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LCD TV

SERVICE MANUAL

CHASSIS : LC12E

MODEL : 32LV5700	32LV5700-CA
37LV5700	37LV5700-CA
42LV5700	42LV5700-CA
47LV5700	47LV5700-CA

CAUTION

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

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SAFETY PRECAUTIONS

IMPORTANT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These parts are identified by ⚠ in the Schematic Diagram and Exploded View.

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

Do not modify the original design without permission of manufacturer.

General Guidance

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

It will also protect the receiver and 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 1W), keep the resistor 10mm 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 $1M\Omega$ and $5.2M\Omega$.

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.

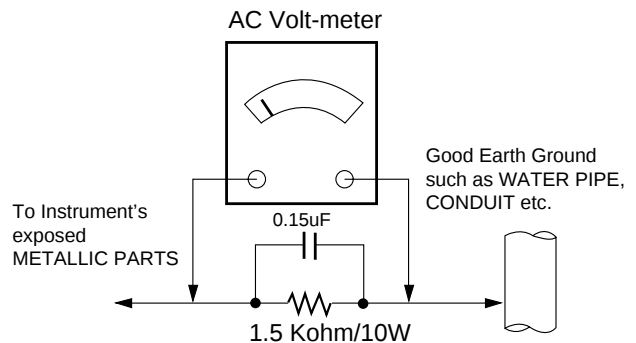
Connect 1.5K/10watt resistor in parallel with a 0.15uF capacitor between a known good earth ground (Water Pipe, Conduit, etc.) and the exposed metallic parts.

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 0.5mA.

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



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)
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 1.25cm) 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.

Product Specification

LC12E

GL1 Group

LCD TV Research Department 3

LG ELECTRONICS Inc.

LC12E Product Specification

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LC12E Product Specification

1. Application range.

This spec sheet is applied to the LCD TV used LC12E chassis.

Chassis	Basic Model Name	Market Place	Brand	Remarks
LC12E	42LV5700-CA 47LV5700-CA 55LV5700-CA	CHIINA(PAL/DTMB Market)	LG	
	32LV5700-CA 37LV5700-CA 42LV5700-CA 47LV5700-CA	HONG KONG(PAL/DTMB Market)	LG	
	42LV5740-CE 47LV5740-CE 55LV5740-CE	CHIINA(PAL/DTMB Market)	LG	

	LC12E Product Specification		

2. Specification

Each part is tested as below without special appointment.`

- 2.1 Temperature : 25±5℃ (77±9°F), CST : 40±5℃
- 2.2 Relative Humidity : 65±10%
- 2.3 Power Voltage : Standard input voltage (100~240V@ 50/60Hz)
Standard Voltage of each product is marked by models
- 2.4 Specification and performance of each parts are followed each drawing and specification by part number in accordance with BOM .
- 2.5 The receiver must be operated for about5 minutes prior to the adjustment

LC12E Product Specification

3. Test method

3.1 Performance : LGE TV test method followed.

3.2 Demanded other specification

Safety : CE, IEC specification

EMC : CE, IEC

Model	Market	Appliance	Remarks
42/47/55LV5700-CA	CHINA (PAL/DTMB Market)	Safety : IEC/EN60065 EMI : EN55013 EMS : EN55020	
32/3742/47LV5700-CA	HONG KONG (PAL/DTMB Market)	Safety : IEC/EN60065 EMI : EN55013 EMS : EN55020	
42/47/55LV5740-CE	CHINA (PAL/DTMB Market)	Safety : IEC/EN60065 EMI : EN55013 EMS : EN55020	

LC12E Product Specification

4. Electrical Specification

4.1 Module Specification

4.1.1 General Specification (2D 100Hz)

No	Item	Specification	Measurement	Result	Remark
1	Display Screen Device	32,37,42,47,55,60 wide Color Display Module			LCD
2	Aspect Ratio	16:9			
3	LCD Module	32" 120Hz Edge LED (LC320EUD-SDA1) 37" 120Hz Edge LED (LC370EUD-SDA1) 42" 120Hz Edge LED (LC420EUF-SDA1) 47" 120Hz Edge LED (LC470EUF-SDA1) 55" 120Hz Edge LED (LC550EUF-SDA1)			LGD
4	Operating Environment	Temp. : 0 ~ 50 deg Humidity : 10 ~ 90 %			
5	Storage Environment	Temp. : -20 ~ 60 deg Humidity : 10 ~ 90 %			
6	Input Voltage	AC100 ~ 240V, 50/60Hz			
7	Power Consumption	Power on (White)			
		32" LGD Typ : 51W			
		37" LGD Typ : 75.17W			
		42" LGD Typ : 71.6W			
		47" LGD Typ : 81.9W			
		55" LGD Typ : 102.4W			
	Module Size	32" LGD Typ : 735.4(H)×433.0 (V) X10.8(B)/23.6(D)mm			
		37" LGD Typ : 856.4(H)×501.0 (V)×10.8(B)/23.6(D) mm			
		42" LGD Typ: 968.4(H) × 564(V) X 10.8(B)/18.3 mm(D)			
		47" LGD Typ: 1078.6(H) × 626.0(V) X 10.8(B)/22.9 mm			
		55" LGD Typ: 1255.6(H) × 726.4(V) X 19.0(B)/10.8 mm			
	Surface treatment	Hard coating(3H), Anti-glare treatment of the front polarizer (Haze 10%)			

LC12E Product Specification

4.2 MODEL General Specification

No	Item	Specification	Measurement	Result	Remarks
1	Market	CHINA, HONG KONG			
2	Broadcasting system	1) PAL-DK 2) PAL-I 3) NTSC-M 4) DTMB 5) DVB-C			DTMB : DMB-T (Multi Carrier) + ADTB-T (Single Carrier)
3	Receiving system	Analog : Upper Heterodyne Digital : COFDM, QAM			► DTMB (Carrier, Code Rate, Constellation, Frame Header, Interleaving) ※ China - MODE1 : 3780, 0.4, 16QAM, PN945, 720, 9.626Mbps - MODE2 : 1, 0.8, 4QAM, PN595, 720, 10.396Mbps - MODE3 : 3780, 0.6, 16QAM, PN945, 720, 14.438Mbps - MODE4 : 1, 0.8, 16QAM, PN595, 720, 20.791Mbps - MODE5 : 3780, 0.8, 16QAM, PN420, 720, 21.658Mbps - MODE6 : 3780, 0.6, 64QAM, PN420, 720, 24.365Mbps - MODE7 : 1, 0.8, 32QAM, PN595, 720, 25.989Mbps ※ Hong Kong - 3780, 0.4/0.6, 4/16/64QAM, PN945, 720 ► DVB-C - Symbolrate : 4.0Msymbols/s to 7.2Msymbols/s - Modulation : 16QAM, 64-QAM, 128-QAM and 256-QAM
4	Video Input RCA(2EA)	PAL, NTSC			4 System : PAL, SECAM, NTSC, PAL60 Rear 1EA, AV gender jack 1EA

LC12E Product Specification

No	Item	Specification	Measurement	Result	Remarks
5	Head phone out	Antenna, AV1, AV2, AV3, Component, RGB, HDMI1, HDMI2, HDMI3, HDMI4, USB			
6	Component Input (1EA)	Y/Cb/Cr Y/Pb/Pr			Component Gender 1EA
7	RGB Input	RGB-PC			Analog(D-SUB 15PIN)
8	HDMI Input (4EA)	HDMI1-DTV/DVI HDMI2-DTV HDMI3-DTV HDMI4-DTV			PC(HDMI version 1.3) Support HDCP
9	Audio Input (4EA)	RGB/DVI Audio Component AV1,2			L/R Input
10	SDPIF out (1EA)	SPDIF out			
11	USB (2EA)	EMF, DivX HD, For SVC (download)			JPEG, MP3, DivX HD

LC12E Product Specification

5. Feature and Function

No	Item	Specification	Measurement	Result	Remarks
1	TV/ DTV Input	1 Analog : PAL BG, DK, I/I' Digital : DTMB,DVB-C			Right : DTMB, Analog Left : DVB-C, Analog
2	RGB Input	1 Analog RGB (Separate)			D-Sub 15 pin, Side(1EA)
3	HDMI Input	4 Digital Input			Rear(4EA)
5	AV Input	2 CVBS/L/R			Rear (1EA), Side (1EA)
7	Component Input	1 480i /576i/480p/576p/720p/1080i/1080p			Side (1EA)
8	RS-232C	1 Remote Control			Rear (1EA)
9	Audio Input	4 RGB/DVI Audio,Component, AV, Side Gender(Component2, AV2)			Rear (3EA)
10	SPDIF Output	1 SPDIF out			Rear (1EA)
11	USB	2 EMF, DivX, For SVC (download)			Side (2EA)
12	Remocon Code	LG code			
13	Remote control	Wireless Remote Control			
14	Local Key	▼PR▲, ◀VOL▶, OK, MENU, INPUT, Power			8EA
15	Set Installation	Wall Mount / Desk top			
16	Main Power Key	O			Soft touch
17	PIP / POP Mode	X			
18	SSC (Split Screen) Mode	X			
19	Favorite	O			
20	Teletext	O			
21	AVL	O			
22	On/Off Timer	O			
23	Aspect Ratio	16:9/JustScan/Original/Full Wide/4:3/14:9/Zoom/Cinema Zoom1/			
24	Picture Mode	Intelligent sensor/ Vivid/ Standard/Cinema/ Sport/ Game/ Expert1/ Expert2			
25	Sound Mode	Standard /Music /Cinema /Sport /Game			

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No	Item	Specification	Measurement	Result	Remarks
26	setup (SETUP)	Auto Tuning	Quick (/Frequency/Symbol rate/Modulation/Network ID/reset/Start and End frequency)		
		Auto Tuning (DVB-C)	Full (full frequency search)		
		Manual Tuning	DTV (UHF CH,Frequency)		
		Manual Tuning Programme Edit Programme Edit	TV/CATV (Storage, System, Band, Channel, Fine, Search, Name)		TV Mode.
			CADTV (Frequency, Symbol Rate, Modulation)		DTV-T Mode
			ATV/TV/: Favourite Pr. Group, Previous, watch, set as favourite,Skip, Move, block/unblock, Delete		
			CADTV: Favourite Pr. Group, Previous, watch, set as favourite,Skip, Move, block/unblock, Delete		DVB-S Mode
		Programme Edit	DTV/Radio/Cable radio: Favourite Pr. Group, Previous, watch, set as favourite,Skip, Move, block/unblock, Delete		TV Mode DTV Mode / Radio Mode
		Booster	On/Off		DTV (DTMB) Mode
		CI Information	Module		DTV (DVB-C) Mode
	Cable DTV Setting	Service operator Channel auto update(on/ff) Audio auto mode(on/off)			Only CHINA

LC12E Product Specification

No	Item		Specification		Measurement	Result	Remarks
27	setup (PICTURE)	Aspect Ratio	16:9 -DTV,ATV, AV1/2, Component, RGB, HDMI1~4 Just Scan -DTV, Component, HDMI1~4(over 720p) Original - DTV,ATV, AV1/2, HDMI1~4 Full Wide(WSS signal) -ATV, AV1/2 4:3 -DTV,ATV, AV1/2, Component, RGB, HDMI1~4 14:9 -DTV,ATV, AV1/2,Component, HDMI1~4 Zoom -DTV,ATV, AV1/2,Component, HDMI1~4 Cinema Zoom 1 -DTV,ATV, AV1/2,Component, HDMI1~4				1. You can only select 4:3, 16:9 (Wide), 14:9, Zoom/Cinema Zoom in Component mode. 2. You can only select 4:3, Original, 16:9 (Wide), 14:9, Zoom/Cinema Zoom in HDMI mode. 3. You can only select 4:3, 16:9 (Wide) in RGB-PC, HDMI-PC mode only. 4. In DTV/HDMI/Component (over 720p) mode, Just Scan is available. 5. In Analogue/AV mode, Full Wide is available.
		Picture Wizard	O				Only for DVB-S model
		Energy Saving	Auto/Off/Minimum/Medium/Maximum/Screen Off				
		Picture Mode	Intelligent sensor/Vivid/ Standard/ Cinema/Game/ Expert1/ Expert2				
		Energy Saving	BackLight(0~100), Contrast(0~100), Brightness(0~100), Sharpness(0~100), Colour(0~100), Tint(R50~G50), Colour Temp(W50~C50), Picture Reset				
		Picture Mode	Advanced Control	Dynamic Contrast : Off, Low, Medium, High Dynamic Colour : Off, Low, High Clear white : off Skin Colour : 0 Noise Reduction : Off, Low, Medium. High Super resolution: on/off MPEG Noise Reduction: low medium high off Gamma : Low, Medium, High Black Level : Low, High Eye Care : on/off Real Cinema : on/off Colour Gamut : Standard, Wide xvYCC : on / off / Auto			

LC12E Product Specification

No	Item	Specification	Measurement	Result	Remarks
		TruMotion	TruMotion:Off, Low, High, User De-Judder:(user mode adjust)0-10 De-Blur:(user mode adjust)0-10		
		LED Local Dimming	OFF,Low,Medium,High		
		Screen	Resolution Auto Config Position Size Phase Reset		Only RGB mode
28	setup (Audio)	Auto volume	Off / On		
		Clear Voice II	Off / On		
		Balance	0 (L50 ~ R50)		
		Sound Mode	Standard /Music /Cinema /Sport /Game		
			Infinite Sound, Treble, Bass, Reset		
		Digital Audio Out	Auto, PCM		
		TV Speaker	Off / On		
29	setup (TIME)	DTV Audio Setting	Auto, AAC, Dolby Digital+, Dolby Digital, MPEG		DTV mode
		ARC Mode	OFF On		
		Sound Optimizer	Normal, Wall Mount Type ,Stand Type		
		AV Sync	AV Sync : Off/ On TV Speaker : SPDIF :		
		Clock	Date, Month, Year, Hour, Minute, Time Zone		
30	setup	Off Time	Repeat (Off, Once, Daily, Mon.~Fri., Mon.~Sat., Sat.~Sun., Sun.) Hour, Minute		DTV mode

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No	Item	Specification	Measurement	Result	Remarks
	(Lock)	On Time	Repeat (Off, Once, Daily, Mon.~Fri., Mon.~Sat., Sat.~Sun., Sun.) Hour, Minute, Input(Antenna, AV1, AV2, AV3, Component, RGB, HDMI1, HDMI2, HDMI3, HDMI4), Programme, Volume		DTV mode
		Sleep timer	Off / 10min / 20min / 30min / 60min / 90min / 120min / 180min / 240min		
		Set Password	New, Confirm		25
		Lock System	On / Off		
		Key Lock	Block Programme	DTV/RADIO/T V (Change, Navigation, Page Change, Previos, Block/Unblock)	
31	setup (Option)	Input Block	AV1, AV2,		
		Language	Menu Language	Chinese / English	
		Subtitle Language	Audio Language	Mandarin / Cantonese / English	
		Country	Subtitle Language	Mandarin / Cantonese / English	
		Country Hard of Heari	Beijing, others, Hong Kong		

LC12E Product Specification

No	Item	Specification	Measurement	Result	Remarks
		ng	Hard of hearing	On/off	
		Power Indicator	Standby Light	On / Off	
			Power Light	On / Off	
		My Media Setting	DMR(On Off), Divx VOD Registration, DivX Deregistration		
		Factory Reset	YES / NO		
		Factory Reset	YES / NO		
		Set ID	1 ~ 99		
32	Hot Key (Remote)	Mode Setting	Store Domo / Home Use		
		ENERGY SAVING	Auto/Off/Minimum/Medium/Maximum/Screen Off		
		INPUT	Antenna→AV1→AV2→Component1→Component2→RGB→HDMI1 →HDMI2 →HDMI3 →HDMI4 → Antenna		
		RATIO			
		TV/RAD			
		Q.MENU			
		MENU			
		GUIDE			
		RETURN			
		INFO			
		AV MODE			
		Etc.	POWER, Navigation key (Up, Down ,Left ,Right), OK, Numeric(0~9), P +/-, Δ +/-, RED KEY, GREEN KEY, YELLOW KEY, BLUE KEY SUBTITLE, REC KEY, SIMPLINK		
		MARK	Favorite List		
		MUTE	Audio Mute		
		LIST			
		Q.VIEW			
33	setup (Network)	APP/*	APP List		MHP model
		Network type	Wired / Wireless		
		Network Setting	IP Auto Setting / IP Manual Setting		
			IP Address(0.0.0.0)		

LC12E Product Specification

No	Item	Specification	Measurement	Result	Remarks
		Subnet Mask(0.0.0.0)			
		Gateway(0,0,0,0)			
		Network Status	DNS Server(0,0,0,0)		
		Network Status	Setting/Test/Close		
34	Customer support	Legal Notice			
		Software update			
		Picture test			
		Sound test			
		Signal test			
		Product service info.			
35	MENU(UI)	Netcast	Yahoo, netflix, accuwether,picasa, you tube		
36	MENU(UI)	APP.store	HOT(TBD), NEW(TBD)		
37	MENU(UI)	PR guide			
38	MENU(UI)	PR list			
39	MENU(UI)	Recorded list			
40	MENU(UI)	My media			
ex	MENU(UI)	Bottom widget	More, search, Appstore, yutnori, sudoku, jump, janggi		

LC12E Product Specification

6. Safety and Regulation

No	Item	Min	Typ	Max	Unit			Remarks
1.	Force Stability – Incline Plane Tip Test	10	12		Deg			IEC60065
2.	Clearances & Creepage, : AC-AC	3.0			mm			
3.	Clearances & Creepage, : AC-GND	3.0			mm			
4.	Clearances & Creepage : Primary ↔ Secondary	6			mm			
5.	Power Consumption, Max	32LV5700-CA 37LV5700-CA 42LV5700-CA 47LV5700-CA 55LV5700-CA	TBD	120 130 140 150 TBD	TBD	W		※ Energy Saving Spec Maximum: 40±15% - Min / Medium / Screen off has 10% difference each other. ※ Power Consumption Stand by - Power Indicator RED LED : Off ※ Dielectric Voltage (AC↔FG) - 1.5kV/100mA/1min - 1.8kV/100mA/1sec(M/P) ※ Dielectric Voltage(WITHOUT FG) External interface signal line↔AC - 3kV/100mA/1min - 3.6kV/100mA/1sec ※ Energy Saving Spec OFF : 100% Minimum: 80±10% Medium: 63±10% Maximum: 43±10% Screen Off: 29±10%
6.	Power Consumption, Stand by	All-inch	0.1	0.13	W			
7.	Dielectric Voltage	1.5			kV			
8.	Dielectric Voltage(for M/P)	1.8			kV		10 MΩ	
9.	Isolation Resistance	4		∞	MΩ			
10.	Leakage Current	UL/CSA		0.5	mA (rms)			
		Etc.		0.35	V Peak			
11.	Power cord Length	1.6	1.8	3.0	M			

LC12E Product Specification

No	Item		Min	Typ	Max	Unit			Remarks
12.	Sharp Edge		None						
13.	Korea Compliance	Safety	K60065			Not Applied			
		EMC	MIC Class A MIC Class B			Not Applied			
	UL Compliance	Safety	UL6500						
		EMC	FCC Part 15 Class A FCC Part 15 Class B			Applied			
	CSA Compliance	Safety	CSA60065						
		EMC	GRR Part II			A			
	IEC Compliance	Safety	IEC60065,			d			
		EMC	CISPR			Applied			
	CE Compliance	Safety	EN60065			Applied			
		EMC	EN55013, EN55020			Applied			
			EN61000-3-2			Harmonics			
			EN61000-3-3			Flicker			
			EN61000-4-2			ESD			
			EN61000-4-3			Radiated			
			EN61000-4-4			EFT			
			EN61000-4-5			Surge			
			EN61000-4-6			Conducted immunity			
			EN61000-4-11			Applied			

LC12E Product Specification

7. Video

No	Item	Min	Typ	Max	Unit			Remarks
1.	IF Rejection Ratio	-13.0			dB			
2.	Image Rejection Ratio	-13.0			dB			
3.	Adjacent CH Rejection, Upper	-6.0			dB			
4.	Adjacent CH Rejection, Lower	-13.0			dB			
5.	Sync Level			25	%			
6.	Color			7	%			
7.	AFT	-1.5		+1.5	MHz			
8.	AGC speed	100			Hz			Multi-Tuner(PAL/SECAM)
8.	Sub Carrier Pull In Range	-450		+450	Hz			
9.	Sub Carrier Delay	-1.5		+1.5	usec			
10.	AV Video Out Level	0.85	1.0	1.15	Vpp			AV Out
11.	AV Video Sync Out Level	0.25	0.3	0.35	Vpp			
12.	AV Burst Out Level	0.15	0.3	0.35	Vpp			
13.	AV Video Out Frequency Characteristic	3.0			MHz			
14.	AV Video Out S/N	40.0			DB			
15.	AV Video Out Frequency Characteristic	3.0			MHz			

LC12E Product Specification

No	Item	Min	Typ	Max	Unit			Remarks
16.	Color Distortion, DG			10	%			
17.	Color Distortion, DP			10	deg			
18.	Color S/N, AM	43			dB			
19.	Color S/N, PM	43			dB			
20.	AV Video In Level	0.85	1	1.15	Vpp			
21.	AV Sync In Level	0.25	0.3	0.35	Vpp			
22.	AV Burst In Level	0.15	0.3	0.35	Vpp			
23.	AV Video In Impedance 100KHz	67.5	75	82.5	Ohm			
24.	AV Video In Impedance 2MHz	67.5	75	82.5	Ohm			
25.	Video Processing Time (50Hz)			270	ms			Signal Time delay from input to output
26.	Video Processing Time (60Hz)			208	ms			Signal Time delay from input to output

LC12E Product Specification

8. Digital Receiver (DTMB)

8-1.Digital Receiver (DTMB : ADTB-T) : C=1, 16QAM, 0.8, PN=595, M=720

No	Item	Min	Typ	Max	Unit			Remarks
1	Frequency Range	474 52.5		866 219	MHz			UHF BAND VHF BAND
2	Input Impedance	75			Ω			
3	Carrier	C=1						
4	Modulation	4QAM, 16QAM, 32QAM						
5	Code Rate	0.8						
6	Frame Header	PN595						
7	Interleaver	M=720						
8-1	RF Sensitivity(VHF)	-85		-25	dBm			
8-2	RF Sensitivity(UHF)	-83		-25	dBm			
9	Channel Offsets	±150			kHz			
10	C/N with AWGN			14	dB			
11-1	PAL CCI Protection (Analog)			2	dB			
11-2	PAL CCI Protection (Digital)			14	dB			
12-1	PAL ACI protection(Analog Lower)			-37	dB			
12-2	PAL ACI protection(Analog Upper)			-36	dB			
12-3	PAL ACI protection(Digital)			-28	dB			
13	Ricean channel C/N			15	dB			
14	Rayleigh channel C/N			18	dB			

LC12E Product Specification

8-2.Digital Receiver (DTMB : DMB-T) : C=3780, 16QAM, 0.8, PN=420, M=720

No	Item	Min	Typ	Max	Unit			Remarks
1	Frequency Range	474 52.5		866 219	MHz			UHF BAND VHF BAND
2	Input Impedance	75			Ω			
3	Carrier	C=3780						
4	Modulation	16QAM, 64QAM						
5	Code Rate	0.4, 0.6, 0.8						
6	Frame Header	PN420, PN945						
7	Interleaver	M=720						
8-1	RF Sensitivity(VHF)	-85		-25	dBm			
8-2	RF Sensitivity(UHF)	-83		-25	dBm			
9	Channel Offsets	±150			kHz			
10	C/N with AWGN			14	dB			
11-1	PAL CCI Protection (Analog)			2	dB			
11-2	PAL CCI Protection (Digital)			14	dB			
12-1	PAL ACI protection(Analog Lower)			-37	dB			
12-2	PAL ACI protection(Analog Upper)			-36	dB			
12-3	PAL ACI protection(Digital)			-28	dB			
13	Ricean channel C/N			15	dB			
14	Rayleigh channel C/N			18	dB			

LC12E Product Specification

9. Digital Receiver (DVB-C)

No	Item		Min	Typ	Max	Unit			Remarks
1.	Frequency Range		52.5		866	MHz			
2.	Input Impedance		75			Ω			
3.	Symbol Rate		4000 Ks/s~7200 Ks/s						
4.	Modulation		16, 64, 128, 256QAM						
5	RF Sensitivity		47		70	dBuV			
6.	C/N with AWGN	16QAM			20.5	dB			
		32QAM			26.5	dB			
		64QAM			29.5	dB			
		128QAM			31.5	dB			
		256QAM			32.5	dB			

LC12E Product Specification

10. Chroma & Brightness

10.1 Module optical specifications.

* Edge LED 100Hz module (LGD)

for more details, refer to the module spec.

No.	Item	Specification		Min.	Typ.	Max.	Remark
1.	Viewing Angle<CR>10>	2D	Right/Left/Up/Down	89/89/89/89			CR>10
2.	Luminance	2D	Luminance (cd/m ²)	360	450		LC320EUD-SDA1
				320	400		LC370EUD-SDA1
				320	400		LC420EUF-SDA1
				320	400		LC470EUF-SDA1
				320	400		LC550EUF-SDA1
		Variation				1.3	MAX / MIN
3.	Contrast Ratio	CR		1100	1600		LC320EUD-SDA1 LC370EUD-SDA1 LC420EUF-SDA1 LC470EUF-SDA1 LC550EUF-SDA1
4	CIE Color Coordinates	RED	R _x		0.650		LC320EUD-SDA1 LC370EUD-SDA1 LC420EUF-SDA1 LC470EUF-SDA1 LC550EUF-SDA1
			R _y		0.331		
		Green	G _x		0.306		
			G _y		0.607		
		Blue	B _x		0.150		
			B _y		0.059		
		White	W _x		0.279		
			W _y		0.292		

1) Standard Test Condition(The unit has been 'ON')

2) Stable for approximately 60 minutes in a dark environment at 25℃

3) The values specified are at approximate distance 50Cm from the LCD surface

LC12E Product Specification

10.2 Chroma (PSM: Vivid, Color Temperature: Cool)

– except “RGB PC Mode PSM: Standard, Color Temperature: Medium”

** The W/B Tolerance is ± 0.002 for Adjustment, but for DQA ± 0.015

(W/B Variation Design(R&D) Spec : ± 0.002 , DQA Spec ± 0.015)

No	Item		Min	Typ	Max	Unit	Remark	
1.	Cool	White Balance, X axis White Balance, Y axis	0.267 0.271	0.269 0.273	0.271 0.275		DQA : ± 0.015 DQA : ± 0.015	<Test Condition> 85% Full white pattern Cool/Medium : Backlight 100
2.	Medium	White Balance, X axis White Balance, Y axis	0.283 0.291	0.285 0.293	0.287 0.295		DQA : ± 0.015 DQA : ± 0.015	Warm : Backlight 30
3.	Warm	White Balance, X axis White Balance, Y axis	0.311 0.327	0.313 0.329	0.315 0.331		DQA : ± 0.015 DQA : ± 0.015	** In the case of LED Model, Measure the color temperature at the warm mode after heat run T.V more than 60 minutes at Cinema mode.

Color Space : After 90min heat run, test the Color Space Spec

Luminance : After 90min heat run, test the Luminance Spec

■ **Color Temperature measure specification**

- 1) In non-impressed condition, measure White Balance displayable as much as possible LCD module.
- 2) Measuring instrument: CA-210 or a sort of Color Analyzer.
- 3) Pattern Generator : VG-828 or a sort of digital pattern generator (216 Gray)
- 4) Measure condition
 - Test pattern: 85% Full White pattern
 - SET condition : Contrast & Brightness Level default
 - Environment condition : Dark room in the non outside light
 - Video menu option condition

	LC12E Product Specification		/
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	Signal	Picture Mode	Backlight	Color Temp.	Dynamic Contrast	Dynamic Color	Eye Care	Black Level
RF	NTSC-M	Standard	100	0	Off	Off	Off	Low
	PAL	Standard	100	0	Off	Off	Off	Auto
AV	NTSC-J	Standard	100	0	Off	Off	Off	High
	PAL	Standard	100	0	Off	Off	Off	Auto
Component	1080p	Standard	100	0	Off	Off	Off	High
RGB	1024x768	Standard	100	0	Off deactivated			NA
HDMI	DTV 1080p	Standard	100	0	Off	Off	Off	Low

■ **Max Luminance measure specification**

- 1) In non-impressed condition, measure peak brightness displayable as much as possible LCD module.
- 2) Measuring instrument: CA-210 or a sort of Color Analyzer.
- 3) Pattern Generator : VG-828 or a sort of digital pattern generator (displayable Full White & 1/25 White Window pattern)
- 4) Measure condition
 - Test pattern: in center, 1/5(H) * 1/5(V) of Window Pattern (white pattern in non-impressed condition)
 - SET condition : Contrast & Brightness Level 100%
 - Environment condition : Dark room in the non outside light
 - Video menu option condition

	Signal	Picture Mode	Backlight	Color Temp.	Dynamic Contrast	Dynamic Color	Eye Care	Black Level
RF	NTSC-M	Standard	100	0	Off	Off	Off	Low
	PAL	Standard	100	0	Off	Off	Off	Auto
AV	NTSC-J	Standard	100	0	Off	Off	Off	High
	PAL	Standard	100	0	Off	Off	Off	Auto
Component	1080p	Standard	100	0	Off	Off	Off	High
RGB	1024x768	Standard	100	0	Off deactivated			NA
HDMI	DTV 1080p	Standard	100	0	Off	Off	Off	Low

	LC12E Product Specification		/
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■ **Brightness / Contrast tracking measure specification**

- 1) In non-impressed condition, measure peak brightness displayable as much as possible LCD module.
- 2) Measuring instrument: CA-210 or a sort of Color Analyzer.
- 3) Pattern Generator : VG-828 or a sort of digital pattern generator (displayable Full White & 1/25 White Window pattern)
- 4) Measure condition
 - Test pattern: in center, 1/5(H) * 1/5(V) of Window Pattern (white pattern in non-impressed condition)
 - Environment condition : Dark room in the non outside light
 - Video menu option condition : Shipment mode (In-stop)

■ **Contrast ratio measure specification**

- 1) Test display signal : 100%(255Gray)Full White Window signal & all Black Raster signal(0Gray)
- 2) Dark room measure condition : : Using touch type Color analyzer CA-210 Dark room in the non outside light
- 3) Bright room measure condition : In bright room of 150Lx illumination in the panel surface, locate a source of light on the above 45° of the panel surface.
- 4) Measure method
 - In standard test condition, impress 100%(255Gray)Full White Window Pattern signal .
measure center peak brightness degree LV of white window
 - Impress black Raster signal as contrast ratio measurement signal.
Measure black brightness degree Lb of central
Calculate the following numerical formula
Contrast ratio = LV / Lb
If it does not use Prior measurement, use generally simple test measurement.

	LC12E Product Specification		/
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	Signal	Picture Mode	Dynamic Contrast	Dynamic Color	Clear White	Black Level
RF	NTSC-M	Vivid	High	High	High	Low
	PAL	Vivid	High	High	High	Auto
AV	NTSC-J	Vivid	High	High	High	High
	PAL	Vivid	High	High	High	Auto
Component	1080p	Vivid	High	High	High	High
RGB	1024x768	Vivid	Off deactivated			NA
HDMI	DTV 1080p	Vivid	High	High	High	Low

■ **Luminance uniformity measure specification**

- 1) Impress 100 % (255Gray Level) full white pattern at the same peak brightness measurement.
- 2) Measure average brightness in IOP LED 17 points.

< EDGE LED >

1	4	7
2	5	8
3	6	9

Luminance uniformity: Min 77% (Full white (17 point measure))

LC12E Product Specification

10.3 SET Optical Feature

1) General feature

(Measurement Condition: Full white/ Dynamic) → Measure the black luminance after 30 seconds.

No	Item	Module	Luminance (min)	C/R(min)	Remark
			AV, COMPONENT, HDMI	AV, COMPONENT, HDMI	
1	32LV5700-CA 37LV5700-CA 42LV5700-CA 47LV5700-CA 55LV5700-CA	LGD	350	900	Except from the PC mode.
2	42LV5740-CE 47LV5740-CE 55LV5740-CE	LGD	350	900	Except from the PC mode.

2) Special feature (Dynamic CR)

No	Item	Min	Typ	Max	Inch	Power B/D	P/N	remark
	Dynamic CR (Only HDMI mode)	40000	50000	-				HDMI 720p Full Black Pattern (Min spec : Typ * 80%)

3) Special feature (Local Dimming Statics CR)

No	Item	Min	Typ	Max	Inch	Power B/D	P/N	remark
	Static CR (Only HDMI mode)	2200	3200	-				HDMI 720p Full Black Pattern (Min spec : Typ * 80%)

LC12E Product Specification

11. Audio

No.	Item	Min	Typ	Max	Unit	Remark
1	Spec In SVC mode EQ off(0)	9	10	12	W	
	RF Audio Output (RF 1kHz 100% modulation)	9	10	12	W	
	PC Audio Output (1KHz 0.7Vrms)	9	10	12	W	
2	Speaker Impedance		8		ohm	
	Speaker Power rating		10	12	W	
4	IF Rejection Ratio	-13			dB	PAL-BG
5	Image Rejection Ratio	-13			dB	PAL-BG
6	Adjacent CH Rejection, Upper	-6			dB	PAL-BG
7	Adjacent CH Rejection, Lower	-13			dB	PAL-BG
8	Audio S/N, Main (Mono)	40			dB	PAL-BG/DK/I
		37			dB	SECAM-L
9	Audio S/N, Sub (SAP)	40			dB	PAL-BG
10	Audio S/N, L	40			dB	PAL-BG
11	Audio S/N, R	40			dB	PAL-BG
12	Audio Buzz P/S Ratio	30			dB	PAL-BG/DK/I
		20			dB	SECAM-L
13	Audio Noise Limited Sensitivity, M			-80	dBm	PAL-BG/DK/I
				-60	dBm	SECAM-L
14	Audio Noise Limited Sensitivity, S			-70	dBm	PAL-BG
15	Audio F Response Low, L/Mono			80	Hz	PAL-BG/DK/I, SECAM-L
16	Audio F Response High, L/Mono	7	10	15	KHz	PAL-BG/DK/I
		6	10	15	KHz	SECAM-L

LC12E Product Specification

17	Audio F Response Low, R			80	Hz	PAL-BG
18	Audio F Response High, R	7	10	15	KHz	PAL-BG
19	Audio THD, L (Mono)			2	%	PAL-BG/DK/I, SECAM-L
20	Audio THD, R			2	%	PAL-BG
21	Audio Practical Max Output, L/Mono	9	10	12	W	PAL-BG/DK/I, SECAM-L
22	Audio Practical Max Output, R	9	10	12	W	PAL-BG
23	Audio Max Output, L/Mono	9	10	12	W	PAL-BG/DK/I, SECAM-L
24	Audio Max Output, R	9	10	12	W	PAL-BG
25	Max Distortion			20	%	PAL-BG/DK/I, SECAM-L
26	Audio Residual Hum, L/Mono			12.5	uW	PAL-BG/DK/I, SECAM-L
27	Audio Residual Hum, R			12.5	uW	PAL-BG
28	Dual Sound Crosstalk, Main			-45	dB	PAL-BG
29	Dual Sound Crosstalk, Sub			-45	dB	PAL-BG
30	Stereo Separation, L	25			dB	PAL-BG
31	Stereo Separation, R	25			dB	PAL-BG
32	Pilot Detection Sensitivity, Dual			-70	dBm	PAL-BG
33	Pilot Detection Sensitivity, Stereo			-70	dBm	PAL-BG
34	Audio Balance Deviation, L/R			1.5	dB	PAL-BG
35	Deviation Linearity	250			%	PAL-BG/DK/I, SECAM-L
36	Deviation 250% Max Distortion			10	%	PAL-BG/DK/I, SECAM-L
37	Output Level at Volume 30%	0.05	0.065	0.085	W	PAL-BG/DK/I, SECAM-L
38	NICAM Audio S/N, L	45			dB	PAL-BG
39	NICAM Audio S/N, R	45			dB	PAL-BG
40	NICAM Audio S/N, Main	45			dB	PAL-BG
41	NICAM Audio S/N, Sub	45			dB	PAL-BG
42	NICAM Audio Sensitivity			-75	dB	PAL-BG
43	NICAM Audio P/N Ratio	30			dB	PAL-BG
44	NICAM Audio F Response Low, L			80	Hz	PAL-BG
45	NICAM Audio F Response High, L	7	10	18	KHz	PAL-BG
46	NICAM Audio F Response Low, R			80	Hz	PAL-BG

LC12E Product Specification

47	NICAM Audio F Response High, R	7	10	18	KHz	PAL-BG
48	NICAM Audio Distortion, L			1	%	PAL-BG
49	NICAM Audio Distortion, R			1	%	PAL-BG
50	NICAM Audio Separation, L	40			dB	PAL-BG
51	NICAM Audio Separation, R	40			dB	PAL-BG
52	NICAM Audio Output, L	9	10	12	W	PAL-BG
53	NICAM Audio Output, R	9	10	12	W	PAL-BG
54	AV Audio Out Level, L	0.4	0.5	0.6	V	PAL-BG/DK/I
		0.4	0.5	0.6	V	SECAM-L
55	AV Audio Out Level, R	0.4	0.5	0.6	V	PAL-BG
56	AV Audio Out Crosstalk, L	20			dB	PAL-BG
57	AV Audio Out Crosstalk, R	20			dB	PAL-BG
58	AV Audio Out S/N, L	43(37)			dB	PAL-BG/DK/I, (SECAM-L)
59	AV Audio Out S/N, R	43			dB	PAL-BG
60	AV Audio Out Frequency Response, Low			40	Hz	PAL-BG/DK/I, SECAM-L
61	AV Audio Out Frequency Response, High	8	10	18	kHz	PAL-BG/DK/I
		6	10	18	kHz	SECAM-L
62	AV Audio Out Distortion			2	%	PAL-BG/DK/I, SECAM-L
63	AV Audio In Level, L	0.87		1.2	V	PAL-BG/DK/I, SECAM-L
64	AV Audio In Level, R	0.87		1.2	V	PAL-BG
65	AV Audio In Crosstalk, L	40			dB	PAL-BG
66	AV Audio In Crosstalk, R	40			dB	PAL-BG
67	AV Audio In S/N, L	43			dB	PAL-BG/DK/I
68	AV Audio In S/N, R	43			dB	PAL-BG
69	AV Audio In Frequency Response, Low			80	Hz	PAL-BG/DK/I, SECAM-L
70	AV Audio In Frequency Response, High	7	10	18	kHz	PAL-BG/DK/I, SECAM-L
71	AV Audio In Distortion			2	%	PAL-BG/DK/I, SECAM-L
72	AV Audio In Dynamic Range	2			V	PAL-BG/DK/I, SECAM-L
73	AV Audio In Max Distortion			10	%	PAL-BG/DK/I, SECAM-L
74	AV Audio In Impedance, 100 Hz	10			Kohm	PAL-BG/DK/I, SECAM-L

LC12E Product Specification

75	AV Audio In Impedance, 1 kHz	10			Kohm	PAL-BG/DK/I, SECAM-L
76	AVL	-8		8	dB	

12. Power

No	Item	Min	Typ	Max	Unit		Remarks
1.	AC Power Shut Down Voltage	90		264	Vac		
2.	DC Voltage, Inverter	47"	22.8	24	25.2	Vdc	
		55"	22.8	24	25.2	Vdc	
		60"	22.8	24	25.2	Vdc	
3.	DC Voltage, LCD Panel	47"	11.4	12.0	12.6	Vdc	
		55"	11.4	12.0	12.6	Vdc	
		60"	11.4	12.0	12.6	Vdc	
4.	DC Voltage, Stand By	3.15	3.5	3.85	Vdc		
5.	DC Voltage, Sound AMP	18.8	20	21.2	Vdc		NTP7400
	(20,24V)	22.8	24	25.2	Vdc		
	DC Voltage, Sound AMP (3.3V)	3.135	3.3	3.465	Vdc		
6.	DC Voltage, Tuner (3.3V)	0	3.3	3.6	Vdc		Full NIM
	DC Voltage, Tuner (2.5V)	2.2	2.5	2.8	Vdc		
	DC Voltage, Tuner (1.2V)	1.1	1.2	1.3	Vdc		
7.	DC Voltage, BCM (3.5V)	3.135	3.3	3.465	Vdc		Main
	DC Voltage, BCM (2.5V)	2.2	2.5	2.8	Vdc		
	DC Voltage, BCM (1.5V)	0.81	0.9	10	Vdc		
	DC Voltage, BCM (0.9)						
8.	DC Voltage, Micom	3.15	3.5	3.85	Vdc		Sanyo micom

LC12E Product Specification

13. Standard Level For Input Signal (Video, Audio, Y/C, Component, RGB)

No	Item	Min	Typ	Max	Unit			Remarks
1.	Video Input Level	0.9	1	1.1	Vpp			
2.	S Video Input Level(Y)	0.85	1	1.15	Vpp			
3.	S Video Input Level(C-Burst)	0.143		0.286	Vpp			
4.	Audio Input Level	0.4	0.5	0.6	Vrms			PAL,SECAM
5.	Component Video Input Level (Y, C _B /P _B , C _R /P _R)	0.6	0.7	0.8	Vpp			
6.	R/G/B Video Input Level,	0.6	0.7	0.8	Vpp			

LC12E Product Specification

14. Component Video Input (Y, P_B, P_R)

No.	Specification				Remark
	Resolution	H-freq(kHz)	V-freq(Hz)		
1.	720×480	15.73	60.00	SDTV, DVD 480i	
2.	720×480	15.63	59.94	SDTV, DVD 480i	
3.	720×480	31.47	59.94	480p	
4.	720×480	31.50	60.00	480p	
5.	720×576	15.625	50.00	SDTV, DVD 625 Line	
6.	720×576	31.25	50.00	HDTV 576p	
7.	1280×720	45.00	50.00	HDTV 720p	
8.	1280×720	44.96	59.94	HDTV 720p	
9.	1280×720	45.00	60.00	HDTV 720p	
10.	1920×1080	31.25	50.00	HDTV 1080i	
11.	1920×1080	33.75	60.00	HDTV 1080i	
12.	1920×1080	33.72	59.94	HDTV 1080i	
13.	1920×1080	56.250	50	HDTV 1080p	
14.	1920×1080	67.5	60	HDTV 1080p	

LC12E Product Specification

15. RGB Input (PC)

No	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	Proposed	Remarks
1.	720*400	31.468	70.08	28.321		For only DOS mode
2.	640*480	31.469	59.94	25.17	VESA	Input 848*480 60Hz, 852*480 60Hz ➔ 640*480 60Hz Display
3	800*600	37.879	60.31	40.00	VESA	
4	1024*768	48.363	60.00	65.00	VESA(XGA)	
5	1360*768	47.72	59.8	84.75	WXGA	
6	1920*1080	66.587	59.93	138.625	WUXGA	FHD model

15-1. EDID Data (RGB-PC)

* RGB-PC EDID DATA:

Refer to adjust specification.

LC12E Product Specification

16. HDMI input

16-1. DTV mode

No	Resolution	H-freq(kHz)	V-freq.(kHz)	Pixel clock(MHz)	Proposed	Remarks
1.	720*480	31.469 / 31.5	59.94 / 60	27.00/27.03	SDTV 480P	
2.	720*576	31.25	50	54	SDTV 576P	
3.	1280*720	37.500	50	74.25	HDTV 720P	
4.	1280*720	44.96 / 45	59.94 / 60	74.17/74.25	HDTV 720P	
5.	1920*1080	33.72 / 33.75	59.94 / 60	74.17/74.25	HDTV 1080I	
6.	1920*1080	28.125	50.00	74.25	HDTV 1080I	
7.	1920*1080	26.97 / 27	23.97 / 24	74.17/74.25	HDTV 1080P	
8.	1920*1080	33.716 / 33.75	29.976 / 30.00	74.25	HDTV 1080P	
9.	1920*1080	56.250	50	148.5	HDTV 1080P	
10.	1920*1080	67.43 / 67.5	59.94 / 60	148.35/148.50	HDTV 1080P	

16-2. PC mode

No	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	Proposed	Remarks
1.	720*400	31.468	70.08	28.321		HDCP
2.	640*480	31.469	59.94	25.17	VESA	HDCP
3	800*600	37.879	60.31	40.00	VESA	HDCP
4	1024*768	48.363	60.00	65.00	VESA(XGA)	HDCP
5	1360*768	47.72	59.8	84.75	WXGA	HDCP
6	1280*1024	63.595	60.0	108.875	SXGA	HDCP / FHD model
7	1920*1080	67.5	60.00	138.625	WUXGA	HDCP / FHD model

LC12E Product Specification

17. RGB/HV Control Signal In/Out Spec (D-sub15 pin Cable)

No	Pin Name	Min	Typ	Max	Unit	Spec.			Remarks
1	R	0.65	0.7	0.75	Vpp	750hm			
2	G	0.65	0.7	0.75	Vpp	750hm			
3	B	0.65	0.7	0.75	Vpp	750hm			
4	NC								
5	ID_DSUBN	3	5	5.5	Vdc	D-sub Enable			
6	GND					Case Common GND			
7	GND					Case Common GND			
8	GND					Case Common GND			
9	NC								
10	GND					Case Common GND			
11	NC								
12	SDA	3.0	4.5	5.5	Vdc				
13	H_SYNC	3.0	5.0	5.5	Vdc				
14	V_SYNC	3.0	5.0	5.5	Vdc				
15	SCL	3.0	4.5	5.5	Vdc				

LC12E Product Specification

18.USB Input

18.1 PHOTO/MUSIC

No	Extension	Item	Profile	Measurement	Result	Remark
1	PHOTO	JPEG, JPG, JPE	Support File type	SOF0 : baseline SOF1 : Extend Sequential SOF2 : Progressive		
			Picture Size	Min : 64 * 64 Max : - Normal type : 15360(W)*8640(H) - Progressive type : 1920(W) * 1440(H)		
2	MUSIC	MP3	Bit rate	32kbps~320kbps		
			Sample freq.	32kHz~48kHz		
			Support	MPEG1, MPEG2, MPEG2.5 Layer2, Layer3		

18.2 MOVIE

■ VIDEO

No	Item		Specification	Measurement	Result	Remark
1	MPG MPEG VOB	Extended name	mpg, mpeg, vob			
		Video Size	1920 X 1080 ≤ 30FPS 1280 X 720 ≤ 60FPS 720 X 576 ≤ 50FPS 720 X 480 ≤ 60FPS			
		Video Format	MPEG-1, MPEG-2			
		Audio Format	AC3, MPEG, MP3, PCM			
2	DAT	Extended name	dat			
		Video Size	1920 X 1080 ≤ 30FPS 1280 X 720 ≤ 60FPS 720 X 576 ≤ 50FPS 720 X 480 ≤ 60FPS			

LC12E Product Specification

No	Item		Specification	Measurement	Result	Remark
		Video Format	MPEG-1			
		Audio Format	AC3, MPEG, MP3, PCM			
3	TS TRP TP	Extended name	ts, trp, tp			
		Video Size	1920 X 1080 ≤ 30FPS 1280 X 720 ≤ 60FPS 720 X 576 ≤ 50FPS 720 X 480 ≤ 60FPS			
		Video Format	MPEG-2, H.264			H.264 : profile level ≤ 4.0
		Audio Format	AC3, AAC, MPEG			
		Extended name	mp4			
4	MP4	Video Size	1920 X 1080 ≤ 30FPS 1280 X 720 ≤ 60FPS 720 X 576 ≤ 50FPS 720 X 480 ≤ 60FPS			
		Video Format	MPEG-4 SP, MPEG-4 ASP, DivX 3.11, DivX 4.12, DivX 5.x, DivX 6, Xvid 1.00, Xvid 1.01, Xvid 1.02, Xvid 1.03, Xvid 1.10-beta 1, Xvid 1.10-beta 2, H.264			H.264 : profile level ≤ 4.0
		Audio Format	AC3, EAC3, HEAAC, AAC, MPEG, MP3, PCM			
		Extended name	avi			
5	AVI	Video Size	1920 X 1080 ≤ 30FPS 1280 X 720 ≤ 60FPS 720 X 576 ≤ 50FPS 720 X 480 ≤ 60FPS			

LC12E Product Specification

No	Item		Specification	Measurement	Result	Remark
		Video Format	MPEG-2, MPEG-4 SP, MPEG-4 ASP, DivX 3.11, DivX 4, DivX 5, DivX 6, Xvid 1.00, Xvid 1.01, Xvid 1.02, Xvid 1.03, Xvid 1.10-beta 1, Xvid 1.10-beta 2, H.264			H.264 : profile level ≤ 4.0
		Audio Format	AC3, EAC3, HEAAC, AAC, MPEG, MP3, PCM			
6	MKV	Extended name	mkv			
		Video Size	1920 X 1080 ≤ 30FPS 1280 X 720 ≤ 60FPS 720 X 576 ≤ 50FPS 720 X 480 ≤ 60FPS			
		Video Format	H.264, MPEG-1, MPEG-2, MPEG-4 SP, MPEG-4 ASP, AVC			H.264 : profile level ≤ 4.0
		Audio Format	AC3, EAC3, HEAAC, AAC, MPEG, MP3, PCM			
7	DIVX	Extended name	DivX			
		Video Size	1920 X 1080 ≤ 30FPS 1280 X 720 ≤ 60FPS 720 X 576 ≤ 50FPS 720 X 480 ≤ 60FPS			
		Video Format	MPEG-2, MPEG-4 SP, MPEG-4 ASP, DivX 3.11, DivX 4, DivX 5, DivX 6, Xvid 1.00, Xvid 1.01, Xvid 1.02, Xvid 1.03, Xvid 1.10-beta 1, Xvid 1.10-beta 2, H.264			H.264 : profile level ≤ 4.0
		Audio Format	AC3, EAC3, HEAAC, AAC, MPEG, MP3, PCM			

■ AUDIO

No	Audio Codec	Bit rate	Sampling rate	Measurement	Result	Remark
1	MP3	32kbps~320kbps	32kHz ~ 48kHz			Not Support : DTS Audio Codec
2	AC3,EAC3	32kbps~640kbps	32kHz, 44.1kHz, 48kHz			
3	MPEG	32kbps~448kbps	32kHz ~ 48kHz			

	LC12E Product Specification		/
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4	AAC,HEAAC	24kbps~3844kbps	8kHz ~ 96kHz			
5	CDDA	1.44kbps	44.1kHz			
6	PCM	1.41~9.6Mbps	Multi-channel : 44.1kHz,88.2kHz/48kHz,96kHz Stereo : 176.4kHz, 192kHz			

■ SUBTITLE

No	File Extension	Subtitle language	Support Language	Measurement	Result	Remark
1	smi,srt,sub,ssa,ass,ps b,txt	Latin1	English, Spanish, French, German, Italian, Swedish, Finnish, Dutch, Portuguese, Danish, Romanian, Norwegian, Albanian, Gaelic, Welsh, Irish, Catalan, Valencian			
2		Latin2	Bosnian, Polish, Croatian, Czech, Slovak, Slovenian, Serbian, Hungarian			
3		Latin4	Estonian, Latvian, Lithuanian			
4		Cyrillic	Bulgarian, Macedonian, Russian, Ukrainian, Kazakh			
5		Greek	Greek			
6		Turkish	Turkish			

LC12E Product Specification

19. WIFI(TBD)

20. Screen Size (over scan spec)

· LG Test PAL/NTSC title Reference #2 basis.

Horizontal size is 8% (left 4%+ right 4%) over scan.

	ATV	DTV	AV1/AV2	AV3	Component	HDMI 1/2/3/4	RGB
Vertical	93.5%	93%	93.5%	93.5%	96%	96%	100%
Horizontal	93.5%	92%	93.5%	93.5%	96%	96%	100%

21. The others

No	Item		Min	Typ	Max	Unit		Remarks
1.	Soft Ware Functionality Test							LGE Specification
2.	REMOCON Working Sensitivity, Straight		12			M		
3.	REMOCON Working Sensitivity		9			M		L/R, 30 degree
			7			M		T/B, 30 degree
			6			M		3 wave length 650Lux, Susceptibility characteristic 1200Lux
4.	Emitted audible Noise	Average			18.0	dB		Front Side (Distance:1m)

LC12E Product Specification

No	Item	Min	Typ	Max	Unit			Remarks
	(B&K2260)			25.0	dB			Rear Side (Distance 1m)
5.	TEXT Sensitivity	-70			dBm			

22. Reliability

No	Item	Min	Typ	Max	Unit			Remarks
1.	ESD	15			kV			IEC-1000-4-2
2.	EFT/Burst	2			kV			IEC-1000-4-4
3.	Surge Immunity	4			kV			IEC-1000-4—5
4.	Voltage Dip Test, 10ms	100			%			IEC-1000-4-11
5.	Voltage Dip Test, 100ms	40			%			IEC-1000-4-11
6.	CST							LGE Specification
7.	Abnormal Test							LGE Specification
8.	Operation Temperature	0	25	40	deg			LGE Specification
9.	Operation Humidity			80	%			LGE Specification
10.	Storage Temperature	-20		60	Deg			LGE Specification
11.	Storage Humidity			85	%			LGE Specification
12.	Accumulated MTBF	180,000			Hours			LGE Specification

	LC12E Product Specification		

No	Item	Min	Typ	Max	Unit			Remarks
13.	Ship Test							LGE Specification

23. LED Control

LED	Operating Status	LED Color	Abnormal	비고
LED Indicator	Off	none		
	ST-BY	Off or Red		Default : Off
	Power On	White		
	Remote control key	White Blinking		
	Power On Sequence	Red (or Off) -> White Blinking -> White		

LC12E Product Specification

24. SET factoring condition

No.	Item		Condition	Remark	
1.	Power		Off		
3.	Volume Level		10		
4.	Main Picture Input		DTV	DTV&ATV	
5.	Main Last Channel		N.A.		
6.	Mute		Off		
7.	ARC		16:9(DTV)		
8.	SETUP (DTV&ATV)	Auto Tuning			
		Manual Tuning	DTV/TV		
		Programme edit	TV/DTV/Radio		
		Booster			
		CI information	Module		
9.	PICTURE	Aspect Ratio	16:9		
		Picture Wizard			
		Energy Saving	Off		
		Picture Mode	Standard		
			Backlight	TBD	
				TBD	
			Contrast	100	
			Brightness	50	
			Sharpness	70	
			Colour	60	
			Tint	0	
			Colour Temp	0	
				Dynamic Contrast	Medium
				Dynamic Colour	Low
				Clear White	off
				Skin Colour	0
				Noise Reduction	Low
				Digital Noise Reduction	Medium

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				Gamma	Medium
				Black level	Auto
				Eye Care	Low
				Real Cinema	On
				Colour Gamut	Wide
				xvYCC	Off
				Picture Reset	
				TruMotion	Low
				Resolution	
				Auto Config	
10.	AUDIO	Screen	Position		
			Size		
			Phase		
			Reset		
			Auto Volume	Off	
			Clear Voice II	Off	On Level 3
			Balance	0	
		Sound Mode	Standard	Standard Music Cinema Sport Game	
			Infinity Sound : off	Treble	50
				BASS	50
			Treble	50	
			Bass	50	
			Reset		
			Digital Audio out	PCM	
			TV Speaker	On	
			DTV Audio Setting	Auto	
11.	Time	Clock	-- : --	User control	
		Off time	Off		

LC12E Product Specification

		On time	Off	
		Sleep Timer	Off	
12.	OPTION	Menu Language	English	In case of UK.
		Audio language	English	In case of UK.
		Subtitle Language	English	In case of UK.
		Hard of hearing	Off	
		Country	UK	
		Set ID	1	
		Power Indicator	Stand by Light Off Power Light on	Stand by Light Control on first boot up
		Factory Reset	Off	
		Mode setting	Home Use	
		IR Blaster	off	
		Lock System	Off	
13.	LOCK	Set Password	New * * * * Confirm * * * *	
		Block Programme	DTV/RADIO/TV	
		Parental Guidance	Blocking Off	
		Input Block		
14.	Bluetooth(spec out)		Off	None
15.	USB	Photo List		
		Music List		
		Movie List		

LC12E Product Specification

25. Accessories & Mechanical Spec.

1) 32LV5700-CA

No	Item		Q'ty(EA)	type	P/N
1.	Power cord	Hong Kong	1		EAD60818102
2.	Manual	CD Manual			
		Owner's manual			
3.	Remote control		1		AKB73275618
4.	Battery		2		130-013B
5	Cleansing Cloths				
6	Screw (Stand Body + Top)				
7.	Deco Stand Cover Detach				
8.	Cover Stand Rear				
9.	Protective bracket for power cord				

2) 37LV5700-CA

No	Item		Q'ty(EA)	type	P/N
1.	Power cord	Hong Kong	1		EAD60818102
2.	Manual	CD Manual			
		Owner's manual			
3.	Remote control		1		AKB73275618
4.	Battery		2		130-013B
5	Cleansing Cloths				
6	Screw (Stand Body + Top)				
7.	Deco Stand Cover Detach				
8.	Cover Stand Rear				
9.	Protective bracket for power cord				

3) 42LV5700-CA

No	Item		Q'ty(EA)	type	P/N
1.	Power cord	China / Hong Kong	1		EAD60818302/EAD60818102
2.	Manual	CD Manual			

LC12E Product Specification

No	Item		Q'ty(EA)	type	P/N
		Owner's manual			
3.	Remote control		1		AKB72914282/AKB73275618
4.	Battery		2		130-013B
5	Cleansing Cloths				
6	Screw (Stand Body + Top)				
7.	Deco Stand Cover Detach				
8.	Cover Stand Rear				
9.	Protective bracket for power cord				

4) 47LV5700-CA

No	Item		Q'ty(EA)	type	P/N
1.	Power cord	China / Hong Kong	1		EAD60818302/EAD60818102
2.	Manual	CD Manual			
		Owner's manual			
3.	Remote control		1		AKB72914282/AKB73275618
4.	Battery		2		130-013B
5	Cleansing Cloths				
6	Screw (Stand Body + Top)				
7.	Deco Stand Cover Detach				
8.	Cover Stand Rear				
9.	Protective bracket for power cord				

5) 55LV5700-CA

No	Item		Q'ty(EA)	type	P/N
1.	Power cord	China	1		EAD60818302
2.	Manual	CD Manual			
		Owner's manual			
3.	Remote control		1		AKB72914282
4.	Battery		2		130-013B
5	Cleansing Cloths				
6	Screw (Stand Body + Top)				
7.	Deco Stand Cover Detach				

LC12E Product Specification

No	Item	Q'ty(EA)	type	P/N
8.	Cover Stand Rear			
9.	Protective bracket for power cord			

6) 42LV5740-CE

No	Item	Q'ty(EA)	type	P/N
1.	Power cord	China / Hong Kong	1	EAD60818302
2.	Manual	CD Manual		
		Owner's manual		
3.	Remote control	1		AKB72914282
4.	Battery	2		130-013B
5	Cleansing Cloths			
6	Screw (Stand Body + Top)			
7.	Deco Stand Cover Detach			
8.	Cover Stand Rear			
9.	Protective bracket for power cord			

7) 47LV5740-CE

No	Item	Q'ty(EA)	type	P/N
1.	Power cord	China / Hong Kong	1	EAD60818302
2.	Manual	CD Manual		
		Owner's manual		
3.	Remote control	1		AKB72914282
4.	Battery	2		130-013B
5	Cleansing Cloths			
6	Screw (Stand Body + Top)			
7.	Deco Stand Cover Detach			
8.	Cover Stand Rear			
9.	Protective bracket for power cord			

8) 55LV5740-CE

No	Item	Q'ty(EA)	type	P/N
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	LC12E Product Specification		/
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No	Item		Q'ty(EA)	type	P/N
1.	Power cord	China / Hong Kong	1		EAD60818302
2.	Manual	CD Manual			
		Owner's manual			
3.	Remote control		1		AKB72914282
4.	Battery		2		130-013B
5.	Cleansing Cloths				
6.	Screw (Stand Body + Top)				
7.	Deco Stand Cover Detach				
8.	Cover Stand Rear				
9.	Protective bracket for power cord				

26. Additional Rules

This specification goes into effect since 2010.12.18

27. Energy Efficiency Index

No	Item	Model	Measurement	Grade	Remarks
1.	EEI	32LV5700	1.055	3	Minimum should get Grade 3.
2.		37LV5700	1.170	2	
3.		42LV5700/LV5740	1.299	2	
4.		47LV5700/LV5740	1.439	2	
5		55LV5700/LV5740	1.582	2	

	LC12E Product Specification		

Remark:

Grade for energy efficiency

Energy efficiency index (<i>EEI</i>)	Energy efficiency grade		
	1級	2級	3級
For LCD (<i>EEI_{LCD}</i>)	1.4	1.0	0.60
For PDP (<i>EEI_{PDP}</i>)	1.2	1.0	0.60

LGE		LCD Division		LG(51)	
Establish:		LC12E Adjust Specification		C2-2230	
Reform:					
Adjust Specification LC12E					
GL1 Group LCD TV Research Department 3 LG ELECTRONICS Inc.					
LG Electronics					

Establish:

LC12E Adjust Specification

C2-2230

Reform:

1. Application range

Chassis	Model Name	Module type	Local dimming		Remark
LC12E	32/37/42/47/55LV5700-CA 42/47/55LV5740-CE	Edge LED	0		1 point W/B adjustment

▪This spec. sheet applies to LC12E Chassis applied LCD TV all models manufactured in TV factory

Major production type

- SET (o)
- CKD (o)
- SKD (o)

2. Specification.

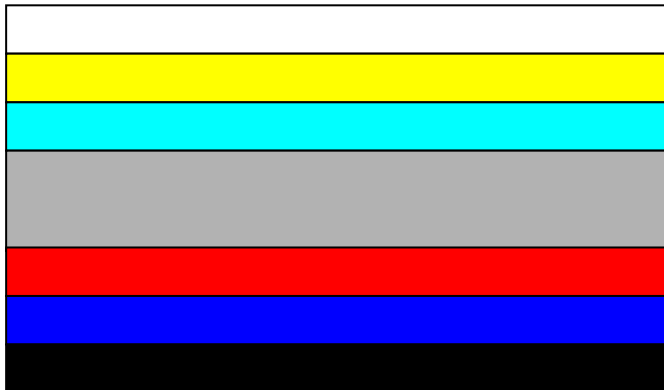
- 2.1 Because this is not a hot chassis, it is not necessary to use an isolation transformer. However, the use of isolation transformer will help protect test instrument.
- 2.2 Adjustment must be done in the correct order.
- 2.3 The adjustment must be performed in the circumstance of $25 \pm 5^{\circ}\text{C}$ of temperature and $65 \pm 10\%$ of relative humidity if there is no specific designation.
- 2.4 The input voltage of the receiver must keep 100~240V, 50/60Hz.
- 2.5 The receiver must be operated for about **5 minutes** prior to the adjustment when module is in the circumstance of over 15

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.

LGE		LCD Division		LG(51)	
Establish:	LC12E Adjust Specification	C2-2230			
Reform:					
3. Adjustment items 3.1 Main PCB check process •MAC Address Download •CI+ Key Download •Adjust 480i, 1920*1080P Comp1 •Adjust 1920*1080 RGB •EDID/DDC download Above adjustment items can be also performed in Final Assembly if needed. Both Board-level and Final assembly adjustment items can be check using In-Start Menu 1.AJUST CHECK. 3.2 Final assembly adjustment •White Balance adjustment •RS-232C functionality check •PING Test •Factory Option setting per destination •Ship-out mode setting (In-Stop) 3.3 Etc •Ship-out mode •Service Option Default •USB Download(S/W Update, Option, Service only) •ISP Download (Option)					
LG Electronics					

LGE		LCD Division		LG(51)				
Establish:		LC12E Adjust Specification	C2-2230					
Reform:								
4. Automatic Adjustment 4.1 ADC Adjustment 4.1.1 Overview ADC adjustment is needed to find the optimum black level and gain in Analog-to-Digital device and to compensate RGB deviation. ※ If Adjust ADC is "OTP", It doesn't need ADC adjustment. (GP3-BCM) 4.1.2 Equipment & Condition 1) Jig (RS-232C protocol) 2) MSPG-925 Series Pattern Generator(MSPG-925FA, pattern -65) - Resolution : 480i Comp1 1080P Comp1 1920*1080 RGB - Pattern : Horizontal 100% Color Bar Pattern - Pattern level : 0.7±0.1 Vp-p - Image  4.1.3 Adjustment 4.1.3.1 Adjustment method ▪ Using RS-232, adjust items listed in 3.1 in the other shown in "4.1.3.3" 4.1.3.2 Adj. protocol <table><tr><td>Protocol</td><td>Command</td><td>Set ACK</td></tr></table>						Protocol	Command	Set ACK
Protocol	Command	Set ACK						

Establish:

LC12E Adjust Specification

C2-2230

Reform:

Enter adj. mode	aa 00 00	a 00 OK00x
Source change	xb 00 04 xb 00 06	b 00 OK04x (Adjust 480i, 1080p Comp1) b 00 OK06x (Adjust 1920*1080 RGB)
Begin adj.	ad 00 10	
Return adj. result		OKx (Case of Success) NGx (Case of Fail)
Read adj. data	(main) ad 00 20 (sub) ad 00 21	(main) 000000000000000000000000000000007c007b006dx (Sub) 000000007000000000000000000000007c00830077x
Confirm adj.	ad 00 99	NG 03 00x (Fail) NG 03 01x (Fail) NG 03 02x (Fail) OK 03 03x (Success)
End adj.	aa 00 90	a 00 OK90x

Ref.) ADC Adj. RS232C Protocol_Ver1.0

4.1.3.3 Adj. order

- aa 00 00 [Enter ADC adj. mode]
- xb 00 04 [Change input source to Component1(480i&1080p)]
- ad 00 10 [Adjust 480i&1080p Comp1]
- xb 00 06 [Change input source to RGB(1024*768)]
- ad 00 10 [Adjust 1920*1080 RGB]
- aa 00 90 End adj.

Ref) ADC adj. RS232C Protocol_Ver1.0

4.2 MAC Address**4.2.1 Equipment & Condition**

- Play file: Serial.exe
- MAC Address edit
- Input Start / End MAC address

Establish:

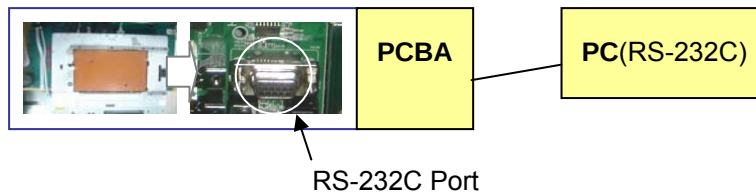
LC12E Adjust Specification

C2-2230

Reform:

4.2.2 Download method

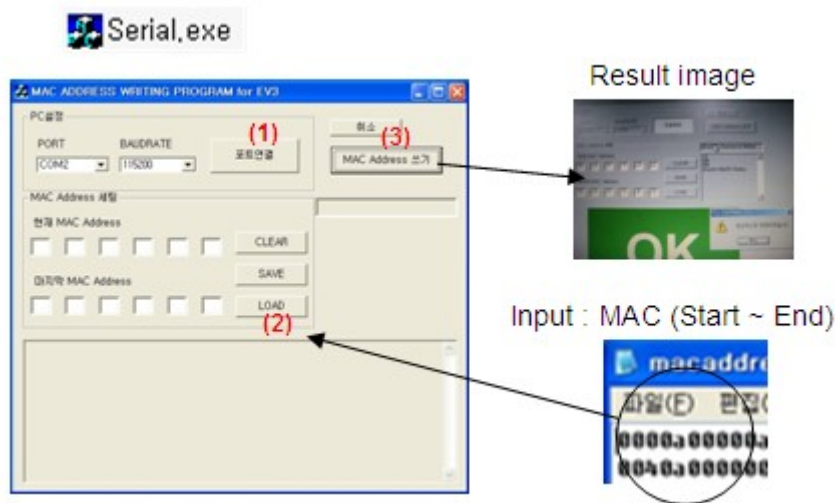
4.2.2.1 Communication Prot connection



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

4.2.2.2 MAC Address Download

- Com 1,2,3,4 and 115200(Baud rate)
- Port connection button click(1)



- Load button click(2) for MAC Address write.
- Start MAC Address write button(3)
- Check the OK Or NG

4.3 LAN Inspection

4.3.1 Equipment & Condition

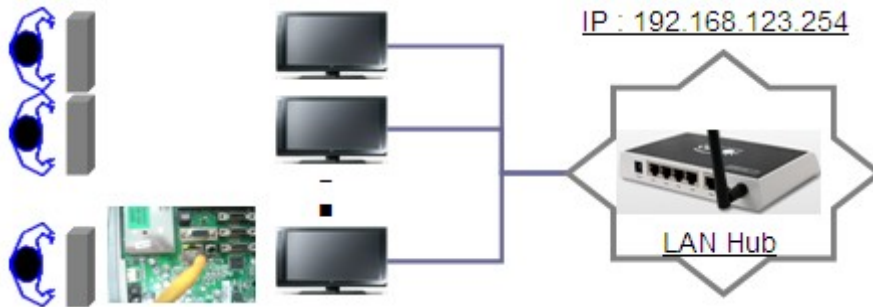
- Each other connection to LAN Port of IP Hub and Jig

Establish:

LC12E Adjust Specification

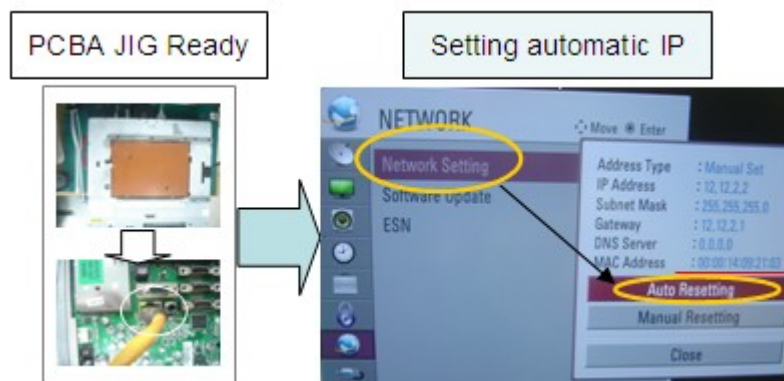
C2-2230

Reform:



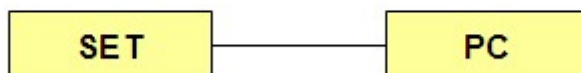
4.3.2 LAN inspection solution

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



4.4 LAN PORT INSPECTION (PING TEST)

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



4.4.1. Equipment setting

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

*IP Number : 12.12.2.2

Establish:

LC12E Adjust Specification

C2-2230

Reform:

4.4.2. LAN PORT inspection (PING TEST)

- 1) Play the LAN Port Test Program.
- 2) connect each other LAN Port Jack.
- 3) Play Test (F9) button and confirm OK Message.
- 4) remove LAN CABLE

**4.5 Model name & Serial number Download****4.5.1 Model name & Serial number D/L**

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

4.5.2 Method & notice

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

※ Manual Download (Model Name and Serial Number)

If the TV set is downloaded By OTA or Service man, Sometimes model name or serial number is initialized.(Not always)

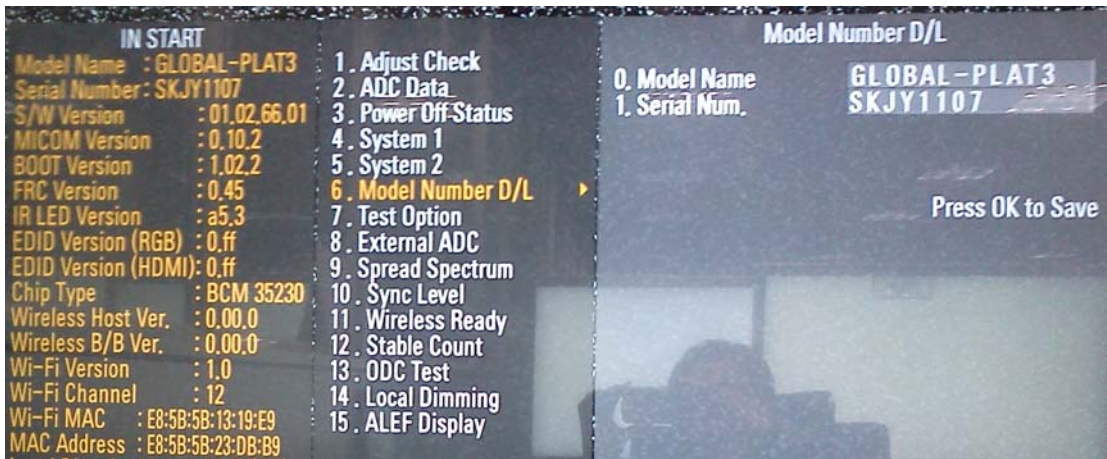
LGE		LCD Division	LG(51)
Establish:	LC12E Adjust Specification	C2-2230	
Reform:			

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

a. Press the 'instart' key of ADJ remote controller.

b. Go to the menu '**5.Model Number D/L**' like below photo.

c. Input the Factory model name(ex 47LW9500-ZA) or Serial number like photo.



d. Check the model name Instart menu → Factory name displayed (ex 42LW750S-ZA)

e. Check the Diagnostics (DTV country only) → Buyer model displayed (ex 42LW750S-ZA)

4.6 CI+ Key Download method

CI+ Key Download

4.6.1. Download Procedure

1. Press "Power on" button of a service R/C.(Baud rate : 115200 bps)
2. Connect RS232-C Signal Cable.
3. Write CI+ Key through RS-232-C.
4. Check whether the key was downloaded or not at 'In Start' menu. (Refer to below).



→ Check the Download to CI+ Key value in LGset.

1. check the method of CI+ Key value

- a. check the method on Instart menu
- b. check the method of RS232C Command

LG Electronics

Establish:

LC12E Adjust Specification

C2-2230

Reform:

1) into the main ass'y mode (RS232 : aa 00 00)

CMD 1	CMD 2	Data 0	
A	A	0	0

2) check the key download for transmitted command (RS232 : ci 00 10)

CMD 1	CMD 2	Data 0	
C	I	1	0

3) result value

- normally status for download : OKx
- abnormally status for download : NGx

2. Check the method of CI+ Key value (RS232)

1) into the main ass'y mode (RS232 : aa 00 00)

CMD 1	CMD 2	Data 0	
A	A	0	0

2) check the mothod of CI+ key by command (RS232 : ci 00 20)

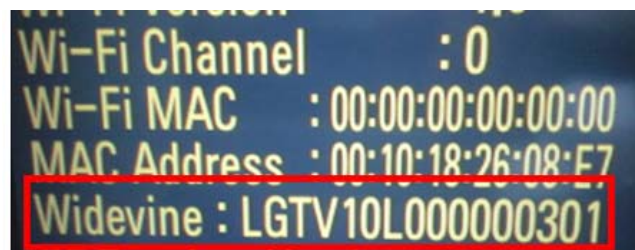
CMD 1	CMD 2	Data 0	
C	I	2	0

3) result value

i 01 OK 1d1852d21c1ed5dcx


 CI+ Key Value
4.7 Widevine Key Download method(Just for HONGKONG)**Widevine Key Download****4.7.1. Download Procedure**

1. Press "Power on" button of a service R/C.(Baud rate : 115200 bps)
2. Connect RS232-C Signal Cable.
3. Write Widevine Key through RS-232-C.
4. Check whether the key was downloaded or not at 'In Start' menu. (Refer to below).



=> Check the Download to Widevine Key value in LGset.

Establish:

LC12E Adjust Specification

C2-2230

Reform:

4.7.2 check the method of Widevine Key value

1. check the method on Instart menu
2. check the method of RS232C Command
 - 1) into the main ass'y mode (RS232 : aa 00 00)

CMD 1	CMD 2	Data 0	
A	A	0	0

- 2) check the key download for transmitted command (RS232 : ci 00 10)

CMD 1	CMD 2	Data 0	
C	I	1	0

- 3) result value

- normally status for download : OKx
- abnormally status for download : NGx
-

4.7.3 check the method of Widevine Key value (RS232)

- 1) into the main ass'y mode (RS232 : aa 00 00)

CMD 1	CMD 2	Data 0	
A	A	0	0

- 2) check the method of Widevine key by command (RS232 : ci 00 20)

CMD 1	CMD 2	Data 0	
C	I	2	0

- 3) result value

i 01 OK 1d1852d21c1ed5dcx

 Widevine Key Value

Establish:

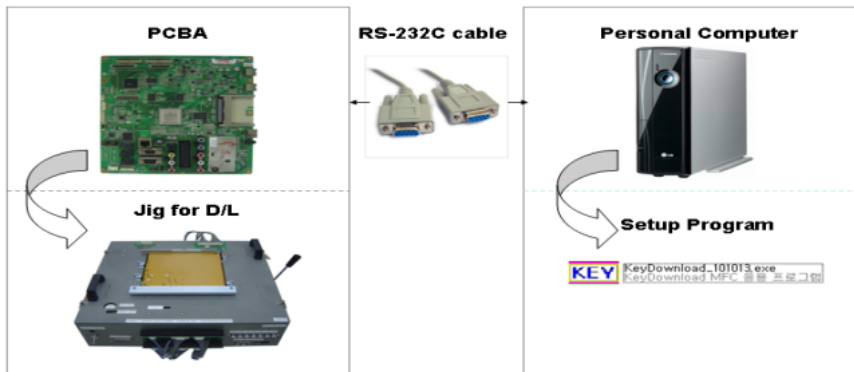
LC12E Adjust Specification

C2-2230

Reform:

4.8 Mac + Widevine + GP3 BCM CI Plus Download

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



4.8.2 MAC Address, CI Plus key and Widevine Key write.

11Y LCD TV + MAC + Widevine + GP3_BCM CI Plus

The screenshot shows the Key Download Tool interface. The device name is highlighted as **11Y L_Wide_CI_GP3_BCM_Zx**. The interface includes fields for Product Info, Test Information, and a table of test items. A red circle highlights the device name. Arrows point to various buttons and labels with yellow callouts:

- MARLIN Key : MAC + CI + WIDEVINE** (points to the top right)
- Com Port Check** (points to the COM port selection area)
- PCBA Power ON Check** (points to the 'Start' button)
- MAC Address Write** (points to the 'Config Save' button)
- CI + Key Write** (points to the 'Config Save' button)
- WIDEVINE Key Write** (points to the 'Config Save' button)
- Result** (points to the 'READY' status)
- Play** (points to the 'Play' button)

1.Equipment setting

- Play file: keydownload.exe
- select the download items.(MARLIN)

2. Communication Prot connection

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

3. Mode check: Online Only

LGE		LCD Division	LG(51)
Establish:	LC12E Adjust Specification	C2-2230	
Reform:			

4. check the test process: DETECT -> MAC -> CI -> WIDEVINE
5. Play: START
6. Result: Ready, Test, OK or NG

4.9 Model name & Serial number Download

4.9.1 Model name & Serial number D/L

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

4.9.2 Method & notice

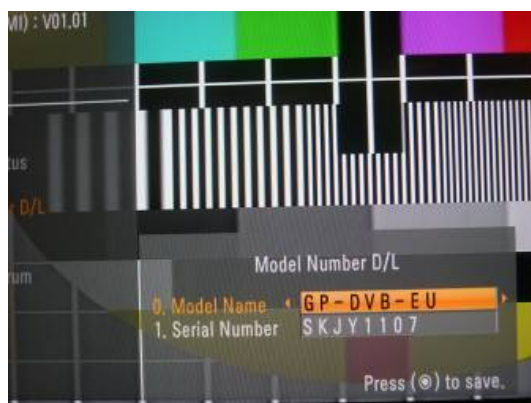
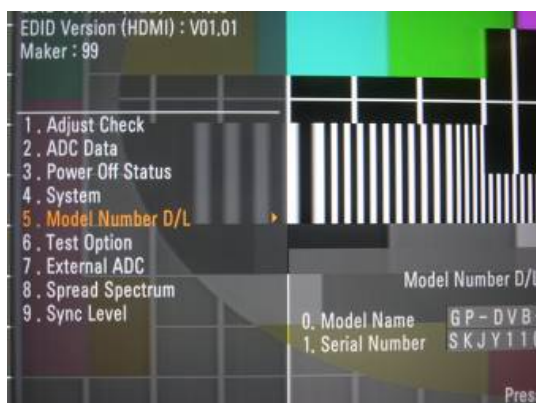
- D. Serial number D/L is using of scan equipment.
- E. Setting of scan equipment operated by Manufacturing Technology Group.
- F. Serial number D/L must be conformed when it is produced in production line, because serial number D/L is mandatory by D-book 4.0

※ Manual Download (Model Name and Serial Number)

If the TV set is downloaded By OTA or Service man, Sometimes model name or serial number is initialized.(Not always)

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

- a. Press the 'instart' key of ADJ remote controller.
- b. Go to the menu '5.Model Number D/L' like below photo.
- c. Input the Factory model name(ex 42LD450-ZA) or Serial number like photo.



- d. Check the model name Instart menu → Factory name displayed (ex 42LE7500-ZA)
- e. Check the Diagnostics (DTV country only) → Buyer model displayed (ex 42LE7500-ZA)

Establish:

LC12E Adjust Specification

C2-2230

Reform:

5. Manual Adjustment

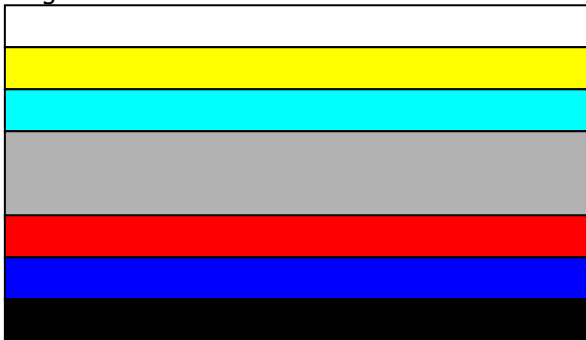
5.1 ADC(GP3) Adjustment

5.1.1 Overview

ADC adjustment is needed to find the optimum black level and gain in Analog-to-Digital device and to compensate RGB deviation.

5.1.2 Equipment & Condition

- 1) Adjust Remocon
- 2) 801GF(802B, 802F, 802R) or MSPG925FA Pattern Generator
 - Resolution: 480i, 720*480 MSPG-925FA → Model: 209, Pattern: 65) - 480i
1080p, 1920*1080 (MSPG-925FA → Model: 225, Pattern: 65) - 1080p
 - Pattern : Horizontal 100% Color Bar Pattern
 - Pattern level: 0.7 ± 0.1 Vp-p
 - Image



- 3) Must use standard cable

5.1.3 Adjust method

※ If Adjust ADC is "OTP", It doesn't need ADC adjustment. (GP3-BCM)

5.1.3.1 ADC 480i, 1080p Comp1

- 1) Check connected condition of Comp1 cable to the equipment
- 2) Give a **480i, 1080p Mode, Horizontal 100% Color Bar Pattern** to Comp1.
 - (MSPG-925FA → Model: 209, Pattern: 65) - 480i
 - (MSPG-925FA → Model: 225, Pattern: 65) - 1080p
- 3) Change input mode as Component1 and picture mode as "Standard"
- 4) Press the In-start Key on the ADJ remote after at least 1 min of signal reception. Then,

LGE		LCD Division	LG(51)
Establish:	LC12E Adjust Specification	C2-2230	
Reform:			
select 7. External ADC -> 1. COMP 1080p on the menu. Press enter key. The adjustment will start automatically. 5) If ADC calibration is successful, "ADC RGB Success" is displayed. If ADC calibration is failure, "ADC RGB Fail" is displayed. 6) If ADC calibration is failure, after recheck ADC pattern or condition retry calibration Error message refer to 5.1.3.2 ADC 1920*1080 RGB 1) Check connected condition of Component & RGB cable to the equipment 2) Give a 1920*1080 Mode, 100% Horizontal Color Bar Pattern to RGB port. (MSPG-925 Series → model:225 , pattern:65) 3) Change input mode as RGB and picture mode as "Standard" 4) Press the In-start Key on the ADJ remote after at least 1 min of signal reception. Then, select 7. External ADC -> 1. COMP 1080p on the menu. Press enter key. The adjustment will start automatically. 5) If ADC calibration is successful, "ADC RGB Success" is displayed. If ADC calibration is failure, "ADC RGB Fail" is displayed. 6) If ADC calibration is failure, after recheck ADC pattern or condition retry calibration Error message refer to 5) 5.2. EDID (The Extended Display Identification Data) / DDC (Display Data Channel) download 5.2.1 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". 5.2.2 Equipment ▪ Since embedded EDID data is used, EDID download JIG, HDMI cable and D-sub cable are not need. ▪ Adjust remocon 5.2.3 Download method 1) Press Adj. key on the Adj. R/C, then select "10.EDID D/L". By pressing Enter key, enter EDID D/L menu.			
LG Electronics			

Establish:

LC12E Adjust Specification

C2-2230

Reform:

- 2) Select [Start] button by pressing Enter key, HDMI1 / HDMI2 / HDMI3 / RGB are Writing and display OK or NG.

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

5.2.4 EDID DATA

-HDMI

	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	a		b			
0x01	c		1	3	80	10	9	78	0A	EE	91	A3	54	4C	99	26
0x02	0F	50	54	A1	8	0	71	40	81	80	1	1	1	1	1	1
0x03	1	1	1	1	1	1	2	3A	80	18	71	38	2D	40	58	2C
0x04	45	0	A0	5A	0	0	0	1E	1B	21	50	A0	51	0	1E	30
0x05	48	88	35	0	BC	86	21	0	0	1C	0	0	0	FD	0	3A
0x06	3E	1E	53	10	0	0A	20	20	20	20	20	20	d			
0x07	d														1	e1
0x00	2	3	26	F1	4E	10	1F	84	13	5	14	3	2	12	20	21
0x01	22	15	1	26	15	7	50	9	57	7	67	f				
0x02	f		E3	5	3	1	1	1D	80	18	71	1C	16	20	58	2C
0x03	25	0	A0	5A	0	0	0	9E	1	1D	0	80	51	D0	1A	20
0x04	6E	88	55	0	A0	5A	0	0	0	1A	2	3A	80	18	71	38
0x05	2D	40	58	2C	45	0	A0	5A	0	0	0	1E	66	21	50	B0
0x06	51	0	1B	30	40	70	36	0	A0	5A	0	0	0	1E	0	0
0x07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	e2

-RGB

	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	a		b			
0x01	c		1	3	68	10	9	78	0A	EE	91	A3	54	4C	99	26
0x02	0F	50	54	A1	8	0	71	4F	81	C0	81	0	81	80	95	0
0x03	90	40	A9	C0	B3	0	2	3A	80	18	71	38	2D	40	58	2C

LGE LCD Division LG(51)

Establish:	LC12E Adjust Specification	C2-2230	
Reform:			

0x04	45	0	A0	5A	0	0	0	1E	66	21	50	B0	51	0	1B	30
0x05	40	70	36	0	A0	5A	0	0	0	1E	0	0	0	FD	0	3A
0x06	3E	1E	53	10	0	0A	20	20	20	20	20	20	ⓓ			
0x07	ⓓ														0	ⓔ3

Reference

- HDMI1 ~ HDMI4 / RGB

- 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 : '2010' → '14'

□ Model Name(Hex): LGTV (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	79	D9	X
HDMI2	79	C9	X
HDMI3	79	B9	X
HDMI4	79	A9	X
RGB	X	X	1C

□ 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
HDMI4	67 03 0C 00 40 00 B8 2D
HDMI5	67 03 0C 00 50 00 B8 2D

5.3 White Balance Adjustment

Establish:

LC12E Adjust Specification

C2-2230

Reform:

5.3.1 Overview

▪ W/B adj. Objective & How-it-works

- Objective: To reduce each Panel's W/B deviation
- 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.

-Adj. condition : normal temperature

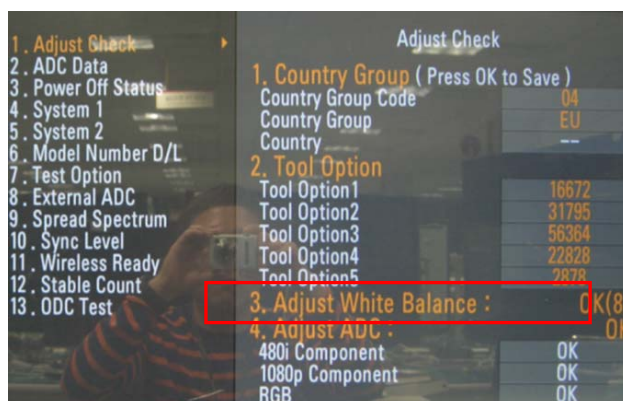
- 1) Surrounding Temperature: 25±5℃
- 2) Warm-up time: About 5 Min
- 3) Surrounding Humidity: 20% ~ 80%

※ Before White balance adjustment, Keep power on status. don't power off.

※ ALEF Header(Module with T-con) supplied as SKD has White Balance data.

(White balance data is stored in EEPROM of the T-con Board)

It doesn't need to adjust White balance if "3. Adjust White Balance" is OK as figure below.

**5.3.2 Equipment**

- 1) Color Analyzer: CA-210 (LED Module : CH 14)
- 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)
 - Only when internal pattern is not available

▪Color Analyzer Matrix should be calibrated using CS-1000

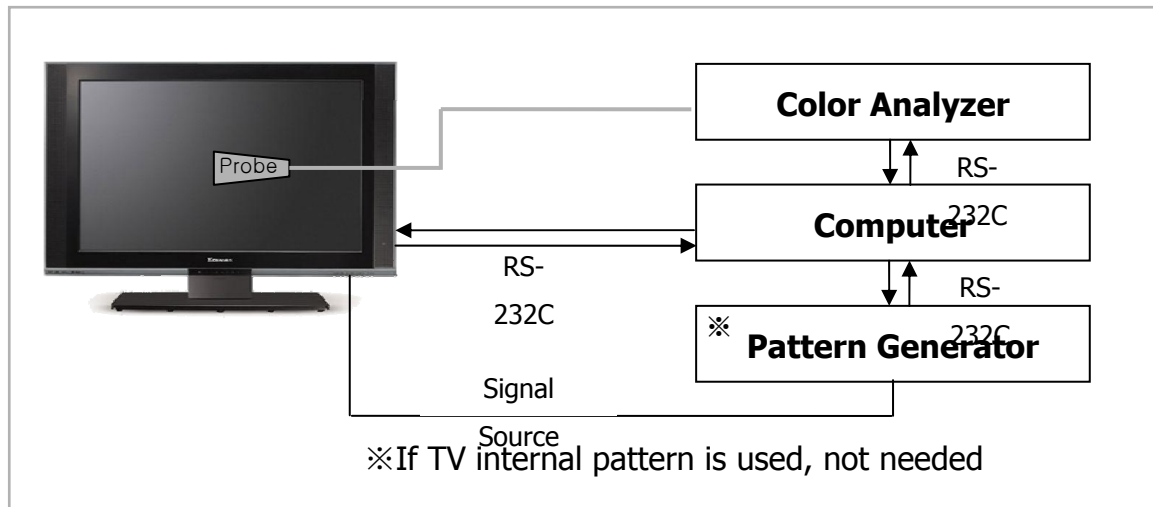
5.3.3 Equipment connection MAP

Establish:

LC12E Adjust Specification

C2-2230

Reform:



5.3.4 Adj. Command (Protocol)

<Command Format>

START 6E A 50 A LEN A 03 A CMD A 00 A VAL A CS A STOP

- LEN: Number of Data Byte to be sent
 - CMD: Command
 - VAL: FOS Data value
 - CS: Checksum of sent data
 - A: Acknowledge
- Ex) [Send: JA_00_DD] / [Ack: A_00_okDDX]

•RS-232C Command used during auto-adj.

RS-232C COMMAND [CMD ID DATA]			Explanation
wb	00	00	Begin White Balance adj.
wb	00	10	Gain adj.(internal white pattern)
wb	00	1f	Gain adj. completed
wb	00	20	Offset adj.(internal white pattern)
wb	00	2f	Offset adj. completed
wb	00	ff	End White Balance adj. (internal pattern disappears)

LGE		LCD Division	LG(51)
Establish:	LC12E Adjust Specification	C2-2230	
Reform:			

Ex) **wb 00 00** -> Begin white balance auto-adj.
 wb 00 10 -> Gain adj.
 ja 00 ff -> Adj. data
 jb 00 c0
 ...
 ...
 wb 00 1f -> Gain adj. complete
 *(wb 00 20(start), wb 00 2f(endc)) -> Off-set adj.
 wb 00 ff -> End white balance auto adj.

•Adj. Map

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

5.3.5 Adj. method

LGE		LCD Division	LG(51)
Establish:	LC12E Adjust Specification	C2-2230	
Reform:			
5.3.5.1 Auto adj. method 1) Set TV in adj. mode using ADJ key 2) Zero calibrate probe then place it on the center of the Display 3) Connect Cable (RS-232C) 4) Select mode in adj. Program and begin adj. 5) When adj. is complete (OK Sing), check adj. status pre mode (Cool, Medium, Warm) 6) Remove probe and RS-232C cable to complete adj. ▪ W/B Adj. must begin as start command "wb 00 00" , and finish as end command "wb 00 ff", and Adj. offset if need 5.3.5.2 Manual adj. method 1) Set TV in Adj. mode using ADJ key 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 → 7. White-Balance then press the cursor to the right (KEY$\square$). (When KEY($\square$) 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 7.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. • 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 - PDP: Color Analyzer (CA-100, CA-100+, CA210) probe should be firmly attached to the Module - LCD: Color Analyzer (CA-210) probe should be within 10cm and perpendicular of the module surface (80°~ 100°)			
LG Electronics			

Establish:

LC12E Adjust Specification

C2-2230

Reform:

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.

5.3.6 Reference (White Balance Adj. coordinate and color temperature)

- Luminance: 216 Gray
- Standard color coordinate and temperature using **CS-1000 (over 26 inch)**

Mode	Coordinate		Temp	Δuv
	x	y		
Cool	0.269	0.273	13000K	0.0000
Medium	0.285	0.293	9300K	0.0000
Warm	0.313	0.329	6500K	0.0000

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

Mode	Coordinate		Temp	Δuv
	x	y		
Cool	0.269±0.002	0.273±0.002	13000K	0.0000
Medium	0.285±0.002	0.293±0.002	9300K	0.0000
Warm	0.313±0.002	0.329±0.002	6500K	0.0000

5.3.8 White balance table

- Module change color coordinate because of aging time
- apply under the color coordinate table, for compensated aging time

GP2	Aging time (Min)	Cool		Medium		Warm	
		x	y	x	y	x	y
		269	273	285	293	313	329
1	0-2	279	288	295	308	320	339
2	3-5	278	286	294	306	319	337
3	6-9	277	285	293	305	318	336
4	10-19	276	283	292	303	317	334
5	20-35	274	280	290	300	315	331
6	36-49	272	277	288	297	313	328
7	50-79	271	275	287	295	312	326
8	80-149	270	274	286	294	311	325
9	Over 150	269	273	285	293	310	324

LGE		LCD Division	LG(51)
Establish:	LC12E Adjust Specification	C2-2230	
Reform:			

5.4 EYE-Q function check

Step 1) Turn on TV

Step 2) Press EYE key of Adj. R/C

Step 3) Cover the Eye Q II sensor on the front of the using your hand and wait for 6 seconds

Step 4) Confirm that R/G/B value is lower than 10 of the "Raw Data (Sensor data, Back light)" . If after 6 seconds, R/G/B value is not lower than 10, replace Eye Q II sensor

Step 5) Remove your hand from the Eye Q II sensor and wait for 6 seconds

Step 6) Confirm that "ok" pop up.

If change is not seen, replace Eye Q II sensor



5.5 Local Dimming Function Check

Step 1) Turn on TV

Step 2) At the Local Dimming mode, module Edge Backlight moving Top to Bottom

Back light of IOP module moving

Step 3) confirm the Local Dimming mode

Step 4) Press "exit" Key

LGE		LCD Division	LG(51)	
Establish:	LC12E Adjust Specification	C2-2230		
Reform:				
 Local Dimming Demo (Edge LED Model)  Local Dimming Demo (IPS/ALEF Model)				
5.6 Magic Motion Remocon test - equipment : RF Remocon for test, IR-KEY-Code Remocon for test - You must confirm the battery power of RF-Remocon before test (recommend that change the battery per every lot) - Sequence (test) a) if you select the 'start key(Mute)' on the controller, you can pairing with the TV SET. b) You can check the cursor on the TV Screen, when select the 'OK Key' on the controller c) You must remove the pairing with the TV Set by select 'Vol+(STOP) Key' on the controller 2) Depending on destination, select Country Group Code 04 or Country Group EU then on the lower Country option, select US, CA, MX. Selection is done using +, - or ► ◀ KEY 5.7 Tool Option selection ▪ Method: Press Adj. key on the Adj. R/C, then select Tool option. 5.8 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-				

LGE		LCD Division		LG(51)	
Establish:		LC12E Adjust Specification		C2-2230	
Reform:					
by mode.					
LG Electronics					

LGE		LCD Division		LG(51)	
Establish:		LC12E Adjust Specification		C2-2230	
Reform:					
6. GND and Internal Pressure auto check 6.1 Method 1) GND & Internal Pressure auto-check preparation - Check that Power Cord is fully inserted to the SET. (If loose, re-insert) 2) Perform GND & Internal Pressure auto-check - Unit fully inserted Power cord, Antenna cable and A/V arrive to the auto-check process. - Connect D-terminal to AV JACK TESTER - Auto CONTROLLER(GWS103-4) ON - Perform GND TEST - If NG, Buzzer will sound to inform the operator. - If OK, changeover to Internal pressure auto check automatically. (Remove CORD, A/V form AV JACK BOX) - Perform I/P test - If NG, Buzzer will sound to inform the operator. - If OK, Good lamp will lit up and the stopper will allow the pallet to move on to next process. 6.2 Checkpoint ▪ TEST voltage - GND: 1.5KV/min at 100mA - SIGNAL: 3KV/min at 100mA ▪ TEST time: 1 second ▪ TEST POINT - GND TEST = POWER CORD GND & SIGNAL CABLE METAL GND - Internal Pressure TEST = POWER CORD GND & LIVE & NEUTRAL ▪ LEAKAGE CURRENT: At 0.5mArms					
LG Electronics					

LGE		LCD Division		LG(51)
Establish:	LC12E Adjust Specification	C2-2230		
Reform:				

7. Audio

No	Item	Min	Typ	Max	Unit		Remark
1.	Audio practical max Output, L/R (Distortion=10% max Output)	9	10	12	W	EQ Off AVL Off Clear Voice Off	
			0.5		Vrms		
2.	Speaker (8Ω Impedance)	9	10.0	12.0	W	EQ On AVL On Clear Voice On	

Measurement condition:

1. RF input: Mono, 1KHz sine wave signal, 100% Modulation
2. CVBS, Component: 1KHz sine wave signal 0.5Vrms
3. RGB PC: 1KHz sine wave signal 0.7Vrms

8. Etc

	Power Status	
	Main B/D Shipping Condition	AC Switch condition
Chassis Module Assembly	ON	N/A
Front Module Assembly	N/A	OFF
Factory incoming	ON	OFF
Final Assembly	ON	ON
Ship-Out	OFF	ON

8. 1 SET Factoring Condition

No.	Item	Condition	Remark
1.	Power	Off	
3.	Volume Level	10	
4.	Main Picture Input	DTV	DTV&ATV
5.	Main Last Channel	N.A.	
6.	Mute	Off	

LGE		LCD Division		LG(51)	
Establish:		LC12E Adjust Specification		C2-2230	
Reform:					
7.	ARC		16:9(DTV)		
8.	SETUP (DTV&ATV)	Auto Tuning			
		Manual Tuning	DTV/TV		
		Programme edit	TV/DTV/Radio		
		Booster			
		CI information	Module		
9.	PICTURE	Aspect Ratio	16:9		
		Picture Wizard			
		Energy Saving	Off		
		Picture Mode	Standard		
			Backlight	70 (47LEX8*) 80 (55LEX8*)	
			Contrast	100	
			Brightness	50	
			Sharpness	70	
			Colour	60	
			Tint	0	
			Colour Temp	0	
				Dynamic Contrast	Medium
				Dynamic Colour	Low
				Clear White	off
				Skin Colour	0
				Noise Reduction	Low
				Digital Noise Reduction	Medium
				Gamma	Medium
				Black level	Auto
				Eye Care	Low
				Real Cinema	On

LGE**LCD Division****LG(51)**

Establish:

Reform:

LC12E Adjust Specification

C2-2230

			Colour Gamut	Wide	
				xvYCC	Off
			Picture Reset		
			TruMotion		
		Screen	Low		
			Resolution		
			Auto Config		
			Position		
			Size		
			Phase		
			Reset		
10.	AUDIO	Auto Volume	Off		
		Clear Voice II	Off		On Level 3
		Balance	0		
		Sound Mode	Standard		Stanard Music Cinema Sport Game
			Infinity Sound : off	Treble	50
				BASS	50
			Treble		50
			Bass		50
			Reset		
		Digital Audio out	PCM		
		TV Speaker	On		
		DTV Audio Setting	Auto		
11.	Time	Clock	-- : --		User control
		Off time	Off		
		On time	Off		
		Sleep Timer	Off		
12.	OPTION	Menu Language	English		In case of UK.
		Audio language	English		In case of UK.

LG Electronics

LGE		LCD Division		LG(51)		
Establish:		LC12E Adjust Specification		C2-2230		
Reform:						
		Subtitle Language	English	In case of UK.		
		Hard of hearing	Off			
		Country	UK			
		Set ID	1			
		Power Indicator	Stand by Light Off Power Light on	Stand by Light Control on first boot up		
		Factory Reset	Off			
		Mode setting	Home Use			
		IR Blaster	off			
	13.	LOCK	Lock System	Off		
			Set Password	New * * * * Confirm * * * *		
			Block Programme	DTV/RADIO/TV		
			Parental Guidance	Blocking Off		
			Input Block			
	14.	USB	Photo List			
Music List						
Movie List						

8.2 USB S/W Download (option, Service only)

1. Put the USB Stick to the USB socket

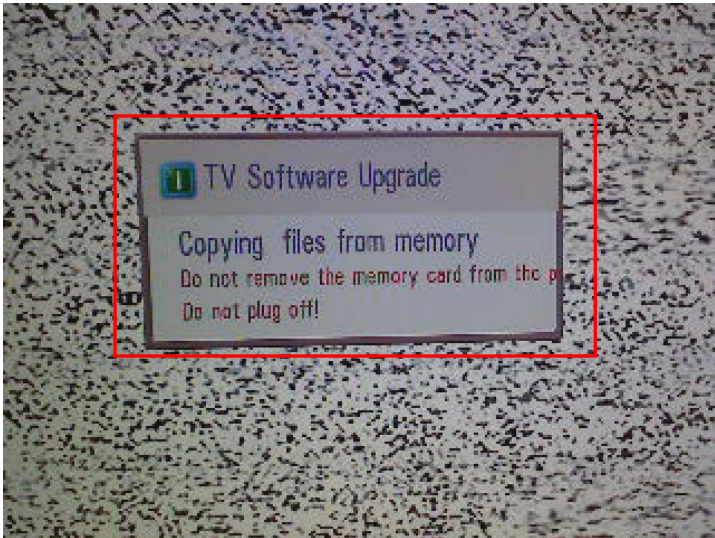
2. Automatically detecting update file in USB Stick

- If your downloaded program version in USB Stick is Low, it didn't work.
But your downloaded version is High, USB data is automatically detecting
(Download Version High & Power only mode, Set is automatically Download)

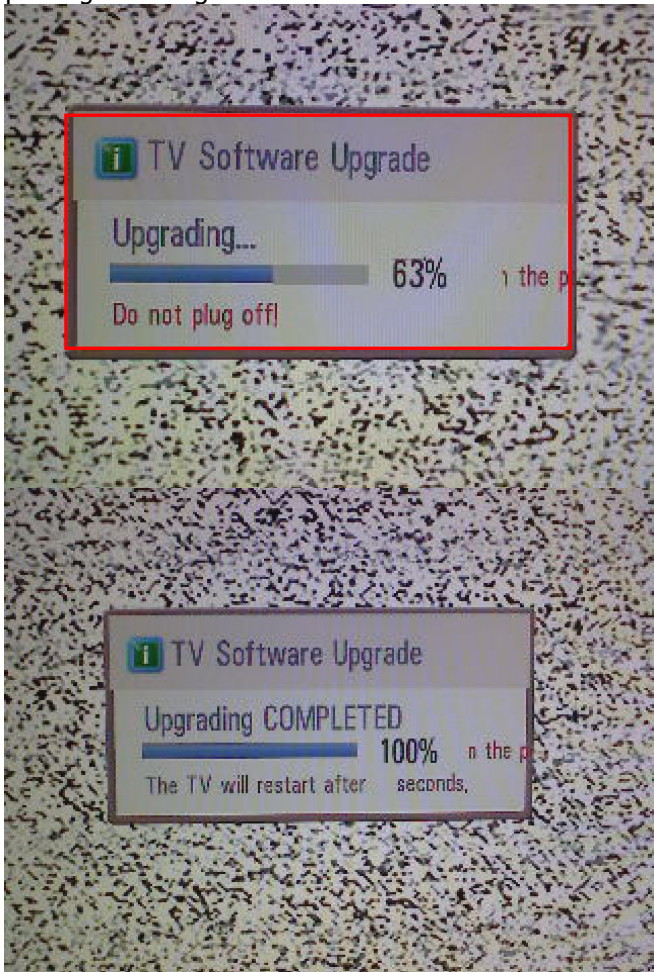
3. Show the message "Copying files from memory"

LG Electronics

LGE		LCD Division		LG(51)	
Establish:	LC12E Adjust Specification	C2-2230			
Reform:					



4. Updating is staring.



LGE		LCD Division	LG(51)
Establish:	LC12E Adjust Specification	C2-2230	
Reform:			
5. Updating Completed, The TV will restart automatically 6. If your TV is turned on, check your updated version and Tool option. (explain the Tool option, next stage) * If downloading version is more high than your TV have, TV can lost all channel data. In this case, you have to channel recover. if all channel data is cleared, you didn't have a DTV/ATV test on production line. * After downloading, have to adjust TOOL OPTION again. 1. Push "IN-START" key in service remote controller. 2. Select Tool Option 1~5 and Push "OK" button. 3. Punch in the number. (Each model has their number.)			
LG Electronics			

LGE		LCD Division		LG(51)	
Establish:		LC12E Adjust Specification		C2-2230	
Reform:					

9. Tool Option selection (TBD)

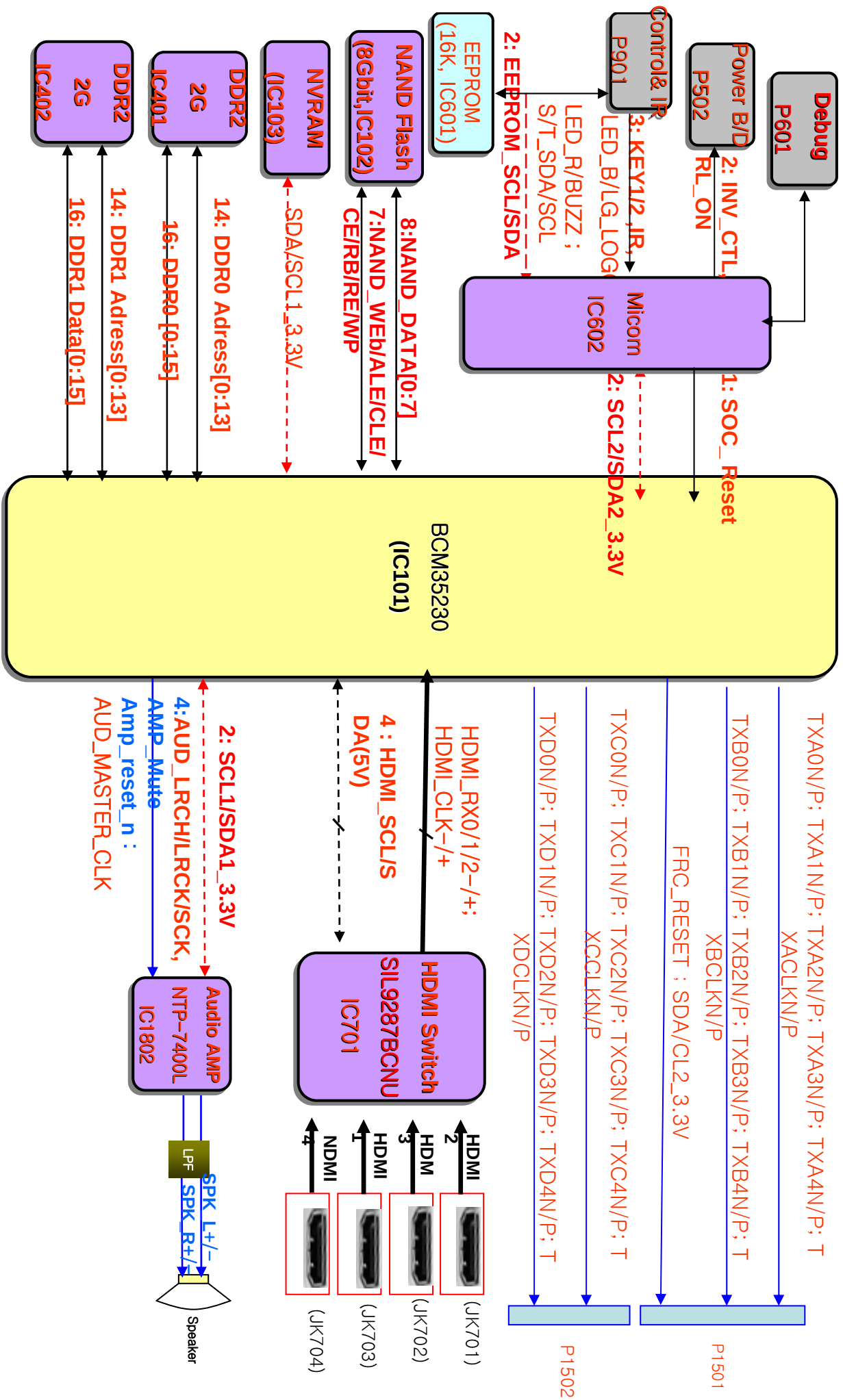
▪ Method: Press Adj. key on the Adj. R/C, then select Tool option.

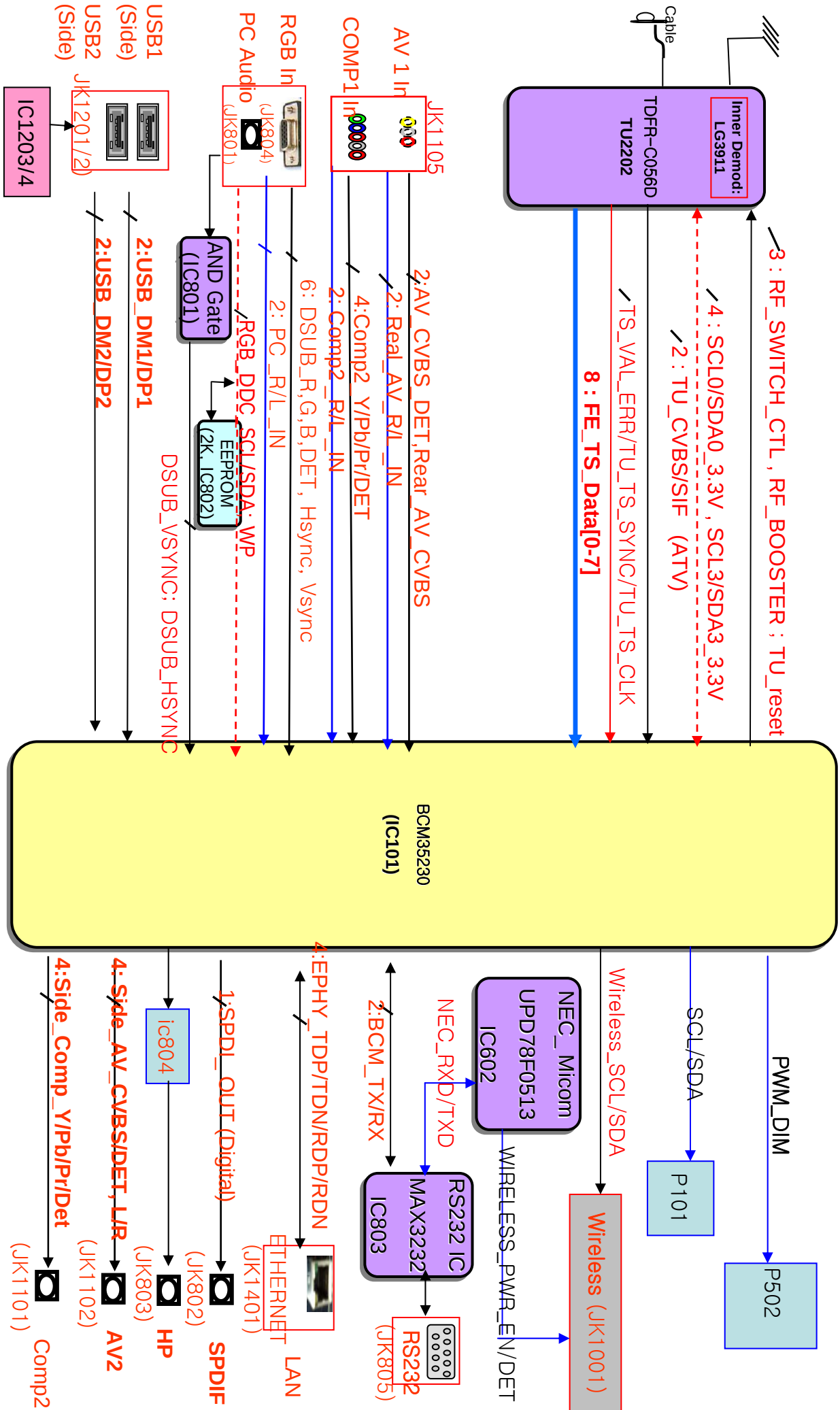
Market	Inch.	Model	Tool Option1	Tool Option 2	Tool Option3	Tool Option4	Tool Option5	Tool Option6	Country Code
CN	42	LV5700. LV5740	33254	5461	3263	17569	42577	729	5
	47	LV5700 LV5740	33256	5461	3263	17569	42577	729	5
	55	LV5700 LV5740	33259	5461	3263	17569	42577	729	5
HK	32	LV5700	33252	5461	3327	17577	41577	665	11
	37	LV5700	33253	5461	3327	17577	41577	665	11
	42	LV5700	33254	5461	3327	17577	41577	665	11
	47	LV5700	33256	5461	3327	17577	41577	665	11

10. Addendum

▪This regulation being starting 2010/09/14.

승 인	연구 2 실 EU2 Gr.장	(인)
심 의	Display 품질보증 Gr.장	(인)
	Display 생기 Gr.장	(인)
	Display 제조 Gr.장	(인)
성 안	연구 2 실 EU2 Gr.장	(인)

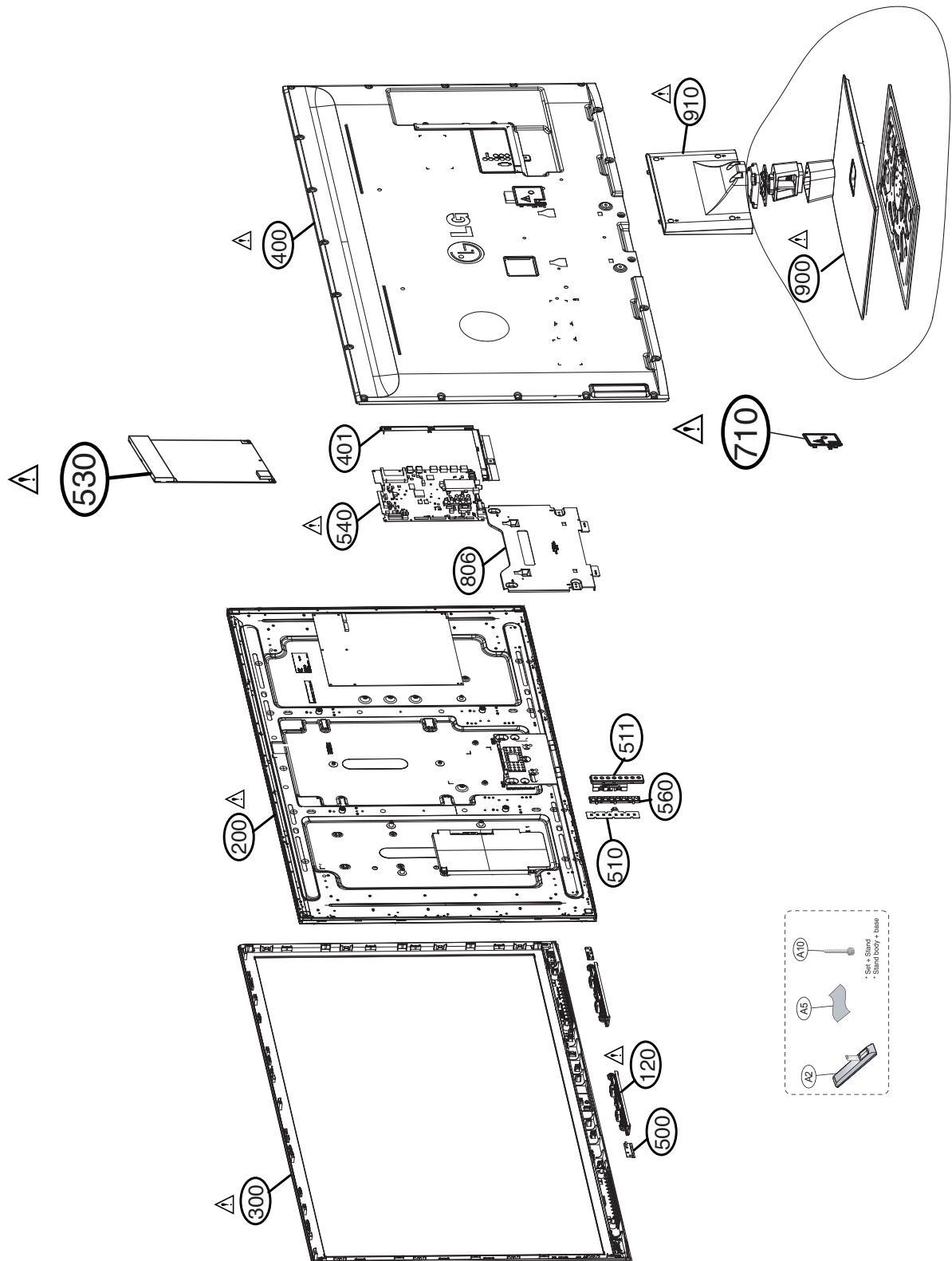




EXPLODED VIEW

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.



The schematic diagram illustrates the electrical connections for the NAND flash memory IC102 (TC58DVG358ETA00). The IC is shown with its pin numbers (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 40, 41, 43, 44, 46, 47, 48) and internal labels (NAND_0Gbit, NC_1 through NC_28, NC_29 through NC_36, NC_37 through NC_48, NC_49 through NC_56, NC_57 through NC_64, NC_65 through NC_72, NC_73 through NC_80, NC_81 through NC_88, NC_89 through NC_96, NC_97 through NC_104, NC_105 through NC_112, NC_113 through NC_120, NC_121 through NC_128, NC_129 through NC_136, NC_137 through NC_144, NC_145 through NC_152, NC_153 through NC_160, NC_161 through NC_168, NC_169 through NC_176, NC_177 through NC_184, NC_185 through NC_192, NC_193 through NC_200, NC_201 through NC_208, NC_209 through NC_216, NC_217 through NC_224, NC_225 through NC_232, NC_233 through NC_240, NC_241 through NC_248, NC_249 through NC_256, NC_257 through NC_264, NC_265 through NC_272, NC_273 through NC_280, NC_281 through NC_288, NC_289 through NC_296, NC_297 through NC_304, NC_305 through NC_312, NC_313 through NC_320, NC_321 through NC_328, NC_329 through NC_336, NC_337 through NC_344, NC_345 through NC_352, NC_353 through NC_360, NC_361 through NC_368, NC_369 through NC_376, NC_377 through NC_384, NC_385 through NC_392, NC_393 through NC_400, NC_401 through NC_408, NC_409 through NC_416, NC_417 through NC_424, NC_425 through NC_432, NC_433 through NC_440, NC_441 through NC_448, NC_449 through NC_456, NC_457 through NC_464, NC_465 through NC_472, NC_473 through NC_480, NC_481 through NC_488, NC_489 through NC_496, NC_497 through NC_504, NC_505 through NC_512, NC_513 through NC_520, NC_521 through NC_528, NC_529 through NC_536, NC_537 through NC_544, NC_545 through NC_552, NC_553 through NC_560, NC_561 through NC_568, NC_569 through NC_576, NC_577 through NC_584, NC_585 through NC_592, NC_593 through NC_600, NC_601 through NC_608, NC_609 through NC_616, NC_617 through NC_624, NC_625 through NC_632, NC_633 through NC_640, NC_641 through NC_648, NC_649 through NC_656, NC_657 through NC_664, NC_665 through NC_672, NC_673 through NC_680, NC_681 through NC_688, NC_689 through NC_696, NC_697 through NC_704, NC_705 through NC_712, NC_713 through NC_720, NC_721 through NC_728, NC_729 through NC_736, NC_737 through NC_744, NC_745 through NC_752, NC_753 through NC_760, NC_761 through NC_768, NC_769 through NC_776, NC_777 through NC_784, NC_785 through NC_792, NC_793 through NC_800, NC_801 through NC_808, NC_809 through NC_816, NC_817 through NC_824, NC_825 through NC_832, NC_833 through NC_840, NC_841 through NC_848, NC_849 through NC_856, NC_857 through NC_864, NC_865 through NC_872, NC_873 through NC_880, NC_881 through NC_888, NC_889 through NC_896, NC_897 through NC_904, NC_905 through NC_912, NC_913 through NC_920, NC_921 through NC_928, NC_929 through NC_936, NC_937 through NC_944, NC_945 through NC_952, NC_953 through NC_960, NC_961 through NC_968, NC_969 through NC_976, NC_977 through NC_984, NC_985 through NC_992, NC_993 through NC_1000).

Key components and connections include:

- Power Supply:** +3.3V_Normal is connected to pins 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 40, 41, 43, 44, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.
- Resistors:** R107 (2.7K) is connected to pins 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 40, 41, 43, 44, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100. R149 (16Gbit) is connected to pins 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 40, 41, 43, 44, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100. R148 (16Gbit) is connected to pins 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 40, 41, 43, 44, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100. R103 (10K) is connected to pins 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 40, 41, 43, 44, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.
- Capacitors:** C102 (4700pF) is connected to pins 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 40, 41, 43, 44, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74,

IC102-1 TM58DVG450ETA20		
NC_1	1	DEV_NAND_160bit
NC_2	2	47
NC_3	3	46
NC_4	4	45
NC_5	5	44
RY/BV2	6	43
RY/BY1	7	42
RE	8	41
CE1	9	40
CE2	10	39
NC_6	11	38
VCC_1	12	37
VSS_1	13	36
NC_7	14	35
NC_8	15	34
CLE	16	33
ALE	17	32
WE	18	31
WP	19	30
NC_9	20	29
NC_10	21	28
NC_11	22	27
NC_12	23	26
NC_13	24	25

0000: ST Micro M26P02 or compatible Serial Flash
 0010: 8-bit 512Mbit 512B page SLC NAND Flash devices
 0100: 8-bit 128, 256Mbit 512B page SLC NAND Flash devices
 0110: 8-bit 10bit 2KB page SLC NAND Flash devices
 1000: 8-bit 20bit, 4GBit, 8GBit 2KB page SLC NAND Flash devices
 1010: 8-bit 16GBit, 32GBit 4KB page SLC NAND Flash devices (0)
 0001: 8-bit 8/16/32GBit 2KB page MLC NAND Flash devices
 0011: 8-bit 16/32GBit 4KB page MLC NAND Flash devices
 0101: 8-bit 32GBit 8KB page MLC NAND Flash devices
 0111: 3B dual IO Serial Flash
 1001: USB dual IO Serial Flash
 1011: fast Serial Flash > 50Mhz
 1100: OneNAND Flash (always 16-bit)
 1110: Reserved
 1101, 1111: Reserved

000 = ECC disabled
 001 = ECC 1-bit repair
 010 = ECC 4-bit BCH (0)
 011 = ECC 8-bit BCH, 27 byte spare
 100 = ECC 12-bit BCH, 27 byte spare
 101 = ECC 8-bit BCH, 16 byte spare
 110, 111 = Reserved

Timing diagram for NAND flash memory operations. The diagram shows a +3.3V_Nominal supply at the top. A series of NAND flash memory chips are connected to this supply. The chips are labeled with their part numbers and package types: P1564 OPT, P1567 OPT, P1569 OPT, P1564 OPT, P1567 OPT, P1570 10K, P1570 OPT, P1577 10K, P1570 OPT, P1581 OPT, P1583 10K, P1587 OPT, and P1582 OPT. The diagram shows the timing of various signals: NAND_DATA[0] through NAND_DATA[5], CI_ADDR[7] through CI_ADDR[13], NAND_CLE, and NAND_DATA[9] through NAND_DATA[15]. The signals are shown as digital waveforms. The NAND_DATA signals are active-low, while the CI_ADDR and NAND_CLE signals are active-high. The NAND_DATA signals are shown as a series of pulses, indicating data transfer. The CI_ADDR signals are shown as a series of pulses, indicating address transfer. The NAND_CLE signal is shown as a single pulse, indicating a command transfer. The NAND_DATA[9] through NAND_DATA[15] signals are shown as a series of pulses, indicating data transfer. The diagram is a timing diagram for NAND flash memory operations.

NAND_DATA[0]:
 0: System is LITTLE endian (0)
 1: System is BIG endian

CI_ADDR[7]:
 0: Disable EDID automatic Downloading from Flash (0)
 1: Enable EDID automatic Downloading from Flash

NAND_DATA[6]:
 0: Disable OSC clock output on chip Pin (0)
 1: Enable OSC clock output on chip pin.

CI_ADDR[8]:
 0: Host MIPS run at 500 Mhz (0)
 1: Host MIPS run at 250 Mhz

NAND_CLE:
 0: Differential Oscillators TVM not bypassed (0)
 1: Differential Oscillators TVM bypassed

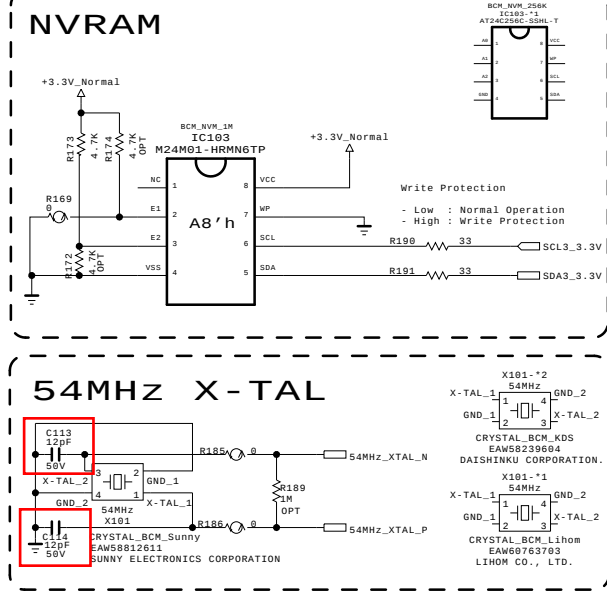
NAND_DATA[4]:
 0: 27MHz TVM Crystal Frequency
 1: 54MHz TVM Crystal Frequency (0)

CI_ADDR[9], CI_ADDR[11], CI_ADDR[12], CI_ADDR[13]:
 TVM Crystal oscillator bias/gain control
 0000: 210uA
 0001: 390uA
 0010: 570uA
 0011: 730uA
 0100: 890uA (0)
 0111: 1280uA
 1000: 1418uA
 1111: 2196uA
 0101, 0110, 1001, 1010, 1011, 1100, 1101, 1110: Reserved

CI_ADDR[8]:
 0: RESETOUTB (in On/Off only) stay asserted until software releases them.
 1: Fix amount of delay for de-assertion on RESETOUTB (in On/10off only) at end of RESETB pulse (0)

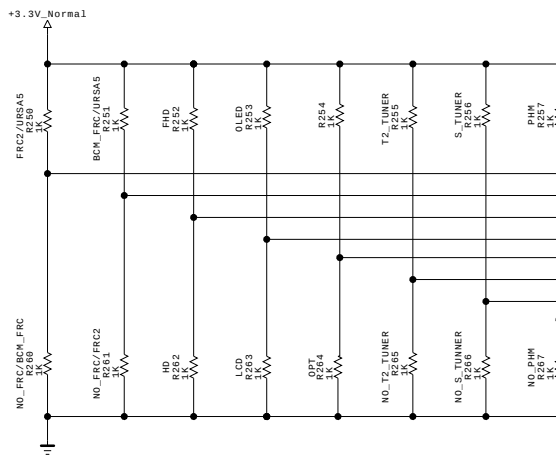
NAND_DATA[3]:
 0: MIPS will boot from external flash (0)
 1: MIPS will boot from ROM

NAND_DATA[5]:
 0: FLASH MODE (0)
 1: BSC_SLAVE(BBS) MODE



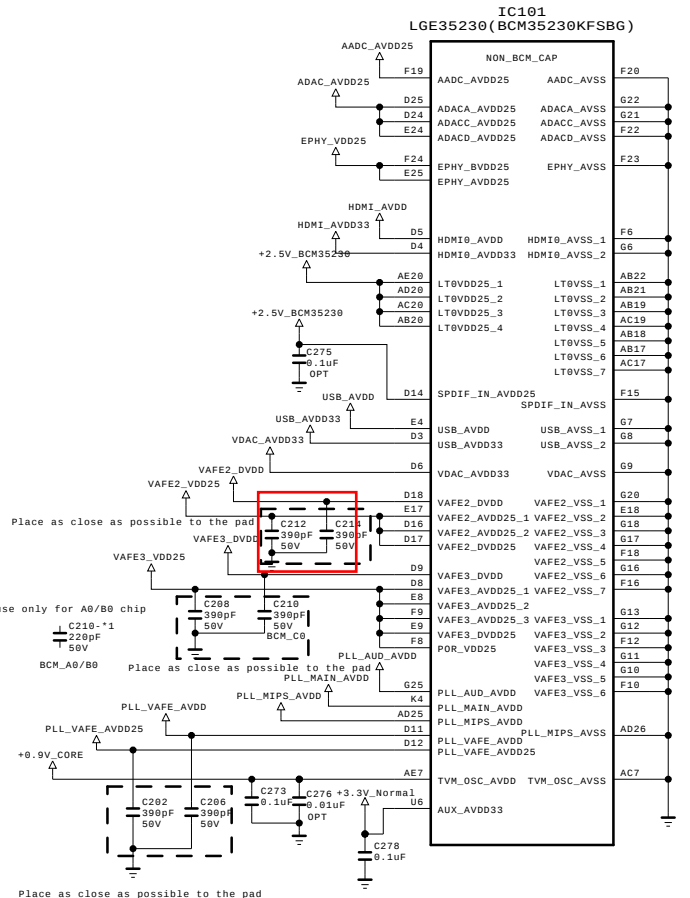
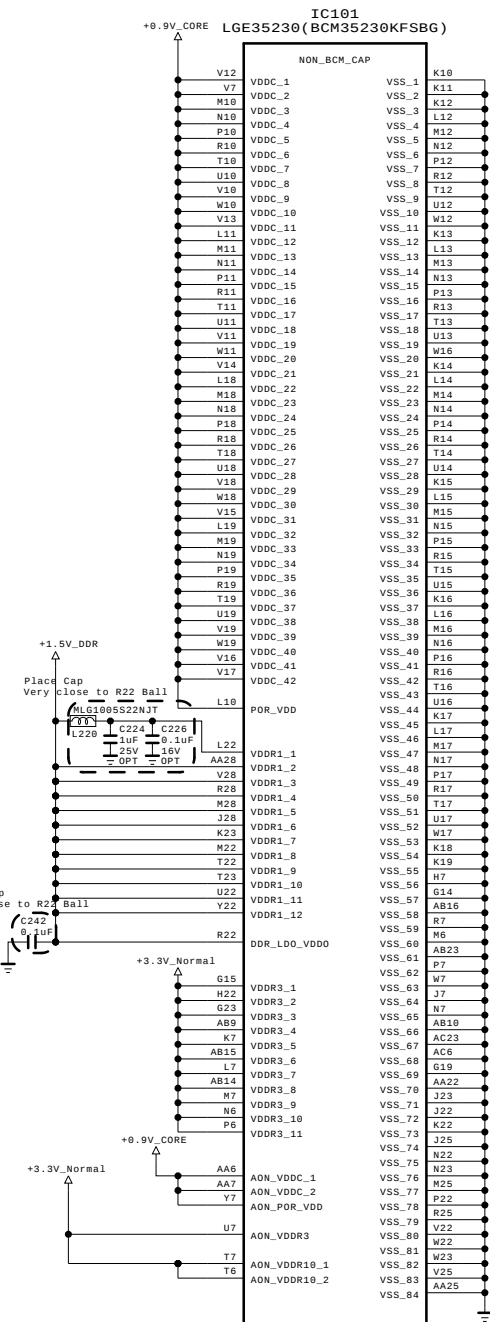
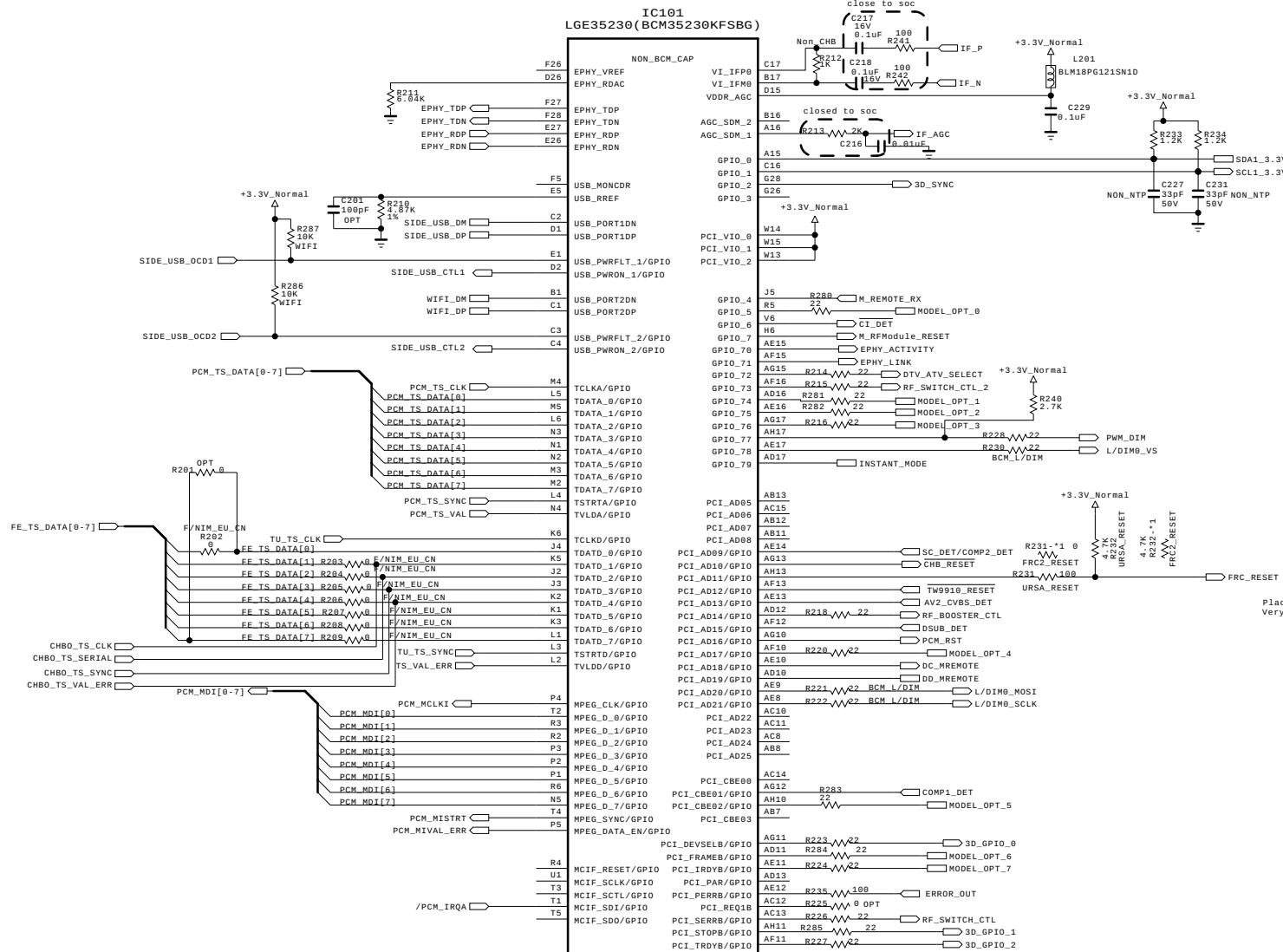
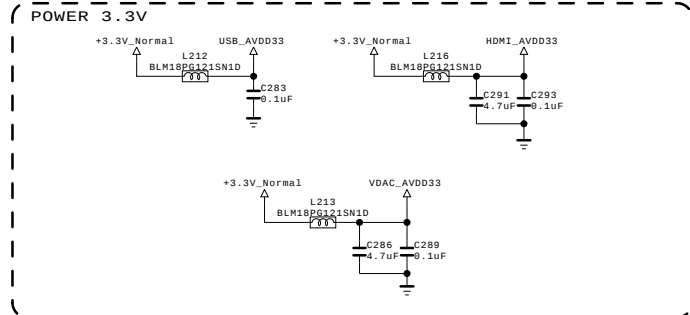
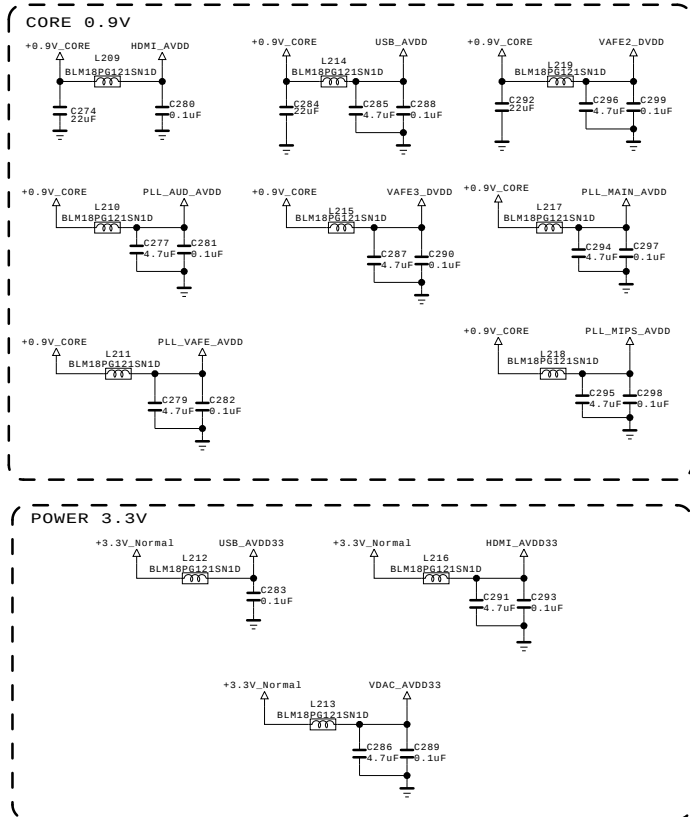
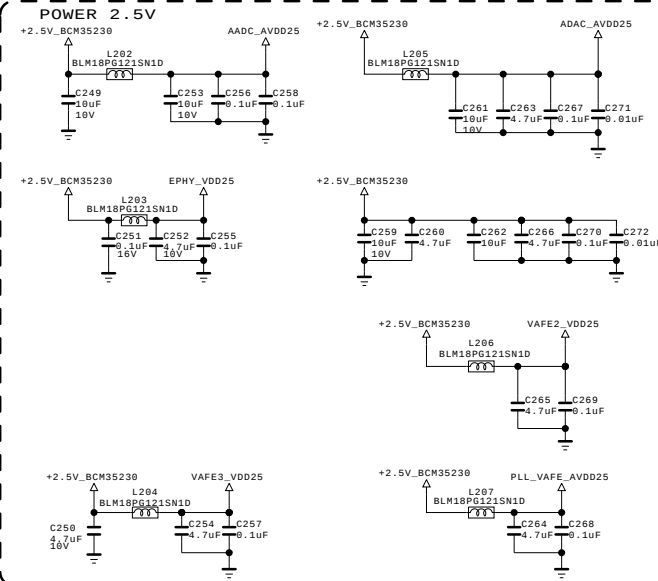
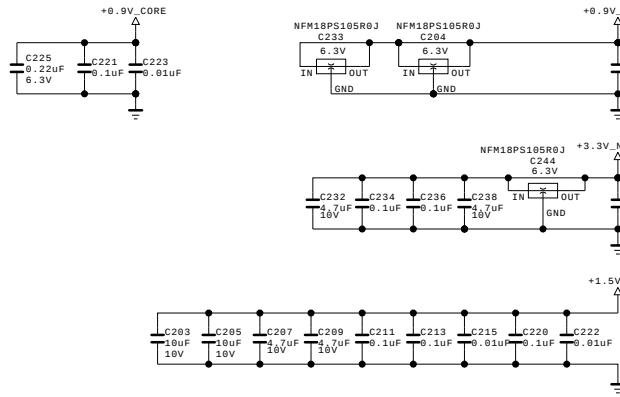
SECRET
LG Electronics





MODEL OPTION			
	NO_FRC	BCM internal FRC	external URSAS
MODEL_OPT_0	0	0	1
MODEL_OPT_1	0	1	0
MODEL_OPT_2			
MODEL_OPT_3			
MODEL_OPT_4			
MODEL_OPT_5			
MODEL_OPT_6			
MODEL_OPT_7			

	HIGH	LOW
MODEL_OPT_2	FHD	HD
MODEL_OPT_3	OLED	LCD
MODEL_OPT_4	DDR speed	1333
MODEL_OPT_5	T2 Tuner	Support
MODEL_OPT_6	S Tuner	Support
MODEL_OPT_7	PHM	Enable

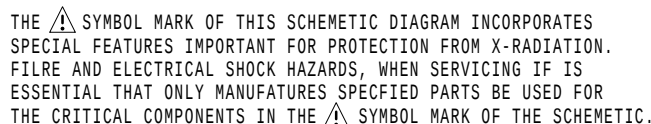
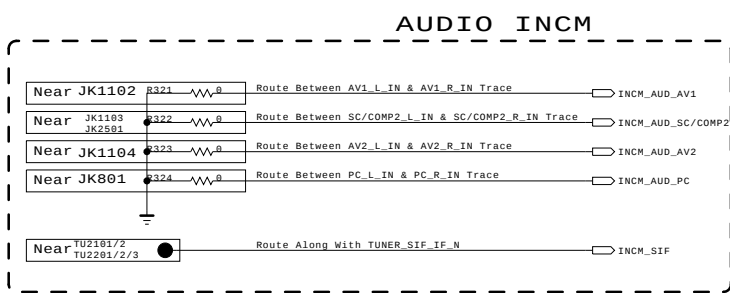
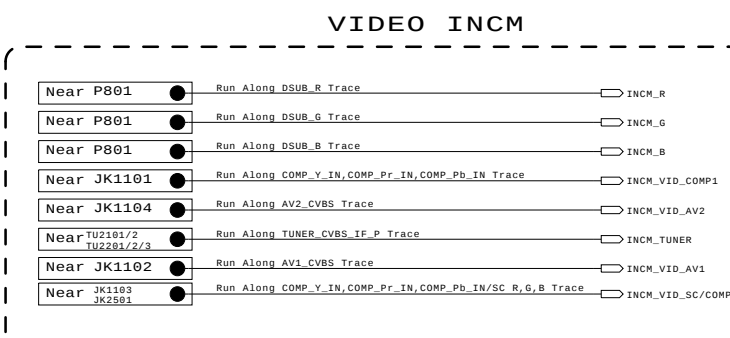


THE SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE SYMBOL MARK OF THE SCHEMATIC.

SECRET
LGElectronics



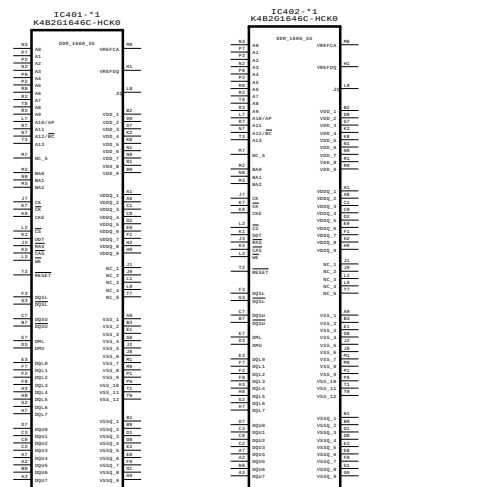
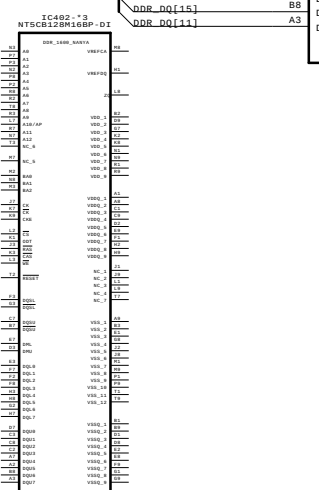
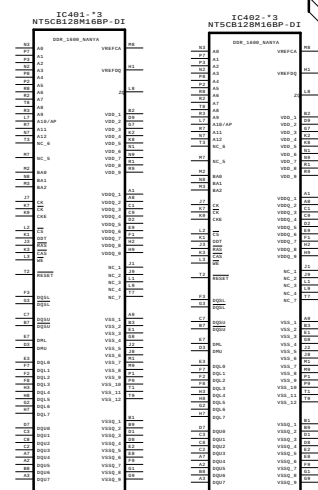
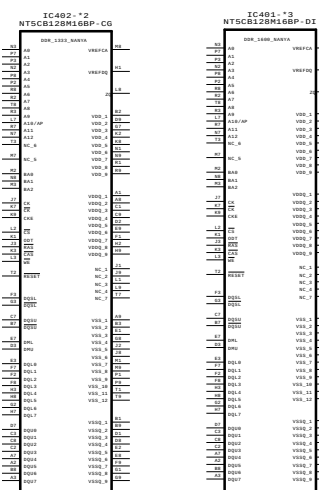
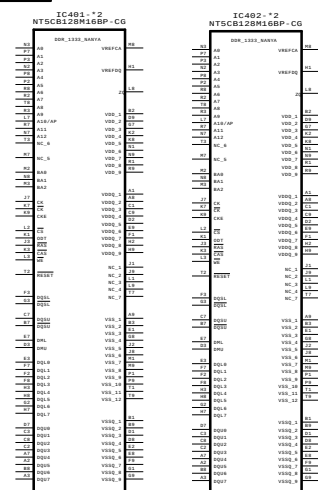
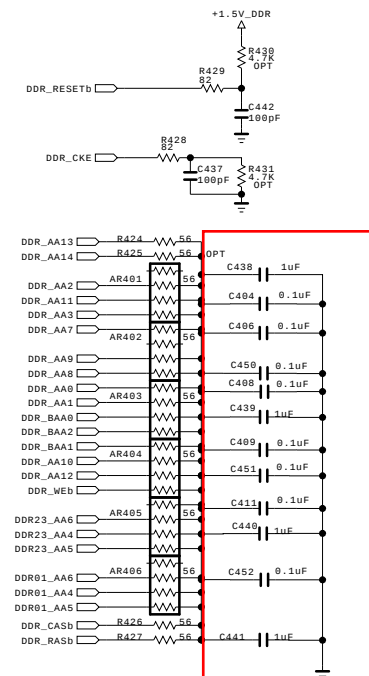
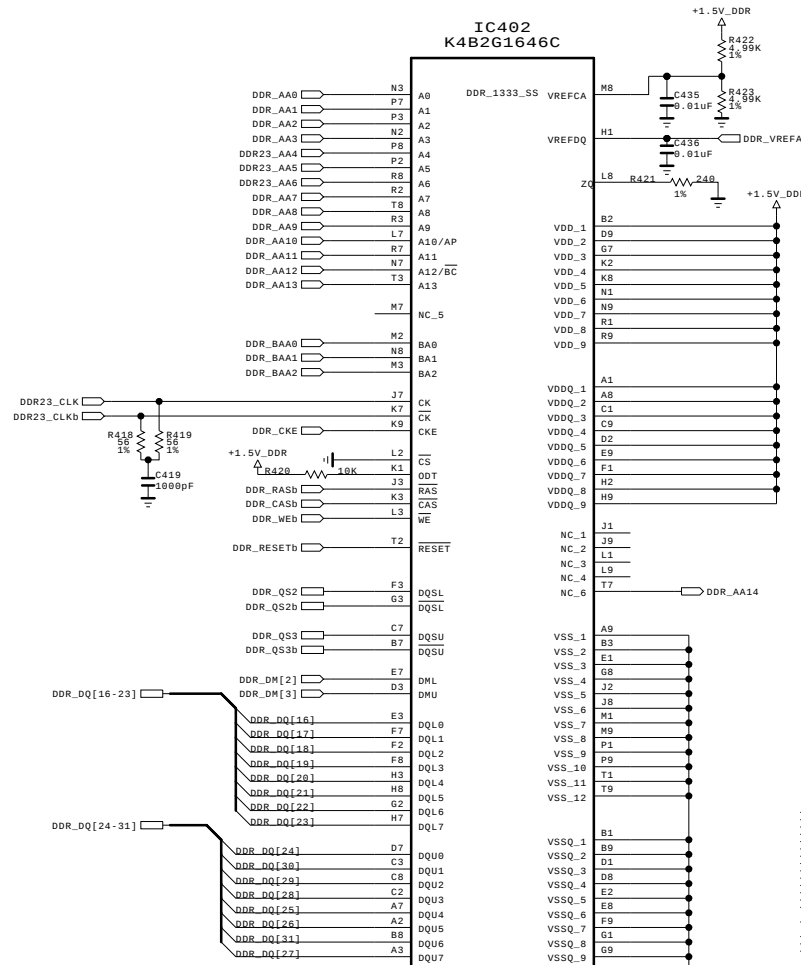
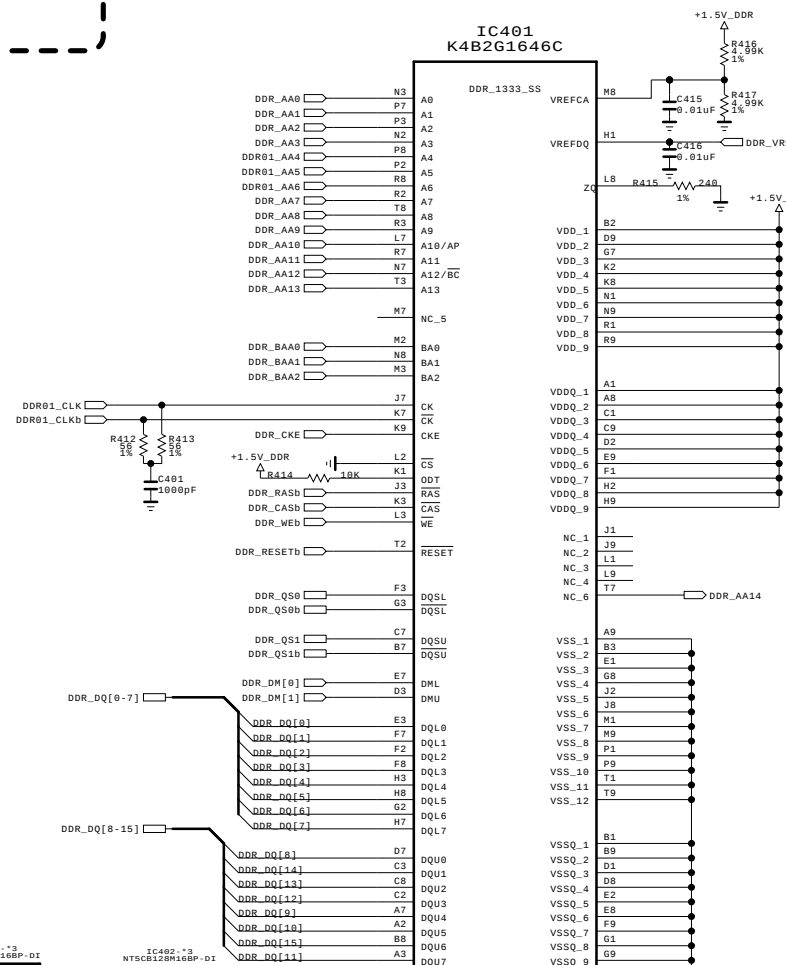
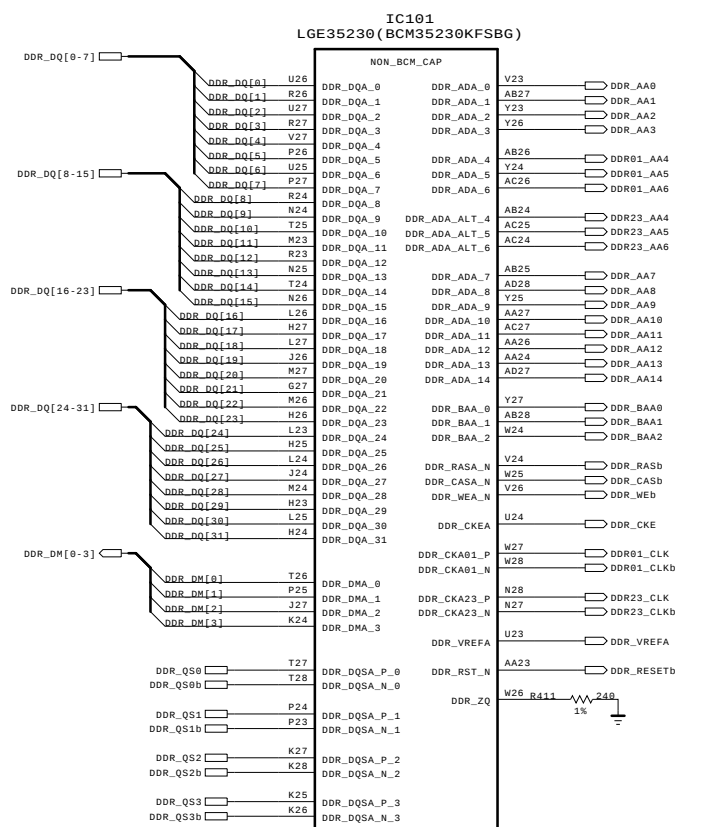
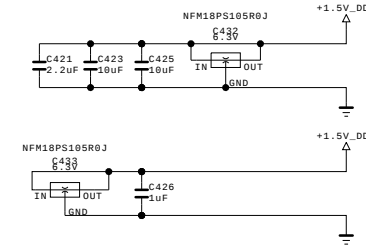
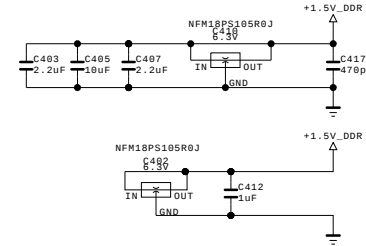
MODEL	BCM35230	DATE	
BLOCK	MAIN POWER	SHEET	2 / 50



DDR STRAP

JEDEC Types : DDR_DQ[0:4]
00001 : DDR3-1333H (CasLat=9)
10101 : DDR3-1600K (CasLat=11) (0)

Bus Width : DDR_DQ[10]
0 - 16b
1 - 32b (0)
Chip Width : DDR_DQ[8]
0 - 8b
1 - 16b (0)
Chip Size : DDR_DQ[6:5]
00 - 4Gbit
01 - 2Gbit (0)
10 - 1Gbit
11 - 512Mbit

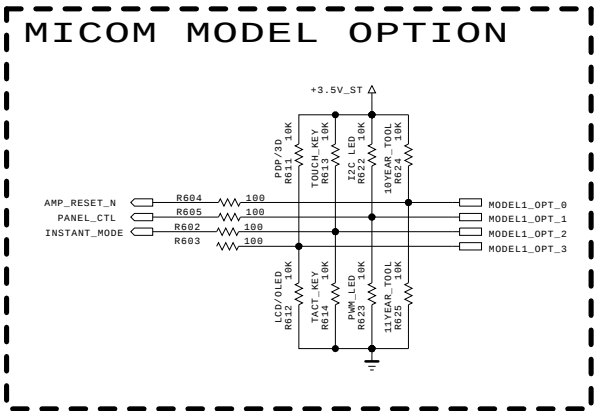
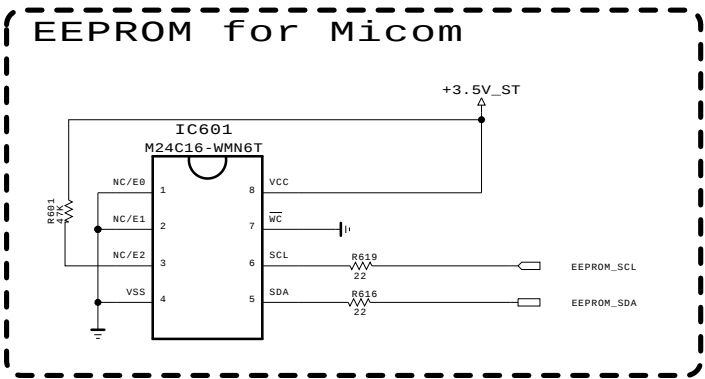
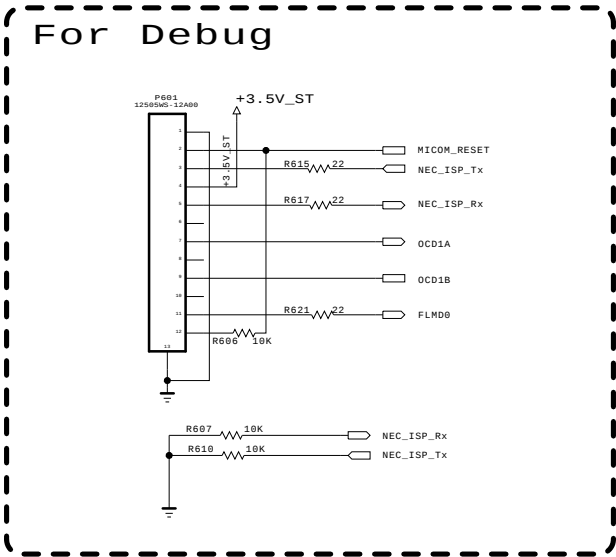


SECRET
LGElectronics

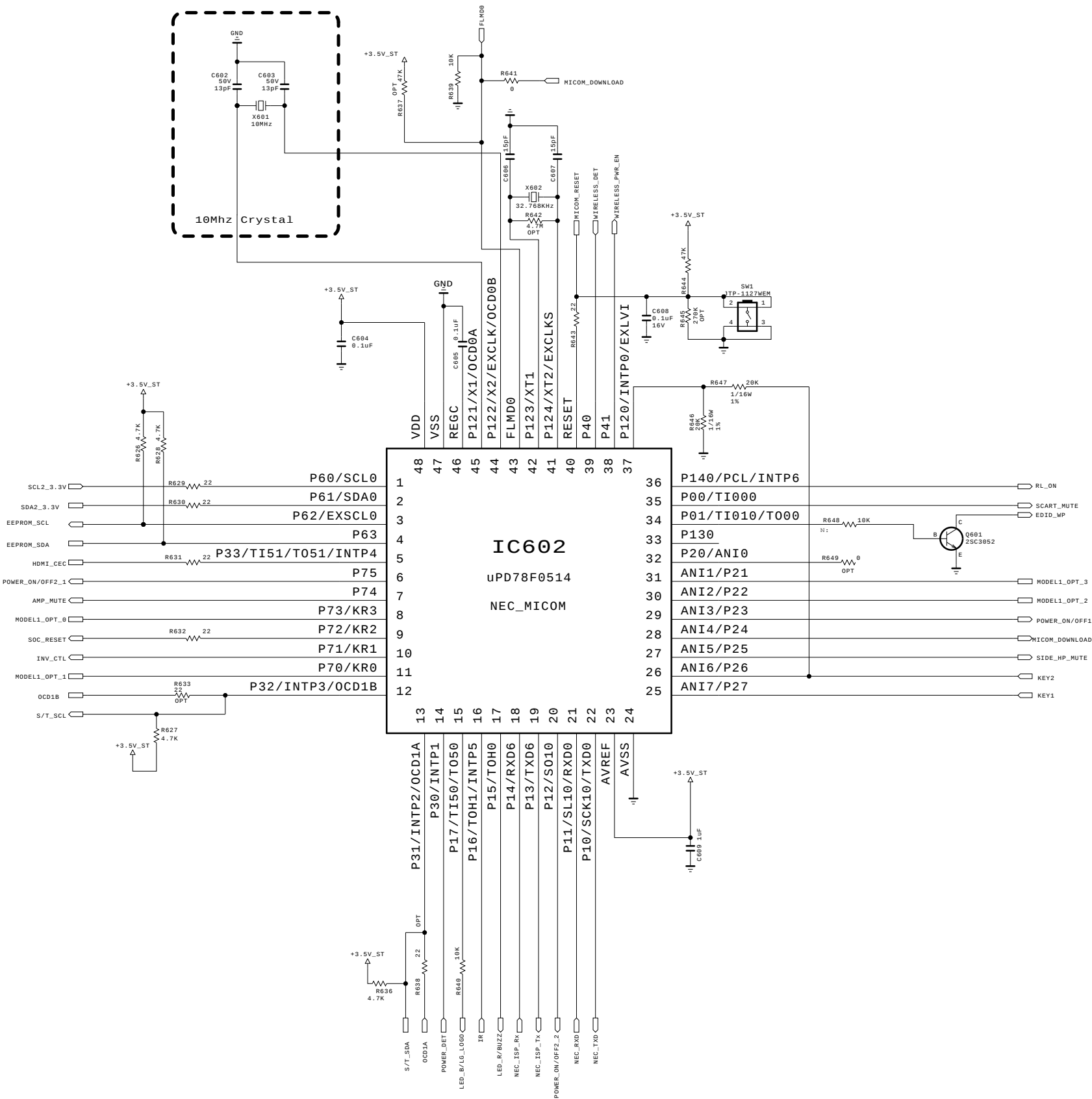


MODEL	BCM35230	DATE	
BLOCK	MAIN DDR	SHEET	4 / 50

NEC MICOM



MODEL OPTION				
PIN NAME	PIN NO.	HIGH	LOW	
MODEL_OPT_0	8	10YEAR_TOOL (10 SENSOR)	11YEAR_TOOL (11 SENSOR)	
MODEL_OPT_1	11	I2C_LED	PWM_LED	
MODEL_OPT_2	30	TOUCH_KEY	TACT_KEY	
MODEL_OPT_3	31	PDP/3D	LCD/OLED	
		LCD	PDP	OLED
MODEL_OPT_3	0	1	0	1
		LOW	LOW_SMALL	TBD
MODEL_OPT_1	0	0	1	1
MODEL_OPT_2	0	1	0	1

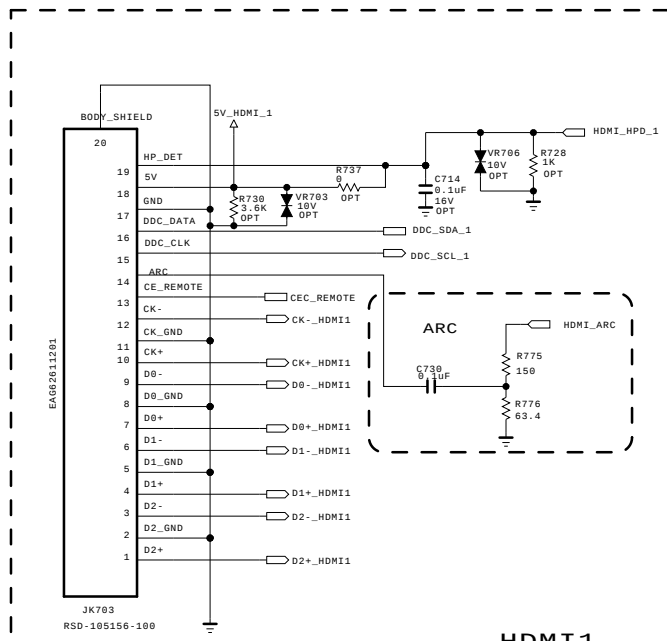


THE  SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE  SYMBOL MARK OF THE SCHEMATIC.

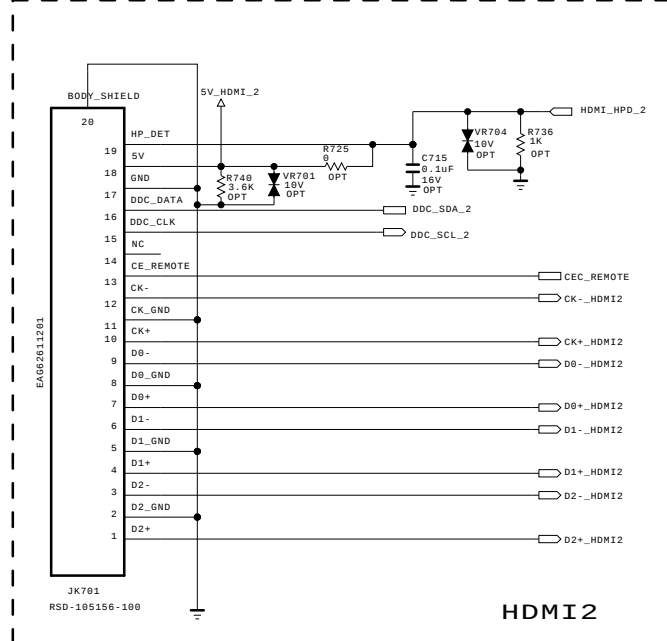
SECRET
LGElectronics



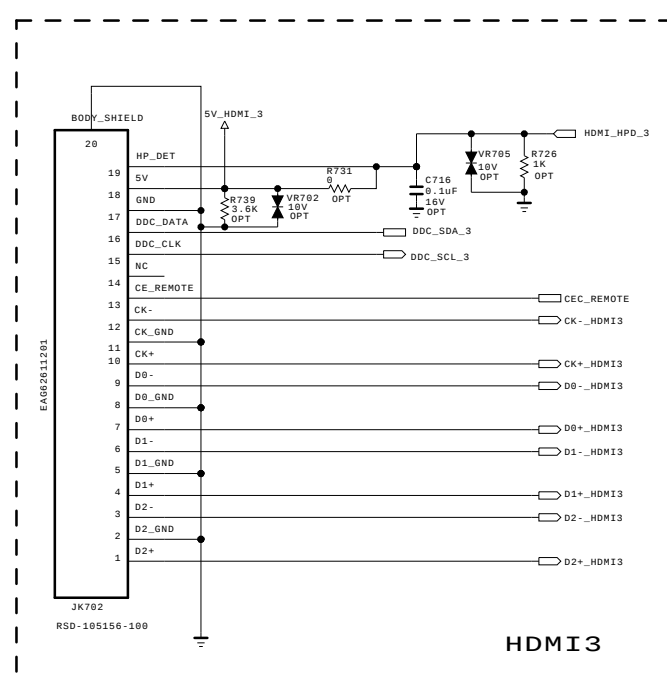
MODEL	BCM35230	DATE	
BLOCK	MICOM	SHEET	6 / 50



HDMI1

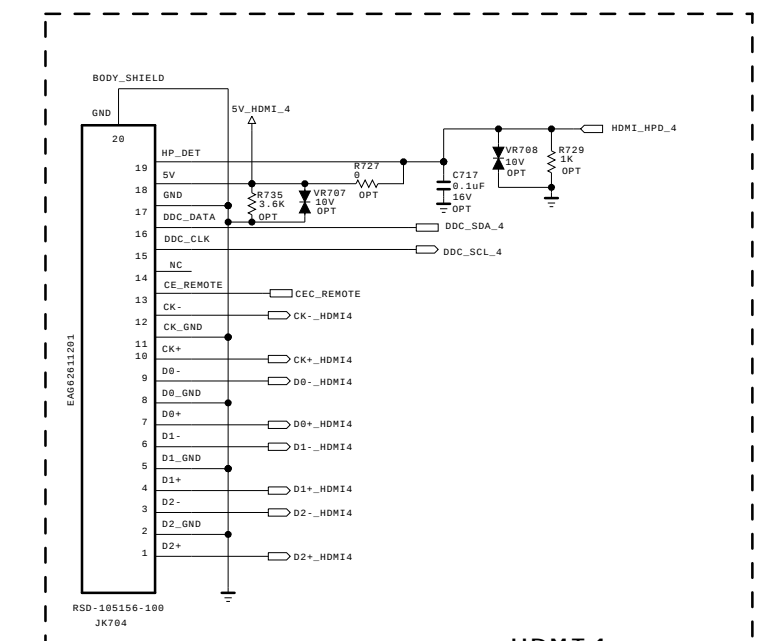


HDMI2

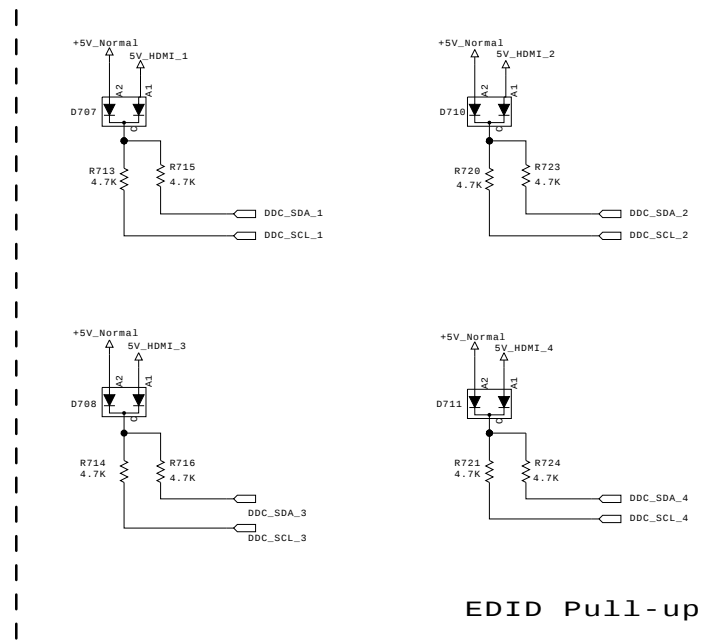


HDMI3

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.



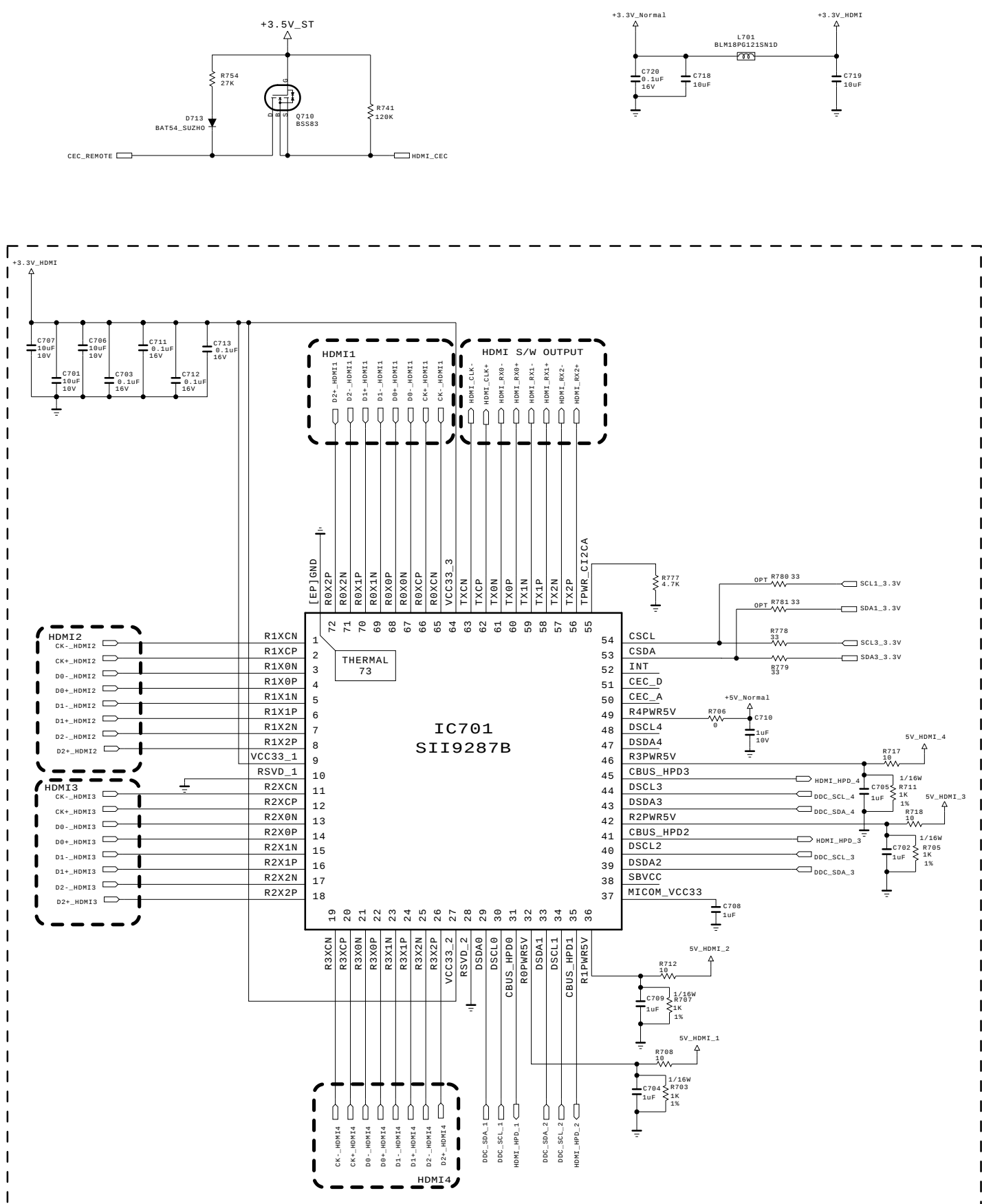
HDMI4



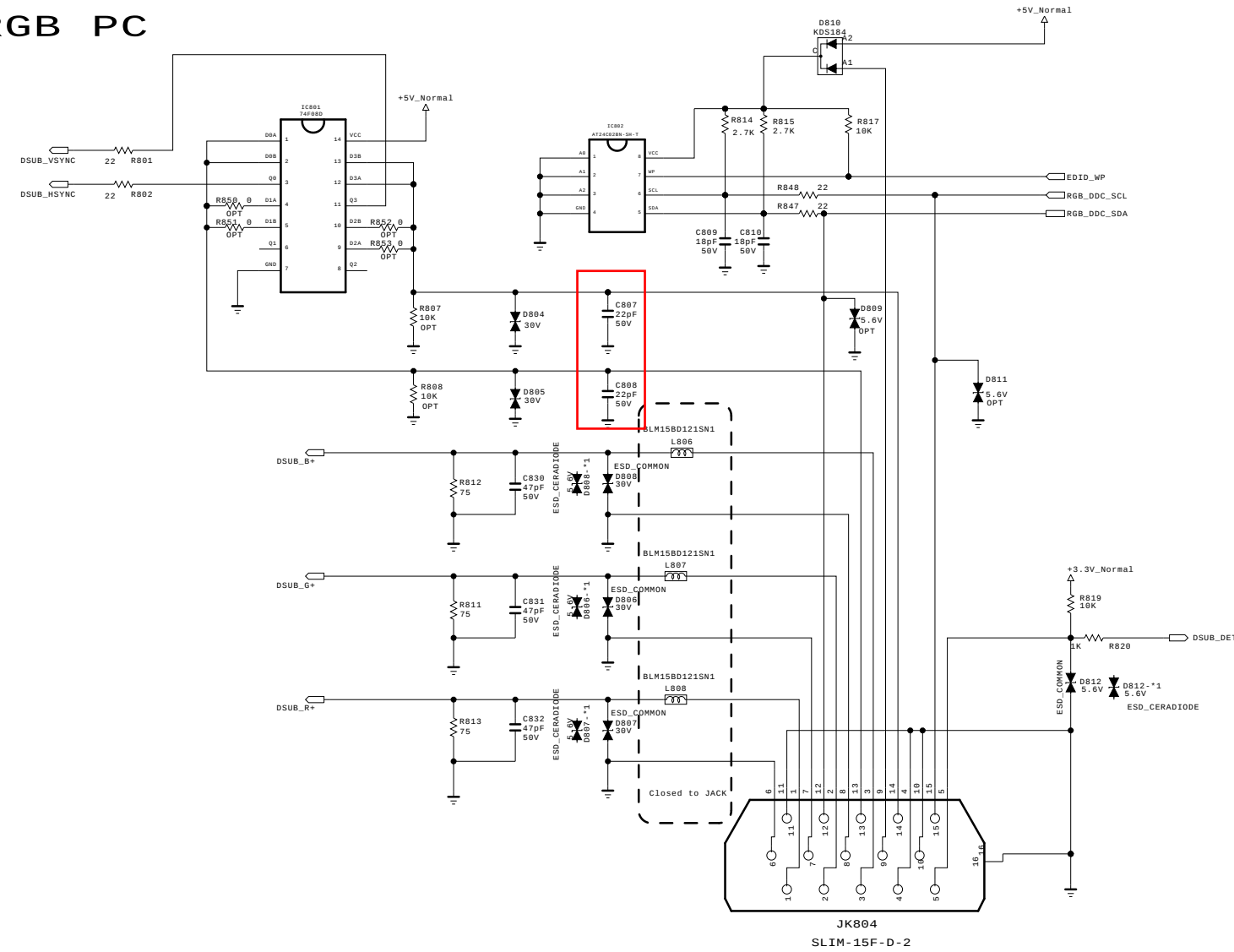
EDID Pull-up

DUAL COMPONENT	
D707, D708 D710, D711	1ST : 0DD184009AA 2ND : 0DSIH00028A
D713	1ST : T-BAT54_SUZH0, 2ND : 0DS0N00138A

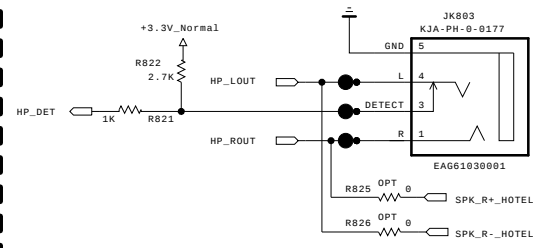
* HDMI CEC



RGB PC

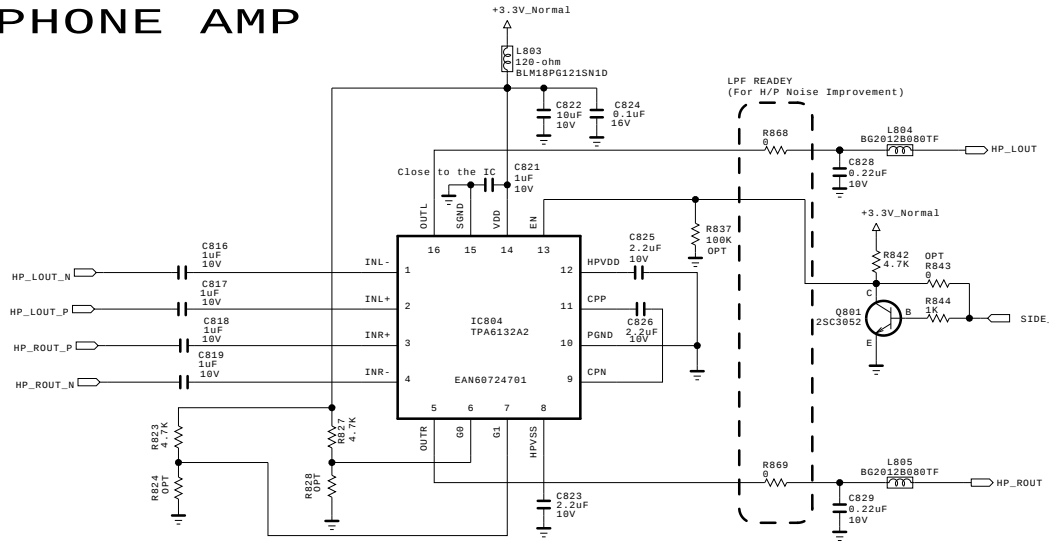


EARPHON JACK

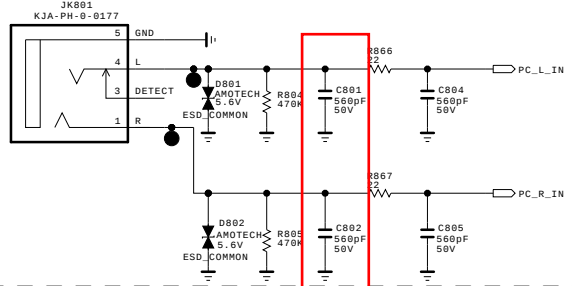


DUAL COMPONENT	
D804, D805, D806 D807, D808, D813 D814	1ST : EAH39491601, 2ND : EAH33945901
D810	1ST : 0DD184009AA, 2ND : 0DSIH00028A
Q801	1ST : 0TRIY80001A, 2ND : 0TR387500AA
IC805	1ST : EAN61151201, 2ND : EAN61130001

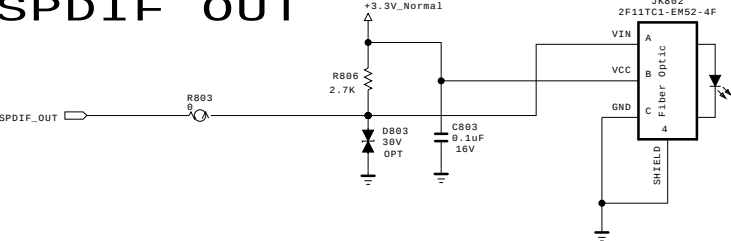
EARPHONE AMP



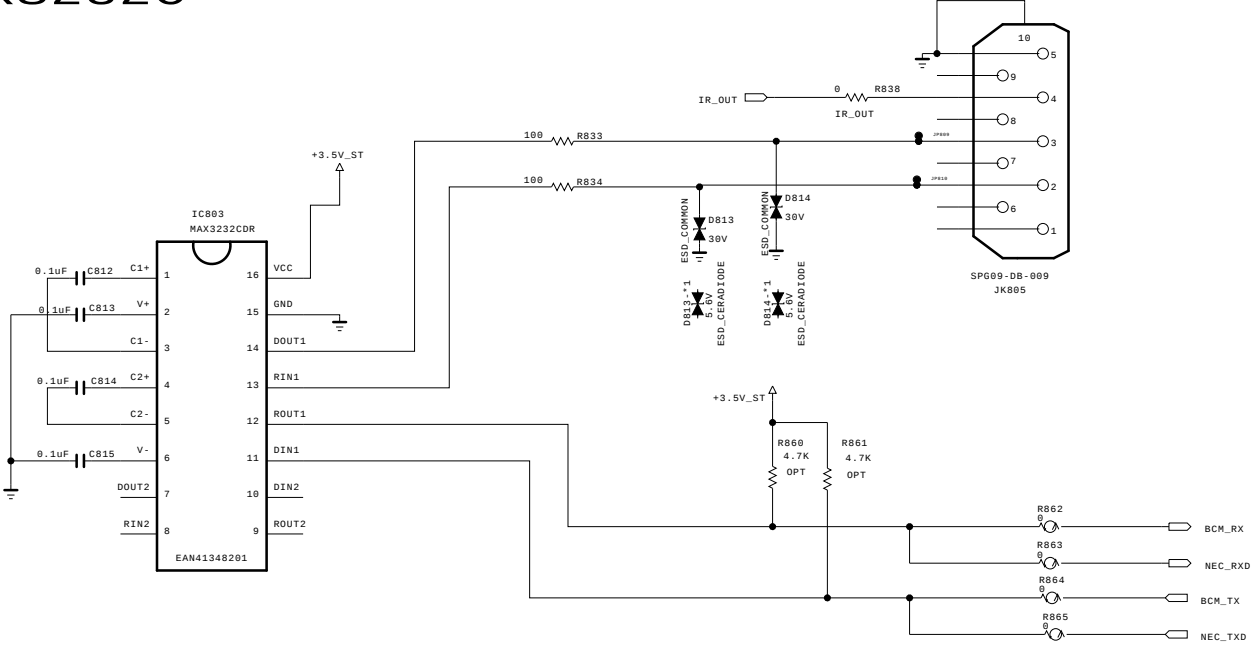
PC AUDIO



SPDIF OUT



RS232C



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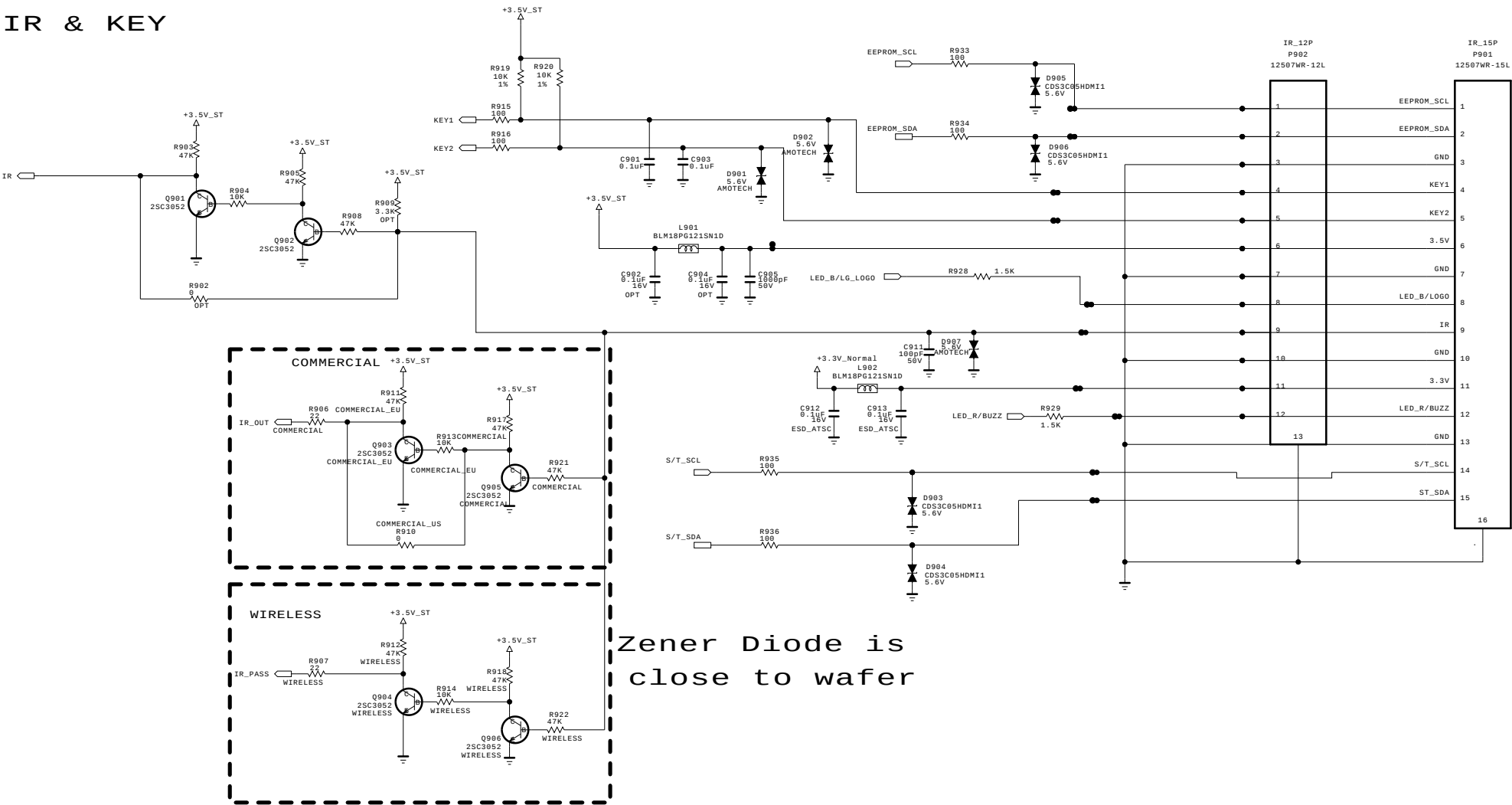
SECRET
LGElectronics

LG ELECTRONICS

MODEL	BCM35230	DATE	2010.10.21
BLOCK	COMMON JACK	SHEET	8 / 58

DUAL COMPONENT	
Q901,Q902,Q903 Q904,Q905,Q906	1ST : 0TRIY80001A 2ND : 0TR387500AA
D903,D904 D905,D906	1ST : EAH42720601, 2ND : EAH60994401

IR & KEY



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SECRET
LGElectronics

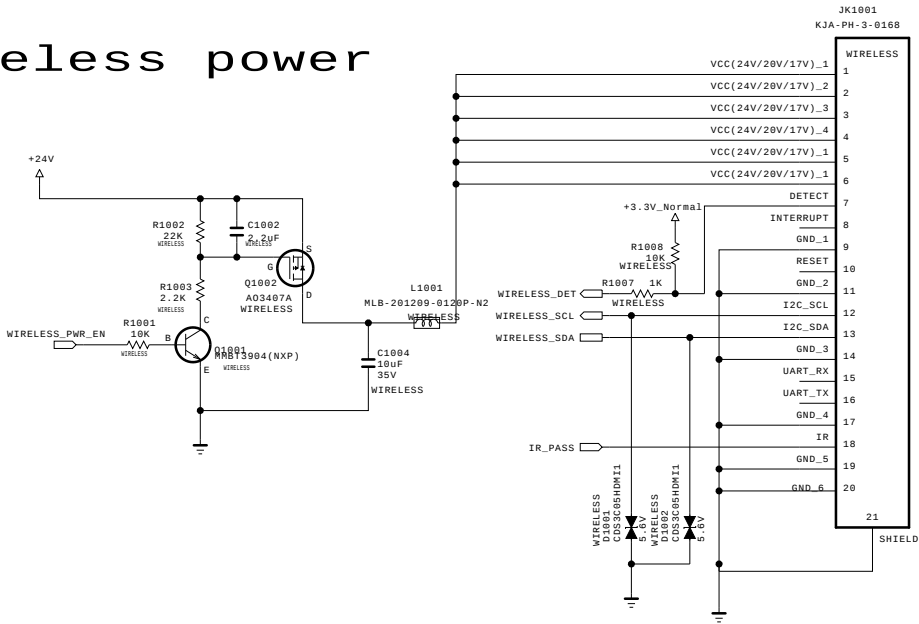


MODEL	BCM35230	DATE	
BLOCK	IR/KEY	SHEET	9 / 50

WIRELESS READY MODEL

DUAL COMPONENT		
D1001,D1002	1ST : EAH42720601	2ND : EAH60994401
Q1001	1ST : EBK61012601,	2ND : 0TRDI80002A
Q1002	1ST : EBK60752501,	2ND : EBK61011501

wireless power



Wireless I2C connection with I2C_1
Address : 0X20

WIRELESS_SCL

WIRELESS_SDA

R1005

WIRELESS

R1006

WIRELESS

33

33

SCL2_3.3V

SDA2_3.3V

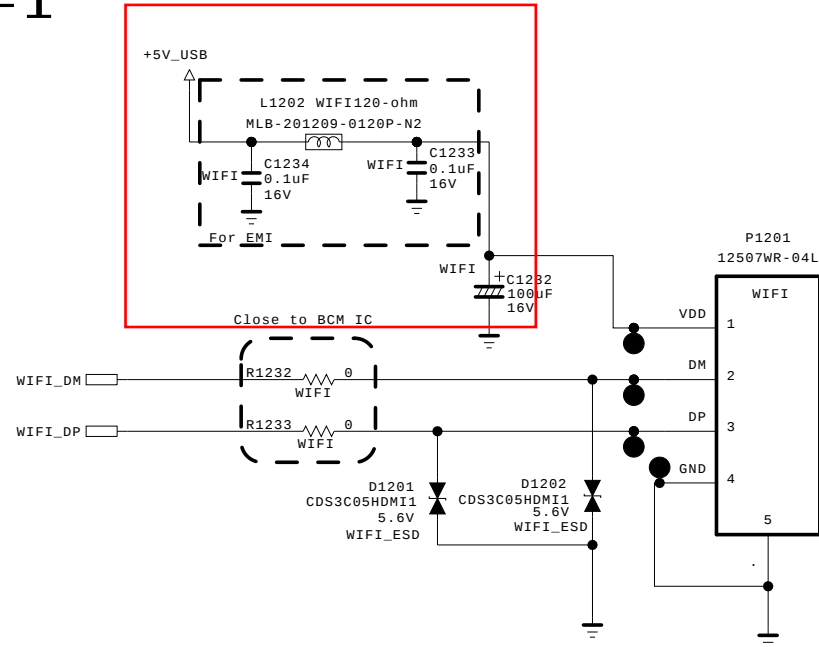
THE  SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE  SYMBOL MARK OF THE SCHEMATIC.

The schematic diagram illustrates the SC/COMP2 board layout. It features a central horizontal bus connected to various components. On the left, there are three input lines and a ground connection. The main circuit includes several diodes (D1112, D1113, D1114, ZD1103, ZD1104, ZD1105, ZD1106, ZD1107, ZD1108) and resistors (R1112, R1122, R1123, R1124, R1125, R1126, R1127, R1133, R1134, R1135, R1139). Capacitors (C1113, C1114, C1121, C1122, C1128, C1129, C1130) are used for filtering and timing. Integrated circuits (ICs) include BLM18PG121SN1D, L1103, L1104, L1109, L1108, L1107, and CM2012FR27KT. The board is divided into sections for SC/COMP2_R_IN, SC/COMP2_L_IN, SC_R/COMP2_Pr, SC_B/COMP2_Pb, SC_G/COMP2_Y, and SC_DET/COMP2_DET. A 3.3V Normal supply is connected to the bottom section. The board is labeled 'FOR EMI' and 'SC/COMP2'.

SECRET
LGElectronics

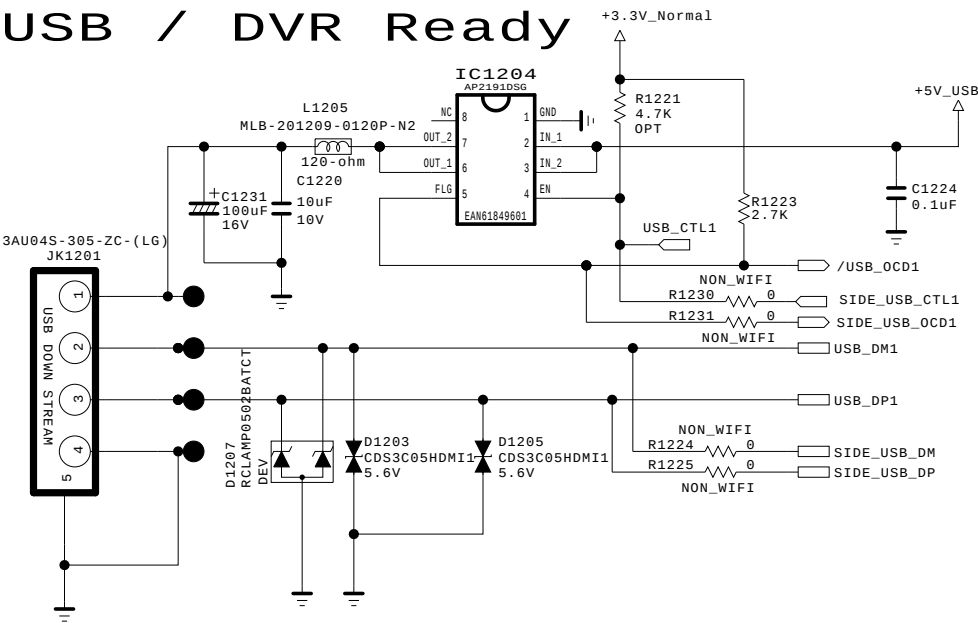


USB_WIFI

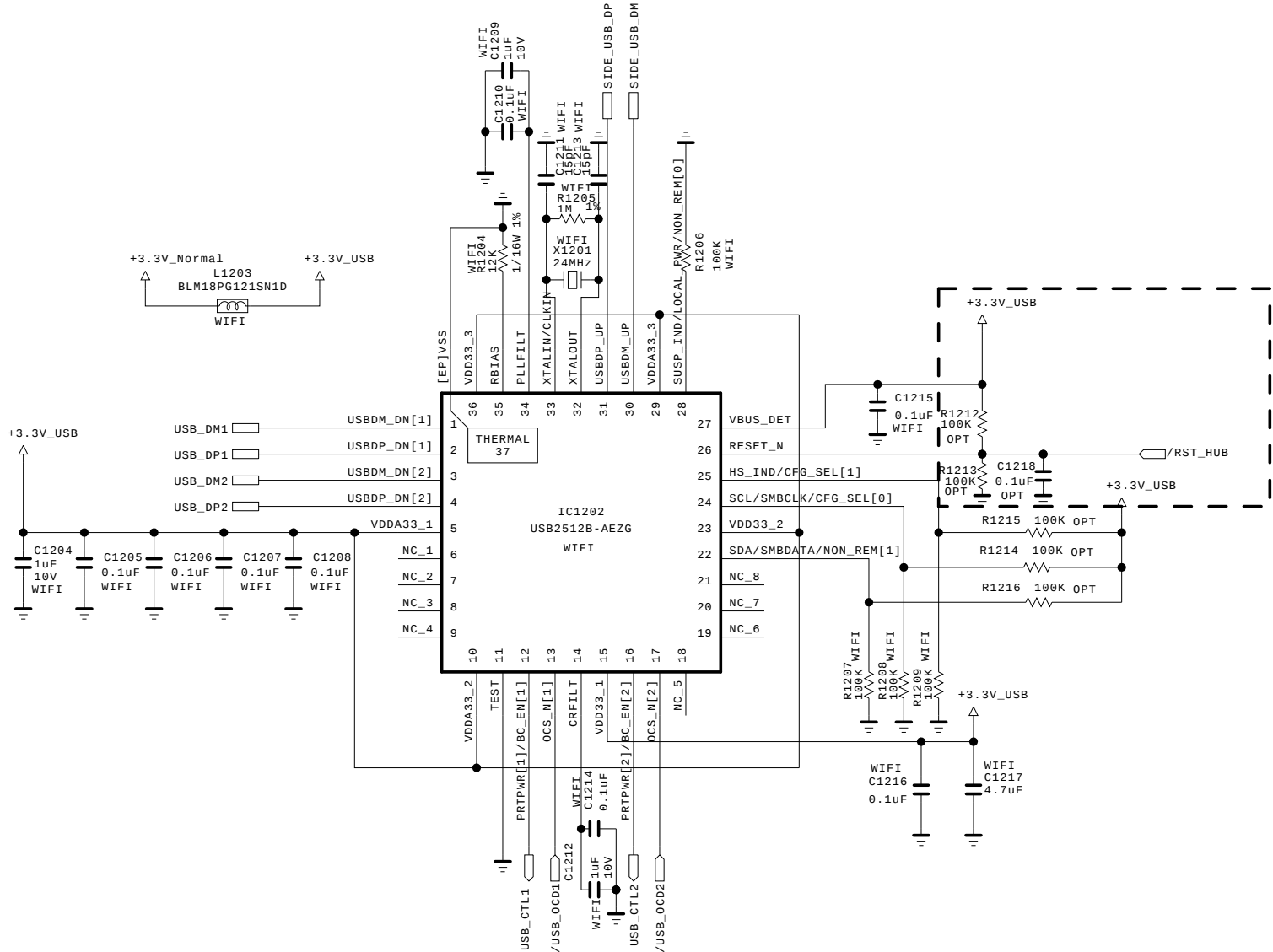
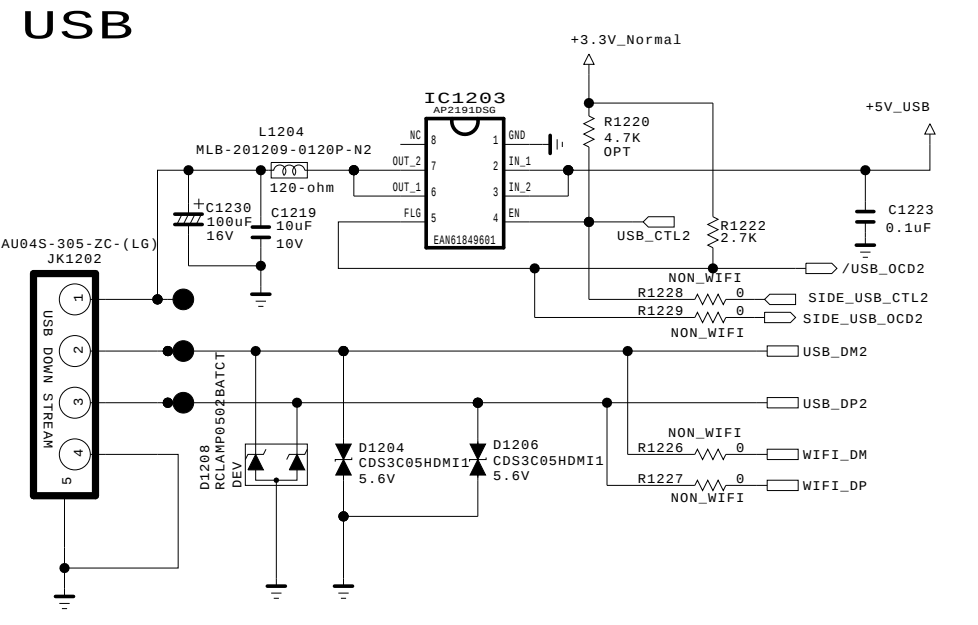


DUAL COMPONENT	
D1201,D1202 D1203,D1204 D1205,D1206	1ST : EAH42720601 2ND : EAH60994401

USB / DVR Ready



USB



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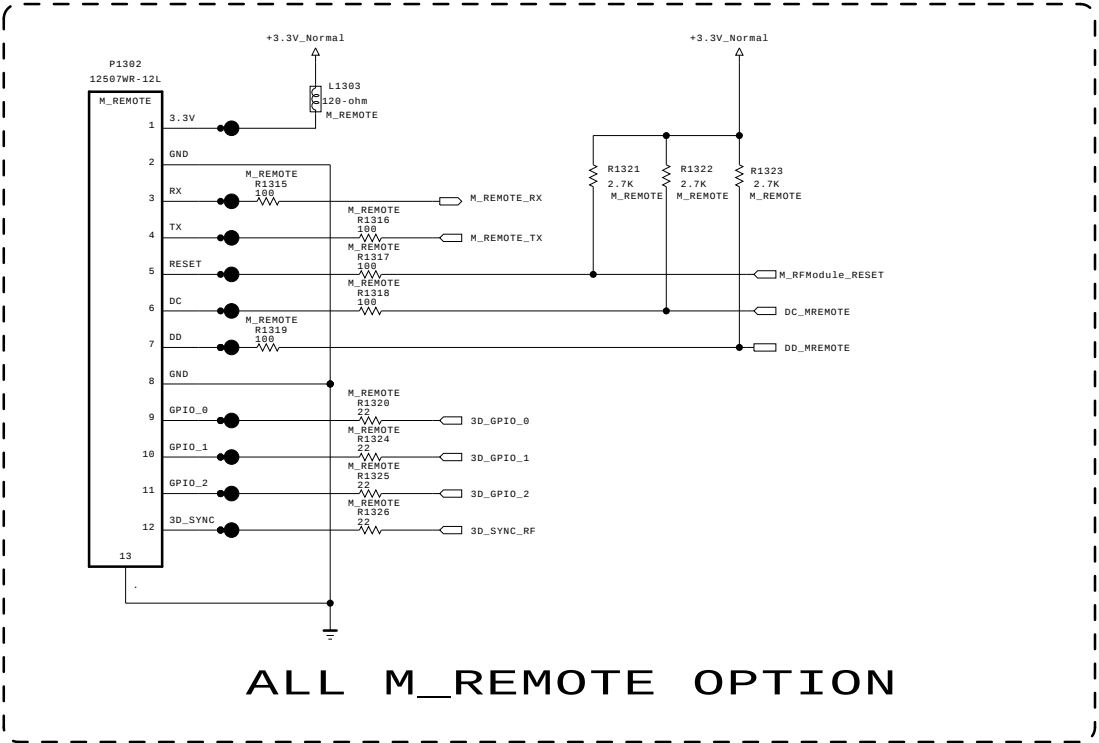
SECRET

LG Electronics

LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	USB + WIFI	SHEET	12 /

TI solution M_REMOTE OPTION



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 SPECIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE  SYMBOL MARK OF THE SCHEMATIC.

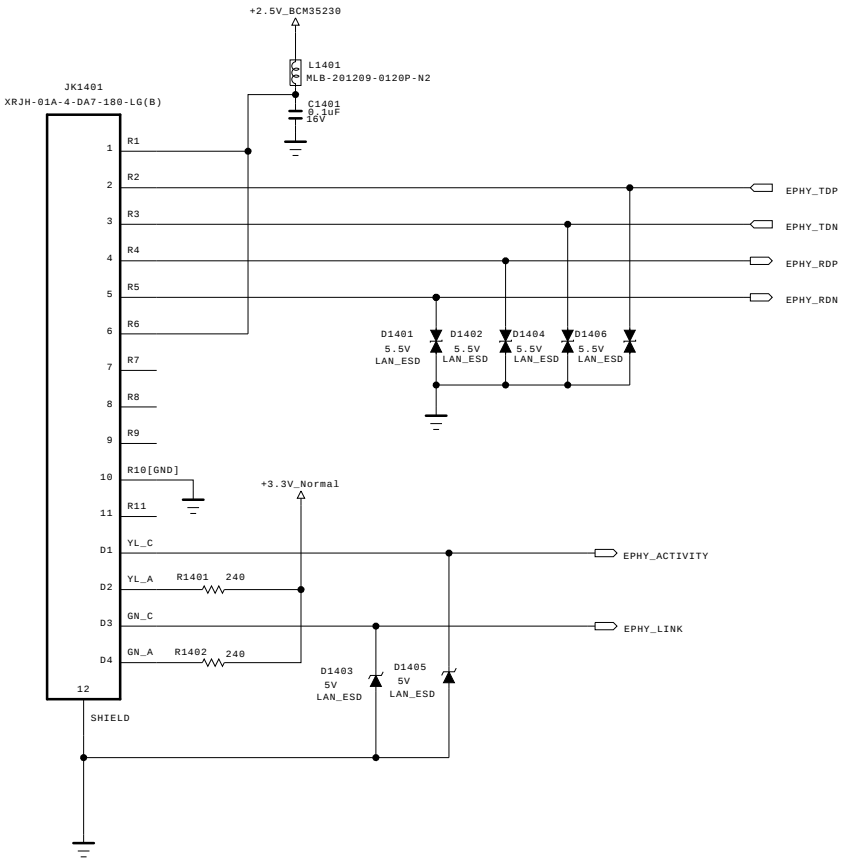
SECRET
LGElectronics



MODEL	BCM35230	DATE	
BLOCK	M_REMOCON	SHEET	13 / 50

Ethernet Block

DUAL COMPONENT	
D1401, D1402 D1403, D1404 D1405, D1406	1ST : EAH42720601 2ND : EAH60994401



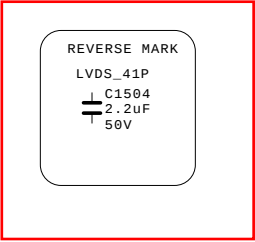
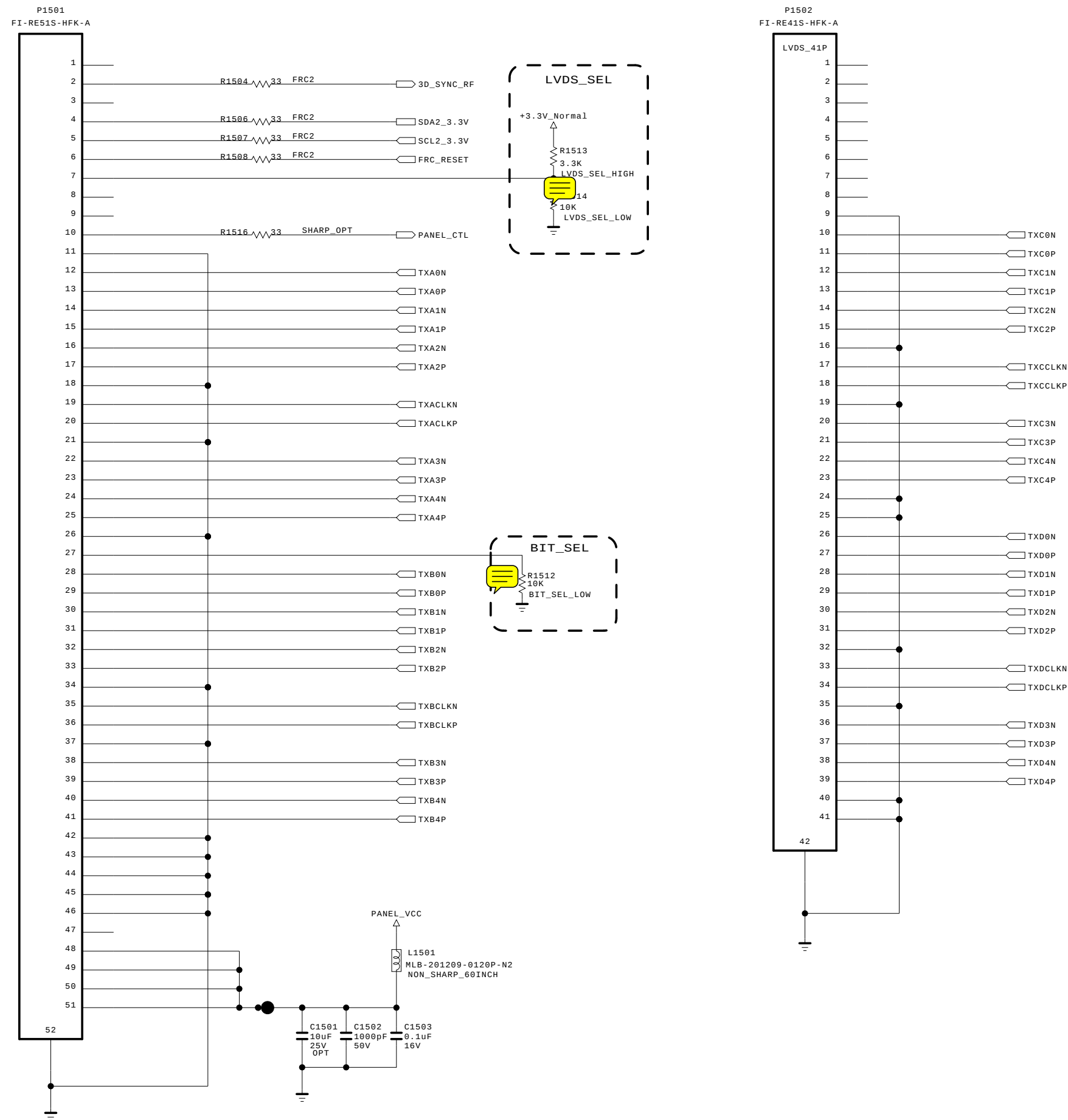
THE  SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE  SYMBOL MARK OF THE SCHEMATIC.

SECRET
LGElectronics



MODEL	BCM35230	DATE	
BLOCK	ETHERNET	SHEET	14 / 50

FHD120Hz LVDS output(51pin+41Pin)



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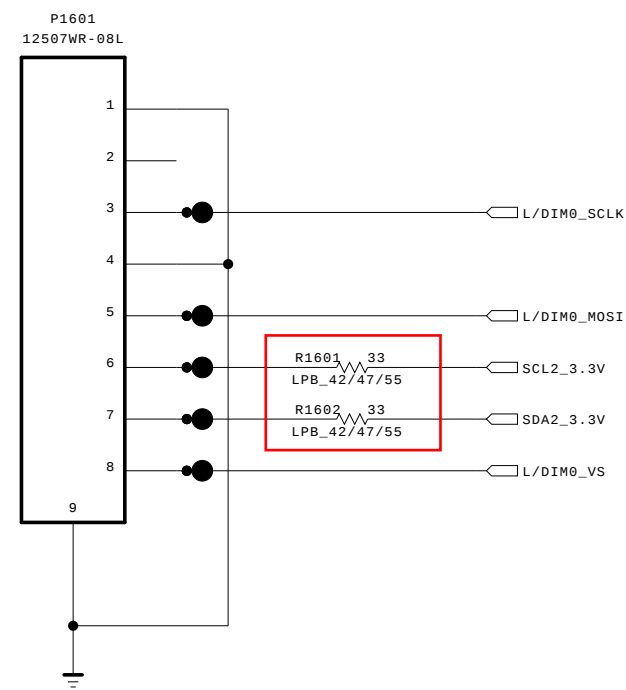
SECRET

LG Electronics

LG ELECTRONICS

MODEL	BCM35230	DATE	2010.11.03
BLOCK	LVDS	SHEET	15 / 50

[Local Dimming Block]

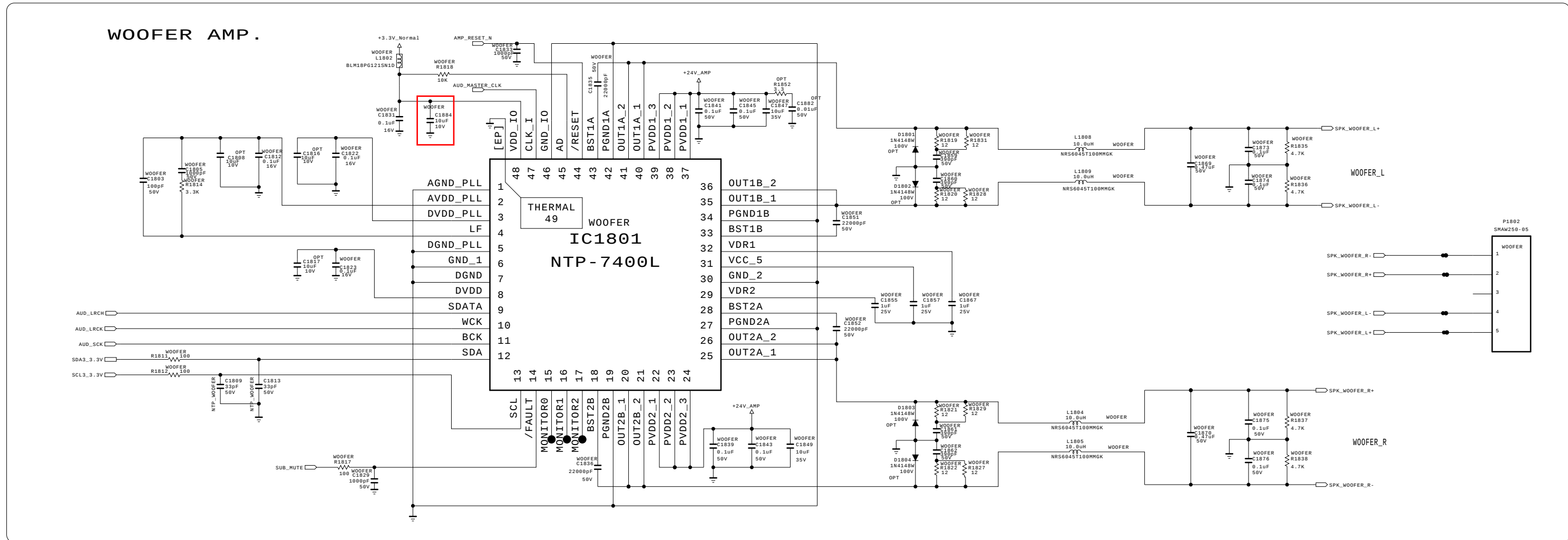
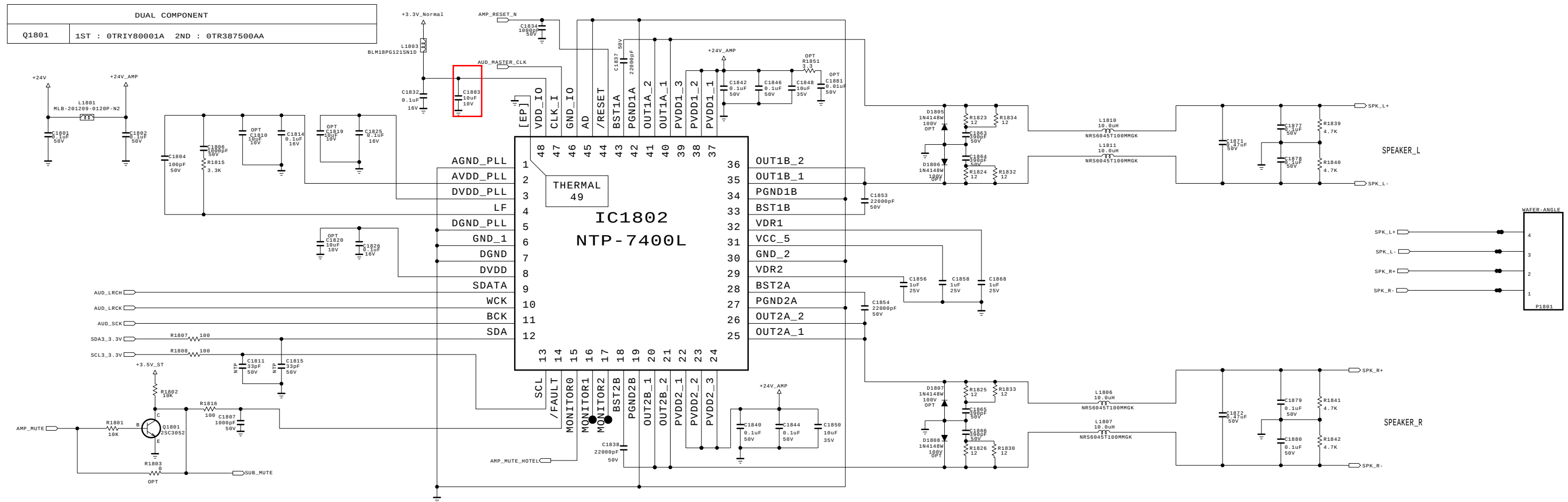


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SECRET
LGElectronics



MODEL	BCM35230	DATE	
BLOCK	L_DIMMING	SHEET	16 / 50

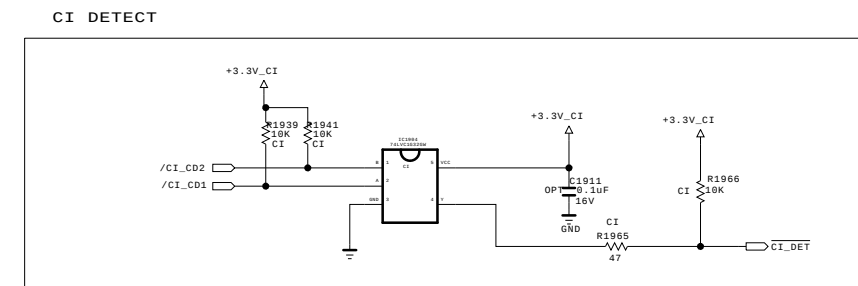
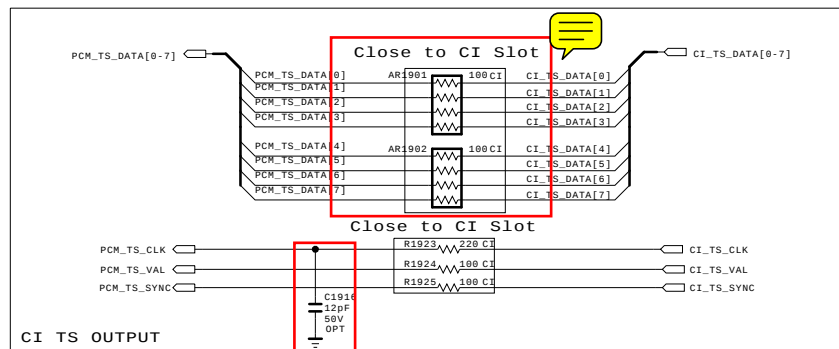


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SECRET
LGElectronics

LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	AUDIO[NEO]	SHEET	18 / 50

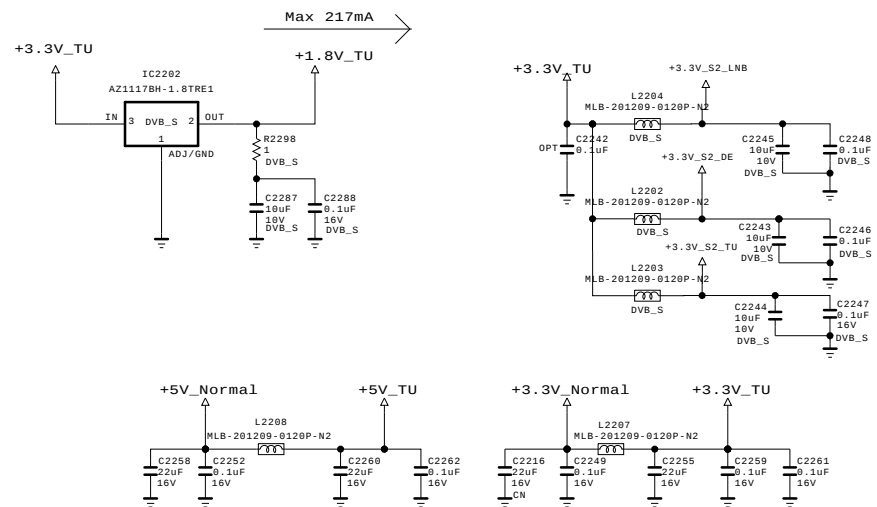
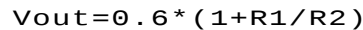
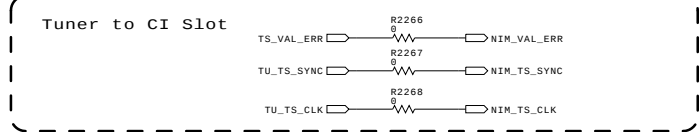
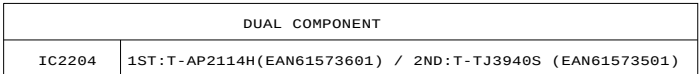


SECRET
LGElectronics



MODEL	BCM35230	DATE	2010.11.11
BLOCK	CI	SHEET	19 / 58

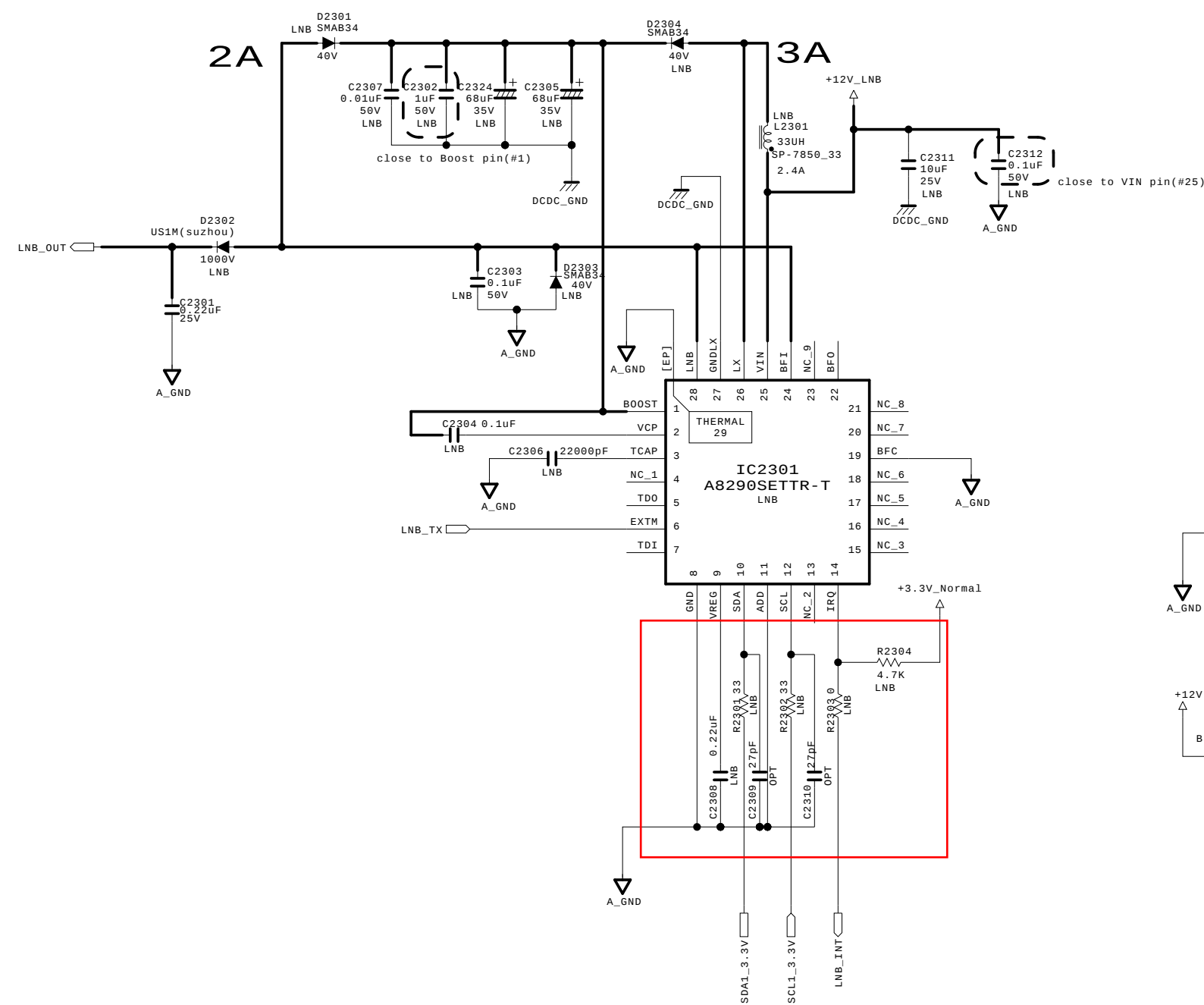
H/NIM & F/NIM & T/C/S2 Combo Tuner

[illegible]

MODEL	BCM35230	DATE	
BLOCK	TUNER SINGLE	SHEET	22 /

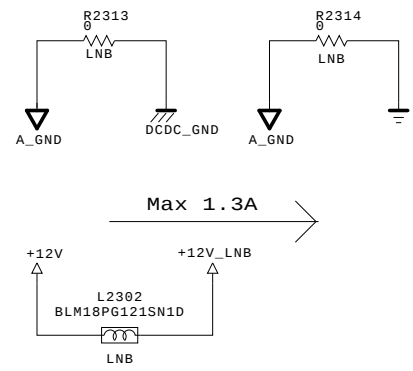
DVB-S2 LNB Part Allegro

(Option:LNB)



DCDC_GND and A_GND are connected
DCDC_GND and A_GND are connected in pin#27
PCB_GND and A_GND are connected

Input trace widths should be sized to conduct at least 3A
Output trace widths should be sized to conduct at least 2A



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 MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

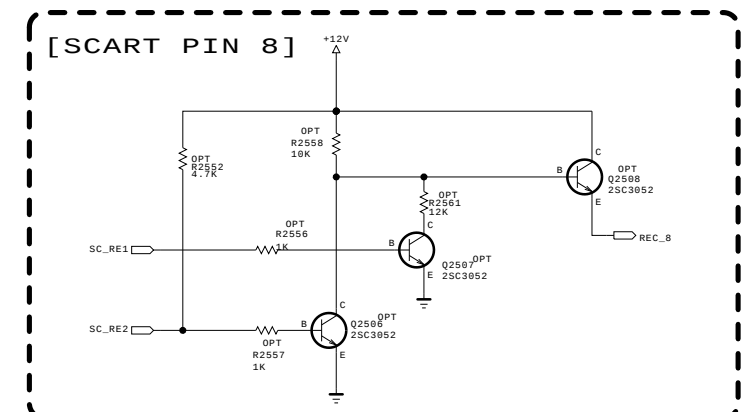
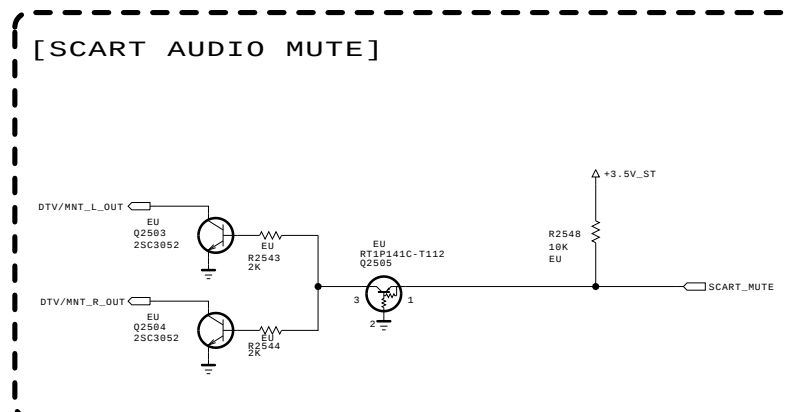
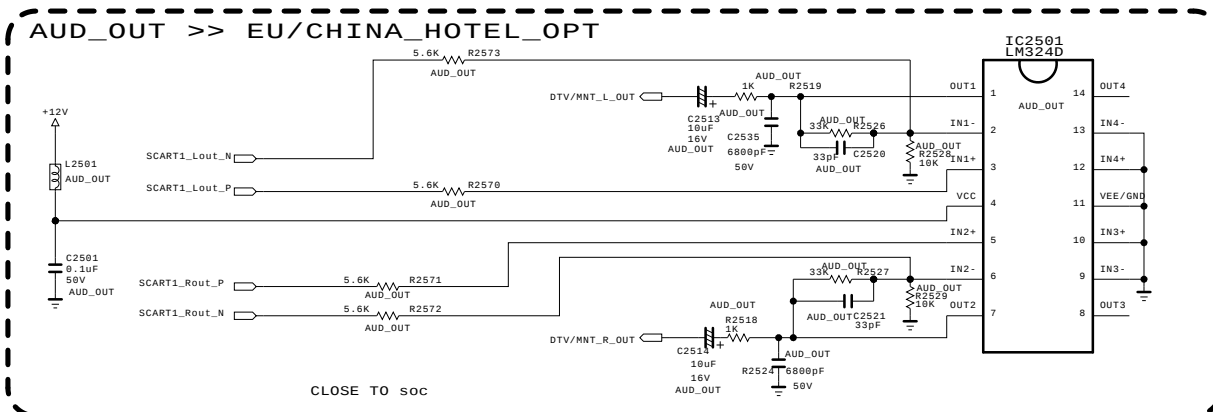
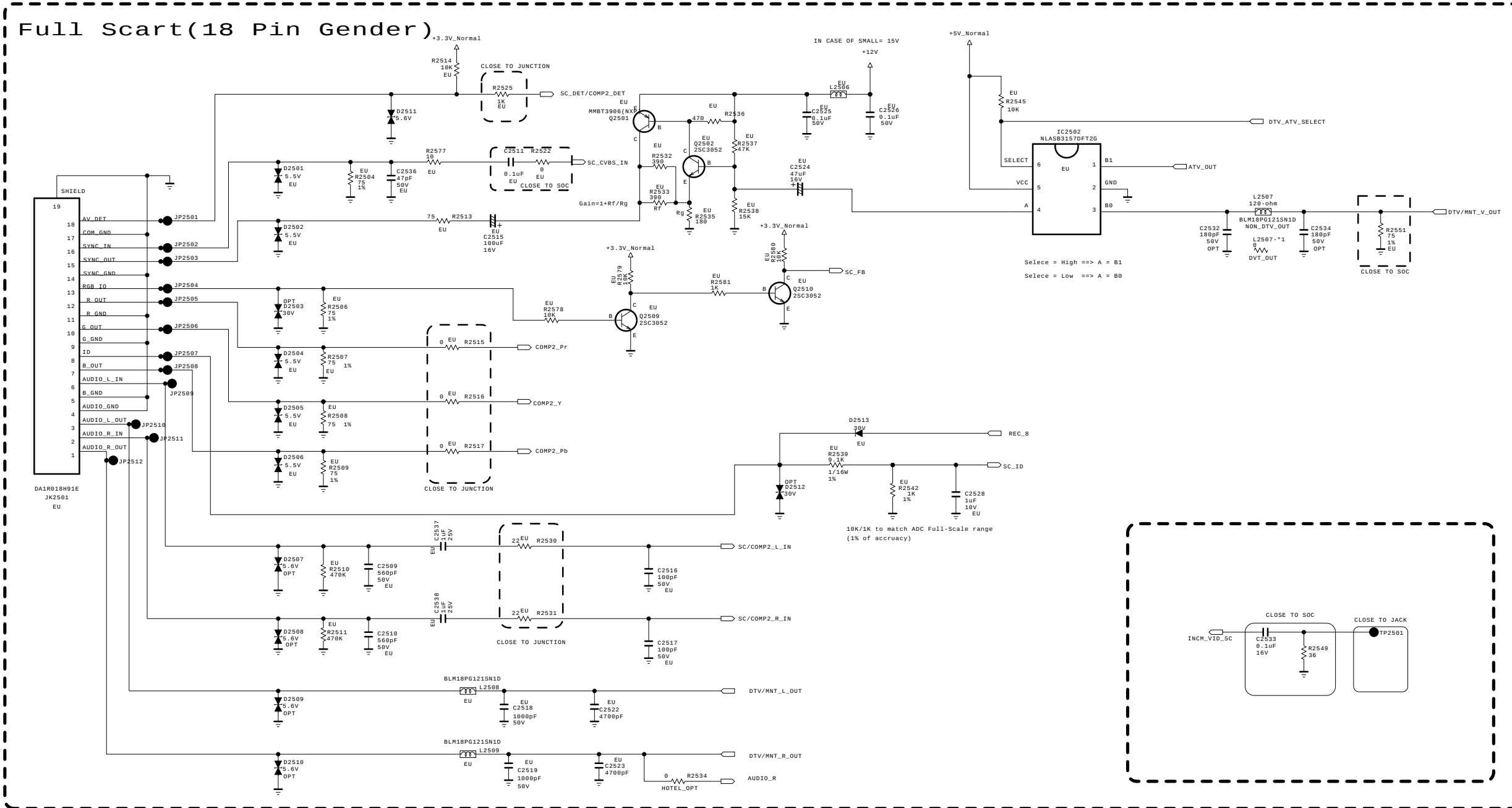
SECRET

LGElectronics

LG ELECTRONICS

MODEL	BCM35230	DATE	2010.11.02
BLOCK	LNB	SHEET	23 / 57

DUAL COMPONENT	
Q2502, Q2503 Q2504, Q2506 Q2507, Q2508	1ST : 0TRIY80001A 2ND : 0TR387500AA
Q2501	1ST : EBK61012701, 2ND : EBK58172301
Q2505	1ST : 0TRI80004A, 2ND : EBK61012501, 3RD : 0TR102009AM
D2513	1ST : T-BAT54_SUZHO, 2ND : 0DSN000138A



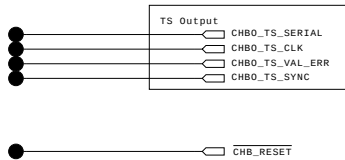
THE ⚠ SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMATIC.

SECRET
LGElectronics



MODEL	BCM35230	DATE	
BLOCK	SCART	SHEET	25 /

NON CHB



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.

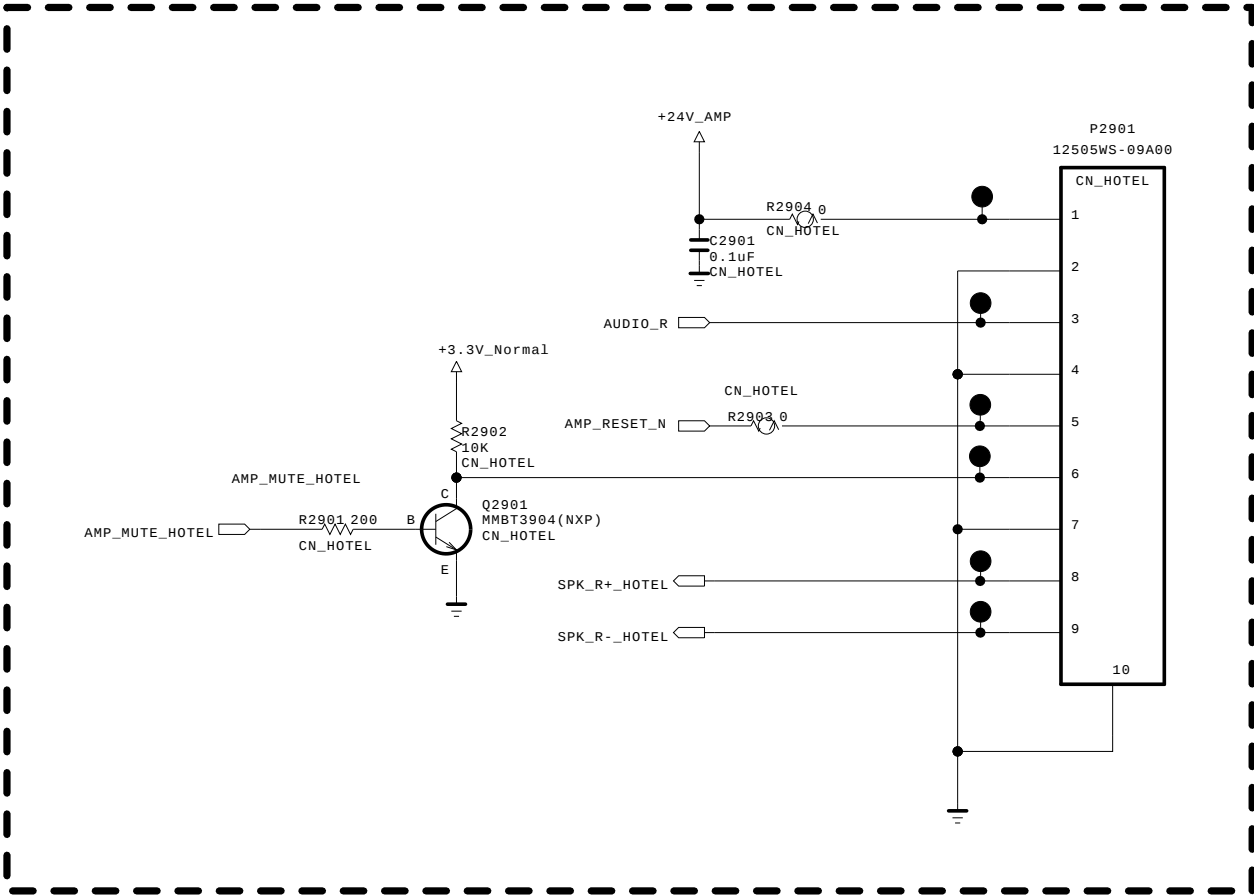
SECRET
LGElectronics



MODEL	BCM35230	DATE	
BLOCK	NON CHB	SHEET	28 / 50

China Hotel Option

DUAL COMPONENT	
Q2901	1ST : EBK61012601 2ND : 0TRDI80002A



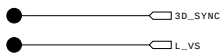
THE  SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE  SYMBOL MARK OF THE SCHEMATIC.

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MODEL	BCM35230	DATE	
BLOCK	CHINA HOTEL	SHEET	29 /



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.

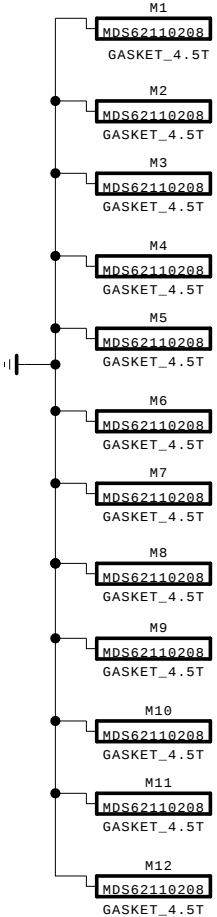
SECRET
LGElectronics



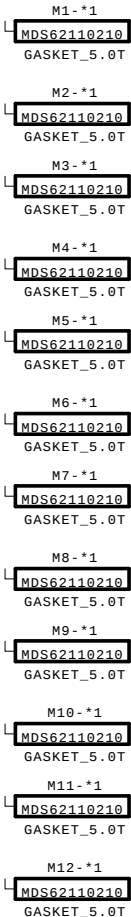
MODEL	BCM35230	DATE	
BLOCK	NON URSA	SHEET	36 / 50

SMD GASKET

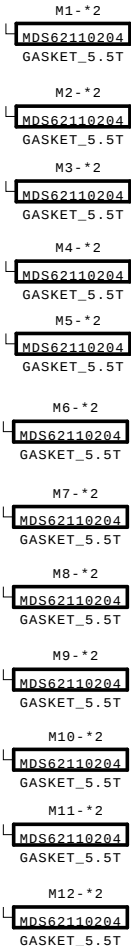
SMD GASKET 4.5T



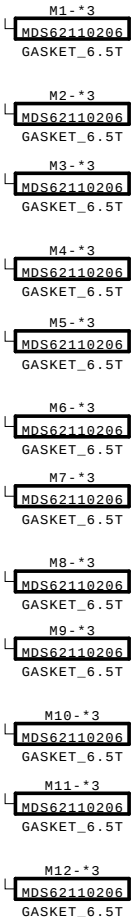
SMD GASKET 5.0T



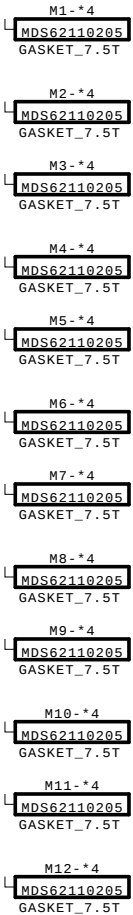
SMD GASKET 5.5T



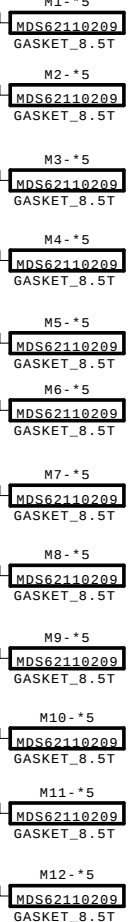
SMD GASKET 6.5T



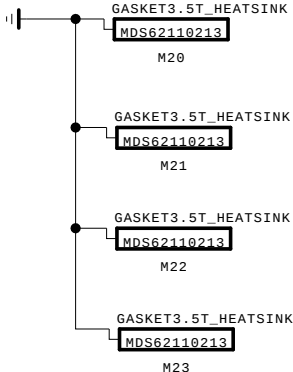
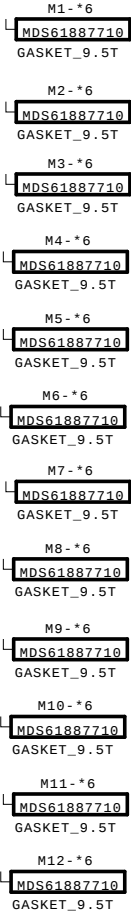
SMD GASKET 7.5T



SMD GASKET 8.5T



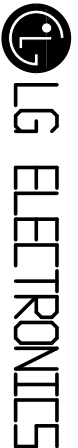
SMD GASKET 9.5T



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

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MODEL

BCM35230

DATE

2010. 09. 18

BLOCK

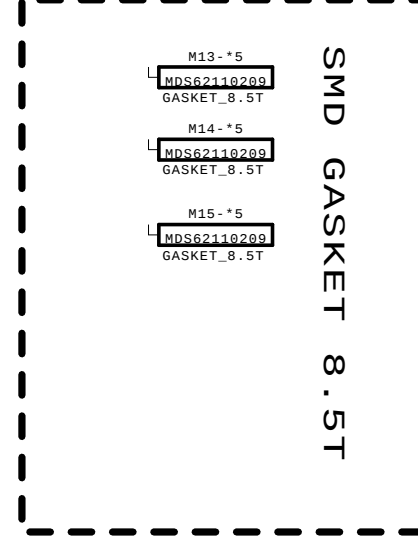
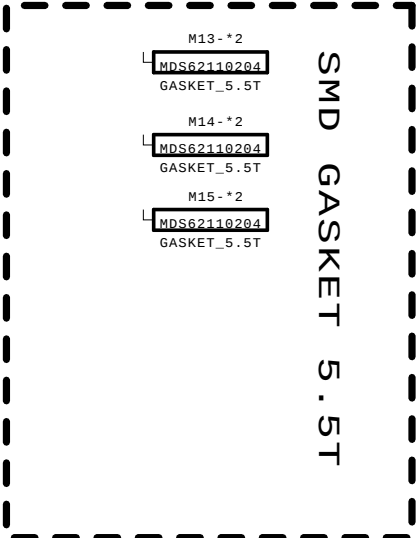
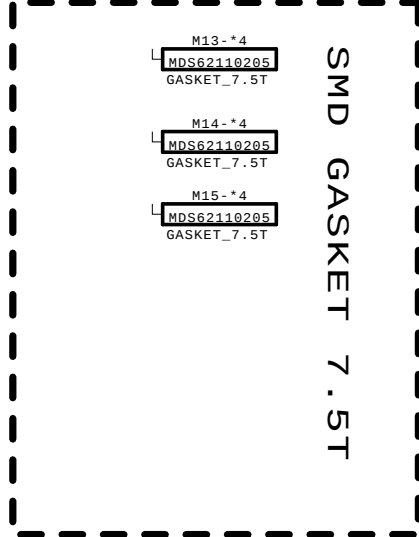
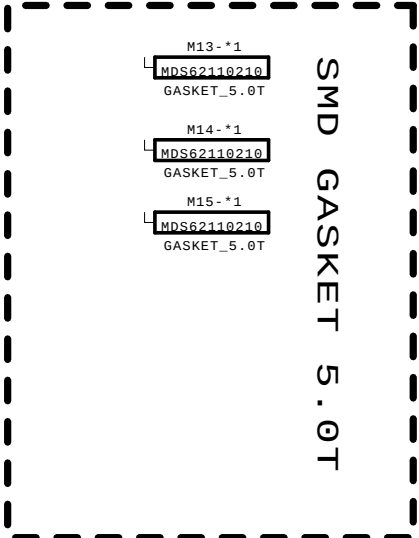
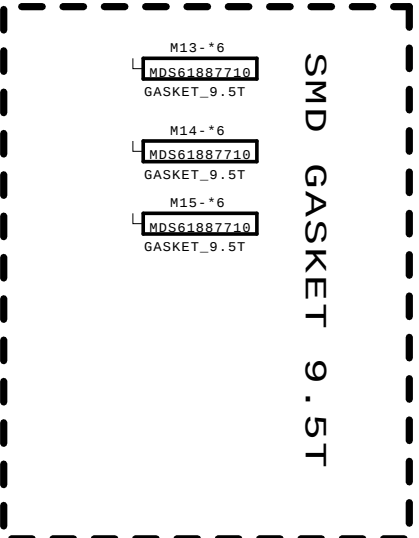
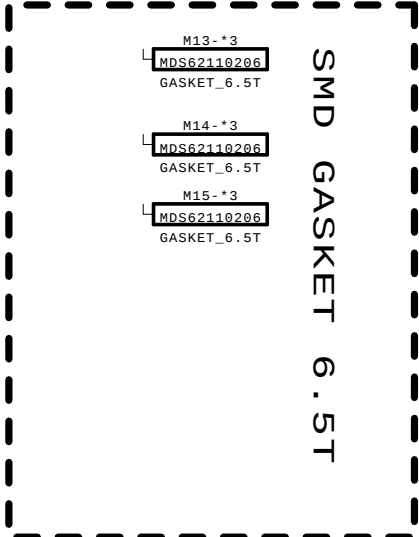
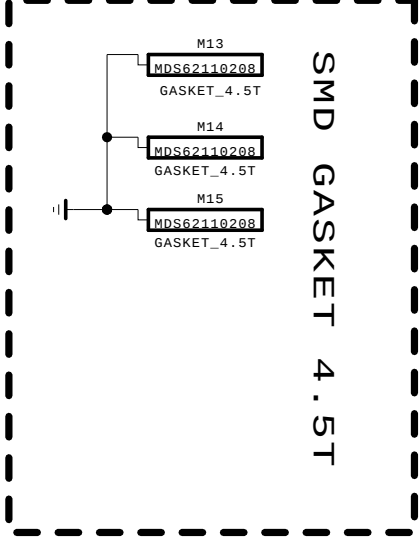
SMD GASKET

SHEET

56

56

SMD GASKET (UNDER THE TUNER)



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

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MODEL	BCM35230	DATE	2010. 09. 18
BLOCK	TUNER SMD GASKET	SHEET	57 / 57

[illegible]

[illegible]OS Module OPT

CHECK PWR/MODULE PIN MAP

[illegible]

IC504
AP2132MP-2.5TRG1 [EP]

9

1 2 3 4 5 6 7 8

PG EN VIN VCTRL

2A

IC504
EAN61387601

POWER_ON/OFF2_1

OPT R528 10k

C527 10uF 6.3V

+3.5V_ST

220k

+5V_Normal

C533 0.1uF OPT

10k

R544 10k 1% R2

R545 10k 1%

R546 1k 1% R1

GND

ADJ

VOUT

NC

C538 47uF 16V

C539 10uF 6.3V

$V_{out} = 0.6 * (1 + R1/R2)$

[illegible]

IC508
AP7173-SPG-13 HF(DIODES)

1.5A

IN 1
PG 2
VCC 3
EN 4
GND 5
SS 6
FB 7
OUT 8
THERMAL 9

+3.5V_ST
L517
BLM18PG121SN10
C590
10uF
10V
POWER_ON/OFF1
R591
10K
C593
560pF
50V
R1
R595
4.3K
1%
R2
R593
9.9K
1%
R592
1K
1%
C594
22uF
16V
C591
0.1uF
16V
+1.5V_DDR

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

IC507
AOZ1073AIL-3

3A

PGND 1 8 LX_2
VIN 2 7 LX_1
AGND 3 6 EN
FB 4 5 COMP

L514 2BLM18PG121SN1D

Placed on SMD-TOP

C546 10uF 10V

L516 3-6uH

NRB040T3R6N

POWER_ON/OFF2

R564 12k

C567 2200pF

C568 22uF 10V

C569 50V 0PT

R570 1k

R571 3.0k

R572 10k

+12V

+5V_Normal

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

Switching freq: 500kHz

The diagram shows a buck converter circuit. The input is +12V, which is connected to the IN pin of the MP8706EN-C247-LF-Z IC. A 150V surge protection is shown at the input. The IC is configured with a 3A output current. The output filter consists of an inductor (L509, 3.6uH) and a capacitor (C536, 0.1uF/16V). The output voltage is regulated by a feedback network (R542, R548) and a compensation network (C528, C529). The output voltage is $V_{out} = (1 + R1/R2) * 0.8$.

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MODEL	BCM35230	DATE	
BLOCK	POWER	SHEET	5 / 58