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LED TV

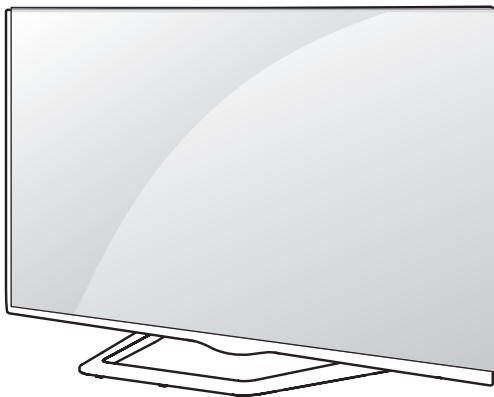
SERVICE MANUAL

CHASSIS : LA33B

MODEL : 47LA7400 47LA7400-UD

CAUTION

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



CONTENTS

CONTENTS	2
PRODUCT SAFETY	3
SPECIFICATION	4
ADJUSTMENT INSTRUCTION	13
EXPLODED VIEW	23
SCHEMATIC CIRCUIT DIAGRAM	

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.

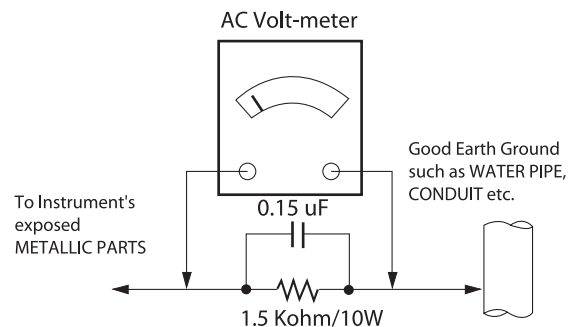
Connect 1.5 K / 10 watt resistor in parallel with a 0.15 uF capacitor between a known good earth ground (Water Pipe, Conduit, etc.) and the exposed metallic parts.

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 or 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

1 This spec sheet is applied all of the 32", 42", 47", 50", 55", 60" LED TV with LA33B chassis.

2. Test condition

Each part is tested as below without special notice.

- 1) Temperature : $25\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ ($77 \pm 9\text{ }^{\circ}\text{F}$) , CST : $40\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$
- 2) Relative Humidity: $65\% \pm 10\%$
- 3) Power Voltage

Market	Input voltage	Frequency	Remark
USA	110~240V	50/60Hz	Standard Voltage of each product 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 : UL, CSA, IEC specification
 - EMC: FCC, ICES, IEC specification

4. General Specification

No	Item	Specification		Remark
1	Market	1) North America		
2	Television System	NTSC-M, ATSC, 64 & 256 QAM		
3	Program Coverage	VHF 2-13, UHF 14-69, CATV 1-135 DTV 2-69, CADTV 1-135		
4	Input Voltage	AC 100 ~ 240V 50/60Hz		
5	Available Channel	1) VHF : 02~13 2) UHF : 14~69 3) DTV : 02-69 4) CATV : 01~135 5) CADTV : 01~135		
7	Aspect Ratio	16:9		
8	Tuning System	FS		
9	LCD Module	LC320DXE-SFR1	LGD	32LN570B-UH
		LC320DUE-SFR1	LGD	32LN5700-UH, 32LN5750-UH , 32LN570B-UH
		HC390DUN-VCFP1	CMI	39LN5700-UH, 39LN5750-UH
		LC420DUE-SFR1	LGD	42LN5700-UA/UH, 42LN5750-UH
		LC470DUE-SFR1	LGD	47LN5700-UA/UH, 47LN5750-UH, 47LN5790-UA
		LC500DUE-SFR1	LGD	50LN5700-UA/UH, 50LN5750-UH
		LC550DUJ-SEE1	LGD	55LN5700-UA/UH, 55LN5750-UH, 55LN5790-UA
		HC600DUD-SLFP1	LGD	60LN5700-UA/UH, 60LN5750-UH
		HC600DUD-SLFS1	LGD	60LN6150-UC
		LC420DUE-SFU1	LGD	42LA6200-UA, 42LA6205-UA
		LC470DUE-SFU1	LGD	47LA6200-UA, 47LA6205-UA
		LC500DUE-SFU1	LGD	50LA6200-UA, 50LA6205-UA
		LC550DUJ-SEK1	LGD	55LA6200-UA, 55LA6205-UA
		HC600DUD-SLFT1	LGD	60LA6200-UA, 60LA6205-UA
		LC470EUN-SFF2	LGD	47LA6400/6450-UA
		LC550EUN-SFF2	LGD	55LA6400/6450-UA
		T500HVD02.1	AUO	50LA6950-UE
		LC420EUG-PFF1	LGD	42LA6650-UA
		LC470EUG-PFF1	LGD	47LA6650-UA ,47LA6900-UD
		LC550EUG-PFF1	LGD	55LA6650-UA ,55LA6900-UD
LC470EUH-PEF1	LGD	47LA7400-UD		
LC550EUH-PEF1	LGD	55LA7400-UD		
10	Operating Environment	1) Temp : 0 ~ 40 deg 2) Humidity : ~ 80 %		
11	Storage Environment	1) Temp : -20 ~ 60 deg 2) Humidity : ~ 85 %		

5. Supported video resolutions

5.1. Component 2D input(Y, CB/PB, CR/PR)

No	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	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	27.0	SDTV 480P
5	1280*720	45.00	60.00	74.25	HDTV 720P
6	1280*720	44.96	59.94	74.176	HDTV 720P
7	1920*1080	33.75	60.00	74.25	HDTV 1080I
8	1920*1080	33.72	59.94	74.176	HDTV 1080I
9	1920*1080	67.50	60	148.50	HDTV 1080P
10	1920*1080	67.432	59.94	148.352	HDTV 1080P

5.2. Component 3D input(Y, CB/PB, CR/PR)

No	Resolution	H-freq(kHz)	V-freq.(kHz)	Pixel clock	3D input proposed mode	Proposed
1	1280*720	45.00	60.00	74.25	2D to 3D,Side by Side, Top and Bottom	HDTV 720P
2	1280*720	44.96	59.94	74.176	2D to 3D,Side by Side, Top and Bottom	HDTV 720P
3	1920*1080	33.75	60.00	74.25	2D to 3D,Side by Side, Top and Bottom	HDTV 1080I
4	1920*1080	33.72	59.94	74.176	2D to 3D,Side by Side, Top and Bottom	HDTV 1080I

5.3. HDMI Input (PC/DTV)

No.	Resolution	H-freq(kHz)	V-freq.(kHz)	Pixel clock(MHz)	Proposed	
	PC				DDC	
1	640*350	31.468	70.09	25.17	EGA	X
2	720*400	31.469	70.08	28.32	DOS	O
3	640*480	31.469	59.94	25.17	VESA(VGA)	O
4	800*600	37.879	60.31	40.00	VESA(SVGA)	O
5	1024*768	48.363	60.00	65.00	VESA(XGA)	O
6	1152*864	54.348	60.053	80.002	VESA	O
7	1360*768	47.712	60.015	85.50	VESA(WXGA)	X
8	1280*1024	63.981	60.020	108.00	VESA(SXGA)	O
9	1920*1080	67.5	60	148.5	HDTV 1080P	O
	DTV					
1	720*480	31.50	60	27.027	SDTV 480P	
2	720*480	31.469	59.94	27.00	SDTV 480P	
3	1280*720	45.00	60.00	74.25	HDTV 720P	
4	1280*720	44.96	59.94	74.176	HDTV 720P	
5	1920*1080	33.75	60.00	74.25	HDTV 1080I	
6	1920*1080	33.72	59.94	74.176	HDTV 1080I	
7	1920*1080	67.500	60	148.50	HDTV 1080P	
8	1920*1080	67.43	59.94	148.352	HDTV 1080P	
9	1920*1080	27.000	24.000	74.25	HDTV 1080P	
10	1920*1080	26.97	23.97	74.176	HDTV 1080P	
11	1920*1080	33.75	30.000	74.25	HDTV 1080P	
12	1920*1080	33.716	29.976	74.176	HDTV 1080P	

5.4. 3D HDMI Input(1.4b)

No.	Resolution	H-freq(kHz)	V-freq.(kHz)	Pixel clock(MHz)	3D input proposed mode
1	640*480	62.938 / 63	59.94/ 60	50.35/50.4	Side-by-side , Top-and-Bottom Checkerboard, Row Interleaving, Column Interleaving, Frame Sequential
		31.469 / 31.5		50.35/50.4	
				25.175/25.2	
2	720*480	62.938 / 63	59.94 / 60	54.001/54.054	Side-by-side , Top-and-Bottom Checkerboard, Row Interleaving, Column Interleaving, Frame Sequential
		31.469 / 31.5		54.001/54.054	
				27.00/27.027	Side-by-side , Top-and-Bottom
3	1280*720	89.91 / 90	59.94 / 60	148.351/148.5	Side-by-side , Top-and-Bottom Checkerboard, Row Interleaving, Column Interleaving, Frame Sequential
		44.96 / 45		148.351/148.5	
				74.17/74.25	Side-by-side , Top-and-Bottom
4	1920*1080	67.432 / 67.5	59.94 / 60	148.35/148.5	Side-by-side , Top-and-Bottom Checkerboard, Row Interleaving, Column Interleaving, Frame Sequential
		33.72 / 33.75		148.35/148.5	
				74.17/74.25	Side-by-side , Top-and-Bottom
5	1920*1080	53.946 / 54	23.976 / 24	148.351/148.5	Side-by-side , Top-and-Bottom Checkerboard, Row Interleaving, Column Interleaving,
		26.973 / 27		148.351/148.5	
				74.176/74.25	Side-by-side , Top-and-Bottom
6	1920*1080	67.432 / 67.5	29.97 / 30.00	148.35/148.5	Side-by-side , Top-and-Bottom Checkerboard, Row Interleaving, Column Interleaving,
		33.716 / 33.75		148.35/148.5	
				74.175/74.25	Side-by-side , Top-and-Bottom

5.5. 3D HDMI-PC Input

No.	Resolution	H-freq(kHz)	V-freq.(kHz)	Pixel clock(MHz)	3D input proposed mode
1	1024*768	48.363	60.004	65.000	2D to 3D,Side by Side , Top & Bottom
2	1360*768	47.712	60.015	85.500	
3	1920*1080	67.50	60.00	148.50	

5.6. 3D HDMI Input(1.3)

No.	Resolution	H-freq(kHz)	V-freq.(kHz)	Pixel clock(MHz)	3D input proposed mode
1	640*480	62.938 / 63	59.94/ 60	50.35/50.4	2D to 3D,Side-by-side, Top-and-Bottom, Checkerboard, Row Interleaving, Column Interleaving, Frame Sequential
		31.469 / 31.5		50.35/50.4	
				25.175/25.2	
2	720*480	62.938 / 63	59.94 / 60	54.001/54.054	2D to 3D,Side-by-side, Top-and-Bottom, Checkerboard, Row Interleaving, Column Interleaving, Frame Sequential
		31.469 / 31.5		54.001/54.054	
				27.00/27.027	
3	1280*720	89.91 / 90	59.94 / 60	148.351/148.5	2D to 3D,Side-by-side, Top-and-Bottom, Checkerboard, Row Interleaving, Column Interleaving, Frame Sequential
		44.96 / 45		148.351/148.5	
				74.17/74.25	
4	1920*1080	67.432 / 67.5	59.94 / 60	148.35/148.5	2D to 3D,Side-by-side, Top-and-Bottom, Checkerboard, Row Interleaving, Column Interleaving, Frame Sequential
		33.72 / 33.75		148.35/148.5	
				74.17/74.25	
5	1920*1080	53.946 / 54	23.976 / 24	148.351/148.5	2D to 3D,Side-by-side, Top-and-Bottom, Checkerboard, Row Interleaving, Column Interleaving
		26.973 / 27		148.351/148.5	
				74.176/74.25	
6	1920*1080	67.432 / 67.5	29.97 / 30.00	148.35/148.5	2D to 3D,Side-by-side, Top-and-Bottom, Checkerboard, Row Interleaving, Column Interleaving

5.7. USB/DLNA Input

5.7.1. 3D Auto detection

No.	Resolution	H-freq(kHz)	V-freq.(kHz)	Pixel clock(MHz)	3D input proposed mode	Proposed
1	1920*1080	33.75	30.000	74.25	Side-by-side, Top-and-Bottom Checkerboard, Row Interleaving, Column Interleaving, Frame Sequential (Photo : Side-by-side, Top-and-Bottom)	HDTV 1080P

5.7.2. 3D Manual





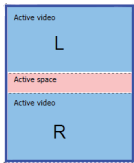

No.	Resolution	H-freq(kHz)	V-freq.(kHz)	Pixel clock(MHz)	3D input proposed mode	Proposed
1	1920*1080	33.75	30.000	74.25	Side-by-side, Top-and-Bottom Checkerboard, Row Interleaving, Column Interleaving, Frame Sequential (Photo : Side-by-side, Top-and-Bottom)	HDTV 1080P

5.8. RF 3D Input(DTV)

No.	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	Proposed	3D input proposed mode
1	1280*720	45.000	60	74.25	HDTV 720P	2D to 3D, Side by Side, Top & Bottom
2	1920*1080	33.75	60	74.25	HDTV 1080I	2D to 3D, Side by Side, Top & Bottom

5.9. 2D to 3D Conversion

No	INPUT	Freq	Resolution
1	Digital TV / Analog TV	2D Support freq	2D Support resolution
2	HDMI	2D Support freq	2D Support resolution
3	Component	2D Support freq	2D Support resolution
4	Composite	2D Support freq	2D Support resolution
5	USB	2D Support freq	2D Support resolution

No	Side by Side	Top & Bottom	Checkerboard	Single Frame Sequential	Frame Packing	2D to 3D
1						

ADJUSTMENT INSTRUCTION

1. Application

This spec. sheet applies to LA33B Chassis applied LED TV all models manufactured in TV factory

2. Specification

- 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.
- Adjustment must be done in the correct order.
- The adjustment must be performed in the circumstance of 25 ± 5 °C of temperature and $65 \pm 10\%$ of relative humidity if there is no specific designation
- The input voltage of the receiver must keep 100~240V, 50/60Hz
- At first Worker must turn on the SET by using Power Only key.
- The receiver must be operated for about 5 minutes prior to the adjustment when module is in the circumstance of over 15 °C
In case of keeping module is in the circumstance of 0°C, it should be placed in the circumstance of above 15°C for 2 hours
In case of keeping module is in the circumstance of below -20°C, it should be placed in the circumstance of above 15°C for 3 hours.

※ Caution

When still image is displayed for a period of 20 minutes or longer (especially where W/B scale is strong. Digital pattern 13ch and/or Cross hatch pattern 09ch), there can some afterimage in the black level area

3. Adjustment items

3.1. Main PCBA Adjustments

- ADC adjustment : ADC adjustment is OTP (Auto ADC)
- EDID download : HDMI

※ Remark

-Above adjustment items can be also performed in Final Assembly if needed. Adjustment items in both PCBA and final assembly tages can be checked by using the INSTART Menu -> 1.ADJUST CHECK

3.2. Final assembly adjustment

- White Balance adjustment
- RS-232C functionality check
- Factory Option setting per destination
- Shipment mode setting (In-Stop)
- GND and HI-POT test

3.3. Appendix

- Tool option menu, USB Download (S/W Update, Option and Service only)
- Manual adjustment for ADC calibration and White balance.
- Shipment conditions, Channel pre-set

4. MAIN PCBA Adjustments

4.1. ADC Calibration

- An ADC calibration is not necessary because MAIN SoC (LGExxxx) is already calibrated from IC Maker
- If it needs to adjust manually, refer to appendix.

4.2. MAC Address, ESN Key and Widevine Key download

4.2.1. Equipment & Condition

- Play file: keydownload.exe

4.2.2. Communication Port connection

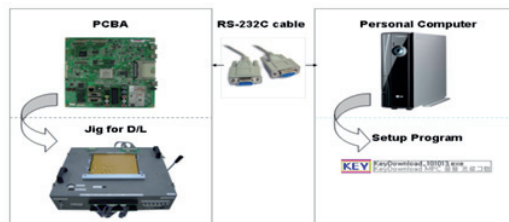
- Key Write: Com 1,2,3,4 and 115200 (Baudrate)
- Barcode: Com 1,2,3,4 and 9600 (Baudrate)

4.2.3. Download process

- Select the download items.
- Mode check: Online Only
- Check the test process
- US, Canada models: DETECT -> MAC_WRITE -> WIDEVINE_WRITE
- Korea, Mexico models: DETECT -> MAC_WRITE -> WIDEVINE_WRITE
- Play : START
- Check of result: Ready, Test, OK or NG
- Printer out (MAC Address Label)

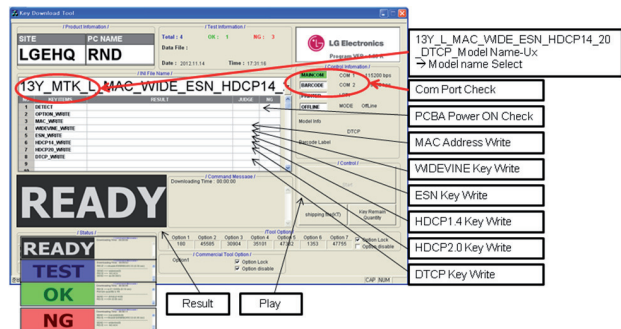
4.2.4. Communication Port connection

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



4.2.5. Download

- US, Canada models (13Y LCD TV + MAC + Widevine + ESN Key + DTCP Key + HDCP1.4 and HDCP2.0)



4.2.6. Inspection

- In INSTART menu, check these keys.

4.3. LAN port Inspection (Ping Test)

4.3.1. 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



4.3.2. 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



4.4. EDID Download

4.4.1 Overview

- It is a VESA regulation. A PC or a MNT will display an optimal resolution through information sharing without any necessity of user input. It is a realization of "Plug and Play".

4.4.2 Equipment

- Since embedded EDID data is used, EDID download JIG, HDMI cable and D-sub cable are not need.
- Adjust remocon

4.4.3 Download method

- 1) Press Adj. key on the Adj. R/C,
- 2) Select EDID D/L menu.
- 3) By pressing Enter key, EDID download will begin
- 4) If Download is successful, OK is display, but If Download is failure, NG is displayed.
- 5) If Download is failure, Re-try downloads.

※ Caution) When EDID Download, must remove RGB/HDMI Cable.

4.4.4. EDID DATA

4.4.4.1. 2D_8bit_PCM(US)_xvYCC : off
HDMI EDID 2D_8bit_PCM(US)_xvYCC : off

	0x00	0x01	0x02	0x03	0x04	0x05	0x06	0x07	0x08	0x09	0x0A	0x0B	0x0C	0x0D	0x0E	0x0F
0x00	00	FF	FF	FF	FF	FF	FF	00	1E	8D	ⓐ					
0x01	ⓑ	01	03	80	A0	5A	78	0A	EE	91	A3	54	4C	99	26	
0x02	0F	50	54	A1	08	00	31	40	45	40	61	40	71	40	81	80
0x03	01	01	01	01	01	01	02	3A	80	18	71	38	2D	40	58	2C
0x04	45	00	40	84	63	00	00	1E	66	21	50	B0	51	00	1B	30
0x05	40	70	3E	00	40	84	63	00	00	1E	00	00	00	FD	00	3A
0x06	3E	1E	53	10	00	0A	20	20	20	20	20	20				
0x07																
0x08																
0x09	02	03	1D	F1	48	90	22	20	05	04	03	02	01	23	09	57
0x0A	07									E3	05	00	00	02	3A	80
0x0B	18	71	38	2D	40	58	2C	04	05	A0	5A	00	00	00	1E	01
0x0C	1D	80	18	71	1C	16	20	58	2C	25	00	40	84	63	00	00
0x0D	9E	01	1D	00	72	51	D0	1E	20	6E	28	55	00	40	84	63
0x0E	00	00	1E	8C	0A	D0	8A	20	E0	2D	10	10	3E	96	00	40
0x0F	84	63	00	18	00	00	00	00	00	00	00	00	00	00	00	00
0x10	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	ⓐ

Reference

- HDMI1 ~ HDMI3
- In the data of EDID, bellows may be different by S/W or Input mode.

Product ID

HEX	EDID Table	DDC Function
0001	0100	Analog
0001	0100	Digital

- Serial No: Controlled on production line.
- Month, Year: Controlled on production line:
ex) Monthly : '01' -> '01'
Year : '2013' -> '17'
- Model Name(Hex): LGTV

Chassis	MODEL NAME(HEX)
LA33B	00 00 00 FC 00 4C 47 20 54 56 0A 20 20 20 20 20 20

Checksum(LG TV): Changeable by total EDID data.

	ⓐ1	ⓐ2	ⓐ3
HDMI1	E8	49	X
HDMI2	E8	39	X
HDMI3	E8	29	X

Vendor Specific(HDMI)

INPUT	MODEL NAME(HEX)
HDMI1	67 03 0C 00 10 00 80 1E
HDMI2	67 03 0C 00 20 00 80 1E
HDMI3	67 03 0C 00 30 00 80 1E

4.4.4.2. 2D_10bit_PCM(US)_xvYCC : off
HDMI EDID 2D_10bit_PCM(US)_xvYCC : off

0x00	00	FF	FF	FF	FF	FF	FF	00	1E	6D	Ⓣ		Ⓣ						
0x01	Ⓣ											Ⓣ							
0x02	0F	50	54	A1	08	00	31	40	45	40	61	40	71	40	81	80			
0x03	01	01	01	01	01	02	3A	80	18	71	38	2D	40	58	2C				
0x04	45	00	A0	5A	00	00	00	1E	66	21	50	B0	51	00	1B	30			
0x05	40	70	36	00	A0	5A	00	00	00	1E	00	00	00	FD	00	3A			
0x06	3E	1E	53	10	00	0A	20	20	20	20	Ⓣ								
0x07	Ⓣ											01	Ⓣ1						
0x08	02	03	1D	F1	48	90	22	20	05	04	03	02	01	23	09	57			
0x09	07	Ⓣ											E3	05	00	00	02	3A	80
0x0A	18	71	38	2D	40	58	2C	04	05	A0	5A	00	00	00	1E	01			
0x0B	1D	80	18	71	1C	16	20	58	2C	25	00	A0	5A	00	00	00			
0x0C	9E	01	1D	00	72	51	D0	1E	20	6E	28	55	00	A0	5A	00			
0x0D	00	00	1E	8C	0A	D0	8A	20	E0	2D	10	10	3E	96	00	A0			
0x0E	5A	00	00	00	18	26	36	80	A0	70	38	1B	40	30	20	25			
0x0F	00	A0	5A	00	00	00	1A	00	00	00	00	00	00	00	Ⓣ2				

- Reference
- HDMI1 ~ HDMI3
- In the data of EDID, bellows may be different by S/W or Input mode.

ⓐ Product ID

HEX	EDID Table	DDC Function
0001	0100	Analog
0001	0100	Digital

- ⓑ Serial No: Controlled on production line.
- ⓒ Month, Year: Controlled on production line:
ex) Monthly : '01' -> '01'
Year : '2013' -> '17'
- ⓓ Model Name(Hex): LGTV

Chassis	MODEL NAME(HEX)
LA33B	00 00 00 FC 00 4C 47 20 54 56 0A 20 20 20 20 20 20

ⓔ Checksum(LG TV): Changeable by total EDID data.

	Ⓣ1	Ⓣ2	Ⓣ3
HDMI1	43	7D	X
HDMI2	43	6D	X
HDMI3	43	5D	X

ⓕ Vendor Specific(HDMI)

INPUT	MODEL NAME(HEX)
HDMI1	67 03 0C 00 10 00 B8 2D
HDMI2	67 03 0C 00 20 00 B8 2D
HDMI3	67 03 0C 00 30 00 B8 2D

4.4.4.3. 3D_8bit_PCM(US)_xvYCC : off
HDMI EDID 3D_8bit_PCM(US)_xvYCC : off

0x00	00	FF	FF	FF	FF	FF	FF	00	1E	6D	Ⓣ		Ⓣ						
0x01	Ⓣ											Ⓣ							
0x02	0F	50	54	A1	08	00	31	40	45	40	61	40	71	40	81	80			
0x03	01	01	01	01	01	01	02	3A	80	18	71	38	2D	40	58	2C			
0x04	45	00	A0	5A	00	00	00	1E	66	21	50	B0	51	00	1B	30			
0x05	40	70	36	00	A0	5A	00	00	00	1E	00	00	00	FD	00	3A			
0x06	3E	1E	53	10	00	0A	20	20	20	20	Ⓣ								
0x07	Ⓣ											01	Ⓣ1						
0x08	02	03	2E	F1	48	90	22	20	05	04	03	02	01	23	09	57			
0x09	07	Ⓣ											E3	05	00	00	02	3A	80
0x0A	18	71	38	2D	40	58	2C	04	05	A0	5A	00	00	00	1E	01			
0x0B	1D	80	18	71	1C	16	20	58	2C	25	00	A0	5A	00	00	00			
0x0C	9E	01	1D	00	72	51	D0	1E	20	6E	28	55	00	A0	5A	00			
0x0D	00	00	1E	8C	0A	D0	8A	20	E0	2D	10	10	3E	96	00	A0			
0x0E	63	00	00	1E	00	00	00	00	00	00	00	00	00	00	00	00			
0x0F	00	00	00	00	00	00	00	00	00	00	00	00	00	00	Ⓣ2				

- Reference
- HDMI1 ~ HDMI3
- In the data of EDID, bellows may be different by S/W or Input mode.

ⓐ Product ID

HEX	EDID Table	DDC Function
0001	0100	Analog
0001	0100	Digital

- ⓑ Serial No: Controlled on production line.
- ⓒ Month, Year: Controlled on production line:
ex) Monthly : '01' -> '01'
Year : '2013' -> '17'
- ⓓ Model Name(Hex): LGTV

Chassis	MODEL NAME(HEX)
LA33B	00 00 00 FC 00 4C 47 20 54 56 0A 20 20 20 20 20 20

ⓔ Checksum(LG TV): Changeable by total EDID data.

	Ⓣ1	Ⓣ2	Ⓣ3
HDMI1	E8	FC	X
HDMI2	E8	EC	X
HDMI3	E8	DC	X

ⓕ Vendor Specific(HDMI)

INPUT	MODEL NAME(HEX)
HDMI1	78 03 0C 00 10 00 80 1E 20 CO 0E 01 4F 00 FE 08 10 06 10 18 10 28 10 38 10
HDMI2	78 03 0C 00 20 00 80 1E 20 CO 0E 01 4F 00 FE 08 10 06 10 18 10 28 10 38 10
HDMI3	78 03 0C 00 30 00 80 1E 20 CO 0E 01 4F 00 FE 08 10 06 10 18 10 28 10 38 10

4.4.4.4. 3D_10bit_PCM(US)_xvYCC : off
HDMI EDID 3D_10bit_PCM(US)_xvYCC : off

	0x00	0x01	0x02	0x03	0x04	0x05	0x06	0x07	0x08	0x09	0x0A	0x0B	0x0C	0x0D	0x0E	0x0F					
0x00	00	FF	FF	FF	FF	FF	00	1E	6D	Ⓢ											
0x01	Ⓢ		01	03	80	A0	5A	78	0A	EE	91	A3	54	4C	99	26					
0x02	0F	50	54	A1	08	00	31	40	45	40	61	40	71	40	81	80					
0x03	01	01	01	01	01	01	02	3A	80	18	71	38	2D	40	58	2C					
0x04	45	00	40	84	63	00	00	1E	66	21	50	B0	51	00	1B	30					
0x05	40	70	36	00	40	84	63	00	00	1E	00	00	00	FD	00	3A					
0x06	3E	1E	53	10	00	0A	20	20	20	20	20	20	Ⓢ								
0x07	Ⓢ															01	Ⓢ1				
0x08	02	03	2E	F1	48	90	22	20	05	04	03	02	01	23	09	57					
0x09	07	Ⓢ																			
0x0A	Ⓢ															E3	05	00	00	02	3A
0x0B	80	18	71	38	2D	40	58	2C	45	00	40	84	63	00	00	1E					
0x0C	01	1D	80	18	71	1C	16	20	58	2C	25	00	40	84	63	00					
0x0D	00	9E	01	1D	00	72	51	D0	1E	20	6E	28	55	00	40	84					
0x0E	63	00	00	1E	00	00	00	00	00	00	00	00	00	00	00	00					
0x0F	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	Ⓢ2					

- Reference
- HDMI1 ~ HDMI3
- In the data of EDID, bellows may be different by S/W or Input mode.

Ⓢ Product ID

HEX	EDID Table	DDC Function
0001	0100	Analog
0001	0100	Digital

- Ⓢ Serial No: Controlled on production line.
- Ⓢ Month, Year: Controlled on production line:
ex) Monthly : '01' -> '01'
Year : '2013' -> '17'
- Ⓢ Model Name(Hex): LGTV

Chassis	MODEL NAME(HEX)
LA33B	00 00 00 FC 00 4C 47 20 54 56 0A 20 20 20 20 20 20

Ⓢ Checksum(LG TV): Changeable by total EDID data.

	Ⓢ1	Ⓢ2	Ⓢ3
HDMI1	E8	B5	X
HDMI2	E8	A5	X
HDMI3	E8	95	X

Ⓢ Vendor Specific(HDMI)

INPUT	MODEL NAME(HEX)
HDMI1	78 03 0C 00 10 00 B8 2D 20 C0 0E 01 4F 00 FE 08 10 06 10 18 10 28 10 38 10
HDMI2	78 03 0C 00 20 00 B8 2D 20 C0 0E 01 4F 00 FE 08 10 06 10 18 10 28 10 38 10
HDMI3	78 03 0C 00 30 00 B8 2D 20 C0 0E 01 4F 00 FE 08 10 06 10 18 10 28 10 38 10

5. Final Assembly Adjustment

5.1. White Balance Adjustment

5.1.1. Overview

- 5.1.1.1. W/B adj. Objective & How-it-works
- (1) Objective: To reduce each Panel's W/B deviation
 - (2) How-it-works: When R/G/B gain in the OSD is at 192, it means the panel is at its Full Dynamic Range. In order to prevent saturation of Full Dynamic range and data, one of R/G/B is fixed at 192, and the other two is lowered to find the desired value.
 - (3) Adj. condition: normal temperature
 - Surrounding Temperature: 25±5 °C
 - Warm-up time: About 5 Min
 - Surrounding Humidity: 20% ~ 80%
 - Before White balance adjustment, Keep power on status, don't power off

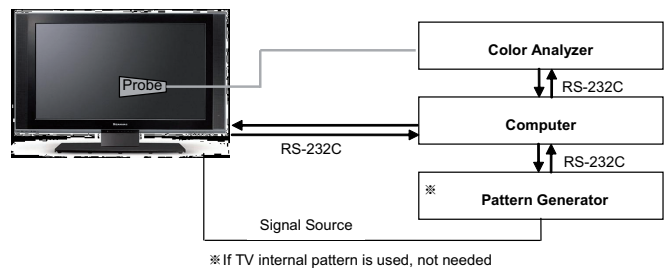
5.1.1.2. Adj. condition and cautionary items

- (1) Lighting condition in surrounding area surrounding lighting should be lower 10 lux. Try to isolate adj. area into dark surrounding.
- (2) Probe location: Color Analyzer (CA-210) probe should be within 10cm and perpendicular of the module surface (80°~ 100°)
- (3) Aging time
 - After Aging Start, Keep the Power ON status during 5 Minutes.
 - In case of LCD, Back-light on should be checked using no signal or Full-white pattern.

5.1.2. Equipment

- (1) Color Analyzer: CA-210 (NCG: CH 9 / WCG: CH12 / LED: CH14)
 - (2) Adj. Computer (During auto adj., RS-232C protocol is needed)
 - (3) Adjust Remocon
 - (4) Video Signal Generator MSPG-925F 720p/204-Gray (Model: 217, Pattern: 49)
- ※ Color Analyzer Matrix should be calibrated using CS-1000

5.1.3. Equipment connection



5.1.4. Adjustment Command (Protocol)

(1) RS-232C Command used during auto-adj.

RS-232C COMMAND			Explanation
CMD	DATA	ID	
Wb	00	00	Begin White Balance adj.
Wb	00	ff	End White Balance adj. (internal pattern disappears)

(2) Adjustment Map

	Adj. item	Command (lower caseASCII)		Data Range (Hex.)	
		CMD1	CMD2	MIN	MAX
Cool	R Gain	j	g	00	C0
	G Gain	j	h	00	C0
	B Gain	j	i	00	C0
Medium	R Gain	j	a	00	C0
	G Gain	j	b	00	C0
	B Gain	j	c	00	C0
Warm	R Gain	j	d	00	C0
	G Gain	j	e	00	C0
	B Gain	j	f	00	C0

5.1.5. Adjustment method

5.1.5.1. Auto WB calibration

- (1) Set TV in ADJ mode using P-ONLY key (or POWER ON key)
 - (2) Place optical probe on the center of the display
- It need to check probe condition of zero calibration before adjustment.
 - (3) Connect RS-232C Cable
 - (4) Select mode in ADJ Program and begin a adjustment.
 - (5) When WB adjustment is completed with OK message, check adjustment status of pre-set mode (Cool, Medium, Warm)
 - (6) Remove probe and RS-232C cable.
- W/B Adj. must begin as start command "wb 00 00", and finish as end command "wb 00 ff", and Adj. offset if need

5.1.5.2. Manual adjustment

- (1) Set TV in Adj. mode using POWER ON
- (2) Zero Calibrate the probe of Color Analyzer, then place it on the center of LCD module within 10cm of the surface..
- (3) Press ADJ key -> EZ adjust using adj. R/C à 9. White-Balance then press the cursor to the right (KEY▶). When KEY(▶) is pressed 206 Gray internal pattern will be displayed.
- (4) Adjust Cool modes
 - (i) Fix the one of R/G/B gain to 192 (default data) and decrease the others.
(If G gain is adjusted over 172 and R and B gain less than 192 , Adjust is O.K.)
 - (ii) If G gain is less than 172, Increase G gain by up to 172, and then increase R gain and G gain same amount of increasing G gain.
 - (iii) If R gain or B gain is over 255, Readjust G gain less than 172, Conform to R gain is 255 or B gain is 255
- (5) Adjust two modes (Medium / Warm) Fix the one of R/G/B gain to 192 (default data) and decrease the others.
- (6) Adj. is completed, Exit adjust mode using "EXIT" key on Remote controller.
 - If internal pattern is not available, use RF input. In EZ Adj. menu. 6.White Balance, you can select one of 2 Test-pattern: ON, OFF. Default is inner (ON). By selecting OFF, you can adjust using RF signal in 206 Gray pattern.

5.1.6. Reference (White Balance Adj. coordinate and color temperature)

- (1) Luminance: 204 Gray, 80IRE
- (2) Standard color coordinate and temperature using CS-1000 (over 26 inch)

5.1.7. Reference (White Balance Adj. coordinate and color temperature)

- Luminance: 204 Gray
- Standard color coordinate and temperature using CS-1000 (over 26 inch)

Mode	Coordinate		Temp	Δuv
	X	Y		
Cool	0.271	0.270	13,000K	0.0000
Medium	0.285	0.293	9,300K	0.0000
Warm	0.313	0.329	6,500K	0.0000

- Standard color coordinate and temperature using CA-210(CH 14)
- (1) LGD , 65" AUC and 50" AUC module

Mode	Coordinate		Temp	Δuv
	X	Y		
Cool	0.269±0.002	0.273±0.002	13,000K	0.0000
Medium	0.285±0.002	0.293±0.002	9,300K	0.0000
Warm	0.313±0.002	0.329±0.002	6,500K	0.0000

- (2) O/S Module(AUC, CMI, Sharp,IPS...)

Mode	Coordinate		Temp	Δuv
	X	Y		
Cool	0.271±0.002	0.276±0.002	13,000K	0.0000
Medium	0.287±0.002	0.296±0.002	9,300K	0.0000
Warm	0.315±0.002	0.332±0.002	6,500K	0.0000

- Standard color coordinate and temperature using CA-210(CH-14) – by aging time

- (1) Normal line (LN5xxx, LA6xxx, LA7xxx, LA8xxx)

GP4	Aging time (Min)	Cool		Medium		Warm	
		X	Y	X	Y	X	Y
		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

- (2) Aging chamber(LN5xxx, LA6xxx, LA7xxx, LA8xxx)

GP4	Aging time (Min)	Cool		Medium		Warm	
		X	Y	X	Y	X	Y
		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

5.2. Option selection per country

5.2.1. Overview

- Tool option selection is only done for models in Non-USA North America due to rating
- Applied model: LA32B Chassis applied to CANADA and MEXICO

5.2.2. Country Group selection

- Press ADJ key on the Adj. R/C, and then select Country Group Menu
- Depending on destination, select US, then on the lower Country option, select US, CA, MX.
Selection is done using +, - KEY

5.2.3. Tool Option inspection

- Press Adj. key on the Adj. R/C, then select Tool option

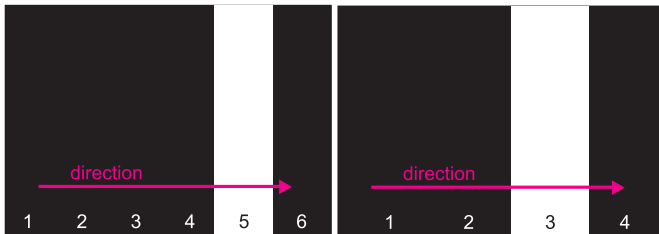
Model	Tool 1	Tool 2	Tool 3	Tool 4	Tool 5	Tool 6	Tool 7
32LN5700-UA/UH	289	12305	33160	61725	4262	5193	8747
39LN5700-UA/UH	2339	13841	33160	61725	4262	5193	8747
42LN5700-UA/UH	292	45073	6536	61725	12326	1353	41131
47LN5700-UA/UH	293	12305	33160	61725	12454	1353	41515
50LN5700-UA/UH	294	12305	33160	61725	12454	1353	41515
55LN5700-UA/UH	295	46609	6536	61725	12326	1353	41131
60LN5700-UA/UH	32856	13841	33160	61725	12454	1353	42539
32LN5750-UH	289	12305	33160	61725	4246	5193	8747
39LN5750-UH	2339	12305	33160	61725	4246	5193	8747
42LN5750-UH	292	12305	33160	61725	12438	1353	41515
47LN5750-UH	293	12305	33160	61725	12438	1353	41515
50LN5750-UH	294	12305	33160	61725	12438	1353	41515
55LN5750-UH	295	13841	33160	61725	12438	1353	41515
60LN5750-UH	33064	13841	33160	61725	12438	1353	41515
32LN570B-UH	289	12305	33160	61725	4262	5193	8747
47LN5790-UH	293	12305	33160	61725	12454	1353	41515
55LN5790-UH	294	12305	33160	61725	12454	1353	41515
60LN6150-UC	32856	13841	33160	61725	12454	1353	42539
42LA6200-UA	84	12305	33672	61725	14502	1353	41515
47LA6200-UA	85	12305	33672	61725	14502	1353	41515
50LA6200-UA	86	12305	33672	61725	14502	1353	41515
55LA6200-UA	87	13841	33672	61725	14502	1353	41515
60LA6200-UA	32856	13841	33672	61725	14502	1353	42539
42LA6205-UA	84	12305	33672	61725	14486	1353	41583
47LA6205-UA	85	12305	33672	61725	14486	1353	41515
50LA6205-UA	86	12305	33672	61725	14486	1353	41515
55LA6205-UA	87	13841	33672	61725	14486	1353	41515
60LA6205-UA	32856	13841	33672	61725	14486	1353	42539

Model	Tool 1	Tool 2	Tool 3	Tool 4	Tool 5	Tool 6	Tool 7
42LA6650-UA	132	45585	29592	61425	14742	1354	47659
47LA6650-UA	133	45585	29592	61425	14742	1354	47659
50LA6650-UA	4230	45585	28592	61725	6294	1354	46635
55LA6650-UA	135	45585	29592	61425	14742	1354	47659
47LA6900-UD	165	45585	29592	61425	14742	1354	47659
55LA6900-UD	167	45585	29592	61425	14742	1354	47659
50LA6900-UE	4230	45585	28592	61725	6294	1354	46635
47LA7400-UD	181	45585	29592	61425	14742	1354	47659
55LA7400-UD	183	45585	29592	61425	14742	1354	47659
60LA7400-UD							
47LA6450-UA	101	45585	6536	61725	14374	1353	42155

※ Tool option can be reconstructed by Software

5.3. Local Dimming Inspection

- Press 'TILT' key of the Adj. R/C and check moving patterns. The black bar patterns moves from top to bottom. If a local dimming function does not work, a whole screen shows full white.



<Local dimming All model except for 32LA6600-NE>



5.4. Magic Motion remote controller Check

5.4.1. 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.

5.4.2. Test

- Make pairing with TV set by pressing "Start key(Wheel key)" on RCU.
- Check a cursor on screen by pressing "Wheel key" of RCU
- Stop pairing with TV set by pressing "Back+ Home" key of RCU

5.4.3. Applied models

Chassis	Model Name	Magic RF receiver
LA33B	42/47/50/55LA6650-UA	Built-in
	47/55LA6900-UD	
	50LA6900-UE	
	32/39/42/47/50/55/60LN5700-UA/UH	Dongle
	32/39/42/47/50/55/60LN5750-UH	
	32LN570B-UH	
	47/55LN5790-UH	
	47/55LA6450-UA	

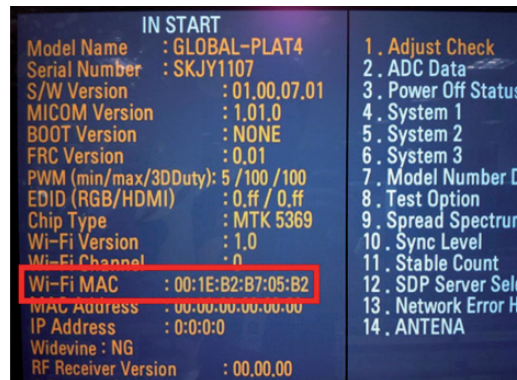
- ※ Dongle Model : An USB dongle-type receiver will be supplied in form of accessory.
So this pairing test is not necessary for these models

5.5. Wi-Fi MAC Address Check

5.5.1. Using RS232 Command

	Command	Set ACK
Transmission	[A][][][Set ID][][20][Cr]	[O][K][x] or [N][G]

5.5.2. Check the menu on in-start



5.6. 3D pattern test (Only for 3D models)

5.6.1. Test equipment

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

5.6.2. 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>

5.7. HDMI ARC Function Inspection

5.7.1. Test equipment

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

5.7.2. Test method

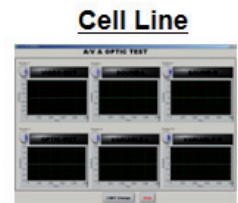
- (1) Insert the HDMI Cable to the HDMI ARC port from the master equipment (HDMI1)



- (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)



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



5.8. Ship-out mode check (In-stop)

- After final inspection, press In-Stop key of the Adj. R/C and check that the unit goes to Stand-by mode

6. AUDIO output check

6.1. Audio input condition

- (1) RF input: Mono, 1KHz sine wave signal, 100% Modulation
- (2) CVBS, Component: 1KHz sine wave signal (0.4Vrms)
- (3) RGB PC: 1KHz sine wave signal (0.7Vrms)

6.2. Specification

No	Item	Min	Typ	Max	Unit	Remark
1	Audio practical max Output, L/R (Distortion=10% max Output)	9.0 8.5	10.0 8.9	12.0 9.9	W Vrms	(1) Measurement condition - EQ/AVL/Clear Voice: Off (2) Speaker (8Ω Impedance)

7. GND and HI-POT Test

7.1. GND & HI-POT auto-check preparation

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

7.2. 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.

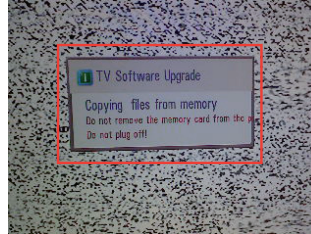
7.3. Checkpoint

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

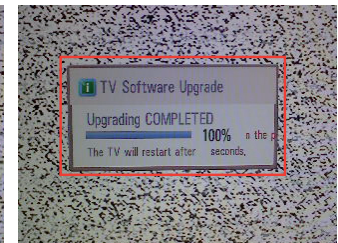
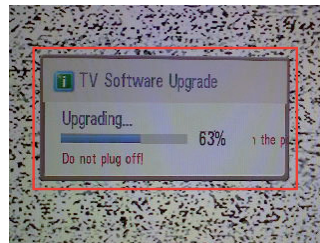
8. USB S/W Download

(optional, Service only)

- (1) Put the USB Stick to the USB socket
- (2) Automatically detecting update file in USB Stick
 - If your downloaded program version in USB Stick is lower than that of TV set, it didn't work. Otherwise USB data is automatically detected.
- (3) Show the message "Copying files from memory"



- (4) Updating is starting.



- (5) Updating Completed, The TV will restart automatically
- (6) If your TV is turned on, check your updated version and Tool option.

* If downloading version is more high than your TV have, TV can lost all channel data. In this case, you have to channel recover. If all channel data is cleared, you didn't have a DTV/ATV test on production line.

* After downloading, TOOL OPTION setting is needed again.

- (1) Push "IN-START" key in service remote controller.
- (2) Select "Tool Option 1" and Push "OK" button.
- (3) Punch in the number. (Each model has their number.)

9. Optional adjustments

9.1. Manual ADC Calibration

9.1.1. Equipment & Condition

- (1) Adjustment Remocon
- (2) 801GF (802B, 802F, 802R) or MSPG925FA Pattern Generator
 - Resolution : 480i Comp1 (MSPG-925FA: model-209, pattern-65)
 - Resolution : 1080p Comp1 (MSPG-925FA: model-225, pattern-65)
 - Resolution : 1080p RGB (MSPG-925FA: model-225, pattern-65)
 - Pattern : Horizontal 100% Color Bar Pattern
 - Pattern level : 0.7±0.1 Vp-p

9.1.2. Adjust method

- 8.1.2.1 ADC 480i/1080p Comp1, RGB
- (1) Check connected condition of Comp1/RGB cable to the equipment
- (2) Give a 480i Mode, Horizontal 100% Color Bar Pattern to Comp1. (MSPG-925FA -> Model: 209, Pattern: 65)
- (3) Change input mode as Component1 and picture mode as "Standard"
- (4) Press the In-start Key on the ADJ remote after at least 1 min of signal reception. Then, select 7.External ADC. And Press OK or Right Button for going to sub menu.
- (5) Press OK in Comp 480i menu
- (6) Give a 1080p Mode, Horizontal 100% Color Bar Pattern to Comp1. (MSPG-925FA -> Model: 225, Pattern: 65)
- (7) Press OK in Comp 1080p menu
- (8) Perform (6) and (7) in RGB-PC
- (9) If ADC Comp is successful, "ADC Component Success" is displayed. If ADC calibration is failure, "ADC Component Fail" is displayed.
- (10) If ADC calibration is failure, after rechecking ADC pattern or condition, retry calibration
- (11) If ADC RGB calibration is successful, "ADC RGB Success" is displayed. If ADC calibration is failure, "ADC RGB Fail" is displayed.
- (12) If ADC calibration is failure, after recheck ADC pattern or condition, retry calibration

9.2. Manual White balance Adjustment

9.2.1. Adj. condition and cautionary items

- (1) Lighting condition in surrounding area surrounding lighting should be lower 10 lux. Try to isolate adj. area into dark surrounding.
- (2) Probe location: Color Analyzer (CA-210) probe should be within 10cm and perpendicular of the module surface (80°~ 100°)
- (3) Aging time
 - After Aging Start, Keep the Power ON status during 5 Minutes.
 - In case of LCD, Back-light on should be checked using no signal or Full-white pattern.

9.2.2. Equipment

- (1) Color Analyzer: CA-210 (NCG: CH 9 / WCG: CH12 / LED: CH14)
- (2) Adj. Computer (During auto adj., RS-232C protocol is needed)
- (3) Adjust Remocon
- (4) Video Signal Generator MSPG-925F 720p/216-Gray (Model: 217, Pattern: 78)

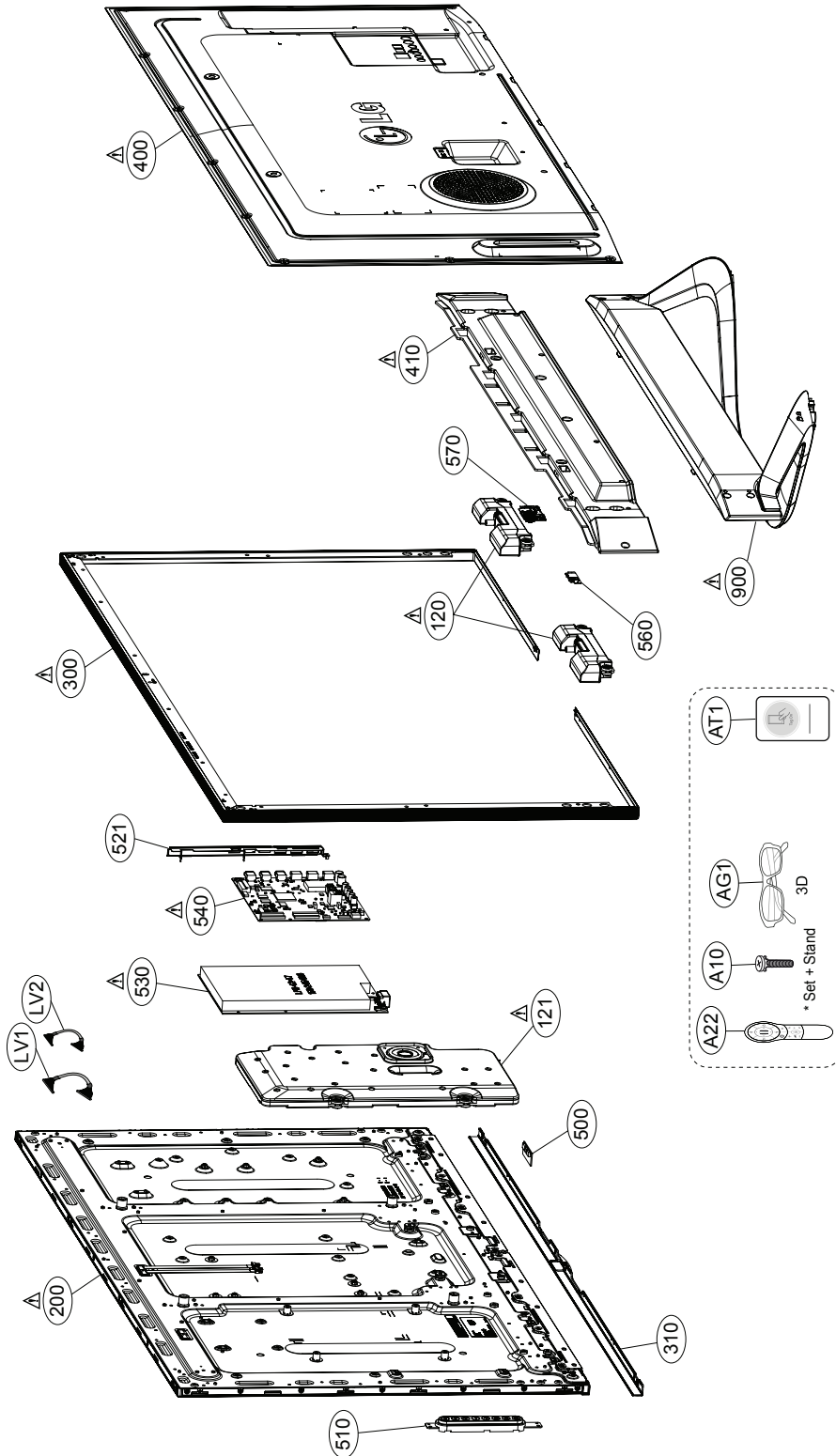
9.2.3. Adjustment

- (1) Set TV in Adj. mode using POWER ON
 - (2) Zero Calibrate the probe of Color Analyzer, then place it on the center of LCD module within 10cm of the surface.
 - (3) Press ADJ key -> EZ adjust using adj. R/C -> 6. White-Balance then press the cursor to the right (KEY▶). When KEY(▶) is pressed 216 Gray internal pattern will be displayed.
 - (4) One of R Gain / G Gain / B Gain should be fixed at 192, and the rest will be lowered to meet the desired value.
 - (5) Adj. is performed in COOL, MEDIUM, WARM 3 modes of color temperature.
- If internal pattern is not available, use RF input. In EZ Adj. menu 6.White Balance, you can select one of 2 Test-pattern: ON, OFF. Default is inner(ON). By selecting OFF, you can adjust using RF signal in 216 Gray pattern.

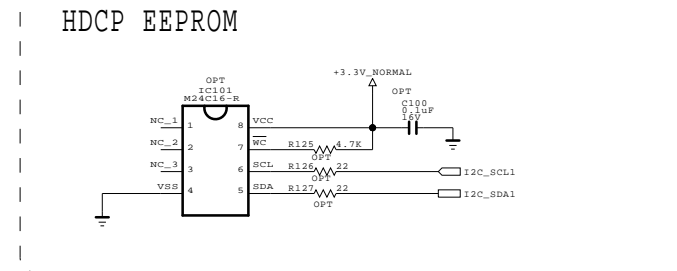
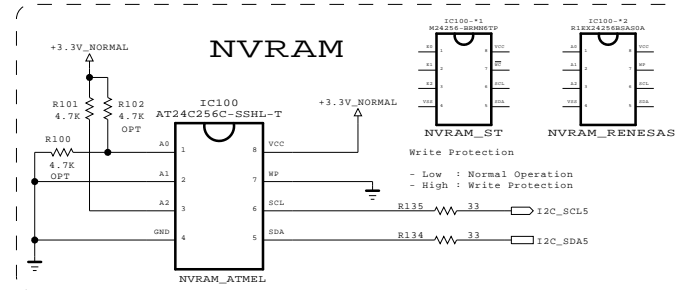
EXPLODED VIEW

IMPORTANT SAFETY NOTICE

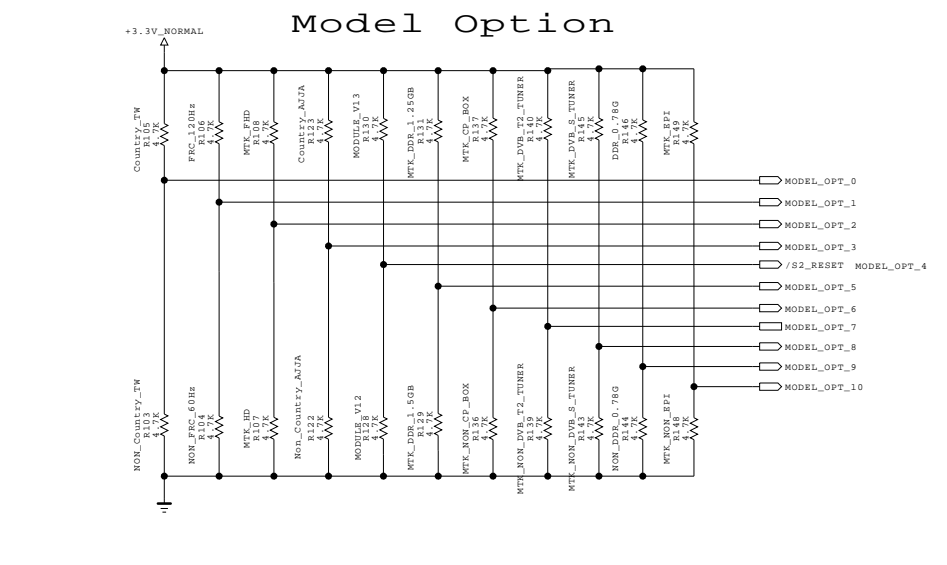
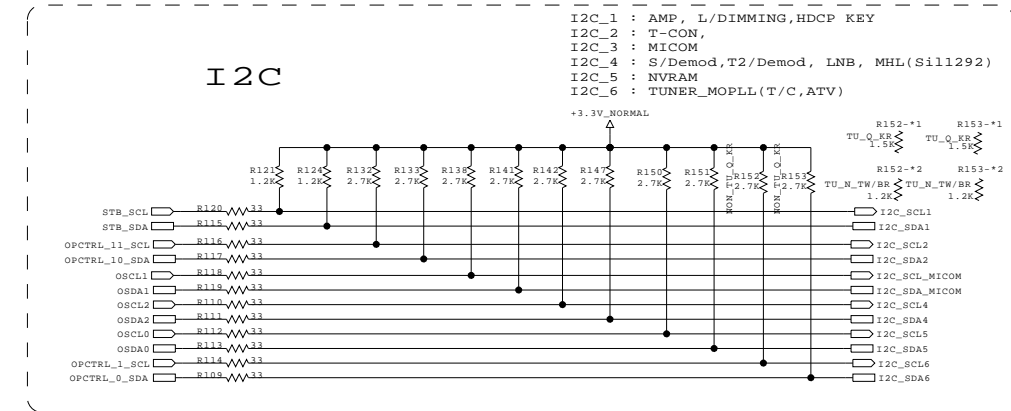
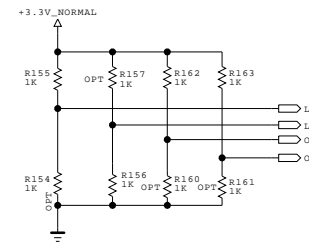
Many electrical and mechanical parts in this chassis have special safety-related characteristics. These parts are identified by \triangle in the Schematic Diagram and EXPLODED VIEW. It is essential that these special safety parts should be replaced with the same components as recommended in this manual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



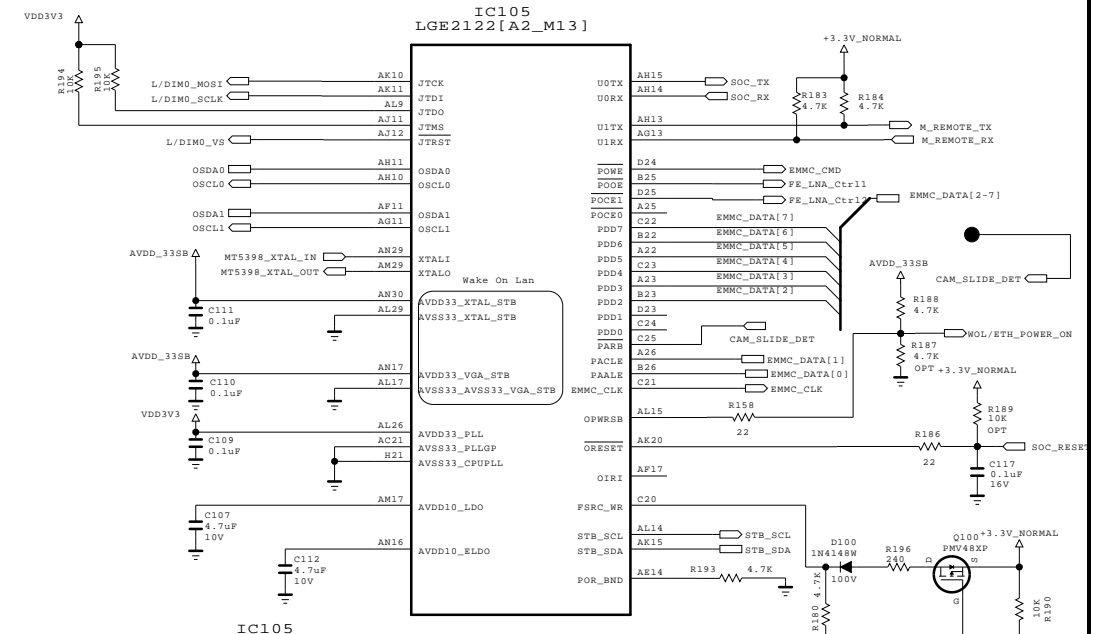
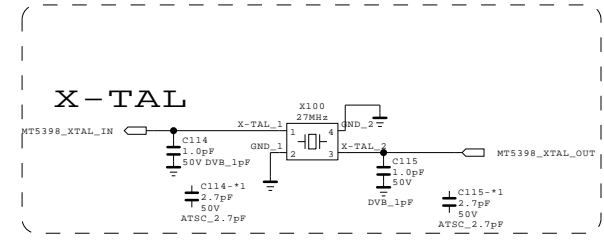
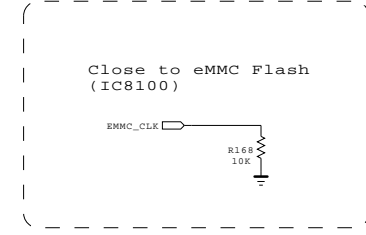
EAX64797001* : LD33B
 EAX64872101* : LA33B



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 60bit 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



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



GPI045(EMMC_RST) is dedicated to reset EMMC for improving A1's leakage current

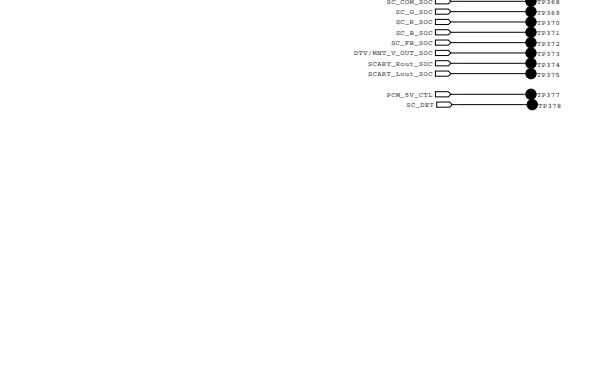
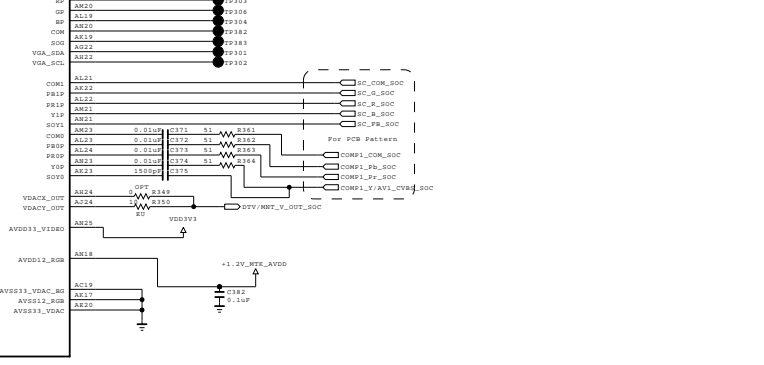
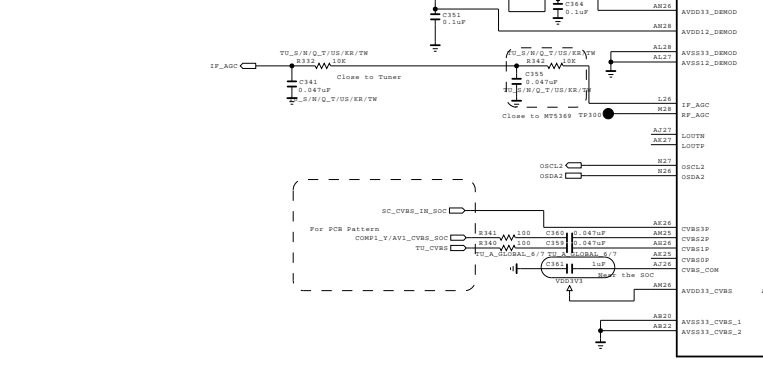
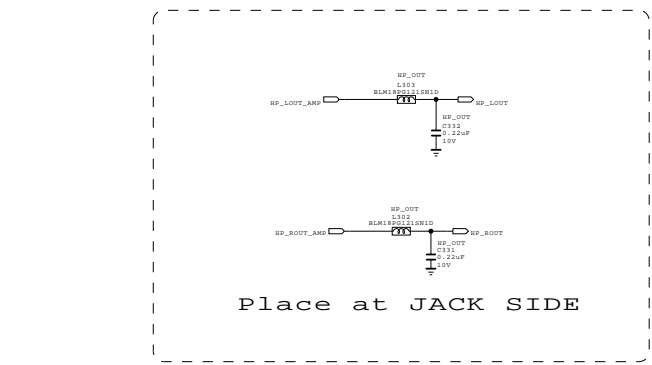
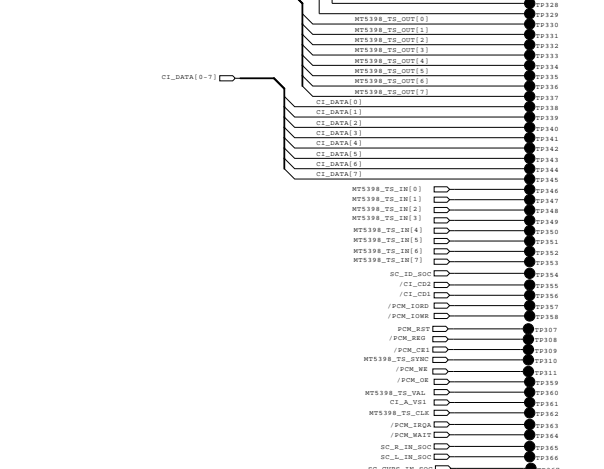
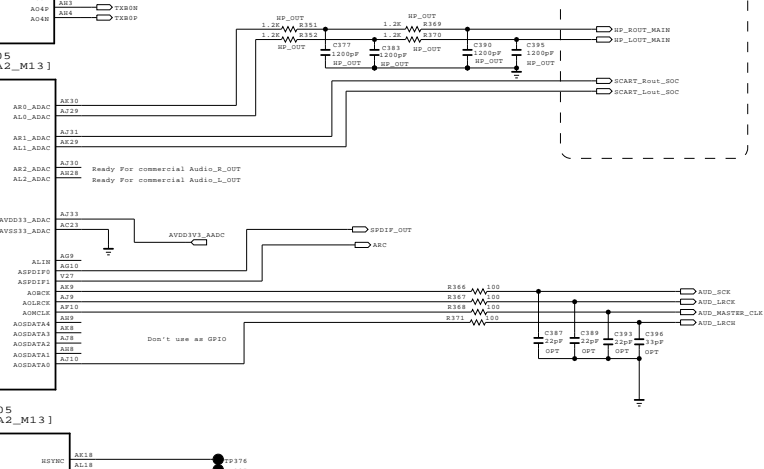
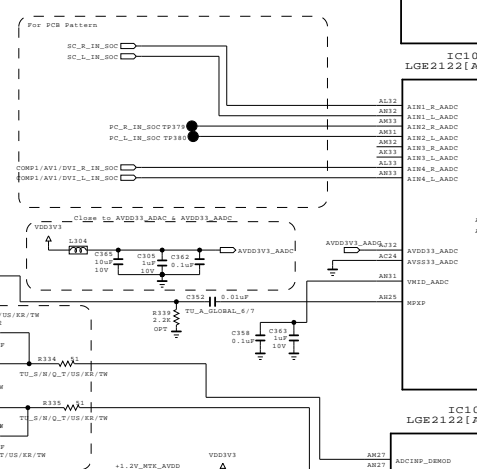
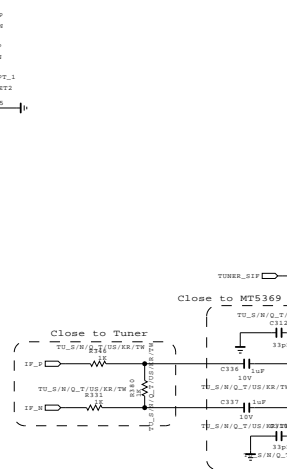
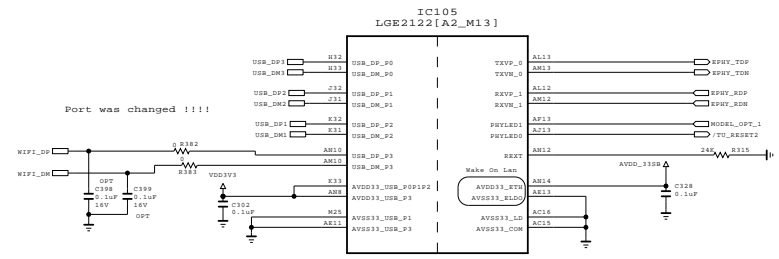
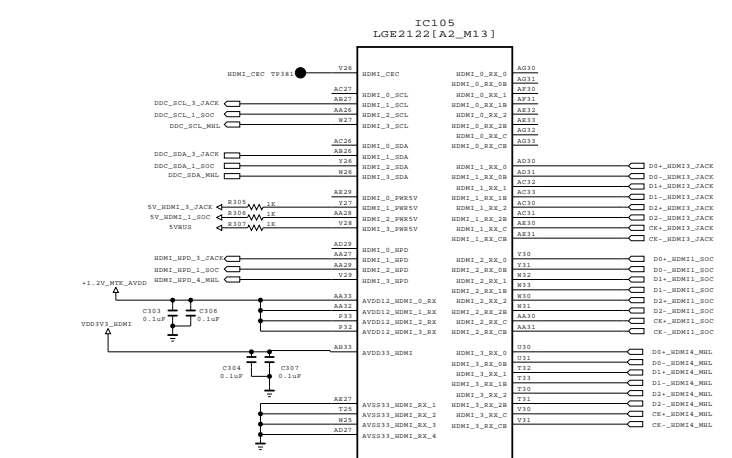
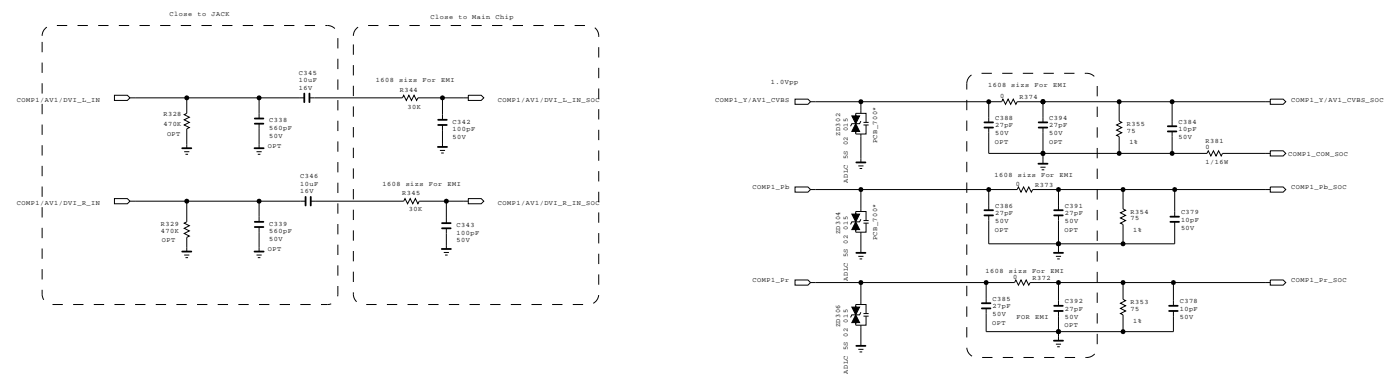
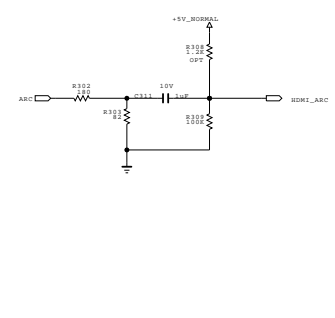
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BLOCK		SHEET	8

PLACE AT JACK SIDE

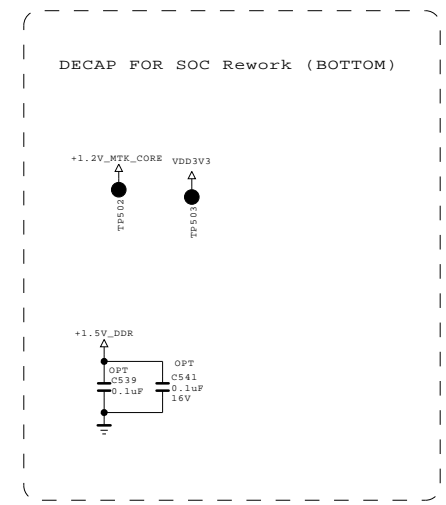
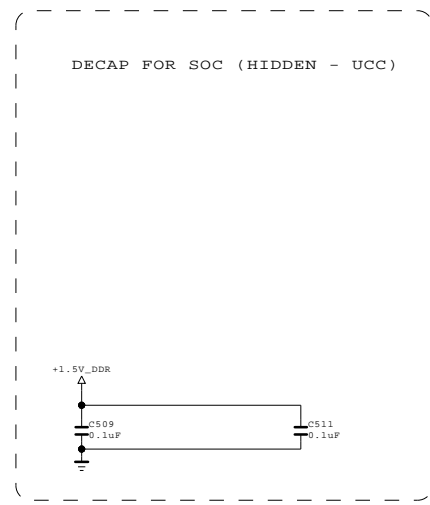
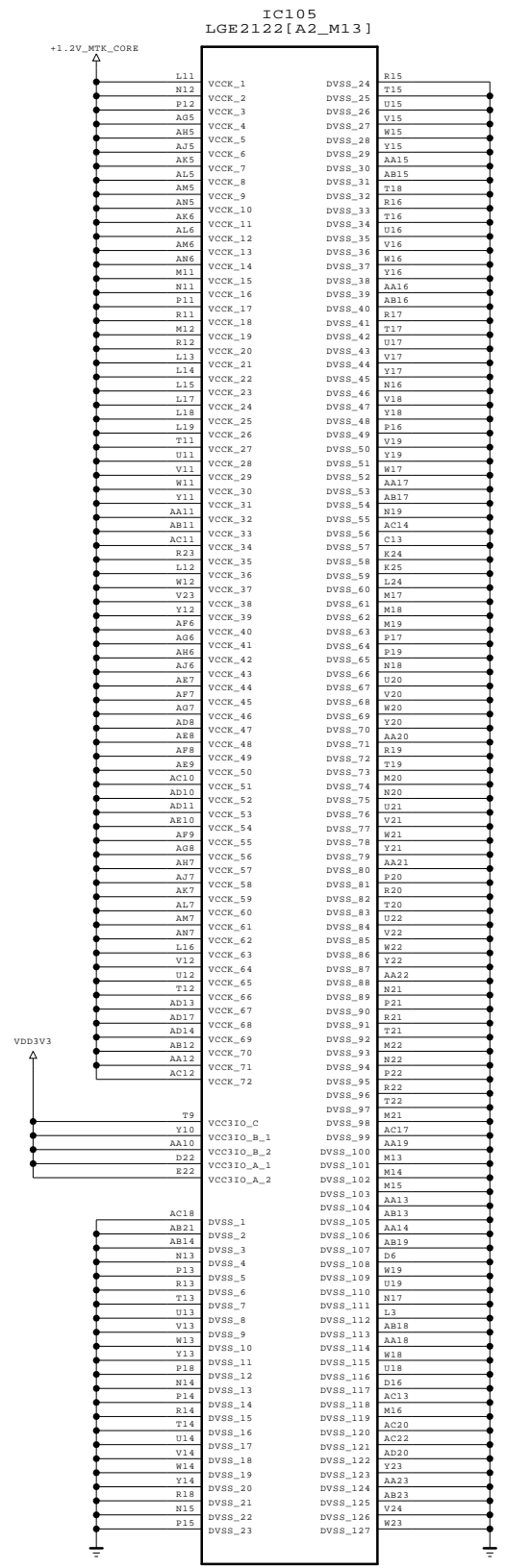
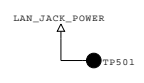
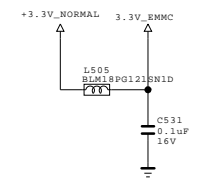
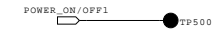
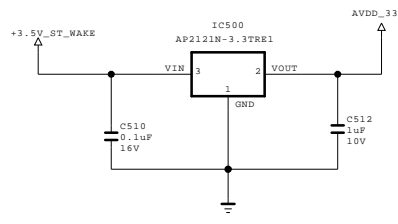
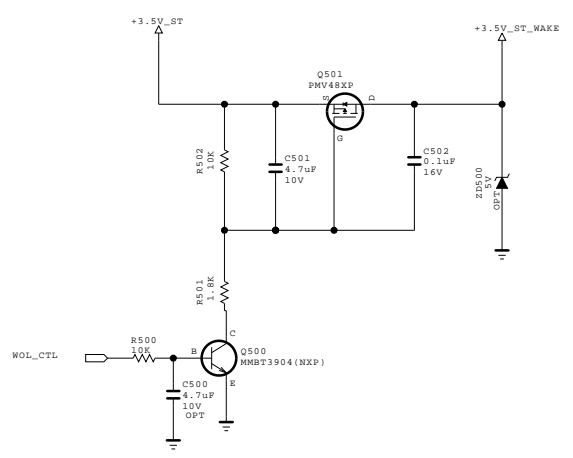
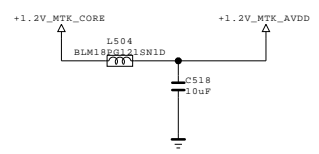
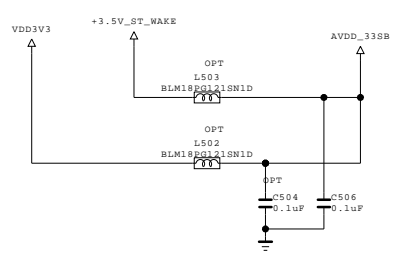
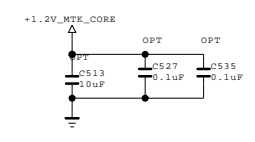
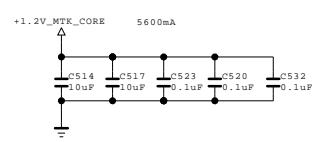
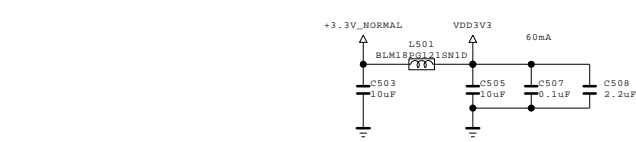


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BLOCK		SHEET	9

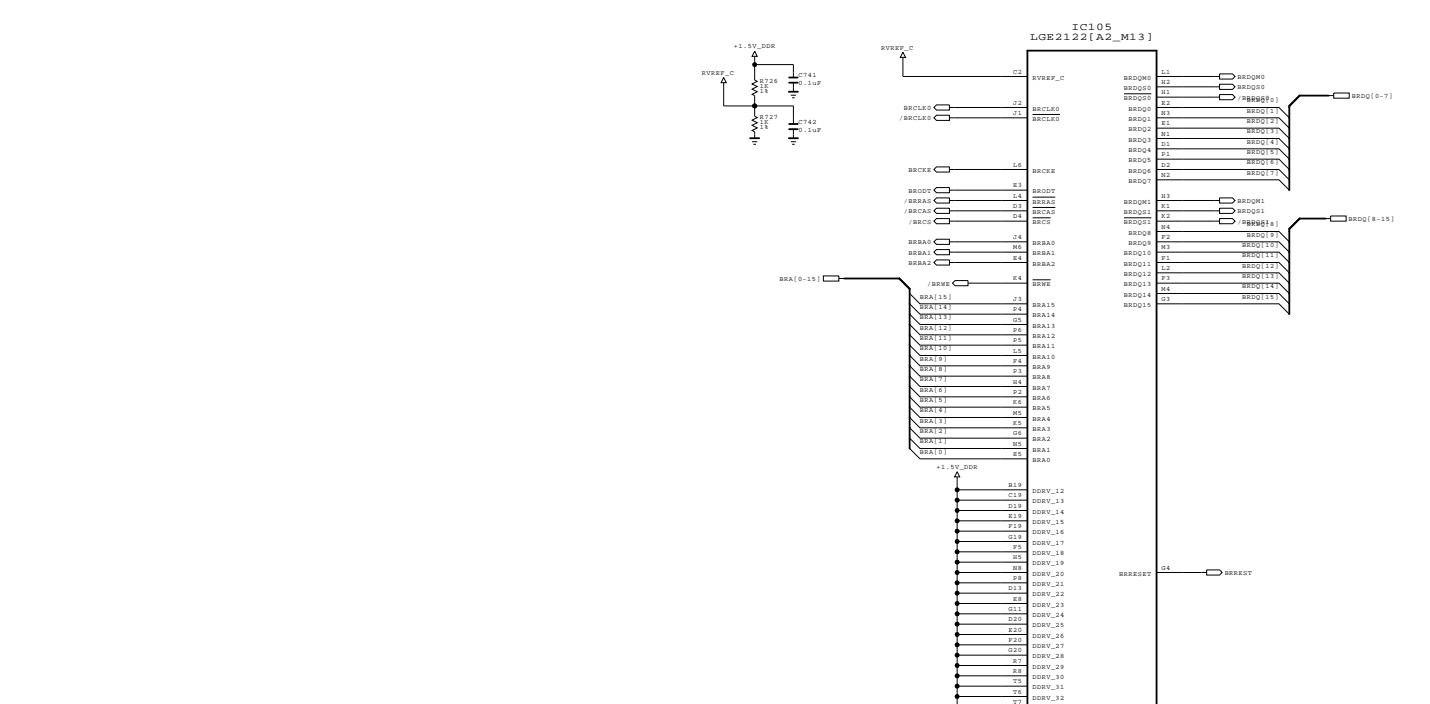
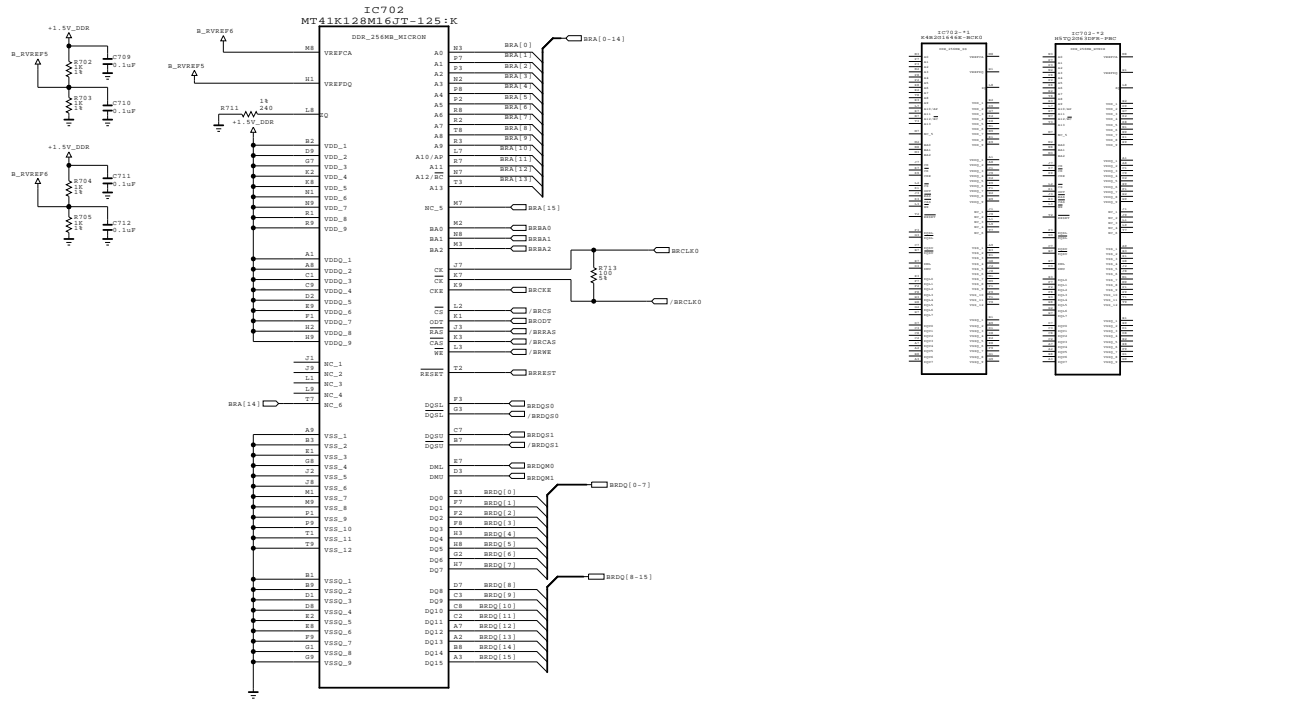
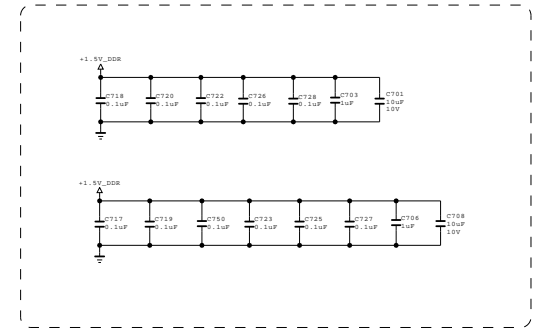
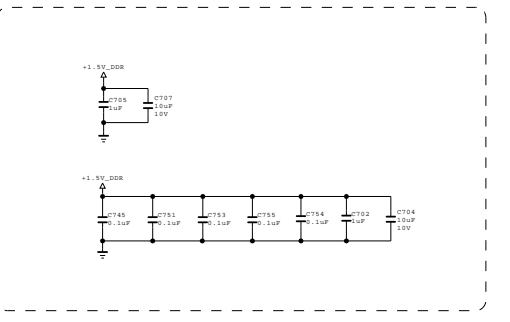
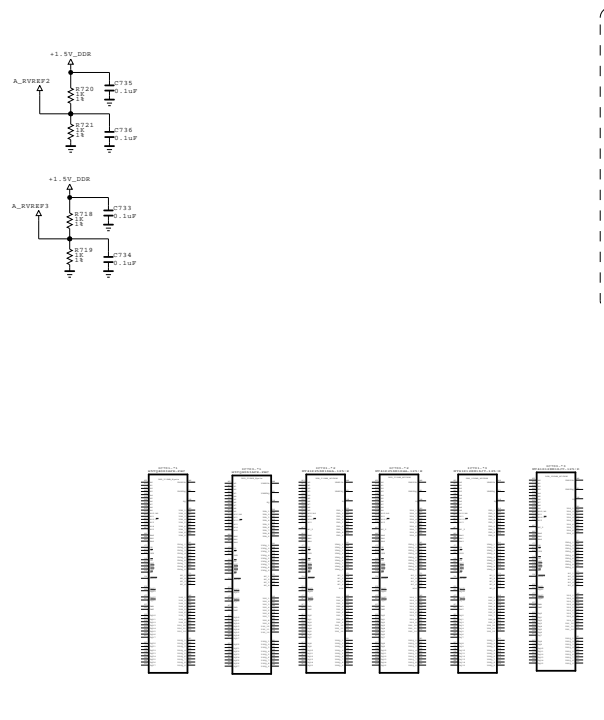
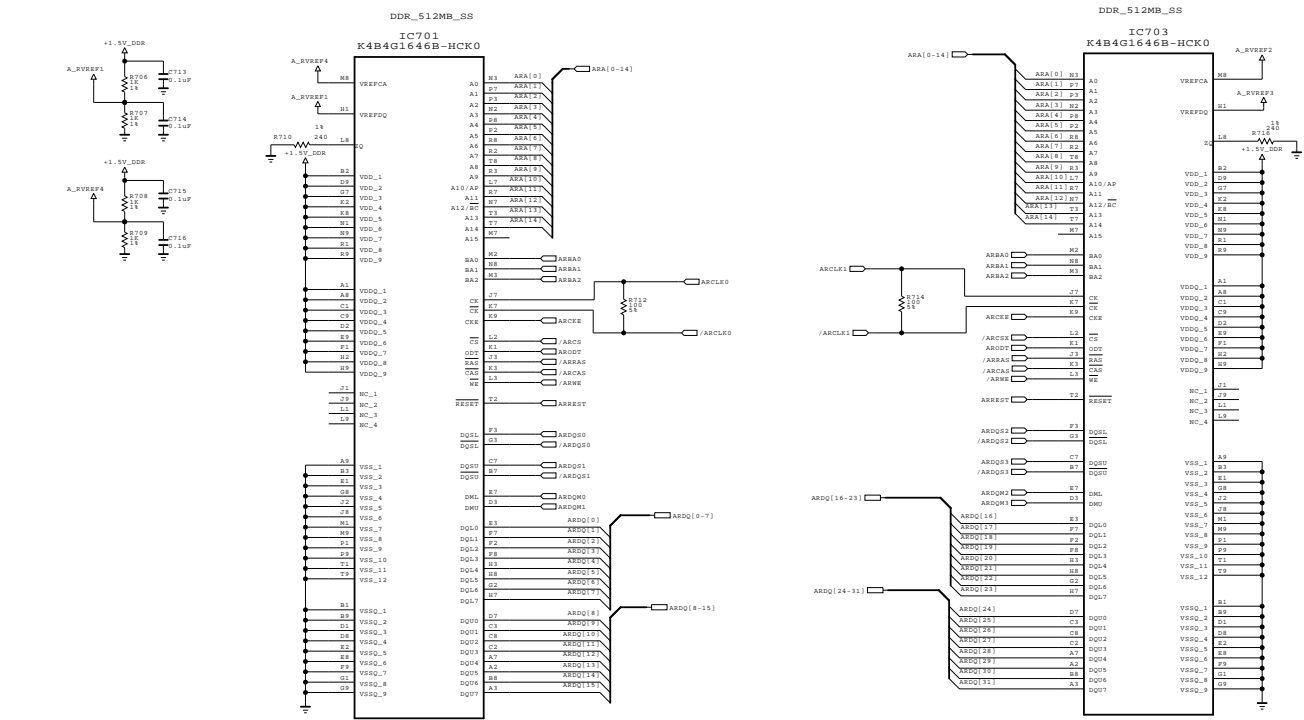


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MODEL	MID_MAIN_3	DATE	2011.12.09
BLOCK		SHEET	10



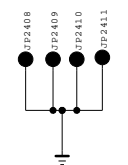
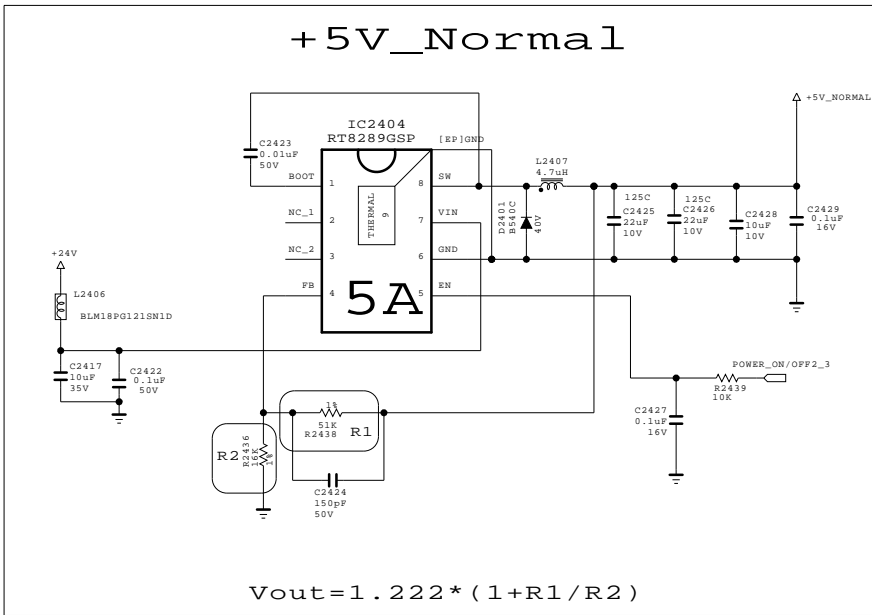
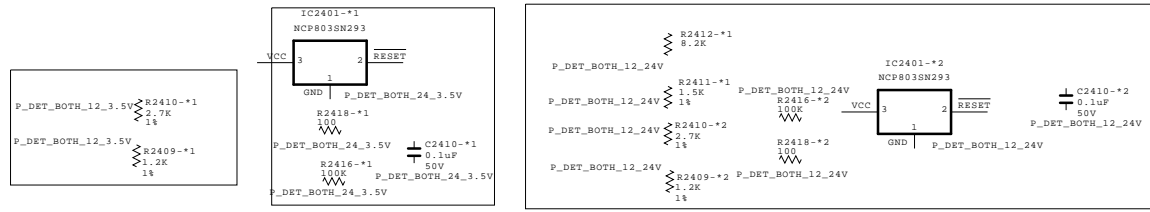
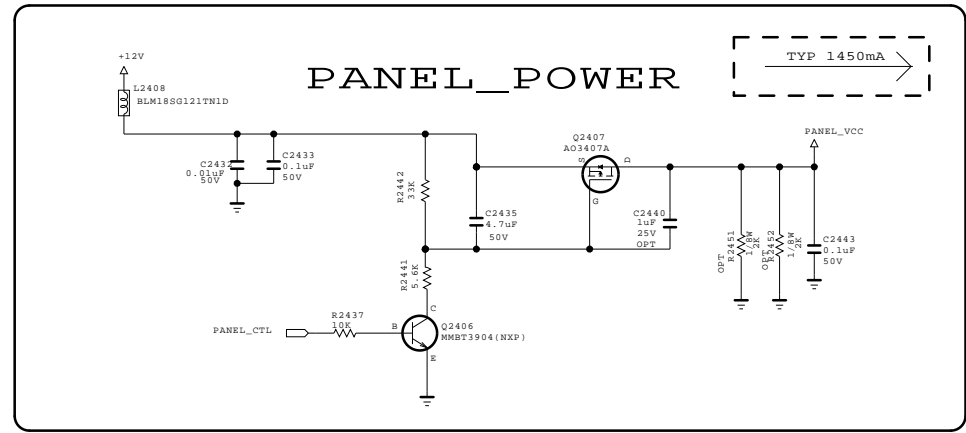
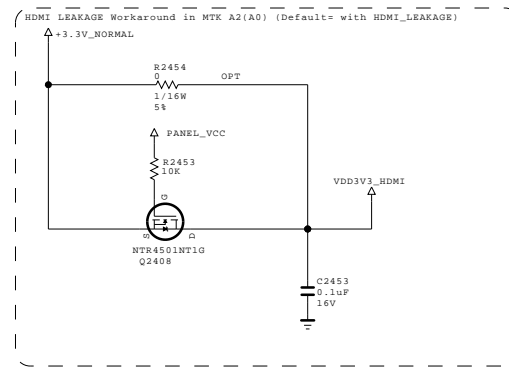
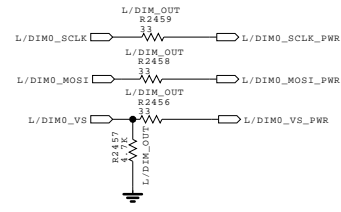
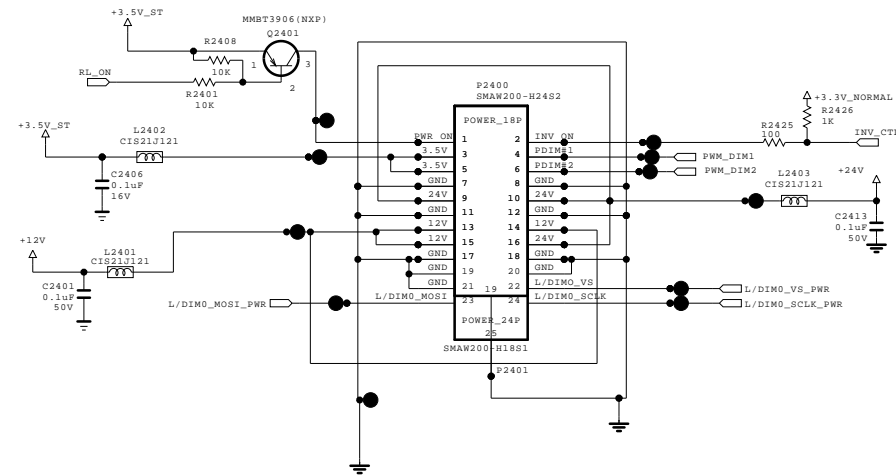
THE SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE SYMBOL MARK OF THE SCHEMATIC.

SECRET
LGElectronics

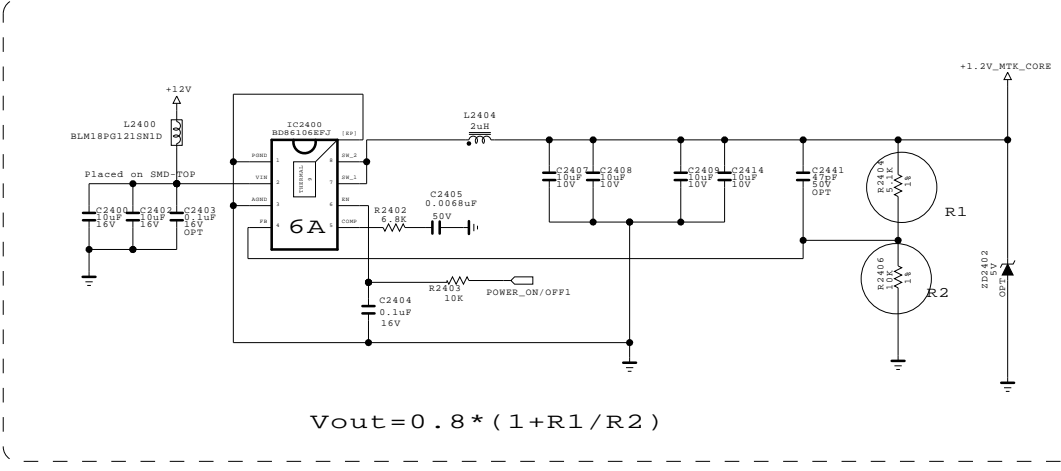
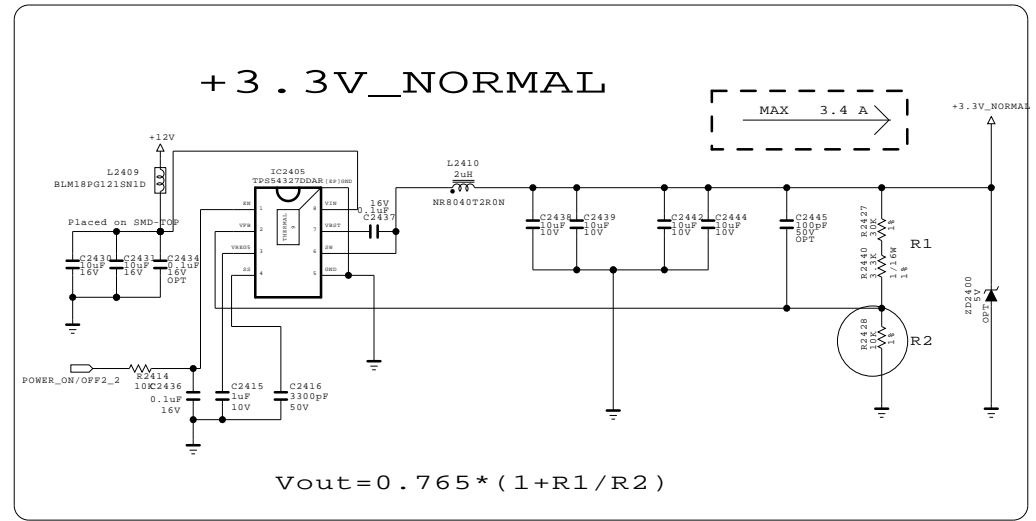
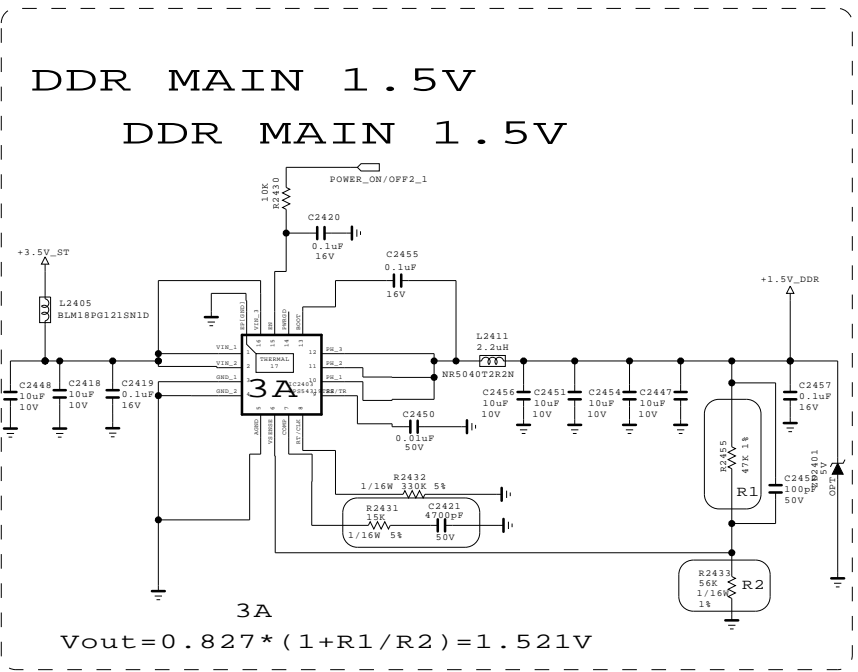
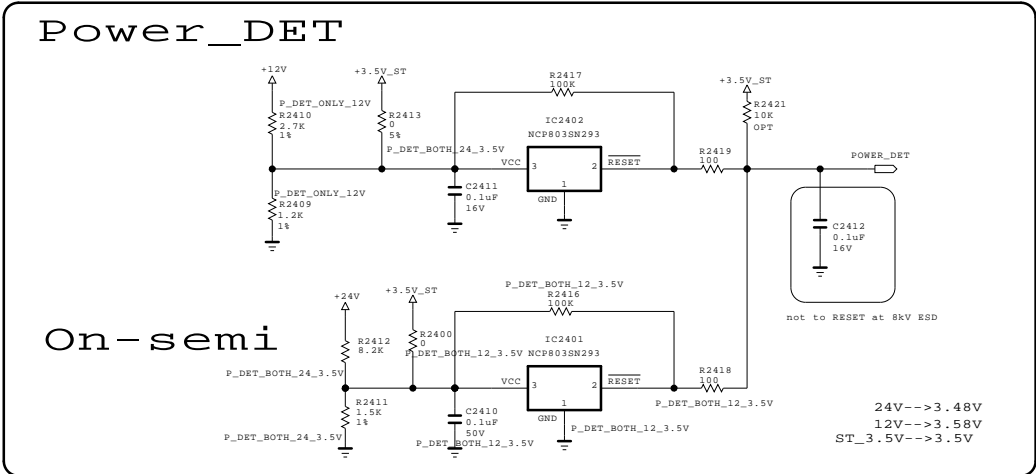
LG ELECTRONICS

MODEL	DATE	2011.12.09
BLOCK	SHEET	12 /

FROM LPB & PSU



- POWER_ON/OFF1
- POWER_ON/OFF2_1
- POWER_ON/OFF2_2
- POWER_ON/OFF2_3
- POWER_ON/OFF2_4



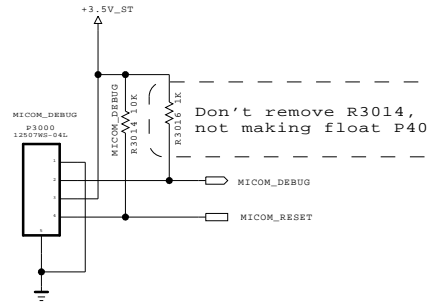
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SECRET
LGElectronics

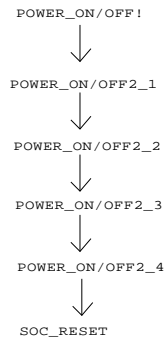
LG ELECTRONICS

MODEL	MID_POWER	DATE	2011.11.25
BLOCK		SHEET	24

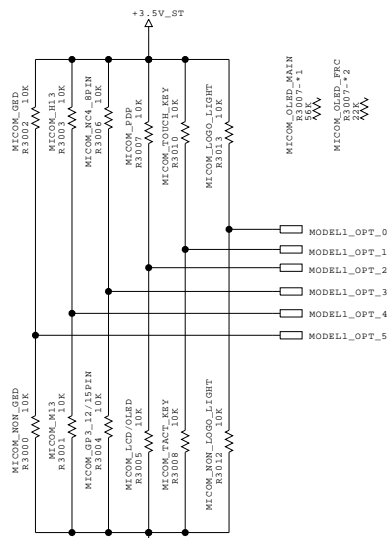
For Debug



GP4 High/MID Power SEQUENCE

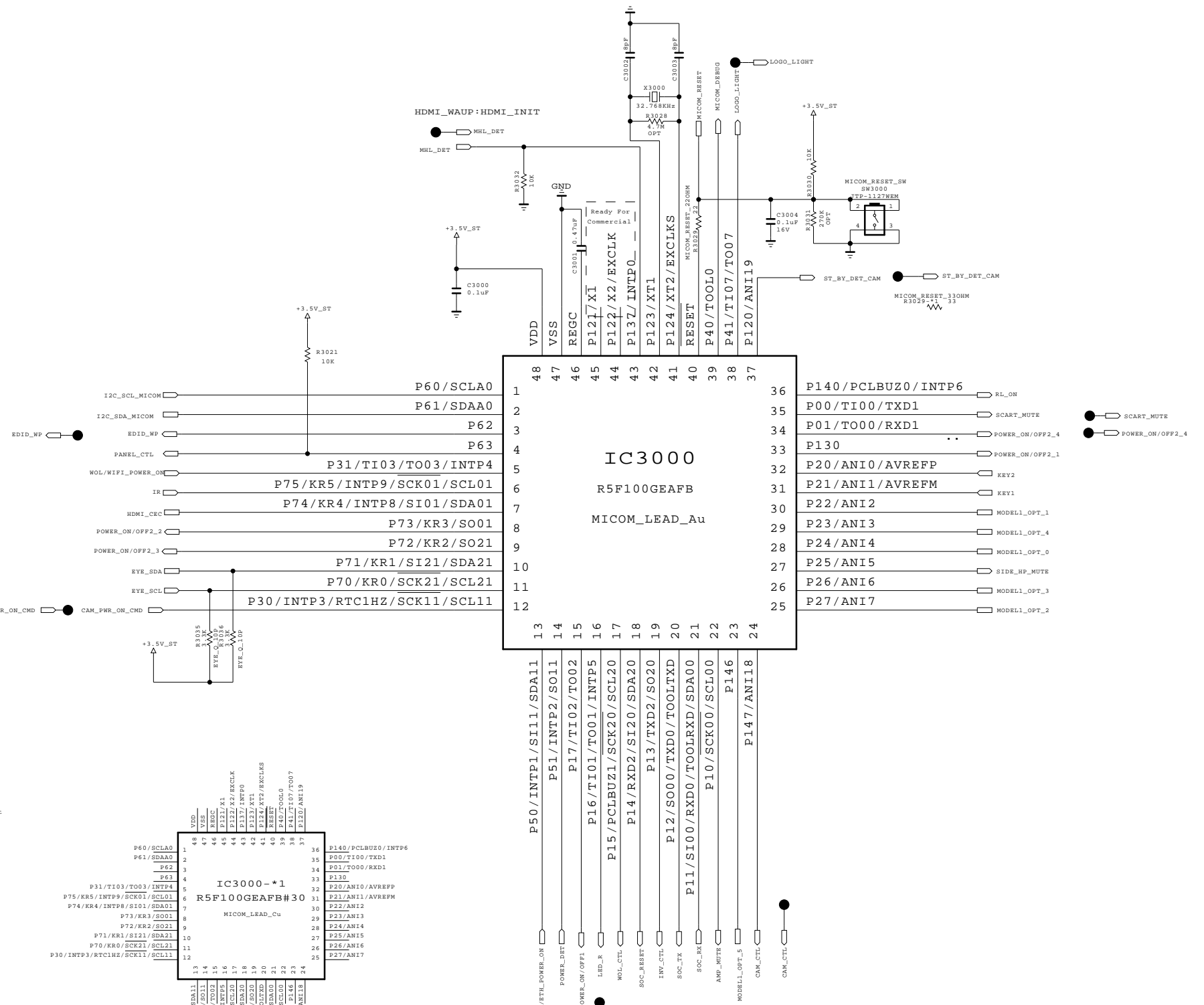


MICOM MODEL OPTION

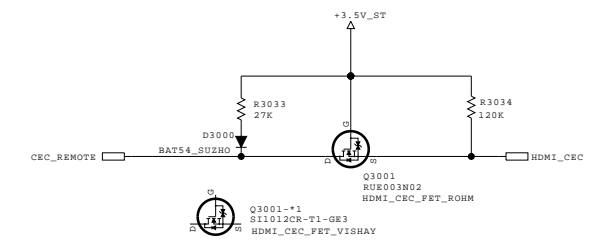


MICOM MODEL OPTION

	0	1	
MODEL1_OPT_0	NON LOGO	LOGO	For LOGO LIGHT
MODEL1_OPT_1	TACT_KEY	TOUCH_KEY	Ready for sample set
MODEL1_OPT_2	LCD / OLCD	PDP	Need to Assign ADC port
MODEL1_OPT_3	IR_wafer(12/15)	IR_wafer(10pin)	Ready for sample set
MODEL1_OPT_4	M13	H13	
MODEL1_OPT_5	NON_GND	GND	



For CEC



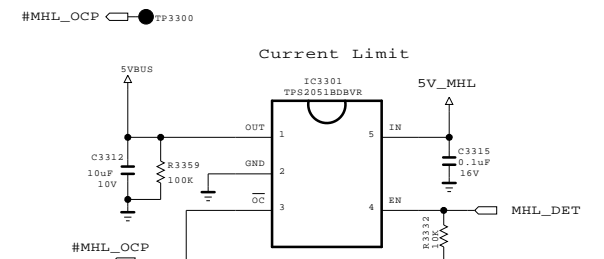
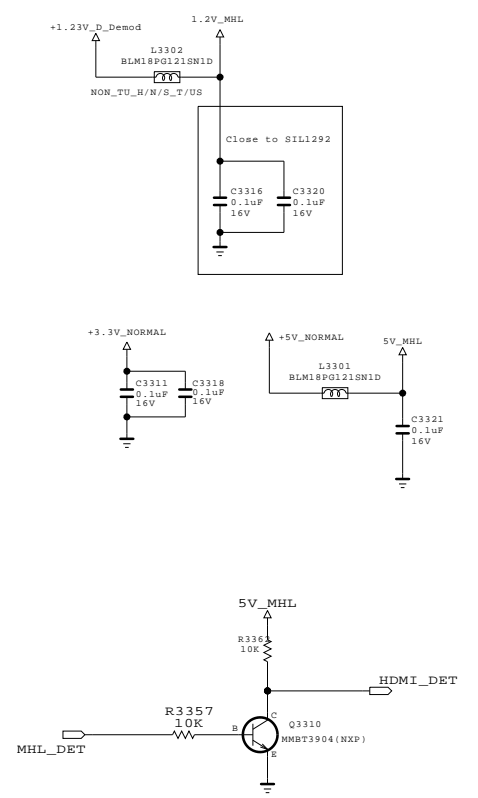
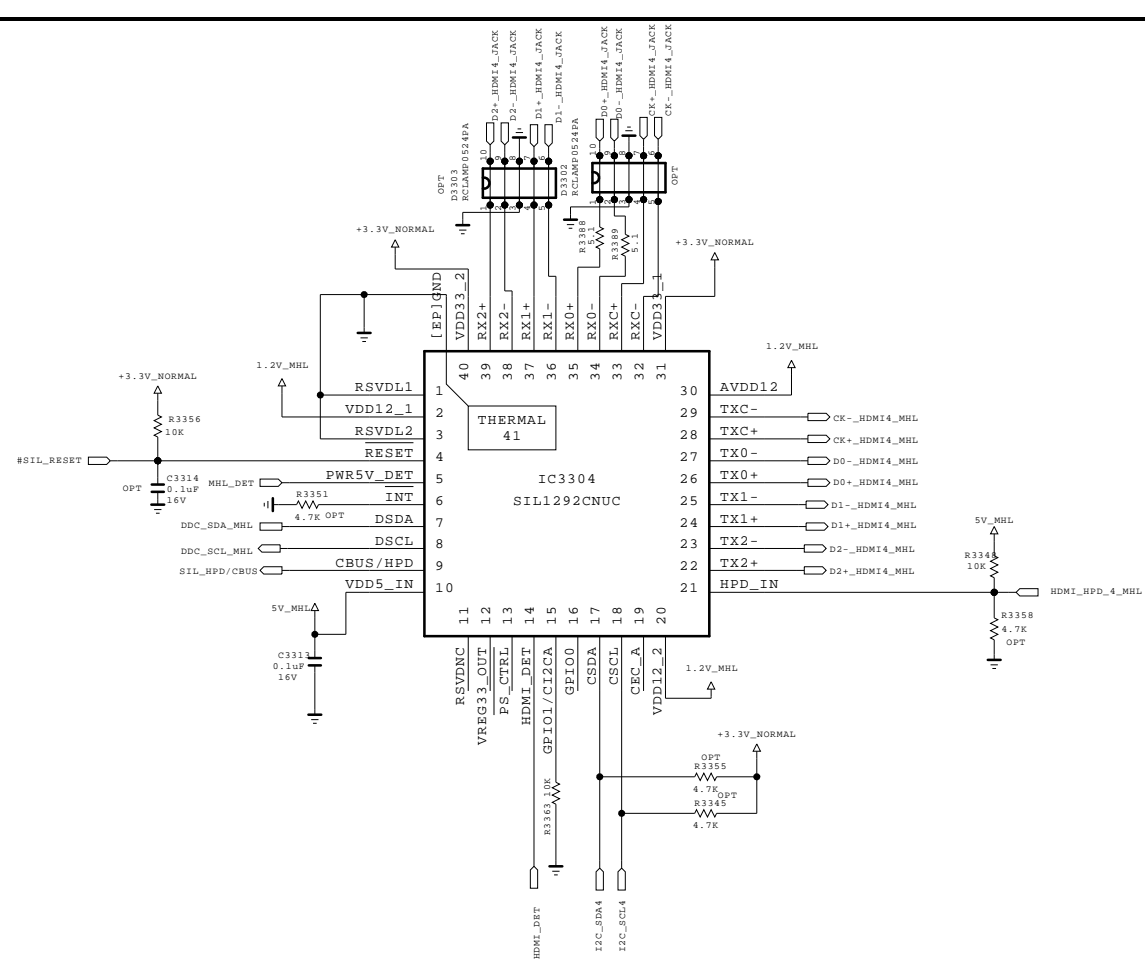
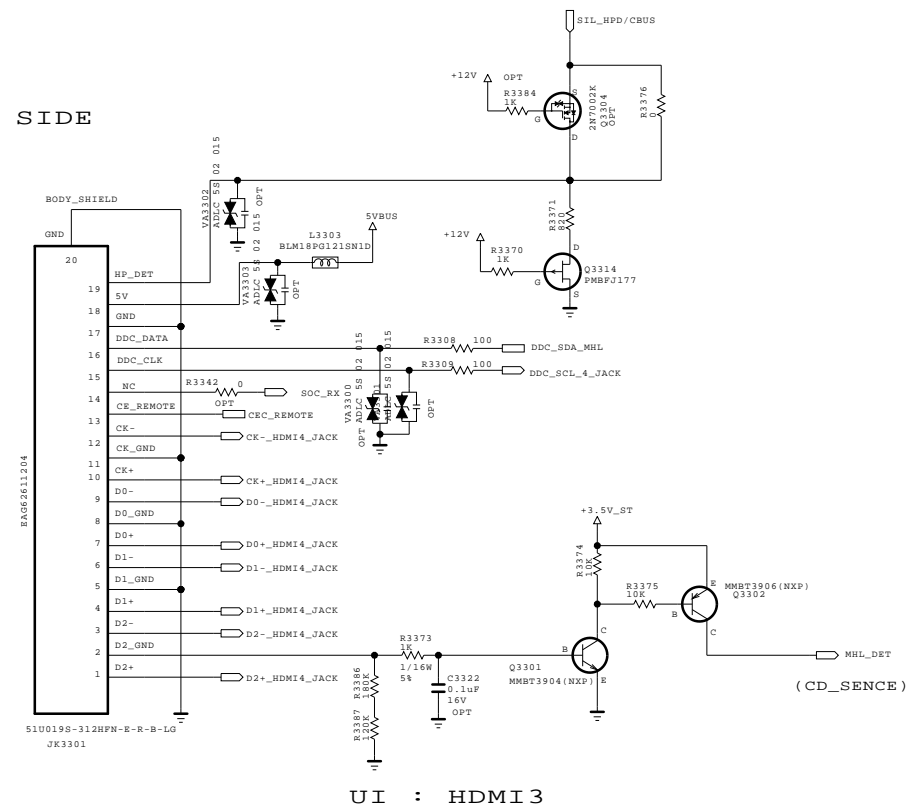
THE SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE SYMBOL MARK OF THE SCHEMATIC.

SECRET
LGElectronics

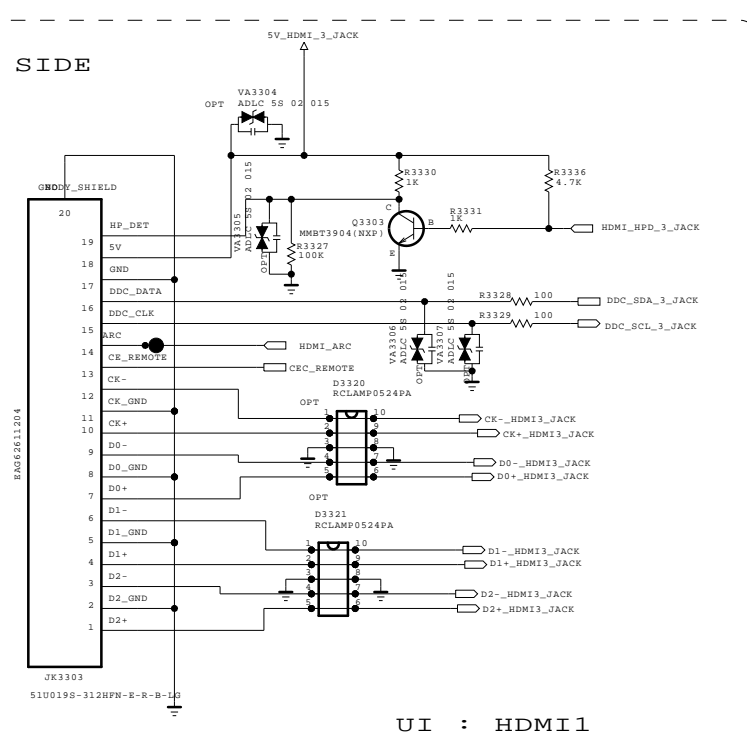


MODEL		DATE	2012.02.22
BLOCK	MICOM	SHEET	30

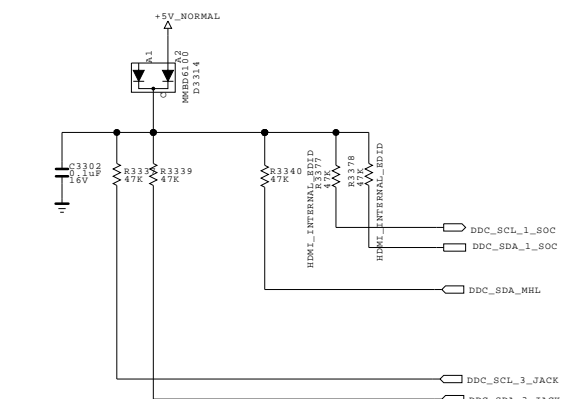
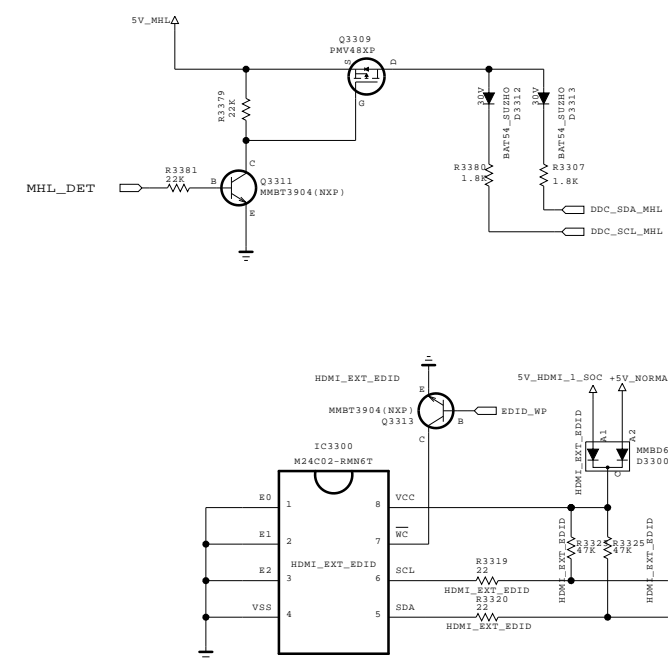
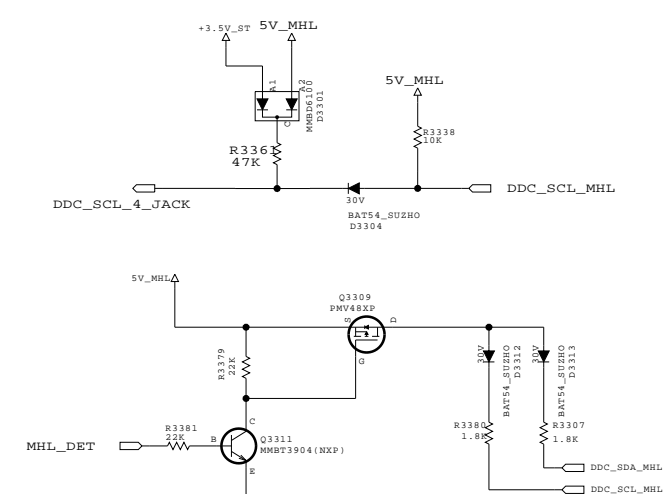
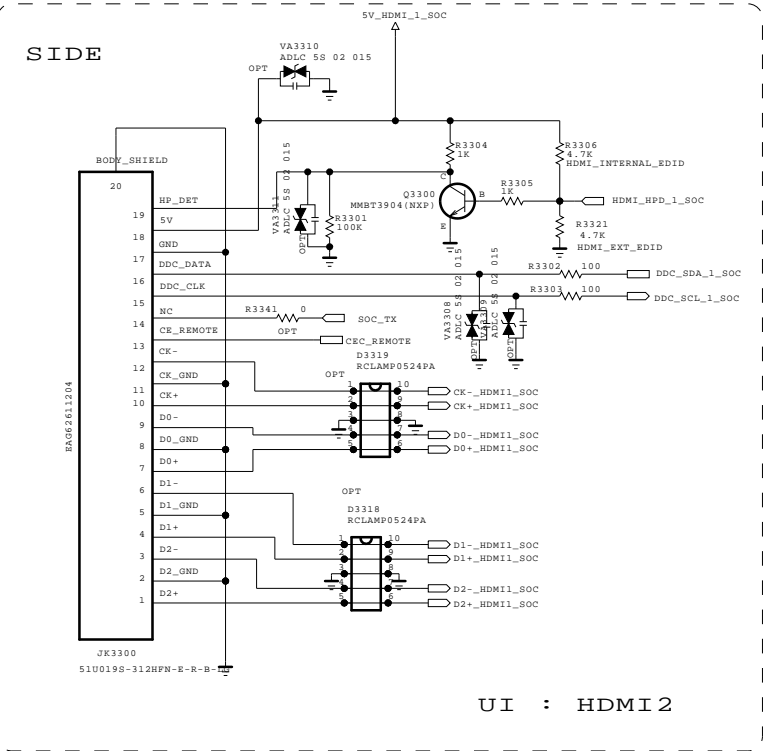
SIDE



SIDE



SIDE



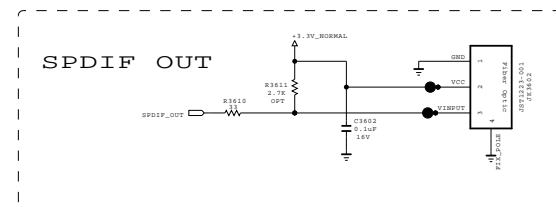
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SECRET
LGElectronics

LG ELECTRONICS

MODEL	HDMI 4	DATE	2011.10.29
BLOCK		SHEET	33

SPDIF

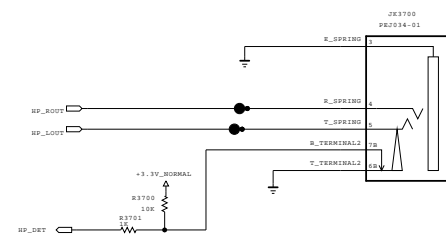


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SECRET
LGElectronics

LG ELECTRONICS

MODEL	JACK HIGH / MID	DATE	2011.11.21
BLOCK		SHEET	36 /

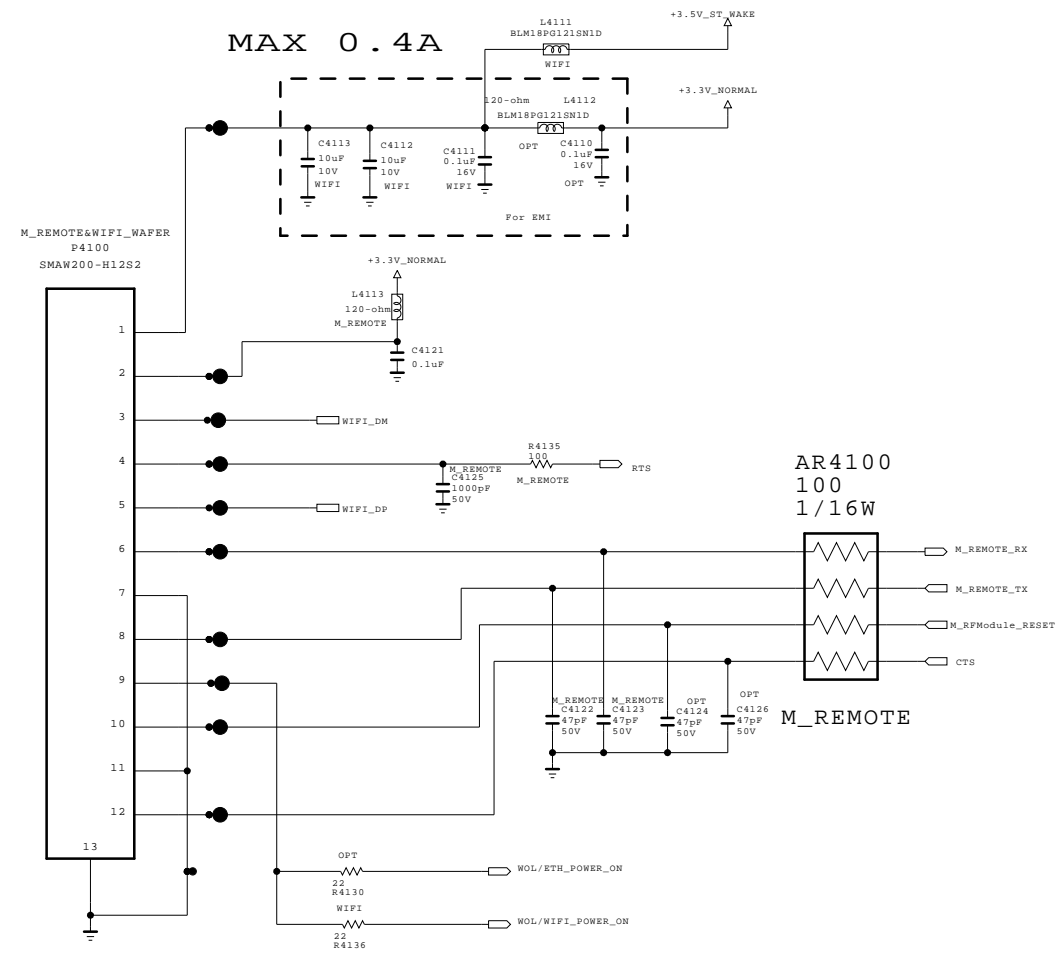
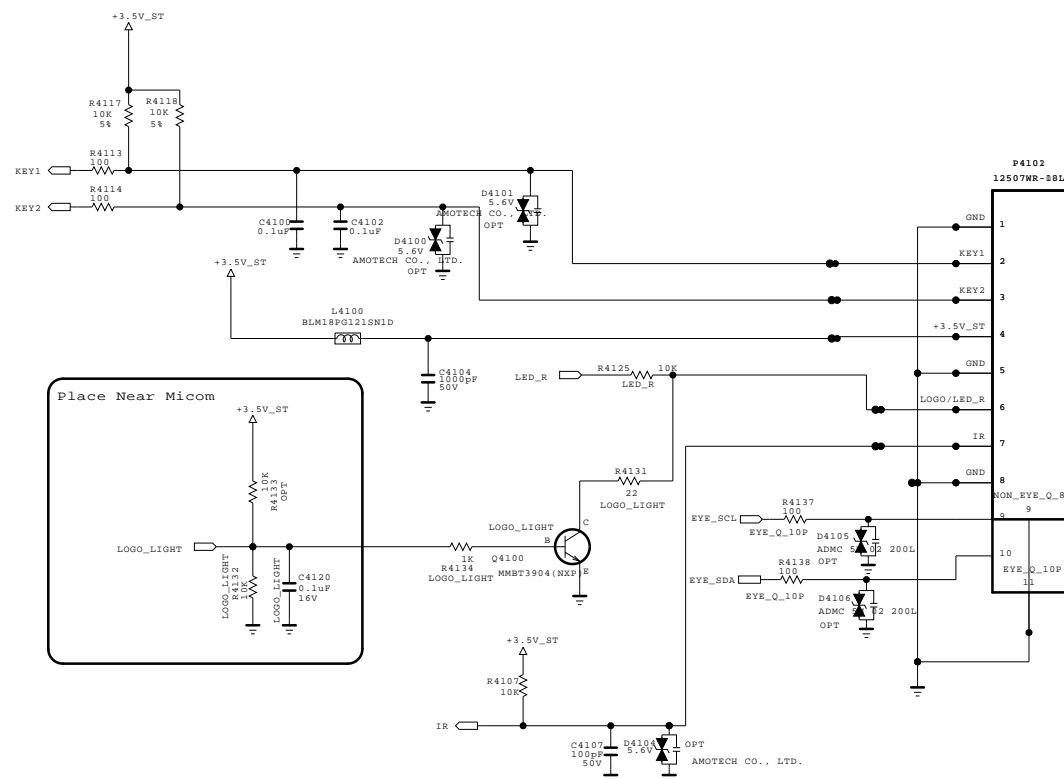


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SECRET
LGElectronics



MODEL	JACK_COMMON	DATE	2011.11.21
BLOCK		SHEET	37 /

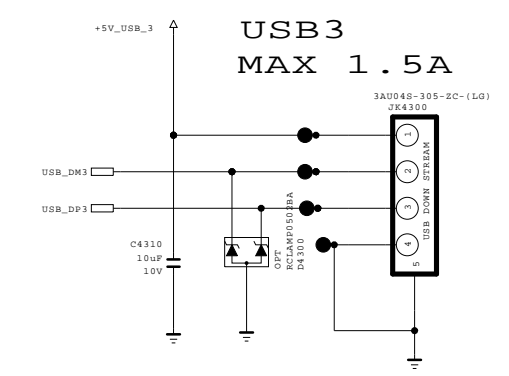
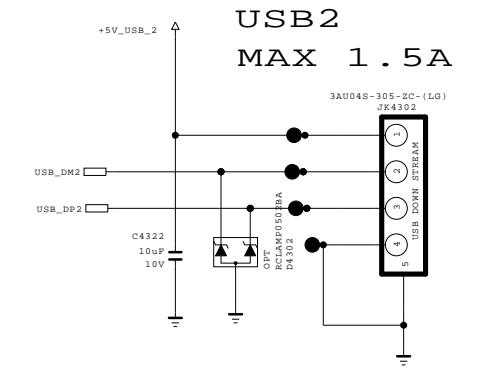
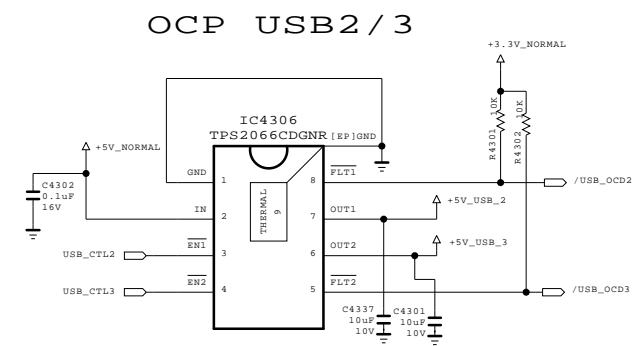


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SECRET
LGElectronics



MODEL	IR / KEY	DATE	2011.11.21
BLOCK		SHEET	41 /

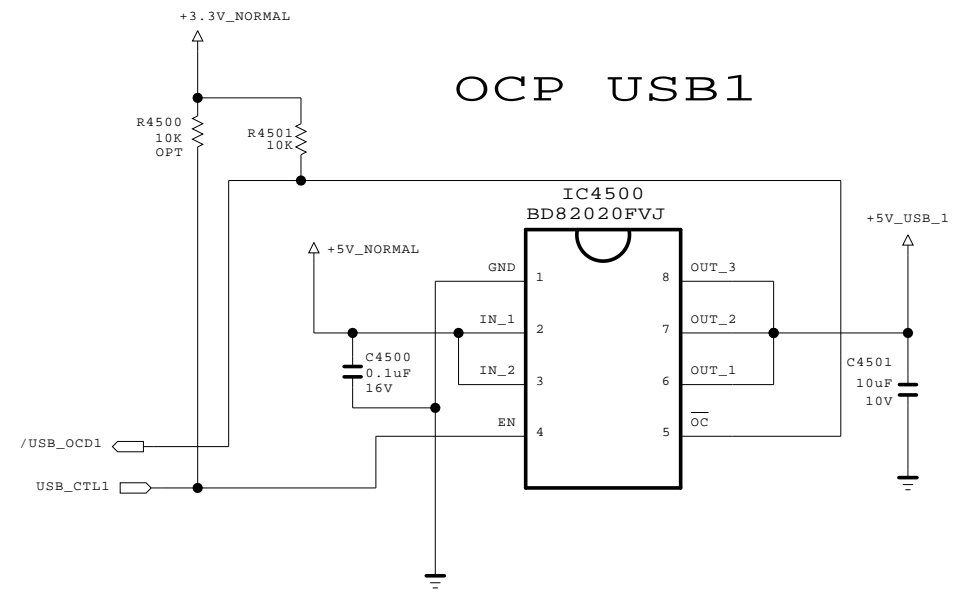


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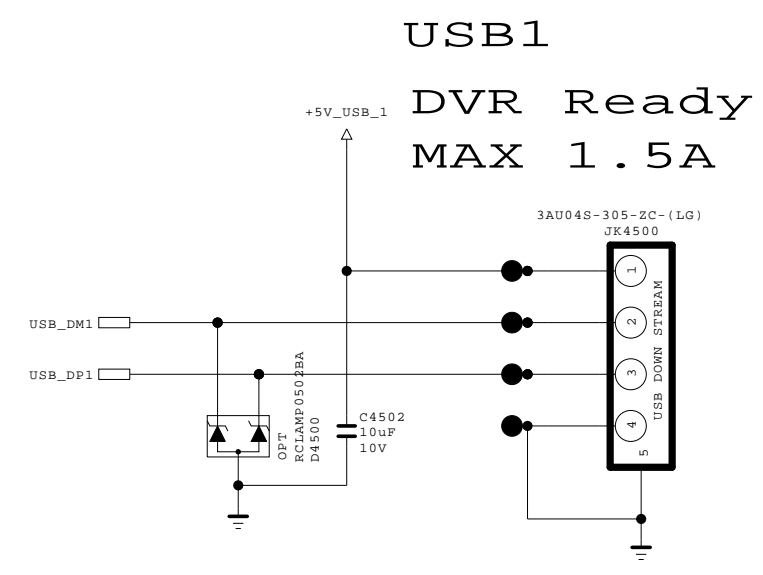
SECRET
LGElectronics



MODEL	USB2_USB3	DATE	2012.7.11
BLOCK		SHEET	43 /



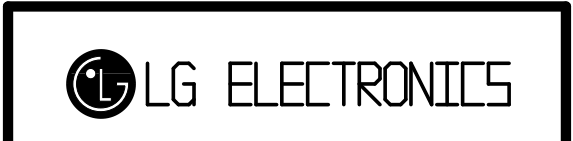
OCP USB1



USB1
DVR Ready
MAX 1.5A

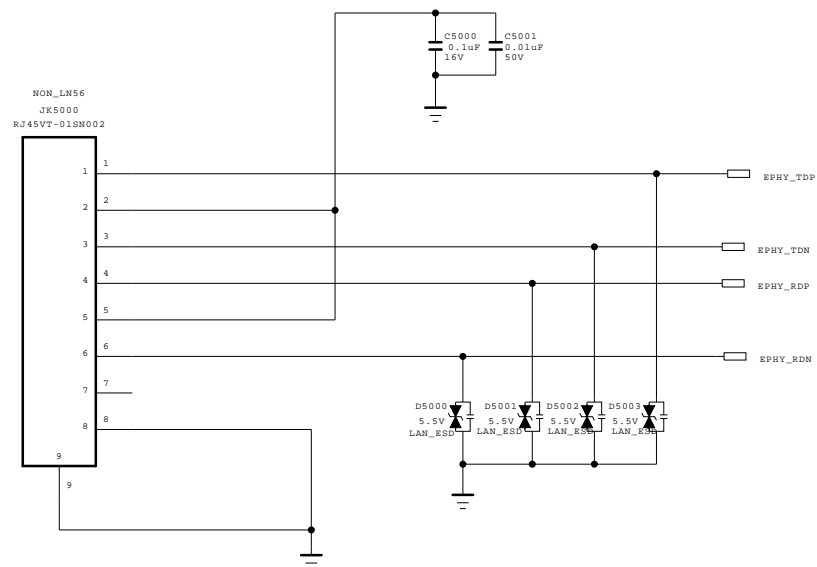
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SECRET
LGElectronics



MODEL		DATE	
BLOCK		SHEET	/

Ethernet Block



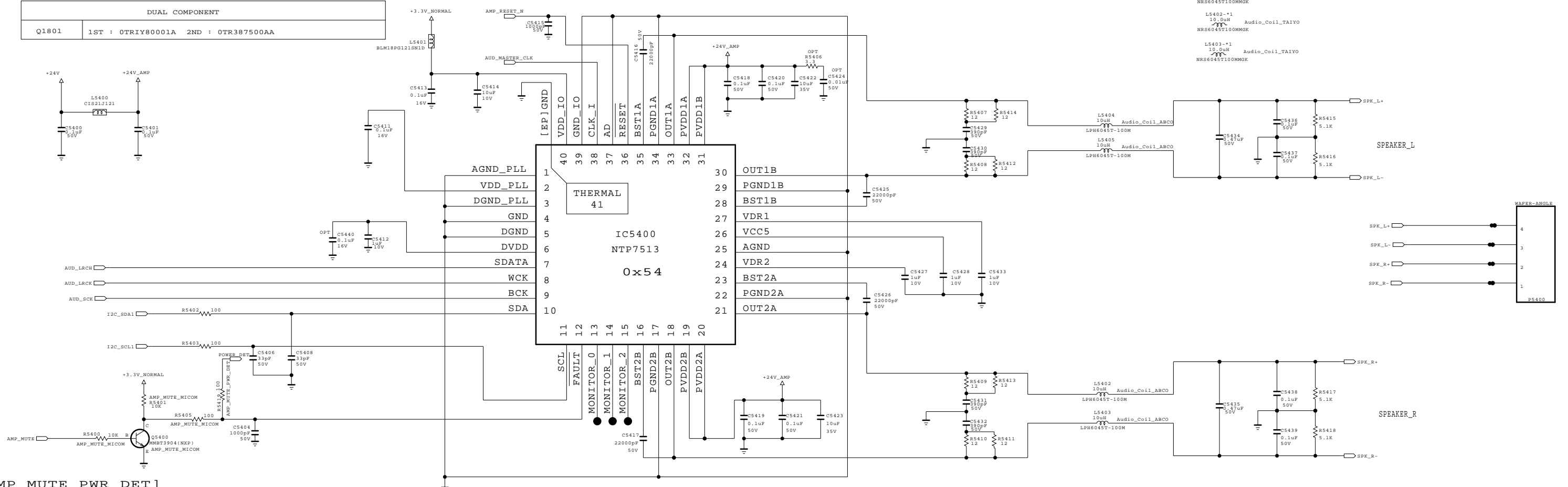
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SECRET
LGElectronics



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

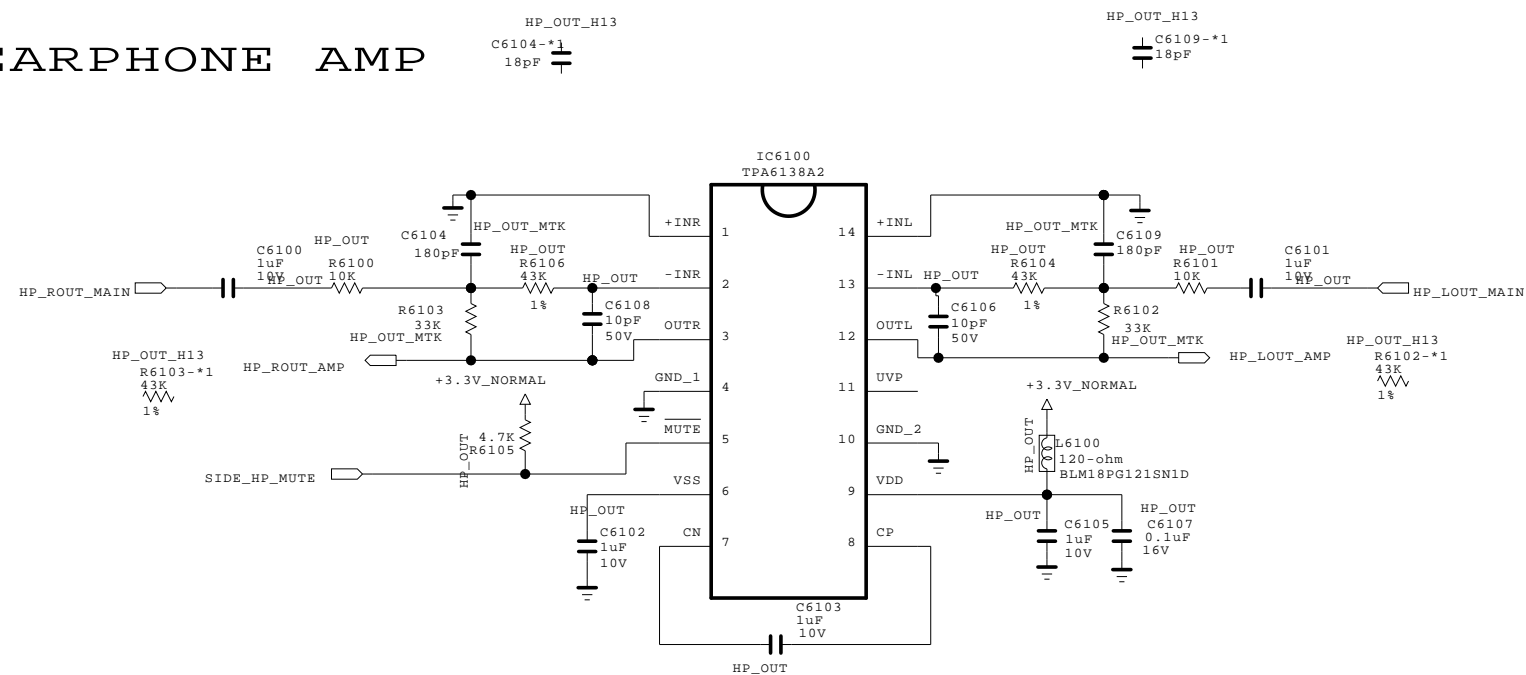
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SECRET
 LGElectronics



MODEL	AMP_NEO	DATE	2011.11.21
BLOCK		SHEET	54

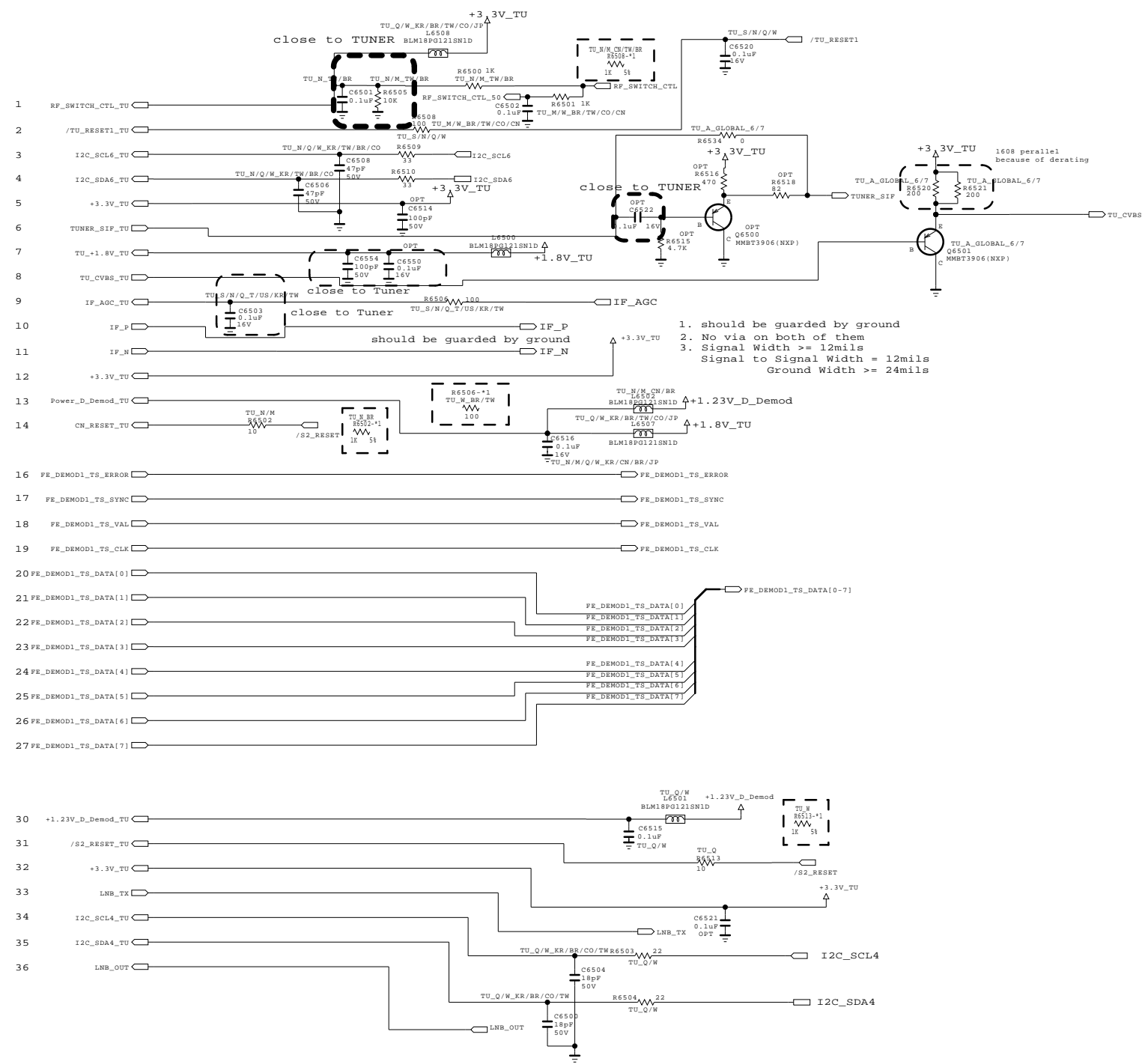
EARPHONE AMP



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
LGElectronics	

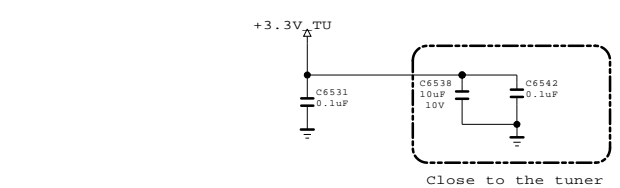
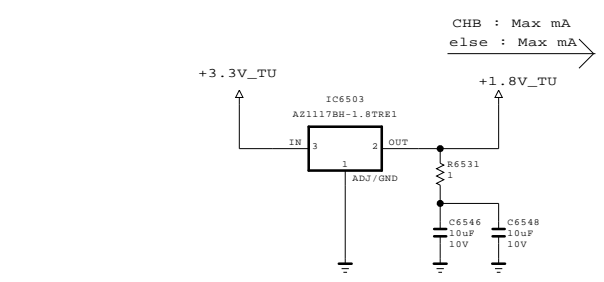
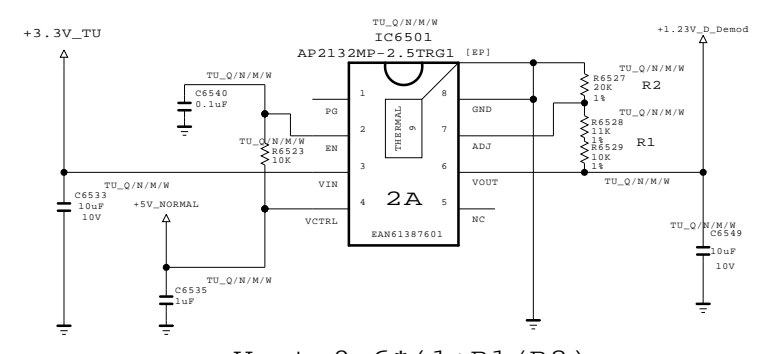
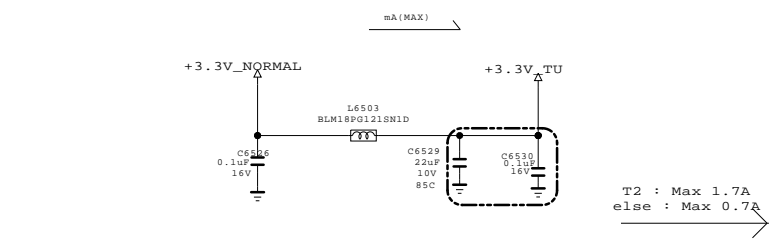
MODEL	HEADPHONE AMP	DATE	2011.09.29
BLOCK		SHEET	61 /



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

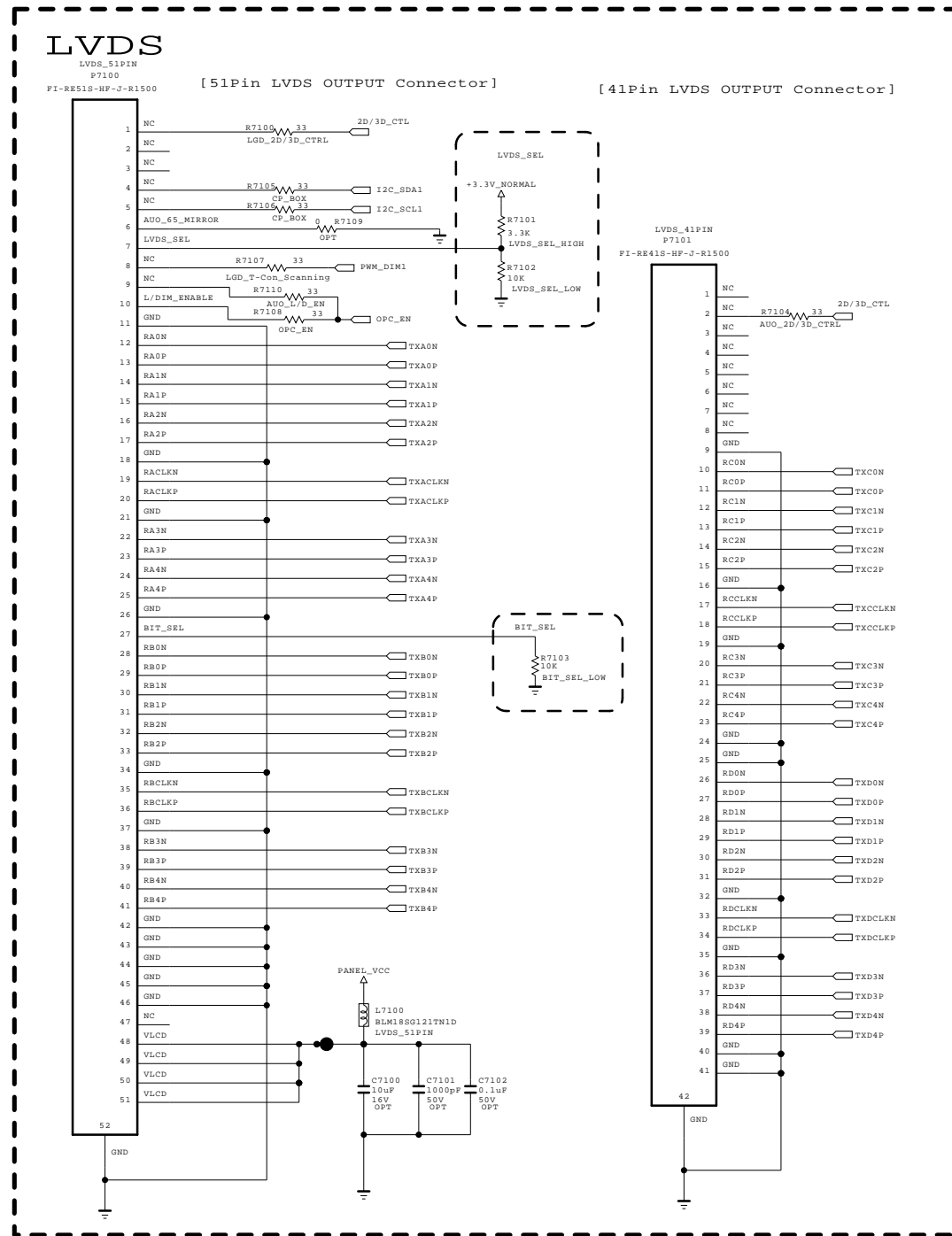


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SECRET
 LGElectronics



MODEL	TUNER	DATE	2012.07.10
BLOCK		SHEET	65



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.

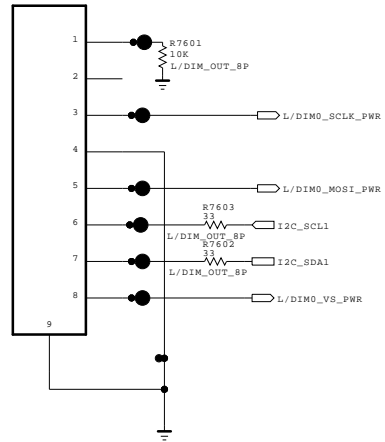
SECRET
LGElectronics



MODEL	LVDS_HIGH_MID	DATE	2011.08.11
BLOCK		SHEET	71 /

LOCAL DIMMING

[To LED DRIVER]
 P7600
 12507MR-08L
 L/DIM_OUT_8P

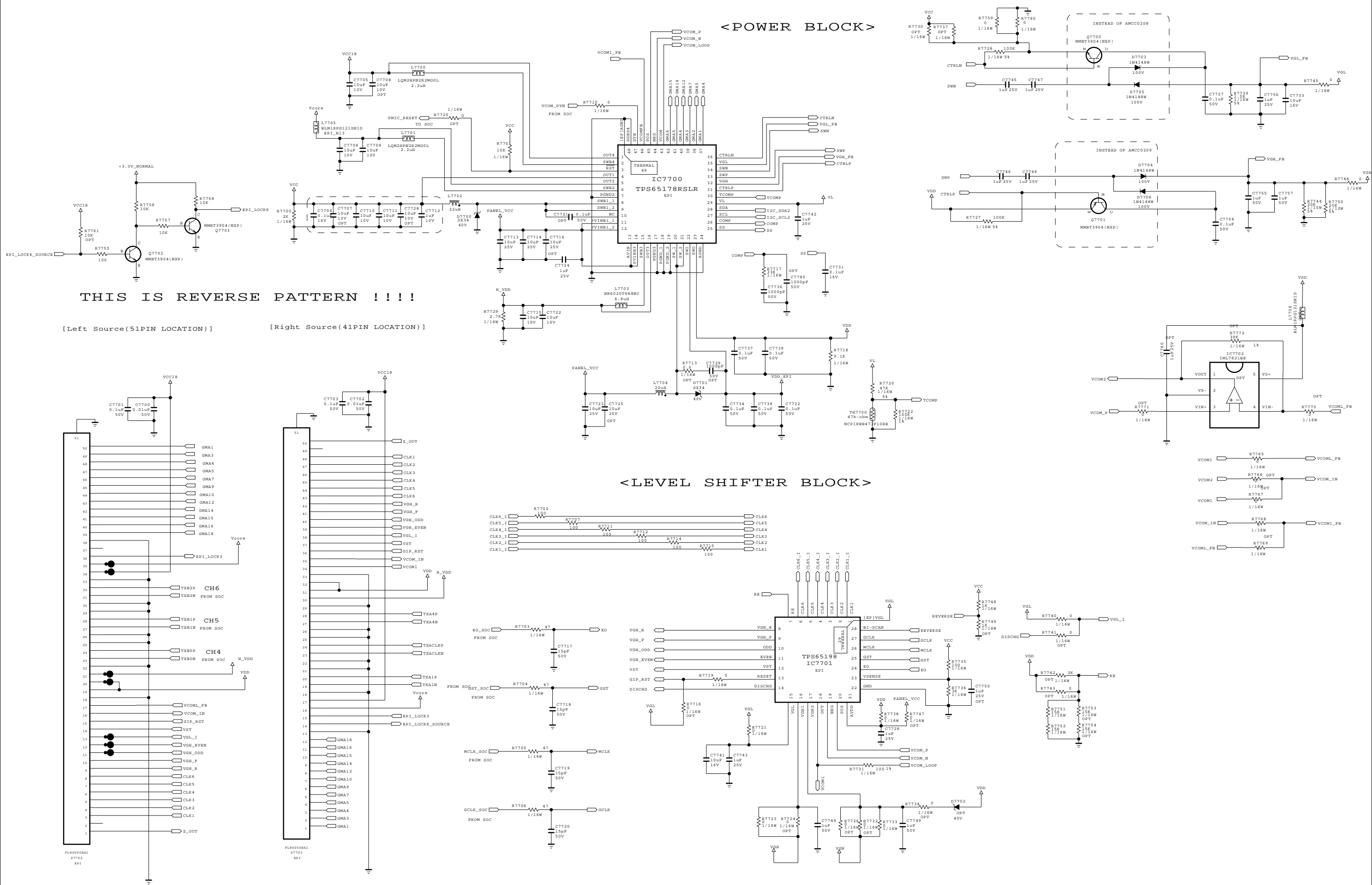


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SECRET
LGElectronics



MODEL	LOCAL DIMMING	DATE	2011.12.13
BLOCK		SHEET	76 /



THIS IS REVERSE PATTERN !!!!

[Left Source(51PIN LOCATION)]

[Right Source(41PIN LOCATION)]

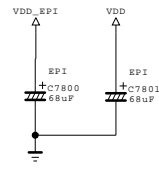
<LEVEL SHIFTER BLOCK>



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SECRET
LGElectronics



MODEL	DATE	2011.12.01
BLOCK	T-Con	SHEET
		77



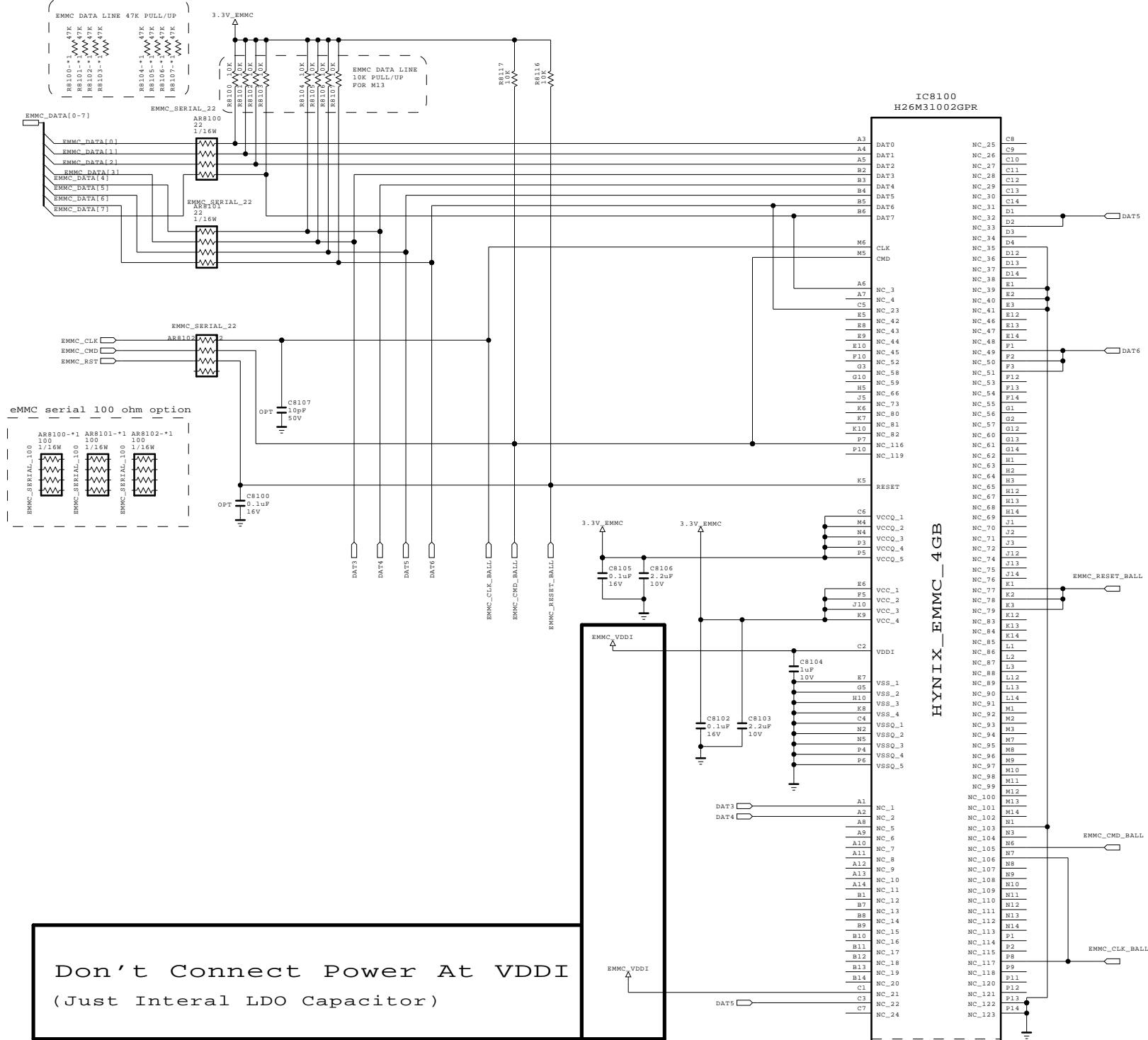
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SECRET
LGElectronics

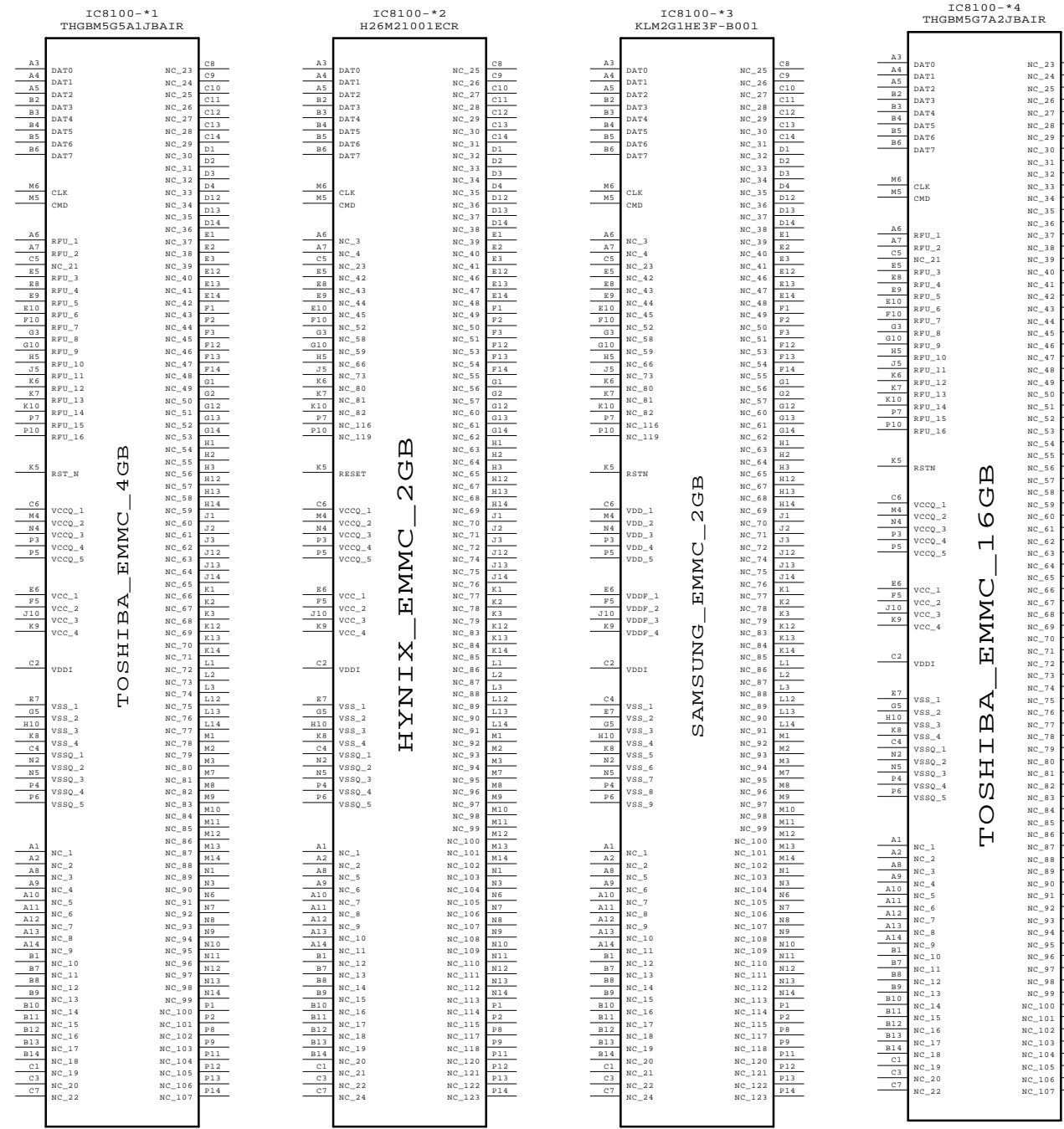


MODEL		DATE	2011.12.01
BLOCK	T-Con	SHEET	77 /

eMMC I/F



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

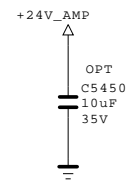


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SECRET
LGElectronics



MODEL	eMMC	DATE	11.09.29
BLOCK		SHEET	81



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
LGElectronics



MODEL		DATE	
BLOCK		SHEET	/



◆ CONTENT ◆

- 1. '2013 Product line-up and features**
- 2. Model naming and tool option**
- 3. New features**
- 4. Main PCBs**
- 5. Block Diagrams, IIC Map**
- 6. Structure of TV set and connection of sub assy's**
- 7. New sub assy's**
 - Instruction of new sub assy's**
 - How to use tool**
 - Download**
- 8. Adjust way of new features**
- 9. Repair guide**

◆ CONTENT ◆

1. '2013 Product line-up and features

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9. Repair guide

◆ CONTENT ◆

1. '2011 Product line-up and features
- 2. Model naming and tool option**
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Model naming and Tool option



Standard of 2013y Model Name	 13년 모델명 변경
Description of Tool Options	 Tool option

◆ CONTENT ◆

1. '2011 Product line-up and features
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 - How to use tool
 - Download
8. Adjust way of new features
9. Repair guide

EPI Interface

● EPI(Embedded Point-Point Interface)

● Features

- Point-Point topology (support 2 Pair option)
- CDR (Clock Data Recovery)
- Bandwidth up to 1.85Gbps/pair at FHD 120Hz 10 bit application
- Lock signal cascading and feedback to T-Con
- Embedded Control Data

● Merits

- Better reliability on common noise
- No data skew and better EMI margin
- Fewer lines than mini-LVDS
- Slim PCB design

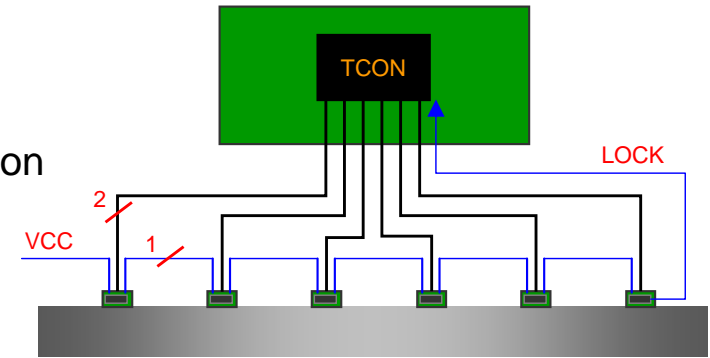


Figure1. Topology

Table 1. Example of FHD 120Hz TV

EPI	FHD (10bit) @ 960Ch		
	60Hz	120Hz	240Hz
Transmission Line	12	12	24
Bandwidth	0.84Gbps	1.68Gbps	1.68Gbps

EPI Interface (mini-LVDS vs. EPI)

Comparison

● HF mini-LVDS

HF mini-LVDS	FHD (10bit)		
	60Hz	120Hz	240Hz
No. of Signal	36	36	72
Connector	60pin (2ea)	60pin (2ea)	80pin (2ea)

- Difficult to upgrade bandwidth limit
- Multiple number of wires needed for higher bandwidth

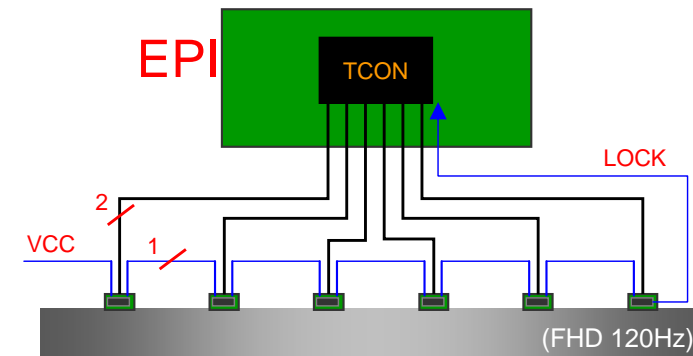
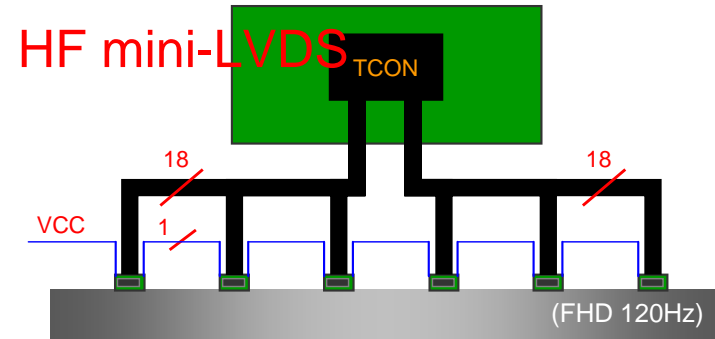
● EPI (Embedded clock P-to-P Interface)

EPI	FHD (10bit)		
	60Hz	120Hz	240Hz
No. of Signal	12	12	32
Connector	-	50 pin (2ea)	70pin (2ea)

- Better reliability on common noise
- No data skew. Better EMI margin
- Lower cost (Cable, Connector)
- Slim S-PCB design (14mm → 10mm) helps slimmer TV

What to change

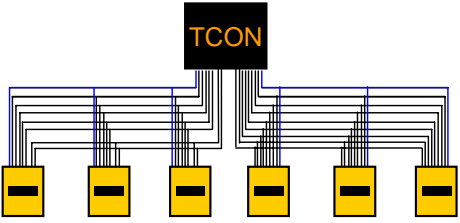
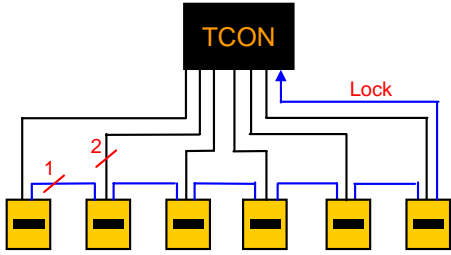
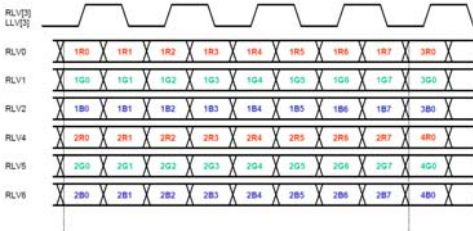
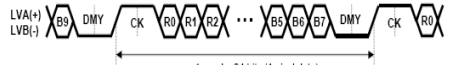
● LCM (T-con to S-Driver IC)



* Bandwidth Capability

- FHD 120Hz 10Bit : 594Mbps@36Lines → 1.65Gbps@12Lines
- FHD 240Hz 10Bit : 594Mbps@72Lines → 1.25Gbps@32Lines

EPI Interface (mini-LVDS vs. EPI)

	HF mini-LVDS	EPI												
Topology														
Protocol		 <table border="1" data-bbox="1444 654 1937 798"> <thead> <tr> <th>Bit</th> <th>Name</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>0, 1</td> <td>CK</td> <td>Indicates a rising edge of bit clock. (Always "H")</td> </tr> <tr> <td>2 ~ 30</td> <td>-</td> <td>RGB data are transmitted. LSB is transmitted at first. 2 ~ 11 : R0 ~ R9 12 ~ 21 : G0 ~ G9 22 ~ 31 : B0 ~ B9</td> </tr> <tr> <td>32, 33</td> <td>DMY</td> <td>Dummy (Always "L")</td> </tr> </tbody> </table>	Bit	Name	Description	0, 1	CK	Indicates a rising edge of bit clock. (Always "H")	2 ~ 30	-	RGB data are transmitted. LSB is transmitted at first. 2 ~ 11 : R0 ~ R9 12 ~ 21 : G0 ~ G9 22 ~ 31 : B0 ~ B9	32, 33	DMY	Dummy (Always "L")
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32, 33	DMY	Dummy (Always "L")												
Features @10bit, FHD120	<ul style="list-style-type: none"> • Multi Drop • Data rate: 660Mbps • External clock 	<ul style="list-style-type: none"> • Point to Point • Data rate : 1.8Gbps • Embedded clock, Control 												
Merit	<ul style="list-style-type: none"> • Simple structure • Standardization 	<ul style="list-style-type: none"> • Fewer Lines : 12 • Embedded clock : low EMI, Clock skew free • Easy to PCB design 												
Demerit	<ul style="list-style-type: none"> • Too many lines : 36 • Clock skew • EMI due to clock lines • Bandwidth limit 	<ul style="list-style-type: none"> • Transmission Overhead : 4bit delimiter 												

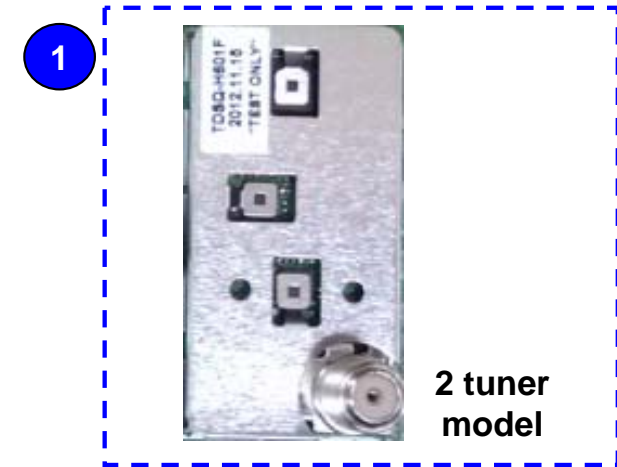
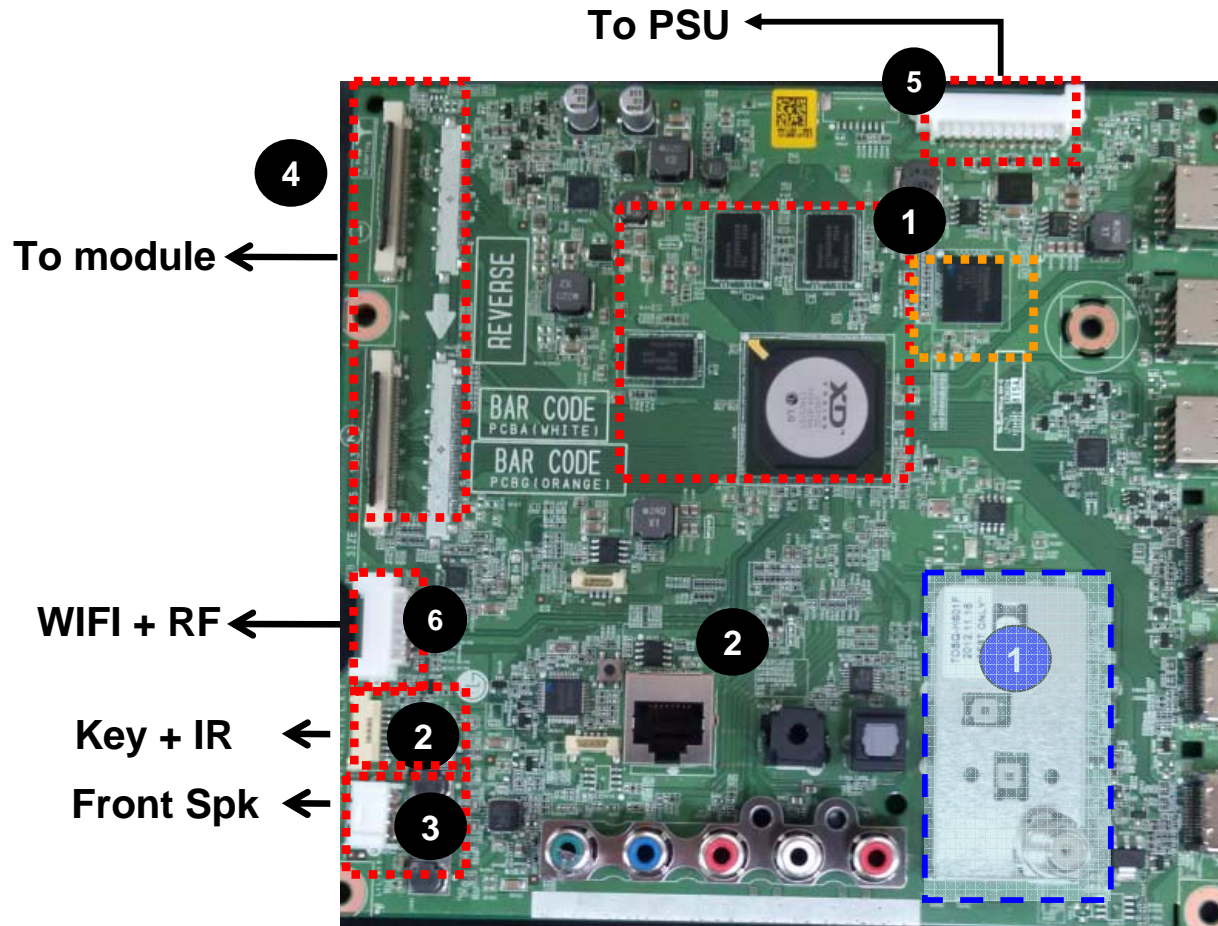
◆ CONTENT ◆

1. '2011 Product line-up and features
2. Model naming and tool option
3. New features
- 4. Main PCBs**
5. Block Diagrams, IIC Map
6. Structure of TV set and connection of sub assy's
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Main PCB for Broadband

xxLA6900-NA

Chassis : LA33B
PCB P/No : EAX64872101

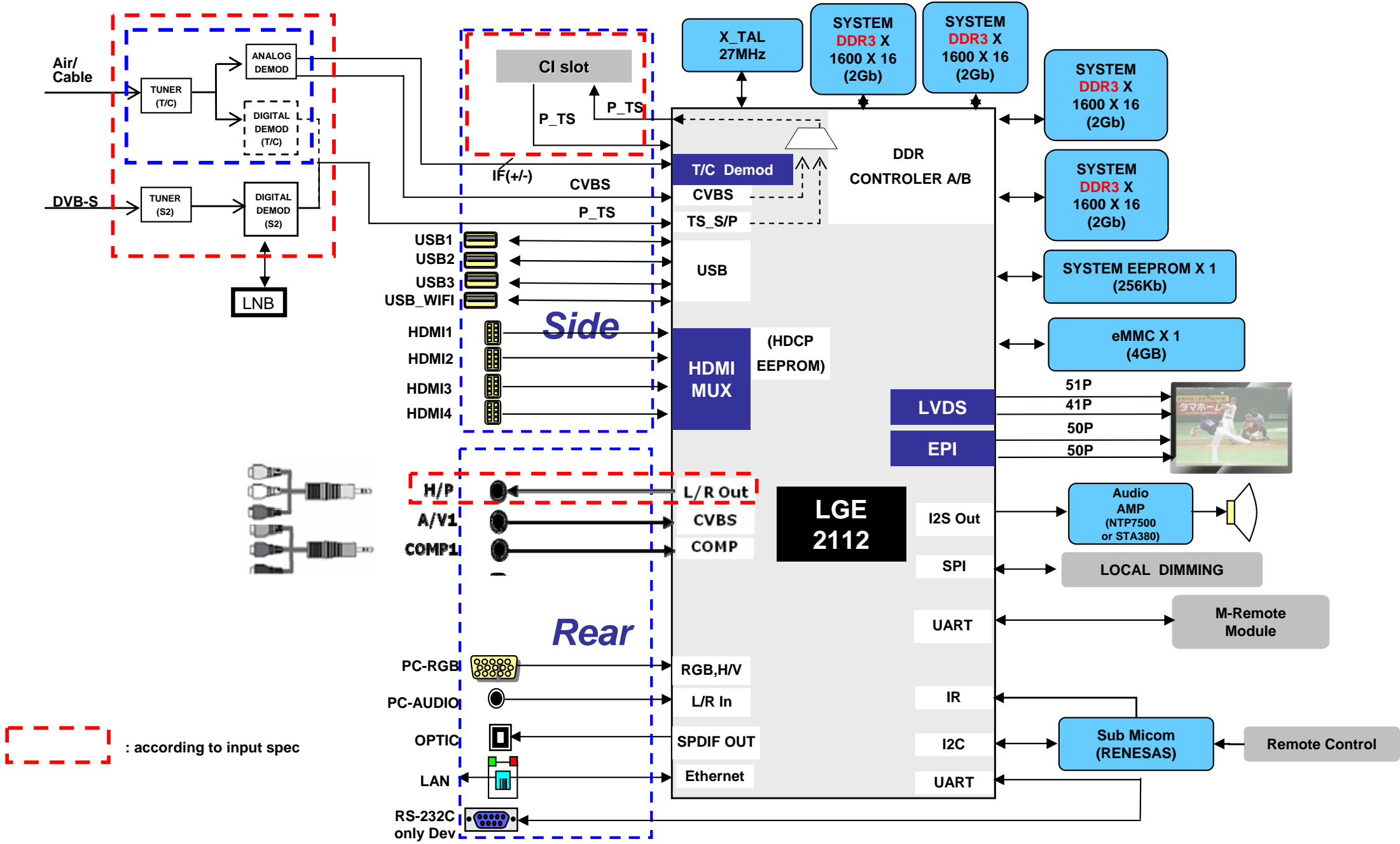


- 1 Main processor, DDR Memory
eMMC Memory
- 2 Micom for Key/IR sensing
- 3 Audio AMP (12W+12W)
- 4 LVDS or EPI Wafer
- 5 PSU
- 6 WiFi + RF(Magic Remocon receiver)

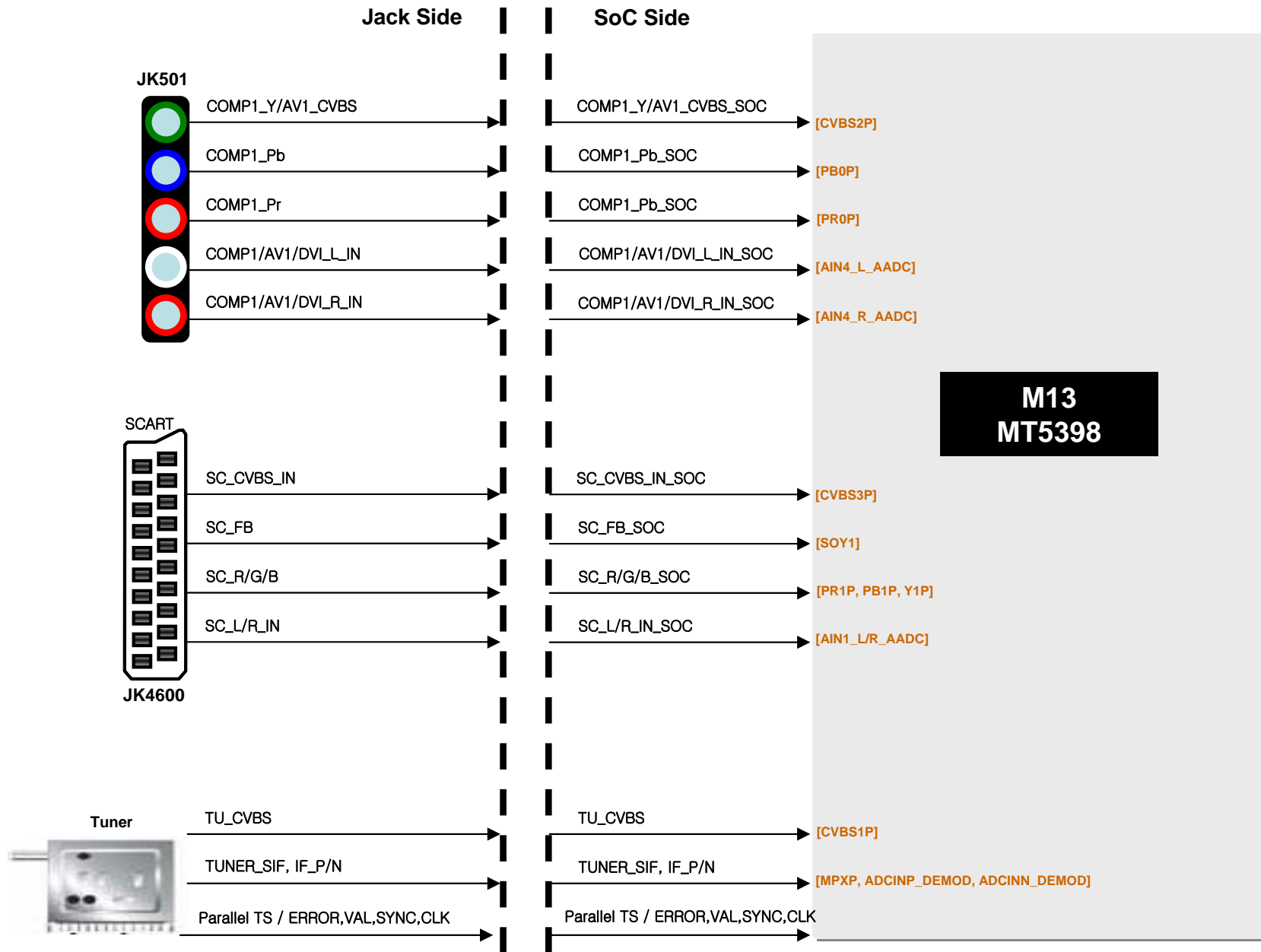
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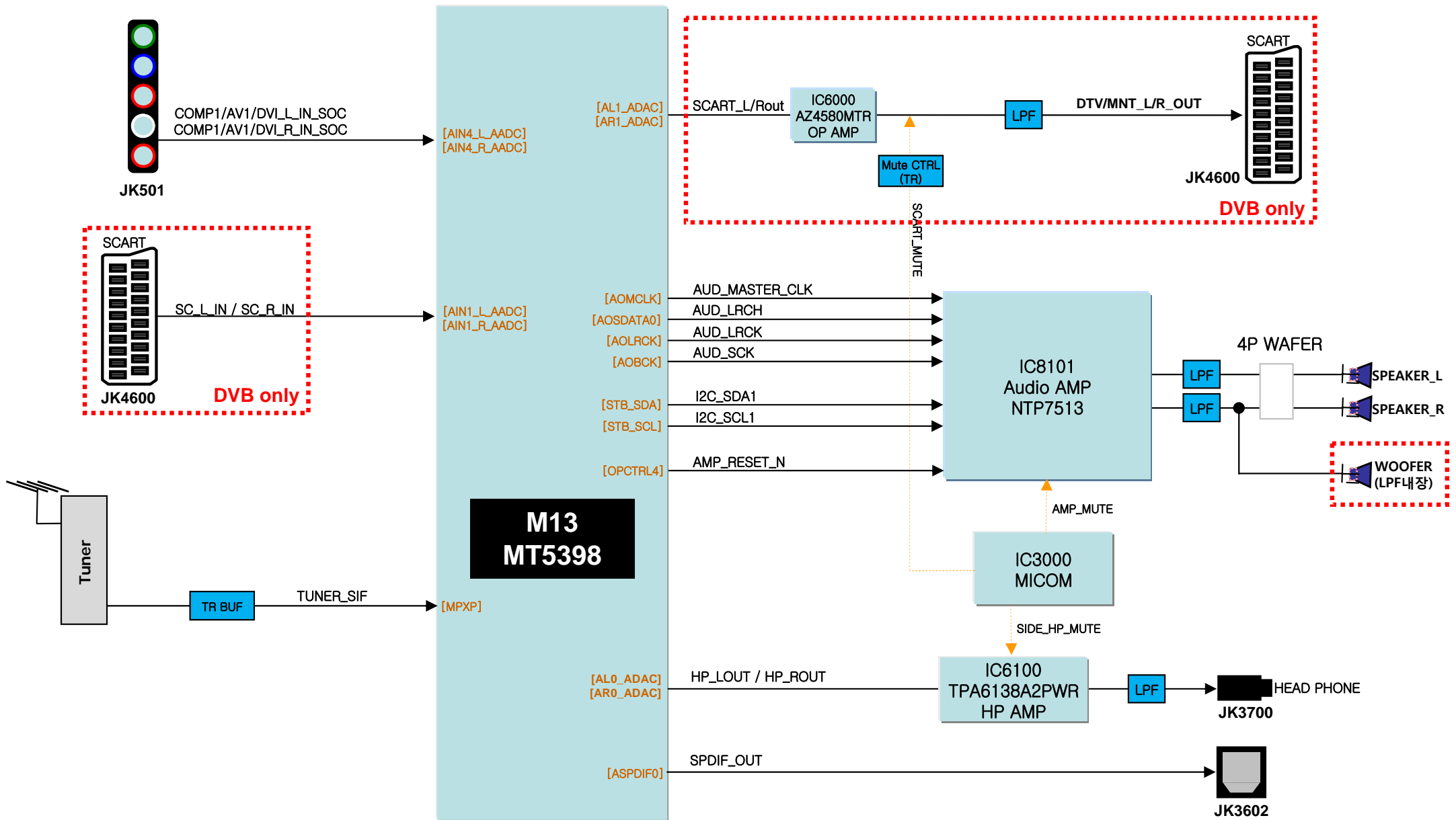
MTK5398 Block Diagram



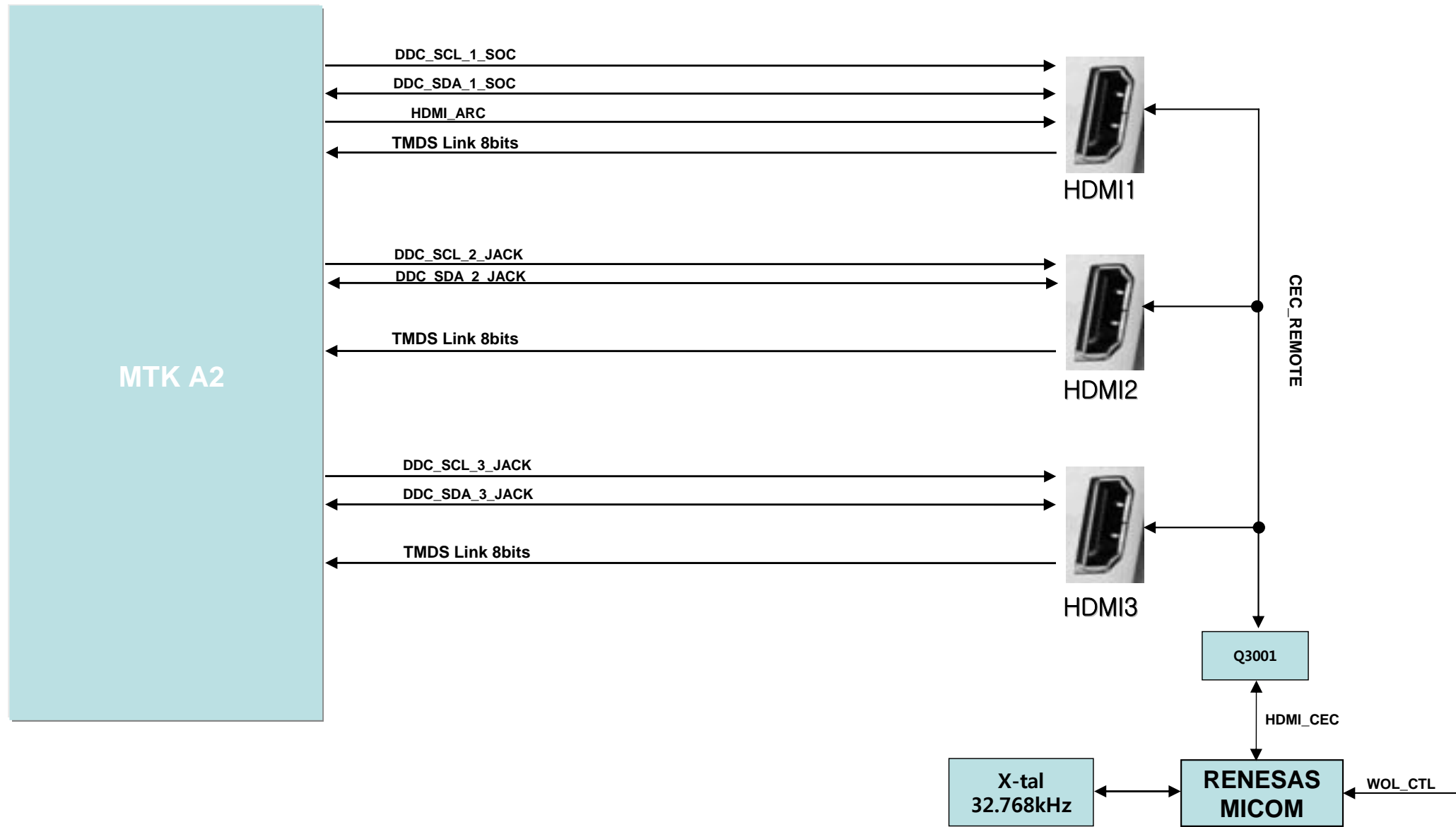
Video/Audio In Block Diagram



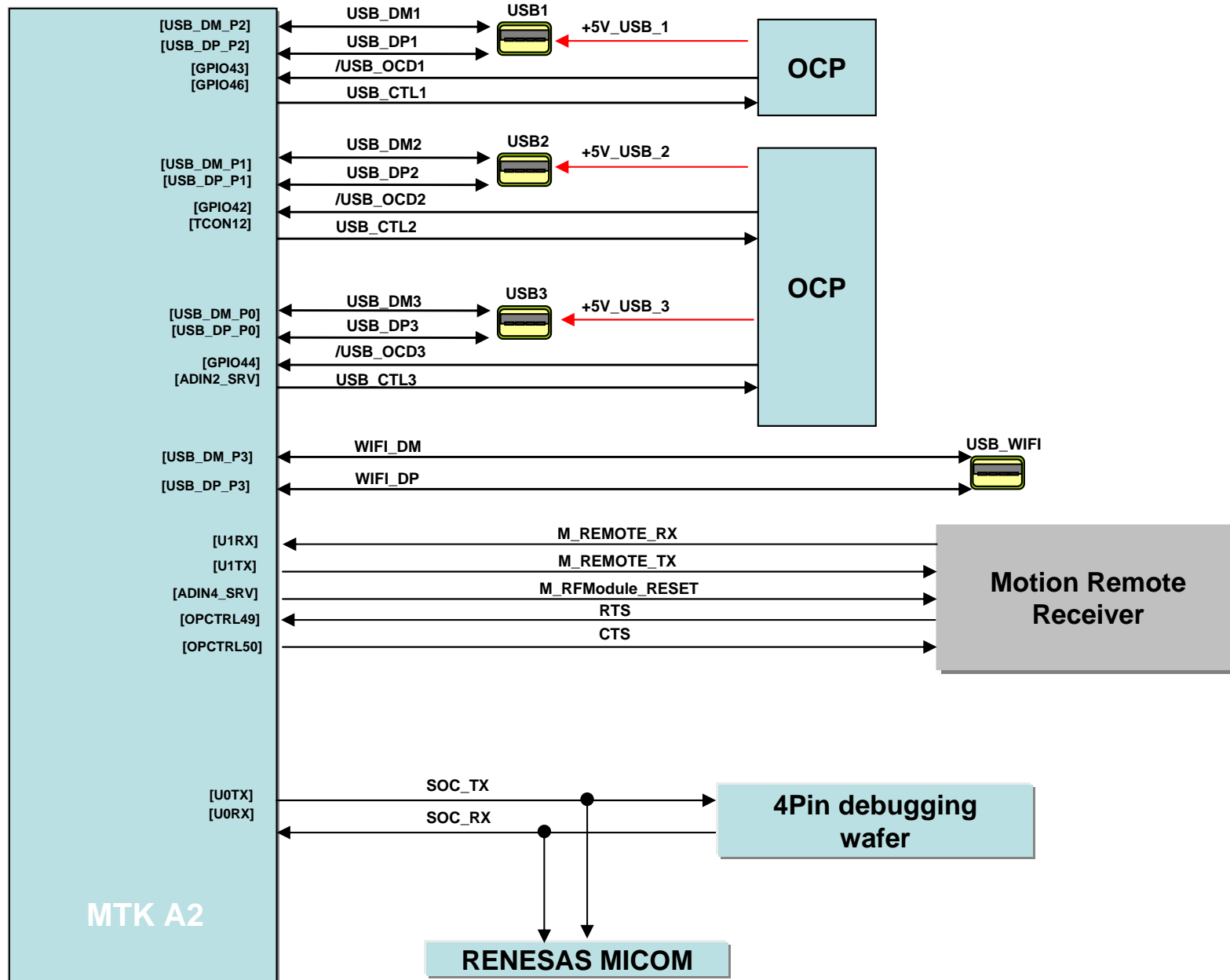
Audio Out Block Diagram



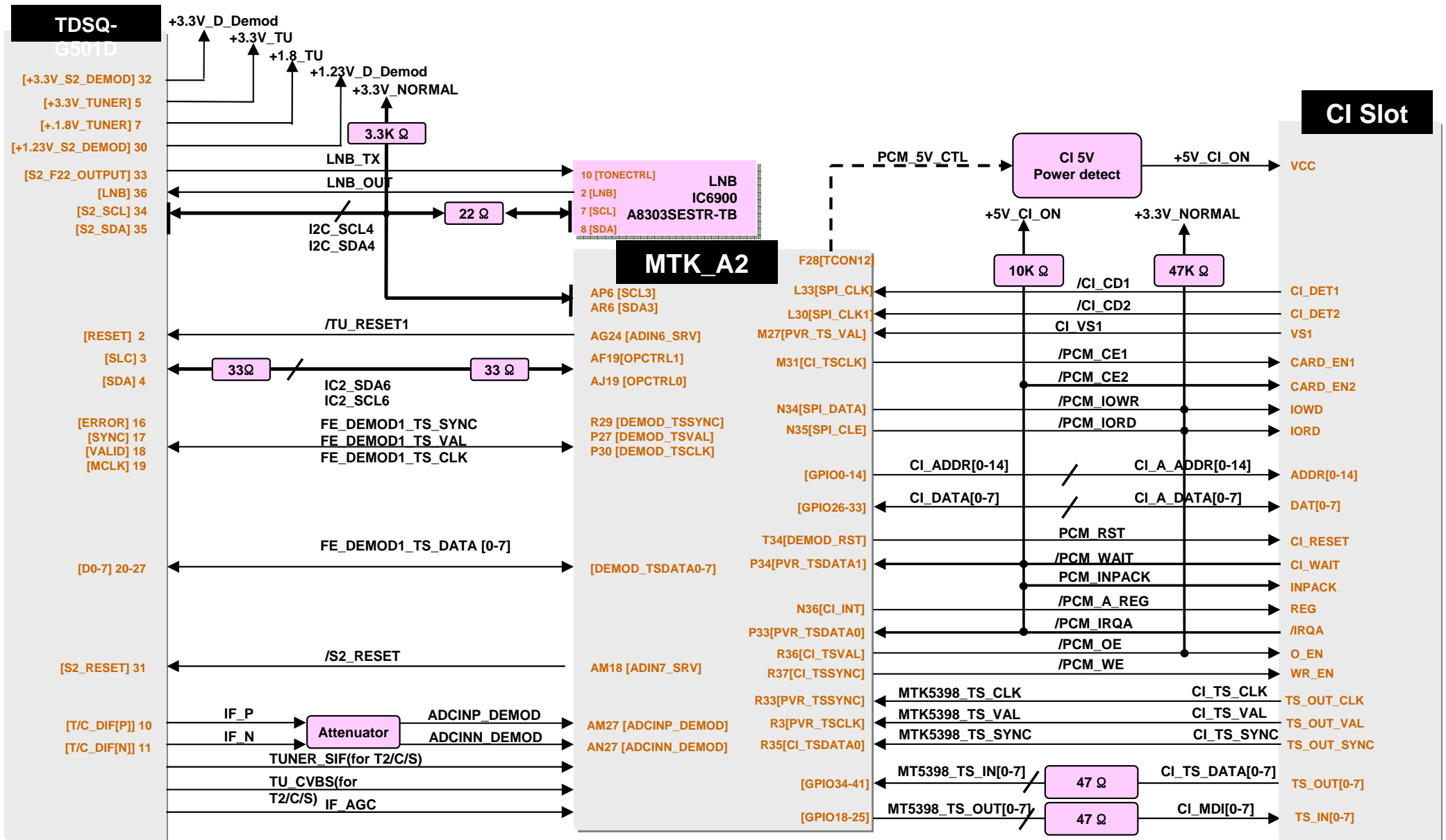
HDMI



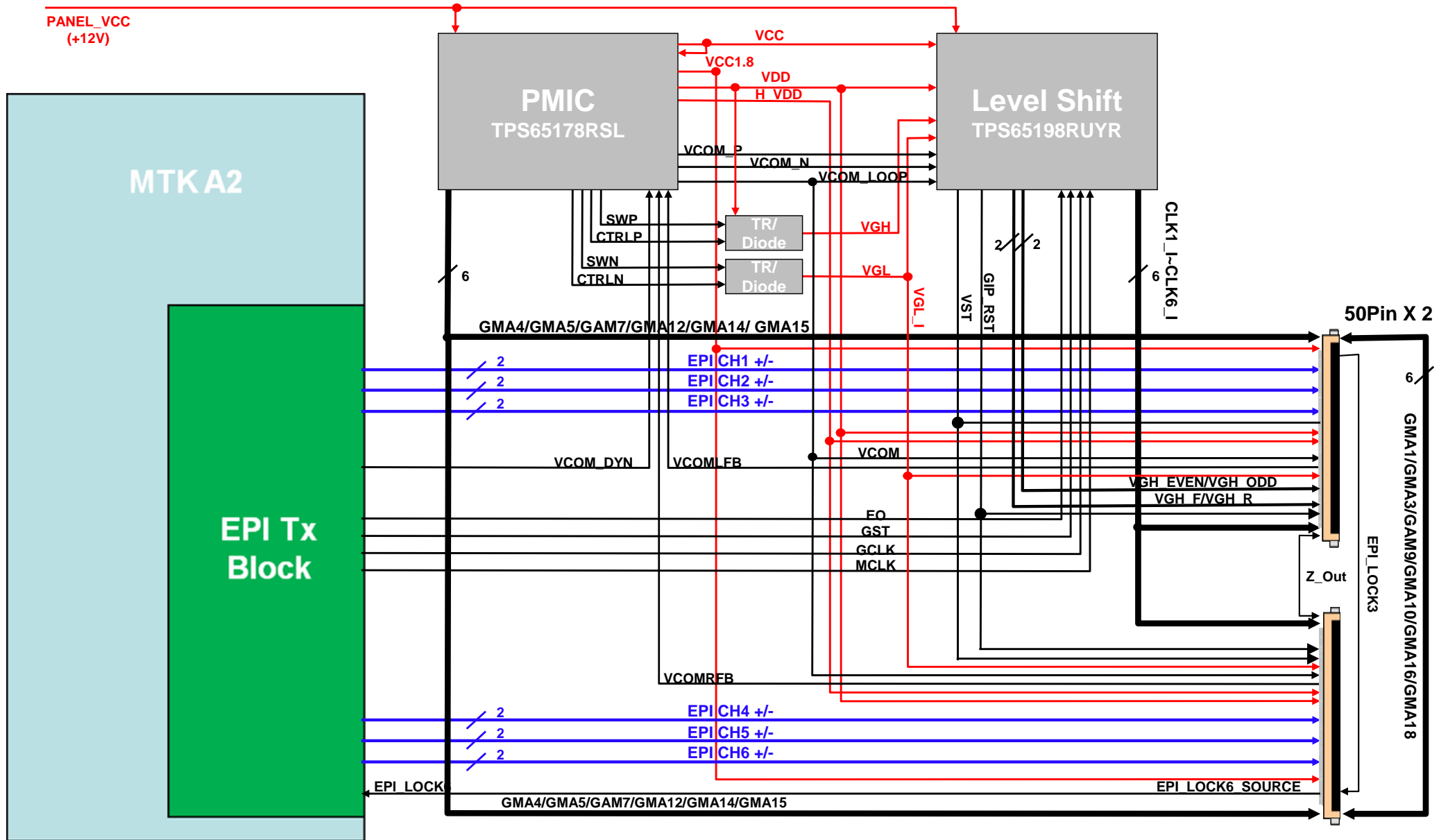
USB / WIFI / M-REMOTE / UART



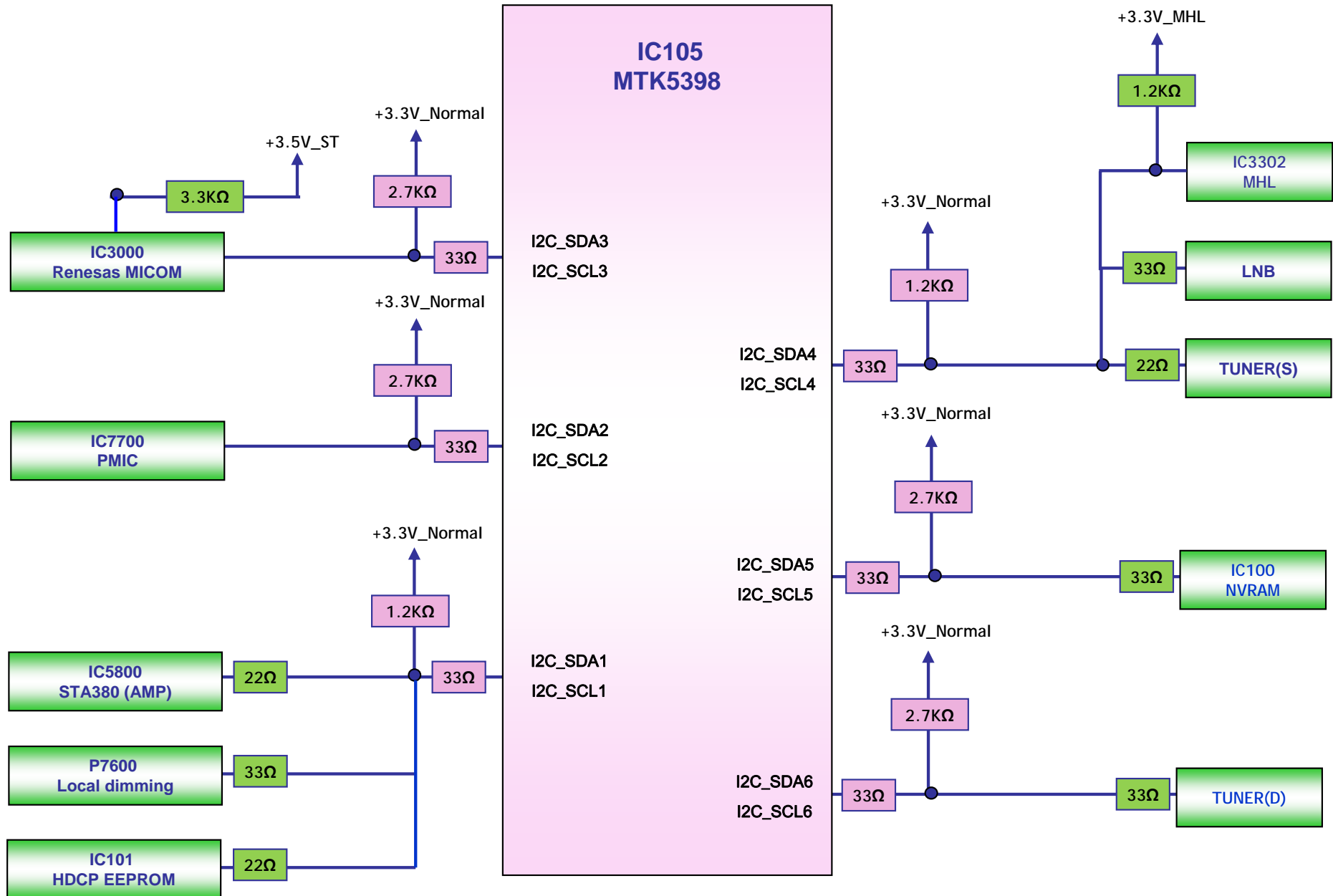
Tuner/CI Block Diagram



Panel Interface Block Diagram



M13 I2C Block Diagram

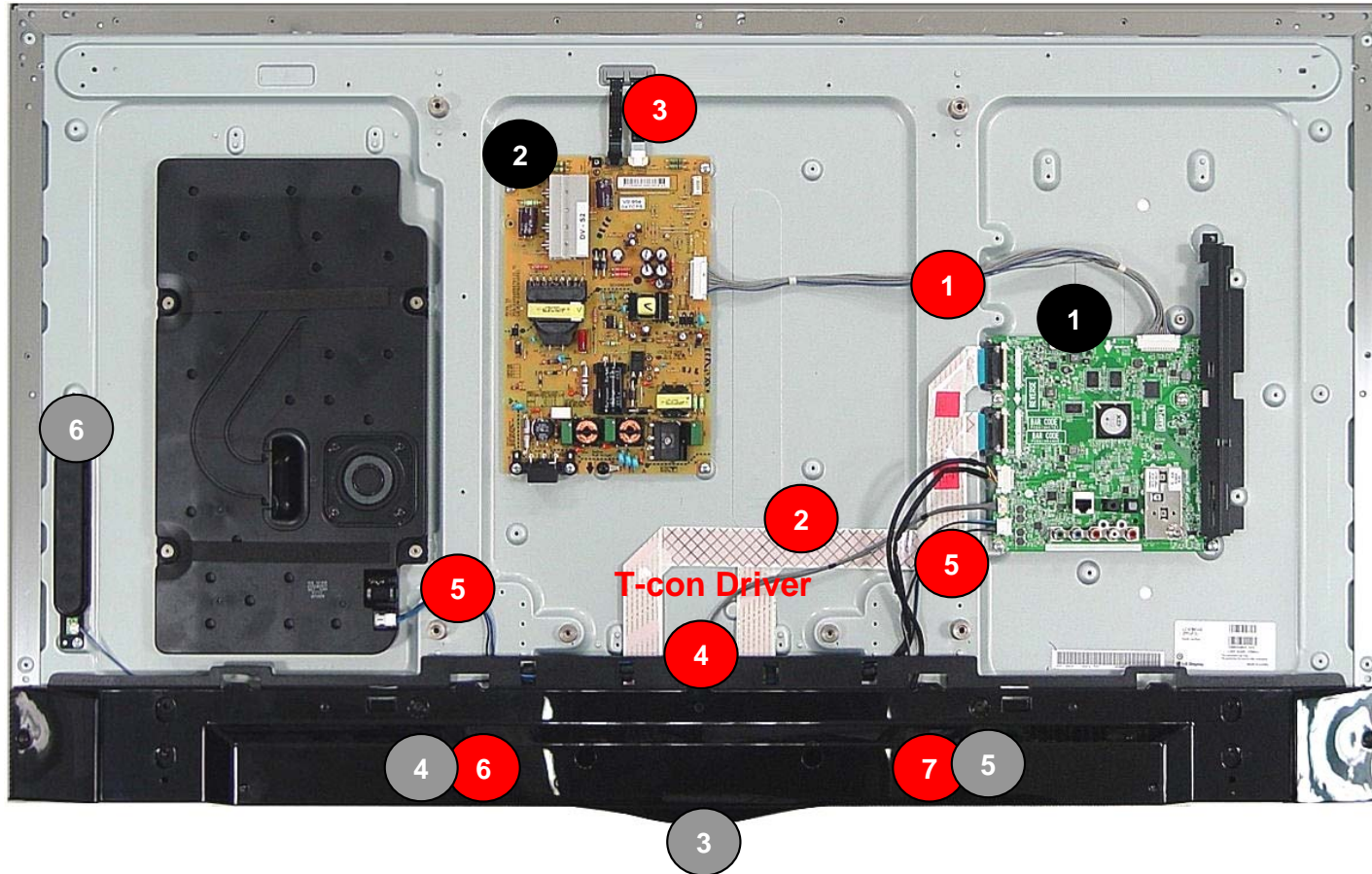


◆ CONTENT ◆

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2. Model naming and tool option
3. New features
4. Main PCBs
5. Block Diagrams, IIC Map
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Interconnection - 1

47LA6900-NA



[PCBs]

- 1 Main PCB
- 2 Power Board
- 3 IR Assy
- 4 RF Assy
- 5 WIFI Assy
- 6 Key Assy

[Cables]

- 1 Main / LPB 24Pin cable
- 2 Main / Module LVDS Cable
- 3 LED driver / PSU
- 4 8Pin (IR+key) Cable
- 5 SPK Cable
- 6 RF Assy Cable
- 7 WIFI Assy Cable

◆ CONTENT ◆

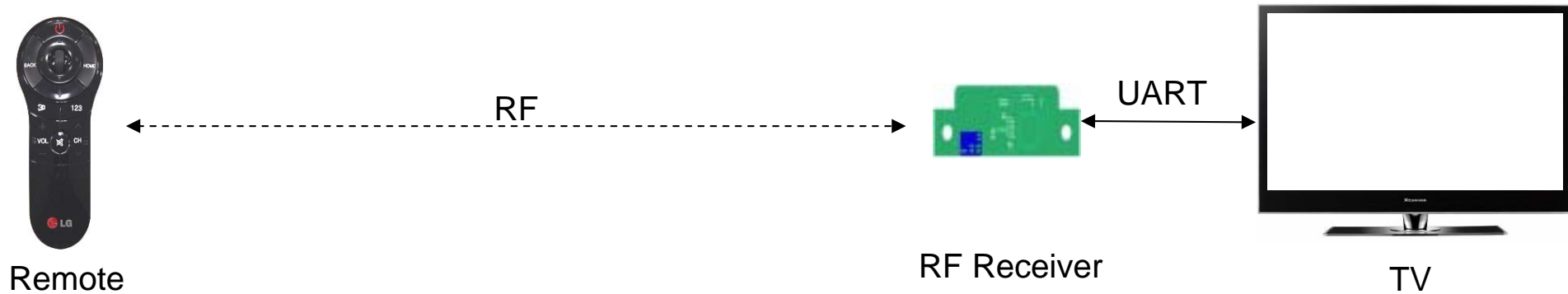
1. '2011 Product line-up and features
2. Model naming and tool option
3. New features
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- 7. New sub assy's**
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Introductions of 13Y RF assy + Magic Remote control

목차

1. System
2. Block diagram
3. Pairing method

1. System



❖ *Pairing Information Transmission (Send to TV after Paired)*

- Static Calibration Data (Bypass only)
- Remote FW ver. (Save also in Receiver)
- BD_ADDR (Save also in Receiver)
- *Pairing Information Transmission Sequence*
 - When it is paired, the remote sends packets(pairing success, F/W version, BD_ADDR) to the receiver.
 - The receiver sends the pairing success packet to TV directly.
 - F/W version and BD_ADDR packets are just saved on the receiver.
 - The receiver sends F/W version or BD_ADDR packet to TV when it is required.

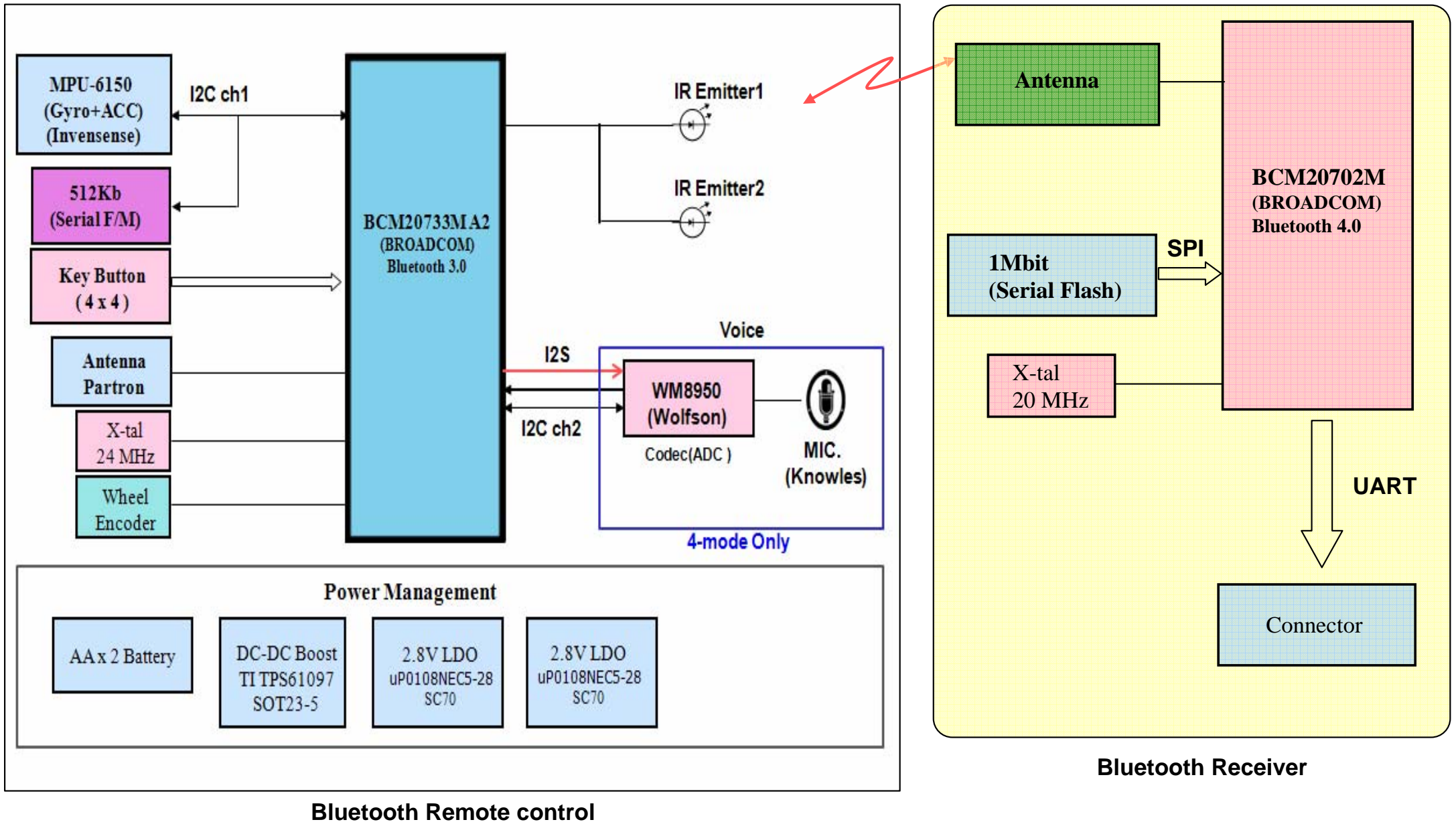
❖ *Motion Data Transmission*

- Period : 7.5msec
- Motion Data : gyro, accelerometer

❖ *Voice Data Transmission*

- Period : 10msec
- Voice sampling : 16khz 16bit

2. MR13 Block Diagram



3. RF Pairing / Un-pairing Method

	Method	Description
RF Pairing	<ul style="list-style-type: none"> ❖ Method1 <ul style="list-style-type: none"> – If unpaired, just press Wheel key. – If paired, press Wheel key after unpairing. ❖ Method 2 (Repairing) <ul style="list-style-type: none"> – Press “BACK” button for 5 sec. 	<ul style="list-style-type: none"> • When do pairing, the remote should make pairing request IR signal(0x29) to TV. • When TV receive the IR signal, it should send "pairing request packet" to the RF receiver. • After pairing success, the remote should blink LED for some time and TV send "pairing success packet" back to TV. • When remote try to unpairing, it doesn't care about state of receiver(stand alone).
RF Unpairing	Press “HOME” button and “BACK” button at the same time for 5 sec.	<ul style="list-style-type: none"> • When remote try to unpairing, it doesn't care about state of receiver(stand alone). • After unpairing, all pairing information should be erased. • After unpairing, LED should be blinked for 3sec. • The remote just becomes to IR mode.

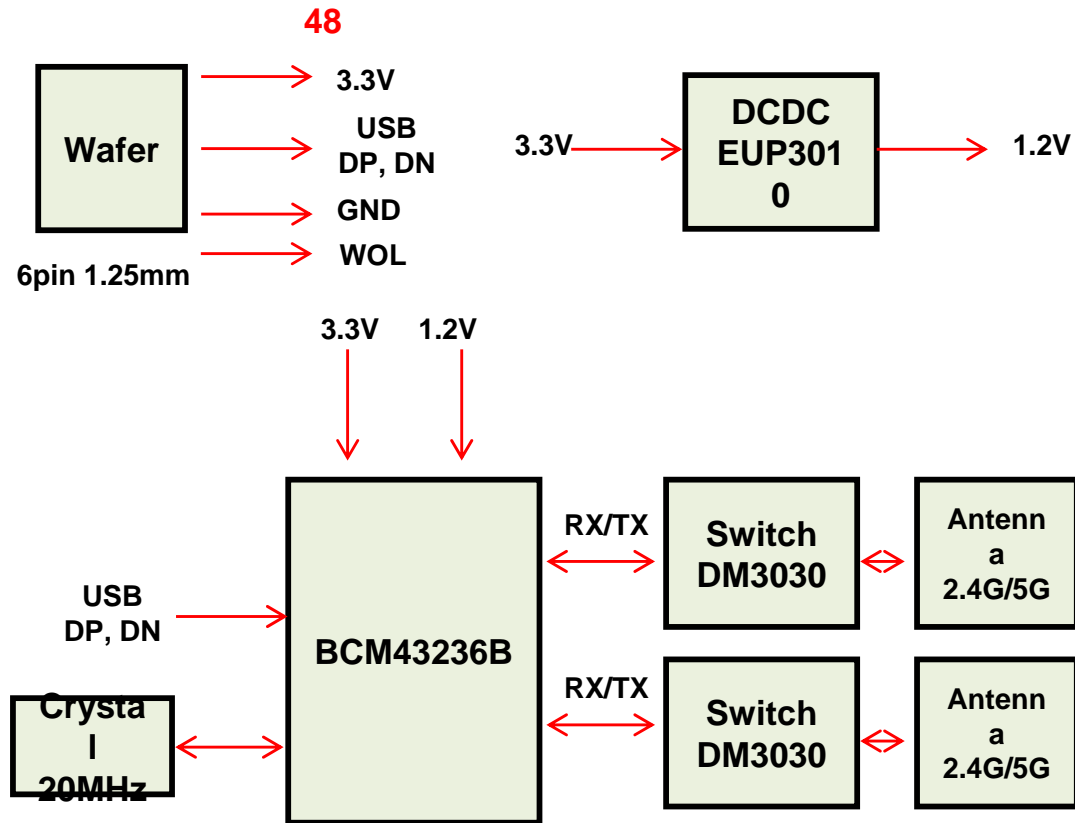
Introductions of 13Y WIFI built in assy

목차

1. Block diagram
2. Specification

WIFI Built in assy feature

Block diagram



WiFi Built in ass'y Specification

- ◆ Frequency Band:

Draft 802.11n Radio: 2.4 GHz

802.11g Radio: 2.4 GHz

802.11b Radio: 2.4 GHz

USA – FCC

2412~2462MHz (Ch1~Ch11)

Canada – IC

2412~2462MHz (Ch1~Ch11)

Europe – ETSI

2412~2472MHz (Ch1~Ch13)

Japan – STD-T66/STD-33

2412~2484MHz (Ch1~Ch14)

802.11a Radio : 5 GHz

5.150~5.250GHz

5.725~5.850GHz

- ◆ Operating Channels:

IEEE 802.11b/g/n compliant:

11 channels (US, Canada)

13 channels (ETSI)

14 channels (Japan)

- ◆ Transmit Power and Sensitivity:

TX Output Power:(Typical) (Meet emission standard)

11b 17 +/- 2 dBm

11g 14 +/- 2 dBm@54Mbps (Each chain)

11n 13 +/- 2 dBm (Each chain)

Rx Sensitivity:(Typical)

-69dBm at HT20 m7 2.4GHz

-87dBm at HT20 m0 2.4GHz

-69dBm at HT20 m7 5.0GHz

-87dBm at HT20 m0 5.0GHz

- ◆ Modulation

DBPSK @1Mbps

DQPSK@2Mbps

CCK@5.5/11Mbps

BPSK@6/9 Mbps

QPSK@12/18Mbps

16-QAM@24Mbps

64-QAM@48/54Mbps and above

- ◆ Current consumption(5V DC):

Full load: 430mA

- ◆ Operating Temperature: 0 ~ 60 °C ambient

- ◆ Storage Temperature: -20 ~ 60 °C ambient

- ◆ Humidity: under 85% and must be non-condensing

- ◆ Regulation and certification compliance available:

- ◆ CE

- ◆ FCC

- ◆ WiFi



- ◆ WPS



◆ CONTENT ◆

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3. New features
4. Main PCBs
5. Block Diagrams, IIC Map
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 - How to use tool
 - Download
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12Y Widevine & HDCP 2.0 & NETFLIX

Contents

1. Widevine?
2. HDCP 2.0 & NETFLIX?
3. DTCP?

1. Widevine?

[Widevine]

Widevine is the Solution(Library) offering Adaptive Streaming and DRM.

In BBTV, when special CP do service, this module is required key.

Currently CP which is requested to widevine, is typically Australian Bigpond Live and North American CinemaNow.

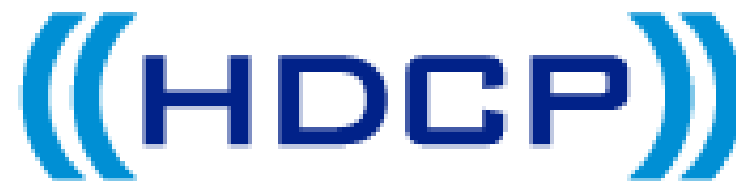
Furthermore, because the future will be the spread of CP, widevine key download for the global model should be applied to production.

(Because operation unique key should be downloaded for Widevine , Widevine key download by NSU is impossible.)

[Widevine Key]

Widevine Key is unique data stored TV for using Widevine.

2. HDCP 2.0 & NETFLIX?



HDCP

- ✓ High-bandwidth Digital Content Protection
- ✓ Protect high-value digital motion pictures, television programs and audio against unauthorized interception and copying between a digital set top box or digital video recorder and a digital TV or PC.
- ✓ Specification developed by Intel Corporation to protect digital entertainment across the DVI/HDMI interface.

Why HDCP2.0?

- ✓ HDCP revision 2.0 supports a broader range of wired and **wireless** interfaces.

Netflix

- ✓ the services maintain a huge selection of movies and latest releases and offer DVD rentals via mail & online streaming.

3. DTCP?

[DTCP]

The Digital Transmission Content Protection Specification defines a cryptographic protocol for protecting audio/video entertainment content from unauthorized copying, intercepting, and tampering as it traverses digital transmission mechanisms such as a high-performance serial bus that conforms to the IEEE 1394-1995 standard. Only legitimate entertainment content delivered to a source device via another approved copy protection system (such as the DVD Content Scrambling System) will be protected by this protection system.

[Three cryptographic Keys]

- Authentication Key which is formed as a result of authentication and used to protect the exchange keys.
- Exchange Key which is used to set up and protect content streams.
- Content Key which is used to encrypt the content being exchanged.

◆ CONTENT ◆

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10. The latest issue and concerning issue

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		Video error, video lag/stop, fail tuning	3, 4	
4		Color error	5	
5		Vertical/Horizontal bar, residual image, light spot, external device color error	6	
6	B. Power error	No power	7	
7		Off when on, off while viewing, power auto on/off	8	
8	C. Audio error	No audio/Normal video	9	
9		Wrecked audio/discontinuation/noise	10	
10	D. Function error	No response in remote controller, key error, recording error, memory error	11	
11		External device recognition error	12	
12	E. Noise	Circuit noise, mechanical noise	13	
13	F. Exterior error	Exterior defect	14	

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	A4	
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		LCD TV connection diagram	A8	
14	A. Video error_Vertical/Horizontal bar, residual image, light spot	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		Exchange T-Con Board (1)	A-1/5	
17	<Appendix> Defected Type caused by T-Con/ Inverter/ Module	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	

Continue to the next page

LCD TV

Error symptom

A. Video error

Established date

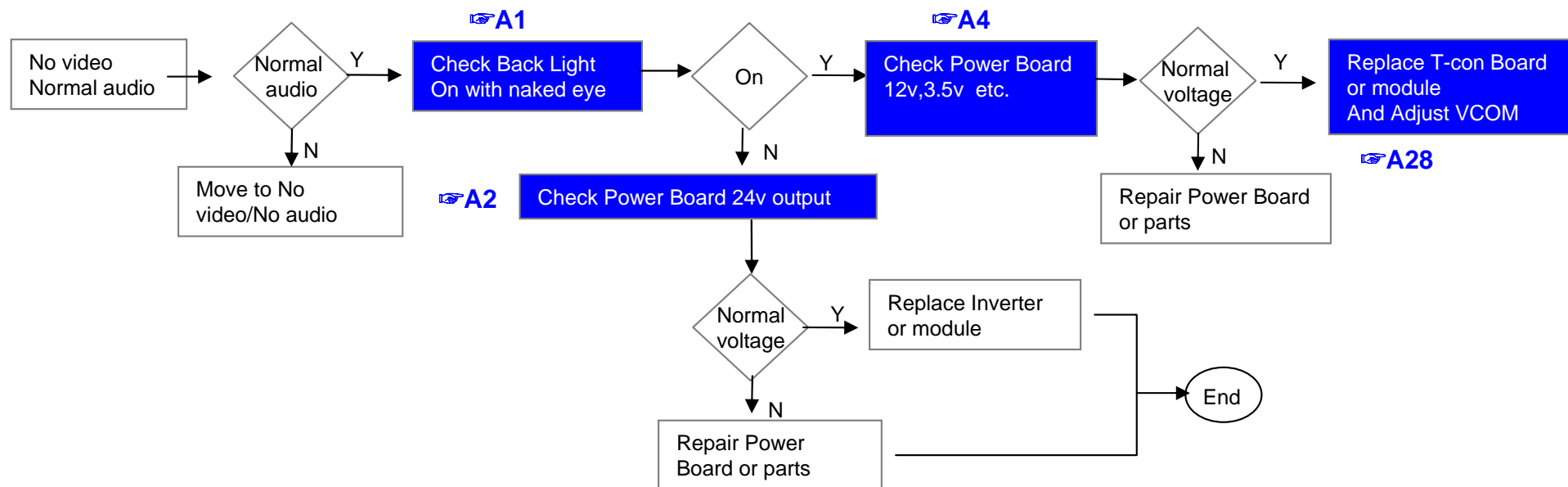
2012. 11 .30

No video/ Normal audio

Revised date

1/13

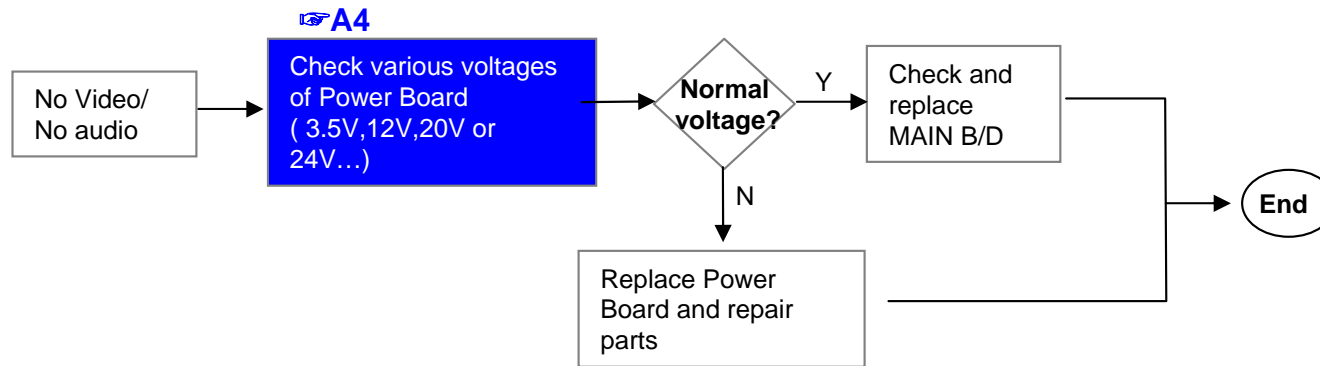
**First of all, Check whether all of cables between board is inserted properly or not.
(Main B/D ↔ Power B/D, LVDS Cable, Speaker Cable, IR B/D Cable,,)**



※Precaution A7 & A3



LCD TV	Error symptom	A. Video error	Established date	2012. 11 .30	
		No video/ No audio	Revised date		2/13

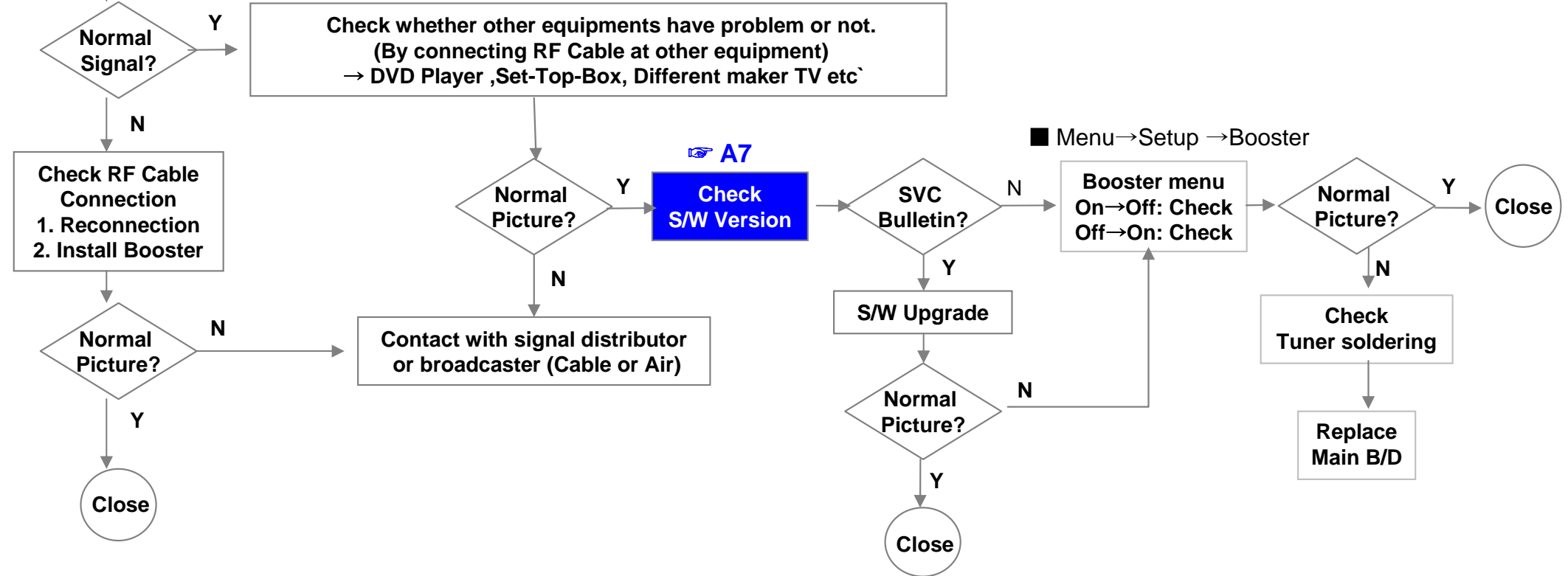


LCD TV	Error symptom	A. Picture Problem	Established date	2012. 11 .30	
		Picture broken/ Freezing	Revised date		3/13

A6

Check RF Signal level

- . By using Digital signal level meter
- . By using Diagnostics menu on OSD
(Menu → Set up → Support → Signal Test)
- Signal strength (Normal : over 50%)
- Signal Quality (Normal: over 50%)

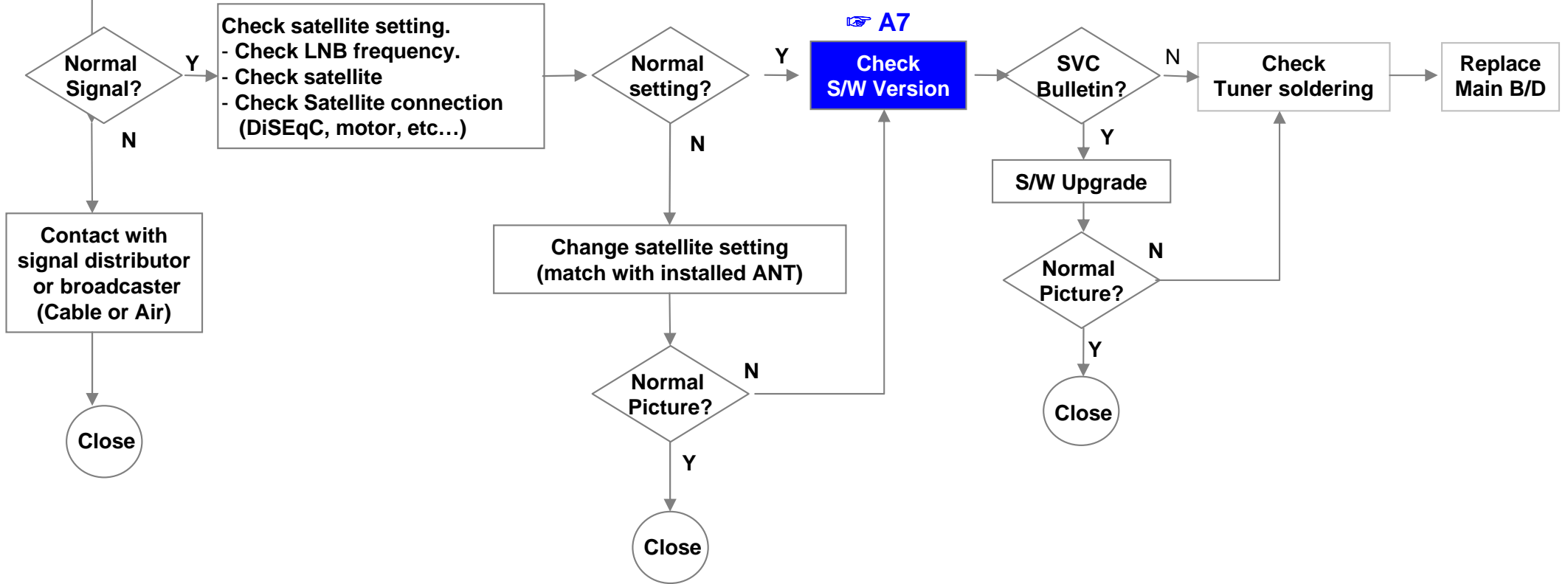


LCD TV	Error symptom	A. Picture Problem (DVB-S/S2)	Established date	2012. 11 .30	
		Tuning fail, Picture broken/ Freezing	Revised date		3/13

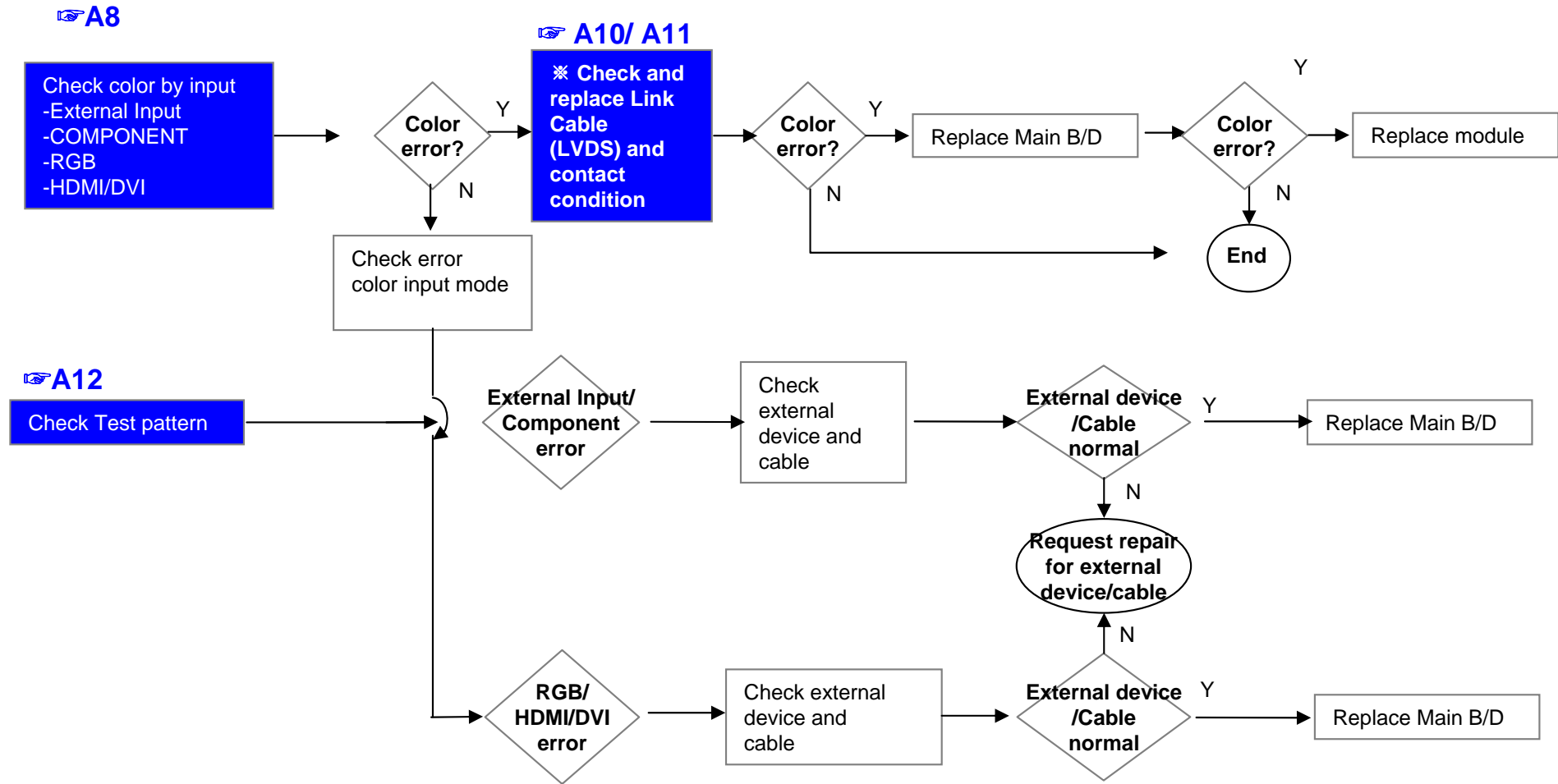
A6

Check RF Signal level

Check RF signal cable (DVB satellite signal or not)
 Check whether other equipments have problem or not.
 (By connecting RF Cable at other equipment)
 → Set-Top-Box, Different maker TV etc



LCD TV	Error symptom	A. Video error	Established date	2012. 11 .30	
		Color error	Revised date		4/13



LCD TV	Error symptom	A. Video error	Established date	2012. 11 .30	
		Vertical / Horizontal bar, residual image, light spot, external device color error	Revised date		5/13

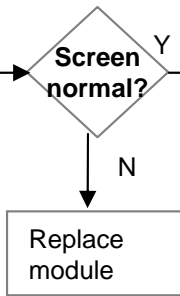
Vertical/Horizontal bar, residual image, light spot

A8

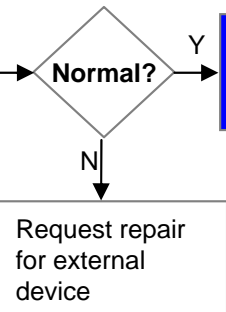
Check color condition by input
 -External Input
 -Component
 -RGB
 -HDMI/DVI

A12

Check Test pattern

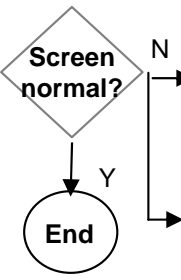


Check external device connection condition



A10/ A11

Check and replace Link Cable

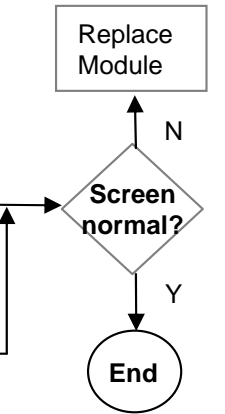


A28
 Replace Main B/D (adjust VCOM)
 For LGD panel

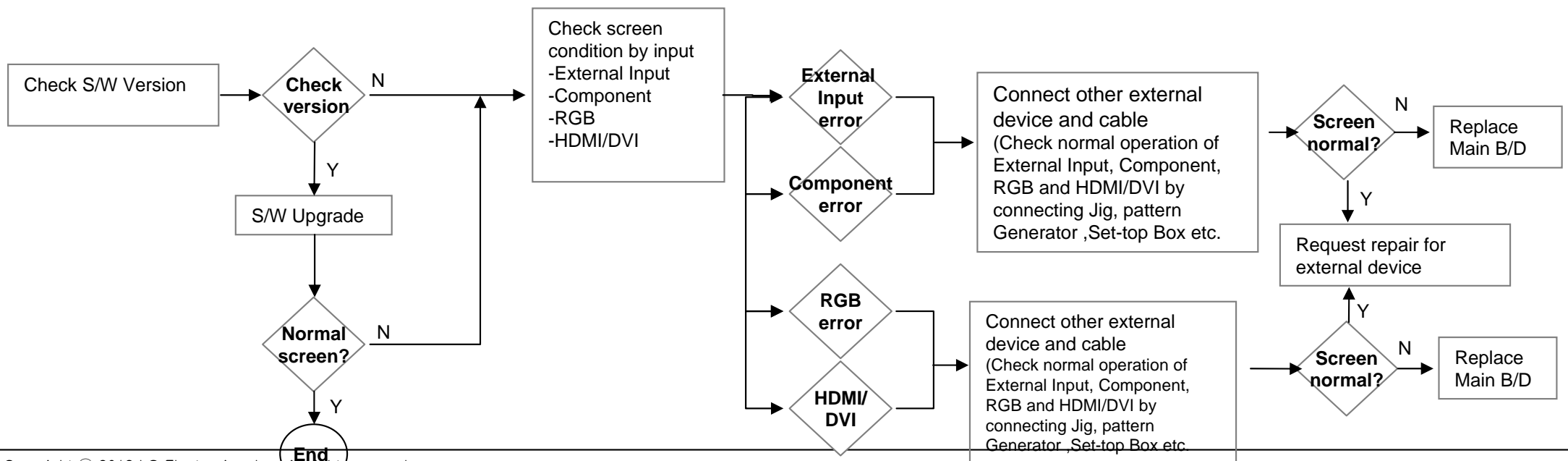
For LGD panel

For other panel

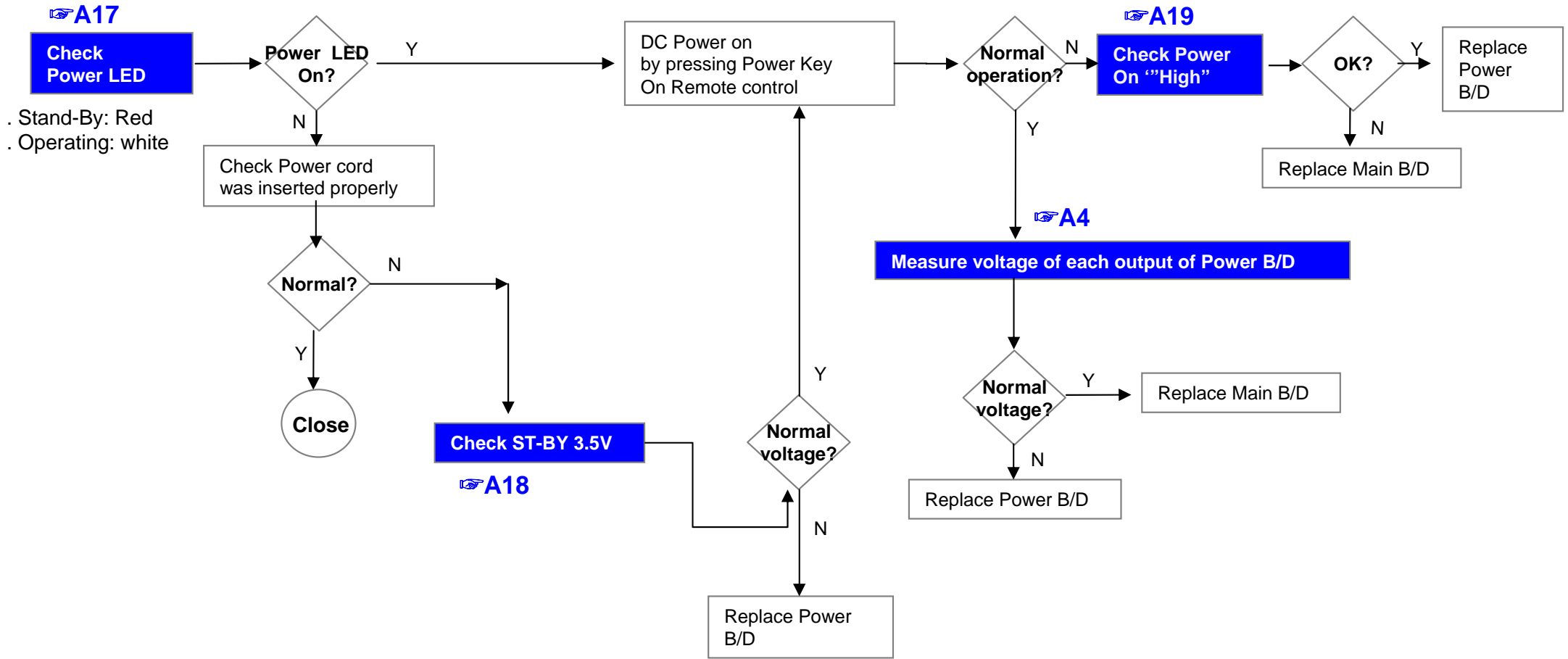
Replace Main B/D
 For other panel



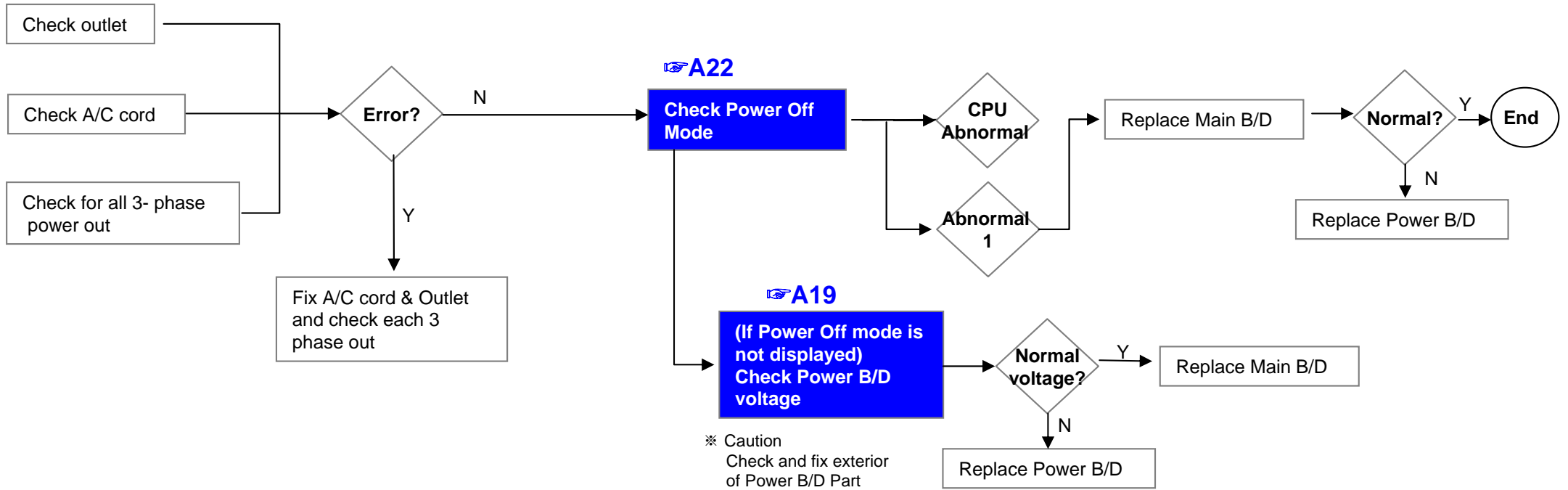
External device screen error-Color error



LCD TV	Error symptom	B. Power error	Established date	2012. 11 .30	
		No power	Revised date		6/13



LCD TV	Error symptom	B. Power error	Established date	2012. 11 .30	
		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.

Status	Power off List	Explanation
Normal	"POWEROFF_REMOTEKEY"	Power off by REMOTE CONTROL
	"POWEROFF_OFFTIMER"	Power off by OFF TIMER
	"POWEROFF_SLEEPTIMER"	Power off by SLEEP TIMER
	"POWEROFF_INSTOP"	Power off by INSTOP KEY
	"POWEROFF_AUTOOFF"	Power off by AUTO OFF
	"POWEROFF_ONTIMER"	Power off by ON TIMER
	"POWEROFF_RS232C"	Power off by RS232C
	"POWEROFF_RESREC"	Power off by Reserved Record
	"POWEROFF_RECEND"	Power off by End of Recording
	"POWEROFF_SWDOWN"	Power off by S/W Download
	"POWEROFF_UNKNOWN"	Power off by unknown status except listed case
Abnormal	"POWEROFF_ABNORMAL1"	Power off by abnormal status except CPU trouble
	"POWEROFF_CPUABNORMAL"	Power off by CPU Abnormal

LCD TV

Error symptom

C. Audio error

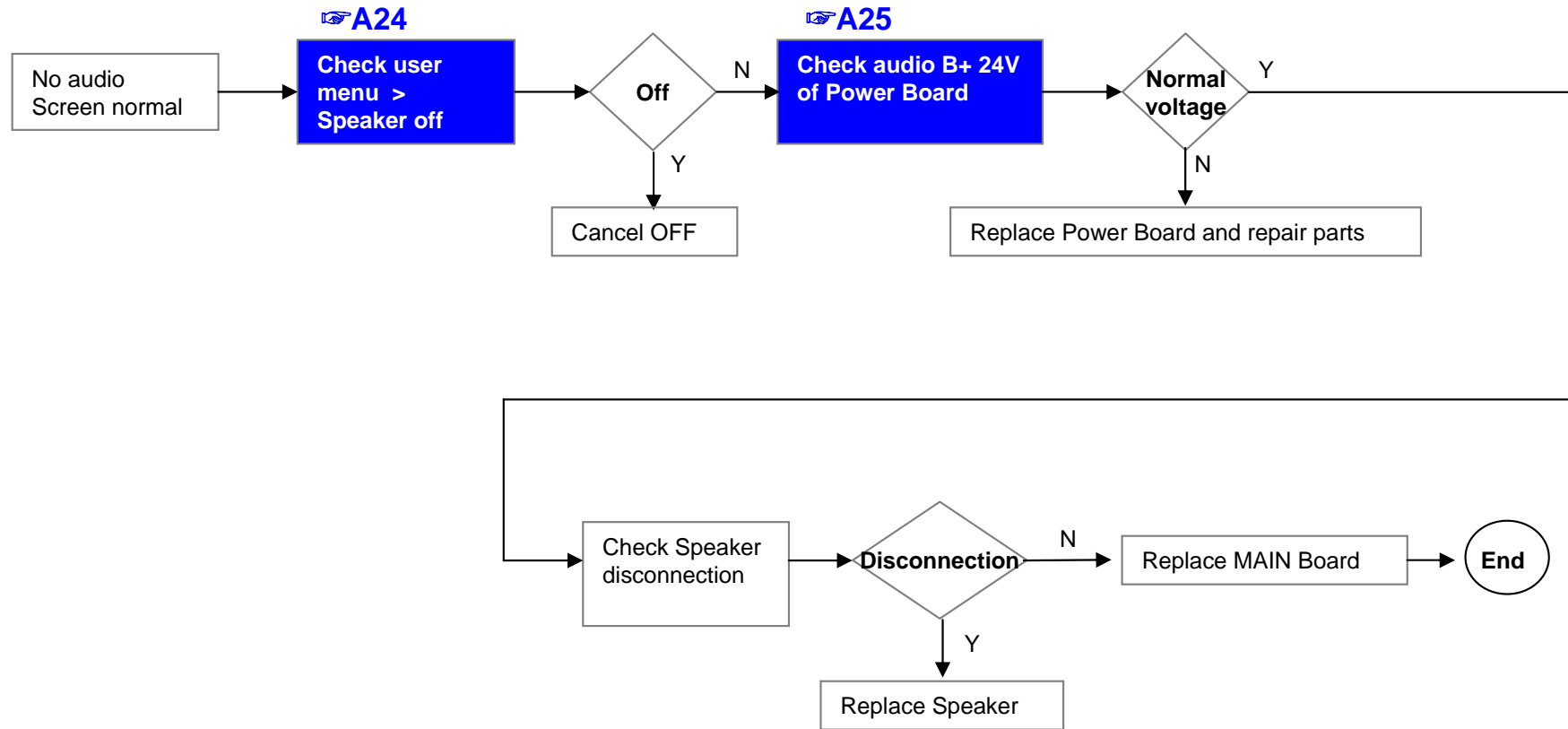
Established date

2012. 11 .30

No audio/ Normal video

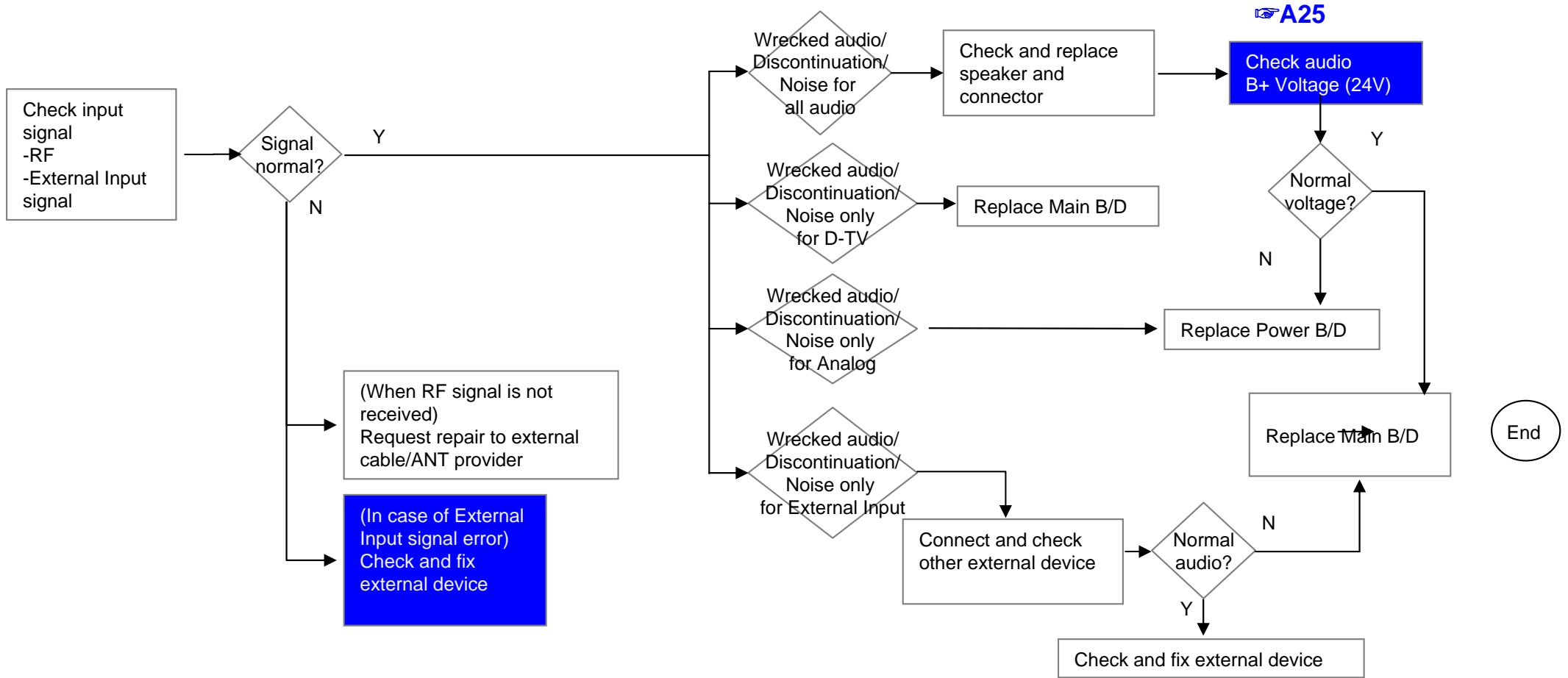
Revised date

8/13



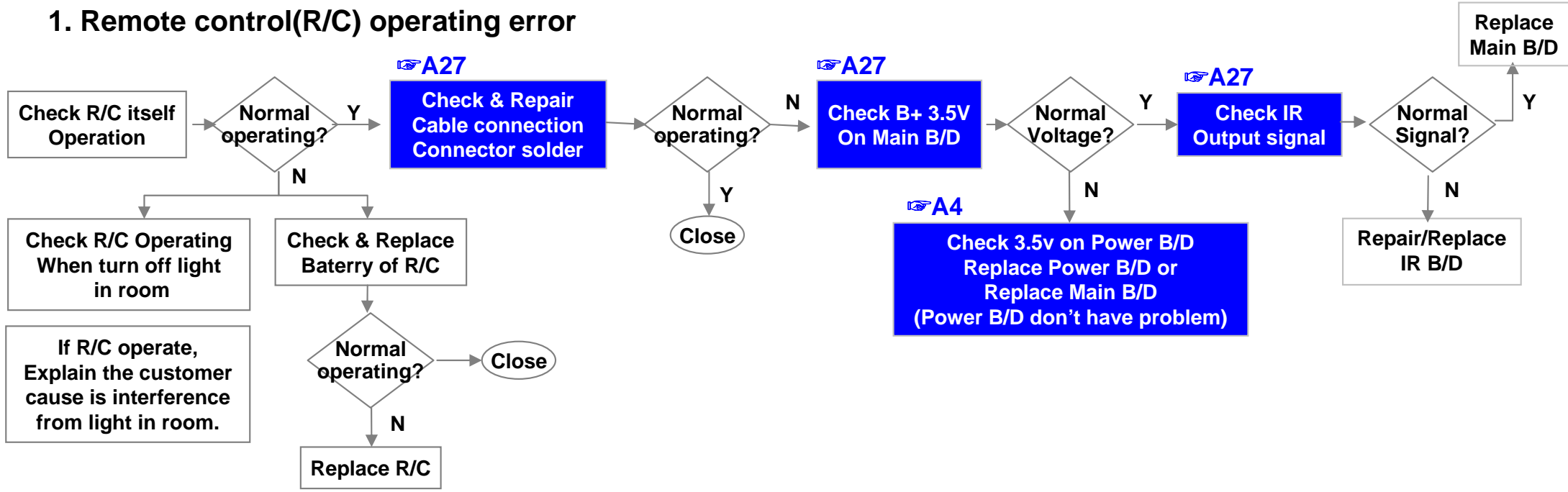
LCD TV	Error symptom	C. Audio error	Established date	2012. 11 .30	
		Wrecked audio/ discontinuation/noise	Revised date		9/13

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

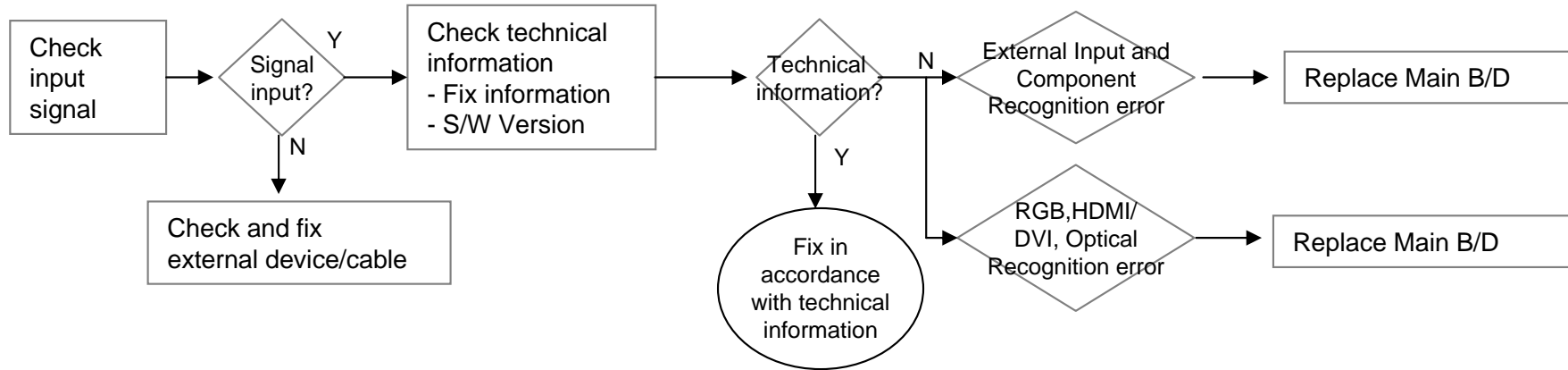


LCD TV	Error symptom	D. General Function Problem	Established date	2012. 11 .30	
		Remote control & Local switch checking	Revised date		10/13

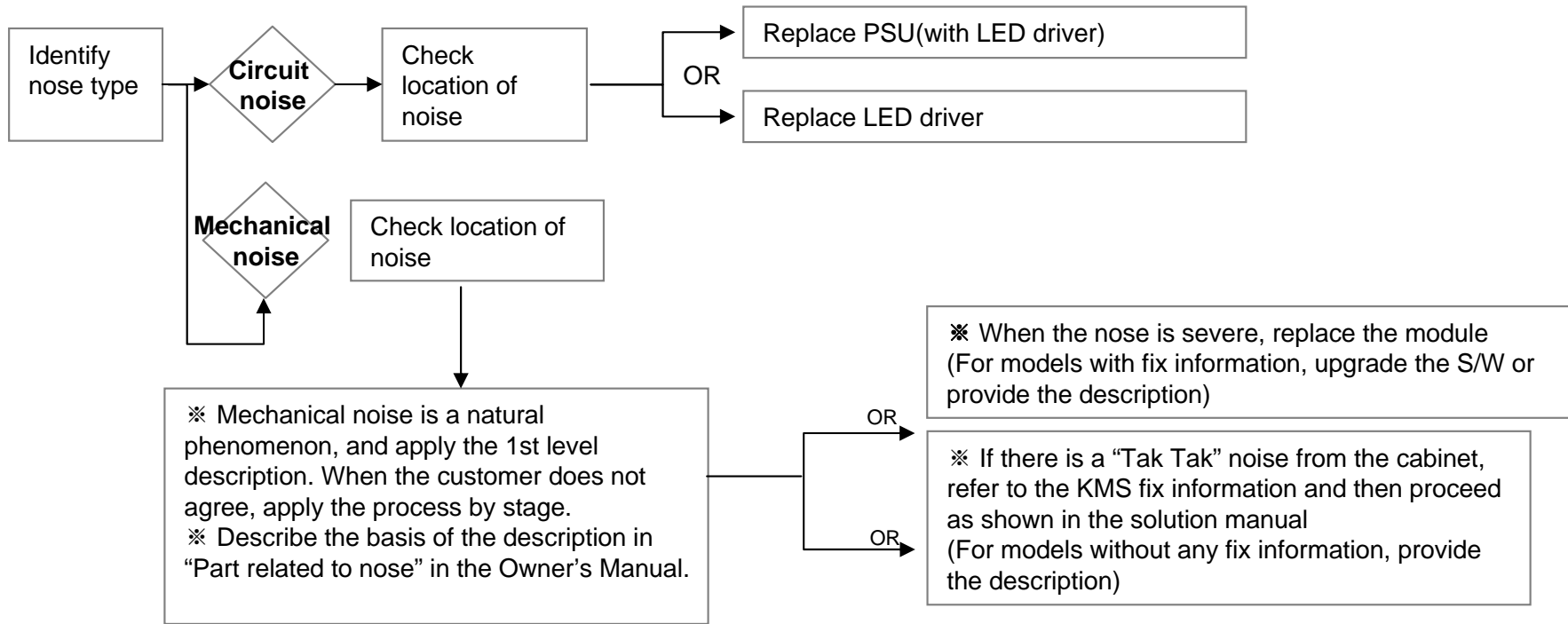
1. Remote control(R/C) operating error



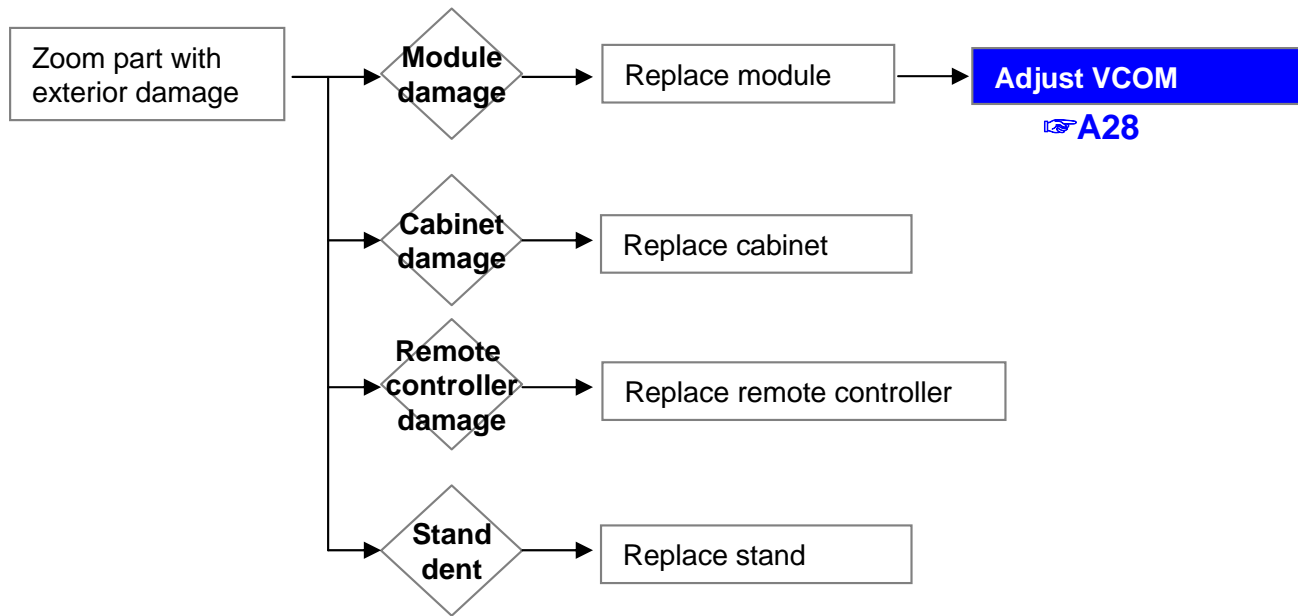
LCD TV	Error symptom	D. Function error	Established date	2012. 11 .30	
		External device recognition error	Revised date		11/13



LCD TV	Error symptom	E. Noise	Established date	2012. 11 .30	
		Circuit noise, mechanical noise	Revised date		12/13



LCD TV	Error symptom	F. Exterior defect	Established date	2012. 11 .30	
		Exterior defect	Revised date		13/13



Contents of LCD TV Standard Repair Process Detail Technical Manual

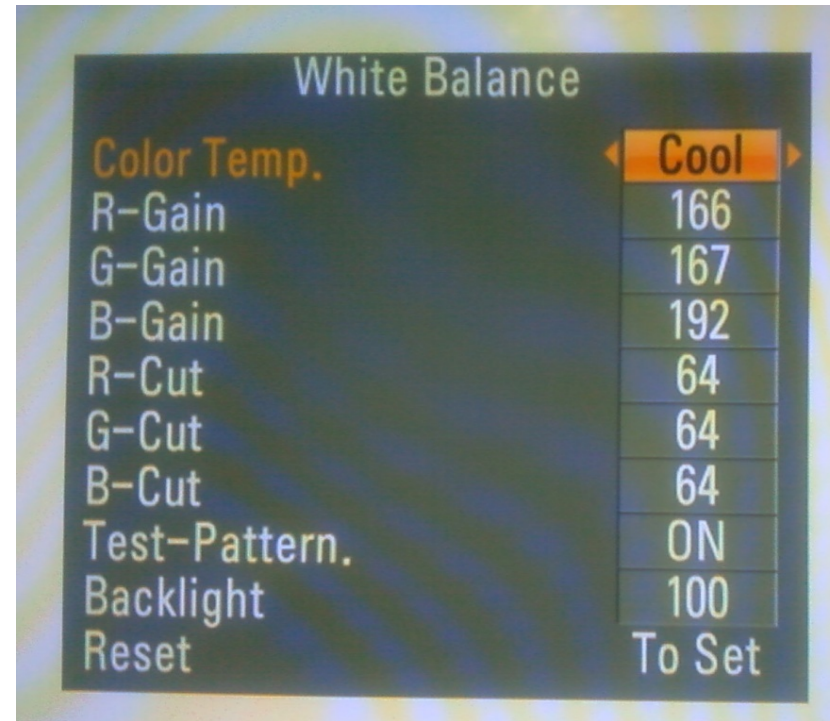
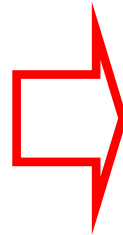
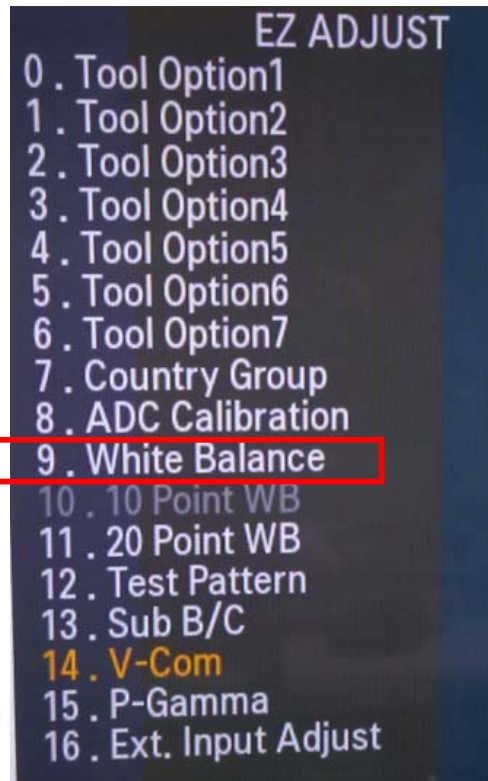
Continued from previous page

No.	Error symptom	Content	Page	Remarks
21	B. Power error_No power	Check front display LED	A17	
22		Check power input Voltage & ST-BY 5V	A18	
23		Checking method when power is ON	A19	
24		POWER BOARD voltage measuring method	A4	
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. 11 .30	
	Content	Check White Balance value	Revised date		A4

<ALL MODELS>



Entry method

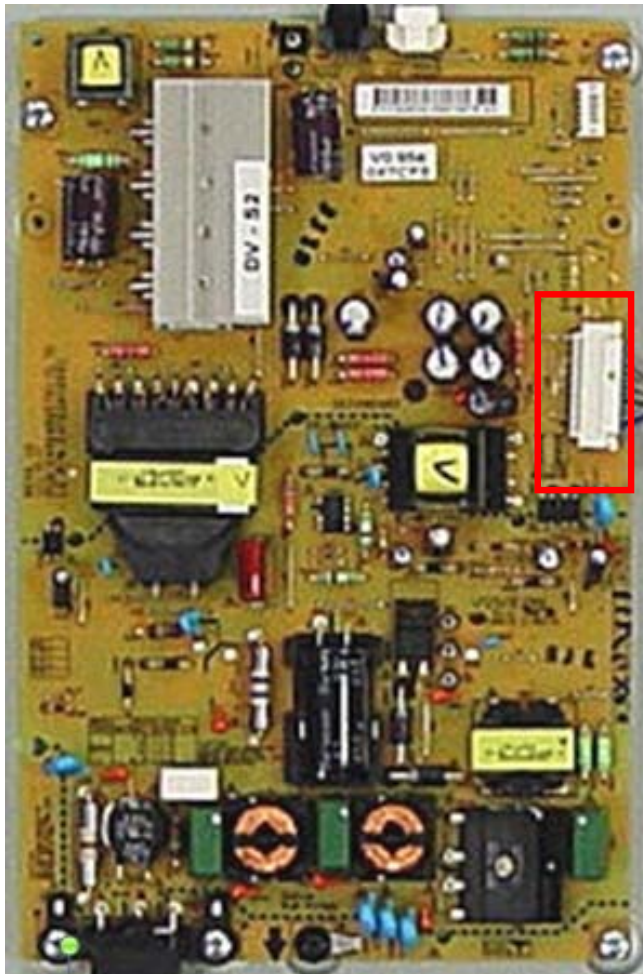
1. Press the ADJ button on the remote controller for adjustment.
2. Enter into White Balance of item 9.
3. After recording the R, G, B (GAIN, Cut) value of Color Temp (Cool/Medium/Warm), re-enter the value after replacing the MAIN BOARD.

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error_No video/ Audio	Established date	2012. 11 .30	
	Content	Power Board voltage measuring method	Revised date		A5

Edge LED

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



24 Pin (Power Board ↔ Main Board) - 공통

SMAW200-H18S1 (YEONHO)

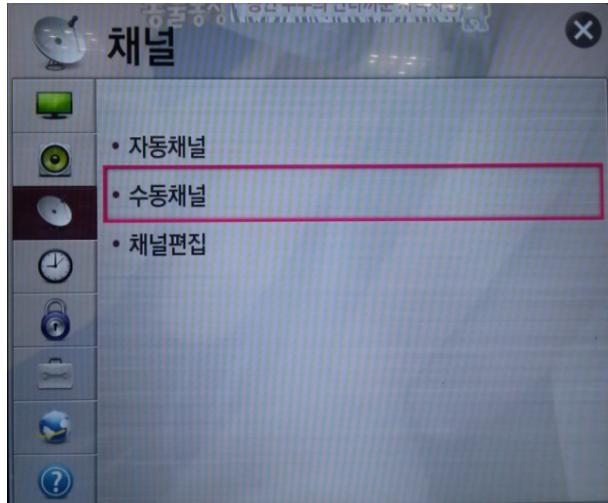
1	Power on	2	INV_ON
3	3.5V	4	PDIM #1(PWM Dim #1)
5	3.5V	6	PDIM #2(PWM Dim #2)
7	GND	8	GND
9	24V	10	24V
11	GND	12	GND
13	12V	14	12V
15	12V	16	12V
17	GND	18	GND
19	GND	20	GND
21	GND	22	L/DIM0_VS
23	L/DIM0_MOSI	24	L/DIM0_SCLK



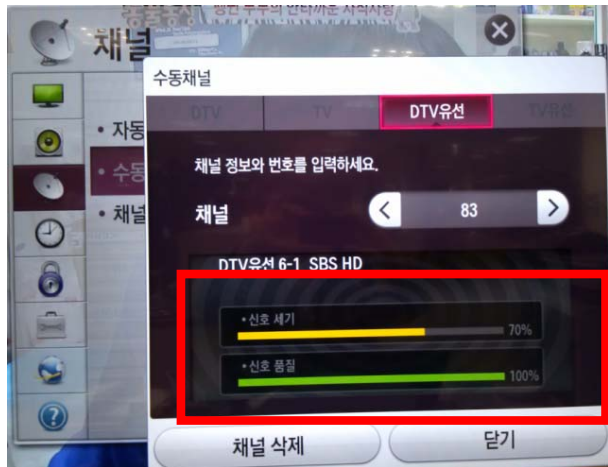
Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error_Video error, video lag/stop	Established date	2012. 11 .30	
	Content	TUNER input signal strength checking method	Revised date		A6

<ALL MODELS>



MENU → Channel → Manual → 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. 11 .30	
	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 : 02.04.01.01
 MICOM Version : 2.00.0
 BOOT Version : 1.00.79
 PWM (min/max/StrDuty): 5 / 99 / 99
 EDID (RGB/HDMI) : 0.01 / 0.00
 Chip Type : MTK 5398
 Wi-Fi Version : 1.0
 Wi-Fi Channel : 0
 Wi-Fi MAC : 50:7E:5D:54:B7:65
 MAC Address : 91:99:98:A9:98:09
 IP Address : 0.0.0.0
 Widevine : NG
 ESN Num. : NG
 HDCP1.4 : NG
 HDCP2.0 : NG
 RF Receiver Version : 02.11
 Wi-Fi/Magic Search : NG/NG
 Camera Ver. : Null
 A.Demod F/W Ver. : Null
 D.Demod F/W Ver. : Null
 Debug Status : EVENT
 Access USB Status: 1/-1(T)/-1(C)
 UTT : 26
 APP History Ver.: 19618
 POL_DB: LGD FILE SI2178 XXXXXX

Adjust Check

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. RF Remocon Test
14. Access Code

Adjust Check

1. Country Group (Press OK to Save)
 - 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 Balance :
4. Adjust ADC(OTP) :
 - Component
5. EDID :
 - HDMI1
 - HDMI2
 - HDMI3

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. 11 .30	
	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. 11 .30	
	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.

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error_Color error	Established date	2012. 11 .30	
	Content	Adjustment Test pattern - ADJ Key	Revised date		A12



- EZ ADJUST**
- 0 . Tool Option1
 - 1 . Tool Option2
 - 2 . Tool Option3
 - 3 . Tool Option4
 - 4 . Tool Option5
 - 5 . Tool Option6
 - 6 . Tool Option7
 - 7 . Country Group
 - 8 . ADC Calibration
 - 9 . White Balance
 - 10 . 10 Point WB
 - 11 . 20 Point WB
 - 12 . Test Pattern**
 - 13 . Sub B/C
 - 14 . V-Com**
 - 15 . P-Gamma
 - 16 . Ext. Input Adjust



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!)

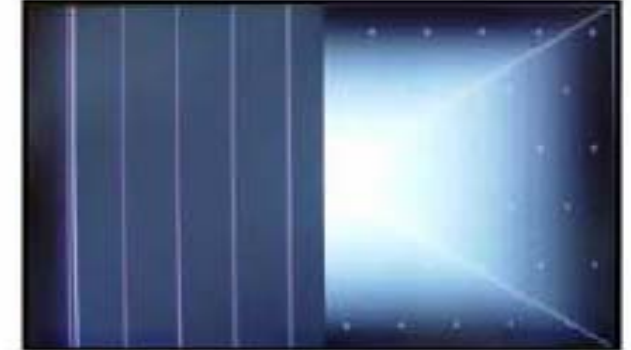
Appendix : Exchange T-Con Board (1)



Solder defect, CNT Broken



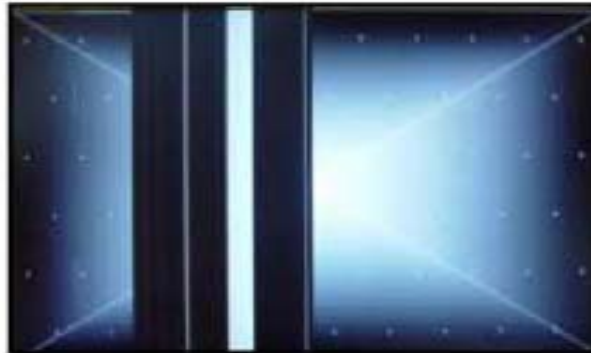
Solder defect, CNT Broken



Solder defect, CNT Broken



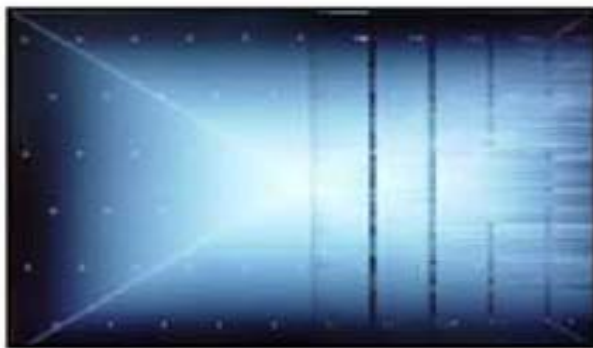
Solder defect, CNT Broken



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



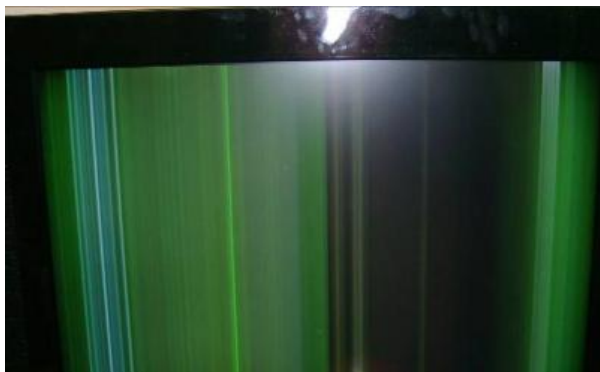
Solder defect, Short/Crack



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)



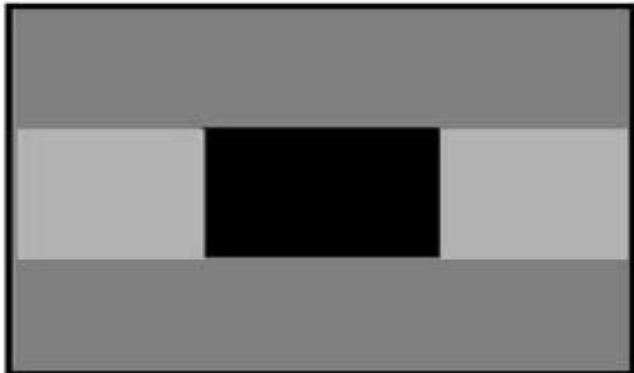
Panel Mura, Light leakage



Panel Mura, Light leakage



Press damage



Crosstalk



Press damage



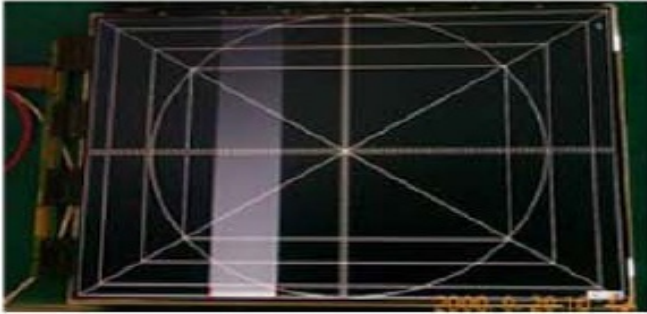
Crosstalk



Press damage

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

Appendix : Exchange the Module (2)



Vertical Block
Source TAB IC Defect



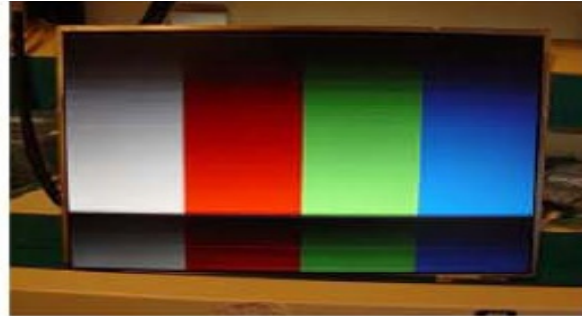
Vertical Line
Source TAB IC Defect



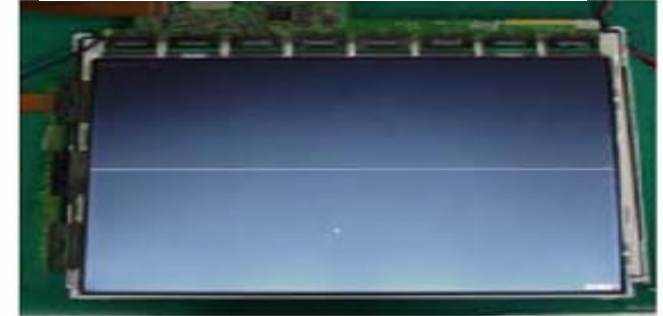
Vertical Block
Source TAB IC Defect



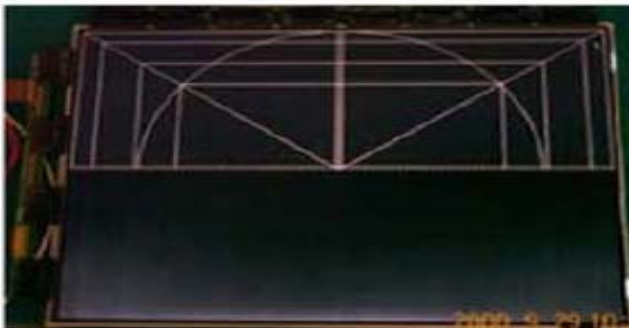
Horizontal Block
Gate TAB IC Defect



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.

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	B. Power error _No power	Established date	2012. 11 .30	
	Content	Check front display LED	Revised date		A17



Front LED control :
Menu → Option → LG Logo indicator
→ Bright / Time

ST-BY condition: On
Power ON condition: Off (but you can select On by menu)



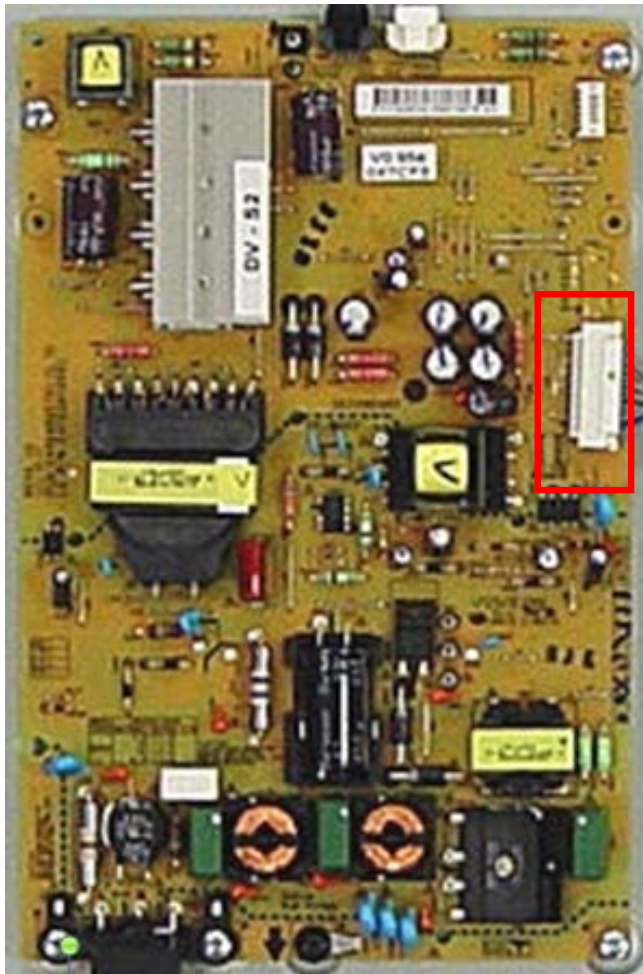
Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	B. Power error _No power	Established date	2012. 11 .30	
	Content	Check power input voltage and ST-BY 5V	Revised date		A18

For '10 models, there is no voltage out for st-by purpose.
When st-by, only 3.5V is normally on.

Edge LED

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



24 Pin (Power Board ↔ Main Board) - 공통

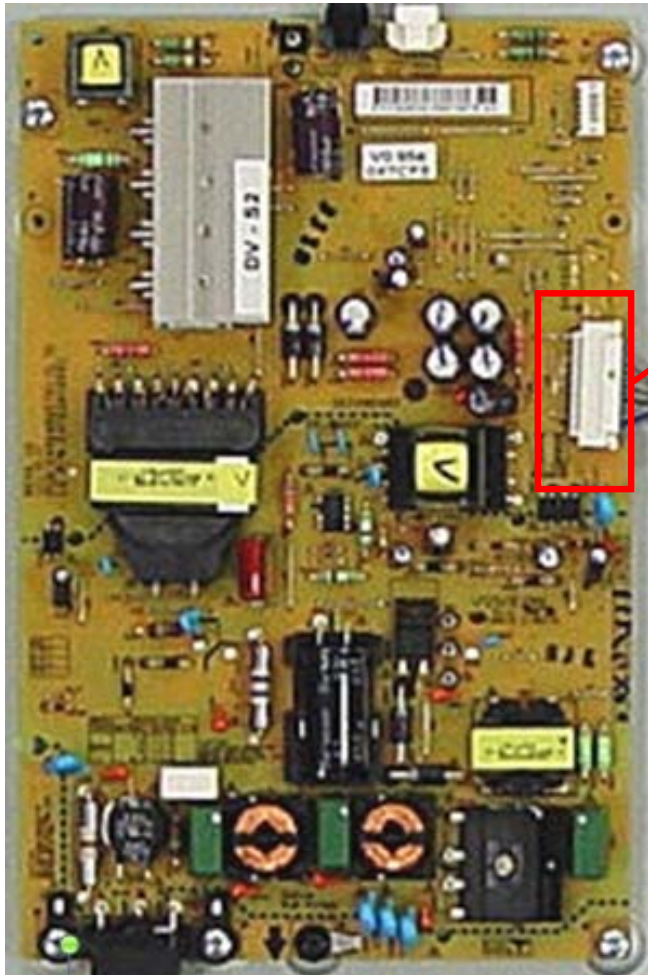
SMAW200-H18S1 (YEONHO)

1	Power on	2	INV_ON
3	3.5V	4	PDIM #1(PWM Dim #1)
5	3.5V	6	PDIM #2(PWM Dim #2)
7	GND	8	GND
9	24V	10	24V
11	GND	12	GND
13	12V	14	12V
15	12V	16	12V
17	GND	18	GND
19	GND	20	GND
21	GND	22	L/DIM0_VS
23	L/DIM0_MOSI	24	L/DIM0_SCLK

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	B. Power error _No power	Established date	2012. 11 .30	
	Content	Checking method when power is ON	Revised date		A19

Check "power on" pin is high



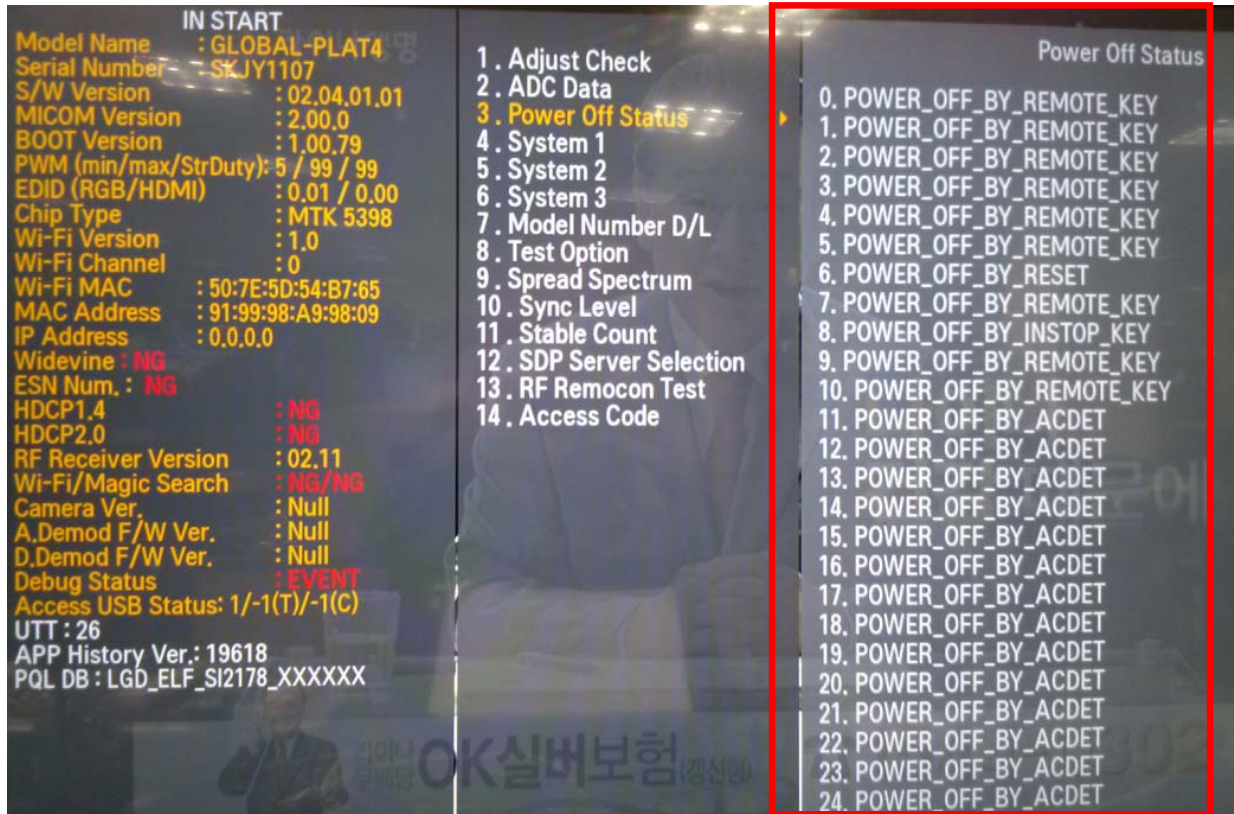
24 Pin (Power Board ↔ Main Board) - 공통			
SMAW200-H18S1 (YEONHO)			
1	Power on	2	INV_ON
3	3.5V	4	PDIM #1(PWM Dim #1)
5	3.5V	6	PDIM #2(PWM Dim #2)
7	GND	8	GND
9	24V	10	24V
11	GND	12	GND
13	12V	14	12V
15	12V	16	12V
17	GND	18	GND
19	GND	20	GND
21	GND	22	L/DIM0_VS
23	L/DIM0_MOSI	24	L/DIM0_SCLK



Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	B. Power error _Off when on, off whiling viewing	Established date	2012. 11 .30	
	Content	POWER OFF MODE checking method	Revised date		A22

<ALL MODELS>



Entry method

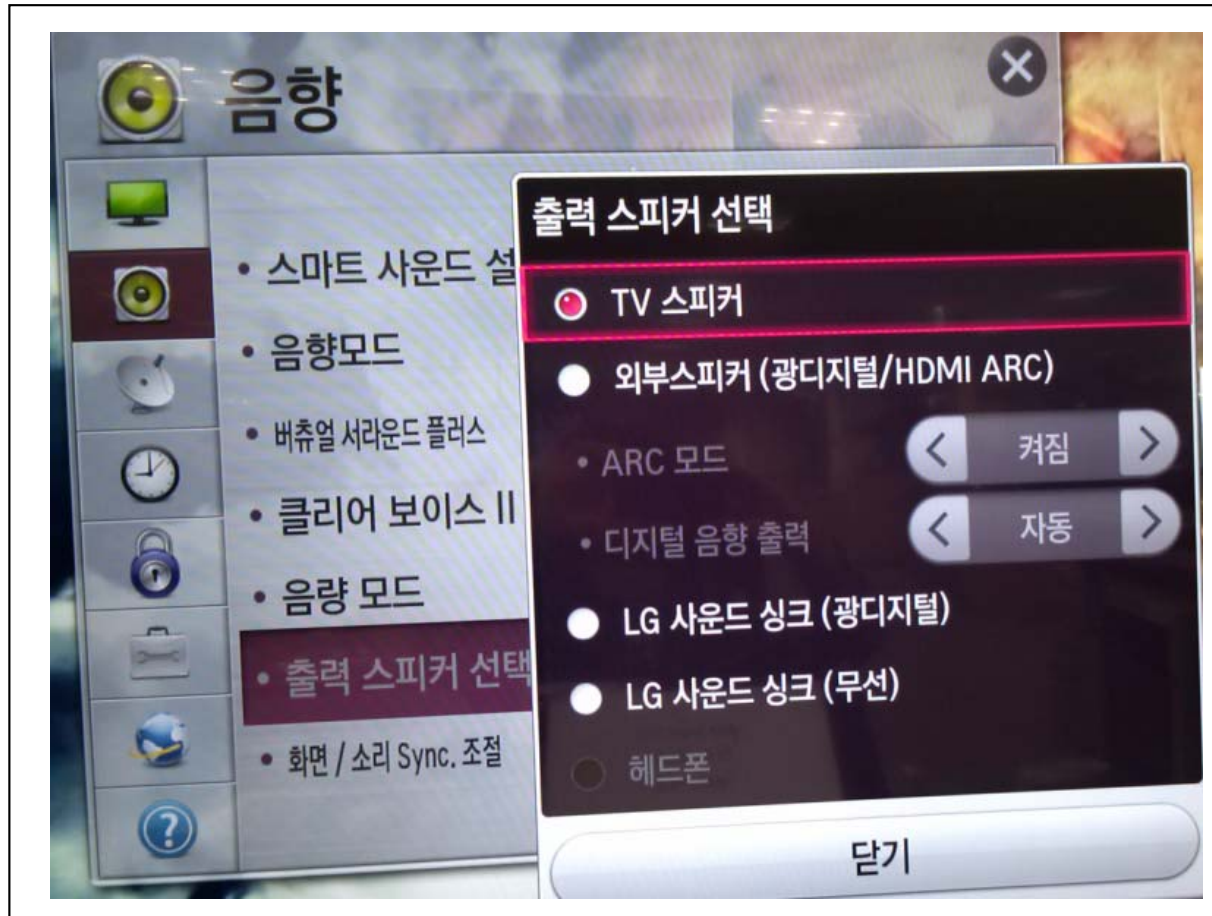
1. Press the IN-START button of the remote controller for adjustment
2. Check the entry into adjustment item 3



Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	C. Audio error_No audio/Normal video	Established date	2012. 11 .30	
	Content	Checking method in menu when there is no audio	Revised date		A24

<ALL MODELS>



Checking method

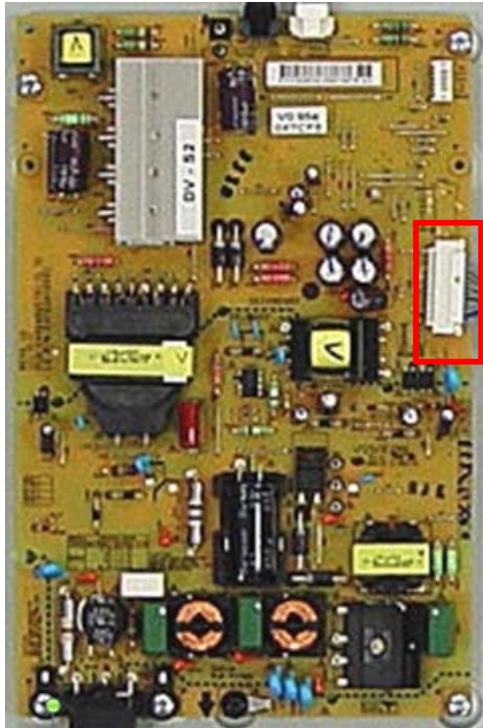
1. Press the MENU button on the remote controller
2. Select the AUDIO function of the Menu
3. Select TV Speaker Or Other



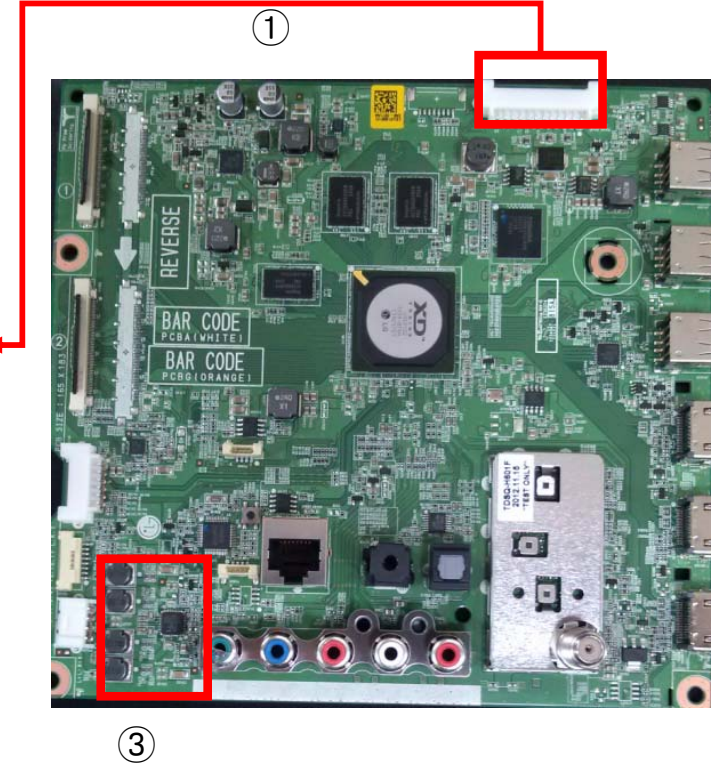
Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	C. Audio error_No audio/Normal video	Established date	2012. 11 .30	
	Content	Voltage and speaker checking method when there is no audio	Revised date		A25

<ALL MODELS>



24 Pin (Power Board ↔ Main Board) - 공통			
SMAW200-H18S1 (YEONHO)			
1	Power on	2	INV_ON
3	3.5V	4	PDIM #1(PWM Dim #1)
5	3.5V	6	PDIM #2(PWM Dim #2)
7	GND	8	GND
9	24V	10	24V
11	GND	12	GND
13	12V	14	12V
15	12V	16	12V
17	GND	18	GND
19	GND	20	GND
21	GND	22	L/DIM0_VS
23	L/DIM0_MOSI	24	L/DIM0_SCLK



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.

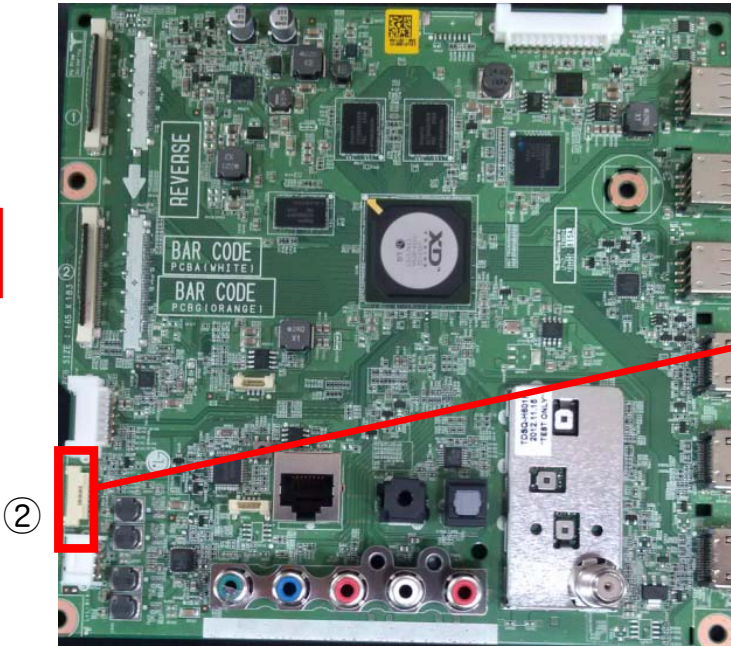
Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	D. Function error_ No response in remote controller, key error	Established date	2012. 11 .30	
	Content	Remote controller operation checking method	Revised date		A27

<ALL MODELS>



①



②

③

④

P4102	
1	GND
2	Key1
3	Key2
4	+3.5V_ST
5	GND
6	LOGO / LED R
7	IR
8	GND
9	EYE_SCL
10	EYE_SDA

Checking order

- 1, 2. Check IR cable condition between IR & Main board.
3. Check the st-by 3.3V on the terminal 4.
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. 11 .30	
	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.

