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LED TV

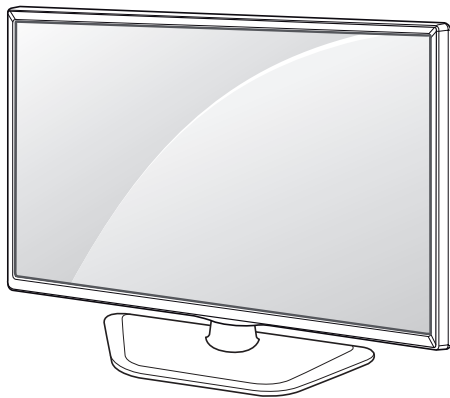
SERVICE MANUAL

CHASSIS : LJ36B

MODEL : 42LN5460 42LN5460-SM

CAUTION

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



P/NO : MFL67711911 (1309-REV00)

Printed in Korea

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SAFETY PRECAUTIONS

IMPORTANT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These parts are identified by $\triangle$ 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.

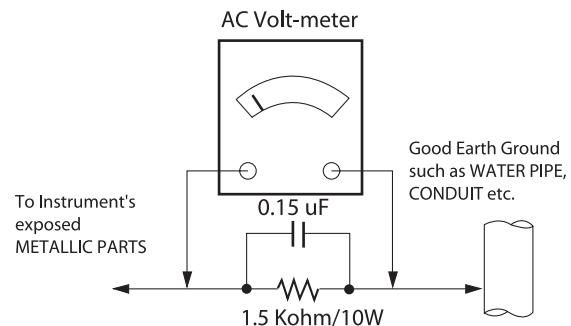
Connect 1.5 K / 10 watt resistor in parallel with a 0.15 μ F capacitor between a known good earth ground (Water Pipe, Conduit, etc.) and the exposed metallic parts.

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 or 500 °F to 600 °F.
2. Use an appropriate gauge of RMA resin-core solder composed of 60 parts tin/40 parts lead.
3. Keep the soldering iron tip clean and well tinned.
4. Thoroughly clean the surfaces to be soldered. Use a mall wire-bristle (0.5 inch, or 1.25 cm) brush with a metal handle. Do not use freon-propelled spray-on cleaners.
5. Use the following unsoldering technique
 - a. Allow the soldering iron tip to reach normal temperature. (500 °F to 600 °F)
 - b. Heat the component lead until the solder melts.
 - c. Quickly draw the melted solder with an anti-static, suction-type solder removal device or with solder braid.

CAUTION: Work quickly to avoid overheating the circuit board printed foil.
6. Use the following soldering technique.
 - a. Allow the soldering iron tip to reach a normal temperature (500 °F to 600 °F)
 - b. First, hold the soldering iron tip and solder the strand against the component lead until the solder melts.
 - c. Quickly move the soldering iron tip to the junction of the component lead and the printed circuit foil, and hold it there only until the solder flows onto and around both the component lead and the foil.

CAUTION: Work quickly to avoid overheating the circuit board printed foil.
 - d. Closely inspect the solder area and remove any excess or splashed solder with a small wire-bristle brush.

IC Remove/Replacement

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

Removal

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

Replacement

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

"Small-Signal" Discrete Transistor

Removal/Replacement

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

Power Output, Transistor Device

Removal/Replacement

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

Diode Removal/Replacement

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

Fuse and Conventional Resistor

Removal/Replacement

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

3. Solder the connections.

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

Circuit Board Foil Repair

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

At IC Connections

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

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

At Other Connections

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

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

SPECIFICATION

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

1. Application range

This spec sheet is applied all of the 32", 42", 47", 50" LED TV with LJ31B/LJ36B chassis.

3. Test method

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

2. Test condition

Each part is tested as below without special notice.

- 1) Temperature : 25 °C ± 5 °C, CST : 40 °C±5 °C
- 2) Relative Humidity: 65 % ± 10 %
- 3) Power Voltage
 - Standard input voltage (100~240V@ 50/60Hz)
 - * Standard Voltage of each products is marked by models.
- 4) Specification and performance of each parts are followed each drawing and specification by part number in accordance with BOM.
- 5) The receiver must be operated for about 20 minutes prior to the adjustment.

4. General Specification

No	Item	Specification	Measurement	Result	Remark
1.	Receiving System	1) SBTVD / NTSC / PAL-M / PAL-N			
2.	Available Channel	1) VHF : 02~13 2) UHF : 14~69 3) CATV : 01~135			
3.	Input Voltage	1) AC 100 ~ 240V 50/60Hz			
4.	Market	Central and South AMERICA			
5.	Screen Size	32 inch Wide (1366 × 768)			32LN540B-SH/SA 32LA613B-SB 32LN520B-SA 32LN536B-SI 32LN546B-SM
		32 inch Wide (1920 × 1080)			32LN5400-SB/SA
		39 inch Wide (1920 × 1080)			39LN5400-SB/SA
		42 inch Wide (1920 × 1080)			42LN5400-SB/SA 42LA6130-SB 42LN5200-SA 42LN5460-SM
		47 inch Wide (1920 × 1080)			47LN5400-SB/SA 47LA6130-SB 47LM5460-SM
		50 inch Wide (1920 × 1080)			50LN5400-SB/SA
		50 inch Wide (1920 × 1080)			55LN5400-SB/SA
6.	Aspect Ratio	16:9			
7.	Tuning System	FS			

No	Item	Specification	Measurement	Result	Remark
8.	Module	LC320DXE-SFR5	HD, 60Hz	LGD	32LN520B-SA
		HC320DXN-SLFG1	HD, 60Hz	LGD	32LN536B-SI
		HC320DXN-SLFA1	HD, 60Hz	LGD	32LN546B-SM
		LC320DXE-SFR1	HD, 60Hz	LGD	32LN540B-SH/SA
		LC320DUE-SFR1	FHD, 60Hz	LGD	32LN5400-SB/SA
		HC390DUN-VCFP1	FHD, 60Hz	CMI	39LN5400-SB/SA
		T390HVN02.2	FHD, 60Hz	AUO	39LN5400-SB/SA
		LC420DUE-SFR5	FHD, 60Hz	LGD	42LN5200-SA
		HC420DUN-SLFA1	FHD, 60Hz	LGD	42LN5460-SM
		LC420DUE-SFR1	FHD, 60Hz	LGD	42LN5400-SB/SA
		T420HVN05.0	FHD, 60Hz	AUO	42LN5400-SB/SA
		LC470DUE-SFR1	FHD, 60Hz	LGD	47LN5400-SB/SA
			FHD, 60Hz	LGD	47LN5460-SM
		LC500DUE-SFR2	FHD, 60Hz	LGD	50LN5400-SB/SA
		LC550DUJ-SEE1	FHD, 60Hz	LGD	55LN5400-SB/SA
		LC320DXE-SFU2	HD, 60Hz	LGD	32LA613B-SB
		LC420DUE-SFU2	FHD, 60Hz	LGD	42LA6130-SB
		LC470DUE-SFU2	FHD, 60Hz	LGD	47LA6130-SB
9.	Operating Environment	1) Temp : 0 ~ 40 deg 2) Humidity : ~ 80 %			
10.	Storage Environment	1) Temp : -20 ~ 60 deg 2) Humidity : ~ 85 %			

5. External Input Support Format

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

No	Resolution	H-freq(kHz)	V-freq.(kHz)	Pixel clock	Proposed
1.	720*576	15.625	50.000	13.5	SDTV 576I
2.	720*480	15.73	60	13.5135	SDTV ,DVD 480I
3.	720*480	15.73	59.94	13.5	SDTV ,DVD 480I
4.	720*480	31.50	60	27.027	SDTV 480P
5.	720*480	31.47	59.94	27.0	SDTV 480P
6.	720*576	31.250	50.000	27.000	SDTV 576P
7.	1280*720	37.500	50.000	74.25	HDTV 720P
8.	1280*720	45.00	60.00	74.25	HDTV 720P
9.	1280*720	44.96	59.94	74.176	HDTV 720P
10.	1920*1080	28.125	50.00	74.250	HDTV 1080I
11.	1920*1080	33.75	60.00	74.25	HDTV 1080I
12.	1920*1080	33.72	59.94	74.176	HDTV 1080I
13.	1920*1080	56.250	50.00	148.50	HDTV 1080P
14.	1920*1080	67.500	60.00	148.50	HDTV 1080P
15.	1920*1080	67.432	59.939	148.352	HDTV 1080P
16.	1920*1080	27.000	24.000	74.25	HDTV 1080P
17.	1920*1080	26.97	23.976	74.176	HDTV 1080P
18.	1920*1080	33.75	30.000	74.25	HDTV 1080P
19.	1920*1080	33.71	29.97	74.176	HDTV 1080P

5.2. HDMI Input (PC/DTV)

*HDMI PC support only Rear HDMI Input

*If use DVI to HDMI cable for PC, you have to use external SPK for PC audio sound.

No	Resolution	H-freq(kHz)	V-freq.(Hz)	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	80.00	VESA	O
7.	1360*768	47.712	60.015	85.50	VESA (WXGA)	O
8.	1280*1024(FHD Only)	63.981	60.02	108.00	VESA (SXGA)	O
9.	1920*1080(FHD Only)	67.5	60	148.5	HDTV 1080P	O
	DTV					
1.	720*480	31.469	59.940	27.000	SDTV 480P	
2.	720*480	31.500	60.000	27.027	SDTV 480P	
3.	720*576	31.250	50.000	27.000	SDTV 576P	
4.	1280*720	37.500	50.000	74.25	HDTV 720P	
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	28.125	50.000	74.25	HDTV 1080I	
8.	1920*1080	33.75	60.00	74.25	HDTV 1080I	
9.	1920*1080	33.72	59.94	74.176	HDTV 1080I	
10.	1920*1080	56.250	50.000	148.50	HDTV 1080P	
11.	1920*1080	67.500	60.00	148.50	HDTV 1080P	
12.	1920*1080	67.432	59.94	148.352	HDTV 1080P	
13.	1920*1080	27.000	24.000	74.25	HDTV 1080P	
14.	1920*1080	26.97	23.976	74.176	HDTV 1080P	
15.	1920*1080	33.75	30.00	74.25	HDTV 1080P	
16.	1920*1080	33.71	29.97	74.176	HDTV 1080P	

※ HDMI Monitor Range Limits

Min Vertical Freq - 58 Hz

Max Vertical Freq - 62 Hz

Min Horiz. Freq - 30 kHz

Max Horiz. Freq - 83 kHz

Pixel Clock - 160 MHz

ADJUSTMENT INSTRUCTION

1. Application

This spec sheet is applied all of the LCD TV with LJ31B, LJ36B, LJ36M chassis.

2. Designation

- (1) The adjustment is according to the order which is designated and which must be followed, according to the plan which Unit: Product Specification Standard.
- (2) Power adjustment : Free Voltage.
- (3) Magnetic Field Condition: Nil.
- (4) Input signal Unit: Product Specification Standard.
- (5) Reserve after operation: Above 5 Minutes (Heat Run).
Temperature : at 25 °C±5 °C
Relative humidity : 65 ± 10%
Input voltage : 100~220V, 50/60Hz
- (6) Adjustment equipments : Color Analyzer (CA-210 or CA-110), SVC remote controller
- (7) Push The "IN STOP KEY" – For memory initialization.

Case1 : Software version up

- 1) After downloading S/W by USB , TV set will reboot automatically
- 2) Push "In-stop" key
- 3) Push "Power on" key
- 4) Function inspection
- 5) After function inspection, Push "In-stop" key.

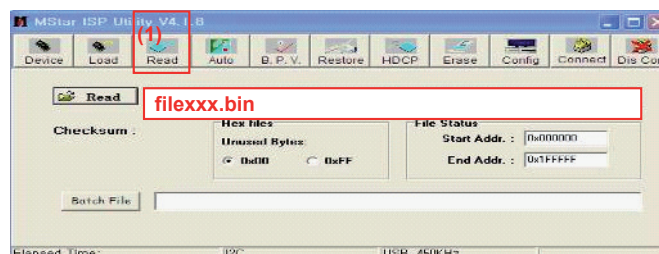
Case2 : Function check at the assembly line

- 1) When TV set is entering on the assembly line, Push "In-stop" key at first.
- 2) Push "Power on" key for turning it on.
=> If you push "Power on" key, TV set will recover channel information by itself.
- 3) After function inspection, Push "In-stop" key.

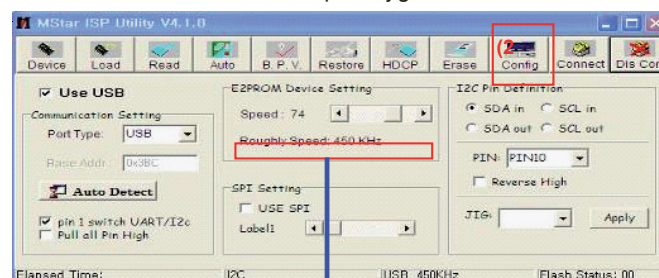
3. Main PCB check process

- * APC – After Manual-Insert, executing APC
- * Boot file Download

- (1) Execute ISP program "Mstar ISP Utility" and then click "Config" tab.
- (2) Set as below, and then click "Auto Detect" and check "OK" message.
If "Error" is displayed, Check connection between computer, jig, and set.
- (3) Click "Read" tab, and then load download file (XXXX.bin) by clicking "Read"

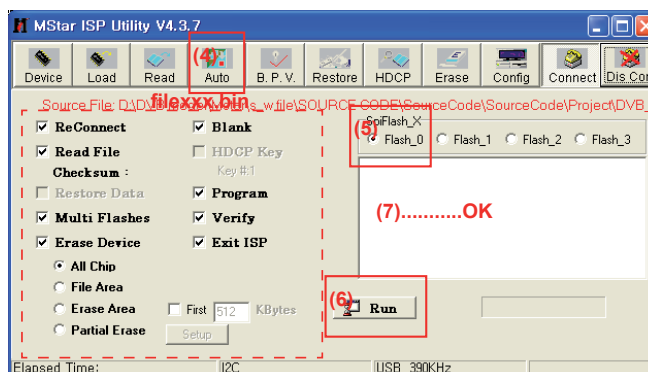


- (4) Click "Connect" tab. If "Can't " is displayed, Check connection between computer, jig, and set.



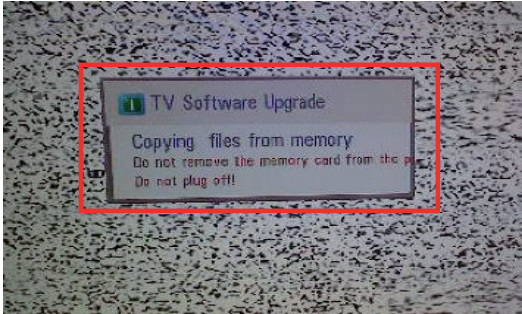
Please Check the Speed
To use speed between
from 200KHz to 400KHz

- (5) Click "Auto" tab and set as below.
- (6) Click "Run".
- (7) After downloading, check "OK" message.

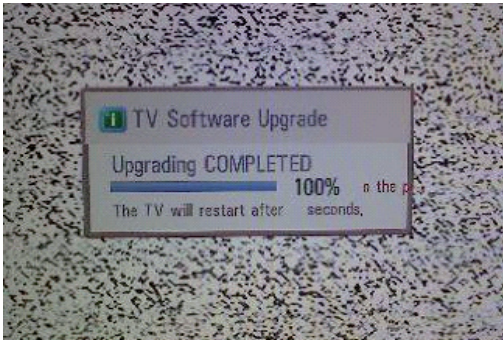
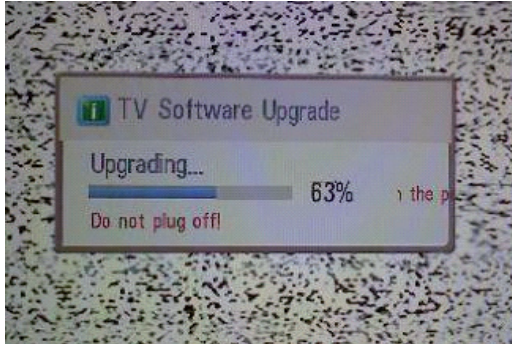


* USB DOWNLOAD(*.epk file download)

- (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 Low, it didn't work. But your downloaded version is High, USB data is automatically detecting
- (3) Show the message "Copying files from memory"



- (4) Updating is starting.



- (5) After updating is complete, The TV will restart automatically.
 - (6) If TV turns on, check your updated version and Tool option.
(refer to the next page about tool option)
- * If downloading version is higher 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 controller.
- (2) Select "Tool Option 1" and Push "OK" button.
- (3) Punch in the number. (Each model has their number.)
- (4) Completed selecting Tool option.

Model	Module	Tool option1	Tool option2	Tool option3	Tool option4	Tool option5	Tool option6
32LA613B-SB	LGD	84	2440	32669	46344	47108	97
42LA6130-SB	LGD	87	2440	32669	46344	47108	97
47LA6130-SB	LGD	88	2440	32669	46344	47108	97
32LN540B-SH/SA	LGD	20	2440	16281	13576	43012	17
32LN5400-SB/SA	LGD	20	2440	16281	13576	43012	17
39LN5400-SB/SA	CMI	2070	2440	16153	13576	43012	17
39LN5400-SB/SA	AUO	4118	2440	16153	13576	43012	17
42LN5400-SB/SA	LGD	23	2440	16281	13576	43012	17
42LN5400-SB/SA	AUO	4119	2440	16153	13576	43012	17
47LN5400-SB/SA	LGD	24	2440	16281	13576	43012	17
50LN5400-SB/SA	LGD	25	2440	16281	13576	43012	17
55LN5400-SB/SA	LGD	26	2440	16153	13576	59396	17
32LN536B-SI	LGD						
32LN520B-SA	LGD						
42LN5200-SA	LGD						
32LN546B-SM	LGD	132	426	16153	13576	10244	273
42LN5460-SM	LGD						
47LN5460-SM	LGD	POLA					

* RS-232C Connection Method

Connection : PCBA (USB Port) -> USB to Serial Adapter (UC-232A) -> RS-232C cable -> PC(RS-232C port)

▪ Product name of USB to Serial Adapter is UC-232A.

※ Caution: LJ31* chassis support only UC-232A driver. (only use this one.)



4. Total Assembly line process

4.1. Adjustment Preparation

■ W/B Equipment condition

CA210 : CH14, Test signal : Inner pattern (80IRE) – in case of LED back light

■ Above 5 minutes H/run in the inner pattern. ("power on" key of adjust remote control)

► The spec of color temperature and coordinate

Model	Mode	Color Temp	Color coordinate	Remark
All	Cool (C50)	13,000k	x = 0.271 (±0.002) y = 0.270 (±0.002)	※ Test signal - Inner pattern for W/B adjust - External white pattern (80IRE, 204gray)
	Medium (0)	9,300k	x = 0.286 (±0.002) y = 0.289 (±0.002)	
	Warm (W50)	6,500k	x = 0.313 (±0.002) y = 0.329 (±0.002)	

► CA210 : CH 14, Test signal : Inner pattern (80IRE)

- Standard color coordinate and temperature using CA-1000 (by H/R time)

■ Normal line

model: (normal line)LN5xxx, LA6xxx, LA7xxx, LA8xxx

H/R Time(Min)		Cool		Medium		Warm	
		x	y	x	x	y	x
		271	270	286	289	313	329
1	0-2	283	287	298	306	322	342
2	3-5	282	285	297	304	321	340
3	6-9	281	284	296	303	320	339
4	10-19	279	281	294	300	318	336
5	20-35	277	277	292	296	316	332
6	36-49	275	274	290	293	314	329
7	50-79	273	272	288	291	312	327
8	80-119	272	271	287	290	311	326
9	Over 120	271	270	286	289	310	325

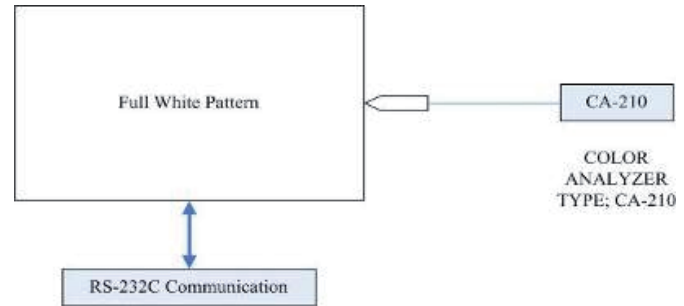
■ Aging chamber line

model: (aging chamber)LN5xxx, LA6xxx, LA7xxx, LA8xxx

H/R Time(Min)		Cool		Medium		Warm	
		x	y	x	x	y	x
		271	270	286	289	313	329
1	0-5	282	285	297	304	321	340
2	6-10	278	280	293	299	317	335
3	11-20	275	275	290	294	314	330
4	21-30	272	272	287	291	311	327
5	31-40	269	269	284	288	308	324
6	41-50	268	267	283	286	307	322
7	51-80	267	266	282	285	306	321
8	81-119	266	264	281	283	305	319
9	Over 120	265	263	280	282	304	318

※ Connecting picture of the measuring instrument (On Automatic control)

Inside PATTERN is used when W/B is controlled. Connect to auto controller or push Adjustment R/C POWER-ON -> Enter the mode of White-Balance, the pattern will come out.



[Fig.5] connecting picture (On Automatic Control)

● Auto-control interface and directions

(1) Adjust in the place where the influx of light like floodlight around is blocked. (Illumination is less than 10ux).

(2) Adhere closely the Color Analyzer (CA210) to the module less than 10cm distance, keep it with the surface of the Module and Color Analyzer's Prove vertically.(80~100°).

(3) Aging time

- After aging start, keep the power on (no suspension of power supply) and heat-run over 5 minutes.

- Using 'no signal' or 'full white pattern' or the others, check the back light on.

● Auto adjustment Map(RS-232C)

RS-232C COMMAND

[CMD ID DATA]

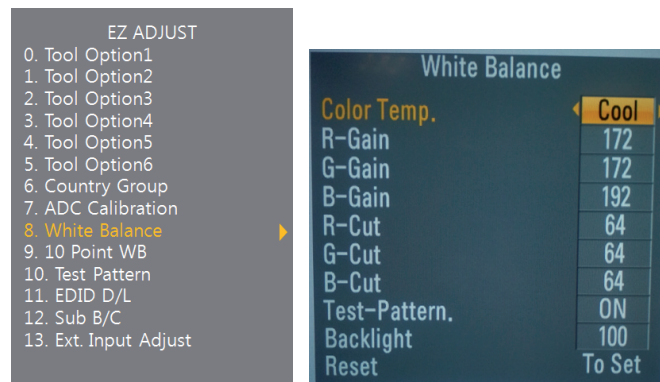
Wb 00 00 White Balance Start

Wb 00 ff White Balance End

	RS-232C COMMAND [CMD ID DATA]			MIN	CENTER (DEFAULT)			MAX
	Cool	Mid	Warm		Cool	Mid	Warm	
R Gain	jg	Ja	jd	00	172	192	192	192
G Gain	jh	Jb	je	00	172	192	192	192
B Gain	ji	Jc	jf	00	192	192	172	192
R Cut					64	64	64	128
G Cut					64	64	64	128
B Cut					64	64	64	128

*Manual W/B process using adjusts Remote control.(TBD)

- Color analyzer(CA100+, CA210) should be used in the calibrated ch by CS-1000
- Operate the zero-calibration of the CA100+ or CA-210, then stick sensor to the module when adjusting.
- After enter Service Mode by pushing "ADJ" key,
- Enter White Balance by pushing "►" key at "8. White Balance".



- For manual adjustment, it is also possible by the following sequence.

- (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 -> 8. 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, increase G gain to 192 and increase R gain and B gain same amount of increasing G gain.)
 - (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 8. 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.

※ CASE Cool

First adjust the coordinate far away from the target value(x, y).

- (1) x, y > target
 - i) Decrease the R, G.
- (2) x, y < target
 - i) First decrease the B gain,
 - ii) Decrease the one of the others.
- (3) x > target , y < target
 - i) First decrease B, so make y a little more than the target.
 - ii) Adjust x value by decreasing the R
- (4) x < target , y > target
 - i) First decrease B, so make x a little more than the target.
 - ii) Adjust x value by decreasing the G

How to adjust

- (1) If G gain is adjusted over 172 and R gain and B gain less than 192 , Adjust is O.K.
- (2) If G gain is less than 172 , increase G gain by up to 172, and then increase R gain and B gain same amount of increasing G gain.
- (3) If R gain or B gain is over 255 , Readjust G gain less than 172, Conform to R gain is 255 or B gain is 255

※ CASE Medium / Warm

First adjust the coordinate far away from the target value(x, y).

- (1) x, y > target
 - i) Decrease the R, G.
- (2) x, y < target
 - i) First decrease the B gain,
 - ii) Decrease the one of the others.
- (3) x > target , y < target
 - i) First decrease B, so make y a little more than the target.
 - ii) Adjust x value by decreasing the R
- (4) x < target , y > target
 - i) First decrease B, so make x a little more than the target.
 - ii) Adjust x value by decreasing the G

- After You finish all adjustments, Press "In-start" button and compare Tool option and Area option value with its BOM, if it is correctly same then unplug the AC cable. If it is not same, then correct it same with BOM and unplug AC cable. For correct it to the model's module from factory JIG model.

- Push the "IN STOP KEY" after completing the function inspection.

4.2. DPM operation confirmation (Only Apply for MNT Model)

Check if Power LED Color and Power Consumption operate as standard.

- Set Input to RGB and connect D-sub cable to set
- Measurement Condition: (100~240V@ 50/60Hz)
- Confirm DPM operation at the state of screen without Signal

4.3. DDC EDID Write (HDMI 256Byte)

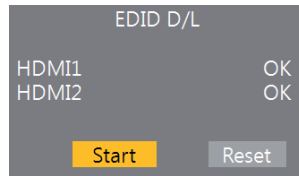
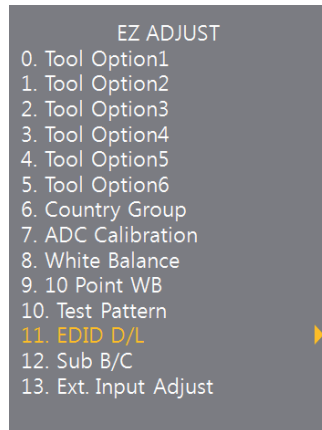
- Connect HDMI Signal Cable to HDMI Jack.
 - Write EDID DATA to EEPROM(24C02) by using DDC2B protocol.
 - Check whether written EDID data is correct or not.
- * For SVC Ass'y, EDID have to be downloaded.

4.4. EDID DATA

- 1) All Data : HEXA Value
- 2) Changeable Data :
 - *: Serial No : Controlled / Data:01
 - ** : Month : Controlled / Data:00
 - ***:Year : Controlled
 - ****:Check sum

- Auto Download

- After enter Service Mode by pushing "ADJ" key,
- Enter EDID D/L mode.
- Enter "START" by pushing "OK" key.



※ Edid data and Model option download (RS232C)

NO	Item	CMD 1	CMD 2	Data 0	
Enter download MODE	Download 'Mode In'	A	A	0	0
Edid data and Model option download	Download	A	E	00	10

When transfer the 'Mode In', Carry the command

Automatically download (The use of a internal Data)

※ Caution

- * Use the proper signal cable for EDID Download
- Analog EDID : Pin3 exists
- Digital EDID : Pin3 exists

=> Caution

- Never connect HDMI & D-sub Cable at the same time.
- Use the proper cables below for EDID Writing.
- Download HDMI1, HDMI2 separately because HDMI1 is different from HDMI2.

For Analog EDID	For HDMI EDID	
D-sub to D-sub	DVI-D to HDMI or HDMI to HDMI	

No.	Item	Condition	Hex Data
1	Manufacturer ID	GSM	1E6D
2	Version	Digital : 1	01
3	Revision	Digital : 3	03

• EDID DATA

(1) HD 2D EDID Data

	Checksum	Physical Address (0x9E)
HDMI 1	A3/5B	10
HDMI 2	A3/4B	20

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01	01
10	01	17	01	03	80	A0	5A	78	0A	EE	91	A3	54	4C	99	26
20	0F	50	54	A1	08	00	31	40	45	40	61	40	71	40	01	01
30	01	01	01	01	01	01	66	21	50	B0	51	00	1B	30	40	70
40	36	00	40	84	63	00	00	1E	64	19	00	40	41	00	26	30
50	18	88	03	06	40	84	63	00	00	18	00	00	00	FD	00	3A
60	3E	1E	53	10	00	0A	20	20	20	20	20	20	00	00	00	FC
70	00	4C	47	20	54	56	0A	20	20	20	20	20	20	20	01	A3

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	02	03	22	F1	4E	10	1F	04	93	05	14	03	02	12	20	21
10	22	15	01	26	15	07	50	09	57	07	67	03	0C	00	10	00
20	80	1E	01	1D	80	18	71	1C	16	20	58	2C	25	00	A0	5A
30	00	00	00	9E	01	1D	00	72	51	D0	1E	20	6E	28	55	00
40	20	C2	31	00	00	1E	8C	0A	D0	8A	20	E0	2D	10	10	3E
50	96	00	A0	5A	00	00	00	18	02	3A	80	18	71	38	2D	40
60	58	2C	45	00	A0	5A	00	00	00	1E	00	00	00	00	00	00
70	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	5B

(2) FHD 2D EDID Data (Support Deep Color – 10bit)

	Checksum	Physical Address (0x9E)
HDMI 1	42/DE	10
HDMI 2	42/CE	20

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01	01
10	01	17	01	03	80	A0	5A	78	0A	EE	91	A3	54	4C	99	26
20	0F	50	54	A1	08	00	31	40	45	40	61	40	71	40	81	80
30	01	01	01	01	01	01	02	3A	80	18	71	38	2D	40	58	2C
40	45	00	A0	5A	00	00	00	1E	66	21	50	B0	51	00	1B	30
50	40	70	36	00	A0	5A	00	00	00	1E	00	00	00	FD	00	3A
60	3E	1E	53	10	00	0A	20	20	20	20	20	20	20	00	00	FC
70	00	4C	47	20	54	56	0A	20	20	20	20	20	20	20	01	42

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	02	03	22	F1	4E	10	9F	04	13	05	14	03	02	12	20	21
10	22	15	01	26	15	07	50	09	57	07	67	03	0C	00	10	00
20	B8	2D	01	1D	80	18	71	1C	16	20	58	2C	25	00	20	C2
30	31	00	00	9E	01	1D	00	72	51	D0	1E	20	6E	28	55	00
40	20	C2	31	00	00	1E	02	3A	80	18	71	38	2D	40	58	2C
50	45	00	A0	5A	00	00	00	1E	01	1D	00	BC	52	00	1E	20
60	B8	28	55	40	C4	8E	21	00	00	1E	00	00	00	00	00	00
70	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	DE

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	02	03	22	F1	4E	10	9F	04	13	05	14	03	02	12	20	21
10	22	15	01	26	15	07	50	09	57	07	67	03	0C	00	10	00
20	B8	2D	01	1D	80	18	71	1C	16	20	58	2C	25	00	20	C2
30	31	00	00	9E	01	1D	00	72	51	D0	1E	20	6E	28	55	00
40	20	C2	31	00	00	1E	02	3A	80	18	71	38	2D	40	58	2C
50	45	00	A0	5A	00	00	00	1E	01	1D	00	BC	52	00	1E	20
60	B8	28	55	40	C4	8E	21	00	00	1E	00	00	00	00	00	00
70	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	DE

(3) FHD 2D EDID Data (Not Support Deep Color – 8bit)

	Checksum	Physical Address (0x9E)
HDMI 1	42/25	10
HDMI 2	42/15	20

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01	01
10	01	17	01	03	80	A0	5A	78	0A	EE	91	A3	54	4C	99	26
20	0F	50	54	A1	08	00	31	40	45	40	61	40	71	40	81	80
30	01	01	01	01	01	01	02	3A	80	18	71	38	2D	40	58	2C
40	45	00	A0	5A	00	00	00	1E	66	21	50	B0	51	00	1B	30
50	40	70	36	00	A0	5A	00	00	00	1E	00	00	00	FD	00	3A
60	3E	1E	53	10	00	0A	20	20	20	20	20	20	20	00	00	FC
70	00	4C	47	20	54	56	0A	20	20	20	20	20	20	20	01	42

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	02	03	22	F1	4E	10	9F	04	13	05	14	03	02	12	20	21
10	22	15	01	26	15	07	50	09	57	07	67	03	0C	00	10	00
20	80	1E	01	1D	80	18	71	1C	16	20	58	2C	25	00	20	C2
30	31	00	00	9E	01	1D	00	72	51	D0	1E	20	6E	28	55	00
40	20	C2	31	00	00	1E	02	3A	80	18	71	38	2D	40	58	2C
50	45	00	A0	5A	00	00	00	1E	01	1D	00	BC	52	00	1E	20
60	B8	28	55	40	C4	8E	21	00	00	1E	00	00	00	00	00	00
70	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	25

(4) HD 3D EDID Data

	Checksum	Physical Address (0x9E)
HDMI 1	A3/59	10
HDMI 2	A3/49	20

- HDMI

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01	01
10	01	17	01	03	80	A0	5A	78	0A	EE	91	A3	54	4C	99	26
20	0F	50	54	A1	08	00	31	40	45	40	61	40	71	40	81	80
30	01	01	01	01	01	01	02	3A	80	18	71	38	2D	40	58	2C
40	36	00	40	84	63	00	00	1E	64	19	00	40	41	00	26	30
50	18	88	03	06	40	84	63	00	00	18	00	00	00	FD	00	3A
60	3E	1E	53	10	00	0A	20	20	20	20	20	20	20	00	00	FC
70	00	4C	47	20	54	56	0A	20	20	20	20	20	20	20	01	A3

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	02	03	33	F1	4E	10	1F	04	93	05	14	03	02	12	20	21
10	22	15	01	26	15	07	50	09	57	07	78	03	0C	00	10	00
20	80	1E	20	C0	0E	01	40	0A	0F	08	10	18	10	98	10	58
30	10	38	10	01	1D	80	18	71	1C	16	20	58	2C	25	00	A0
40	5A	00	00	00	9E	01	1D	00	72	51	D0	1E	20	6E	28	55
50	00	20	C2	31	00	00	1E	8C	0A	D0	8A	20	E0	2D	10	10
60	3E	96	00	A0	5A	00	00	00	18	02	3A	80	18	71	38	2D
70	40	58	2C	45	00	A0	5A	00	00	00	1E	00	00	00	00	59

(5) FHD 3D EDID Data (Not Support Deep Color – 8bit)

	Checksum	Physical Address (0x9E)
HDMI 1	42/23	10
HDMI 2	42/13	20

- HDMI

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01	01
10	01	17	01	03	80	A0	5A	78	0A	EE	91	A3	54	4C	99	26
20	0F	50	54	A1	08	00	31	40	45	40	61	40	71	40	81	80
30	01	01	01	01	01	01	02	3A	80	18	71	38	2D	40	58	2C
40	45	00	A0	5A	00	00	00	1E	66	21	50	B0	51	00	1B	30
50	40	70	36	00	A0	5A	00	00	00	1E	00	00	00	FD	00	3A
60	3E	1E	53	10	00	0A	20	20	20	20	20	20	20	00	00	FC
70	00	4C	47	20	54	56	0A	20	20	20	20	20	20	20	01	42

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	02	03	33	F1	4E	10	9F	04	13	05	14	03	02	12	20	21
10	22	15	01	26	15	07	50	09	57	07	78	03	0C	00	10	00
20	80	1E	20	C0	0E	01	40	0A	0F	08	10	18	10	98	10	58
30	10	38	10	01	1D	80	18	71	1C	16	20	58	2C	25	00	20
40	C2	31	00	00	9E	01	1D	00	72	51	D0	1E	20	6E	28	55
50	00	20	C2	31	00	00	1E	02	3A	80	18	71	38	2D	40	58
60	2C	45	00	A0	5A	00	00	00	1E	01	1D	00	BC	52	D0	1E
70	20	B8	28	55	40	C4	8E	21	00	00	1E	00	00	00	00	23

(6) FHD 3D EDID Data (Support Deep Color – 10bit)

	Checksum	Physical Address (0x9E)
HDMI 1	42/DC	10
HDMI 2	42/CC	20

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01	01
10	01	17	01	03	80	A0	5A	78	0A	EE	91	A3	54	4C	99	26
20	0F	50	54	A1	08	00	31	40	45	40	61	40	71	40	81	80
30	01	01	01	01	01	01	02	3A	80	18	71	38	2D	40	58	2C
40	45	00	A0	5A	00	00	00	1E	66	21	50	B0	51	00	1B	30
50	40	70	36	00	A0	5A	00	00	1E	00	00	00	00	FD	00	3A
60	3E	1E	53	10	00	0A	20	20	20	20	20	20	20	00	00	FC
70	00	4C	47	20	54	56	0A	20	20	20	20	20	20	01	42	

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	02	03	33	F1	4E	10	9F	04	13	05	14	03	02	12	20	21
10	22	15	01	26	15	07	50	09	57	07	78	03	0C	00	10	00
20	B8	2D	20	C0	0E	01	40	0A	0F	08	10	18	10	98	10	58
30	10	38	10	01	1D	80	18	71	1C	16	20	58	2C	25	00	20
40	C2	31	00	00	9E	01	1D	00	72	51	00	1E	20	6E	28	55
50	00	20	C2	31	00	00	1E	02	3A	80	18	71	38	2D	40	58
60	2C	45	00	A0	5A	00	00	00	1E	01	1D	00	BC	52	00	1F
70	20	B8	28	55	40	C4	8E	21	00	00	1E	00	00	00	00	DC

(7) HD 3D DTS EDID Data

	Checksum	Physical Address (0x9E)
HDMI 1	A3/C0	10
HDMI 2	A3/B0	20

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01	01
10	01	17	01	03	80	A0	5A	78	0A	EE	91	A3	54	4C	99	26
20	0F	50	54	A1	08	00	31	40	45	40	61	40	71	40	01	01
30	01	01	01	01	01	01	01	66	21	50	B0	51	00	1B	30	40
40	36	00	40	84	63	00	00	1E	64	19	00	40	41	00	26	30
50	18	88	03	06	40	84	63	00	00	18	00	00	00	FD	00	3A
60	3E	1E	53	10	00	0A	20	20	20	20	20	20	20	00	00	FC
70	00	4C	47	20	54	56	0A	20	20	20	20	20	20	01	A3	

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	02	03	36	F1	4E	10	1F	04	93	05	14	03	02	12	20	21
10	22	15	01	29	15	07	50	09	57	07	3D	06	50	78	03	0C
20	00	10	00	80	1E	20	C0	0E	01	40	0A	0F	08	10	18	10
30	98	10	58	10	38	10	01	1D	80	18	71	1C	16	20	58	2C
40	25	00	A0	5A	00	00	00	9E	01	1D	00	72	51	D0	1E	20
50	6E	28	55	00	20	C2	31	00	00	1E	8C	0A	D0	8A	20	E0
60	2D	10	10	3E	96	00	A0	5A	00	00	18	02	3A	80	18	
70	71	38	2D	40	58	2C	45	00	A0	5A	00	00	00	1E	00	C0

(8) FHD 3D DTS EDID Data (Not Support Deep Color – 8bit)

	Checksum	Physical Address (0x9E)
HDMI 1	42/8A	10
HDMI 2	42/7A	20

- HDMI

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01	01
10	01	17	01	03	80	A0	5A	78	0A	EE	91	A3	54	4C	99	26
20	0F	50	54	A1	08	00	31	40	45	40	61	40	71	40	81	80
30	01	01	01	01	01	01	02	3A	80	18	71	38	2D	40	58	2C
40	45	00	A0	5A	00	00	00	1E	66	21	50	B0	51	00	1B	30
50	40	70	36	00	A0	5A	00	00	1E	00	00	00	00	FD	00	3A
60	3E	1E	53	10	00	0A	20	20	20	20	20	20	20	00	00	FC
70	00	4C	47	20	54	56	0A	20	20	20	20	20	20	01	42	

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	02	03	36	F1	4E	10	9F	04	13	05	14	03	02	12	20	21
10	22	15	01	29	15	07	50	09	57	07	3D	06	50	78	03	0C
20	00	10	00	80	1E	20	C0	0E	01	40	0A	0F	08	10	18	10
30	98	10	58	10	38	10	01	1D	80	18	71	1C	16	20	58	2C
40	25	00	20	C2	31	00	00	9E	01	1D	00	72	51	D0	1E	20
50	6E	28	55	00	20	C2	31	00	00	1E	02	3A	80	18	71	38
60	2D	40	58	2C	45	00	A0	5A	00	00	00	1E	01	1D	00	BC
70	52	D0	1E	20	B8	28	55	40	C4	8E	21	00	00	1E	00	8A

(9) HD 2D DTS EDID Data

	Checksum	Physical Address (0x9E)
HDMI 1	A3/C2	10
HDMI 2	A3/B2	20

- HDMI

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01	01
10	01	17	01	03	80	A0	5A	78	0A	EE	91	A3	54	4C	99	26
20	0F	50	54	A1	08	00	31	40	45	40	61	40	71	40	01	01
30	01	01	01	01	01	01	01	66	21	50	B0	51	00	1B	30	40
40	36	00	40	84	63	00	00	1E	64	19	00	40	41	00	26	30
50	18	88	03	06	40	84	63	00	00	18	00	00	00	FD	00	3A
60	3E	1E	53	10	00	0A	20	20	20	20	20	20	20	00	00	FC
70	00	4C	47	20	54	56	0A	20	20	20	20	20	20	01	A3	

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	02	03	25	F1	4E	10	1F	04	93	05	14	03	02	12	20	21
10	22	15	01	29	15	07	50	09	57	07	3D	06	50	67	03	0C
20	00	10	00	80	1E	01	1D	80	18	71	1C	16	20	58	2C	25
30	00	A0	5A	00	00	00	9E	01	1D	00	72	51	D0	1E	20	6E
40	28	55	00	20	C2	31	00	00	1E	8C	0A	D0	8A	20	E0	2D
50	10	10	3E	96	00	A0	5A	00	00	00	18	02	3A	80	18	71
60	38	2D	40	58	2C	45	00	A0	5A	00	00	00	1E	00	00	00
70	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	C2

(10) FHD 2D DTS EDID Data (Not Support Deep Color – 8bit)

	Checksum	Physical Address (0x9E)
HDMI 1	42/8C	10
HDMI 2	42/7C	20

- HDMI

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01	01
10	01	17	01	03	80	A0	5A	78	0A	EE	91	A3	54	4C	99	26
20	0F	50	54	A1	08	00	31	40	45	40	61	40	71	40	81	80
30	01	01	01	01	01	01	02	3A	80	18	71	38	2D	40	58	2C
40	45	00	A0	5A	00	00	00	1E	66	21	50	B0	51	00	1B	30
50	40	70	36	00	A0	5A	00	00	00	1E	00	00	00	FD	00	3A
60	3E	1E	53	10	00	0A	20	20	20	20	20	20	00	00	00	FC
70	00	4C	47	20	54	56	0A	20	20	20	20	20	20	20	01	42

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	02	03	25	F1	4E	10	9F	04	13	05	14	03	02	12	20	21
10	22	15	01	29	15	07	50	09	57	07	3D	06	50	67	03	0C
20	00	10	00	80	1E	01	1D	80	18	71	1C	16	20	58	2C	25
30	00	20	C2	31	00	00	9E	01	1D	00	72	51	D0	1E	20	6E
40	28	55	00	20	C2	31	00	00	1E	02	3A	80	18	71	38	2D
50	40	58	2C	45	00	A0	5A	00	00	00	1E	01	1D	00	BC	52
60	D0	1E	20	B8	28	55	40	C4	8E	21	00	00	1E	00	00	00
70	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	8C

4.5. Outgoing condition Configuration

- When pressing IN-STOP key by SVC remocon, Red LED are blinked alternatively. And then automatically turn off. (Must not AC power OFF during blinking)

4.6. GND & Hi-pot test

4.6.1. GND & HI-POT auto-check preparation

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

4.6.2. GND & HI-POT auto-check

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

4.6.3. Checkpoint

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

5. Local Dimming Function Check

- Step1) Turn on TV.
- Step2) Press "P-only" key, enter to power only mode and escape the "P-only" Mode by pressing "Exit" key
- Step3) Press "Tilt" key, entrance to Local Dimming mode.
- Step4) At the Local Dimming mode, module Edge Backlight moving Top to bottom Back light of module moving
- Step5) confirm the Local Dimming mode
- Step6) Press "Exit" key

6. 3D Function Test (Only 3D Model)

(Pattern Generator MSHG-600, MSPG-6100 [SUPPORT HDMI1.4])

* HDMI mode NO. 872 , pattern No.83

1) Please input 3D test pattern like below (HDMI mode NO. 872 , pattern No.83)

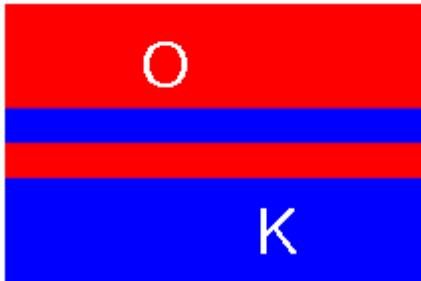


Fig.1

<HDMI Mode 872번, Pattern No. 83>

2) When 3D OSD appear automatically , then select OK button.



Fig.3

<OK Key>

3) Don't wear a 3D Glasses, Check the picture like below

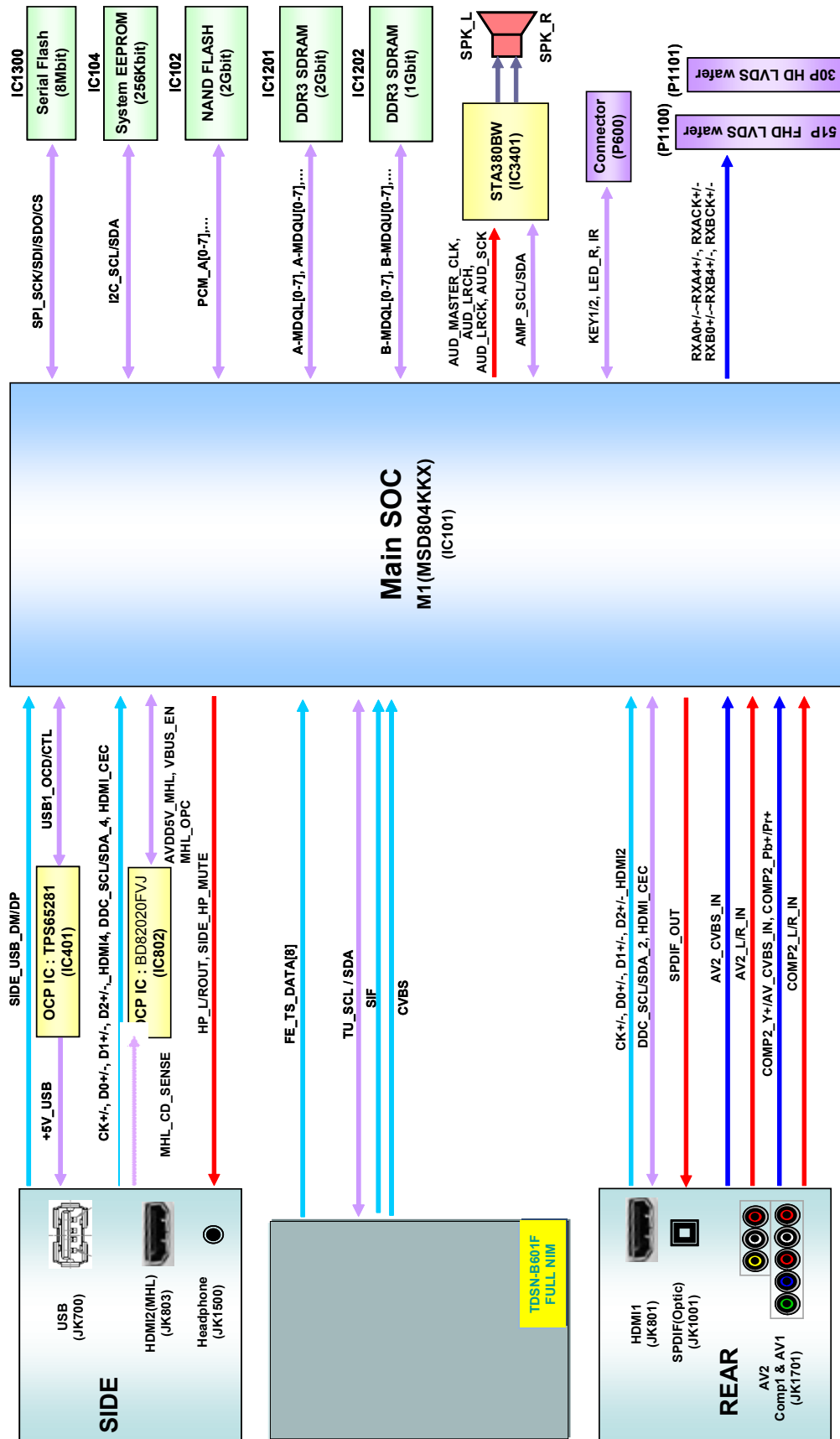


Fig.2

<3D Mode 진입 후 화면>

* 안경을 착용하지 않은 상태임.

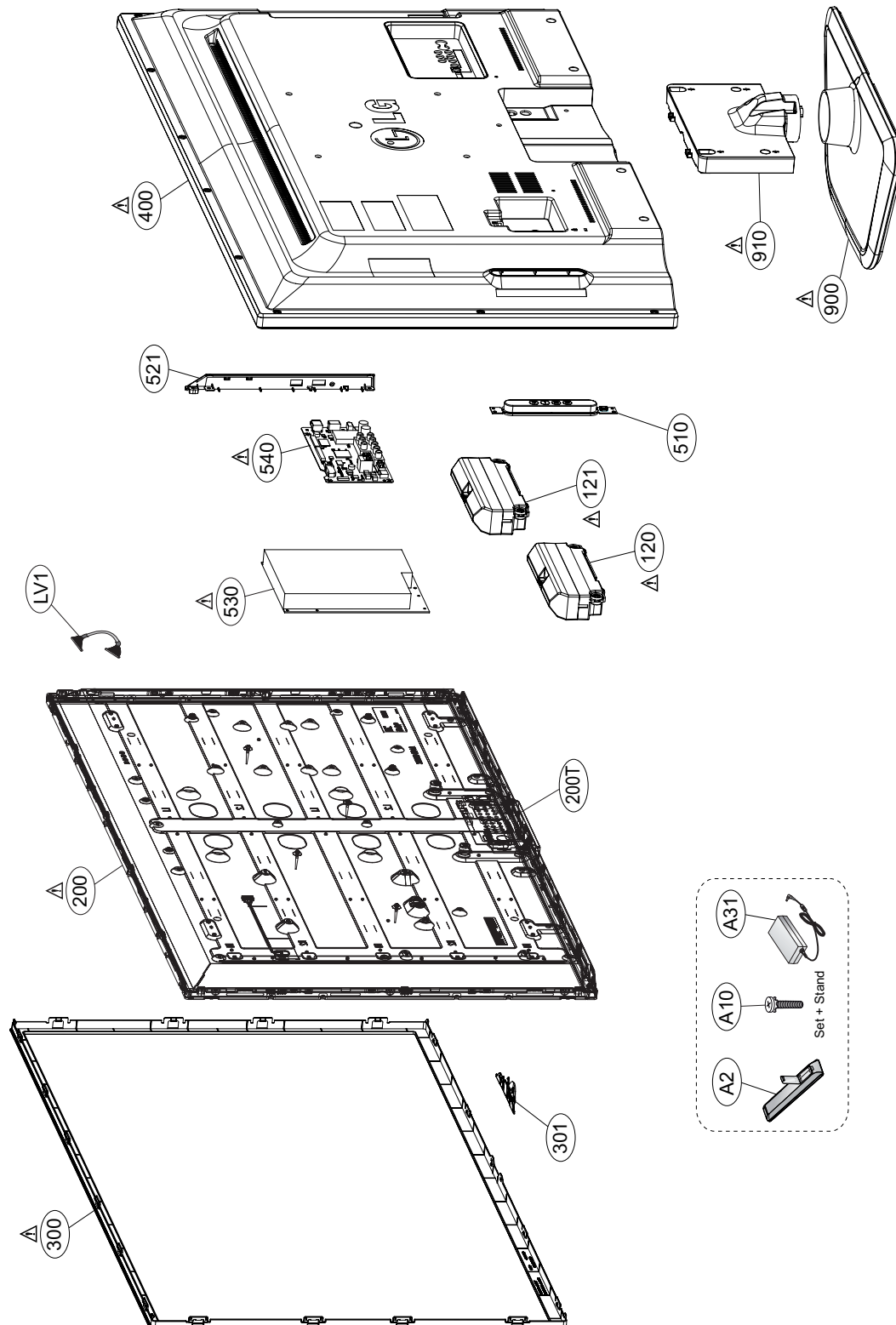
BLOCK DIAGRAM



EXPLODED VIEW

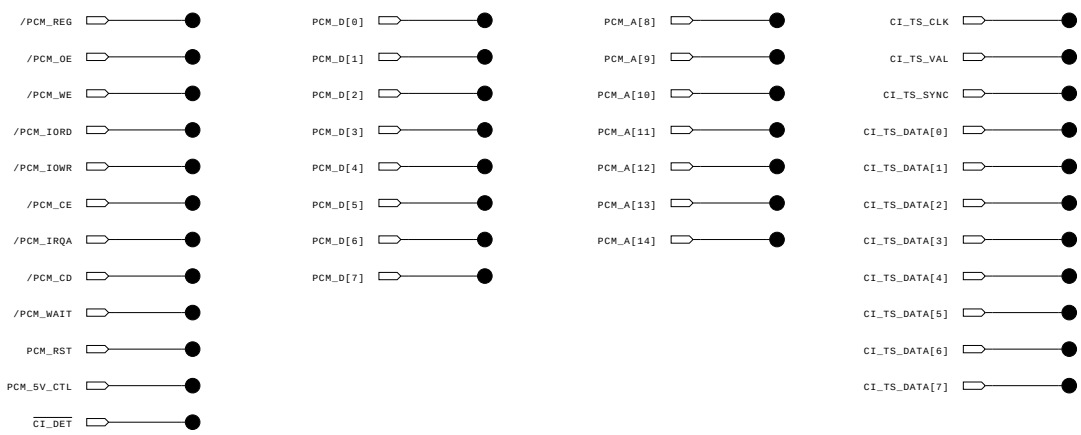
IMPORTANT SAFETY NOTICE

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 X-RADIATION, Shock, Fire, or other Hazards. Do not modify the original design without permission of manufacturer.

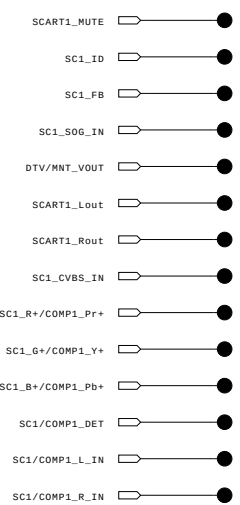


TP for NON-EU models(except EU and China)

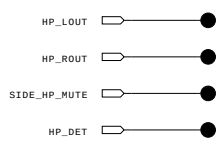
TP for CI slot



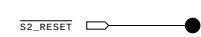
TP for SCART



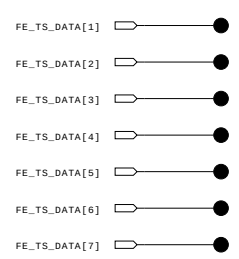
TP for Headphone



TP for S2



TP for FE_TS_DATA



THE  SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE 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.

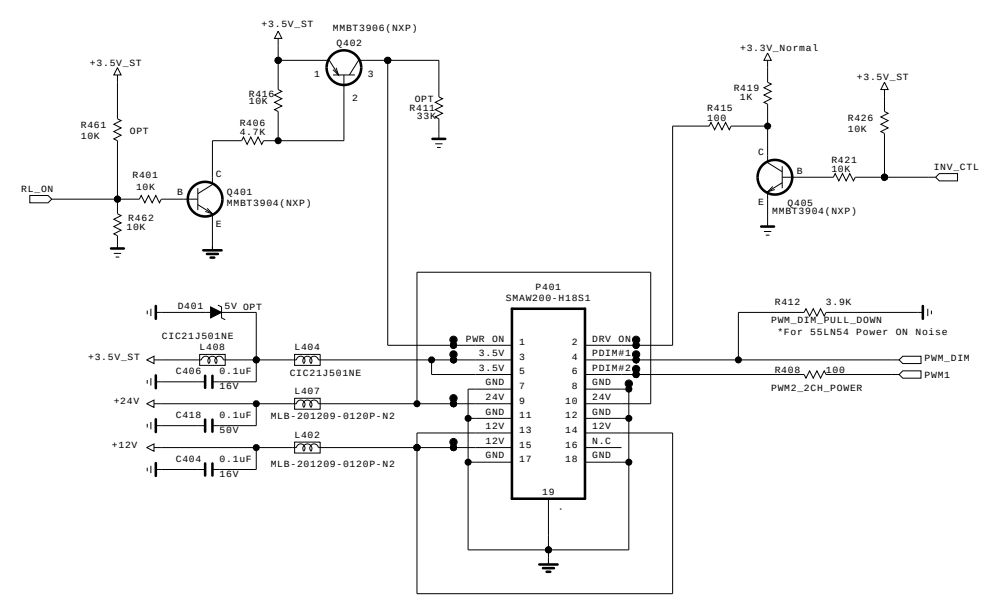
SECRET
LGElectronics



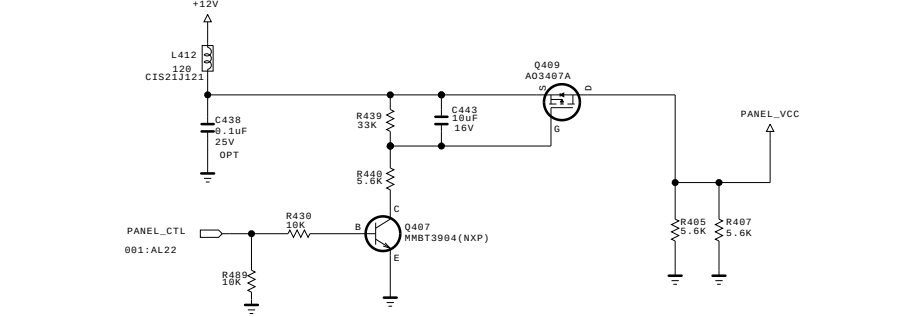
MODEL	NC4_S7LRM	DATE	2012.07.02
BLOCK	TP_NON_EN	SHEET	3 /

L13 POWER BLOCK (POWER DETECT 2)

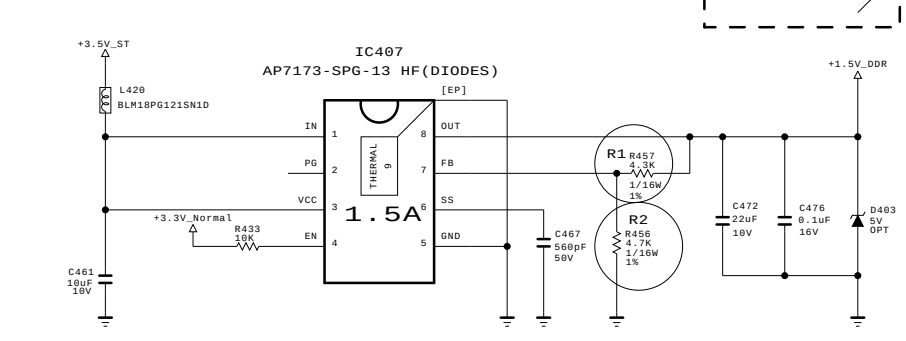
FROM LIPS & POWER B/D



PANEL_POWER

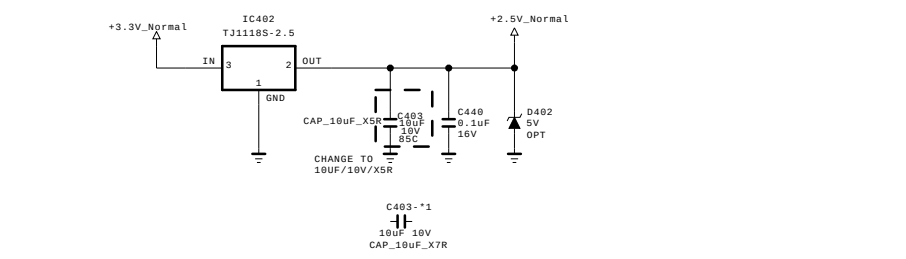


+1.5V_DDR

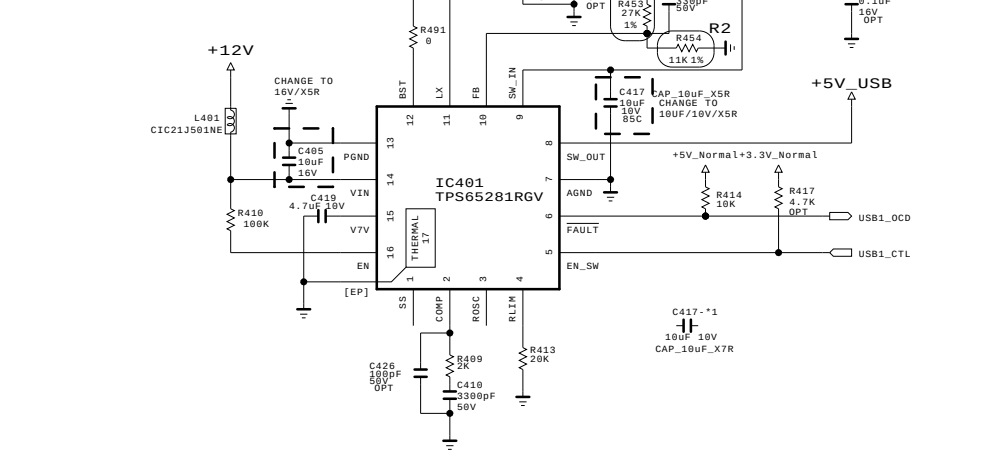


$V_{out} = 0.8 * (1 + R1/R2) = 1.5319$

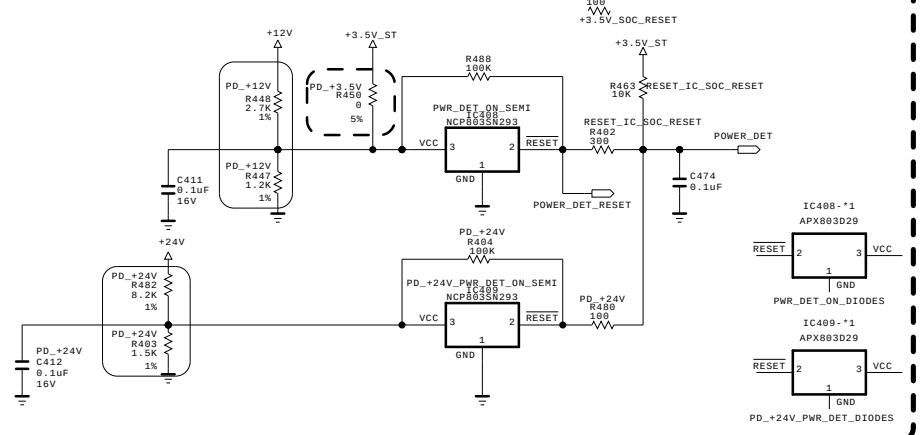
+2.5V_Normal



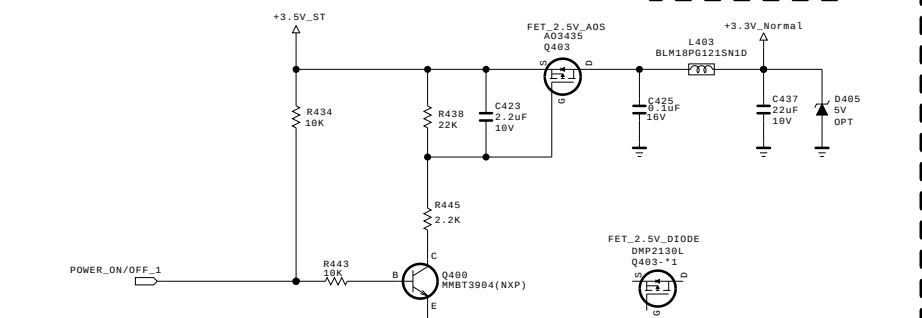
+5V_Normal
&
+5V_USB



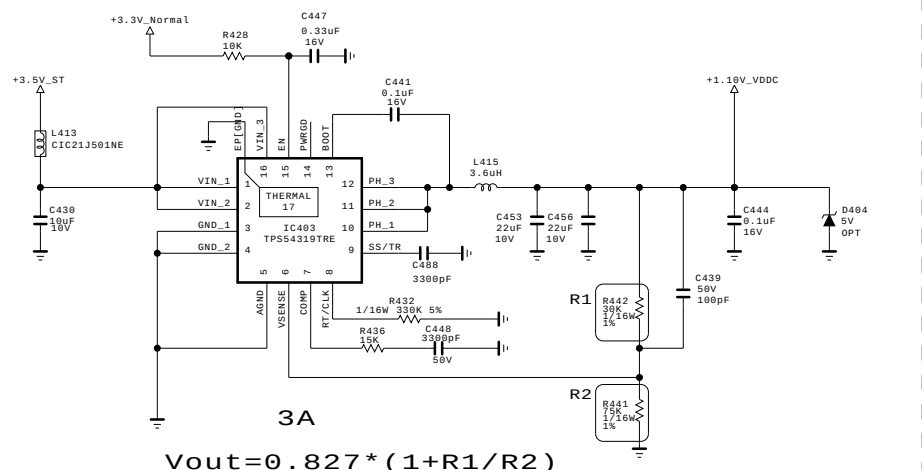
Power_DET



+3.3V_Normal



S7LR core 1.15V volt



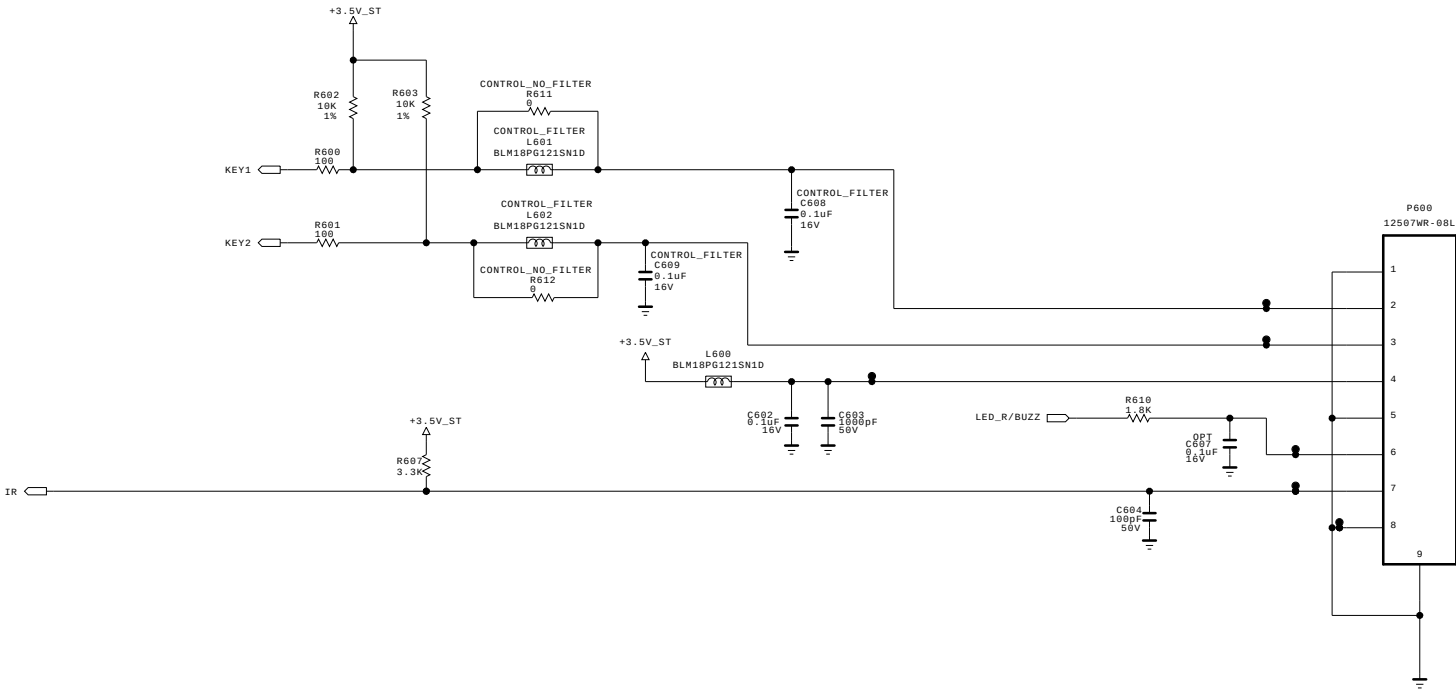
THE  SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE  SYMBOL MARK OF THE SCHEMATIC.

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MODEL	NC4_S7LRM	DATE	2012/09/19
BLOCK	Power_PD2	SHEET	4

IR/LED and Control



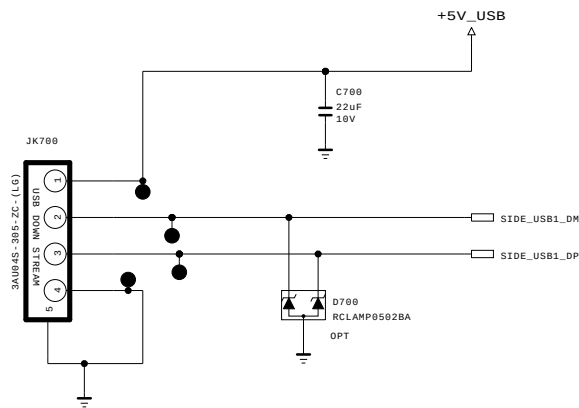
THE  SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFATURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE  SYMBOL MARK OF THE SCHEMATIC.

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LGElectronics



MODEL	NC4_S7LRM	DATE	2012/07/18
BLOCK	IR/CONTROL	SHEET	6 /

USB (SIDE)



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

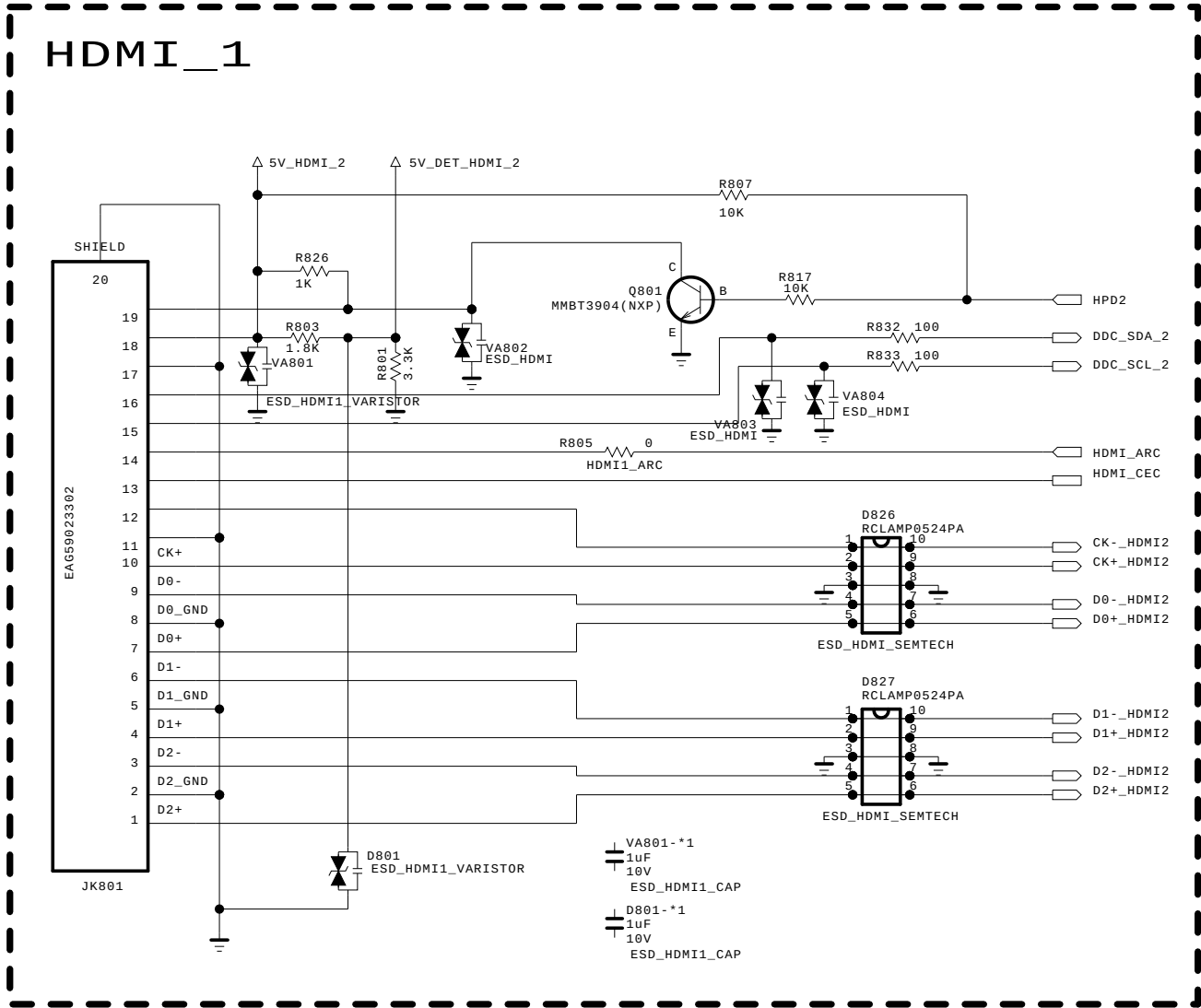
SECRET
LGElectronics



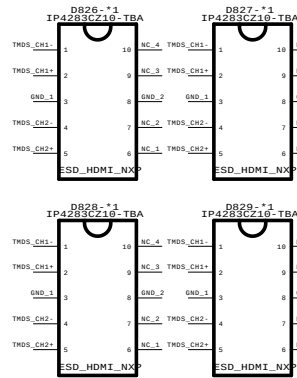
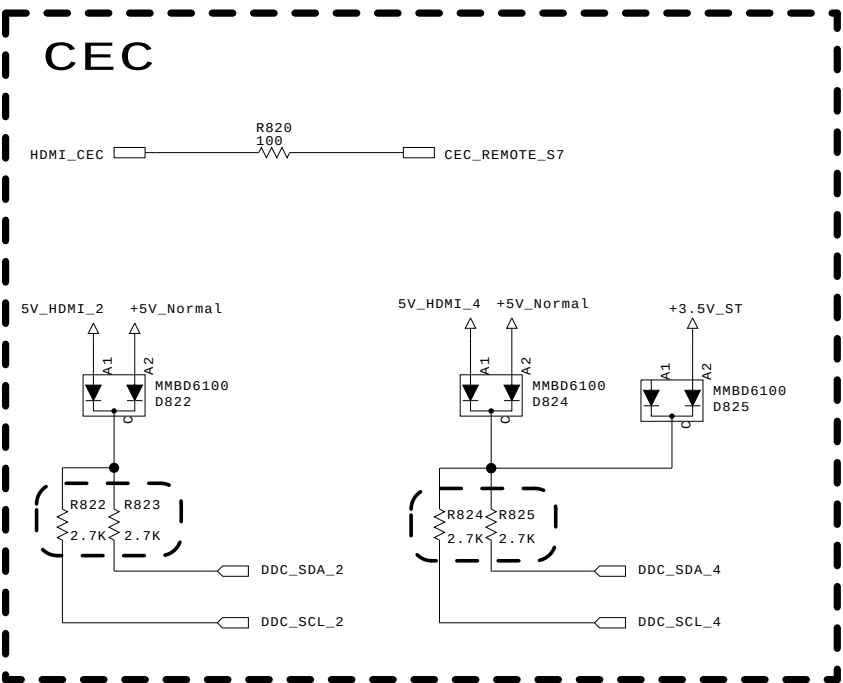
MODEL	NC4_S7LRM	DATE	12/06/20
BLOCK	USB	SHEET	7 /

HDMI (REAR 1 / SIDE 1 MHL)

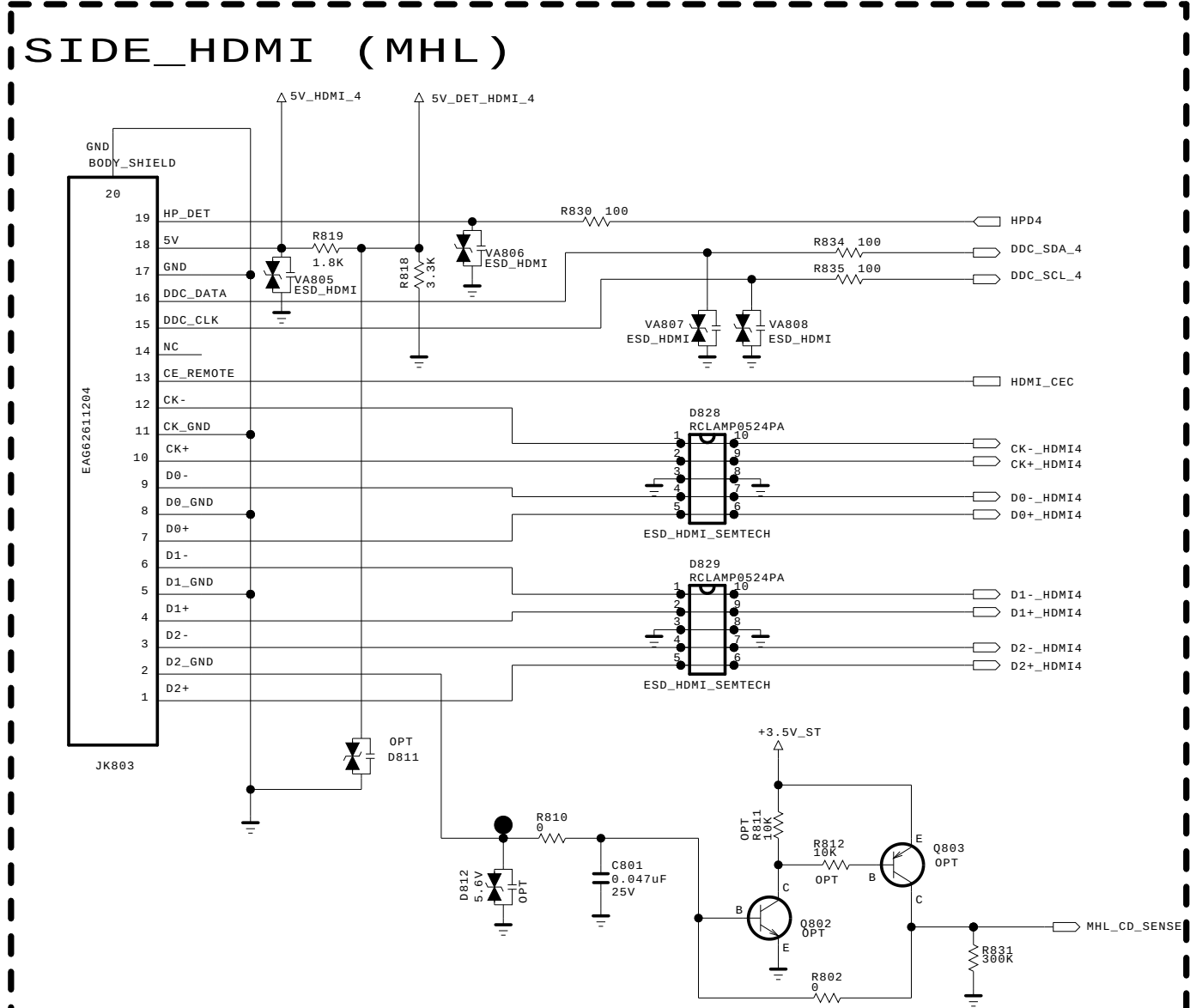
HDMI_1



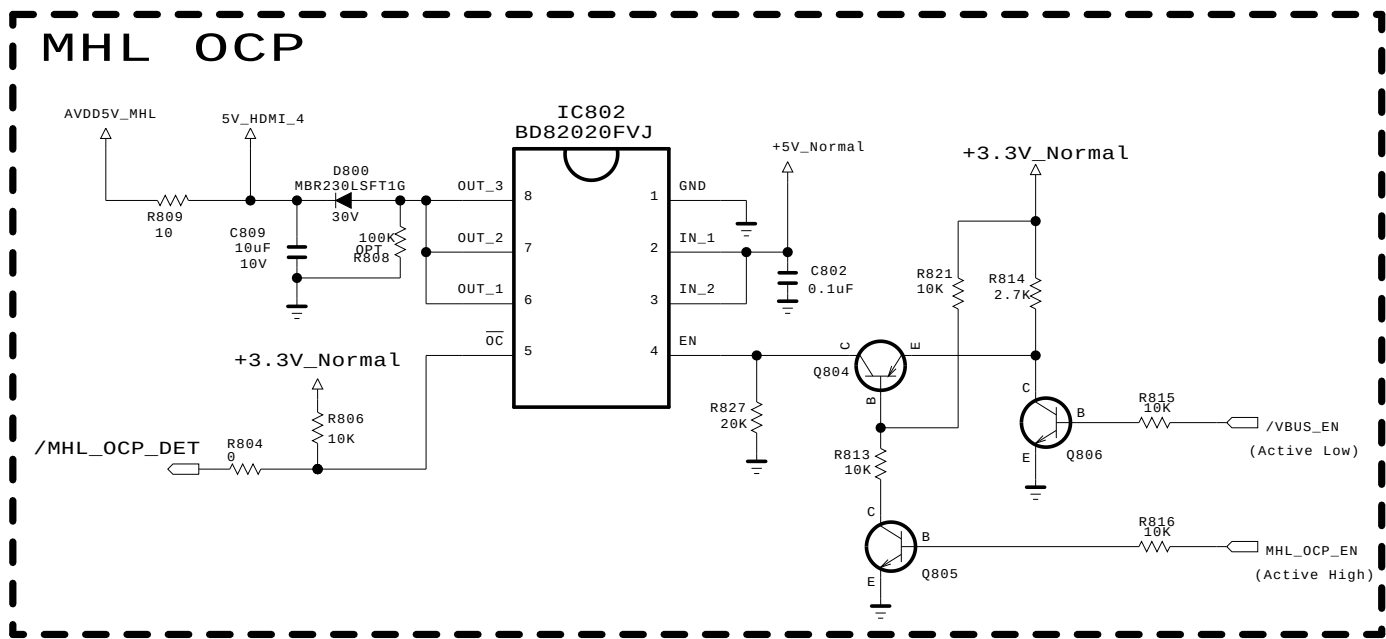
CEC



SIDE_HDMI (MHL)



MHL OCP



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

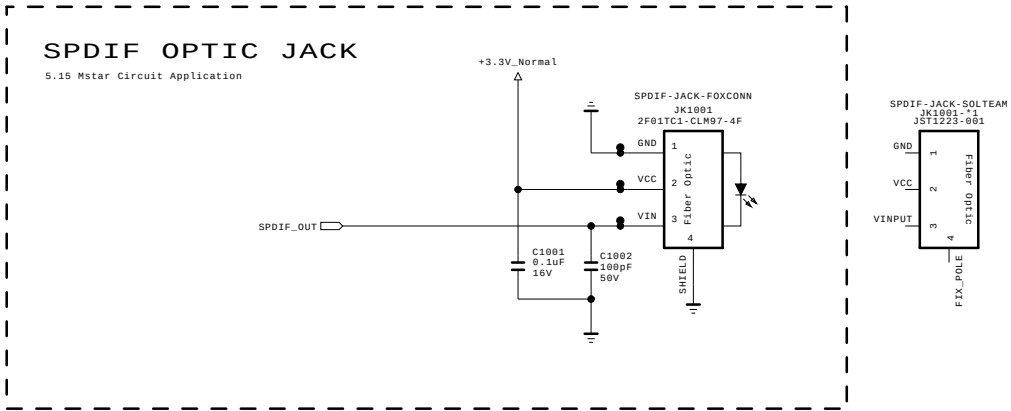
SECRET

LG Electronics

LG ELECTRONICS

MODEL	NC4_S7LRM	DATE	2012/11/07
BLOCK	HDMI_R1_S1	SHEET	8 /

SPDIF



THE  SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE 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.

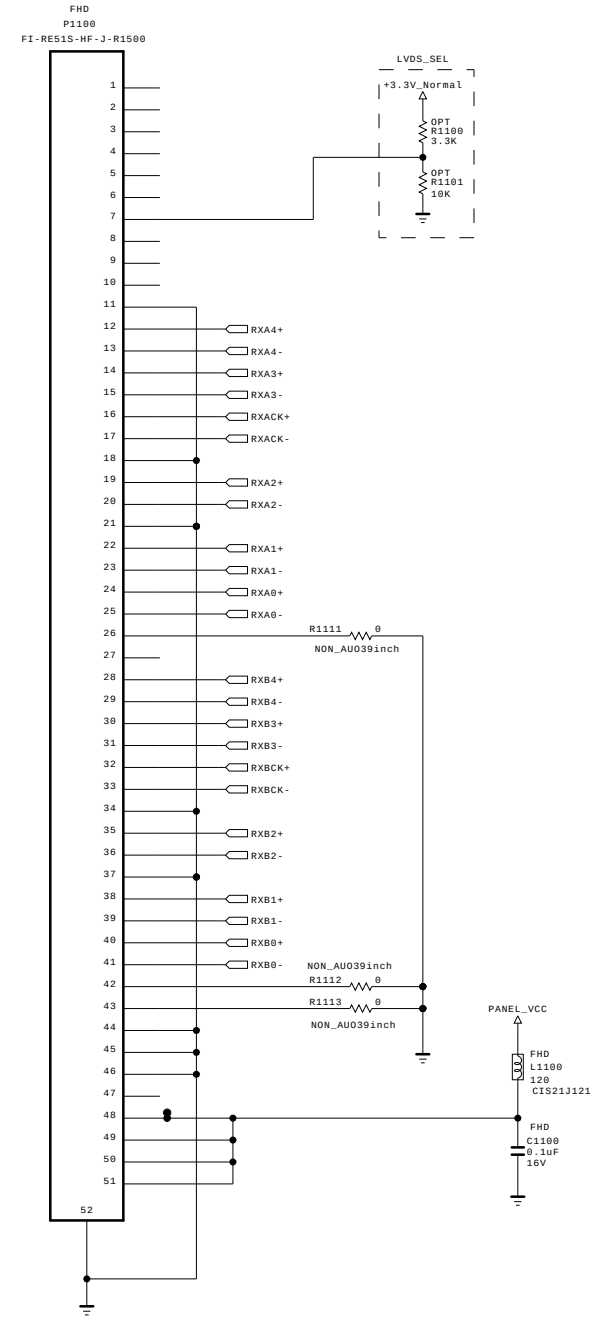
SECRET
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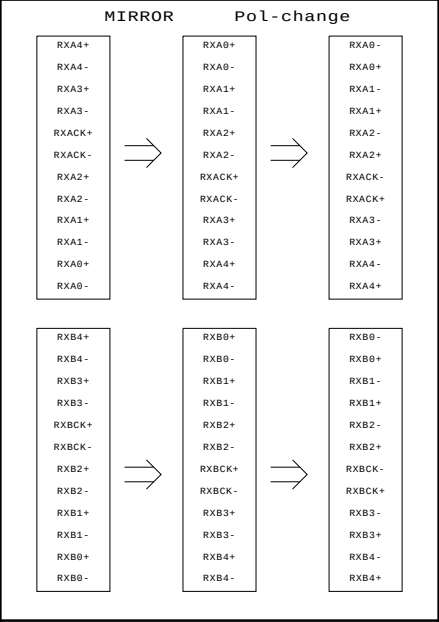
MODEL	NC4_S7LRM	DATE	12/06/12
BLOCK	SPDIF	SHEET	10 /

LVDS (NON EU)

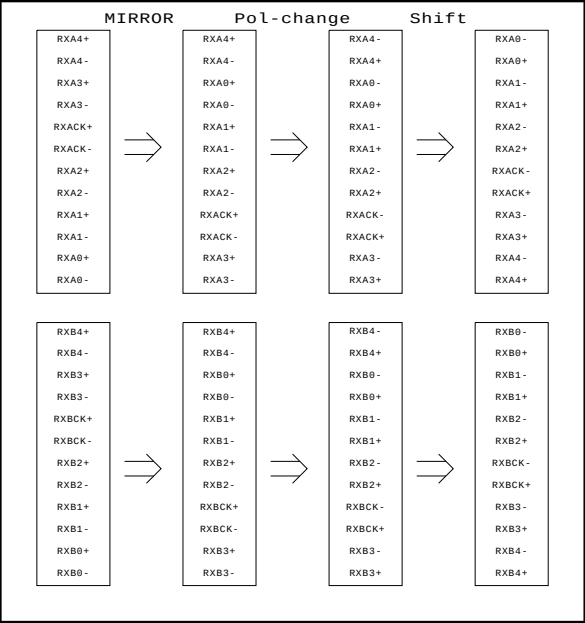
[51Pin LVDS Connector]
(For FHD 60Hz)



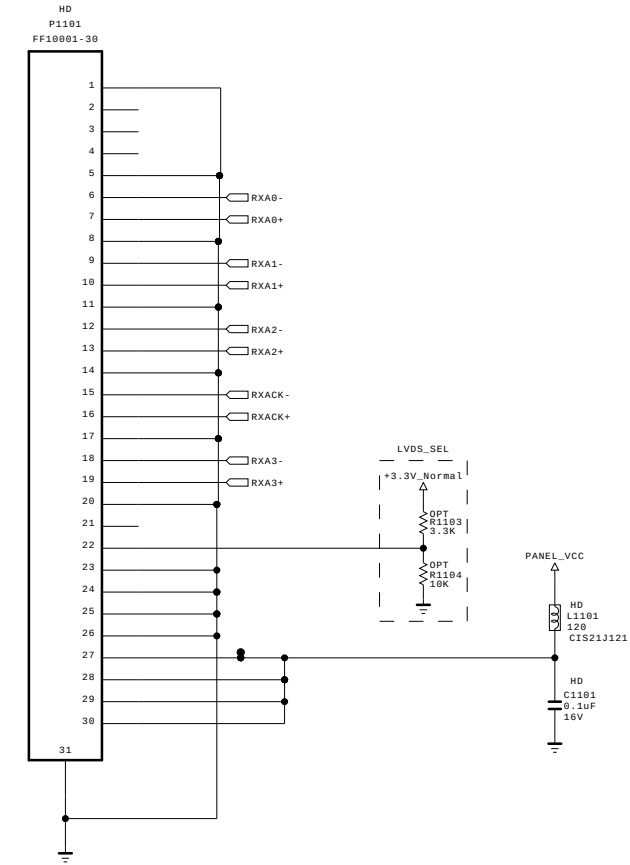
FOR FHD REVERSE(10bit)
Change in S7LR



FOR FHD REVERSE(8bit)
Change in S7LR



[30Pin LVDS Connector]
(For HD 60Hz_Normal)



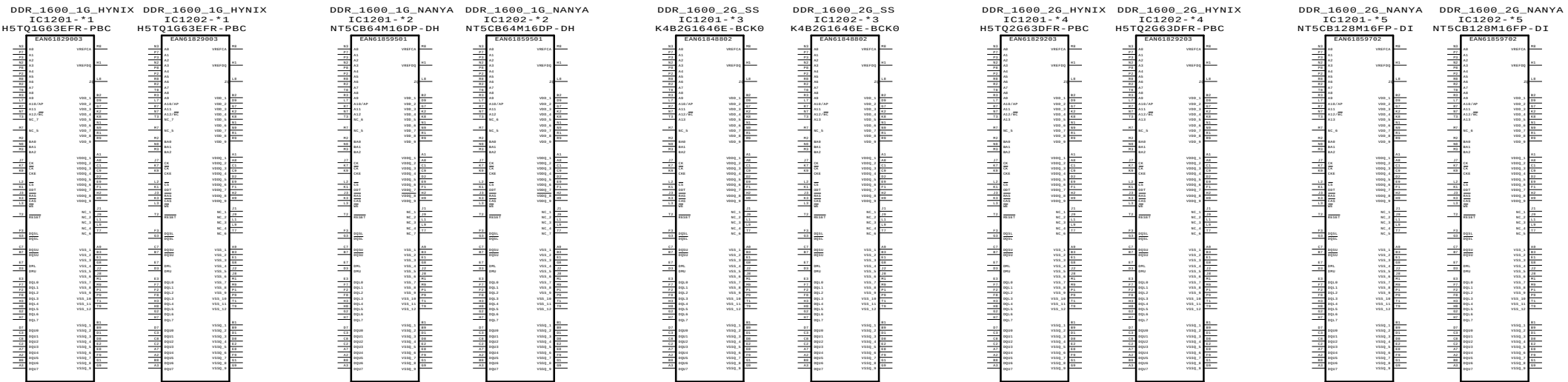
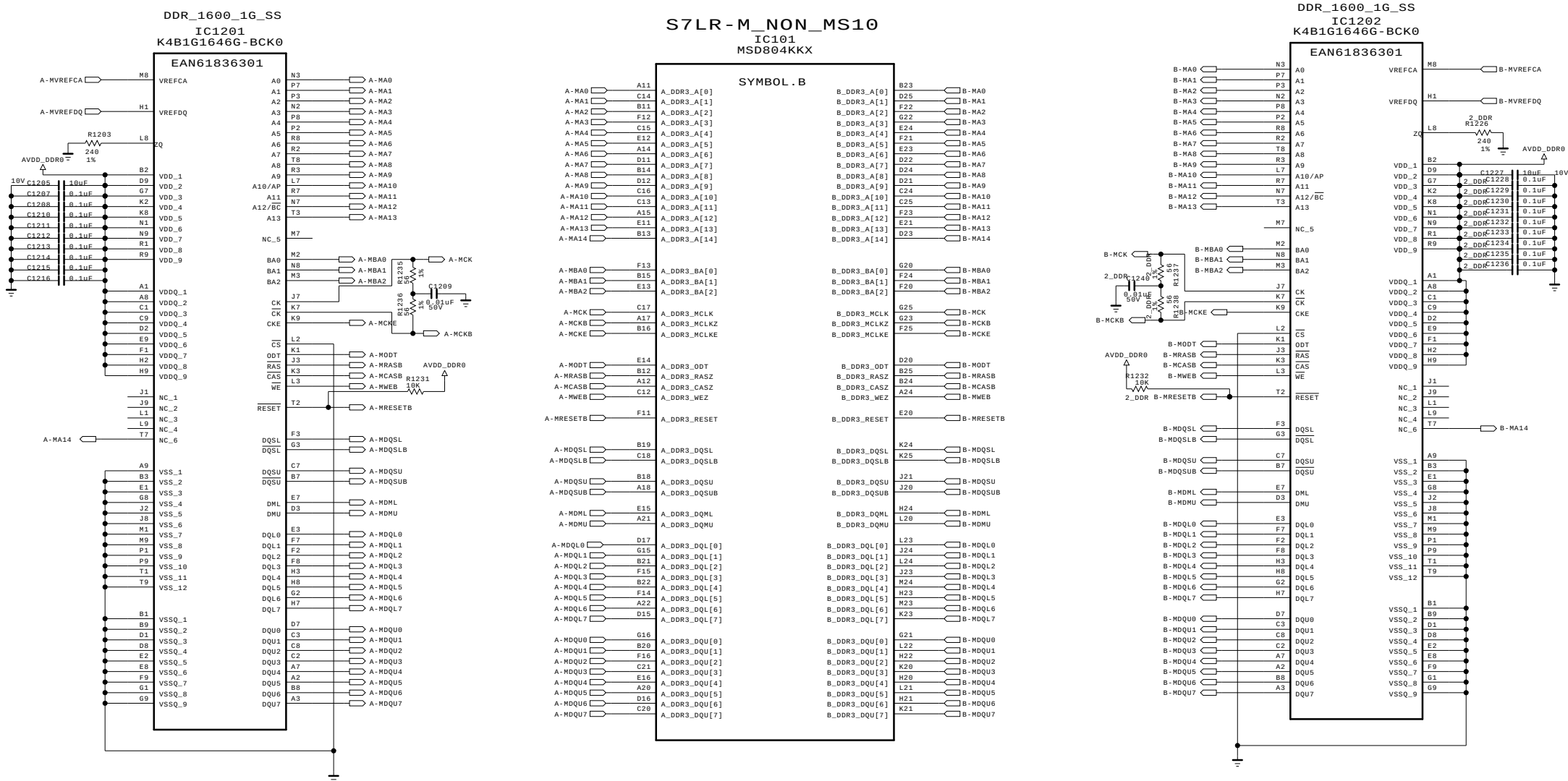
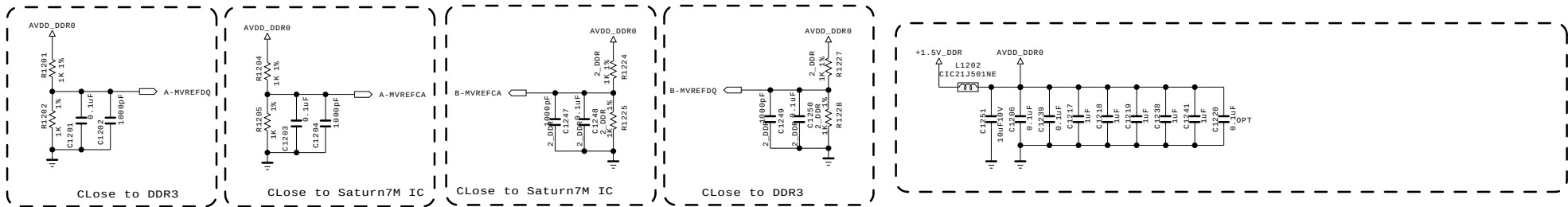
EU pin assign is different from NON EU.
Because of position of HD wafer.

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MODEL	NC4_S7LRM	DATE	2012/09/19
BLOCK	LVDS_NON_EU	SHEET	11 /



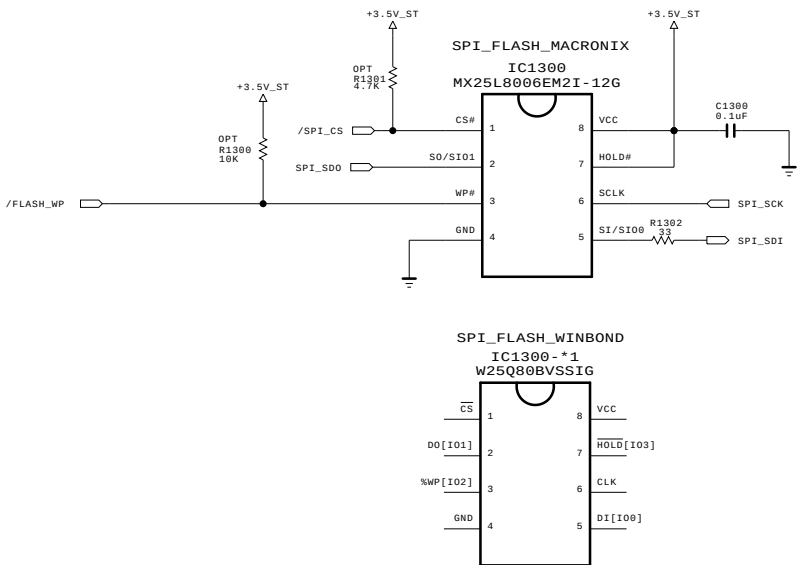
THE SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILTRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE MARK OF THE SCHEMATIC.

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MODEL	NC4_S7LRM	DATE	2012/07/16
BLOCK	M1_DDR (2DDR)	SHEET	12 /

Serial Flash for SPI boot(OS)



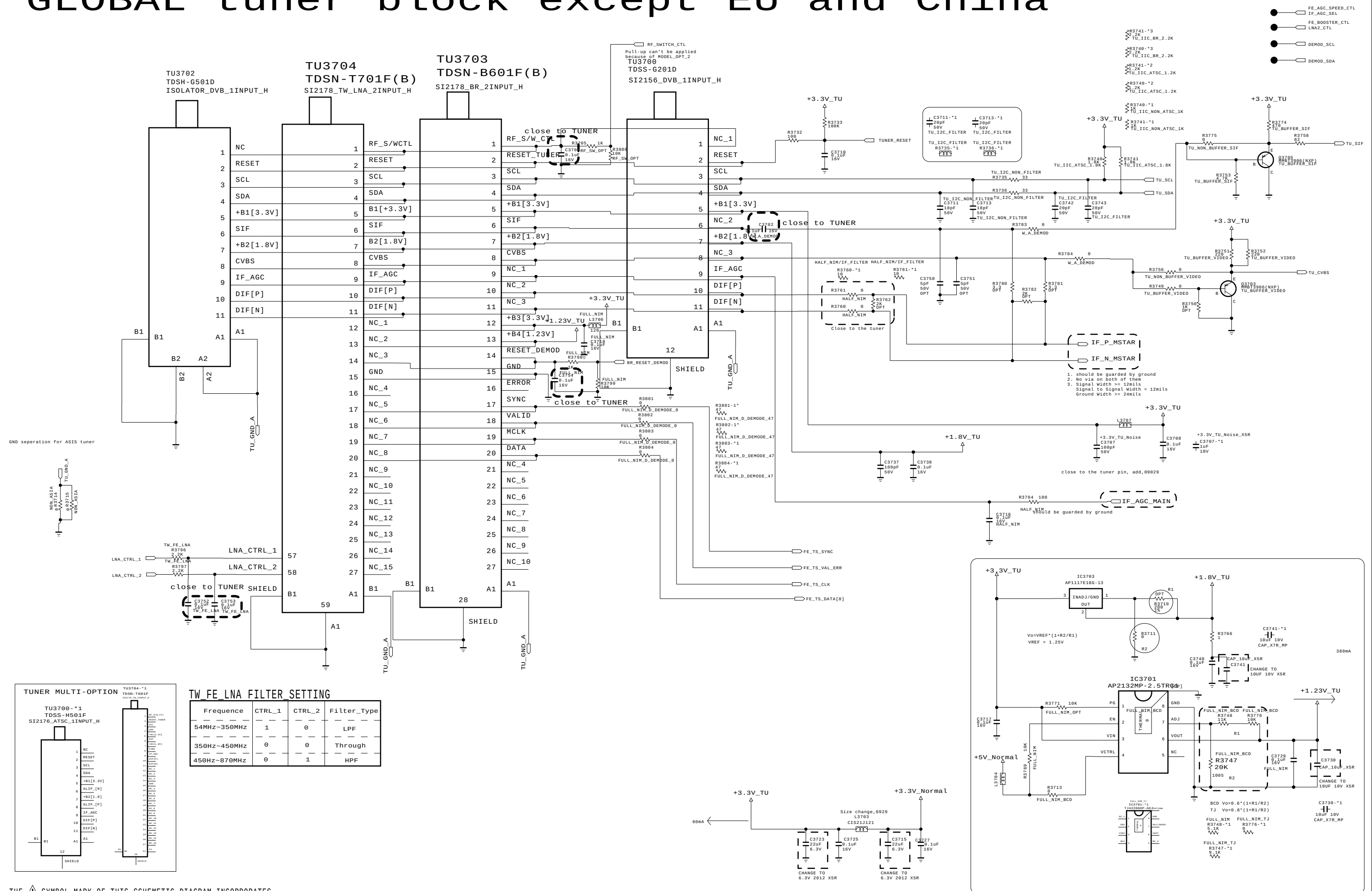
THE  SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFATURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE  SYMBOL MARK OF THE SCHEMATIC.

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MODEL	NC4_S7LRM	DATE	2012/06/20
BLOCK	S_FLASH_OS	SHEET	13 /

GLOBAL tuner block except EU and China



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

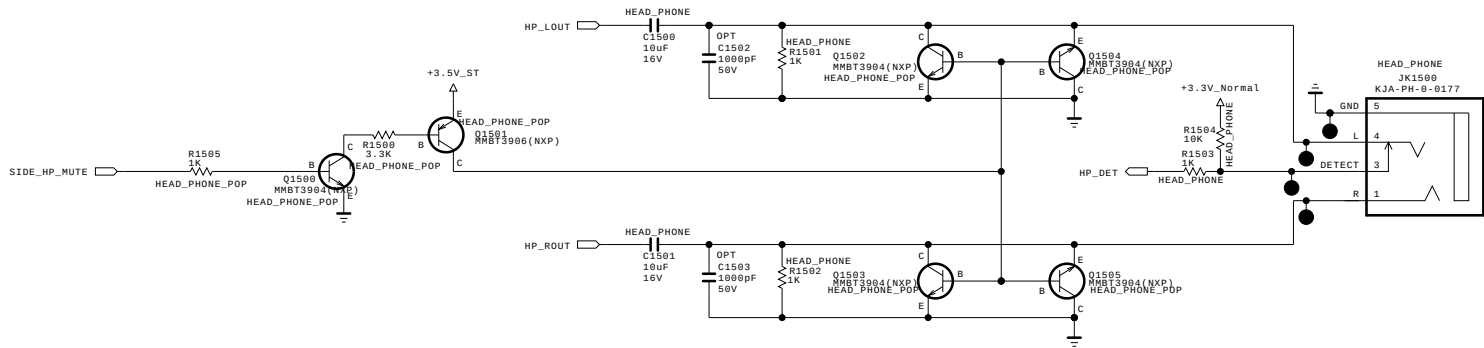
SECRET
LG Electronics



MODEL	NC4_S7LRM	DATE	2012.09.19
BLKCK	TUNER_NON_EU	SHEET	14 /

Headphone

*Option : HEAD_PHONE



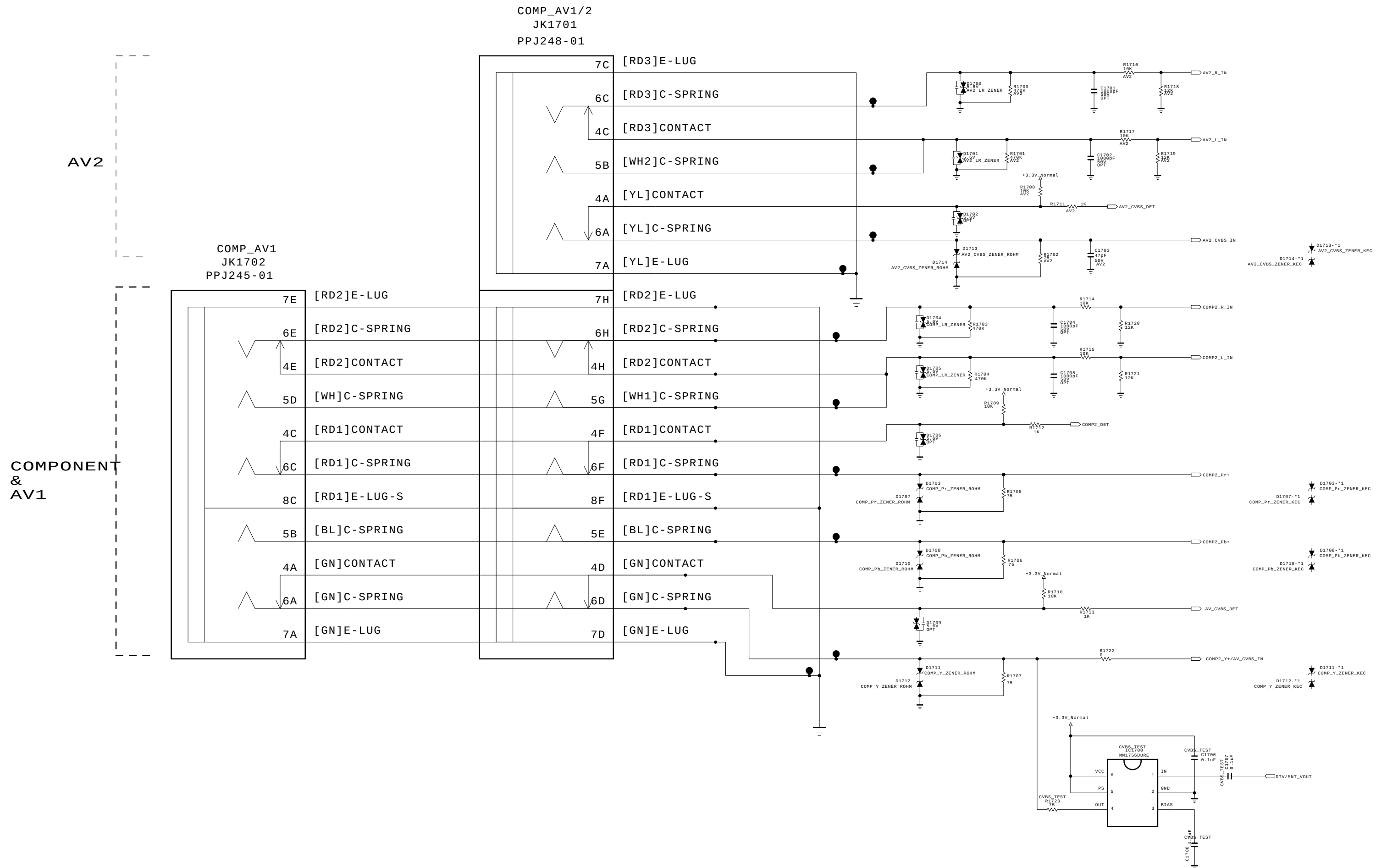
THE  SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE  SYMBOL MARK OF THE SCHEMATIC.

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MODEL	NC4_S7LRM	DATE	2012/06/20
BLOCK	HEADPHONE	SHEET	15 /

COMPONENT1 & AV (COMMON), AV2



THE  SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE 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.

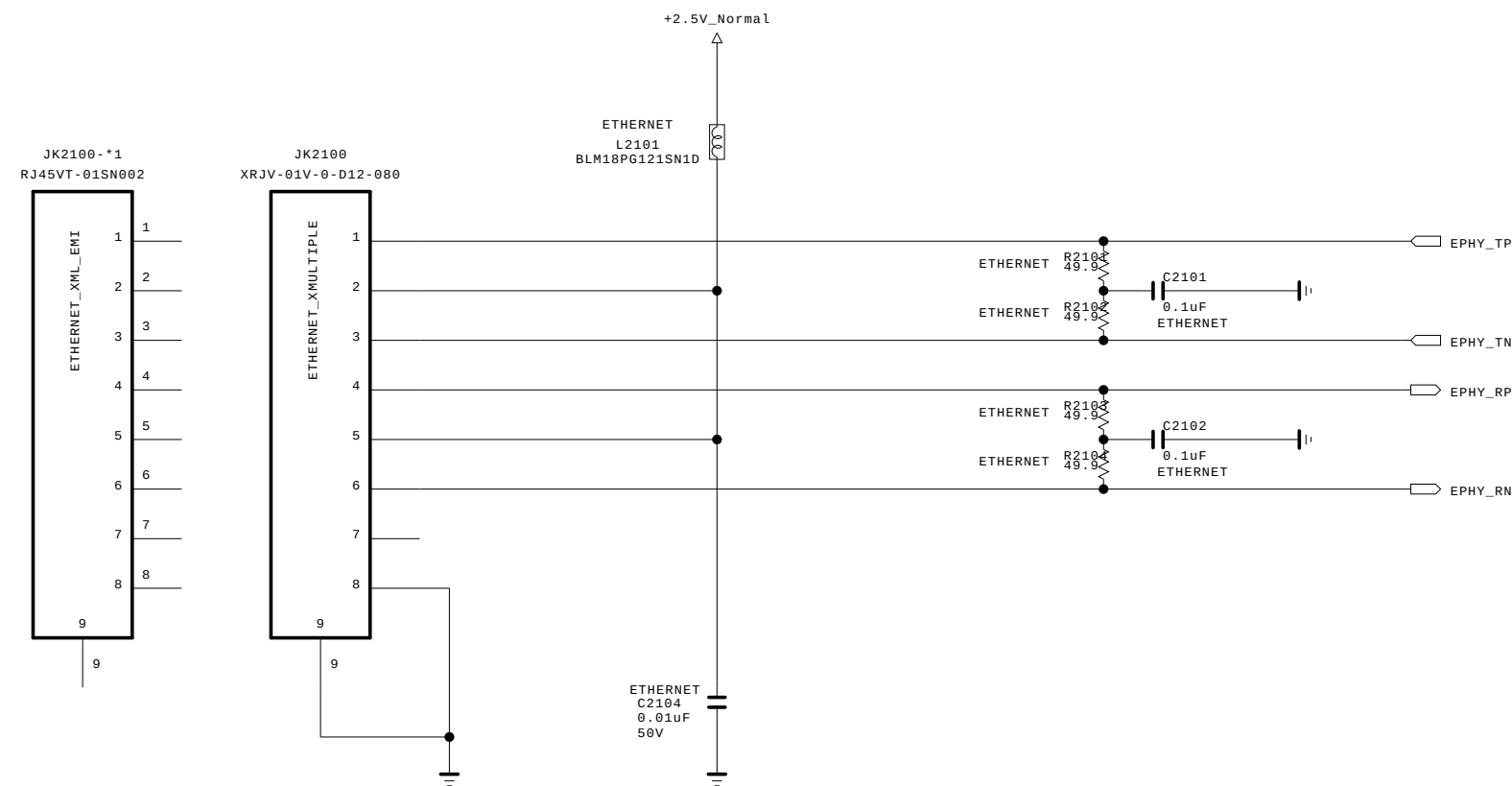
SECRET
LGElectronics



MODEL	NC4_S7LRM	DATE	2012.08.14
FIGURE	REAR NON EU L	SHEET	17 /

ETHERNET

* H/W option : ETHERNET



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

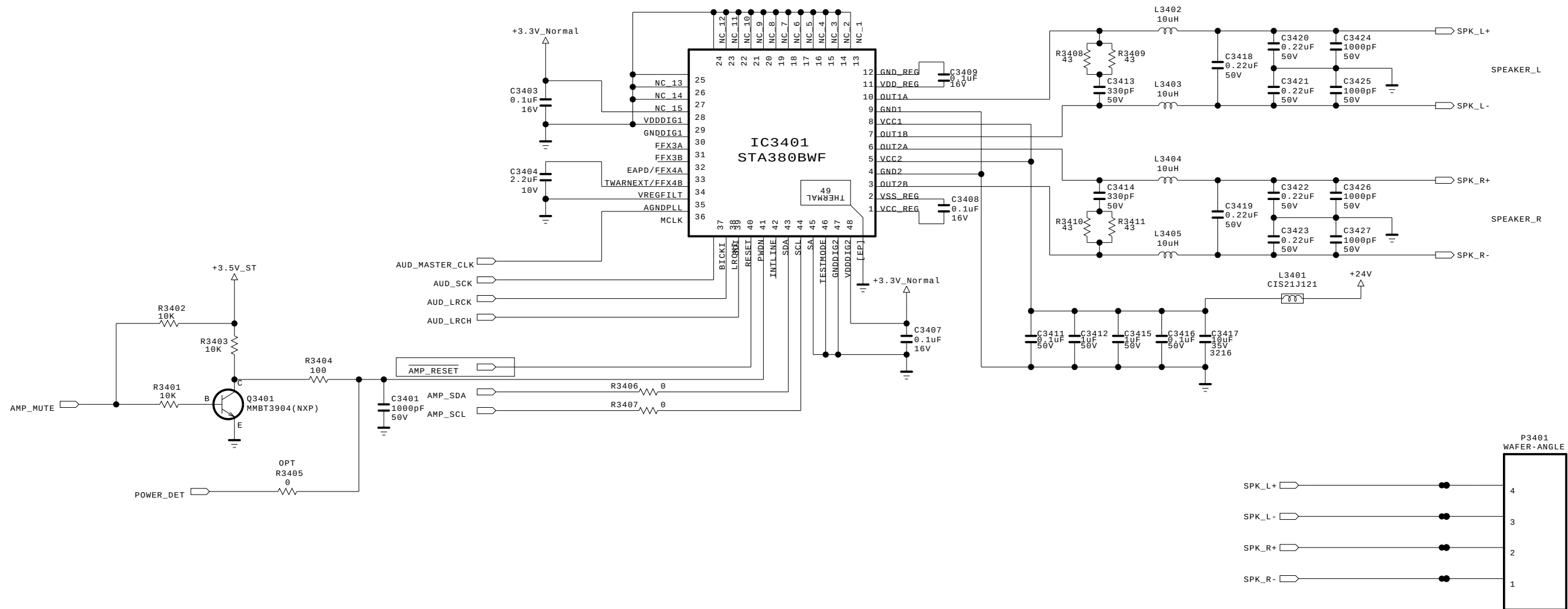
SECRET

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 LG ELECTRONICS

MODEL	NC4_S7LRM	DATE	2012/06/21
BLOCK	LAN	SHEET	21 /

AUDIO AMP (STA380BWEF)



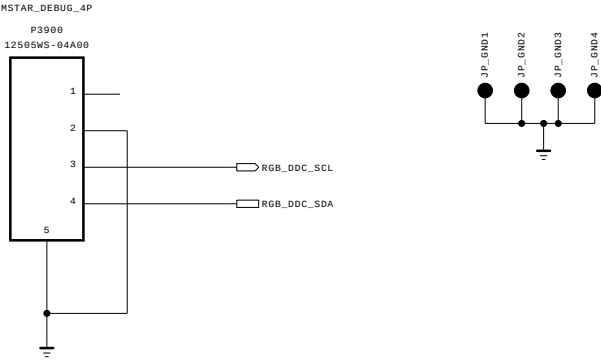
THE  SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE  SYMBOL MARK OF THE SCHEMATIC.

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MODEL	NC4_S7LRM	DATE	2012/08/29
BLOCK	AMP_STA380BWEF	SHEET	34 /

MSTAR_DEBUG_4PIN



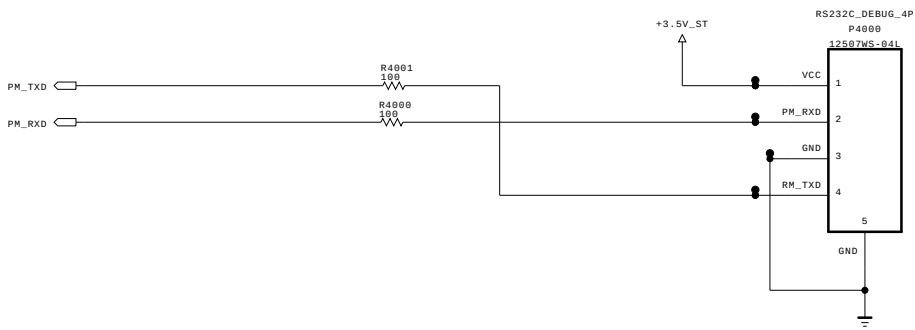
THE ⚠ SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFATURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMATIC.

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MODEL	NC4_S7LRM	DATE	2012/06/20
BLOCK	MSTAR_DEBUG_4PIN	SHEET	39 /

RS - 232C

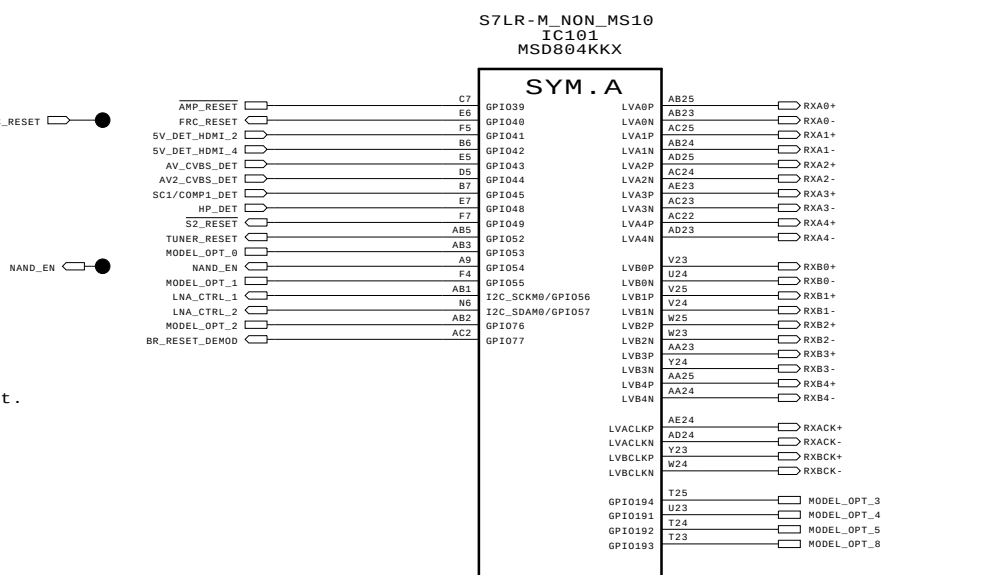
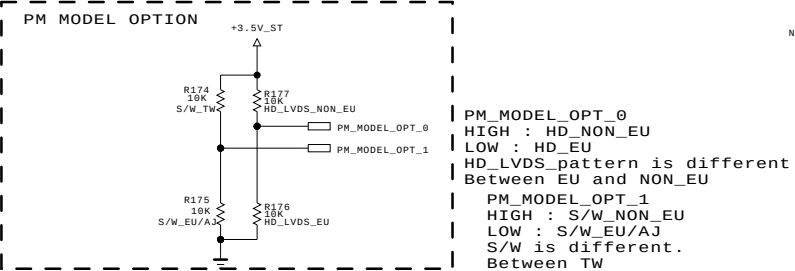
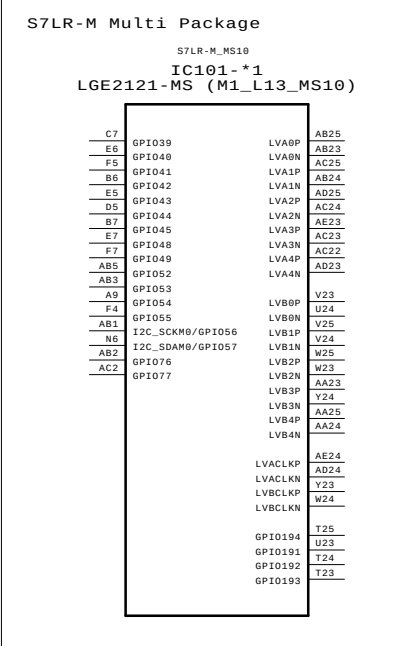
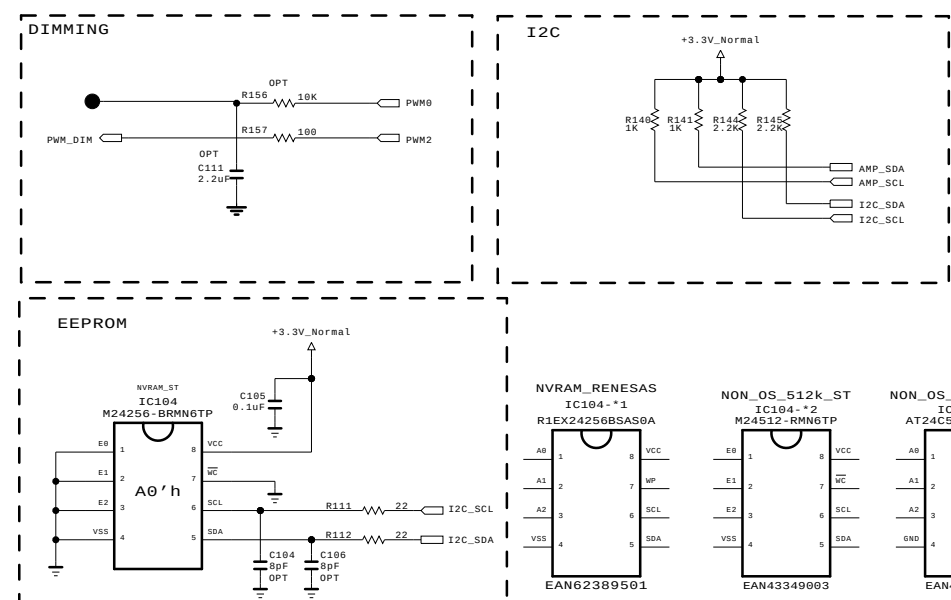
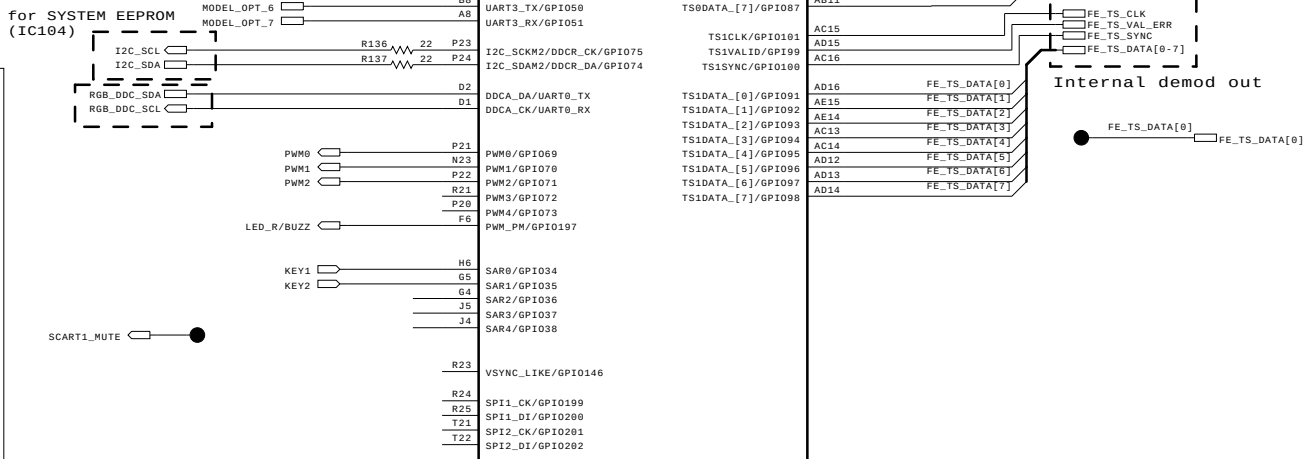
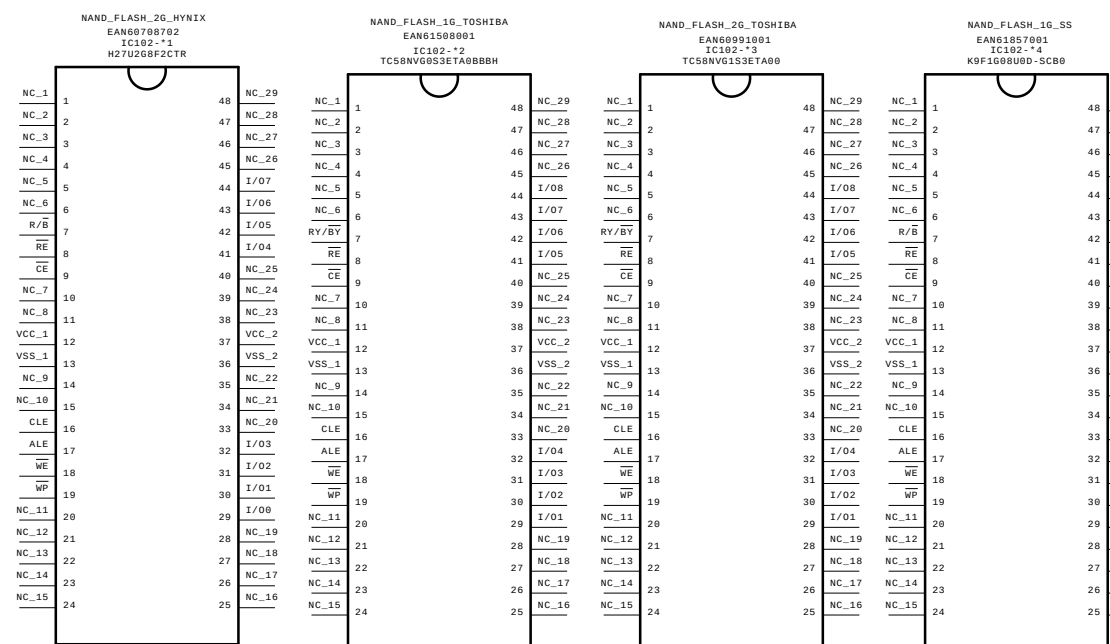
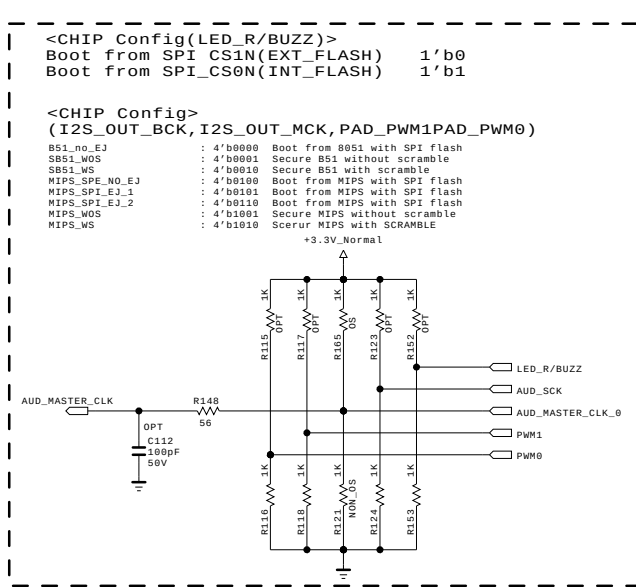


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MODEL	NC4_S7LRM	DATE	2012/06/20
BLOCK	RS232C_4P_0S	SHEET	40 /

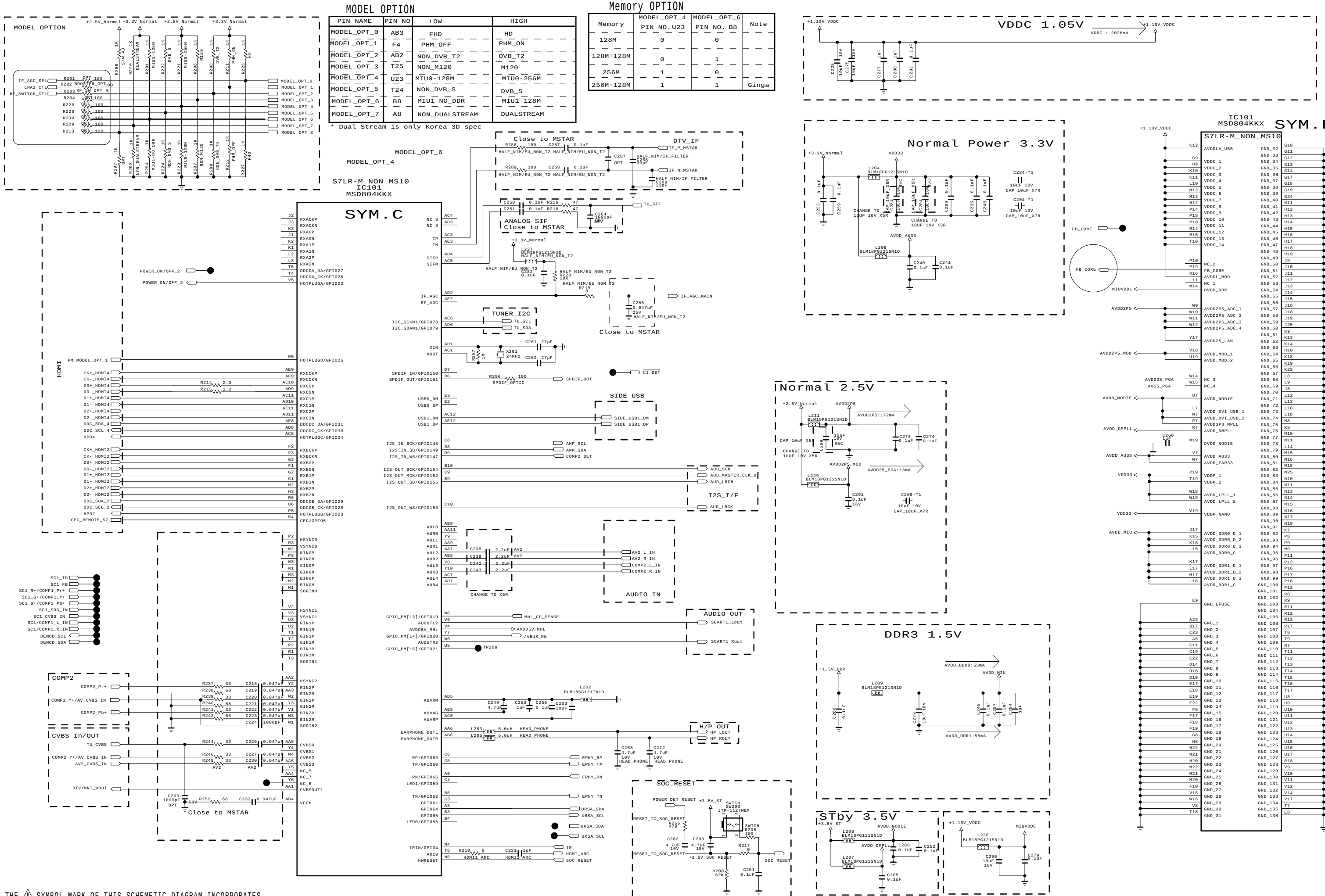


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MODEL	NC4_S7LRM	DATE	2012/09/19
BLOCK	MAIN1_NON_EU	SHEET	51 /



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

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MODEL	NC4_S7LRM	DATE	2012.09.19
BLOCK	MAIN2_NON_EU	SHEET	52

