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LED TV

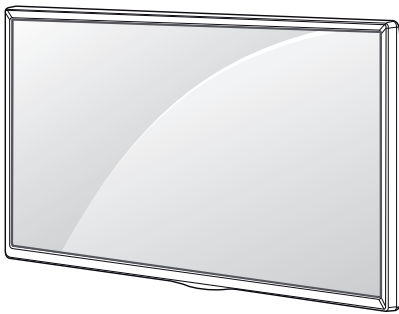
SERVICE MANUAL

CHASSIS : LA4BY

MODEL : 42LY770M 42LY770M-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 \triangle in the Schematic Diagram and Exploded View.

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

Do not modify the original design without permission of manufacturer.

General Guidance

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

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

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

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

Keep wires away from high voltage or high temperature parts.

Before returning the receiver to the customer,

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

Leakage Current Cold Check(Antenna Cold Check)

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

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

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

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

Leakage Current Hot Check (See below Figure)

Plug the AC cord directly into the AC outlet.

Do not use a line Isolation Transformer during this check.

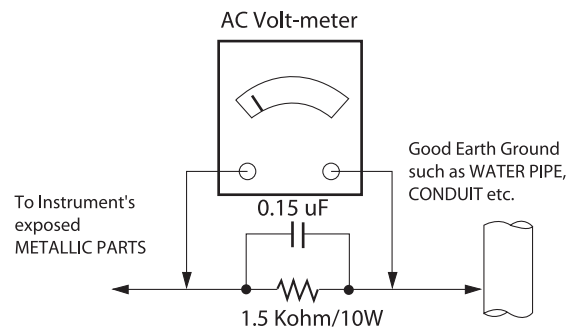
Connect 1.5 K / 10 watt resistor in parallel with a 0.15 uF capacitor between a known good earth ground (Water Pipe, Conduit, etc.) and the exposed metallic parts.

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

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

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

Leakage Current Hot Check circuit



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

*Base on Adjustment standard

SERVICING PRECAUTIONS

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

General Servicing Precautions

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

Electrostatically Sensitive (ES) Devices

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

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

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

General Soldering Guidelines

1. Use a grounded-tip, low-wattage soldering iron and appropriate tip size and shape that will maintain tip temperature within the range of 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 specification is applied to the LED TV used LA4BY chassis.

3. Test method

- 1) Performance: LGE TV test method followed
- 2) Demanded other specification
 - Safety : CE, IEC specification
 - EMC : CE, IEC

2. Requirement for Test

Each part is tested as below without special appointment.

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

4. Model General Specification

No.	Item	Specification		Remarks
1	Receiving System	ATSC / NTSC-M / 64 QAM / 256 QAM		North America
2	Available Channel	1) VHF : 02~13 2) UHF : 14~69 3) DTV : 02-69 4) CATV : 01~135 5) CADTV : 01~135		
3	Input Voltage	North America	AC 100 ~ 240V@ 50/60Hz	AC 120V, 50/60Hz on the label (USA)
4	Market	North America		
5	Screen Size	32/42 inches	FHD / 60Hz	
6	Aspect Ratio	16:9		
7	Tuning System	FS		
8	Module	LC320DUE-FGA3	LGD	32LY770M-UA
		LC420DUE-FGA3	LGD	42LY770M-UA
9	Operating Environment	1) Temp : 0 ~ 40 deg 2) Humidity : ~ 80 %		
10	Storage Environment	1) Temp. : -20 ~ 60 deg 2) Humidity : ~ 85%		

5. Video resolutions

5.1. HDMI Input(PC/DTV)

No.	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	Proposed		Remark
PC					DDC		
1	640*350	31.468	70.09	25.17	EGA	X	
2	720*400	31.469	70.08	28.32	DOS	O	
3	640*480	31.469	59.94	25.17	VESA(VGA)	O	
4	800*600	37.879	60.31	40.00	VESA(SVGA)	O	
5	1024*768	48.363	60.00	65.00	VESA(XGA)	O	
6	1152*864	54.348	60.053	80.002	VESA	O	
7	1360*768	47.712	60.015	85.50	VESA (WXGA)	X	
8	1280*1024	63.981	60.020	108.00	VESA (SXGA)	O	
9	1920*1080	67.5	60	148.5	HDTV 1080P	O	
DTV							
1	640*480	31.469	59.94	25.175	SDTV 480P		
2	640*480	31.5	60	25.200	SDTV 480P		
3	720*480	31.50	60	27.027	SDTV 480P		
4	720*480	31.469	59.94	27.00	SDTV 480P		
5	1280*720	45.00	60.00	74.25	HDTV 720P		
6	1280*720	44.96	59.94	74.176	HDTV 720P		
7	1920*1080	33.75	60.00	74.25	HDTV 1080I		
8	1920*1080	33.72	59.94	74.176	HDTV 1080I		
9	1920*1080	67.500	60	148.50	HDTV 1080P		
10	1920*1080	67.43	59.94	148.352	HDTV 1080P		
11	1920*1080	27.000	24.000	74.25	HDTV 1080P		
12	1920*1080	26.97	23.97	74.176	HDTV 1080P		
13	1920*1080	33.75	30.000	74.25	HDTV 1080P		
14	1920*1080	33.716	29.976	74.176	HDTV 1080P		

ADJUSTMENT INSTRUCTION

1. Application Range

This specification sheet is applied to all of the LED TV with LA4BY chassis.

2. Specification

- (1) Because this is not a hot chassis, it is not necessary to use an isolation transformer. However, the use of isolation transformer will help protect test instrument.
- (2) Adjustment must be done in the correct order.
- (3) The adjustment must be performed in the circumstance of 25 ± 5 °C of temperature and $65 \pm 10\%$ of relative humidity if there is no specific designation
- (4) The input voltage of the receiver must keep 100~240V, 50/60Hz
- (5) At first Worker must turn on the SET by using Power Only key.
- (6) The receiver must be operated for about 5 minutes prior to the adjustment when module is in the circumstance of over 15 °C
In case of keeping module is in the circumstance of 0°C, it should be placed in the circumstance of above 15°C for 2 hours
In case of keeping module is in the circumstance of below -20°C, it should be placed in the circumstance of above 15°C for 3 hours.

※ Caution

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

3. Adjustment items

3.1. Main PCBA Adjustments

- (1) ADC adjustment: Component 480i, 1080p
- (2) EDID downloads for HDMI

* Remark

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

3.2. Final assembly adjustment

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

3.3. Appendix

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

4. MAIN PCBA Adjustments

4.1. ADC Calibration

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

4.2. MAC Address, ESN Key and Widevine Key, DTCP Key, HDCP1.4, HDCP2.0 download.

4.2.1. Equipment & Condition

- (1) Play file: keydownload.exe

4.2.2. Communication Port connection

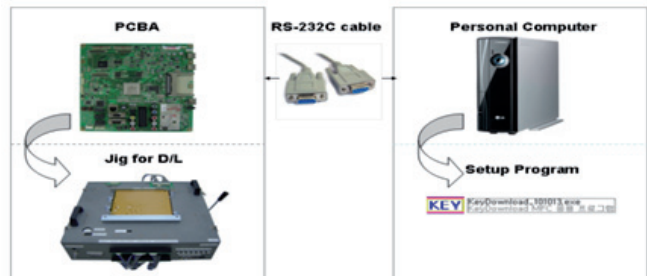
- (1) Key Write: Com 1,2,3,4 and 115200 (Baudrate)
- (2) Barcode: Com 1,2,3,4 and 9600 (Baudrate)

4.2.3. Download process

- (1) Select the download items.
- (2) Mode check: Online Only
- (3) Check the test process
 - US, Canada models: DETECT -> MAC_WRITE -> WIDEVINE_WRITE
 - Korea, Mexico models: DETECT -> MAC_WRITE -> WIDEVINE_WRITE
- (4) Play: START
- (5) Check of result: Ready, Test, OK or NG

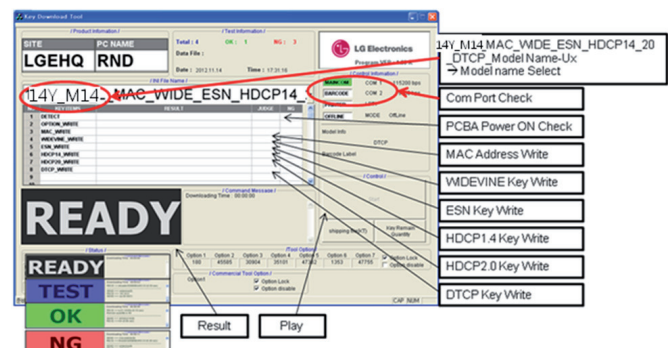
4.2.4. Communication Port connection

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

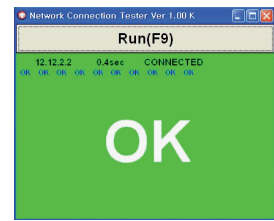
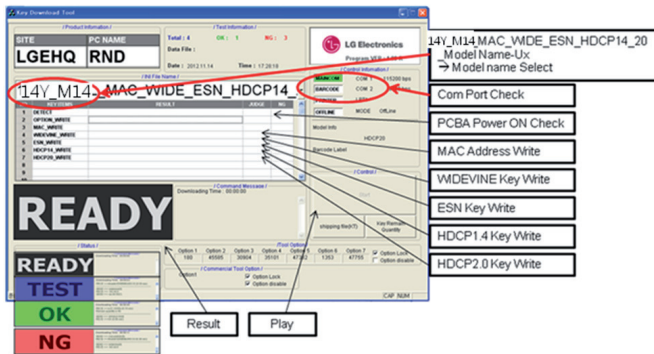


4.2.5. Download (**ESN Key : 14Y_CS_M14)

- (1) US, Canada models (14Y LCD TV + MAC + Widevine + ESN Key + DTCP Key + HDCP1.4 and HDCP2.0)



(2) Mexico models (14Y LCD TV + MAC + Widevine + ESN Key + HDCP1.4 and HDCP2.0)



4.5 . Model name & Serial number Download

4.5.1. Model name & Serial number D/L

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

4.5.2. Method & notice

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

* Manual Download (Model Name and Serial Number)
Press If the TV set is downloaded By OTA or Service man, Sometimes model name or serial number is initialized.(Not always)

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

- a. Press the 'instart' key of ADJ remote controller.
- b. Go to the menu '16.Model Number D/L' like below photo.
- c. Input the Factory model name or Serial number.
- d. Check the model name Instart menu -> Factory name displayed
- e. Check the Diagnostics (DTV country only) -> Buyer model displayed

4.6. EDID Download

4.6.1. Overview

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

4.6.2. Equipment

- (1) Since EDID data is embedded, EDID download JIG, HDMI cable and D-sub cable are not need.
- (2) Adjust by using remote controller.

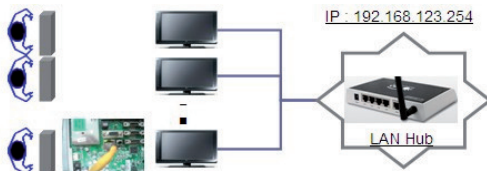
4.2.6. Inspection

- In INSTART menu, check these keys.

4.3. LAN Inspection

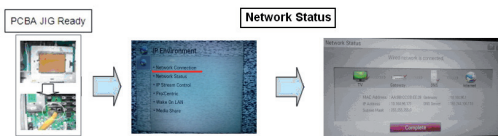
4.3.1. Equipment & Condition

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



4.3.2. LAN inspection solution

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



4.4. LAN PORT INSPECTION(PING TEST)

4.4.1. Equipment setting

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



4.4.2. LAN PORT inspection (PING TEST)

- (1) Play the LAN Port Test Program.
- (2) Connect each other LAN Port Jack.
- (3) Play Test (F9) button and confirm OK Message.
- (4) Remove LAN cable.

4.6.3. EDID DATA

4.6.3.1. 2D_8bit_PCM(US)_ xvYCC : off

- HDMI EDID 2D_8bit_PCM(US)_ xvYCC : off

0x00	00	FF	FF	FF	FF	FF	FF	00	1E	6D	a				b									
0x01	01	01	01	01	01	01	01	02	3A	80	18	71	38	2D	40	58	2C							
0x02	0F	50	54	A1	08	00	31	40	45	40	61	40	71	40	81	80								
0x03	01	01	01	01	01	01	02	3A	80	18	71	38	2D	40	58	2C								
0x04	45	00	40	84	63	00	00	1E	66	21	50	B0	51	00	1B	30								
0x05	40	70	36	00	40	84	63	00	00	1E	00	00	00	FD	00	3A								
0x06	3E	1E	53	10	00	0A	20	20	20	20	20	20	d				01	e1						
0x07	g																01	e1						
0x08	02	03	1D	F1	48	90	22	20	05	04	03	02	01	23	09	57								
0x09	07	f																E3	05	00	00	02	3A	80
0x0A	18	71	38	2D	40	58	2C	04	05	A0	5A	00	00	00	1E	01								
0x0B	1D	80	18	71	1C	16	20	58	2C	25	00	40	84	63	00	00								
0x0C	9E	01	1D	00	72	51	D0	1E	20	6E	28	55	00	40	84	63								
0x0D	00	00	1E	8C	0A	D0	8A	20	E0	2D	10	10	3E	96	00	40								
0x0E	84	63	00	00	18	00	00	00	00	00	00	00	00	00	00	00								
0x0F	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	h2							

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

a. Product ID

HEX	EDID Table	DDC Function
0001	0100	Analog
0001	0100	Digital

- Serial No: Controlled on production line.
- Month, Year: Controlled on production line:
ex) Week : '01' -> '01'
Year : '2014' -> '18'
- Model Name(Hex): LGTV

Chassis	MODEL NAME(HEX)
LA4BY	00 00 00 FC 00 4C 47 20 54 56 0A 20 20 20 20 20 20

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

	e1	e2	e3
HDMI1	E7	E0	X
HDMI2	E7	D0	X

f. Vendor Specific(HDMI)

INPUT	Model name(HEX)_
HDMI1	67 03 0C 00 10 00 80 1E
HDMI2	67 03 0C 00 20 00 80 1E

4.6.3.2. 2D_10bit_PCM(US)_ xvYCC : off

- HDMI EDID 2D_10bit_PCM(US)_ xvYCC : off

0x00	00	FF	FF	FF	FF	FF	FF	00	1E	6D	a				b									
0x01	0F	50	54	A1	08	00	31	40	45	40	61	40	71	40	81	80								
0x02	01	01	01	01	01	01	02	3A	80	18	71	38	2D	40	58	2C								
0x03	01	01	01	01	01	01	02	3A	80	18	71	38	2D	40	58	2C								
0x04	45	00	40	84	63	00	00	1E	66	21	50	B0	51	00	1B	30								
0x05	40	70	36	00	40	84	63	00	00	1E	00	00	00	FD	00	3A								
0x06	3E	1E	53	10	00	0A	20	20	20	20	20	20	d				01	e1						
0x07	g																01	e1						
0x08	02	03	1D	F1	48	90	22	20	05	04	03	02	01	23	09	57								
0x09	07	f																E3	05	00	00	02	3A	80
0x0A	18	71	38	2D	40	58	2C	04	05	A0	5A	00	00	00	1E	01								
0x0B	1D	80	18	71	1C	16	20	58	2C	25	00	40	84	63	00	00								
0x0C	9E	01	1D	00	72	51	D0	1E	20	6E	28	55	00	40	84	63								
0x0D	00	00	1E	8C	0A	D0	8A	20	E0	2D	10	10	3E	96	00	40								
0x0E	84	63	00	00	18	00	00	00	00	00	00	00	00	00	00	00								
0x0F	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	h2							

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

HEX	EDID Table	DDC Function
0001	0100	Analog
0001	0100	Digital

- Serial No: Controlled on production line.
- Month, Year: Controlled on production line:
ex) Week : '01' -> '01'
Year : '2014' -> '18'
- Model Name(Hex): LGTV

Chassis	MODEL NAME(HEX)
LA4BY	00 00 00 FC 00 4C 47 20 54 56 0A 20 20 20 20 20 20

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

	e1	e2	e3
HDMI1	E7	02	X
HDMI2	E7	F2	X

f. Vendor Specific(HDMI)

INPUT	Model name(HEX)_
HDMI1	67 03 0C 00 10 00 B8 2D
HDMI2	67 03 0C 00 20 00 B8 2D

4.6.3.3. 3D_8bit_PCM(US)_xvYCC : off
 - HDMI EDID 3D_8bit_PCM(US)_xvYCC : off

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

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

HEX	EDID Table	DDC Function
0001	0100	Analog
0001	0100	Digital

- b. Serial No: Controlled on production line.
- c. Month, Year: Controlled on production line:
ex) Week : '01' -> '01'
Year : '2014' -> '18'
- d. Model Name(Hex): LGTV

Chassis	MODEL NAME(HEX)
LA4BY	00 00 00 FC 00 4C 47 20 54 56 0A 20 20 20 20 20 20

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

	e1	e2	e3
HDMI1	E7	FC	X
HDMI2	E7	EC	X

- f. Vendor Specific(HDMI)

INPUT	Model name(HEX)_
HDMI1	78 03 0C 00 10 00 80 1E 20 C0 0E 01 4F 00 FE 08 10 06 10 18 10 28 10 38 10
HDMI2	78 03 0C 00 20 00 80 1E 20 C0 0E 01 4F 00 FE 08 10 06 10 18 10 28 10 38 10

4.6.3.4. 3D_10bit_PCM(US)_xvYCC : off
 - HDMI EDID 3D_10bit_PCM(US)_xvYCC : off

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

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

HEX	EDID Table	DDC Function
0001	0100	Analog
0001	0100	Digital

- b. Serial No: Controlled on production line.
- c. Month, Year: Controlled on production line:
ex) Week : '01' -> '01'
Year : '2014' -> '18'
- d. Model Name(Hex): LGTV

Chassis	MODEL NAME(HEX)
LA4BY	00 00 00 FC 00 4C 47 20 54 56 0A 20 20 20 20 20 20

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

	e1	e2	e3
HDMI1	E7	B5	X
HDMI2	E7	A5	X

- f. Vendor Specific(HDMI)

INPUT	Model name(HEX)_
HDMI1	78 03 0C 00 10 00 B8 2D 20 C0 0E 01 4F 00 FE 08 10 06 10 18 10 28 10 38 10
HDMI2	78 03 0C 00 20 00 B8 2D 20 C0 0E 01 4F 00 FE 08 10 06 10 18 10 28 10 38 10

5. Final Assembly Adjustment

5.1. White Balance Adjustment

5.1.1. Overview

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

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

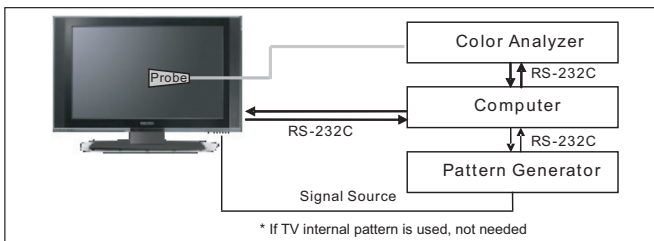
5.1.1.2. Adj. condition and cautionary items

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

5.1.2. Equipment

- (1) Color Analyzer: CA-210 (NCG: CH 9 / WCG: CH12 / LED: CH14)
- (2) Adj. Computer(During auto adj., RS-232C protocol is needed)
- (3) Adjust Remocon
- (4) Video Signal Generator MSPG-925F 720p/204-Gray (Model:217, Pattern:49)
 - Only when internal pattern is not available
 - ※ Color Analyzer Matrix should be calibrated using CS-1000

5.1.3. Equipment connection



5.1.4. Adjustment Command (Protocol)

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

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

(2) Adjustment Map

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

5.1.5. Adjustment method

5.1.5.1. Auto WB calibration

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

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

5.1.5.2. Manual adj. method

- (1) Set TV in Adj. mode using POWER ON
- (2) Zero Calibrate the probe of Color Analyzer, then place it on the center of LCD module within 10cm of the surface.
- (3) Press ADJ key -> EZ adjust using adj. R/C -> 6. White-Balance then press the cursor to the right (KEY▶). (When KEY(▶) is pressed 204 Gray(80IRE) internal pattern will be displayed)
- (4) Adjust Cool modes
 - 1) Fix the one of R/G/B gain to 192 (default data) and decrease the others. (If G gain is adjusted over 172 and R and B gain less than 192 , Adjust is O.K.)
 - 2) If G gain is less than 172, Increase G gain by up to 172, and then increase R gain and G gain same amount of increasing G gain.
 - 3) If R gain or B gain is over 255, Readjust G gain less than 172, Conform to R gain is 255 or B gain is 255

- 5) Adjust two modes (Medium / Warm) Fix the one of R/G/B gain to 192 (default data) and decrease the others.
- 6) Adj. is completed, Exit adjust mode using "EXIT" key on Remote controller.
 - If internal pattern is not available, use RF input. In EZ Adj. menu
- 6.White Balance, you can select one of 2 Test-pattern: ON, OFF. Default is inner (ON). By selecting OFF, you can adjust using RF signal in 206 Gray pattern.

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

- Luminance: 204 Gray, 80IRE
- Standard color coordinate and temperature using

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

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

Mode	Coordinate		Temp	Δuv
	x	y		
Cool	0.271	0.270	13000 K	0.0000
Medium	0.286	0.289	9300 K	0.0000
Warm	0.313	0.329	6500 K	0.0000

- Standard color coordinate and temperature using CA-210(CH-14) – by aging time
 - 1) Normal line in Korea (From January to February) : LGD (LY7xxx Series models)

	Aging time (Min)	Cool		Medium		Warm	
		x	y	x	y	x	y
		271	270	286	289	313	329
1	0-2	286	295	301	314	328	354
2	3-5	284	290	299	309	326	349
3	6-9	282	287	297	306	324	346
4	10-19	279	283	294	302	321	342
5	20-35	276	278	291	297	318	337
6	36-49	274	275	289	294	316	334
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

- Standard color coordinate and temperature using CA-210(CH-14) – by aging time
 - 2) Normal line in Korea (From March to December) : LGD (LY7xxx Series models)
 - Normal line in Mexico : LGD (LY7xxx models)

	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

3) O/S Module(AUO, INX, Sharp, CSOT, BOE)

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

5.2. Tool Option setting & Inspection per countries

5.2.1. Overview

- (1) Tool option selection is only done for models in Non-USA North America due to rating
- (2) Applied model: LA4BX Chassis applied to CANADA and MEXICO

5.2.2. Country Group selection

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

5.2.3. Tool Option Inspection

- (1) Press Adj. key on the Adj. R/C, and then check Tool option.
 - * Tool option can be reconstructed by Software

5.3. Magic Motion remote controller Check

5.3.1. Test equipment

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

5.4.2. Test

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

5.4.3. Applied models

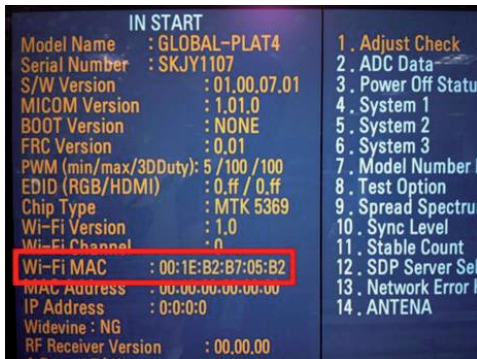
Chassis	Model Name	Magic RF receiver
LA4BY	32LY770M-UA	Built-in
	42LY770M-UA	

5.4. Wi-Fi MAC Address Check

5.4.1. Using RS232 Command

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

5.4.2. Check the menu on in-start



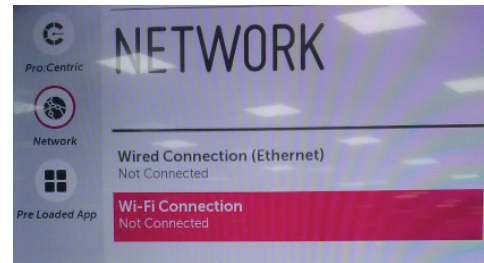
5.5. Wi-Fi Test

Step 1) Turn on TV

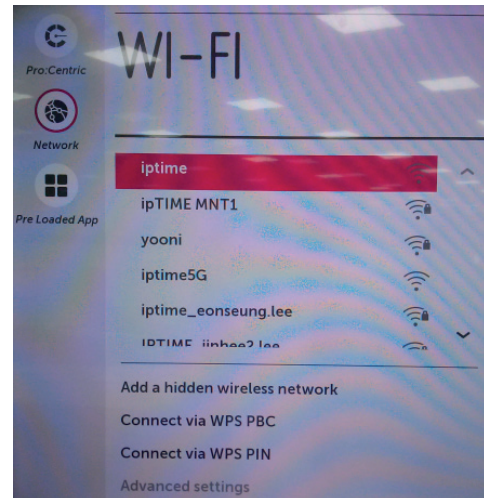
Step 2) Select Network Connection option in Network Menu.
Installer menu -> 119 -> 253 -> Menu -> Network



Step 3) Select Start Connection Button in Network Setting -> Wi-Fi Connection



Step 4) If the system finds any AP like below PIC, it is working well.



5.6. HDMI ARC Function Inspection

5.6.1. Test equipment

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

5.6.2. 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)

Flow Line



Cell Line



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



5.7. EYE-Q Green Function Inspection

Step 1) Turn on the TV..

Step 2) Press 'EYE button' on the adjustment remote-controller.

Step 3) Cover 'Eye Q sensor' on the front of set with your hands, hold it for 6 seconds.

Step 4) Check "the Sensor Data" on the screen, make certain that Data is below 10.

If Data isn't below 10 in 6 seconds, Eye Q sensor would be bad. You should change Eye Q sensor.

Step 5) Uncover your hands from Eye Q sensor, hold it for 6 seconds.

Step 6) Check "Back Light(xxx)" on the screen, check data increase .

You should change Eye Q sensor.



STEP(2)



STEP(3)



STEP(4)



STEP(5)



STEP(6)

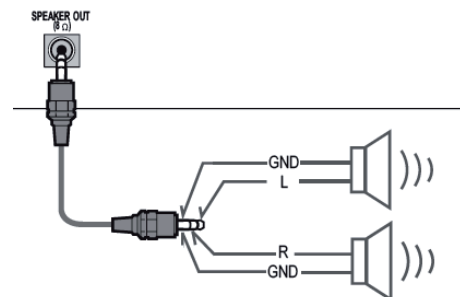
6. Check Commercial features

6.1. External SPK Out

Commercial Feature							
IR Out	DC Power Out (12V)	Ext SPK Out	RJP	MPI	Pro:Idiom	b-LAN	Pillow
X	X	O	X	O	O	O	O

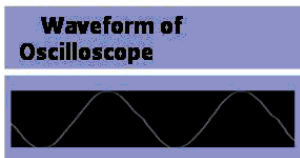
6.1.1. Equipment & Condition

- Jig (Speaker out JIG) or Oscilloscope
- Power only mode



6.1.2. Check the speaker out

- 1) Connect the External Speaker : check the sound
Connect oscilloscope, you can see this waveform.



Recommended Input signal
RF, 1KHz, Sing wave

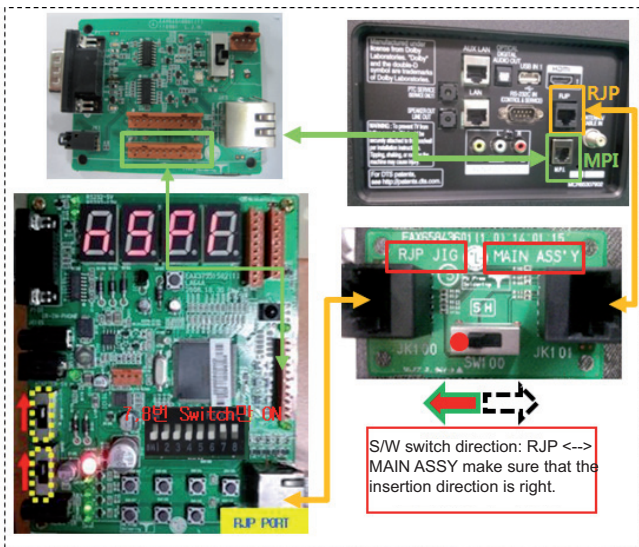
6.2. RJP/MPI Check

6.2.1. Initial setting

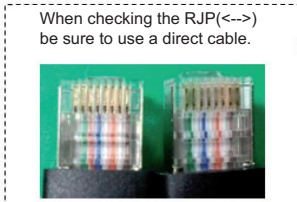
- (1) Select Power switch (up) as the picture
- (2) Set the Switch No.7&8 to ON (up) as the picture Others should be set to OFF (down)

6.2.2. Checking Guide

- (1) Press the P-ONLY key of R/C.
- (2) Press the Exit key of R/C.
- (3) Connect with the TV through RJP cable (wait for the JIG on) and MPI cable.
- (4) RJP/MPI Pin check is carried out automatically.
- (5) The result is shown as below. [Picture 3]
- (6) If RJP/MPI Pin check finished or you check other function, must remove the RJP/MPI cable from TV



[Picture 1]



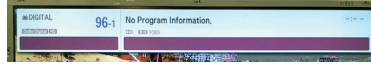
[Picture 2]



[Picture 3]

6.3. Pro : Idiom Check

- (1) Connect the RF Cable
 - (2) Turn to the Pro:Idiom channel (No. 333)
 - (3) Check the video & sound
- ** Only displayed at "POWER ONLY" mode



6.4. b-LAN Main board Check

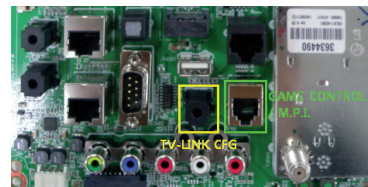
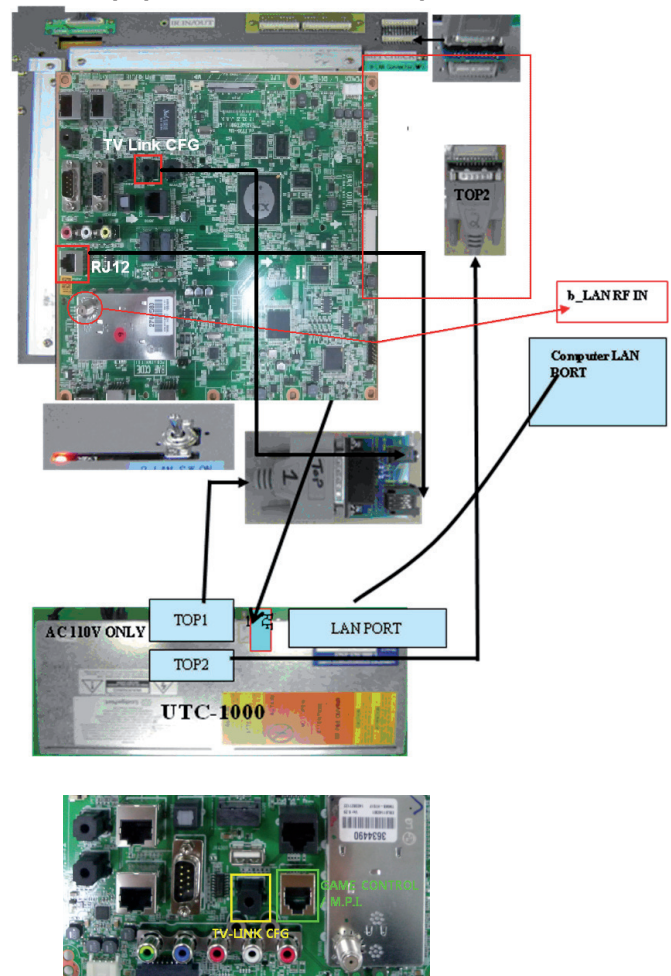
6.4.1. Overview

It is LNET RF modem & FTG card

6.4.2. Equipment

- (1) b-LAN Checker: UTC-1000 (with Cable accessory)
- (2) Computer(for test result monitoring)
- (3) Connection JIG

6.4.3. Equipment connection map & b-LAN Check



7. AUDIO output check

7.1. Audio input condition

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

7.2. Specification

Item	Audio practical max Output, L/R
Min	9.0 8.5
Typ	10.0 8.9
Max	12.0 9.9
Unit	W Vrms
Remark	(1) Measurement condition - EQ/AVL/Clear Voice: Off (2) Speaker (8Ω Impedance)

8. GND and HI-POT Test

8.1. GND & HI-POT auto-check preparation

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

8.2 GND & HI-POT auto-check

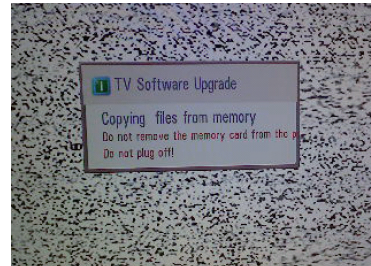
- (1) Pallet moves in the station. (POWER CORD / AV CORD is tightly inserted)
- (2) Connect the AV JACK Tester.
- (3) Controller (GWS103-4) on.
- (4) GND Test (Auto)
 - If Test is failed, Buzzer operates.
 - If Test is passed, execute next process (Hi-pot test). (Remove A/V CORD from A/V JACK BOX)
-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

8.2.1. Checkpoint

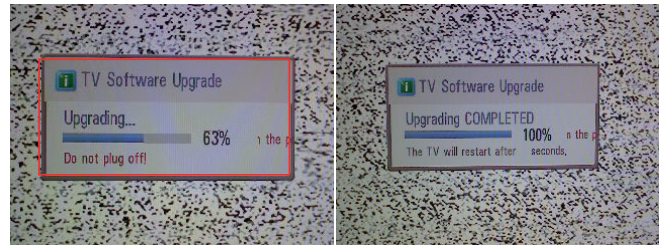
- TEST voltage
 - GND: 1.5 KV / min at 100 mA
 - SIGNAL: 3 KV / min at 100 mA
- TEST time: 1 second
- TEST POINT
 - GND TEST = POWER CORD GND & SIGNAL CABLE METAL GND
 - Hi-pot TEST = POWER CORD GND & LIVE & NEUTRAL
- LEAKAGE CURRENT: At 0.5 mArms

9. USB S/W Download(Service only)

- (1) Put the USB Stick to the USB socket
- (2) Automatically detecting update file in USB Stick
 - If your downloaded program version in USB Stick is Lower, it didn't work.
 - But your downloaded version is Higher, USB data is automatically detecting (Download Version High & Power only mode, Set is automatically Download)
- (3) Show the message "Copying files from memory"



- (4) Updating is starting.



- (5) Updating Completed, the TV will restart automatically.
- (6) If your TV is turned on, check your updated version and Tool option. (explain the Tool option, next stage)
 - * If downloading version is more high than your TV have, TV can lost all channel data. In this case, you have to channel recover. if all channel data is cleared, you didn't have a DTV/ATV test on production line.

* After downloading, have to adjust Tool Option again.

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

10. Optional adjustments

10.1. Manual ADC Calibration

10.1.1. Equipment & Condition

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

10.1.2. Adjust method

10.1.2.1. 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 7.External ADC. And Press OK or Right Button for going to sub menu.
- (5) Press OK in Comp 480i menu
- (6) Give a 1080p Mode, Horizontal 100% Color Bar Pattern to Comp1. (MSPG-925FA -> Model: 225, Pattern: 65)
- (7) Press OK in Comp 1080p menu
- (8) If ADC Comp is successful, "ADC Component Success" is displayed.
If ADC calibration is failure, "ADC Component Fail" is displayed.
- (10) If ADC calibration is failure, after rechecking ADC pattern or condition, retry calibration
- (11) If ADC calibration is failure, after recheck ADC pattern or condition, retry calibration

10.2. Manual White balance Adjustment

10.2.1. Adj. condition and cautionary items

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

10.2.2. 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)

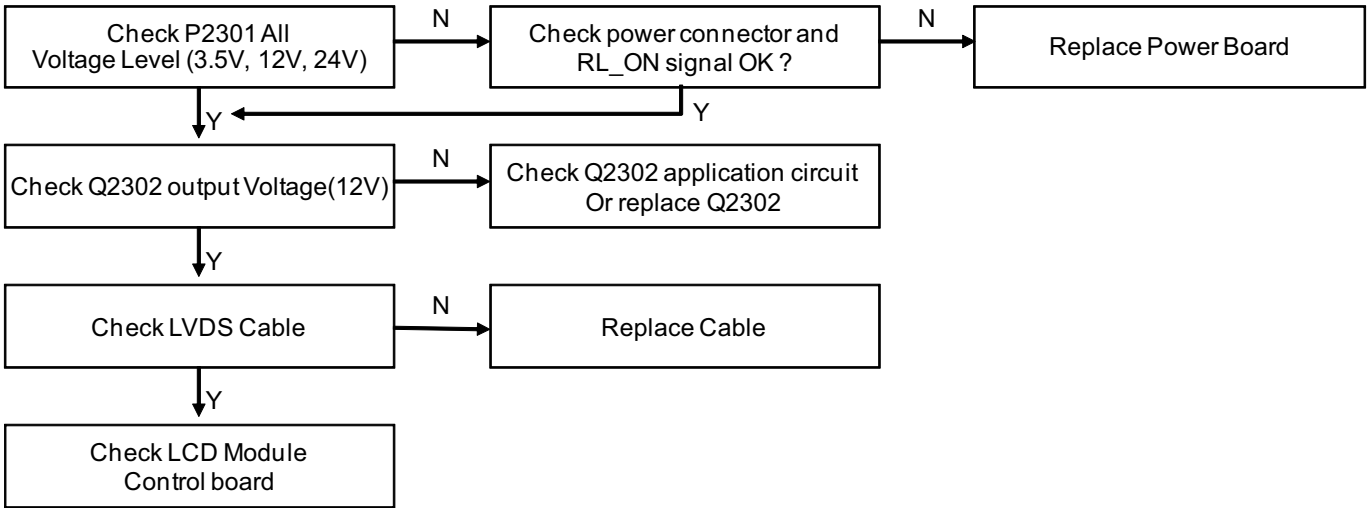
10.2.3. Adjustment

- (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.

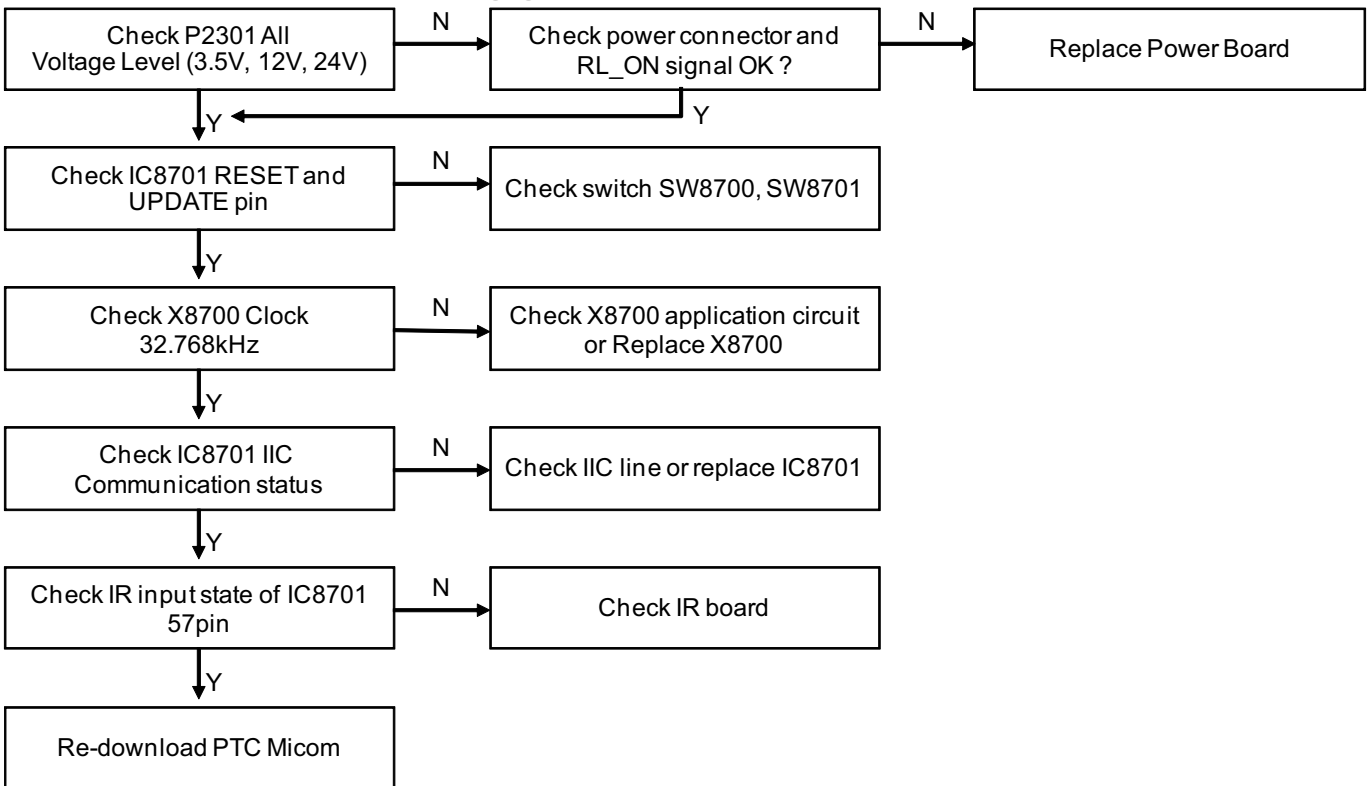
- If internal pattern is not available, use RF input. In EZ Adj. menu 6.White Balance, you can select one of 2 Test-pattern: ON, OFF. Default is inner(ON). By selecting OFF, you can adjust using RF signal in 216 Gray pattern.

TROUBLE SHOOTING GUIDE

1. Power-Up Boot Fail Trouble Shooting guide

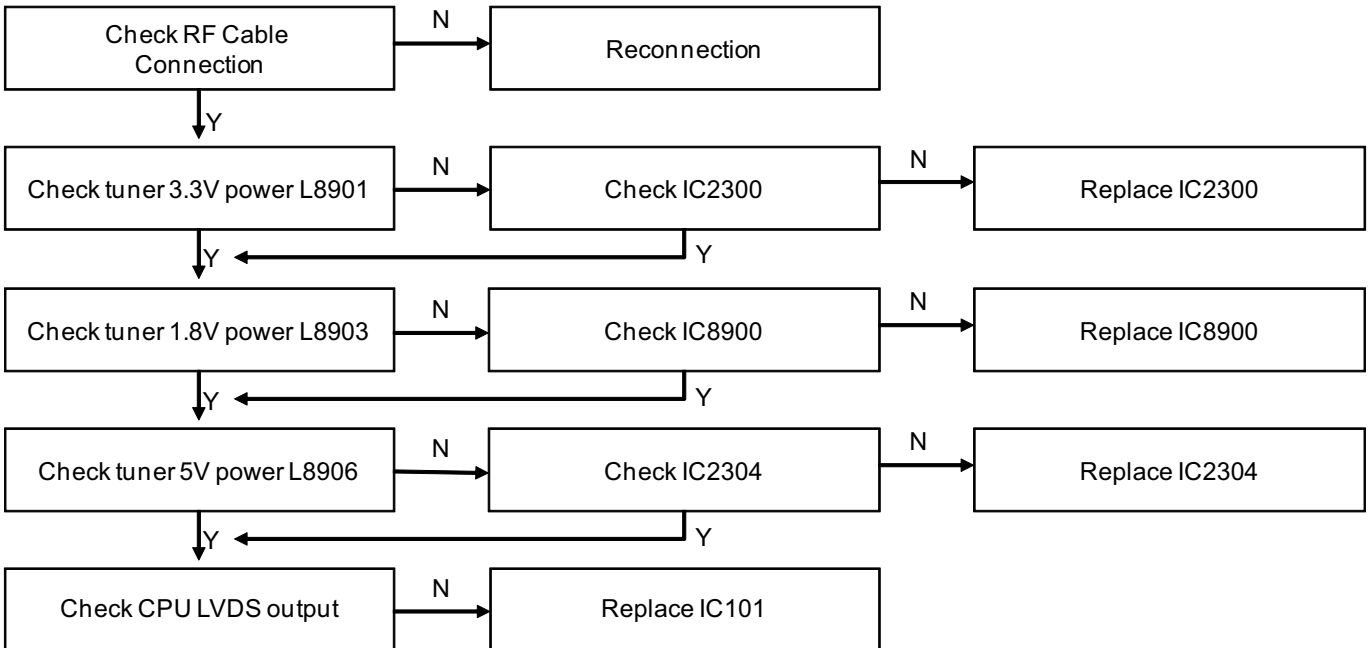


2. No OSD Trouble Shooting guide

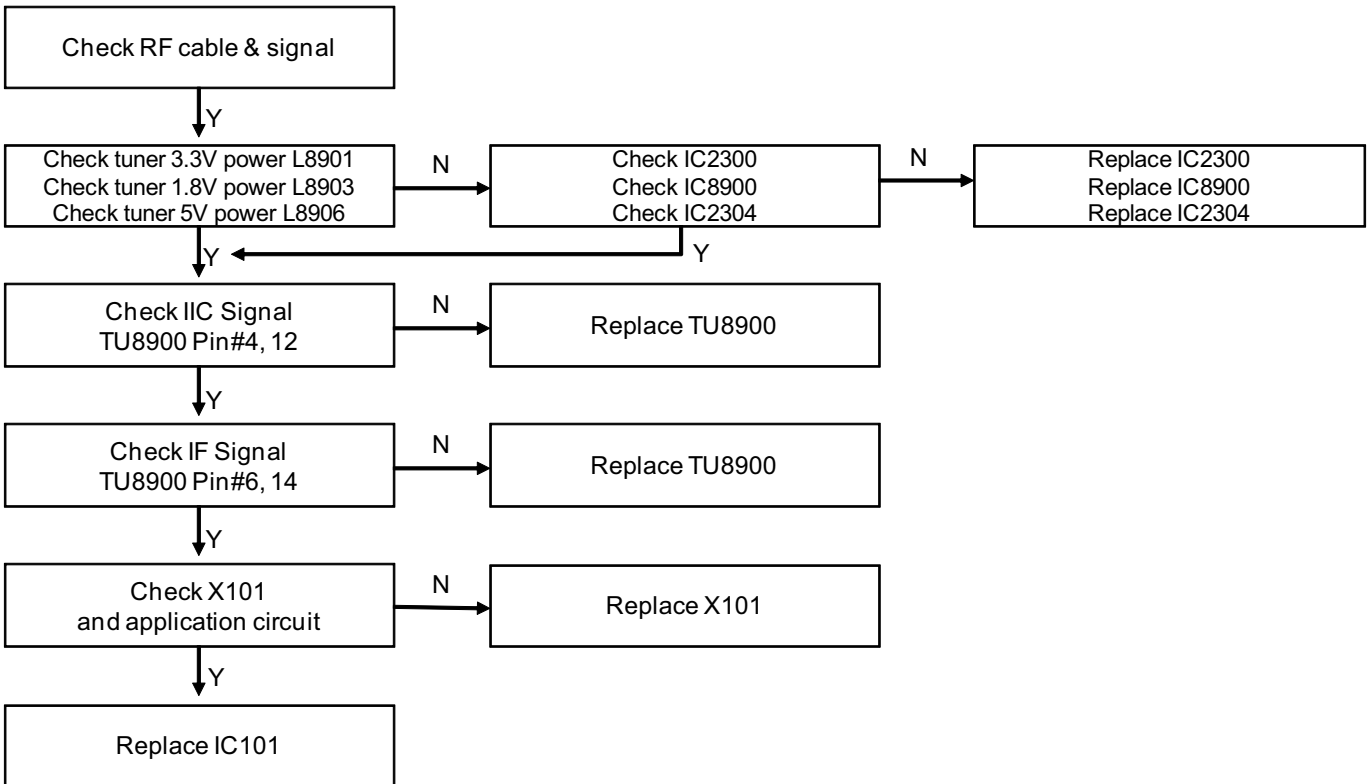


3. Analog RF Video Trouble Shooting guide

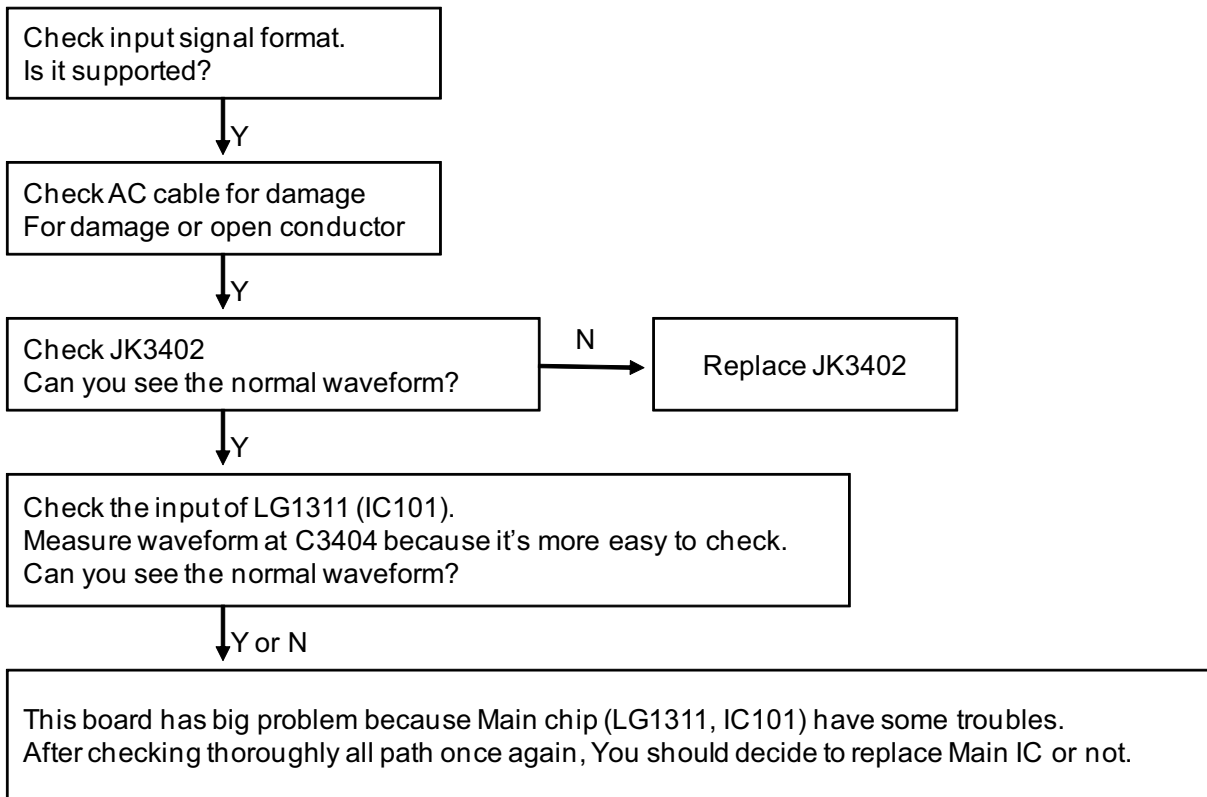
First of all, Check whether all of cables between board is inserted properly or not.
(Main B/D ↔ Power B/D, LVDS Cable, Speaker Cable, IR B/D Cable,,,))



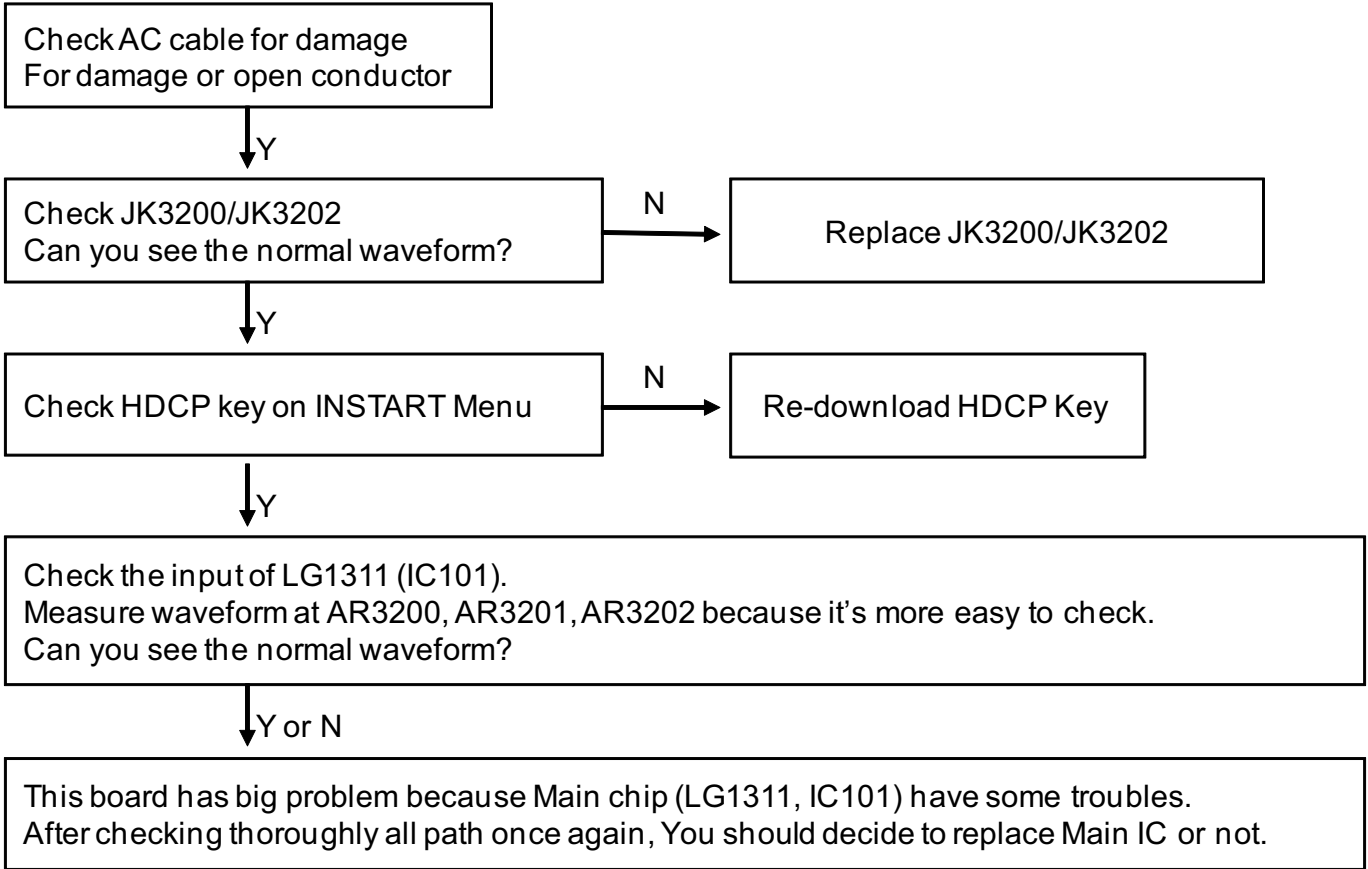
4. Digital RF Trouble Shooting guide



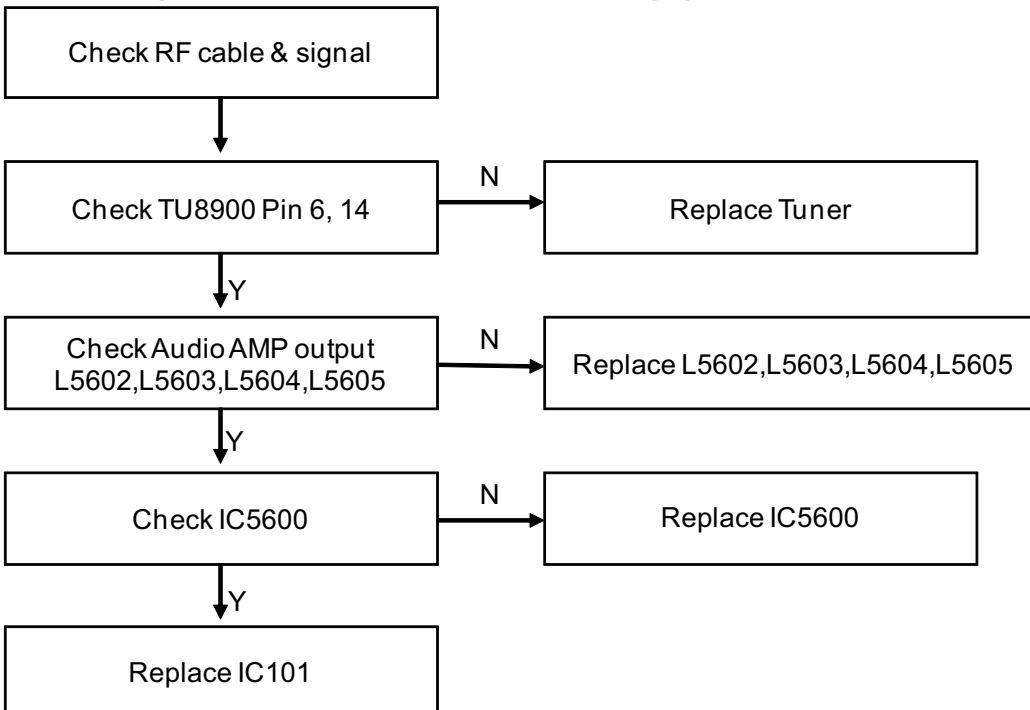
5. AV Video Trouble Shooting guide



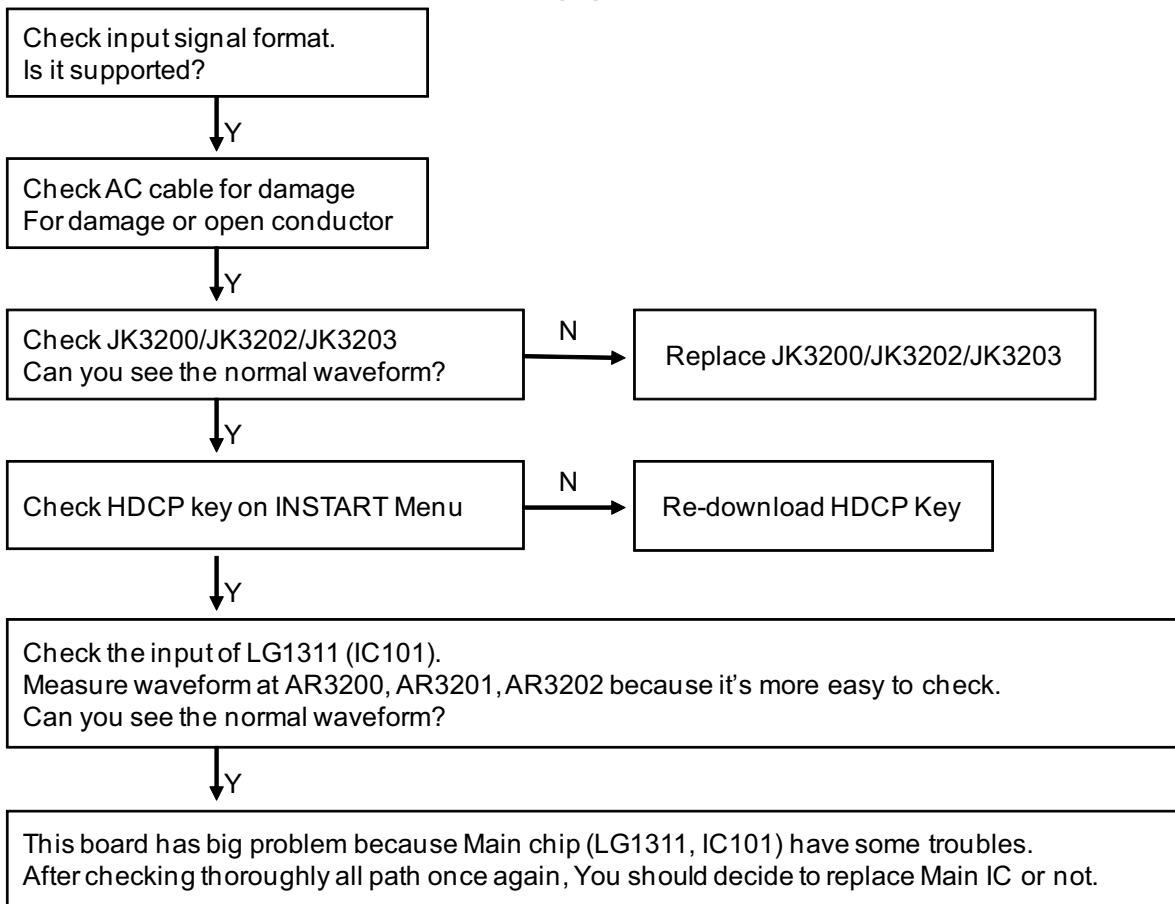
6. HDMI Video Trouble Shooting guide



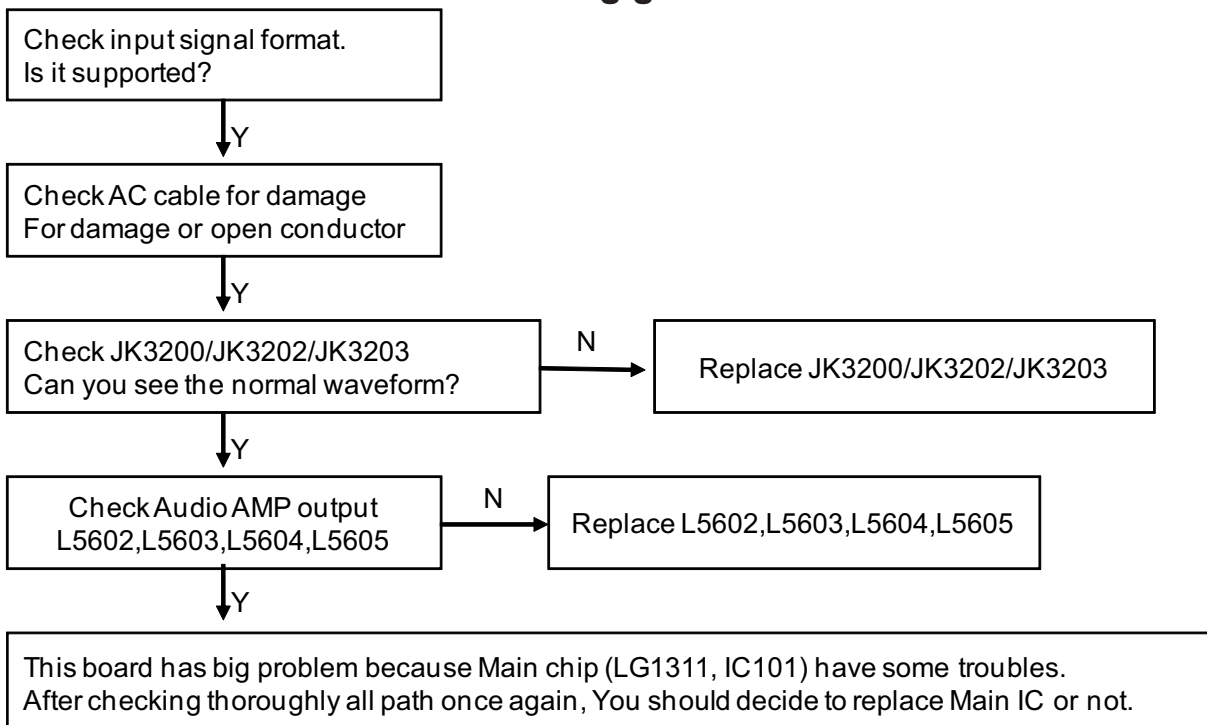
7. Analog RF Audio Trouble Shooting guide



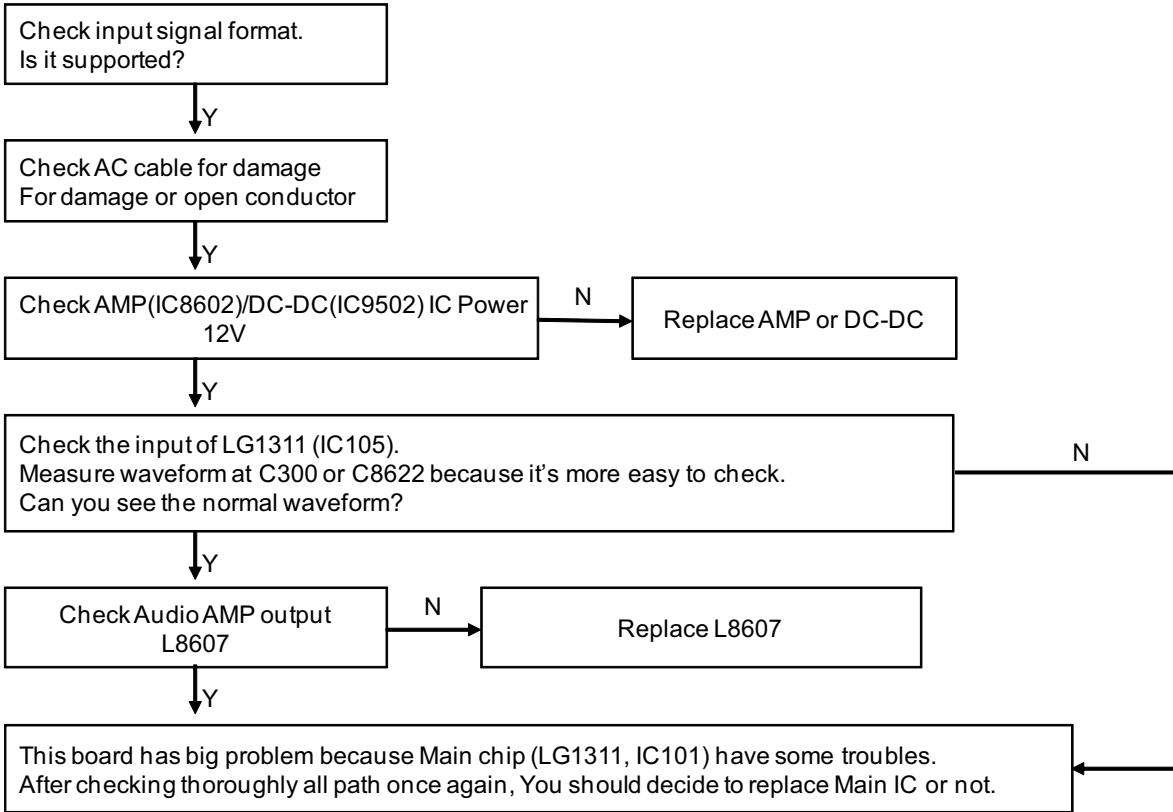
8. AV Audio in Trouble Shooting guide



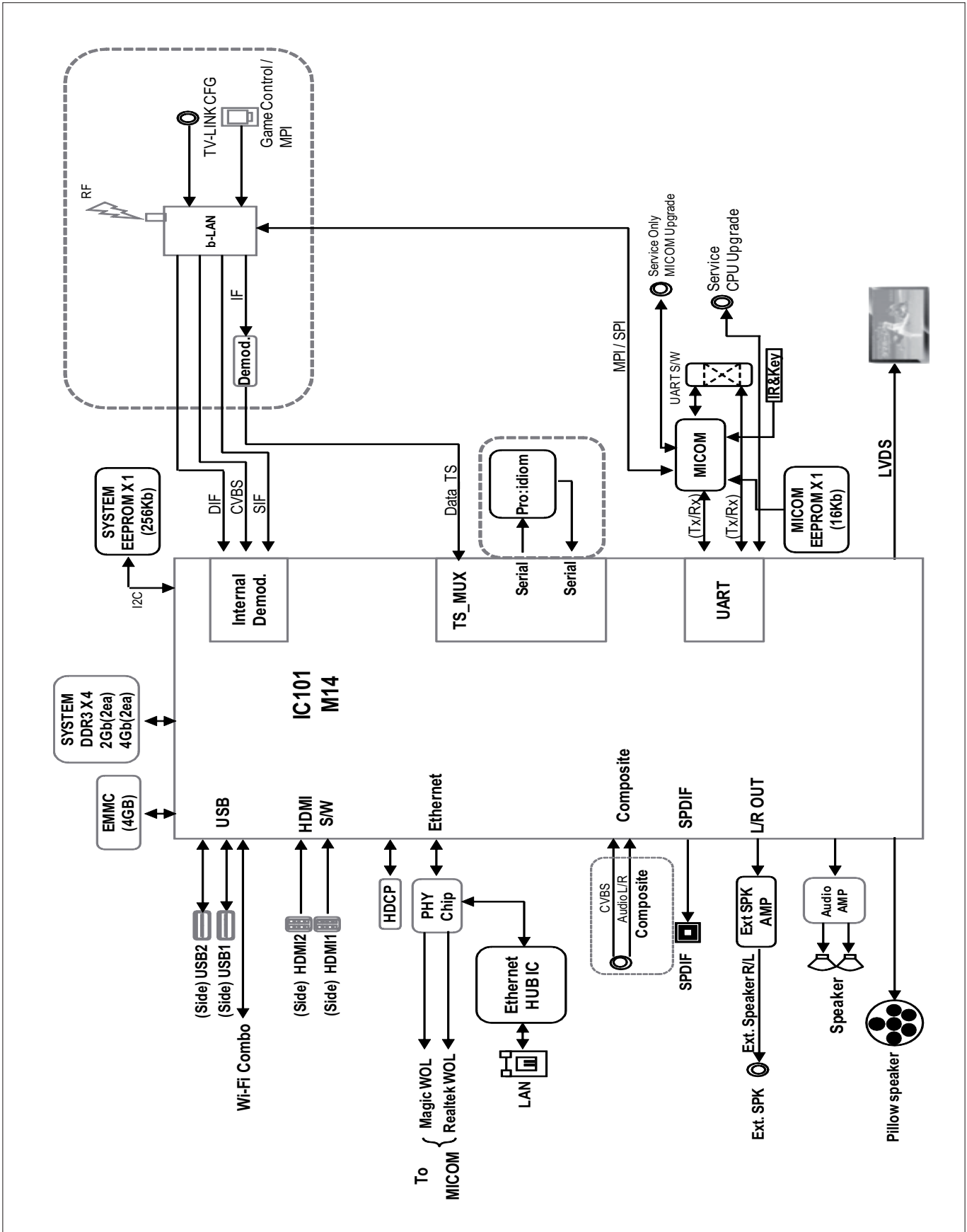
9. HDMI Audio in Trouble Shooting guide



10. Pillow Speaker in Trouble Shooting guide



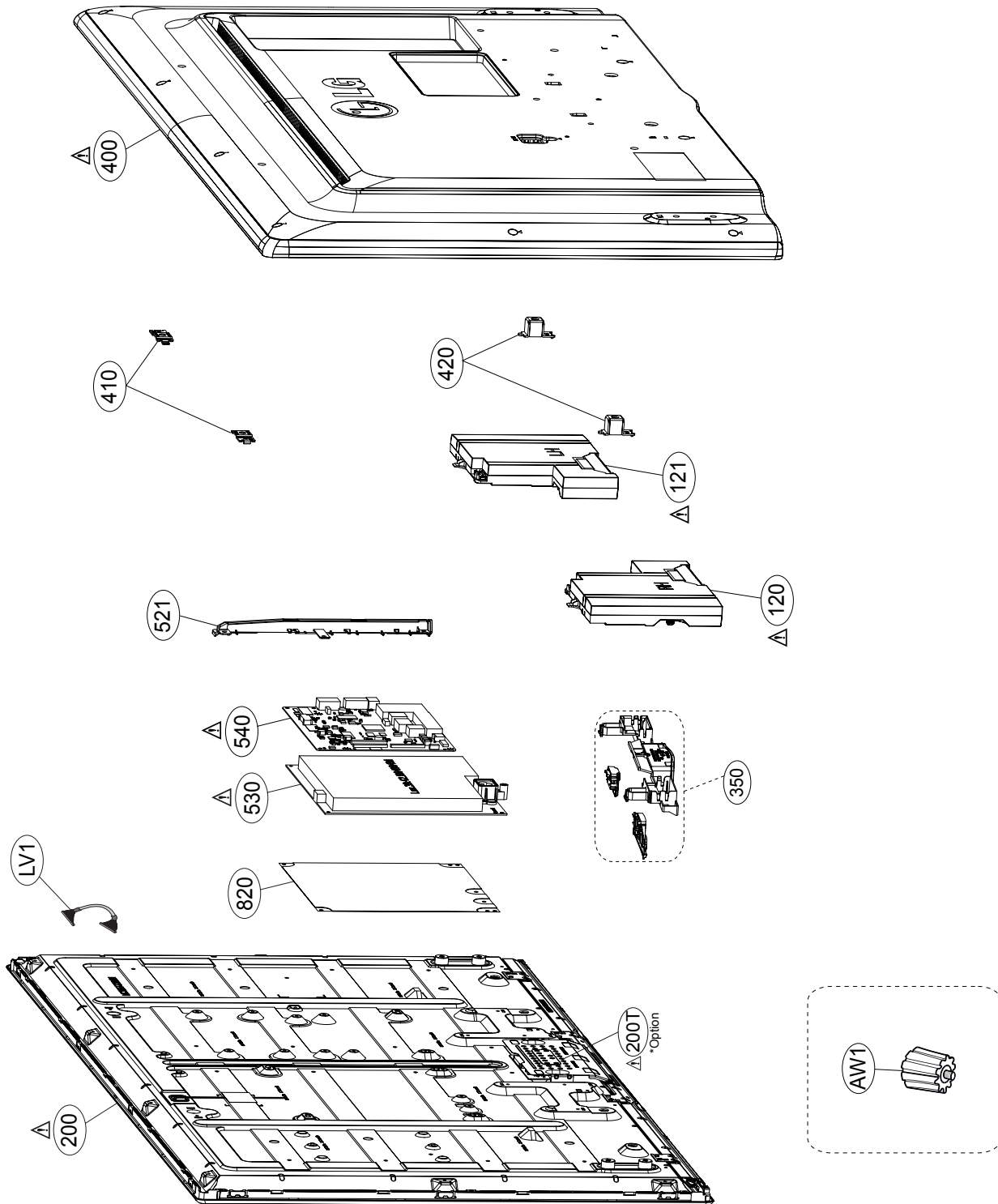
BLOCK DIAGRAM



EXPLODED VIEW

IMPORTANT SAFETY NOTICE

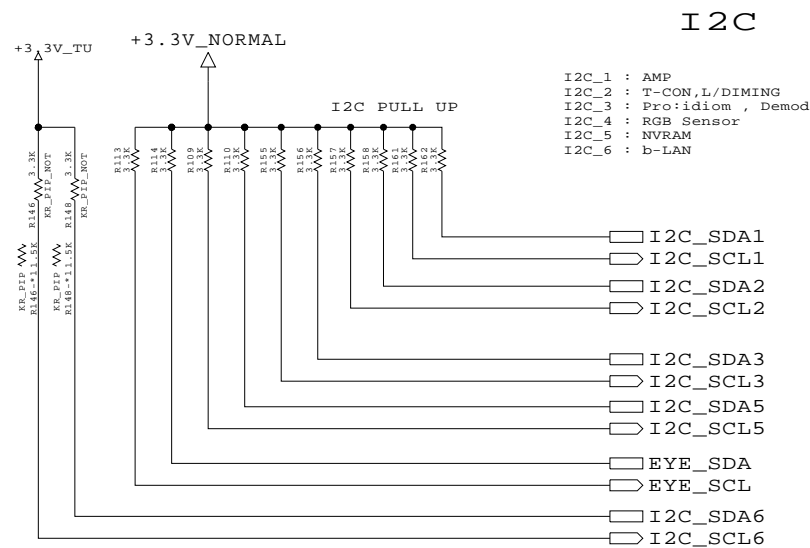
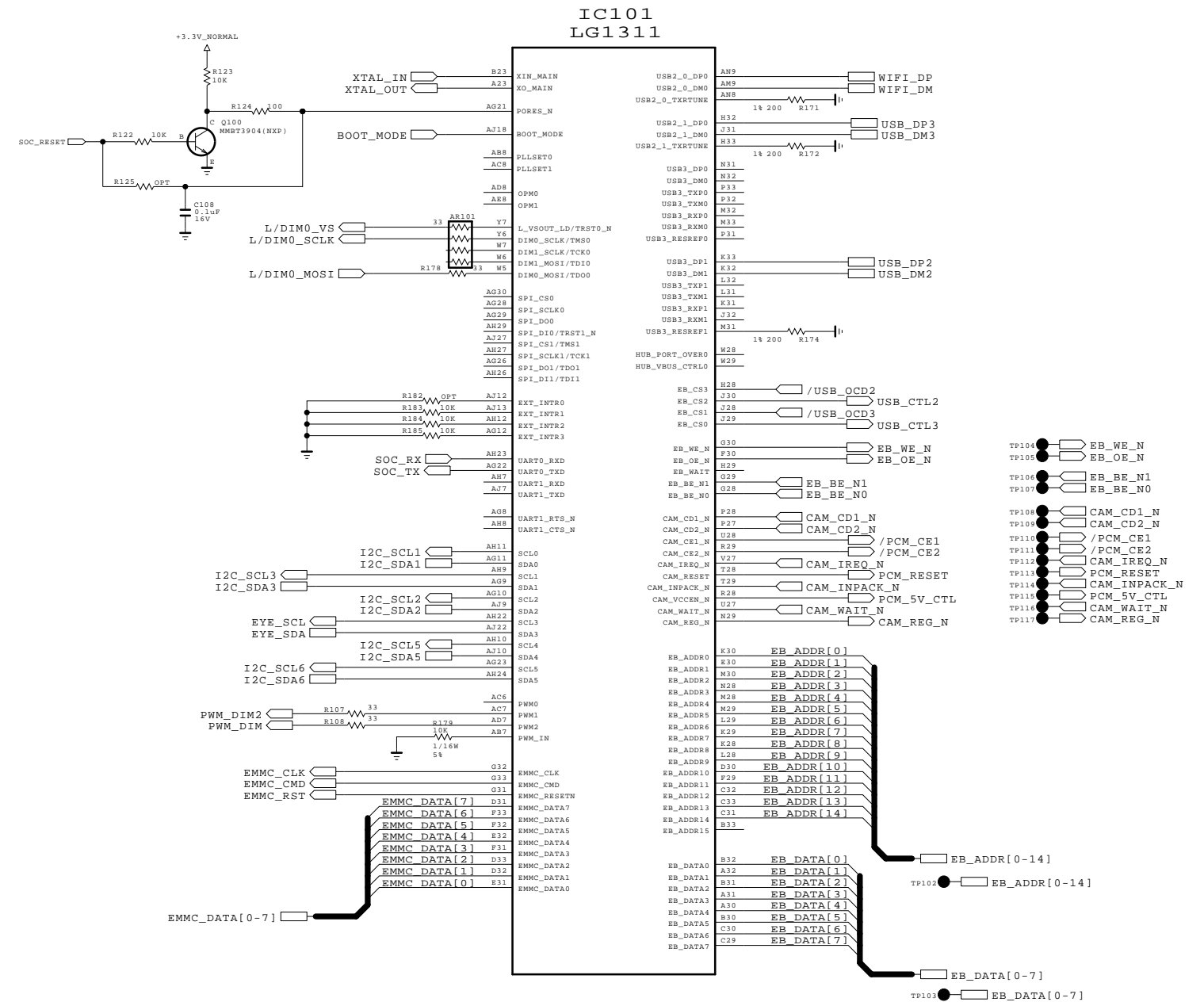
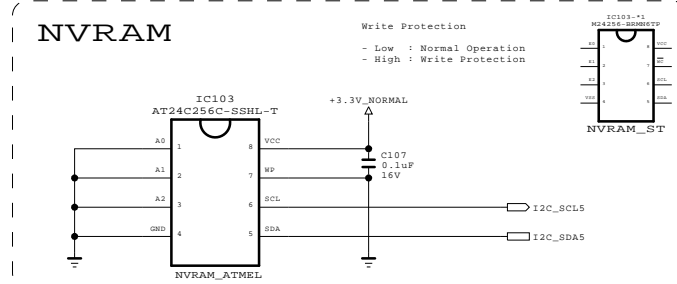
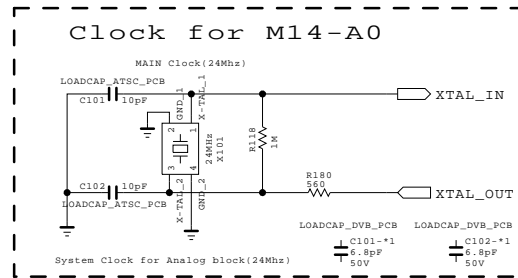
Many electrical and mechanical parts in this chassis have special safety-related characteristics. These parts are identified by Δ in the Schematic Diagram and EXPLODED VIEW. It is essential that these special safety parts should be replaced with the same components as recommended in this manual to prevent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



EAX66144103(1.0)

Chassis Name:LA4BY

System Configuration



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LGElectronics



MODEL	LY770M-UA	DATE	2014.05.12
BLOCK	M14 Symbol A	SHEET	1 / 25

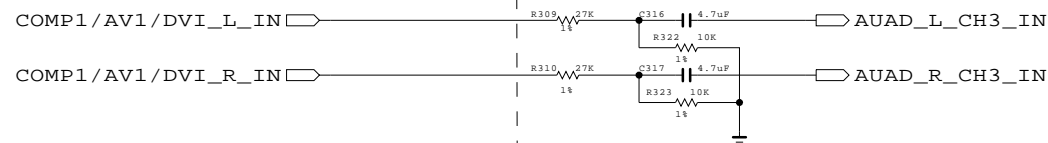
PLACE AT JACK SIDE

Place JACK Side Place SOC Side

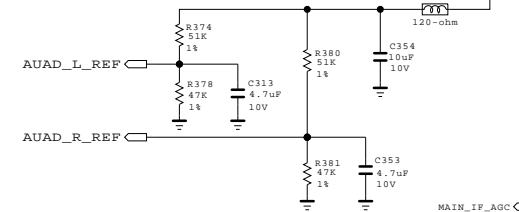
AVI_CVBS/COMP1_Y Circuit was moved to 34Page



AUDIO IN

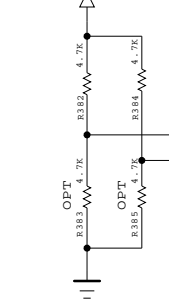


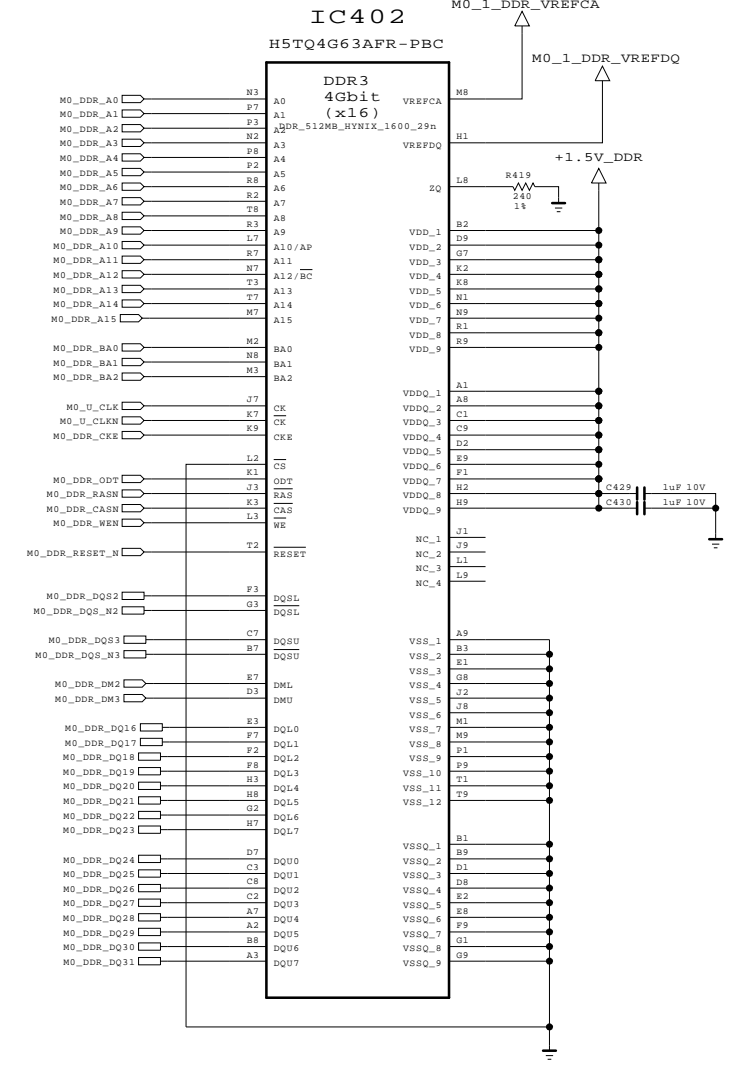
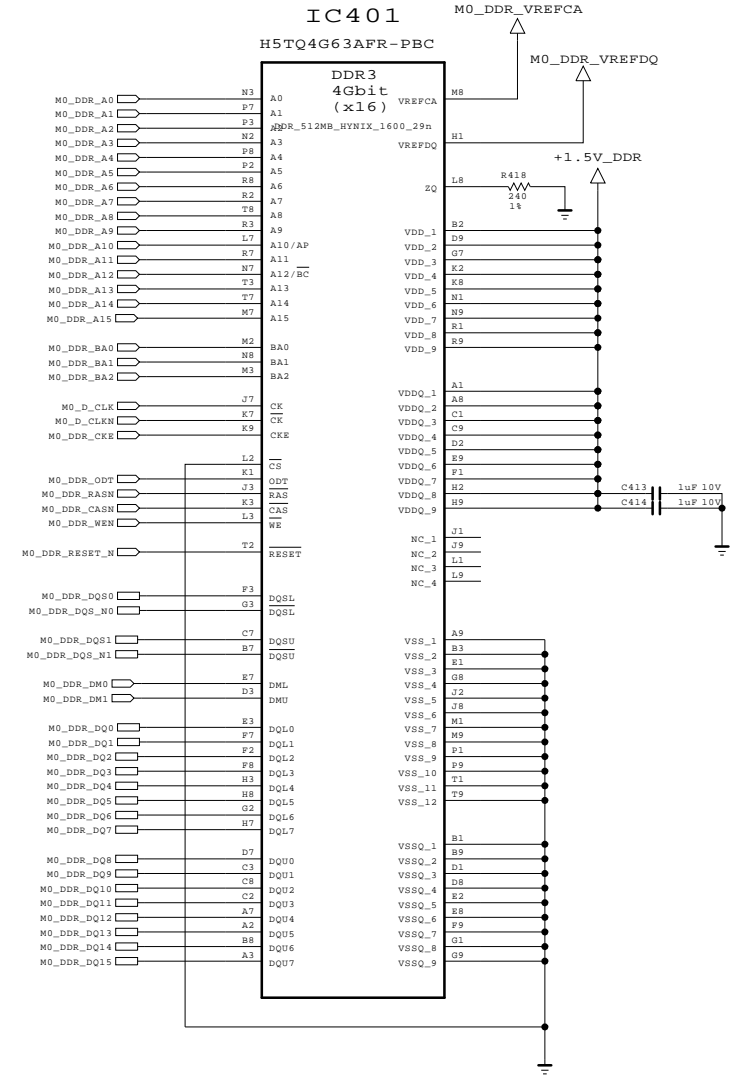
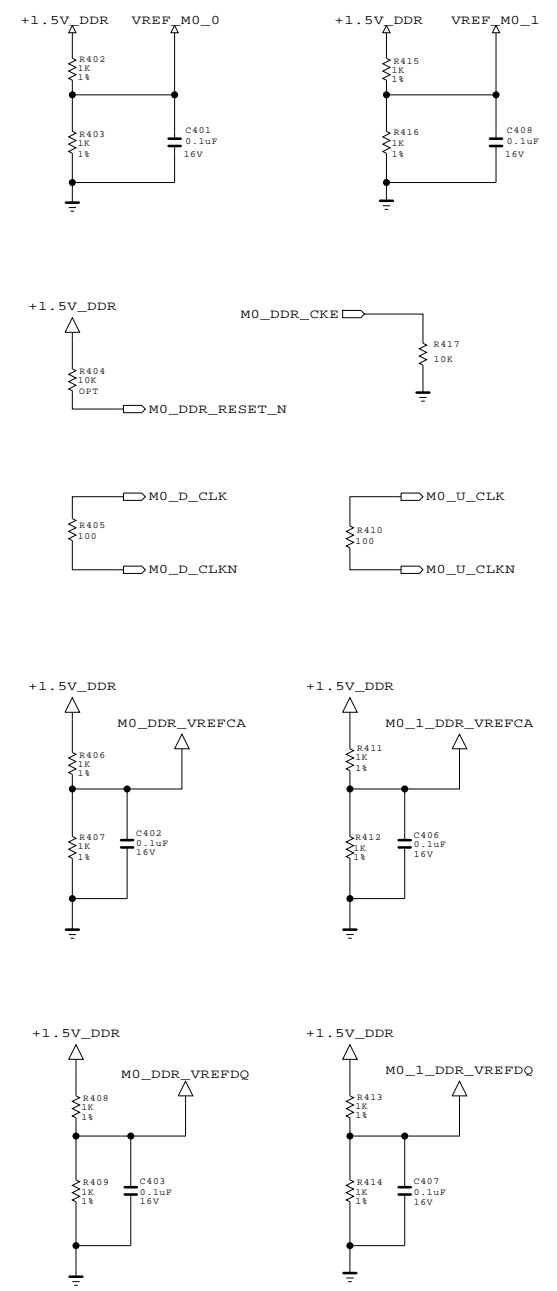
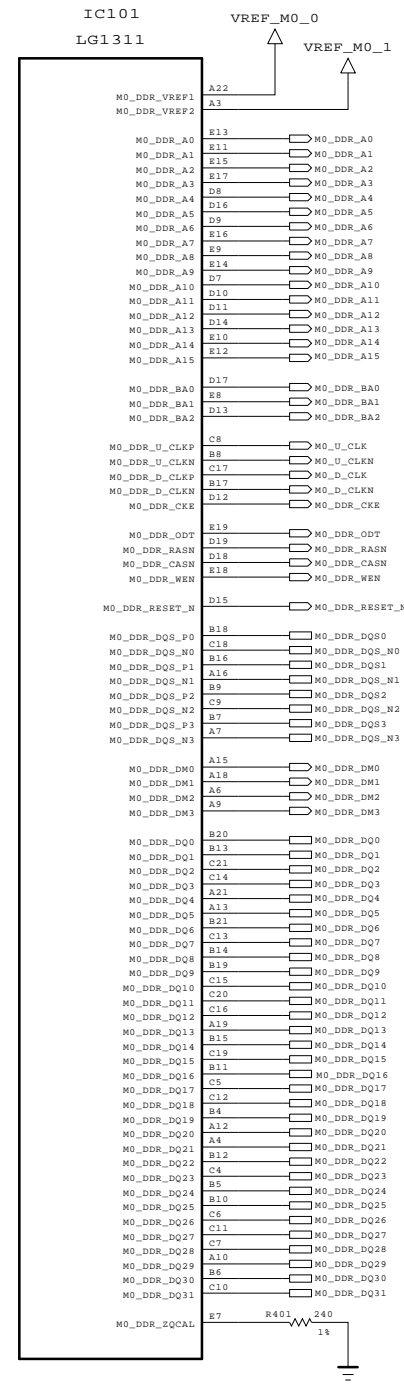
Placed as close as possible to IC101 AVDD25



DDR3 VENDOR OPTION

+3.3V_NORMAL



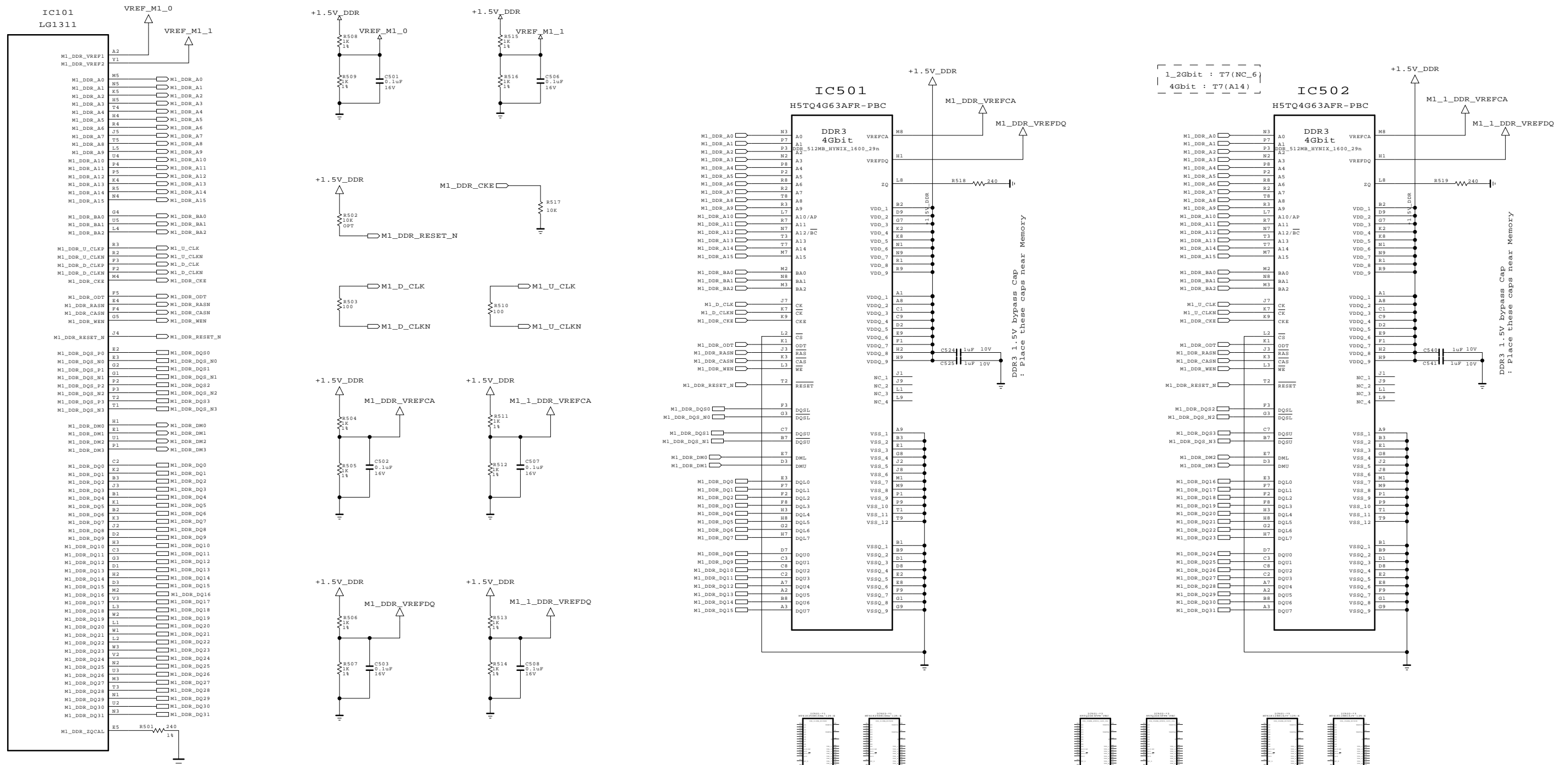


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MODEL	LY770M-UA	DATE	2014.05.12
BLOCK	M14 DDR3-M0	SHEET	4 / 25

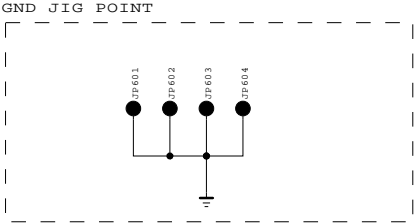
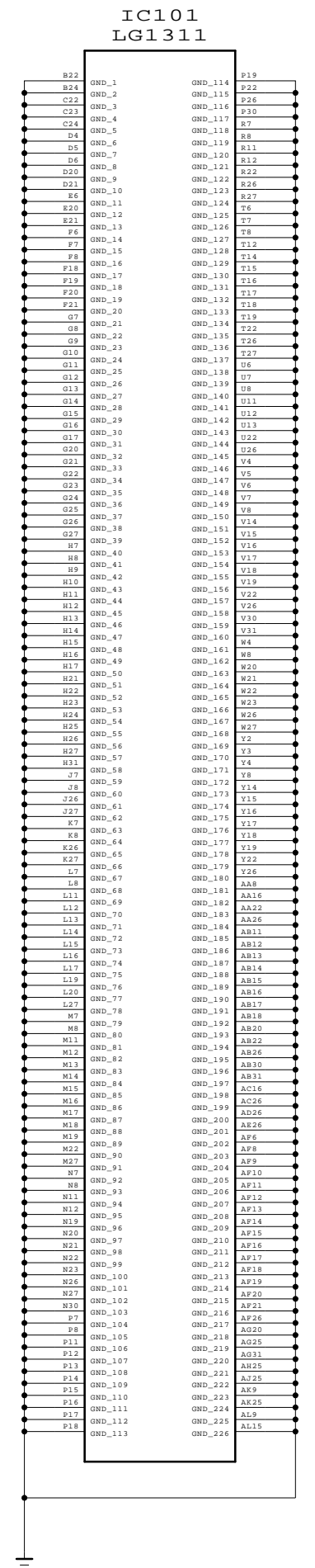
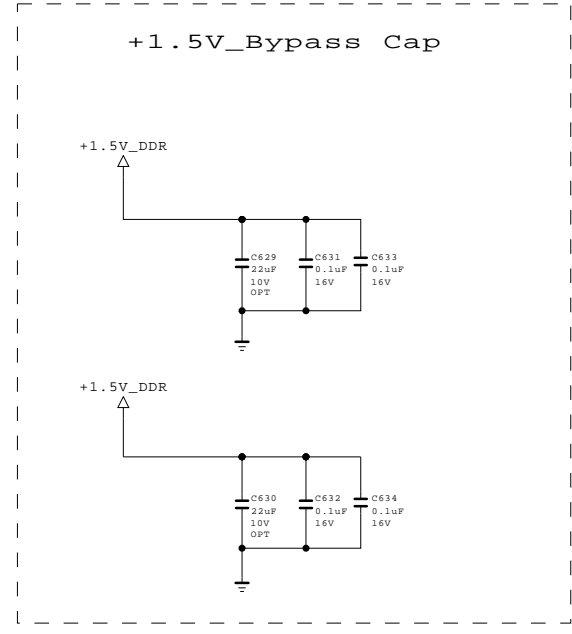
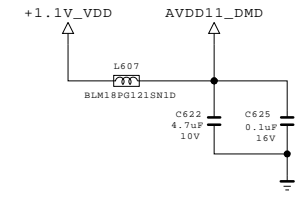
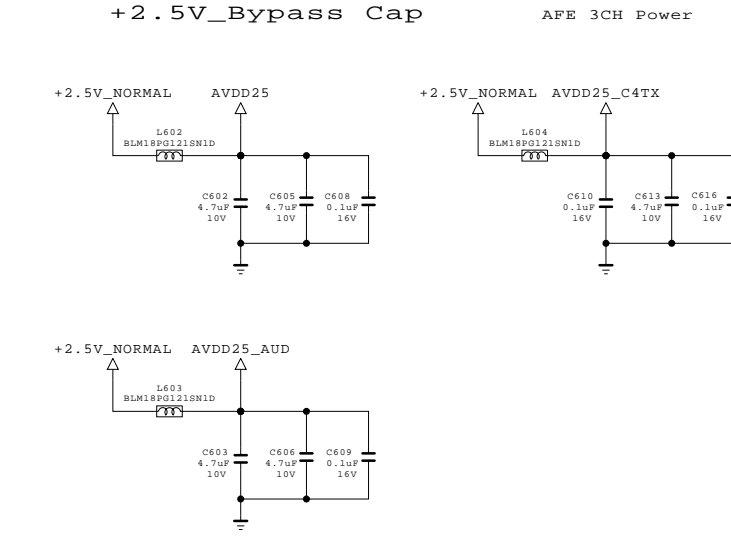
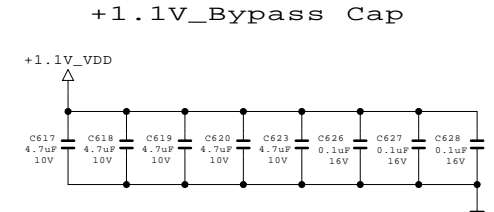
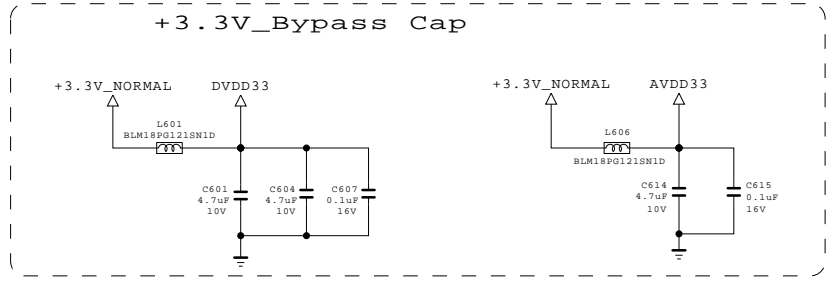
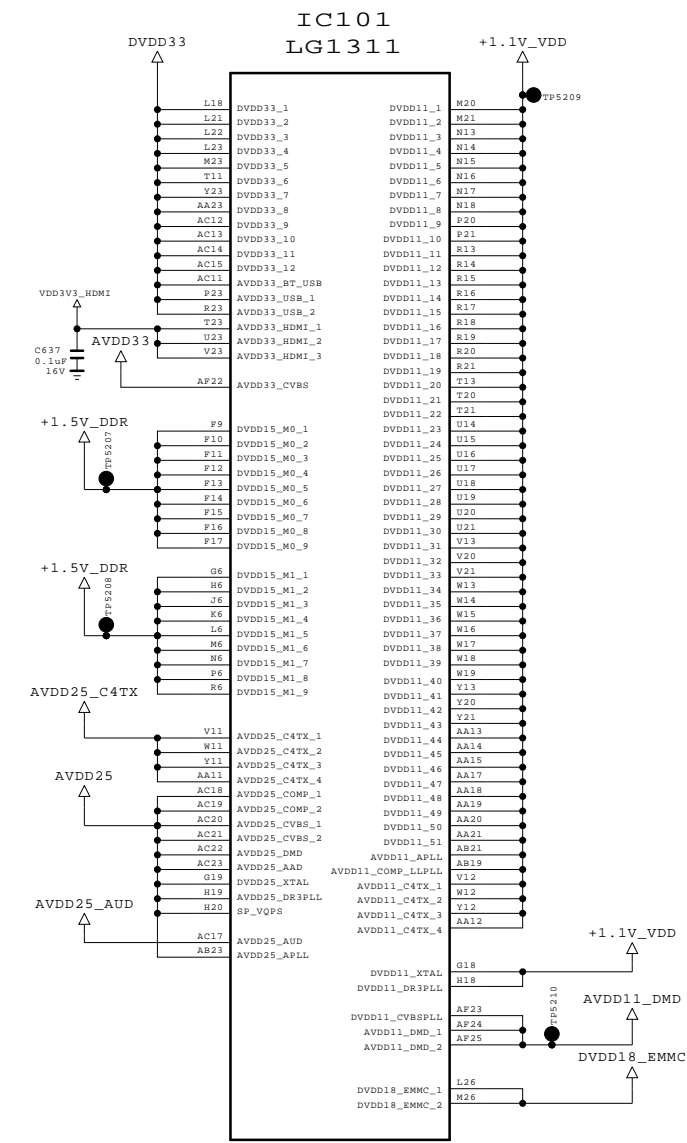


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MODEL	LY770M-UA	DATE	2014.05.12
BLOCK	M14 DDR3-M1	SHEET	5 / 25

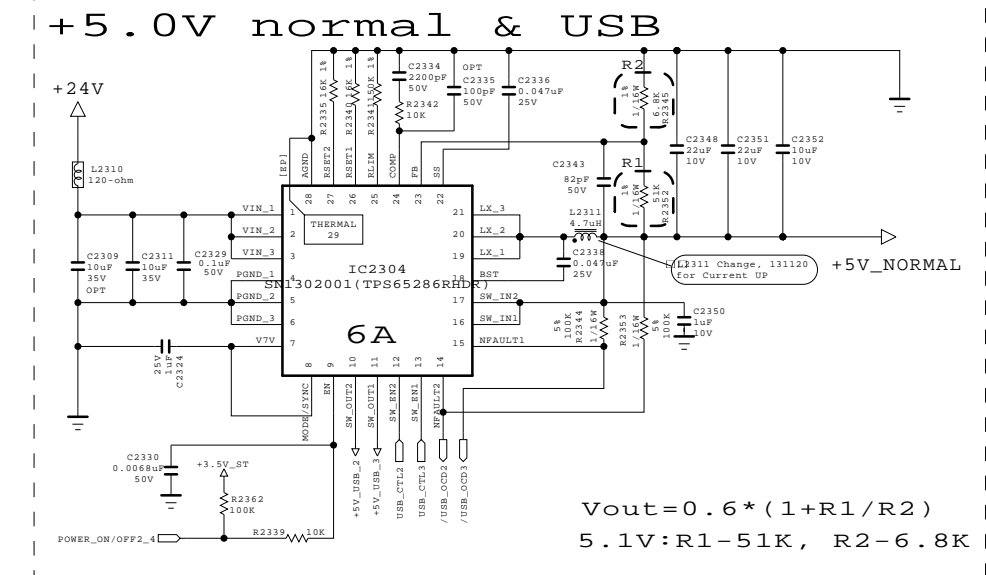
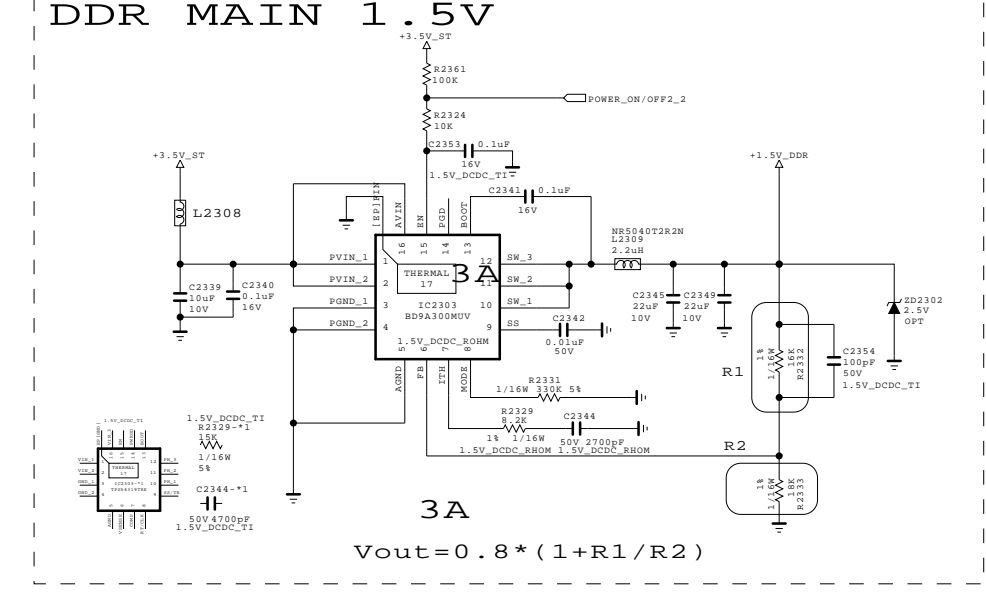
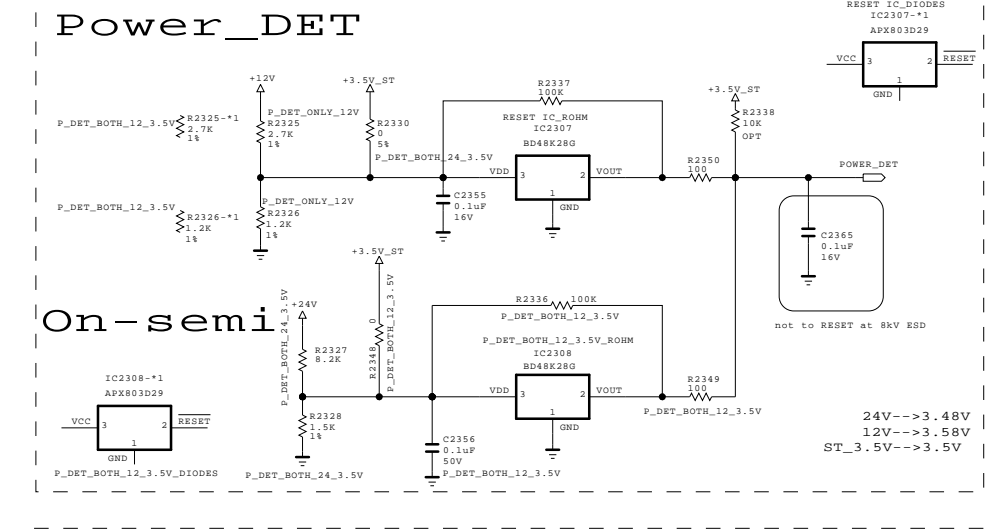
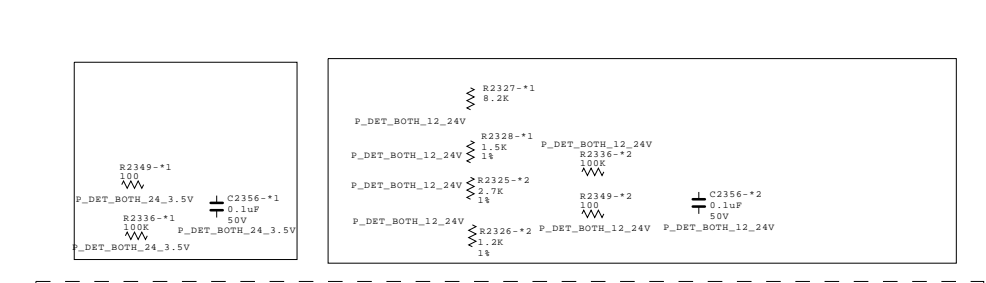
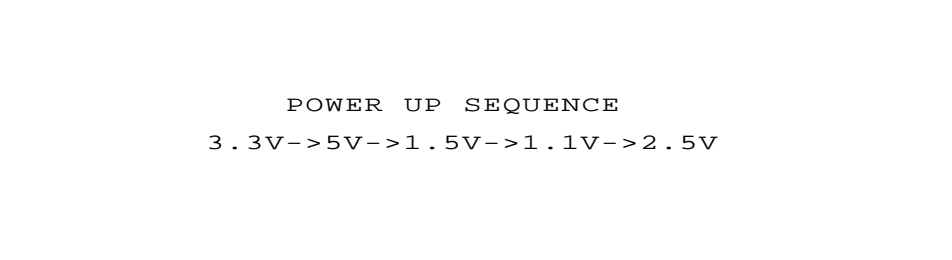
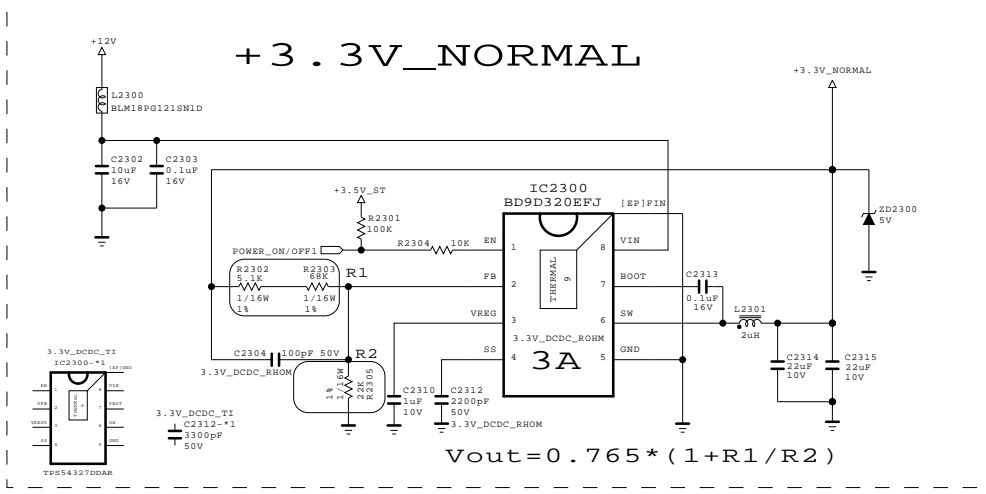
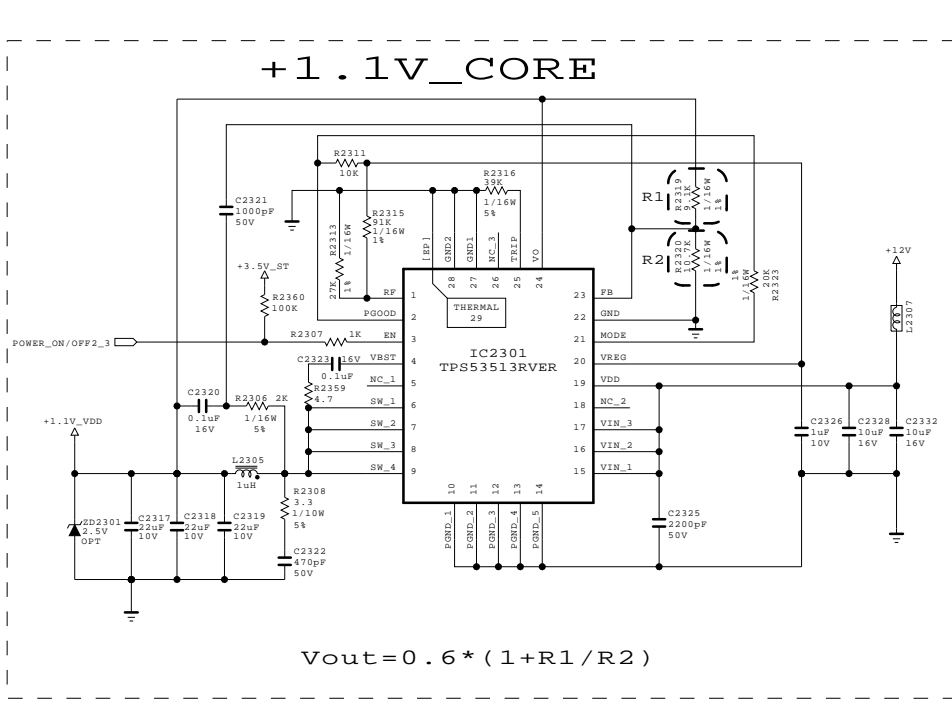
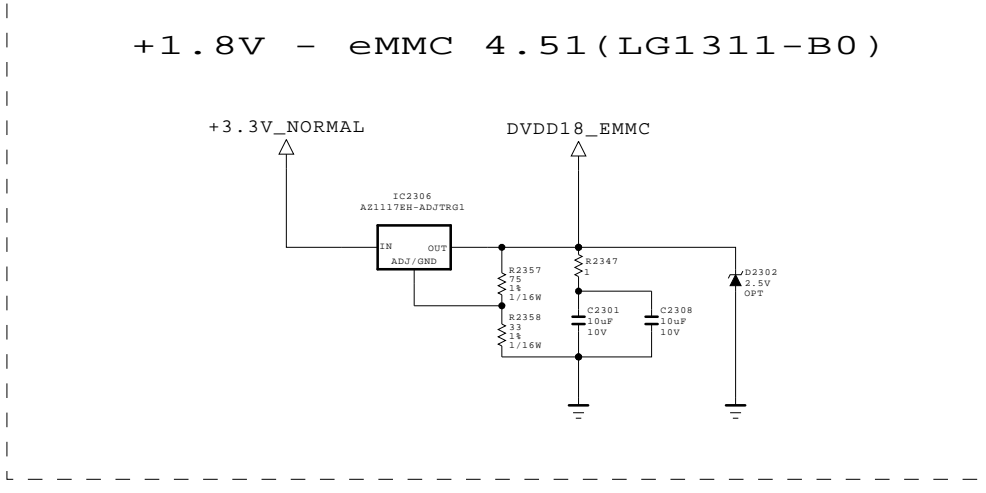
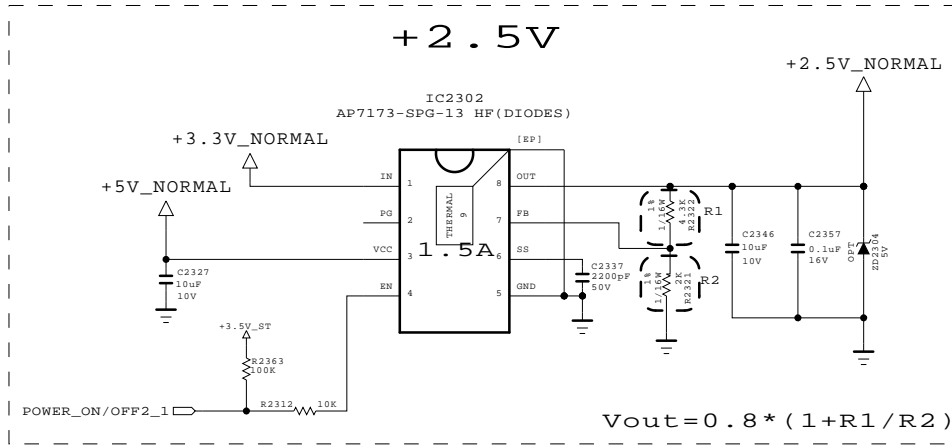
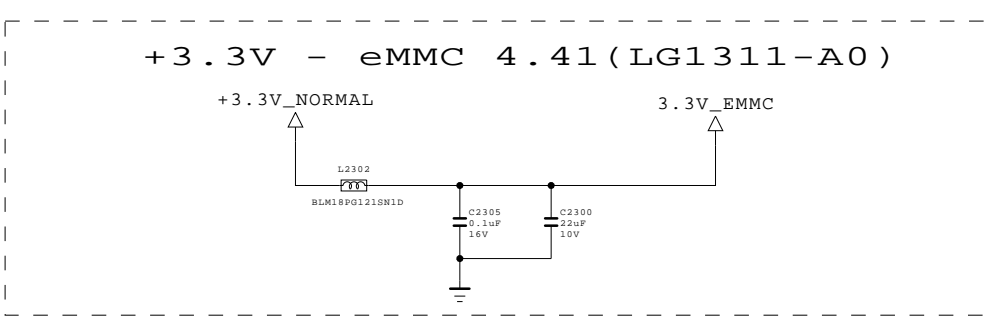
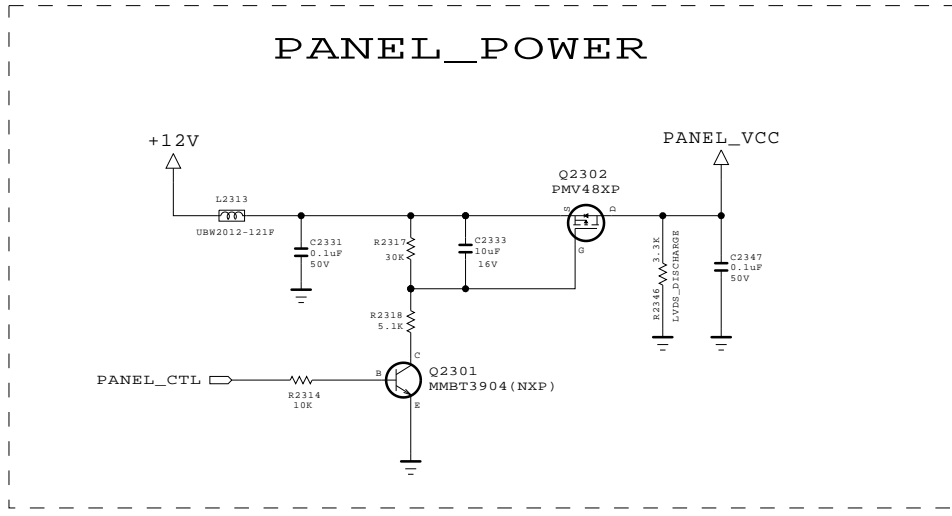
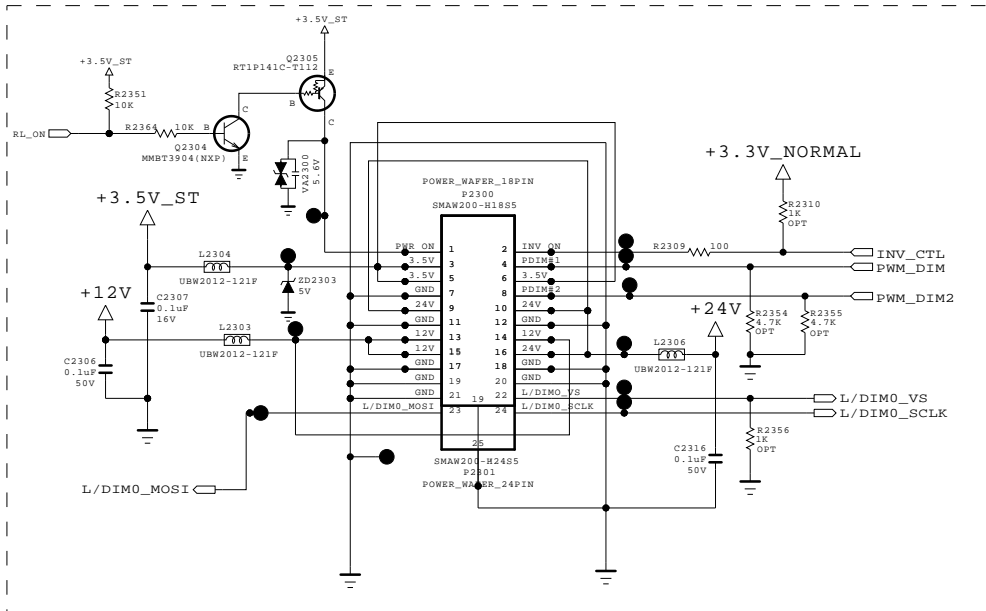


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MODEL	LY770M-UA	DATE	2014.05.12
BLOCK	VCC & GND	SHEET	6 / 25



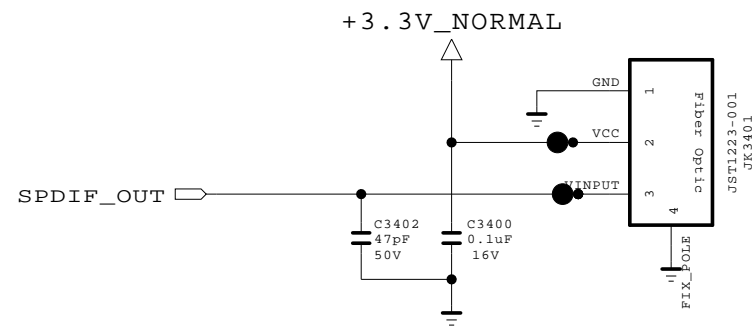
THE SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FIRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURERS SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE SYMBOL MARK OF THE SCHEMATIC.

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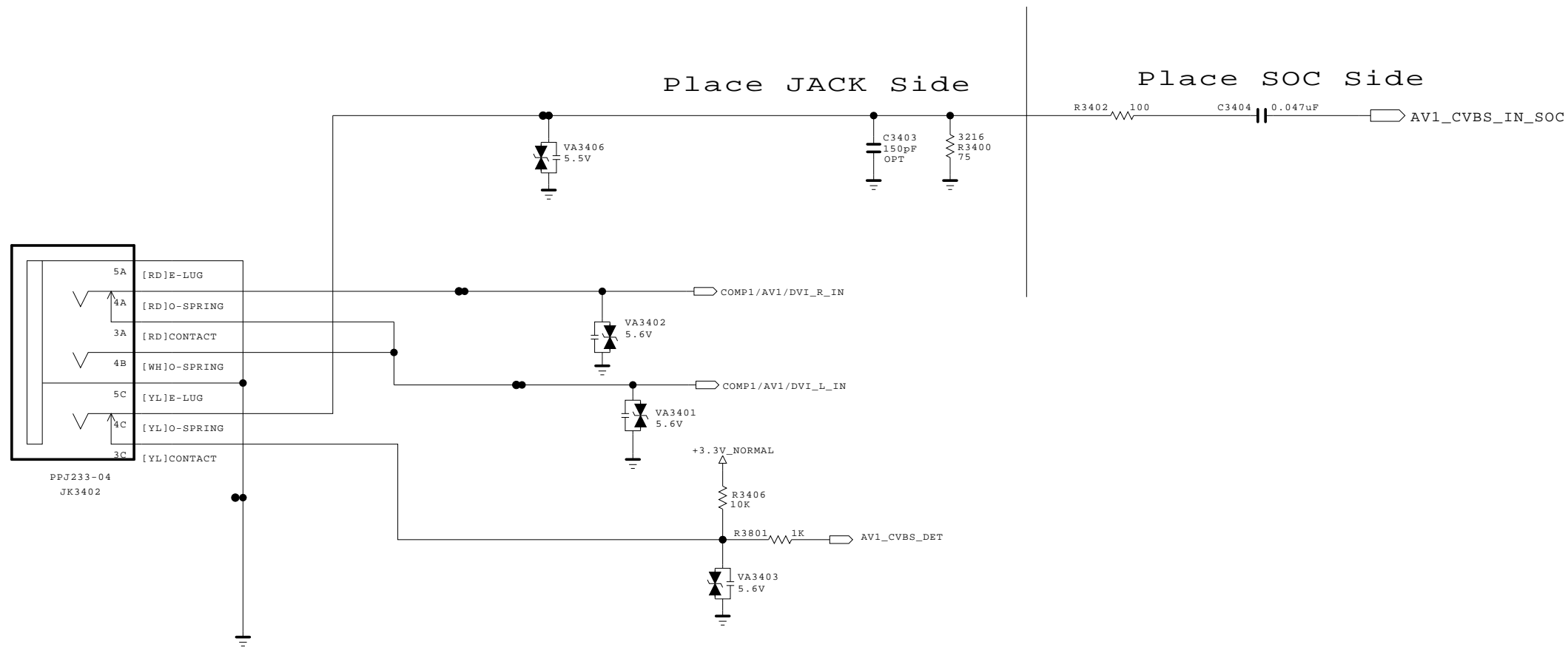
LG ELECTRONICS

MODEL	LY770M-UA	DATE	2014.07.10
BLOCK	POWER	SHEET	7 / 25

SPDIF OUT



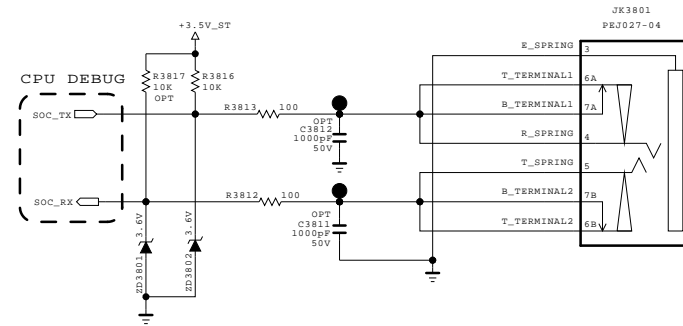
AV REAR



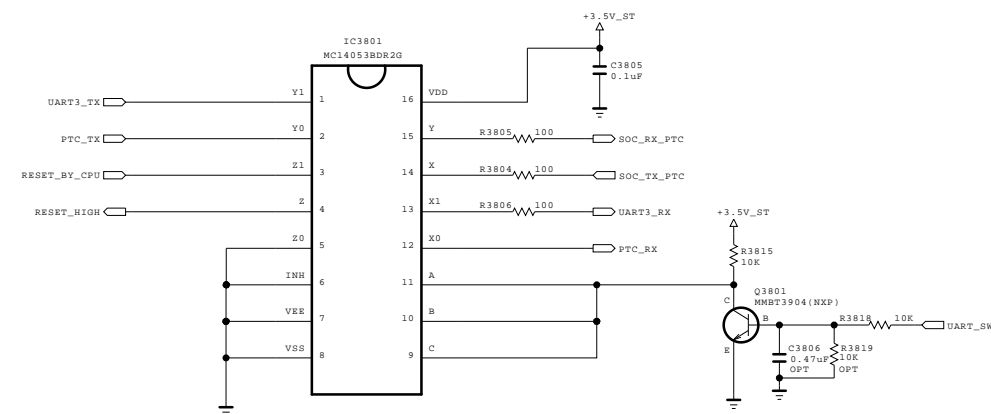
THE SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FIRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE SYMBOL MARK OF THE SCHEMATIC.



SECRET	LG ELECTRONICS
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MODEL	LY770M-UA	DATE	2014.05.12
BLOCK	AV JACK	SHEET	9 / 25



Serial UART for Commercial

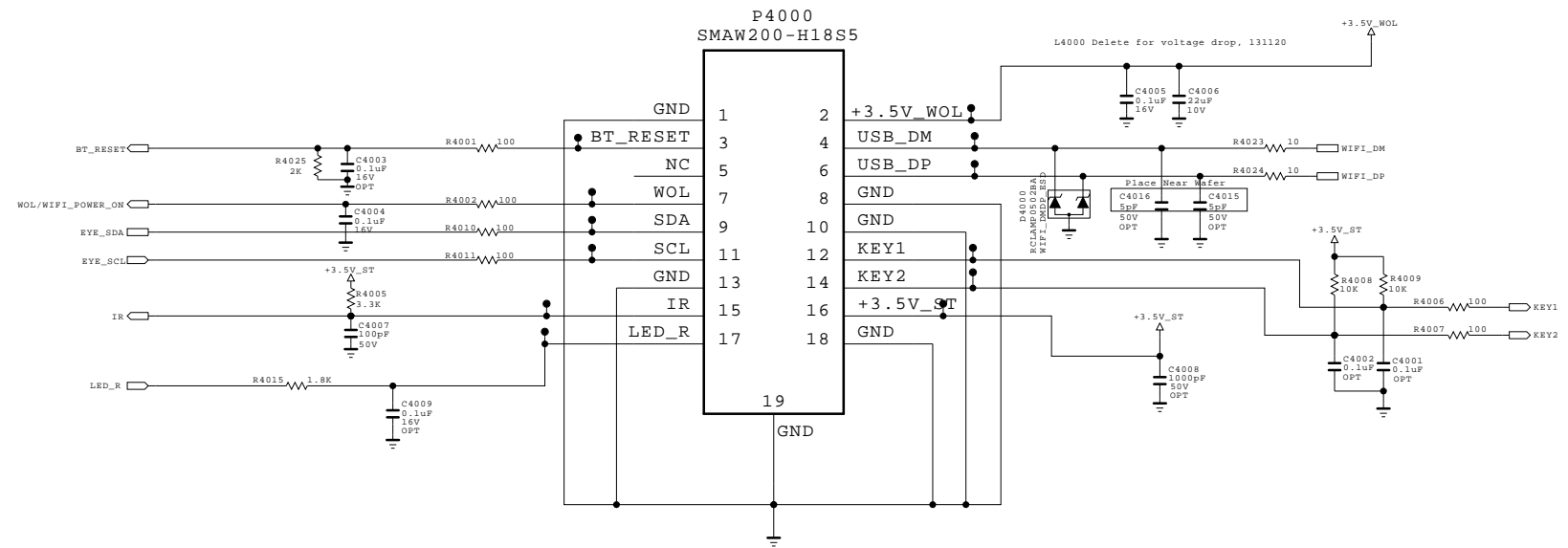


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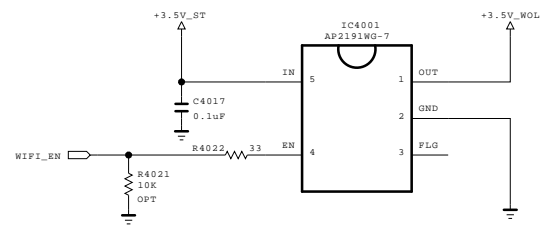
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MODEL	LY770M-UA	DATE	2014.07.10
BLOCK	UART	SHEET	10 / 25



WOL POWER ENABLE CONTROL

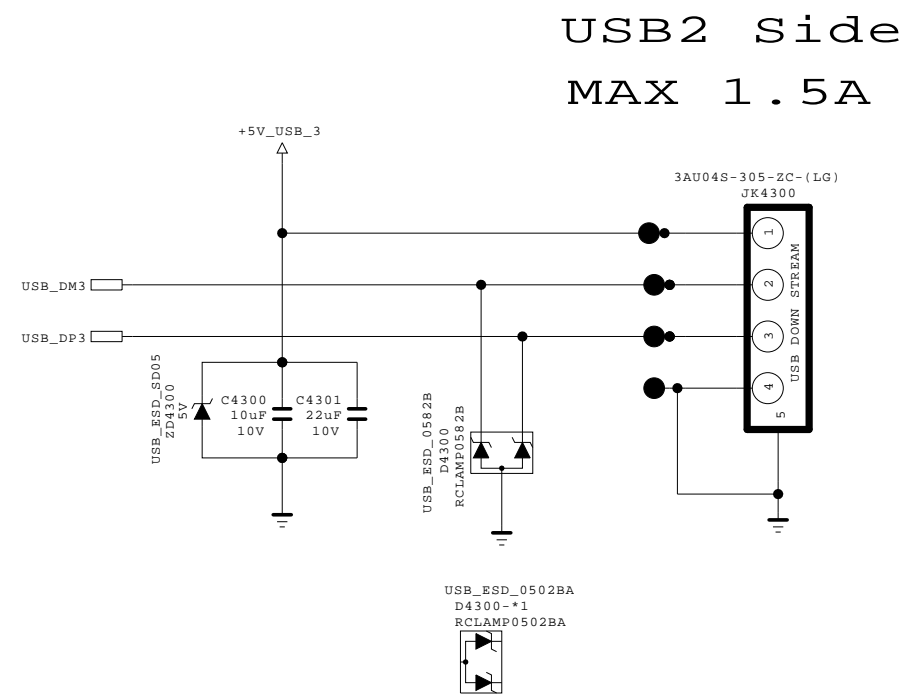
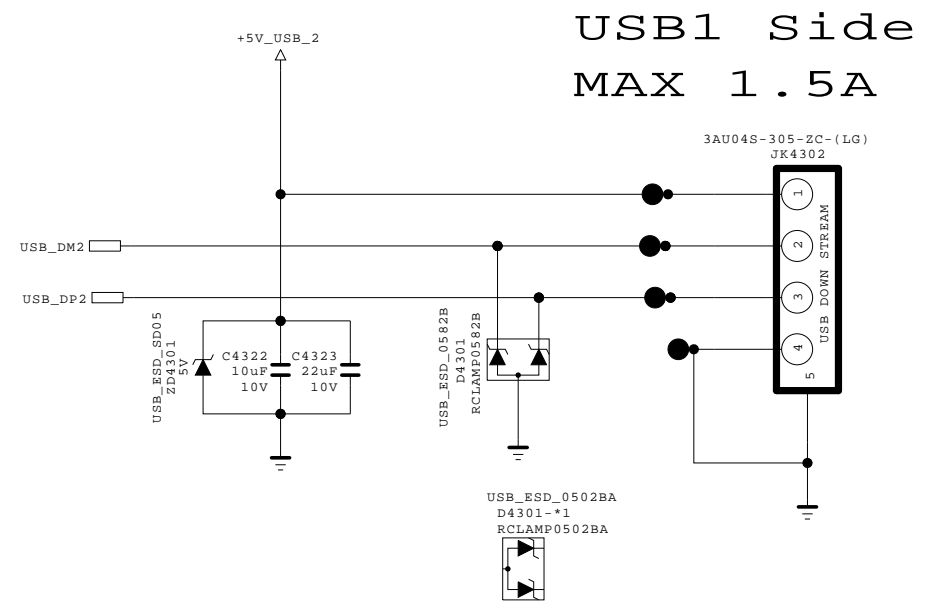


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MODEL	LY770M-UA	DATE	2014.07.10
BLOCK	IR / KEY	SHEET	11 / 25



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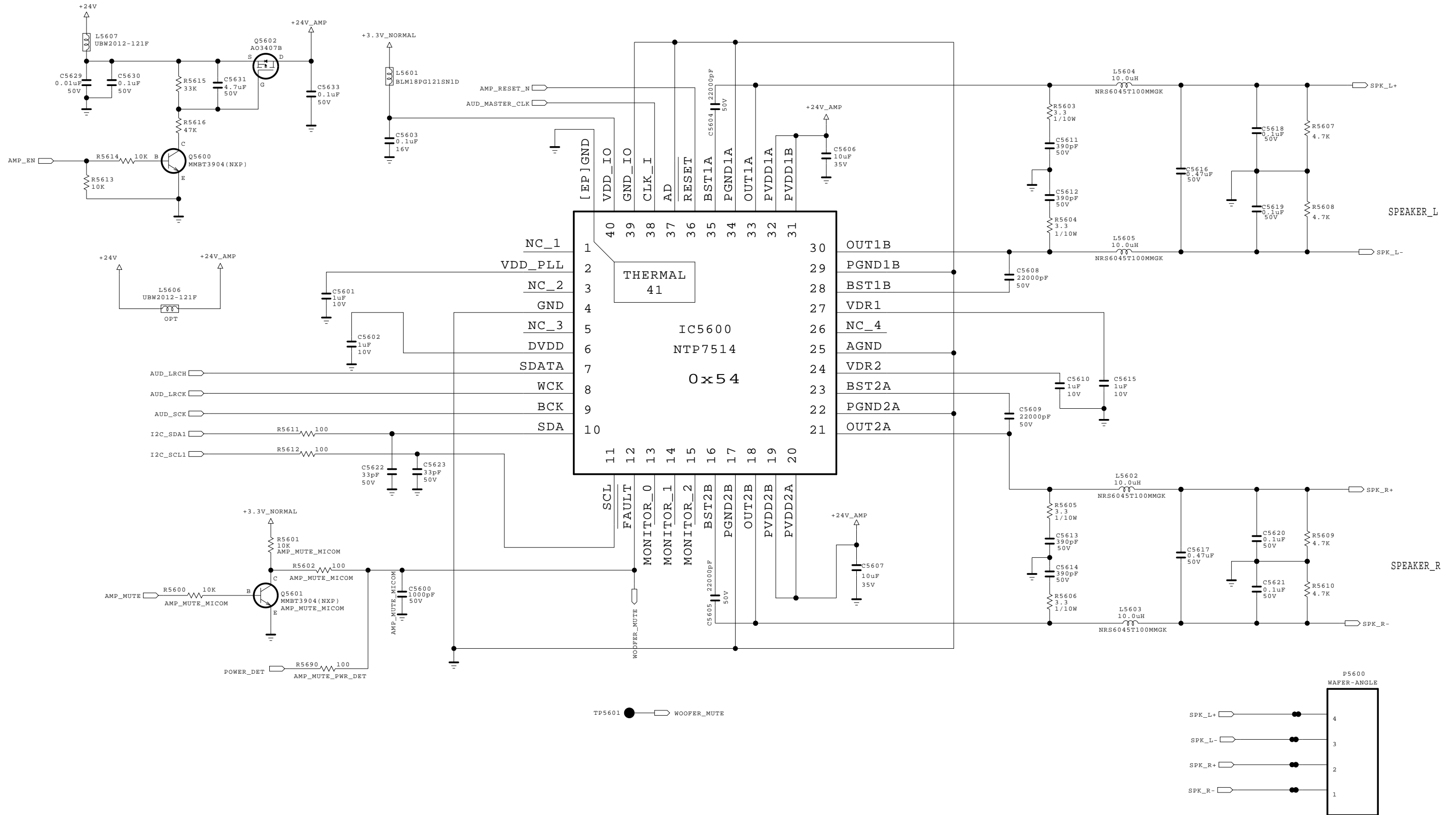
SECRET
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MODEL	LY770M-UA	DATE	2014.05.12
BLOCK	USB	SHEET	12 / 25

AUDIO AMP (NTP7514)

Instant_Power_On



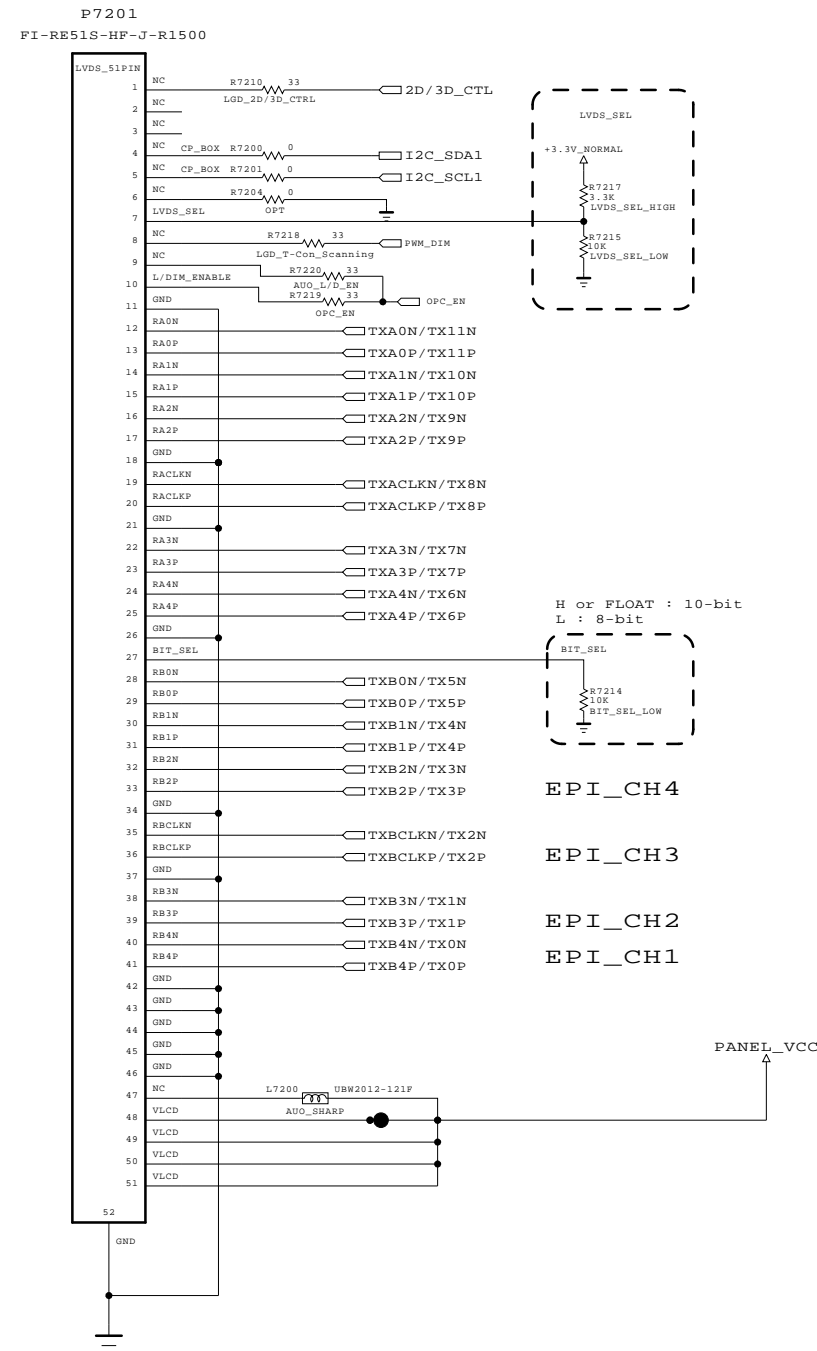
THE ⚠ SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FIRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMATIC.

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MODEL	LY770M-UA	DATE	2014.05.12
BLOCK	AUDIO[ST]	SHEET	13 / 25

LVDS

[51Pin LVDS OUTPUT Connector]



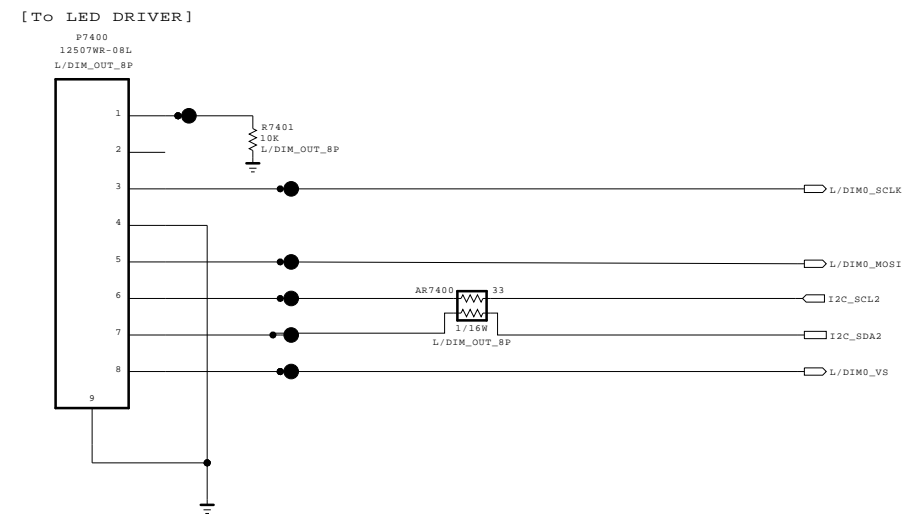
THE SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FIRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURERS SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE SYMBOL MARK OF THE SCHEMATIC.



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MODEL	LY770M-UA	DATE	2014.05.12
BLOCK	LVDS	SHEET	14 / 25

LOCAL DIMMING



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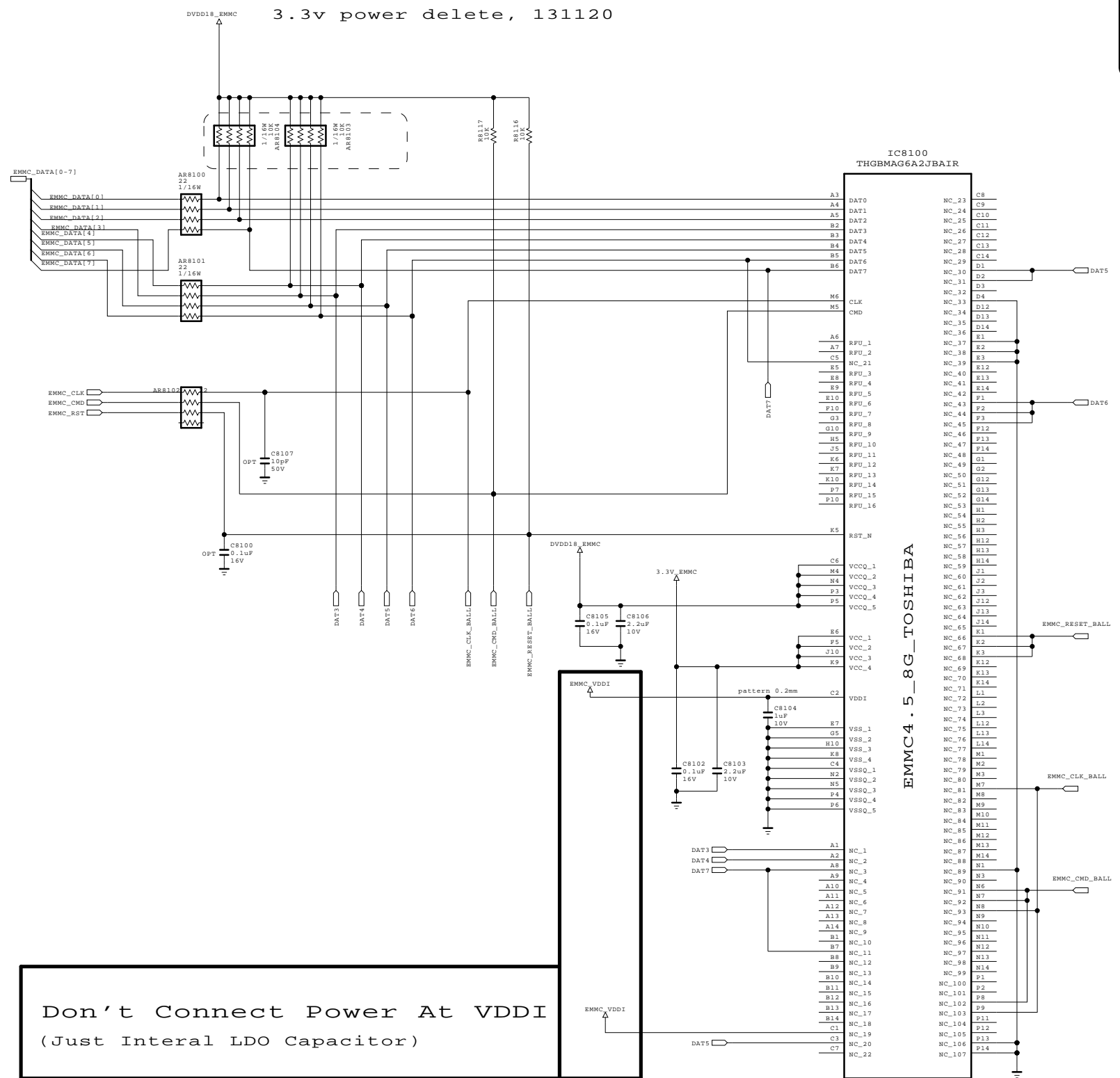
 LG ELECTRONICS

MODEL	LY770M-UA	DATE	2014.05.12
BLOCK	LOCAL DIMMING	SHEET	15 / 26

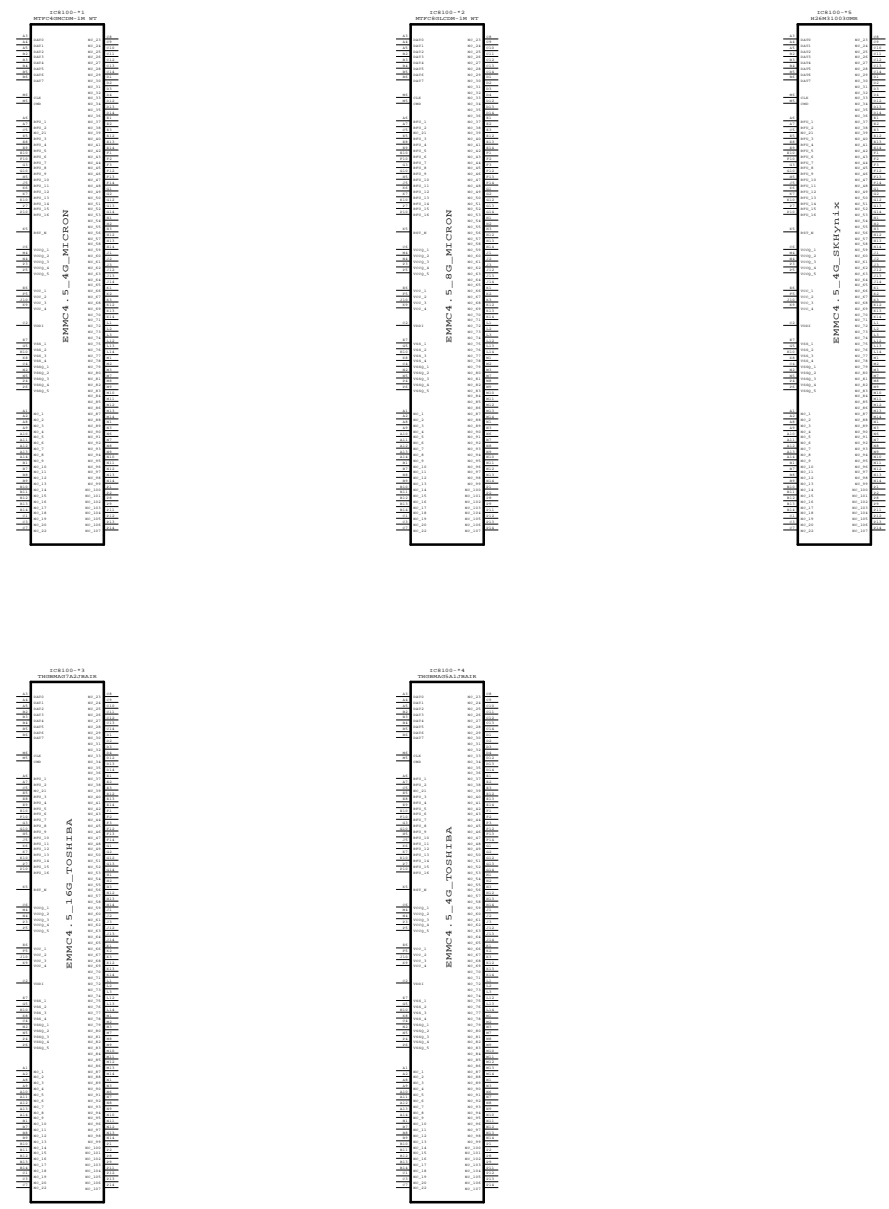
eMMC I/F

3.3v power delete, 131120

* A0 / A1 : Use EMMC_4.41
 * B0 : Use EMMC_4.5
 (130923_Jihwan Hyun)



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



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

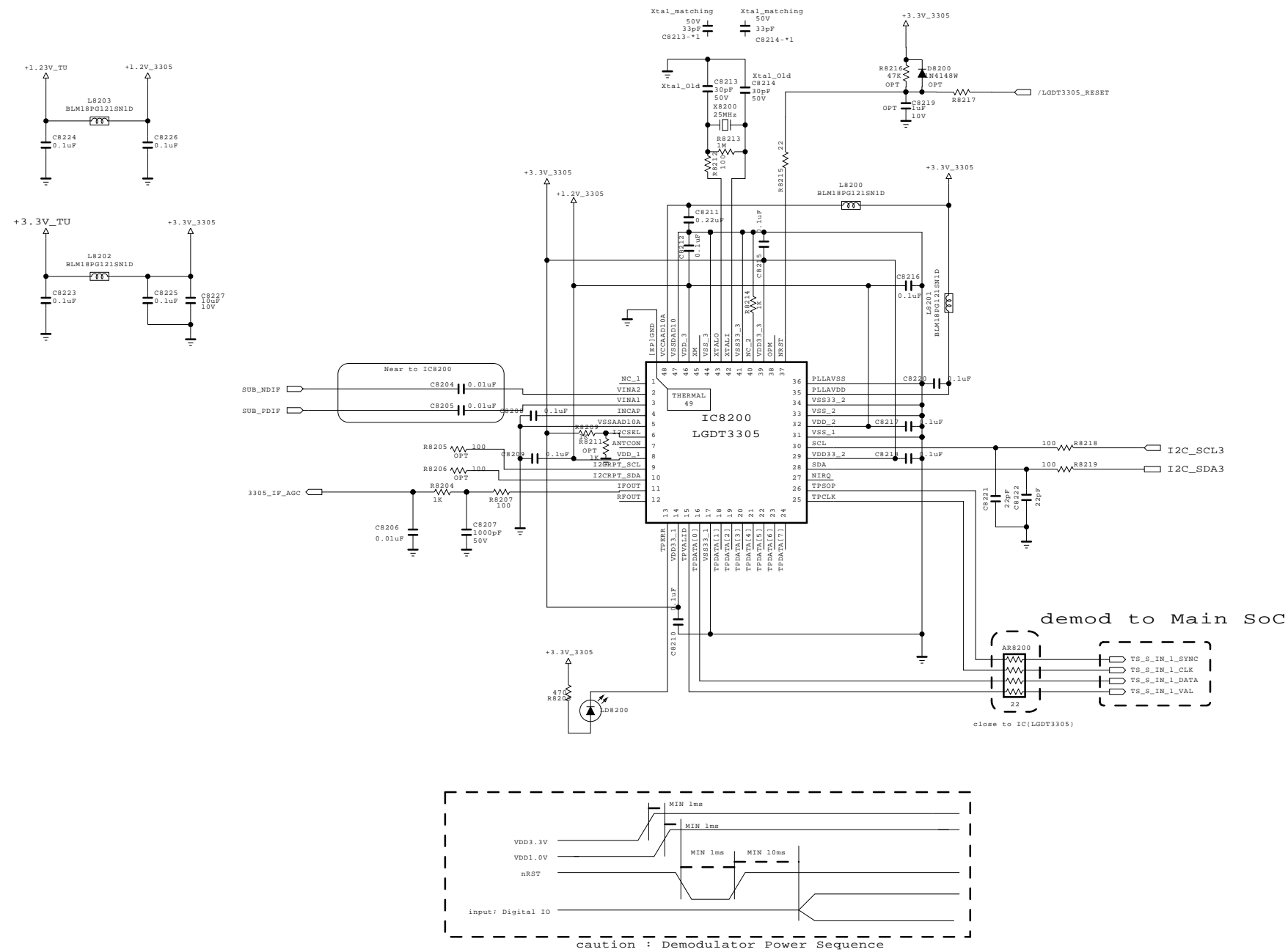
SECRET
 LGElectronics



MODEL	LY770M-UA	DATE	2014.05.12
BLOCK	eMMC	SHEET	16 / 25

DATA Digital Demodulator_LGDT3305 (USA)

(For Pro:Centric DATA Channel)



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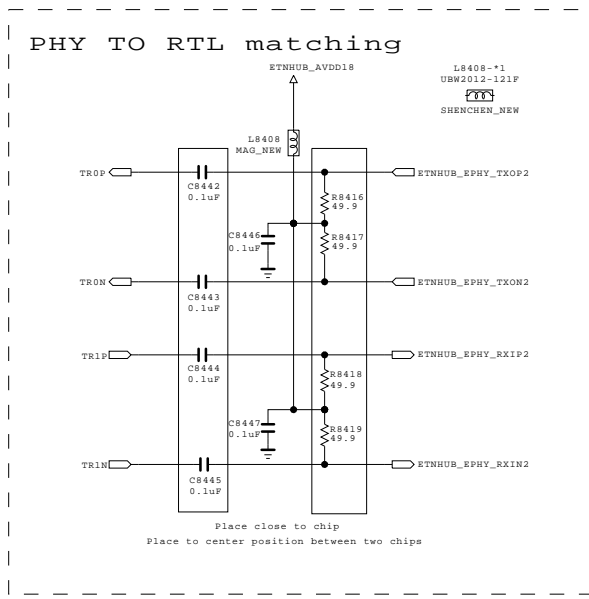
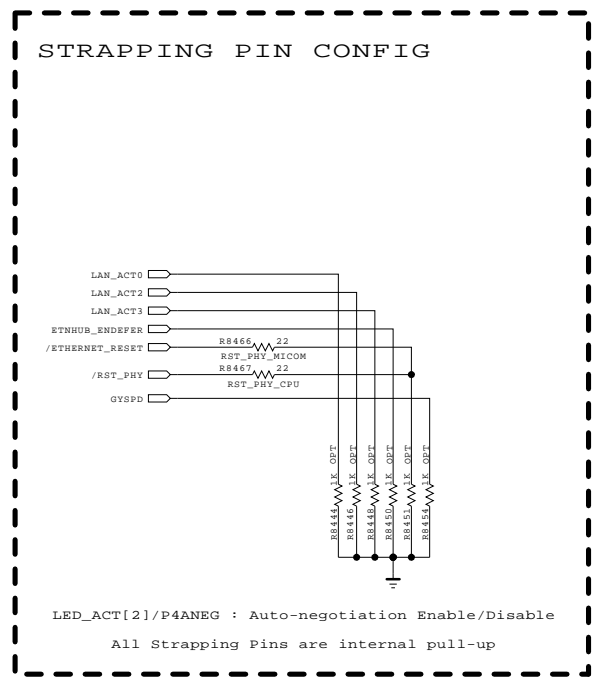
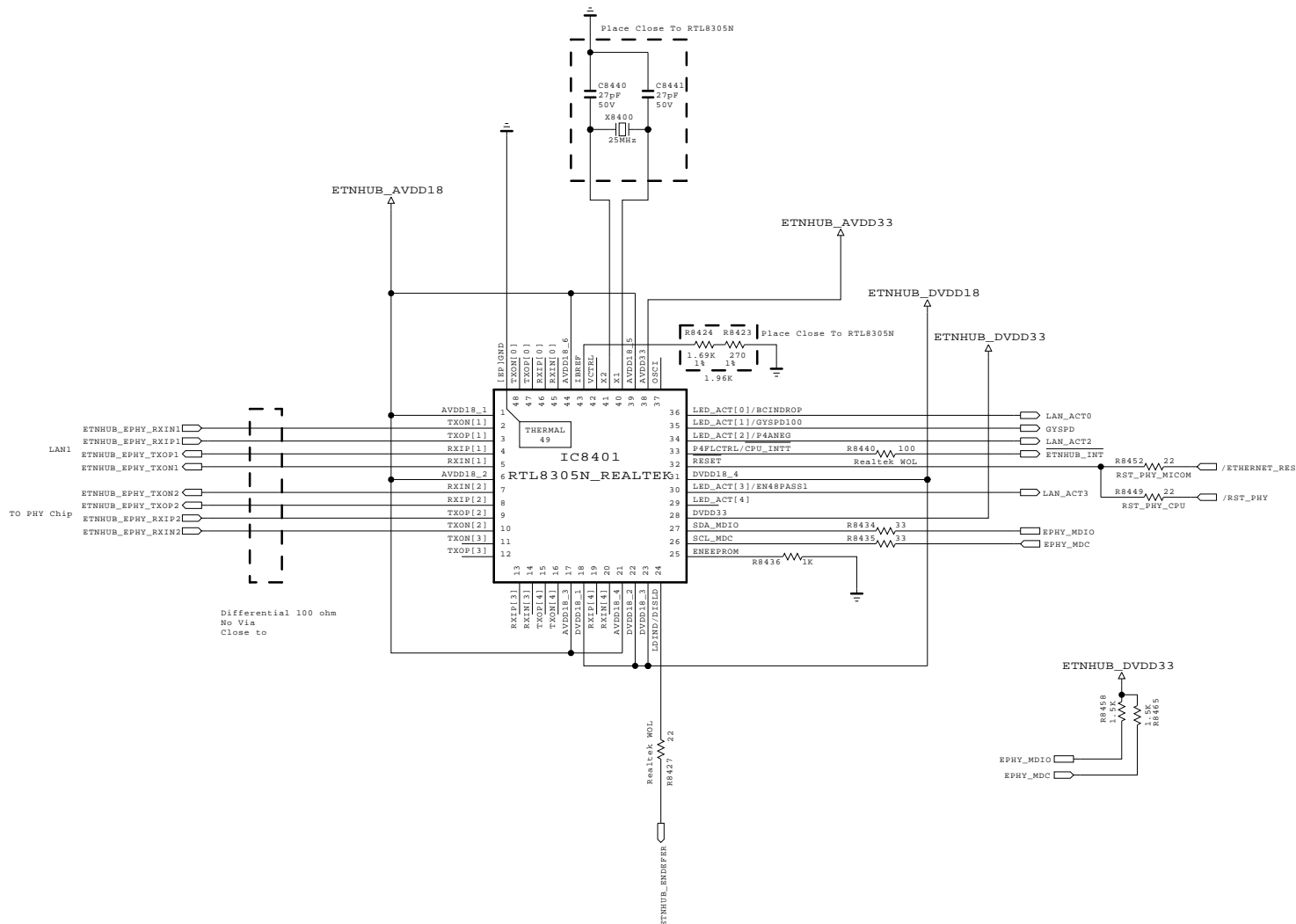
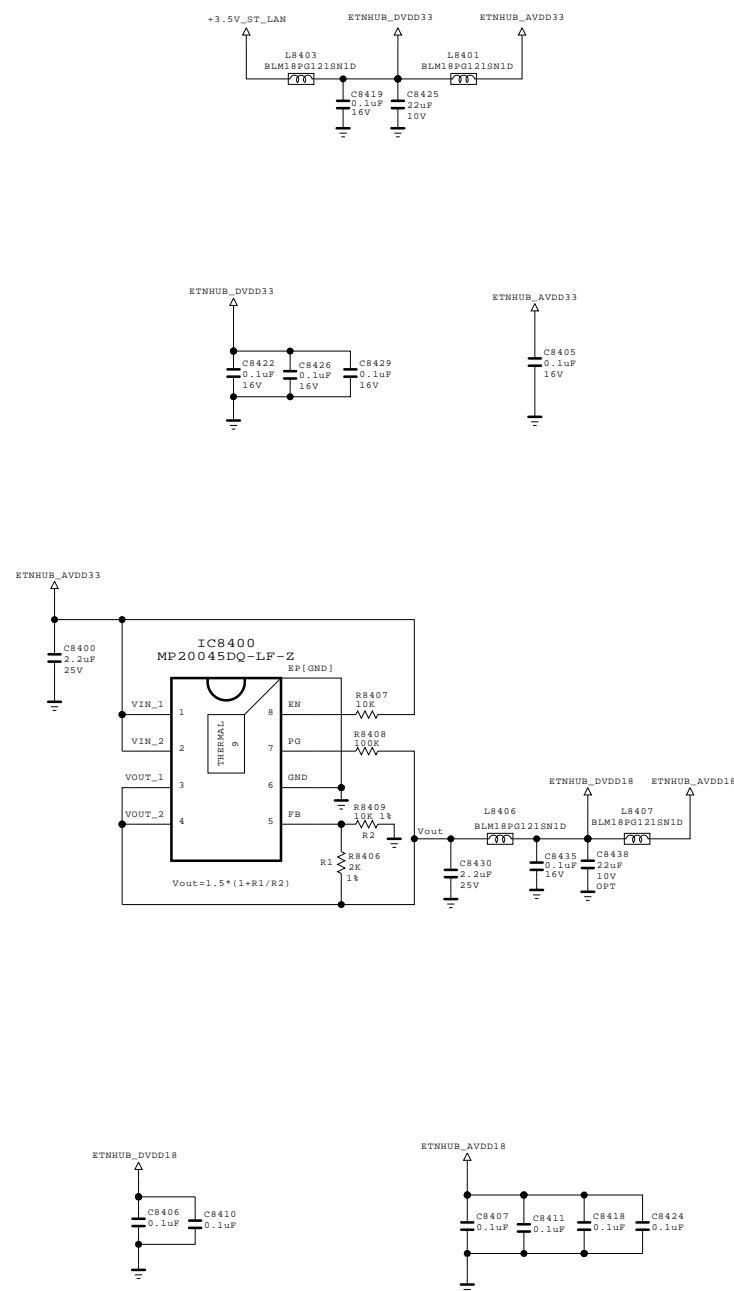
SECRET
LGElectronics

LG ELECTRONICS

MODEL	LY770M-UA	DATE	2014.05.12
BLOCK	DATA Demod	SHEET	17 / 25

Ethernet HUB (RTL8305N-CG)

Ethernet Power



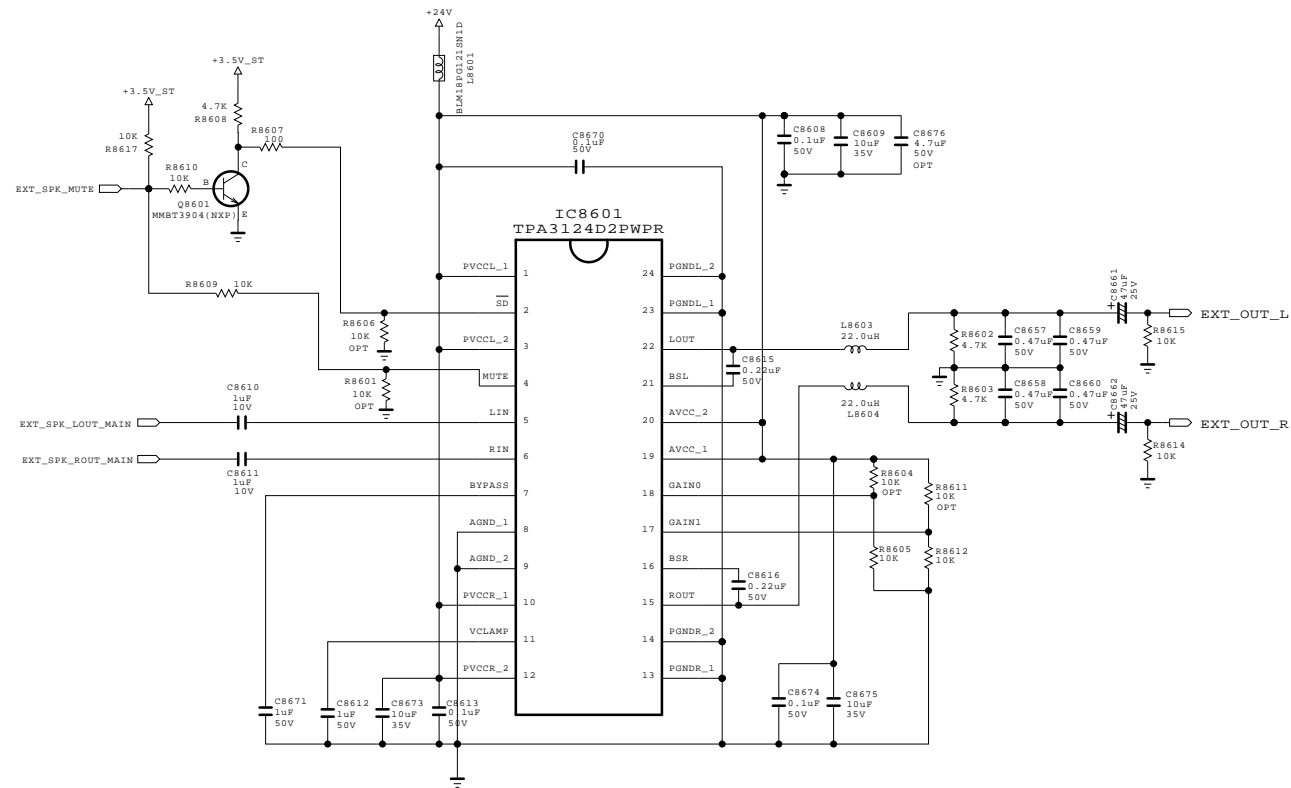
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SECRET
LGElectronics

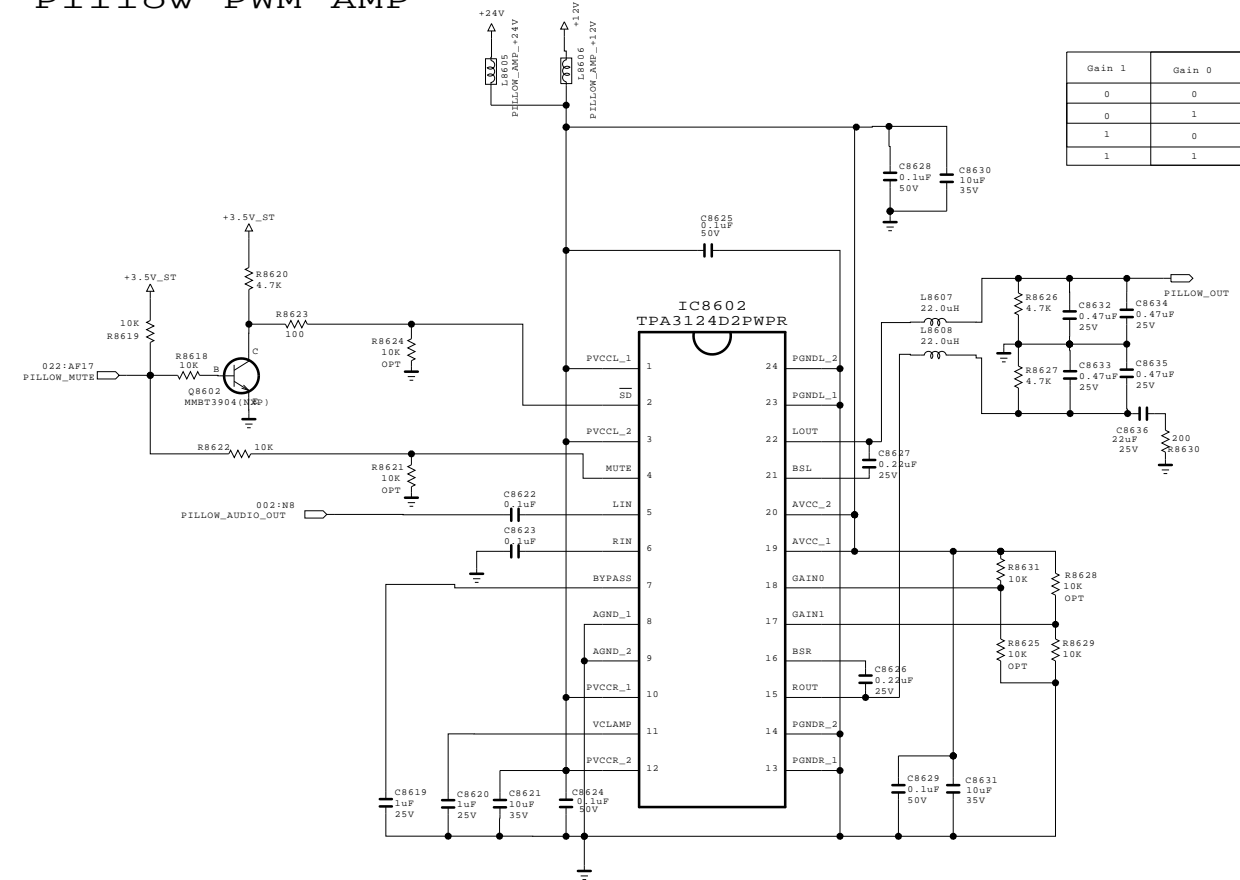


MODEL	LY770M-UA	DATE	2014.07.14
BLOCK	ETHERNET HUB	SHEET	18 / 25

EXT_SPK AMP

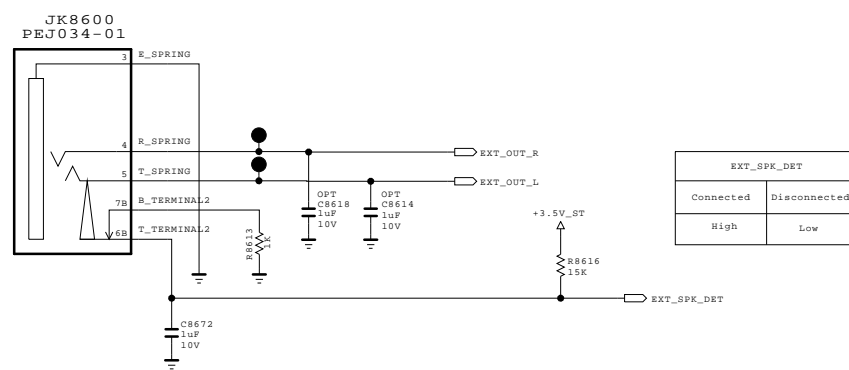


Pillow PWM AMP



Gain 1	Gain 0	(dB)
0	0	20
0	1	26
1	0	32
1	1	36

EXT_SPK OUT (Single End)



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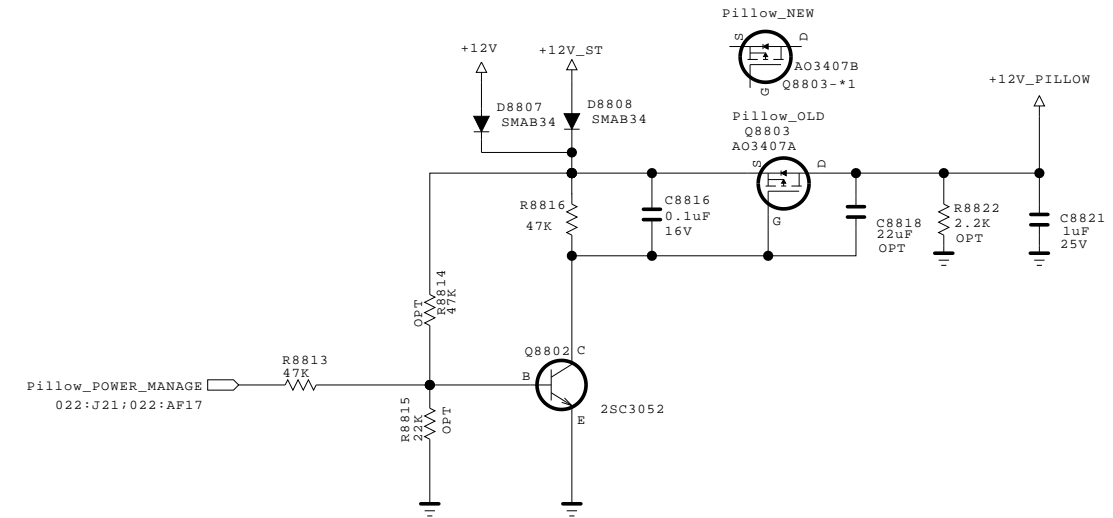
SECRET
LGElectronics



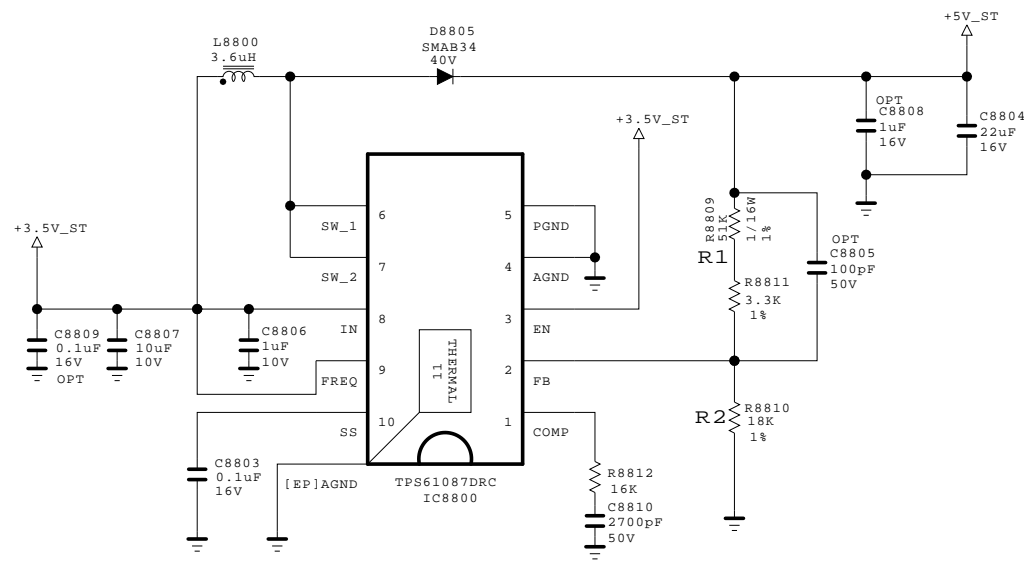
MODEL	LY770M-UA	DATE	2014.07.31
BLOCK	EXT. SPK	SHEET	19 / 25

Pillow Power

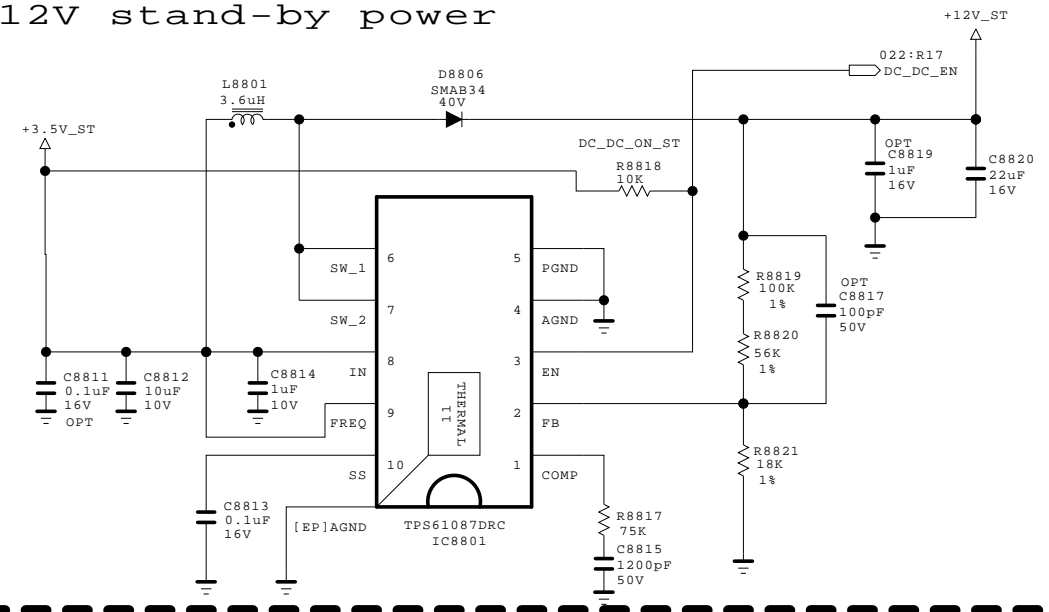
Pillow Power Control





* 3.5V_ST -> 5V_ST Step-up Power



12V stand-by power



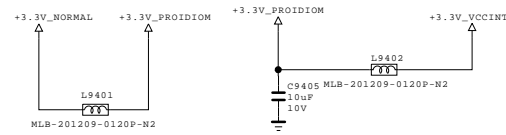
THE  SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FIRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURERS SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE  SYMBOL MARK OF THE SCHEMATIC.

SECRET	 LG ELECTRONICS
LGElectronics	

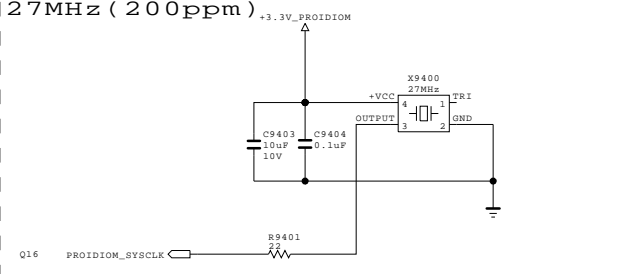
MODEL	LY770M-UA	DATE	2014.05.12
BLOCK	5V_ST/12V_ST	SHEET	21 / 25

Pro:Idiom (XMARK)

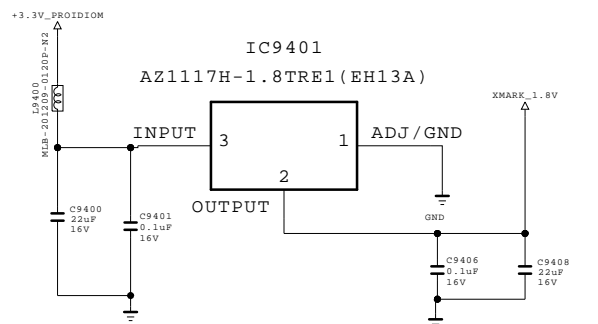
Power



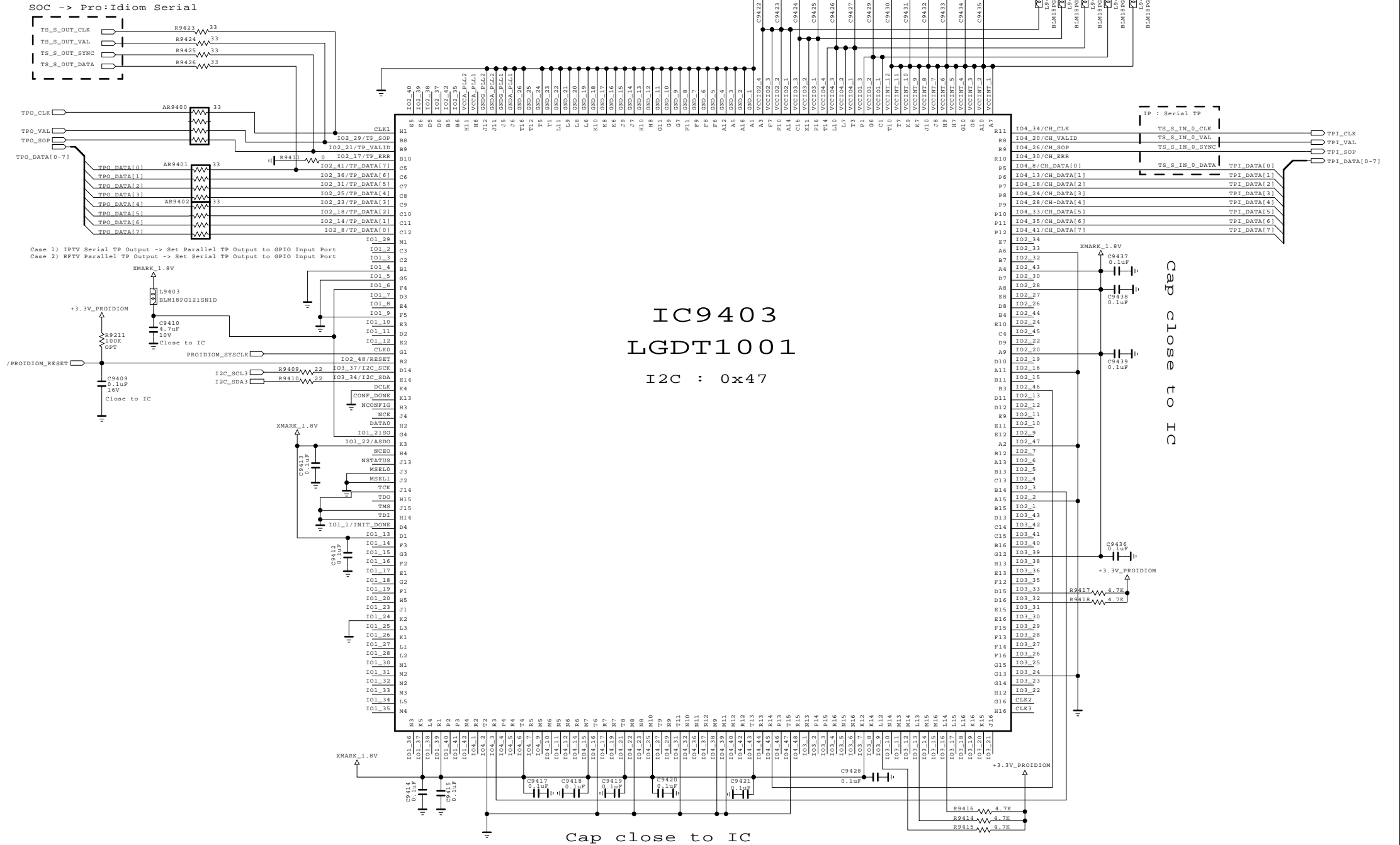
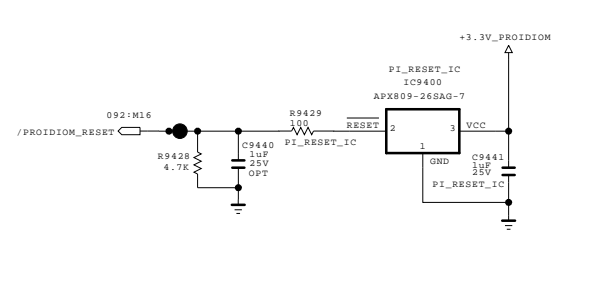
127MHz (200ppm)



XMARK_1.8V



RESET



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SECRET
LGElectronics



MODEL	LY770M-UA	DATE	2014.05.12
BLOCK	PRO:IDIOM	SHEET	24 / 25

