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LED TV

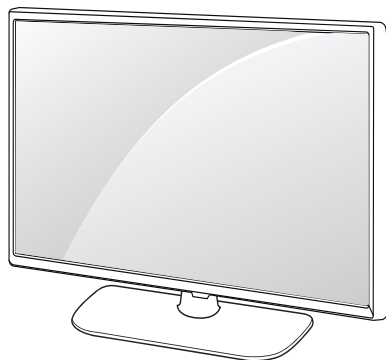
SERVICE MANUAL

CHASSIS : LA5GG

MODEL : 40LX770H 40LX770H-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.

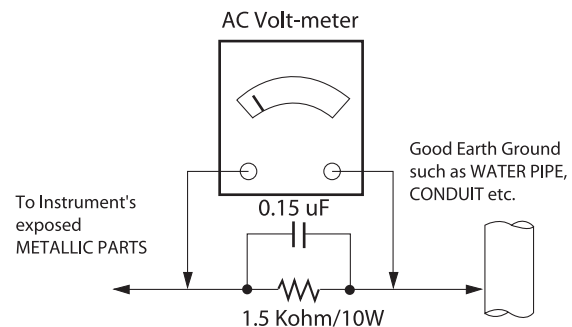
Connect 1.5 K / 10 watt resistor in parallel with a 0.15 μ F capacitor between a known good earth ground (Water Pipe, Conduit, etc.) and the exposed metallic parts.

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

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

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

Leakage Current Hot Check circuit



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

*Base on Adjustment standard

SERVICING PRECAUTIONS

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

General Servicing Precautions

1. Always unplug the receiver AC power cord from the AC power source before;
 - 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 LA5GG chassis.

2. Test condition

Each part is tested as below without special appointment.

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

3. Test method

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

4. General Specification

No	Item	Specification	Result	Remark
1	Receiving System	ATSC / NTSC-M / 64 & 256 QAM		
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	AC 100 ~ 240V 50/60Hz		Mark : 110V, 60Hz (N.America)
4	Market	NORTH AMERICA		
5	Screen Size	40/43/49/55/65 inches		
6	Aspect Ratio	16:9		
7	Tuning System	FS		
8	Module	LC320DUE-FHA3	LGD	32LX770M-UA
		HC400DUN-VCKN5	Heesung	40LX770H-UA
		LC430EUE-FHM3	LGD	43LX770H-UA 43LX770M-UA
		LC490EUE-FHM3	LGD	49LX770H-UA
		LC550EUE-FHM3	LGD	55LX770H-UA
		LC650EUF-FHM3	LGD	65LX770H-UA
9	Operating Environment	1) Temp : 0 ~ 40 deg 2) Humidity : ~ 80 %		
10	Storage Environment	1) Temp : -20 ~ 60 deg 2) Humidity : ~ 85 %		

5. Supported video resolutions

5.1. Component 2D input(Y, C_B/P_B, C_R/P_R)

No	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	Proposed
1	720*480	15.73	60.00	13.5135	SDTV ,DVD 480I
2	720*480	15.73	59.94	13.50	SDTV ,DVD 480I
3	720*480	31.50	60.00	27.027	SDTV 480P
4	720*480	31.47	59.94	27.0	SDTV 480P
5	1280*720	45.00	60.00	74.25	HDTV 720P
6	1280*720	44.96	59.94	74.176	HDTV 720P
7	1920*1080	33.75	60.00	74.25	HDTV 1080I
8	1920*1080	33.72	59.94	74.176	HDTV 1080I
9	1920*1080	67.50	60.00	148.50	HDTV 1080P
10	1920*1080	67.432	59.94	148.352	HDTV 1080P

5.2. HDMI Input (PC/DTV)

No.	Resolution	H-freq(kHz)	V-freq.(kHz)	Pixel clock(MHz)	Proposed	
	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	67.50	60.00	148.5	HDTV 1080P	O
	DTV					
1	640*480	31.46	59.94	25.175	SDTV 480P	
2	640*480	31.50	60.00	25.200	SDTV 480P	
3	720*480	31.50	60.00	27.027	SDTV 480P	
4	720*480	31.47	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	60.00	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

This spec. sheet applies to LA5GG 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 $25 \pm 5^\circ\text{C}$ of temperature and $65 \pm 10\%$ of relative humidity if there is no specific designation
- (4) The input voltage of the receiver must keep 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

- White Balance adjustment
- RS-232C functionality check
- Factory Option setting per destination
- Ship-out mode setting (In-Stop)
- GND and HI-POT test

3.3. Appendix

- Tool option menu, USB Download (S/W Update, Option and Service only)
- Manual adjustment for ADC calibration and White balance
- 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

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

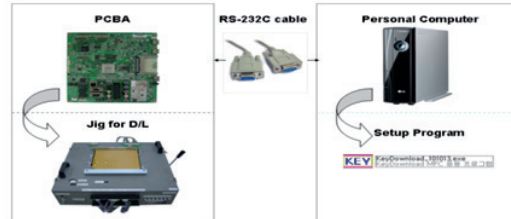
- (1) Key Write: Com 1,2,3,4 and 115200 (Baudrate)
- (2) Barcode: Com 1,2,3,4 and 9600 (Baudrate)

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
- (4) Play : START
- (5) Check of result: Ready, Test, OK or NG
- (6) Printer out (MAC Address Label)

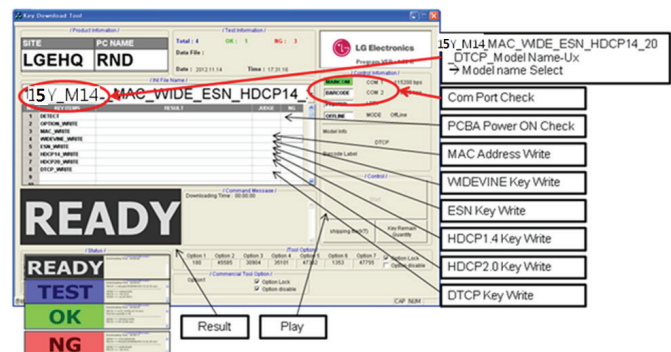
4.2.4. Communication Port connection

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



4.2.5. Download

- (1) US, Canada models (15Y LCD TV + MAC + Widevine + ESN Key + DTCP Key + HDCP1.4 and HDCP2.0)



4.2.6. Inspection

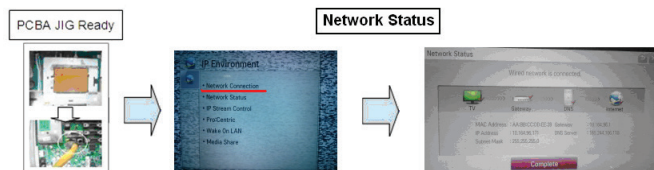
- In INSTART menu, check these keys.

- In INSTART menu, check these keys.

4.3.1. Equipment & Condition

-

- LAN Port connection with PCB
- Network setting at MENU Mode of TV (Installer Menu -> 119 -> 253 -> Menu)
- setting automatic IP
- Setting state confirmation
- If automatic setting is finished, you confirm IP and MAC Address.



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graph LR; SET[SET] --- PC[PC]
```

(4) Remove LAN cable.

(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.

5) Check the Diagnostics.(DTV country only) → Buyer model displayed.

- 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".

- Adjust remocon

4.6.3. EDID DATA

4.6.3.1. 2D_8bit_PCM(US) _ xvYCC : off

HDMI EDID 2D_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	(d)				
0x07	(e)															(e1)
0x00	02	03	1D	F1	48	90	22	20	05	04	03	02	01	23	09	57
0x01	07	(f)										E3	05	00	00	02
0x02	18	71	38	2D	40	58	2C	04	05	A0	5A	00	00	00	1E	01
0x03	1D	80	18	71	1C	16	20	58	2C	25	00	40	84	63	00	00
0x04	9E	01	1D	00	72	51	D0	1E	20	6E	28	55	00	40	84	63
0x05	00	00	1E	8C	0A	D0	8A	20	E0	2D	10	10	3E	96	00	40
0x06	84	63	00	00	18	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	(e2)	

- 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) Monthly : '01' -> '01'
Year : '2015' -> '19'
- (d) Model Name(Hex): LGTV

Chassis	MODEL NAME(HEX)
LA5GG/J	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	E6	E0	X
HDMI2	E6	D0	X
HDMI3	E6	C0	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
HDMI3	67 03 0C 00 30 00 80 1E

4.4.3.2. 2D_8bit_PCM(US) _ xvYCC : off (For Direct TV)

HDMI EDID 2D_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	(d)				
0x07	(e)															(e1)
0x00	02	03	1D	F1	48	90	22	20	05	04	03	02	01	23	09	57
0x01	07	(f)										E3	05	00	00	02
0x02	18	71	38	2D	40	58	2C	04	05	A0	5A	00	00	00	1E	01
0x03	1D	80	18	71	1C	16	20	58	2C	25	00	40	84	63	00	00
0x04	9E	01	1D	00	72	51	D0	1E	20	6E	28	55	00	40	84	63
0x05	00	00	1E	8C	0A	D0	8A	20	E0	2D	10	10	3E	96	00	40
0x06	84	63	00	00	18	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	(e2)

- 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) Monthly : '01' -> '01'
Year : '2015' -> '19'
- (d) Model Name(Hex): LGTV

Chassis	MODEL NAME(HEX)
LA5GG	00 00 00 FC 00 4C 47 20 54 56 20 52 56 55 0A 20 20 20

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

	(e1)	(e2)	(e3)
HDMI1	49	E0	X
HDMI2	49	D0	X
HDMI3	49	C0	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
HDMI3	67 03 0C 00 30 00 80 1E

4.4.3.3. 2D_10bit_PCM(US)_xvYCC : off HDMI EDID 2D_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	e1
0x08	02	03	1D	F1	48	90	22	20	05	04	03	02	01	23	09	57	
0x01	07	f								E3	05	00	00	02	3A	80	
0x02	18	71	38	2D	40	58	2C	04	05	A0	5A	00	00	00	1E	01	
0x03	1D	80	18	71	1C	16	20	58	2C	25	00	40	84	63	00	00	
0x04	9E	01	1D	00	72	51	D0	1E	20	6E	28	55	00	40	84	63	
0x05	00	00	1E	8C	0A	D0	8A	20	E0	2D	10	10	3E	96	00	40	
0x06	84	63	00	00	18	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	e2	

- 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) Monthly : '01' -> '01'
Year : '2015' -> '19'
- d) Model Name(Hex): LGTV

Chassis	MODEL NAME(HEX)
LA5GG/J	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	E6	99	X
HDMI2	E6	89	X
HDMI3	E6	79	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
HDMI3	67 03 0C 00 30 00 B8 2D

4.4.3.4. 2D_10bit_PCM(US)_xvYCC : off (For Direct TV) HDMI EDID 2D_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	d					
0x07	e															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	e2		

- 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) Monthly : '01' -> '01'
Year : '2015' -> '19'
- d) Model Name(Hex): LGTV

Chassis	MODEL NAME(HEX)
LA5GG	00 00 00 FC 00 4C 47 20 54 56 20 52 56 55 0A 20 20 20

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

	e1	e2	e3
HDMI1	49	99	X
HDMI2	49	89	X
HDMI3	49	79	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
HDMI3	67 03 0C 00 30 00 B8 2D

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

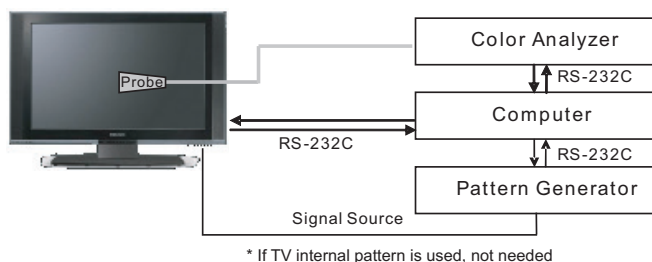
5.1.1.2. Adj. condition and cautionary items

- (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)
- ※ 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

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 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 à 9. White-Balance then press the cursor to the right (KEY▶). When KEY(▶) is pressed 206 Gray internal pattern will be displayed.
- (4) Adjust Cool modes
 - (i) 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.)
 - (ii) 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.
 - (iii) 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 CS-1000 (over 26 inch)

Mode	Coordinate		Temp	△uv
	X	Y		
Cool	0.271	0.270	13,000K	0.0000
Medium	0.286	0.289	9,300K	0.0000
Warm	0.313	0.329	6,500K	0.0000

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

	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 (From March to December) : LGD

	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

- Standard color coordinate and temperature using CA-210(CH-14)
- 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: LA46H 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 US, then on the lower Country option, select US, CA, MX.
Selection is done using +, - KEY

5.2.3. Tool Option inspection

- Press Adj. key on the Adj. R/C, then select 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.

5.3.2. 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

5.3.3. Applied models

Chassis	Model Name	Magic RF receiver
LA5GG	40LX770H-UA	Built-in
	43LX770H-UA	
	49LX770H-UA	
	55LX770H-UA	
	65LX770H-UA	
LA5GJ	32LX770M-UA	
	43LX770M-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]

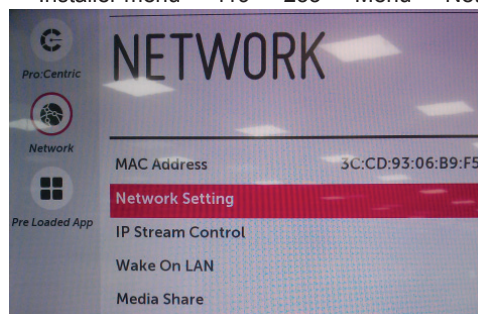
5.4.2. Check the menu on in-start

IN START	
Model Name : GLOBAL-PLAT4	1. Adjust Check
Serial Number : SKJY1107	2. ADC Data
S/W Version : 01.00.07.01	3. Power Off Status
MICOM Version : 1.01.0	4. System 1
BOOT Version : NONE	5. System 2
FRC Version : 0.01	6. System 3
PWM (min/max/3DDuty): 5 / 100 / 100	7. Model Number D
EDID (RGB/HDMI) : 0.ff / 0.ff	8. Test Option
Chip Type : MTK 5369	9. Spread Spectrum
Wi-Fi Version : 1.0	10. Sync Level
Wi-Fi Channel : 0	11. Stable Count
Wi-Fi MAC : 00:1E:B2:B7:05:B2	12. SDP Server Sel
MAC Address : 00:00:00:00:00:00	13. Network Error H
IP Address : 0:0:0:0	14. ANTENA
Widevine : NG	
RF Receiver Version : 00.00.00	

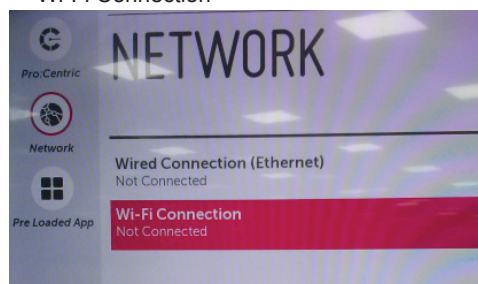
5.4. Wi-Fi Test

(Step 1) Turn on TV

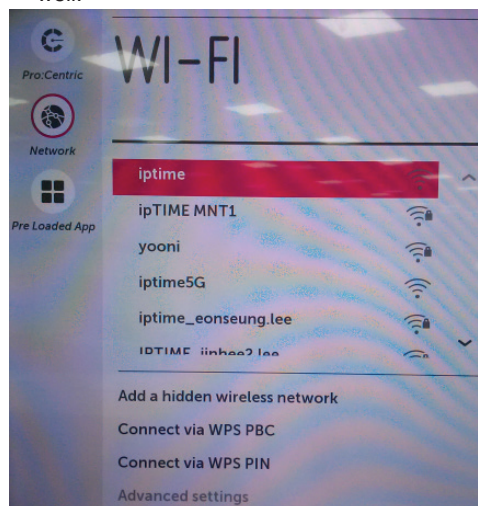
(Step 2) Select Network Connection option in Network Menu.
Installer menu -> 119 -> 253 -> Menu -> Network



(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.



5.5. HDMI ARC Function Inspection

5.5.1. Test equipment

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

5.5.2. Test method

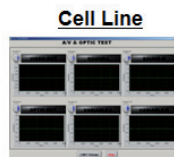
- (1) Insert the HDMI Cable to the HDMI ARC port from the master equipment (HDMI1)



- (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)



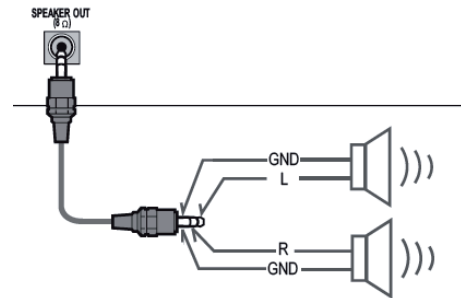
* Remark: Inspect in Power Only Mode and check SW version in a master equipment



6. Check Commercial features

Model	LX770H-UA	LX770M-UA
inch	40/43/49/55/65	32/43
IR Out	X	X
DC Power Out (12V)	X	X
Ext SPK Out	O	O
RJP (RJ-45 interface)	O	X
Pro:Idiom	O	O
b-LAN	O	O

6.1. External SPK Out



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

Waveform of Oscilloscope



Recommended Input signal
RF, 1KHz, Sing wave

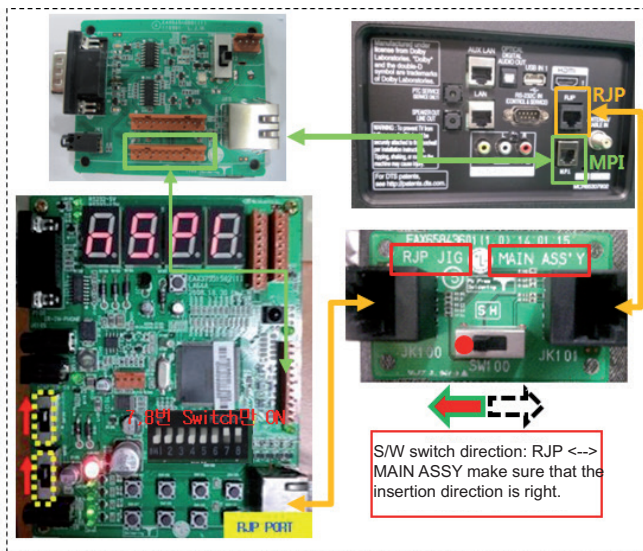
6.2. RJP/MPI Check

6.2.1. Initial setting

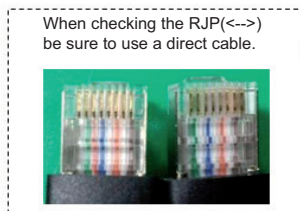
- (1) Select Power switch (up) as the picture
- (2) Set the Switch No.5 to ON (up) as the picture
Others should be set to OFF (down)

6.2.2. Checking Guide

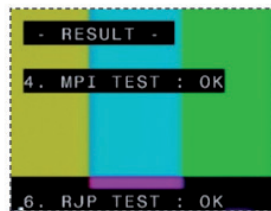
- (1) Press the P-ONLY key of R/C
- (2) Press the Exit key of R/C
- (3) Connect with the TV through RJP cable (wait for the JIG on)
- (4) RJP Pin check is carried out automatically
- (5) The result is shown as below
- (6) If RJP Pin check finished or you check other function, must remove the RJP cable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



[Picture 1]



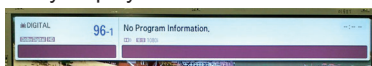
[Picture 2]



[Picture 3]

6.3. Pro:Idiom Check

- (1) Connect the RF Cable
 - (2) Turn to the Pro:Idiom channel (No. 96-1)
 - (3) Check the video & sound
- ** Only displayed at "POWER ONLY" mode



6.4. b-LAN Main board Check

Press the Still key of Adjust Remocon for checking MPI port in Power Only Mode.
(Display "b-LAN On" message.)

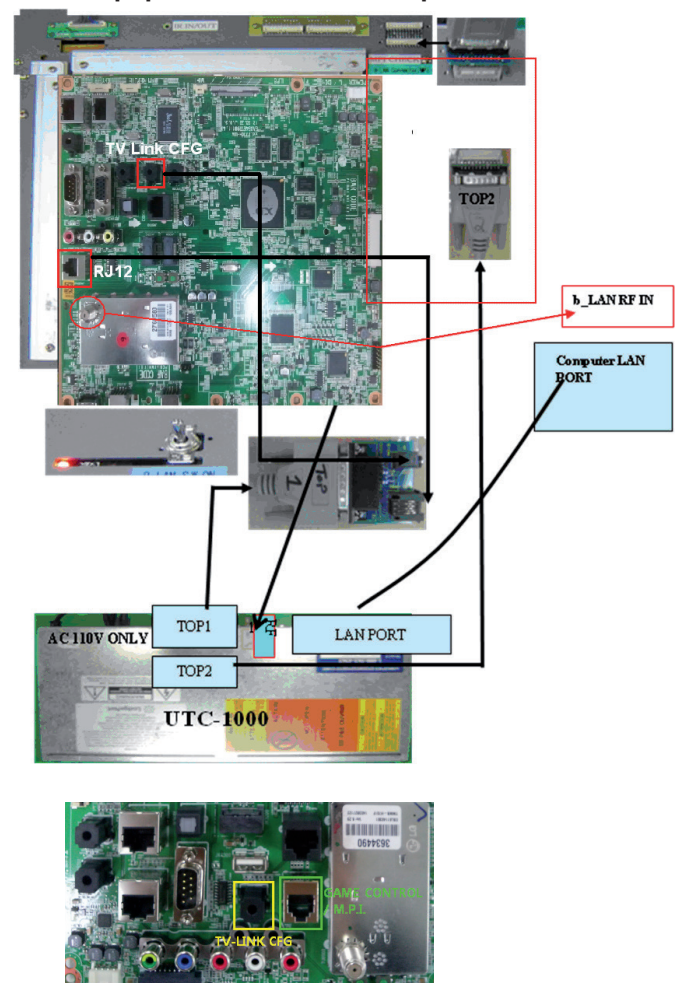
6.4.1. Overview

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



6.4.4. Check

6.4.4.1. Setting Procedure

(1) Setting JIG

- 1) Connect UTC-1000 Equipment to JIG device as a like left picture

- Connection Line:

UTC-1000 TOP1 <--> Game port(RJ21)
-> TV-LINK CFG (Phone Jack)
UTC-1000 TOP2 -> JIG 11pin Connection
UTC-1000 RF1 <--> b-LAN RF IN
UTC-1000 LAN <--> PC LAN Port

6.4.4.2. Working procedure

(1) Connection

UTC-1000 LAN <--> PC LAN Port
UTC-1000 TOP1 <--> Game port(RJ21)
-> TV-LINK CFG (Phone Jack)
UTC-1000 RF1 <--> b-LAN RF IN

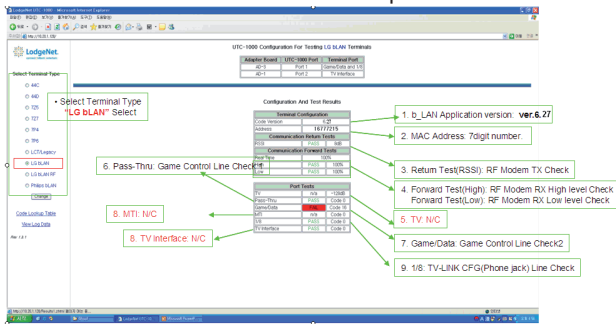
(2) Power on JIG : Switch on front of the JIG

(3) Test Start

UTC-1000 TOP2 <--> JIG 11pin Connection

(4) Checking b-LAN MAC Address

Check whether it is same their address numbers or not between b-LAN Label and on the pc address numbers.



* Checking JIG contents

- (1) Check whether displaying all "Pass" or not at the number 3.4.6.7.9 contents of UTC-1000 on the PC
- (2) Check "Version 6.27" of the 1. b-LAN Application version
- (3) Check whether it is same their address numbers or not between b-LAN Label and
- (4) MAC Address on the pc.

6.5. Ship-out mode check (In-stop)

- after final inspection, press In-Stop key of the Adj. R/C and check that the unit goes to Stand-by mode.

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 (Distortion=10% max Output)	
Min	9.0	4.5
	8.5	4.0
Typ	10.0	5.0
	8.9	4.4
Max	12.0	6.0
	9.9	5.4
Unit	W	W
	Vrms	Vrms
Remark	(1) Measurement condition - EQ/AVL/Clear Voice: Off	
	(2) Speaker (6Ω Impedance)	
	ALL MODEL	LX770M-UA ONLY

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.

8.2.2. 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. PILLOW SPEAKER

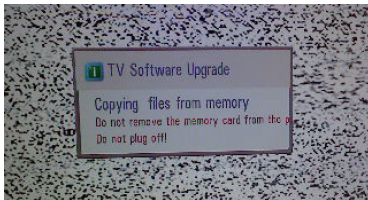
9.1. Pillow speaker test method

- (1) Connect pillow speaker on the pillow speaker jack
- (2) Press channel Up/Down, Volume Up/Down key
- (3) If operate Pillow speaker Key, It is OK

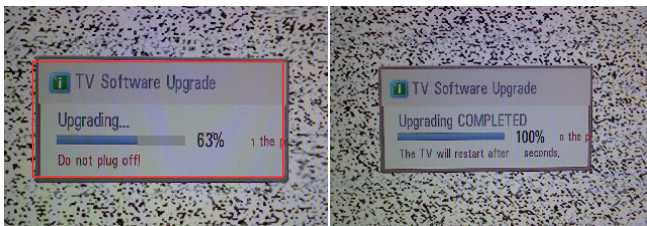


10. USB S/W Download(Service only)

- (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)

11. Optional adjustments

11.1. Manual White balance Adjustment

11.1.1. 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
 - i) After Aging Start, Keep the Power ON status during 5 Minutes.
 - ii) In case of LCD, Back-light on should be checked using no signal or Full-white pattern.

11.1.2. Equipment

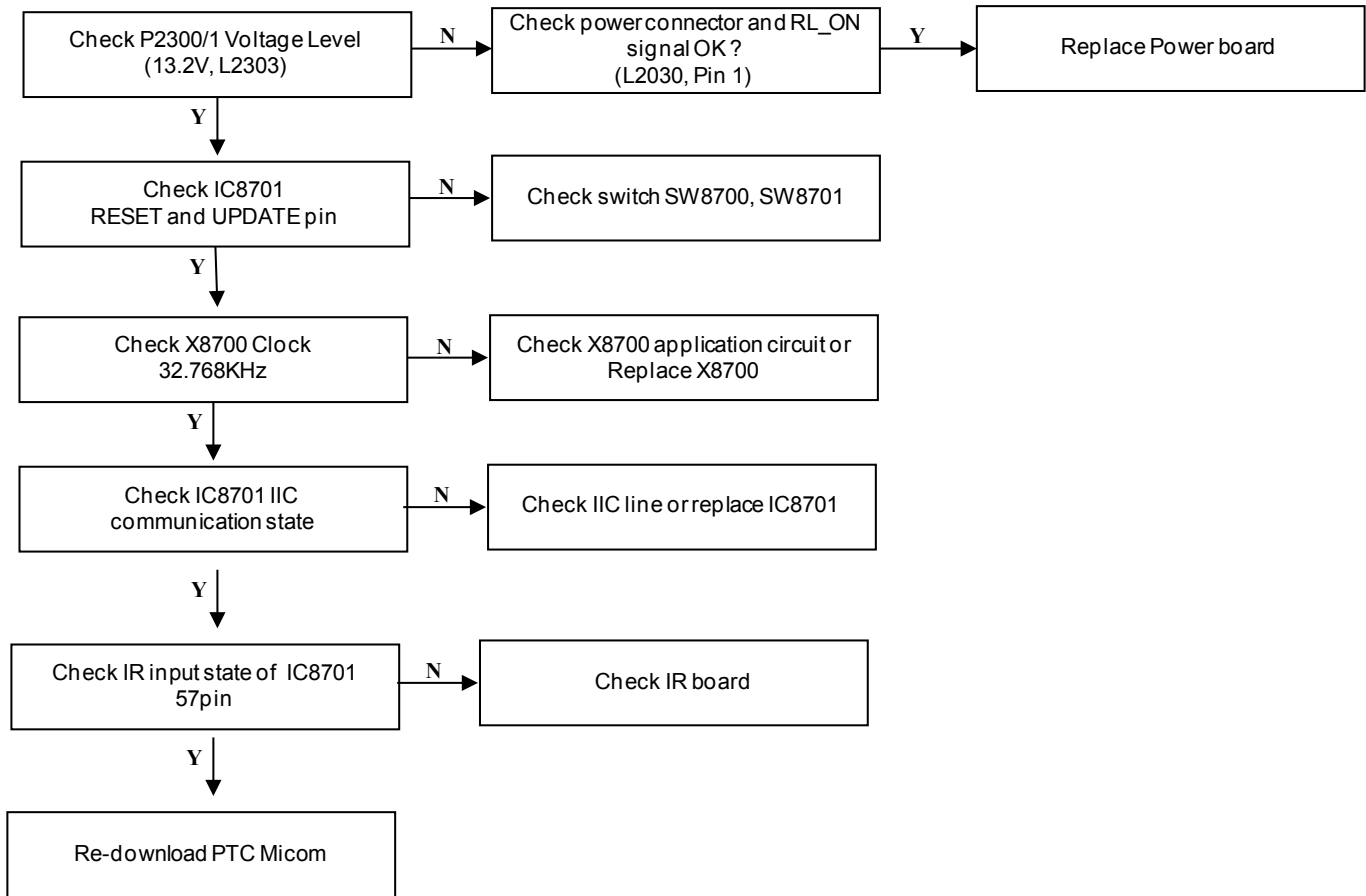
- (1) Color Analyzer: CA-210 (NCG: CH 9 / WCG: CH12 / LED: CH14)
- (2) Adj. Computer (During auto adj., RS-232C protocol is needed)
- (3) Adjust Remocon
- (4) Video Signal Generator MSPG-925F 720p/216-Gray (Model: 217, Pattern: 78)

11.1.3. Adjustment

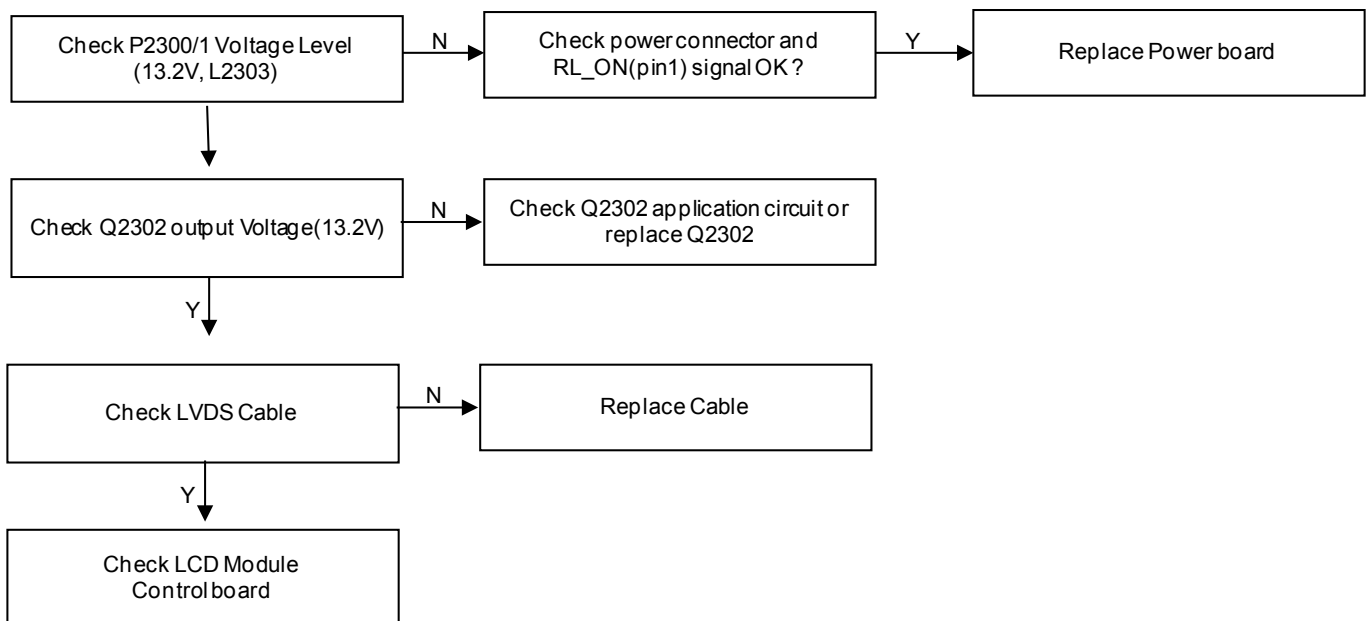
- (1) Set TV in Adj. mode using POWER ON
 - (2) Zero Calibrate the probe of Color Analyzer, then place it on the center of LCD module within 10cm of the surface.
 - (3) Press ADJ key -> EZ adjust using adj. R/C -> 6. White-Balance then press the cursor to the right (KEY▶). When KEY(▶) is pressed 216 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

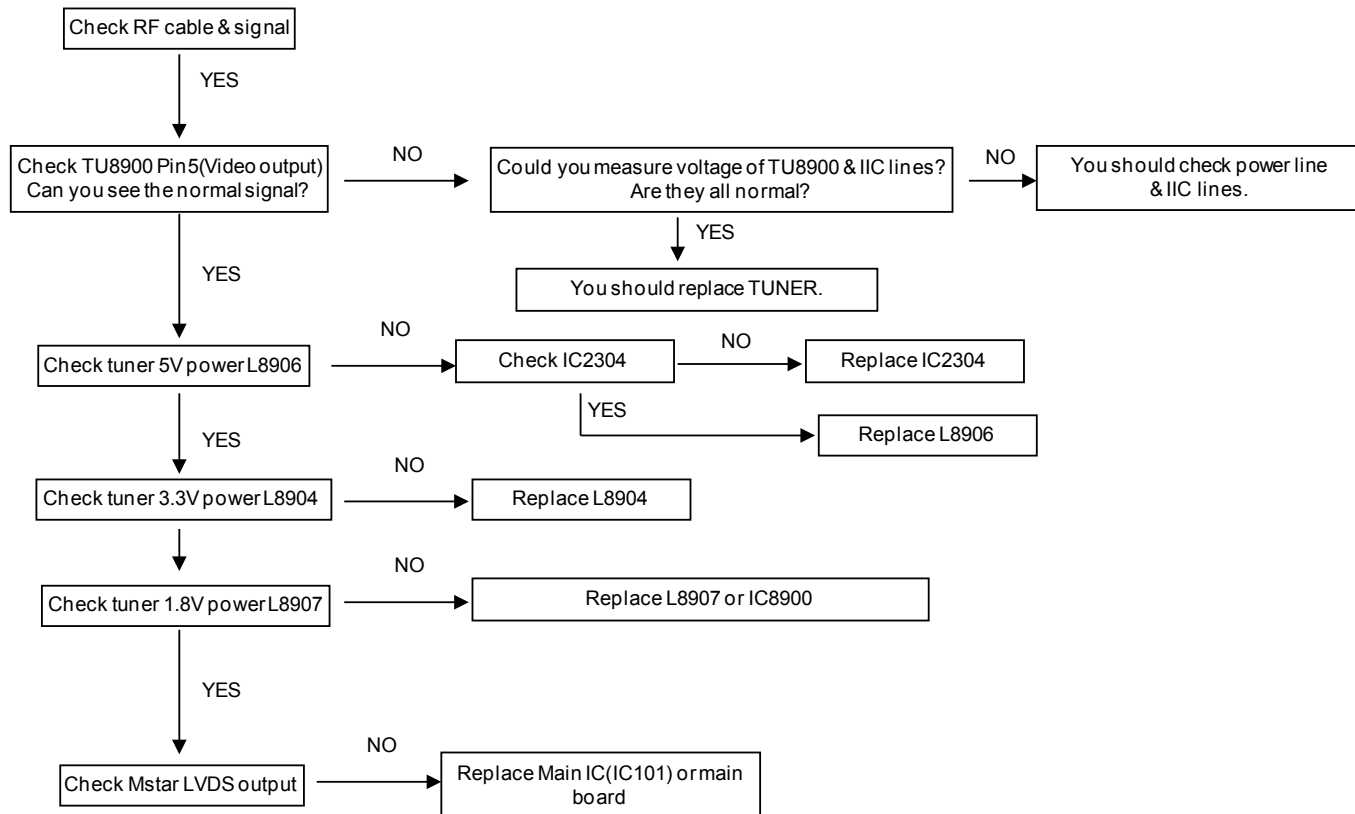
1. Power-Up Boot Fail Trouble Shooting guide



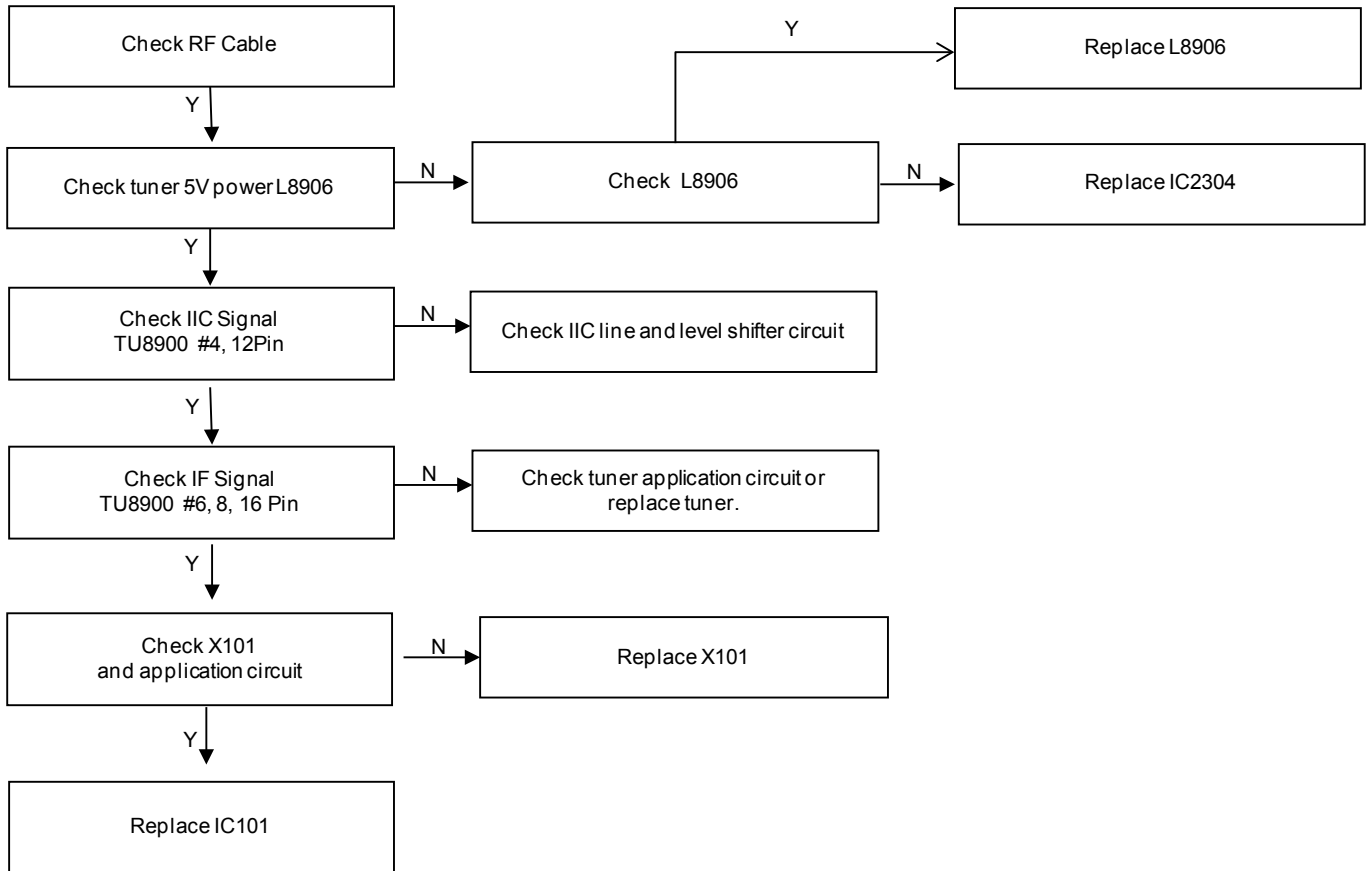
2. No OSD Trouble Shooting guide



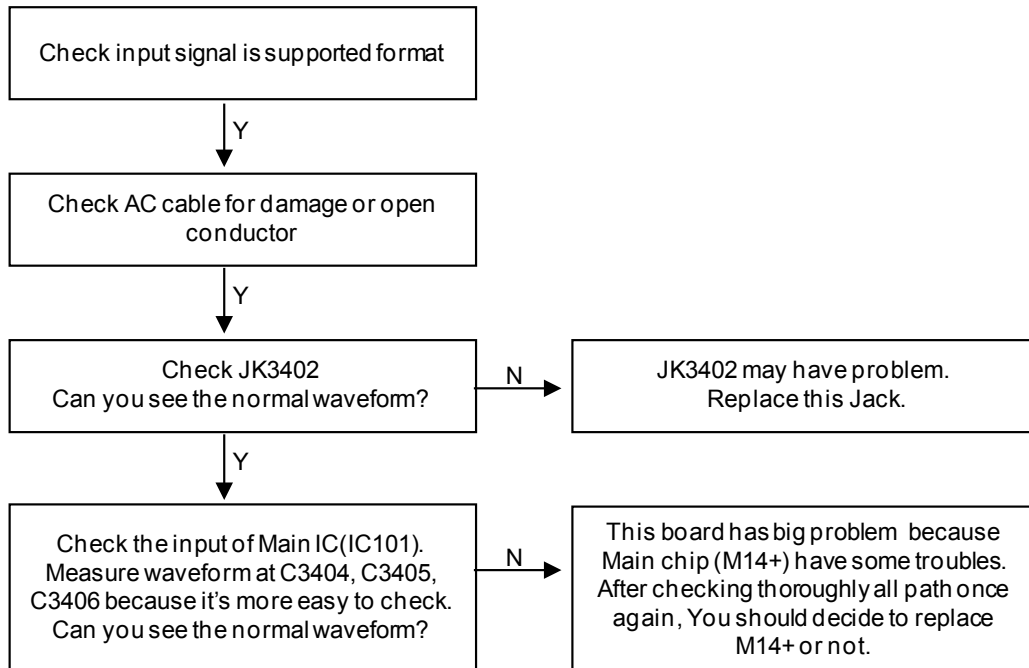
3. Analog RF Video Trouble Shooting guide



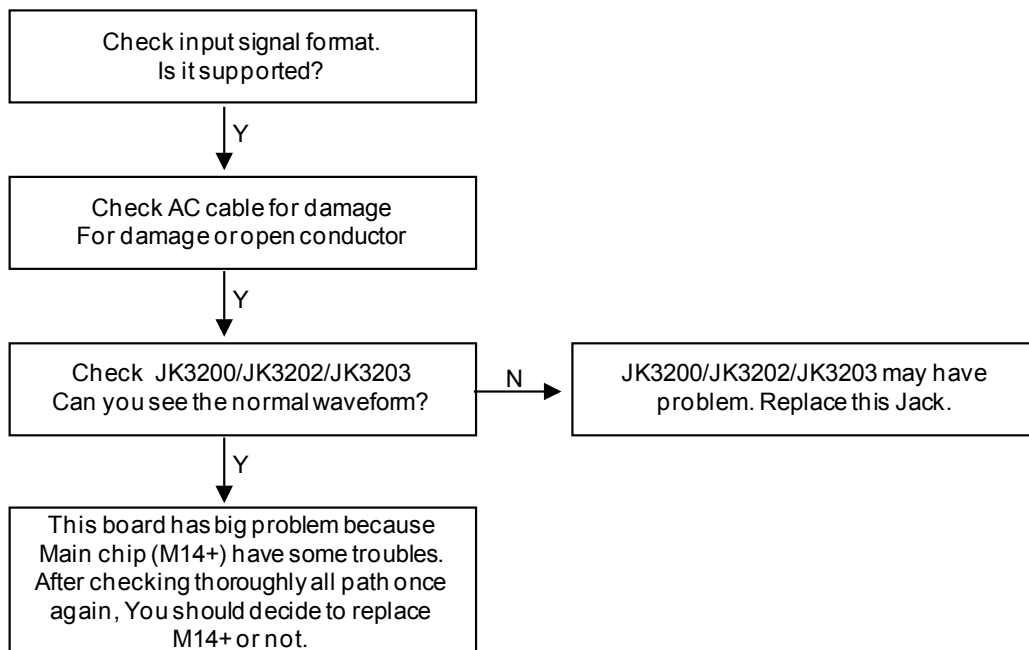
4. Digital RF Trouble Shooting guide



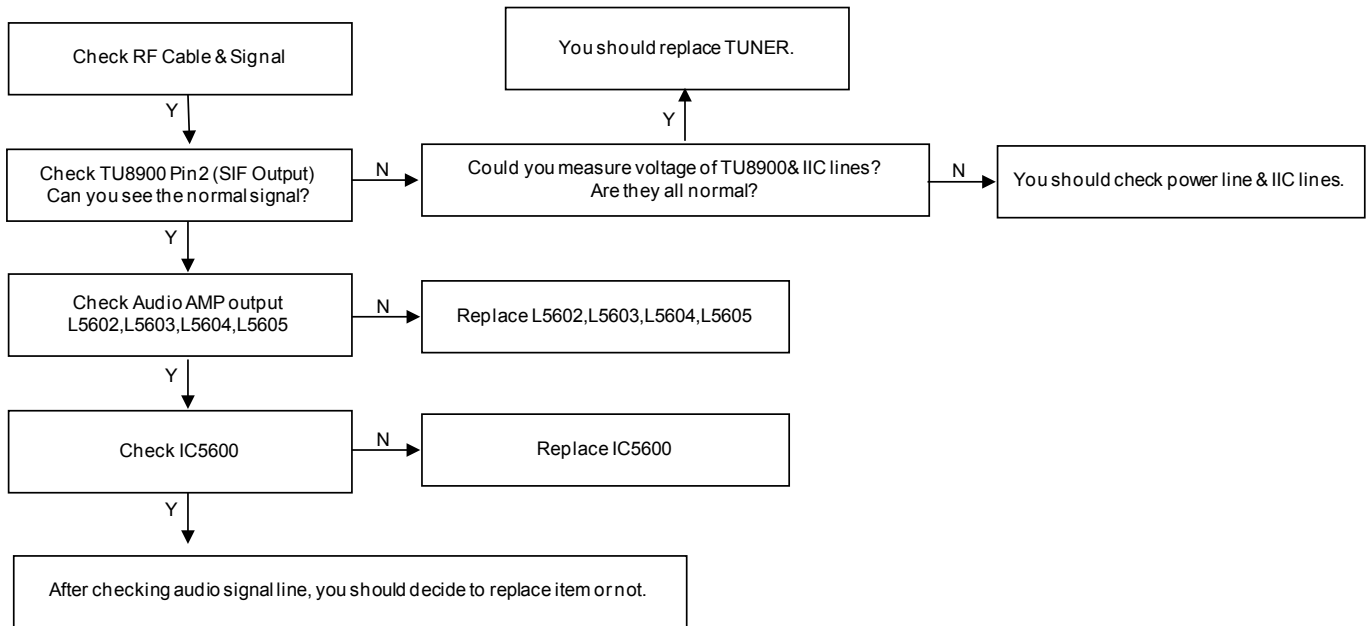
5. AV/Component Trouble Shooting guide



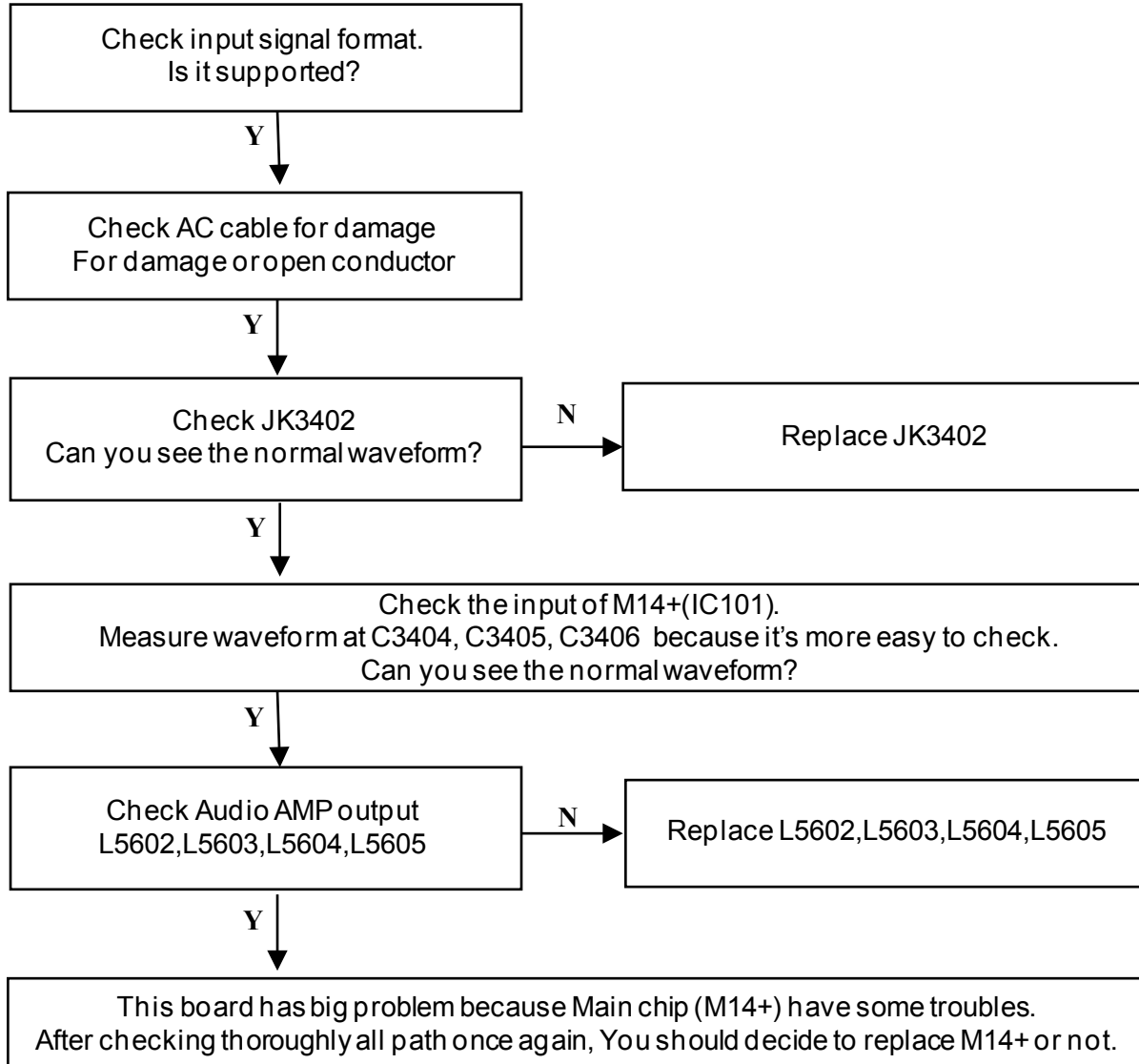
6. HDMI Video Trouble Shooting guide



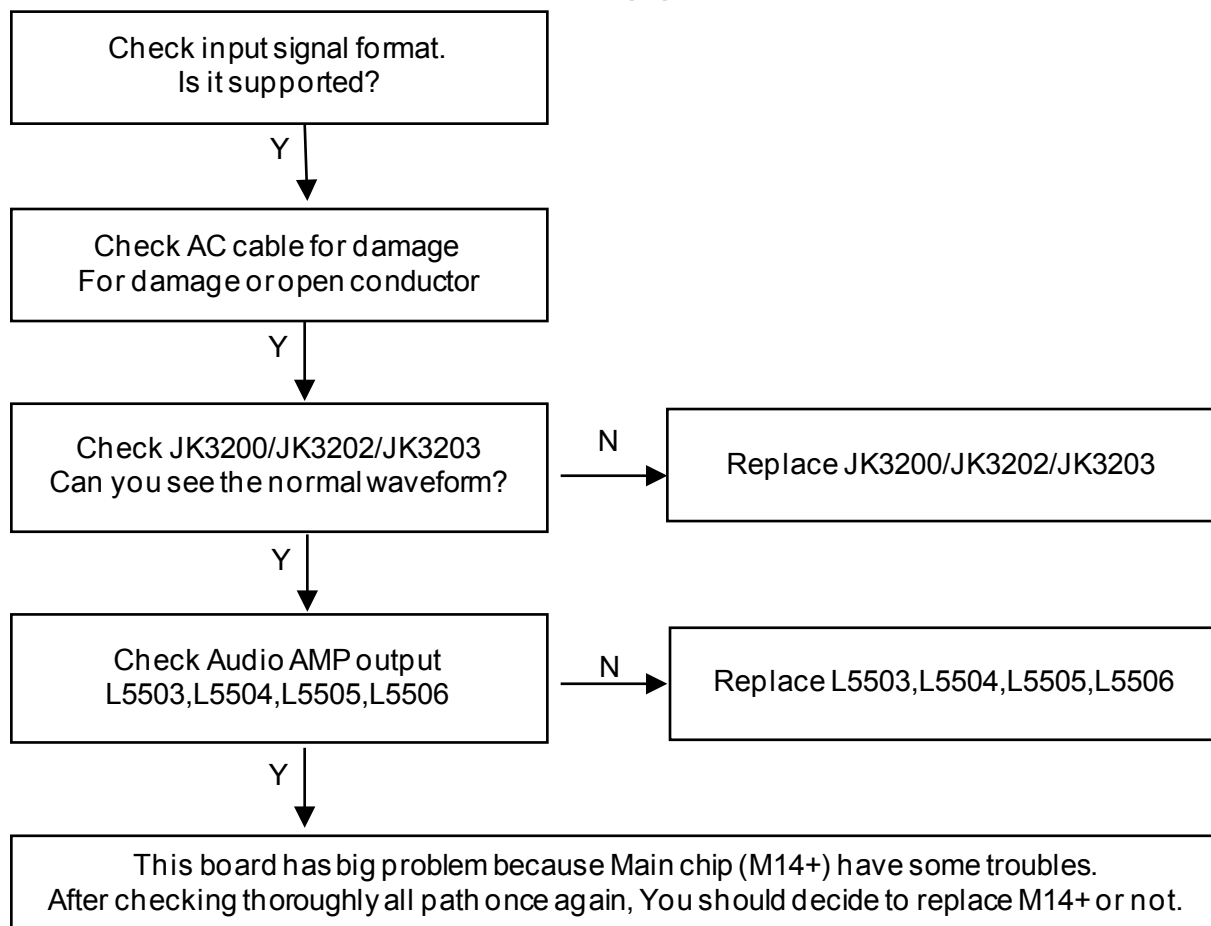
7. Analog RF Audio Trouble Shooting guide



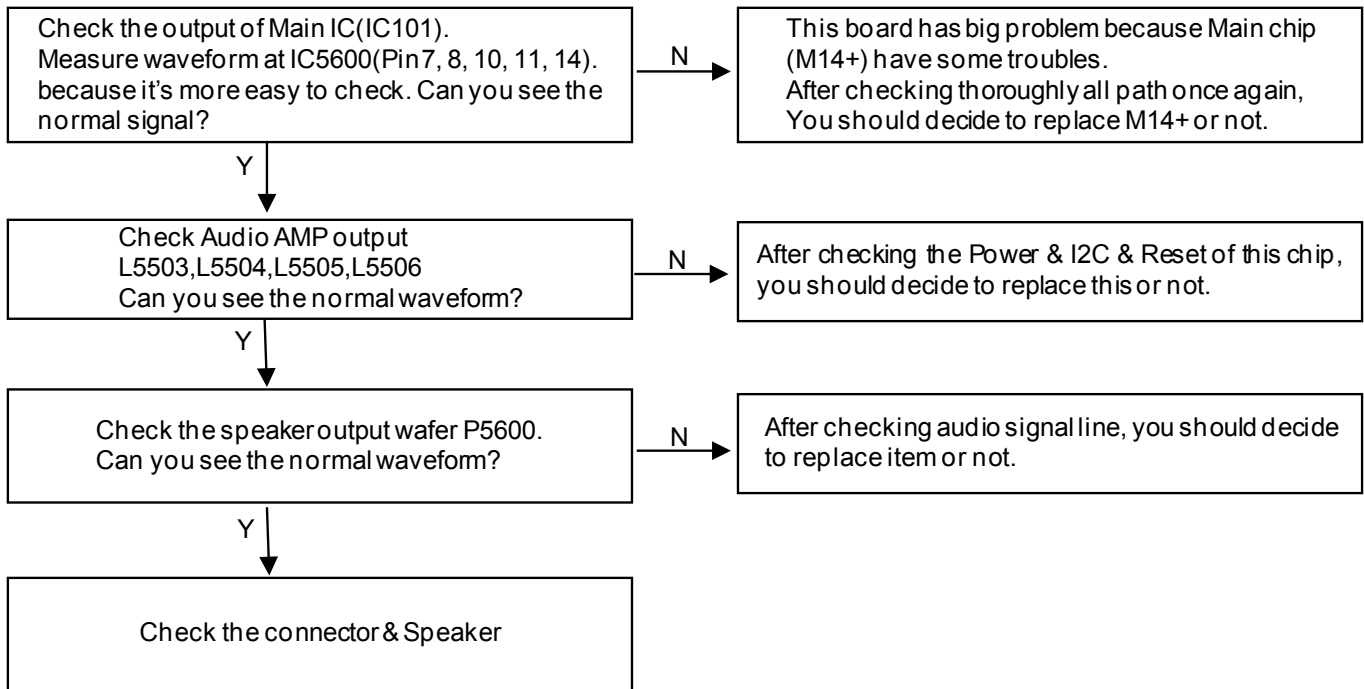
8. AV/Component Audio (in) Trouble shooting guide



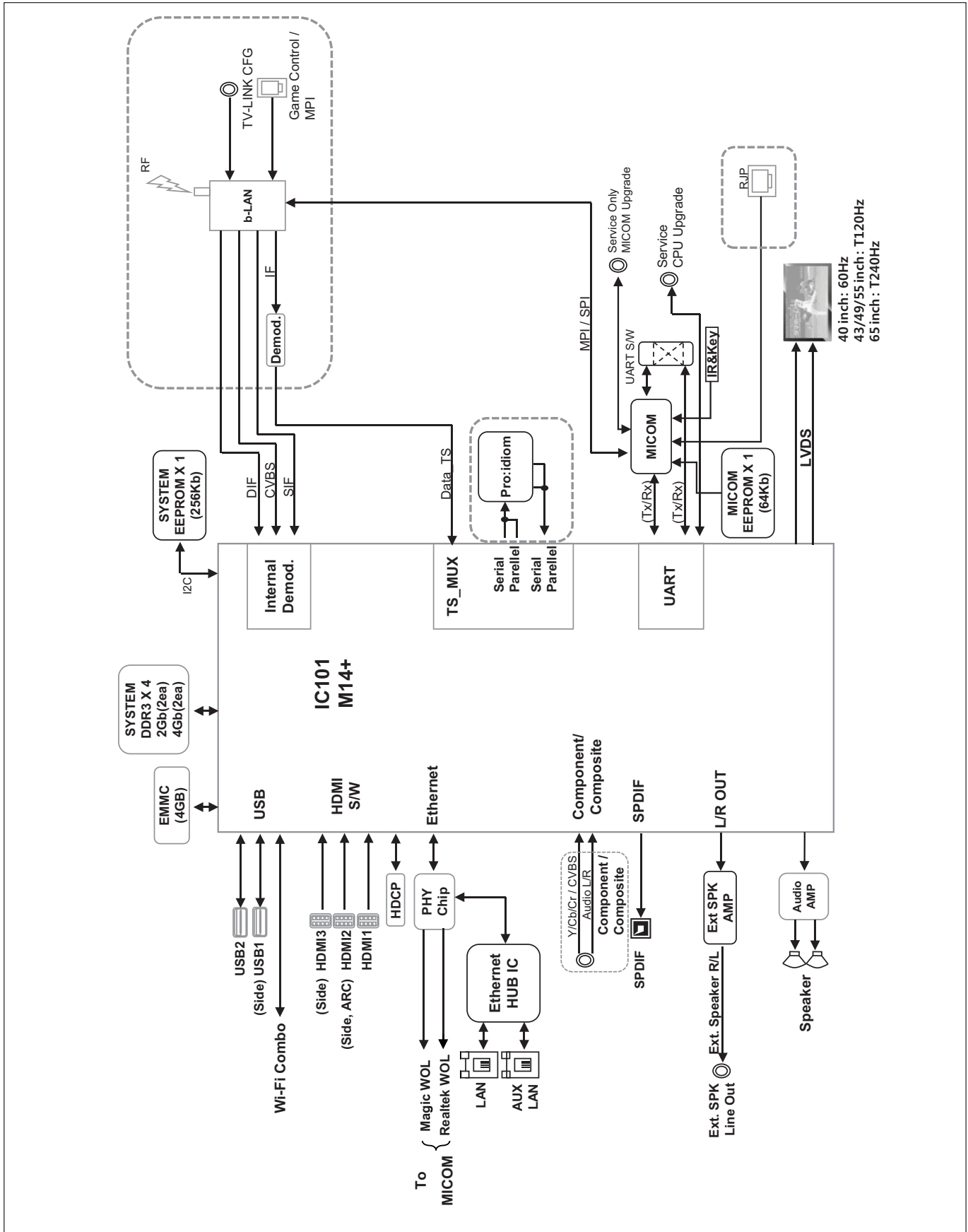
9. HDMI Audio (in) Trouble shooting guide



10. Audio out Trouble shooting guide



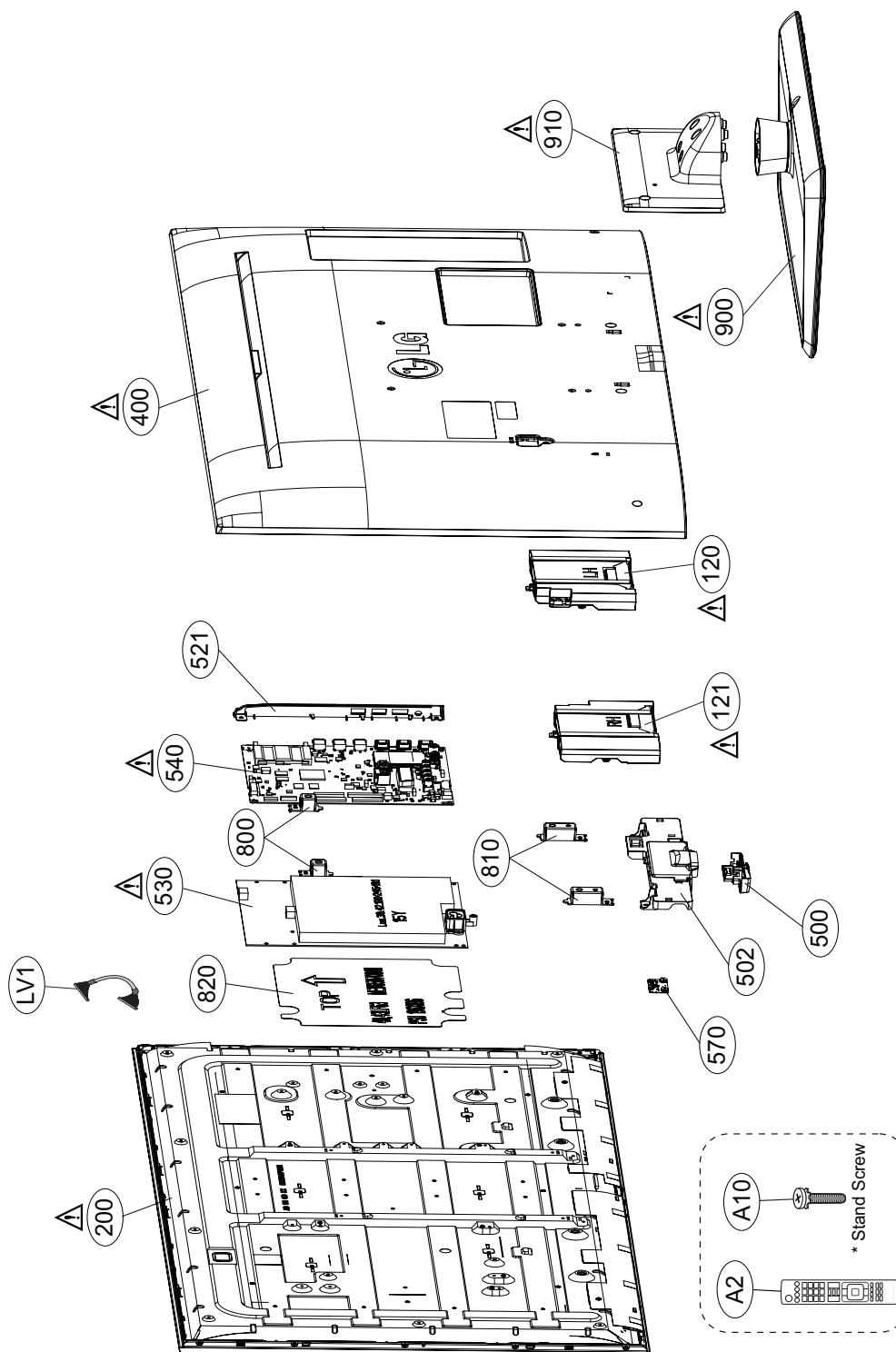
BLOCK DIAGRAM



EXPLODED VIEW

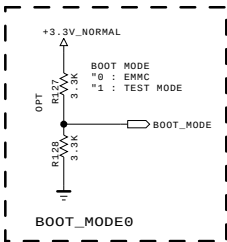
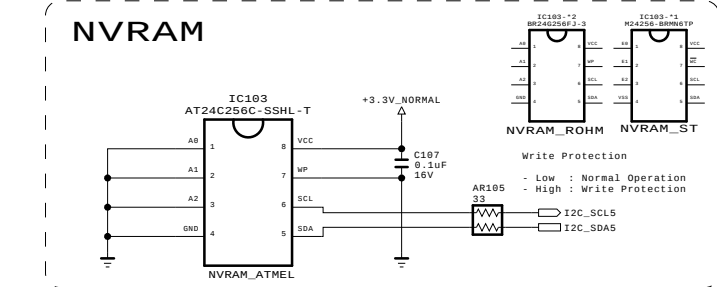
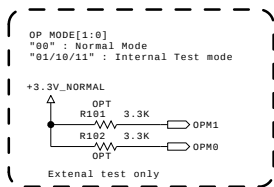
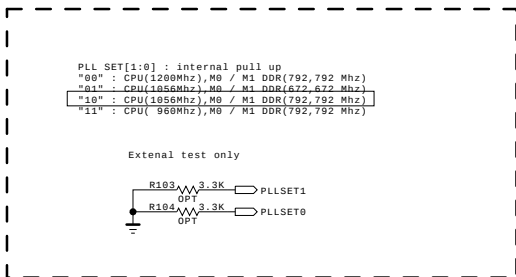
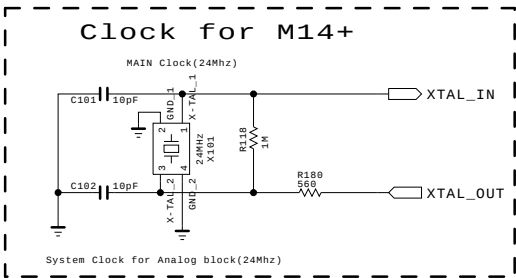
IMPORTANT SAFETY NOTICE

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.

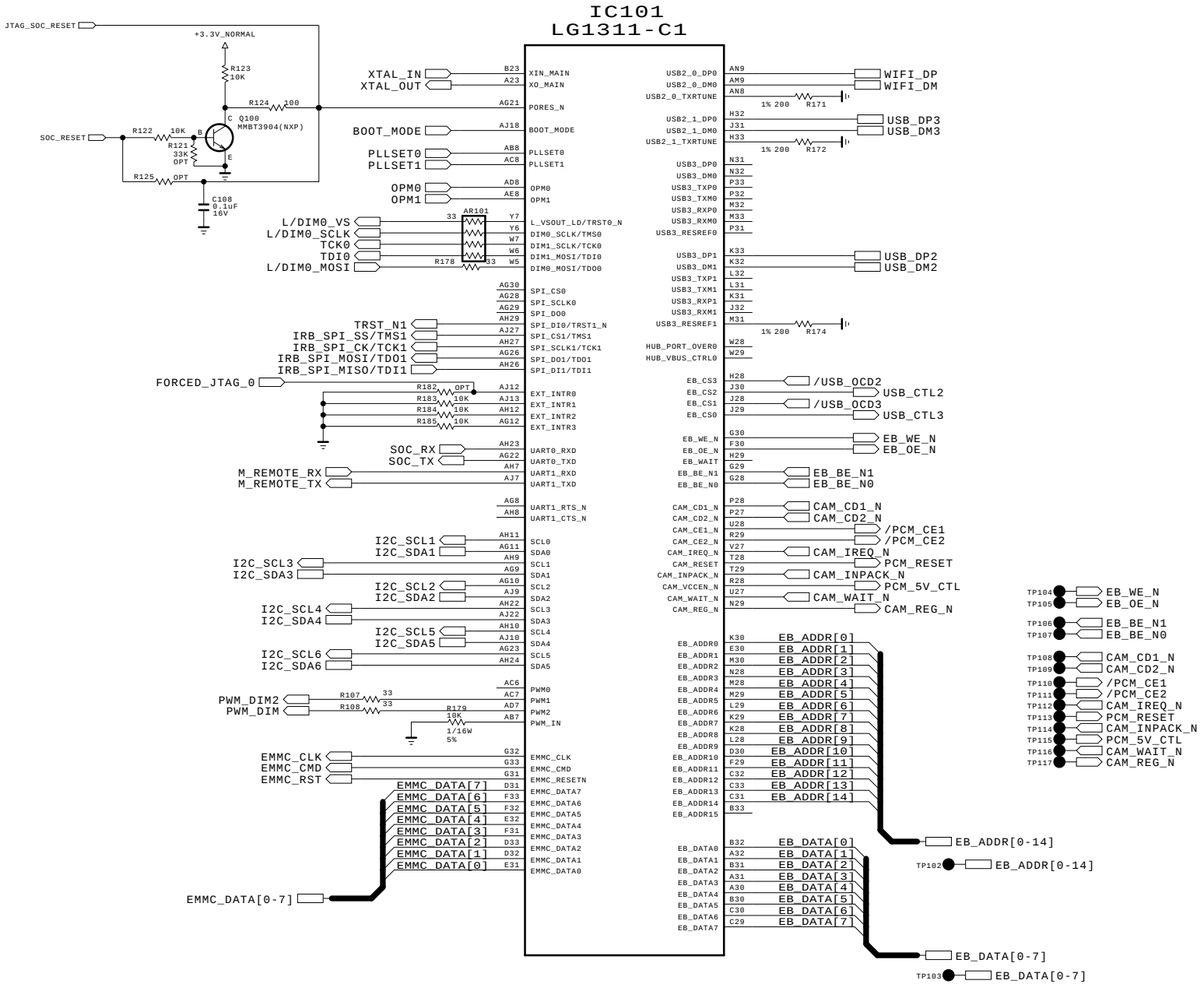
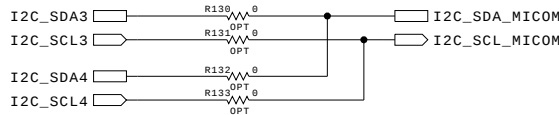
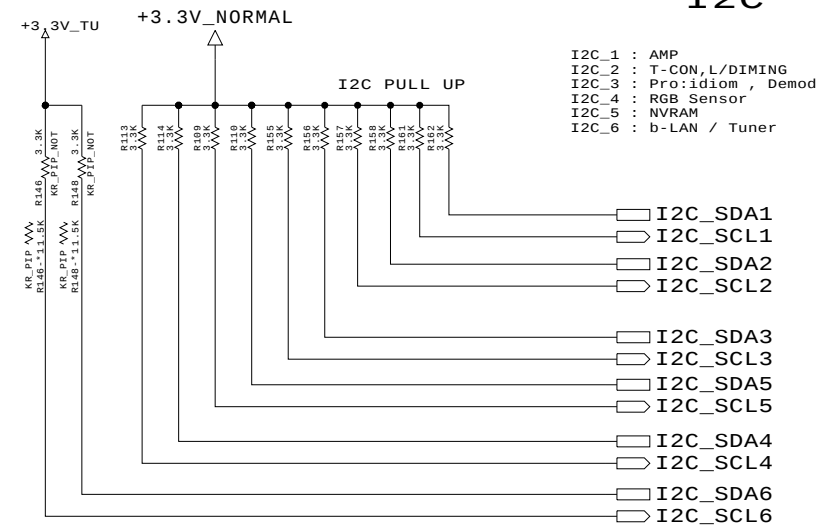


LX770H-UA:webOS 2.0
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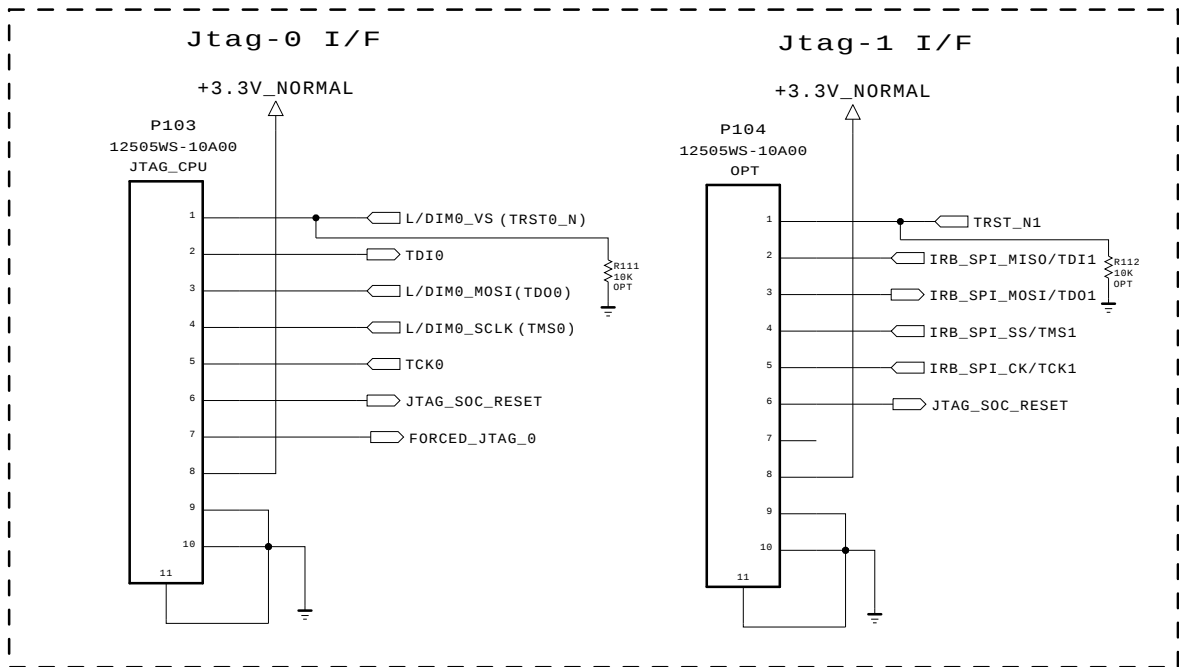
System Configuration



I2C



Jtag-0 I/F

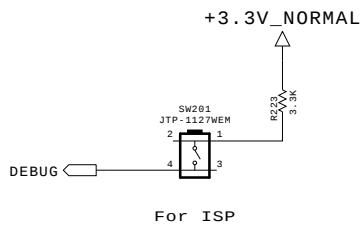
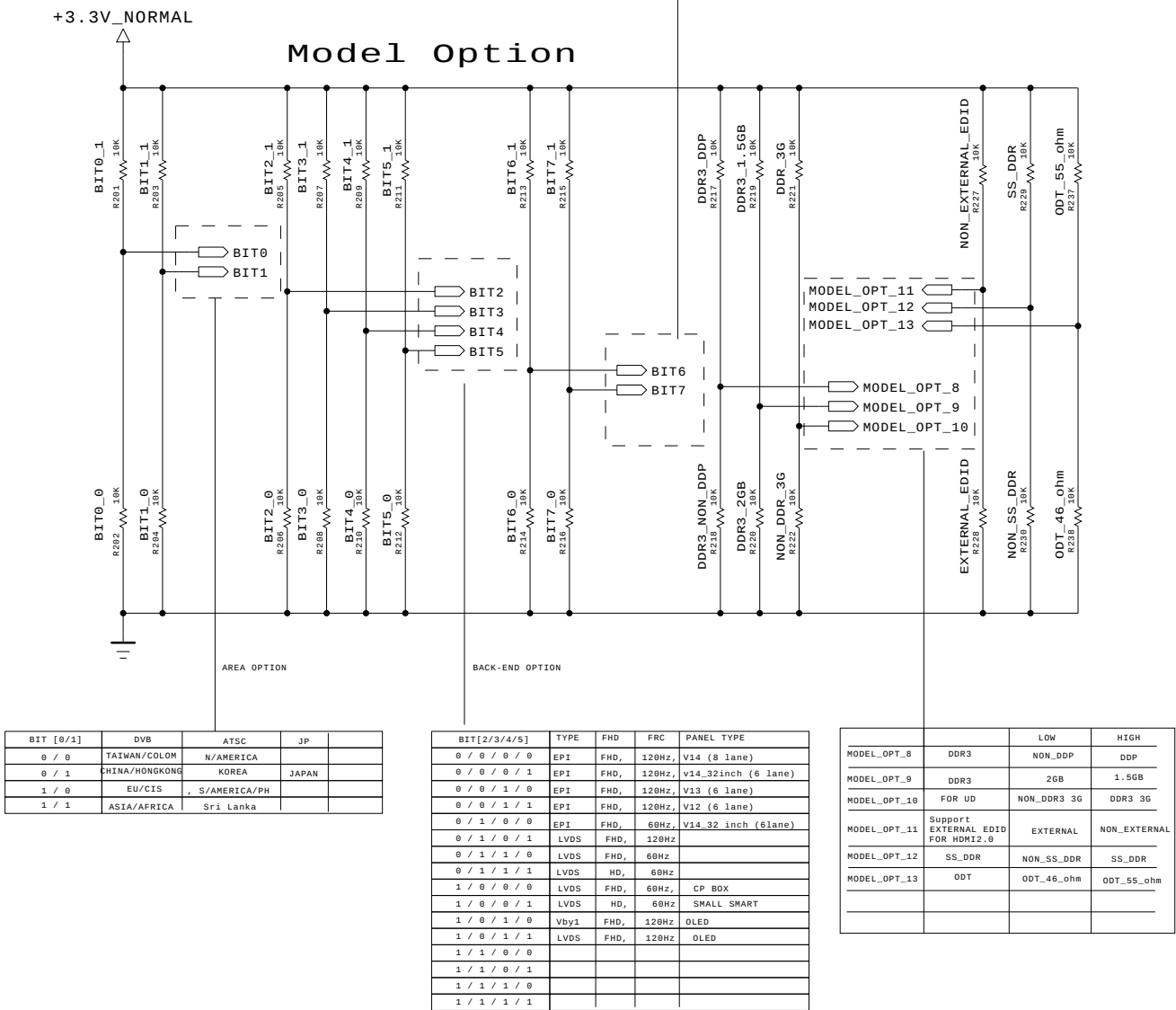


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LG ELECTRONICS

MODEL	LX770H	DATE	2015.3.11
BLOCK	M14+ Symbol A	SHEET	1 / 24

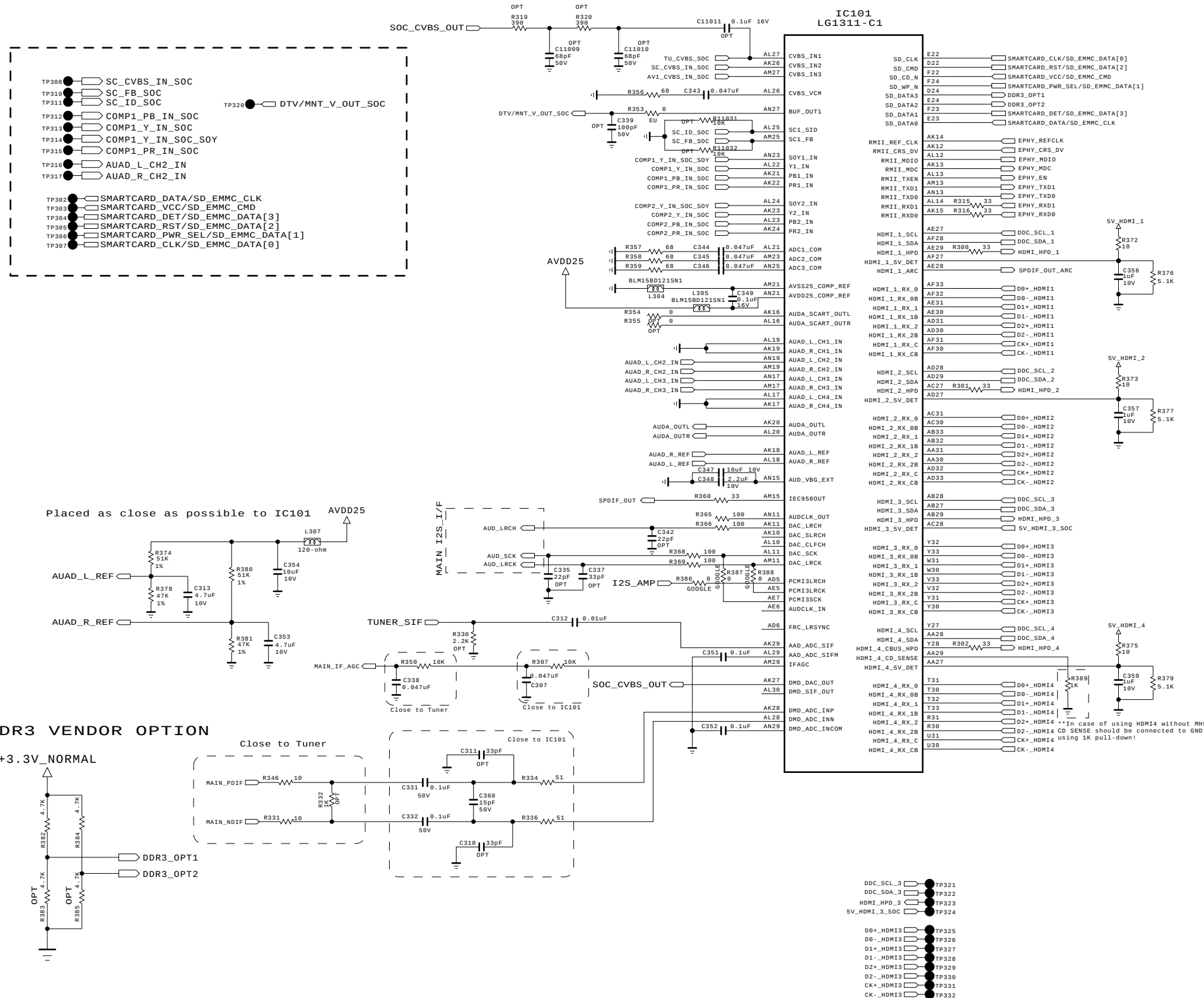
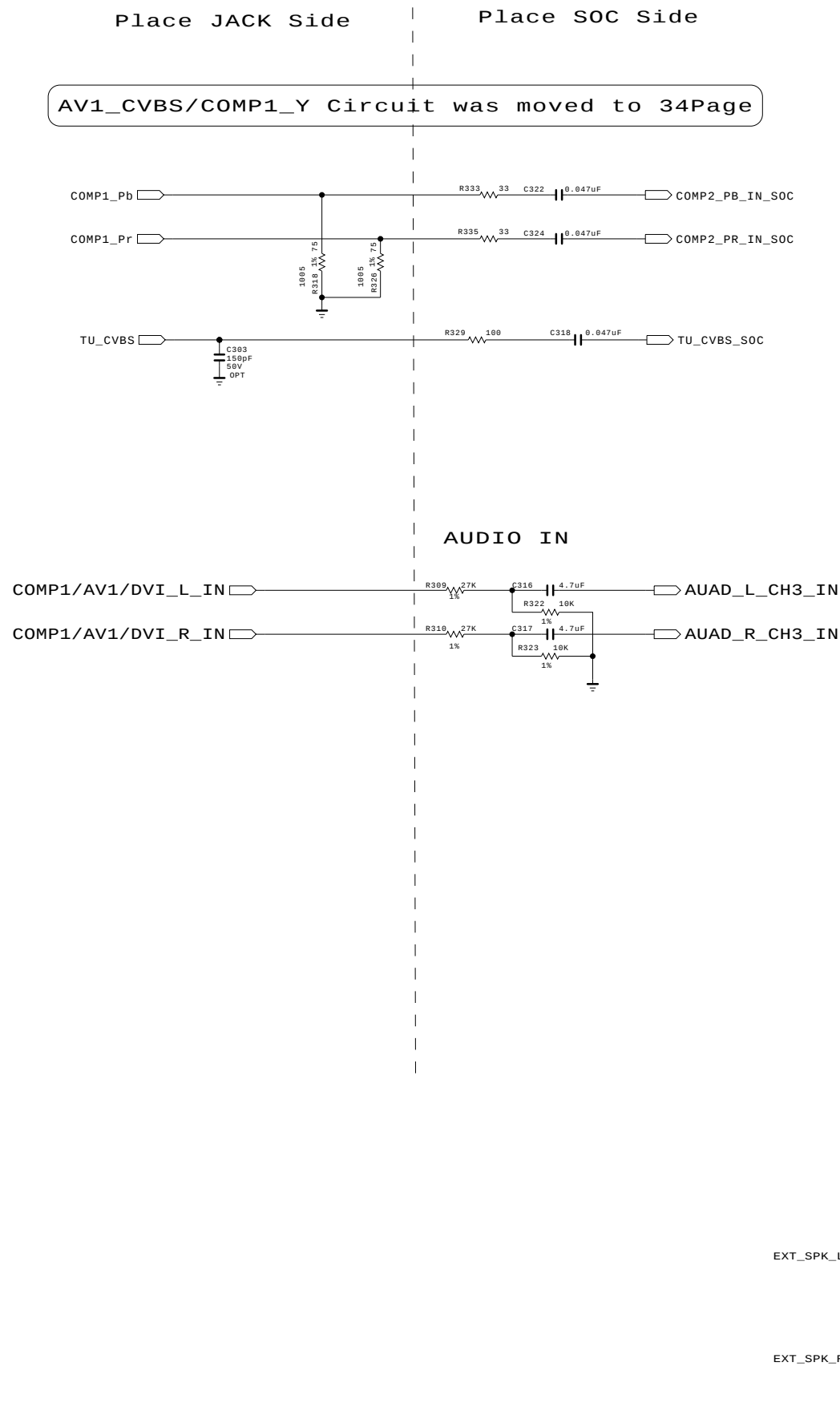


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MODEL	LX770H	DATE	2015.3.11
BLOCK	M14+ Symbol B	SHEET	2 / 24

PLACE AT JACK SIDE

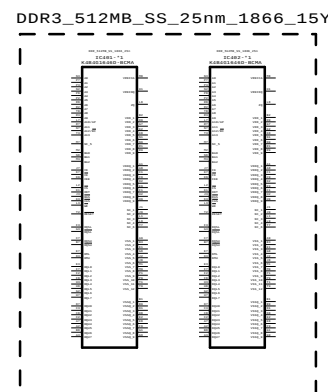
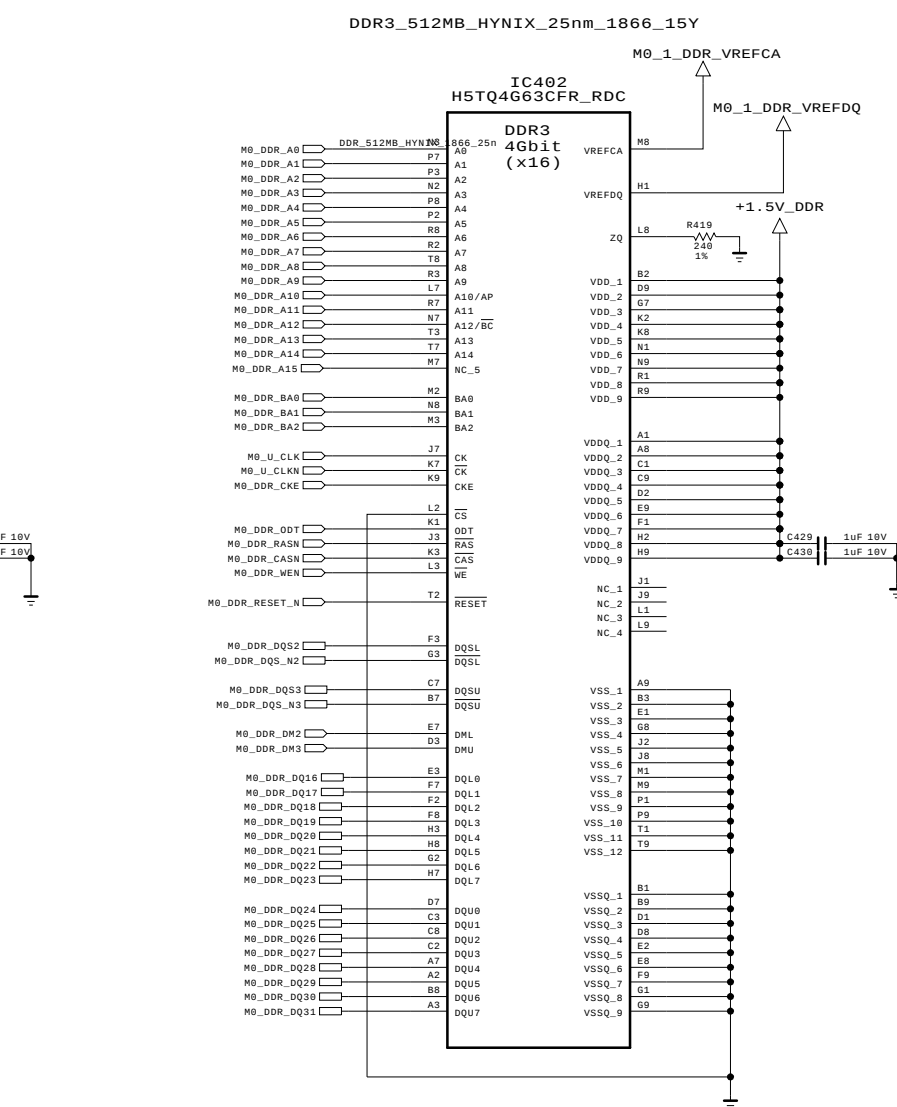
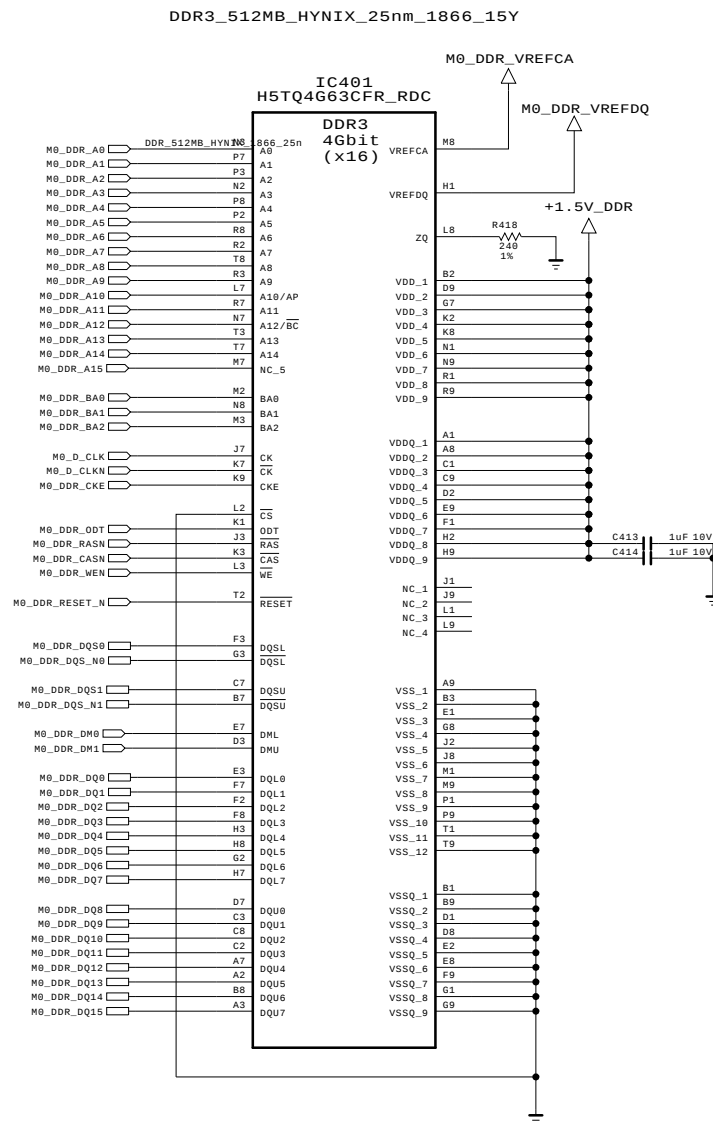
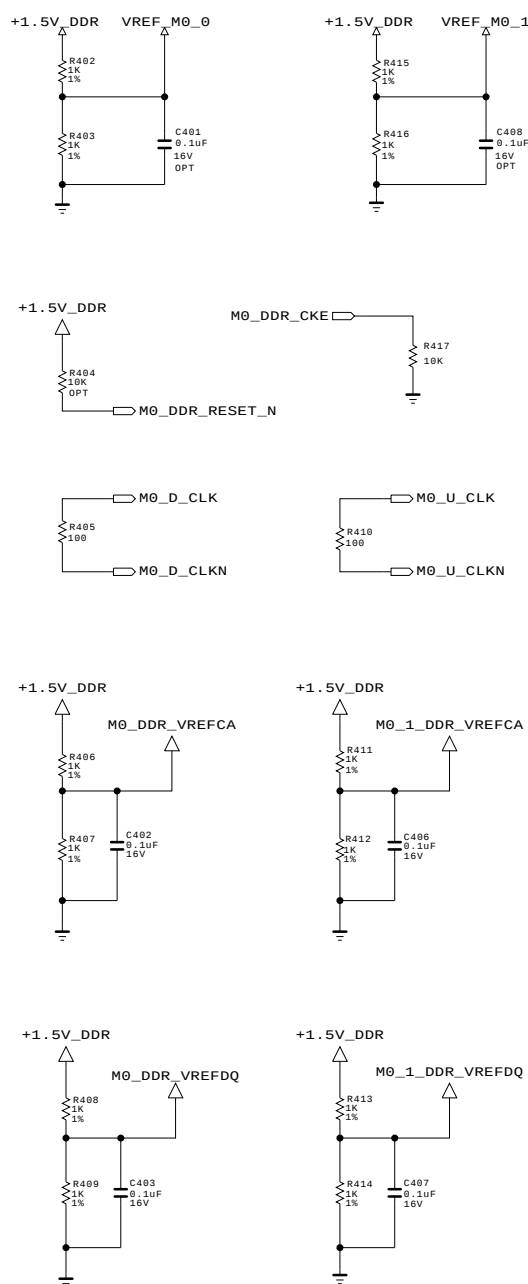
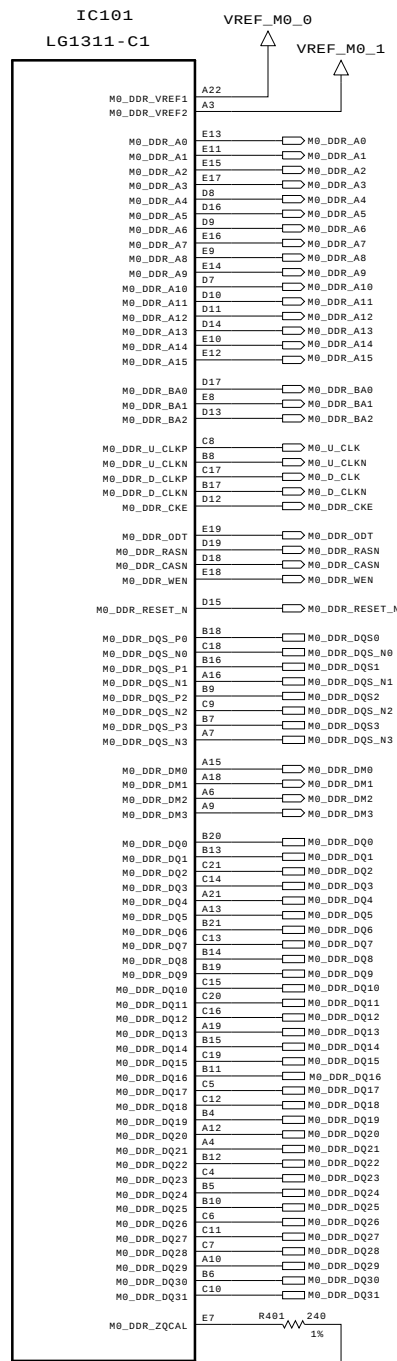


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MODEL	LX770H	DATE	2015.3.11
BLOCK	M14+ Symbol C	SHEET	3 / 24

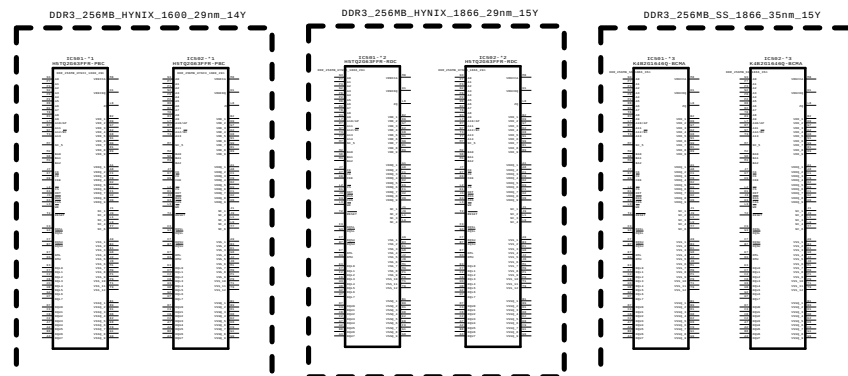
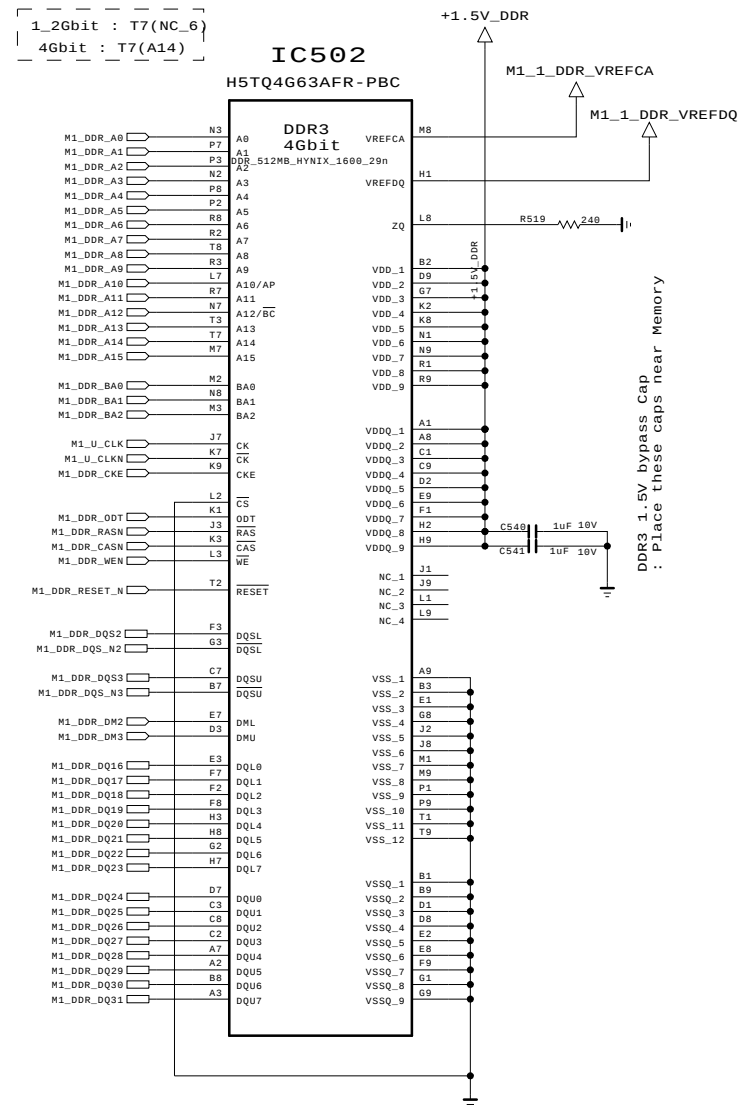
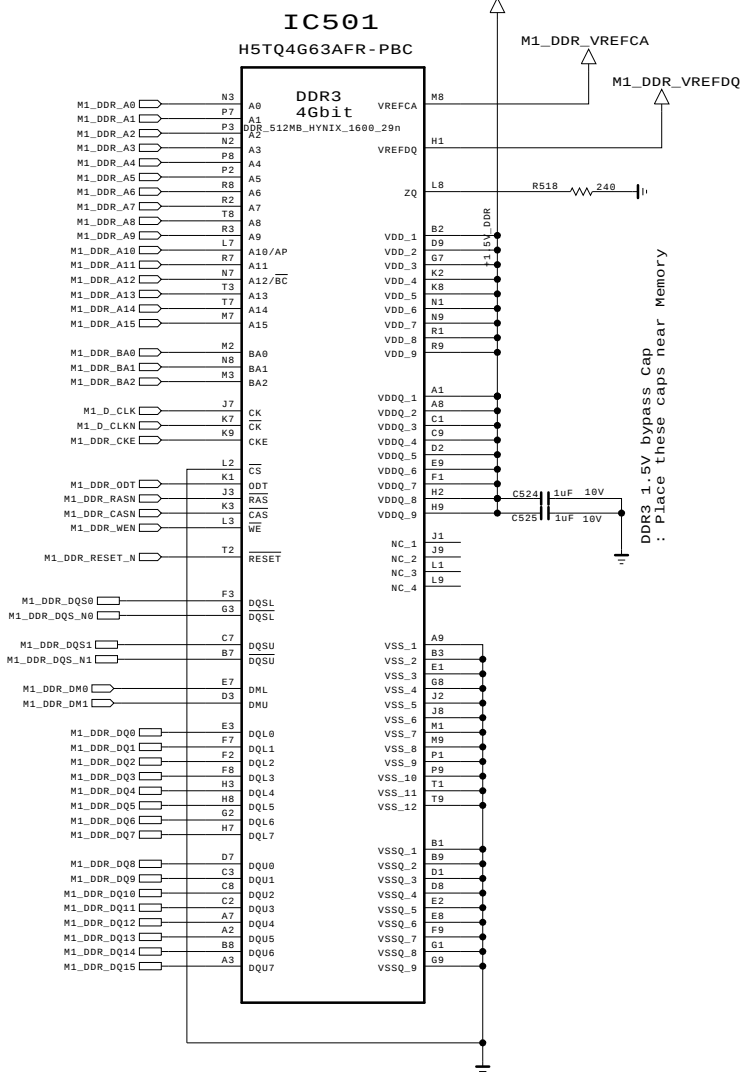
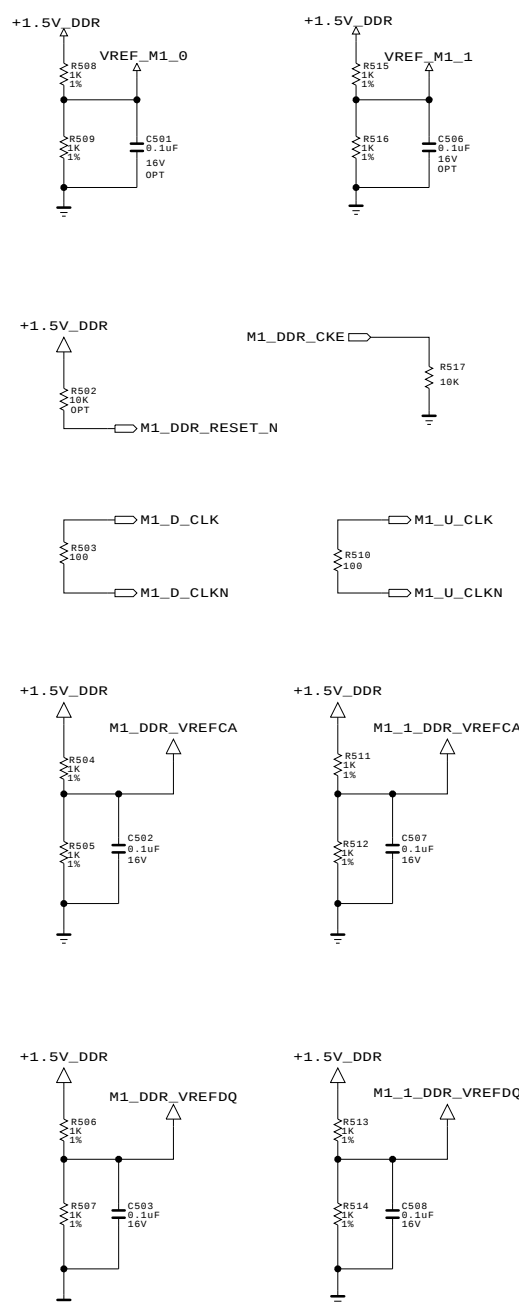
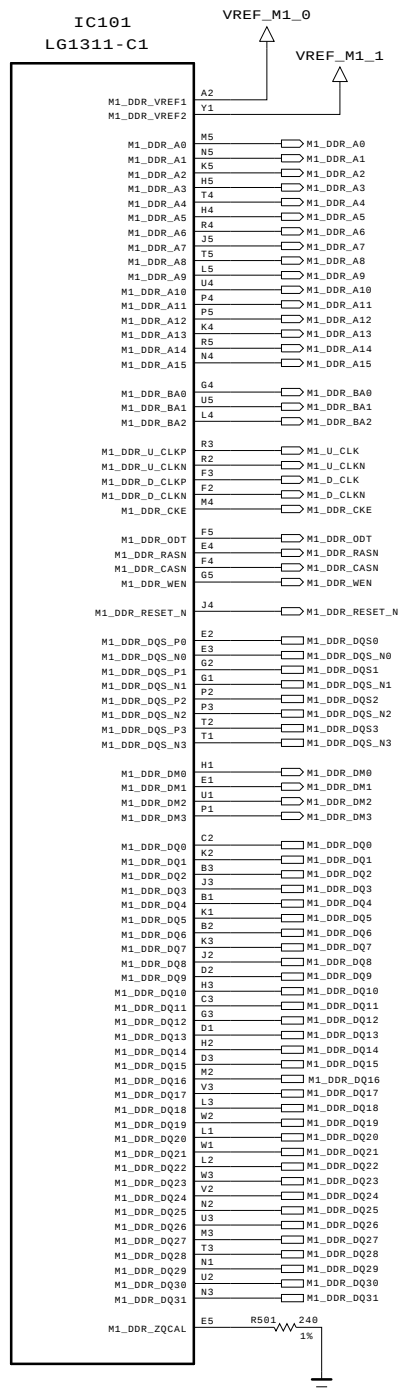


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BLOCK	M14+ DDR3-(DE)	SHEET	4 / 24

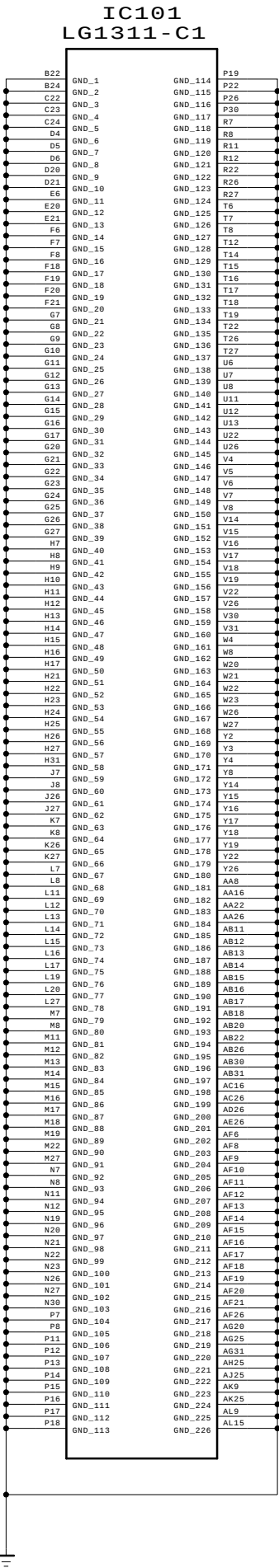
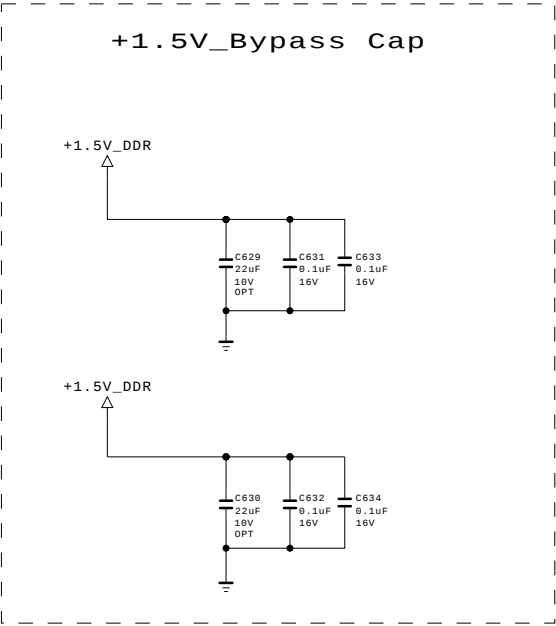
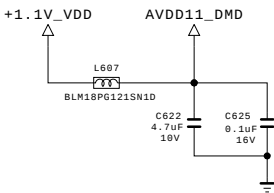
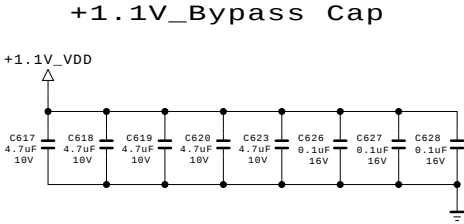
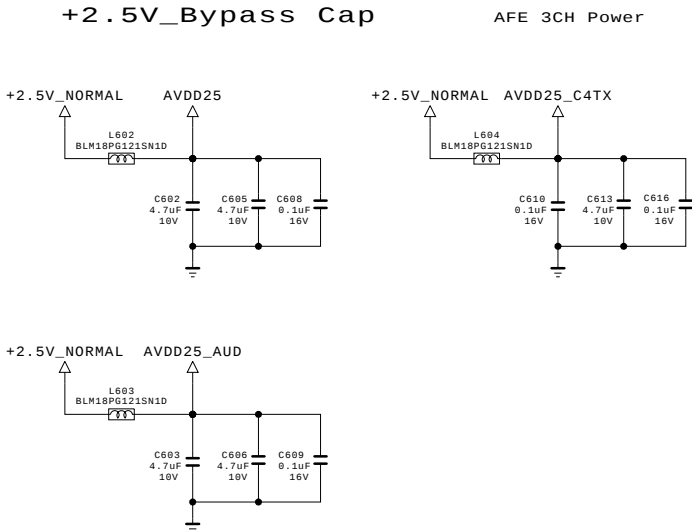
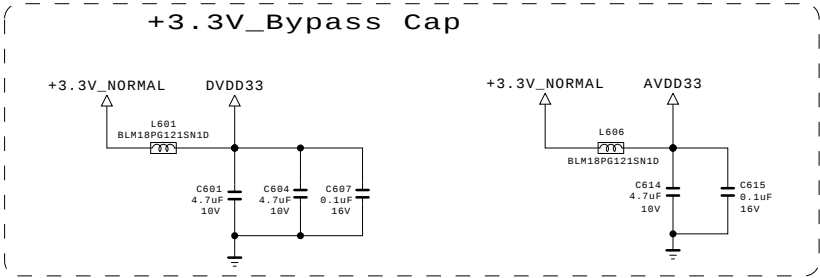
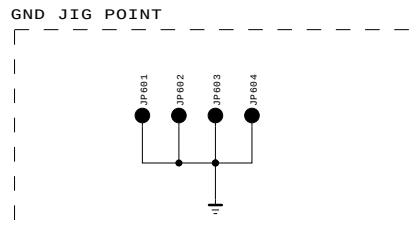
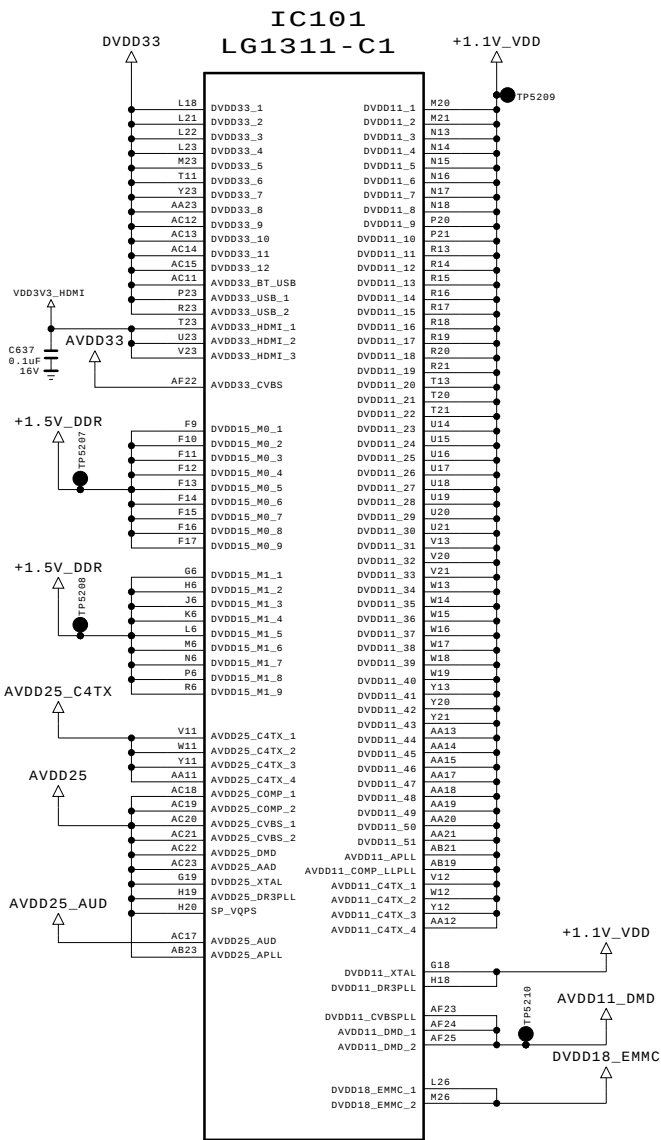


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MODEL	LX770H	DATE	2015.3.11
BLOCK	M14+ DDR3(DE)	SHEET	5 / 24

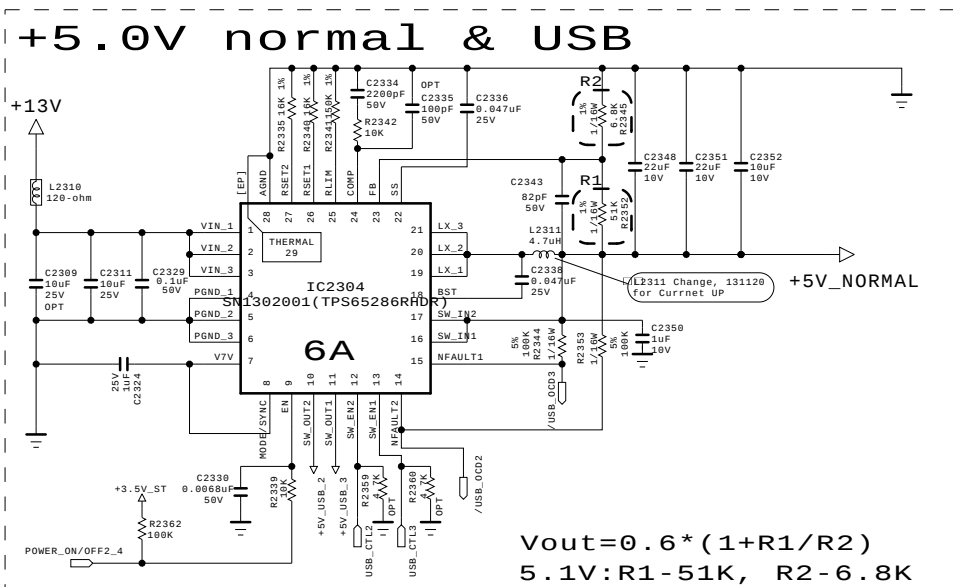
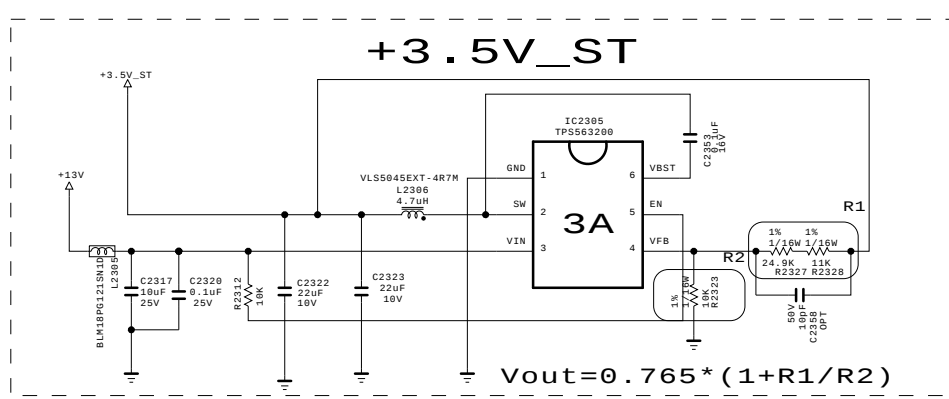
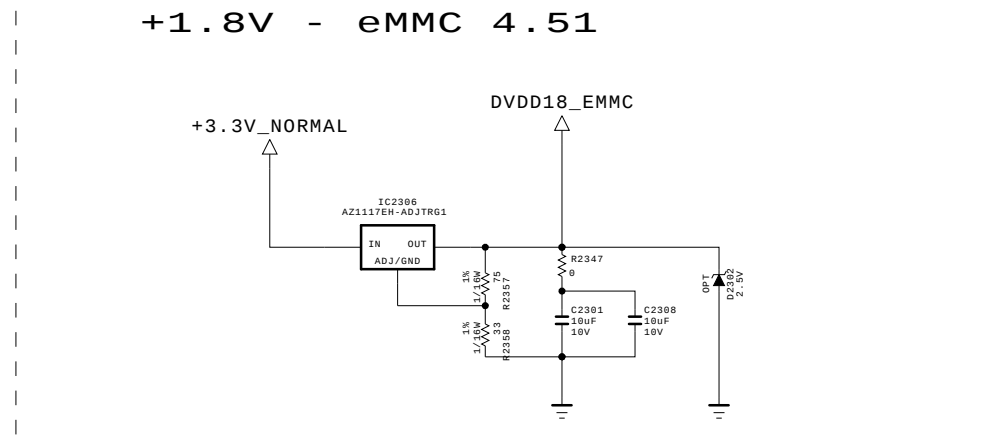
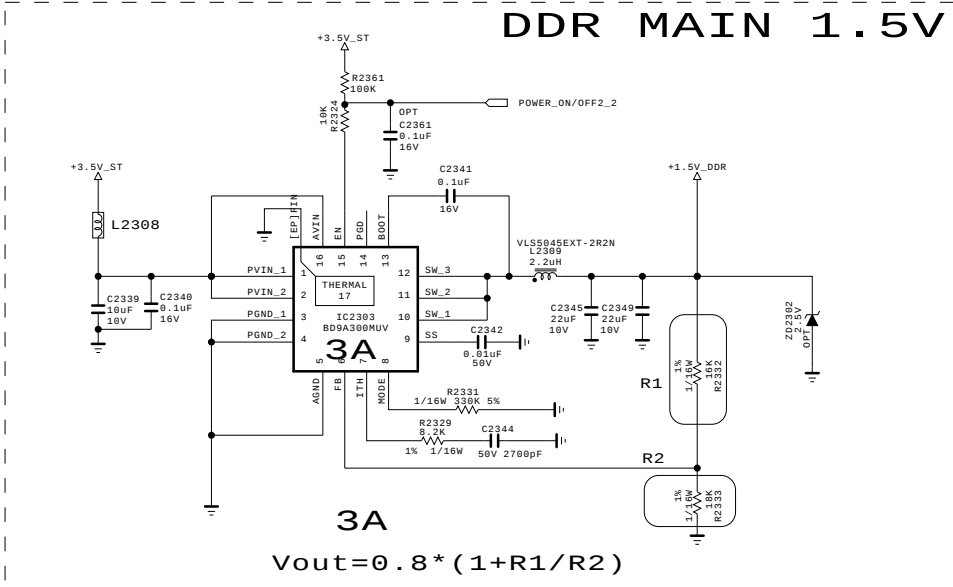
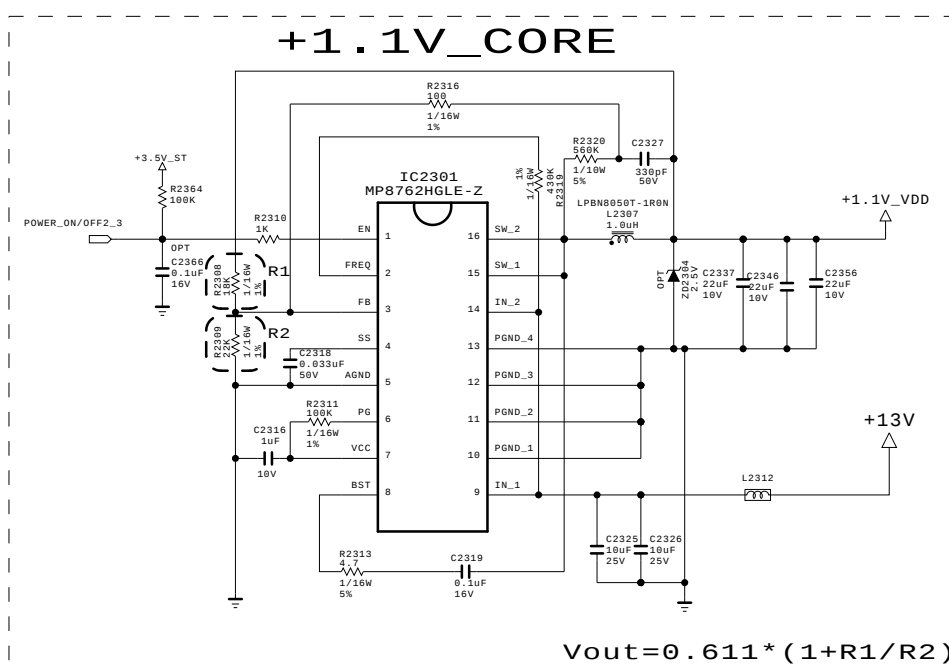
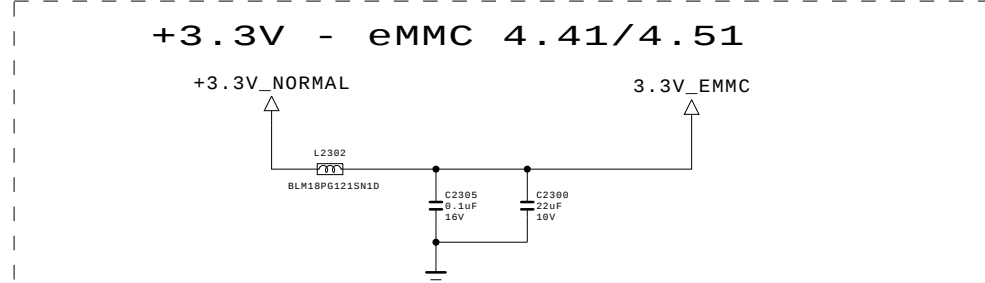
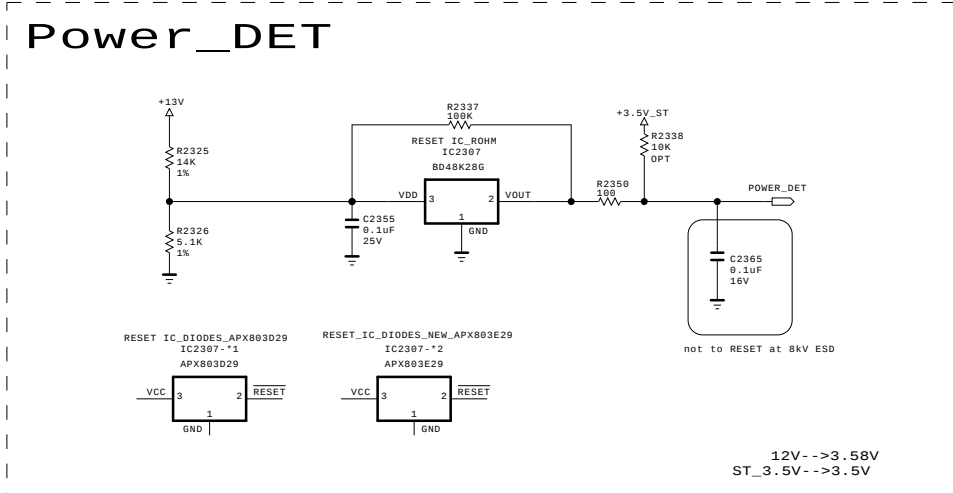
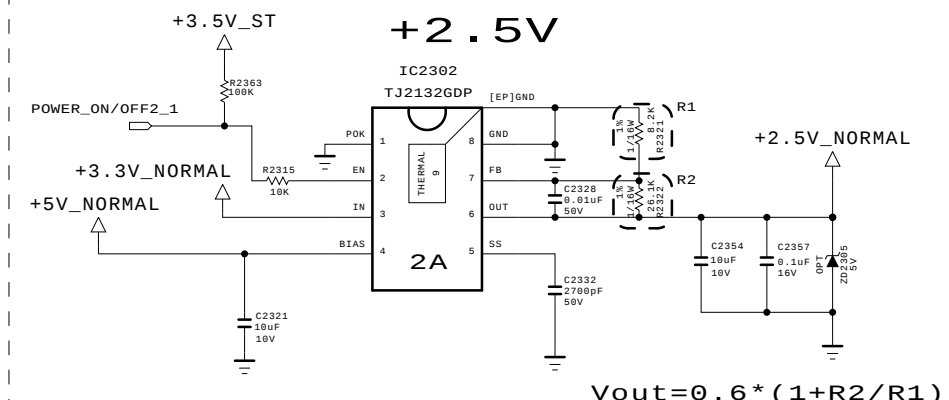
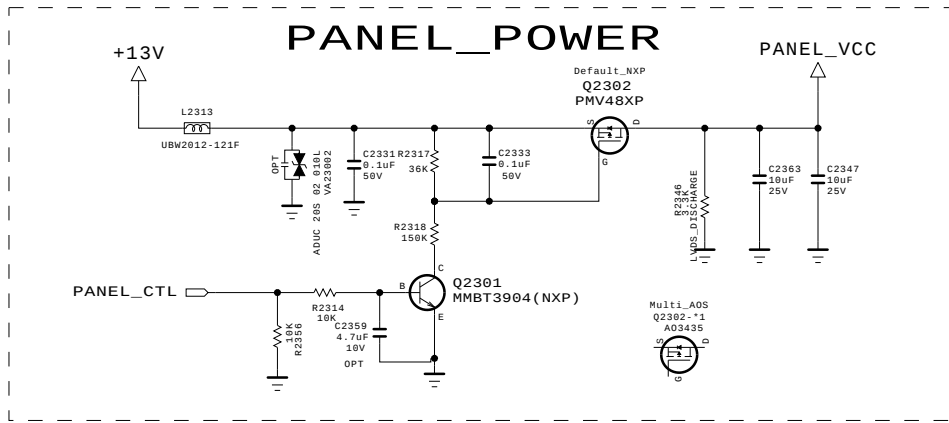


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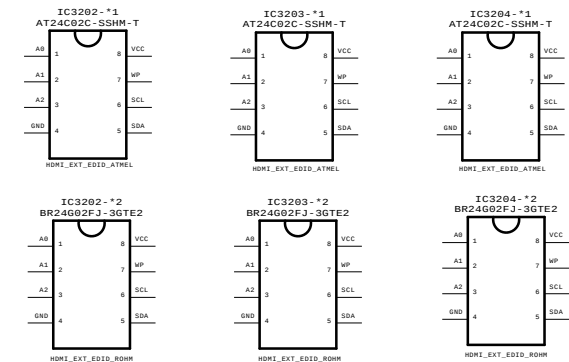
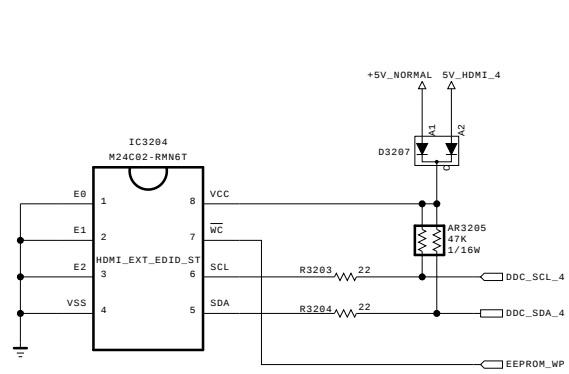
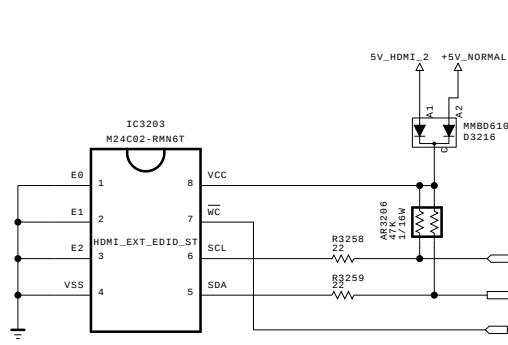
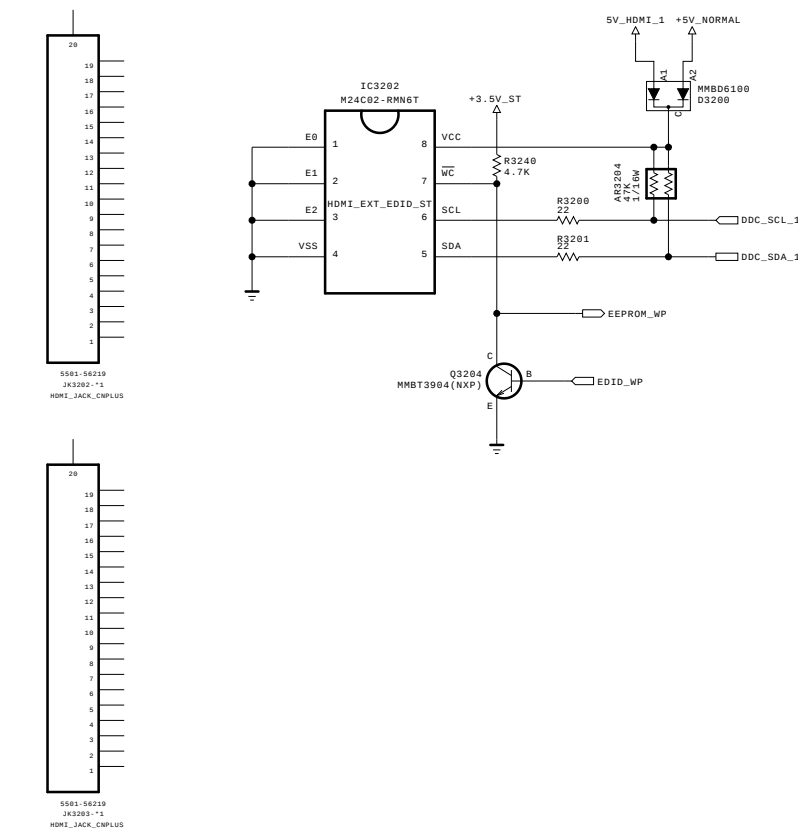
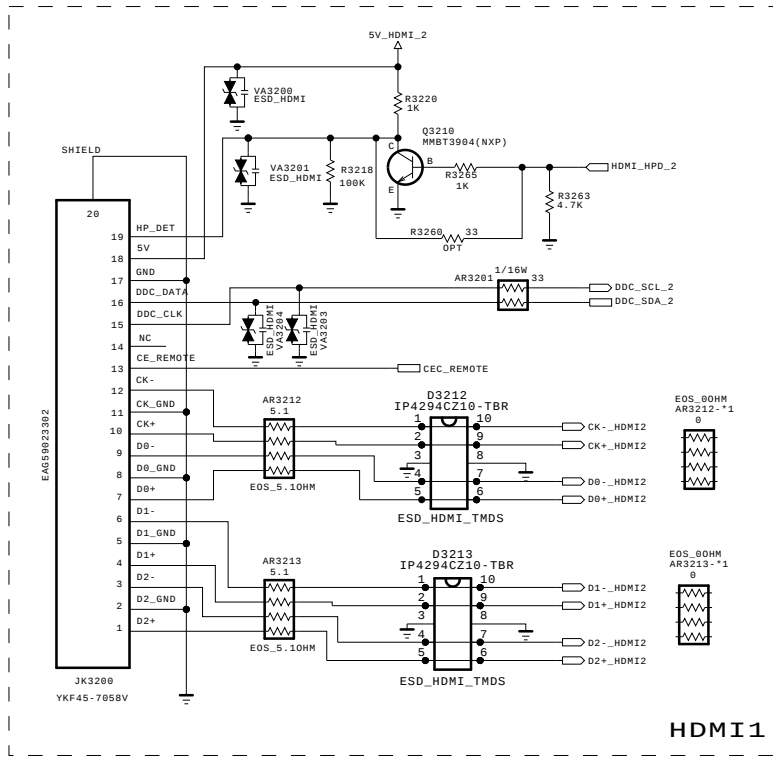
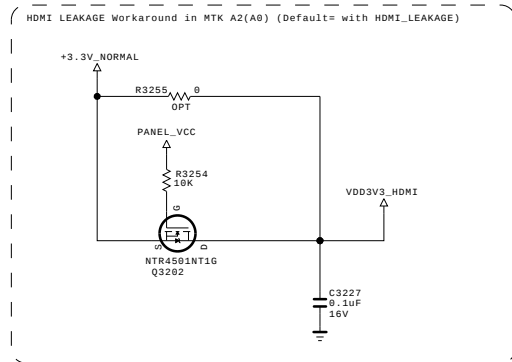
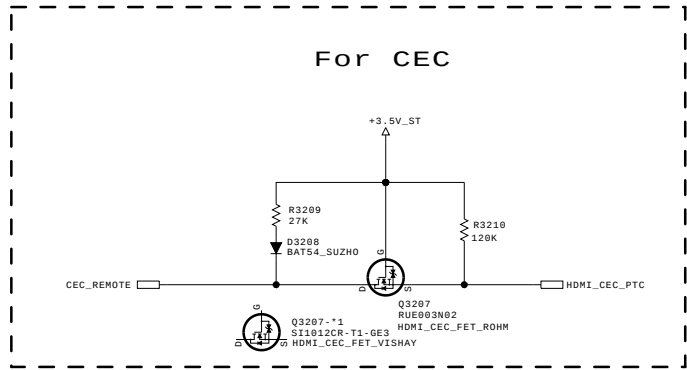
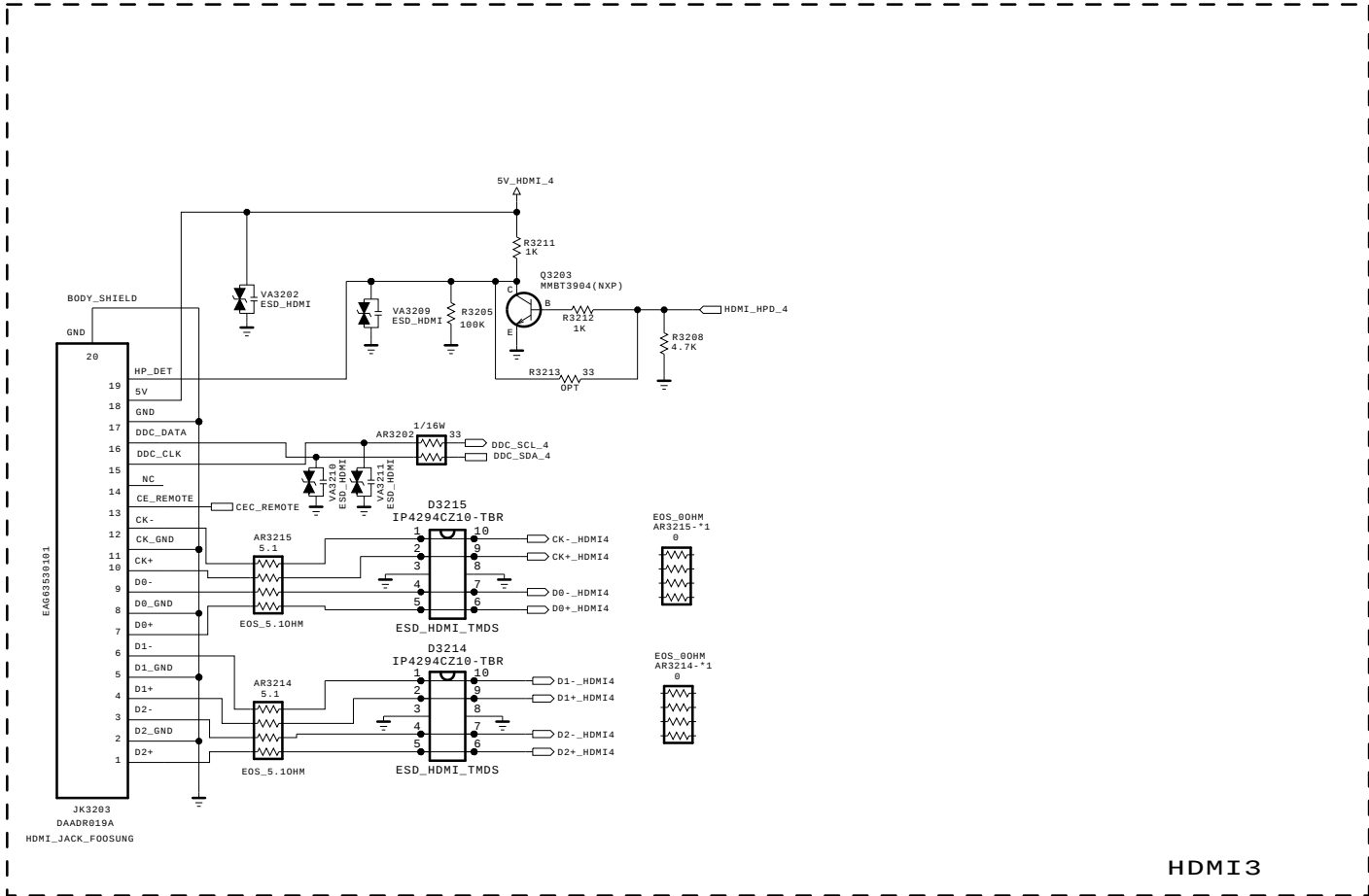
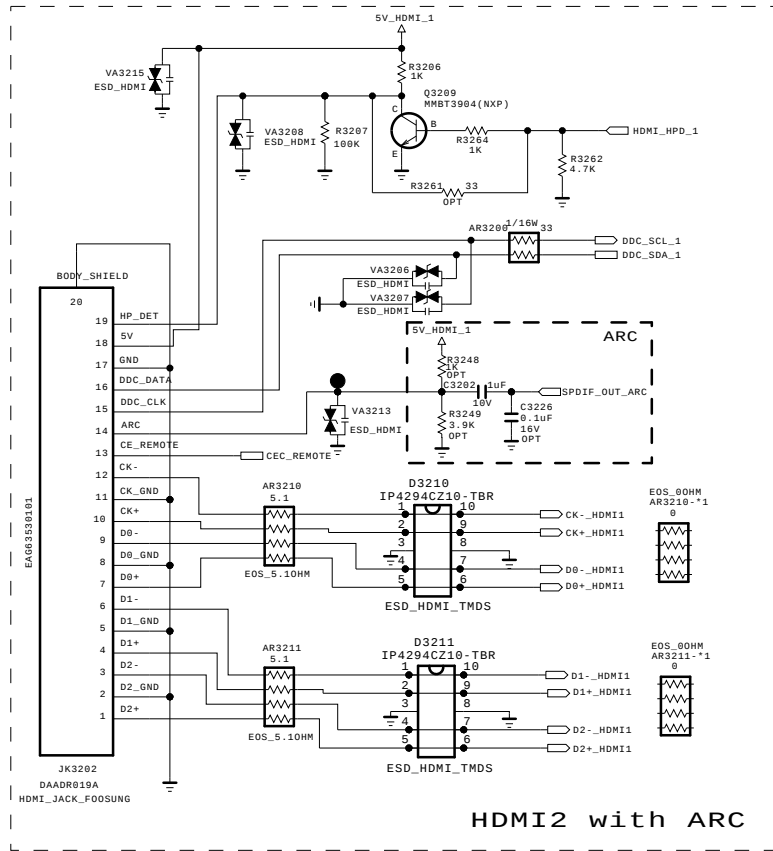
MODEL	LX770H	DATE	2014.11.15
BLOCK	VCC & GND	SHEET	6 / 24



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MODEL	LX770H	DATE	2015.3.11
BLOCK	POWER	SHEET	7 / 24



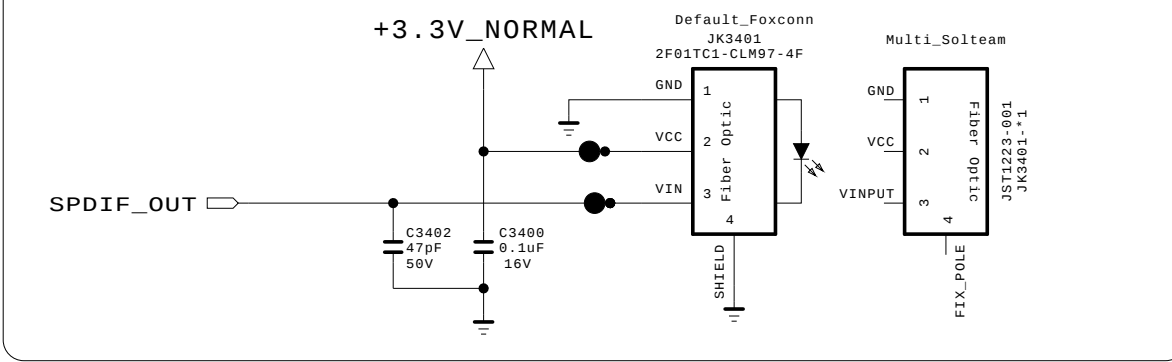
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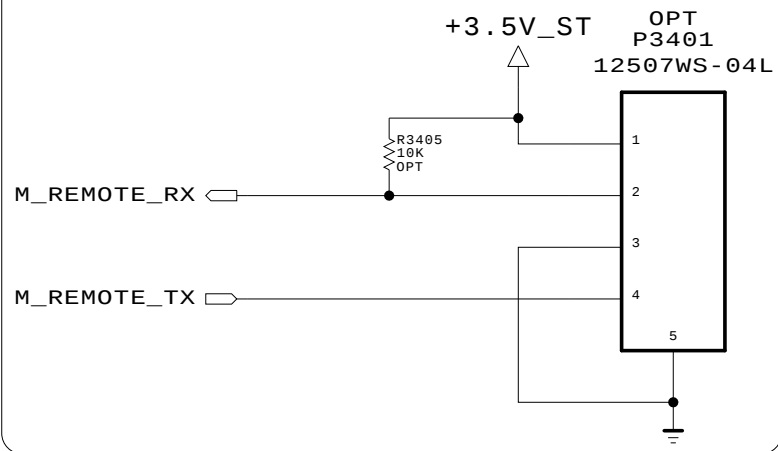


MODEL	LX770H	DATE	2015.3.11
BLOCK	HDMI	SHEET	8 / 24

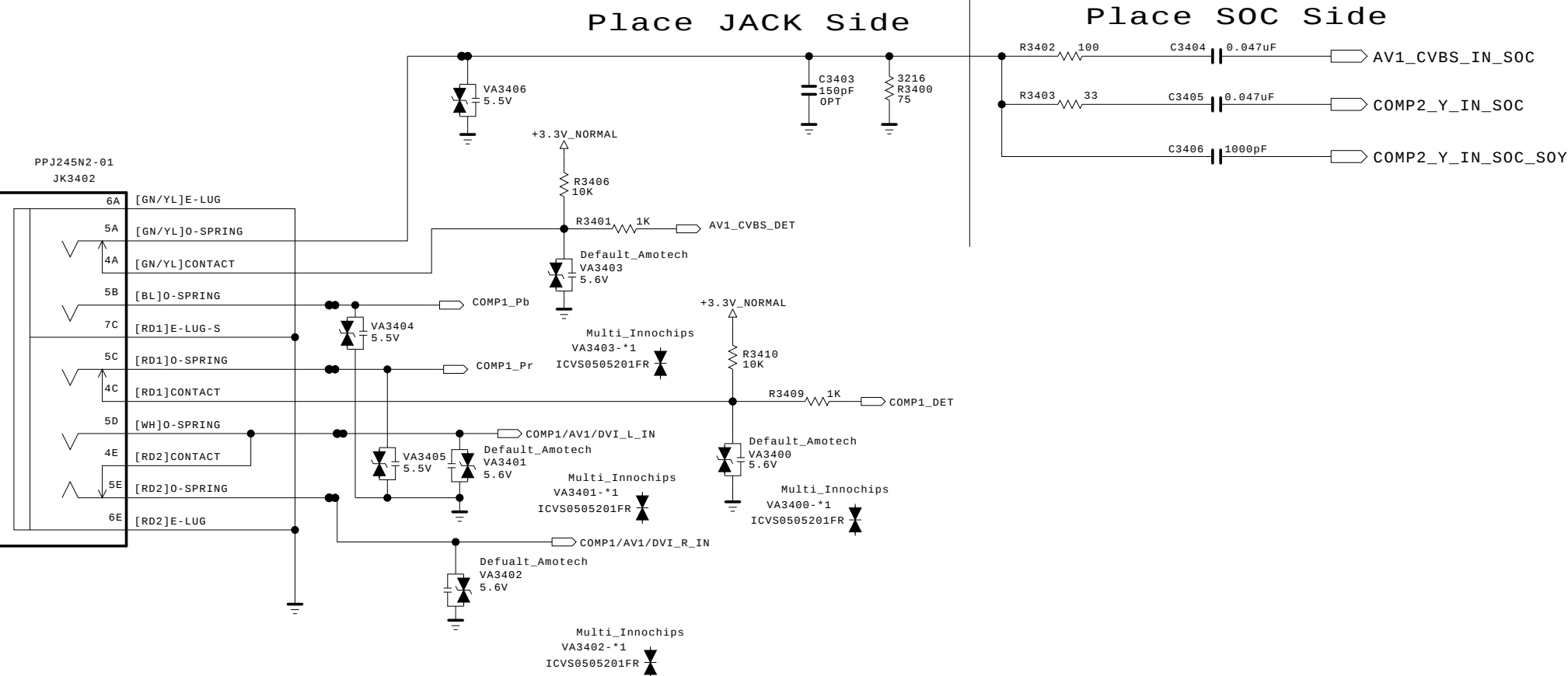
SPDIF OUT



DDTS TEST ONLY



AV/COMPONENT REAR



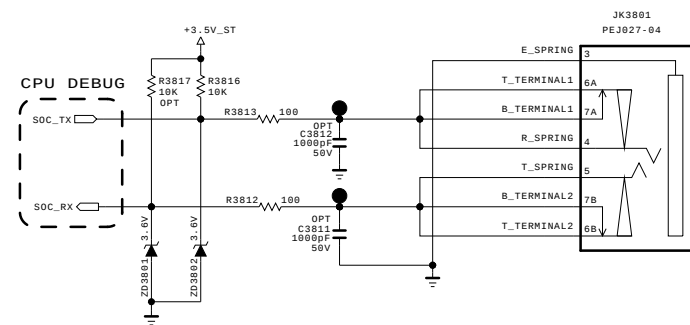
THE ⚠ SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FIRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMATIC.

SECRET

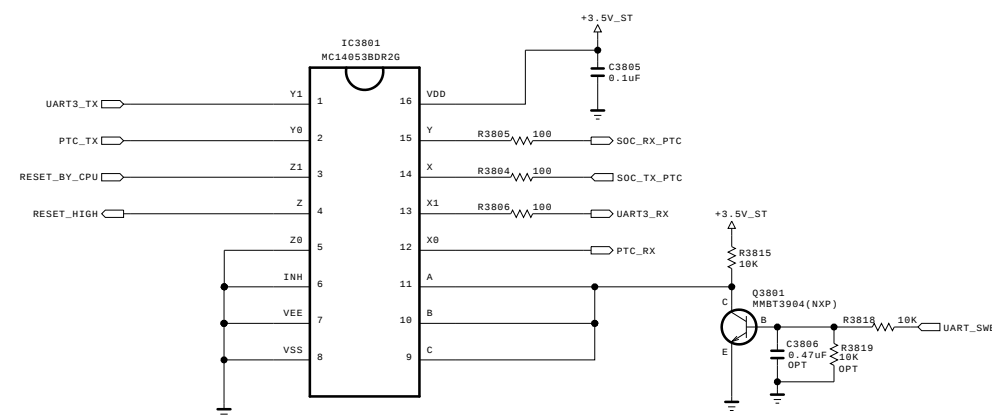
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MODEL	LX770H	DATE	2015.3.11
BLOCK	AV JACK	SHEET	9 / 24



Serial UART for Commercial

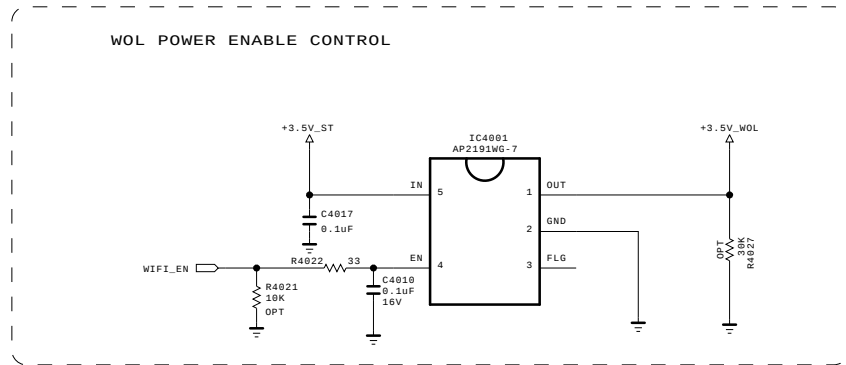
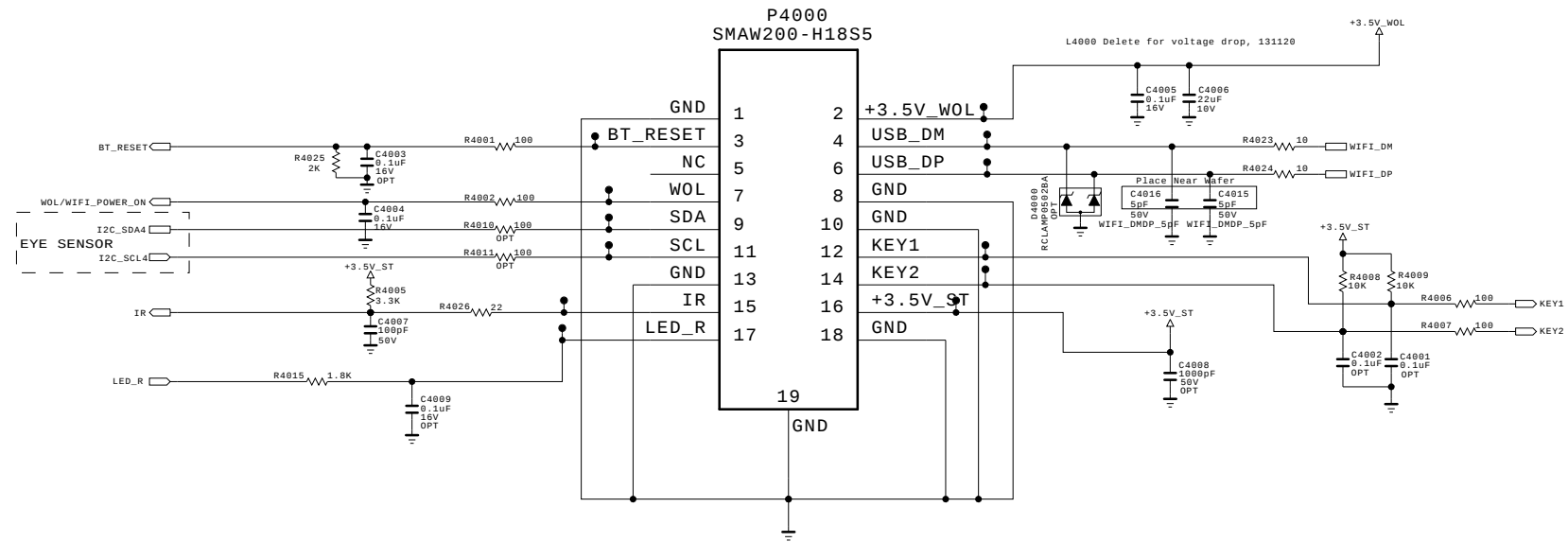


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MODEL	LX770H	DATE	2014.11.15
BLOCK	UART	SHEET	10 / 24

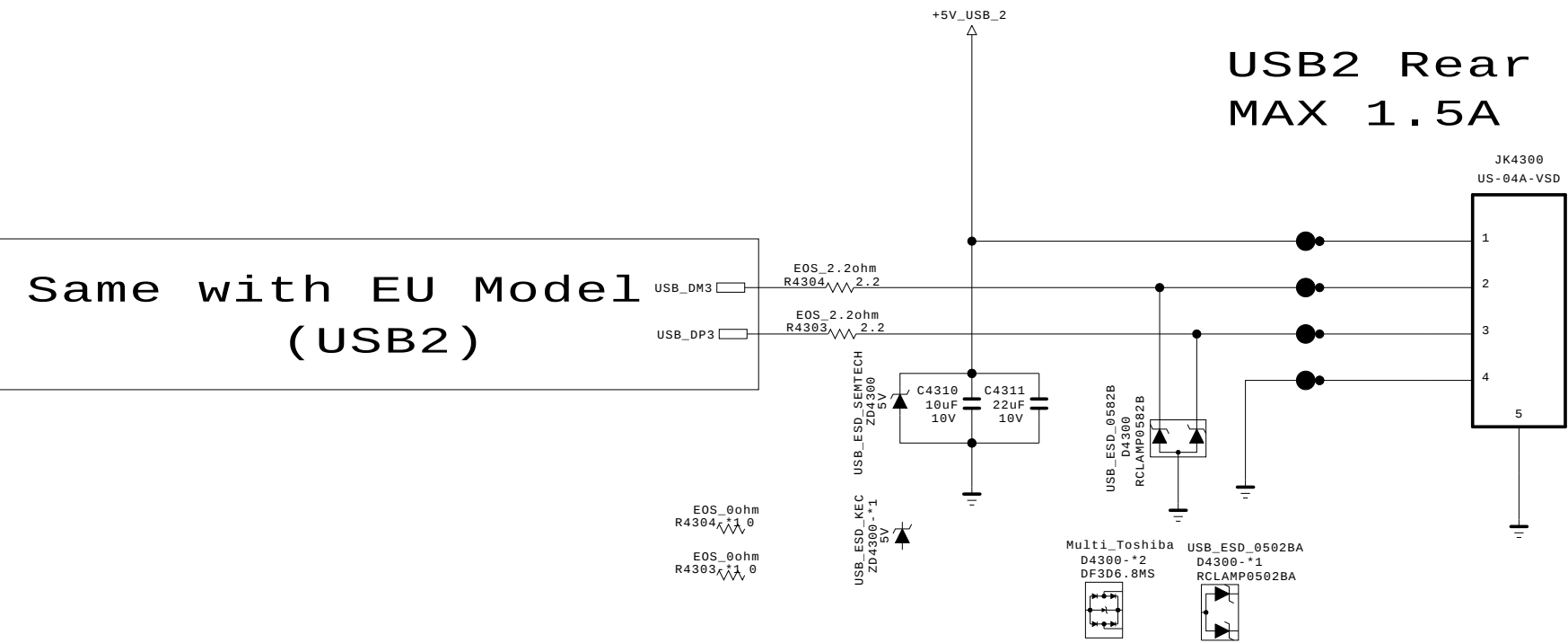
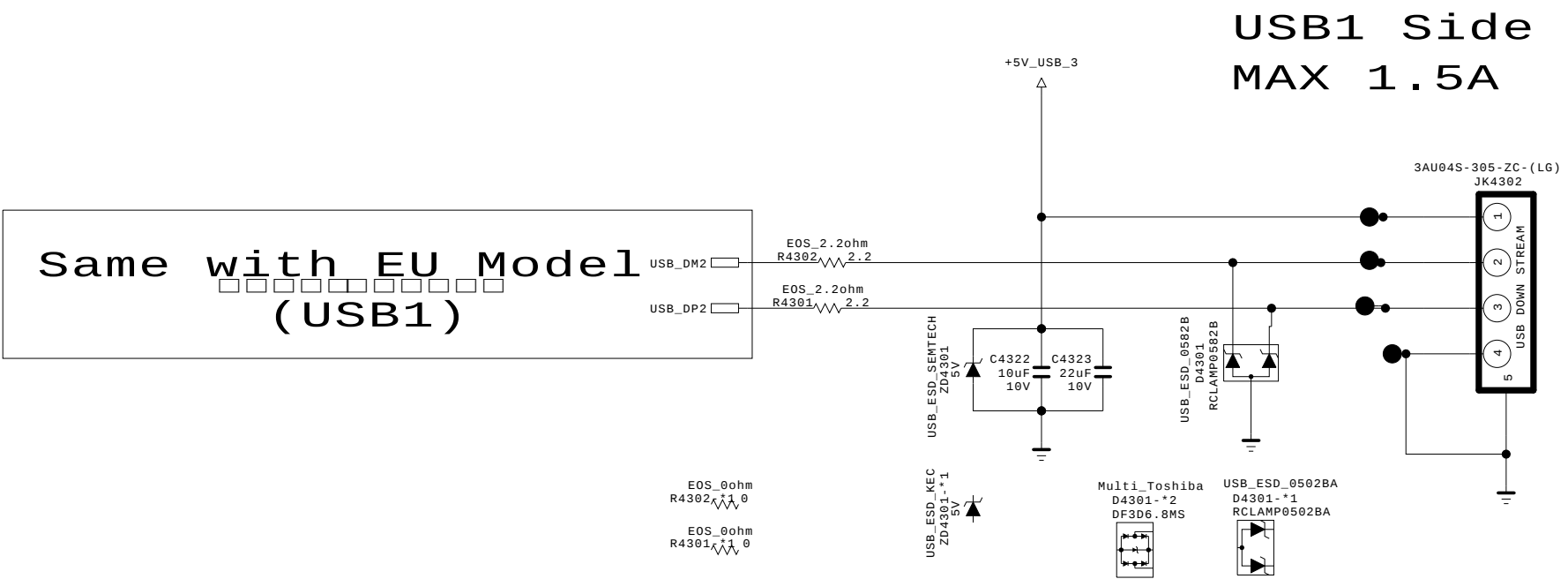


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MODEL	LX770H	DATE	2015.3.11
BLOCK	IR / KEY	SHEET	11 / 24



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

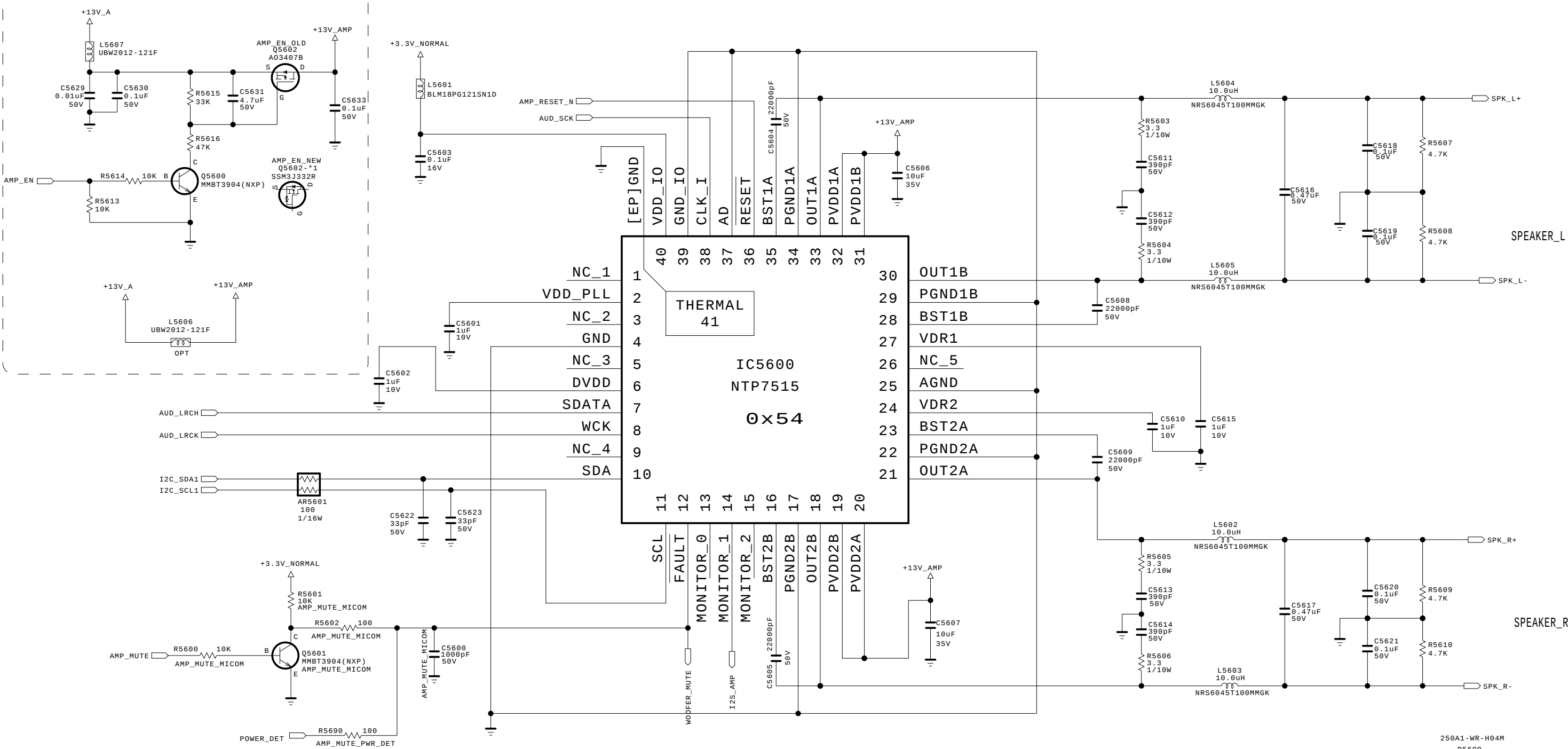
LG Electronics

 LG ELECTRONICS

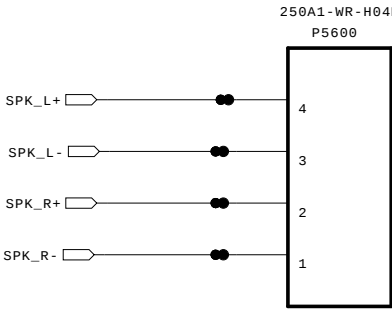
MODEL	LX770H	DATE	2015.3.11
BLOCK	USB	SHEET	12 / 24

AUDIO AMP(NTP7515)

Instant_Power_On



TP5601 WOOFER_MUTE



Black : Box_Type

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SECRET

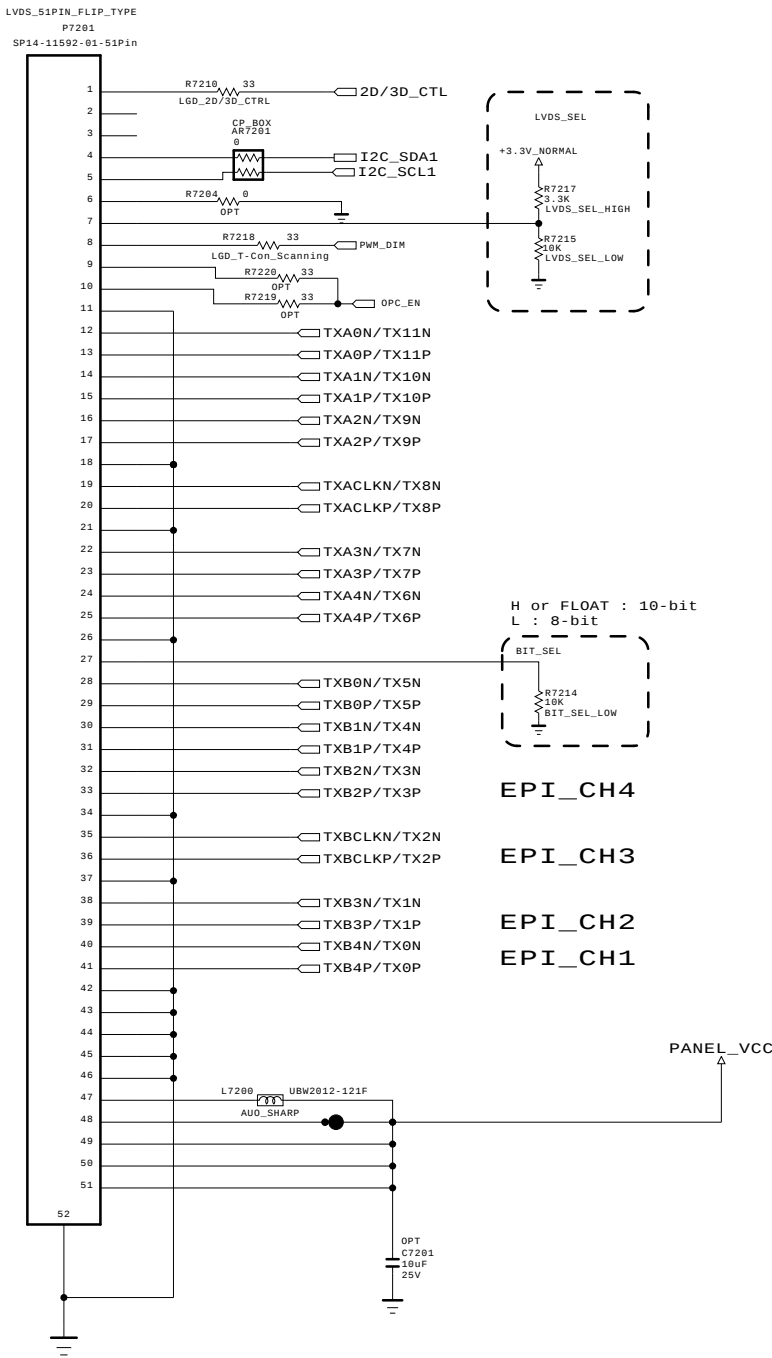
LG Electronics

LG ELECTRONICS

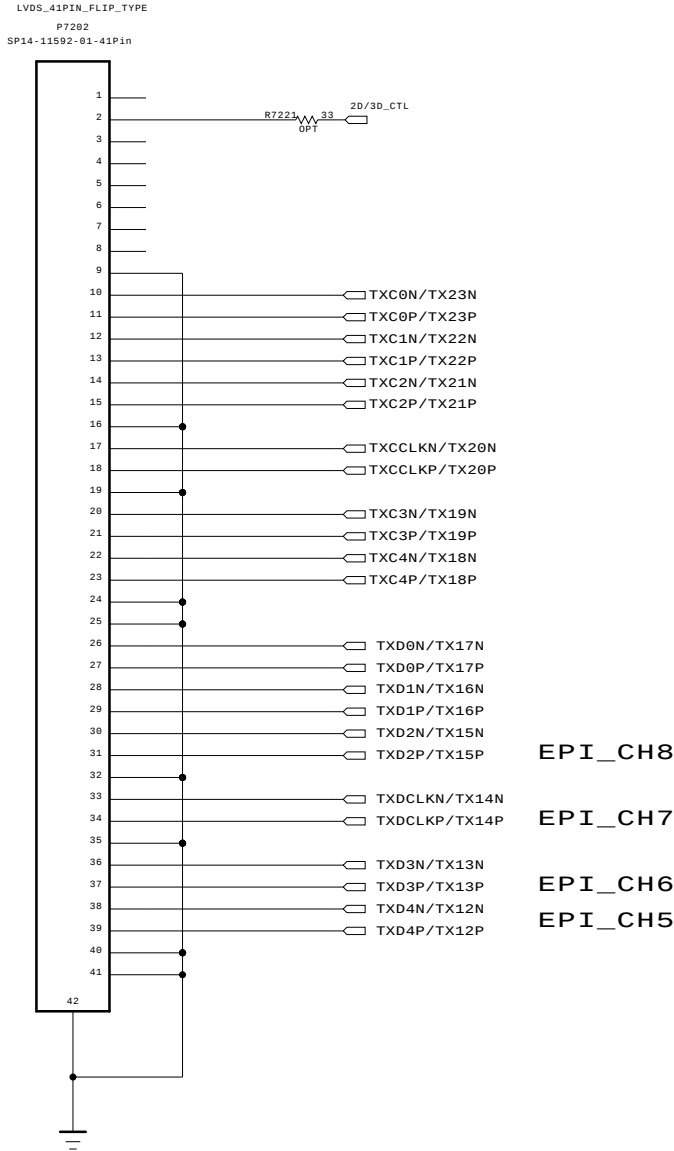
MODEL	LX770H	DATE	2015.3.11
BLOCK	AUDIO[ST]	SHEET	13 / 24

LVDS

[51Pin LVDS OUTPUT Connector]



[41Pin LVDS OUTPUT Connector]



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LGElectronics



MODEL	LX770H	DATE	2015.3.11
BLOCK	LVDS	SHEET	14 / 24

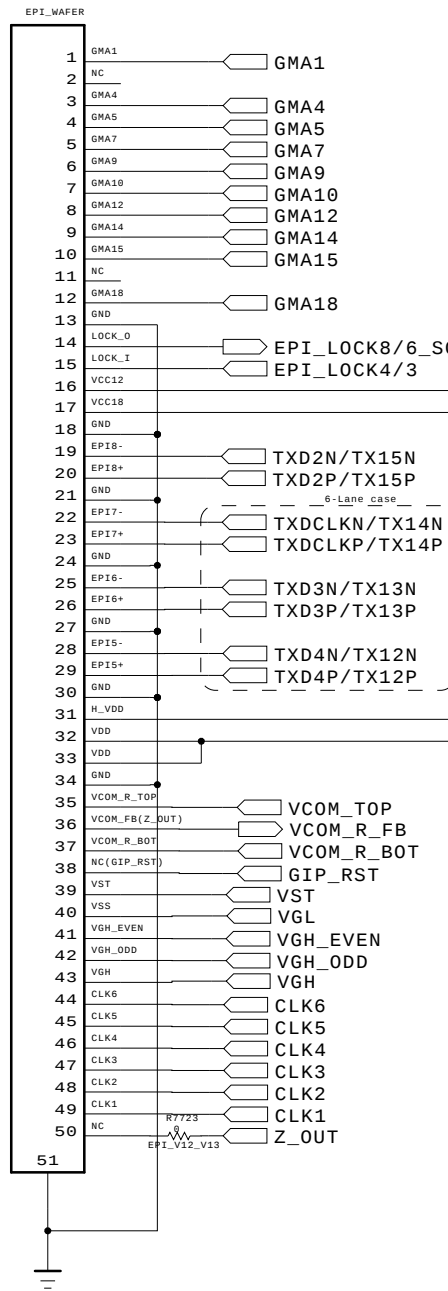
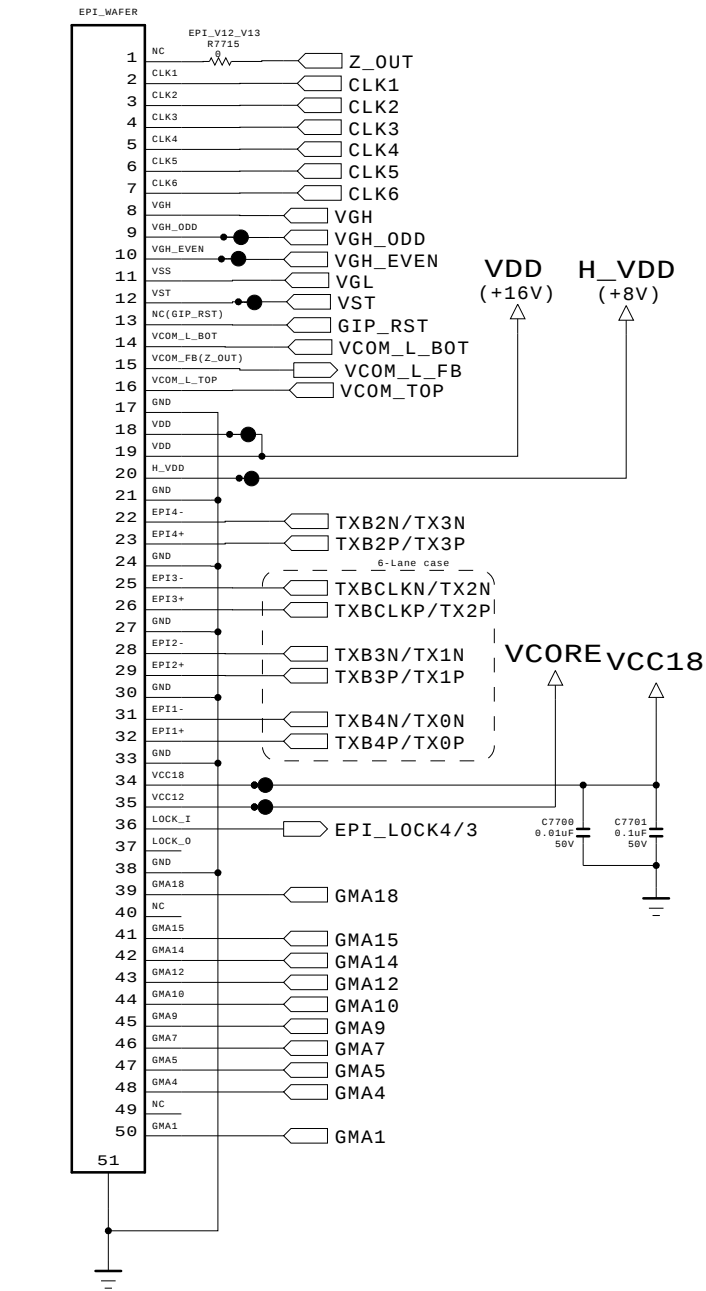
V14-LGD PANEL

EPI 8-Lane (LEFT)

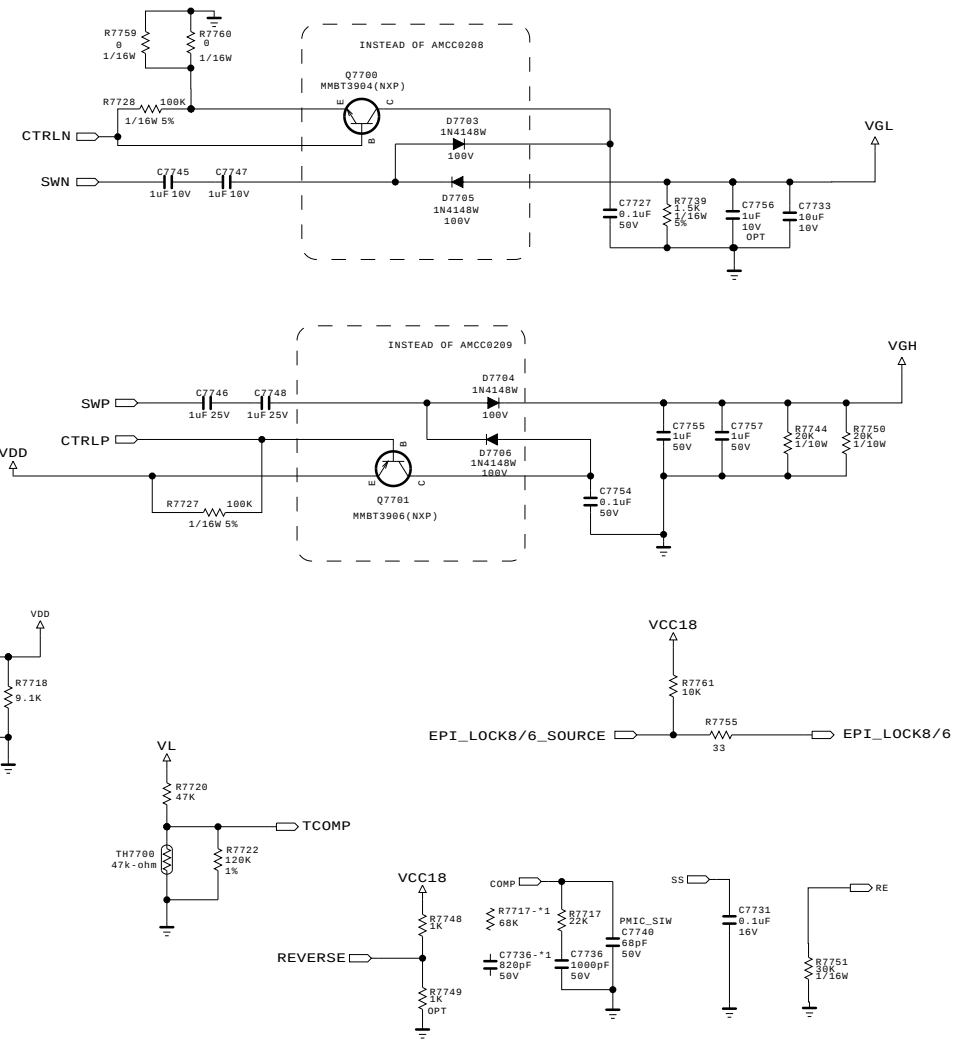
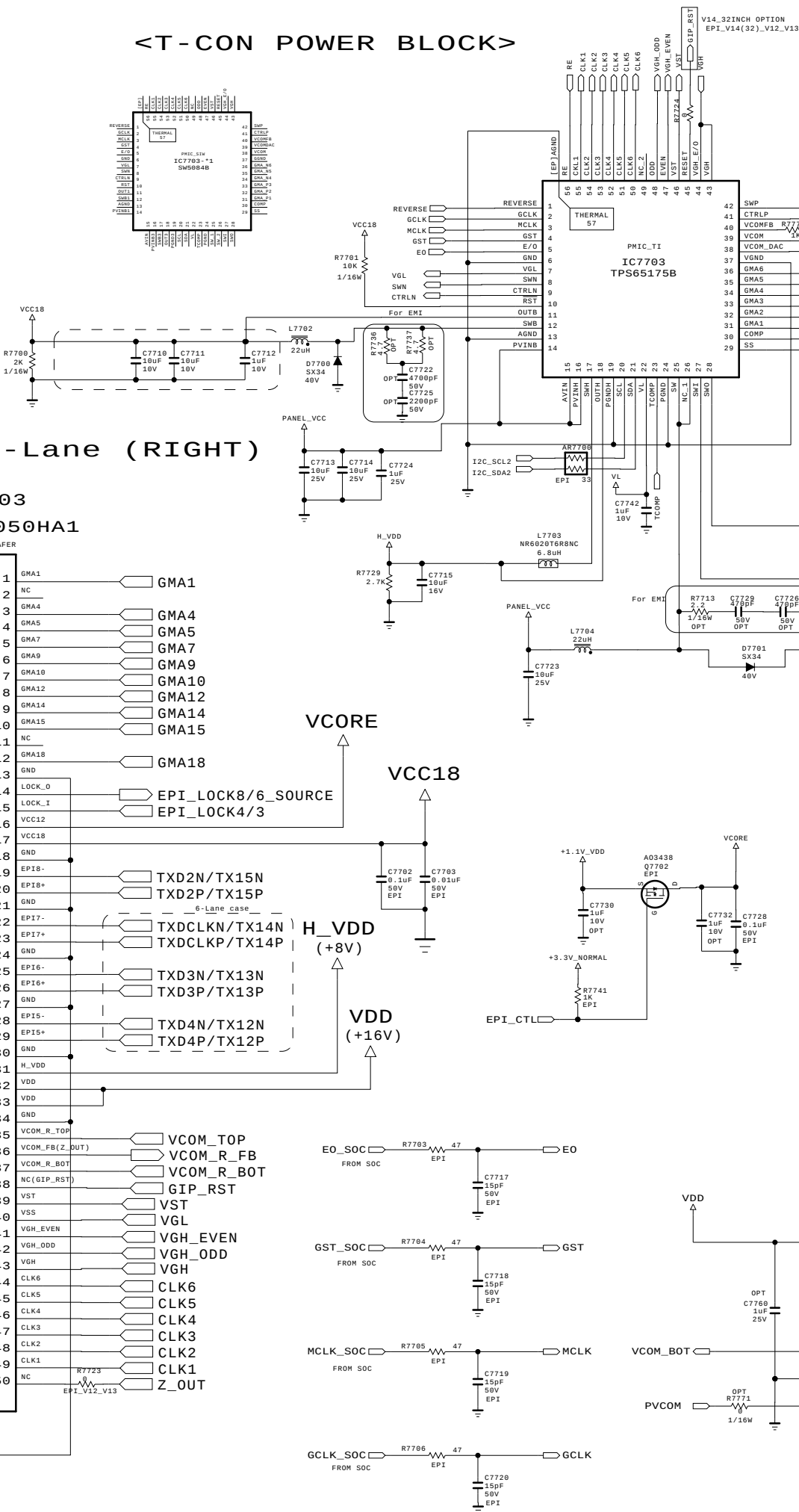
EPI 8-Lane (RIGHT)

P7702
FL11S050HA1

P7703
FL11S050HA1



<T-CON POWER BLOCK>



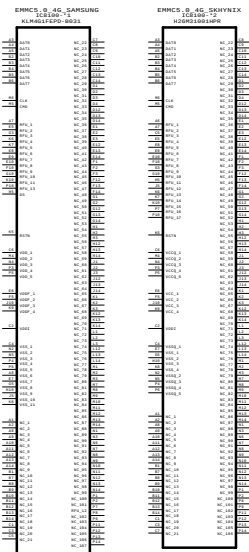
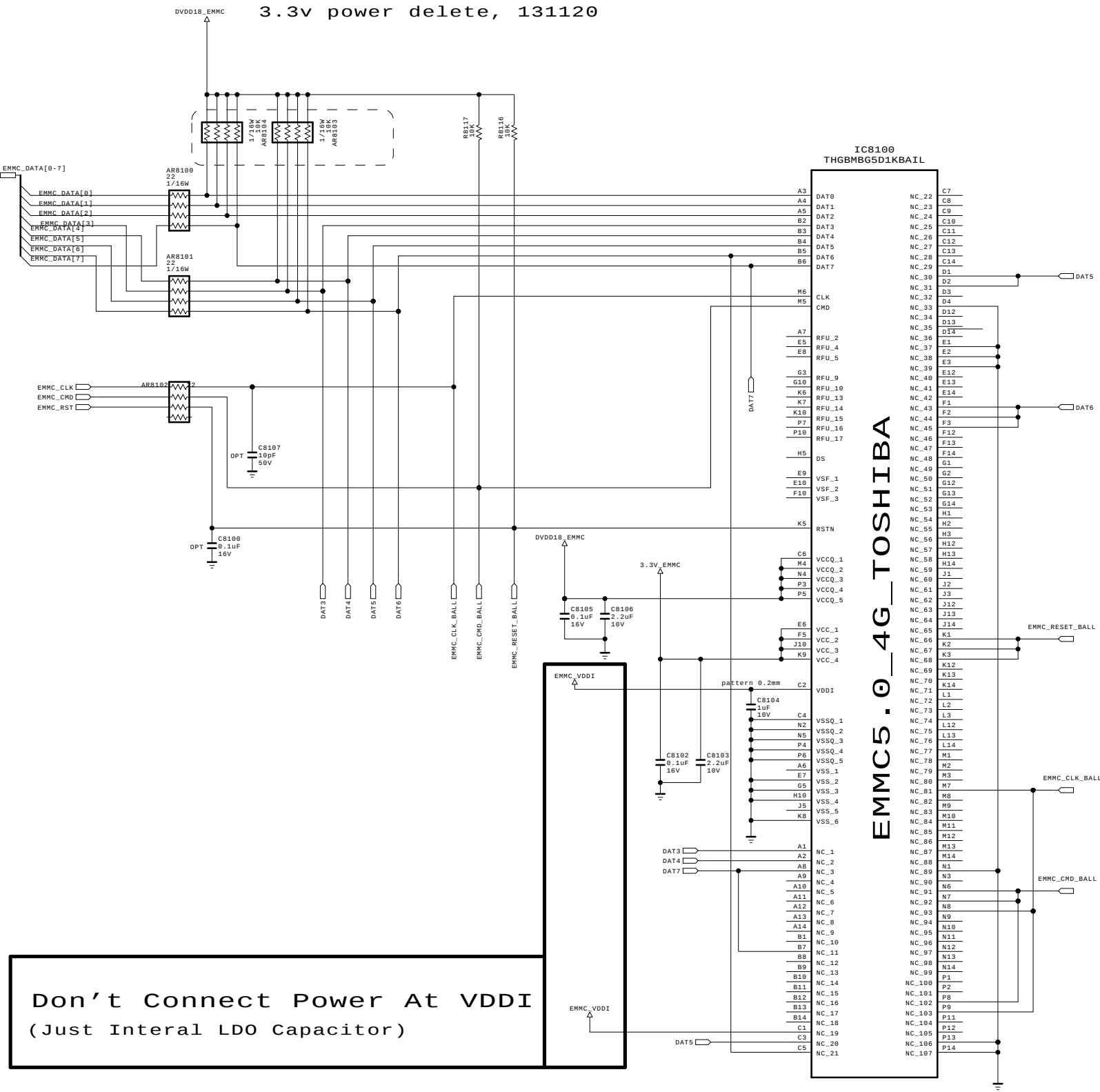
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LG ELECTRONICS

MODEL	LX770H	DATE	2014.11.15
BLOCK	EPI	SHEET	15 / 24

eMMC I/F



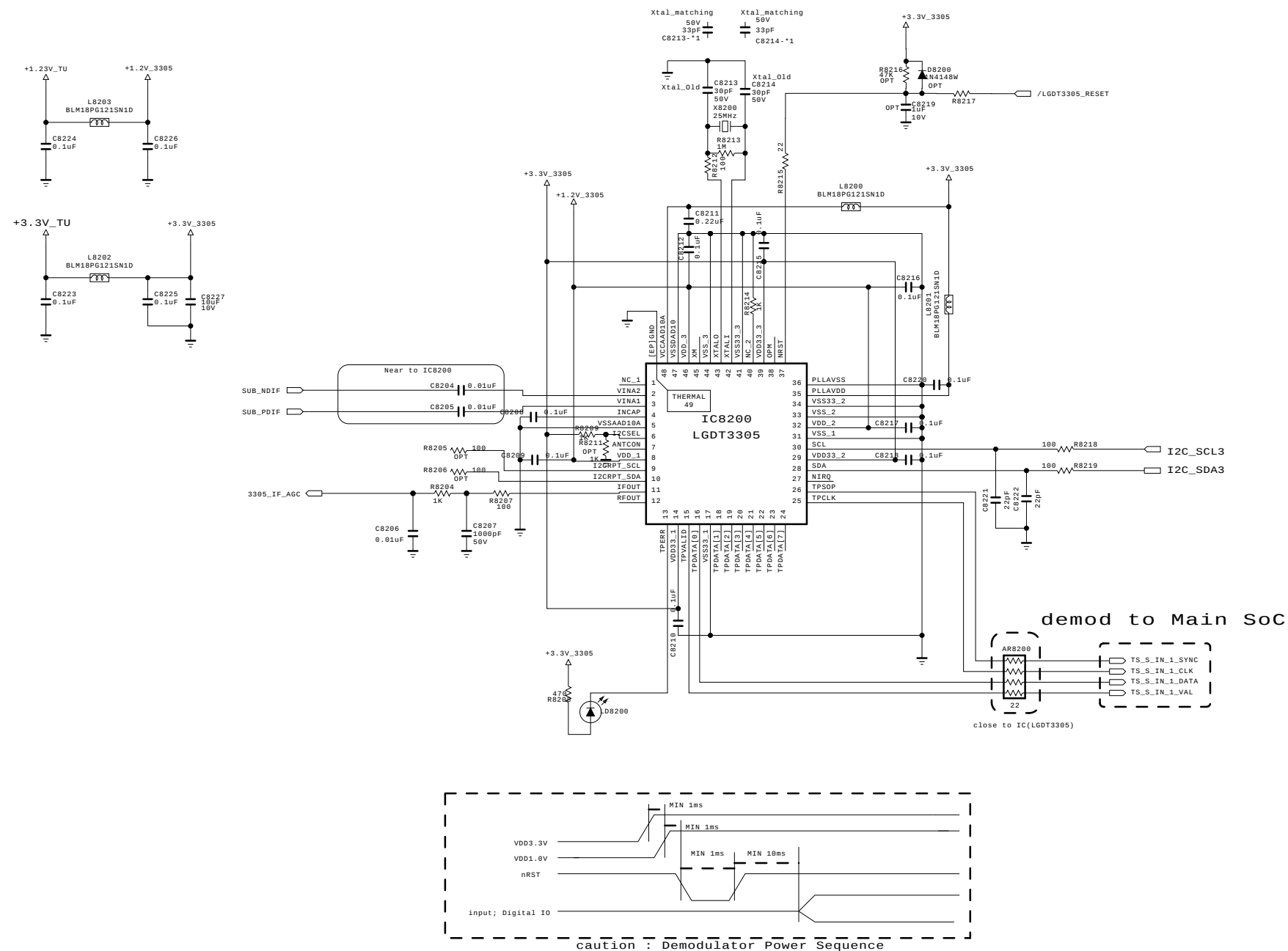
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MODEL	LX770H	DATE	2015.3.11
BLOCK	eMMC	SHEET	16 / 24

DATA Digital Demodulator_LGDT3305 (USA)
(For Pro:Centric DATA Channel)



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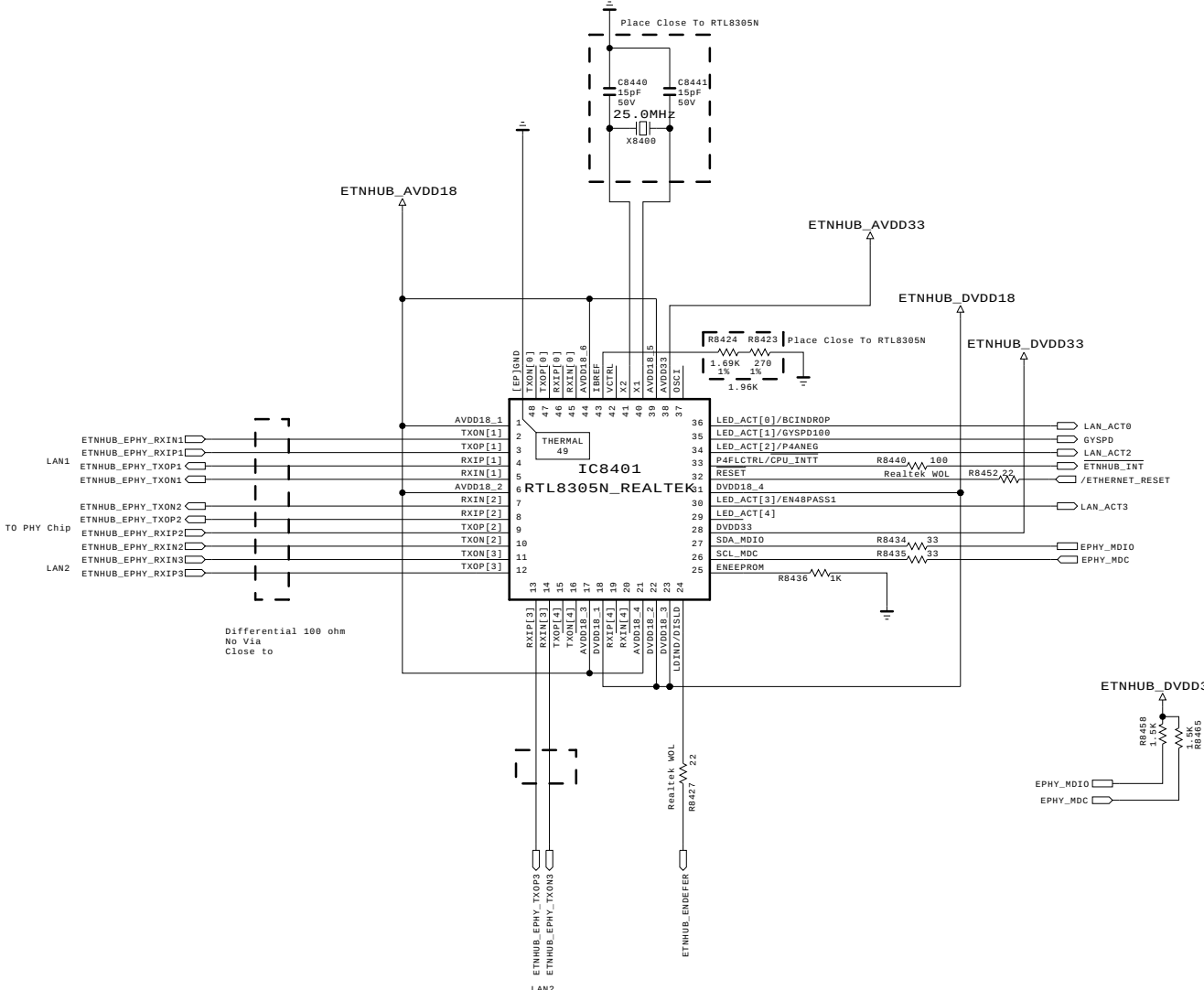
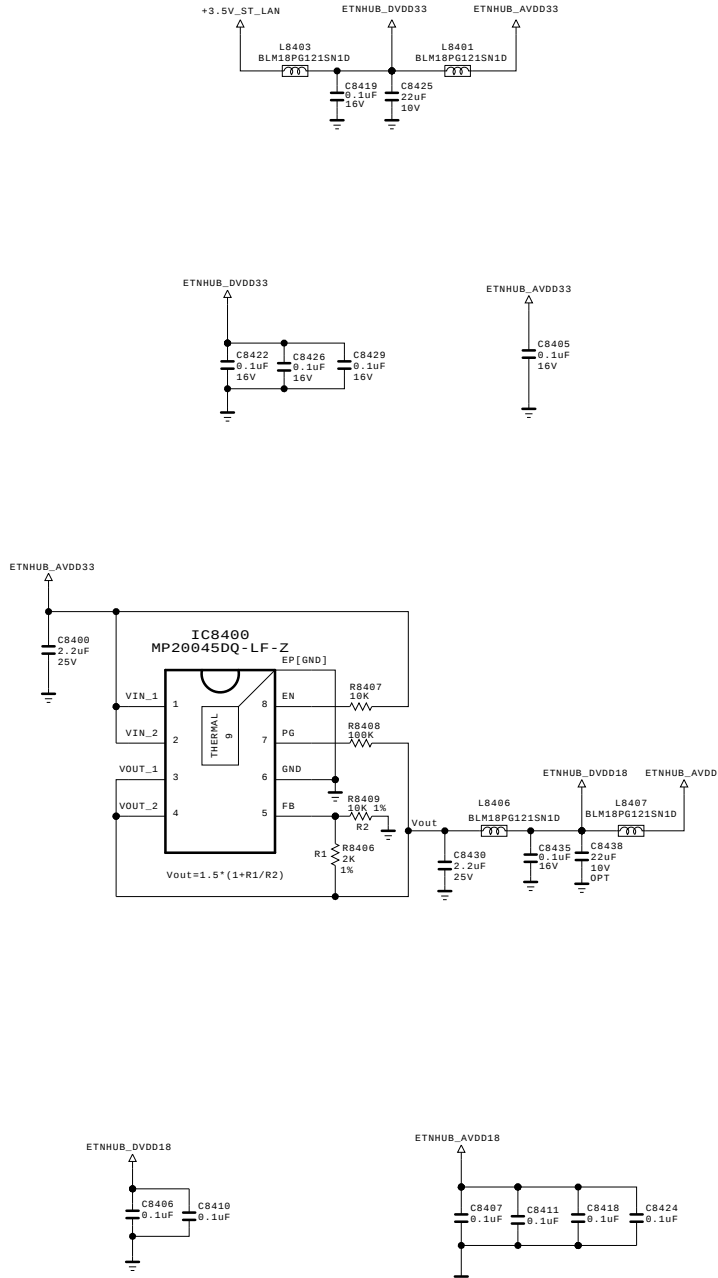
SECRET
LG Electronics



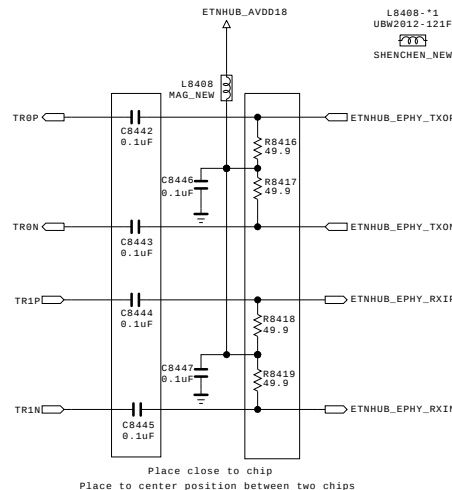
MODEL	LX770H	DATE	2014.11.15
BLOCK	DATA Demod	SHEET	17 / 24

Ethernet HUB(RTL8305N-CG)

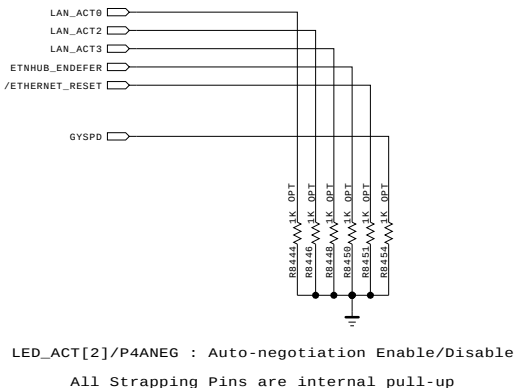
Ethernet Power



PHY TO RTL matching



STRAPPING PIN CONFIG



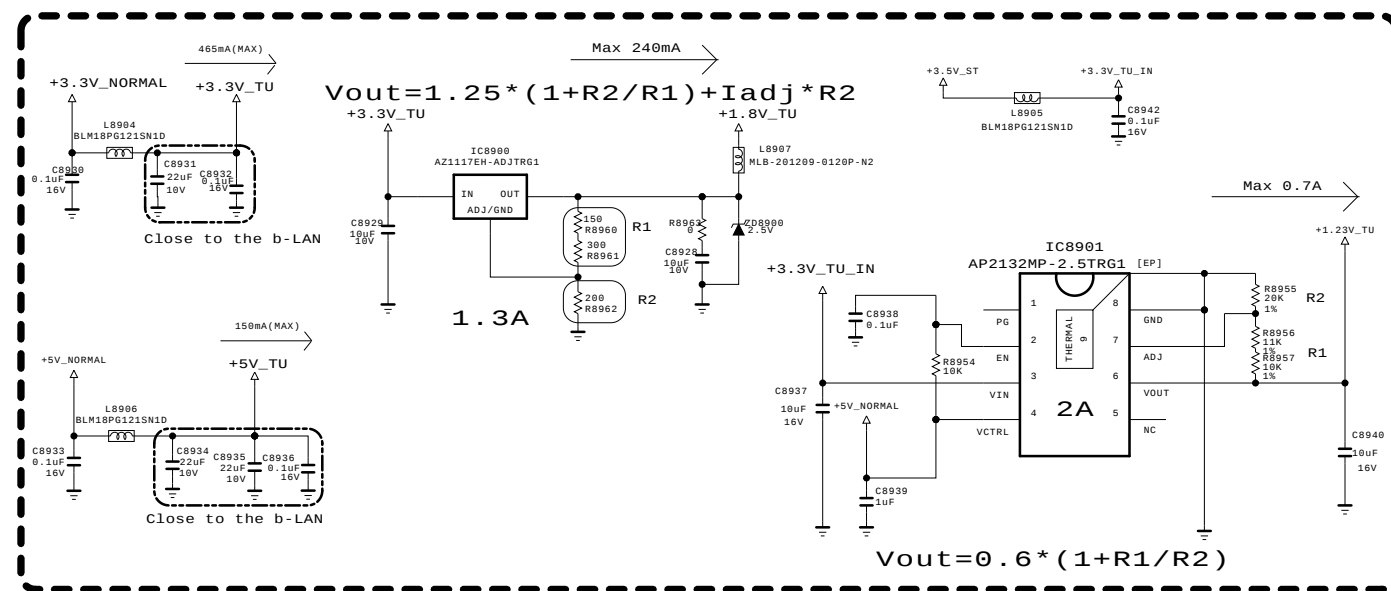
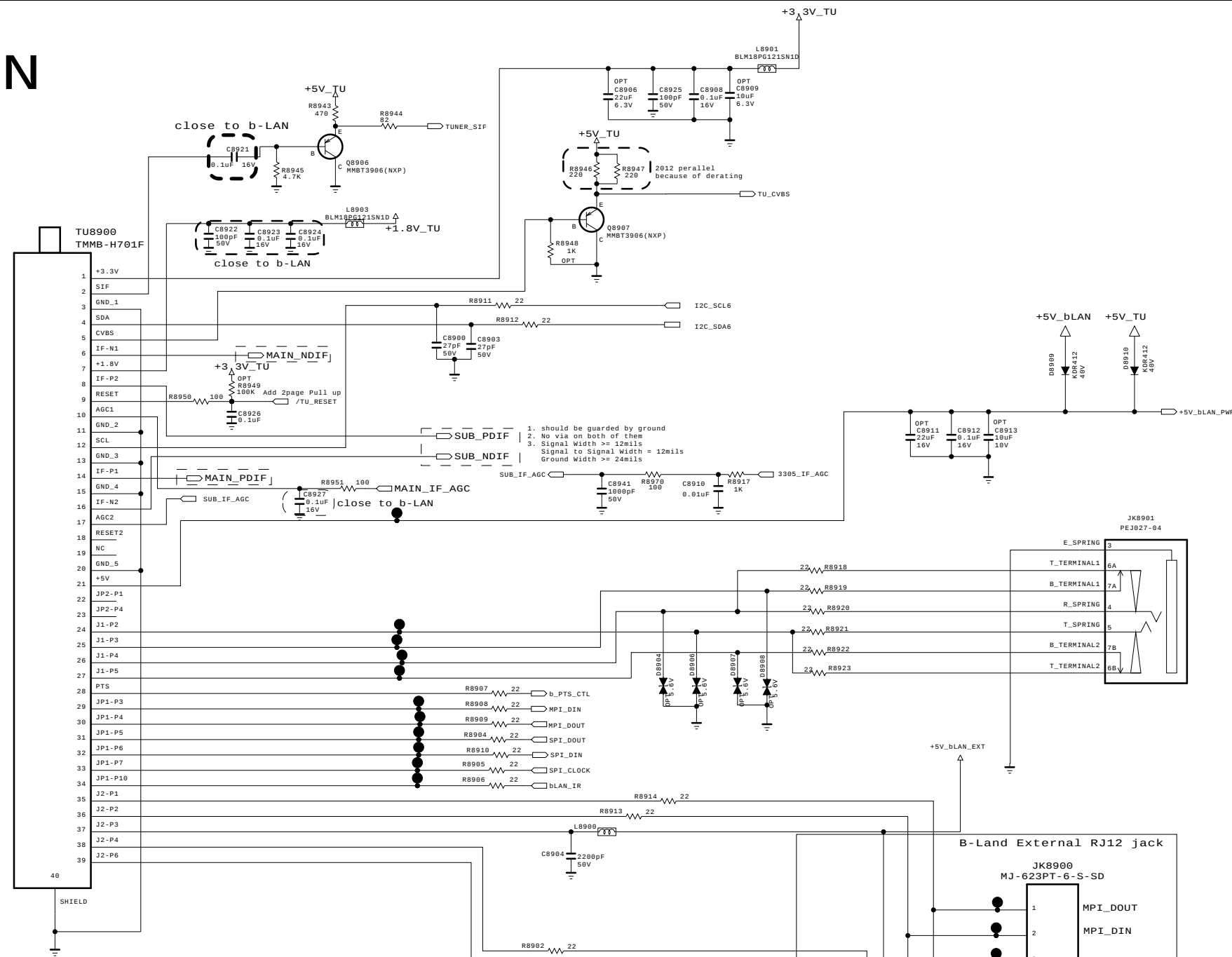
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SECRET
G Electronics



MODEL	LX770H	DATE	2015.3.11
BLOCK	ETHERNET HUB	SHEET	18 / 24

b - LAN

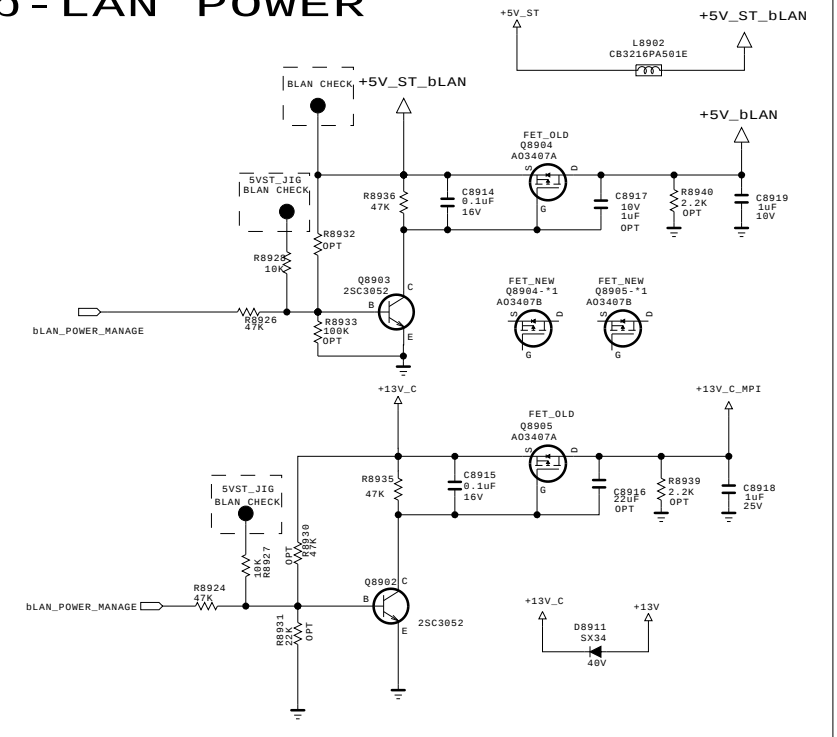


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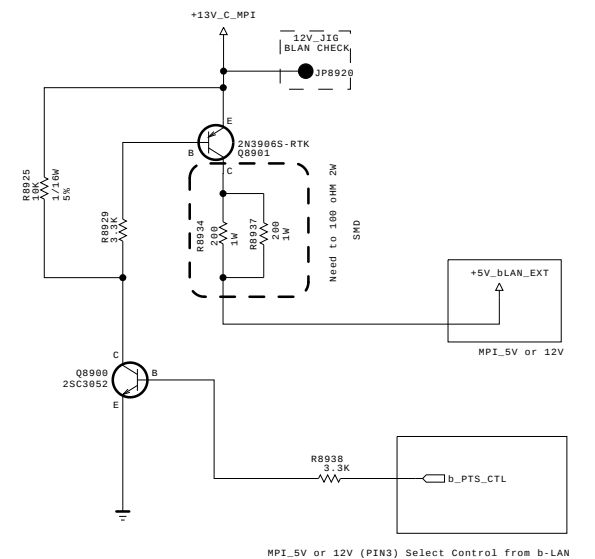
SECRET
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b - LAN POWER

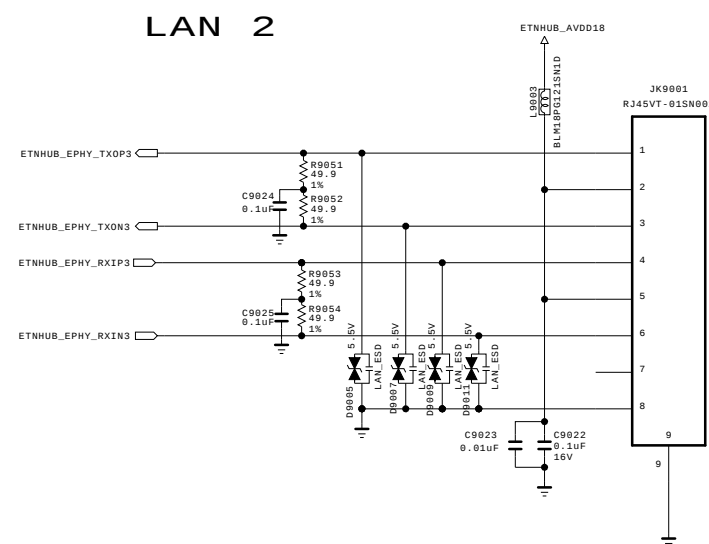
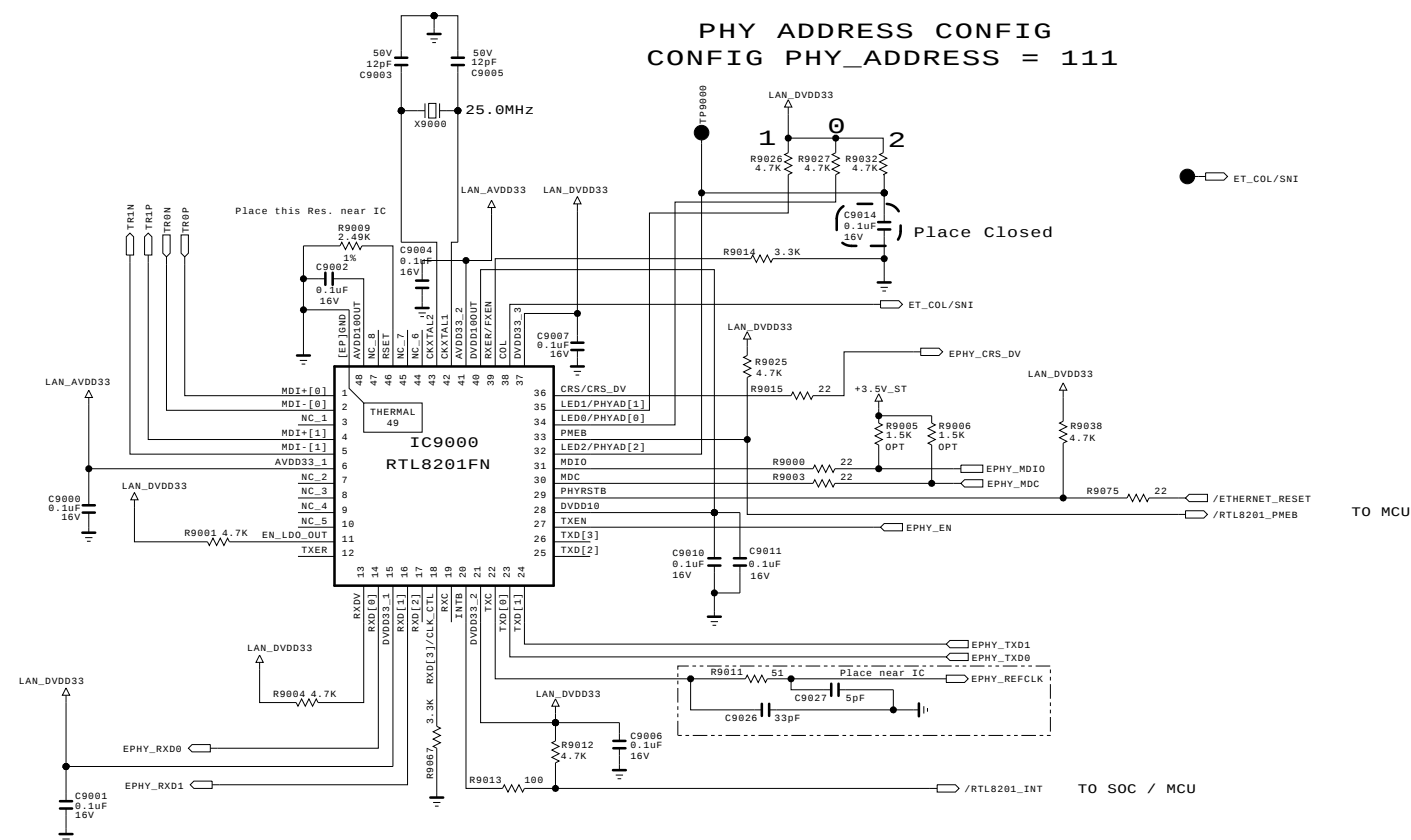
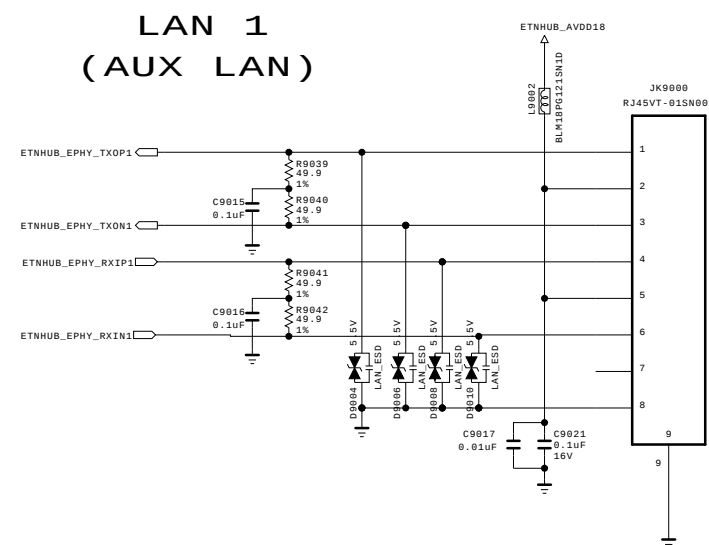
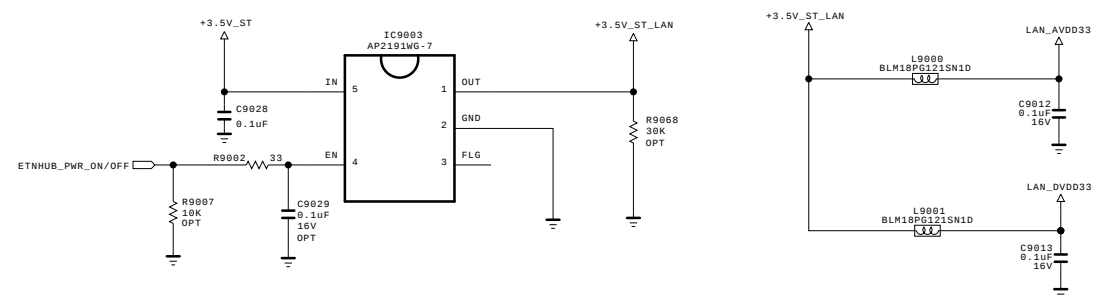


B-Lan MPI pin3 output power(12V) control



MODEL	LX770H	DATE	2014.11.15
BLOCK	bLAN	SHEET	22 / 24

Ethernet PHY(RTL8201FN)/RJ45



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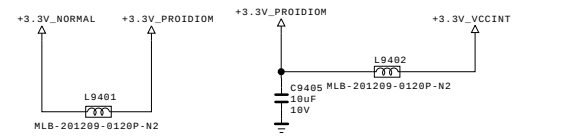
SECRET
LG Electronics



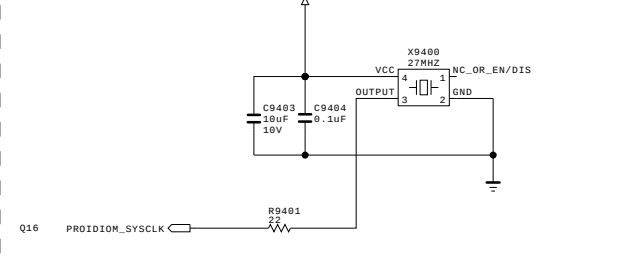
MODEL	LX770H	DATE	2015.3.11
BLOCK	PHY / RJ45	SHEET	23 / 24

Pro:Idiom (XMARK)

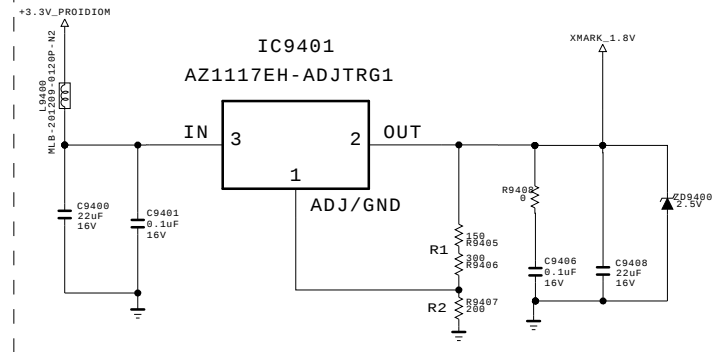
Power



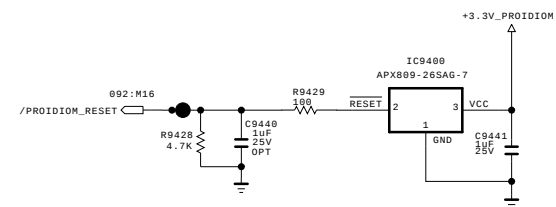
27MHz (200ppm)



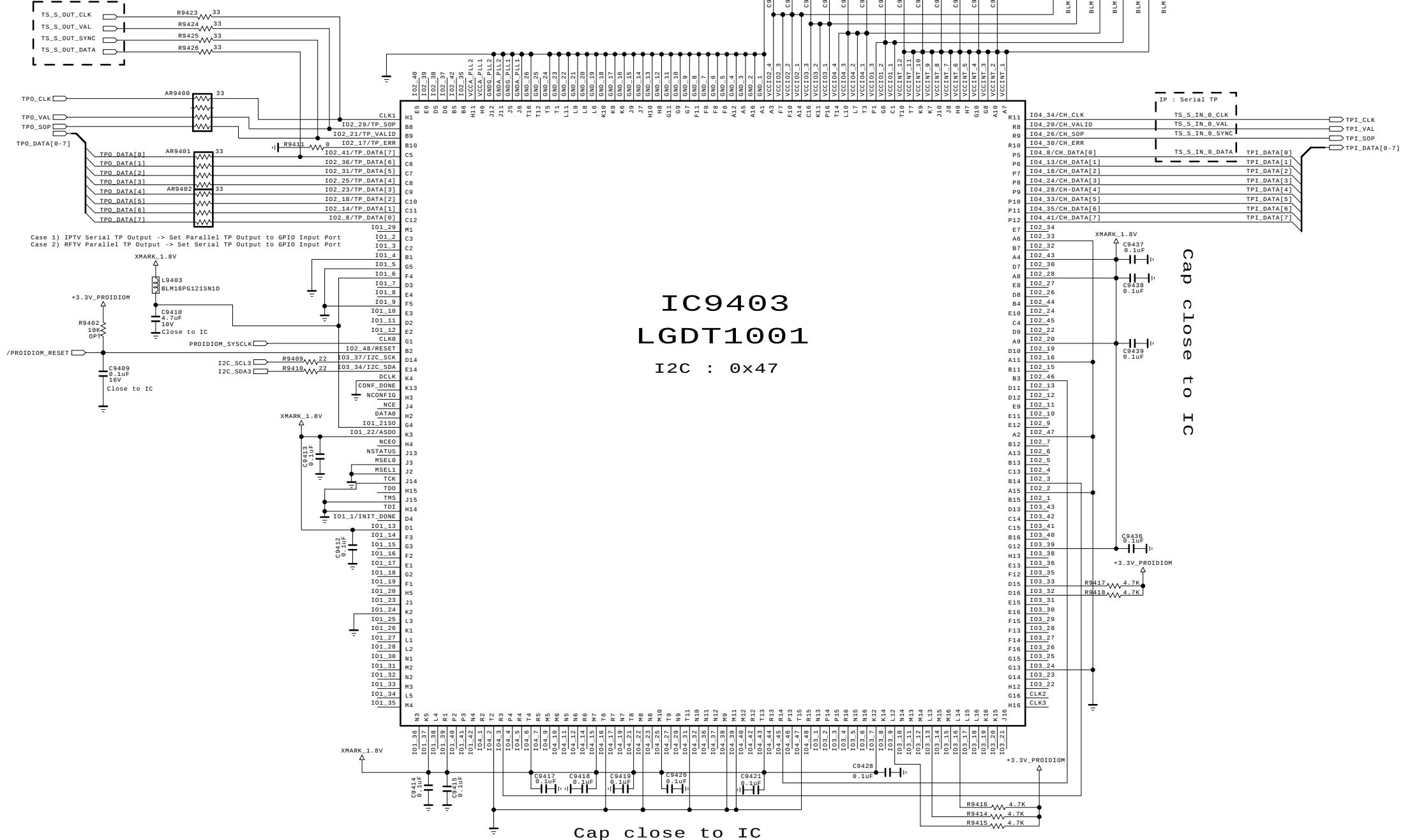
XMARK_1.8V



RESET



SOC -> Pro:Idiom Serial



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MODEL	LX770H	DATE	2015.3.11
BLOCK	PRO:IDIOM	SHEET	24 / 24

