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LED TV

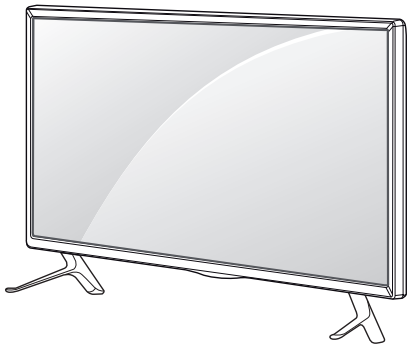
SERVICE MANUAL

CHASSIS : LA46H

MODEL : 60LF6100 60LF6100-UA
60LF6090 60LF6090-UB

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.

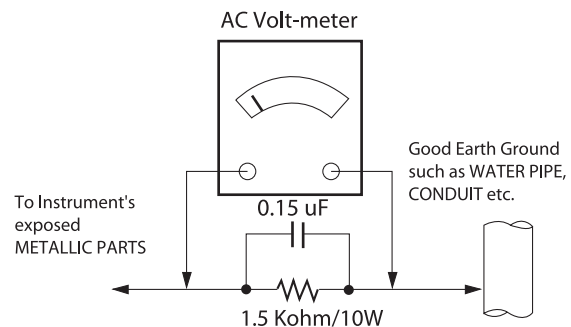
Connect 1.5 K / 10 watt resistor in parallel with a 0.15 uF capacitor between a known good earth ground (Water Pipe, Conduit, etc.) and the exposed metallic parts.

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

IC Remove/Replacement

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

Removal

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

Replacement

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

"Small-Signal" Discrete Transistor Removal/Replacement

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

Power Output, Transistor Device

Removal/Replacement

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

Diode Removal/Replacement

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

Fuse and Conventional Resistor

Removal/Replacement

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

3. Solder the connections.

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

Circuit Board Foil Repair

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

At IC Connections

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

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

At Other Connections

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

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

SPECIFICATION

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

1. Application range

This specification is applied to the LED TV used LA46H 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		Remark
1	Market	North America		
2	Television System	NTSC-M, ATSC, 64 & 256 QAM		
3	Input Voltage	AC 100 ~ 240V 50/60Hz		
4	Available Channel	1) VHF : 02~13 2) UHF : 14~69 3) DTV : 02-69 4) CATV : 01~135 5) CADTV : 01~135		
5	Aspect Ratio	16:9		
6	Tuning System	FS		
7	LCD Module	NC500DUN-VXBP3	INX	50LF6100-UA 50LF6090-UB
		LC500DUE-MGA3	LGD	50LF6100-UA 50LF6090-UB
		NC550DUE-VCCP1	CSOT	55LF6100-UA 55LF6090-UB
		LC550DUE-MGA3	LGD	55LF6100-UA 55LF6090-UB
		T550HVF04.3	AUO	55LF6090-UB
		HC600DUF-VHHS3	Sharp	60LF6100-UA 60LF6090-UB
8	Operating Environment	1) Temp : 0 ~ 40 deg 2) Humidity : ~ 80 %		
9	Storage Environment	1) Temp : -20 ~ 60 deg 2) Humidity : ~ 85 %		

5. Supported video resolutions

5.1. Component 2D input(Y, CB/PB, CR/PR)

No	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	Proposed
1.	720*480	15.73	60	13.5135	SDTV ,DVD 480I
2.	720*480	15.73	59.94	13.5	SDTV ,DVD 480I
3.	720*480	31.50	60	27.027	SDTV 480P
4.	720*480	31.47	59.94	27.0	SDTV 480P
5.	1280*720	45.00	60.00	74.25	HDTV 720P
6.	1280*720	44.96	59.94	74.176	HDTV 720P
7.	1920*1080	33.75	60.00	74.25	HDTV 1080I
8.	1920*1080	33.72	59.94	74.176	HDTV 1080I
9.	1920*1080	26.97	23.976	74.176	HDTV 1080P
10.	1920*1080	27.00	24.00	74.25	HDTV 1080P
11.	1920*1080	33.71	29.97	74.176	HDTV 1080P
12.	1920*1080	33.75	30.00	74.25	HDTV 1080P
13.	1920*1080	67.432	59.94	148.352	HDTV 1080P
14.	1920*1080	67.50	60	148.50	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	67.5	60	148.5	HDTV 1080P	O
	DTV					
1	720*480	31.50	60	27.027	SDTV 480P	
2	720*480	31.469	59.94	27.00	SDTV 480P	
3	1280*720	45.00	60.00	74.25	HDTV 720P	
4	1280*720	44.96	59.94	74.176	HDTV 720P	
5	1920*1080	33.75	60.00	74.25	HDTV 1080I	
6	1920*1080	33.72	59.94	74.176	HDTV 1080I	
7	1920*1080	67.500	60	148.50	HDTV 1080P	
8	1920*1080	67.43	59.94	148.352	HDTV 1080P	
9	1920*1080	27.000	24.000	74.25	HDTV 1080P	
10	1920*1080	26.97	23.97	74.176	HDTV 1080P	
11	1920*1080	33.75	30.000	74.25	HDTV 1080P	
12	1920*1080	33.716	29.976	74.176	HDTV 1080P	

ADJUSTMENT INSTRUCTION

1. Application

This spec. sheet applies to LA46H Chassis applied LED TV all models manufactured in TV factory

2. Specification

- (1) Because this is not a hot chassis, it is not necessary to use an isolation transformer. However, the use of isolation transformer will help protect test instrument.
- (2) Adjustment must be done in the correct order.
- (3) The adjustment must be performed in the circumstance of 25 ± 5 °C of temperature and $65 \pm 10\%$ 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. 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

3.2. 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

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

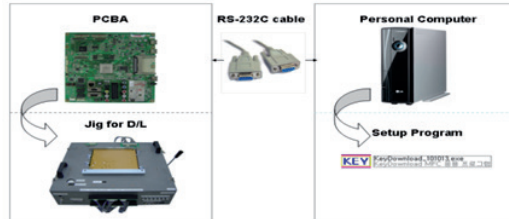
- 1) Key Write: Com 1,2,3,4 and 115200 (Baudrate)
- 2) Barcode: Com 1,2,3,4 and 9600 (Baudrate)

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)

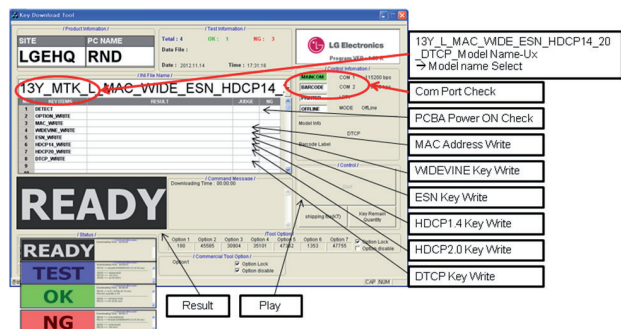
4.2.4. Communication Port connection

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



4.2.5. Download

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



4.2.6. Inspection

- In INSTART menu, check these keys.

4.3. LAN port Inspection (Ping Test)

4.3.1. Equipment setting

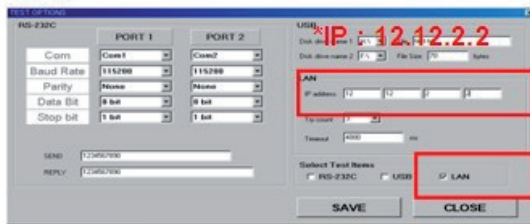
- 1) Play the LAN Port Test PROGRAM.
- 2) Input IP set up for an inspection to Test Program.
- IP number: 12.12.2.2

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



4.3.2. 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



4.4. EDID Download

4.4.1 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".

4.4.2 Equipment

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

4.4.3. EDID DATA

4.4.3.1. . 2D_8bit_PCM(US)_xyVCC : off (HD)
HDMI EDID 2D_8bit_PCM(US)_xyVCC : off (HD)

	0x00	0x01	0x02	0x03	0x04	0x05	0x06	0x07	0x08	0x09	0x0A	0x0B	0x0C	0x0D	0x0E	0x0F
0x00	0	FF	FF	FF	FF	FF	FF	0	1E	6D	ⓐ	ⓑ	ⓑ	ⓑ	ⓑ	ⓑ
0x01	ⓐ	01	03	80	A0	5A	78	0A	31	33	A5	54	4E	96	26	
0x02	10	48	49	A1	08	00	31	40	45	40	61	40	71	40	01	01
0x03	01	01	01	01	01	01	66	21	50	B0	51	00	1B	30	40	70
0x04	36	00	40	84	63	00	00	1A	64	19	00	40	41	00	2B	30
0x05	18	88	36	00	40	84	63	00	00	18	00	00	00	FD	00	3A
0x06	3E	1E	53	10	00	0A	20	20	20	20	20	20	ⓐ			
0x07															01	ⓐ
0x00	02	03	19	F1	48	10	22	20	05	84	03	02	01	23	09	57
0x01	07									02	3A	80	18	71	38	20
0x02	40	58	2C	04	05	40	84	63	00	00	1E	01	1D	80	18	71
0x03	1C	16	20	58	2C	25	00	40	84	63	00	00	9E	01	1D	00
0x04	72	51	D0	1E	20	6E	28	55	00	40	84	63	00	00	1A	8C
0x05	0A	D0	8A	20	E0	2D	10	10	3E	96	00	40	84	63	00	00
0x06	18	00	00	00	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	ⓐ

Reference

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

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) Monthly : '01' -> '01'
Year : '2014' -> '18'
- Model Name(Hex): LGTV

Chassis	MODEL NAME(HEX)
LA46H	00 00 00 FC 00 4C 47 20 54 56 0A 20 20 20 20 20 20

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

	ⓐ1	ⓐ2	ⓐ3
HDMI1	A5	0C	X
HDMI2	A5	FC	X
HDMI3	A5	EC	X

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
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	00	1E	6D	ⓐ		ⓑ						
0x01	ⓐ		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	ⓐ					
0x07	ⓐ															01	ⓐ1	
0x00	02	03	1D	F1	48	90	22	20	05	04	03	02	01	23	09	57		
0x01	07	ⓐ										E3	05	00	00	02	3A	80
0x02	18	71	38	2D	40	58	2C	04	05	40	84	63	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	ⓐ2		

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

ⓐ 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) Monthly : '01' -> '01'
Year : '2014' -> '18'
- ⓓ Model Name(Hex): LGTV

Chassis	MODEL NAME(HEX)
LA46H	00 00 00 FC 00 4C 47 20 54 56 0A 20 20 20 20 20 20

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

	ⓐ1	ⓐ2	ⓐ3
HDMI1	E7	1C	X
HDMI2	E7	0C	X
HDMI3	E7	FC	X

ⓕ 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	00	1E	6D	ⓐ		ⓑ						
0x01	ⓐ		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	A0	5A	00	00	00	1E	66	21	50	B0	51	00	1B	30		
0x05	40	70	36	00	A0	5A	00	00	00	1E	00	00	00	FD	00	3A		
0x06	3E	1E	53	10	00	0A	20	20	20	20	20	20	ⓐ					
0x07	ⓐ															01	ⓐ1	
0x00	02	03	1D	F1	48	90	22	20	05	04	03	02	01	23	09	57		
0x01	07	ⓐ										E3	05	00	00	02	3A	80
0x02	18	71	38	2D	40	58	2C	04	05	40	84	63	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	A0	5A	00	00	00	1A	00	00	00	00	00	00	00	00	ⓐ2		

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

ⓐ Product ID

HEX	EDID Table	DDC Function
0001	0100	Analog
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- ⓒ Month, Year: Controlled on production line:
ex) Monthly : '01' -> '01'
Year : '2014' -> '18'
- ⓓ Model Name(Hex): LGTV

Chassis	MODEL NAME(HEX)
LA46H	00 00 00 FC 00 4C 47 20 54 56 0A 20 20 20 20 20 20

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

	ⓐ1	ⓐ2	ⓐ3
HDMI1	E7	02	X
HDMI2	E7	F2	X
HDMI3	E7	E2	X

ⓕ 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

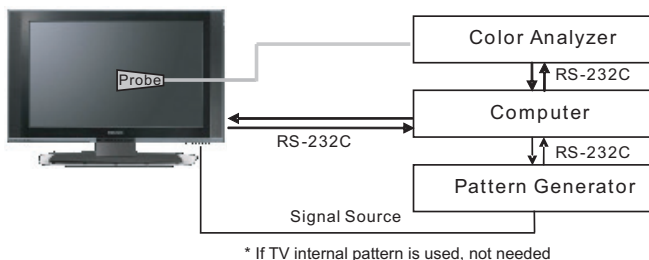
5.1.1.2. Adj. condition and cautionary items

- (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.)	
		CMD1	CMD2	MIN	MAX
Cool	R Gain	j	g	00	C0
	G Gain	j	h	00	C0
	B Gain	j	i	00	C0
Medium	R Gain	j	a	00	C0
	G Gain	j	b	00	C0
	B Gain	j	c	00	C0
Warm	R Gain	j	d	00	C0
	G Gain	j	e	00	C0
	B Gain	j	f	00	C0

5.1.5. 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	Δuv
	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 18) – ALEF

Mode	Coordinate		Temp	Δuv
	X	Y		
Cool	0.271±0.002	0.270±0.002	13,000K	0.0000
Medium	0.286±0.002	0.289±0.002	9,300K	0.0000
Warm	0.313±0.002	0.329±0.002	6,500K	0.0000

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

Mode	Coordinate		Temp	Δuv
	X	Y		
Cool	0.271±0.002	0.270±0.002	13,000K	0.0000
Medium	0.286±0.002	0.289±0.002	9,300K	0.0000
Warm	0.313±0.002	0.329±0.002	6,500K	0.0000

5.1.7. Reference (White balance table)

- 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
LA46H	50/55/60LF6100-UA 50/55/60LF6090-UB	Dongle

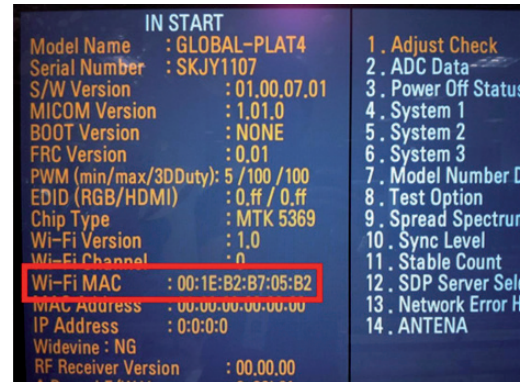
※ Dongle Model : An USB dongle-type receiver will be supplied in form of accessory. So this pairing test is not necessary for these models

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. 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)

Flow Line



Cell Line

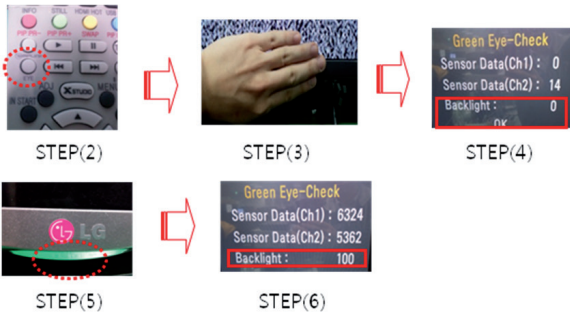


* Remark: Inspect in Power Only Mode and check SW version in a master equipment



5.6. 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



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

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

6. AUDIO output check

6.1. Audio input condition

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

6.2. Specification

No	Item	Min	Typ	Max	Unit	Remark
1	Audio practical max Output, L/R (Distortion=10% max Output)	9.0 8.5	10.0 8.9	12.0 9.9	W Vrms	(1) Measurement condition - EQ/AVL/Clear Voice: Off (2) Speaker (8Ω Impedance)

7. GND and HI-POT Test

7.1. GND & HI-POT auto-check preparation

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

7.2. GND & HI-POT auto-check

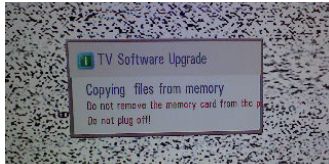
- (1) Pallet moves in the station. (POWER CORD / AV CORD is tightly inserted)
- (2) Connect the AV JACK Tester.
- (3) Controller (GWS103-4) on.
- (4) GND Test (Auto)
 - If Test is failed, Buzzer operates.
 - If Test is passed, execute next process (Hi-pot test).
- (5) HI-POT test (Auto)
 - If Test is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

7.3. Checkpoint

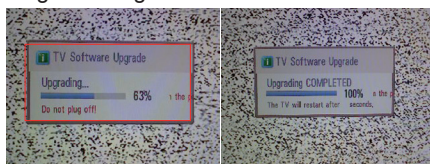
- (1) Test voltage
 - GND: 1.5KV/min at 100mA
 - SIGNAL: 3KV/min at 100mA
- (2) TEST time: 1 second
- (3) TEST POINT
 - GND Test = POWER CORD GND and SIGNAL CABLE GND.
 - Hi-pot Test = POWER CORD GND and LIVE & NEUTRAL.
- (4) LEAKAGE CURRENT: At 0.5mArms

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

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



- (4) Updating is starting.



- (5) Updating Completed, The TV will restart automatically
- (6) If your TV is turned on, check your updated version and Tool option.

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

* After downloading, TOOL OPTION setting is needed again.

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

9. Optional adjustments

9.1. Manual White balance Adjustment

9.1.1. 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.

9.1.2. Equipment

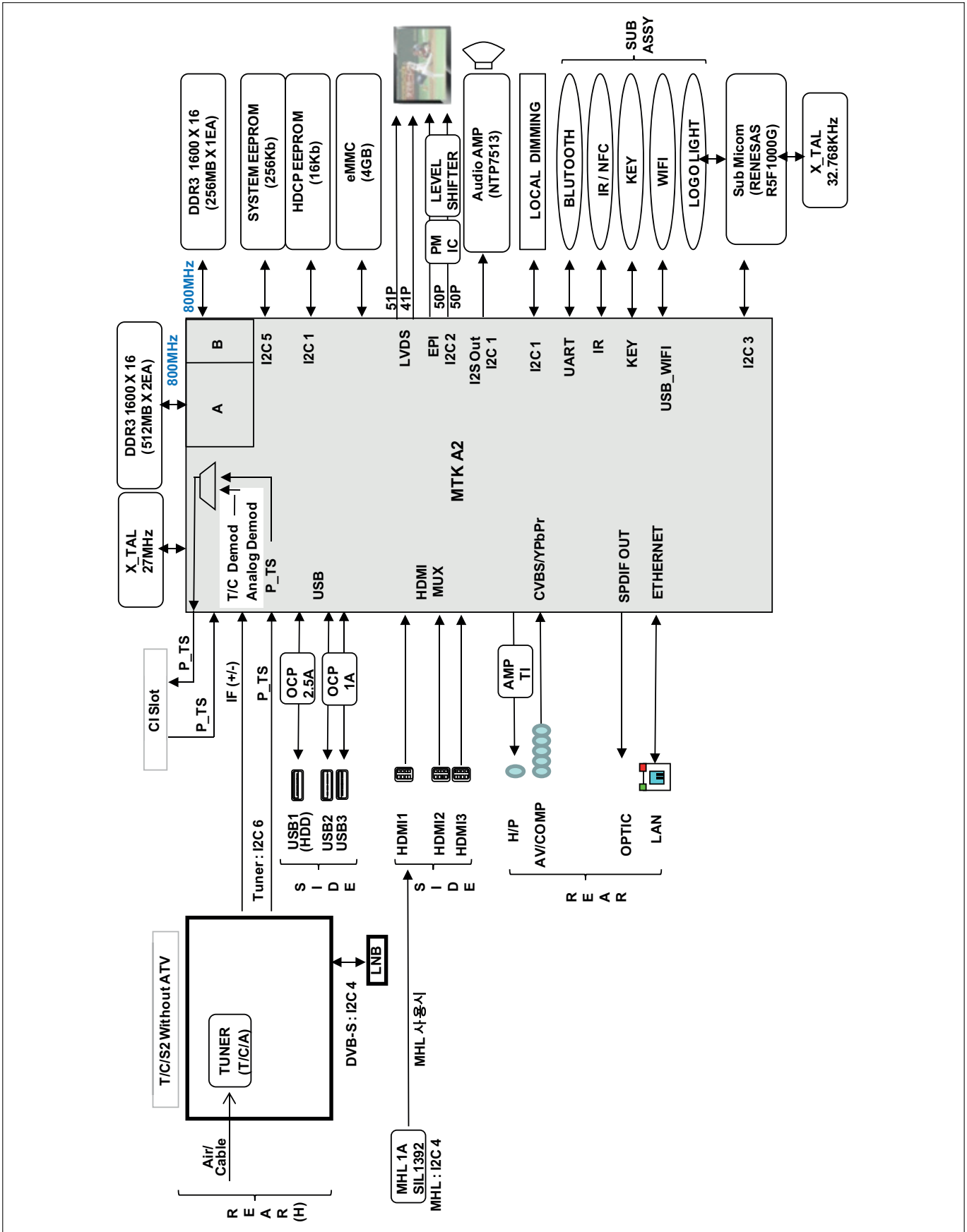
- (1) Color Analyzer: CA-210 (NCG: CH 9 / WCG: CH12 / LED: CH14)
- (2) Adj. Computer (During auto adj., RS-232C protocol is needed)
- (3) Adjust Remocon
- (4) Video Signal Generator MSPG-925F 720p/216-Gray (Model: 217, Pattern: 78)

9.1.3. 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.

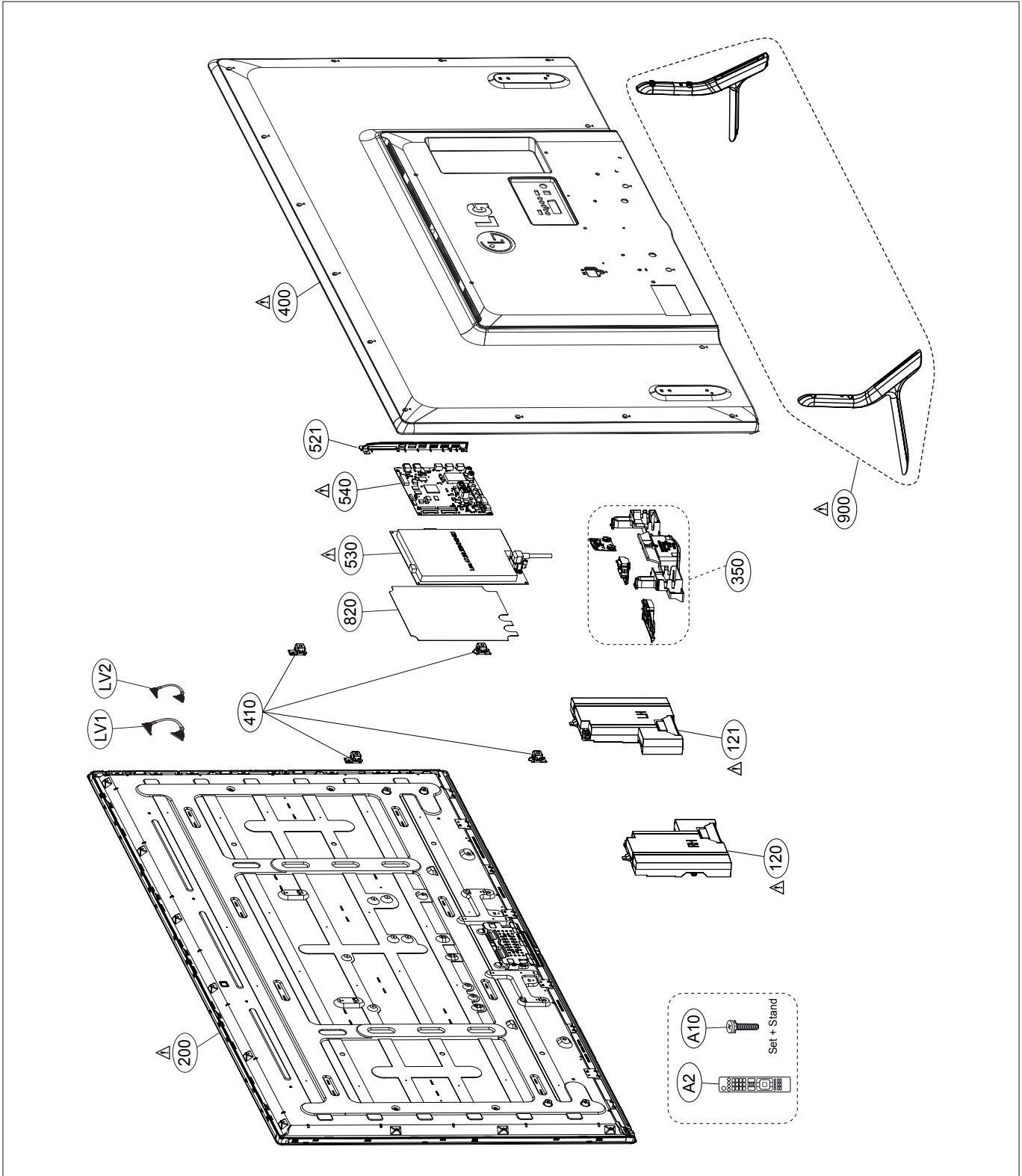
BLOCK DIAGRAM

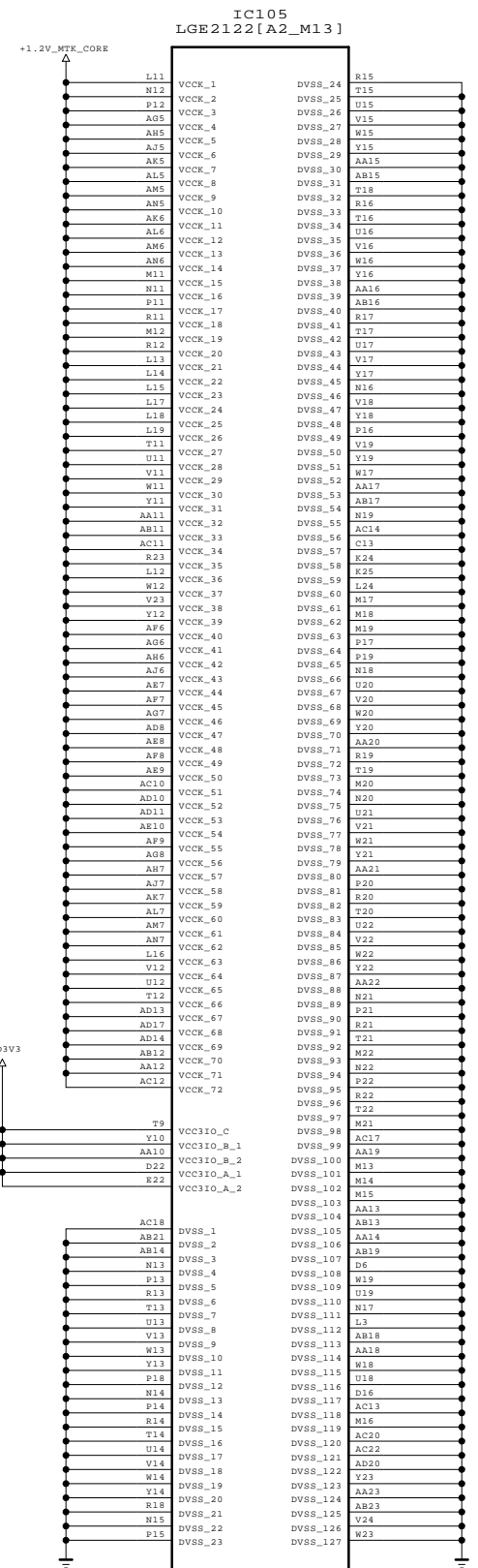
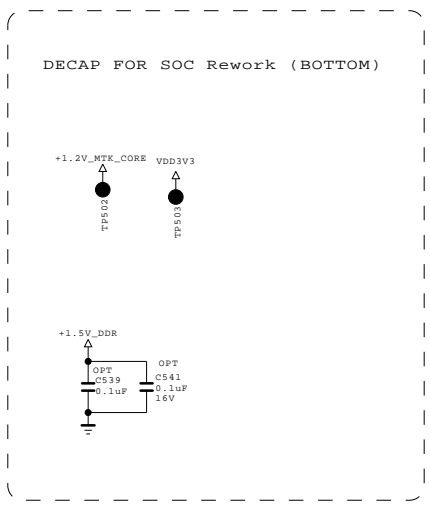
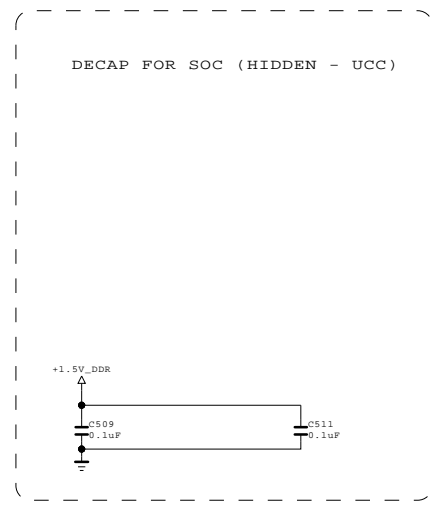
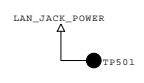
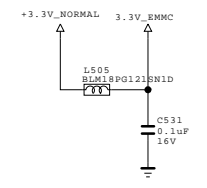
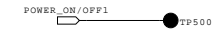
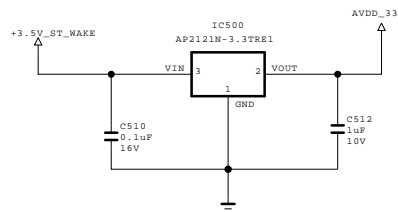
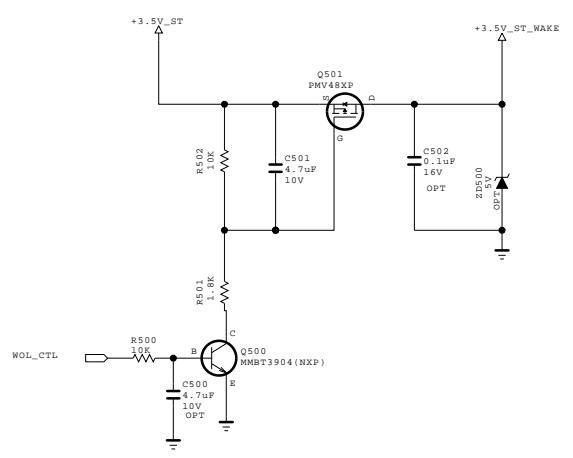
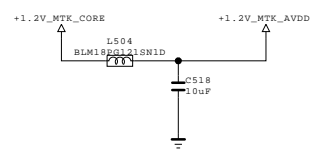
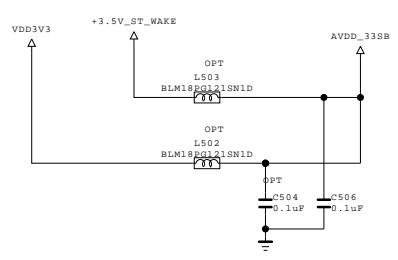
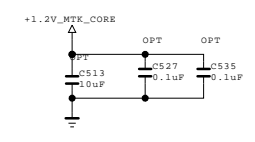
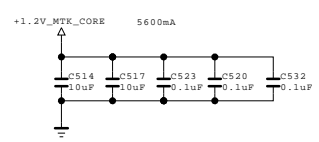
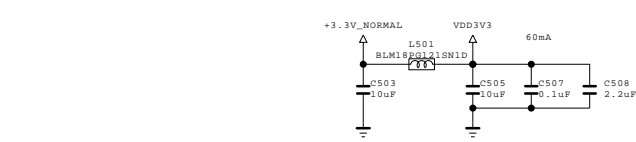


EXPLODED VIEW

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.



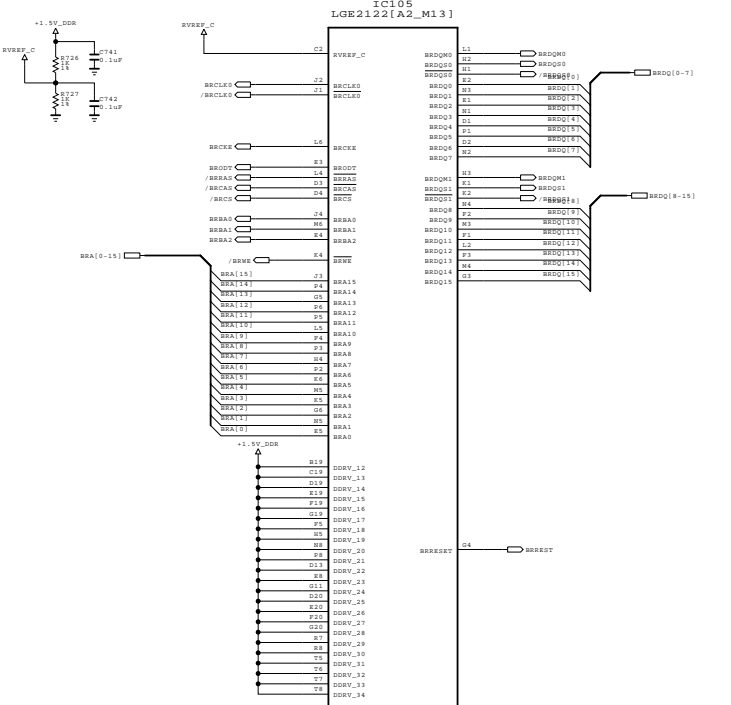
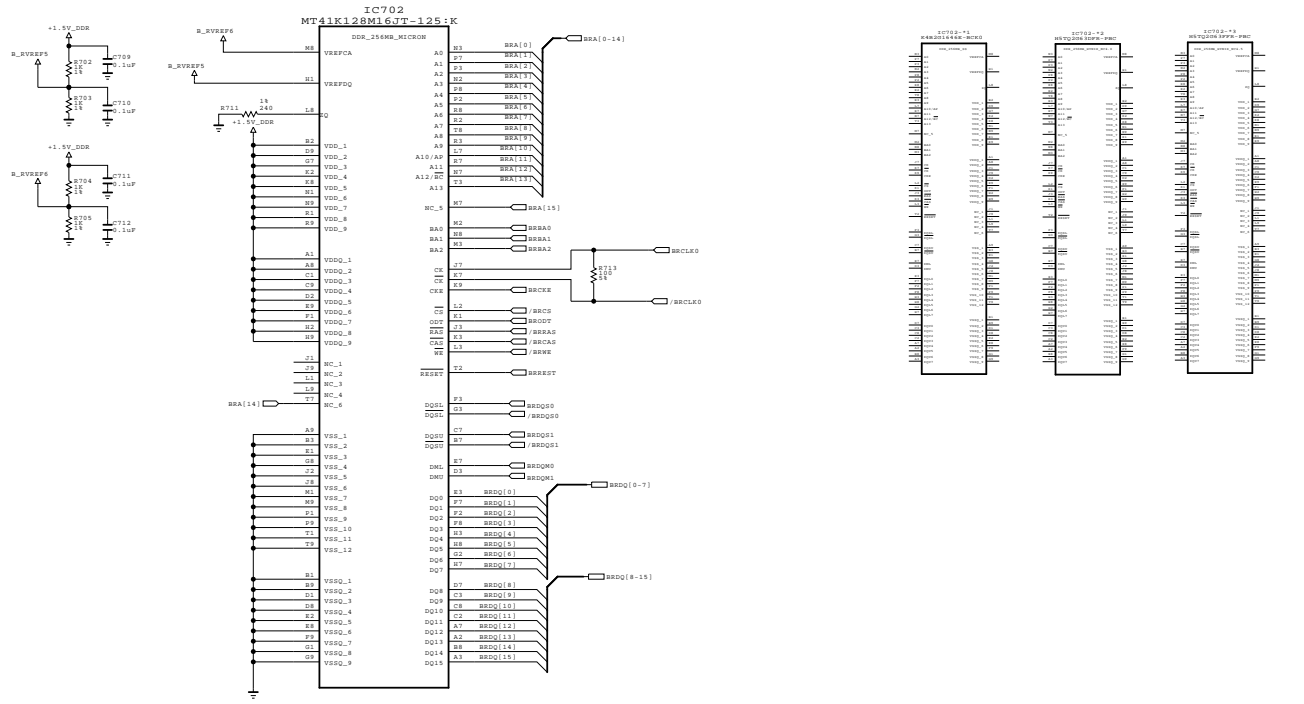
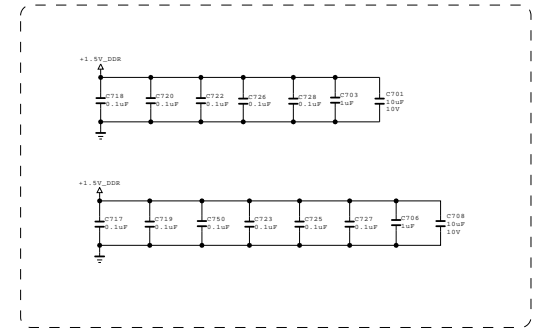
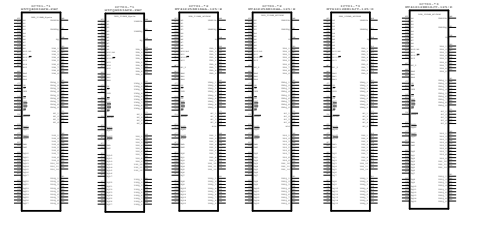
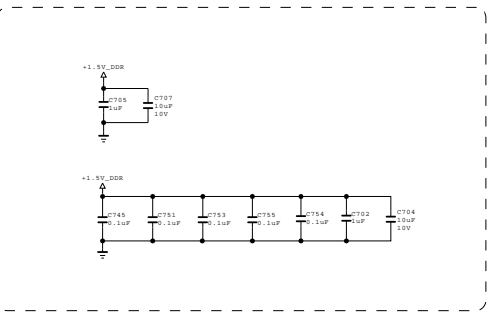
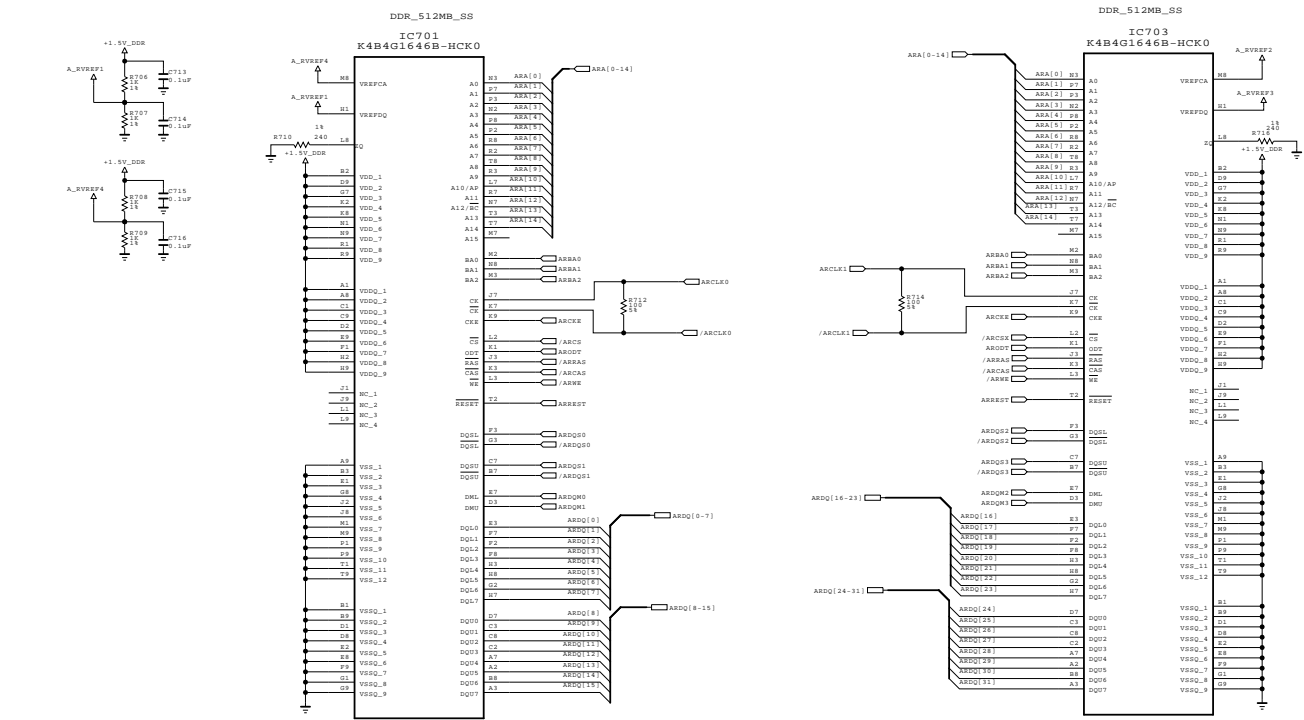


THE SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FIRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURERS SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE SYMBOL MARK OF THE SCHEMATIC.

SECRET
LGElectronics



MODEL	MID_MAIN_3	DATE	2011.12.09
BLOCK		SHEET	10



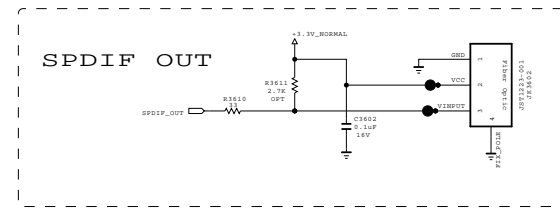
THE SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FIRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURERS SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE SYMBOL MARK OF THE SCHEMATIC.

SECRET
LGElectronics

LG ELECTRONICS

MODEL	DATE	2011.12.09
BLOCK	SHEET	12 /

SPDIF

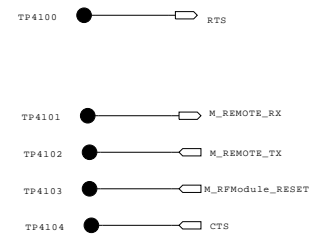
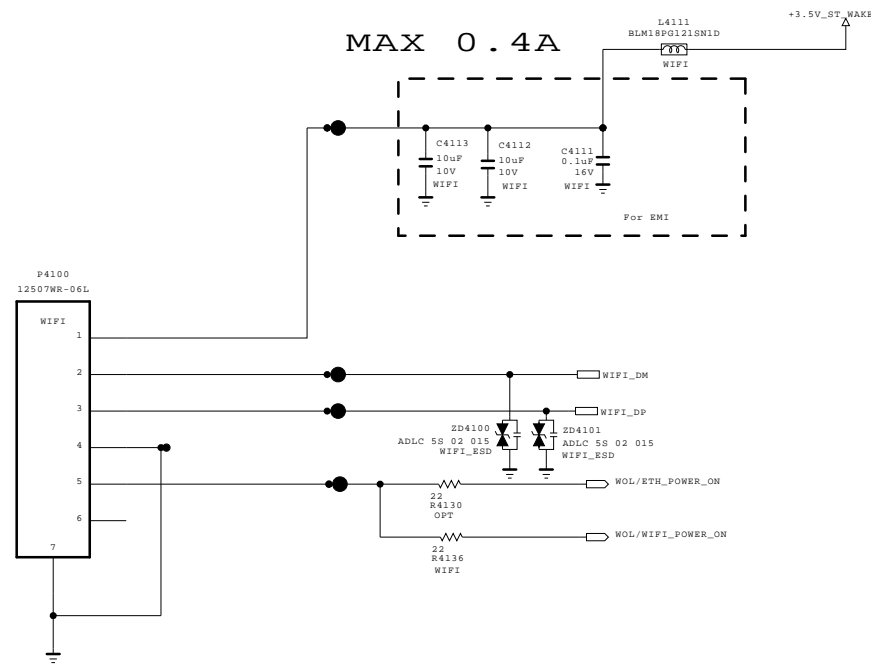
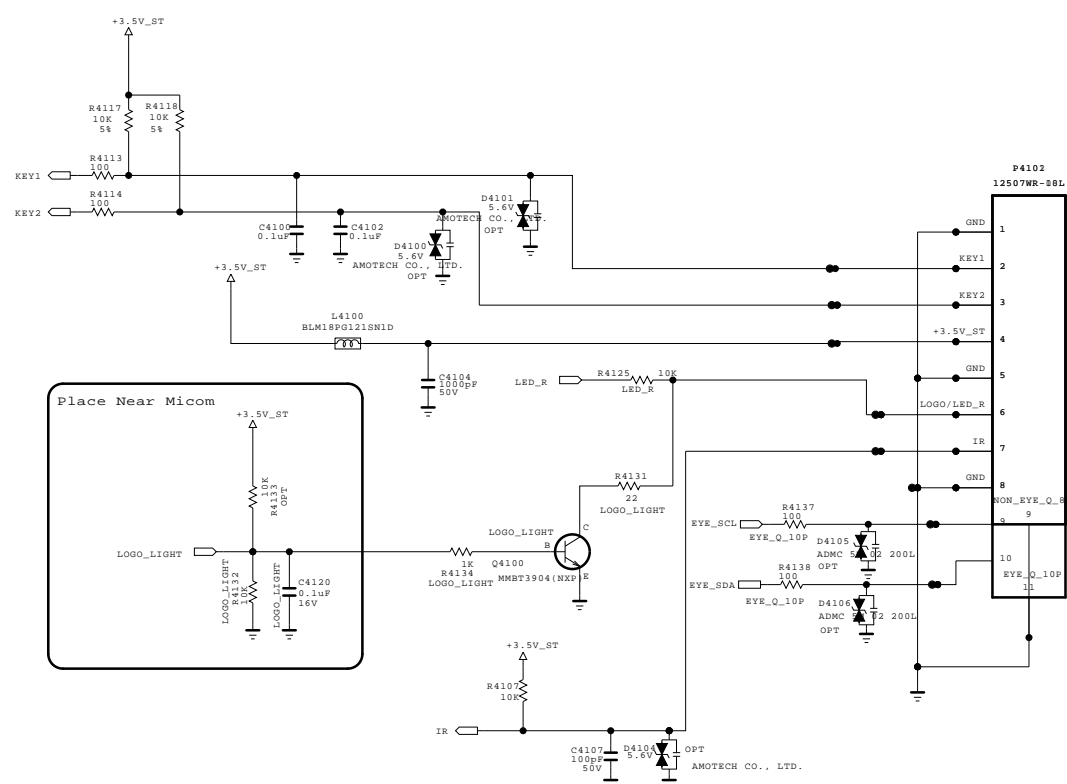


THE SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FIRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURERS SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE SYMBOL MARK OF THE SCHEMATIC.

SECRET
LGElectronics



MODEL	JACK HIGH / MID	DATE	2011.11.21
BLOCK		SHEET	36 /



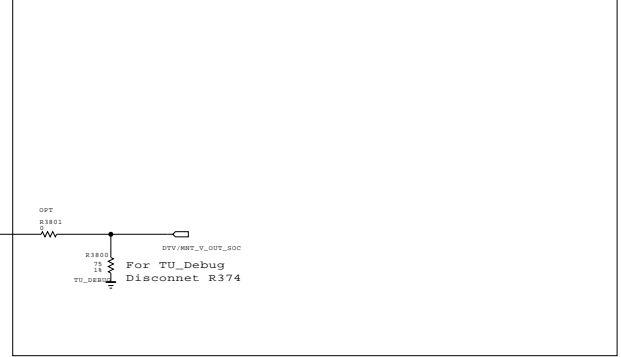
THE SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FIRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURERS SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE SYMBOL MARK OF THE SCHEMATIC.

SECRET
LGElectronics

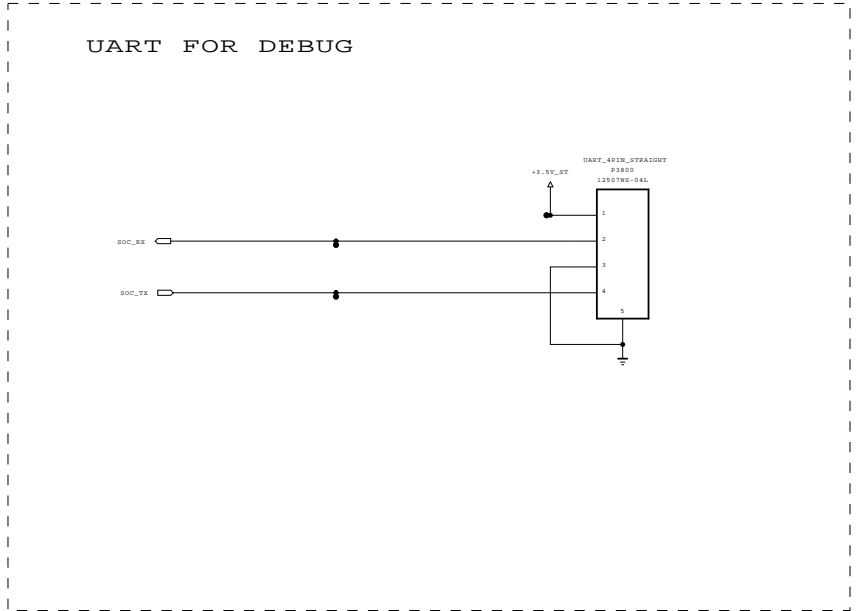


MODEL	IR / KEY	DATE	2011.11.21
BLOCK		SHEET	41 /

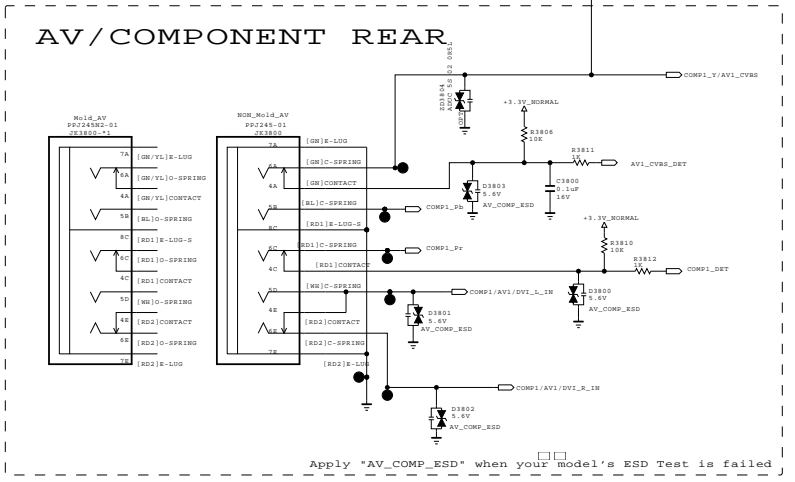
DEBUG FOR INTERNAL AMOD.



UART FOR DEBUG



AV/COMPONENT REAR



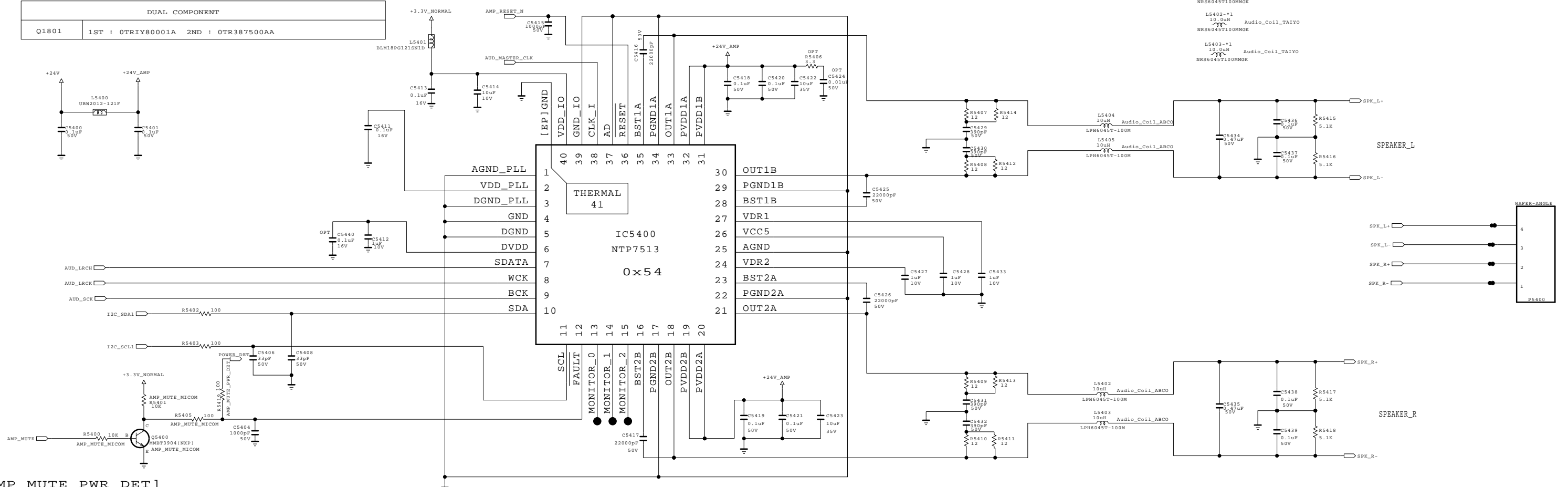
THE SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FIRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURERS SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE SYMBOL MARK OF THE SCHEMATIC.

SECRET
LGElectronics



MODEL	JACK_COMMON	DATE	2011.11.21
BLOCK		SHEET	38 /

DUAL COMPONENT	
Q1801	1ST : 0TRIY80001A 2ND : 0TR387500AA



[AMP_MUTE_PWR_DET]
 -->For fixing AC-OFF POP noise 32"POLA/ROW model
 -->32"POLA/ROW LPB's 3.5st drop time is very fast

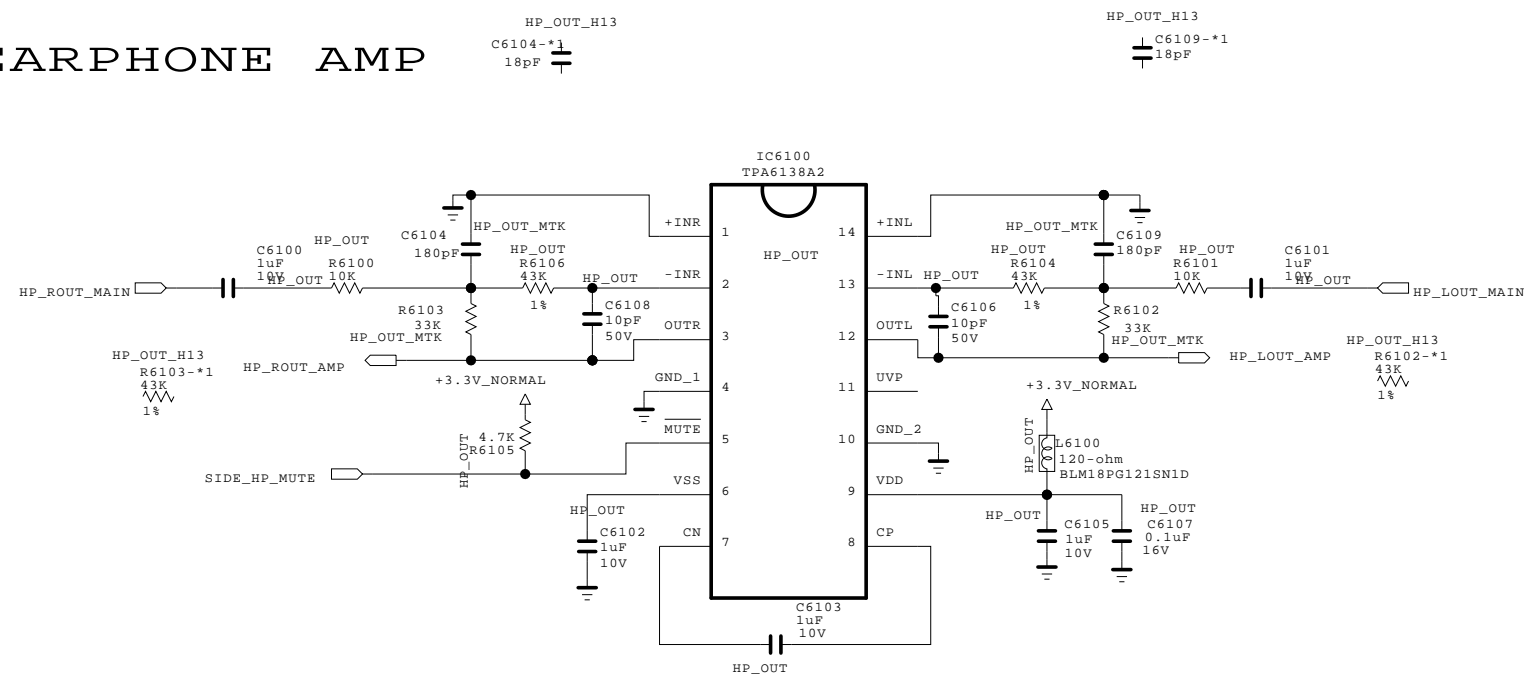
THE SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FIRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURERS SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE SYMBOL MARK OF THE SCHEMATIC.

SECRET
 LGElectronics



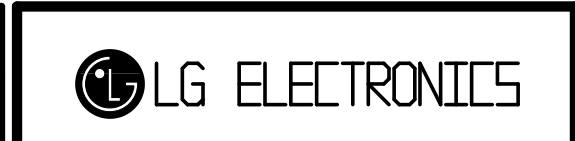
MODEL	AMP_NEO	DATE	2011.11.21
BLOCK		SHEET	54

EARPHONE AMP



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

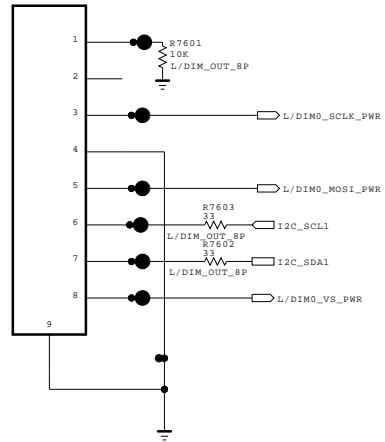
SECRET
LGElectronics



MODEL	HEADPHONE AMP	DATE	2011.09.29
BLOCK		SHEET	61 /

LOCAL DIMMING

[To LED DRIVER]
 P7600
 12507MR-08L
 L/DIM_OUT_8P



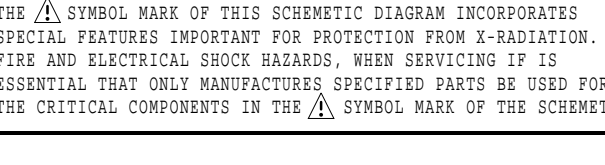
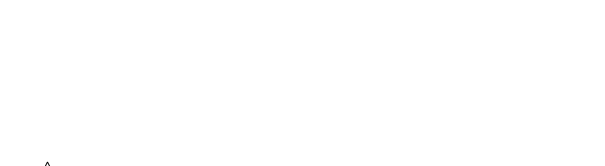
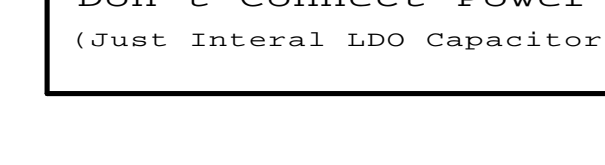
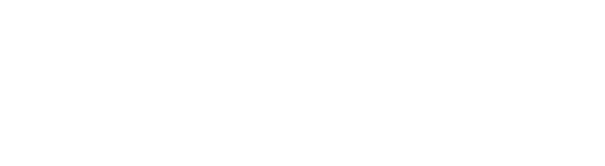
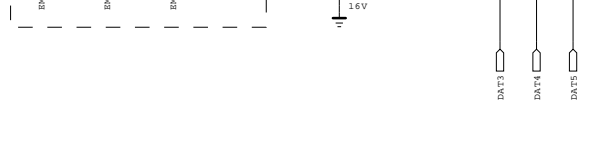
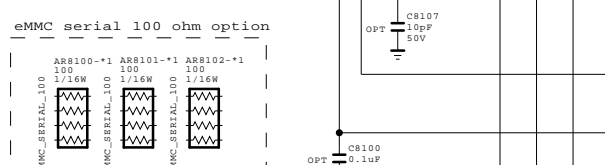
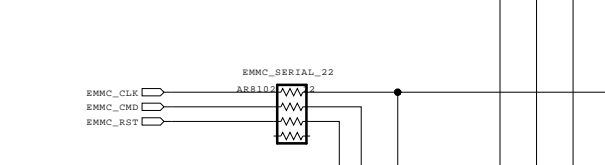
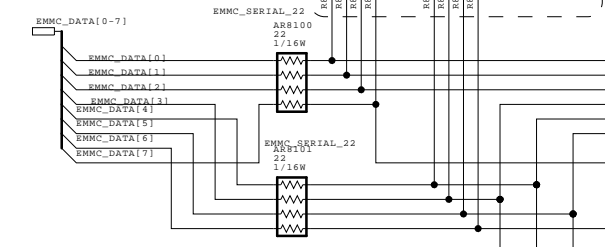
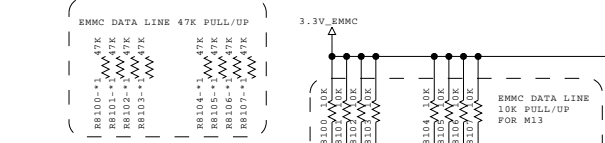
THE SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FIRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE SYMBOL MARK OF THE SCHEMATIC.

SECRET
LGElectronics

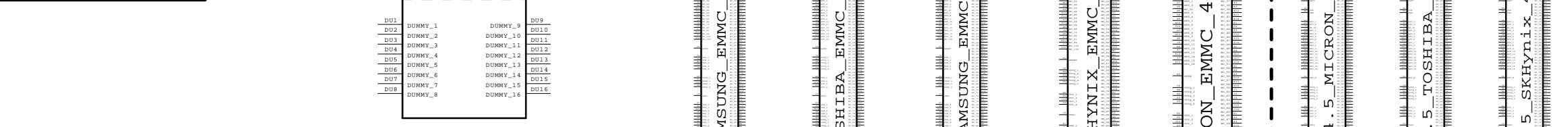
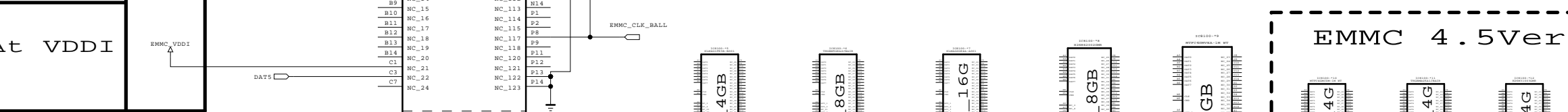
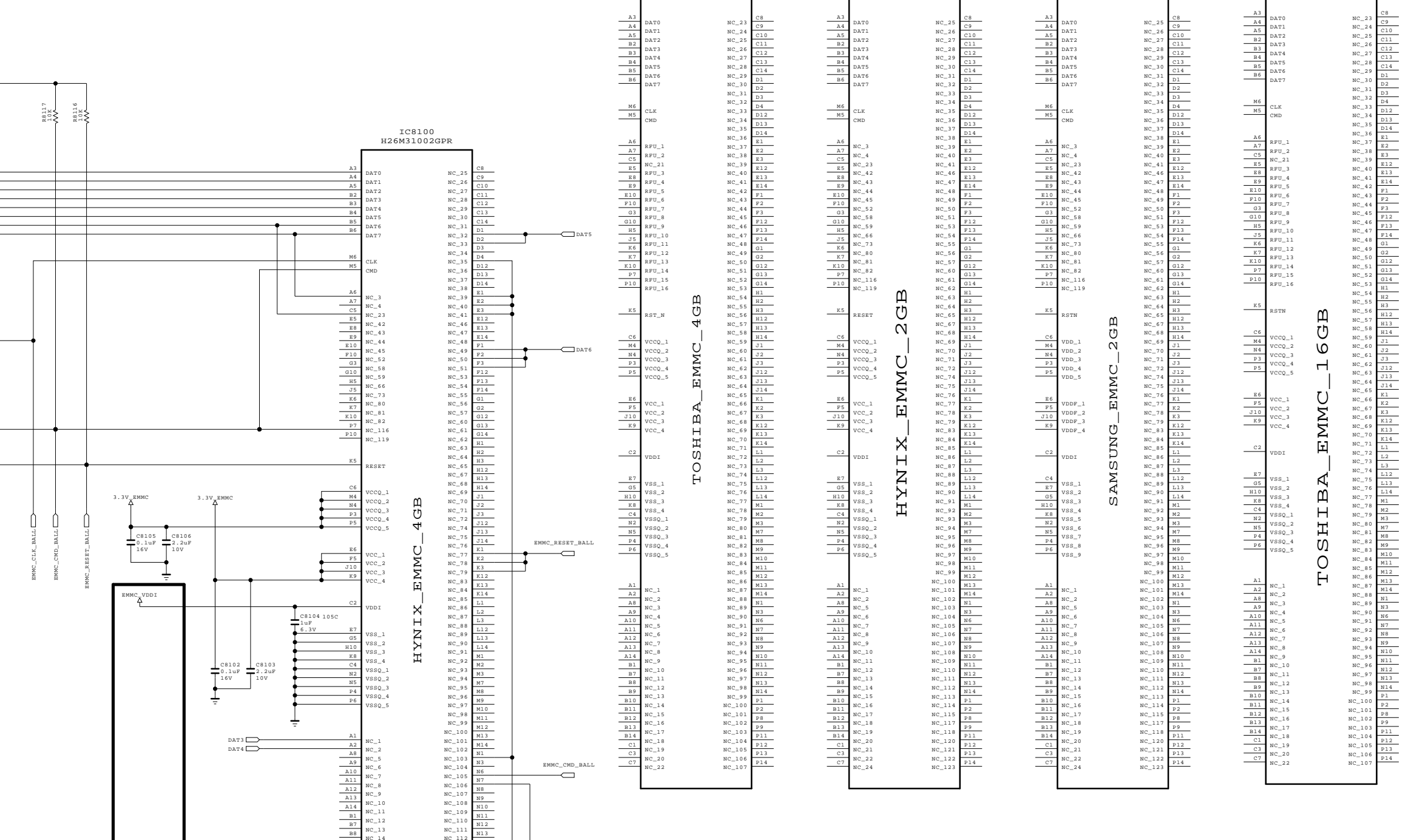


MODEL	LOCAL DIMMING	DATE	2011.12.13
BLOCK		SHEET	76 /

eMMC I/F



IC8100-*1 THGBM5G5A1JBAIR IC8100-*2 H26M21001ECR IC8100-*3 KLM2G1H83F-B001 IC8100-*4 THGBM5G7A2JBAIR



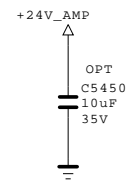
Don't Connect Power At VDDI
(Just Internal LDO Capacitor)



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SECRET
LGElectronics

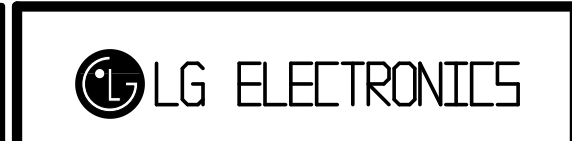
LG ELECTRONICS

MODEL	eMMC	DATE	11.09.29
BLOCK		SHEET	81



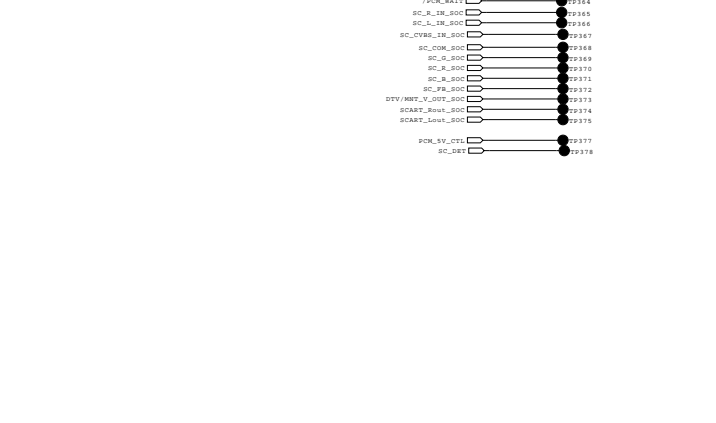
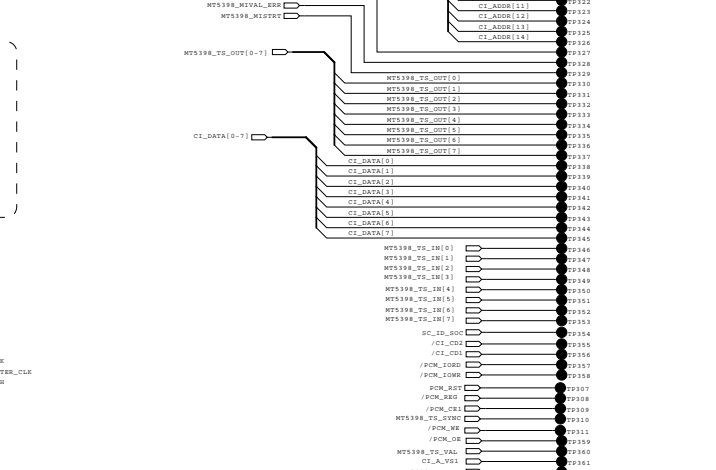
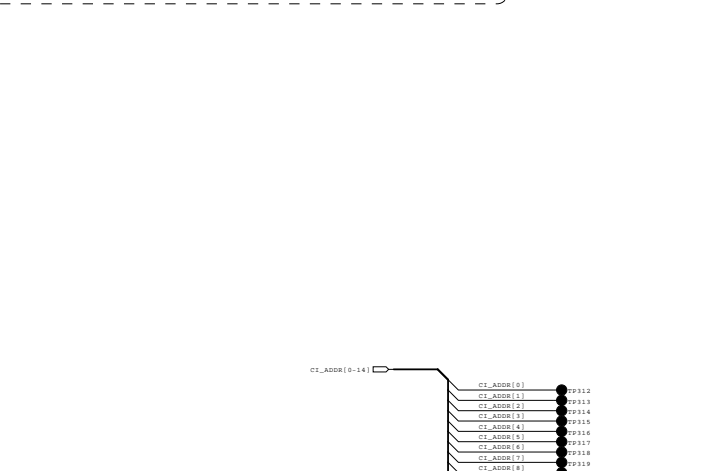
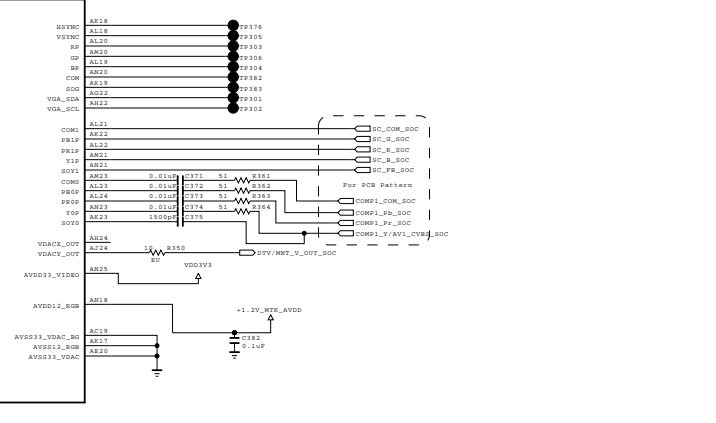
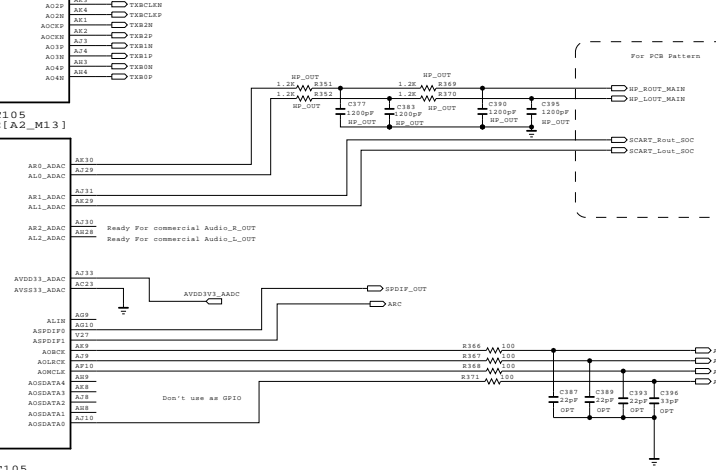
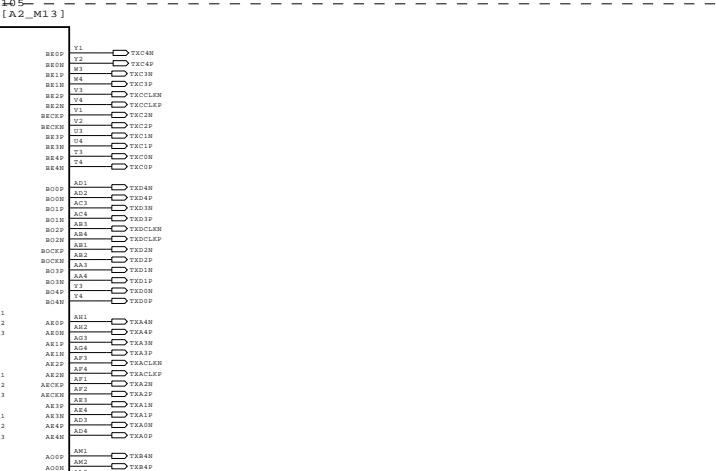
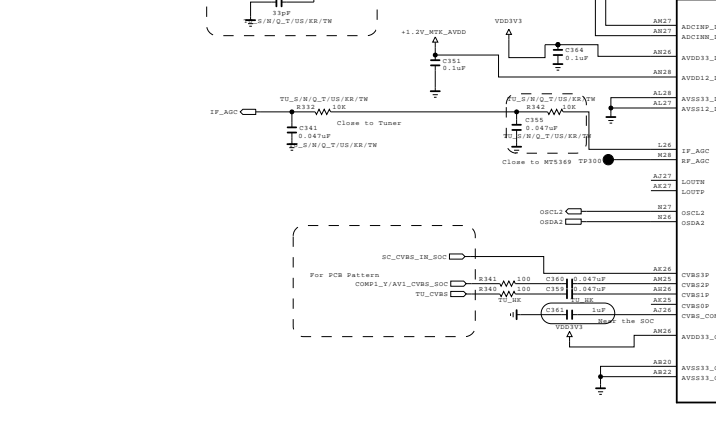
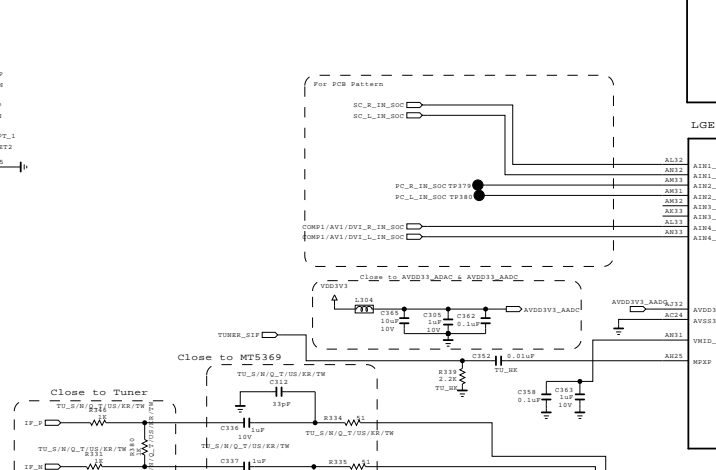
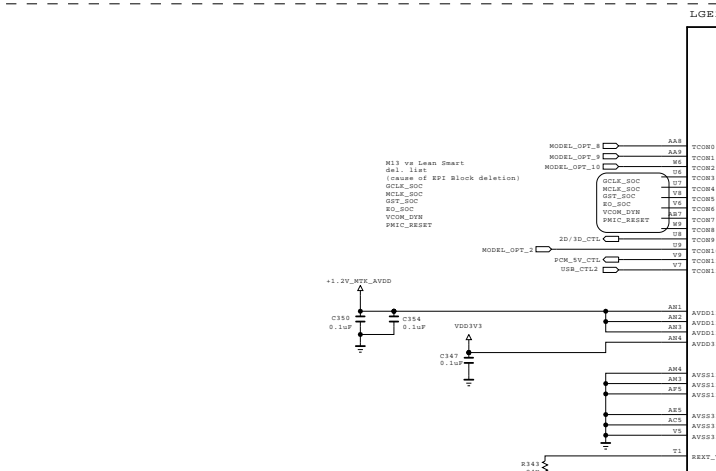
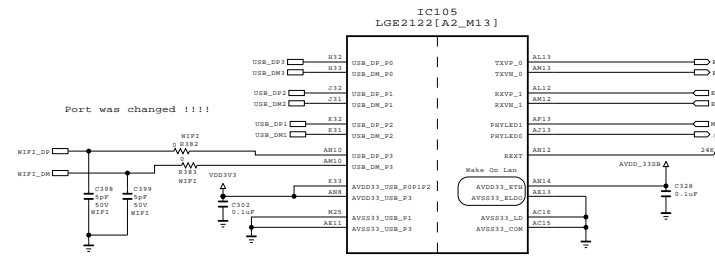
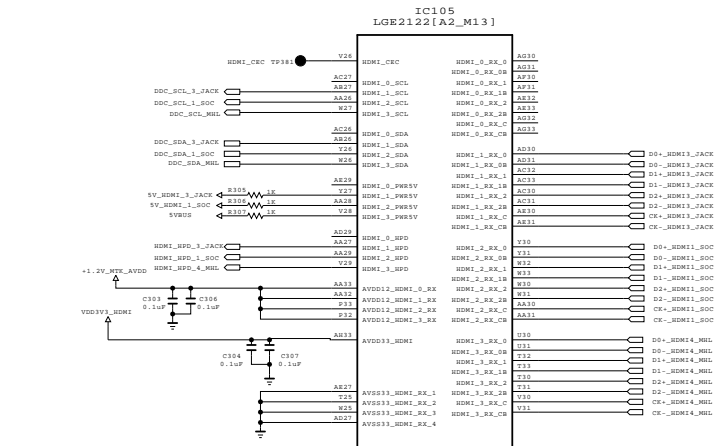
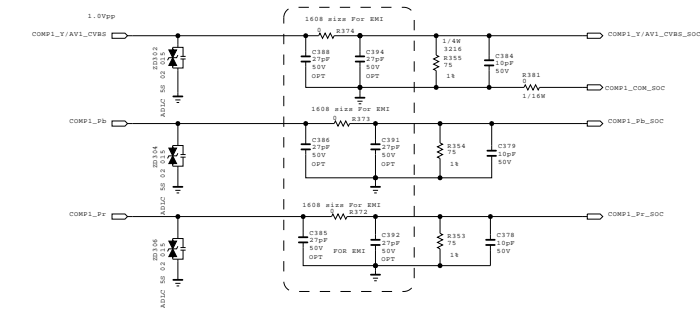
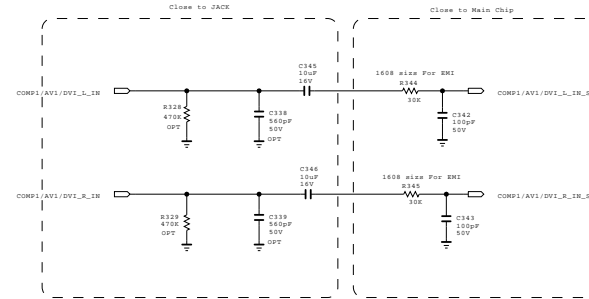
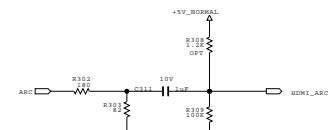
THE  SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FIRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IT IS ESSENTIAL THAT ONLY MANUFACTURERS SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE  SYMBOL MARK OF THE SCHEMATIC.

SECRET
LGElectronics



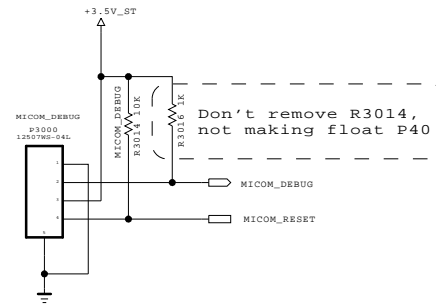
MODEL		DATE	
BLOCK		SHEET	/

PLACE AT JACK SIDE

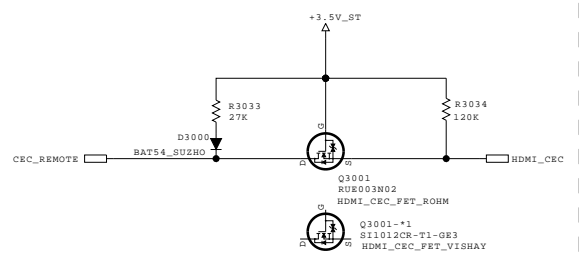


Renesas MICOM

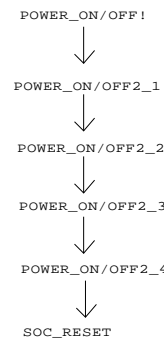
For Debug



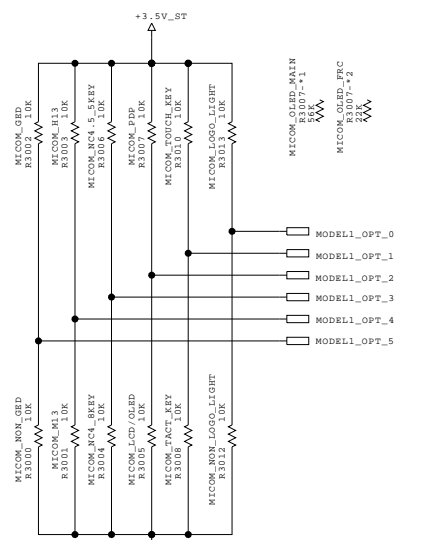
For CEC



GP4 High/MID Power SEQUENCE

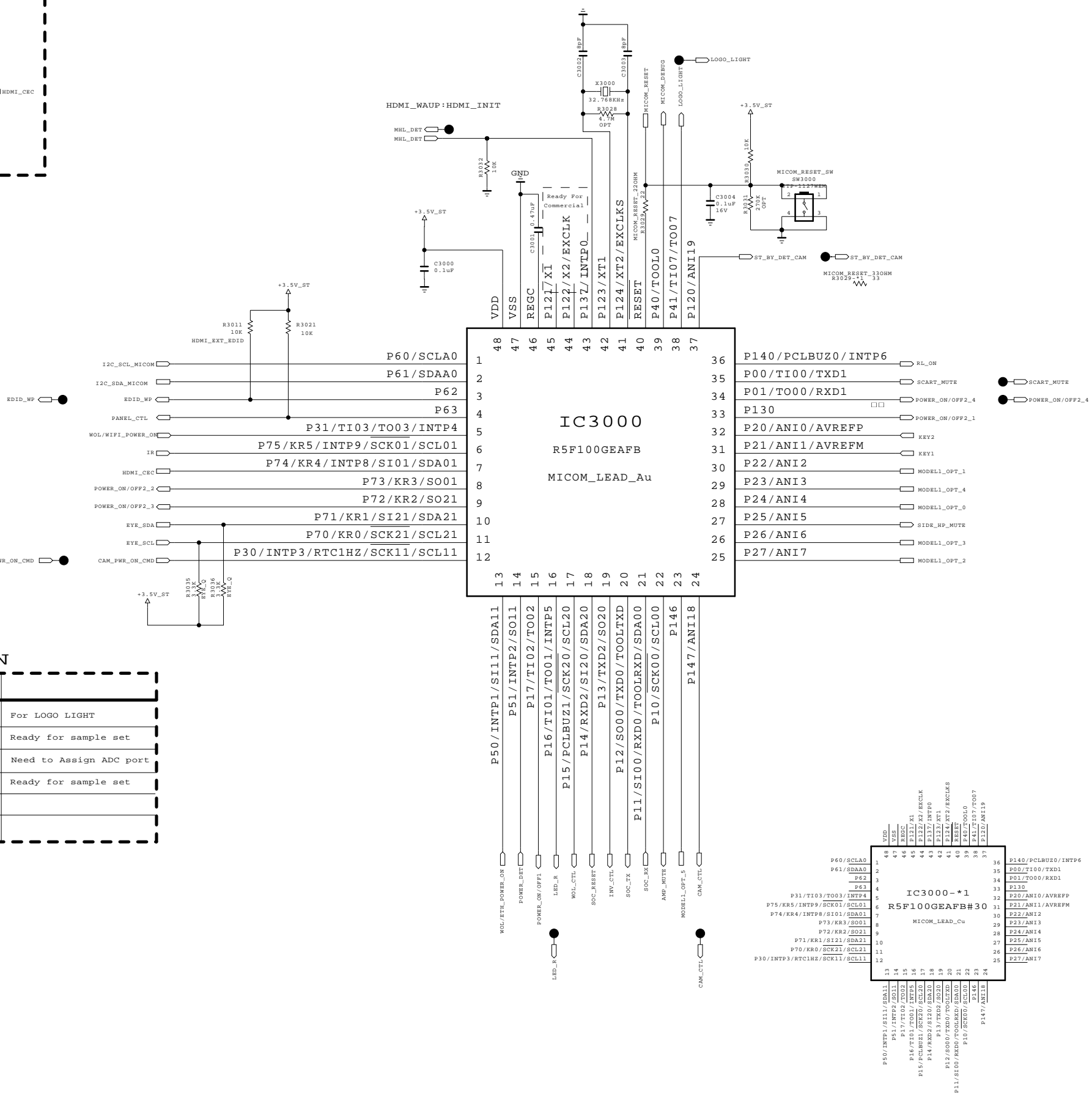


MICOM MODEL OPTION



MICOM MODEL OPTION

	0	1	
MODEL_OPT_0	NON LOGO	LOGO	For LOGO LIGHT
MODEL_OPT_1	TACT_KEY	TOUCH_KEY	Ready for sample set
MODEL_OPT_2	LCD / OLED	PDP	Need to Assign ADC port
MODEL_OPT_3	IR_wafer (12/15)	IR_wafer (10pin)	Ready for sample set
MODEL_OPT_4	M13	H13	
MODEL_OPT_5	NON_GED	GED	



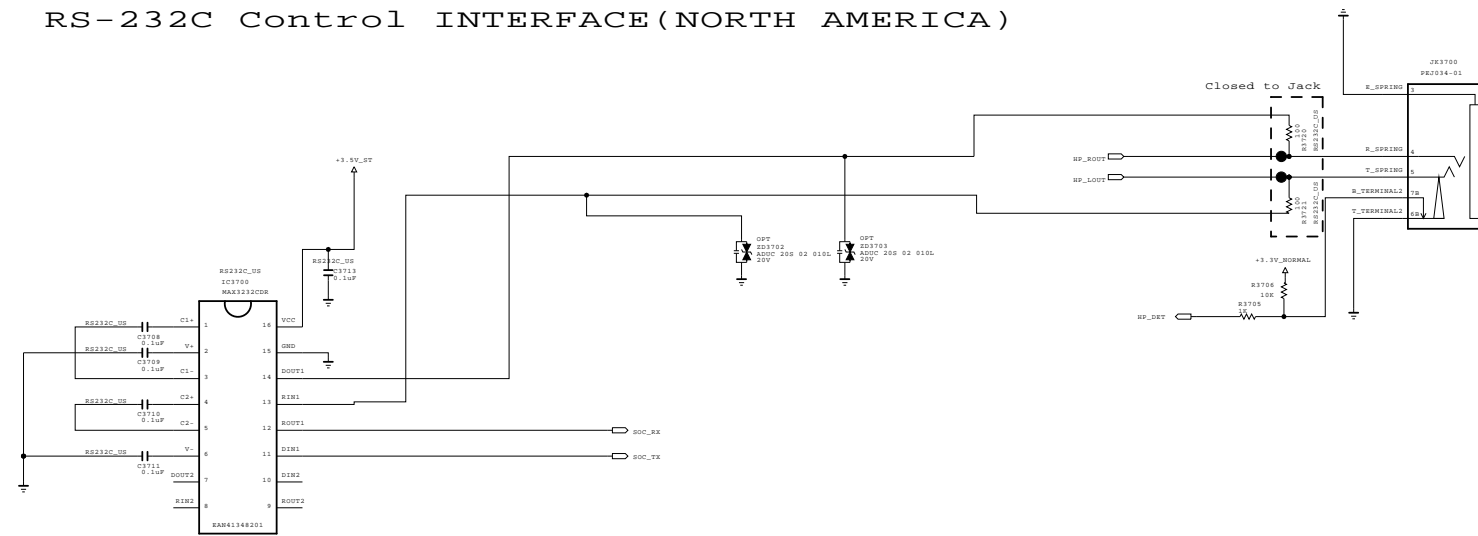
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SECRET
LGElectronics



MODEL	NetCast 4.0	DATE	2013.02.05
BLOCK	MICOM (RENESAS)	SHEET	530

RS-232C Control INTERFACE (NORTH AMERICA)

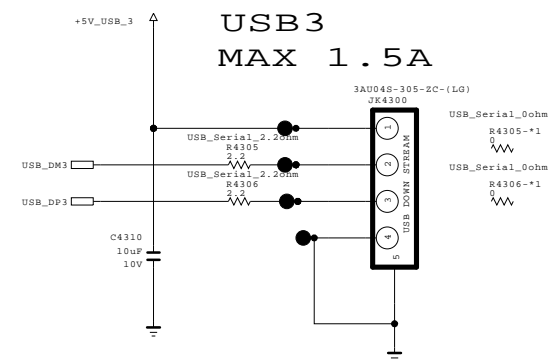
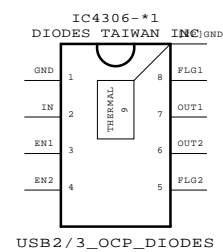
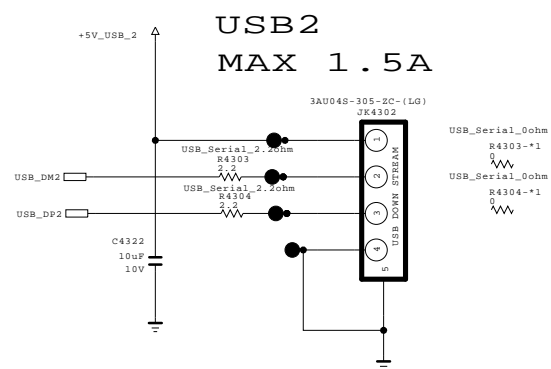
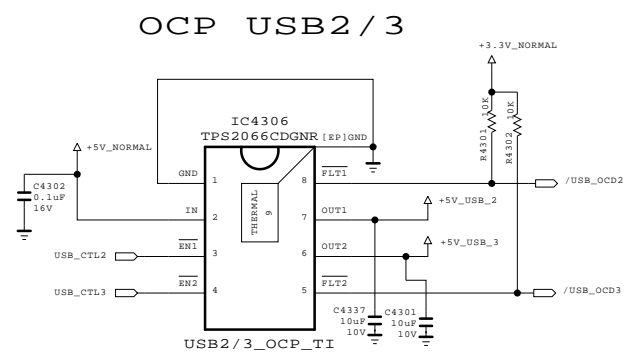
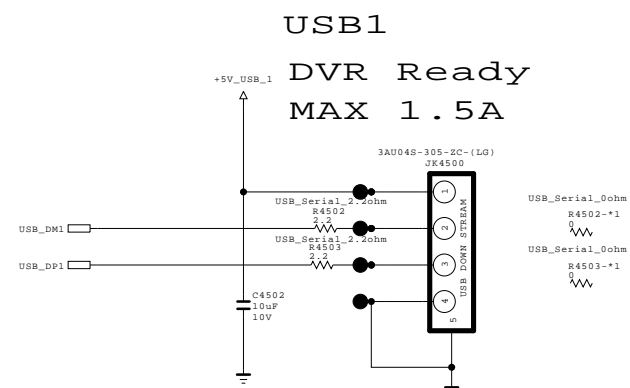
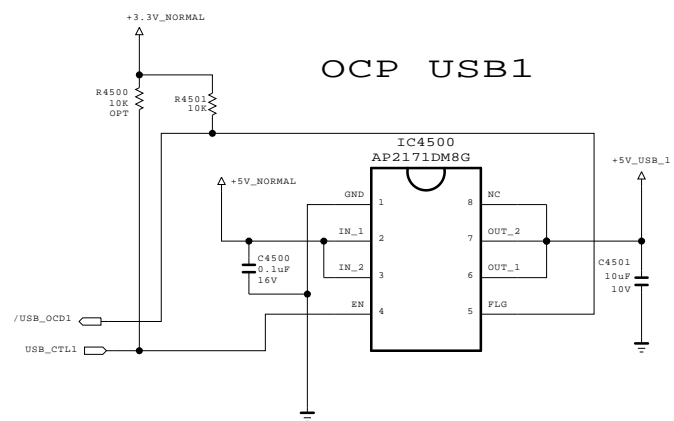


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SECRET
LGElectronics

LG ELECTRONICS

MODEL	14Y Phone Jack	DATE	2013.08.27
BLOCK		SHEET	537 /



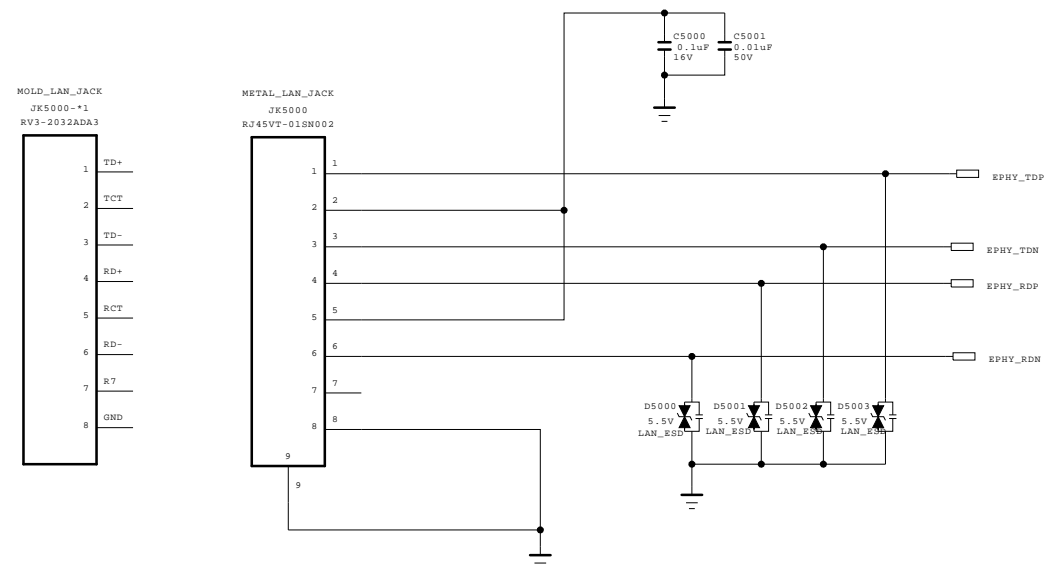
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SECRET
LGElectronics

LG ELECTRONICS

MODEL	USB2_USB3	DATE	2013.11.25
BLOCK		SHEET	543

Ethernet Block

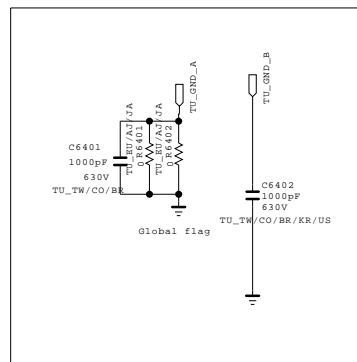
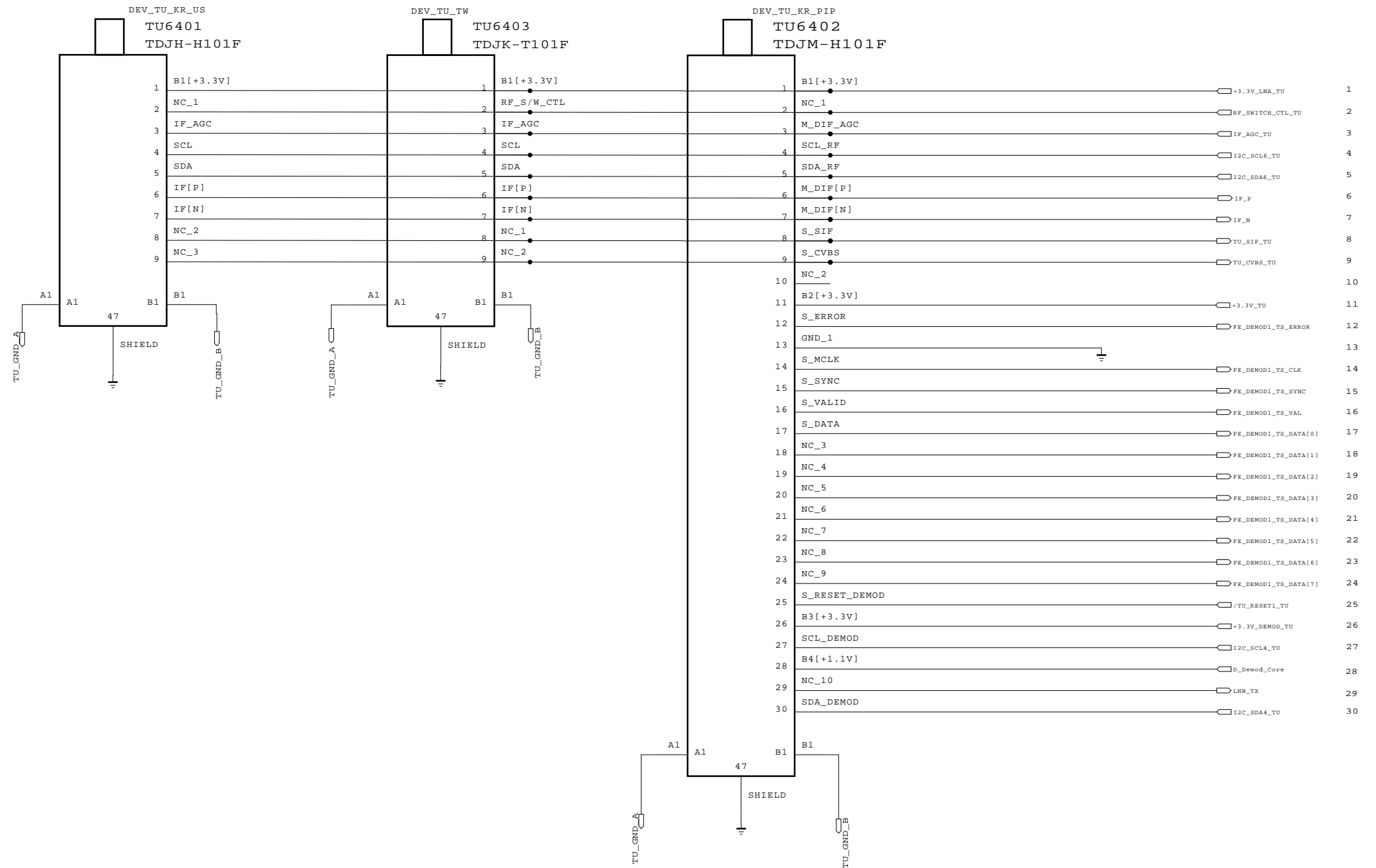
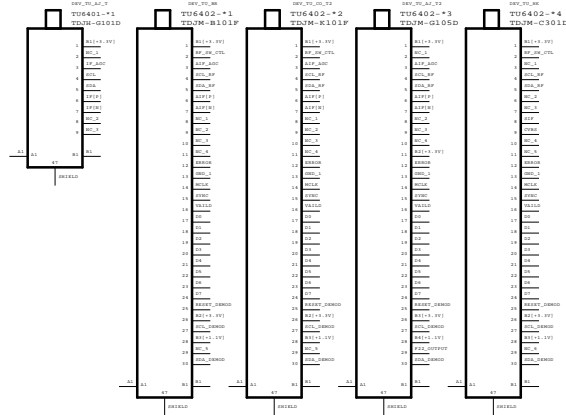


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SECRET
LGElectronics



MODEL	LAN_VERTICAL	DATE	2013.11.26
BLOCK		SHEET	550 /



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

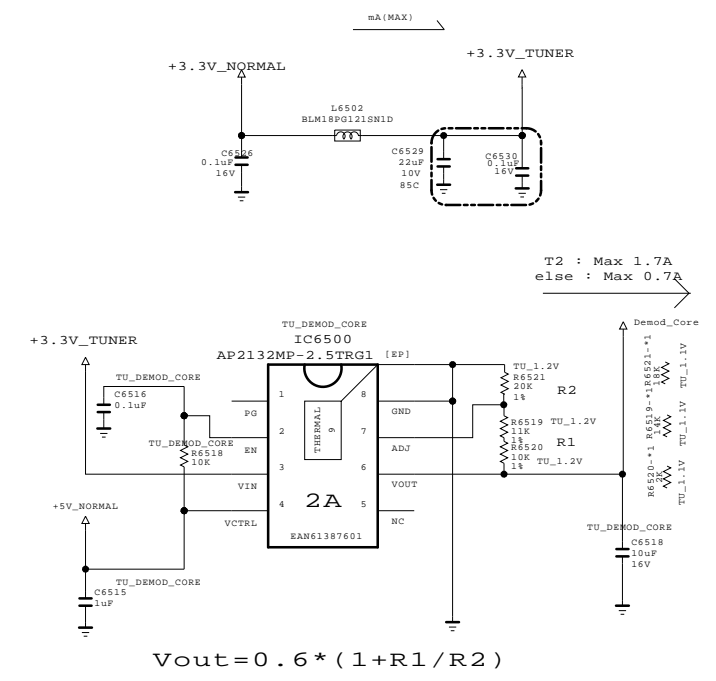
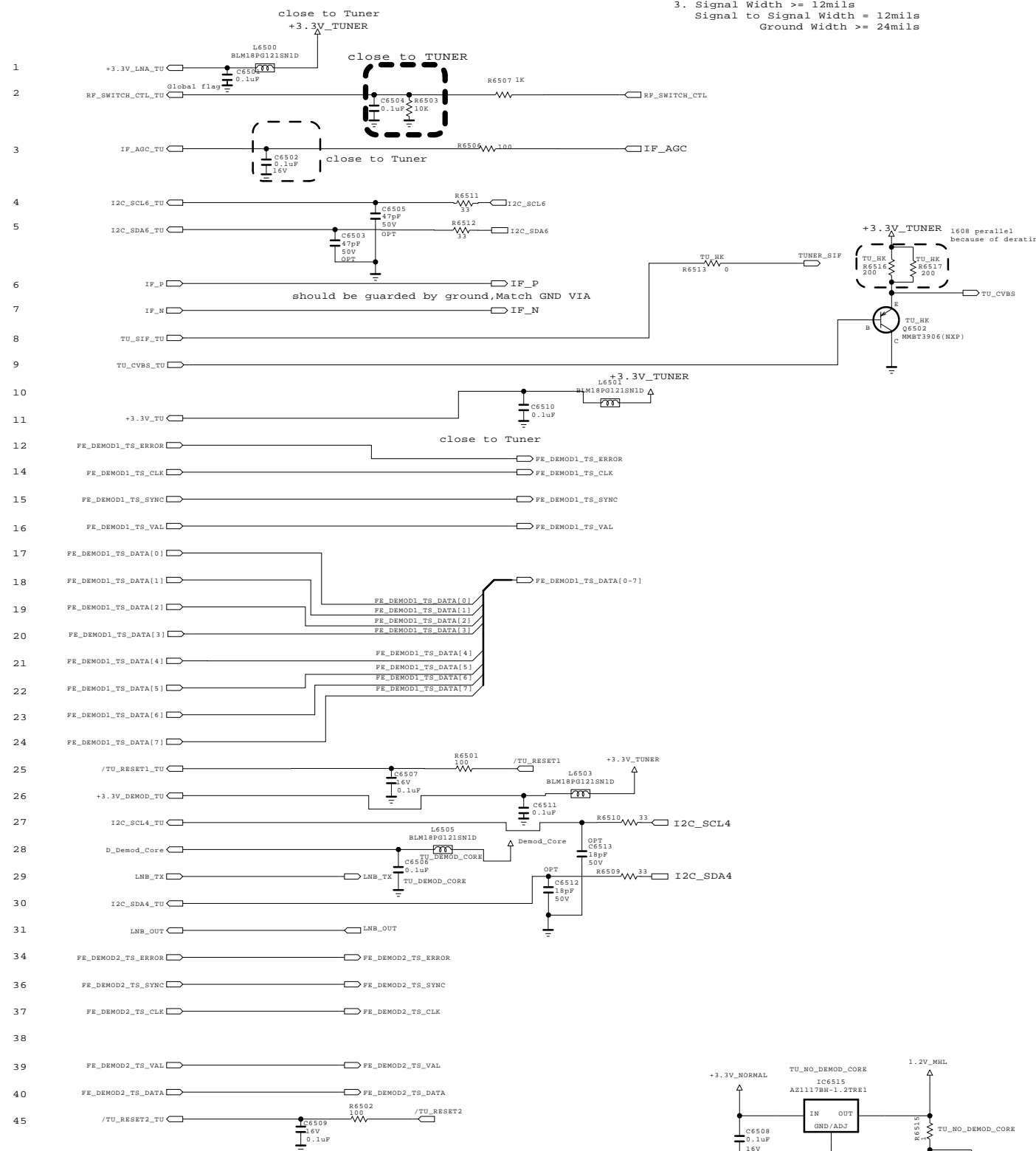
SECRET
LGElectronics



MODEL	TUNER	DATE	2013.07.16
BLOCK		SHEET	564 /

/TU_RESET2_TU /TU_RESET2
 FE_DEMOD1_TS_ERROR

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



DELETE 1.8V POWER

Global F/E Option Name
 1. TU
 2. Tuner Name = TDS'S', TDS'Q'...
 3. Country Name = T, T2, S2, KR, US, BR ...

Example of Option name
 TU_Q_T2 = apply TDSQ type tuner and T2 country
 TU_M/W = apply TDSM&TDSW Type Tuner

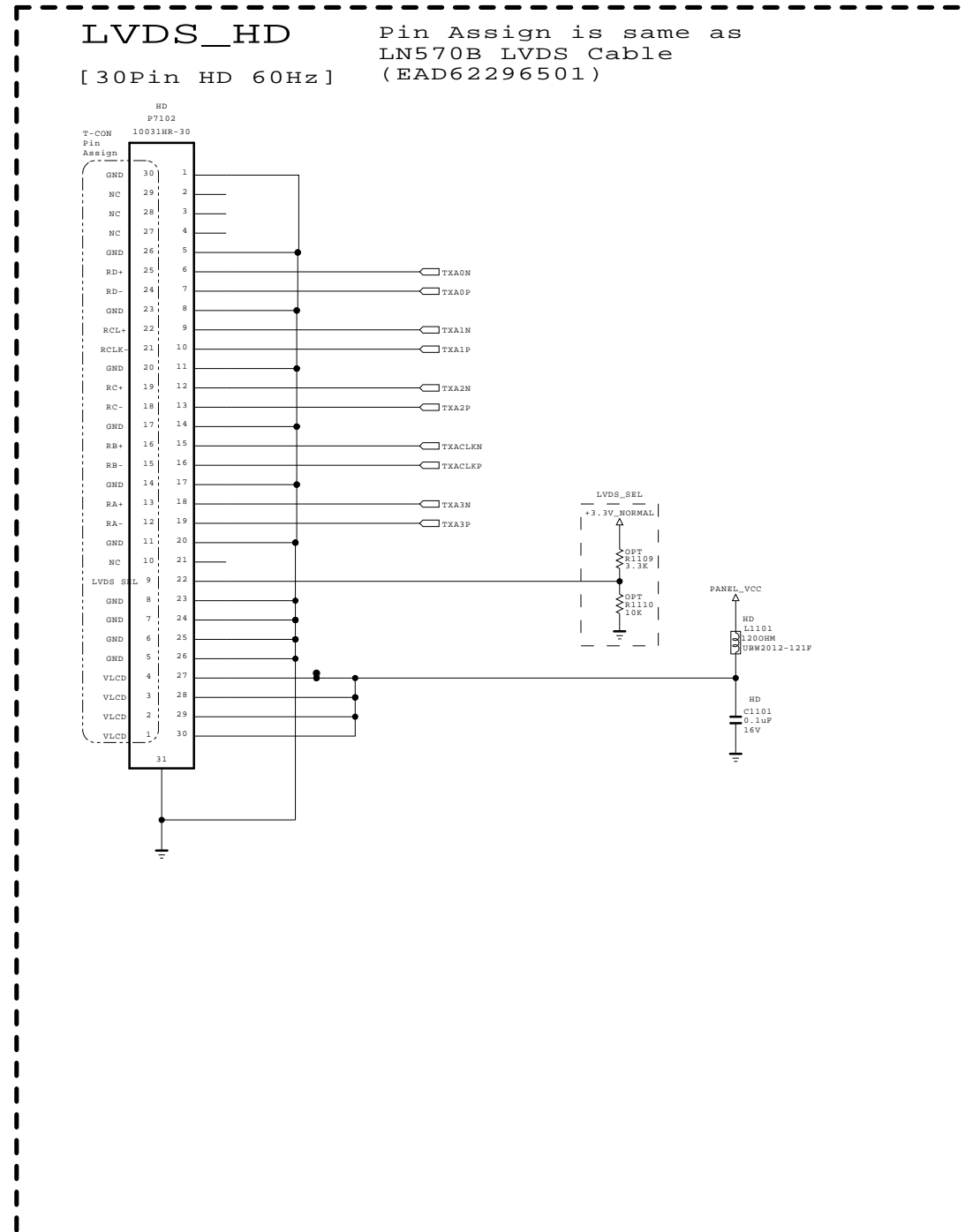
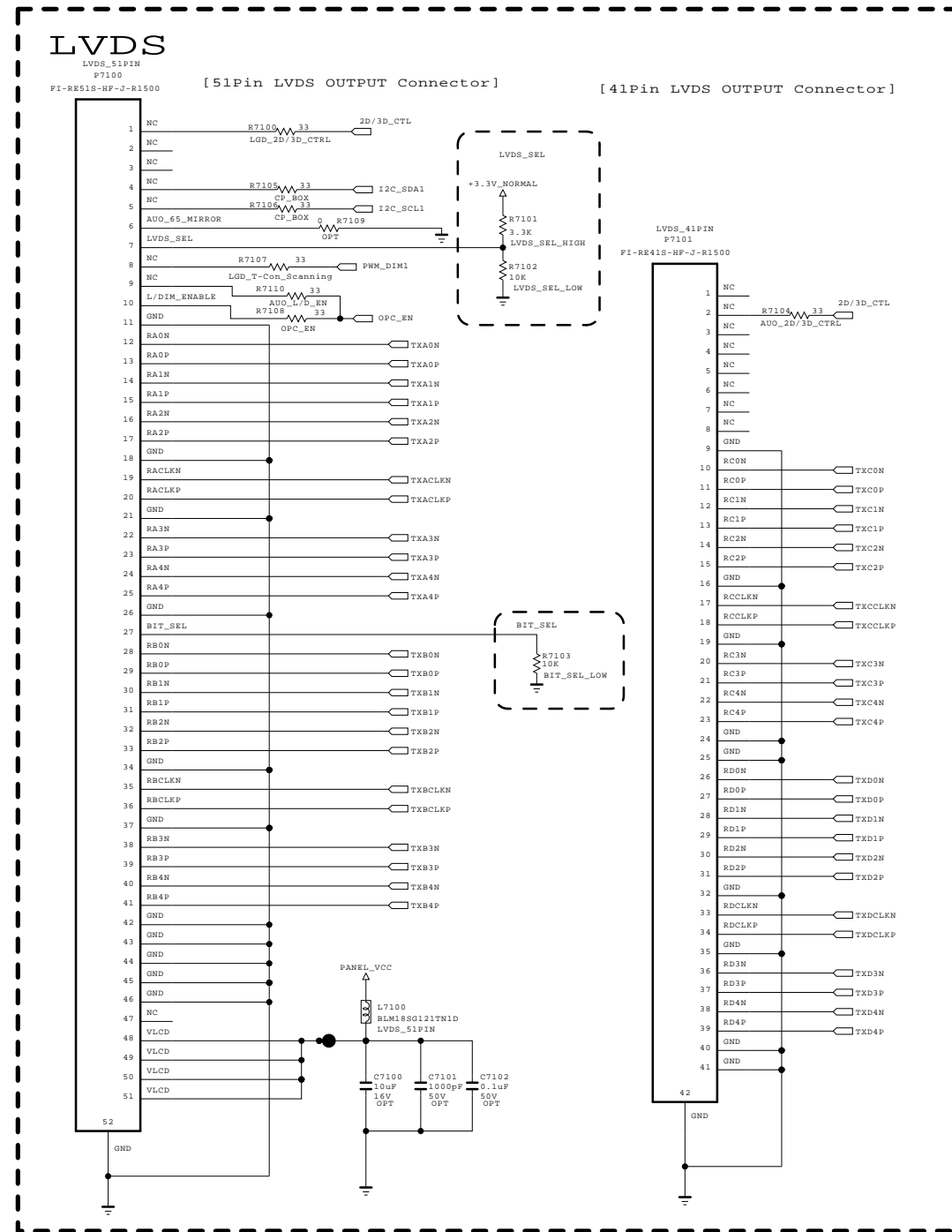
13' Tuner Type for Global
 TDS'S'-G501D : T/C Half NIM Horizontal Type
 TDS'Q'-G501D : T/C/S2 Combo Horizontal type
 TDS'Q'-G601D : T2/C/S2 Combo Horizontal Type
 TDS'Q'-G651D : T2/C/S2 Combo Vertical Type
 TDS'Q'-G705D : Singapore DVB-T2 (V1.3.1)
 TDS'M'-C601D : China NIM with Isolater Type
 TDS'W'-J551F : Japan Dual NIM
 TDS'W'-B651F : Brazil 2Tuner
 TDS'W'-A651F : Taiwan 2Tuner
 TDS'W'-K651F : Colombia DVB-T2 2Tuner

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



MODEL	TUNER_CIRCUIT	DATE	2013.07.16
BLOCK		SHEET	565 /



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


SECRET
LGElectronics



MODEL	LVDS_HIGH_MID	DATE	2013.07.16
BLOCK		SHEET	571



Contents of Standard Repair Process

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

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

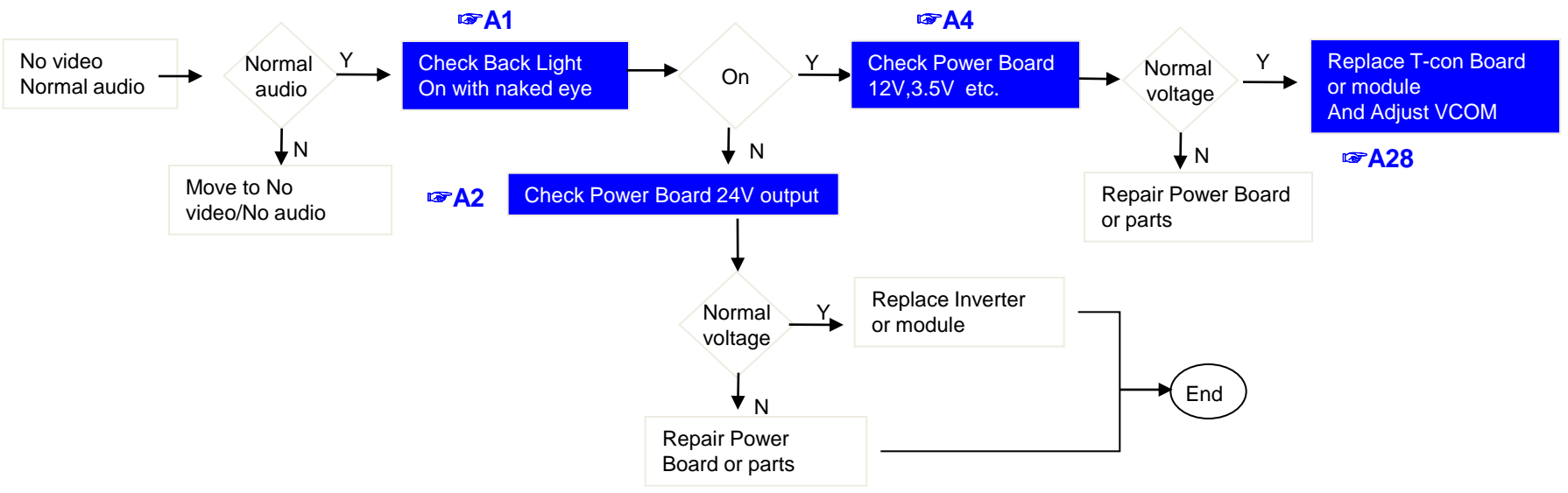
Contents of Standard Repair Process Detail Technical Manual

No.	Error symptom	Content	Page	Remarks
1	A. Video error_ No video/Normal audio	Check LCD back light with naked eye	A1	
2		LED driver B+ 24V measuring method	A2	
3		Check White Balance value	A3	
4		Power Board voltage measuring method	A5	
6	A. Video error_ No video/Video lag/stop	TUNER input signal strength checking method	A6	
7		Version checking method	A7	
9	A. Video error_Color error	connection diagram	A8	
10		Tuner Checking Part	A9	
11		Check Link Cable (LVDS) reconnection condition	A10 A11	A10 : 32/37/42/47/55 A11 : 32 AUO
12		Adjustment Test pattern - ADJ Key	A12	
13		connection diagram	A8	
14	A. Video error_Vertical/Horizontal bar, residual image, light spot	Check Link Cable (LVDS) reconnection condition	A10 A11	A10 : 32/37/42/47/55 A11 : 32 AUO
15		Adjustment Test pattern - ADJ Key	A12	
16	<Appendix> Defected Type caused by T-Con/ Inverter/ Module	Exchange T-Con Board (1)	A-1/5	
17		Exchange T-Con Board (2)	A-2/5	
18		Exchange LED driver Board (PSU)	A-3/5	55" : driver board Other : PSU
19		Exchange Module itself (1)	A-4/5	
20		Exchange Module itself (2)	A-5/5	

Standard Repair Process

	Error symptom	A. Video error	Established date	
		No video/ Normal audio	Revised date	1/13

**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, ETC...)**

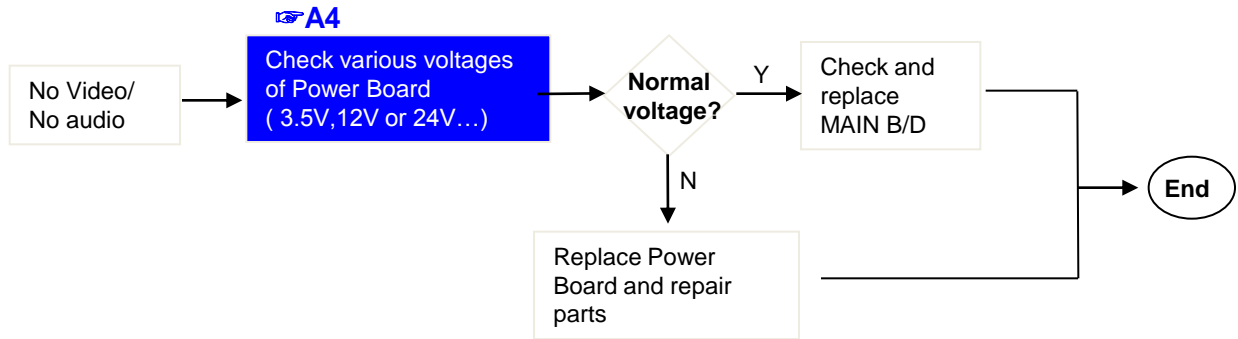


※Precaution **A7 & A3**



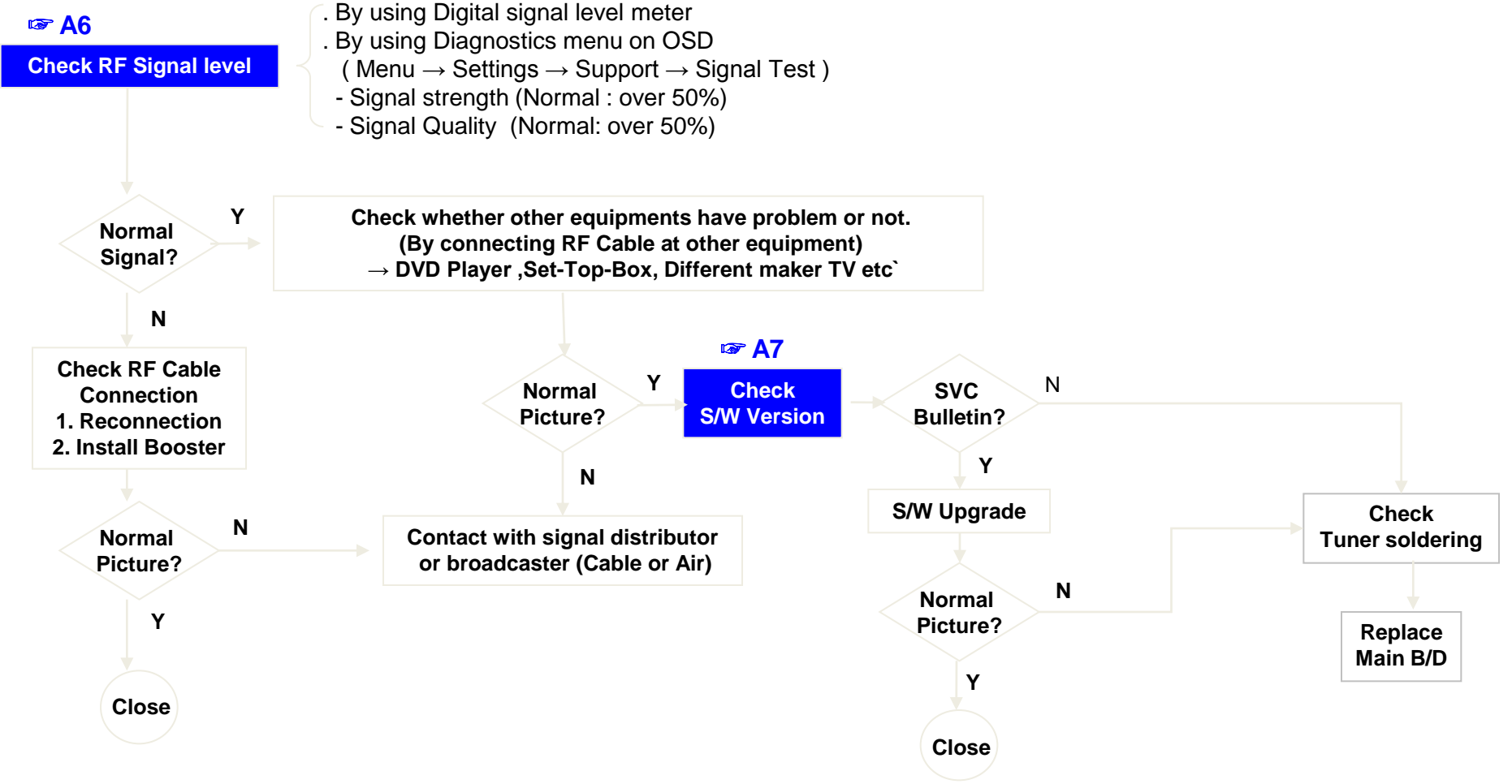
Standard Repair Process

	Error symptom	A. Video error	Established date	
		No video/ No audio	Revised date	2/13



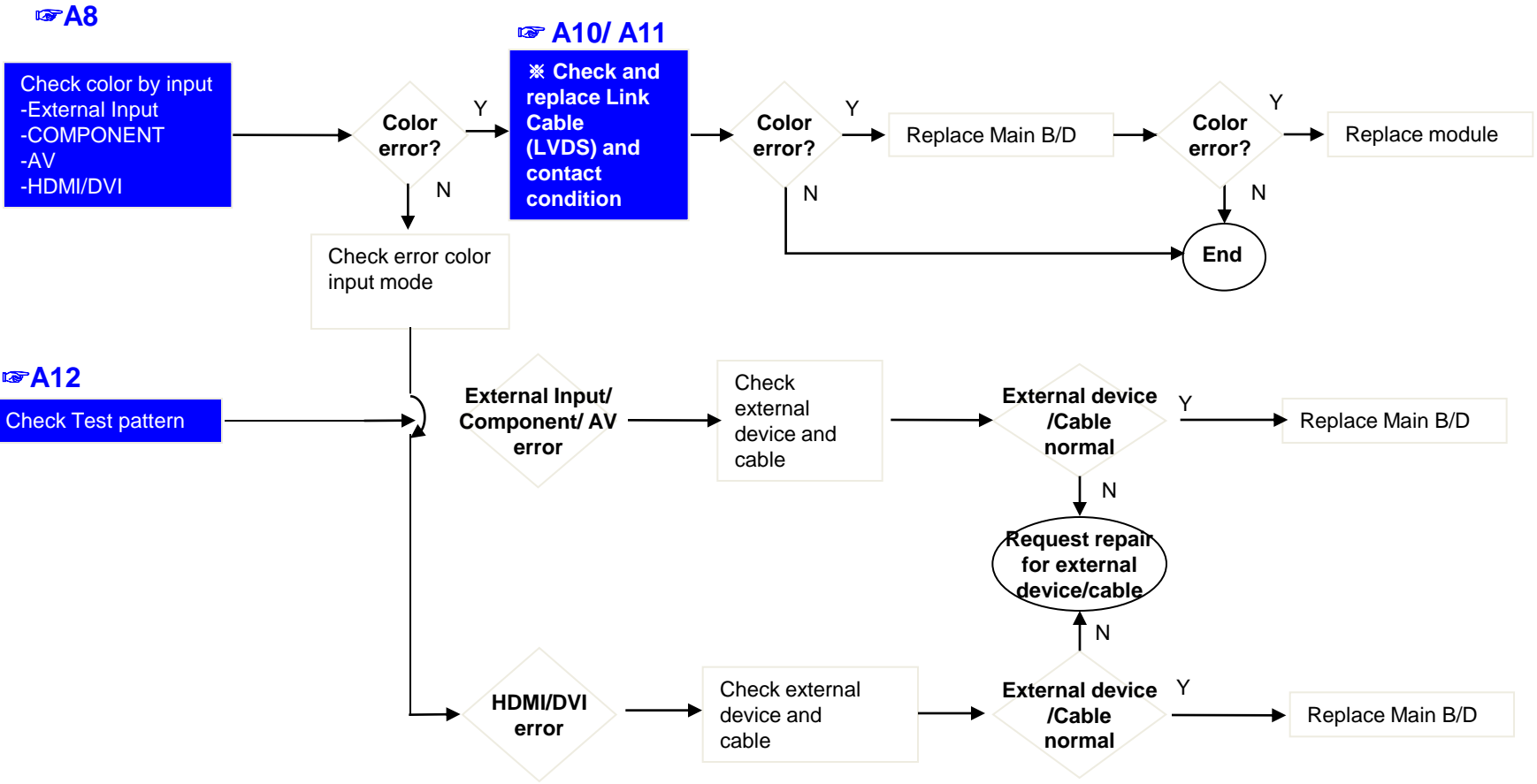
Standard Repair Process

	Error symptom	A. Video error	Established date		
		Picture broken/ Freezing	Revised date		3/13



Standard Repair Process

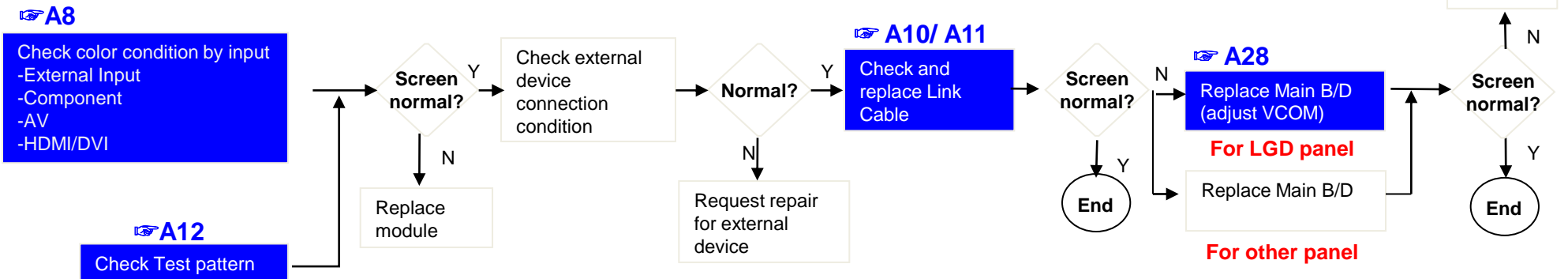
Error symptom	A. Video error	Established date	
	Color error	Revised date	4/13



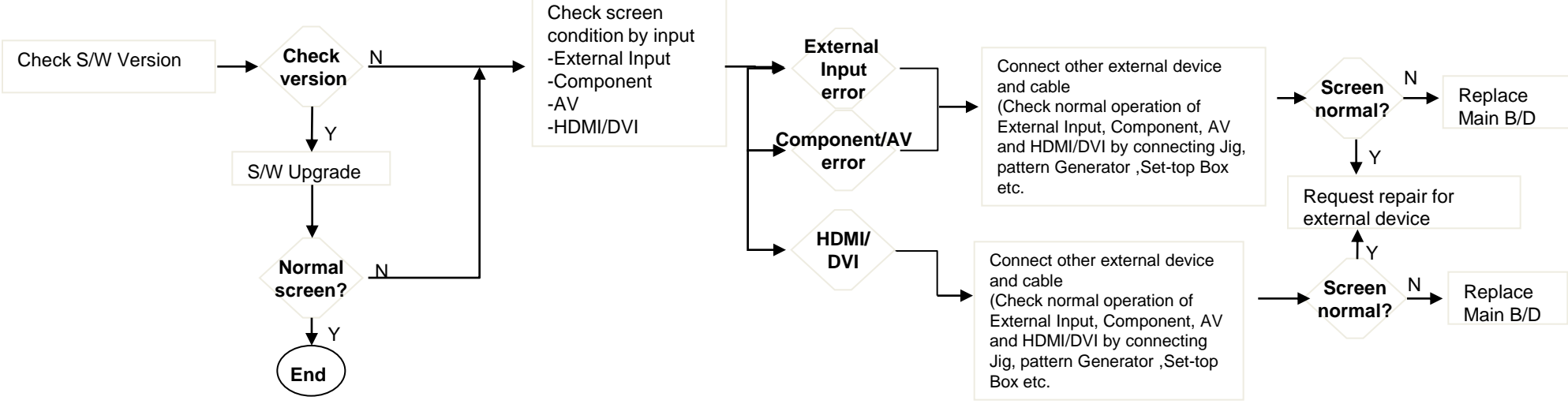
Standard Repair Process

Error symptom	A. Video error	Established date	
	Vertical / Horizontal bar, residual image, light spot, external device color error	Revised date	5/13

Vertical/Horizontal bar, residual image, light spot

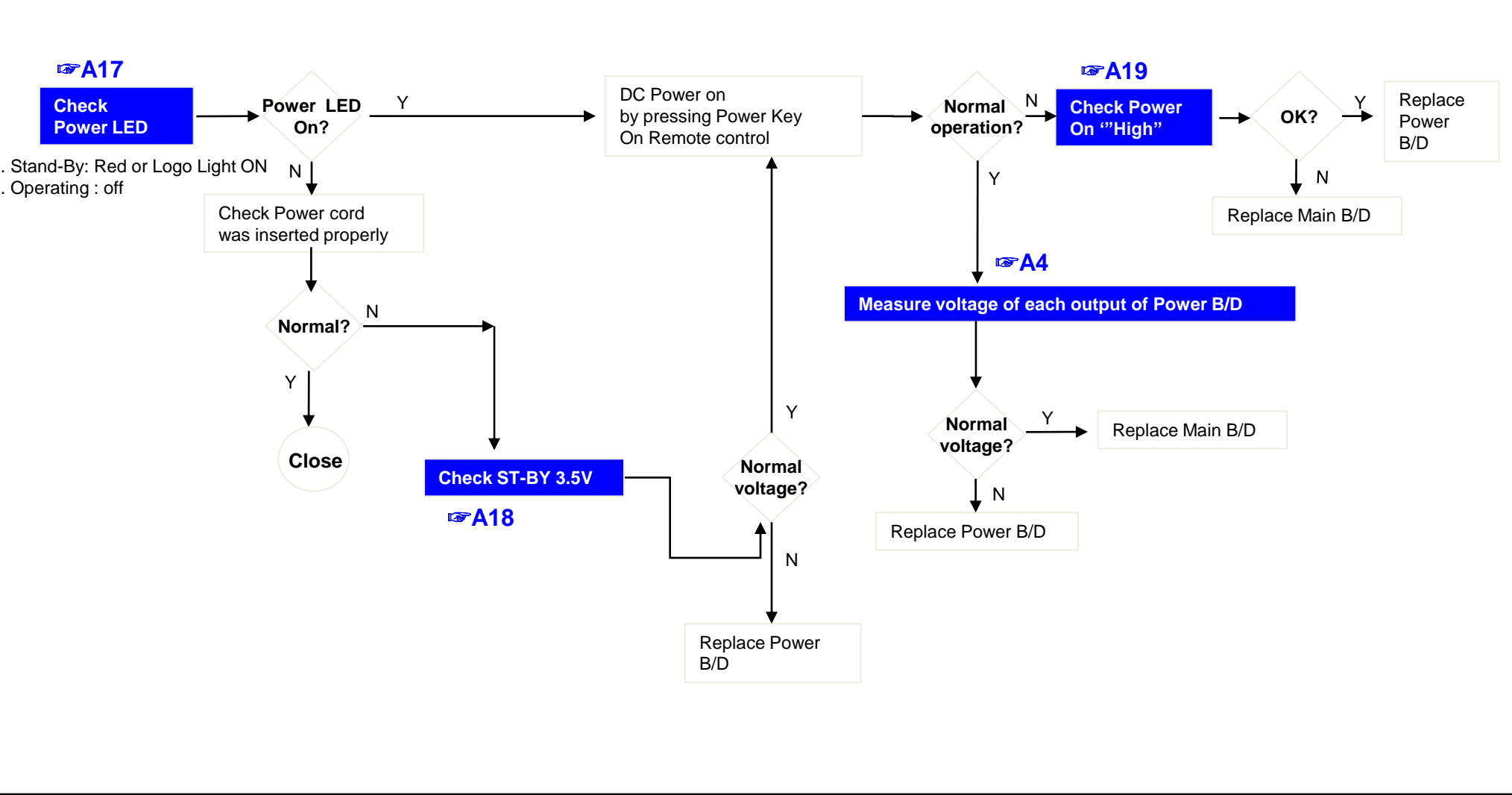


External device screen error-Color error



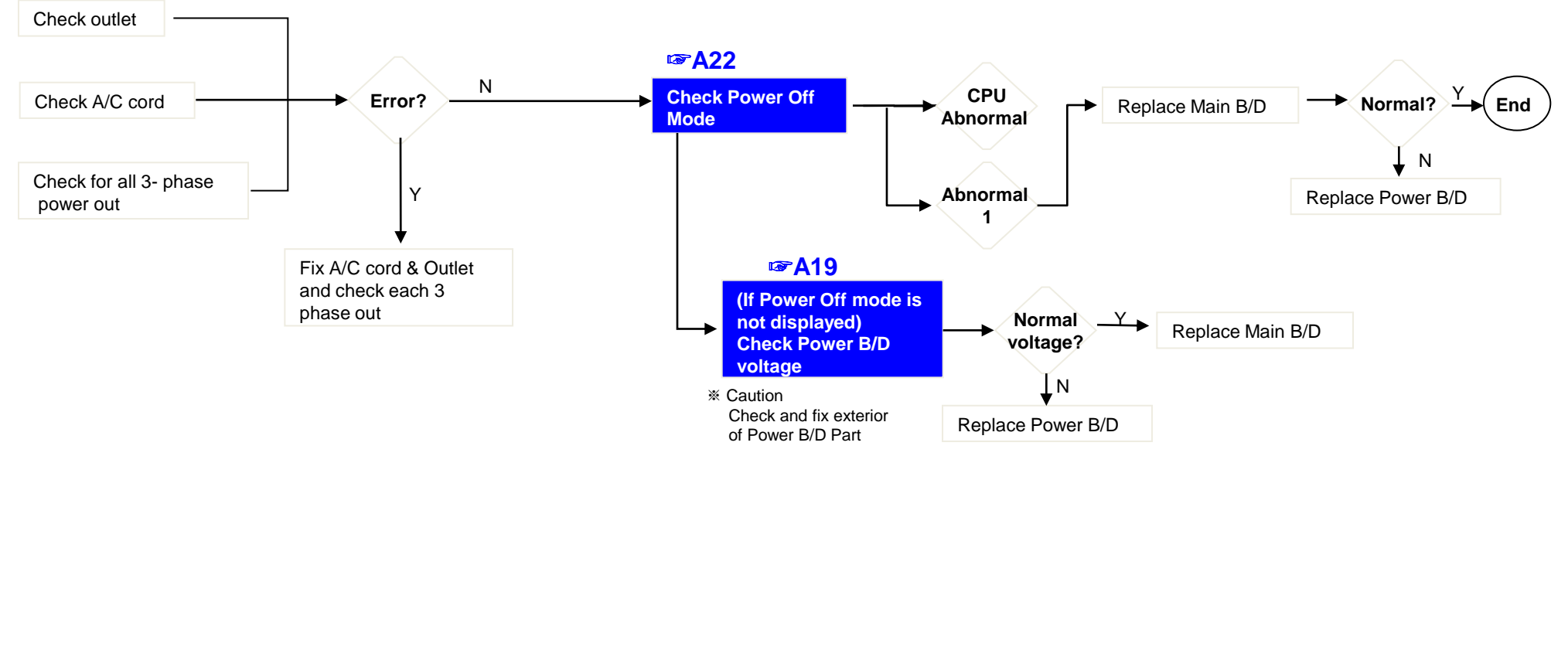
Standard Repair Process

	Error symptom	B. Power error	Established date	
		No power	Revised date	6/13



Standard Repair Process

	Error symptom	B. Power error	Established date	
		Off when on, off while viewing, power auto on/off	Revised date	7/13

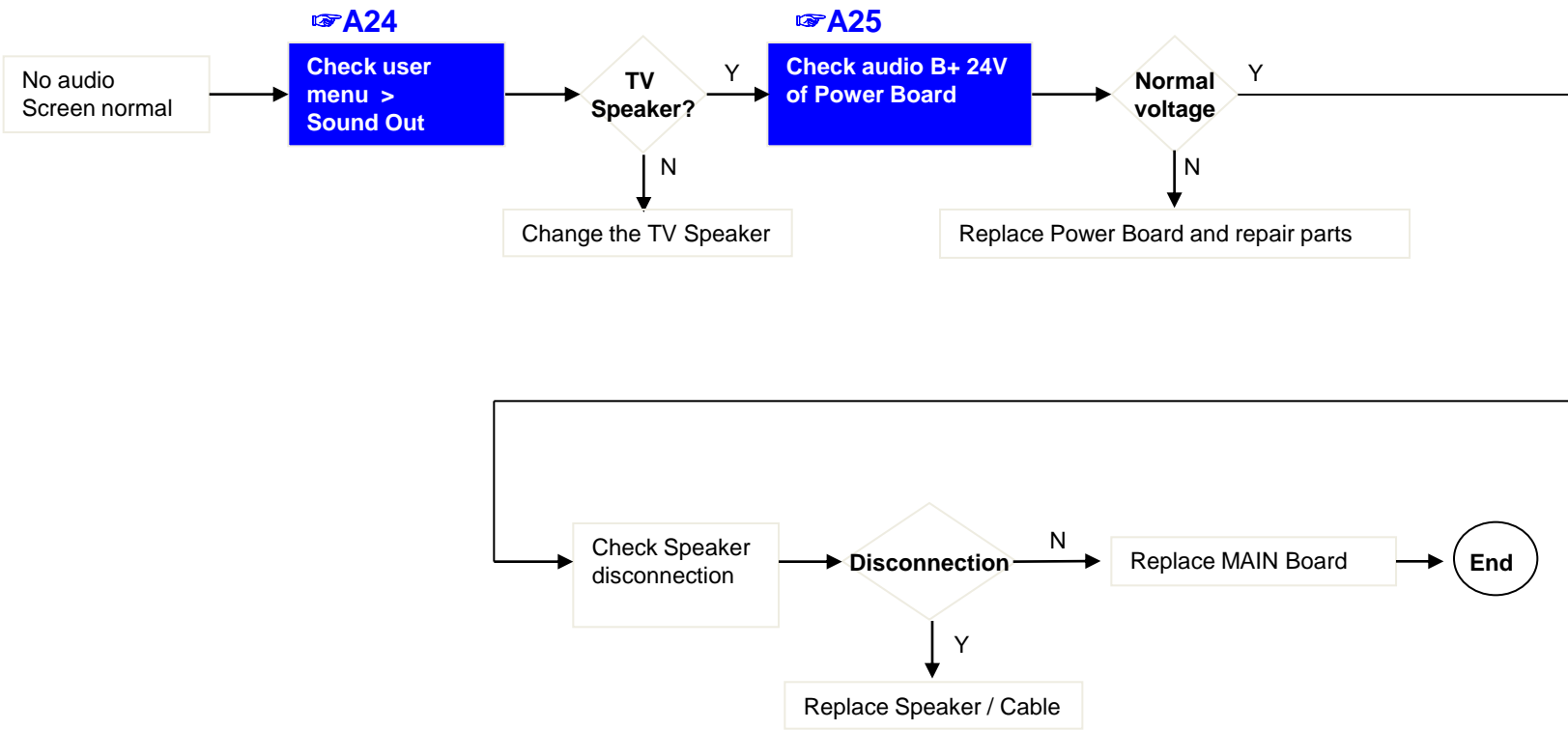


* Please refer to the all cases which can be displayed on power off mode. Click the below Hyper_link



Standard Repair Process

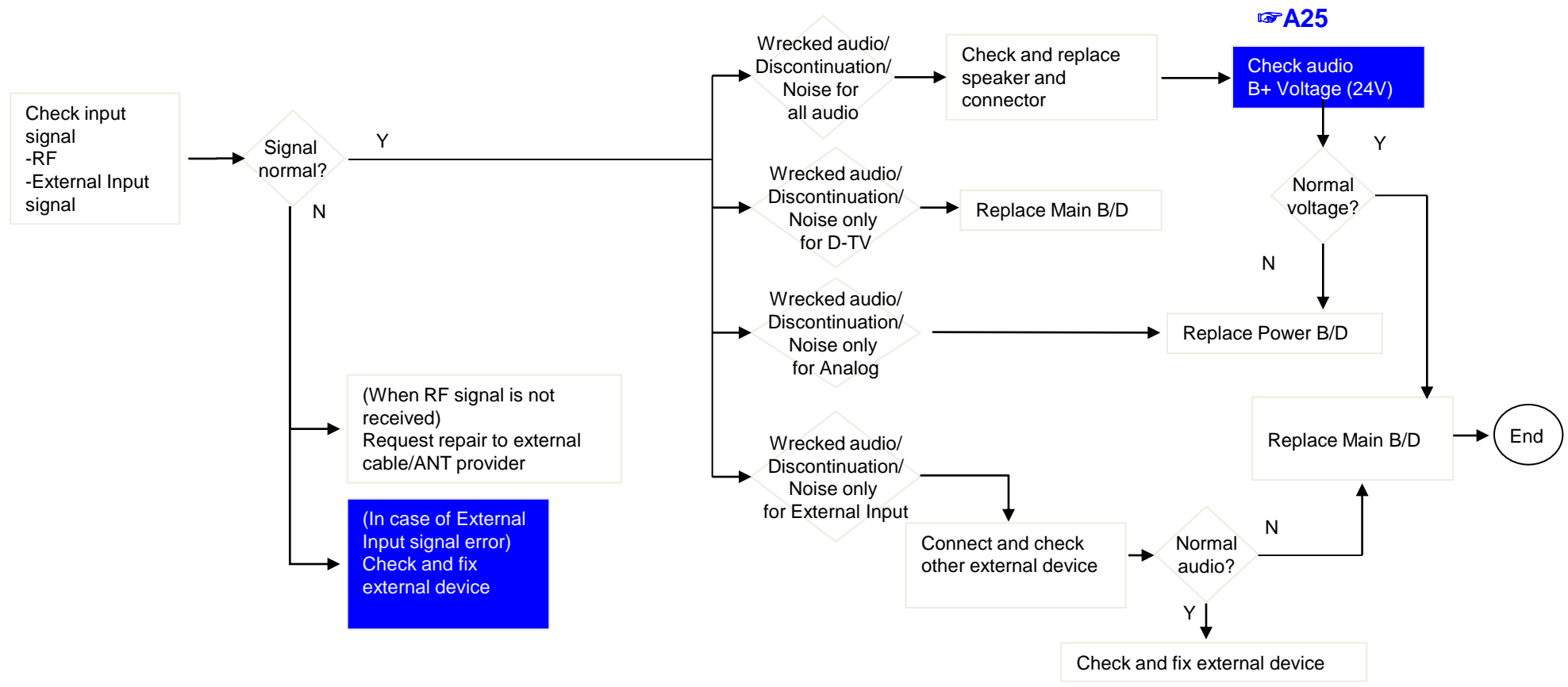
	Error symptom	C. Audio error	Established date	
		No audio/ Normal video	Revised date	8/13



Standard Repair Process

Error symptom	C. Audio error	Established date	
	Wrecked audio/ discontinuation/noise	Revised date	9/13

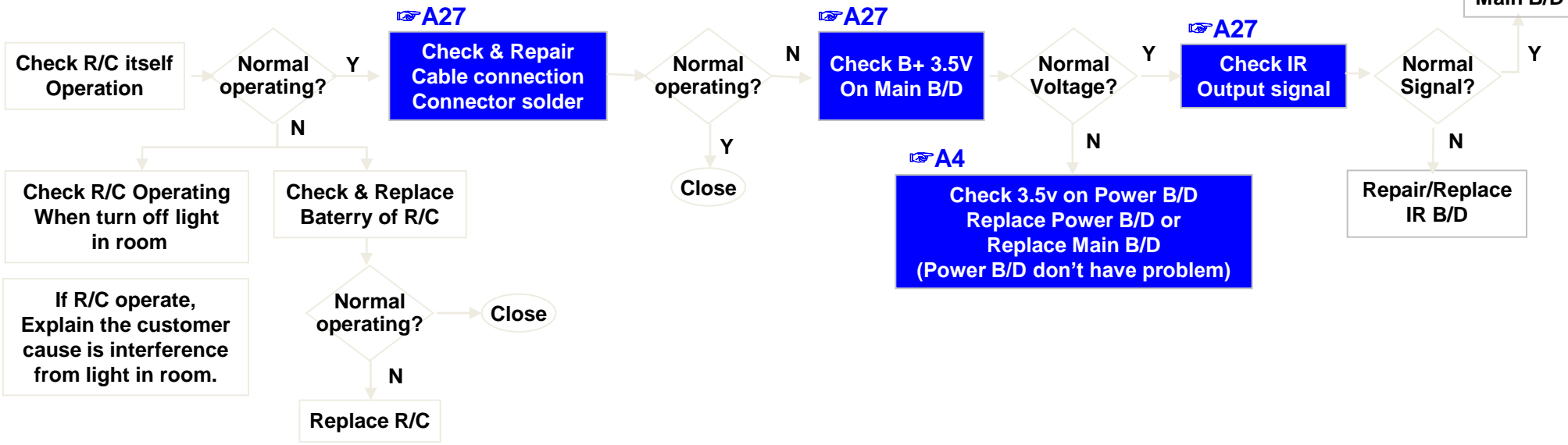
→ abnormal audio/discontinuation/noise is same after "Check input signal" compared to No audio



Standard Repair Process

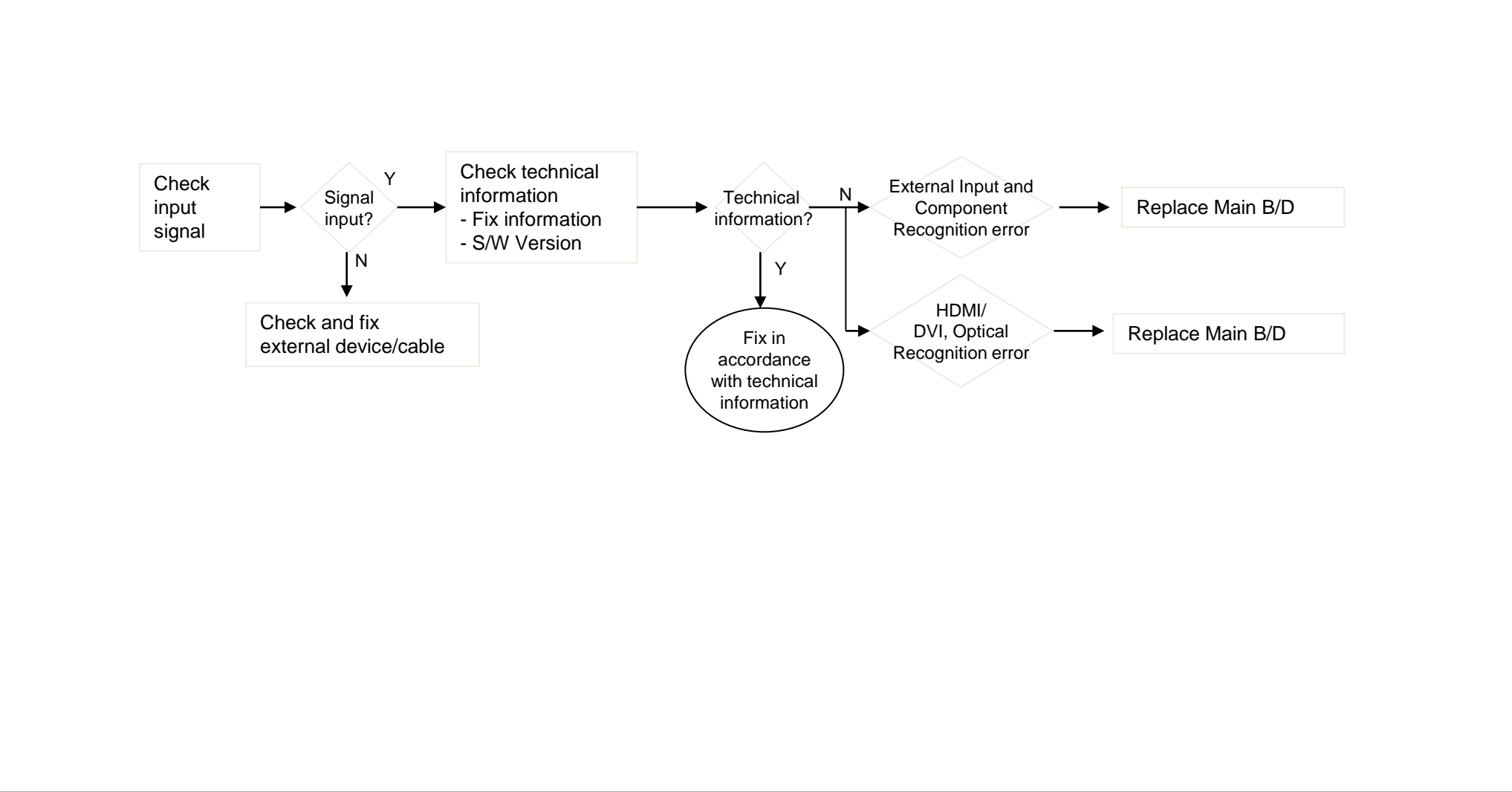
	Error symptom	D. General Function Problem	Established date		
		Remote control & Local switch checking	Revised date		10/13

1. Remote control(R/C) operating error



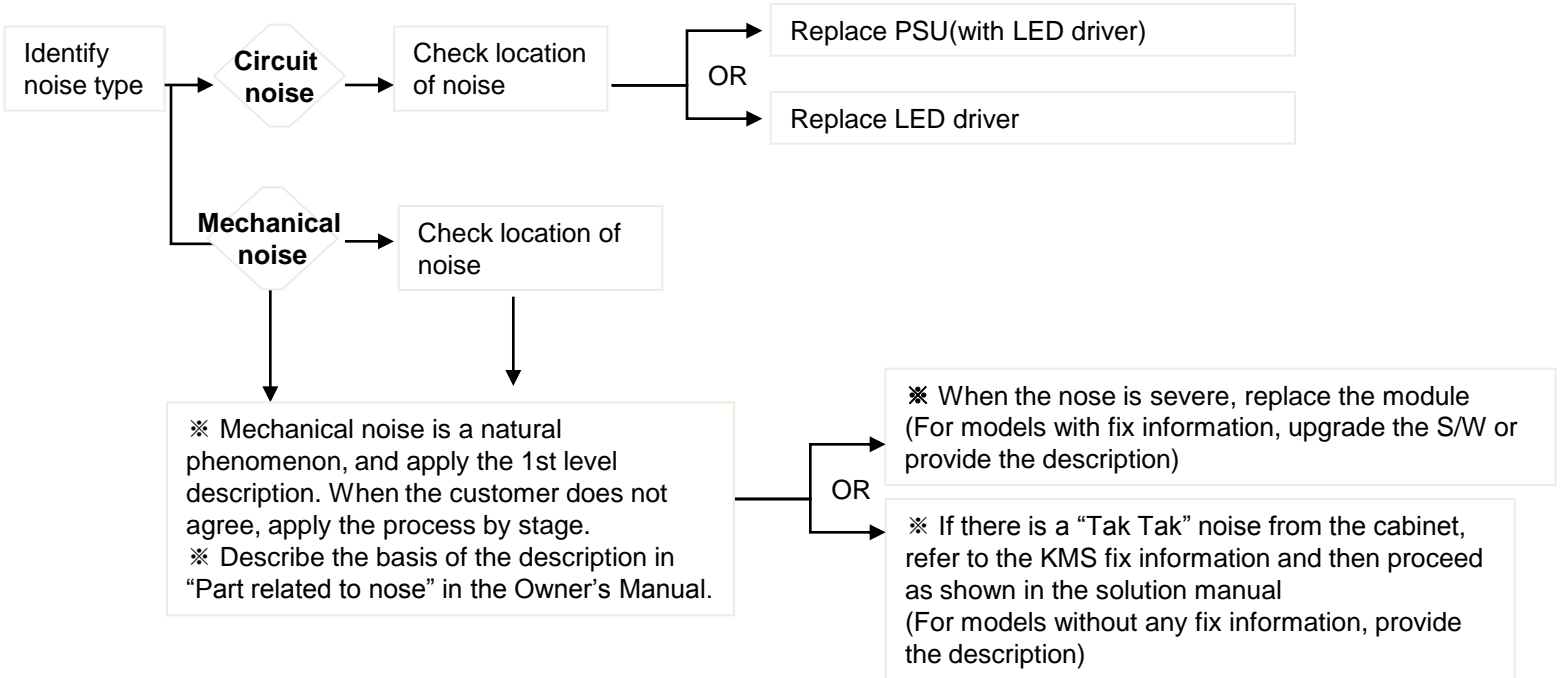
Standard Repair Process

	Error symptom	D. Function error	Established date	
		External device recognition error	Revised date	11/13



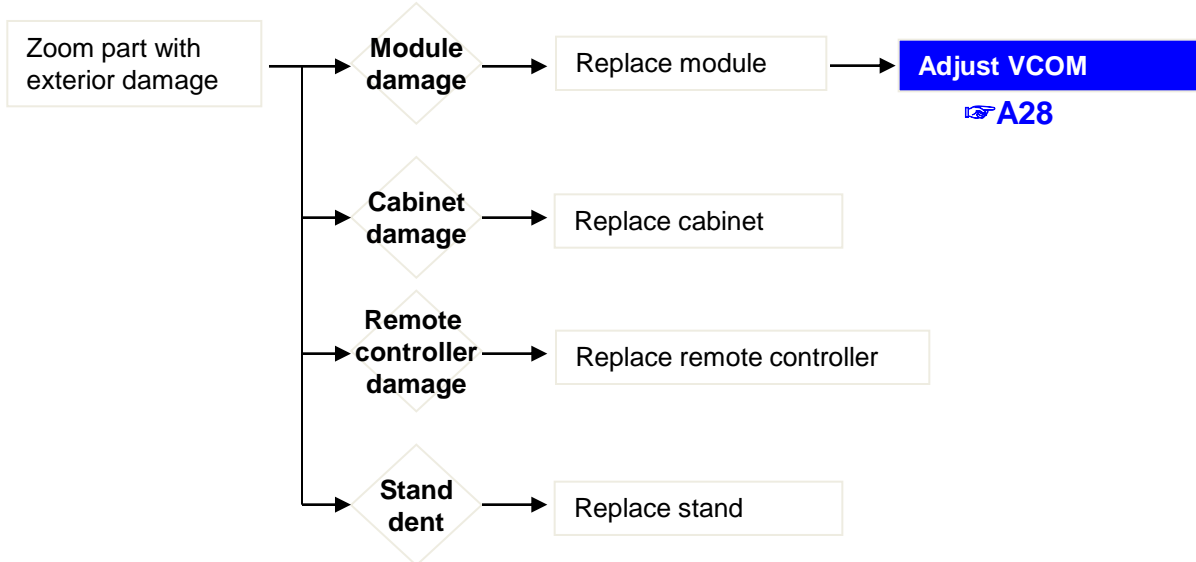
Standard Repair Process

	Error symptom	E. Noise	Established date	
		Circuit noise, mechanical noise	Revised date	12/13



Standard Repair Process

	Error symptom	F. Exterior defect	Established date		
		Exterior defect	Revised date		13/13



Contents of Standard Repair Process Detail Technical Manual

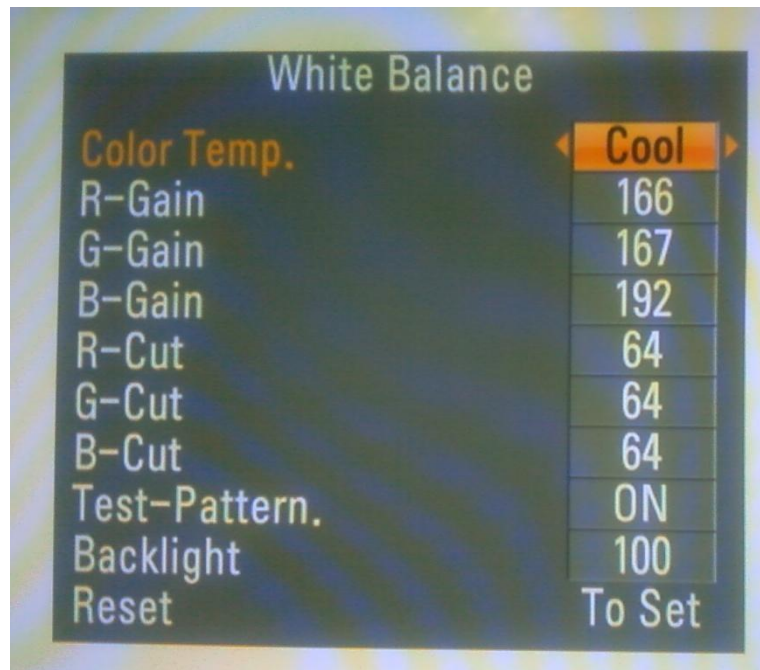
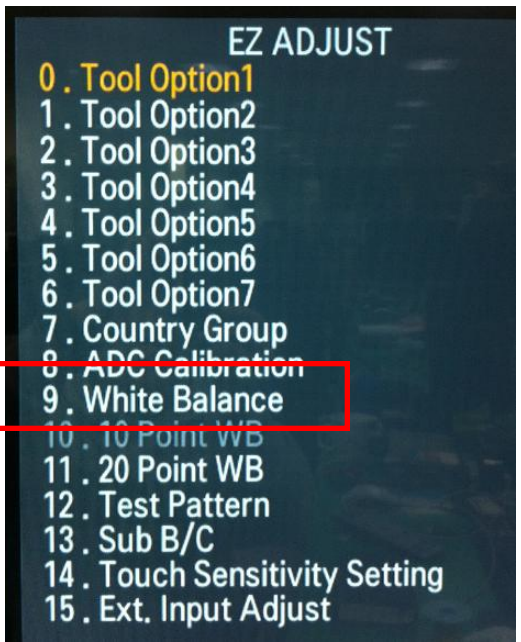
Continued from previous page

No.	Error symptom	Content	Page	Remarks
21	B. Power error_No power	Check front display LED	A17	
22		Check power input Voltage & ST-BY 3.5V	A18	
23		Checking method when power is ON	A19	
24		POWER BOARD voltage measuring method	A5	
25				
26	B. Power error_Off when on, off while viewing	POWER OFF MODE checking method	A22	
27	B. Power error_Off when on, off while viewing	POWER BOARD PIN voltage checking method	A19	
28	C. Audio error_No audio/Normal video	Checking method in menu when there is no audio	A24	
29		Voltage and speaker checking method when there is no audio	A25	
30	C. Audio error_Wrecked audio/discontinuation	Voltage and speaker checking method in case of audio error	A25	
31	D. Function error_ No response in remote controller, key error	Remote controller operation checking method	A27	
32	D. VCOM Adjustment	Sequence of the Vcom adjustment	A28	

Standard Repair Process Detail Technical Manual

Error symptom	A. Video error_No video/Normal audio	Established date		
Content	Check White Balance value	Revised date		A3

<ALL MODELS>



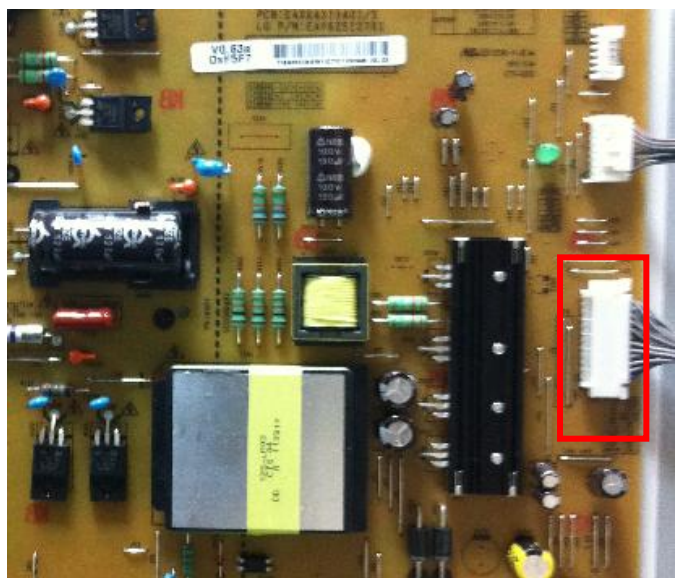
- Entry method**
1. Press the ADJ button on the remote controller for adjustment.
 2. Enter into White Balance of item 7.
 3. After recording the R, G, B (GAIN, Cut) value of Color Temp (Cool/Medium/Warm), re-enter the value after replacing the MAIN BOARD.



Standard Repair Process Detail Technical Manual

	Error symptom	A. Video error_No video/ Audio	Established date		
	Content	Power Board voltage measuring method	Revised date		A5

Check the DC 24V, 12V, 3.5V.



18 or 24 Pin (Power Board ↔ Main Board) - 공통			
SMAW200-H18/24S5 (YEONHO)			
1	PWR ON/OFF	2	INV ON
3	3.5V	4	PDIM #1
5	3.5V	6	3.5V
7	GND	8	PDIM #2
9	24V	10	24V
11	GND	12	GND
13	12V	14	12V
15	12V	16	24V or N.C
17	GND	18	GND
19	GND	20	GND
21	GND	22	L/DIMO_VS
23	L/DIMO_MOSI	24	L/DIMO-SCLK

The Wafer, 18Pin and 24Pin, is used by operating LocalDimming or not LocalDimming

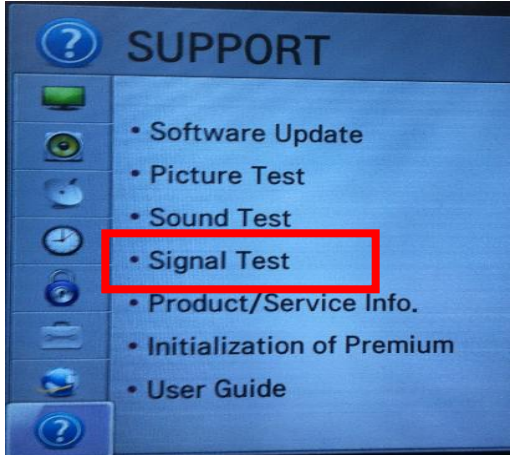
- 24Pin wafer is applied operating L/D at power and main B/D
- 18Pin wafer is applied not operating L/D at power and main B/D



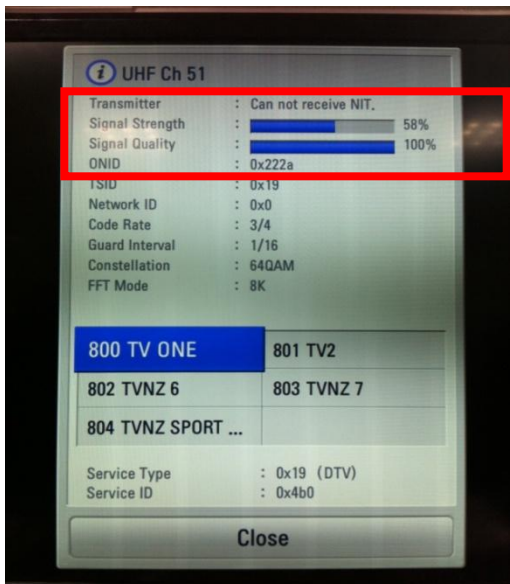
Standard Repair Process Detail Technical Manual

	Error symptom	A. Video error_Video error, video lag/stop	Established date		
	Content	TUNER input signal strength checking method	Revised date		A6

<ALL MODELS>



MENU -> Settings -> support -> signal test
-> select channel



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



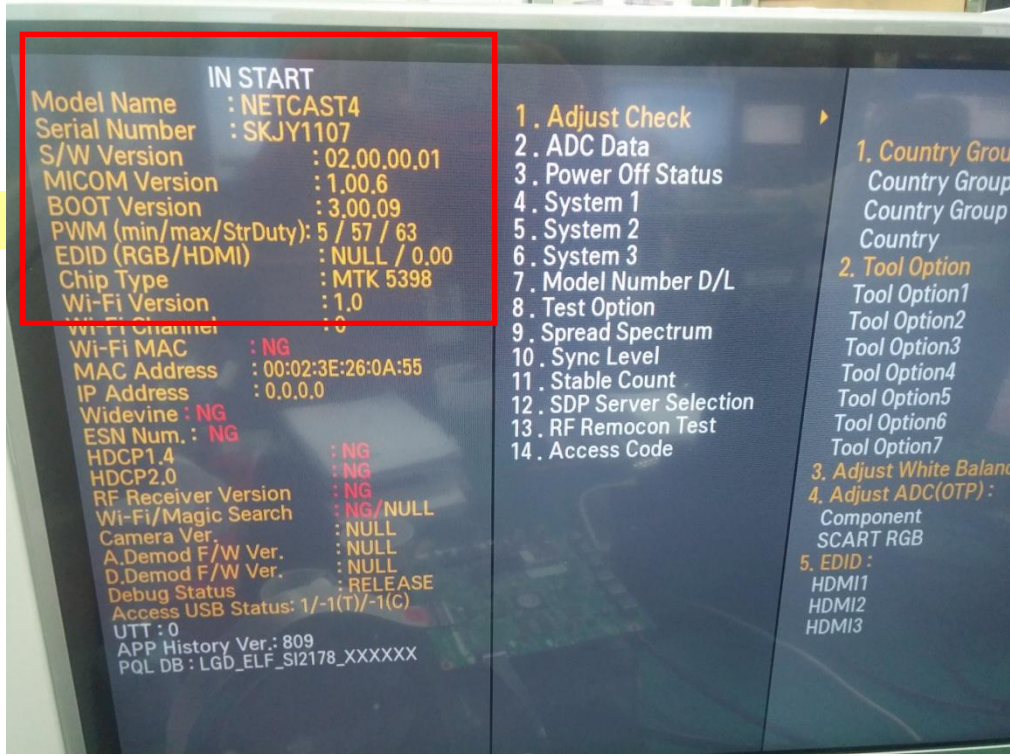
Standard Repair Process Detail Technical Manual

	Error symptom	A. Video error_Video error, video lag/stop	Established date		
	Content	LCD-TV Version checking method	Revised date		A7

<ALL MODELS>

1. Checking method for remote controller for adjustment

Version



Press the IN-START with the remote controller for adjustment



Standard Repair Process Detail Technical Manual

	Error symptom	A. Video error _Vertical/Horizontal bar, residual image, light spot	Established date		
	Content	LCD TV connection diagram (1)	Revised date		A8

<ALL MODELS>



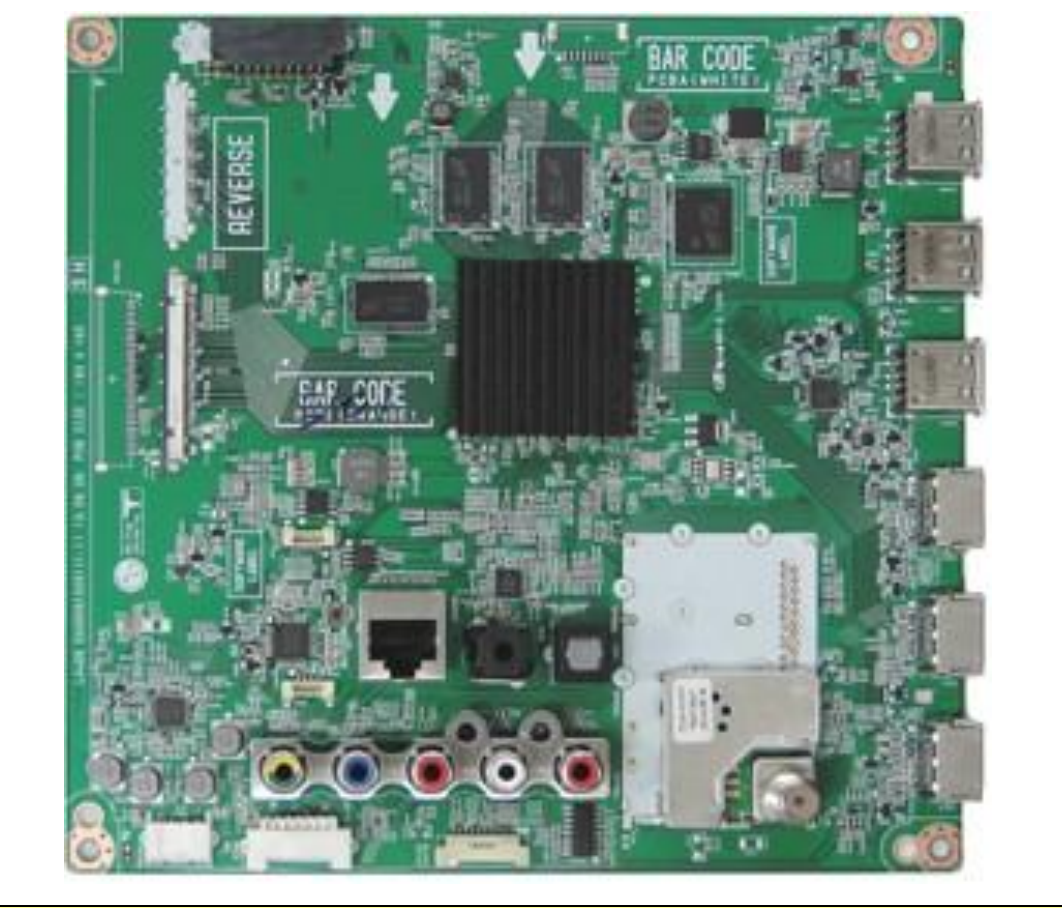
As the part connecting to the external input, check the screen condition by signal



Standard Repair Process Detail Technical Manual

Error symptom	A. Video error_Video error, video lag/stop	Established date		
Content	TUNER checking part	Revised date		A9

<ALL MODELS>



Checking method:

1. Check the signal strength or check whether the screen is normal when the external device is connected.
2. After measuring each voltage from power supply, finally replace the MAIN BOARD.(with Main to Power Cable, Speaker Cable and LVDS or EPI Cable)

Standard Repair Process Detail Technical Manual

	Error symptom	A. Video error_Color error	Established date		
	Content	Adjustment Test pattern - ADJ Key	Revised date		A12



- EZ ADJUST**
- 0. Tool Option1
 - 1. Tool Option2
 - 2. Tool Option3
 - 3. Tool Option4
 - 4. Tool Option5
 - 5. Tool Option6
 - 6. Tool Option7
 - 7. Country Group
 - 8. ADC Calibration
 - 9. White Balance
 - 10. 10 Point WB
 - 11. 20 Point WB
 - 12. Test Pattern
 - 13. Sub B/C
 - 14. Touch Sensitivity Setting
 - 15. Ext. Input Adjust

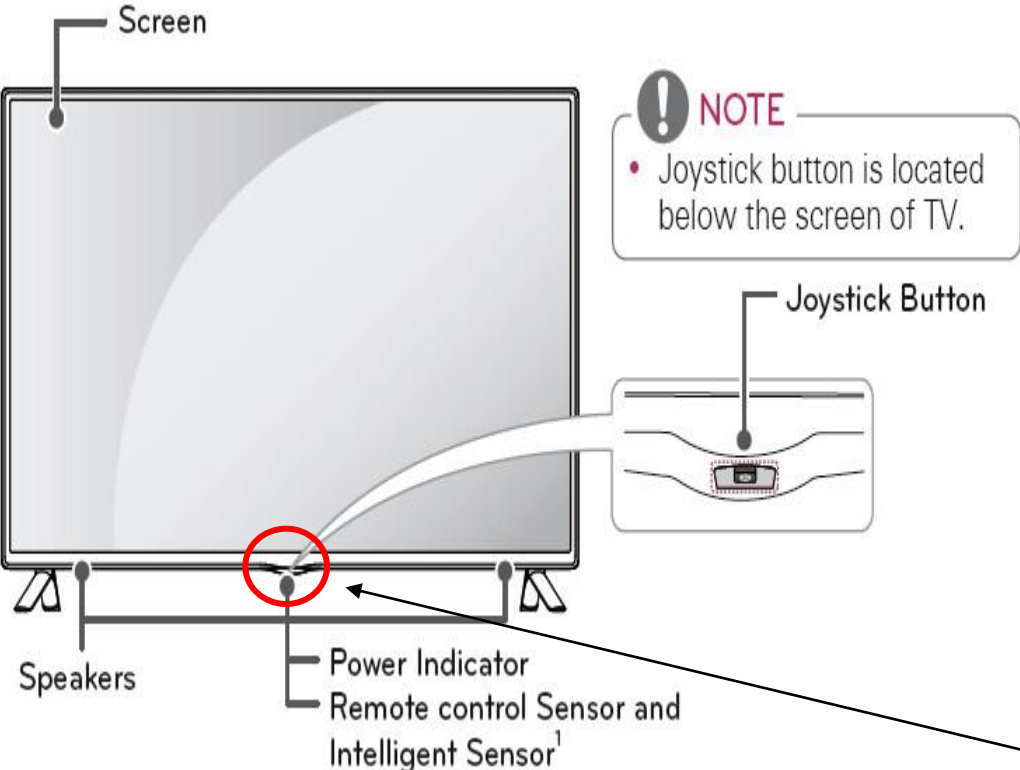


You can view 6 types of patterns using the ADJ Key
 Checking item : 1. Defective pixel 2. Residual image 3. MODULE error (ADD-BAR,SCAN BAR..)
 4.Video error (Classification of MODULE or Main-B/D!)



Standard Repair Process Detail Technical Manual

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



Front LED control :
Menu → Option → LG Logo Light
→ Brightness and Duration

ST-BY condition: Red or Logo Light ON
Power ON condition: OFF or User Settings

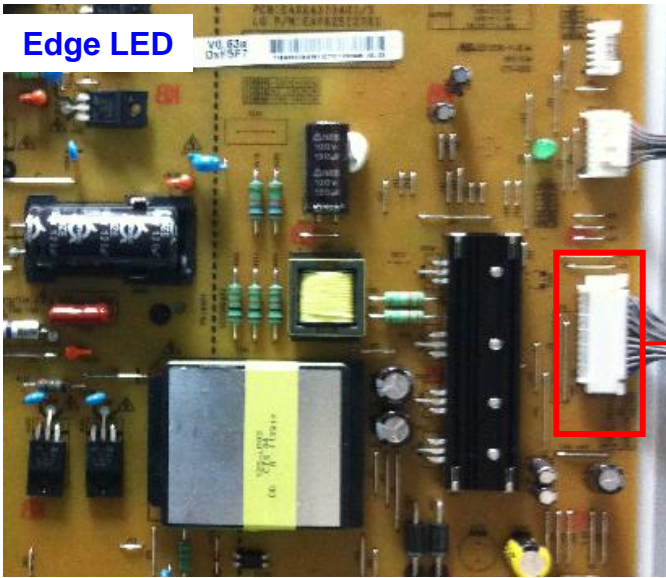


Standard Repair Process Detail Technical Manual

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

A18

For 13' models, there is no voltage out for st-by purpose.
When st-by, only 3.5V is normally on.



18 or 24 Pin (Power Board ↔ Main Board) - 공통			
FREE LGP-14PL1-IT			
1	PWR ON/OFF	2	INV ON
3	3.5V	4	PDIM #1
5	3.5V	6	GND
7	GND	8	PDIM #2
9	24V	10	24V
11	GND	12	GND
13	12V	14	12V
15	12V	16	24V or N.C
17	GND	18	GND
19	GND	20	GND
21	GND	22	L/DIMO_VS
23	L/DIMO_MOSI	24	L/DIMO_SCLK

The Wafer, 18Pin and 24Pin, is used by operating LocalDimming or not LocalDimming

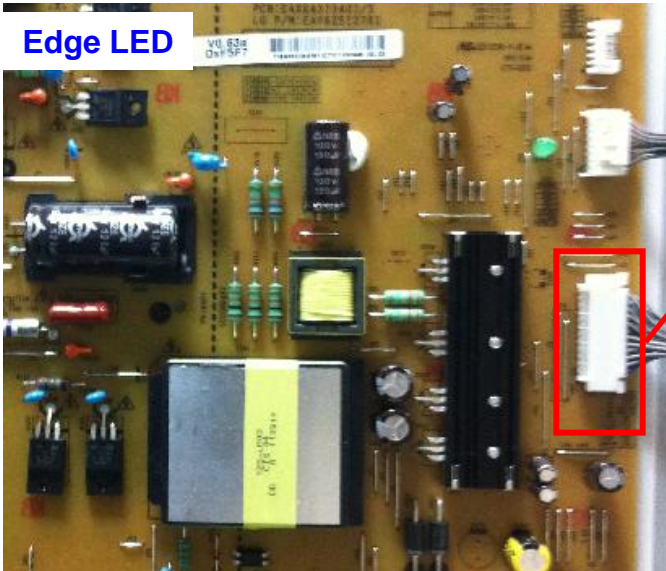
- 24Pin wafer is applied operating L/D at power and main B/D
- 18Pin wafer is applied not operating L/D at power and main B/D



Standard Repair Process Detail Technical Manual

	Error symptom	B. Power error _No power	Established date		
	Content	Checking method when power is ON	Revised date		A19

Check "power on" pin is high



18 or 24 Pin (Power Board ↔ Main Board) - 공통			
FREE LGP-14PL1-IT			
1	PWR ON/OFF	2	INV ON
3	3.5V	4	PDIM #1
5	3.5V	6	3.5V
7	GND	8	PDIM #2
9	24V	10	24V
11	GND	12	GND
13	12V	14	12V
15	12V	16	24V or N.C
17	GND	18	GND
19	GND	20	GND
21	GND	22	L/DIMO_VS
23	L/DIMO_MOSI	24	L/DIMO_SCLK

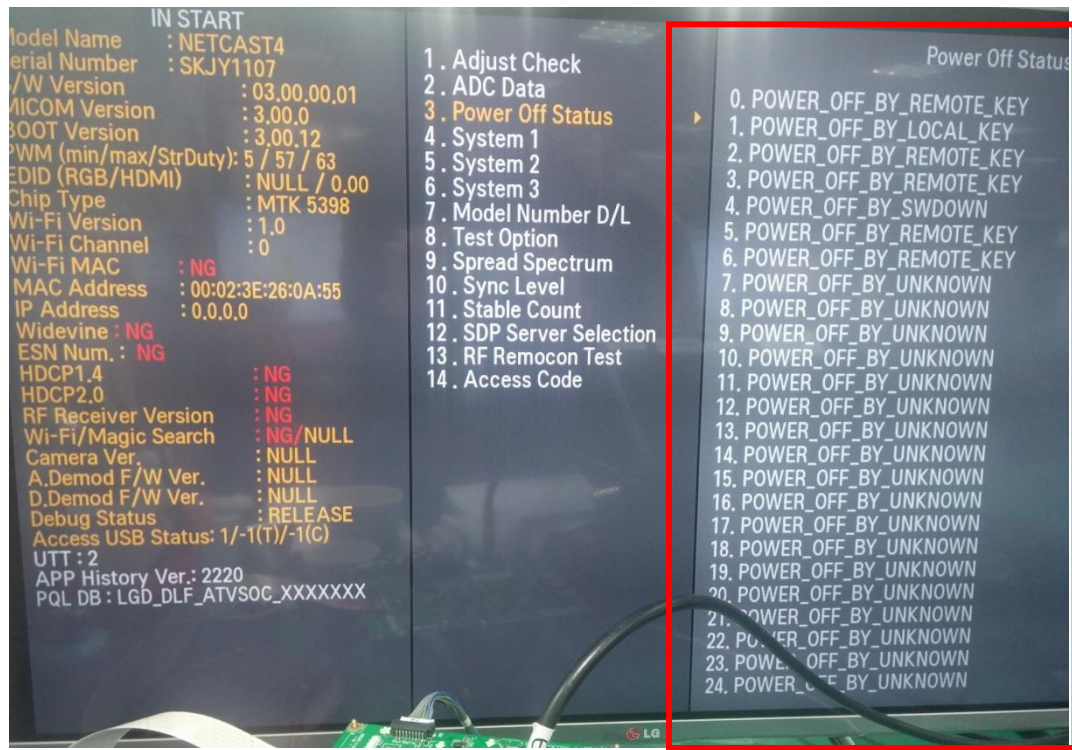
The Wafer, 18Pin and 24Pin, is used by operating LocalDimming or not LocalDimming

- 24Pin wafer is applied operating L/D at power and main B/D
- 18Pin wafer is applied not operating L/D at power and main B/D

Standard Repair Process Detail Technical Manual

	Error symptom	B. Power error _Off when on, off whiling viewing	Established date		
	Content	POWER OFF MODE checking method	Revised date		A22

<ALL MODELS>



Entry method

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



Standard Repair Process Detail Technical Manual

	Error symptom	C. Audio error_No audio/Normal video	Established date		
	Content	Checking method in menu when there is no audio	Revised date		A24

<ALL MODELS>



Checking method

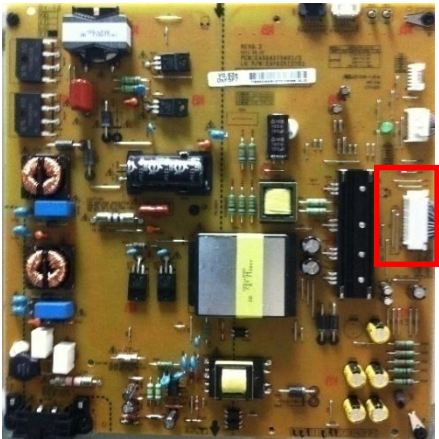
1. Press the MENU button on the remote controller
2. Select the SOUND function of the Menu
3. Select TV Speaker from Others



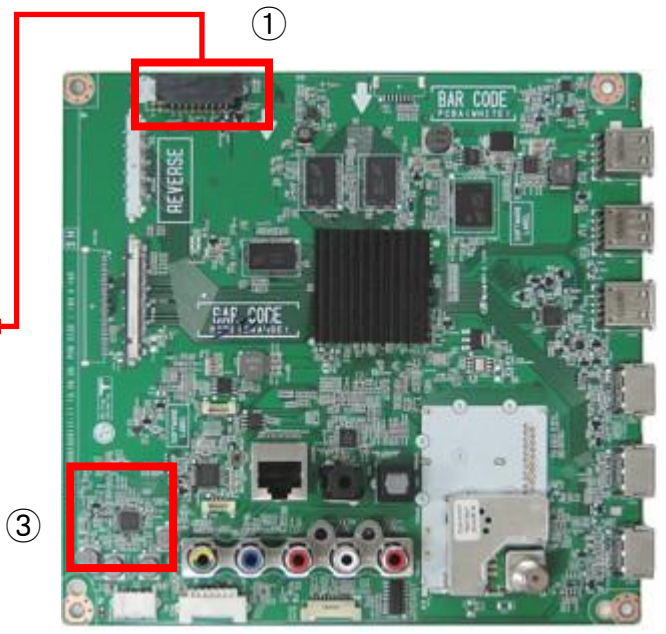
Standard Repair Process Detail Technical Manual

	Error symptom	C. Audio error_No audio/Normal video	Established date	
	Content	Voltage and speaker checking method when there is no audio	Revised date	A25

<ALL MODELS>



18 or 24 Pin (Power Board ↔ Main Board) - $\frac{1}{10}$			
② FREE LGP-14PL1-IT			
1	PWR ON/OFF	2	INV ON
3	3.5V	4	PDIM #1
5	3.5V	6	3.5V
7	GND	8	PDIM #2
9	24V	10	24V
11	GND	12	GND
13	12V	14	12V
15	12V	16	24V or N.C
17	GND	18	GND
19	GND	20	GND
21	GND	22	L/DIMO_VS
23	L/DIMO_MOSI	24	L/DIMO_SCLK



The Wafer, 18Pin and 24Pin, is used by operating LocalDimming or not LocalDimming

- 24Pin wafer is applied operating L/D at power and main B/D
- 18Pin wafer is applied not operating L/D at power and main B/D

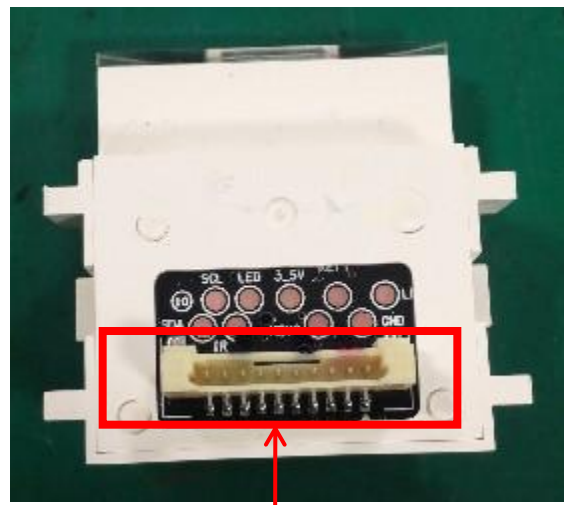
Checking order when there is no audio

- ① Check the contact condition of or 24V connector of Main Board
- ② Measure the 24V input voltage supplied from Power Board (If there is no input voltage, remove and check the connector)
- ③ Connect the tester RX1 to the speaker terminal and if you hear the "Chik Chik" sound when you touch the GND and output terminal, the speaker is normal.

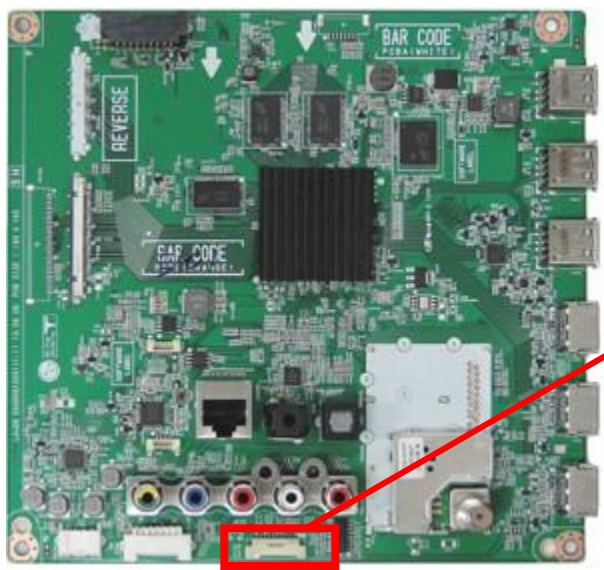
Standard Repair Process Detail Technical Manual

	Error symptom	D. Function error_ No response in remote controller, key error	Established date		
	Content	Remote controller operation checking method	Revised date		A27

<ALL MODELS>



①



②

P4102	
1	GND
2	KEY1
3	KEY2
4	+3.5V_ST
5	GND
6	LOGO/LED_R
7	IR
8	GND
9	EYE_SCL
10	EYE_SDA

③

④

Checking order

- 1, 2. Check IR cable condition between IR & Main board.
3. Check the st-by 3.5V on the terminal 6.
4. When checking the Pre-Amp when the power is in ON condition, it is normal when the Analog Tester needle moves slowly, and defective when it does not move at all.



Standard Repair Process Detail Technical Manual

	Error symptom	D. VCOM Adjustment	Established date		
	Content	Sequence of the Vcom adjustment	Revised date		A28

1. Case

- LCD module change
- T-Con board change

2. Equipment

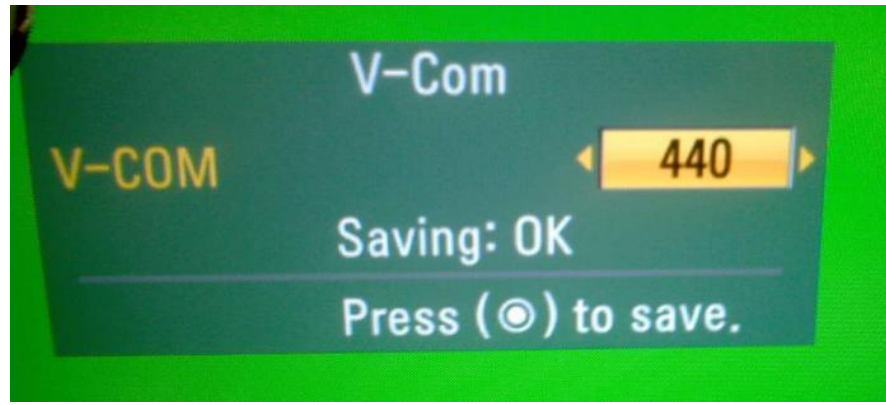
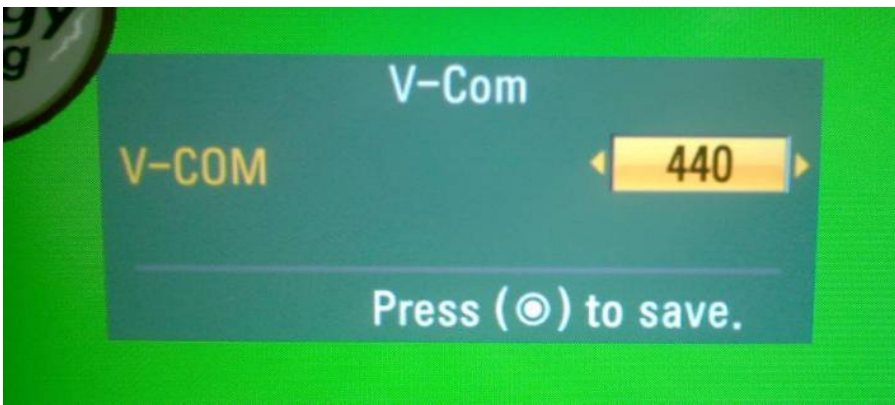
- Service Remote controller

3. Adjust sequence

- Press the 'adj' key
- select V-COM
- As pushing the right or the left button on the remote controller, And find the V-COM value Which is no or minimized the Flicker.

(If there is no flicker at default value, Press the exit key and finish the VCOM adjustment.)

- Push the OK key to store the value. Then the message "Saving: OK" is pop.
- Press the exit key to finish V-COM adjustment.



Appendix : Power OFF History

Status	Power off List	Explanation
Normal	POWER_OFF_BY_REMOTE KEY	POWER_OFF_BY_REMOTE CONTROL
	POWER_OFF_BY_OFF_TIMER	POWER_OFF_BY_OFF TIMER
	POWER_OFF_BY_SLEEP_TIMER	POWER_OFF_BY_SLEEP TIMER
	POWER_OFF_BY_TS_END	POWER_OFF_BY_REMOTE or LOCAL KEY While recording
	POWER_OFF_BY_INSTOP_KEY	POWER_OFF_BY_INSTOP KEY
	POWER_OFF_BY_AUTO_OFF	POWER_OFF_BY_AUTO OFF
	POWER_OFF_BY_ON_TIMER	POWER_OFF_BY_ON TIMER
	POWER_OFF_BY_RS232C	POWER_OFF_BY_RS232C
	POWER_OFF_BY_RESREC	POWER_OFF_BY_Reserved Record
	POWER_OFF_BY_RECEND	POWER_OFF_BY_End of Recording
	POWER_OFF_BY_SWDOWN	POWER_OFF_BY_S/W Download
	POWER_OFF_BY_LOCAL_KEY	POWER_OFF_BY_LOCAL KEY
	POWER_OFF_BY_OTA	POWER_OFF_BY_End of OTA
	POWER_OFF_BY_SIGNAL_DETECT	POWER_OFF_BY_Another MICOM (Only OLED)
	POWER_OFF_BY_RESET	POWER_OFF_BY_Factory Reset
POWER_OFF_BY_UNKNOWN	POWER_OFF_BY_unknown status except listed case	
Abnormal	POWER_OFF_BY_ABN	POWER_OFF_BY_abnormal Panel status
	POWER_OFF_BY_KEY_TIMEOUT	POWER_OFF_BY_abnormal Power Off Key At Warm/Hot status
	POWER_OFF_BY_ACDT	POWER_OFF_BY_AC OFF
	POWER_OFF_BY_5VMNT	POWER_OFF_BY_AC DETECT
	POWER_OFF_BY_NO_POLLING	POWER_OFF_BY_MCU Abnormal for 15 sec.
	POWER_OFF_BY_1SEC_POWER_OFF	POWER_OFF_BY_MCU Abnormal status with Power Off Key
	POWER_OFF_BY_20VMNT	POWER_OFF_BY_abnormal Panel status (Only OLED)



Appendix : Exchange T-Con Board (1)



Solder defect, CNT Broken



Solder defect, CNT Broken



Solder defect, CNT Broken



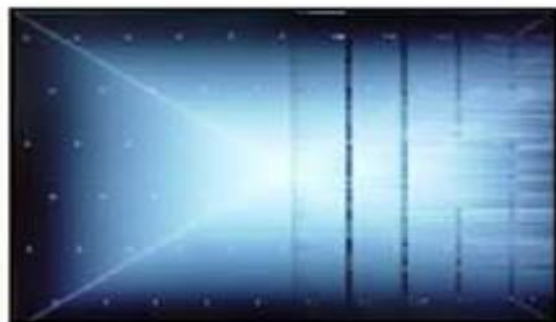
Solder defect, CNT Broken



Solder defect, CNT Broken



Abnormal Power Section



Solder defect, Short/Crack



Abnormal Power Section



Solder defect, Short/Crack

Appendix : Exchange T-Con Board (2)



Abnormal Power Section



Abnormal Power Section



Solder defect, Short/Crack



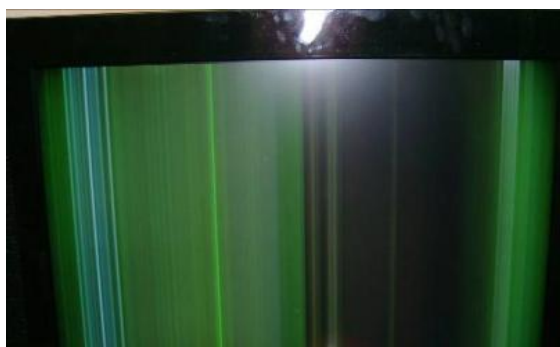
Solder defect, Short/Crack



Fuse Open, Abnormal power section



Abnormal Display



GRADATION



Noise



GRADATION

Appendix : Exchange PSU(LED driver)



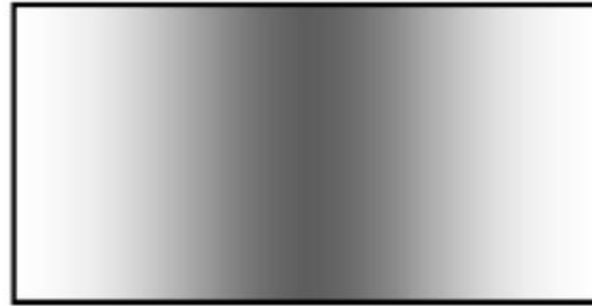
No Light



Dim Light



Dim Light



Dim Light



No picture/Sound Ok

Appendix : Exchange the Module (1)



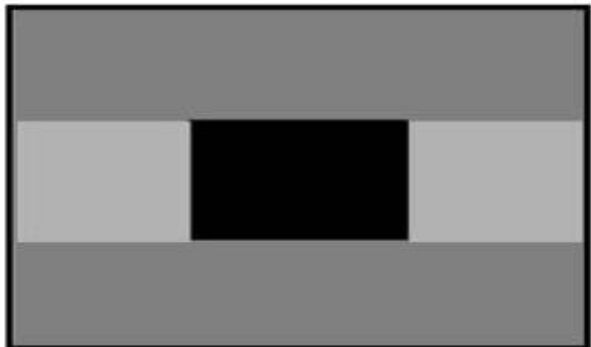
Panel Mura, Light leakage



Panel Mura, Light leakage



Press damage



Crosstalk



Press damage



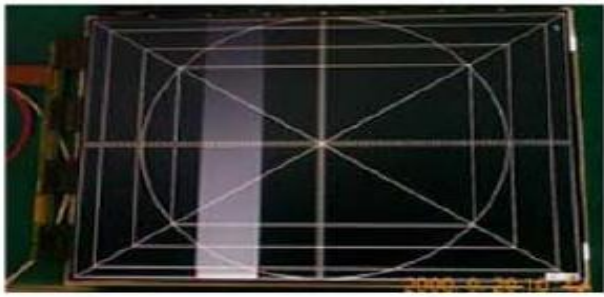
Crosstalk

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



Press damage

Appendix : Exchange the Module (2)



Vertical Block
Source TAB IC Defect



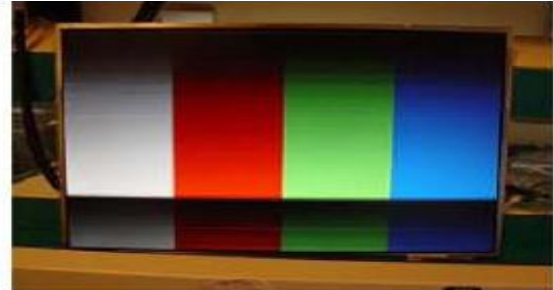
Vertical Line
Source TAB IC Defect



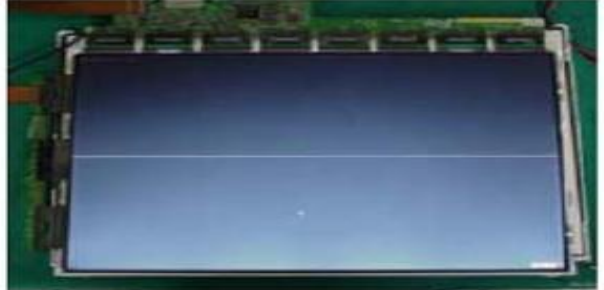
Vertical Block
Source TAB IC Defect



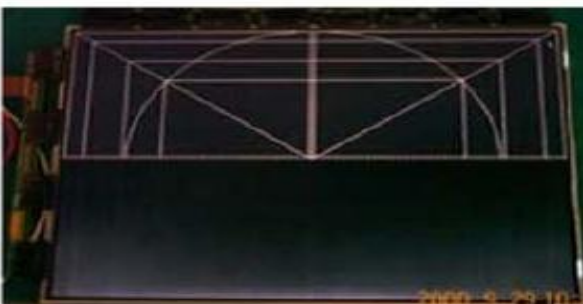
Horizontal Block
Gate TAB IC Defect



Horizontal Block
Gate TAB IC Defect



Horizontal line
Gate TAB IC Defect



Horizontal Block
Gate TAB IC Defect

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