



LG

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Internal Use Only

LED TV

SERVICE MANUAL

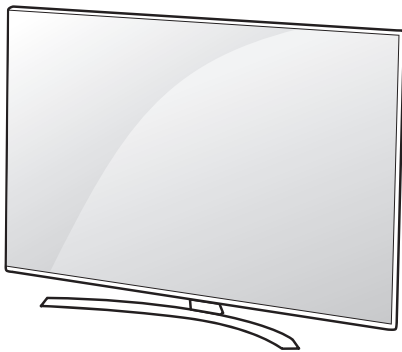
CHASSIS : UJ64J

MODEL : 60/65UH7700 60/65UH7700-SA

60/65UH7700 60/65UH7700-PA

CAUTION

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



P/NO : MFL69485003 (1603-REV01)

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SAFETY PRECAUTIONS

IMPORTANT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These parts are identified by \triangle in the Schematic Diagram and Exploded View.

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

Do not modify the original design without permission of manufacturer.

General Guidance

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

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

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

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

Keep wires away from high voltage or high temperature parts.

Before returning the receiver to the customer,

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

Leakage Current Cold Check(Antenna Cold Check)

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

If the exposed metallic part has a return path to the chassis, the measured resistance should be between 1 M Ω and 5.2 M Ω .

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

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

Leakage Current Hot Check (See below Figure)

Plug the AC cord directly into the AC outlet.

Do not use a line Isolation Transformer during this check.

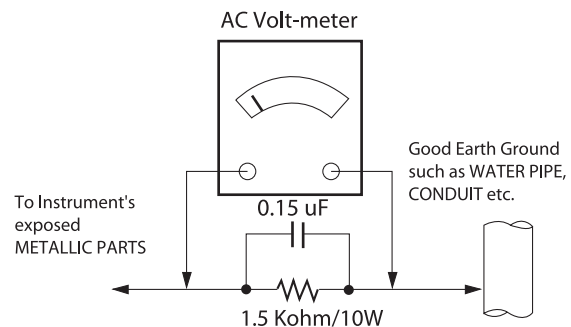
Connect 1.5 K / 10 watt resistor in parallel with a 0.15 uF capacitor between a known good earth ground (Water Pipe, Conduit, etc.) and the exposed metallic parts.

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

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

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

Leakage Current Hot Check circuit



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

*Base on Adjustment standard

SERVICING PRECAUTIONS

CAUTION: Before servicing receivers covered by this service manual and its supplements and addenda, read and follow the *SAFETY PRECAUTIONS* on page 3 of this publication.
NOTE: If unforeseen circumstances create conflict between the following servicing precautions and any of the safety precautions on page 3 of this publication, always follow the safety precautions. Remember: Safety First.

General Servicing Precautions

1. Always unplug the receiver AC power cord from the AC power source before;
 - a. Removing or reinstalling any component, circuit board module or any other receiver assembly.
 - b. Disconnecting or reconnecting any receiver electrical plug or other electrical connection.
 - c. Connecting a test substitute in parallel with an electrolytic capacitor in the receiver.
CAUTION: A wrong part substitution or incorrect polarity installation of electrolytic capacitors may result in an explosion hazard.
2. Test high voltage only by measuring it with an appropriate high voltage meter or other voltage measuring device (DVM, FETVOM, etc) equipped with a suitable high voltage probe. Do not test high voltage by "drawing an arc".
3. Do not spray chemicals on or near this receiver or any of its assemblies.
4. Unless specified otherwise in this service manual, clean electrical contacts only by applying the following mixture to the contacts with a pipe cleaner, cotton-tipped stick or comparable non-abrasive applicator; 10 % (by volume) Acetone and 90 % (by volume) isopropyl alcohol (90 % - 99 % strength)
CAUTION: This is a flammable mixture.
Unless specified otherwise in this service manual, lubrication of contacts is not required.
5. Do not defeat any plug/socket B+ voltage interlocks with which receivers covered by this service manual might be equipped.
6. Do not apply AC power to this instrument and/or any of its electrical assemblies unless all solid-state device heat sinks are correctly installed.
7. Always connect the test receiver ground lead to the receiver chassis ground before connecting the test receiver positive lead.
Always remove the test receiver ground lead last.
8. Use with this receiver only the test fixtures specified in this service manual.
CAUTION: Do not connect the test fixture ground strap to any heat sink in this receiver.

Electrostatically Sensitive (ES) Devices

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

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

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

General Soldering Guidelines

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

IC Remove/Replacement

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

Removal

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

Replacement

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

"Small-Signal" Discrete Transistor Removal/Replacement

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

Power Output, Transistor Device

Removal/Replacement

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

Diode Removal/Replacement

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

Fuse and Conventional Resistor

Removal/Replacement

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

3. Solder the connections.

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

Circuit Board Foil Repair

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

At IC Connections

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

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

At Other Connections

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

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

SPECIFICATION

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

1. Application range

This spec sheet is applied to the LED TV used UJ64J chassis

2. Test condition

Each part is tested as below without special notice.

- (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 (100~240V@ 50/60Hz)
* Standard Voltage of each products is marked by models.
- (4) Specification and performance of each parts are followed each drawing and specification by part number in accordance with BOM.
- (5) The receiver must be operated for about 20 minutes prior to the adjustment.

3. Test method

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

4. General Specification

4.1. Model Specification

No	Item		Specification	Remark
1	Market		Colombia, Panama, Taiwan	
2	Broadcasting system		Digital : DVB-T Analog : NTSC / PAL-M / PAL-N Analog : NTSC-M	Colombia : DVB-T/T2 Colombia/Panama Taiwan
3	Available Channel		BAND	NTSC
			VHF	2 ~ 13
			UHF	14 ~ 69
			DTV CATV	2 ~ 69 1 ~ 125
4	Receiving system		Digital : SBTVD / Analog : NTSC / PAL-M / PAL-N	
5	Component Input		Y/Cb/Cr, Y/ Pb/Pr	Rear RCA & Gender
6	HDMI Input	HDMI 3	DTV format, Support HDCP2.2/ PC(HDMI version 1.4)	
		HDMI 2	DTV format, Support HDCP2.2/ PC(HDMI version 1.4/2.0)	
		HDMI 1	DTV format, Support HDCP2.2/ PC(HDMI version 1.4/2.0)	
7	Audio Input		Component / AV Audio / DVI Audio,	Side, Support ARC only HDMI2
8	SPDIF out(1EA)		Optical Audio out	Side,
9	USB Input(2EA)		EMF, MPEG, For SVC (download)	Side(1)/Rear(2) :JPEG, MP3, DivX HD

5. External input format

5.1. 2D Mode

5.1.1. CVBS input

No	Resolution	H-freq(kHz)	V-freq.(kHz)	Pixel clock	Proposed	Remarks
1	720*480i	15.73	59.94	13.50	SDTV, DVD 480I(525I)	NTSC-M
2	720*480i	15.73	60.00	13.51	SDTV, DVD 480I(525I)	NTSC-M
3	720*576i	15.62	50.00	13.50	SDTV, DVD 576I(625I) 50Hz	PAL-BDGHI

5.1.2. Component input(Y, C_B/P_B, C_R/P_R)

No	Resolution	H-freq(kHz)	V-freq.(kHz)	Pixel clock	Proposed
1	720*480	15.73	60	13.5135	SDTV ,DVD 480I
2	720*480	15.73	59.94	13.5	SDTV ,DVD 480I
3	720*480	31.50	60	27.027	SDTV 480P
4	720*480	31.47	59.94	27.0	SDTV 480P
5	1280*720	45.00	60.00	74.25	HDTV 720P
6	1280*720	44.96	59.94	74.176	HDTV 720P
7	1920*1080	33.75	60.00	74.25	HDTV 1080I
8	1920*1080	33.72	59.94	74.176	HDTV 1080I
9	1920*1080	67.500	60	148.50	HDTV 1080P
10	1920*1080	67.432	59.94	148.352	HDTV 1080P
11	1920*1080	27.000	24.000	74.25	HDTV 1080P
12	1920*1080	26.97	23.976	74.176	HDTV 1080P
13	1920*1080	33.75	30.000	74.25	HDTV 1080P
14	1920*1080	33.71	29.97	74.176	HDTV 1080P

5.1.3. HDMI Input (DTV)

No	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	Proposed	Remark
1	640*480	31.46	59.94	25.13	SDTV 480P	
2	640*480	31.50	60.00	25.13	SDTV 480P	
3	720*480	15.73	59.94	13.50	SDTV, DVD 480I(525I)	Spec. out but display
4	720*480	15.75	60.00	13.51	SDTV, DVD 480I(525I)	
5	720*576	15.62	50.00	13.50	SDTV, DVD 576I(625I) 50Hz	
6	720*480	31.47	59.94	27.00	SDTV 480P	
7	720*480	31.50	60.00	27.03	SDTV 480P	
8	720*576	31.25	50.00	27.00	SDTV 576P	
9	1280*720	44.96	59.94	74.18	HDTV 720P	
10	1280*720	45.00	60.00	74.25	HDTV 720P	
11	1280*720	37.50	50.00	74.25	HDTV 720P	
12	1920*1080	28.12	50.00	74.25	HDTV 1080I	
13	1920*1080	33.72	59.94	74.18	HDTV 1080I	
14	1920*1080	33.75	60.00	74.25	HDTV 1080I	
15	1920*1080	26.97	23.97	63.30	HDTV 1080P	
16	1920*1080	27.00	24.00	63.36	HDTV 1080P	
17	1920*1080	33.71	29.97	79.12	HDTV 1080P	
18	1920*1080	33.75	30.00	79.20	HDTV 1080P	
19	1920*1080	56.25	50.00	148.50	HDTV 1080P	
20	1920*1080	67.43	59.94	148.35	HDTV 1080P	
21	1920*1080	67.50	60.00	148.50	HDTV 1080P	
22	3840*2160	53.95	23.98	297.00	UDTV 2160P	UHD only
23	3840*2160	54.00	24.00	297.00	UDTV 2160P	UHD only
24	3840*2160	56.25	25.00	297.00	UDTV 2160P	UHD only
25	3840*2160	61.43	29.97	297.00	UDTV 2160P	UHD only
26	3840*2160	67.50	30.00	297.00	UDTV 2160P	UHD only
27	3840*2160	112.50	50.00	594.00	UDTV 2160P(DVB)	UHDOnly(Port1,2)
28	3840*2160	135.00	59.94	593.41	UDTV 2160P	UHDOnly(Port1,2)
29	3840*2160	135.00	60.00	594.00	UDTV 2160P	UHDOnly(Port1,2)
30	4096*2160	53.95	23.98	297.00	UDTV 2160P	UHD only
31	4096*2160	54.00	24.00	297.00	UDTV 2160P	UHD only
32	4096*2160	56.25	25.00	297.00	UDTV 2160P	UHD only
33	4096*2160	61.43	29.97	297.00	UDTV 2160P	UHD only
34	4096*2160	67.50	30.00	297.00	UDTV 2160P	UHD only
35	4096*2160	112.50	50.00	594.00	UDTV 2160P(DVB)	UHDOnly(Port1,2)
36	4096*2160	135.00	59.94	593.41	UDTV 2160P	UHDOnly(Port1,2)
37	4096*2160	135.00	60.00	594.00	UDTV 2160P	UHDOnly(Port1,2)

5.1.4. HDMI Input (PC)

No.	Resolution	H-freq(kHz)	V-freq.(kHz)	Pixel clock	Proposed	Remarks
1	640*350	31.46	70.09	25.17	EGA	
2	720*400	31.46	70.08	28.32	DOS	
3	640*480	31.46	59.94	25.17	VESA(VGA)	
4	800*600	37.87	60.31	40.00	VESA(SVGA)	
5	1024*768	48.36	60.00	65.00	VESA(XGA)	
6	1152*864	54.34	60.05	80.00	VESA	
7	1280*1024	63.98	60.02	109.00	VESA(SXGA)	FHD only
8	1360*768	47.71	60.01	85.00	VESA(WXGA)	
9	1920*1080	67.50	60.00	158.40	WUXGA(CEA 861D)	FHD only
10	3840*2160	67.50	30.00	297.00	UDTV 2160P	UHD only
11	3840*2160	56.25	25.00	297.00	UDTV 2160P	UHD only
12	3840*2160	54.00	24.00	297.00	UDTV 2160P	UHD only
13	4096*2160	53.95	23.97	296.703	UDTV 2160P	UHD only
14	4096*2160	54.00	24.00	297.00	UDTV 2160P	UHD only

5.2. 3D mode(3D MODEL Only)

5.2.1. RF Input

No	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	Proposed	3D input proposed mode
1	1280*720	37.50	50	74.25	HDTV 720P	2D to 3D, Side by Side, Top & Bottom
2	1920*1080	28.13	50	74.25	HDTV 1080I	2D to 3D, Side by Side, Top & Bottom

5.2.2. HDMI Input (3D supported mode automatically)

No	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock (MHz)	VIC	3D input proposed mode	Proposed
1	640*480	31.46 / 31.50	59.94/ 60.00	25.13/25.20	1	Top-and-Bottom Side-by-side(half)	Secondary(SDTV 480P) Secondary(SDTV 480P)
		31.46 / 31.50	59.94/ 60.00	50.35/50.40	1	Side-by-side(Full)	(SDTV 480P)
		62.93 / 63.00	59.94/ 60.00	50.35/50.40	1	Frame packing Line alternative	Secondary(SDTV 480P) (SDTV 480P)
2	720*480	31.46 / 31.50	59.94 / 60.00	27.00/27.03	2,3	Top-and-Bottom Side-by-side(half)	Secondary(SDTV 480P) Secondary(SDTV 480P)
		31.46 / 31.50	59.94 / 60.00	27.00/27.03	2,3	Side-by-side(Full)	(SDTV 480P)
		62.93 /63.00	59.94 / 60.00	54.00/54.06	2,3	Frame packing Line alternative	Secondary(SDTV 480P) (SDTV 480P)
3	720*576	15.62	50.00	27.00	21	Top-and-Bottom Side-by-side(half) Side-by-side(Full) Frame packing Field alternative	(SDTV 576I) Secondary(SDTV 576I) (SDTV 576I) Secondary(SDTV 576I) Secondary(SDTV 576I)
4	720*576	31.25	50.00	27.00	17, 18	Top-and-Bottom Side-by-side(half) Side-by-side(Full)	Secondary(SDTV 576P) Secondary(SDTV 576P) (SDTV 576P)
		62.50	50.00	54.00	17, 18	Frame packing Line alternative	Secondary(SDTV 576P) (SDTV 576P)
5	1280*720	37.50	50.00	74.25	19	Top-and-Bottom Side-by-side(half)	Primary(HDTV 720P) Primary(HDTV 720P)
		37.50	50.00	148.50	19	Side-by-side(Full)	(HDTV 720P)
		44.96 / 45.00	59.94 / 60.00	74.17/74.25	4	Top-and-Bottom Side-by-side(half)	Primary(HDTV 720P) Primary(HDTV 720P)
		44.96 / 45.00	59.94 / 60.00	148.35/148.50	4	Side-by-side(Full)	(HDTV 720P)
		75.00	50.00	148.50	19	Frame packing Line alternative	Primary(HDTV 720P) (HDTV 720P)
		89.91/90.00	59.94 / 60.00	148.35/148.50	4	Frame packing Line alternative	Primary(HDTV 720P) (HDTV 720P)
6	1920*1080	28.12	50.00	74.25	20	Top-and-Bottom Side-by-side(half)	Secondary(HDTV 1080I) Primary(HDTV 1080I)
		28.12	50.00	148.50	20	Side-by-side(Full)	(HDTV 1080I)
		33.72 / 33.75	59.94 / 60.00	74.17/74.25	5	Top-and-Bottom Side-by-side(half)	Secondary(HDTV 1080I) Primary(HDTV 1080I)
		33.72 / 33.75	59.94 / 60.00	148.35/148.50	5	Side-by-side(Full)	(HDTV 1080I)
		56.25	50.00	148.50	20	Frame packing Field alternative	Primary(HDTV 1080I) (HDTV 1080I)
		67.43/67.50	59.94 / 60.00	148.35/148.50	5	Frame packing Field alternative	Primary(HDTV 1080I) (HDTV 1080I)

No	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock (MHz)	VIC	3D input proposed mode	Proposed
7	1920*1080	26.97 / 27.00	23.97 / 24.00	74.17 / 74.25	32	Top-and-Bottom Side-by-side(half)	Primary(HDTV 1080P) Primary(HDTV 1080P)
		26.97 / 27.00	23.97 / 24.00	148.35 / 148.50	32	Side-by-side(Full)	(HDTV 1080P)
		28.12	25.00	74.25	33	Top-and-Bottom Side-by-side(half)	Secondary(HDTV 1080P) Secondary(HDTV 1080P)
		28.12	25.00	148.50	33	Side-by-side(Full)	(HDTV 1080P)
		33.72 / 33.75	29.98 / 30.00	74.18/74.25	34	Top-and-Bottom Side-by-side(half)	Primary(HDTV 1080P) Secondary(HDTV 1080P)
		33.72 / 33.75	29.98 / 30.00	148.35/148.50	34	Side-by-side(Full)	(HDTV 1080P)
		43.94/54.00	23.97 / 24.00	148.35/148.50	32	Frame packing Line alternative	Primary(HDTV 1080P) (HDTV 1080P)
		56.25	25.00	148.50	33	Frame packing Line alternative	Secondary(HDTV 1080P) (HDTV 1080P)
		67.43 / 67.5	29.98 / 30.00	148.35/148.50	34	Frame packing Line alternative	Primary(HDTV 1080P) (HDTV 1080P)
		56.25	50.00	148.50	31	Top-and-Bottom Side-by-side(half)	Primary(HDTV 1080P) Secondary(HDTV 1080P)
		67.43 / 67.50	59.94 / 60.00	148.35/148.50	16	Top-and-Bottom Side-by-side(half)	Primary(HDTV 1080P) Secondary(HDTV 1080P)

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

No	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	3D input proposed mode	Proposed
1	1280*720	37.50	50.00	74.25	2D to 3D, Side by Side(half), Top & Bottom	HDTV 720P
2	1280*720	45.00	60.00	74.25	2D to 3D, Side by Side(half), Top & Bottom	HDTV 720P
3	1280*720	44.96	59.94	74.18	2D to 3D, Side by Side(half), Top & Bottom	HDTV 720P
4	1920*1080	33.75	60.00	74.25	2D to 3D, Side by Side(half), Top & Bottom	HDTV 1080I
5	1920*1080	33.72	59.94	74.18	2D to 3D, Side by Side(half), Top & Bottom	HDTV 1080I
6	1920*1080	28.12	50.00	74.25	2D to 3D, Side by Side(half), Top & Bottom	HDTV 1080I
7	1920*1080	67.50	60.00	148.50	2D to 3D, Side by Side(half), Top & Bottom	HDTV 1080P
8	1920*1080	67.43	59.94	148.35	2D to 3D, Side by Side(half), Top & Bottom	HDTV 1080P
9	1920*1080	27.00	24.00	74.25	2D to 3D, Side by Side(half), Top & Bottom	HDTV 1080P
10	1920*1080	28.12	25.00	74.25	2D to 3D, Side by Side(half), Top & Bottom	HDTV 1080P
11	1920*1080	56.25	50.00	74.25	2D to 3D, Side by Side(half), Top & Bottom	HDTV 1080P
12	1920*1080	26.97	23.98	74.18	2D to 3D, Side by Side(half), Top & Bottom	HDTV 1080P
13	1920*1080	33.75	30.00	74.25	2D to 3D, Side by Side(half), Top & Bottom	HDTV 1080P
14	1920*1080	33.71	29.97	74.18	2D to 3D, Side by Side(half), Top & Bottom	HDTV 1080P

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

No	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	3D input proposed mode	Proposed
1	1024*768	48.36	60.00	65.00	2D to 3D, Side by Side(half), Top & Bottom	HDTV 768P
2	1920*1080	67.50	60.00	148.50	2D to 3D, Side by Side(half), Top & Bottom, Checker Board, Single Frame Sequential, Row Interleaving, Column Interleaving	HDTV 1080P
3	3840*2160	54.00	24.00	296.70	2D to 3D, Side by Side(half), Top & Bottom	HDTV 2160P
		56.25	25.00	297.00		
		67.50	30.00	296.70		
4	4096*2160	54	24.00	297.00	2D to 3D, Side by Side(half), Top & Bottom	HDTV 2160P
5	Others	-	-	-	2D to 3D, Side by Side(half), Top & Bottom	640*350 720*400 640*480 800*600 1152*864

5.2.5. HDMI-DTV (3D supported mode manually)

No	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	Proposed	3D input proposed mode
1	720*480	31.50	60.00	27.03	SDTV 480P	2D to 3D, Side by Side(Half), Top & Bottom, Checker Board, Frame Sequential, Row Interleaving, Column Interleaving
2	720*576	31.25	50.00	27.00	SDTV 576P	
3	1280*720	45.00	60.00	74.25	HDTV 720P	
		37.50	50.00	74.25	HDTV 720P	
4	1920*1080	33.75	60.00	74.25	HDTV 1080I	2D to 3D, Side by Side(Half), Top & Bottom
		28.12	50.00	74.25	HDTV 1080I	
5	1920*1080	27.00	24.00	74.25	HDTV 1080P	2D to 3D, Side by Side(Half), Top & Bottom, Checker Board, Row Interleaving, Column Interleaving
		28.12	25.00	74.25	HDTV 1080P	
		33.75	30.00	74.25	HDTV 1080P	
		67.50	60.00	148.50	HDTV 1080P	2D to 3D, Side by Side(Half), Top & Bottom, Checker Board, Single Frame Sequential, Row Interleaving, Column Interleaving
		56.25	50.00	148.50	HDTV 1080P	
6	3840*2160 4096*2160 (Ultra HD model only)	53.95	23.97	297.00	HDTV 2160P	2D to 3D, Top & Bottom(half), Side by Side(half),
		54.00	24.00	296.70		
		56.25	25.00	297.00		
		61.43	29.97	297.00		
		67.50	30.00	296.70		
		112.50	50.00 (HDMI1, HDMI2 Only)	594.00	HDTV 2160P	
	135.00	60.00 (HDMI1, HDMI2 Only)	594.00	2D to 3D, Side by Side(half) Top & Bottom		

5.2.6. USB – Movie (3D) (3D supported mode manually)

No	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	3D input proposed mode
1	Under 704x480	-	-	-	2D to 3D
2	Over 704x480 Under 1080P interlaced	-	-	-	2D to 3D, Side by Side(Half), Top & Bottom
3	Over 704x480 Under 1080P progressive	-	50 / 60	-	2D to 3D, Side by Side(Half), Top & Bottom, Checker Board, Row Interleaving, Column Interleaving, Frame Sequential
4		-	others	-	2D to 3D, Side by Side(Half), Top & Bottom, Checker Board, Row Interleaving, Column Interleaving
5	Over 2160P	-	24/25/30	-	2D to 3D, Side by Side(Half), Top & Bottom



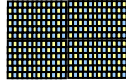
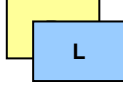



5.2.7. Miracast, Widi (3D supported mode manually)

No	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	3D input proposed mode
1	1024*768p	-	30/60	-	2D to 3D, Side by Side(Half), Top & Bottom
2	1280*720p	-	30/60	-	
3	1920*1080p	-	30/60	-	
4	Others	-	-	-	2D to 3D

5.2.8. USB, DLNA (3D) (3D supported mode automatically)

No	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	3D input proposed mode
1	1080p	33.75	30.00	74.25	Side by Side(Half), Top & Bottom, Checker Board, MPO(Photo), JPS(Photo)
2	2160p	67.50	30.00	297.00	

****Remark: 3D Input mode**

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

ADJUSTMENT INSTRUCTION

1. Application Range

This spec. sheet applies to UJ64J Chassis applied LED TV all models manufactured in TV factory

2. Specification.

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

3.1. Main PCB check process

- MAC Address Download
- ADC adjustment : 480i Comp1, 1920*1080 Comp1
- EDID/DDC download

Above adjustment items can be also performed in Final Assembly if needed. Both Board-level and Final assembly adjustment items can be check using In-Start Menu 1.ADJUST CHECK.

3.2. Final assembly adjustment

- White Balance adjustment
- RS-232C functionality check
- PING Test
- Factory Option setting per destination
- Ship-out mode setting (In-Stop)

3.3. Etc.

- Ship-out mode
- Service Option Default
- USB Download(S/W Update, Option, Service only)
- ISP Download (Option)

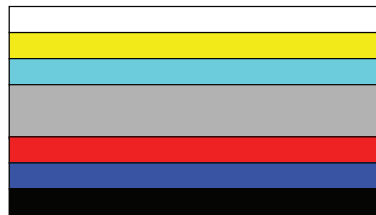
4. Automatic Adjustment

4.1. ADC Adjustment

ADC adjustment is needed to find the optimum black level and gain in Analog-to-Digital device and to compensate RGB deviation.

4.1.1. Equipment & Condition

- (1) USB to RS-232C Jig
- (2) MSPG-925 Series Pattern Generator(MSPG-925FA, pattern -65)
 - Resolution : 480i Comp1
1080P Comp1
 - Pattern : Horizontal 100% Color Bar Pattern
 - Pattern level : 0.7±0.1 Vp-p
 - Image



4.1.2. Adjustment method

- Using USB, adjust items listed in 3.1 in the other shown in "4.1.3.3"

4.1.3. Adj. protocol

Protocol	Command	Set ACK
Enter adj. mode	aa 00 00	a 00 OK00x
Source change	xb 00 04 xb 00 06	b 00 OK04x (Adjust 480i, 1080p Comp1) b 00 OK06x (Adjust 1920*1080 RGB)
Begin adj.	ad 00 10	
Return adj. result		OKx (Case of Success) NGx (Case of Fail)
Read adj. data	(main) ad 00 20 (sub) ad 00 21	(main) 0000000000000000000000000007c007b006dx (Sub) 0000000700000000000000000007c00830077x
Confirm adj.	ad 00 99	NG 03 00x (Fail) NG 03 01x (Fail) NG 03 02x (Fail) OK 03 03x (Success)
End adj.	ad 00 90	a 00 OK90x

(Ref.) ADC Adj. RS232C Protocol_Ver1.0

Adj. order

- aa 00 00 [Enter ADC adj. mode]
- xb 00 04
[Change input source to Component1(480i&1080p)]
- ad 00 10 [Adjust 480i&1080p Comp1]
- xb 00 06 [Change input source to RGB(1024*768)]
- ad 00 10 [Adjust 1920*1080 RGB]
- aa 00 90 End adj.

4.2. MAC address, ESN, Widevine, HDCP2.0 key D/L

4.2.1. Equipment & Condition

- (1) Play file: keydownload.exe

4.2.2. Communication Port connection

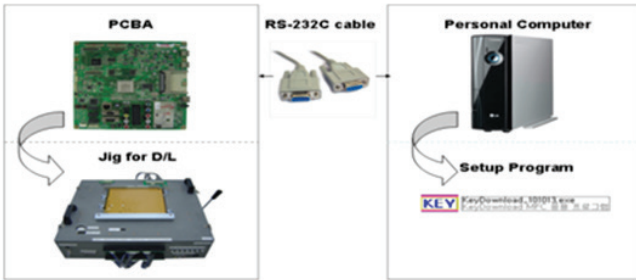
- (1) Key Write: Com 1,2,3,4 and 115200 (Baudrate)
- (2) Barcode: Com 1,2,3,4 and 9600 (Baudrate)

4.2.3. Download process

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

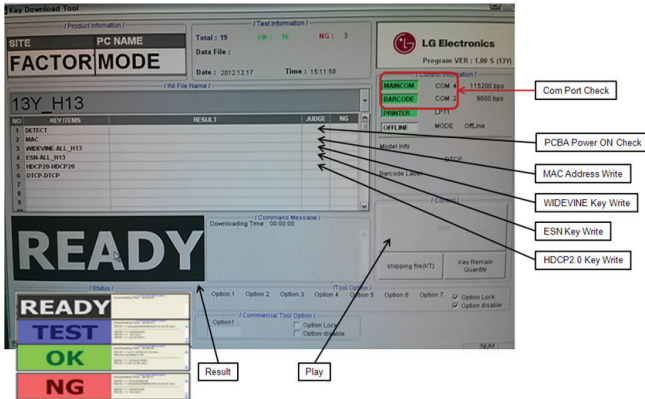
4.2.4. Communication Port connection

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



4.2.5. Download

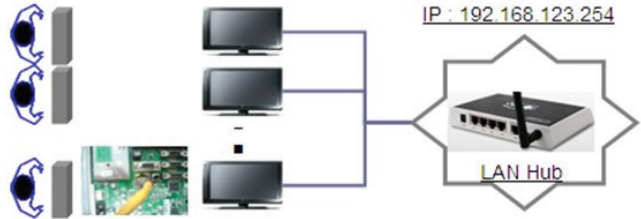
- (1) Models(MAC + Widevine + ESN)



4.3. LAN Inspection

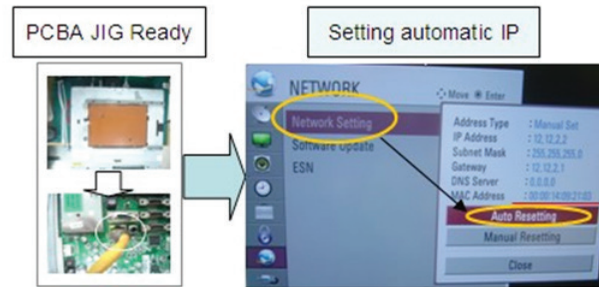
4.3.1. Equipment & Condition

- Each other connection to LAN Port of IP Hub and Jig



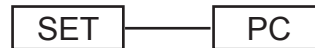
4.3.2. LAN inspection solution

- LAN Port connection with PCB
- Network setting at MENU Mode of TV
- Setting automatic IP
- Setting state confirmation
 - If automatic setting is finished, you confirm IP and MAC Address.



4.3.3. LAN PORT INSPECTION (PING TEST)

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



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

4.3.4. LAN PORT inspection (PING TEST)

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



4.4. Model name & Serial number Download

4.4.1. Model name & Serial number D/L

- Press "Power on" key of service remocon.(Baud rate : 115200 bps)
- Connect RS-232C Signal to USB Cable to USB.
- Write Serial number by use USB port.
- Must check the serial number at Instart menu.

■ Method & Notice

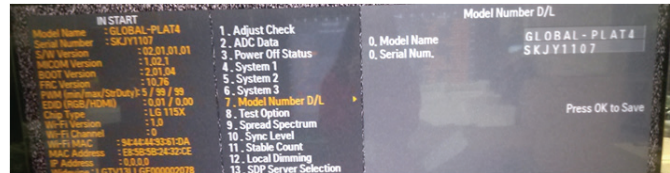
- A. Serial number D/L is using of scan equipment.
- B. Setting of scan equipment operated by Manufacturing Technology Group.
- C. Serial number D/L must be conformed when it is produced in production line, because serial number D/L is mandatory by D-book 4.0

* Manual Download (Model Name and Serial Number)

If the TV set is downloaded By OTA or Service man, Sometimes model name or serial number is initialized. (not always)

It is impossible to download by bar code scan, so It need Manual download.

- a. Press the 'INSTART' key of ADJ remote controller.
- b. Go to the menu '7. Model Number D/L' like below photo.
- c. Input the Factory model name or Serial number like below photo.



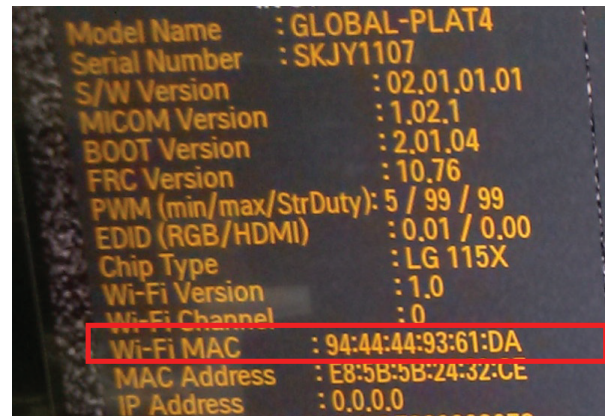
- d. Check the model name INSTART menu -> Factory name displayed
- e. Check the Diagnostics (DTV country only) -> Buyer model displayed

4.5. WIFI MAC ADDRESS CHECK

4.5.1. Using RS232 Command

	Command	Set ACK
Transmission	[A][0][0][Set ID][0][20][Cr]	[O][K][x] or [N][G]

- Check the menu on in-start



5. Manual Adjustment

5.1. ADC adjustment is not needed because of OTP (Auto ADC adjustment)

5.2. EDID (The Extended Display Identification Data) / DDC (Display Data Channel) download

5.2.1. 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".

5.2.2. Equipment

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

5.2.3. Download method

- Press Adj. key on the Adjust remocon, then select "12.EDID D/L".
By pressing Enter key, enter EDID D/L menu
(2) Select [Start] button by pressing Enter key, HDMI1 / HDMI2 / HDMI3 / HDMI4 are Writing and display OK or NG.

For HDMI EDID
DVI-D to HDMI or HDMI to HDMI
Image showing a DVI-D to HDMI adapter and a coiled HDMI cable.

5.2.4. EDID DATA

- Reference
HDMI1 ~ HDMI3
In the data of EDID, bellows may be different by Input mode

EDID Block 0, Bytes 0-127 hex data table with columns 0-F and rows 0-7.

- Product ID
Serial No: Controlled on production line.
Month, Year: Controlled on production line:
ex) Monthly : '01' -> '01'
Year : '2016' -> '1A'
Model Name(Hex): LGTV
Checksum(LG TV): Changeable by total EDID data.
Vendor Specific(HDMI)

5.2.4.1. EDID

DTS HDMI1 (C/S: A0,E5)_6G_UHD Deep Color ON
EDID Block 0, Bytes 0-127

Hex data table for DTS HDMI1 #1, Bytes 0-127.

DTS HDMI1 (C/S: E6 72)_3G_UHD Deep Color OFF
EDID Block 0, Bytes 0-127

Hex data table for DTS HDMI1 #2, Bytes 0-127.

EDID Block 1, Bytes 128-255

Hex data table for EDID Block 1, Bytes 128-255.

DTS HDMI2 (C/S: A0,D5)_6G_UHD Deep Color ON
EDID Block 0, Bytes 0-127

Hex data table for DTS HDMI2 #1, Bytes 0-127.

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	02	03	4C	F1	50	90	22	20	05	04	03	02	01	61	5D	5E
10	5F	66	62	63	64	29	3D	06	C0	15	07	50	09	57	07	7C
20	03	0C	00	20	00	B8	3C	20	C0	8E	01	02	03	04	01	4F
30	00	FE	08	10	06	10	18	10	28	10	38	10	67	D8	5D	C4
40	01	78	80	03	E3	05	C0	00	E3	0F	00	11	66	21	50	B0
50	51	00	1B	30	40	70	36	00	40	84	63	00	00	1E	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	D5

DTS HDMI2 (C/S: E6 62) 3G_UHD Deep Color OFF
EDID Block 0, Bytes 0-127

	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	19	01	03	80	A0	5A	78	0A	EE	91	A3	54	4C	99	26
20	0F	50	54	A1	08	00	31	40	45	40	61	40	71	40	81	80
30	01	01	01	01	01	01	02	3A	80	18	71	38	2D	40	58	2C
40	45	00	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	E6	

EDID Block 1, Bytes 128-255

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	02	03	3E	F1	4E	90	22	20	05	04	03	02	01	5D	5E	5F
10	62	63	64	29	3D	06	C0	15	07	50	09	57	07	7C	03	0C
20	00	20	00	B8	3C	20	C0	8E	01	02	03	04	01	4F	00	FE
30	08	10	06	10	18	10	28	10	38	10	E3	0E	61	66	01	1D
40	80	18	71	1C	16	20	58	2C	25	00	40	84	63	00	00	9E
50	01	1D	00	72	51	D0	1E	20	6E	28	55	00	40	84	63	00
60	00	1E	00	00	00	00	00	00	00	00	00	00	00	00	00	00
70	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	62

DTS HDMI3 (C/S: E6 52)
EDID Block 0, Bytes 0-127

	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	19	01	03	80	A0	5A	78	0A	EE	91	A3	54	4C	99	26
20	0F	50	54	A1	08	00	31	40	45	40	61	40	71	40	81	80
30	01	01	01	01	01	01	02	3A	80	18	71	38	2D	40	58	2C
40	45	00	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	E6	

EDID Block 1, Bytes 128-255

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	02	03	3E	F1	4E	90	22	20	05	04	03	02	01	5D	5E	5F
10	62	63	64	29	3D	06	C0	15	07	50	09	57	07	7C	03	0C
20	00	30	00	B8	3C	20	C0	8E	01	02	03	04	01	4F	00	FE
30	08	10	06	10	18	10	28	10	38	10	E3	0E	61	66	01	1D
40	80	18	71	1C	16	20	58	2C	25	00	40	84	63	00	00	9E
50	01	1D	00	72	51	D0	1E	20	6E	28	55	00	40	84	63	00
60	00	1E	00	00	00	00	00	00	00	00	00	00	00	00	00	00
70	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	52

DTS HDMI1 (C/S: A0,F3)_6G_2D ONLY_UHD Deep Color ON

	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	19	01	03	80	A0	5A	78	0A	EE	91	A3	54	4C	99	26
20	0F	50	54	A1	08	00	31	40	45	40	61	40	71	40	81	80
30	01	01	01	01	01	01	08	E8	00	30	F2	70	5A	80	B0	58
40	8A	00	40	84	63	00	00	1E	02	3A	80	18	71	38	2D	40
50	58	2C	45	00	40	84	63	00	00	1E	00	00	00	FD	00	3A
60	3E	1E	88	3C	00	0A	20	20	20	20	20	20	20	00	00	FC
70	00	4C	47	20	54	56	0A	20	20	20	20	20	20	01	A0	
0	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	02	03	3E	F1	50	90	22	20	05	04	03	02	01	61	5D	5E
10	5F	66	62	63	64	2C	3D	06	C0	15	07	50	09	57	07	6E
20	03	0C	00	10	00	B8	3C	20	00	80	01	02	03	04	67	D8
30	5D	C4	01	78	80	03	E3	05	C0	00	E3	0F	00	11	66	21
40	50	B0	51	00	1B	30	40	70	36	00	40	84	63	00	00	1E
50	01	1D	00	72	51	D0	1E	20	6E	28	55	00	40	84	63	00
60	00	1E	00	00	00	00	00	00	00	00	00	00	00	00	00	00
70	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	F3

DTS HDMI2 (C/S: A0,E3)_6G_2D ONLY_UHD Deep Color ON

	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	19	01	03	80	A0	5A	78	0A	EE	91	A3	54	4C	99	26
20	0F	50	54	A1	08	00	31	40	45	40	61	40	71	40	81	80
30	01	01	01	01	01	01	08	E8	00	30	F2	70	5A	80	B0	58
40	8A	00	40	84	63	00	00	1E	02	3A	80	18	71	38	2D	40
50	58	2C	45	00	40	84	63	00	00	1E	00	00	00	FD	00	3A
60	3E	1E	88	3C	00	0A	20	20	20	20	20	20	20	00	00	FC
70	00	4C	47	20	54	56	0A	20	20	20	20	20	20	01	A0	
0	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	02	03	3E	F1	50	90	22	20	05	04	03	02	01	61	5D	5E
10	5F	66	62	63	64	2C	3D	06	C0	15	07	50	09	57	07	6E
20	03	0C	00	20	00	B8	3C	20	00	80	01	02	03	04	67	D8
30	5D	C4	01	78	80	03	E3	05	C0	00	E3	0F	00	11	66	21
40	50	B0	51	00	1B	30	40	70	36	00	40	84	63	00	00	1E
50	01	1D	00	72	51	D0	1E	20	6E	28	55	00	40	84	63	00
60	00	1E	00	00	00	00	00	00	00	00	00	00	00	00	00	00
70	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	E3

DTS HDMI1 (C/S: E6,80)_3G_2D ONLY_UHD Deep Color OFF

	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	19	01	03	80	A0	5A	78	0A	EE	91	A3	54	4C	99	26
20	0F	50	54	A1	08	00	31	40	45	40	61	40	71	40	81	80
30	01	01	01	01	01	01	02	3A	80	18	71	38	2D	40	58	2C
40	45	00	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	20	00	00	FC
70	00	4C	47	20	54	56	0A	20	20	20	20	20	20	01	E6	
0	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	02	03	30	F1	4E	90	22	20	05	04	03	02	01	5D	5E	5F
10	62	63	64	2C	3D	06	C0	15	07	50	09	57	07	6E	03	0C
20	00	10	00	B8	3C	20	00	80	01	02	03	04	E3	0E	61	66
30	01	1D	80	18	71	1C	16	20	58	2C	25	00	40	84	63	00
40	00	9E	01	1D	00	72	51	D0	1E	20	6E	28	55	00	40	84
50	63	00	00	1E	00	00	00									

DTS HDMI2 (C/S: E6,70)_3G_2D ONLY_UHD Deep Color OFF

	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	19	01	03	80	A0	5A	78	0A	EE	91	A3	54	4C	99	26
20	0F	50	54	A1	08	00	31	40	45	40	61	40	71	40	81	80
30	01	01	01	01	01	01	02	3A	80	18	71	38	2D	40	58	2C
40	45	00	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	20	01	E6
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	02	03	30	F1	4E	90	22	20	05	04	03	02	01	5D	5E	5F
10	62	63	64	2C	3D	06	C0	15	07	50	09	57	07	6E	03	0C
20	00	20	00	B8	3C	20	00	80	01	02	03	04	E3	0E	61	66
30	01	1D	80	18	71	1C	16	20	58	2C	25	00	40	84	63	00
40	00	9E	01	1D	00	72	51	D0	1E	20	6E	28	55	00	40	84
50	63	00	00	1E	00	00	00	00	00	00	00	00	00	00	00	00
60	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
70	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	70

DTS HDMI3 (C/S: E6,60)_3G_2D ONLY_UHD Deep Color OFF

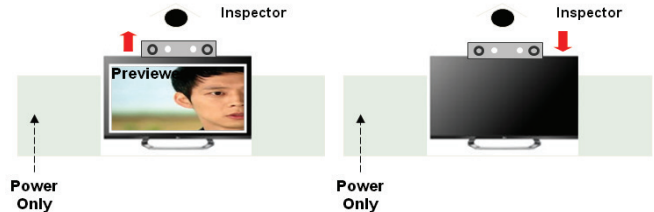
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01	01
10	01	19	01	03	80	A0	5A	78	0A	EE	91	A3	54	4C	99	26
20	0F	50	54	A1	08	00	31	40	45	40	61	40	71	40	81	80
30	01	01	01	01	01	01	02	3A	80	18	71	38	2D	40	58	2C
40	45	00	40	84	63	00	00	1E	66	21	50	B0	51	00	1B	30
50	40	70	36	00	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	20	01	E6
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	02	03	30	F1	4E	90	22	20	05	04	03	02	01	5D	5E	5F
10	62	63	64	2C	3D	06	C0	15	07	50	09	57	07	6E	03	0C
20	00	30	00	B8	3C	20	00	80	01	02	03	04	E3	0E	61	66
30	01	1D	80	18	71	1C	16	20	58	2C	25	00	40	84	63	00
40	00	9E	01	1D	00	72	51	D0	1E	20	6E	28	55	00	40	84
50	63	00	00	1E	00	00	00	00	00	00	00	00	00	00	00	00
60	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
70	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	60

* Checksum (HDMI 1/2/3)

	DTS(3D)		DTS (2D)	
	3G	6G		
HDMI1	E6/72	A0/E5	E6/80	A0/F3
HDMI2	E6/62	A0/D5	E6/70	A0/E3
HDMI3	E6/52		E6/60	

5.3. Camera Port Inspection

- (1) Objective : To check how it connects between Camera and PCBA normally, and their Function
- (2) Test Method : This Inspection is available only Power-Only Status.
 - 1) Push Camera Up
 - 2) Camera's Preview picture appears on TV Set
 - 3) Push Camera Down



(3) RS-232C Command

RS-232C COMMAND			Explanation
CMD	DATA	ID	
Ai	00	23	Camera Function Start.
Ai	00	24	Camera Function End.

5.4. V-COM Adjust

(ONLY FOR EPI model, 43/49/55UH6600, 43/49/55UH6500)

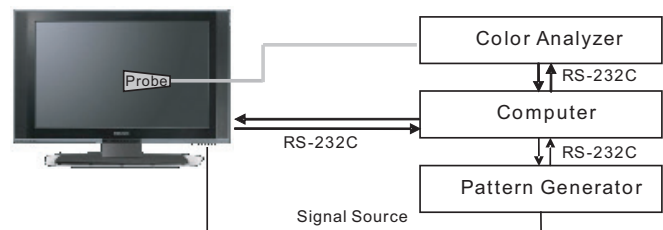
5.4.1. Overview

- V-COM adj. Objective & How-it-works
- Objective: To reduce each Panel's V-COM voltage deviation
- How-it-works: When V-COM gain in the adjust-OSD of each SET is at default value, each SET can have flicker by each Panel's V-COM voltage deviation. In order to prevent flicker of each SET, find the desired each Panel's V-COM voltage value.
- Adj. condition: normal temperature
 - 1) Surrounding Temperature: 25 °C ± 5 °C
 - 2) Warm-up time: About 5 Min
 - 3) Surrounding Humidity: 20% ~ 80%

5.4.2. Equipment

- (1) Color Analyzer: CA-310 (LED Module : CH 14) or CM-H505
- (2) Adj. Computer (During auto adj., RS-232C protocol is needed)
- (3) Adjust Remocon
- (4) Signal : internal flicker Pattern in SET
 - Color Analyzer Matrix should be calibrated using CS-100

5.4.3. Equipment connection MAP



* If TV internal pattern is used, not needed

5.4.4. Adj. Command (Protocol)

<Command Format>
 CMD ID DATA CR RF

- CMD: Command
- ID : Command
- Data : Command
- (Ex) [Send: va 00 00\r\n]

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

RS-232C COMMAND			Explanation
CMD	DATA	ID	
va	00	00	V-com pattern
vb	00	00 ~ FE	V-com adj.(internal Flicker pattern)
wb	00	FF	V-com adj. completed

5.4.5. Adjustment method

- (1) Set TV in POWER-ONLY mode using POWER ONLY key
 - (2) Zero calibrate probe then place it on the center of the Display
 - (3) Connect Cable (RS-232C to USB)
 - (4) Select Model in "V-com adj. Program" and begin "V-com adj."
 - (5) When V-com adj. is complete (OK)
 - (6) Remove probe and RS-232C to USB cable to complete adj.
- V-com Adj. must begin as start command "va 00 00" , and finish as end command "wb 00 ff"

▪ V-com adjust data

	43" inch		49" inch		55" inch		65" inch	
	V-com Data							
	hex	dec	hex	dec	hex	dec	hex	dec
Max	B4	180	8B	139	85	133	AB	171
Default	96	150	6D	109	68	104	8D	141
Min	78	120	4F	79	49	73	6F	111

5.4.5.1 Manual adj. method
 TBD

5.5. White Balance Adjustment

5.5.1. Overview

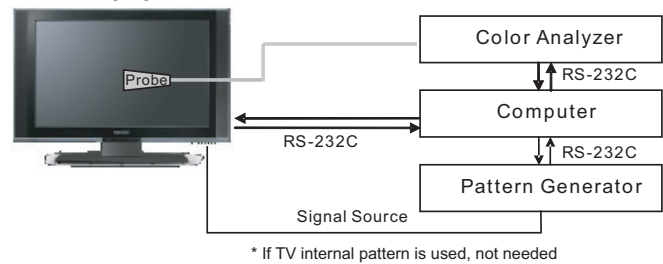
5.5.1.1. W/B adj. Objective & How-it-works

- (1) Objective: To reduce each Panel's W/B deviation
- (2) How-it-works: When R/G/B gain in the OSD is at 192, it means the panel is at its Full Dynamic Range. In order to prevent saturation of Full Dynamic range and data, one of R/G/B is fixed at 192, and the other two is lowered to find the desired value.
- (3) Adj. condition: normal temperature
 - Surrounding Temperature: 25±5 °C
 - Warm-up time: About 5 Min
 - Surrounding Humidity: 20% ~ 80%

5.5.2. Equipment

- (1) Color Analyzer: CA-210 (LED Module : CH 14)
 - (2) Adj. Computer (During auto adj., RS-232C protocol is needed)
 - (3) Adjust Remocon
 - (4) Video Signal Generator MSPG-925F 720p/204-Gray (Model: 217, Pattern: 49)
- ※ Color Analyzer Matrix should be calibrated using CS-1000

5.5.3. Equipment connection MAP



5.5.4. Adj. Command (Protocol)

<Command Format>

START 6E A 50 A LEN A 03 A CMD A 00 A VAL A CS A STOP

- LEN: Number of Data Byte to be sent
- CMD : Command
- VAL : FOS Data value
- CS : Checksum of sent data
- A : Acknowledge
- (Ex) [Send: JA_00_DD] / [Ack: A_00_okDDX]

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

RS-232C COMMAND			Explanation
CMD	DATA	ID	
wb	00	00	Begin White Balance adj.
wb	00	10	Gain adj.(internal white pattern)
wb	00	1f	Gain adj. completed
wb	00	20	Offset adj.(internal white pattern)
wb	00	2f	Offset adj. completed
wb	00	ff	End White Balance adj. (internal pattern disappears)

(Ex) wb 00 00 -> Begin white balance auto-adj.
 wb 00 10 -> Gain adj.
 ja 00 ff -> Adj. data
 jb 00 c0
 ...
 ...
 wb 00 1f -> Gain adj. complete
 * (wb 00 20(start), wb 00 2f(endc)) -> Off-set adj.
 wb 00 ff -> End white balance auto adj.

(2) Adjustment Map
 Applied Model : ALL MODELS

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

5.5.5. Adjustment method

5.5.5.1. Auto WB calibration

- (1) Set TV in adj. mode using POWER ONNY key
- (2) Zero calibrate probe then place it on the center of the Display
- (3) Connect Cable (RS-232C to USB)
- (4) Select mode in adj. Program and begin adj.
- (5) When adj. is complete (OK Sign), check adj. status pre mode(Warm, Medium, Cool)
- (6) Remove probe and RS-232C to USB cable to complete adj.
 - W/B Adj. must begin as start command “wb 00 00” , and finish as end command “wb 00 ff”, and Adj. offset if need

5.5.5.2. Manual adj. method

- (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 -> 7. 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.

** G-fix adjustment

Adjust modes (Cool), Fix the G gain to 172 (default data) and change the others (G/B Gain).
 Adjust two modes(Medium / Warm), Fix the one of R/G/B gain to 192 (default data) and decrease the others.

▪ If internal pattern is not available, use RF input. In EZ Adj. menu 7.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.

▪ 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
 - LCD : Color Analyzer (CA-210) probe should be within 10cm and perpendicular of the module surface (80°~ 100°)
- (3) Aging time
 - After Aging Start, Keep the Power ON status during 5 Minutes.
 - In case of LCD, Back-light on should be checked using no signal or Full-white pattern.

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

- Luminance: 206 Gray
- Standard color coordinate and temperature using CS-1000 (over 26 inch)

Mode	Coordinate		Temp	Δuv
	X	Y		
Cool	0.271	0.270	13,000K	0.0000
Medium	0.283	0.289	9,300K	0.0000
Warm	0.313	0.329	6,500K	0.0000

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

Mode	Coordinate		Temp	Δuv
	X	Y		
Cool	0.271±0.002	0.270±0.002	13000K	0.0000
Medium	0.286±0.002	0.289±0.002	9300K	0.0000
Warm	0.313±0.002	0.329±0.002	6500K	0.0000

5.5.7. EDGE & IOL LED White balance table

- Edge & ALEF LED module change color coordinate because of aging time
- apply under the color coordinate table, for compensated aging time

(Jan~Dec) & Global (except Japan)

model: (normal line)LGD use(LH5xxx, LH6xxx, UH6xxx, UH7xxx,UH8xxx,UH9xxx) - Normal model

	Aging time (Min)	Cool		Medium		Warm	
		x	y	x	y	x	y
		271	270	286	289	313	329
1	0-2	282	289	297	308	324	348
2	3-5	281	287	296	306	323	346
3	6-9	279	284	294	303	321	343
4	10-19	277	280	292	299	319	339
5	20-35	275	277	290	296	317	336
6	36-49	274	274	289	293	316	333
7	50-79	273	272	288	291	315	331
8	80-119	272	271	287	290	314	330
9	Over 120	271	270	286	289	313	329

(Jan~Dec) & Global (except Japan)

model: (normal line)LGD use (79UH95XX) - 15year WCG Carry over module

	Aging time (Min)	Cool		Medium		Warm	
		x	y	x	y	x	y
		271	270	286	289	313	329
1	0-2	285	296	300	315	327	355
2	3-5	284	294	299	313	326	353
3	6-9	283	293	298	312	325	352
4	10-19	283	292	298	311	325	351
5	20-35	281	288	296	307	323	347
6	36-49	279	286	294	305	321	345
7	50-79	278	284	293	303	320	343
8	80-119	277	282	292	301	319	341
9	Over 120(24Hr)	271	270	286	289	313	329

(Jan~Dec) & Only Japan

(normal line)LGD use(LH5xxx, LH6xxx, UH6xxx, UH7xxx,UH8xxx,UH9xxx) - Normal model

	Aging time (Min)	Cool		Medium		Warm	
		x	y	x	y	x	y
		271	270	286	289	314	318
1	0-2	282	289	297	308	325	337
2	3-5	281	287	296	306	324	335
3	6-9	279	284	294	303	322	332
4	10-19	277	280	292	299	320	328
5	20-35	275	277	290	296	318	325
6	36-49	274	274	289	293	317	322
7	50-79	273	272	288	291	316	320
8	80-119	272	271	287	290	315	319
9	Over 120	271	270	286	289	314	318

(Jan~Dec) & Only Japan

model: (normal line)LGD use (79UH95XX) - 15year WCG Carry over module

	Aging time (Min)	Cool		Medium		Warm	
		x	y	x	y	x	y
		271	270	286	289	314	318
1	0-2	285	296	300	315	328	344
2	3-5	284	294	299	313	327	342
3	6-9	283	293	298	312	326	341
4	10-19	283	292	298	311	326	340
5	20-35	281	288	296	307	324	336
6	36-49	279	286	294	305	322	334
7	50-79	278	284	293	303	321	332
8	80-119	277	282	292	301	320	330
9	Over 120(24Hr)	271	270	286	289	314	318

AUO, INX, Sharp, CSOT, BOE applied model(If Cool is 13000K SPEC)_DV standard

	cool		med		warm	
	x	y	x	y	x	y
spec	271	270	286	289	313	329
target	278	280	293	299	320	339

Except Gumi Winter(Mar~Dec) & Global

model: 22 inch LGD module

NC5.0	Aging time (Min)	Cool		Medium		Warm	
		x	y	x	y	x	y
		286	289	295	305	313	329
1	0-2	291	295	300	311	318	335
2	3-5	290	294	299	310	317	334
3	6-9	289	293	298	309	316	333
4	10-19	289	293	298	309	316	333
5	20-35	288	291	297	307	315	331
6	36-49	287	290	296	306	314	330
7	50-79	287	290	296	306	314	330
8	80-119	286	289	295	305	313	329
9	Over 120	286	289	295	305	313	329

LGD TN Module(If Cool is 9300K Spec)

	cool		med		warm	
	x	y	x	y	x	y
spec	286	289	295	305	313	329
target	286	289	295	305	313	329

5.6. Local Dimming Function Check

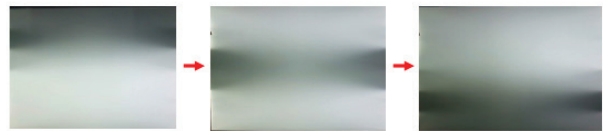
(Step 1) Turn on TV

(Step 2) At the Local Dimming mode, module Edge Backlight moving right to left

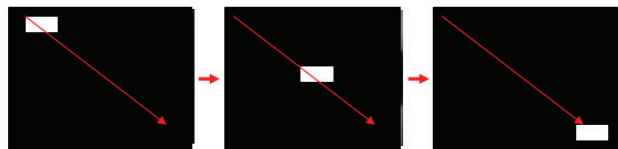
Back light of IOP module moving

(Step 3) confirm the Local Dimming mode

(Step 4) Press "exit" Key



Local Dimming Demo (Edge LED Model)



Local Dimming Demo (ALEF Model)

5.7. Magic Motion Remocon test

- Equipment : RF Remocon for test, IR-KEY-Code Remocon for test
- You must confirm the battery power of RF-Remocon before test
(recommend that change the battery per every lot)
- Sequence (test)
 - a) if you select the 'start key(OK)' on the controller, you can pairing with the TV SET.
 - b) You can check the cursor on the TV Screen, when select the 'OK Key' on the controller
 - c) You must remove the pairing with the TV Set by select 'Mute + OK Key' on the controller

5.8. 3D function test

(Pattern Generator MSHG-600, MSPG-6100 [SUPPORT HDMI1.4])
 * HDMI mode NO. 872 , pattern No.83

- (1) Please input 3D test pattern like below (HDMI mode NO. 872 , pattern No.83)



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

- (2) When 3D OSD appear automatically , then select green button



Fig.3
 <OK Key>

- (3) Don't wear a 3D Glasses, Check the picture like below



Fig.2

5.9 HDMI ARC Function Inspection

5.9.1. Test equipment

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

5.9.2. Test method

- (1) Insert the HDMI Cable to the HDMI ARC port from the master equipment (HDMI2)
- (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)

5.10. EYE-Q Green Function Inspection

- (Step 1) Turn on the TV.
- (Step 2) Press 'EYE button' on the adjustment remote-controller.
- (Step 3) Cover 'Eye Q sensor' on the front of set with your hands, hold it for 6 seconds.
- (Step 4) Check "the Sensor Data" on the screen, make certain that Data is below 10. If Data isn't below 10 in 6 seconds, Eye Q sensor would be bad. You should change Eye Q sensor.
- (Step 5) Uncover your hands from Eye Q sensor, hold it for 6 seconds.
- (Step 6) Check "Back Light(xxx)" on the screen, check data increase . You should change Eye Q sensor



STEP(2)

STEP(3)

STEP(4)



STEP(5)

STEP(6)

5.11. 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.

6. GND and Internal Pressure check

6.1. Method

- (1) GND & Internal Pressure auto-check preparation
 - Check that Power Cord is fully inserted to the SET. (If loose, re-insert)
- (2) Perform GND & Internal Pressure auto-check
 - Unit fully inserted Power cord, Antenna cable and A/V arrive to the auto-check process.
 - Connect D-terminal to AV JACK TESTER
 - Auto CONTROLLER(GWS103-4) ON
 - Perform GND TEST
 - If NG, Buzzer will sound to inform the operator.
 - If OK, changeover to I/P check automatically. (Remove CORD, A/V form AV JACK BOX)
 - Perform I/P test
 - If NG, Buzzer will sound to inform the operator.
 - If OK, Good lamp will lit up and the stopper will allow the pallet to move on to next process.

6.2. Checkpoint

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

7. AUDIO output check

No	Item	Min	Typ	Max	Unit	Remark
1	Audio practical max Output, L/R (Distortion=10% max Output)		10.0 8.10	12.0 10.8	W Vrms	EQ Off AVL Off Clear Voice Off
2	Speaker (8Ω Impedance)		10	12	W	EQ On AVL On Clear Voice On

*Measurement condition:

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

8. USB S/W Download

(optional, Service only)

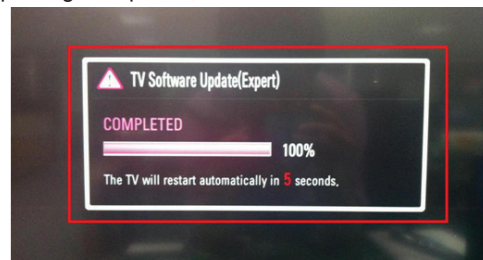
- (1) Put the USB Stick to the USB socket
- (2) Automatically detecting update file in USB Stick
 - If your downloaded program version in USB Stick is lower than that of TV set, it didn't work. Otherwise USB data is automatically detected.
- (3) Show the message "Copying files from memory"



- (4) Updating is starting



- (5) Updating Completed, The TV will restart automatically



- (6) If your TV is turned on, check your updated version and Tool option.

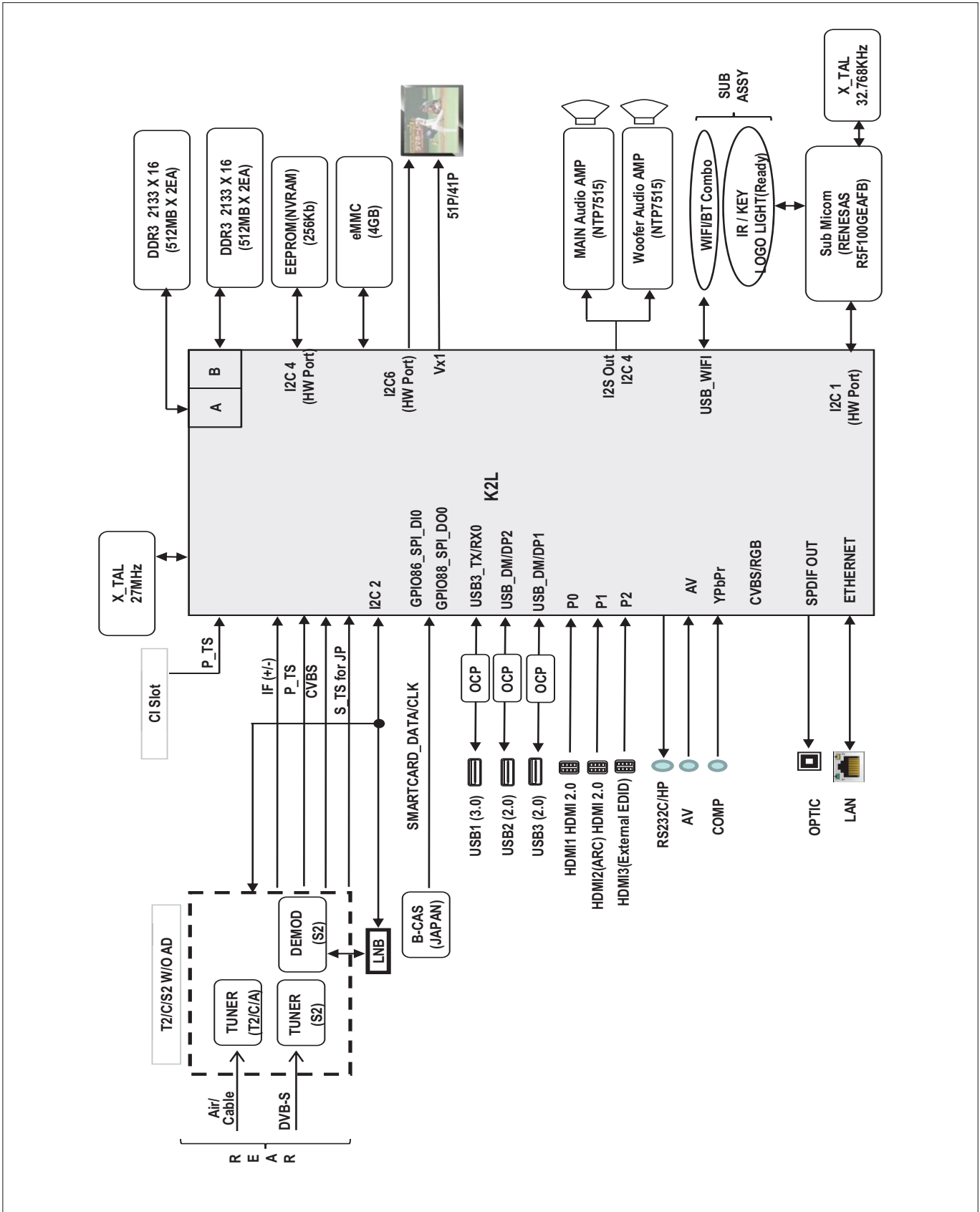
* If downloading version is more high than your TV have, TV can lost all channel data. In this case, you have to channel recover. If all channel data is cleared, you didn't have a DTV/ ATV test on production line.

* After downloading, TOOL OPTION setting is needed again.

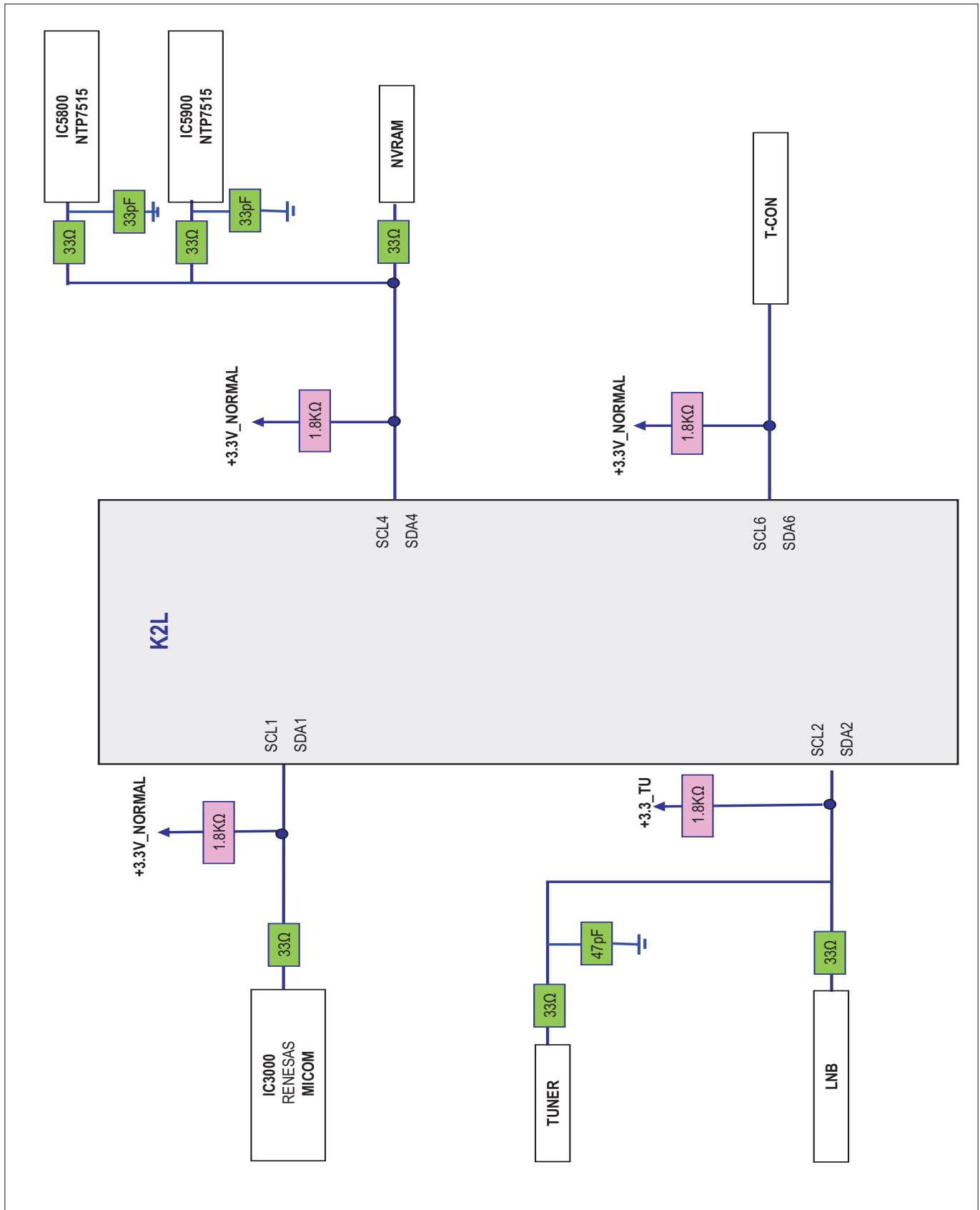
- (1) Push "IN-START" key in service remote controller.
- (2) Select "Tool Option 1" and Push "OK" button.
- (3) Punch in the number. (Each model has their number.)

Block Diagram

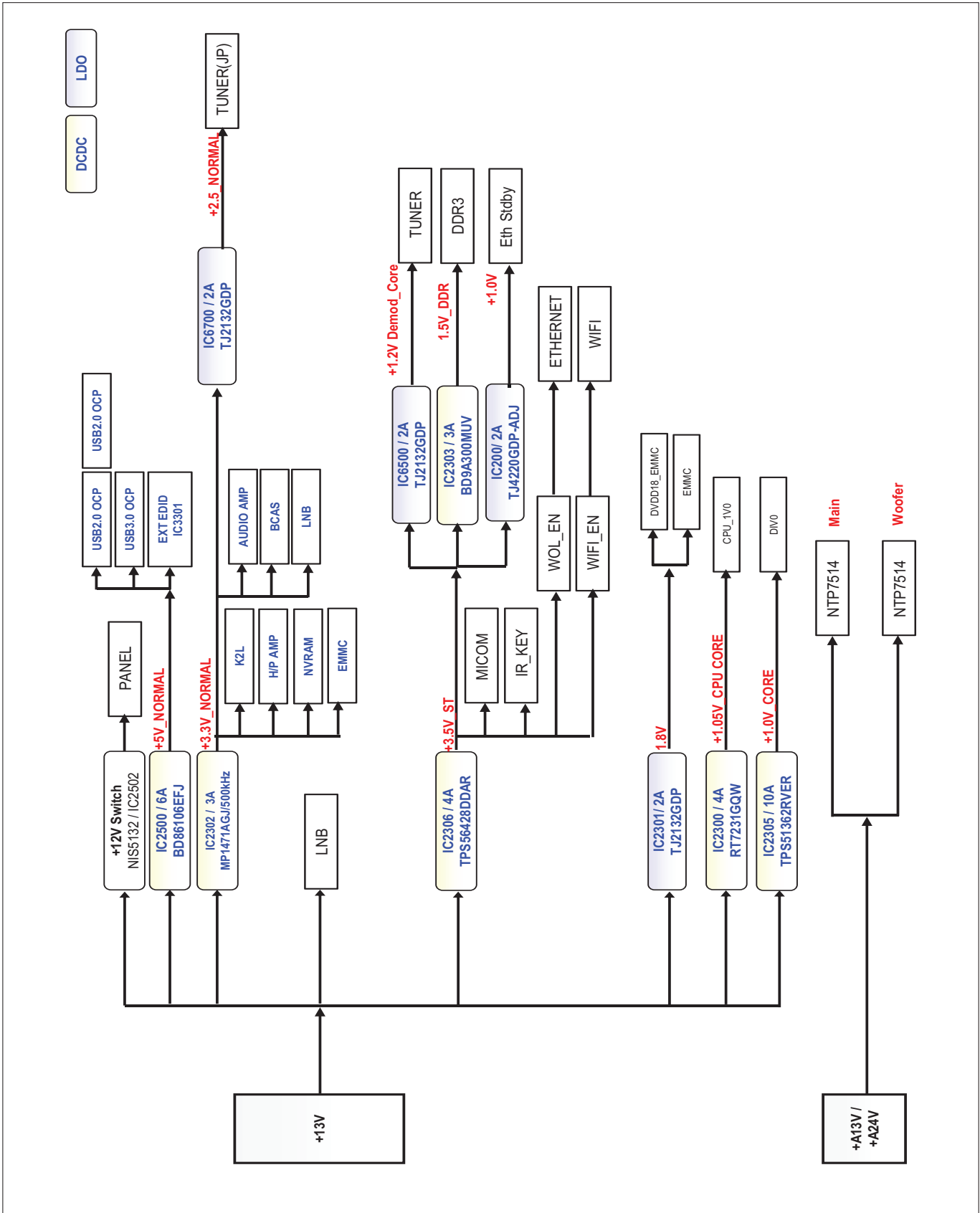
1.K2L Circuit Block Diagram



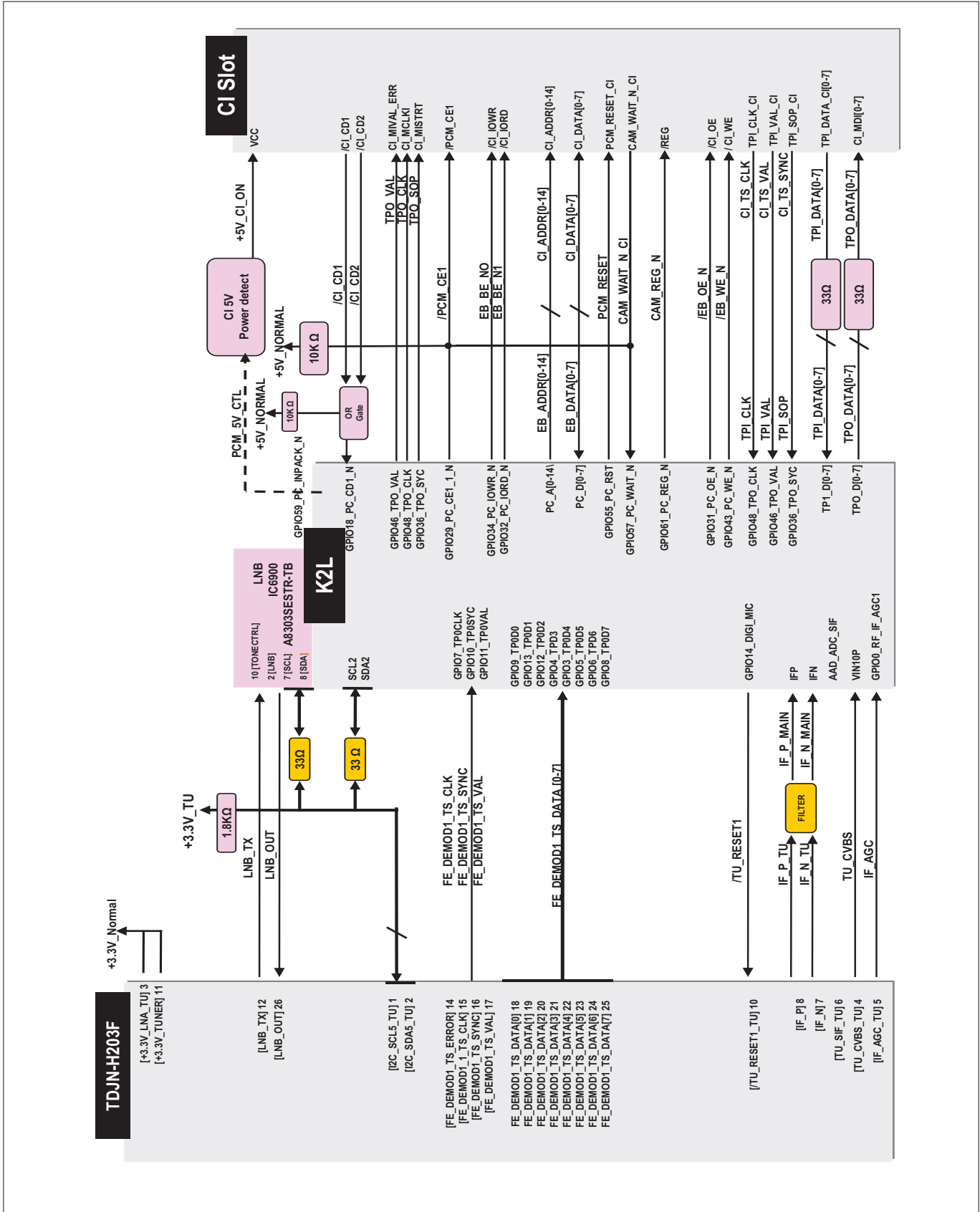
2. K2L I2C Block Diagram



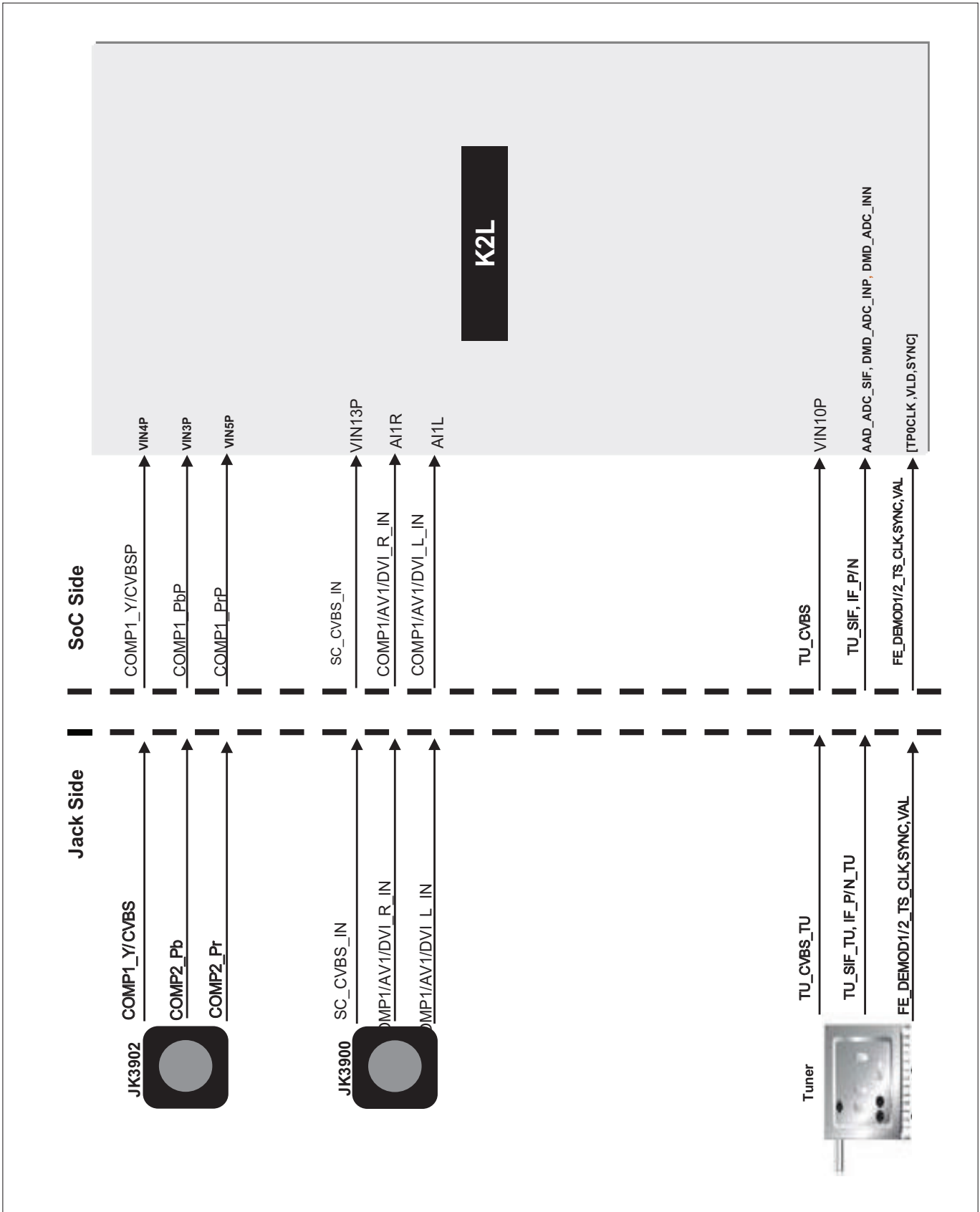
3. K2L Power Block



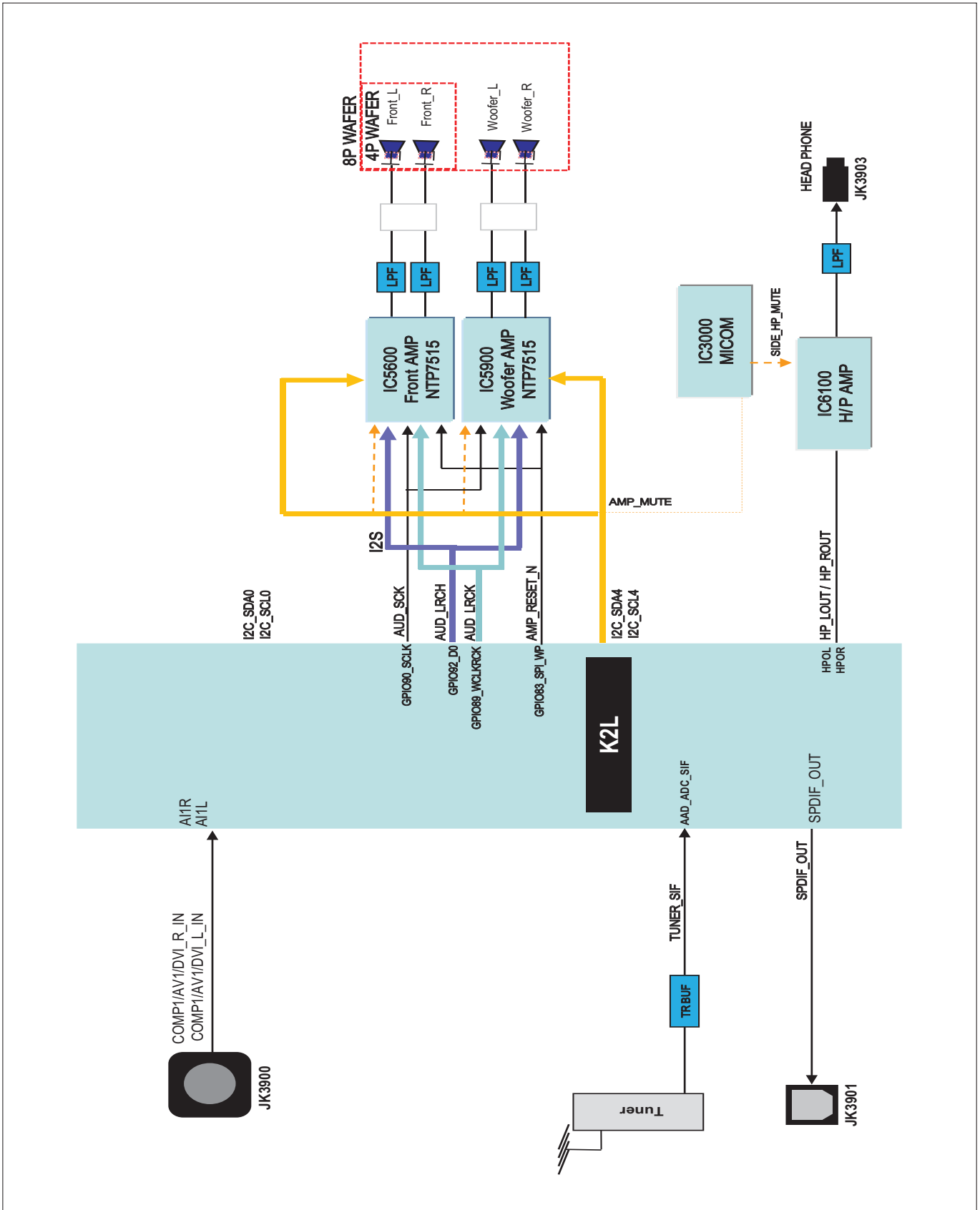
4. Tuner/CI Block Diagram



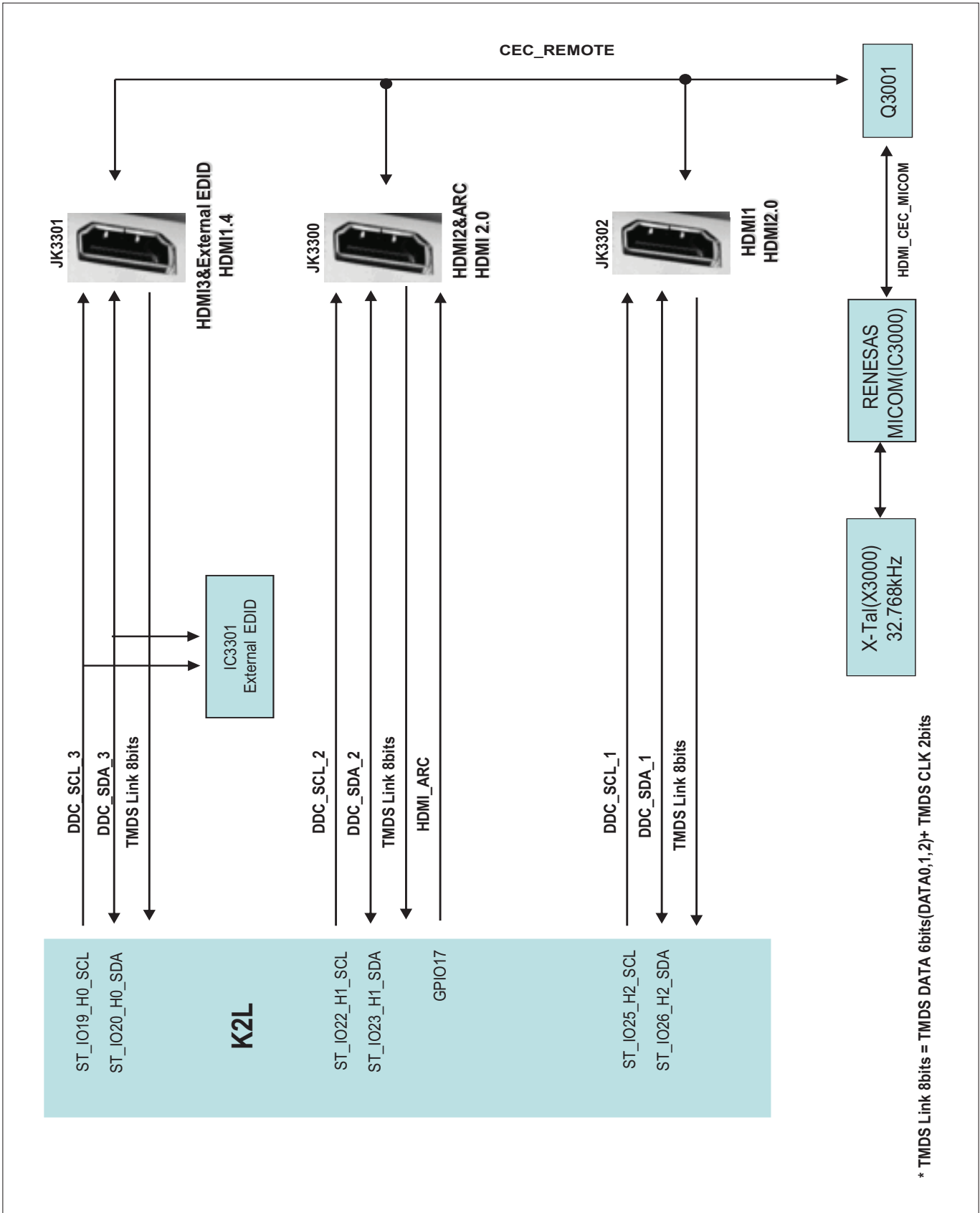
5. Video/Audio In Block Diagram



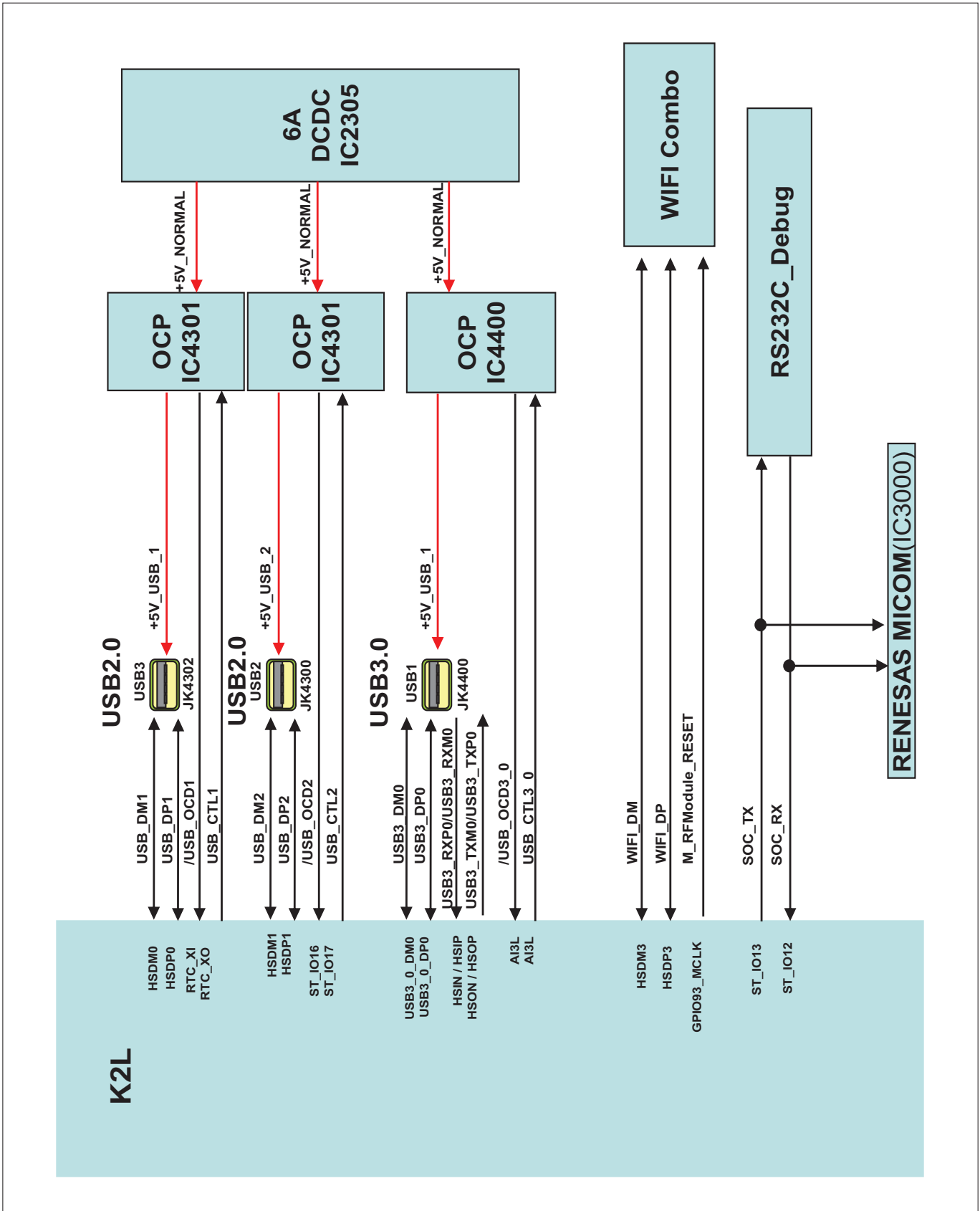
6. Audio Out Block Diagram



7. HDMI



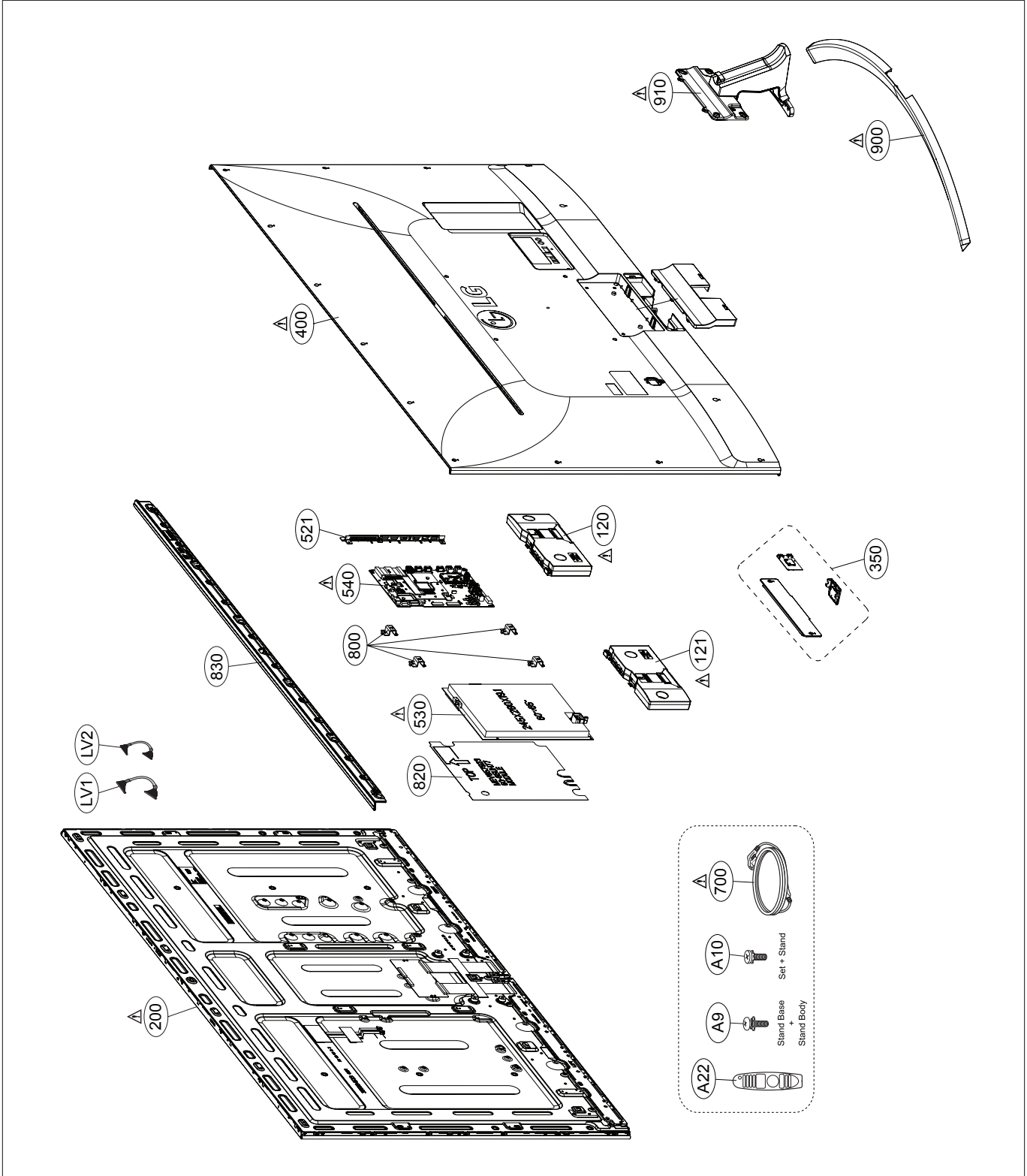
8. USB / WIFI / M-REMOTE / UART



EXPLODED VIEW

IMPORTANT SAFETY NOTICE

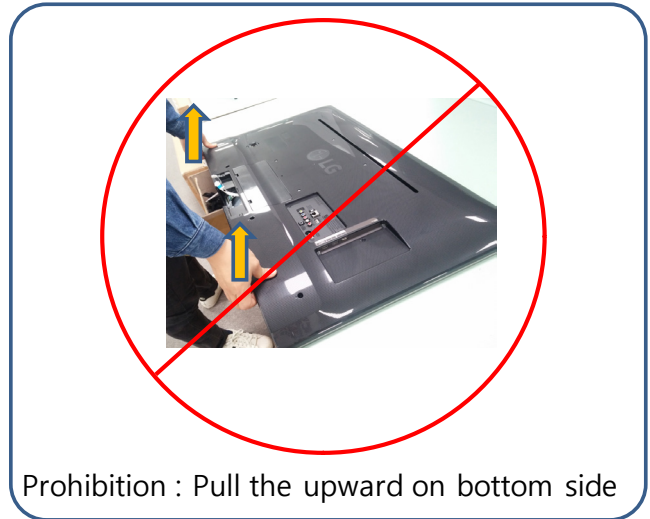
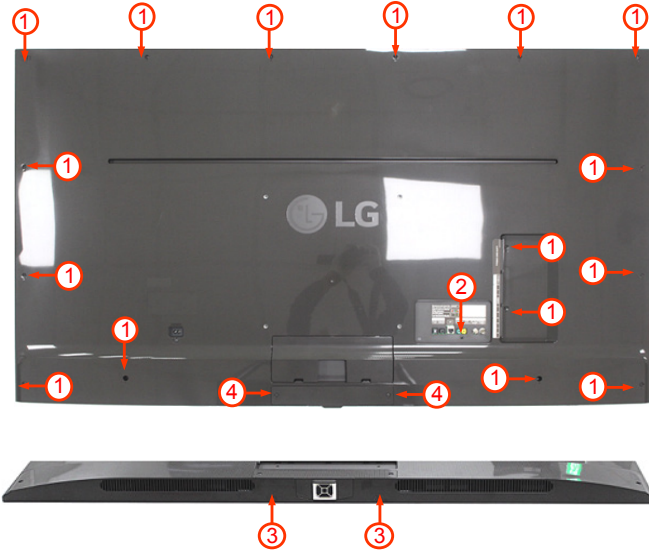
Many electrical and mechanical parts in this chassis have special safety-related characteristics. These parts are identified by Δ in the Schematic Diagram and EXPLODED VIEW. It is essential that these special safety parts should be replaced with the same components as recommended in this manual to prevent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



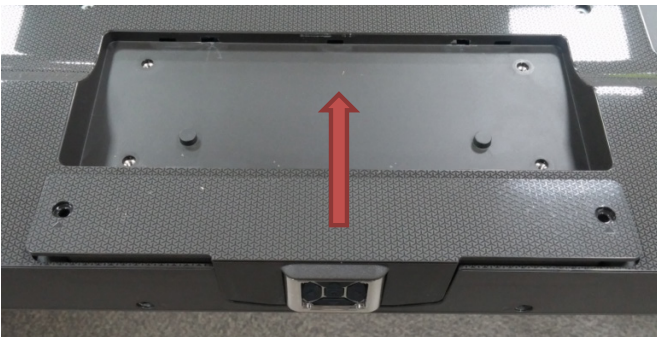
ASSEMBLY / DISASSEMBLY

▪ Cover Disassemble Guide

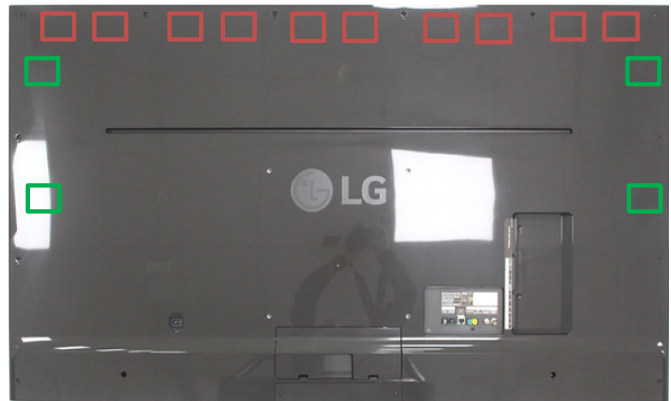
(1) Remove Screw



(2) Disassemble the Bottom Bracket(Pull the upward.)

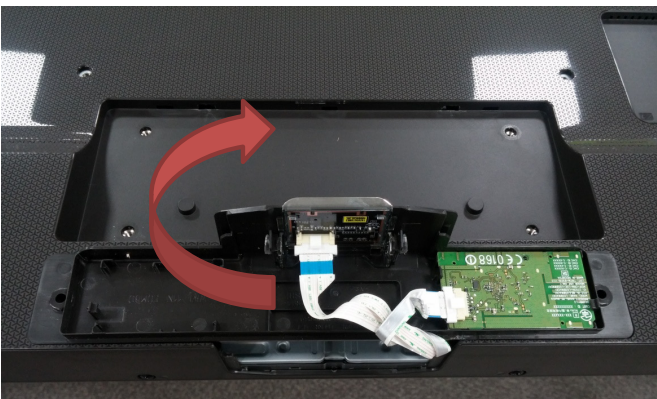


(4) Latch Open Method

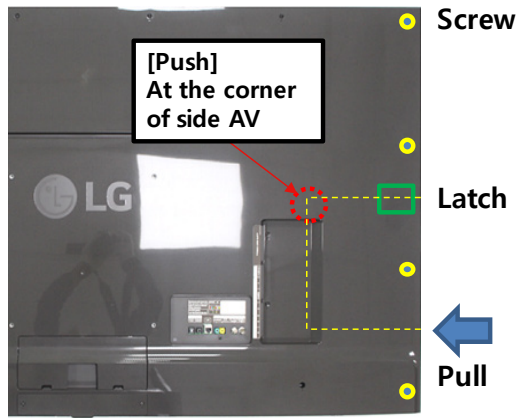


□ : Top Side Latch
 □ : Right Side Latch

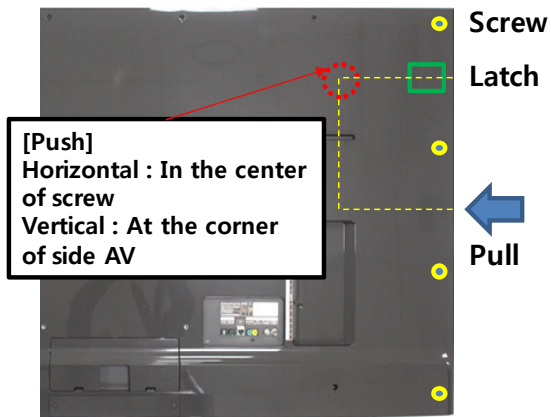
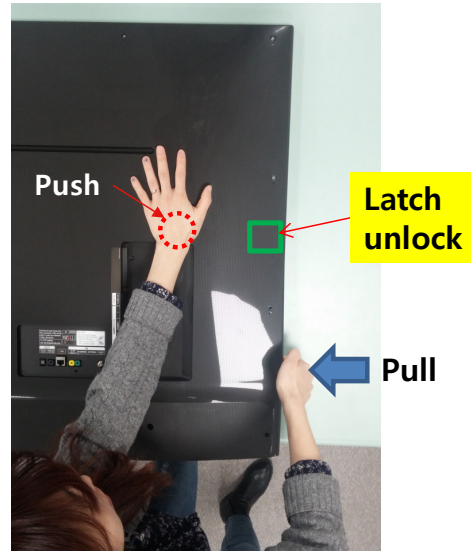
(3) Rotate 180° and disassemble HARNESS



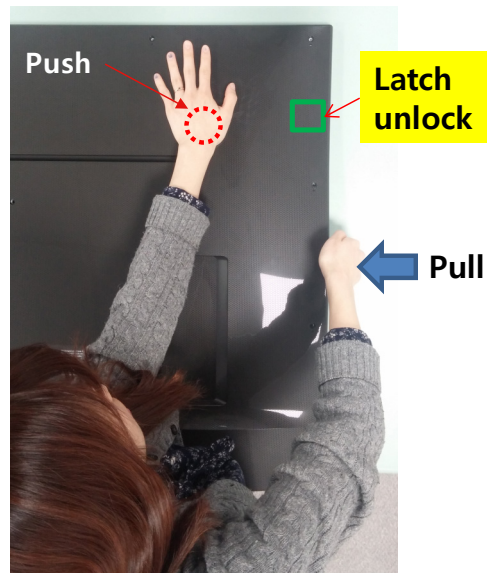
(4-1) Latch Open at Side Latch 2 places(Upper Display)
 Push and Pull by hand as shown on the below picture.
 (first lower side, and then the upper side.)



[Lower Right Side]



[Upper Right Side]

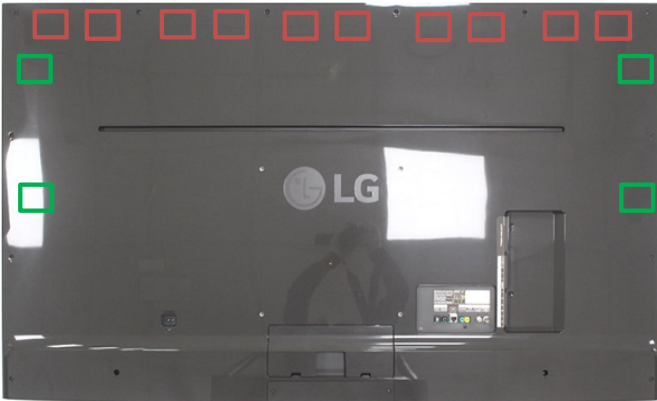


(4-2) Latch Open at top Latch 10 places(Upper Display)
 Pull the Cover on right side to Left direction



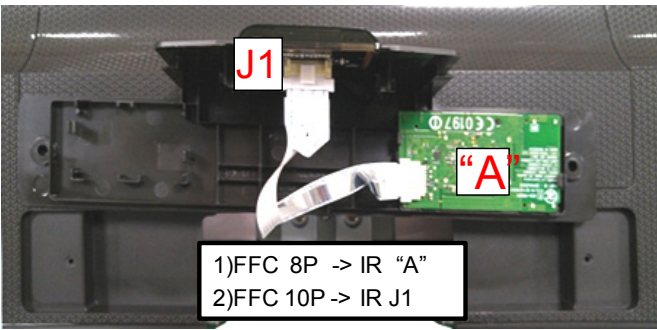
▪ **Cover assemble Guide**

(1) Push Latches



□ : Top Side Latch
 □ : Right Side Latch

(2) Assemble HARNESS

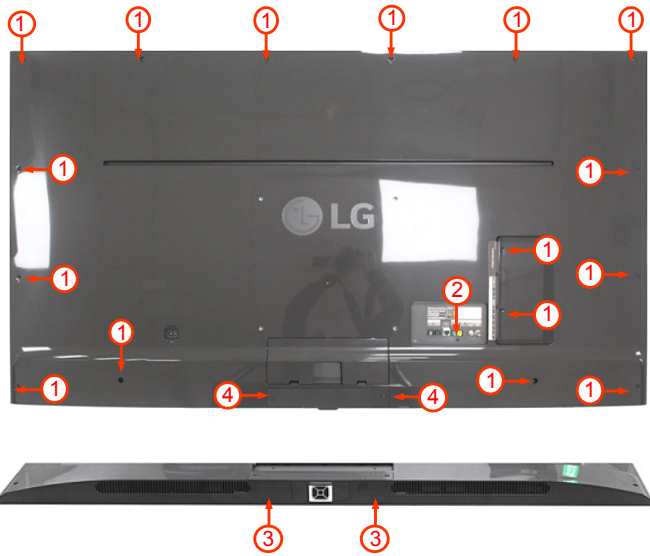


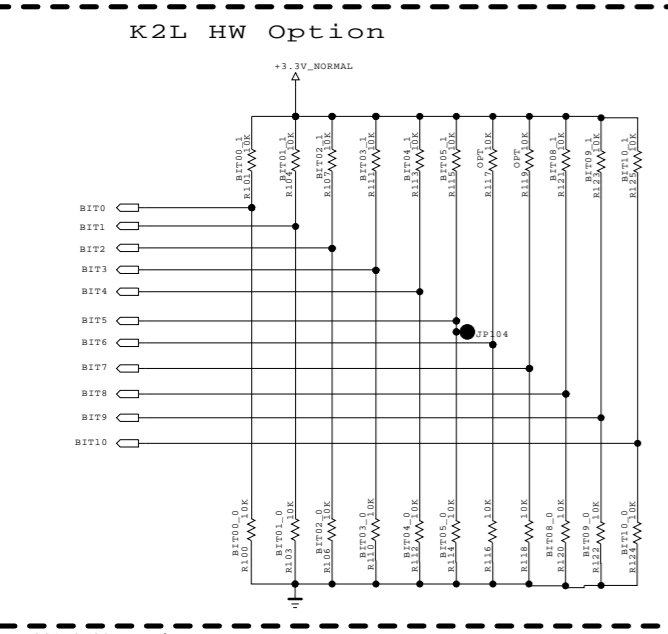
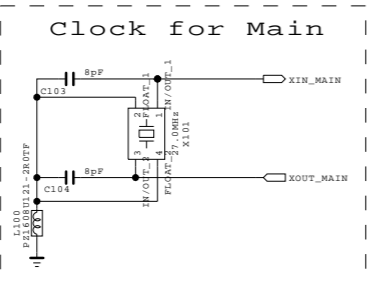
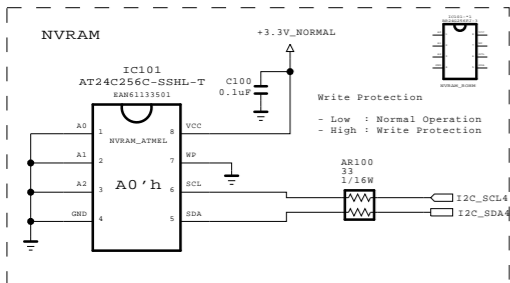
(3) Insert Bottom bracket



(4) Joint Screw

1,2,3 SCREW : 5 ~ 7Kgf.cm
 4 SCREW : 8 ~ 12Kgf.cm





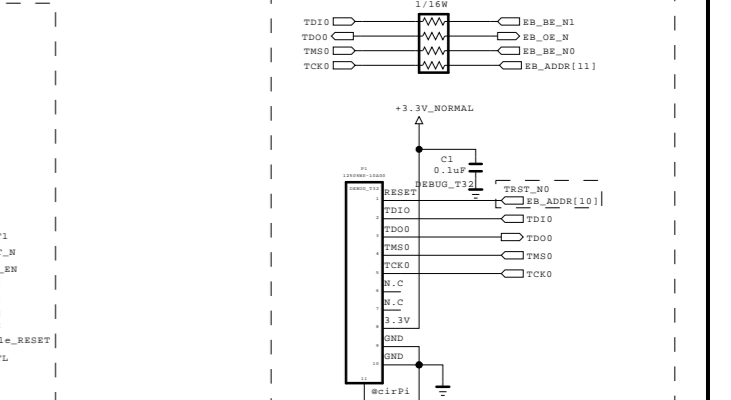
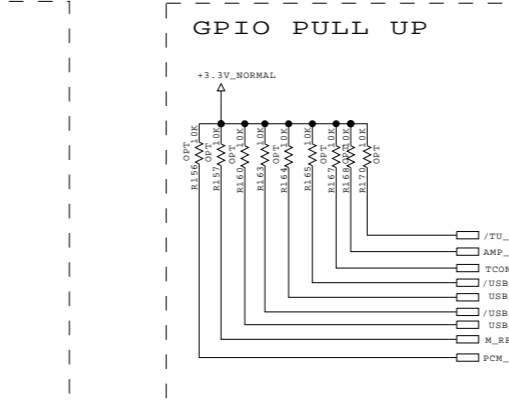
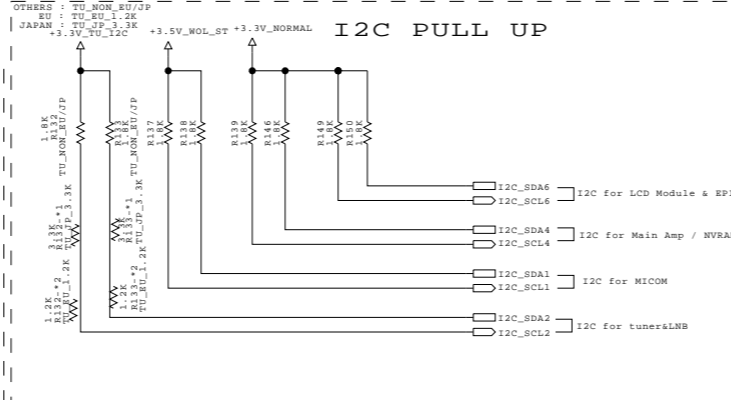
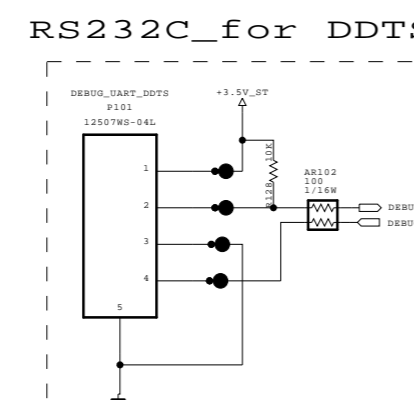
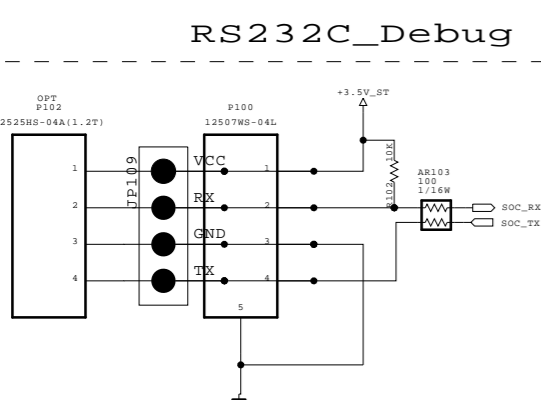
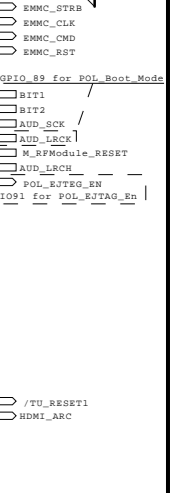
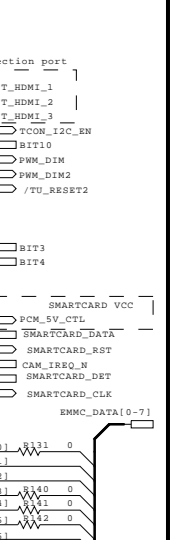
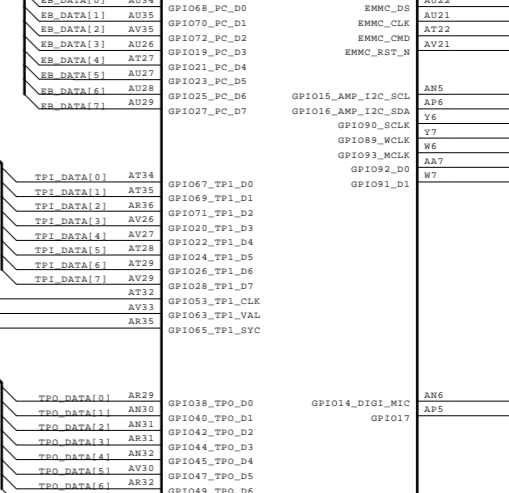
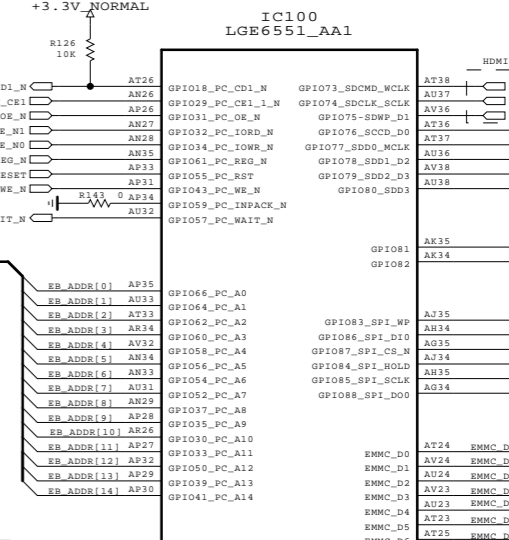
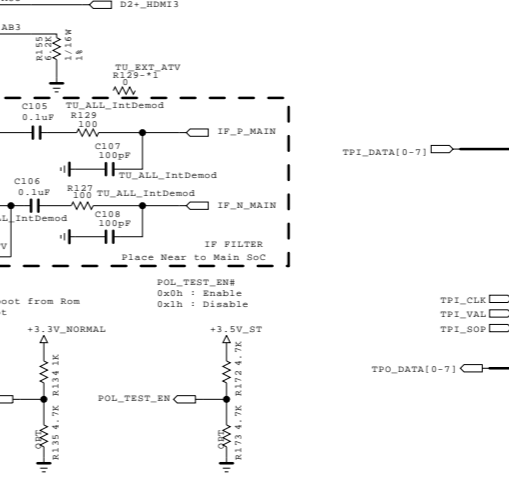
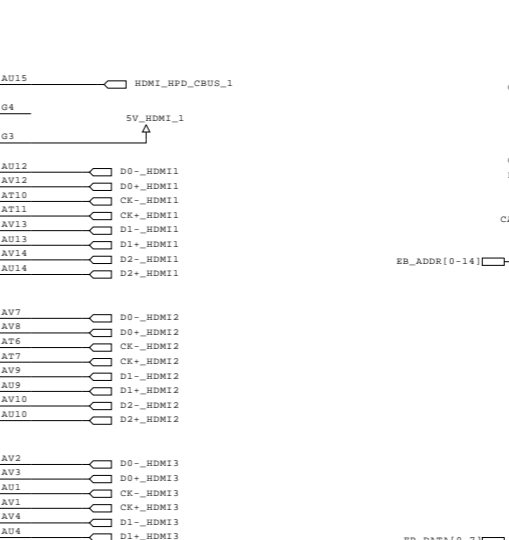
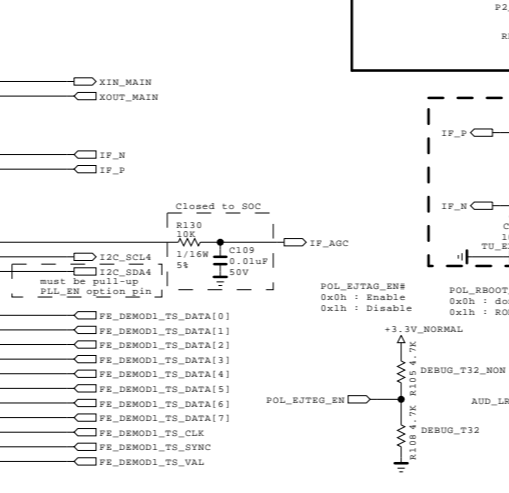
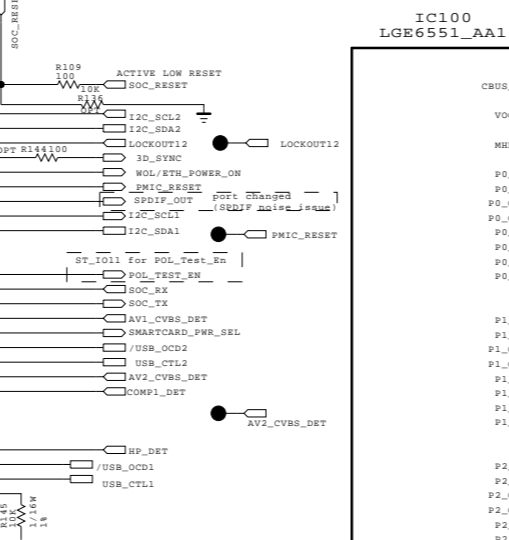
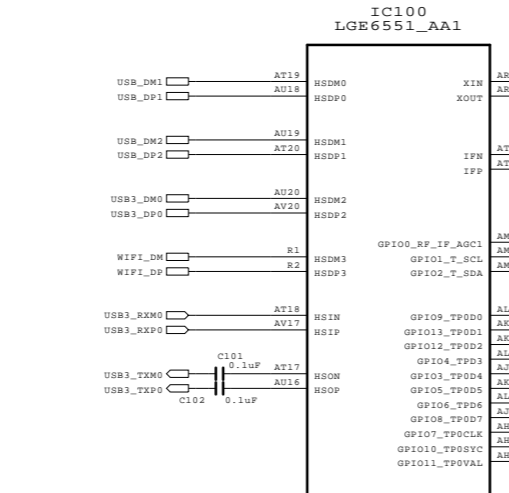
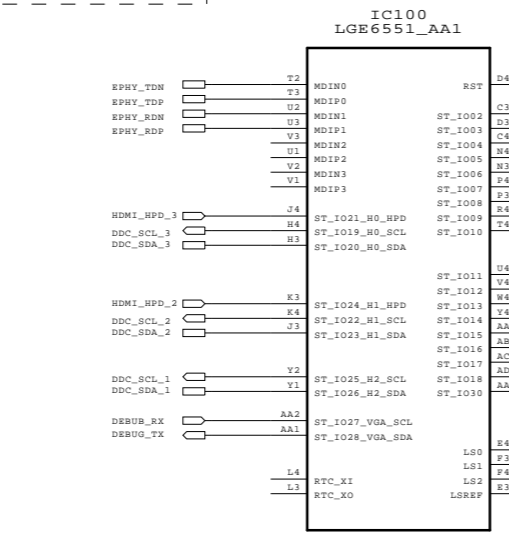
20150709 version

BIT(0/1)	DVB	ATSC	JP
00	TW/COL	US	
01	CM/HR	KR	JP
10	EU	BR	
11	AJJA	CI	

BIT(2/3)	Low	High
BIT4	Display	LCD
BIT5	15/16 Tuner	15_Tuner
BIT6	Reserved	default
BIT7	Reserved	default

BIT(8)	B/E(FRC)
0	Vx1_60Hz
1	Vx1_120Hz

BIT(2/3)	EU/CIS	AJJA	TW/COL	CM/HR	KR	North_AM	BR	JP
00	T2/C/S2_PIP_EX_ATV	T_IN_ATV		EXT_ATV		IN_ATV		Default
01	T2/C/S2_IN_ATV	T2/C/S2_IN_ATV	T2_IN_ATV	IN_ATV	ATSC+T2_IN_ATV			
10	T2/C/S2_EX_ATV	T2/C/S2_EX_ATV						
11		T2_EX_ATV						

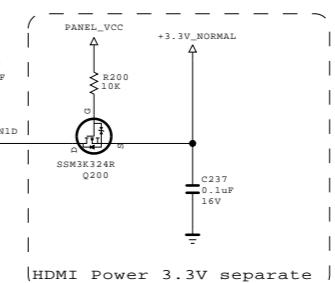
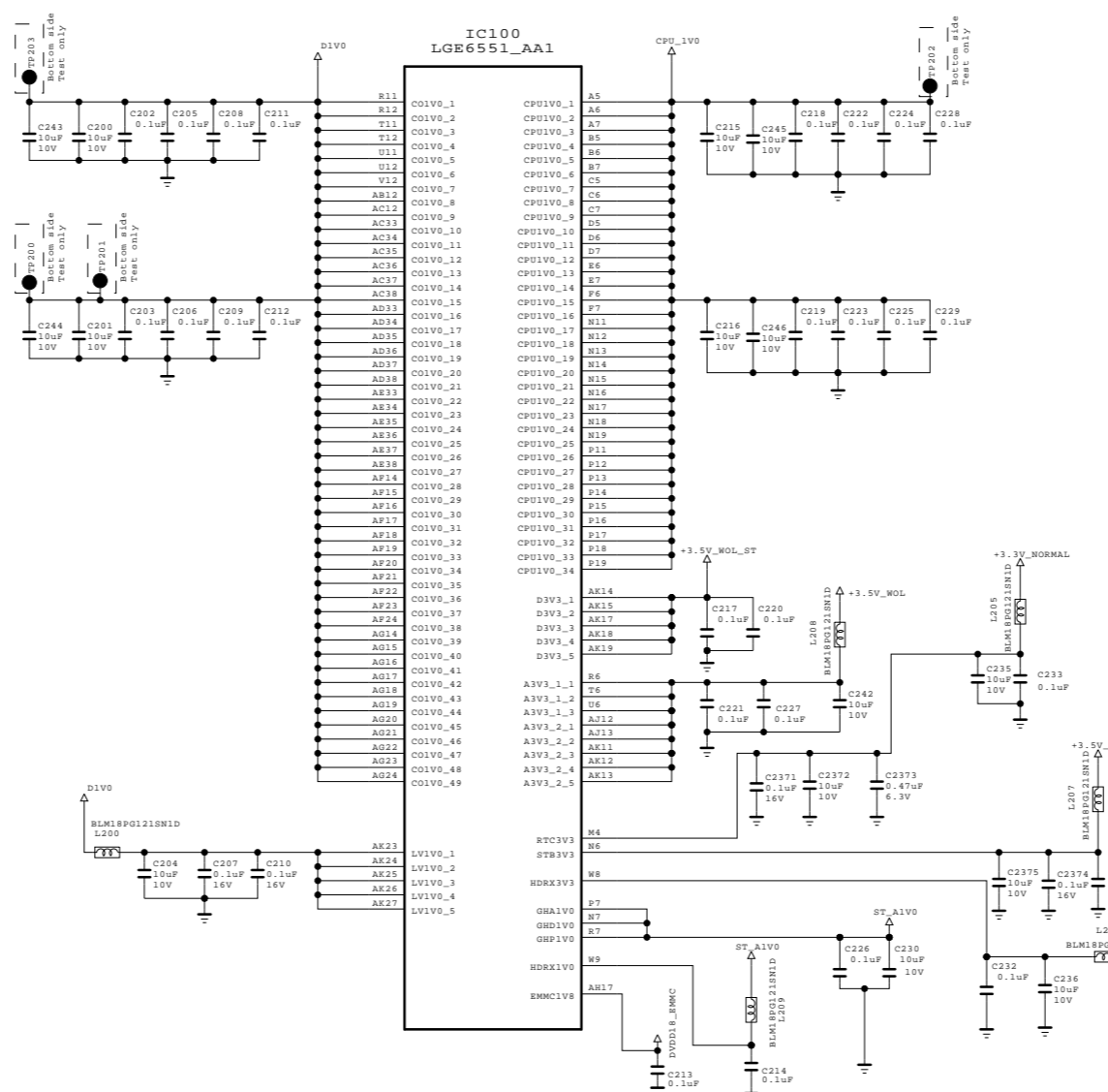
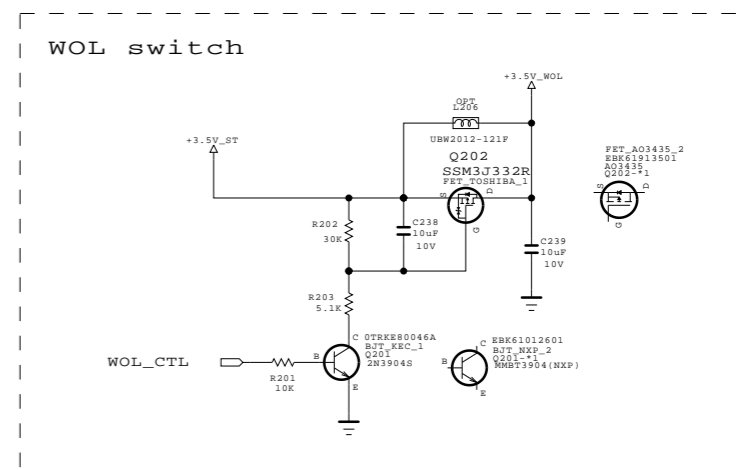
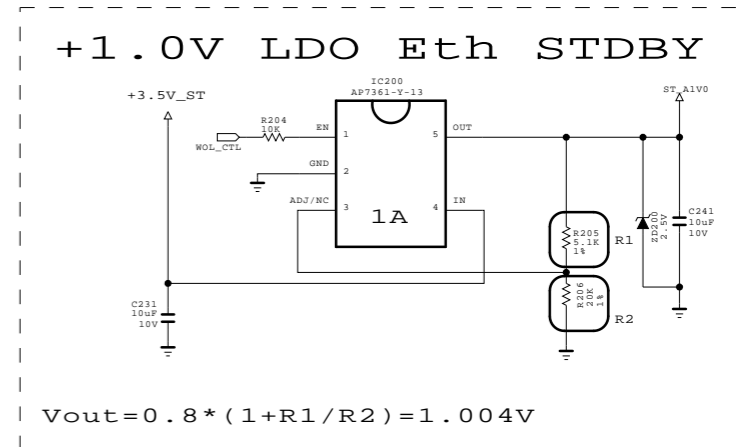
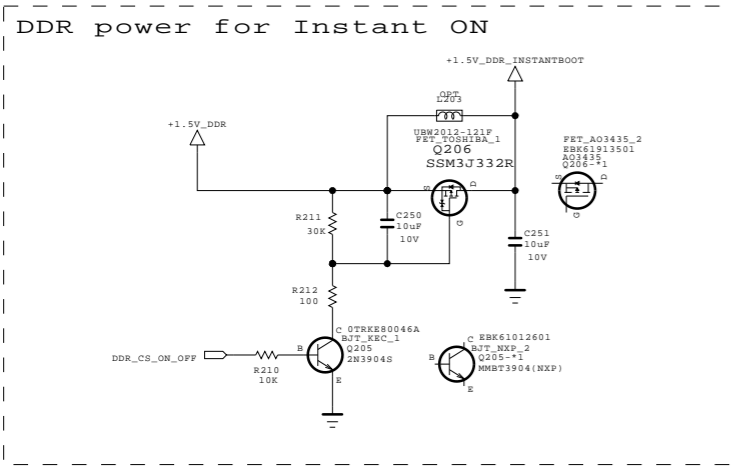
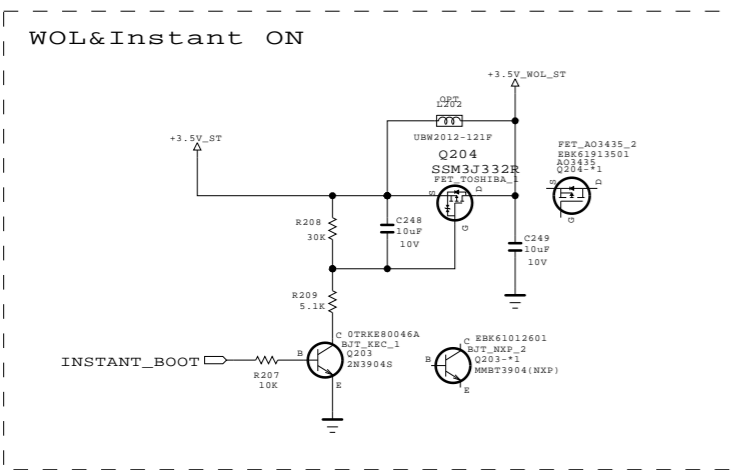


THE SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FIRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURERS SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE SYMBOL MARK OF THE SCHEMATIC.

SECRET
LGElectronics

LG ELECTRONICS

MODEL	K2L	DATE	2015-06-13
BLOCK	MAIN1_SYSTEM	SHEET	01

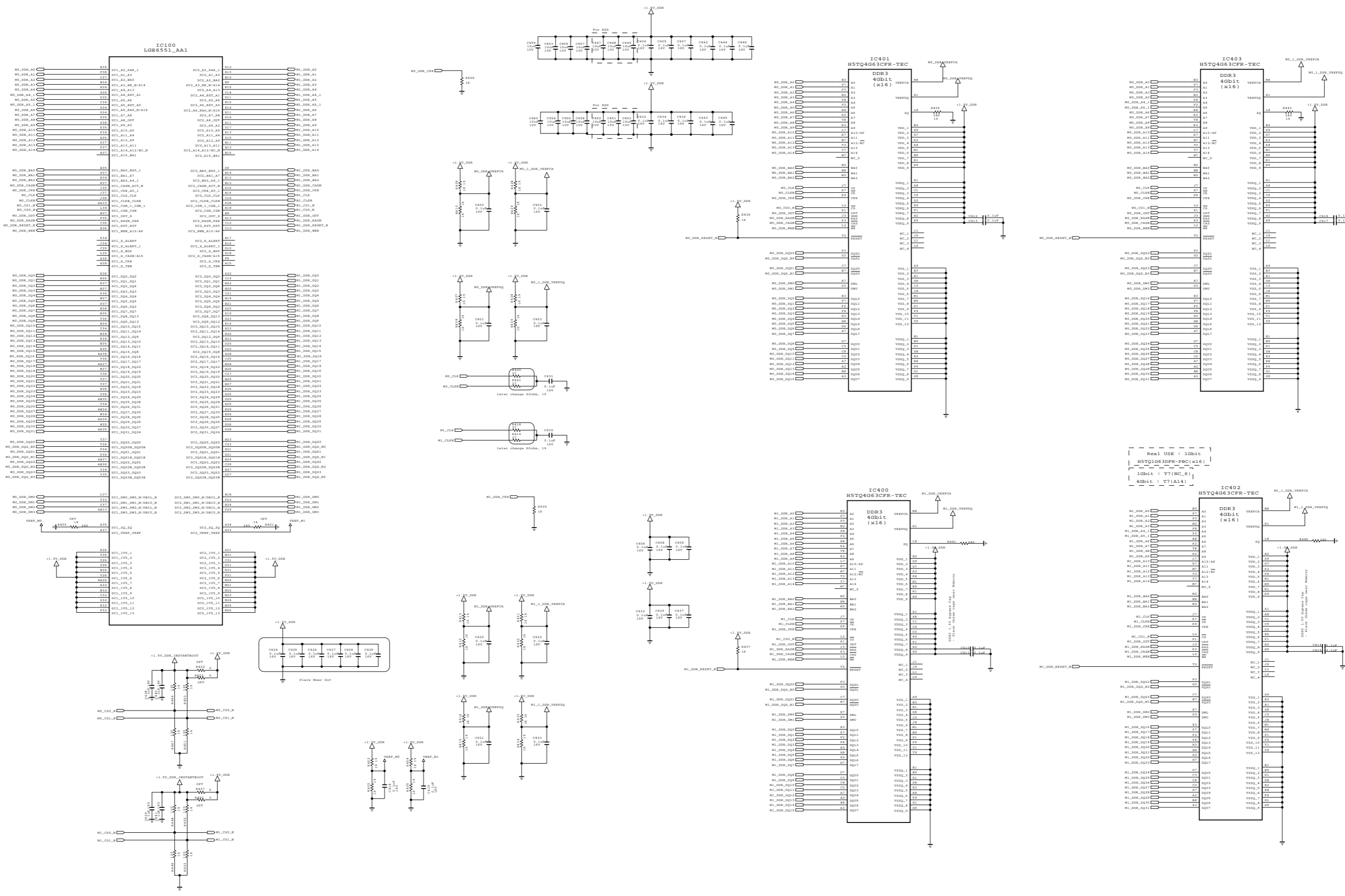


THE Δ SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FIRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE Δ SYMBOL MARK OF THE SCHEMATIC.

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MODEL	K2L	DATE	2015-06-13
BLOCK	K2L POWER	SHEET	02

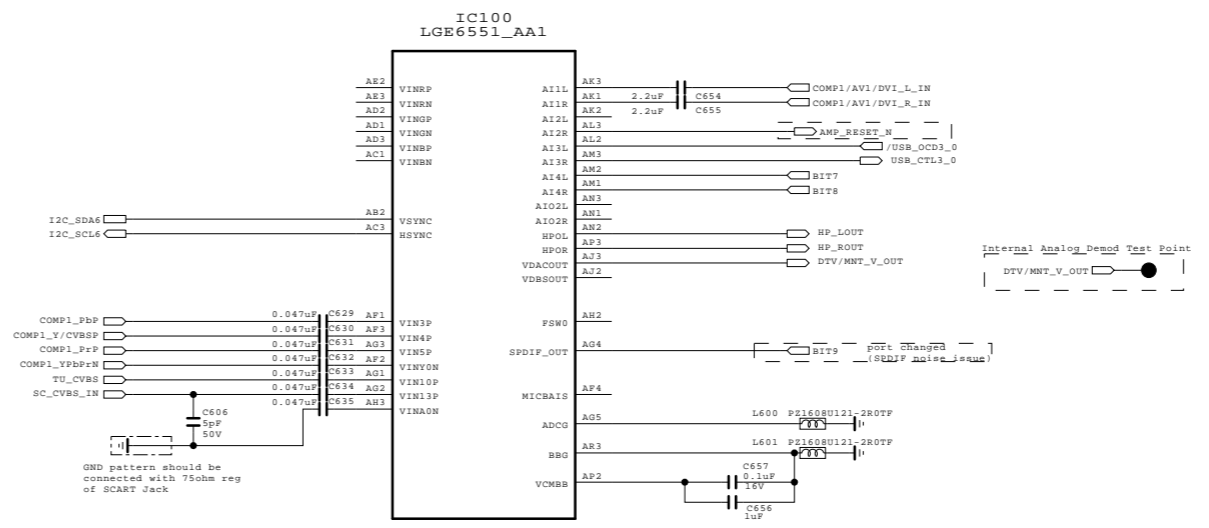
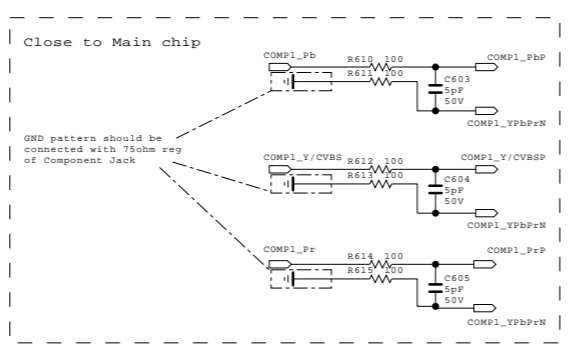
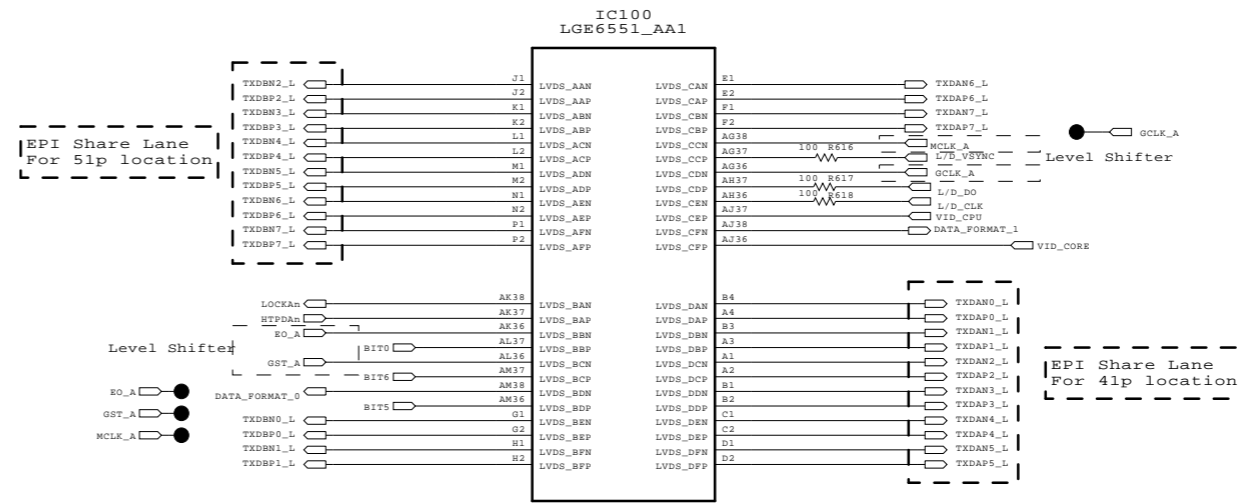


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LG ELECTRONICS

MODEL	K2L	DATE	2015-06-13
BLOCK	K2L DDR	SHEET	03

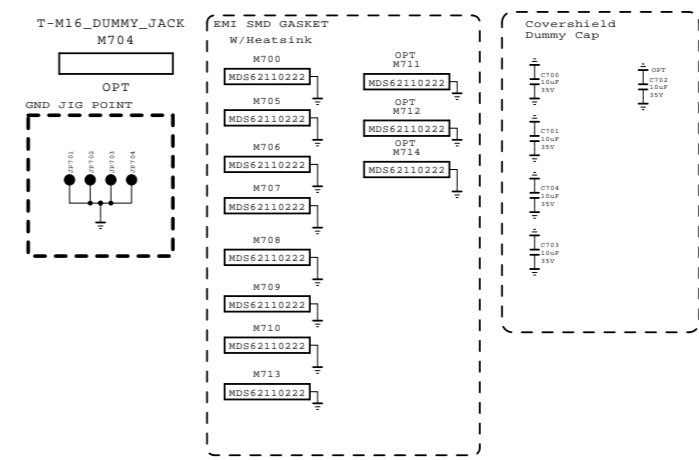
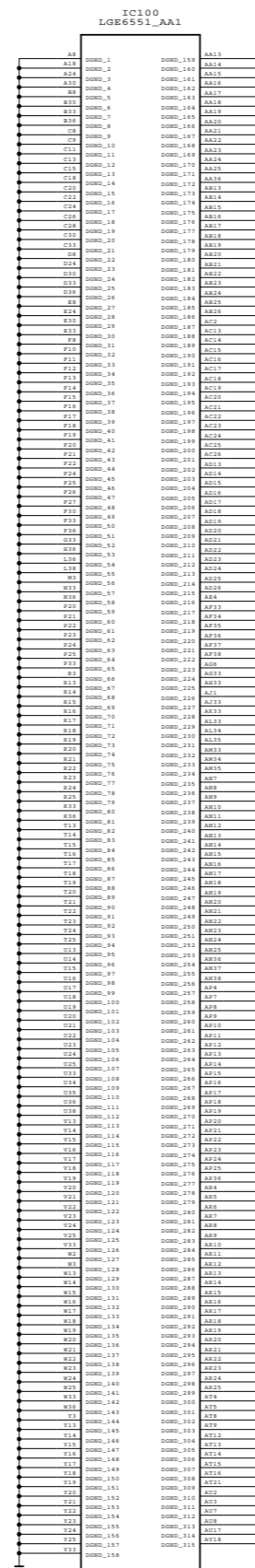


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MODEL	K2L	DATE	15-06-13
BLOCK	MAIN4_EXT_IN/OUTPUT	SHEET	06

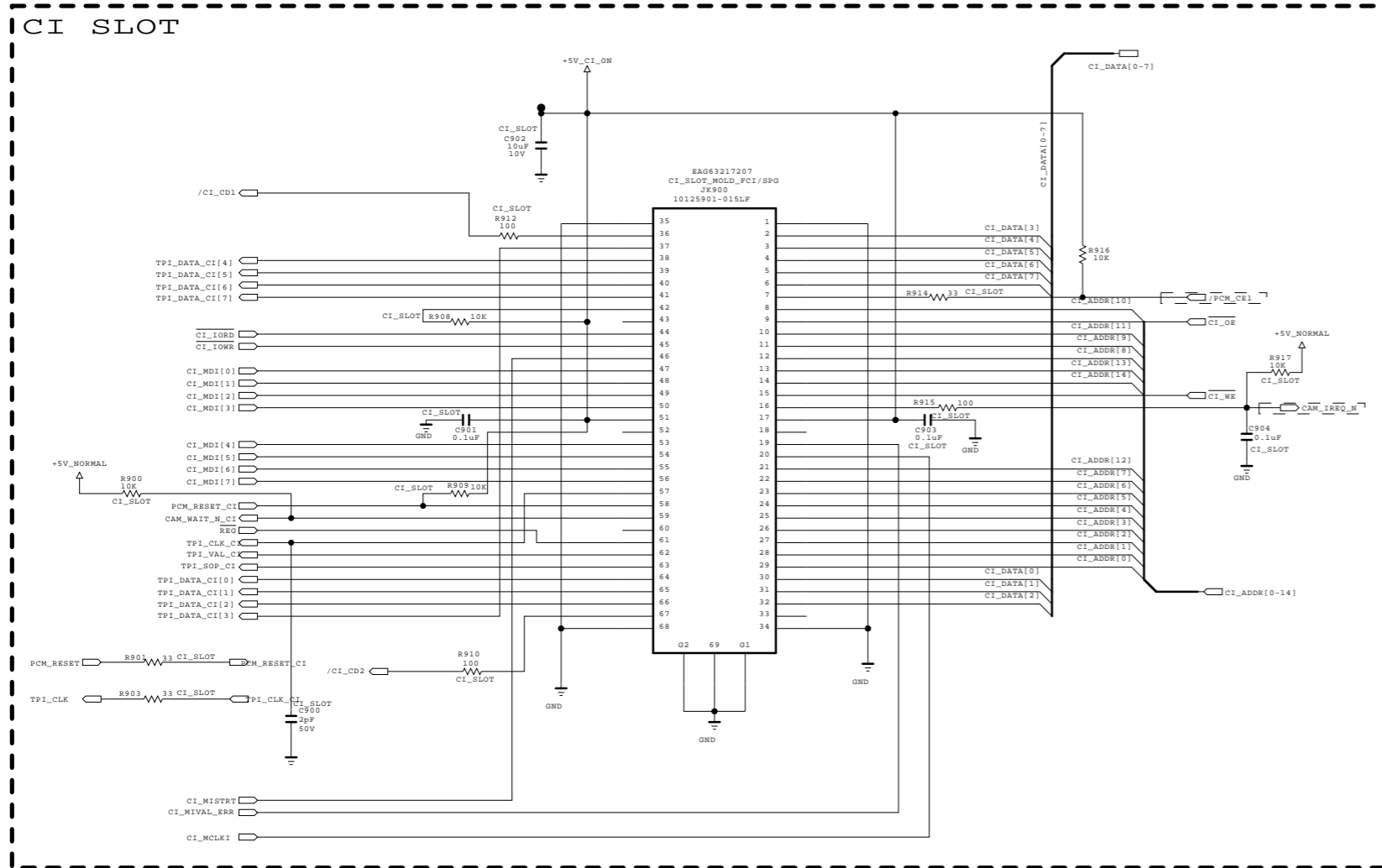


THE SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FIRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURERS SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE SYMBOL MARK OF THE SCHEMATIC.

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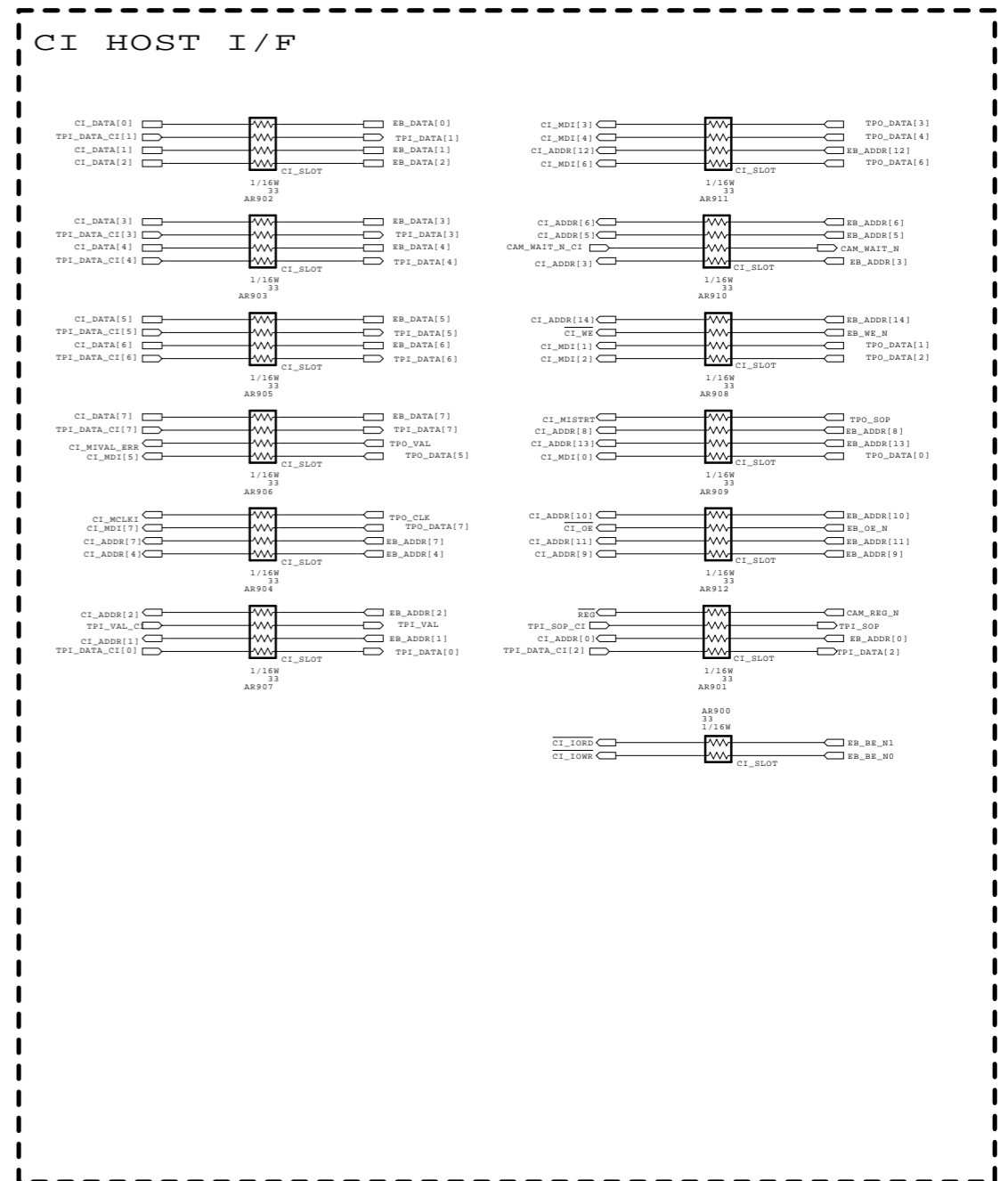
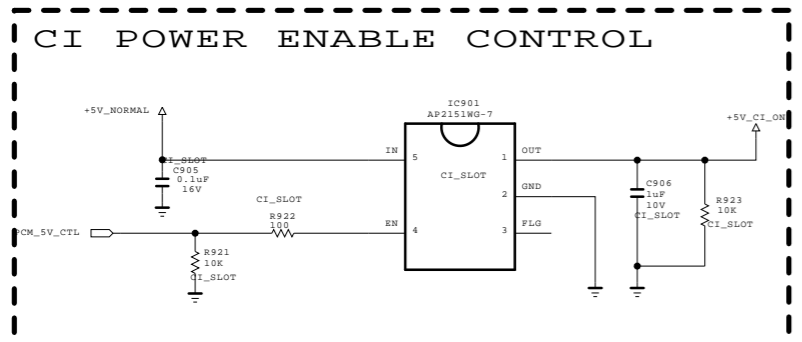
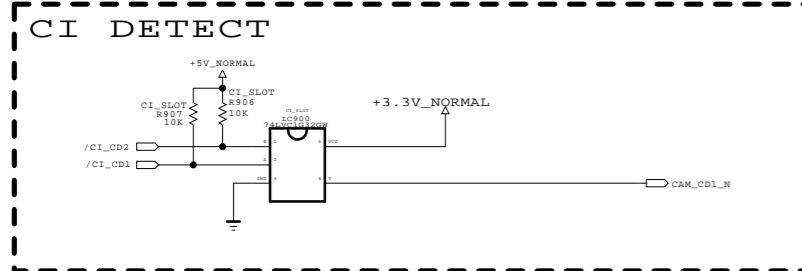
LG ELECTRONICS

MODEL	K2L	DATE	2015-06-13
BLOCK	K2L_GND	SHEET	07



METAL CI SLOT ONLY FOR 43/49UH61
CI_SLOT_METAL_43_49UH61_ONLY
J4900-02
10067972-000LP

RAG63217210
CI_SLOT_MOLD_HONGKIN...
J4900-01
HONGKIN...

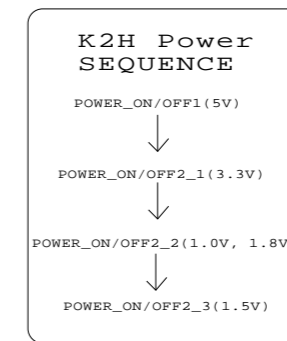
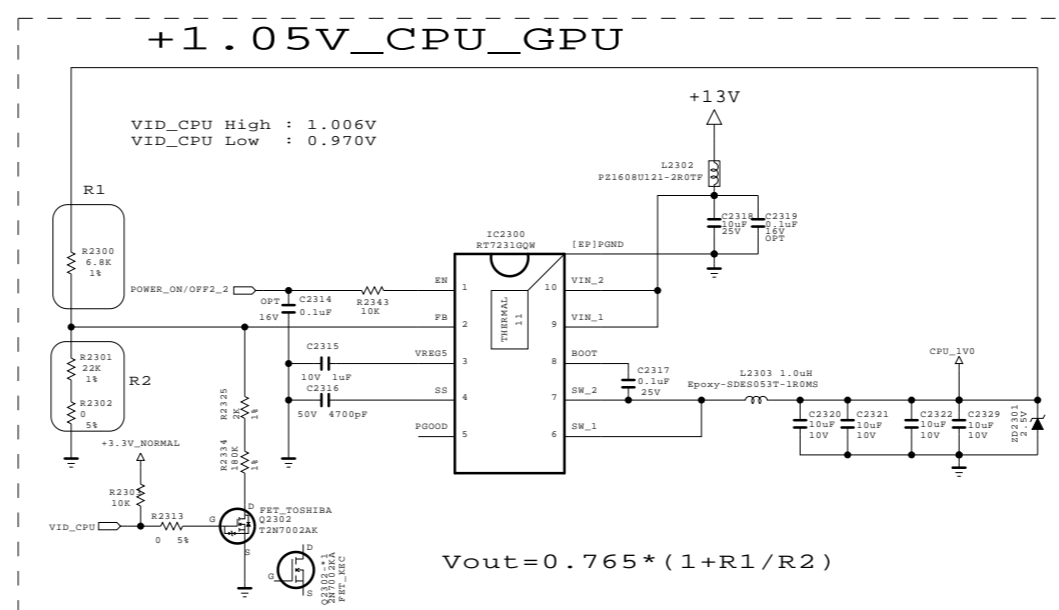
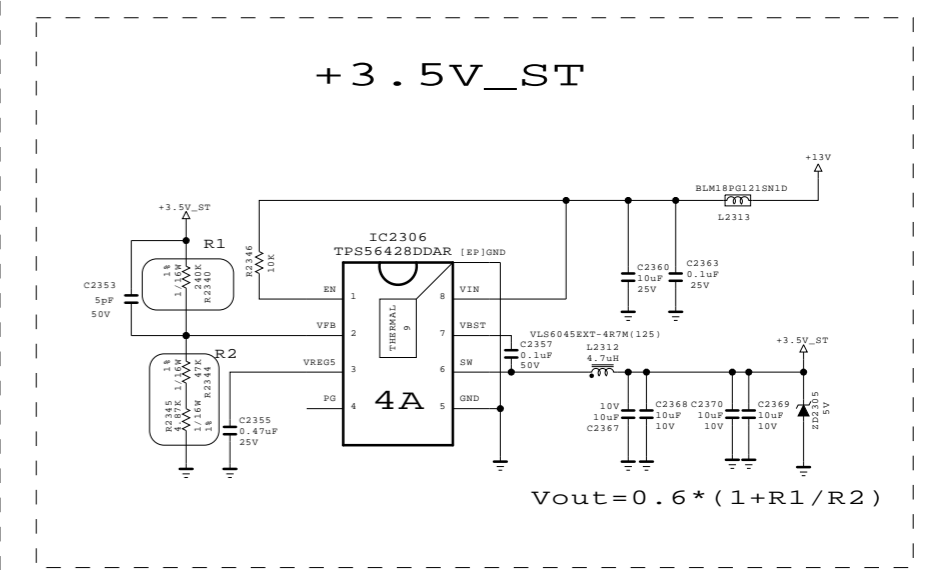
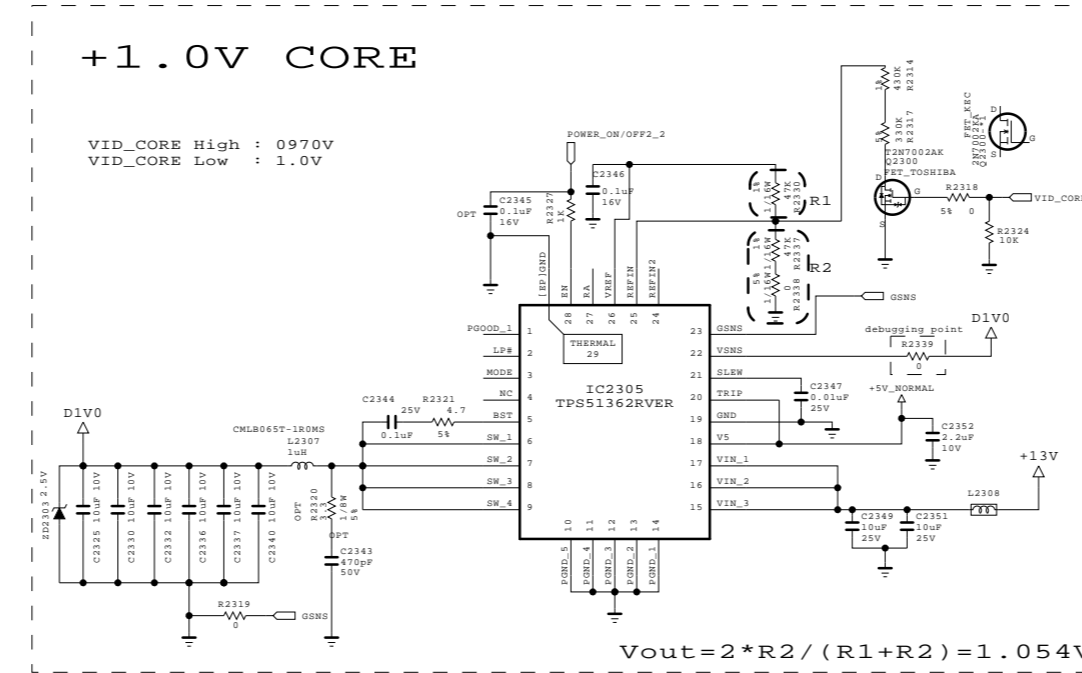
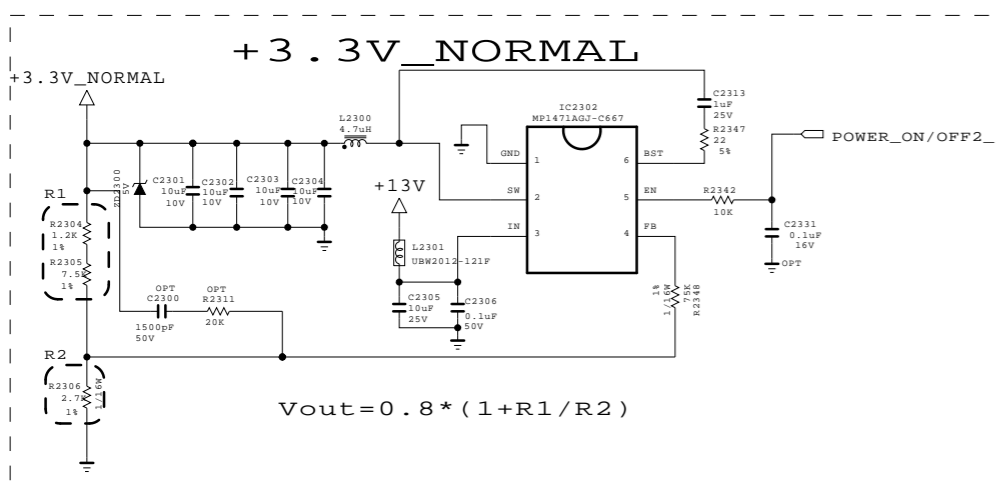
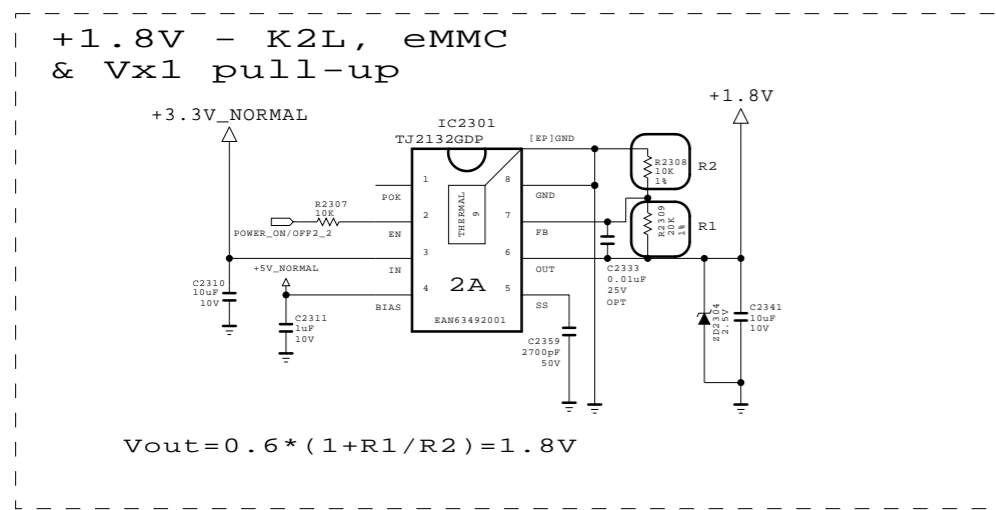
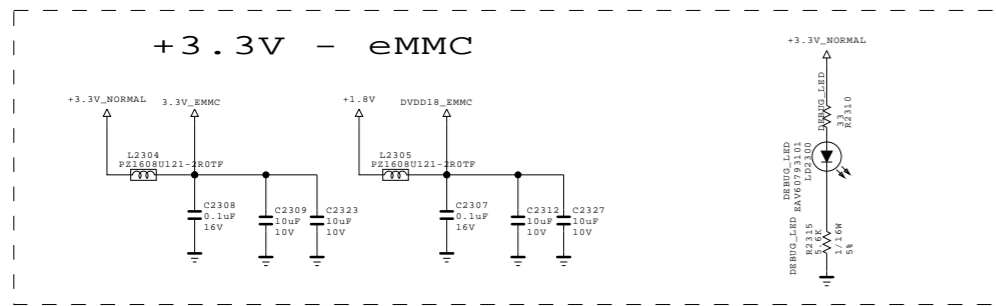
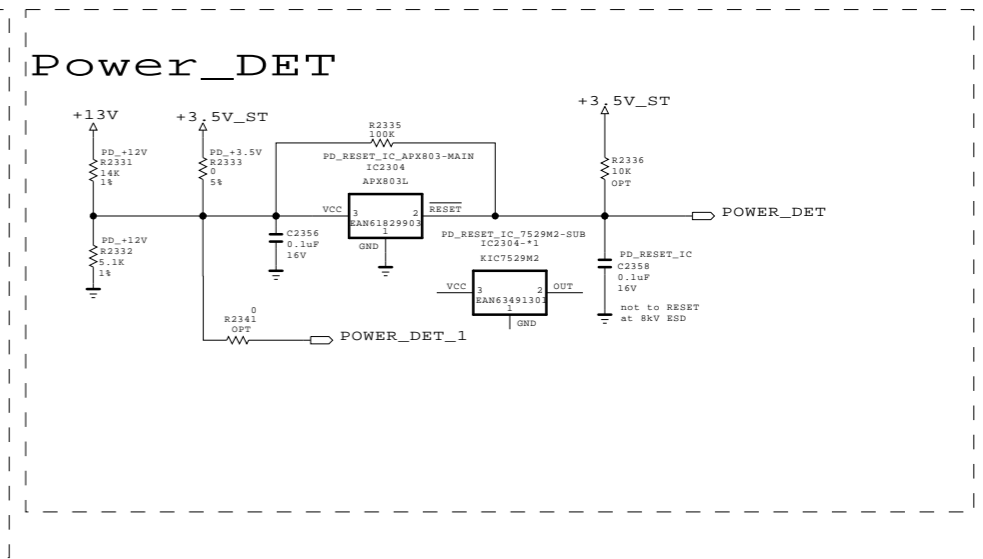
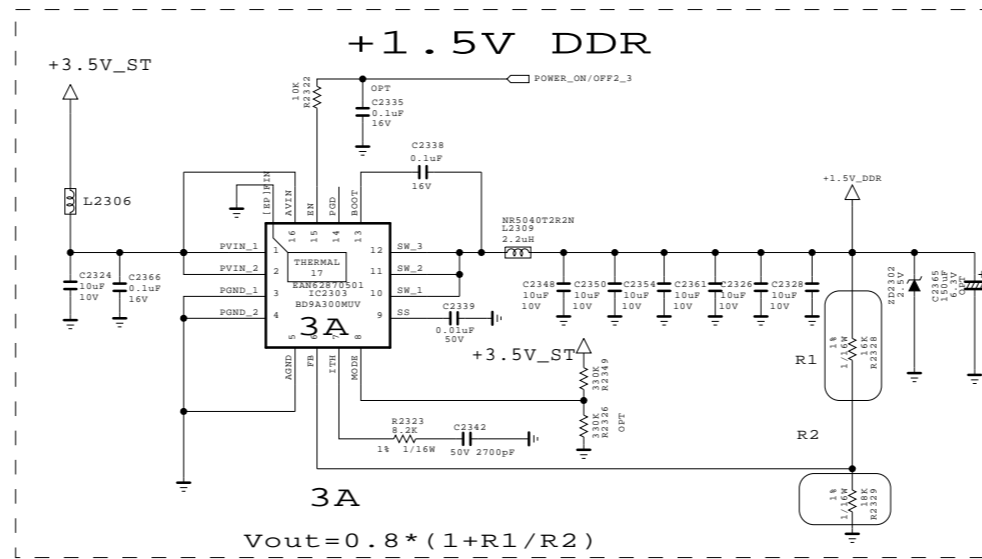


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SECRET
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MODEL	K2L / K2Lp	DATE	2015-01-10
BLOCK	PCMC1	SHEET	9

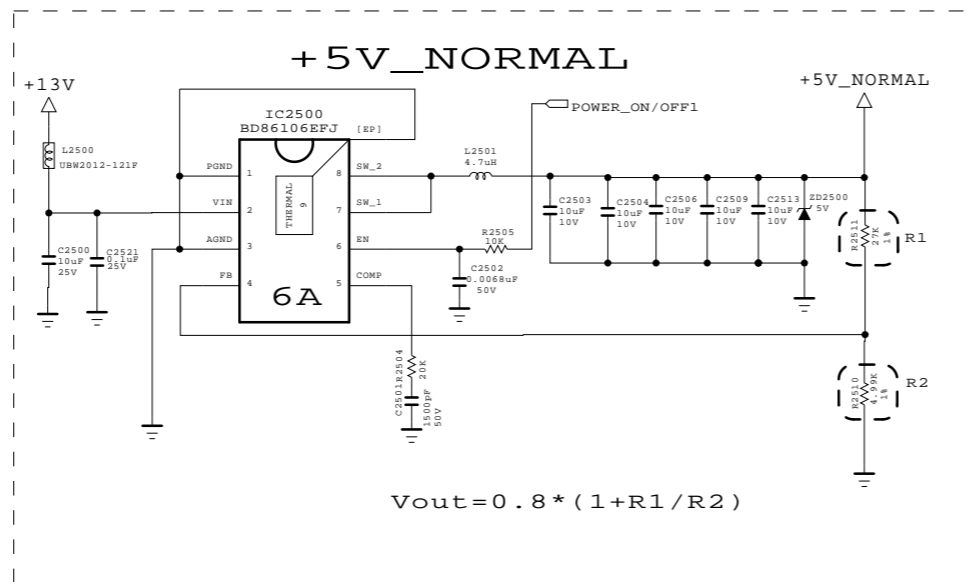
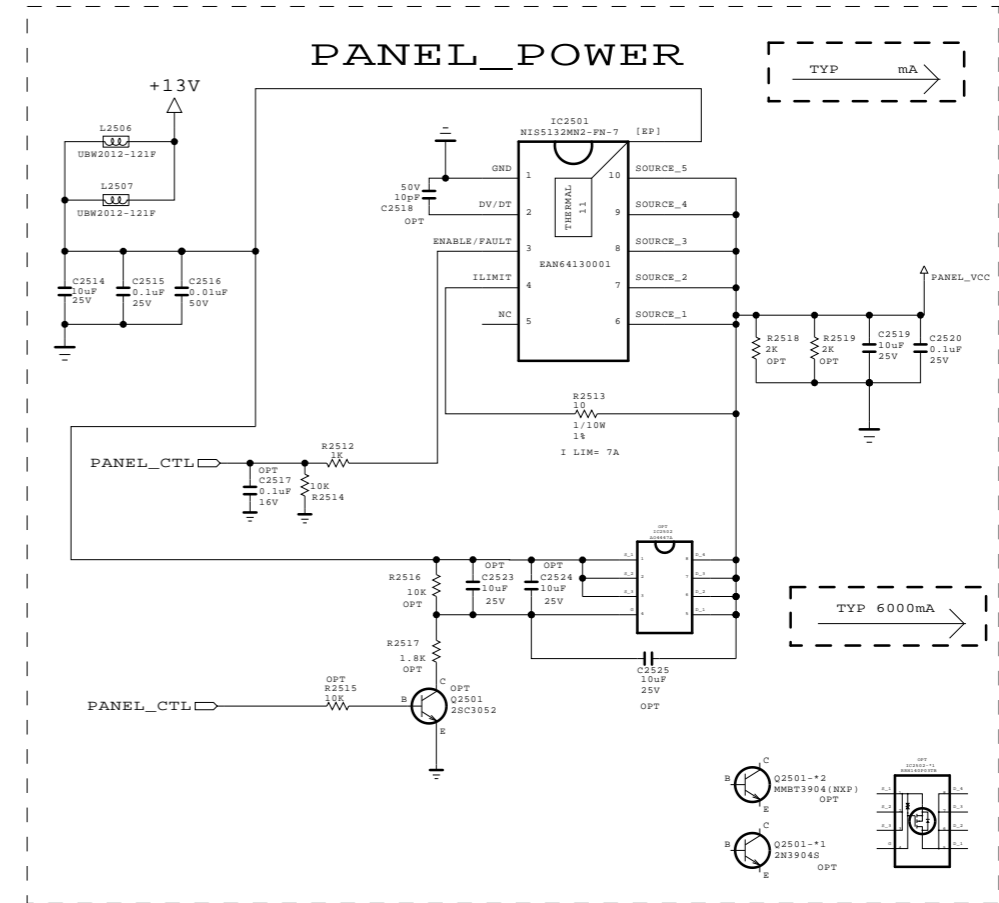
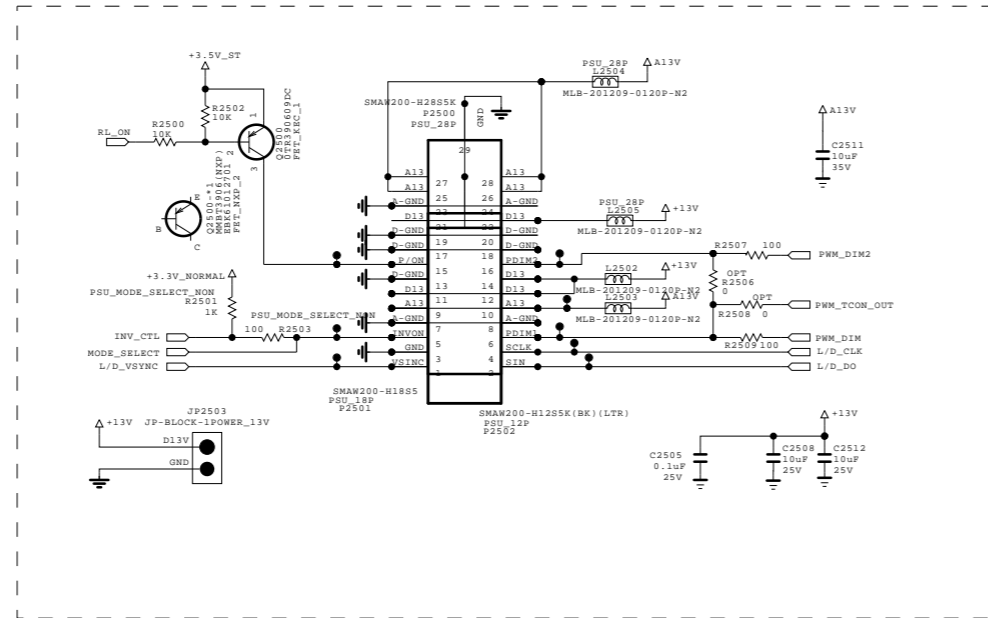


THE SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FIRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE SYMBOL MARK OF THE SCHEMATIC.

SECRET
LGElectronics

LG ELECTRONICS

MODEL	K2H	DATE	2015-01-10
BLOCK	PWR_1	SHEET	07



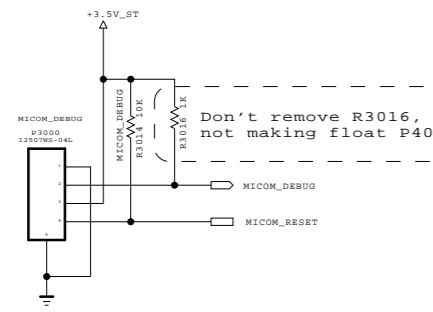
THE SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FIRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE SYMBOL MARK OF THE SCHEMATIC.

SECRET
LGElectronics

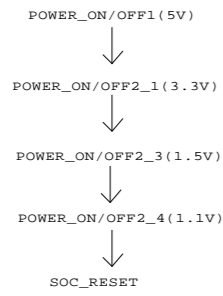


MODEL	K2L	DATE	2015-06-13
BLOCK	PWR_2	SHEET	25 /

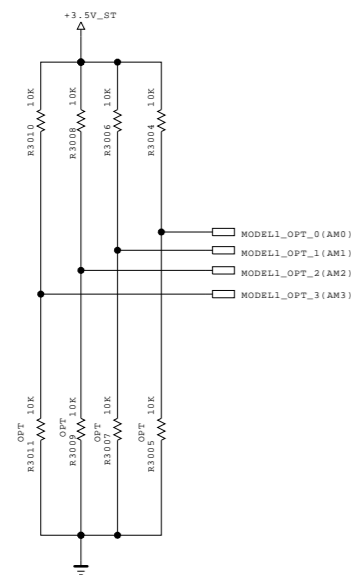
For Debug



LM15 Power SEQUENCE

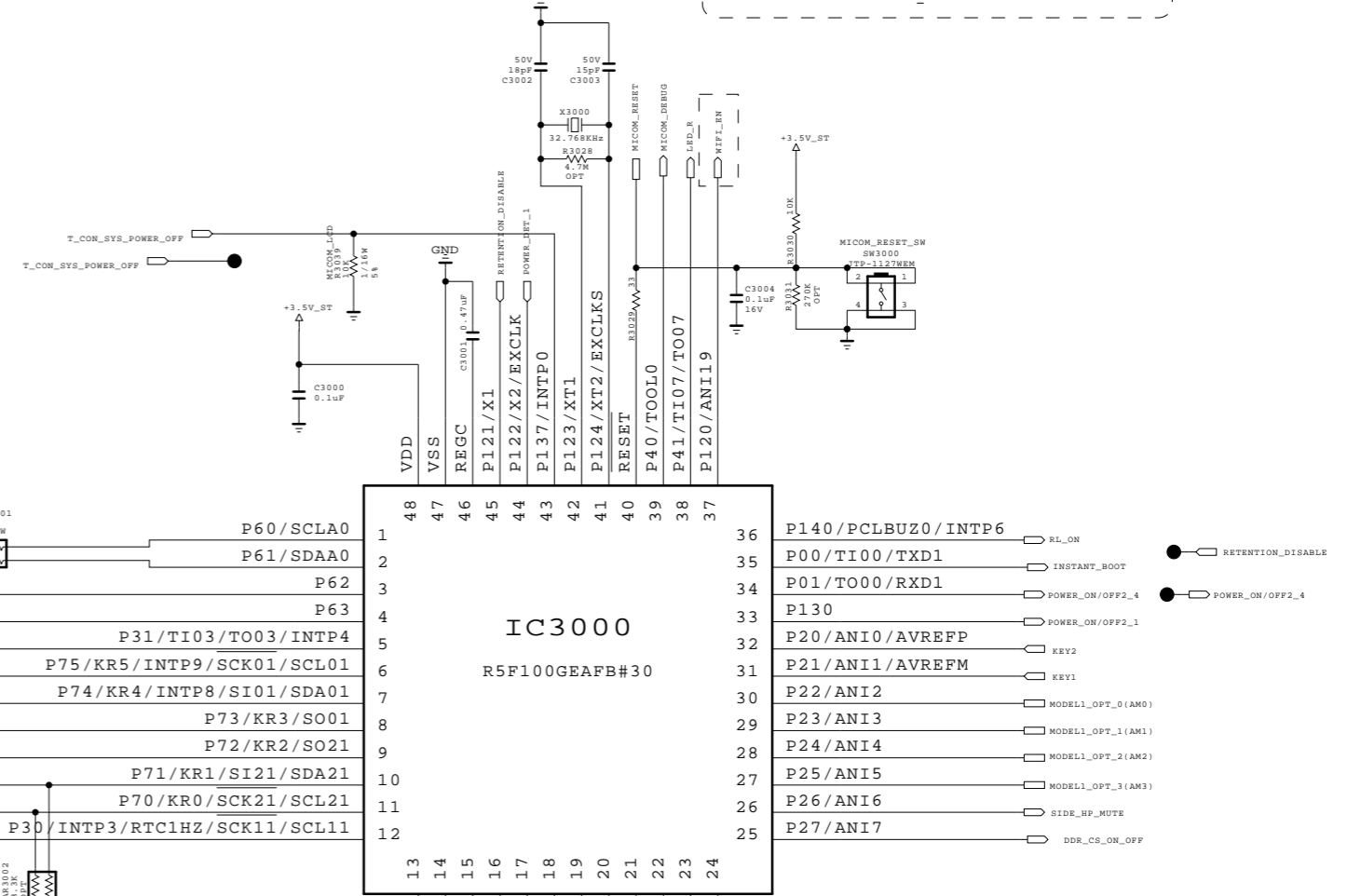
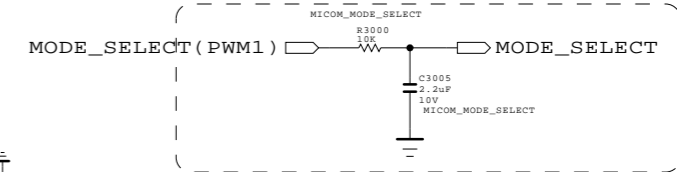


MICOM MODEL OPTION

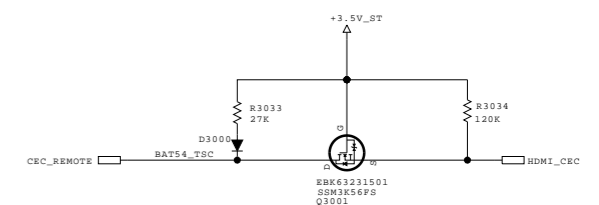


MICOM MODEL OPTION

	0.72V	1.53V	2.27V	3.0V
MODEL_OPT_0	NON LOGO / LCD	LOGO / LCD	NON LOGO / OLED	LOGO / OLED
MODEL_OPT_1	TV	BOX	TV	BOX
MODEL_OPT_2	FHD		UHD	8K
MODEL_OPT_3 (FHD)	M16		ASLR	M2
MODEL_OPT_3 (UHD)	M16	RTK	H15	



For CEC



THE SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FIRE 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	K2L / K2Lp	DATE	2015-06-13
BLOCK	MICOM	SHEET	30

MICOM MODEL OPTION

	0.72V (2.7K)	1.53V (8.2K)	2.27V (20K)	3.0V (75K)
MODEL_OPT_0(AM0)	NON LOGO / LCD	LOGO / LCD	NON LOGO / OLED	LOGO / OLED
MODEL_OPT_1(AM1)	TV_NON_EPI	BOX_NON_EPI	TV_EPI	BOX_NON_EPI
MODEL_OPT_2(AM2)	FHD		URD	8K
MODEL_OPT_3(AM3) (FHD)	M16		A5LR	M2
MODEL_OPT_3(AM3) (URD)	M16	RTK	M15	

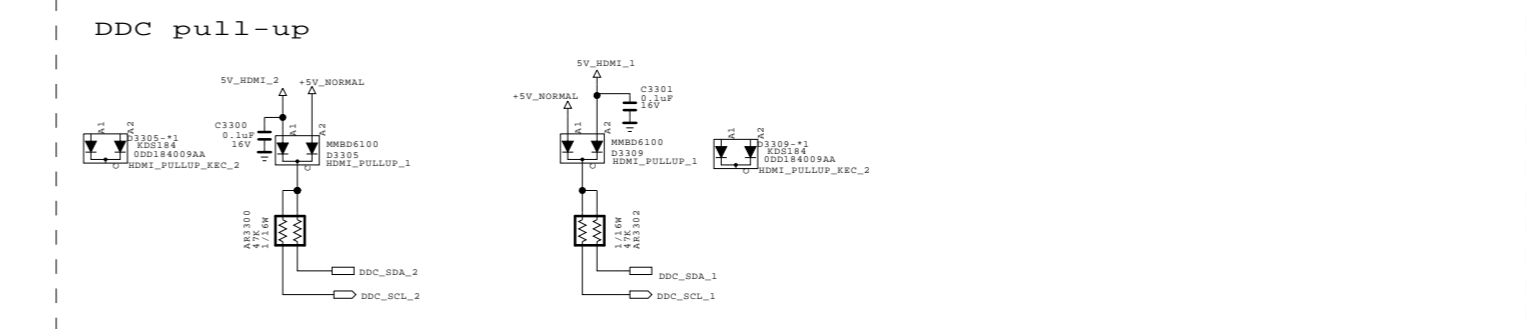
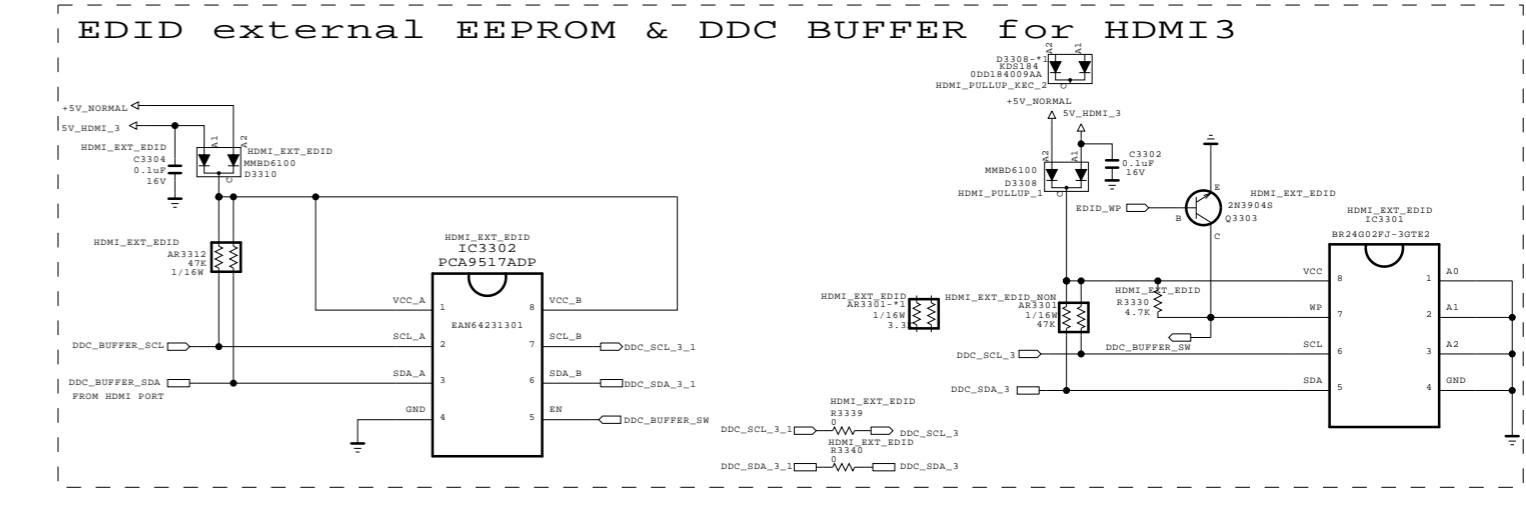
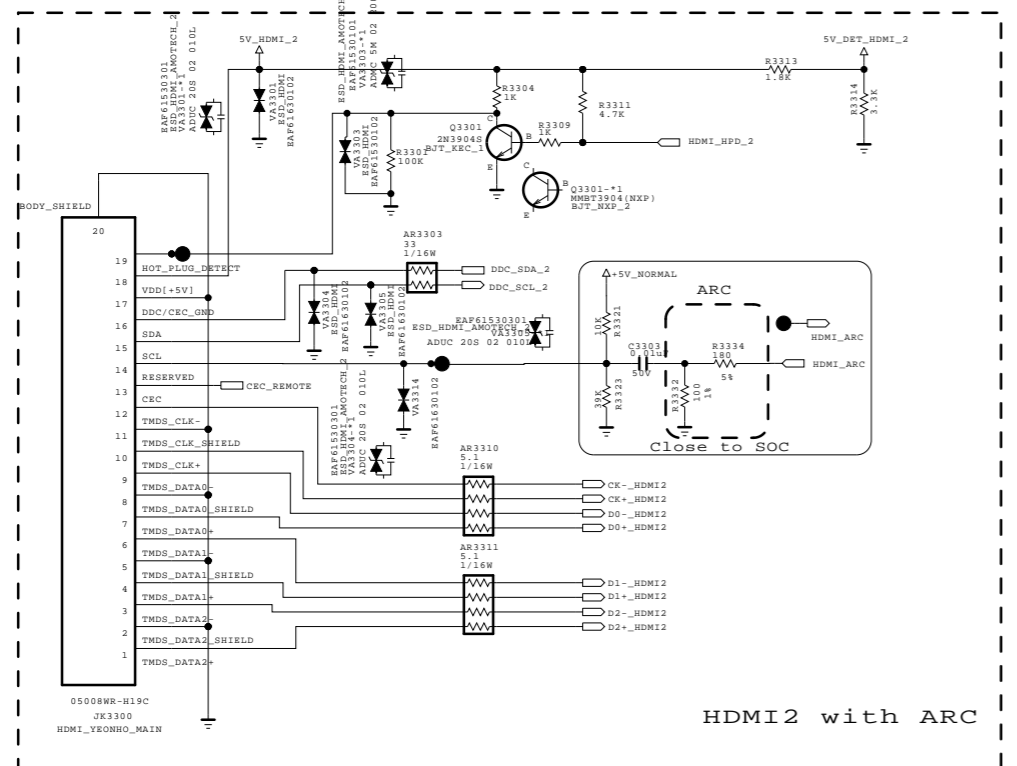
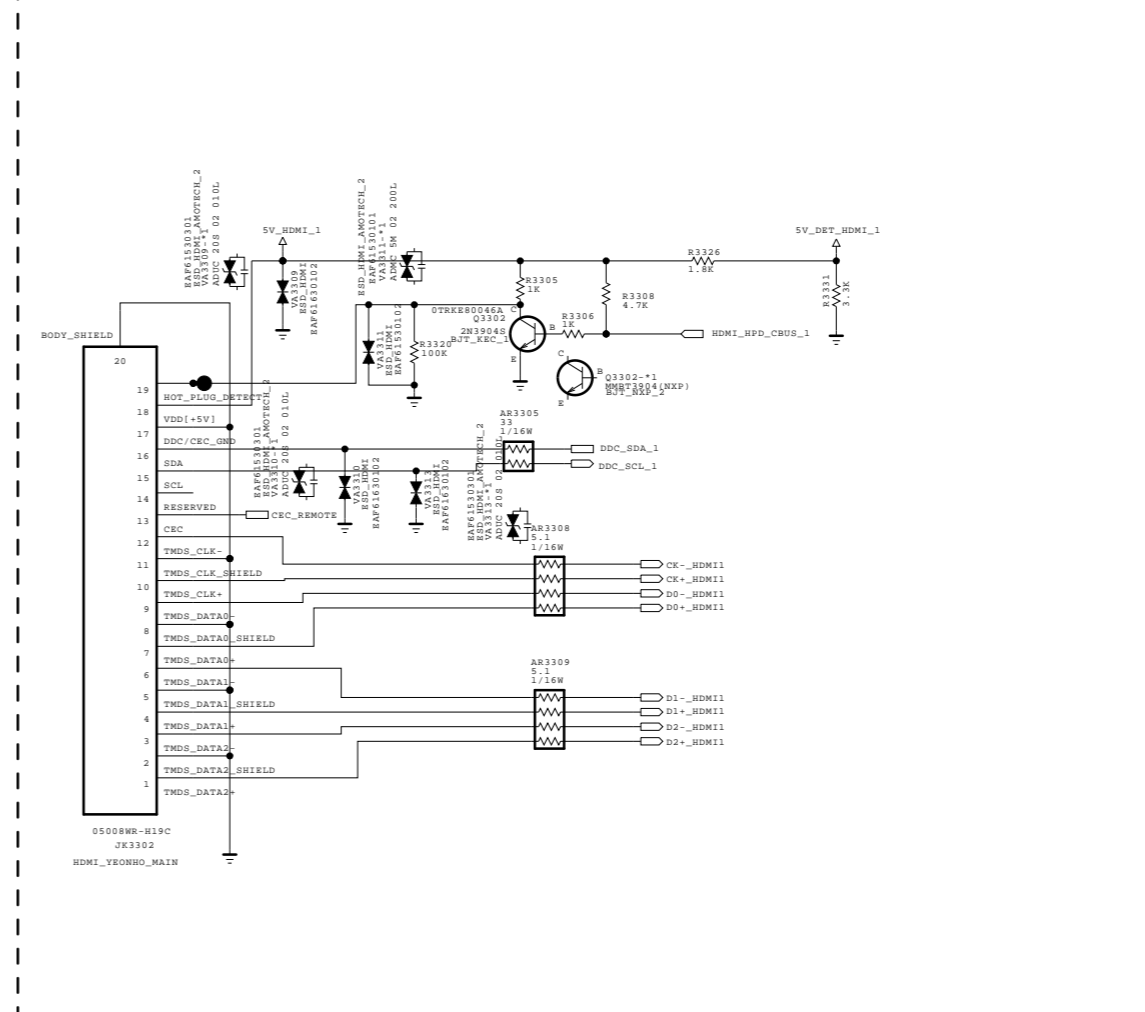
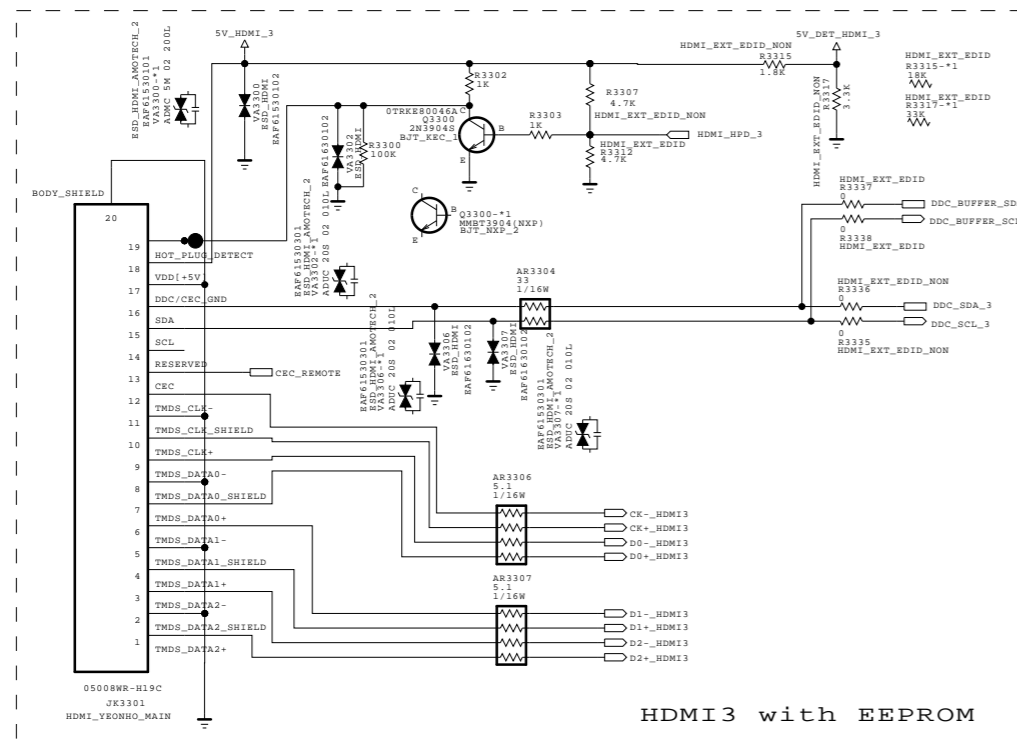
	0.72V (2.7K)	1.53V (8.2K)	2.27V (20K)	3.0V (75K)
MODEL_OPT_0(AM0)	MICOM_NON_LOGO/LCD R3005-*1 2.7K	MICOM_LOGO/LCD R3005-*2 8.2K	MICOM_NON_LOGO/OLED R3005-*3 20K	MICOM_LOGO/OLED R3005-*4 75K
MODEL_OPT_1(AM1)	MICOM_TV_NON_EPI R3007-*1 2.7K		MICOM_TV_EPI R3007-*3 20K	
MODEL_OPT_2(AM2)	MICOM_FHD R3009-*1 2.7K		MICOM_URD R3009-*3 20K	MICOM_8K R3009-*4 75K
MODEL_OPT_3(AM3) (FHD)	MICOM_M16 R3011-*1 2.7K	MICOM_RTK R3011-*2 8.2K	MICOM_M15/A5LR R3011-*3 20K	MICOM_M2 R3011-*4 75K
MODEL_OPT_3(AM3) (URD)				

THE  SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FIRE 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	K2H	DATE	2015-01-10
BLOCK	MODEL OPTION	SHEET	30 /

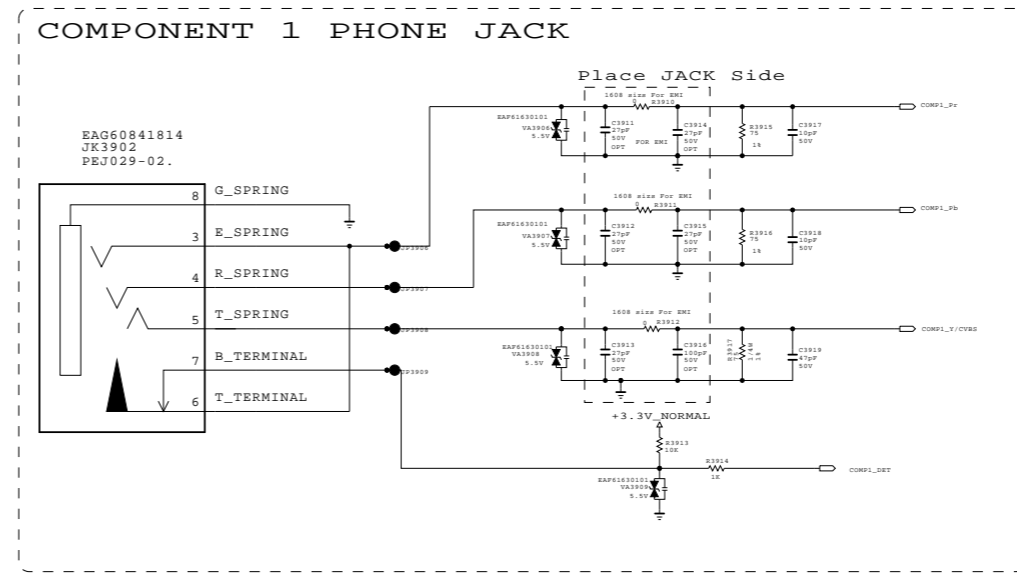
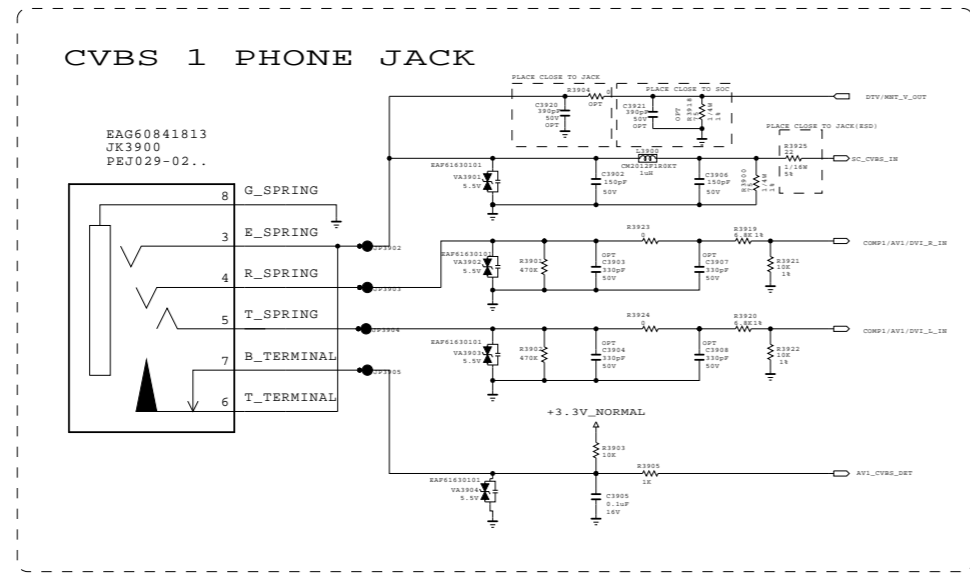
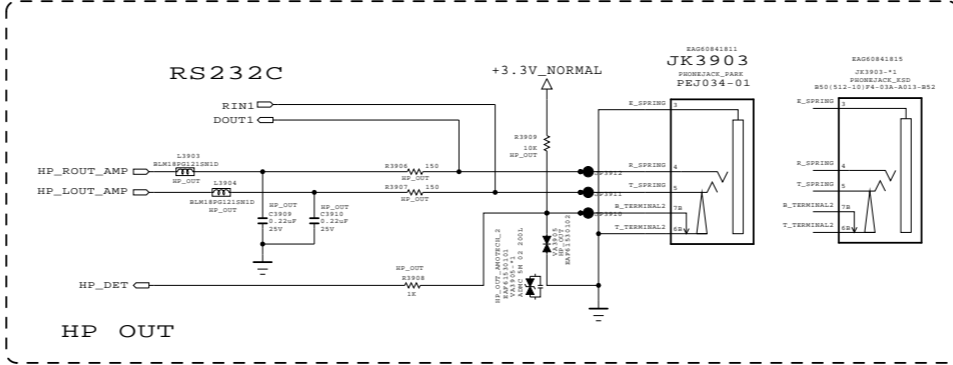
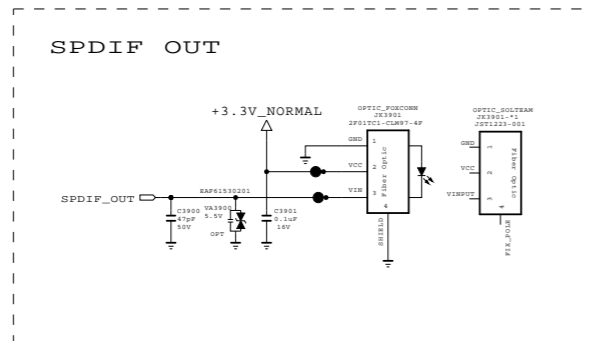


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SECRET
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MODEL	K2L	DATE	2015-01-10
BLOCK	HDMI	SHEET	33

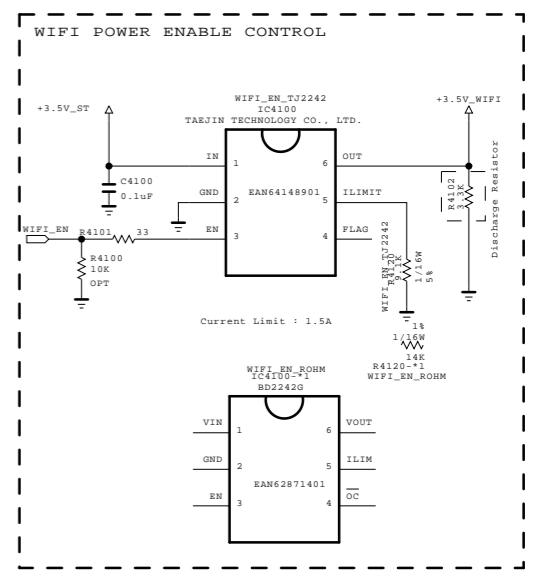
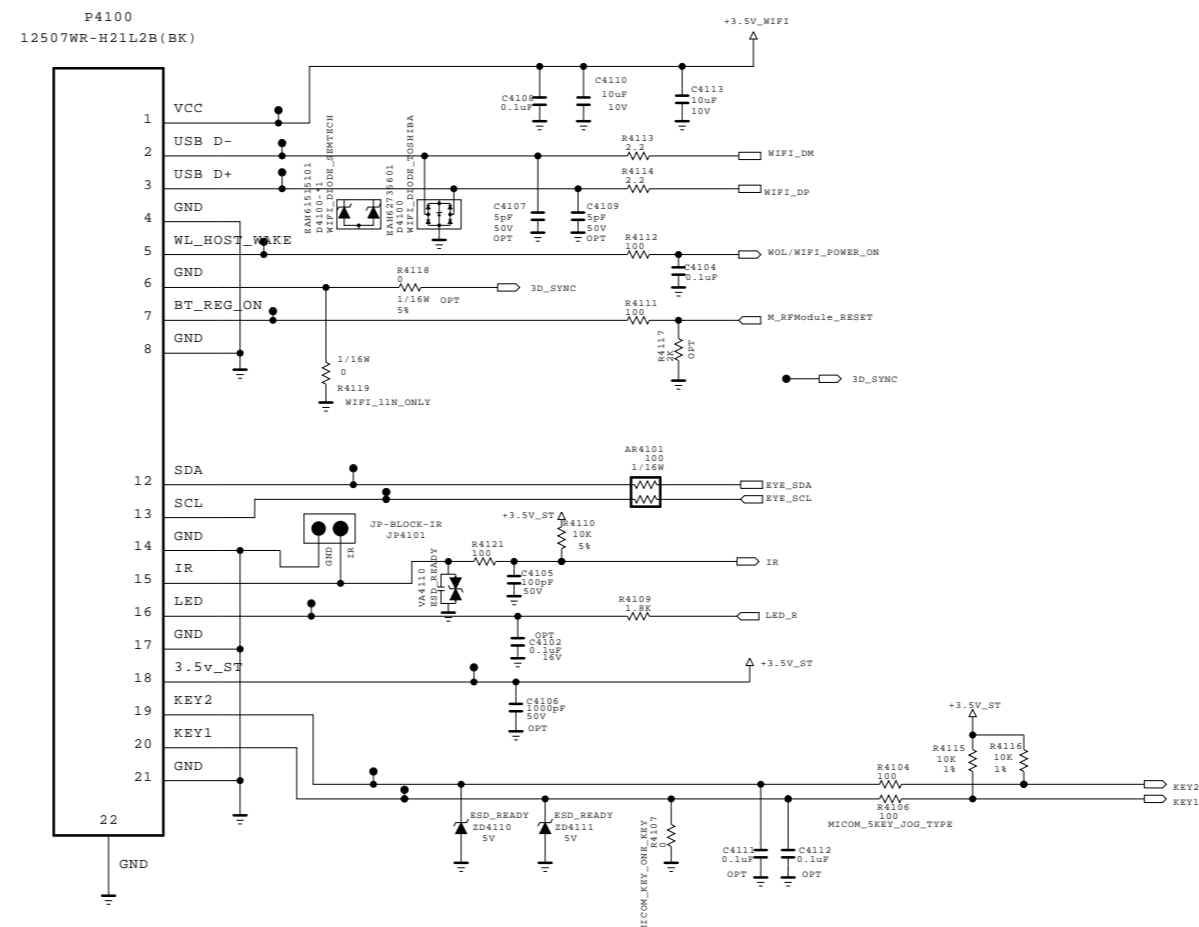
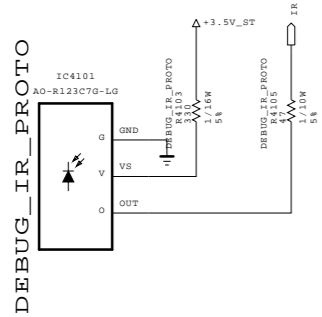


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SECRET
LGElectronics

LG ELECTRONICS

MODEL	UF71/7500	DATE	2014-07-24
BLK	COMMON_PHONE	SHEET	38

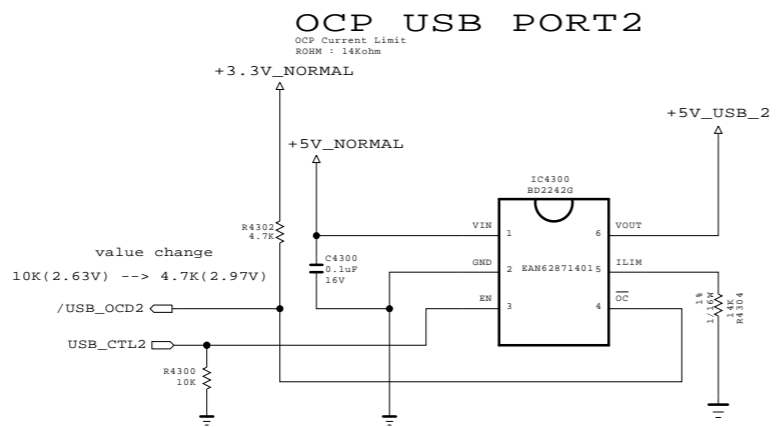
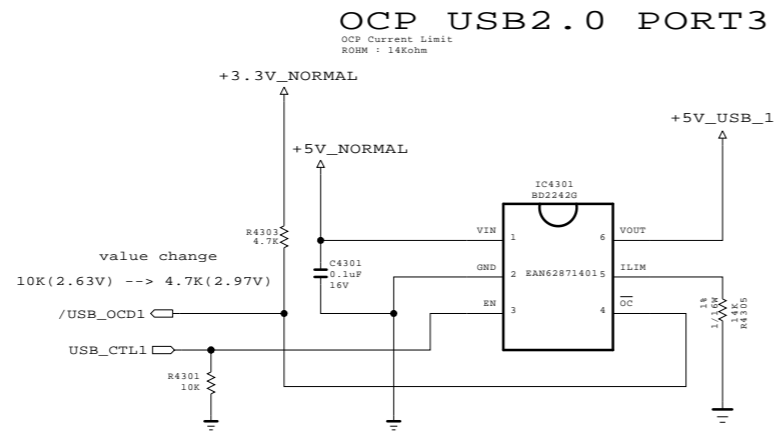


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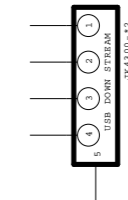
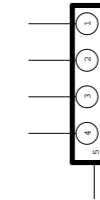
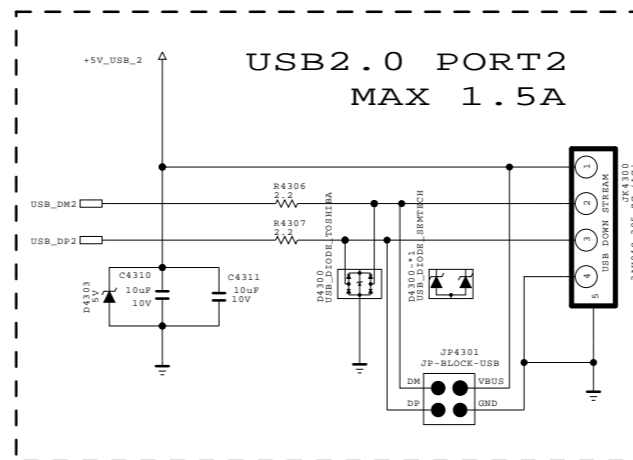
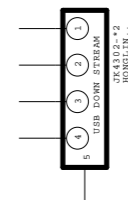
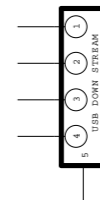
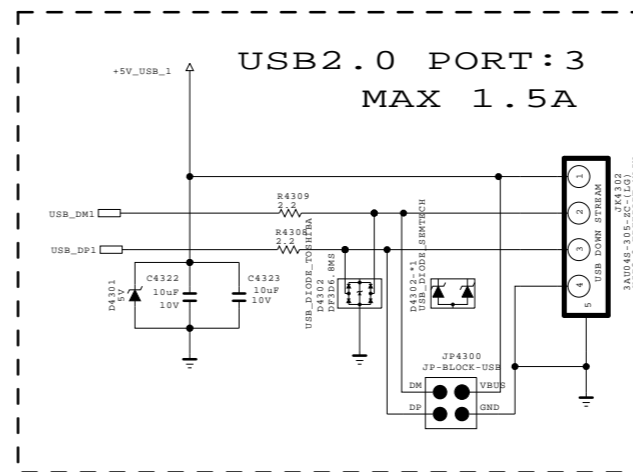
SECRET
LGElectronics



MODEL	UF71/7500	DATE	2014-05-19
BLOCK	IR/KEY	SHEET	12 /



USB2.0 2Port



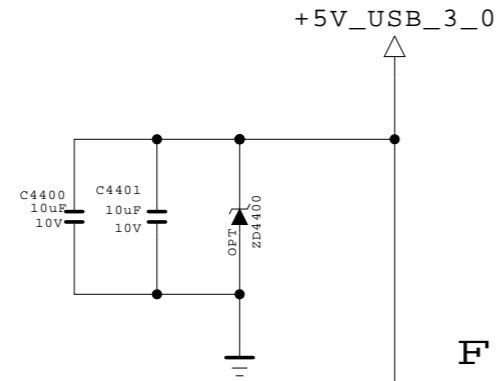
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SECRET
LGElectronics

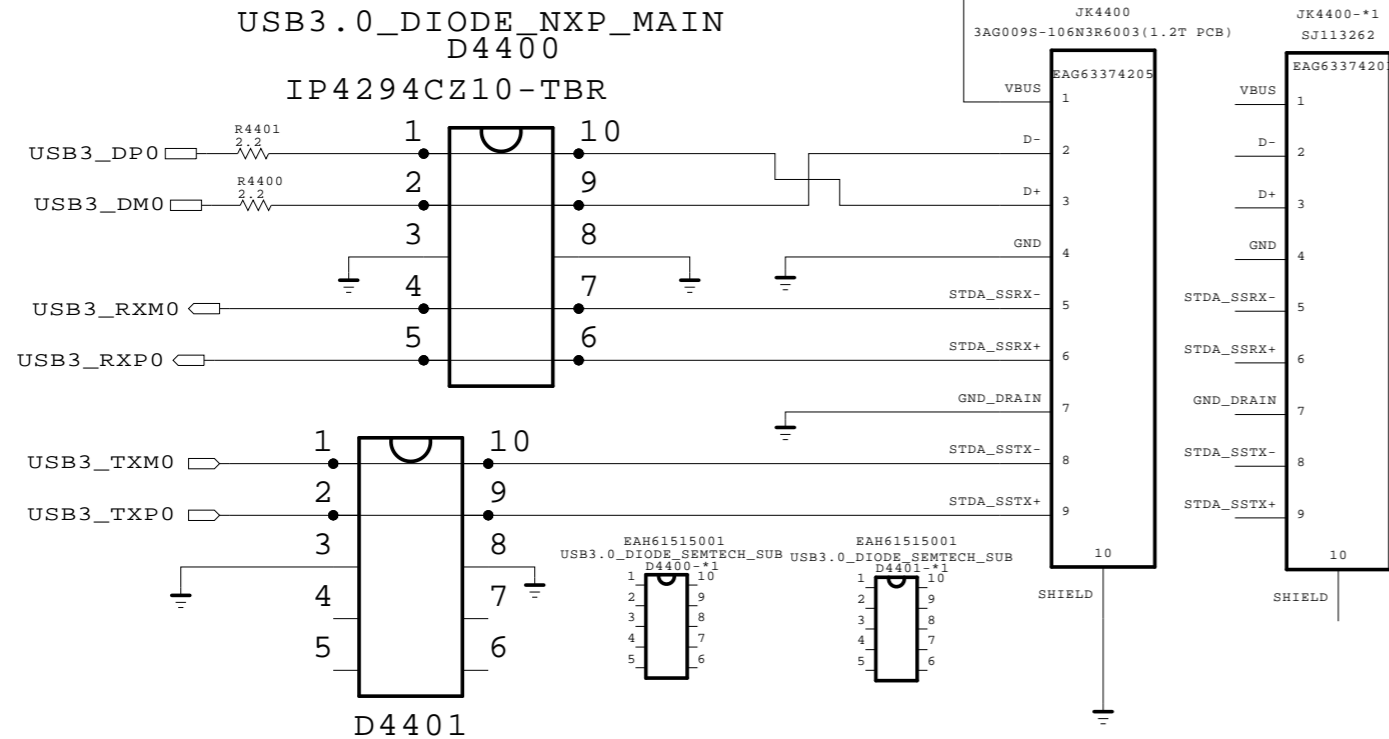


MODEL	K2L	DATE	2015-04-27
BLOCK	USB2.0 jack	SHEET	13 /

USB3.0
MAX 1.5A



FOR 1.2T PCB



USB3.0_DIODE_NXP_MAIN
D4400

IP4294CZ10-TBR

USB3.0_FREEPORT_1.2T JK4400
3AG009S-106N3R6003(1.2T PCB)

USB3.0_CNPLUS_1.2T JK4400-*1
SJ113262

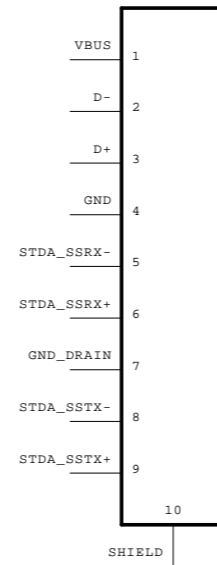
D4401

IP4294CZ10-TBR

USB3.0_DIODE_NXP_MAIN

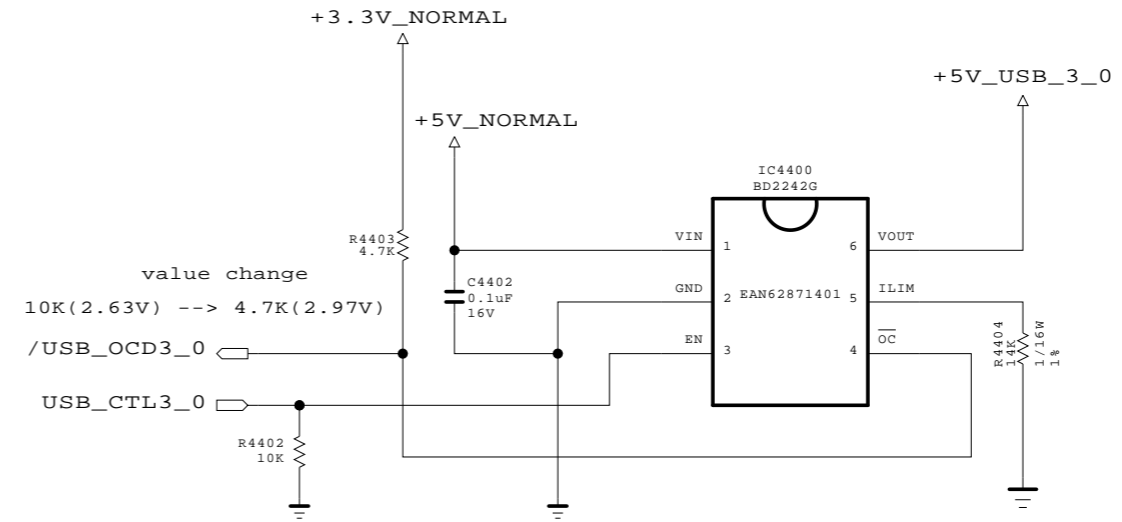
FOR 1.6T PCB

USB3.0_CNPLUS_1.6T JK4400-*2
5205-56209



OCV USB3.0

OCV Current Limit 1.5A
ROHM : 14K



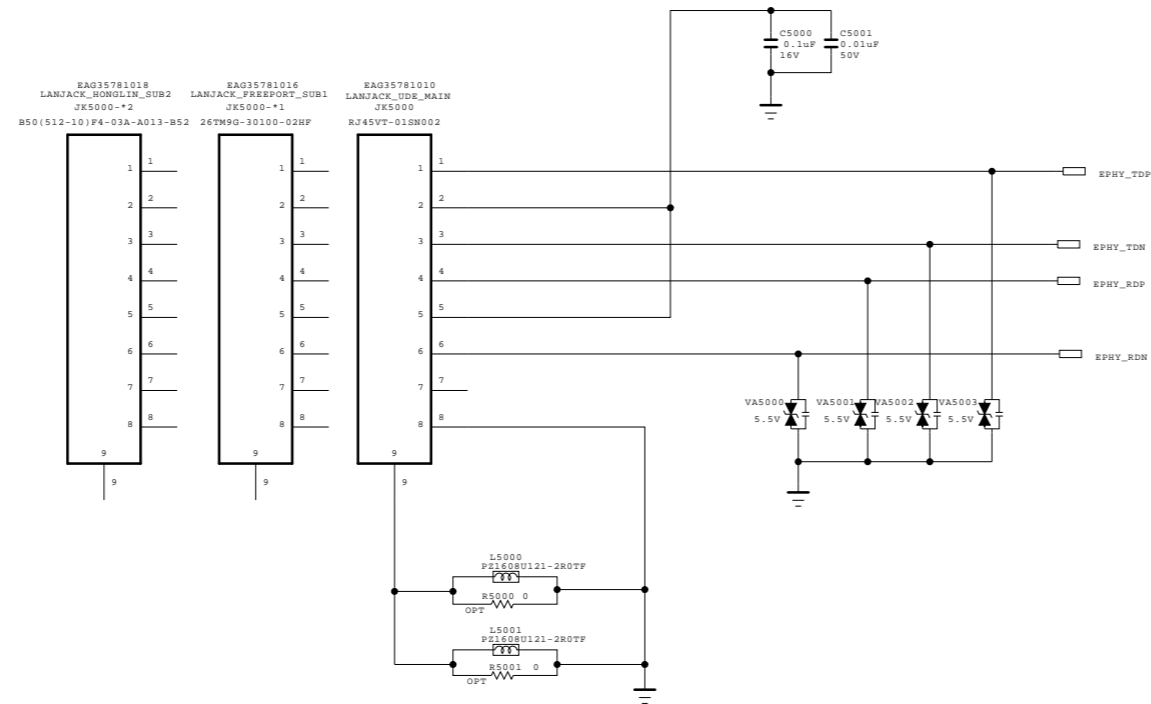
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SECRET
LGElectronics

MODEL	K2H	DATE	2015.02.11
BLOCK	USB 2 & 3	SHEET	15 / 26

043.sht

Ethernet Block



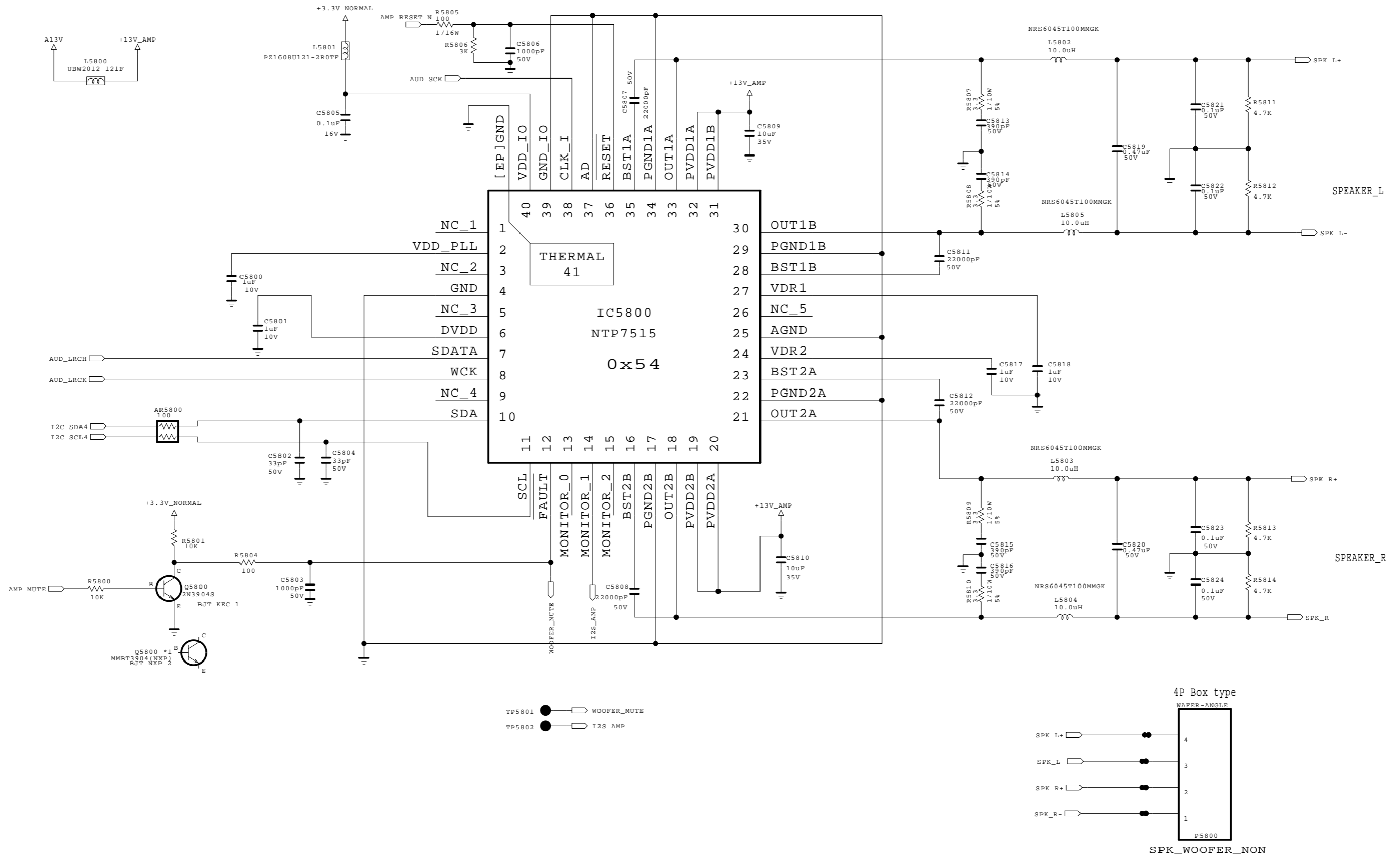
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SECRET
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MODEL	K2H	DATE	2014-12-15
BLOCK	LAN_H	SHEET	50 /

AUDIO AMP (NTP7515)



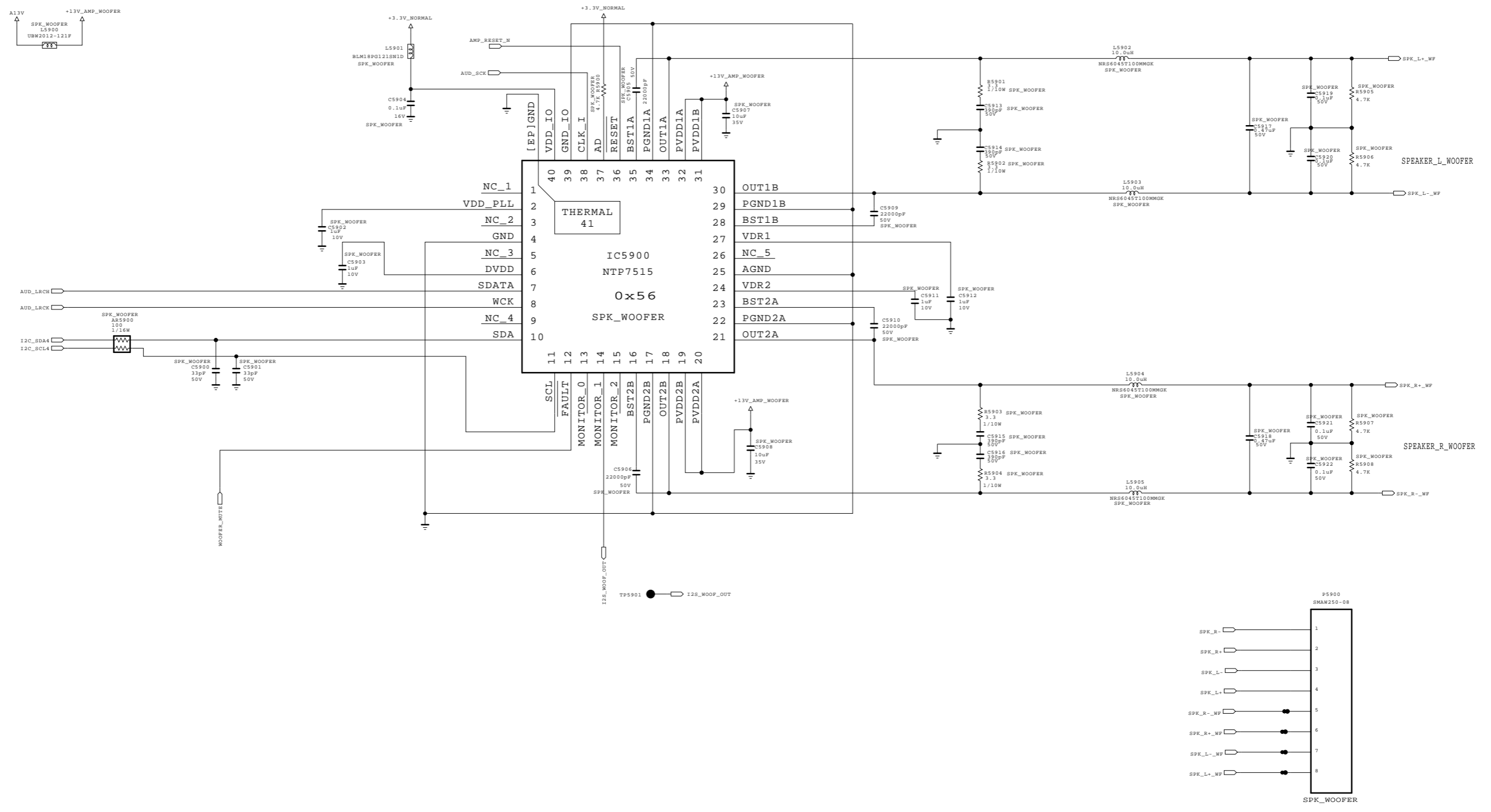
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SECRET	LG ELECTRONICS
LGElectronics	

MODEL		DATE	2014-10-17
BLOCK	MAIN_AMP	SHEET	58 /

AMP - Woofer

Option name : SPK_WOOFER



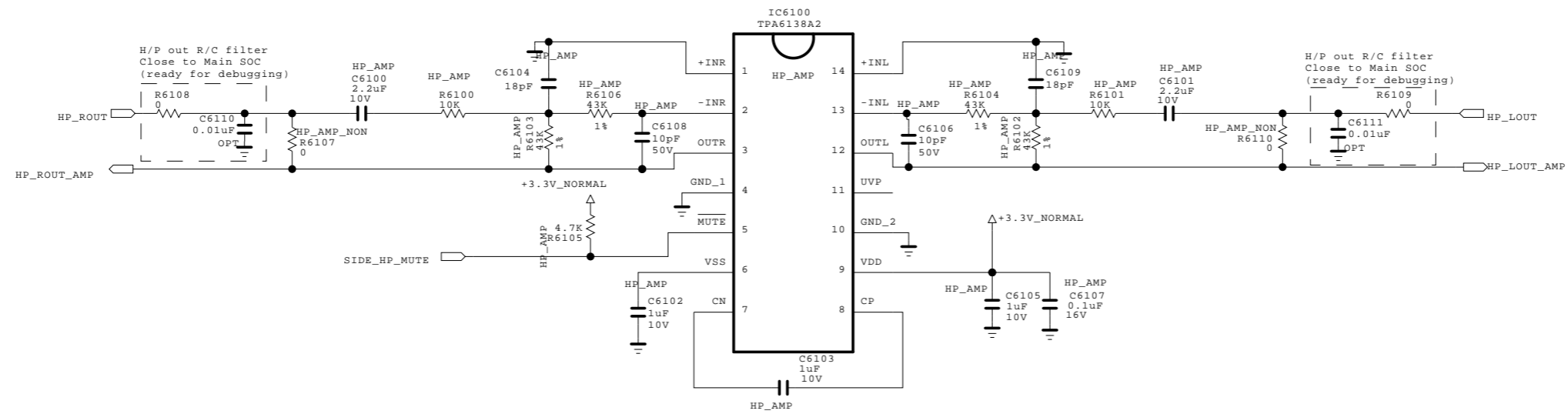
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SECRET
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MODEL	K2L	DATE	2015.03.16
BLOCK	WOOFER AMP	SHEET	59

EARPHONE AMP



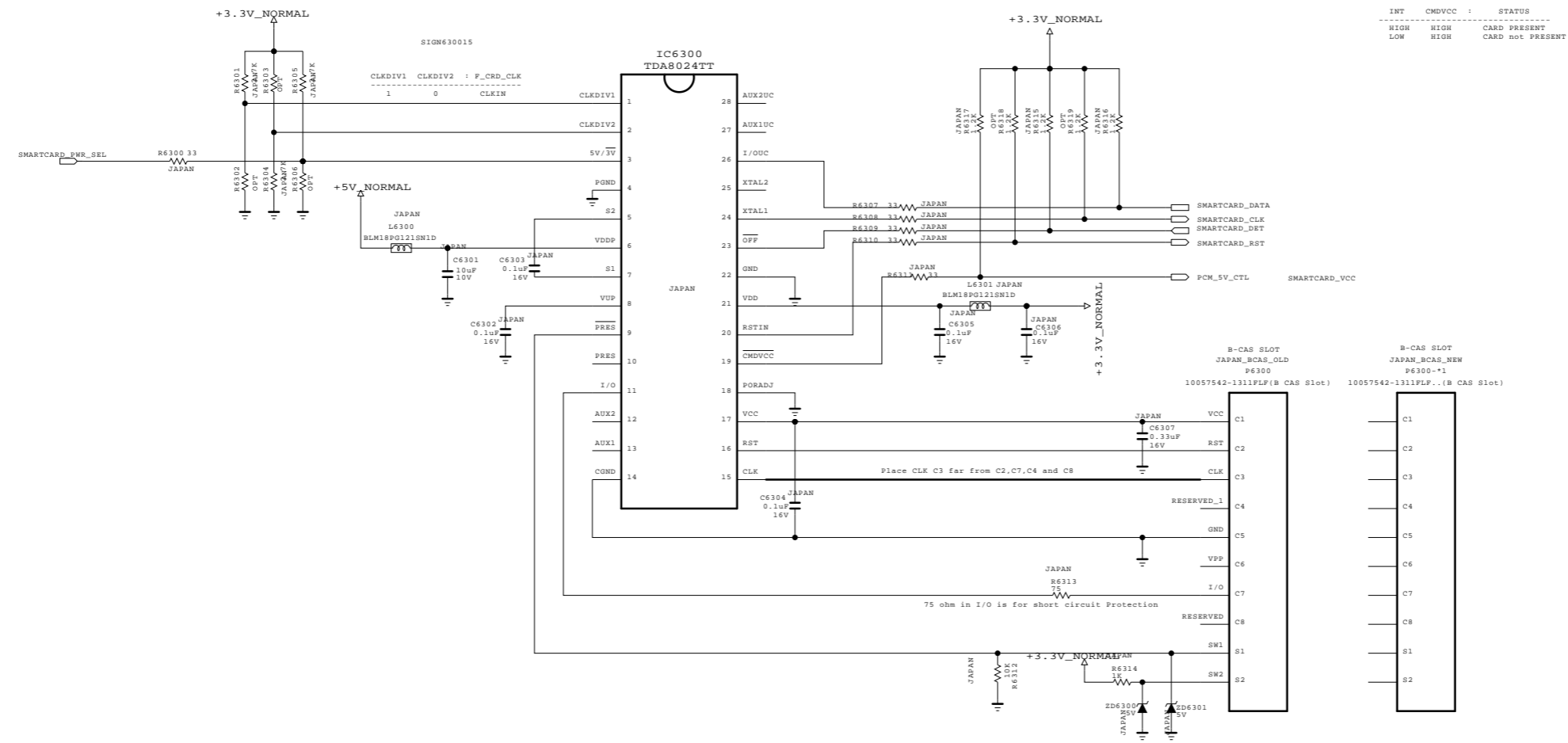
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SECRET
LGElectronics



MODEL	K2H	DATE	2014-11-22
BLOCK	HP_AMP	SHEET	61 /

B-CAS (SMART CARD) INTERFACE



THE SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FIRE 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.

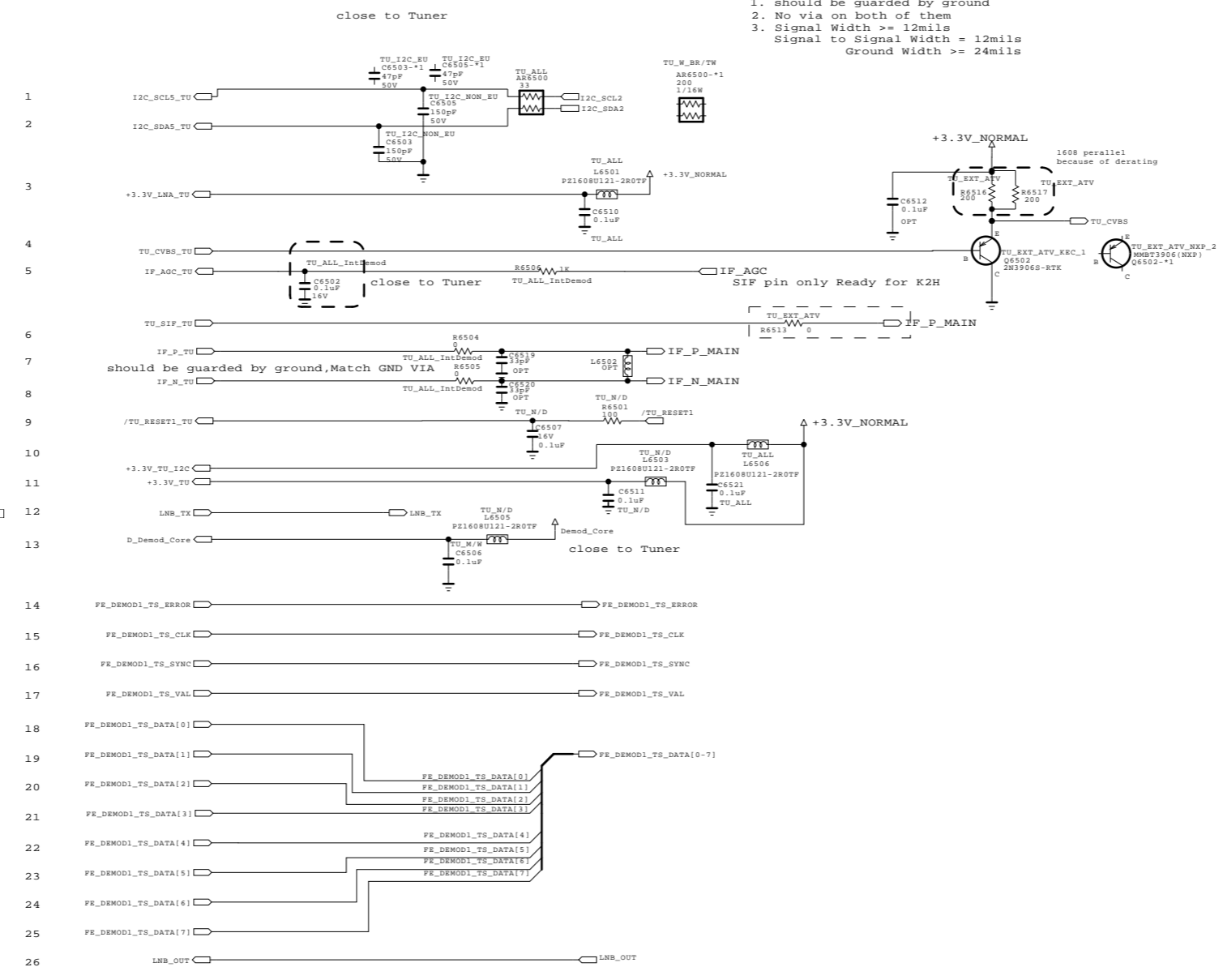
SECRET
LGElectronics



MODEL	JAPAN B-CAS	DATE	2011.04.17
BLOCK		SHEET	63

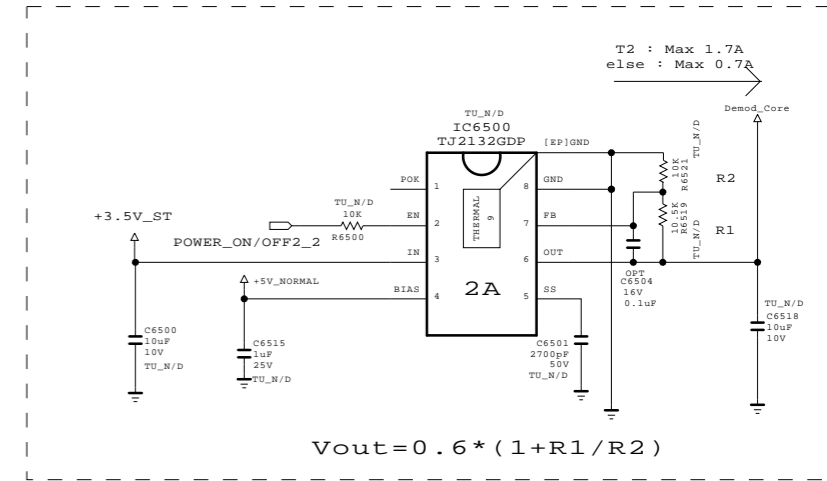
● FE_DEMOD1_TS_ERROR
 ● FE_DEMOD2_TS_ERROR

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



Global F/E Option Name
 1. TU
 2. Tuner Name = TDJ'H',TDj'M'...
 3. Country Name = KR,US,BR,EU ...
 Example of Option name
 TU_ALL_IntDemod = All Tuner type for Internal demod
 TU_M/W = apply TDSM&TDSW Type Tuner

14' Tuner Type for Global
 TDJ'H'-G101D : Half NIM for EU,AJJA
 TDJ'H'-H101F : Half NIM for US, KR
 TDJ'K'-T101F : Half NIM for TW
 TDJ'M'-C301D,F : FULL NIM for China
 TDJ'M'-B101F : Brazil NIM with Isolater Type
 TDJ'M'-K101F : colombia NIM
 TDJ'M'-G101D,G105D,G151D : EU Combo&Full NIM
 TDJ'M'-H101F,H151F : Korea PIP tuner
 TDJ'W'-A151D : AJJA T2 PIP

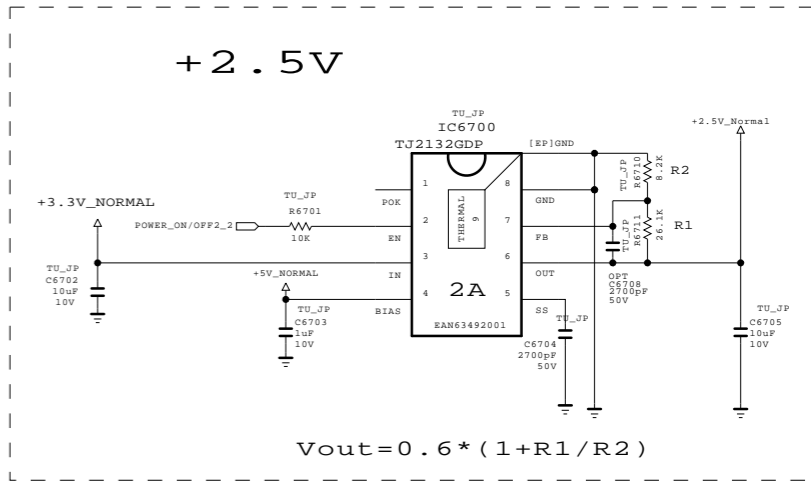
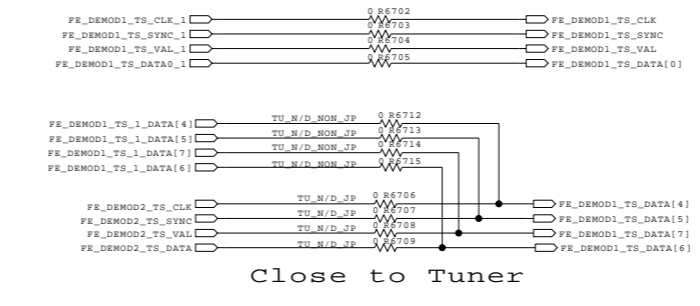
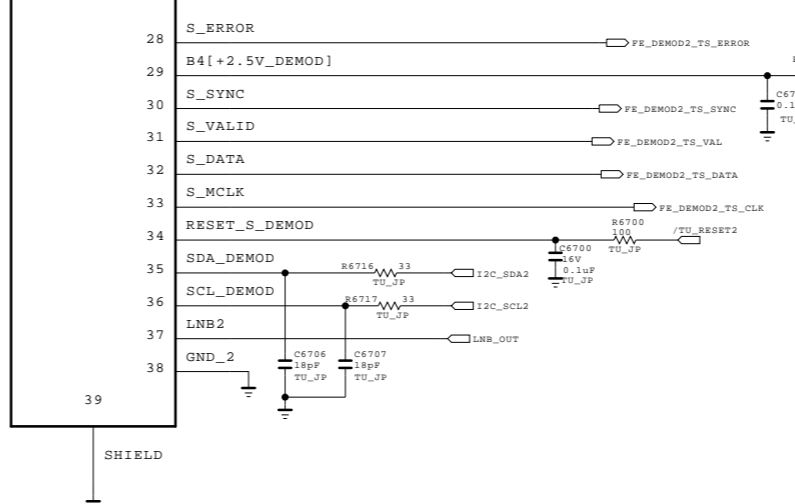
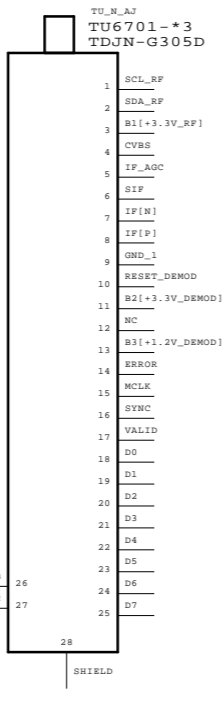
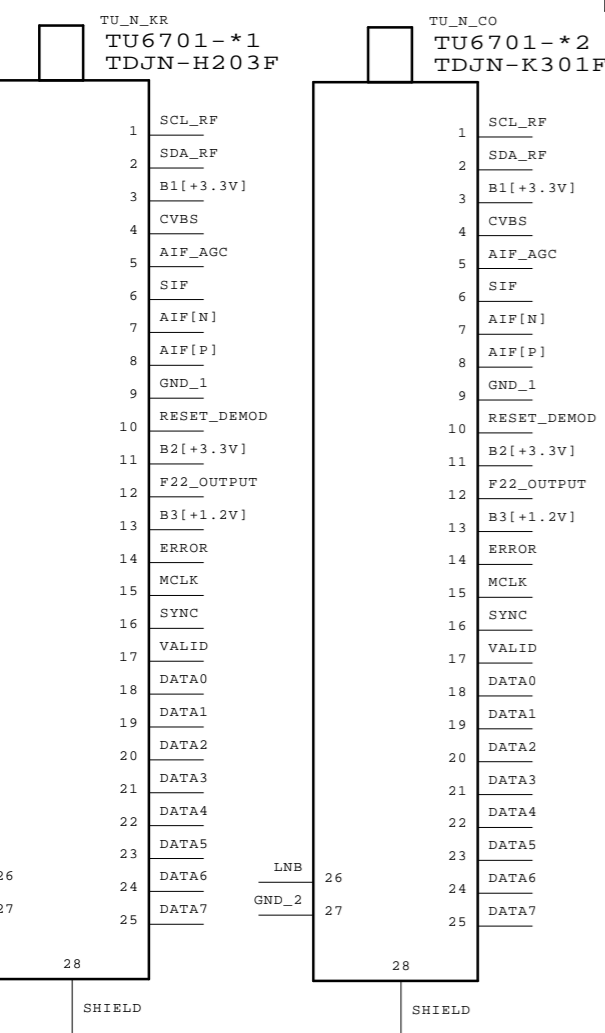
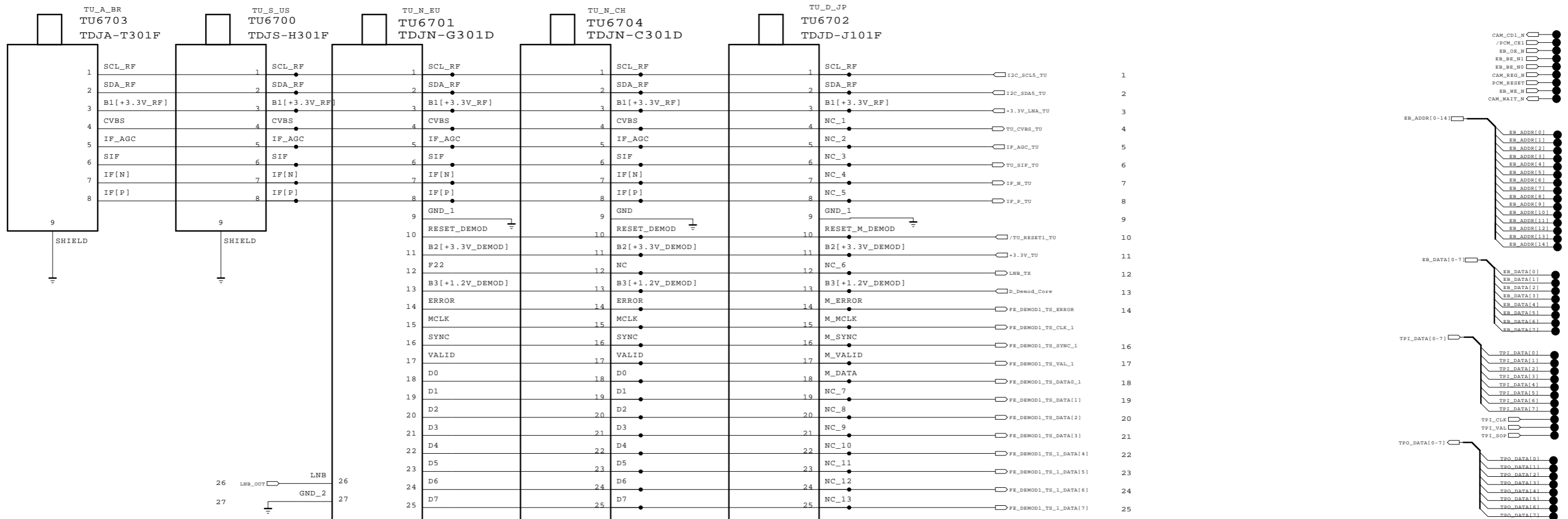


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 LGElectronics



MODEL	K2H	DATE	2014-10-17
BLOCK	TU_CIRCUIT	SHEET	18



THE SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FIRE 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.

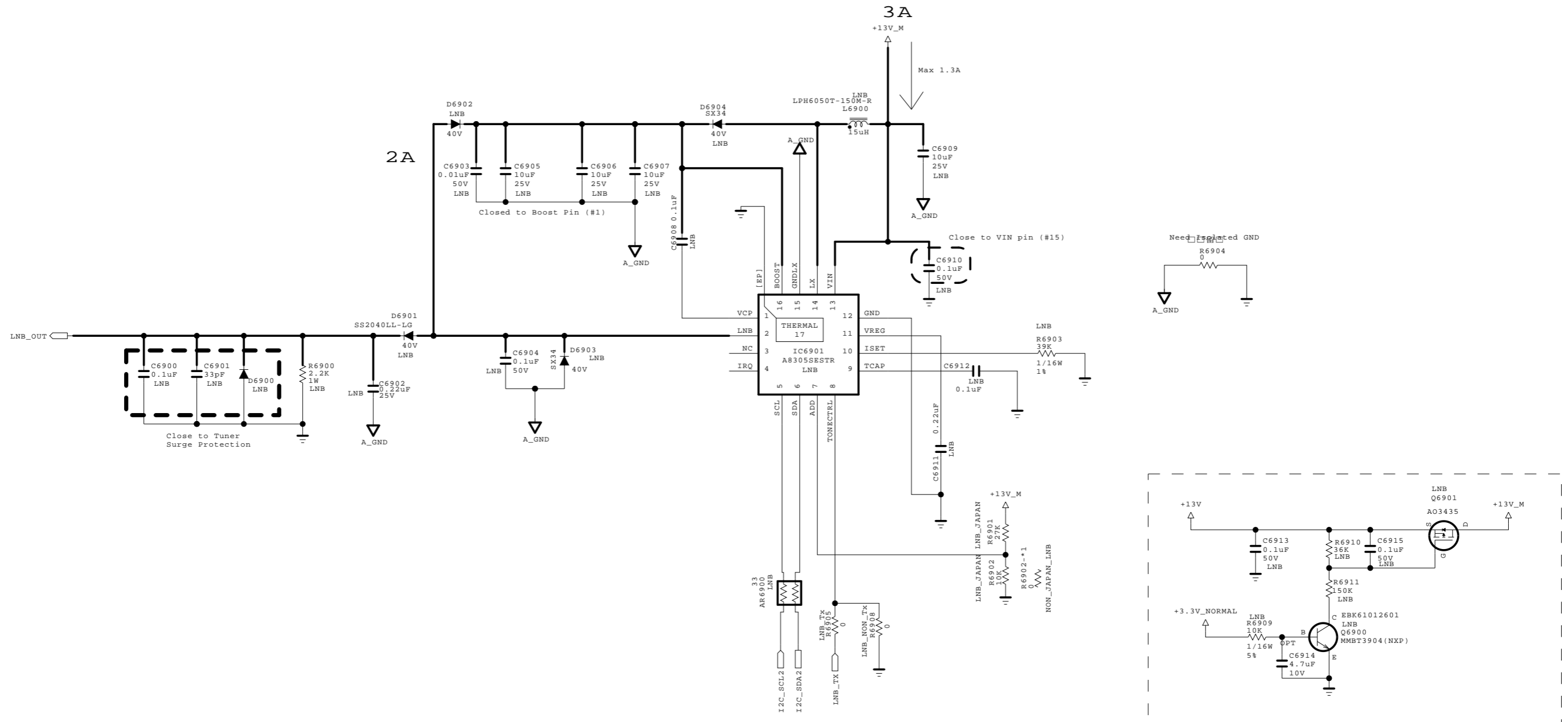
SECRET
LGElectronics



MODEL	K2H	DATE	2014-09-11
BLOCK	TU_SYMBOL_H	SHEET	19

LNB PART (DVB-S2)
 OPTION ; LNB

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



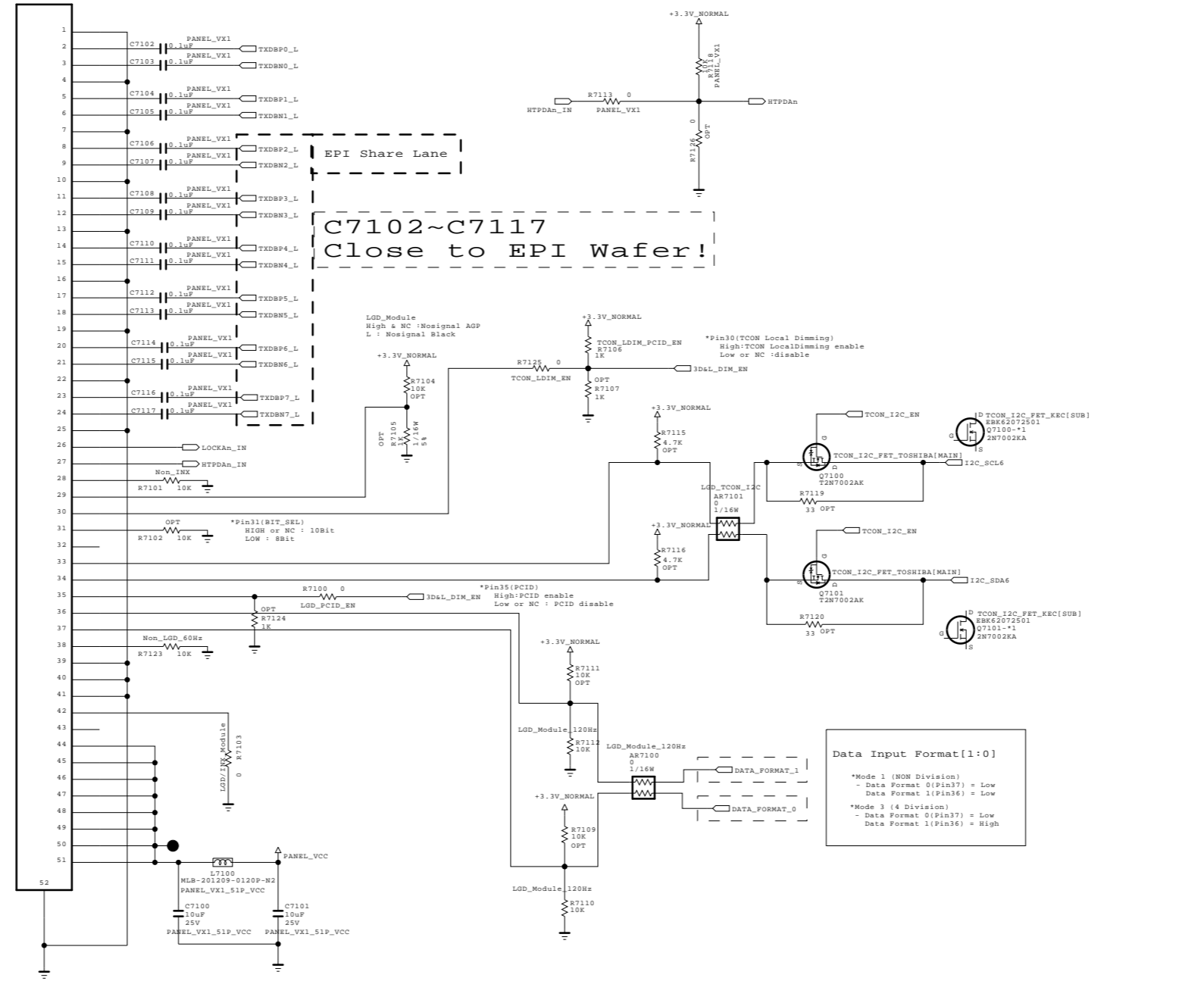
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SECRET	
LG Electronics	

MODEL	K2H	DATE	2014-08-25
BLOCK	LNB	SHEET	20 /

[51P Vx1
output wafer]

PANEL_VX1
P7100
SP14-11592-01-51P Pin



Must be assigned at Vx1 51p wafer !!!

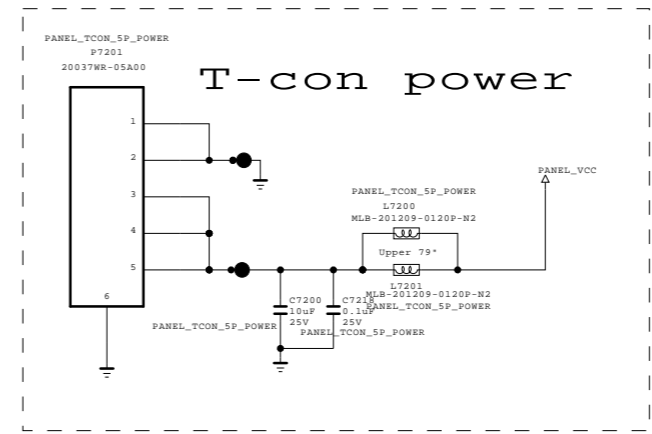
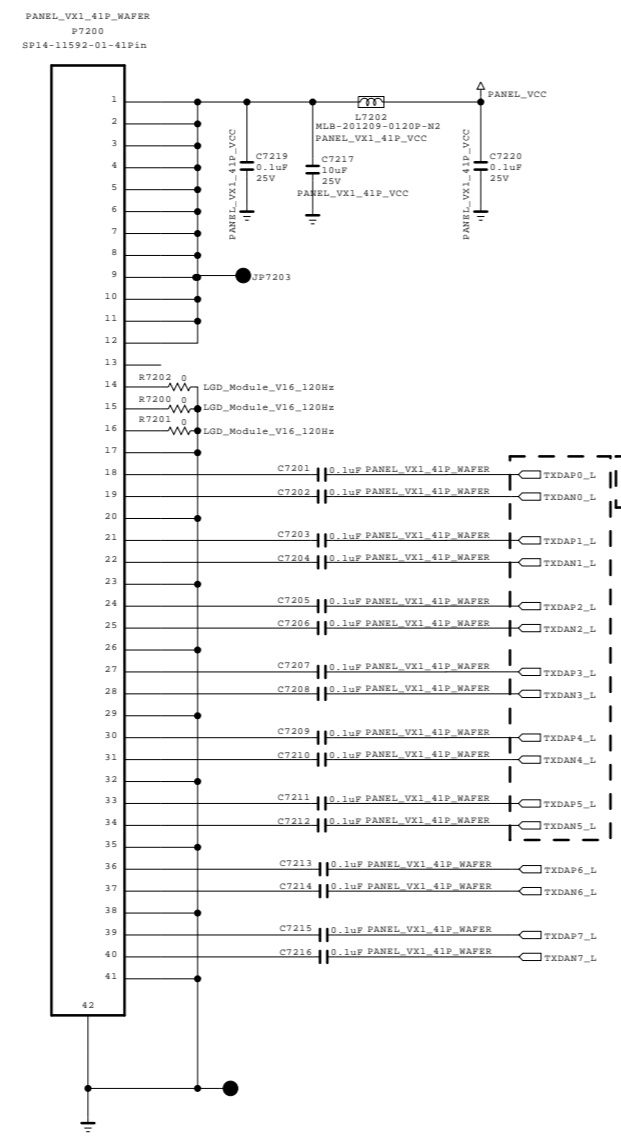
THE SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FIRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE SYMBOL MARK OF THE SCHEMATIC.

SECRET
LGElectronics



MODEL	K2H	DATE	2014-08-27
BLOCK	Vx1 51P	SHEET	21 /

[41P Vx1
output wafer]



C7201~C7216
Close to EPI Wafer!

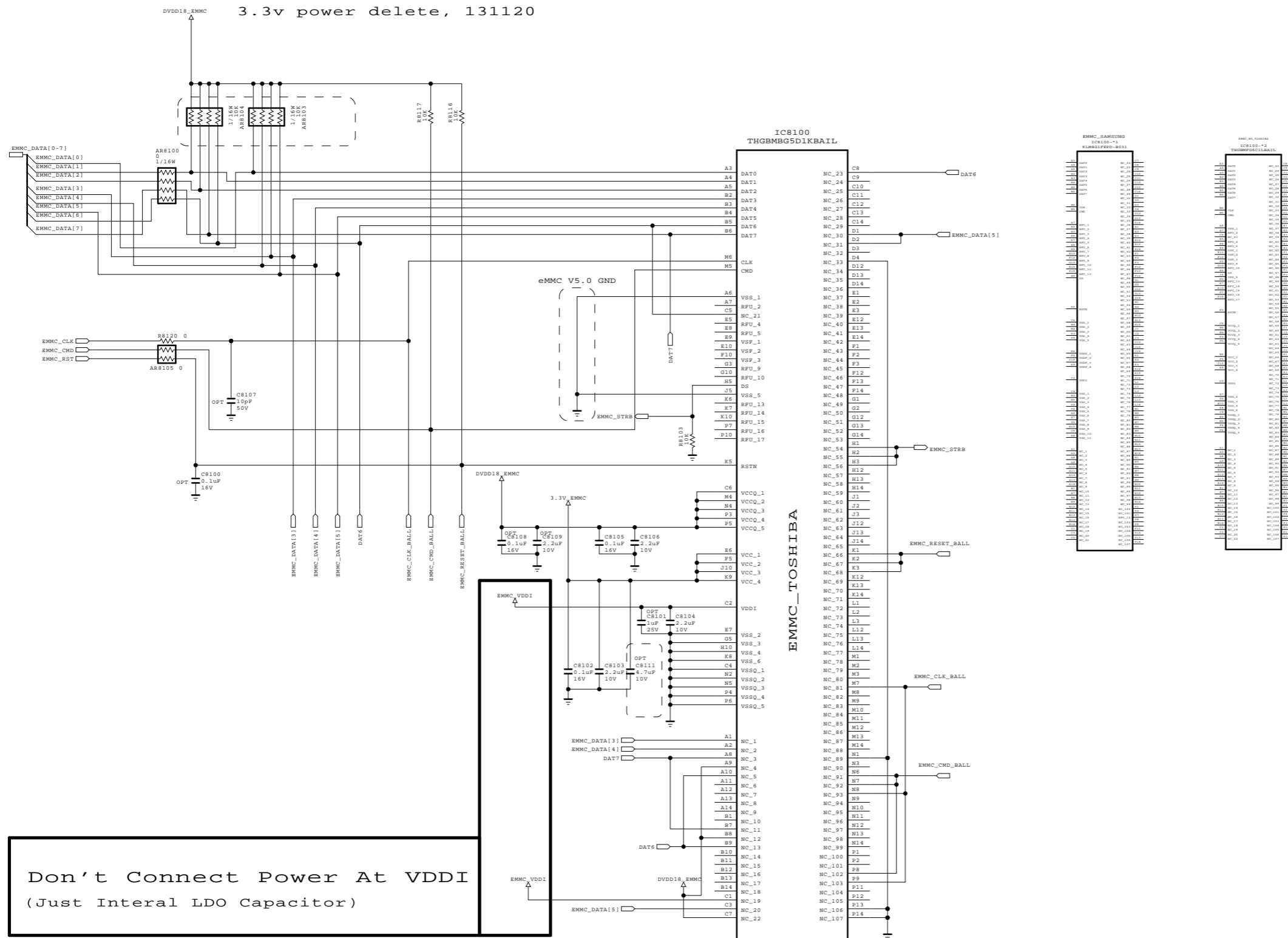
THE SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FIRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE SYMBOL MARK OF THE SCHEMATIC.

SECRET
LGElectronics



MODEL	UF71/7500	DATE	14/07/19
BLOCK	Vx1 41P	SHEET	22

eMMC I/F



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

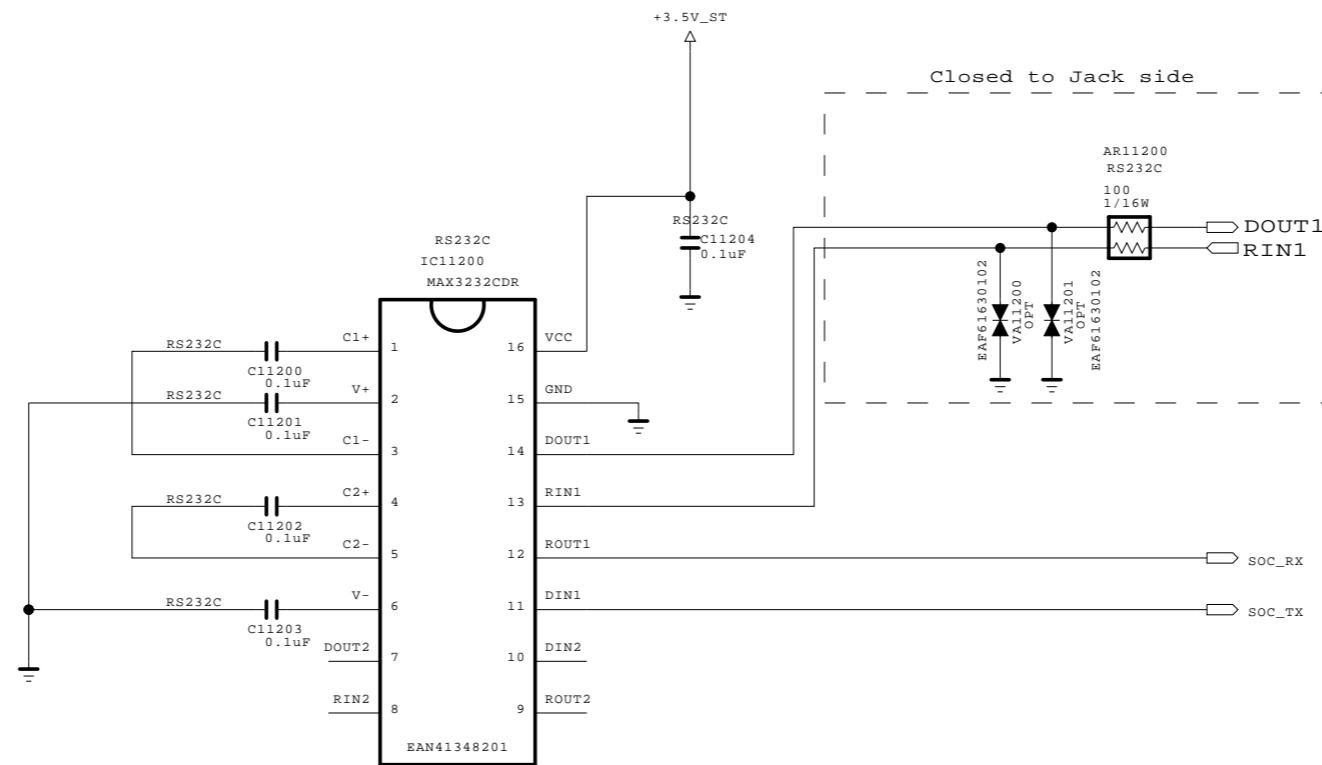
THE SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FIRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURERS SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE SYMBOL MARK OF THE SCHEMATIC.

SECRET
LGElectronics



MODEL	K2H	DATE	2014-11-17
BLOCK	eMMC	SHEET	81

RS-232C Control INTERFACE



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

SECRET
LGElectronics



MODEL	UF71/7500	DATE	2014-05-19
BLOCK	RS232C	SHEET	22 /



TROUBLE SHOOTING GUIDE

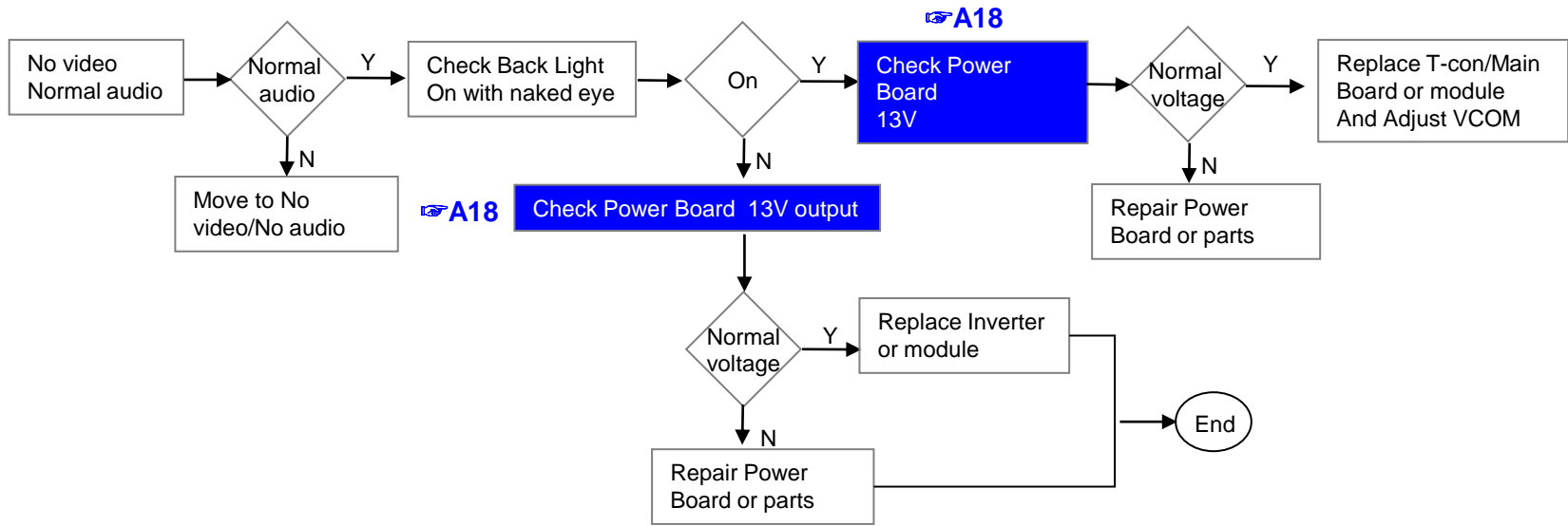
Contents of Standard Repair Process

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		MR15 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 GSCS System for these model.

Error symptom	A. Video error	Established date	
	No video/ Normal audio	Revised date	1/16

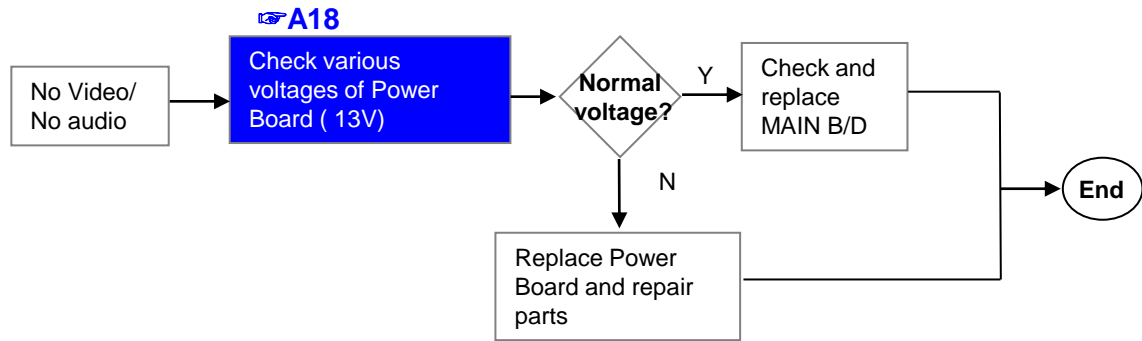
**First of all, Check whether all of cables between board is inserted properly or not.
(Main B/D↔ Power B/D, LVDS Cable, Speaker Cable, IR B/D Cable,,,)**



※Precaution A4 & A2



	Error symptom	A. Video error	Established date	
		No video/ No audio	Revised date	2/16

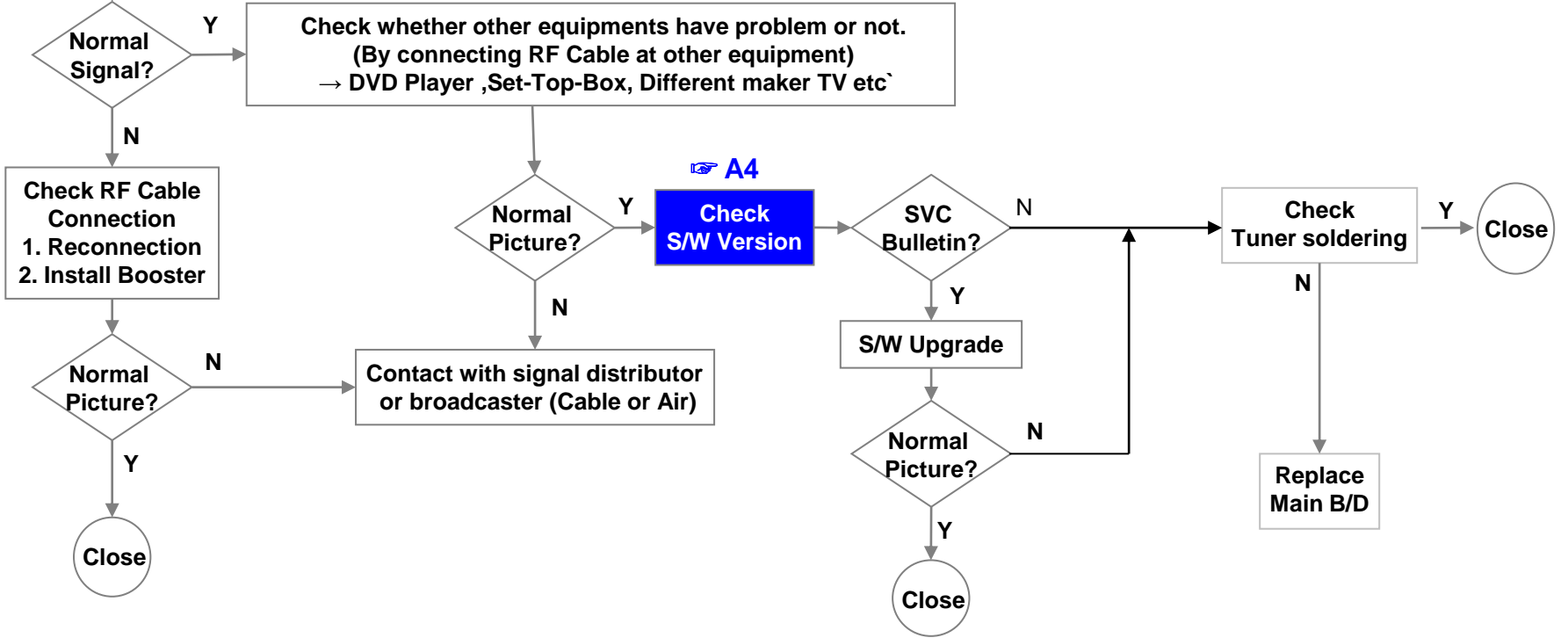


Error symptom	A. Video error	Established date	
	Picture broken/ Freezing	Revised date	3/16

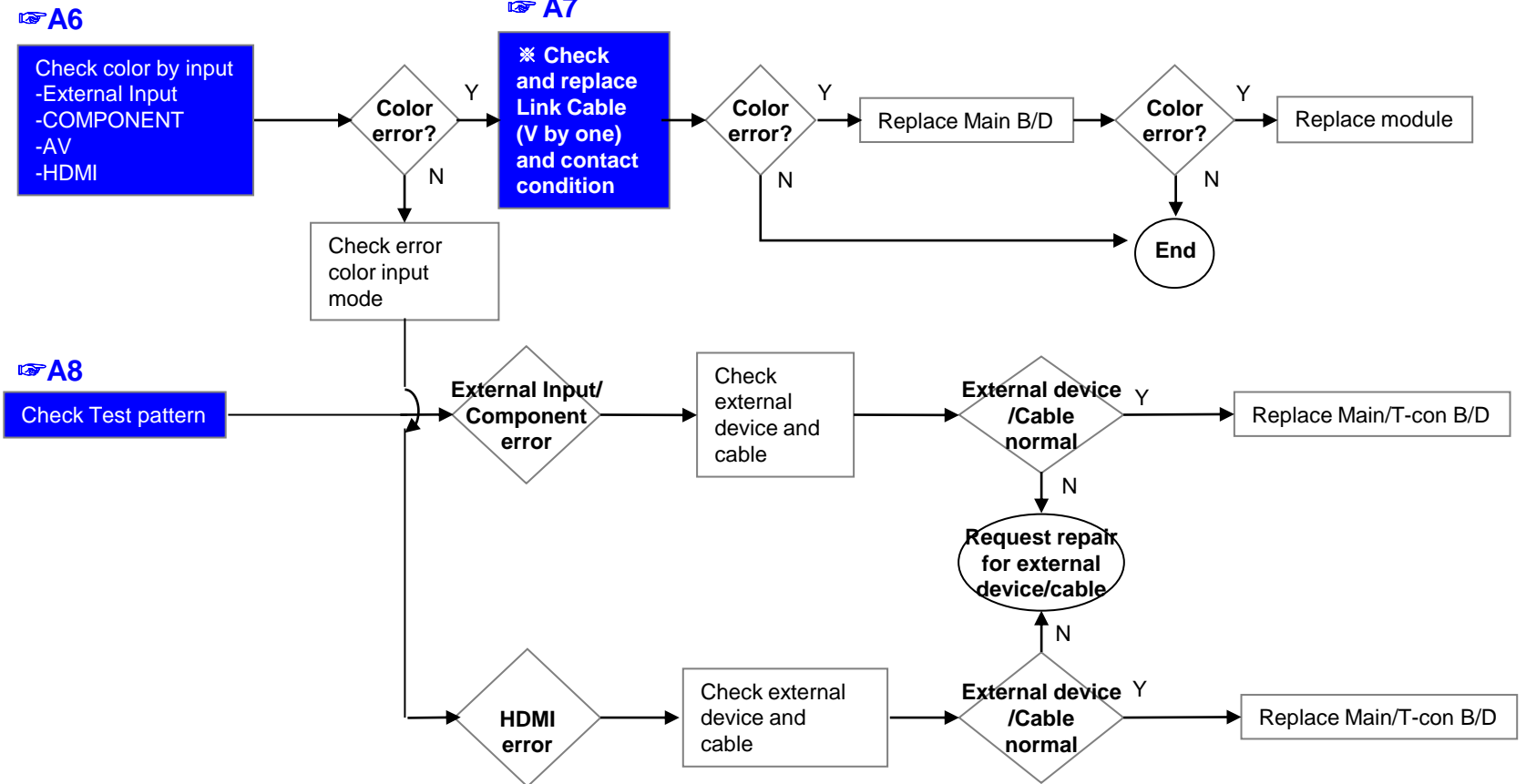
A3

Check RF Signal level

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

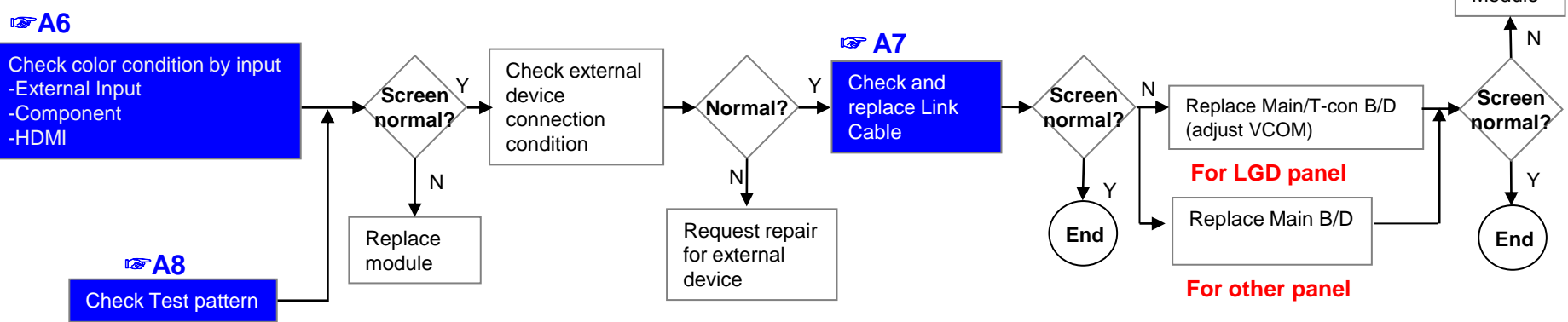


Error symptom	A. Video error	Established date	
	Color error	Revised date	4/16

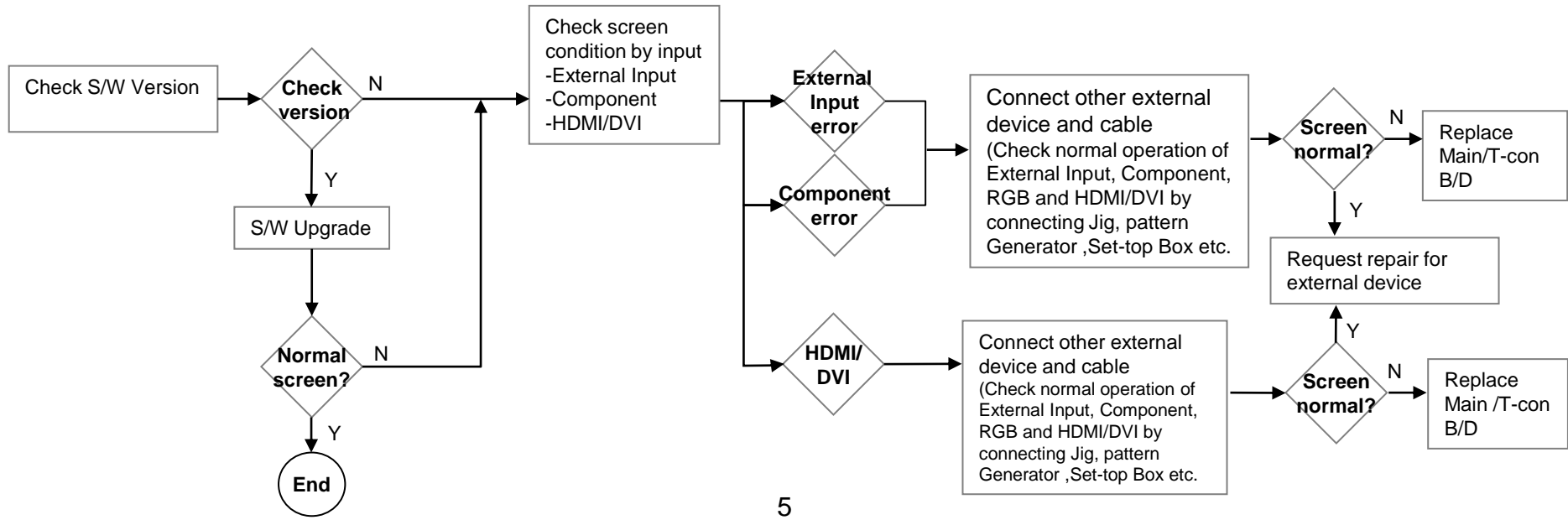


Error symptom	A. Video error	Established date	
	Vertical / Horizontal bar, residual image, light spot, external device color error	Revised date	5/16

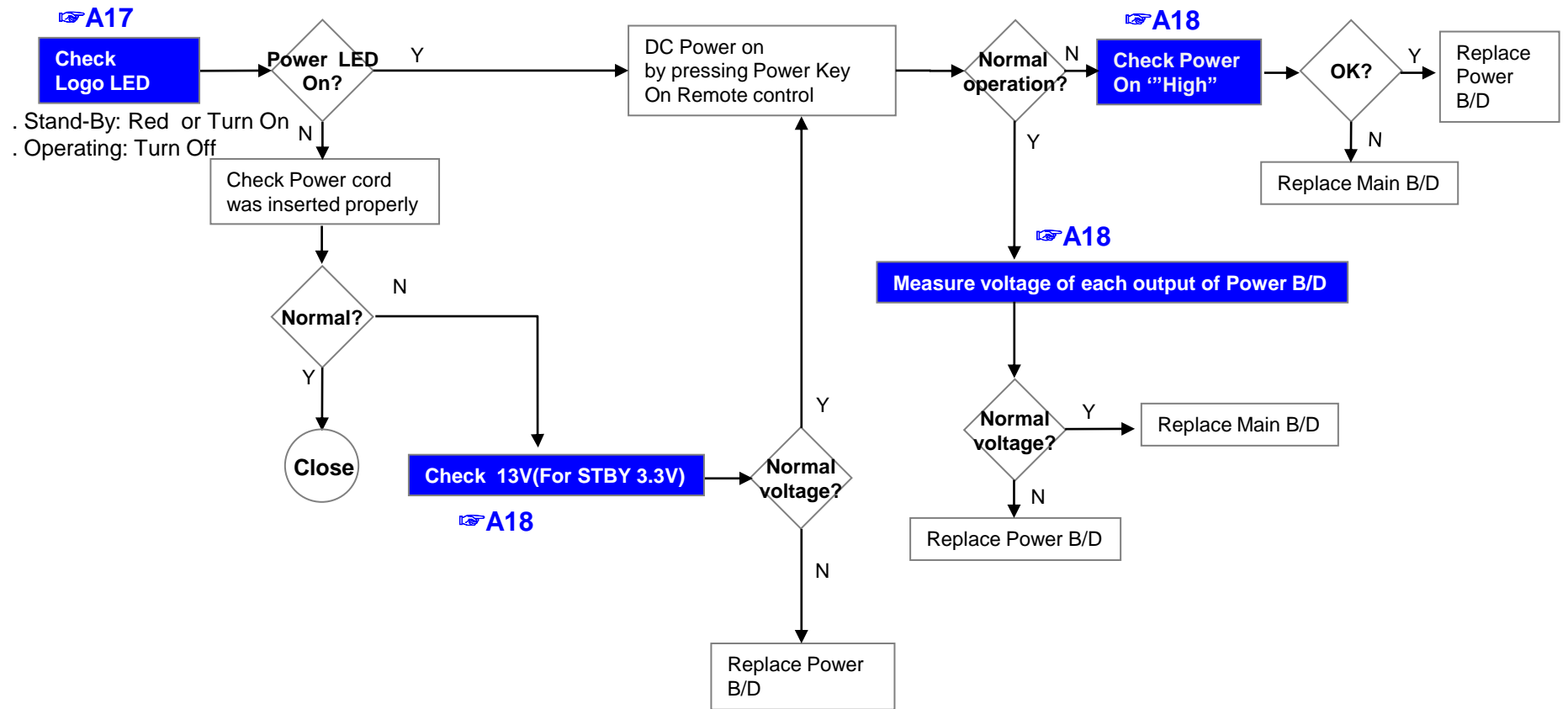
Vertical/Horizontal bar, residual image, light spot



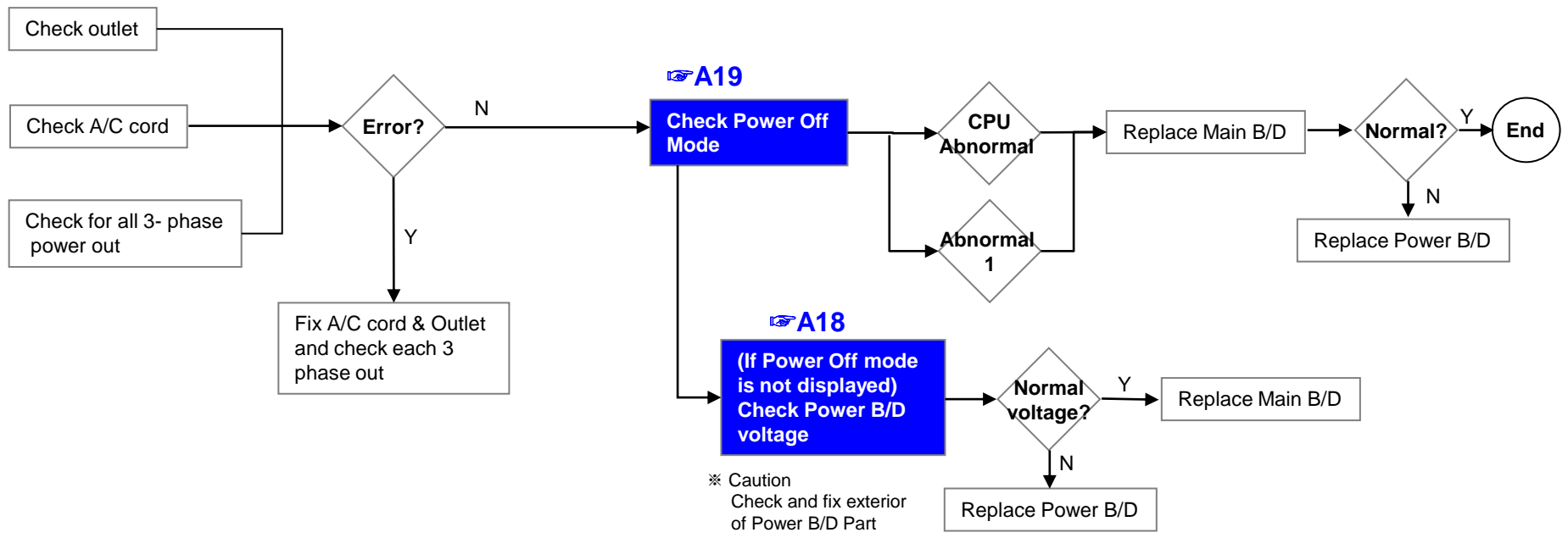
External device screen error-Color error



Error symptom	B. Power error	Established date	
	No power	Revised date	6/16



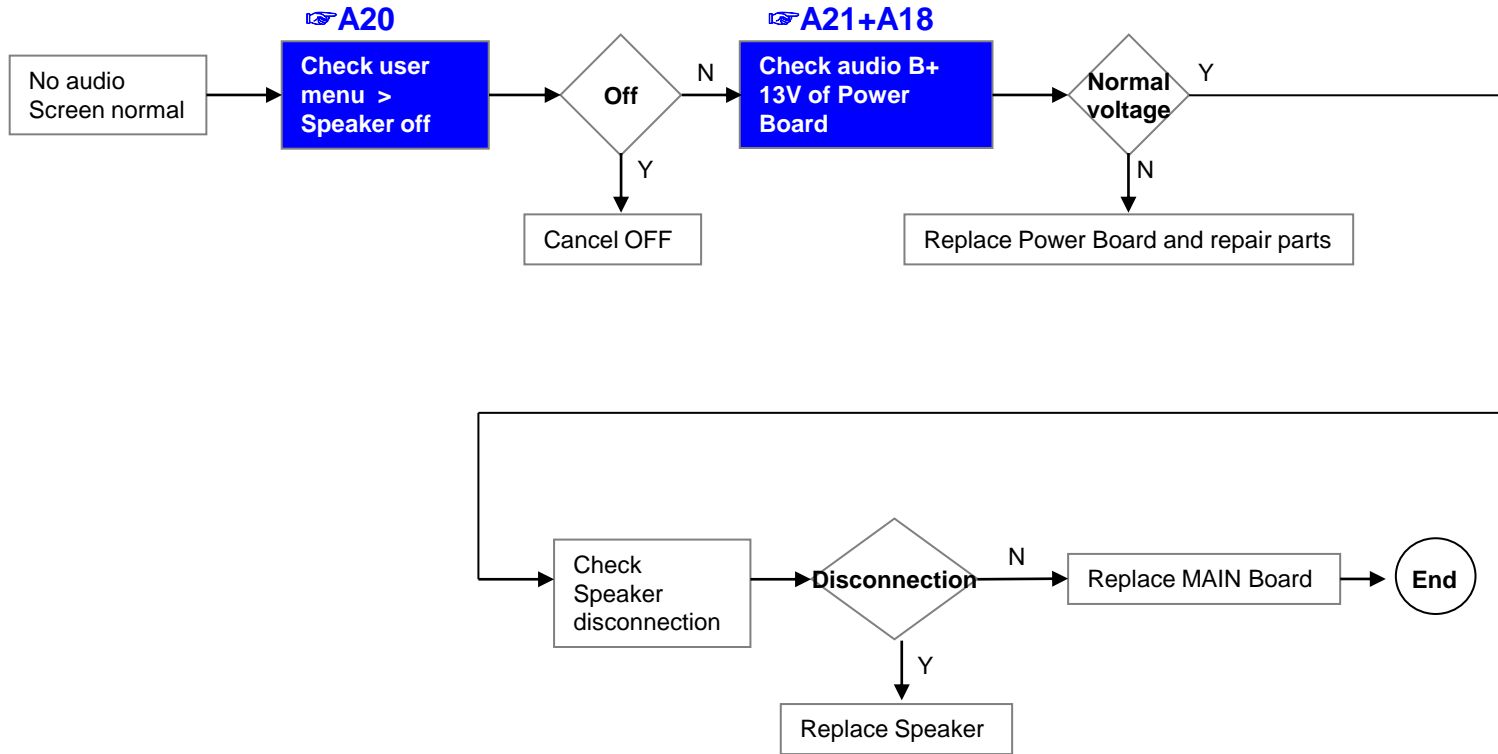
Error symptom	B. Power error	Established date	
	Off when on, off while viewing, power auto on/off	Revised date	7/16



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

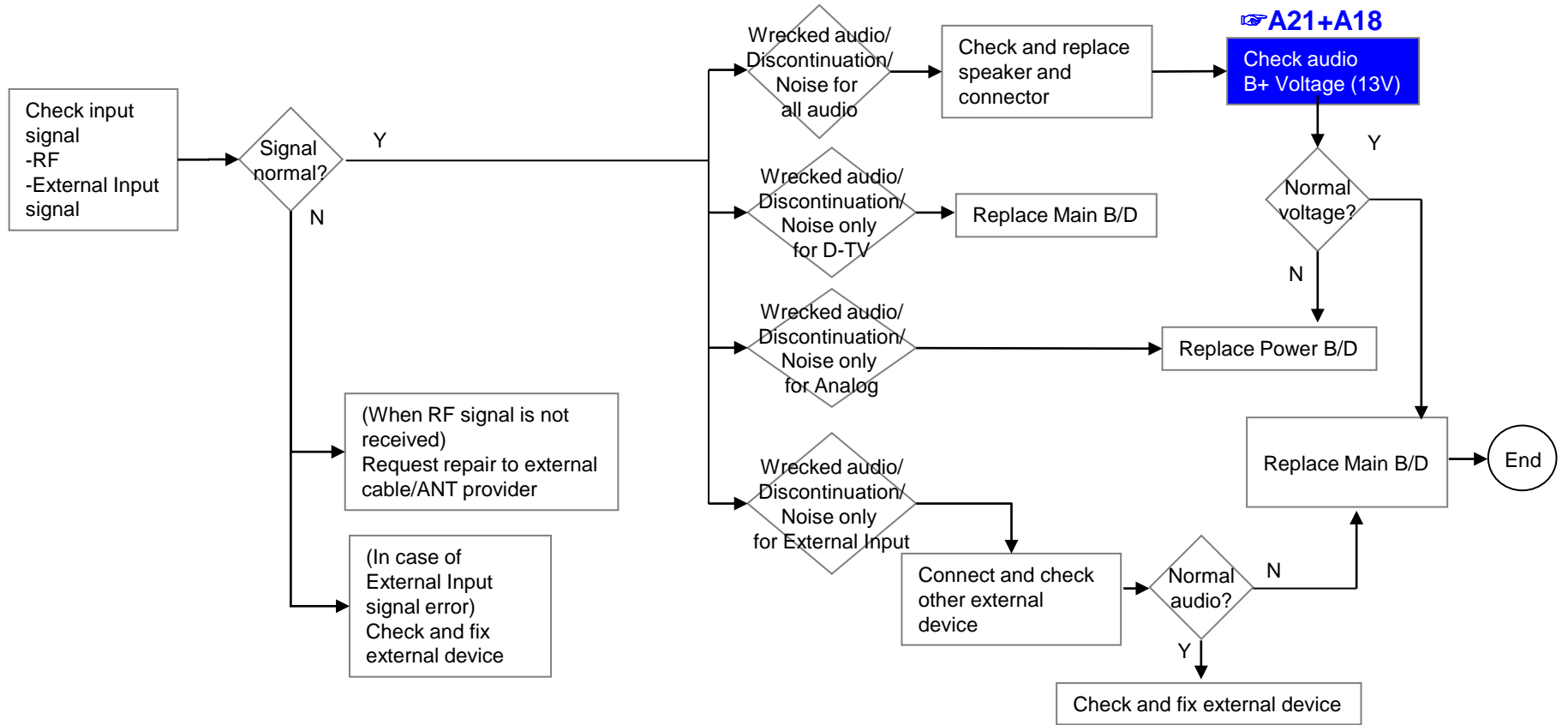
Status	Power off List	Explanation
Normal	"POWEROFF_REMOTEKEY"	Power off by REMOTE CONTROL
	"POWEROFF_OFFTIMER"	Power off by OFF TIMER
	"POWEROFF_SLEEPTIMER"	Power off by SLEEP TIMER
	"POWEROFF_INSTOP"	Power off by INSTOP KEY
	"POWEROFF_AUTOOFF"	Power off by AUTO OFF
	"POWEROFF_ONTIMER"	Power off by ON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

	Error symptom	C. Audio error	Established date	
		No audio/ Normal video	Revised date	8/16



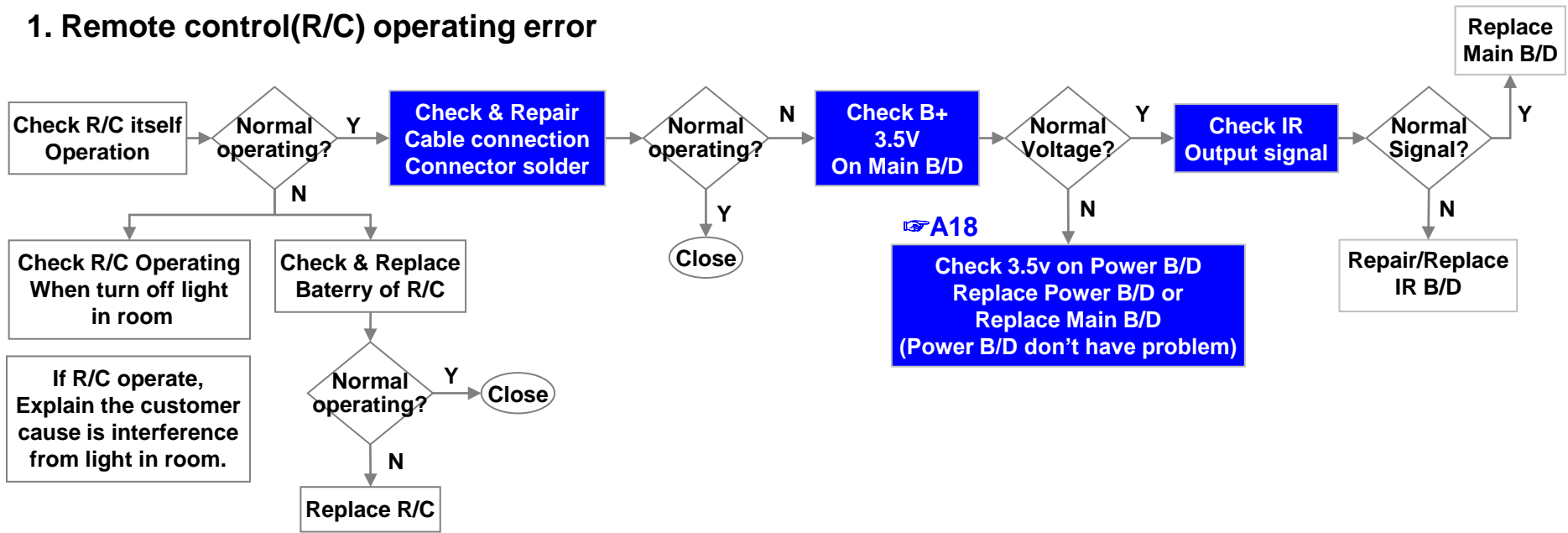
Error symptom	C. Audio error		Established date	
	Wrecked audio/ discontinuation/noise		Revised date	9/16

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



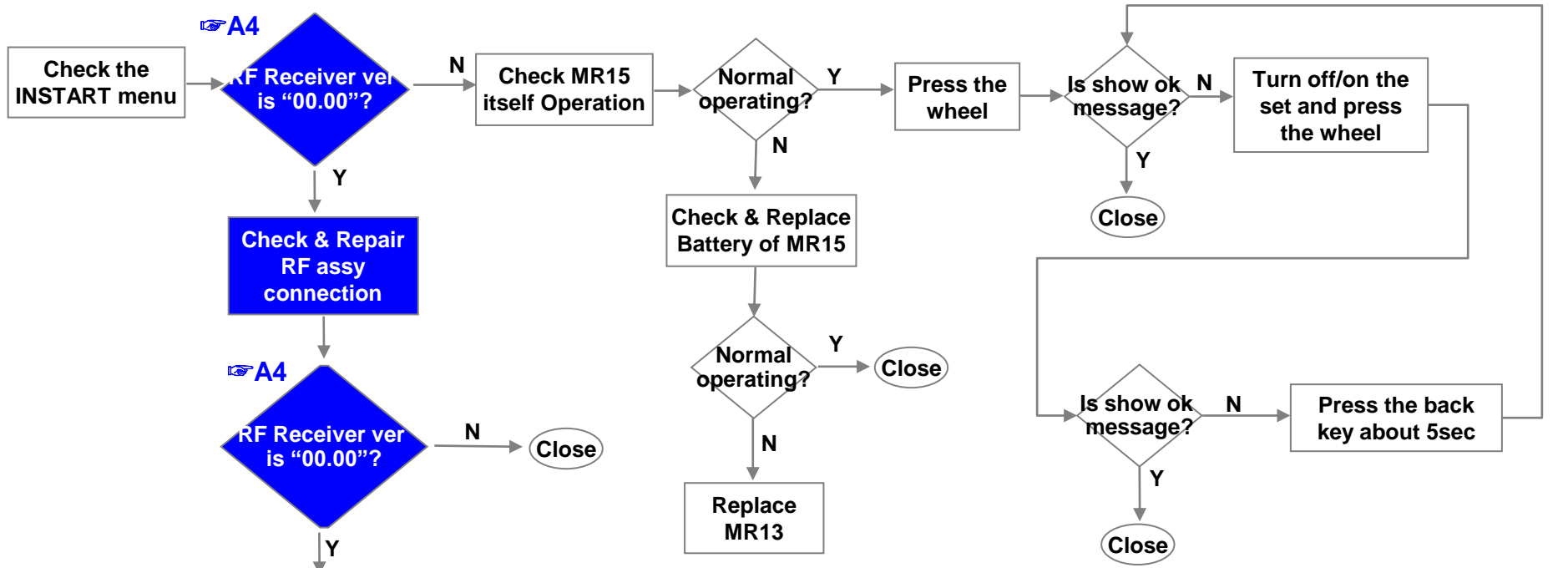
	Error symptom	D. Function error	Established date	
		Remote control & Local switch checking	Revised date	10/16

1. Remote control(R/C) operating error



	Error symptom	D. Function error	Established date	
		MR15R operating checking	Revised date	11/16

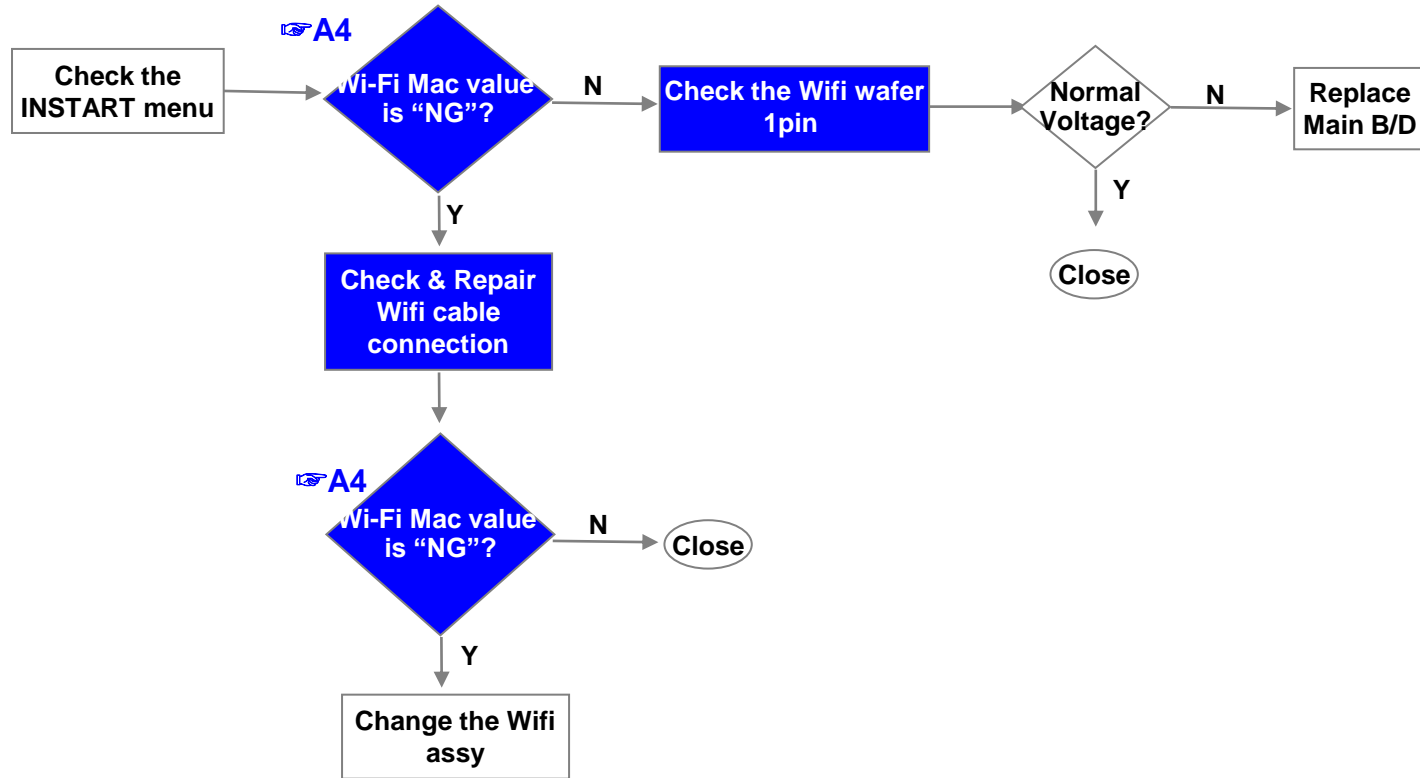
2. MR15R(Magic Remocon) operating error



* If you conduct the loop at 3times, change the M4.

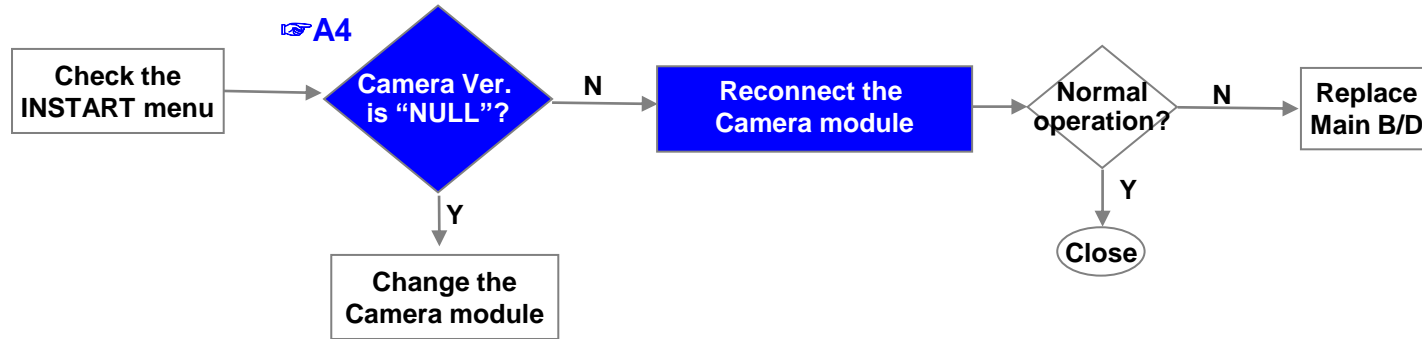
	Error symptom	D. Function error	Established date		
		Wifi operating checking	Revised date		12/16

3.Wifi operating error

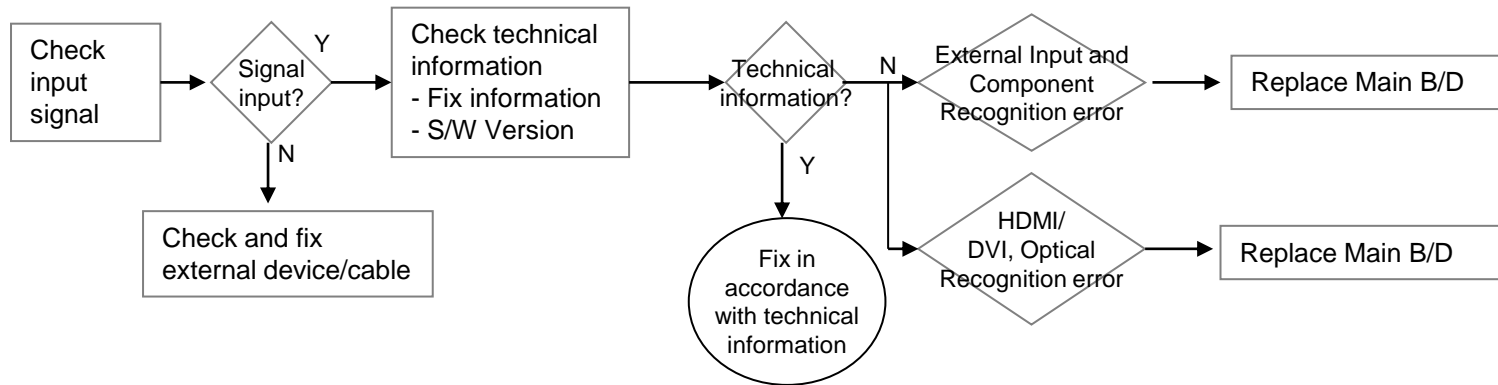


Error symptom	D. Function error	Established date	
	Camera operating checking	Revised date	13/16

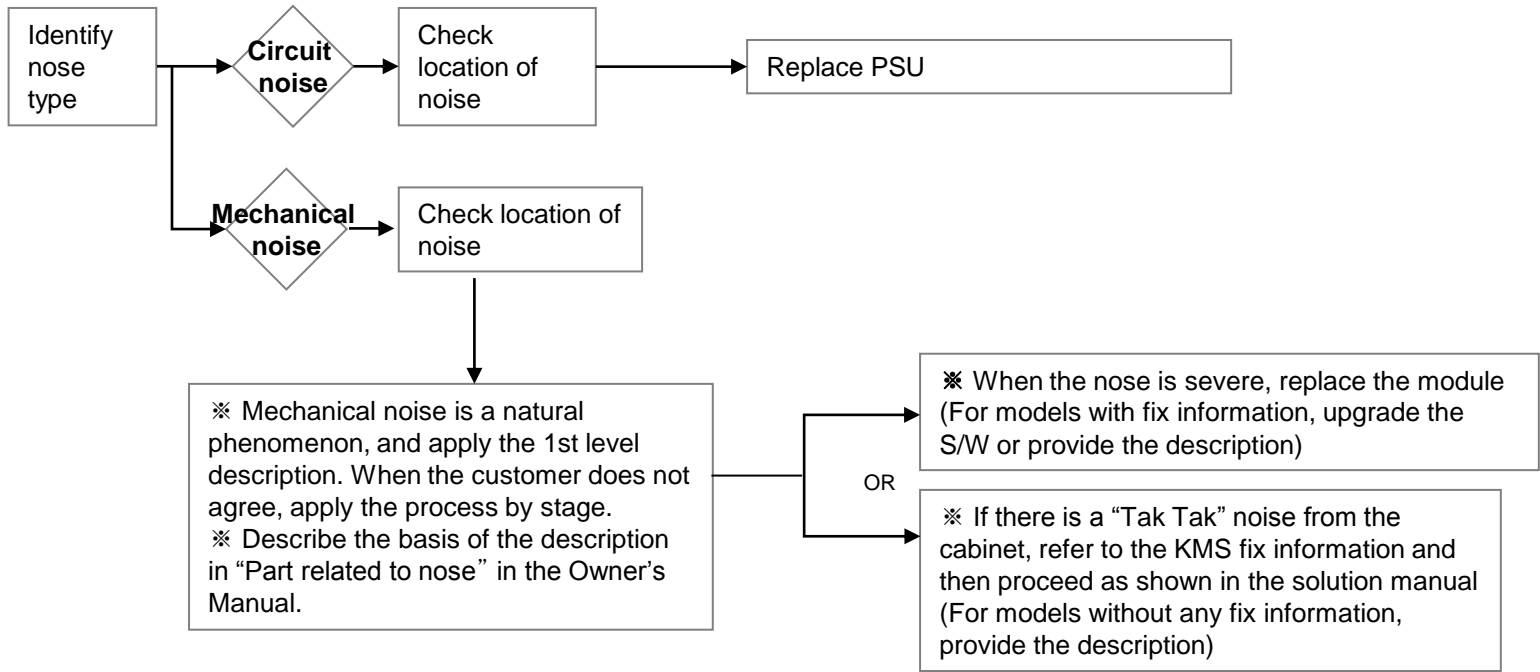
4.Camera operating error



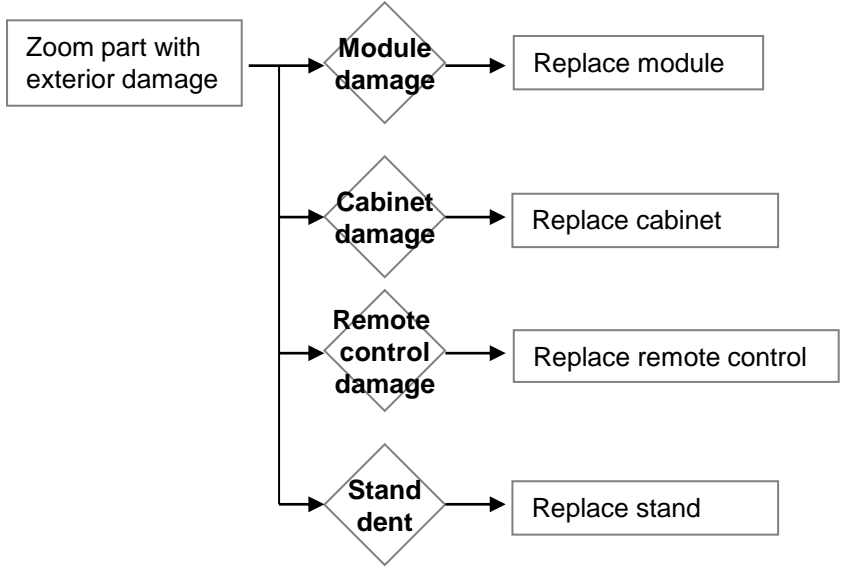
	Error symptom	D. Function error	Established date	
		External device recognition error	Revised date	14/16



	Error symptom	E. Noise	Established date		
		Circuit noise, mechanical noise	Revised date		15/16



	Error symptom	F. Exterior defect	Established date		
		Exterior defect	Revised date		16/16



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

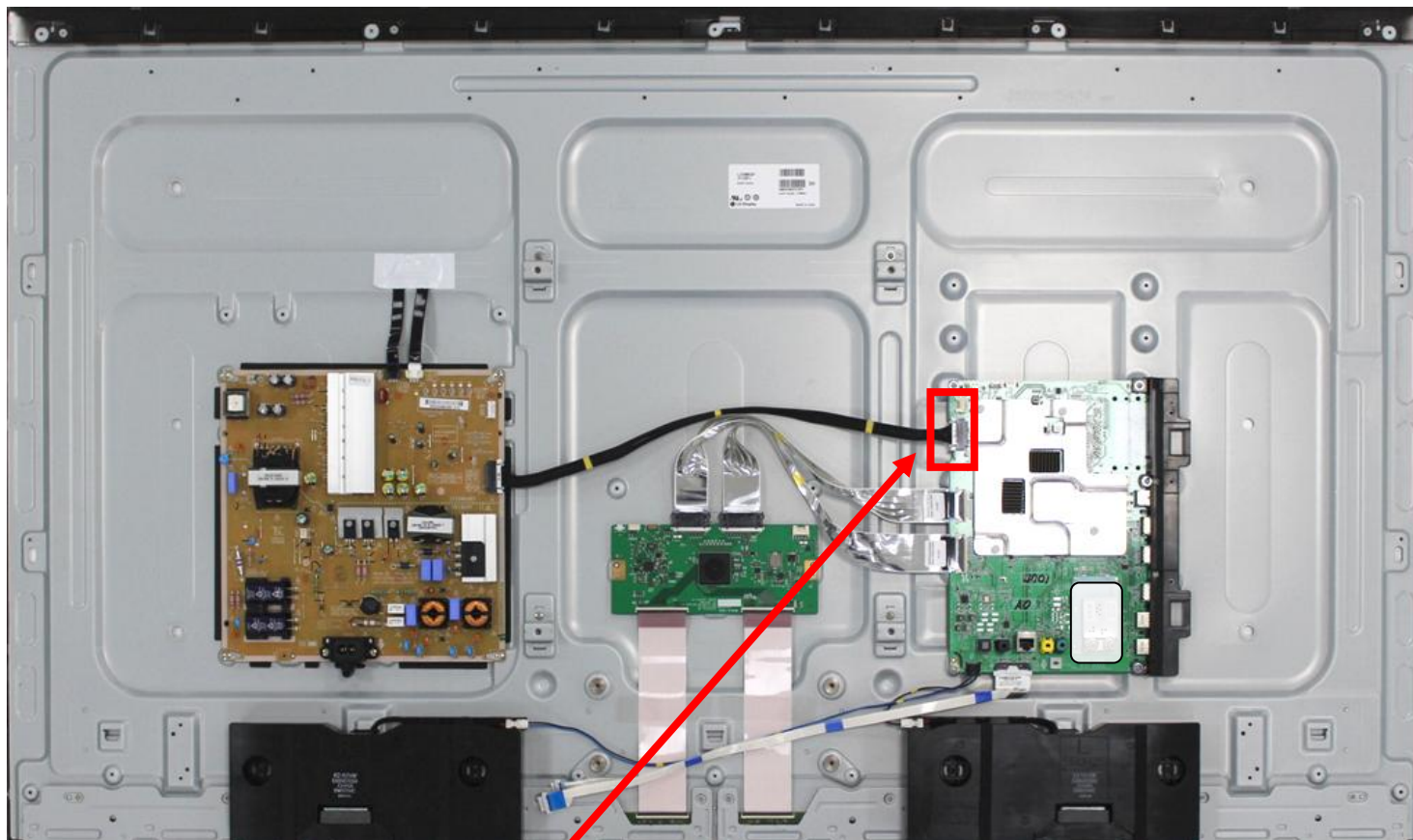
Contents of Standard Repair Process Detail Technical Manual

No.	Error symptom	Content	Page	Remarks
14	B. Power error_ No power	Check front display LED	A17	
15		Check power input Voltage & ST-BY 3.5V	A18	
16	B. Power error_Off when on, off while viewing	POWER OFF MODE checking method	A19	
17	C. Audio error_ No audio/Normal video	Checking method in menu when there is no audio	A20	
18		Voltage and speaker checking method when there is no audio	A21	
19	D. Function error	Remote control operation checking method	A22	
20		Motion Remote operation checking method	A23	
21		Wifi operation checking method	A24	
22		Camera operation checking method	A25	Not Used

Standard Repair Process Detail Technical Manual

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

<xxUH7700-Ux>



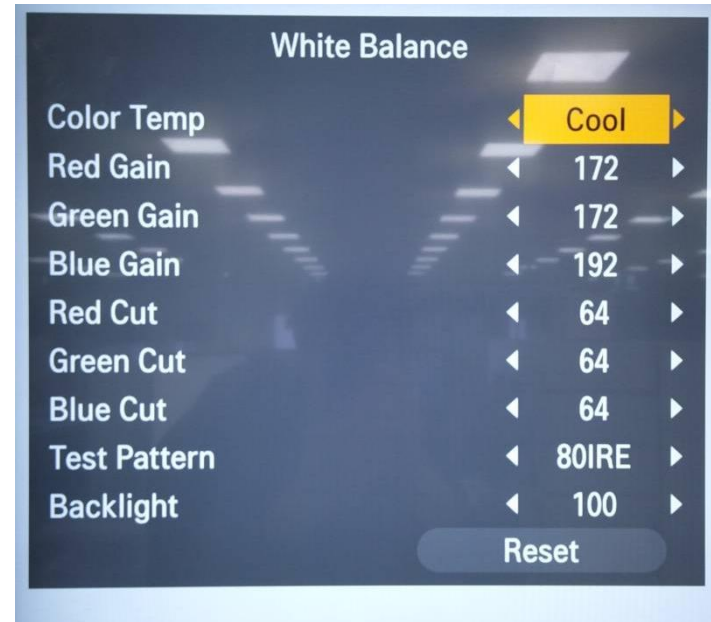
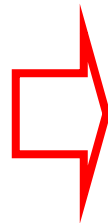
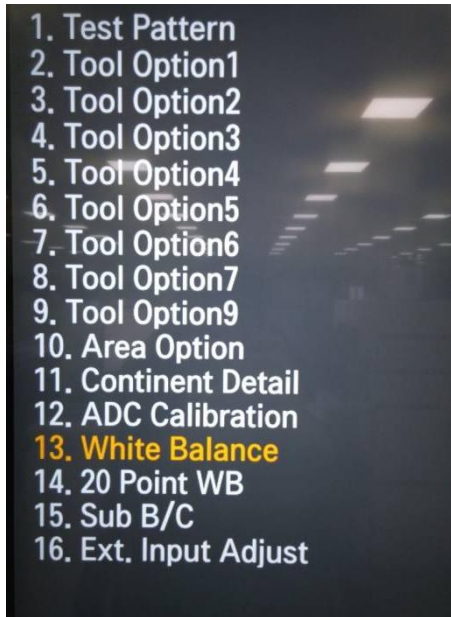
After turning on the power and disassembling the case, check with the naked eye, whether you can see light from locations.

A1

Standard Repair Process Detail Technical Manual

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

<ALL MODELS>



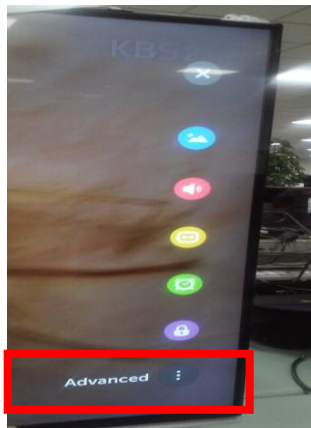
Entry method

1. Press the ADJ button on the remote control for adjustment.
2. Enter into White Balance of item 10.
3. After recording the R, G, B (GAIN, Cut) value of Color Temp (Cool/Medium/Warm), re-enter the value after replacing the MAIN BOARD.

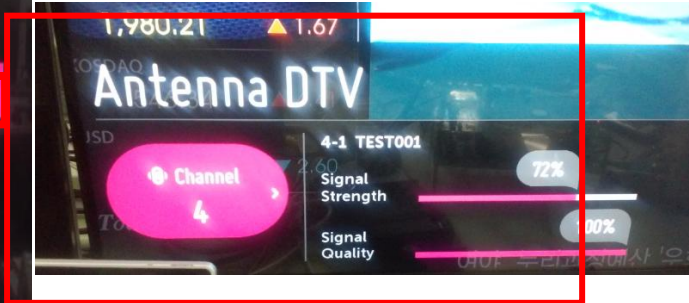
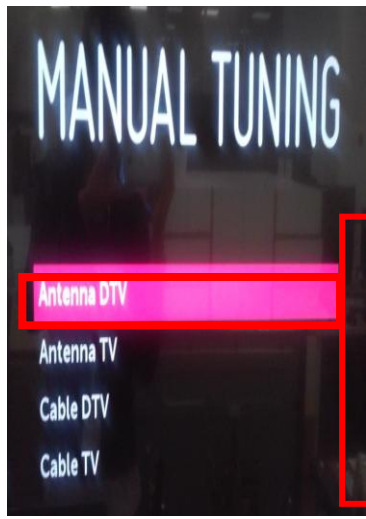
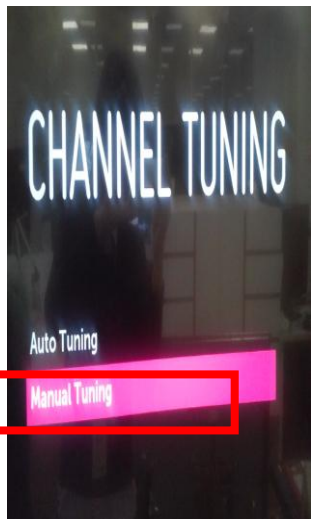
Standard Repair Process Detail Technical Manual

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

<ALL MODELS>



Advanced → Channels → Channel Tuning → Manual Tuning



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



Standard Repair Process Detail Technical Manual

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

<ALL MODELS>

1. Checking method for remote control for adjustment

Version

```

Instart
Model Name : WEBOS3
Serial Number : SKY1107
S/W Version : 02.01.58.01
Micom Version : V3.01.1
Boot Version : 4.02.02/4.02.02
UHD BE Version : OK(40.00.21.00)
Chip Type : LG1312
Wi-Fi Channel : 1
Wi-Fi MAC : v 5C:DC:96:D9:4A:9A
Wi-Fi Speed : USB 2.0
MAC Address : 3C:CD:93:60:4A:9E
IP Address : 0.0.0.0
SFU Key : OK
Widevine : NG
ESN Num. : NG
HDCP1.4 : OK
HDCP2(Miracast/HDMI) : OK/OK
RF Receiver Version v 1.3.4.104
Wi-Fi/Magic Search : OK/OK
Camera Ver. : NULL
Debug Status : EVENT
SIGN Key : DEVELKEY
Eye Check : NG
Control Key : NG
Access USB Status : 1/-1(T)/-1(C)
UTT : 1
App History Version : 158 (deathvalley)
PQL DB : LGD_EDGE_SI2178B_XXXX49
Video : NULL
    
```



Press the IN-START with the remote control for adjustment

Standard Repair Process Detail Technical Manual

Error symptom

A. Video error_Video error, video lag/stop

Established date

Content

TUNER checking part

Revised date

A5

<ALL MODELS>



Checking method:

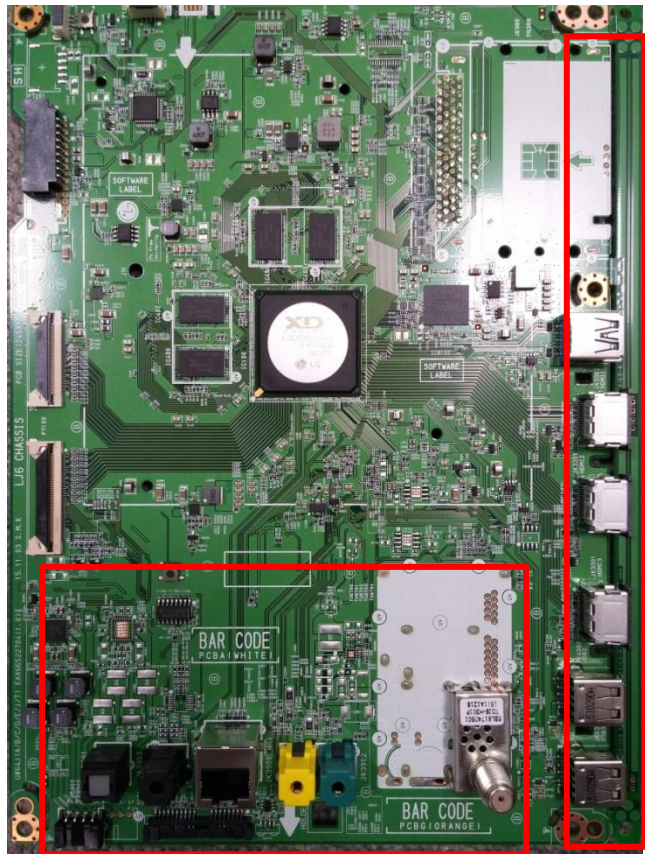
1. Check the signal strength or check whether the screen is normal when the external device is connected.
2. After measuring each voltage from power supply, finally replace the MAIN BOARD.
3. If you can't see the UHD live TV, please connect signal at left side of jack. (Korea model only)

A5

Standard Repair Process Detail Technical Manual

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

<ALL MODELS>

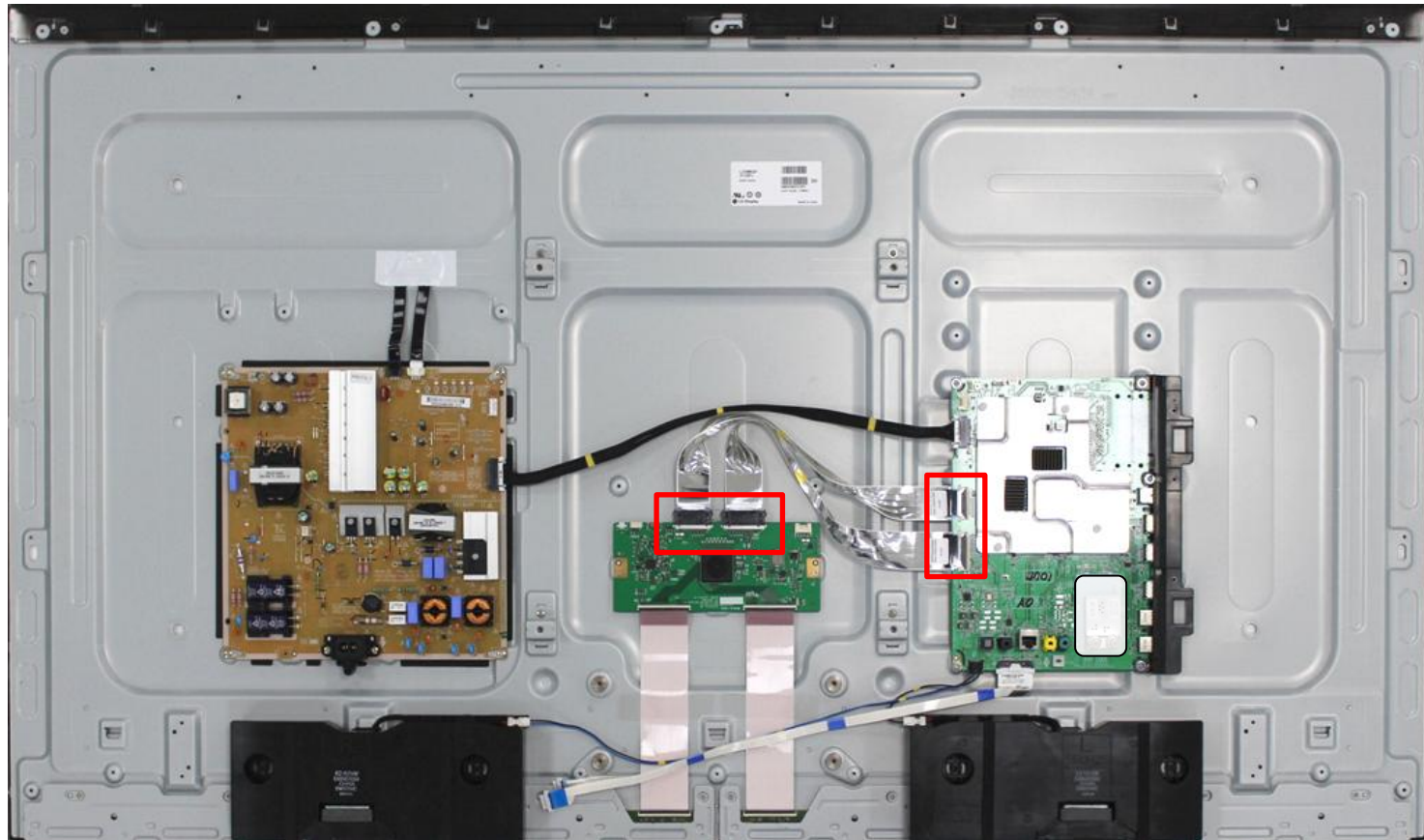


As the part connecting to the external input, check the screen condition by signal

Standard Repair Process Detail Technical Manual

	Error symptom	A. Video error_Color error	Established date		
	Content	Check Link Cable(VX1) reconnection condition	Revised date		A7

<ALL MODELS>



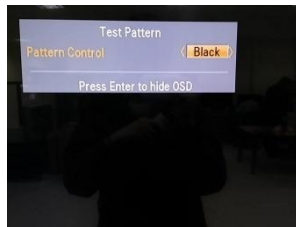
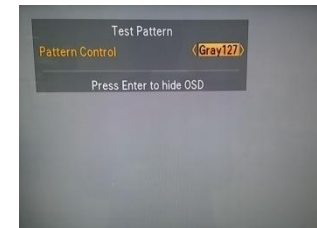
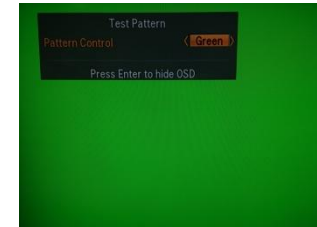
Check the contact condition of the Link Cable, especially dust or mis insertion.

Standard Repair Process Detail Technical Manual

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



1. Test Pattern
2. Tool Option 1
3. Tool Option 2
4. Tool Option 3
5. Tool Option 4
6. Tool Option 5
7. Tool Option 6
8. Tool Option 7
9. Tool Option 9
10. Area Option
11. Continent Detail
12. ADC Calibration
13. White Balance
14. 20 Point WB
15. Sub B/C
16. Ext. Input Adjust



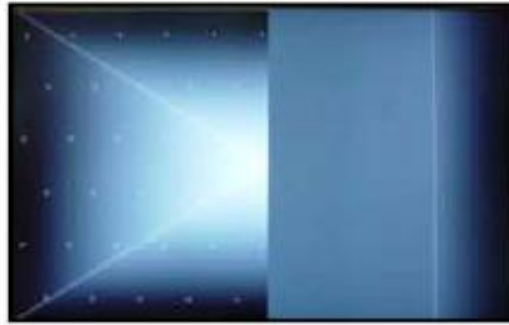
You can view 6 types of patterns using the ADJ Key

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

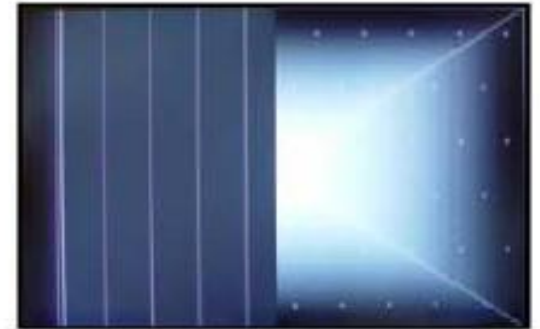
Appendix : Exchange Main Board (1)



Solder defect, CNT Broken



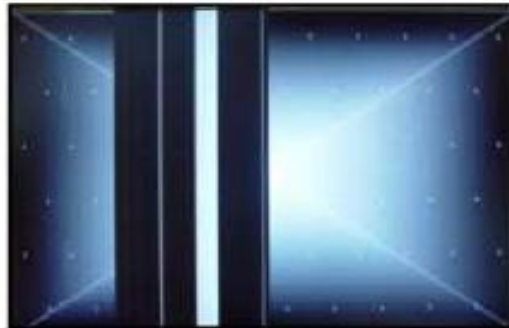
Solder defect, CNT Broken



Solder defect, CNT Broken



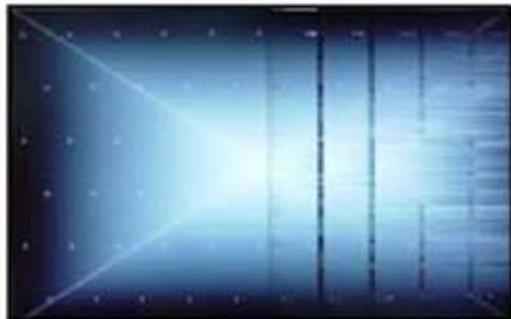
Solder defect, CNT Broken



Solder defect, CNT Broken



Abnormal Power Section



Solder defect, Short/Crack

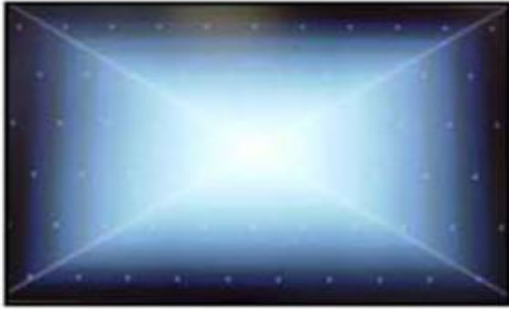


Abnormal Power Section



Solder defect, Short/Crack

Appendix : Exchange Main Board (2)



Abnormal Power Section



Abnormal Power Section



Solder defect, Short/Crack



Solder defect, Short/Crack



Fuse Open, Abnormal power section



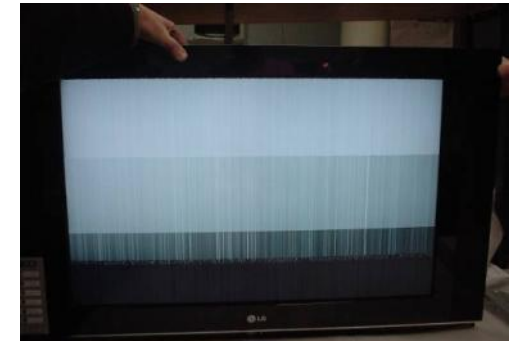
Abnormal Display



GRADATION



Noise



GRADATION

Appendix : Exchange Power Board (PSU)



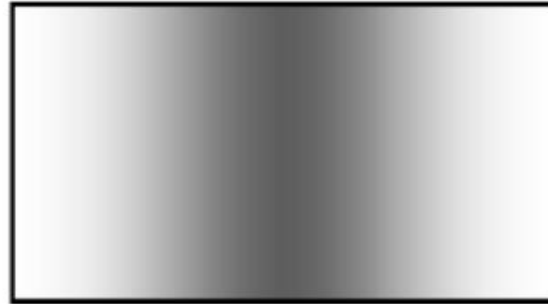
No Light



Dim Light



Dim Light



Dim Light



No picture/Sound Ok

Appendix : Exchange the Module (1)



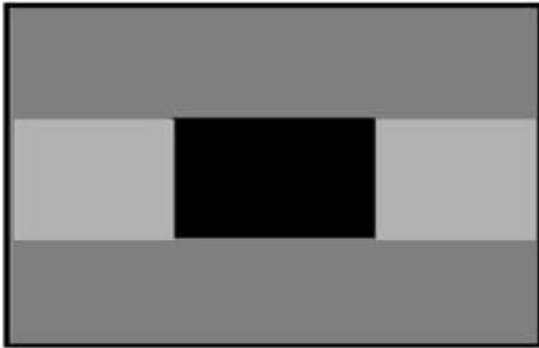
Panel Mura, Light leakage



Panel Mura, Light leakage



Press damage



Crosstalk



Press damage



Crosstalk

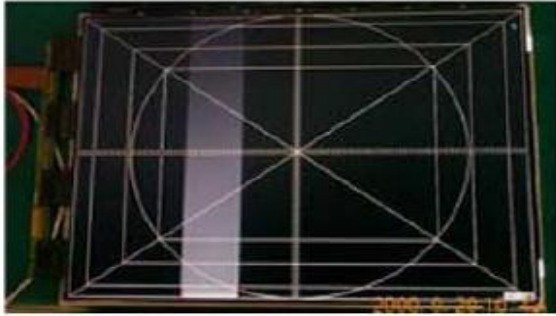


Press damage

Un-repairable Cases

In this case please exchange the module.

Appendix : Exchange the Module (2)



Vertical Block
Source TAB IC Defect



Vertical Line
Source TAB IC Defect



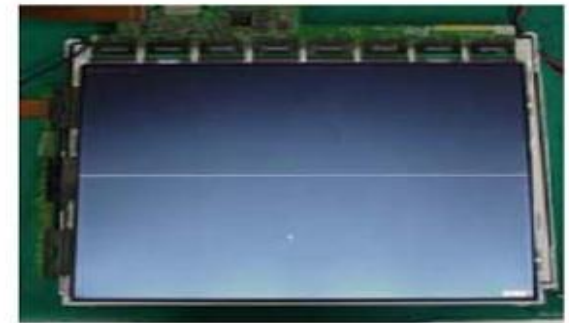
Vertical Block
Source TAB IC Defect



Horizontal Block
Gate TAB IC Defect



Horizontal Block
Gate TAB IC Defect



Horizontal line
Gate TAB IC Defect



Horizontal Block
Gate TAB IC Defect

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

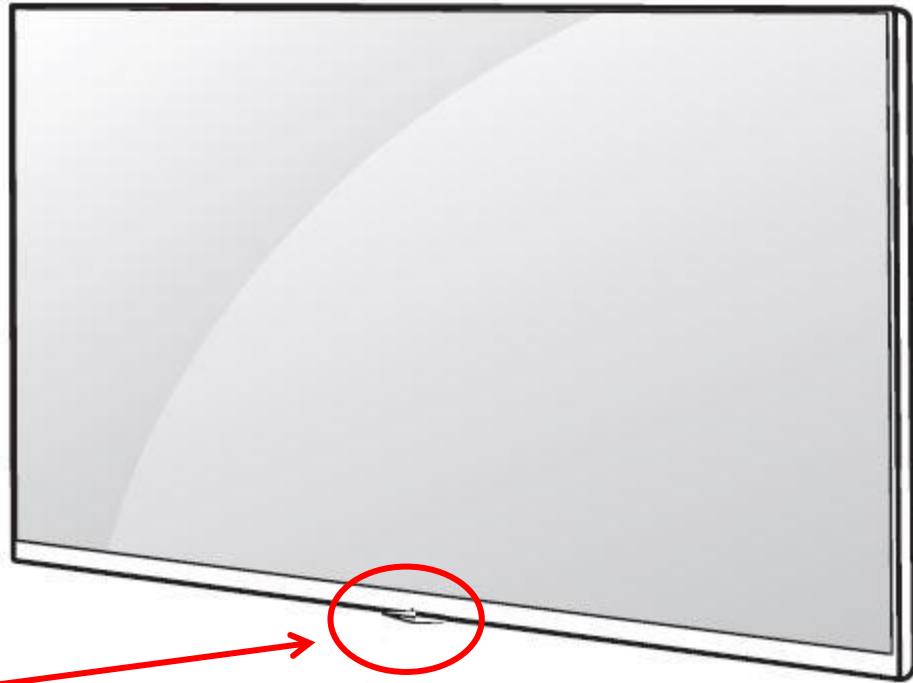
Standard Repair Process Detail Technical Manual

	Error symptom	B. Power error _No power	Established date		
	Content	Check front Power Indicator	Revised date		A17

<xxUH77-Ux>



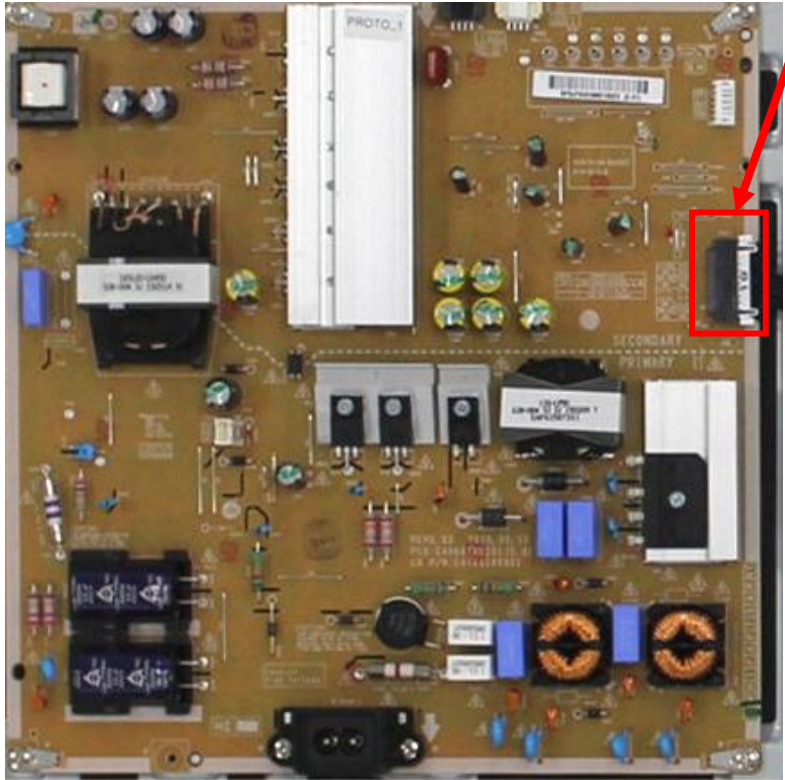
ST-BY condition: On or Off
Power ON condition: Turn Off



Standard Repair Process Detail Technical Manual

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

Check the DC 13.2V.



P201			
Type : SMAW200-H18S5K			
Maker : YEONHO			
Pin No.	Signal	Pin No.	Signal
1	GND	2	GND
3	PWR_ON	4	P-DIM2
5	GND	6	13.2V
7	13.2V	8	13.2V
9	13.2V	10	13.2V
11	GND	12	GND
13	DRV_ON	14	P-DIM
15	GND	16	SCLK
17	V-SYNC	18	SIN

Standard Repair Process Detail Technical Manual

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

<ALL MODELS>

<ol style="list-style-type: none"> 1. Adjust Check 2. ADC Data 3. Power On/Off Status 4. System 1 5. System 2 6. System 3 7. Model Number D/L 8. Test Option 9. Spread Spectrum 10. Stable Count 11. SDP Server Selection 12. RF Remocon Test 13. Access Code 14. Twin TV 	<p style="text-align: center;">Power On/Off Status</p> <ol style="list-style-type: none"> 0. POWER_ON_BY_REMOTE_KEY(0x20) 1. POWER_OFF_BY_AUTO_OFF(0x16) 2. POWER_ON_BY_LAST_POWERON(0x2B) 3. POWER_OFF_BY_ACDET(0x03) 4. POWER_ON_BY_REMOTE_KEY(0x20) 5. POWER_OFF_BY_INSTOP_KEY(0x15) 6. POWER_ON_BY_POWER_ONLY(0x25) 7. POWER_ON_BY_POWER_ONLY(0x25) 8. POWER_ON_BY_POWER_ONLY(0x25) 9. POWER_OFF_BY_POWERONLY(0x61) 10. POWER_ON_BY_REMOTE_KEY(0x20) 11. POWER_OFF_BY_AUTO_OFF(0x16) 12. POWER_ON_BY_LAST_POWERON(0x2B) 13. POWER_OFF_BY_ACDET(0x03) 14. POWER_ON_BY_LAST_POWERON(0x2B) 15. POWER_OFF_BY_ACDET(0x03) 16. POWER_ON_BY_LAST_POWERON(0x2B) 17. POWER_OFF_BY_ACDET(0x03) 18. POWER_ON_BY_LOCAL_KEY(0x22)
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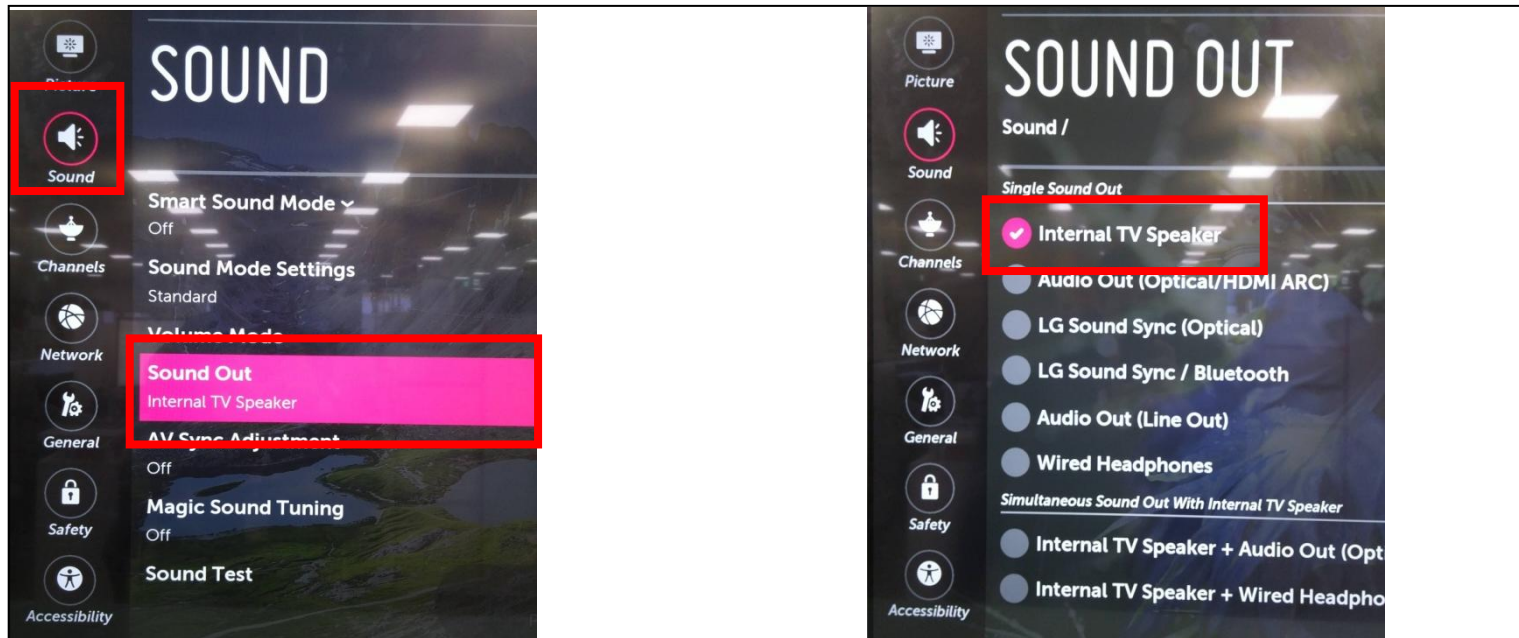
Entry method

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

Standard Repair Process Detail Technical Manual

	Error symptom	C. Audio error_No audio/Normal video	Established date		
	Content	Checking method in menu when there is no audio	Revised date		A20

<ALL MODELS>



Checking method

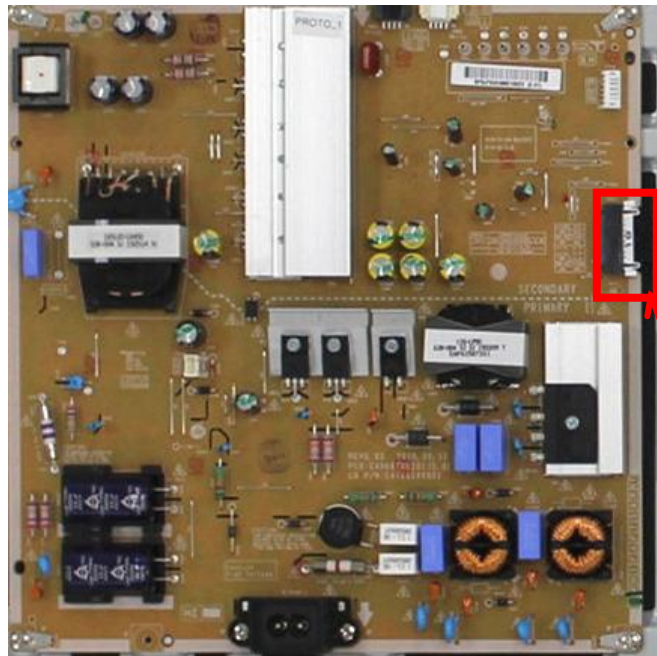
1. Press the Setting button on the remote control
2. Select the Sound function of the Menu
3. Select the Sound Out
4. Select TV Speaker

A20

Standard Repair Process Detail Technical Manual

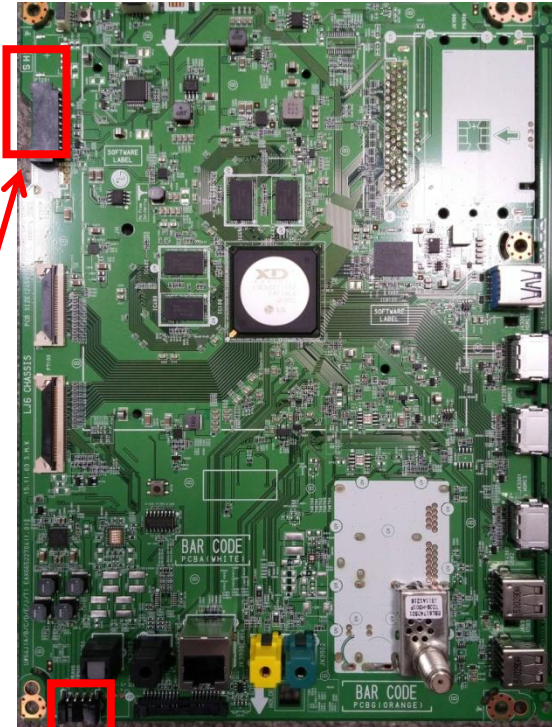
	Error symptom	C. Audio error_No audio/Normal video	Established date	
	Content	Voltage and speaker checking method when there is no audio	Revised date	A21

<xxUH7700-Ux>



②

P201			
Type : SMAW200-H18S5K			
Maker : YEONHO			
Pin No.	Signal	Pin No.	Signal
1	GND	2	GND
3	PWR_ON	4	P-DIM2
5	GND	6	13.2V
7	13.2V	8	13.2V
9	13.2V	10	13.2V
11	GND	12	GND
13	DRV_ON	14	P-DIM
15	GND	16	SCLK
17	V-SYNC	18	SIN



①

③

1	SPK_R-
2	SPK_R+
3	SPK_L-
4	SPK_L+

Checking order when there is no audio

1. Check the contact condition of or 13.2V connector of Main Board

2. Measure the 13.2V 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.

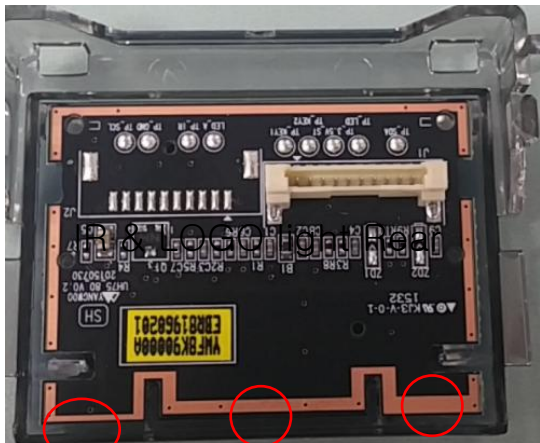
A21

Standard Repair Process Detail Technical Manual

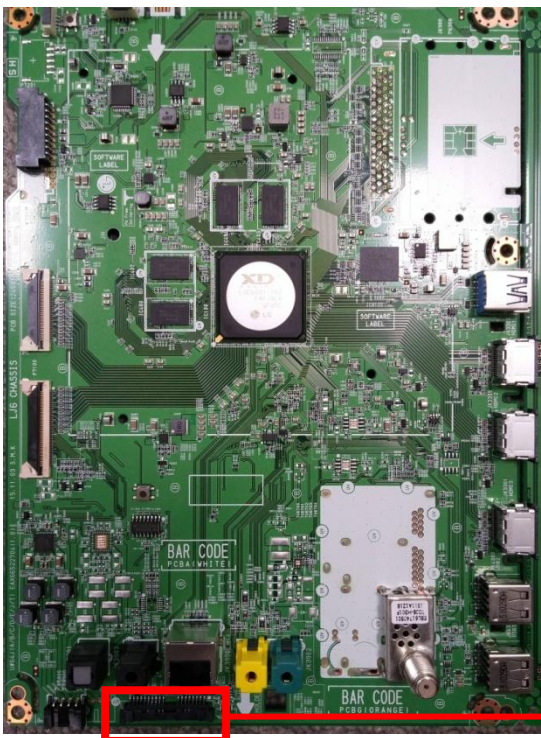
	Error symptom	D. Function error	Established date		
	Content	Remote control operation checking method	Revised date		A22

<xxUH7700-Ux>

①
IR & EYE Sensor



IR LED Eye



②

③

Pin	Pin name
1	VCC
2	USB_DM
3	USB_DP
4	WOL_HOST_WAKE
5	GND
6	BT_RESET
7	GND
8	
9	
10	
11	
12	SDA
13	SCL
14	GND
15	IR
16	LED
17	GND
18	3.5V
19	KEY1
20	KEY2
21	GND

Checking order to check remote control

Checking order

1. Check IR cable condition between IR & Main board. (Check picture number ① and ②)
2. Check the standby 3.5V on the terminal 16 pin (③)
3. AS checking the Pre-Amp(IR LED light) , the power is in ON condition, an Analog Tester needle should move slowly, otherwise, it's defective.

Standard Repair Process Detail Technical Manual

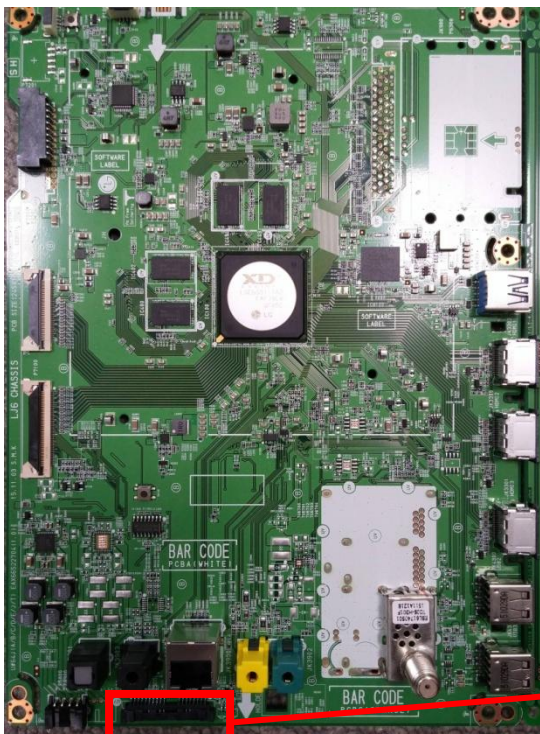
	Error symptom	D. Function error	Established date		
	Content	Remote control operation checking method	Revised date		A22

<xxUH7700-Ux>

① Wifi & BT Front



Wifi & BT Rear



②

③

Pin	Pin name
1	VCC
2	USB_DM
3	USB_DP
4	WOL_HOST_WAKE
5	GND
6	BT_RESET
7	GND
8	
9	
10	
11	
12	SDA
13	SCL
14	GND
15	IR
16	LED
17	GND
18	3.5V
19	KEY1
20	KEY2
21	GND

Checking order to check motion remote/wifi

Checking order

1. Check BT/Wifi cable condition between BT/Wifi assy & Main board.
2. Check the 3.5V on the terminal 16

A23/A24