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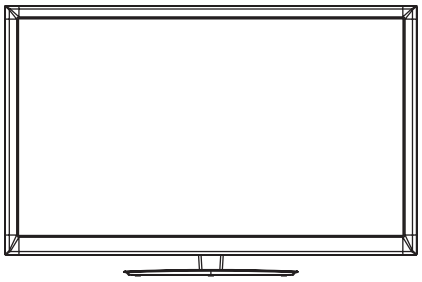
LED LCD TV
SERVICE MANUAL

CHASSIS : LA12C

MODEL : 47LW6500 47LW6500-UA

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



P/NO : MFL66980407 (1103-REV00)

Printed in Korea

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SAFETY PRECAUTIONS

IMPORTANT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These parts are identified by ⚠ 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 it's 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,

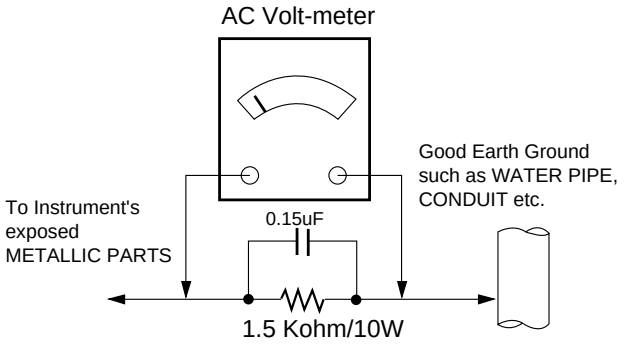
always perform an **AC leakage current check** on the exposed metallic parts of the cabinet, such as antennas, terminals, etc., to be sure the set is safe to operate without damage of electrical shock.

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 1MΩ and 5.2MΩ.
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 is 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)
   CAUTION: This is a flammable mixture.
   Unless specified otherwise in this service manual, lubrication of contacts in not required.
5. Do not defeat any plug/socket B+ voltage interlocks with which receivers covered by this service manual might be equipped.
6. Do not apply AC power to this instrument and/or any of its electrical assemblies unless all solid-state device heat sinks are correctly installed.
7. Always connect the test receiver ground lead to the receiver chassis ground before connecting the test receiver positive lead.
   Always remove the test receiver ground lead last.
8. *Use with this receiver only the test fixtures specified in this service manual.*
   CAUTION: Do not connect the test fixture ground strap to any heat sink in this receiver.

Electrostatically Sensitive (ES) Devices

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

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

General Soldering Guidelines

1. Use a grounded-tip, low-wattage soldering iron and appropriate tip size and shape that will maintain tip temperature within the range or 500°F to 600°F.
2. Use an appropriate gauge of RMA resin-core solder composed of 60 parts tin/40 parts lead.
3. Keep the soldering iron tip clean and well tinned.
4. Thoroughly clean the surfaces to be soldered. Use a mall wire-bristle (0.5 inch, or 1.25cm) 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.

SPECIFICATION

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

1. Application range

This spec sheet is applied LCD TV with LA12C chassis.

2. Requirement for Test

Each part is tested as below without special appointment.

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

3. Test method

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

3. General specifications

No	Item	Specification		Remark
1.	Receiving System	1) ATSC / NTSC-M	OK	
2.	Available Channel	1) VHF : 02~13 2) UHF : 14~69 3) DTV : 02-69 4) CATV : 01~135 5) CADTV : 01~135	OK	
3.	Input Voltage	1) AC 100 ~ 240V~, 50/60Hz	OK	110V, 50/60Hz on the label
4.	Market	North America	OK	
5.	Screen Size	47/55/65 inches		
6.	Aspect Ratio	16:9	OK	
7.	Tuning System	FS	OK	
8.	Module	LC470EUF-SDF1	LGD	47LW6500-UA
		LC550EUF-SDF1	LGD	55LW6500-UA
		T645HW05-V0	AUO	65LW6500-UA
9.	Operating Environment	1) Temp : 0 ~ 40 deg 2) Humidity : ~ 80 %	OK	
10.	Storage Environment	1) Temp : -20 ~ 60 deg 2) Humidity : ~ 85 %	OK	

4. Component Video Input (Y, C_B/P_B, C_R/P_R)-2D

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

5. RGB Input (PC)

No	Resolution	H-freq(kHz)	V-freq.(kHz)	Pixel clock	Proposed	
PC						DDC
1.	640*350	31.468	70.09	25.17	EGA	X
2.	720*400	31.469	70.08	28.32	DOS	O
3.	640*480	31.469	59.9	25.17	VESA(VGA)	O
4.	800*600	37.879	60.31	40.00	VESA(SVGA)	O
5.	1024*768	48.363	60.00	65.00	VESA(XGA)	O
6.	1360*768	47.712	60.015	5.50	VESA(WXGA)	X
7.	1920*1080	66.587	59.934	138.5	HDTV 1080P	O

6. HDMI input (PC/DTV)

No	Resolution	H-freq(kHz)	V-freq.(kHz)	Pixel clock	Proposed	
PC						DDC
1	640*350	31.468	70.09	25.17	EGA	X
2	720*400	31.469	70.08	28.32	DOS	O
3	640*480	31.469	59.94	25.17	VESA(VGA)	O
4	800*600	37.879	60.31	40.00	VESA(SVGA)	O
5	1024*768	48.363	60.00	65.00	VESA(XGA)	O
6	1360*768	47.712	60.015	85.50	VESA (WXGA)	O
7	1280*1024	63.981	60.020	108.00	VESA (SXGA)	O
8	1920*1080	67.5	60	148.5	HDTV 1080P	O
DTV						
1	720*480	31.50	60	27.027	SDTV 480P	
2	720*480	31.47	59.94	27.00	SDTV 480P	
3	1280*720	45.00	60.00	74.25	HDTV 720P	
4	1280*720	44.96	59.94	74.176	HDTV 720P	
5	1920*1080	33.75	60.00	74.25	HDTV 1080I	
6	1920*1080	33.72	59.94	74.176	HDTV 1080I	
7	1920*1080	67.500	60	148.50	HDTV 1080P	
8	1920*1080	67.432	59.939	148.352	HDTV 1080P	
9	1920*1080	27.000	24.000	74.25	HDTV 1080P	
10	1920*1080	26.97	23.976	74.176	HDTV 1080P	
11	1920*1080	33.75	30.000	74.25	HDTV 1080P	
12	1920*1080	33.71	29.97	74.176	HDTV 1080P	

7. RF Input - 3D

No	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	3D input proposed mode	Proposed
1	1920*1080				Side by Side Top & Bottom	HDTV 1080I
2	1280*720				Side by Side Top & Bottom	HDTV 720P

8. HDMI Input - 3D

No	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	3D input proposed mode	Proposed
1	1280*720	90.00	60.00	148.50	HDMI 3D Frame Packing	1.4a HDTV 720P
2	1280*720	45.00	60.00	74.25	Side by Side Top & Bottom HDMI 3D Top & Bottom	1.3 HDTV 720P 1.4a HDTV 720P
3	1920*1080	33.75	60.00	74.25	Side by Side , Top & Bottom HDMI 3D Side by Side (Half)	1.3 HDTV 1080I 1.4a HDTV 1080I
4	1920*1080	67.50	60	148.50	Side by Side Top & Bottom Checkerboard Single Frame Sequential	1.3 HDTV 1080P
5	1920*1080	54.00	24.000	148.50	HDMI 3D Frame Packing	1.4a HDTV 1080P
6	1920*1080	27.00	24.000	74.25	Side by Side Top & Bottom Checkerboard HDMI 3D Top & Bottom	1.3 HDTV 1080P 1.4a HDTV 1080P
7	1920*1080	67.50	30.000	148.50	HDMI 3D Frame Packing	1.4a HDTV 1080P
8	1920*1080	33.75	30.000	74.25	Side by Side Top & Bottom Checkerboard	1.3 HDTV 1080P

9. RGB-PC Input - 3D

No	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	3D input proposed mode	Proposed
1	1920*1080	67.50	60	148.50	Side by Side Top & Bottom	HDTV 1080P

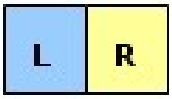
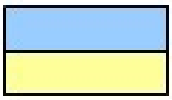
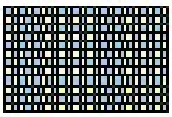
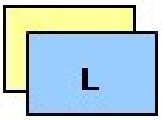
10. USB Input - 3D

No	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	3D input proposed mode	Proposed
1	1920*1080	33.75	30.000	74.25	Side by Side Top & Bottom Checkerboard	HDTV 1080P

11. DLNA Input - 3D

No	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	3D input proposed mode	Proposed
1	1920*1080	33.75	30.000	74.25	Side by Side Top & Bottom Checkerboard	HDTV 1080P

12. 3D Input

No	Side by Side	Top & Bottom	Checkerboard	Single Frame Sequential	Frame Packing
					

13. Optical specs for LCD Module.

No	Item			Min	Typ	Max	Unit	Remark
1	Max Luminance (Center1-point / Full White Pattern)		2D	320	400		cd/m	T315HB01-V0
			3D	100	250		cd/m	
			2D	320	400		cd/m	LC420EUF-SDF1
			3D	120	150		cd/m	
			2D	320	400		cd/m	LC470EUF-SDF1
			3D	120	150		cd/m	
			2D	320	400		cd/m	LC550EUF-SDF1
			3D	120	150		cd/m	
			2D	360	450		cd/m	T645HW05-V0
			3D	100	125		cd/m	
2	Color coordinate (Default)	RED	X	Typ. -0.03	0.630	Typ. +0.03		T315HB01-V0
			Y		0.330			
		GREEN	X		0.320			
			Y		0.620			
		BLUE	X		0.150			
			Y		0.040			
		WHITE	X		0.280			
			Y		0.290			
		RED	X	Typ. -0.05	0.650	Typ. +0.05		LC420EUF-SDF1
			Y		0.333			
		GREEN	X		0.307			
			Y		0.604			
		BLUE	X		0.150			
			Y		0.059			
		WHITE	X		0.279			
			Y		0.292			
		RED	X	Typ. -0.05	0.648	Typ. +0.05		LC470EUF-SDF1
			Y		0.332			
		GREEN	X		0.306			
			Y		0.606			
		BLUE	X		0.150			
			Y		0.058			
		WHITE	X		0.279			
			Y		0.292			
		RED	X	Typ. -0.05	0.648	Typ. +0.05		LC550EUF-SDF1
			Y		0.334			
		GREEN	X		0.307			
			Y		0.606			
		BLUE	X		0.152			
			Y		0.058			
		WHITE	X		0.279			
			Y		0.292			
		RED	X	Typ. -0.05	0.630	Typ. +0.05		T645HW05-V0
			Y		0.330			
		GREEN	X		0.320			
			Y		0.620			
		BLUE	X		0.150			
			Y		0.040			
		WHITE	X		0.280			
			Y		0.290			
3	Contrastratio			1,100:1	1,600:1			LGD Module
				3,200:1	4,000:1			AUO Module (32LW5700/65LW6500)
4	3DCrosstalk				1	3	%	
5	Luminance Uniformity					1.3	%	2D Only
6	Response Time(Gray to Gray)				5	6	ms	
	Response Time(MPRT)				6	9	ms	
	Response Time(Uniformity MPRT)					1		
	Response Time(Uniformity G to G)					1		

ADJUSTMENT INSTRUCTION

1. Application range

Chassis	Model Name	Module type	Local dimming	THX	Remark
LA12C	47/55/65LW6500-UA	Edge LED	O (Except AUO)	X	1 point W/B adjustment
	32/42/47/55LW5700-UE				
	42/47/55LW5600-UA				
	42/47/55LW5700-NA				
	42/47/55LW6500-NB				

This spec. sheet applies to LA12C Chassis applied LCD TV all models manufactured in TV factory .

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±5°C of temperature and 65±10% of relative humidity

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

3. Adjustment items

3.1 Main PCBA Adjustments

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

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

3.2 Final Assembly adjustment

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

3.3. Appendix

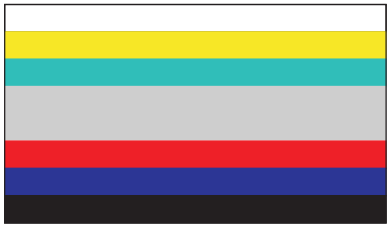
(1)Tool option menu, USB Download (S/W Update, Option and Service only)
(2) Manual adjustment for ADC calibration and White balance.
(3) Shipment conditions, Channel pre-set

4. MAIN PCBA Adjustments

4.1. ADC Calibration

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.

4.1.2. Equipment & Condition
1) Jig (RS-232C protocol)
2) MSPG-925 Series Pattern Generator(MSPG-925FS)
- Resolution : 480i Comp1 (MSPG-925FS: model-209, pattern-65)
- Resolution : 1080p Comp1 (MSPG-925FS: model-225, pattern-65)
- Resolution : 1080p RGB (MSPG-925FS: model-225, pattern-65)
- 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
Ref.) ADC Adj. RS232C Protocol_Ver1.0

Protocol	Command	SetACK
Enter adj. mode	aa 00 00	a 00 OK00x
Source change	xb 00 40 xb 00 60	b 00 OK40x (Adjust 480i/1080p Comp1) b 00 OK60x (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) 00000000000000000000000007c007b006dx (Sub) 00000007000000000000000007c00830077x
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

4.1.3.3. Adj. order
• aa 00 00 [Enter ADC adj. mode]
• xb 00 40 [Change input source to Component1 (480i/1080p)]
• ad 00 10 [Adjust 480i//1080p Comp1]
• xb 00 60 [Change input source to RGB(1920*1080)]
• ad 00 10 [Adjust 1920*1080 RGB]
• ad 00 90 End adj.

4.2. MAC Address, ESN Key and Widevine Key download

4.2.1. Equipment & Condition
1) Play file: keydownload.exe

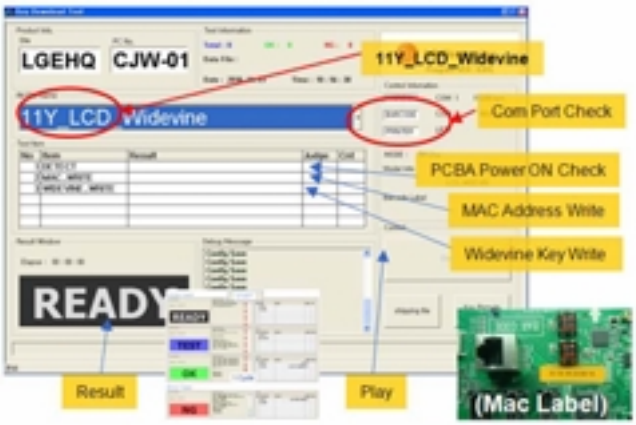
4.2.2. Communication Port connection
1) Key Write: Com 1,2,3,4 and 115200(Baudrate)
2) Barcode: Com 1,2,3,4 and 9600(Baudrate)

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

4.2.4. Communication Port connection
1) Connect: PCBA Jig RS-232C Port == PC RS-232C Port

4.2.5. Download
1) US, Canada models (11Y LCD TV + MAC + Widevine + ESN Key)

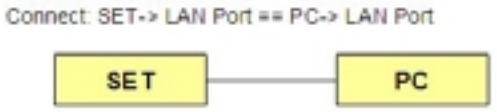
2) Korea, Mexico models (11Y LCD TV + MAC + Widevine Only)



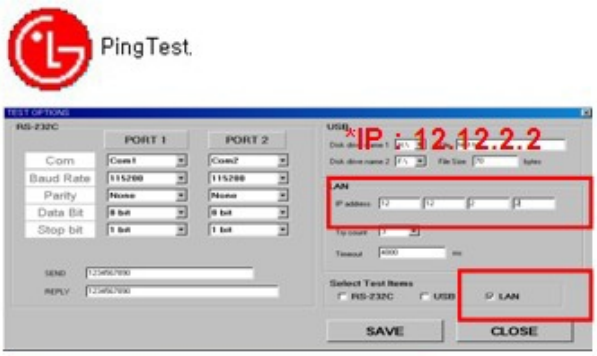
4.1.6. Inspection
- In INSTART menu, check these keys.

4.3. LAN port Inspection (Ping Test)

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



4.3.2. LAN PORT inspection (PING TEST)
1) Play the LAN Port Test Program.
2) Connect each other LAN Port Jack.
3) Play Test (F9) button and confirm OK Message.
4) Remove LAN CABLE



4.4. EDID Download

4.4.1. Overview

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

4.4.2. Equipment

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

4.3.3 Download method

1) Press Adj. key on the Adj. R/C,
2) Select EDID D/L menu.
3) By pressing Enter key, EDID download will begin
4) If Download is successful, OK is display, but If Download is failure, NG is displayed.
5) If Download is failure, Re-try downloads.

* Caution) When EDID Download, must remove RGB/HDMI Cable.

4.4.4. EDID DATA

4.4.4.1. For North America (PCM)

HDMI 1(C/S : 7F6F)

EDID Block 0, Bytes 0-127 [00H-7FH]

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01	01
10	01	15	01	03	80	10	09	78	0A	EE	91	A3	54	4C	99	26
20	0F	50	54	A1	08	00	71	40	81	C0	81	00	81	80	95	00
30	90	40	A9	C0	B3	00	02	3A	80	18	71	38	2D	40	58	2C
40	45	00	A0	5A	00	00	00	1E	66	21	50	B0	51	00	1B	30
50	40	70	36	00	A0	5A	00	00	00	1E	00	00	00	FD	00	39
60	3F	1F	52	10	00	0A	20	20	20	20	20	20	00	00	00	FC
70	00	4C	47	20	54	56	0A	20	20	20	20	20	20	20	01	7F

EDID Block 1, Bytes 128-255 [80H-FFH]

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	02	03	2E	F1	48	10	22	20	05	84	03	02	01	23	09	07
10	07	78	03	0C	00	10	00	B8	2D	20	C0	0E	01	40	00	14
20	08	10	18	10	28	10	38	10	48	10	E3	05	03	01	02	3A
30	80	18	71	38	2D	40	58	2C	04	05	A0	5A	00	00	00	1E
40	01	1D	80	18	71	1C	16	20	58	2C	25	00	A0	5A	00	00
50	00	9E	01	1D	00	72	51	D0	1E	20	6E	28	55	00	A0	5A
60	00	00	00	1E	26	36	80	A0	70	38	1F	40	30	20	25	00
70	A0	5A	00	00	00	1A	00	00	00	00	00	00	00	00	00	6F

HDMI 2(C/S : 7F5F)

EDID Block 0, Bytes 0-127 [00H-7FH]

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01	01
10	01	15	01	03	80	10	09	78	0A	EE	91	A3	54	4C	99	26
20	0F	50	54	A1	08	00	71	40	81	C0	81	00	81	80	95	00
30	90	40	A9	C0	B3	00	02	3A	80	18	71	38	2D	40	58	2C
40	45	00	A0	5A	00	00	00	1E	66	21	50	B0	51	00	1B	30
50	40	70	36	00	A0	5A	00	00	00	1E	00	00	00	FD	00	39
60	3F	1F	52	10	00	0A	20	20	20	20	20	20	00	00	00	FC
70	00	4C	47	20	54	56	0A	20	20	20	20	20	20	20	01	7F

EDID Block 1, Bytes 128-255 [80H-FFH]

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	02	03	2E	F1	48	10	22	20	05	84	03	02	01	23	09	07
10	07	78	03	0C	00	20	00	B8	2D	20	C0	0E	01	40	00	14
20	08	10	18	10	28	10	38	10	48	10	E3	05	03	01	02	3A
30	80	18	71	38	2D	40	58	2C	04	05	A0	5A	00	00	00	1E
40	01	1D	80	18	71	1C	16	20	58	2C	25	00	A0	5A	00	00
50	00	9E	01	1D	00	72	51	D0	1E	20	6E	28	55	00	A0	5A
60	00	00	00	1E	26	36	80	A0	70	38	1F	40	30	20	25	00
70	A0	5A	00	00	00	1A	00	00	00	00	00	00	00	00	00	5F

HDMI 3(C/S : 7F4F)

EDID Block 0, Bytes 0-127 [00H-7FH]

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01	01
10	01	15	01	03	80	10	09	78	0A	EE	91	A3	54	4C	99	26
20	0F	50	54	A1	08	00	71	40	81	C0	81	00	81	80	95	00
30	90	40	A9	C0	B3	00	02	3A	80	18	71	38	2D	40	58	2C
40	45	00	A0	5A	00	00	00	1E	66	21	50	B0	51	00	1B	30
50	40	70	36	00	A0	5A	00	00	00	1E	00	00	00	FD	00	39
60	3F	1F	52	10	00	0A	20	20	20	20	20	20	00	00	00	FC
70	00	4C	47	20	54	56	0A	20	20	20	20	20	20	20	01	7F

EDID Block 1, Bytes 128-255 [80H-FFH]

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	02	03	2E	F1	48	10	22	20	05	84	03	02	01	23	09	07
10	07	78	03	0C	00	30	00	B8	2D	20	C0	0E	01	40	00	14
20	08	10	18	10	28	10	38	10	48	10	E3	05	03	01	02	3A
30	80	18	71	38	2D	40	58	2C	04	05	A0	5A	00	00	00	1E
40	01	1D	80	18	71	1C	16	20	58	2C	25	00	A0	5A	00	00
50	00	9E	01	1D	00	72	51	D0	1E	20	6E	28	55	00	A0	5A
60	00	00	00	1E	26	36	80	A0	70	38	1F	40	30	20	25	00
70	A0	5A	00	00	00	1A	00	00	00	00	00	00	00	00	00	4F

HDMI 4(C/S : 7F3F)

EDID Block 0, Bytes 0-127 [00H-7FH]

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01	01
10	01	15	01	03	80	10	09	78	0A	EE	91	A3	54	4C	99	26
20	0F	50	54	A1	08	00	71	40	81	C0	81	00	81	80	95	00
30	90	40	A9	C0	B3	00	02	3A	80	18	71	38	2D	40	58	2C
40	45	00	A0	5A	00	00	00	1E	66	21	50	B0	51	00	1B	30
50	40	70	36	00	A0	5A	00	00	00	1E	00	00	00	FD	00	39
60	3F	1F	52	10	00	0A	20	20	20	20	20	20	00	00	00	FC
70	00	4C	47	20	54	56	0A	20	20	20	20	20	20	20	01	7F

EDID Block 1, Bytes 128-255 [80H-FFH]

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	02	03	2E	F1	48	10	22	20	05	84	03	02	01	23	09	07
10	07	78	03	0C	00	40	00	B8	2D	20	C0	0E	01	40	00	14
20	08	10	18	10	28	10	38	10	48	10	E3	05	03	01	02	3A
30	80	18	71	38	2D	40	58	2C	04	05	A0	5A	00	00	00	1E
40	01	1D	80	18	71	1C	16	20	58	2C	25	00	A0	5A	00	00
50	00	9E	01	1D	00	72	51	D0	1E	20	6E	28	55	00	A0	5A
60	00	00	00	1E	26	36	80	A0	70	38	1F	40	30	20	25	00
70	A0	5A	00	00	00	1A	00	00	00	00	00	00	00	00	00	3F

RGB(C/S : 98)
EDID Block 0, Bytes 0-127 [00H-7FH]

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01	01
10	01	15	01	03	68	10	09	78	0A	EE	91	A3	54	4C	99	26
20	0F	50	54	A1	08	00	71	40	81	C0	81	00	81	80	95	00
30	90	40	A9	C0	B3	00	02	3A	80	18	71	38	2D	40	58	2C
40	45	00	A0	5A	00	00	00	1E	66	21	50	B0	51	00	1B	30
50	40	70	36	00	A0	5A	00	00	00	1E	00	00	00	FD	00	3A
60	3E	1E	53	10	00	0A	20	20	20	20	20	20	00	00	00	FC
70	00	4C	47	20	54	56	0A	20	20	20	20	20	20	20	00	98

4.4.4.2. For Korea (AC3)
HDMI 1(C/S : 7FFD)
EDID Block 0, Bytes 0-127 [00H-7FH]

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01	01
10	01	15	01	03	80	10	09	78	0A	EE	91	A3	54	4C	99	26
20	0F	50	54	A1	08	00	71	40	81	C0	81	00	81	80	95	00
30	90	40	A9	C0	B3	00	02	3A	80	18	71	38	2D	40	58	2C
40	45	00	A0	5A	00	00	00	1E	66	21	50	B0	51	00	1B	30
50	40	70	36	00	A0	5A	00	00	00	1E	00	00	00	FD	00	39
60	3F	1F	52	10	00	0A	20	20	20	20	20	20	00	00	00	FC
70	00	4C	47	20	54	56	0A	20	20	20	20	20	20	20	01	7F

EDID Block 1, Bytes 128-255 [80H-FFH]

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
10	50	09	07	07	78	03	0C	00	10	00	B8	2D	20	C0	0E	01
20	40	00	14	08	10	18	10	28	10	38	10	48	10	E3	05	03
30	01	02	3A	80	18	71	38	2D	40	58	2C	04	05	A0	5A	00
40	00	00	1E	01	1D	80	18	71	1C	16	20	58	2C	25	00	A0
50	5A	00	00	00	9E	01	1D	00	72	51	D0	1E	20	6E	28	55
60	00	A0	5A	00	00	00	1E	26	36	80	A0	70	38	1F	40	30
70	20	25	00	A0	5A	00	00	00	1A	00	00	00	00	00	00	FD

HDMI 2(C/S : 7FED)
EDID Block 0, Bytes 0-127 [00H-7FH]

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01	01
10	01	15	01	03	80	10	09	78	0A	EE	91	A3	54	4C	99	26
20	0F	50	54	A1	08	00	71	40	81	C0	81	00	81	80	95	00
30	90	40	A9	C0	B3	00	02	3A	80	18	71	38	2D	40	58	2C
40	45	00	A0	5A	00	00	00	1E	66	21	50	B0	51	00	1B	30
50	40	70	36	00	A0	5A	00	00	00	1E	00	00	00	FD	00	39
60	3F	1F	52	10	00	0A	20	20	20	20	20	20	00	00	00	FC
70	00	4C	47	20	54	56	0A	20	20	20	20	20	20	20	01	7F

EDID Block 1, Bytes 128-255 [80H-FFH]

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	02	03	31	F1	48	10	22	20	05	84	03	02	01	26	15	07
10	50	09	07	07	78	03	0C	00	20	00	B8	2D	20	C0	0E	01
20	40	00	14	08	10	18	10	28	10	38	10	48	10	E3	05	03
30	01	02	3A	80	18	71	38	2D	40	58	2C	04	05	A0	5A	00
40	00	00	1E	01	1D	80	18	71	1C	16	20	58	2C	25	00	A0
50	5A	00	00	00	9E	01	1D	00	72	51	D0	1E	20	6E	28	55
60	00	A0	5A	00	00	00	1E	26	36	80	A0	70	38	1F	40	30
70	20	25	00	A0	5A	00	00	00	1A	00	00	00	00	00	00	ED

HDMI 3(C/S : 7FDD)
EDID Block 0, Bytes 0-127 [00H-7FH]

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01	01
10	01	15	01	03	80	10	09	78	0A	EE	91	A3	54	4C	99	26
20	0F	50	54	A1	08	00	71	40	81	C0	81	00	81	80	95	00
30	90	40	A9	C0	B3	00	02	3A	80	18	71	38	2D	40	58	2C
40	45	00	A0	5A	00	00	00	1E	66	21	50	B0	51	00	1B	30
50	40	70	36	00	A0	5A	00	00	00	1E	00	00	00	FD	00	39
60	3F	1F	52	10	00	0A	20	20	20	20	20	20	00	00	00	FC
70	00	4C	47	20	54	56	0A	20	20	20	20	20	20	20	01	7F

EDID Block 1, Bytes 128-255 [80H-FFH]

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	02	03	31	F1	48	10	22	20	05	84	03	02	01	26	15	07
10	50	09	07	07	78	03	0C	00	30	00	B8	2D	20	C0	0E	01
20	40	00	14	08	10	18	10	28	10	38	10	48	10	E3	05	03
30	01	02	3A	80	18	71	38	2D	40	58	2C	04	05	A0	5A	00
40	00	00	1E	01	1D	80	18	71	1C	16	20	58	2C	25	00	A0
50	5A	00	00	00	9E	01	1D	00	72	51	D0	1E	20	6E	28	55
60	00	A0	5A	00	00	00	1E	26	36	80	A0	70	38	1F	40	30
70	20	25	00	A0	5A	00	00	00	1A	00	00	00	00	00	00	DD

HDMI 4(C/S : 7FCD)
EDID Block 0, Bytes 0-127 [00H-7FH]

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01	01
10	01	15	01	03	80	10	09	78	0A	EE	91	A3	54	4C	99	26
20	0F	50	54	A1	08	00	71	40	81	C0	81	00	81	80	95	00
30	90	40	A9	C0	B3	00	02	3A	80	18	71	38	2D	40	58	2C
40	45	00	A0	5A	00	00	00	1E	66	21	50	B0	51	00	1B	30
50	40	70	36	00	A0	5A	00	00	00	1E	00	00	00	FD	00	39
60	3F	1F	52	10	00	0A	20	20	20	20	20	20	00	00	00	FC
70	00	4C	47	20	54	56	0A	20	20	20	20	20	20	20	01	7F

EDID Block 1, Bytes 128-255 [80H-FFH]

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	02	03	31	F1	48	10	22	20	05	84	03	02	01	26	15	07
10	50	09	07	07	78	03	0C	00	40	00	B8	2D	20	C0	0E	01
20	40	00	14	08	10	18	10	28	10	38	10	48	10	E3	05	03
30	01	02	3A	80	18	71	38	2D	40	58	2C	04	05	A0	5A	00
40	00	00	1E	01	1D	80	18	71	1C	16	20	58	2C	25	00	A0
50	5A	00	00	00	9E	01	1D	00	72	51	D0	1E	20	6E	28	55
60	00	A0	5A	00	00	00	1E	26	36	80	A0	70	38	1F	40	30
70	20	25	00	A0	5A	00	00	00	1A	00	00	00	00	00	00	CD

RGB(C/S : 98)
EDID Block 0, Bytes 0-127 [00H-7FH]

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01	01
10	01	15	01	03	68	10	09	78	0A	EE	91	A3	54	4C	99	26
20	0F	50	54	A1	08	00	71	40	81	C0	81	00	81	80	95	00
30	90	40	A9	C0	B3	00	02	3A	80	18	71	38	2D	40	58	2C
40	45	00	A0	5A	00	00	00	1E	66	21	50	B0	51	00	1B	30
50	40	70	36	00	A0	5A	00	00	00	1E	00	00	00	FD	00	3A
60	3E	1E	53	10	00	0A	20	20	20	20	20	20	00	00	00	FC
70	00	4C	47	20	54	56	0A	20	20	20	20	20	20	20	00	98

5. Final Assembly Adjustment

5.1. White Balance Adjustment

5.1.1. Overview

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

(1) Objective: To reduce each Panel's W/B deviation

(2) How-it-works: When R/G/B gain in the OSD is at 192, it means the panel is at its Full Dynamic Range. In order to prevent saturation of Full Dynamic range and data, one of R/G/B is fixed at 192, and the other two is lowered to find the desired value.

(3) Adj. condition: normal temperature

1) Surrounding Temperature: 25±5°C

2) Warm-up time: About 5 Min

3) Surrounding Humidity: 20% ~ 80%

4) Before White balance adjustment, Keep power on status, don't power off

5.1.1.2. Adj. condition and cautionary items

(1) Lighting condition in surrounding area surrounding lighting should be lower 10 lux. Try to isolate adj. area into dark surrounding.

(2) Probe location: Color Analyzer (CA-210) probe should be within 10cm and perpendicular of the module surface (80°~ 100°)

(3) Aging time

1) After Aging Start, Keep the Power ON status during 5 Minutes.

2) In case of LCD, Back-light on should be checked using no signal or Full-white pattern.

5.1.2. Equipment

(1) Color Analyzer: CA-210 (NCG: CH 9 / WCG: CH12 / LED: CH14)

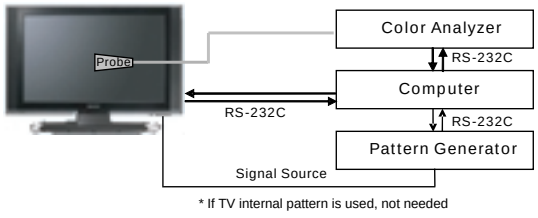
(2) Adj. Computer (During auto adj., RS-232C protocol is needed)

(3) Adjust Remocon

(4) Video Signal Generator MSPG-925F 720p/204-Gray (Model: 217, Pattern: 49)

• Color Analyzer Matrix should be calibrated using CS-1000

5.1.3. Equipment connection



Connection Diagram of Automatic Adjustment

5.1.4. Adjustment Command (Protocol)

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

RS-232C COMMAND [CMD ID DATA]			Meaning
wb	00	00	Begin White Balance adj.
wb	00	ff	End White Balance adj.(Internal pattern disappeared)

(2) Adjustment Map

	ITEM	Command		Data Range (Hex.)		Default (Decimal)
		Cmd 1	Cmd 2	Min	Max	
Cool	R-Gain	j	g	00	C0	
	G-Gain	j	h	00	C0	
	B-Gain	j	i	00	C0	
	R-Cut					
	G-Cut					
	B-Cut					
Medium	R-Gain	j	a	00	C0	
	G-Gain	j	b	00	C0	
	B-Gain	j	c	00	C0	
	R-Cut					
	G-Cut					
	B-Cut					
Warm	R-Gain	j	d	00	C0	
	G-Gain	j	e	00	C0	
	B-Gain	j	f	00	C0	
	R-Cut					
	G-Cut					

5.1.5. Adjustment method

5.1.5.1 Auto WB calibration

(1) Set TV in ADJ mode using P-ONLY key (or POWER ON key)

(2) Place optical probe on the center of the display

- It need to check probe condition of zero calibration before adjustment.

(3) Connect RS-232C Cable

(4) Select mode in ADJ Program and begin a adjustment.

(5) When WB adjustment is completed with OK message, check adjustment status of pre-set mode (Cool, Medium, Warm)

(6) Remove probe and RS-232C cable.

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

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

(1) Luminance: 204 Gray, 80IRE

(2) Standard color coordinate and temperature using CS-1000 (over 26 inch)

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

• Luminance: 204 Gray

• Standard color coordinate and temperature using CS-1000 (over 26 inch)

Mode	Color Coordination		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	Color Coordination		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

• Standard color coordinate and temperature using CA-210(CH-14) – by aging time

GP2G	Aging time (Min)	Cool		Medium		Warm	
		x	y	x	y	x	y
		269	273	285	293	313	329
1	0-2	276	285	292	305	315	334
2	3-5	274	282	290	302	313	332
3	6-9	273	280	289	300	312	330
4	10-19	272	278	288	298	311	328
5	20-35	271	276	287	296	310	326
6	36-49	269	274	286	294	309	324
7	50-79	269	273	286	293	308	323
8	Over 80	269	273	285	293	308	323

*Only LGD Module (Except 32LW5700-UE/65LW6500-UA)

5.2. Tool Option setting & Inspection per countries

5.2.1. Overview

(1) Tool option selection is only done for models in Non-USA North America due to rating

(2) Applied model: LA02D and LA02E Chassis applied to CANADA and MEXICO

5.2.2. Country Group selection

(1) Press ADJ key on the Adj. R/C, and then select Country Group Menu

(2) Depending on destination, select KR or US, then on the lower Country option, select US, CA, MX. Selection is done using +, - KEY

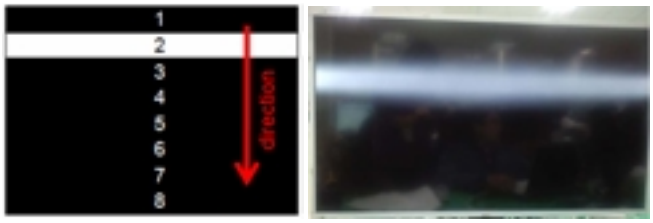
5.2.3. Tool Option Inspection

(1) Press Adj. key on the Adj. R/C, and then check Tool option.

Model	Tool 1	Tool 2	Tool 3	Tool 4	Tool 5	Tool 6
47LW6500-UA	33032	4161	7295	21897	47693	667
55LW6500-UA	33035	4161	7295	21897	47693	667
65LW6500-UA	37132	65	7295	21642	14925	667
32LW5700-UE	37284	65	5247	21898	14933	667
42LW5700-UE	33190	65	5247	21897	14933	667
47LW5700-UE	33192	65	5247	21897	14933	667
55LW5700-UE	33195	65	5247	21897	14933	667
42LW5700-NA	33190	4161	3327	22281	47661	665
47LW5700-NA	33192	4161	3327	22281	47661	665
55LW5700-NA	33195	4161	3327	22281	47661	665
42LW5600-UA	33174	4161	7295	21897	14925	667
47LW5600-UA	33176	4161	7295	21897	14925	667
55LW5600-UA	33179	4161	7295	21897	14925	667
42LW6500-NB	33030	4161	3327	22281	47661	665
47LW6500-NB	33032	4161	3327	22281	47661	665
55LW6500-NB	33195	4161	3327	22281	47661	665

5.3. Local Dimming Inspection

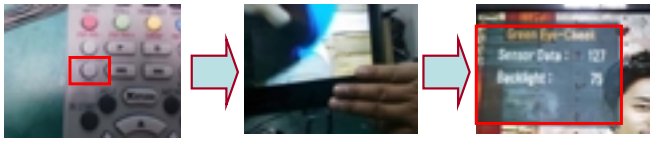
(1) Press 'TILT" key of the Adj. R/C and check moving patterns. The black bar patterns moves from top to bottom. If a local dimming function does not work, a whole screen shows full white.



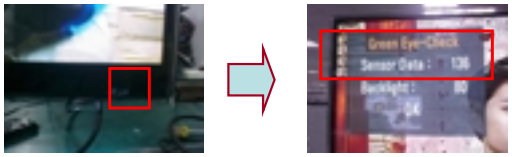
* Except 32LW5700-UE / 55LW6500-UA (AUO / No local-dimming)

5.4. EYE-Q Check

Step 1) Turn on the TV.
Step 2) Press EYE button in adjust remote control.
Step 3) Stay 6 seconds with Eye Q sensor hidden located on the front of the set.
Step 4) Check the “Sensor Data” on the screen and check whether the value is lower thanafter 6 seconds, the value does not go below 10, Eye Q sensor is not working properly. Then, change the sensor.
Step 5) Remove hand from the Eye Q II sensor and stay for 6 seconds.
Step 6) Check whether the “Back Light (xxx)” value has risen on the screen. If after 6 seconds and the value still does not go high, the eye Q II sensor is not working properly. Replace the sensor.



<Step1> <Step2> <Step3>



<Step4> <Step5>

5.5. Magic Motion remote controller Check

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

5.5.2. Test
(1) Make pairing with TV set by pressing “Mute (START) key” on RCU.
(2) Check a cursor on screen by pressing ‘ENTER” or “OK” key of RCU
(3) Stop paring with TV set by pressing “VOL+ (STOP) key.

5.6. 3D pattern test

5.6.1. Test equipment
(1) Pattern Generator MSHG-600 or MSPG-6100 (HDMI 1.4 support)
(2) Pattern: HDMI mode (model No. 872, pattern No. 83)

5.6.2. Test method
(1) Input 3D test signal as Fig.1.

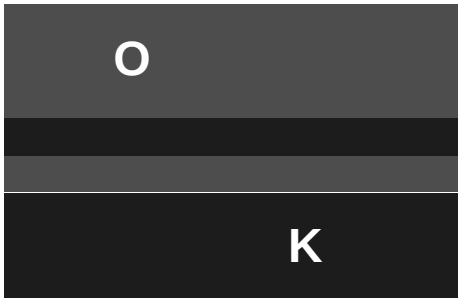


Fig.1
<HDMI Mode 872, Pattern No.83

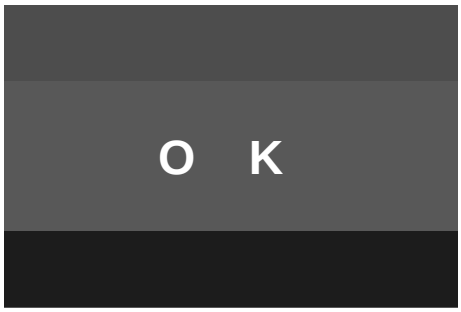


Fig.2

5.7. HDMI ARC Function Inspection

5.7.1. Test equipment

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

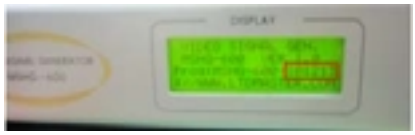
5.7.2. Test method

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

(2) Check the sound from the TV Set

(3) Check the Sound from the Speaker or using AV & Optic TEST program (It's connected to MSHG-600)

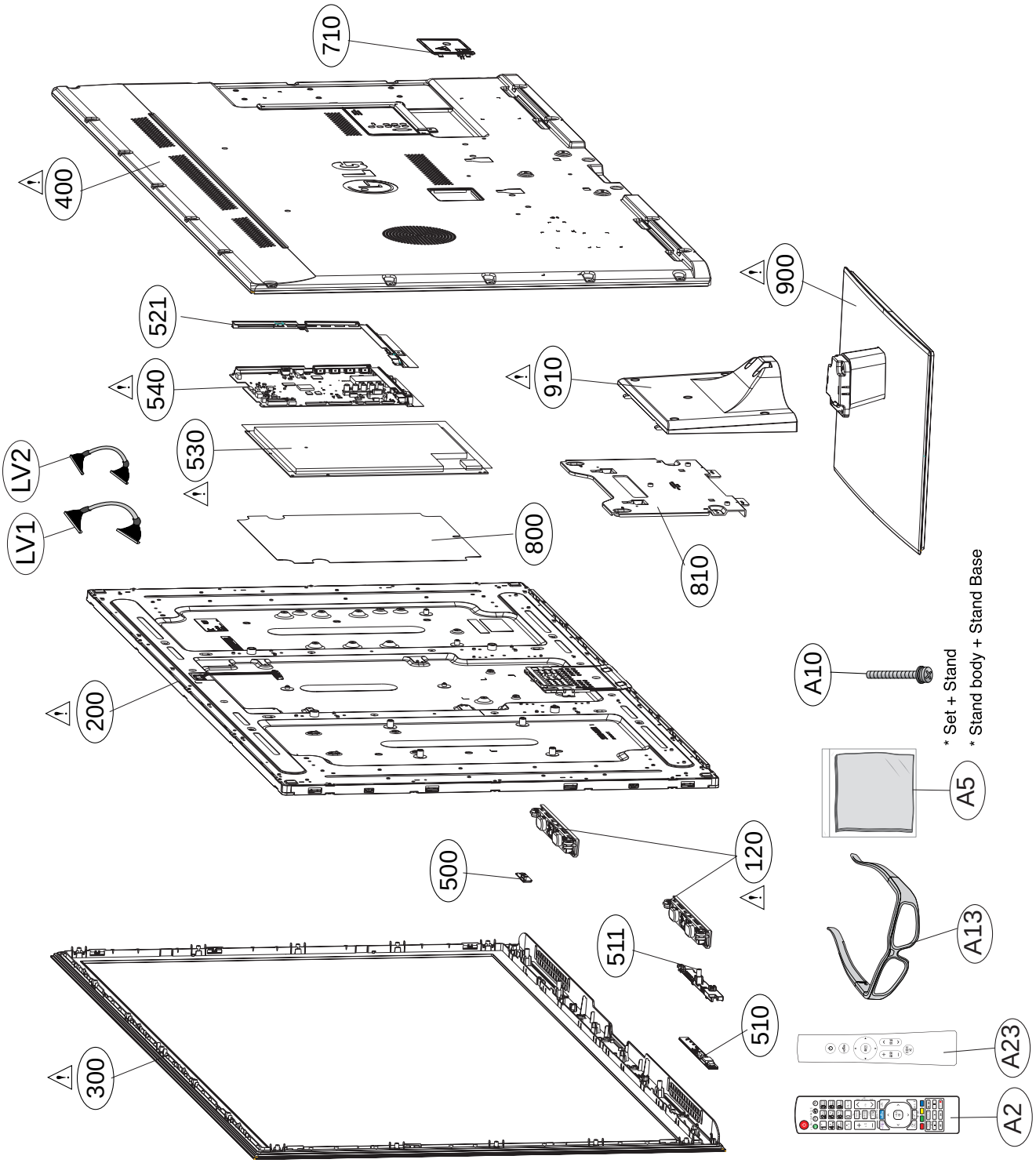
* Remark: Inspect in Power Only Mode and check SW version in a master equipment

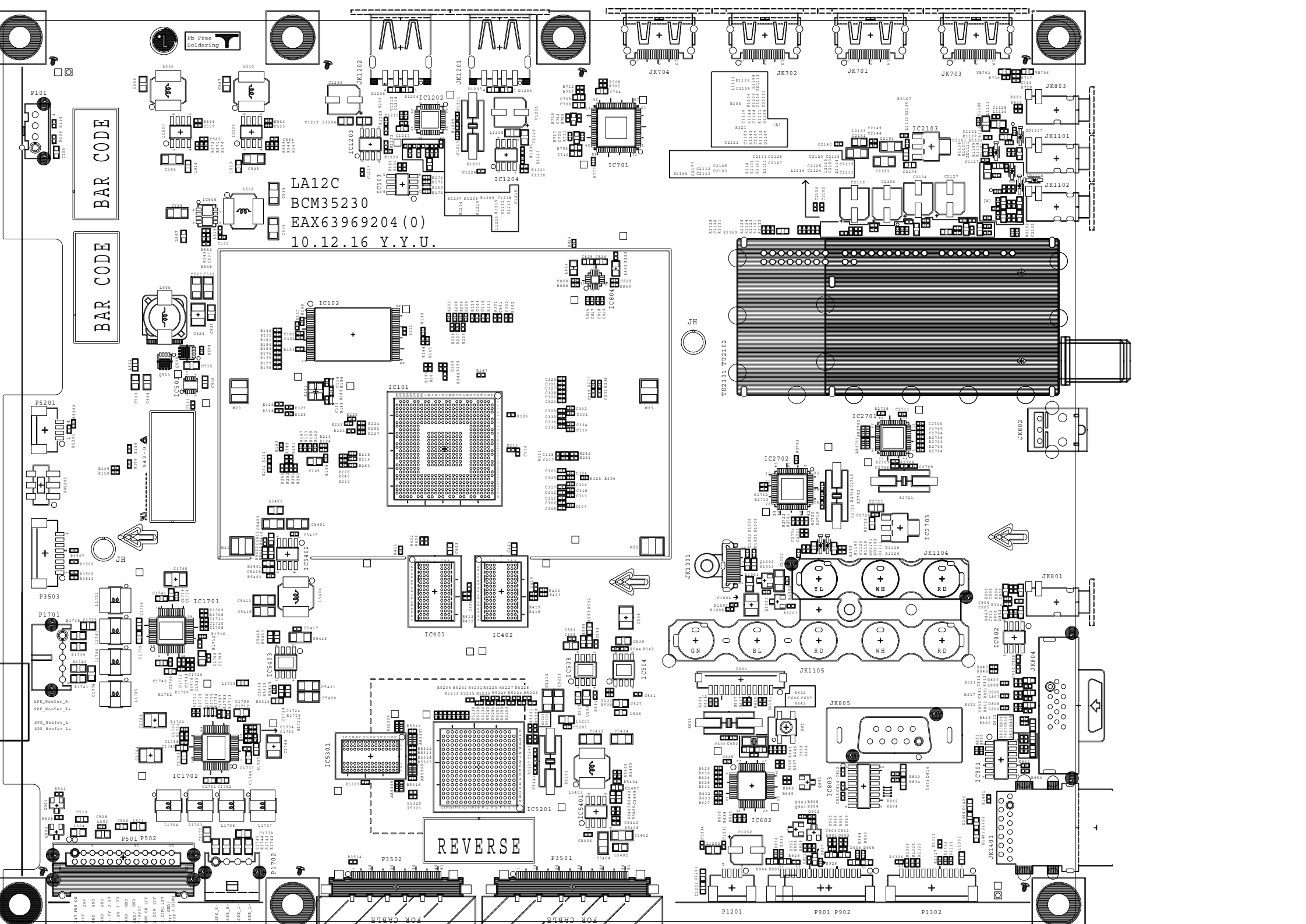


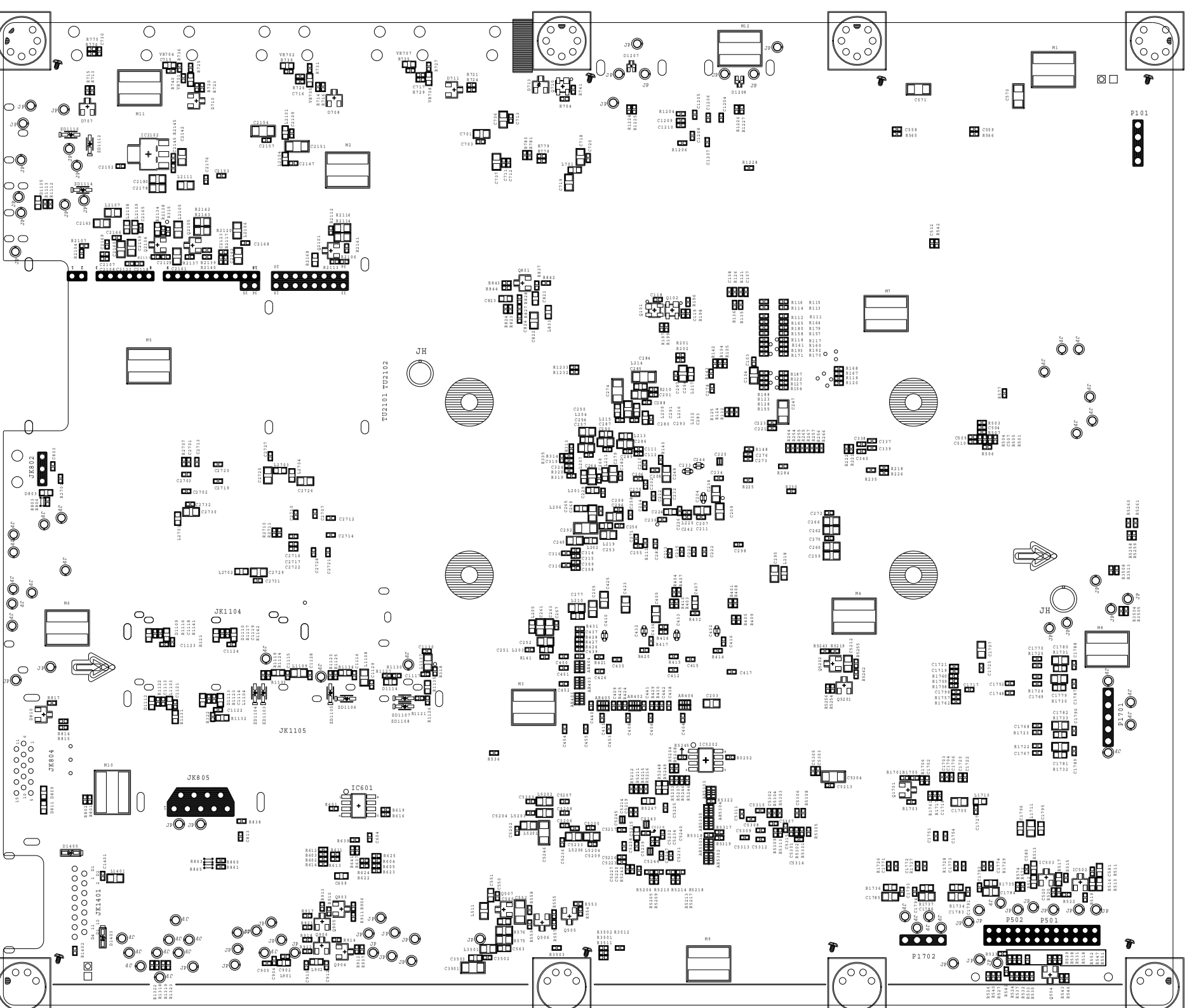
EXPLODED VIEW

IMPORTANT SAFETY NOTICE

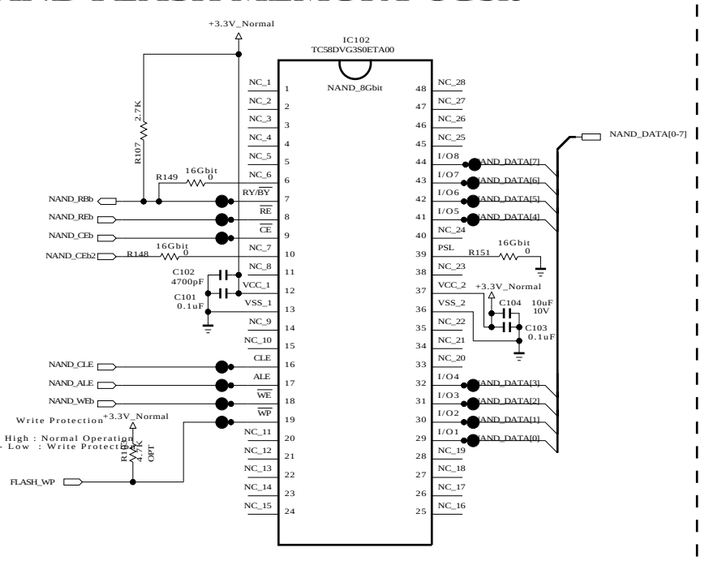
Many electrical and mechanical parts in this chassis have special safety-related characteristics. These parts are identified by ⚠ in the Schematic Diagram and EXPLODED VIEW.
It is essential that these special safety parts should be replaced with the same components as recommended in this manual to prevent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



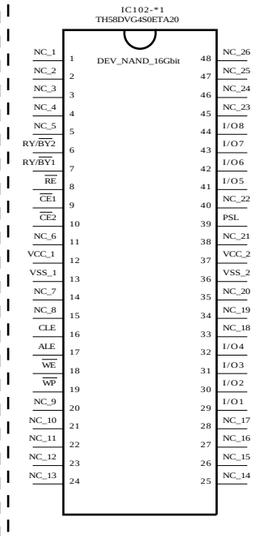

Pb Free Soldering
BAR CODE
BAR CODE
LA12C
BCM35230
EAX63969204(0)
10.12.16 Y.Y.U.
REVERSE
FOR CABLE
FOR CABLE
JK704
JK702
JK701
JK703
JK803
JK1101
JK1102
JK802
JK1104
JK1105
JK801
JK805
JK804
JK1401
JK1001
JK1202
JK1201
P101
P5201
P3503
P1701
P501 P502
P1702
P3502
P3501
P1201
P901 P902
P1302
JH
TU2101 TU2102
IC102
IC101
IC401
IC402
IC1701
IC1702
IC1202
IC1203
IC1204
IC701
IC2103
IC2701
IC2702
IC2703
IC602
IC803
IC801
IC802
IC804
IC5301
IC5201
IC5403
IC5402
IC1504
IC508
IC510
YL
WH
RD
GN
BL
RD
WH
RD


JH
JH
TU2101 TU2102
JK802
JK804
JK805
JK1104
JK1105
JK1401
IC601
IC5202
P101
P501
P502
P1701
P1702

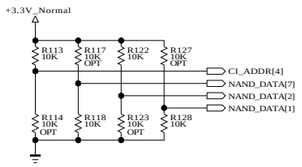
NAND FLASH MEMORY 8Gbit



16Gbit

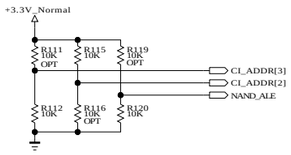


Boot ROM Device Select - (FA4,FAD7,FAD2,FAD1)



0000: ST Micro M25P 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 1Gbit 2KB page SLC NAND Flash devices
1000: 8-bit 2Gbit, 4Gbit, 8Gbit 2KB page SLC NAND Flash devices
1010: 8-bit 16Gbit, 32Gbit 4KB page SLC NAND Flash devices (O)
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: BB dual IO Serial Flash
1011: fast Serail Flash > 50Mhz
1100: OneNAND Flash (always 16-bit)
1110: Reserved
1101, 1111: Reserved

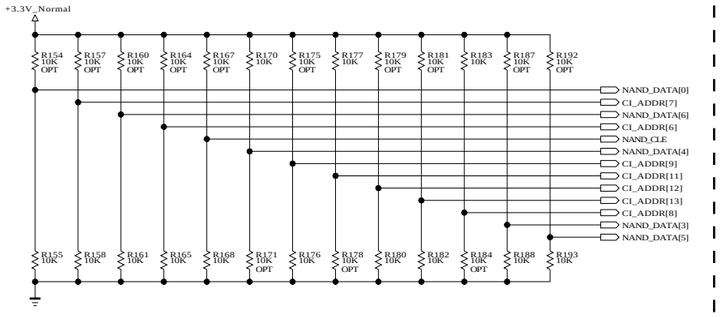
NAND ECC (FA3, FA2, FALE)



000 = ECC disabled
001 = ECC 1-bit repair
010 = ECC 4-bit BCH (O)
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 = Reserveddd

DUAL COMPONENT	
IC102	1ST : EAN61000101 2ND : T-TH58DVG4S0ETA20
IC102-*1	

Strap Setting



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

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

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

CI_ADDR[6]:
0: Host MIPS run at 500 MHz (O)
1: Host MIPS run at 250 MHz

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

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

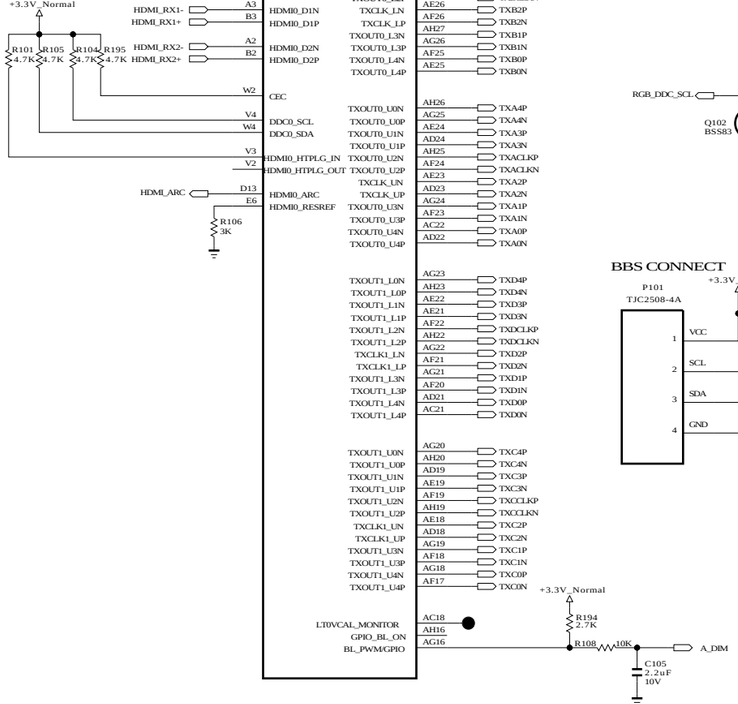
CI_ADDR[9],CI_ADDR[11],CI_ADDR[12],CI_ADDR[13]
TVM Crystal oscillator bias/gain control
0000: 210uA
0001: 390uA
0010: 570uA
0011: 730uA
0100: 890uA (O)
0111: 1290uA
1000: 1416uA
1111: 2196uA
0101, 0110, 1001, 1010, 1011, 1100, 1101, 1110: Reserved

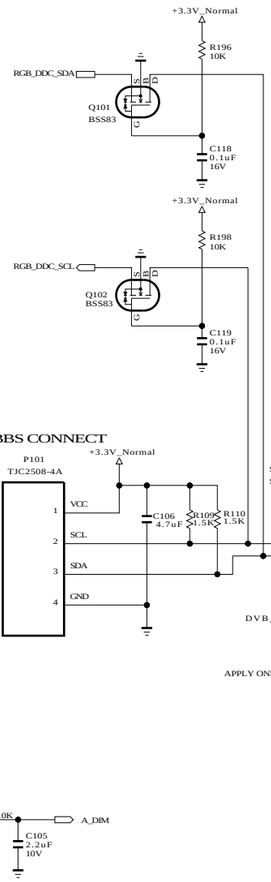
CI_ADDR[8]:
0: RESETOUTb (in On/Off only) stay asserted until software releases them.
1: Fix amount of delay for de-assertion on RESETOUTb (in On/IOff only) at end of RESETb pulse (O)

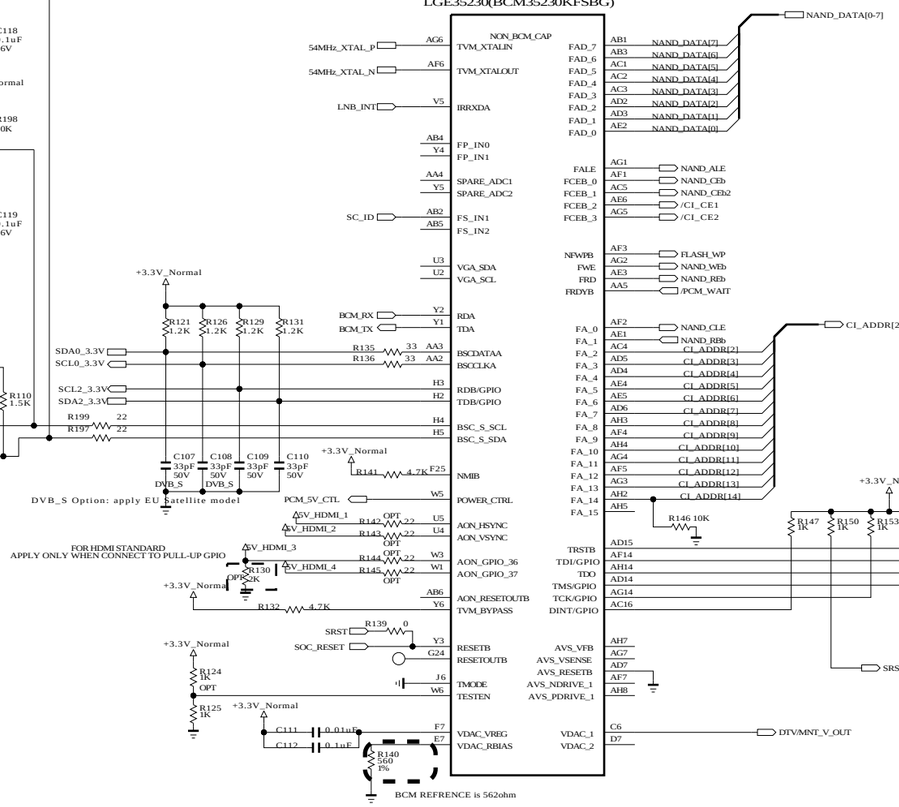
NAND_DATA[3]:
0: MIPS will boot from external flash (O)
1: MIPS will boot from ROM

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

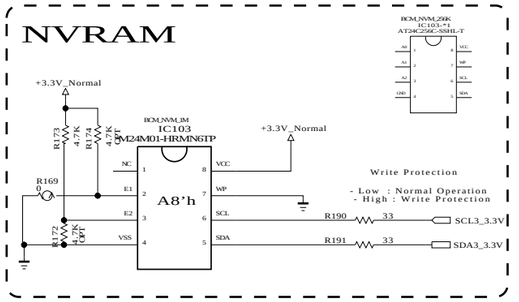
IC101
LGE35230(BCM35230KFSBG)



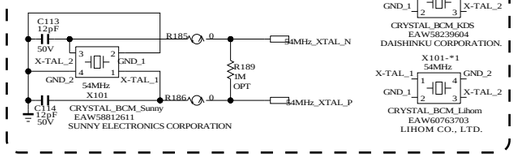




NVRAM



54MHz X-TAL



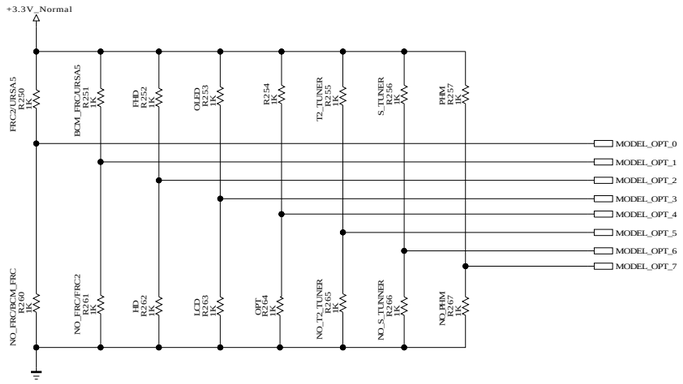
THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFATURES SPECFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

SECRET

LGElectronics

LG ELECTRONICS

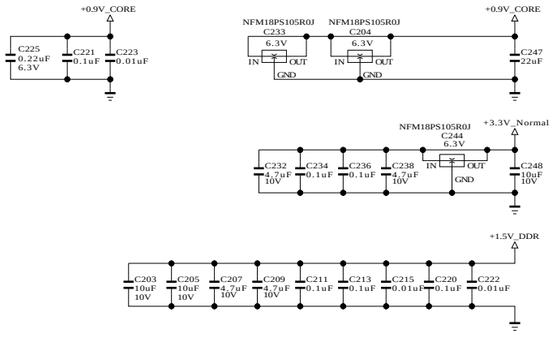
MODEL	BCM35230	DATE	2010.09.18
BLOCK	MAIN & NAND FLASH	SHEET	1

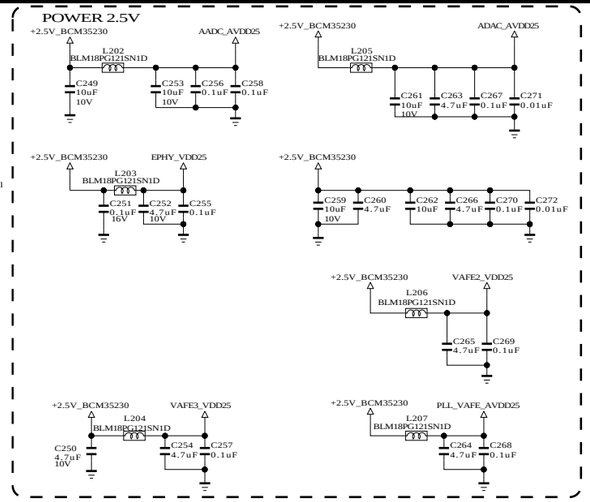


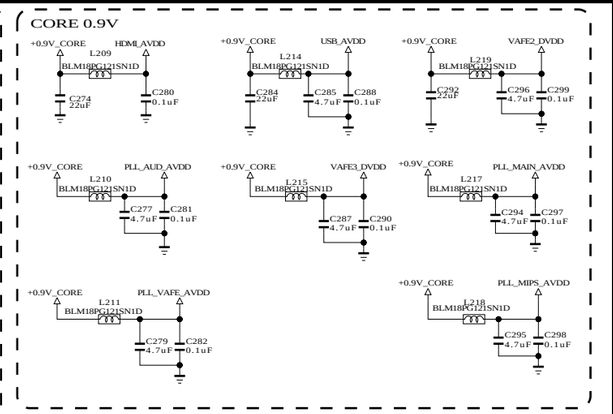
MODEL OPTION

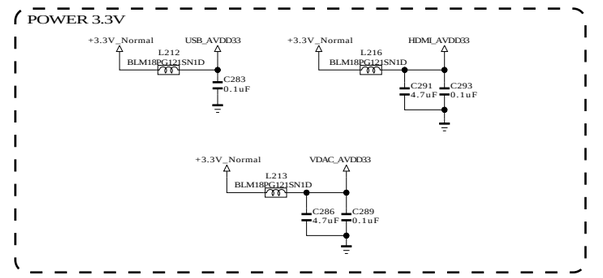
	NO_FRC	BCM internal FRC	LG FRC2	external URSA5
MODEL_OPT_0	0	0	1	1
MODEL_OPT_1	0	1	0	1

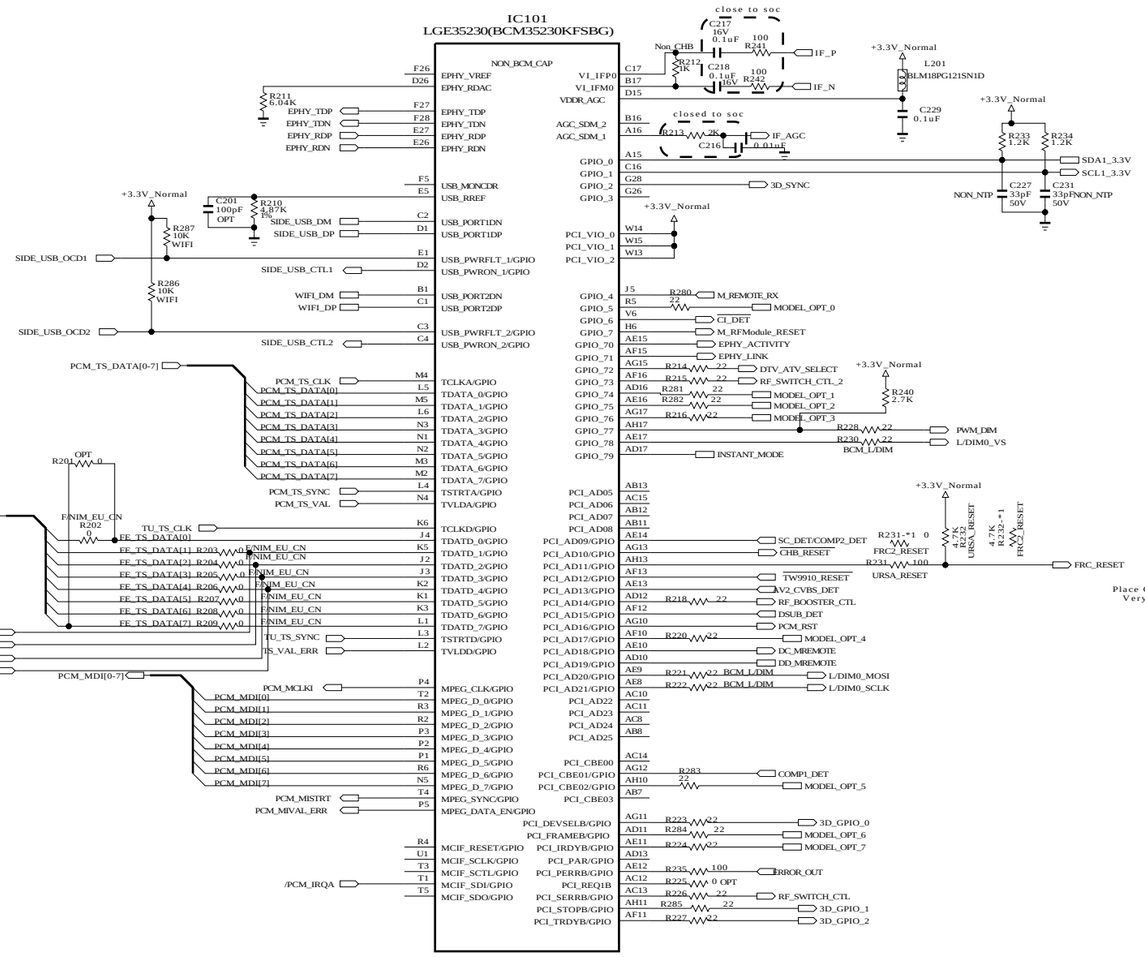
		HIGH	LOW
MODEL_OPT_2		FHD	HD
MODEL_OPT_3		OLED	LCD
MODEL_OPT_4	DDR speed	1333	1600
MODEL_OPT_5	T2 Tuner	Support	Not Support
MODEL_OPT_6	S Tuner	Support	Not Support
MODEL_OPT_7	PHM	Enable	Disable

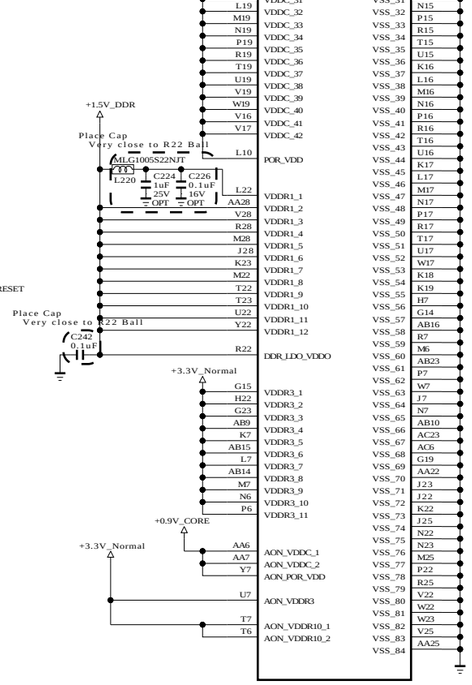


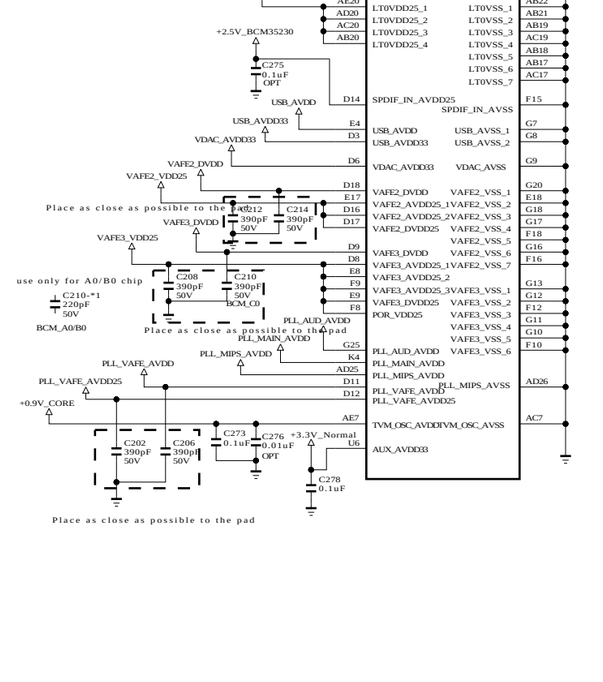












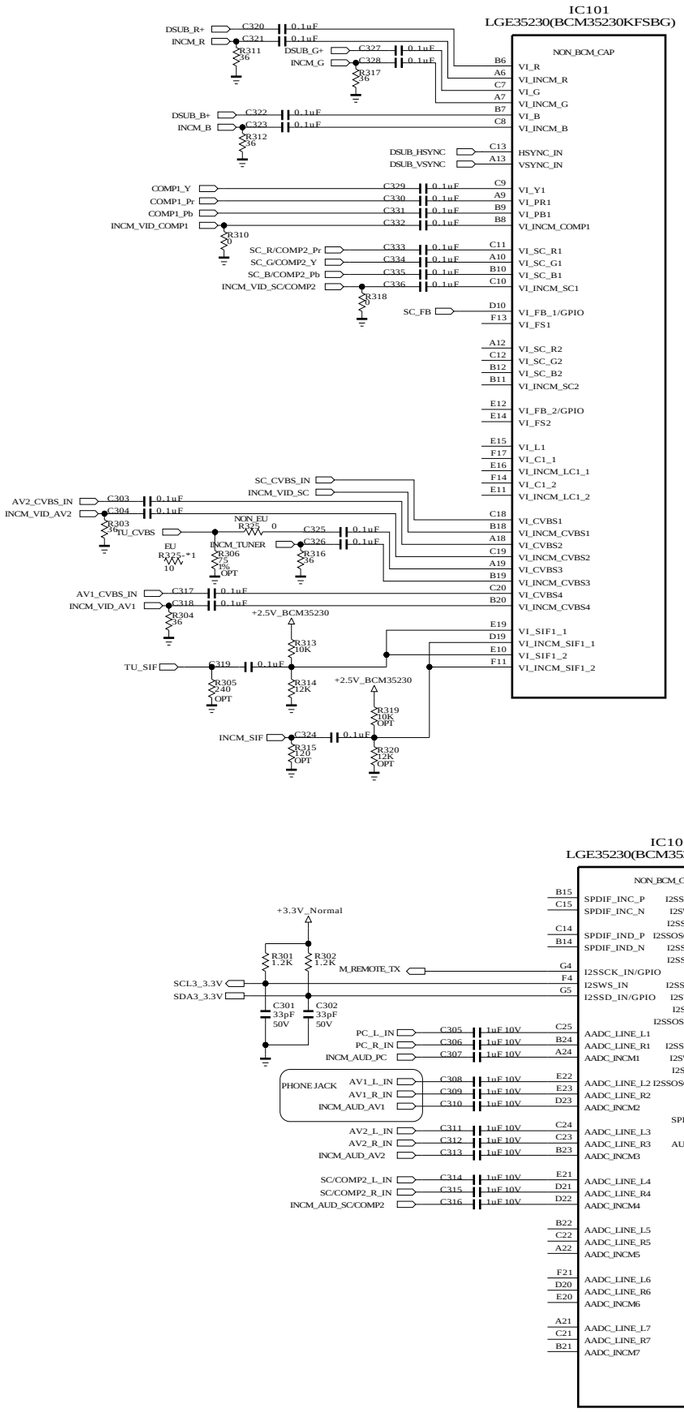
THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFATURES SPECFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

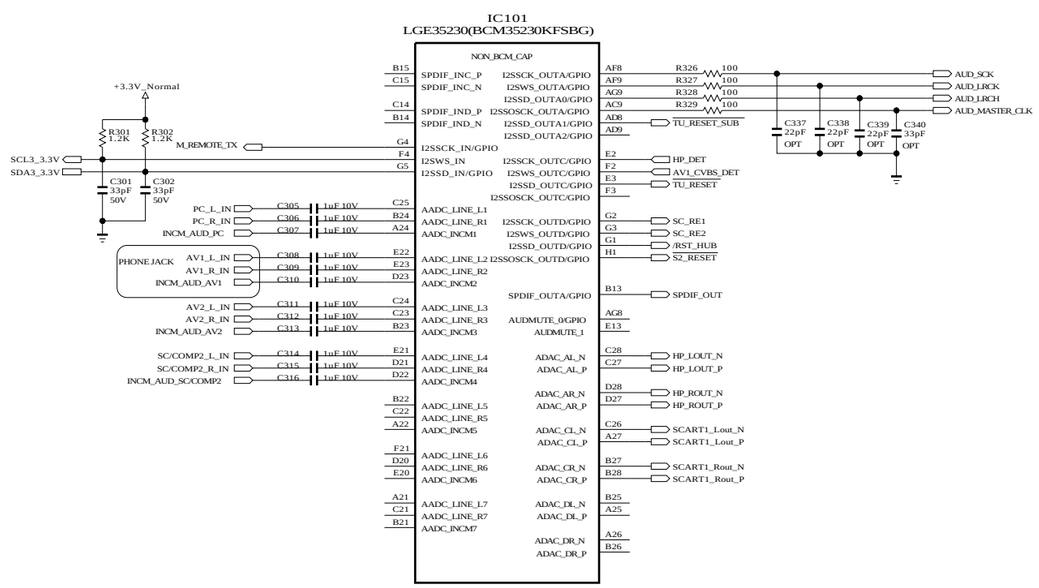
SECRET

LGElectronics

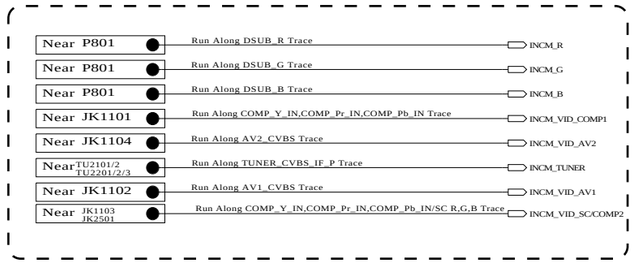
LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	MAIN POWER	SHEET	2 / 50



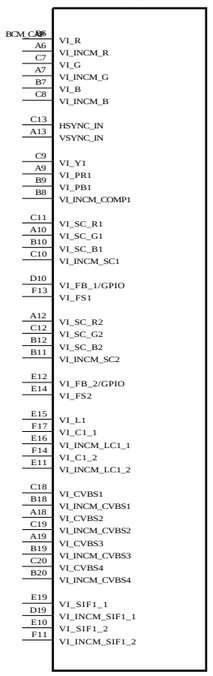


VIDEO INCM

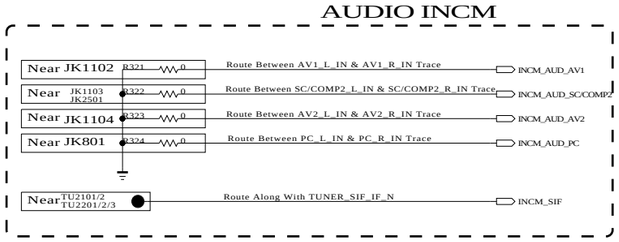


BCM35230_with_CAP_220pF

IC101-*1
LGE35230



AUDIO INCM

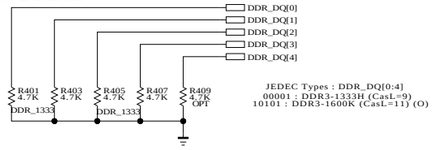


LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	MAIN AUDIO/VIDEO	SHEET	3 / 50

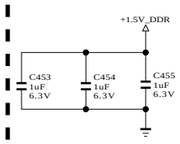
DUAL COMPONENT	
IC401,IC402	1ST : EAN61667501, 2ND : EAN61570701
IC401-*1 IC402-*1	1ST : T-K4B2G1646B_HCK0, 2ND : T-H5TQ2G63BFR-PBC

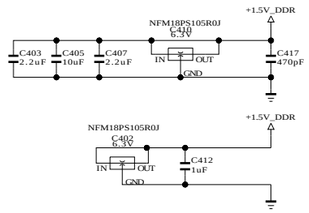
DDR STRAP

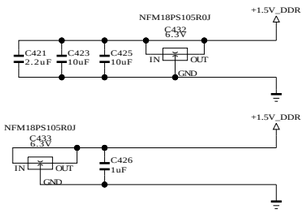


JEDEC Types : DDR_DQ[0:4]
00001 : DDR3-1333H (CasL=9)
10101 : DDR3-1600K (CasL=11) (O)

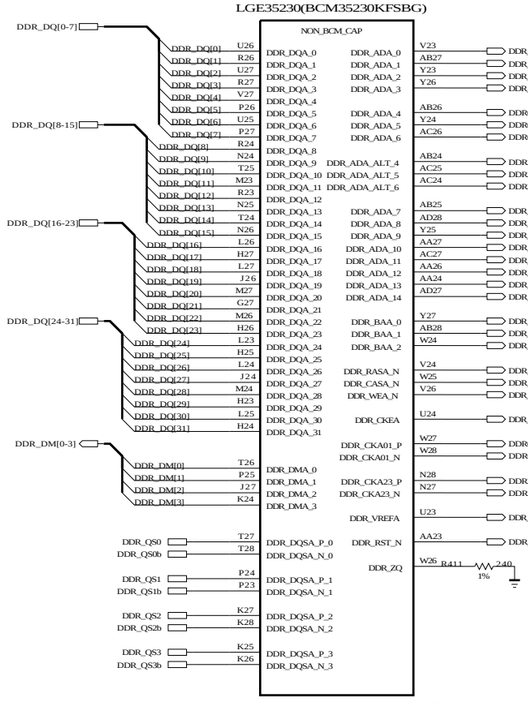
Bus Width : DDR_DQ[10]
0 - 16b
1 - 32b (O)
Chip Width : DDR_DQ[8]
0 - 8b
1 - 16b (O)
Chip Size : DDR_DQ[6:5]
00 - 4Gbit
01 - 2Gbit (O)
10 - 1Gbit
11 - 512Mbit



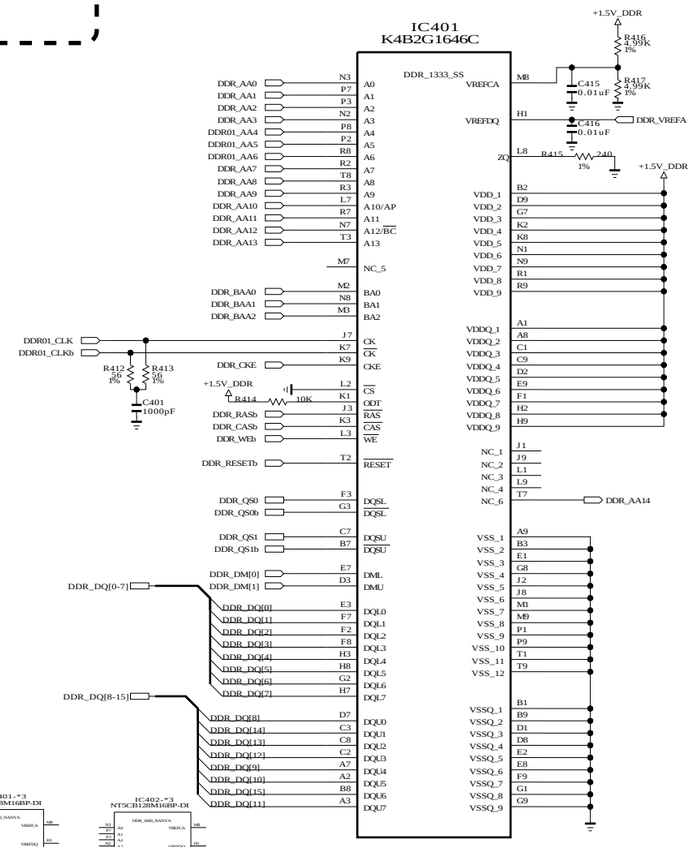




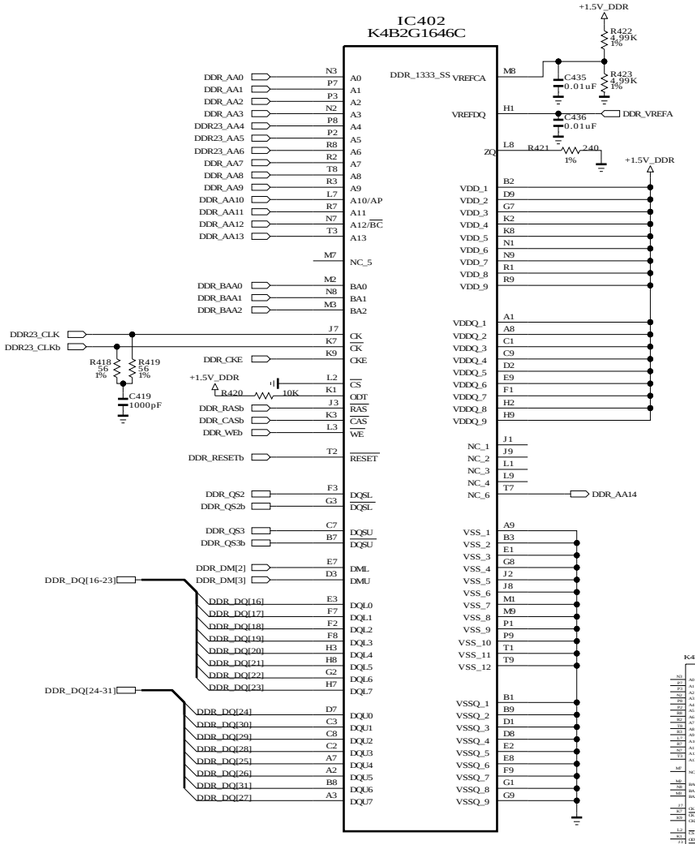
IC101
LGE35230(BCM35230KFSBG)

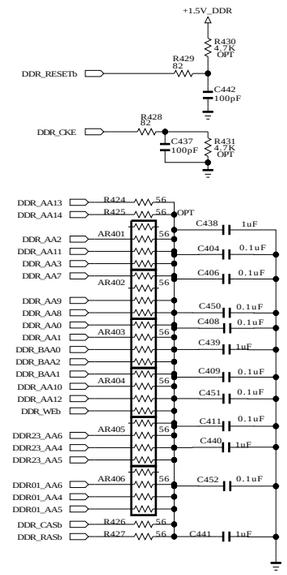


IC401
K4B2G1646C

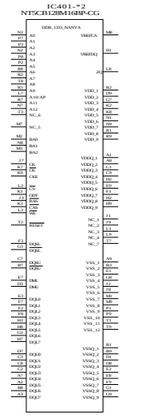


IC402
K4B2G1646C

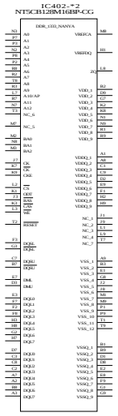




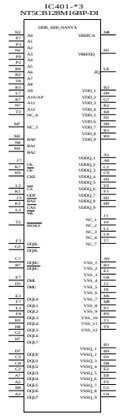
IC401-*2
NT5CB128M16BP-CG



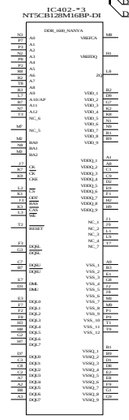
IC402-*2
NT5CB128M16BP-CG



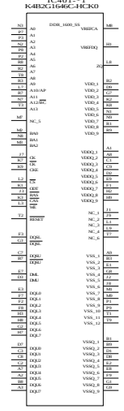
IC401-*3
NT5CB128M16BP-DI



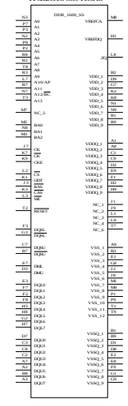
IC402-*3
NT5CB128M16BP-DI



IC401-*1
K4B2G1646C-HCK0



IC402-*1
K4B2G1646C-HCK0



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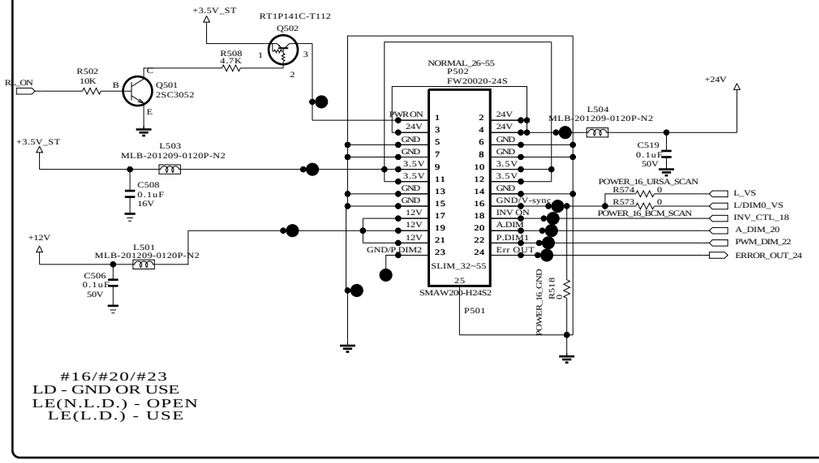
SECRET

LGElectronics

LG ELECTRONICS

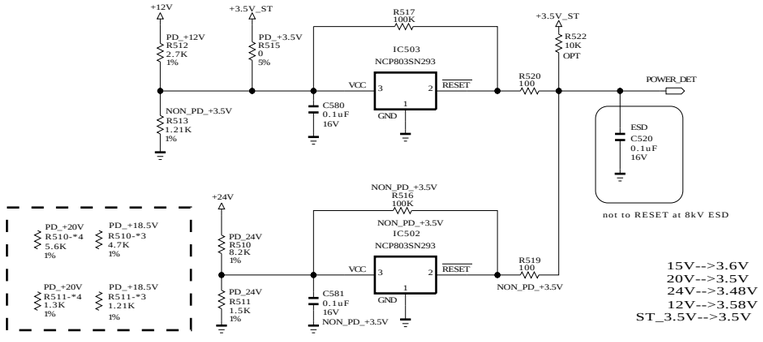
MODEL	BCM35230	DATE	
BLOCK	MAIN DDR	SHEET	4 / 50

FROM LIPS & POWER B/D

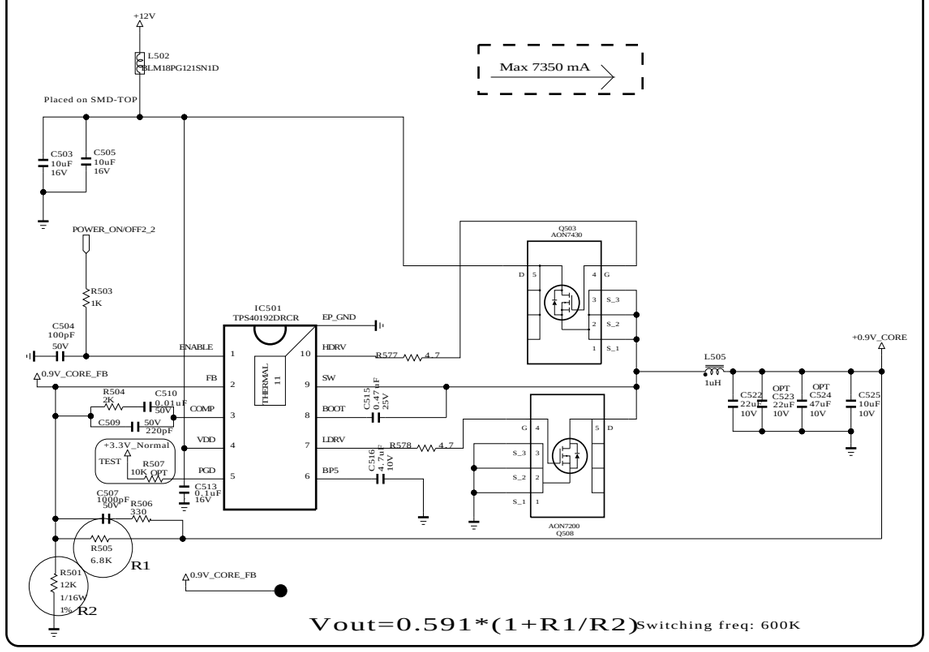


#16/#20/#23
LD - GND OR USE
LE(N.L.D.) - OPEN
LE(L.D.) - USE

Power_DET

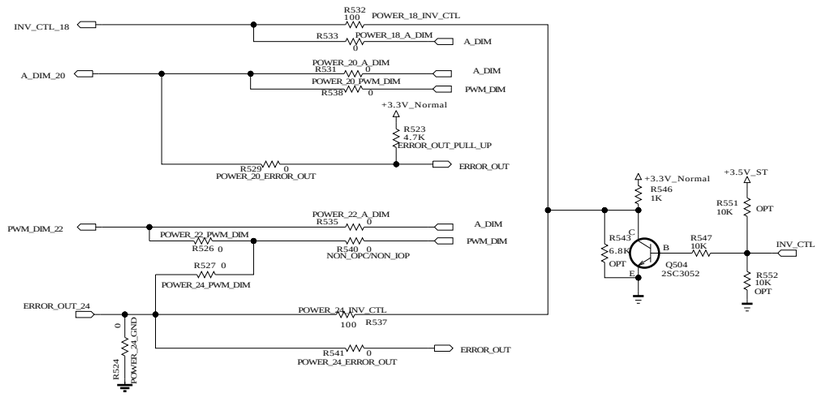


+0.9V_CORE_BCM35230



DUAL COMPONENT	
Q501,Q504, Q505,Q506	1ST : 0TRIY80001A 2ND : 0TR387500AA
Q502	1ST : 0TRIH80004A, 2ND : EBK61012501, 3RD : 0TR102009AM
Q507	1ST : EBK60752501, 2ND : EBK61011501
IC502,IC503	1ST : EAN61151001, 2ND : EAN60670101

OS Module OPT

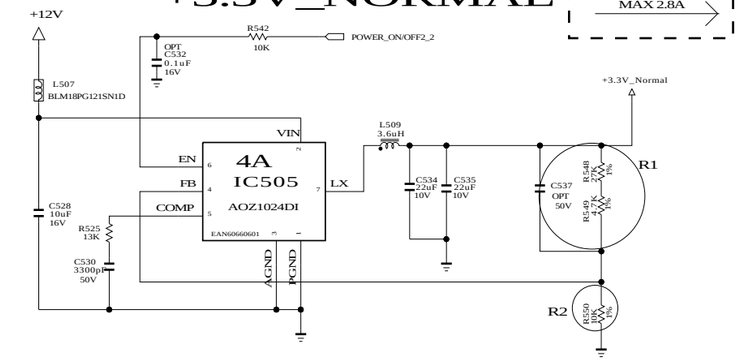


<OS MODULE PIN MAP>

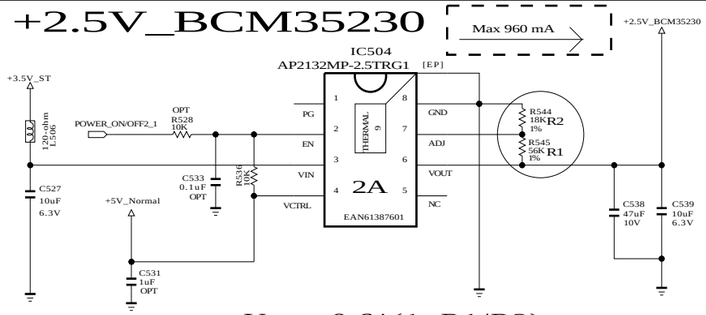
PIN No	LGD	CMO(09)	AUO	SHARP
18	INV_ON	A-DIM	INV_ON	INV_ON
20	V4:VBR-A V5:NC	NC	Err_out	Err_out
22	PWM_DIM	PWM_DIM	A-DIM	PWM_DIM
24	Err_out LED:GND	INV_ON	PWM_DIM	GND

CHECK PWR/MODULE PIN MAP

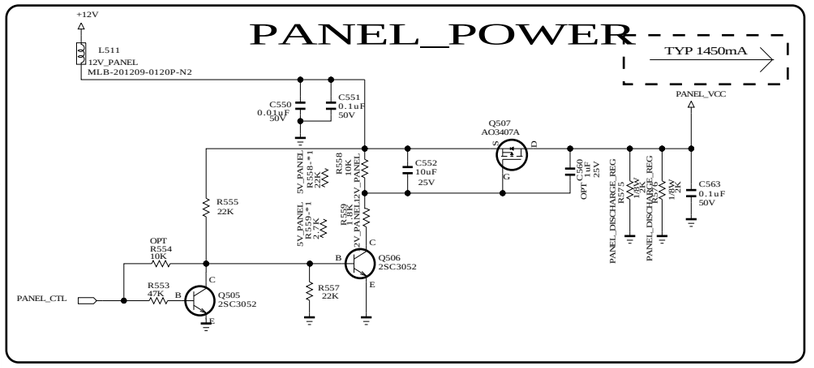
+3.3V_NORMAL



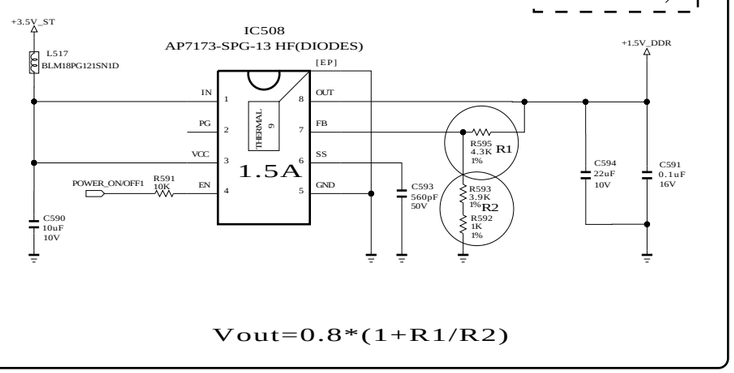
+2.5V_BCM35230



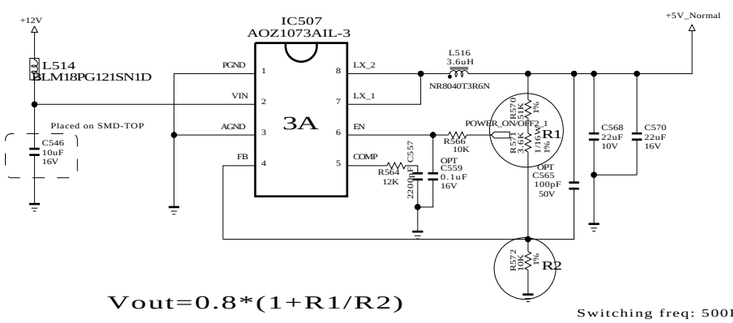
PANEL_POWER



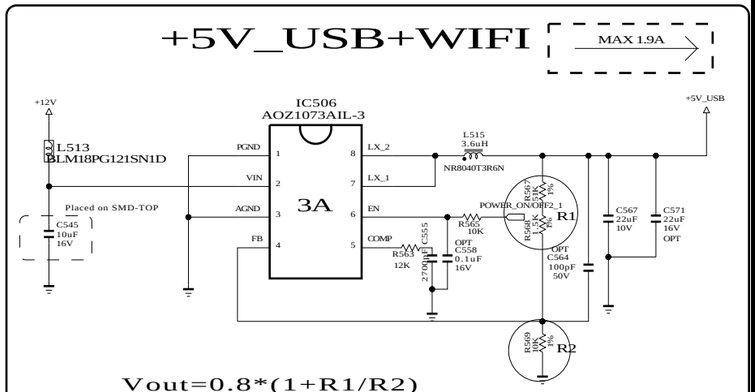
+1.5V_DDR



+5V_Normal



+5V_USB+WIFI



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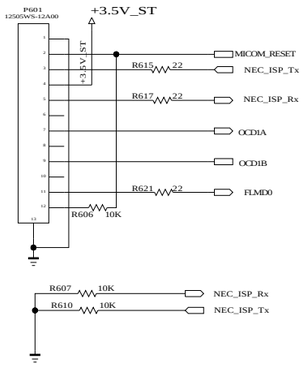
SECRET
LGElectronics

LG ELECTRONICS

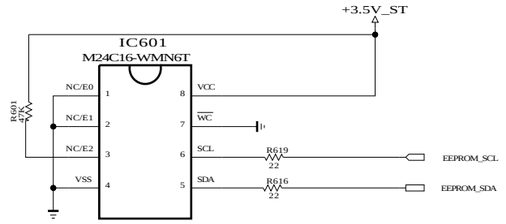
MODEL	BCM35230	DATE	
BLOCK	POWER	SHEET	5 / 58

NEC MICOM

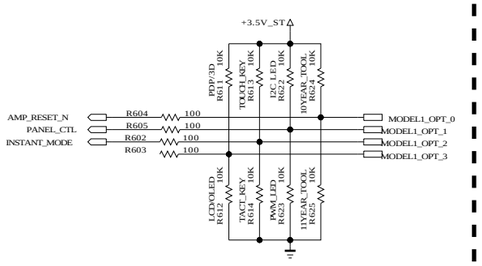
For Debug



EEPROM for Micom



MICOM MODEL OPTION

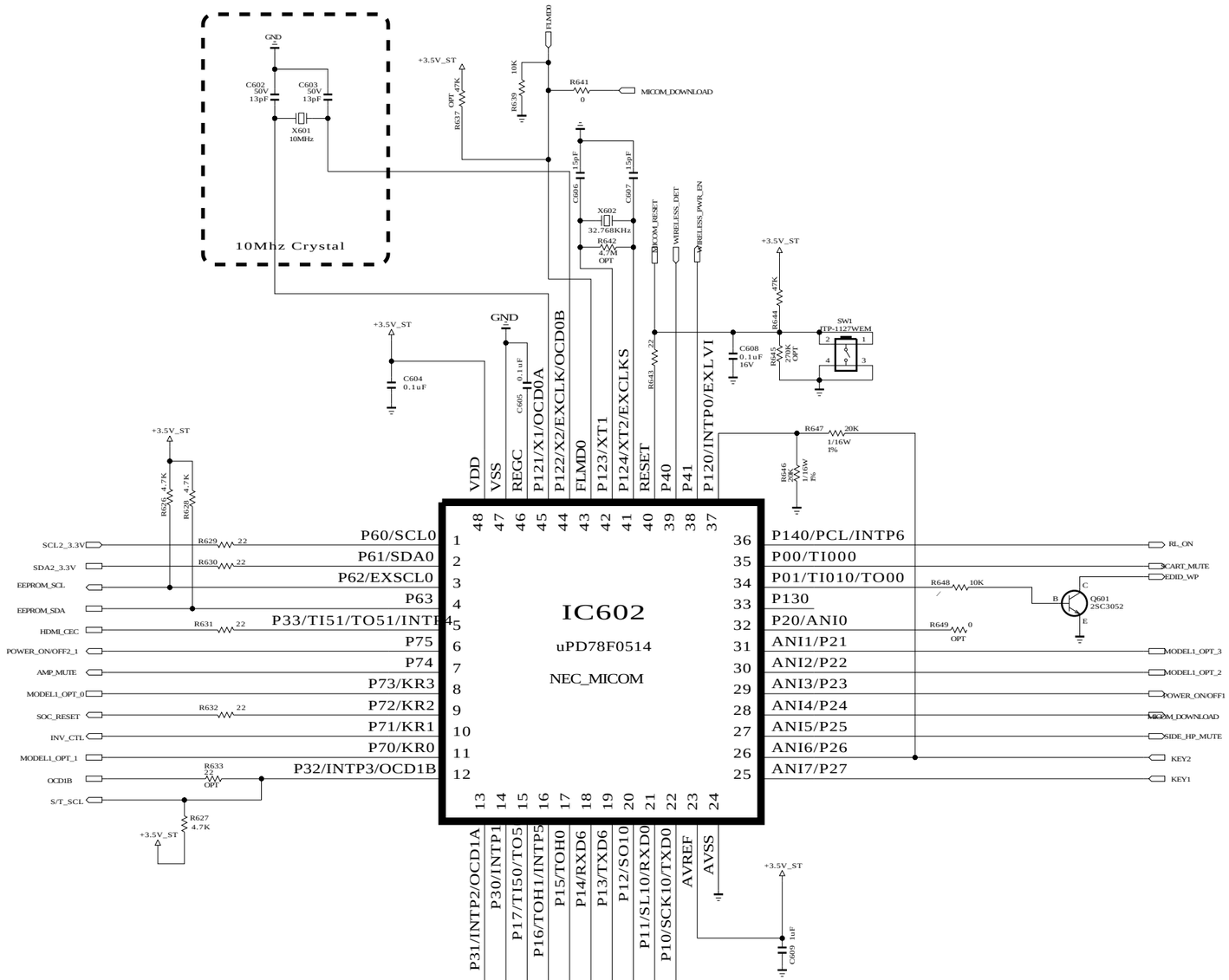


MODEL OPTION

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	3D
MODEL_OPT_3	0	1	0	1

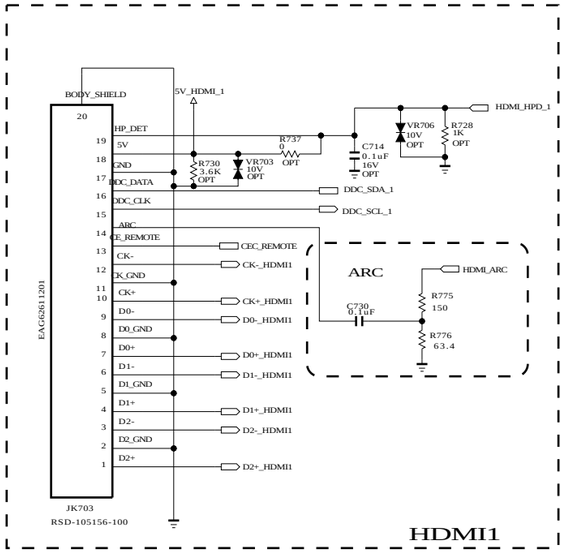
	LOW	LOW_SMALL	TBD	HIGH
MODEL_OPT_1	0	0	1	1
MODEL_OPT_2	0	1	0	1

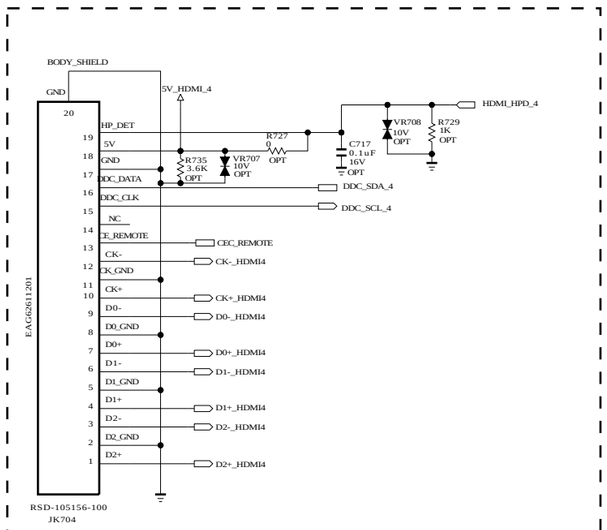


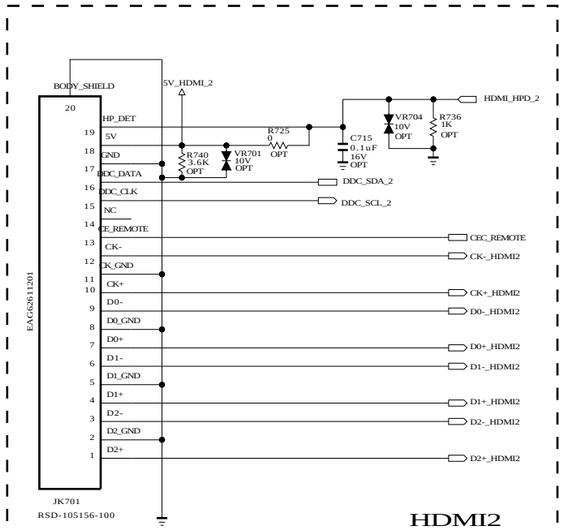
LG ELECTRONICS

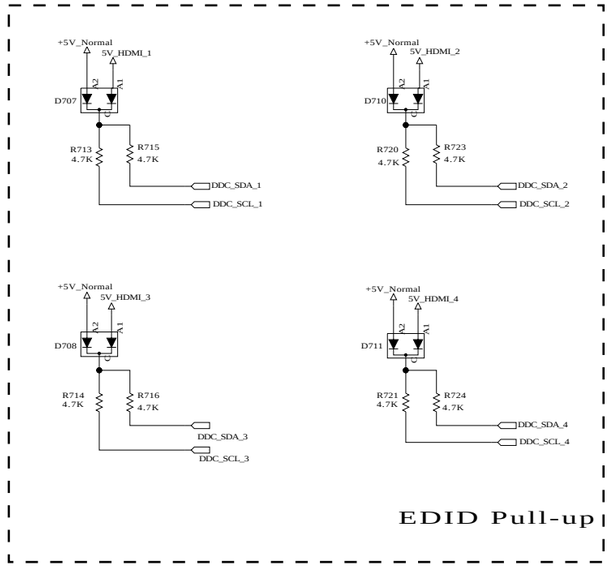
MODEL	BCM35230	DATE	
BLOCK	MICOM	SHEET	6 / 50

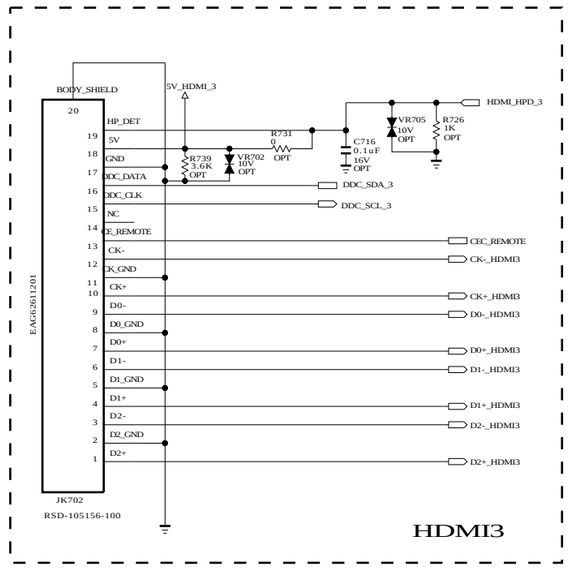
DUAL COMPONENT	
D707,D708 D710,D711	1ST : 0DD184009AA 2ND : 0DSIH00028A
D713	1ST : T-BAT54_SUZHO, 2ND : 0DSON00138A



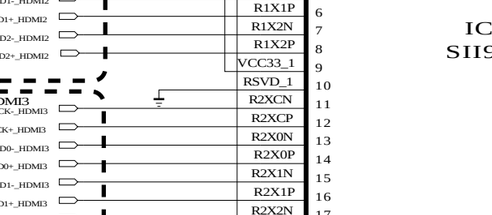


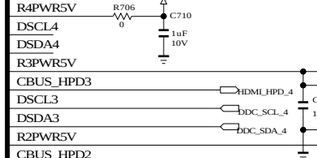






* HDMI CEC





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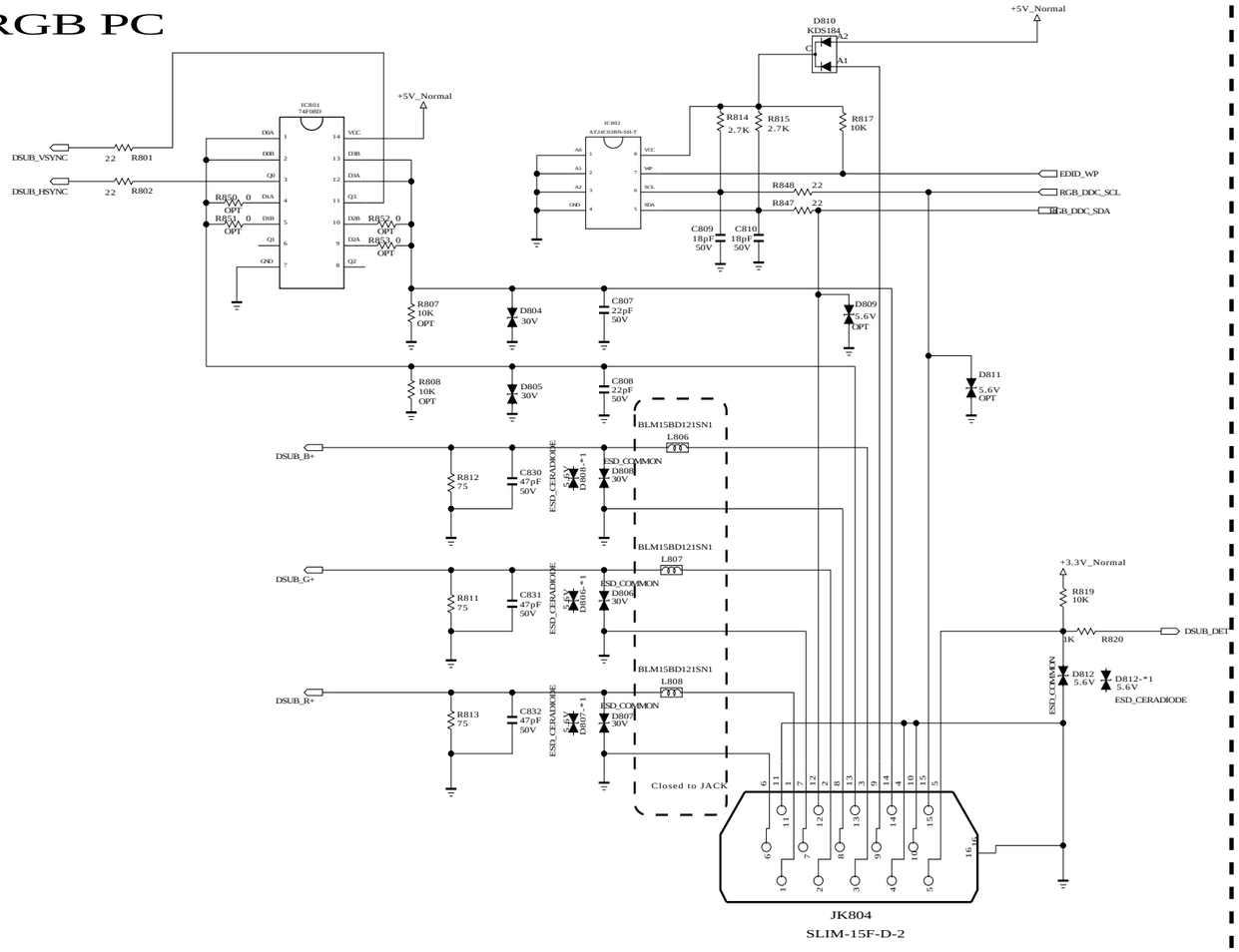
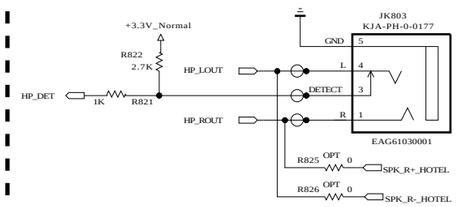
RGB/ PC AUDIO/ SPDIF/ EARPHONE/ RS232C

RGB PC

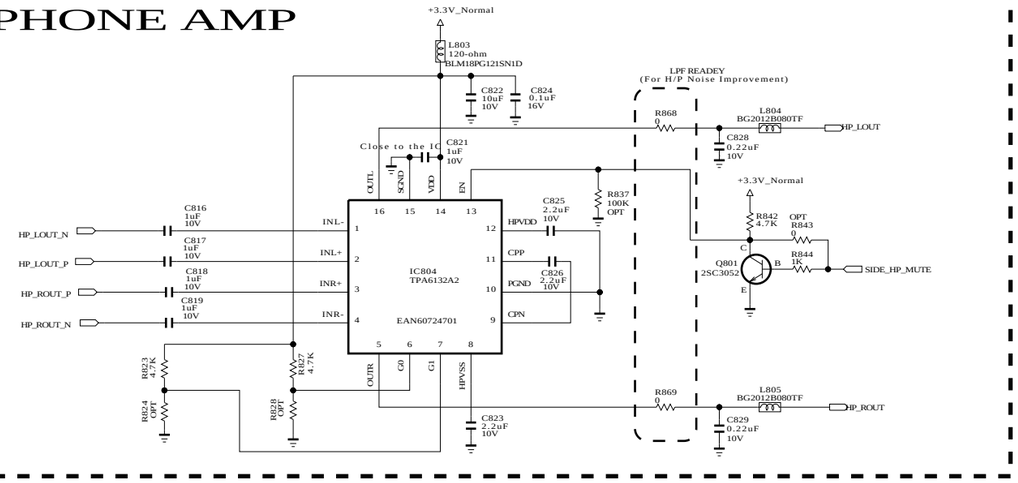


EARPHON JACK

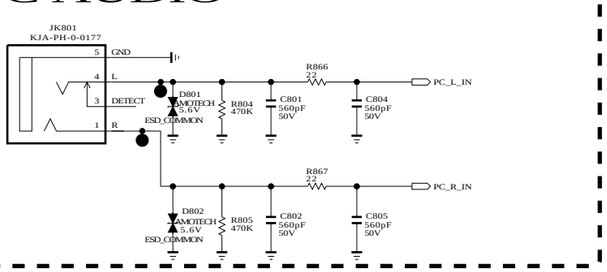


DUAL COMPONENT	
D804,D805,D806 D807,D808,D813 D814	1ST : EAH39491601, 2ND : EAH33945901
D810	1ST : 0DD184009AA, 2ND : 0DSIH00028A
Q801	1ST : 0TRIY80001A, 2ND : 0TR387500AA
IC805	1ST : EAN61151201, 2ND : EAN61130001

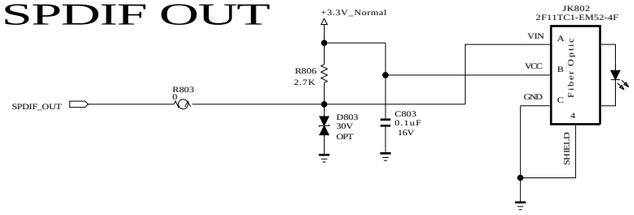
EARPHONE AMP



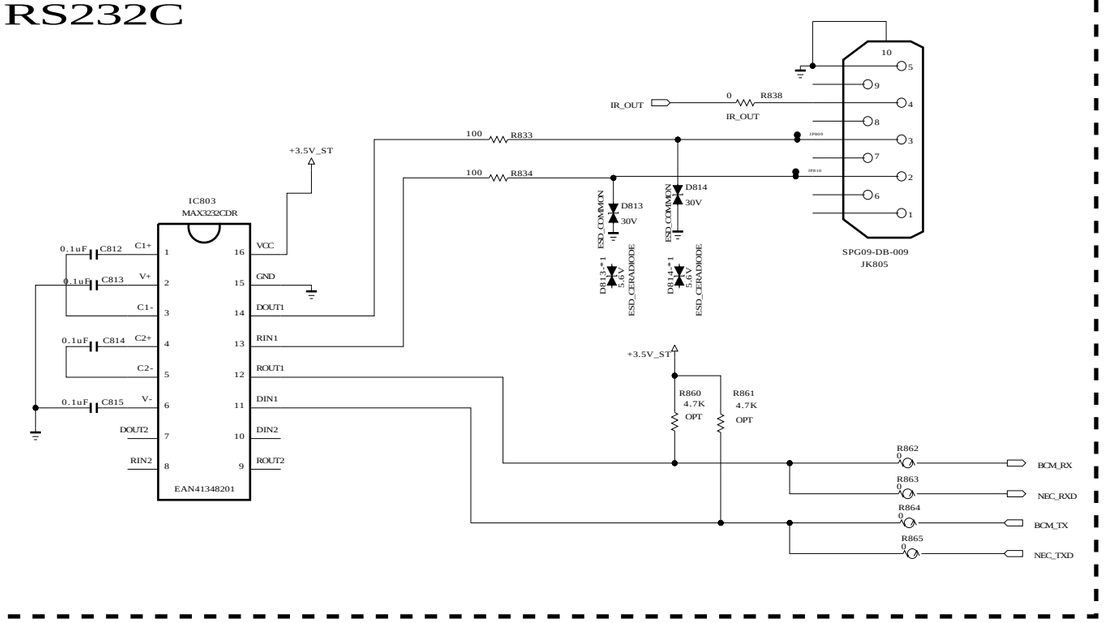
PC AUDIO



SPDIF OUT



RS232C



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SECRET

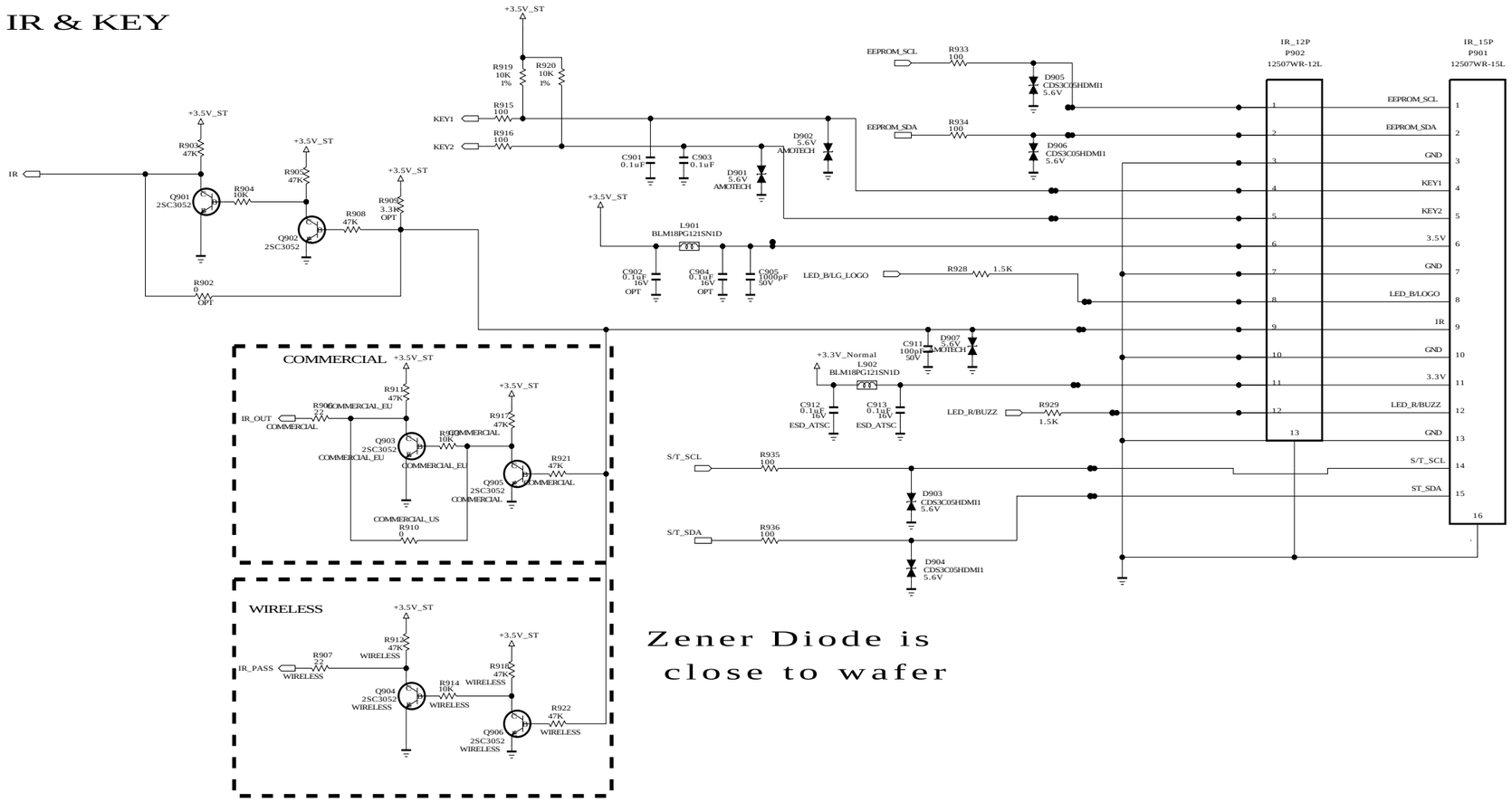
LGElectronics

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

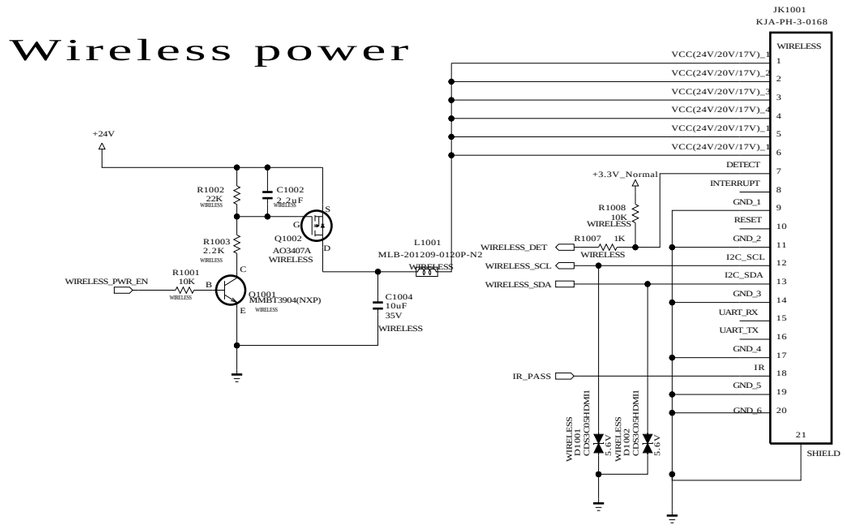
LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	IR/KEY	SHEET	9 / 50

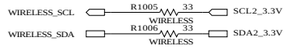
WIRELESS READY MODEL

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



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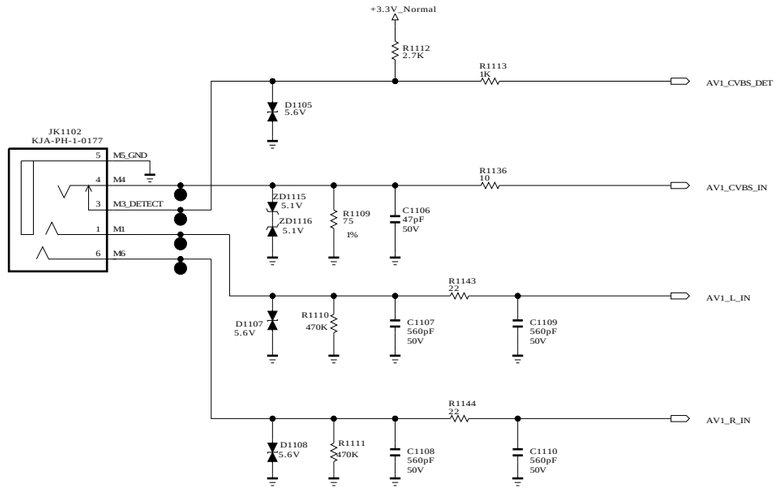
SECRET
LGElectronics

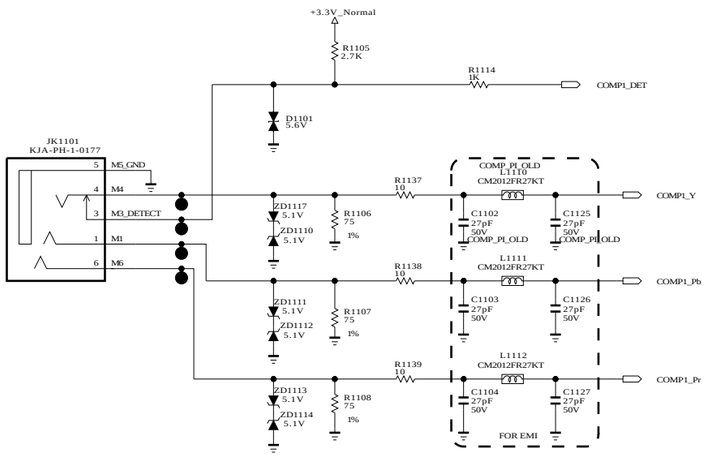
LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	WIRELESS	SHEET	10 / 50

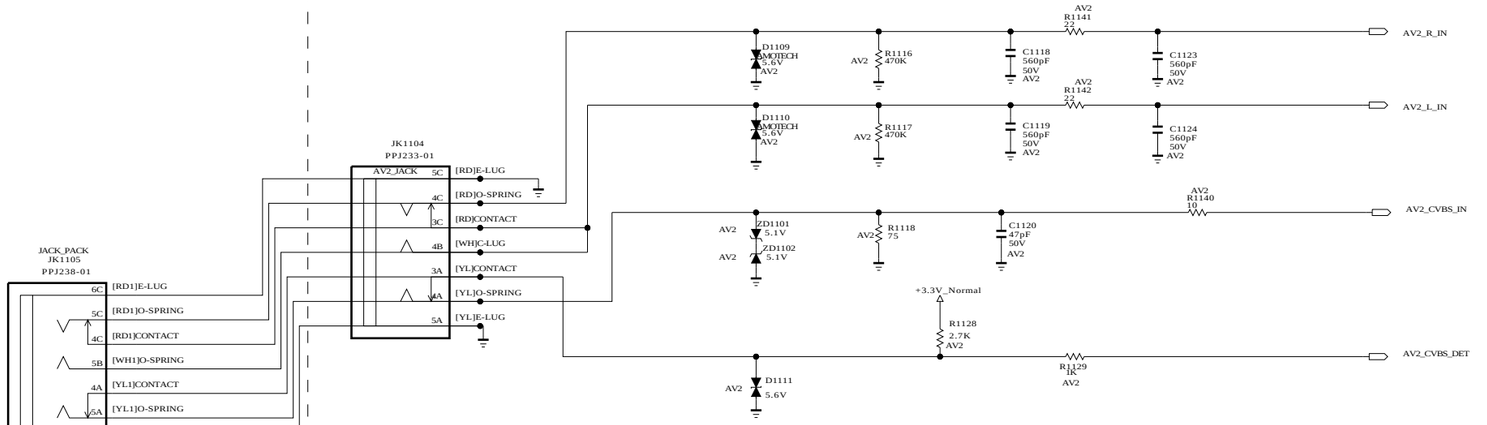
CVBS 1 PHONE JACK



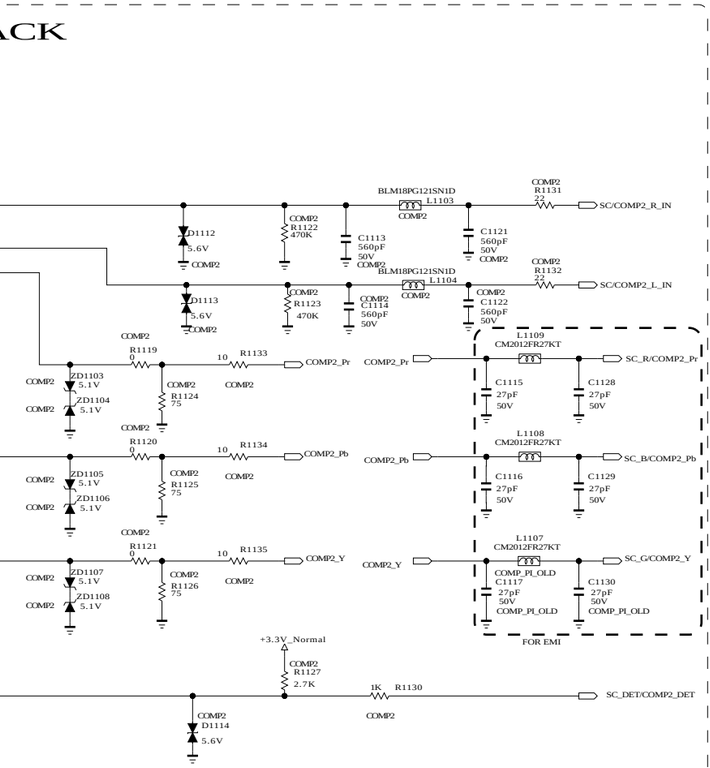
COMPONENT 1 PHONE JACK



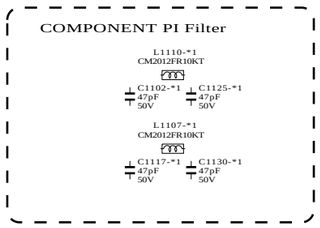
CVBS2 REAR JACK



COMP2 REAR JACK



COMPONENT PI Filter



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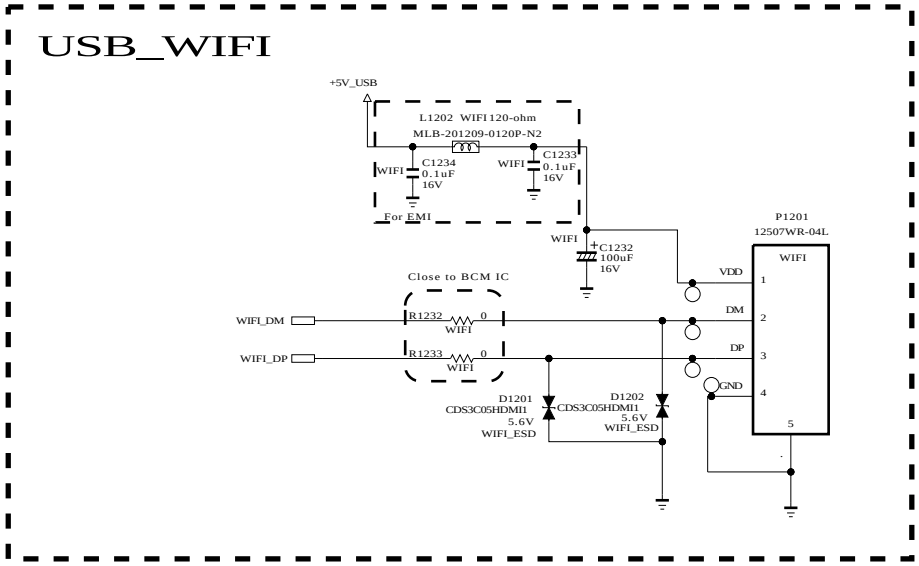
SECRET

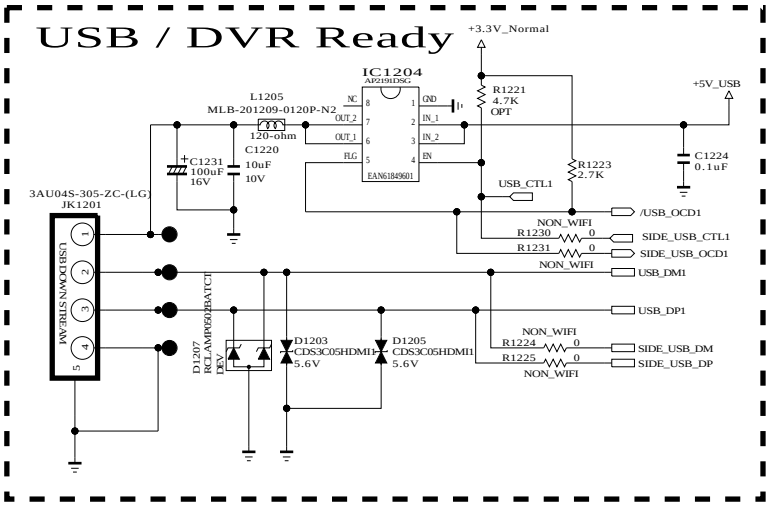
LGElectronics

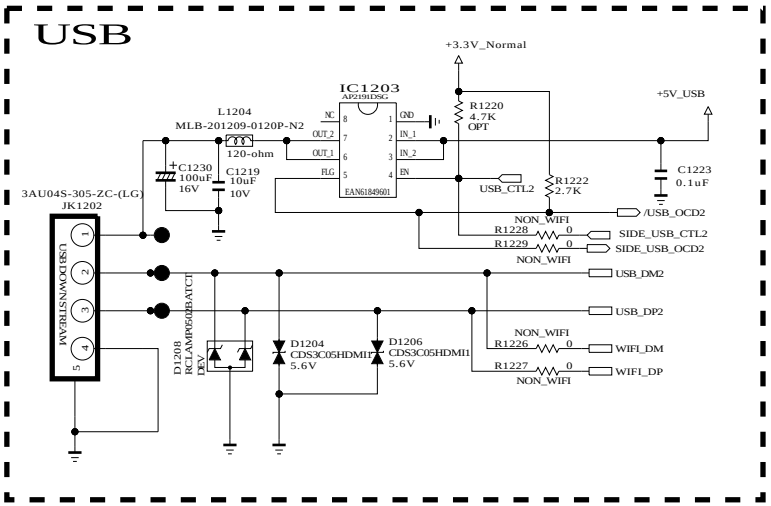
LG ELECTRONICS

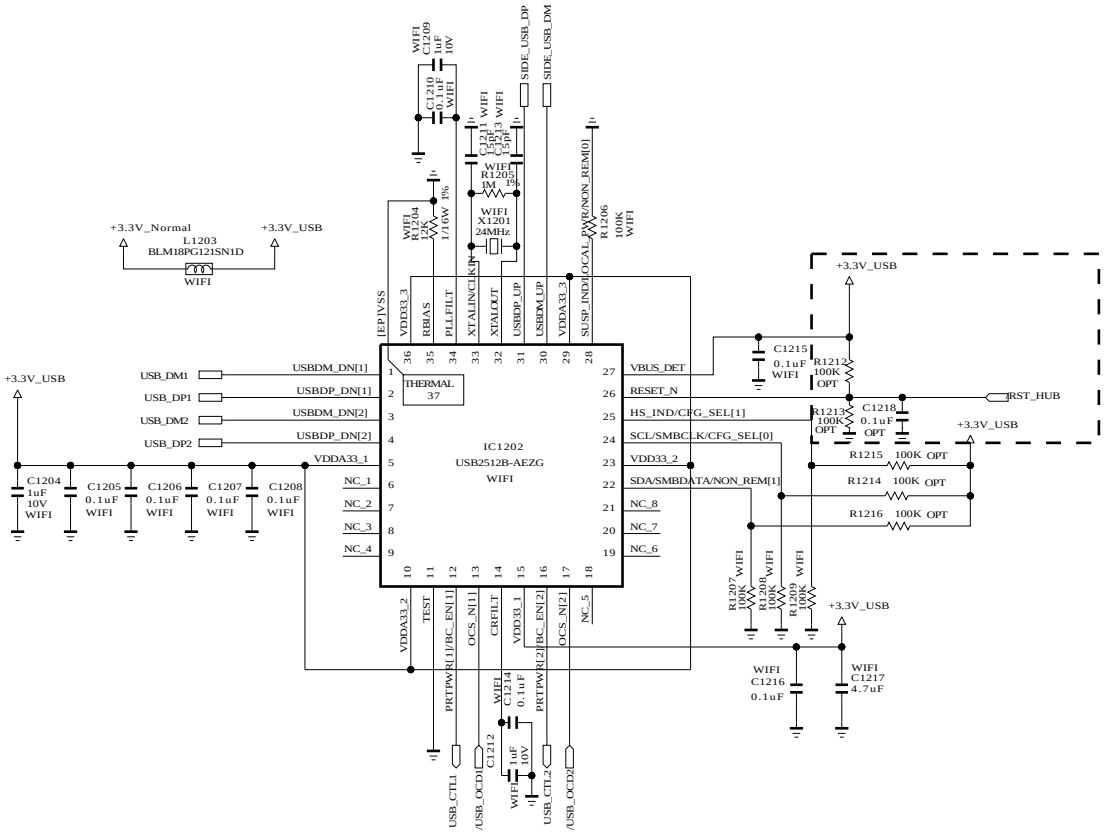
MODEL	BCM35230	DATE	
BLOCK	COMP/AV	SHEET	11 / 50



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







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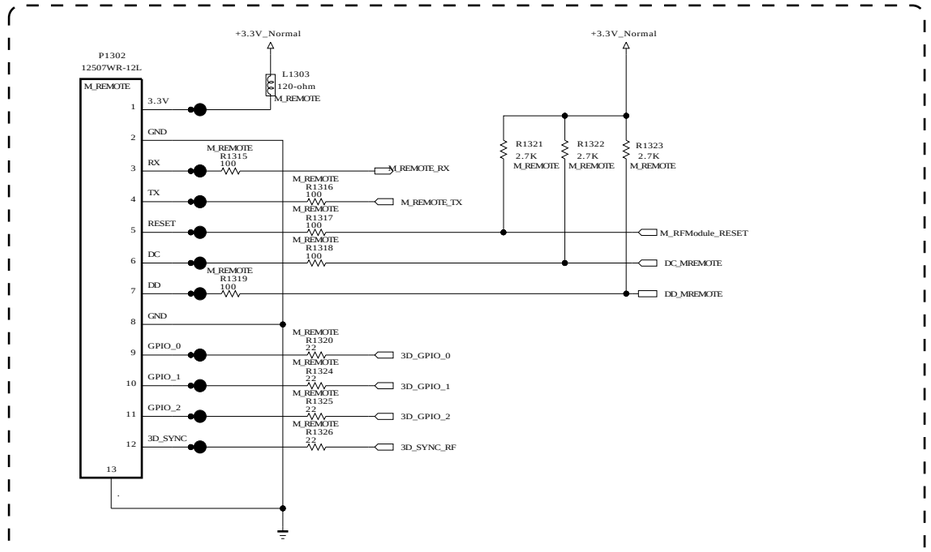
SECRET

LGElectronics

LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	USB + WIFI	SHEET	12

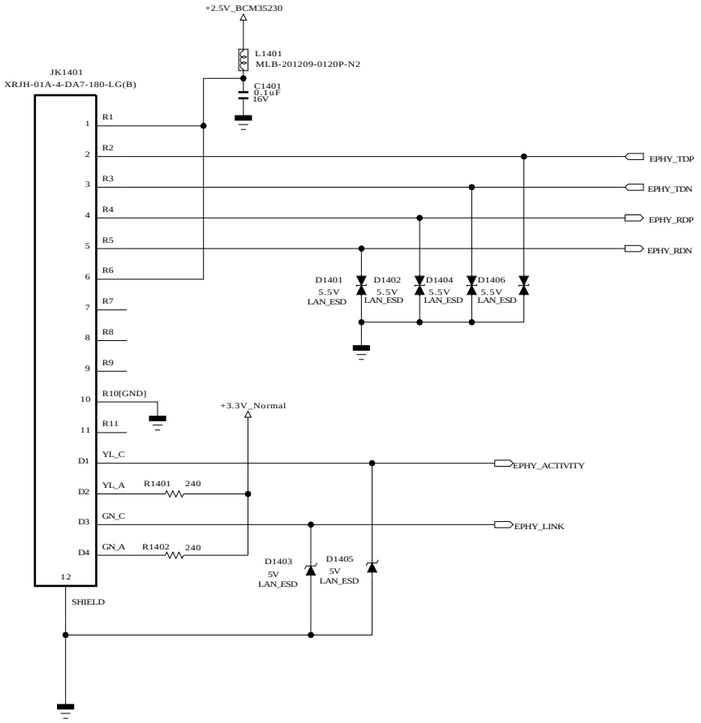
TI solution M_REMOTE OPTION



ALL M_REMOTE OPTION

Ethernet Block

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



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SECRET

LGElectronics

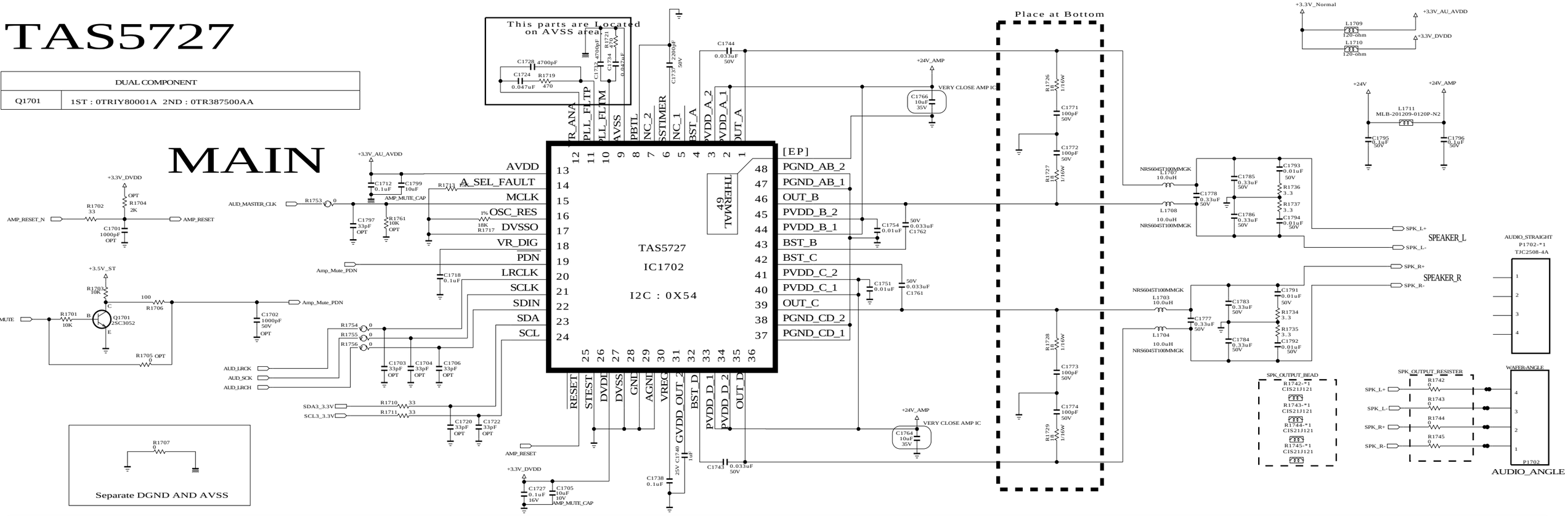
LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	ETHERNET	SHEET	14 / 50

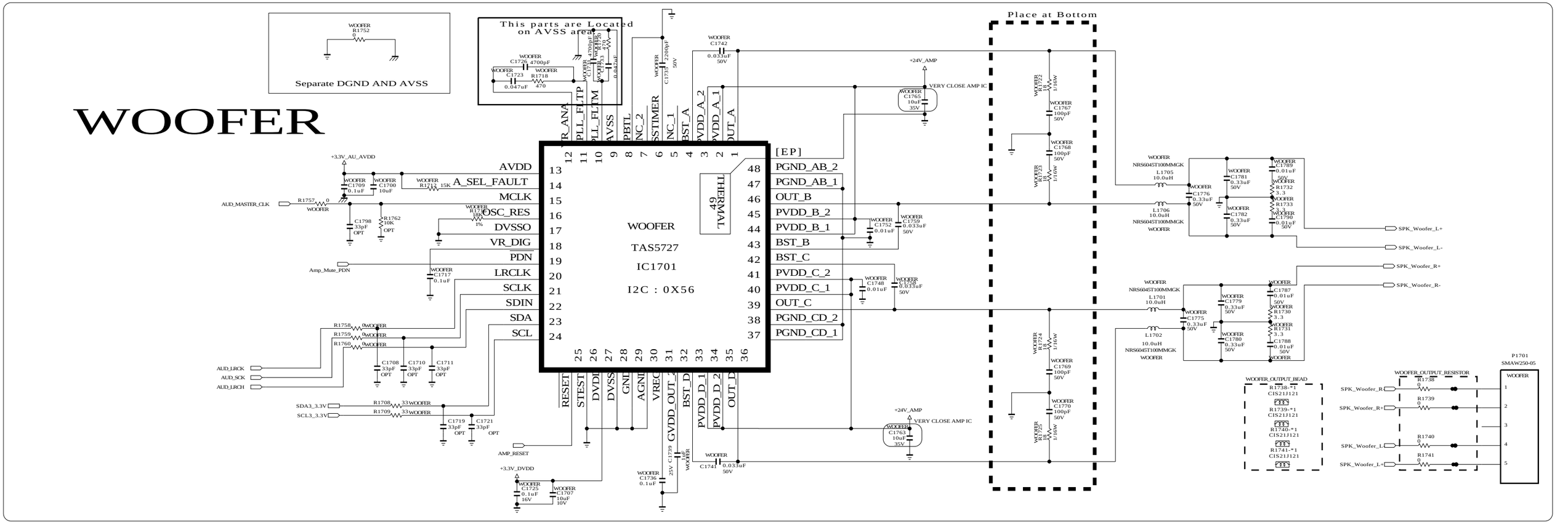
TAS5727

DUAL COMPONENT	
Q1701	1ST : 0TRIY80001A 2ND : 0TR387500AA

MAIN



WOOFER



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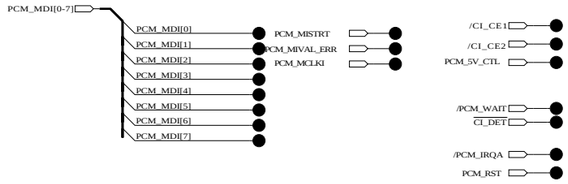
SECRET

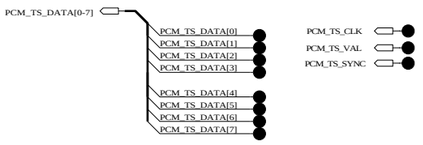
LGElectronics

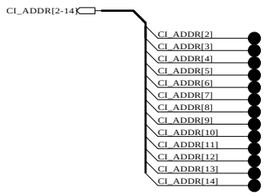
LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	AUDIO[TI]	SHEET	17 / 50

NON CI







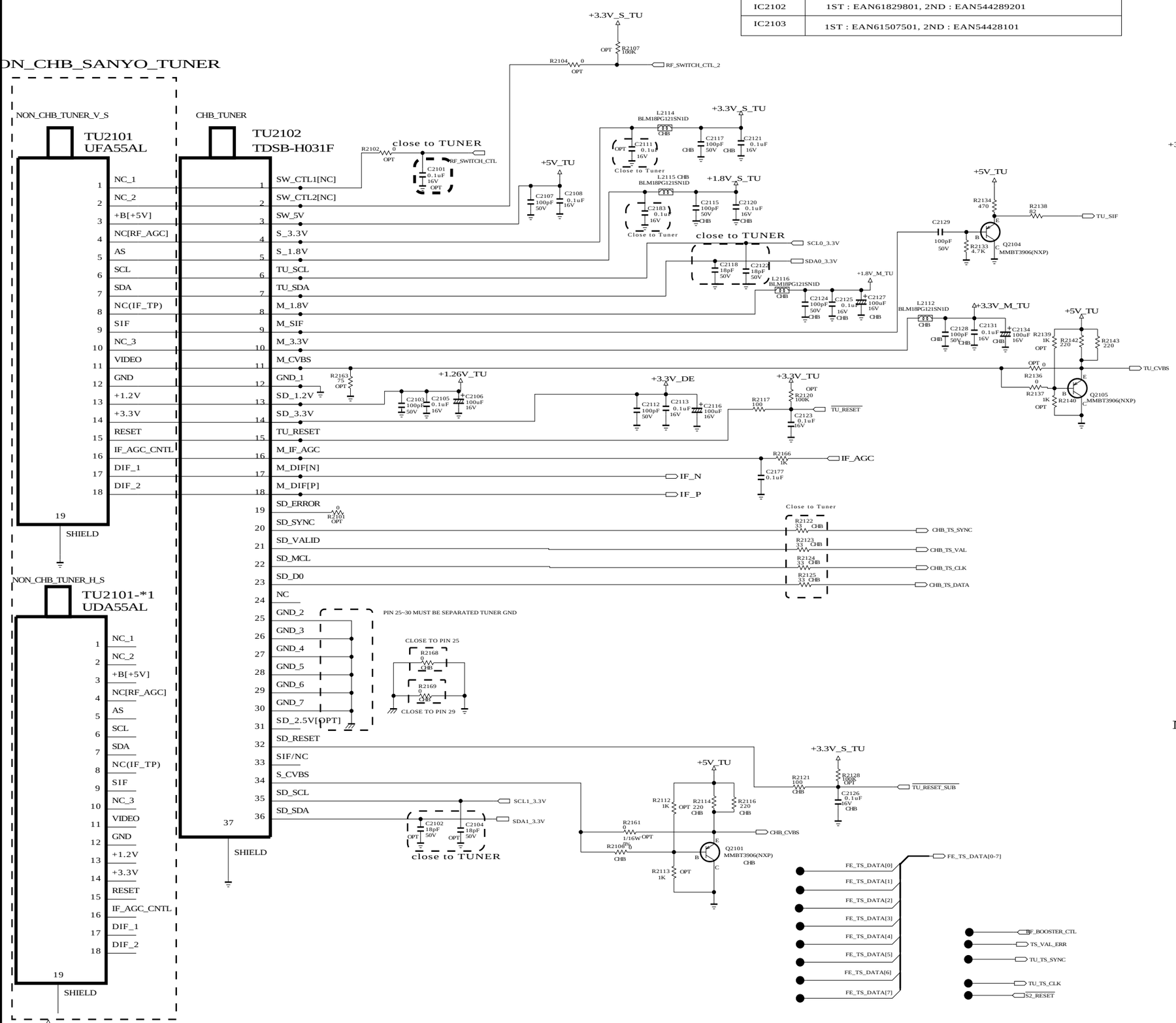
SECRET
LGElectronics

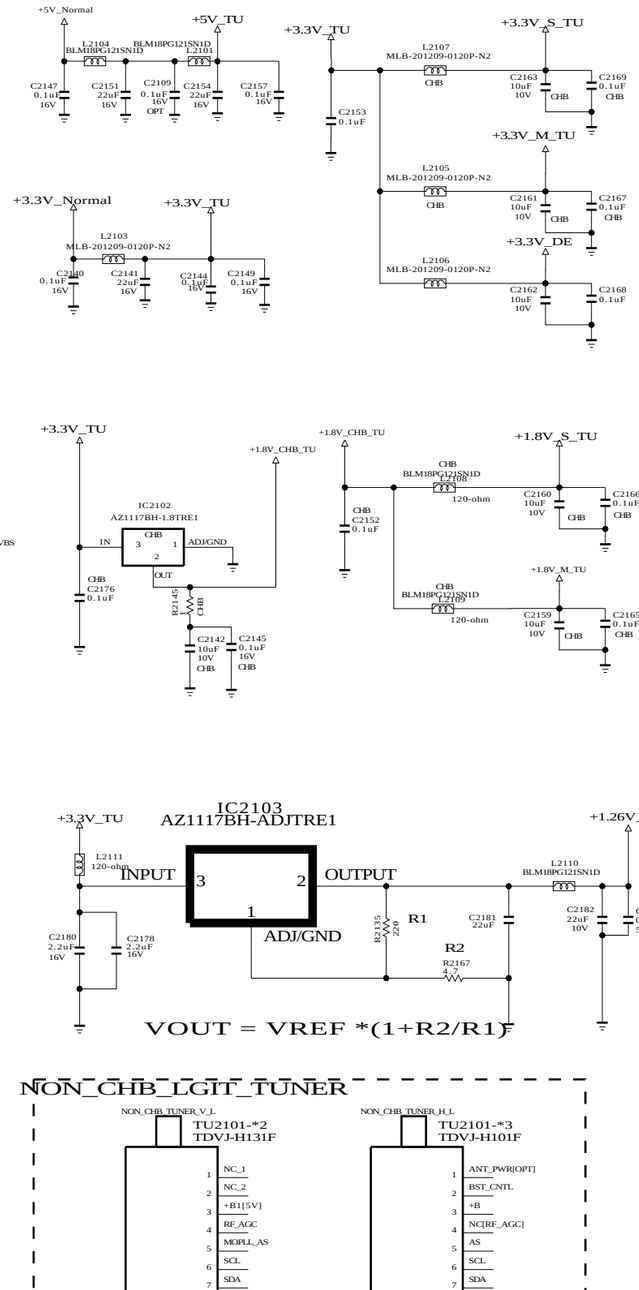
LG ELECTRONICS

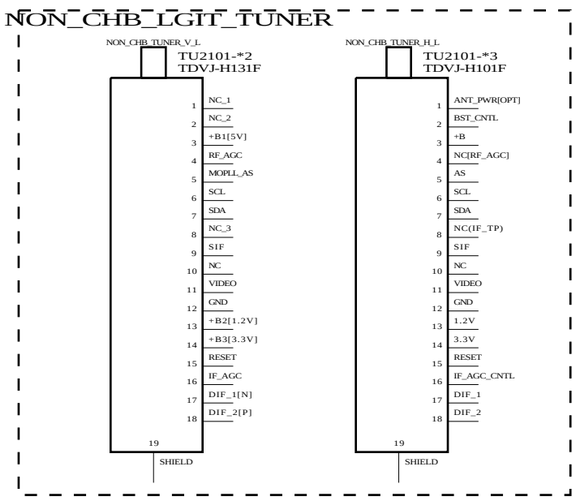
MODEL	BCM35230	DATE	
BLOCK	NON CI	SHEET	20 / 50

NON_CHB & CHB TUNER (KOR/USA)

DUAL COMPONENT	
IC2102	1ST : EAN61829801, 2ND : EAN544289201
IC2103	1ST : EAN61507501, 2ND : EAN54428101







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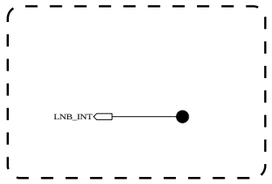
SECRET

LGElectronics

LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	ATSC_TUNER	SHEET	21 / 50

Non_DVB-S2 LNB Part_Allegro



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FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS
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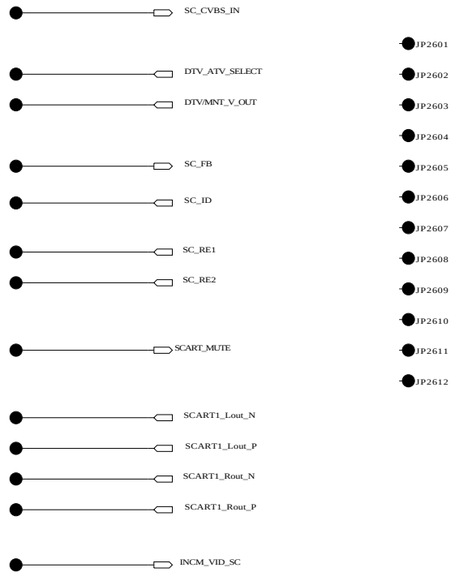
THE CRITICAL COMPONENTS IN THE ⚠SYMBOL MARK OF THE SCHEMETIC.

SECRET
LGElectronics

LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	NON LNB	SHEET	24 / 50



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SECRET

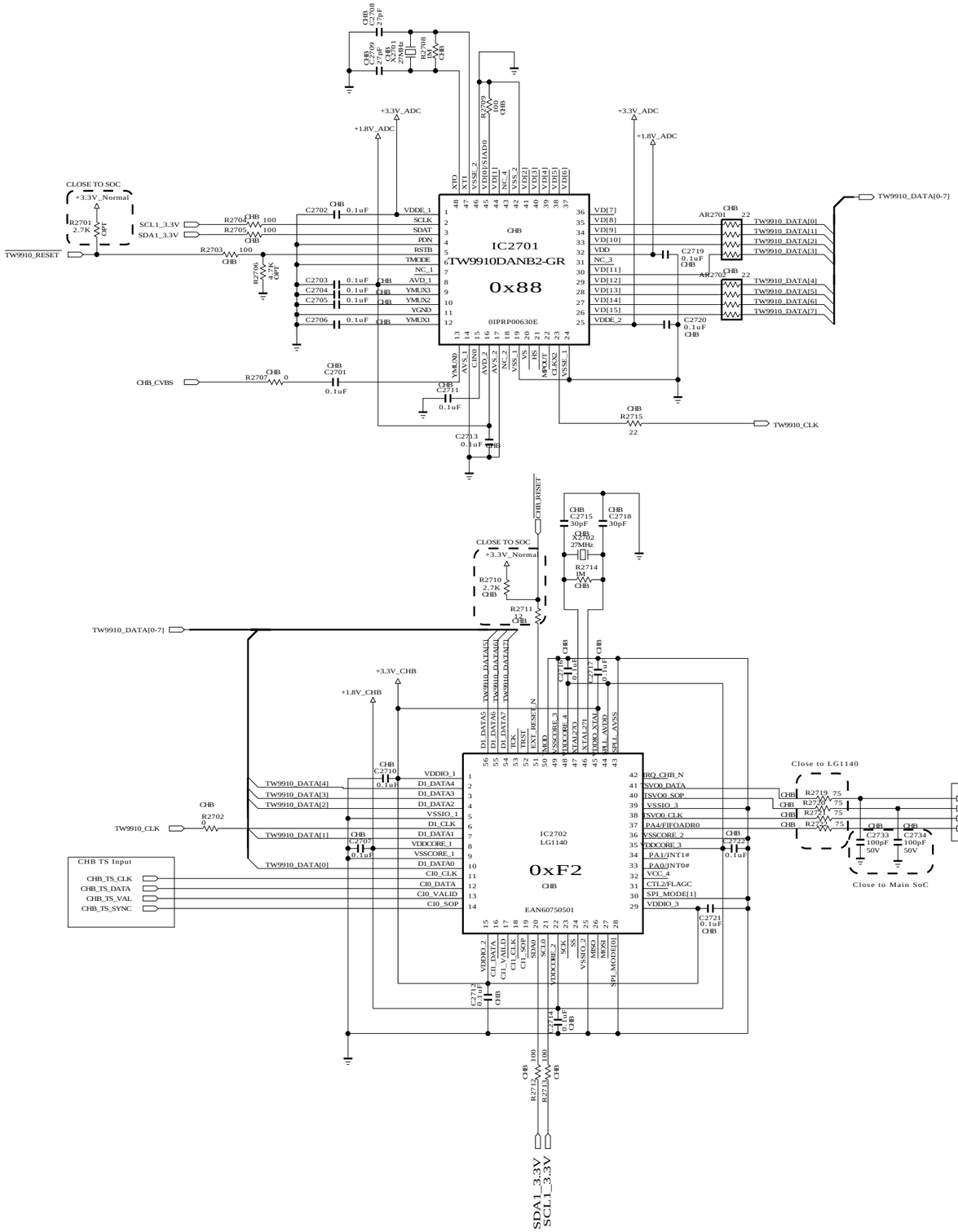
LGElectronics

LG ELECTRONICS

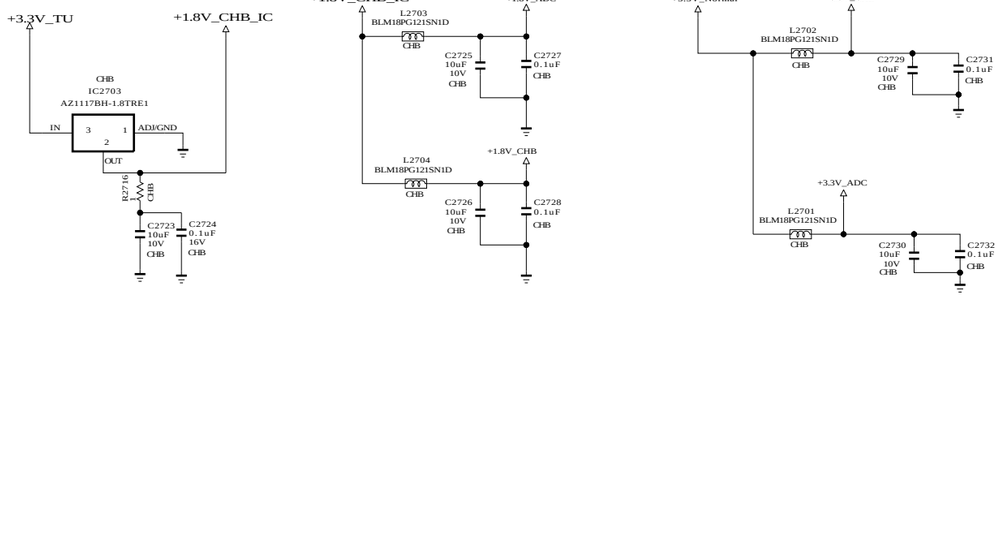
MODEL	BCM35230	DATE	
BLOCK	NON SCART	SHEET	26 / 50

CHANNEL BROWSER

DUAL COMPONENT	
IC2703	1ST : EAN61829801 2ND : EAN54428201



CHB OPTION



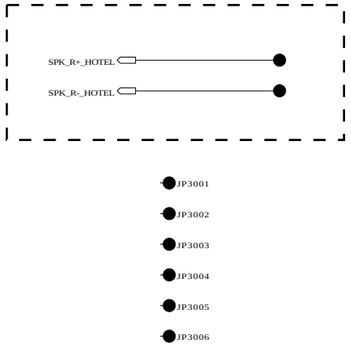
SECRET

LGElectronics

LG ELECTRONICS

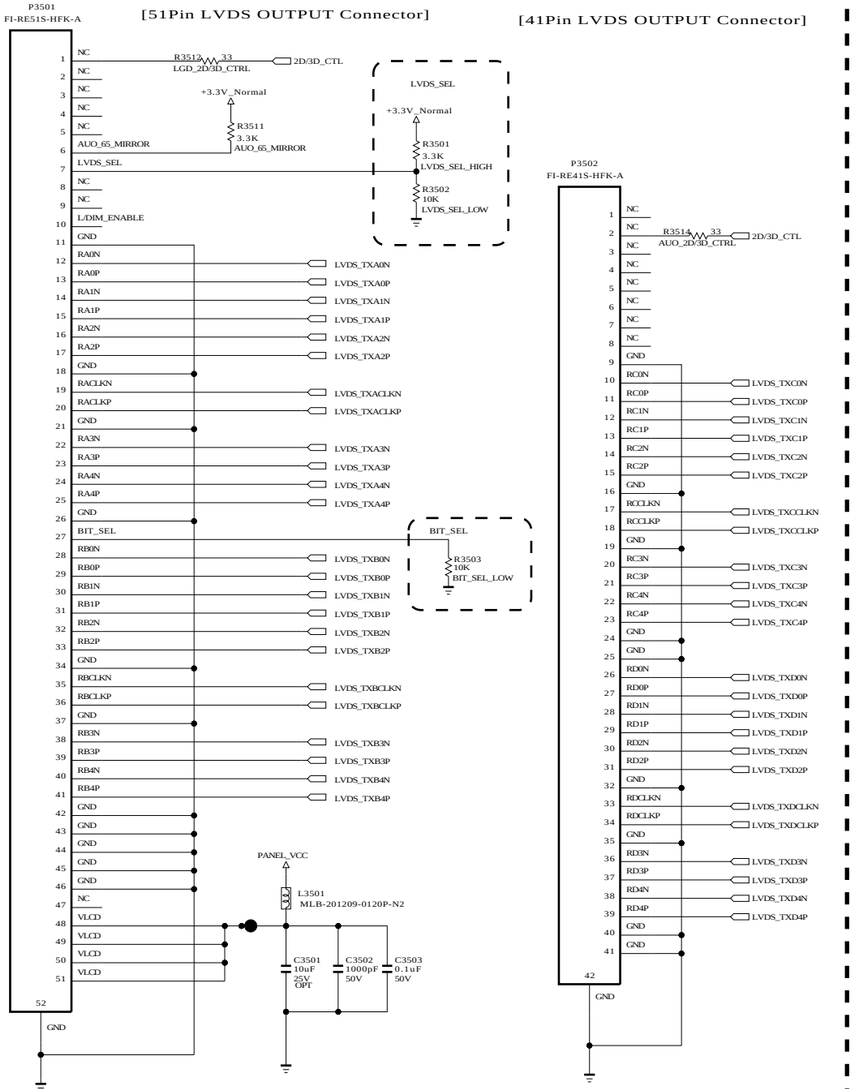
MODEL	BCM35230	DATE	
BLOCK	CHB	SHEET	27 / 50

NON CHINA HOTEL

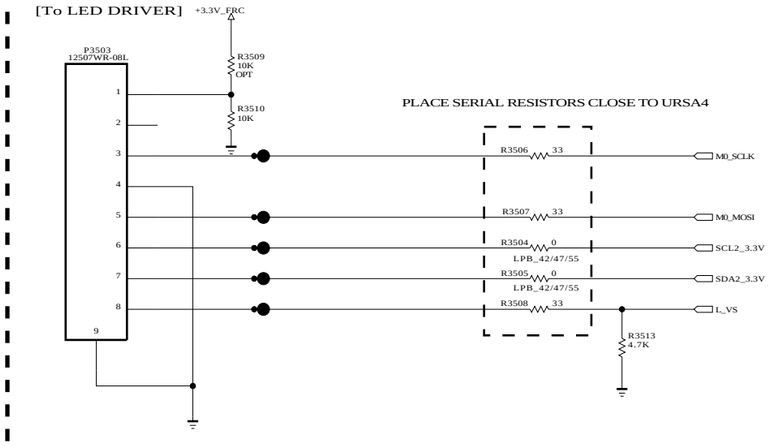


MODEL	BCM35230	DATE	
BLOCK	NON CHINA HOTEL	SHEET	30 / 50

LVDS



LOCAL DIMMING



NON USED L/DIMMING (FOR EDGE_LED)

MODEL	BCM35230	DATE	2010. 10. 20
BLOCK	Interface block	SHEET	35 / 58

+1.26V_FRC
L5205 CIC21J501NE
C5201 0.1uF
C5210 22uF 10V
C5211 22uF 10V
VDDC10
C5243 6.3V
C5225 0.1uF
C5228 0.1uF
+1.5V_FRC_DDR
C5213 0.1uF
C5244 0.22uF 6.3V
C5231 0.1uF
C5232 0.1uF
C5234 0.1uF
C5247 1uF 6.3V
+1.26V_FRC
L5201 CIC21J501NE
C5202 0.1uF
C5246 22uF 10V
C5206 0.1uF
DVDD_DDR_1V
Place Close to Bead
+3.3V_FRC
L5202 CIC21J501NE
C5203 0.1uF
C5207 0.1uF
VDD33
C5214 0.1uF
C5219 0.1uF
C5245 0.22uF 6.3V
VDD33 (VDDP)
+3.3V_FRC
L5206 CIC21J501NE
C5233 0.1uF
C5236 0.1uF
AVDD33
C5238 0.1uF
C5239 0.1uF
AVDD33
+3.3V_FRC
L5203 CIC21J501NE
C5204 0.1uF
C5208 0.1uF
AVDD_PLL
C5215 10uF 6.3V
C5217 0.1uF
AVDD_PLL
+3.3V_FRC
L5204 CIC21J501NE
C5205 0.1uF
C5209 0.1uF
AVDD_LVDS_3.3V
C5216 0.1uF
C5220 0.1uF
C5223 0.1uF
C5227 0.1uF
AVDD_LVDS_3.3V

GPIO1 : HI => B8/94, LOW => B4/98
CHIP_CONF : {GPIO8, PWM1, PWM0}
CHIP_CONF = 3'd5 : boot from interal SRAM
CHIP_CONF = 3'd6 : boot from EEPROM
CHIP_CONF = 3'd7 : boot from SPI Flash

URSA5 CONFIGURATION
+3.3V_FRC
R5210 10K
R5211 10K
R5212 10K
R5213 10K
PWM0
PWM1
GPIO[8]
GPIO[1]
R5208 10K
R5209 10K OPT
R5214 10K OPT
R5215 10K

URSA5 H/W OPTION
+3.3V_FRC
LVDS_EXT_URSA5 32/37
R5216 10K
R5217 10K
R5218 10K OPT
R5219 10K
URSA_MODEL_OPT_0
URSA_MODEL_OPT_1
URSA_MODEL_OPT_2
2D/3D_CTL
LVDS_S7M_PLUS 24/19/5
R5206 10K
R5207 10K OPT
R5208 10K
R5209 10K
L/DIM_EDGE 24/7/5
R5210 10K
R5211 10K
R5212 10K OPT
R5213 10K

MODEL OPTION

PIN NAME	PIN NO.	HIGH	LOW
MODEL_OPT_0	D10	L/DIM_10BLOCK	L/DIM_16BLOCK
MODEL_OPT_1	D11	RESERVED	RESERVED
MODEL_OPT_2	D12	LVDS_EXT_URSA5	LVDS_S7M_PLUS
MODEL_OPT_3	D13	RESERVED	RESERVED

Debugging for URSA5
P5201
12507WR-04L
URSA5_DEBUG
URSA5_DEBUG R5201 22 SCL2_+3.3V_DB
URSA5_DEBUG R5202 22 SDA2_+3.3V_DB
SW5201 JS2235S
SCL2_3.3V R5258 0 URSA5_MP
SCL2_+3.3V_URSA R5260 0 OPT
SCL2_+3.3V_DB
SDA2_3.3V R5259 0 URSA5_MP
SDA2_+3.3V_URSA R5261 0 OPT
SDA2_+3.3V_DB

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PLACE TERMINATION RESISTORS CLOSE TO URSA5

IC5201
LGE7303C

[SPI FLASH(2Mbit)]
+3.3V_FRC
IC5202
W25X20BVSNIG
R5244 4.7K
R5246 10K
SPI_CS
SPI_DO
R5245 33
CS DO WP GND VCC HOLD CLK DIO
R5252 3.3K
SPI_SCLK
SPI_DI
URSA5_FLASH_WINBOND_2M

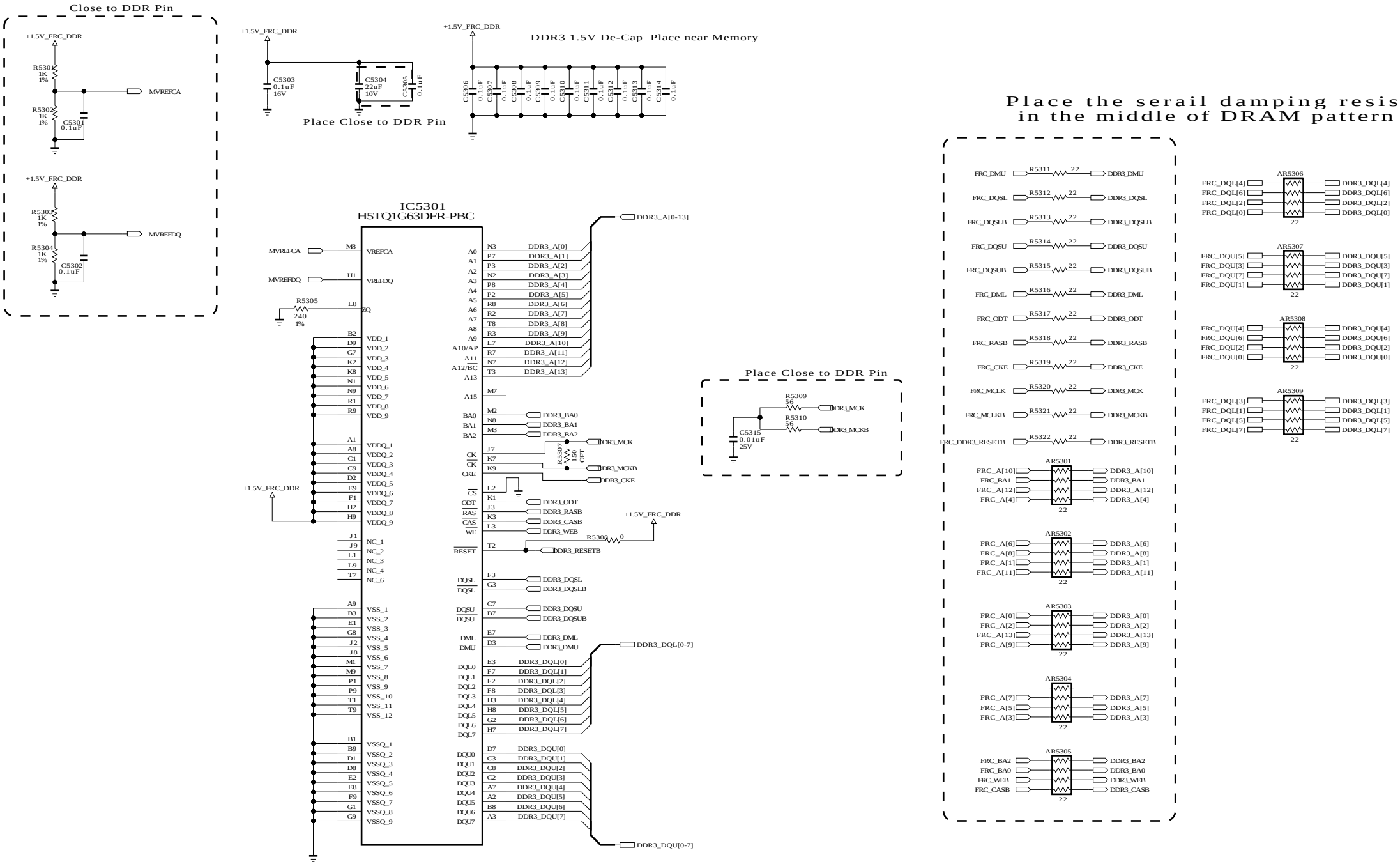
IC5202-*1
MX25L2006EM1I-12G, HF
CS SO/SIO1 WP GND VCC HOLD SCL SI/S
URSA5_FLASH_MACRONIX_2M

NON USED
BCM35230 LVDS CHC/D
TXC0N TXC0P TXC1N TXC1P TXC2N TXC2P TXCCLKN TXCCLKP TXC3N TXC3P TXC4N TXC4P TXD0N TXD0P TXD1N TXD1P TXD2N TXD2P TXDCLKN TXDCLKP TXD3N TXD3P TXD4N TXD4P

MODEL	MStar URSA5	DATE	2010. 08.18
BLOCK	FRC block	SHEET	52 / 55

SECRET
LGElectronics

LG ELECTRONICS



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

SECRET

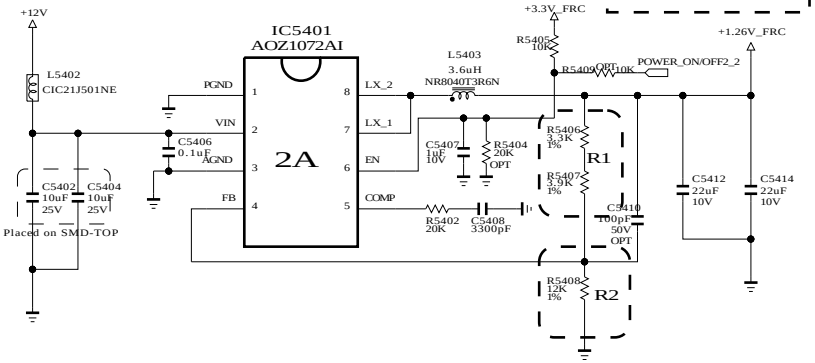
LGElectronics

LG ELECTRONICS

MODEL	MStar URSA5	DATE	2010. 08.18
BLOCK	DDR3 4Mbit	SHEET	53 / 55

CORE +1.26V_FRC

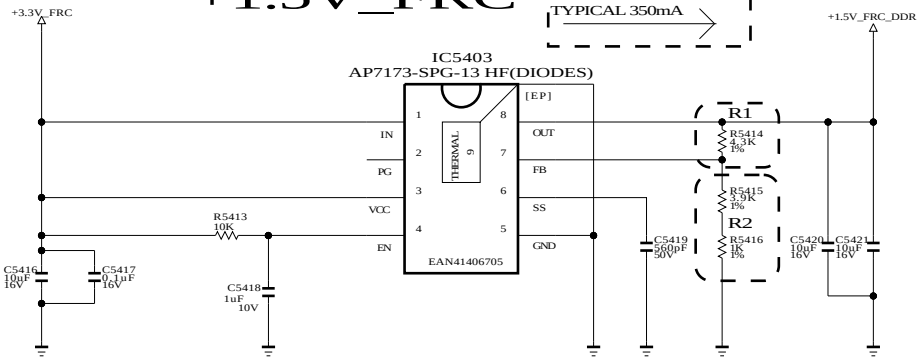
TYPICAL 980mA



Vout=(1+R1/R2)*0.8

+1.5V_FRC

TYPICAL 350mA

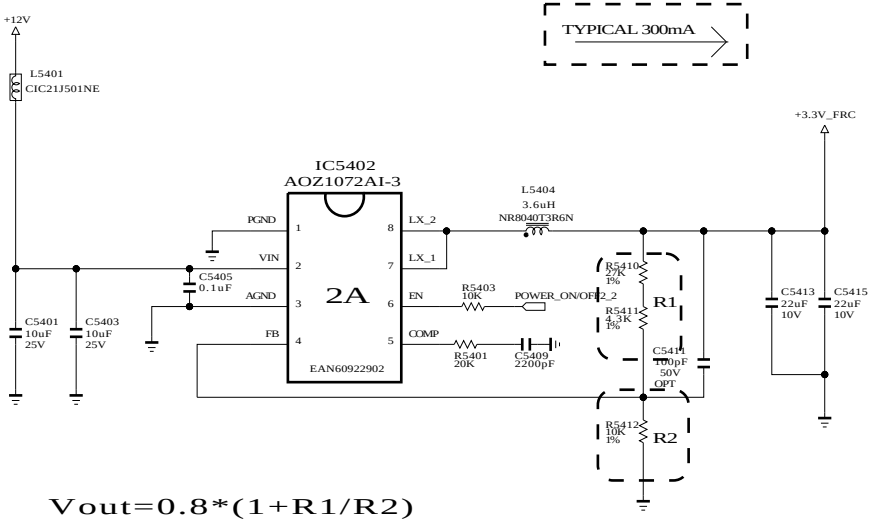


Vout=0.6*(1+R1/R2)

+1.5V of DDR&URSA5 uses same power line

+3.3V_FRC

TYPICAL 300mA

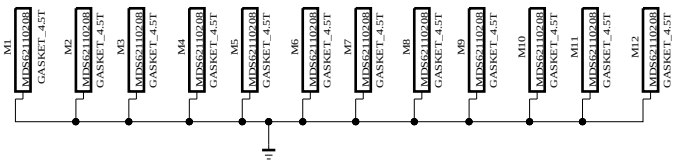


Vout=0.8*(1+R1/R2)

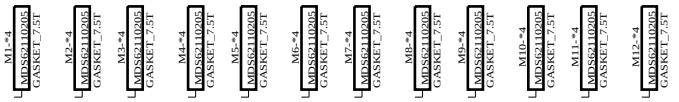
THE ⚠5 SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFATURES SPECFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠1 SYMBOL MARK OF THE SCHEMETIC.

SMD GASKET

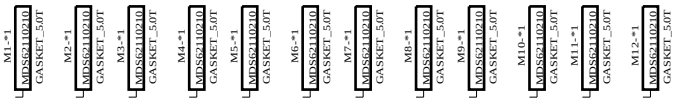
SMD GASKET 4.5T



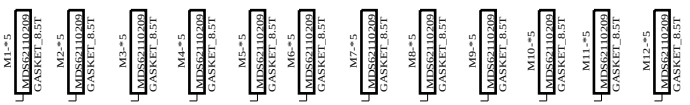
SMD GASKET 7.5T



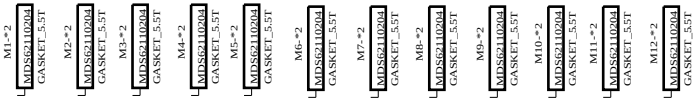
SMD GASKET 5.0T



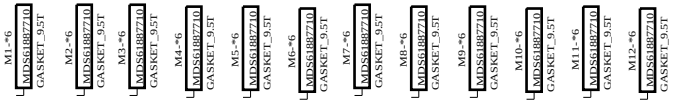
SMD GASKET 8.5T



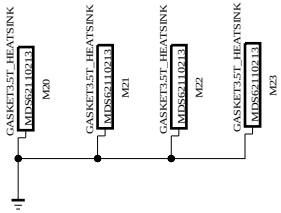
SMD GASKET 5.5T



SMD GASKET 9.5T



SMD GASKET 6.5T



THE ⚠5⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFATURES SPECFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠!⚠ SYMBOL MARK OF THE SCHEMETIC.

SECRET

LGElectronics

LG ELECTRONICS

MODEL	BCM35230	DATE	2010. 09. 18
BLOCK	SMD GASKET	SHEET	56 / 56


LG Electronics Inc.

GP3-BCM (3D FPR/ATSC) trouble shooting guide

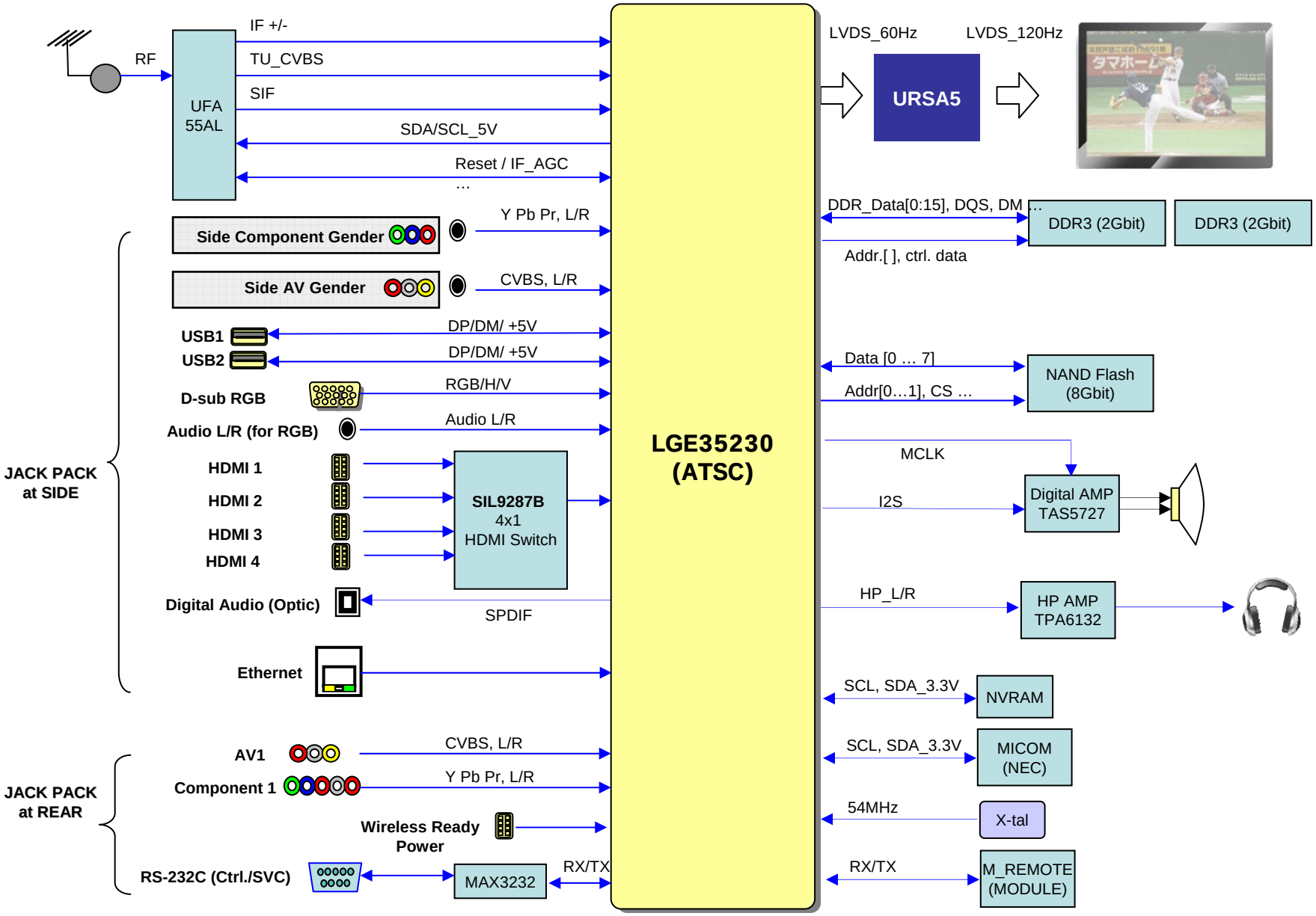
Applied chassis & models

Chassis: LA12C
Models : 47/55LW6500-UA

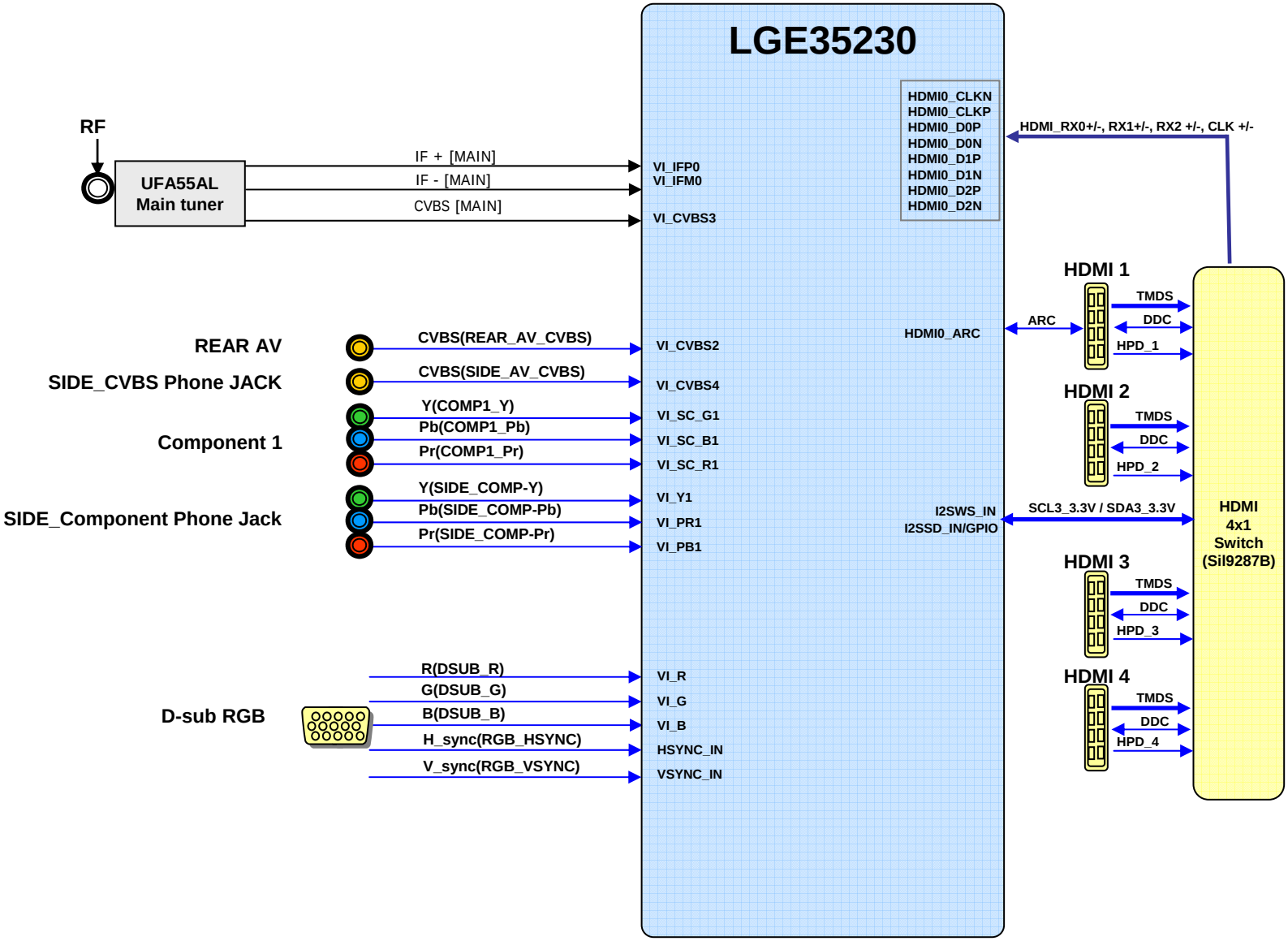
2010. 12. 28.

LCD TV Division
LCD TV Lab. / AT1Gr.

1. Overview for LGE35230 (ATSC) - US

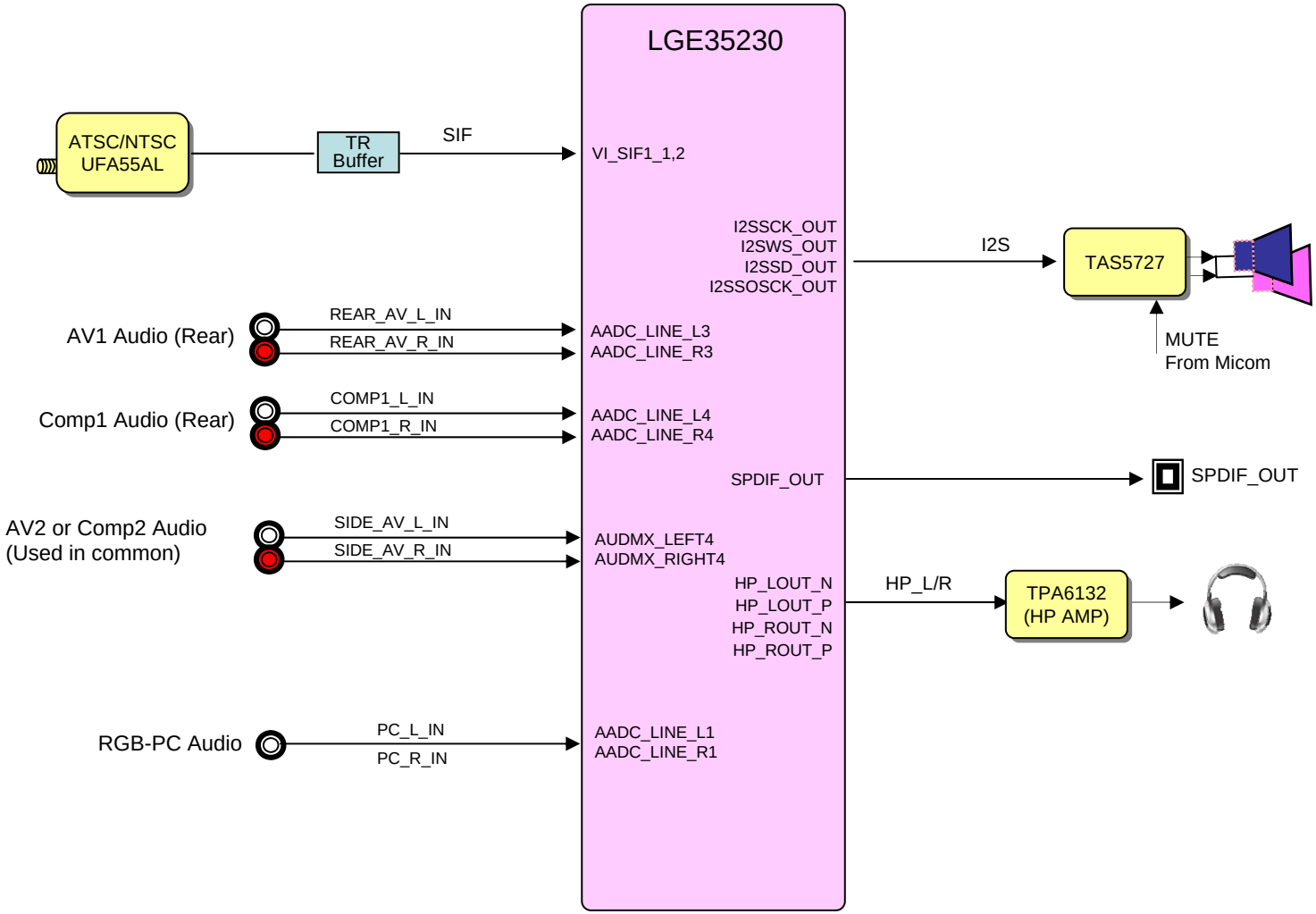


2. Video Signal block



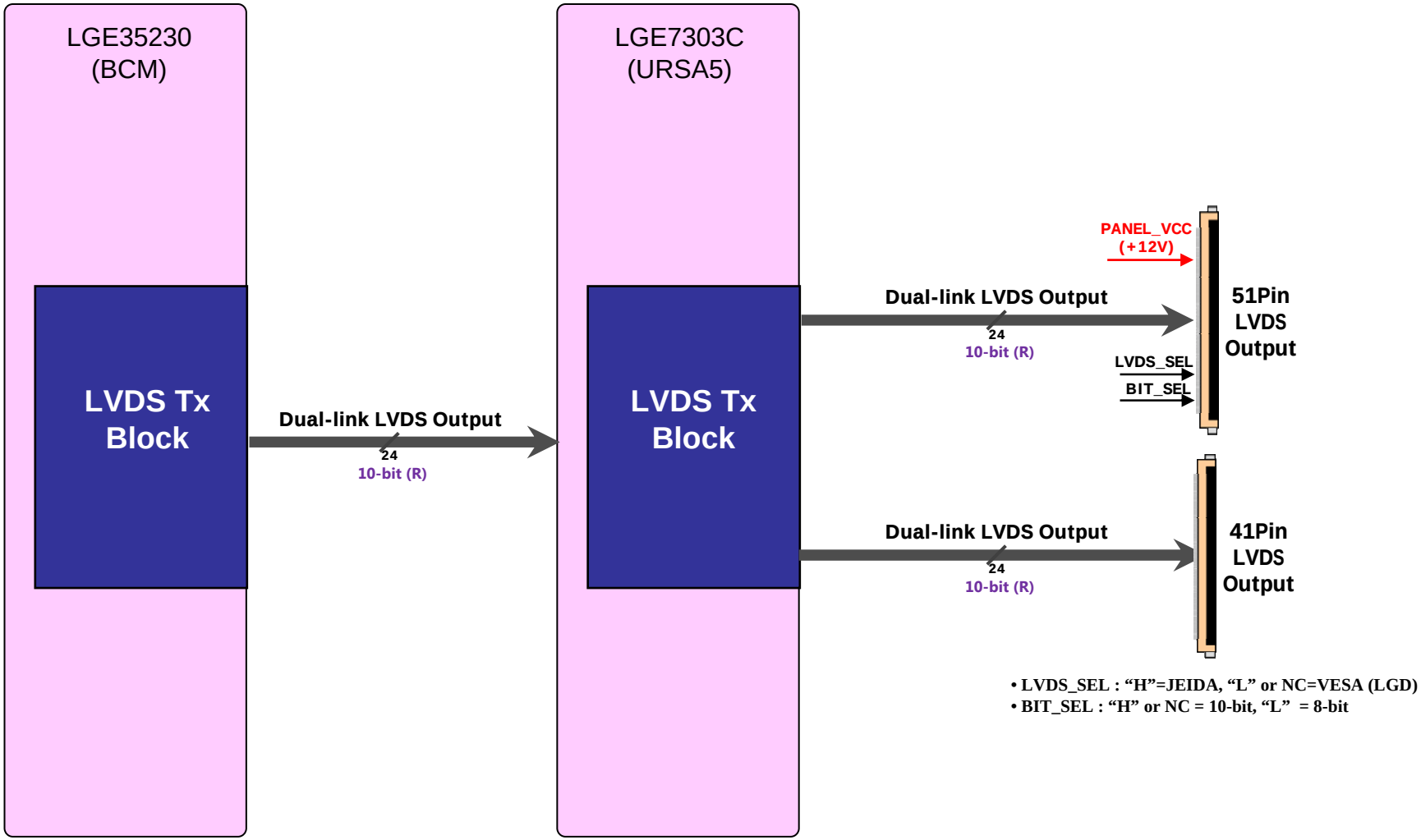
*** Each of analog audio signals shall be designed with “Common Mode (INCM) signal ”**

3. Audio Signal block



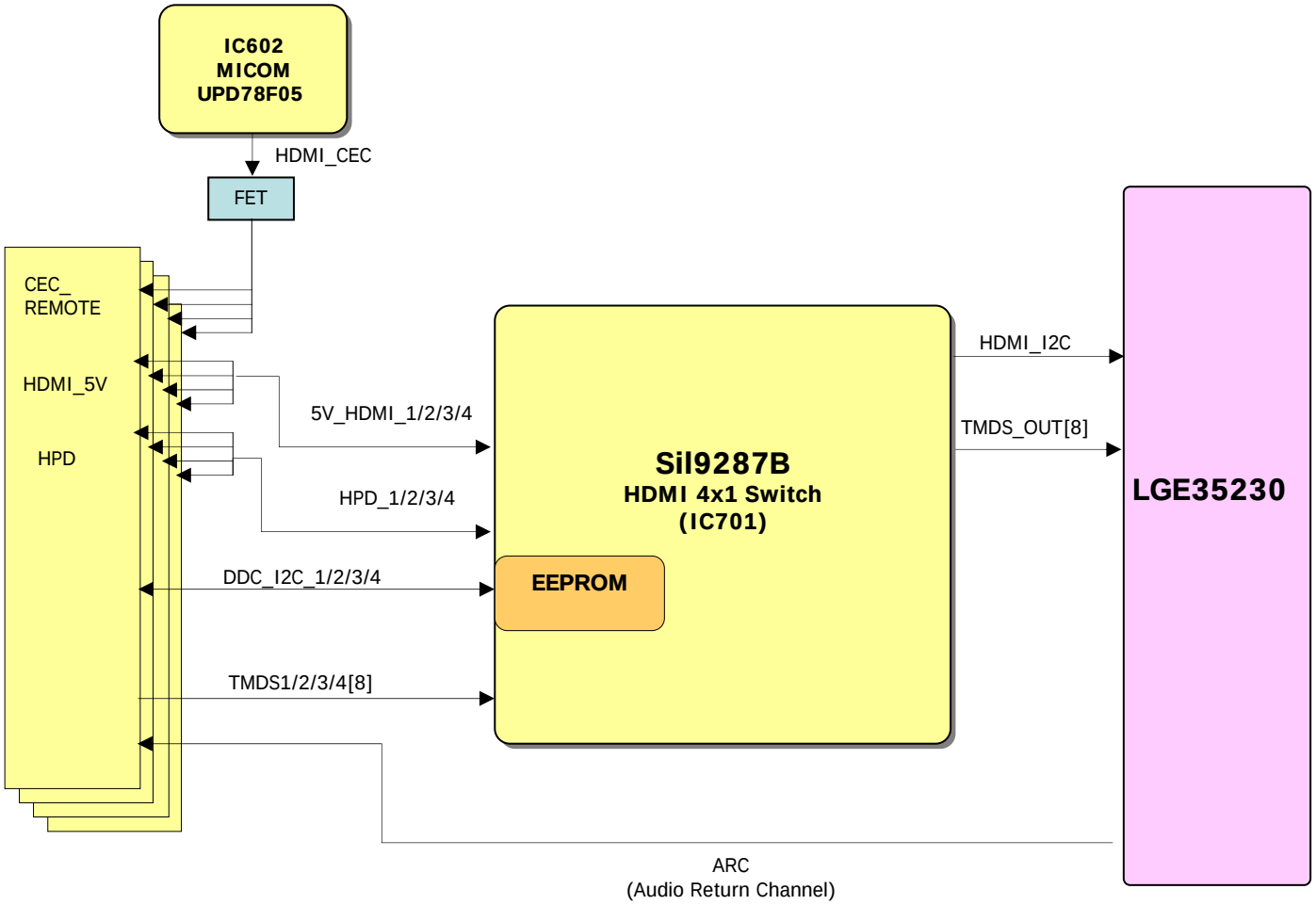
*** Each of analog signals shall be designed with “Common Mode (INCM) signal ”**

4. LVDS Tx (FHD120Hz)

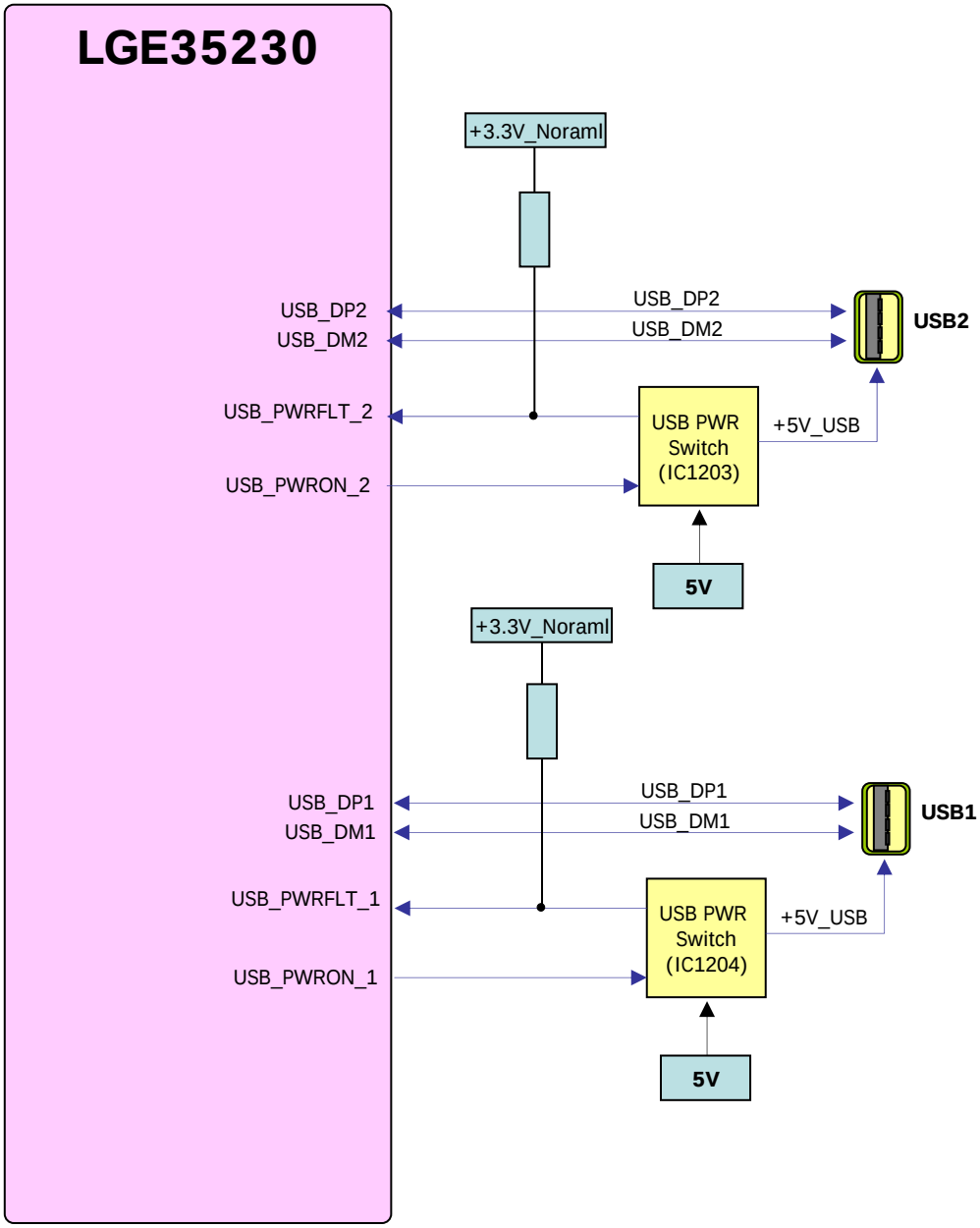


• LVDS_SEL : “H”=JEIDA, “L” or NC=VESA (LGD)
• BIT_SEL : “H” or NC = 10-bit, “L” = 8-bit

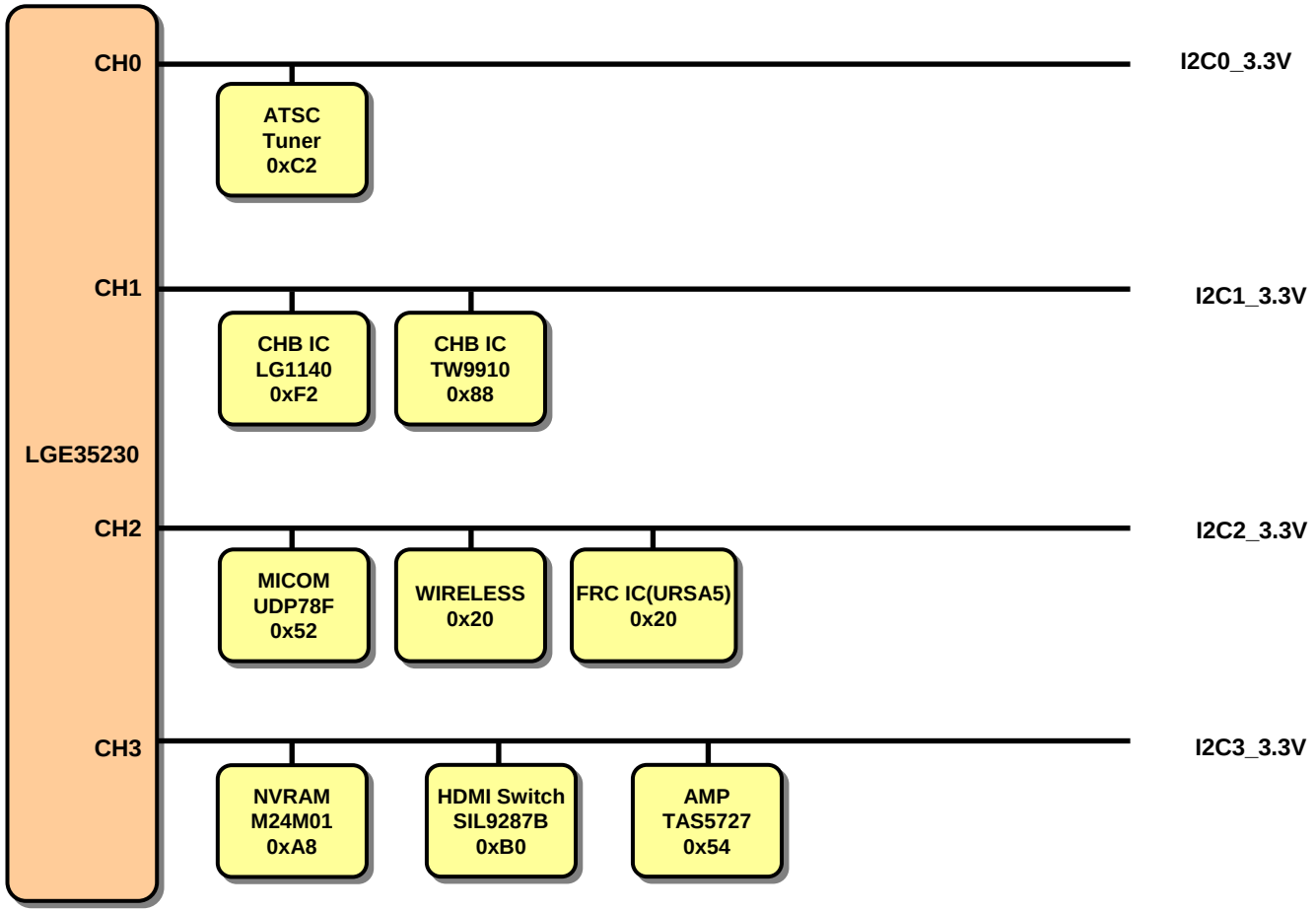
5. HDMI block



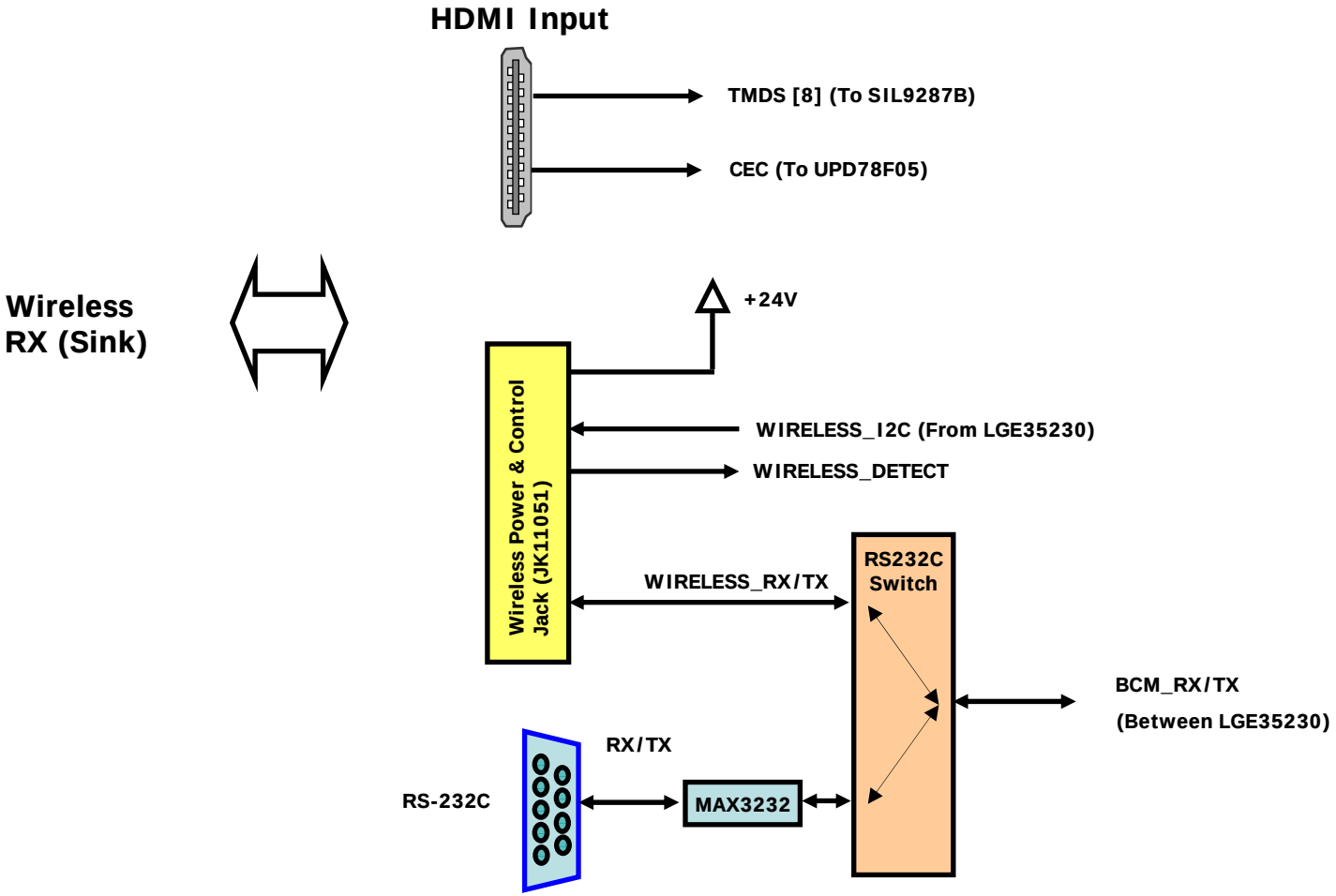
6. USB block



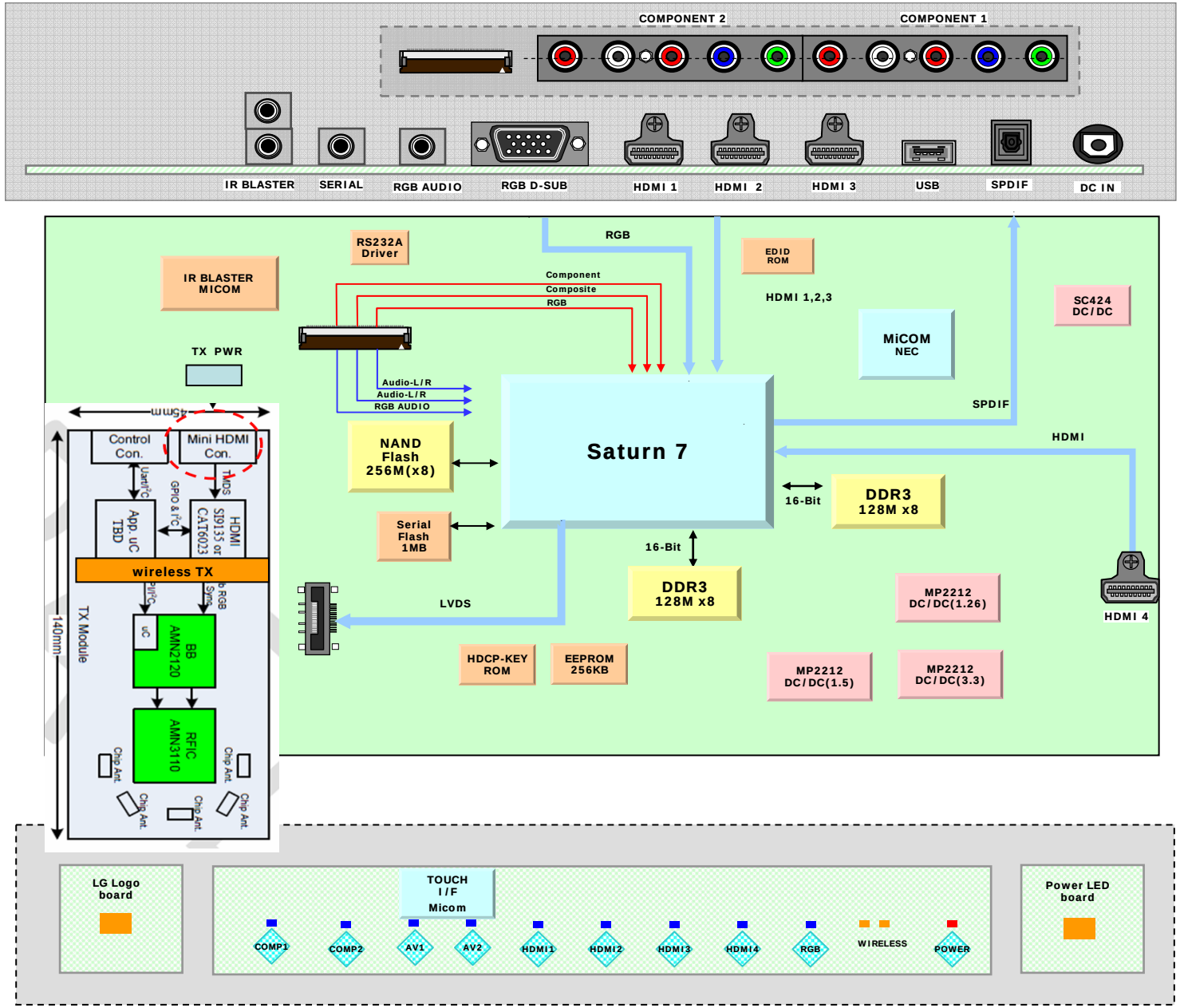
7. I²C Connections



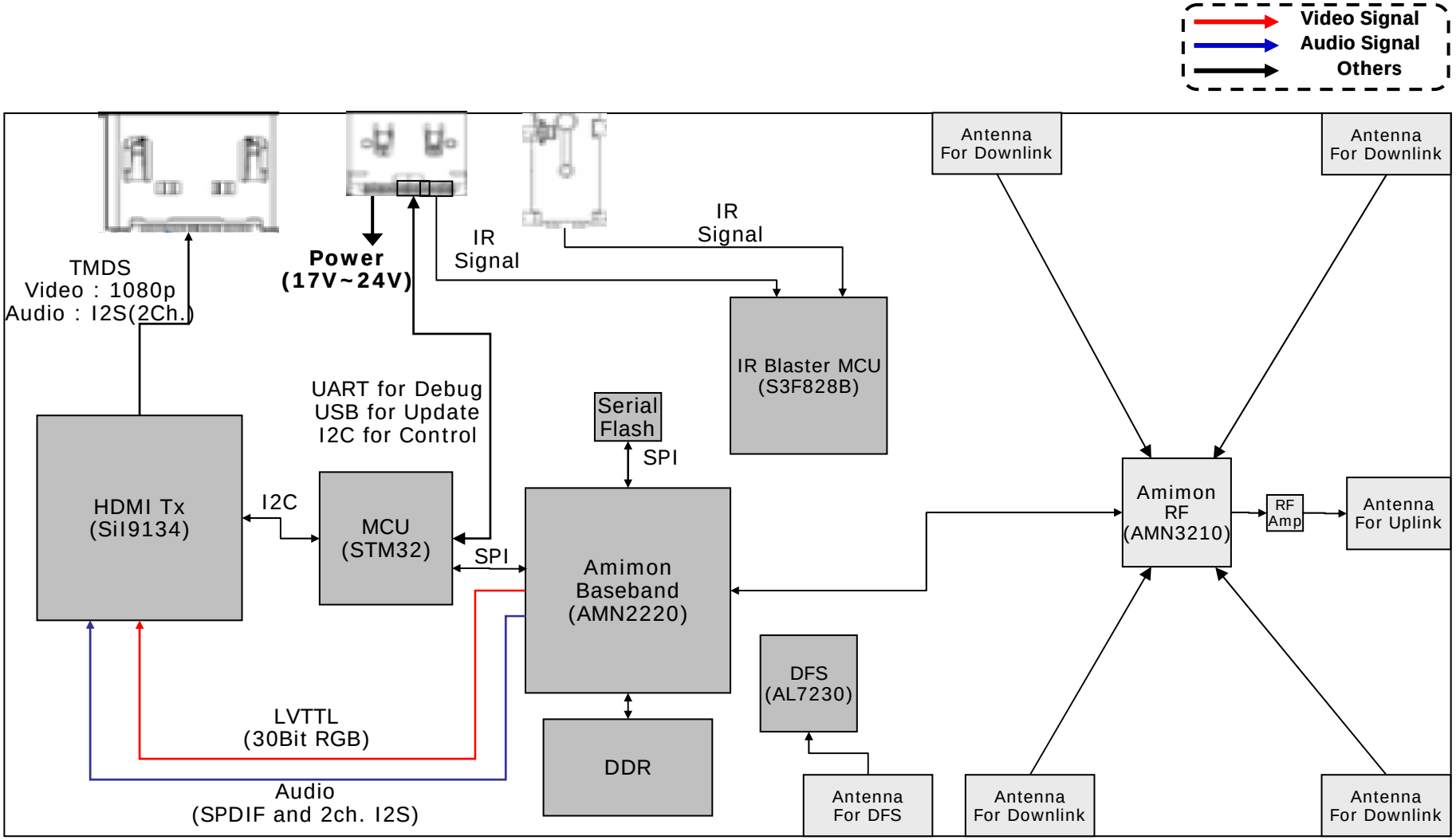
8. Wireless ready



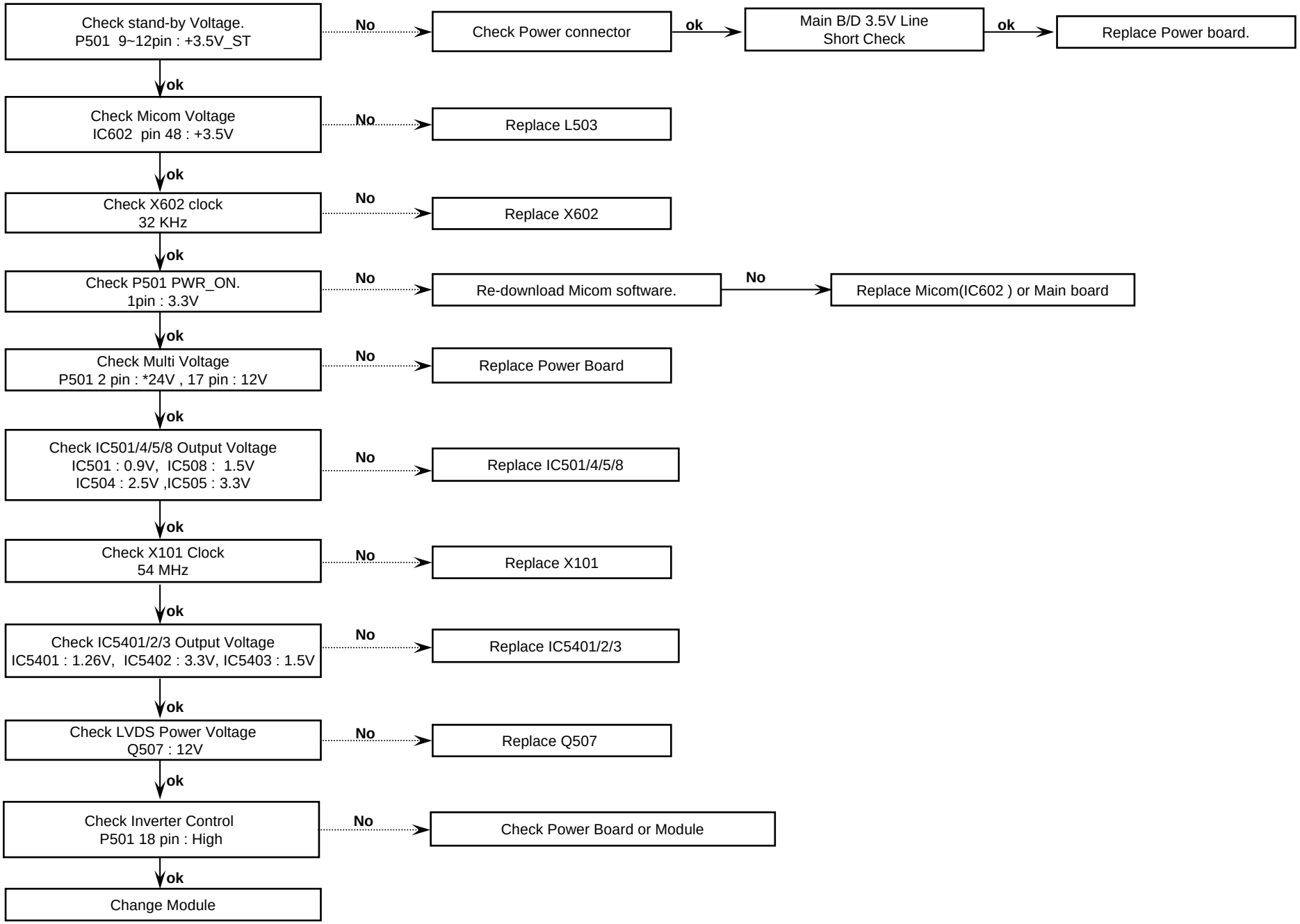
9. Wireless TX (Source) – AV BOX



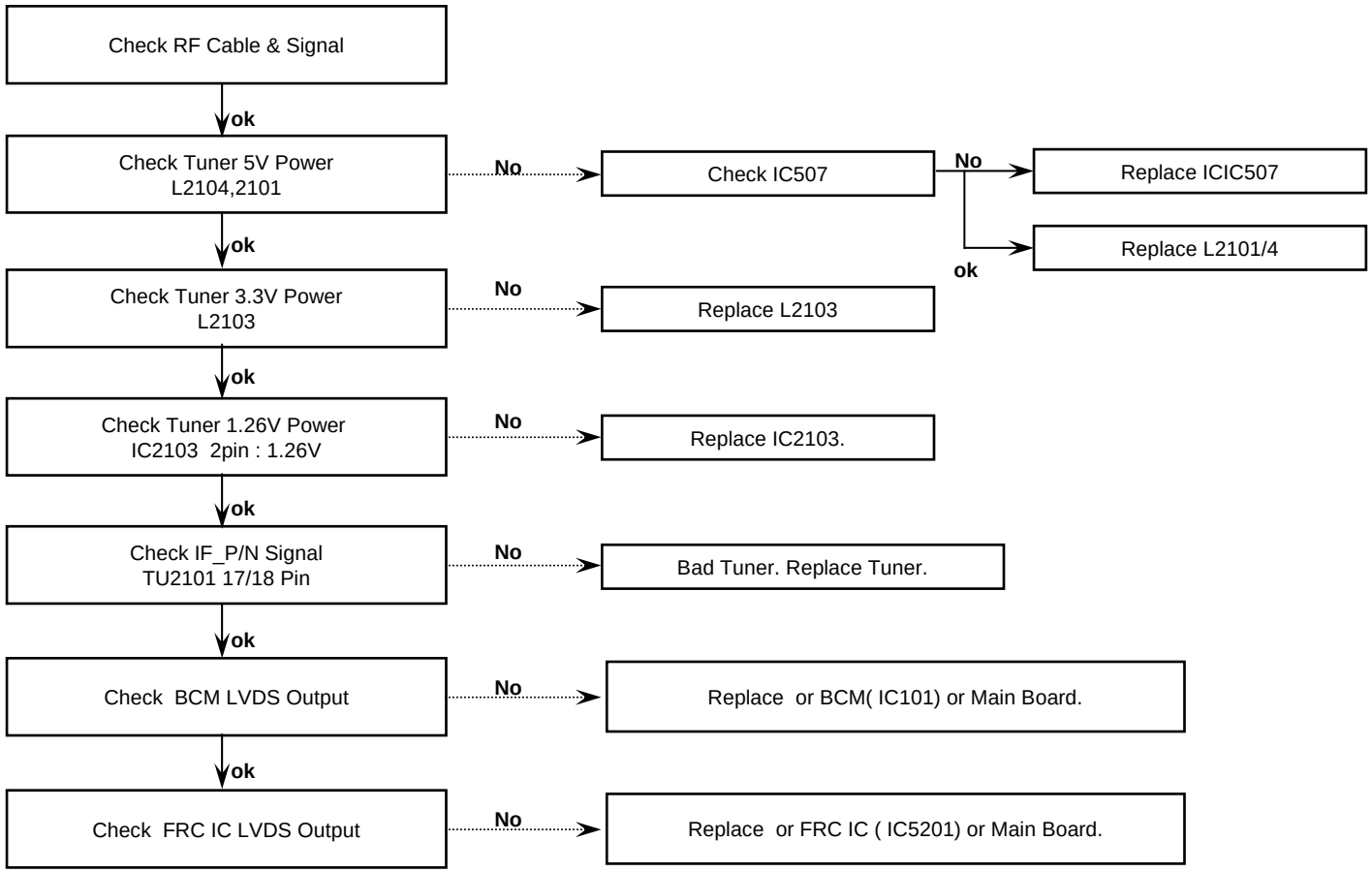
10. Wireless RX (Sink)



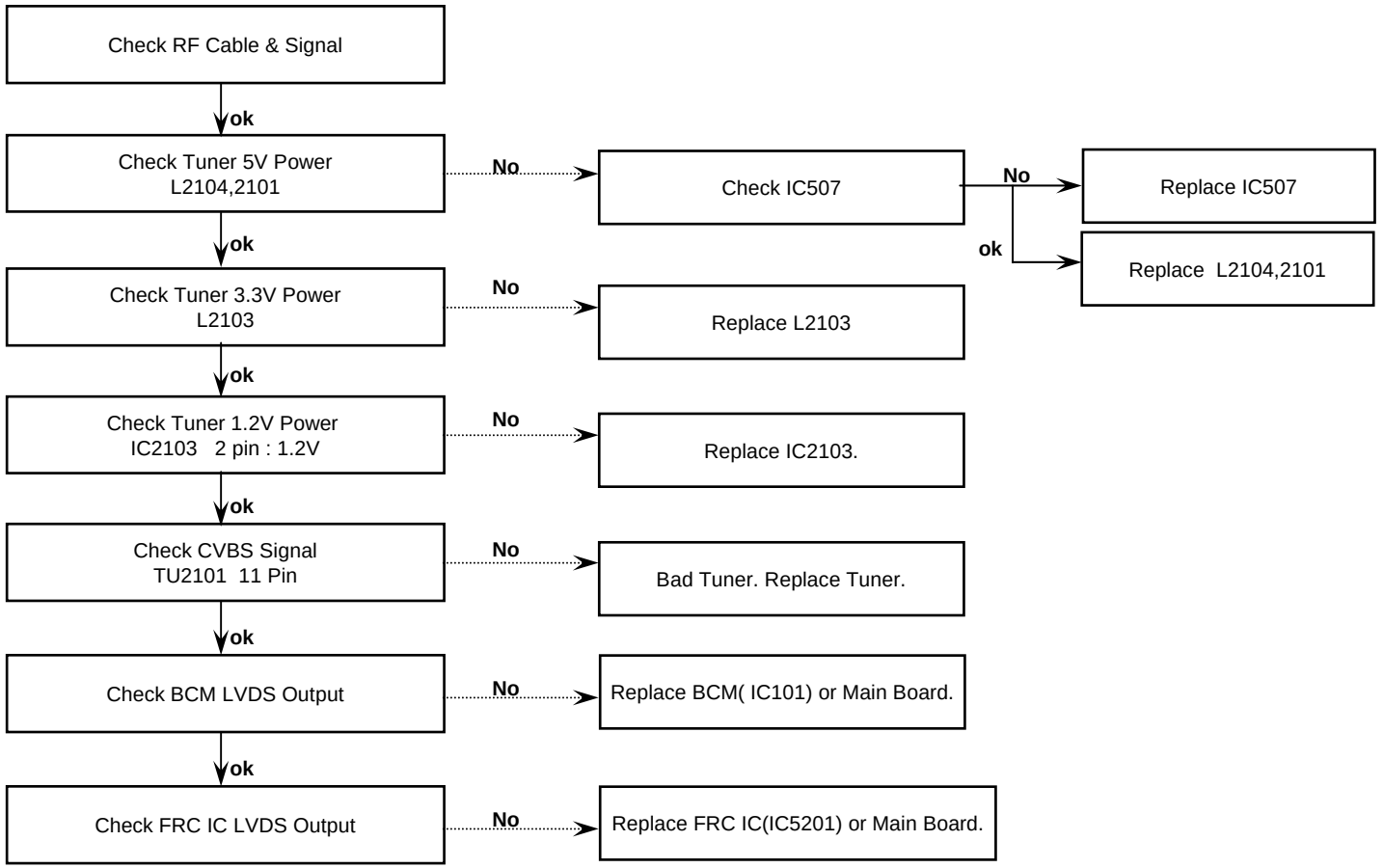
1. Trouble shooting - No power



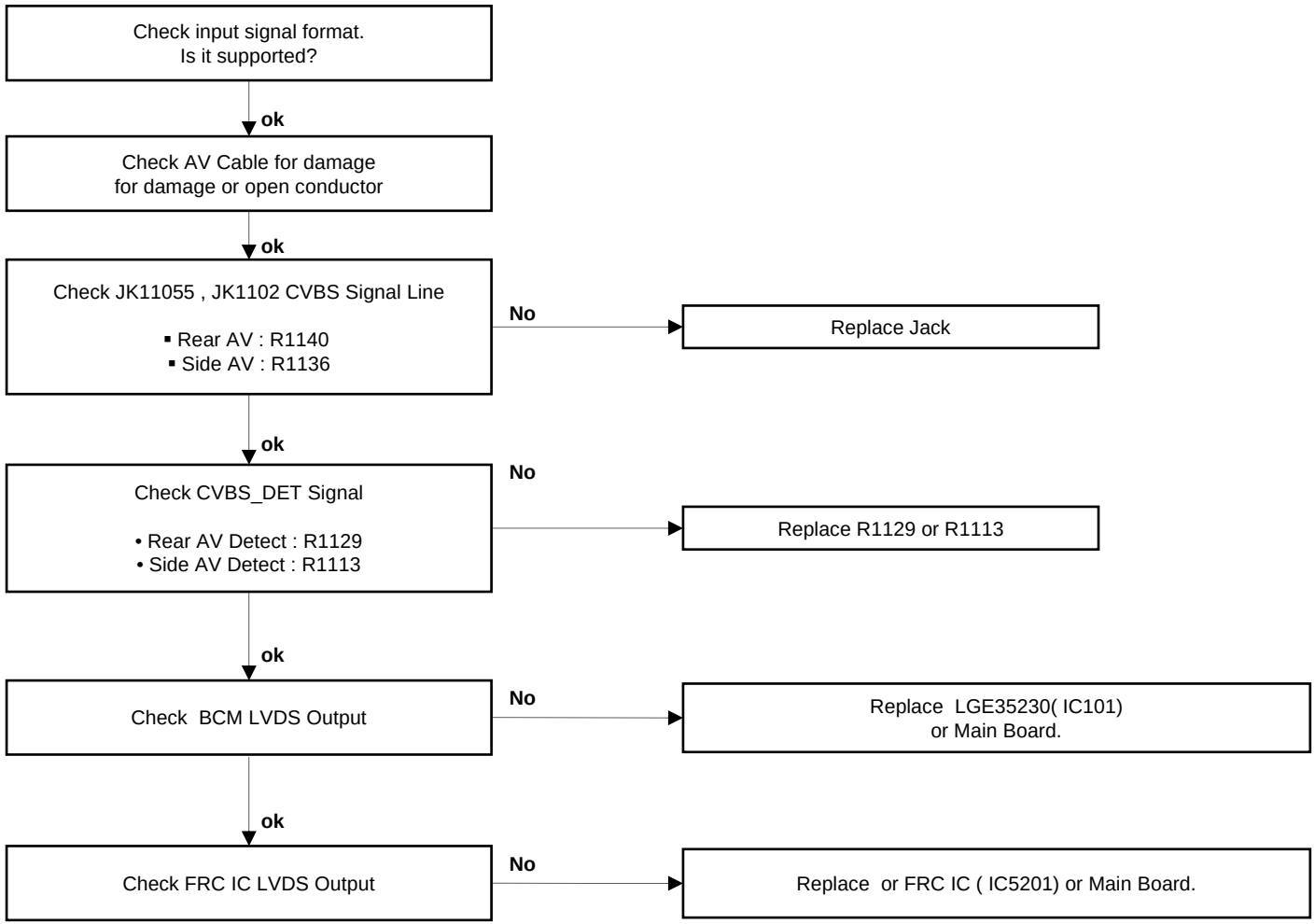
2. Trouble shooting - No video (Digital TV video)



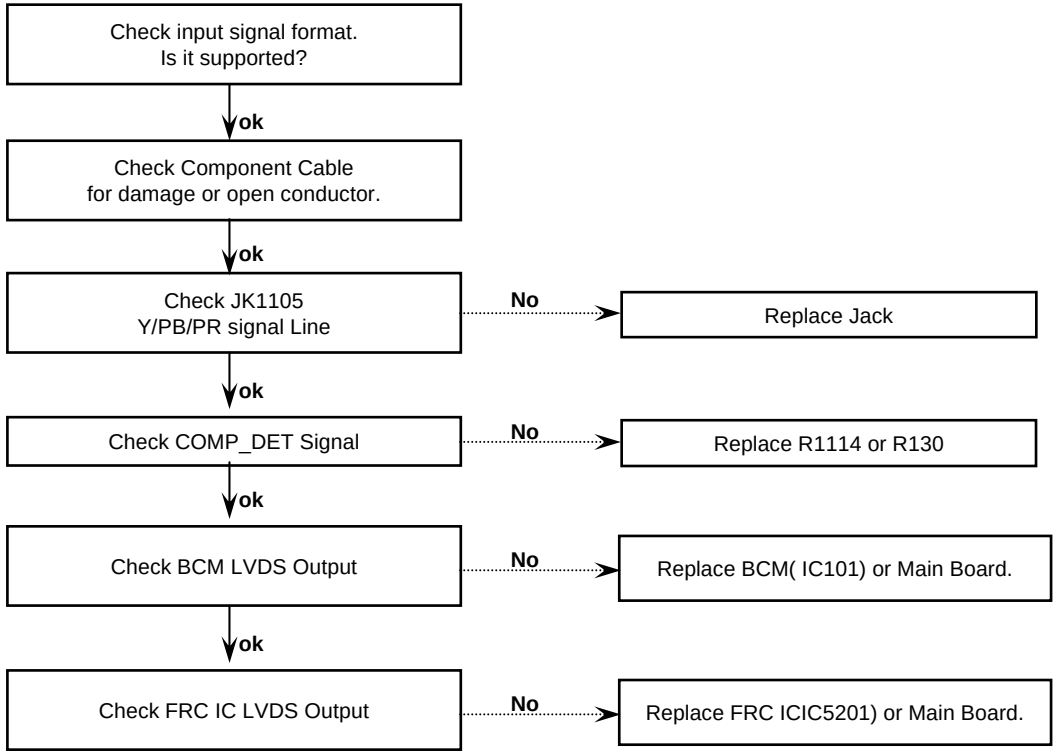
3. Trouble shooting - No video (Analog TV video)



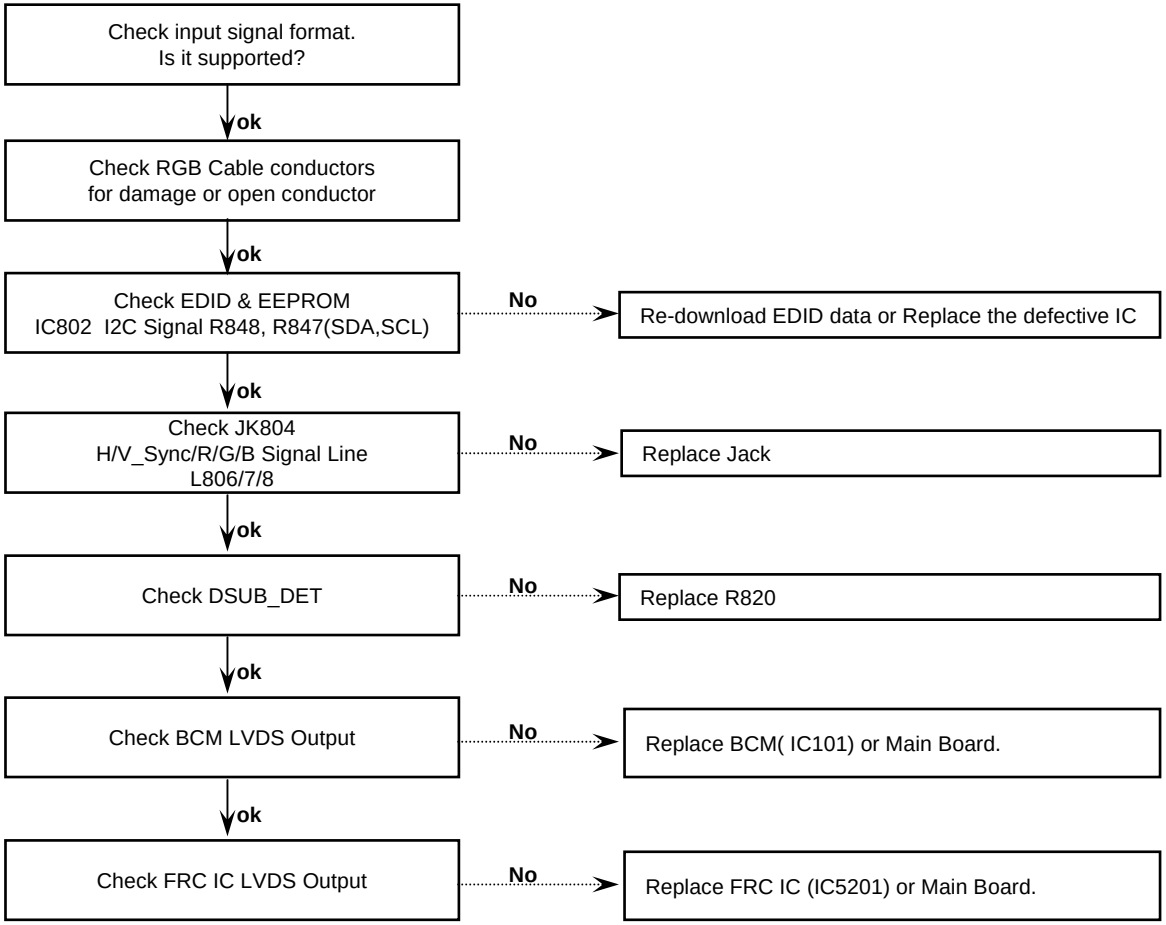
4. Trouble shooting - No video (AV)



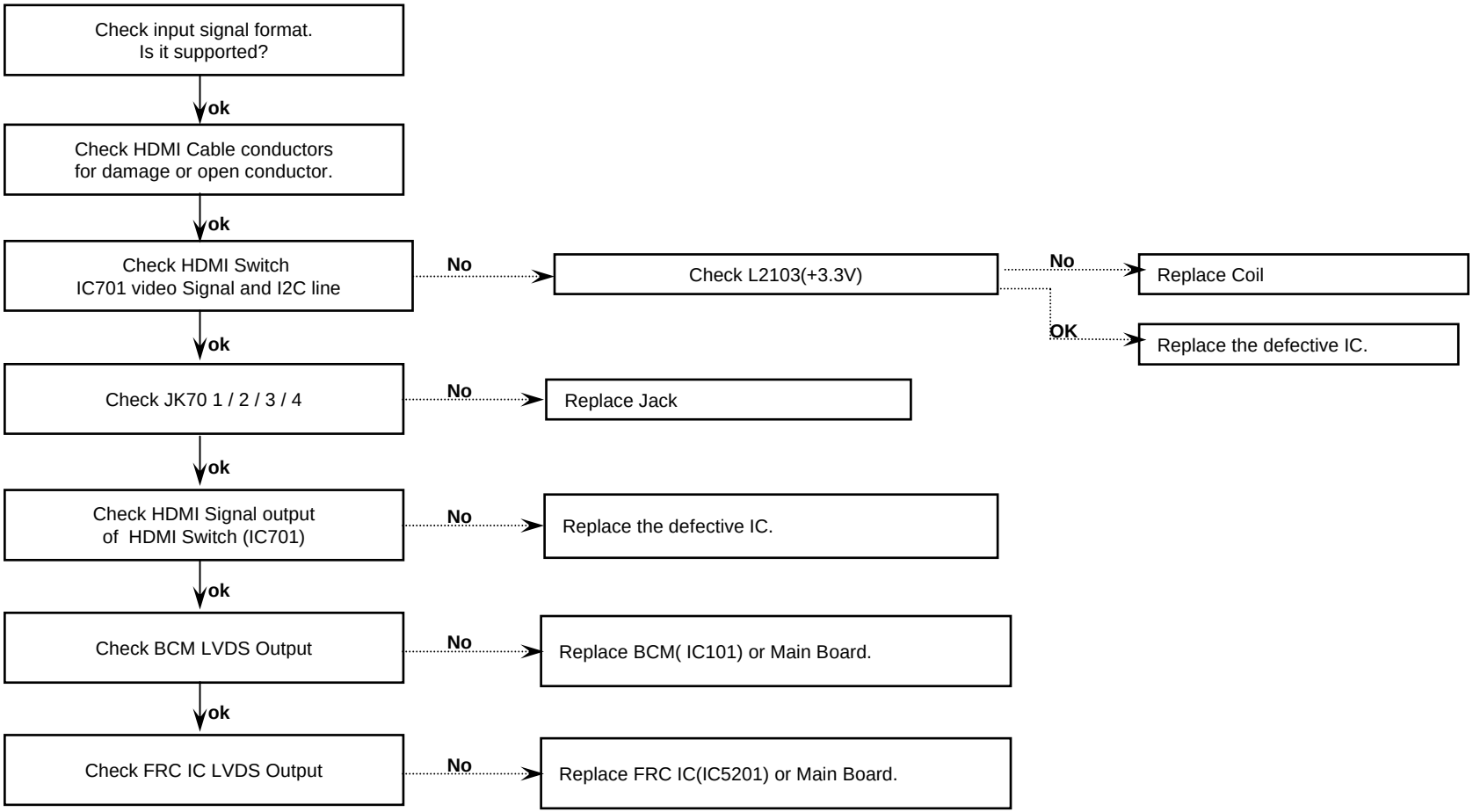
5. Trouble shooting - No video (Component)



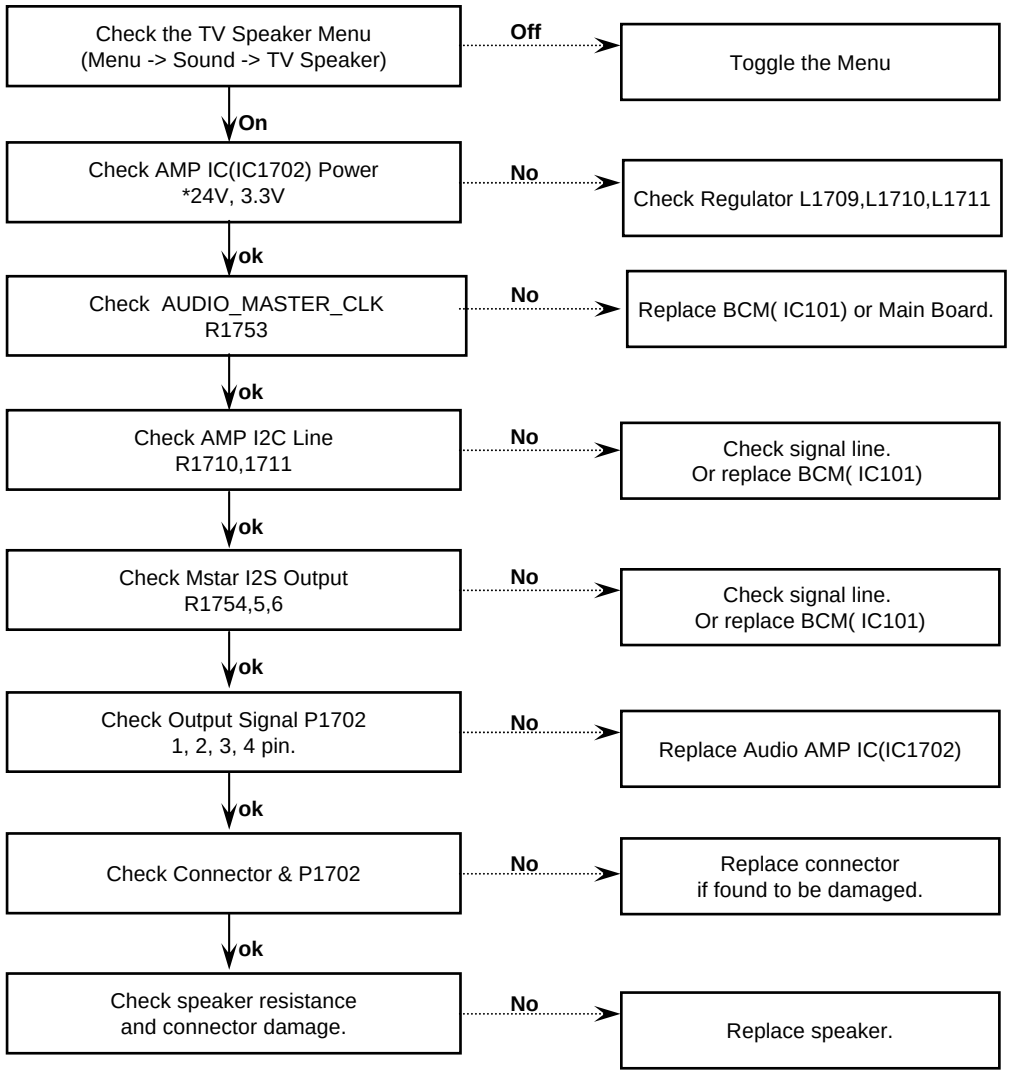
6. Trouble shooting - No video (RGB-PC)



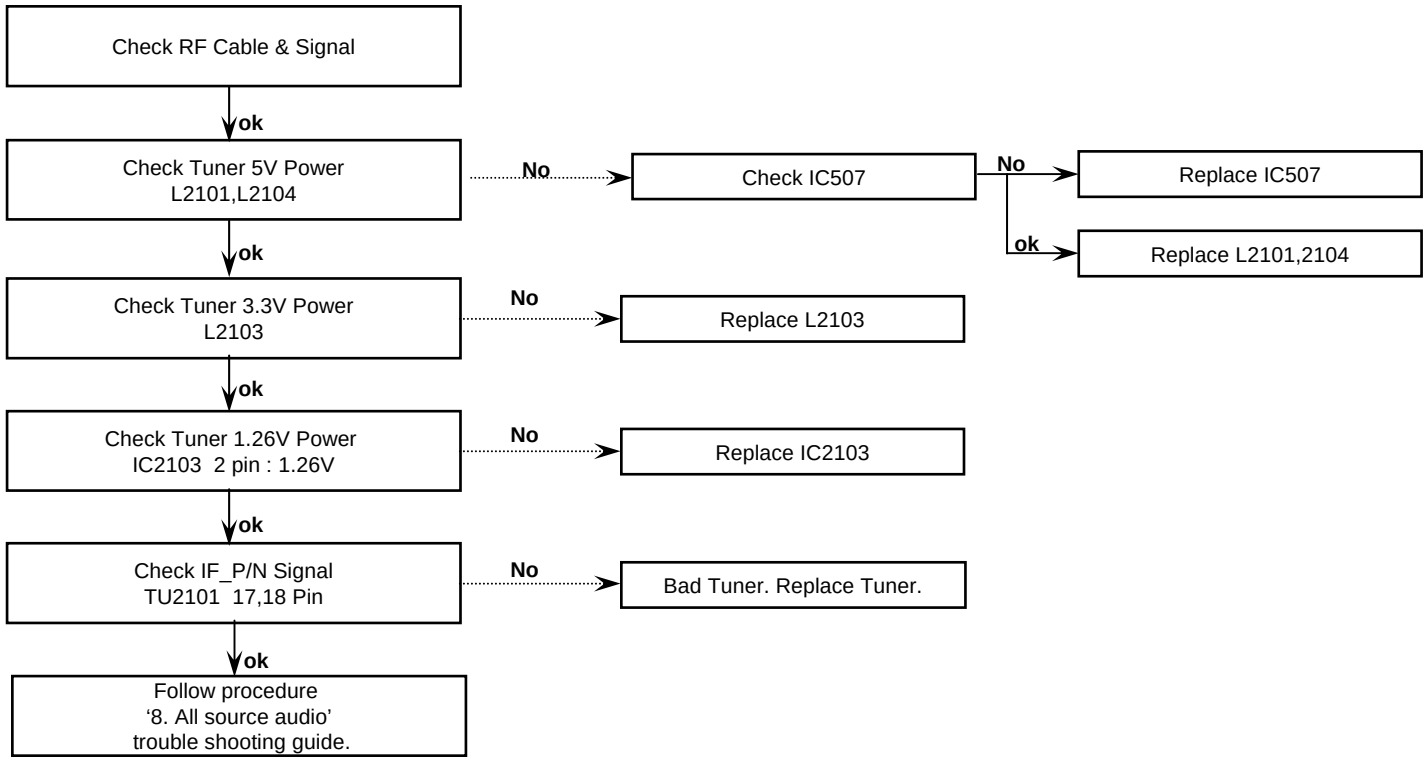
7. Trouble shooting - No video (HDMI)



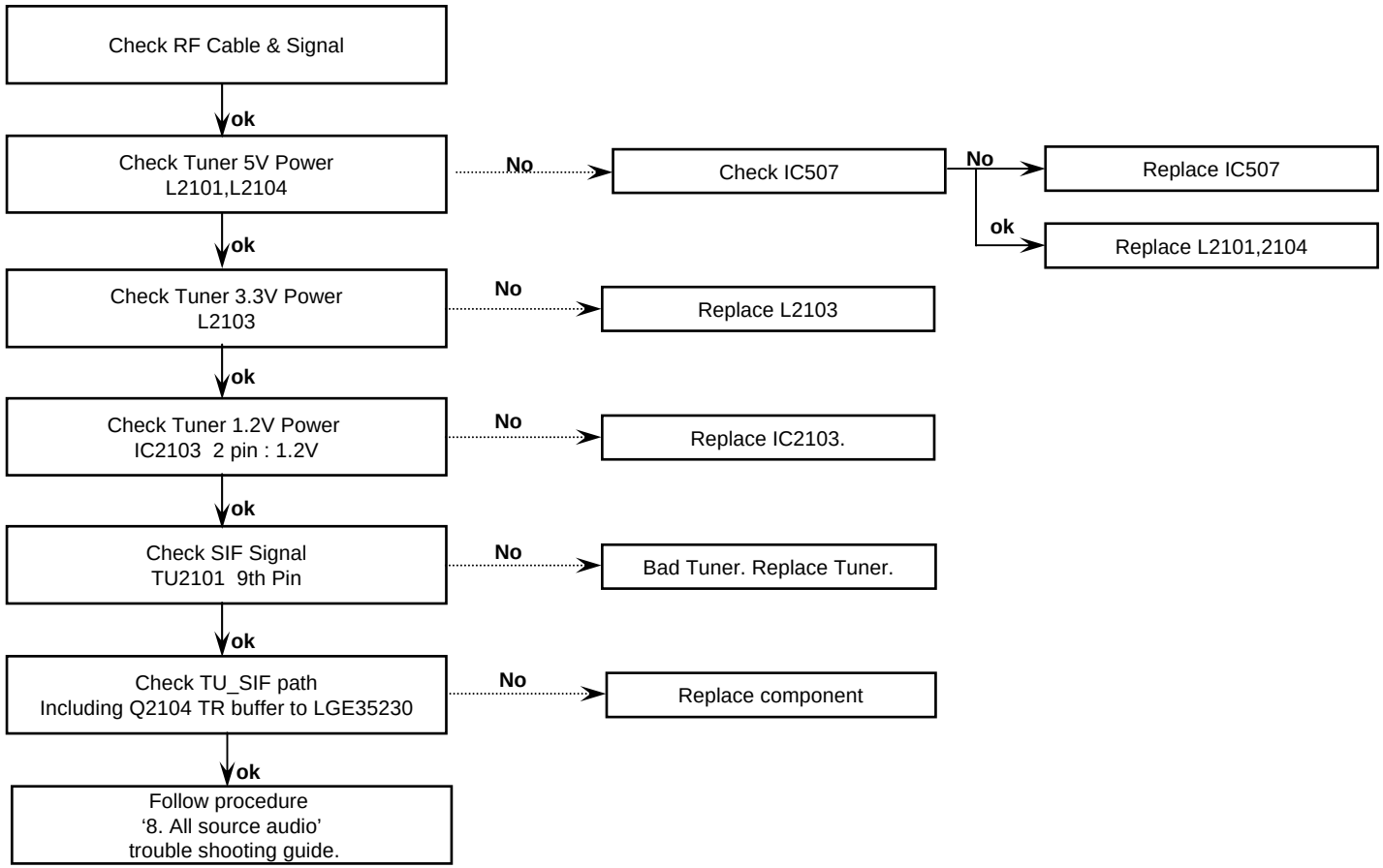
8. Trouble shooting - No Audio (all audio source)



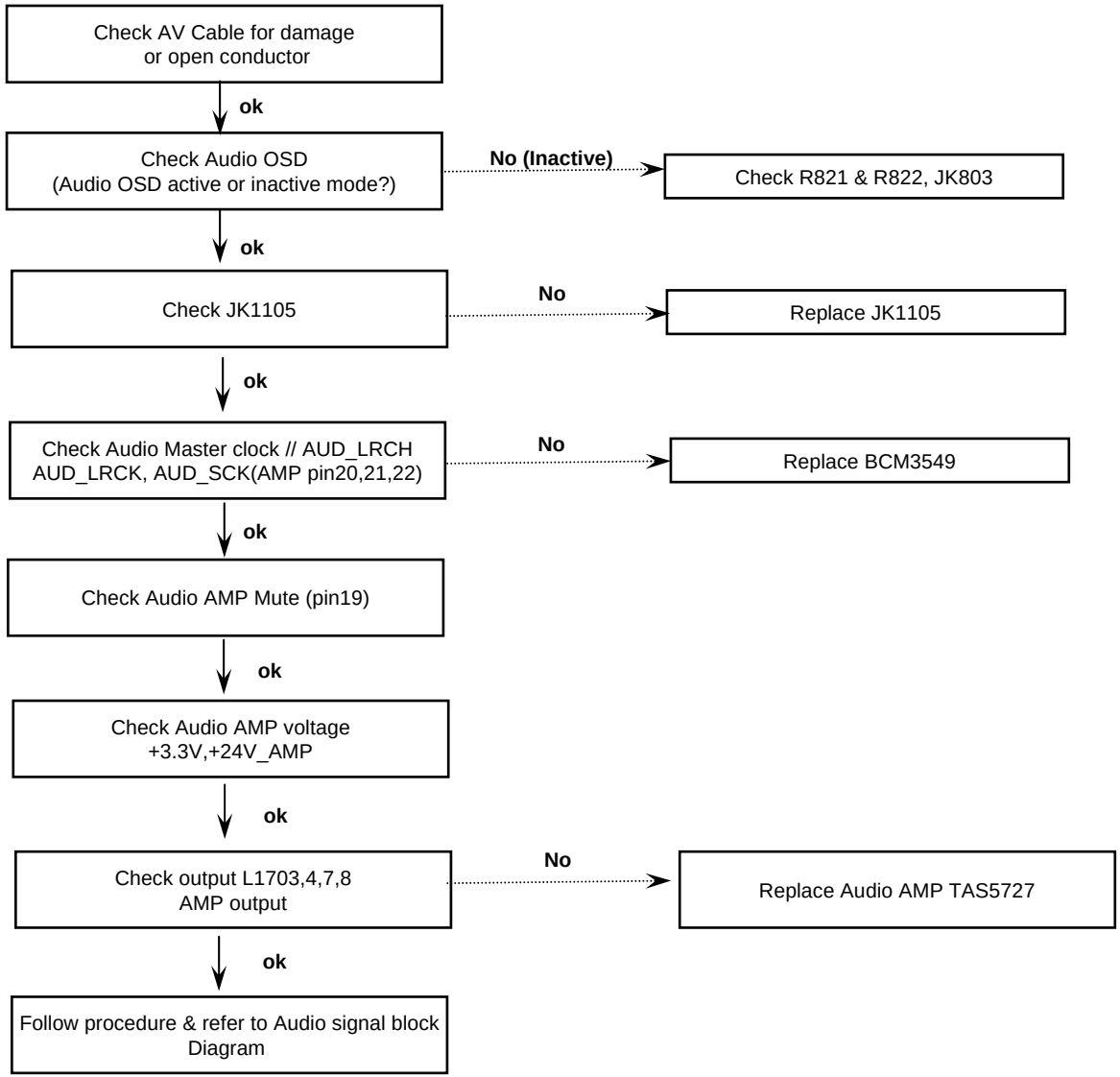
9. Trouble shooting - No audio (Digital TV audio)



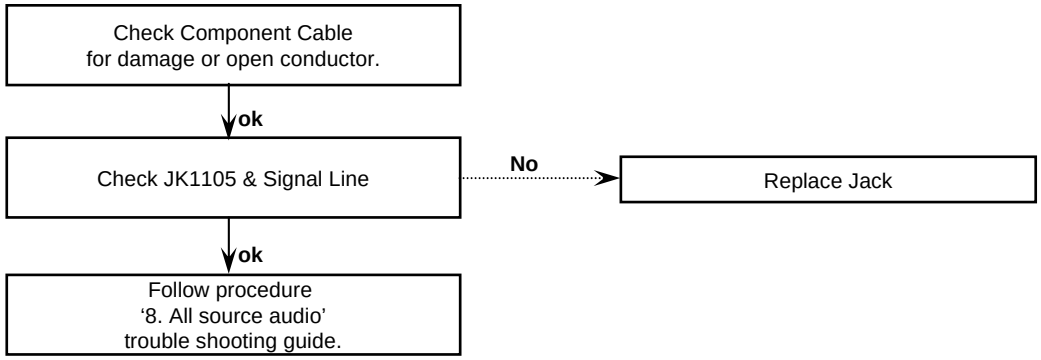
10. Trouble shooting - No audio (Analog TV audio)



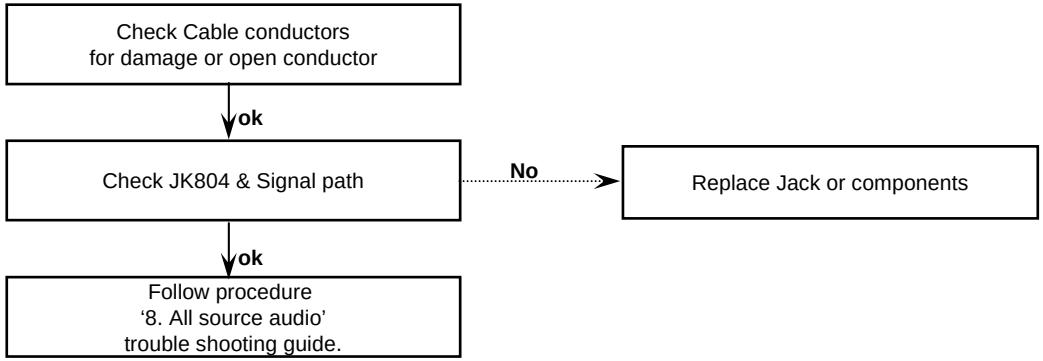
11. Trouble shooting - No audio (AV)



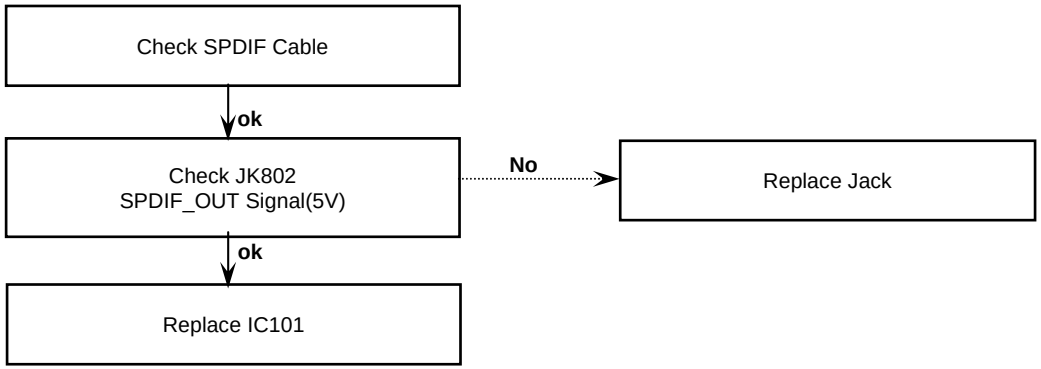
12. Trouble shooting - No audio (Component)



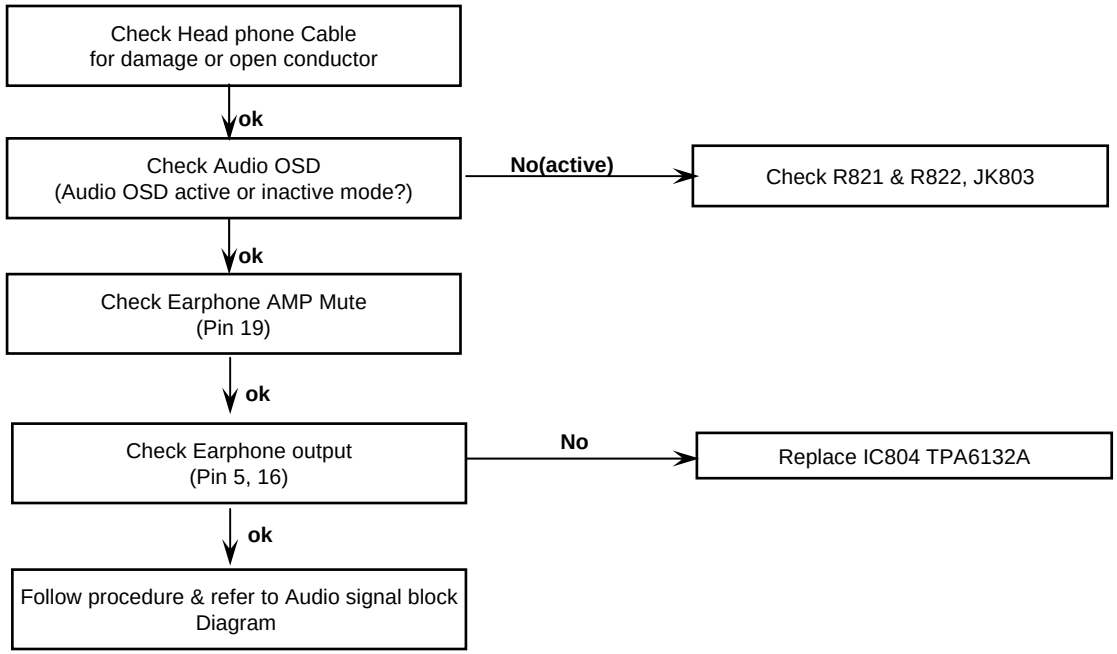
13. Trouble shooting - No audio (RGB-PC)



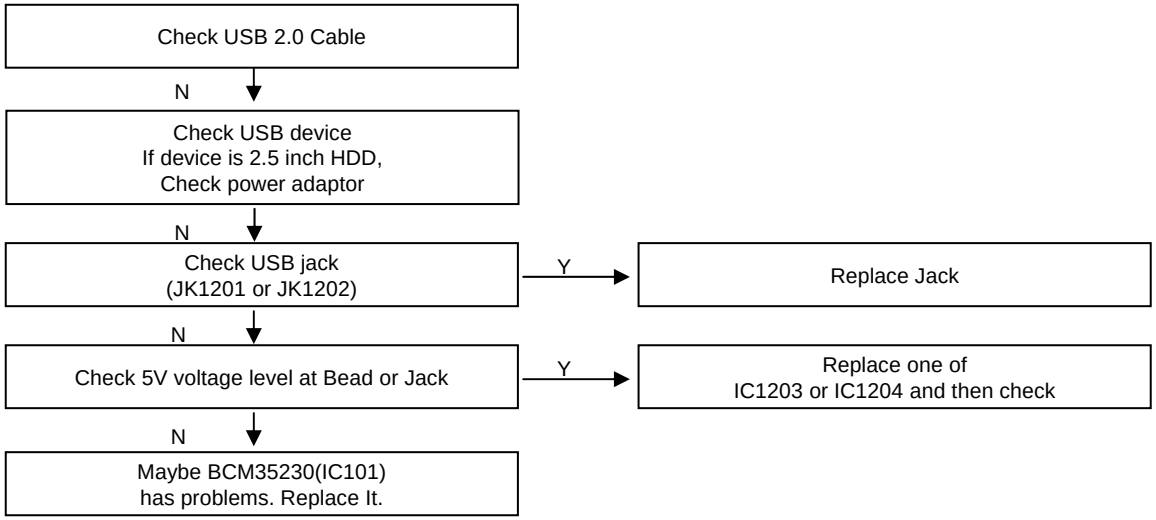
14. Trouble shooting - No audio (SPDIF)



15. Trouble shooting - No audio (Head phone audio out)



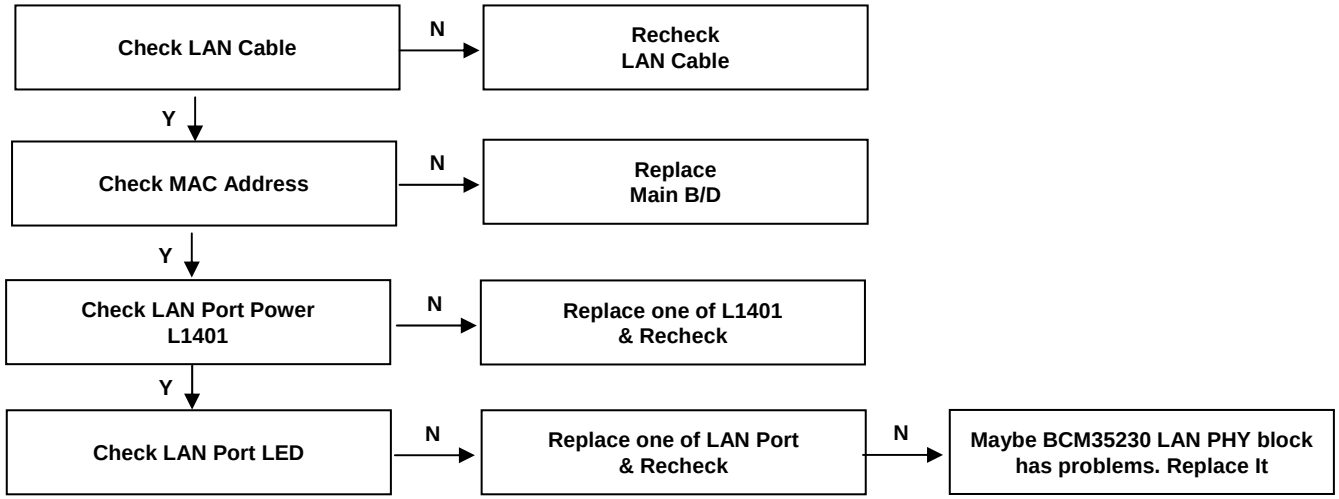
16. Trouble shooting - USB connection error



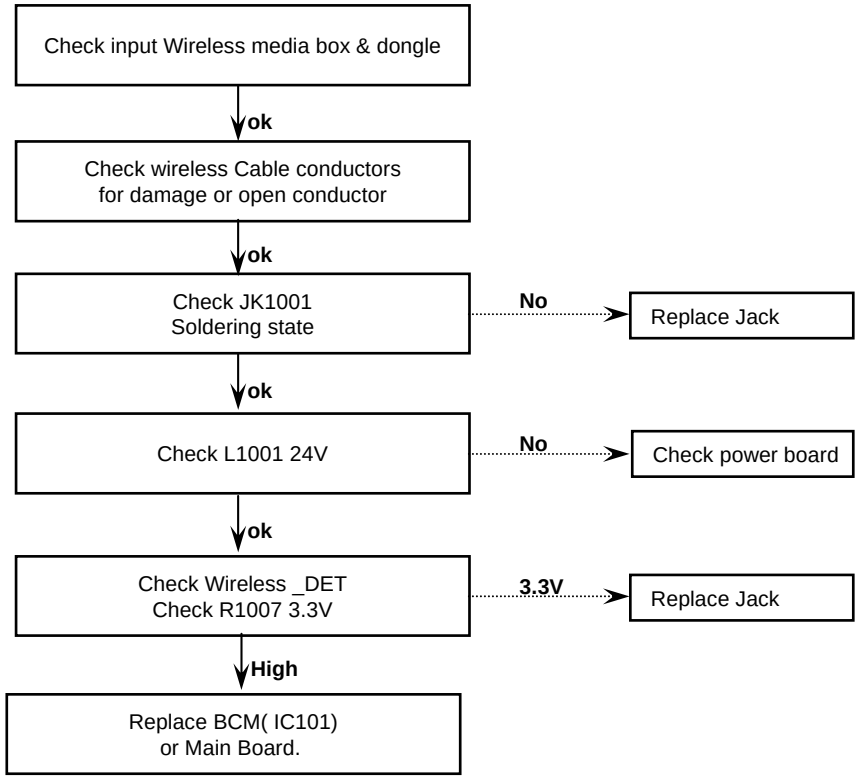
• Exception

- USB power could be disabled by inrushing current
- In this case, remove the device and try to reboot the TV (AC power off/on)

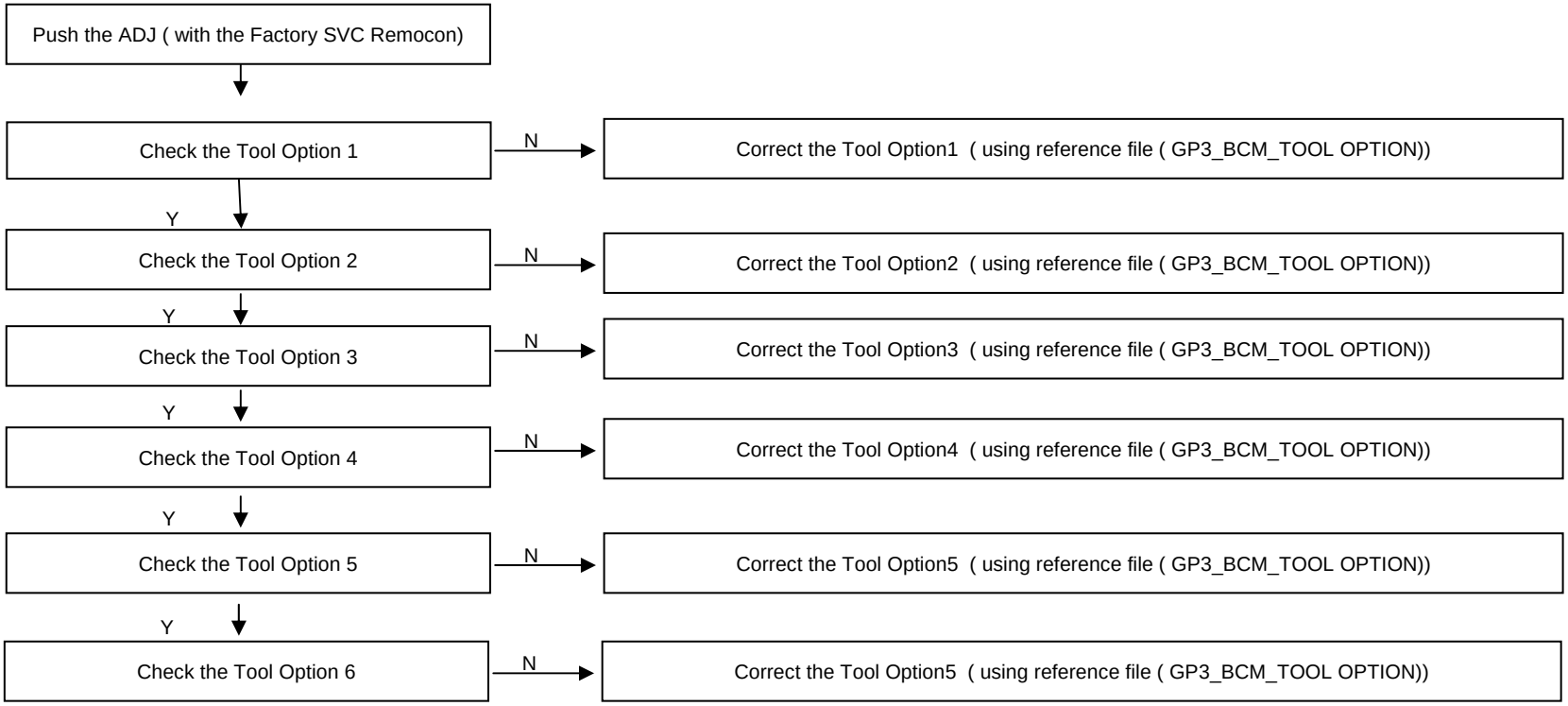
17. Trouble shooting - Ethernet connection error



18. Trouble shooting - Wireless media box - connection error

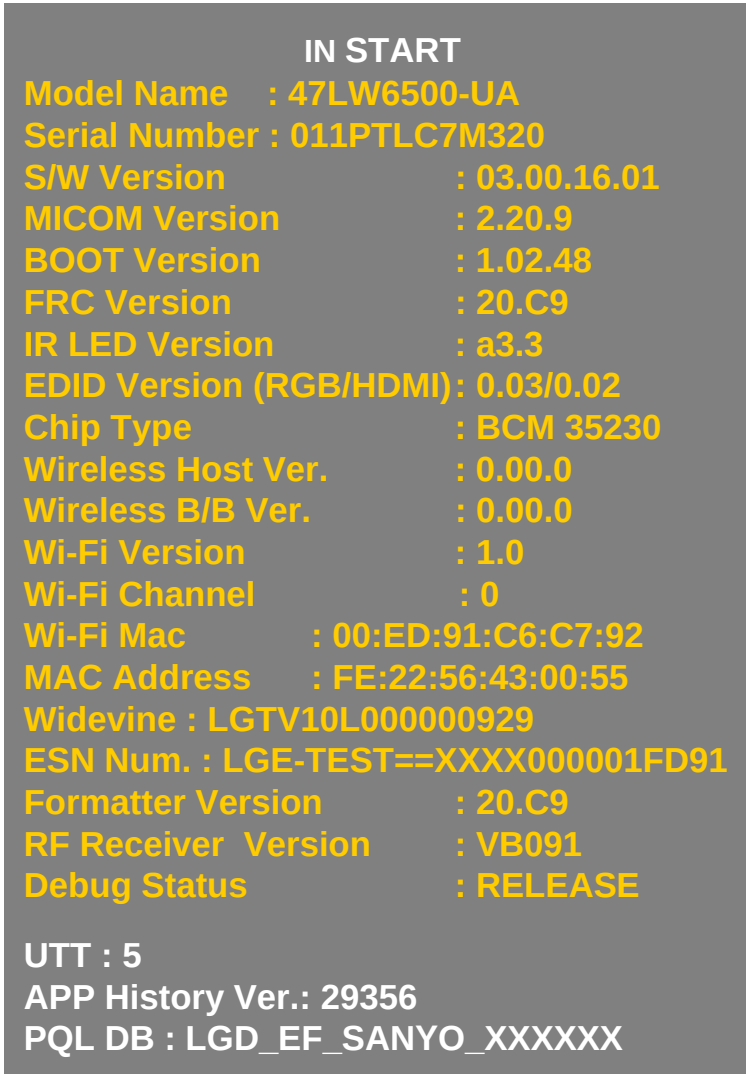


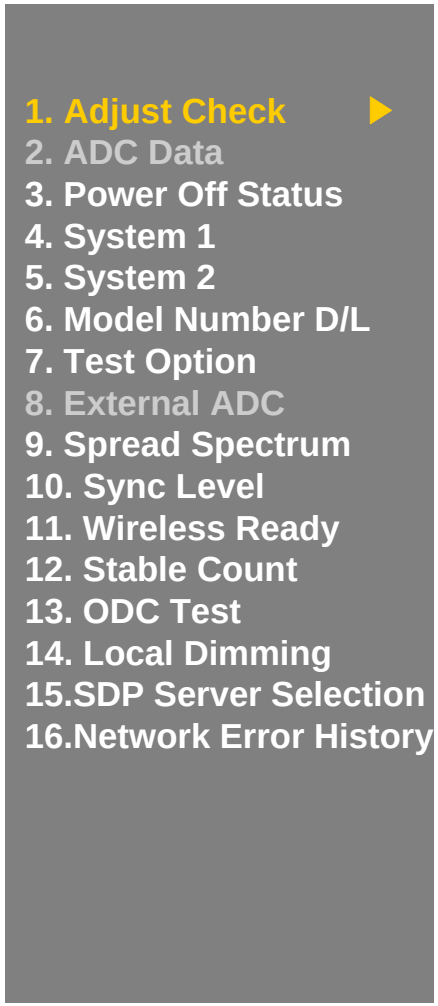
19. Trouble shooting - Tool option



Reference file : GP3_Tool option

20. Trouble shooting - Service Mode (INSTART)





• IN-START mode displays various TV system information and supports useful functions for engineer.

• Each of menu has sub-menus for detail set-up

1. Adjust Check
: Refer to next page.

2. ADC Data
: This menu supports manual ADC adjustment for COMP 480i/COMP 1080P/RGB.

3. Power Off Status
: You can check previous power-off history with this menu.

4 & 5 . System
: There are various sub-menus for TV system setting.

6. Model Number D/L
: You can change TV System's model name & Serial Number manually.

7. Test Option

8. External ADC
: You can adjust external Analog-to-Digital Converting Level when you have external devices as Master.

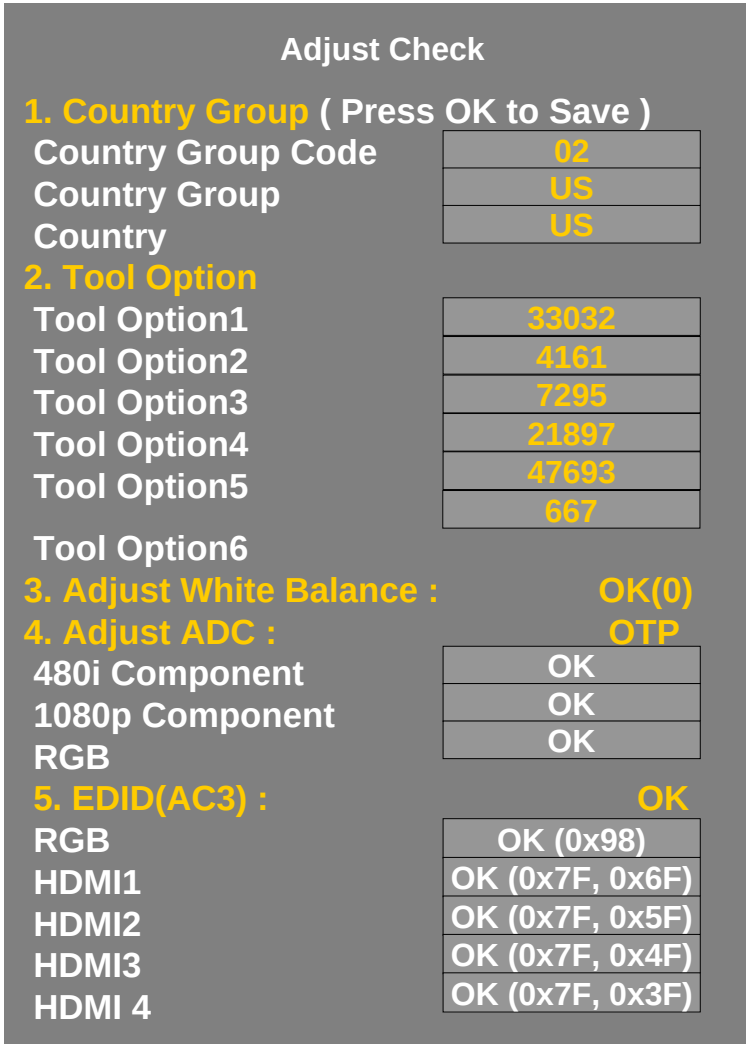
9. Spread Spectrum
: To enable FRC spread spectrum function and set detail value as spreading percent, period.

10. Sync Level
: You can control sync level of Component, HDMI input source. (Range is from 0 to 31)

11. Wireless Ready
: You can set RF Group, Media-box type and get some information about Wireless Diagnostics.

14. Local Dimming
: You can check current Local Dimming binary file version. When you upgrade latest F/W, you can re-download with using this menu.
If TV system doesn't support Local Dimming Function, you can't see this menu.

21. Trouble shooting - Service Mode (INSTART – Adjust Check)



1. Adjust Check
: This menu displays Country Group, Tool Option and Adjust Result Information. This is very useful when you want to know about TV systems adjustment as White Balance, ADC.

1) Country Group
- You can change Country Group and Tool Option only. This change is saved real-time.

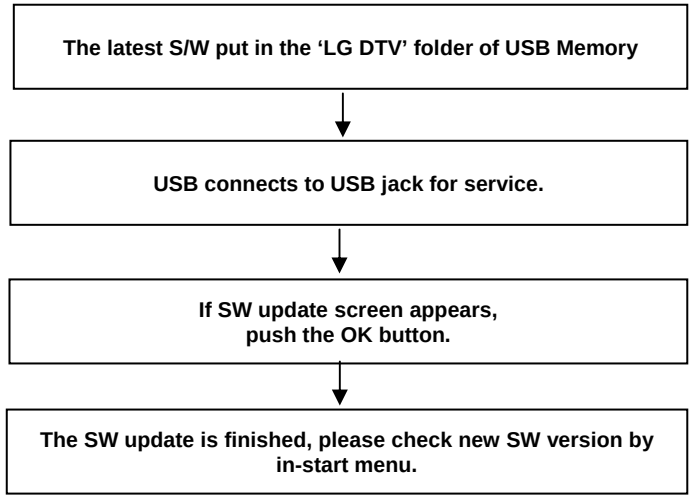
2) Tool Option
- You can change Tool Option value. Move a cursor to dialog box and push some numbers with remote-controller.

3) Adjust White Balance
- This dialog box shows the result of White Balance adjustment. OK/NG

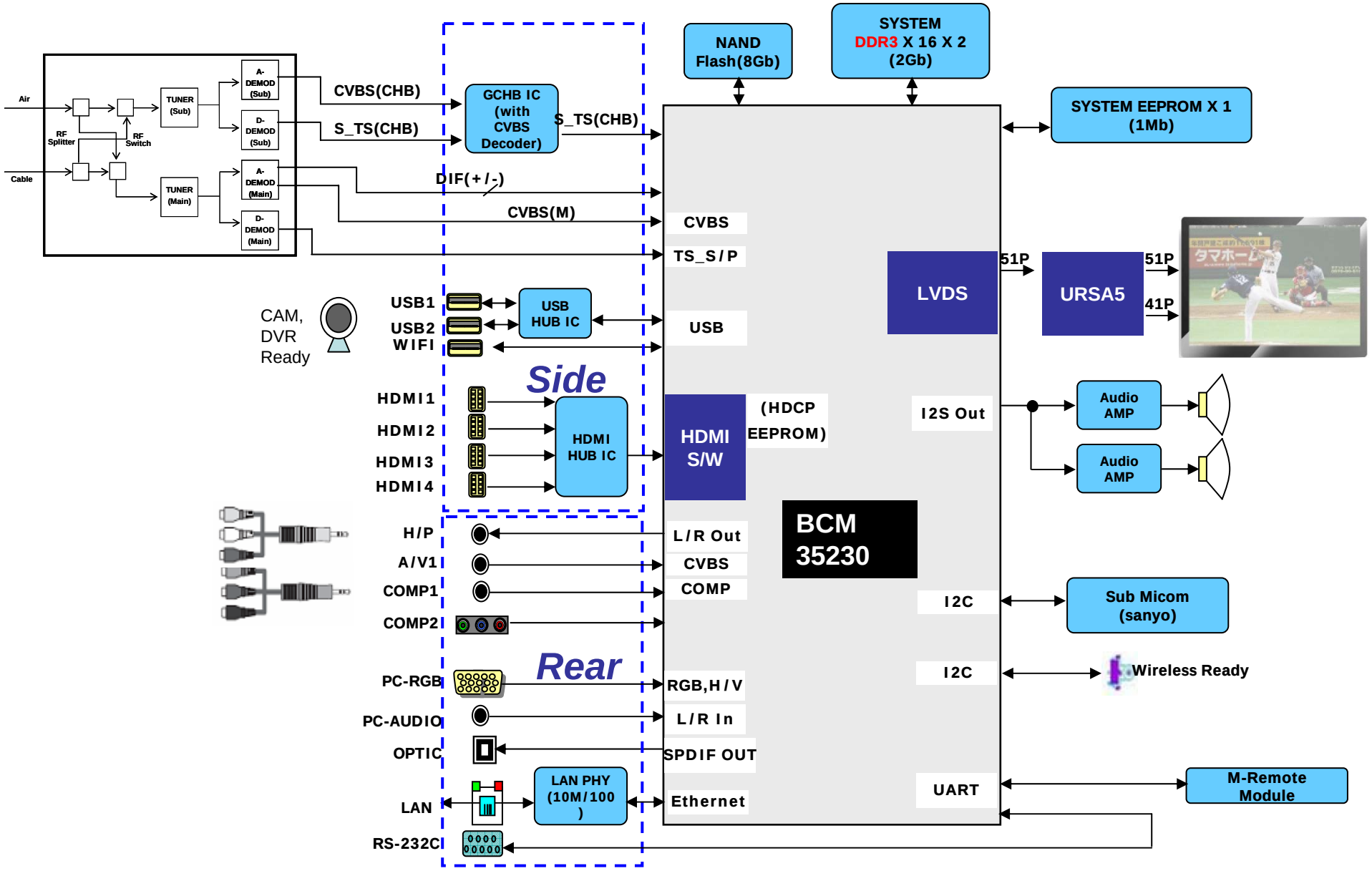
4) Adjust ADC
- You need not control ADC

5) EDID
- This dialog box shows the status of EDID Download.

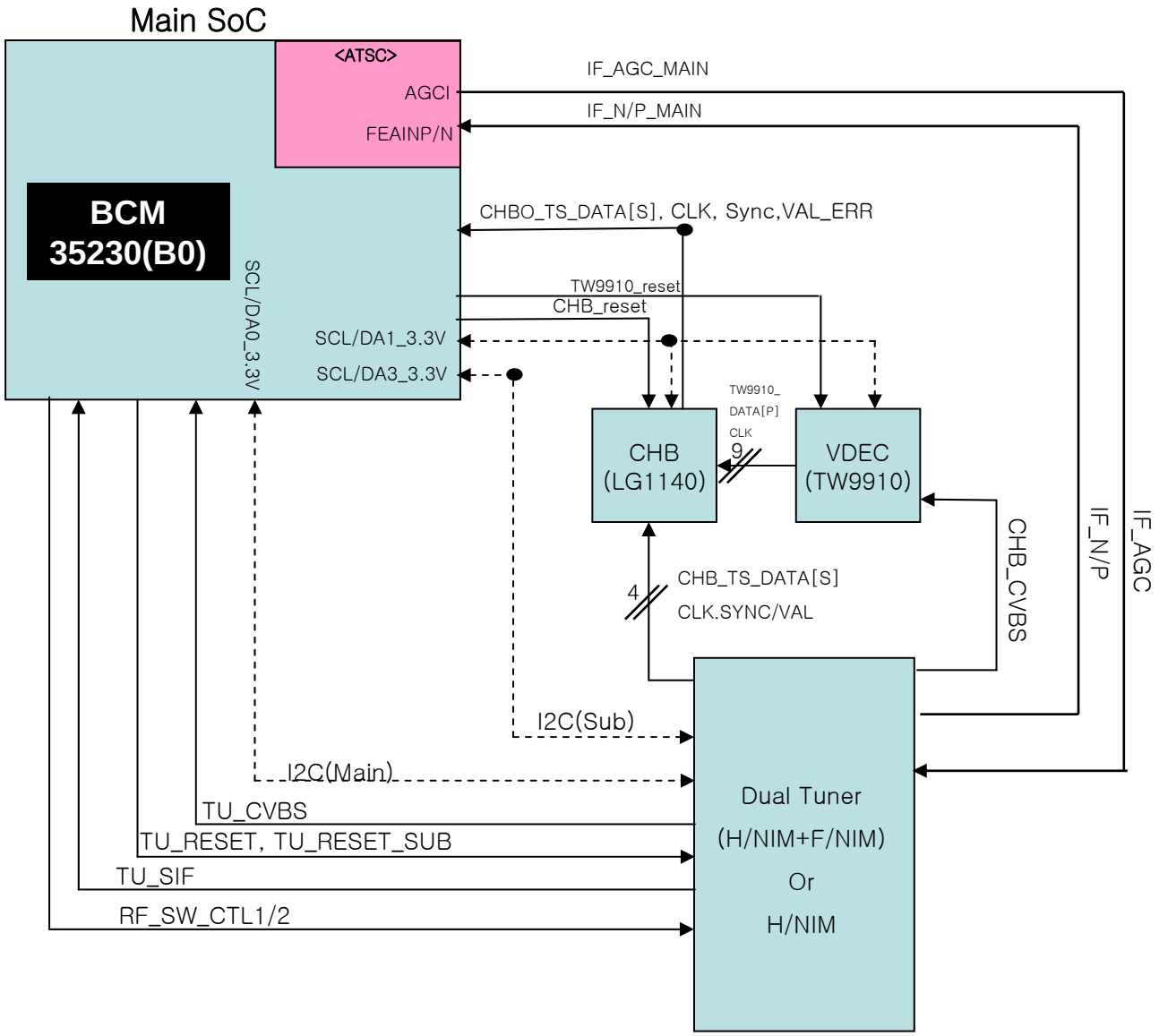
22. Trouble shooting - SW download



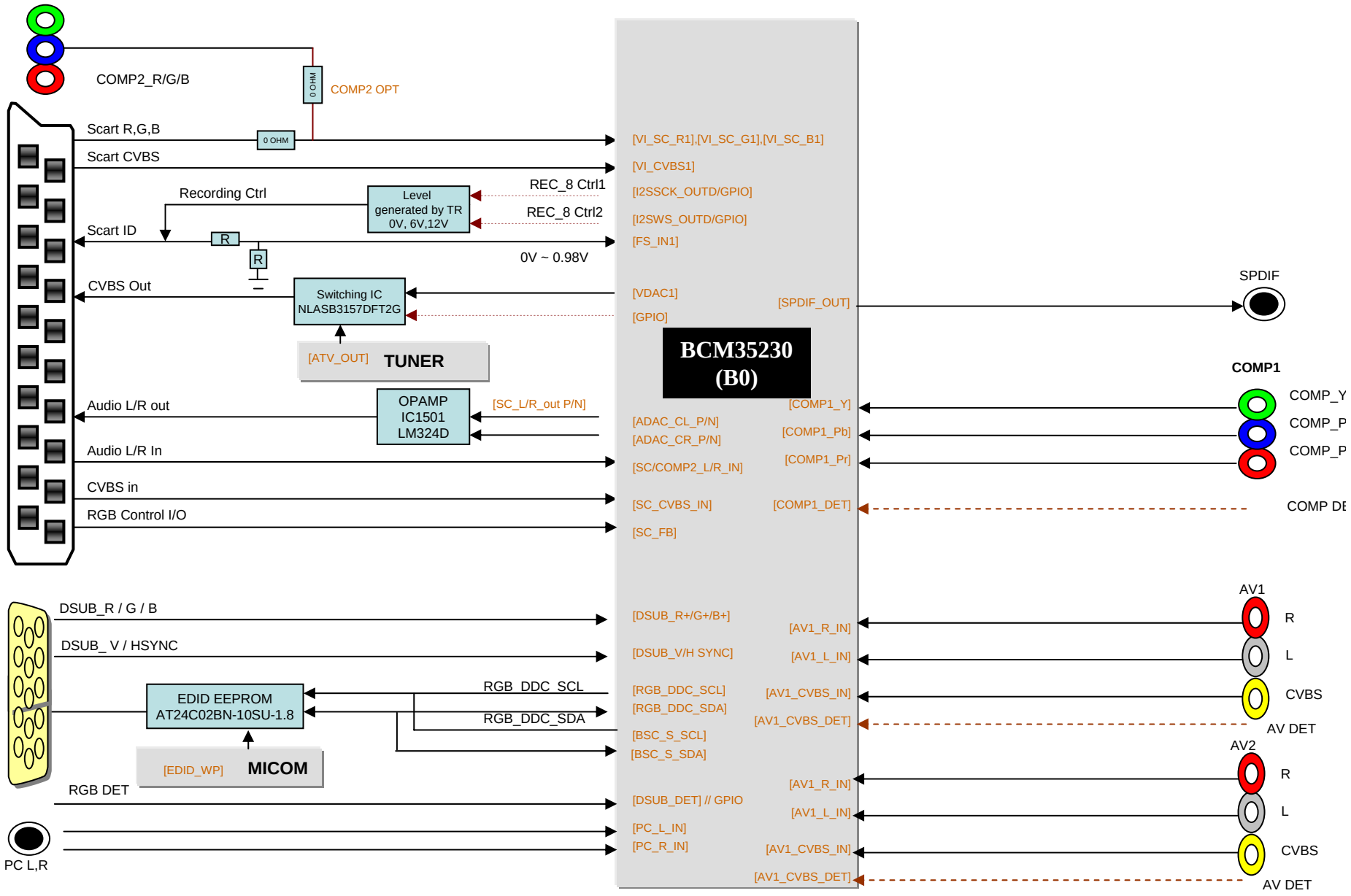
BCM35230 Block Diagram



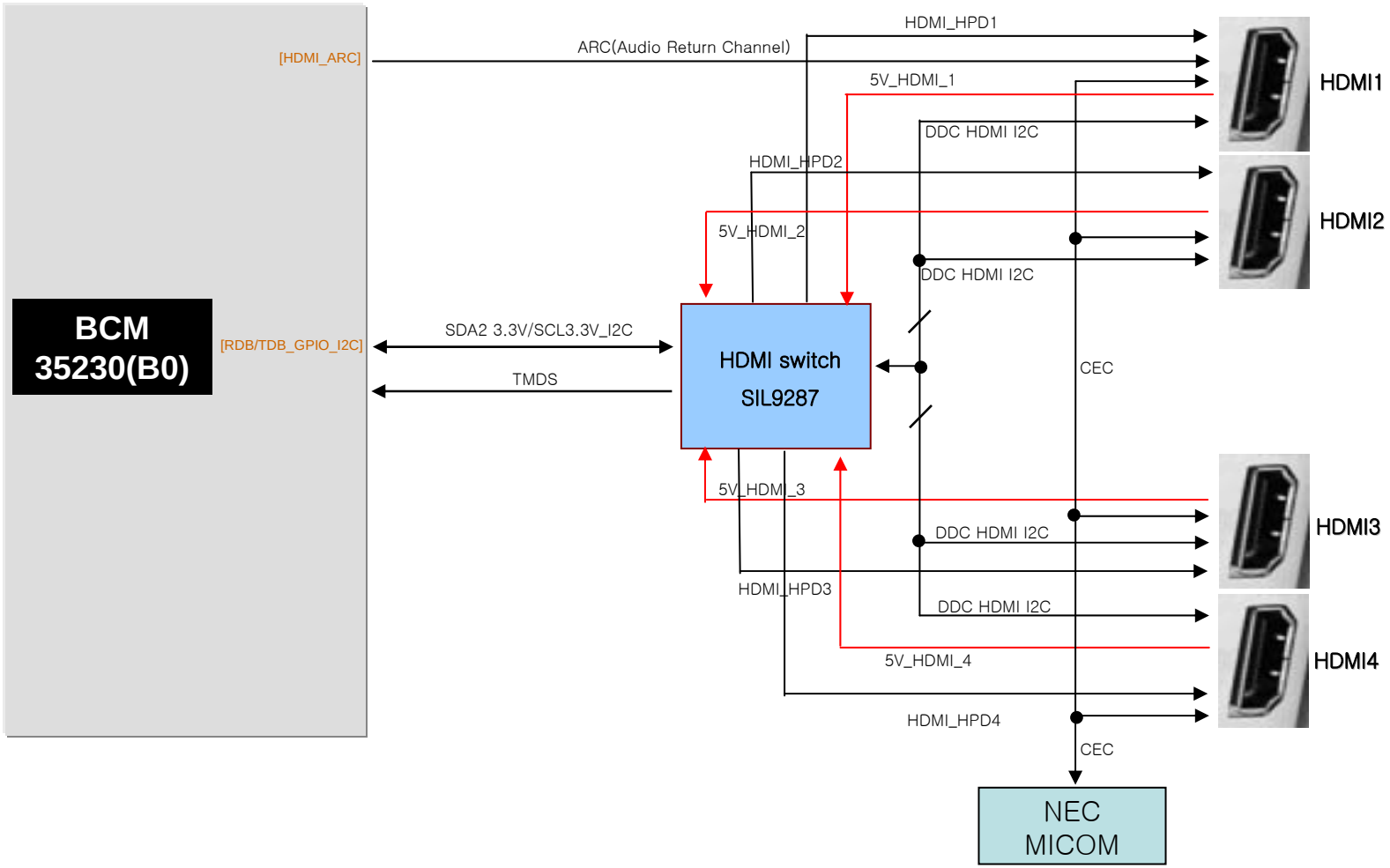
Dual_TUNER / CHB (한국 / 북미)



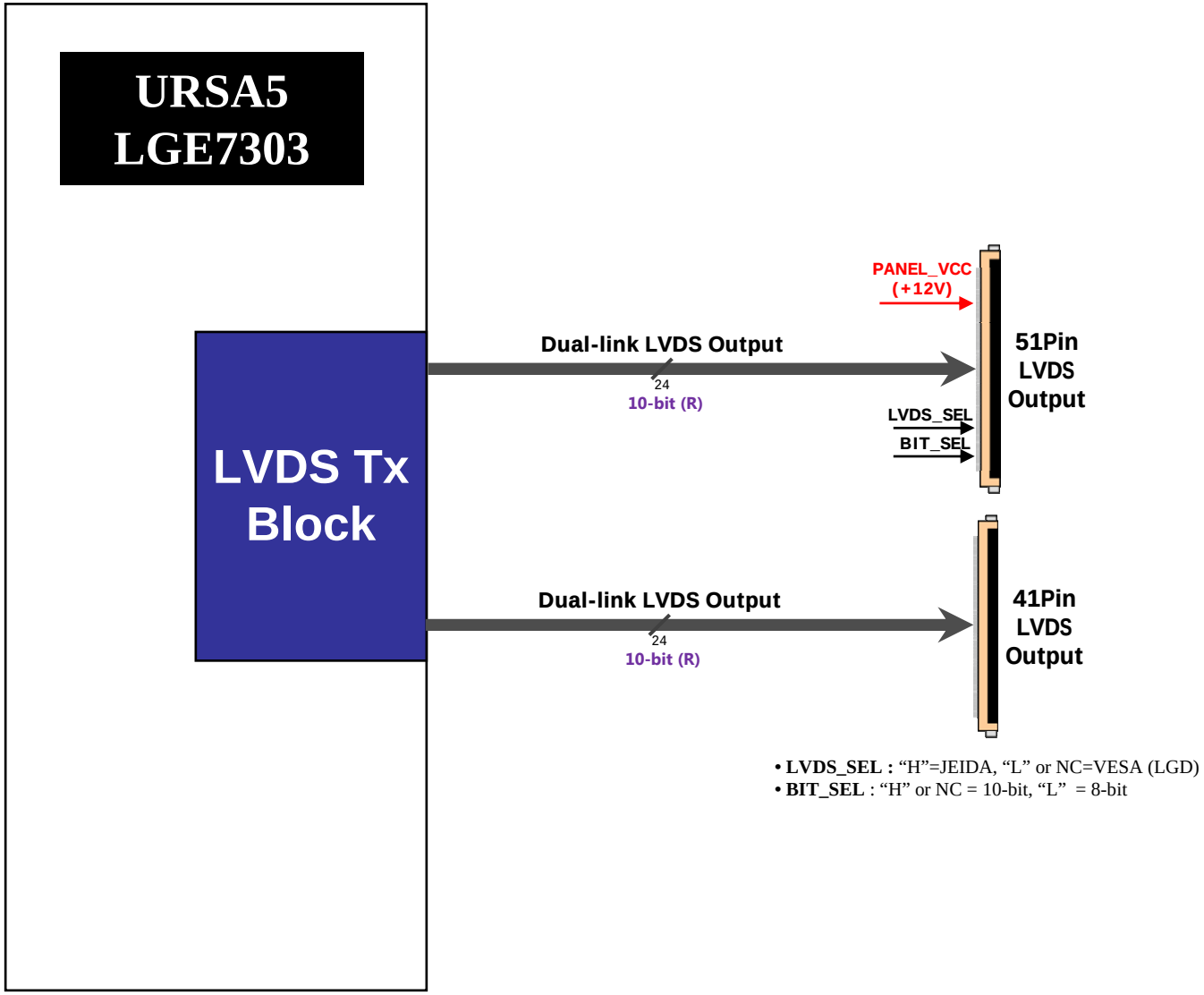
Jack Interface



HDMI(Sillicon Image SIL9287)

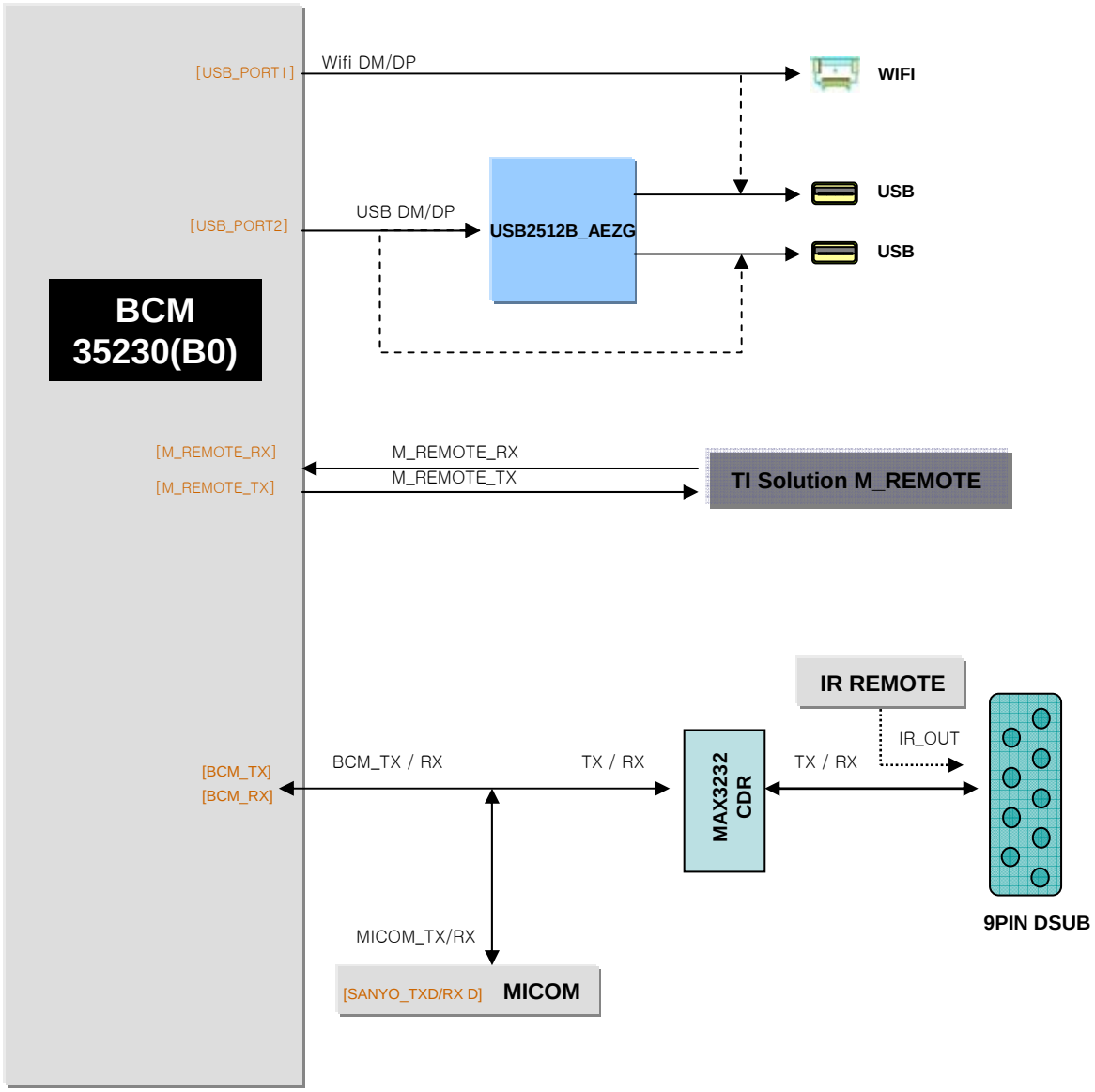


LVDS Tx (FHD120Hz)

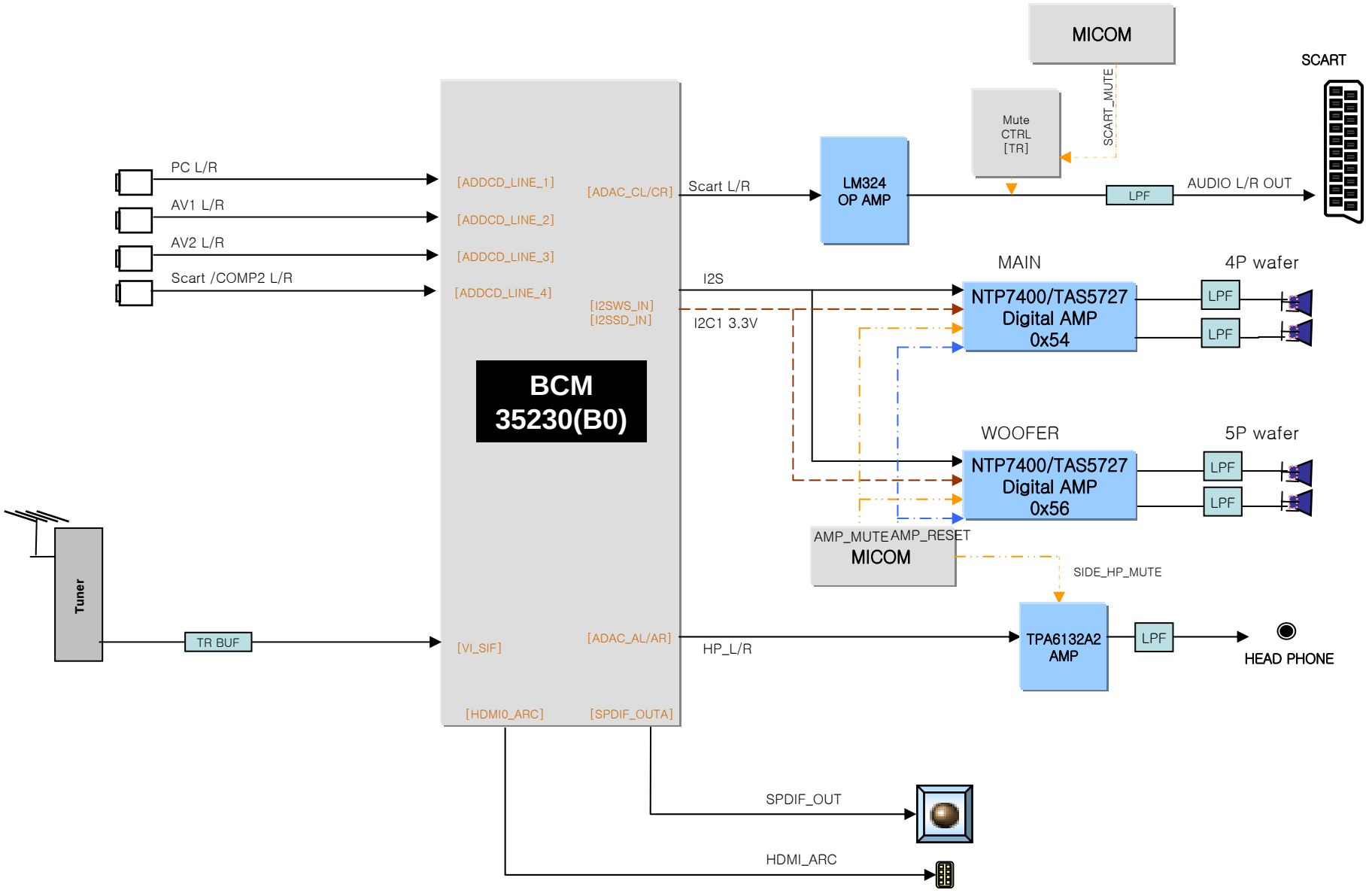


• **LVDS_SEL :** "H"=JEIDA, "L" or NC=VESA (LGD)
• **BIT_SEL** : "H" or NC = 10-bit, "L" = 8-bit

USB / WIFI / M-REMOTE / UART



AUDIO



I2C Map

※PV2 회로도 기준