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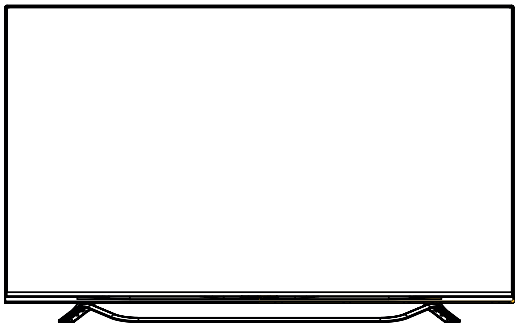
LED TV
SERVICE MANUAL

CHASSIS : LJ53J

MODEL : 49UF7700 49UF7700-SA

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



P/NO : MFL68704607 (1503-REV00)

Printed in Korea

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SAFETY PRECAUTIONS

IMPORTANT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These parts are identified by ⚠ in the Schematic Diagram and 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 it's 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,

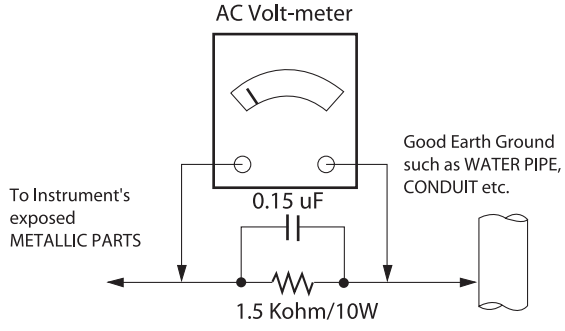
always perform an **AC leakage current check** on the exposed metallic parts of the cabinet, such as antennas, terminals, etc., to be sure the set is safe to operate without damage of electrical shock.

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 MΩ and 5.2 MΩ.
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 is 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 in not required.
5. Do not defeat any plug/socket B+ voltage interlocks with which receivers covered by this service manual might be equipped.
6. Do not apply AC power to this instrument and/or any of its electrical assemblies unless all solid-state device heat sinks are correctly installed.
7. Always connect the test receiver ground lead to the receiver chassis ground before connecting the test receiver positive lead.
   Always remove the test receiver ground lead last.
8. Use with this receiver only the test fixtures specified in this service manual.
   CAUTION: Do not connect the test fixture ground strap to any heat sink in this receiver.

Electrostatically Sensitive (ES) Devices

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

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

General Soldering Guidelines

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

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

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

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

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

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

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

Fuse and Conventional Resistor
Removal/Replacement
1. Clip each fuse or resistor lead at top of the circuit board hollow stake.
2. Securely crimp the leads of replacement component around notch at stake top.
3. Solder the connections.
   CAUTION: Maintain original spacing between the replaced component and adjacent components and the circuit board to prevent excessive component temperatures.

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

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

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

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

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

SPECIFICATION

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

1. Application range

This spec sheet is applied to the LED TV used LJ53H chassis

2. Test condition

Each part is tested as below without special notice.

1) Temperature : 25 ºC ± 5 ºC(77±9ºF), CST : 40 ºC±5 ºC
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 : CE, IEC specification
   - EMC: CE, IEC

4. Model Specification

No	Item	Specification		Remark
1.	Market	Central and South AMERICA		
2.	Broadcasting system	Digital : SBTVD / Analog : NTSC / PAL-M / PAL-N		
3.	Available Channel	BAND	NTSC	
		VHF UHF DTV CATV	2 ~ 13 14 ~ 69 2 ~ 69 1 ~ 135	
4.	Receiving system	Digital : SBTVD / Analog : NTSC / PAL-M / PAL-N		
5.	Input Voltage	AC 100 ~ 240V 50/60Hz		

5. External input format

5.1. 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	15.63	50.00	13.50	SDTV, DVD 576I(625I) 50Hz	PAL-BDGHI

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

No	Resolution	H-freq(kHz)	V-freq.(kHz)	Pixel clock	Proposed
1.	720*480i	15.73	59.94	13.50	SDTV, DVD 480I(525I)
2.	720*480i	15.73	60.00	13.51	SDTV, DVD 480I(525I)
3.	720*576i	15.63	50.00	13.50	SDTV, DVD 576I(625I) 50Hz
4.	720*480p	31.47	59.94	27.00	SDTV 480P
5.	720*480p	31.50	60.00	27.03	SDTV 480P
6.	720*576p	31.25	50.00	27.00	SDTV 576P 50Hz
7.	1280*720	44.96	59.94	74.18	HDTV 720P
8.	1280*720	45.00	60.00	74.25	HDTV 720P
9.	1280*720	45.00	50.00	74.25	HDTV 720P 50Hz
10.	1920*1080	28.13	50.00	74.25	HDTV 1080I 50Hz,
11.	1920*1080	33.72	59.94	74.18	HDTV 1080I
12.	1920*1080	33.75	60.00	74.25	HDTV 1080I
13.	1920*1080	56.25	50.00	148.50	HDTV 1080P
14.	1920*1080	67.50	60.00	148.50	HDTV 1080P

5.3. 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)-LM15U Only
28	3840*2160	135.00	59.94	593.41	UDTV 2160P	UHDonly(Port1,2)-LM15U Only
29	3840*2160	135.00	60.00	594.00	UDTV 2160P	UHDonly(Port1,2)-LM15U Only
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)-LM15U Only
36	4096*2160	135.00	59.94	593.41	UDTV 2160P	UHDonly(Port1,2)-LM15U Only
37	4096*2160	135.00	60.00	594.00	UDTV 2160P	UHDonly(Port1,2)-LM15U Only

5.4. 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

6. 3D mode(3D MODEL Only)

6.1. RF Input (3D supported mode manually)

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

6.2. HDMI Input

6.2.1. RF Input (3D supported mode automatically)

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
		28.13	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	53.95	23.98	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	594.00	HDTV 2160P	2D to 3D, Top & Bottom(half), Side by Side(half) (8 bit, YCbCr 4:2:0)
		135.00	60.00	594.00		

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

No	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock (MHz)	VIC	3D input proposed mode	Proposed
1	640*480	31.47 / 31.50	59.94/ 60.00	25.13/25.20	1	Top-and-Bottom Side-by-side(half)	Secondary(SDTV 480P) Secondary(SDTV 480P)
		31.47 / 31.50	59.94/ 60.00	50.35/50.40	1	Side-by-side(Full)	(SDTV 480P)
		62.94 / 63.00	59.94/ 60.00	50.35/50.40	1	Frame packing Line alternative	Secondary(SDTV 480P) (SDTV 480P)
2	720*480	31.47 / 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)
		31.47 / 31.50	59.94 / 60.00	54.00/54.06	2,3	Side-by-side(Full)	(SDTV 480P)
		62.94 /63.00	59.94 / 60.00	54.00/54.06	2,3	Frame packing Line alternative	Secondary(SDTV 480P) (SDTV 480P)
3	720*576	31.25	50.00	27.00	17,18	Top-and-Bottom Side-by-side(half)	Secondary(SDTV 576P) Secondary(SDTV 576P)
		31.25	50.00	54.00	17,18	Side-by-side(Full)	(SDTV 576P)
		62.50	50.00	54.00	17,18	Frame packing Line alternative	Secondary(SDTV 576P) (SDTV 576P)
4	720*576	15.63	50.00	27.00	21	Frame packing Side-by-side(Full) Top-and-Bottom Side-by-side(half)	Secondary(SDTV 576I) (SDTV 576I (SDTV 576I Secondary(SDTV 576I) Secondary(SDTV 576I)
5	1280*720	37.50	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	28.13	50.00	74.25	20	Top-and-Bottom Side-by-side(half)	Secondary(HDTV 1080I) Primary(HDTV 1080I)
		28.13	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	Primary(HDTV 1080I) (HDTV 1080I)
		67.43/67.50	59.94 / 60.00	148.35/148.50	5	Frame packing	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)

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

No	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	3D input proposed mode	Proposed
1	1024*768	48.36	60.00	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

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

No	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	3D input proposed mode	Proposed
1	1280*720	37.50	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

6.2.5. 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

6.2.6. USB, DLNA -Photo (3D) (3D supported mode manually)

No	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	3D input proposed mode
1	Under 320x240	-	-	-	2D to 3D
2	Over 320x240	-	-	-	2D to 3D, Side by Side(Half), Top & Bottom

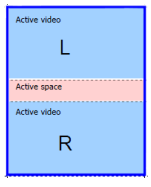
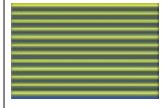
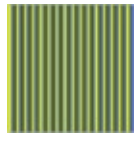
6.2.7. USB, DLNA (3D) (3D supported mode automatically)

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	

6.2.8. 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

**Remark: 3D Input mode

No.	Side by Side	Top & Bottom	Checker-board	Single Frame Sequential	Frame Pack-ing	Line Interleaving	Column Interleaving	2D to 3D
1								

ADJUSTMENT INSTRUCTION

1. Application Range

This spec. sheet applies to LJ53H/J 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 ±5ºC 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 15ºC

- 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)

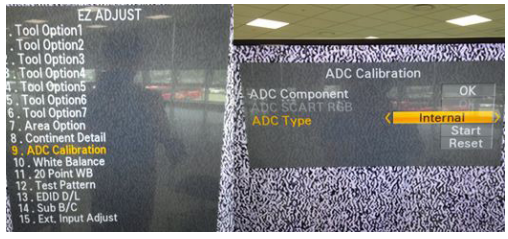
3.3. Etc.

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

4. Automatic Adjustment

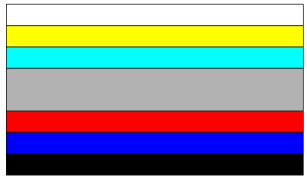
4.1. ADC Adjustment

1) Enter the ADC Calibration in ADJ Menu
2) Check the 'Internal' at ADC Type and push Start button.
3) Check ' OK '



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

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) 00000000000000000000000007c007b-006dx (Sub) 00000007000000000000000007c0083 0077x
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

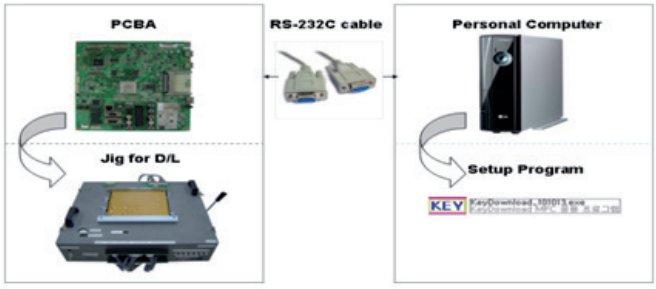
1) Key Write: Com 1,2,3,4 and 115200 (Baudrate)
2) Barcode: Com 1,2,3,4 and 9600 (Baudrate)

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

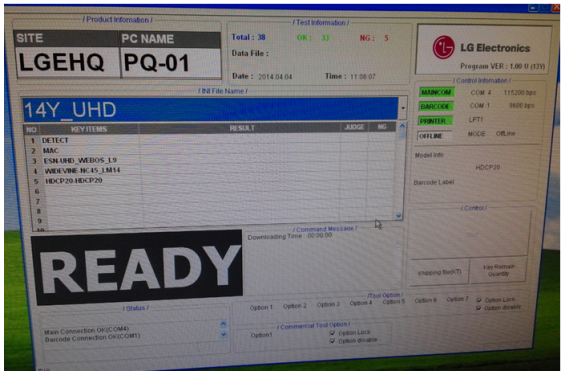
4.2.4. Communication Port connection

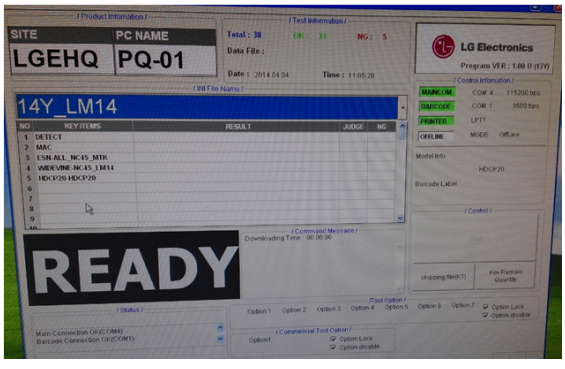
1)) Connect: PCBA Jig -> RS-232C Port == PC -> RS-232C Port



4.2.5. Download

1) TW/CO Models (15Y LCD TV + MAC + Widevine + ESN + HDCP2.0)

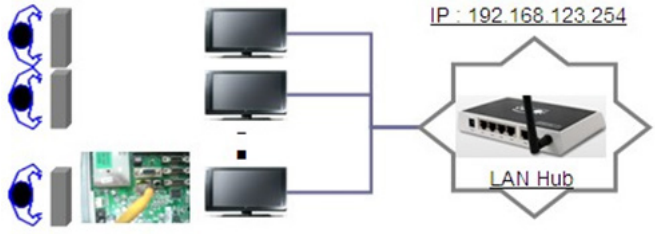




4.3. LAN Inspection

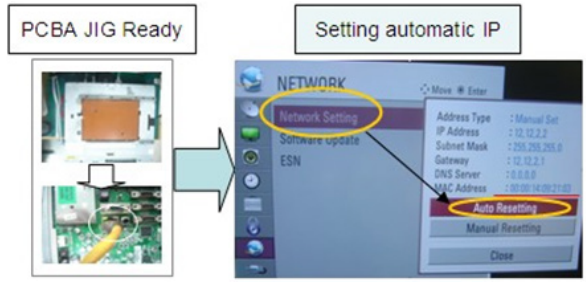
4.3.1. Equipment & Condition

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



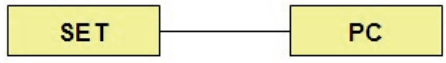
4.3.2. LAN inspection solution

▪ 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)

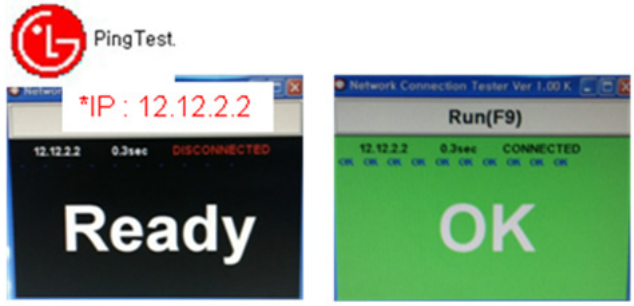
Connect: SET-> LAN Port == PC-> LAN Port



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.

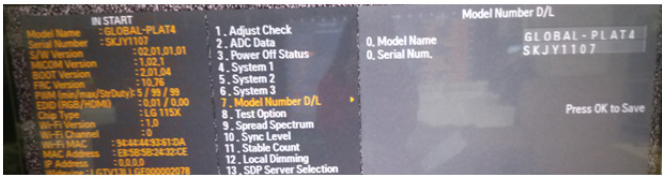
■ **Method & Notice**

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.



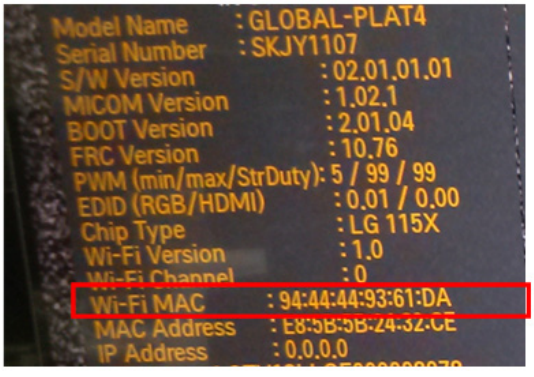
d. Check the model name INSTART menu -> Factory name displayed
e. Check the Diagnostics (DTV country only) -> Buyer model displayed

4.5. WIFI MAC ADDRESS CHECK

4.5.1. Using RS232 Command

	Command	Set ACK
Transmission	[A][I][][Set ID][][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

1) 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.

5.2.4. EDID DATA

▪ Reference
- HDMI1 ~ HDMI3
- HDMI1 ~ HDMI4
- In the data of EDID, bellows may be different by Input mode

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0x00	00	FF	FF	FF	FF	FF	FF	00	1E	6D	ⓐ		ⓑ			
0x01	ⓒ			01	03	80	A0	5A	78	0A	EE	91	A3	54	4C	99	26
0x02	0F	50	54	A1	8	00	31	40	45	40	61	40	71	40	81	80
0x03	01	01	01	01	01	01	02	3A	80	18	71	38	2D	40	58	2C
0x04	45	00	40	84	63	00	00	1E	66	21	50	B0	51	00	1B	30
0x05	40	70	36	00	40	84	63	00	00	1E	00	00	00	FD	00	3A
0x06	3E	1E	53	10	00	0A	20	20	20	20	20	20	ⓓ			
0x07	ⓓ														01	ⓔ1
0x00	02	03	3A	F1	4E	10	9F	04	13	05	14	03	02	12	20	21
0x01	22	15	01	29	3D	06	C0	15	07	50	ⓕ					
0x02	ⓕ															
0x03	ⓕ			10	28	10	E3	05	03	01	02	3A	80	18	71	38
0x04	2D	40	58	2C	45	00	40	84	63	00	00	1E	01	1D	80	18
0x05	71	1C	16	20	58	2C	25	00	40	84	63	00	00	9E	01	1D
0x06	00	72	51	D0	1E	20	6E	28	55	00	40	84	63	00	00	1E
0x07	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	ⓔ2

ⓐ Product ID
ⓑ Serial No: Controlled on production line.
ⓒ Month, Year: Controlled on production line:
ex) Monthly : '01' -> '01'
Year : '2015' -> '19
ⓓ Model Name(Hex): LGTV
ⓔ Checksum(LG TV): Changeable by total EDID data.
ⓕ Vendor Specific(HDMI)

5.2.4.1. EDID for 3D Model olny

HDMI 1(C/S : E6 F4) – 3G
EDID Block 0, Bytes 0-127 [00H-7FH]

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01	01
10	01	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

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

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	02	03	46	F1	54	10	9F	04	13	05	14	03	02	12	20	21
10	22	15	01	5D	5E	5F	62	63	64	29	3D	06	C0	15	07	50
20	09	57	07	7C	03	0C	00	10	00	B8	3C	20	C0	8E	01	02
30	03	04	01	4F	3F	FC	08	10	18	10	06	10	16	10	28	10
40	E5	0E	60	61	65	66	01	1D	80	18	71	1C	16	20	58	2C
50	25	00	40	84	63	00	00	9E	01	1D	00	72	51	D0	1E	20
60	6E	28	55	00	40	84	63	00	00	1E	00	00	00	00	00	00
70	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	F4

HDMI 1(C/S : A0 9E) – 6G
EDID Block 0, Bytes 0-127 [00H-7FH]

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01	01
10	01	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	00	00	00	FC
70	00	4C	47	20	54	56	0A	20	20	20	20	20	20	20	01	A0

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

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	02	03	55	F1	58	10	9F	04	13	05	14	03	02	12	20	21
10	22	15	01	60	61	5D	5E	5F	65	66	62	63	64	29	3D	06
20	C0	15	07	50	09	57	07	7C	03	0C	00	10	00	B8	3C	20
30	C0	8E	01	02	03	04	01	4F	3F	FC	08	10	18	10	06	10
40	16	10	28	10	67	D8	5D	C4	01	78	80	03	E3	05	C0	00
50	E4	0F	00	C0	18	66	21	50	B0	51	00	1B	30	40	70	36
60	00	40	84	63	00	00	1E	01	1D	00	72	51	D0	1E	20	6E
70	28	55	00	40	84	63	00	00	1E	00	00	00	00	00	00	9E

HDMI 2(C/S : E6 E4) -3G
EDID Block 0, Bytes 0-127 [00H-7FH]

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01	01
10	01	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

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

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	02	03	46	F1	54	10	9F	04	13	05	14	03	02	12	20	21
10	22	15	01	5D	5E	5F	62	63	64	29	3D	06	C0	15	07	50
20	09	57	07	7C	03	0C	00	20	00	B8	3C	20	C0	8E	01	02
30	03	04	01	4F	3F	FC	08	10	18	10	06	10	16	10	28	10
40	E5	0E	60	61	65	66	01	1D	80	18	71	1C	16	20	58	2C
50	25	00	40	84	63	00	00	9E	01	1D	00	72	51	D0	1E	20
60	6E	28	55	00	40	84	63	00	00	1E	00	00	00	00	00	00
70	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	E4

HDMI 2(C/S : A0 8E) – 6G

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

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01	01
10	01	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	00	00	00	FC
70	00	4C	47	20	54	56	0A	20	20	20	20	20	20	20	01	A0

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

HDMI 3(C/S : E6 D4) -3G/6G

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	02	03	55	F1	58	10	9F	04	13	05	14	03	02	12	20	21
10	22	15	01	60	61	5D	5E	5F	65	66	62	63	64	29	3D	06
20	C0	15	07	50	09	57	07	7C	03	0C	00	20	00	B8	3C	20
30	C0	8E	01	02	03	04	01	4F	3F	FC	08	10	18	10	06	10
40	16	10	28	10	67	D8	5D	C4	01	78	80	03	E3	05	C0	00
50	E4	0F	00	C0	18	66	21	50	B0	51	00	1B	30	40	70	36
60	00	40	84	63	00	00	1E	01	1D	00	72	51	D0	1E	20	6E
70	28	55	00	40	84	63	00	00	1E	00	00	00	00	00	00	8E

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

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01	01
10	01	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

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

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	02	03	46	F1	54	10	9F	04	13	05	14	03	02	12	20	21
10	22	15	01	5D	5E	5F	62	63	64	29	3D	06	C0	15	07	50
20	09	57	07	7C	03	0C	00	30	00	B8	3C	20	C0	8E	01	02
30	03	04	01	4F	3F	FC	08	10	18	10	06	10	16	10	28	10
40	E5	0E	60	61	65	66	01	1D	80	18	71	1C	16	20	58	2C
50	25	00	40	84	63	00	00	9E	01	1D	00	72	51	D0	1E	20
60	6E	28	55	00	40	84	63	00	00	1E	00	00	00	00	00	00
70	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	D4

* Checksum(HDMI 1/2/3)

Input	FFh (Checksum) 3G		FFh (Checksum) 6G(HDMI Deep Color)	
HDMI1	E6	F4	A0	9E
HDMI2	E6	E4	A0	8E
HDMI3	E6	D4	E6	D4

5.2.4.2. EDID for Non 3D Model (UF77,UF69,UF68)

HDMI 1(C/S : E6 1D) – 3G

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

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01	01
10	01	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	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

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

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	02	03	38	F1	54	10	9F	04	13	05	14	03	02	12	20	21
10	22	15	01	5D	5E	5F	62	63	64	29	3D	06	C0	15	07	50
20	09	57	07	6E	03	0C	00	10	00	B8	3C	20	00	80	01	02
30	03	04	E5	0E	60	61	65	66	01	1D	80	18	71	1C	16	20
40	58	2C	25	00	40	84	63	00	00	9E	01	1D	00	72	51	D0
50	1E	20	6E	28	55	00	40	84	63	00	00	1E	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	1D

HDMI 1(C/S : A0 C7) – 6G

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

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01	01
10	01	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	00	00	00	FC
70	00	4C	47	20	54	56	0A	20	20	20	20	20	20	20	01	A0

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

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	02	03	47	F1	58	10	9F	04	13	05	14	03	02	12	20	21
10	22	15	01	60	61	5D	5E	5F	65	66	62	63	64	29	3D	06
20	C0	15	07	50	09	57	07	6E	03	0C	00	10	00	B8	3C	20
30	00	80	01	02	03	04	67	D8	5D	C4	01	78	80	03	E3	05
40	C0	00	E4	0F	00	C0	18	66	21	50	B0	51	00	1B	30	40
50	70	36	00	40	84	63	00	00	1E	01	1D	00	72	51	D0	1E
60	20	6E	28	55	00	40	84	63	00	00	1E	00	00	00	00	00
70	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	C7

HDMI 2(C/S : E6 0D) -3G/6G

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

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01	01
10	01	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

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

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	02	03	38	F1	54	10	9F	04	13	05	14	03	02	12	20	21
10	22	15	01	5D	5E	5F	62	63	64	29	3D	06	C0	15	07	50
20	09	57	07	6E	03	0C	00	20	00	B8	3C	20	00	80	01	02
30	03	04	E5	0E	60	61	65	66	01	1D	80	18	71	1C	16	20
40	58	2C	25	00	40	84	63	00	00	9E	01	1D	00	72	51	D0
50	1E	20	6E	28	55	00	40	84	63	00	00	1E	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	0D

HDMI 3(C/S : E6 0D) -3G/6G
EDID Block 0, Bytes 0-127 [00H-7FH]

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01	01
10	01	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

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

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01	01
10	01	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

* Checksum(HDMI 1/2/3)

Input	FFh (Checksum) 3G		FFh (Checksum) 6G(HDMI Deep Color)	
HDMI1	E6	1D	A0	C7
HDMI2	E6	0D	E6	0D
HDMI3	E6	FD	E6	FD

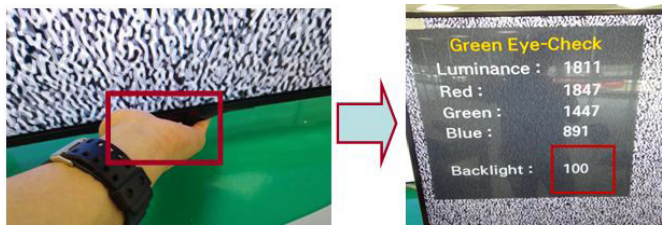
5.3. Green Eye Inspection Guide

Step 1. Turn on the TV set.

Step 2. Press “EYE” button on the Adjustment remote controller.

Step 3. Block the Intelligent Sensor module on the front C/A about 6 seconds. When the “Sensor Data” is lower than 20, you can see the “OK” message

=> If it doesn’t show “OK” message, the Sensor Module is defected one. You have to replace that with a good one.

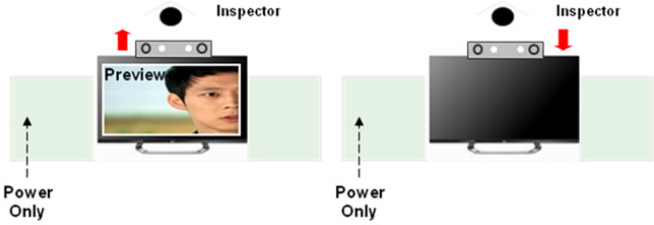


Step 4. After check the “OK” message come out, take out your hand from the Sensor module.

=> Check “Backlight” value change from “0” to “100” or not. If it doesn’t change the value, the sensor is also defected one. You have to replace it.

5.4. Camera Function Inspection (TBD)

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.
   i) Push Camera Up
   ii) Camera's Preview picture appears on TV Set
   iii) 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.

5.5. V-COM Adjust

(*) ONLY FOR GP2 2010year model. GP3 LW Series [2011year] spec out !

5.6. Adjustment White balance

5.6.1. Overview

▪ 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.

[Test condition]
Temperature : 20 ± 5ºC
Heat run mode : Vivid
Measurement mode : Adjust > White Balance mode
Measurement Point : center
Measurement Device : CA-210 / CA-310
Heat run time : continue 24 hours(for new-born module)
2 hours(for module UTT is over 24 hrs)

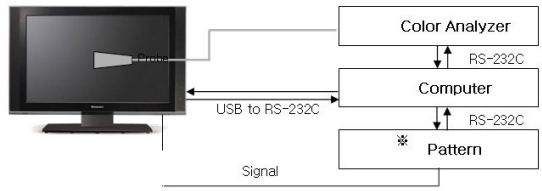
[Spec]
- Color coordinate x, y ± 0.015 (after 24 hours aging)
- Color coordinate x ± 0.020, y ± 0.030 (within 24 hours aging)

5.6.2. 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/216-Gray (Model:217, Pattern:78)
-> Only when internal pattern is not available

※ Color Analyzer Matrix should be calibrated using CS-1000

5.6.3. Equipment connection MAP



※If TV internal pattern is used, not needed

5.6.4. 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 : LJ53H Chassis ALL MODELS)

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

5.6.5. Adjustment method

5.6.5.1. 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

5.6.5.2. 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
- PDP : Color Analyzer (CA-100, CA-100+, CA210) probe should be firmly attached to the Module
- LCD : Color Analyzer (CA-210) probe should be within 10cm and perpendicular of the module surface (90+/-2.5°)
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.

5.6.6. 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	△uv
	X	Y		
Cool	0.271	0.270	13000K	0.0000
Medium	0.286	0.289	9300K	0.0000
Warm	0.313	0.329	6500K	0.0000

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

Mode	Coordinate		Temp	△uv
	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

5.6.7. EDGE & IOL LED White balance table(TBD)

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

(Normal line) Edge & ALEF LED White balance table
-gumi & Global
Model : (normal line) - UF85,UF77,UF69, UF68, UF64

webOS	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

(*) AUO, INX, Sharp, CSOT, BOE(Cool 1300K)

webOS	Cool		Medium		Warm	
	x	y	x	y	x	y
	271	270	285	293	313	329
Target	278	280	293	299	320	339

Model : 79UF95, UG87 only(LJ53V)

webOS	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	271	270	286	289	313	329

*) AUO, INX, Sharp, CSOT, BOE(Cool 1300K)

webOS	Cool		Medium		Warm	
	x	y	x	y	x	y
	271	270	285	293	313	329
Target	278	280	293	299	320	339

5.7. Local Dimming Function Check

Step 1) Turn on TV

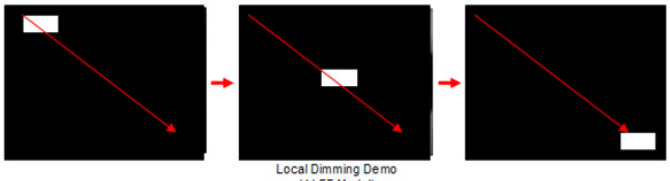
Step 2) At the Local Dimming mode, module Edge Backlight moving right to left
Back light of IOP module moving

Step 3) confirm the Local Dimming mode

Step 4) Press “exit” Key

Local Dimming Demo
(For Horizontal Edge Model)

Local Dimming Demo
(Edge LED Model)



Local Dimming Demo
(ALEF Model)

5.8. Magic Motion Remocon test

5.8.1. Automatically Test Using Golden remocon(for line inspection)

1) Place the Golden remocon in the line inspection step.
2) check instart menu “ Wi-Fi/Magic Search : OK/OK “

5.8.2. Manually 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

5.9. 3D function test (3D model Olny)

(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)

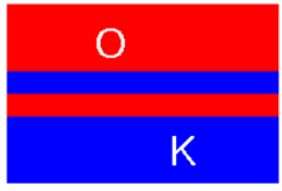


Fig.1
<HDMI Mode 872번, Pattern No. 83>

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
<3D Mode 진입 후 화면>
* 안경을 착용하지 않은 상태임.

5.10. Option selection per country

5.10.1. Overview

▪ Option selection is only done for models in AJ/JA/IL

5.10.2. Method

1) Press ADJ key on the Adj. R/C, then select Country Group Meun

2) Depending on destination, select Country Group Code or Country Group then on the lower Country option, select US, CA, MX. Selection is done using +, - or ►◄ KEY

5.11. HDMI ARC Function Inspection

5.11.1. Test equipment

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

5.11.2. Test method

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

2) Check the sound from the TV Set

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

5.12. 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

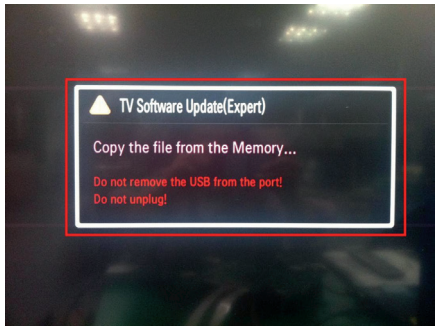
No	Item	Min	Typ	Max	Unit	Remark
1	Audio practical max Output, L/R (Distortion=10% max Output)		10.0 8.10	12.0 10.8	W Vrms	EQ Off AVL Off Clear Voice Off
2	Speaker (8Ω Impedance)		10	12	W	EQ On AVL On Clear Voice On

*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)

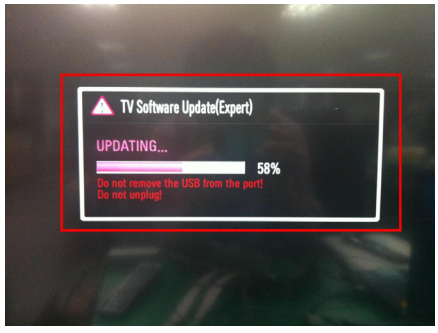
8. USB S/W Download (optional, Service only)

(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 staring



(5) Updating Completed, The TV will restart automatically

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

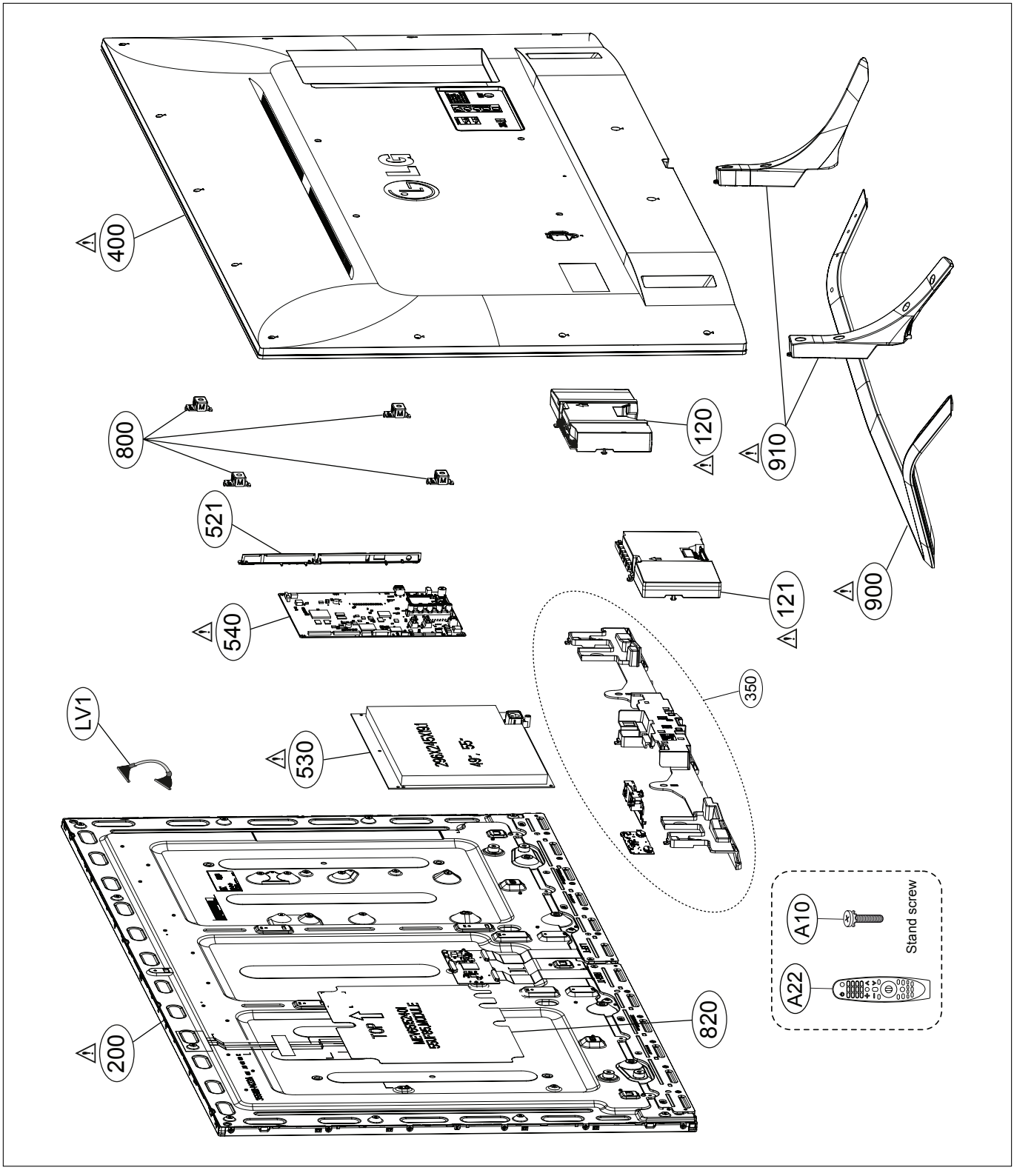
* If downloading version is more high than your TV have, TV can lost all channel data. In this case, you have to channel recover. If all channel data is cleared, you didn't have a DTV/ATV test on production line.

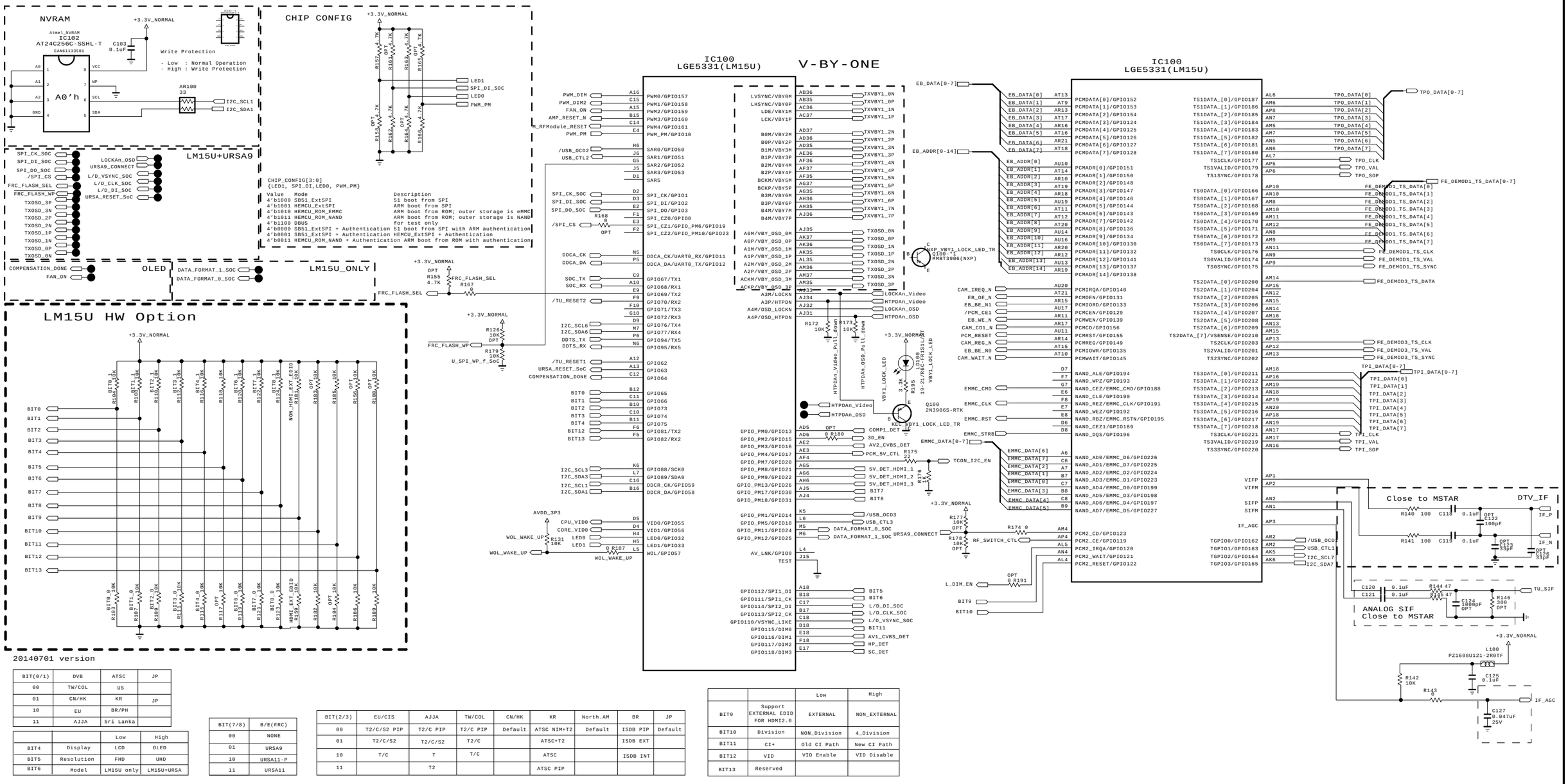
* After downloading, TOOL OPTION setting is needed again.
(1) Push "IN-START" key in service remote controller.
(2) Select "Tool Option 1" and Push "OK" button.
(3) Punch in the number. (Each model has their number.)

EXPLODED VIEW

IMPORTANT SAFETY NOTICE

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





BIT(0/1)	DVB	ATSC	JP
00	TW/COL	US	
01	CN/HK	KR	JP
10	EU	BR/PH	
11	AJJA	Sri Lanka	

		Low	High
BIT4	Display	LCD	OLED
BIT5	Resolution	FHD	UHD
BIT6	Model	LM15U only	LM15U+URSA

BIT(7/8)	B/E(FRC)
00	NONE
01	URSA9
10	URSA11-P
11	URSA11

BIT(2/3)	EU/CIS	AJJA	TW/COL	CN/HK	KR	North.AM	BR	JP
00	T2/C/S2 PIP	T2/C PIP	T2/C PIP	Default	ATSC NIM+T2	Default	ISDB PIP	Default
01	T2/C/S2	T2/C/S2	T2/C		ATSC+T2		ISDB EXT	
10	T/C	T	T/C		ATSC		ISDB INT	
11		T2			ATSC PIP			

		Low	High
BIT9	Support EXTERNAL EDID FOR HDMI2.0	EXTERNAL	NON_EXTERNAL
BIT10	Division	NON_Division	4_Division
BIT11	CI+	Old CI Path	New CI Path
BIT12	VID	VID Enable	VID Disable
BIT13	Reserved		

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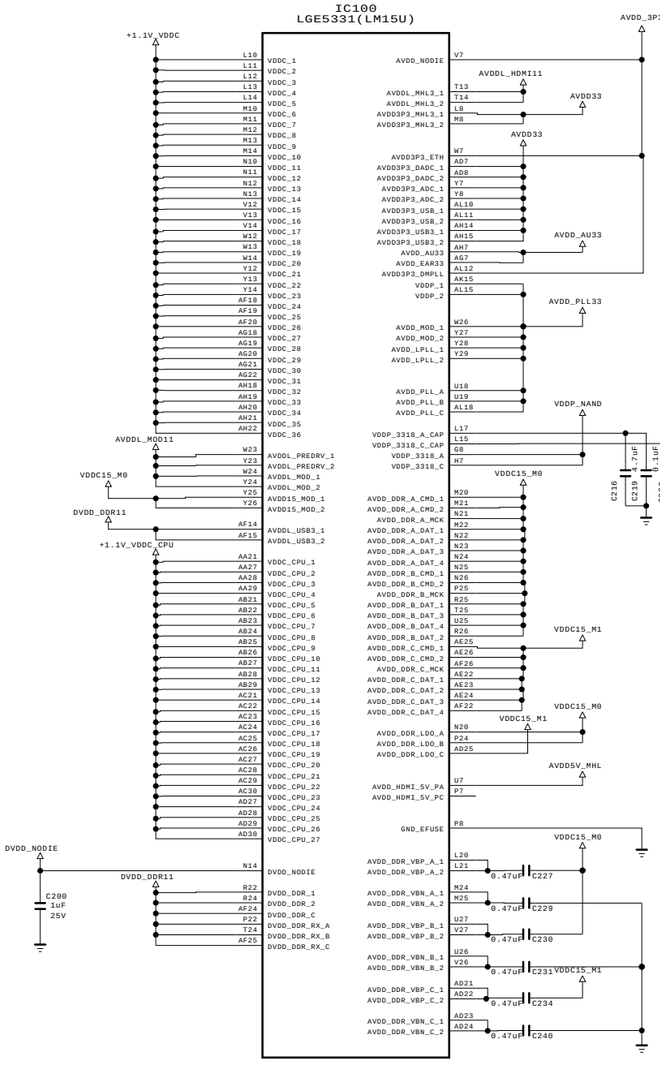
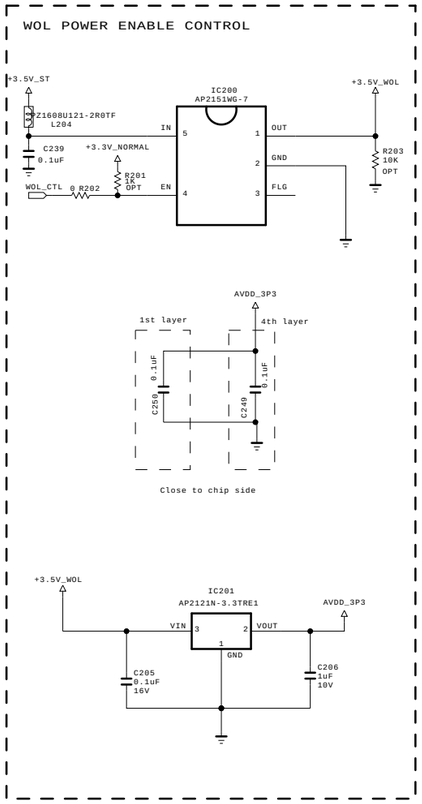
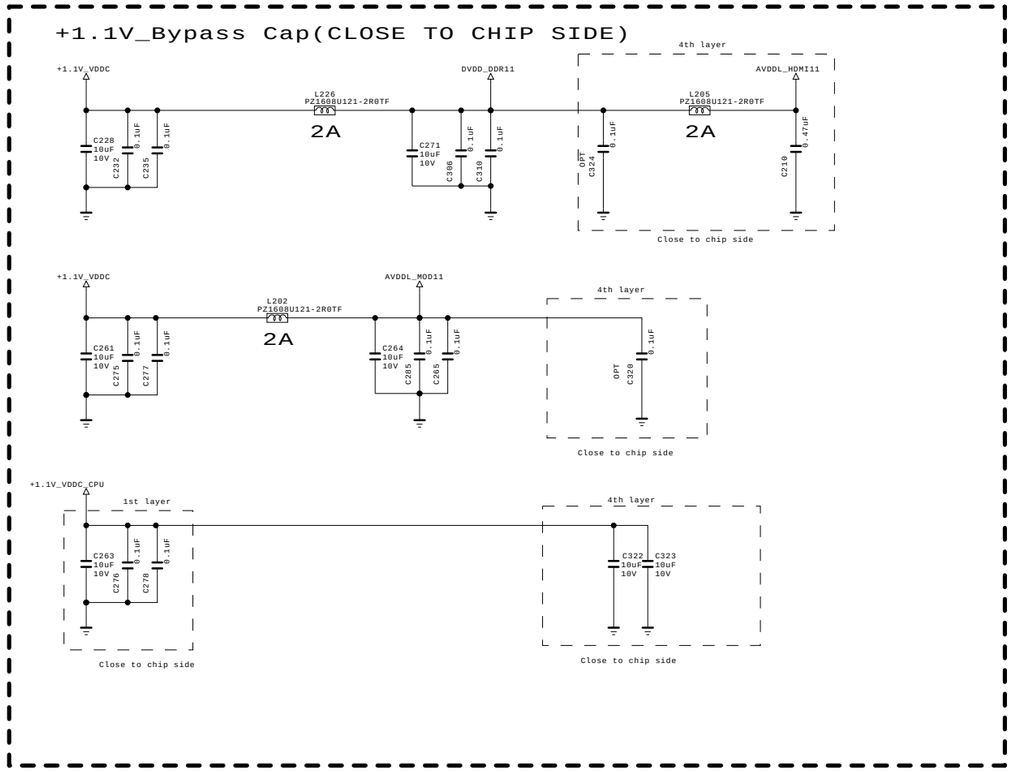
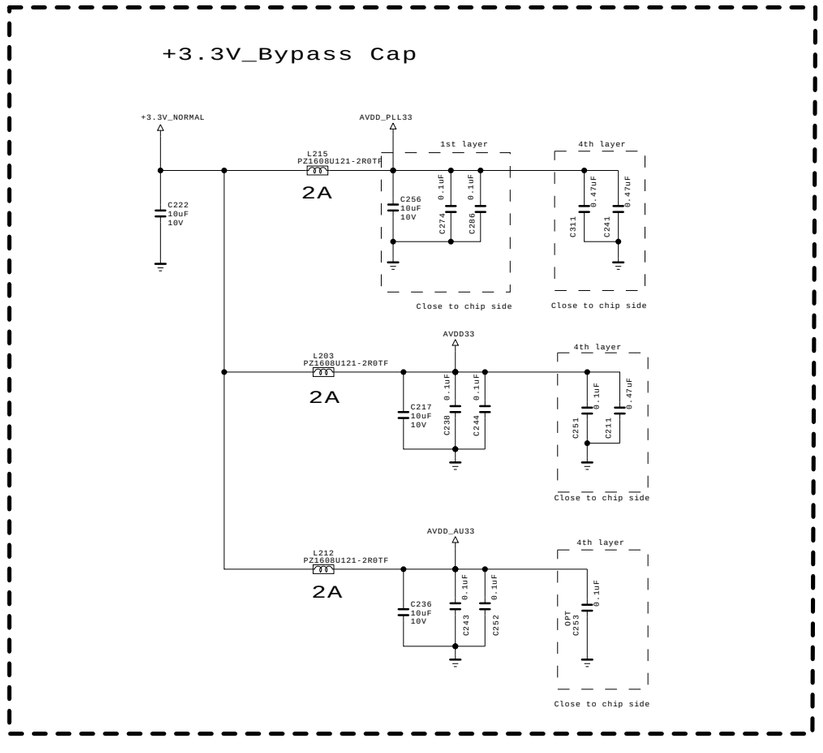
LG ELECTRONICS

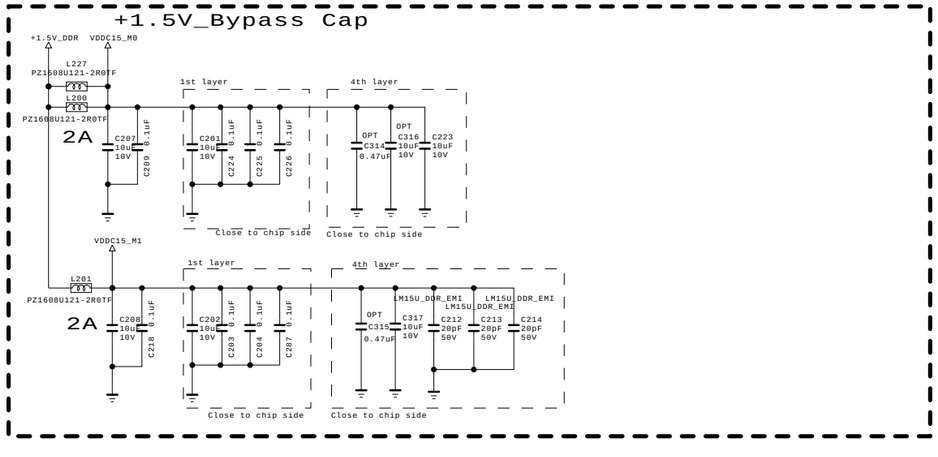
MODEL	LM15U	DATE	2014-12-17
BLOCK	MAIN1_SYSTEM	SHEET	1

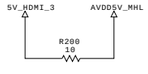


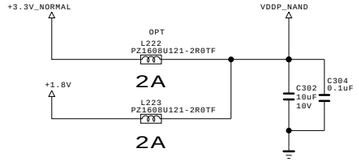


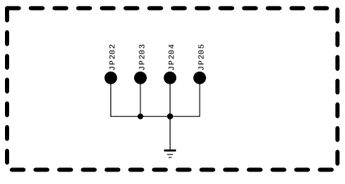












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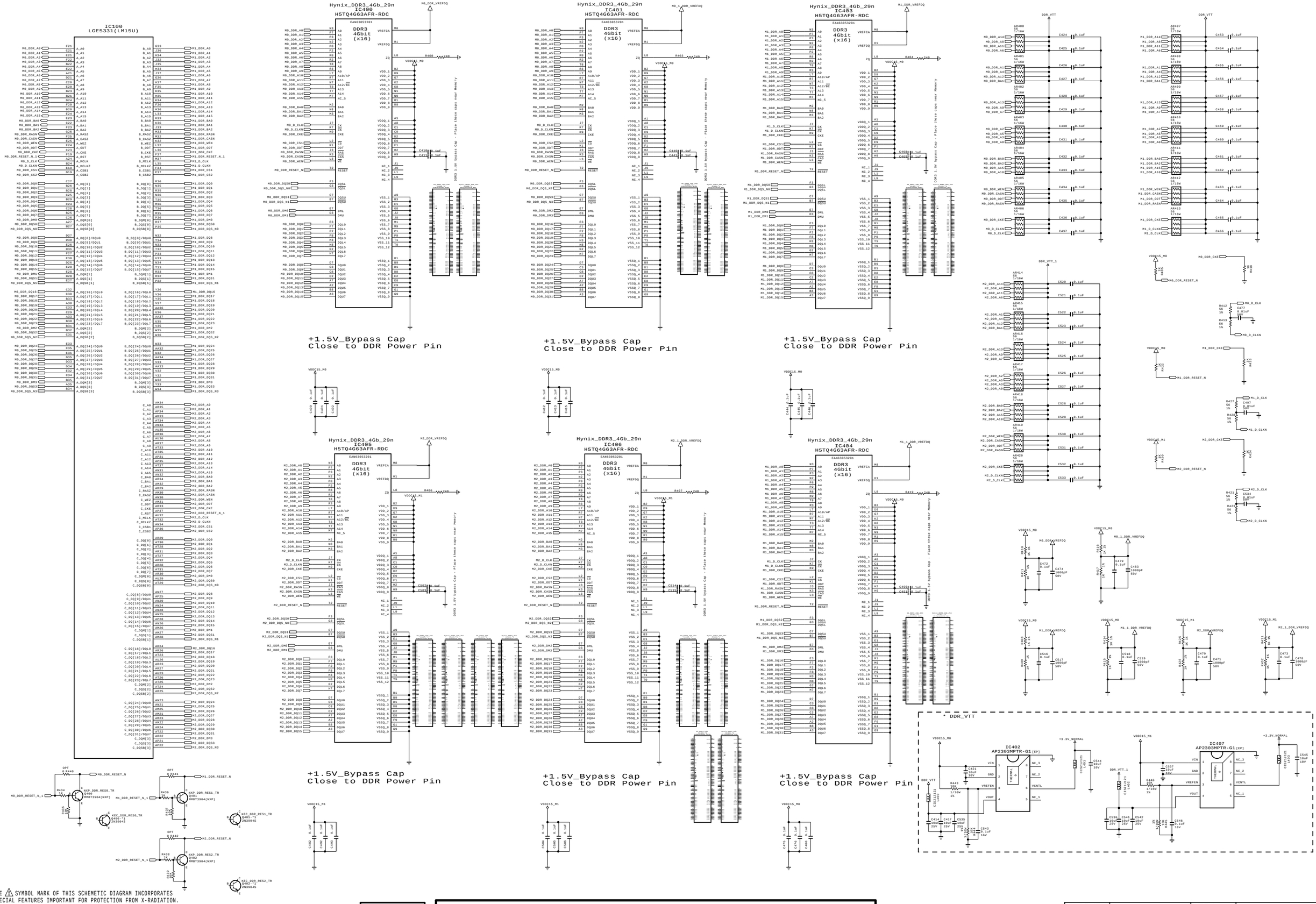
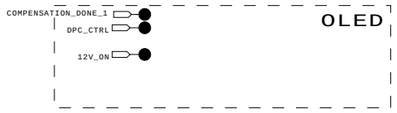
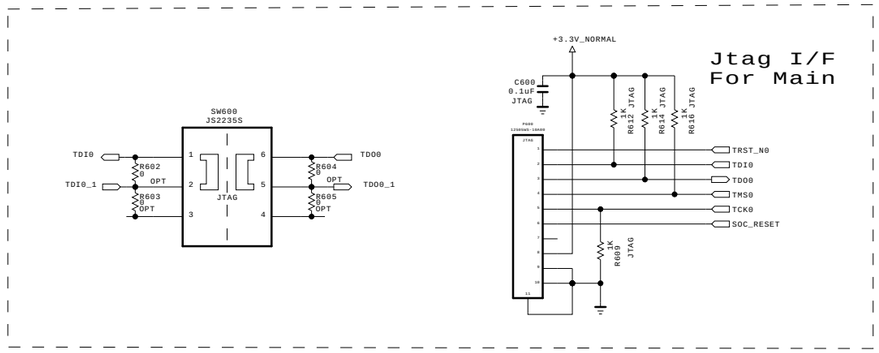
MODEL	LM15U	DATE	2014-08-26
BLOCK	LM15U POWER	SHEET	02

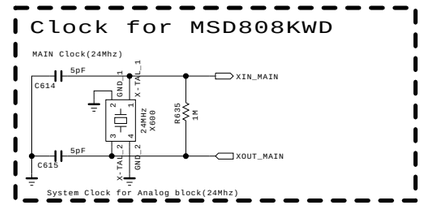
11/05/31

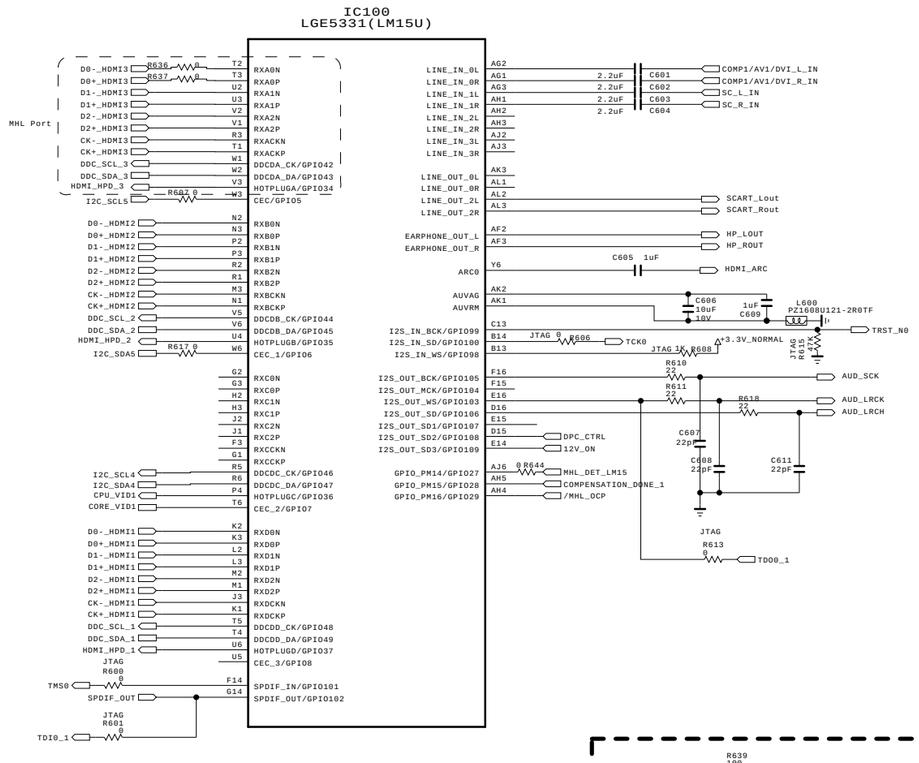
LGE Internal Use Only

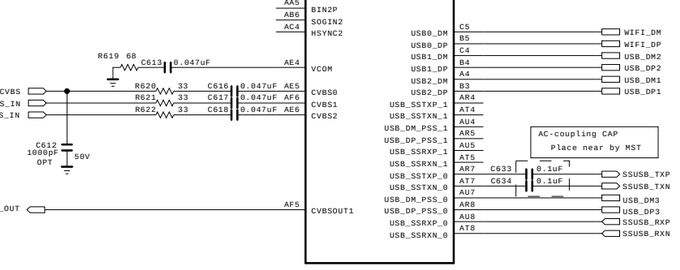


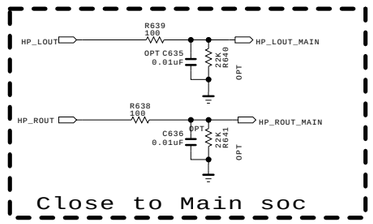












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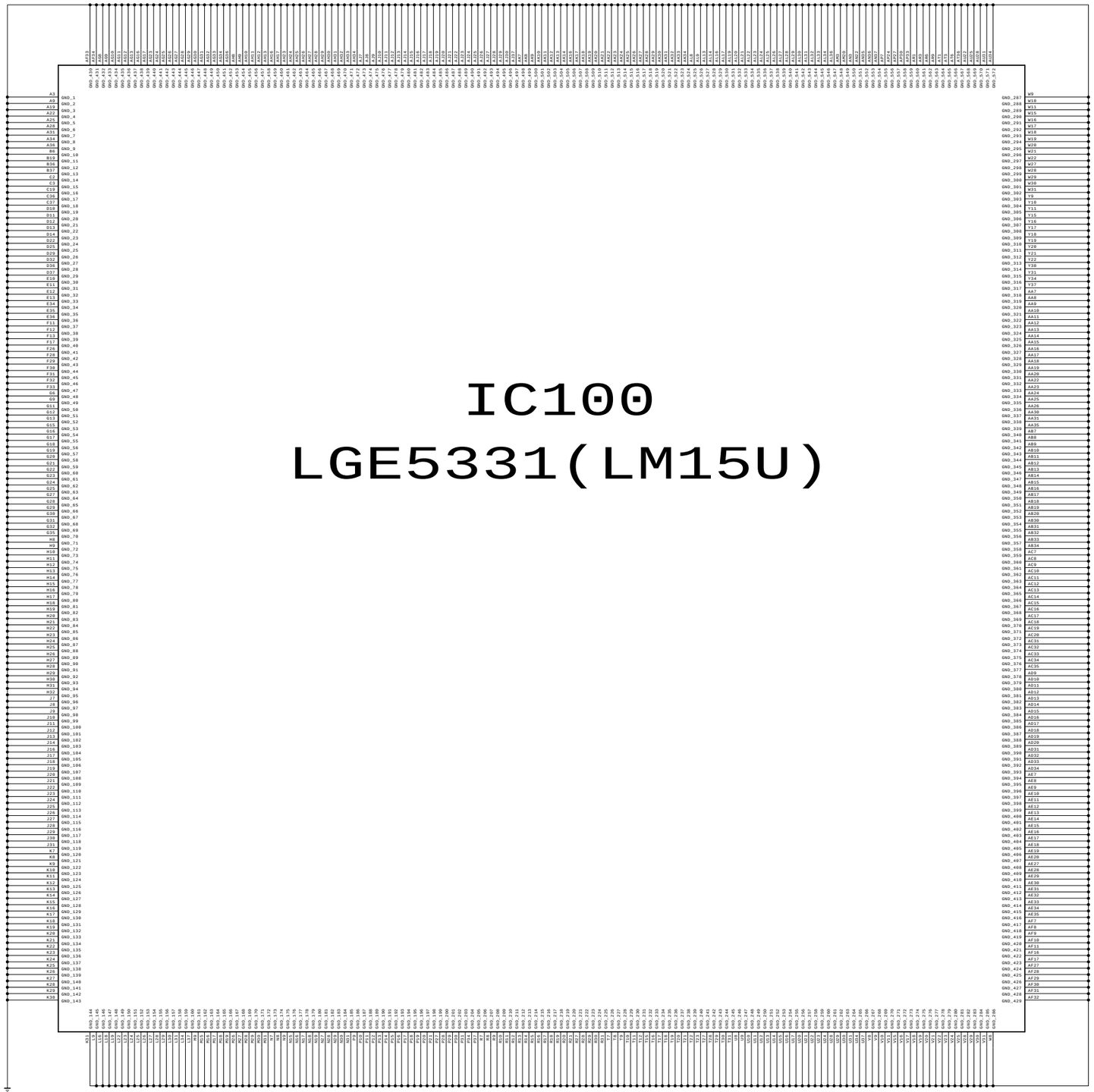
MODEL	LM15U	DATE	2014-11-20
BLOCK	MAIN4_EXT_IN/OUTPUT	SHEET	04



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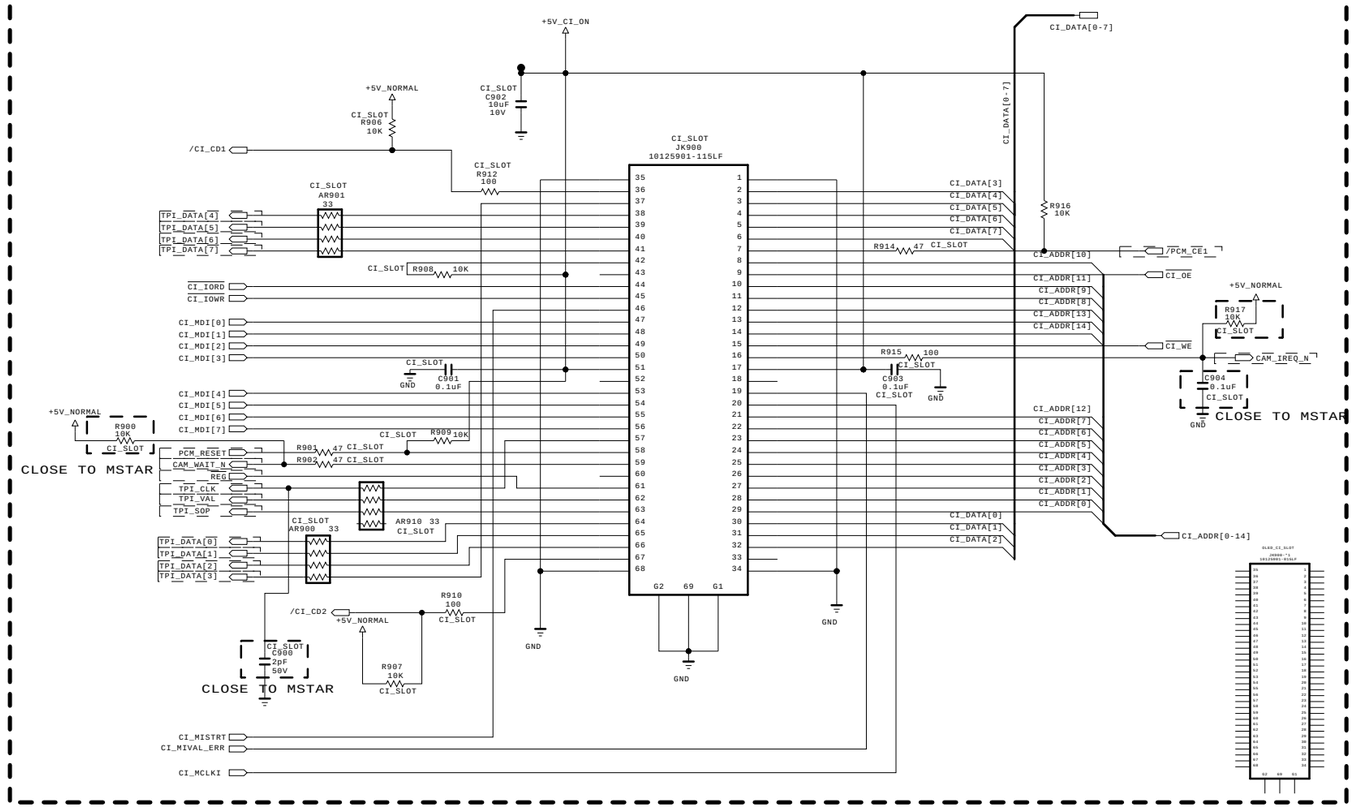
MODEL	LM15U	DATE	2014-1-21
BLOCK	LM15U_GND	SHEET	05

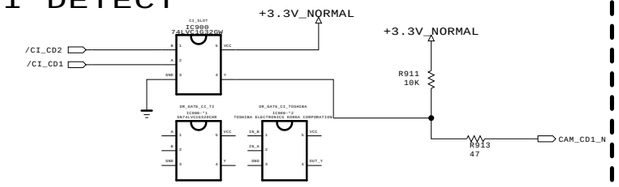
CI Region

* Option name of this page : CI_SLOT
(because of Hong Kong)

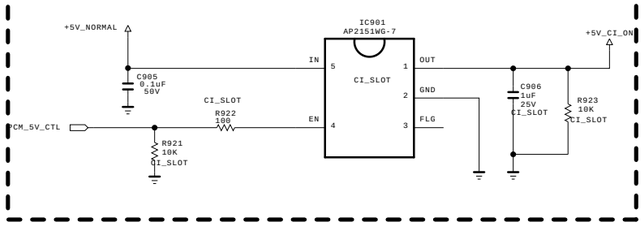
CI SLOT



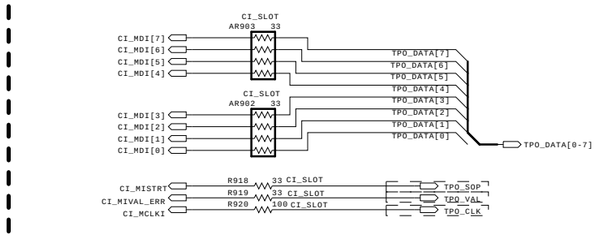
CI DETECT



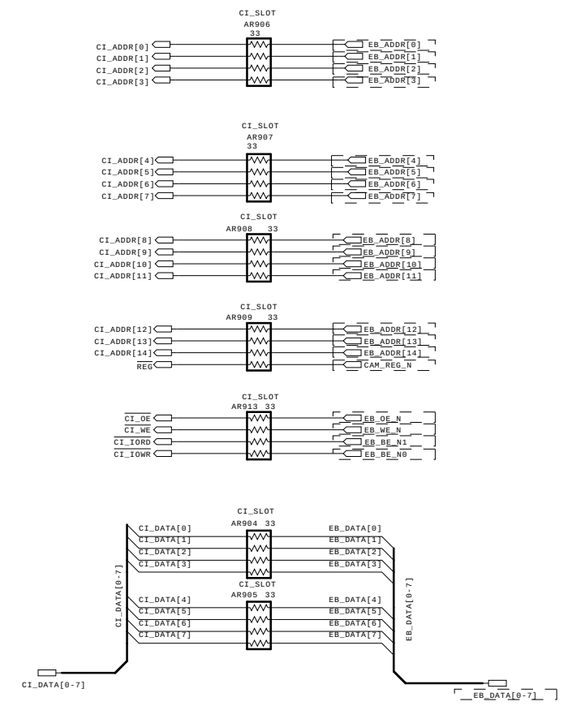
CI POWER ENABLE CONTROL



CI TS INPUT



CI HOST I/F



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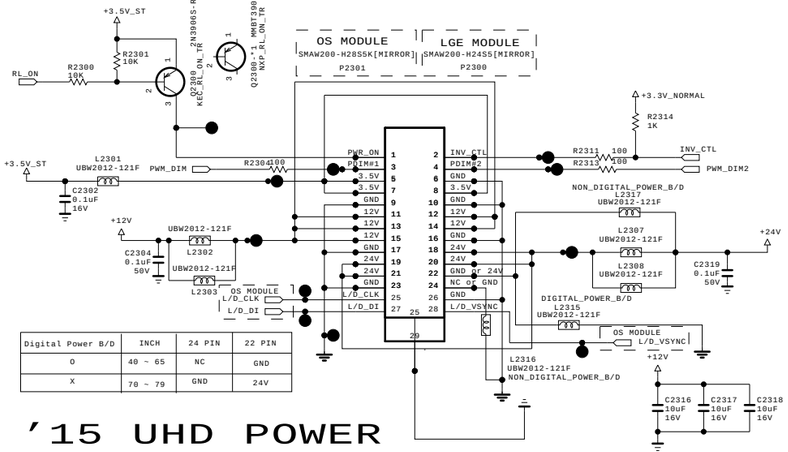
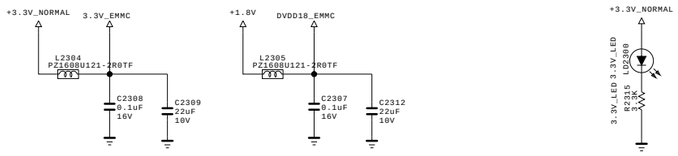
MODEL	LM15U	DATE	2014-10-17
BLOCK	PCMCI	SHEET	9 /

’15 UHD POWER

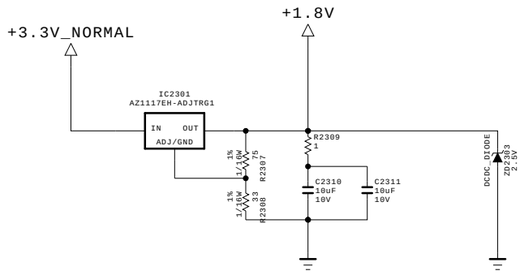


Digital Power B/D	INCH	24 PIN	22 PIN
O	40 ~ 65	NC	GND
X	70 ~ 79	GND	24V

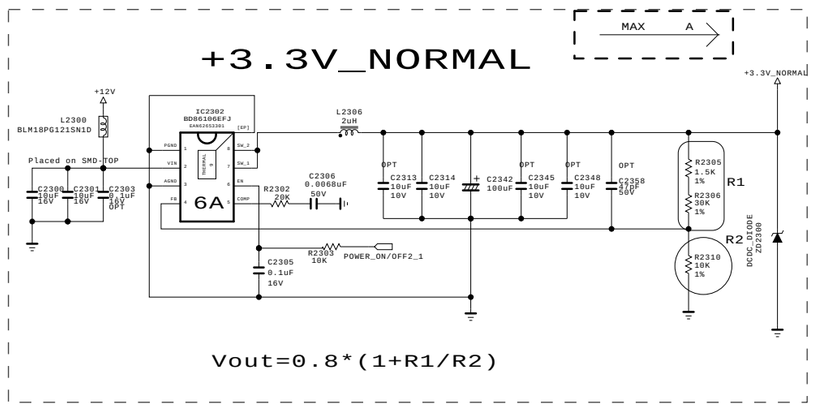
+3.3V - eMMC



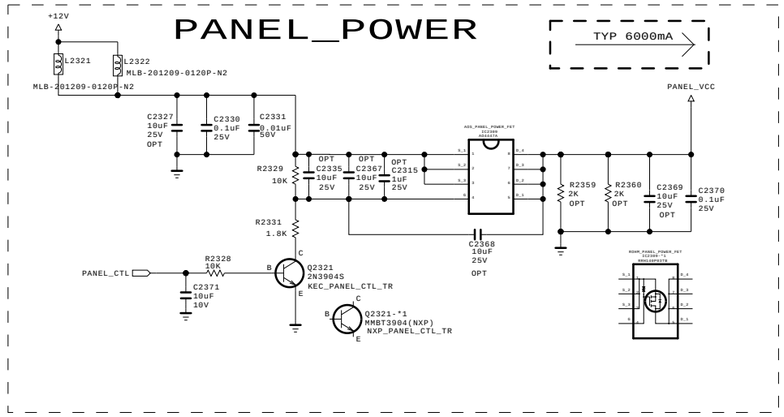
+1.8V - LM15U, eMMC & Vx1 pull-up



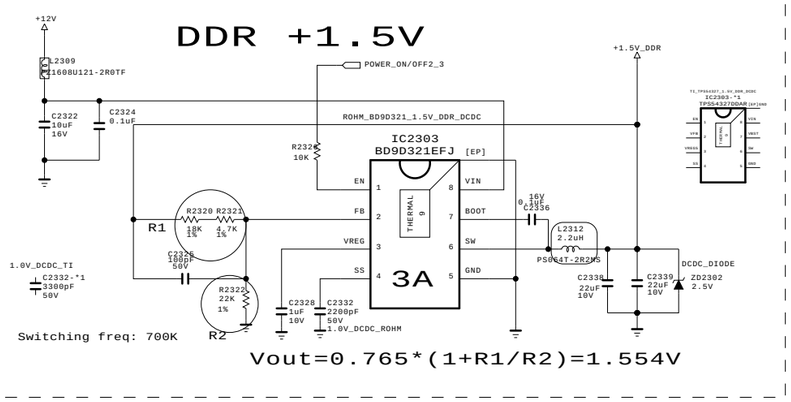
+3.3V_NORMAL



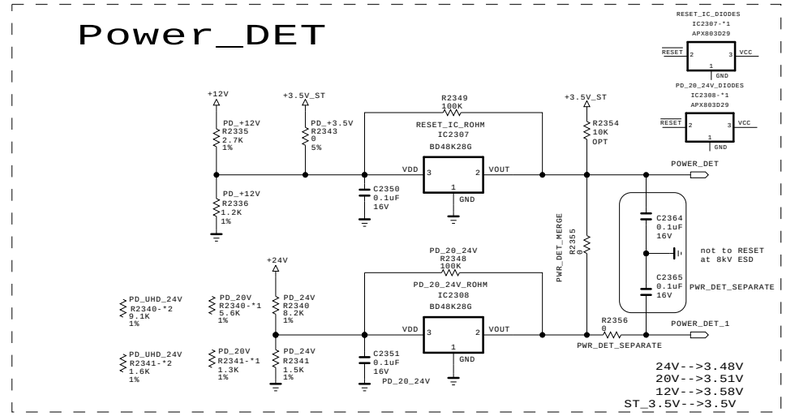
PANEL_POWER



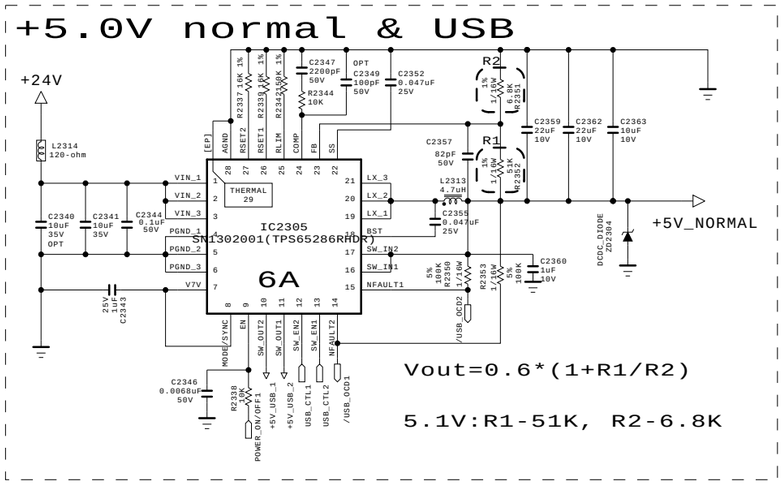
DDR +1.5V



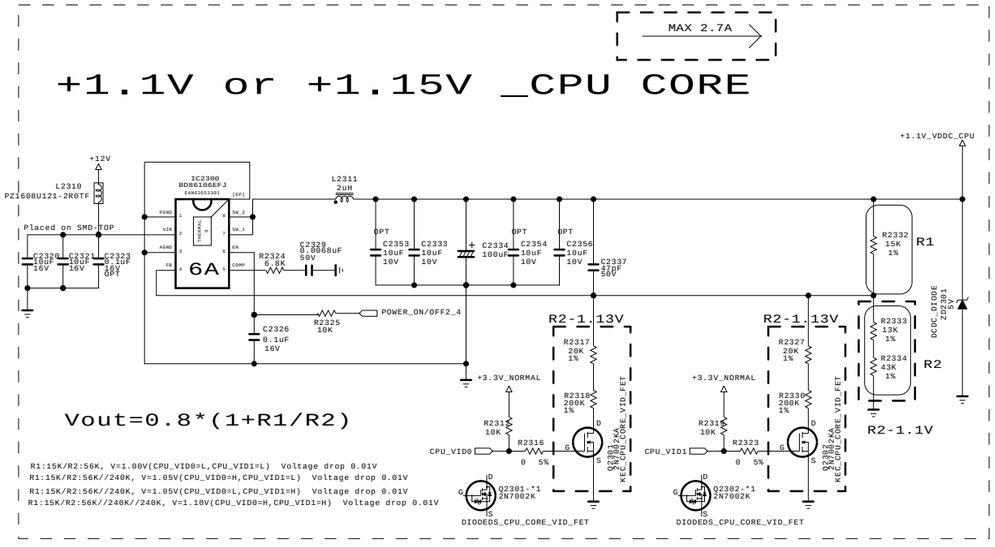
Power_DET



+5.0V normal & USB



+1.1V or +1.15V _CPU CORE



LM15 Power SEQUENCE

POWER_ON/OFF1(5V)

↓

POWER_ON/OFF2_1(3.3V)

↓

POWER_ON/OFF2_3(1.5V, 2.5V)

↓

POWER_ON/OFF2_4(1.1V)

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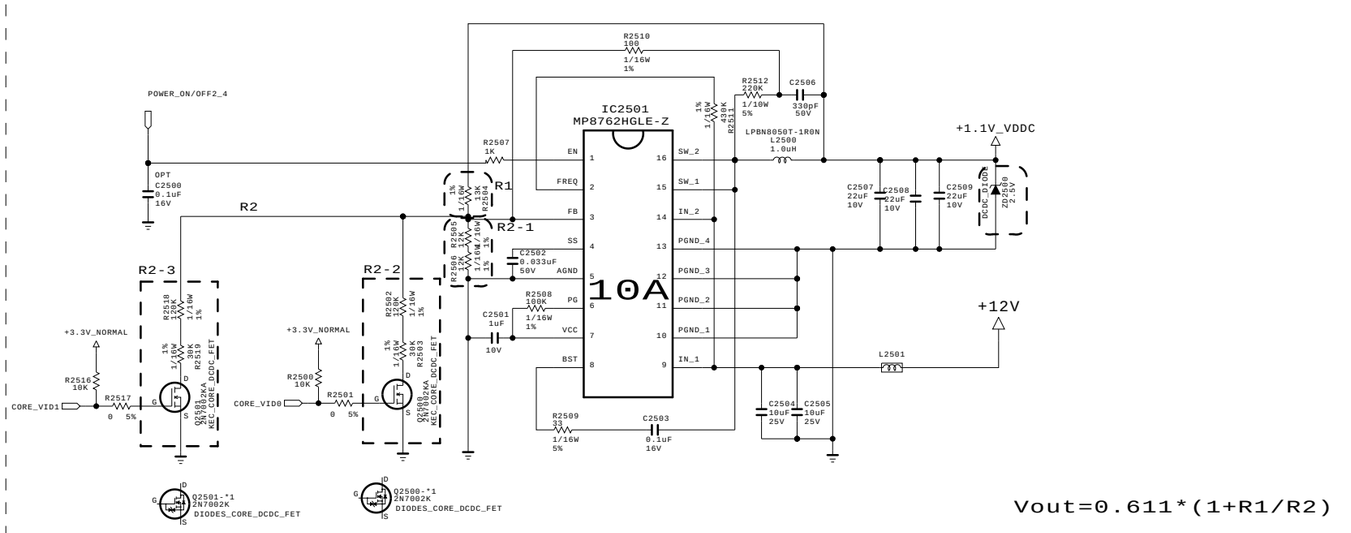
SECRET

LGElectronics

LG ELECTRONICS

MODEL	LM15U	DATE	2014-00-01
BLOCK	LM15U_PWR_1_UHD	SHEET	07

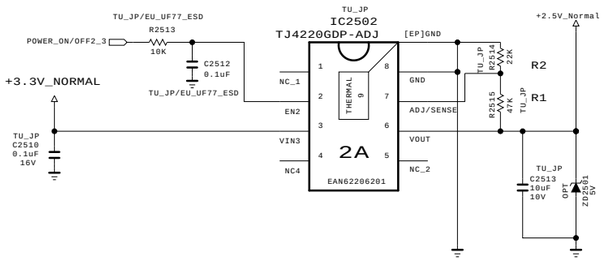
+1.1V or +1.15V _CORE



Vout=0.611*(1+R1/R2)

R1:13K/R2:22K, V=0.95V(CORE_VID0=L,CORE_VID1=L) Voltage drop 0.02V
R1:13K/R2:22K//150K, V=1.00V(CORE_VID0=H,CORE_VID1=L) Voltage drop 0.02V
R1:13K/R2:22K//150K, V=1.00V(CORE_VID0=L,CORE_VID1=H) Voltage drop 0.02V
R1:13K/R2:22K//150K//150K, V=1.05V(CORE_VID0=H,CORE_VID1=H) Voltage drop 0.02V

+2.5V

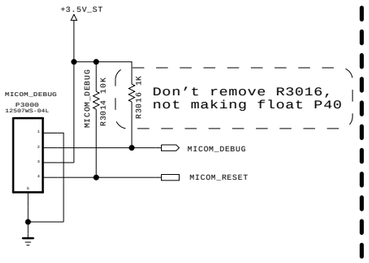


Vout=0.6*(1+R1/R2)

MODEL	LM15U	DATE	2014-11-26
BLOCK	LM15U_PWR_2_ALL	SHEET	25

Renesas MICOM

For Debug



LM15 Power SEQUENCE

POWER_ON/OFF1(5V)

↓

POWER_ON/OFF2_1(3.3V)

↓

POWER_ON/OFF2_3(1.5V)

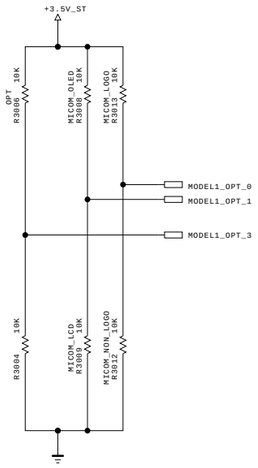
↓

POWER_ON/OFF2_4(1.1V)

↓

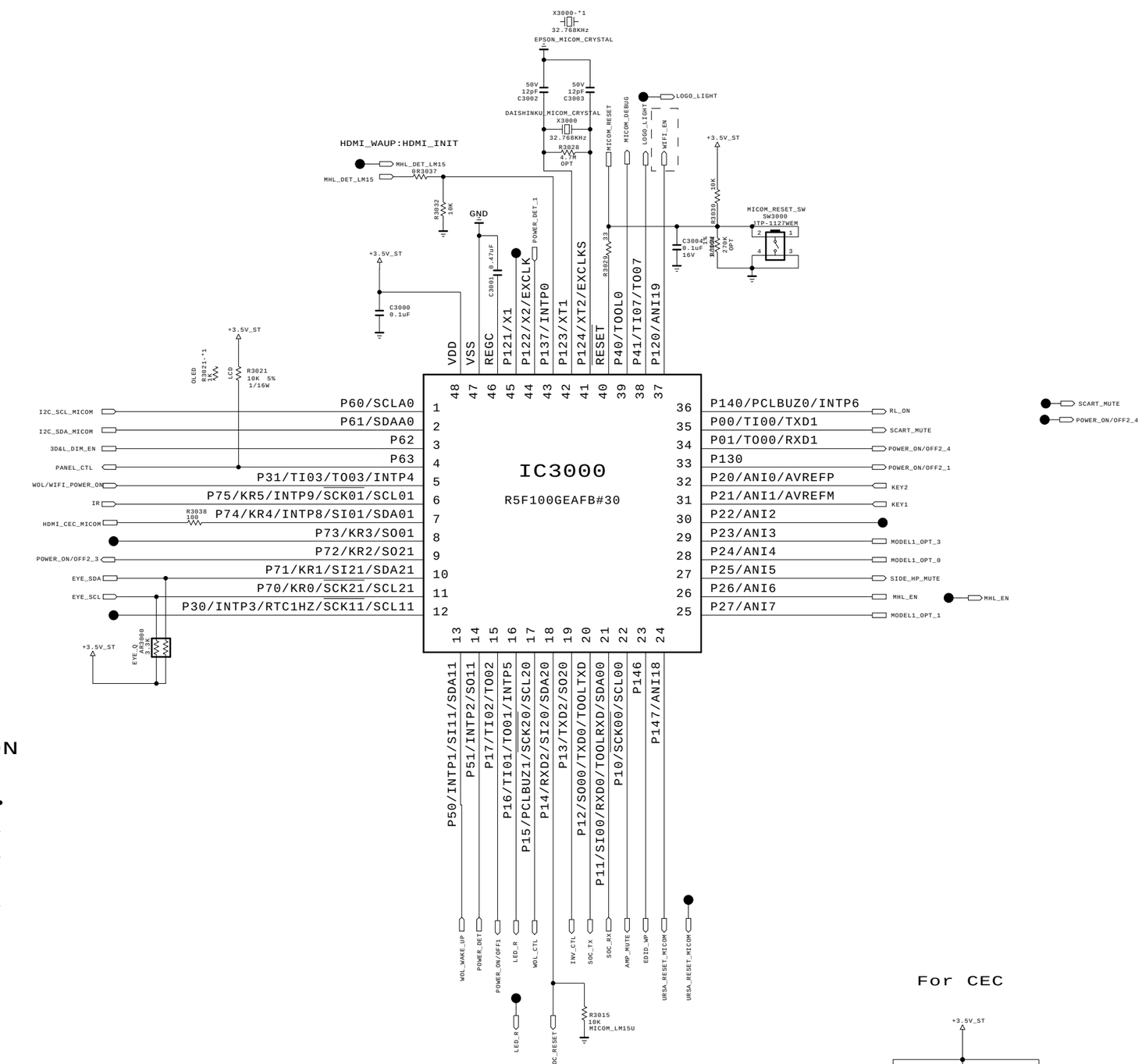
SOC_RESET

MICOM MODEL OPTION



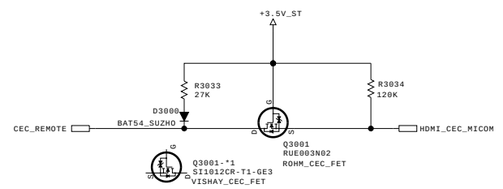
MICOM MODEL OPTION

	0	1	
MODEL_OPT_0	NON LOGO	LOGO	
MODEL_OPT_1	LCD	OLED	
MODEL_OPT_3	LM15U	H15	



LM15U : Active high reset

For CEC



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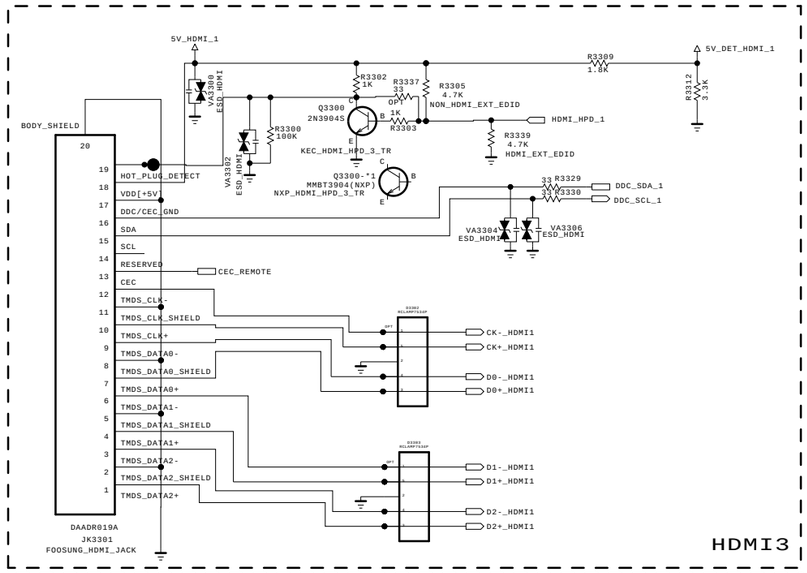
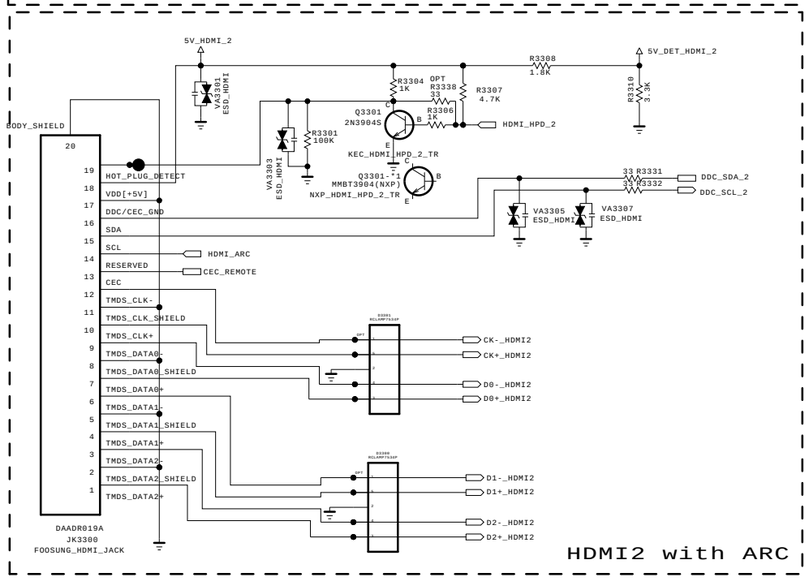
SECRET

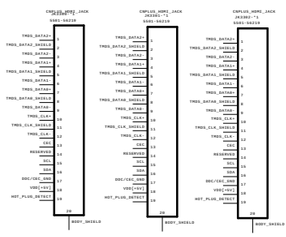
LGElectronics

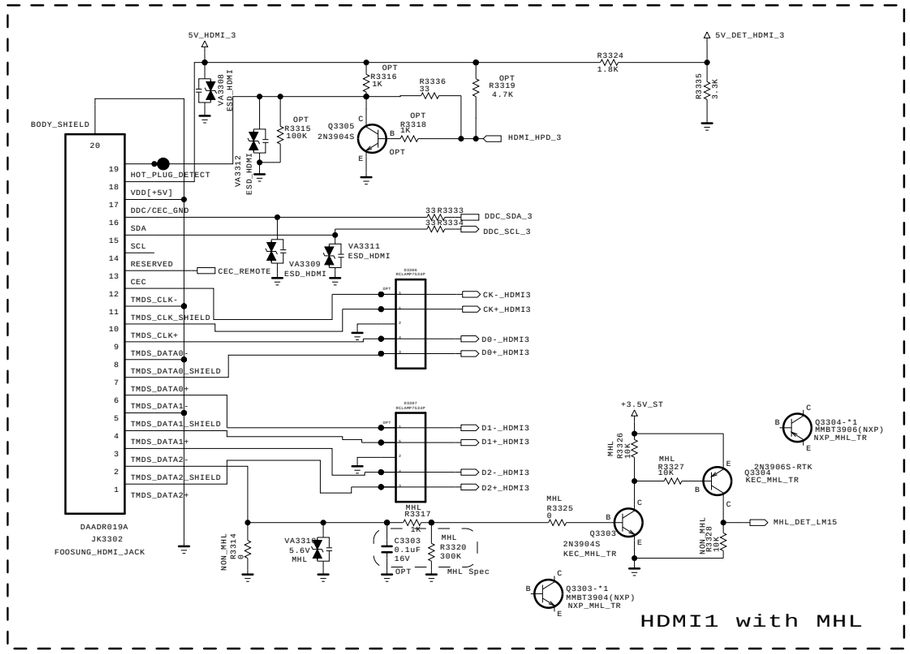
LG ELECTRONICS

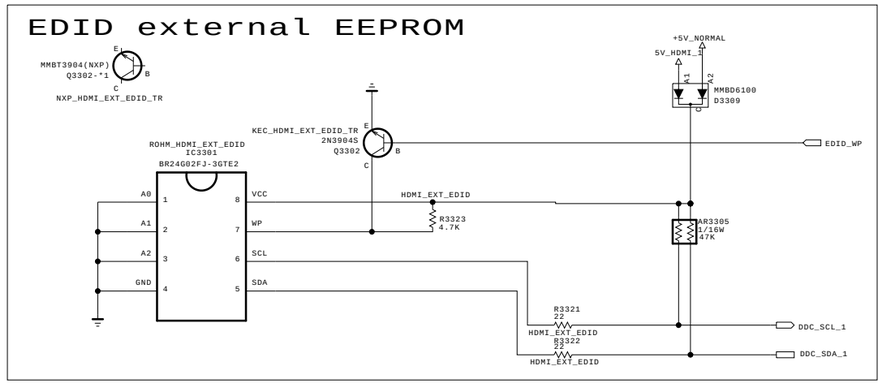
MODEL	LM15U	DATE	2014-12-30
BLOCK	MICOM	SHEET	30

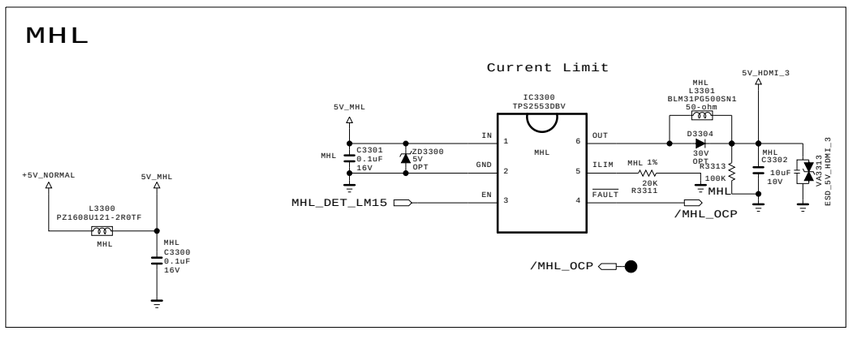


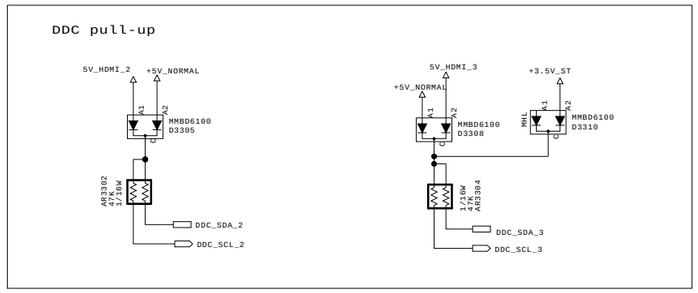












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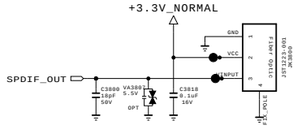
SECRET
LGElectronics

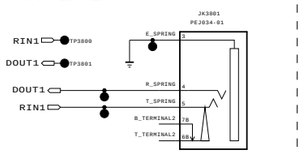
LG ELECTRONICS

MODEL	LM15U	DATE	2014-11-04
BLOCK	HDMI	SHEET	10

SPDIF OUT

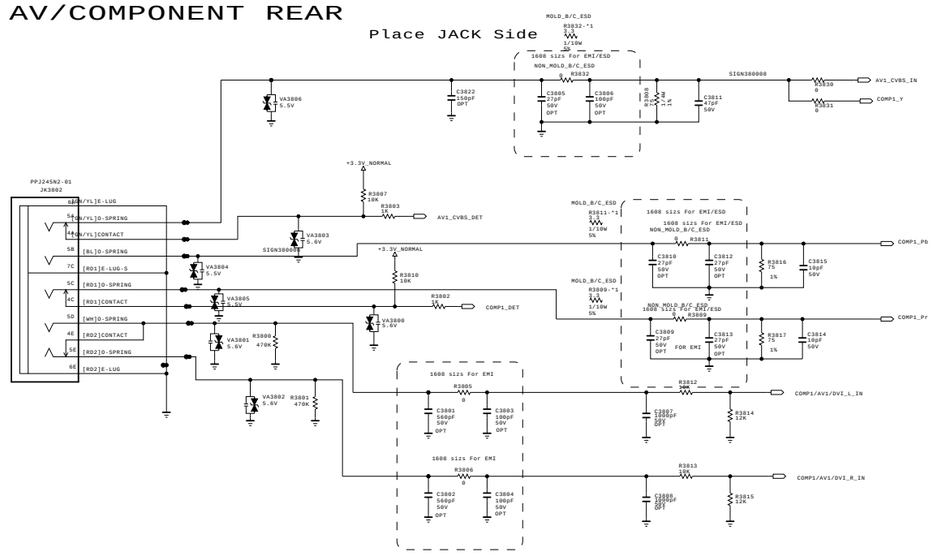


RS232C

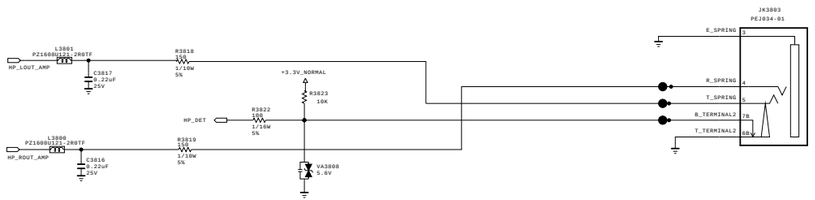


AV/COMPONENT REAR

Place JACK Side



HP OUT



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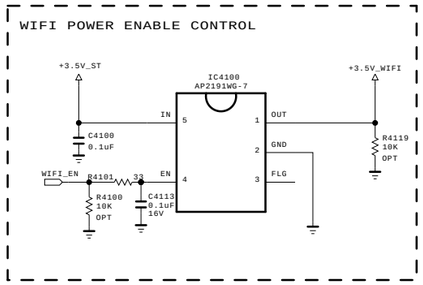
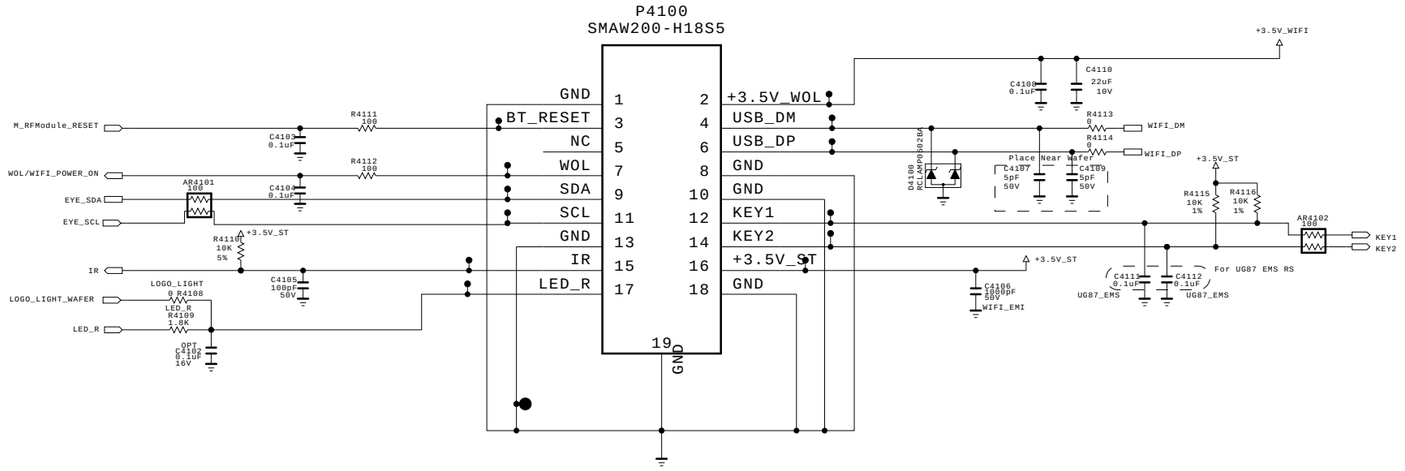
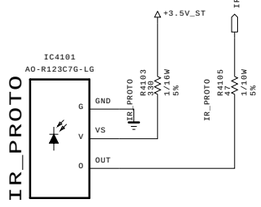
SECRET
LGElectronics

LG ELECTRONICS

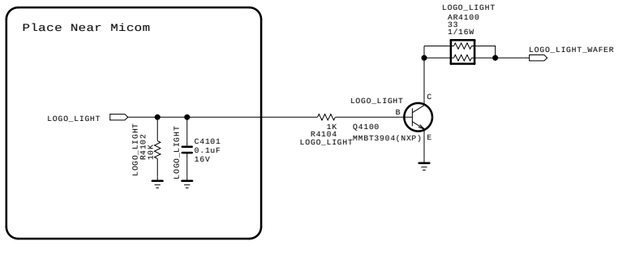
MODEL	LM15U	DATE	2014-12-22
BLOCK	JACK_COMMON_H	SHEET	38







SMD bottom -> Page 135



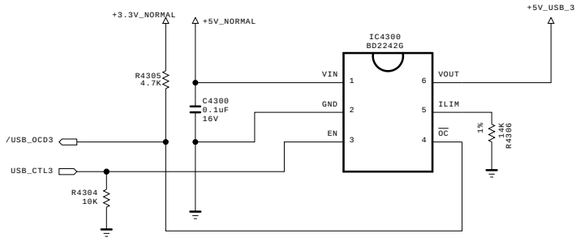
SECRET
LGElectronics

LG ELECTRONICS

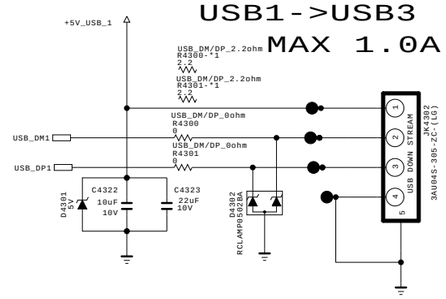
MODEL	LM15U	DATE	2014-12-25
BLOCK	IR/KEY	SHEET	41

+5V_USB FOR USB3->USB1

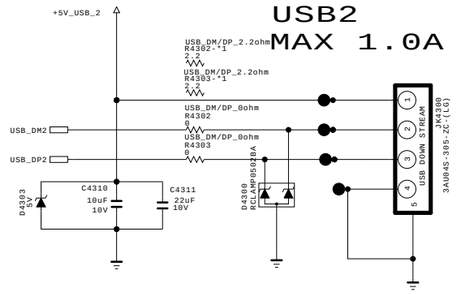
OCP USB3->USB1



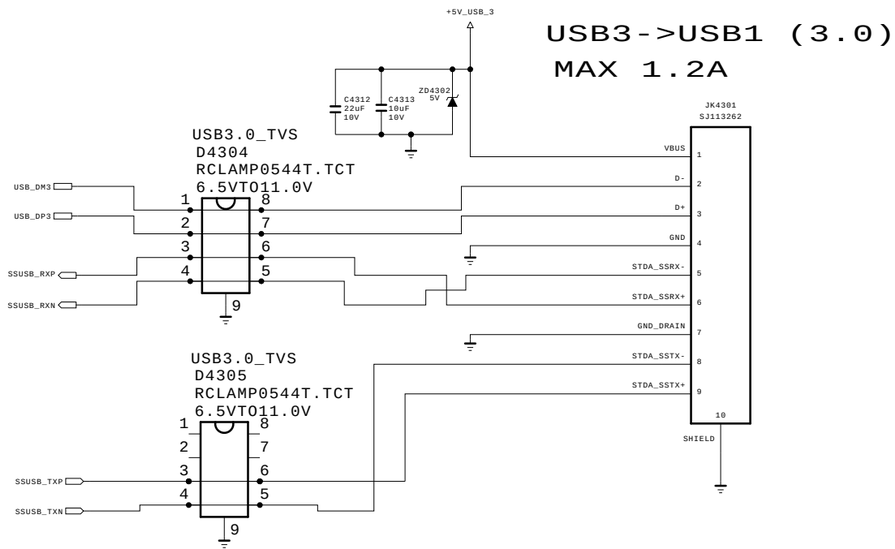
USB1->USB3 MAX 1.0A



USB2 MAX 1.0A



USB3->USB1 (3.0) MAX 1.2A



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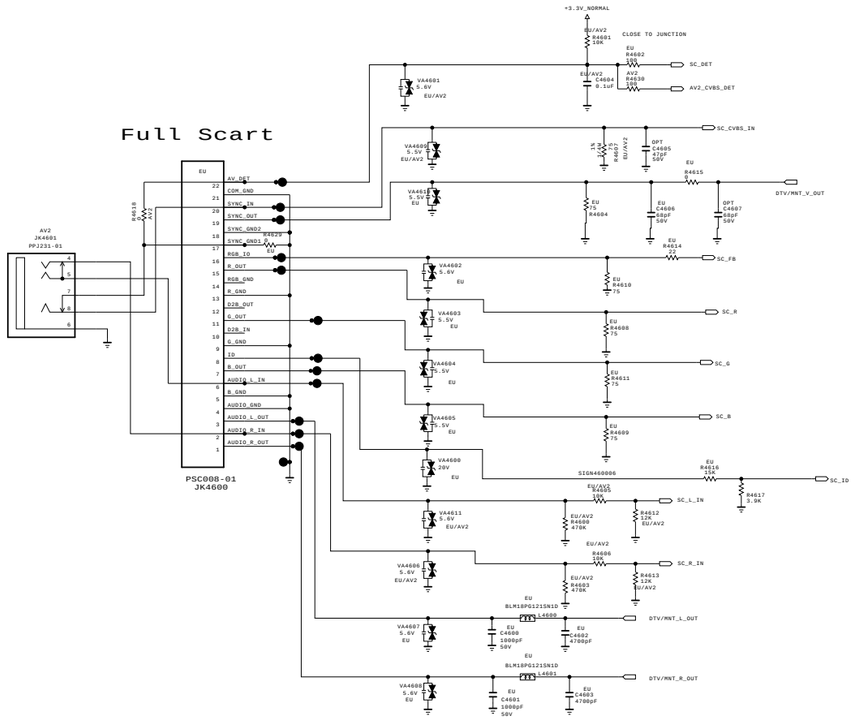
SECRET

LGElectronics

LG ELECTRONICS

MODEL	LM15U	DATE	2014-12-10
BLOCK	USB3_HUB	SHEET	43

Full Scart



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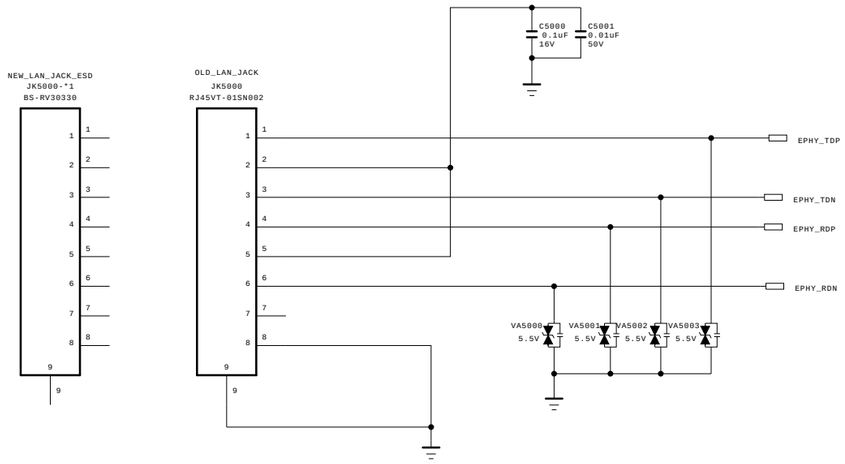
SECRET
LGElectronics

LG ELECTRONICS

MODEL	LM15U	DATE	2014-12-05
BLOCK	SCART JACK_H	SHEET	46

SCART_JACK_H

Ethernet Block



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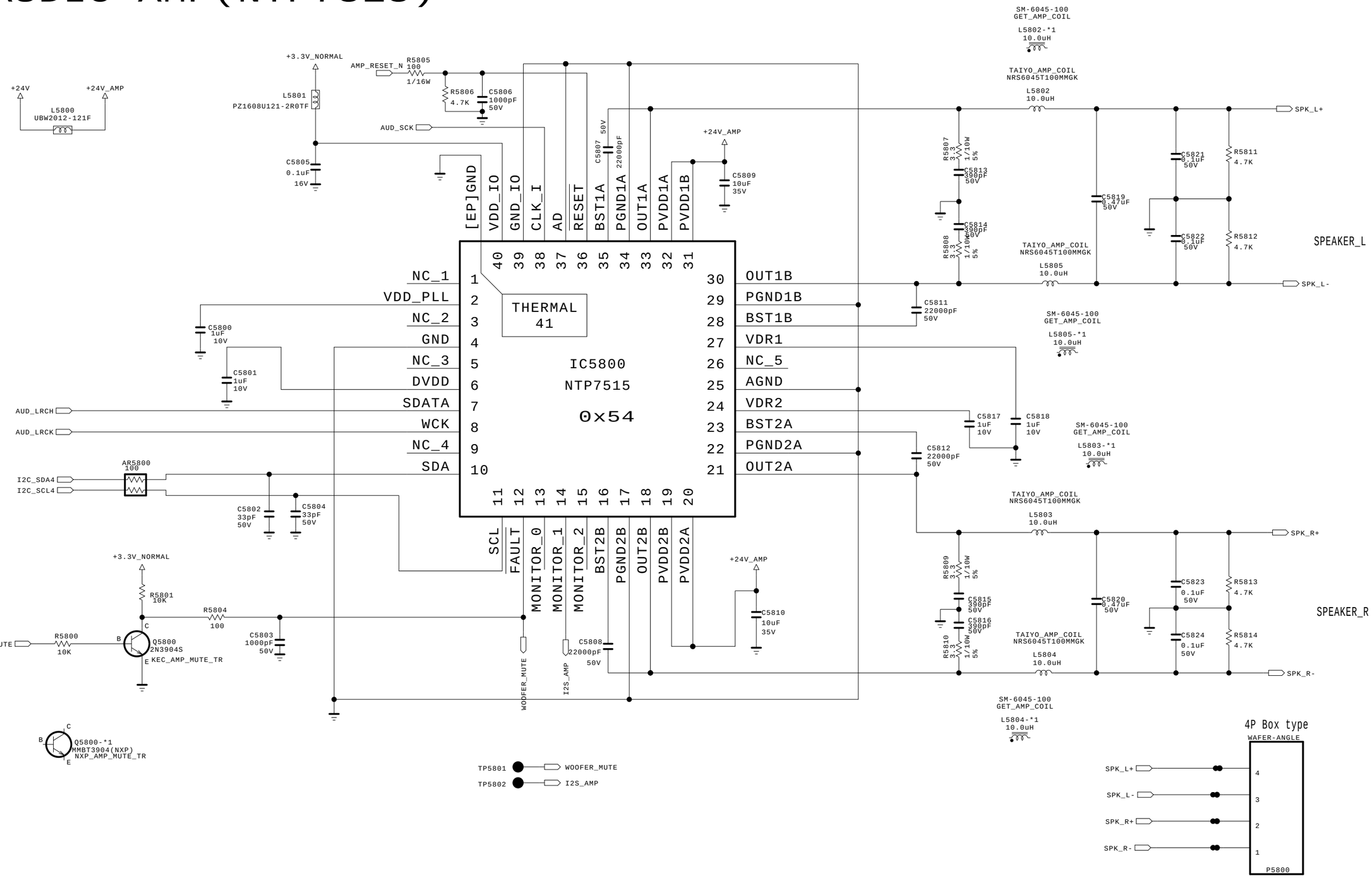
SECRET
LGElectronics

LG ELECTRONICS

MODEL	LM15U	DATE	2014-12-15
BLOCK	LAN_H	SHEET	50

AUDIO AMP(NTP7515)



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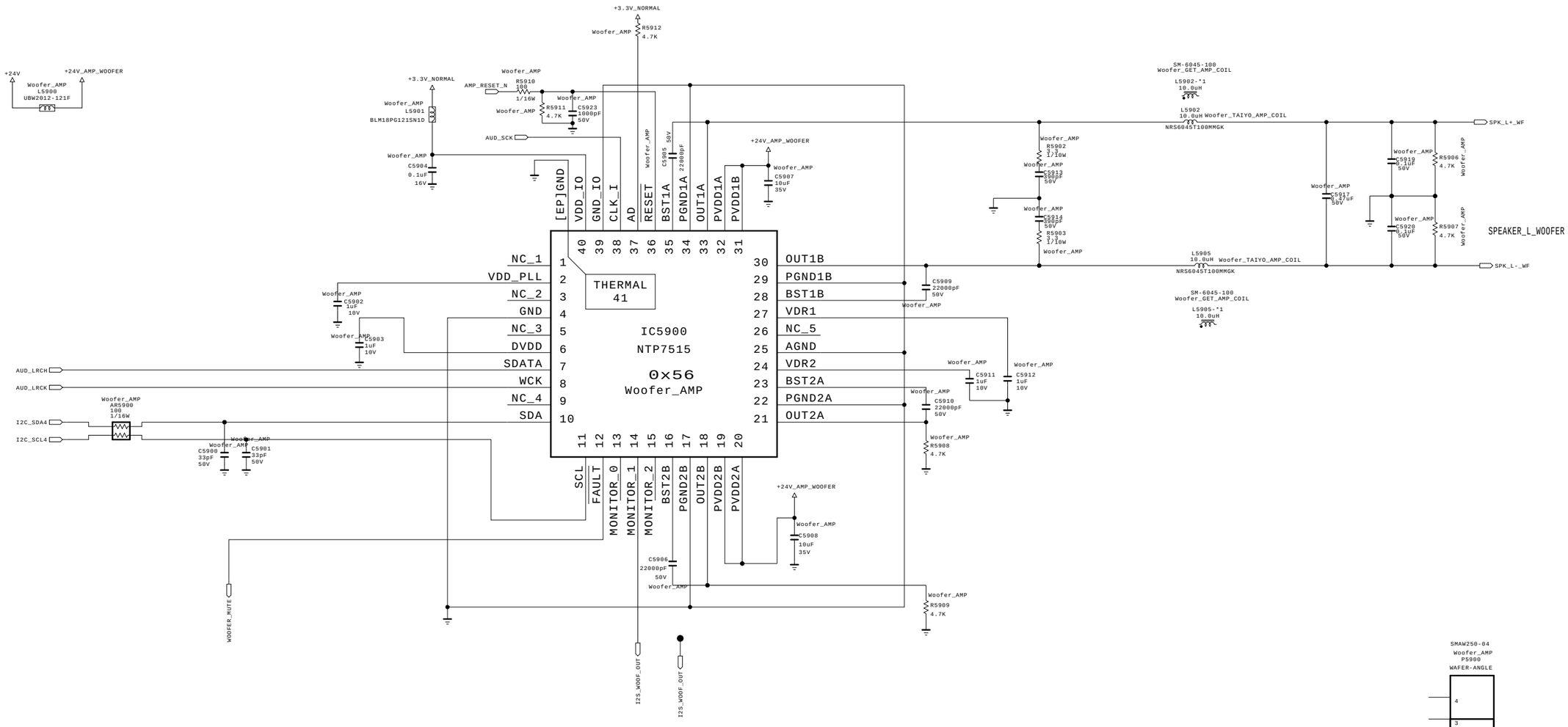
SECRET

LGElectronics

LG ELECTRONICS

MODEL	LM15U	DATE	2014-10-17
BLOCK	STM_AMP	SHEET	58

AMP - Woofer



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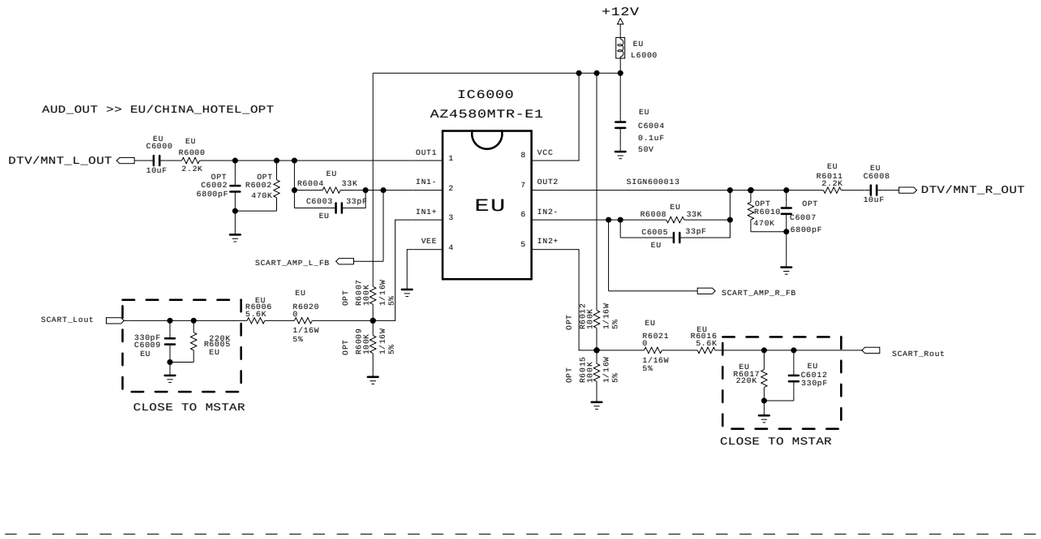
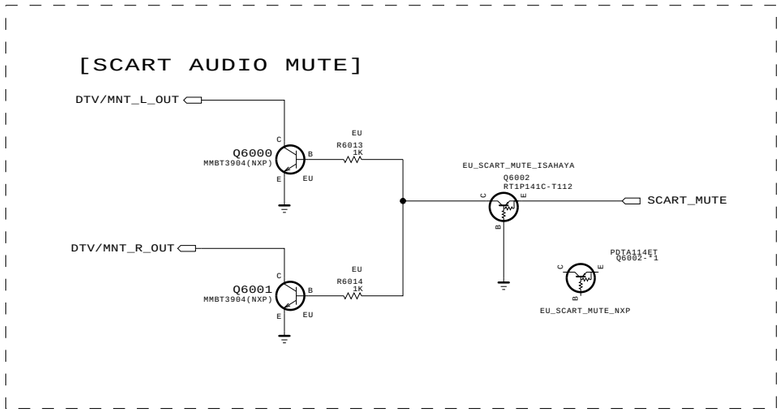
SECRET
LGElectronics

LG ELECTRONICS

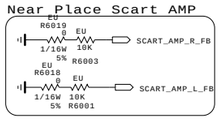
BSD-14Y-UD-059-HD

MODEL		DATE	
BLOCK		SHEET	/





Near Place Scart AMP



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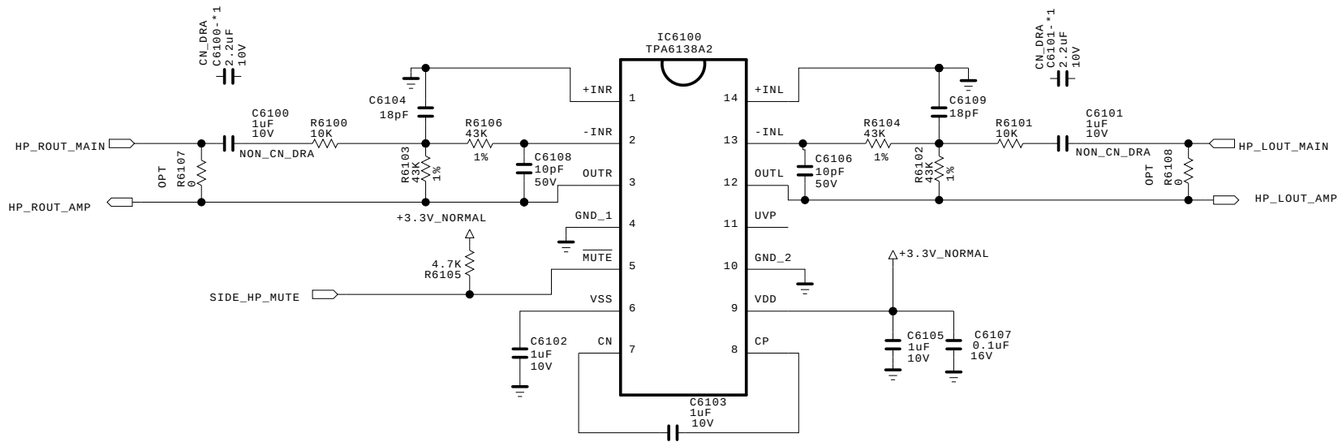
SECRET
LGElectronics

LG ELECTRONICS

MODEL	UF71/7500	DATE	2014-05-19
BLOCK	SCART AMP	SHEET	17

EARPHONE AMP



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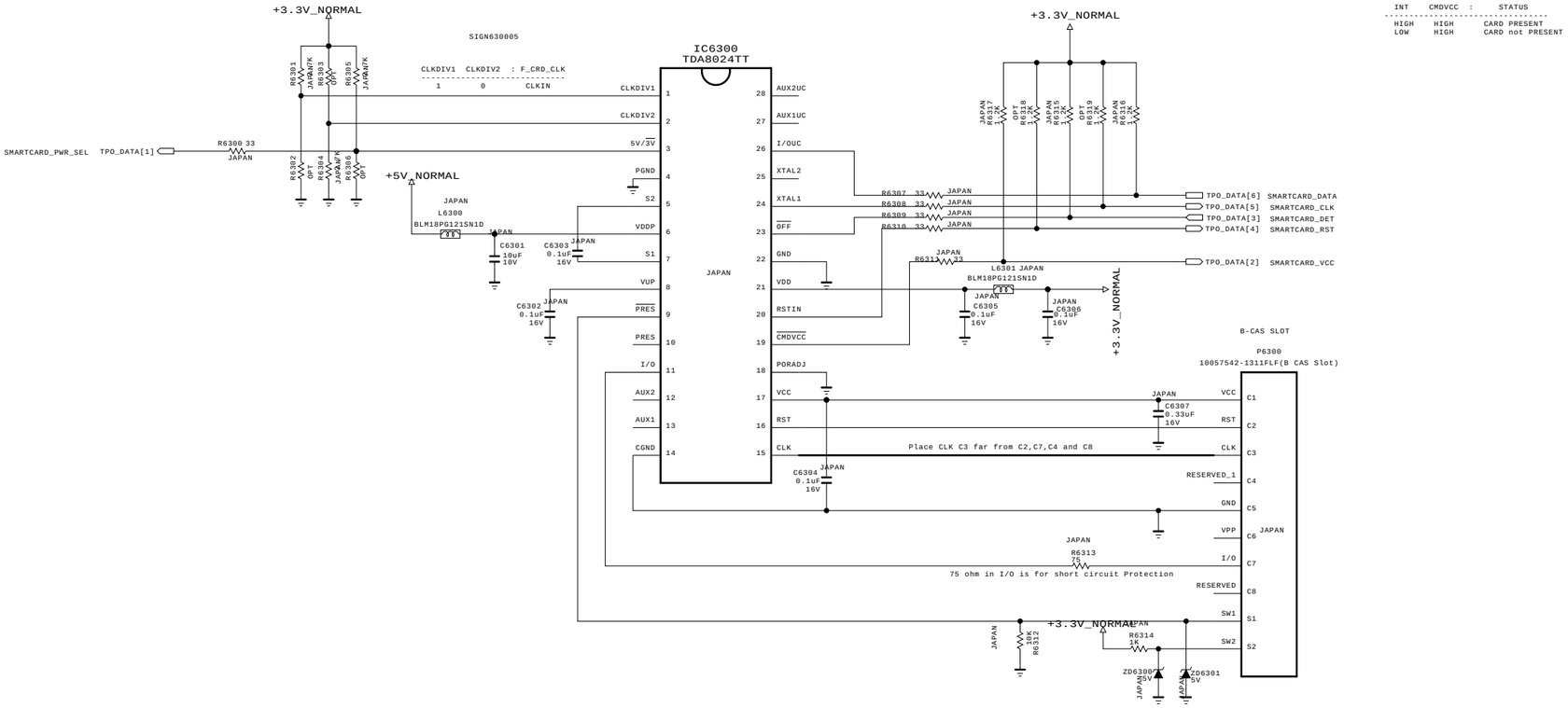
SECRET

LGElectronics

LG ELECTRONICS

MODEL	LM15U	DATE	2015-01-22
BLOCK	HP_AMP	SHEET	61

B-CAS (SMART CARD) INTERFACE



INT	CMDVCC	: STATUS
HIGH	HIGH	CARD PRESENT
LOW	HIGH	CARD not PRESENT

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SECRET
LGElectronics

LG ELECTRONICS

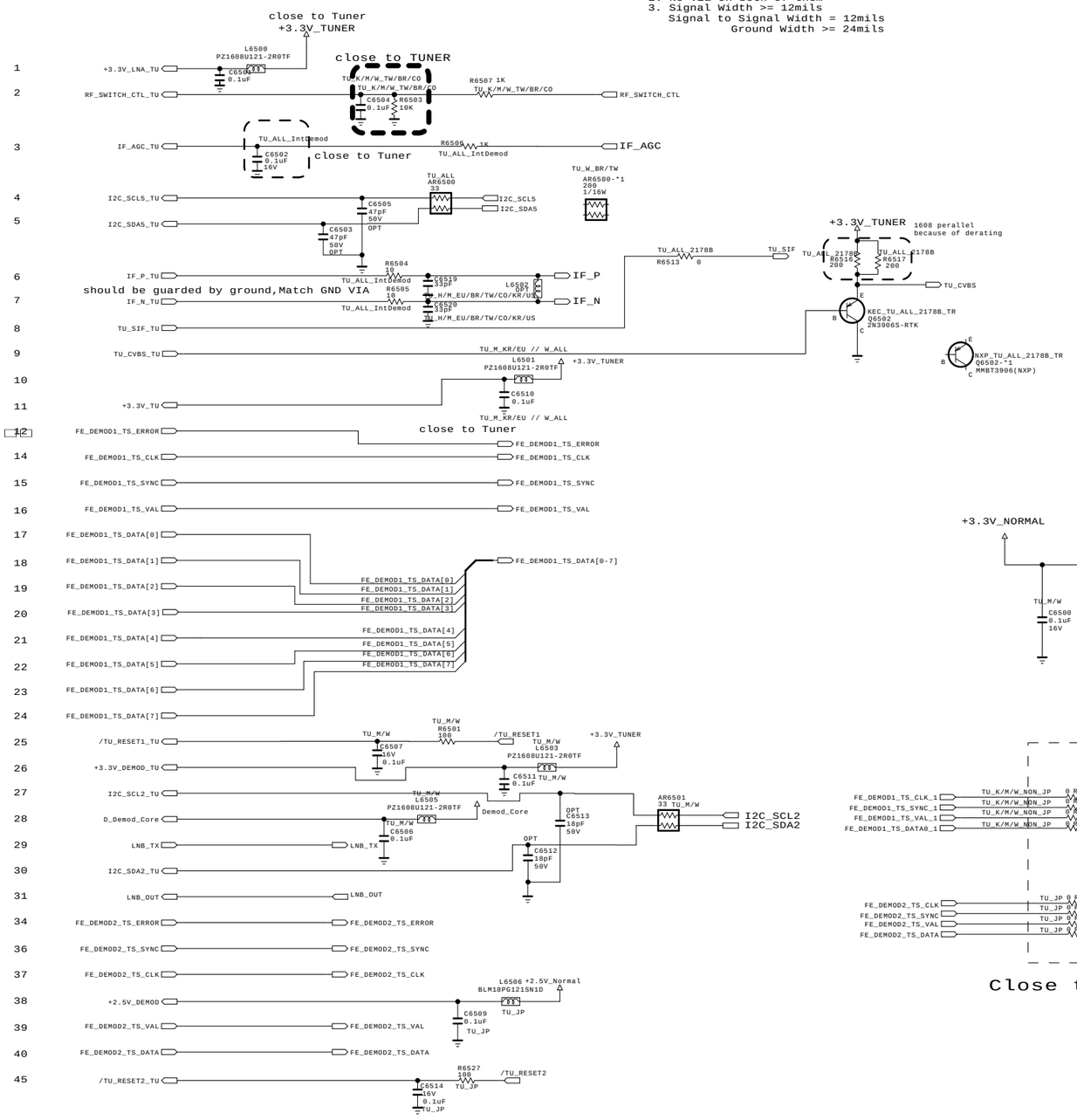
MODEL	JAPAN B-CAS	DATE	2011.04.17
BLOCK		SHEET	63

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

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



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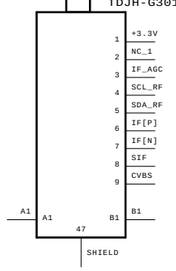
SECRET
LGElectronics

LG ELECTRONICS

MODEL	LM15U	DATE	2014-12-30
BLOCK	TU_CIRCUIT	SHEET	65

TDJH-G301D

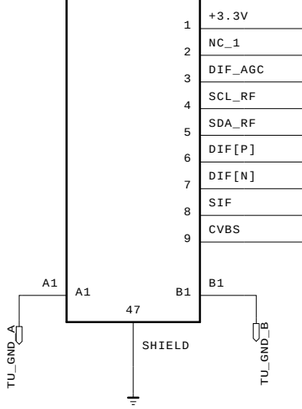
TU6705-*1
TDJH-G301D



EMS Page --> Sheet : 135

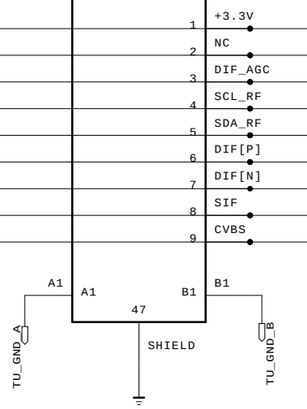
TU_H_US

TU6705
TDJH-H301F



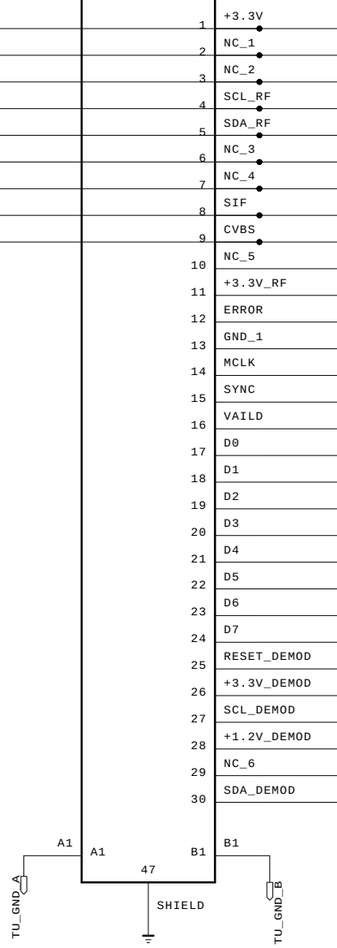
TU_H_BR

TU6701
TDJK-T301F



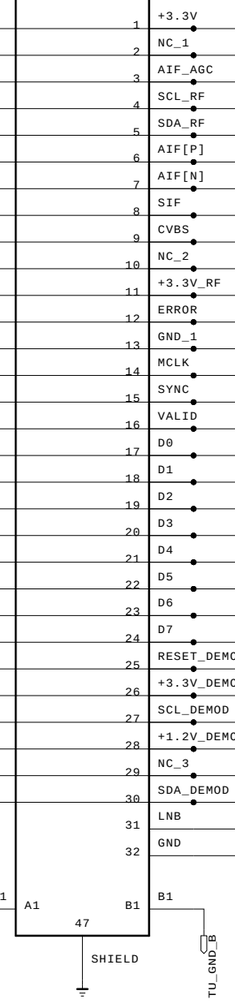
TU_H_T2_KR

TU6704
TDJM-H401F



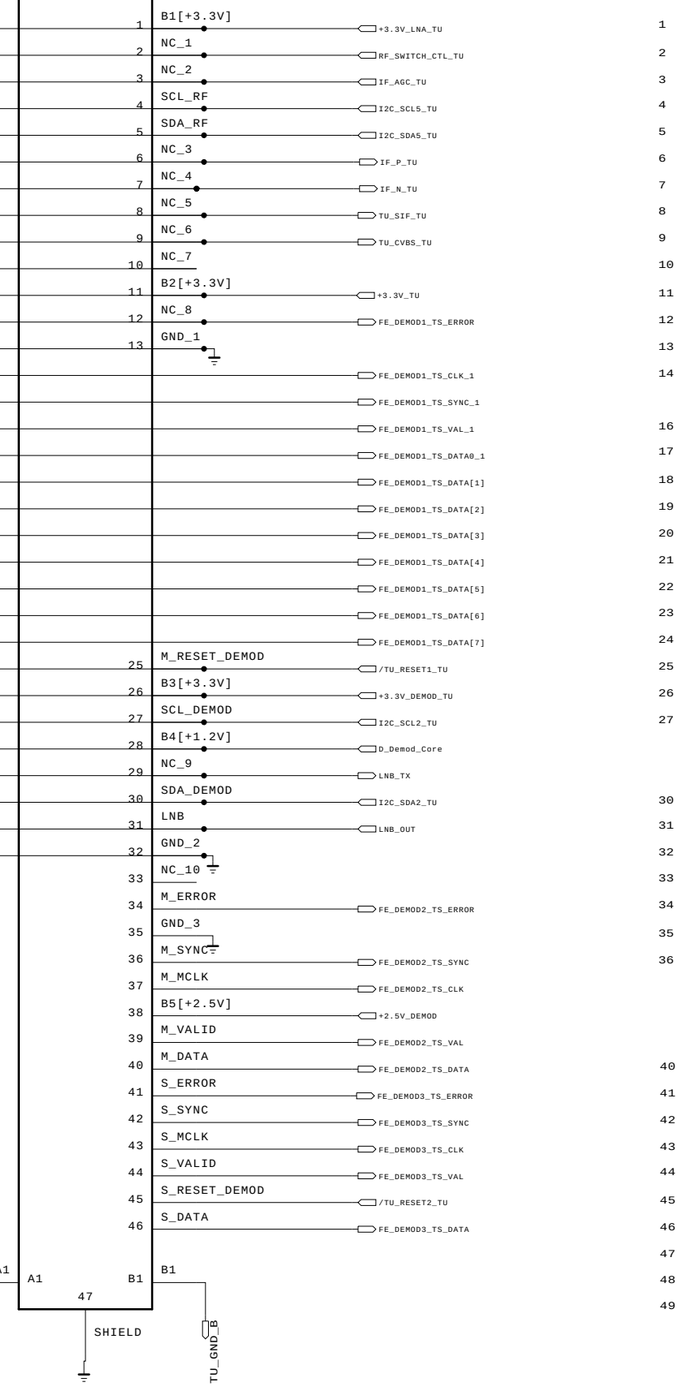
TU_M_EU

TU6702
TDJM-G301D



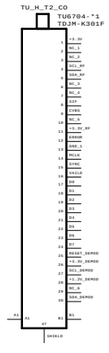
TU_W_JP

TU6703
TDJW-J202F



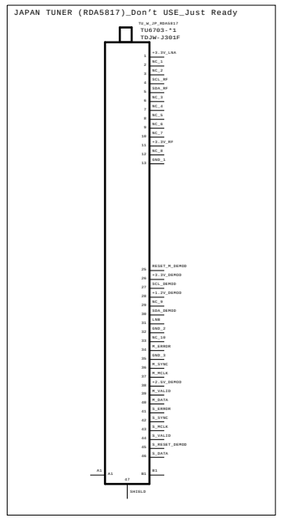
TU_H_T2_CO

TU6704-*1
TDJM-K301F

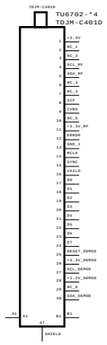


JAPAN TUNER (RDA5817)_Don't USE_Just Ready

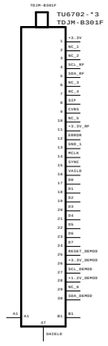
TU6703-*1
TDJW-J301F



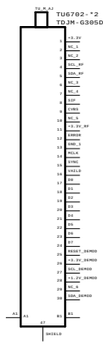
TU6702-*4
TDJM-C401D



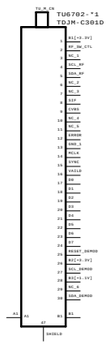
TU6702-*3
TDJM-B301F



TU6702-*2
TDJM-G305D



TU6702-*1
TDJM-C301D



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SECRET
LGElectronics

LG ELECTRONICS

MODEL	LM15U	DATE	2014-09-11
BLOCK	TU_SYMBOL_H	SHEET	19

LGE Internal Use Only

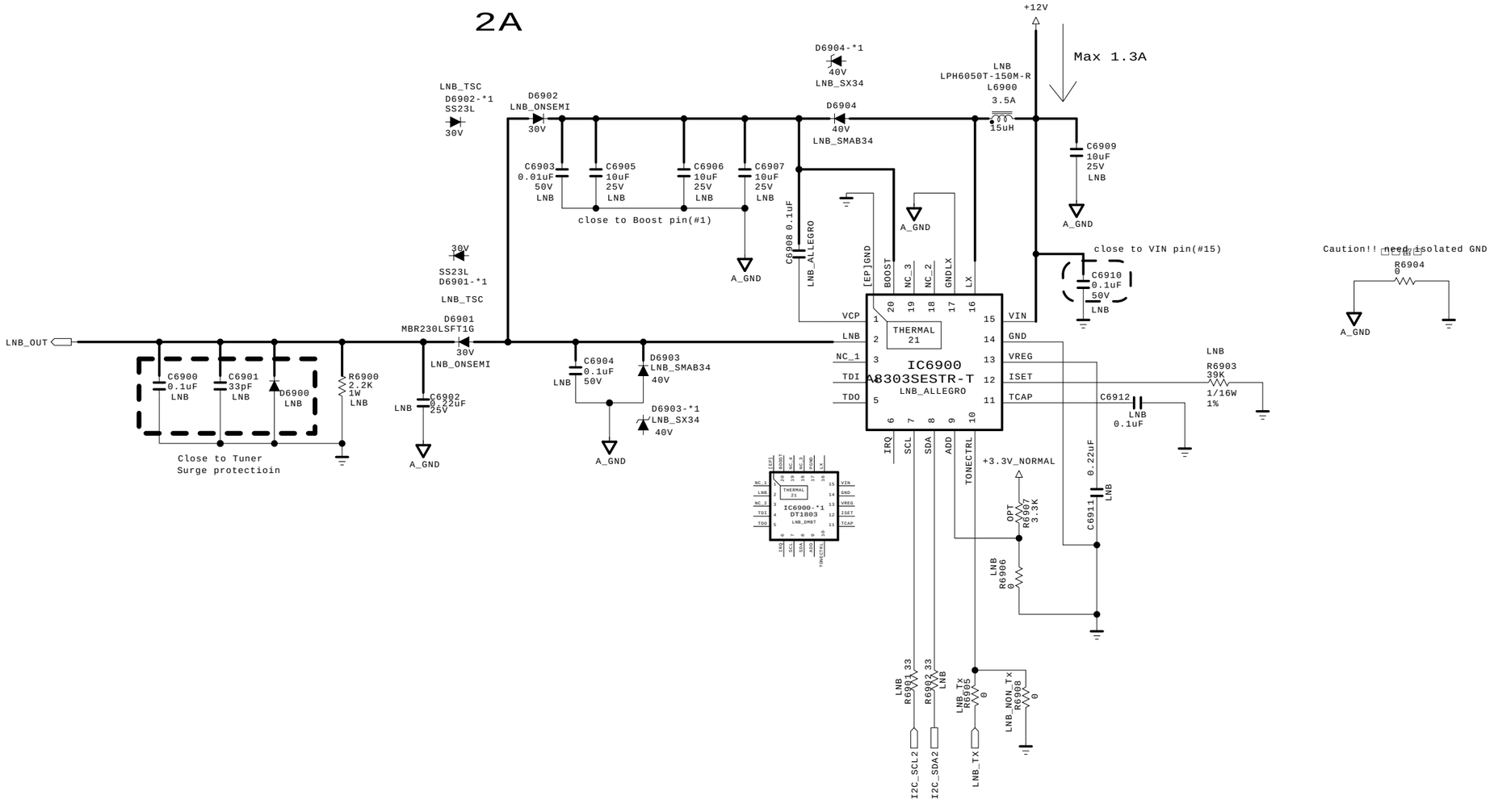
DVB-S2 LNB Part Allegro

(Option:LNB)

3A

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

Ouput trace widths should be sized to conduct at least 2A



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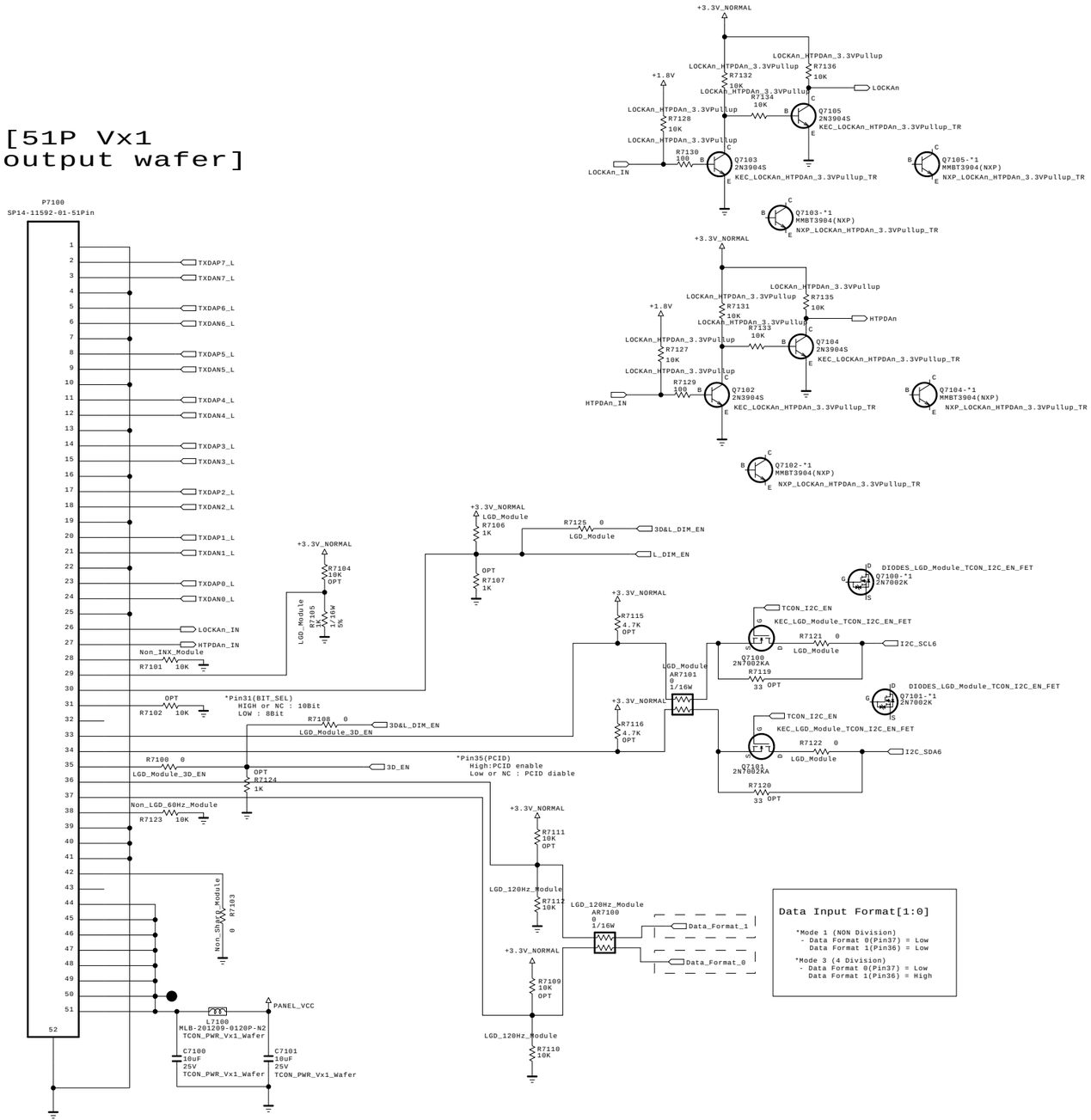
SECRET

LGElectronics

LG ELECTRONICS

MODEL	LM15U	DATE	2014-08-25
BLOCK	LNB	SHEET	20

[51P Vx1 output wafer]



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SECRET

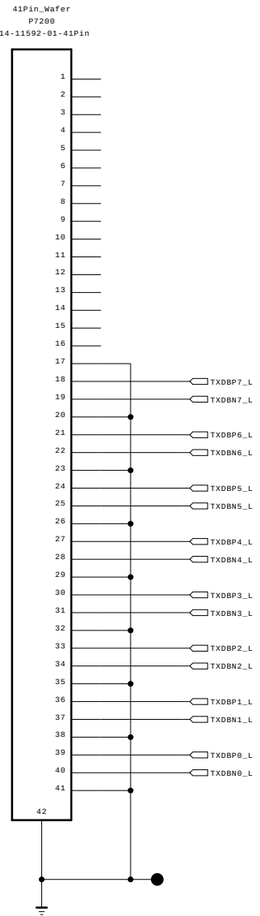
LGElectronics

LG ELECTRONICS

MODEL	LM15U	DATE	2014-08-27
BLOCK	Vx1 51P	SHEET	21

LGE Internal Use Only

[41P Vx1 output wafer]



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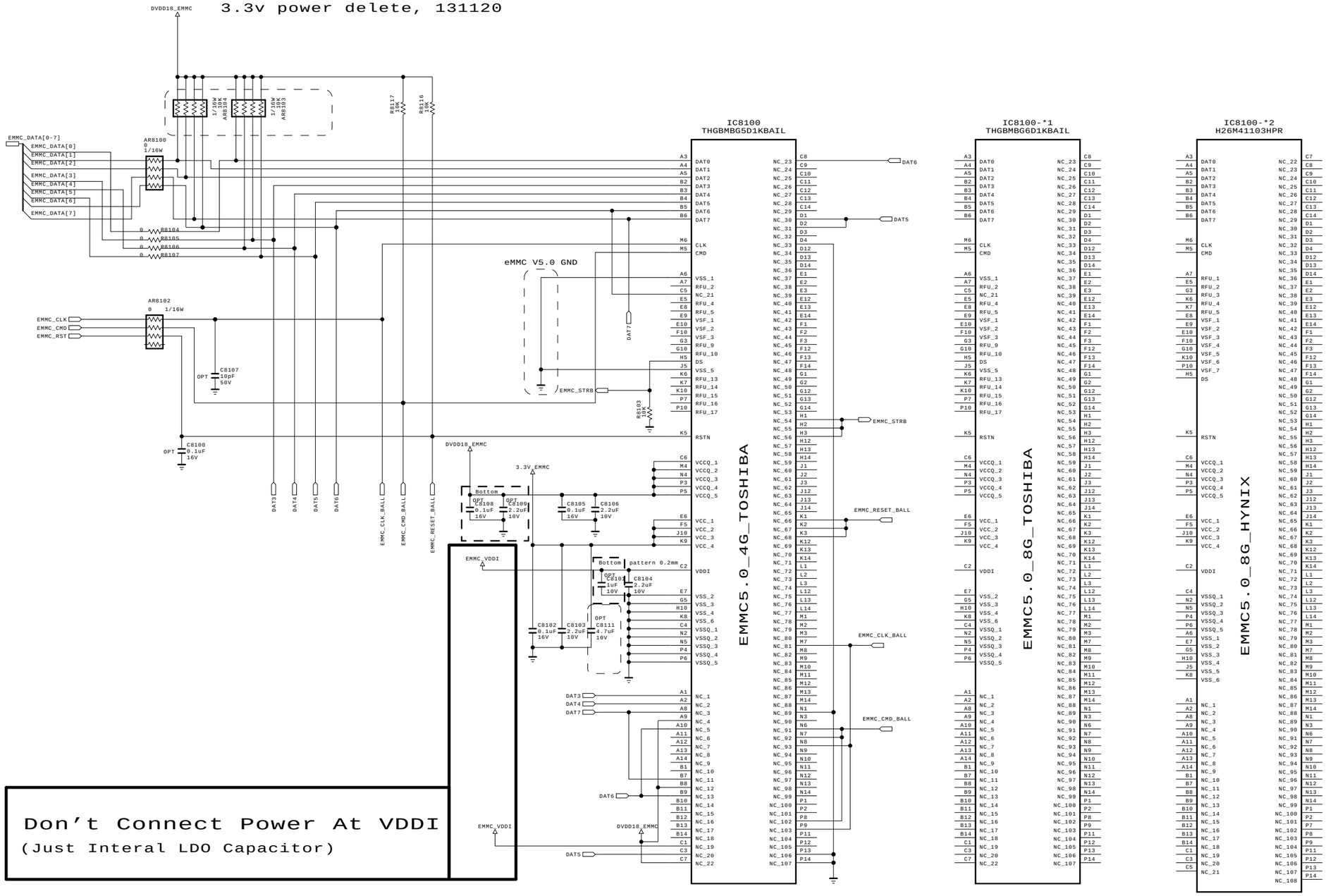
SECRET
LGElectronics

LG ELECTRONICS

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

eMMC I/F

3.3v power delete, 131120



Don’t Connect Power At VDDI
(Just Interal LDO Capacitor)

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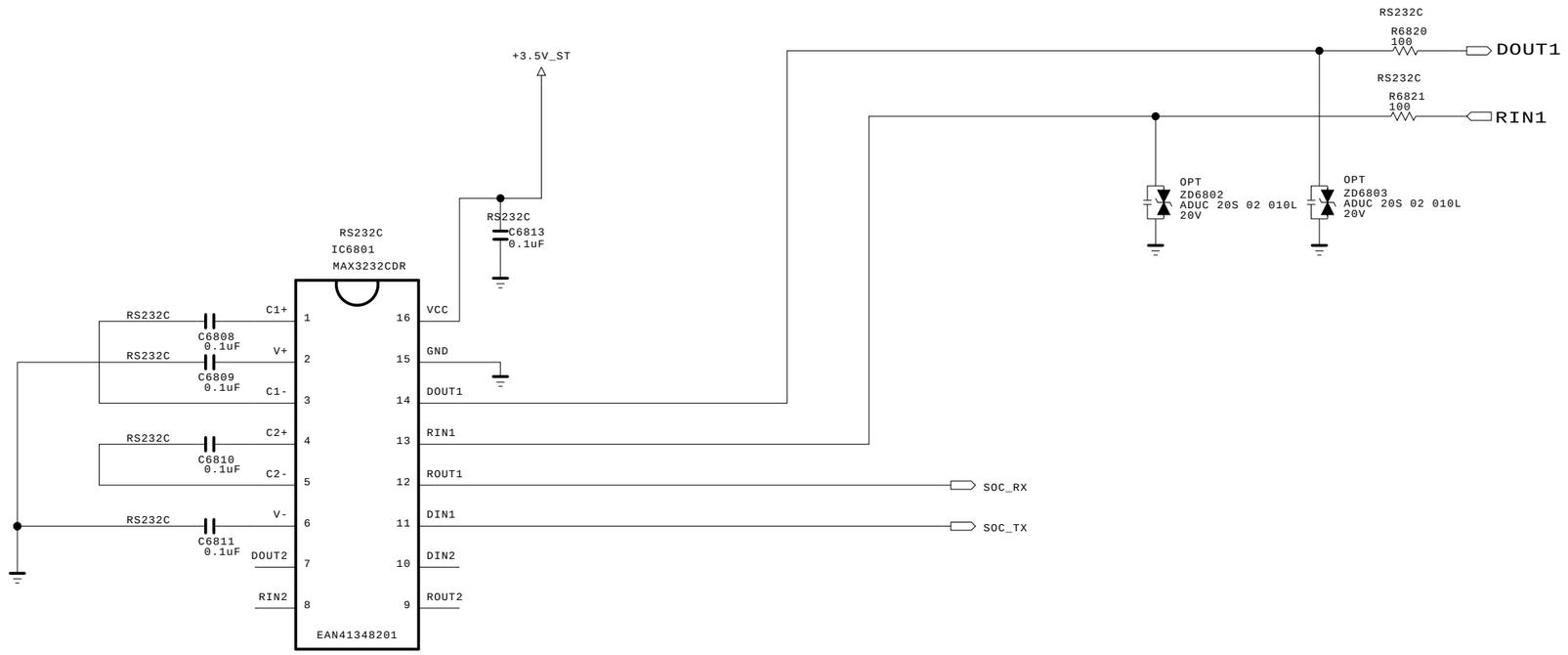
SECRET
LGElectronics

LG ELECTRONICS

MODEL	LM15U	DATE	2014-11-17
BLOCK	eMMC	SHEET	81 /

LGE Internal Use Only

RS-232C Control INTERFACE



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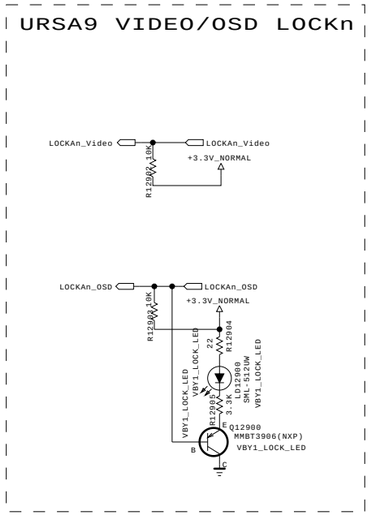
SECRET

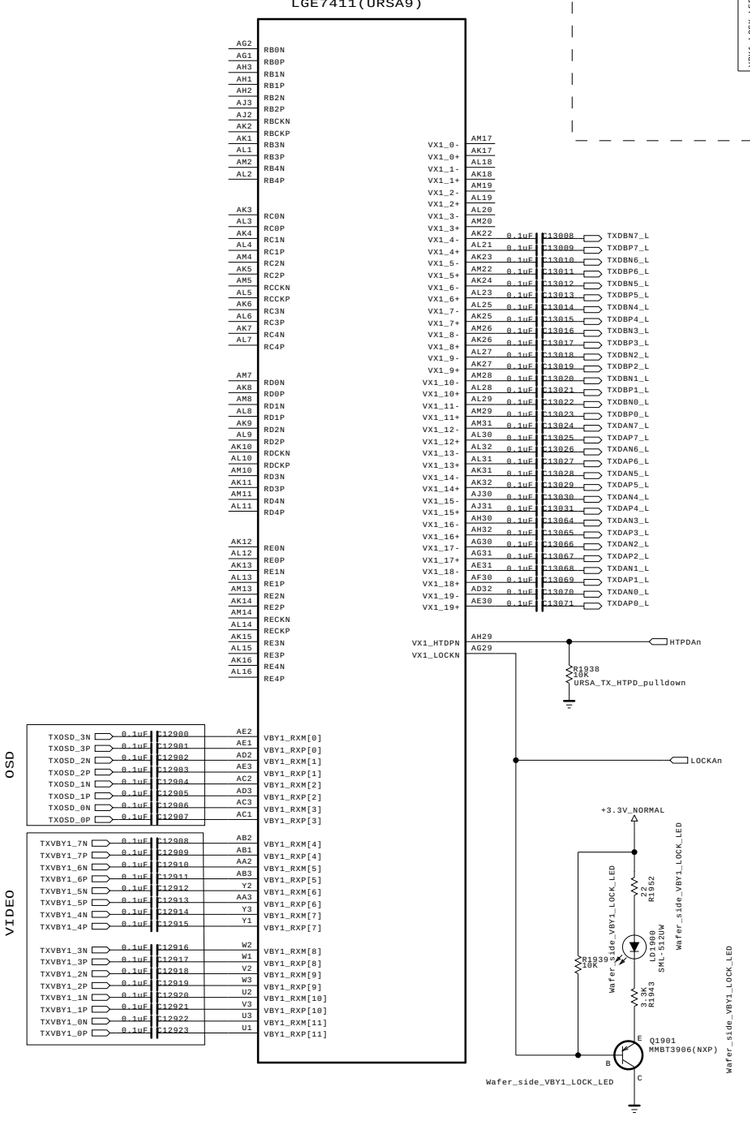
LGElectronics

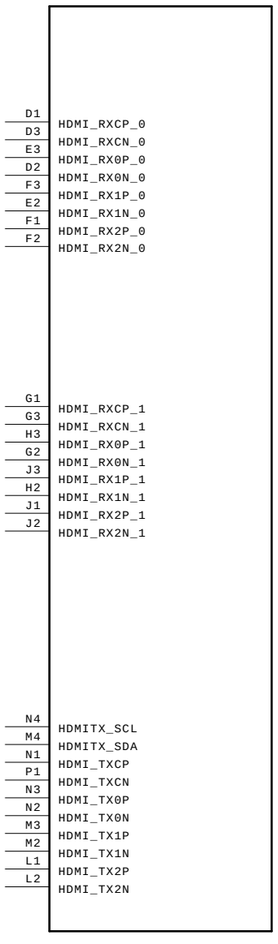
LG ELECTRONICS

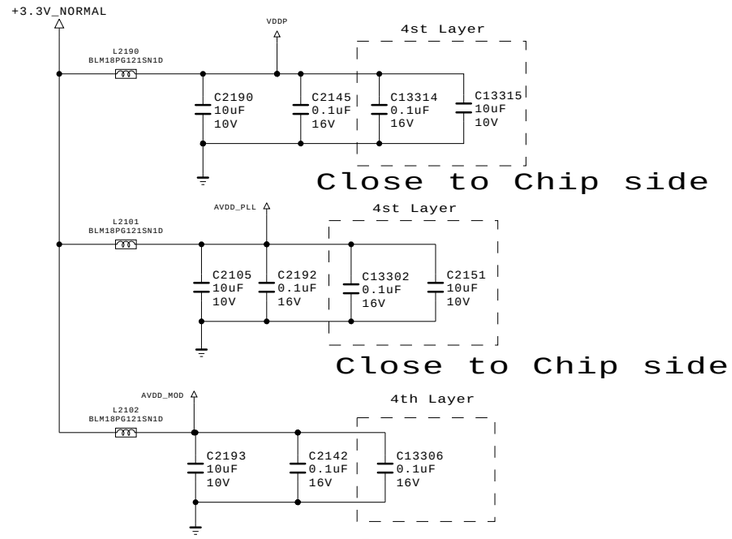
MODEL	UF71/7500	DATE	2014-05-19
BLOCK	RS232C	SHEET	22 /

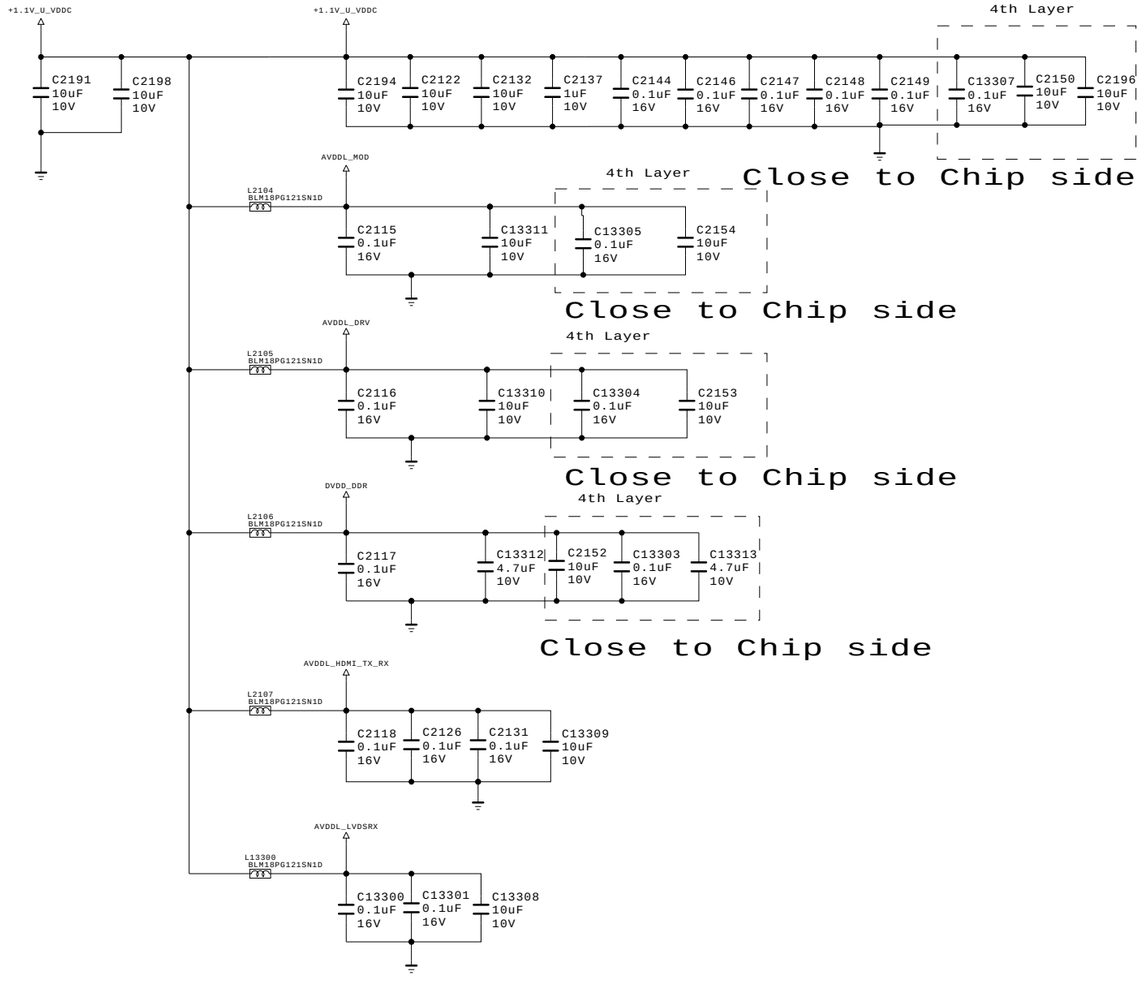
URSA9 VIDEO/OSD LOCKn











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SECRET
LGElectronics

LG ELECTRONICS

BSD-14Y-UD-128-02-HD

MODEL		DATE	2013.12.17
BLOCK	U_LVDS INPUT	SHEET	/

IC2500
LGE7411(URSA9)

DDR PHY VREF

IC2600
H5TQ1G63EFR-RDC

IC2700
H5TQ1G63EFR-RDC

IC2800
H5TQ1G63EFR-RDC

IC2900
H5TQ1G63EFR-RDC

* DDR_VTT

IC13100
AP2303MPTR-G1(PF)

Close to DDR

Decap removed

Close to DDR Power pin

Close to DDR Power pin
Decap removed

Close to DDR Power pin
Decap removed

4th layer

BSD-14Y-UD-131-HD

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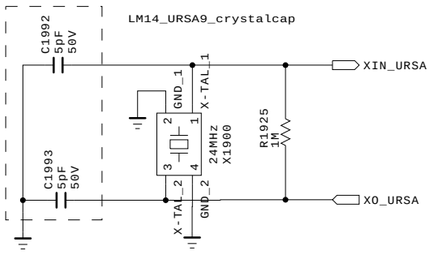
MODEL		DATE	2013.12.17
BLOCK	URSA7_DDR	SHEET	

SECRET
LGElectronics

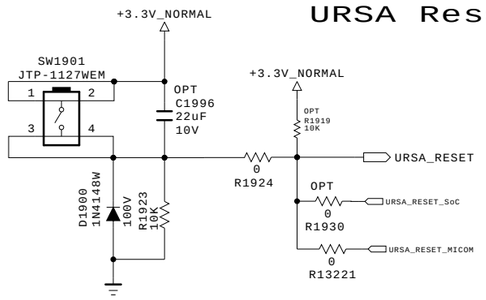
LG ELECTRONICS

LGE Internal Use Only

Clock for URSA9

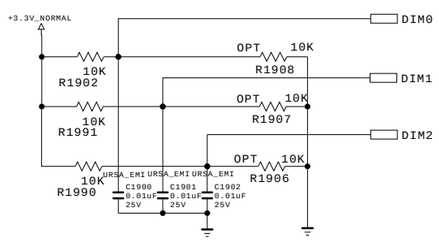


URSA Reset



Chip Config

Debug/ISP ADDR
Slave (Debug Port:0XB4,ISP:0X98)
CHIP_CONF:{DIM2,DIM1,DIM0}
CHIP_CONF=3'd7:111:boot from SPI Flash

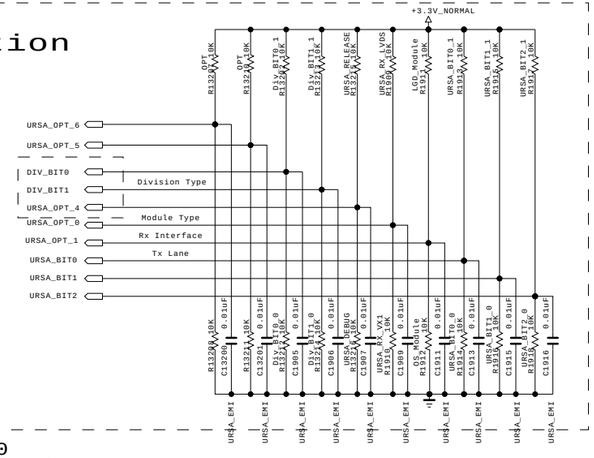


URSA9 Option

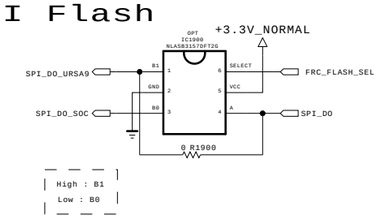
DIV_BIT [1/0]	MODULE DIVISION
0/0	NON DIVISION
0/1	2 DIVISION
1/0	4 DIVISION
1/1	8 DIVISION

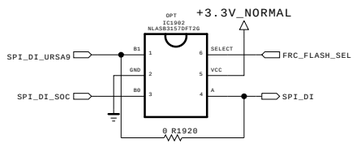
URSA_OPT_4	
	HIGH:URSA_PRINT_OFF
	LOW:URSA_PRINT_ON

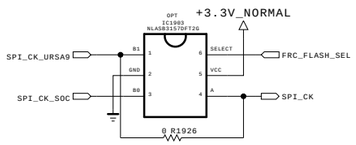
BIT [2/1/0]	Tx Lane
0/0/0	4K@120 (16lane)
0/0/1	4k@60 (8lane)
0/1/0	5k@120 (20lane)
0/1/1	OLED ULTRA HD
1/0/0	FHD@120 (4lane)
1/0/1	FHD@60 (2lane)
1/1/0	Reserved
1/1/1	Reserved



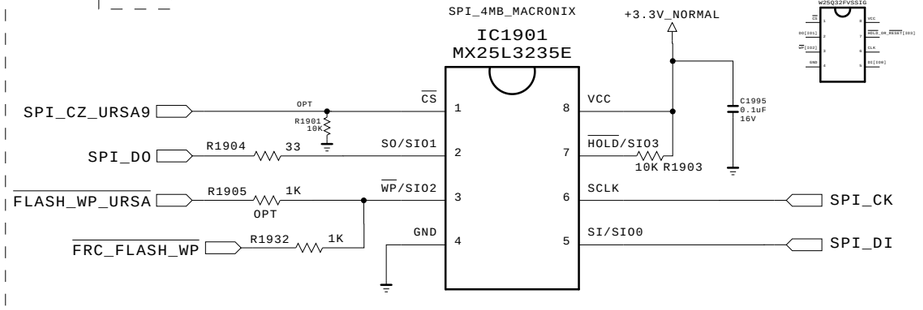
SPI Flash



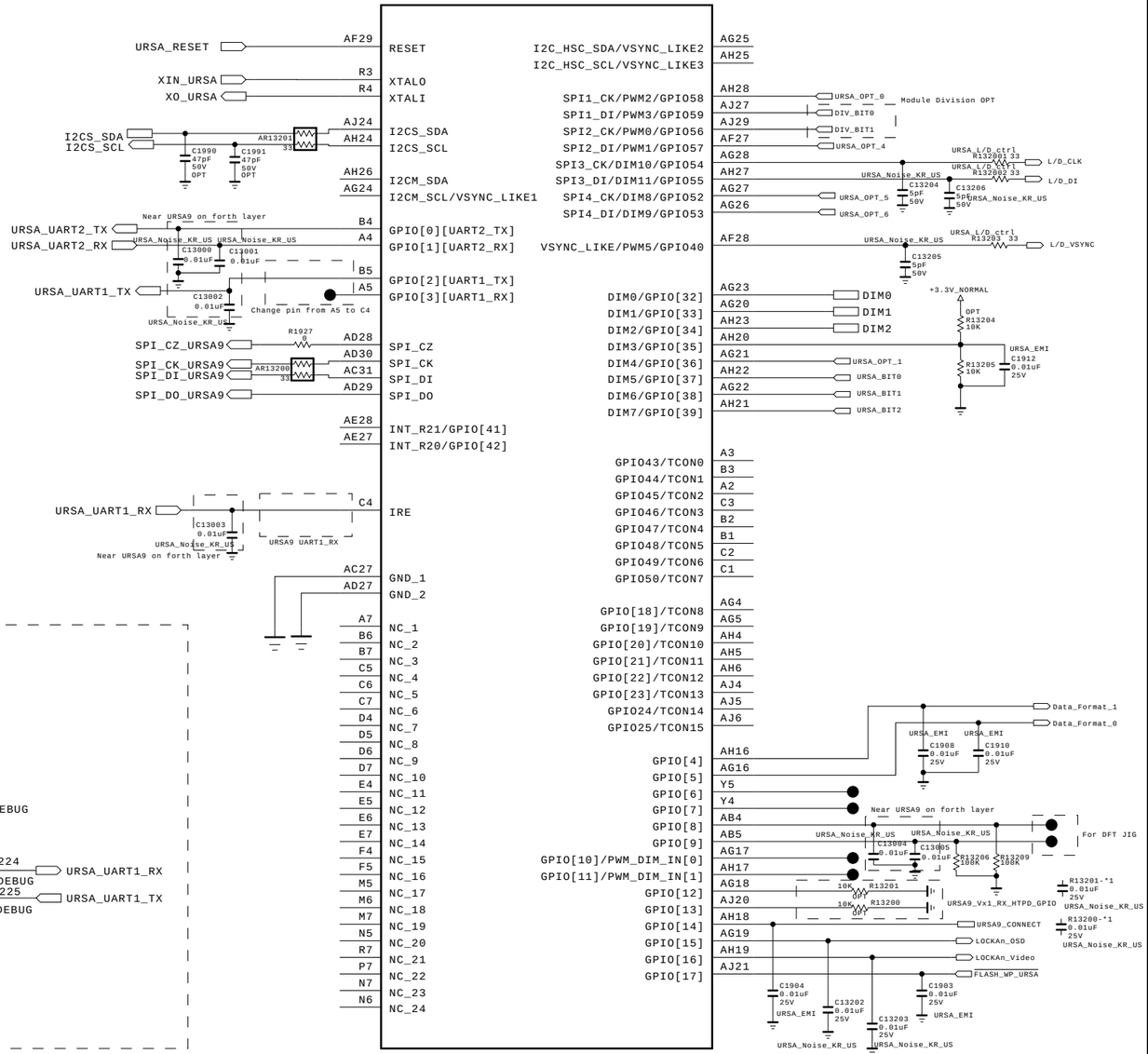




SPI_4MB_MACRONIX

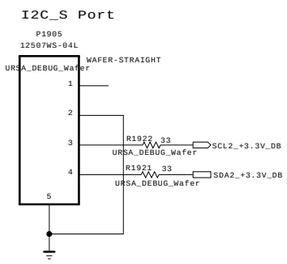


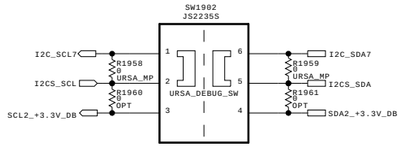
IC2500
LGE7411(URSA9)



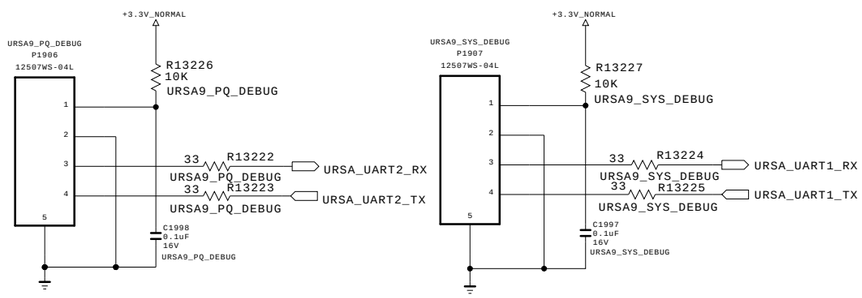
Debugging for URSA9

I2C_S Port





UART PQ/System Debug



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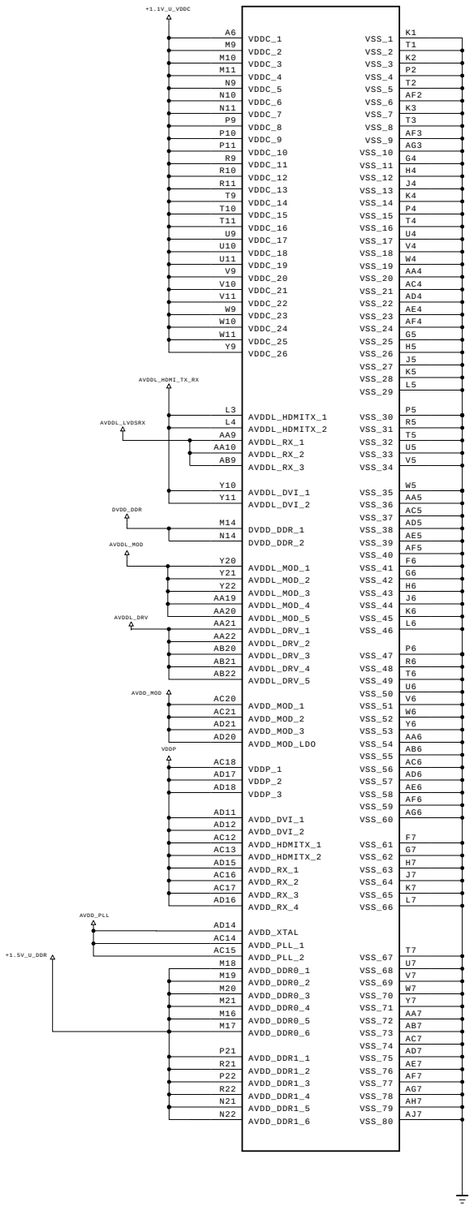
SECRET
LGElectronics

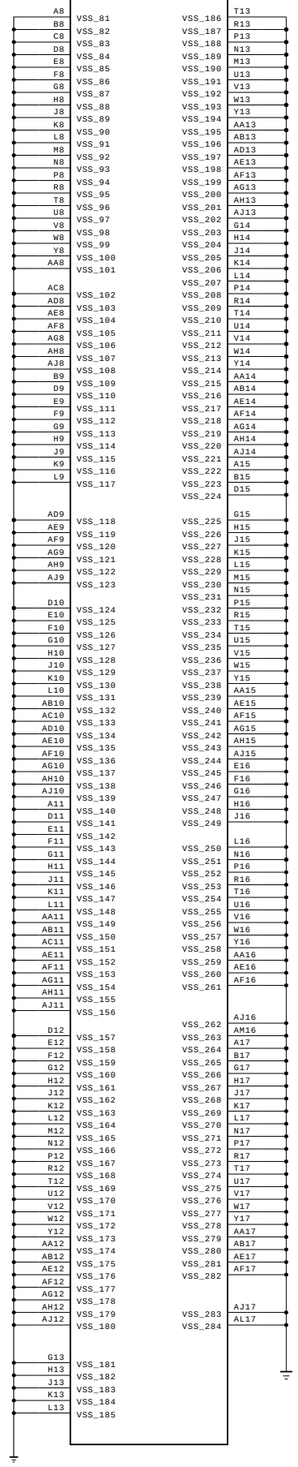
LG ELECTRONICS

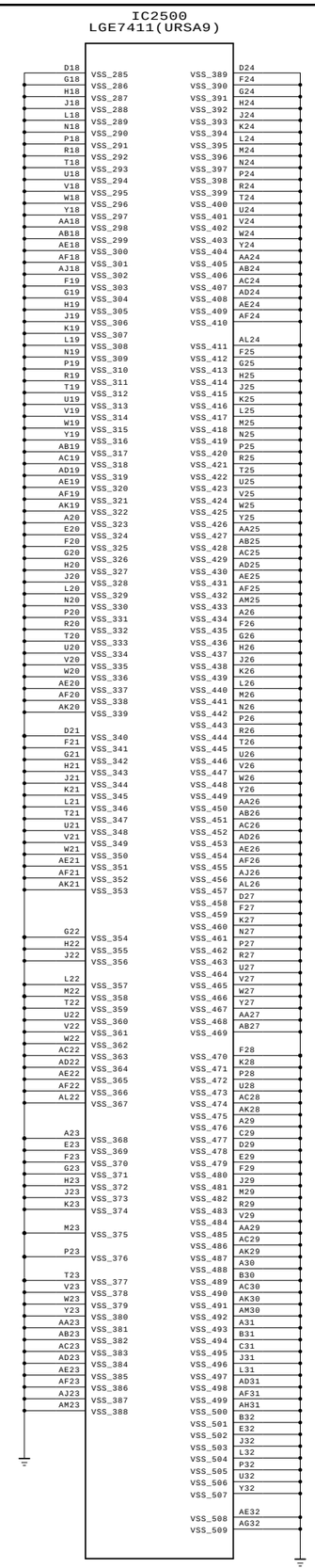
BSD-14Y-UD-132-HD

MODEL		DATE	2013.12.17
BLOCK		SHEET	/

LGE Internal Use Only







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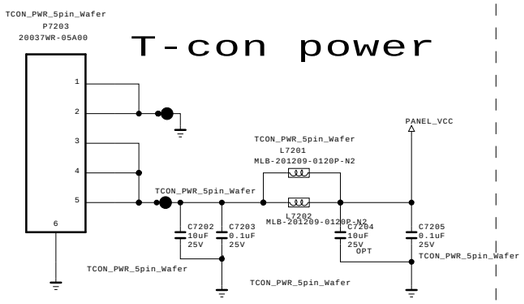
SECRET
LGElectronics

LG ELECTRONICS

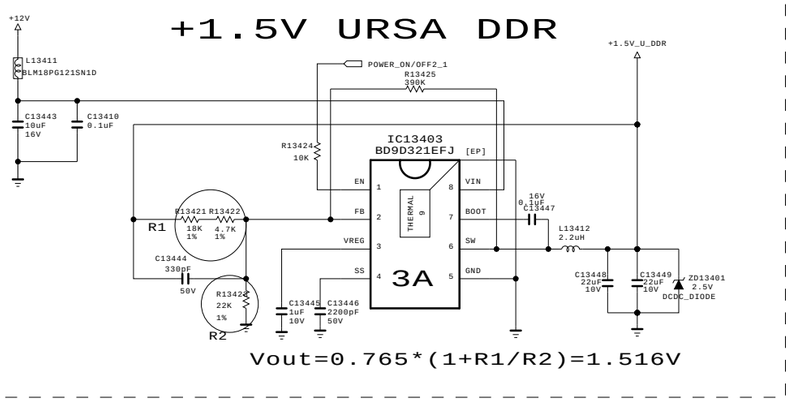
BSD-14Y-UD-133-HD

MODEL		DATE	2013.12.17
BLOCK	U_Power	SHEET	/

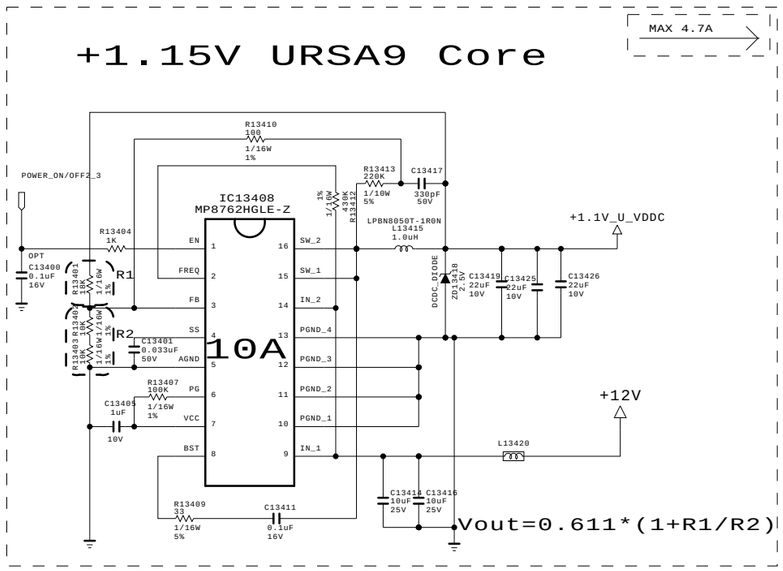
T-con power



+1.5V URSA DDR



+1.15V URSA9 Core



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SECRET
LGElectronics

LG ELECTRONICS

BSD-14Y-UD-134-HD

MODEL		DATE	2013.12.17
BLOCK		SHEET	/

LGE Internal Use Only

LM15U+URSA

CLIP Top Side for Covershield

M13500 OPT
EAG64250901

M13502 CLIP_EMI
EAG64250901

M13507 CLIP_EMI
EAG64250901

M13508 OPT
MDS62110209

CLIP 1 - PUSH TYPE

SMD Top Side for Covershield 8.5T

M13505 SMD_EMI
MDS62110209

M13509 EU_UF77_ESD
MDS62110209
FOR TUNER ESD

M13510 OPT
MDS62110221

M13511 SMD_EMI
MDS62110209

M13512 70UF77_EMI
MDS62110209

SMD Top for EMI 3.5T

M13514 70UF77_EMI
MDS62110213

M13515 OPT
MDS62110213

SMD bottom for ESD

SMD_BOT_3_10.5T GASKET_8.0X6.0X10.5H M4101 MDS62110225
SMD_BOT_6_10.5T GASKET_8.0X6.0X10.5H M4104 MDS62110225
SMD_BOT_7_10.5T GASKET_8.0X6.0X10.5H M4105 MDS62110225
SMD_BOT_1_10.5T GASKET_8.0X6.0X10.5H M4109 MDS62110225

SMD_BOT_3_8.5T GASKET_8.0X6.0X8.5H M4101-*1 MDS62110209
SMD_BOT_6_12.5T GASKET_8.0X6.0X12.5H M4104-*1 MDS62110217
SMD_BOT_7_12.5T GASKET_8.0X6.0X12.5H M4105-*1 MDS62110217
SMD_BOT_1_12.5T GASKET_8.0X6.0X12.5H M4109-*1 MDS62110217

SMD_BOT_3_9.5T GASKET_8.0X6.0X9.5H M4101-*2 MDS62110214
SMD_BOT_6_9.5T GASKET_8.0X6.0X9.5H M4104-*2 MDS62110214
SMD_BOT_7_9.5T GASKET_8.0X6.0X9.5H M4105-*2 MDS62110214
SMD_BOT_5_10.5T GASKET_8.0X6.0X10.5H M4103 MDS62110225

SMD_BOT_5_8.5T GASKET_8.0X6.0X8.5H M4103-*1 MDS62110209

SMD_BOT_11_10.5T GASKET_8.0X6.0X10.5H M4114 MDS62110225
SMD_BOT_12_10.5T GASKET_8.0X6.0X10.5H M4117 MDS62110225

SMD_BOT_11_12.5T GASKET_8.0X6.0X12.5H M4114-*1 MDS62110217
SMD_BOT_12_12.5T GASKET_8.0X6.0X12.5H M4117-*1 MDS62110217
SMD_BOT_4_10.5T GASKET_8.0X6.0X10.5H M4102 MDS62110225
SMD_BOT_4_12.5T GASKET_8.0X6.0X12.5H M4102-*1 MDS62110217

HDMI1
HDMI1_BOT_SMD_10.5T GASKET_8.0X6.0X10.5H M4100 MDS62110225
HDMI3_BOT_SMD_11.5T GASKET_8.0X6.0X11.5H M4100-*3 MDS62110228
HDMI1_BOT_SMD_8.5T GASKET_8.0X6.0X8.5H M4100-*1 MDS62110209

HDMI2
HDMI2_BOT_SMD_10.5T GASKET_8.0X6.0X10.5H M4108 MDS62110225
HDMI2_BOT_SMD_11.5T GASKET_8.0X6.0X11.5H M4108-*2 MDS62110228
HDMI2_BOT_SMD_8.5T GASKET_8.0X6.0X8.5H M4108-*1 MDS62110209

HDMI3
HDMI3_BOT_SMD_8.5T GASKET_8.0X6.0X8.5H M4115 MDS62110209
HDMI3_BOT_SMD_10.5T GASKET_8.0X6.0X10.5H M4115-*1 MDS62110225
HDMI3_BOT_SMD_9T GASKET_8.0X6.0X9.0H M4115-*2 MDS62110226

USB3
USB3_BOT_SMD_10.5T GASKET_8.0X6.0X10.5H M4111 MDS62110225
USB1_BOT_SMD_11.5T GASKET_8.0X6.0X11.5H M4111-*2 MDS62110228
USB3_BOT_SMD_8.5T GASKET_8.0X6.0X8.5H M4111-*1 MDS62110209

USB2
USB2_BOT_SMD_10.5T GASKET_8.0X6.0X10.5H M4113 MDS62110225
USB2_BOT_SMD_11.5T GASKET_8.0X6.0X11.5H M4113-*2 MDS62110228
USB2_BOT_SMD_8.5T GASKET_8.0X6.0X8.5H M4113-*1 MDS62110209

USB1
USB1_BOT_SMD_8.5T GASKET_8.0X6.0X8.5H M4116 MDS62110209
USB1_BOT_SMD_10.5T GASKET_8.0X6.0X10.5H M4116-*1 MDS62110225

SMD_BOT_9_10.5T GASKET_8.0X6.0X10.5H M4107 MDS62110225
SMD_BOT_2 GASKET_8.0X6.0X10.5H M4112 MDS62110225
SMD_BOT_8_10.5T GASKET_8.0X6.0X10.5H M4106 MDS62110225
SMD_BOT_10_10.5T GASKET_8.0X6.0X10.5H M4110 MDS62110225
SMD_BOT_13_10.5T GASKET_8.0X6.0X10.5H M4118 MDS62110225
SMD_BOT_14_10.5T GASKET_8.0X6.0X10.5H M4119 MDS62110225
SMD_BOT_15_10.5T GASKET_8.0X6.0X10.5H M4120 MDS62110225
SMD_BOT_16_10.5T GASKET_8.0X6.0X10.5H M4121 MDS62110225
SMD_BOT_17_10.5T GASKET_8.0X6.0X10.5H M4122 MDS62110225

THE ⚠ SYMBOL MARK OF THIS SCHEMETIC 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 SCHEMETIC.

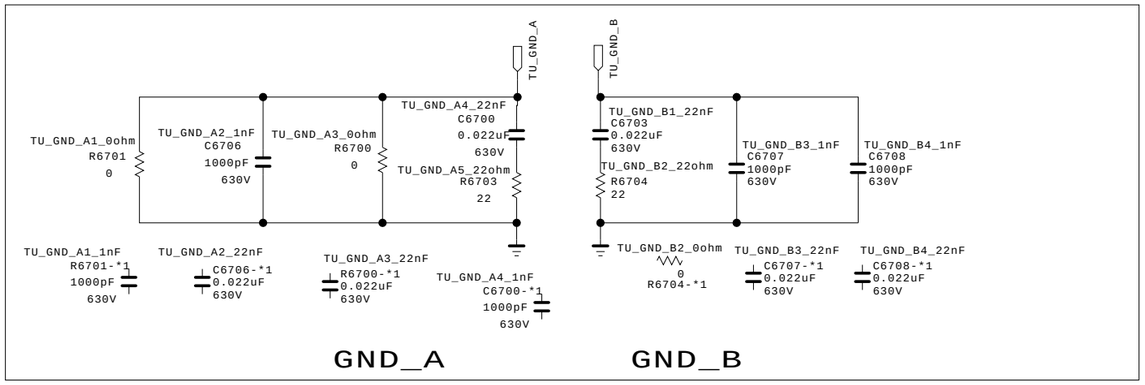
SECRET
LGElectronics

LG ELECTRONICS
CLIP TYPE
14.06.10

MODEL		DATE	
BLOCK		SHEET	/

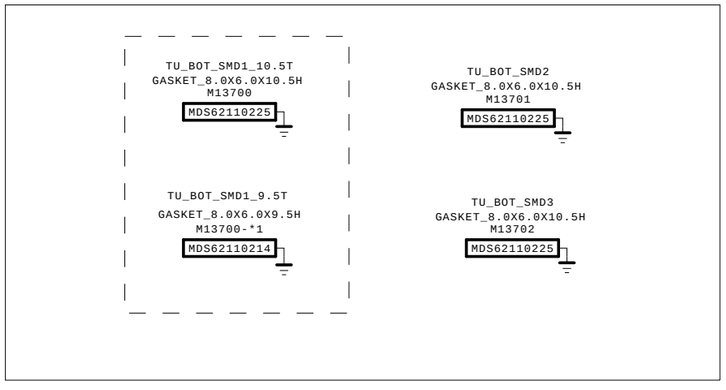
LM15U ONLY, LM15U+URSA

TUNER EMS GND SEPERATION



TU_GND_A	EU/CIS	AJJA	TW/COL	CN/HK	KR	North.AM	BR	JP
GND A_1	0 ohm	0 ohm			X	0 ohm	X	0 ohm
GND A_2	X	X			22 nF	X	22 nF	1 nF
GND A_3	X	0 ohm			X	0 ohm	22 nF	0 ohm
GND A_4	X	X			22 nF	X	22 nF	1 nF
GND A_5	X	X			22 ohm	X	22 ohm	22 ohm

TU_GND_B	EU/CIS	AJJA	TW/COL	CN/HK	KR	North.AM	BR	JP
GND B_1	X	X			22 nF	X	22 nF	X
GND B_2	X	X			22 ohm	X	22 ohm	X
GND B_3	1 nF	1 nF			22 nF	1 nF	22 nF	1 nF
GND B_4	1 nF	1 nF			22 nF	1 nF	22 nF	1 nF



TU_BOT_SMD	EU/CIS	AJJA	TW/COL	CN/HK	KR	North.AM	BR	JP
SMD1								
SMD2								
SMD3								

THE ⚠ SYMBOL MARK OF THIS SCHEMETIC 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 SCHEMETIC.

SECRET

LGElectronics

LG ELECTRONICS

MODEL	LM15U	DATE	2014-11-11
BLOCK	Tuner_GND	SHEET	137

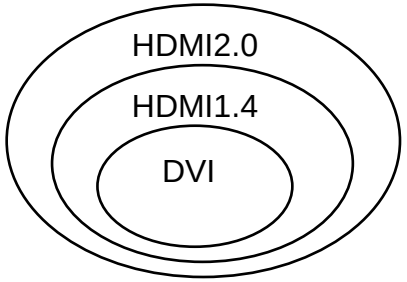

LG
Life's Good

Overview for `15 ULTRA HD Model (Hardware)

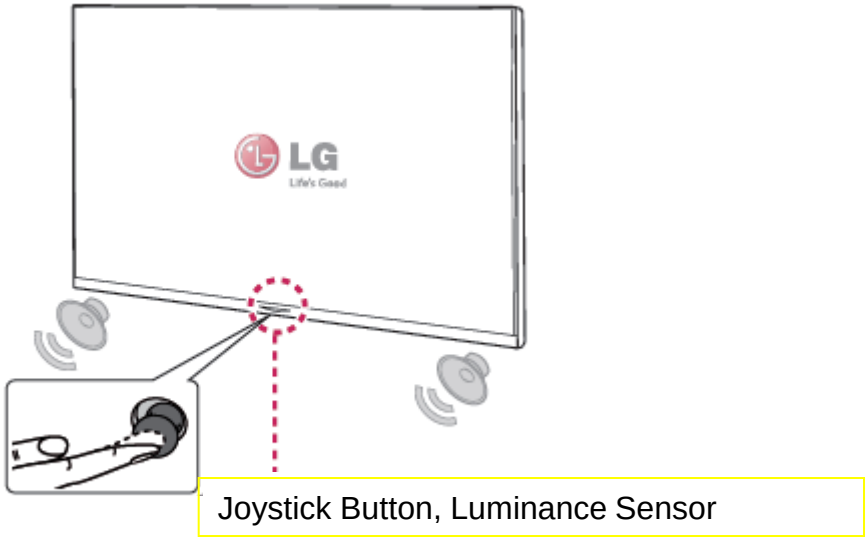
`15 ULTRA HD New Feature 1. HDMI

구 분	HDMI1.4	HDMI2.0 3Gbps	HDMI2.0 6Gbps 4K@60Hz 4:2:2 10bit	HDCP2.2	ARC	MHL2.1	HDMI1.4 Legacy
HDMI 3	O	O	x	O	X	X	X
HDMI 2	O	O	O (Only UF85↑)	O	O	X	O
HDMI 1	O	O	O	O	X	X	O

It is different form each HDMI port spec.
We offer a HDMI cable for HDMI 1.4 legacy issue.



`15 ULTRA HD New Feature 2. Sub Assy (Joy stick button, lum. sensor)



1. Using the Joystick Button

- Joystick button is located below the screen of TV
- You can operate the TV by pressing the button or moving the joystick left, right, up, or down

⏻	Turns the power off.
⚙	Accesses the quick settings.
✕	Clears on-screen displays and returns to TV viewing.
⇄	Changes the input source.

2. Luminance Sensor

Adjusts the image quality and brightness based on the surrounding environment.

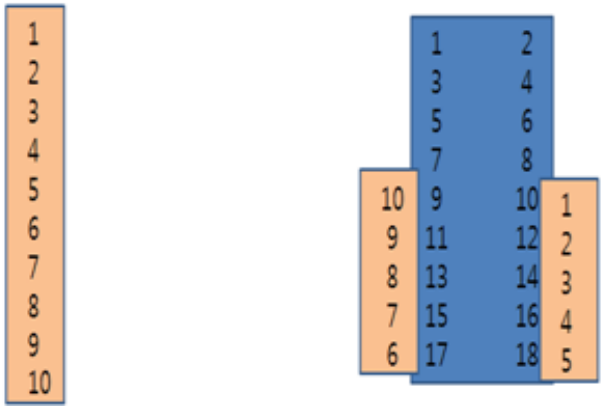
2015 model : Luminance sensor

`14 ULTRA HD New Feature 3. Sub Assy (WiFi)

UF77~UF94

	BT	WiFi
16:9	802.11n (BT Combo) 14” Carry over	

IR (10p) – Main (18p) 802.11n combo + IR



Pin name	Sub Wafer	Main Wafer
GND	1	10
Key1	2	12
Key2	3	14
3.5V	4	16
GND	5	18
LED/Logo	6	17
IR	7	15
GND	8	13
SCL	9	11
SDA	10	9

LCD TV Repair Guide

`15 years New Models

< Applicable Model >

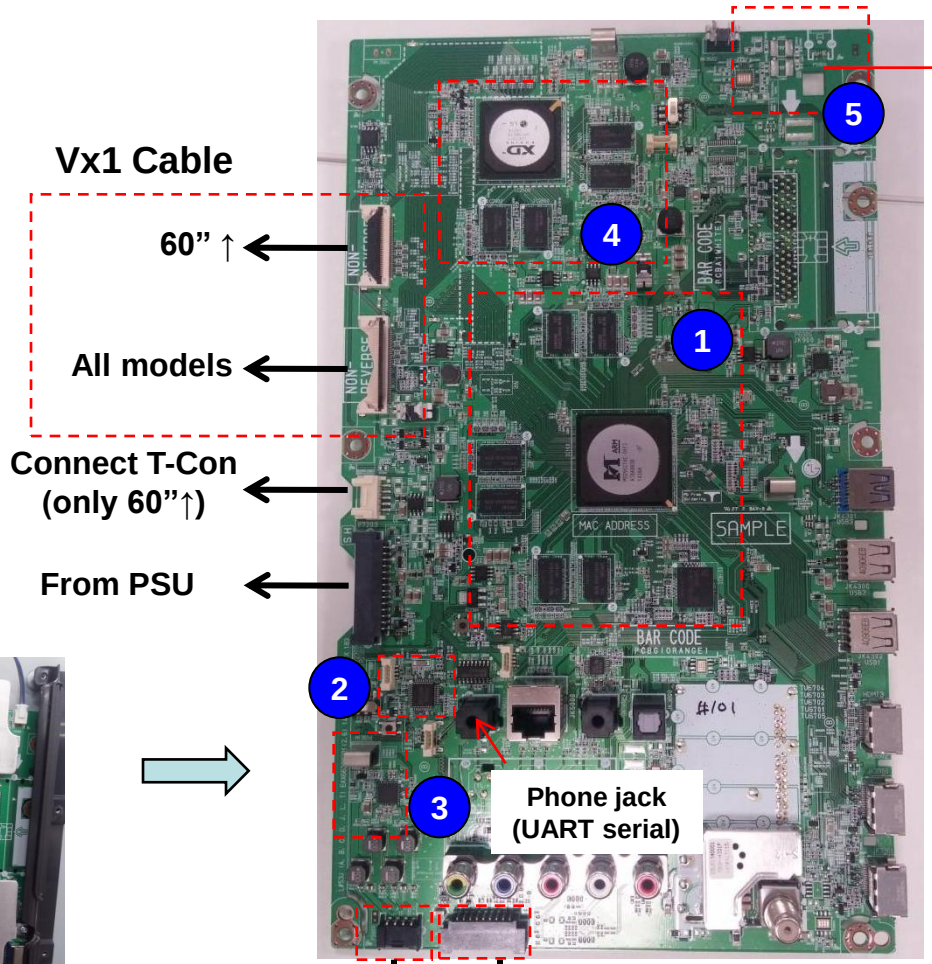
UF77/85 series

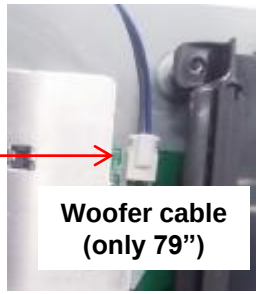
Main PCB

All UF77/85 series

PCB SIZE: 300X183(All model)

< 60” ↑> < 55”↓>

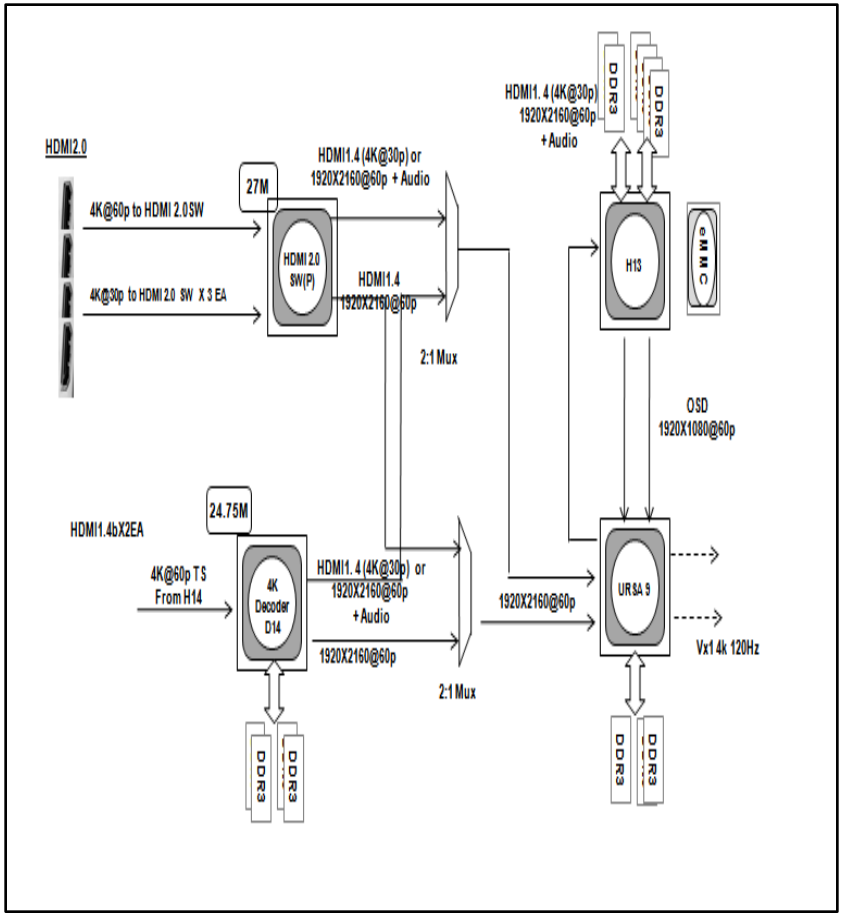




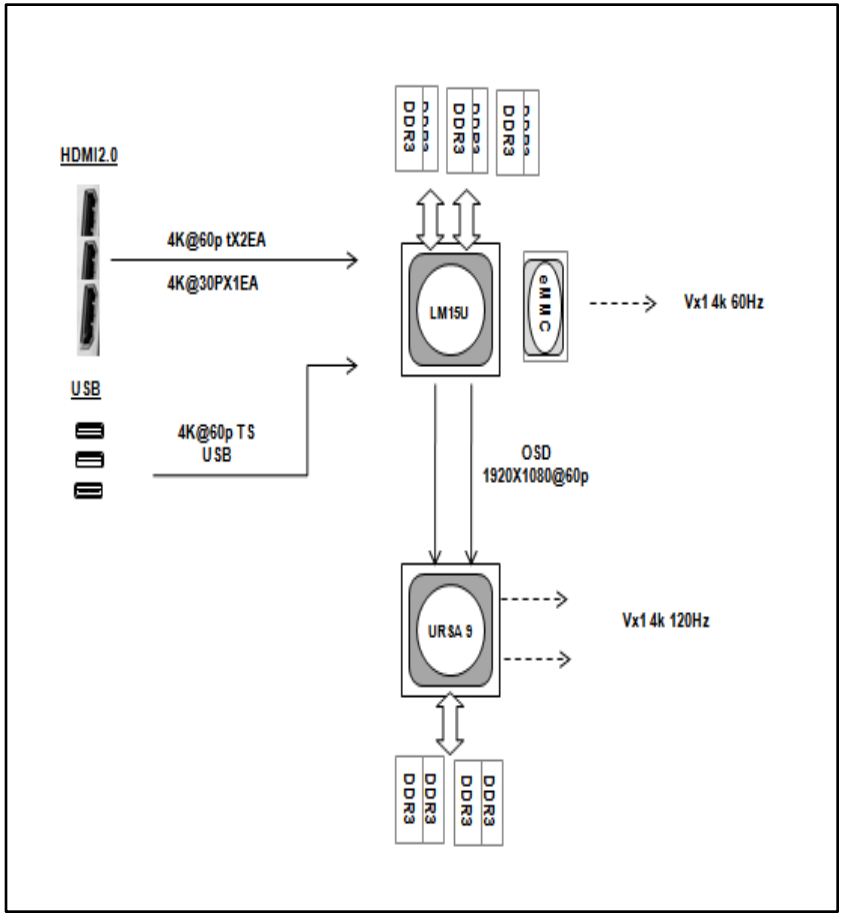
1. Main processor_(LM15U)
   DDR Memory
   eMMC Memory
2. Micom for Key/IR sensing
3. Audio AMP
4. Image processor(URSA9)
   DDR Memory
5. Sub Woofer wafer
   (only 79”)

0. System Overview (Main External)

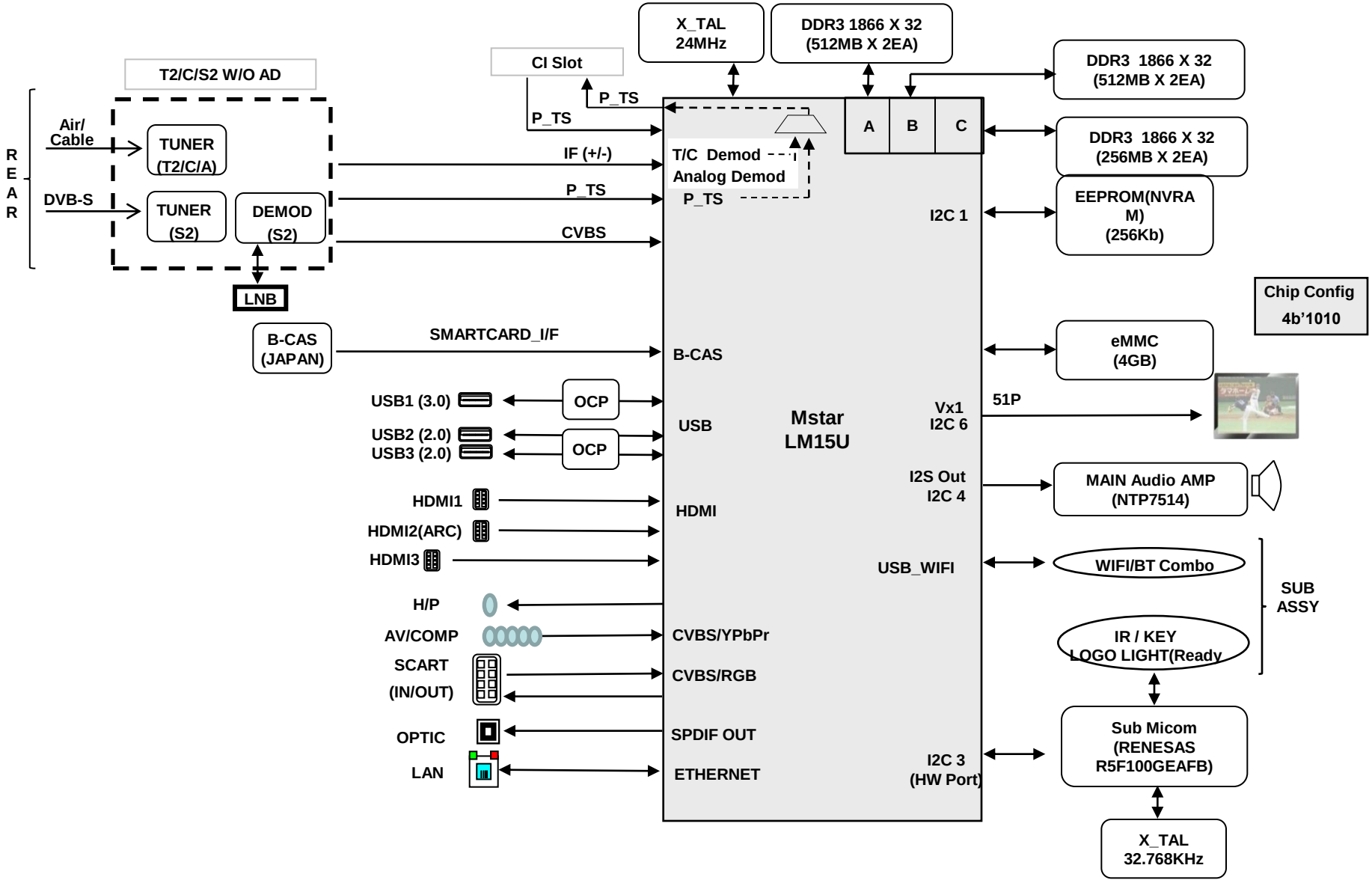
<14 year UHD model>



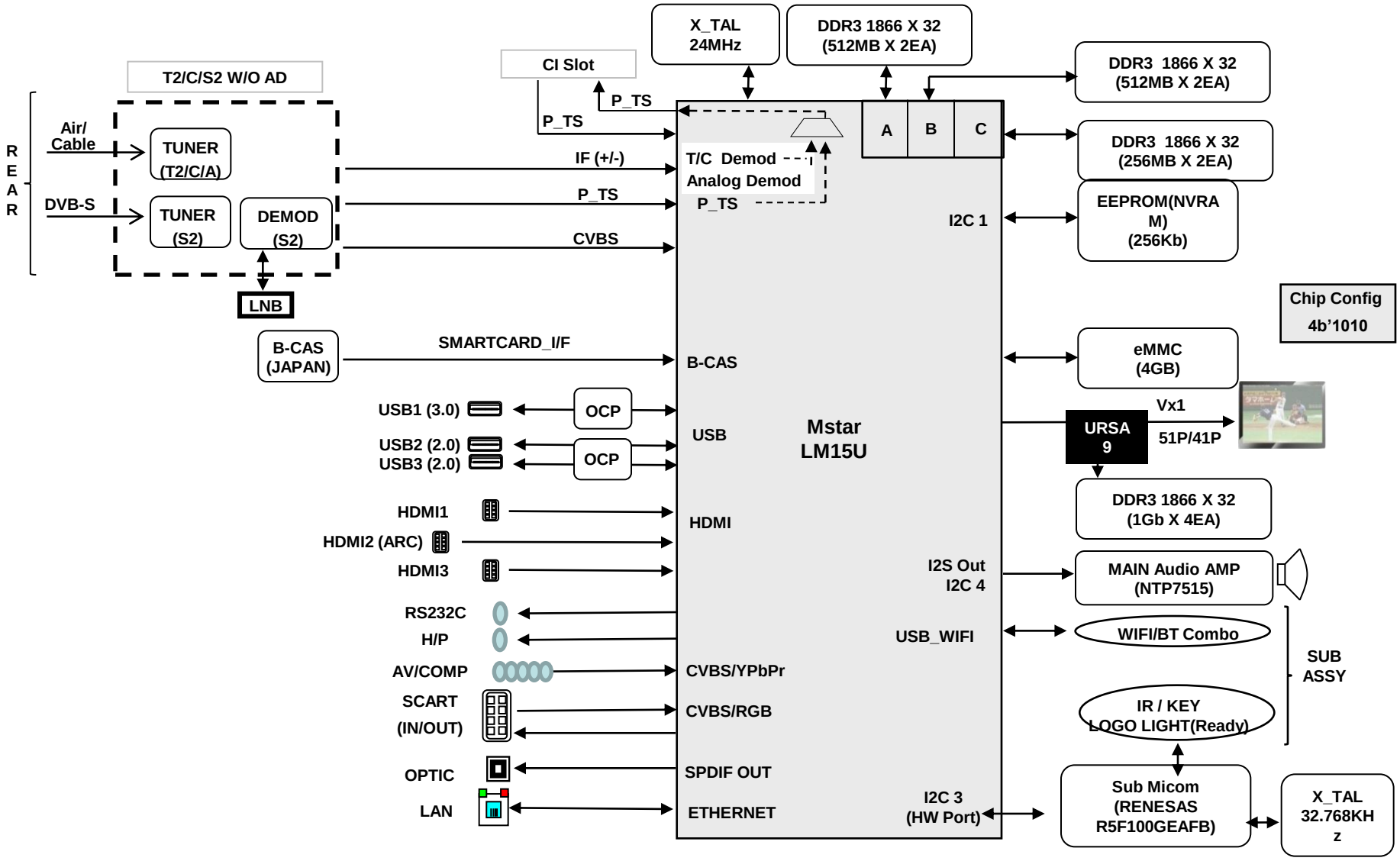
<15 year UHD model>



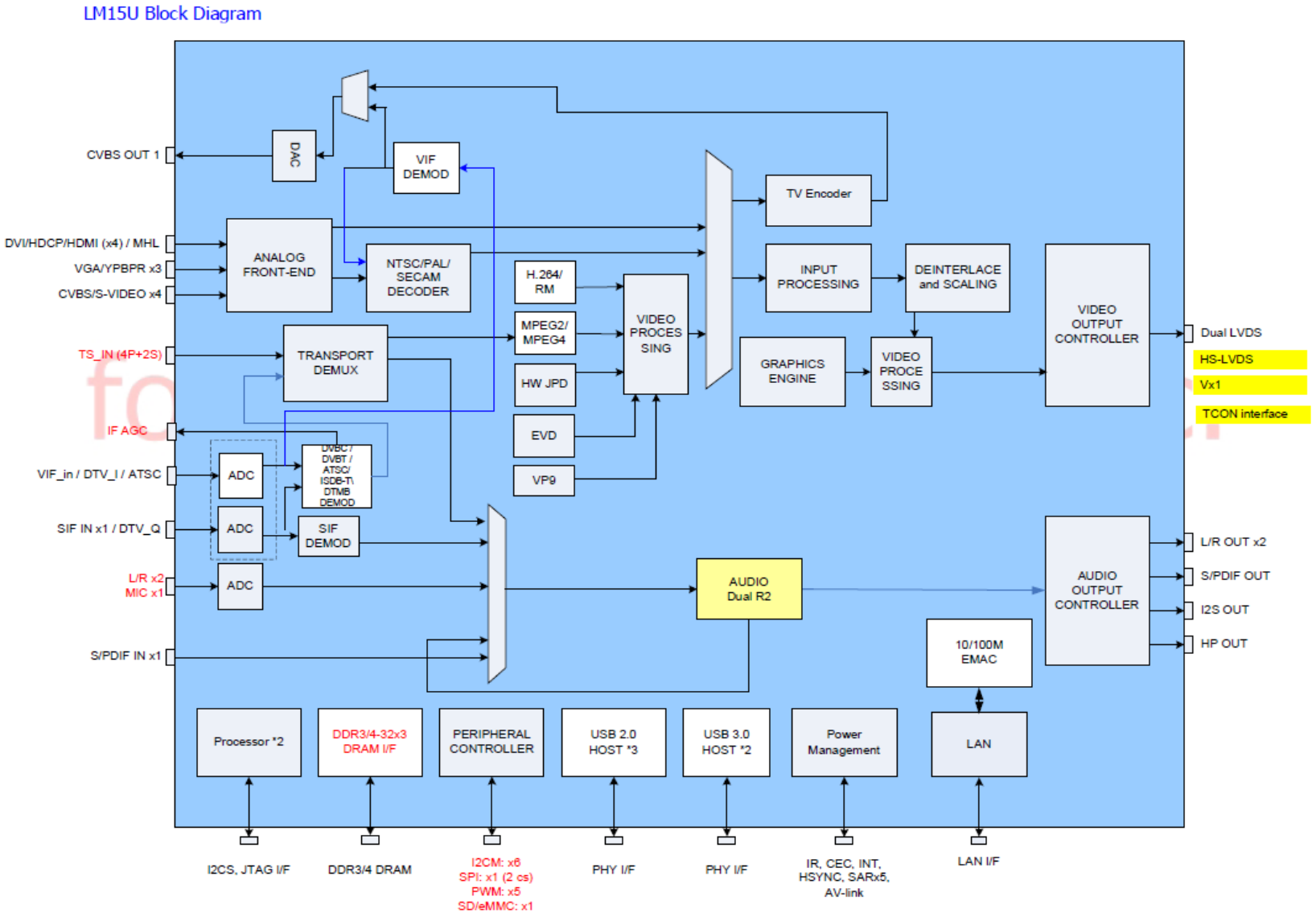
1. LM15U Circuit Block Diagram



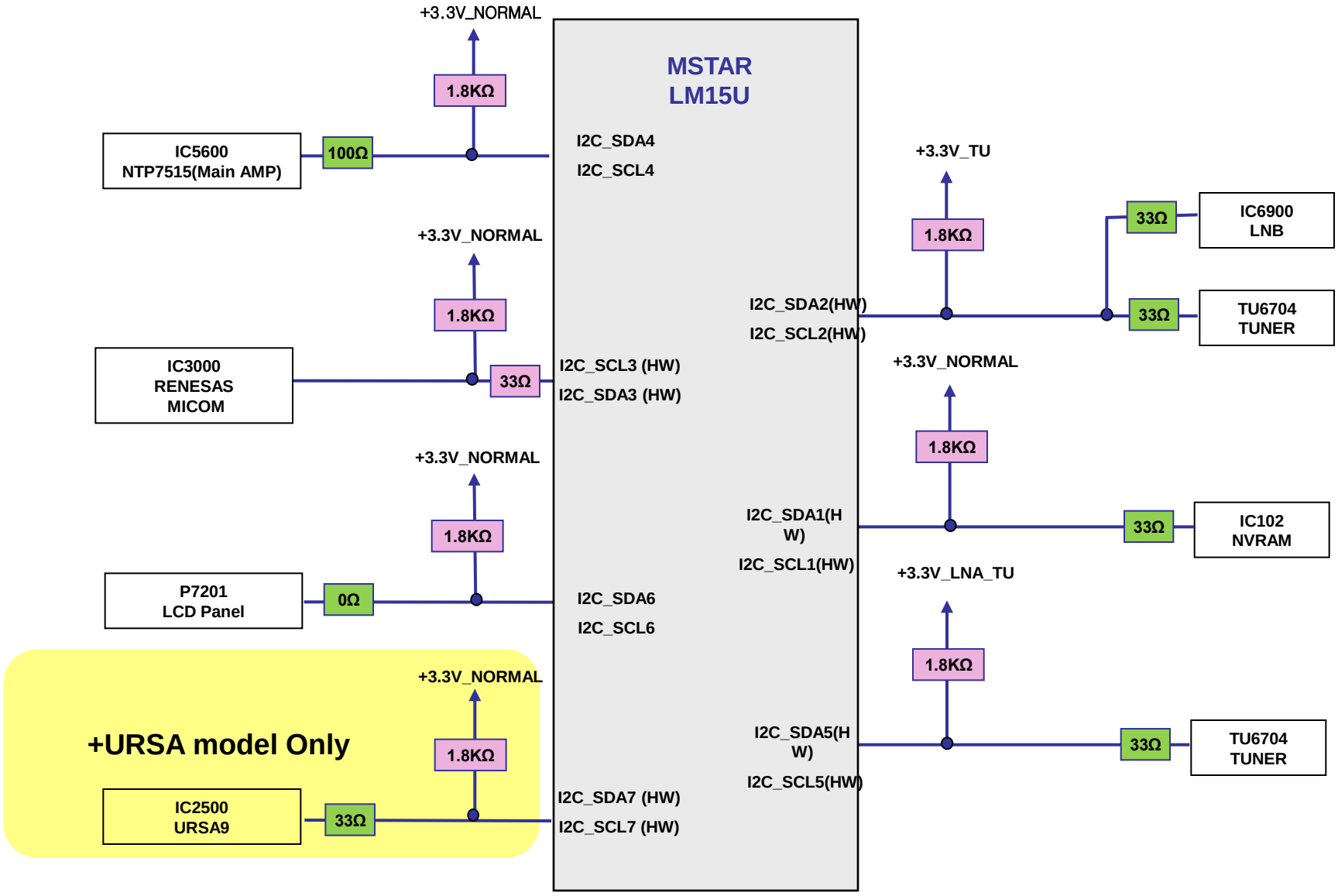
1-1.LM15U (+ URSA9) Circuit Block Diagram



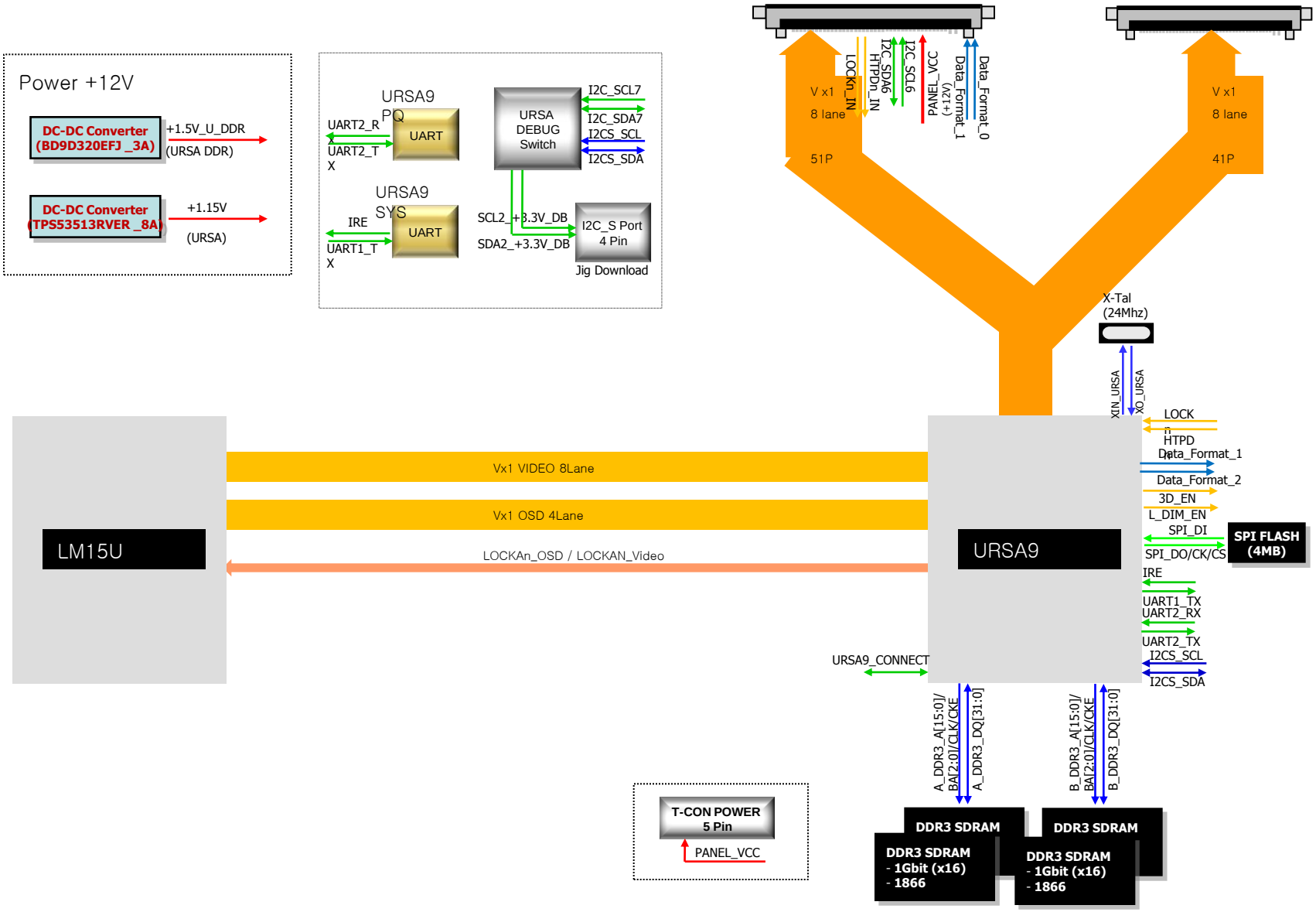
2. LM15U Block Diagram (Internal)



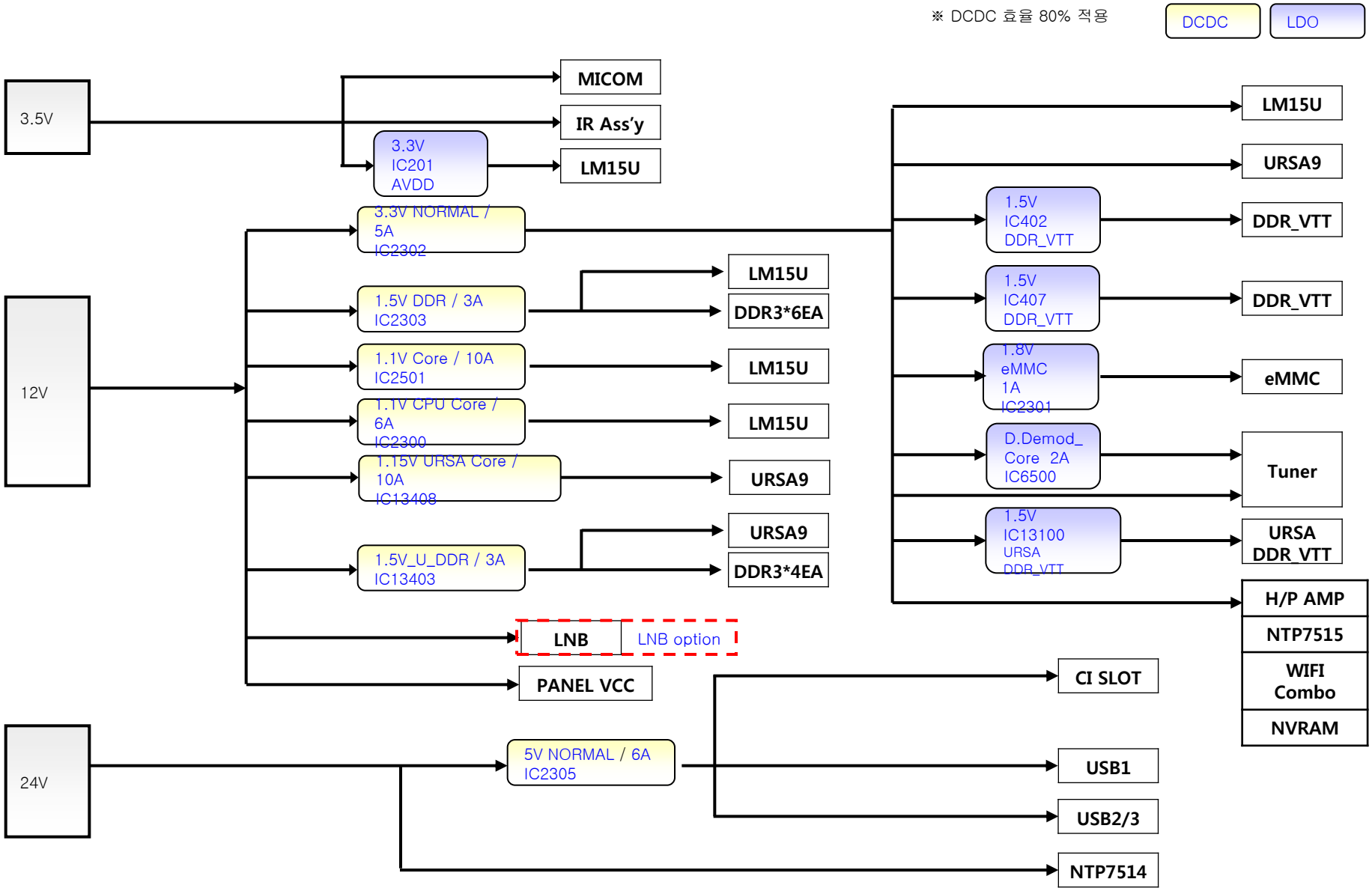
3. LM15U(+ URSA9) I2C Block Diagram



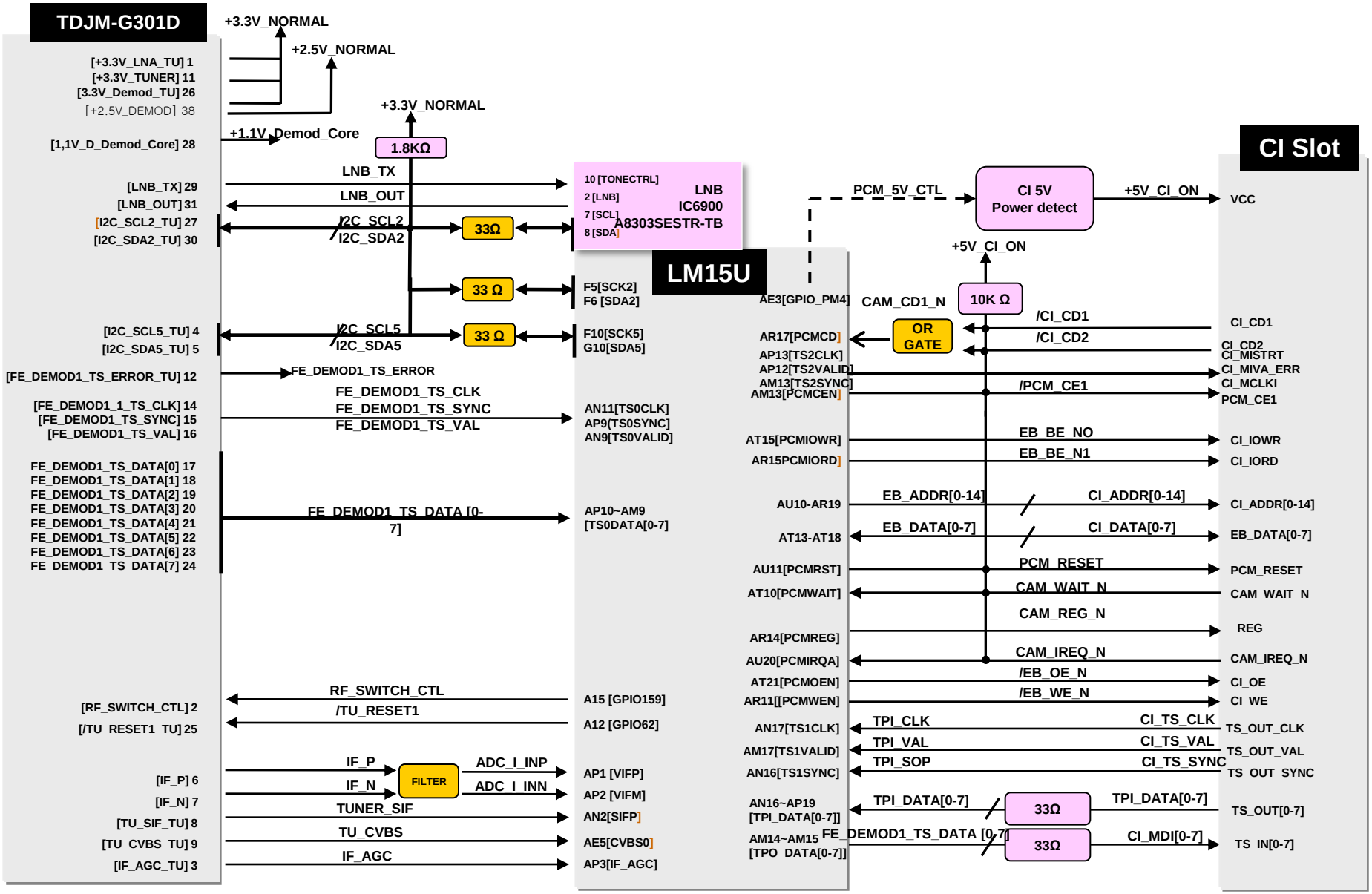
4. URSA9 Block Diagram



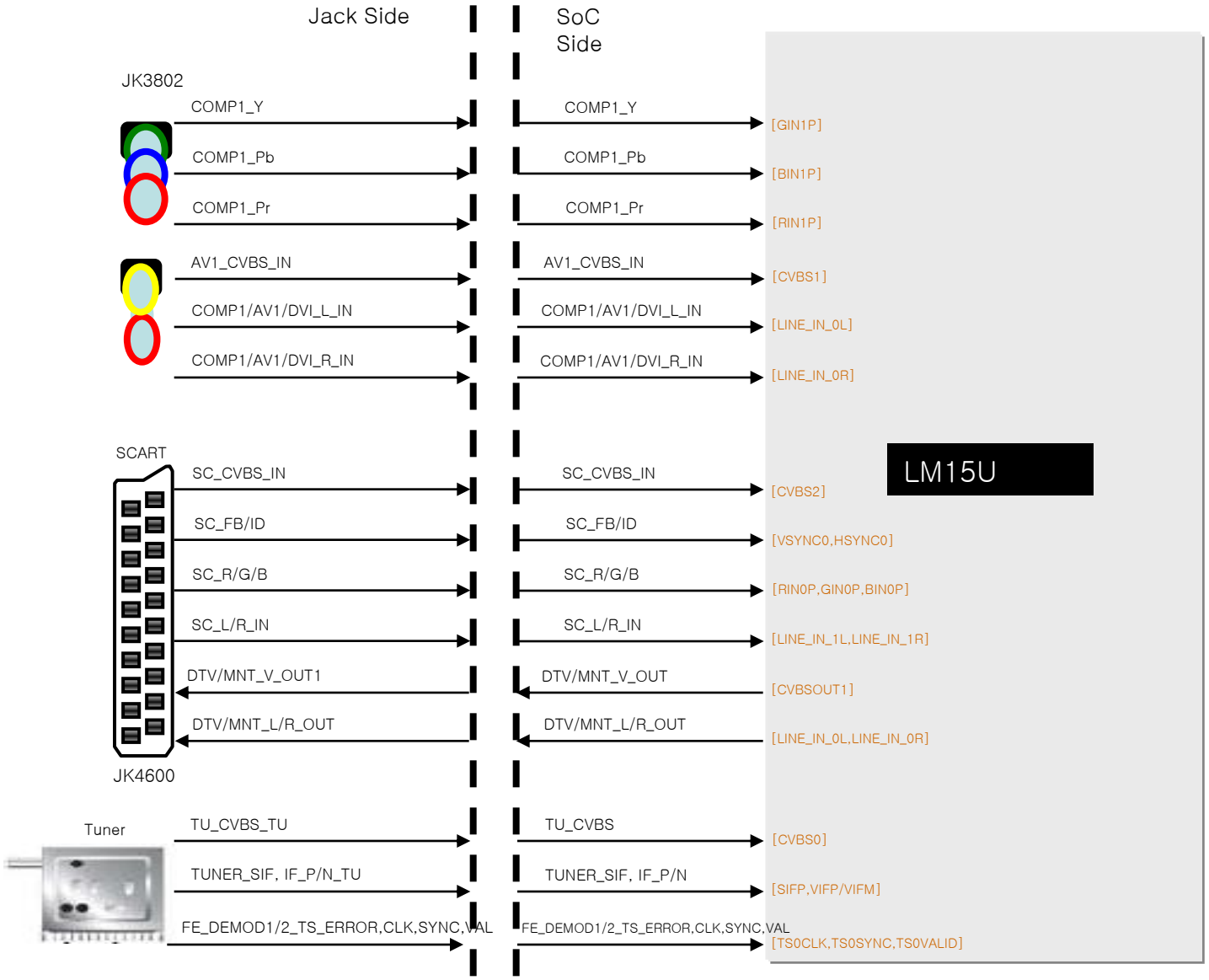
5. LM15U + URSA9 Power Block Diagram



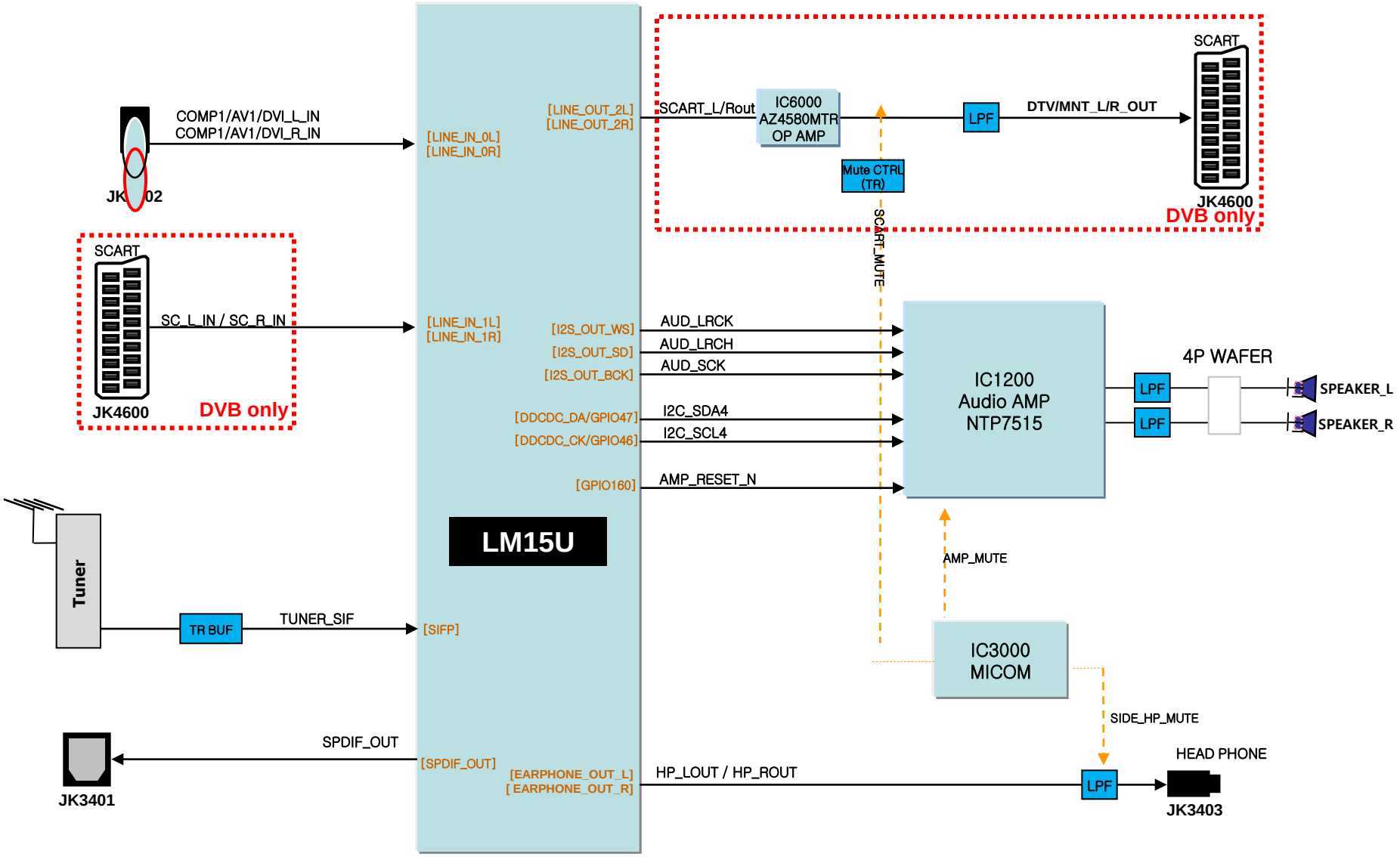
6. Tuner/CI Block Diagram



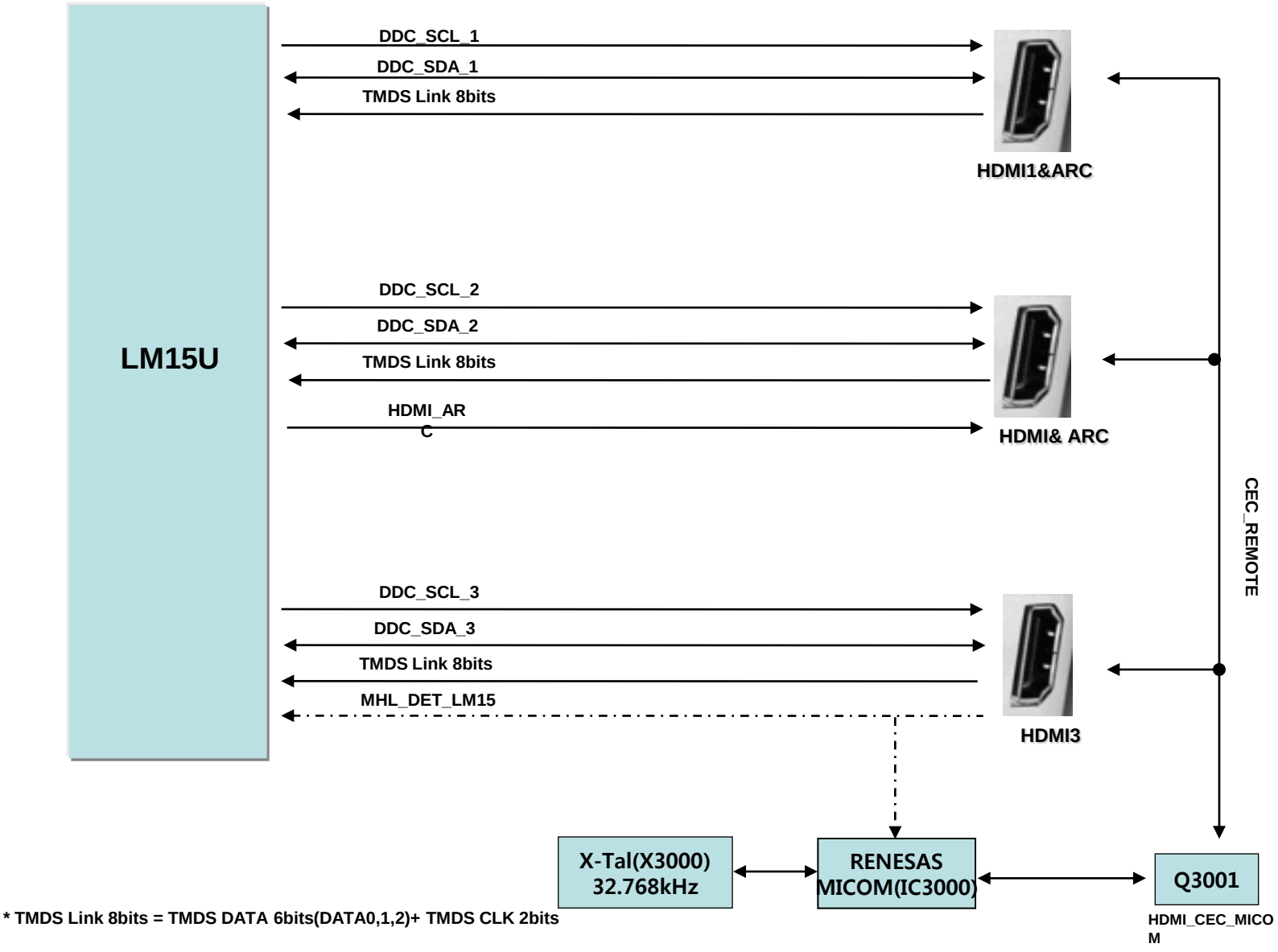
7. Video/Audio In Block Diagram



8. Audio Out Block Diagram

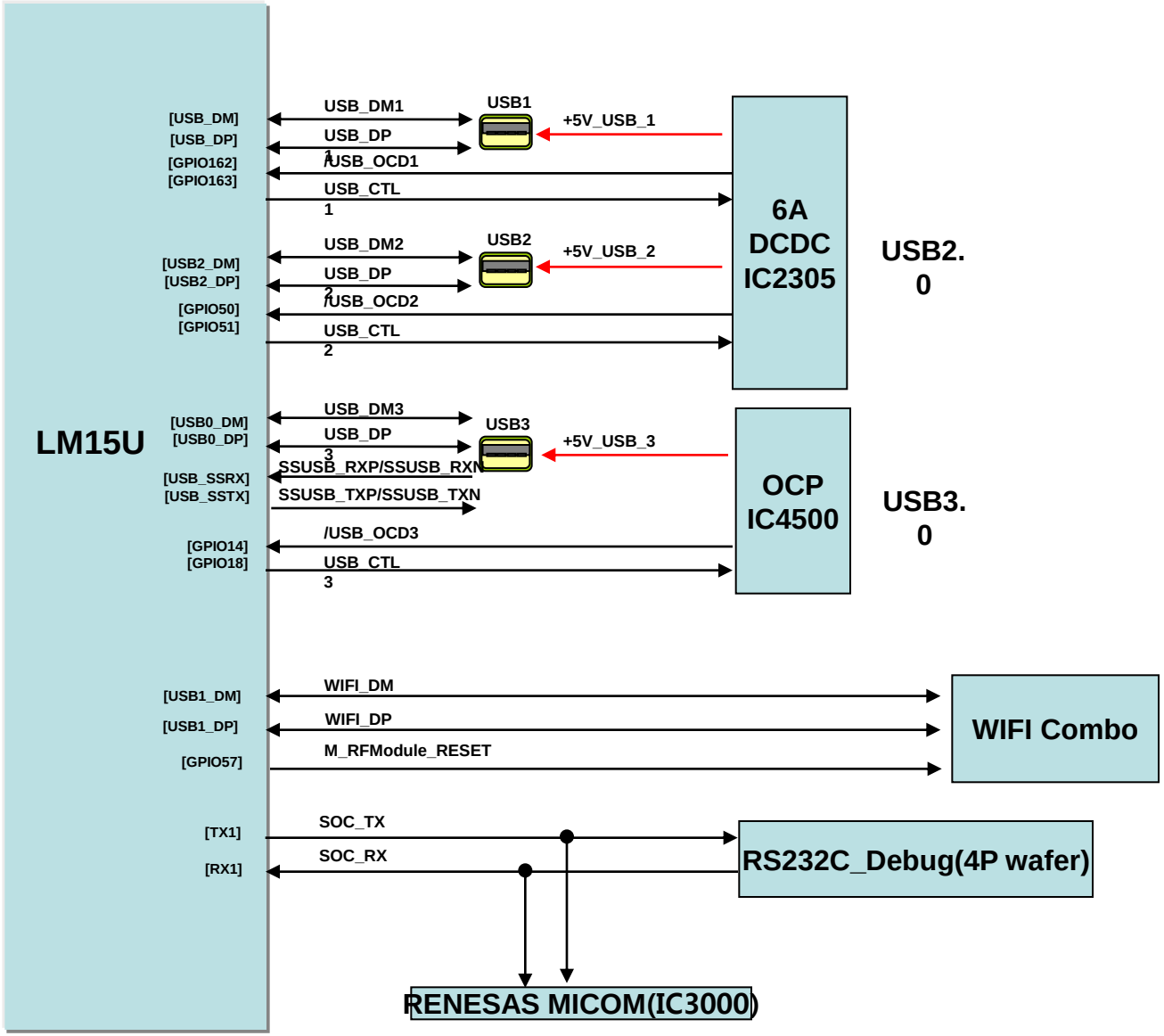


9. HDMI



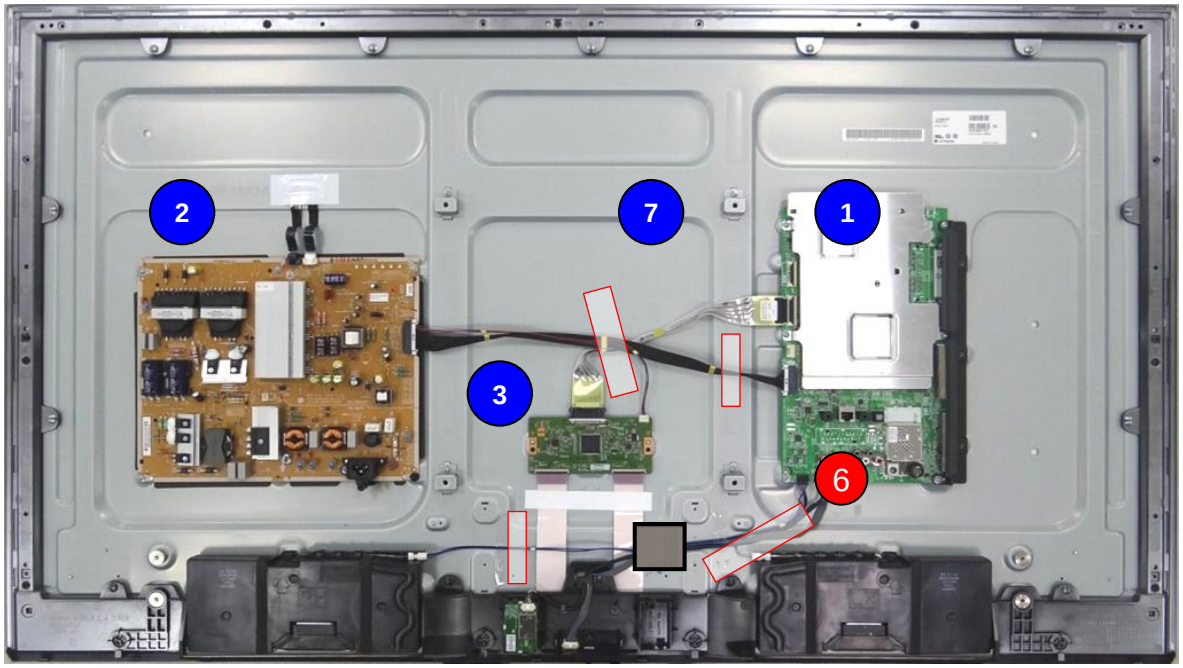
* TMDS Link 8bits = TMDS DATA 6bits(DATA0,1,2)+ TMDS CLK 2bits

10. USB / WIFI / M-REMOTE / UART



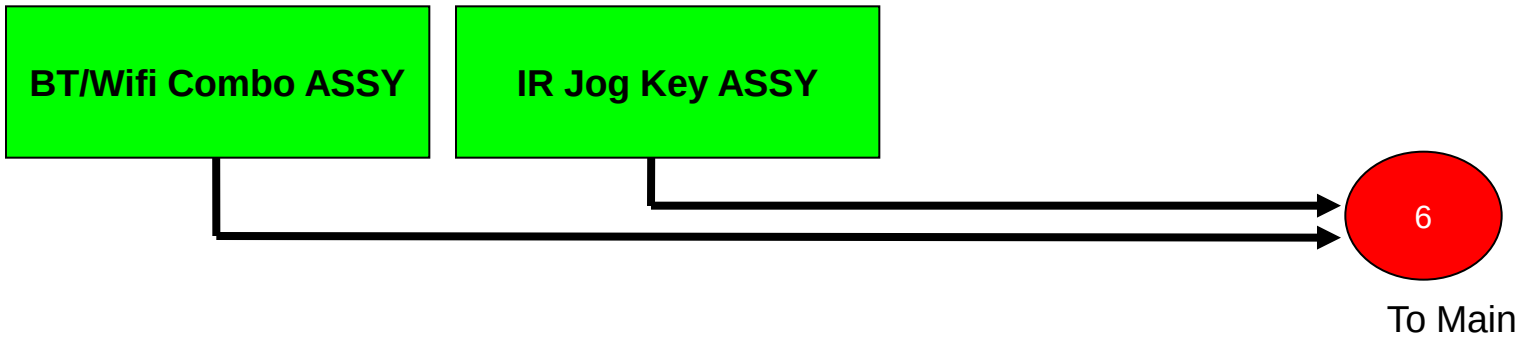
Interconnection – sub PCB UF85 series)

49/55UF85



[PCBs]

1. Main PCB
2. PSU
3. T - CON
4. IR Jog Key ASSY
5. BT/Wifi Combo ASSY



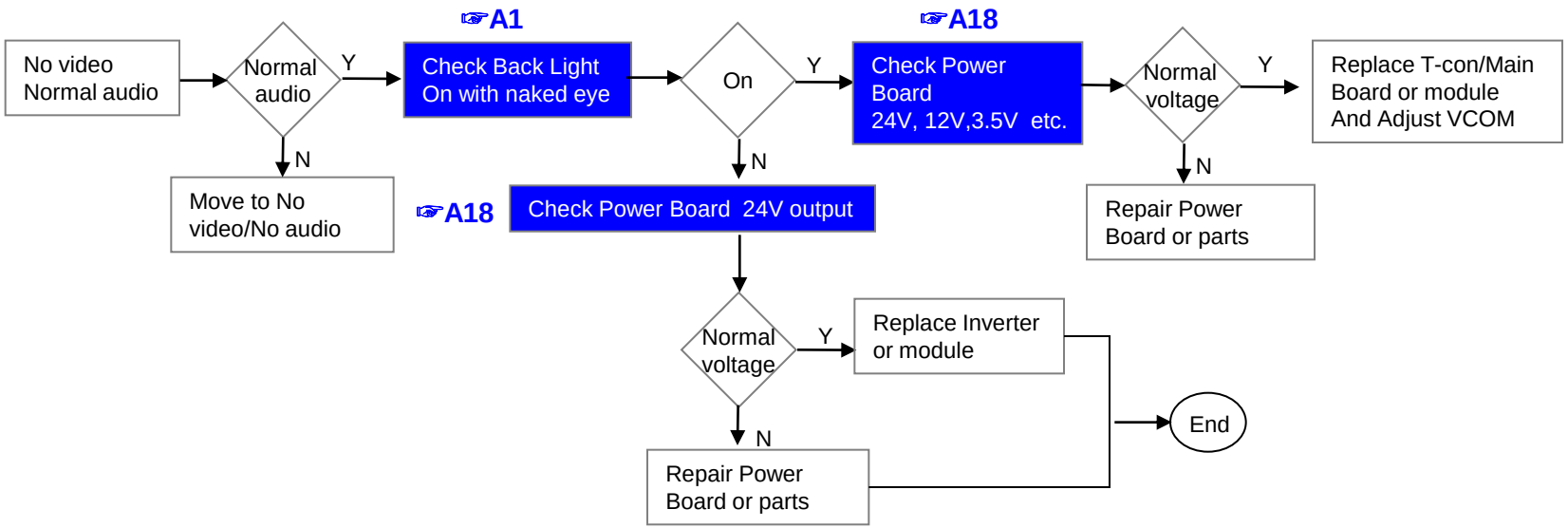
Contents of Standard Repair Process

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 GCSC System for these model.

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

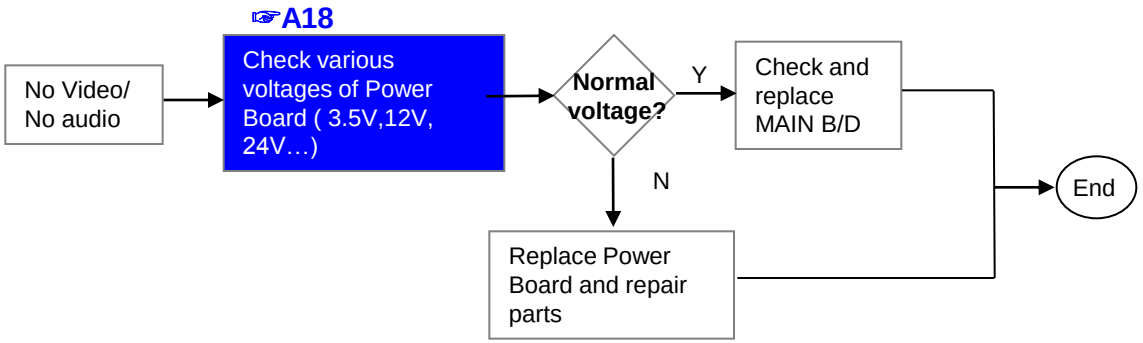
First of all, Check whether all of cables between board is inserted properly or not.
(Main B/D↔ Power B/D, LVDS Cable, Speaker Cable, IR B/D Cable,,,)



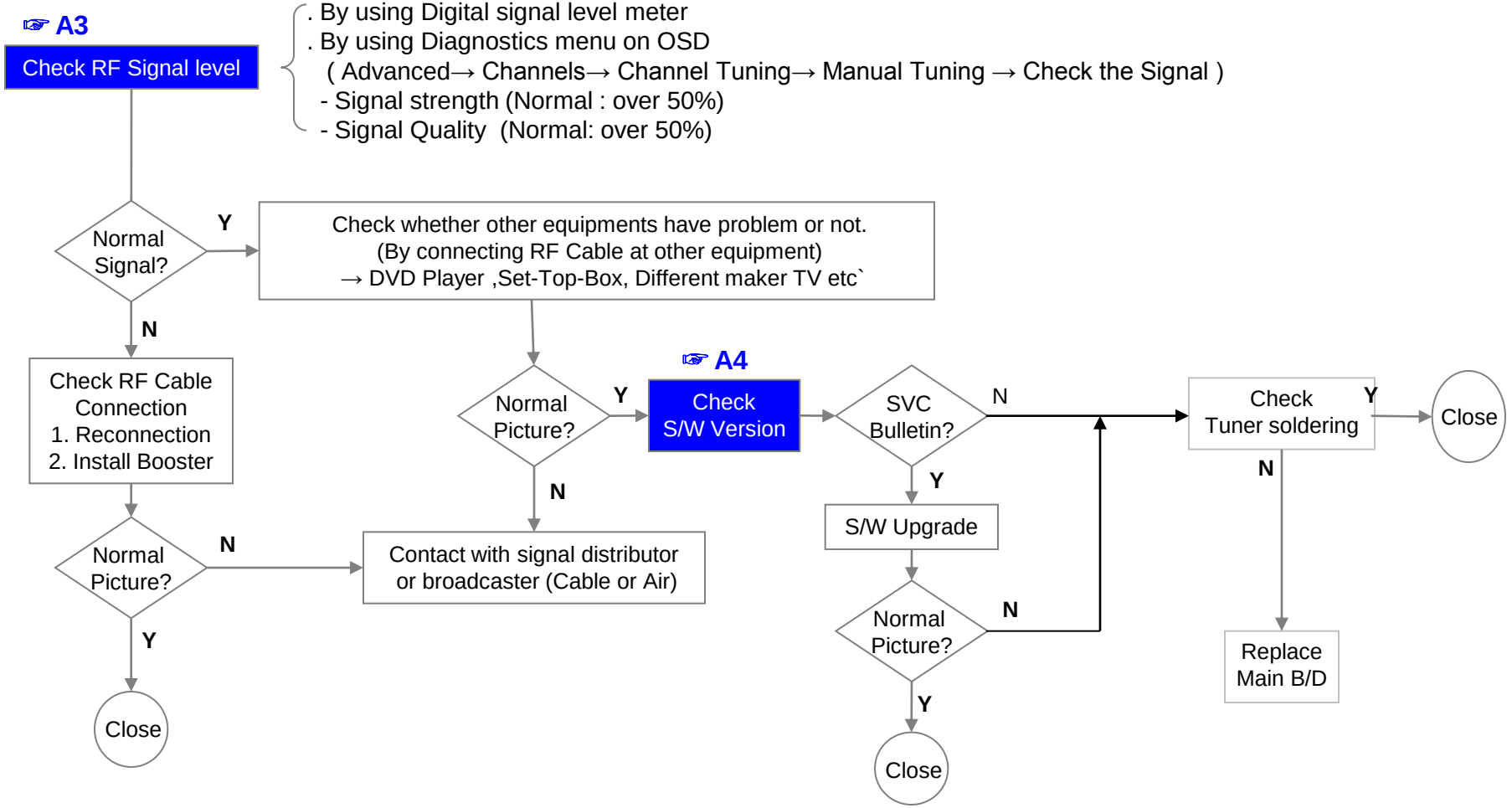
※Precaution ☞A4 & A2

Always check & record S/W Version and White Balance value before replacing the Main Board → Replace Main Board → Re-enter White Balance value

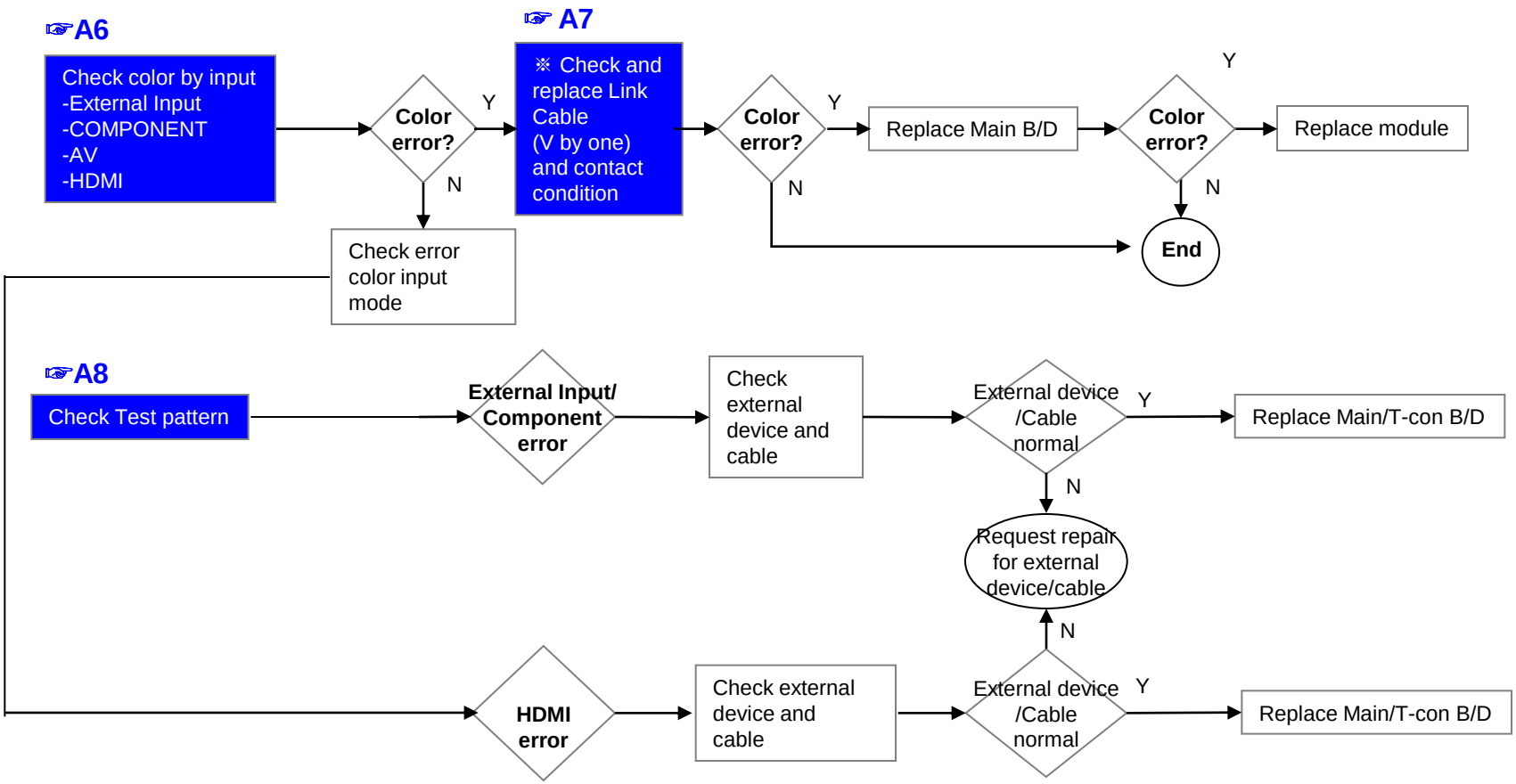
Error symptom	A. Video error	Established date		
	No video/ No audio	Revised date		2/16



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

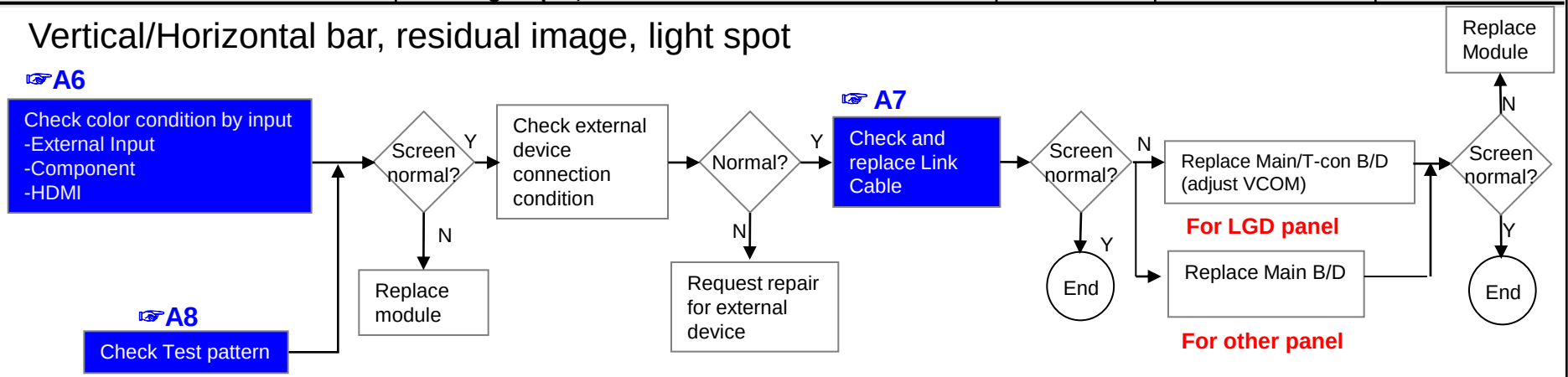


Error symptom	A. Video error	Established date		
	Color error	Revised date		4/16

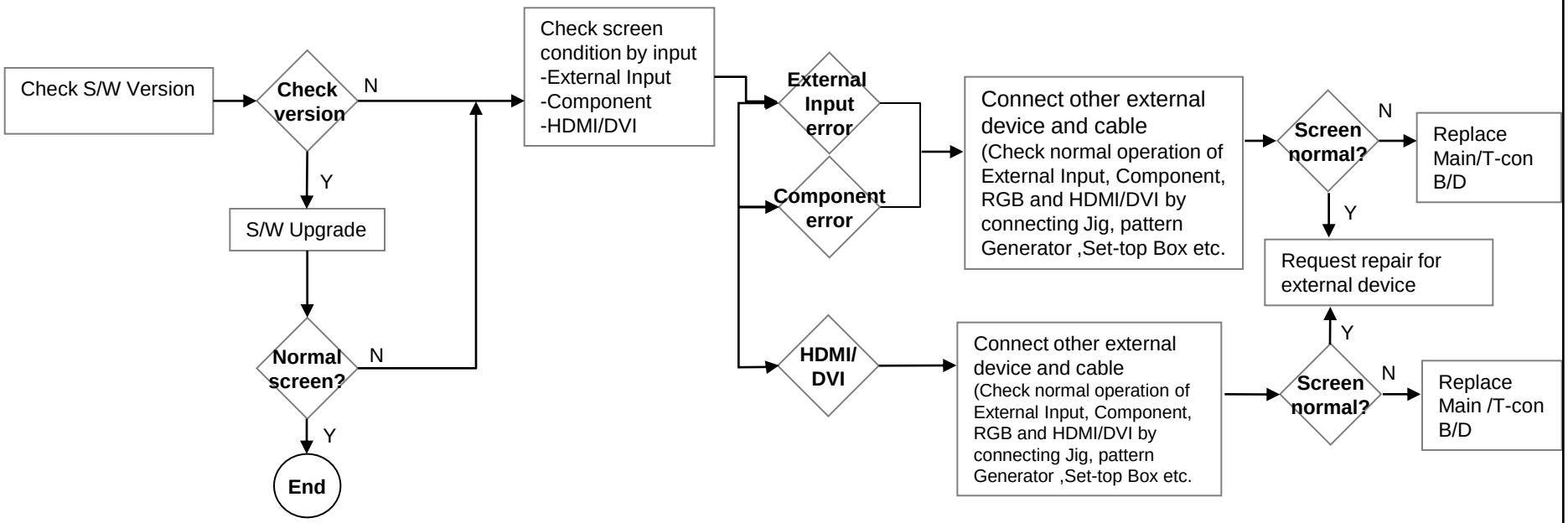


Error symptom	A. Video error	Established date		
	Vertical / Horizontal bar, residual image, light spot, external device color error	Revised date		5/16

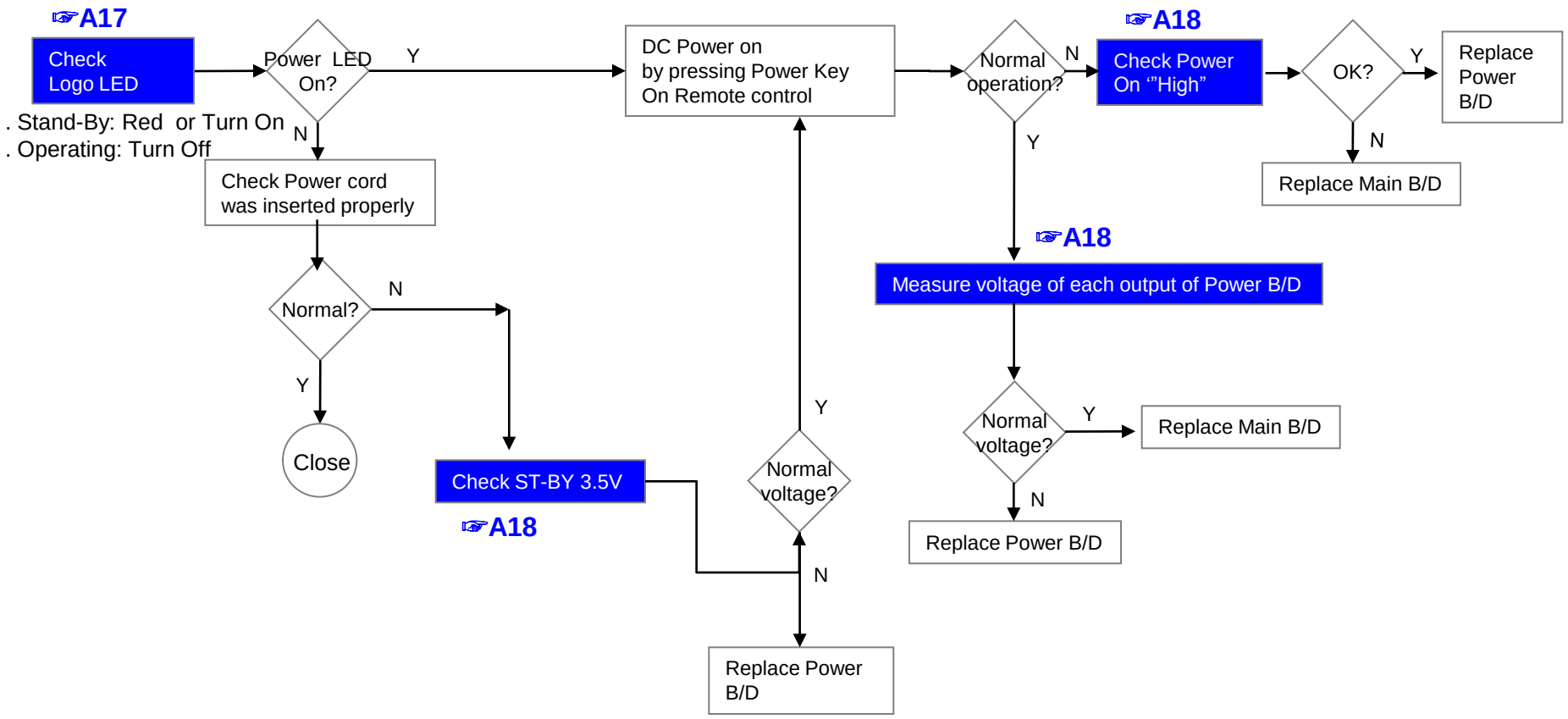
Vertical/Horizontal bar, residual image, light spot



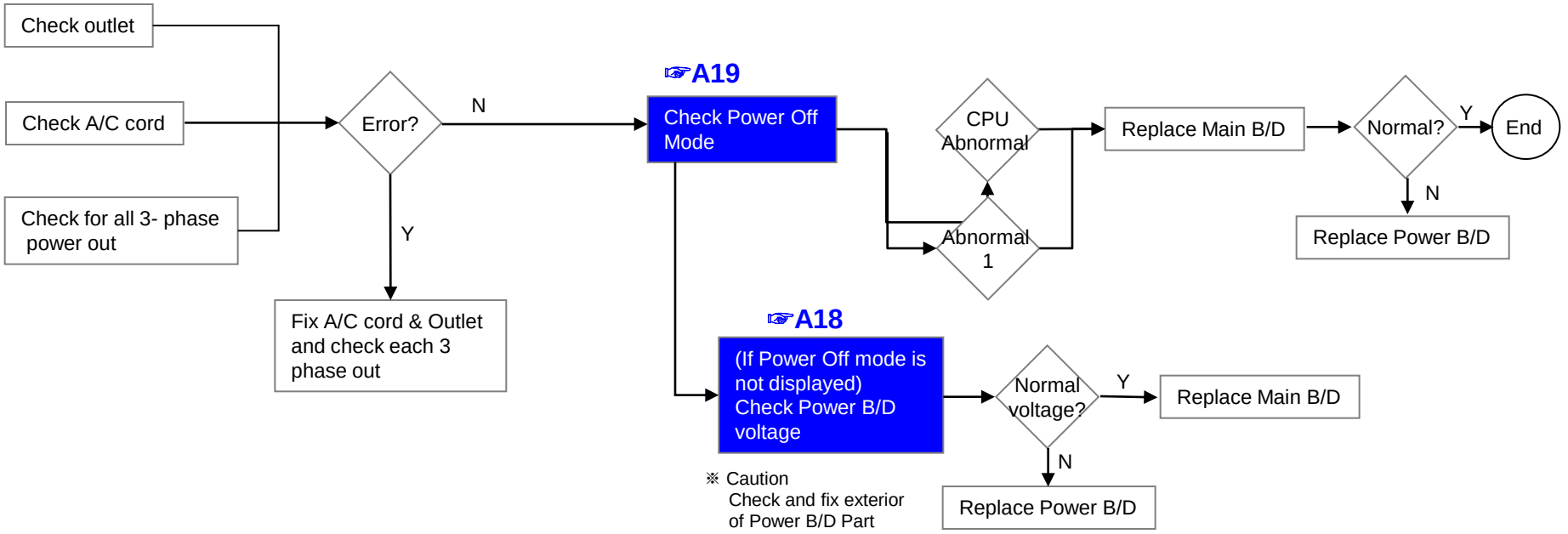
External device screen error-Color error



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



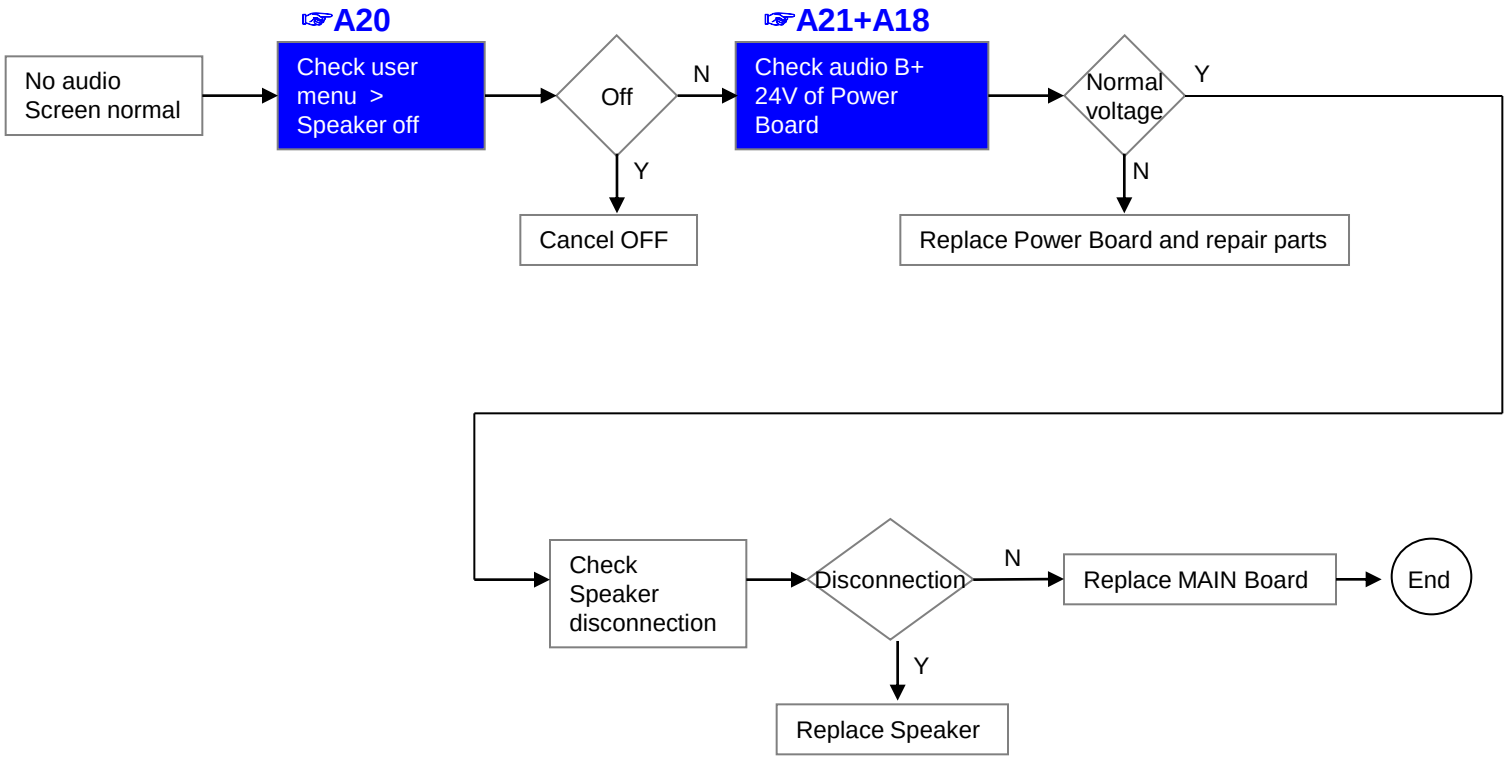
Error symptom	B. Power error	Established date		
	Off when on, off while viewing, power auto on/off	Revised date		7/16



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

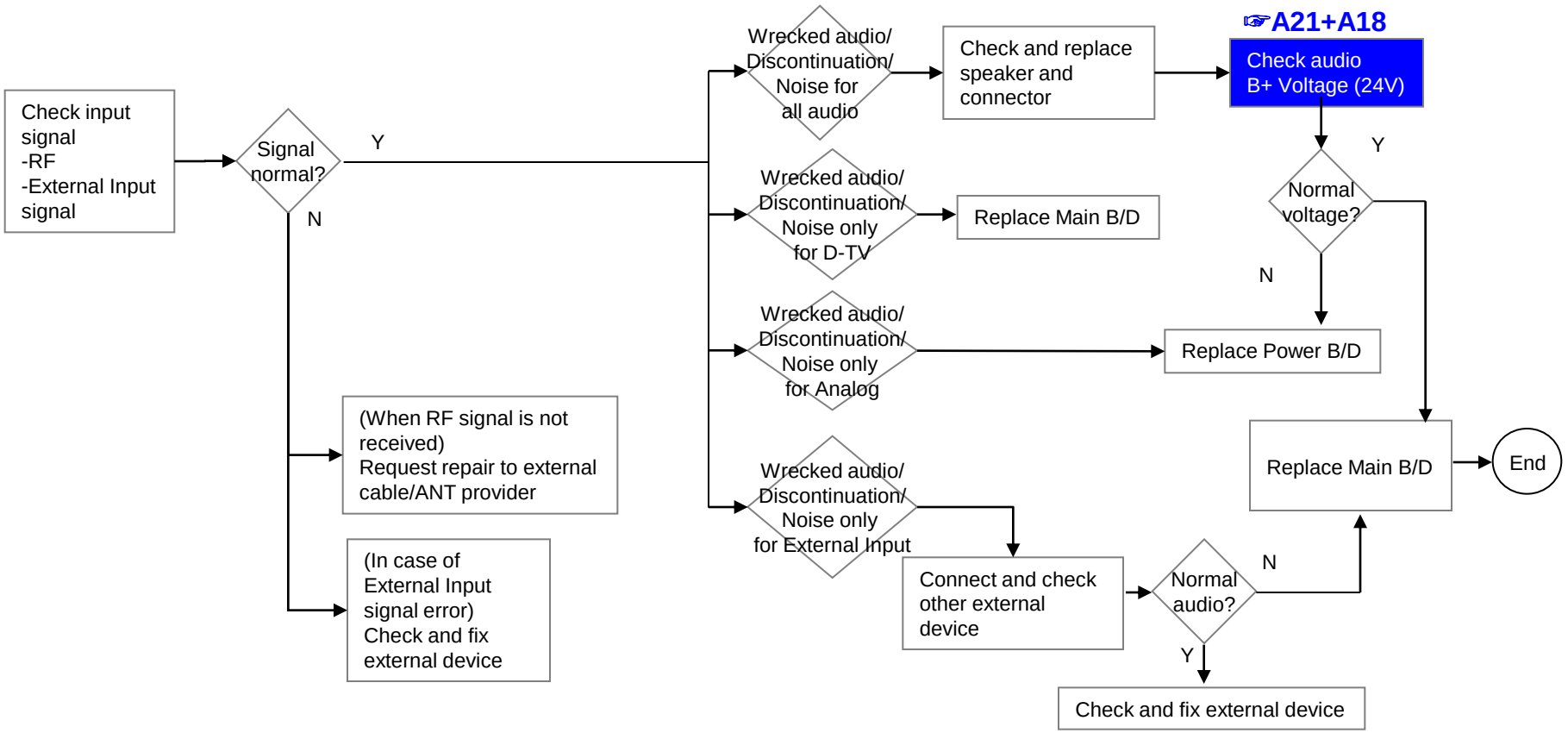
Status	Power off List	Explanation
Normal	"POWEROFF_REMOTEKEY"	Power off by REMOTE CONTROL
	"POWEROFF_OFFTIMER"	Power off by OFF TIMER
	"POWEROFF_SLEEPTIMER"	Power off by SLEEP TIMER
	"POWEROFF_INSTOP"	Power off by INSTOP KEY
	"POWEROFF_AUTOOFF"	Power off by AUTO OFF
	"POWEROFF_ONTIMER"	Power off by ON TIMER
	"POWEROFF_RS232C"	Power off by RS232C
	"POWEROFF_RESREC"	Power off by Reservated 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



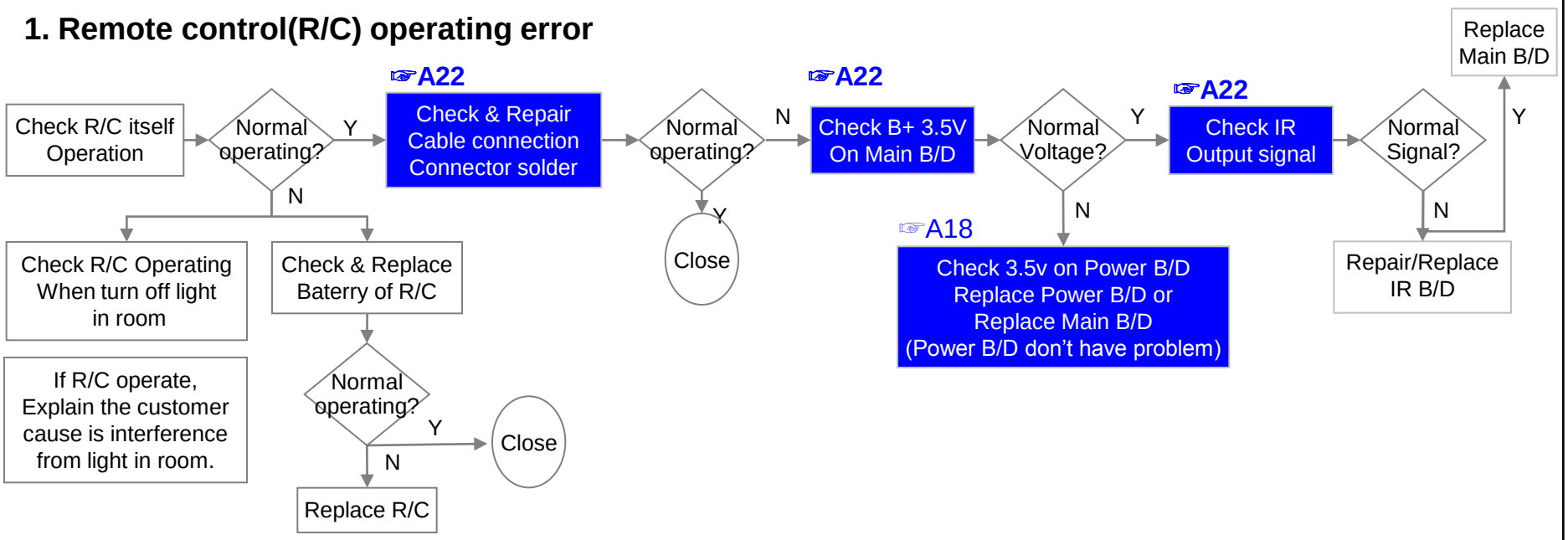
Error symptom	C. Audio error	Established date		
	Wrecked audio/ discontinuation/noise	Revised date		9/16

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



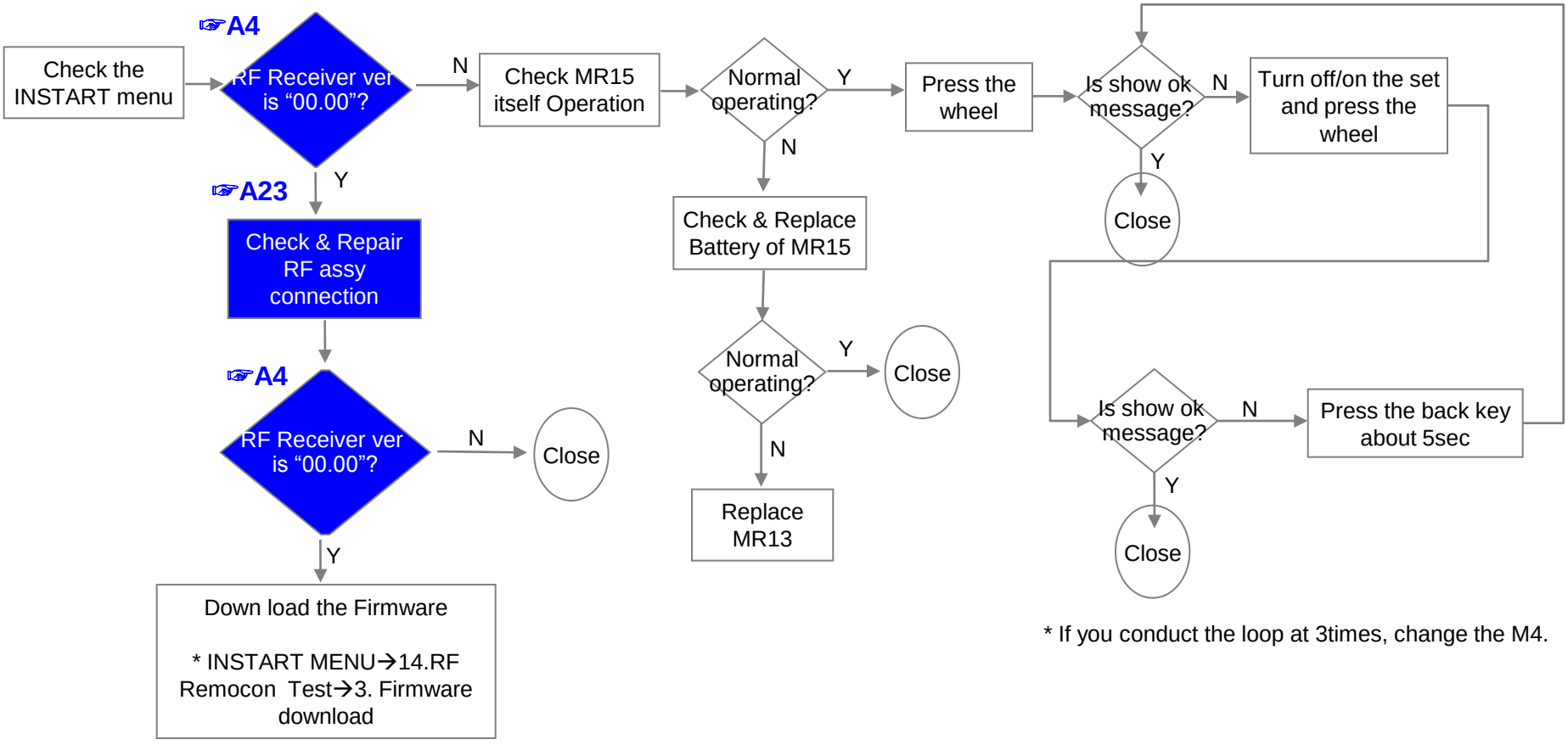
Error symptom	D. Function error	Established date		
	Remote control & Local switch checking	Revised date		10/16

1. Remote control(R/C) operating error



Error symptom	D. Function error	Established date		
	MR13 operating checking	Revised date		11/16

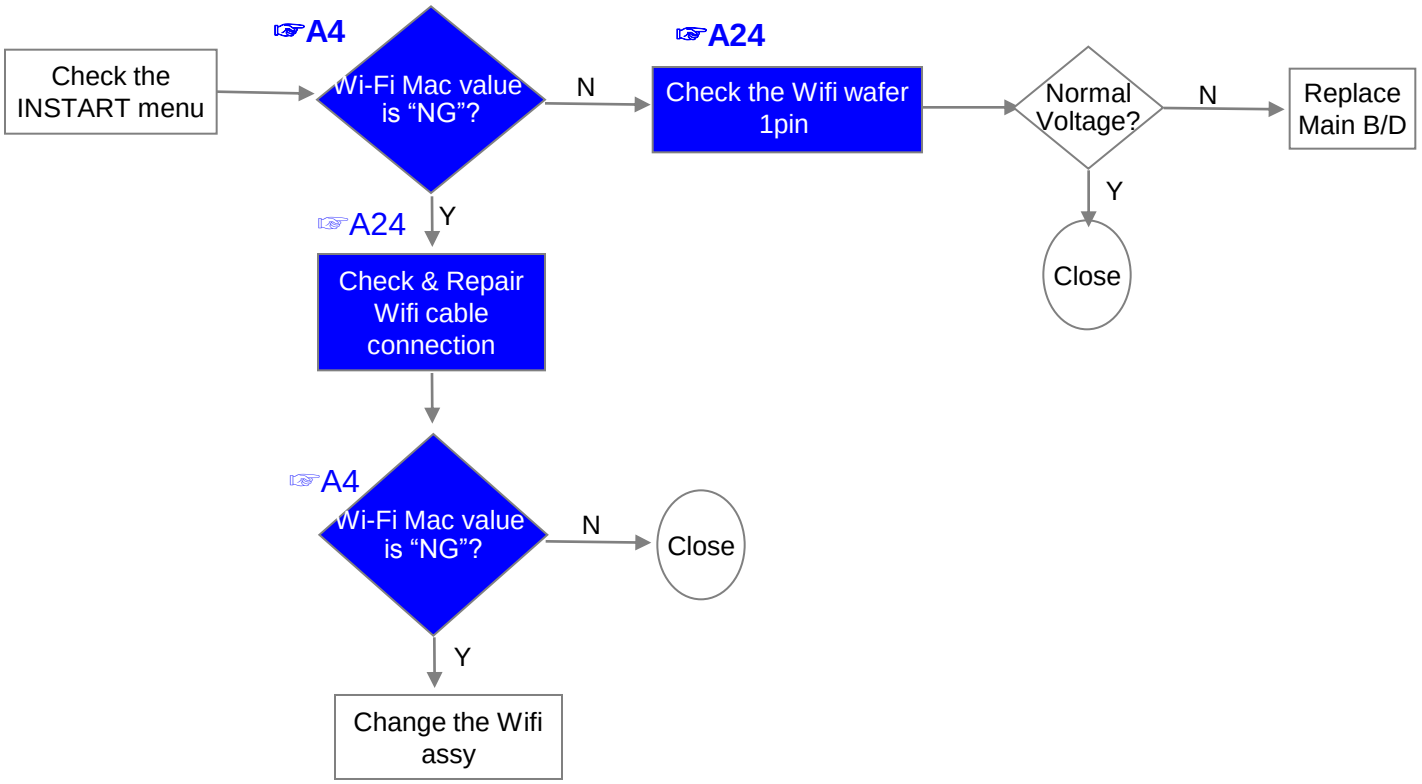
2. MR15(Magic Remocon) operating error



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

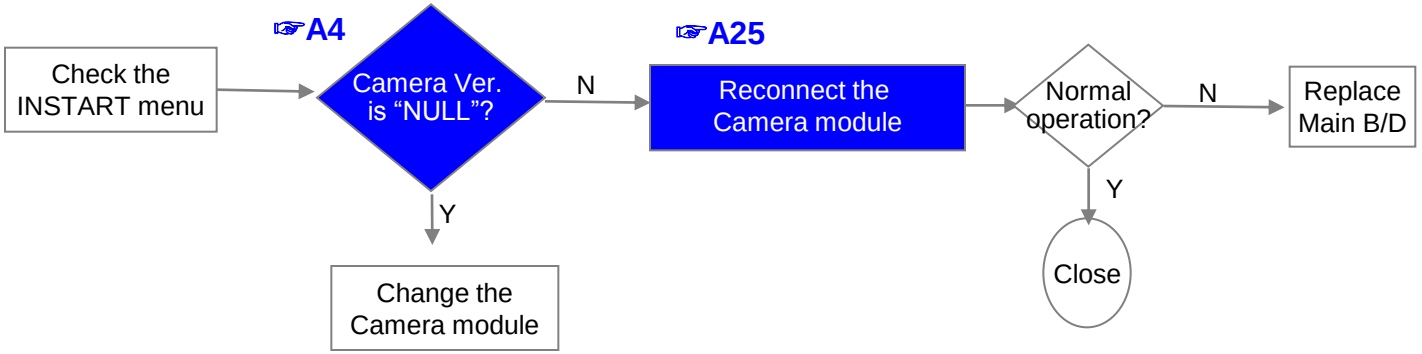
Error symptom	D. Function error	Established date		
	Wifi operating checking	Revised date		12/16

3.Wifi operating error

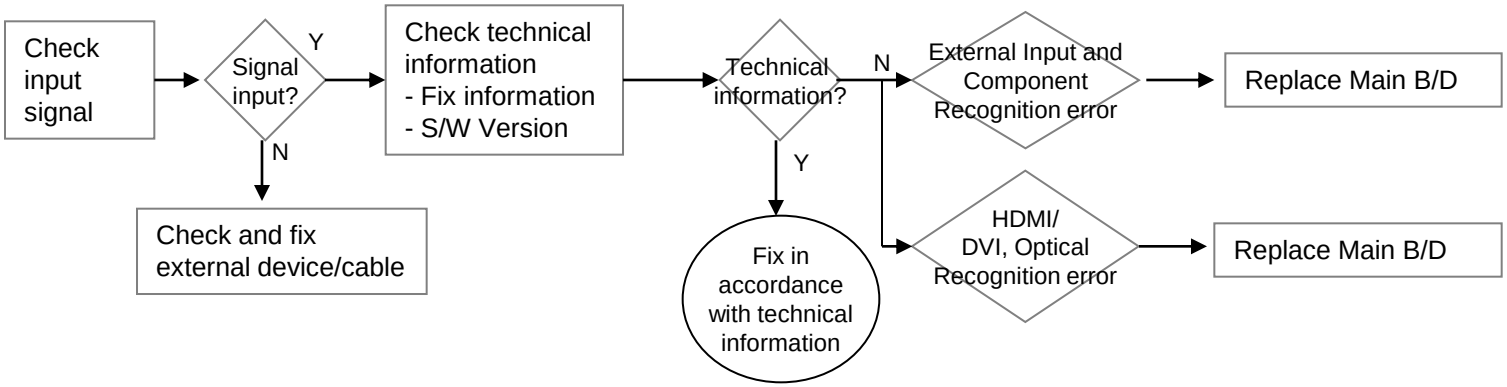


Error symptom	D. Function error	Established date		
	Camera operating checking	Revised date		13/16

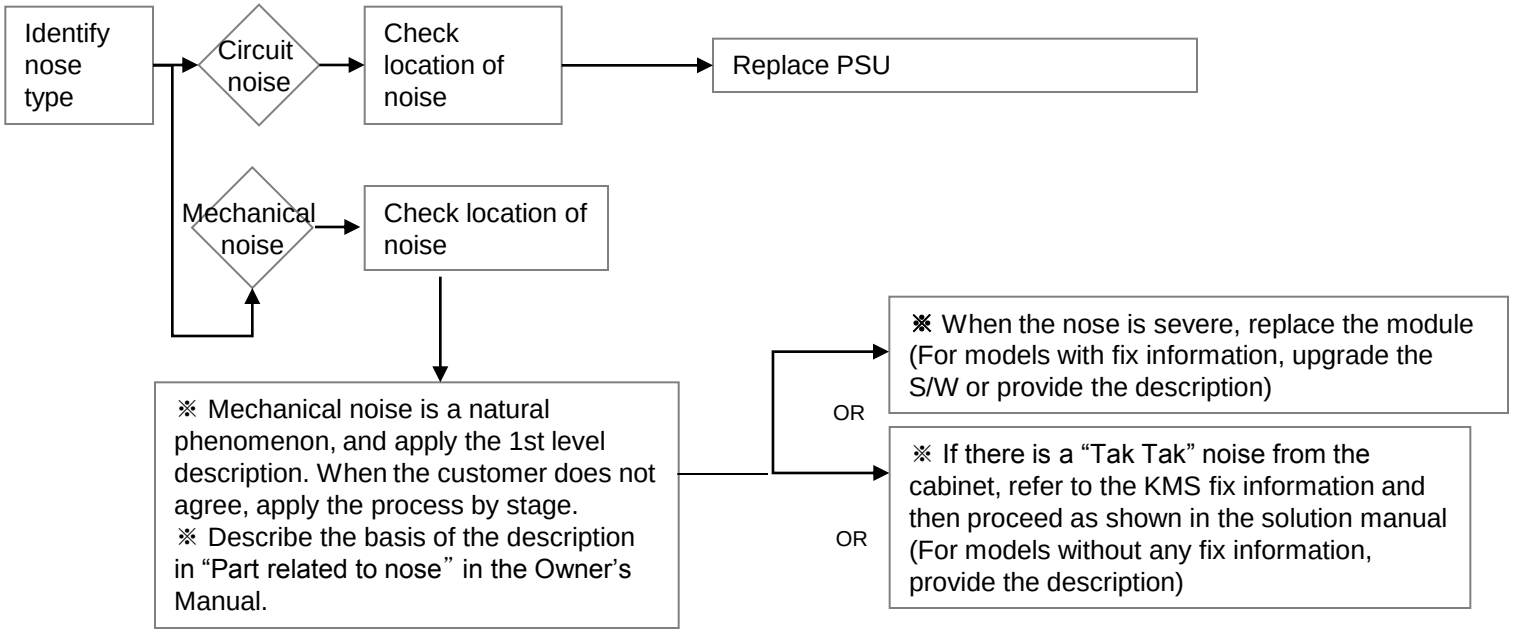
4.Camera operating error



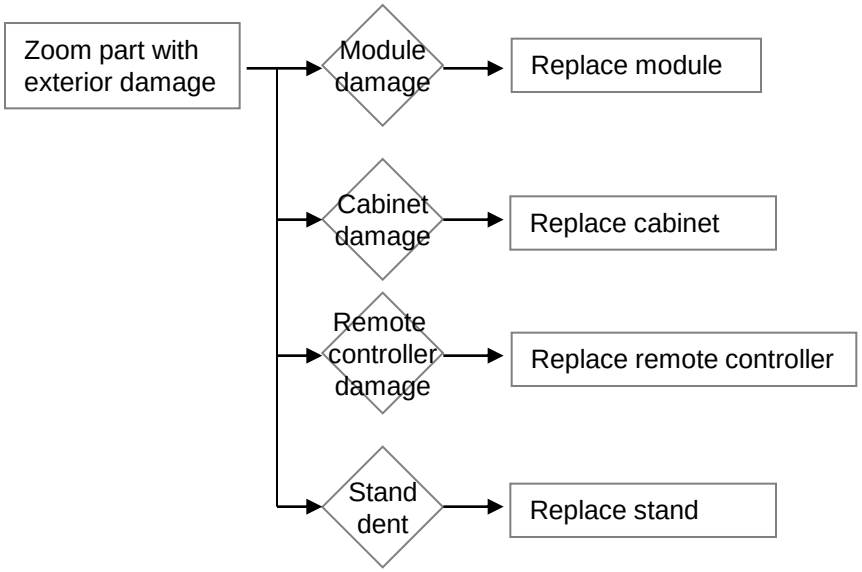
Error symptom	D. Function error	Established date		
	External device recognition error	Revised date		14/16



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

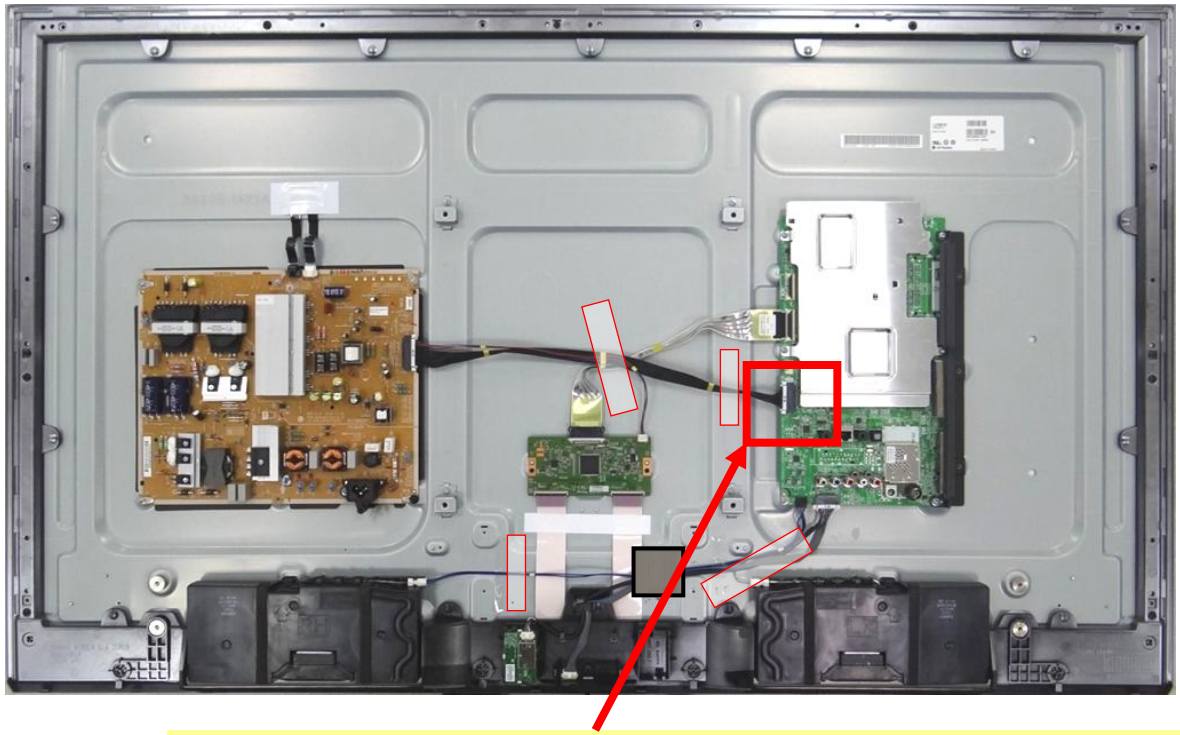
Continue to the next page

Contents of Standard Repair Process Detail Technical Manual

Continued from previous page

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

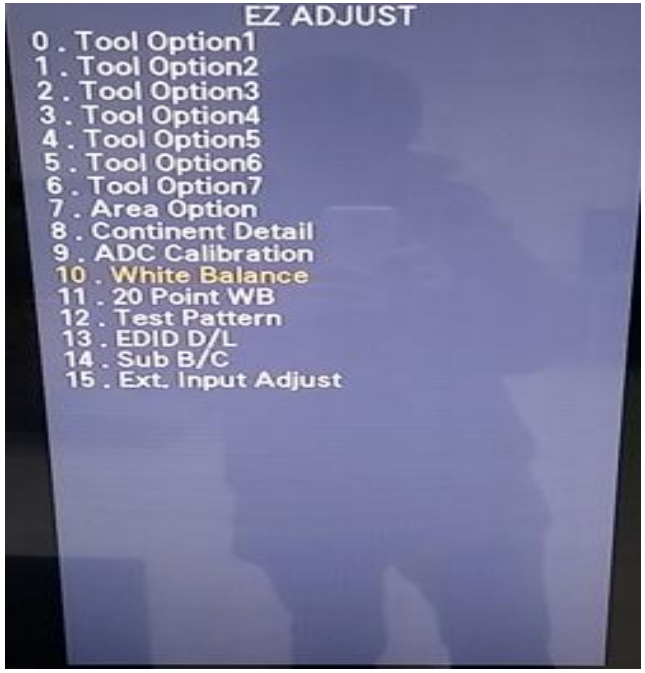


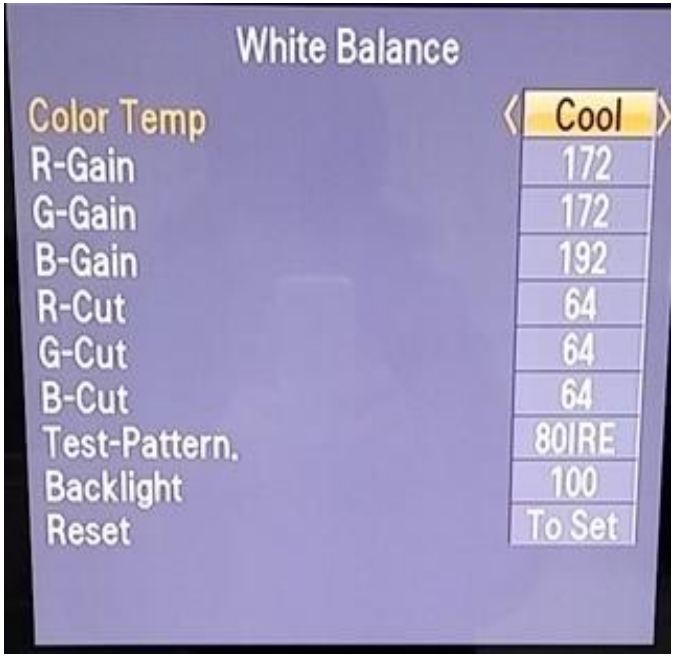
After turning on the power and disassembling the case, check with the naked eye, whether you can see light from locations.

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 controller for adjustment.

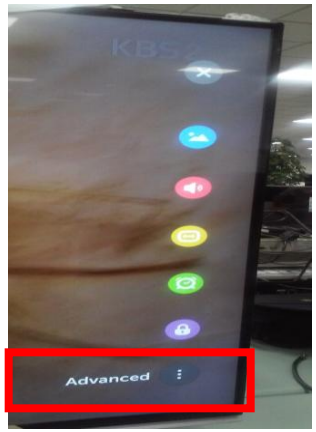
2. Enter into White Balance of item 10.

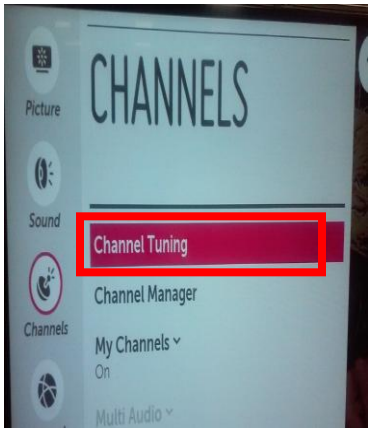
3. After recording the R, G, B (GAIN, Cut) value of Color Temp (Cool/Medium/Warm), re-enter the value after replacing the MAIN BOARD.

Standard Repair Process Detail Technical Manual

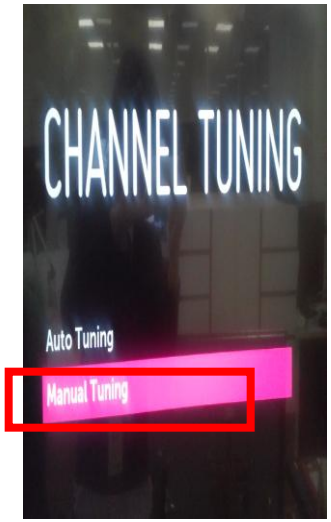
Error symptom	A. Video error_Video error, video lag/stop	Established date		
Content	TUNER input signal strength checking method	Revised date		A3

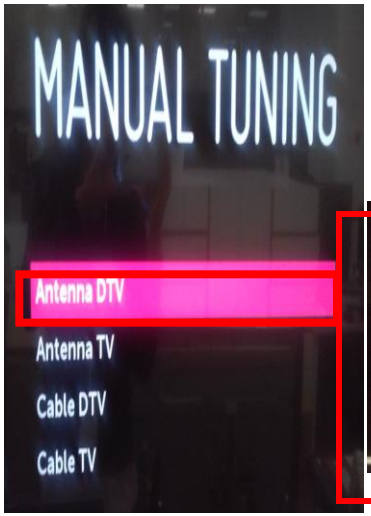
<ALL MODELS>

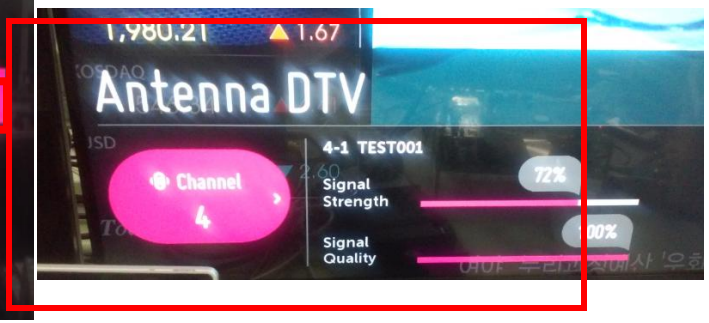




Advanced→ Channels → Channel Tuning→ Manual Tuning







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

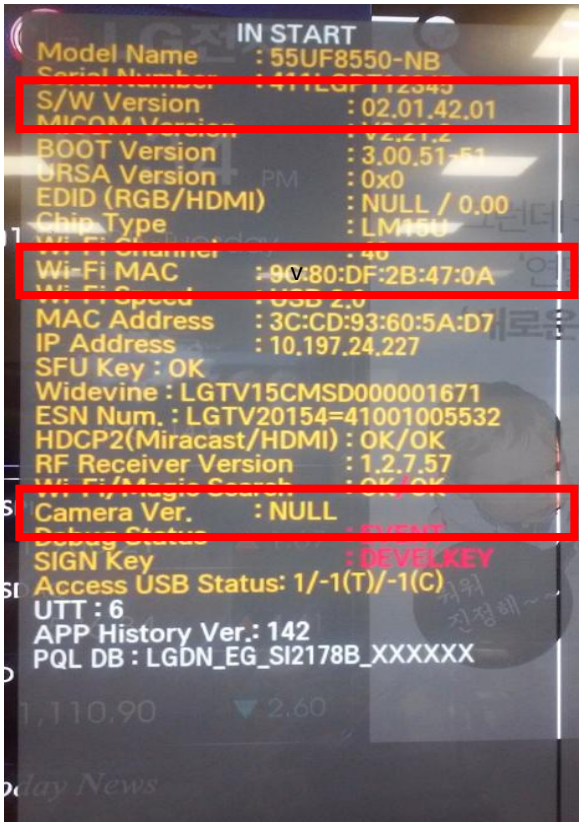
Standard Repair Process Detail Technical Manual

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

<ALL MODELS>

1. Checking method for remote controller for adjustment

Version

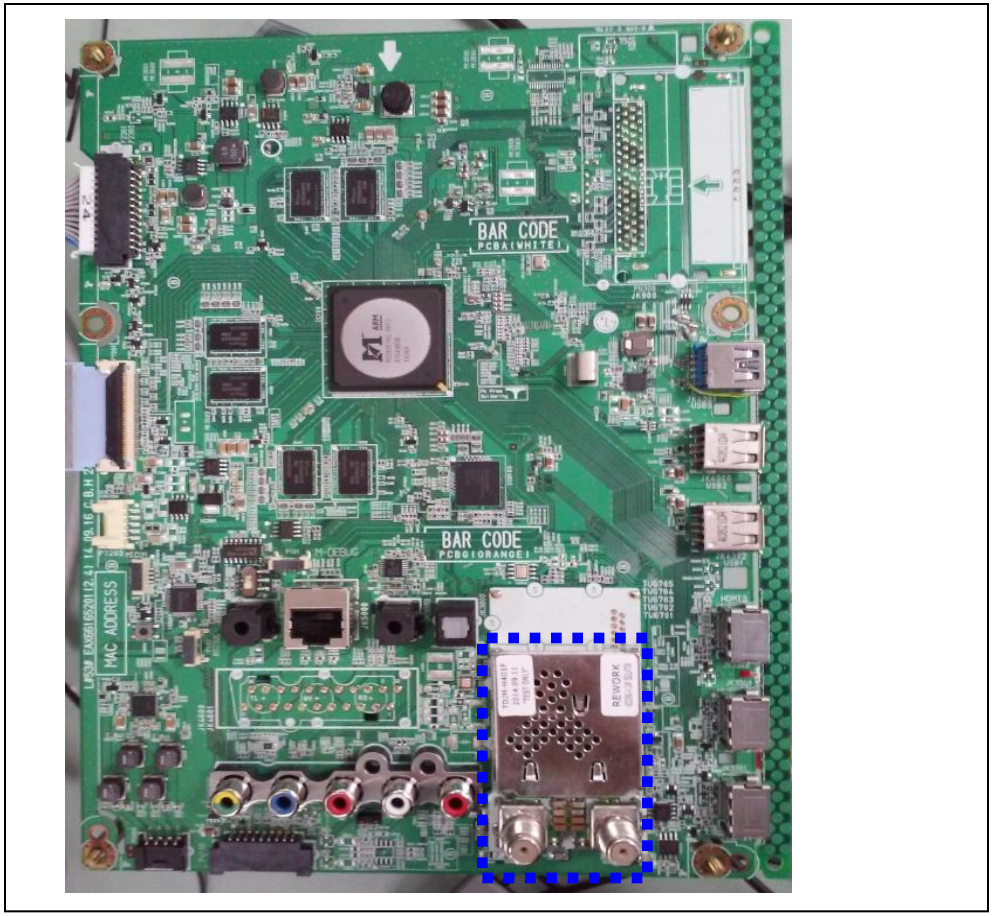


Press the IN-START with the remote controller for adjustment

Standard Repair Process Detail Technical Manual

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

<ALL MODELS>

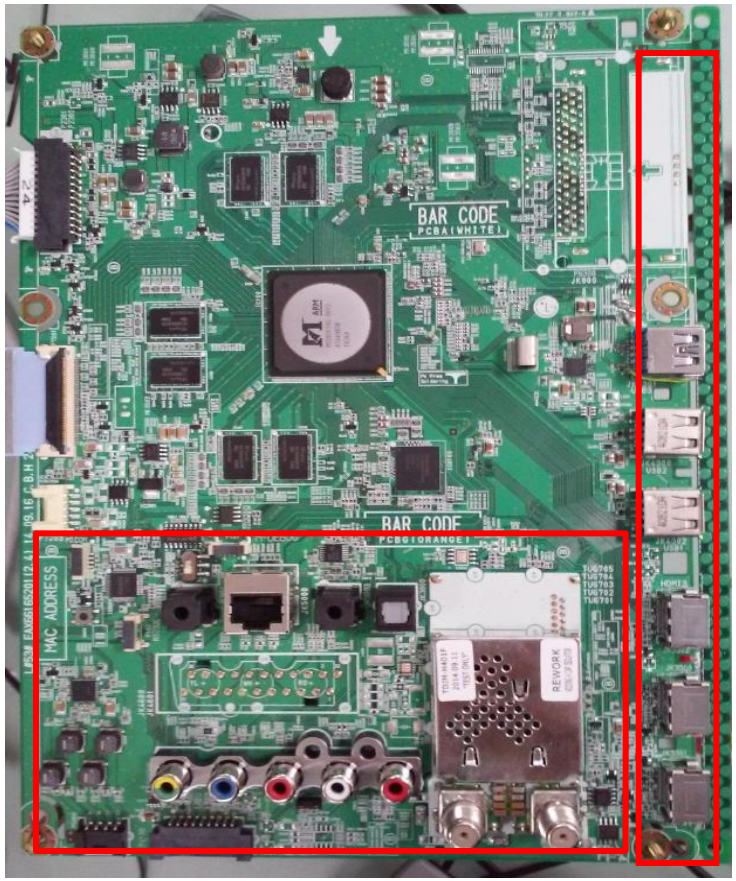


Checking method:
1. Check the signal strength or check whether the screen is normal when the external device is connected.
2. After measuring each voltage from power supply, finally replace the MAIN BOARD.
3. If you can`t see the UHD live TV, please connect signal at left side of jack. (Korea model only)

Standard Repair Process Detail Technical Manual

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

<ALL MODELS>

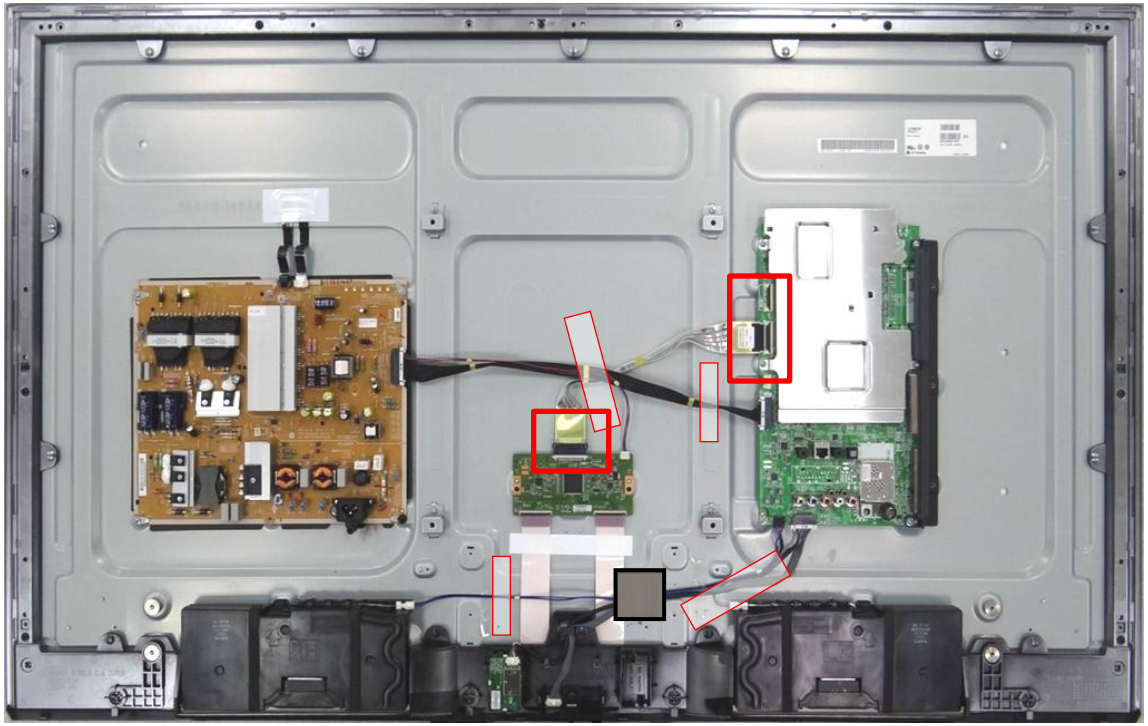


As the part connecting to the external input, check the screen condition by signal

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

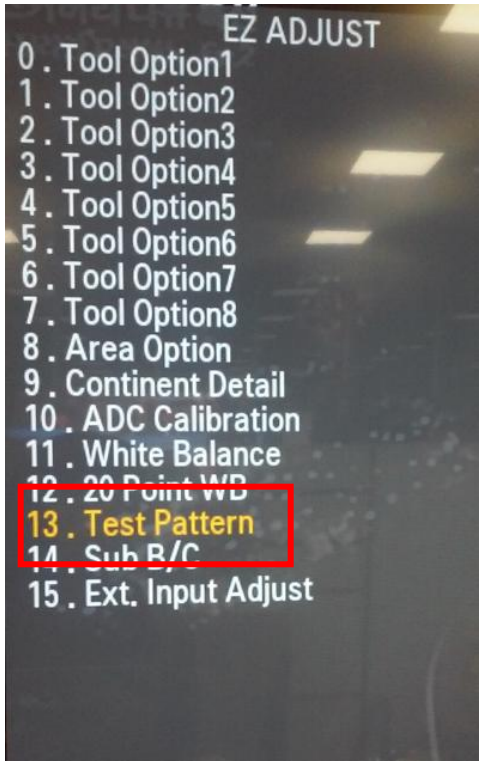
<ALL MODELS>

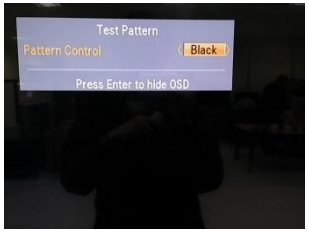


Check the contact condition of the Link Cable, especially dust or mis insertion.

Standard Repair Process Detail Technical Manual

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



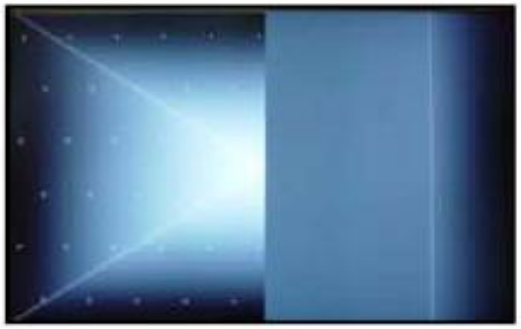


You can view 6 types of patterns using the ADJ Key

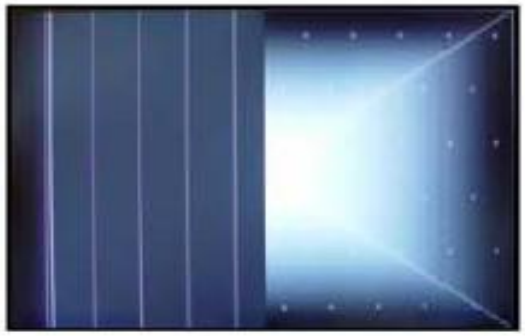
Checking item : 1. Defective pixel 2. Residual image 3. MODULE error (ADD-BAR,SCAN BAR..)
4.Video error (Classification of MODULE or Main-B/D!)

Appendix : Exchange Main Board (1)

Solder defect, CNT Broken

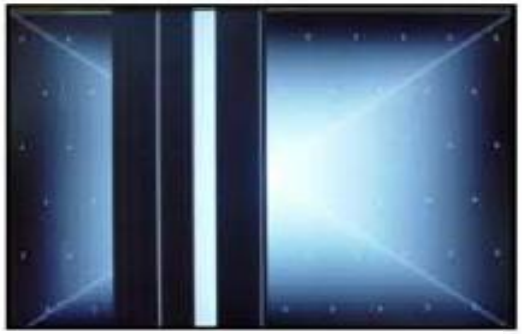


Solder defect, CNT Broken

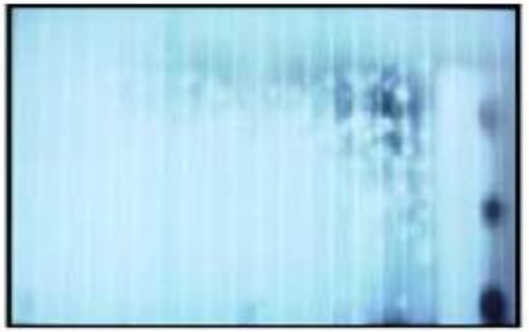


Solder defect, CNT Broken

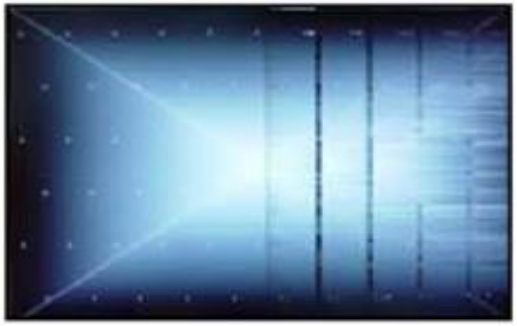
Solder defect, CNT Broken



Solder defect, CNT Broken



Abnormal Power Section

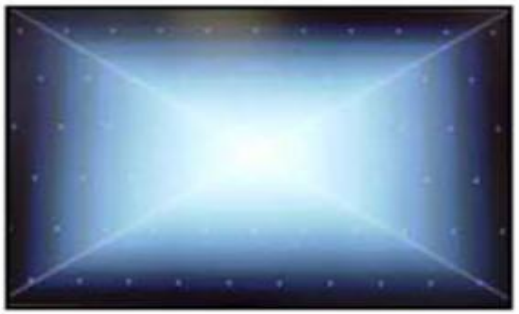


Solder defect, Short/Crack

Abnormal Power Section

Solder defect, Short/Crack

Appendix : Exchange Main Board (2)



Abnormal Power Section

Abnormal Power Section

Solder defect, Short/Crack

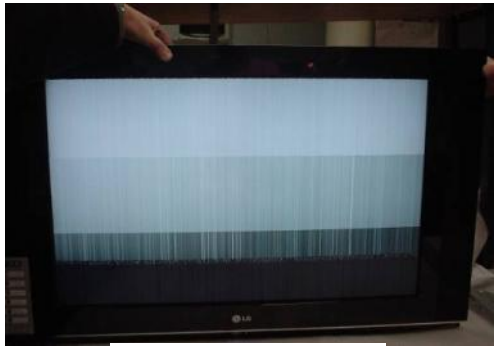
Solder defect, Short/Crack

Fuse Open, Abnormal power section

Abnormal Display

GRADATION

Noise



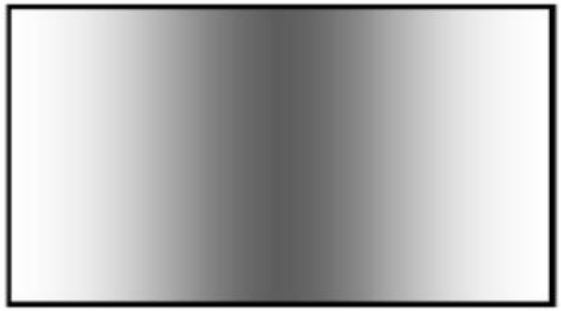
GRADATION

Appendix : Exchange Power Board (PSU)

No Light

Dim Light

Dim Light



Dim Light

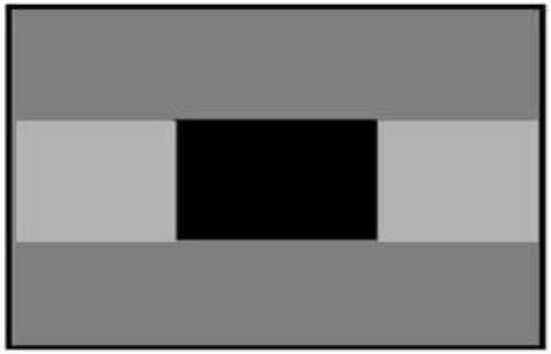
No picture/Sound Ok

Appendix : Exchange the Module (1)

Panel Mura, Light leakage

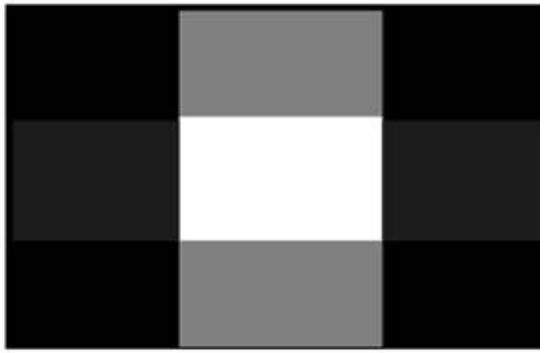
Panel Mura, Light leakage

Press damage



Crosstalk

Press damage



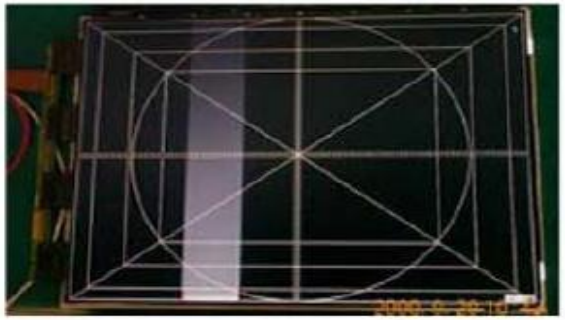
Crosstalk

Press damage

Un-repairable Cases

In this case please exchange the module.

Appendix : Exchange the Module (2)



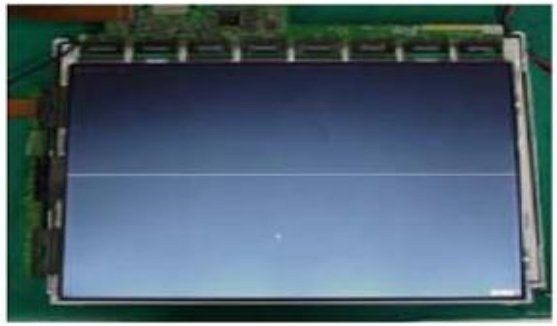
Vertical Block
Source TAB IC Defect

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

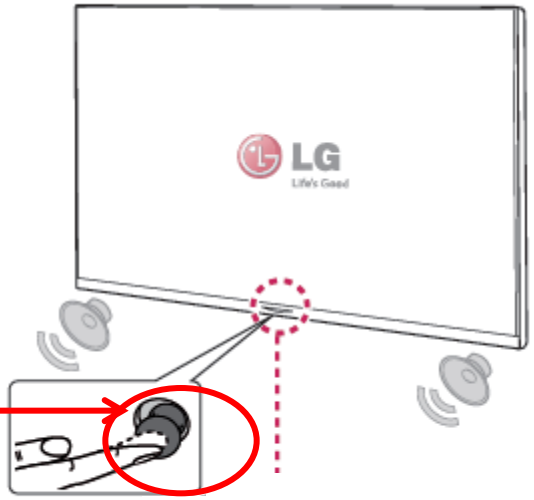
In this case please exchange the module.

Standard Repair Process Detail Technical Manual

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

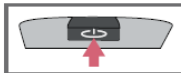
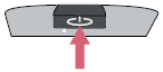
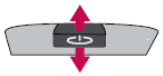
<55UF8550-NB>

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



조이스틱 기능

버튼을 누르거나 조이스틱을 좌,우,위,아래로 움직여 TV를 작동 할 수 있습니다.

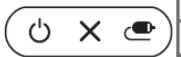
	전원 켜짐	TV가 꺼진 상태에서 조이스틱 버튼을 한번 눌렀다 놓습니다.
	전원 꺼짐	TV가 켜진 상태에서 조이스틱 버튼을 몇 초간 눌렀다 놓습니다.
	음량 조절	조이스틱 버튼을 좌/우로 움직여 음량을 조절할 수 있습니다.
	채널 조절	조이스틱 버튼을 위/아래로 움직여 채널을 변경할 수 있습니다.

잠깐

- 조이스틱 버튼을 좌,우,위,아래로 움직일 때 버튼을 누르지 않도록 주의하세요. 조이스틱 버튼을 누르고 움직일 경우 음량 및 채널을 조절 할 수 없습니다.

조이스틱 메뉴 설정

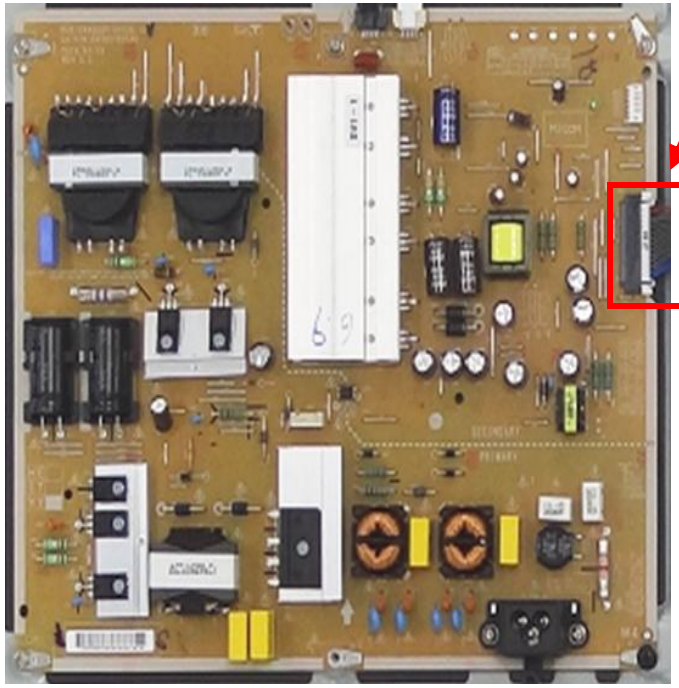
TV가 켜진 상태에서 조이스틱 버튼을 한번 누르세요.
조이스틱 버튼을 좌,우로 움직여 메뉴(⏻, ✕,)를 선택 할 수 있습니다.

	⏻	TV 꺼짐	TV의 전원을 끕니다.
	✕	닫기	메뉴창을 닫습니다.
		외부입력	외부입력을 변경합니다.

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 24V, 12V, 3.5V.

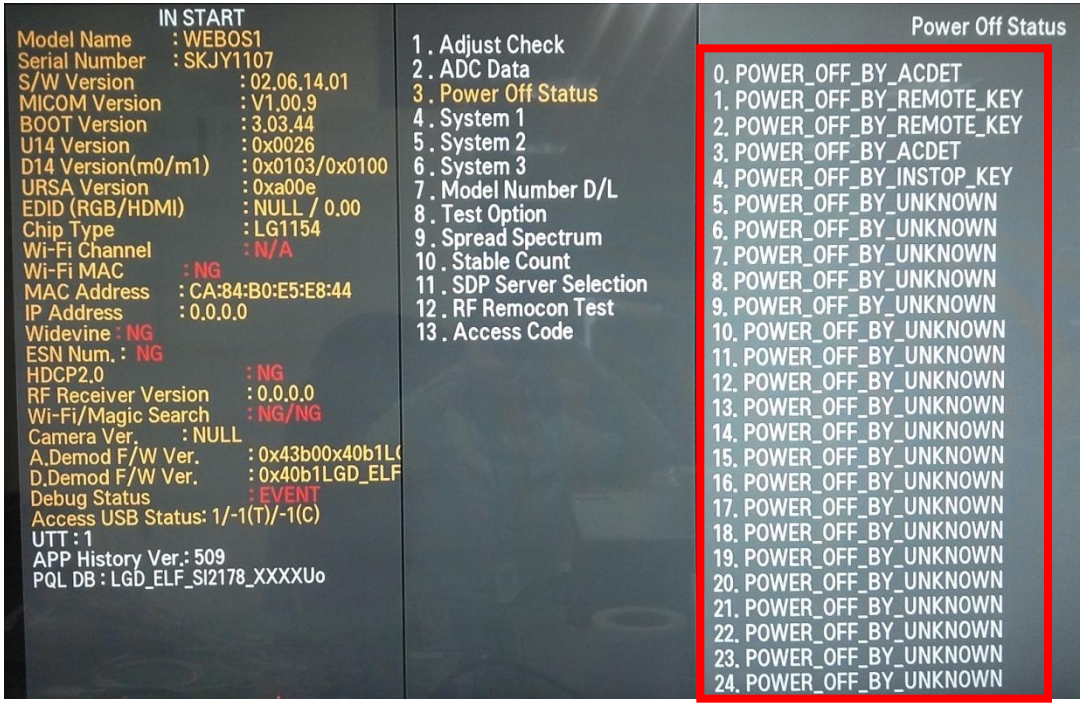


P201			
Type : SMAW200-H28S5K (BLACK) Maker : YEONHO			
Pin No.	Signal	Pin No.	Signal
1	PWR_ON	2	DRV_ON
3	P-DIM	4	P-DIM2
5	3.5V	6	GND
7	3.5V	8	3.5V
9	GND	10	GND
11	12V	12	12V
13	12V	14	12V
15	12V	16	GND
17	GND	18	24V
19	24V	20	24V
21	24V	22	GND
23	GND	24	N.C
25	SCLK	26	GND
27	SIN	28	VSYNC

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>



Entry method

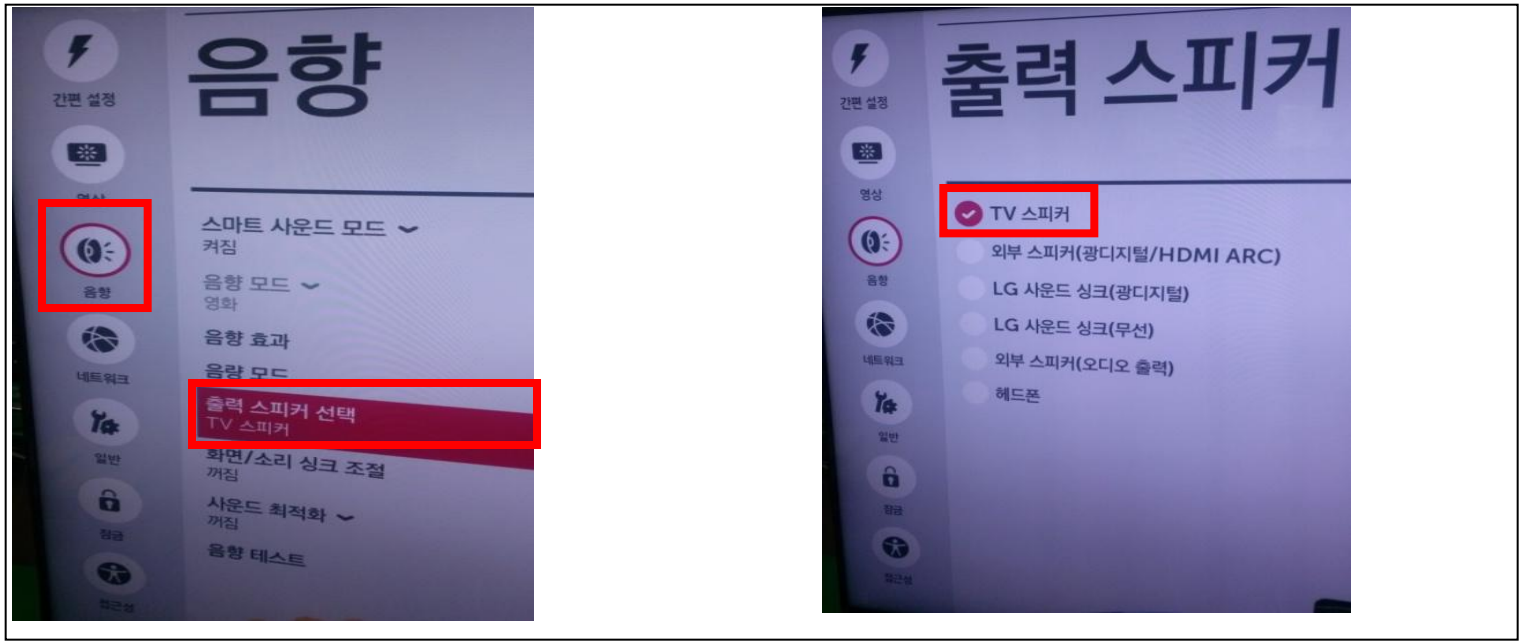
1. Press the IN-START button of the remote controller for adjustment

2. Check the entry into adjustment item 3

Standard Repair Process Detail Technical Manual

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>

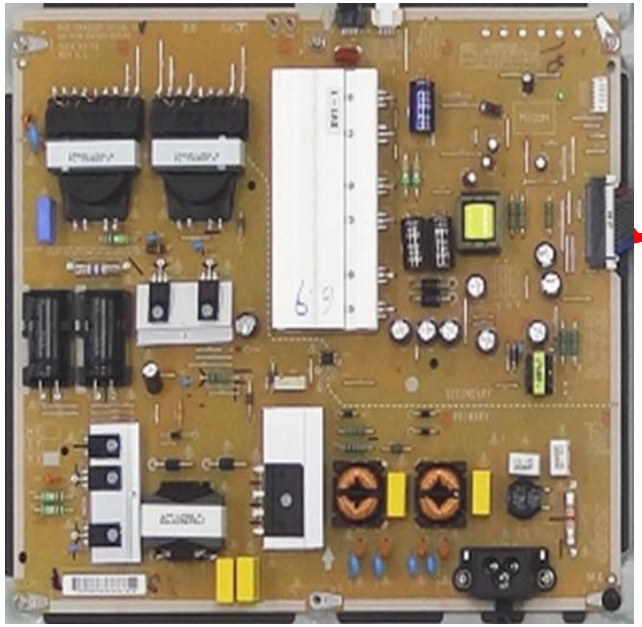


Checking method

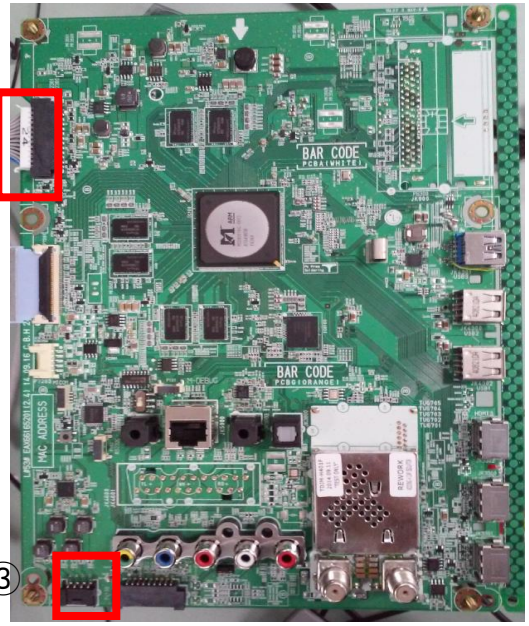
1. Press the Setting button on the remote controller
2. Select the Sound function of the Menu
3. Select the Sound Out
4. Select TV Speaker

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



23	PWR ON	24	DVR_ON
21	P_DIM #1	22	PDIM #2
19	3.5V	20	GND
17	3.5V	18	3.5V
15	GND	16	GND
13	12V	14	12V
11	12V	12	12V
9	12V	10	GND
7	GND	8	24V
5	24V	6	GND
3	24V	4	NC
1	GND	2	GND



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 24V connector of Main Board

2. Measure the 24V input voltage supplied from Power Board
(If there is no input voltage, remove and check the connector)

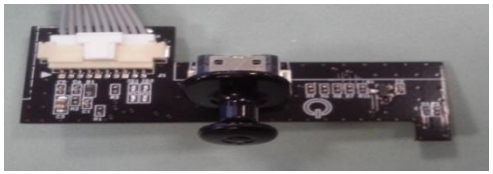
3.Connect the tester RX1 to the speaker terminal and if you hear the Chik Chik sound when you touch the GND and output terminal, the speaker is normal.

Standard Repair Process Detail Technical Manual

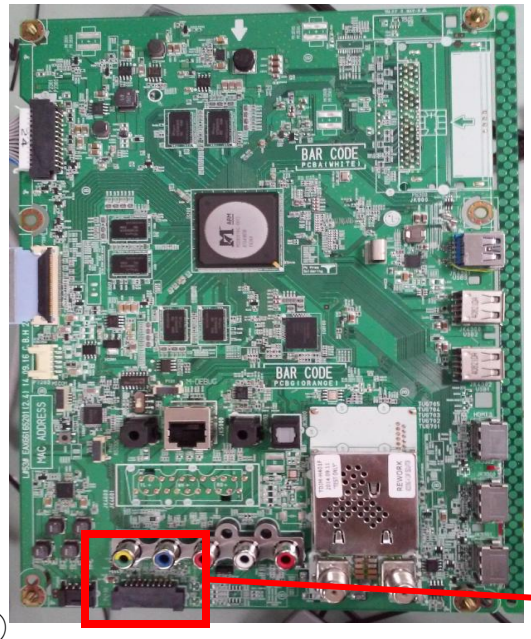
Error symptom	D. Function error	Established date		
Content	Remote controller operation checking method	Revised date		A22

①

IR & LOGO light front



IR & LOGO light Rear



1	GND
2	+3.5V WOL
3	BT_RESET
4	USB_DM
5	NC
6	USB_DP
7	WOL
8	GND
9	SDA
10	GND
11	SCL
12	KEY1
13	GND
14	KEY2
15	IR
16	+3.5V_ST
17	LED_R
18	GND

Checking order to check remote controller

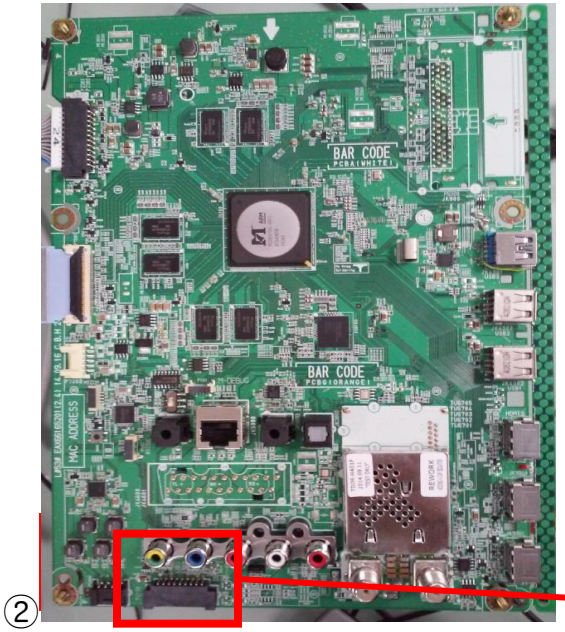
Checking order

1.Check IR cable condition between IR & Main board.(Check picture number① 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.

<55UF8550-NB>

① Wifi & BT Front

Wifi & BT Rear



② ③

1	GND
2	+3.5V WOL
3	BT_RESET
4	USB_DM
5	NC
6	USB_DP
7	WOL
8	GND
9	SDA
10	GND
11	SCL
12	KEY1
13	GND
14	KEY2
15	IR
16	+3.5V_ST
17	LED_R
18	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