation transformer will help protect test instrument.
- 2.2 Adjustment must be done in the correct order.
- 2.3 The adjustment must be performed in the circumstance of $25\pm5^{\circ}\text{C}$ of temperature and $65\pm10\%$ of relative humidity if there is no specific designation.
- 2.4 The input voltage of the receiver must keep 100~220V, 50/60Hz.
- 2.5 Before adjustment, execute Heat-Run for 15 minutes at RF no signal.

3. Adjustment items

3.1 PCB assembly adjustment items

Download the MSTAR main software (IC801, Mstar ISP Utility)

3.2 SET assembly adjustment items

DDC Data input.
Adjustment of White Balance.
Factoring Option Data input

4. PCB assembly adjustment method (Using MSTAR Download program)

4.1 S/W program download

4.1.1 Preliminary steps

- (1) Download method 1 (PCB Assy)
 - HD



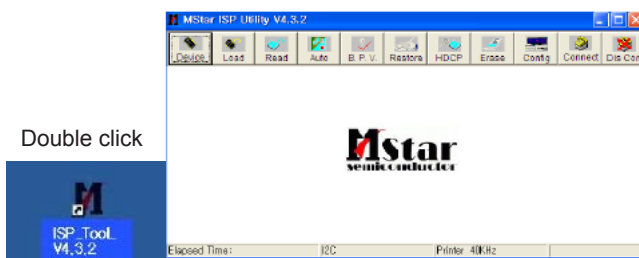
- FHD



- (2) Connect the download jig to D-sub jack

4.1.2 Download steps

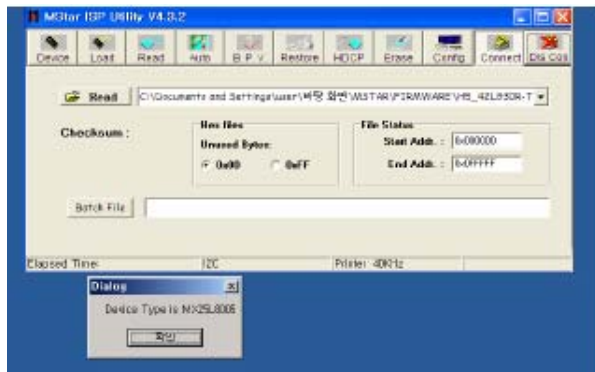
- (1) Execute 'ISP Tool' program in PC, then a main window will be opened



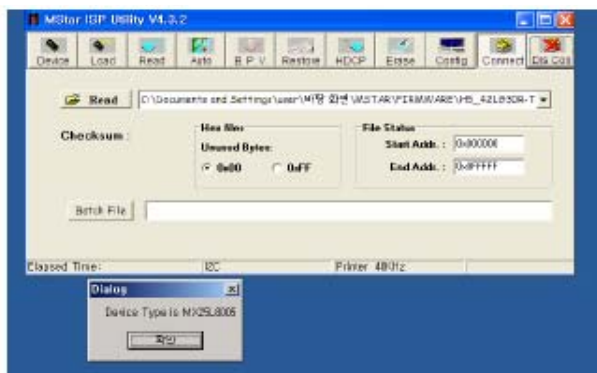
- (2) Click the connect button and confirm "Dialog Box".



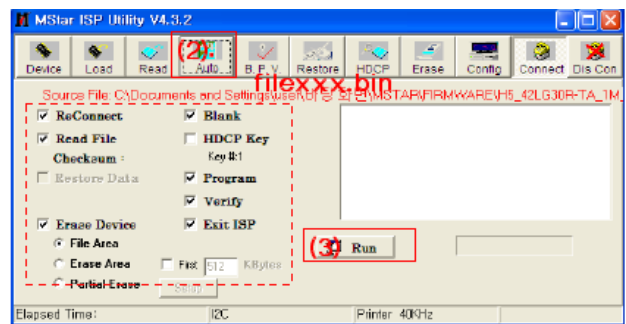
- (3) Click the Config button and Change speed E2PROM Device setting : over the 350KHz



- (4) Read and write bin file
Click "(1)Read" tab, and then load download file(XXXX.bin) by clicking "Read".

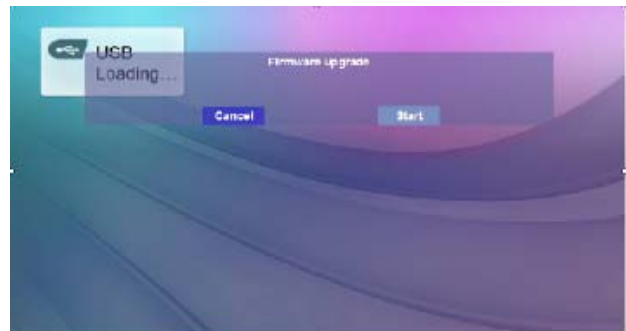
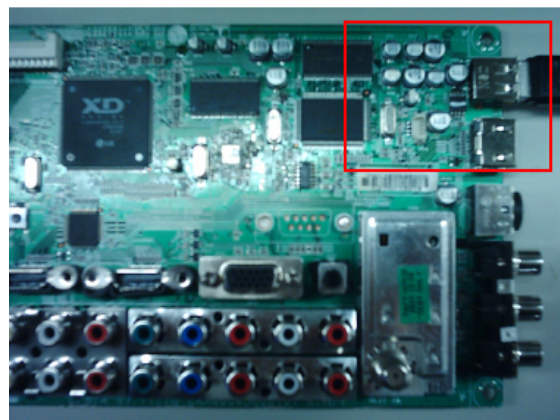


- (5).Click "Auto(2)" tab and set as below
- (6).click "Run(3)".
- (7).After downloading, check "OK(4)" message.

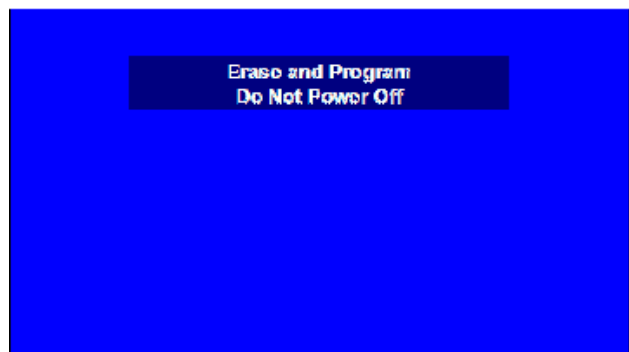


USB DOWNLOAD

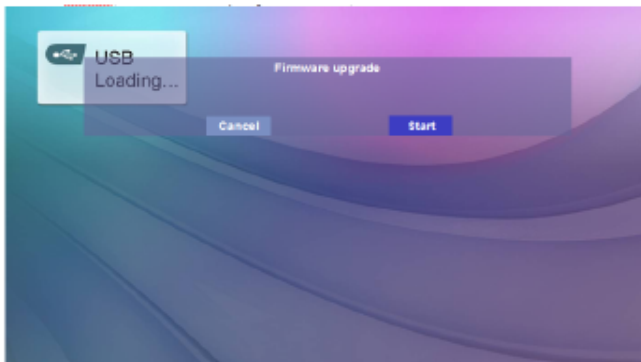
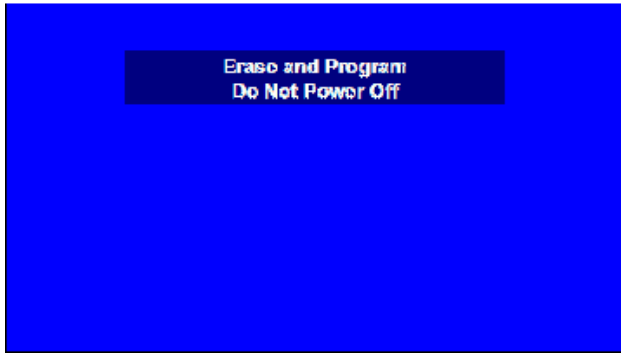
1. Put the USB Stick to the USB socket



2. Automatically detecting update file in USB Stick



3. Select "Start" Button and press "ok" button
Updating is starting.



4. Finishing the version updating, you have to put out USB stick and "AC Power" off
5. After putting "AC Power" on and check updated version on your TV

4.2 ADC Process

- Required Equipments
- Remote controller for adjustment
- MSPG-925F Pattern Generator

4.2.1 Method of Auto RGB Color Balance

- Convert to RGB PC in Input-source
- Input the PC 1024x768 @ 60Hz 1/2 Black & White Pattern(MSPG-925F model:60, pattern:54) into RGB



- Adjust by commanding AUTO_COLOR_ADJUST(0xF1) 0x00 0x02 instruction.

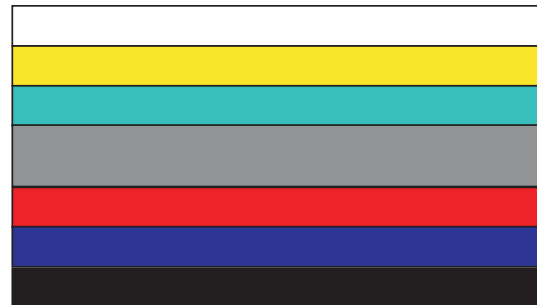
4.2.1.1 Confirmation

- We confirm whether "0xF3 (offset), 0xF4 (gain)" address of EEPROM "0xBC" is "0xAA" or not.
- If "0xF3", "0xF4" address of EEPROM "0xBC" isn't "0xAA", we adjust once more
- We can confirm the ADC values from "0x06~0x0B" addresses in a page "0xBC"
- *Manual ADC process using Service Remocon. After enter Service Mode by pushing "ADJ" key, execute "Auto-RGB" by pushing "_" key at "Auto-RGB".

4.2.2 Component input ADC

4.2.2.1 Component Gain/Offset Adjustment7

- Convert to Component in Input-source
- Input the Component (Which has 720p@60Hz YPbPr signal : 100% Color Bar (MSPG-925F Model : 217 / Pattern: 65) into Component.



- Adjust by commanding AUTO_COLOR_ADJUST (0xF1) 0x00 0x02 instruction

4.2.2.2 Confirmation

- We confirm whether "0xF3 (offset), 0xF4 (gain)" address of EEPROM "0xBC" is "0xAA" or not.
- If "0xF3", "0xF4" address of EEPROM "0xBC" isn't "0xAA", we adjust once more
- We can confirm the ADC values from "0x06~0x0B" addresses in a page "0xBC"
- *Manual ADC process using Service Remocon. After enter Service Mode by pushing "ADJ" key, execute "Auto-RGB" by pushing "_" key at "Auto-RGB".

5. Adjusting the White Balance

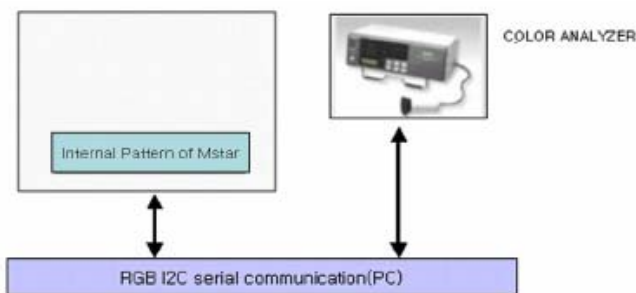
5.1 Purpose and Principle for adjustment of the color temperature

- Purpose : Adjust the color temperature to reduce the deviation of the module color temperature.
- Principle : To adjust the white balance without the saturation,
(Fix the one of R/G/B gain to C0 and decrease the others.)

5.2 Adjustment mode : Two modes of Cool and Warm (Medium data is automatically calibrated by the Cool data)

- Required Equipments
- Remote controller for adjustment
- Color Analyzer : CA100+ or CA-210 or same product
LCD TV(ch : 9),
- Auto W/B adjustment instrument(only for Auto adjustment)

5.3 Connecting diagram of equipment for measuring (For Automatic Adjustment)



- (1) Enter the adjustment mode of DDC
 - Set command delay time : 50ms
 - Enter the DDC adjustment mode at the same time heat-run
 - Maintain the DDC adjustment mode with same condition of Heat-run
 - > Maintain after AC off/on in status of Heat-run pattern display)
- (2) Release the DDC adjustment mode
 - Release the adjust mode after AC off/on or std-by off/on in status of finishing the Hear-run mode
 - Release the Adjust mode when receiving the aging off command(F3 00 00) from adjustment equipment
 - Need to transmit the aging off command to TV set after finishing the adjustment.
 - Check DDC adjust mode release by exit key and release DDC adjust mode
- (3) Enter the adjust mode of white balance
 - Enter the white balance adjustment mode with aging command(F3, 00, FF)

* Luminance min value is 200cd/β≥ in the cool mode(For LCD)

6. Adjustment of White Balance

- Adjustment mode : Two modes (Cool and Warm)
(Medium data is automatically calibrated by the Cool data)
- Color analyzer(CA100+, CA210) should be used in the calibrated ch by CS-1000
(LCD : CH9, PDP : CH10)
- Operate the zero-calibration of the CA100+ or CA-210, then stick sensor to the module when adjusting.
- For manual adjustment, it is also possible by the following sequence.

- 1) Select white pattern of heat-run by pressing "POWER ON" key on remote control for adjustment then operate heat run longer than 15 minutes.
(If not executed this step, the condition for W/B may be different.)
- 2) Push "Exit" key.
- 3) Change to the AV mode by remote control.(Push front-AV or Input key)
- 4) Input external pattern(85% white pattern)
- 5) Push the ADJ key two times (entering White Balance mode)
- 6) Stick the sensor to the center of the screen and select each items (Red/Green/Blue Gain and Offset) using ▲/▼ (CH +/-) key on R/C..
- 7) Adjust R/ G/ B Gain using ◀/▶(VOL+/-) key on R/C.
- 8) Adjust two modes (Cool and Warm)
(Fix the one of R/G/B and change the others)
- 9) When adjustment is completed, Exit adjustment mode using EXIT key on R/C.

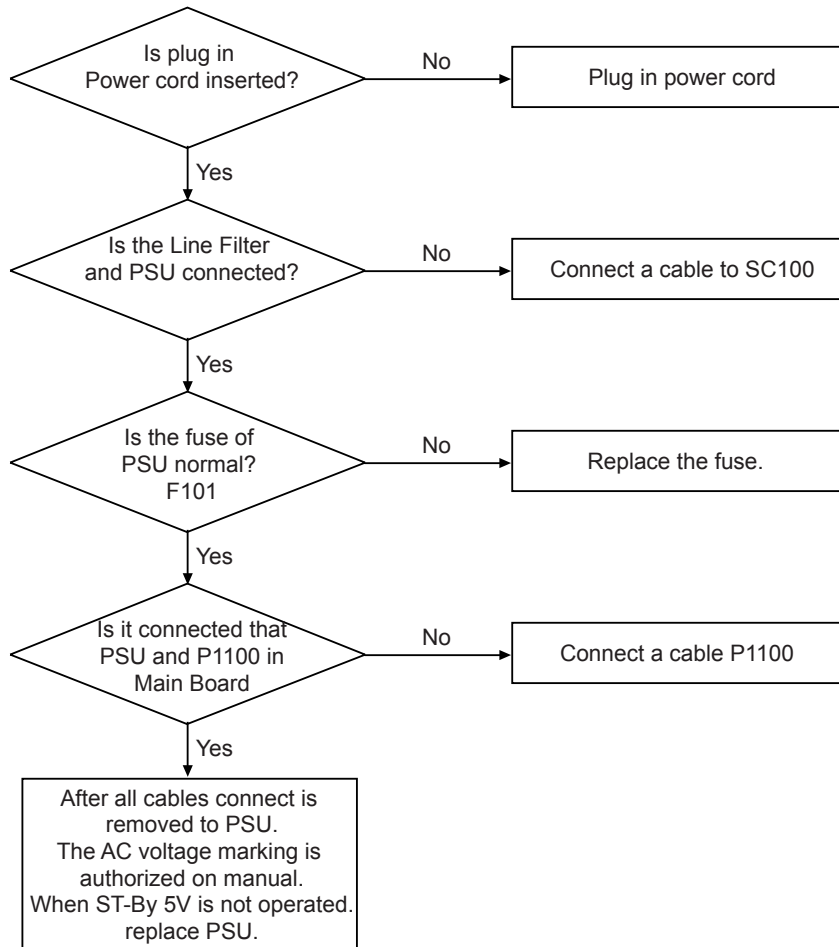
TROUBLE SHOOTING

1. No power

1) Symptom

- 1) It is not discharged minutely from the module.
- 2) Light doesnotcome into the front LED.

2) Check process

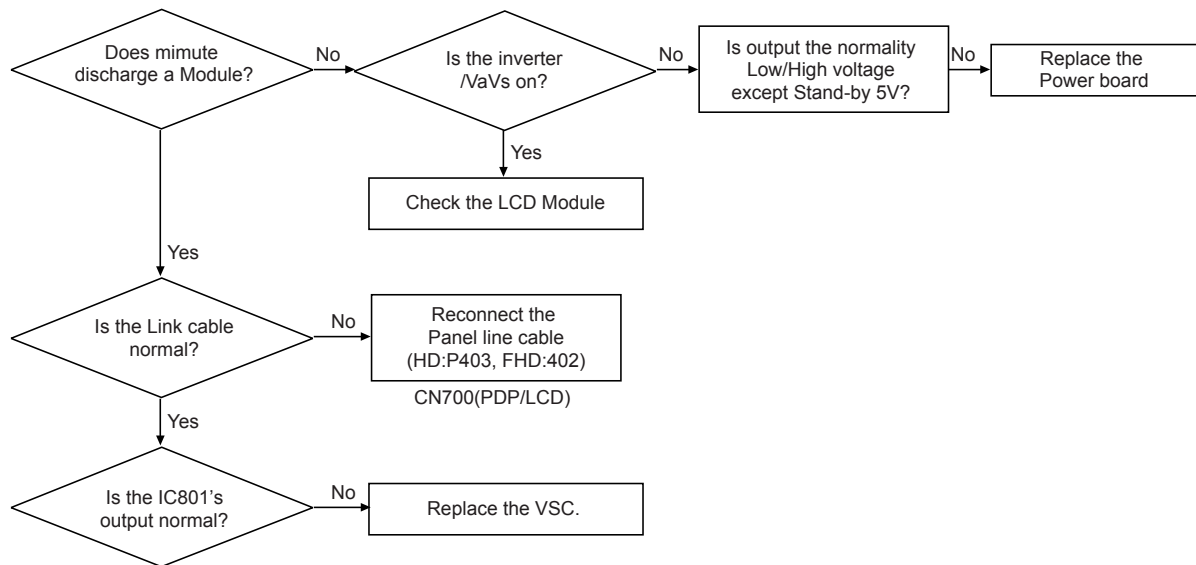


2. No Raster

1) Symptom

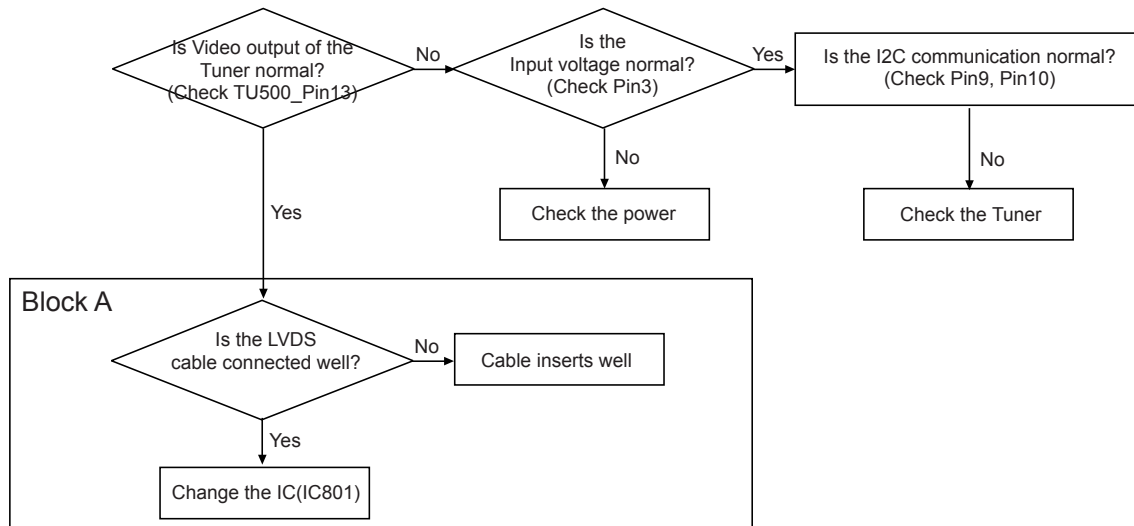
- 1) No OSD and image occur at screen.
- 2) It maintains the condition where the front LED is green

2) Check process

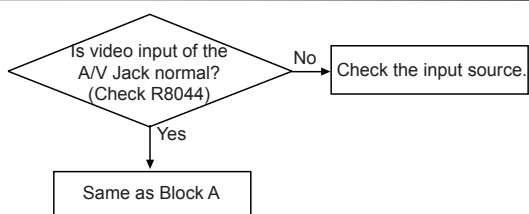


3. Unusual display from RF mode.

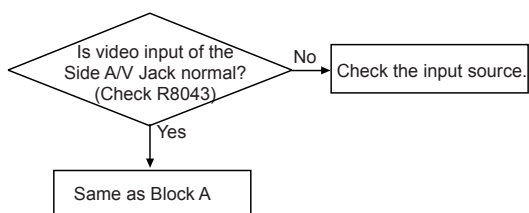
1) Check process



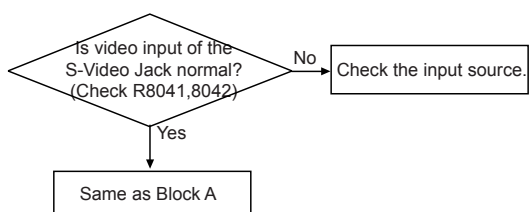
4. Unusual display from rear AV mode



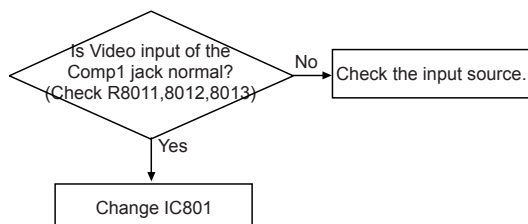
5. Unusual display from Side AV mode.



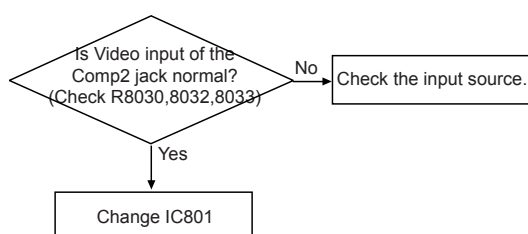
6. Unusual display from Side S-Video mode.



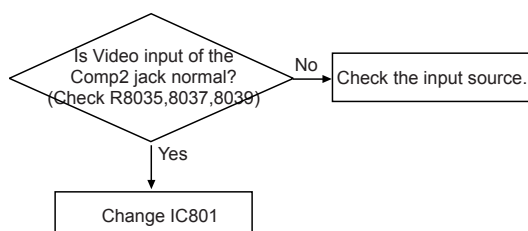
7. Unusual display from component 1 mode.



8. Unusual display from component 2 mode.



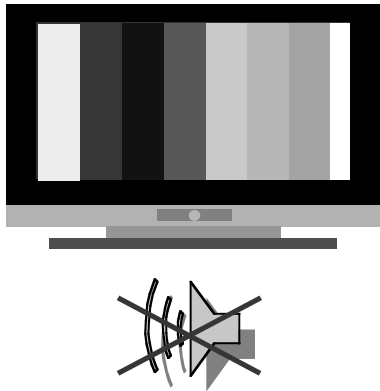
9. Unusual display from RGB mode.



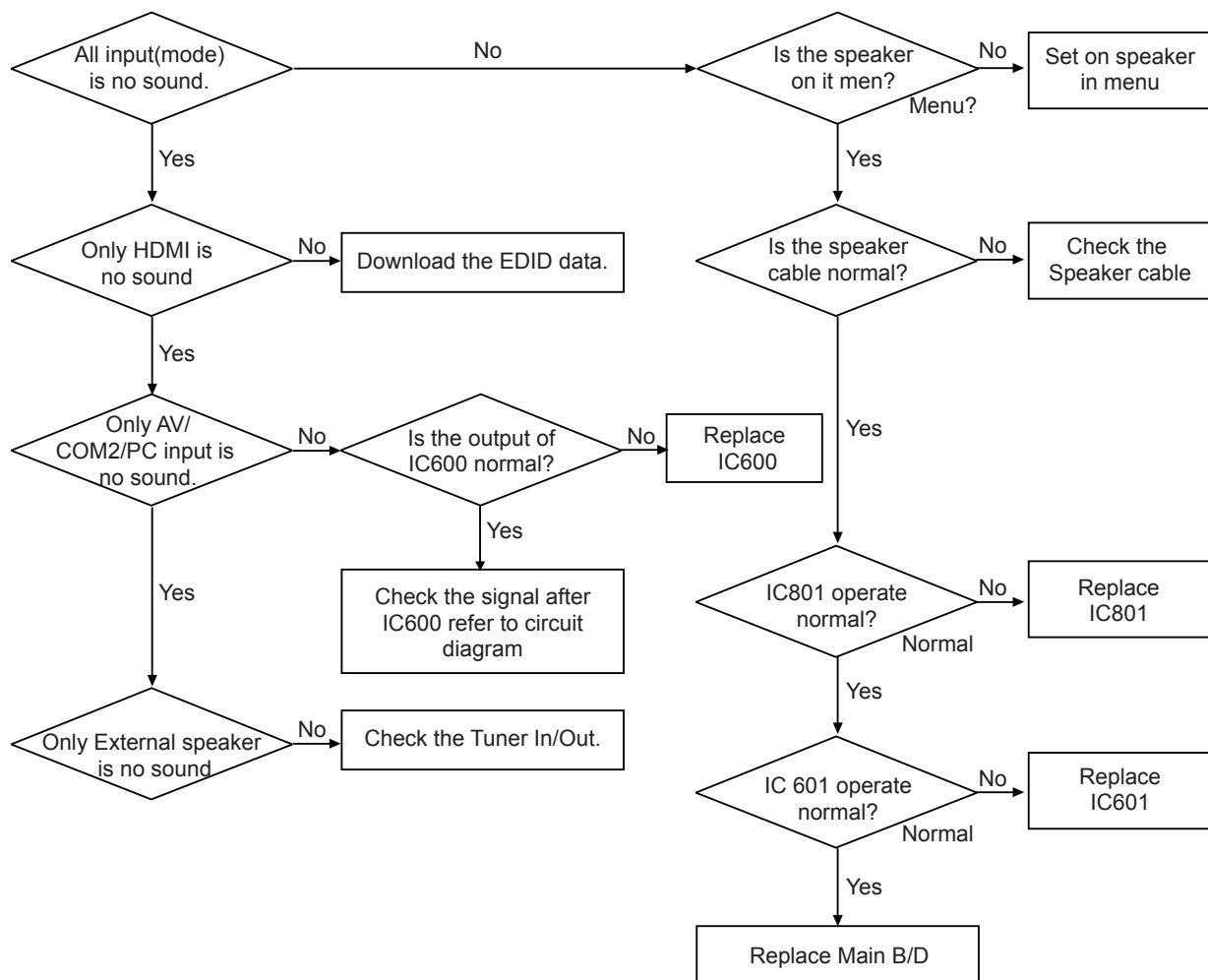
10. No Sound

10-1 Symptom

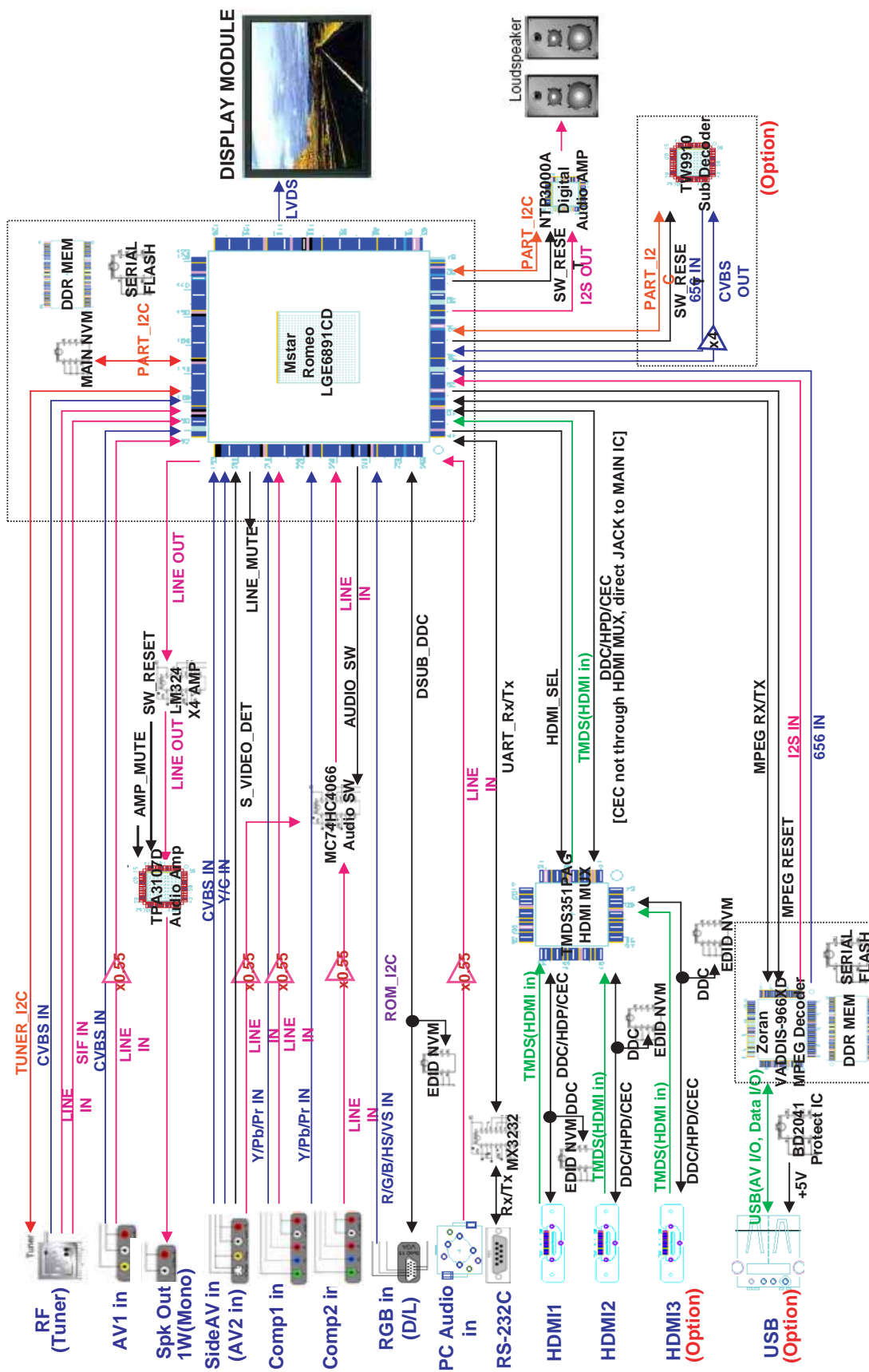
- 1) LED is green.
- 2) Screen display but sound is not output.



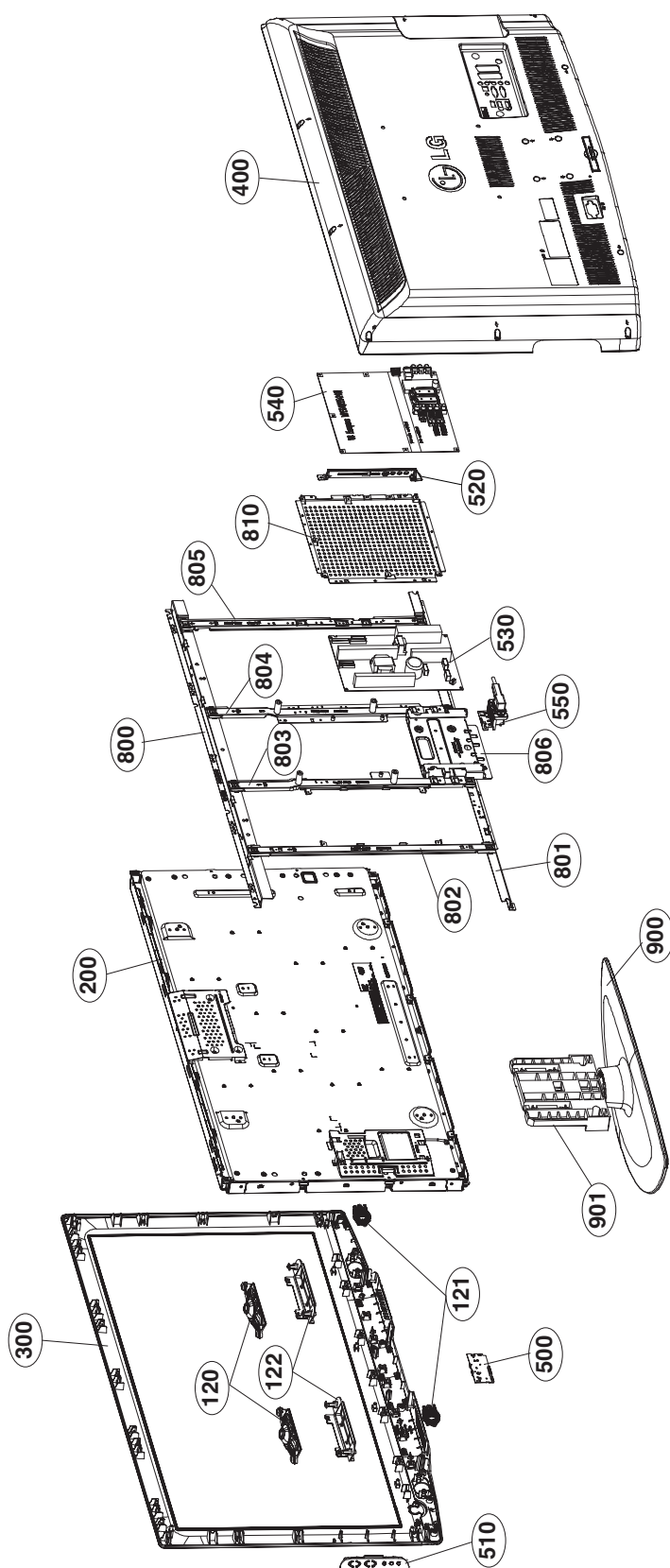
10-2 Check process



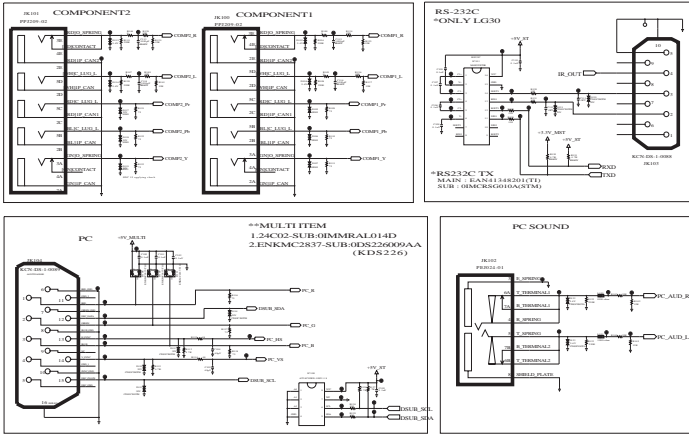
BLOCK DIAGRAM



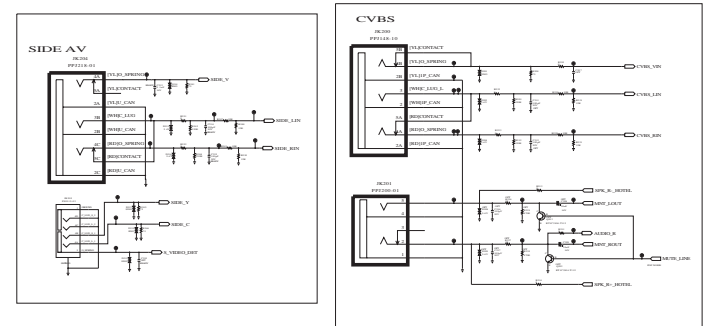
EXPLODED VIEW



INPUT1 : COMP1/2,RS232C,PC

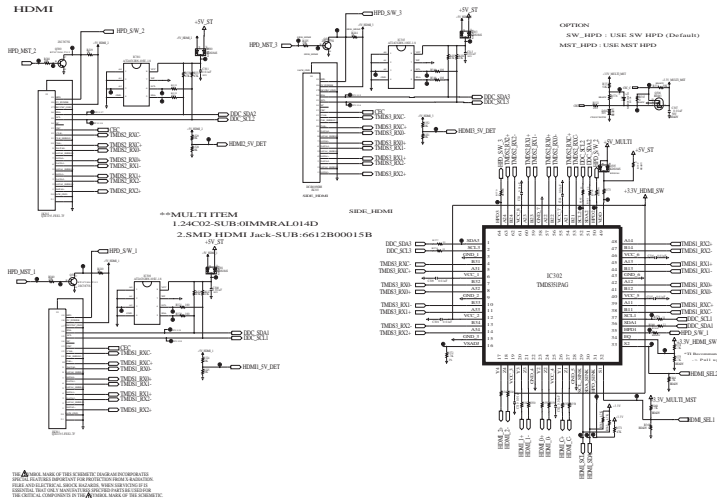


INPUT2 : CVBS,SIDE AV

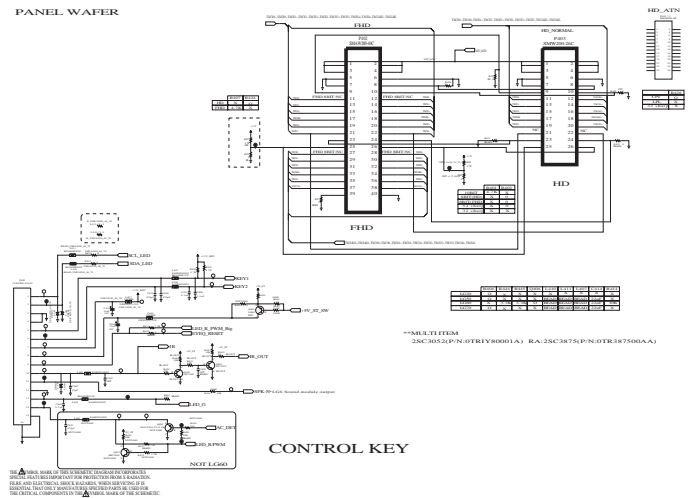


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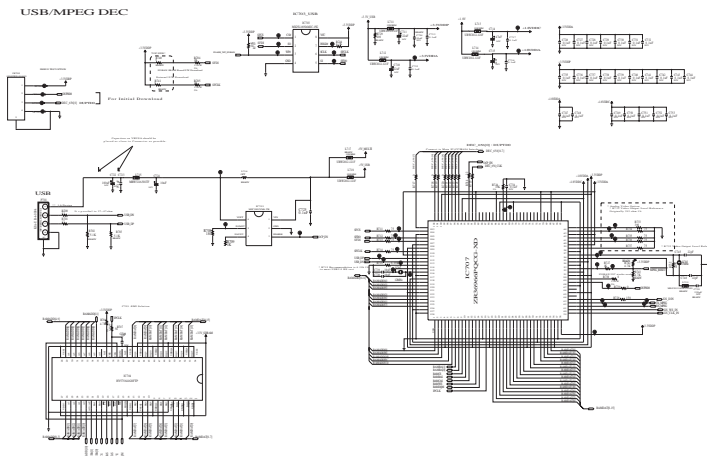


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USB/MPEG DEC

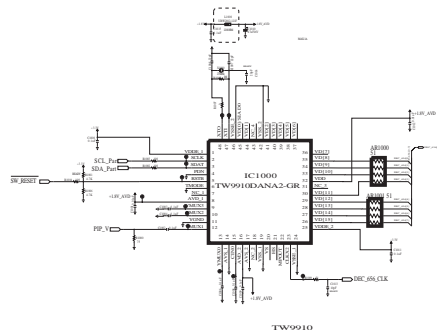
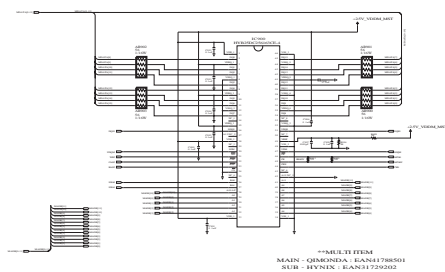


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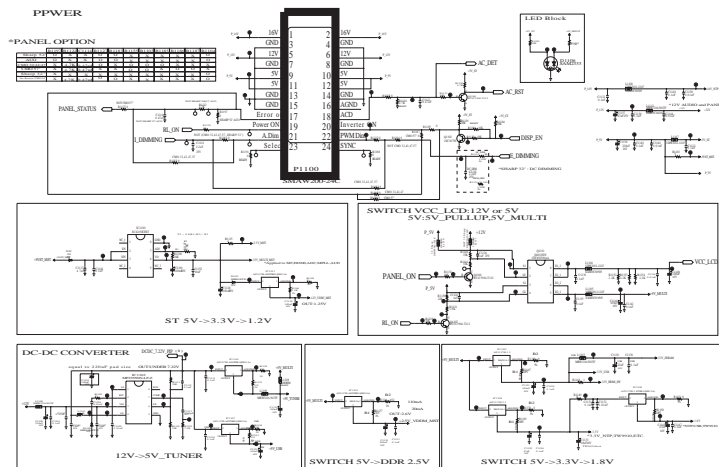
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