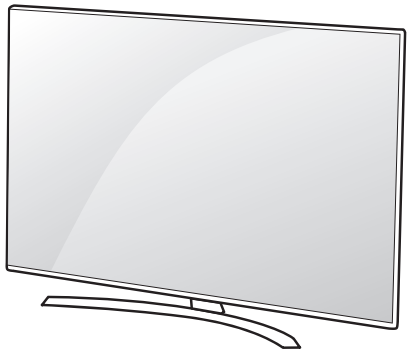
Internal Use Only

LED TV
SERVICE MANUAL

CHASSIS : UA62M

MODEL : 65UH9500 65UH9500-UA

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



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SAFETY PRECAUTIONS

IMPORTANT SAFETY NOTICE

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

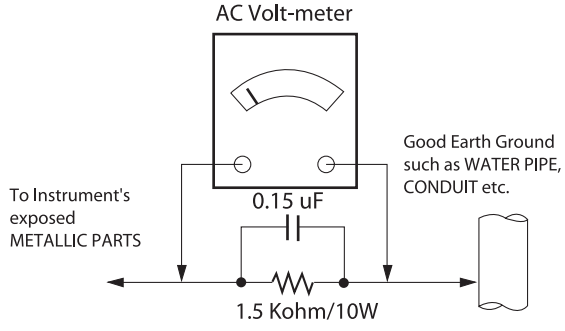
always perform an **AC leakage current check** on the exposed metallic parts of the cabinet, such as antennas, terminals, etc., to be sure the set is safe to operate without damage of electrical shock.

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 UA62M 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. General Specification

4.1. Model Specification

No	Item		Specification	Remark
1	Market		North America	
2	Broadcasting system		Digital : DVB-T2, ATSC /64 & 256 QAM, ATSC Analog : NTSC-M / NTSC-M	
3	Available Channel		VHF : 2~13	
			UHF : 14~69	
			DTV : 2-69	
			CATV : 1 ~ 135	
			CADTV : 1 ~ 135	
			DTV(UHD) : 2 ~ 69	
4	Receiving system		Digital : ATSC Analog : NTSC-M	
5	Video Input		NTSC-M	Rear gender(1EA)
6	Component Input		$Y/C_b/C_r$, $Y/ P_b/P_r$	Rear gender(1EA)
7	HDMI Input	HDMI 1	PC / DTV format	Support 6Gbps
		HDMI 2	PC / DTV format	Support 6Gbps, Support ARC
		HDMI 3	PC / DTV format	Support 6Gbps
8	Audio Input		Component / AV Audio / DVI Audio	L/R Input ; Rear(Gender) Component and av and DVI use same jack ; Rear (Gender)
9	SPDIF out(1EA)		Optical Audio out	Rear (1EA),
10	USB Input(3EA)		EMF, DivX HD, For SVC (download)	JPEG, MP3, DivX HD

4.2. Module Specification

No	Item	Specification		Remark
1	Display Screen Device	49” wide Color Display Module		Resolution: 3840*2160
		55” wide color display module		
		60” wide color display module		
		65” wide color display module		
		75” wide color display module		
		79” wide color display module		
		86” wide color display module		
2	Aspect Ratio	16:9		All
3	LCD Module	49” TFT QWUXGA LCD		LC490EQH-DJF1 [UH93/UH85]
		55” TFT QWUXGA LCD		LC550EQH-DJF1[UH93/UH85]
				LC550EQF-YJF1[UH96/UH95]
		60” TFT QWUXGA LCD		LC600EQF-DJF1[UH93/UH85]
		65” TFT QWUXGA LCD		LC650EQF-DJF1[UH93/UH85]
				LC650EQF-YJF1[UH96/UH95]
		75” TFT QWUXGA LCD		LC750EQF-FJF1[UH93/UH85]
				LC750EQF-FJM1[UH68/UH65]
		79” TFT QWUXGA LCD		LC790EQF-FJF1[UH96/UH95]
		86” TFT QWUXGA LCD		LC860EQD-FJF1[UH96/UH95]
4	Operating Environment	TFT	Temp. : 0 ~ 40 deg Humidity : 0 ~ 85%	LGE SPEC
		TFT	Temp. : 0 ~ 50 deg Humidity : 20 ~ 90%	
5	Storage Environment	TFT	Temp. : -20 ~ 60 deg Humidity : 10 ~ 90%	
		ALEF	Temp. : -20 ~ 60 deg Humidity : 10 ~ 90%	
6	Input Voltage	AC100 ~ 240V, 50/60Hz		

5. External input format

5.1. 2D Mode

5.1.1. Component input(Y, PB, PR)

No	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	Proposed
1	720*480i	15.73	59.94	13.50	SDTV, DVD 480I(525I)
2	720*480i	15.75	60.00	13.51	SDTV, DVD 480I(525I)
3	720*576i	15.62	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	27.02	SDTV 480P
6	720*576p	31.25	50.00	27.00	SDTV 576P 50Hz
7	1280*720	44.96	59.94	74.17	HDTV 720P
8	1280*720	45.00	60.00	74.25	HDTV 720P
9	1280*720	37.50	50.00	74.25	HDTV 720P 50Hz
10	1920*1080	28.12	50.00	74.25	HDTV 1080I 50Hz,
11	1920*1080	33.72	59.94	74.17	HDTV 1080I
12	1920*1080	33.75	60.00	74.25	HDTV 1080I
13	1920*1080	56.25	50	148.5	HDTV 1080P
14	1920*1080	67.43	59.94	148.5	HDTV 1080P
15	1920*1080	67.50	60.00	148.5	HDTV 1080P

5.1.2. HDMI Input (PC/DTV)

No.	Resolution	H-freq(kHz)	V-freq.(kHz)	Pixel clock(MHz)	Proposed	
	HDMI-PC					
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	VESA(SVGA)	
5	1024*768	48.36	60.00	65	VESA(XGA)	
6	1360*768	47.71	60.01	84.75	VESA(WXGA)	
7	1152*864	54.34	60.05	80	VESA	
8	1280*1024	63.98	60.02	109.00	SXGA	Support to HDMI-PC
9	1920*1080	67.5	60	158.40	WUXGA(Reduced Blanking)	
10	3840*2160	54	24.00	297.00	UDTV 2160P	
11	3840*2160	56.25	25.00	297.00	UDTV 2160P	
12	3840*2160	67.5	30.00	297.00	UDTV 2160P	
13	4096*2160	53.95	23.97	296.70	UDTV 2160P	
14	4096*2160	54	24	297	UDTV 2160P	

	HDMI-DTV					
No.	Resolution	H-freq(kHz)	V-freq.(kHz)	Pixel clock(MHz)	Proposed	Remarks
1	640*480	31.46	59.94	25.12	SDTV 480P	
2	640*480	31.5	60.00	25.12	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	SDTV 480P	
7	720*480	31.5	60.00	27.02	SDTV 480P	
8	720*576	31.25	50.00	27	SDTV 576P	
9	1280*720	44.96	59.94	74.17	HDTV 720P	
10	1280*720	45	60.00	74.25	HDTV 720P	
11	1280*720	37.5	50.00	74.25	HDTV 720P	
12	1920*1080	28.12	50.00	74.25	HDTV 1080I	
13	1920*1080	33.72	59.94	74.17	HDTV 1080I	
14	1920*1080	33.75	60.00	74.25	HDTV 1080I	
15	1920*1080	26.97	23.97	63.29	HDTV 1080P	
16	1920*1080	27.00	24.00	63.36	HDTV 1080P	
17	1920*1080	33.71	29.97	79.120	HDTV 1080P	
18	1920*1080	33.75	30.00	79.20	HDTV 1080P	
19	1920*1080	56.25	50.00	148.5	HDTV 1080P	
20	1920*1080	67.43	59.94	148.35	HDTV 1080P	
21	1920*1080	67.5	60.00	148.50	HDTV 1080P	
22	3840*2160	53.95	23.98	296.70	UDTV 2160P	
23	3840*2160	54	24.00	297.00	UDTV 2160P	
24	3840*2160	56.25	25.00	297.00	UDTV 2160P	
25	3840*2160	61.43	29.97	296.70	UDTV 2160P	
26	3840*2160	67.5	30.00	297.00	UDTV 2160P	
27	3840*2160	112.5	50.00	594	UDTV 2160P	When HDMI1,2,3 UHD DEEP COLOUR ON
28	3840*2160	134.86	59.94	593.40	UDTV 2160P	
29	3840*2160	135	60.00	594	UDTV 2160P	
30	4096*2160	53.95	23.98	296.70	UDTV 2160P	
31	4096*2160	54	24.00	297	UDTV 2160P	
32	4096*2160	56.25	25.00	297	UDTV 2160P	
33	4096*2160	61.43	29.97	296.70	UDTV 2160P	
34	4096*2160	67.5	30.00	297	UDTV 2160P	
35	4096*2160	112.5	50.00	594	UDTV 2160P	When HDMI1,2,3 UHD DEEP COLOUR ON
36	4096*2160	134.86	59.94	593.40	UDTV 2160P	
37	4096*2160	135	60.00	594	UDTV 2160P	

5.2. 3D Mode

5.2.1. 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	31.46 / 31.5	59.94/ 60	25.17/25.2	1	Top-and-Bottom Side-by-side(half)	Secondary(SDTV 480P) Secondary(SDTV 480P)
		62.93 / 63	59.94/ 60	50.35/50.4	1	Frame packing Line alternative	Secondary(SDTV 480P) (SDTV 480P)
		31.46 / 31.5	59.94/ 60	50.35/50.4	1	Side-by-side(Full)	(SDTV 480P)
2	720*480	31.46 / 31.5	59.94 / 60	27.00/27.03	2,3	Top-and-Bottom Side-by-side(half)	Secondary(SDTV 480P) Secondary(SDTV 480P)
		62.93 / 63	59.94 / 60	54/54.06	2,3	Frame packing Line alternative	Secondary(SDTV 480P) (SDTV 480P)
3	720*576	31.25	50	27	17,18	Top-and-Bottom Side-by-side(half)	Secondary(SDTV 576P) Secondary(SDTV 576P)
		62.5	50	54	17,18	Frame packing	Secondary(SDTV 576P)
4	720*576	15.62	50	27	21	Frame packing Top-and-Bottom Side-by-side(half)	Secondary(SDTV 576I) Secondary(SDTV 576I) Secondary(SDTV 576I)
5	1280*720	37.50	50	74.25	19	Top-and-Bottom Side-by-side(half)	Primary(HDTV 720P) Primary(HDTV 720P)
		44.96 / 45	59.94 / 60	74.17/74.25	4	Top-and-Bottom Side-by-side(half)	Primary(HDTV 720P) Primary(HDTV 720P)
		75	50	148.5	19	Frame packing	Primary(HDTV 720P)
		89.91/90	59.94 / 60	148.35/148.5	4	Frame packing	Primary(HDTV 720P)
6	1920*1080	28.12	50.00	74.25	20	Top-and-Bottom Side-by-side(half)	Secondary(HDTV 1080I) Primary(HDTV 1080I)
		33.72 / 33.75	59.94 / 60	74.17/74.25	5	Top-and-Bottom Side-by-side(half)	Secondary(HDTV 1080I) Primary(HDTV 1080I)
		56.25	50.00	148.5	20	Frame packing	Primary(HDTV 1080I)
		67.43/67.50	59.94 / 60	148.35/148.5	5	Frame packing	Primary(HDTV 1080I)
7	1920*1080	26.97 / 27	23.97 / 24	74.17/74.25	32	Top-and-Bottom Side-by-side(half)	Primary(HDTV 1080P) Primary(HDTV 1080P)
		28.12	25	74.25	33	Top-and-Bottom Side-by-side(half)	Secondary(HDTV 1080P) Secondary(HDTV 1080P)
		33.71 / 33.75	29.97 / 30.00	74.18/74.25	34	Top-and-Bottom Side-by-side(half)	Primary(HDTV 1080P) Secondary(HDTV 1080P)
		43.94/54	23.97 / 24	148.35/148.5	32	Frame packing	Primary(HDTV 1080P)
		56.25	25	148.5	33	Frame packing	Secondary(HDTV 1080P)
		67.43 / 67.5	29.97 / 30.00	148.35/148.5	34	Frame packing	Primary(HDTV 1080P)
		56.250	50	148.5	31	Top-and-Bottom Side-by-side(half)	Primary(HDTV 1080P) Secondary(HDTV 1080P)
		67.43 / 67.5	59.94 / 60	148.35/148.50	16	Top-and-Bottom Side-by-side(half)	Primary(HDTV 1080P) Secondary(HDTV 1080P)

5.2.2. HDMI 1.4/2.0(3D Supported mode manaually)

No	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock (MHz)	Proposed	3D input proposed mode
1	720*480	31.5	60	27.03	SDTV 480P	2D to 3D, Side by Side(Half), Top & Bottom
2	720*576	31.25	50	27	HDTV 720P	
3	1280*720	45.00	60.00	74.25	HDTV 1080I	
		37.50	50	74.25	HDTV 1080P	
4	1920*1080	33.75	60.00	74.25	HDTV 1080P	
		28.125	50.00	74.25	HDTV 1080P	
5	1920*1080	27.00	24.00	74.25	HDTV 1080P	
		28.12	25	74.25	HDTV 2160P	
		33.75	30.00	74.25	HDTV 2160P	
		67.50	60.00	148.5	HDTV 2160P	
		56.250	50	148.5	HDTV 2160P	
6	3840*2160 4096*2160	53.95	23.97	296.70	HDTV 2160P	2D to 3D, Top & Bottom, Side by Side(half)
		54	24.00	297.00	HDTV 2160P	
		56.25	25.00	297.00	HDTV 2160P	
		61.43	29.97	296.70	HDTV 2160P	
		67.5	30.00	297.00	HDTV 2160P	
7	3840*2160	54	24.00	297.00	HDTV 2160P	2D to 3D, Top & Bottom(half), Side by Side(half), When HDMI1,2,3 UHD DEEP COLOUR ON
8	4096*2160	56.25	25.00	297.00	HDTV 2160P	

5.2.3. HDMI-PC Input (3D) (3D Supported Mode Manually)

No	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock (MHz)	Proposed	3D input proposed mode
1	1024*768	48.36	60	65	HDTV 768P	2D to 3D, Side by Side(half), Top & Bottom
2	1360*768	47.71	60	85.5	HDTV 768P	2D to 3D, Side by Side(half), Top & Bottom
3	1920*1080	67.50	60	148.50	HDTV 1080P	2D to 3D, Side by Side(half), Top & Bottom
4	3840*2160	54	24.00	297.00	HDTV 2160P	2D to 3D, Top & Bottom(half), Side by Side(half),
		56.25	25.00	297.00		
		67.5	30.00	297.00		
5	4096*2160	54	24	297.00	HDTV 2160P	2D to 3D, Top & Bottom(half), Side by Side(half),
6	Others	-	-	-	640*350 720*400 640*480 800*600 1152*864	2D to 3D, Side by Side(half), Top & Bottom

5.2.4. 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	28.12	50	74.25	HDTV 1080I	2D to 3D, Side by Side, Top & Bottom

5.2.5. RF Input (3D supported mode automatically)

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

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

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

5.2.7. USB -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, Side by Side(Half), Top & Bottom
2	Over 320x240	-	-	-	2D to 3D, Side by Side(Half), Top & Bottom

5.2.8. USB(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	74.25	Side by Side(Half), Top & Bottom, Side by Side(Full), Frame Sequential, MPO(Photo), JPS(Photo)
2	2160p	67.5	30	297	

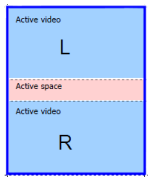
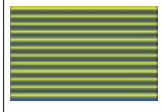
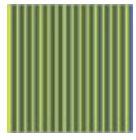
5.2.9. Component Input(3D supported mode manually)

No.	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	Proposed	3D input proposed mode
1	1280*720	37.5	50	74.25	HDTV 720P	2D to 3D, Side by Side(half), Top & Bottom
2	1280*720	45.00	60.00	74.25	HDTV 720P	
3	1280*720	44.96	59.94	74.17	HDTV 720P	
4	1920*1080	33.75	60.00	74.25	HDTV 1080I	
5	1920*1080	33.72	59.94	74.17	HDTV 1080I	
6	1920*1080	28.12	50	74.25	HDTV 1080I	
7	1920*1080	67.500	60	148.50	HDTV 1080P	
8	1920*1080	67.43	59.94	148.35	HDTV 1080P	
9	1920*1080	27.00	24.00	74.25	HDTV 1080P	
10	1920*1080	28.12	25	74.25	HDTV 1080P	
11	1920*1080	56.25	50	74.25	HDTV 1080P	
12	1920*1080	26.97	23.97	74.17	HDTV 1080P	
13	1920*1080	33.75	30.00	74.25	HDTV 1080P	
14	1920*1080	33.71	29.97	74.17	HDTV 1080P	

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

No	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	3D input proposed mode
1	1024X768p	-	30 / 60	-	2D to 3D, Side by Side(Half), Top & Bottom
2	1280x720p	-	30 / 60	-	
3	1920X1080p		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 UA62M 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.

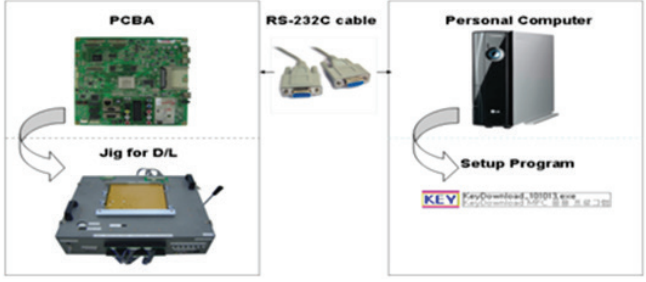
3. PCB assembly adjustment method

3.1. MAC Address, ESN Key, Wide-vine Key, HDCP 2.2 Download

- D/L Program : keydownload.exe

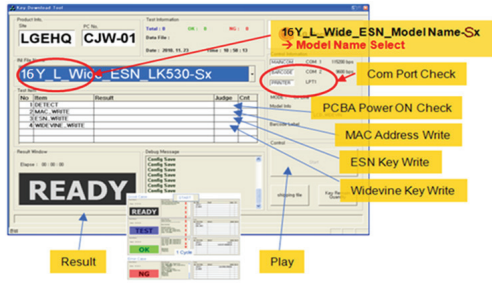
3.1.1. Equipment & Condition

(1) Play file: keydownload.exe
(2) Key Write: Com 1,2,3,4 and 115200 (Baudrate)
(3) Barcode: Com 1,2,3,4 and 9600 (Baudrate)



3.1.2. Download Process (MAC + WIDEVINE + ESN+HDCP2.2)

(1) Execute “keydownload.exe” on PC
(2) Select the download items.
(3) Mode check : Online only
(4) Check the test process
- DETECT -> MAC_WRITE -> ESN_WRITE (only Colombia/Panama) -> WIDEVINE_WRITE
(5) Play: START
(6) Check of result: Ready, Test, OK or NG



3.1.3. Inspection : InINSTART menu, check these keys.

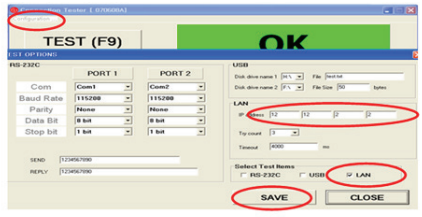
3.2. LAN Test(Ping-test)

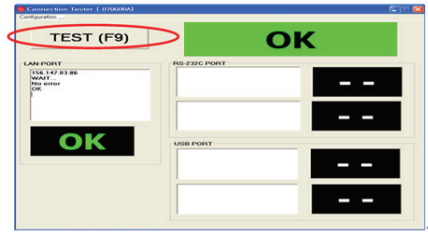
3.2.1. PING Test(LAN Operating Test)

3.2.1.1. Check PCBA
(1) Connect LAN to PCBA& Power On.(Default IP can be set to automatic setting. When power ON, IP can be Automatically be achieved from the router)
(2) Push ADJ key on Adjust remote-controller.
(3) Enter “13. ACAP PING TEST” & check Network.

3.2.1.2. Check Set(Manufacturer)
(1) Connect TV-Set & PC with Cross LAN cable.(PC IP : 12.12.2.3)
(2) Execute “PINT Test program”, Check setting data of program. (TV-Set IP : 12.12.2.2)

(3) Push Power Only key on Adjust remote-controlle.
(4) Click “RUN”, Check “OK” or “NG”





3.3. Main S/W program download

3.3.1. Using the Memory Stick

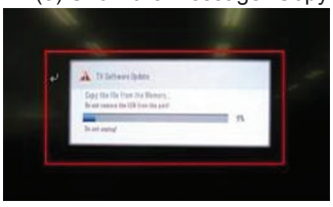
** USB DOWNLOAD : Service Mode

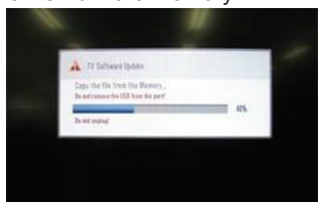
(1) Insert the USB memory Stick to the USB port

(2) Automatically detect the SW Version.

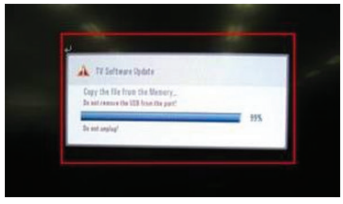
-> S/W download process is executed automatically.

(3) Show the message “Copy the file from the Memory”





(4) After Finished the Download, Automatically DC Off -> On



(5) If the TV IS Turn On, Check the updated SW Version and Tool Option.

3.4. Input tool option

Adjust tool option refer to the BOM.

- Tool Option Input : PCBA Check Process
- Area Option Input : Set Assembly Process

After Input Tool Option and AC off

Before PCBA check, you have to change the Tool option and have to AC off/on (Plug out and in)

(If missing this process, set can operate abnormally)

3.4.1.Profile

Must be changed the option value because being different with some setting value depend on module maker, inch and market

3.4.2. Equipment

adjustment remote control.

3.4.3. Adjustment method

- The input methods are same as other chassis.(Use ADJ Key on the Adjust Remocon.)
  (If not changed the option, the input menu can differ the model spec.)
  Refer to Job Expression of each main chassis ass’y (EBTxxxxxxxx) for Option value

(Caution)

Don’t Press “IN-STOP” key after completing the function inspection.

3.5. EDID D/L method

Recommend that don’t connect HDMI and RGB(D-SUB) cable when downloading the EDID.

If not possible, recommend that connect the MSPG equipment.

There are two methods of downloading the edid data

It is a VESA regulation. A PC or a MNT will display an optimal resolution through information

Sharing without any necessity of user input. It is a realization of “Plug and Play”

3.5.1. 1st Method

EDID data’s are automatically downloaded when adjusting the Tool Options.

Automatically downloaded when pushing the enter key in the EDID D/L menu.

It takes about 2seconds.

3.5.2. 2nd Method

(Caution)

Must be checked that the tool option is right or not.

If tool option is wrong, HDMI edid data could not be downloaded well.

(1) Press the ADJ key

(2) Move to the 13. EDID D/L and Press the right direction key(►)

(3) Press the right direction key(►) at Start.

(4) After about a few seconds, appear “Waiting..” => “OK”, then complete.

3.5.3. RS-232C command Method

(1) Command : AE 00 10

(Caution)

Don’t connect HDMI and RGB(D-SUB) cable when downloading the EDID.

If the cables are connected, Downloading of edid could be failed.

3.5.4. EDID data

3.5.4.1. DTS

Input	3D			
	6G		3G	
HDMI 1	9F	65	9F	8B
HDMI 2	9F	55	9F	7B
HDMI 3	9F	45	9F	6B

(1) 3D_6G

- HDMI1 6G_UHD Deep Color ON

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01	01
10	01	1A	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	9F
80	02	03	49	F1	50	61	10	04	05	03	02	20	22	01	5D	5E
90	5F	66	62	63	64	29	3D	06	C0	15	07	50	09	57	07	75
A0	03	0C	00	10	00	B8	3C	20	C0	87	01	02	03	04	01	40
B0	01	FC	18	10	16	67	D8	5D	C4	01	78	80	03	E3	05	C0
C0	00	E3	0F	01	10	E3	06	07	01	01	1D	80	18	71	1C	16
D0	20	58	2C	25	00	40	84	63	00	00	9E	66	21	50	B0	51
E0	00	1B	30	40	70	36	00	40	84	63	00	00	1E	00	00	00
F0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	65

- HDMI2 6G_UHD Deep Color ON

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01	01
10	01	1A	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	9F
80	02	03	49	F1	50	61	10	04	05	03	02	20	22	01	5D	5E
90	5F	66	62	63	64	29	3D	06	C0	15	07	50	09	57	07	75
A0	03	0C	00	20	00	B8	3C	20	C0	87	01	02	03	04	01	40
B0	01	FC	18	10	16	67	D8	5D	C4	01	78	80	03	E3	05	C0
C0	00	E3	0F	01	10	E3	06	07	01	01	1D	80	18	71	1C	16
D0	20	58	2C	25	00	40	84	63	00	00	9E	66	21	50	B0	51
E0	00	1B	30	40	70	36	00	40	84	63	00	00	1E	00	00	00
F0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	55

- HDMI3 6G_UHD Deep Color ON

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01	01
10	01	1A	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	9F
80	02	03	49	F1	50	61	10	04	05	03	02	20	22	01	5D	5E
90	5F	66	62	63	64	29	3D	06	C0	15	07	50	09	57	07	75
A0	03	0C	00	30	00	B8	3C	20	C0	87	01	02	03	04	01	40
B0	01	FC	18	10	16	67	D8	5D	C4	01	78	80	03	E3	05	C0
C0	00	E3	0F	01	10	E3	06	07	01	01	1D	80	18	71	1C	16
D0	20	58	2C	25	00	40	84	63	00	00	9E	66	21	50	B0	51
E0	00	1B	30	40	70	36	00	40	84	63	00	00	1E	00	00	00
F0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	45

(2) 3D_3G

- HDMI1 3G_UHD Deep Color ON

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01	01
10	01	1A	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	9F
80	02	03	3B	F1	4E	5D	10	04	05	03	02	20	22	01	5E	5F
90	62	63	64	29	3D	06	C0	15	07	50	09	57	07	75	03	0C
A0	00	10	00	B8	3C	20	C0	87	01	02	03	04	01	40	01	FC
B0	18	10	16	E3	0E	61	66	E3	06	07	01	01	1D	80	18	71
C0	1C	16	20	58	2C	25	00	40	84	63	00	00	9E	66	21	50
D0	B0	51	00	1B	30	40	70	36	00	40	84	63	00	00	1E	00
E0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
F0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	8B

- HDMI2 3G_UHD Deep Color ON

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01	01
10	01	1A	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	9F
80	02	03	3B	F1	4E	5D	10	04	05	03	02	20	22	01	5E	5F
90	62	63	64	29	3D	06	C0	15	07	50	09	57	07	75	03	0C
A0	00	20	00	B8	3C	20	C0	87	01	02	03	04	01	40	01	FC
B0	18	10	16	E3	0E	61	66	E3	06	07	01	01	1D	80	18	71
C0	1C	16	20	58	2C	25	00	40	84	63	00	00	9E	66	21	50
D0	B0	51	00	1B	30	40	70	36	00	40	84	63	00	00	1E	00
E0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
F0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	7B

- HDMI3 3G_UHD Deep Color ON

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01	01
10	01	1A	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	9F
80	02	03	3B	F1	4E	5D	10	04	05	03	02	20	22	01	5E	5F
90	62	63	64	29	3D	06	C0	15	07	50	09	57	07	75	03	0C
A0	00	30	00	B8	3C	20	C0	87	01	02	03	04	01	40	01	FC
B0	18	10	16	E3	0E	61	66	E3	06	07	01	01	1D	80	18	71
C0	1C	16	20	58	2C	25	00	40	84	63	00	00	9E	66	21	50
D0	B0	51	00	1B	30	40	70	36	00	40	84	63	00	00	1E	00
E0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
F0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	6B

3.6. ADC Calibration

Comp 480i/Comp 1080p/RGB

3.6.1. ADC Calibration : Internal Auto ADC

ADC calibration is not necessary because MAIN SoC (LGExxxx) is already calibrated from IC Maker

3.6.2. Manual ADC Calibration

3.6.2.1. Equipment & Condition

(1) Adjustment Remocon

(2) 801GF (802B, 802F, 802R) or MSPG925FA Pattern Generator

- Resolution : 480i Comp1 (MSPG-925FA: model-209, pattern-65)
- Resolution : 1080p Comp1 (MSPG-925FA: model-225, pattern-65)
- Resolution : 1080p RGB (MSPG-925FA: model-225, pattern-65)
- Pattern : Horizontal 100% Color Bar Pattern
- Pattern level: 0.7±0.1 Vp-p

3.6.2.2. Adjust method

3.6.2.2.1. ADC 480i/1080p Comp

(1) Check connected condition of Comp cable to the equipment

(2) Give a 480i Mode, Horizontal 100% Color Bar Pattern to Comp1. (MSPG-925FA -> Model: 209, Pattern: 65)

(3) Change input mode as Component1 and picture mode as “Standard”

(4) Press the In-start Key on the ADJ remote after at least 1 min of signal reception. Then, select

(5) External ADC. And Press OK or Right Button for going to sub menu.

(6) Press OK in Comp 480i menu

(7) Give a 1080p Mode, Horizontal 100% Color Bar Pattern to Comp1. (MSPG-925FA -> Model: 225, Pattern: 65)

(8) Press OK in Comp 1080p menu

(9) If ADC Comp is successful, “ADC Component Success” is displayed.

(10) If ADC calibration is failure, “ADC Component Fail” is displayed.

(11) If ADC calibration is failure, after rechecking ADC pattern or condition, retry calibration

(12) If ADC calibration is failure, after recheck ADC pattern or condition, retry calibration

3.7. Check SW Version

3.7.1. Method

(1) Push In-star key on Adjust remote-controller.

(2) SW Version check

IN START

Model Name :	49UH9300-NA	1.Adjust Check		
Serial Number :	012PTED6N500	2.ADC Data	Country Group	
S/W Version :	3.02.06.01	3.Power Off Status	Country Group Code	1
MICOM Version :	3.05.3	4.System1	Country Group	KR
BOOT Version :	1.02.22	5.System2	Country	--
UHD BE Version :	OK(40.00.1b.00)	6.System3	Area Option	18048
Chip Type :	LG1312	7.Model Number D/L	Tool Option	
Wi-Fi Channel :	1	8.Test Option	Tool Option1	99598
Wi-Fi MAC :	E8:F2:E2:69:06:CA	9.Spread Spectrum	Tool Option2	29902887
Wi-Fi Speed :	USB 2.0	10.Stable Count	Tool Option3	255827
MAC Address :	3C:CD:93:4F:CB:5D	11.SDP Server Selection	Tool Option4	64814
IP Address :	0.0.0.0	12.RF Remocon Test	Tool Option5	119176
SFU Key :	OK	13.Access Code	Tool Option6	134828
Widevine :	LGTV10L000011618	14.Twin TV	Tool Option7	922283
ESN Num. :	LGTV20162=21001000272		Tool Option9	94338
HDCP1.4 :	OK		Tool CRC	57316
HDCP2(Miracast/HDMI) :	OK/OK		Adjust White Balance :	OK
DTCP :	OK		Adjust ADC(OTP):	OK
RF Receiver Version	1.3.4.18		Component	OK
Wi-Fi/Magic Search :	OK/OK		EDID:	OK
Camera Ver. :	NULL		HDMI1	OK(0x7F,0xCB)
Debug Status :	Release		HDMI2	OK(0x7F,0xBB)
SIGN Key :	DEVELKEY		HDMI3	OK(0x7F,0xAB)
Eye Check :	OK			
Control Key :	OK			
Access USB Status :	1 / -1(T) / -1(C)			
UTT : 40	75			
APP History Version	146(deathvalley)			
PQL DB :	LGD_EGDE_SI2178B_XXXX55			
Video :	NULL			

Adjust Check

3.8. Camera Port Inspection

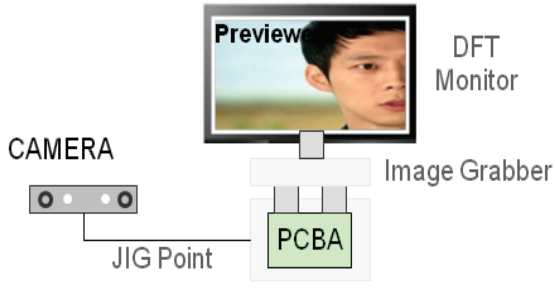
(1) Objective : To check PCBA’s CAMERA Port.

(2) How-it-works

1) Connect the PCBA like below Picture.

2) Send specific RS-232C Command for displaying Camera Preview.

* CAMERA need to be status of Slide up



3) RS-232C Command

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

4. SET assembly adjustment method

4.1. Input Area-Option

4.1.1. Profile

Must be changed the Area option value because being different of each Country's Language
and signal Condition.

4.1.2. Equipment

adjustment remote control.

4.1.3. Adjustment method

- The input methods are same as other chassis.(Use IN-START Key on the Adjust Remocon.)
  Refer to Job Expression of each main chassis ass'y (EBTxxxxxxxx) for Option value.

4.2. Adjustment of White Balance

* 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.

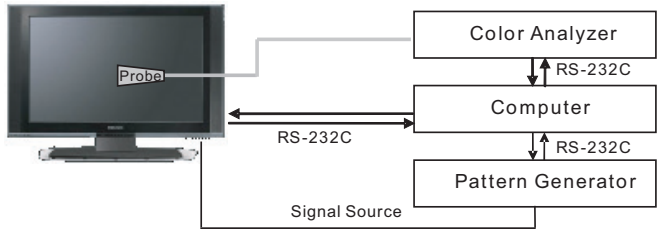
▪ Purpose : Adjust the color temperature to reduce the deviation of the module color temperature.
▪ Principle : To adjust the white balance without the saturation, Fix the one of R/G/B gain to 192 (default data) and decrease the others.
▪ Adjustment mode : Three modes – Cool / Medium / Warm

* Required Equipment

▪ Remote controller for adjustment
▪ Color Analyzer : CA100+ or CA-210 or same product (should be used in the calibrated ch by CS-1000)
  - LCD TV : CH-9
  - PDP TV : CH-10
  - White LED TV : CH-14
  - ALEF : CH-18
  - RGB LED(MNT) : CH-16
  - Auto W/B adjustment instrument(only for Auto adjustment)

4.2.1. Adjustment of White Balance (For Automatic Adjustment)

Connecting diagram of equipment for measuring (For Automatic Adjustment)



* If TV internal pattern is used, not needed

(1) Set TV in ADJ mode using P-ONLY key (or POWER ON key)
(2) Place optical probe on the center of the display
(3) It need to check probe condition of zero calibration before adjustment.
(4) Connect RS-232C Cable
(5) Select mode in ADJ Program and begin a adjustment.
(6) When WB adjustment is completed with OK message, check adjustment status of pre-set mode (Cool, Medium, Warm)
(7) Remove probe and RS-232C cable.

▪ W/B Adj. must begin as start command "wb 00 00" , and finish as end command "wb 00 ff", and Adj. offset if need

4.2.2. Adjustment of White Balance (for Manual adjustment)

4.2.1.1. Adj. condition and cautionary items

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

4.2.2.2. Equipment

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

4.2.2.3. Adjustment

(1) Set TV in Adj. mode using POWER ON

(2) Zero Calibrate the probe of Color Analyzer, then place it on the center of LCD module within 10cm of the surface.

(3) Press ADJ key -> EZ adjust using adj. R/C -> 6. White-Balance then press the cursor to the right (KEY►). When KEY(►) is pressed 216 Gray internal pattern will be displayed.

(4) One of R Gain / G Gain / B Gain should be fixed at 192, and the rest will be lowered to meet the desired value.

(5) Adj. is performed in COOL, MEDIUM, WARM 3 modes of color temperature.

▪ If internal pattern is not available, use RF input. In EZ Adj. menu 6.White Balance, you can select one of 2 Test-pattern: ON, OFF. Default is inner(ON). By selecting OFF, you can adjust using RF signal in 216 Gray pattern.

4.2.3. LED White balance table

4.2.3.1. Cool Mode

(1) Purpose : Especially G-gain fix adjust leads to the luminance enhancement. Adjust the color temperature to reduce the deviation of the module color temperature.

(2) Principle : To adjust the white balance without the saturation, Adjust the G gain more than 172 (If R gain or G gain is more than 255 , G gain can adjust less than 172) and change the others (R/B Gain).

(3) Adjustment mode : mode – Cool

5.2.3.2. Medium / Warm Mode

(1) Purpose : Adjust the color temperature to reduce the deviation of the module color temperature.

(2) Principle : To adjust the white balance without the saturation,Fix the one of R/G/B gain to 192 (default data) and decrease the others.

(3) Adjustment mode : Two modes – Medium / Warm

▪ Standard color coordinate and temperature when using the CA210 equipment(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

▪ The Time Table of color coordinates by SET Aging Time

(1) Edge LED Models(UH8/UH9)_nomarl line

	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

▪ In the SET applied LED module (LM9600), cause of the physical characteristics of LED Module, sets are taken a 120 minutes by aging time to stabilize a color coordinates.
So White Balance Control equipments have to get the SET Aging Time from the SET and then going to control the W/B by revise color coordinates at each time

- To check the Coordinates of White Balance, you have to measure at the below conditions.

Picture Mode : select Vivid and change
Dynamic Contrast : Off ,
Dynamic Colour : Off,
Clear White : Off
-> Picture Mode change : Vidid -> Vivid(User)

(If you miss the upper condition, the coordinates of W/B can be lower than the spec.)

4.4. LAN Inspection

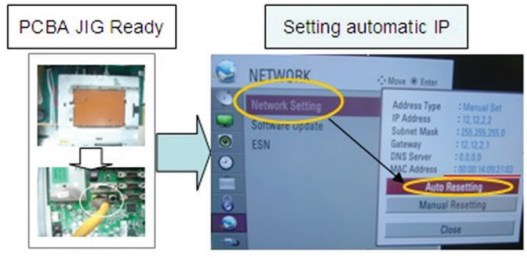
(1) LAN Port connection with PCB

(2) Network setting at MENU Mode of TV

(3) Setting automatic IP

(4) Setting state confirmation

(5) If automatic setting is finished, you confirm IP and MAC Address



4.5.WIDEVINE Key Inspection

(1) Confirm Key input Data at the “IN START” MENU Mode

4.6. Model name & Serial number D/L

4.6.1. Notice

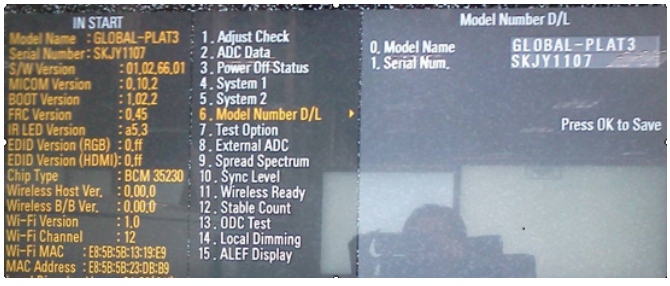
(1) Serial number D/L is using of scan equipment.
(2) Setting of scan equipment operated by Manufacturing Technology Group.
(3) Serial number D/L must be conformed when it is produced in production line, because serial number D/L is mandatory by D-book 4.0
(4) Check the model name In-start menu -> Factory name displayed
(5) Check the Diagnostics (DTV country only) -> Buyer model displayed

4.6.2. Method : Auto

(1) Press “Power on” key of service remocon.(Baud rate : 115200 bps)
(2) Connect RS232 Signal Cable to RS-232 Jack
(3) Write Serial number by use RS-232.
(4) Must check the serial number at Instart menu.

4.6.3. Method : Manual

* 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.
(1) Press the ‘instart’ key of ADJ remote controller.
(2) Go to the menu ‘6.Model Number D/L’ like below photo.
(3) Input the Factory model name or Serial number like photo.



4.7. Wi-Fi MAC Address Check

4.7.1. Using RS232 Command

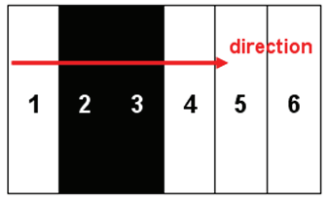
	Command	Set ACK
Transmission	[A][I][][Set ID][][20][Cr]	[O][K][x] or [N][G]

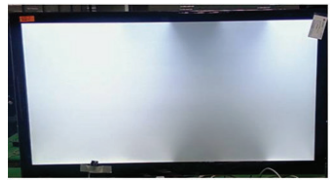
4.7.2. Check the menu on in-start

4.8. Local Dimming Inspection (Optional)

4.8.1. ALEF models with local dimming

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





4.9. GND and Hi-Pot test

4.9.1. GND & HI-POT auto-check preparation

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

4.9.2. GND & HI-POT auto-check

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

4.9.3. Check point

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

4.10. Motion Remote controller Inspection

(1) Equipment : Motion remote controller for test, IR-KEY-CODE remote controller for test
1) Check battery before test. (Recommend : Change battery for every Lot.)
(2) Process
1) If you select the 'start key(wheel)' on the controller, you can pairing with the TV SET.
2) You can check the cursor on the TV Screen, when select the 'Wheel Key' on the controller
3) You must remove the pairing with the TV Set by select 'Back + Home Key' on the controller

4.11. AUDIO output check

No	Item	Min	Typ	Max	Unit	Remark
1	Audio practical max Output, L/R (Distortion=10% max Output)	9.0 8.5	10.0 8.10	12.0 9.88	W Vrms	Measurement condition
2	Speaker (8Ω Impedance)		10.0	15.0	W	Measurement condition

*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)

4.12. 3D Function test

4.12.1. Equipment

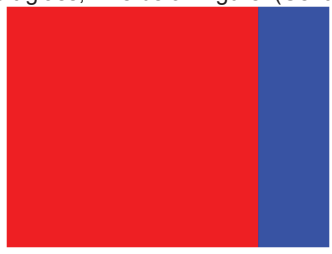
Pattern Generator MSPG-3233, HDMI mode 37, pattern No. 81

4.12.2. Process

(1) Connect HDMI (HDMI mode 371, Pattern No. 81)

(2) Insert 3D Mode, Select side by side mode.
(3) Without 3D-glasses, Like below figure.

(4) With 3D left-glass, Like below figure. (Center is RED)



(5) With 3Dright-glass, Like below figure.(Center is Blue)

4.13. HDMI ARC Function Inspection

4.13.1. Test equipment

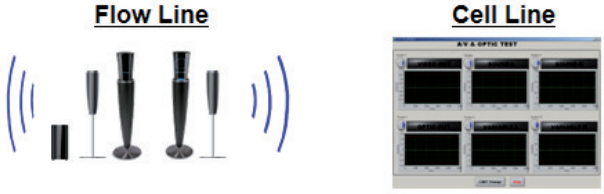
- Optic Receiver Speaker
- MSHG-600 (SW: 1220 ↑)
- HDMI Cable (for 1.4 version)

4.13.2. Test method

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

(2) Check the sound from the TV Set

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



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

4.14. Camera Port Inspection

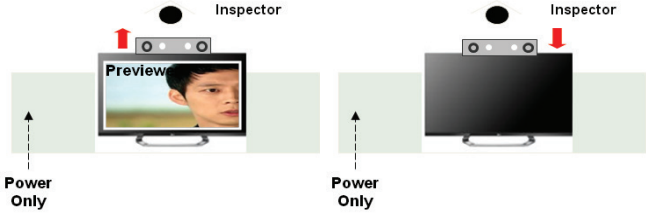
(1) Objective : To check how it connects between Camera and PCBA normally, and their Function

(2) Test Method : This Inspection is available only Power-Only Status.

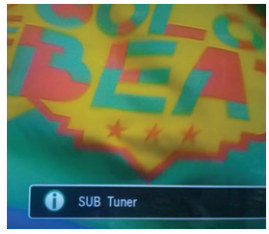
1) Push Camera Up

2) Camera's Preview picture appears on TV Set

(3) Push Camera Down



4.15. PIP/W&R Function Inspection



(1) Objective : To check the connection between sub tuner and PCBA, and their Function

(2) Test Method : This Inspection is available only Power-Only Status.

1) Press exit key of the Adj. R/C and Press PIP key.

2) Check that the SUB TUNER pop up window on the TV Set.

(3) Check that the normal operation (picture, sound) of DTV on the TV Set.

** Appendix **

A. DDC Adjustment Command set

	Adjustment content	CMD (HEX)	ADR	VALUE	detail
1	Aging On/Off	F3	00	FF/00	FF : ON / OO : OFF
2	Input select	F4	00		0x10 : TV 0x20 : AV1 0x21 : AV2 0x40 : Component1 0x41 : Component2 0x60 : RGB 0x90 : HDMI1 0x91 : HDMI2
3	R GAIN	16	00	00 - C0	Gain Value Adjustment CSM COOL
4	G GAIN	18		00 - C0	
5	B GAIN	1A		00 - C0	
6	R GAIN	16	01	00 - C0	Gain Value Adjustment CSM NORMAL
7	G GAIN	18		00 - C0	
8	B GAIN	1A		00 - C0	
9	R GAIN	16	02	00 - C0	Gain Value Adjustment CSM WARM
10	G GAIN	18		00 - C0	
11	B GAIN	1A		00 - C0	
12	CSM mode	F2	00	00	COOL
				01	NORMAL
				02	WARM
13	AUTO ADC	F1	00	0, 1, 2	0: Offset Value Adjustment 1: Gain Value Adjustment 2: Offset and Gain Value Adjustment
14	EEPROM Read	E7	00	00	EEPROM read
15	EEPROM Write	E8	00	data	EEPROM write

B. DDC command protocol

1. Signal TABLE

START 6E A 50 A 84 A 03 A CMD A ADR A VAL A CS A STOP

2. E^{2}PROM Data Write

(1) Signal TABLE

START 6E A 50 A 84+n A 03 A CMD A ADH A ADL A
Data_1 A ... Data_n A CS A STOP Delay 20

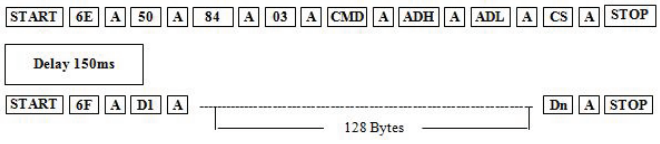
LEN : 84h+Bytes
CMD : E8h
ADH : E2PROM Slave Address(A0,A2,A4,A6),
Not 00h(Reserved by BufferToEEPROM)
ADL : E2PROM Sub Address(00~FF)
Data : Write data
Delay : 20ms

(2) Command Set

	Adjustment content	CMD(hex)	LEN	Detail
1	EEPROM READ	E8h	94h	16-Byte Write
2			(84+n)h	n-byte Write

3. E^{2}PROM Data Read

(1) Command Sequential TABLE



(2) COMMAND SET

No.	Adjustment content	CMD (hex)	ADH (hex)	ADL (hex)	Detail
1	EEPROM READ	E7	A0	0	0-Page 0~7F Read
2				80	0-Page 80~FF Read
3			A2	0	1-Page 0~7F Read
4				80	1-Page 80~FF Read
5			A4	0	2-Page 0~7F Read
6				80	2-Page 80~FF Read
7			A6	0	3-Page 0~7F Read
8				80	3-Page 80~FF Read

C. RS-232C Command Protocol

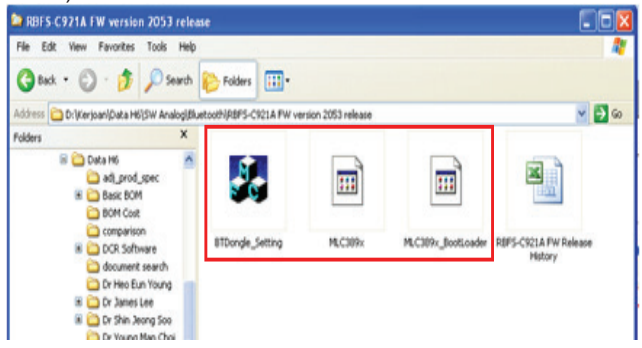
RS-232C COMMAND			Explanation
CMD	ID	DATA	
wb	00	00	White Balance Adjust Start.
wb	00	10	Gain Adjust Start (Internal white pattern)
wb	00	1f	Gain Adjust Stop.
wb	00	20	Offset Adjust Start. (Internal white pattern)
wb	00	2f	Offset Adjust Stop.
wb	00	ff	White Balance Adjust Stop (Internal pattern Exit)
xb	00		10 : Analog, 20 : Video 1, 21 : Video 2, 40 : Component 1, 41 : Component 2, 50 : RGB_DTV, 60 : RGB_PC 90 : HDMI 1, 91 : HDMI 2, 92 : HDMI
ad	00	10	ADC Start

D. Bluetooth S/W Upgrade by using USB drive Input

(1) Preparation Equipment

1) USB Memory Stick

2) New Bluetooth Software



3) Copy New File

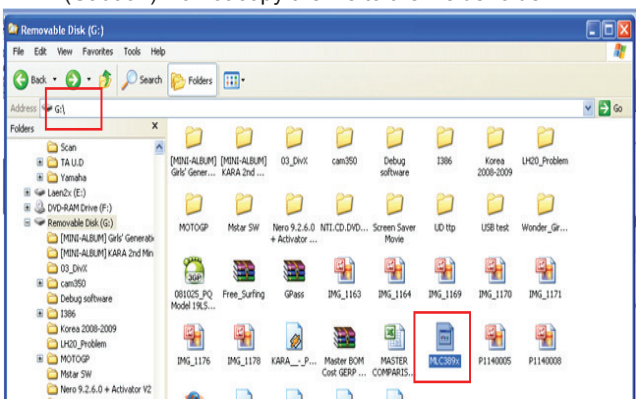
Copy Bluetooth software MCL389x.bin file to memory stick with out folder.

(Caution) Do no t copy the file to the inside folder

3) Copy New File

Copy Bluetooth software MCL389x.bin file to memory stick with out folder.

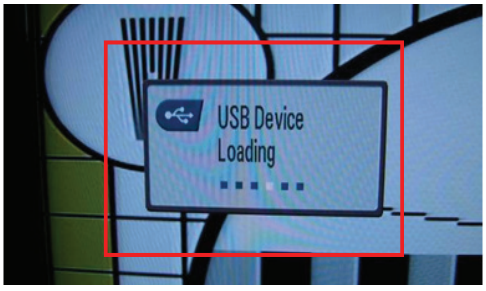
(Caution) Do not copy the file to the inside folder



(2) Connection

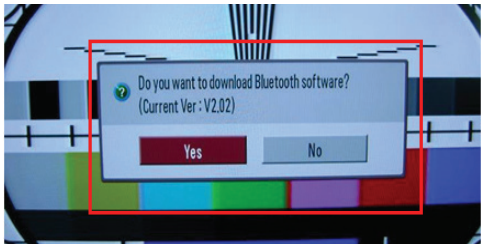
- Plug-in USB Memory stick to the USB input of the set.

(3) USB input -> Automatically loading menu



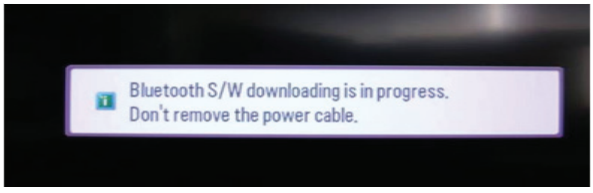
* The OSD “USB Device loading” is appealed by automatically…

(4) Selecting Window for Bluetooth Software update



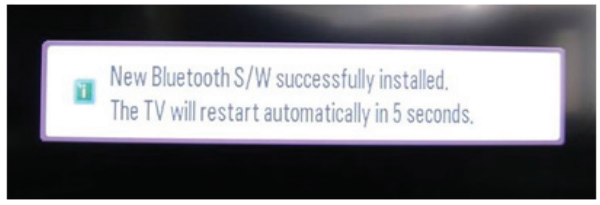
- The Pop-up window appears for selecting to update Bluetooth software and information about current Bluetooth software. (Ex : V2.02)
- Select “Yes”

(5) Bluetooth S/W Downloading Process



- Time Process Downloading new Bluetooth software about 10seconds
- Please Wait until finish and do not un-plug power cable

(6) OSD – Bluetooth software updated successfully



- OSD Information Bluetooth software update success
- LCDTV Set will restart by automatically…
- Time Process to restart about 5seconds

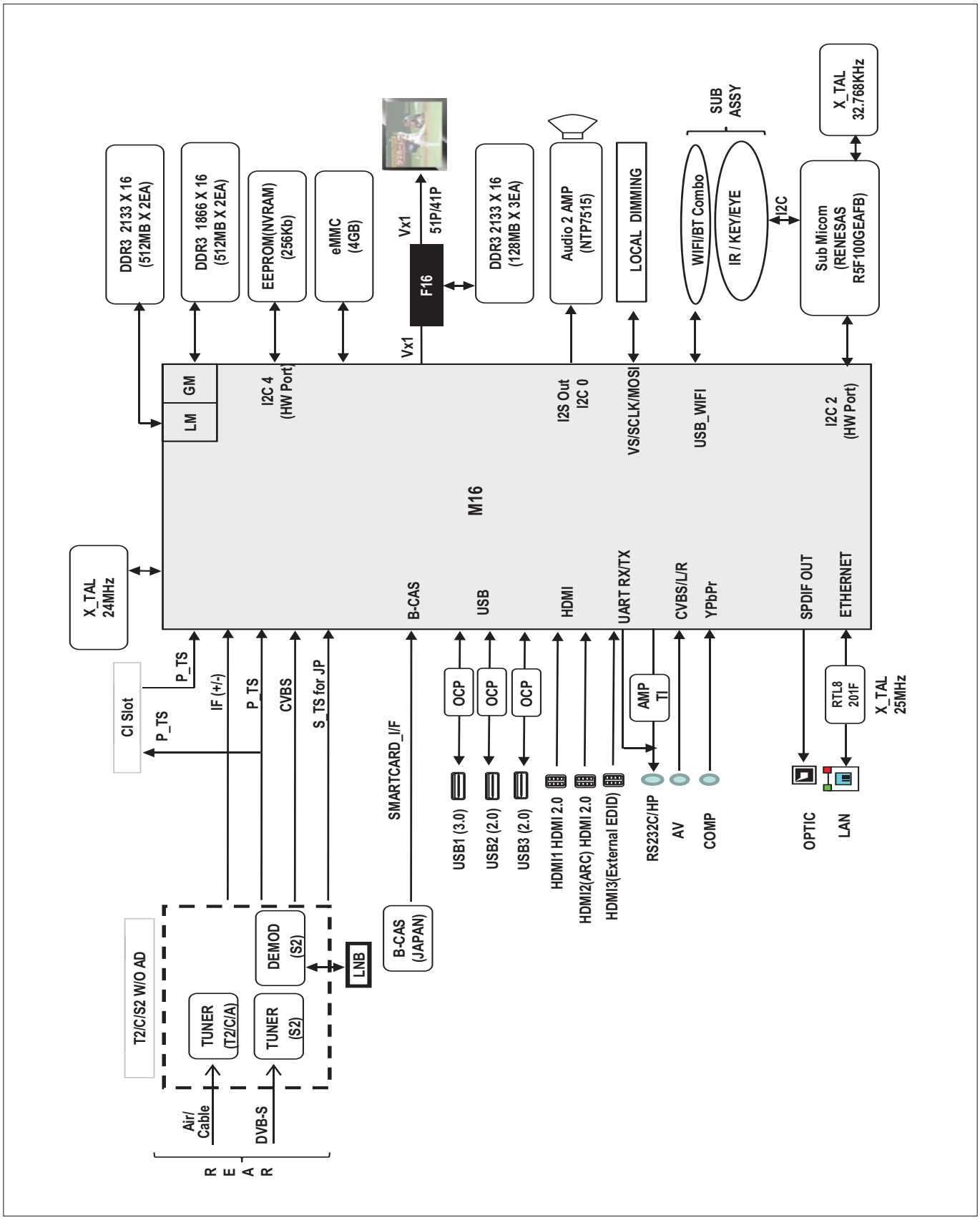
(7) Check S/W Version

- Push “IN-START” button on service remote Controller
- Check Information Bluetooth S/W version will appear on OSD Service Menu.

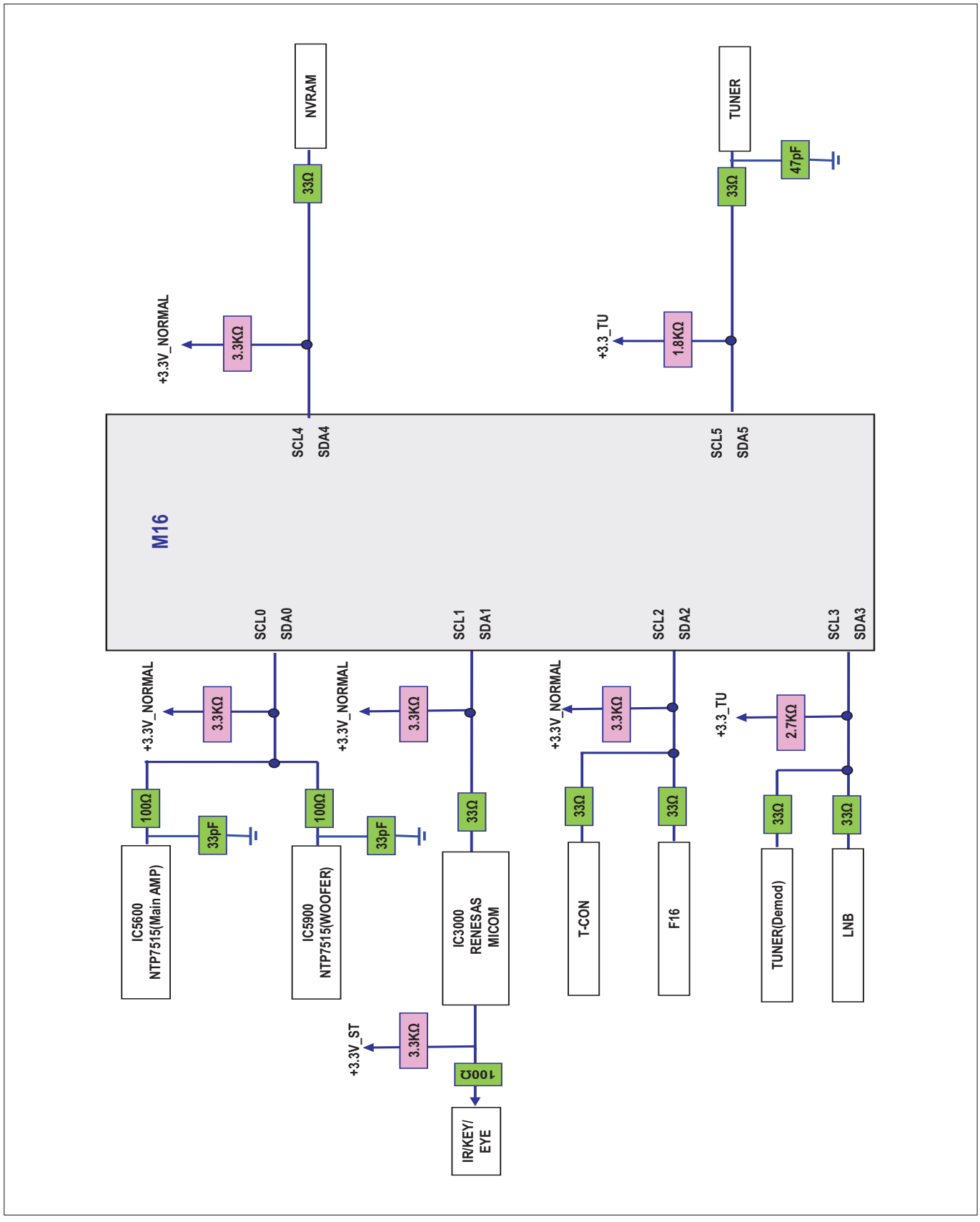
  Example : Bluetooth SW version 2.05

Block Diagram

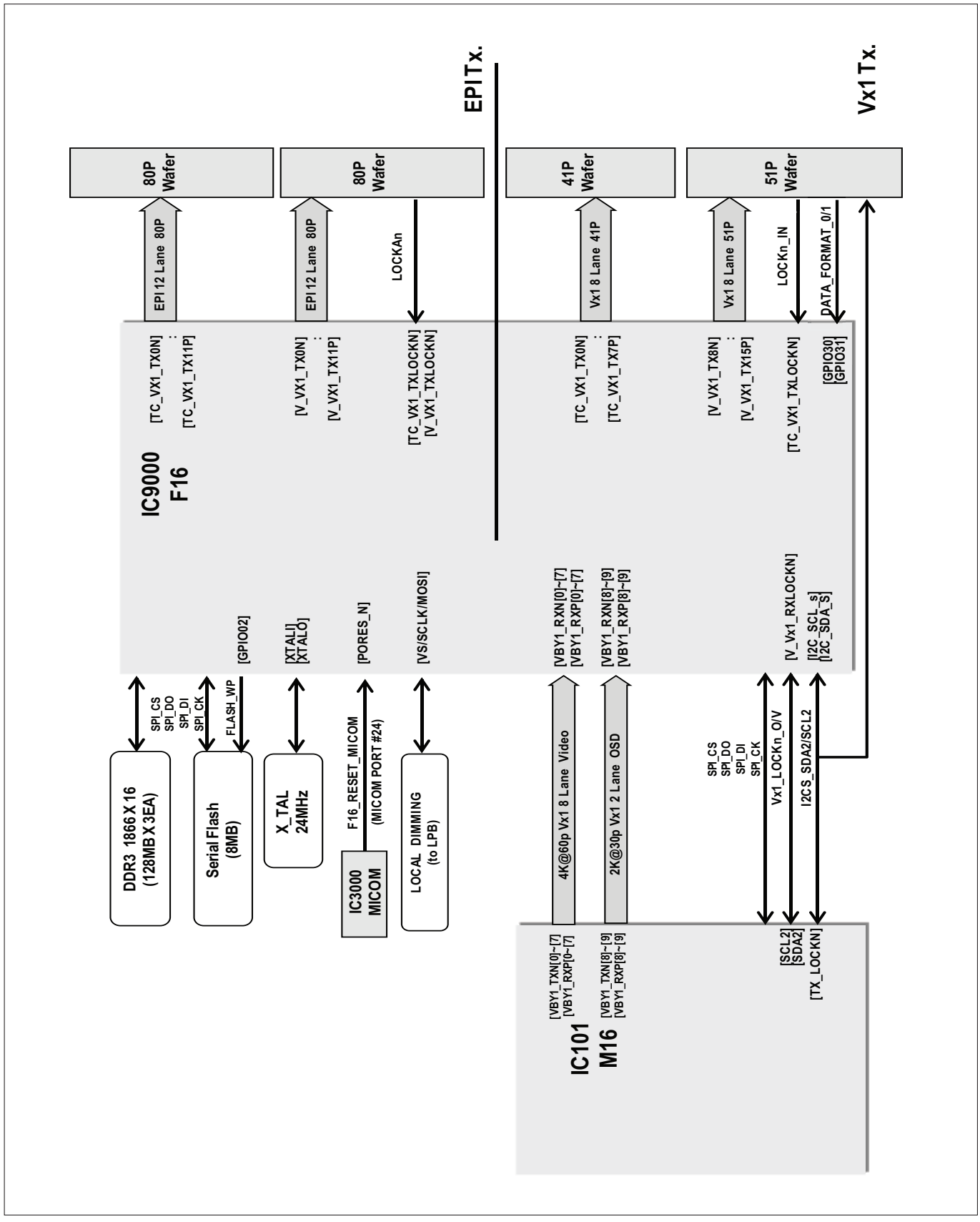
1. M16 + F16 Circuit Block Diagram



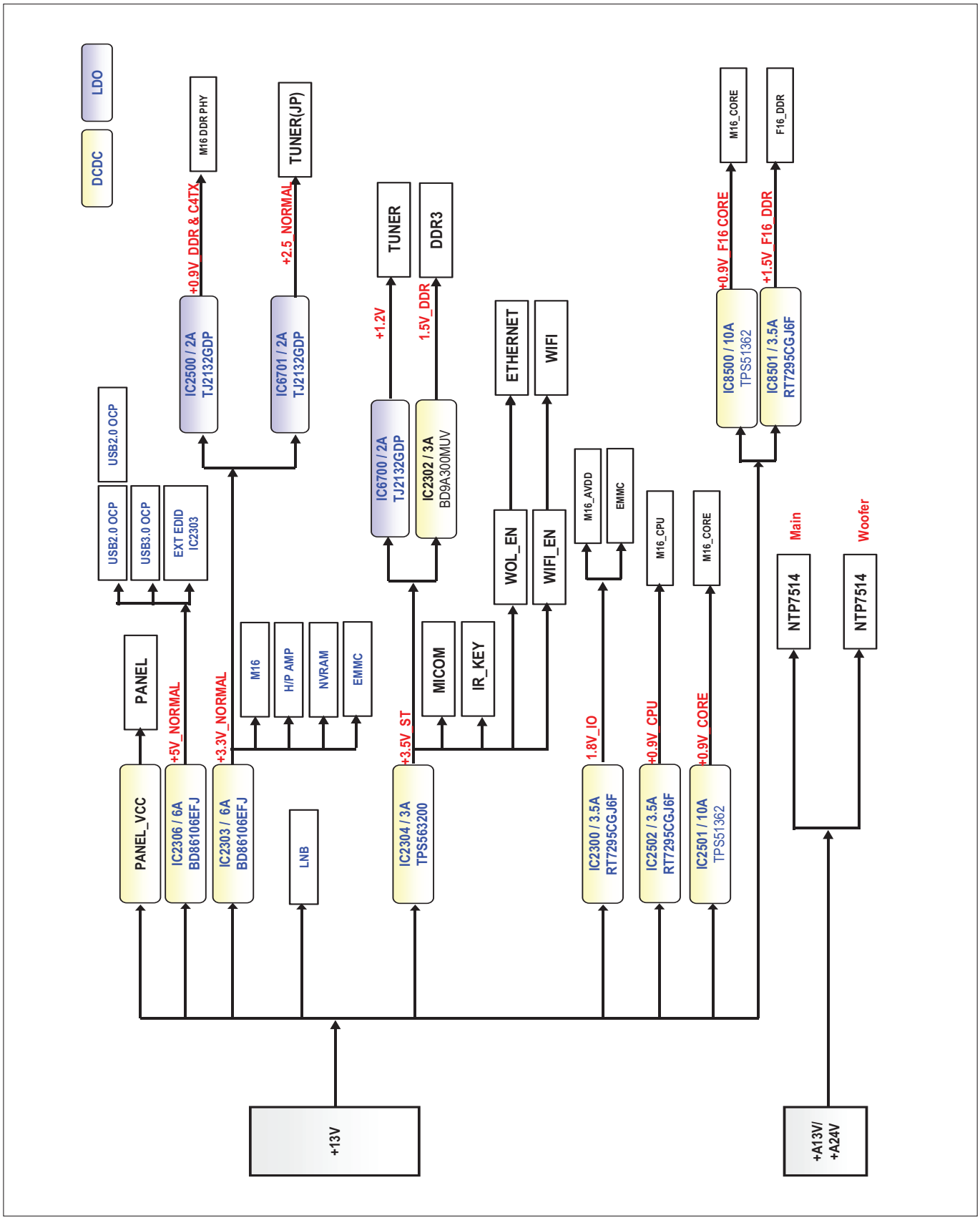
2. M16 + F16 I2C Block Diagram



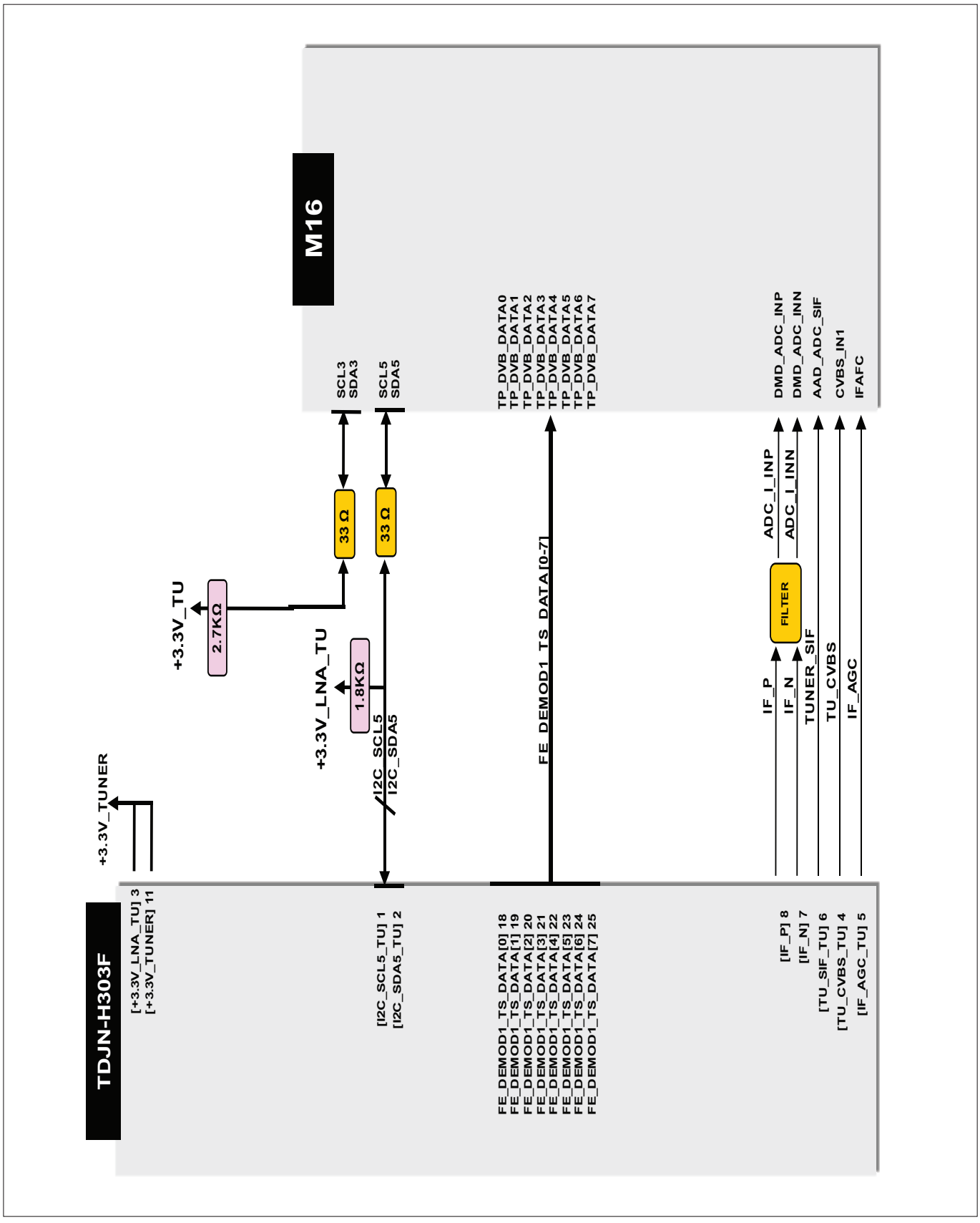
3. F16 Block Diagram



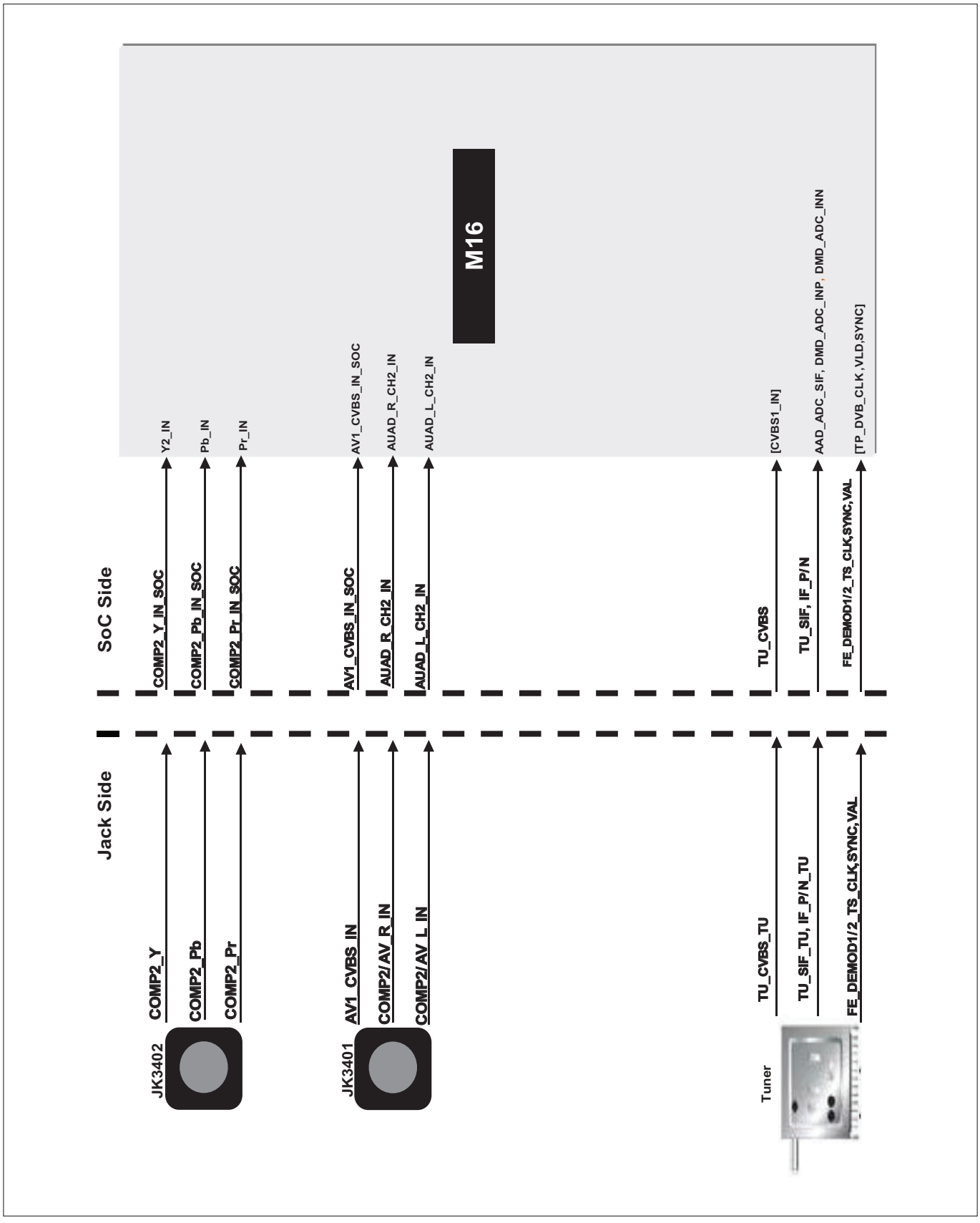
4. M16 Power Block



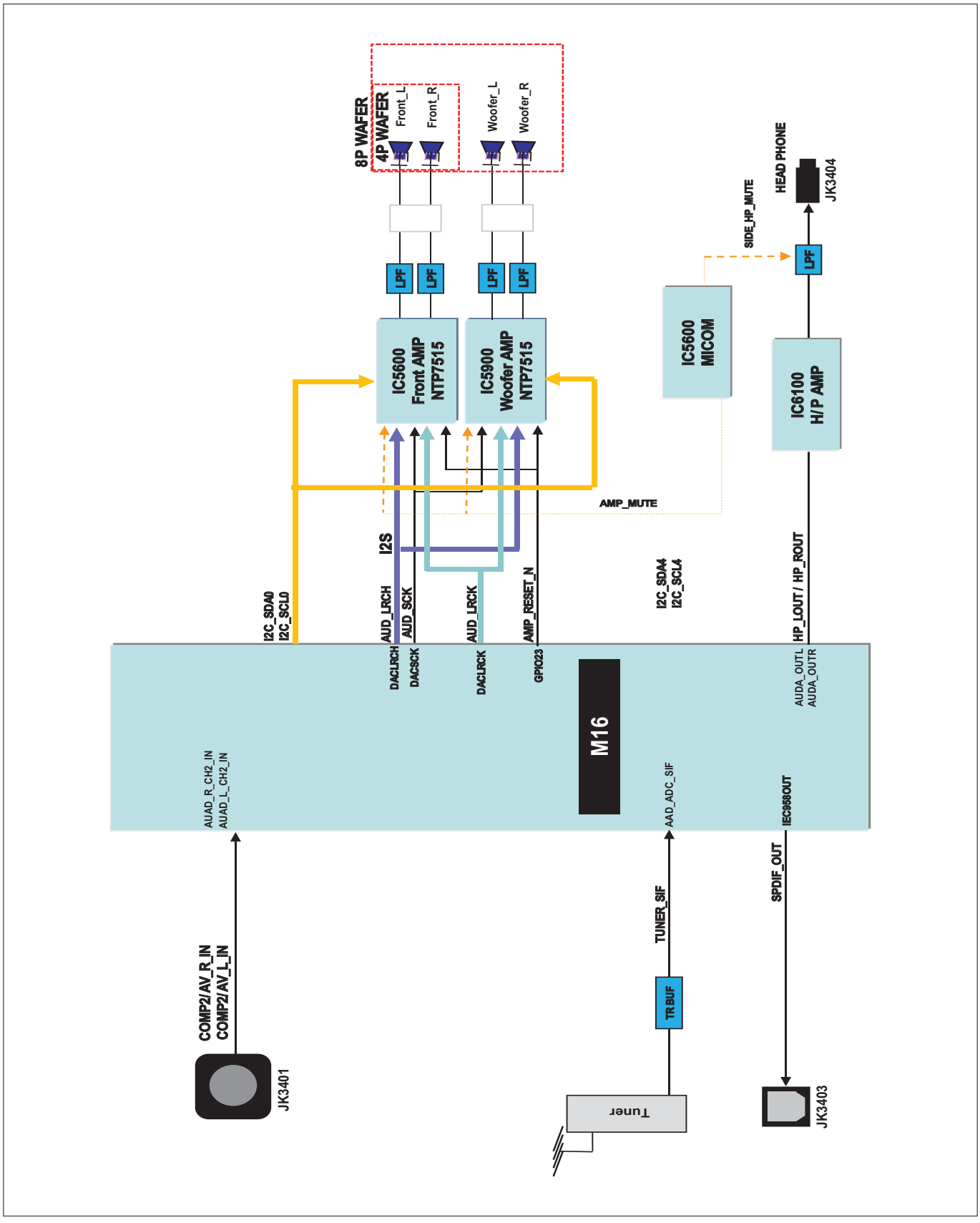
5. Tuner/CI Block Diagram



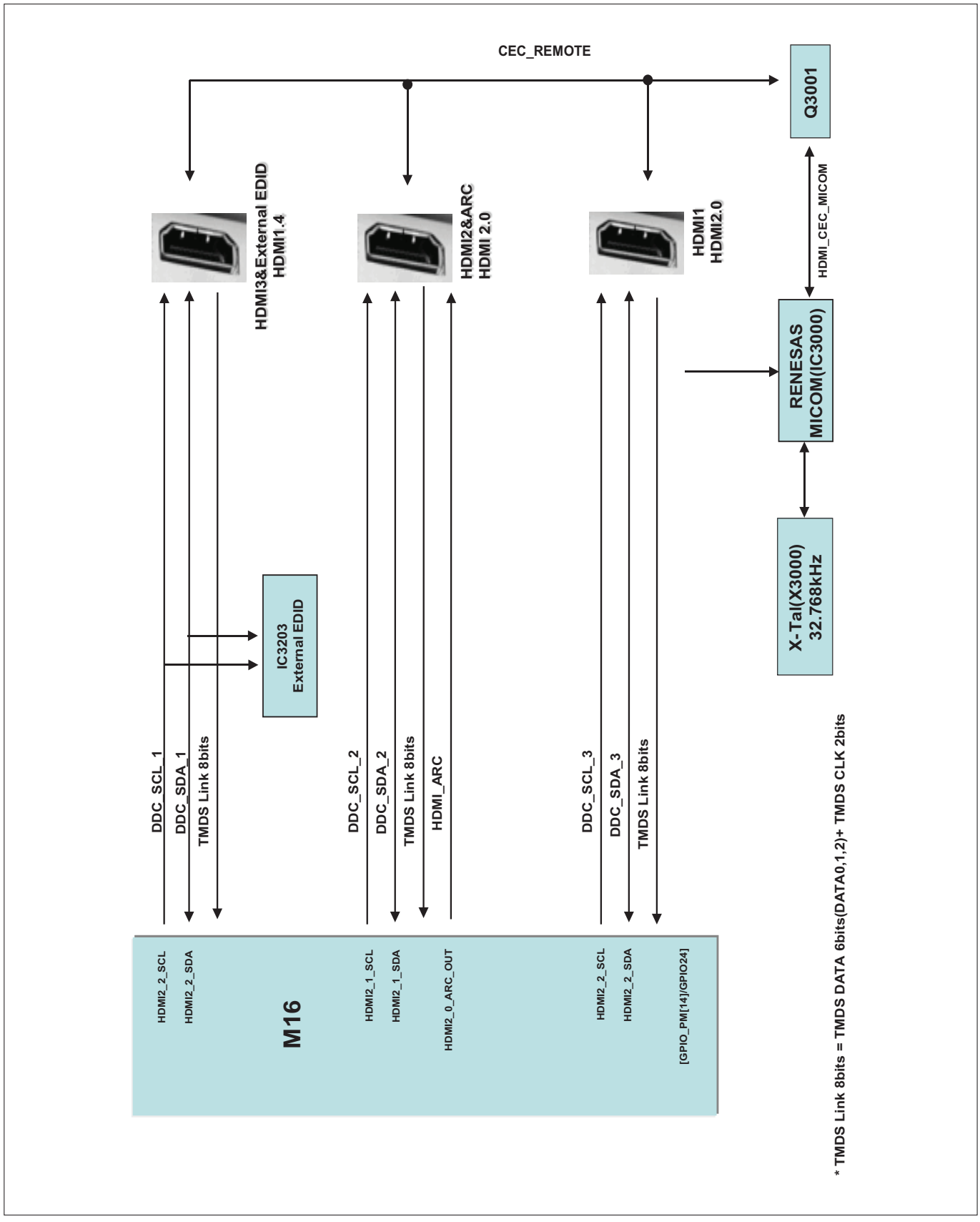
6. Video/Audio In Block Diagram



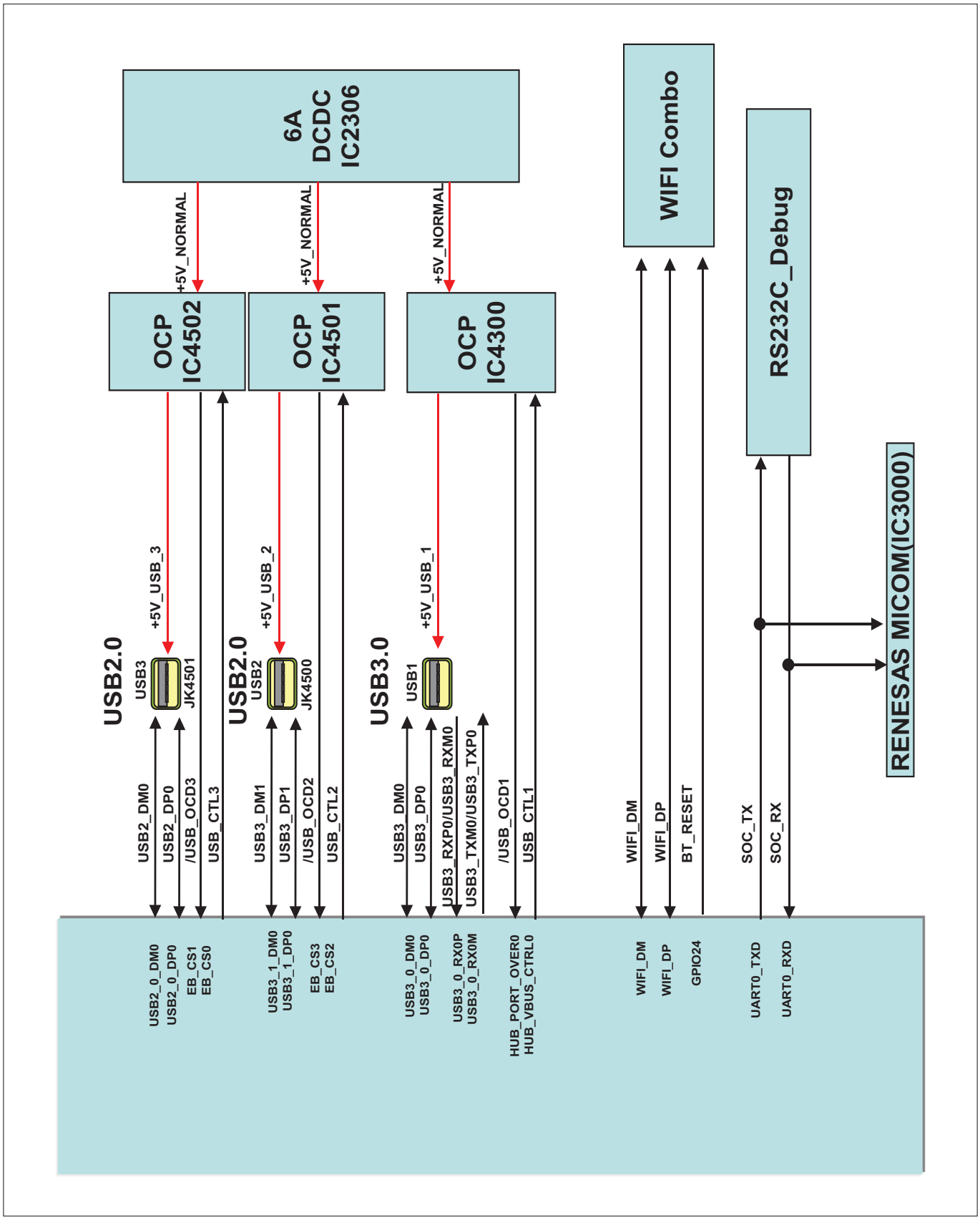
7. Audio Out Block Diagram



8. HDMI



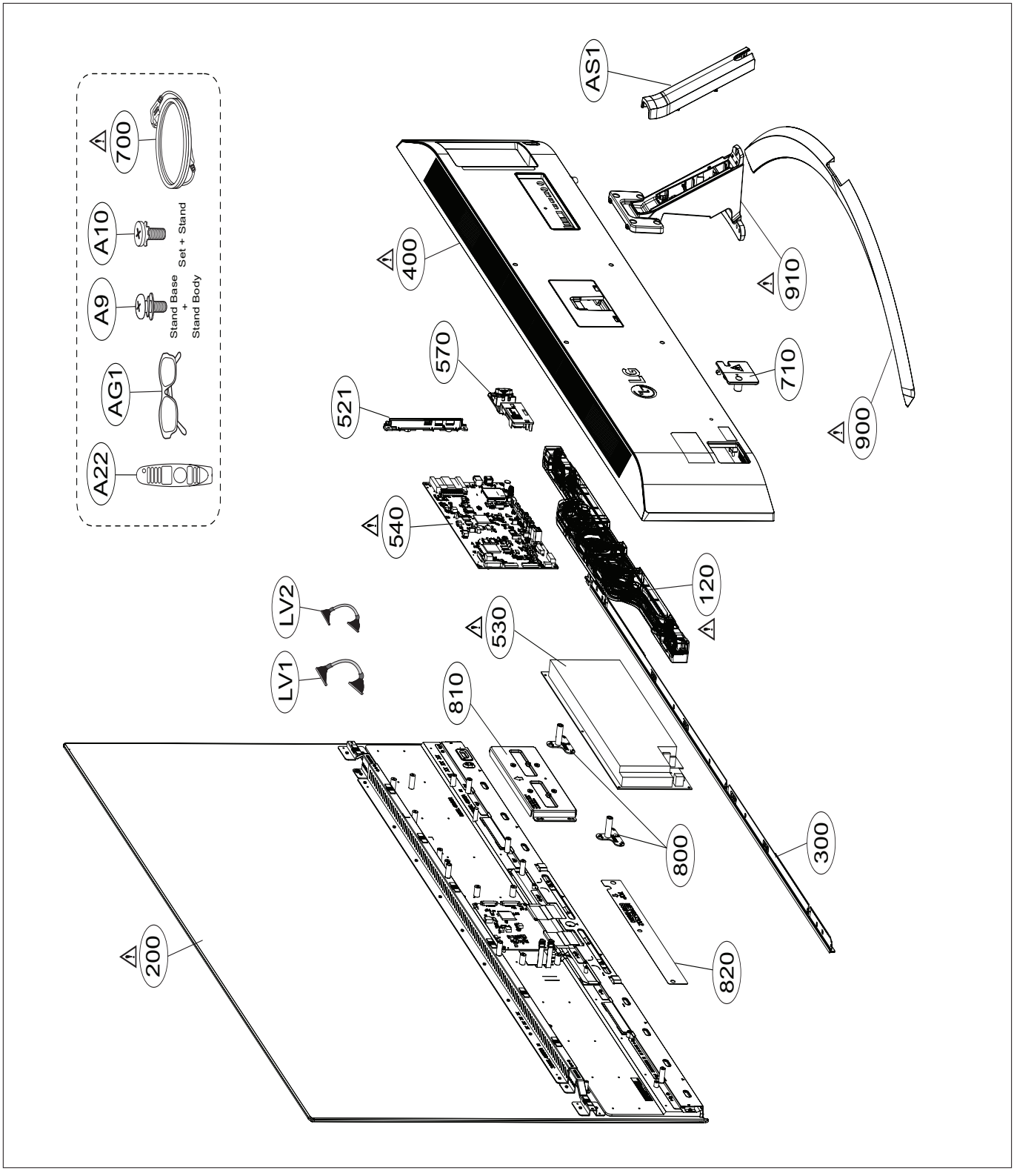
9. USB / WIFI / M-REMOTE / UART



EXPLODED VIEW

IMPORTANT SAFETY NOTICE

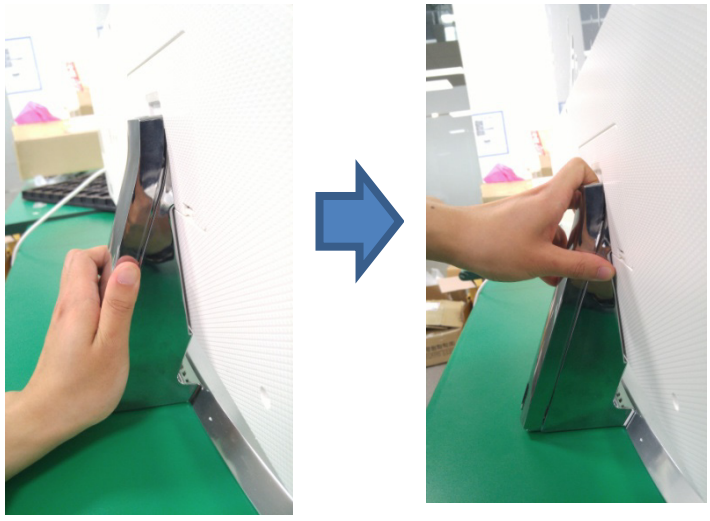
Many electrical and mechanical parts in this chassis have special safety-related characteristics. These parts are identified by ⚠ in the Schematic Diagram and EXPLODED VIEW.
It is essential that these special safety parts should be replaced with the same components as recommended in this manual to prevent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



DISASSEMBLY

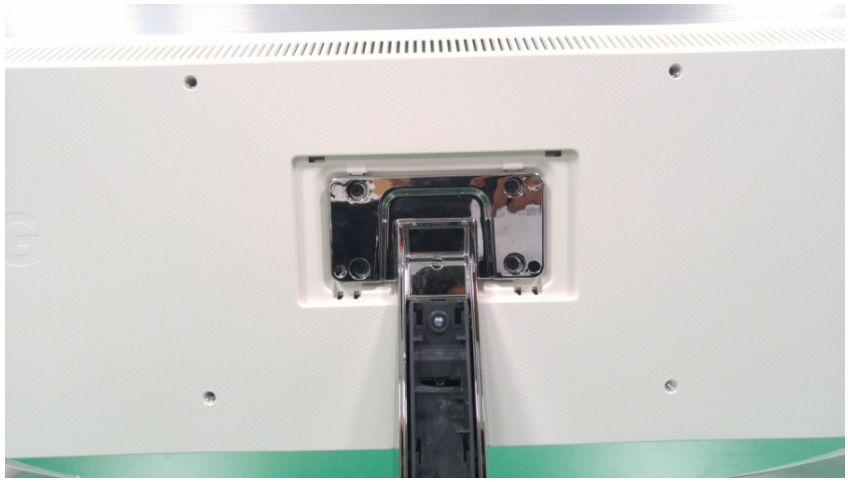
1. Disassemble Stand

(1) Push up Cable Cover and Pull the Cable Cover.

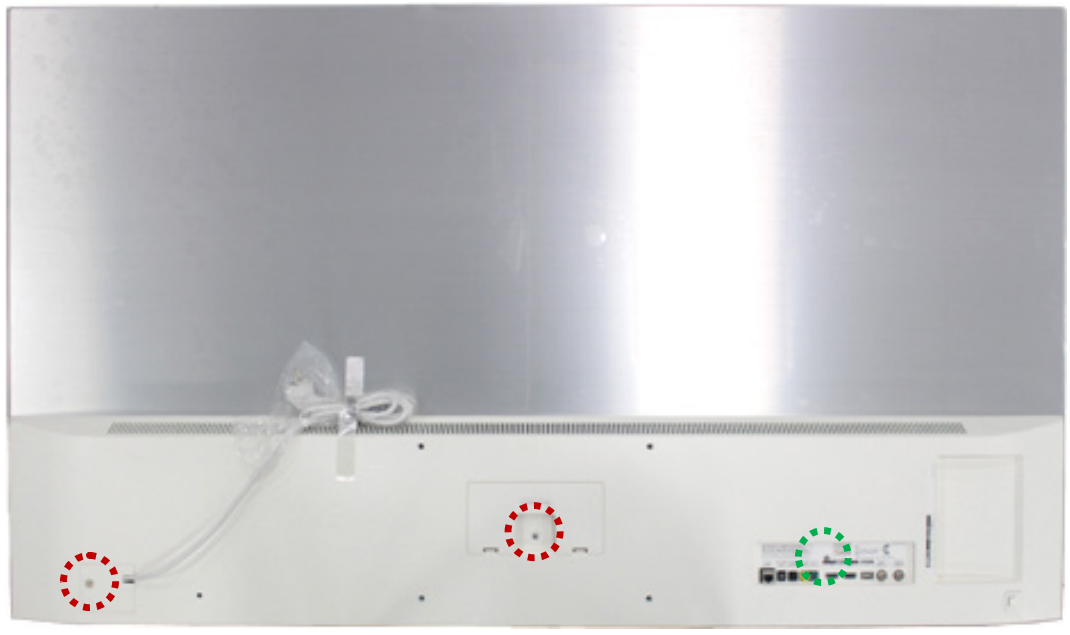


(2) Disassemble Stand Cover.

(3) Disassemble Screw (4EA).



2. Disassemble B/C Screw



O : M3*5.5 (8EA)
O : M4*10 (1EA)

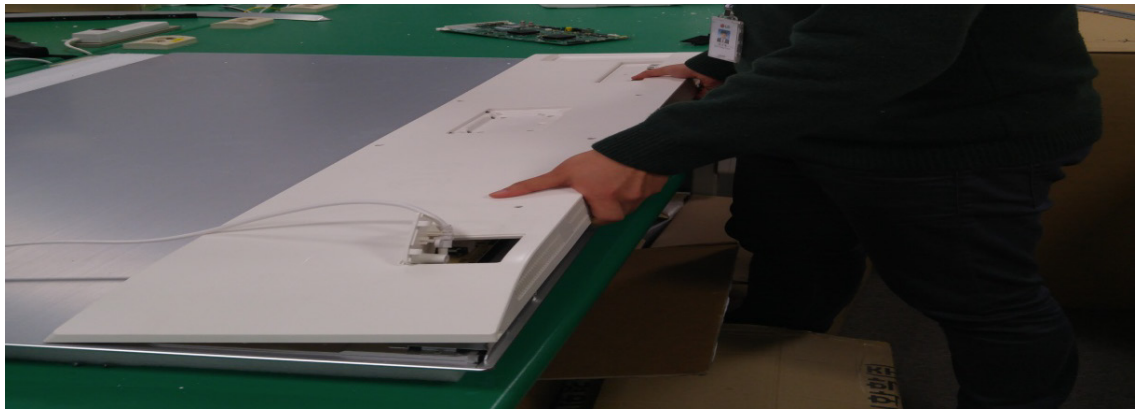
O : 4 ~ 7Kgf.cm
O : 5~ 7Kgf.cm

3. Disassemble Back Cover

(1) Pull the Power Cord Bracket Holing Power Cable.

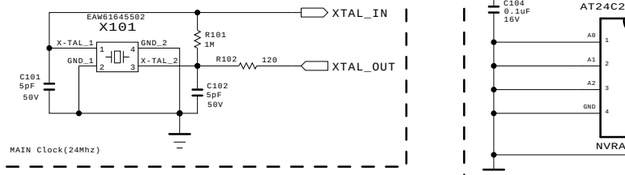
(2) Pull the Back Cover upward with using snap.

(3) Change Position and Pull up Back Cover.

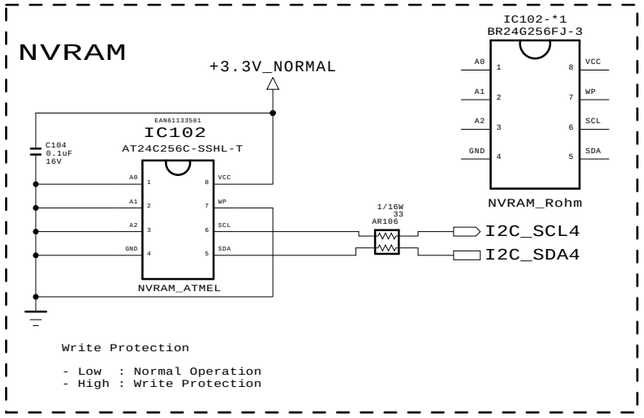


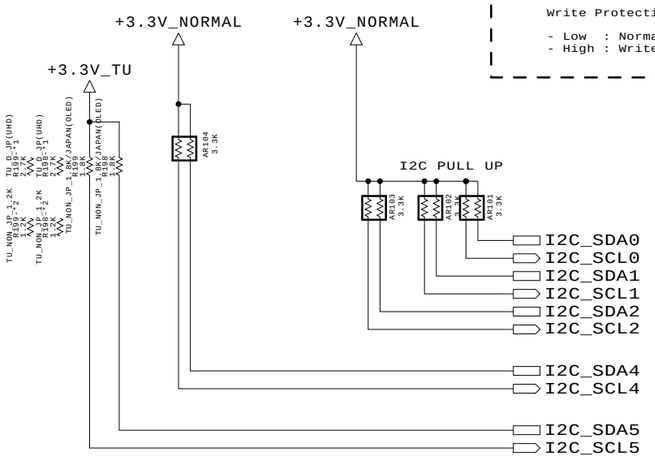
System Configuration

Clock for M16



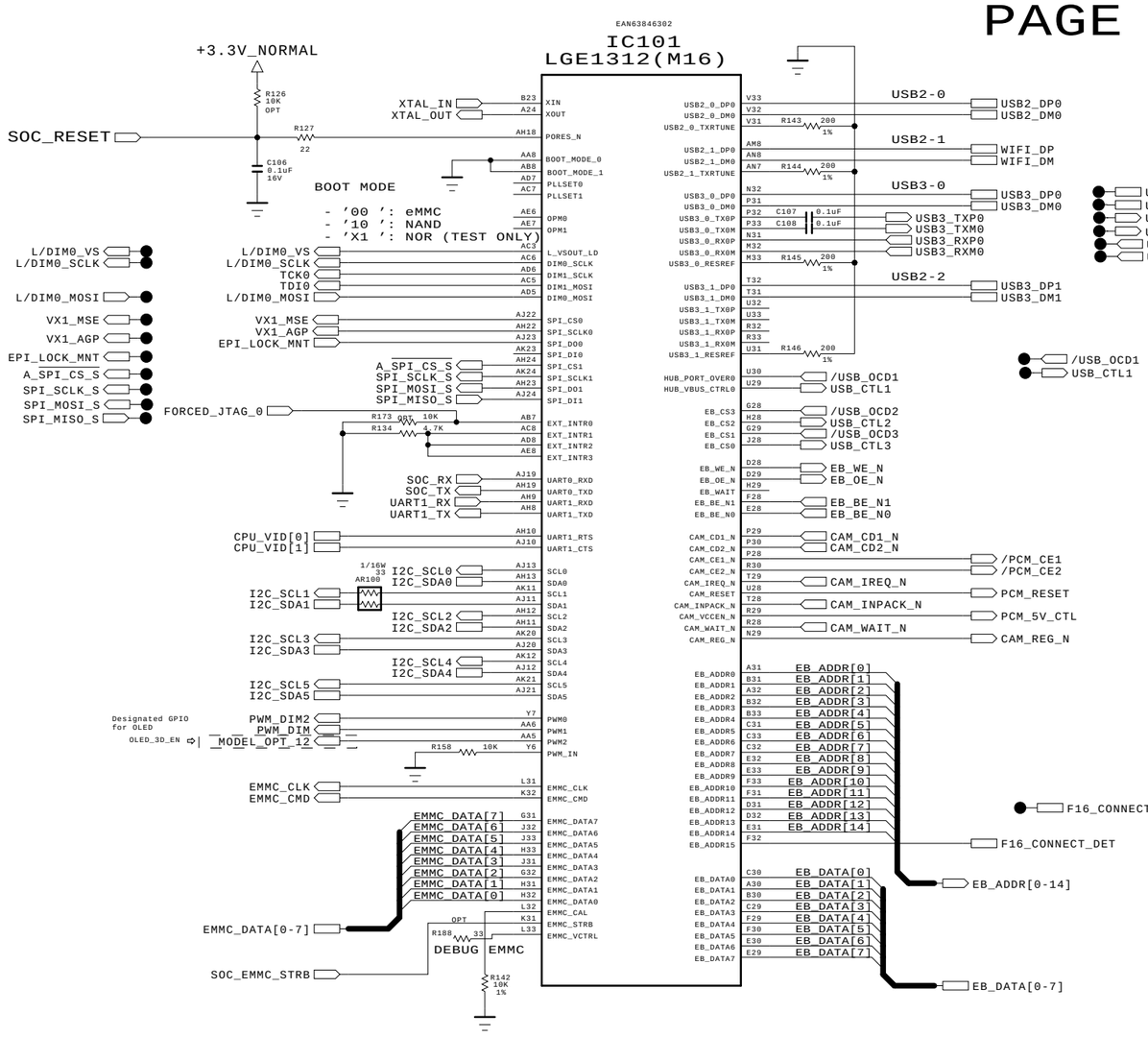
NVRAM



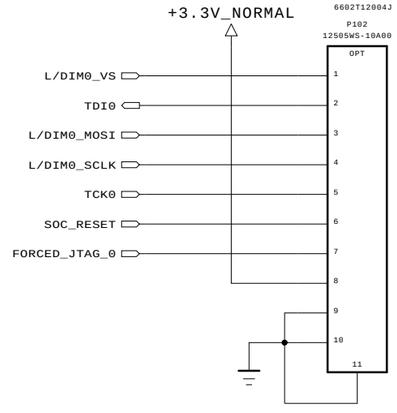


I2C

I2C-0 : AMP
I2C-1 : MICOM
I2C-2 : T-CON,L/DIMING
I2C-3 : S/Demod,T2/Demod, LNB
I2C-4 : NVRAM
I2C-5 : TUNER_MOPLL(T/C,ATV)

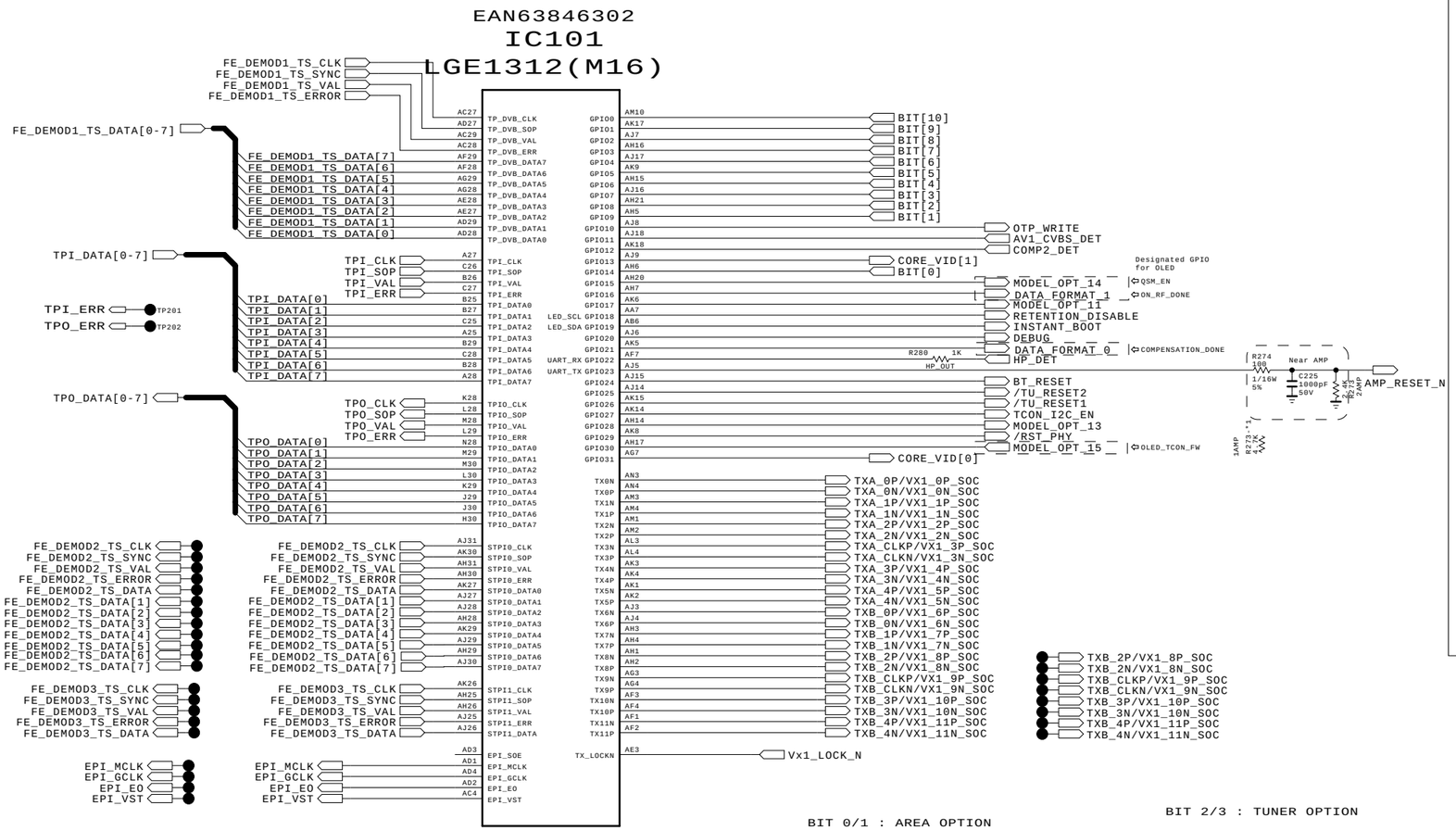


JTAG-0 I/F

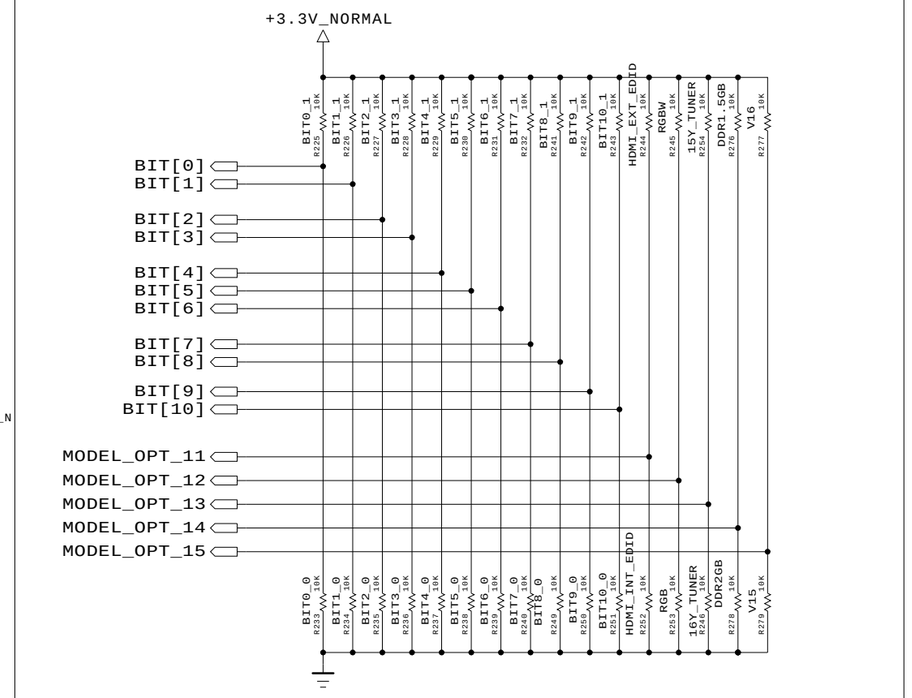


MODEL	M16	DATE	2015.12.22
BLOCK	M16 Symbol A	SHEET	1 / 99

EAN63846302
IC101
LGE1312(M16)



M16 HW Model Option



BIT 0/1 : AREA OPTION

BIT [0/1]	DVB	ATSC	JP
0 / 0	TAIWAN/COLOM)	N/AMERICA	
0 / 1	CHINA/HONGKONG	KOREA	JAPAN
1 / 0	EU/CIS	S/AMERICA	
1 / 1	ASIA/AFRICA	Sri Lanka	

BIT 2/3 : TUNER OPTION

BIT(2/3)	EU/CIS	AJJA	TW/COL	CN/HK	KR	N.America	BR	JP
0/0	T2/C/S2 PIP EXT_ATV	T EXT_ATV	T2/C PIP EXT_ATV	EXT_ATV	ATSC+T2 INT_ATV	INT_ATV	ISDB PIP EXT_ATV	Default
0/1	T2/C/S2 INT_ATV	T2/C/S2 INT_ATV	T2 EXT_ATV	INT_ATV	ATSC+T2 INT_ATV	EXT_ATV	ISDB EXT_ATV	
1/0	T2C/S2 EXT_ATV	T2/C/S2 EXT_ATV	T2 INT_ATV		ATSC+T2 EXT_ATV		ISDB INT_ATV	
1/1		T2 EXT_ATV						

BIT 4/5/6 : BACK-END OPTION

BIT[4/5/6]	DISPLAY TYPE	FHD/UHD	TYPE	COMMENT
0 / 0 / 0	LCD	UHD	VBY1	M16+F16 / M16 VX1
0 / 0 / 1	LCD	UHD	EPI	M16 EPI
0 / 1 / 0				RESERVED
0 / 1 / 1				RESERVED
1 / 0 / 0	OLED	UHD	VBY1	-
1 / 0 / 1				RESERVED
1 / 1 / 0	OLED	FHD	VBY1	-
1 / 1 / 1				RESERVED

BIT 7/8 : DDR Vender

BIT(7/8)	DDR vender
00	HYNIX
01	SAMSUNG
10	MICRON
11	

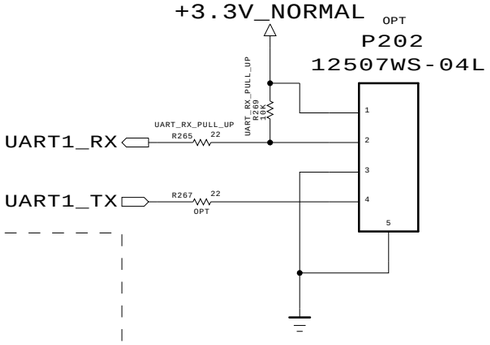
BIT 9/10 : FRC

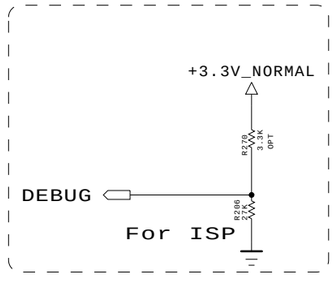
BIT(9/10)	FRC
00	M16 ONLY
01	M16+F16
10	
11	

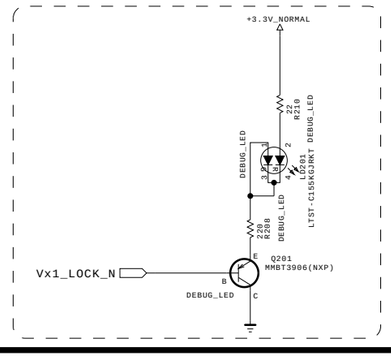
MODEL OPTION

		Low	High
MODEL_OPT_11	HDMI EEPROM	HDMI_INT_EDID	HDMI_EXT_EDID
MODEL_OPT_12	MLE_M+	RGB	RGBW
MODEL_OPT_13	TUNER TYPE	16Y TUNER	15Y TUNER
MODEL_OPT_14	DDR SIZE	DDR2GB	DDR1.5GB
MODEL_OPT_15	MODULE	V15	V16

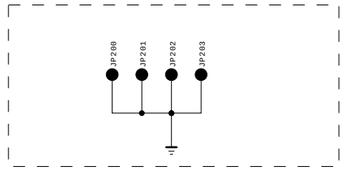
UART 1 / 2







GND JIG POINT (5pi)



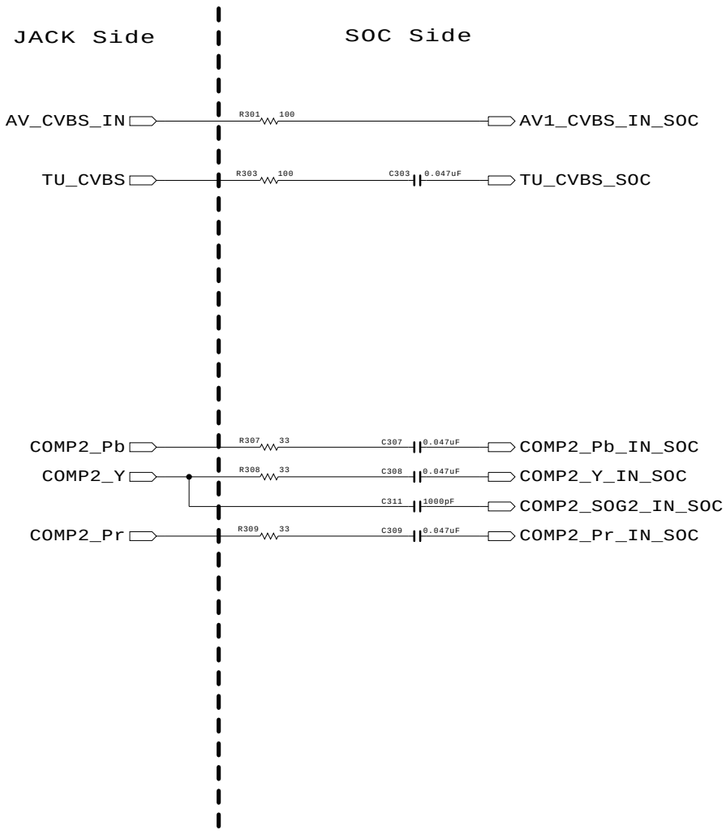
THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FIRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

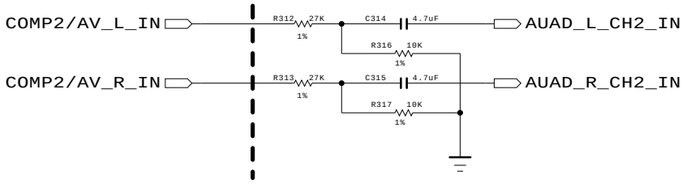
SECRET
LGElectronics

LG ELECTRONICS

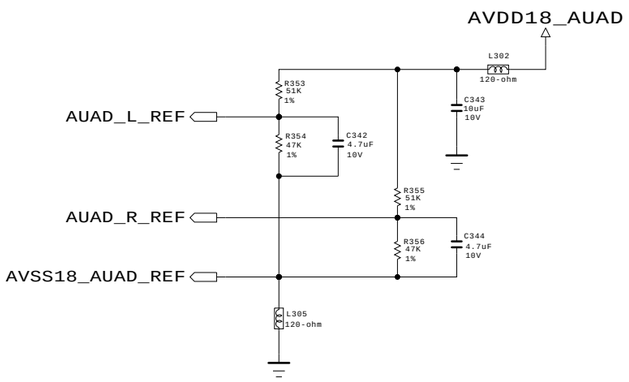
MODEL	M16	DATE	2015.11.23
BLOCK	M16 Symbol B	SHEET	2 / 99

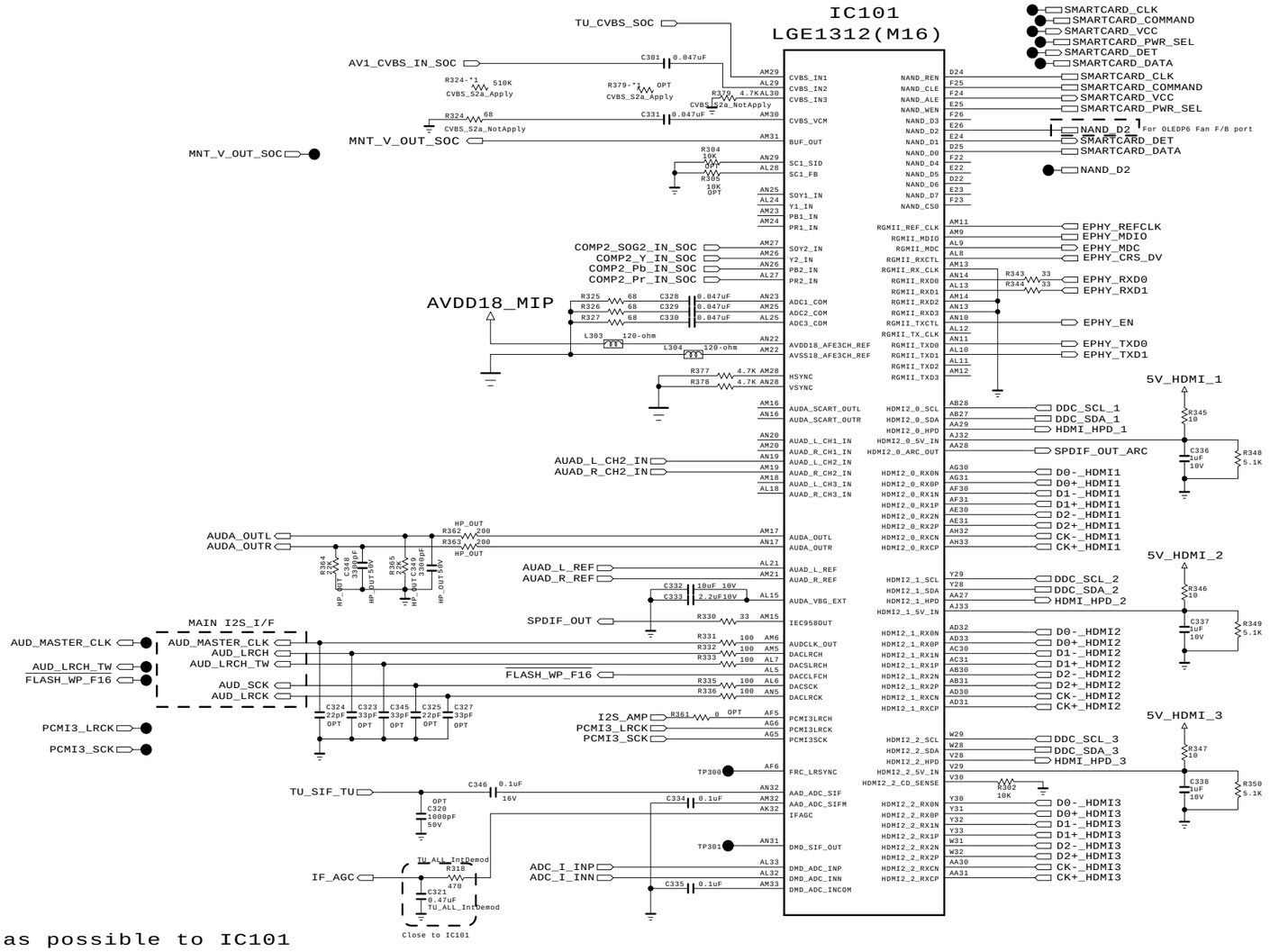
PLACE AT JACK SIDE



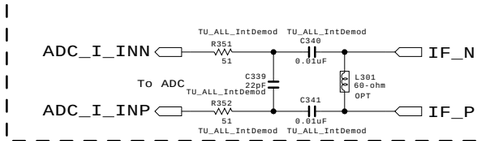


Placed as close as possible to IC101





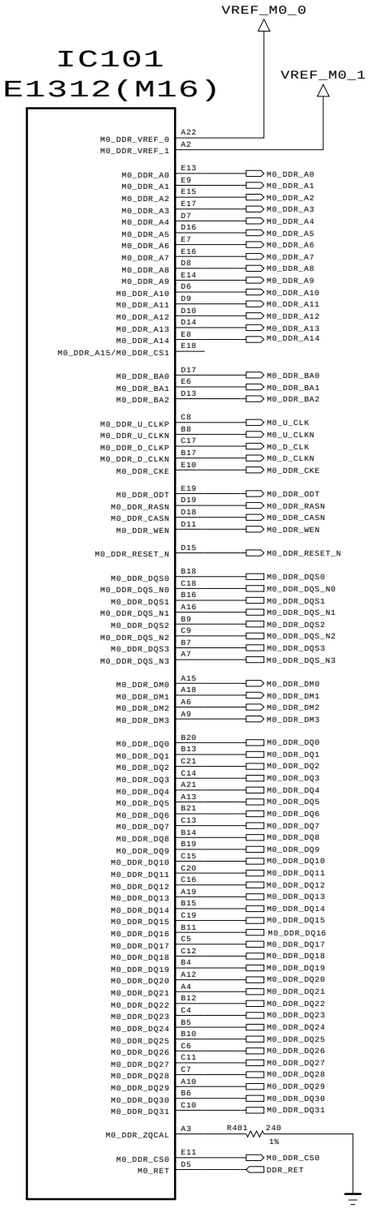
Tuner IF Filter

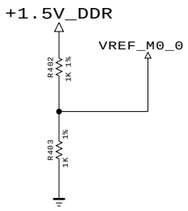


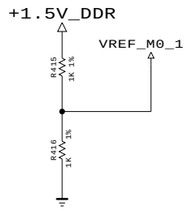
Placed as close as possible to IC101

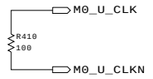
MODEL	M16	DATE	2015.02.23
BLOCK	M16 Symbol C	SHEET	3 / 26

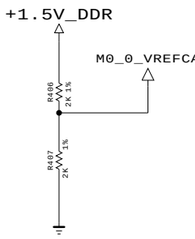
IC101
LGE1312(M16)

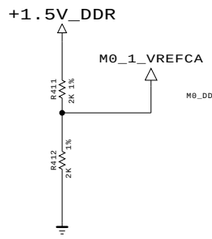


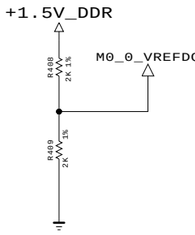


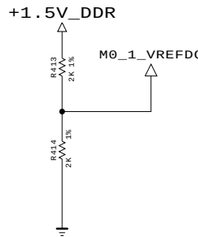




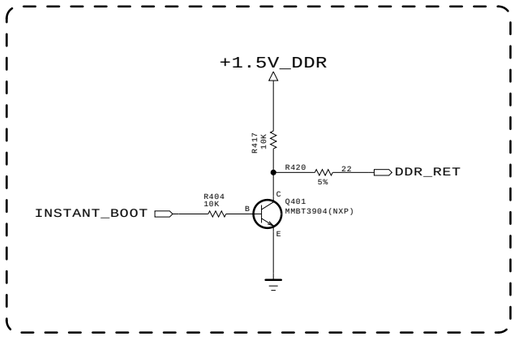






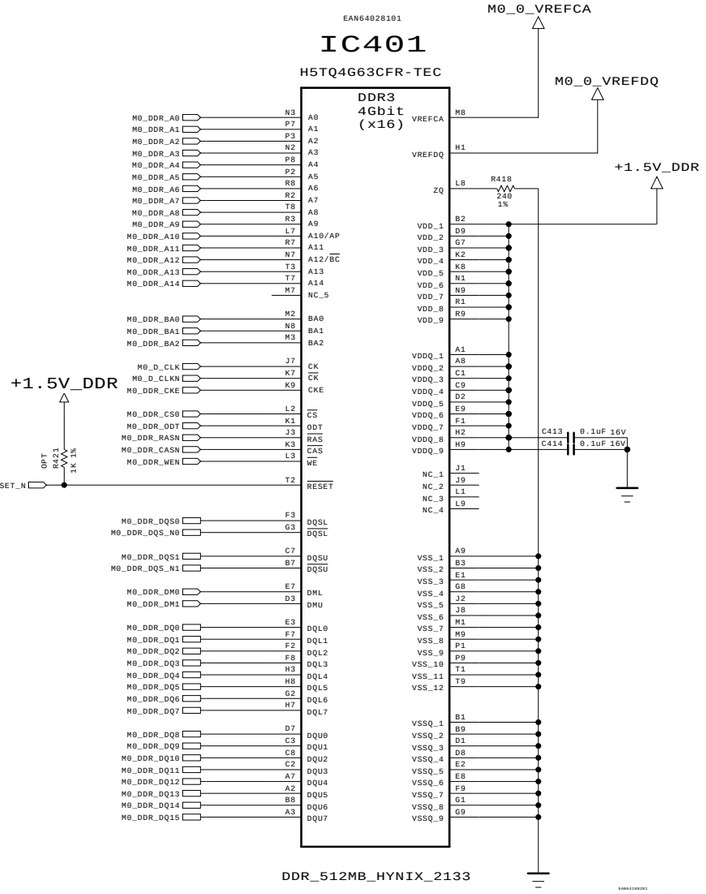


Add CS signal for 2T Mode &
RET signal for Instant On

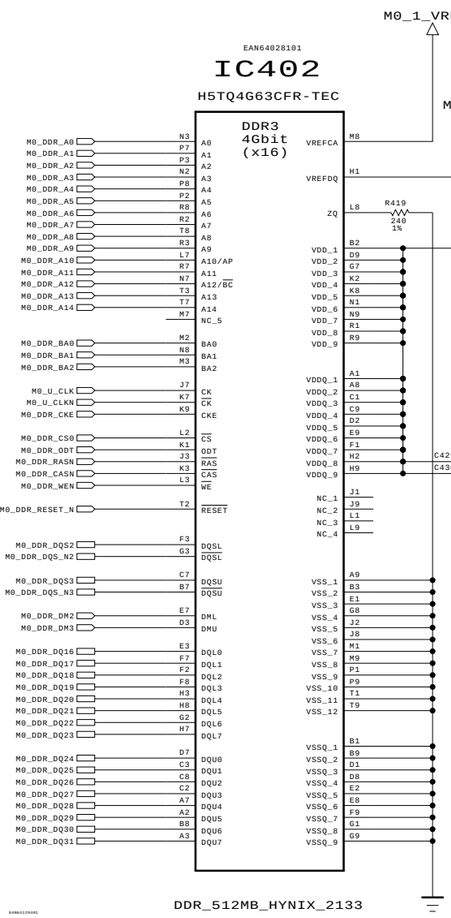


INSTANT BOOT MODE

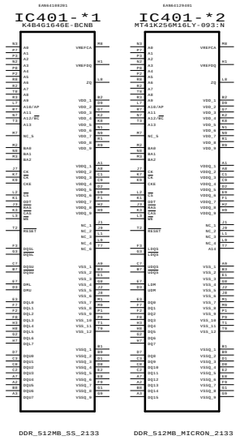
- '0' : Normal, Default
  (Internal Pull-down)
- '1': Instant Boot



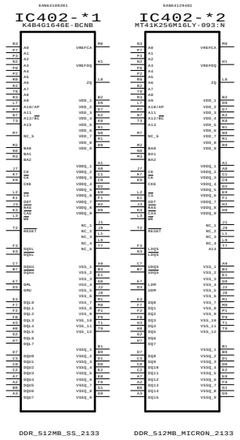
DDR_512MB_HYNIX_2133



DDR_512MB_HYNIX_2133



DDR_512MB_SS_2133 DDR_512MB_MICRON_2133



DDR_512MB_SS_2133 DDR_512MB_MICRON_2133

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SECRET
LGElectronics

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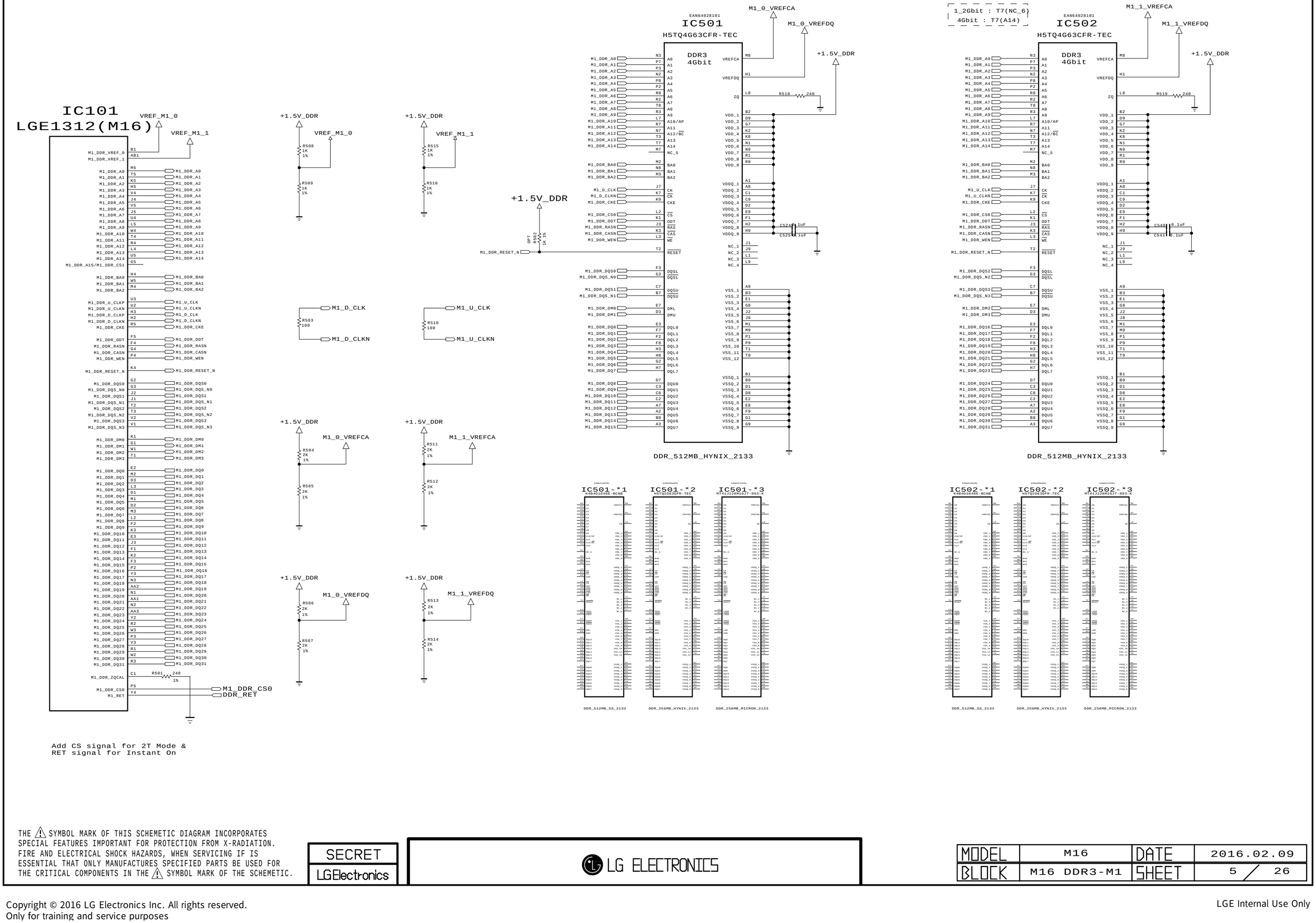
MODEL	M16	DATE	2015.02.09
BLOCK	M16 DDR3-M0	SHEET	4 / 26



Add CS signal for 2T Mode &
RET signal for Instant On

SECRET
LGElectronics

LG ELECTRONICS

MODEL	M16	DATE	2016.02.09
BLOCK	M16 DDR3-M1	SHEET	5 / 26

LGE Internal Use Only

IC101
LGE1312(M16)

DVDD33
DVDD09_DDR_C4TX
+0.9V_CORE
AVDD33_HDMI
AVDD33_AUDA
AVDD18_MIP
AVDD18_PLL
AVDD18_AUAD
AVDD18_C4TX
AVDD18_HDMI
+0.9V_CPU
+1.5V_DDR
AVDD09_PLL
DVDD09_DDR_C4TX
+0.9V_CORE
DVDD09_USB
AVDD09_HDMI
AVDD09_MIP
+1.8V_IO
+1.5V_DDR
OTP_WRITE

+0.9V AC Decoupling Cap

+0.9V_CORE: C601 4.7uF 10V, C602 4.7uF 10V, C605 4.7uF 10V, C606 0.1uF 16V, C607 0.1uF 16V, C608 0.1uF 16V, C609 0.1uF 16V, C615 0.1uF 16V, C616 0.1uF 16V

+0.9V_CPU: C617 4.7uF 10V, C619 4.7uF 10V, C623 0.1uF 16V, C626 0.1uF 16V

DVDD09_DDR_C4TX
+0.9V_DDR: L601 120-ohm; C627 4.7uF 10V, C628 0.1uF 16V, C629 0.1uF 16V, C681 1000pF 50V

AVDD09_PLL
+0.9V_CORE: L603 120-ohm; C633 4.7uF 10V, C634 0.1uF 16V

DVDD09_USB
+0.9V_CORE: L604 120-ohm; C636 0.1uF 16V

AVDD09_MIP
+0.9V_CORE: L606 120-ohm; C638 0.1uF 16V, C639 0.1uF 16V, C640 4.7uF 10V

+3.3V AC Decoupling Cap

DVDD33
+3.3V_NORMAL: L607 BLM18PG121SN1D; C641 4.7uF 10V, C644 0.1uF 16V, C645 0.1uF 16V, C646 0.1uF 16V, C647 0.1uF 16V

AVDD33_AUDA
+3.3V_NORMAL: L608 BLM18PG121SN1D; Close to SOC Side; C692 22uF 10V, C693 0.1uF 16V, C694 0.1uF 16V, C695 0.1uF 16V

Q601 SSM3J332R
R601 4.7K
R602 10K
R607 22

+1.5V_DDR: C664 10uF 10V, C665 10uF 10V, C666 10uF 10V, C667 10uF 10V, C668 0.01uF 50V, C669 0.1uF 16V, C671 0.01uF 50V, C673 0.01uF 50V, C675 0.1uF 16V, C676 0.1uF 16V, C679 0.01uF 50V, C680 0.1uF 16V, C682 0.1uF 16V, C684 0.1uF 16V, C686 0.01uF 50V, C688 0.01uF 50V, C689 0.1uF 16V, C690 0.01uF 50V, C691 0.01uF 50V, C699 0.01uF 50V, C697 0.1uF 16V, C698 0.1uF 16V

HDMI POWER CONTROL

AVDD33_HDMI
+0.9V_CORE
+3.3V_NORMAL
AVDD09_HDMI: L613 120-ohm; C672 10uF 10V, C683 0.1uF 16V
Q604 SSM3K324R
L615 120-ohm; C677 10uF 10V, C685 0.1uF 16V
PANEL_VCC
R605 100K
+1.8V_IO
AVDD18_HDMI: L614 120-ohm; C674 10uF 10V, C687 0.1uF 16V

+1.5V AC Decoupling Cap

+1.5V_DDR: C661 4.7uF 10V, C662 0.1uF 16V, C663 0.1uF 16V, C670 0.01uF 50V, C635 4.7uF 10V, C637 4.7uF 10V

+1.5V_DDR: C630 0.1uF 16V, C631 0.01uF 50V, C632 0.1uF 16V, C642 0.1uF 16V, C643 0.01uF 50V, C648 0.1uF 16V, C650 0.01uF 50V

+1.8V AC Decoupling Cap

AVDD18_MIP
+1.8V_IO: L609 BLM18PG121SN1D; C649 4.7uF 10V, C696 10uF 10V, C652 0.1uF 16V, C653 0.1uF 16V, C654 0.1uF 16V

AVDD18_C4TX
+1.8V_IO: L610 BLM18PG121SN1D; C655 4.7uF 10V, C656 0.1uF 16V, C657 1000pF 50V

AVDD18_PLL
+1.8V_IO: L611 120-ohm; C658 4.7uF 10V, C659 0.1uF 16V

AVDD18_AUAD
+1.8V_IO: L612 120-ohm; C678 4.7uF 10V, C660 0.1uF 16V

IC101
LGE1312(M16)

B3 GND_1, B22 GND_2, B24 GND_3, C2 GND_4, C22 GND_5, C23 GND_6, C24 GND_7, D20 GND_8, D21 GND_9, D27 GND_10, E4 GND_11, E20 GND_12, E21 GND_13, E27 GND_14, F6 GND_15, F7 GND_16, F8 GND_17, F9 GND_18, F10 GND_19, F11 GND_20, F13 GND_21, F14 GND_22, F15 GND_23, F16 GND_24, F17 GND_25, F18 GND_26, F19 GND_27, F20 GND_28, F21 GND_29, F27 GND_30, G6 GND_31, G7 GND_32, G17 GND_33, G18 GND_34, G19 GND_35, G20 GND_36, G21 GND_37, G22 GND_38, G23 GND_39, G24 GND_40, G25 GND_41, G26 GND_42, G27 GND_43, H6 GND_44, H7 GND_45, H8 GND_46, H9 GND_47, H10 GND_48, H11 GND_49, H12 GND_50, H13 GND_51, H14 GND_52, H15 GND_53, H16 GND_54, H17 GND_55, H19 GND_56, H20 GND_57, H21 GND_58, H22 GND_59, H24 GND_60, H25 GND_61, H26 GND_62, H27 GND_63, J6 GND_64, J8 GND_65, J27 GND_66, K6 GND_67, K8 GND_68, K27 GND_69, L6 GND_70, L8 GND_71, L12 GND_72, L13 GND_73, L14 GND_74, L15 GND_75, L16 GND_76, L20 GND_77, L26 GND_78, L27 GND_79, M6 GND_80, M8 GND_81, M12 GND_82, M13 GND_83, M14 GND_84, M15 GND_85, M16 GND_86, M17 GND_87, M18 GND_88, M19 GND_89, M20 GND_90, M21 GND_91, M22 GND_92, M23 GND_93, M26 GND_94, M27 GND_95, M31 GND_96, N8 GND_97, N11 GND_98, N14 GND_99, N16 GND_100, N19 GND_101, N20 GND_102, N21 GND_103, N22 GND_104, N26 GND_105, N27 GND_106, P6 GND_107, P8 GND_108, P11 GND_109, P12 GND_110, P14 GND_111, P16 GND_112, P22 GND_113, P26 GND_114, P27 GND_115, R6 GND_116, R8 GND_117, R11 GND_118, R12 GND_119, R14 GND_120, R16 GND_121, R22 GND_122, R26 GND_123, R27 GND_124, AVSS18_AUAD_REF

GND_125 R31, GND_126 T6, GND_127 T8, GND_128 T11, GND_129 T12, GND_130 T13, GND_131 T14, GND_132 T16, GND_133 T22, GND_134 T27, GND_135 U6, GND_136 U8, GND_137 U12, GND_138 U14, GND_139 U16, GND_140 U18, GND_141 U20, GND_142 U22, GND_143 U27, GND_144 V6, GND_145 V7, GND_146 V8, GND_147 V12, GND_148 V14, GND_149 V16, GND_150 V18, GND_151 V20, GND_152 V22, GND_153 V23, GND_154 V26, GND_155 V27, GND_156 W6, GND_157 W7, GND_158 W12, GND_159 W14, GND_160 W16, GND_161 W18, GND_162 W20, GND_163 W22, GND_164 W23, GND_165 W26, GND_166 W27, GND_167 Y5, GND_168 Y8, GND_169 Y12, GND_170 Y14, GND_171 Y16, GND_172 Y18, GND_173 Y20, GND_174 Y22, GND_175 Y27, GND_176 AA11, GND_177 AA12, GND_178 AA14, GND_179 AA16, GND_180 AA18, GND_181 AA20, GND_182 AA22, GND_183 AA26, GND_184 AB3, GND_185 AB4, GND_186 AB12, GND_187 AB13, GND_188 AB14, GND_189 AB15, GND_190 AB16, GND_191 AB17, GND_192 AB18, GND_193 AB19, GND_194 AB20, GND_195 AB21, GND_196 AB22, GND_197 AB23, GND_198 AB26, GND_199 AC14, GND_200 AC15, GND_201 AC16, GND_202 AC23, GND_203 AC26, GND_204 AD26, GND_205 AE4, GND_206 AE26, GND_207 AF8, GND_208 AF9, GND_209 AF10, GND_210 AF12, GND_211 AF15, GND_212 AF16, GND_213 AF17, GND_214 AF18, GND_215 AF26, GND_216 AF27, GND_217 AG8, GND_218 AG9, GND_219 AG10, GND_220 AG11, GND_221 AG12, GND_222 AG13, GND_223 AG14, GND_224 AG15, GND_225 AG16, GND_226 AG17, GND_227 AG18, GND_228 AG19, GND_229 AG20, GND_230 AG21, GND_231 AG22, GND_232 AG23, GND_233 AG24, GND_234 AG25, GND_235 AG26, GND_236 AG27, GND_237 AH27, GND_238 AL14, GND_239 AL16, GND_240 AL17, GND_241 AL19, GND_242 AL22, GND_243 AL23, GND_244 AL26, GND_245 AL31, GND_246 AM7

AL20 AVSS18_AUAD_REF

AVSS18_AUAD_REF

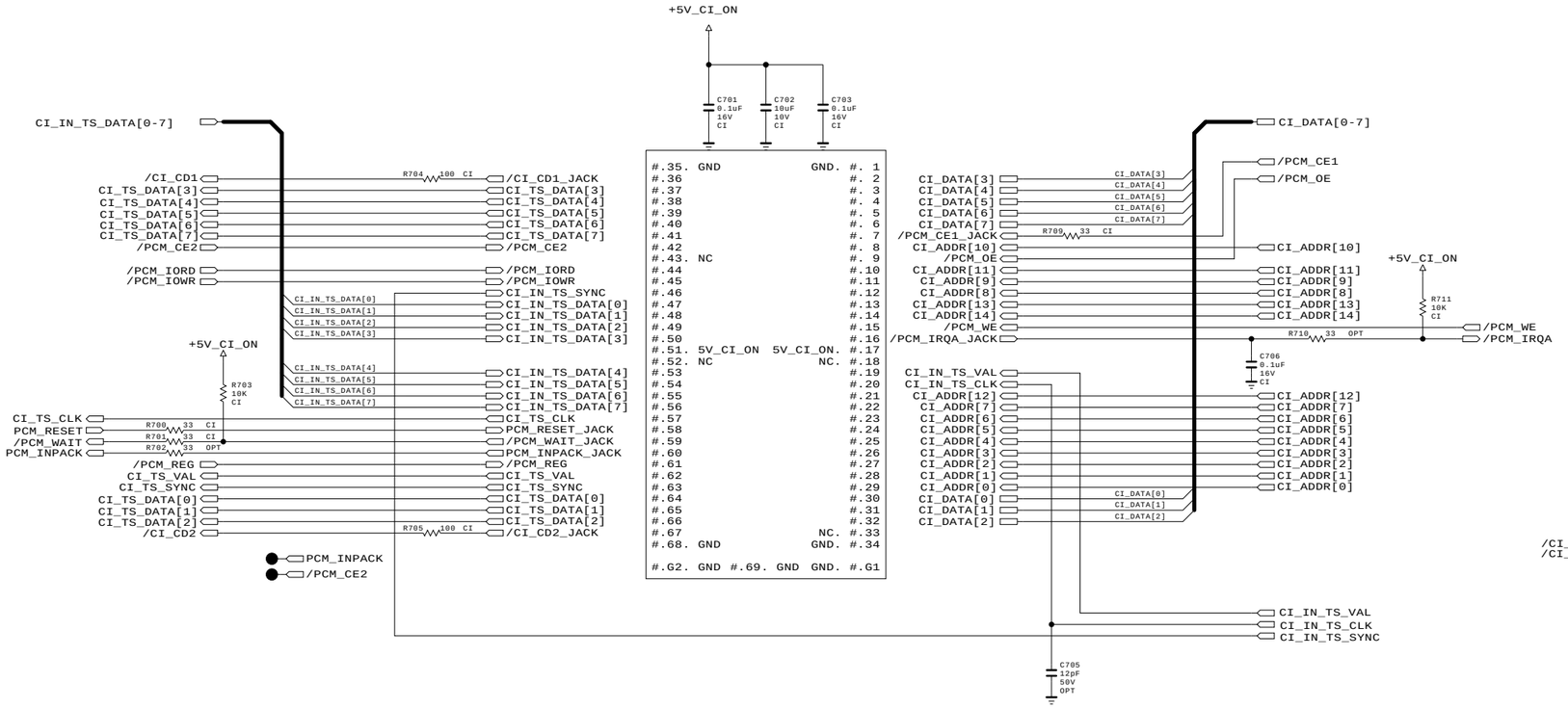
THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FIRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

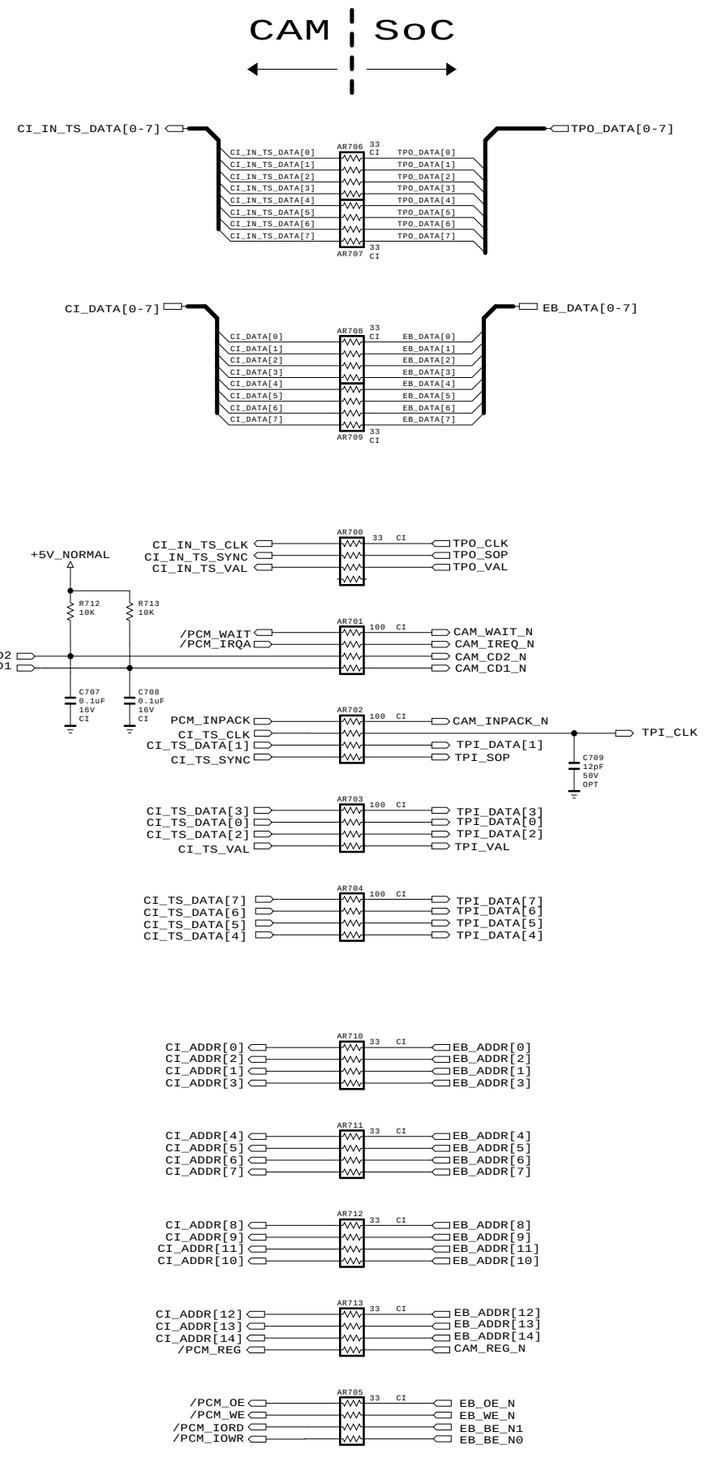
SECRET
LGElectronics

LG ELECTRONICS

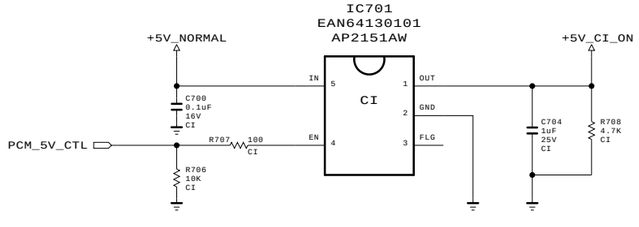
MODEL	M16	DATE	2015.02.16
BLOCK	VCC & GND	SHEET	6 / 27

CI CAM





CI POWER ENABLE CONTROL



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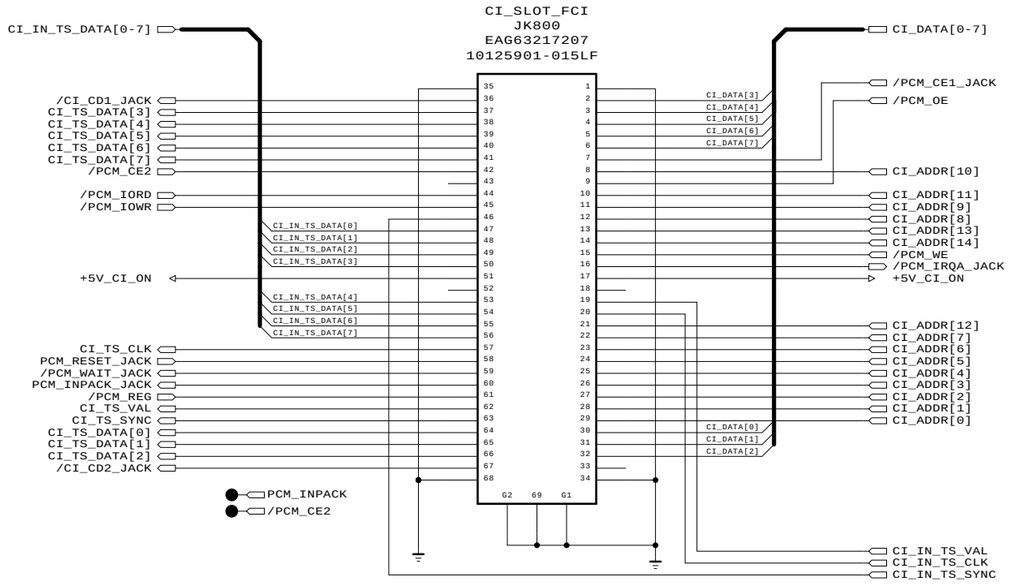
SECRET
LGElectronics

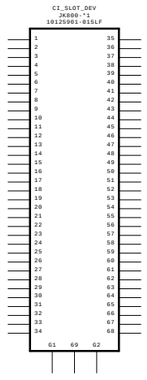
LG ELECTRONICS

MODEL	M16	DATE	2015.02.09
BLOCK	CI for DVB	SHEET	7 / 26

CI CAM

CI Slot
LONG : EAG63217207
SHORT : EAG63217208

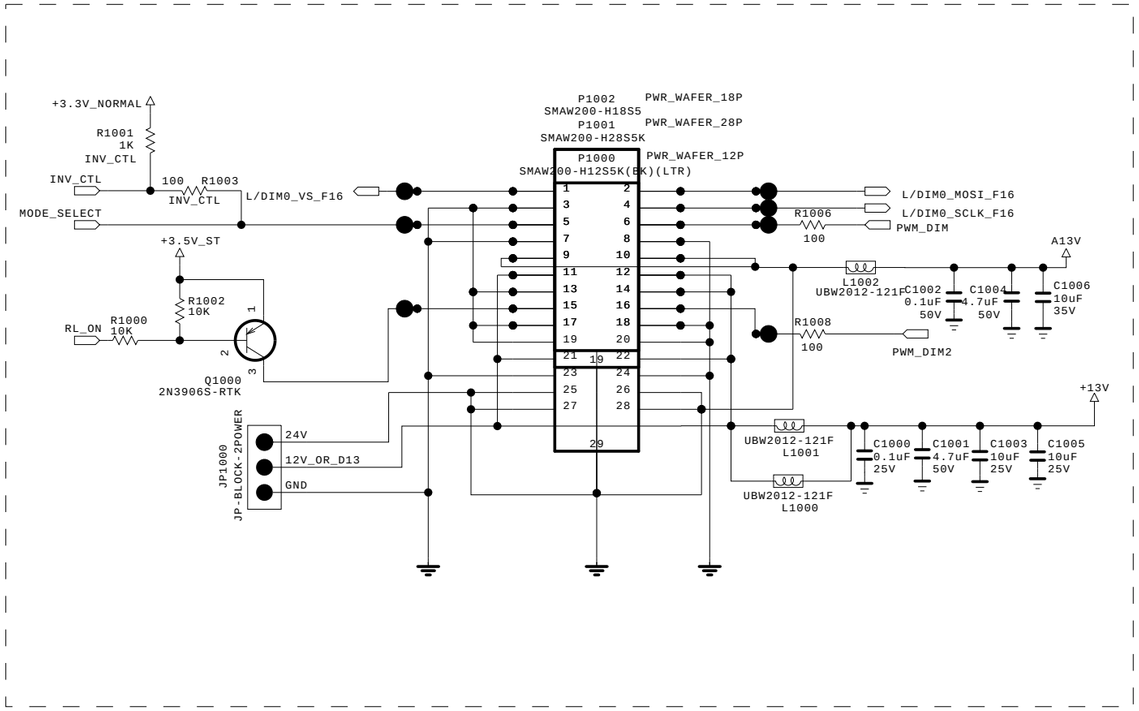


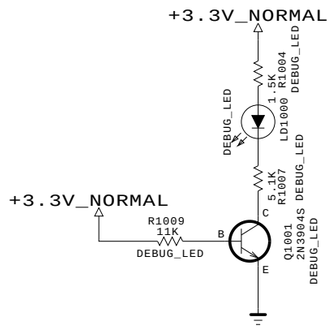


SECRET
LGElectronics

LG ELECTRONICS

MODEL	M16	DATE	2015.02.09
BLOCK	CI for DVB	SHEET	7 / 26





28pin power pin map

12/24V multi power + local dimming

Pin	Signal	Pin	Signal
1	VSYNC	2	SIN
3	GND	4	SCLK
5	DRVON	6	PDIM1
7	GND	8	GND
9	A13	10	A13
11	D13	12	D13
13	GND	14	D13
15	PWR-ON	16	PDIM2
17	GND	18	GND
19	GND	20	GND
21	D13	22	D13
23	GND	24	GND
25	A13	26	A13
27	A13	28	A13

A13 : 12V
D13 : 24V

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

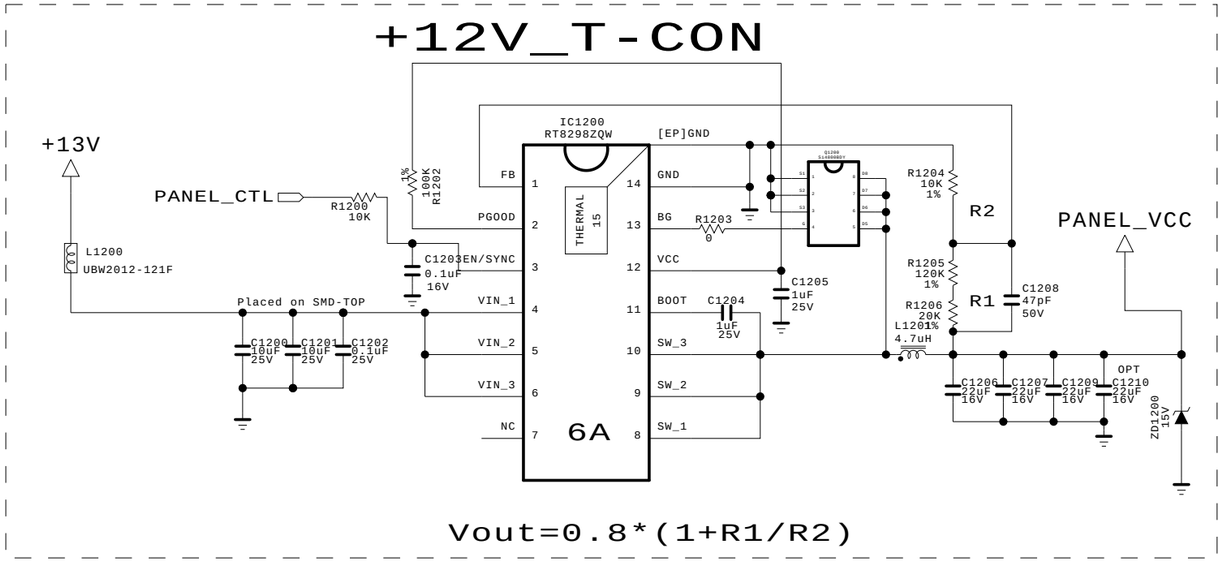
LGElectronics

LG ELECTRONICS

MODEL	Power Wafer (UH80)	DATE	15/06/13
BLOCK		SHEET	/

LGE Internal Use Only

+12V_T-CON



Vout=0.8*(1+R1/R2)

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

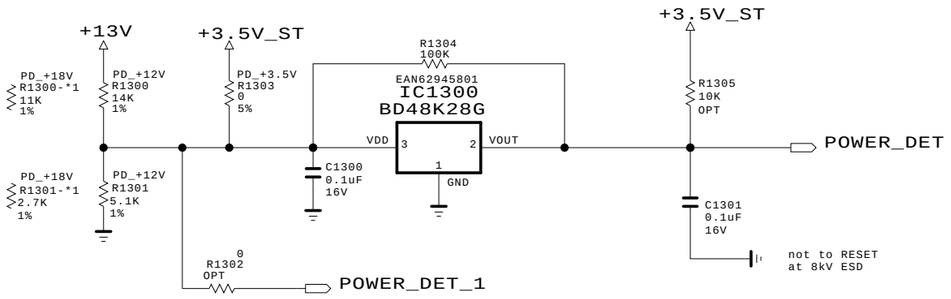
LGElectronics

LG ELECTRONICS

MODEL		DATE	
BLOCK		SHEET	/

LGE Internal Use Only

Power_DET



24V-->3.48V
20V-->3.51V
12V-->3.58V
ST_3.5V-->3.5V

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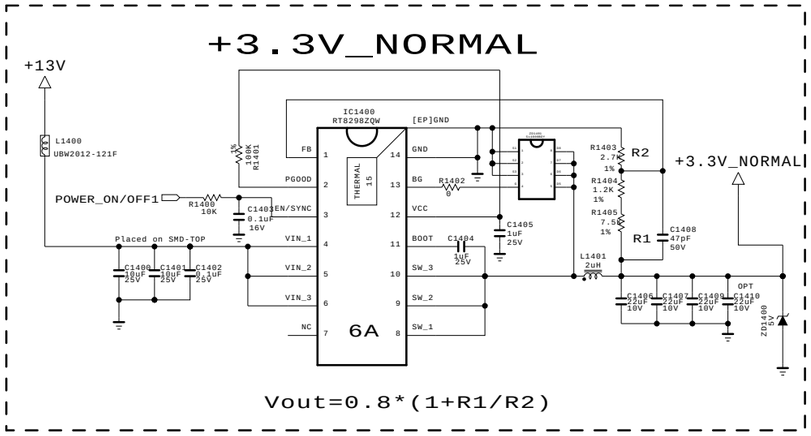
SECRET

LGElectronics

LG ELECTRONICS

MODEL	Power det	DATE	15/06/13
BLOCK		SHEET	/

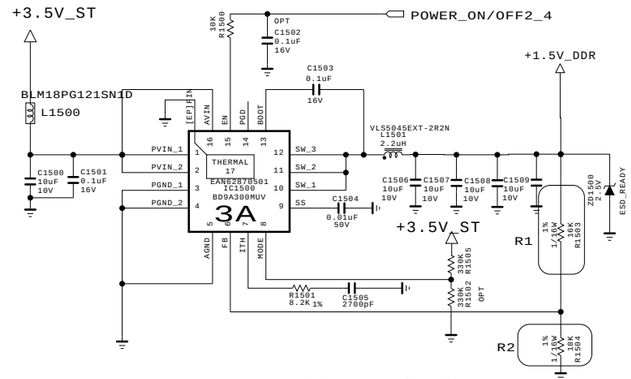


SECRET
LGElectronics

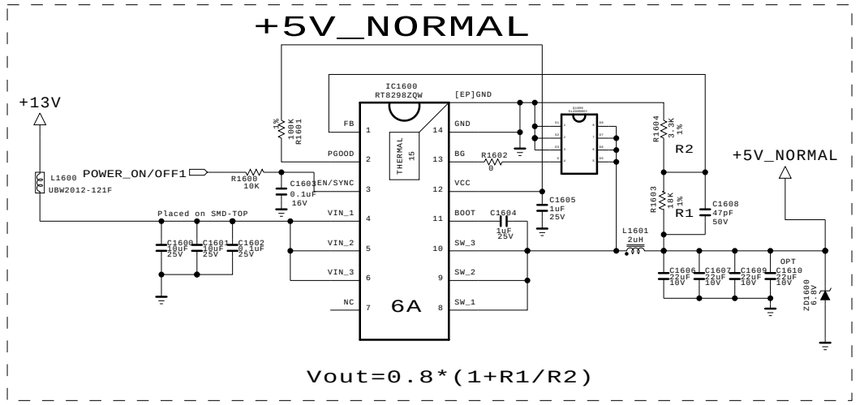
LG ELECTRONICS

MODEL	M16	DATE	2015.06.02
BLOCK	M16 UHD-mid Power	SHEET	14 / 100

+1.5V DDR



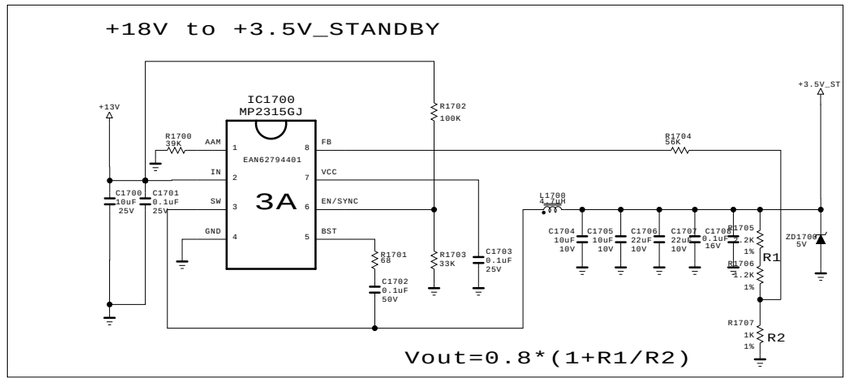
Vout=0.8*(1+R1/R2)



SECRET
LGElectronics

LG ELECTRONICS

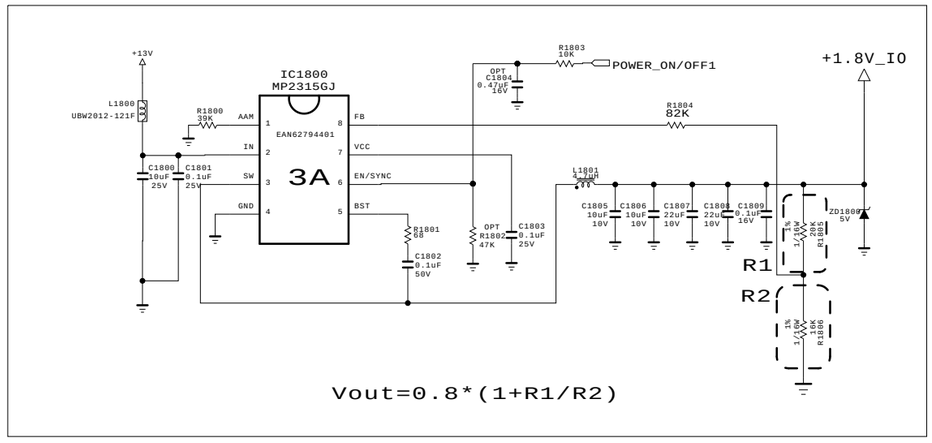
MODEL	M16	DATE	2015.06.03
BLOCK	5V normal	SHEET	16 / 100



SECRET
LGElectronics

LG ELECTRONICS

MODEL	M16	DATE	2015.07.15
BLOCK	3.5V ST	SHEET	17 / 100

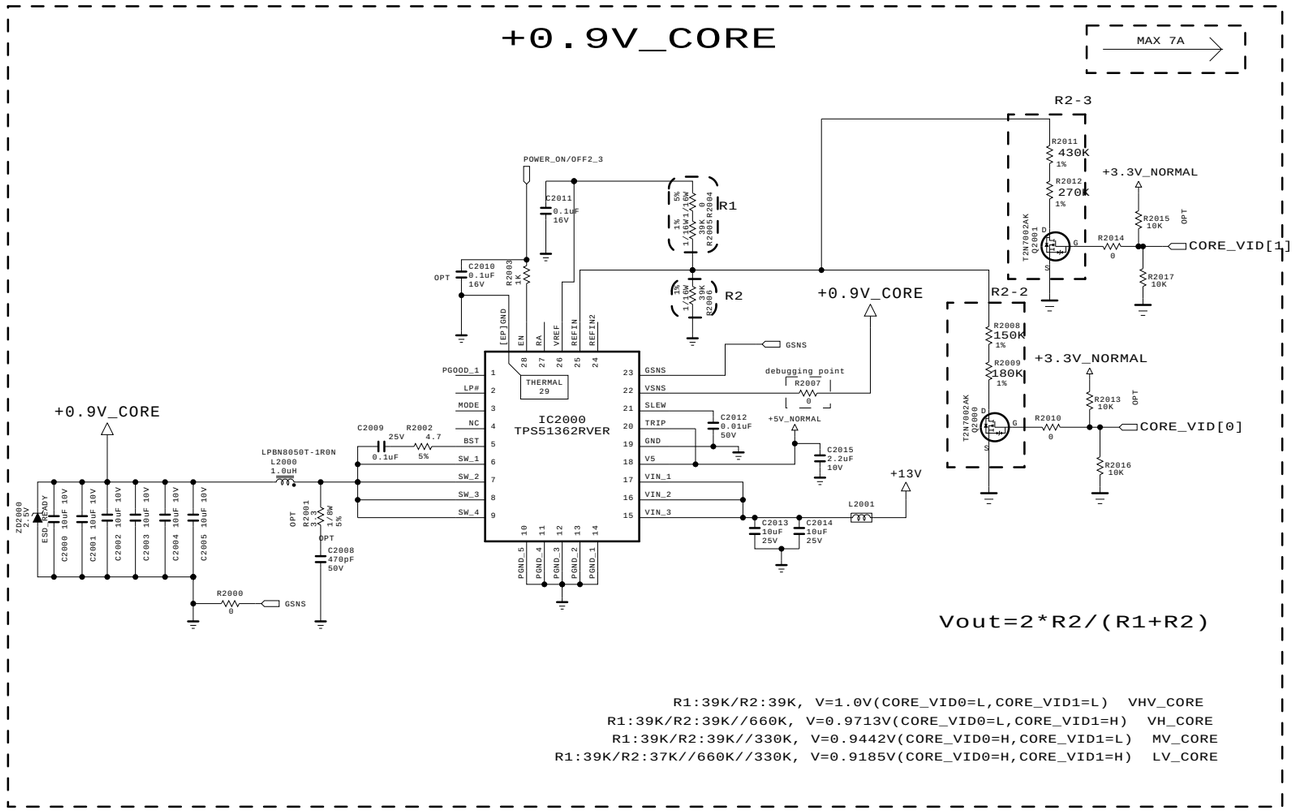


THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FIRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

SECRET
LGElectronics

LG ELECTRONICS

MODEL	M16	DATE	2015.07.15
BLOCK	1.8V_IO	SHEET	18 / 100



CORE_VID TABLE

CORE_VID0	CORE_VID1	VOUT	R2
L	L	1.0V	39 kohm
L	H	0.9713V	36.94 kohm
H	L	0.9442V	34.87 kohm
H	H	0.9185V	33.22 kohm

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.

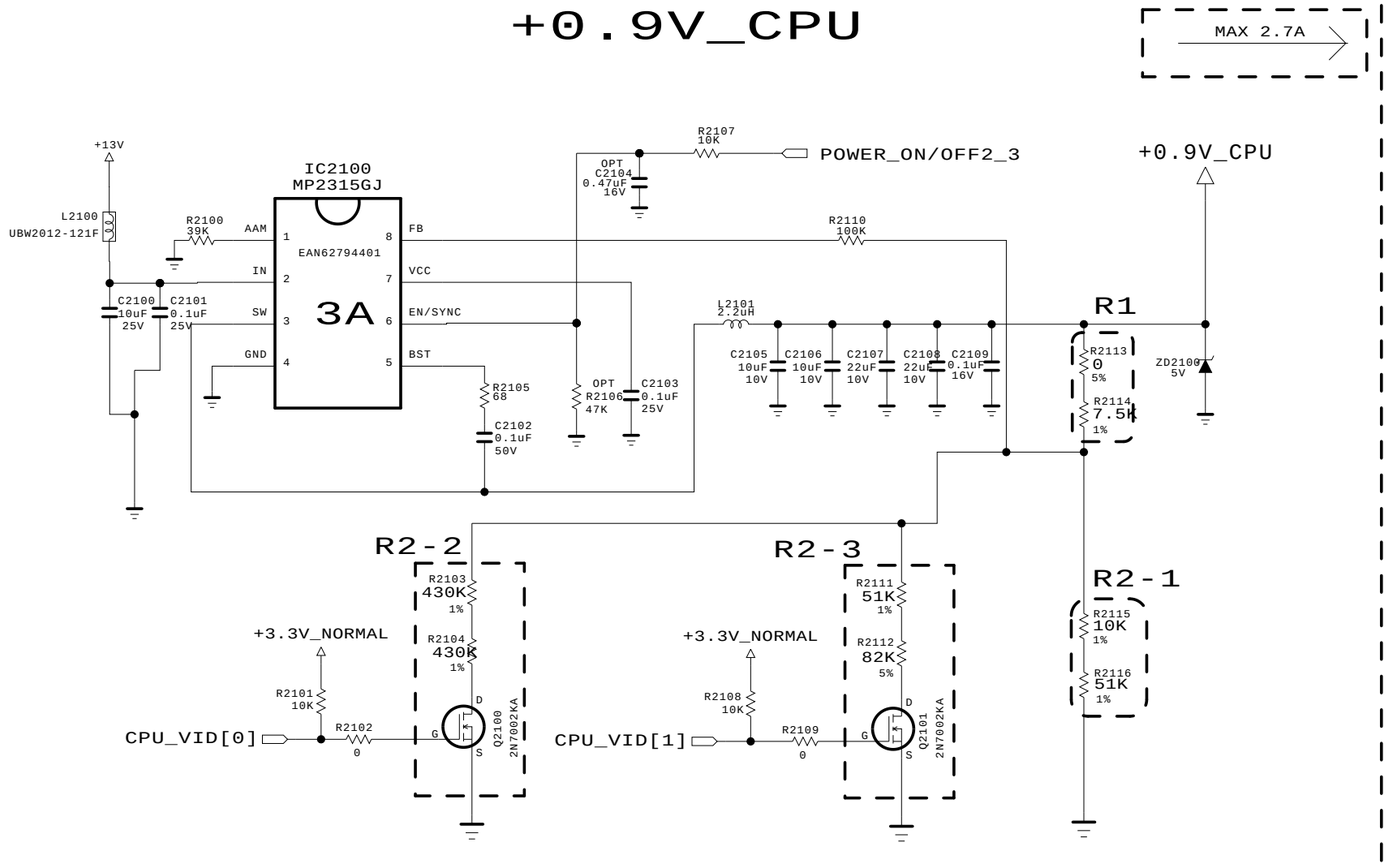
SECRET
LGElectronics

LG ELECTRONICS

020.sht

MODEL		DATE	15/06/13
BLOCK	M16_0.9V Core	SHEET	19 / 73

+0.9V_CPU



Vout=0.8*(1+R1/R2)

R1:9.1K/R2:18K, V=0.9033V(CPU_VID0=L,CPU_VID1=L) LV_CPU
R1:9.1K/R2:18K//210K, V=0.9293V(CPU_VID0=L,CPU_VID1=H) MV_CPU
R1:9.1K/R2:18K//120K, V=0.9488V(CPU_VID0=H,CPU_VID1=L) LV_CPU
R1:9.1K/R2:18K//210K//120K, V=0.9748V(CPU_VID0=H,CPU_VID1=H) VHV_CPU

CPU_VID TABLE

CPU_VID0	CPU_VID1	VOUT	R2
L	L	0.9033V	18 kohm
L	H	0.9293V	16.57 kohm
H	L	0.9488V	15.65 kohm
H	H	0.9743V	14.56 kohm

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.

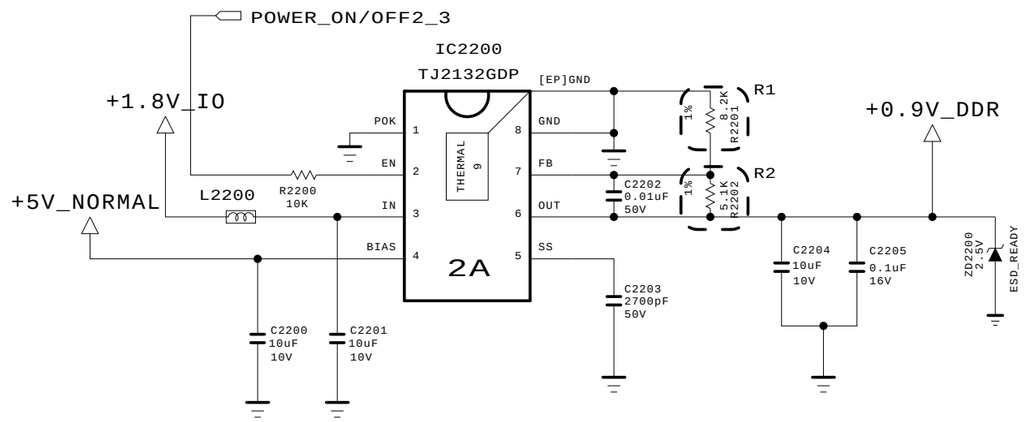
SECRET

LGElectronics

LG ELECTRONICS

MODEL		DATE	
BLOCK		SHEET	/

+0.9V DDR & C4TX



Vout=0.6*(1+R2/R1)

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

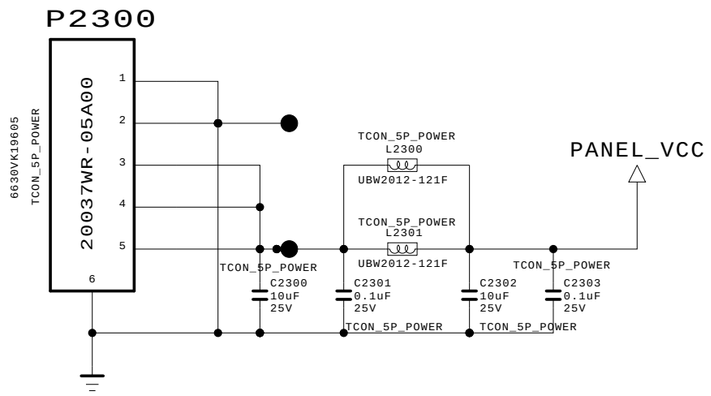
LGElectronics

LG ELECTRONICS

022.sht

MODEL		DATE	15/09/24
BLOCK	M16_0.9V DDR & C4TX	SHEET	21 / 73

T-con Sub power



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SECRET

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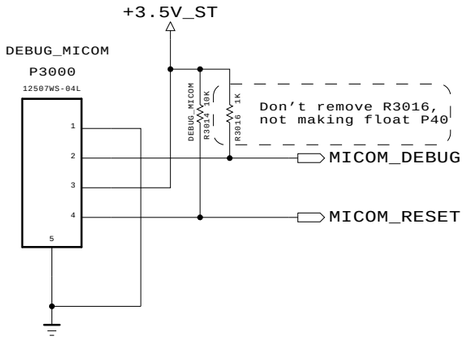
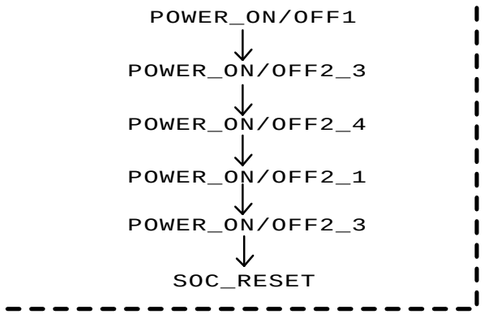
LG ELECTRONICS

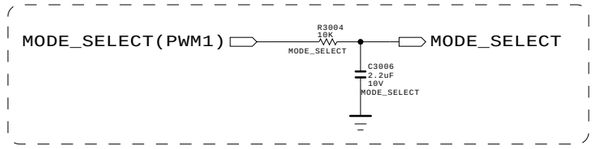
MODEL		DATE	15/06/13
BLOCK	T-con power wafer	SHEET	/ 73

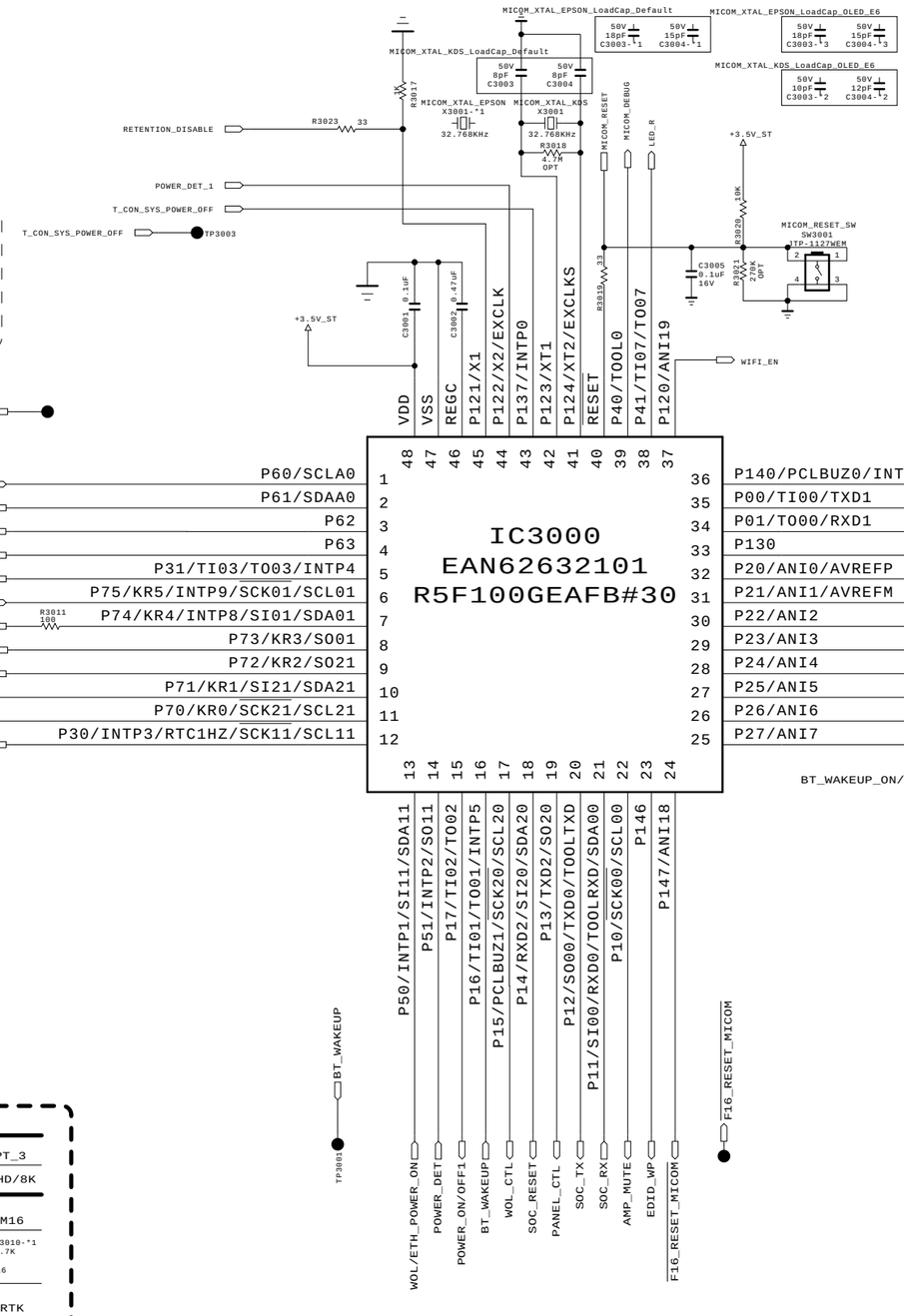
For Debug



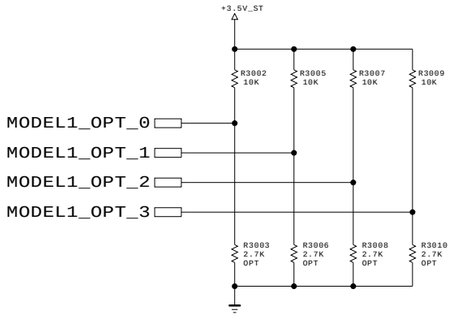
M16/F16 Power SEQUENCE





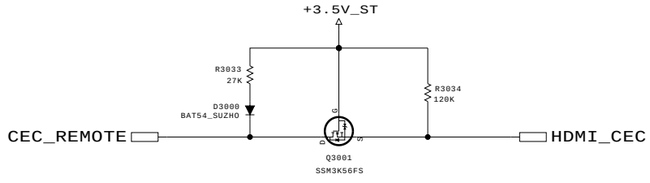


MICOM MODEL OPTION



	MODEL_OPT_0	MODEL_OPT_1	MODEL_OPT_2	MODEL_OPT_3	
				FHD	UHD/8K
00 (0.72V)	NON LOGO/LCD	TV-NON EPI	FHD	M16	M16
	R3003-*1 2.7K MICOM_NON_LOGO_LCD	R3006-*1 2.7K MICOM_TV_NONEPI	R3008-*1 2.7K MICOM_FHD	R3010-*1 2.7K MICOM_M16	
01 (1.53V)	LOGO/LCD	BOX	-	-	RTK
	R3003-*2 8.2K MICOM_LOGO_LCD	R3006-*2 8.2K MICOM_BOX_NONEPI_OLED	R3008-*2 8.2K NOT USE	R3010-*2 8.2K MICOM_RTK	
10 (2.27V)	NON LOGO/OLED	TV-EPI	UHD	A5LR	H15
	R3003-*3 20K MICOM_NONLOGO_OLED	R3006-*3 20K MICOM_TV_EPI	R3008-*3 20K MICOM_UD	R3010-*3 20K MICOM_H15/A5LR	
11 (3.0V)	LOGO/OLED	BOX	8K	M2	-
	R3003-*4 75K MICOM_LOGO_OLED	R3006-*4 75K MICOM_BOX_RGB_Sensor	R3008-*4 75K MICOM_8K	R3010-*4 75K MICOM_M2	

For HDMI CEC (Consumer Electronic Control)



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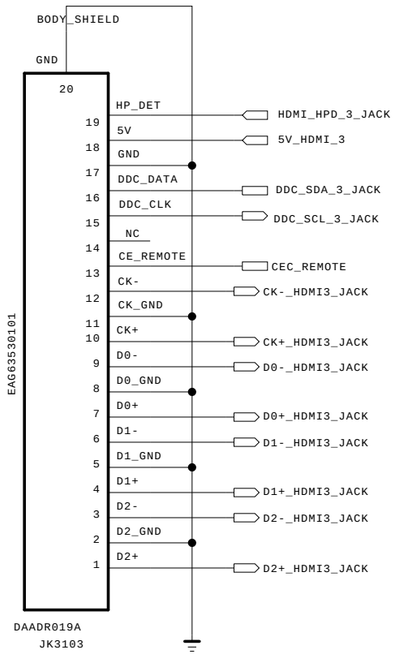
LG ELECTRONICS

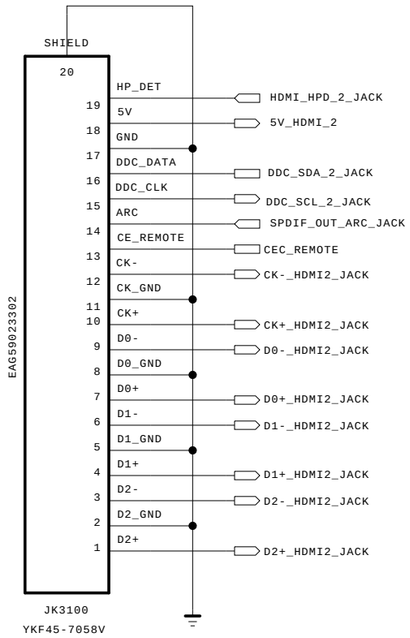
030.sht

MODEL	M16	DATE	2015.06.27
BLOCK	MICOM_NEC	SHEET	30 / 99

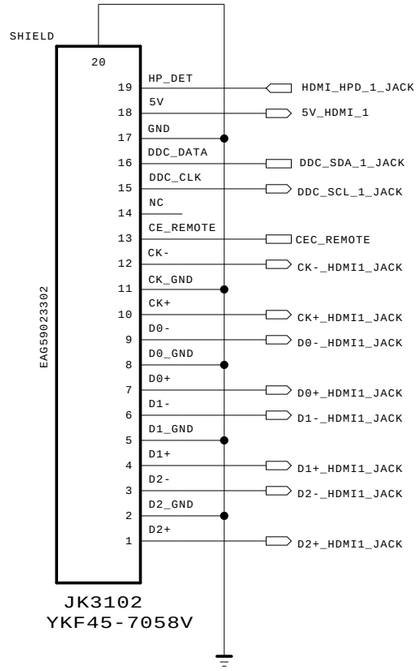
HDMI1 (2.0)



HDMI2 With ARC (2.0)



HDMI3 with Ext.EDID (1.4)



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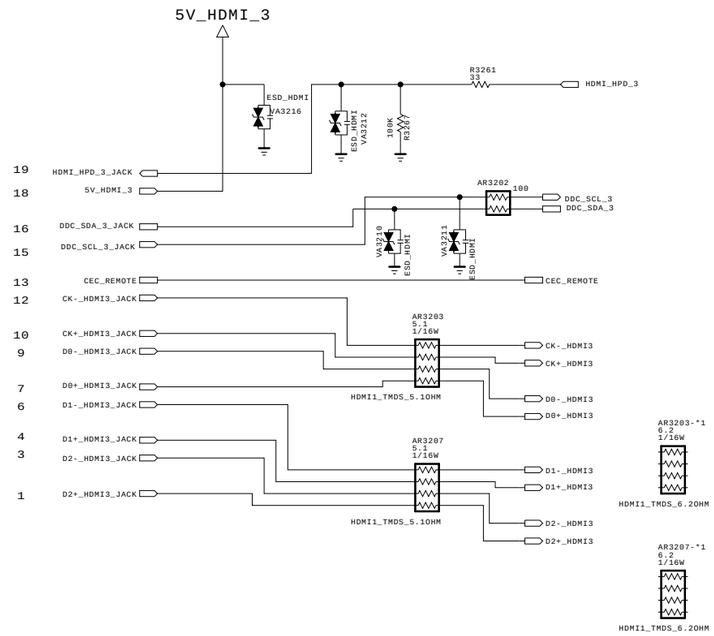
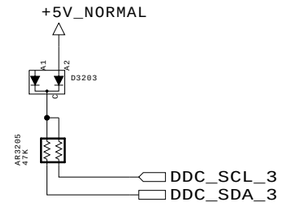
LG ELECTRONICS

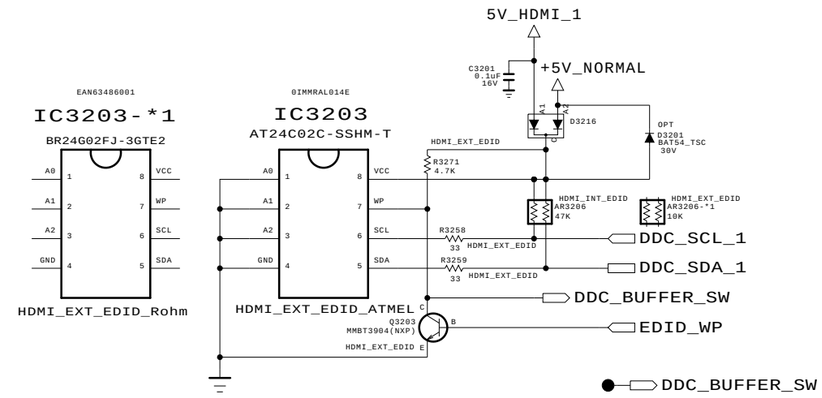
MODEL		DATE	15/07/15
BLOCK	HDMI SYMBOL	SHEET	24 / 73

HDMI1 (2.0)

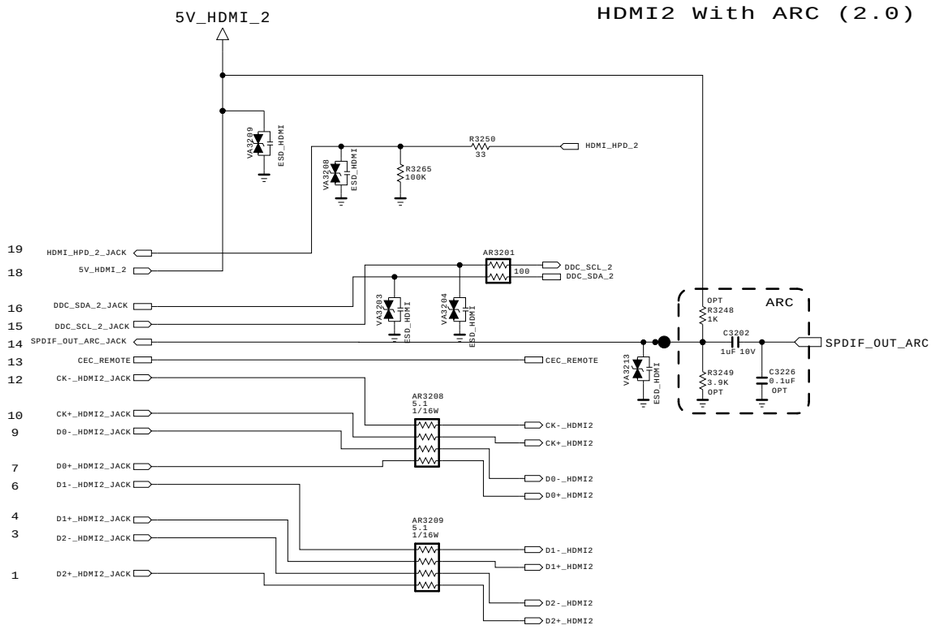


External EDID

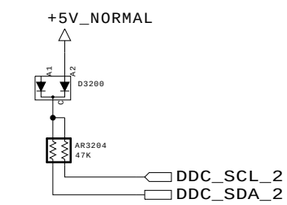




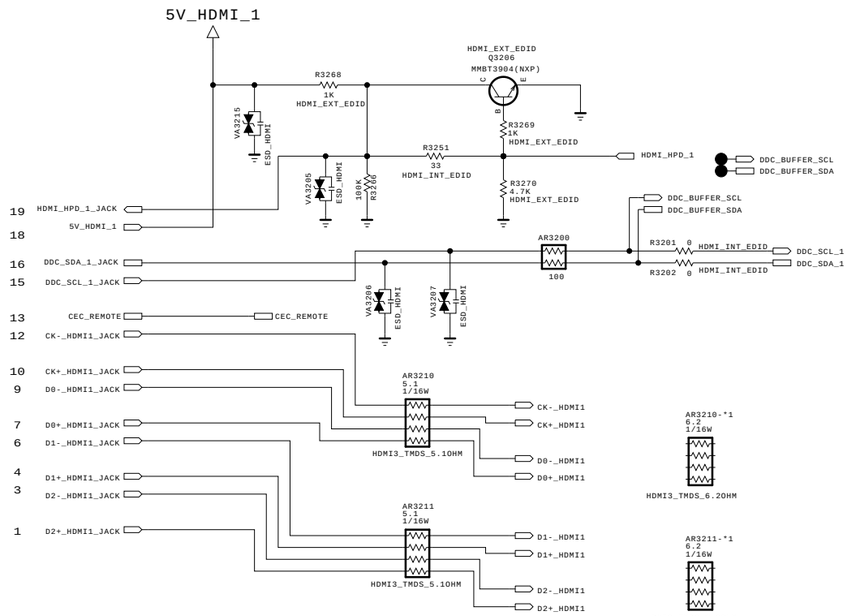
HDMI2 With ARC (2.0)



DDC I2C Pull-up

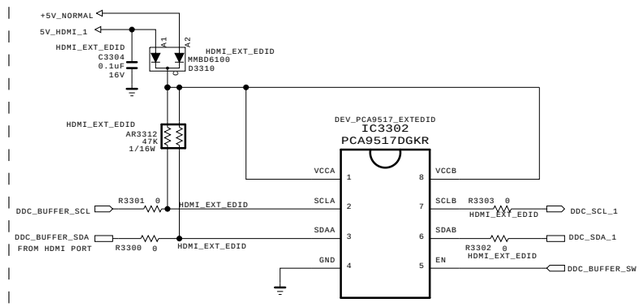


HDMI3 with Ext.EDID (2.0)



MODEL	M16	DATE	2015.12.07
BLOCK	HDMI Rx	SHEET	32 / 99

EDID external EEPROM & DDC BUFFER for HDMI3



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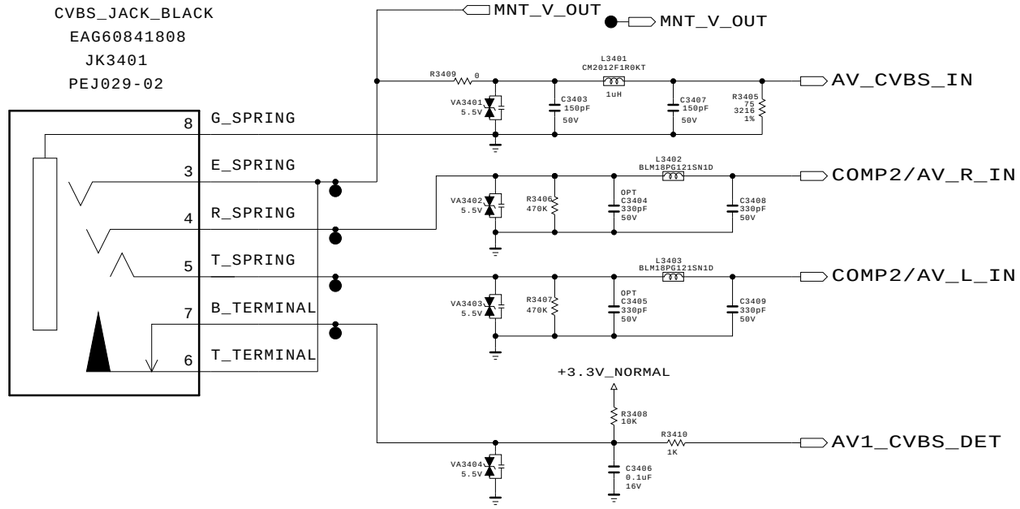
MODEL	M16	DATE	2015-01-10
BLOCK	HDMI	SHEET	33

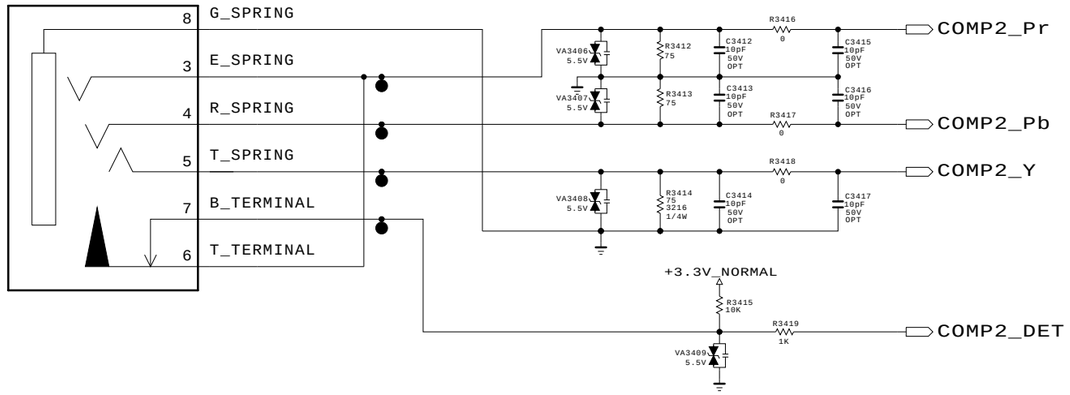
CVBS 1 PHONE JACK

CVBS_JACK_BLACK
EAG60841808
JK3401
PEJ029-02

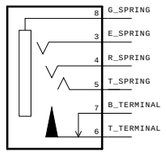


COMPONENT 1 PHONE JACK

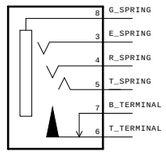
COMPONENT_JACK_BLACK
EAG60841808
JK3402
PEJ029-02



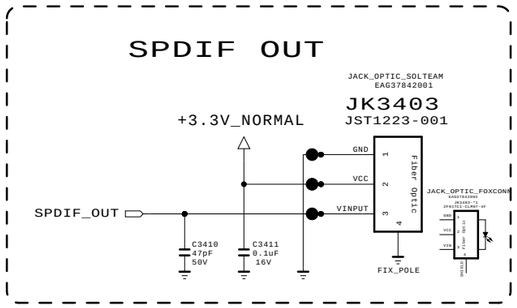
CVBS_JACK_YELLOW
JK3401-*1
PEJ029-02..



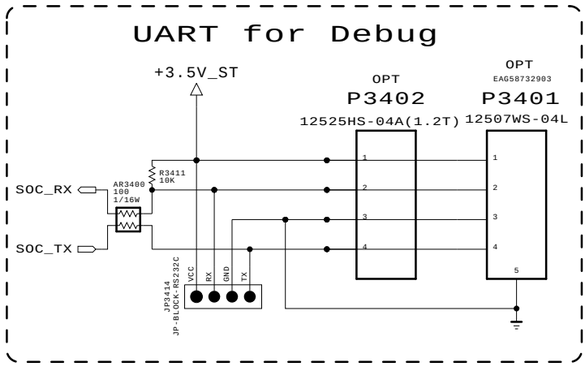
COMP_JACK_GREEN
JK3402-*1
PEJ029-02.



SPDIF OUT



UART for Debug



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SECRET
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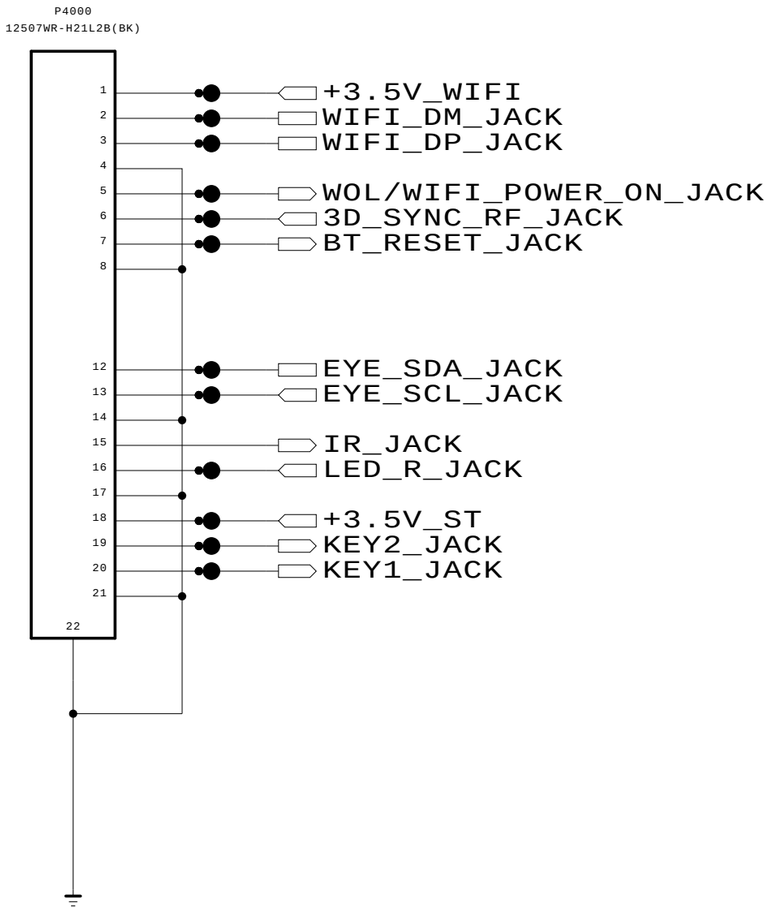
MODEL	M16	DATE	2015.12.22
BLOCK	JACK_HORIZONTAL	SHEET	34 / 99



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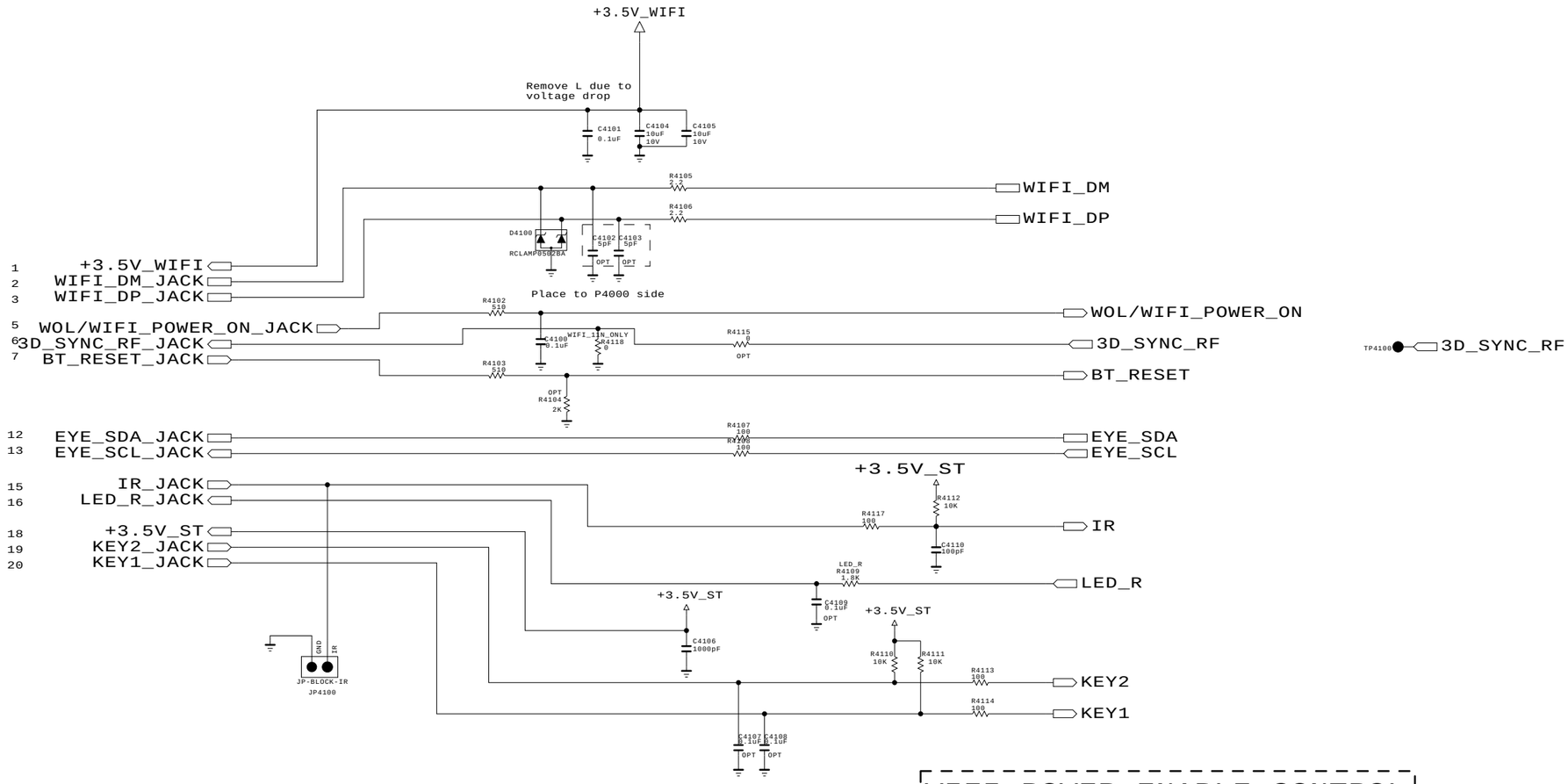
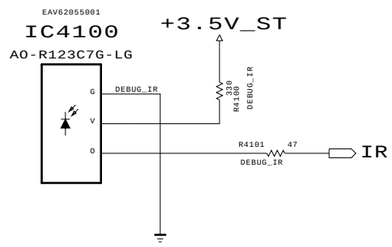
MODEL	M16	DATE	2015.12.22
BLOCK	WAFER_IR/KEY/WIFI/BT	SHEET	40 / 99

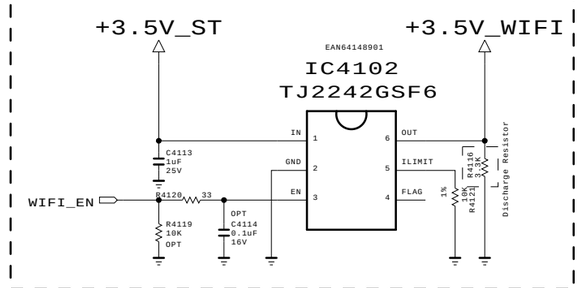
WIFI/BT CONNECTOR



IR Reciever on Board : EV board Only



WIFI POWER ENABLE CONTROL



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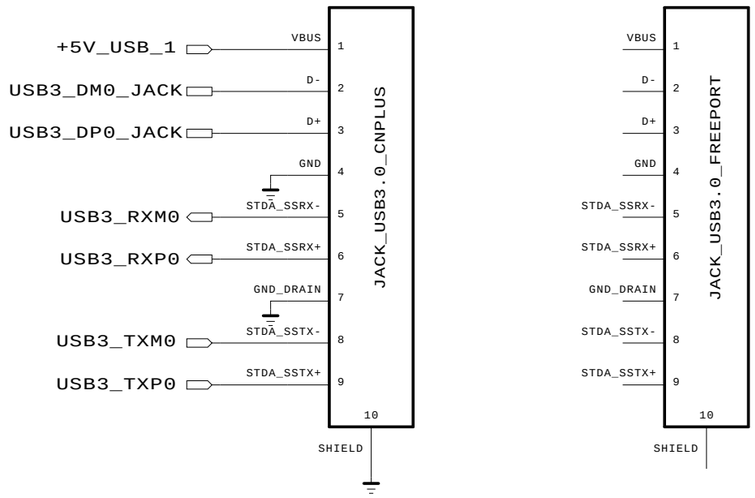
MODEL	M16	DATE	2015.12.22
BLOCK	IR/KEY/WIFI/BT	SHEET	41 / 99

USB3.0

MAX 1.5A

EAG63374203
JK4200
5205-56209

EAG63374205
JK4200-*1
3AG009S-106N3R6003(1.2T PCB)



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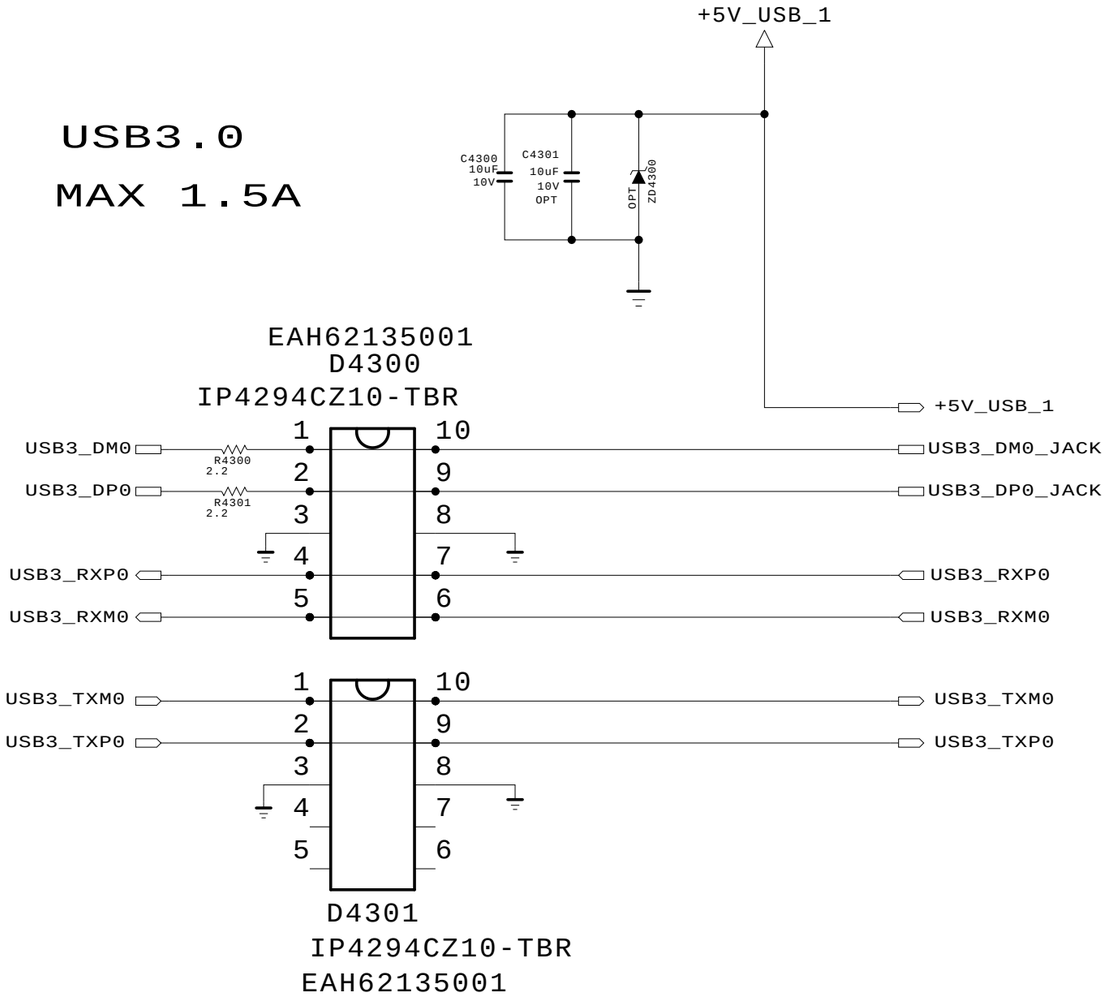
LG ELECTRONICS

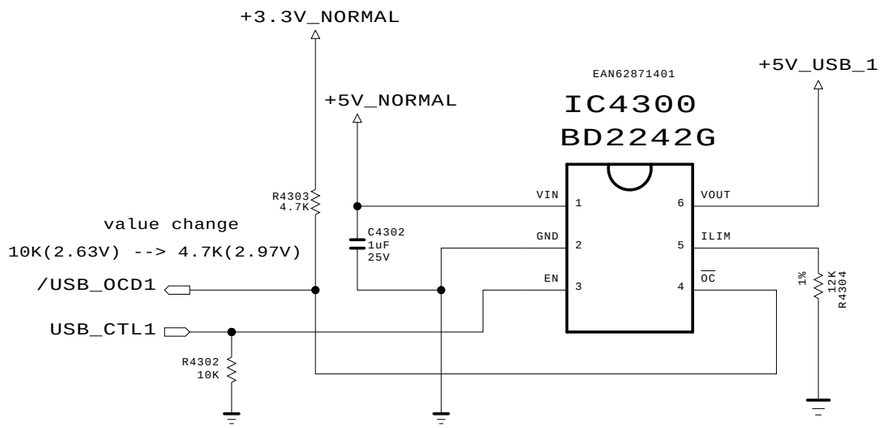
MODEL	M16	DATE	2015.12.22
BLOCK	JACK_USB1_3.0	SHEET	42 / 99

USB3.0

MAX 1.5A



OCP USB3.0



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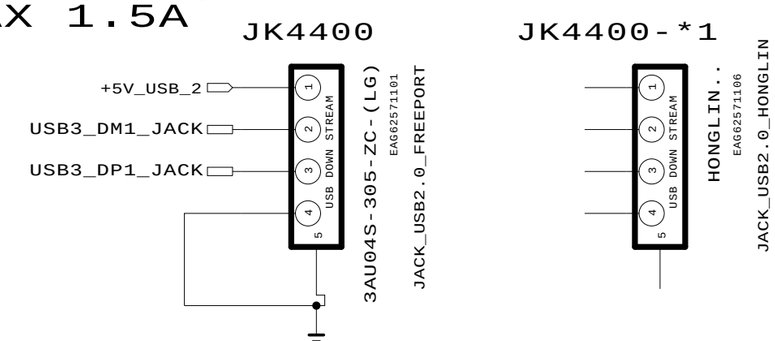
MODEL	M16	DATE	2015.11.23
BLOCK	USB1_3.0	SHEET	43 / 99

USB2 (2.0)
MAX 1.5A



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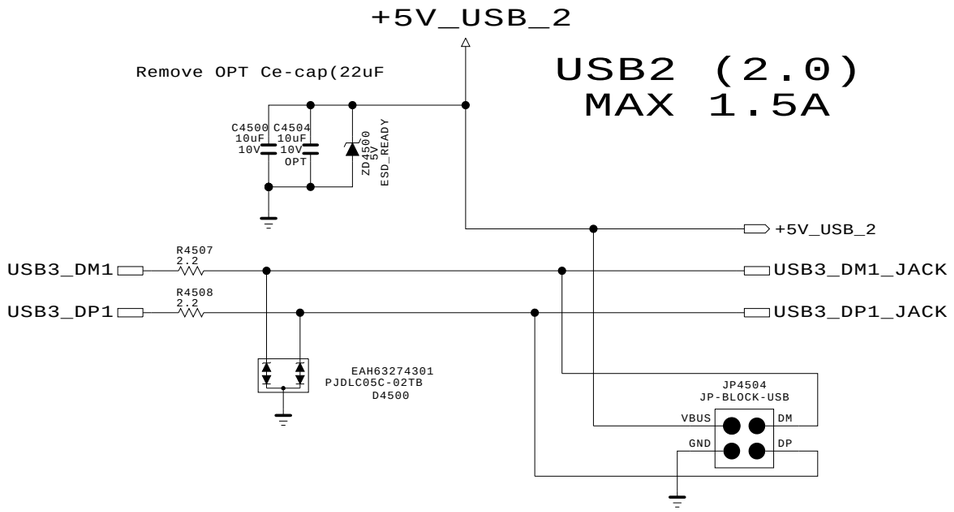
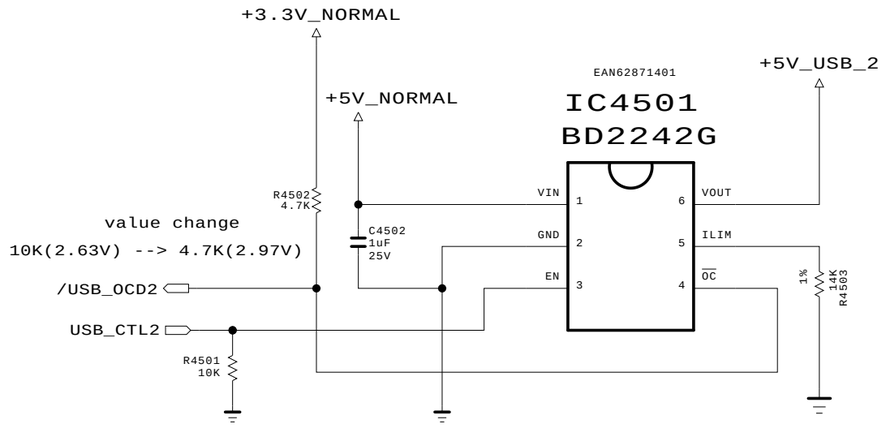
MODEL	M16	DATE	2015.12.22
BLOCK	JACK_USB2_2.0	SHEET	44 / 99



OCP USB2_2.0



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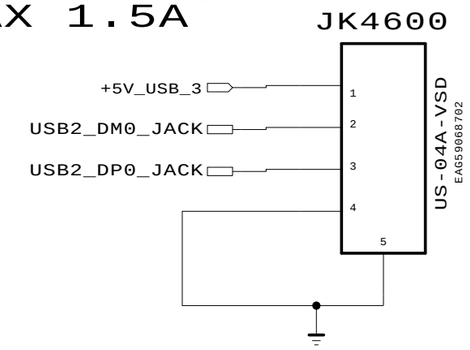
MODEL	M16	DATE	2015.11.23
BLOCK	USB2_2.0	SHEET	45 / 99

USB3 (2.0)
MAX 1.5A



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SECRET

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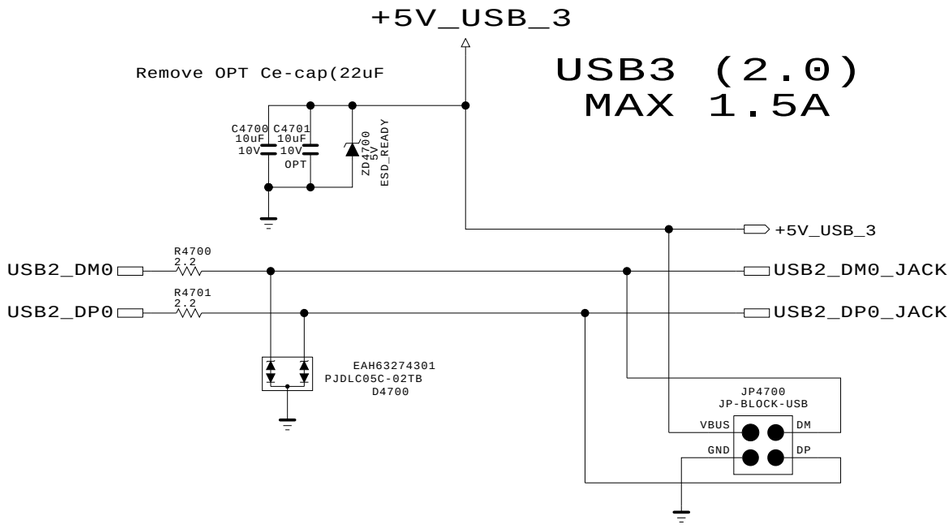
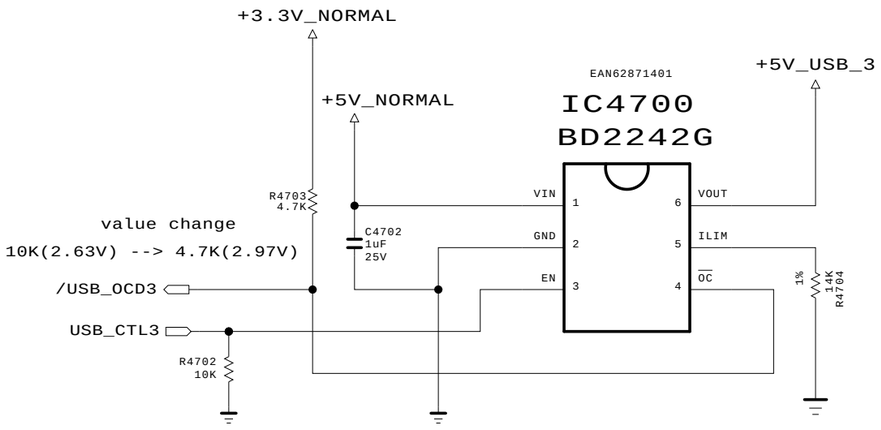
LG ELECTRONICS

MODEL		DATE	15/06/13
BLOCK	JACK_USB3_2.0	SHEET	/ 73



OCP USB3_2.0



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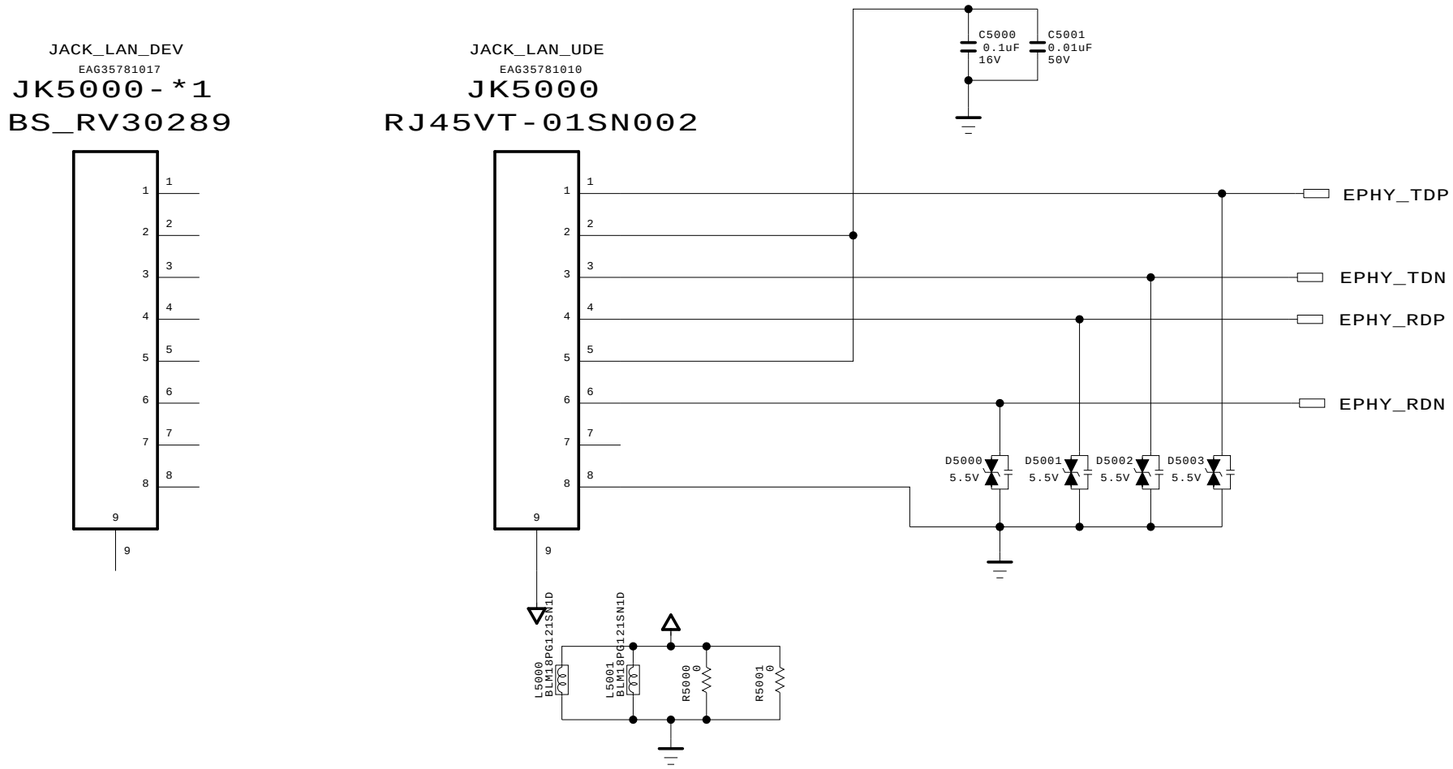
LGElectronics

LG ELECTRONICS

MODEL	M16	DATE	2015.11.23
BLOCK	USB3_2.0	SHEET	47 / 99

Ethernet Block



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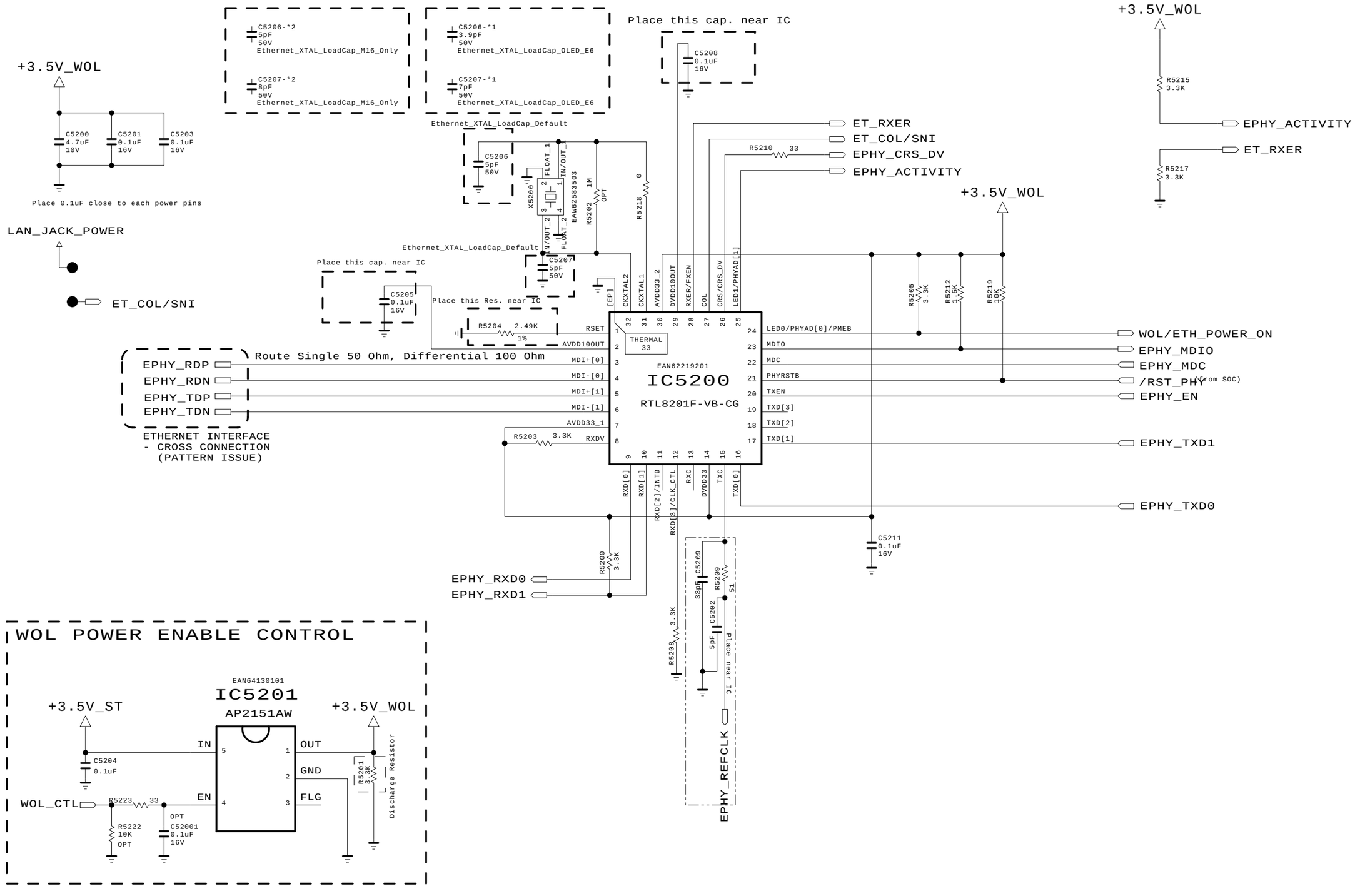
SECRET

LGElectronics

LG ELECTRONICS

050.sht

MODEL	M16	DATE	2015.02.09
BLOCK	ETHERNET JACK	SHEET	18 / 26



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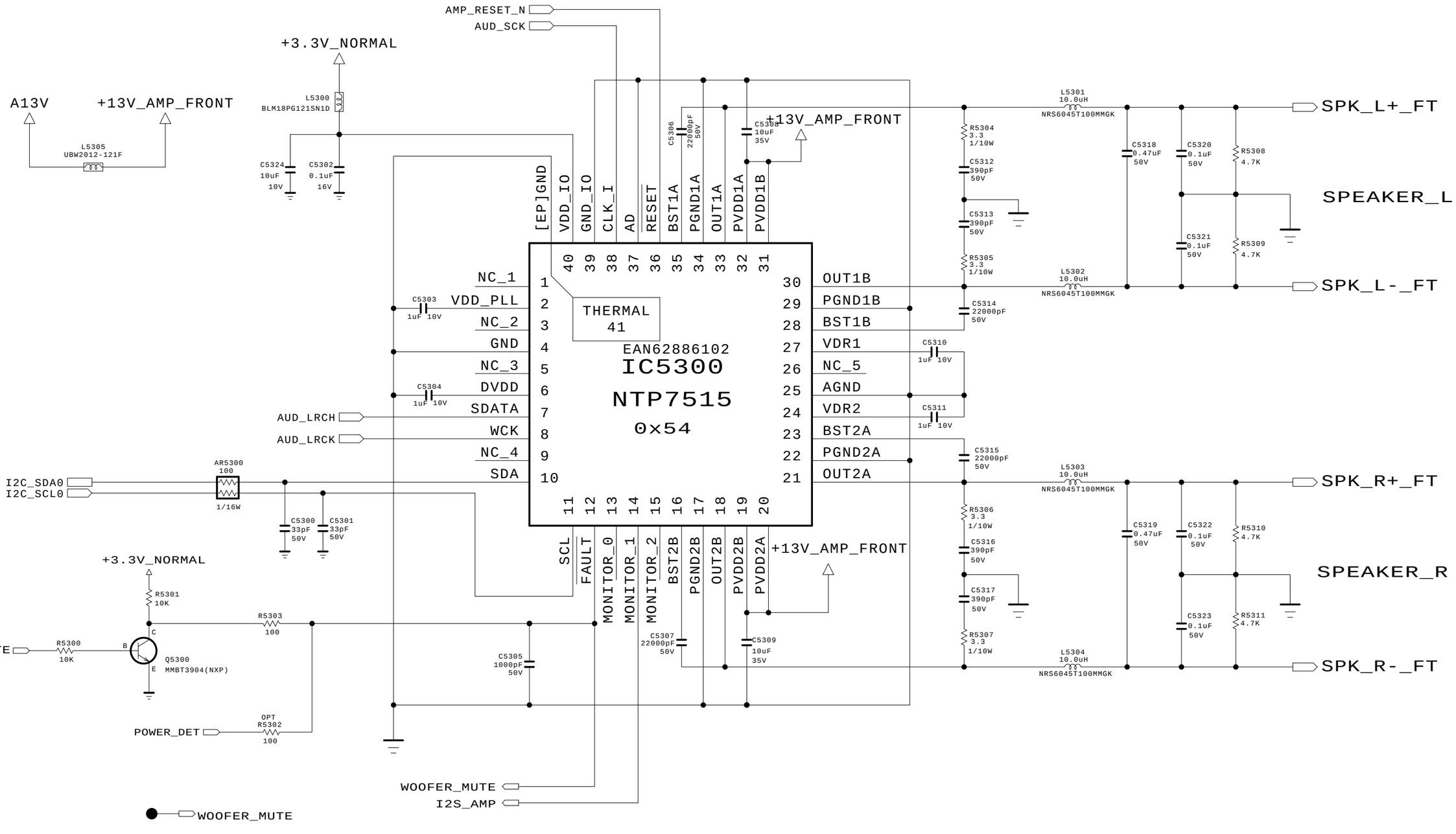
SECRET
LGElectronics

LG ELECTRONICS

MODEL	M16	DATE	2015.11.04
BLOCK	LAN	SHEET	52 / 100

NTP_AMP_Front



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SECRET

LGElectronics

LG ELECTRONICS

053.sht

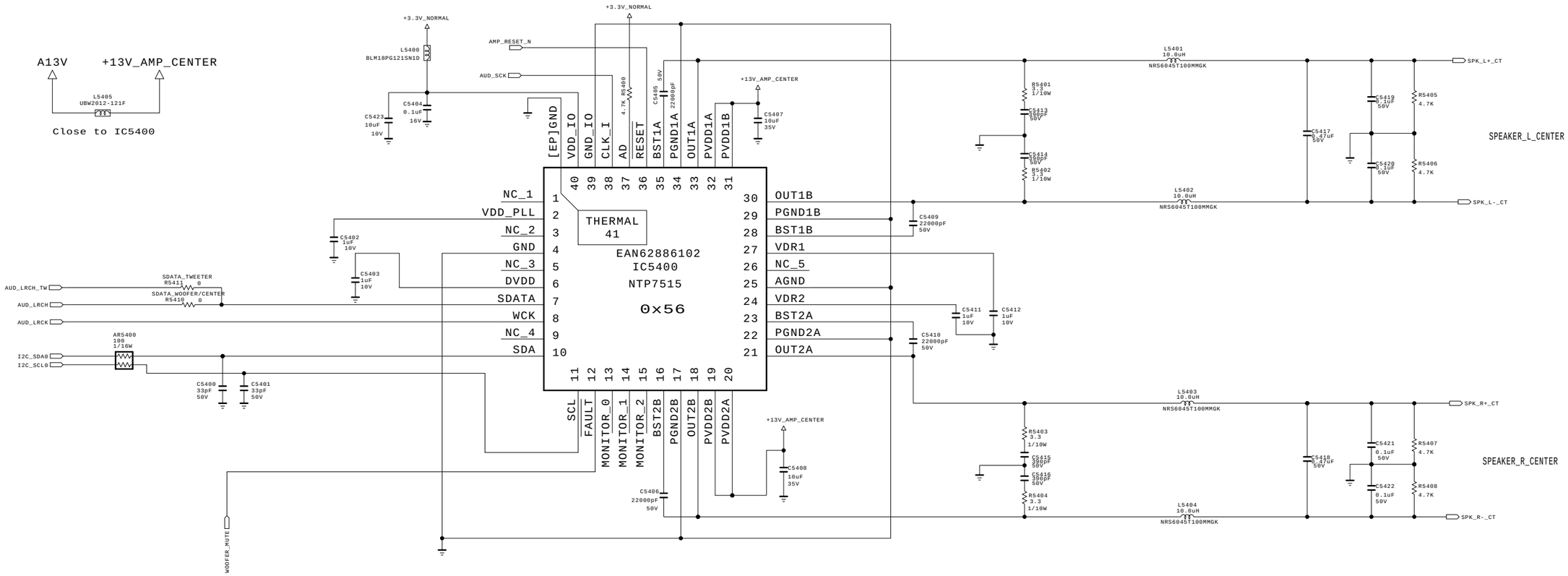
MODEL	M16	DATE	2015.02.24
BLOCK	NTP AMP	SHEET	20 / 26

AMP - Center(Upper 75")
Woofer(Below 65")
Tweeter(EH92)

Option Description

1. SDATA_TWEETER : Use the AMP for Tweeter (EH92)

2. SDATA_WOOFER/CENTER :
Use this AMP for Center (upper 75inch model) or Woofer STEREO (below 65 inch model)



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SECRET
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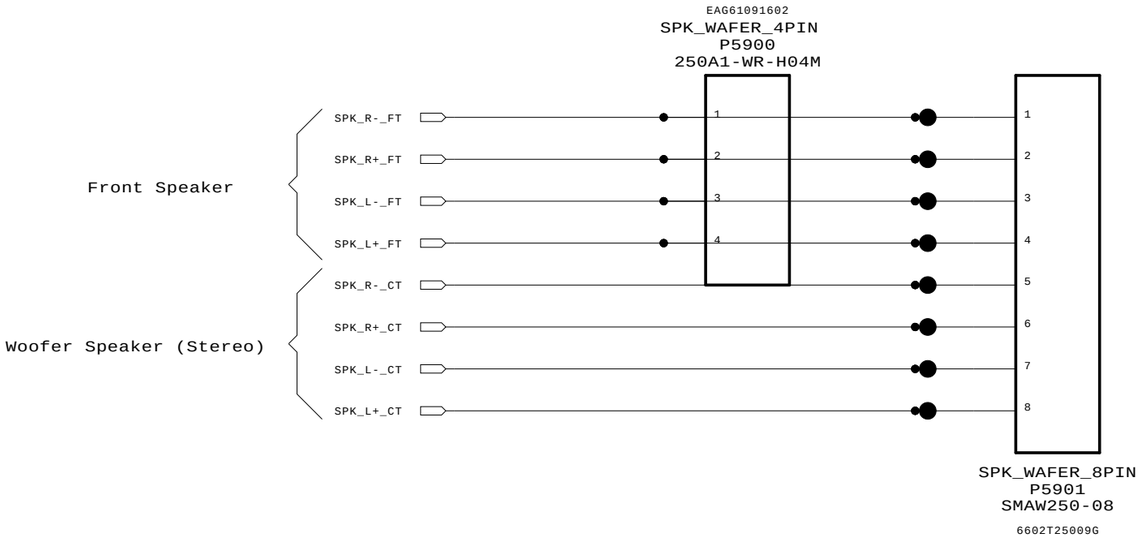
LG ELECTRONICS

MODEL	M16	DATE	2015.06.27
BLOCK	AMP_CENTER/WOOFER	SHEET	54 / 99

WAFER_SPK_4P_8P
(49/55/60/65UH80)



SECRET

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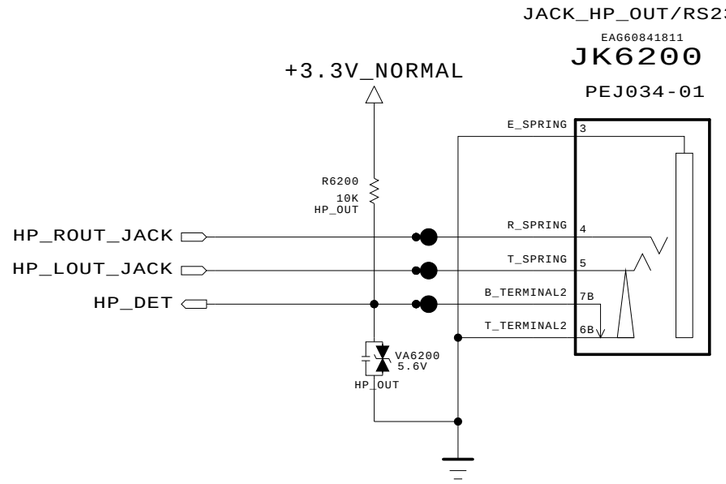
LG ELECTRONICS

059.sht

MODEL	M16	DATE	2015.06.27
BLOCK	SPEAKER WAFER	SHEET	59 / 99

HP OUT



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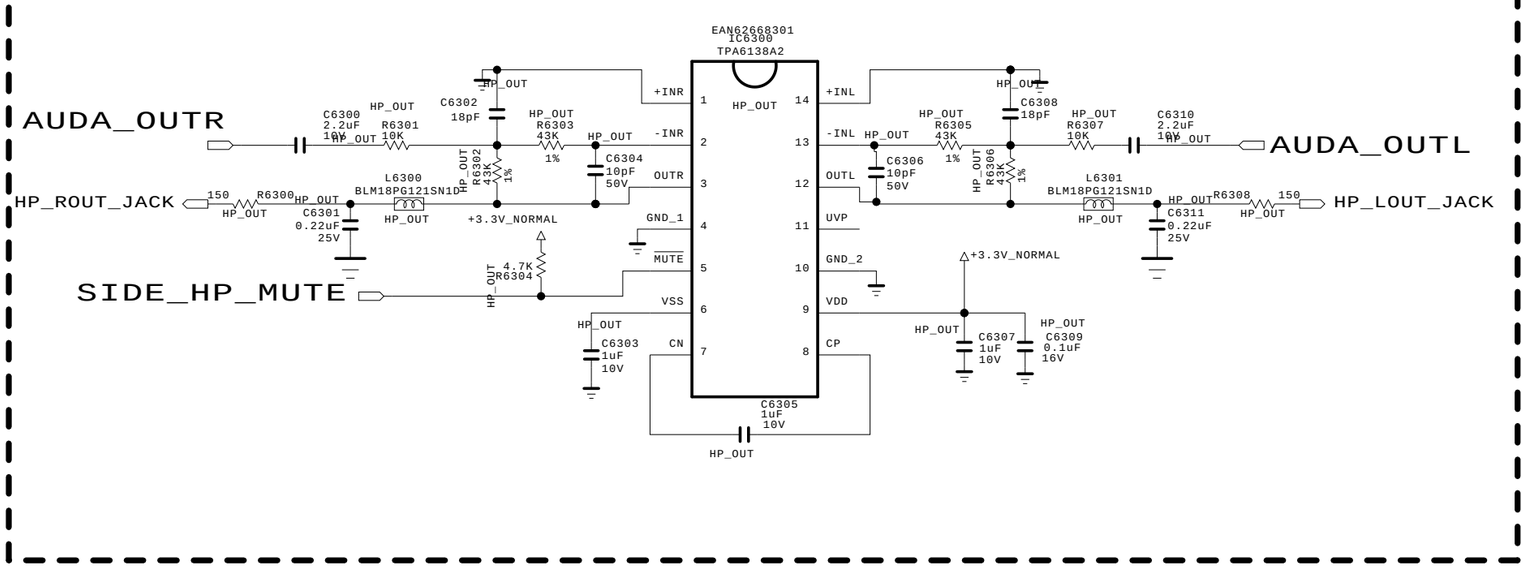
SECRET

LGElectronics

LG ELECTRONICS

MODEL		DATE	15/06/13
BLOCK	HP JACK	SHEET	23 / 73

EARPHONE AMP



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SECRET

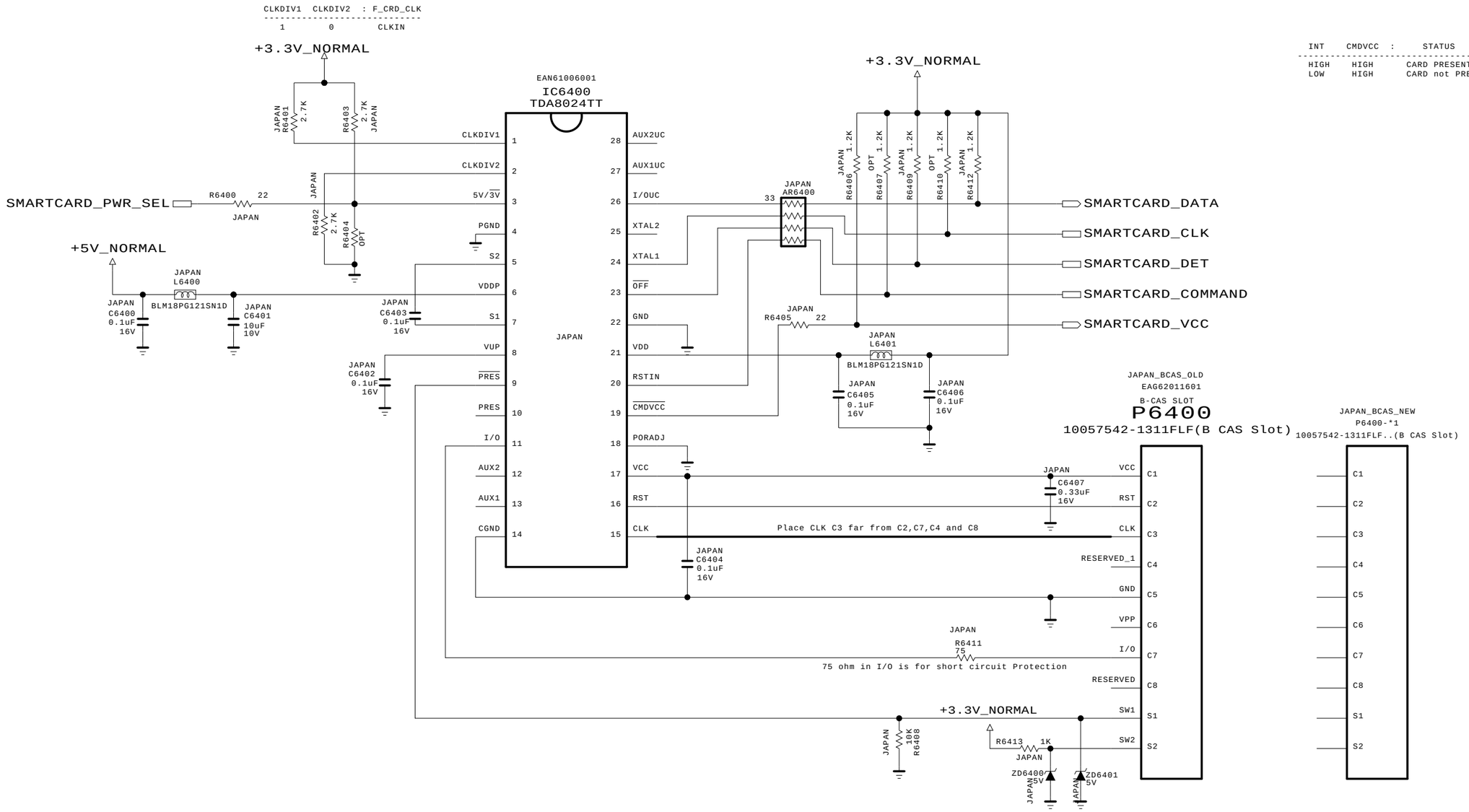
LGElectronics

LG ELECTRONICS

063.sht

MODEL	M16	DATE	2015.02.09
BLOCK	HEADPHONE AMP	SHEET	23 / 73

B-CAS (SMART CARD) INTERFACE



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

JAPAN_BCAS_OLD
EAG62011601

064.sht

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SECRET
LGElectronics

LG ELECTRONICS

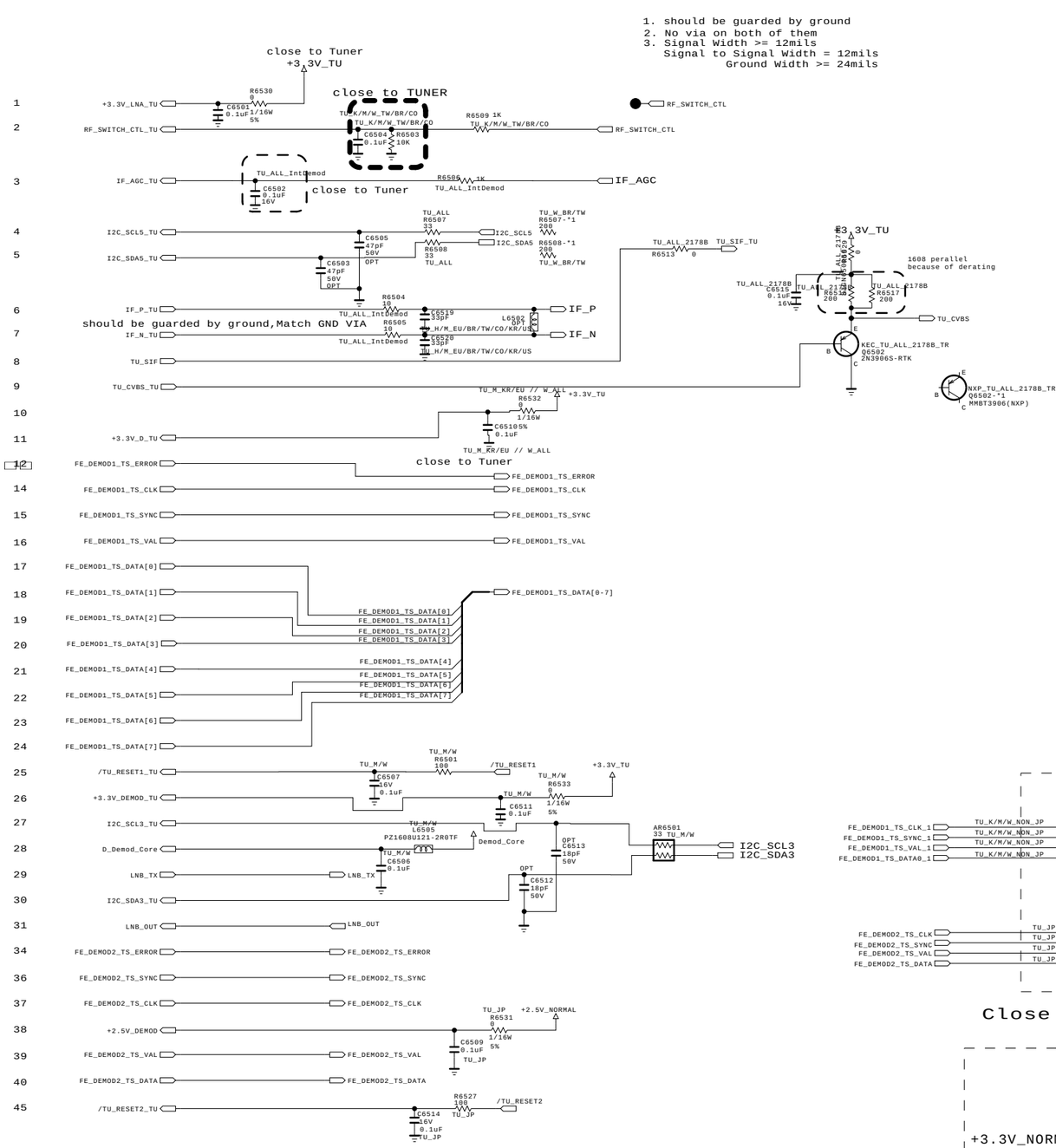
MODEL	M16	DATE	2015.02.09
BLOCK	JAPAN B-CAS	SHEET	23 / 26

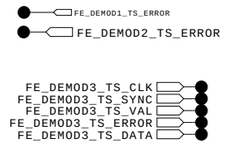
Global F/E Option Name
1. TU
2. Tuner Name = TDJ'H',TDj'M'...
3. Country Name = KR,US,BR,EU ...

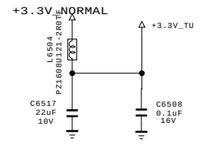
Example of Option name
TU_ALL_IntDemod = All Tuner type for Internal demod
TU_M/W = apply TDSM&TDSW Type Tuner

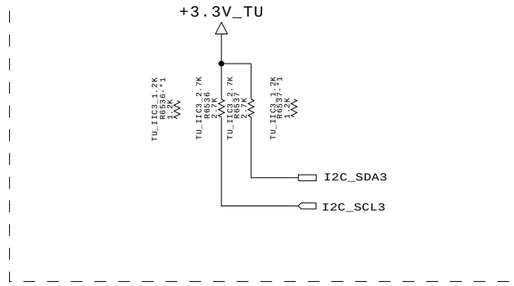
14' Tuner Type for Global
TDJ'H'-G101D : Half NIM for EU,AJJA
TDJ'H'-H101F : Half NIM for US, KR
TDJ'K'-T101F : Half NIM for TW
TDJ'M'-C301D,F : FULL NIM for China
TDJ'M'-B101F : Brazil NIM with Isolater Type
TDJ'M'-K101F : colombia NIM
TDJ'M'-G101D,G105D,G151D : EU Combo&Full NIM
TDJ'M'-H101F,H151F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

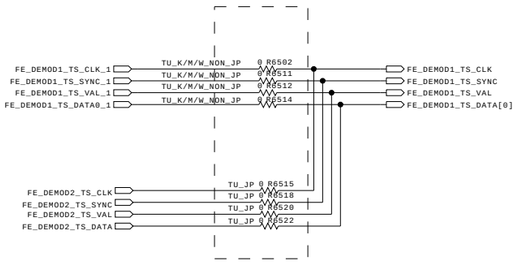
1. should be guarded by ground
2. No via on both of them
3. Signal Width >= 12mils
   Signal to Signal Width = 12mils
   Ground Width >= 24mils

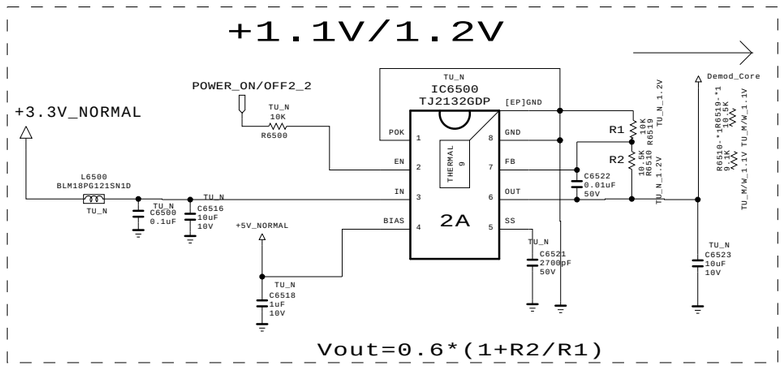












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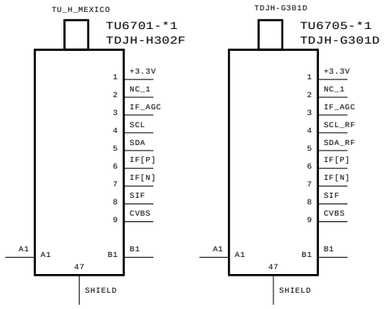
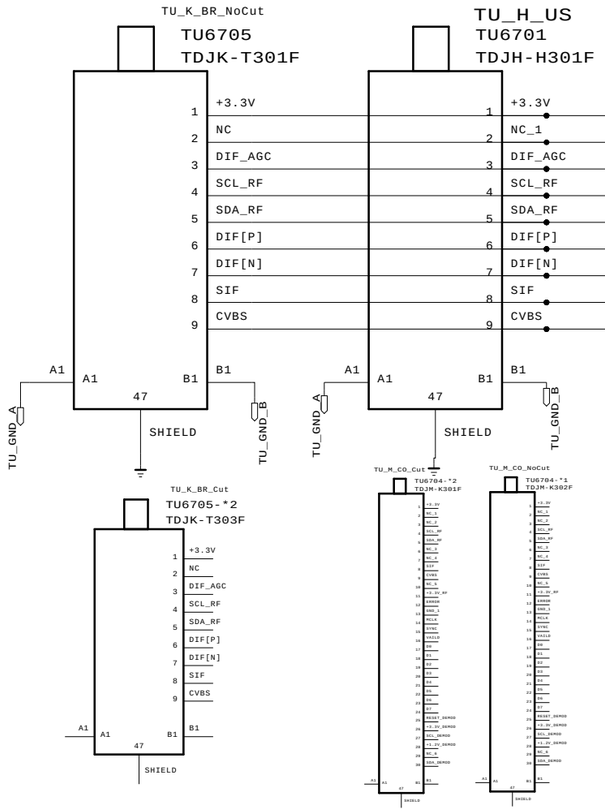
SECRET
LGElectronics

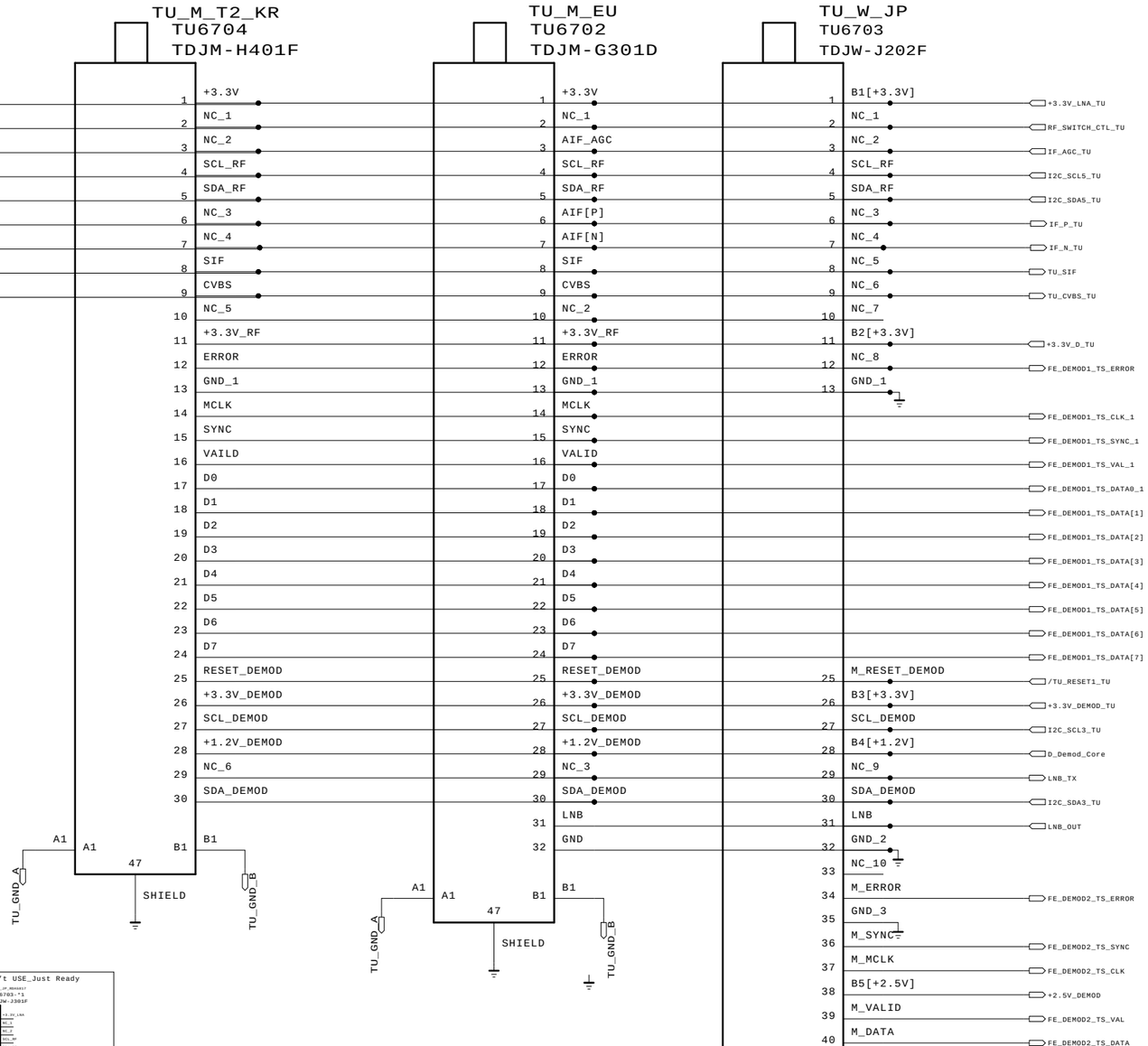
LG ELECTRONICS

MODEL	TUNER	DATE	2015.04.20
BLOCK		SHEET	65

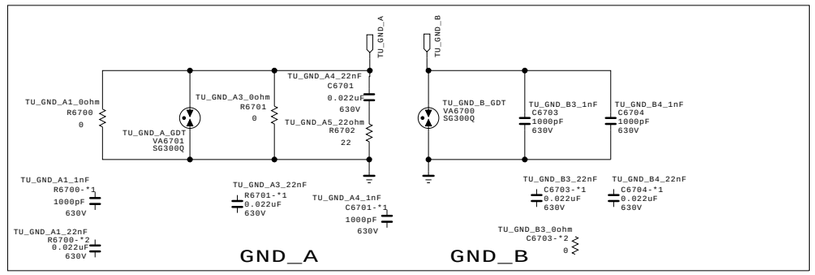
LGE Internal Use Only





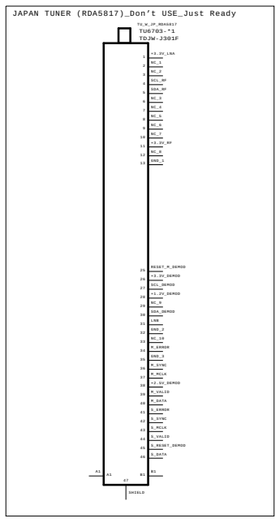


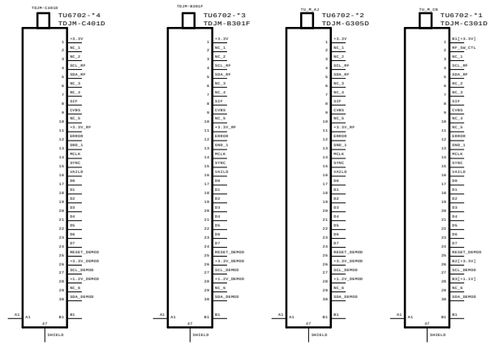
TUNER EMS GND SEPERATION



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





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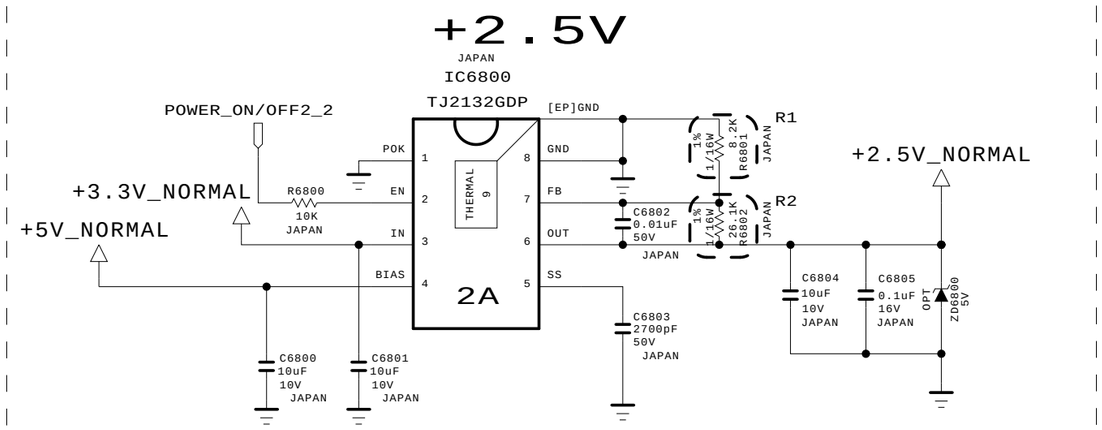
SECRET
LGElectronics

LG ELECTRONICS

MODEL	TU_SYMBOL	DATE	2012.09.14
BLOCK		SHEET	73



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SECRET

LGElectronics

LG ELECTRONICS

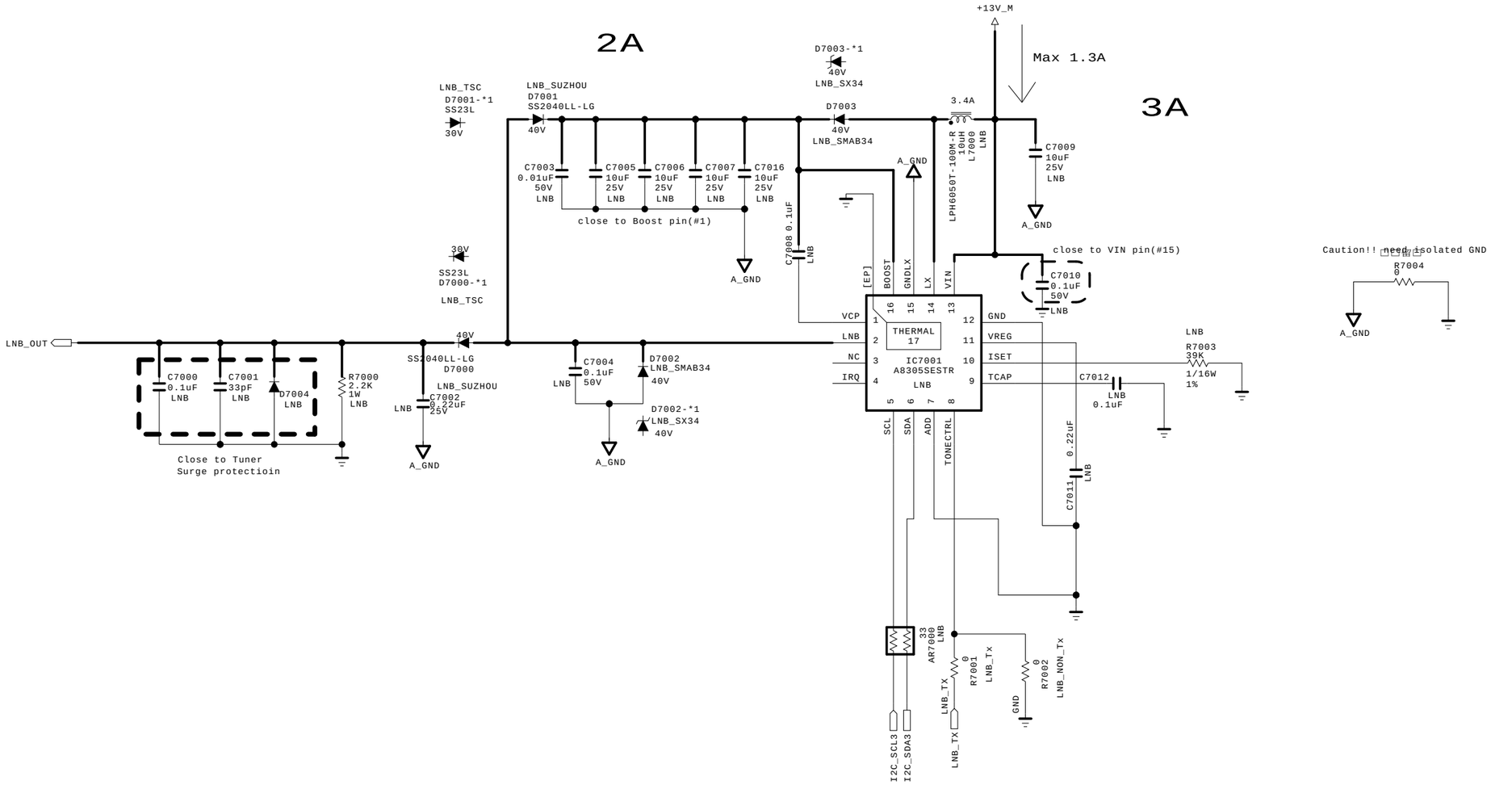
068.sht

MODEL	M16	DATE	2015.06.27
BLOCK	Tuner_2.5V	SHEET	68 / 99

DVB-S2 LNB Part Allegro

(Option:LNB)

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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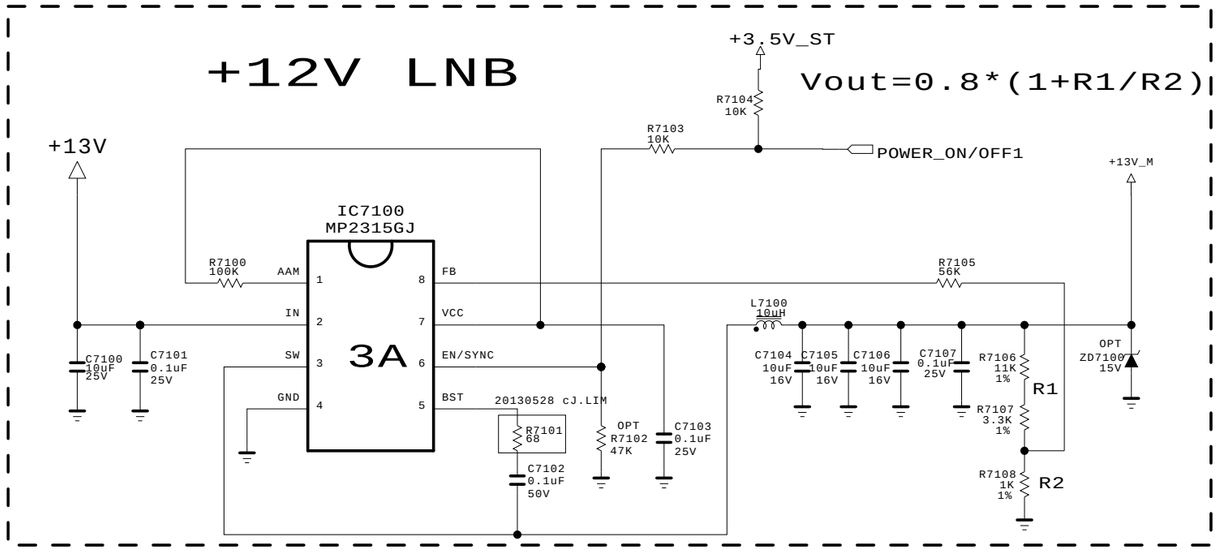
SECRET
LGElectronics

LG ELECTRONICS

MODEL	M16	DATE	2015.06.05
BLOCK	LNB	SHEET	70 / 100



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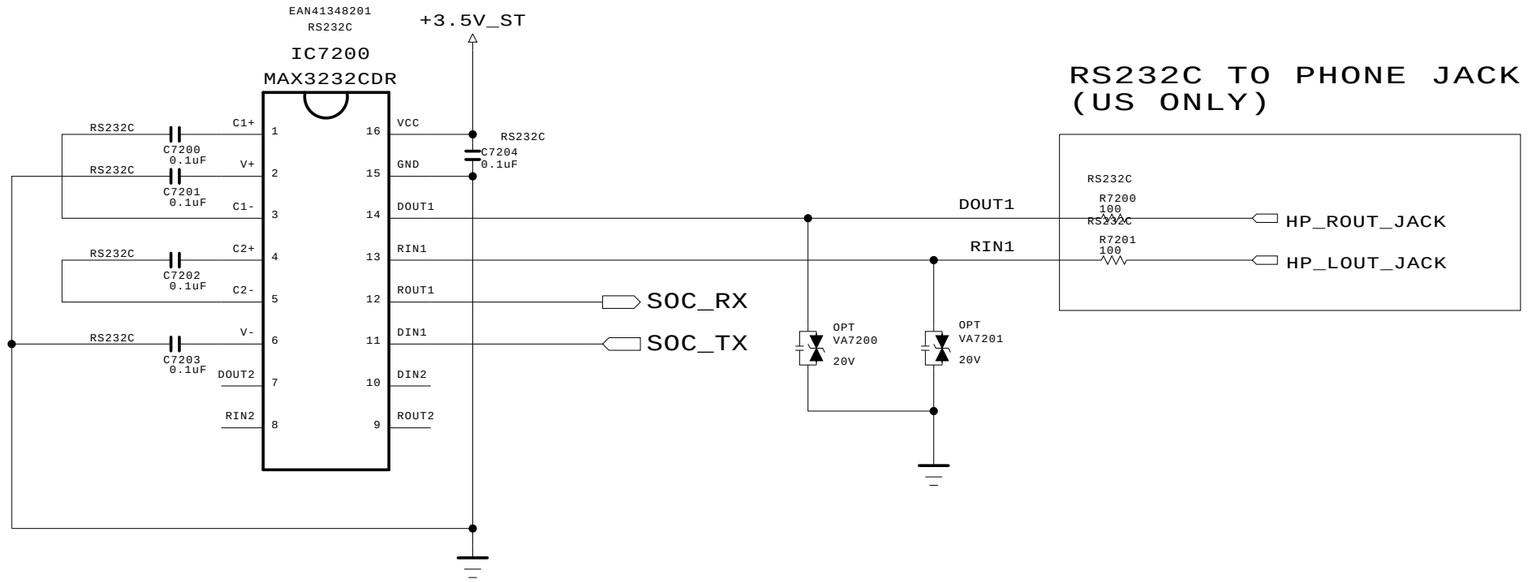
SECRET

LGElectronics

LG ELECTRONICS

MODEL	M16	DATE	2015.06.05
BLOCK	LNB	SHEET	70 / 100

RS-232C Control INTERFACE



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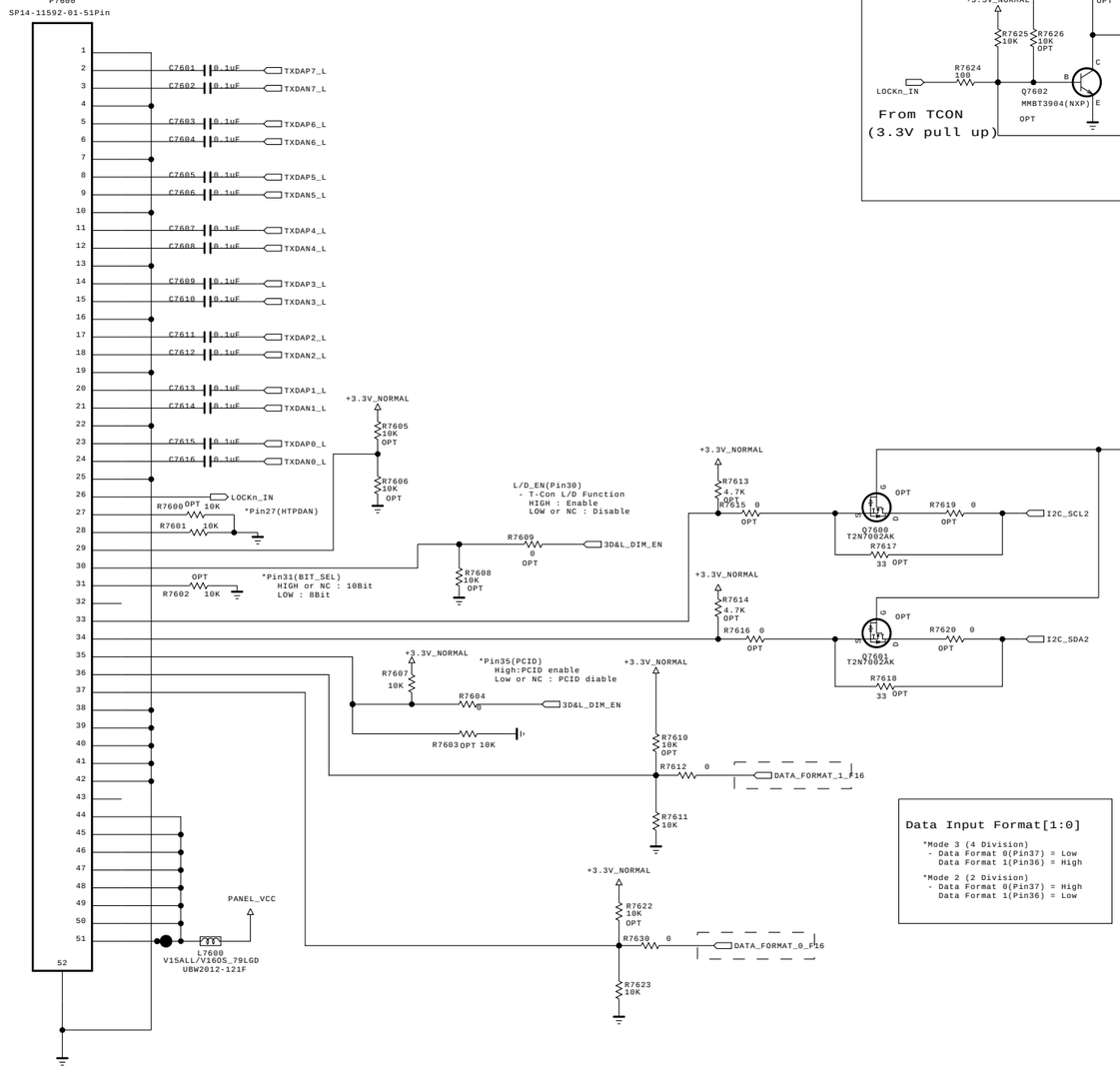
LGElectronics

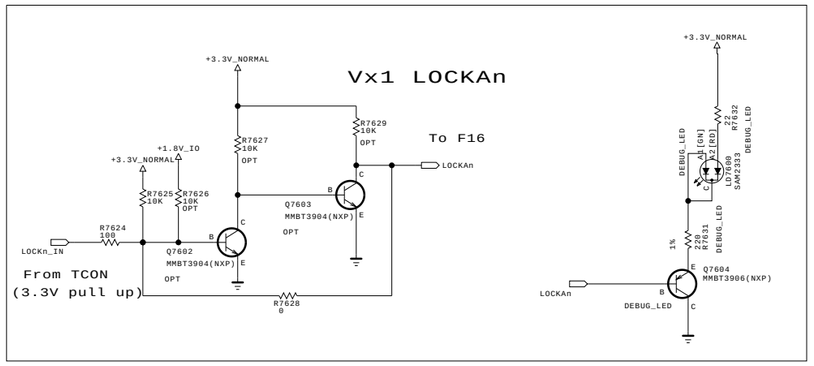
LG ELECTRONICS

MODEL		DATE	15/06/13
BLOCK	RS232C	SHEET	73

Non-Reverse

[51P Vx1 output wafer]



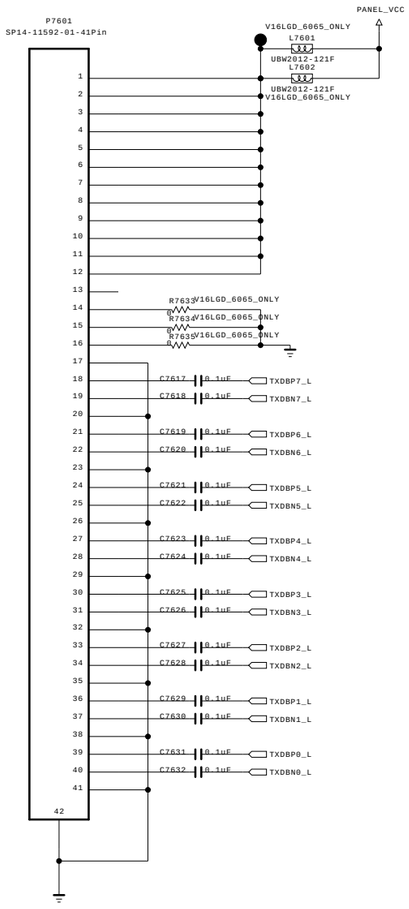


Data Input Format[1:0]

*Mode 3 (4 Division)
- Data Format 0(Pin37) = Low
Data Format 1(Pin36) = High

*Mode 2 (2 Division)
- Data Format 0(Pin37) = High
Data Format 1(Pin36) = Low

[41P Vx1 output wafer]



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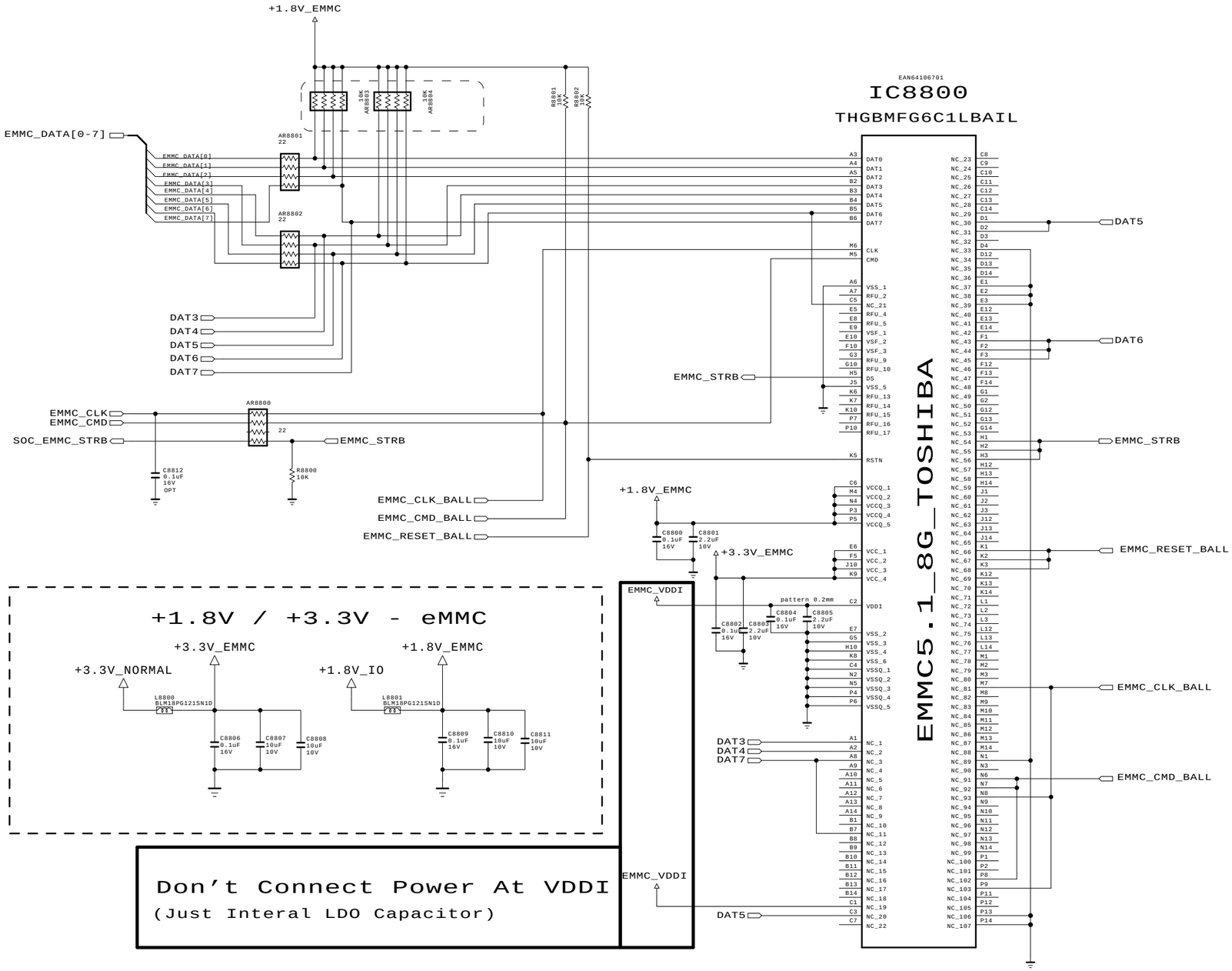
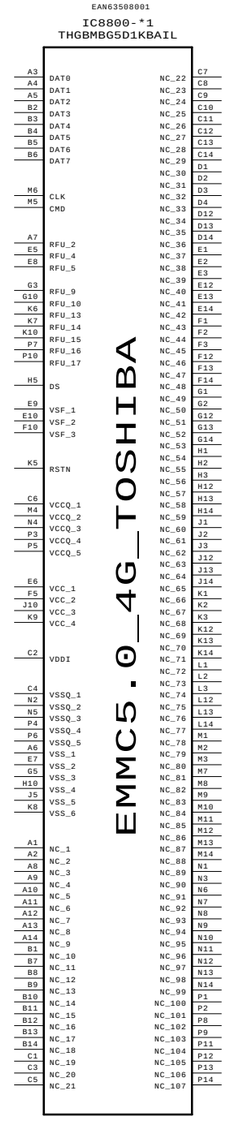
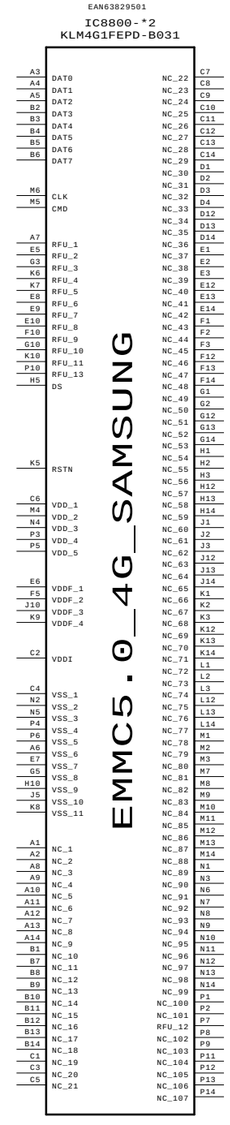
SECRET
LGElectronics

LG ELECTRONICS

MODEL	F16	DATE	2015.6.13
BLOCK	Output wafer	SHEET	76 / 100







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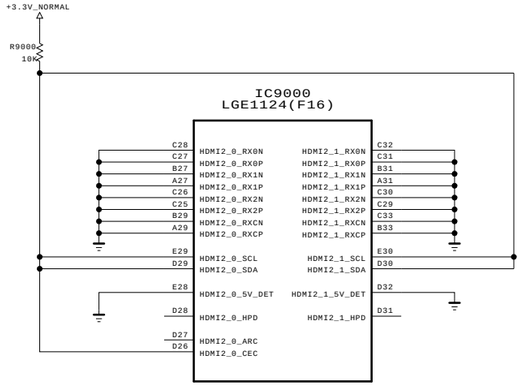
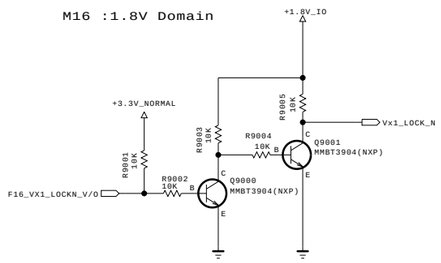
SECRET
LGElectronics

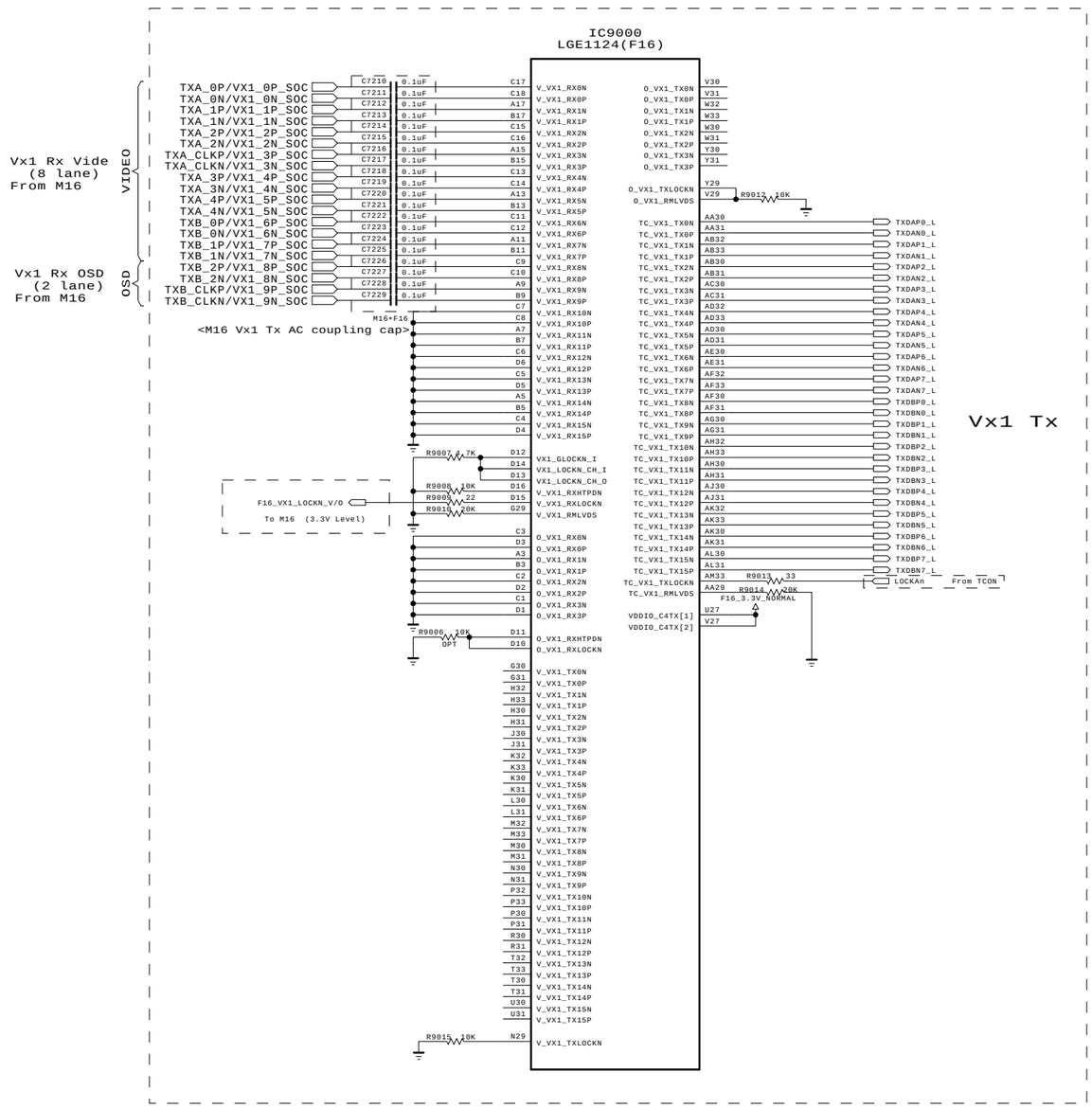
LG ELECTRONICS

081.sht

MODEL	M16	DATE	2015.02.09
BLOCK	eMMC 5.0	SHEET	26 / 26







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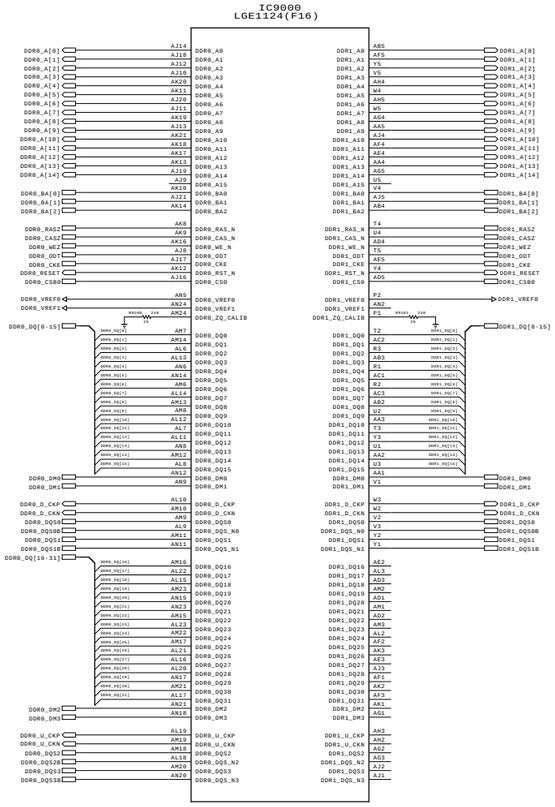
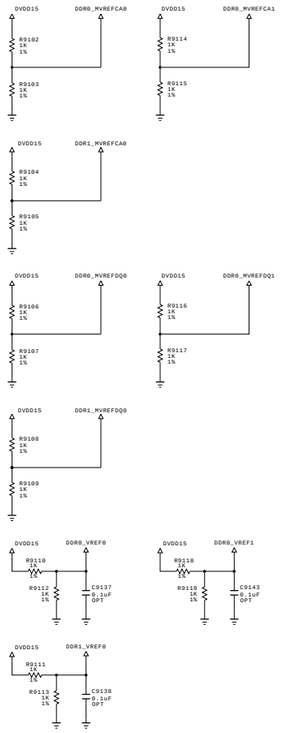
SECRET

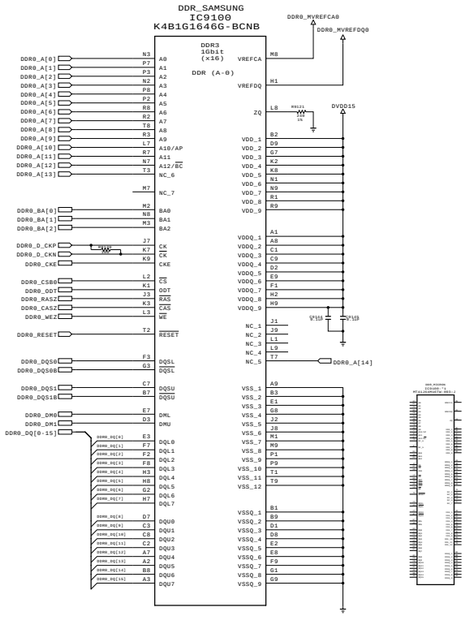
LGElectronics

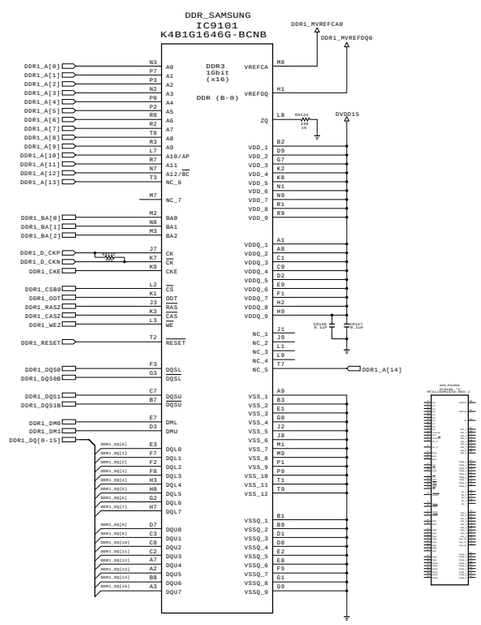
LG ELECTRONICS

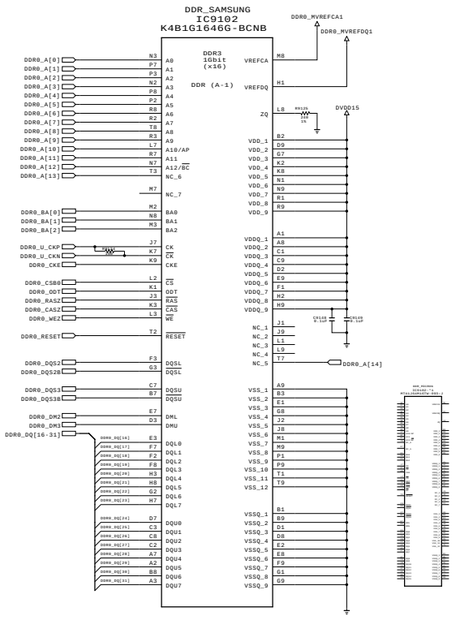
MODEL		DATE	2015.4.27
BLOCK	Vx1, HDMI IF	SHEET	/

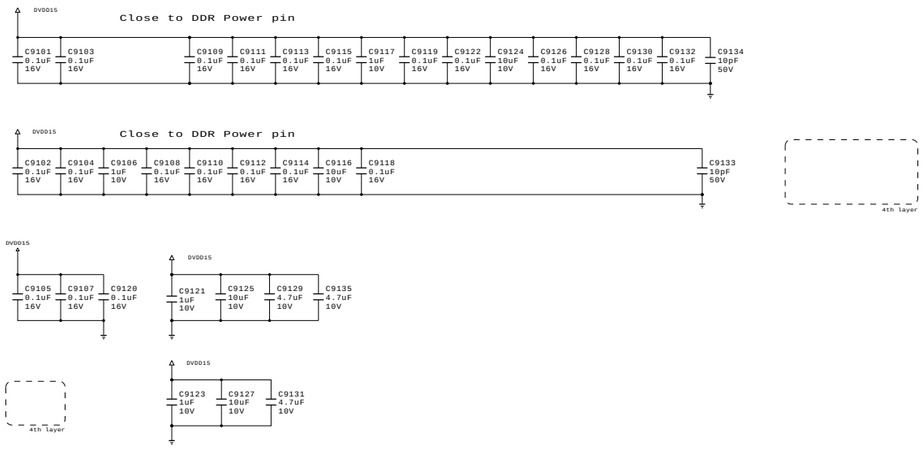












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MODEL	F16 4K EPI	DATE	2015.4.28
BLOCK	DDR	SHEET	

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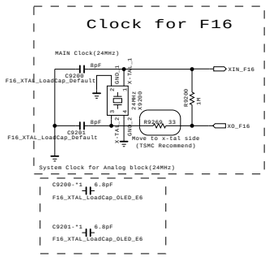
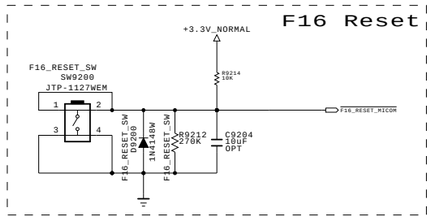
LGElectronics

LG ELECTRONICS

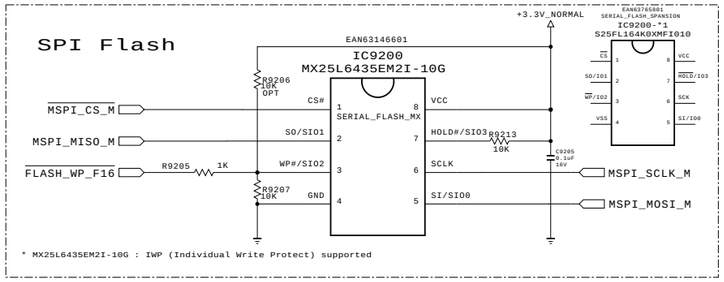
Clock for F16



F16 Reset

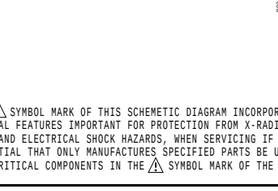


SPI Flash

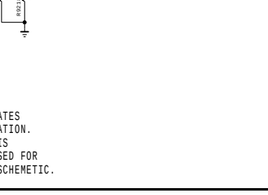


* MX25L6435EM2I-10G : IWP (Individual Write Protect) supported

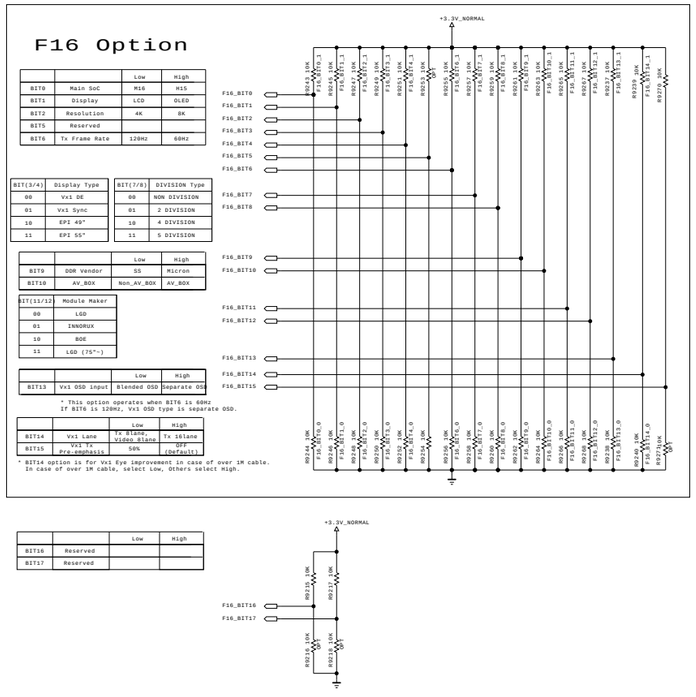
UART0 For system



UART1 For FRC



F16 Option



		Low	High
BIT0	Main SoC	M16	H15
BIT1	Display	LCD	OLED
BIT2	Resolution	4K	8K
BIT5	Reserved		
BIT6	Tx Frame Rate	120HZ	60HZ

BIT(3/4)	Display Type
00	Vx1 DE
01	Vx1 Sync
10	EPI 49"
11	EPI 55"

BIT(7/8)	DIVISION Type
00	NON DIVISION
01	2 DIVISION
10	4 DIVISION
11	5 DIVISION

		Low	High
BIT9	DDR Vendor	SS	Micron
BIT10	AV_BOX	Non_AV_BOX	AV_BOX

BIT(11/12)	Module Maker
00	LGD
01	INNORUX
10	BOE
11	LGD (75"~)

		Low	High
BIT13	Vx1 OSD input	Blended OSD	Separate OSD

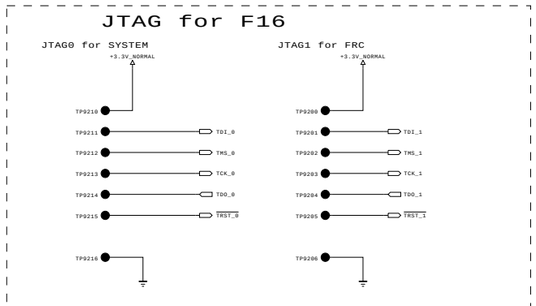
* This option operates when BIT6 is 60Hz
If BIT6 is 120Hz, Vx1 OSD type is separate OSD.

		Low	High
BIT14	Vx1 Lane	Tx Blank Video Blank	Tx 16lane
BIT15	Vx1 Tx Pre-emphasis	50%	OFF (Default)

* BIT14 option is for Vx1 Eye improvement in case of over 1M cable.
In case of over 1M cable, select Low, Others select High.

		Low	High
BIT16	Reserved		
BIT17	Reserved		

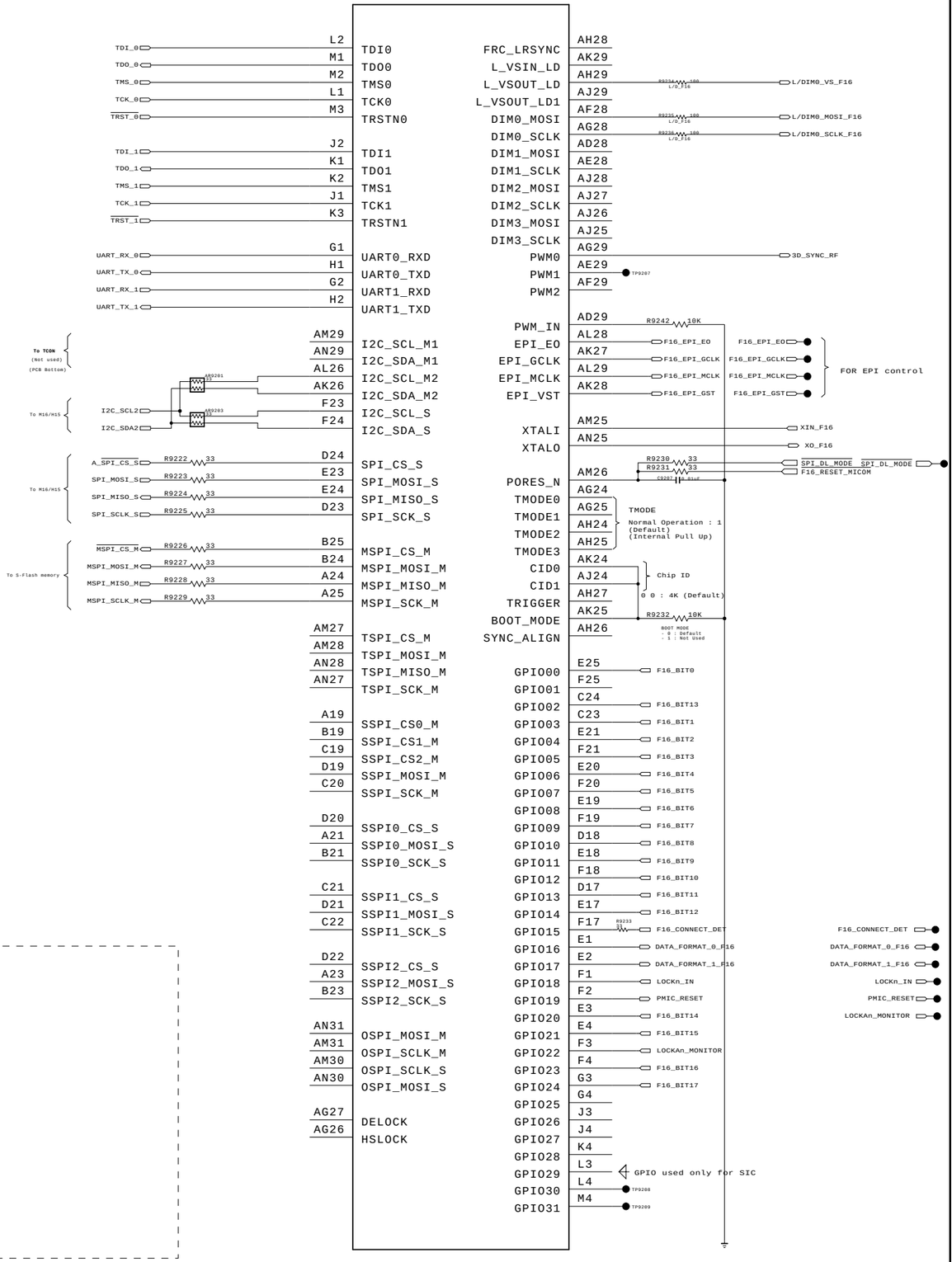
JTAG for F16



SPI/I2C Live Boot Test

SPI/I2C Serial Flash Boot Test

IC9000 LGE1124(F16)



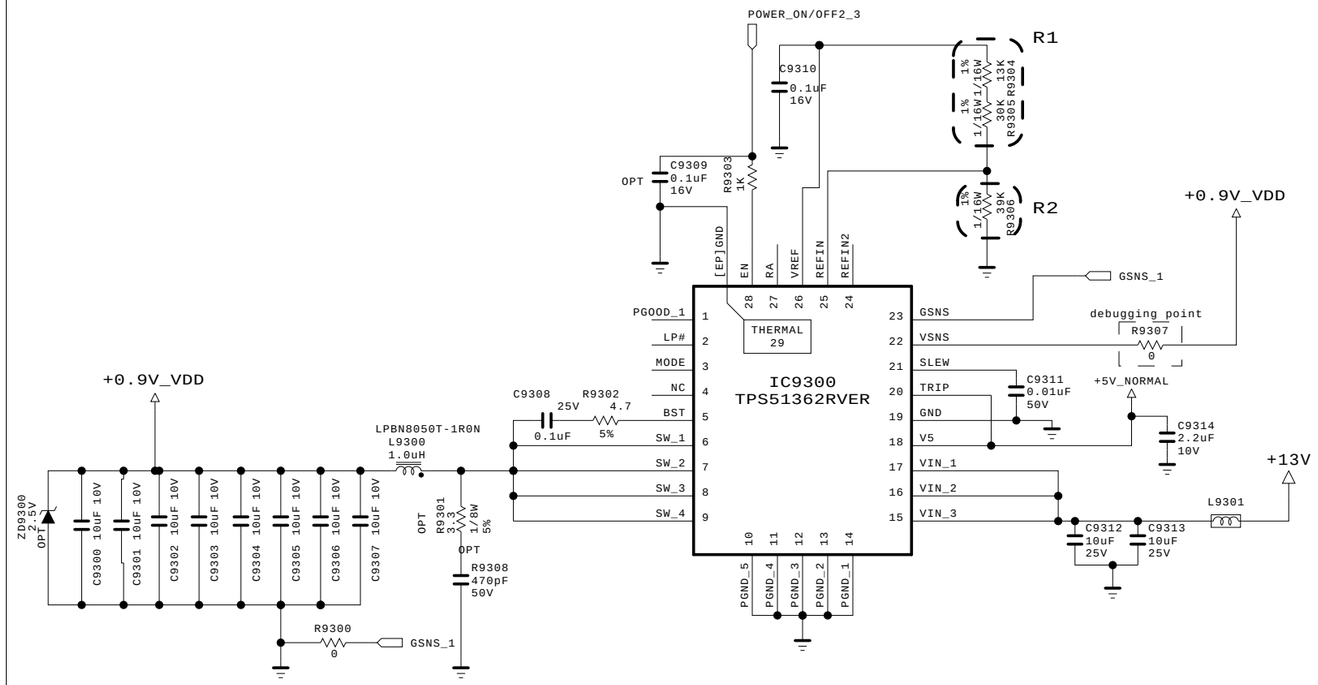
THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FIRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

SECRET
LGElectronics

LG ELECTRONICS

MODEL	M16	DATE	2015.11.23
BLOCK	F16_SPI,UART,GPIO	SHEET	92 / 99

+0.9V F16 Core



Vout=2*(R2/(R1+R2))

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.

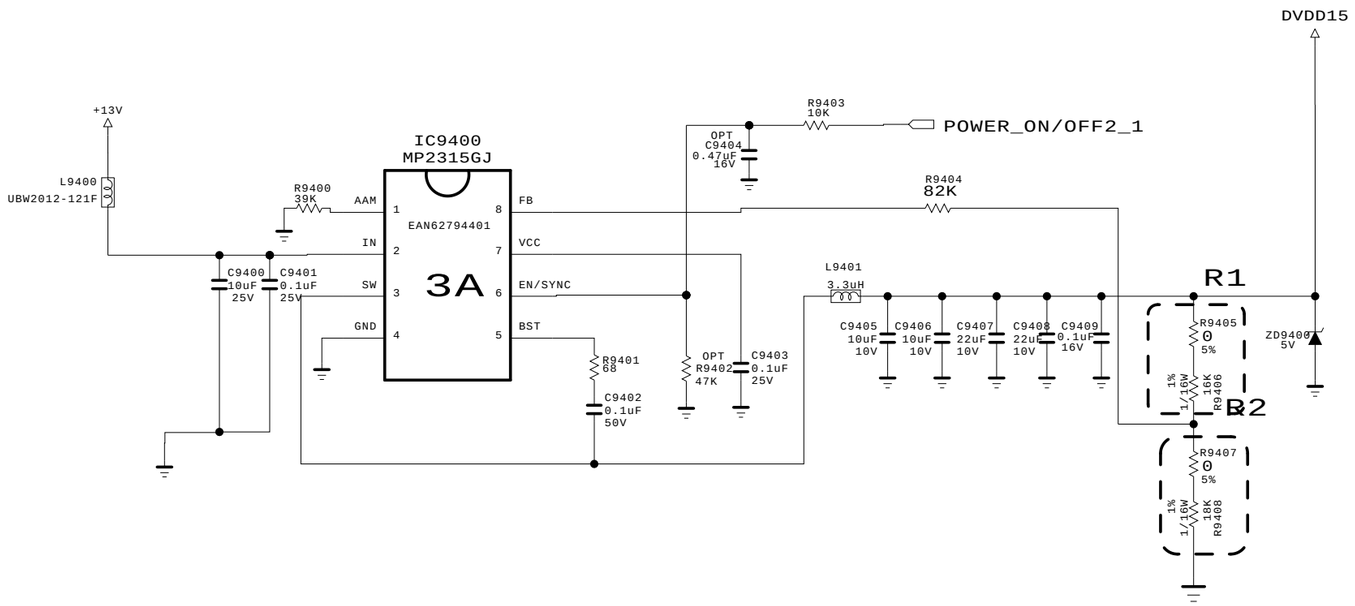
SECRET

LGElectronics

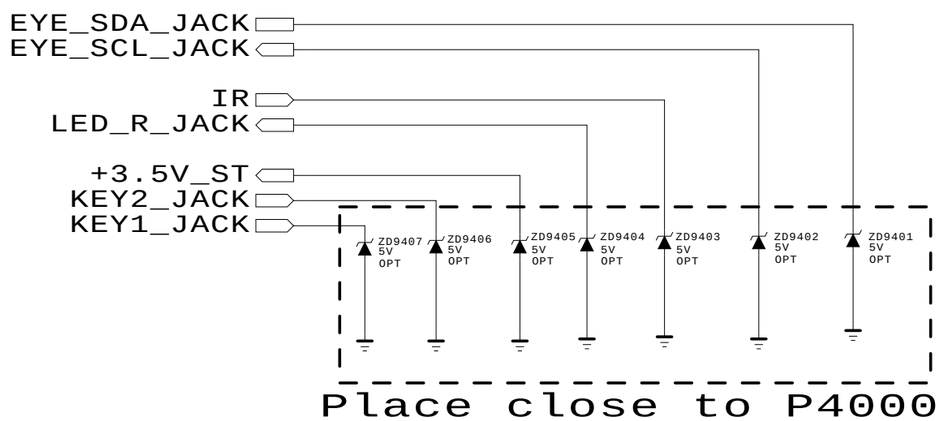
LG ELECTRONICS

MODEL	F16	DATE	2015.6.10
BLOCK	F16_0.9V Core	SHEET	93 / 100

+1.5V F16 DDR



Vout=0.8*(1+R1/R2)



Place close to P4000

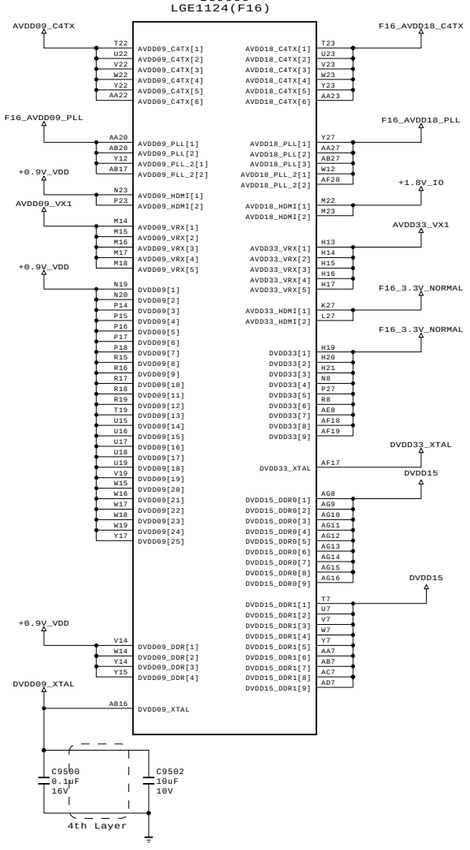
THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FIRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

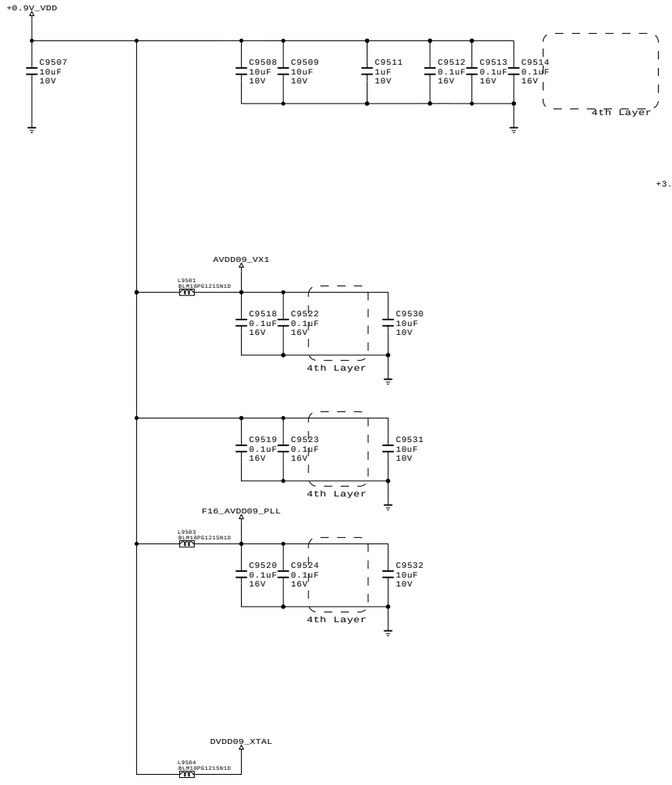
SECRET

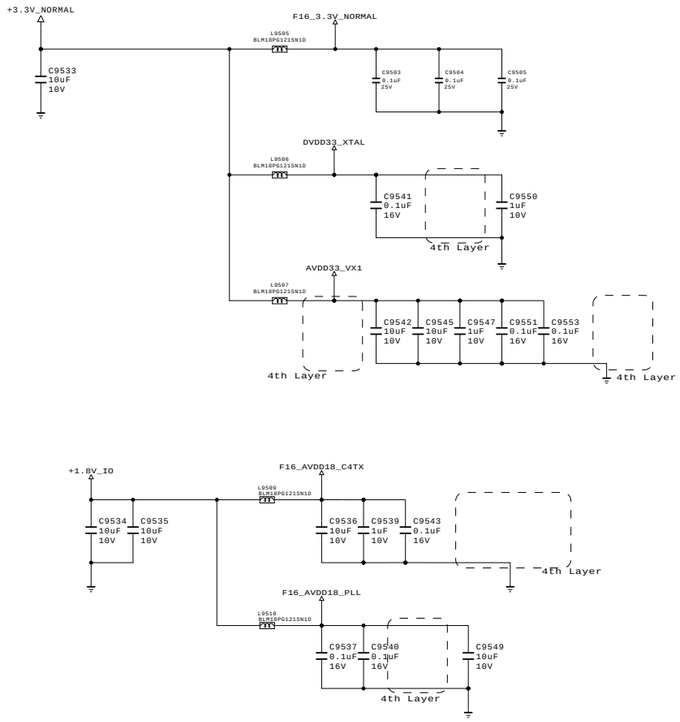
LGElectronics

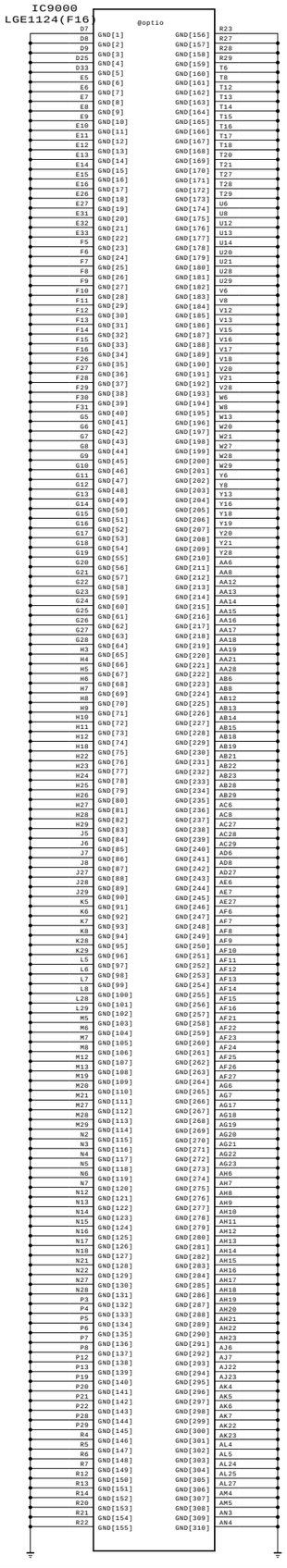
LG ELECTRONICS

MODEL	F16	DATE	2015.6.10
BLOCK	F16 1.5V_DDR	SHEET	94 / 100









2. Power Off Sequence
1.5V -> 0.9V -> 1.8V -> 3.3V

Power Tree

+3.3V_NORMAL
- (AVDD33_HDMI)
- (AVDD33_VX1)
- (AVDD33_XTAL)

AVDD18
- (AVDD18_C4TX)
- (AVDD18_PLL)
- (AVDD18_HDMI)

DVDD15

DVDD09
- (AVDD09_C4TX)
- (AVDD09_VX1)
- (AVDD09_DDR)
- (AVDD09_HDMI)
- (AVDD09_PLL)
- (AVDD09_XTAL)

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

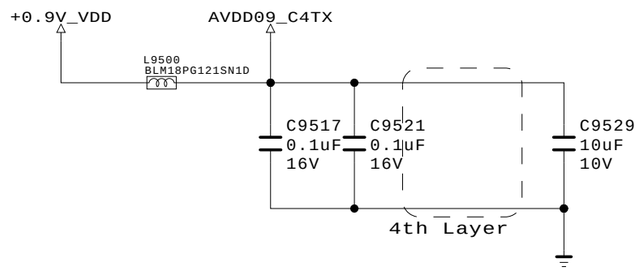
MODEL	F16	DATE	2015.6.13
BLOCK	F16 Power	SHEET	95 / 100

LGE Internal Use Only

F16 AVDD09_C4TX

Sheet separation

Vx1 : 96_00
EPI : 96_01



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	M16	DATE	2015.09.22
BLOCK	F16 AVDD09_C4TX	SHEET	/


LG
Life's Good

TROUBLE SHOOTING GUIDE

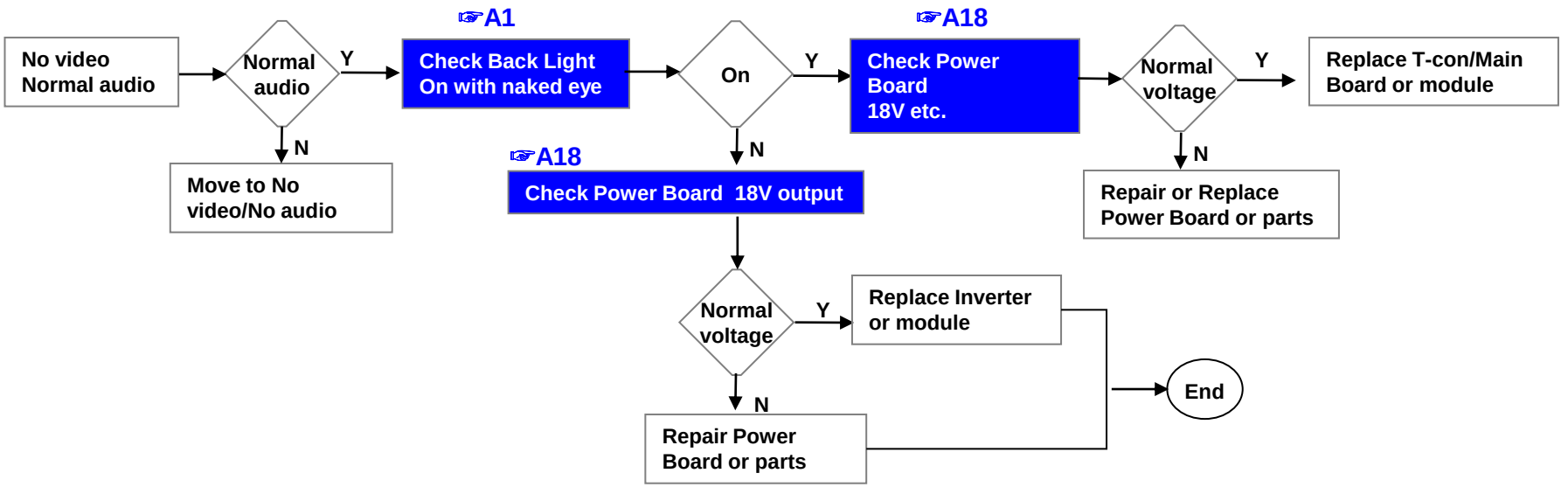
Contents of Standard Repair Process

No.	Error symptom (High category)	Error symptom (Mid category)	Page	Remarks
1	A. Video error	No video/Normal audio	1	
2		No video/No audio	2	
3		Picture broken/ Freezing	3	
4		Color error	4	
5		Vertical/Horizontal bar, residual image, light spot, external device color error	5	
6	B. Power error	No power	6	
7		Off when on, off while viewing, power auto on/off	7	
8	C. Audio error	No audio/Normal video	8	
9		Wrecked audio/discontinuation/noise	9	
10	D. Function error	Remote control & Local switch checking	10	
11		MR15R operating checking	11	
12		Wifi operating checking	12	
13		Camera operating checking	13	
14		External device recognition error	14	
15	E. Noise	Circuit noise, mechanical noise	15	
16	F. Exterior error	Exterior defect	16	

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

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

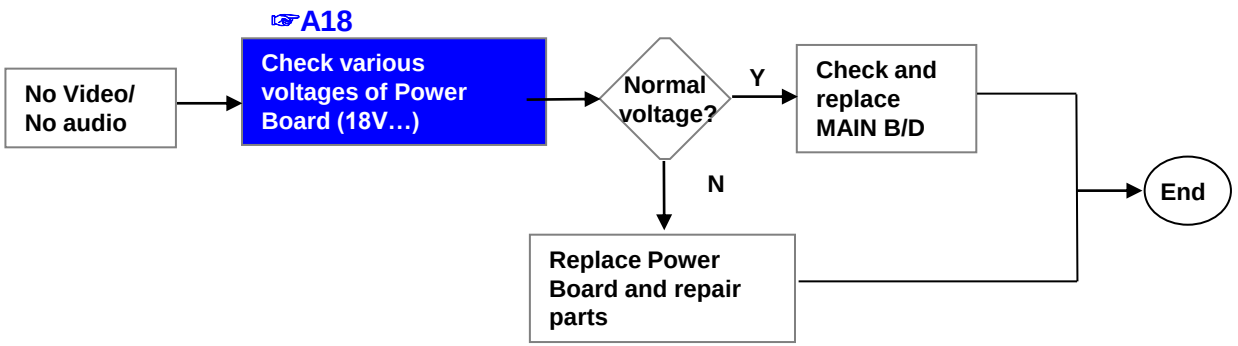
First of all, Check whether all of cables between board is inserted properly or not.
(Main B/D↔ Power B/D, Vx1/EPI Cable, Speaker Cable, IR B/D Cable,,,)



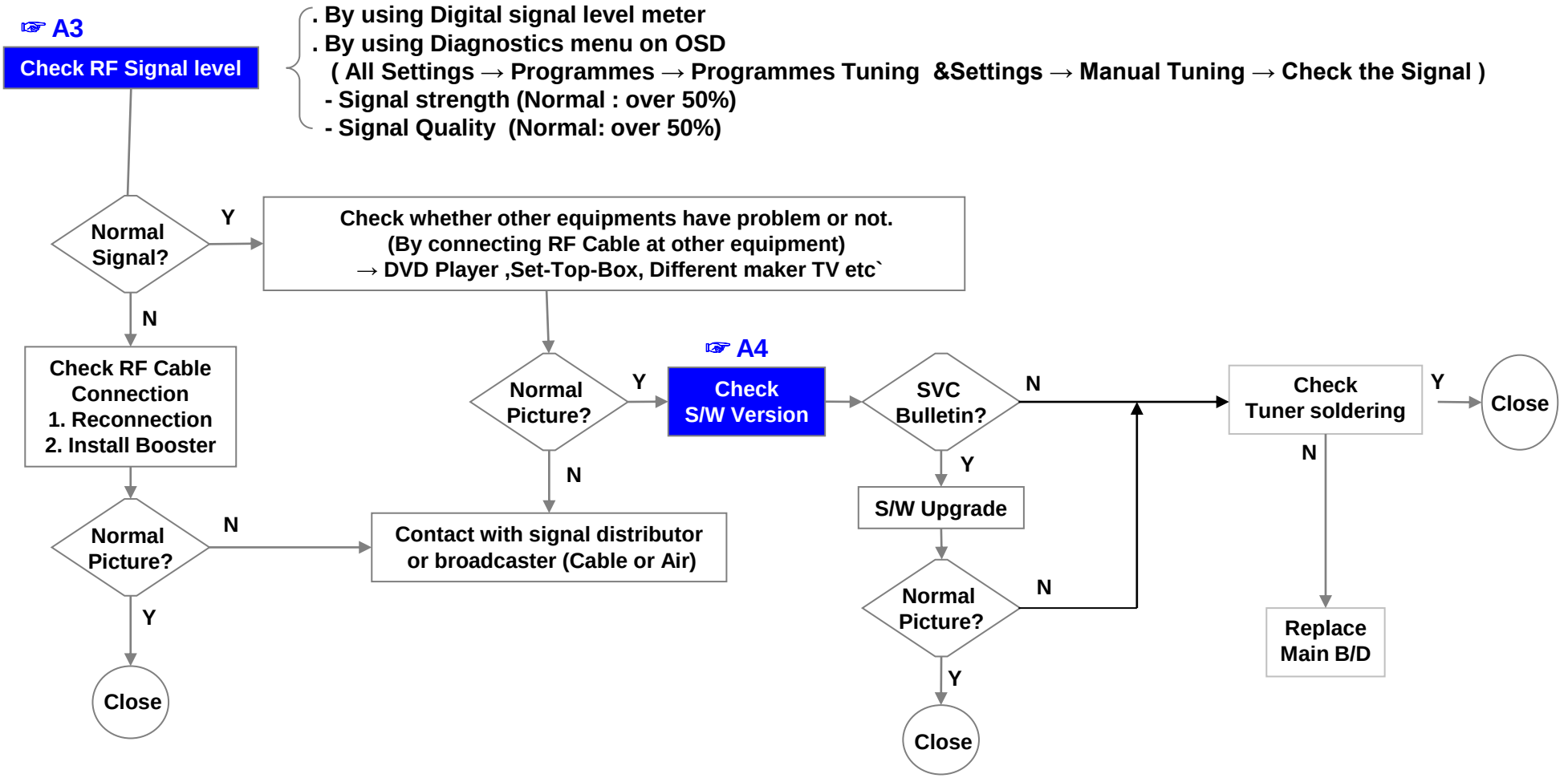
※Precaution ☞A4 & A2

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

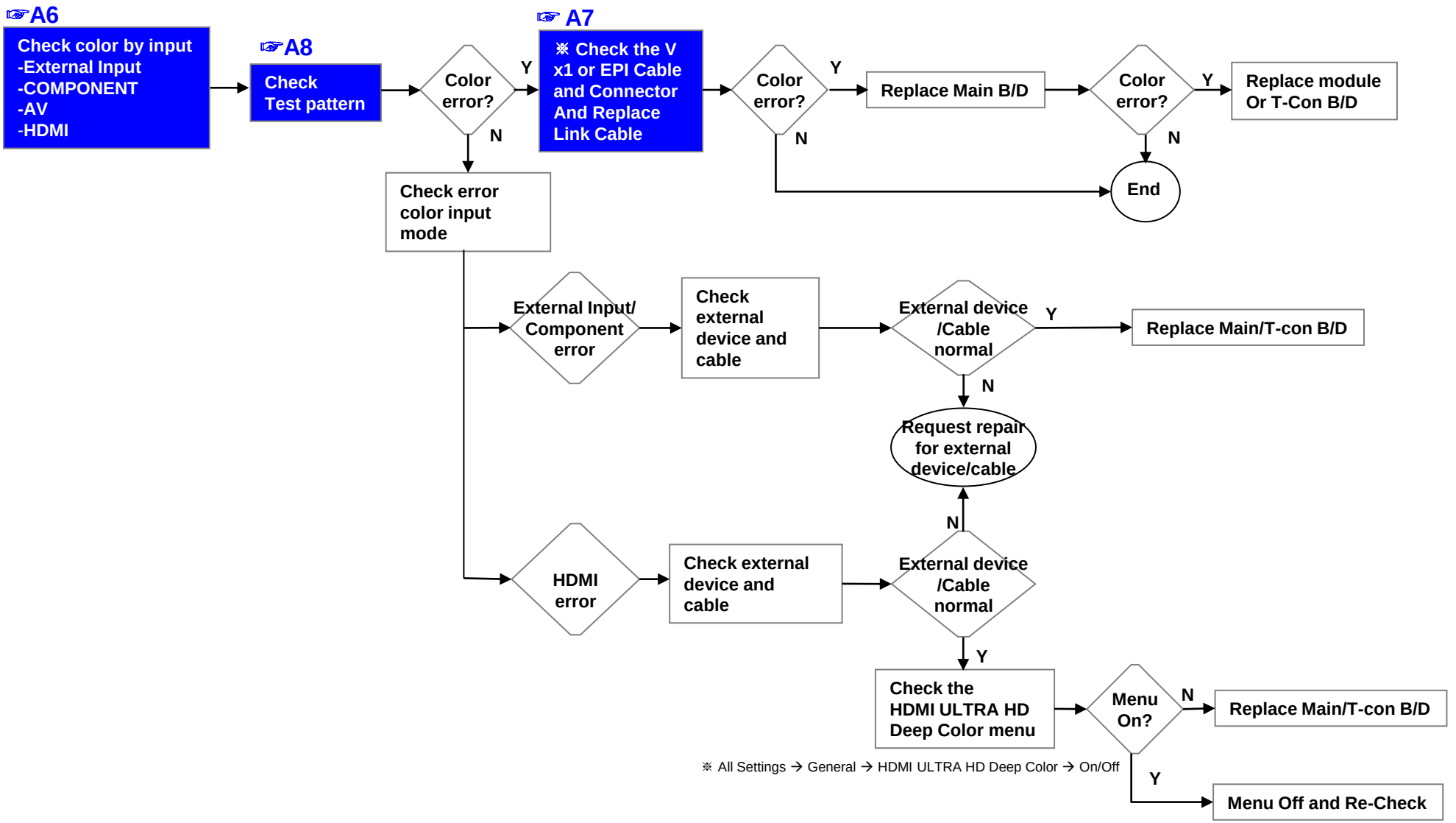
	Error symptom	A. Video error	Established date		
		No video/ No audio	Revised date		2/16



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

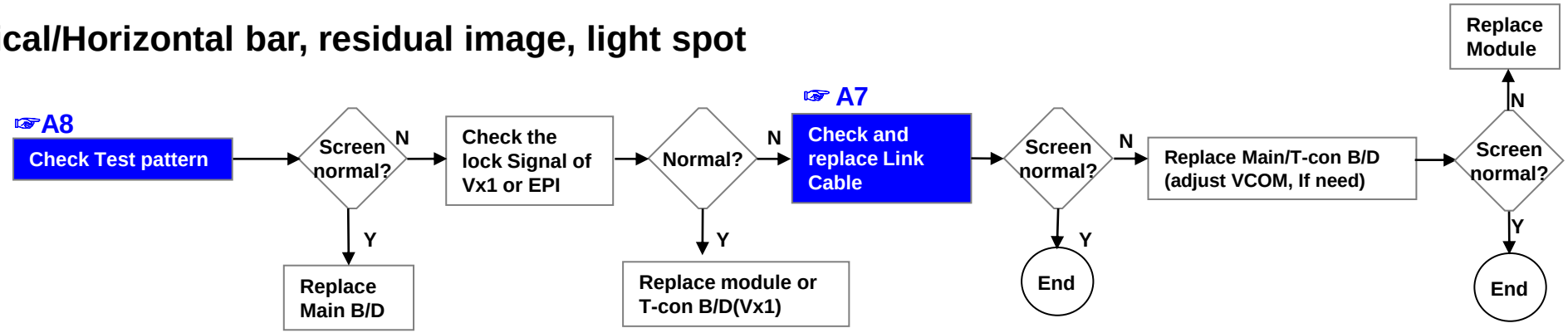


	Error symptom	A. Video error	Established date		
		Color error	Revised date		4/16

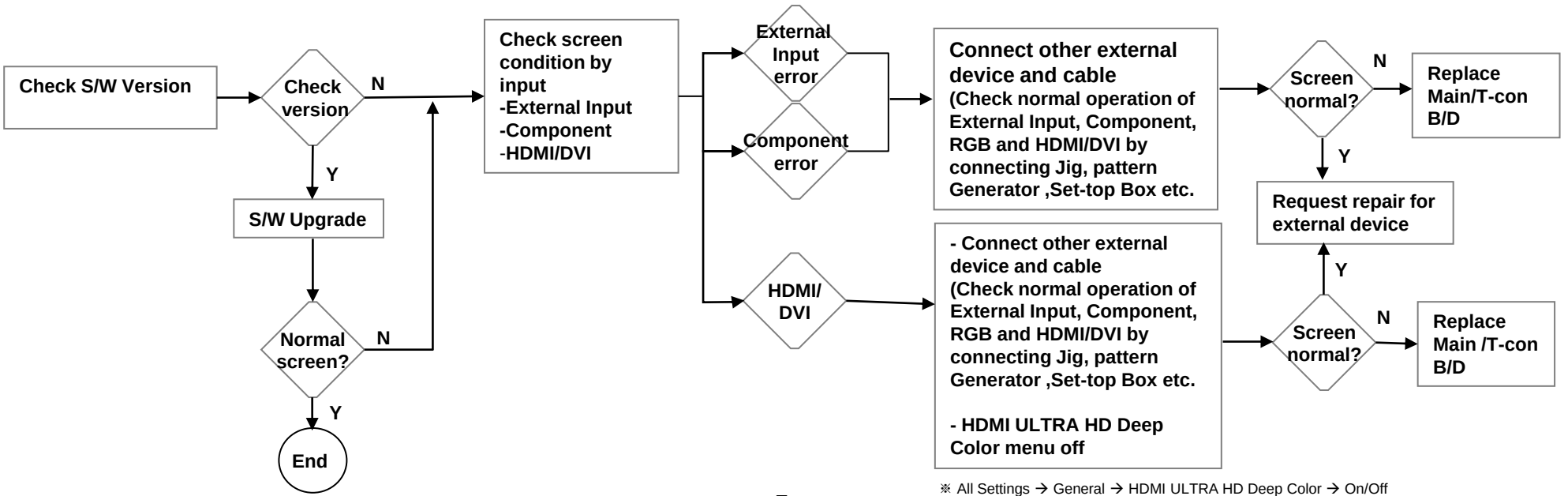


	Error symptom	A. Video error	Established date		
		Vertical / Horizontal bar, residual image, light spot, external device color error	Revised date		5/16

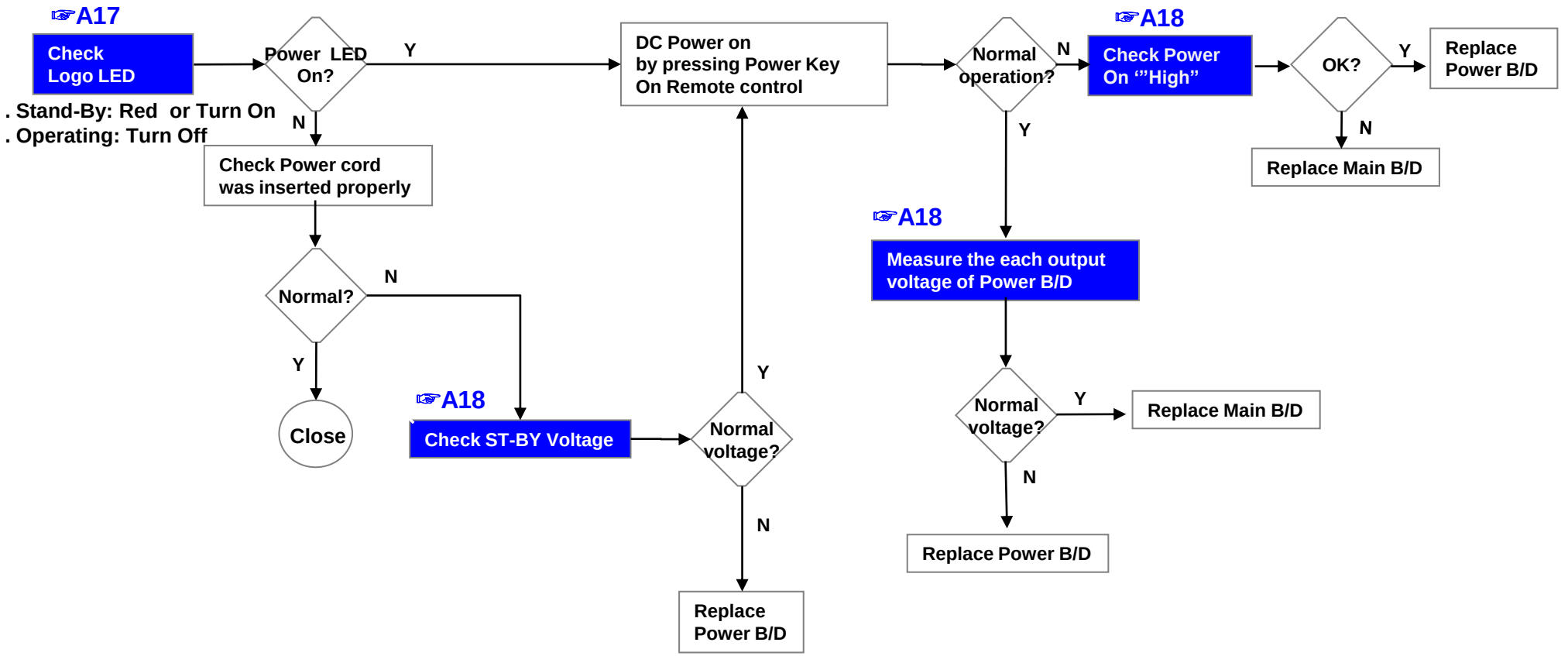
Vertical/Horizontal bar, residual image, light spot



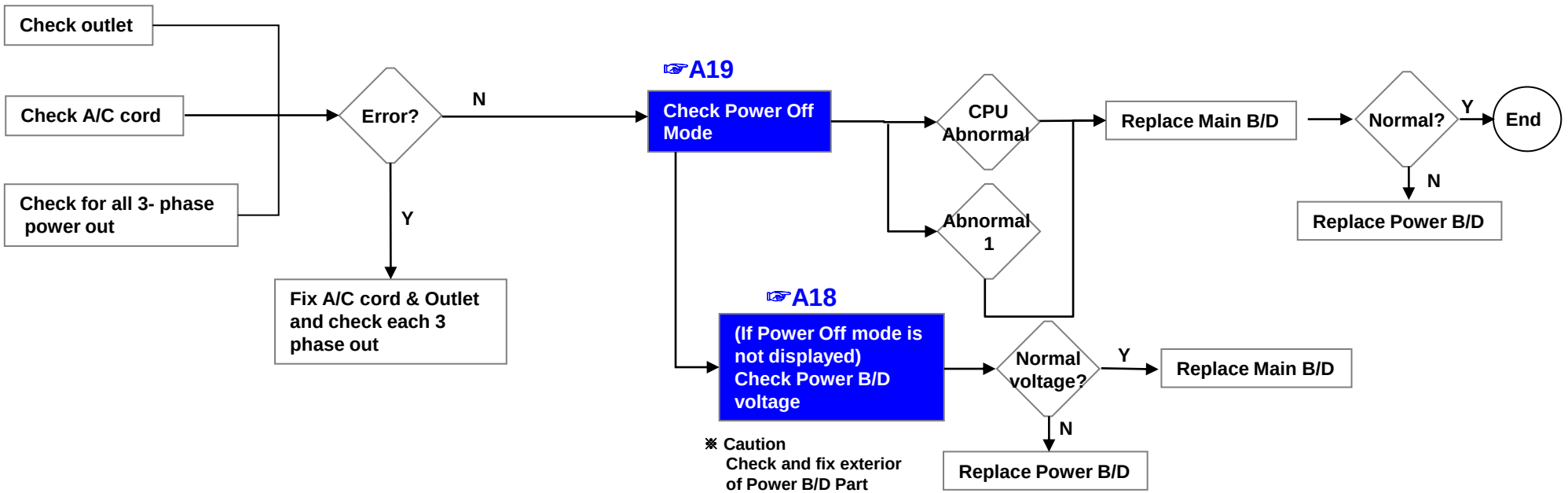
External device screen error-Color error



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



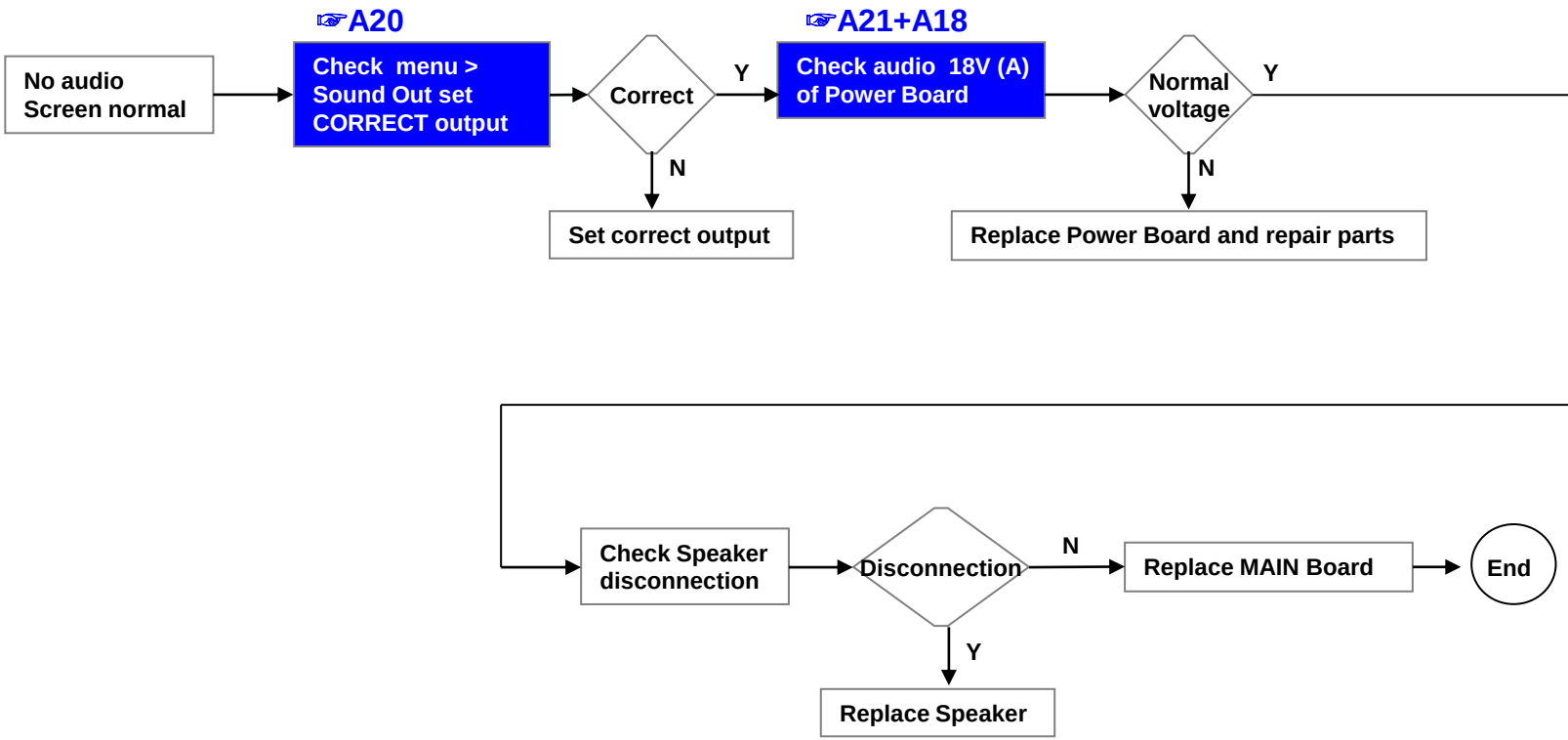
	Error symptom	B. Power error	Established date		
		Off when on, off while viewing, power auto on/off	Revised date		7/16



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

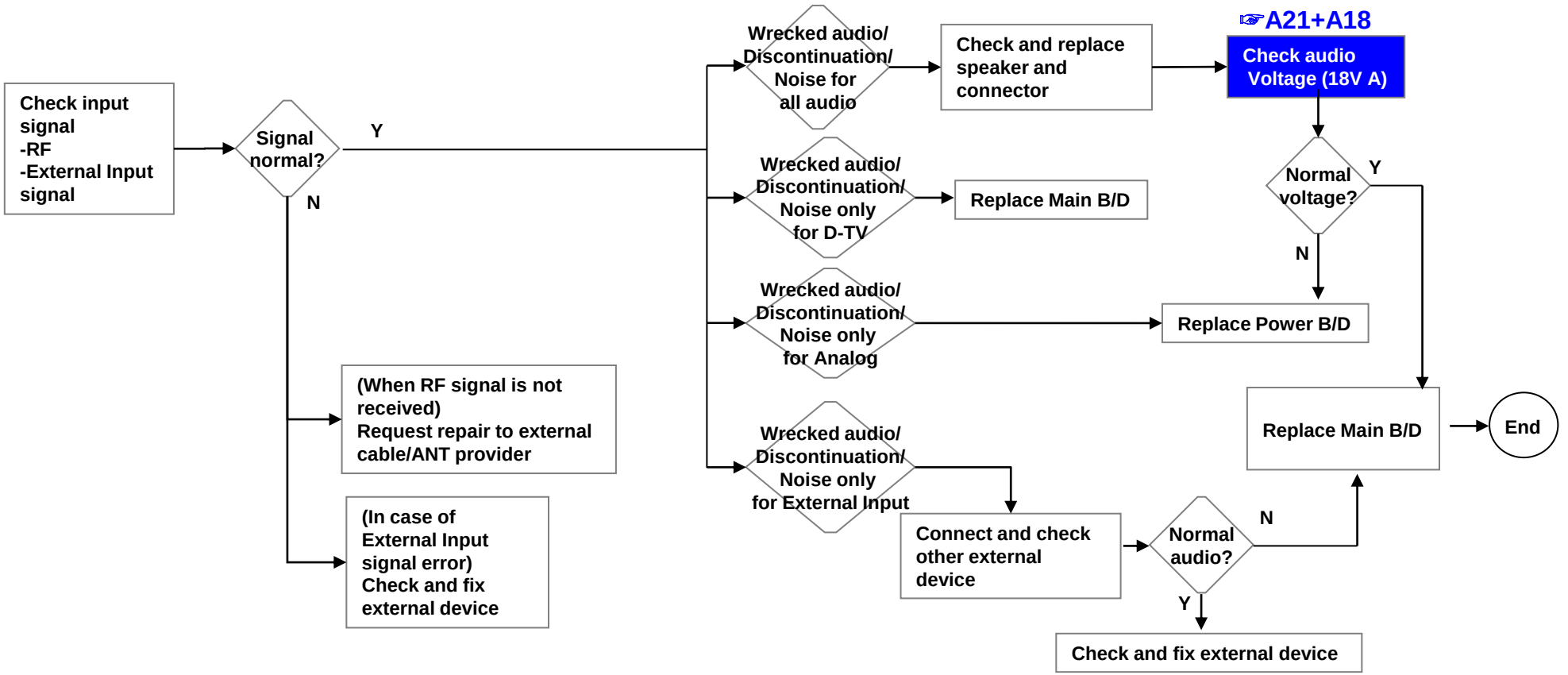
Status	Power off List	Explanation
Normal	"POWEROFF_REMOTEKEY"	Power off by REMOTE CONTROL
	"POWEROFF_OFFTIMER"	Power off by OFF TIMER
	"POWEROFF_SLEEPTIMER"	Power off by SLEEP TIMER
	"POWEROFF_INSTOP"	Power off by INSTOP KEY
	"POWEROFF_AUTOOFF"	Power off by AUTO OFF
	"POWEROFF_ONTIMER"	Power off by ON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



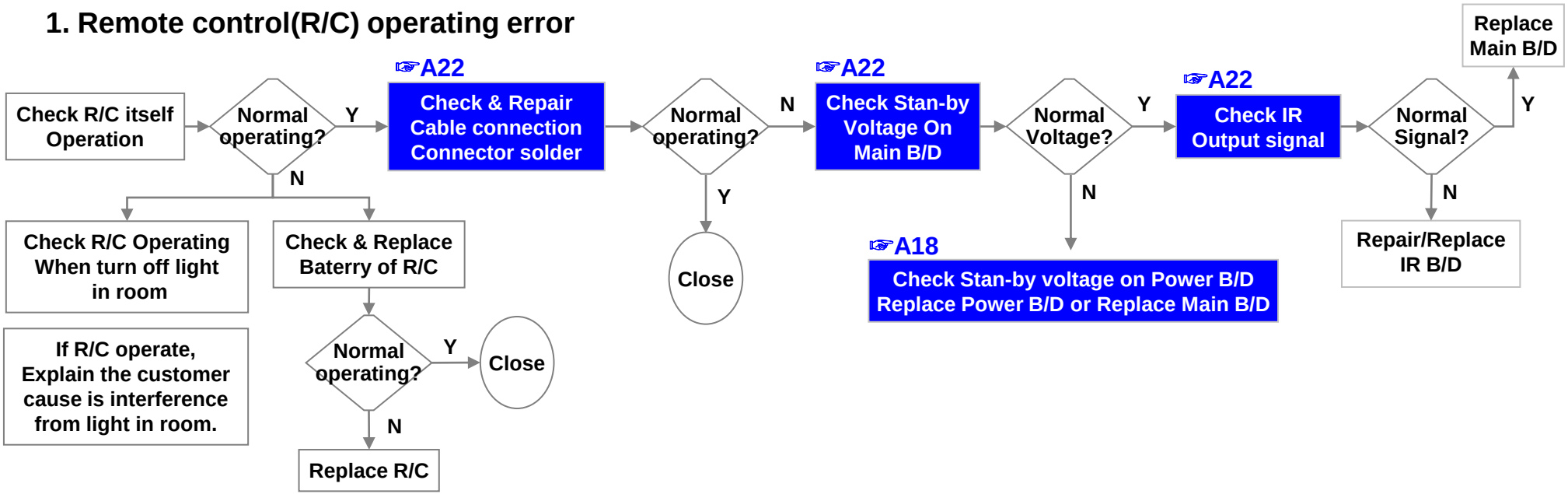
	Error symptom	C. Audio error	Established date		
		Wrecked audio/ discontinuation/noise	Revised date		9/16

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

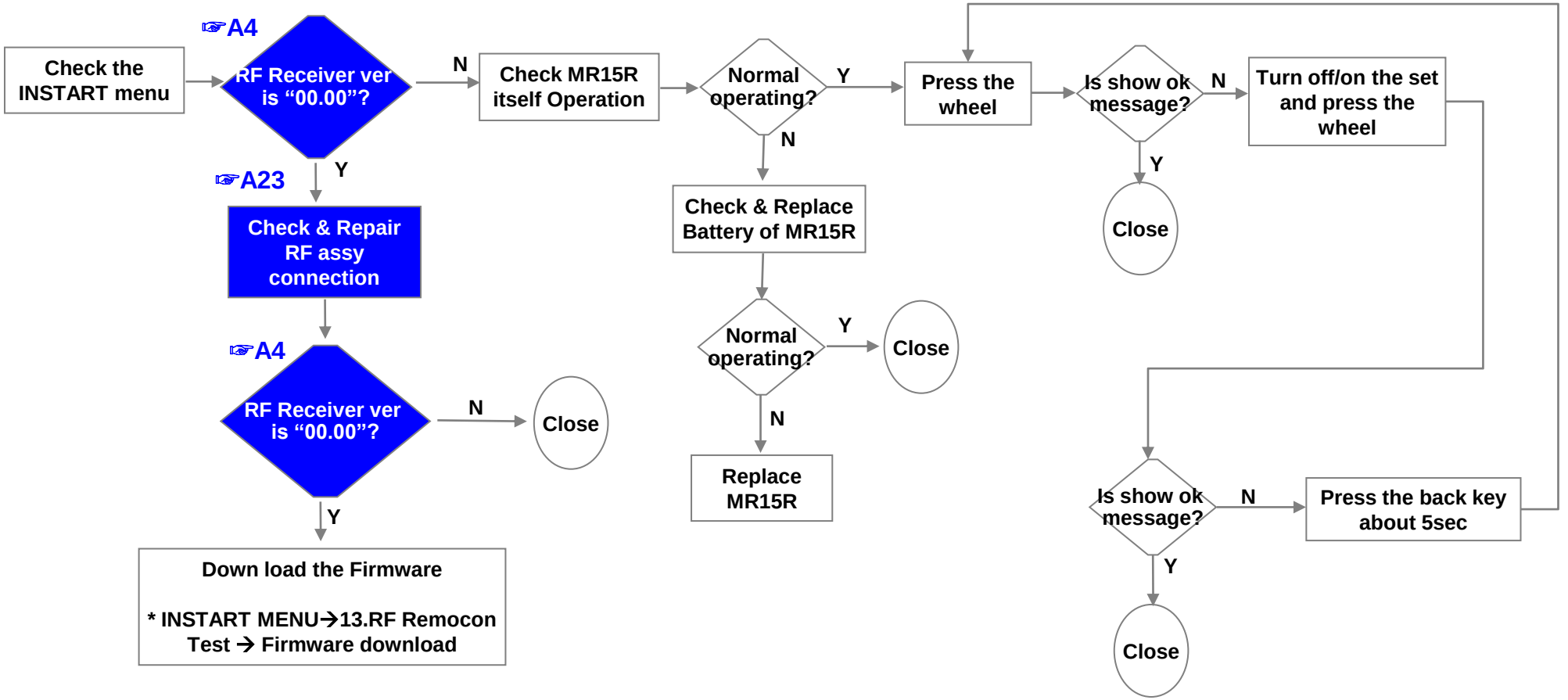


	Error symptom	D. Function error	Established date		
		Remote control & Local switch checking	Revised date		10/16

1. Remote control(R/C) operating error

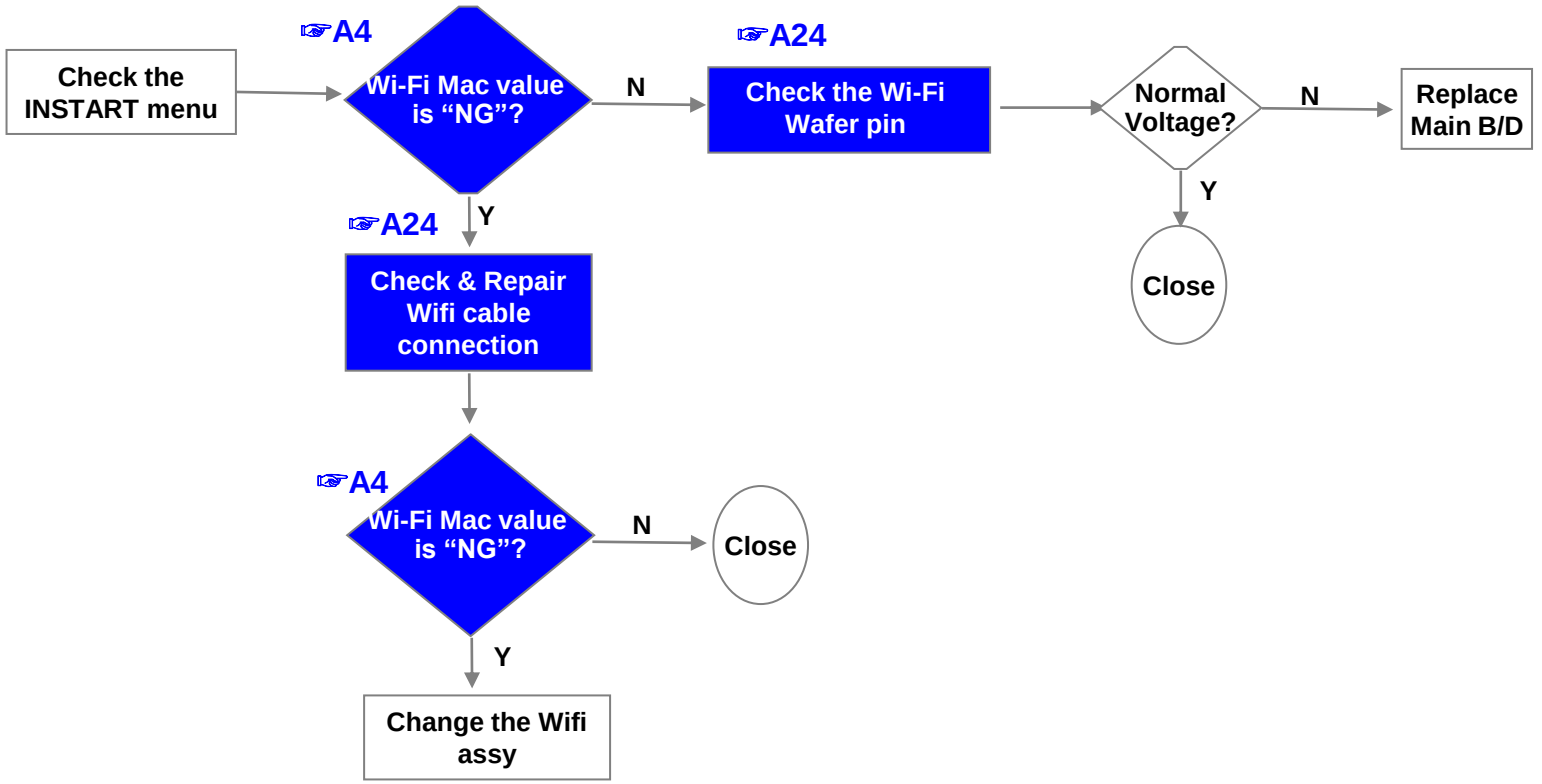


2. MR15R(Magic Remocon) operating error



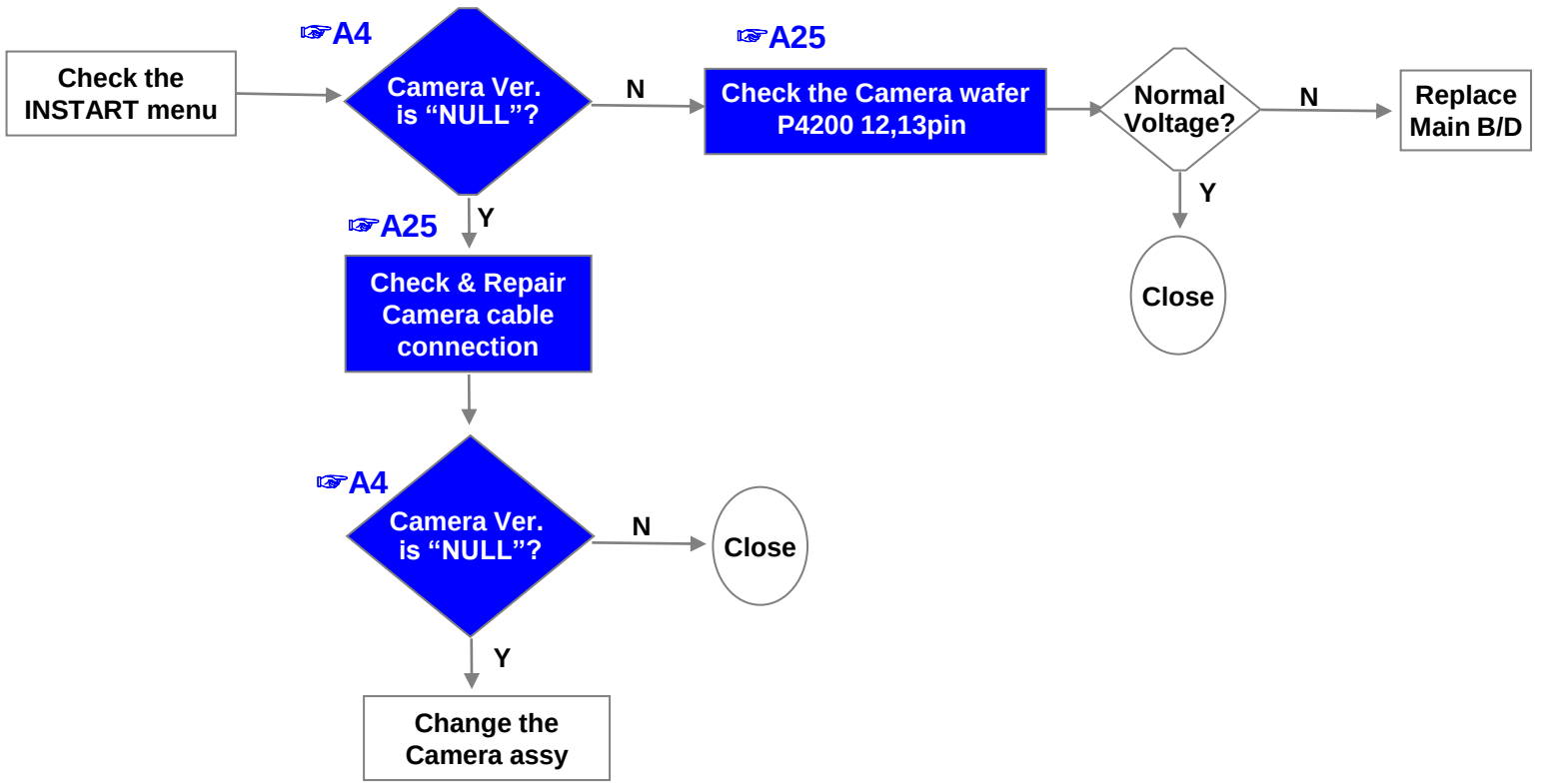
*** If you conduct the loop at 3times, change the MR15R.**

3.Wifi operating error

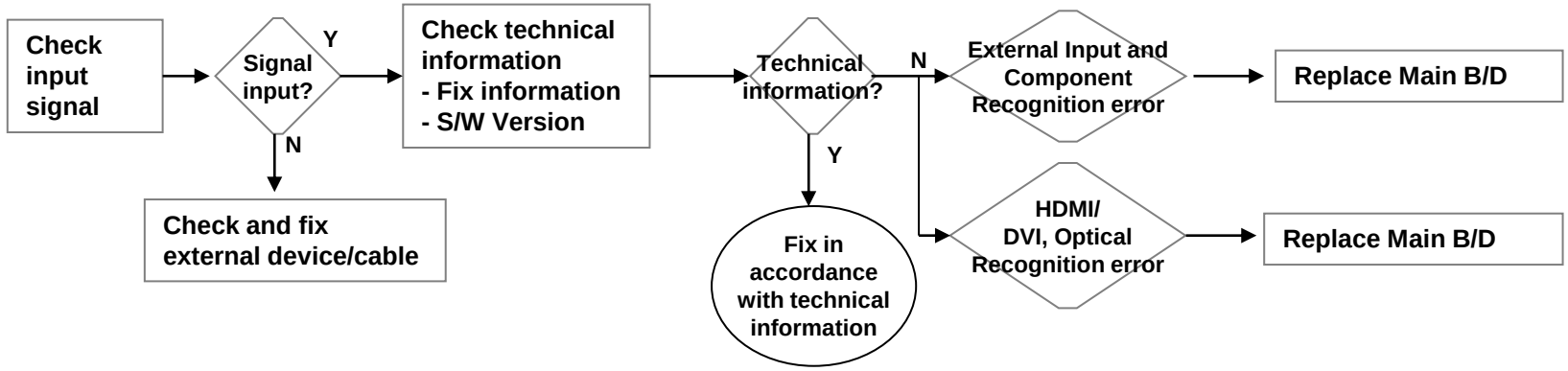


4.Camera operating error

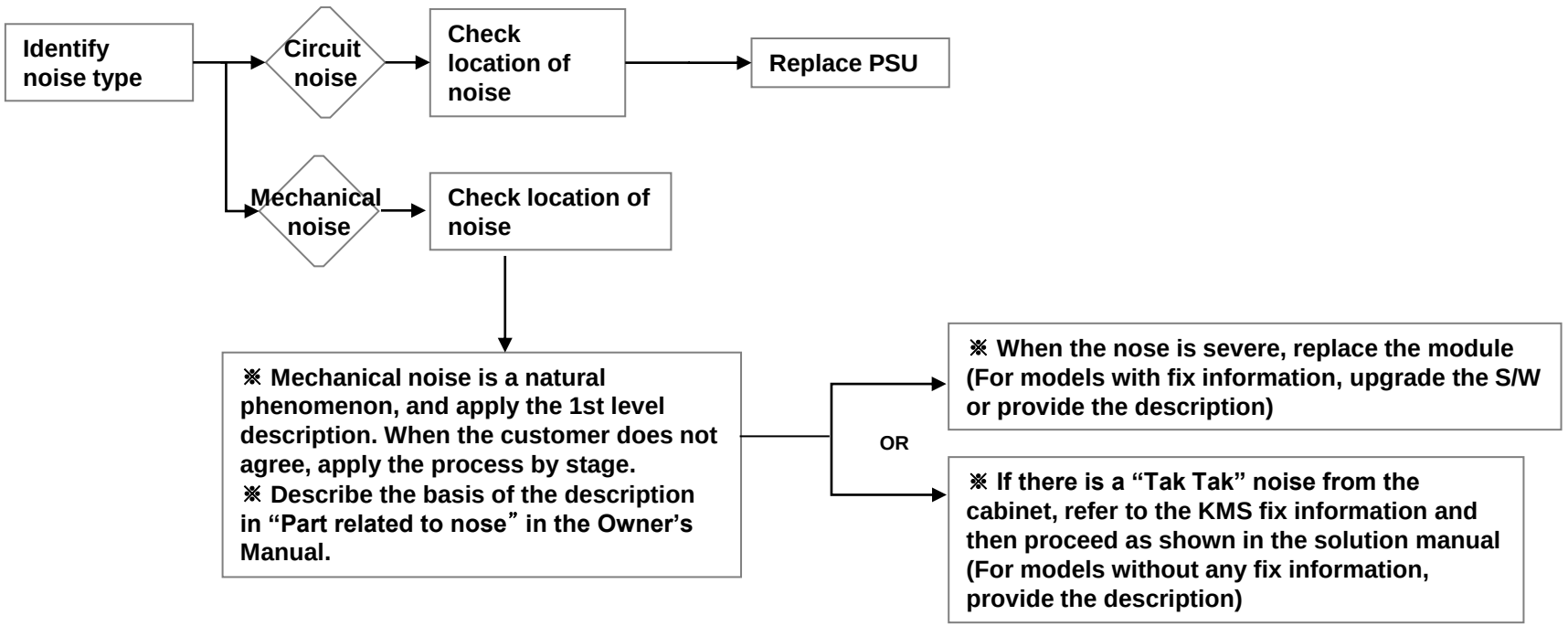
(Only Camera Build-in model)

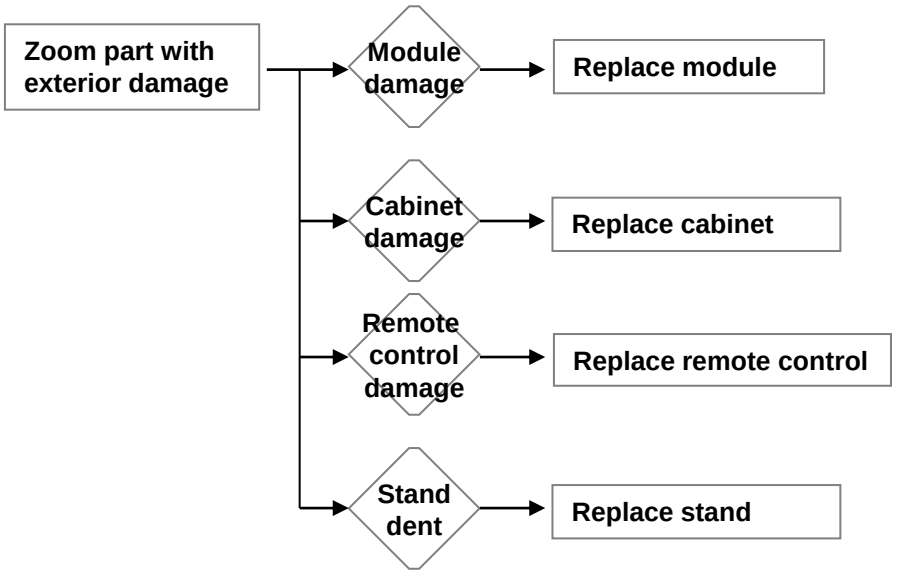


	Error symptom	D. Function error	Established date		
		External device recognition error	Revised date		14/16



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





Contents of Standard Repair Process Detail Technical Manual

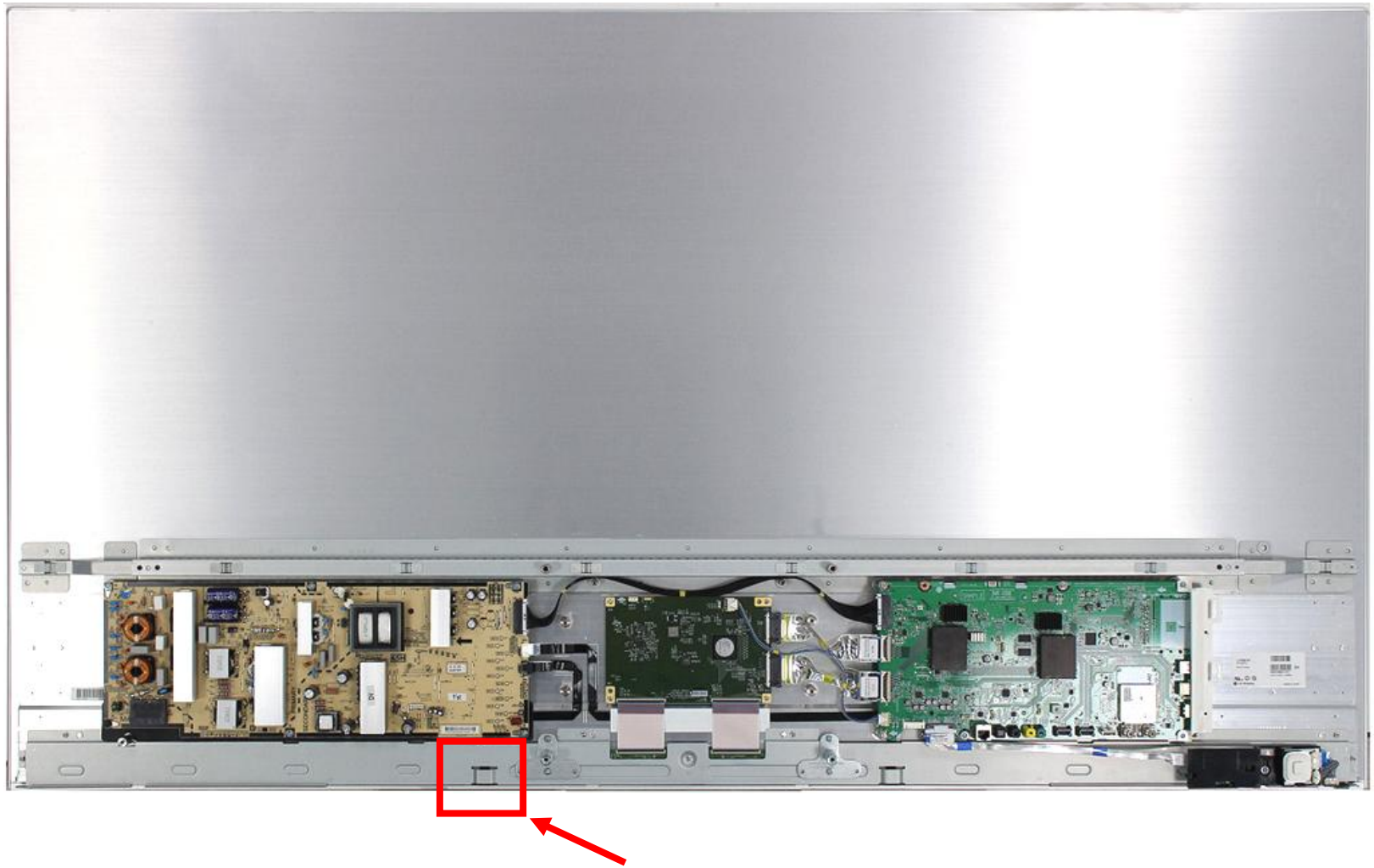
No.	Error symptom	Content	Page	Remarks
1	A. Video error_ No video/Normal audio	Check LCD back light with naked eye	A1	
2		Check White Balance value	A2	
3	A. Video error_ video error /Video lag/stop	TUNER input signal strength checking method	A3	
4		Version checking method	A4	
5		Tuner Checking Part	A5	
6	A. Video error _Vertical/Horizontal bar, residual image, light spot	connection diagram	A6	
7	A. Video error_ Color error	Check Link Cable (EPI) reconnection condition	A7	
8		Adjustment Test pattern - ADJ Key	A8	
9	**<Appendix>** Defected Type caused by T-Con/ Inverter/ Module	Exchange Main Board (1)	A-1/5	
10		Exchange Main Board (2)	A-2/5	
11		Exchange Power Board (PSU)	A-3/5	
12		Exchange Module (1)	A-4/5	
13		Exchange Module (2)	A-5/5	

Contents of Standard Repair Process Detail Technical Manual

No.	Error symptom	Content	Page	Remarks
14	B. Power error_ No power	Check front display Indicator	A17	
15		Check power input Voltage & ST-BY 3.5V	A18	
16	B. Power error_Off when on, off while viewing	POWER OFF MODE checking method	A19	
17	C. Audio error_ No audio/Normal video	Checking method in menu when there is no audio	A20	
18		Voltage and speaker checking method when there is no audio	A21	
19	D. Function error	Remote control operation checking method	A22	
20		Motion Remote operation checking method	A23	

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



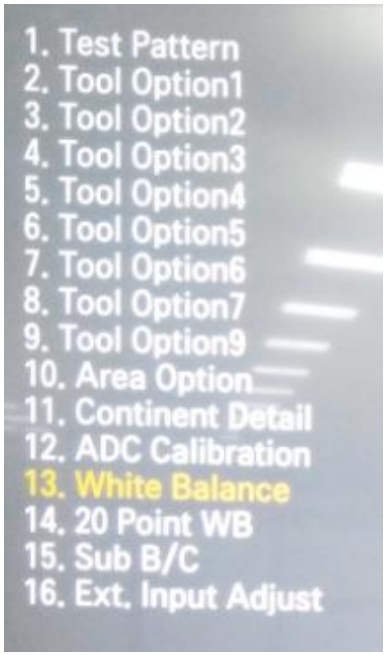
After turning on the power and disassembling the case, check with the naked eye, whether you can see light from locations.

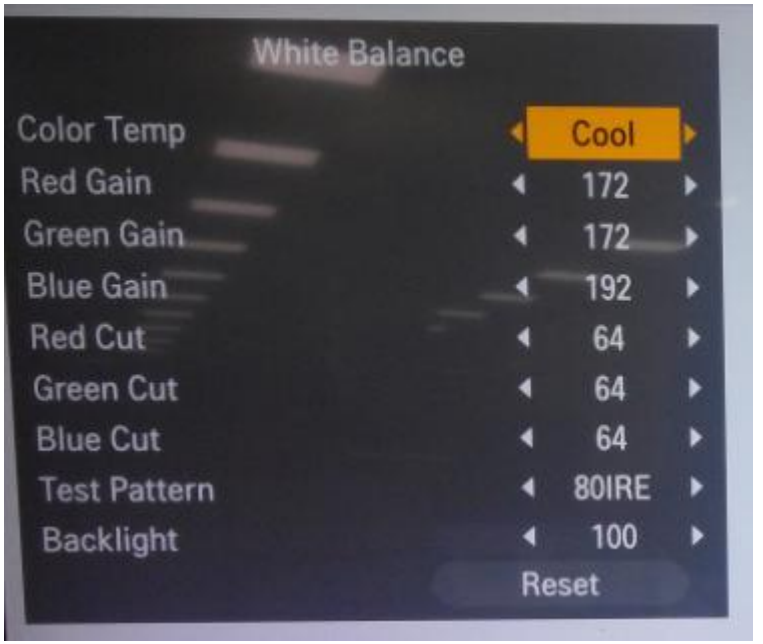
A1

Standard Repair Process Detail Technical Manual

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

<ALL MODELS>





Entry method

1. Press the ADJ button on the remote control for adjustment.

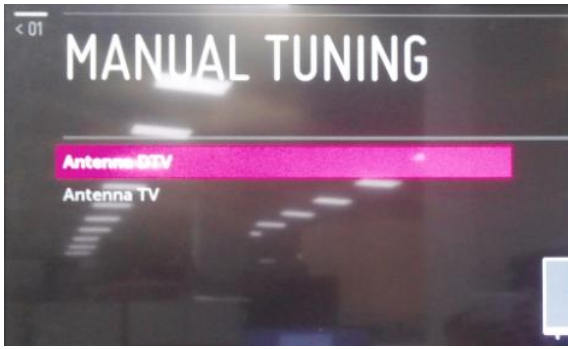
2. Enter into White Balance of item 13.

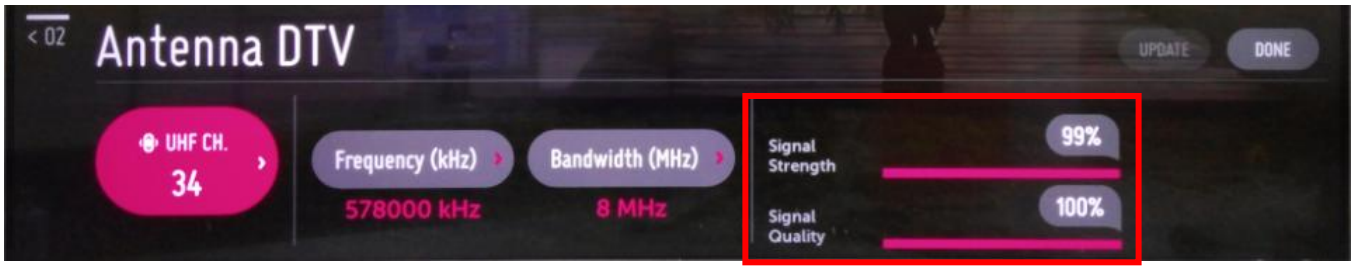
3. After recording the R, G, B (GAIN, Cut) value of Color Temp (Cool/Medium/Warm), re-enter the value after replacing the MAIN BOARD.

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>





All Settings → Programmes → Programmes Tuning & Settings → Manual Tuning → Antenna DTV

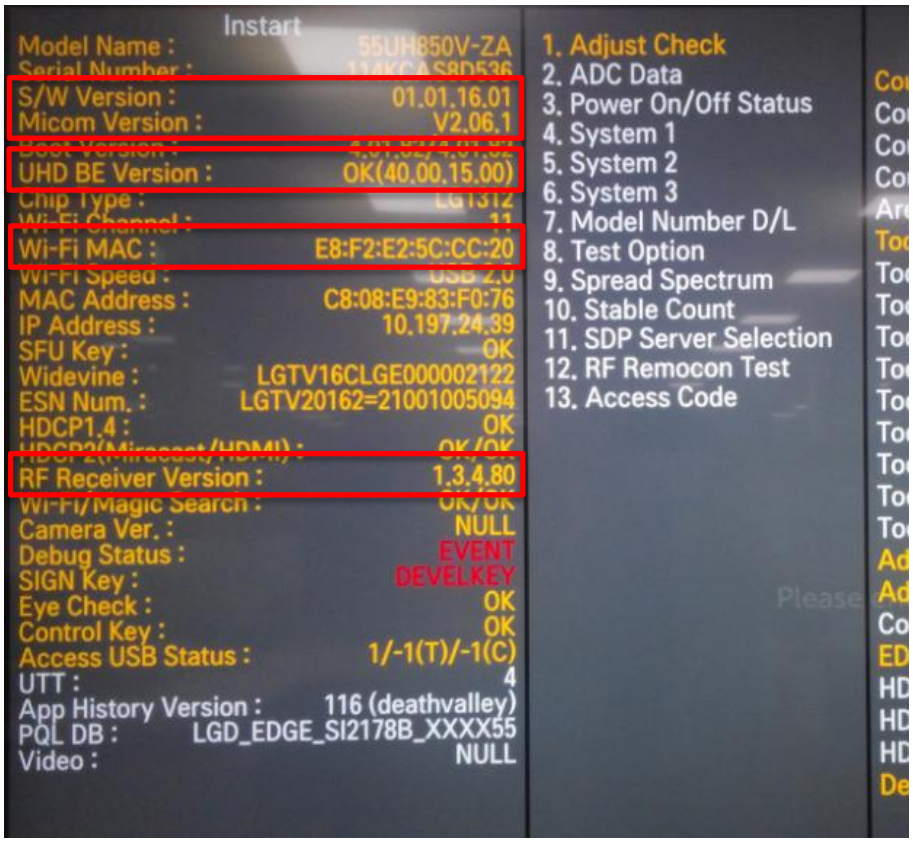
Signal Strength is too strong : Use attenuator (-10dB, -15dB, -20dB etc.)
Signal Strength is too weak : Use Signal Booster

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

<ALL MODELS>

1. Checking method for remote control for adjustment

Version

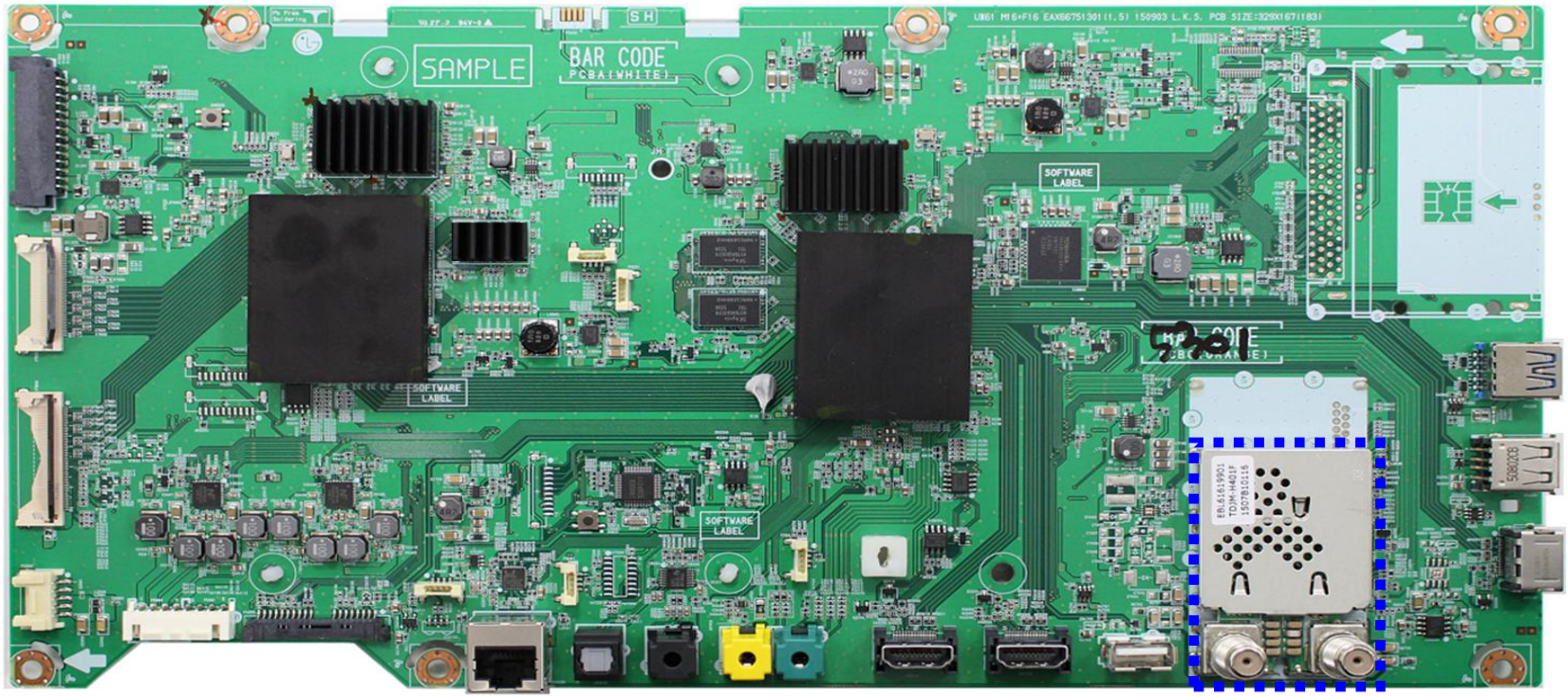


Press the IN-START with the remote control for adjustment

Standard Repair Process Detail Technical Manual

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

<ALL MODELS>

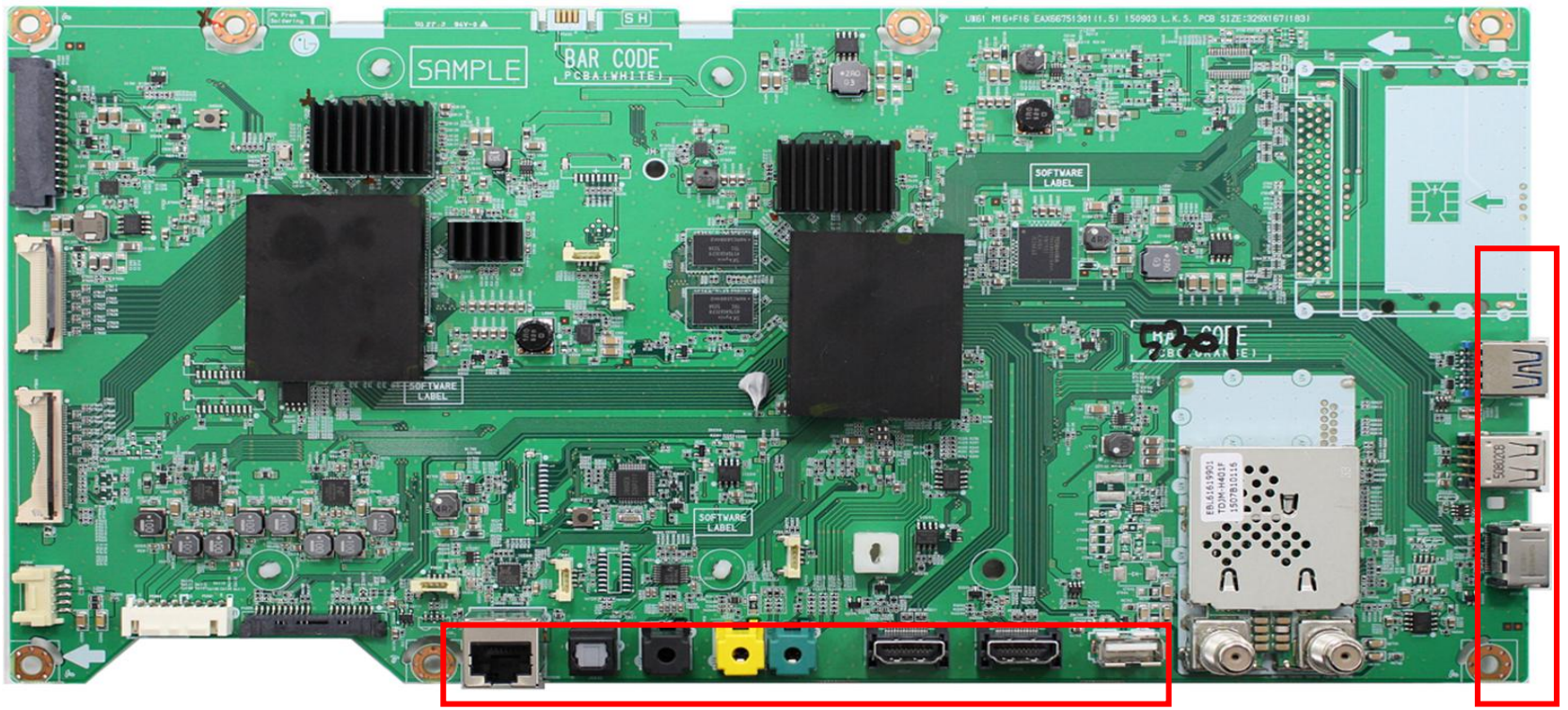


Checking method:
1. Check the signal strength or check whether the screen is normal when the external device is connected.
2. After measuring each voltage from power supply, finally replace the MAIN BOARD.

Standard Repair Process Detail Technical Manual

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

<ALL MODELS>

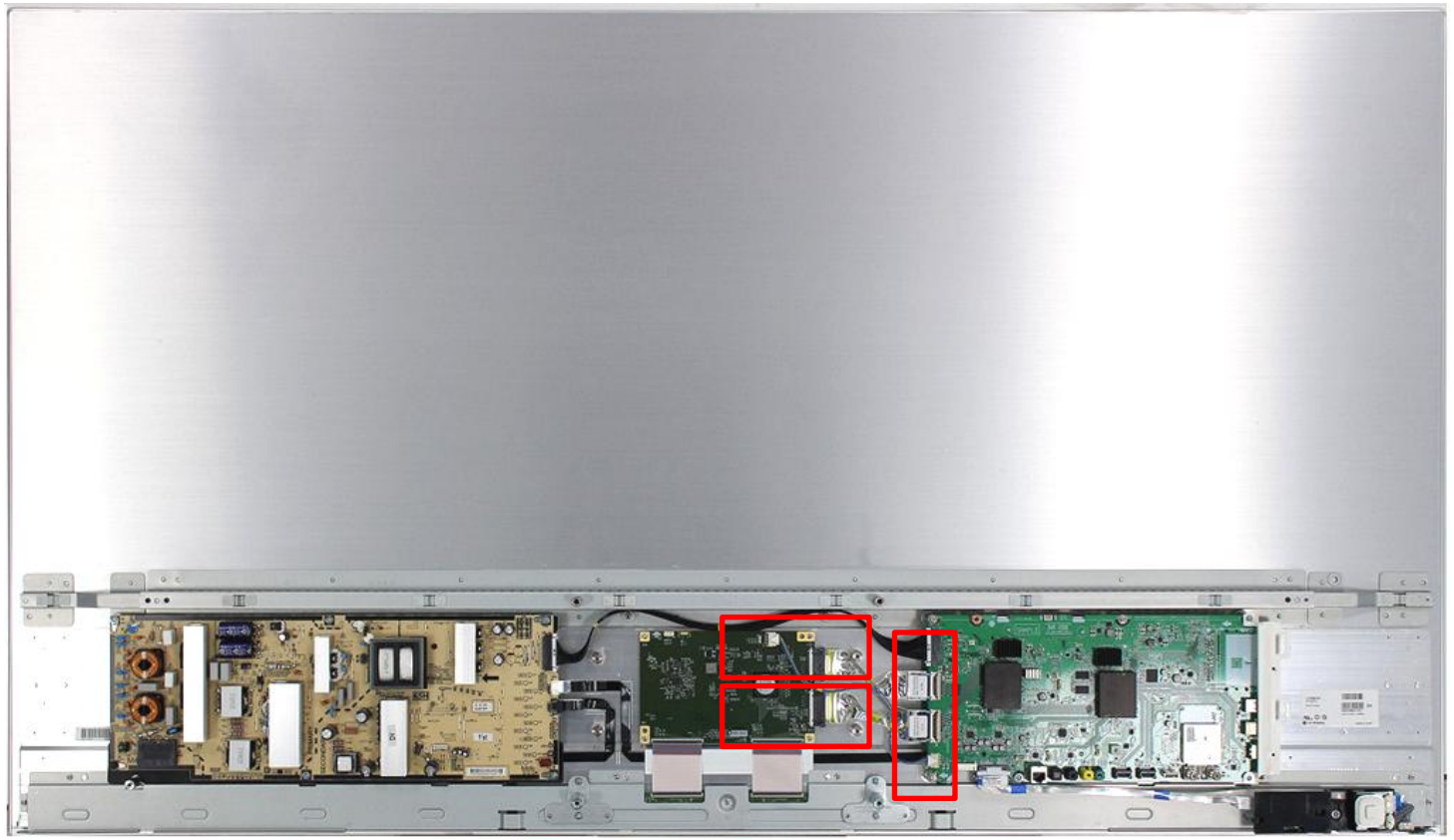


As the part connecting to the external input, check the screen condition by signal

A6

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

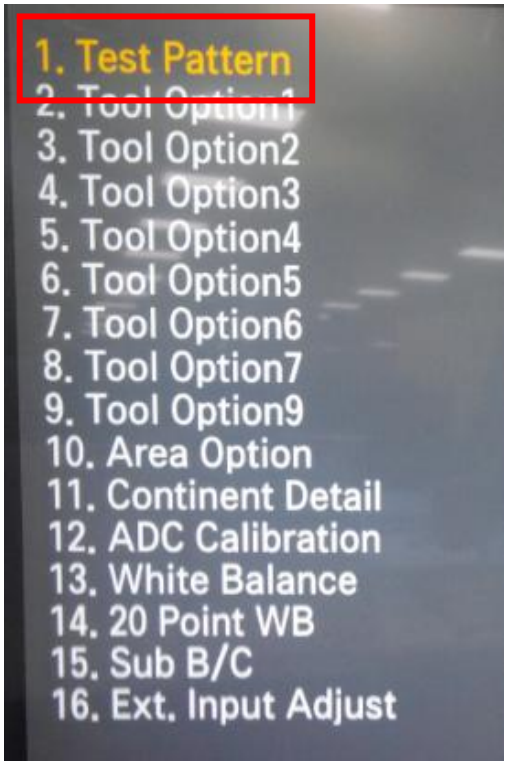
<ALL MODELS>

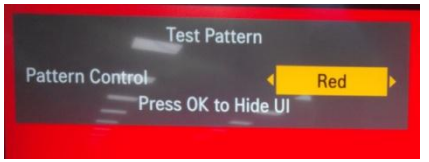


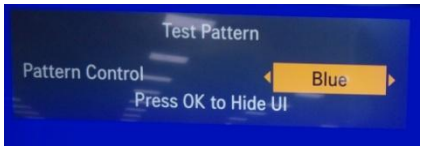
Check the contact condition of the Link Cable, especially dust or mis insertion.

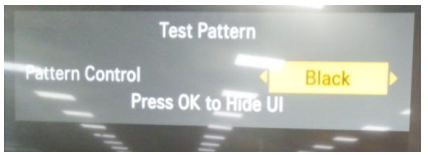
Standard Repair Process Detail Technical Manual

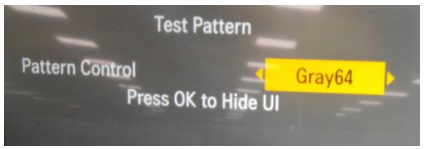
	Error symptom	A. Video error_Color error	Established date		
	Content	Adjustment Test pattern - ADJ Key	Revised date		A8

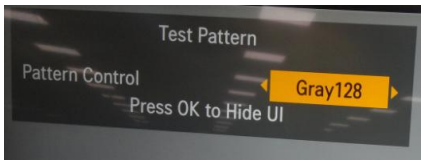


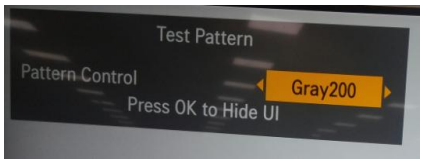










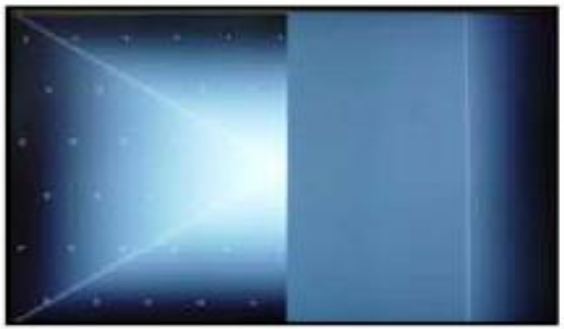


You can view 8 types of patterns using the ADJ Key

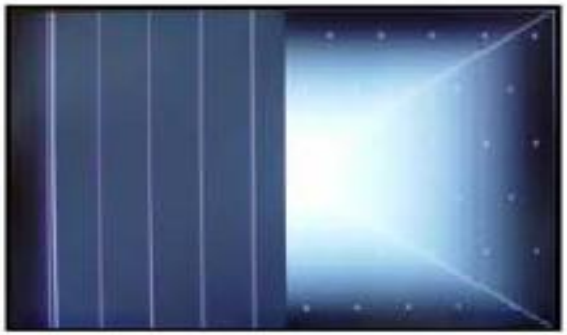
Checking item : 1. Defective pixel 2. Residual image 3. MODULE error (ADD-BAR,SCAN BAR..)
4.Video error (Classification of MODULE or Main-B/D)

Appendix : Exchange Main Board (1)

Solder defect, CNT Broken

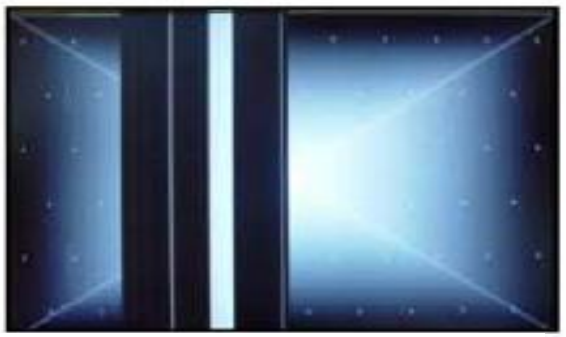


Solder defect, CNT Broken



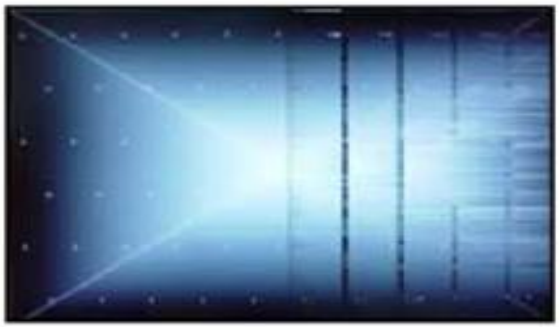
Solder defect, CNT Broken

Solder defect, CNT Broken



Solder defect, CNT Broken

Abnormal Power Section

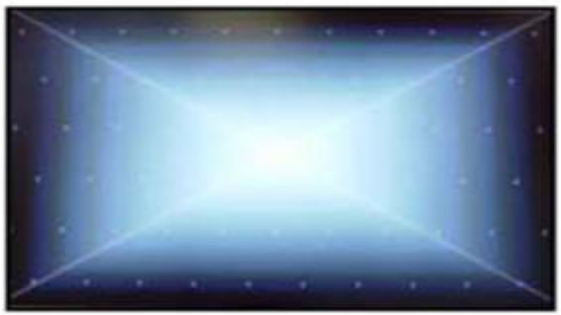


Solder defect, Short/Crack

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

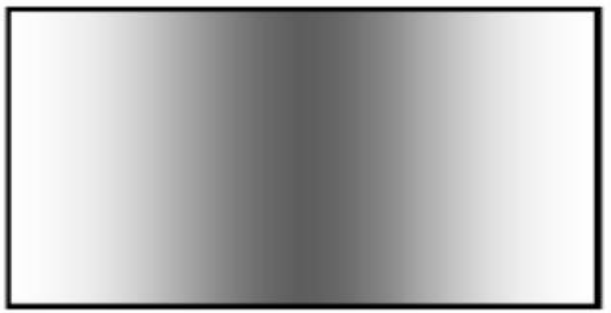
A - 2/5

Appendix : Exchange Power Board (PSU)

No Light

Dim Light

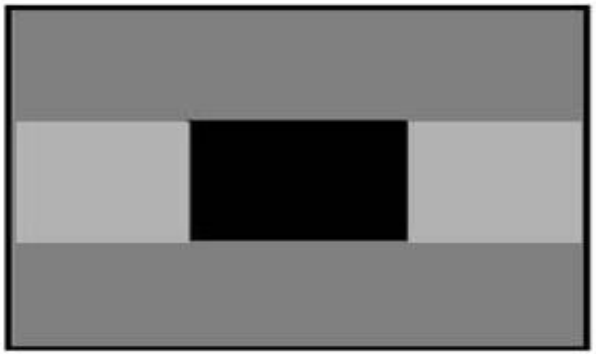
Dim Light



Dim Light

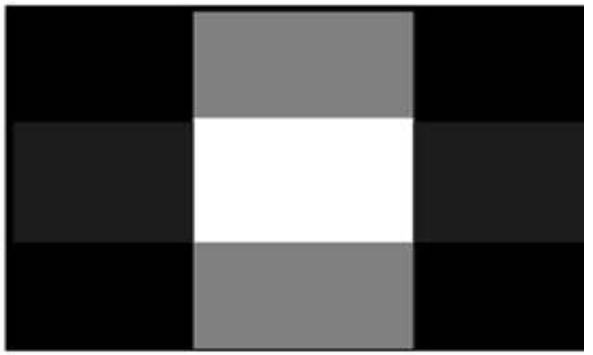
No picture/Sound Ok

Appendix : Exchange the Module (1)



Crosstalk

Press damage



Crosstalk

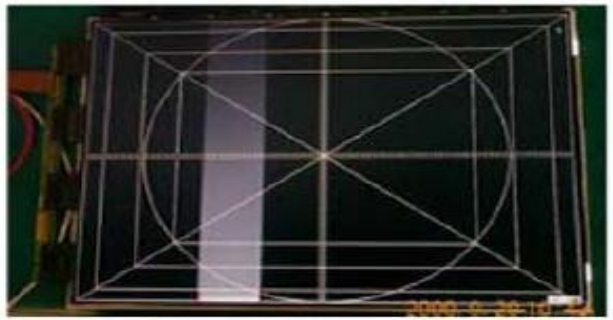
Press damage

Press damage

Un-repairable Cases

In this case please exchange the module.

Appendix : Exchange the Module (2)



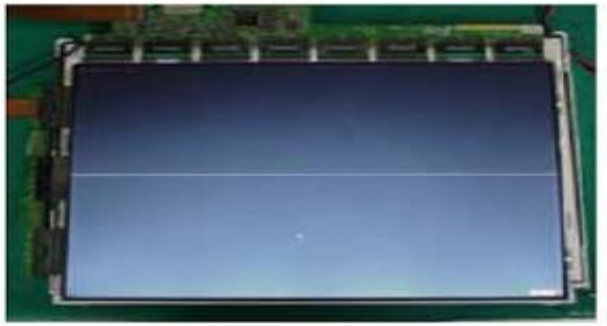
Vertical Block
Source TAB IC Defect

Vertical Line
Source TAB IC Defect

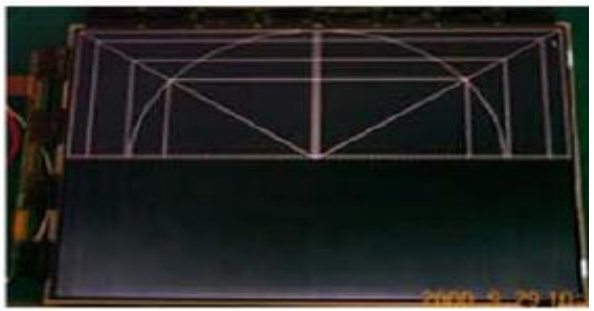
Vertical Block
Source TAB IC Defect

Horizontal Block
Gate TAB IC Defect

Horizontal Block
Gate TAB IC Defect



Horizontal line
Gate TAB IC Defect



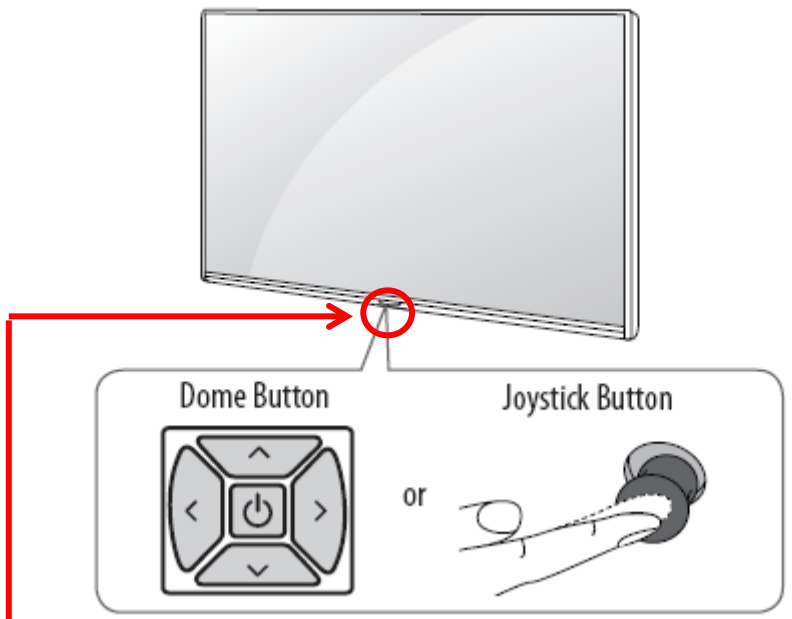
Horizontal Block
Gate TAB IC Defect

Un-repairable Cases

In this case please exchange the module.

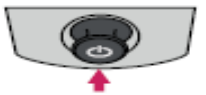
(Depending on model)

You can simply operate the TV functions, pressing or moving the button.



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

Basic functions

		Power On (Press) Power Off (Press and hold)
		Volume Control
		Programmes Control

NOTE

- When the TV is turned on, place your finger on the ⏻ button and press it once for a few seconds and release it. All running apps will close, and any recording in progress will stop.

Adjusting the menu

When the TV is turned on, press the ⏻ button one time. You can adjust the Menu items pressing or moving the buttons.

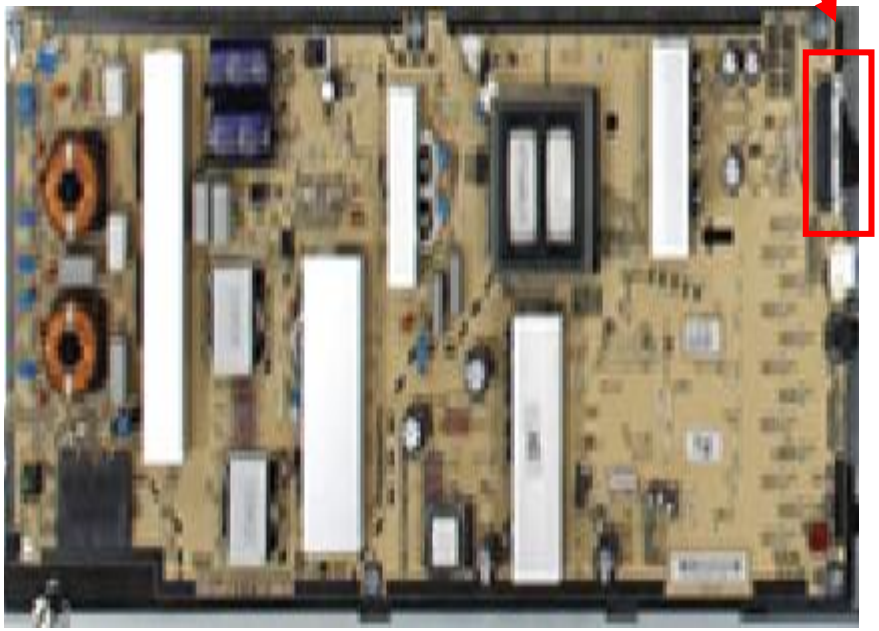
⏻	Turns the power off.
✕	Clears on-screen displays and returns to TV viewing.
⇄	Changes the input source.
⚙	Accesses the settings menu.

NOTE

- When your finger over the joystick button and push it to the up, down, left or right, be careful not to press the joystick button. If you press the joystick button first, you may not be able to adjust the volume level and saved programmes.

	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 18V



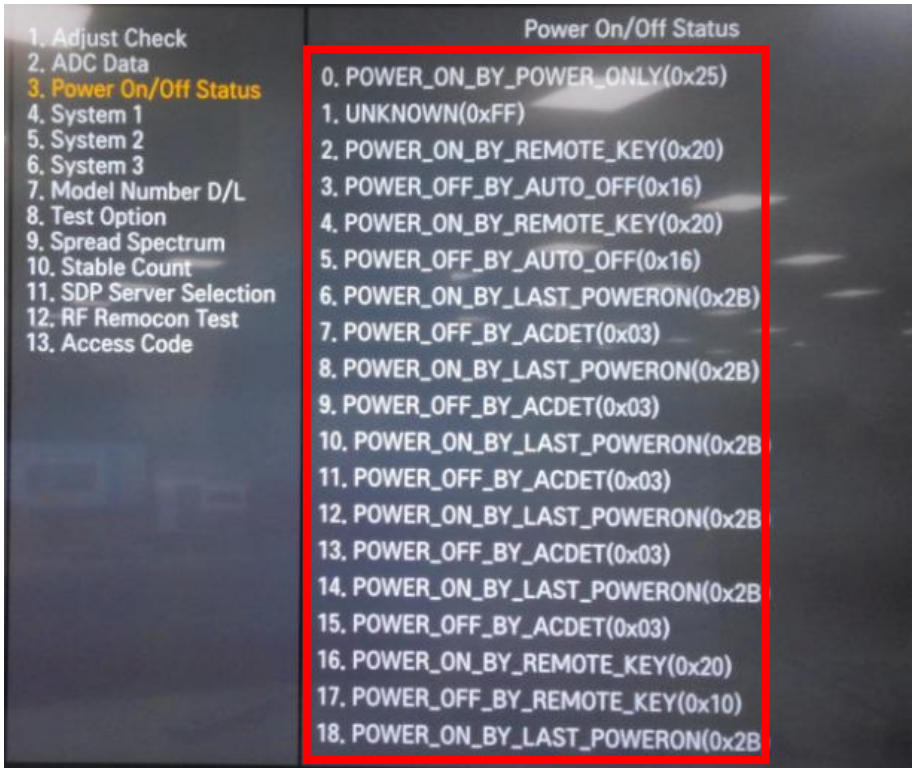
28Pin map (LPB)

P201			
Type : SMAW200-H28S5K (BLACK) Maker : YEON-HO			
Pin No.	Signal	Pin No.	Signal
1	18V(A)	2	18V(A)
3	18V(A)	4	18V(A)
5	GND(A)	6	GND(A)
7	18V	8	18V
9	GND	10	GND
11	GND	12	GND
13	PWR-ON	14	PDIM2
15	GND	16	18V
17	18V	18	18V
19	18V(A)	20	18V(A)
21	GND(A)	22	GND(A)
23	DRV-ON	24	PDIM
25	GND	26	SCLK
27	VSYNC	28	SIN

Standard Repair Process Detail Technical Manual

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

<ALL MODELS>



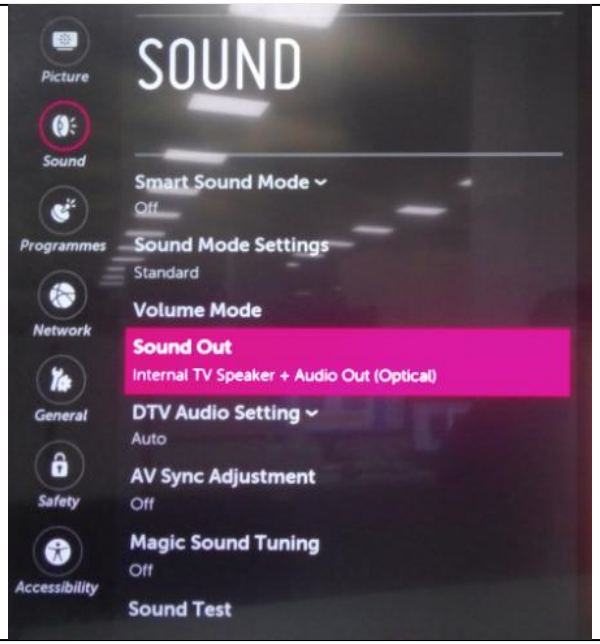
Entry method

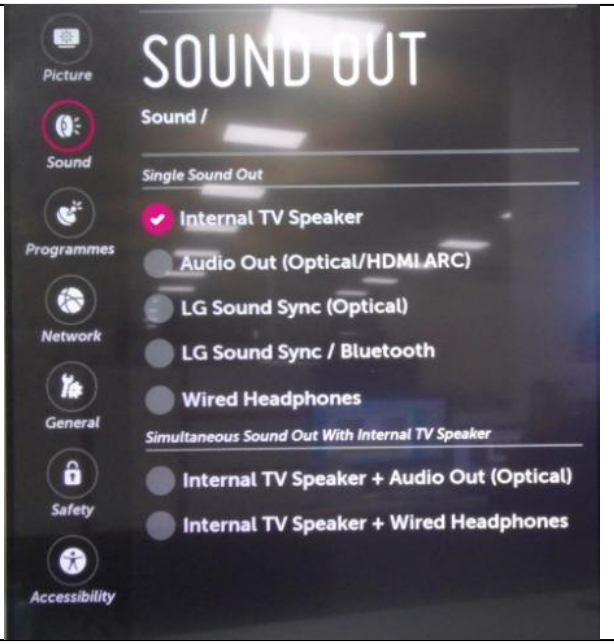
1. Press the IN-START button of the remote control for adjustment

2. Check the entry into adjustment item 3`

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

<ALL MODELS>





Checking method

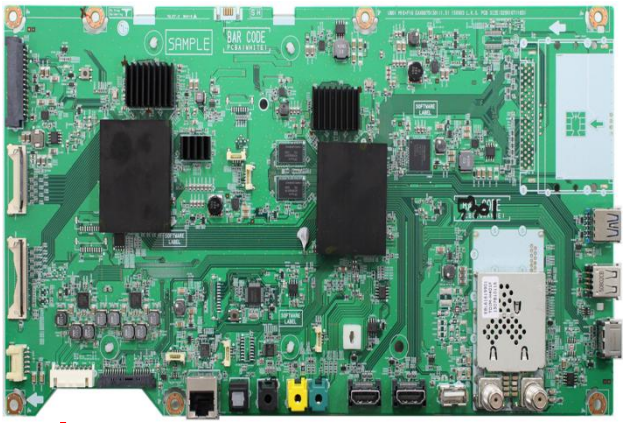
1. Press the Setting button on the remote control
2. Select the Sound function of the Menu
3. Select the Sound Out
4. Select TV Speaker

②

P201			
Type : SMAW200-H28S5K (BLACK) Maker : YEON-HO			
Pin No.	Signal	Pin No.	Signal
1	18V(A)	2	18V(A)
3	18V(A)	4	18V(A)
5	GND(A)	6	GND(A)
7	18V	8	18V
9	GND	10	GND
11	GND	12	GND
13	PWR-ON	14	PDIM2
15	GND	16	18V
17	18V	18	18V
19	18V(A)	20	18V(A)
21	GND(A)	22	GND(A)
23	DRV-ON	24	PDIM
25	GND	26	SCLK
27	VSYNC	28	SIN

①

Main B/D Side
Pin map reversed



③

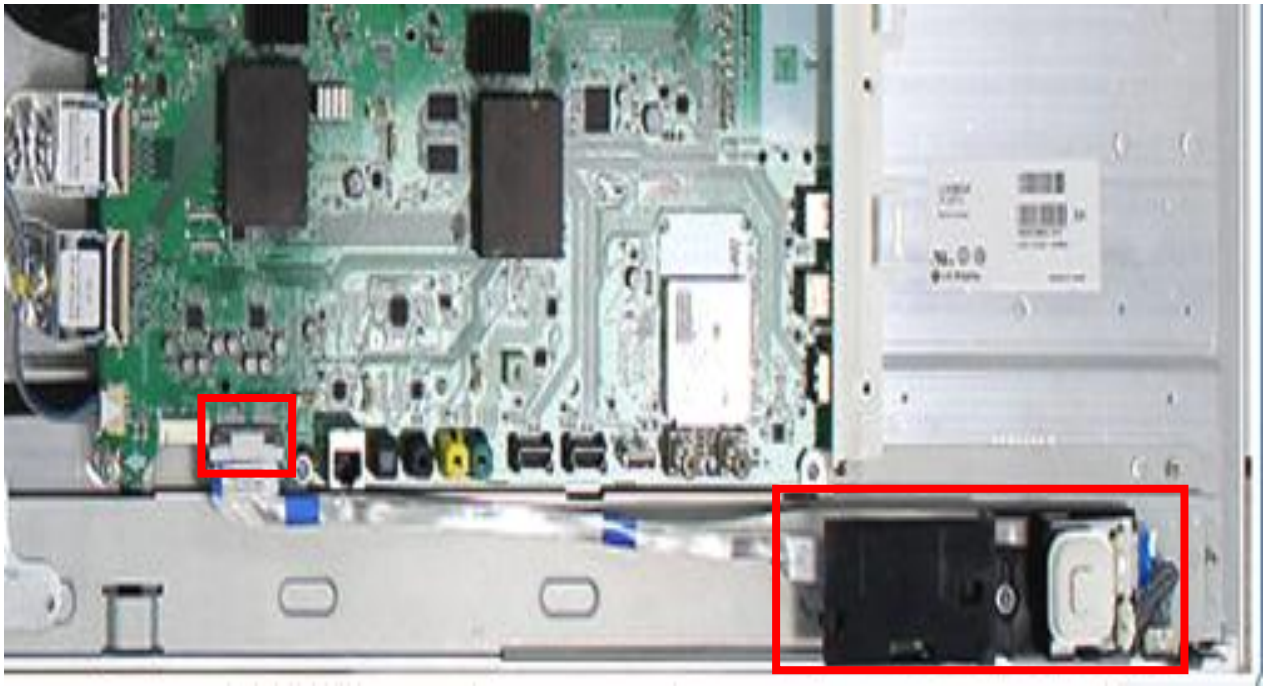
1	SPK_R-_FT	2	SPK_R+_FT
3	SPK_L-_FT	4	SPK_L+_FT
5	SPK_R-_CT	6	SPK_R+_CT
7	SPK_L-_CT	8	SPK_L+_CT

Checking order when there is no audio

① Check the contact condition of cable or connector

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

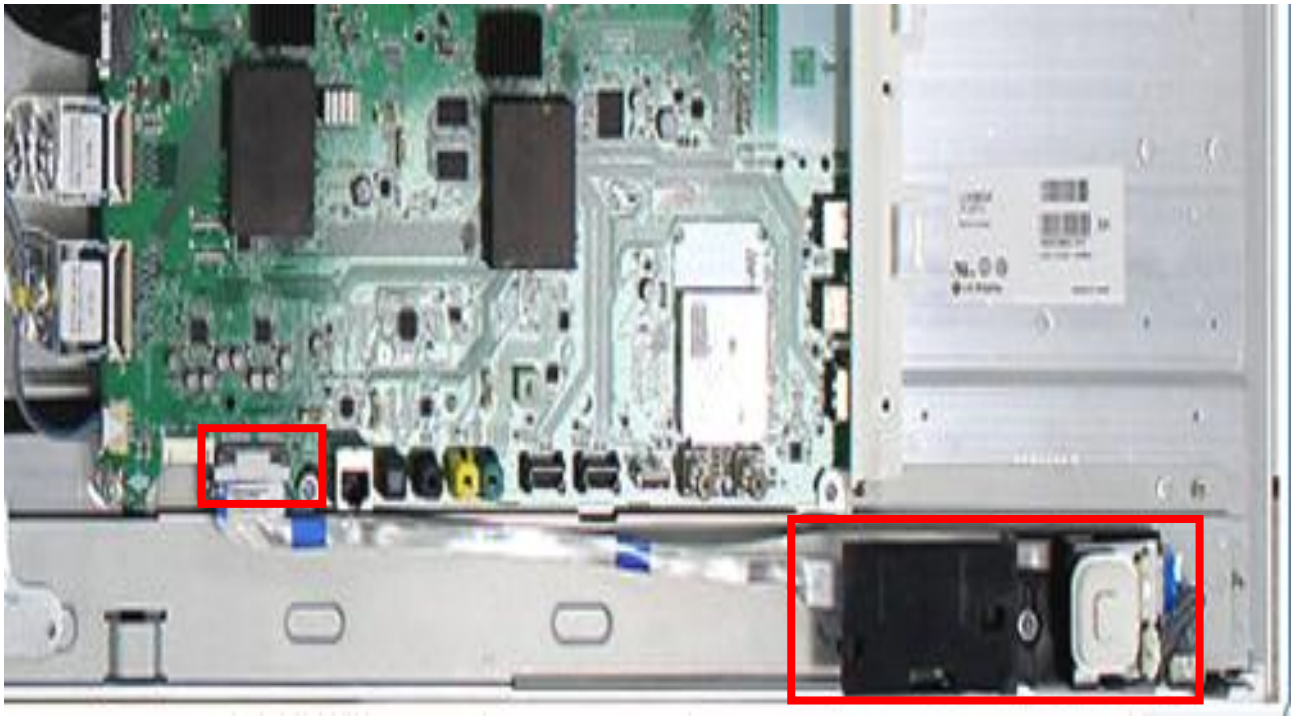
	Error symptom	D. Function error	Established date		
	Content	Remote control operation checking method	Revised date		A22



P4000 Pin map			
1	+3.5V_WIFI	12	EYE_SCL
2	WIFI_DM	13	EYE_SDA
3	WIFI_DP	14	GND
4	GND	15	IR
5	WOL_Power_On	16	LED_R
6	3D_Sync	17	GND
7	BT_Reset	18	+3.5_ST
8	GND	19	KEY2
		20	KEY1
		21	GND

Checking order
1. Check IR cable condition between IR & Main board.
2. Check the st-by 3.5V on the pin 18

	Error symptom	D. Function error	Established date		
	Content	Motion Remote, Wi-Fi operation checking method	Revised date		A23



P4000 Pin map			
1	+3.5V_WIFI	12	EYE_SCL
2	WIFI_DM	13	EYE_SDA
3	WIFI_DP	14	GND
4	GND	15	IR
5	WOL_Power_On	16	LED_R
6	3D_Sync	17	GND
7	BT_Reset	18	+3.5_ST
8	GND	19	KEY2
		20	KEY1
		21	GND

Checking order

1. Check Motion cable condition between Motion assy & Main board.
2. Check the 3.5V on the pin 1.