



LG

Life's Good

North/Latin America
Europe/Africa
Asia/Oceania

Internal Use Only

<http://aic.lgservice.com>
<http://eic.lgservice.com>
<http://biz.lgservice.com>

OLED TV

SERVICE MANUAL

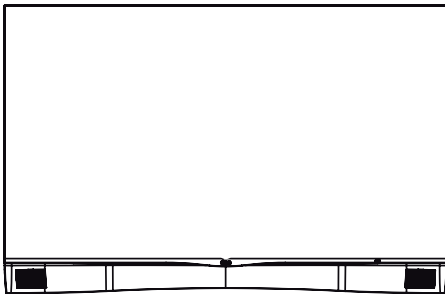
CHASSIS : EB34D

MODEL : 55EA9700/970T/970Y

55EA9700/970T/970Y-TA

CAUTION

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



CONTENTS

CONTENTS	2
SAFETY PRECAUTIONS	3
SERVICING PRECAUTIONS.....	4
SPECIFICATION	6
ADJUSTMENT INSTRUCTION	13
EXPLODED VIEW	20
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.

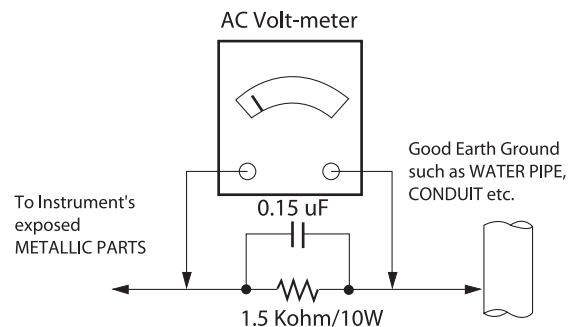
Connect 1.5 K / 10 watt resistor in parallel with a 0.15 μ F capacitor between a known good earth ground (Water Pipe, Conduit, etc.) and the exposed metallic parts.

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

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

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

Leakage Current Hot Check circuit



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

*Base on Adjustment standard

SERVICING PRECAUTIONS

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

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

General Servicing Precautions

1. Always unplug the receiver AC power cord from the AC power source before;

- Removing or reinstalling any component, circuit board module or any other receiver assembly.
- Disconnecting or reconnecting any receiver electrical plug or other electrical connection.
- 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.

- 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".
- Do not spray chemicals on or near this receiver or any of its assemblies.
- 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.
- Do not defeat any plug/socket B+ voltage interlocks with which receivers covered by this service manual might be equipped.
- 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.
- 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.
- 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.

- 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.

- 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.
- Use only a grounded-tip soldering iron to solder or unsolder ES devices.
- 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.
- Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ES devices.
- 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).
- 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.
- 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

- Use a grounded-tip, low-wattage soldering iron and appropriate tip size and shape that will maintain tip temperature within the range of 500 °F to 600 °F.
- Use an appropriate gauge of RMA resin-core solder composed of 60 parts tin/40 parts lead.
- Keep the soldering iron tip clean and well tinned.
- 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.
- Use the following unsoldering technique
 - Allow the soldering iron tip to reach normal temperature. (500 °F to 600 °F)
 - Heat the component lead until the solder melts.
 - 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.
- Use the following soldering technique.
 - Allow the soldering iron tip to reach a normal temperature (500 °F to 600 °F)
 - First, hold the soldering iron tip and solder the strand against the component lead until the solder melts.
 - 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.
 - Closely inspect the solder area and remove any excess or splashed solder with a small wire-bristle brush.

IC Remove/Replacement

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

Removal

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

Replacement

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

"Small-Signal" Discrete Transistor

Removal/Replacement

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

Power Output, Transistor Device

Removal/Replacement

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

Diode Removal/Replacement

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

Fuse and Conventional Resistor

Removal/Replacement

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

3. Solder the connections.

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

Circuit Board Foil Repair

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

At IC Connections

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

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

At Other Connections

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

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

CAUTION: Be sure the insulated jumper wire is dressed so the it does not touch components or sharp edges.

SPECIFICATION

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

1. Application range

This specification is applied to the OLED TV with EB34D chassis.

2. Requirement for Test

Each part is tested as below without special appointment.

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

3. Test method

- 1) Performance: LGE TV test method followed
- 2) Demanded other specification
 - Safety : UL, CSA, CE, IEC specification
 - EMC : FCC, ICES, CE, IEC specification
 - Wireless : Wireless HD Specification (Option)

4. Model General Specification

No.	Item	Specification	Remarks
1	Market	Asia, Oceania, Africa, Middle East (PAL/DVB Market)	
2	Broadcasting system	Digital : DVB-T Analog : PAL-BG, DK, I/I', SECAM-DK/BG/I	* Australia/India : only PAL-BG(B)
3	Receiving system	Digital : COFDM, QAM Analog : Upper Heterodyne	► DVB-T - Guard Interval(Bitrate_Mbit/s) 1/4, 1/8, 1/16, 1/32 - Modulation : Code Rate QPSK : 1/2, 2/3, 3/4, 5/6, 7/8 16-QAM : 1/2, 2/3, 3/4, 5/6, 7/8 64-QAM : 1/2, 2/3, 3/4, 5/6, 7/8
4	Input Voltage	AC100 ~ 240V, 50/60Hz	
5	Screen Size	55 inch Wide(1920 × 1080)	
6	Aspect Ratio	16:9	
7	Operating Environment	1) Temp : 0 ~ 40 deg 2) Humidity : ~ 80 %	
8	Storage Environment	1) Temp : -20 ~ 60 deg 2) Humidity : ~ 85 %	

5. External Input Support Format

5.1. 2D Mode

(1) Component (Y, C_B/P_B, C_R/P_R)

No.	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock	Proposed
1.	720*480i	15.63	59.94	13.500	SDTV, DVD 480I(525I)
2	720*480i	15.73	60.00	13.514	SDTV, DVD 480I(525I)
3.	720*480p	31.47	59.94	27.000	SDTV 480P
4	720*480p	31.50	60.00	27.027	SDTV 480P
5	720*576i	15.625	50.00	13.500	SDTV, DVD 576I(625I) 50Hz
6	720*576p	31.25	50.00	27.000	SDTV 576P 50Hz
7	1280*720	44.96	59.94	74.176	HDTV 720P
8	1280*720	45.00	50.00	74.250	HDTV 720P
9	1280*720	45.00	60.00	74.25	HDTV 720P 50Hz
10	1920*1080	28.125	50.00	74.250	HDTV 1080I 50Hz,
11	1920*1080	33.72	59.94	74.176	HDTV 1080I
12	1920*1080	33.75	60.00	74.25	HDTV 1080I
13	1920*1080	56.25	50	148.5	HDTV 1080P
14	1920*1080	67.5	60.00	148.5	HDTV 1080P

(2) HDMI Input(PC/DTV)

No.	Resolution	H-freq(kHz)	V-freq.(kHz)	Pixel clock(MHz)	Proposed	
	HDMI-PC					DDC
1	720*400	31.469	70.08	28.32	DOS	X
2	640*480	31.469	59.94	25.17	VESA(VGA)	O
3	800*600	37.879	60.317	40	VESA(SVGA)	O
4	1024*768	48.363	60.004	65	VESA(XGA)	O
5	1360*768	47.712	60.015	84.75	VESA(WXGA)	O
6	1152*864	54.348	60.053	80	VESA	O
7	1280*1024	63.981	60.02	109.00	SXGA	O
8	1920*1080	67.5	60	158.40	WUXGA(Reduced Blanking)	O
	HDMI-DTV					
1	720*480	15.73	59.94	13.500	Spec. out but display.	
2	720*480	15.75	60.00	13.514		
3	720*576	15.625	50.00	13.500		
4	640*480	31.47	59.94	24.175		
5	640*480	31.5	60.00	25.2		
6	720*480	31.47	59.94	27	SDTV 480P	
7	720*480	31.5	60.00	27.027	SDTV 480P	
8	720*576	31.25	50.00	27	SDTV 576P	
9	1280*720	44.96	59.94	74.176	HDTV 720P	
10	1280*720	45	60.00	74.25	HDTV 720P	
11	1280*720	37.5	50.00	74.25	HDTV 720P	
12	1920*1080	28.125	50.00	74.25	HDTV 1080I	
13	1920*1080	33.72	59.94	74.176	HDTV 1080I	
14	1920*1080	33.75	60.00	74.25	HDTV 1080I	
15	1920*1080	26.97	23.976	63.296	HDTV 1080P	
16	1920*1080	27.00	24.000	63.36	HDTV 1080P	
17	1920*1080	33.71	29.97	79.120	HDTV 1080P	
18	1920*1080	33.75	30.00	79.20	HDTV 1080P	
19	1920*1080	56.25	50.00	148.5	HDTV 1080P	
20	1920*1080	67.432	59.94	148.350	HDTV 1080P	
21	1920*1080	67.5	60	158.40	HDTV 1080P	

5.2. 3D Mode

(1) RF Input

No.	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	Proposed	Remarks
1	1920*1080	45.00	60	74.25	HDTV 1080I	Side by Side, Top & Bottom
2	1280*720	45.00	60	74.25	HDTV 720P	Side by Side, Top & Bottom

(2) HDMI Input

1) HDMI 1.3 (3D Supported mode manually)

No.	Resolution	H-freq(kHz)	V-freq.(kHz)	Pixel clock(MHz)	Proposed	3D input proposed mode
1	1280*720	45.00	60.00	74.25	HDTV 720P	2D to 3D Side by Side(half), Top & Bottom, Single Frame Sequential
2	1280*720	37.500	50	74.25	HDTV 720P	2D to 3D Side by Side(half), Top & Bottom, Single Frame Sequential
3	1920*1080	33.75	60.00	74.25	HDTV 1080I	2D to 3D Side by Side(half), Top & Bottom,
4	1920*1080	28.125	50.00	74.25	HDTV 1080I	2D to 3D Side by Side(half), Top & Bottom,
5	1920*1080	27.00	24.00	74.25	HDTV 1080P	2D to 3D, Side by Side(half), Top & Bottom, Checkerboard
6	1920*1080	28.12	25.00	74.25	HDTV 1080P	2D to 3D, Side by Side(half), Top & Bottom, Checkerboard
7	1920*1080	33.75	30.00	74.25	HDTV 1080P	2D to 3D, Side by Side(half), Top & Bottom, Checkerboard
8	1920*1080	67.50	60.00	148.5	HDTV 1080P	2D to 3D, Side by Side(half), Top & Bottom, Checkerboard, Single Frame Sequential, Row Interleaving, Column Interleaving
9	1920*1080	56.250	50.00	148.5	HDTV 1080P	2D to 3D Side by Side(half), Top & Bottom, Checkerboard, Single Frame Sequential, Row Interleaving, Column Interleaving

2) HDMI 1.4b (3D Supported mode automatically)

No.	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	VIC	3D input proposed mode	Proposed
1	640*480	31.469 / 31.5	59.94/ 60	25.125	1	Frame packing Line alternative Side-by-side(Full) Top-and-Bottom Side-by-side(half)	Secondary(SDTV 480P) (SDTV 480P) (SDTV 480P) Secondary(SDTV 480P) Secondary(SDTV 480P)
2	720*480	31.469 / 31.5	59.94 / 60	27.00/27.03	2,3	Frame packing Line alternative Side-by-side(Full) Top-and-Bottom Side-by-side(half)	Secondary(SDTV 480P) (SDTV 480P) (SDTV 480P) Secondary(SDTV 480P) Secondary(SDTV 480P)
3	720*576	31.25	50	27	17,18	Frame packing Line alternative Side-by-side(Full) Top-and-Bottom Side-by-side(half)	Secondary(SDTV 576P) (SDTV 576P) (SDTV 576P) Secondary(SDTV 576P) Secondary(SDTV 576P)
4	720*576	15.625	50	27	21	Frame packing Line alternative Side-by-side(Full) Top-and-Bottom Side-by-side(half)	Secondary(SDTV 576I) (SDTV 576I) (SDTV 576I) Secondary(SDTV 576I) Secondary(SDTV 576I)
5	1280*720	37.500	50	74.25	19	Top-and-Bottom Side-by-side(half) Side-by-side(Full)	Primary(HDTV 720P) Primary(HDTV 720P)
6	1280*720	44.96 / 45	59.94 / 60	74.17/74.25	4	Top-and-Bottom Side-by-side(half) Side-by-side(Full)	Primary(HDTV 720P) Primary(HDTV 720P)
7	1280*720	75	50	148.5	19	Frame packing Line alternative	Primary(HDTV 720P) (HDTV 720P) (HDTV 720P)
8	1280*720	90	59.94 / 60	148.5	4	Frame packing Line alternative	Primary(HDTV 720P) (HDTV 720P) (HDTV 720P)
9	1920*1080	28.125	50.00	74.25	20	Top-and-Bottom Side-by-side(half) Side-by-side(Full)	Secondary(HDTV 1080I) Primary(HDTV 1080I)
10	1920*1080	33.72 / 33.75	59.94 / 60	74.17/74.25	5	Top-and-Bottom Side-by-side(half) Side-by-side(Full)	Secondary(HDTV 1080I) Primary(HDTV 1080I)
11	1920*1080	56.25	50.00	148.5	20	Frame packing Line alternative	Primary(HDTV 1080I) (HDTV 1080I) (HDTV 1080I)
12	1920*1080	67.437/67.50	59.94 / 60	148.5	5	Frame packing Field alternative	Primary(HDTV 1080I) (HDTV 1080I) (HDTV 1080I)
13	1920*1080	26.97 / 27	23.97 / 24	74.17/74.25	32	Top-and-Bottom Side-by-side(half) Side-by-side(Full)	Primary(HDTV 1080P) Primary(HDTV 1080P)
14	1920*1080	28.125	25	74.17/74.25	33	Top-and-Bottom Side-by-side(half) Side-by-side(Full)	Secondary(HDTV 1080P) Secondary(HDTV 1080P)
15	1920*1080	33.716 / 33.75	29.976 / 30.00	74.25	34	Top-and-Bottom Side-by-side(half) Side-by-side(Full)	(HDTV 1080P) Secondary(HDTV 1080P)
16	1920*1080	43.94/54	23.97 / 24	148.5	32	Frame packing Field alternative	Primary(HDTV 1080P) (HDTV 1080P) (HDTV 1080P)
17	1920*1080	56.25	25	148.5	33	Frame packing Field alternative	Secondary(HDTV 1080P) (HDTV 1080P) (HDTV 1080P)
18	1920*1080	67.432/67.5	29.976 / 30.00	148.5	34	Frame packing Field alternative	(HDTV 1080P) (HDTV 1080P) (HDTV 1080P)
19	1920*1080	56.250	50	148.5	31	Top-and-Bottom Side-by-side(half)	Primary(HDTV 1080P) Secondary(HDTV 1080P)
20	1920*1080	67.43 / 67.5	59.94 / 60	148.35/148.50	16	Top-and-Bottom Side-by-side(half)	Primary(HDTV 1080P) Secondary(HDTV 1080P)

(3) HDMI-PC Input (3D Supported mode manually)

No.	Resolution	H-freq(kHz)	V-freq.(kHz)	Pixel clock(MHz)	Proposed	3D input proposed mode
1	1024*768	48.363	60.004	65.000	HDTV 768P	Side by Side, Top & Bottom
2	1360*768	47.712	60.015	85.500	HDTV 768P	Side by Side, Top & Bottom
3	1920*1080	67.50	60.00	148.50	HDTV 1080P	Side by Side , Top & Bottom Checkerboard, Single Frame Sequential Row Interleaving, Column Interleaving

(4) USB Input

1) USB Input (3D Supported mode automatically)

No.	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	Proposed	3D input proposed mode
1	1920*1080	33.75	30.000	74.25	HDTV 1080P	Side by Side, Top & Bottom, Checkerboard, MPO (Photo)

2) USB Input (3D Supported mode manually)

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

(5) DLNA Input

1) DLNA Input (3D Supported mode automatically)

No.	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	Proposed	3D input proposed mode
1	1920*1080	33.75	30.000	74.25	HDTV 1080P	Side by Side, Top & Bottom, Checkerboard, MPO (Photo)

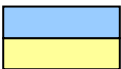
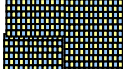
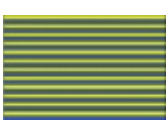
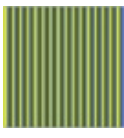
2) DLNA Input (3D Supported mode manually)

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

(6) Component Input

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

■ Remark: 3D Input mode

No.	Side by Side	Top & Bottom	Checker board	Single Frame Sequential	Frame Packing	Line Interleaving	Column Interleaving
1							

ADJUSTMENT INSTRUCTION

1. Application Range

This specification sheet is applied to EB34D Chassis applied OLED TV all models manufactured in TV factory.

2. Designation

- (1) Because this is not a hot chassis, it is not necessary to use an isolation transformer. However, the use of isolation transformer will help protect test instrument.
- (2) Adjustment must be done in the correct order.
- (3) The adjustment must be performed in the circumstance of $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ of temperature and $65\% \pm 10\%$ of relative humidity if there is no specific designation.
- (4) The input voltage of the receiver must keep AC 100-240 V~, 50/60 Hz.
- (5) 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. MAIN PCBA Adjustments

3.1. ADC Calibration

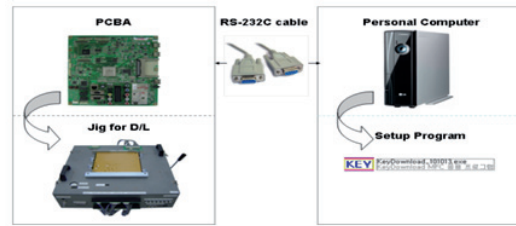
- An ADC calibration is not necessary because MAIN SoC (LGExxxx) is already calibrated from IC Maker
- If it needs to adjust manually, refer to appendix

3.2. MAC Address, ESN, Widevine, HDCP2.0 key download

- (1) Equipment & Condition
 - 1) Play file: keydownload.exe
- (2) Communication Port connection
 - 1) Key Write: Com 1,2,3,4 and 115200 (Baudrate)
 - 2) Barcode: Com 1,2,3,4 and 9600 (Baudrate)
- (3) Download process
 - 1) Select the download items.
 - 2) Mode check: Online Only
 - 3) Check the test process : DETECT → MAC_WRITE → WIDEVINE_WRITE
 - 4) Play: START
 - 5) Check of result: Ready, Test, OK or NG
 - 6) Printer out (MAC Address Label)

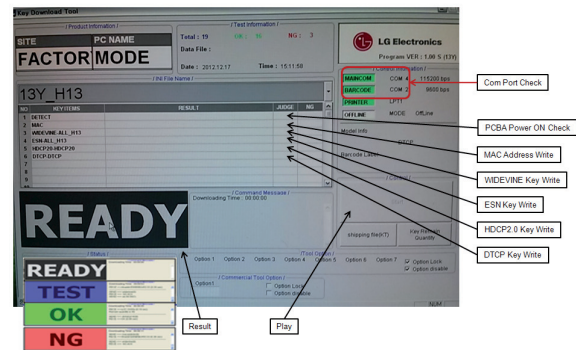
(4) Communication Port connection

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



(5) Download

- 1) AJ/JA/IL models (13Y_H13)
 - MAC+ Widevine + ESN + HDCP 2.0



(6) Inspection

- In INSTART menu, check these keys.

3.3. LAN Inspection(Ping Test)

3.3.1. Equipment setting

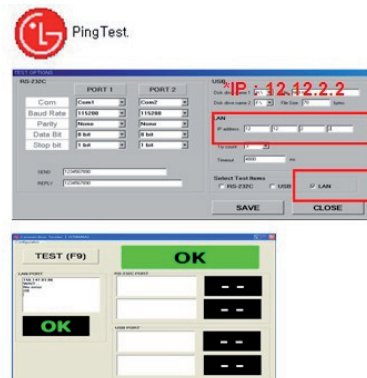
- (1) Play the LAN Port Test PROGRAM.
 - (2) Input IP set up for an inspection to Test Program.
 - *IP Number : 12.12.2.2
- Connect SET → LAN Port == PC → LAN Port

3.3.2. 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.



3.4. EDID download

3.4.1. 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".

3.4.2. Equipment

- (1) Since embedded EDID data is used, EDID download JIG, HDMI cable are not need.
- (2) Adjustment remote control

3.4.3. Download method

- (1) Press Adj. key on the Adjustment remote control
- (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 HDMI Cable.

3.4.4. EDID DATA

HDMI1 (C/S: E8 71)

EDID Block 0, Bytes 0-127 [00H-7FH]

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01	01
10	01	17	01	03	80	A0	5A	78	0A	EE	91	A3	54	4C	99	26
20	0F	50	54	A1	8	00	31	40	45	40	61	40	71	40	81	80
30	01	01	01	01	01	01	02	3A	80	18	71	38	2D	40	58	2C
40	45	00	40	84	63	00	00	1E	66	21	50	B0	51	00	1B	30
50	40	70	36	00	40	84	63	00	00	1E	00	00	00	FD	00	3A
60	3E	1E	53	10	00	0A	20	20	20	20	20	20	00	00	00	FC
70	00	4C	47	20	54	56	0A	20	20	20	20	20	20	01	XX	

EDID Block 1, Bytes 128-255 [80H-FFH]

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	02	03	3A	F1	4E	10	9F	04	13	05	14	03	02	12	20	21
10	22	15	01	29	3D	06	C0	15	07	50	09	57	07	78	03	0C
20	00	10	00	B8	2D	20	C0	0E	01	4F	3F	FC	08	10	18	10
30	06	10	16	10	28	10	E3	05	03	01	02	3A	80	18	71	38
40	2D	40	58	2C	45	00	40	84	63	00	00	1E	01	1D	80	18
50	71	1C	16	20	58	2C	25	00	40	84	63	00	00	9E	01	1D
60	00	72	51	D0	1E	20	6E	28	55	00	40	84	63	00	00	1E
70	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	XX

* Checksum (HDMI 1/2/3/4)

Input	FFh (Checksum)	
HDMI1	E8	81
HDMI2	E8	71
HDMI3	E8	61
HDMI4	E8	51

4. Final Assembly Adjustment

4.1. White Balance Adjustment

4.1.1. Overview

- (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) Adjustment condition : normal temperature
 - ① Surrounding Temperature : 25 °C ± 5 °C
 - ② Warm-up time: About 5 Min
 - ③ Surrounding Humidity : 20 % ~ 80 %
 - ④ Before White balance adjustment, Keep power on status, don't power off

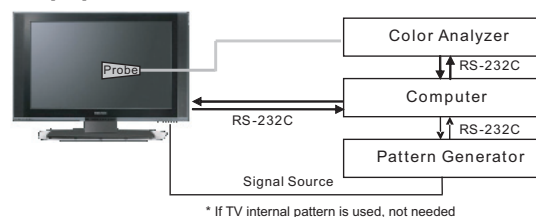
(2) Adj. condition and cautionary items

- 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 10 cm and perpendicular of the module surface (80°~ 100°)
- 3) Aging time
 - ① After Aging Start, Keep the Power ON status during 5 Minutes.
 - ② In case of LCD, Back-light on should be checked using no signal or Full-white pattern.

4.1.2. Equipment

- (1) Color Analyzer: CA-210 (NCG: CH 9 / WCG: CH 12 / LED: CH 14 / ALEF: CH 18 / OLED: CH 17)
 - (2) Adjustment Computer(During auto adj., RS-232C protocol is needed)
 - (3) Adjustment Remote control
 - (4) Video Signal Generator MSPG-925F 720p/204-Gray (Model: 217, Pattern: 49)
- * Color Analyzer Matrix should be calibrated using CS-1000.

4.1.3. Equipment connection



4.1.4. Adj. Command (Protocol)

- RS-232C Command used during auto-adjustment.

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

- Adj. Map

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

4.1.5. Adjustment method

- (1) Auto WB calibration

- 1) Set TV in ADJ mode using P-ONLY key(or POWER ONLY 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

- (2) LED White balance table

- 1) Cool Mode

- Purpose : Especially G-gain fix adjust leads to the luminance enhancement. Adjust the color temperature to reduce the deviation of the module color temperature.
- Principle : To adjust the white balance without the saturation, Adjust the G gain more than 172 (If R gain or G gain is more than 255 , G gain can adjust less than 172) and change the others (R/B Gain).
- Adjustment mode : mode - Cool

- 2) Medium / Warm Mode

- Purpose : Adjust the color temperature to reduce the deviation of the module color temperature.
- Principle : To adjust the white balance without the saturation, Fix the one of R/G/B gain to 192 (default data) and decrease the others.

- Adjustment mode : Two modes - Medium / Warm

4.1.6. Reference (White balance Adj. coordinate and color temperature)

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

Mode	Coordinate		Temp	Δuv
	x	y		
Cool	0.276	0.283	11,000 K	0.0000
Medium	0.285	0.293	9,300 K	0.0000
Warm	0.313	0.329	6,500 K	+0.0030

- Standard color coordinate and temperature using CA-210(CH-14)

Mode	Coordinate		Temp	Δuv
	x	y		
Cool	0.276±0.002	0.283±0.002	11,000 K	0.0000
Medium	0.285±0.002	0.293±0.002	9,300 K	0.0000
Warm	0.313±0.002	0.329±0.002	6,500 K	+0.0030

4.2. Tool Option setting & Inspection per countries

4.2.1. Overview

- (1) Tool option selection is only done for models in Non-USA North America due to rating
- (2) Applied model: LA02D and LA02E Chassis applied to CANADA and MEXICO

4.2.2. Country Group selection

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

4.2.3. Tool Option Inspection

- (1) Press Adj. key on the Adj. R/C, and then check Tool option.

4.3. Magic Motion remote control Check

4.3.1. Required Instruments

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

4.3.2. Test procedures

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

4.4. WIFI MAC ADDRESS CHECK

a. Using RS232

	Command	Set ACK
Transmission	[A][I][][Set ID][][20][Cr]	[O][K][X] or [NG]

b. check the menu on in-start



4.5. 3D pattern test(Only for 3D models)

4.5.1. Test equipment

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

4.5.2. Test method

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



<Fig.1> HDMI Model No.872, 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)



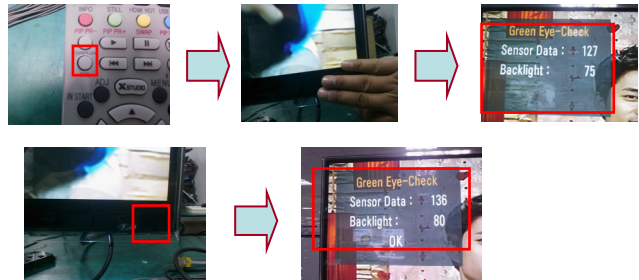
<Fig.2> OK in 3D mode without 3D glasses



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

4.6. EYE-Q function check

- (1) Turn on TV.
- (2) Press EYE key of Adjustment remote control.
- (3) Cover the Eye Q sensor on the front of the set using your hand and wait for 6 seconds.
- (4) Confirm that value is lower than 100 of the "Sensor Data". If the value is not lower than 100 after 6 seconds, replace Eye Q sensor.
- (5) Remove3 your hand from the Eye Q sensor and wait 6 seconds.
- (6) Confirm that "ok" pop up. If change is not seen, replace Eye Q sensor



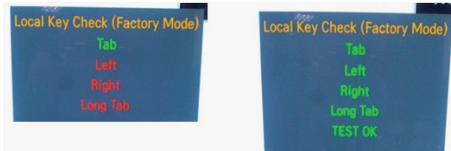
4.7. Speaker Inspection

- (1) Input "Check-S" key of adjust remote control to inspect speaker.
 - 1) When you click the first, the output volume of left &right main speakers must be 50.
 - 2) When you click the second, the output volume of left &right main speakers must be 80.
 - 3) When you click the third, the output volume of left &right main speakers must be 100.
 - 4) When you click the fourth, the output volume of left main speaker must be 50.
 - 5) When you click the fifth, the output volume of right main speaker must be 50.
 - 6) When you click the sixth, the output volume of left sub speaker must be 100.
 - 7) When you click the seventh, the output volume of right sub speaker must be 100.
 - 8) When you click the eighth, the output volume of all speakers(left &right main speaker and left &right sub speaker) must be 30.

4.8. Control PCB Inspection

** Before you start a test, you must run a "Power-only mode"
After you touch soft touch key of set, local key check display will start.

- (1) Tab test
: Touch Soft touch key of set quickly
- (2) Left test
: Touch Soft touch key of set to the left side
- (3) Right test
: Touch Soft touch key of set to the right side
- (4) Long tab test
: Touch Soft touch key of SET long



** The picture on your left side will pop up while tab test is progressed. The color of passed test will be changed green. 'TEST OK' will pop up the very bottom if you pass all test.

4.9. HDMI ARC Function Inspection

4.9.1. Test equipment

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

4.9.2. Test method

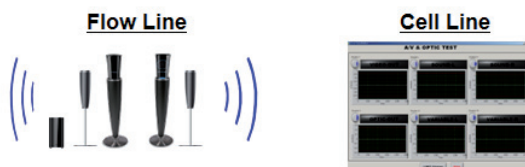
- (1) Insert the HDMI Cable to the HDMI ARC port from the master equipment (HDMI1)



- (2) Check the sound from the TV Set



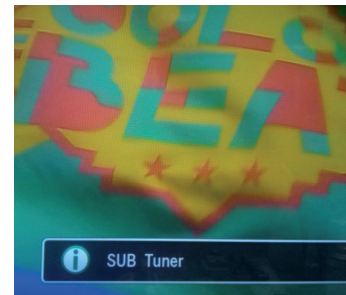
- (3) Check the Sound from the Speaker or using AV & Optic TEST program (It's connected to MSHG-600)



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



4.10. PIP/ W&R Function Inspection



- (1) Objective : To check the connection between sub tuner and PCBA, and their Function
- (2) Test Method : This Inspection is available only Power-Only Status.
 - 1) Press exit key of the Adj. R/C and Press PIP key.
 - 2) Check that the SUB TUNER pop up window on the TV Set.
 - 3) Check that the normal operation (picture, sound) of DTV on the TV Set.

4.11. 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.

5. AUDIO output check

5.1. AUDIO output check

- (1) RF input: Mono, 1 KHz sine wave signal, 100 % Modulation
- (2) CVBS, Component: 1 KHz sine wave signal (0.5 Vrms)

5.2. Specification

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

6. GND and HI-POT Test

6.1. GND & HI-POT auto-check preparation

- Check the POWER cable and SIGNAL cable insertion condition

6.2. GND & HI-POT auto-check

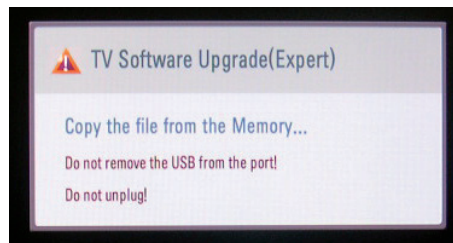
- (1) Pallet moves in the station. (POWER CORD / AV CORD is tightly inserted)
- (2) Connect the AV JACK Tester.
- (3) Controller (GWS103-4) on.
- (4) GND Test (Auto)
 - If Test is failed, Buzzer operates.
 - If Test is passed, execute next process (Hi-pot test). (Remove A/V CORD from A/V JACK BOX)
-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

6.3. Checkpoint

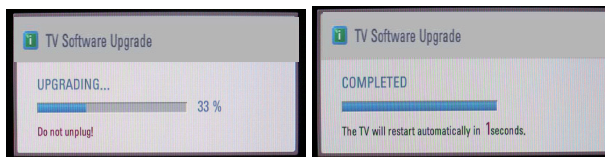
- (1) Test voltage
 - GND: 1.5 KV/min at 100 mA
 - SIGNAL: 3 KV/min at 100 mA
- (2) TEST time: 1 second
- (3) TEST POINT
 - GND Test = POWER CORD GND and SIGNAL CABLE GND.
 - Hi-pot Test = POWER CORD GND and LIVE & NEUTRAL.
- (4) LEAKAGE CURRENT: At 0.5 mArms

7. USB S/W download(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 Low, it didn't work. But your downloaded version is High, USB data is automatically detecting.
- (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. (explain the Tool option, next stage)
 - * 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, have to adjust TOOL OPTION again.
 - 1) Push "IN-START" key in service remote control.
 - 2) Select "Tool Option 1" and push "OK" key.
 - 3) Punch in the number. (Each model has their number.)

8. Optional adjustments

8.1. Manual ADC Calibration

8.1.1. Equipment & Condition

- (1) Adjustment Remote control
- (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

8.1.2. Adjust method

- (1) Check connected condition of Comp 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 control after at least 1 min of signal reception. Then, select 7.External ADC. And Press OK or Right key 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) If ADC Comp is successful, "ADC Component Success" is displayed.
- (9) 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 calibration is failure, after recheck ADC pattern or condition, retry calibration

8.2. Manual White balance Adjustment

8.2.1. 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
 - 1) After Aging Start, Keep the Power ON status during 5 Minutes.
 - 2) In case of LCD, Back-light on should be checked using no signal or Full-white pattern.

8.2.2. 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 Remote control
- (4) Video Signal Generator MSPG-925F 720p/216-Gray (Model: 217, Pattern: 78)

8.2.3. Adjustment

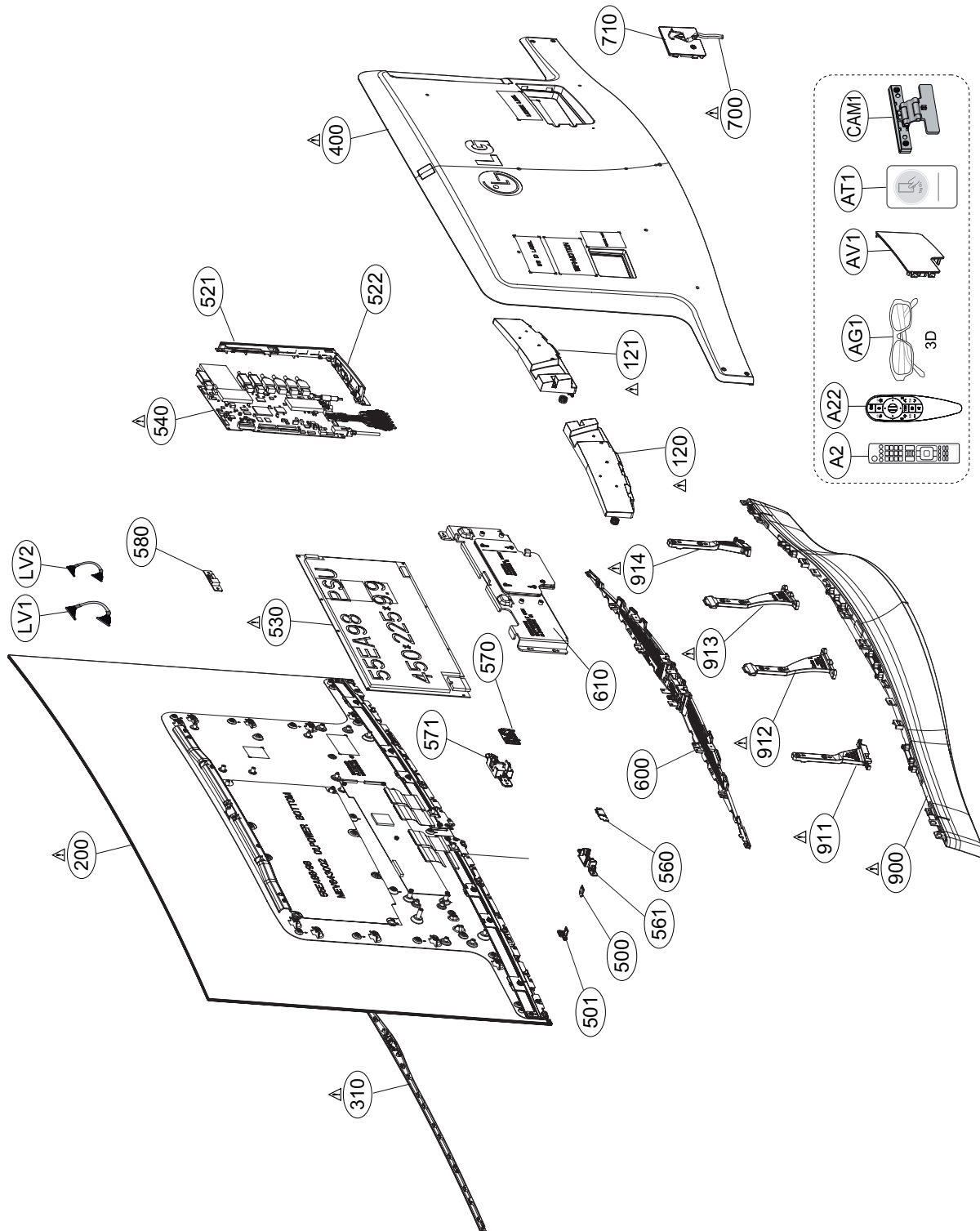
- (1) Set TV in Adj. mode using POWER ON
- (2) Zero Calibrate the probe of Color Analyzer, then place it on the center of LCD module within 10cm of the surface.
- (3) Press ADJ key → EZ adjust using adj. R/C → 6. White-Balance then press the cursor to the right (KEY▶). When KEY(▶) is pressed 216 Gray 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 Δ in the Schematic Diagram and EXPLODED VIEW. It is essential that these special safety parts should be replaced with the same components as recommended in this manual to prevent X-RADIATION, Shock, Fire, or other Hazards. Do not modify the original design without permission of manufacturer.



Clock for LG1154D

MAIN Clock(24Mhz)

C100 10pF

XIN_MAIN

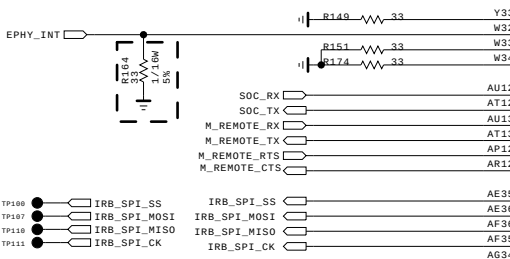
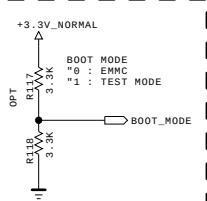
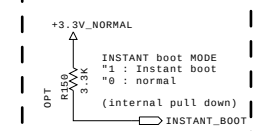
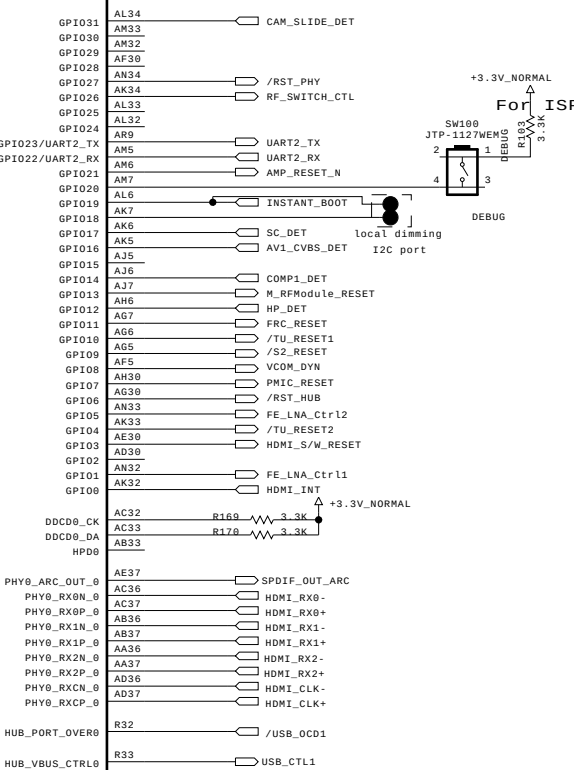
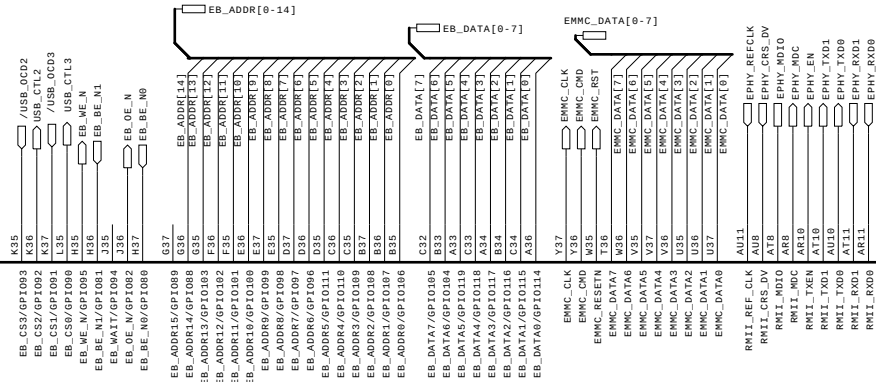
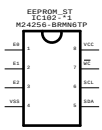
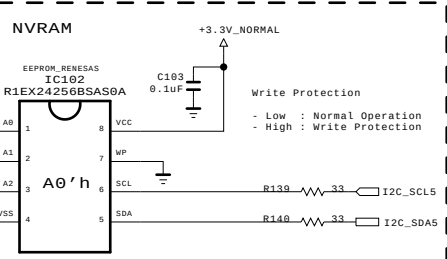
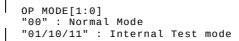
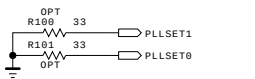
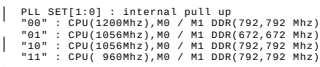
X108 24Mhz

R108 10k

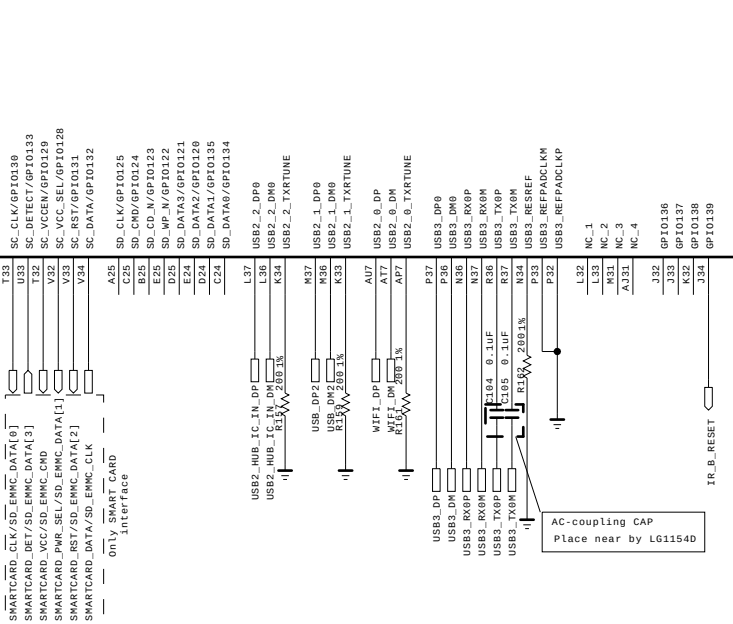
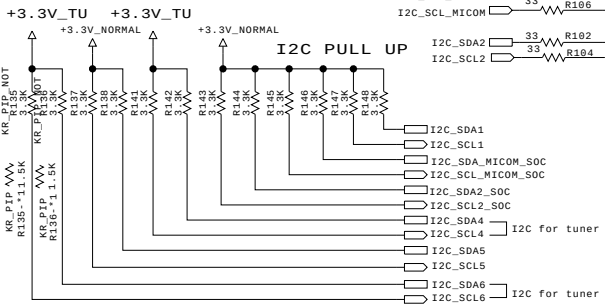
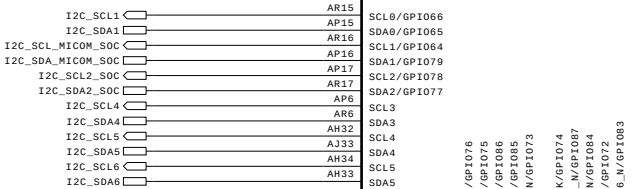
XO_MAIN

C101 10pF

System Clock for Analog block(24Mhz)



		HIGH	LOW
MODEL_OPT_0	Area1	Taiwan	non Taiwan
MODEL_OPT_1	FRC	FRC (120Hz)	No FRC (60Hz)
MODEL_OPT_2	Panel	FHD	UD
MODEL_OPT_3	OLED	OLED	NON OLED
MODEL_OPT_4	Module	V13	V12
MODEL_OPT_5	Reserved		Default
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	Area2	AJ_3A	non AJ_3A
MODEL_OPT_10	EPI	Support	Not Support



SECRET
LGElectronics



MODEL		DATE	2012-11-14
BLOCK	H13 D CHIP	SHEET	/

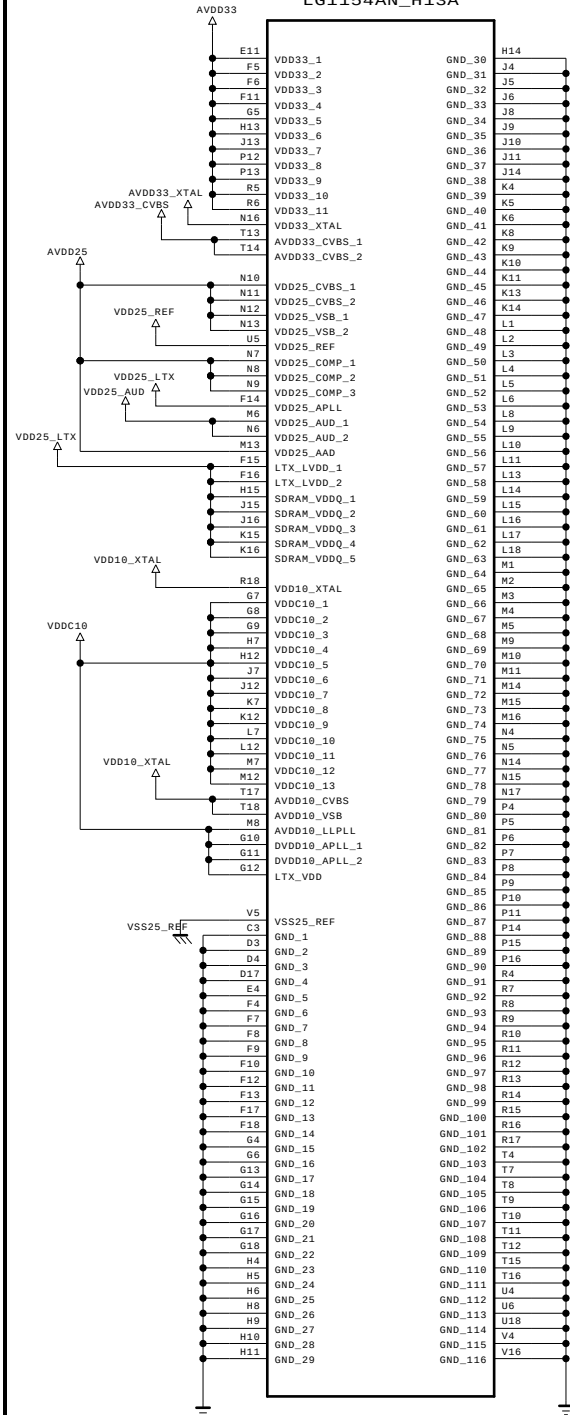
LG1154A LG1154D

LG1154A

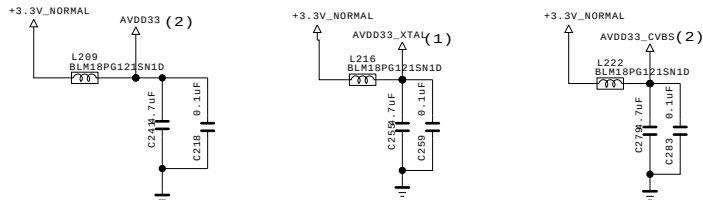
H13A_NON_BRAZIL

IC101

LG1154AN_H13A

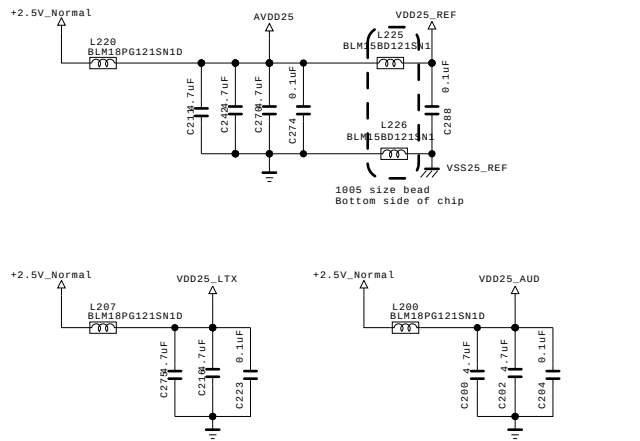


+3.3V_Bypass Cap

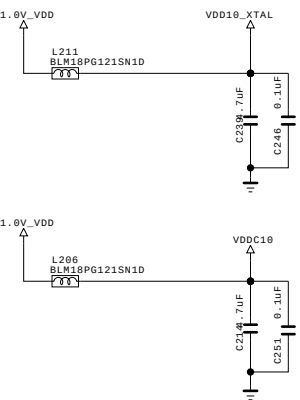


+2.5V_Bypass Cap

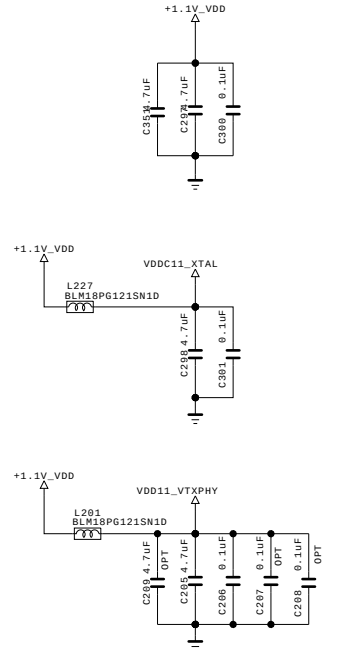
AFE 3CH Power



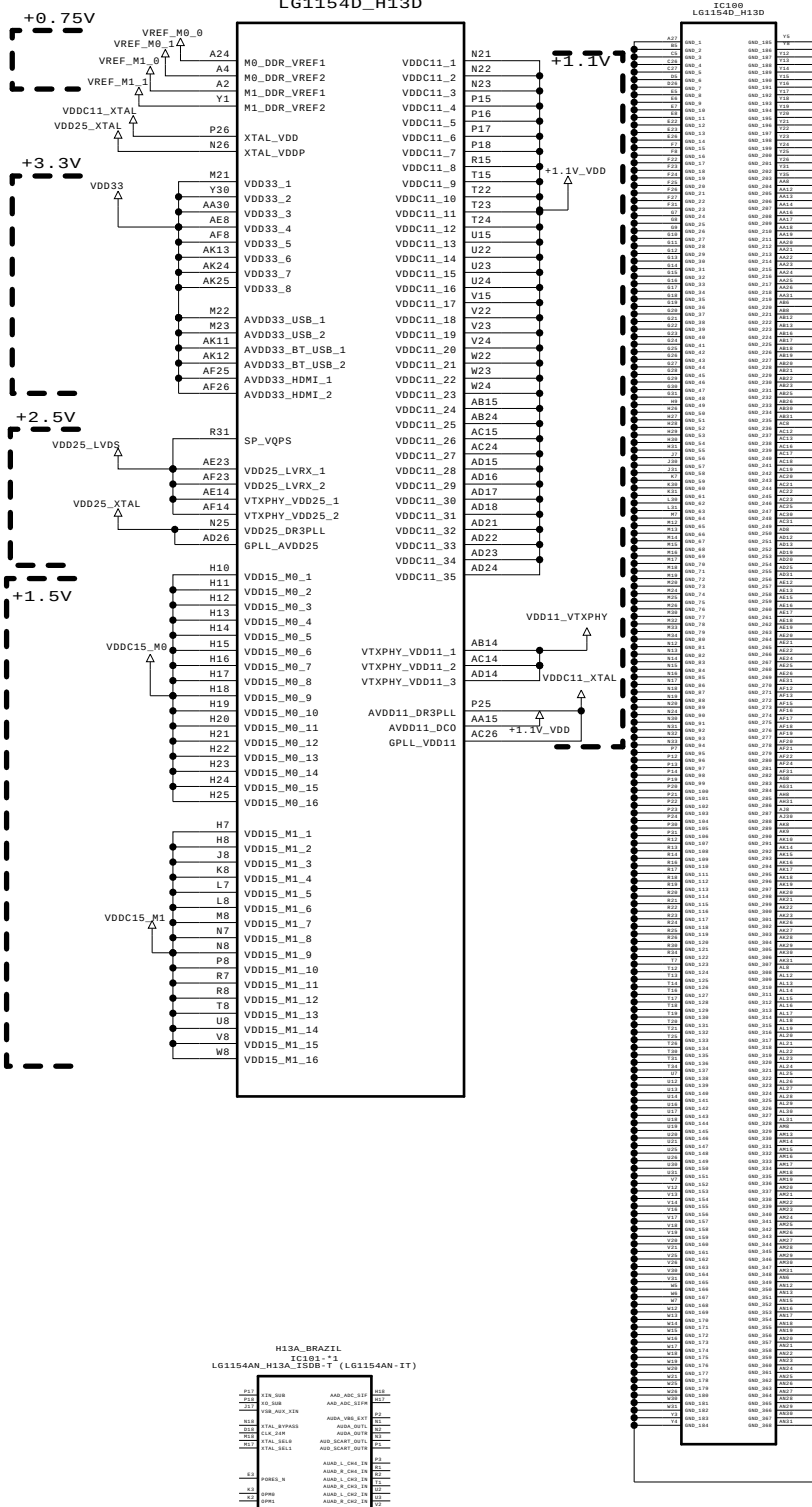
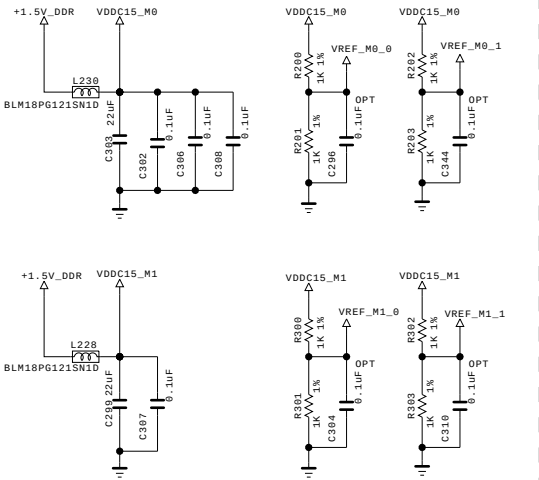
+1.0V_Bypass Cap



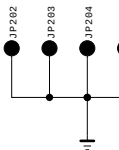
+1.1V_Bypass Cap



+1.5V_Bypass Cap



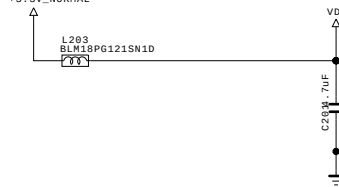
GND JIG POINT



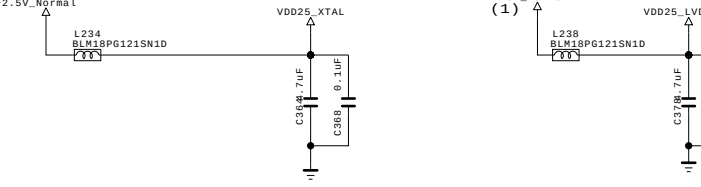
SMD TOP for EMI



+3.3V_Bypass Cap



+2.5V_Bypass Cap



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.

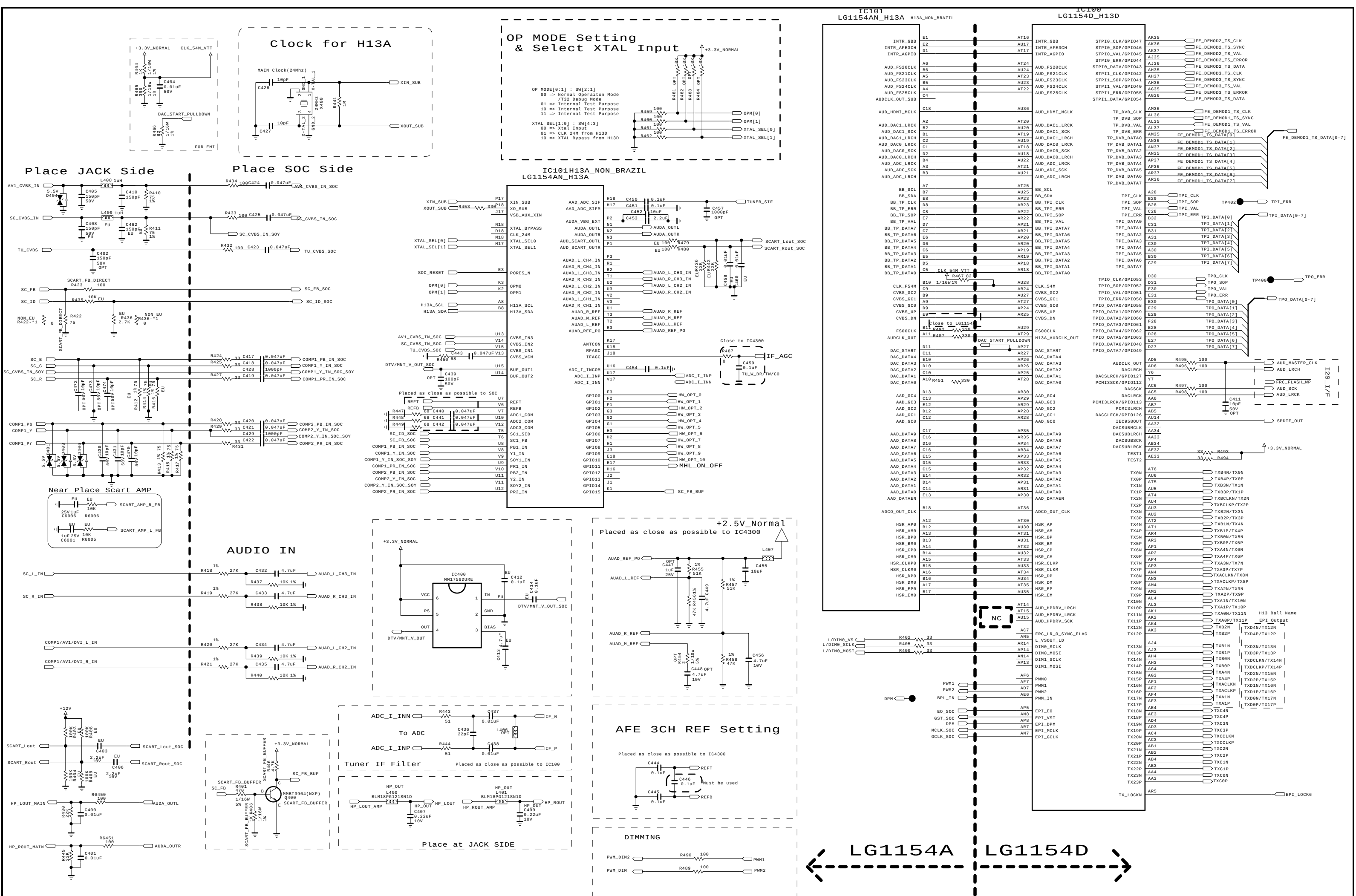
SECRET

LGElectronics

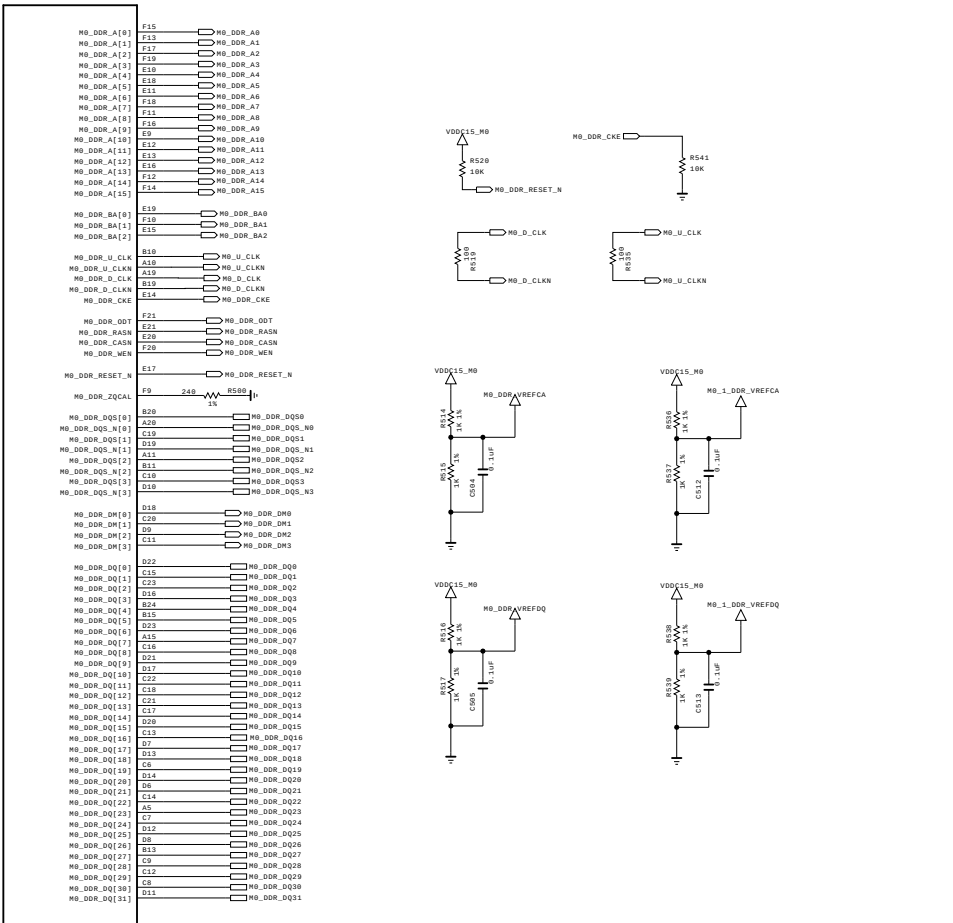
LG ELECTRONICS

BSD-NC4_H002-HD

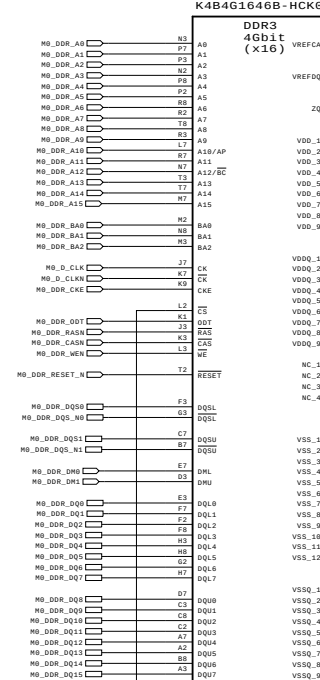
MODEL	DATE
BLOCK	SHEET
MAIN POWER	2012-12-24



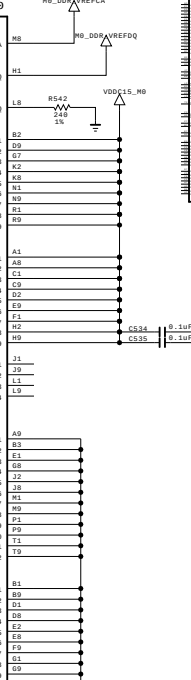
IC100
LG1154D_H13D



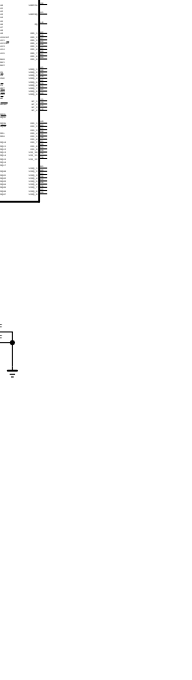
DDR_SAMSUNG
IC503
K4B4G1646B-HCK0



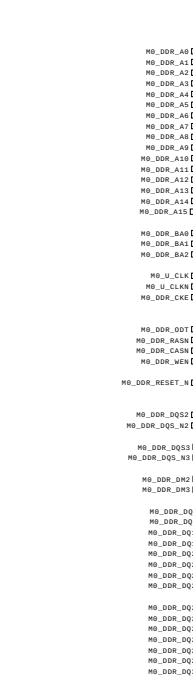
DDR_SAMSUNG
IC502
K4B4G1646B-HCK0



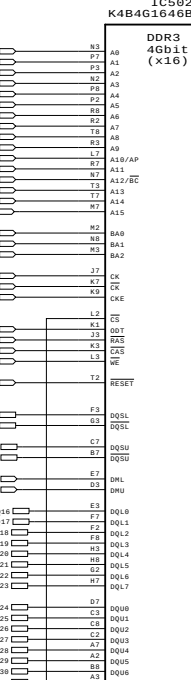
DDR_SAMSUNG
IC501
K4B4G1646B-HCK0



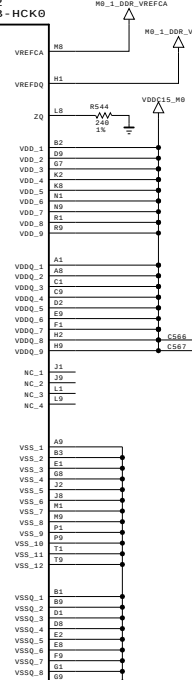
DDR_SAMSUNG
IC504
K4B4G1646B-HCK0



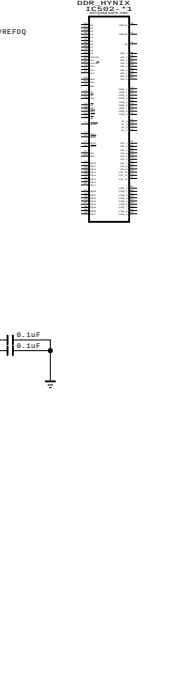
DDR_SAMSUNG
IC503
K4B4G1646B-HCK0



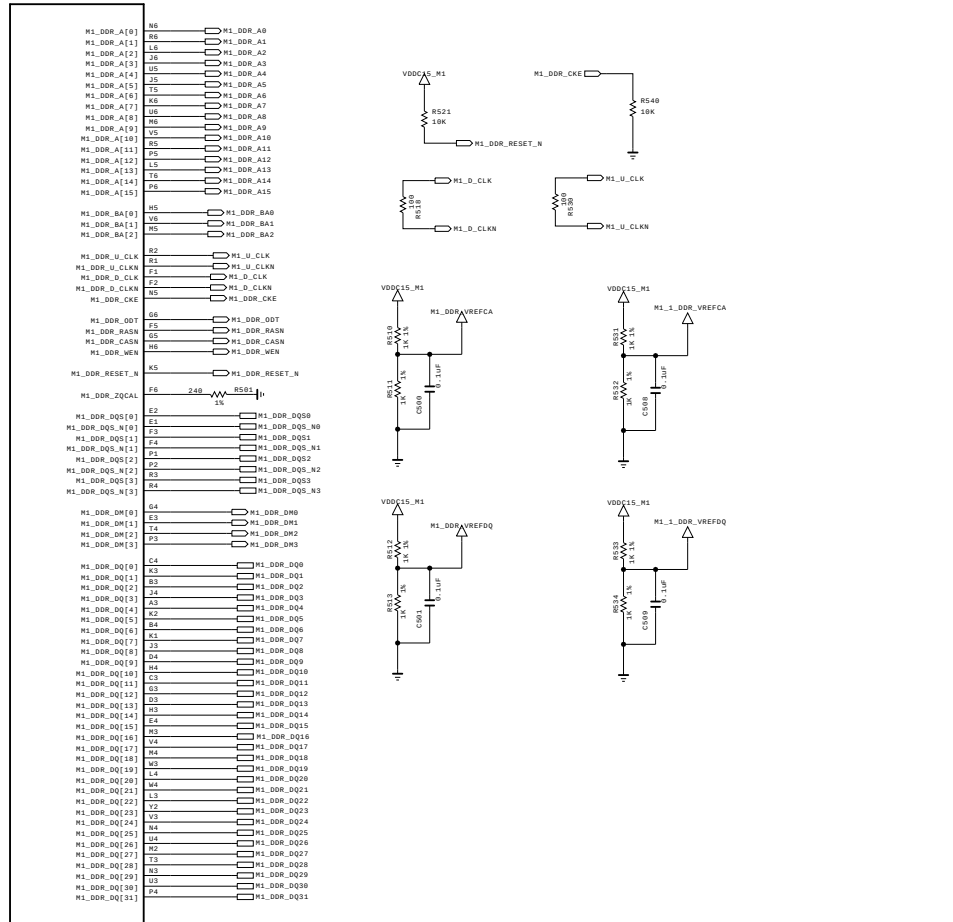
DDR_SAMSUNG
IC502
K4B4G1646B-HCK0



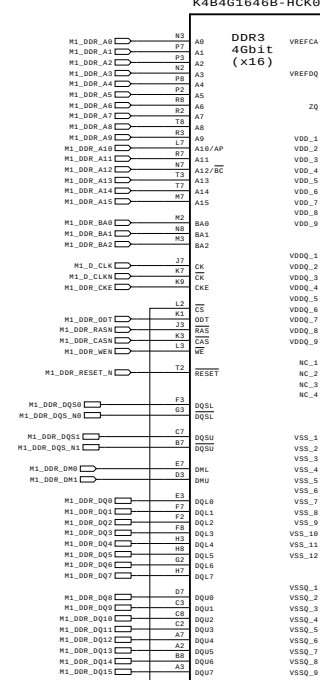
DDR_SAMSUNG
IC501
K4B4G1646B-HCK0



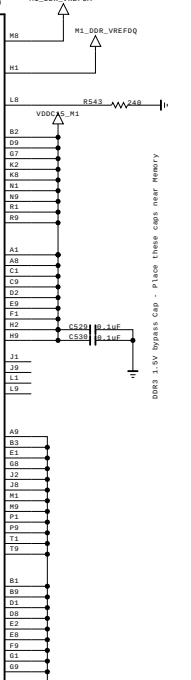
IC100
LG1154D_H13D



DDR_SAMSUNG
IC504
K4B4G1646B-HCK0



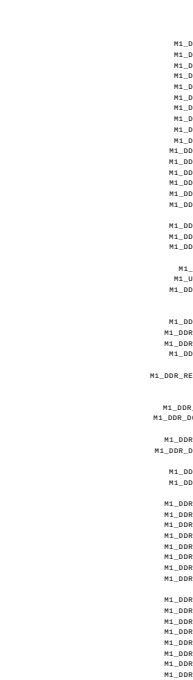
DDR_SAMSUNG
IC503
K4B4G1646B-HCK0



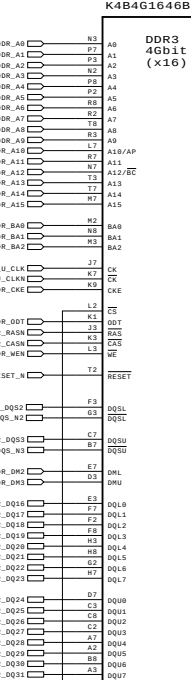
DDR_SAMSUNG
IC501
K4B4G1646B-HCK0

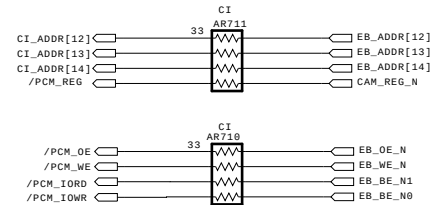
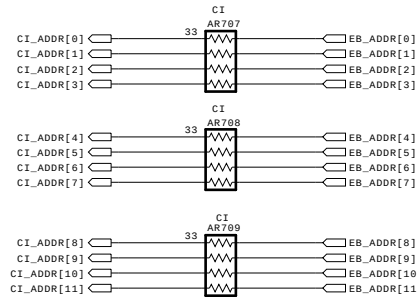
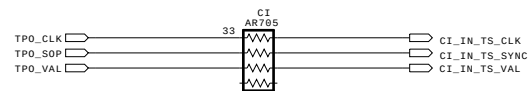
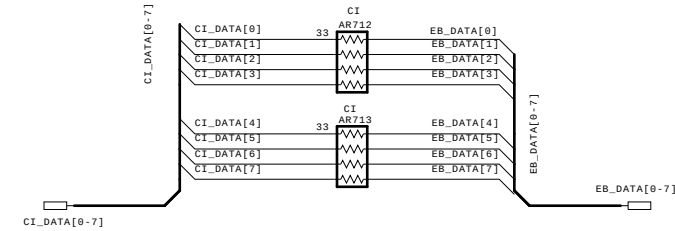


DDR_SAMSUNG
IC504
K4B4G1646B-HCK0



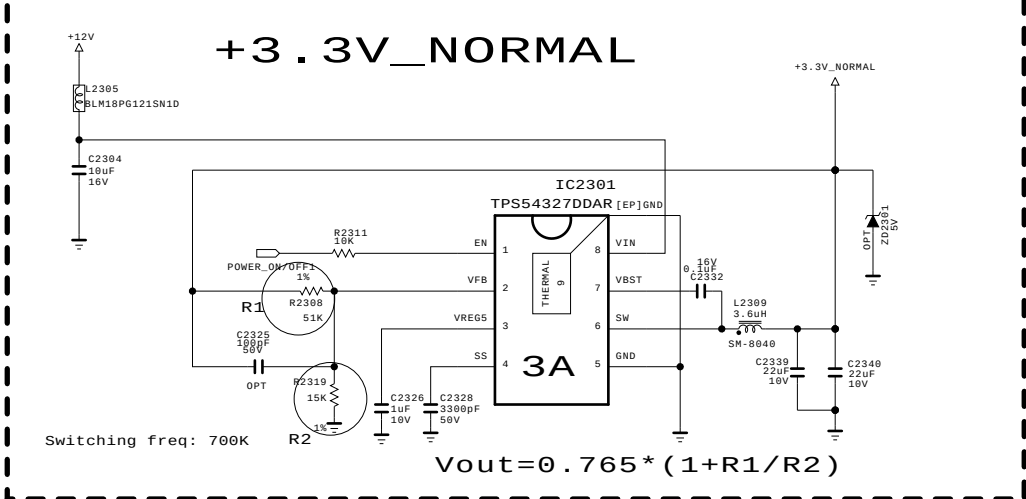
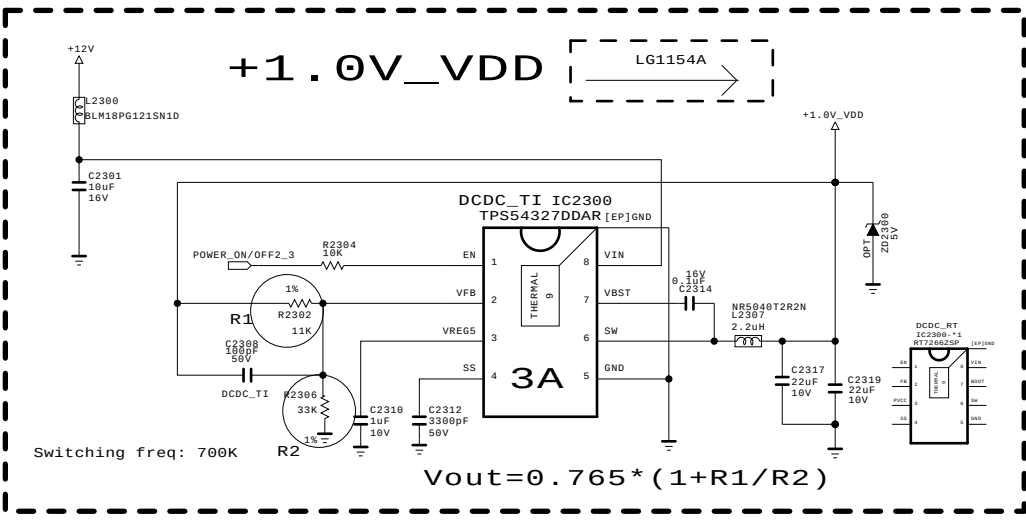
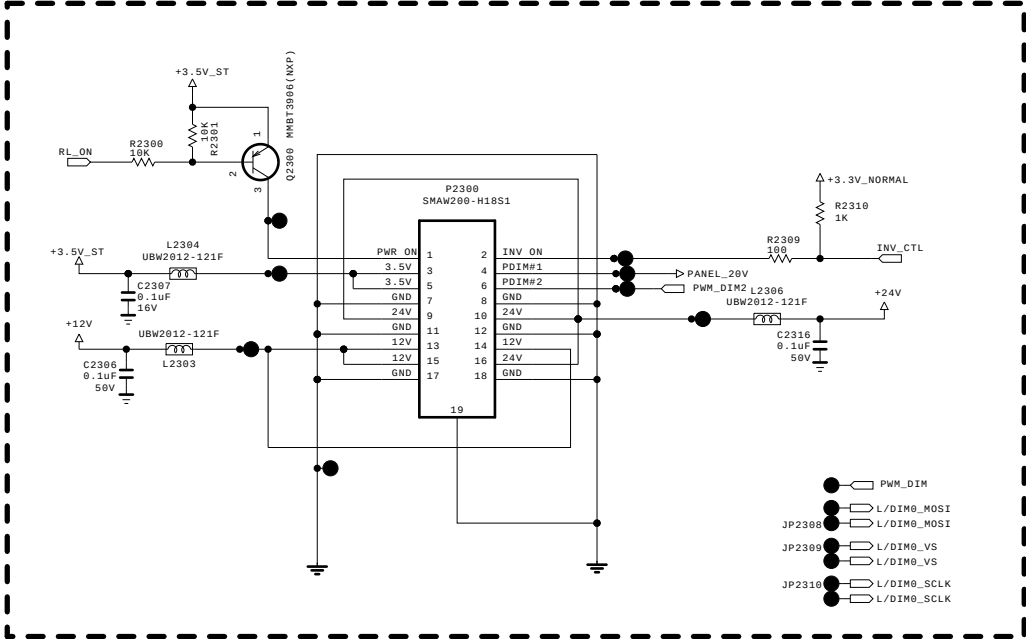
DDR_SAMSUNG
IC503
K4B4G1646B-HCK0





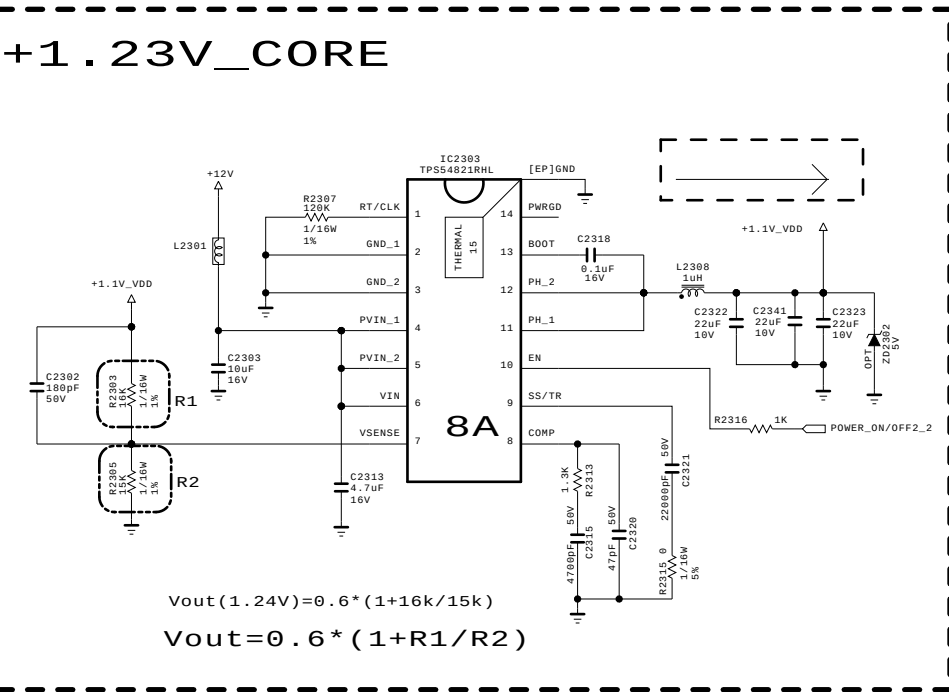
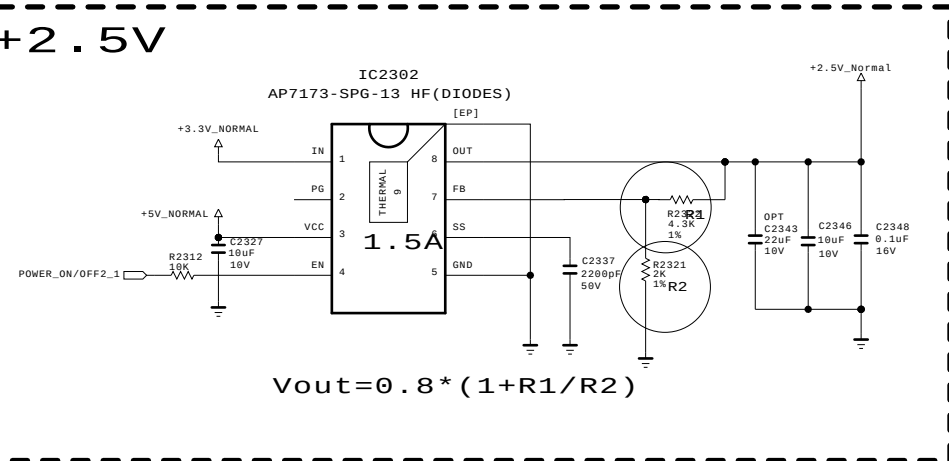
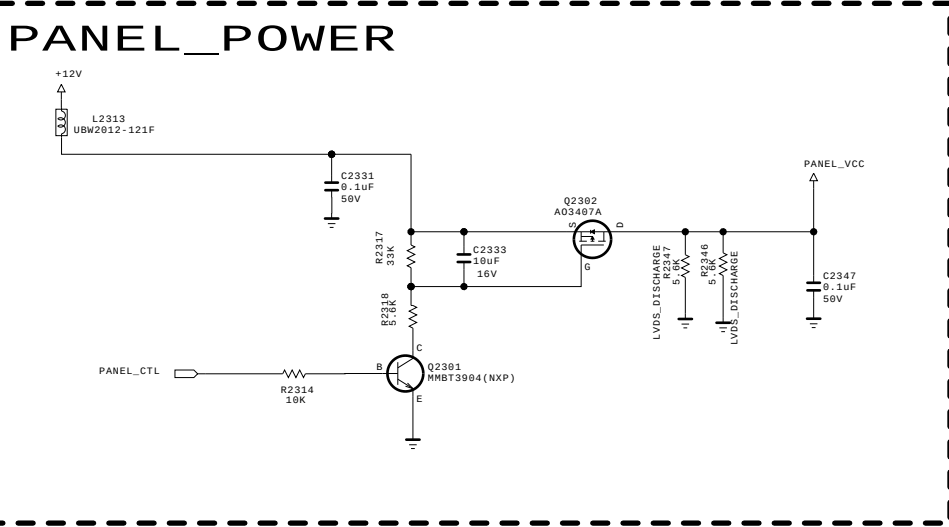
SECRET
LGElectronics





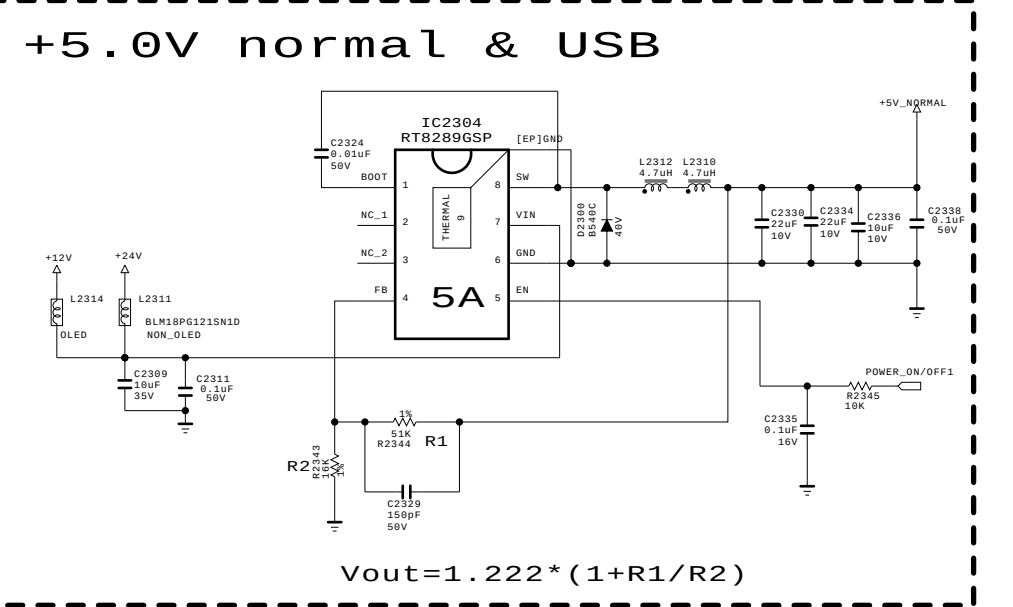
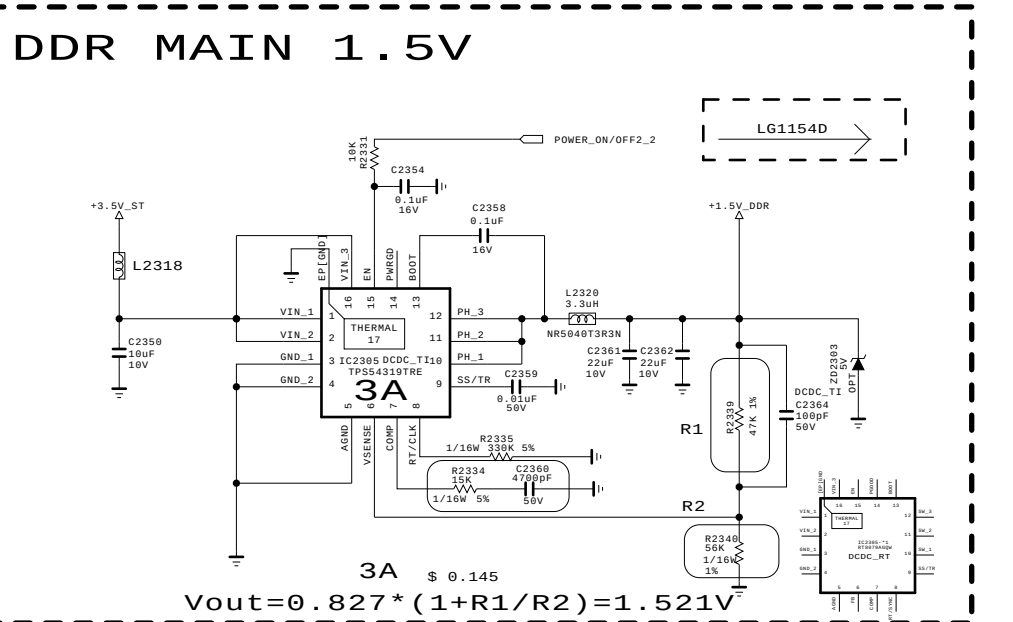
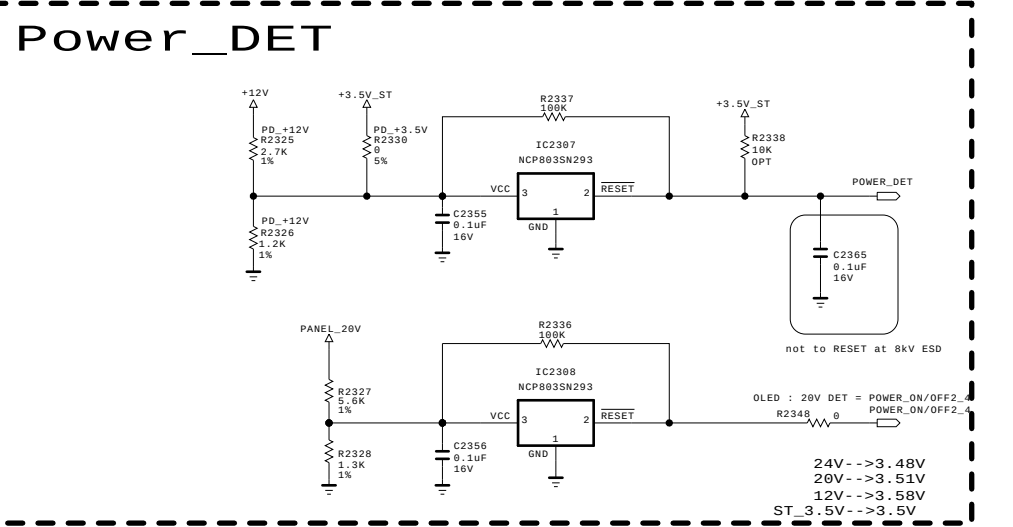
THE SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE SYMBOL MARK OF THE SCHEMATIC.

SECRET
LGElectronics



POWER UP SEQUENCE

5V/3.3V->2.5V->1.5V/1.1V->1.0V
 LG1154D : 3.3V->2.5V->1.5V->1.1V
 LG1154AN : 3.3V->2.5V->1.0V



BSD - NC4_H039 - HD

MODEL	NC4_H13	DATE	2013.03.05
BLOCK	POWER_BLOCK(OLED)	SHEET	23

For Debug

The diagram illustrates the debug circuit for the P3899 microcontroller. The microcontroller is connected to a +3.5V_ST supply. A network of resistors (R3014, R3015, R3016) is used to connect the microcontroller's pins to the MICOM_DEBUG and MICOM_RESET signals. A dashed box highlights the R3014 resistor with the note: "Don't remove R3014, not making float P40".

CEC_REMOTE

BAT54_SUZHO

R3033 27K

R3034 120K

+3.5V_ST

Q3001 RUE003N02

HDMI_CEC_FET_ROHM

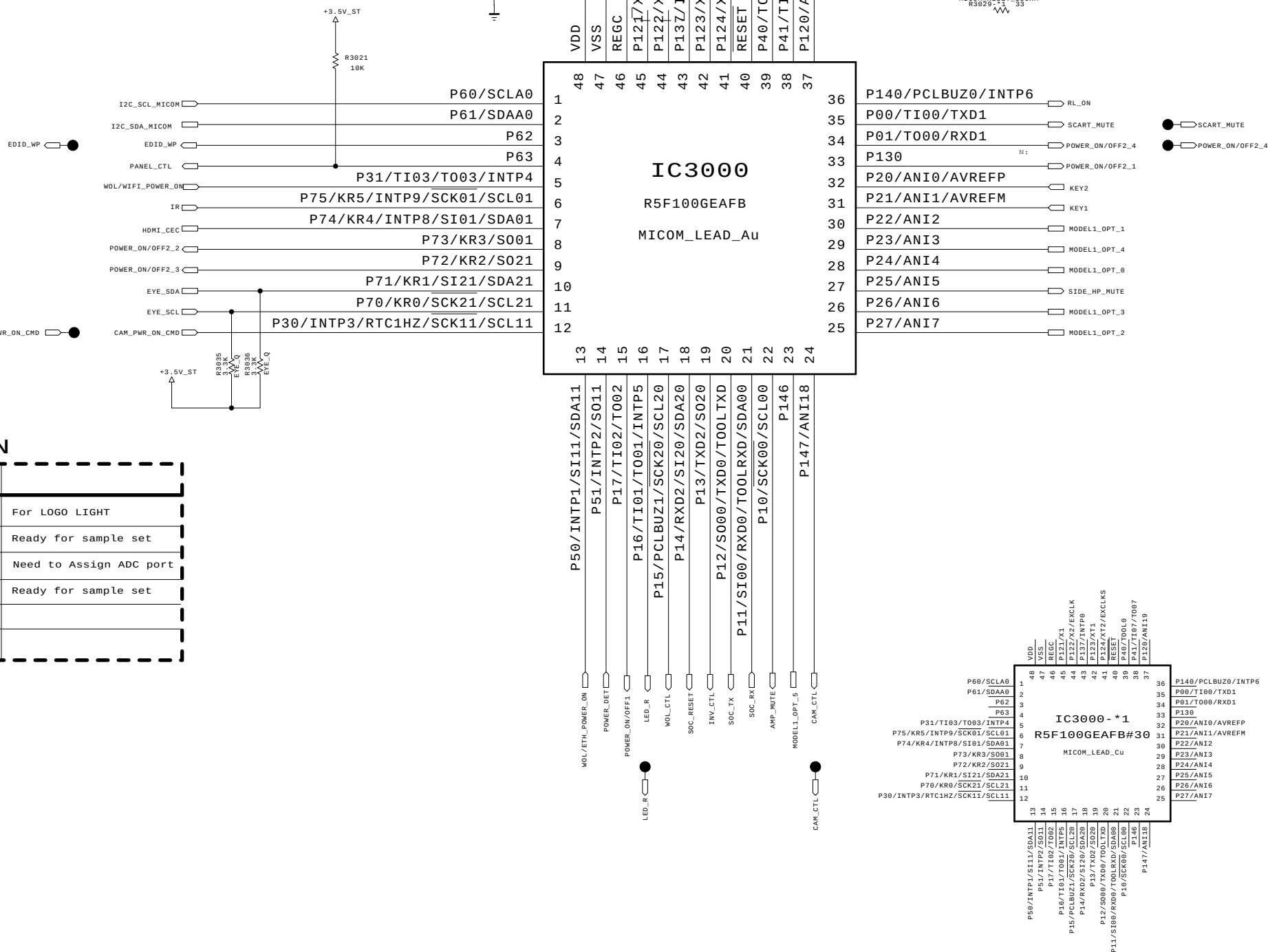
Q3001-11

SI1012CR-T1-GE3

HDMI_CEC_FET_VISHAY

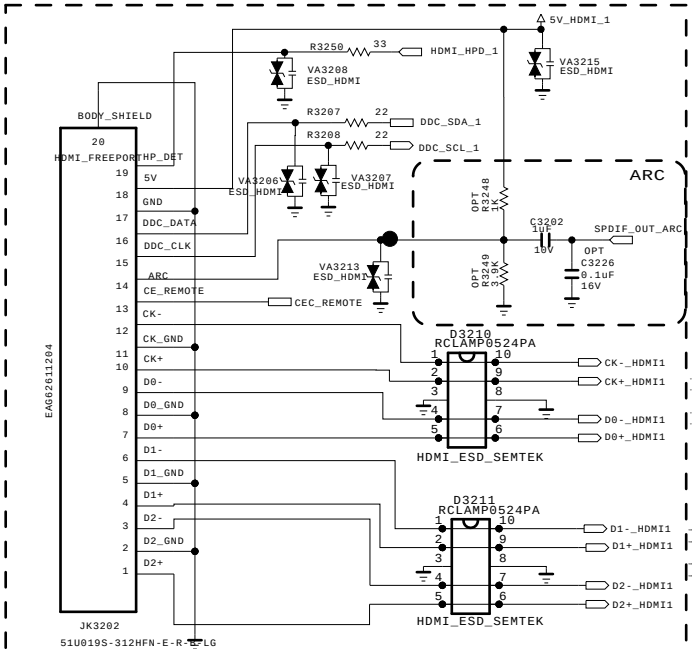
```

graph TD
    A[POWER_ON/OFF !] --> B[POWER_ON/OFF2_1]
    B --> C[POWER_ON/OFF2_2]
    C --> D[POWER_ON/OFF2_3]
    D --> E[POWER_ON/OFF2_4]
    E --> F[SOC_RESET]
  
```

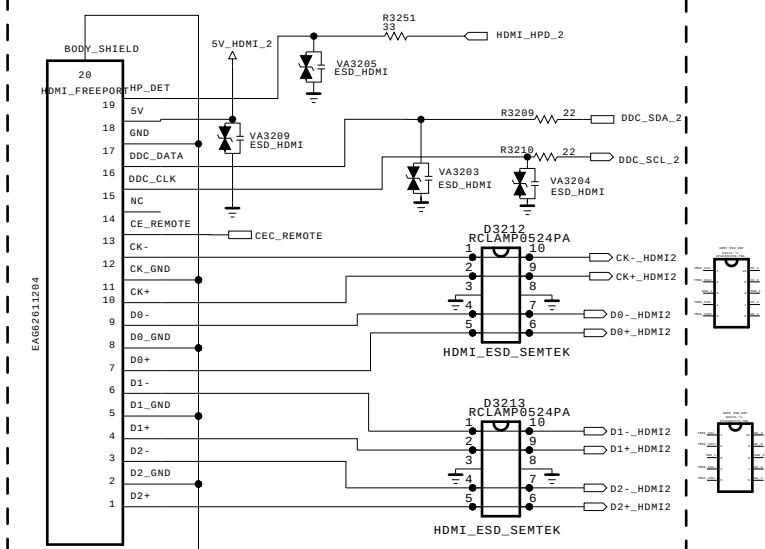


SECRET	 LG ELECTRONICS
LGElectronics	

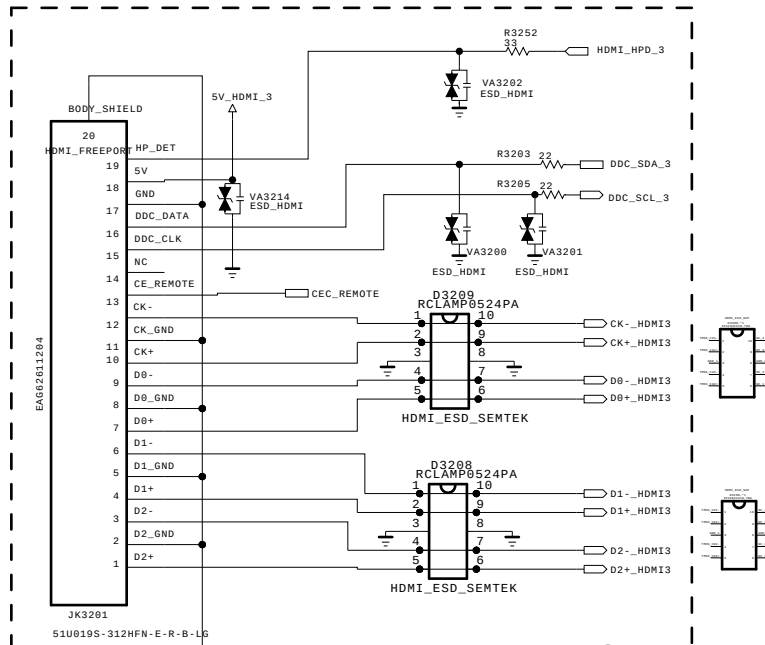
MODEL	NetCast4.0	DATE	2013.02.05
BLOCK	MICOM (RENESAS)	SHEET	30 /



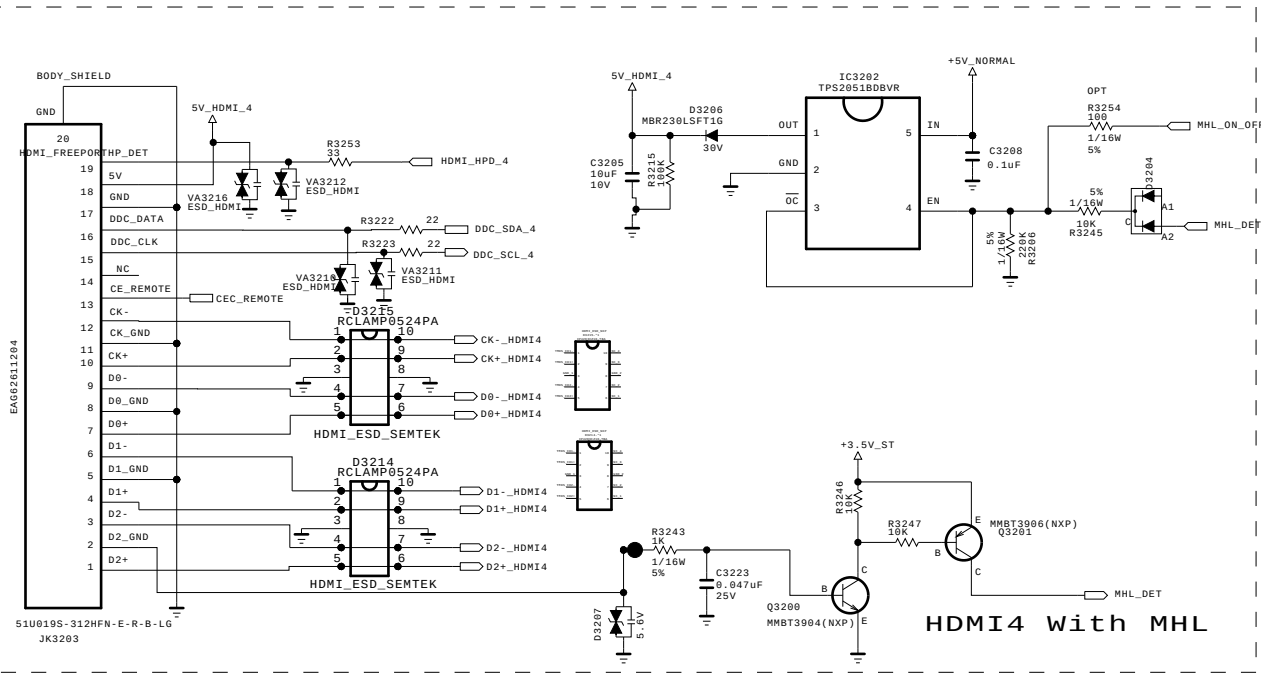
HDMI1 With ARC



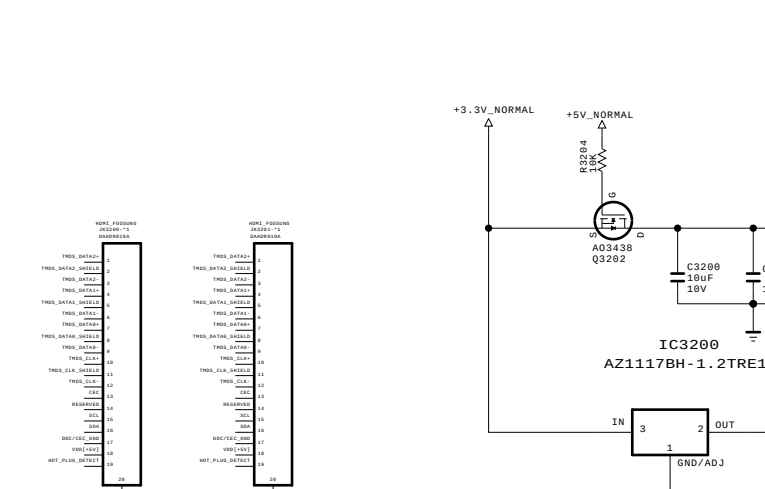
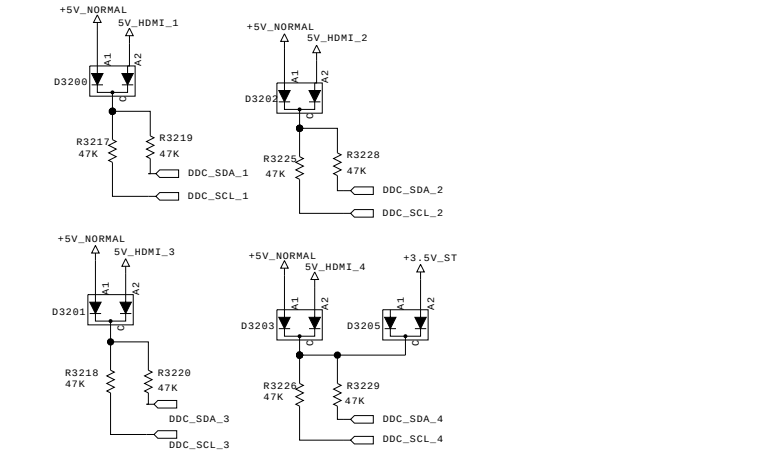
HDMI2



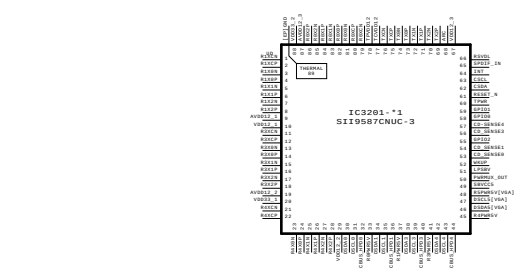
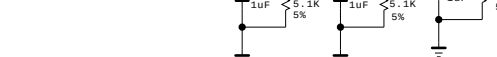
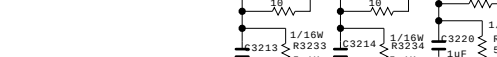
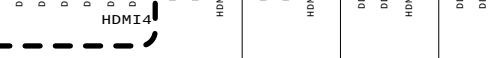
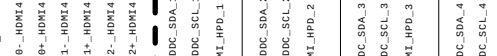
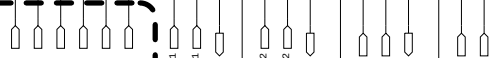
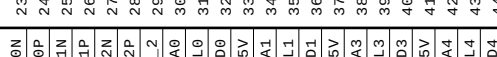
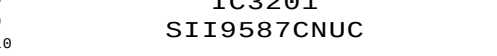
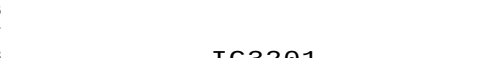
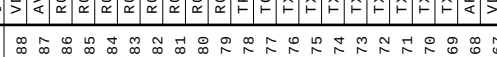
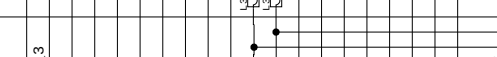
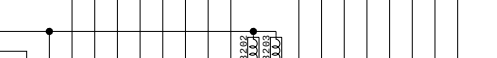
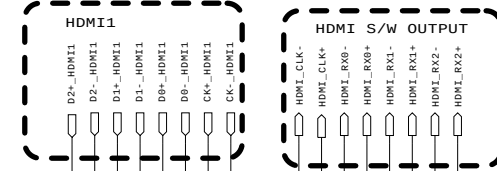
HDMI3



HDMI4 With MHL



$$V_{out} = 0.8 * (1 + R1/R2)$$

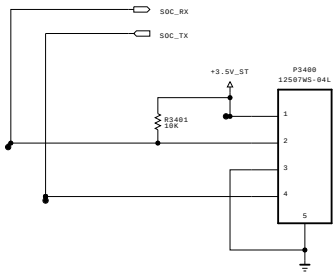
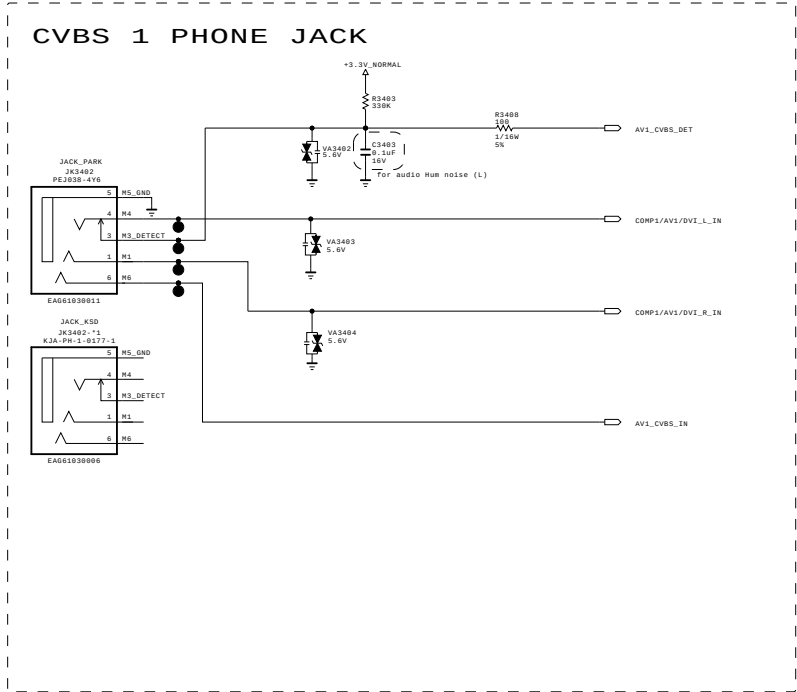
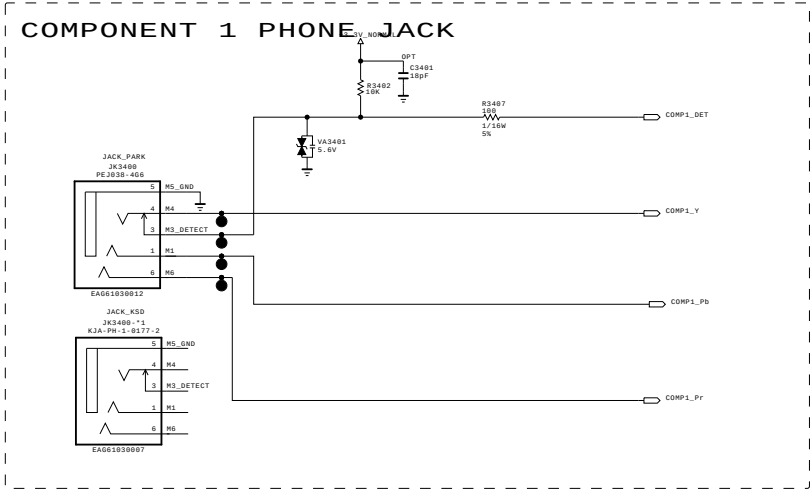
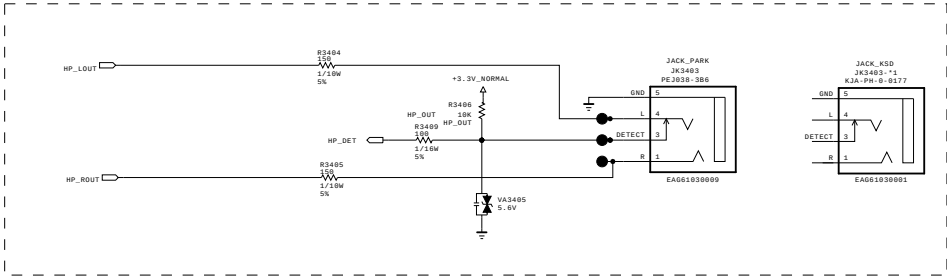
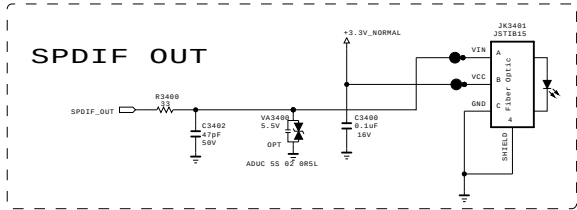


THE  SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE  SYMBOL MARK OF THE SCHEMATIC.

SECRET
LGElectronics



MODEL	GP4	DATE	
BLOCK	HDMI	SHEET	32



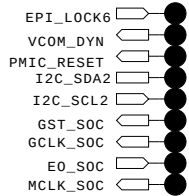
THE SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE SYMBOL MARK OF THE SCHEMATIC.

SECRET
LGElectronics

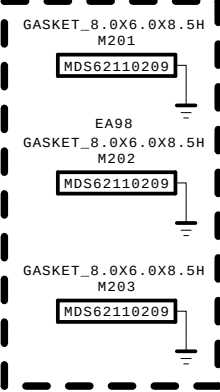
LG ELECTRONICS

MODEL			
BLOCK			
JACK HIGH/MID			
DATE			
SHEET			
2012.10.09			

BSD-NC4_H034-HD



SMD TOP for EMI



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.

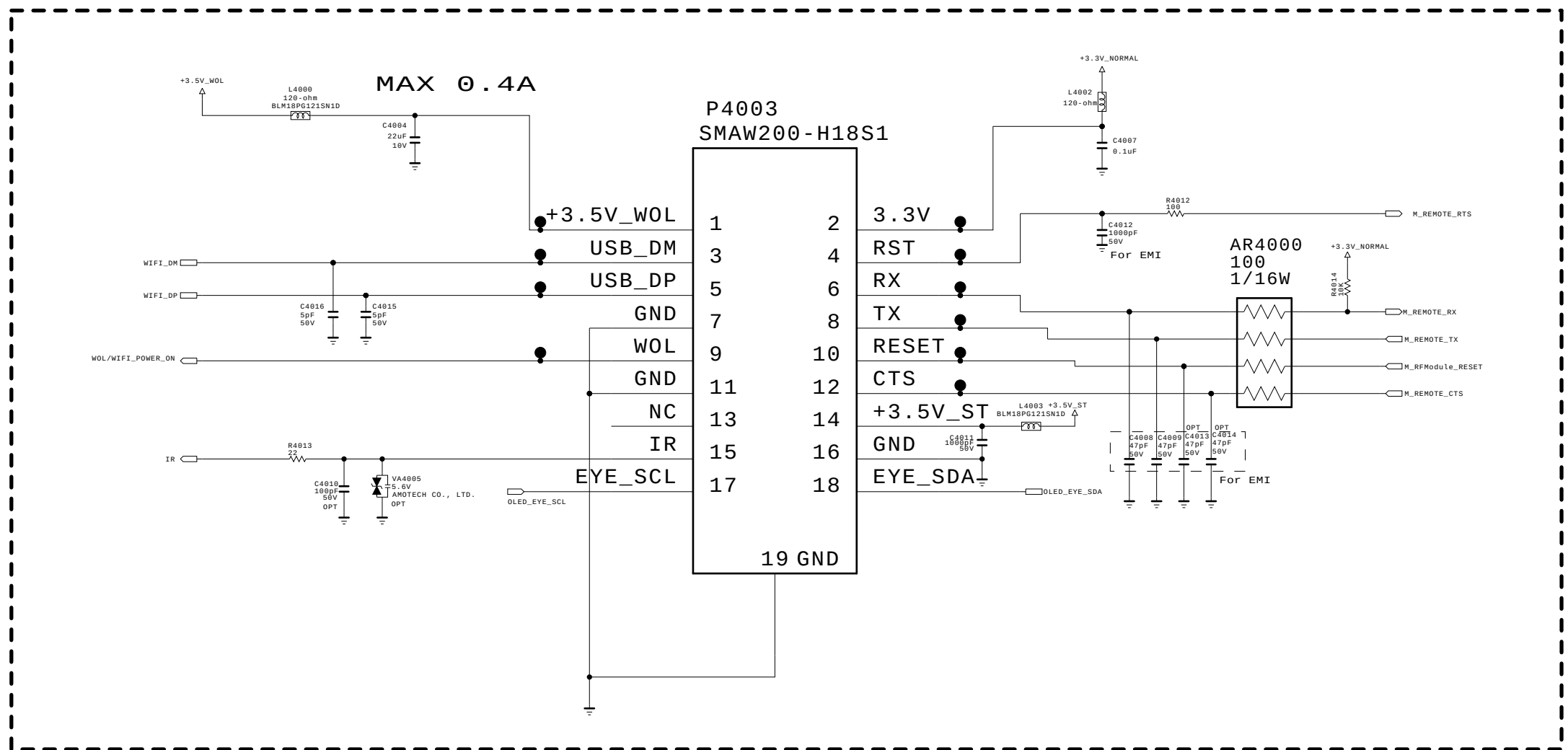
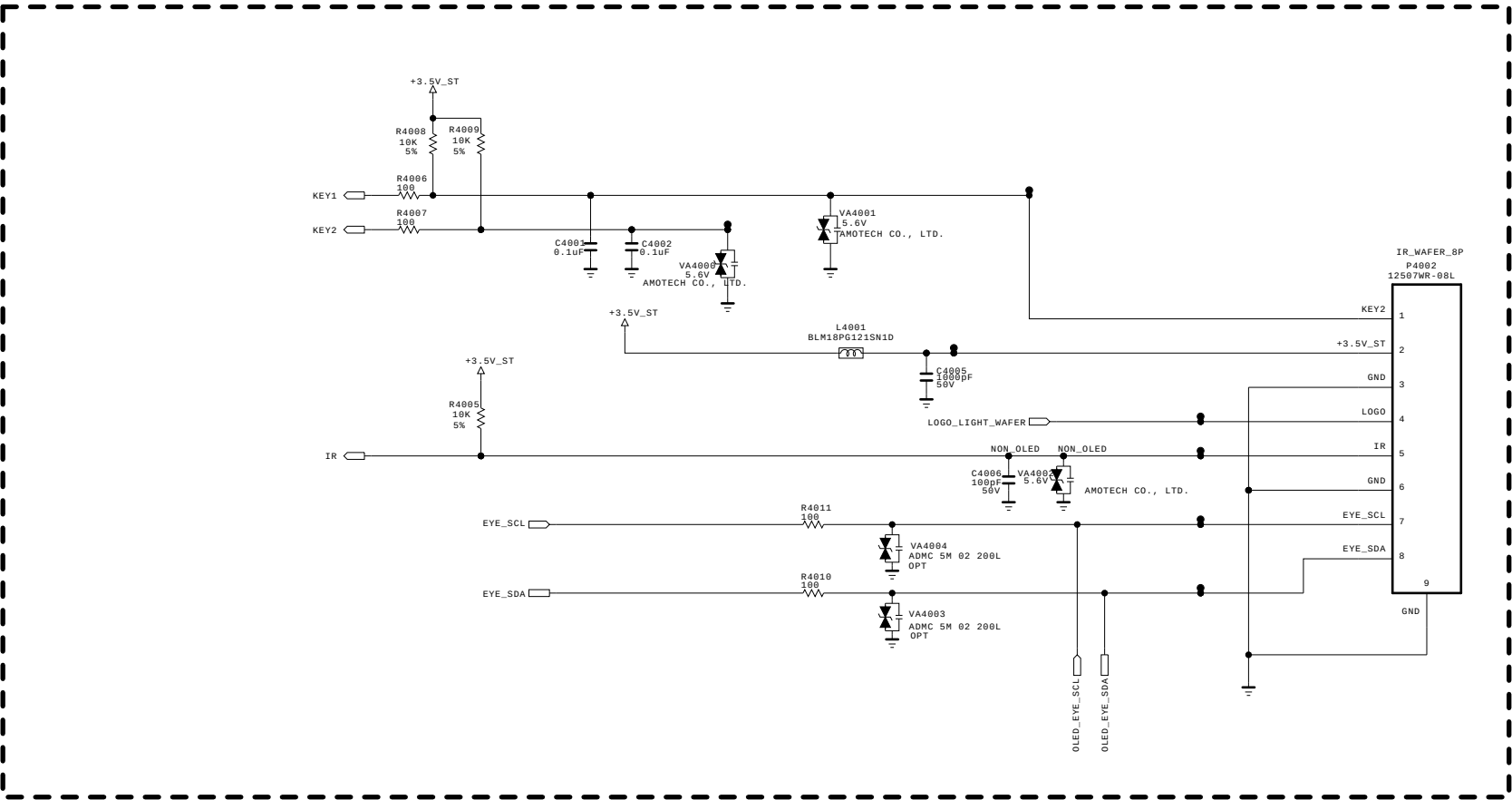
SECRET

LGElectronics

 LG ELECTRONICS

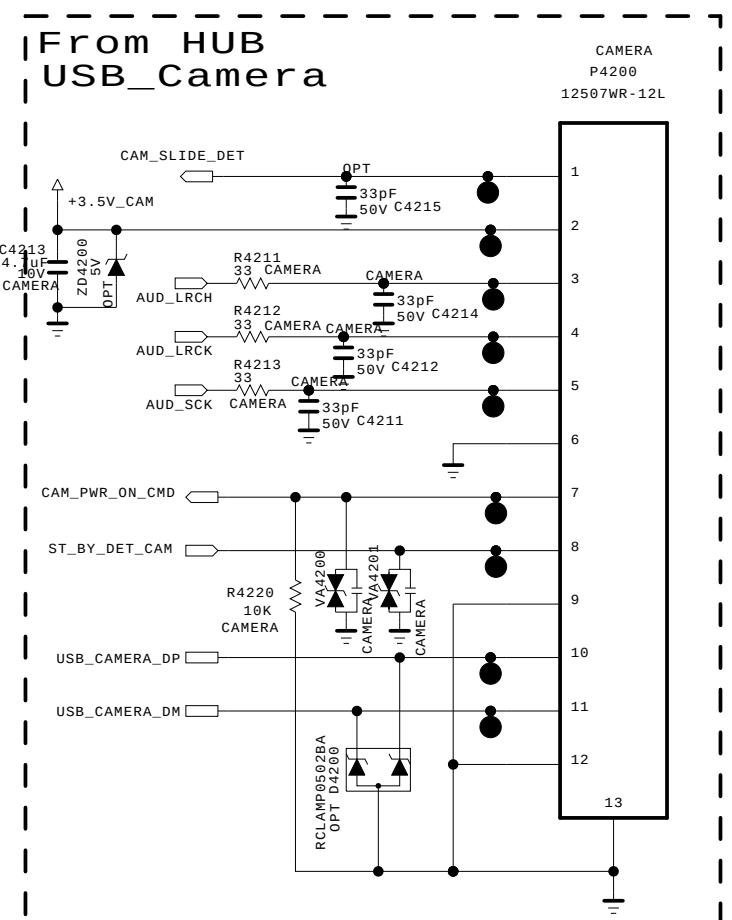
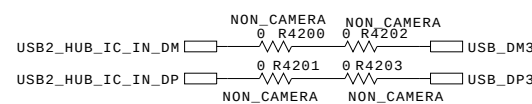
MODEL	NC4_H13	DATE	2013.02.22
BLOCK	NON_EPI(OLED)	SHEET	36 /

BSD-NC4_H036-HD



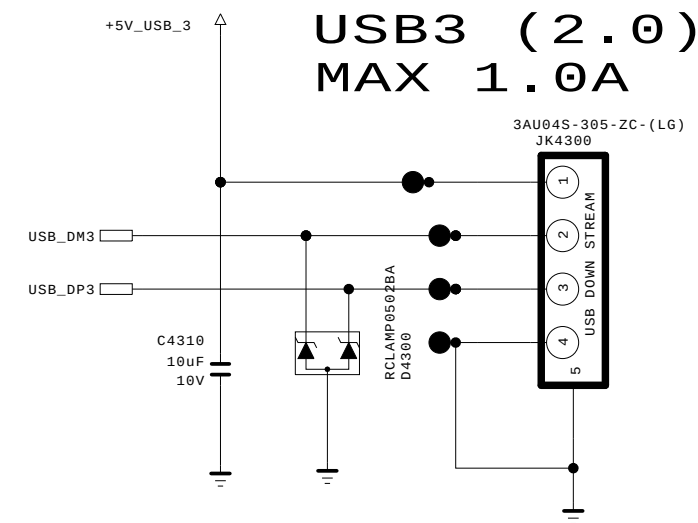
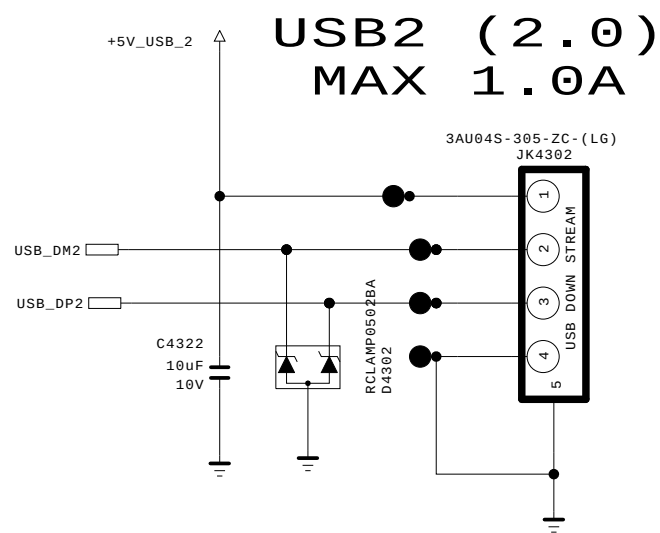
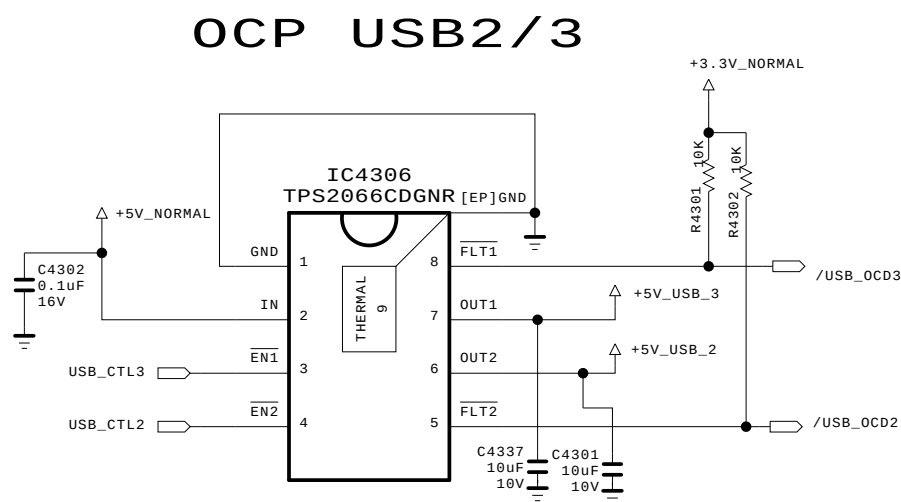
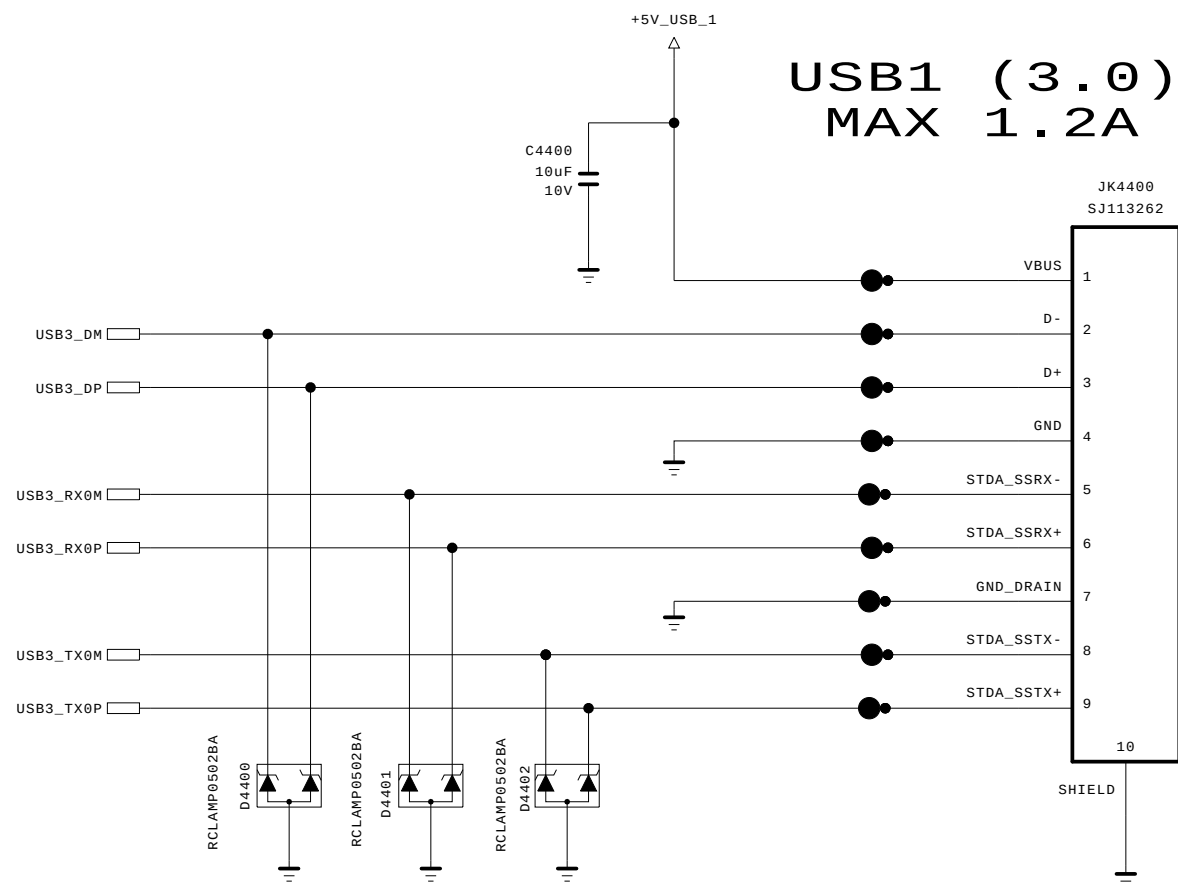
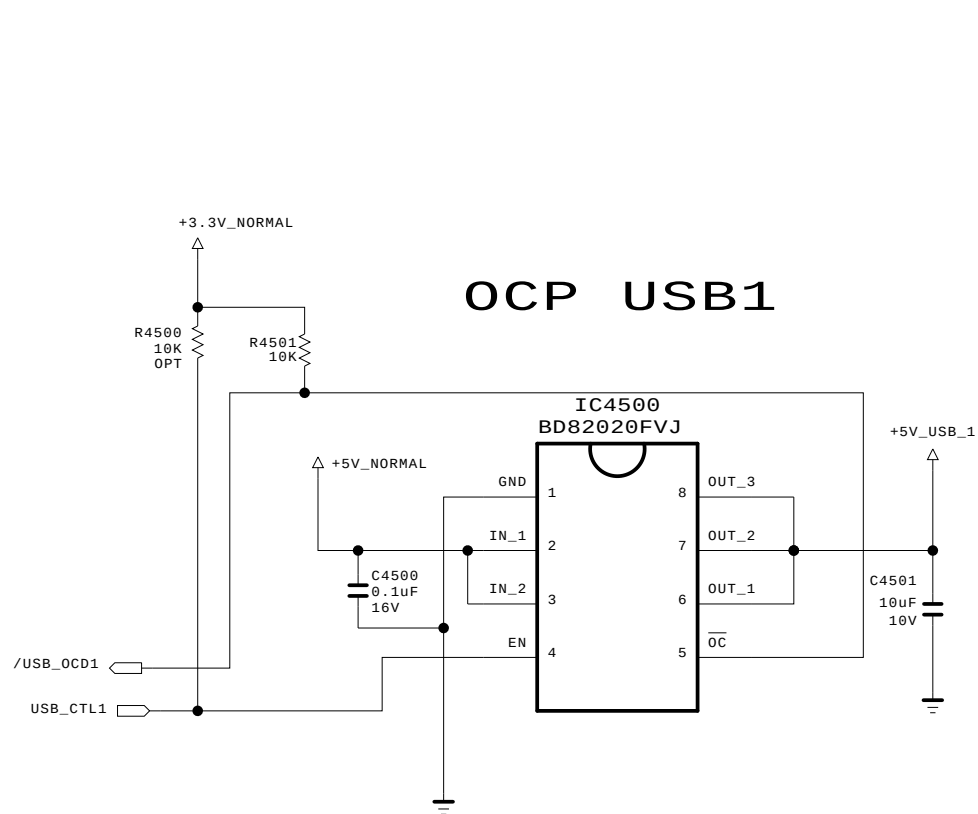
SECRET
LGElectronics





SECRET	 LG ELECTRONICS
LG Electronics	

LGE Internal Use Only

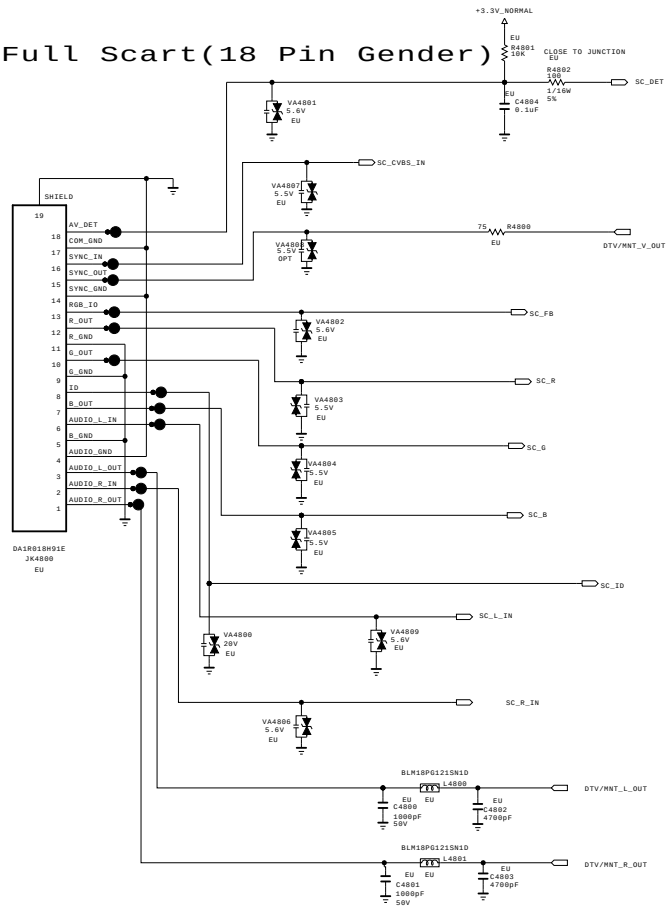


THE  SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE  SYMBOL MARK OF THE SCHEMATIC.

SECRET	 LG ELECTRONICS
LG Electronics	

MODEL		DATE	2012-11-09
BLOCK	USB JACK	SHEET	/

BSD-NC4_H044-HD



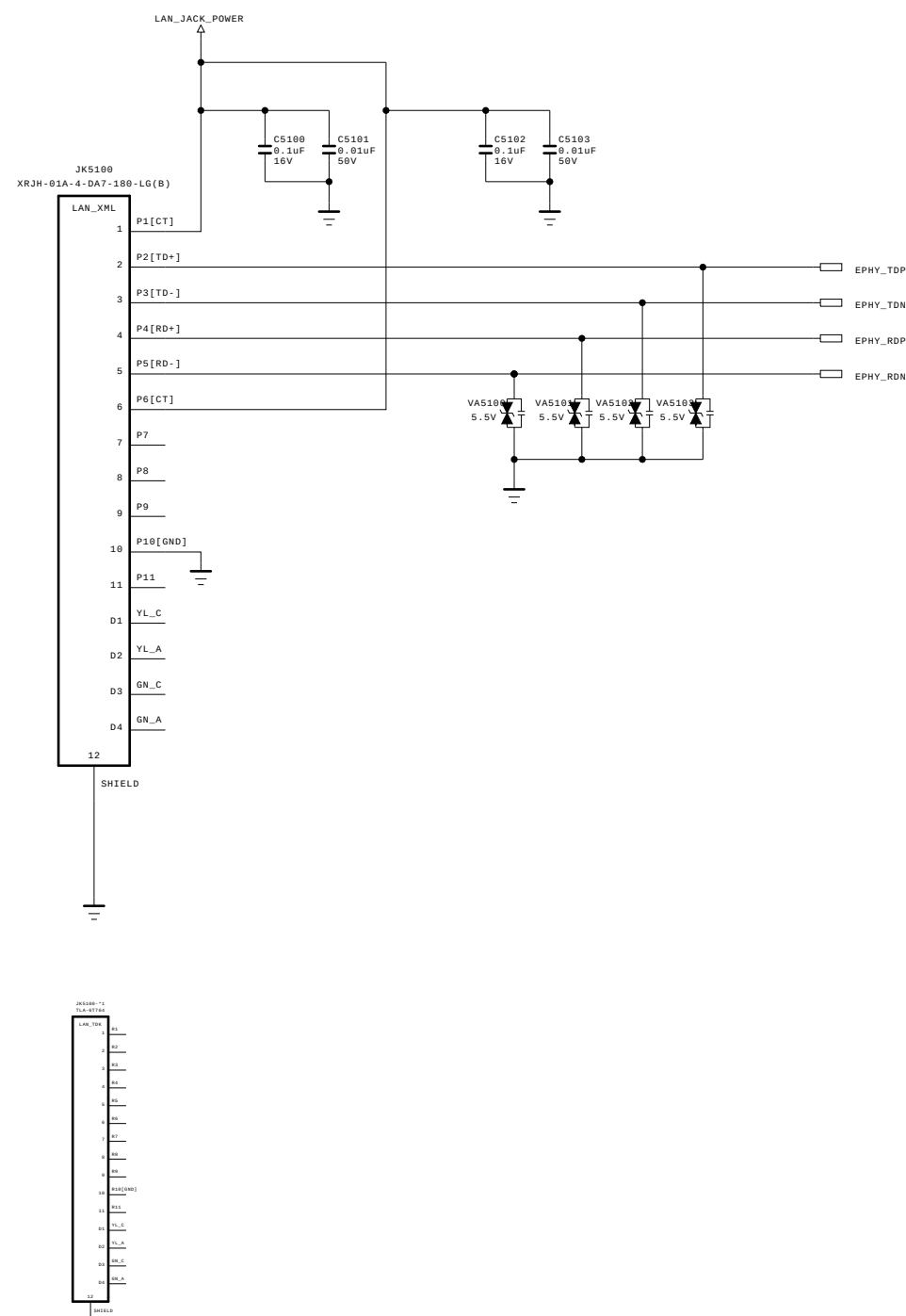
THE  SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE  SYMBOL MARK OF THE SCHEMATIC.

SECRET
LGElectronics



BSD-NC4_H048-HD			
MODEL		DATE	2012.10.31
BLOCK	SCART GENDER	SHEET	/

Ethernet Block



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

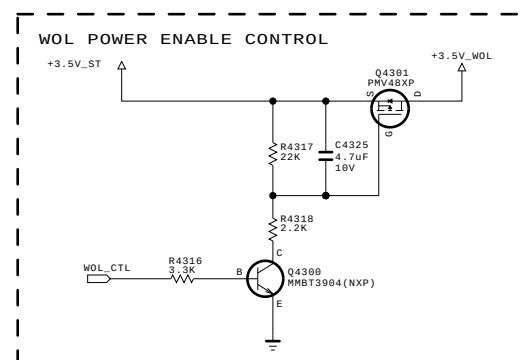
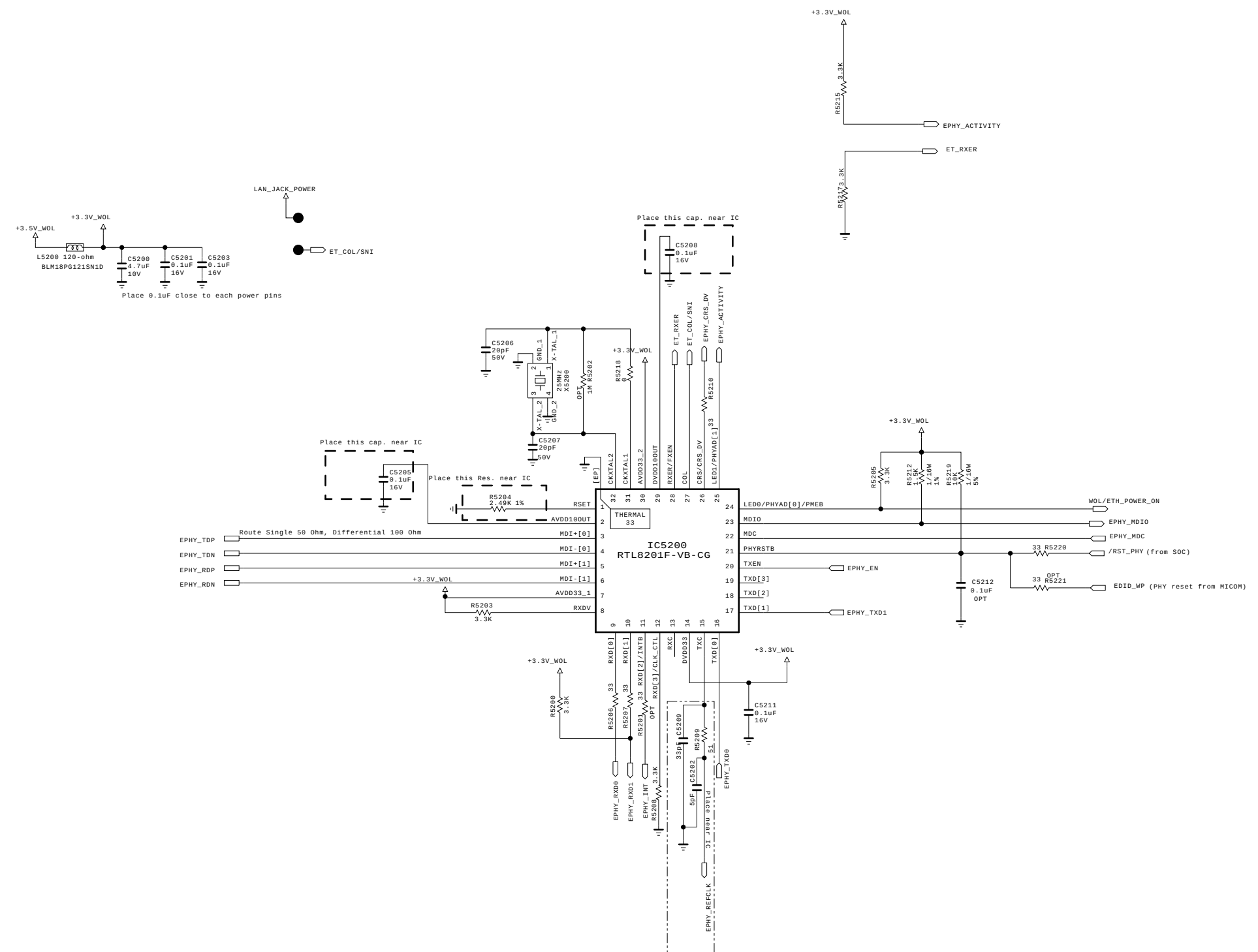
SECRET

LGElectronics

 LG ELECTRONICS

MODEL	LAN_VERTICAL	DATE	2011.12.09
BLOCK		SHEET	50 /

Ethernet Block



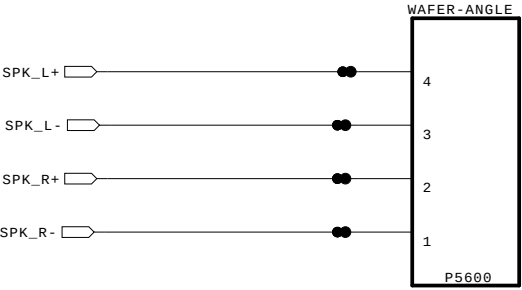
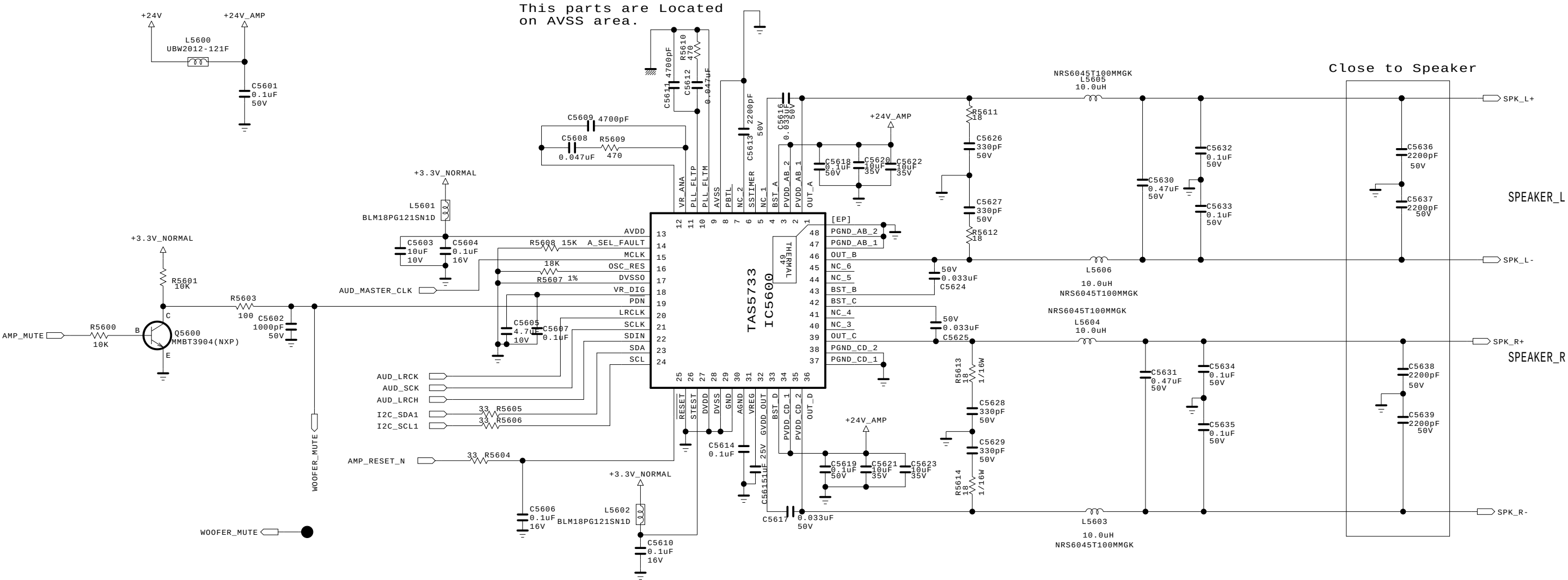
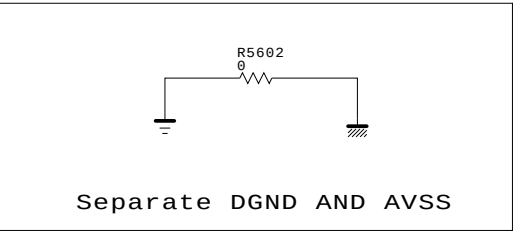
THE  SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE  SYMBOL MARK OF THE SCHEMATIC.

SECRET
LGElectronics



BSD-NC4_H052-HD

MODEL		DATE	2012-09-12
BLOCK	ETHERNET	SHEET	/



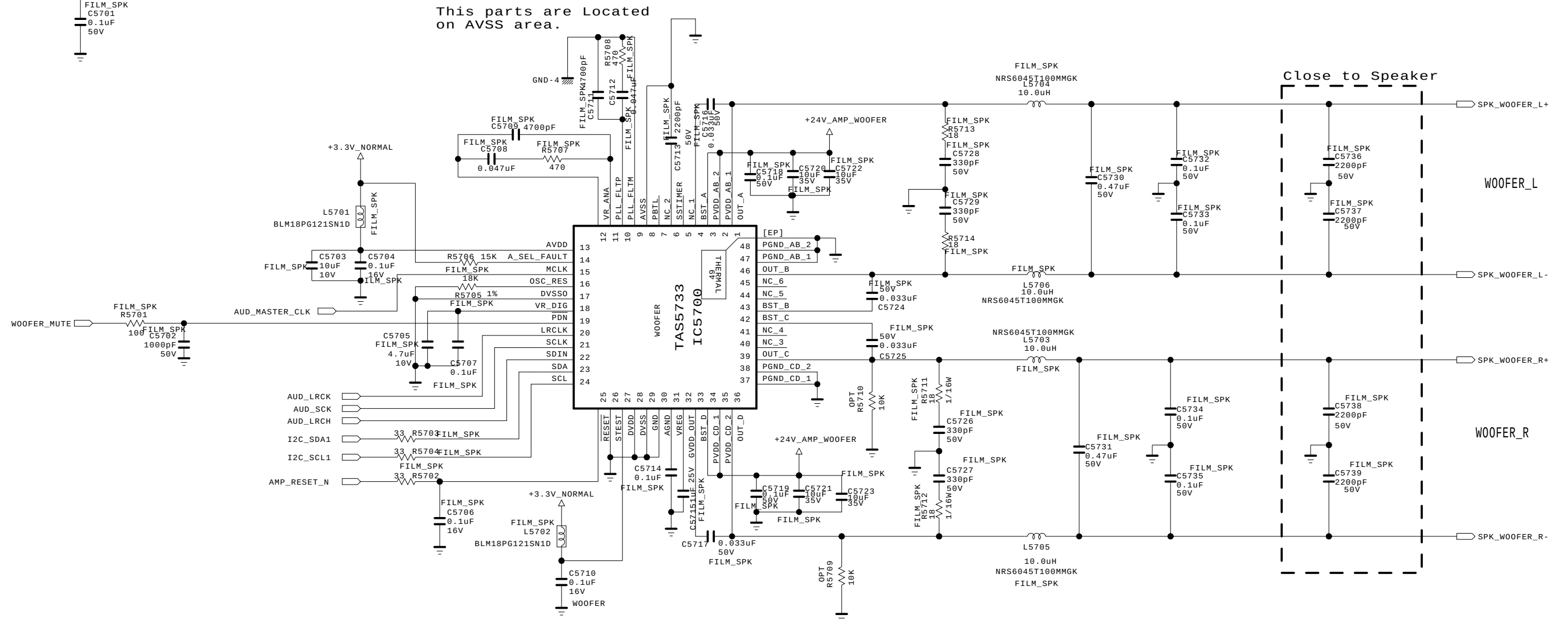
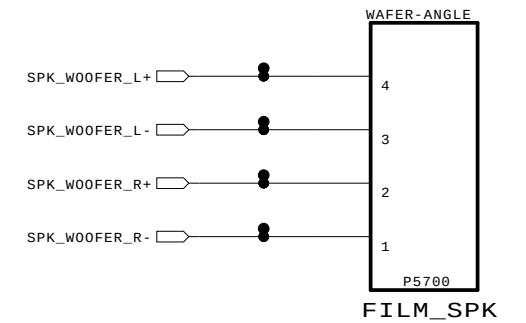
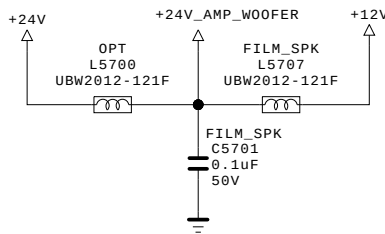
THE ⚠ SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMATIC.

SECRET

LG Electronics

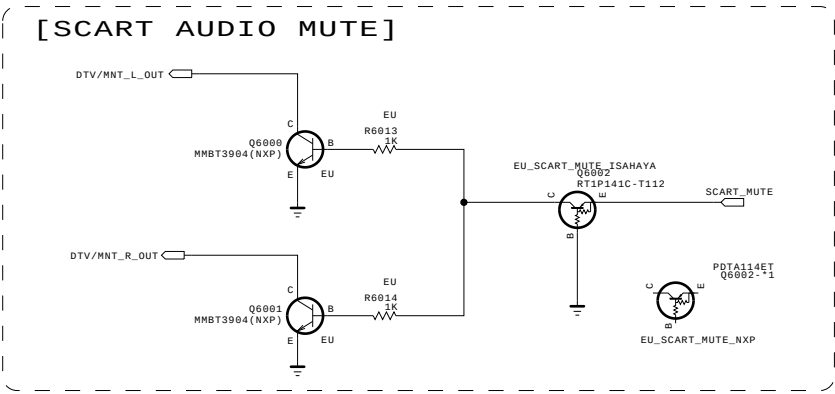
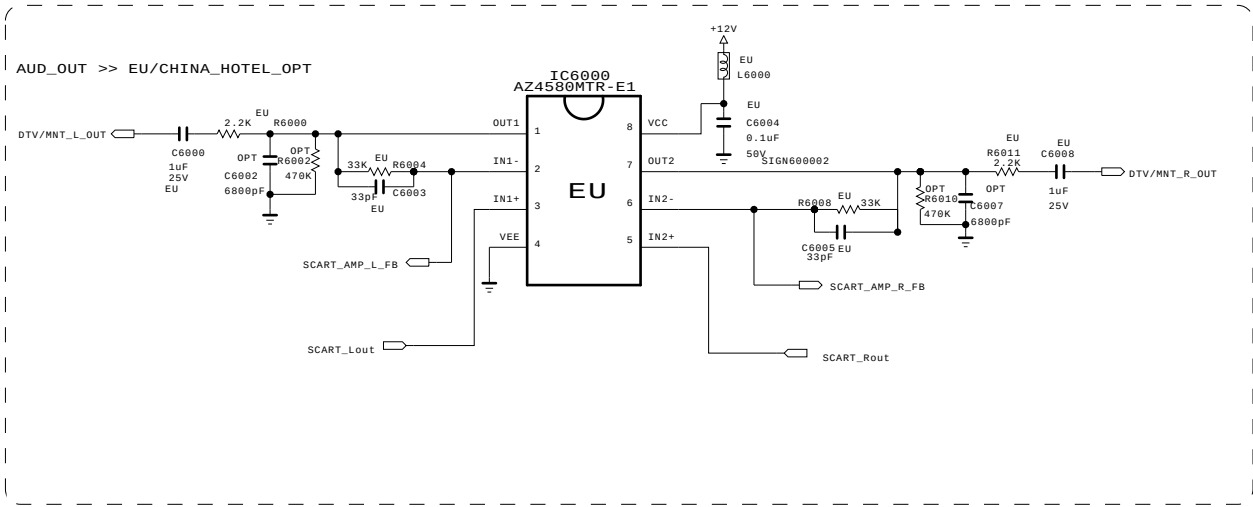
LG ELECTRONICS

MODEL	GP4_MT5369	DATE	2011.11.21
BLOCK	AUDIO[ST]	SHEET	58 /



SECRET	 LG ELECTRONICS
LG Electronics	

MODEL	NC4_H13	DATE	2013.02.01
BLOCK	TI_AMP_FILM_SPK	SHEET	57 /



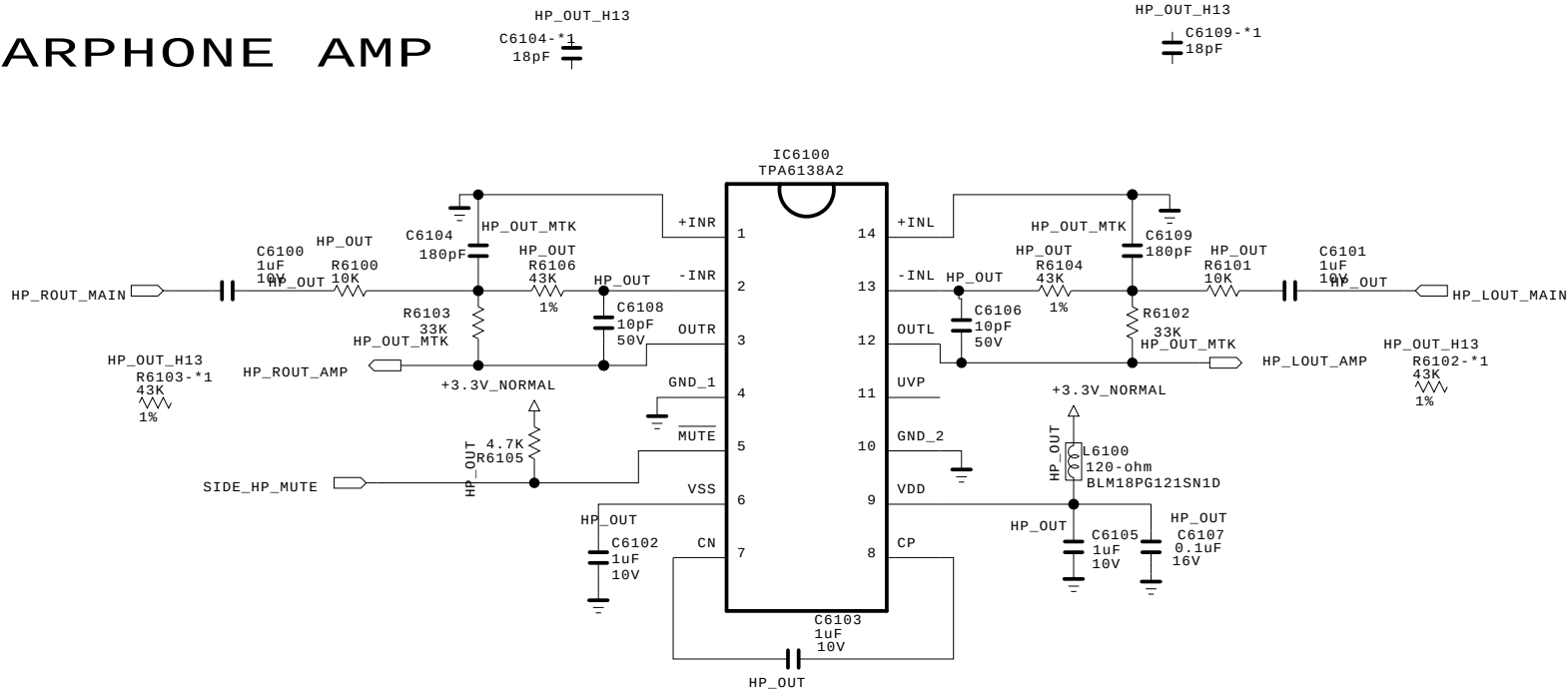
THE  SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE  SYMBOL MARK OF THE SCHEMETIC.

SECRET
LGElectronics



MODEL	SCART AUDIO AMP	DATE	2011.11.21
BLOCK		SHEET	60 /

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



MODEI

HEADPHONE AMP

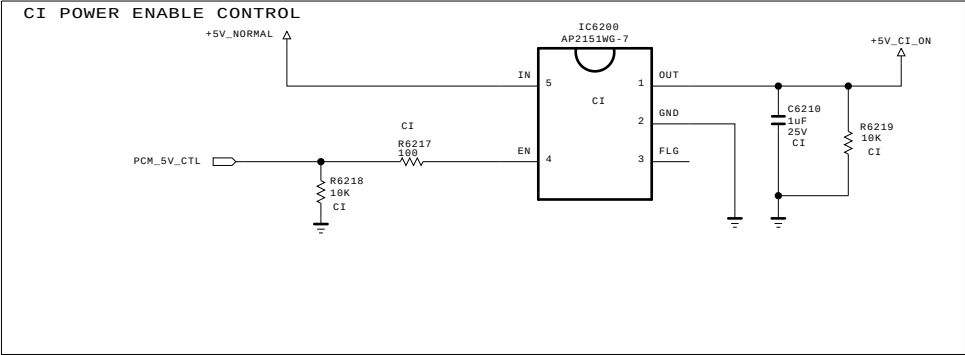
DATE

2011.09.29

В П Г К

SHEET

61



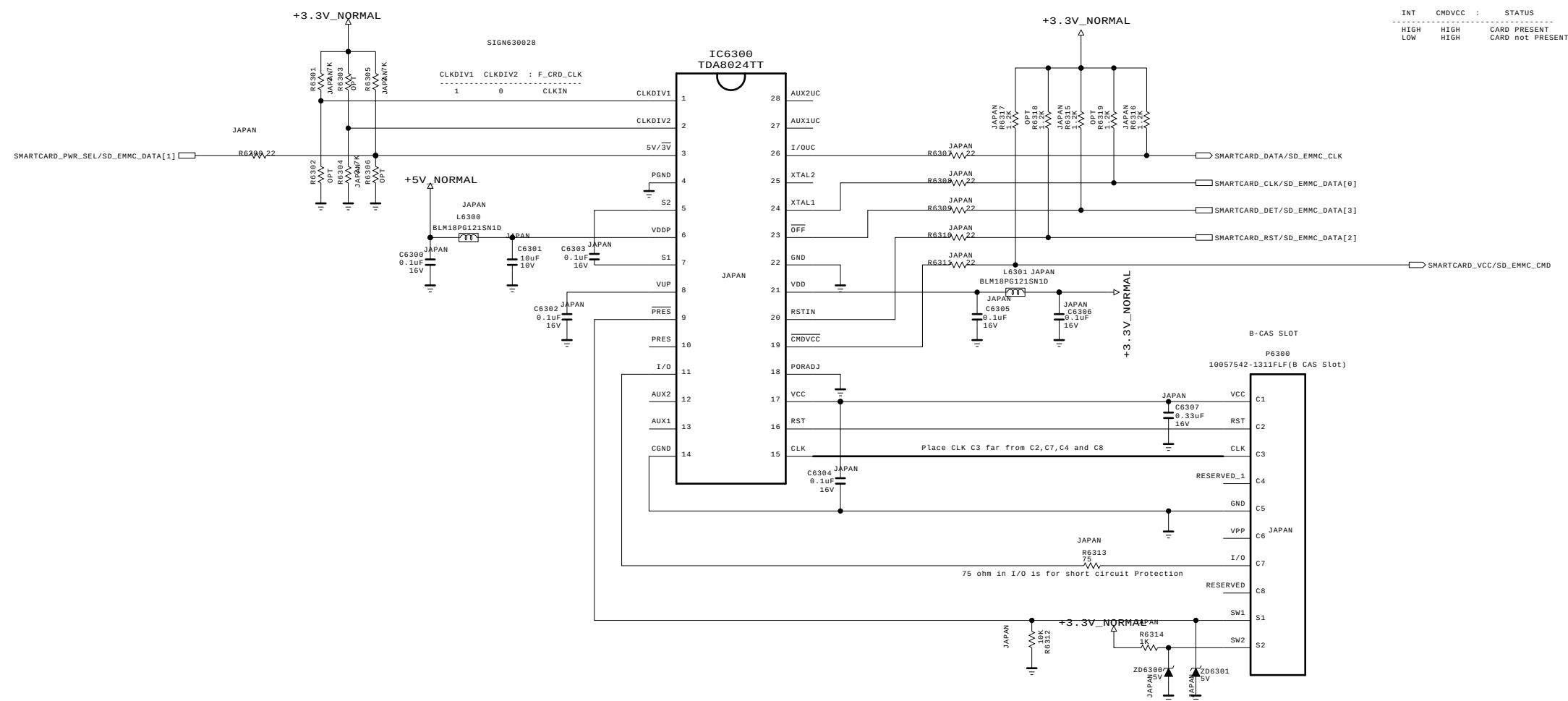
THE  SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE  SYMBOL MARK OF THE SCHEMATIC.

SECRET
LGElectronics



MODEL	CI SLOT	DATE	2011.10.31
BLOCK		SHEET	62 /

B-CAS (SMART CARD) INTERFACE



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



MODEL

CI SLOT

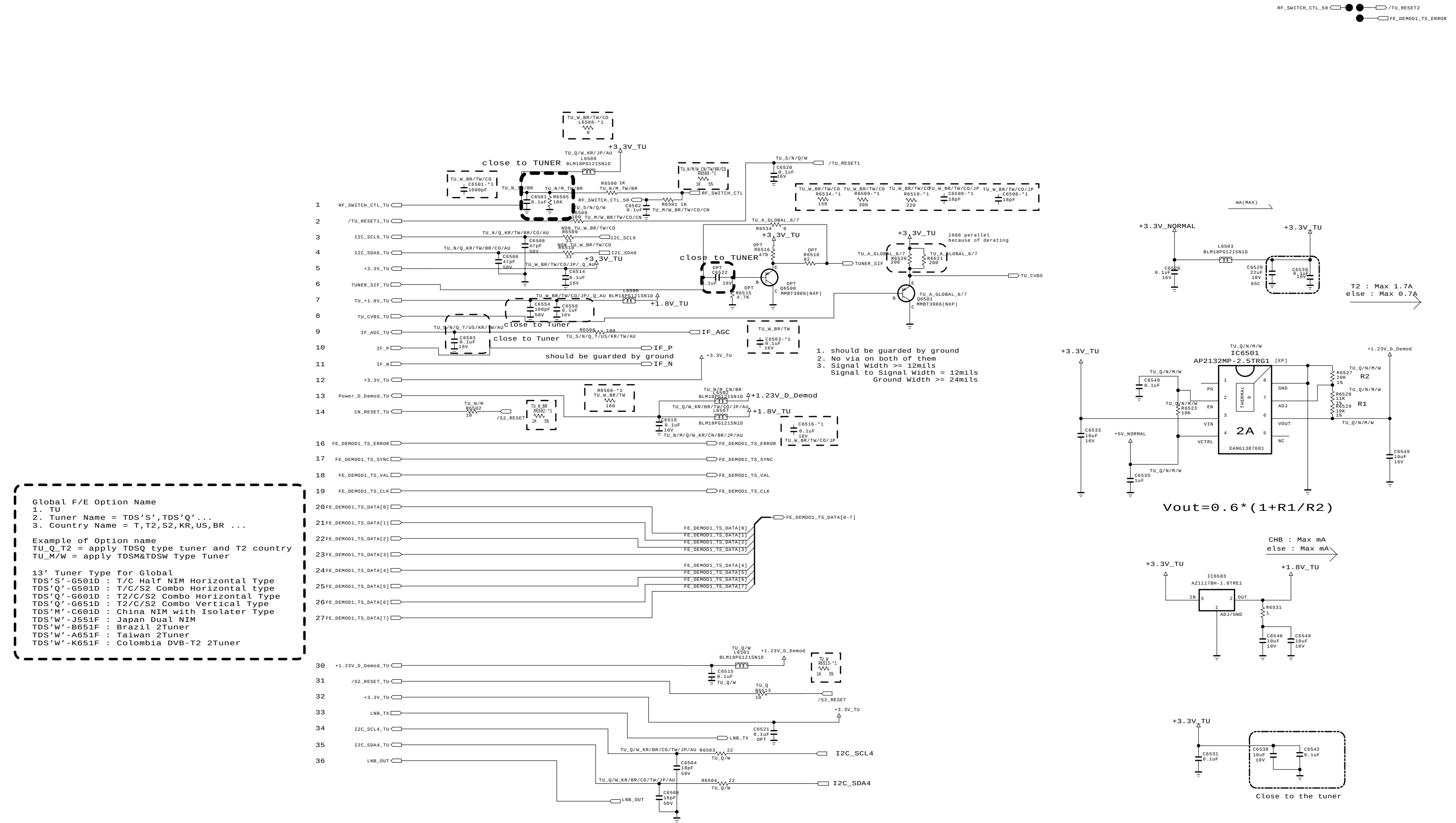
DATE

2011.04.17

BLOCK

SHEET

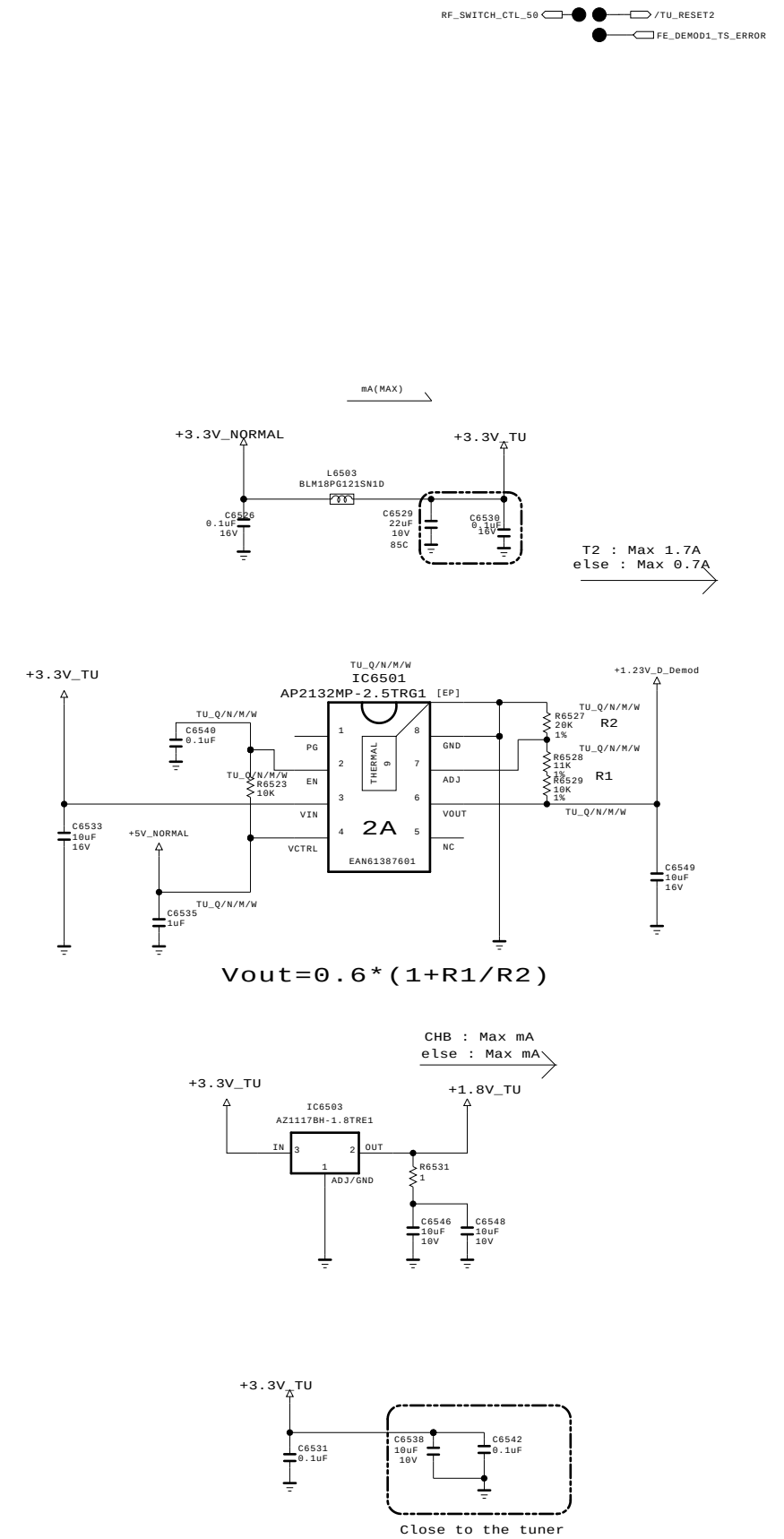
62



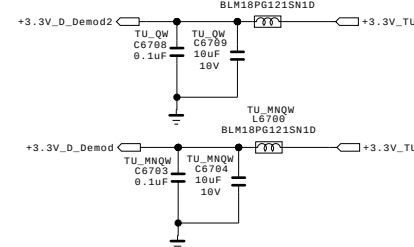
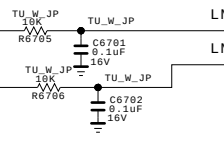
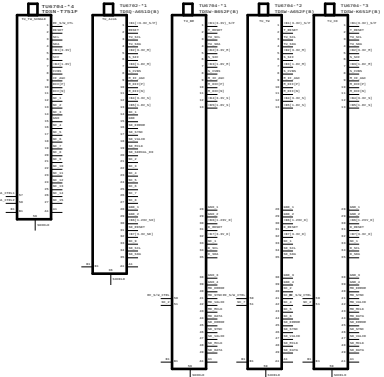
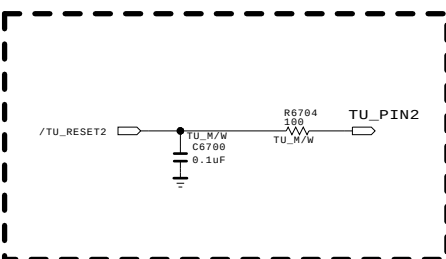
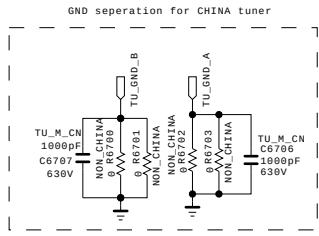
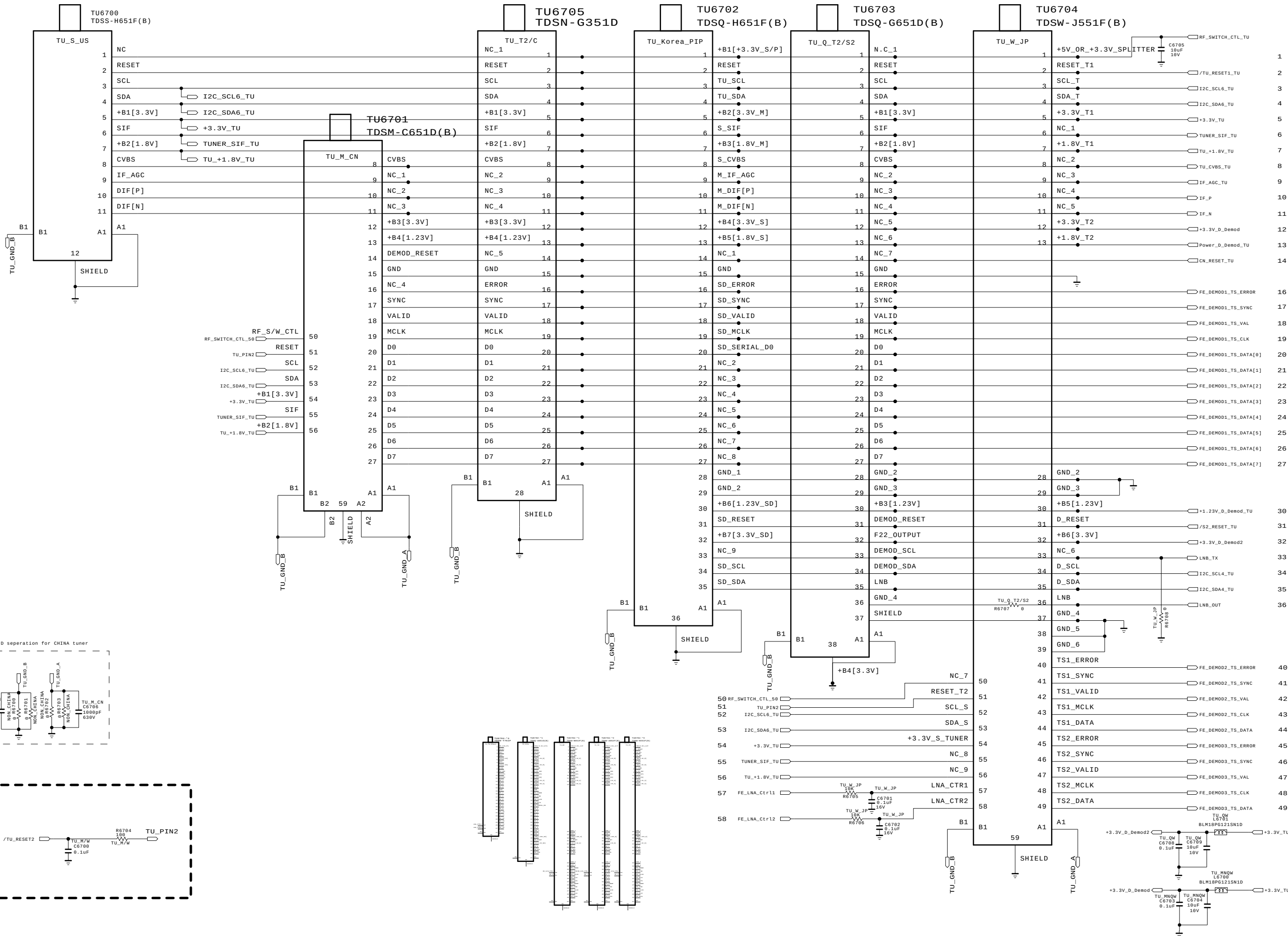
Global F/E Option Name
1. TU
2. Tuner Name = TDS'S',TDS'Q'...
3. Country Name = T,T2,S2,KR,US,BR ...

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'W'-J551F : China NIM with Isolater Type
TDS'W'-B551F : Japan Dual NIM
TDS'W'-B651F : Brazil 2Tuner
TDS'W'-A651F : Taiwan 2Tuner
TDS'W'-K651F : Colombia DVB-T2 2Tuner



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.



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 SPECIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMATIC.

SECRET
LGElectronics

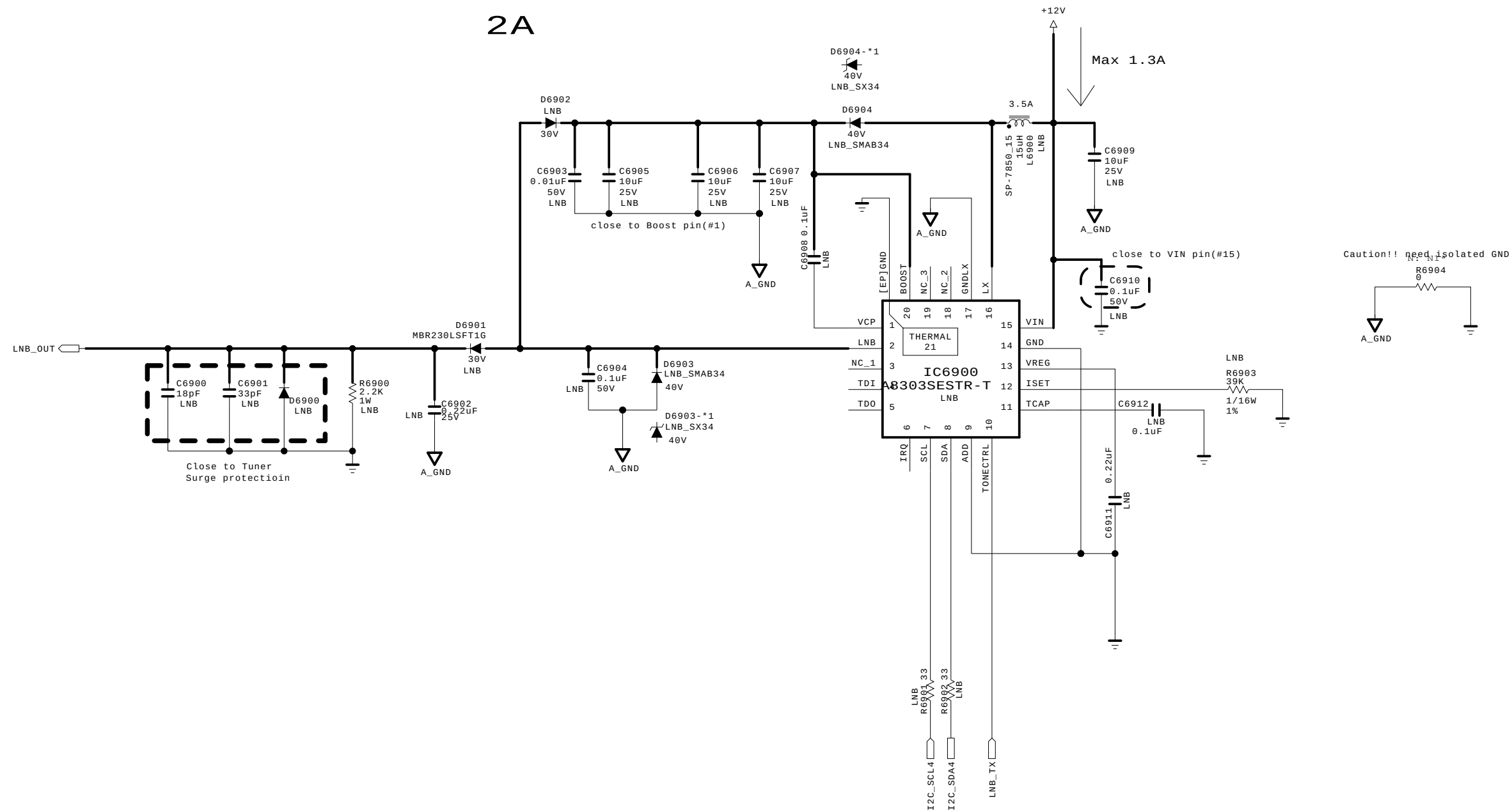


MODEL	TU_SYMBOL	DATE	2012.09.14
BLOCK		SHEET	/

(Option: LNB)

3A

Input trace widths should be sized to conduct at least 3A
Output trace widths should be sized to conduct at least 2A



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



MODEL

BLOCK

LNB

DATE _____

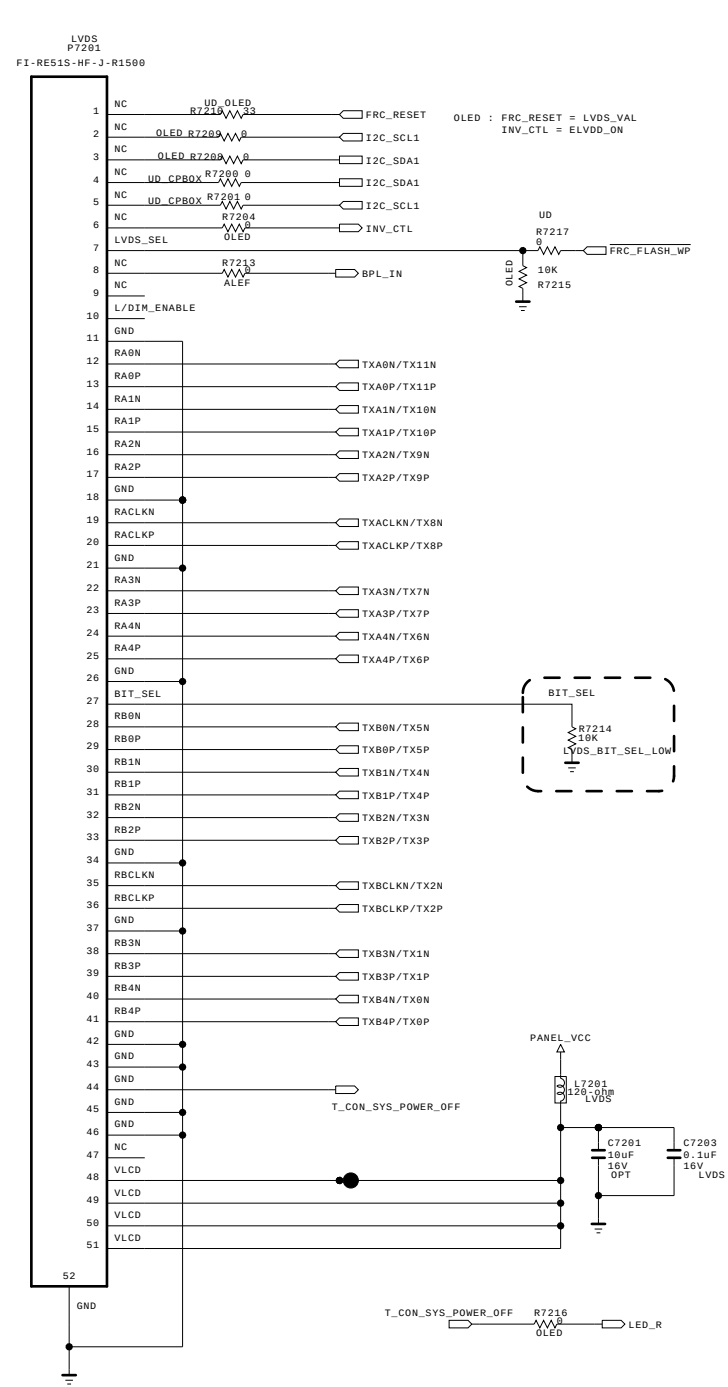
SHEET

2012.03.08

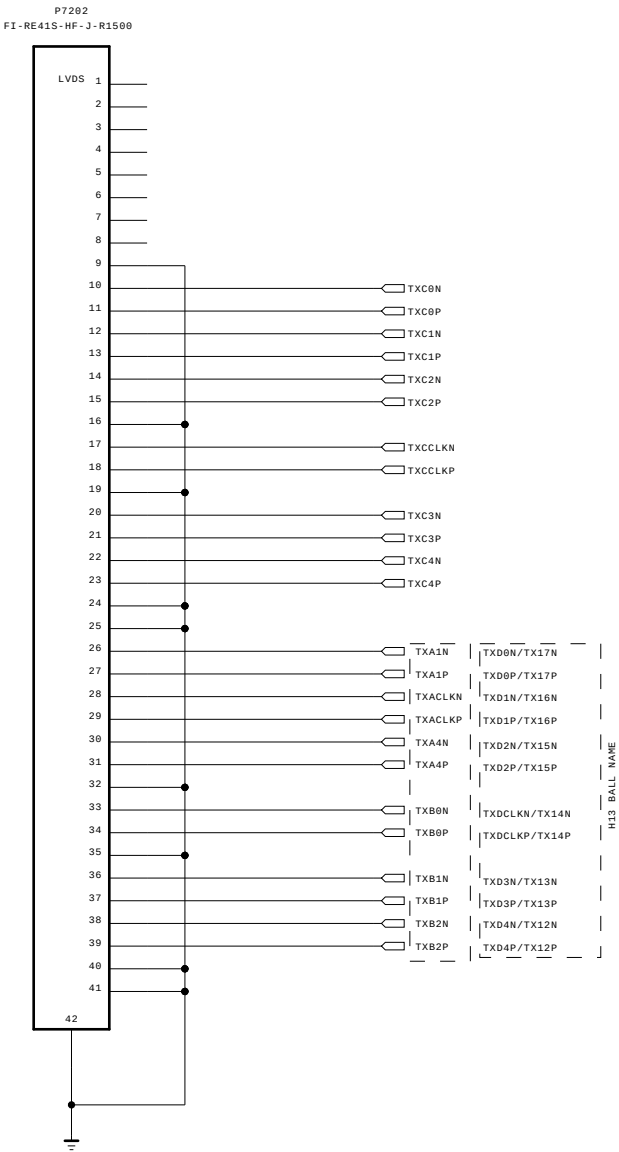
69

LVDS

[51Pin LVDS OUTPUT Connector]



[41Pin LVDS OUTPUT Connector]



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.

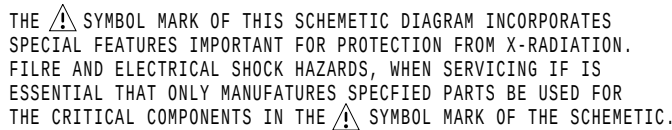
SECRET

LGElectronics

 LG ELECTRONICS

BSD - NC4_H072 - HD			
MODEL		DATE	2012-10-15
BLOCK	LVDS INTERFACE	SHEET	/

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



LG Electronics



LGE Internal Use Only



OLED TV Repair Guide

`13 years New Models

Main PCB for Broadband

55EA9800

Clear Speaker

CAM USB

Local Dim.

To PSU

Module

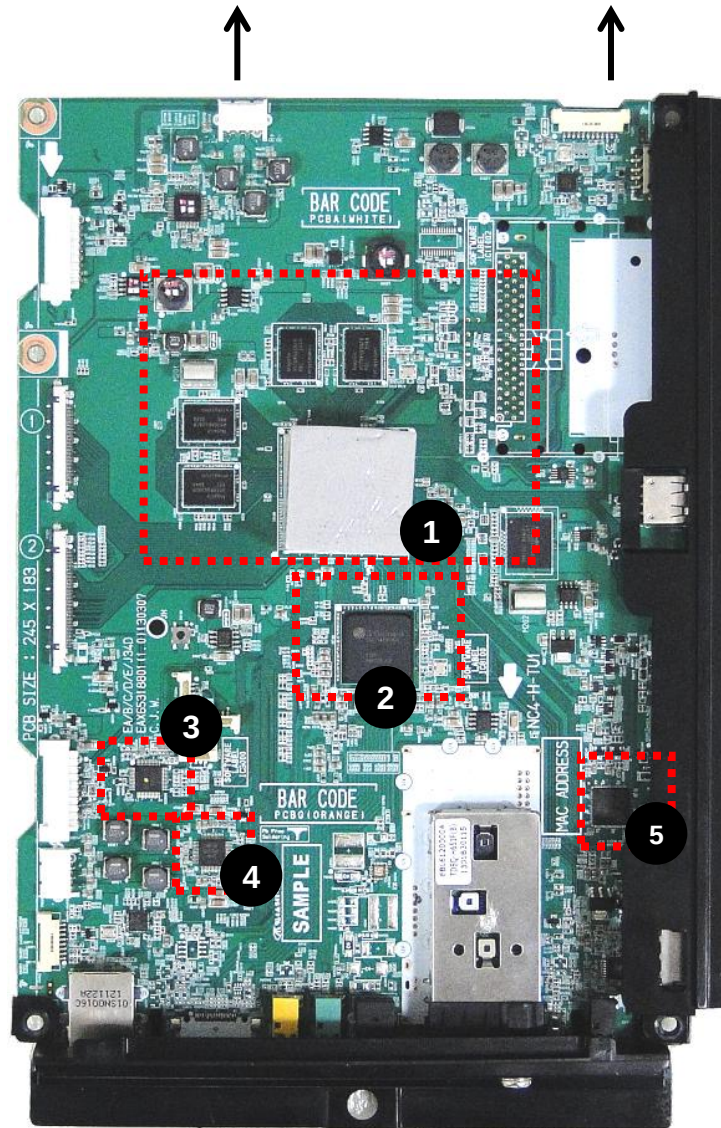
wifi

Motion assy

IR + Digital Eye

Front Spk

Local Key



1

Main processor_Digital(LG1152D),
DDR Memory
Flash Memory

2

Main processor_analog(LG1152A)

3

Micom for Key/IR sensing

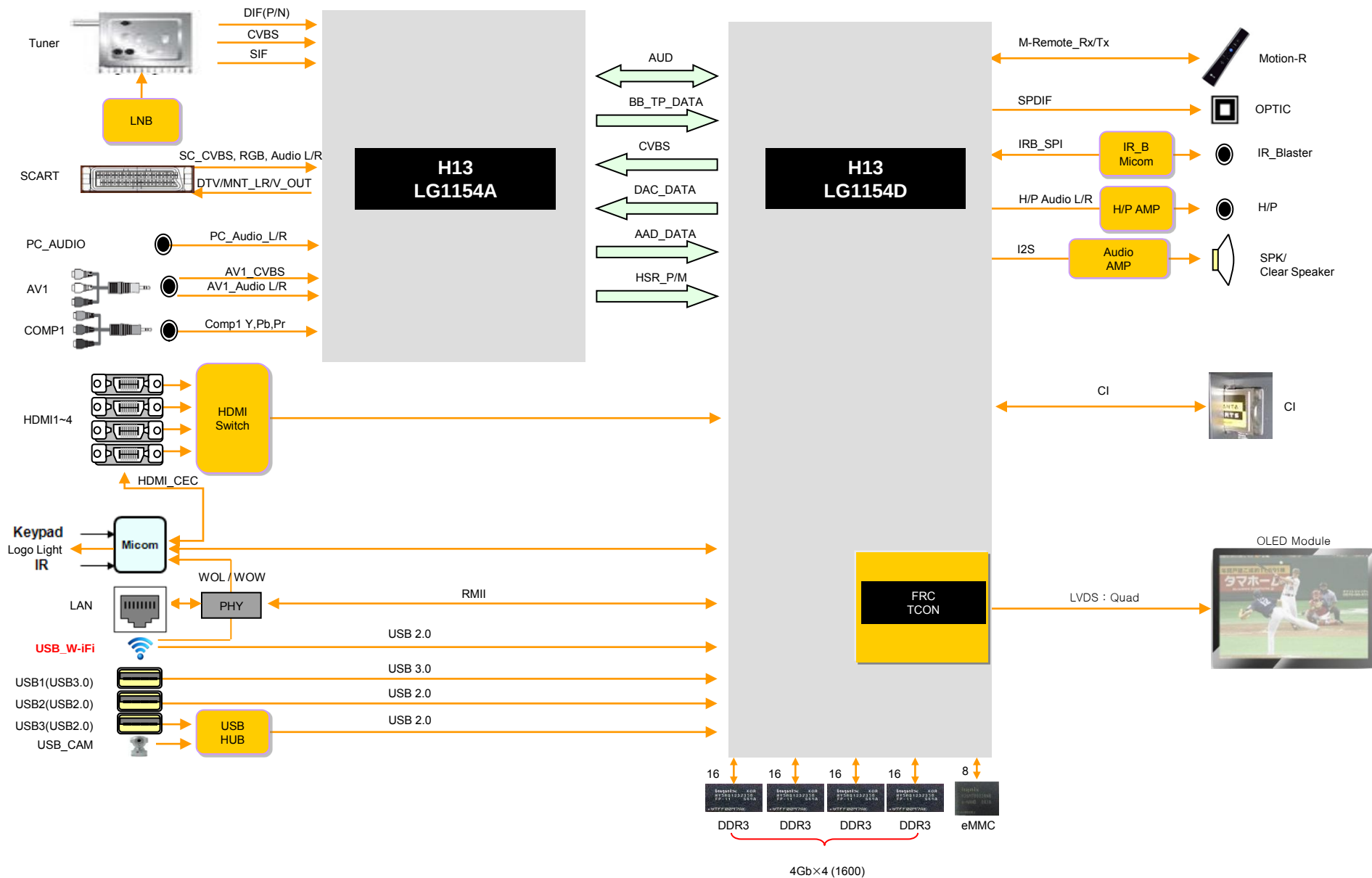
4

Audio AMP (Max 12W)

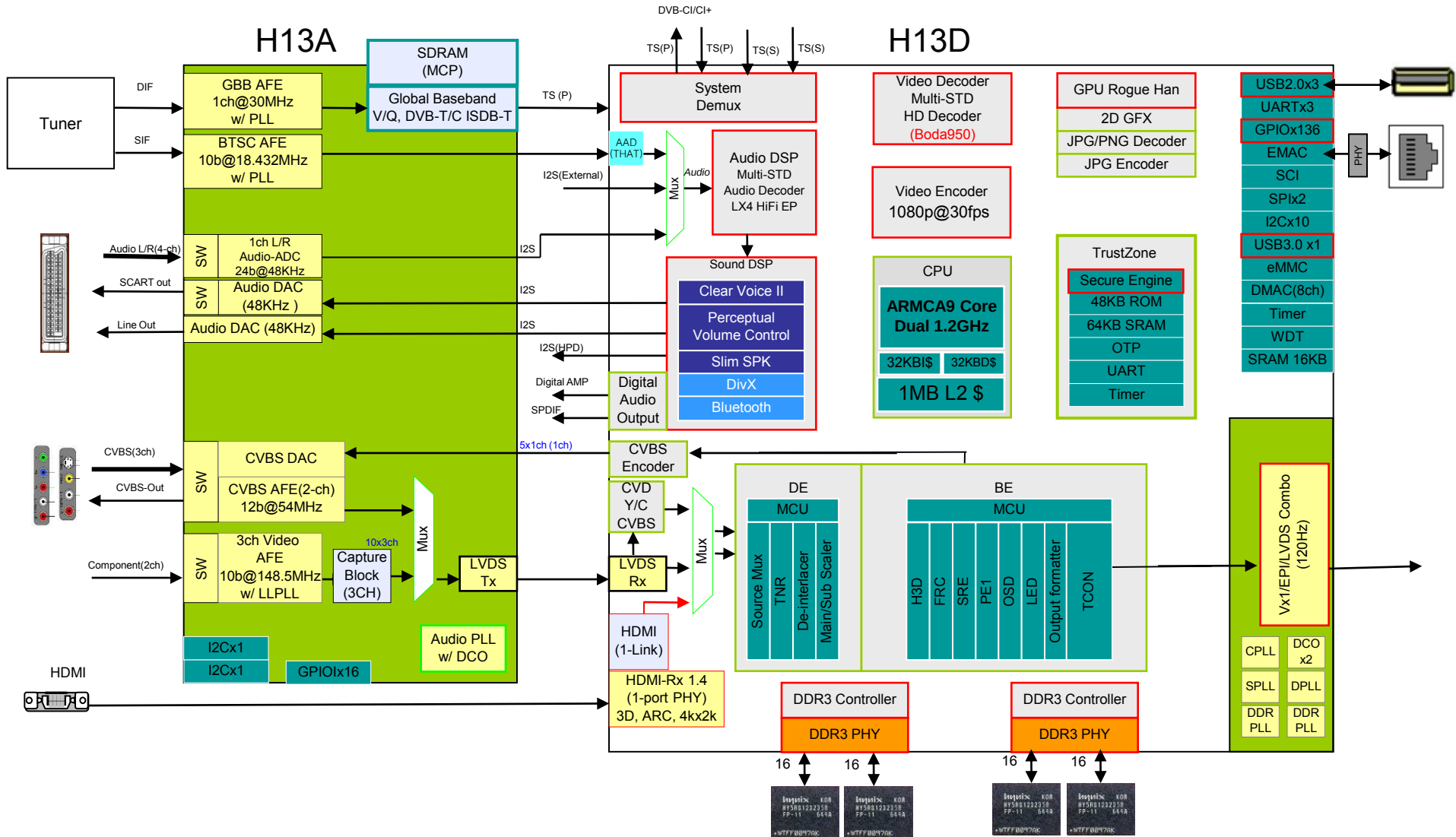
5

HDMI switch (4:1)

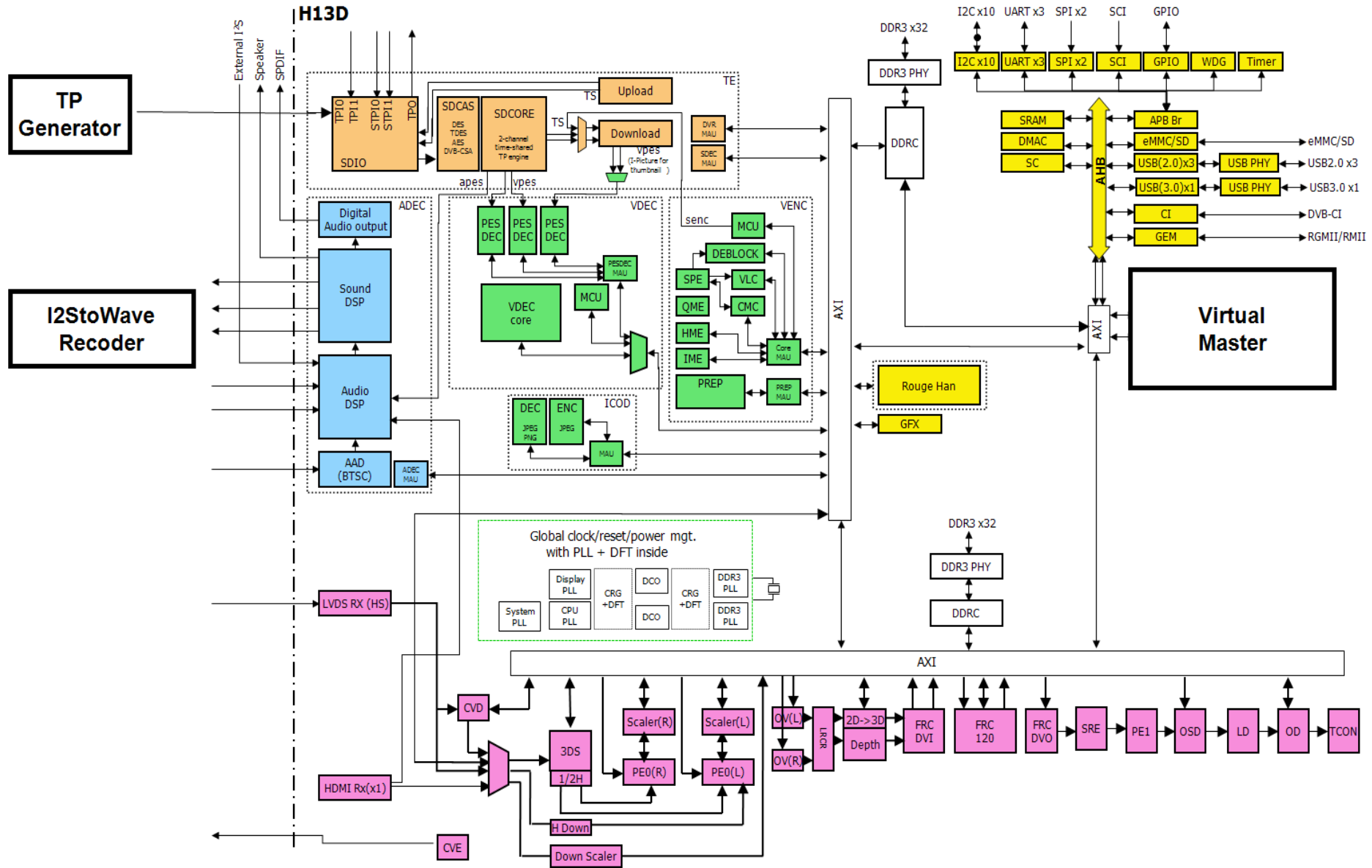
H13 Block diagram



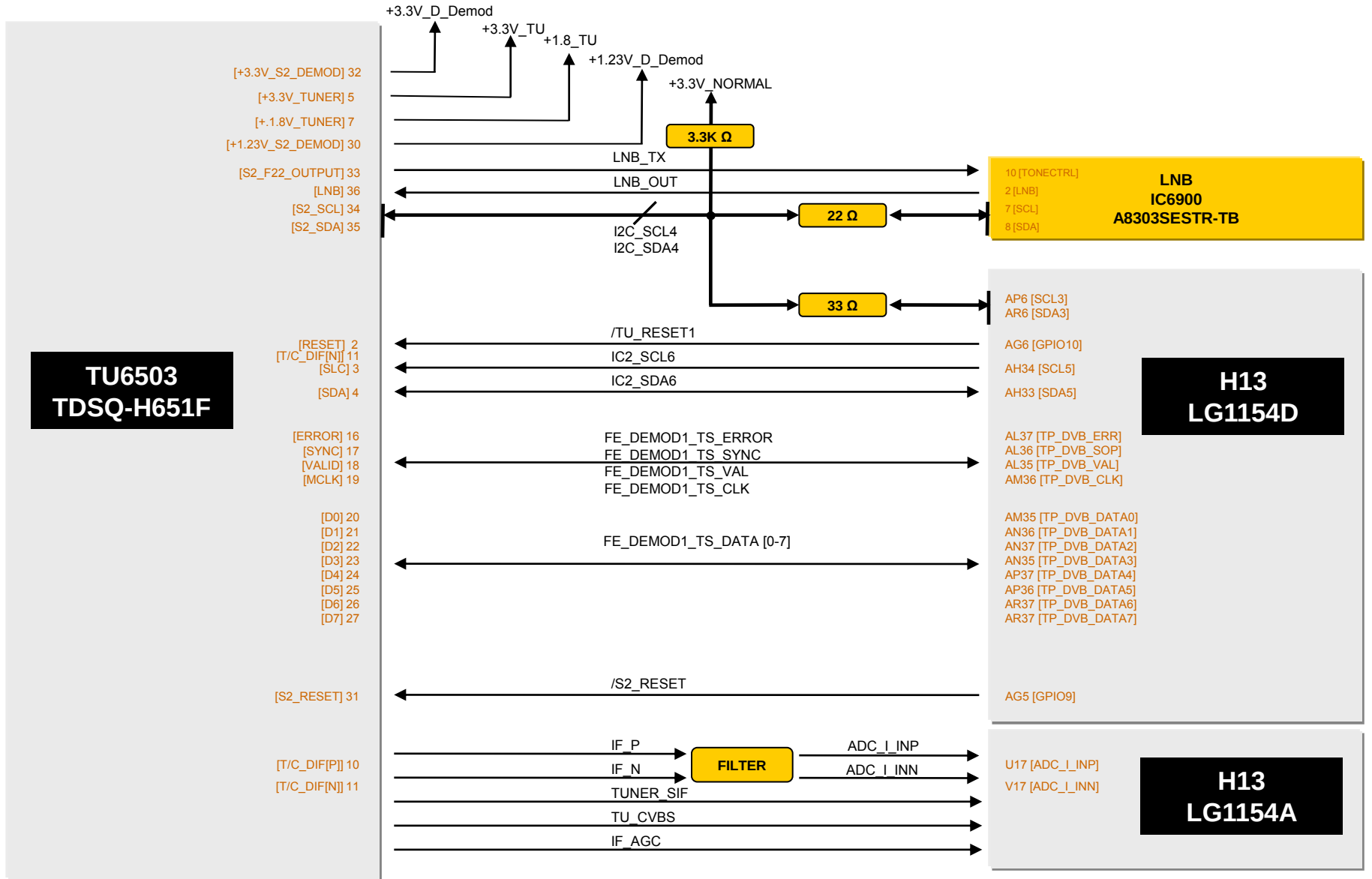
H13 Block diagram



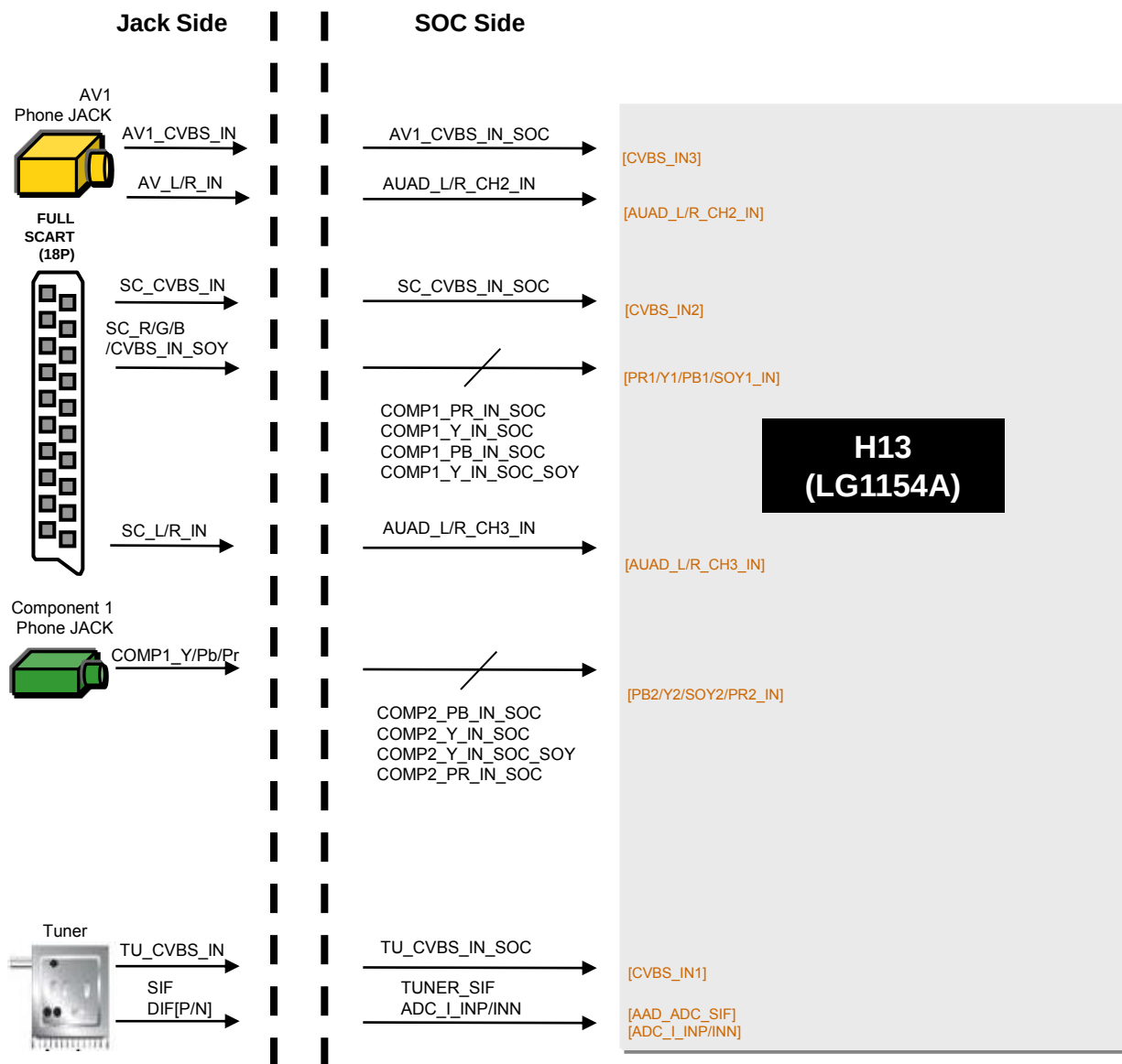
H13 Block diagram



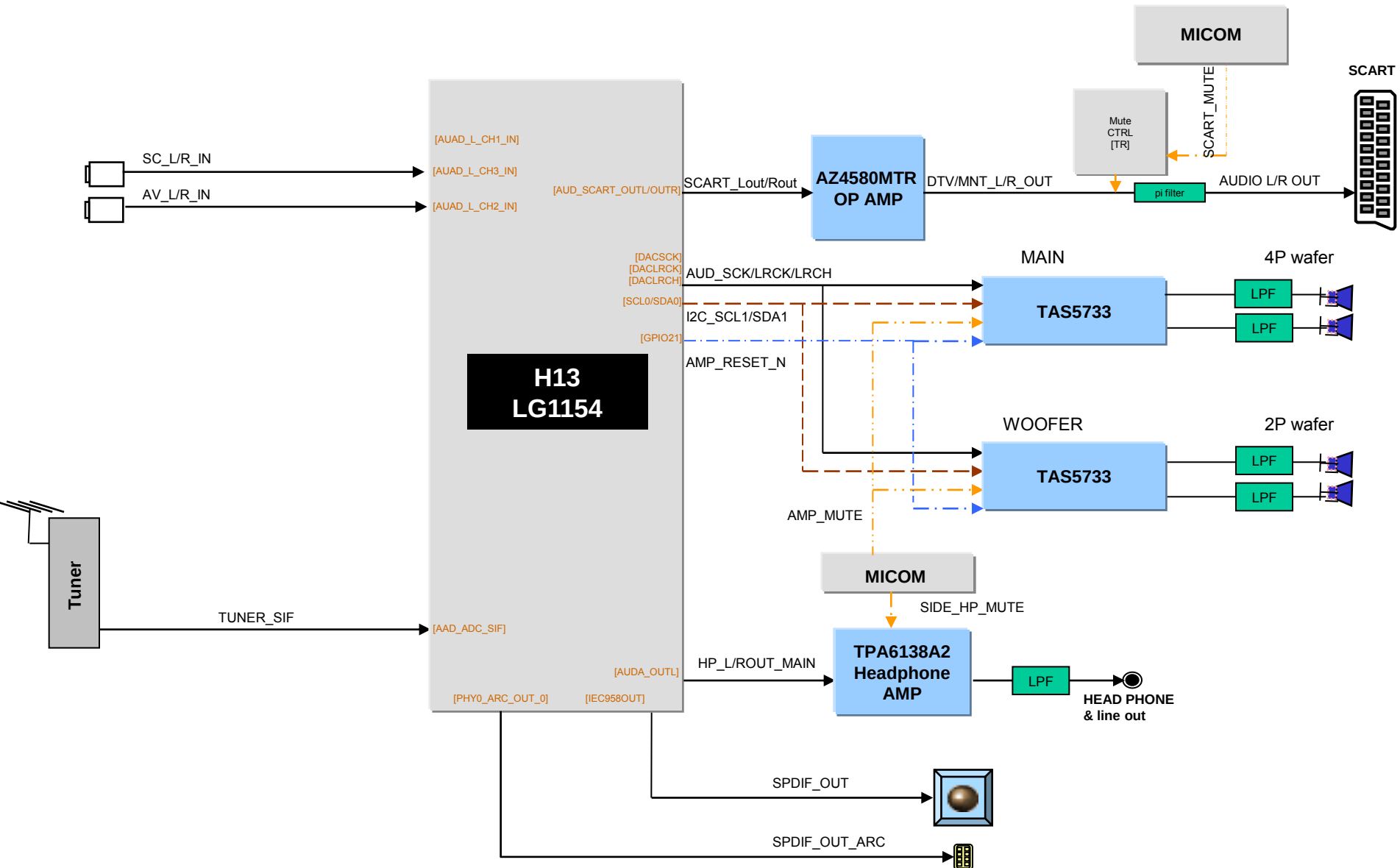
H13 Block diagram



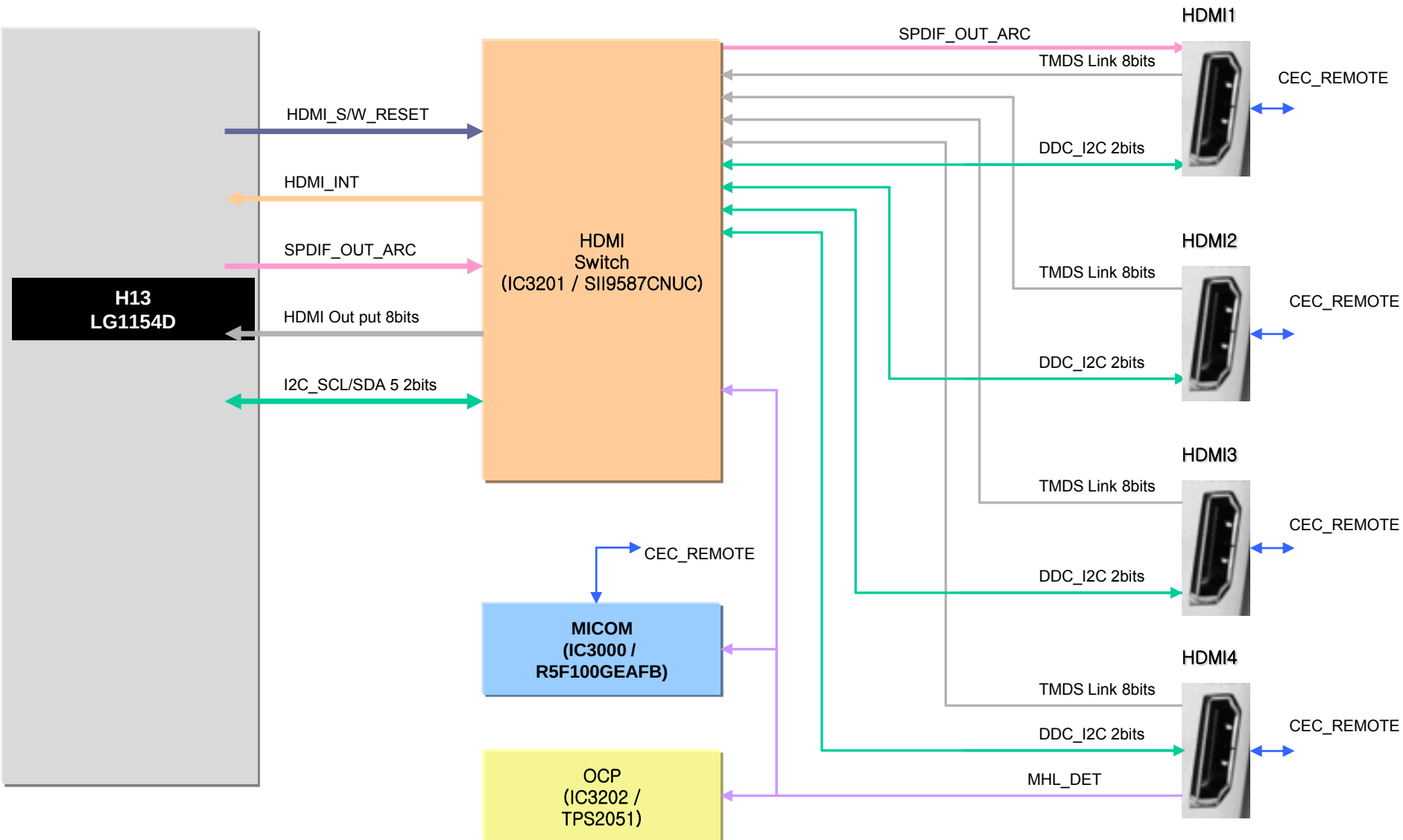
H13 Block diagram



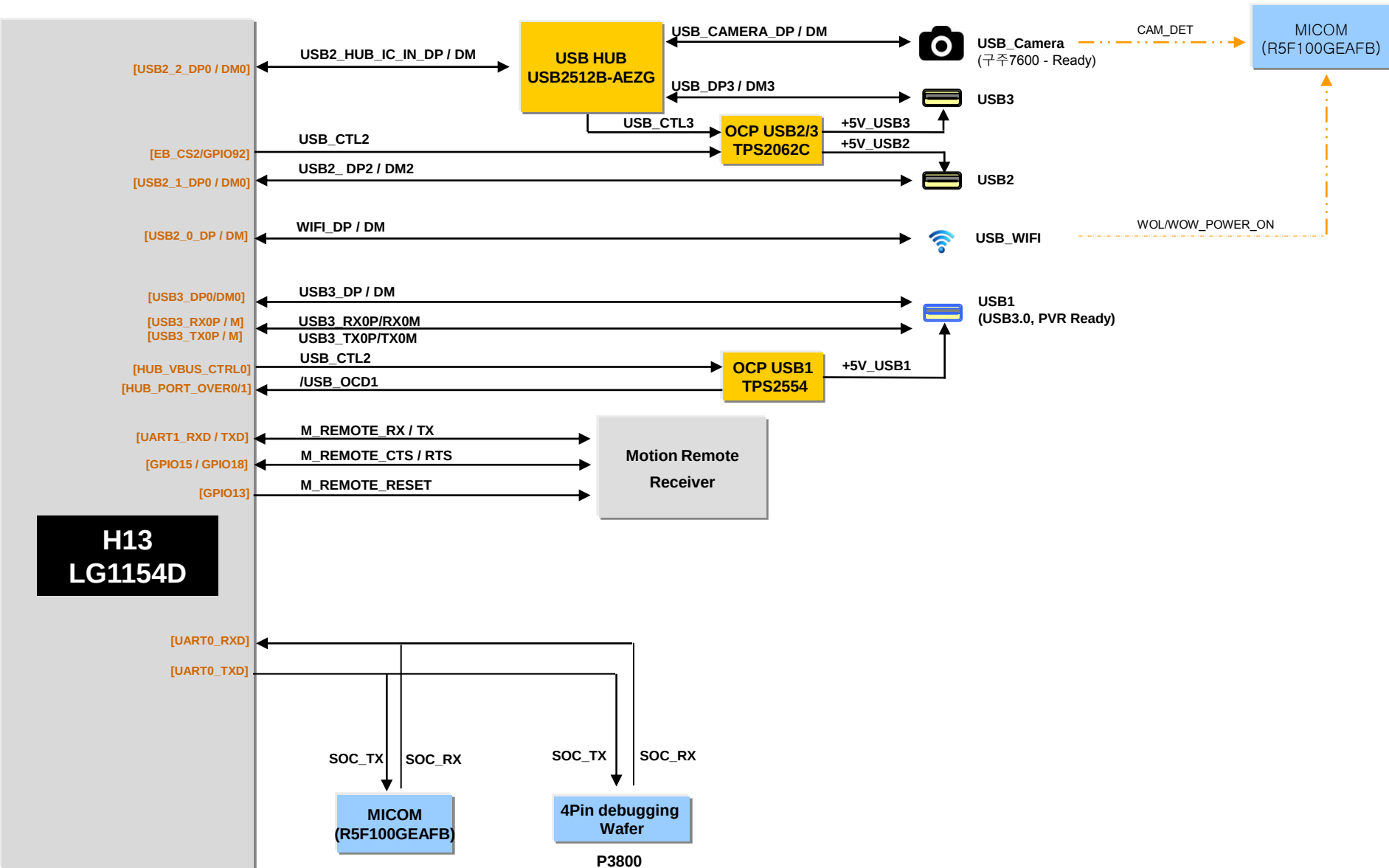
H13 Block diagram



H13 Block diagram

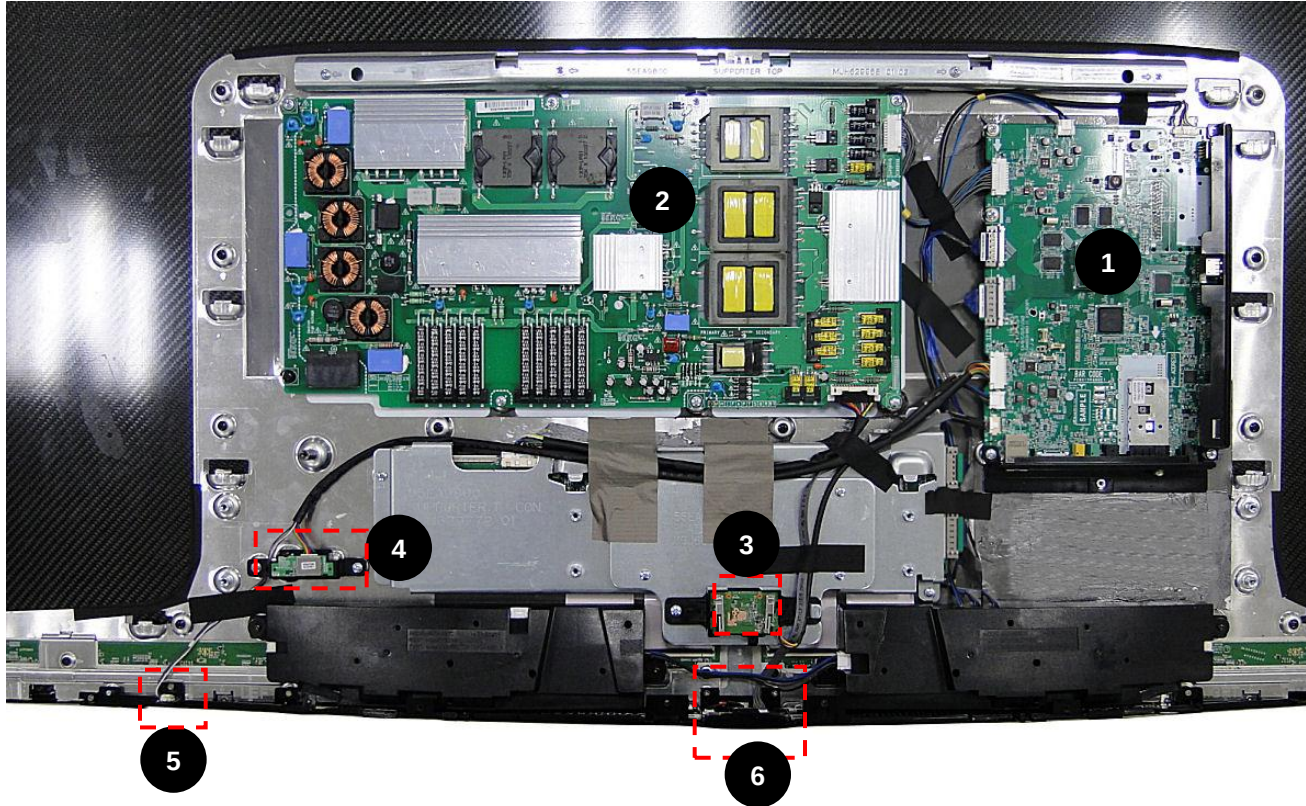


H13 Block diagram



Interconnection - 1

55EA9800



[PCBs]

- 1 Main PCB
- 2 PSU
- 3 WIFI ASSY
- 4 BT MOTION ASSY
- 5 IR PCB
- 6 Touch Key / Logo

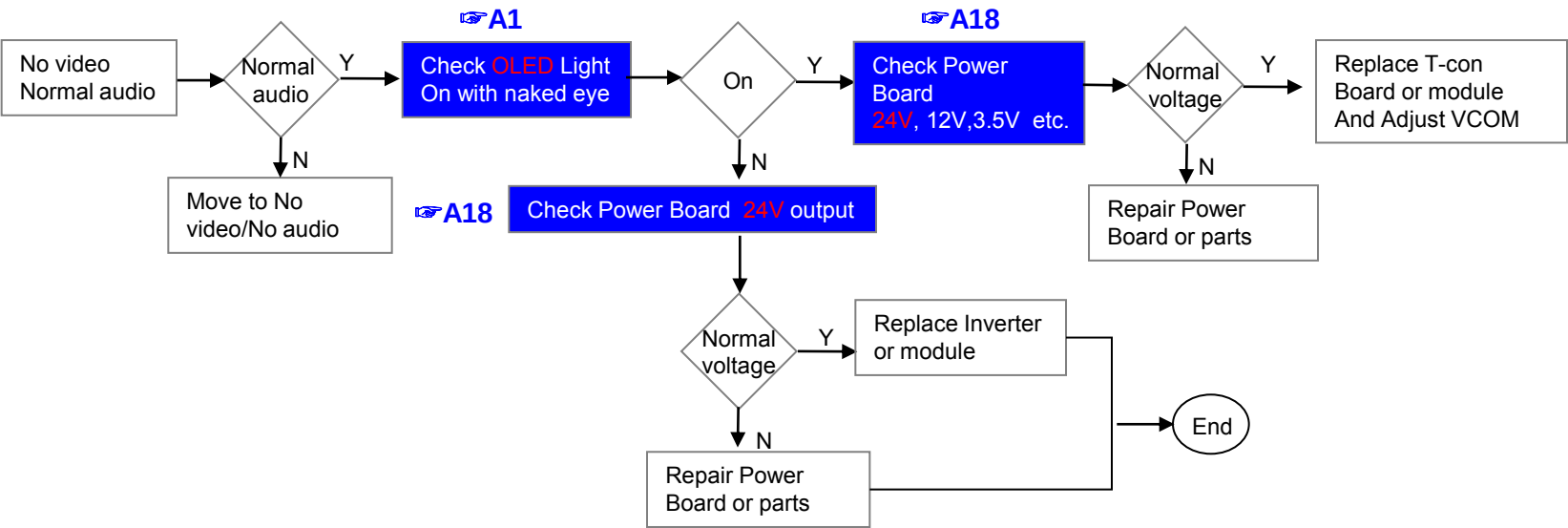
Contents of LCD TV Standard Repair Process

No.	Error symptom (High category)	Error symptom (Mid category)	Page	Remarks
1	A. Video error	No video/Normal audio	1	
2		No video/No audio	2	
3		Picture broken/ Freezing	3	
4		Color error	4	
5		Vertical/Horizontal bar, residual image, light spot, external device color error	5	
6	B. Power error	No power	6	
7		Off when on, off while viewing, power auto on/off	7	
8	C. Audio error	No audio/Normal video	8	
9		Wrecked audio/discontinuation/noise	9	
10	D. Function error	Remote control & Local switch checking	10	
11		MR13 operating checking	11	
12		Wifi operating checking	12	
13		Camera operating checking	13	
14		External device recognition error	14	
15	E. Noise	Circuit noise, mechanical noise	15	
16	F. Exterior error	Exterior defect	16	

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

Standard Repair Process					
LCD TV	Error symptom	A. Video error	Established date	2013.01.31	
		No video/ Normal audio	Revised date		1/16

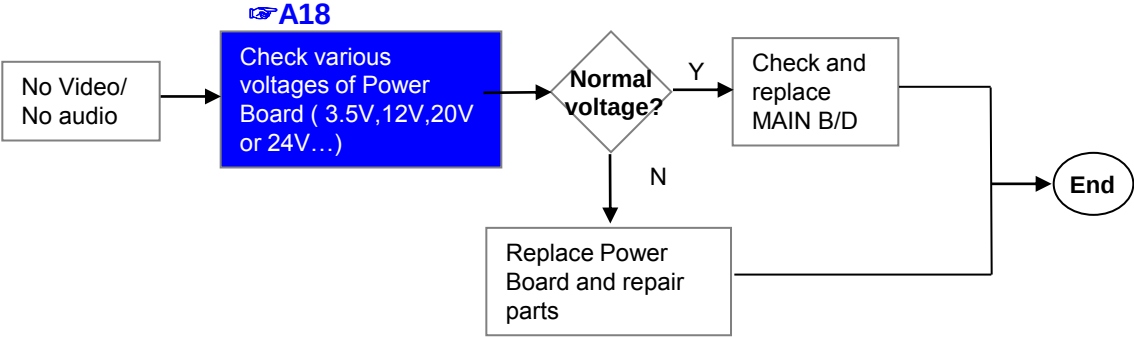
First of all, Check whether all of cables between board is inserted properly or not.
(Main B/D↔ Power B/D, EPI Cable,Speaker Cable,IR B/D Cable,,,)



※Precaution A4 & A2



Standard Repair Process					
LCD TV	Error symptom	A. Video error	Established date	2013.01.31	
		No video/ No audio	Revised date		2/16

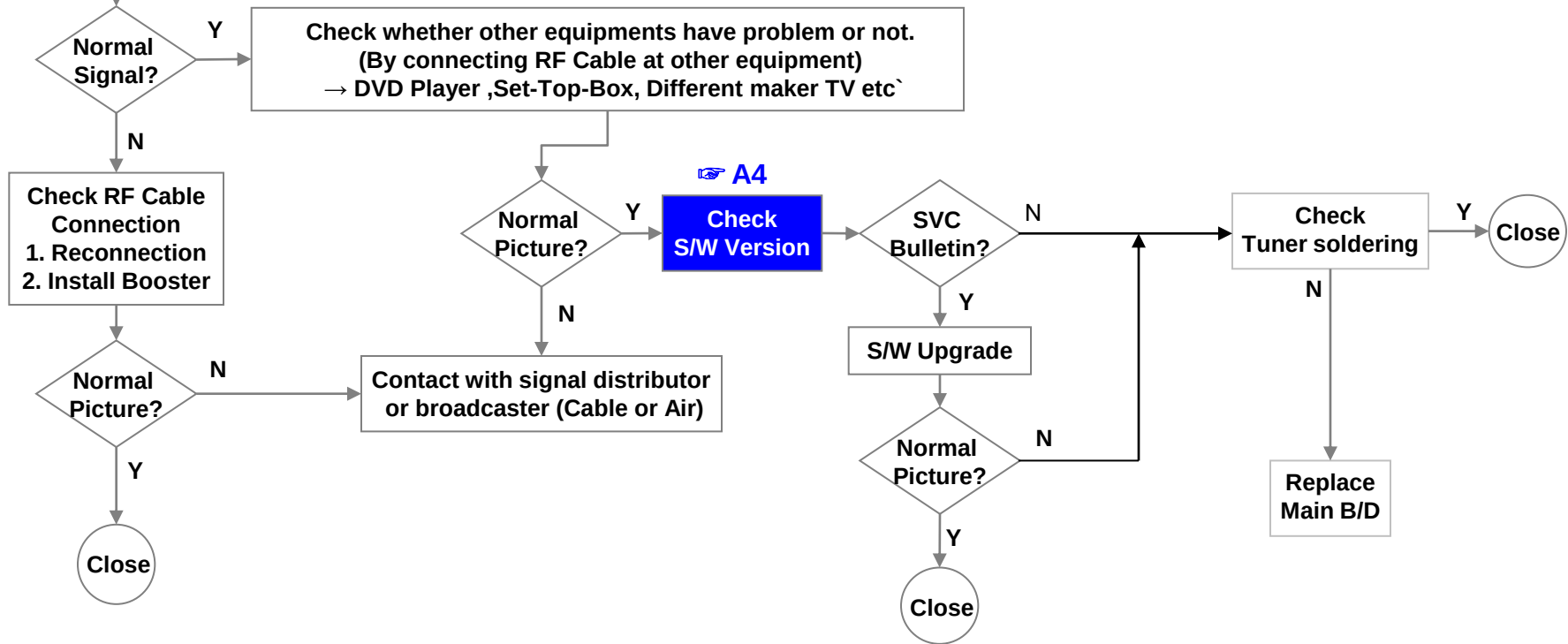


LCD TV	Error symptom	A. Video error	Established date	2013.01.31	
		Picture broken/ Freezing	Revised date		3/16

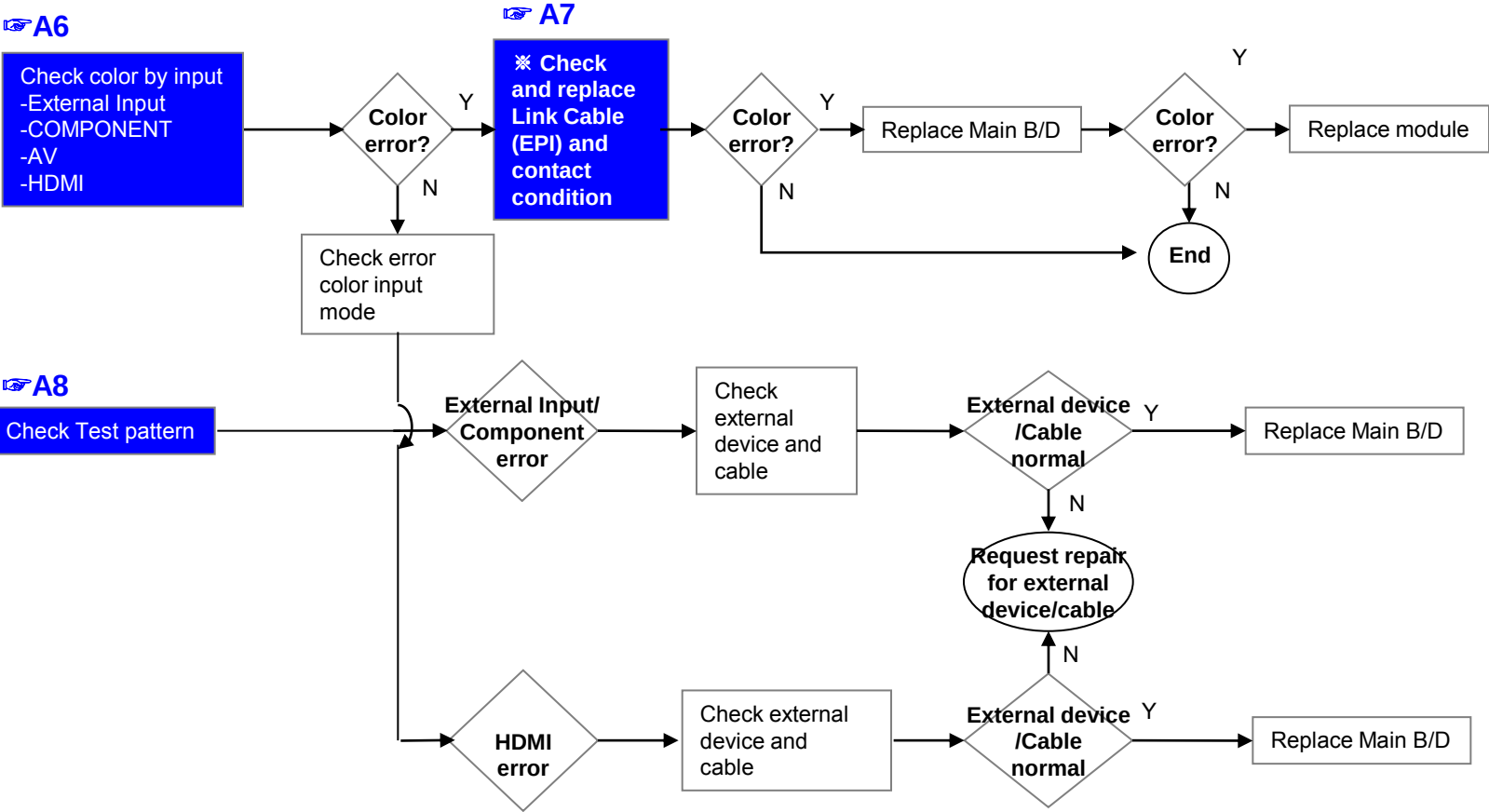
☞ A3

Check RF Signal level

- . By using Digital signal level meter
- . By using Diagnostics menu on OSD
(Setting → Set up → Manual Tuning → Check the Signal)
- Signal strength (Normal : over 50%)
- Signal Quality (Normal: over 50%)

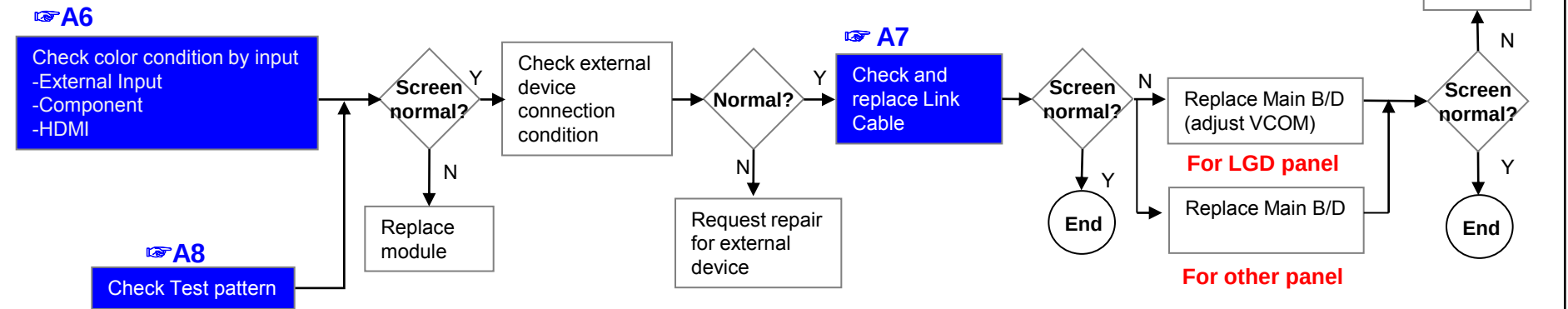


Standard Repair Process					
LCD TV	Error symptom	A. Video error	Established date	2013.01.31	
		Color error	Revised date		4/16

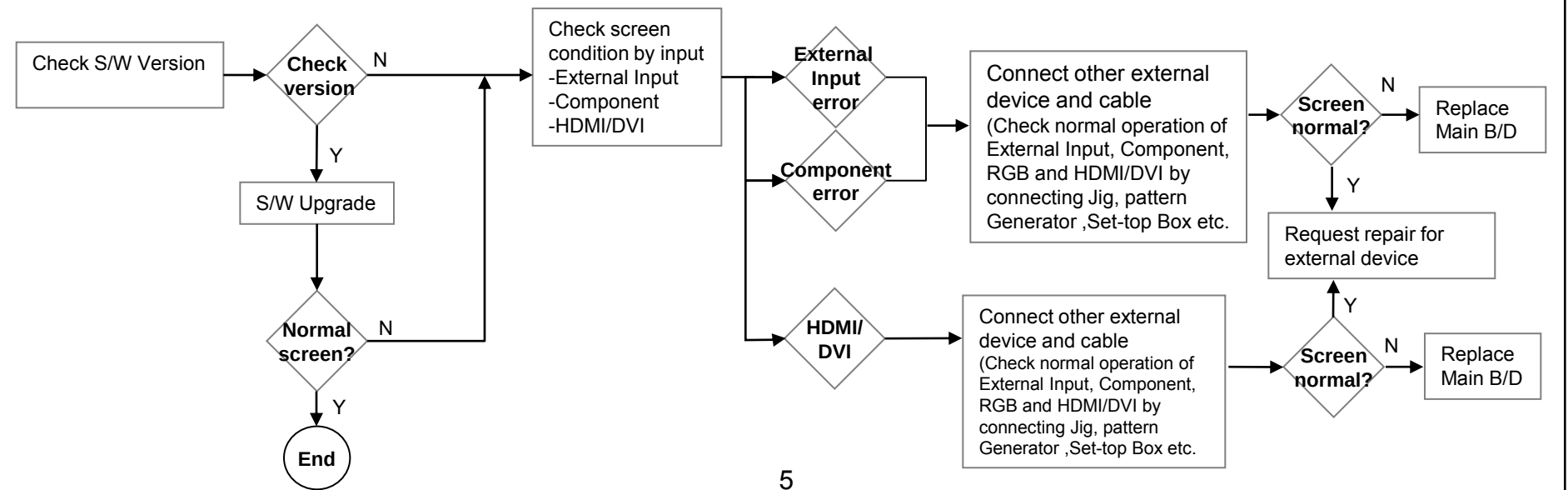


LCD TV	Error symptom	A. Video error	Established date	2013.01.31	
		Vertical / Horizontal bar, residual image, light spot, external device color error	Revised date		5/16

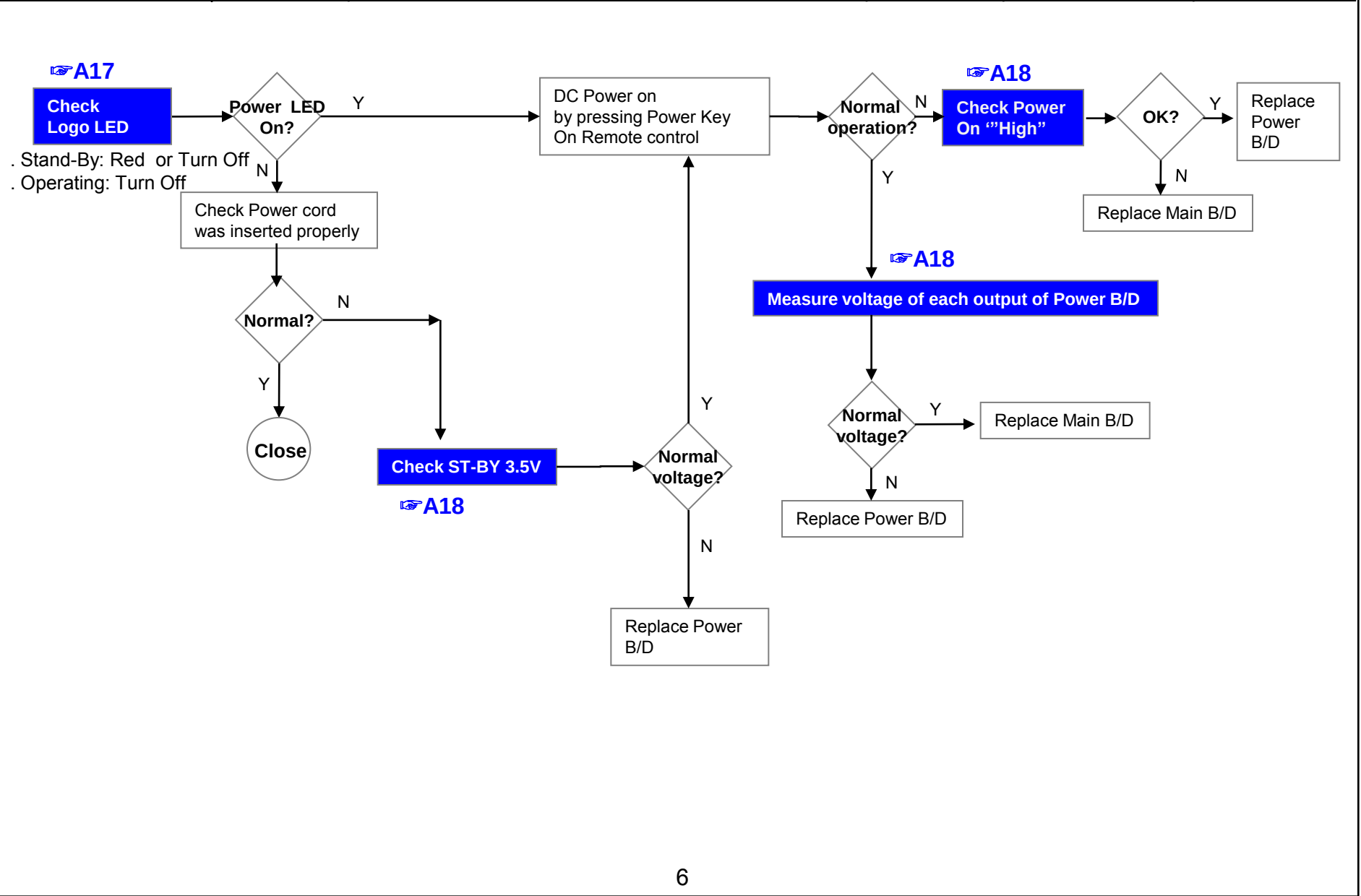
Vertical/Horizontal bar, residual image, light spot



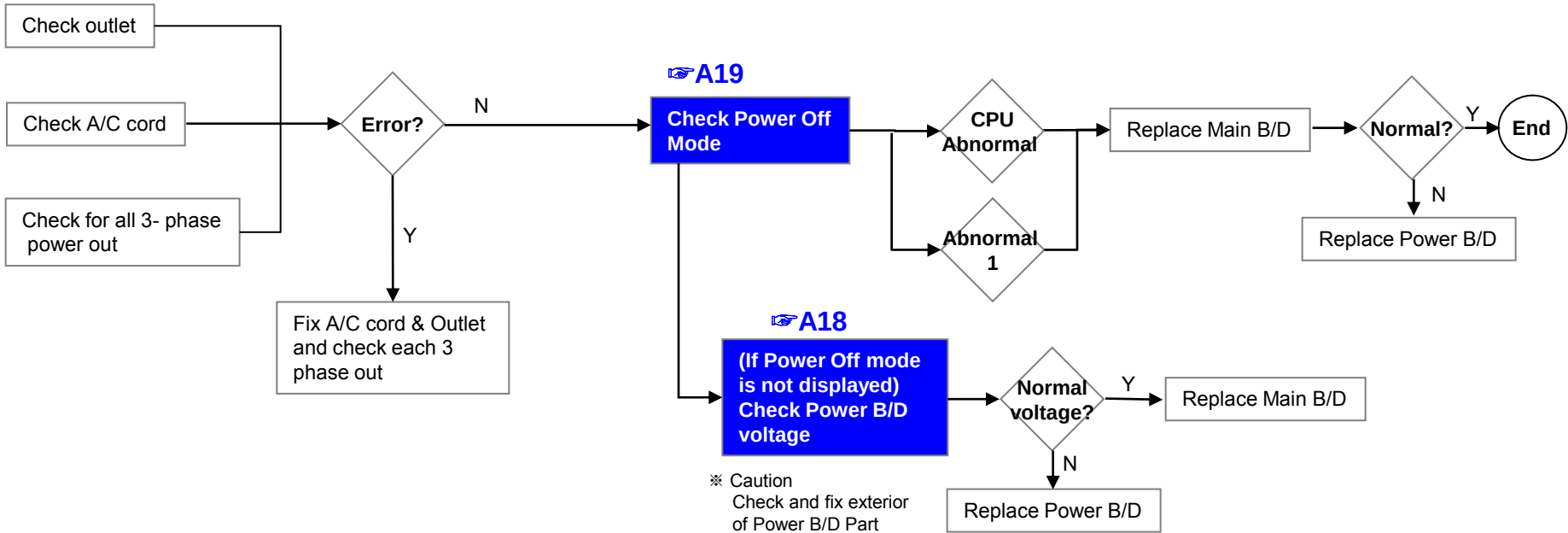
External device screen error-Color error



Standard Repair Process					
LCD TV	Error symptom	B. Power error	Established date	2013.01.31	
		No power	Revised date		6/16



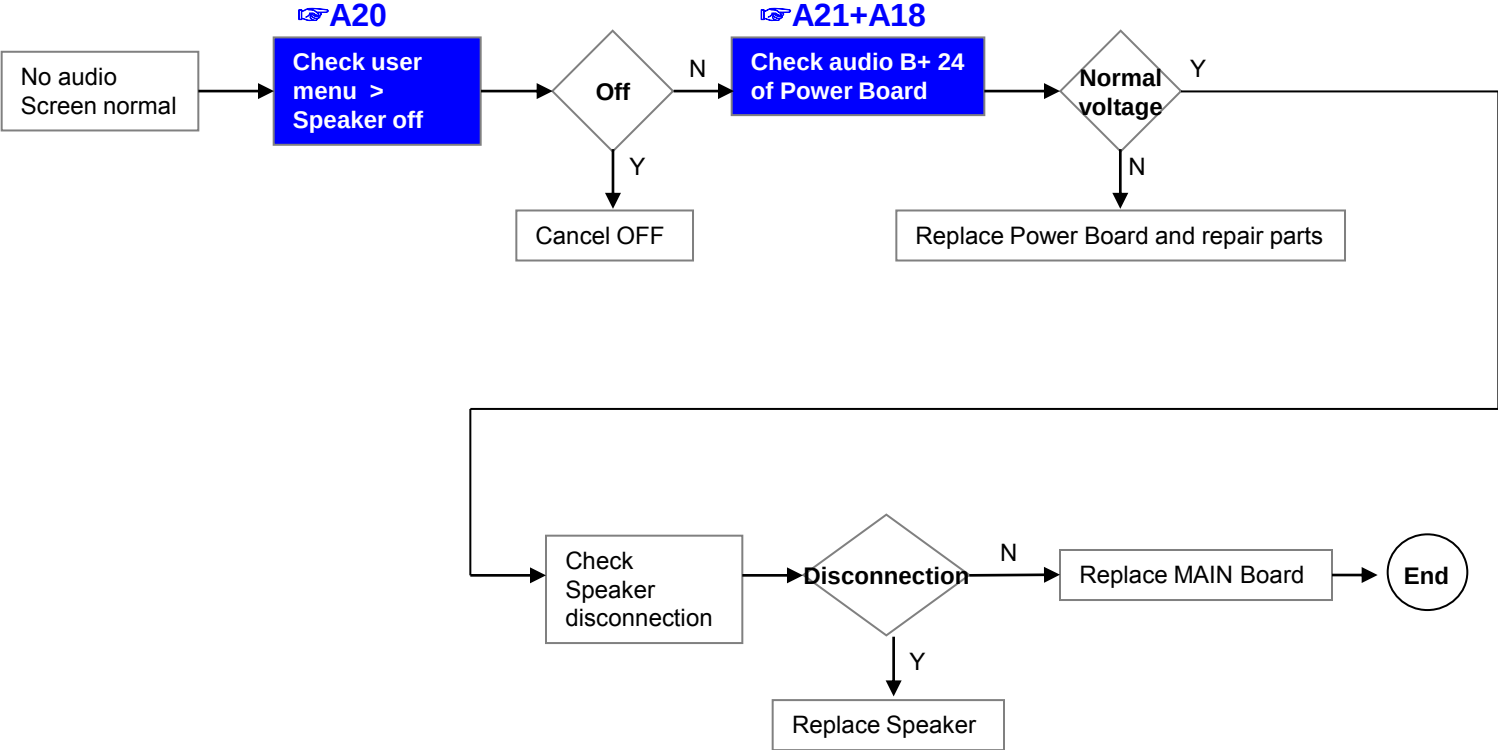
LCD TV	Error symptom	B. Power error	Established date	2013.01.31	
		Off when on, off while viewing, power auto on/off	Revised date		7/16



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

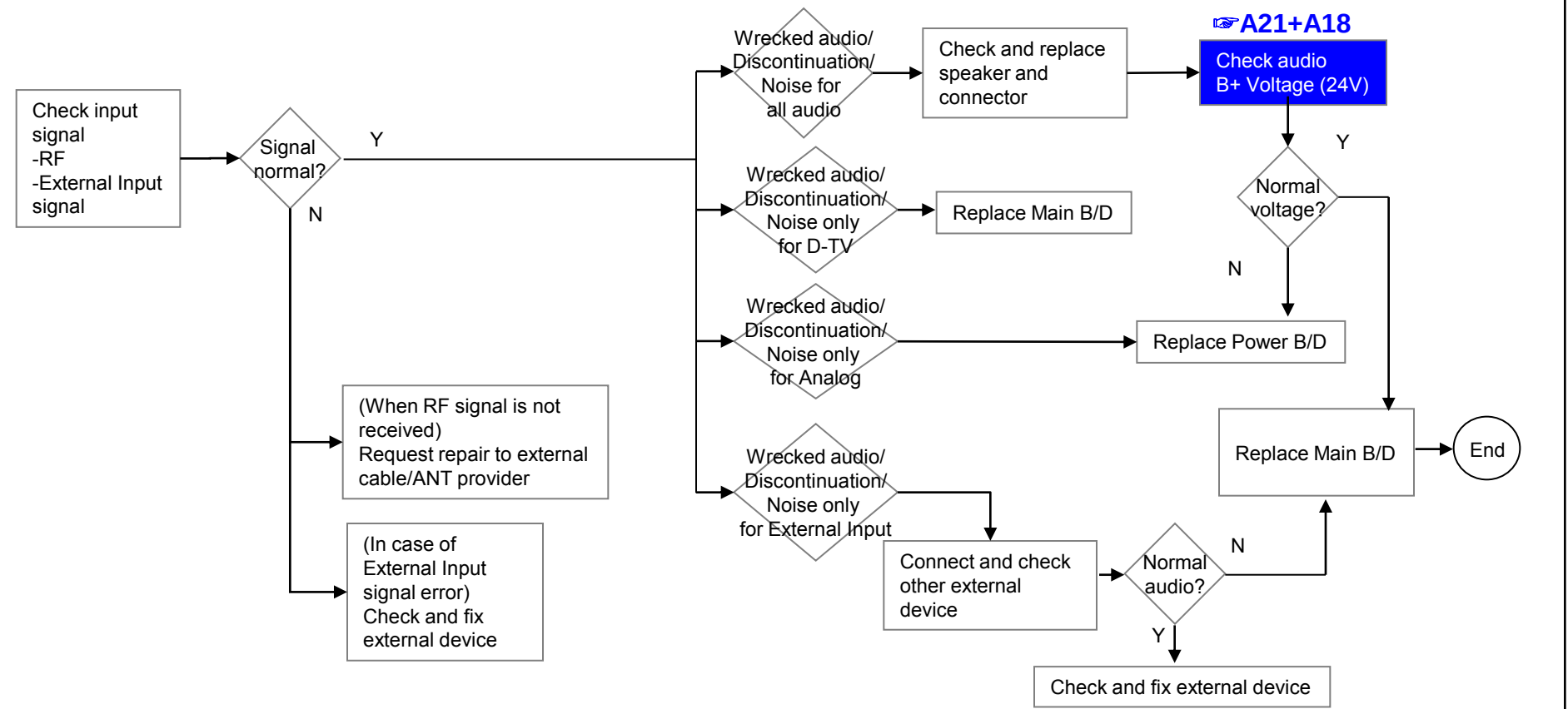
Status	Power off List	Explanation
Normal	"POWEROFF_REMOTEKEY"	Power off by REMOTE CONTROL
	"POWEROFF_OFFTIMER"	Power off by OFF TIMER
	"POWEROFF_SLEEPTIMER"	Power off by SLEEP TIMER
	"POWEROFF_INSTOP"	Power off by INSTOP KEY
	"POWEROFF_AUTOOFF"	Power off by AUTO OFF
	"POWEROFF_ONTIMER"	Power off by ON TIMER
	"POWEROFF_20V_DET"	Power off by AC OFF
	"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	2013.01.31	
		No audio/ Normal video	Revised date		8/16



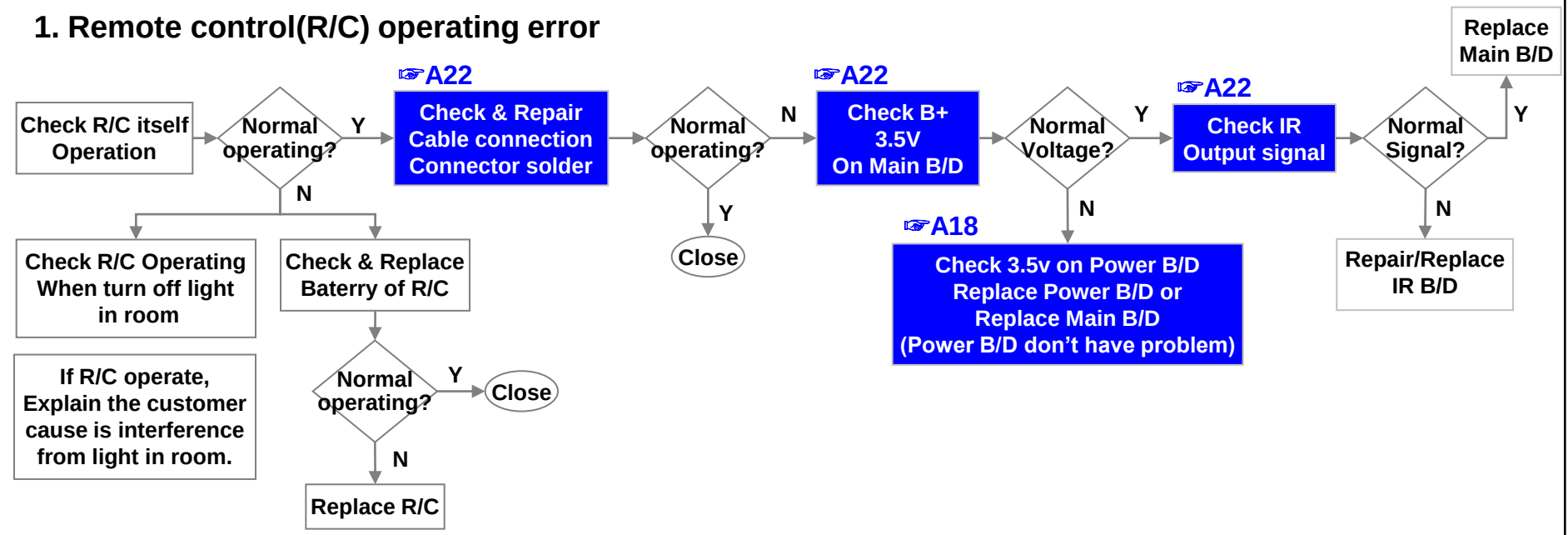
LCD TV	Error symptom	C. Audio error	Established date	2013.01.31	
		Wrecked audio/ discontinuation/noise	Revised date		9/16

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



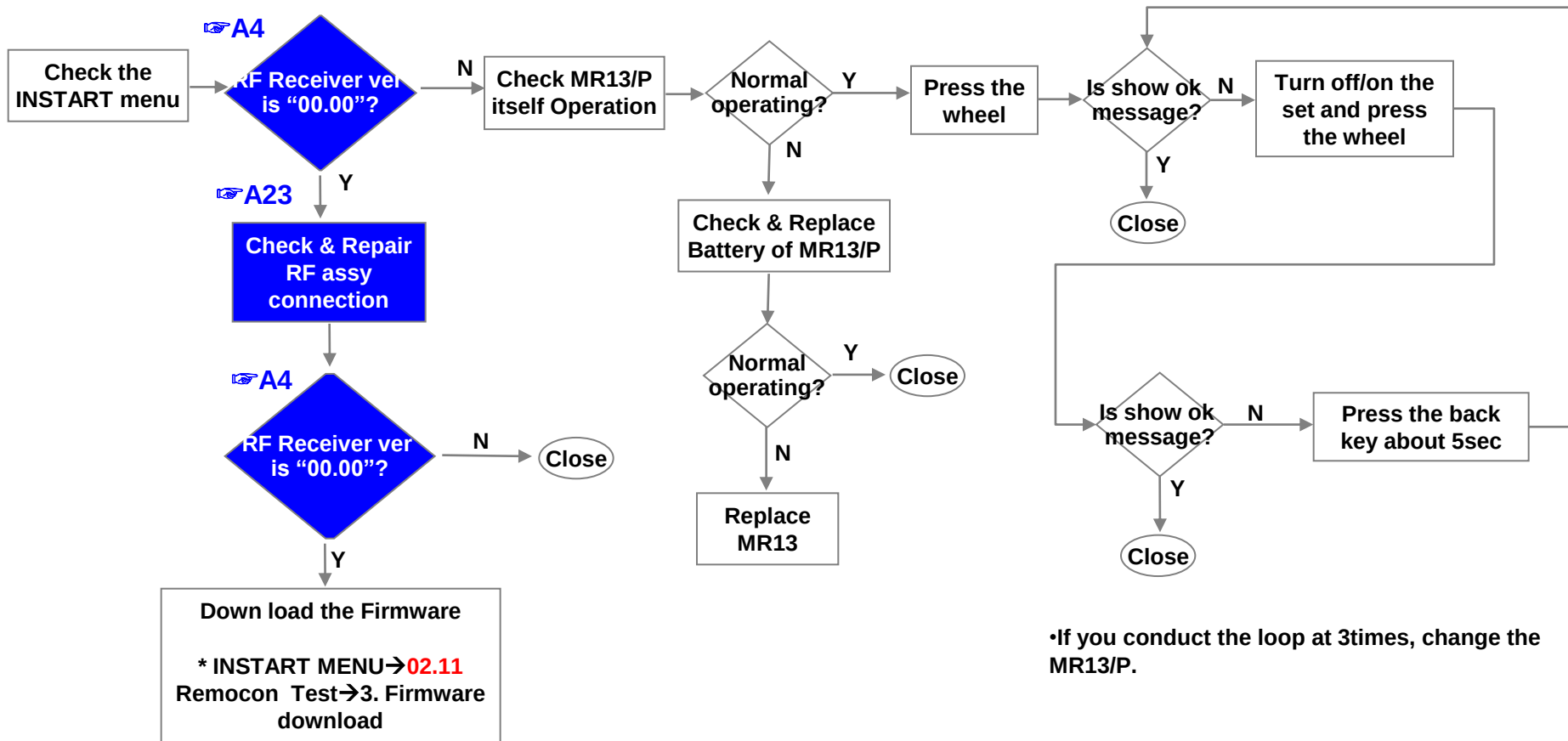
LCD TV	Error symptom	D. Function error	Established date	2013.01.31	
		Remote control & Local switch checking	Revised date		10/16

1. Remote control(R/C) operating error



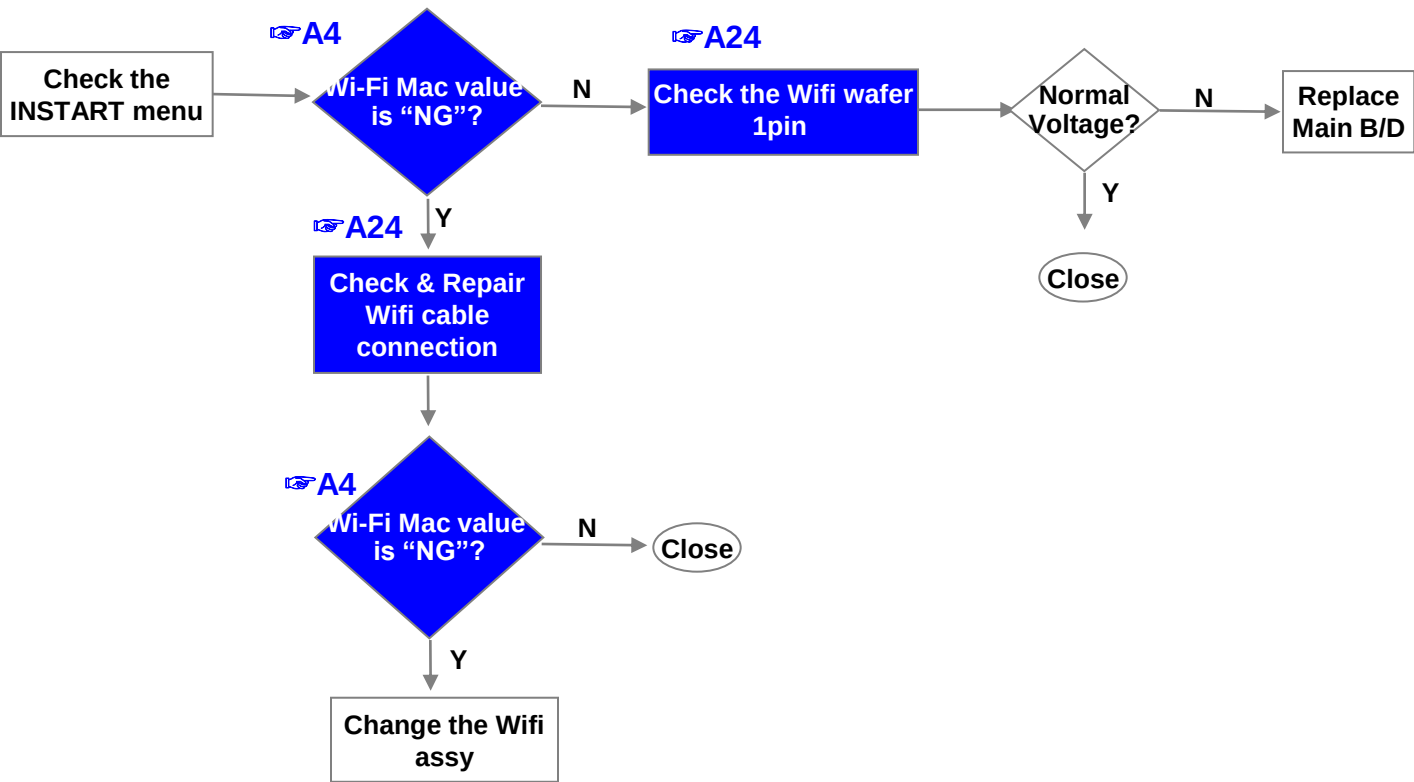
LCD TV	Error symptom	D. Function error	Established date	2013.01.31	
		MR13/P operating checking	Revised date		11/16

2. MR13/P (Magic Remocon) operating error



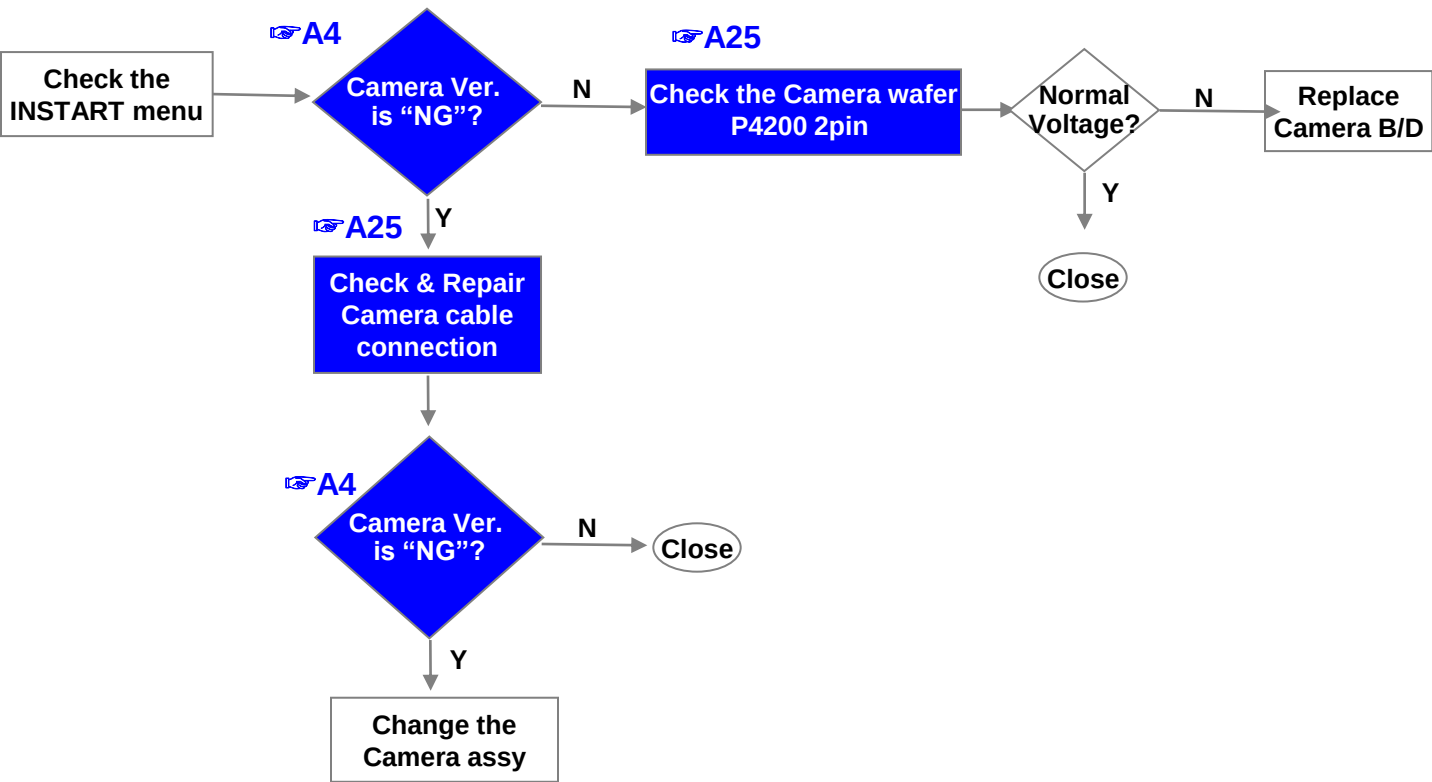
LCD TV	Error symptom	D. Function error	Established date	2013.01.31	
		Wifi operating checking	Revised date		12/16

3.Wifi operating error

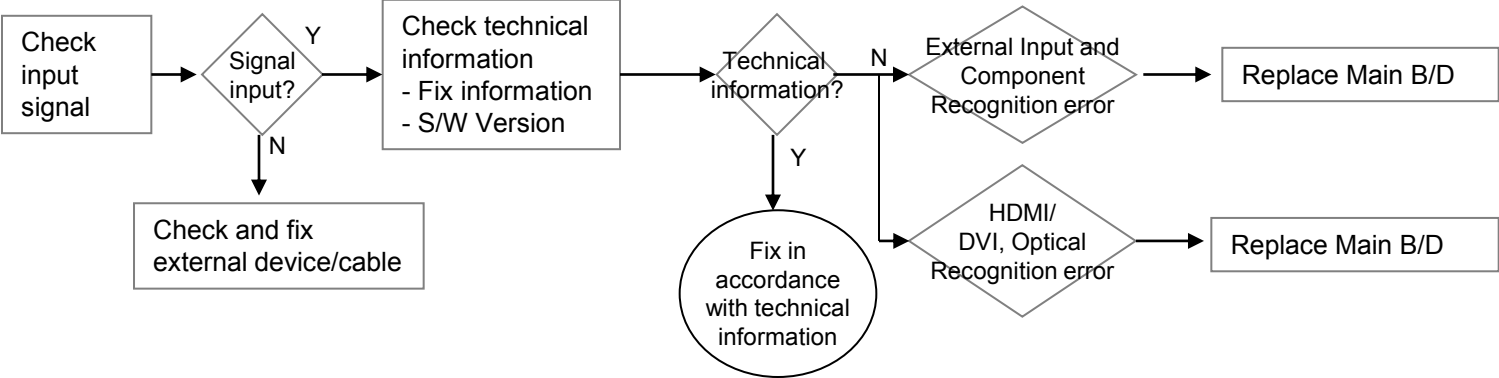


LCD TV	Error symptom	D. Function error	Established date	2013.01.31	
		Camera operating checking	Revised date		13/16

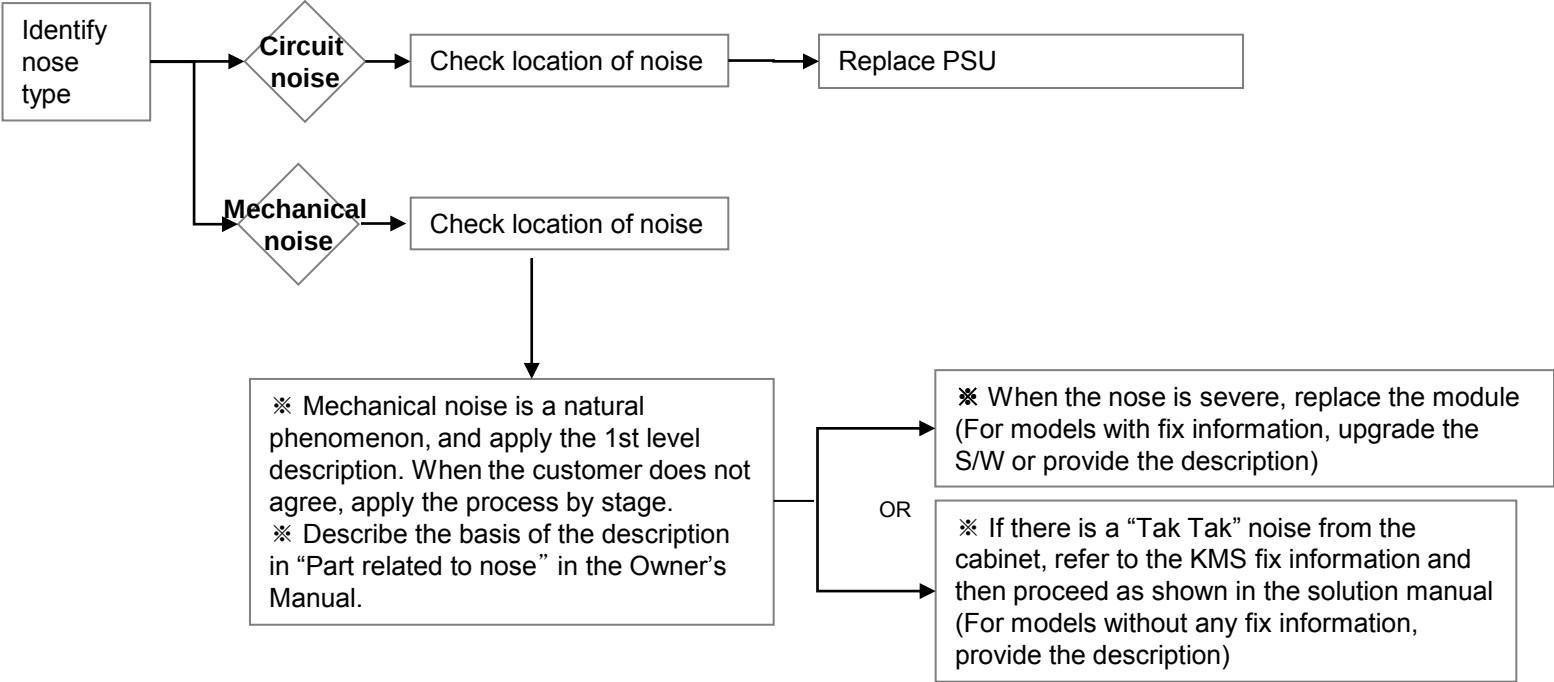
4.Camera operating error



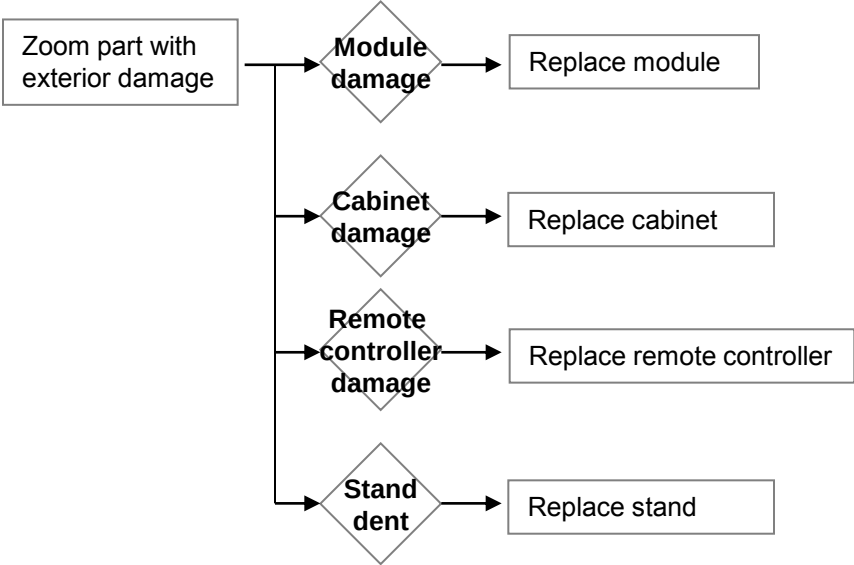
Standard Repair Process					
LCD TV	Error symptom	D. Function error	Established date	2013.01.31	
		External device recognition error	Revised date		14/16



Standard Repair Process					
LCD TV	Error symptom	E. Noise	Established date	2013.01.31	
		Circuit noise, mechanical noise	Revised date		15/16



Standard Repair Process					
LCD TV	Error symptom	F. Exterior defect	Established date	2013.01.31	
		Exterior defect	Revised date		16/16



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		Check White Balance value	A2	
4	A. Video error_ video error /Video lag/stop	TUNER input signal strength checking method	A3	
5		LCD-TV Version checking method	A4	
6		Tuner Checking Part	A5	
7	A. Video error _Vertical/Horizontal bar, residual image, light spot	LCD TV connection diagram	A6	
8	A. Video error_ Color error	Check Link Cable (EPI) reconnection condition	A7	
9		Adjustment Test pattern – ADJ Key	A8	
10	<Appendix> Defected Type caused by T-Con/ Inverter/ Module	Exchange Main Board (1)	A-1/5	
11		Exchange Main Board (2)	A-2/5	
12		Exchange Power Board (PSU)	A-3/5	
13		Exchange Module (1)	A-4/5	
14		Exchange Module (2)	A-5/5	

Continue to the next page

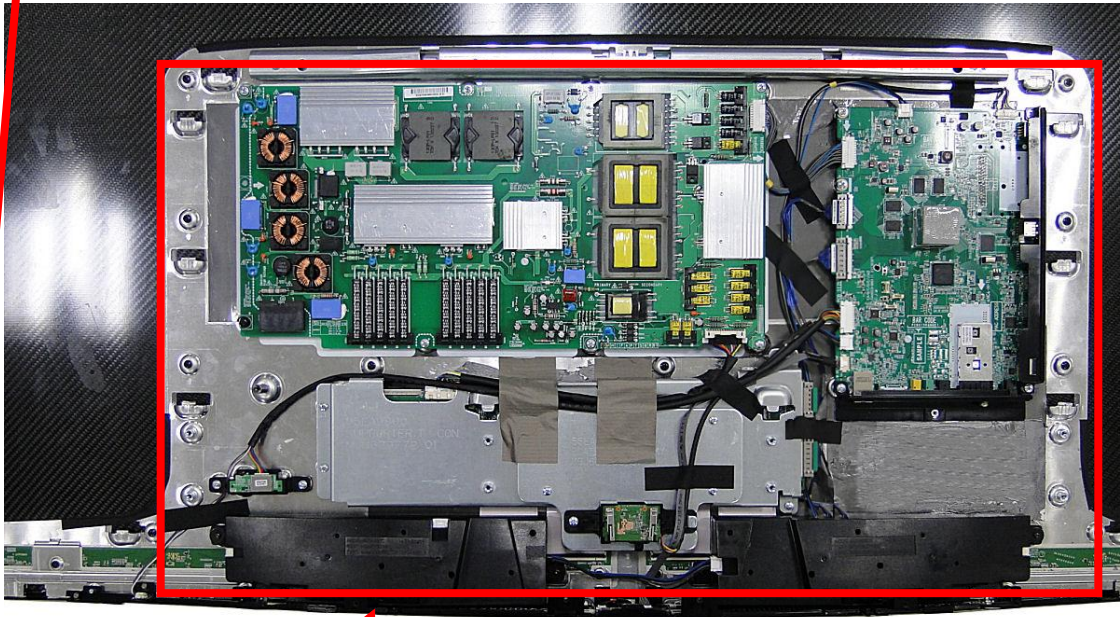
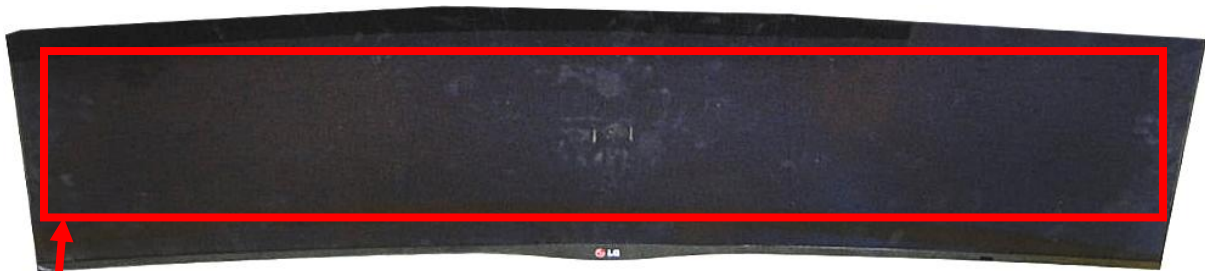
Contents of LCD TV Standard Repair Process Detail Technical Manual

Continued from previous page

No.	Error symptom	Content	Page	Remarks
16	B. Power error_ No power	Check front display LED	A17	
17		Check power input Voltage & ST-BY 3.5V	A18	
18	B. Power error_Off when on, off while viewing	POWER OFF MODE checking method	A19	
19	C. Audio error_ No audio/Normal video	Checking method in menu when there is no audio	A20	
20		Voltage and speaker checking method when there is no audio	A21	
21	D. Function error	Remote controller operation checking method	A22	
22		Motion Remote operation checking method	A23	
23		Wifi operation checking method	A24	
24		Camera operation checking method	A25	
25	E. Etc	Tool option changing method	A26	

Standard Repair Process Detail Technical Manual

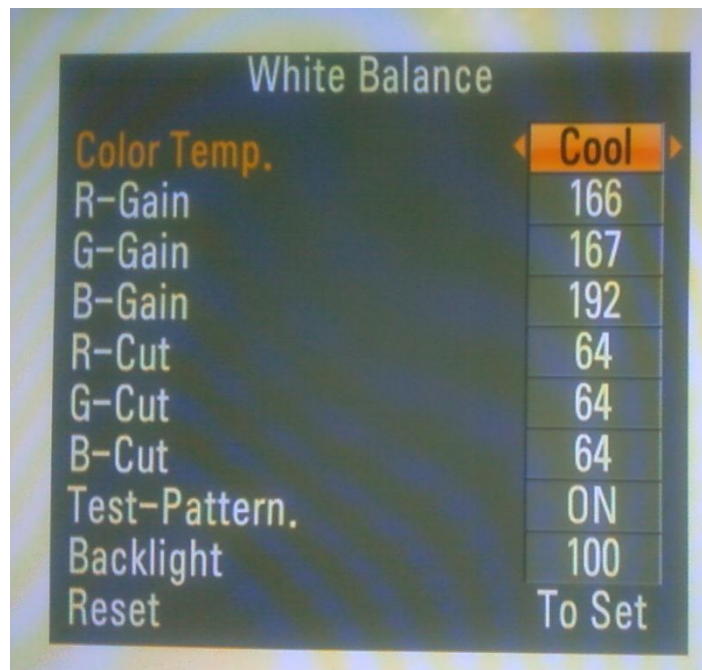
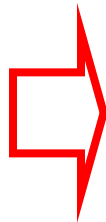
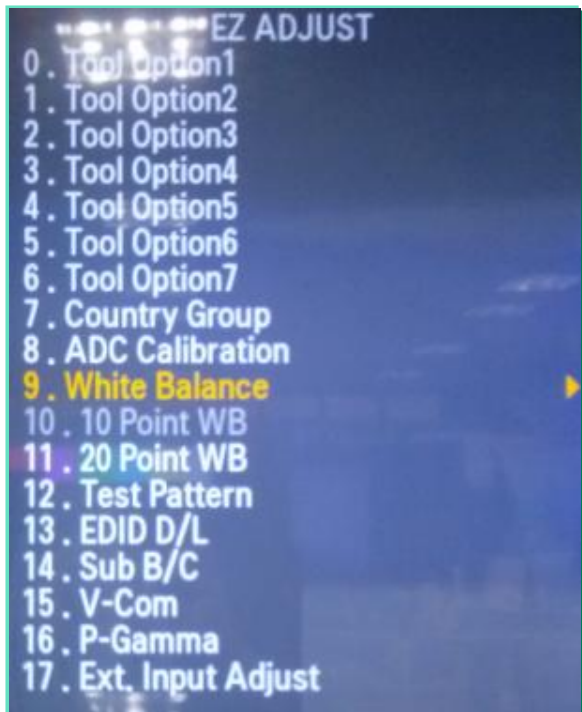
LCD TV	Error symptom	A. Video error_No video/Normal audio	Established date	2013.01.31	
	Content	Check LCD back light with naked eye	Revised date		A1



After Remove the Rear Cover, turning on the power and disassembling the case, check with the naked eye.

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error_No video/Normal audio	Established date	2013.01.31	
	Content	Check White Balance value	Revised date		A2



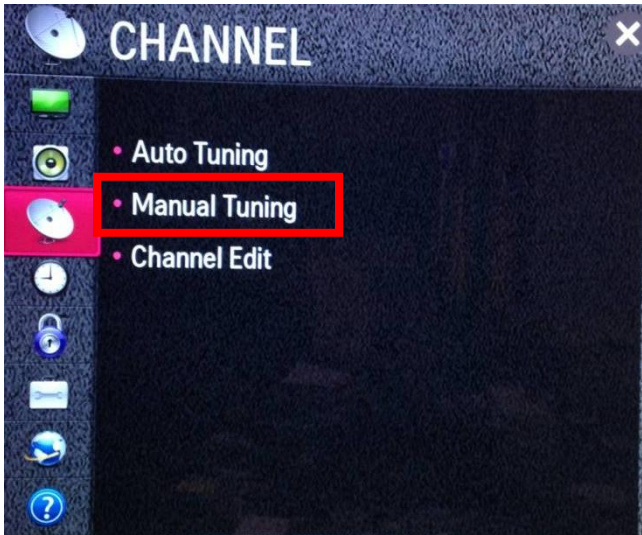
Entry method

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.

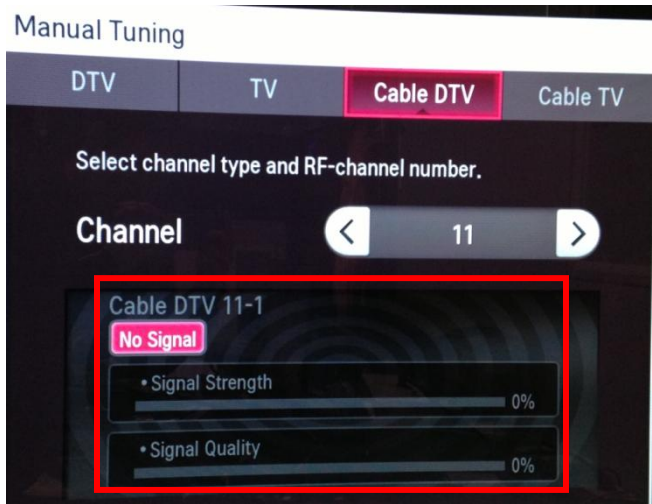
A2

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error_Video error, video lag/stop	Established date	2013.01.31	
	Content	TUNER input signal strength checking method	Revised date		A3



Settings → Channel → Manual Tuning
→ select channel



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

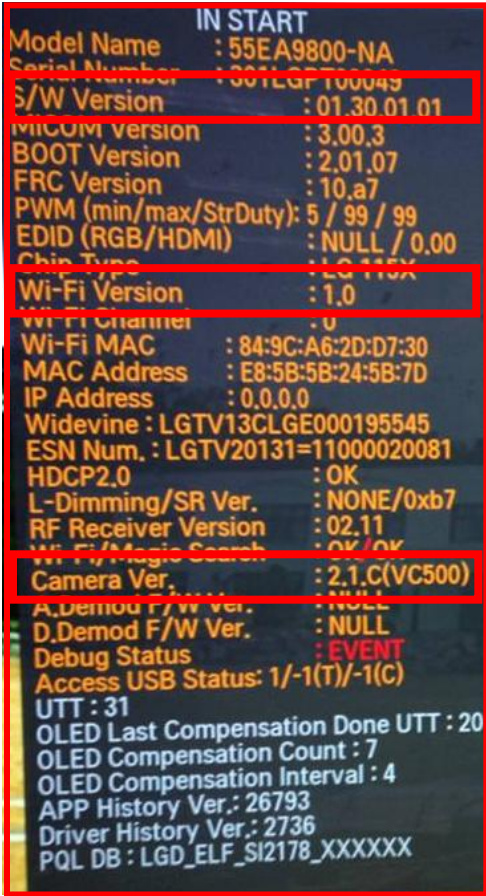


Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error_Video error, video lag/stop	Established date	2013.01.31	
	Content	LCD-TV Version checking method	Revised date		A4

1. Checking method for remote controller for adjustment

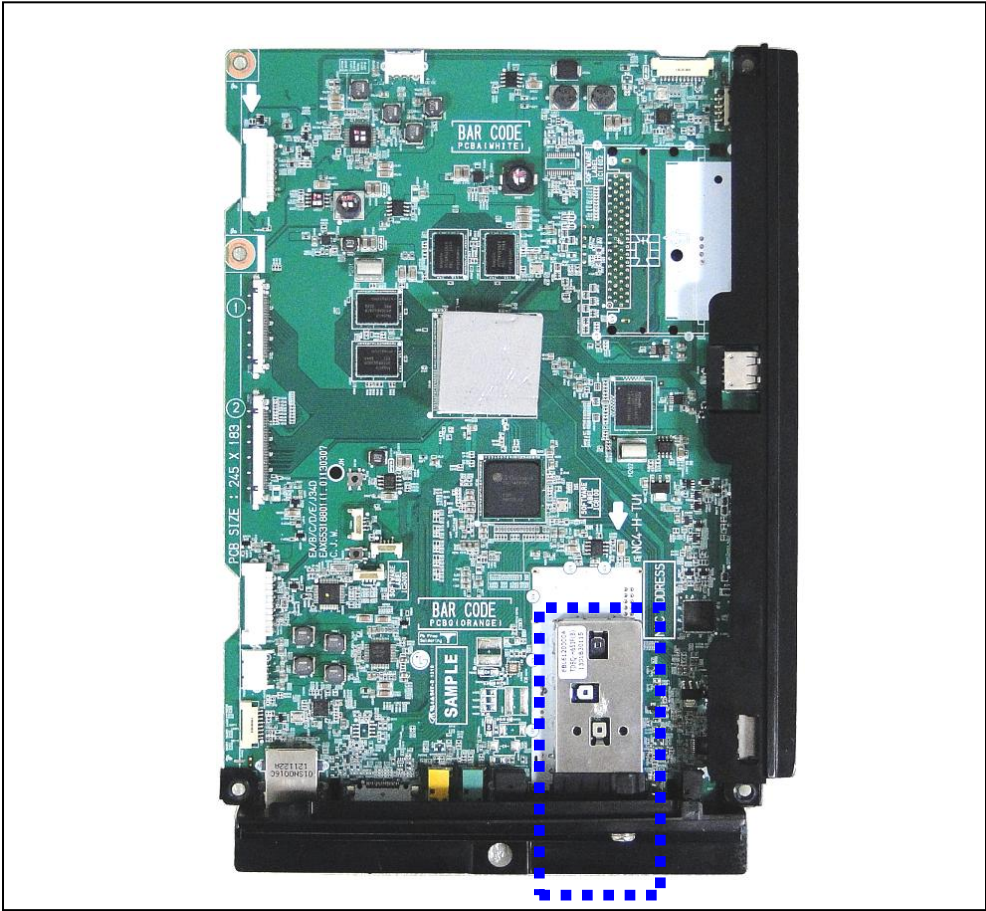
Version



Press the IN-START with the remote controller for adjustment

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error_Video error, video lag/stop	Established date	2013.01.31	
	Content	TUNER checking part	Revised date		A5

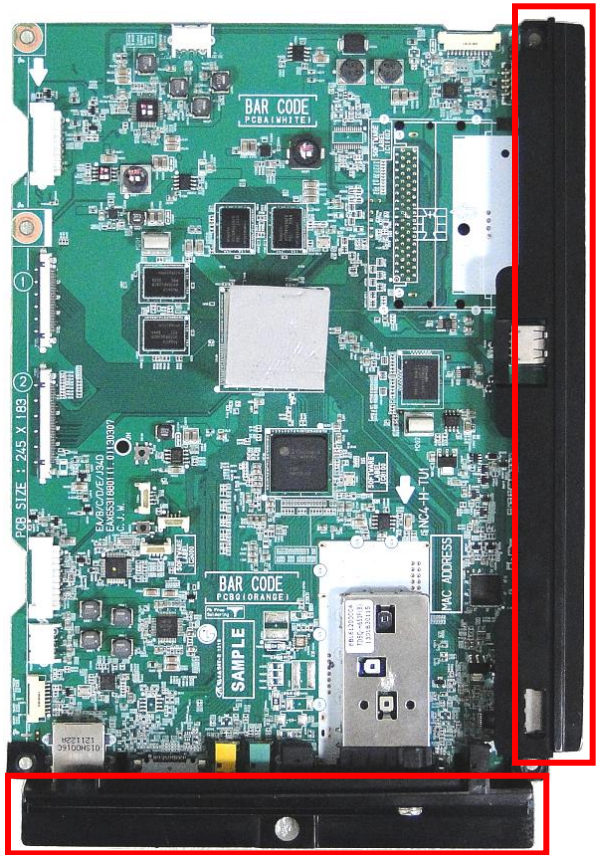


Checking method:

- 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

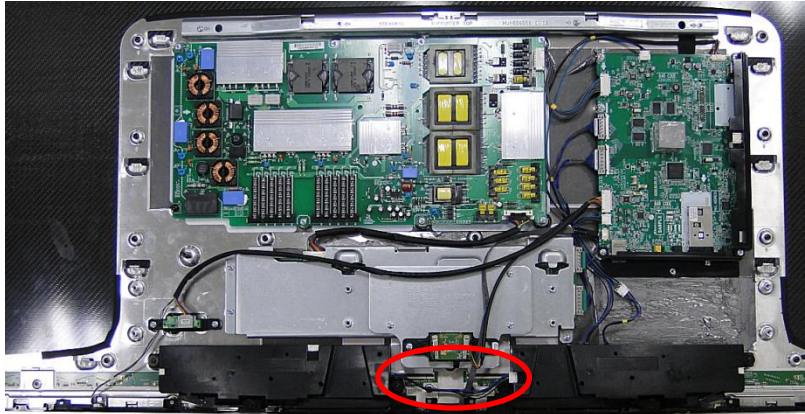
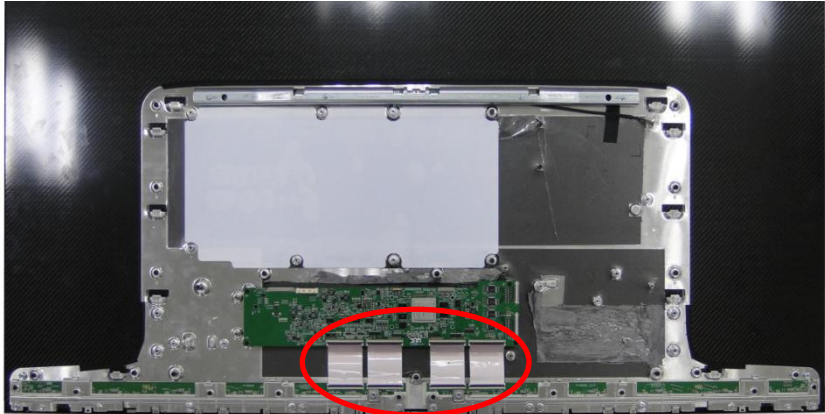
LCD TV	Error symptom	A. Video error _ Vertical/Horizontal bar, residual image, light spot	Established date	2013.01.31	
	Content	LCD TV connection diagram (1)	Revised date		A6



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

Standard Repair Process Detail Technical Manual

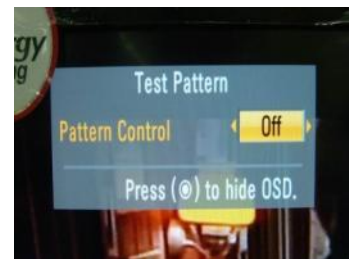
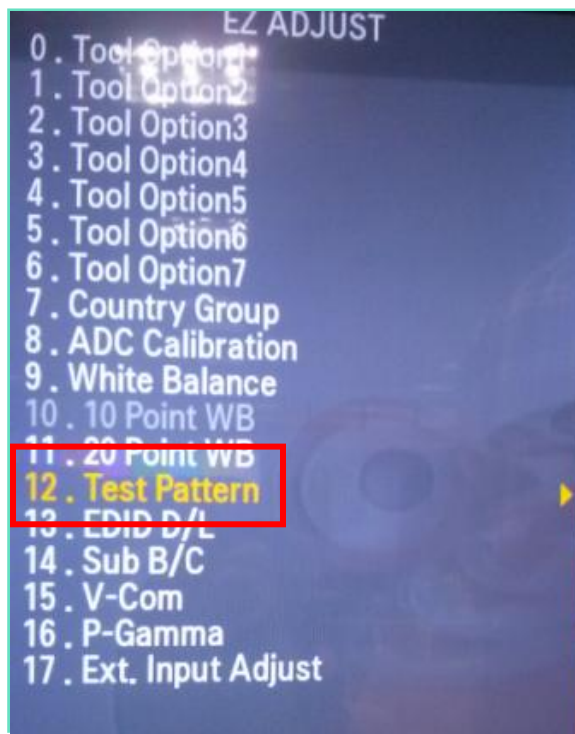
LCD TV	Error symptom	A. Video error_Color error	Established date	2013.01.31	
	Content	Check Link Cable (EPI) reconnection condition	Revised date		A7



Check the contact condition of the Link Cable, especially dust or mis insertion.

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error_Color error	Established date	2013.01.31	
	Content	Adjustment Test pattern - ADJ Key	Revised date		A8



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!)

A8

Appendix : Exchange the Module (1)



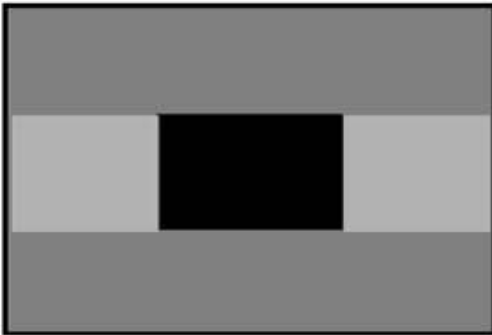
Vertical Block



Brightness difference



Line Dim



Crosstalk



Press damage



Crosstalk



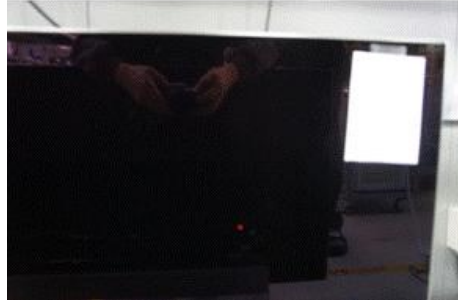
Burnt

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

Appendix : Exchange the Module (2)



Angle view Color difference



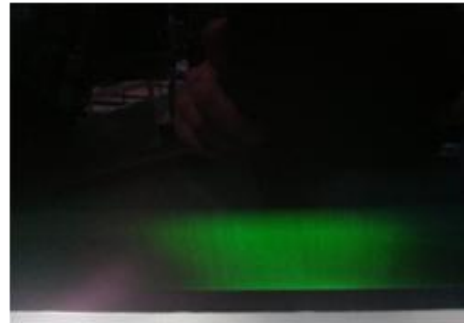
Brightness dot noise



Half dead



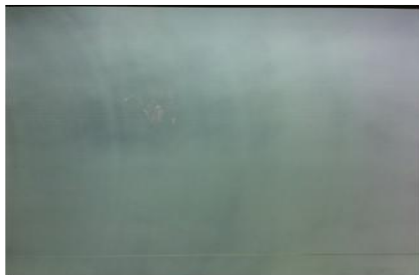
Brightness difference



Green Noise on power on/off time



Line Defect

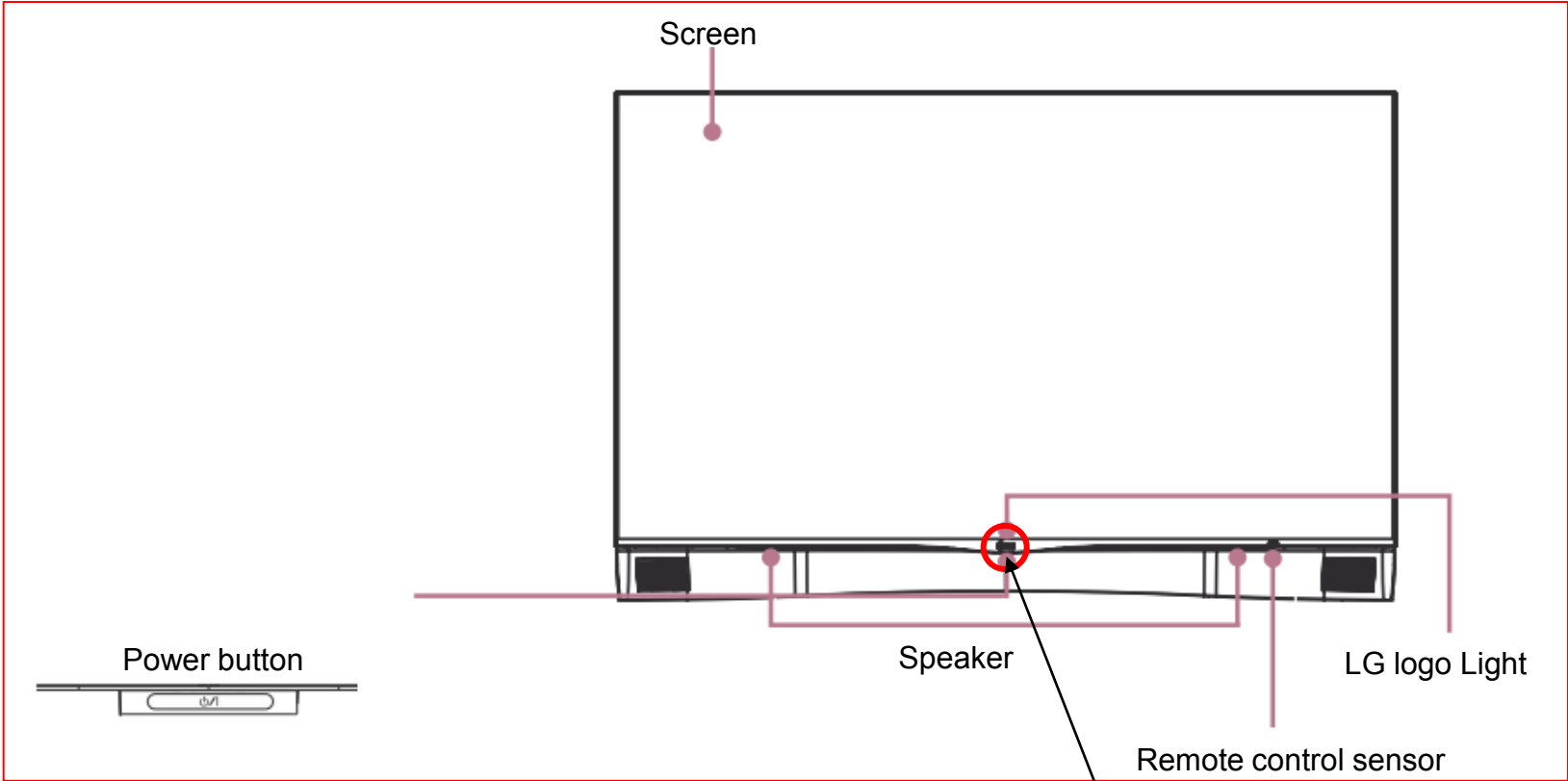


Mura

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	2013.01.31	
	Content	Check front display Logo	Revised date		A17



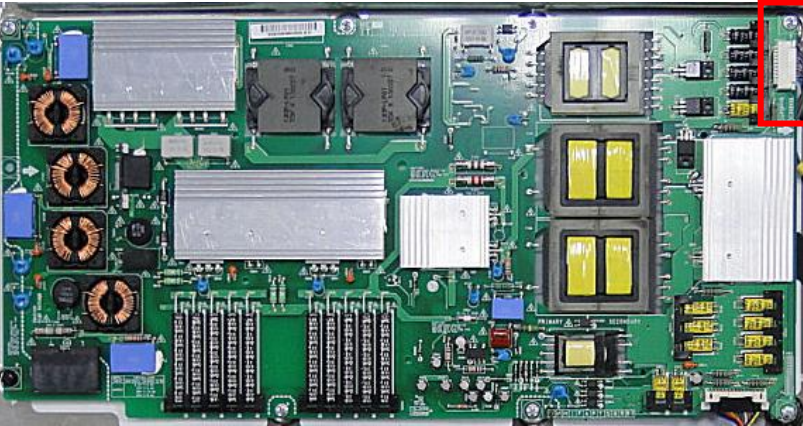
Front LED control :
Menu → Option →
Standby Light
→ ON/ Off

ST-BY condition: On or Off
Power ON condition: Turn Off

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	B. Power error _No power	Established date	2013.01.31	
	Content	Check power input voltage and ST-BY 3.5V	Revised date		A18

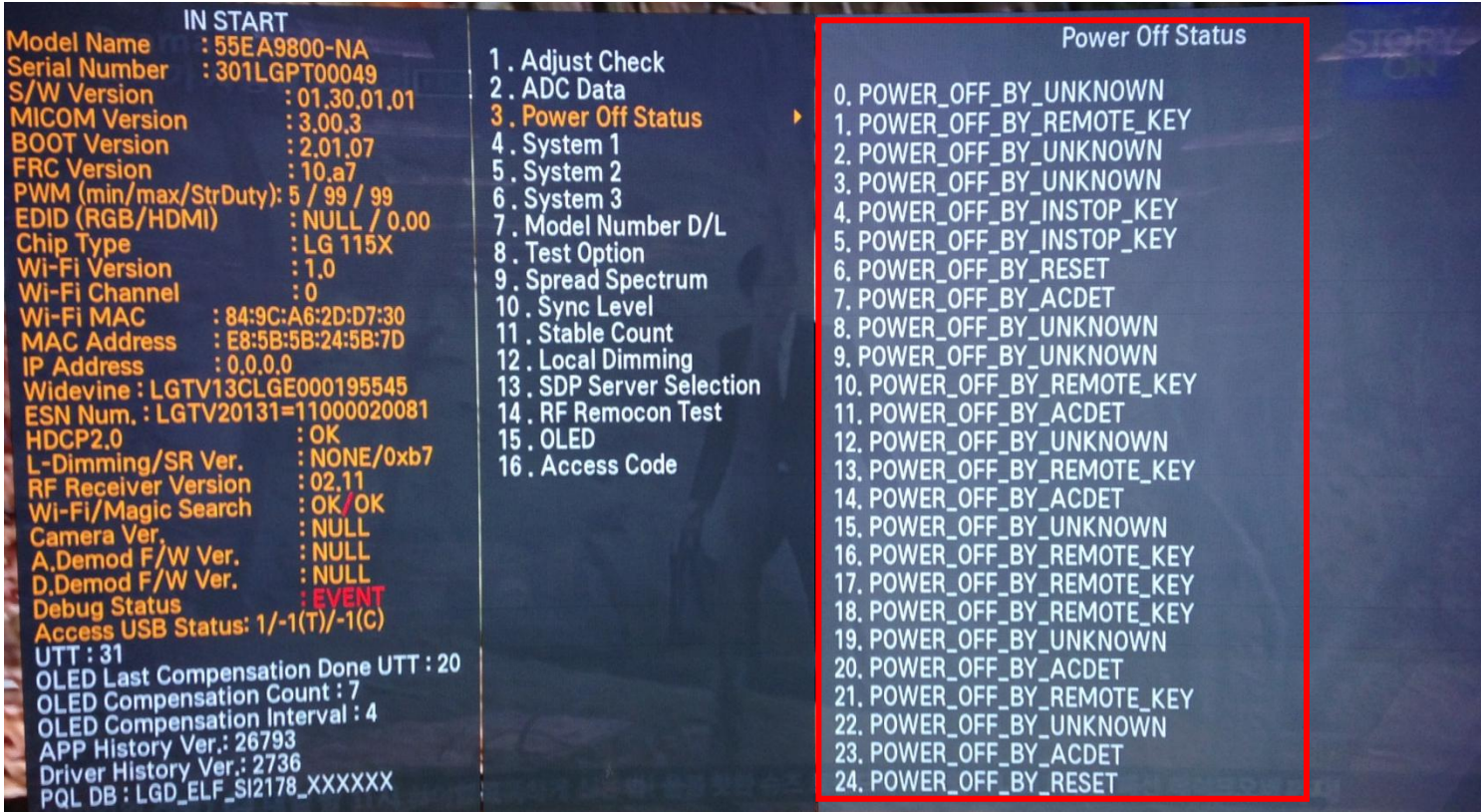
Check the DC 24V, 12V, 3.5V.



18 Pin (Power Board ↔ Main Board)			
1	Power on	2	DRV ON
3	3.5V	4	20V
5	3.5V	6	N.C
7	GND	8	GND
9	24V	10	24V
11	GND	12	GND
13	12V	14	12V
15	12V	16	24V
17	GND	18	GND

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	B. Power error _Off when on, off whiling viewing	Established date	2013.01.31	
	Content	POWER OFF MODE checking method	Revised date		A19

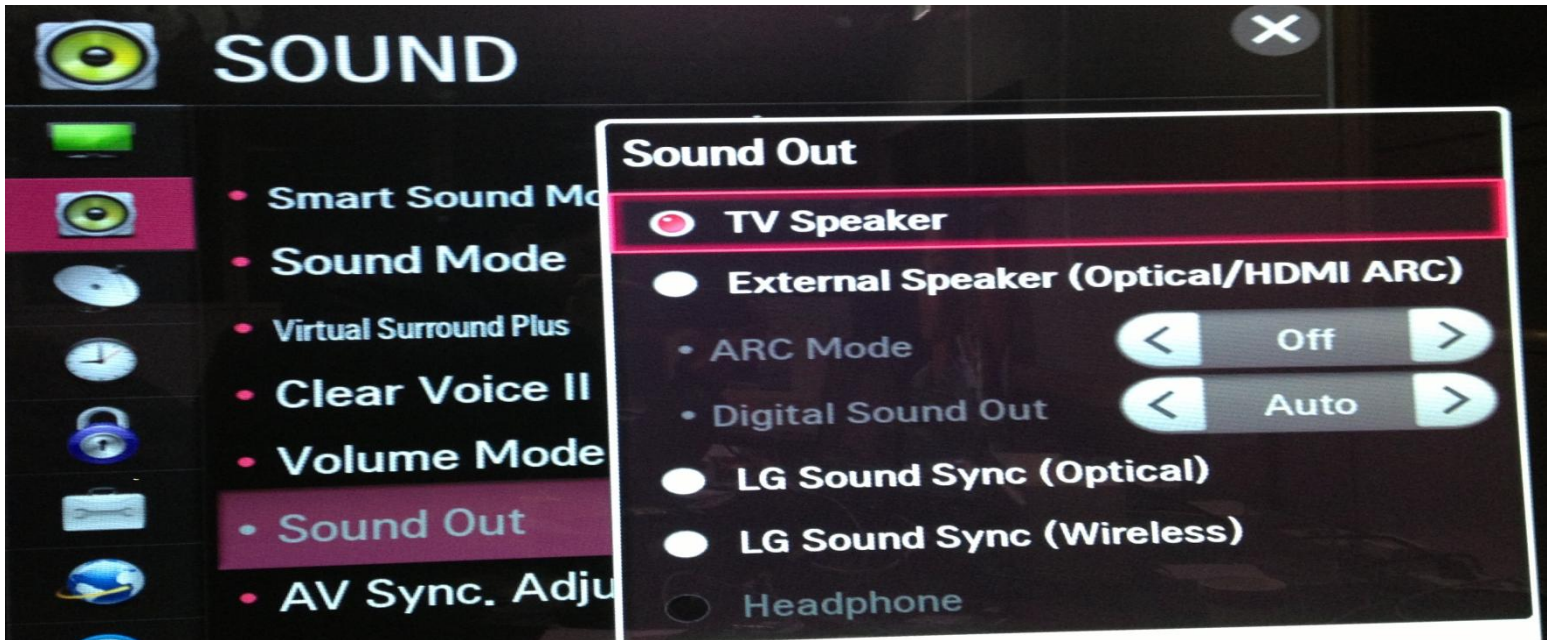


Entry method

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	2013.01.31	
	Content	Checking method in menu when there is no audio	Revised date		A20

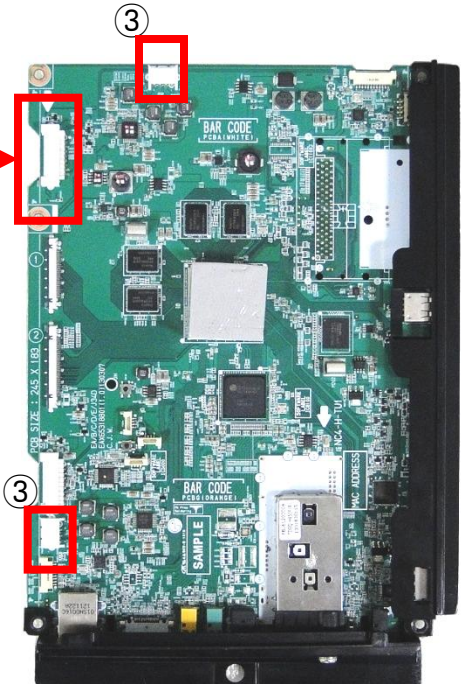
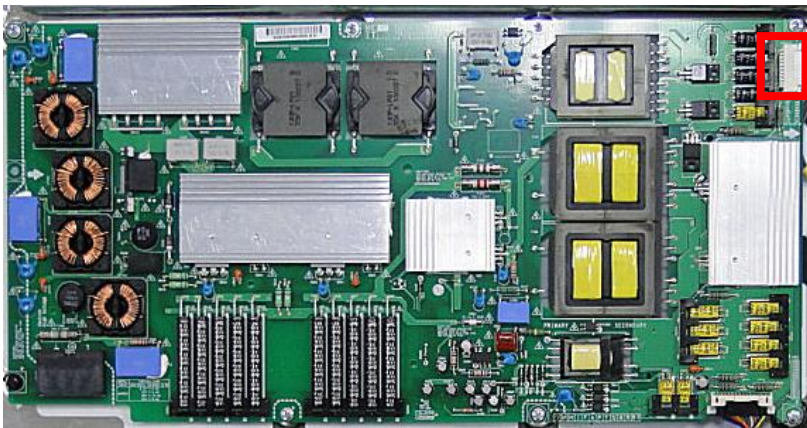


Checking method

1. Press the Setting button on the remote controller
2. Select the Sound function of the Menu
3. Select the Sound Setting
4. Select TV Speaker

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	C. Audio error_No audio/Normal video	Established date	2013.01.31	
	Content	Voltage and speaker checking method when there is no audio	Revised date		A21



24 Pin (Power Board ↔ Main Board)

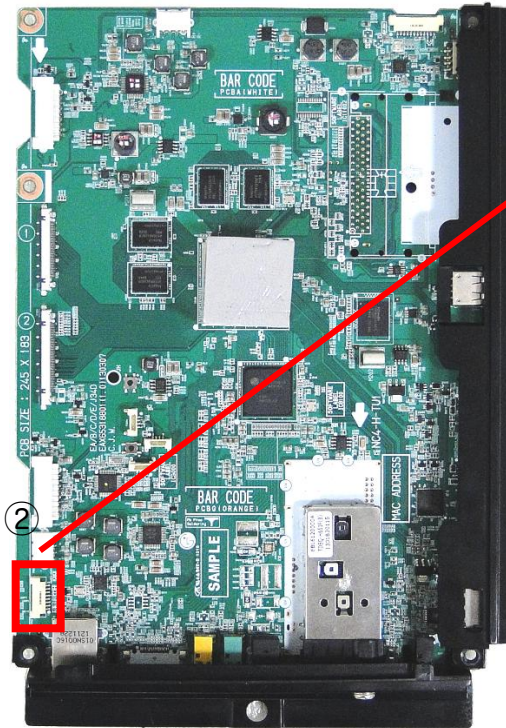
1	Power on	2	INV ON
3	3.5V	4	PDIM#1
5	3.5V	6	PDIM#2
7	GND	8	GND
9	24V	10	24V
11	GND	12	GND
13	12V	14	12V
15	12V	16	24V
17	GND	18	GND
19	GND	20	GND
21	GND	22	L/DIM0_V8
23	L/DIM0_MOSI	24	L/DIM0_SCLK

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	Established date	2013.01.31	
	Content	Remote controller operation checking method	Revised date		A22



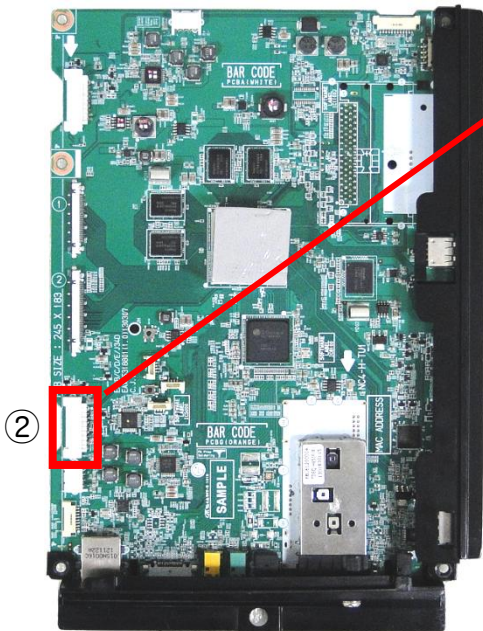
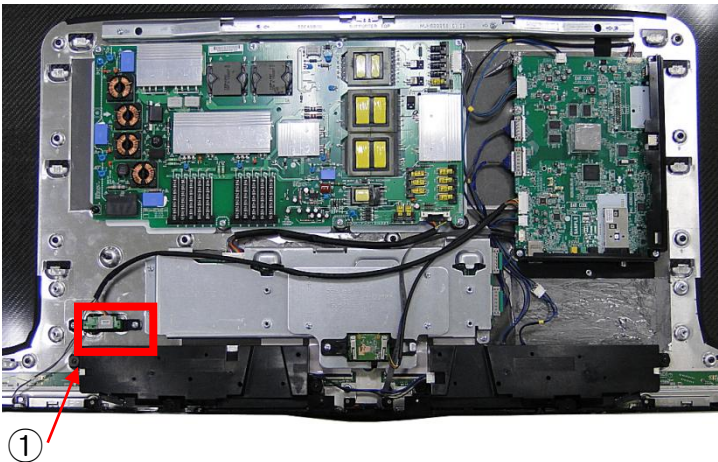
P4002	
1	KEY2
2	+3.5V_ST
3	GND
4	LOGO Light Wafer
5	IR
6	GND
7	EYE SCL
8	EYE SDA

Checking order

- 1, 2. Check Touch cable condition between Touch & Main board.
3. Check the st-by 3.5V on the terminal 4,7.
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. Function error	Established date	2013.01.31	
	Content	Motion Remote operation checking method	Revised date		A23



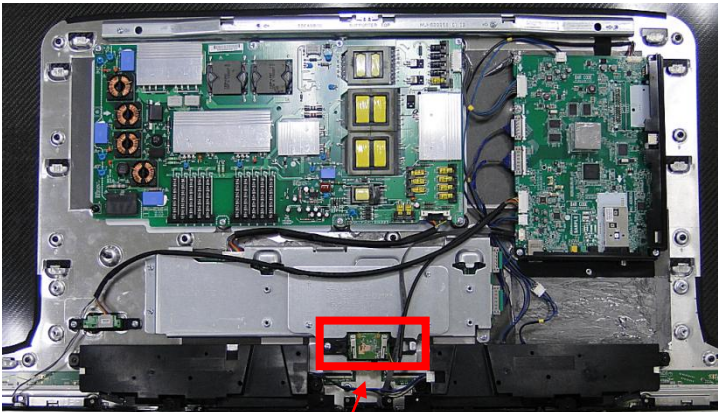
P4003	
1	+3.5V_WOL
2	+3.3V
3	USB_DM
4	RTS
5	USB_DP
6	RX
7	GND
8	TX
9	WOL
10	RESET
11	GND
12	CTS
13	NC
14	+3.5V_ST(OLED)
15	IR(OLED)
16	GND
17	EYE_SCL
18	EYE_SDA

Checking order

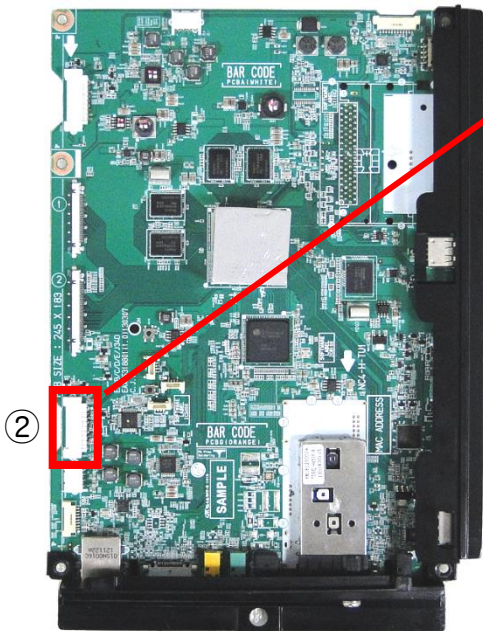
- 1, 2. Check Motion cable condition between Motion assy & Main board.
- 3. Check the 3.3V on the terminal 2.

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	D. Function error	Established date	2013.01.31	
	Content	Wifi operation checking method	Revised date		A24



①



②

③

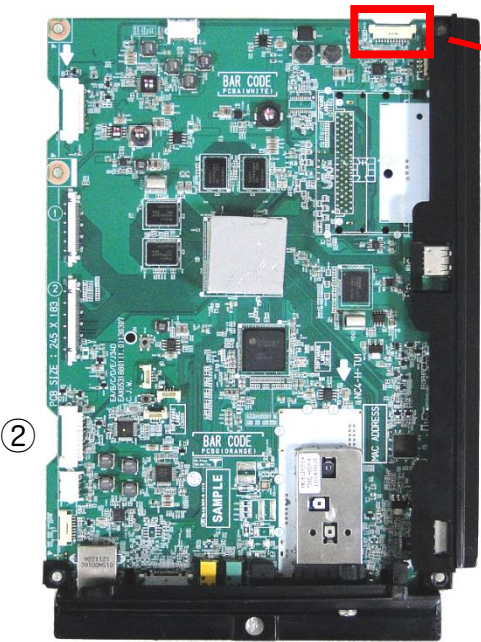
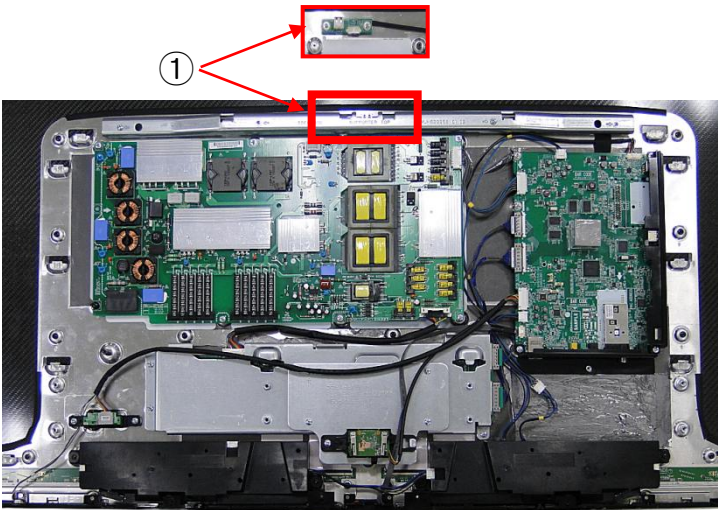
P4003	
1	+3.5V_WOL
2	+3.3V
3	USB_DM
4	RTS
5	USB_DP
6	RX
7	GND
8	TX
9	WOL
10	RESET
11	GND
12	CTS
13	NC
14	+3.5V_ST(OLED)
15	IR(OLED)
16	GND
17	EYE_SCL
18	EYE_SDA

Checking order

- 1, 2. Check Wifi cable condition between Wifi assy & Main board.
3. Check the 3.3V on the terminal 2.

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	D. Function error	Established date	2013.01.31	
	Content	Camera operation checking method	Revised date		A25



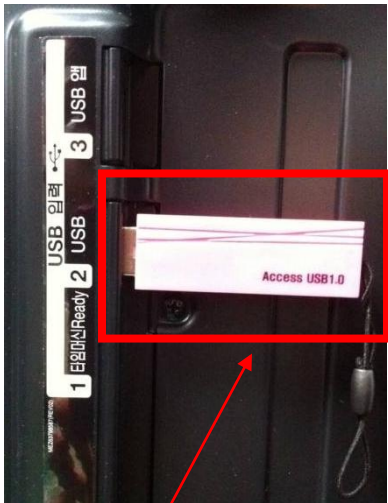
P4200	
1	CAM_SLIDE_DET
2	+3.5V_CAM
3	AUD_LRCH
4	AUD_LRCK
5	AUD_SCK
6	GND
7	CAM_PWR_ON_CMD
8	ST_BY_DET_CAM
9	GND
10	USB_CAMERA_DP
11	USB_CAMERA_DM
12	GND

Checking order

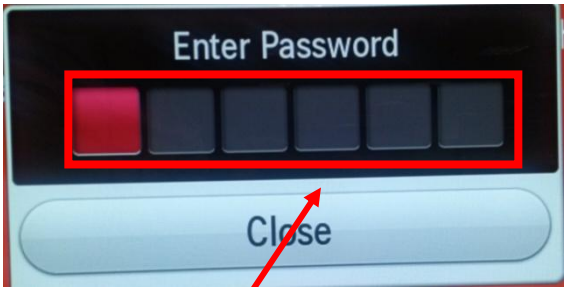
- 1, 2. Check Camera cable condition between Camera assy & Main board.
- 3. Check the 3.5V on the terminal 2.

Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	E. Etc	Established date	2013.01.31	
	Content	Tool option changing method	Revised date		A26



①



②

Changing method

1. Contact the USB memory. (USB 1,2,3 jack)
 2. Enter the password. (ex. 000000)
- * Access USB Memory has each password.