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LED TV

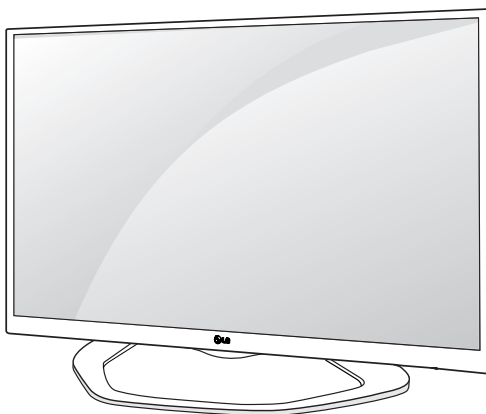
SERVICE MANUAL

CHASSIS : LJ33B

MODEL : 42LA6200 42LA6200-SA

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 $\triangle$ in the Schematic Diagram and Exploded View.

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 1 W), keep the resistor 10 mm 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 M Ω and 5.2 M Ω .

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.

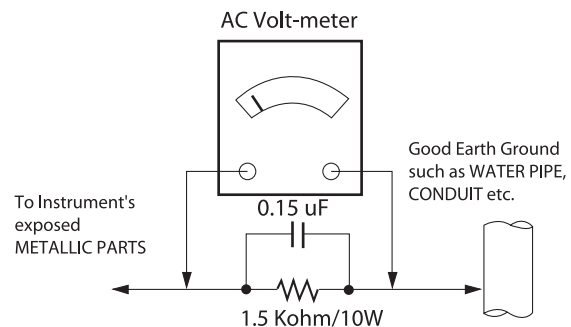
Connect 1.5 K / 10 watt resistor in parallel with a 0.15 μ F capacitor between a known good earth ground (Water Pipe, Conduit, etc.) and the exposed metallic parts.

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 0.5 mA.

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



When 25A is impressed between Earth and 2nd Ground for 1 second, Resistance must be less than 0.1 Ω

*Base on Adjustment standard

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 of 500 °F to 600 °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 1.25 cm) 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 °F to 600 °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 circuit board printed foil.
6. Use the following soldering technique.
 - a. Allow the soldering iron tip to reach a normal temperature (500 °F to 600 °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 all of the 32",42",47",55",60", 65"
LED TV with LJ33B chassis

2. Test condition

Each part is tested as below without special notice.

- 1) Temperature : $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$, CST : $40^{\circ}\text{C} \pm 5^{\circ}\text{C}$
- 2) Relative Humidity: $65\% \pm 10\%$
- 3) Power Voltage
Standard input voltage (100~240V@ 50/60Hz)
* Standard Voltage of each products is marked by models.
- 4) Specification and performance of each parts are followed
each drawing and specification by part number in
accordance with BOM.
- 5) The receiver must be operated for about 20 minutes prior to
the adjustment.

3. Test method

- 1) Performance: LGE TV test method followed
- 2) Demanded other specification
 - Safety : CE, IEC specification
 - EMC: CE, IEC

4. General Specification

No	Item	Specification				Remark
1.	Display Screen Device	32" wide Color Display Module				Resolution: 1366*768 (32LN370B)
		32" wide Color Display Module				Resolution: 1920*1080
		42" wide Color Display Module				Resolution: 1920*1080
		47" wide Color Display Module				Resolution: 1920*1080
		50" wide Color Display Module				Resolution: 1920*1080
		55" wide Color Display Module				Resolution: 1920*1080
		60" wide Color Display Module				Resolution: 1920*1080
2.	Aspect Ratio	16:9				All
3.	LCD Module	32" TFT WUXGA LCD				
		32" TFT WXGA LCD				Only 32LN570B
		42" TFT WUXGA LCD				
		47" TFT WUXGA LCD				
		50" TFT WUXGA LCD				
		55" TFT WUXGA LCD				
		60" TFT WUXGA LCD				
4.	Operating Environment	TFT	1) Temp. : 0 ~ 40 deg 2) Humidity : 0 ~ 85%			LGE SPEC
5.	Storage Environment	TFT	1) Temp. : -20 ~ 60 deg 2) Humidity : 10 ~ 90%			
6.	Input Voltage	AC100 ~ 240V, 50/60Hz				
7.	Power Consumption(Max) = LCD(Module) + Backlight(LED)	FHD T240Hz POLA	60	TBD	W	FPR : LC600DUK-SEF1 [60LA7400 / LA6200-SA]
		FHD T240Hz Edge	55	83.7	W	FPR : LC550EUH-PFF1[55LA7400]
			47	69.2	W	FPR : LC470EUH-PFF1[47LA7400]
		FHD T120Hz POLA	55	TBD	W	FPR : LC550EUJ-SEK1 [55LA6200-SA]
		FHD T120Hz CINEMA	42"	56.4	W	FPR: LC420EUG-PFF1 [42LA6600 / 6900-SA]
			47"	62.4	W	FPR: LC470EUG-PFF1 [47LA6600 / 6900-SA]
			55"	74.3	W	FPR: LC550EUG-PFF1 [55LA6600 / 6900-SA]
		FHD T120Hz Edge	42"	57	W	FPR: LC420EUN-SFF2 [42LA6400-SA]
			47"	68	W	FPR: LC470EUN-SFF2 [47LA6400-SA]
			50"	76	W	FPR: LC500EUN-SFF1 [50LA6400-SA]
			55"	88	W	FPR: LC550EUN-SFF1/2 [55LA6400-SA]
		FHD T120Hz Direct	42"	77	W	FPR : LC420DUE-SFU1 [42LA6200-SA]
			47"	91	W	FPR : LC470DUE-SFU1 [47LA6200-SA]
			50"	108	W	FPR : LC500DUE-SFU1 [50LA6200-SA]
FHD 60Hz Direct	42"	62.34	W	Normal : LC420DUE-SFR1 [42LN5700]		
	47"	91	W	Normal : LC470DUE-SFR1 [47LN5700]		
	HD 60Hz Direct	32	39.2	W	Normal: LC320DXE-SFR1[32LN570B]	

8.	LCD Module	Size	Maker	Inch	(H) × (V) × (D)	
				32"	725.2 x 424.4 x 35.0	LC320DXE-SFR1 [32LN570B]
			42"	947.7 x 546.65 x 9.7	LC420EUG-PFF1 [42LA6600 -SA]	
				958 x 559.1 x 9.9	LC420EUN-SFF2 [42LA6400-SA]	
				956.4 x 555.0 x 37.4	LC420DUE-SFU1 [42LA6200-SA]	
				958.2 x 555.8 x 35.0	LC420DUE-SFR1 [42LN5700]	
			47"	1059.5 x 609.5 x 9.7	LC470EUG-PFF1 [47LA6600 / 6900-SA]	
				1070.6 x 622.0 x 9.9	LC470EUN-SFF2 [47LA6400-SA]	
				1068.0 x 617.8 x 38.8	LC470DUE-SFU1 [47LA6200-SA]	
				1059.5 x 609.5 x 9.7	LC470EUH-PFF1 [47LA7400-SC]	
			50"	1067.6 x 617.4 x 36.5	LC470DUE-SFR1 [47LN5700]	
				1121.6 x 644.3 x 10.8	LC500EUN-SFF1 [50LA6400-SA]	
				1123.0 x 648.2 x 40.3	LC500DUE-SFU1 [50LA6200-SA]	
			55"	1229.4 x 706.3 x 13.2	LC550EUG-PFF1 [55LA6600 / 6900-SA]	
				1244.6 x 720.9 x 9.9	LC550EUN-SFF1 [55LA6400-SA]	
				1229.4 x 706.3 x 9.9	LC550EUH-PFF1 [55LA7400-SC]	
				1232.0 x 704.0 x 1.94	LC550EUJ-SEK1 [55LA6200-SA]	
			60"	1333.0 x 758.94 x 1.42	LC600DUK-SEF1 [60LA6200-SA / 7400-SA]	
		Pixel Pitch	Maker	Inch	(H) × (V) × (D)	
				32"	170.25 x 510.75	LC320DXE-SFR1 [32LN570B]
			42"	483.3 x 483.3	LC420EUG-PFF1 [42LA6600 -SA]	
				483.3 x 483.3	LC420EUN-SFF2 [42LA6400-SA]	
				483.3 x 483.3	LC420DUE-SFU1 [42LA6200-SA]	
				483.3 x 483.3	LC420DUE-SFR1 [42LN5700]	
			47"	541.5 x 541.5	LC470EUG-PFF1 [47LA6600 / 6900-SA]	
				541.5 x 541.5	LC470EUN-SFF2 [47LA6400-SA]	
				541.5 x 541.5	LC470DUE-SFU1 [47LA6200-SA]	
				541.5 x 541.5	LC470DUE-SFR1 [47LN5700]	
			50"	570.75 x 570.75	LC500EUN-SFF1 [50LA6400-SA]	
				570.75 x 570.75	LC500DUE-SFU1 [50LA6200-SA]	
			55"	630 x 630	LC550EUG-KFF1 [55LA6600 / 6900-SA]	
				630 x 630	LC550EUN-SFF1 [55LA6400-SA]	
				630 x 630	LC550EUJ-SEK1 [55LA6200-SA]	
			60"	687 x 687	LC600DUK-SEF1 [60LA6200-SA]	

8.	Back Light	Maker	Inch	TYPE	Module Name
		LGD	32"	CINEMA	FPR : LC320EUA-KFF1 [32LA6900-SA]
			42"		FPR: LC420EUG-KFF1 [42LA6600 / 6900-SA]
			47"		FPR: LC470EUG-KFF1 [47LA6600 / 6900-SA]
			55"		FPR: LC550EUG-KFF1 [47LA6600 / 6900-SA]
			42"	Edge	FPR: LC420EUN-SFF2 [42LA6400-SA]
			47"		FPR: LC470EUN-SFF2 [47LA6400-SA]
			47"		FPR: LC470EUH-PFF1 [47LA7400-SC]
			50"		FPR: LC500EUN-SFF1 [50LA6400-SA]
			55"		FPR: LC550EUH-PFF1 [55LA7400-SC]
			55"		FPR: LC550EUN-SFF1 [55LA6400-SA]
			55"	POLA	FPR: LC550EUJ-SEK1 [55LA6200-SA]
			60"		FPR: LC600DUK-SEF1 [60LA6200-SA]
			32	Direct	LC320DXE-SFR1 [32LN570B]
			42		FPR : LC420DUE-SFU1 [42LA6200-SA]
					Normal : LC420DUE-SFR1 [42LN5700]
			47		FPR : LC470DUE-SFU1 [47LA6200-SA]
					Normal : LC470DUE-SFR1 [47LN5700]
			50		FPR : LC500DUE-SFU1 [50LA6200-SA]
	Display Colors	1.06 B (10-bit)			Except FHD 60Hz models
		16.7 M (8-bit)			FHD/HD 60Hz models
	Coating	3H(Hard coating), Anti-glare			

5. External Input Support Format

5.1. Component input(Y, CB/PB, CR/PR)

No	Resolution	H-freq(kHz)	V-freq.(kHz)	Pixel clock	Proposed
1.	720*480	15.73	60	13.5135	SDTV ,DVD 480I
2.	720*480	15.73	59.94	13.5	SDTV ,DVD 480I
3.	720*480	31.50	60	27.027	SDTV 480P
4.	720*480	31.47	59.94	27.00	SDTV 480P
5.	720*576	15.625	50*	13.5	SDTV 576I
6.	720*576	31.25	50*	13.5	SDTV 576P
7.	1280*720	37.5	50*	74.25	HDTV 720P
8.	1280*720	45.00	60.00	74.25	HDTV 720P
9.	1280*720	44.96	59.94	74.176	HDTV 720P
10.	1920*1080	28.125	50*	74.25	HDTV 1080I
11.	1920*1080	33.75	60.00	74.25	HDTV 1080I
12.	1920*1080	33.72	59.94	74.176	HDTV 1080I
13.	1920*1080	56.25	50*	148.5	HDTV 1080P
14.	1920*1080	67.50	60	148.50	HDTV 1080P
15.	1920*1080	67.432	59.94	148.352	HDTV 1080P
16.	1920*1080	27.00	24.00	74.25	HDTV 1080P
17.	1920*1080	26.97	23.976	74.176	HDTV 1080P
18.	1920*1080	33.75	30.00	74.25	HDTV 1080P
19.	1920*1080	33.71	29.97	74.176	HDTV 1080P

5.2. HDMI : EDID DATA : Refer to adjust specification

5.2.1. DTV mode

No	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	Proposed	Remark
1	720*480	15.73	59.94	13.500	SDTV, DVD 480I(525I)	Spec. out but display
2		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	SDTV 480P	
5		31.5	60.00	27.027	SDTV 480P	
6	720*576	31.25	50.00	27	SDTV 576P	
7	1280*720	44.96	59.94	74.176	HDTV 720P	
8		45	60.00	74.25	HDTV 720P	
9		37.5	50.00	74.25	HDTV 720P	
10	1920*1080	28.125	50.00	74.25	HDTV 1080I	
11		33.72	59.94	74.176	HDTV 1080I	
12		33.75	60.00	74.25	HDTV 1080I	
13		26.97	23.976	63.296	HDTV 1080P	
14		27.00	24.000	63.36	HDTV 1080P	
15		33.71	29.97	79.120	HDTV 1080P	
16		33.75	30.00	79.20	HDTV 1080P	
17		56.25	50.00	148.5	HDTV 1080P	
18		67.432	59.94	148.350	HDTV 1080P	
19		67.5	60.00	148.5	HDTV 1080P	

5.2.2. PC mode

No.	Resolution	H-freq(kHz)	V-freq.(kHz)	Pixel clock	Proposed	Remarks
1	640*350	31.468	70.09	25.17	EGA	
2	720*400	31.469	70.09	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	60.00	65	VESA(XGA)	
6	1152*864	54.348	60.053	80.002	VESA(VGA)	
7	1360*768	47.712	60.015	84.75	VESA(WXGA)	
8	1280*1024	63.981	60.020	109.00	SXGA	Only FHD Model (Support to HDMI-PC)
9	1920*1080	67.5	60	158.40	WUXGA (Reduced Blanking)	Only FHD Model

5.3. 3D mode

5.3.1. RF Input

No	Resolution	Proposed	3D input proposed mode
1	HD	1080I 720P	2D to 3D Side by Side(Half) Top & Bottom
2	SD	576P 576I	2D to 3D

5.3.2. RF Input (3D supported mode automatically)

No	Signal	3D input proposed mode
1	Frame Compatible	Side by Side(Half), Top & Bottom

5.3.3. HDMI Input 1.3(3D supported mode manually)

No	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	Proposed	Remark
1	1280*720	45.00	60.00	74.25	HDTV 720P	2D to 3D Side by Side(half), Top & Bottom, Single Frame Sequential
2	1280*720	37.500	50	74.25	HDTV 720P	2D to 3D Side by Side(half), Top & Bottom, Single Frame Sequential
3	1920*1080	33.75	60.00	74.25	HDTV 1080I	2D to 3D Side by Side(half), Top & Bottom
4	1920*1080	28.125	50.00	74.25	HDTV 1080I	2D to 3D Side by Side(half), Top & Bottom
5	1920*1080	27.00	24.00	74.25	HDTV 1080P	2D to 3D Side by Side(half), Top & Bottom, Checkerboard
6	1920*1080	28.12	25	74.25	HDTV 1080P	2D to 3D Side by Side(half), Top & Bottom, Checkerboard
7	1920*1080	33.75	30.00	74.25	HDTV 1080P	2D to 3D Side by Side(half), Top & Bottom, Checkerboard
8	1920*1080	56.25	50	148.5	HDTV 1080P	2D to 3D Side by Side(half), Top & Bottom, Checkerboard, Single Frame Sequential, Row Interleaving, Column Interleaving
9	1920*1080	67.50	60.00	148.5	HDTV 1080P	2D to 3D Side by Side(half), Top & Bottom, Checkerboard, Single Frame Sequential, Row Interleaving, Column Interleaving

5.3.4. HDMI Input 1.4b (3D supported mode automatically)

No	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	3D input proposed mode	Proposed
1	640*480	31.469 / 31.5	59.94/ 60	25.175/25.2	Top-and-Bottom Side-by-side(half)	Secondary(SDTV 480P) Secondary(SDTV 480P)
2		62.938 / 63	59.94/ 60	50.35/50.4	Frame packing Line alternative	Secondary(SDTV 480P) (SDTV 480P)
3		31.469 / 31.5	59.94/ 60	50.35/50.4	Side-by-side(Full)	(SDTV 480P)
4	720*480	31.25	50	27	Top-and-Bottom Side-by-side(half)	Secondary(SDTV 480P) Secondary(SDTV 480P)
5		62.5	50	54	Frame packing Line alternative	Secondary(SDTV 480P) (SDTV 480P)
6		31.25	50	54	Side-by-side(Full)	(SDTV 480P)
7	720*576 (576p)	31.25	50	27	Top-and-Bottom Side-by-side(half)	Secondary(SDTV 576P) Secondary(SDTV 576P)
8		62.5	50	54	Frame packing Line alternative	Secondary(SDTV 576P) (SDTV 576P)
9		31.25	50	54	Side-by-side(Full)	(SDTV 576P)
10	720 (1440)*576 (576i)	15.625	50	27	Top-and-Bottom Side-by-side(half)	Secondary(SDTV 576I) Secondary(SDTV 576I)
11		31.25	50	54	Frame packing Field alternative	Secondary(SDTV 576I) (SDTV 576I)
12		15.625	50	54	Side-by-side(Full)	(SDTV 576I)
13	1280*720	37.5	50	74.25	Top-and-Bottom Side-by-side(half)	Primary(HDTV 720P) Primary(HDTV 720P)
14		75	50	148.5	Frame packing Line alternative	Primary(HDTV 720P) (HDTV 720P)
15		37.5	50	148.5	Side-by-side(Full)	(HDTV 720P)
16		44.96 / 45	59.94 / 60	74.18/74.25	Top-and-Bottom Side-by-side(half)	Primary(HDTV 720P) Primary(HDTV 720P)
17		89.91 / 90	59.94 / 60	148.35/148.5	Frame packing Line alternative	Primary(HDTV 720P) (HDTV 720P)
18		44.96 / 45	59.94 / 60	148.35/148.5	Side-by-side(Full)	(HDTV 720P)

No	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	3D input proposed mode	Proposed
19	1920*1080	33.72 / 33.75	59.94 / 60	74.18/74.25	Top-and-Bottom Side-by-side(half)	Secondary(HDTV 1080I) Primary(HDTV 1080I)
20		67.432 / 67.5	59.94 / 60	148.35/148.5	Frame packing Field alternative	Primary(HDTV 1080I) (HDTV 1080I)
21		33.72 / 33.75	59.94 / 60	148.35/148.5	Side-by-side(Full)	(HDTV 1080I)
22		28.125	50.00	74.25	Top-and-Bottom Side-by-side(half)	Secondary(HDTV 1080I) Primary(HDTV 1080I)
23		56.25	50.00	148.5	Frame packing Field alternative	Primary(HDTV 1080I) (HDTV 1080I)
24		28.125	50.00	148.5	Side-by-side(Full)	(HDTV 1080I)
25		26.97 / 27	23.97 / 24	74.18/74.25	Top-and-Bottom Side-by-side(half)	Primary(HDTV 1080P) Primary(HDTV 1080P)
26		43.94 / 54	23.97 / 24	148.35/148.5	Frame packing Line alternative	Primary(HDTV 1080P) (HDTV 1080P)
27		26.97 / 27	23.97 / 24	148.35/148.5	Side-by-side(Full)	(HDTV 1080P)
28		28.12	25	74.25	Top-and-Bottom Side-by-side(half)	Secondary(HDTV 1080P) Secondary(HDTV 1080P)
29		56.25	25	148.5	Frame packing Line alternative	Secondary(HDTV 1080P) (HDTV 1080P)
30		28.125	25	148.5	Side-by-side(Full)	(HDTV 1080P)
31		33.716 / 33.75	29.976 / 30.00	74.18/74.25	Top-and-Bottom Side-by-side(half)	Primary(HDTV 1080P) Secondary(HDTV 1080P)
32		67.432 / 67.5	29.976 / 30.00	148.35/148.5	Frame packing Line alternative	Primary(HDTV 1080P) (HDTV 1080P)
33		33.716 / 33.75	29.976 / 30.00	148.35/148.5	Side-by-side(Full)	(HDTV 1080P)
34		56.25	50	148.5	Top-and-Bottom Side-by-side(half)	Primary(HDTV 1080P) Secondary(HDTV 1080P)
35		67.43 / 67.5	59.94 / 60	148.35/148.50	Top-and-Bottom Side-by-side(half)	Primary(HDTV 1080P) Secondary(HDTV 1080P)

5.3.5. HDMI-PC 3D Input (3D supported mode manually)

No	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	3D input proposed mode	Proposed
1	1024*768	48.36	60	65	2D to 3D, Side by Side(half) Top & Bottom	HDTV 768P
2	1360*768	47.71	60	85.5	2D to 3D, Side by Side(half) Top & Bottom	HDTV 768P
3	1920*1080	67.500	60	148.50	2D to 3D, Side by Side(half) Top & Bottom, Checker Board, Single Frame Sequential Row Interleaving, Column Interleaving	HDTV 1080P
4	Others	-	-	-	2D to 3D	640*350 720*400 640*480 800*600 1152*864

5.3.6. Component 3D Input (3D supported mode manually)

No	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	3D input proposed mode	Proposed
1	1280*720	37.5	50	74.25	2D to 3D, Side by Side(half), Top & Bottom	HDTV 720P
2	1280*720	45.00	60.00	74.25	2D to 3D, Side by Side(half), Top & Bottom	HDTV 720P
3	1280*720	44.96	59.94	74.176	2D to 3D, Side by Side(half) Top & Bottom	HDTV 720P
4	1920*1080	33.75	60.00	74.25	2D to 3D, Side by Side(half) Top & Bottom	HDTV 1080I
5	1920*1080	33.72	59.94	74.176	2D to 3D, Side by Side(half) Top & Bottom	HDTV 1080I
6	1920*1080	28.12	50	74.25	2D to 3D, Side by Side(half) Top & Bottom	HDTV 1080I
7	1920*1080	67.500	60	148.50	2D to 3D, Side by Side(half) Top & Bottom	HDTV 1080P
8	1920*1080	67.432	59.94	148.352	2D to 3D, Side by Side(half) Top & Bottom	HDTV 1080P
9	1920*1080	27.000	24.000	74.25	2D to 3D, Side by Side(half) Top & Bottom	HDTV 1080P
10	1920*1080	28.12	25	74.25	2D to 3D, Side by Side(half) Top & Bottom	HDTV 1080P
11	1920*1080	56.25	50	74.25	2D to 3D, Side by Side(half) Top & Bottom	HDTV 1080P
12	1920*1080	26.97	23.976	74.176	2D to 3D, Side by Side(half) Top & Bottom	HDTV 1080P
13	1920*1080	33.75	30.000	74.25	2D to 3D, Side by Side(half) Top & Bottom	HDTV 1080P
14	1920*1080	33.71	29.97	74.176	2D to 3D, Side by Side(half) Top & Bottom	HDTV 1080P

5.3.7. USB Input (3D) (3D supported mode manually)

No	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	3D input proposed mode	Proposed
1	1920*1080	33.75	30	74.25	2D to 3D Side by Side(Half)*, Top & Bottom*, Checkerboard* Row Interleaving, Column Interleaving (Photo : side by Side(half), Top & Bottom)	HDTV 1080P

5.2.8. DLNA Input (3D)

No	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	3D input proposed mode	Proposed
1	1920*1080	33.75	30	74.25	2D to 3D Side by Side(Half)*, Top & Bottom*, Checkerboard* Row Interleaving, Column Interleaving (Photo : side by Side(half), Top & Bottom)	HDTV 1080P

ADJUSTMENT INSTRUCTION

1. Application Range

This specification sheet is applied all of the LJ33B LED TV models, which produced in manufacture department or similar LG TV factory

2. Specification

- (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) Adjustment must be done in the correct order. But it is flexible when its factory local problem occurs.
- (3) The adjustment must be performed in the circumstance of $25 \pm 5^{\circ}\text{C}$ of temperature and $65 \pm 10\%$ of relative humidity if there is no specific designation.
- (4) The input voltage of the receiver must keep 100~220V, 50/60Hz.
- (5) Before adjustment, execute Heat-Run for 5 minutes.

- After Receive 100% Full white pattern (06CH) then process Heat-run
(or "8. Test pattern" condition of Ez-Adjust status)
- How to make set white pattern
 - 1) Press Power ON button of Service Remocon
 - 2) Press ADJ button of Service remocon. Select "8. Test pattern" and, after select "White" using navigation button, and then you can see 100% Full White pattern.
- * In this status you can maintain Heat-Run useless any pattern generator
- * Notice : if you maintain one picture over 20 minutes (Especially sharp distinction black with white pattern -13Ch, or Cross hatch pattern - 09Ch) then it can appear image stick near black level.

3. Adjustment items

3.1. PCB Assembly Adjustment

- MAC Address / ESN / Widevine Download
- EDID (The Extended Display Identification Data)/DDC (Display Data Channel) download
- * If it is necessary, it can adjustment at Manufacture Line
You can see set adjustment status at "1. ADJUST CHECK" of the "In-start menu"

3.2. Set Assembly Adjustment

- Color Temperature (White Balance) Adjustment
- Using RS-232C
- PING Test
- Selection Factory output option

4. PCB Assembly Adjustment

4.1. MAC Address, ESN Key and Widevine Key download

4.1.1. Equipment & Condition

- 1) Play file: keydownload.exe

4.1.2. Communication Port connection

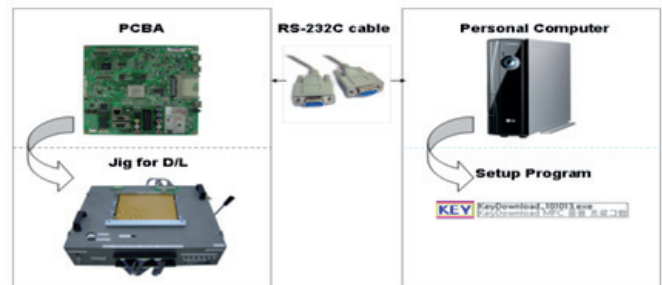
- 1) Key Write: Com 1,2,3,4 and 115200 (Baudrate)
- 2) Barcode: Com 1,2,3,4 and 9600 (Baudrate)

4.1.3. Download process

- 1) Select the download items.
- 2) Mode check: Online Only
- 3) Check the test process
 - DETECT -> MAC_WRITE -> ESN_WRITE -> WIDEVINE_WRITE
- 4) Play : START
- 5) Check of result: Ready, Test, OK or NG

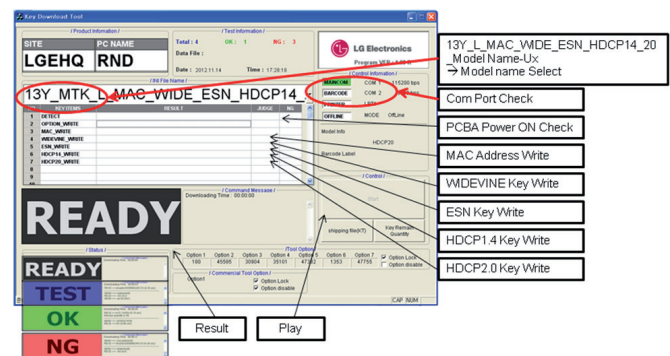
4.1.4. Communication Port connection

- 1) Connect: PCBA Jig -> RS-232C Port == PC -> RS-232C Port



4.1.5. Download

- 1) 13Y LCD TV+MAC+Widevine+ESN Key+ HDCP1.4 and HDCP2.0



4.1.6. Inspection

- In INSTART menu, check these keys.

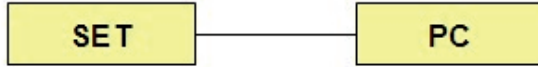
4.2. LAN PORT INSPECTION(PING TEST)

4.2.1. Equipment setting

- 1) Play the LAN Port Test PROGRAM.
- 2) Input IP set up for an inspection to Test Program.

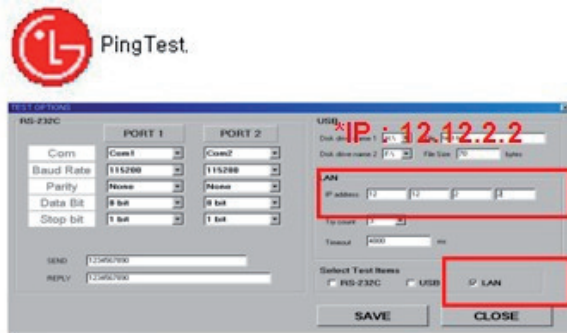
*IP Number : 12.12.2.2.

Connect: SET-> LAN Port == PC-> LAN Port



4.2.2. LAN PORT inspection (PING TEST)

- 1) Play the LAN Port Test Program.
- 2) connect each other LAN Port Jack.
- 3) Play Test (F9) button and confirm OK Message.
- 4) remove LAN CABLE



4.3. ADC Adjust => No need at Assembly line because of OPT type

* OTP mode

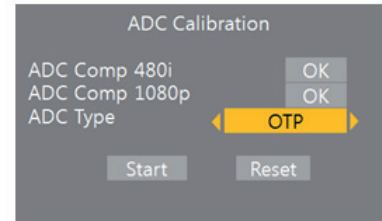
Automatic ADC Calibration. (Internal ADC Calibration) On the manufacture line, OTP is used for ADC Calibration automatically.

* External mode

Manual ADC Calibration. When OTP mode is failed, ADC calibration should be "OK" by using External mode.

- If you want re-adjust for ADC.

- Enter Service Mode by pushing "ADJ" key,
- Enter Internal ADC mode by pushing "▶" key at "6. ADC Calibration"



■ Adjustment protocol

Order	Command	Set response
(1) Inter the Adjustment mode	aa 00 00	a 00 OK00x
(2) Change the Source	xb 00 40 xb 00 60	b 00 OK40x (Adjust 480i Comp1) (Adjust 1080p Comp1) b 00 OK60x (Adjust 1080p RGB)
(3) Start Adjustment	ad 00 10	
(4) Return the Response		OKx (Success condition) NGx (Failed condition)
(5) Read Adjustment data	(main) ad 00 20 (main) ad 00 30	(main : component1 480i, RGB 1080p) 00000000000000000000000007c007b- 006dx (main : component1 1080p) 00000007000000000000000007c0083 0077x
(6) Confirm Adjustment	ad 00 99	NG 03 00x (Failed condition) NG 03 01x (Failed condition) NG 03 02x (Failed condition) OK 03 03x (Success condition)
(7) End of Adjustment	ad 00 90	d 00 OK90x

5. Factory Adjustment

5.1. EDID (The Extended Display Identification Data)/DDC (Display Data Channel) Download

- Summary

- It is established in VESA, for communication between PC and Monitor without order from user for building user condition. It helps to make easily use realize "Plug and Play" function. For EDID data write, we use DDC2B protocol.

- Auto Download (No need Writing EDID data in Assembly line)

- After Set Tool Option, then TV turn off and on finish auto download

* EDID data for 3DTV (LA62/64/66/68/69/74 Serie) (Model name = LG TV) .

*Rev. 15xxx to confirm that, Rev. up subject to change

- HDMI EDID table

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01	01
10	01	16	01	03	80	A0	5A	78	0A	EE	91	A3	54	4C	99	26
20	0F	50	54	A1	08	00	31	40	45	40	61	40	71	40	81	80
30	01	01	01	01	01	01	02	3A	80	18	71	38	2D	40	58	2C
40	45	00	A0	5A	00	00	00	1E	66	21	50	B0	51	00	1B	30
50	40	70	36	00	A0	5A	00	00	00	1E	00	00	00	FD	00	3A
60	3E	1E	53	10	00	0A	20	20	20	20	20	20	20	00	00	FC
70	00	4C	47	20	54	56	0A	20	20	20	20	20	20	20	01	43

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	02	03	29	F1	4E	10	9F	04	13	05	14	03	02	12	20	21
10	22	15	01	29	3D	07	50	15	07	50	09	57	07	67	03	0C
20	00	10	00	80	1E	E3	05	00	00	01	1D	80	18	71	1C	16
30	20	58	2C	25	00	A0	5A	00	00	00	9E	01	1D	00	80	51
40	D0	1A	20	6E	88	55	00	A0	5A	00	00	00	1A	02	3A	80
50	18	71	38	2D	40	58	2C	45	00	A0	5A	00	00	00	1E	66
60	21	50	B0	51	00	1B	30	40	70	36	00	A0	5A	00	00	00
70	1E	00	00	00	00	00	00	00	00	00	00	00	00	00	00	8A

- HDMI-1 EDID table (0xE8, 0xCC)

- HDMI 1 Check sum : 0xE8, 0XCC (CEA Block 0x21 :10)
- HDMI 2 Check sum : 0xE8, 0XBC (CEA Block 0x21 :20)
- HDMI 3 Check sum : 0xE8, 0XAC (CEA Block 0x21 :30)

* EDID data for Non-3DTV (LN57 Serie) (Model name = LG TV)

*Rev. 15xxx to confirm that, Rev. up subject to change

- HDMI EDID table

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01	01
10	01	16	01	03	80	A0	5A	78	0A	EE	91	A3	54	4C	99	26
20	0F	50	54	A1	08	00	31	40	45	40	61	40	71	40	81	80
30	01	01	01	01	01	01	02	3A	80	18	71	38	2D	40	58	2C
40	45	00	A0	5A	00	00	00	1E	66	21	50	B0	51	00	1B	30
50	40	70	36	00	A0	5A	00	00	00	1E	00	00	00	FD	00	3A
60	3E	1E	53	10	00	0A	20	20	20	20	20	20	20	00	00	FC
70	00	4C	47	20	54	56	0A	20	20	20	20	20	20	20	01	43

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	02	03	29	F1	4E	10	9F	04	13	05	14	03	02	12	20	21
10	22	15	01	29	3D	07	50	15	07	50	09	57	07	67	03	0C
20	00	10	00	80	1E	E3	05	00	00	01	1D	80	18	71	1C	16
30	20	58	2C	25	00	A0	5A	00	00	00	9E	01	1D	00	80	51
40	D0	1A	20	6E	88	55	00	A0	5A	00	00	00	1A	02	3A	80
50	18	71	38	2D	40	58	2C	45	00	A0	5A	00	00	00	1E	66
60	21	50	B0	51	00	1B	30	40	70	36	00	A0	5A	00	00	00
70	1E	00	00	00	00	00	00	00	00	00	00	00	00	00	00	8A

- HDMI-1 EDID table (0X43, 0x8A)

- HDMI 1 Check sum : 0x43, 0X8A (CEA Block 0x21 :10)
- HDMI 2 Check sum : 0x43, 0X7A (CEA Block 0x21 :20)
- HDMI 3 Check sum : 0x43, 0X6A (CEA Block 0x21 :30)

5.2. Adjustment White balance

- W/B Equipment condition
 - CA210 : CH 9, Test signal : Inner pattern (80IRE) – LAMP Module
 - CH14 , Test signal : Inner pattern (80IRE) – LED Module
- Above 5 minutes H/run in the inner pattern. ("power on" key of adjust remote control)

※ The spec of color temperature and coordinate.

All	Cool (C50)	13,000k	K	X=0.269 (±0.002) Y=0.273 (±0.002)	<Test signal> - Inner pattern for W/B adjust - External white pattern (80IRE, 204gray)
	Medium (0)	9,300k	K	X=0.285 (±0.002) Y=0.293 (±0.002)	
	Warm (W50)	6,500k	K	X=0.313 (±0.002) Y=0.329 (±0.002)	

※ LA6xxx, LA7xxx, LA8xxx, LN5x Series (Normal Line)

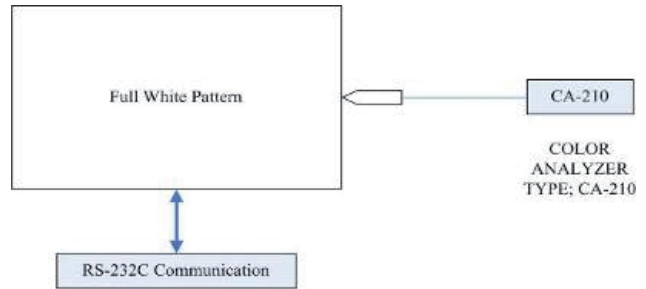
H/R Time(Min)		Cool		Medium		Warm	
		x	y	x	x	y	x
		271	270	285	293	313	329
1	0-2	281	287	295	310	320	342
2	3-5	280	285	294	308	319	340
3	6-9	278	284	292	307	317	339
4	10-19	276	281	290	304	315	336
5	20-35	275	277	289	300	314	332
6	36-49	274	274	288	297	313	329
7	50-79	273	272	287	295	312	327
8	80-119	272	271	286	294	311	326
9	Over 120	271	270	285	293	310	325

※ LA6xxx, LA7xxx, LA8xxx, LN5x Series (Aging Chamber)

H/R Time(Min)		Cool		Medium		Warm	
		x	y	x	x	y	x
		271	270	285	293	313	329
1	0-5	280	285	294	308	319	340
2	6-10	276	280	290	303	315	335
3	11-20	272	275	286	298	311	330
4	21-30	269	272	283	295	308	327
5	31-40	267	268	281	291	306	323
6	41-50	266	265	280	288	305	320
7	51-80	265	263	279	286	304	318
8	81-119	264	261	278	284	303	316
9	Over 120	264	260	278	283	303	315

※ Connecting picture of the measuring instrument (On Automatic control)

Inside PATTERN is used when W/B is controlled. Connect to auto controller or push Adjustment R/C POWER-ON -> Enter the mode of White-Balance, the pattern will come out



[Fig.5] connecting picture (On Automatic Control)

● Auto-control interface and directions

- Adjust in the place where the influx of light like floodlight around is blocked. (Illumination is less than 10ux).
- Adhere closely the Color Analyzer (CA210) to the module less than 10cm distance, keep it with the surface of the Module and Color Analyzer's Prove vertically.(80~100°).
- Aging time
 - After aging start, keep the power on (no suspension of power supply) and heat-run over 5 minutes.
 - Using 'no signal' or 'full white pattern' or the others, check the back light on.

● Auto adjustment Map(RS-232C)

RS-232C COMMAND

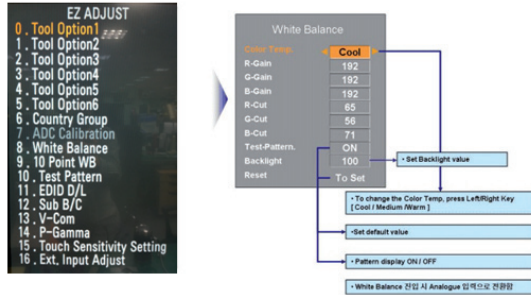
[CMD ID DATA]

Wb 00 00 White Balance Start

Wb 00 ff White Balance End

	RS-232C COMMAND [CMD ID DATA]			MIN	CENTER (DEFAULT)			MAX
	Cool	Mid	Warm	00	Cool	Mid	Warm	
R Gain	Jg	ja	jd	00	172	192	192	192
G Gain	Jh	jb	je	00	172	192	192	192
B Gain	Ji	jc	jf		192	192	172	192
R Gain					64	64	64	128
G Gain					64	64	64	128
B Gain					64	64	64	128

- Manual W/B process using adjusts Remote control.(TBD)
 - Color analyzer(CA100+, CA210) should be used in the calibrated ch by CS-1000
 - Operate the zero-calibration of the CA100+ or CA-210, then stick sensor to the module when adjusting.
 - After enter Service Mode by pushing “ADJ” key,
 - Enter White Balance by pushing “▶” key at “8. White Balance”



- For manual adjustment, it is also possible by the following sequence
 - (1) Set TV in Adj. mode using “P-ONLY” key on remote controller and 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) Enter White Balance mode by pushing the ADJ key and select “8. White Balance”. When KEY (▶) is pressed, 206 Gray internal pattern will be displayed.
 - (4) Zero Calibrate the probe of Color Analyzer, then place it on the center of LCD module within 10cm of the surface
 - (5) Select each items (Red/Green/Blue Gain) using ▲/▼(CH +/-) key on R/C..
 - (6) Adjust R/ G/ B Gain using ◀/▶(VOL +/-) key on R/C.
 - (7) Adjust three modes all (Cool / Medium / Warm) -Fix the one of R/G/B gain and change the others
 - (8) When adjustment is completed, exit adjustment mode using EXIT key on R/C.

※ CASE Cool

- First adjust the coordinate far away from the target value(x, y).

- (1) $x, y > \text{target}$
 - (i) Decrease the R, G.
- (2) $x, y < \text{target}$
 - (i) First decrease the B gain,
 - (ii) Decrease the one of the others.
- (3) $x > \text{target}, y < \text{target}$
 - (i) First decrease B, so make y a little more than the target.
 - (ii) Adjust x value by decreasing the R
- (4) $x < \text{target}, y > \text{target}$
 - (i) First decrease B, so make x a little more than the target.
 - (ii) Adjust x value by decreasing the G

※ After You finish all adjustments, Press “In-start” button and compare Tool option and Area option value with its BOM, if it is correctly same then unplug the AC cable.
If it is not same, then correct it same with BOM and unplug AC cable. For correct it to the model's module from factory JIG model.

※ Push The “IN STOP KEY” after completing the function inspection.

• RS-232C Command (Commonly apply)

RS-232C COMMAND			Explanation
CMD	DATA	ID	
wb	00	00	White Balance adjustment start
Wb	00	10	Start of adjust gain (Inner white pattern)
wb	00	1f	End of gain adjust
wb	00	20	Start of offset adjust(Inner white pattern)
wb	00	2f	End of offset adjust
wb	00	ff	End of White Balance adjust (Inner pattern disappeared)

- “wb 00 00”: Start Auto-adjustment of white balance.
- “wb 00 10”: Start Gain Adjustment (Inner pattern)
- “jb 00 c0” :
- ...
- “wb 00 1f”: End of Adjustment
- * If it needs, offset adjustment (wb 00 20-start, wb 00 2f-end)
- “wb 00 ff”: End of white balance adjustment (inner pattern disappear)

※ Notice) Adjustment Mapping information

	RS-232C COMMAND [CMD ID DATA]				MIN	CENTER (DEFAULT)			MAX
	Cool	Mid	Warm	00	Cool	Mid	Warm		
R Gain	Jg	ja	jd	00	172	192	192	192	
G Gain	Jh	jb	je	00	172	192	192	192	
B Gain	Ji	jc	jf		192	192	172	192	
R Gain					64	64	64	128	
G Gain					64	64	64	128	
B Gain					64	64	64	128	

5.3. Magic Motion remote controller Check

5.3.1 Test equipment

- RF-remote controller for check, IR-KEY-CODE remote controller.
- Check AA battery before test. A recommendation is that a tester change battery every lots.

5.3.2. Test

- (1) Make pairing with TV set by pressing “Mute (START) key” on RCU.
- (2) Check a cursor on screen by pressing ‘ENTER” or “OK” key of RCU
- (3) Stop pairing with TV set by pressing “VOL+ (STOP) key.

5.4. 3D pattern test

5.4.1. Test equipment

- (1) Pattern Generator MSHG-600 or MSPG-6100 (HDMI 1.4 support)
- (2) Pattern: HDMI mode (model No. 872, pattern No. 83)

5.4.2. Test method

- (1) Input 3D test signal as Fig.1.



Fig.1
<HDMI Mode 872번, Pattern No. 83>

- (2) Press 'OK' key as a 3D input OSD is shown.
- (3) Check pattern as Fig2 without 3D glasses. (3D mode without 3D glasses)



Fig.2
<OK in 3D mode without 3D glasses>



Fig.3
<NG in 3D mode without 3D glasses>

5.5. HDMI ARC Function Inspection

5.5.1. Test equipment

- Optic Receiver Speaker
- MSHG-600 (SW: 1220 ↑)
- HDMI Cable (for 1.4 version)

5.5.2. Test method

- (1) Insert the HDMI Cable to the HDMI ARC port from the master equipment (HDMI1)



- (2) Check the sound from the TV Set



- (3) Check the Sound from the Speaker or using AV & Optic TEST program (It's connected to MSHG-600)

Flow Line



Cell Line



- * Remark: Inspect in Power Only Mode and check SW version in a master equipment



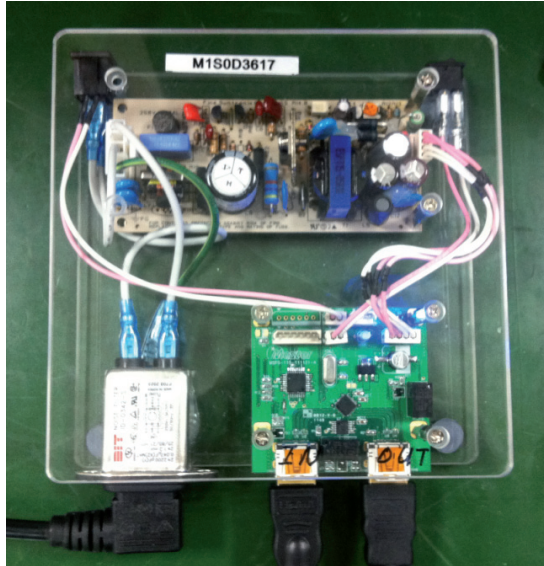
5.6. Selection of Country option

Selection of country option is allowed only North American model (Not allowed Korean model). It is selection of Country about Rating and Time Zone.

- Models: All models which use LJ22E Chassis (See the first page.)
- Press "In-Start" button of Service Remocon, then enter the "Option" Menu with "PIP CH-" Button
- Select one of these three (USA, CANADA, MEXICO) depends on its market using "Vol. +/-" button.

5.7. MHL Test

- Step 1) Turn on TV
- Step 2) Select HDMI4 mode using input Menu.
- Step 3) Set MHL Zig(M1S0D3617) using MHL input, output and power code.
- Step 4) Connect HDMI cable between MHL Zig and HDMI4 port.
- Step 5) Check LED light of Zig and Module of Set



Result) If, The LED light is green and The Module shows normal stream -> OK
Else -> NG

※ Caution : Don't push The INSTOP KEY after completing the function inspection.

6. GND and HI-POT Testing

6.1. GND & HI-POT auto-check preparation

Check the connection between set and power cord

- (1) Check the POWER CABLE and SIGNAL CABLE insertion condition

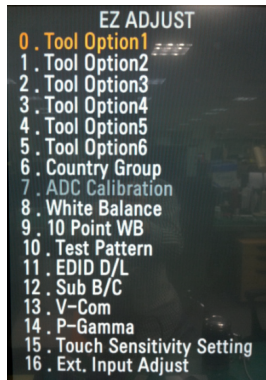
6.2. GND & HI-POT auto-check

- (1) Pallet moves in the station. (POWER CORD / AV CORD is tightly inserted)
- (2) Connect the AV JACK Tester
- (3) Controller (GWS103-4) on.
- (4) GND Test (Auto)
 - If Test is failed, Buzzer operates.
 - If Test is passed, execute next process (Hi-pot test).
- (Remove A/V CORD from A/V JACK BOX)
- (5) HI-POT test (Auto)
 - If Test is failed, Buzzer operates.
 - If Test is passed, GOOD Lamp on and move to next process automatically

6.3. Check Point

- (1) Test voltage
 - 3 Poles : GND: 1.5KV/min at 100mA / SIGNAL: 3KV/min at 100mA
- (2) TEST time: 1 second
- (3) TEST POINT
 - 3 Poles : GND Test = POWER CORD GND and SIGNAL CABLE GND.
 - Hi-pot Test = POWER CORD GND and LIVE & NEUTRAL.
- (4) LEAKAGE CURRENT: At 0.5mA

7. Default Service option



7.1. ADC-Set

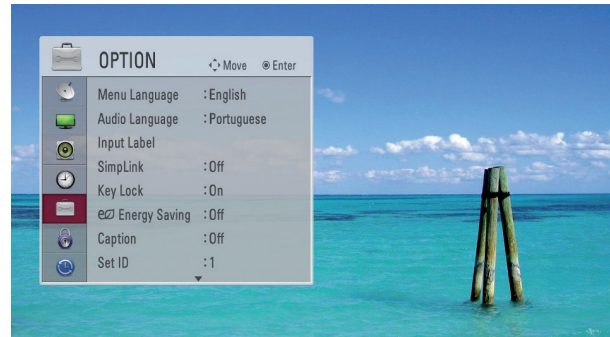
- R-Gain adjustment Value (default 128)
- G-Gain adjustment Value (default 128)
- B-Gain adjustment Value (default 128)
- R-Offset adjustment Value (default 128)
- G-Offset adjustment Value (default 128)
- B-Offset adjustment Value (default 128)

7.2. White balance. Value

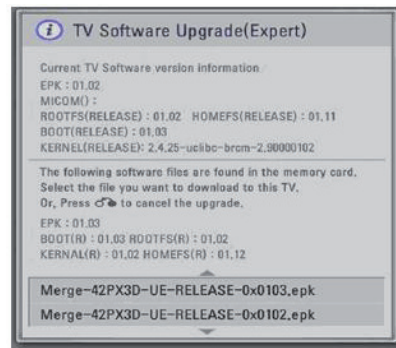
	CENTER (DEFAULT)		
	C50	0	W50
R Gain	192	192	192
G Gain	192	192	192
B Gain	192	192	192
R Cut	64	64	64
G Cut	64	64	64
B Cut	64	64	64

8. USB DOWNLOAD (*.epk file download)

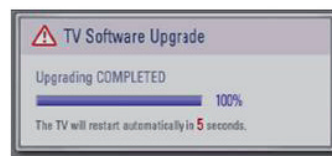
- (1) Put the USB Stick to the USB socket
- (2) Press Menu key, and move OPTION
- (3)



- (4) Press "FAV" Press 7 times.

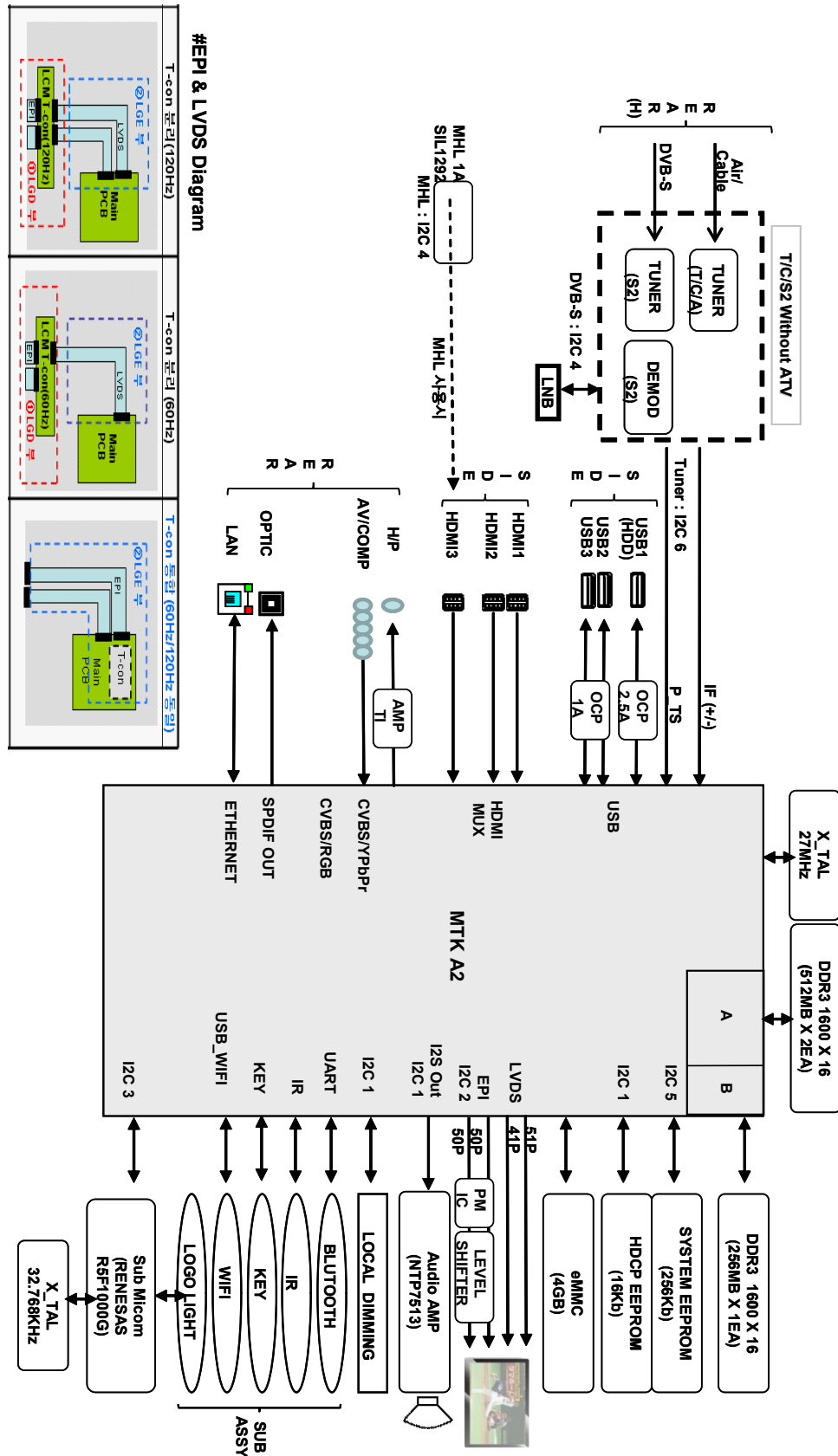


- (5) Select download file (epk file)

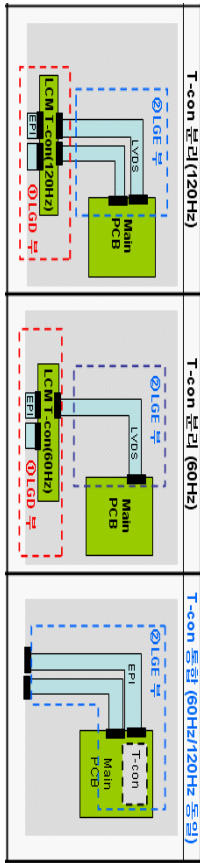


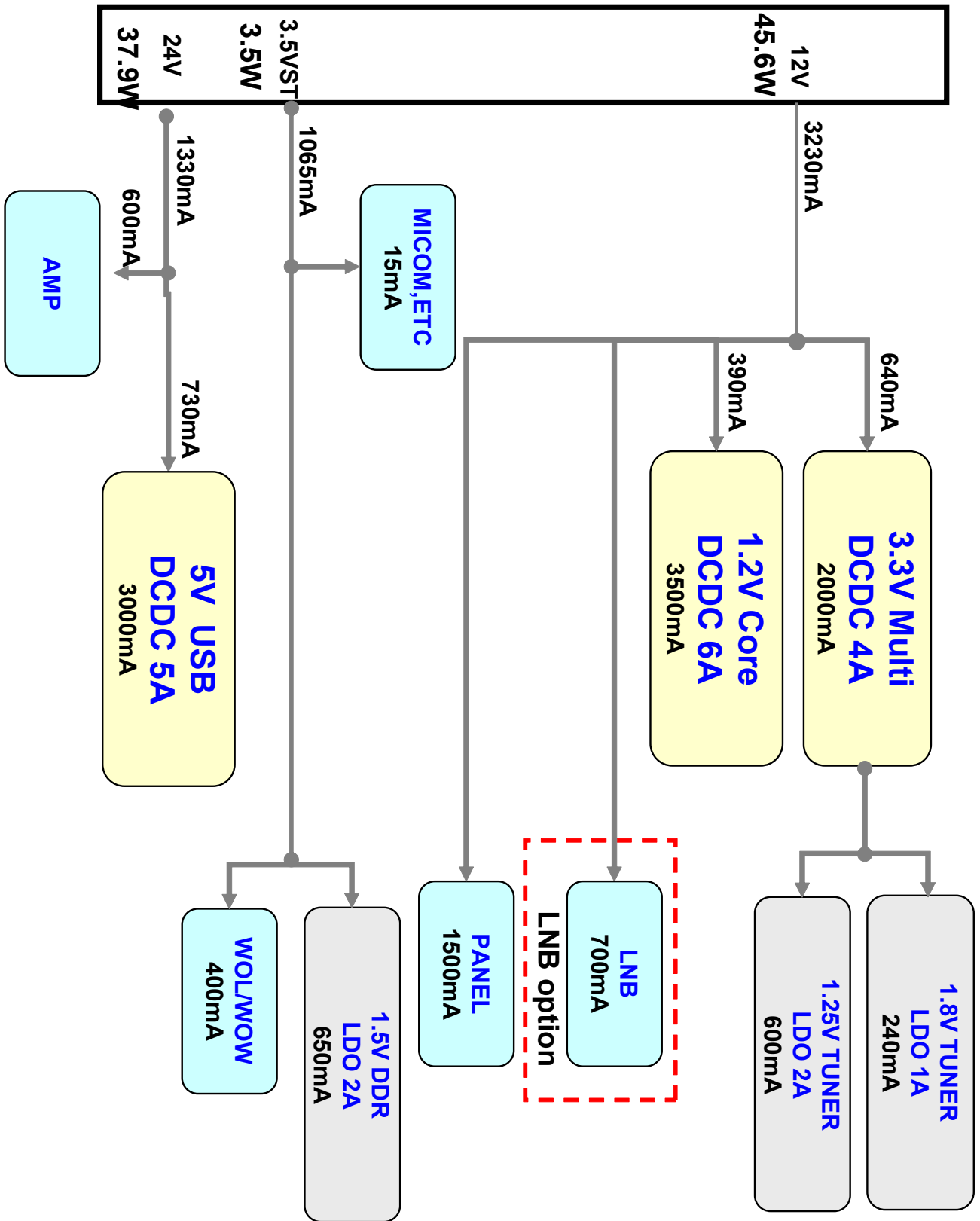
- (6) After download is finished, remove the USB stick.
- (7) Press "IN-START" key of ADJ remote control, check the S/W version

BLOCK DIAGRAM

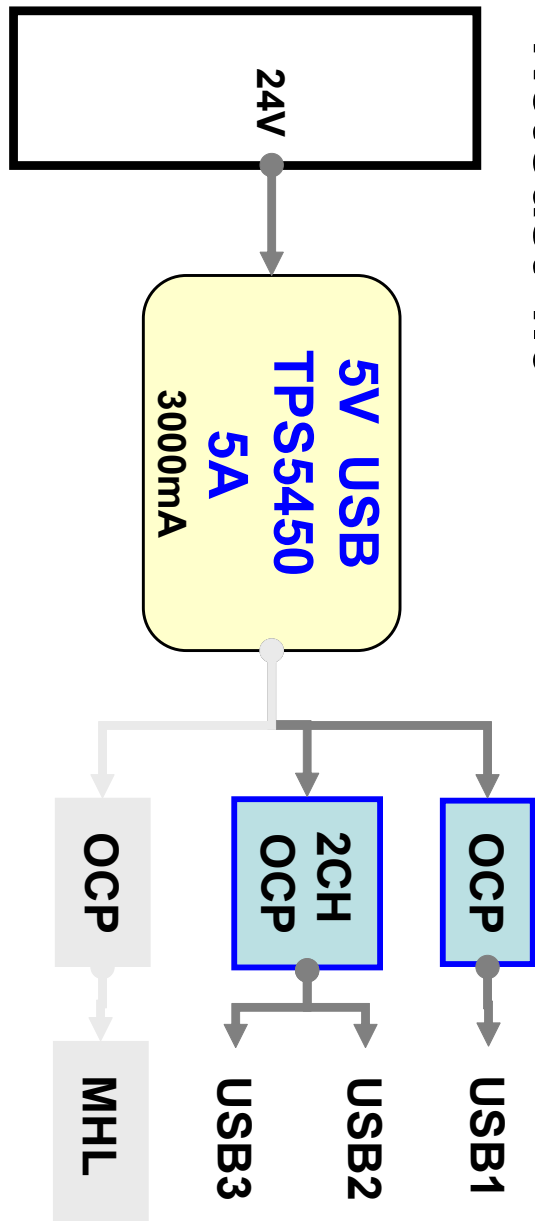


#EPI & LVDS Diagram

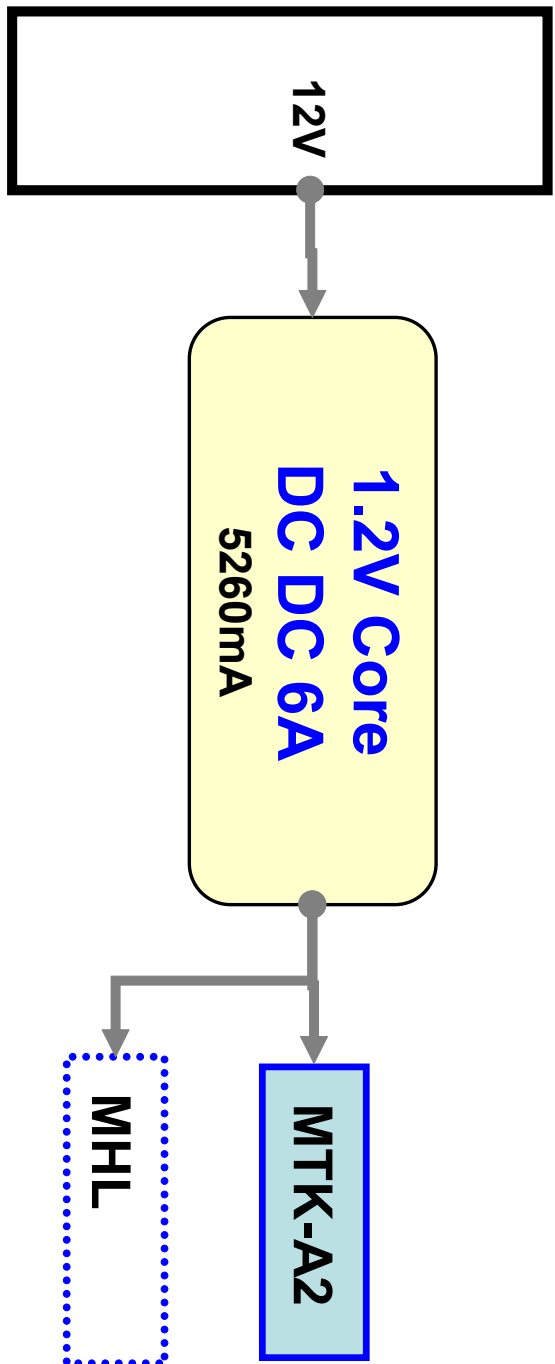


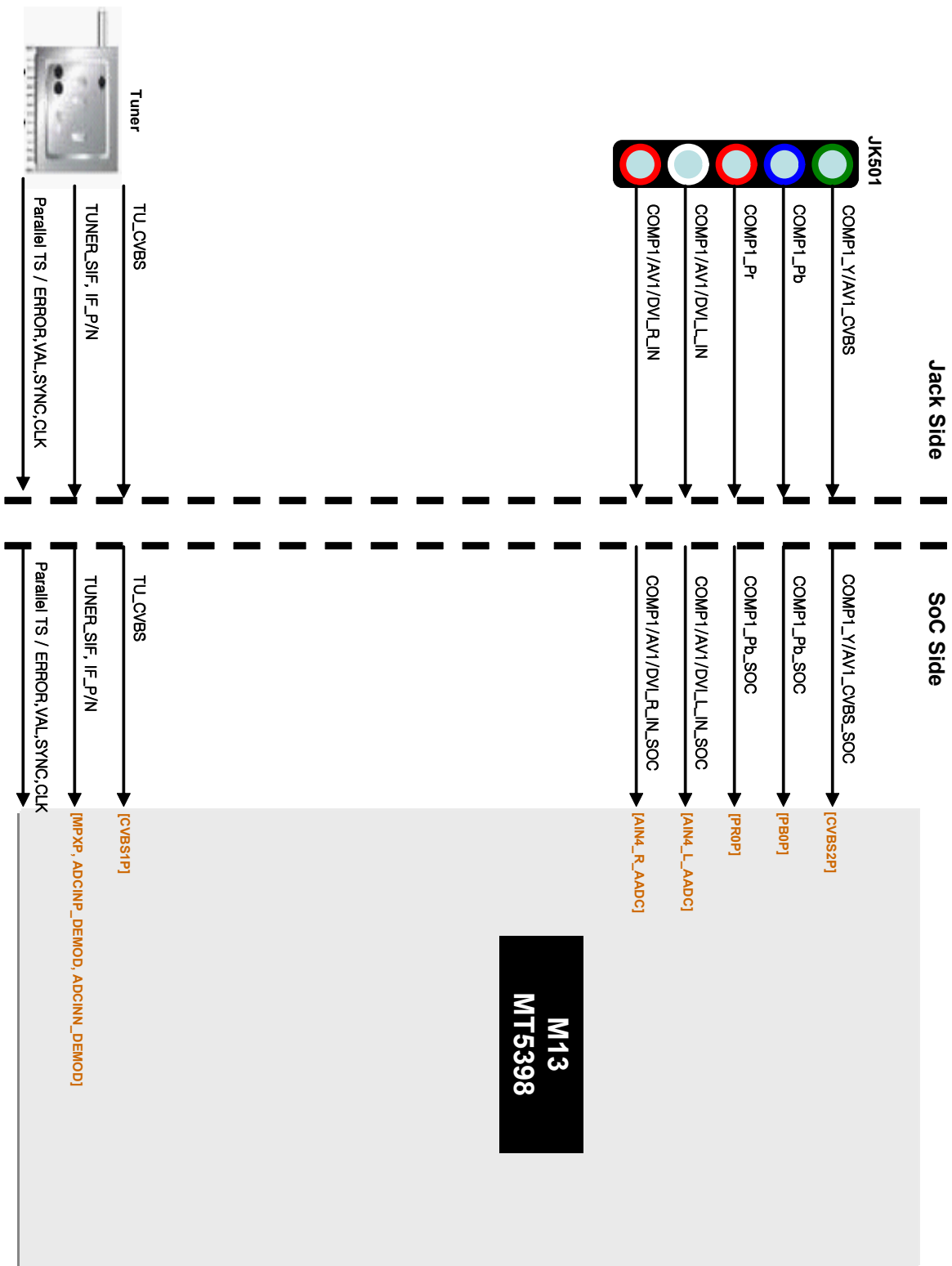


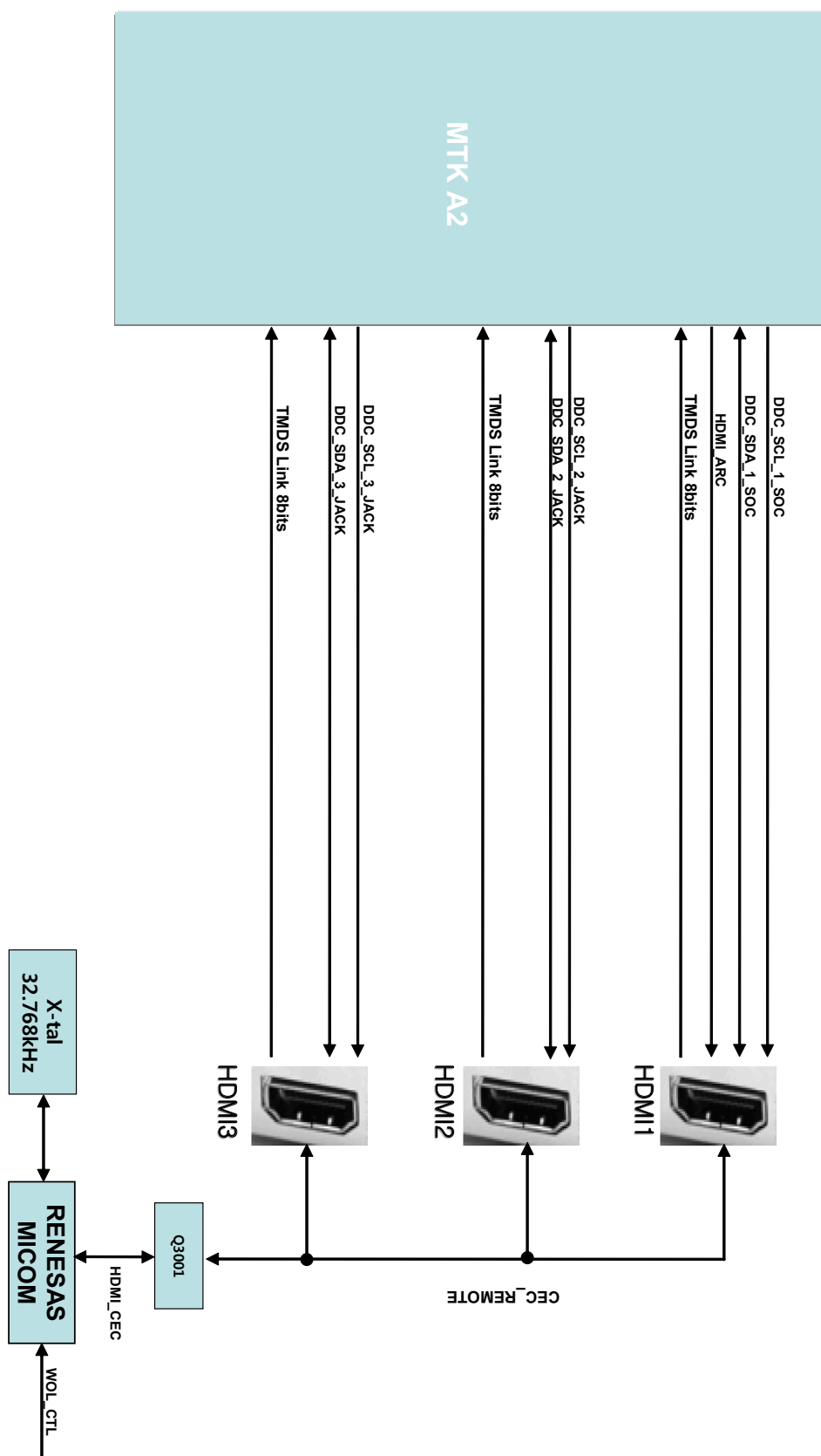
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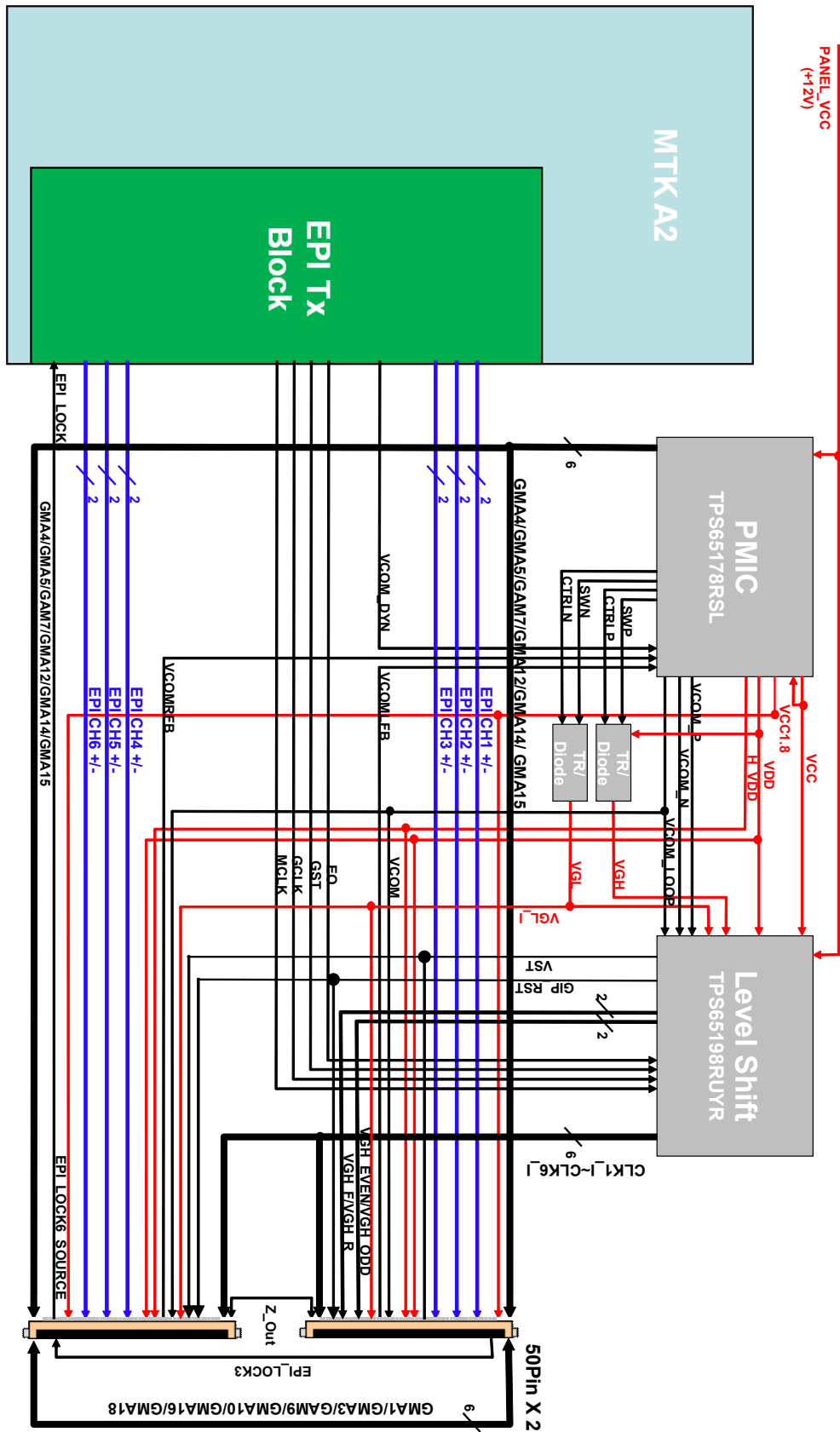


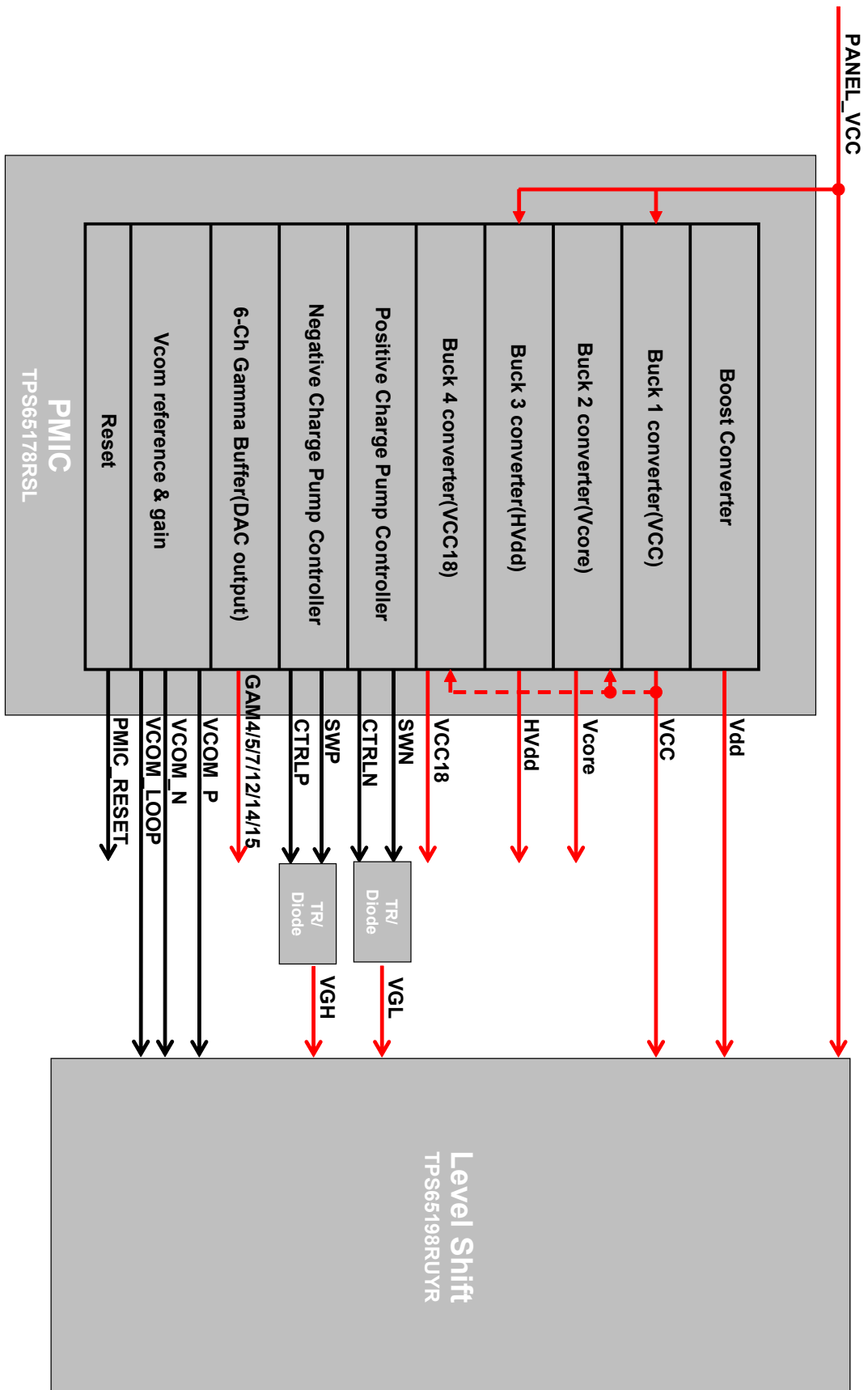
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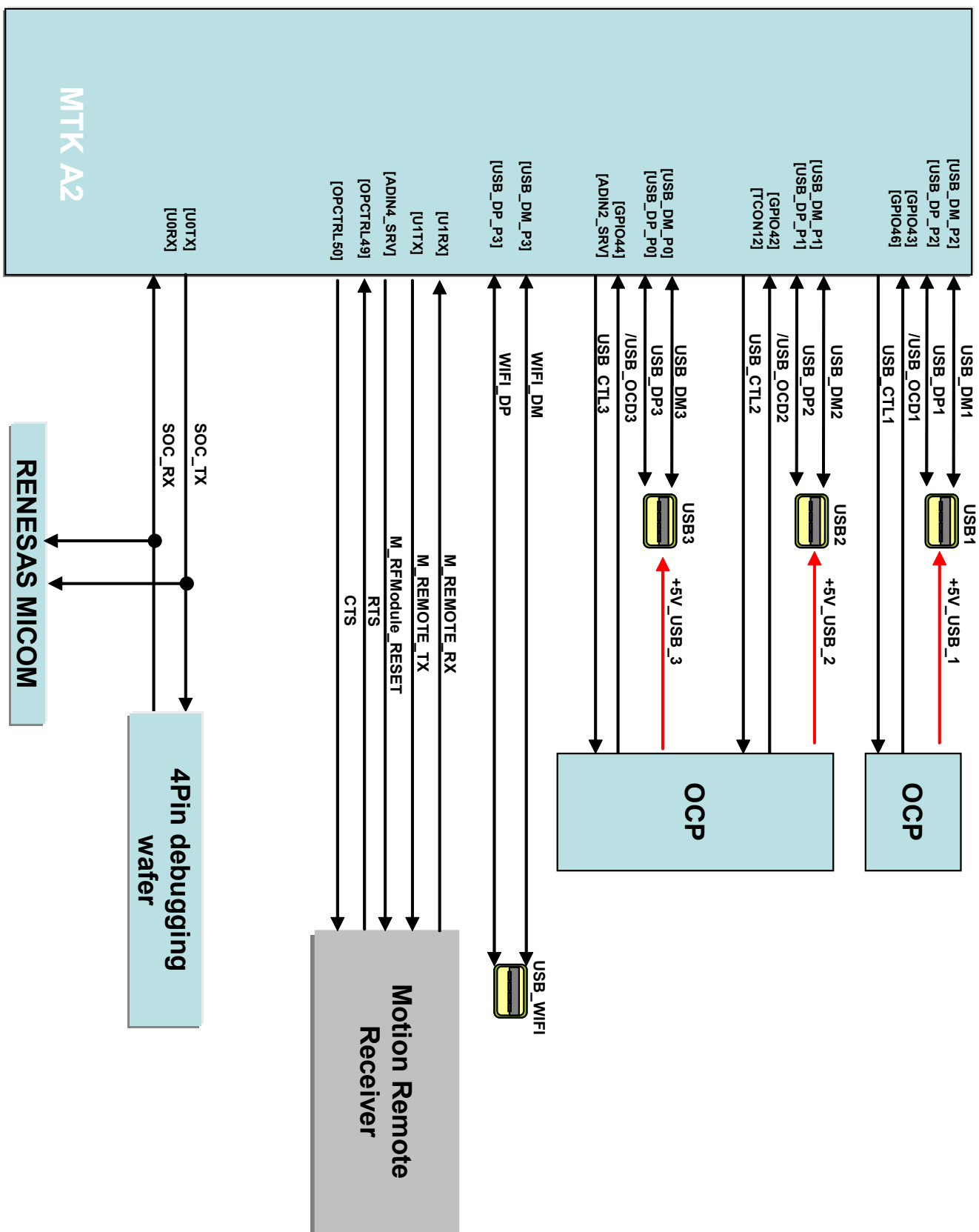








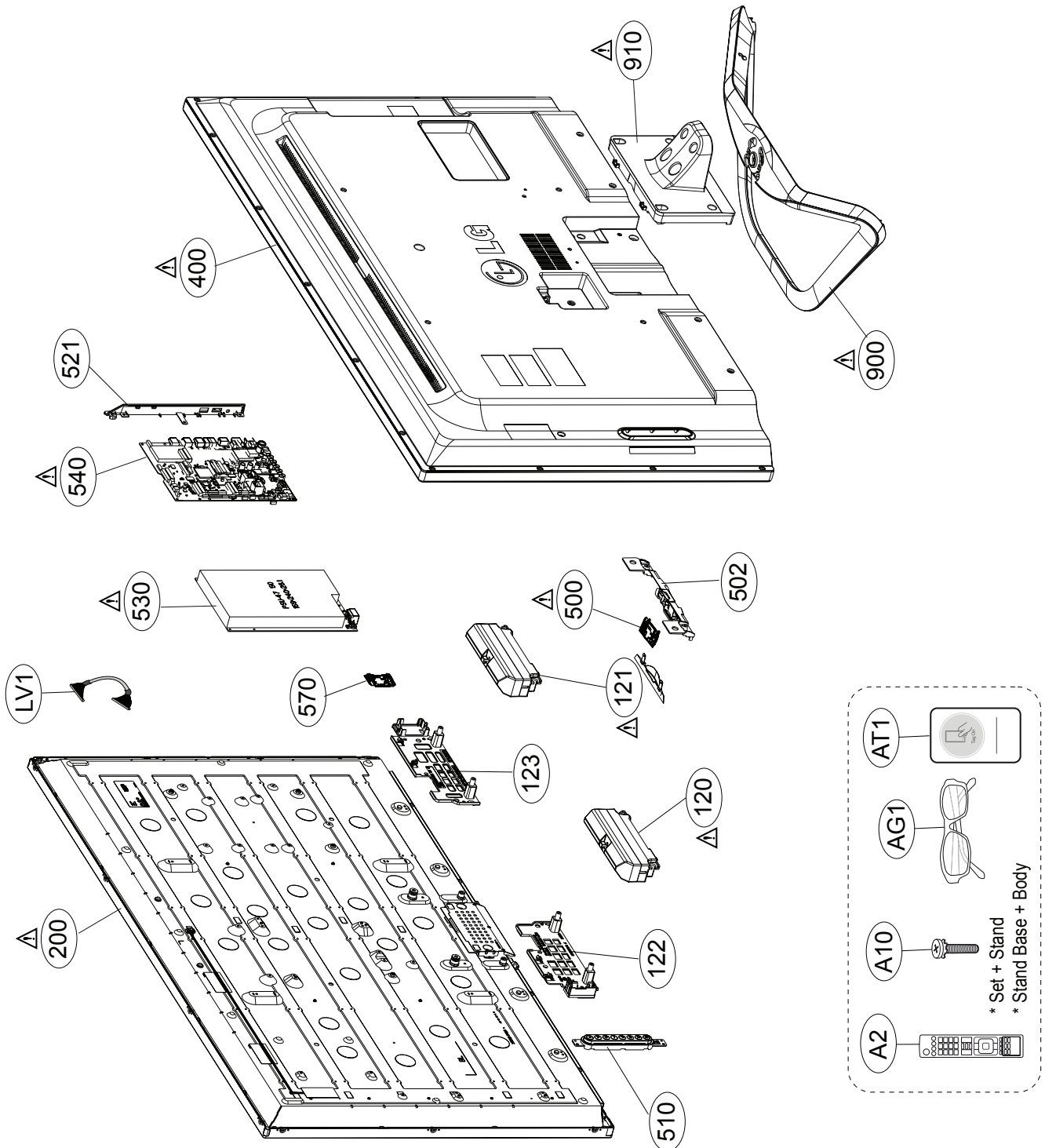




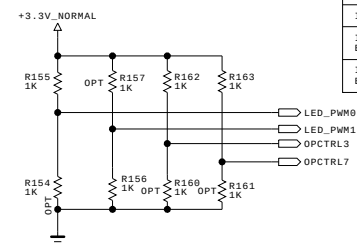
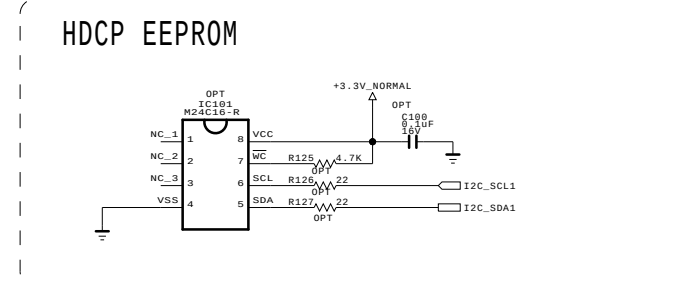
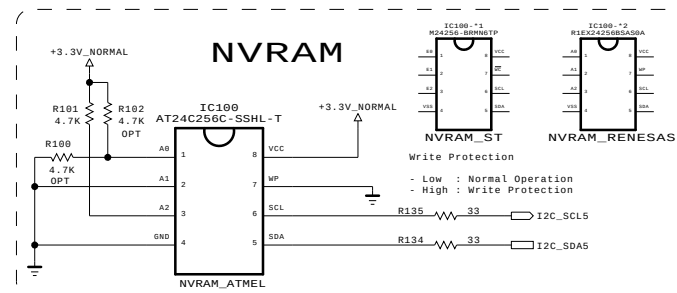
EXPLODED VIEW

IMPORTANT SAFETY NOTICE

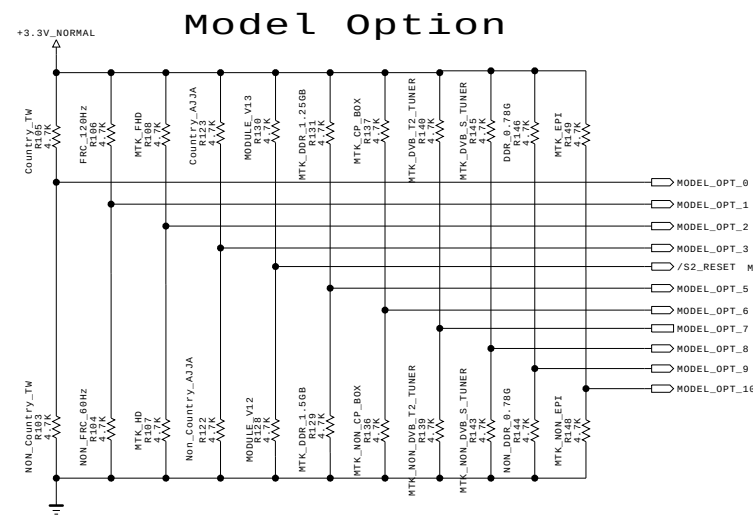
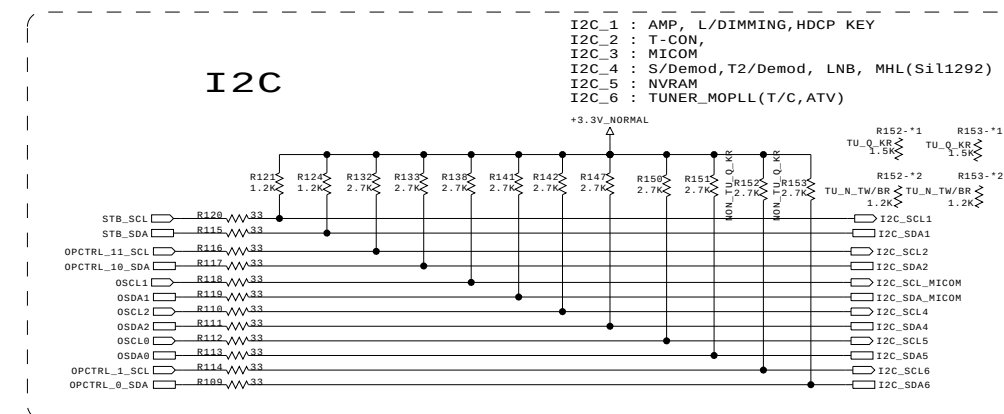
Many electrical and mechanical parts in this chassis have special safety-related characteristics. These parts are identified by Δ in the Schematic Diagram and EXPLODED VIEW. It is essential that these special safety parts should be replaced with the same components as recommended in this manual to prevent X-RADIATION, Shock, Fire, or other Hazards. Do not modify the original design without permission of manufacturer.



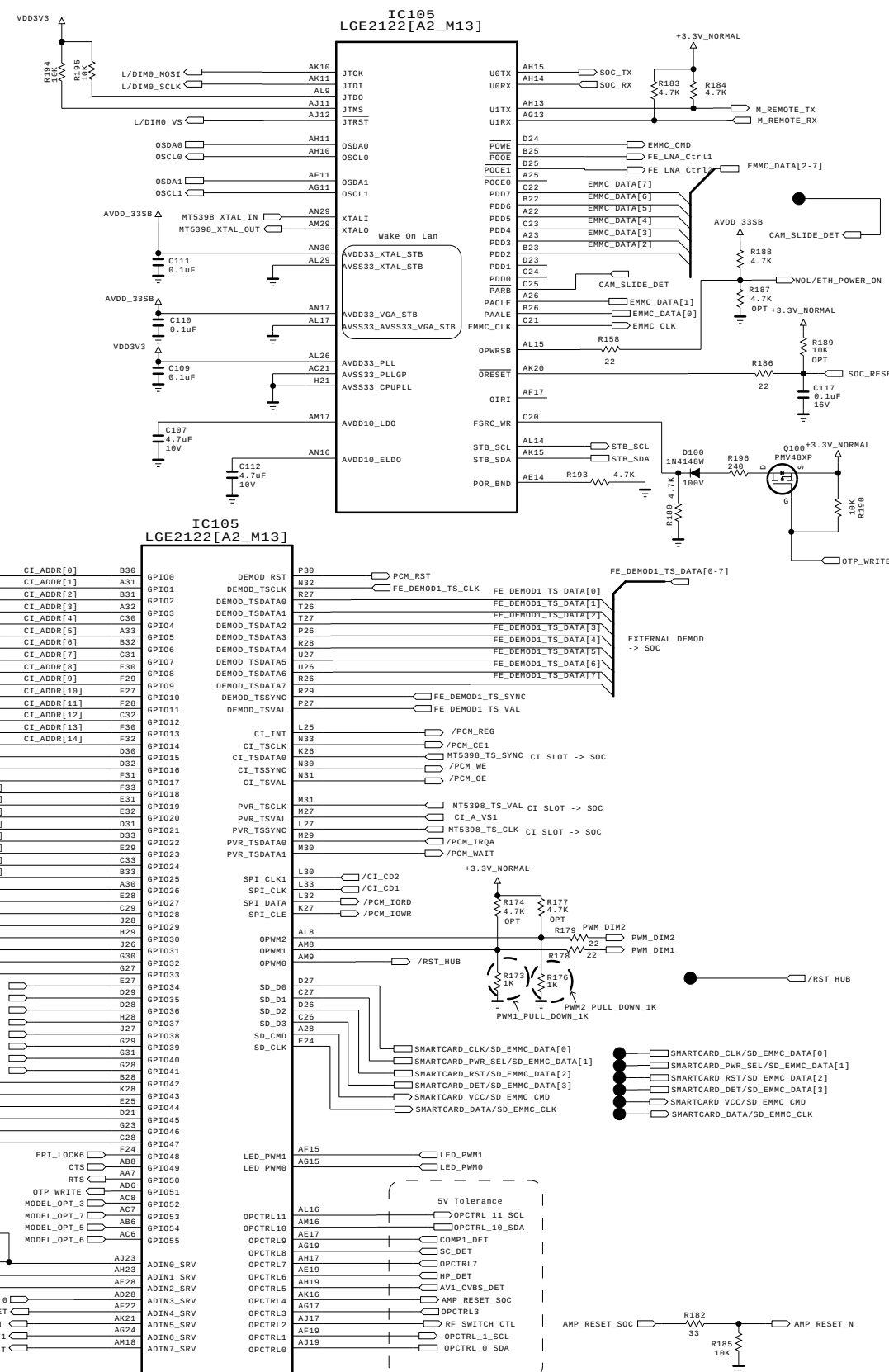
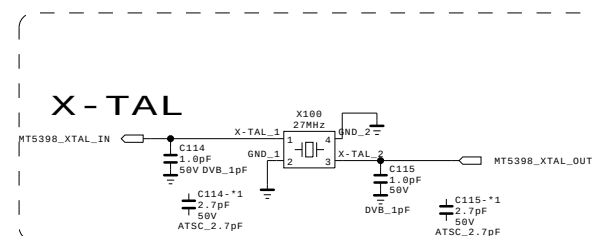
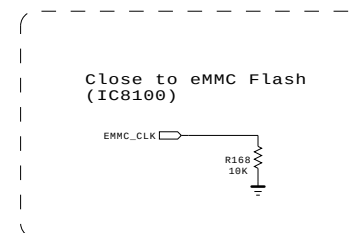
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EAX64797001* : LD33B
EAX64872101* : LA33B
```



STRAPPING	LED_PWM0	LED_PWM1	OPCTRL3	OPCTRL7
ICE mode + 27M + serial boot	1	0	0	0
ICE mode + 27M + ROM to NAND boot	1	0	0	1
ICE mode + 27M + ROM to 64bit ECC NAND boot	1	0	1	0
ICE mode + 27M + ROM to eMMC boot from eMMC pins (share pins w/s NAND)	1	0	1	1
ICE mode + 27M + ROM to eMMC boot from SDIO pins	1	1	0	0



		HIGH	LOW
MODEL_OPT_0	Country_TW	TW	Non_TW
MODEL_OPT_1	FRC	FRC(120Hz)	No FRC(60Hz)
MODEL_OPT_2	Panel	FHD	HD
MODEL_OPT_3	Country_AJJA	AJJA	Non_AJJA
MODEL_OPT_4	Module	V13	V12
MODEL_OPT_5	DDR	DDR_1.25G	DDR_1.5G
MODEL_OPT_6	CP_BOX	Enable	Disable
MODEL_OPT_7	T2 Tuner	Support	Not Support
MODEL_OPT_8	S Tuner	Support	Not Support
MODEL_OPT_9	DDR	DDR_0.78G	NON_DDR_0.78G
MODEL_OPT_10	EPI	Support	Not Support
	DDR_1.25G	DDR_1.5G	DDR_0.768G
MODEL_OPT_5	High	Low	High
MODEL_OPT_9	Low	Low	High



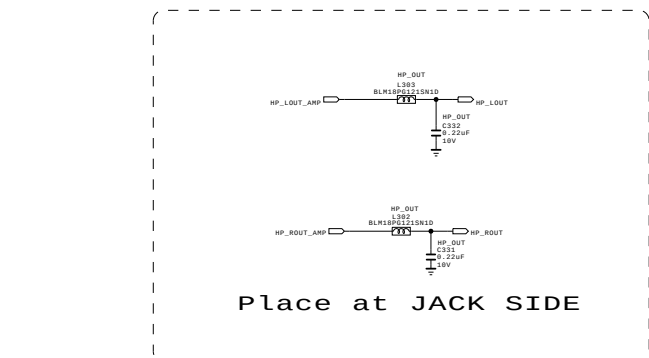
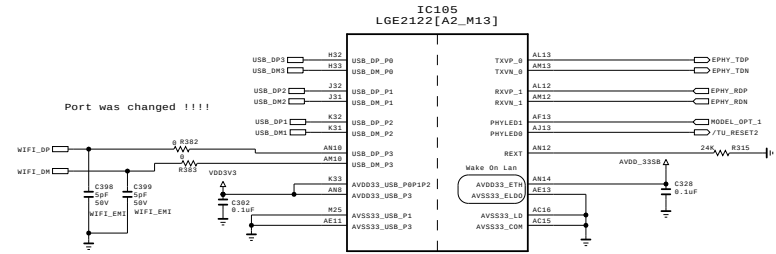
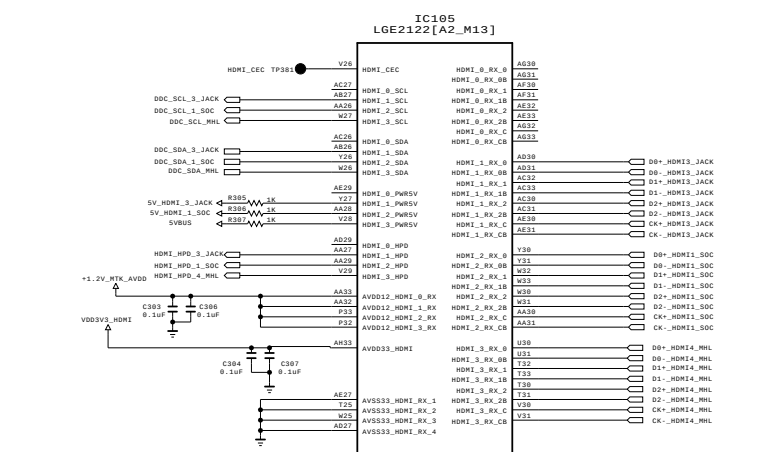
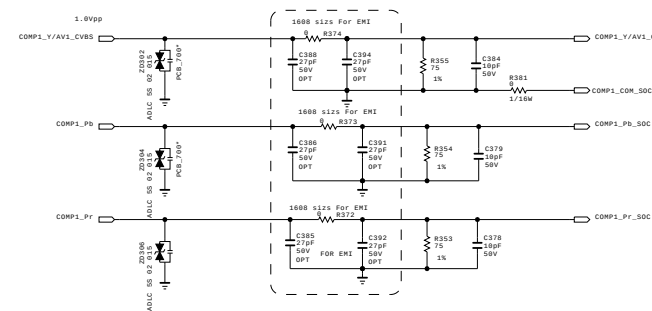
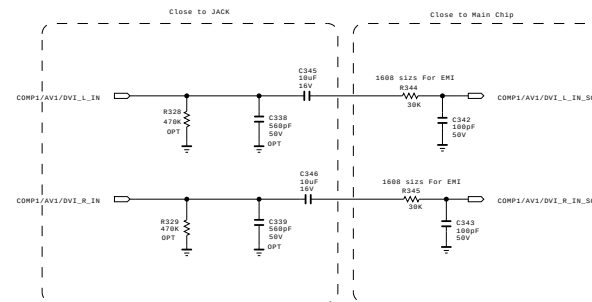
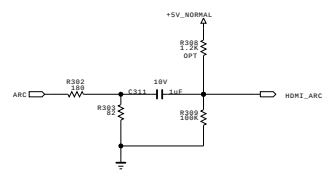
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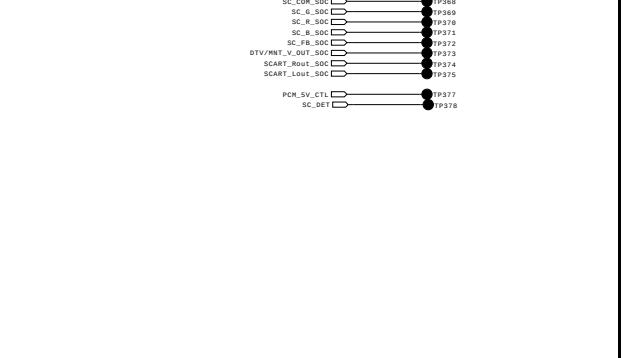
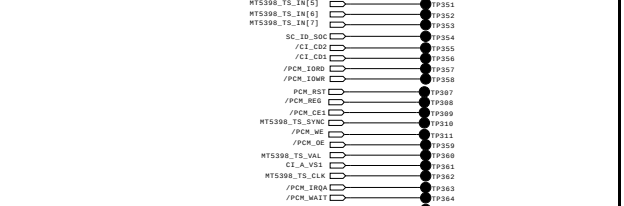
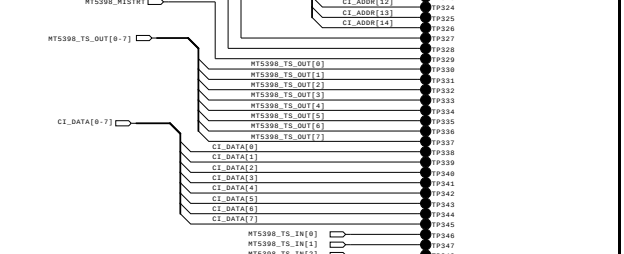
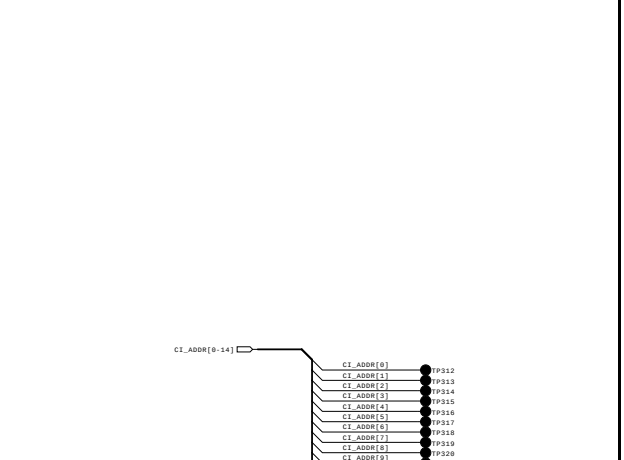
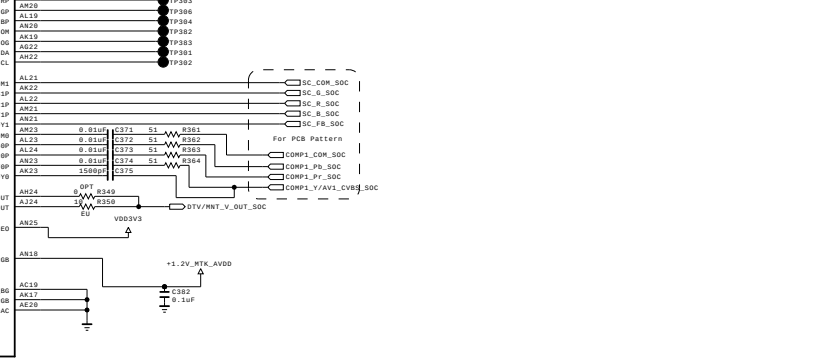
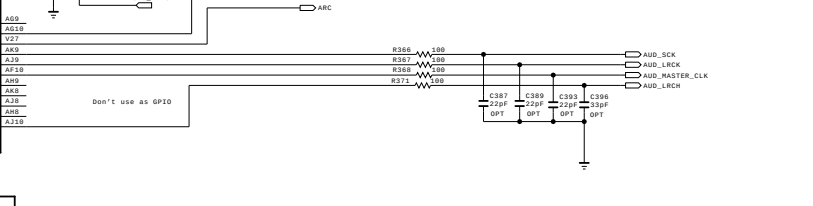
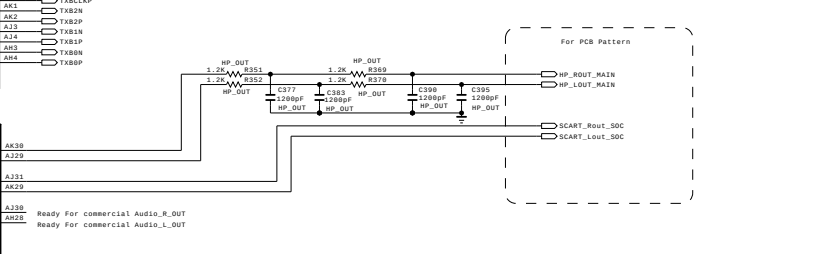
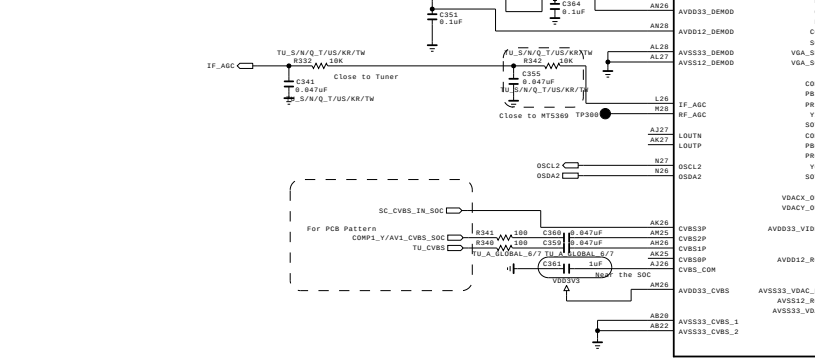
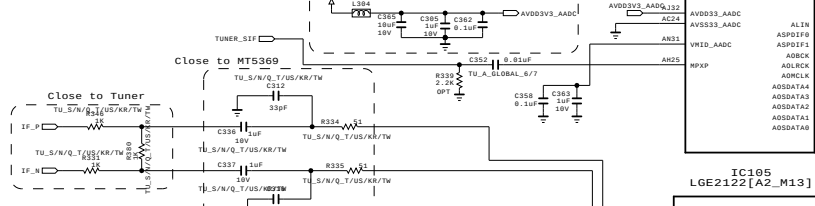
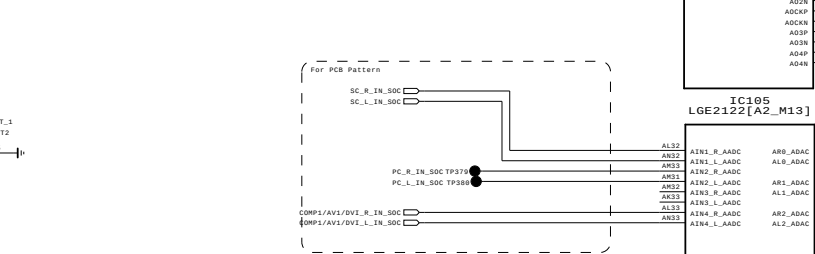
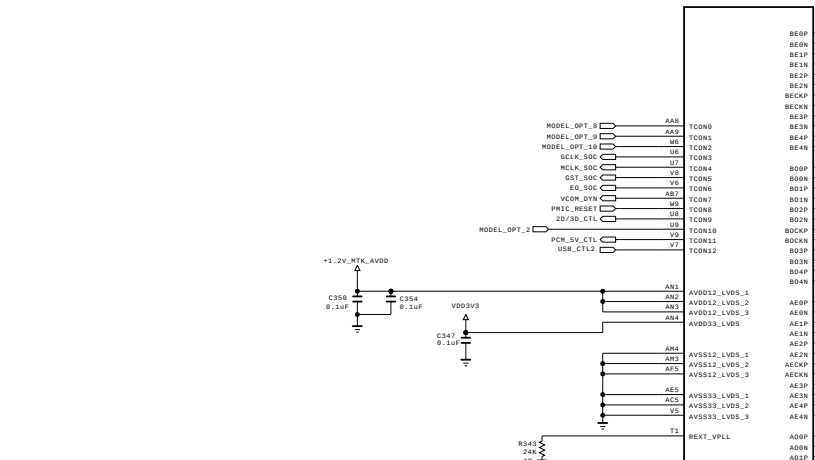
MODEL	MID_MAIN_1	DATE	2011.12.13
BLKCK		SHEET	8 /

PLACE AT JACK SIDE



Place at JACK SIDE

IC105 LG2122[A2_M13]

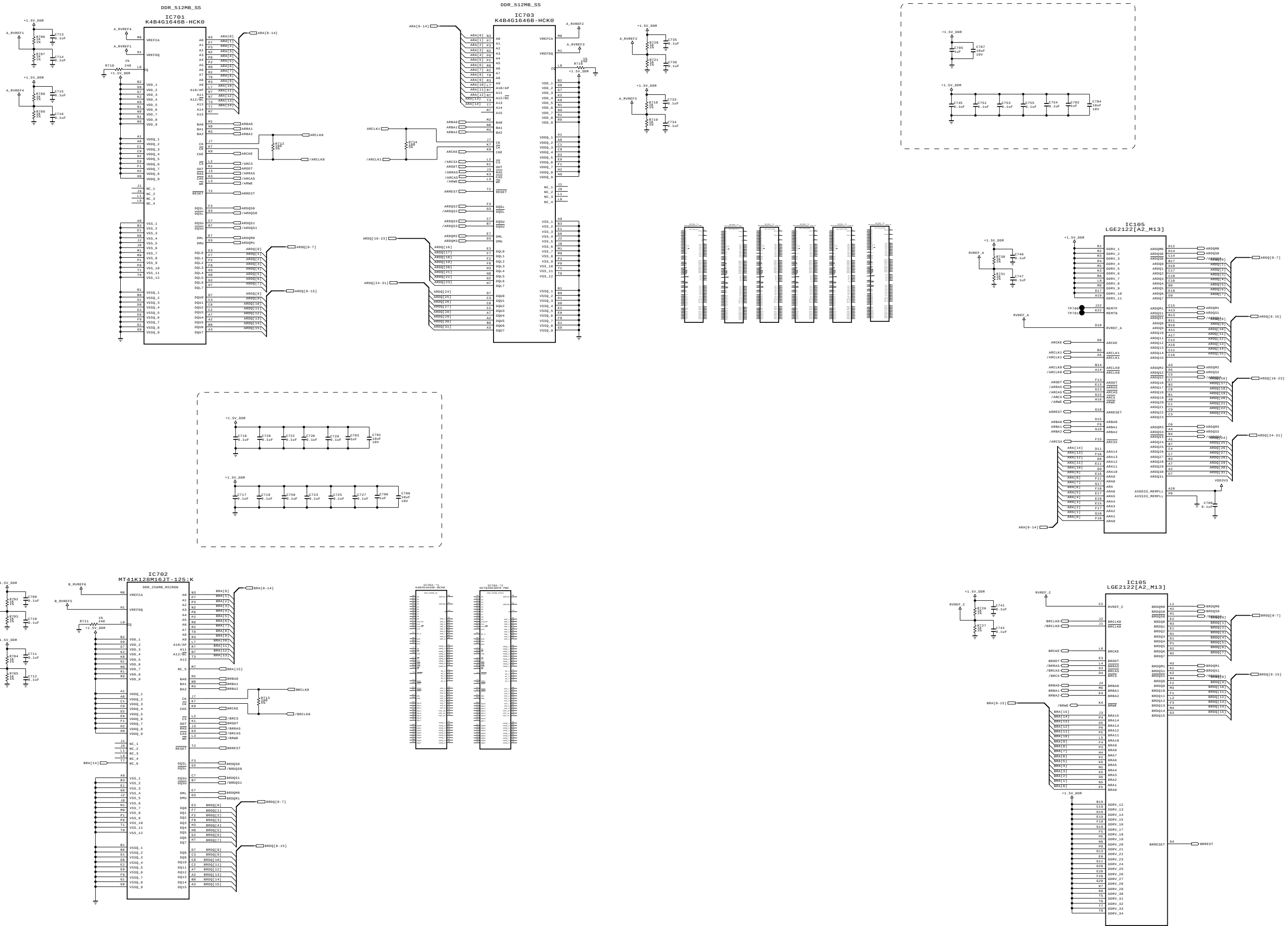


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BLOCK		SHEET	9



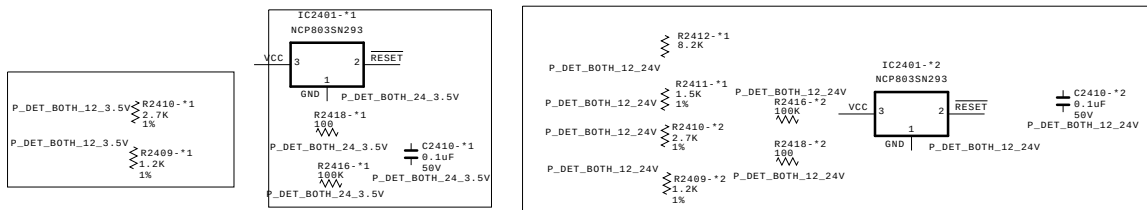
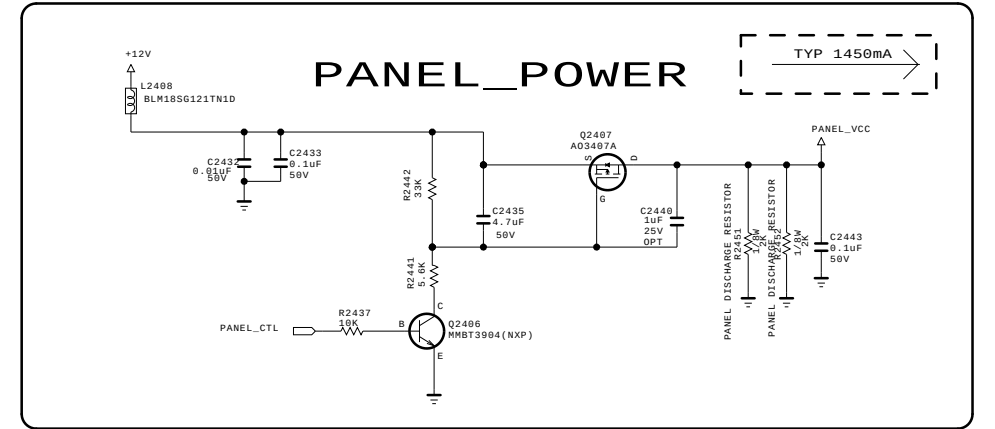
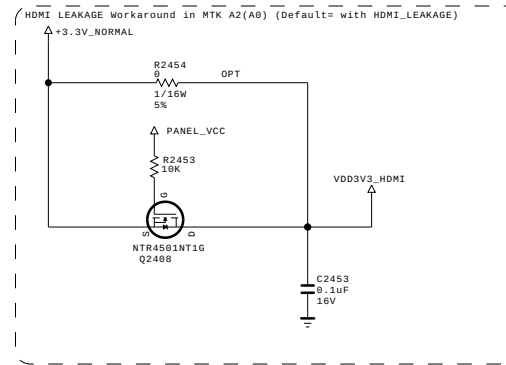
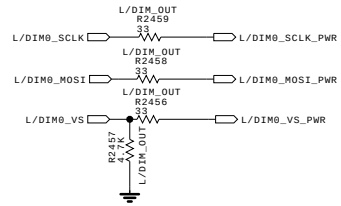
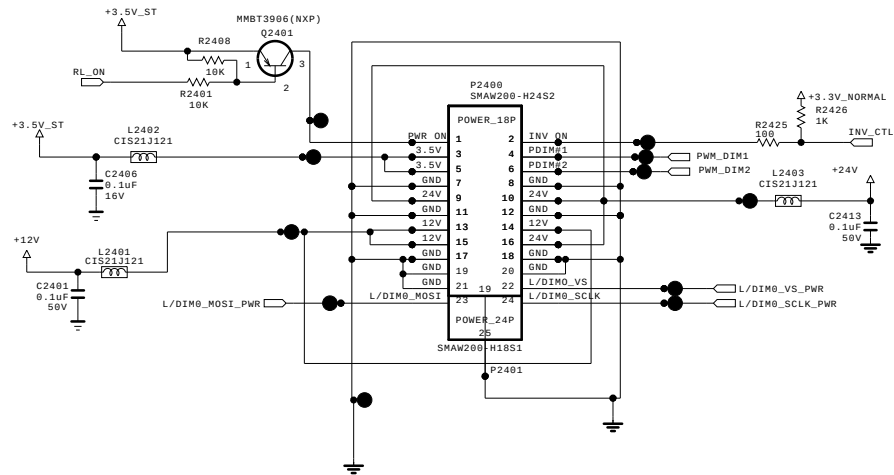
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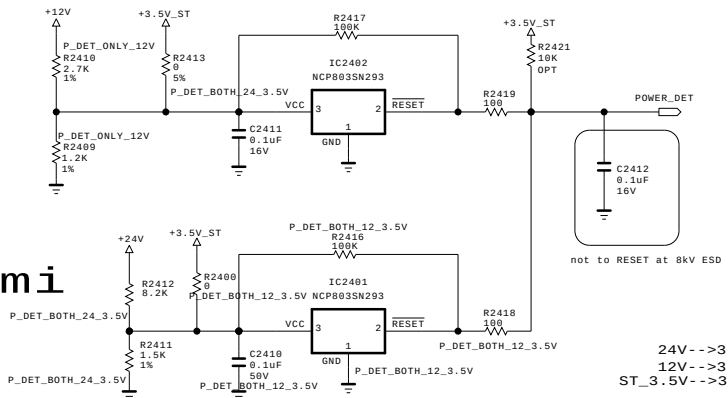
LG ELECTRONICS

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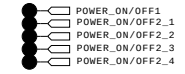
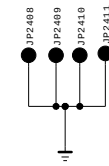
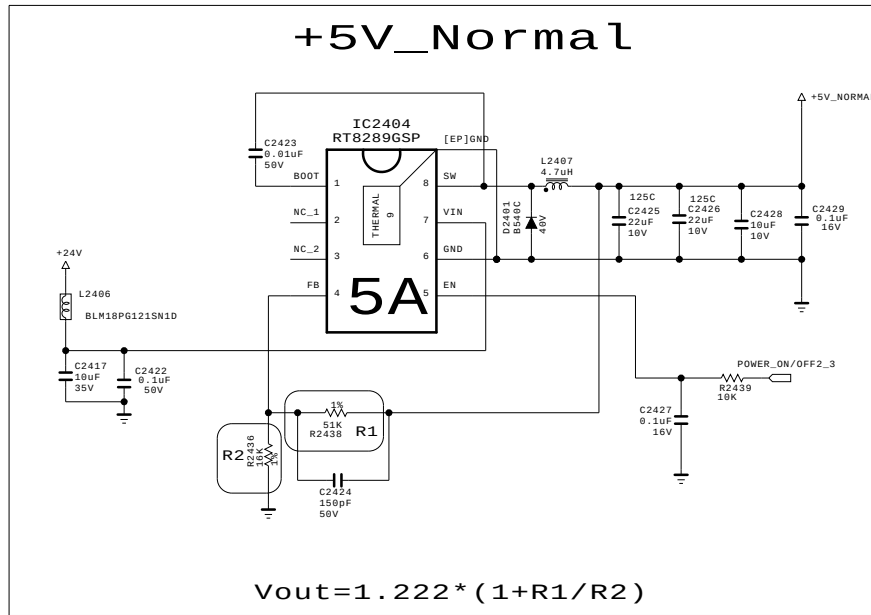
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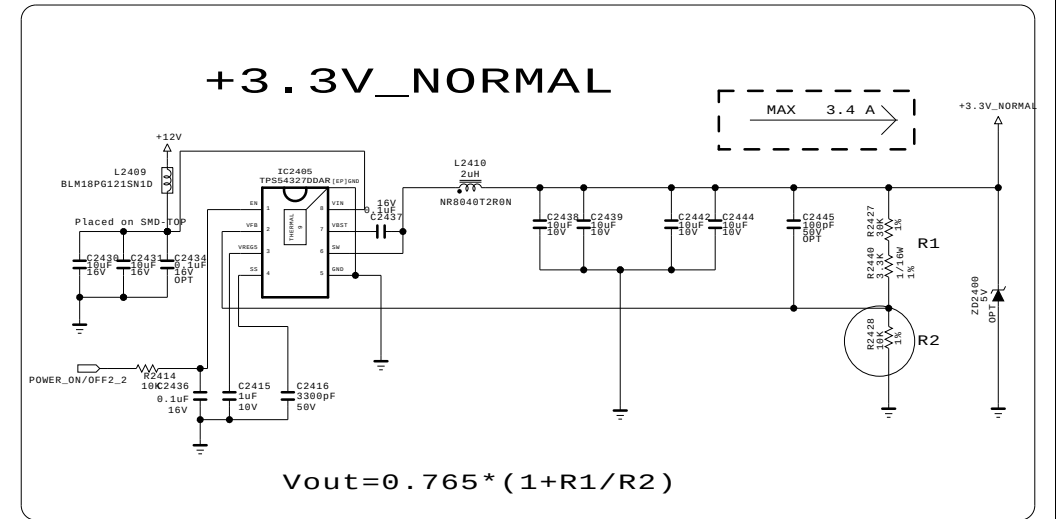
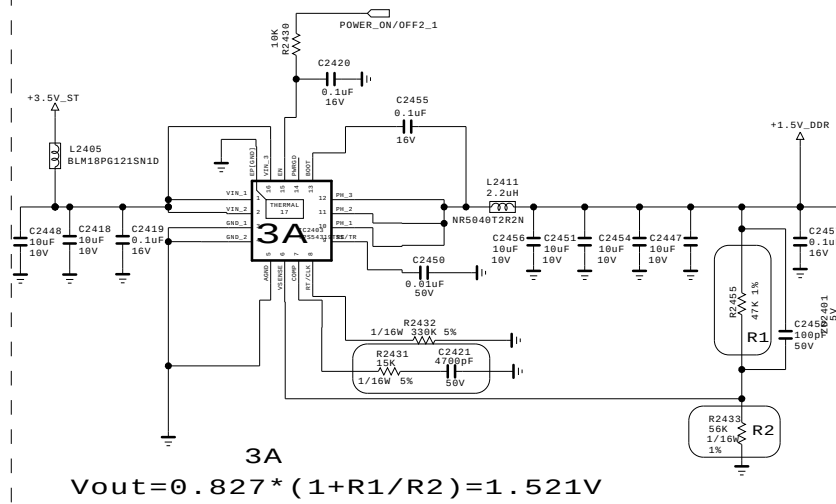
Power_DET



On - semi



DDR MAIN 1.5V



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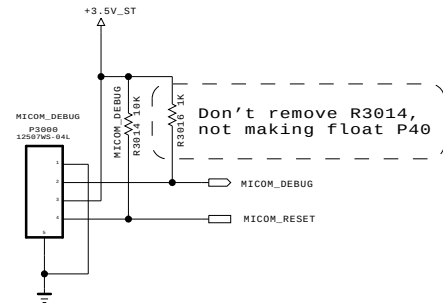
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LGElectronics



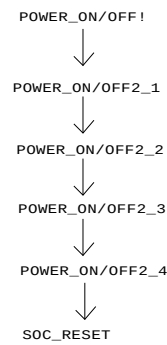
MODEL	MID_POWER	DATE	2011.11.25
BLOCK		SHEET	24 /

Renesas MICOM

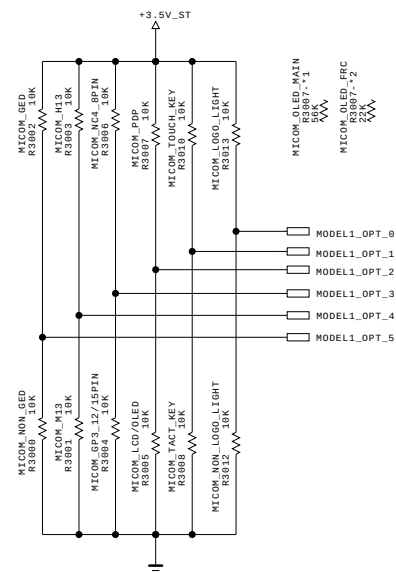
For Debug



GP4 High/MID Power SEQUENCE



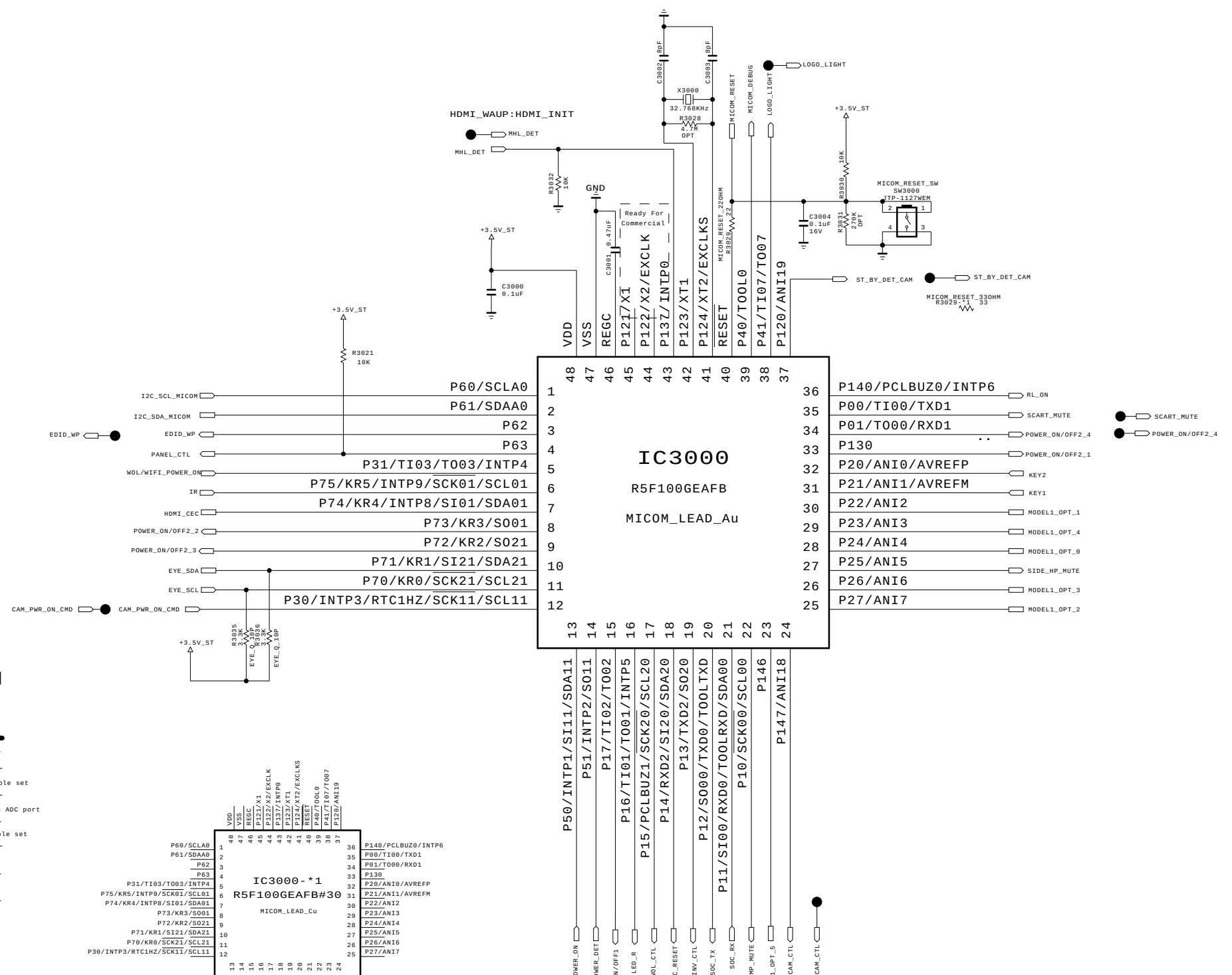
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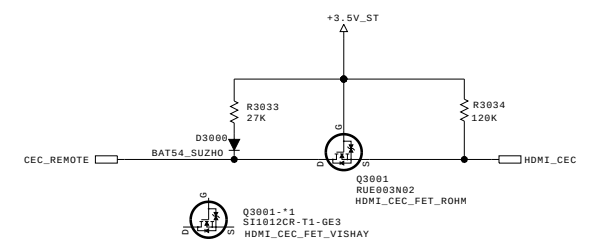
THE  SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE  SYMBOL MARK OF THE SCHEMATIC.

SECRET

LG Electronics



For CEC



MODEL
BLOCK

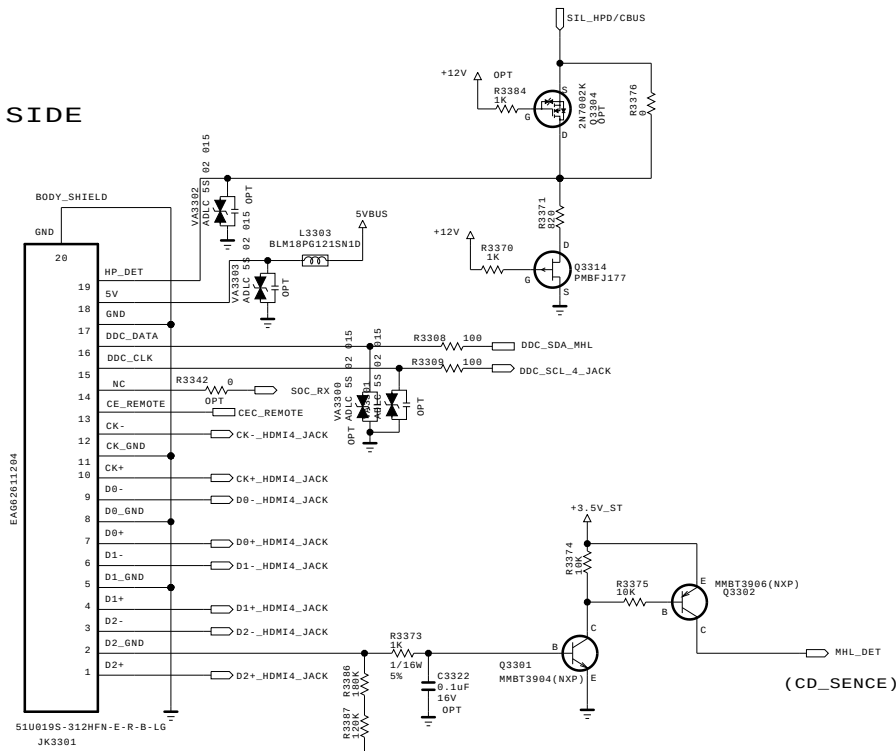
MICOM

DATE
SHEET

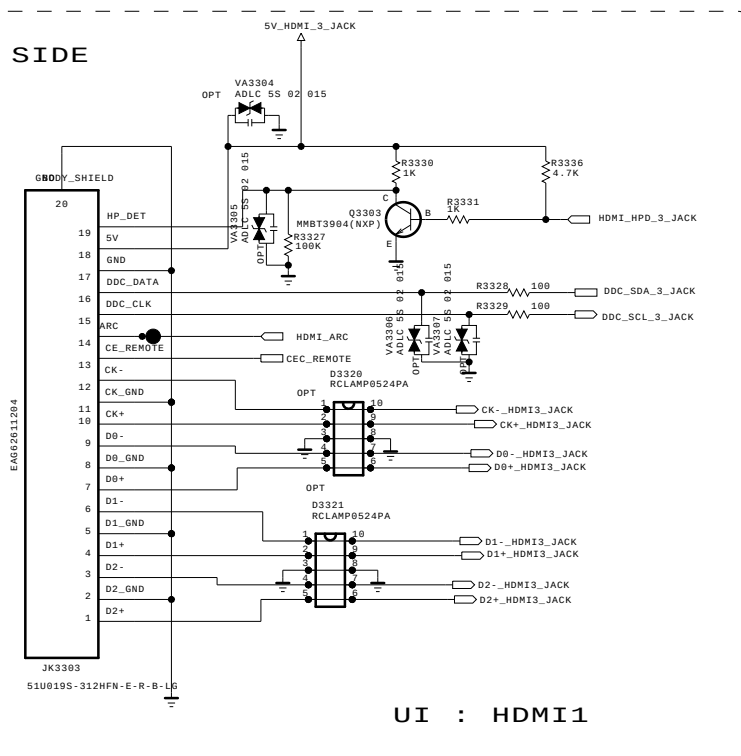
2012.02.22

30

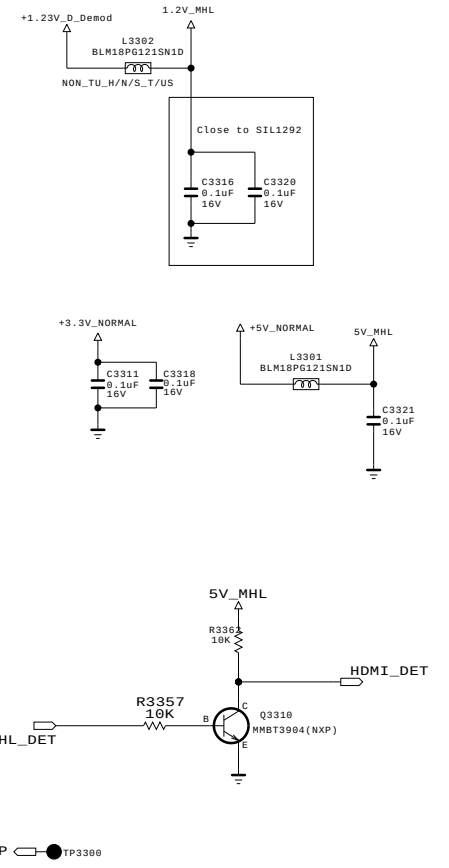
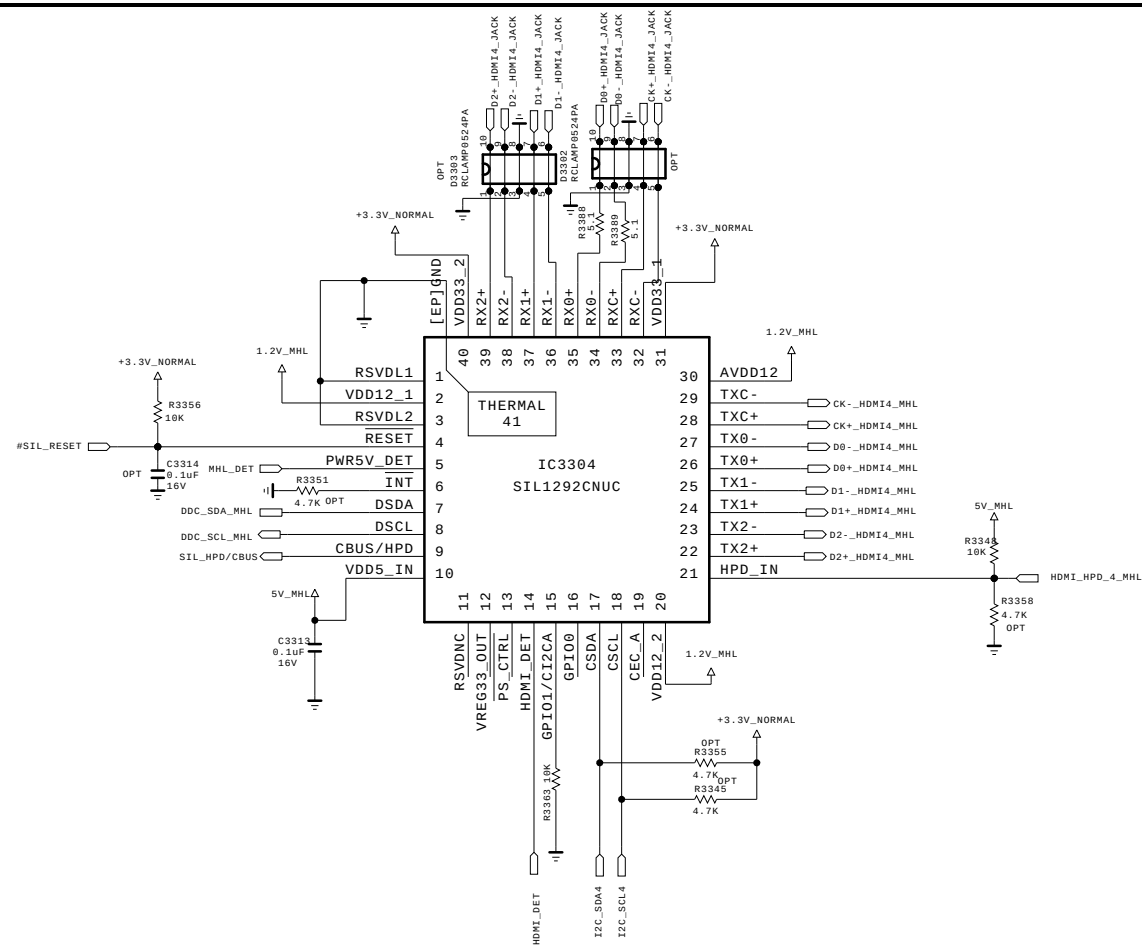
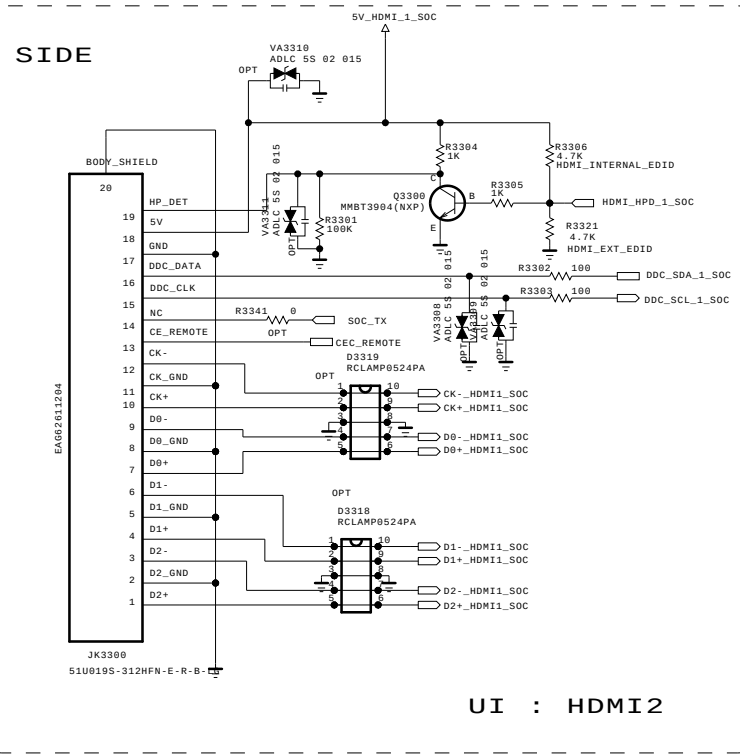
SIDE



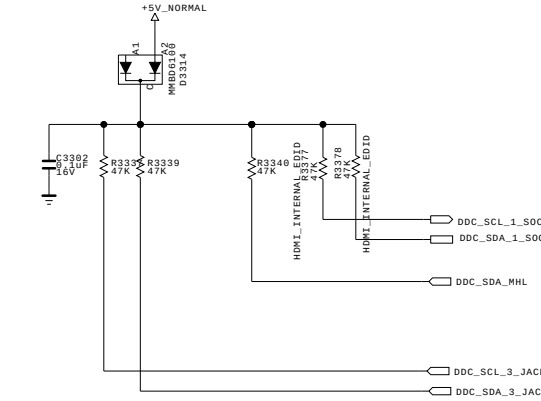
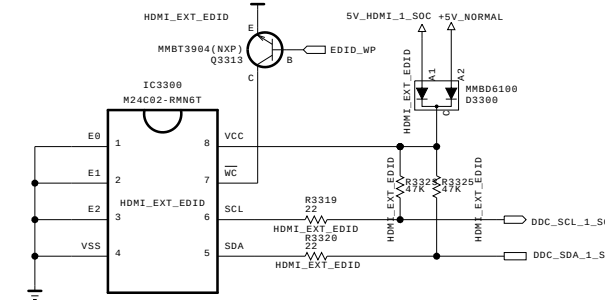
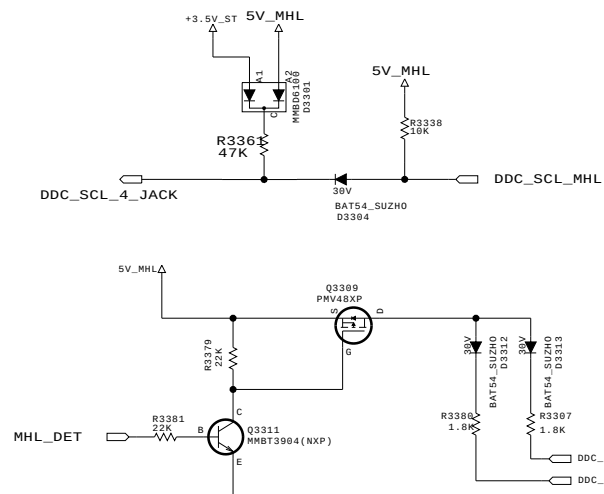
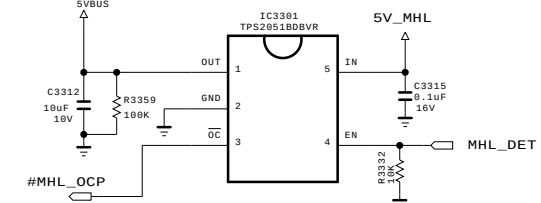
SIDE



SIDE



Current Limit



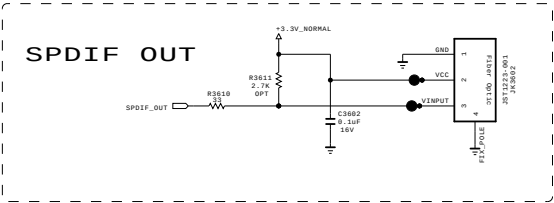
THE SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE SYMBOL MARK OF THE SCHEMATIC.

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LG ELECTRONICS

MODEL	HDMI 4	DATE	2011.10.29
BLOCK		SHEET	33

SPDIF

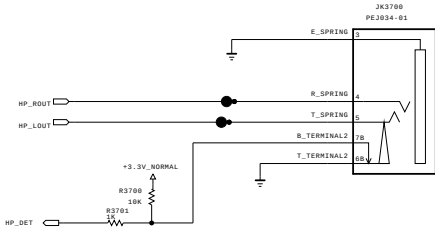


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MODEL	JACK HIGH / MID	DATE	2011.11.21
BLOCK		SHEET	36 /

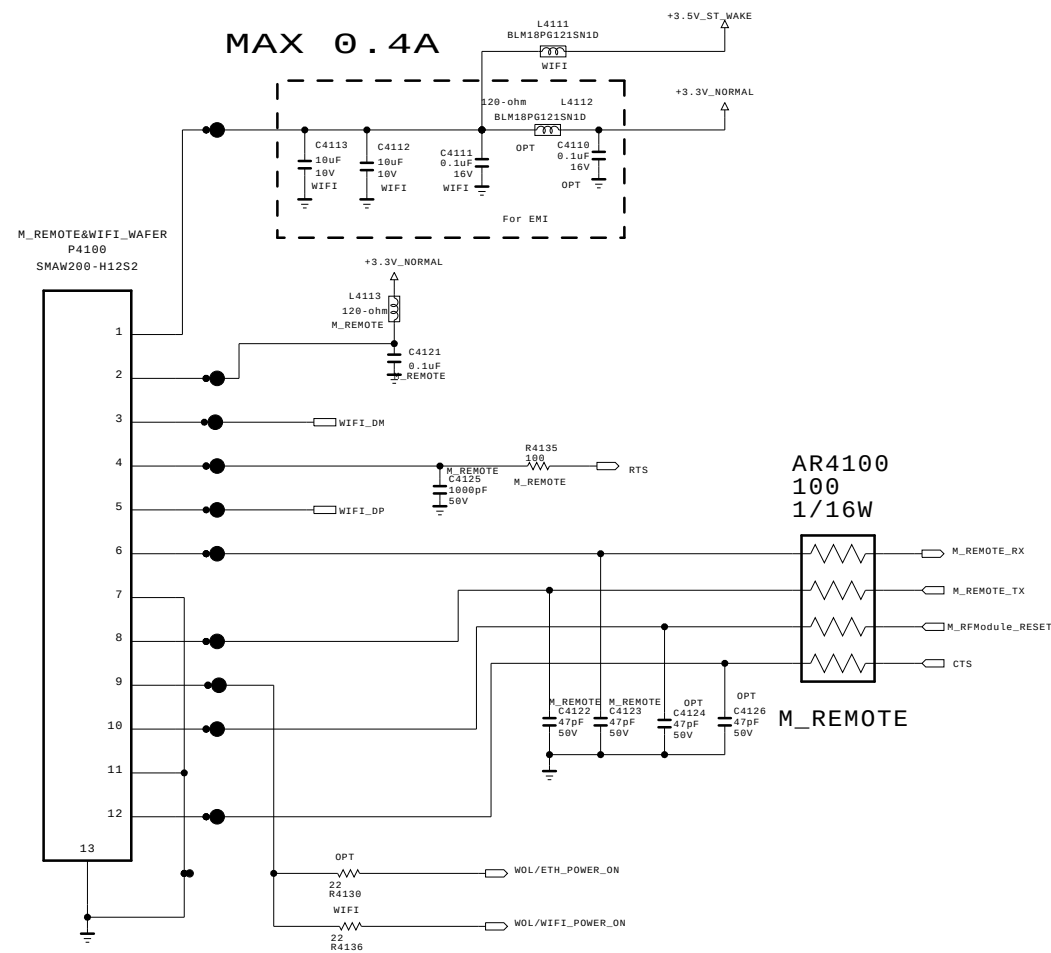
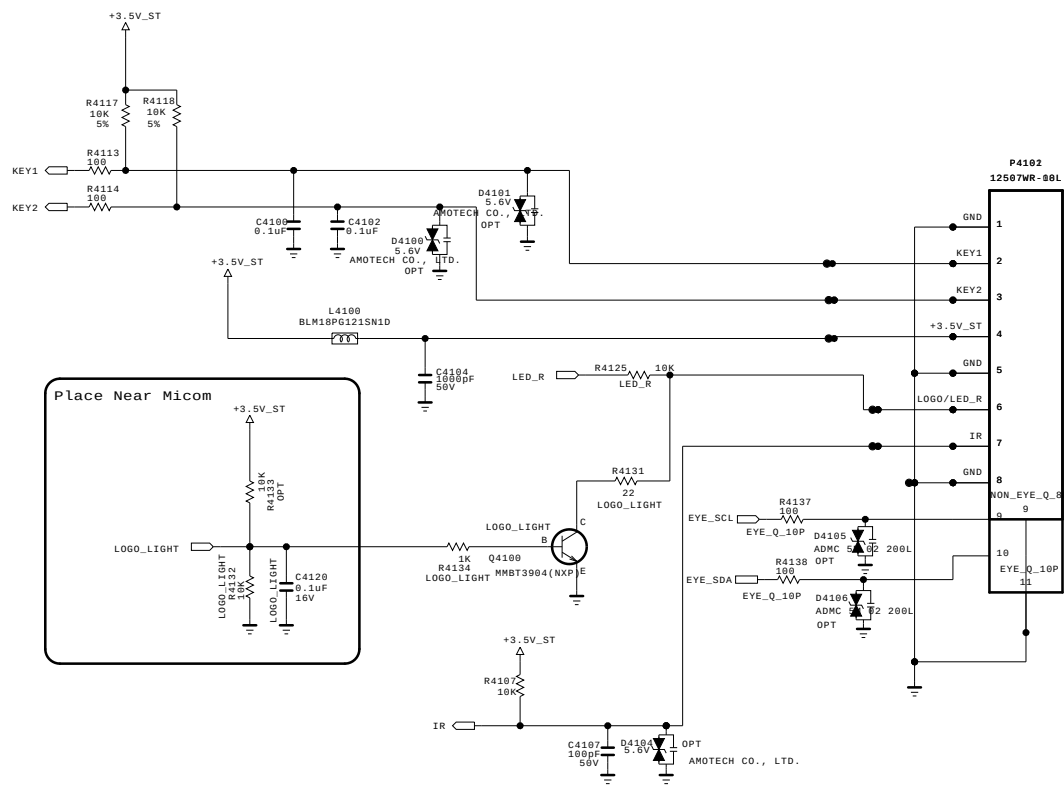


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SECRET
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MODEL	JACK_COMMON	DATE	2011.11.21
BLOCK		SHEET	37 /

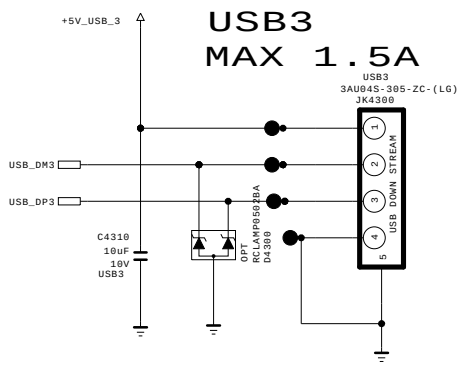
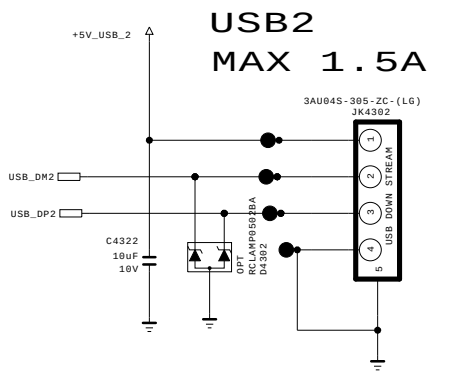
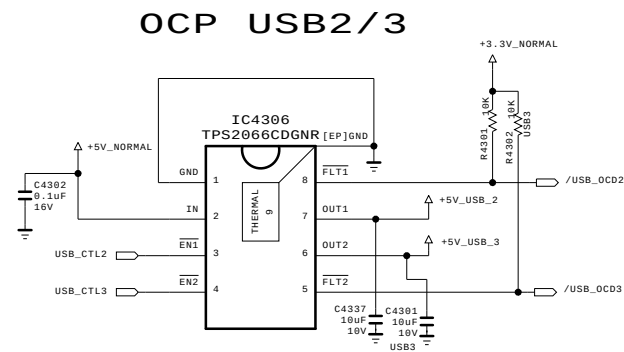


THE  SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE  SYMBOL MARK OF THE SCHEMATIC.

SECRET
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 LG ELECTRONICS

MODEL	IR / KEY	DATE	2011.11.21
BLOCK		SHEET	41 /

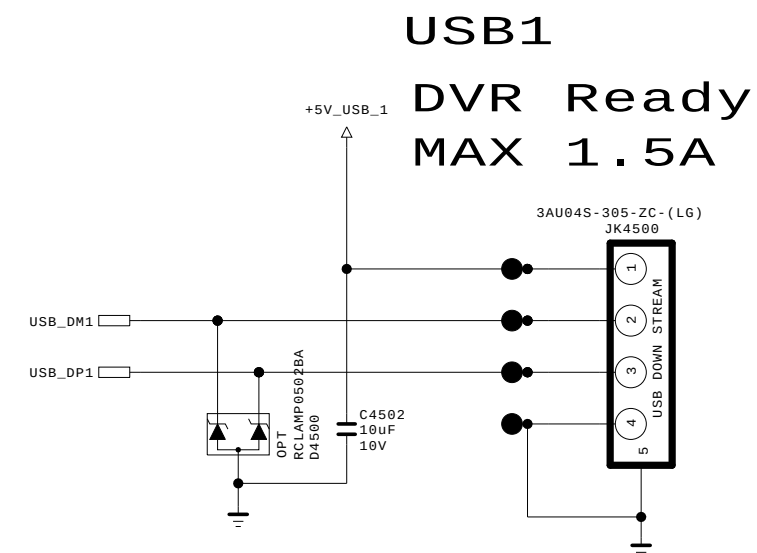
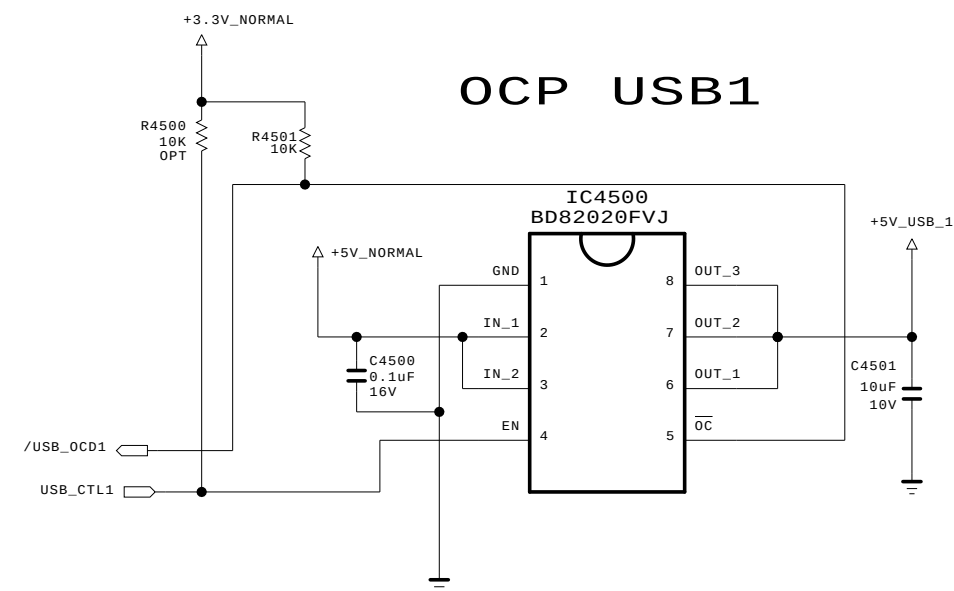


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SECRET
LGElectronics



MODEL	USB2_USB3	DATE	2012.7.11
BLOCK		SHEET	43 /



THE  SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFATURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE  SYMBOL MARK OF THE SCHEMATIC.

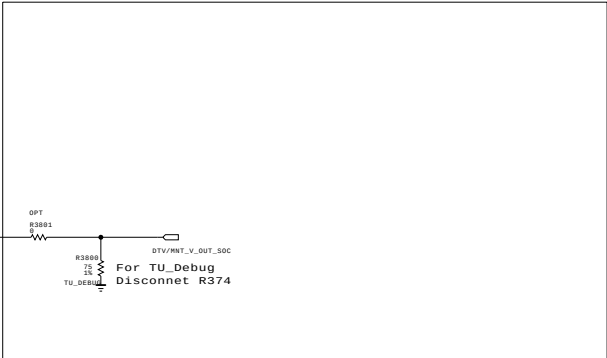
SECRET	 LG ELECTRONICS
LGElectronics	

MODEL		DATE	
BLOCK		SHEET	/

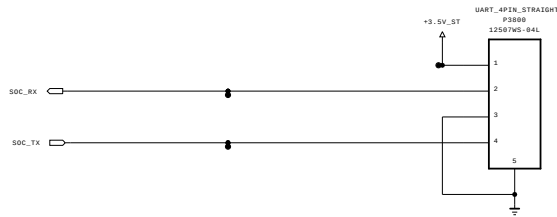
Eye sensor JIG POINT



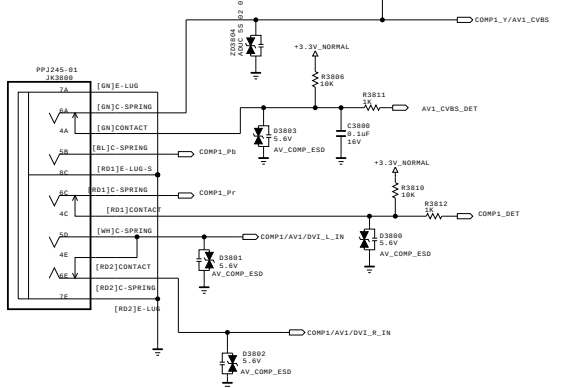
DEBUG FOR INTERNAL AMOD.



UART FOR DEBUG



AV/COMPONENT REAR



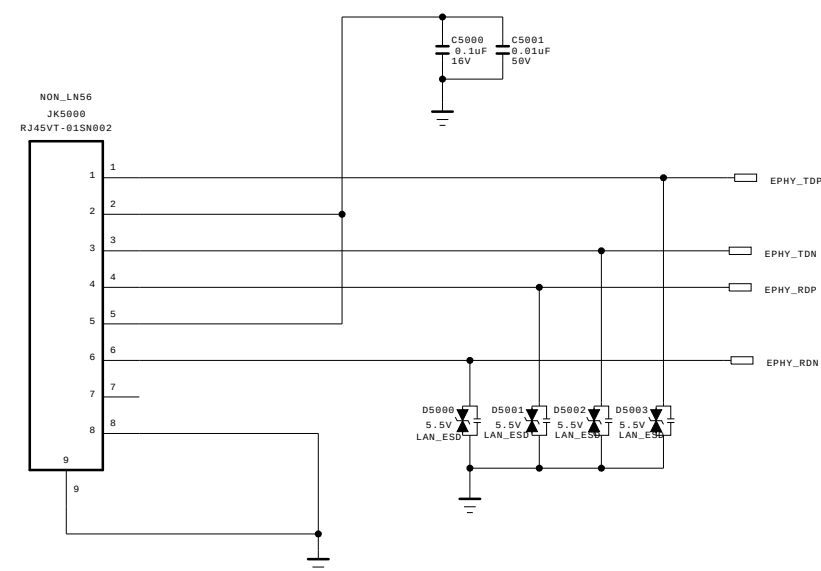
THE  SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE  SYMBOL MARK OF THE SCHEMATIC.

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MODEL	JACK_COMMON	DATE	2011.11.21
BLOCK		SHEET	38 /

Ethernet Block



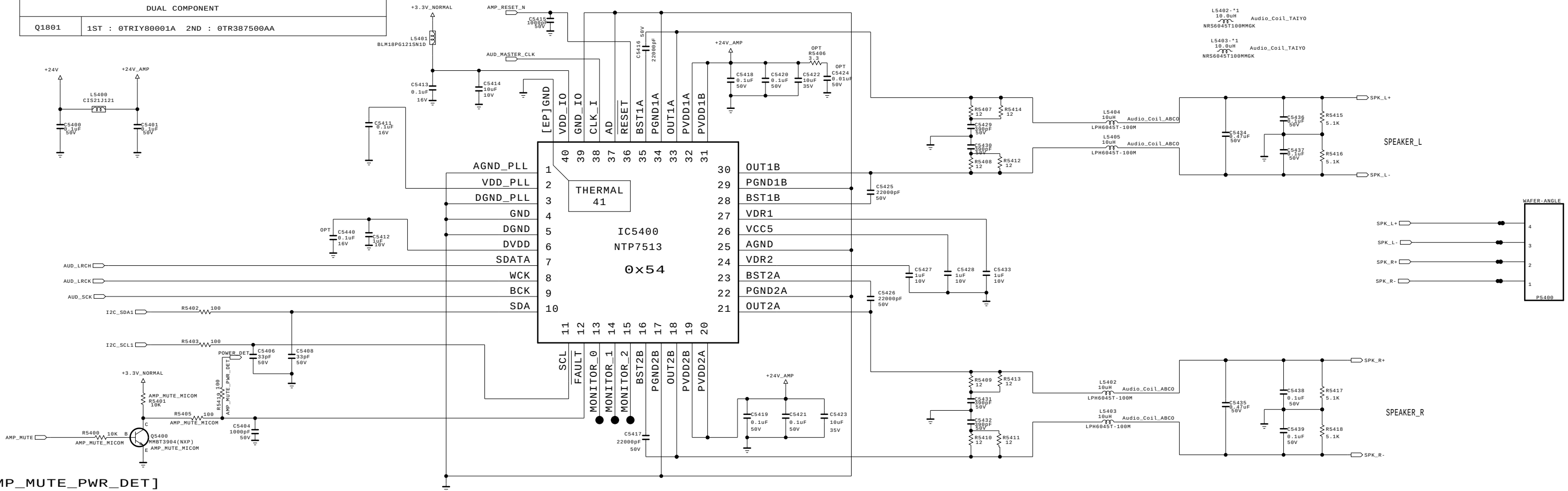
THE ⚠ SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFATURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMATIC.

SECRET
LGElectronics



MODEL	LAN_VERTICAL	DATE	2012.03.08
BLOCK		SHEET	50 /

DUAL COMPONENT		
Q1801	1ST : 0TRIY80001A	2ND : 0TR387500AA



[AMP_MUTE_PWR_DET]
 -->For fixing AC-OFF POP noise 32"POLA/ROW model
 -->32"POLA/ROW LPB's 3.5st drop time is very fast

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SECRET
 LGElectronics

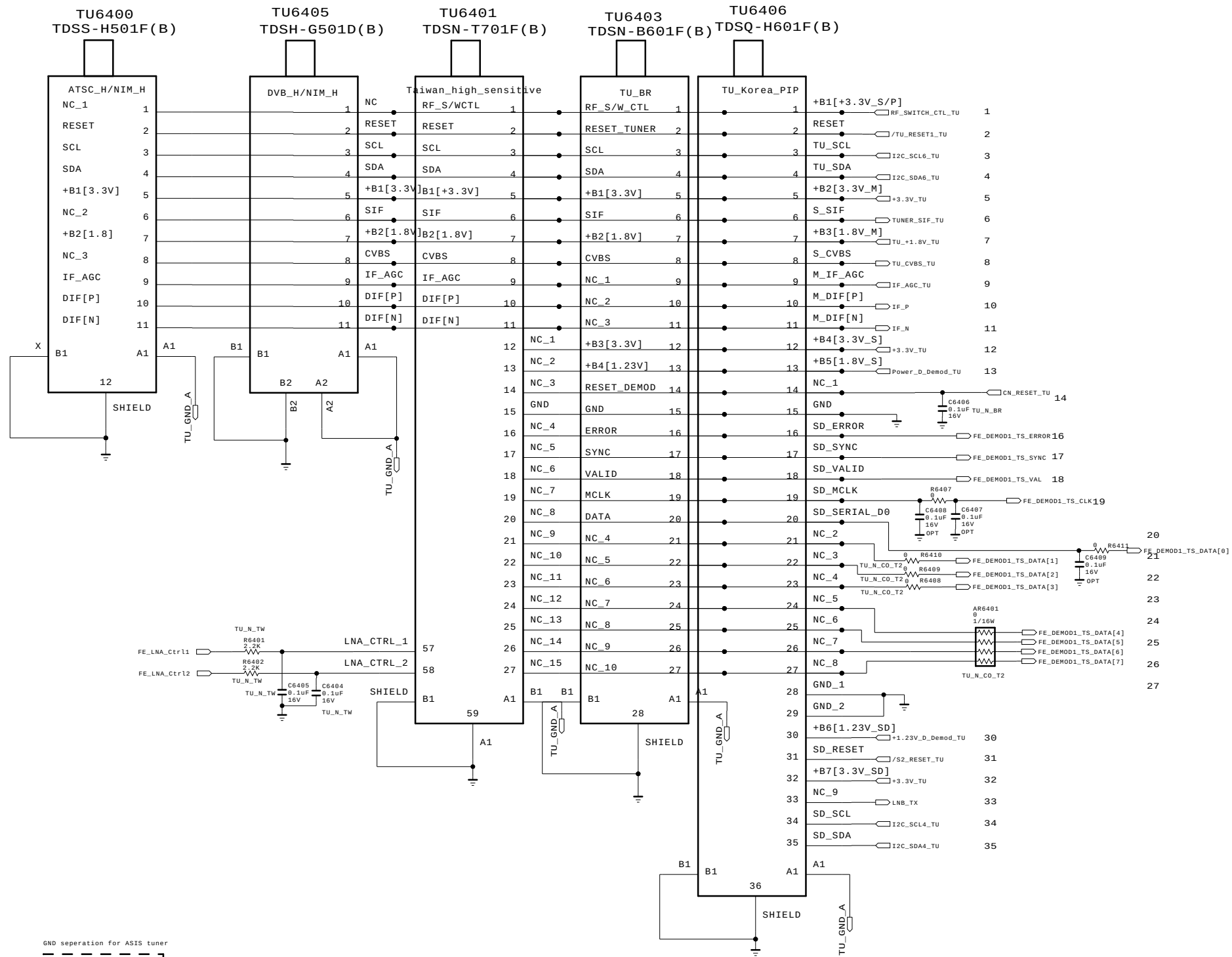


MODEL	AMP_NEO	DATE	2011.11.21
BLOCK		SHEET	54 /

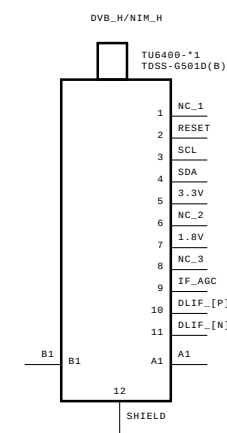
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SECRET	 LG ELECTRONICS
LGElectronics	

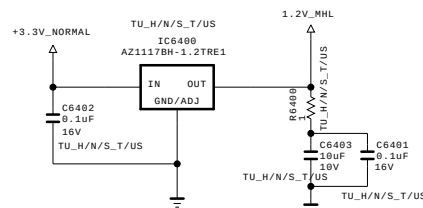
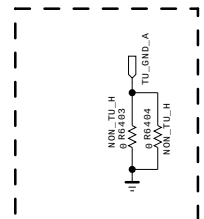
LGE Internal Use Only



TUNER MULTI-OPTION



GND separation for ASIS tuner

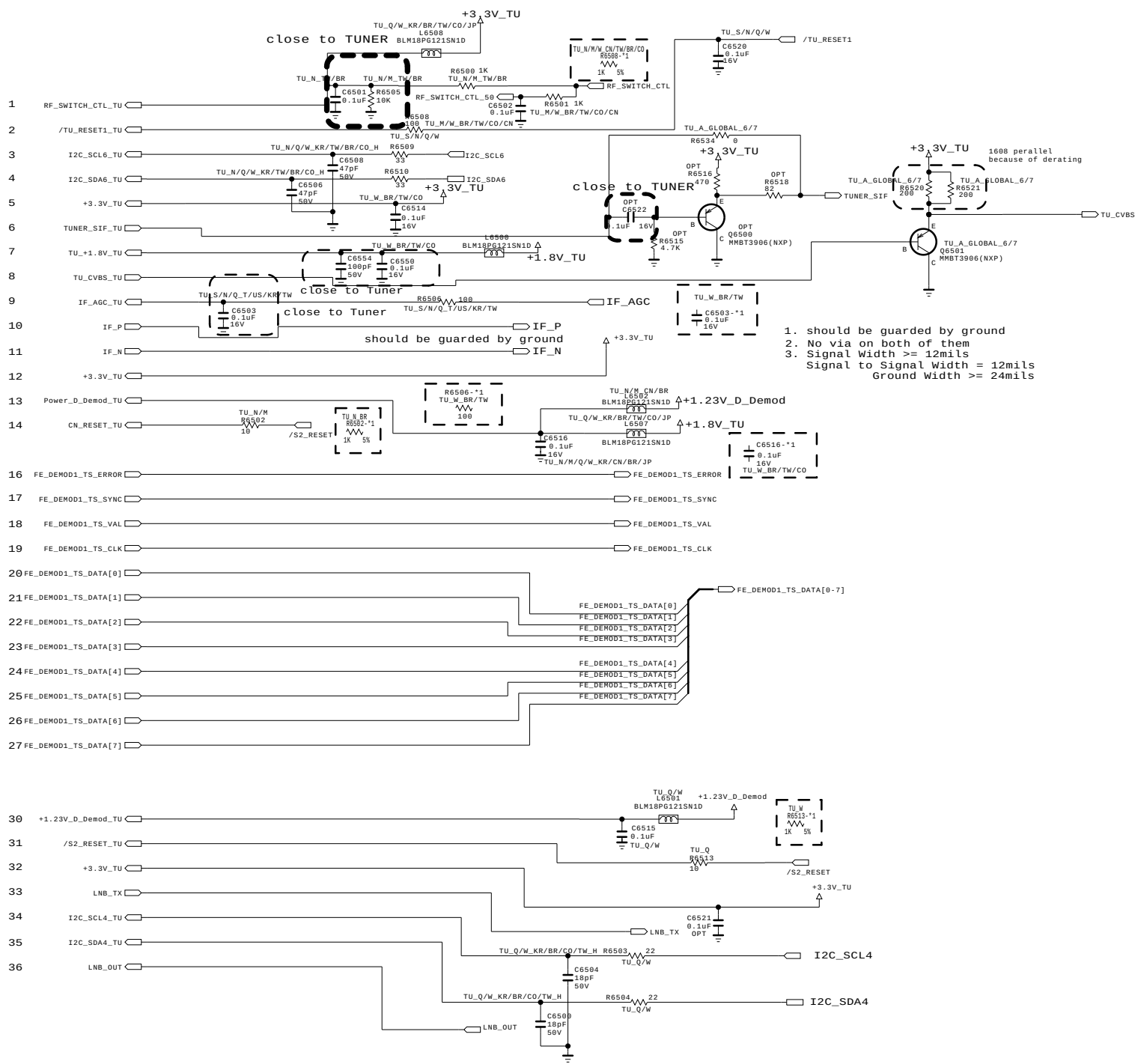
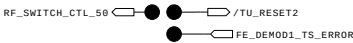


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LGElectronics



MODEL	TUNER	DATE	2012.03.08
BLOCK		SHEET	65



- 1. should be guarded by ground
- 2. No via on both of them
- 3. Signal Width >= 12mils
Signal to Signal Width = 12mils
Ground Width >= 24mils

Global F/E Option Name

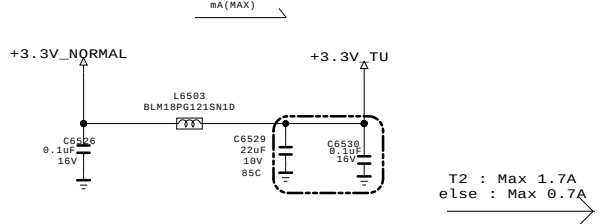
- 1. TU
- 2. Tuner Name = TDS'S',TDS'Q'...
- 3. Country Name = T,T2,S2,KR,US,BR ...

Example of Option name

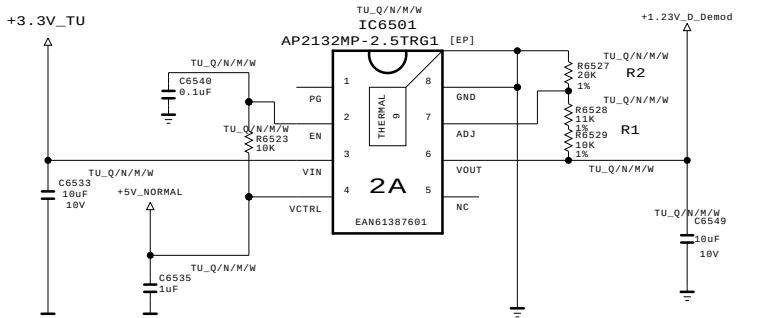
TU_Q_T2 = apply TDSQ type tuner and T2 country
TU_M/W = apply TDSM&TDSW Type Tuner

13' Tuner Type for Global

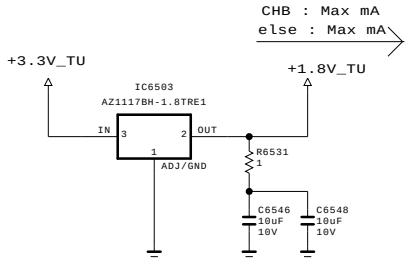
- TDS'S'-G501D : T/C Half NIM Horizontal Type
- TDS'Q'-G501D : T/C/S2 Combo Horizontal type
- TDS'Q'-G601D : T2/C/S2 Combo Horizontal Type
- TDS'Q'-G651D : T2/C/S2 Combo Vertical Type
- TDS'M'-C601D : China NIM with Isolater Type
- TDS'W'-J551F : Japan Dual NIM
- TDS'W'-B651F : Brazil 2Tuner
- TDS'W'-A651F : Taiwan 2Tuner
- TDS'W'-K651F : Colombia DVB-T2 2Tuner



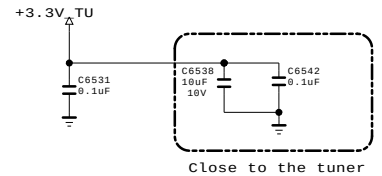
T2 : Max 1.7A
else : Max 0.7A



$$V_{out} = 0.6 * (1 + R1/R2)$$



CHB : Max mA
else : Max mA



Close to the tuner

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SECRET
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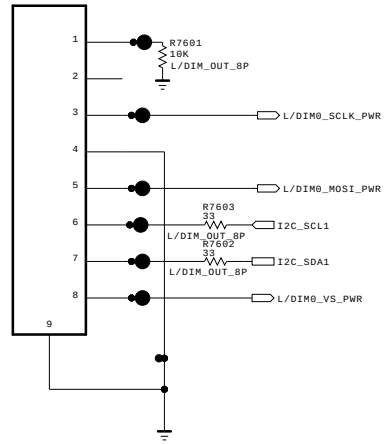
LG ELECTRONICS

MODEL	TUNER	DATE	2012.07.10
BLOCK		SHEET	65

LOCAL DIMMING

[To LED DRIVER]

P7600
12507MR-08L
L/DIM_OUT_8P

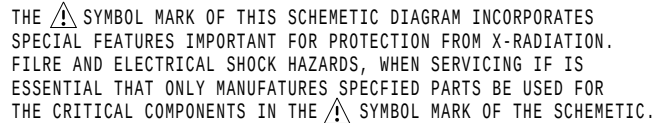


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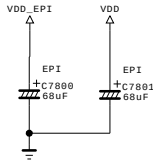
MODEL	LOCAL DIMMING	DATE	2011.12.13
BLOCK		SHEET	76 /



LG Electronics



MODEL		DATE	2011.12.01
BLOCK	T-Con	SHEET	77 /



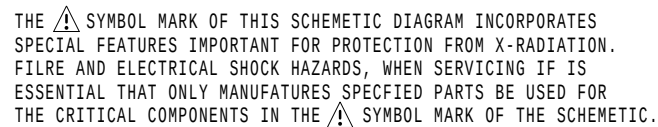
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SECRET
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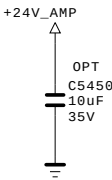


MODEL		DATE	2011.12.01
BLOCK	T - Con	SHEET	77 /

Don't Connect Power At VDD1
(Just Internal LDO Capacitor)



MODEL	eMMC	DATE	11.09.29
BLOCK		SHEET	81 /



THE  SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFATURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE  SYMBOL MARK OF THE SCHEMETIC.

SECRET	 LG ELECTRONICS		MODEL		DATE	
LGElectronics			BLOCK		SHEET	/



Contents of LCD TV Standard Repair Process

No.	Error symptom (High category)	Error symptom (Mid category)	Page	Remarks
1	A. Video error	No video/Normal audio	1	
2		No video/No audio	2	
3		Picture broken/ Freezing	3	
4		Color error	4	
5		Vertical/Horizontal bar, residual image, light spot, external device color error	5	
6	B. Power error	No power	6	
7		Off when on, off while viewing, power auto on/off	7	
8	C. Audio error	No audio/Normal video	8	
9		Wrecked audio/discontinuation/noise	9	
10	D. Function error	Remote control & Local switch checking	10	
11		External device recognition error	11	
12	E. Noise	Circuit noise, mechanical noise	12	
13	F. Exterior error	Exterior defect	13	
14	APPENDIX	Power Off History		

First of all, Check whether there is SVC Bulletin in GCSC System for these model.

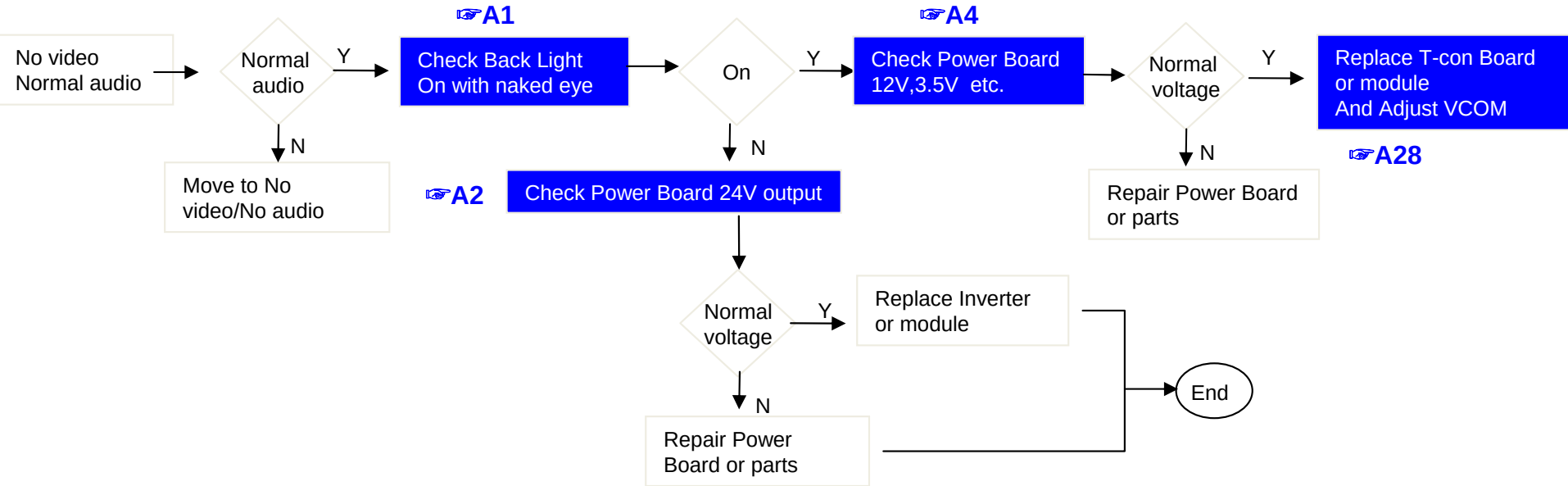
Contents of LCD TV Standard Repair Process Detail Technical Manual

No.	Error symptom	Content	Page	Remarks
1	A. Video error_ No video/Normal audio	Check LCD back light with naked eye	A1	
2		LED driver B+ 24V measuring method	A2	
3		Check White Balance value	A3	
4		Power Board voltage measuring method	A5	
6	A. Video error_ No video/Video lag/stop	TUNER input signal strength checking method	A6	
7		LCD-TV Version checking method	A7	
9	A. Video error_Color error	LCD TV connection diagram	A8	
10		Tuner Checking Part	A9	
11		Check Link Cable (LVDS) reconnection condition	A10 A11	A10 : 32/37/42/47/55 A11 : 32 AUO
12		Adjustment Test pattern - ADJ Key	A12	
13	A. Video error_Vertical/Horizontal bar, residual image, light spot	LCD TV connection diagram	A8	
14		Check Link Cable (LVDS) reconnection condition	A10 A11	A10 : 32/37/42/47/55 A11 : 32 AUO
15		Adjustment Test pattern - ADJ Key	A12	
16	<Appendix> Defected Type caused by T-Con/ Inverter/ Module	Exchange T-Con Board (1)	A-1/5	
17		Exchange T-Con Board (2)	A-2/5	
18		Exchange LED driver Board (PSU)	A-3/5	55" : driver board Other : PSU
19		Exchange Module itself (1)	A-4/5	
20		Exchange Module itself (2)	A-5/5	

Standard Repair Process

LCD TV	Error symptom	A. Video error	Established date	2012. 12 .21	1/13
		No video/ Normal audio	Revised date		

First of all, Check whether all of cables between board is inserted properly or not.
(Main B/D↔ Power B/D, LVDS Cable,Speaker Cable,IR B/D Cable, ETC...)

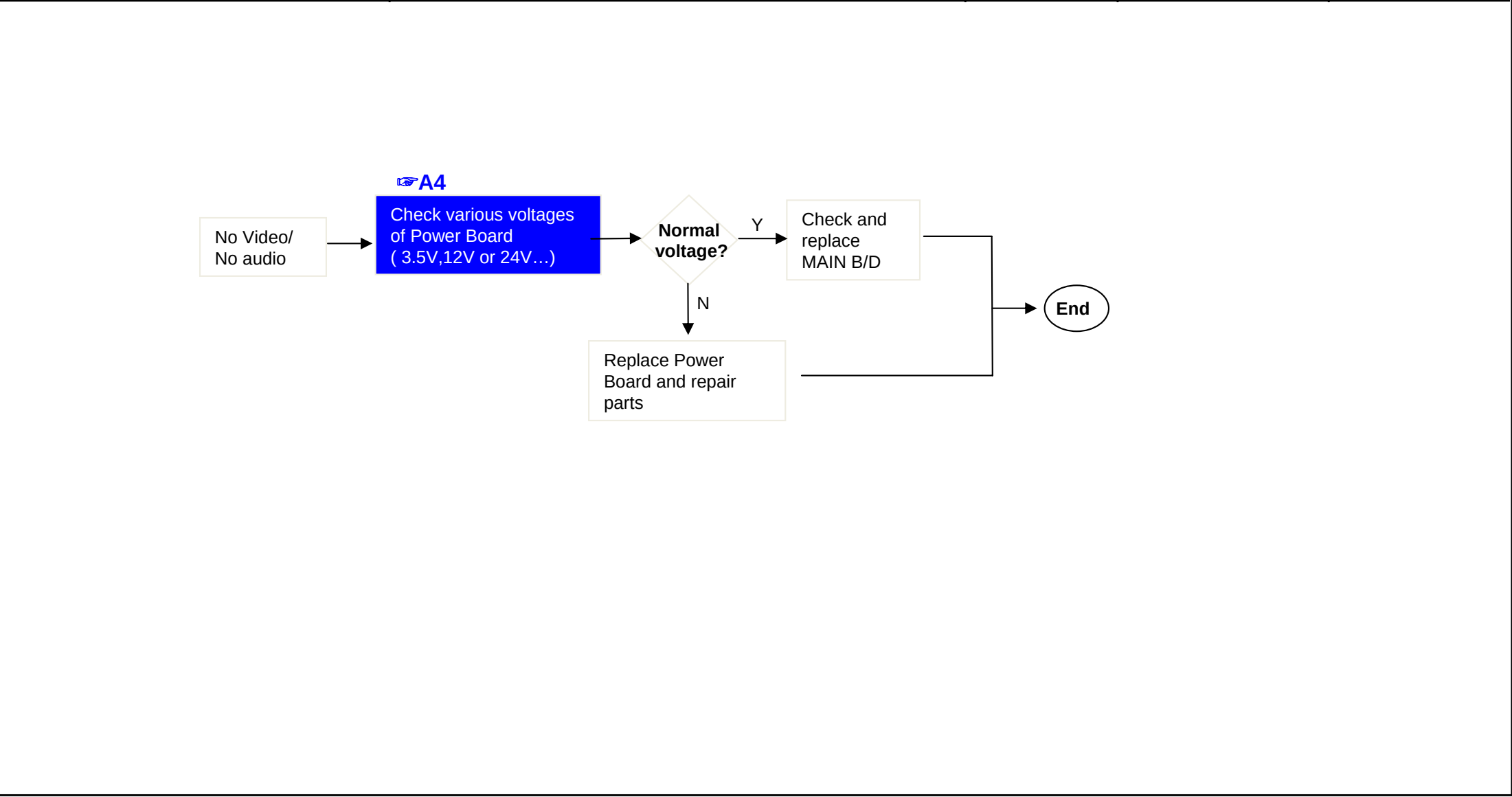


※Precaution A7 & A3



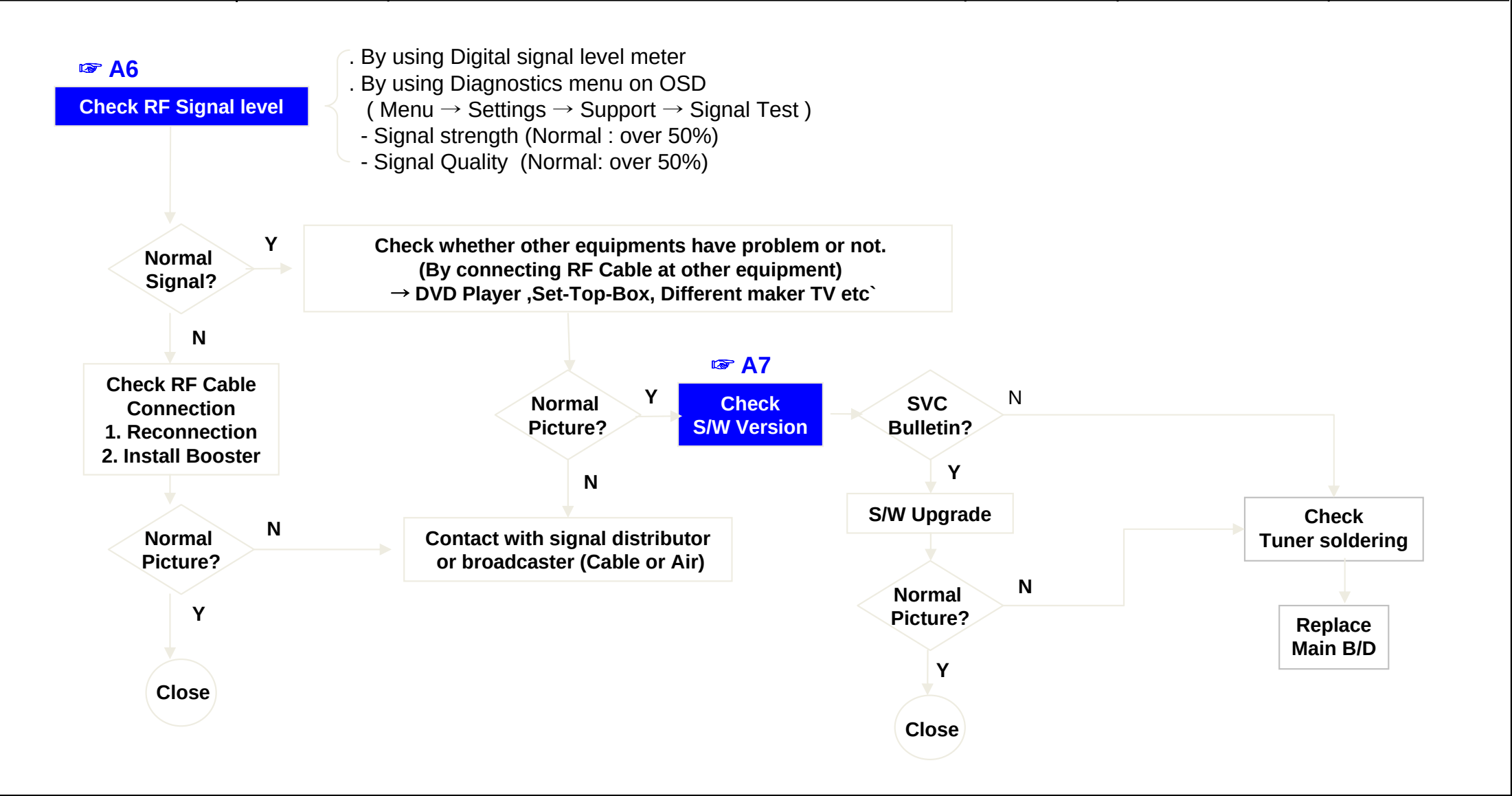
Standard Repair Process

LCD TV	Error symptom	A. Video error	Established date	2012. 12 .21	
		No video/ No audio	Revised date		2/13



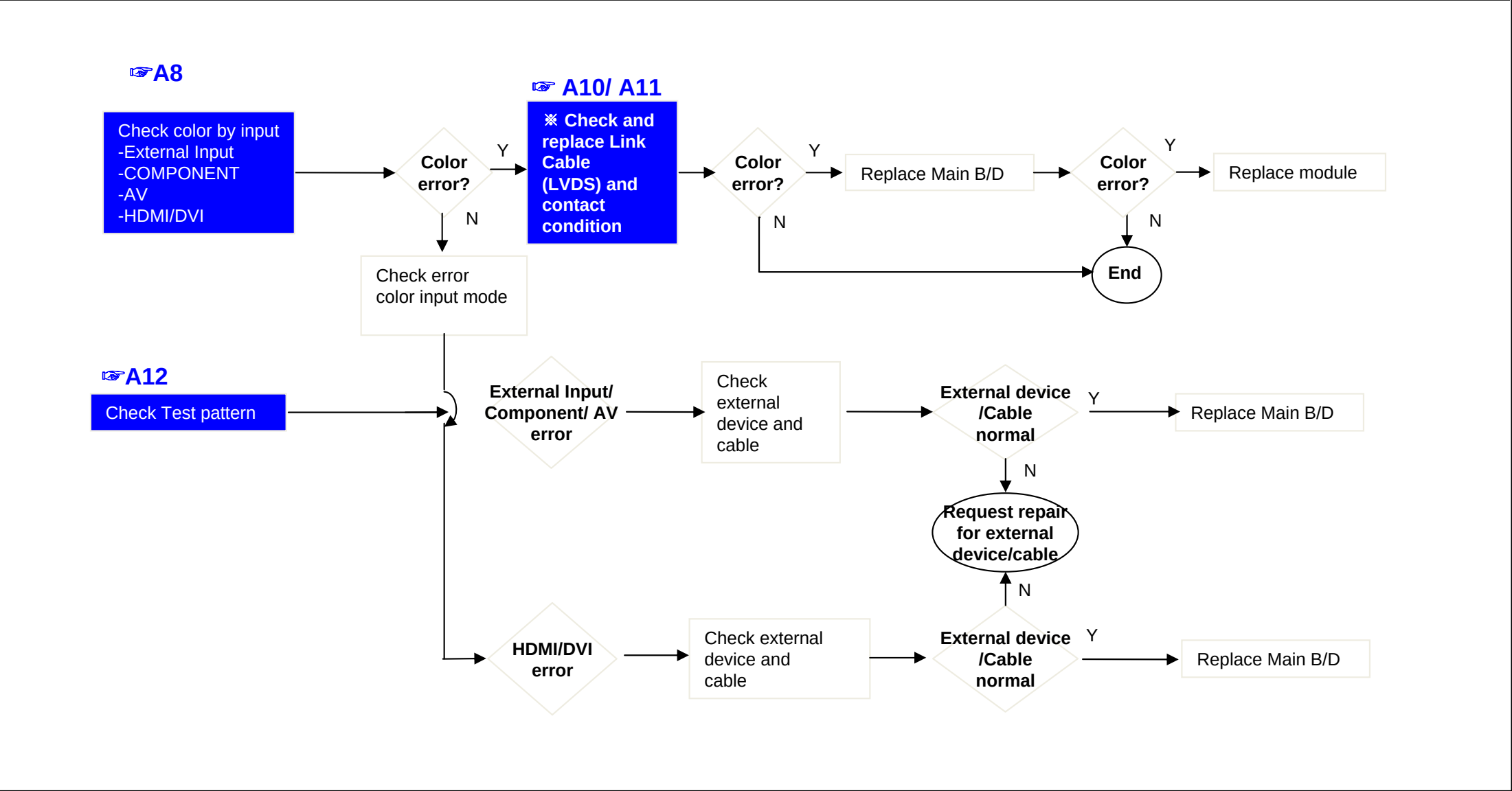
Standard Repair Process

LCD TV	Error symptom	A. Video error	Established date	2012. 12 .21	
		Picture broken/ Freezing	Revised date		3/13



Standard Repair Process

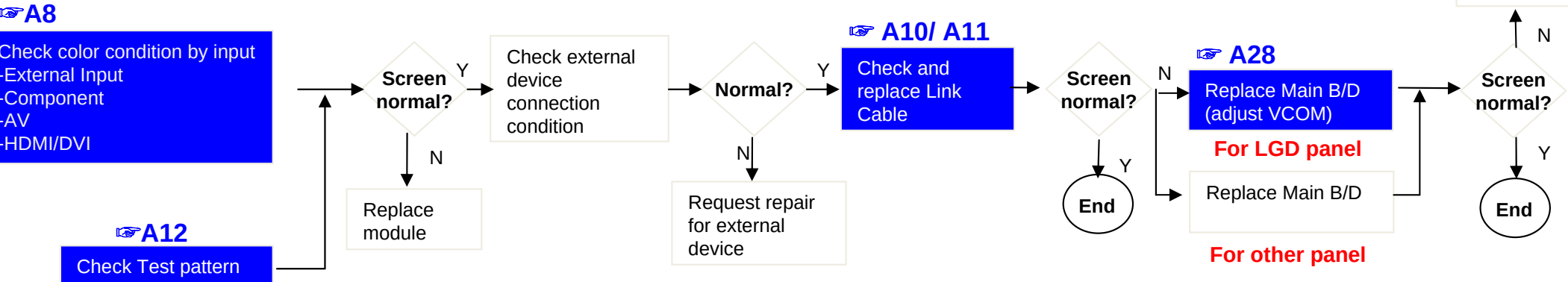
LCD TV	Error symptom	A. Video error	Established date	2012. 12 .21	
		Color error	Revised date		4/13



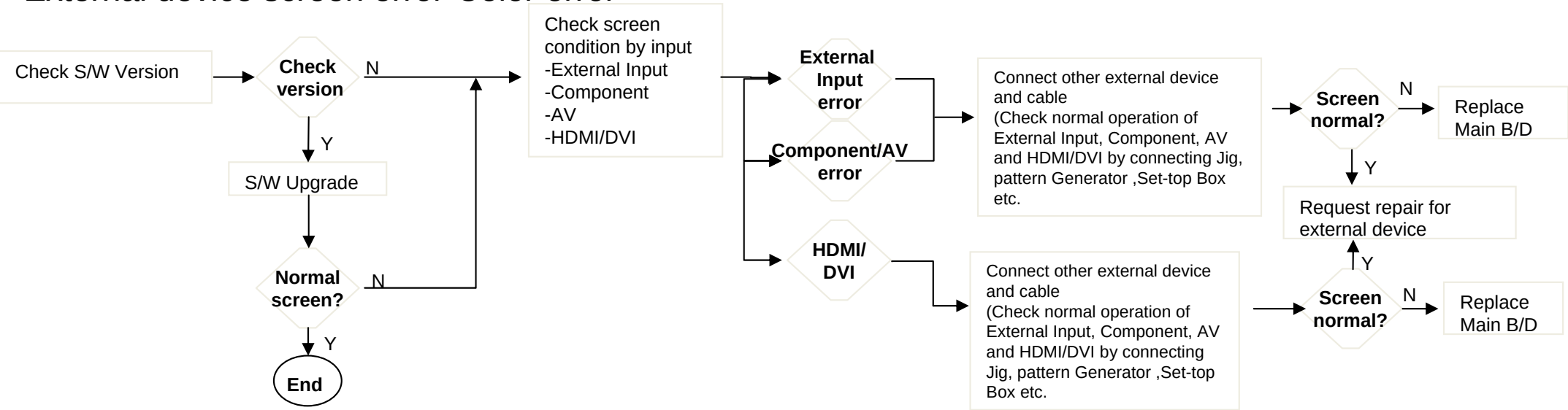
Standard Repair Process

LCD TV	Error symptom	A. Video error	Established date	2012. 12 .21	
		Vertical / Horizontal bar, residual image, light spot, external device color error	Revised date		5/13

Vertical/Horizontal bar, residual image, light spot

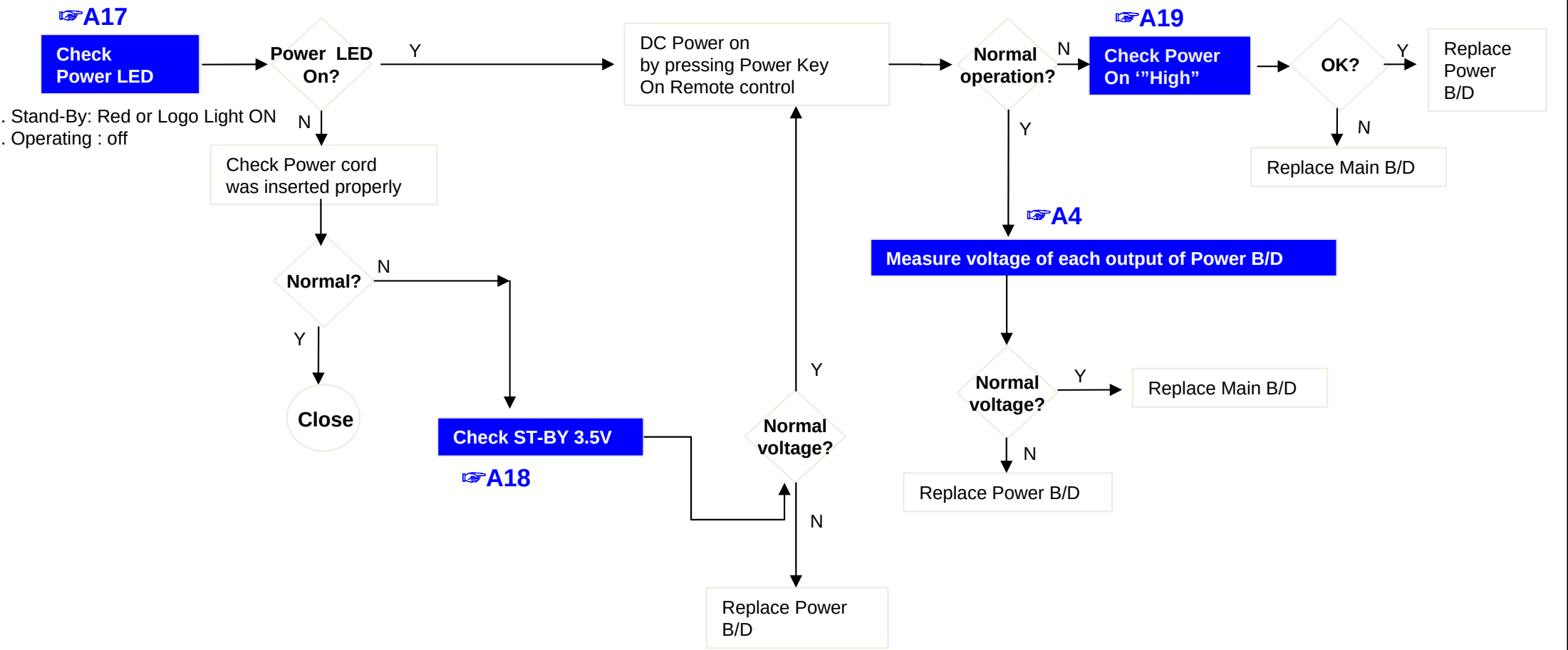


External device screen error-Color error



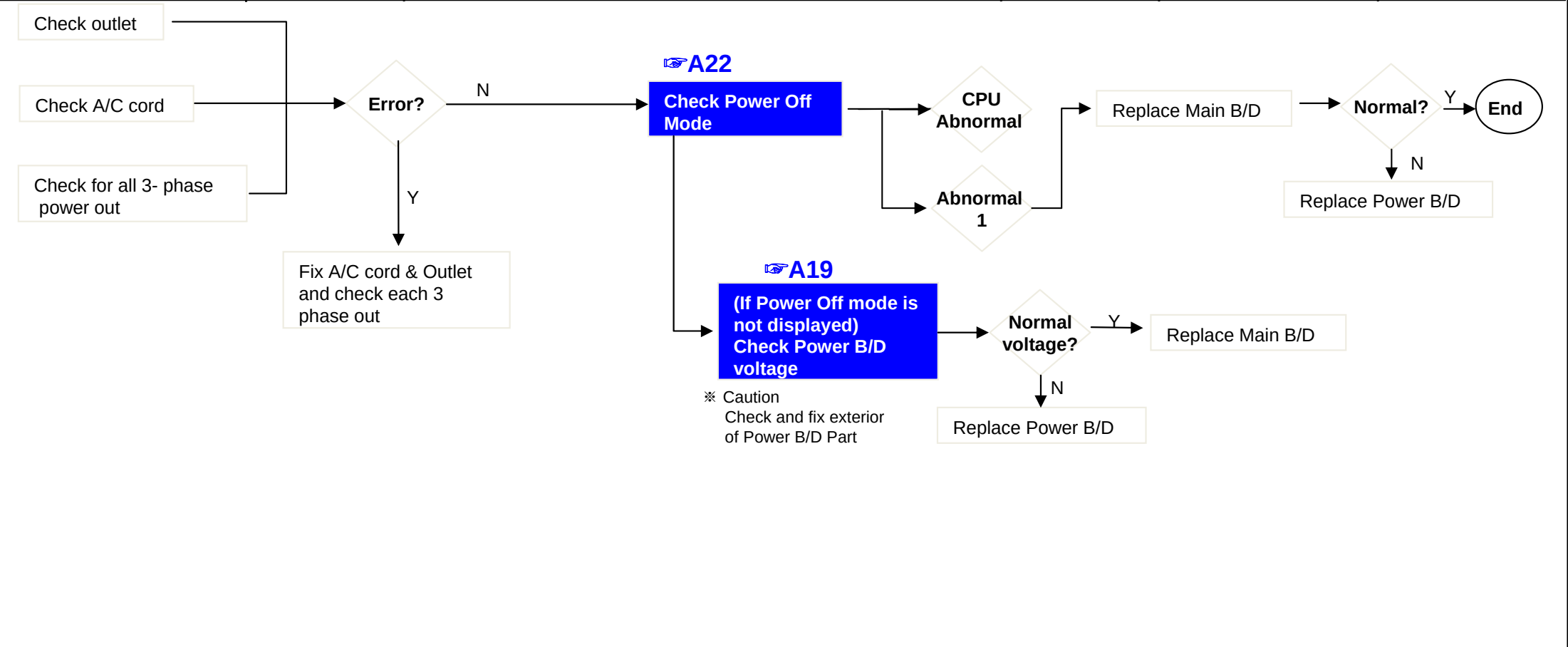
Standard Repair Process

LCD TV	Error symptom	B. Power error	Established date	2012. 12 .21	
		No power	Revised date		6/13



Standard Repair Process

LCD TV	Error symptom	B. Power error	Established date	2012. 12 .21	
		Off when on, off while viewing, power auto on/off	Revised date		7/13

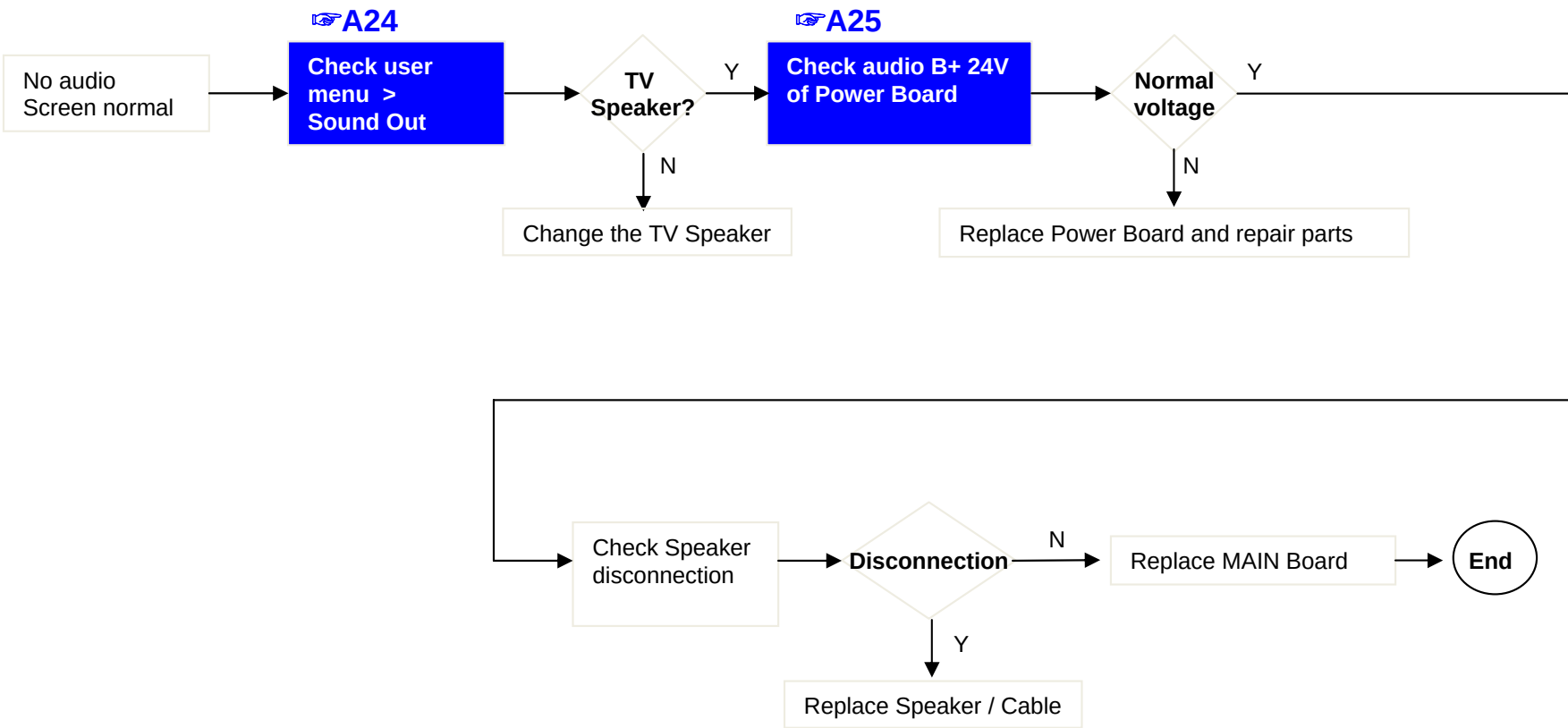


* Please refer to the all cases which can be displayed on power off mode.
Click the below Hyper_link



Standard Repair Process

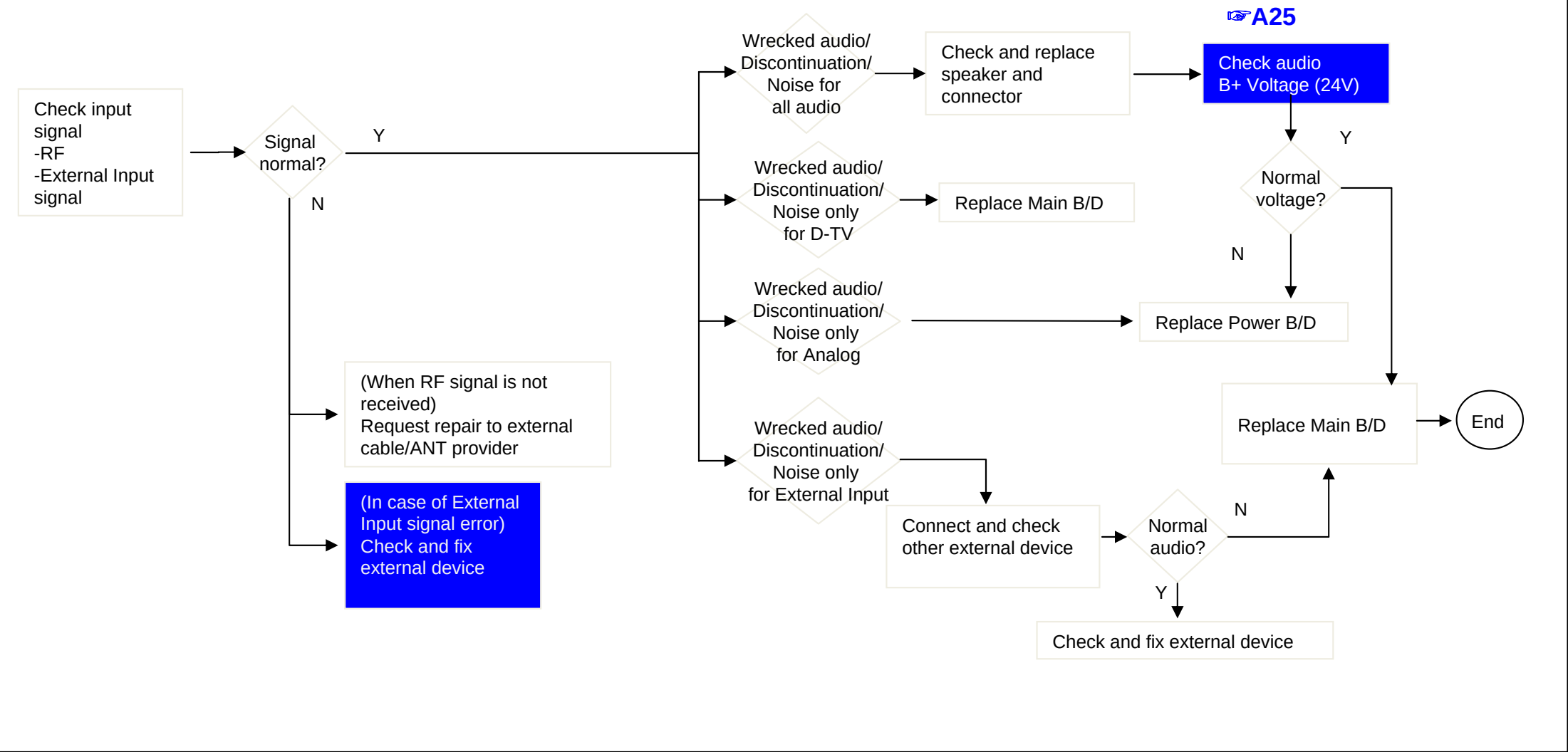
LCD TV	Error symptom	C. Audio error	Established date	2012. 12 .21	
		No audio/ Normal video	Revised date		8/13



Standard Repair Process

LCD TV	Error symptom	C. Audio error	Established date	2012. 12 .21	
		Wrecked audio/ discontinuation/noise	Revised date		9/13

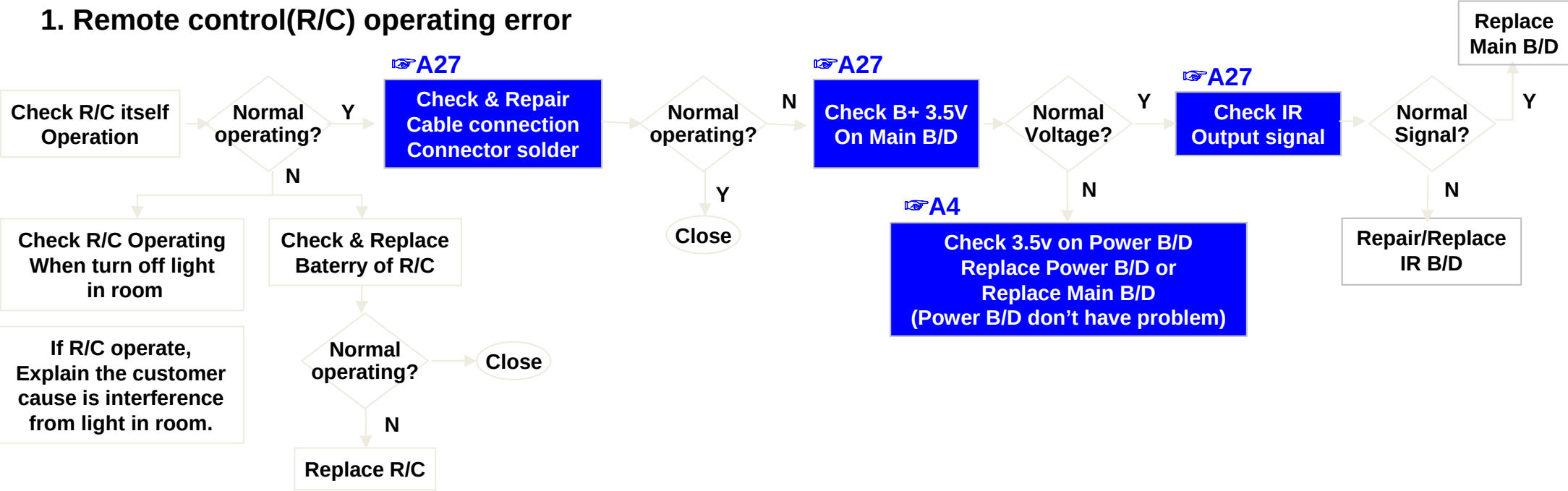
→ abnormal audio/discontinuation/noise is same after “Check input signal” compared to No audio



Standard Repair Process

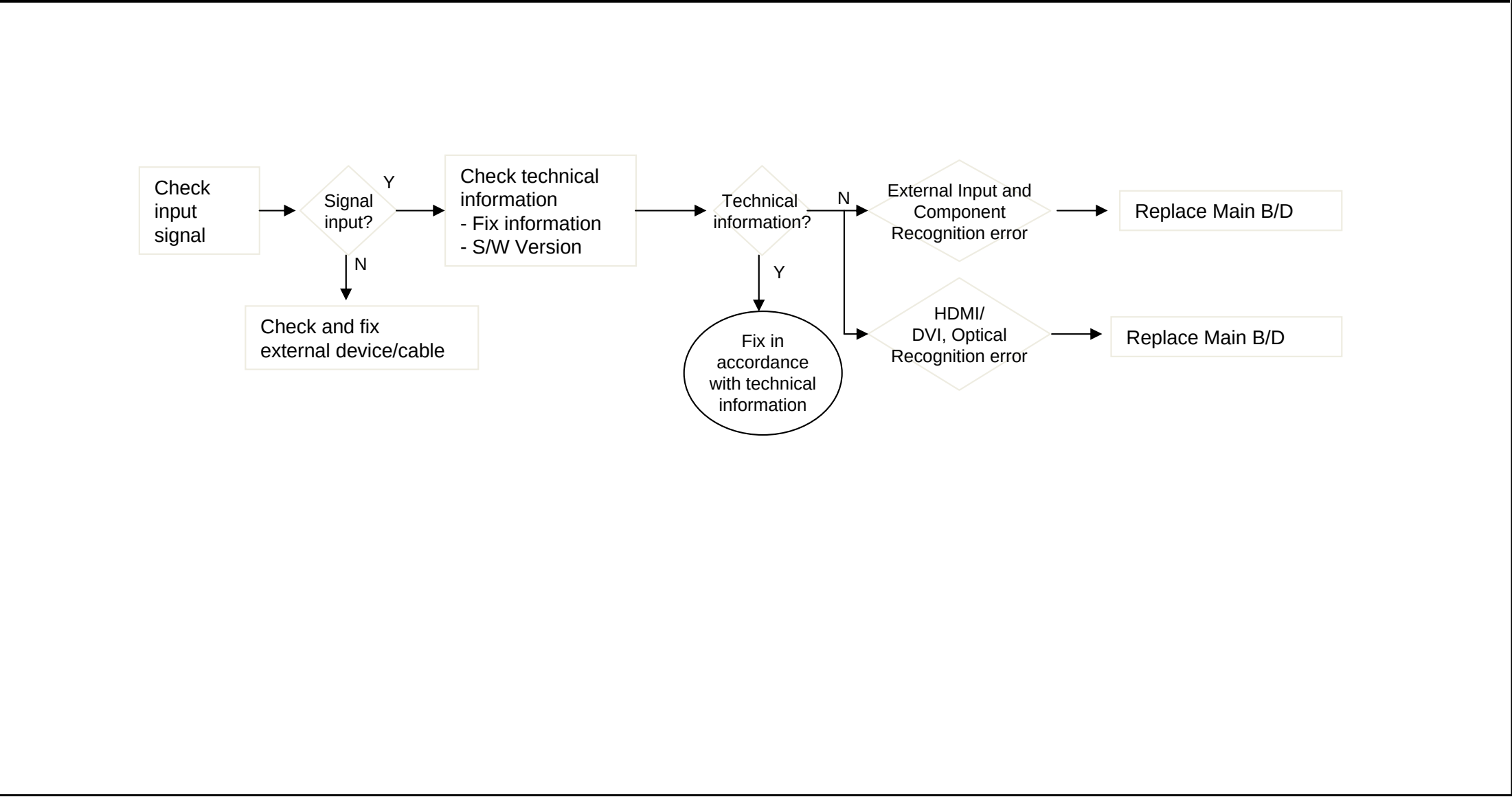
LCD TV	Error symptom	D. General Function Problem	Established date	2012. 12 .21	
		Remote control & Local switch checking	Revised date		10/13

1. Remote control(R/C) operating error



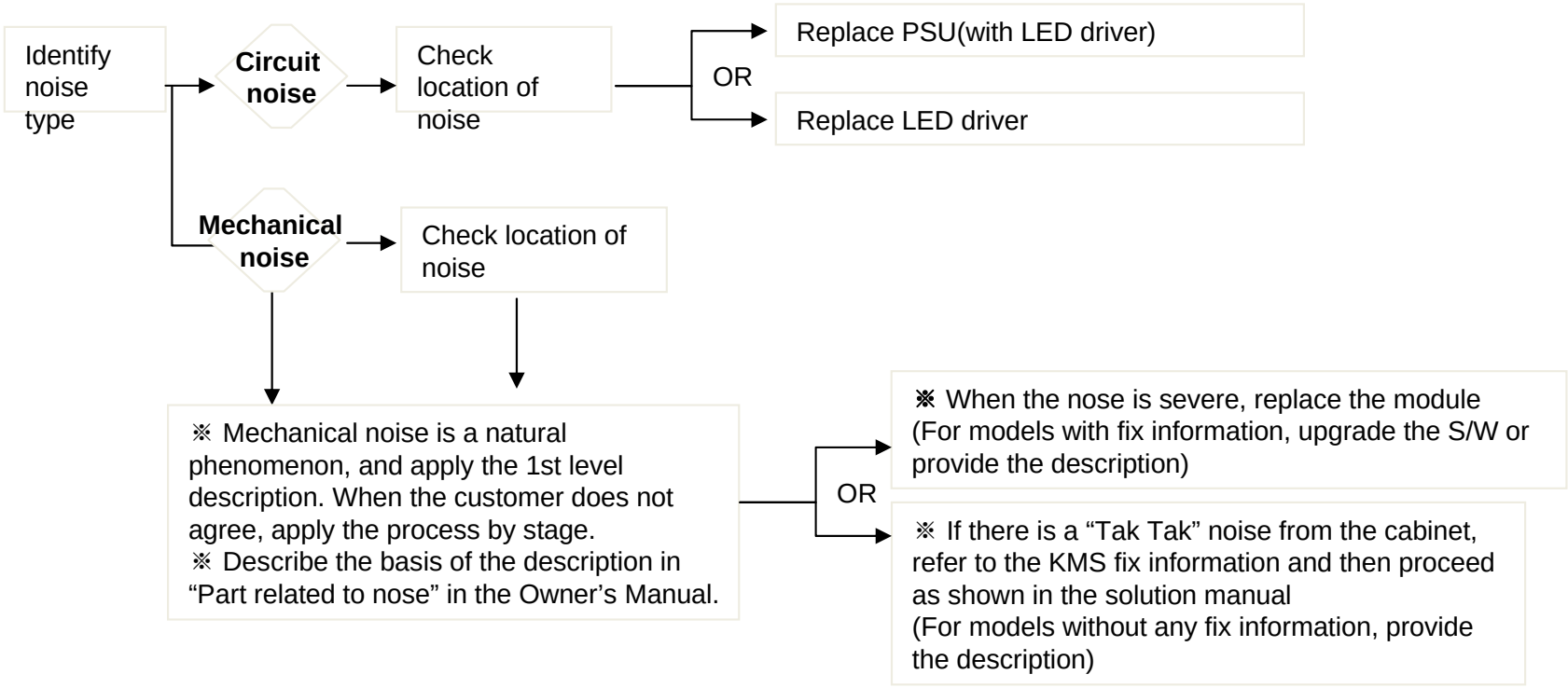
Standard Repair Process

LCD TV	Error symptom	D. Function error	Established date	2012. 12 .21	
		External device recognition error	Revised date		11/13



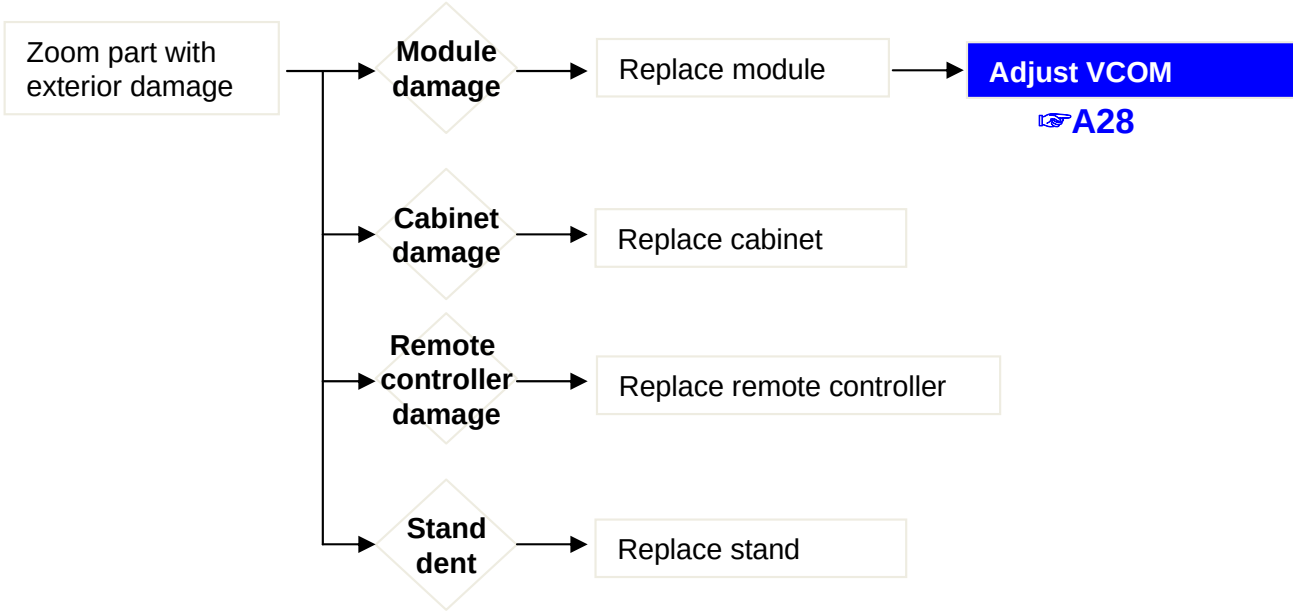
Standard Repair Process

LCD TV	Error symptom	E. Noise	Established date	2012. 12 .21	
		Circuit noise, mechanical noise	Revised date		12/13



Standard Repair Process

LCD TV	Error symptom	F. Exterior defect	Established date	2012. 12 .21	
		Exterior defect	Revised date		13/13



Contents of LCD TV Standard Repair Process Detail Technical Manual

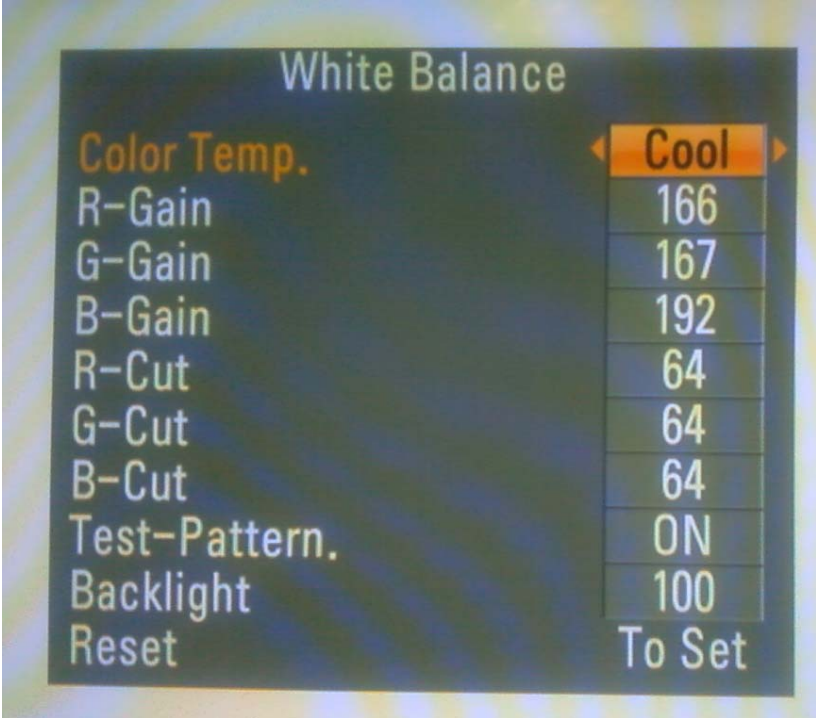
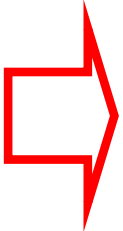
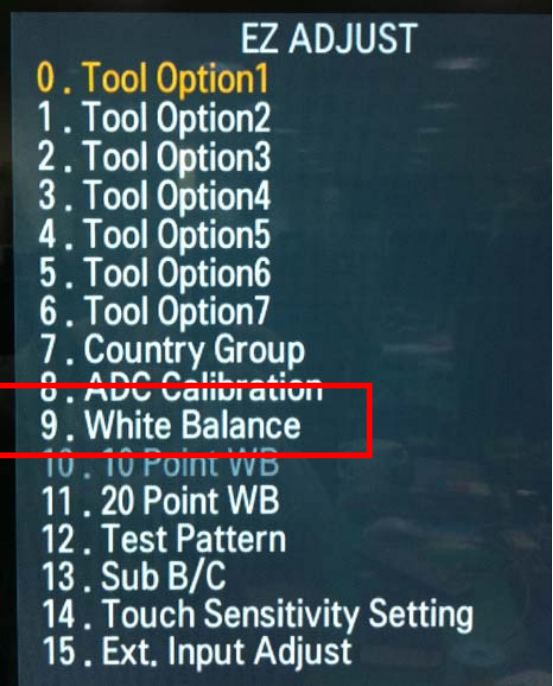
Continued from previous page

No.	Error symptom	Content	Page	Remarks
21	B. Power error_No power	Check front display LED	A17	
22		Check power input Voltage & ST-BY 3.5V	A18	
23		Checking method when power is ON	A19	
24		POWER BOARD voltage measuring method	A5	
25				
26	B. Power error_Off when on, off while viewing	POWER OFF MODE checking method	A22	
27	B. Power error_Off when on, off while viewing	POWER BOARD PIN voltage checking method	A19	
28	C. Audio error_No audio/Normal video	Checking method in menu when there is no audio	A24	
29		Voltage and speaker checking method when there is no audio	A25	
30	C. Audio error_Wrecked audio/discontinuation	Voltage and speaker checking method in case of audio error	A25	
31	D. Function error_ No response in remote controller, key error	Remote controller operation checking method	A27	
32	D. VCOM Adjustment	Sequence of the Vcom adjustment	A28	

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error_No video/Normal audio	Established date	2012. 12 .21	
	Content	Check White Balance value	Revised date		A3

<ALL MODELS>



Entry method

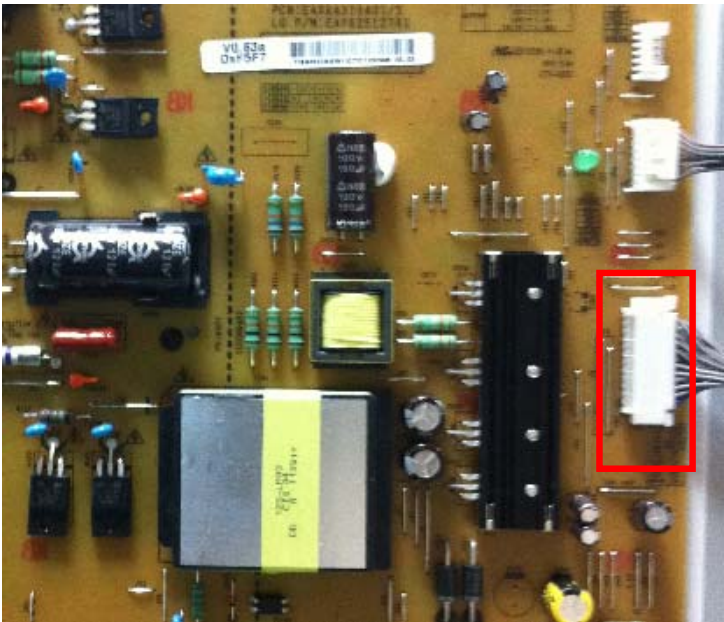
1. Press the ADJ button on the remote controller for adjustment.
2. Enter into White Balance of item 7.
3. After recording the R, G, B (GAIN, Cut) value of Color Temp (Cool/Medium/Warm), re-enter the value after replacing the MAIN BOARD.



Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error_No video/ Audio	Established date	2012. 12 .21	
	Content	Power Board voltage measuring method	Revised date		A5

Check the DC 24V, 12V, 3.5V.



18 or 24 Pin (Power Board ↔ Main Board) - 공통			
SMAW200-H24S (YEONHO)			
1	PWR ON/OFF	2	DVR ON/OFF
3	3.5V	4	PDIM #1
5	3.5V	6	PDIM #2
7	GND	8	GND
9	24V	10	24V
11	GND	12	GND
13	12V	14	12V
15	12V	16	24V or N.C
17	GND	18	GND
19	GND	20	GND
21	GND	22	V-SYNC
23	SPI-SIN	24	SPI-SCLK

The Wafer,18Pin and 24Pin, is used by operating LocalDimming or not LocalDimming

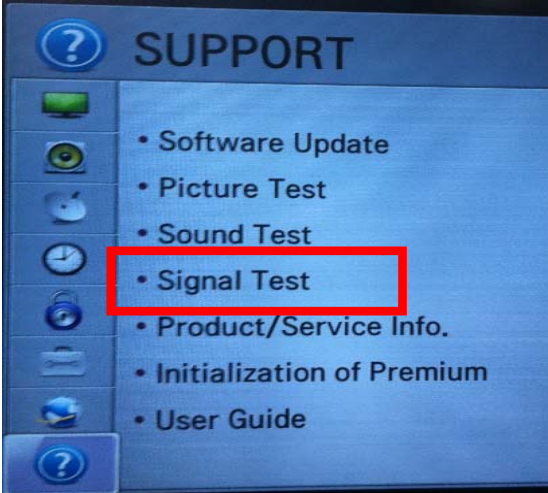
- 24Pin wafer is applied operating L/D at power and main B/D
- 18Pin wafer is applied not operating L/D at power and main B/D



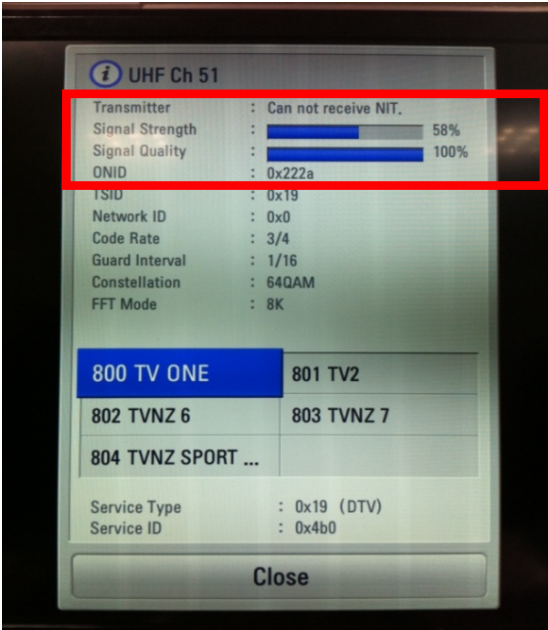
Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error_Video error, video lag/stop	Established date	2012. 12 .21	
	Content	TUNER input signal strength checking method	Revised date		A6

<ALL MODELS>



MENU -> Settings → support -> signal test
-> select channel



When the signal is strong, use the attenuator (-10dB, -15dB, -20dB etc.)



Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error_Video error, video lag/stop	Established date	2012. 12 .21	
	Content	LCD-TV Version checking method	Revised date		A7

<ALL MODELS>

1. Checking method for remote controller for adjustment

Version



IN-START

Model Name : GLOBAL-PLAT4
Serial Number : SKJY1107
S/W Version : 00.00.07.01
MICOM Version : 1.02.9
BOOT Version : 1.00.49
IR LED Version : 0.0
PWM (min/max/3DDuty): 5 / 99 / 99
EDID (RGB/HDMI) : 0.01 / 0.01
Chip Type : MTK 5369
Wi-Fi Version : 1.0
Wi-Fi Channel : 0
Wi-Fi MAC : NG
MAC Address : 00:00:00:00:00:00
IP Address : 0.0.0.0
Widevine : NG
ESN Num. : NG
RF Receiver Version : 00.00
A.Demod F/W Ver. : Null
D.Demod F/W Ver. : Null
Debug Status : RELEASE
Access USB Status: 0/0(T)/0(C)
UTT : 1
APP History Ver.: 35067
Eye Q Gain : 4478
POL DB : LGD_ELF_S02176_XXXXXX

1. Adjust Check
2. ADC Data
3. Power Off Status
4. System 1
5. System 2
6. System 3
7. Model Number D/L
8. Test Option
9. Spread Spectrum
10. Sync Level
11. Stable Count
12. SDP Server Selection
13. Network Error History
14. RF Remocon Test
15. Access Code

1. Country Group (Pr
Country Group Code
Country Group
Country
2. Tool Option
Tool Option1
Tool Option2
Tool Option3
Tool Option4
Tool Option5
Tool Option6
Tool Option7
3. Adjust White Balanc
4. Adjust ADC(OTP) :
Component
RGB
5. EDID :
RGB
HDMI1
HDMI2
HDMI3
HDMI4

Press the IN-START with the remote controller for adjustment



Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error _Vertical/Horizontal bar, residual image, light spot	Established date	2012. 12 .21	
	Content	LCD TV connection diagram (1)	Revised date		A8

<ALL MODELS>



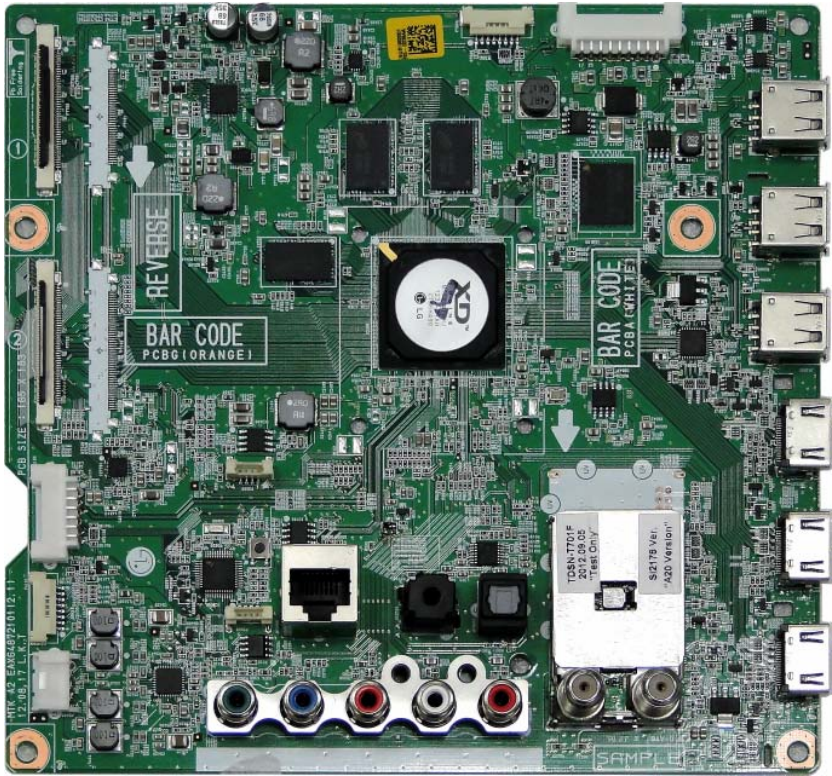
As the part connecting to the external input, check the screen condition by signal



Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error_Video error, video lag/stop	Established date	2012. 12 .21	
	Content	TUNER checking part	Revised date		A9

<ALL MODELS>

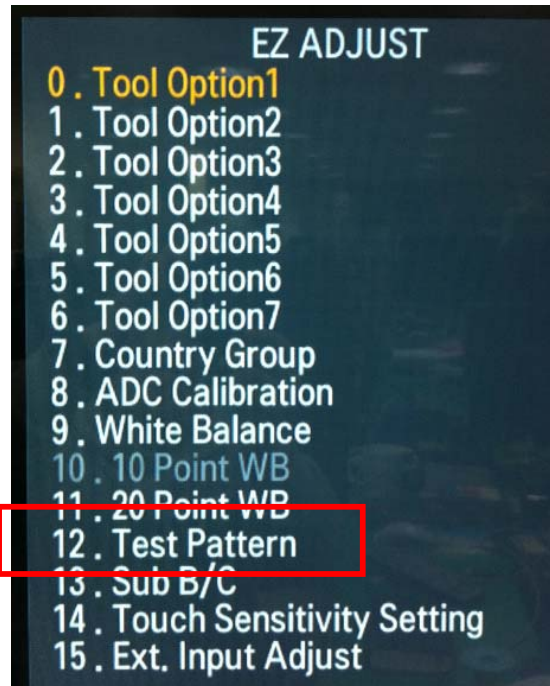


Checking method:

- 1. Check the signal strength or check whether the screen is normal when the external device is connected.
- 2. After measuring each voltage from power supply, finally replace the MAIN BOARD.(with Main to Power Cable, Speaker Cable and LVDS or EPI Cable)

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error_Color error	Established date	2012. 12 .21	
	Content	Adjustment Test pattern - ADJ Key	Revised date		A12



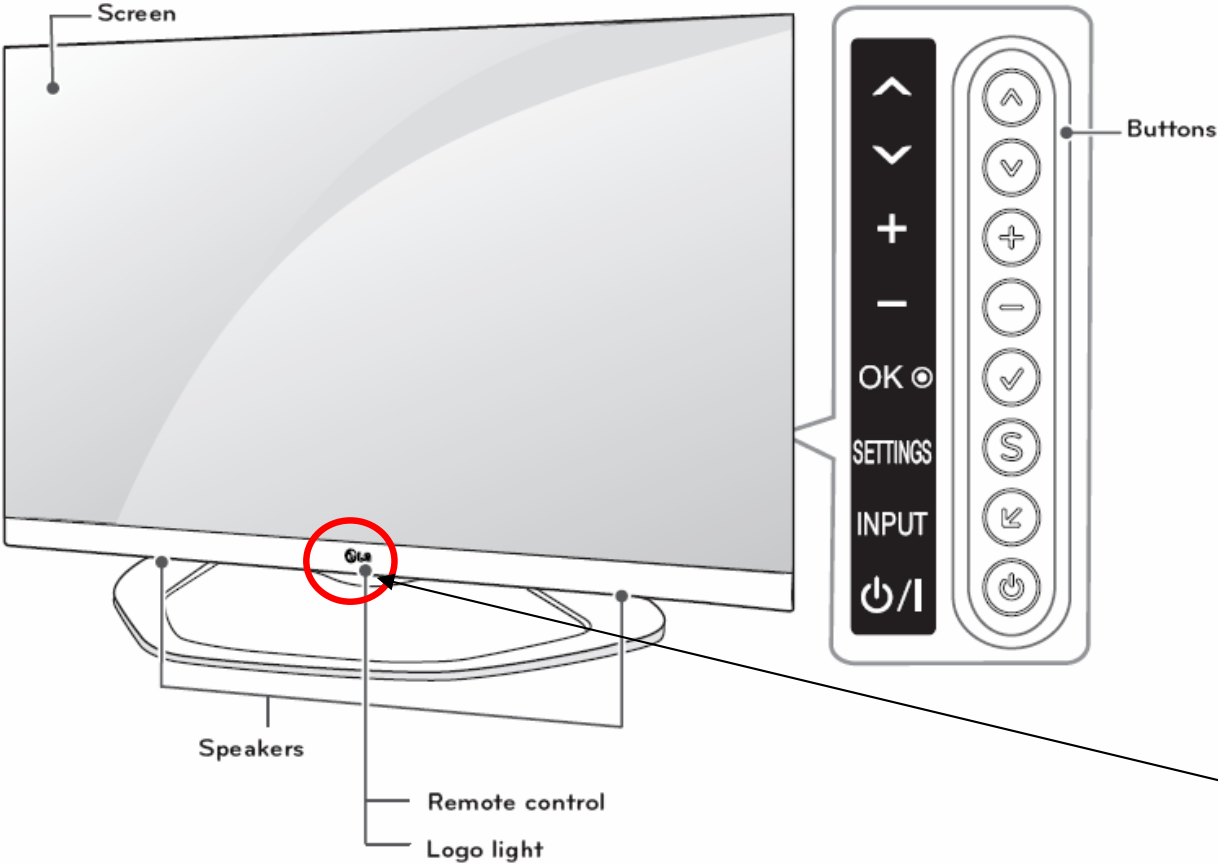
You can view 6 types of patterns using the ADJ Key

Checking item : 1. Defective pixel 2. Residual image 3. MODULE error (ADD-BAR,SCAN BAR..)
4.Video error (Classification of MODULE or Main-B/D!)



Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	B. Power error _No power	Established date	2012. 12 .21	
	Content	Check front display LED	Revised date		A17



Front LED control :
Menu → Option → LG Logo Light
→ Brightness and Duration

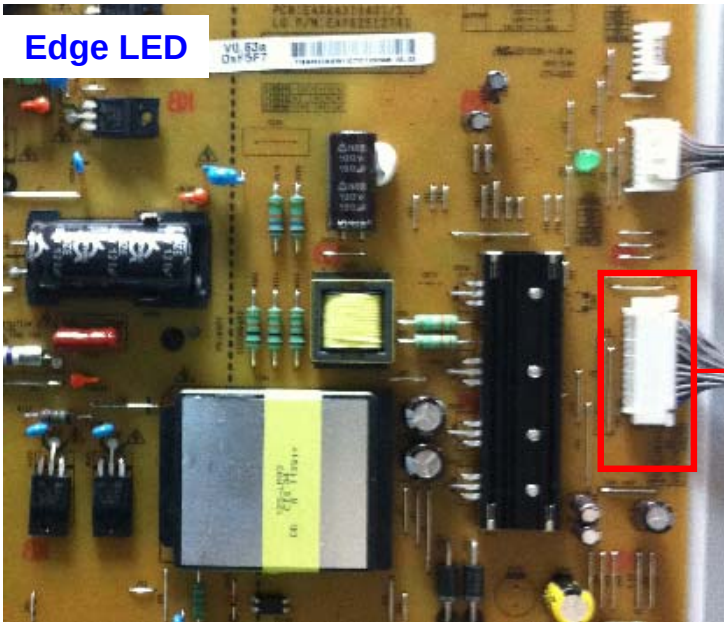
ST-BY condition: Red or Logo Light ON
Power ON condition: OFF or User Settings



Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	B. Power error _No power	Established date	2012. 12 .21	A18
	Content	Check power input voltage and ST-BY 3.5V	Revised date		

For 13' models, there is no voltage out for st-by purpose.
When st-by, only 3.5V is normally on.



18 or 24 Pin (Power Board ↔ Main Board) - 공통			
SMAW200-H24S (YEONHO)			
1	PWR ON/OFF	2	DVR ON/OFF
3	3.5V	4	PDIM #1
5	3.5V	6	PDIM #2
7	GND	8	GND
9	24V	10	24V
11	GND	12	GND
13	12V	14	12V
15	12V	16	24V or N.C
17	GND	18	GND
19	GND	20	GND
21	GND	22	V-SYNC
23	SPI-SIN	24	SPI-SCLK

The Wafer,18Pin and 24Pin, is used by operating LocalDimming or not LocalDimming

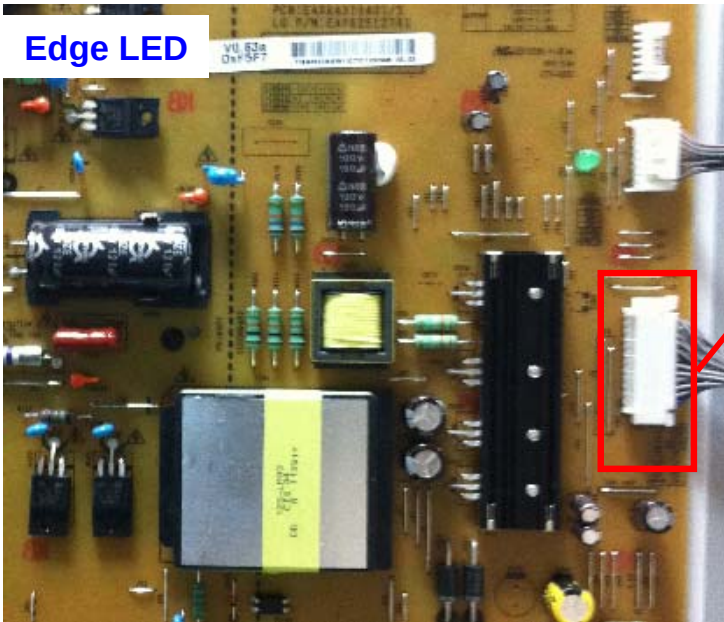
- 24Pin wafer is applied operating L/D at power and main B/D
- 18Pin wafer is applied not operating L/D at power and main B/D



Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	B. Power error _No power	Established date	2012. 12 .21	
	Content	Checking method when power is ON	Revised date		A19

Check “power on” pin is high



18 or 24 Pin (Power Board ↔ Main Board) – 공통			
SMAW200-H24S (YEONHO)			
1	PWR ON/OFF	2	DVR ON/OFF
3	3.5V	4	PDIM #1
5	3.5V	6	PDIM #2
7	GND	8	GND
9	24V	10	24V
11	GND	12	GND
13	12V	14	12V
15	12V	16	24V or N.C
17	GND	18	GND
19	GND	20	GND
21	GND	22	V-SYNC
23	SPI-SIN	24	SPI-SCLK

The Wafer,18Pin and 24Pin, is used by operating LocalDimming or not LocalDimming

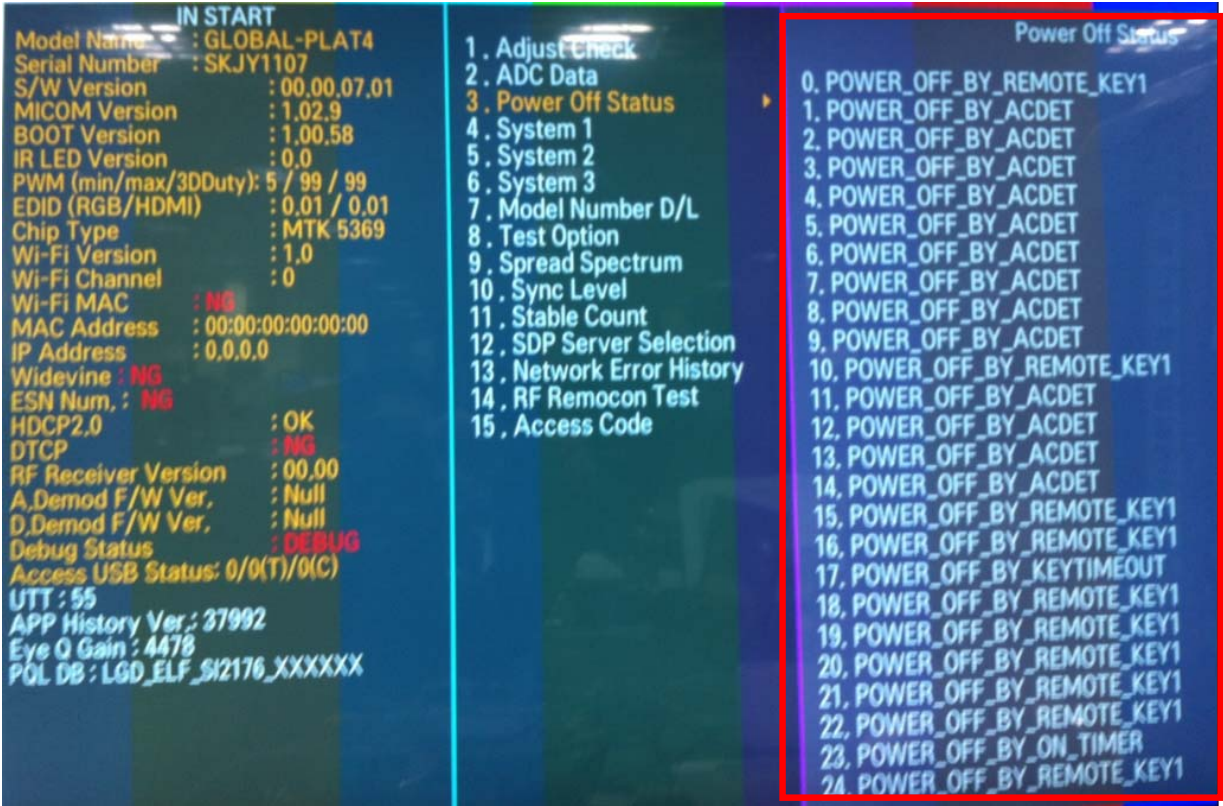
- 24Pin wafer is applied operating L/D at power and main B/D
- 18Pin wafer is applied not operating L/D at power and main B/D



Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	B. Power error _Off when on, off whiling viewing	Established date	2012. 12 .21	
	Content	POWER OFF MODE checking method	Revised date		A22

<ALL MODELS>



Entry method

1. Press the IN-START button of the remote controller for adjustment
2. Check the entry into adjustment item 3



Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	C. Audio error_No audio/Normal video	Established date	2012. 12 .21	
	Content	Checking method in menu when there is no audio	Revised date		A24

<ALL MODELS>



Checking method

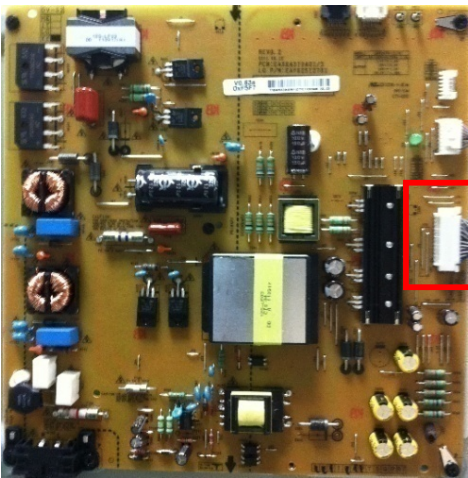
1. Press the MENU button on the remote controller
2. Select the SOUND function of the Menu
3. Select TV Speaker from Others



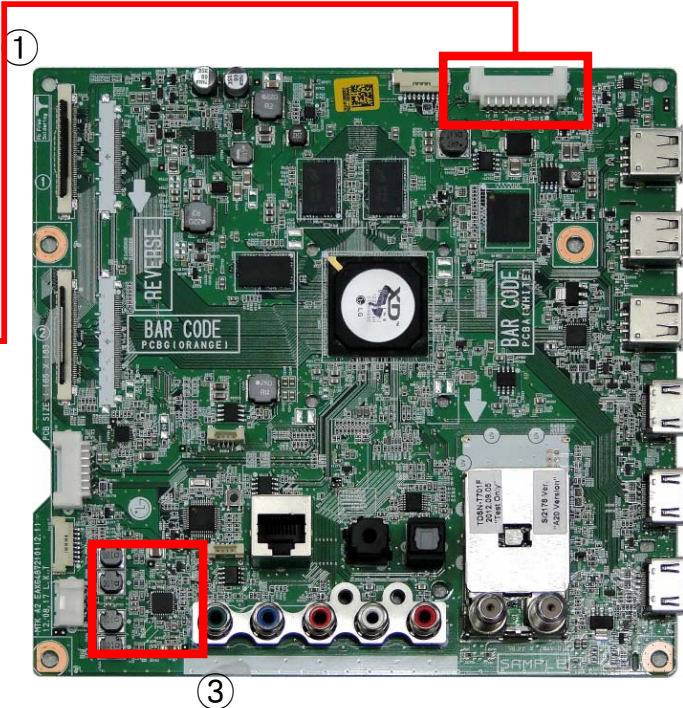
Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	C. Audio error_No audio/Normal video	Established date	2012. 12 .21	
	Content	Voltage and speaker checking method when there is no audio	Revised date		A25

<ALL MODELS>



18 or 24 Pin (Power Board ↔ Main Board) - 공통			
② SMAW200-H24S (YEONHO)			
1	PWR ON/OFF	2	DVR ON/OFF
3	3.5V	4	PDIM #1
5	3.5V	6	PDIM #2
7	GND	8	GND
9	24V	10	24V
11	GND	12	GND
13	12V	14	12V
15	12V	16	24V or N.C
17	GND	18	GND
19	GND	20	GND
21	GND	22	V-SYNC
23	SPI-SIN	24	SPI-SCLK



The Wafer,18Pin and 24Pin, is used by operating LocalDimming or not LocalDimming

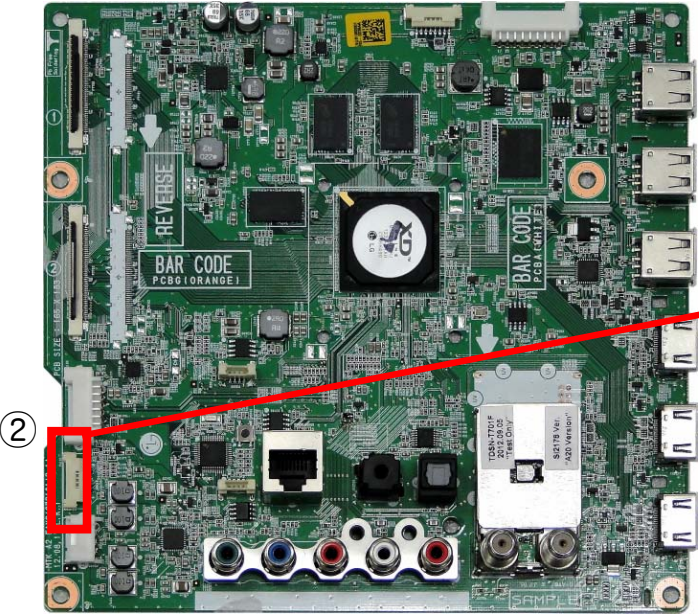
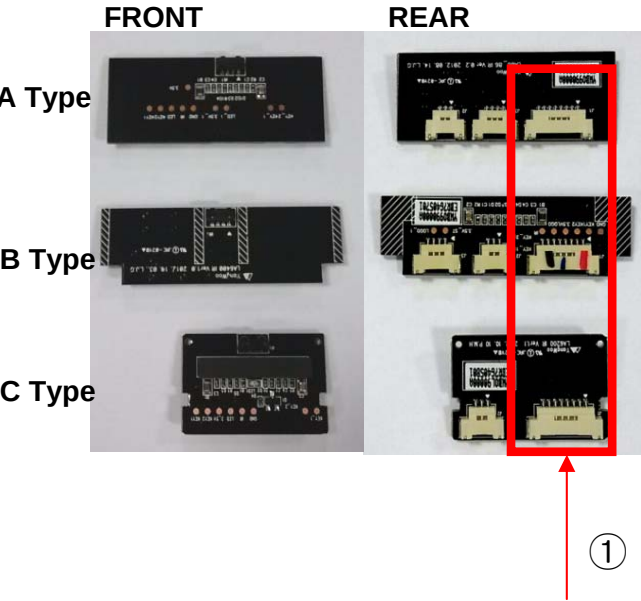
Checking order when there is no audio

- ① Check the contact condition of or 24V connector of Main Board
- ② Measure the 24V input voltage supplied from Power Board
(If there is no input voltage, remove and check the connector)
- ③ Connect the tester RX1 to the speaker terminal and if you hear the “Chik Chik” sound when you touch the GND and output terminal, the speaker is normal.
- 24Pin wafer is applied operating L/D at power and main B/D
- 18Pin wafer is applied not operating L/D at power and main B/D

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	D. Function error_ No response in remote controller, key error	Established date	2012. 12 .21	A27
	Content	Remote controller operation checking method	Revised date		

<ALL MODELS>



P4102	
1	GND
2	KEY1
3	KEY2
4	+3.5V_ST
5	GND
6	LOGO/LED_R
7	IR
8	GND
9	N/A
10	N/A

Checking order

- 1, 2. Check IR cable condition between IR & Main board.
3. Check the st-by 3.5V on the terminal 6.
4. When checking the Pre-Amp when the power is in ON condition, it is normal when the Analog Tester needle moves slowly, and defective when it does not move at all.



Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	D. VCOM Adjustment	Established date	2012. 12 .21	
	Content	Sequence of the Vcom adjustment	Revised date		A28

1. Case

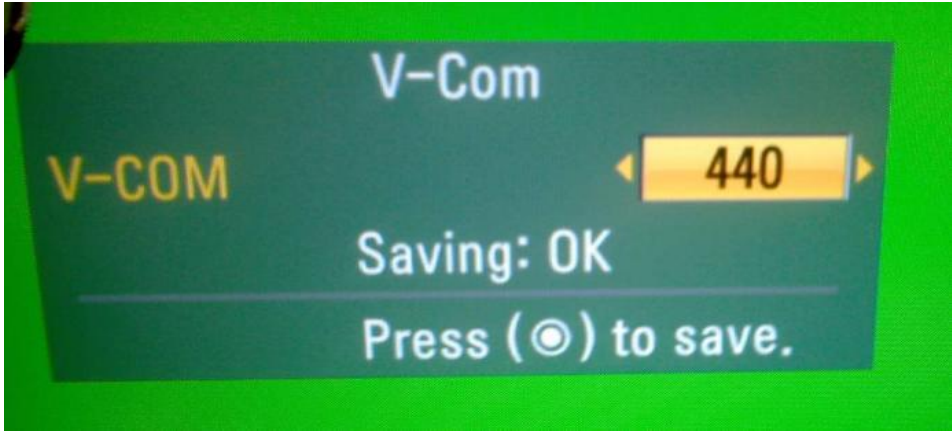
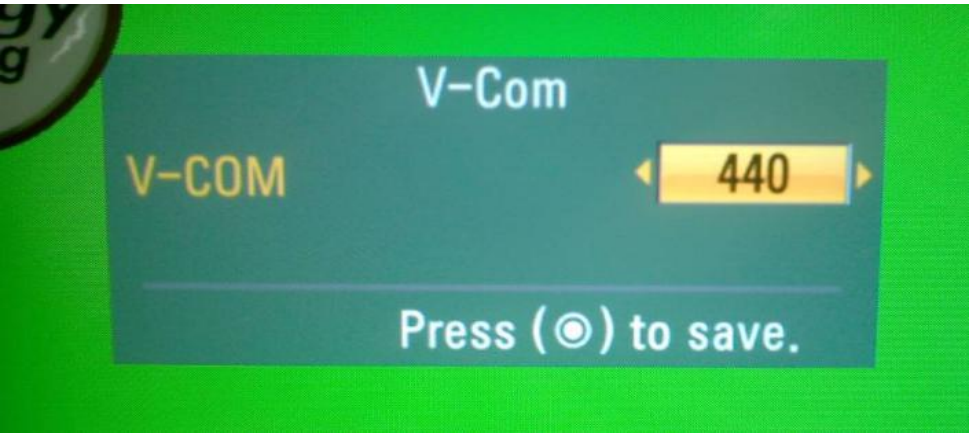
- LCD module change
- T-Con board change

2. Equipment

- Service Remote controller

3. Adjust sequence

- Press the 'adj' key
 - select V-COM
 - As pushing the right or the left button on the remote controller, And find the V-COM value Which is no or minimized the Flicker.
- (If there is no flicker at default value, Press the exit key and finish the VCOM adjustment.)**
- Push the OK key to store the value. Then the message "Saving OK" is pop.
 - Press the exit key to finish V-COM adjustment.



Appendix : Power OFF History

Status	Power off List	Explanation
Normal	POWER_OFF_BY_REMOTE KEY	POWER_OFF_BY_REMOTE CONTROL
	POWER_OFF_BY_OFF_TIMER	POWER_OFF_BY_OFF TIMER
	POWER_OFF_BY_SLEEP_TIMER	POWER_OFF_BY_SLEEP TIMER
	POWER_OFF_BY_TS_END	POWER_OFF_BY_REMOTE or LOCAL KEY While recording
	POWER_OFF_BY_INSTOP_KEY	POWER_OFF_BY_INSTOP KEY
	POWER_OFF_BY_AUTO_OFF	POWER_OFF_BY_AUTO OFF
	POWER_OFF_BY_ON_TIMER	POWER_OFF_BY_ON TIMER
	POWER_OFF_BY_RS232C	POWER_OFF_BY_RS232C
	POWER_OFF_BY_RESREC	POWER_OFF_BY_Reserved Record
	POWER_OFF_BY_RECEND	POWER_OFF_BY_End of Recording
	POWER_OFF_BY_SWDOWN	POWER_OFF_BY_S/W Download
	POWER_OFF_BY_LOCAL_KEY	POWER_OFF_BY_LOCAL KEY
	POWER_OFF_BY_OTA	POWER_OFF_BY_End of OTA
	POWER_OFF_BY_SIGNAL_DETECT	POWER_OFF_BY_Another MICOM (Only OLED)
	POWER_OFF_BY_RESET	POWER_OFF_BY_Factory Reset
	POWER_OFF_BY_UNKNOWN	POWER_OFF_BY_unknown status except listed case
Abnormal	POWER_OFF_BY_ABN	POWER_OFF_BY_abnormal Panel status
	POWER_OFF_BY_KEY_TIMEOUT	POWER_OFF_BY_abnormal Power Off Key At Warm/Hot status
	POWER_OFF_BY_ACDET	POWER_OFF_BY_AC OFF
	POWER_OFF_BY_5VMNT	POWER_OFF_BY_AC DETECT
	POWER_OFF_BY_NO_POLLING	POWER_OFF_BY_MCU Abnormal for 15 sec.
	POWER_OFF_BY_1SEC_POWER_OFF	POWER_OFF_BY_MCU Abnormal status with Power Off Key
	POWER_OFF_BY_20VMNT	POWER_OFF_BY_abnormal Panel status (Only OLED)



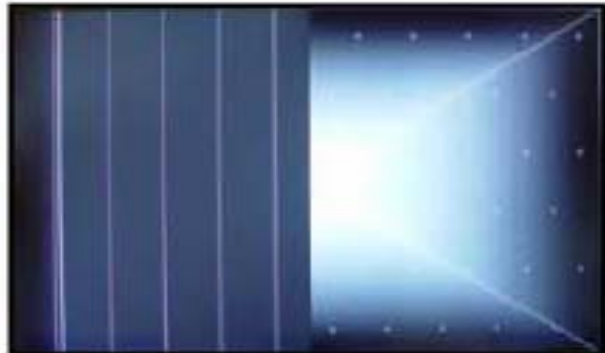
Appendix : Exchange T-Con Board (1)



Solder defect, CNT Broken



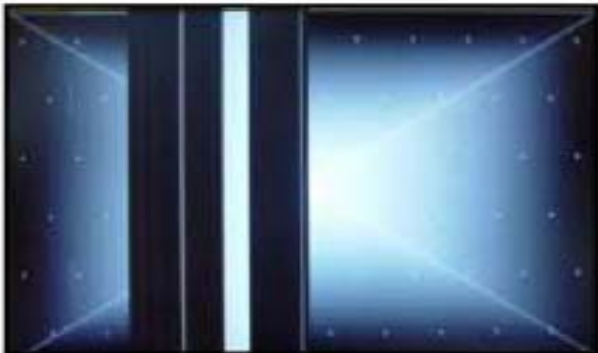
Solder defect, CNT Broken



Solder defect, CNT Broken



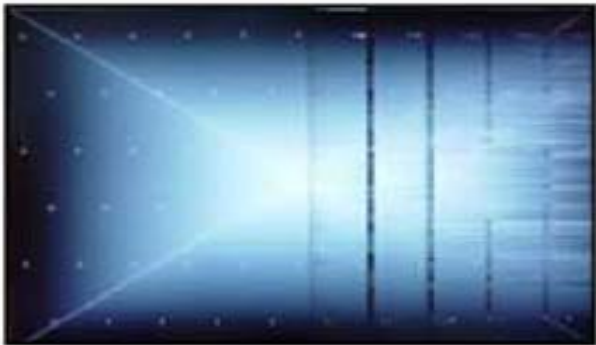
Solder defect, CNT Broken



Solder defect, CNT Broken



Abnormal Power Section



Solder defect, Short/Crack

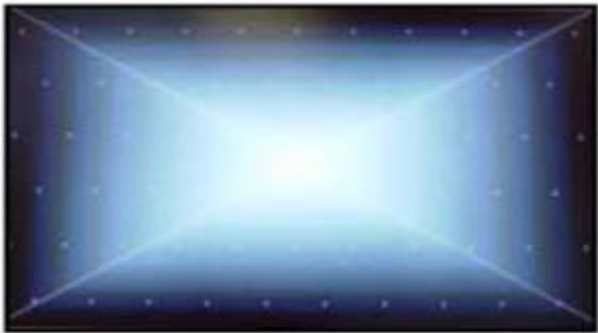


Abnormal Power Section



Solder defect, Short/Crack

Appendix : Exchange T-Con Board (2)



Abnormal Power Section



Abnormal Power Section



Solder defect, Short/Crack



Solder defect, Short/Crack



Fuse Open, Abnormal power section



Abnormal Display



GRADATION



Noise



GRADATION

Appendix : Exchange PSU(LED driver)



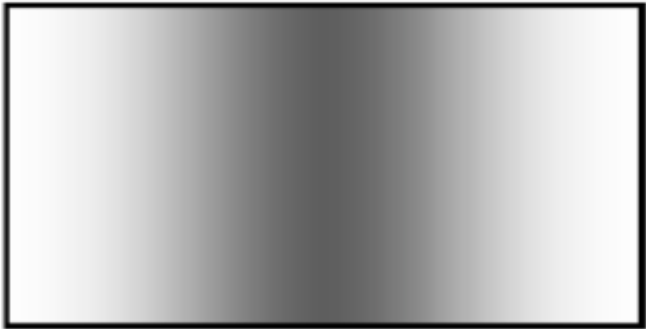
No Light



Dim Light



Dim Light



Dim Light



No picture/Sound Ok

Appendix : Exchange the Module (1)



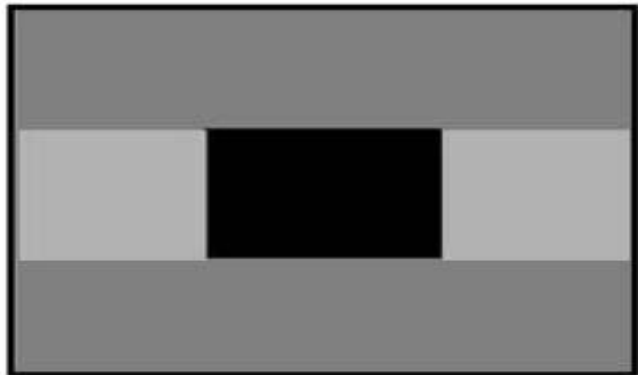
Panel Mura, Light leakage



Panel Mura, Light leakage



Press damage



Crosstalk



Press damage



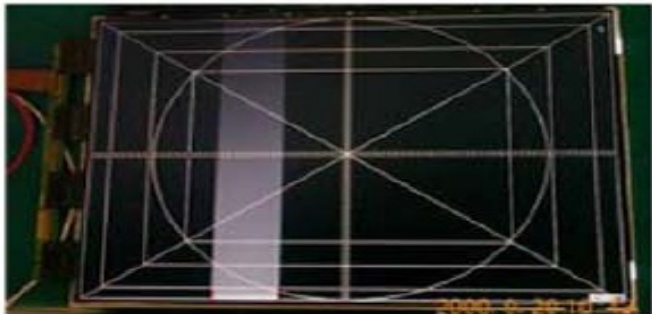
Crosstalk



Press damage

Un-repairable Cases
In this case please exchange the module.

Appendix : Exchange the Module (2)



Vertical Block
Source TAB IC Defect



Vertical Line
Source TAB IC Defect



Vertical Block
Source TAB IC Defect



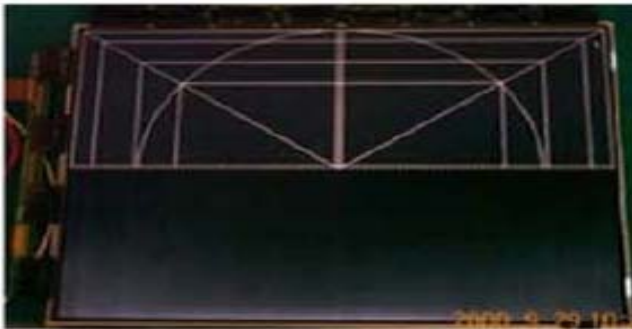
Horizontal Block
Gate TAB IC Defect



Horizontal Block
Gate TAB IC Defect



Horizontal line
Gate TAB IC Defect



Horizontal Block
Gate TAB IC Defect

Un-repairable Cases
In this case please exchange the module.