

Printed in Korea

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# SAFETY PRECAUTIONS

## IMPORTANT SAFETY NOTICE

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

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

Do not modify the original design without permission of manufacturer.

### General Guidance

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

It will also protect the receiver and its components from being damaged by accidental shorts of the circuitry that may be inadvertently introduced during the service operation.

If any fuse (or Fusible Resistor) in this TV receiver is blown, replace it with the specified.

When replacing a high wattage resistor (Oxide Metal Film Resistor, over 1 W), keep the resistor 10 mm away from PCB.

Keep wires away from high voltage or high temperature parts.

### Before returning the receiver to the customer,

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

### Leakage Current Cold Check(Antenna Cold Check)

With the instrument AC plug removed from AC source, connect an electrical jumper across the two AC plug prongs. Place the AC switch in the on position, connect one lead of ohm-meter to the AC plug prongs tied together and touch other ohm-meter lead in turn to each exposed metallic parts such as antenna terminals, phone jacks, etc.

If the exposed metallic part has a return path to the chassis, the measured resistance should be between 1 M $\Omega$  and 5.2 M $\Omega$ .

When the exposed metal has no return path to the chassis the reading must be infinite.

An other abnormality exists that must be corrected before the receiver is returned to the customer.

### Leakage Current Hot Check (See below Figure)

Plug the AC cord directly into the AC outlet.

### Do not use a line Isolation Transformer during this check.

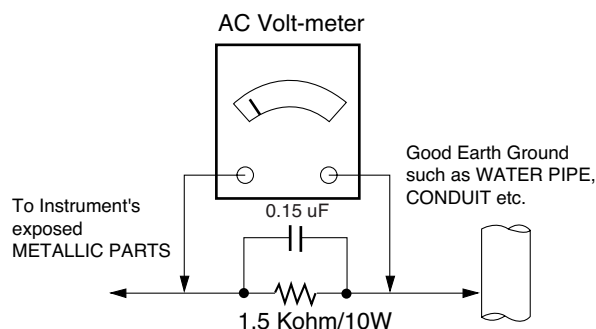
Connect 1.5 K / 10 watt resistor in parallel with a 0.15  $\mu$ F capacitor between a known good earth ground (Water Pipe, Conduit, etc.) and the exposed metallic parts.

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

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

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

### Leakage Current Hot Check circuit



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

\*Base on Adjustment standard

# SPECIFICATION

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

## 1. Application range

This specification is applied to the LCD TV used LD12B chassis.

## 2. Requirement for Test

Each part is tested as below without special appointment.

- 1) Temperature:  $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$  ( $77^{\circ}\text{F} \pm 9^{\circ}\text{F}$ ), CST:  $40^{\circ}\text{C} \pm 5^{\circ}\text{C}$
- 2) Relative Humidity :  $65\% \pm 10\%$
- 3) Power Voltage
  - : Standard input voltage (AC 100-240 V~, 50 / 60 Hz)
  - \* Standard Voltage of each products is marked by models.
- 4) Specification and performance of each parts are followed each drawing and specification by part number in accordance with BOM.
- 5) The receiver must be operated for about 5 minutes prior to the adjustment.

## 3. Test method

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

## 4. Model General Specification

No.	Item	Specification	Remarks
1	Market	EU(PAL Market-36Countries)	<b>DTV &amp; Analog (Total 36 countries)</b> <b>DTV (MPEG2/4, DVB-T) :</b> 31 countries (England/Italy/Germany/France/Spain/Sweden/Finland/Netherlands/Belgium/Luxemburg/Greece/Denmark/Czech/Austria /Hungary/Swiss/Croatia/Turkey/Norway/Slovenia/Poland/Ukraine/Portugal/Ireland/Moroco/Latvia/Estonia/Lithania/Rumania/Russia/Slovakia)  <b>DTV (MPEG2/4, DVB-T2):</b> 5 countries (England/Sweden/Finland/Denmark/Norway)  <b>DTV (MPEG2/4, DVB-C):</b> 10 countries (Sweden/Finland/Denmark/Norway/Austria/Swiss/Germany/Netherlands/Hungary/Slovenia)  <b>Analog Only - 5 countries</b> (Bosnia/Serbia/Bulgaria/Albania/Kazakhstan)
2	Broadcasting system	1) PAL-BG 2) PAL-DK 3) PAL-I/I' 4) SECAM L/L' 5) DVB-T/C 6) DVB-T2 7) DVB-S	- DVB-T2/S is supported in specific models. 1. DVB-T2 : Model name : xxxxxxxT 2. DVB-S : Model name : xxxxxxxS - SECAM L/L' is not supported in DVB-T2 models.
3	Receiving system	Analog : Upper Heterodyne Digital : COFDM , QAM	<b>► DVB-T</b> - Guard Interval(Bitrate_Mbit/s) 1/4, 1/8, 1/16, 1/32 - Modulation : Code Rate QPSK : 1/2, 2/3, 3/4, 5/6, 7/8 16-QAM : 1/2, 2/3, 3/4, 5/6, 7/8 64-QAM : 1/2, 2/3, 3/4, 5/6, 7/8 <b>► DVB-C</b> - Symbolrate : 4.0Msymbols/s to 7.2Msymbols/s - Modulation : 16QAM, 64-QAM, 128-QAM and 256-QAM <b>► DVB-T2</b> - Guard Interval(Bitrate_Mbit/s) 1/4,1/8,1/16,1/32,1/128,19/128,19/256, - Modulation : Code Rate QPSK : 1/2, 2/5, 2/3, 3/4, 5/6 16-QAM : 1/2, 2/5, 2/3, 3/4, 5/6 64-QAM : 1/2, 2/5, 2/3, 3/4, 5/6 256-QAM : 1/2, 2/5, 2/3, 3/4, 5/6 <b>► DVB-S</b> <b>► DVB-S2</b>
4	Scart Jack (1EA)	PAL, SECAM	Scart Jack is Full scart and support RF-OUT(analog & DTV) SECAM is not supported in DVB-T2 models.
5	Video Input RCA(1EA)	PAL, SECAM, NTSC	4System : PAL, SECAM, NTSC, PAL60 SECAM is not supported in DVB-T2 models.
6	Component Input(1EA)	Y/Cb/Cr, Y/Pb/Pr	
7	RGB Input	RGB-PC	Analog(D-SUB 15PIN)
8	HDMI Input (3EA)	HDMI1-DTV (DVI) HDMI2-DTV HDMI3-DTV	PC(HDMI version 1.3) Support HDCP
9	Audio Input (3EA)	RGB/DVI Audio, Component, AV	L/R Input
10	SDPIF out (1EA)	SPDIF out	
11	Earphone out (1EA)	Antenna, AV1, AV2, AV3, Component, RGB, HDMI1, HDMI2, HDMI3, USB	
12	USB (1EA)	EMF For SVC (download) DivX HD	JPEG, MP3

## 5. Component Video Input (Y, Cb/Pb, Cr/Pr)

No.	Specification				Remark
	Resolution	H-freq(kHz)	V-freq(Hz)		
1.	720x480	15.73	60.00	SDTV,DVD 480i	
2.	720x480	15.63	59.94	SDTV,DVD 480i	
3.	720x480	31.47	59.94	480p	
4.	720x480	31.50	60.00	480p	
5.	720x576	15.625	50.00	SDTV,DVD 625 Line	
6.	720x576	31.25	50.00	HDTV 576p	
7.	1280x720	45.00	50.00	HDTV 720p	
8.	1280x720	44.96	59.94	HDTV 720p	
9.	1280x720	45.00	60.00	HDTV 720p	
10.	1920x1080	31.25	50.00	HDTV 1080i	
11.	1920x1080	33.75	60.00	HDTV 1080i	
12.	1920x1080	33.72	59.94	HDTV 1080i	
13.	1920x1080	56.250	50	HDTV 1080p	
14.	1920x1080	67.5	60	HDTV 1080p	

## 6. RGB Input (PC)

No.	Specification				Proposed	Remarks
	Resolution	H-freq(kHz)	V-freq(Hz)	Pixel Clock(MHz)		
1.	720*400	31.468	70.08	28.321		For only DOS mode
2.	640*480	31.469	59.94	25.17	VESA	Input 848*480 60 Hz, 852*480 60 Hz -> 640*480 60 Hz Display
3.	800*600	37.879	60.31	40.00	VESA	
4.	1024*768	48.363	60.00	65.00	VESA(XGA)	
5.	1280*768	47.78	59.87	79.5	WXGA	
6.	1360*768	47.72	59.8	84.75	WXGA	
7.	1920*1080	66.587	59.93	138.625	WUXGA	FHD model

## 7. HDMI Input

### (1) DTV Mode

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

### (2) PC Mode

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

# ADJUSTMENT INSTRUCTION

## 1. Application Range

This specification sheet is applied to all of the LCD TV with LD12B chassis.

## 2. Designation

- (1) Because this is not a hot chassis, it is not necessary to use an isolation transformer. However, the use of isolation transformer will help protect test instrument.
- (2) Adjustment must be done in the correct order.
- (3) The adjustment must be performed in the circumstance of  $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$  of temperature and  $65\% \pm 10\%$  of relative humidity if there is no specific designation.
- (4) The input voltage of the receiver must keep AC 100-240 V~, 50 / 60Hz.
- (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  $0^{\circ}\text{C}$ , it should be placed in the circumstance of above  $15^{\circ}\text{C}$  for 2 hours

In case of keeping module is in the circumstance of below  $-20^{\circ}\text{C}$ , it should be placed in the circumstance of above  $15^{\circ}\text{C}$  for 3 hours.

### [Caution]

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

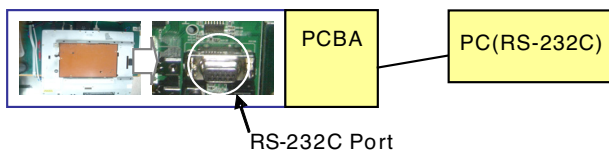
## 3. Automatic Adjustment

### 3.1. MAC Address

- (1) Equipment & Condition
  - Play file: Serial.exe
  - MAC Address edit
  - Input Start / End MAC address

- (2) Download method

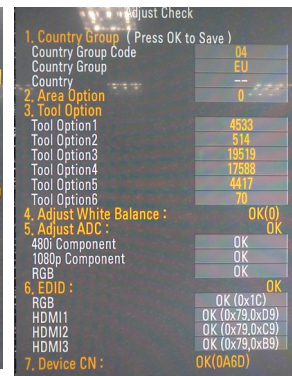
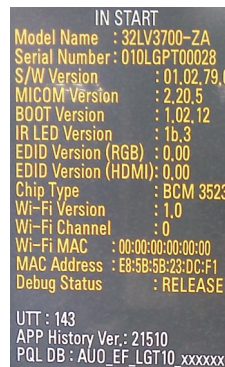
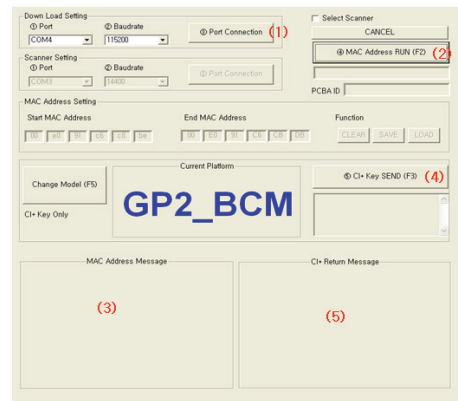
- 1) Communication Prot connection



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

- 2) MAC Address & CI+ key Download

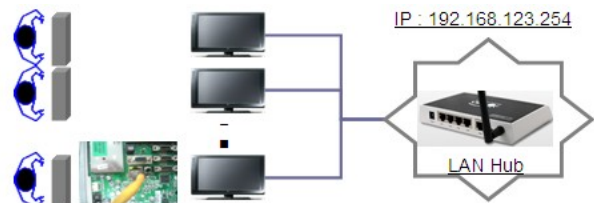
- Set CI+ key path Directory at start Mac & CI Download Program
- Com 1,2,3,4 and 115200(Baud rate)
- Port connection button click(1)
- Push the (2) MAC Address write.
- At success Download, check the OK(3)
- Start CI+ Download, Push the (4)
- Check the OK or NG.(5)



### 3.2. LAN

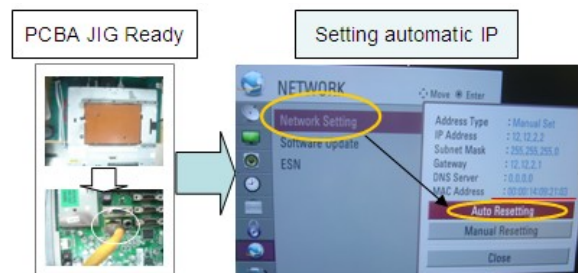
- (1) Equipment & Condition

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



- (2) LAN inspection solution

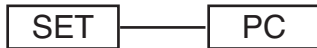
- LAN Port connection with PCB
- Network setting at MENU Mode of TV
- setting automatic IP
- Setting state confirmation
- > If automatic setting is finished, you confirm IP and MAC Address.



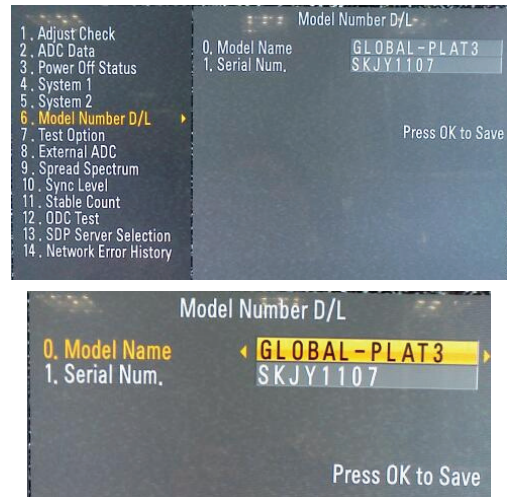
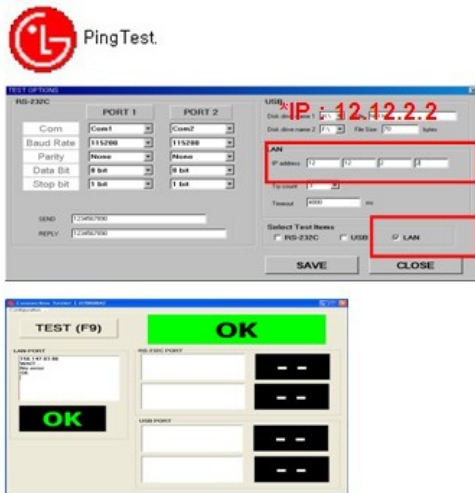


### 3.3. LAN PORT INSPECTION(PING TEST)

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



- (1) Equipment setting
  - 1) Play the LAN Port Test PROGRAM.
  - 2) Input IP set up for an inspection to Test Program.  
\*IP Number : 12.12.2.2
- (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



- d. Check the model name Instart menu -> Factory name displayed (ex 32LV3700-ZA)
- e. Check the Diagnostics (DTV country only) -> Buyer model displayed (ex 32LV3700)

### 3.4. Model name & serial number download

- (1) Model name & Serial number D/L
  - Press "Power on" key of service remote control.(Baud rate : 115200 bps)
  - Connect RS232 Signal Cable to RS-232 Jack.
  - Write Serial number by use RS-232.
  - Must check the serial number at Instart menu.
- (2) Method & notice
  - A. Serial number D/L is using of scan equipment.
  - B. Setting of scan equipment operated by Manufacturing Technology Group.
  - C. Serial number D/L must be conformed when it is produced in production line, because serial number D/L is mandatory by D-book 4.0

- \* Manual Download (Model Name and Serial Number)  
If the TV set is downloaded by OTA or service man, sometimes model name or serial number is initialized.(Not always)  
There is impossible to download by bar code scan, so It need Manual download.
  - a. Press the 'instart' key of ADJ remote control.
  - b. Go to the menu '5.Model Number D/L' like below photo.
  - c. Input the Factory model name(ex 42LD450-ZA) or Serial number like photo.

## 4. Manual Adjustment

### 4.1. EDID(The Extended Display Identification Data)/DDC(Display Data Channel) download

- (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".
- (2) Equipment
  - Adjust remote control
  - Since embedded EDID data is used, EDID download JIG, HDMI cable and D-sub cable are not need.
- (3)Download method
  - 1) Press Adj. key on the Adj. R/C, then select "12.EDID D/L", By pressing Enter key, enter EDID D/L menu.
  - 2) Select [Start] button by pressing Enter key, HDMI1/ HDMI2/ HDMI3/ RGB are Writing and display OK or NG.

- (4) EDID DATA
  - HDMI

	0x00	0x01	0x02	0x03	0x04	0x05	0x06	0x07	0x08	0x09	0x0A	0x0B	0x0C	0x0D	0x0E	0x0F
0x00	00	FF	FF	FF	FF	FF	FF	00	1E	6D						
0x01			01	03	80	10	09	78	0A	EE	91	A3	54	4C	99	26
0x02	0F	50	54	A1	08	00	71	40	81	C0	81	00	81	80	95	00
0x03	90	40	A9	C0	B3	00	02	3A	80	18	71	38	2D	40	58	2C
0x04	45	00	A0	5A	00	00	00	1E	66	21	50	B0	51	00	1B	30
0x05	40	70	36	00	A0	5A	00	00	00	1E	00	00	00	FD	00	39
0x06	3F	1F	52	10	00	0A	20	20	20	20	20	20				
0x07															01	1
0x08	02	03	26	F1	4E	10	1F	84	13	05	14	03	02	12	20	21
0x09	22	15	01	26	15	07	50	09	57	07	67					
0x0A			E3	05	03	01	01	1D	80	18	71	1C	16	20	58	2C
0x0B	25	00	A0	5A	00	00	00	9E	01	1D	00	80	51	D0	1A	20
0x0C	6E	88	55	00	A0	5A	00	00	00	1A	02	3A	80	18	71	38
0x0D	2D	40	58	2C	45	00	A0	5A	00	00	00	1E	66	21	50	B0
0x0E	51	00	1B	30	40	70	36	00	A0	5A	00	00	00	1E	00	00
0x0F	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	2

## ■ RGB

	0x00	0x01	0x02	0x03	0x04	0x05	0x06	0x07	0x08	0x09	0x0A	0x0B	0x0C	0x0D	0x0E	0x0F
0x00	00	FF	FF	FF	FF	FF	FF	00	1E	6D						
0x01			01	03	68	10	09	78	0A	EE	91	A3	54	4C	99	26
0x02	0F	50	54	A1	08	00	71	4F	01	01	01	01	01	01	95	00
0x03	90	40	A9	C0	B3	00	02	3A	80	18	71	38	2D	40	58	2C
0x04	45	00	A0	5A	00	00	00	1E	66	21	50	B0	51	00	1B	30
0x05	40	70	36	00	A0	5A	00	00	00	1E	00	00	00	FD	00	3A
0x06	3E	1E	53	10	00	0A	20	20	20	20	20	20				
0x07															01	3

## ■ Reference

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

## Product ID

Model Name	HEX	EDID Table	DDC Function
ALL	0001	0100	Analog
	0001	0100	Digital

Serial No. : Controlled on product line

Month, Year: Controlled on production line:

ex) Monthly : '01' -> '01'

Year : '2010' -> '14'

Model Name(Hex):

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

Checksum: Changeable by total EDID data.

INPUT	1	2	3
HDMI1	7F	D9	X
HDMI2	7F	C9	X
HDMI3	7F	B9	X
RGB	X	X	46

## Vendor Specific(HDMI)

INPUT	MODEL NAME(HEX)
HDMI1	67 03 0C 00 10 00 B8 2D
HDMI2	67 03 0C 00 20 00 B8 2D
HDMI3	67 03 0C 00 30 00 B8 2D
RGB	67 03 0C 00 40 00 B8 2D

## 4.2. White Balance Adjustment

### 4.2.1. Overview

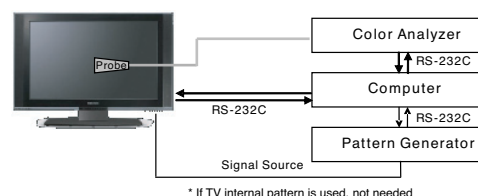
- (1) W/B adj. Objective & How-it-works
- (2) Objective: To reduce each Panel's W/B deviation
- (3) How-it-works : When R/G/B gain in the OSD is at 192, it means the panel is at its Full Dynamic Range. In order to prevent saturation of Full Dynamic range and data, one of R/G/B is fixed at 192, and the other two is lowered to find the desired value.
- (4) Adj. condition : normal temperature
  - 1) Surrounding Temperature : 25 °C ± 5 °C
  - 2) Warm-up time: About 5 Min
  - 3) Surrounding Humidity : 20 % ~ 80 %

### 4.2.2 Equipment

- 1) Color Analyzer: CA-210 (LED Module : CH 14)
- 2) Adj. Computer(During auto adj., RS-232C protocol is needed)
- 3) Adjust Remote control
- 4) Video Signal Generator MSPG-925F 720p/204-Gray (Model:217, Pattern:49)
  - > Only when internal pattern is not available

■ Color Analyzer Matrix should be calibrated using CS-1000

### 4.2.3. Equipment connection MAP



### 4.2.4. Adj. Command (Protocol)

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

#### <Command Format>

- LEN: Number of Data Byte to be sent
  - CMD: Command
  - VAL: FOS Data value
  - CS: Checksum of sent data
  - A: Acknowledge
- Ex) [Send: JA\_00\_DD] / [Ack: A\_00\_okDDX]

#### ■ RS-232C Command used during auto-adj.

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

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

### ■ Adj. 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					

### ■ 3 Command White Balance Adj. Map

	Command (lower case ASCII)		SetID	R Gain(HEX)		G Gain(HEX)		B Gain(HEX)	
	CMD1	CMD2		MIN	MAX	MIN	MAX	MIN	MAX
Cool	j	j	00	00	C0	00	C0	00	C0
Medium	j	k	00	00	C0	00	C0	00	C0
Warm	j	l	00	00	C0	00	C0	00	C0

### ■ Infrared Sensor Adj. Map

	Command (lower case ASCII)		R Gain(HEX)		G Gain(HEX)		B Gain(HEX)	
	CMD1	CMD2	MIN	MAX	MIN	MAX	MIN	MAX
Cool	1	C	00	C0	00	C0	00	C0
Medium	1	D	00	C0	00	C0	00	C0
Warm	1	E	00	C0	00	C0	00	C0

### 4.2.5. Adj. method

- (1) Auto adj. method
  - 1) Set TV in adj. mode using POWER ON key.
  - 2) Zero calibrate probe then place it on the center of the Display.
  - 3) Connect Cable (RS-232C)
  - 4) Select mode in adj. Program and begin adjustment.
  - 5) When adj. is complete (OK Sing), check adj. status pre mode. (Warm, Medium, Cool)
  - 6) Remove probe and RS-232C cable to complete adj.

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

### (2) Manual adj. method

- 1) Set TV in Adj. mode using POWER ON
- 2) Zero Calibrate the probe of Color Analyzer, then place it on the center of LCD module within 10cm of the surface.
- 3) Press ADJ key -> EZ adjust using adj. R/C -> 9.White-Balance then press the cursor to the right (KEY ►).  
(When KEY(►) is pressed 216 Gray internal pattern will be displayed)
- 4) One of R Gain / G Gain / B Gain should be fixed at 192, and the rest will be lowered to meet the desired value.
- 5) Adj. is performed in COOL, MEDIUM, WARM 3 modes of color temperature.

■ If internal pattern is not available, use RF input. In EZ Adj. menu 9.White Balance, you can select one of 2 Test-pattern: ON, OFF. Default is inner(ON). By selecting OFF, you can adjust using RF signal in 216 gray pattern.

### ■ Adj. condition and cautionary items

- 1) Lighting condition in surrounding area  
Surrounding lighting should be lower 10 lux. Try to isolate adj. area into dark surrounding.
- 2) Probe location  
: Color Analyzer (CA-210) probe should be within 10cm and perpendicular of the module surface (80°~100°)
- 3) Aging time
  - After Aging Start, Keep the Power ON status during 5 Minutes.
  - In case of LCD, Back-light on should be checked using no signal or Full-white pattern.

### 4.2.6. Reference (White Balance Adj. coordinate and 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	13000 K	0.0000
MEDIUM	0.285	0.293	9300 K	0.0000
WARM	0.313	0.329	6500 K	0.0000

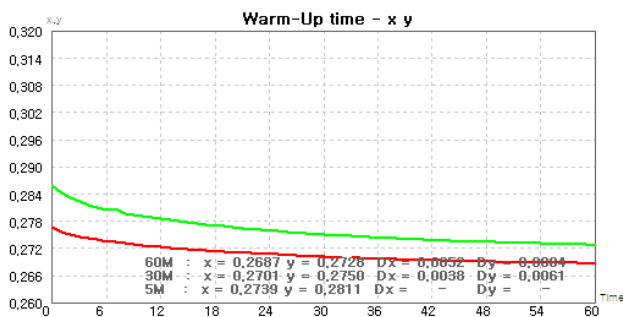
■ Standard color coordinate and temperature using CA-210(CH 14)

Mode	Color Coordination		Temp	ΔUV
	x	y		
COOL	0.269 ± 0.002	0.273 ± 0.002	13000 K	0.0000
MEDIUM	0.285 ± 0.002	0.293 ± 0.002	9300 K	0.0000
WARM	0.313 ± 0.002	0.329 ± 0.002	6500 K	0.0000

#### 4.2.7. Edge LED White balance table

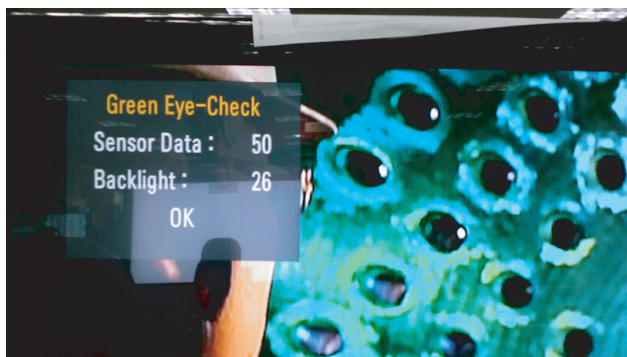
- IOP & Edge LED module change color coordinate because of aging time.
- apply under the color coordinate table, for compensated aging time.
- EDGE LED(LV3700)

GP2	Aging Time (Min.)	Cool		Medium		Warm	
		X	Y	X	Y	X	Y
		269	273	285	293	313	329
1	0-2	280	291	296	311	319	340
2	3-5	278	288	294	308	317	338
3	6-9	276	285	292	305	315	335
4	10-15	274	282	290	302	313	332
5	20-35	273	279	289	299	312	329
6	36-49	270	276	287	296	310	326
7	50-79	269	273	286	293	308	323
8	Over 80	269	273	285	293	308	323



#### 4.3. EYE-Q function check

- Step 1) Turn on TV
- Step 2) Press EYE key of Adj. R/C
- Step 3) Cover the Eye Q II sensor on the front of the using your hand and wait for 6 seconds
- Step 4) Confirm that R/G/B value is lower than 10 of the "Raw Data (Sensor data, Back light)". If after 6 seconds, R/G/B value is not lower than 10, replace Eye Q II sensor.
- Step 5) Remove your hand from the Eye Q II sensor and wait for 6 seconds.
- Step 6) Confirm that "ok" pop up. If change is not seen, replace Eye Q II sensor.



#### 4.4. Option selection per country

- (1) Overview
  - Option selection is only done for models in Non-EU.
  - Applied model: LD12B Chassis applied EU model.
- (2) Method
  - 1) Press ADJ key on the Adj. Remote Control, then select Country Group Menu.
  - 2) Depending on destination, select Country Group Code 04 or Country Group EU then on the lower Country option, select US, CA, MX. Selection is done using +, - or ►◀ KEY.

#### 5. Tool Option selection

- Method : Press Adj. key on the Adj. Remote Control, then select Tool option.

#### 6. Ship-out mode check(In-stop)

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

#### 7. GND and Internal Pressure check

##### 7.1. Method

- 1) GND & Internal Pressure auto-check preparation
  - Check that Power Cord is fully inserted to the SET. (If loose, re-insert)
- 2) Perform GND & Internal Pressure auto-check
  - Unit fully inserted Power cord, Antenna cable and A/V arrive to the auto-check process.
  - Connect D-terminal to AV JACK TESTER
  - Auto CONTROLLER(GWS103-4) ON
  - Perform GND TEST
  - If NG, Buzzer will sound to inform the operator.
  - If OK, changeover to I/P check automatically. (Remove CORD, A/V form AV JACK BOX)
  - Perform I/P test
  - If NG, Buzzer will sound to inform the operator.
  - If OK, Good lamp will lit up and the stopper will allow the pallet to move on to next process.

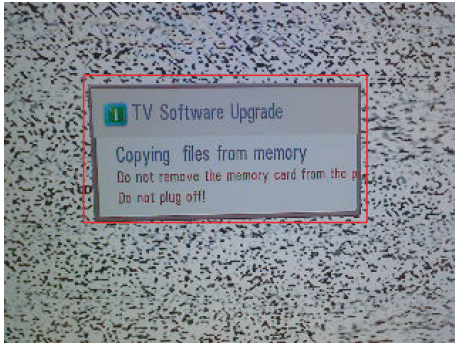
##### 7.2. Checkpoint

- TEST voltage
  - GND: 1.5 KV/min at 100 mA
  - SIGNAL: 3 KV/min at 100 mA
- TEST time: 1 second
- TEST POINT
  - GND TEST = POWER CORD GND & SIGNAL CABLE METAL GND
  - Internal Pressure TEST = POWER CORD GND & LIVE & NEUTRAL
- LEAKAGE CURRENT: At 0.5 mArms

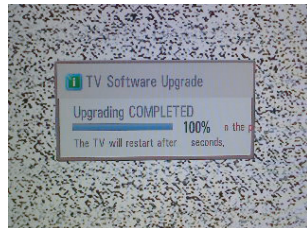
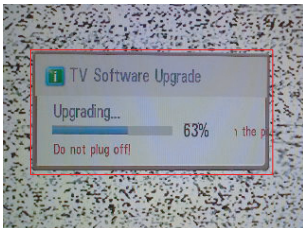


## 8. USB S/W download(option, Service only)

- 1) Put the USB Stick to the USB socket
- 2) Automatically detecting update file in USB Stick
  - If your downloaded program version in USB Stick is Low, it didn't work. But your downloaded version is High, USB data is automatically detecting
- 3) Show the message "Copying files from memory"

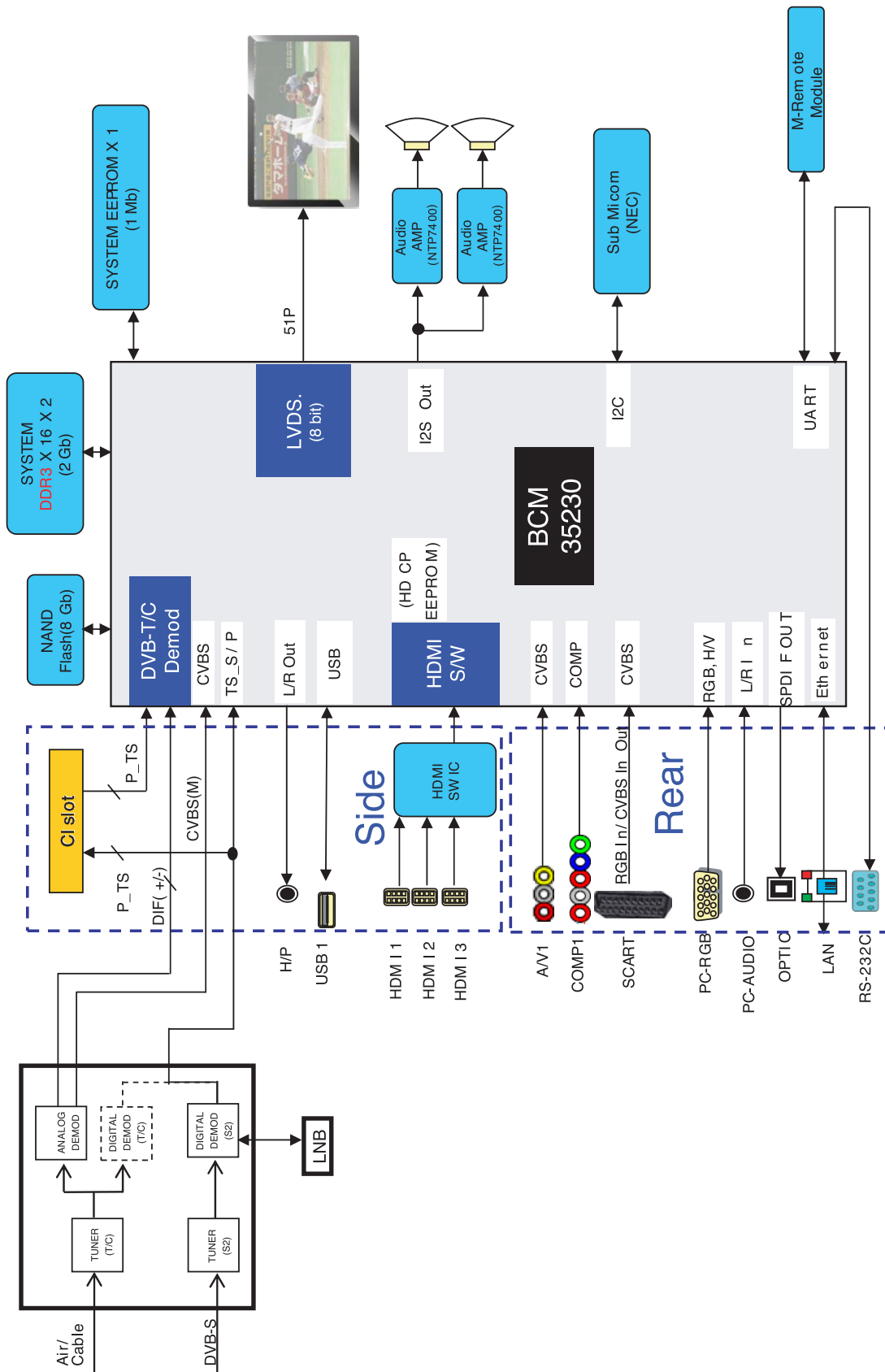


- 4) Updating is starting.



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

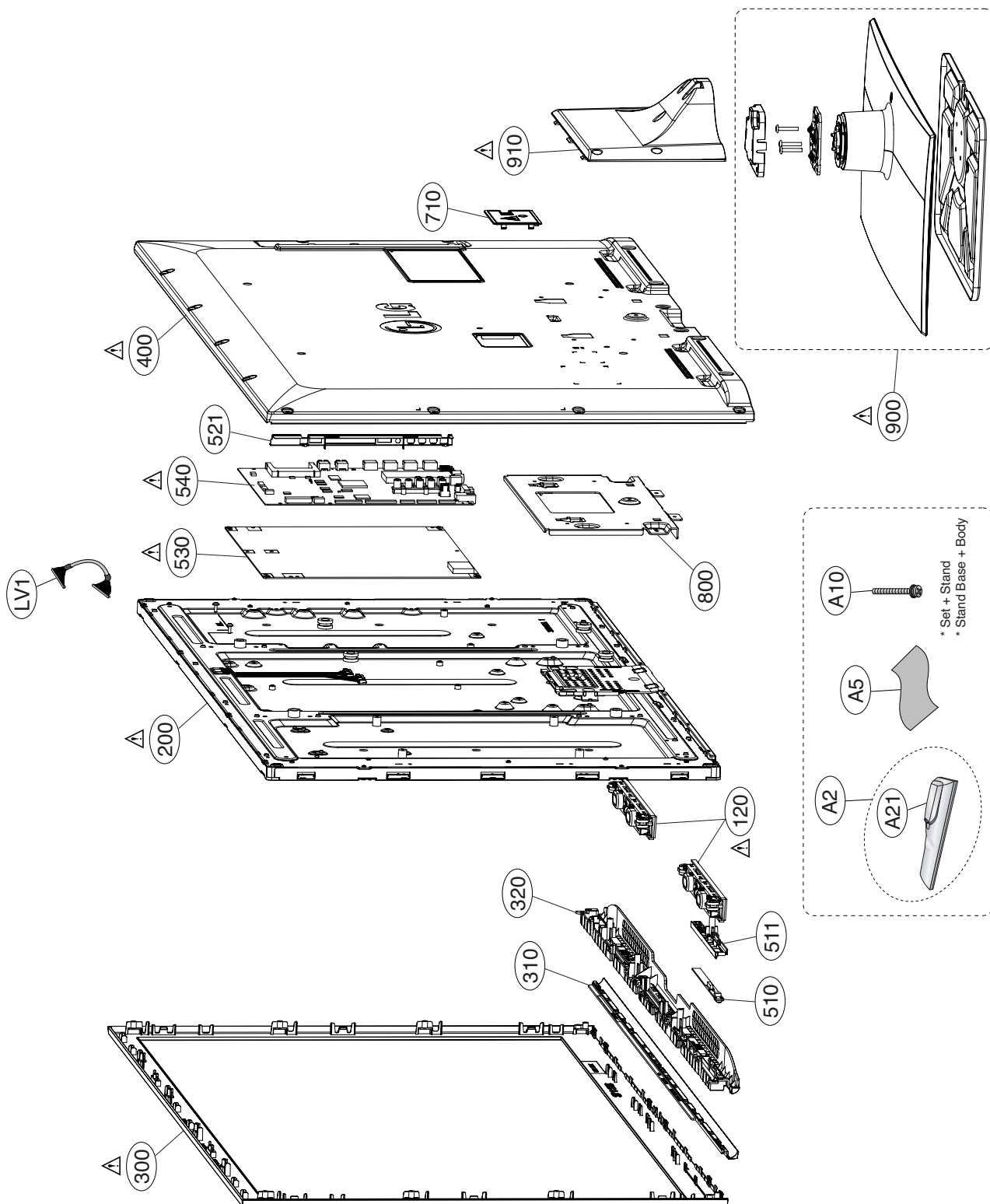
# BLOCK DIAGRAM



# EXPLODED VIEW

## IMPORTANT SAFETY NOTICE

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



The diagram illustrates the electrical connection between a microcontroller (MCU) and a NAND Flash memory (IC102 TC58BDV308TA00). The MCU pins are numbered 1 through 24 on the left, and the NAND Flash pins are numbered 1 through 24 on the right. The NAND Flash is labeled IC102 TC58BDV308TA00.

**Power and Ground Connections:**

- VCC:** Connected to pin 1 (NC\_1) and pin 19 (WP).
- GND:** Connected to pin 12 (VSS\_1) and pin 24 (NC\_15).
- +3.3V\_Normal:** Connected to pin 19 (WP) and pin 24 (NC\_15).

**Control Signal Connections:**

- Hand\_Rb:** Connected to pin 6 (RY/BF).
- Hand\_Rb:** Connected to pin 8 (RE).
- Hand\_Ceb:** Connected to pin 9 (CE).
- Hand\_Ceb2:** Connected to pin 10 (NC\_7).
- Hand\_Cle:** Connected to pin 16 (CLE).
- Hand\_Ale:** Connected to pin 17 (ALE).
- Hand\_We:** Connected to pin 18 (WE).
- Flash\_Wp:** Connected to pin 19 (WP).

**Data Signal Connections:**

- Hand\_Data[0-7]:** Connected to pins 44 through 51 (NC\_28 through NC\_16).

**Timing and Decoupling Components:**

- R107:** 2.7kΩ resistor connected to VCC and pin 1 (NC\_1).
- R149:** 16Gbit resistor connected to VCC and pin 6 (RY/BF).
- R148:** 16Gbit resistor connected to VCC and pin 10 (NC\_7).
- C102:** 4700pF capacitor connected to VCC and pin 11 (NC\_8).
- VSS\_1:** 0.1uF capacitor connected to GND and pin 12 (VSS\_1).
- VCC\_2:** +3.3V\_Normal connected to pin 13 (VCC\_2).
- C104:** 10uF capacitor connected to VCC\_2 and pin 16 (NC\_22).
- C103:** 0.1uF capacitor connected to GND and pin 16 (NC\_22).
- P51:** 16Gbit resistor connected to VCC and pin 39 (NC\_23).

**Legend:**

- High : Normal Operation
- Low : Write Protection

IC102-+1		TH58DVG480ETA20	
NC_1	1	DEV_NAND_16Gbit	48
NC_2	2		47
NC_3	3	NC_24	46
NC_4	4	NC_23	45
NC_5	5	I/O8	44
RV/RV2	6	I/O7	43
RV/RV1	7	I/O6	42
RE	8	I/O5	41
CE1	9	NC_22	40
CE2	10	FSL	39
NC_6	11	NC_21	38
VCC_1	12	VCC_2	37
VSS_1	13	VSS_2	36
NC_7	14	NC_20	35
NC_8	15	NC_19	34
CLE	16	NC_18	33
ALE	17	I/O4	32
WE	18	I/O3	31
WP	19	I/O2	30
NC_9	20	I/O1	29
NC_10	21	NC_17	28
NC_11	22	NC_16	27
NC_12	23	NC_15	26
NC_13	24	NC_14	25

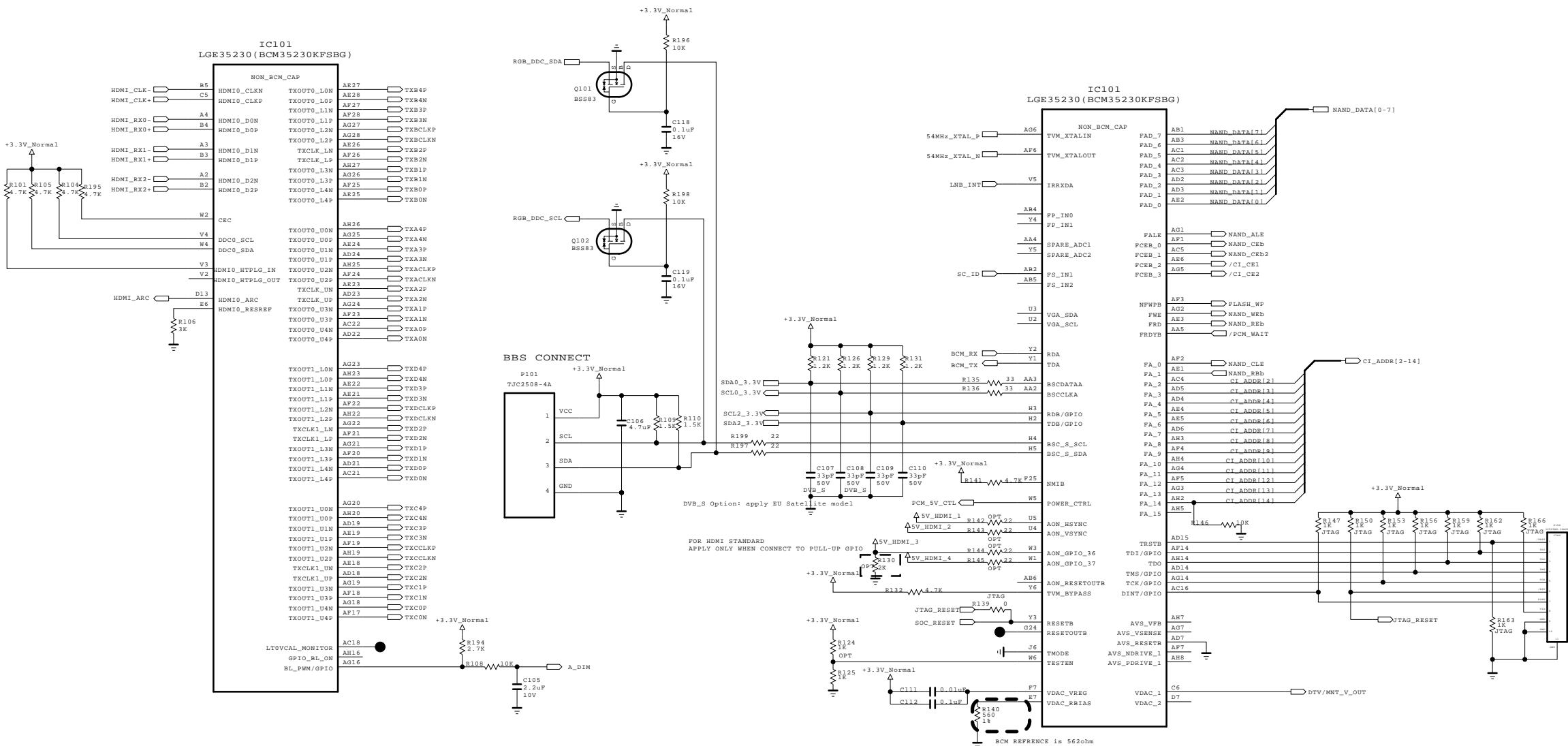
The diagram shows the NAND ECC (FA3, FA2, FALE) circuit. It includes a 3.3V\_Normal supply connected to a network of resistors (R113, R117, R122, R127, R114, R118, R123, R128) and NAND Flash devices. The NAND Flash devices are connected to a common data bus (NAND\_DATA[0:15]) and a common address bus (NAND\_ADDR[4]). The NAND Flash devices are:

- 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 10bit 2KB page SLC NAND Flash devices
- 1000: 8-bit 20bit, 40bit, 80bit 2KB page SLC NAND Flash devices
- 1010: 8-bit 160bit, 320bit 4KB page SLC NAND Flash devices (0)
- 0001: 8-bit 8/16/320bit 2KB page MLC NAND Flash devices
- 0011: 8-bit 320bit: 8KB page MLC NAND Flash devices
- 0111: 3B dual IO Serial Flash
- 1001: 8B dual IO Serial Flash
- 1011: Fast Serial Flash > 50MHz
- 1100: OneNAND Flash (always 16-bit)
- 1110: Reserved
- 1101, 1111: Reserved

DUAL COMPONENT	
IC102	1ST : EAN60999801 2ND : T-TC58DVG3S0ETA00
IC102-*1	

NAND\_DATA[0]:  
 0: System is LITTLE endian (0)  
 1: System is BIG endian  
  
 CI\_ADDR[7]:  
 0: Disable EDID automatic Downloading from Flash (0)  
 1: Enable EDID automatic Downloading from Flash  
  
 NAND\_DATA[6]:  
 0: Disable OSC clock output on chip pin (0)  
 1: Enable OSC clock output on chip pin.  
  
 CI\_ADDR[6]:  
 0: Host MIPS run at 500 Mhz (0)  
 1: Host MIPS run at 250 Mhz  
  
 NAND\_CLE:  
 0: Differential Oscillators TVM not bypassed (0)  
 1: Differential Oscillators TVM bypassed  
  
 NAND\_DATA[4]:  
 0: 27MHz TVM Crystal Frequency  
 1: 54MHz TVM Crystal Frequency (0)

CI\_ADDR[9], CI\_ADDR[11], CI\_ADDR[12], CI\_ADDR[13]  
 TVM Crystal oscillator bias/gain control  
 0000: 210uA  
 0001: 390uA  
 0010: 570uA  
 0011: 730uA  
 0100: 890uA (0)  
 0111: 1290uA  
 1000: 1416uA  
 1111: 2186uA  
 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/Off only)  
 at end of RESETb pulse (0)  
  
 NAND\_DATA[3]:  
 0: MIPS will boot from external flash (0)  
 1: MIPS will boot from ROW  
  
 NAND\_DATA[5]:  
 0: FLASH MODE (0)  
 1: BSC\_SLAVE(BBS) MODE

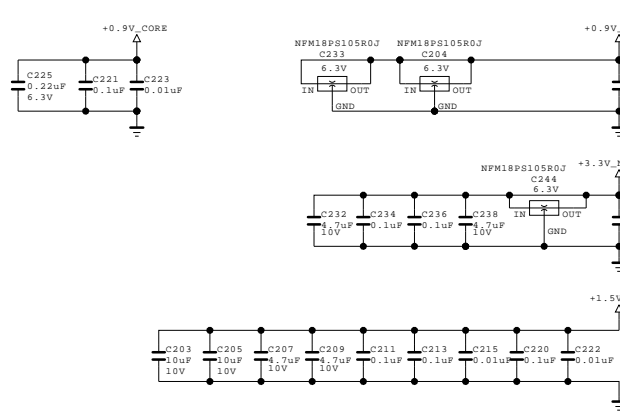


SECRET  
LGElectronics

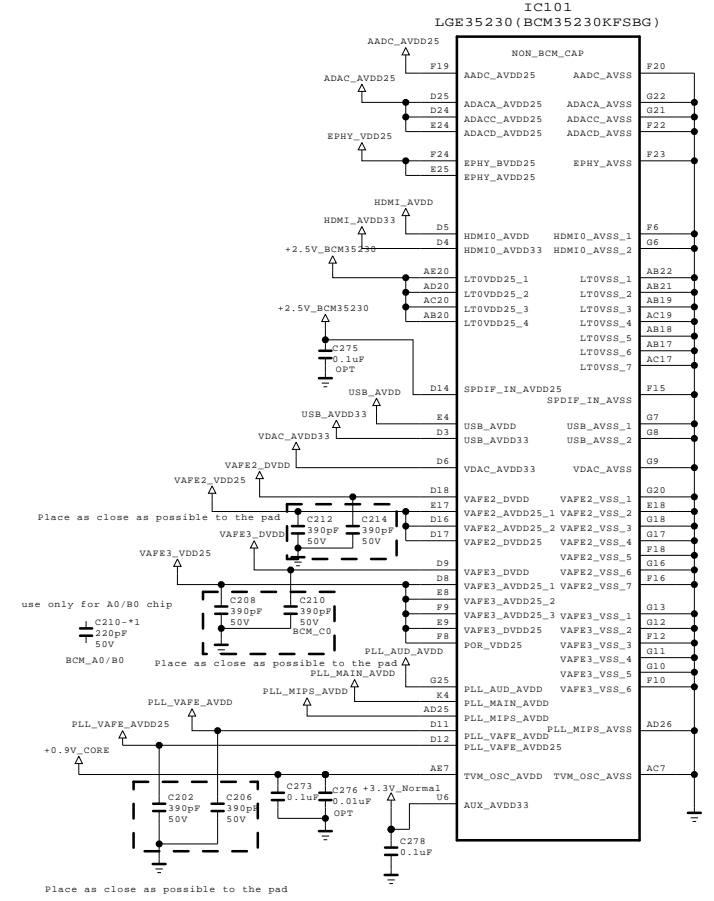
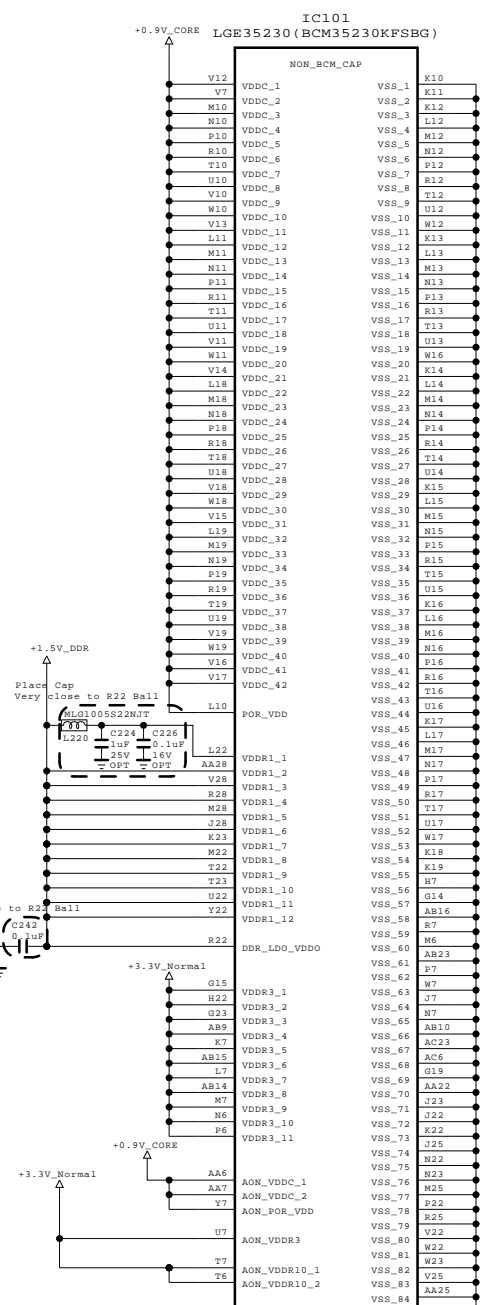
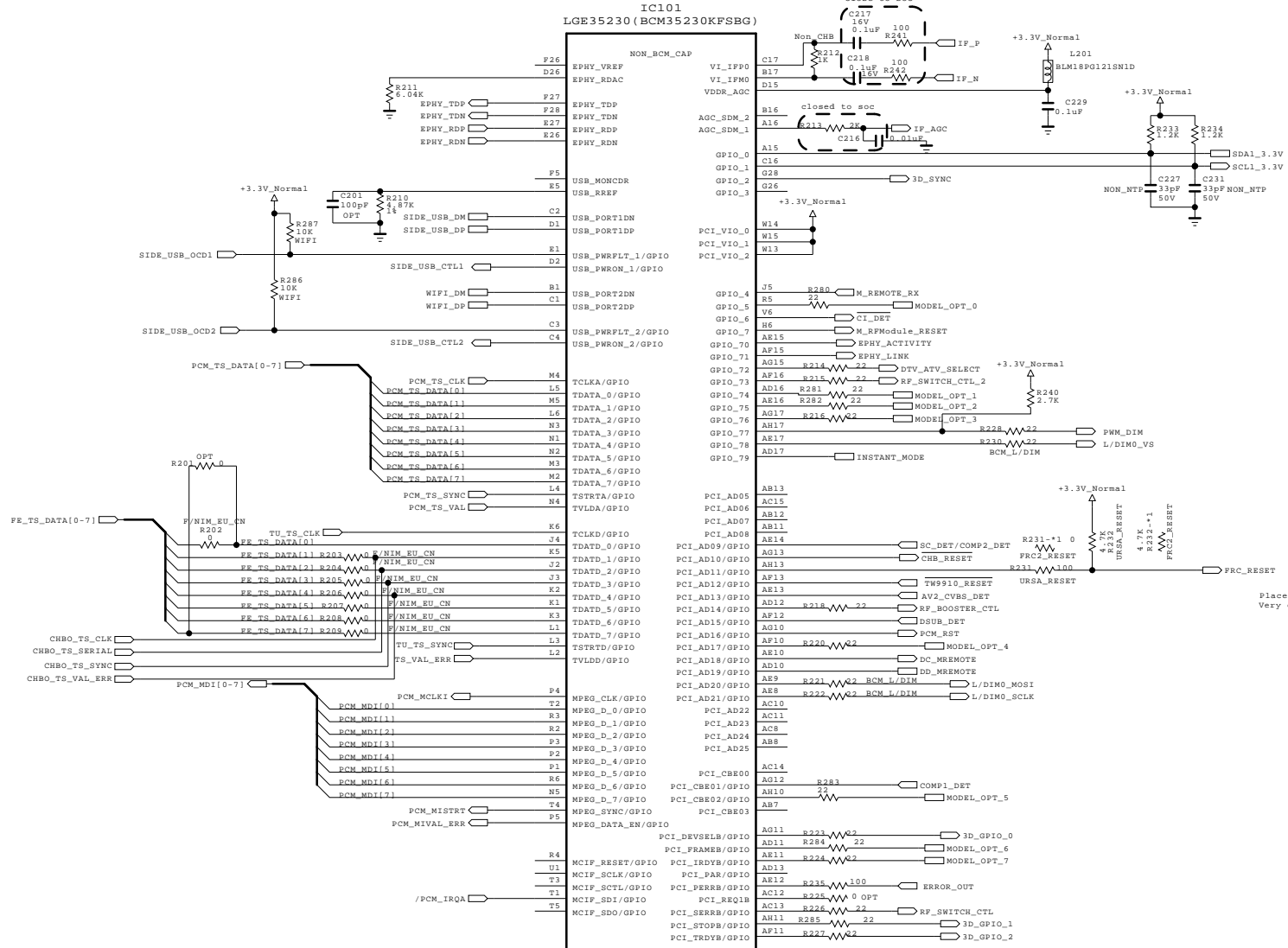
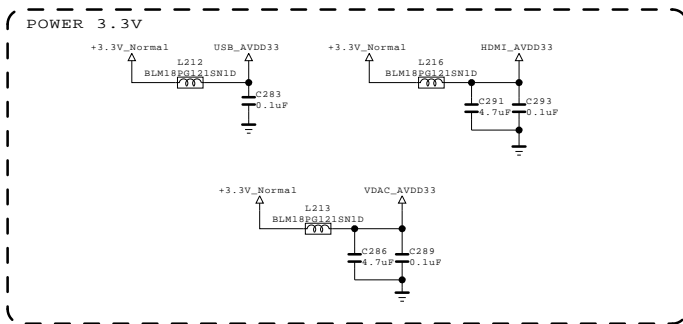
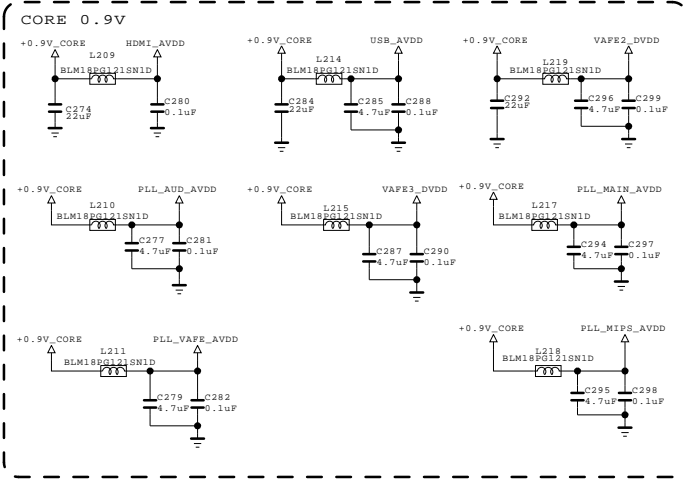
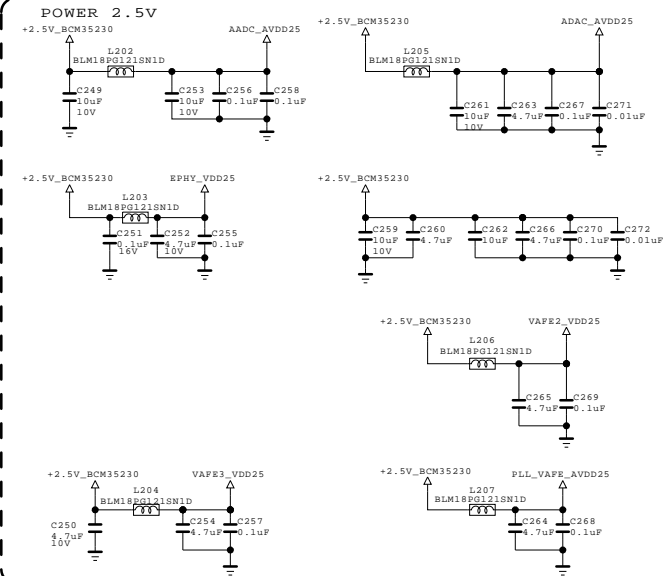


MODEL	BCM35230	DATE	2010.09.18
BLOCK	MAIN & NAND FLASH	SHEET	1 / 57





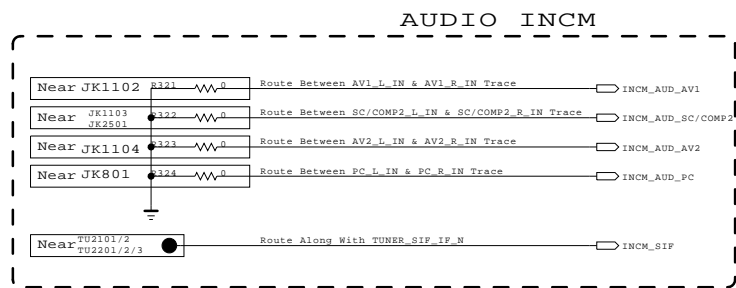
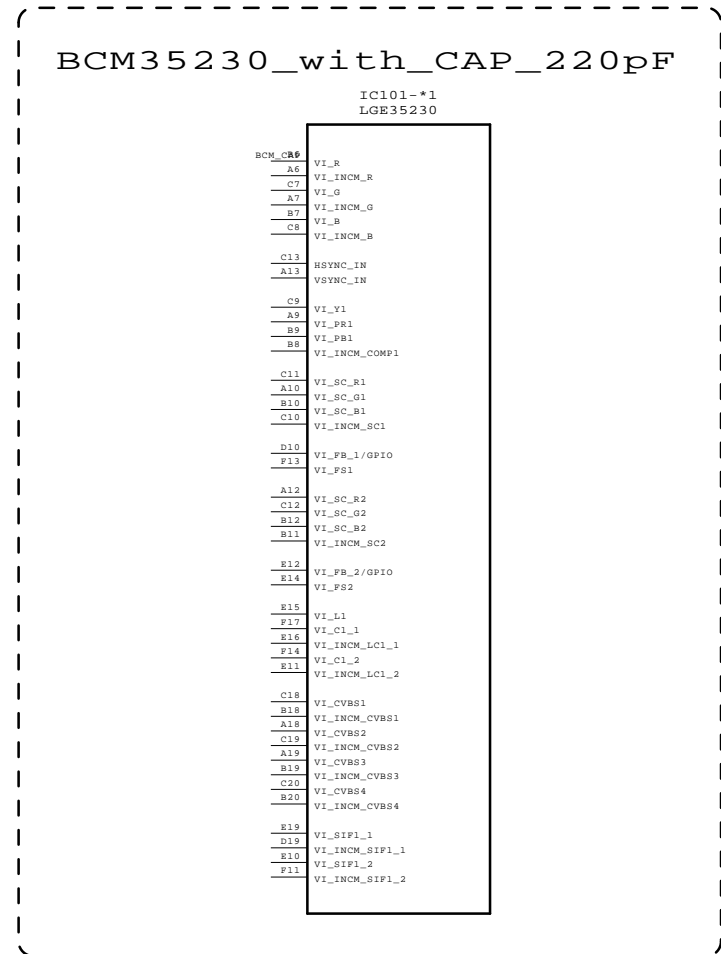
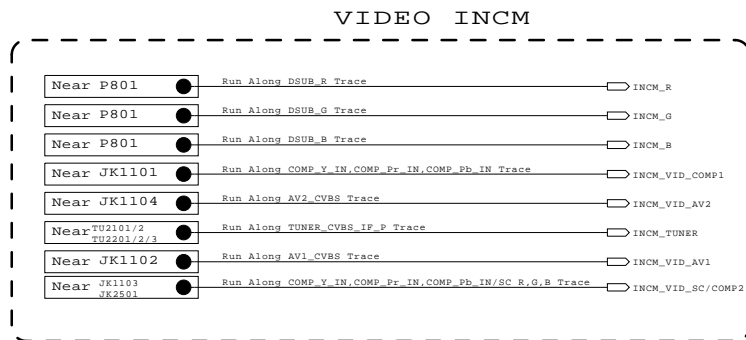
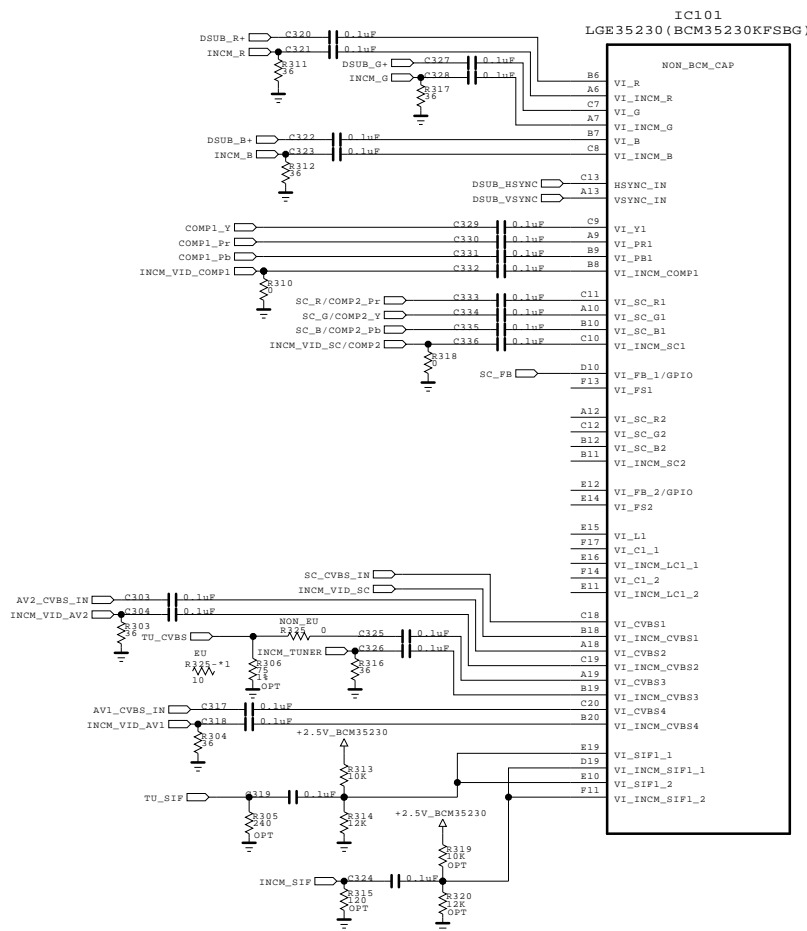
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MODEL_OPT_2		FHD	HD
MODEL_OPT_3		OLED	LCD
MODEL_OPT_4	DDR speed	1333	1600
MODEL_OPT_5	T2 Tuner	Support	Not Support
MODEL_OPT_6	S Tuner	Support	Not Support
MODEL_OPT_7	PRM	Enable	Disable





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MODEL	BCM35230	DATE	
BLOCK	MAIN POWER	SHEET	2 / 50



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

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

DDR STRAP

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

DDR\_DQ[10]  
 DDR\_DQ[9]  
 DDR\_DQ[7]  
 DDR\_DQ[8]  
 DDR\_DQ[6]  
 DDR\_DQ[5]

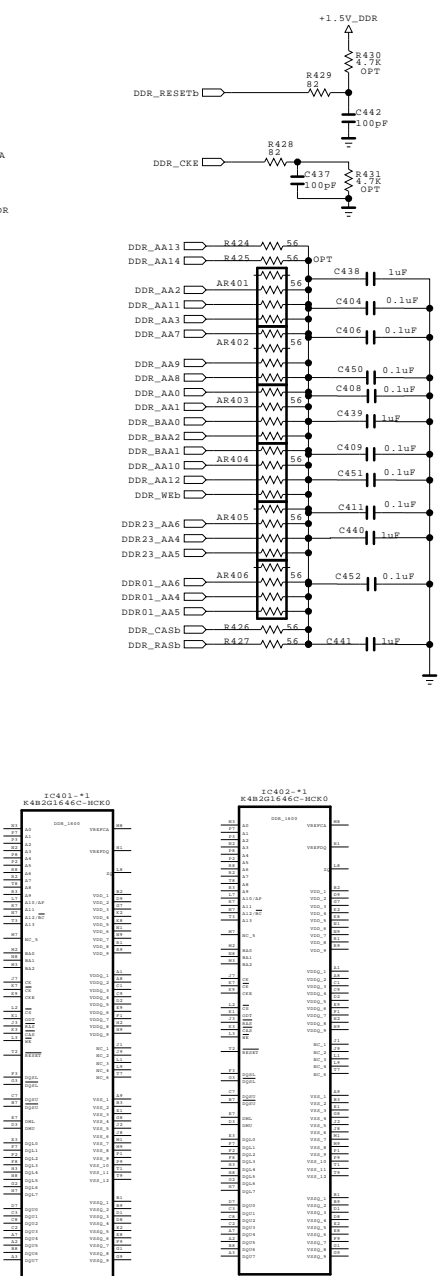
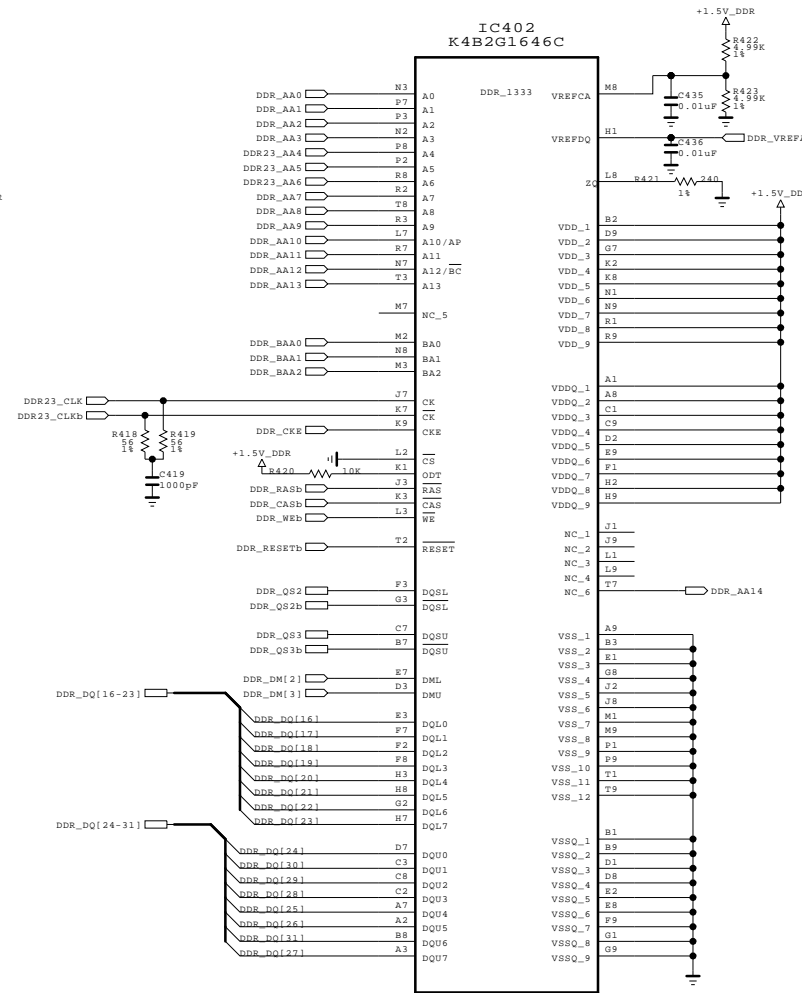
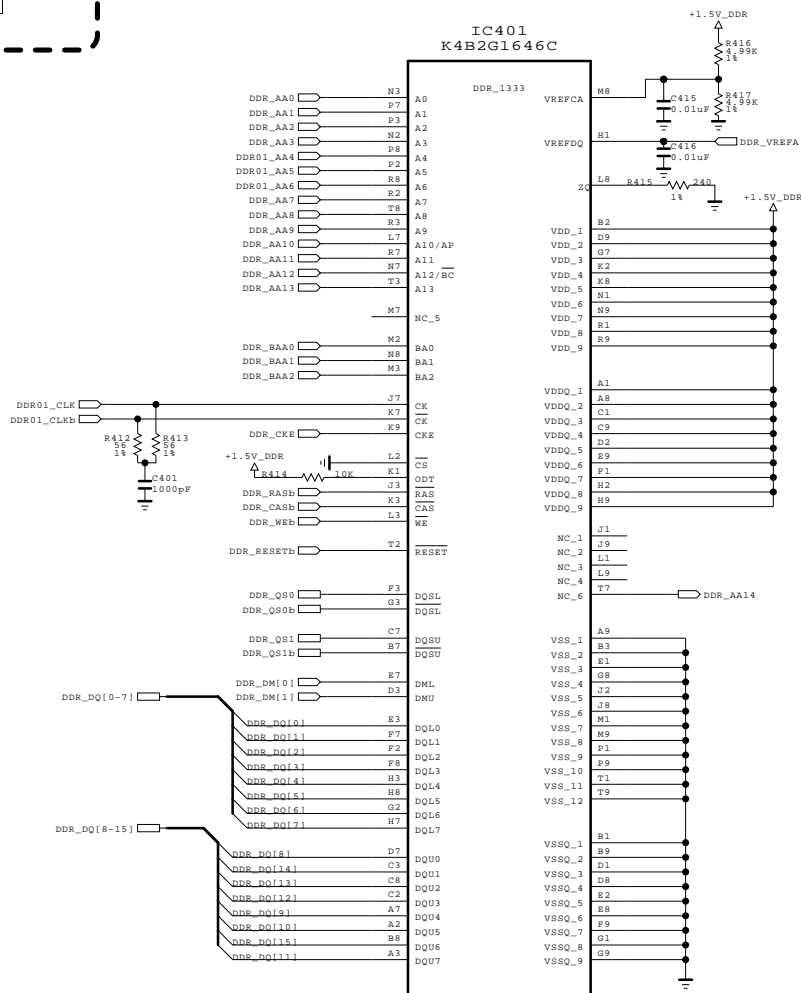
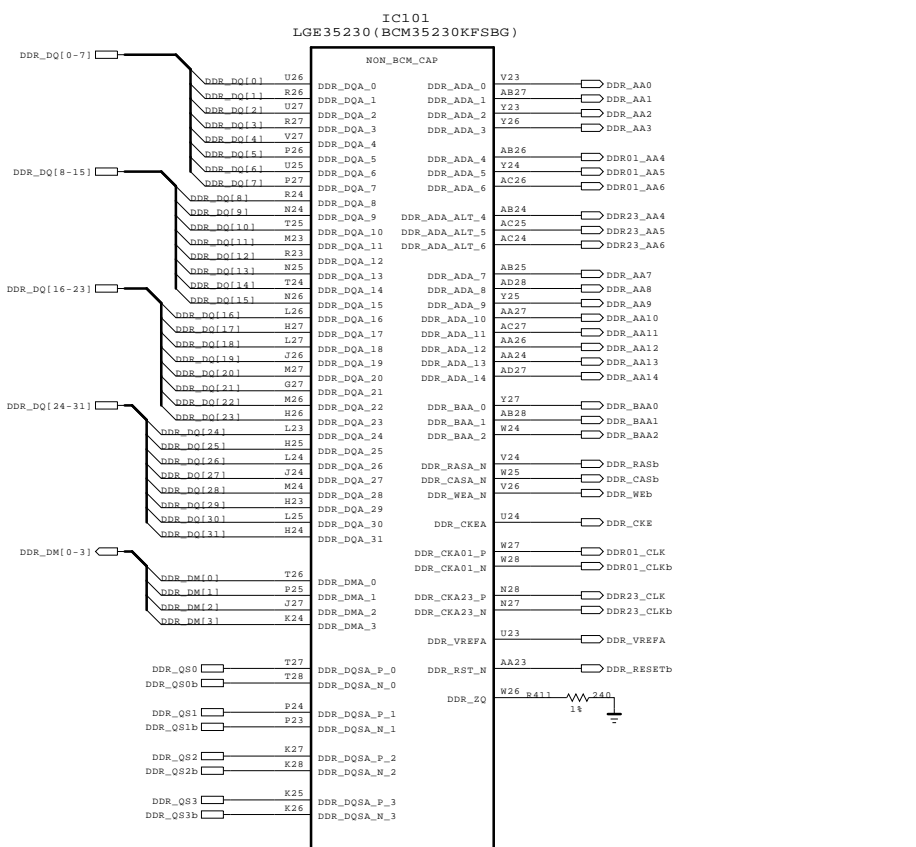
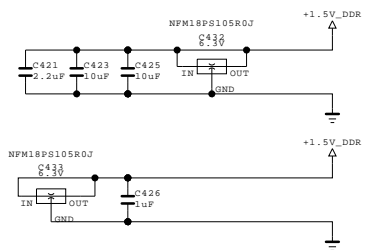
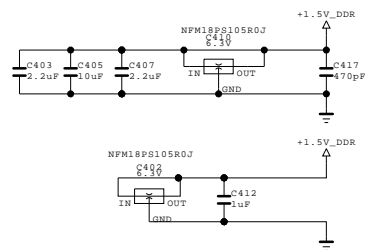
8402  
8403  
8404  
8405  
8407  
8409  
OPT

VDD\_1.33V

HYNIX\_DDR

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 - 8Gbit (O)  
 10 - 16Gbit  
 11 - 32Gbit

DDR_DQ[9]	DDR_DQ[7]	Maker
1	1	SS
1	0	Hynix
0	1	Reserve
0	0	Reserve

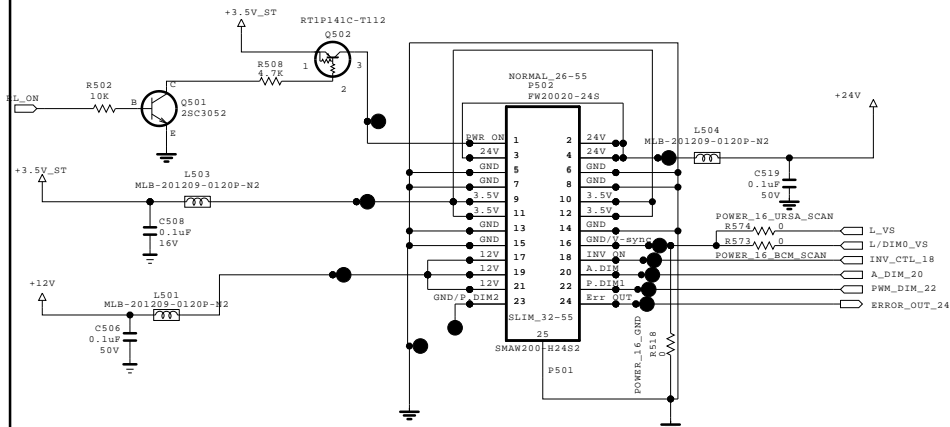


SECRET  
LGElectronics



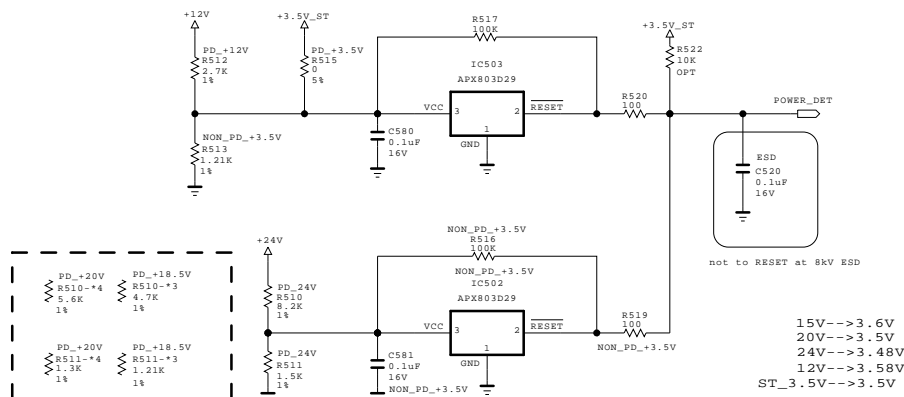
MODEL	BCM35230	DATE	
BLOCK	MAIN DDR	SHEET	4 / 50

## FROM LIPS & POWER B/D

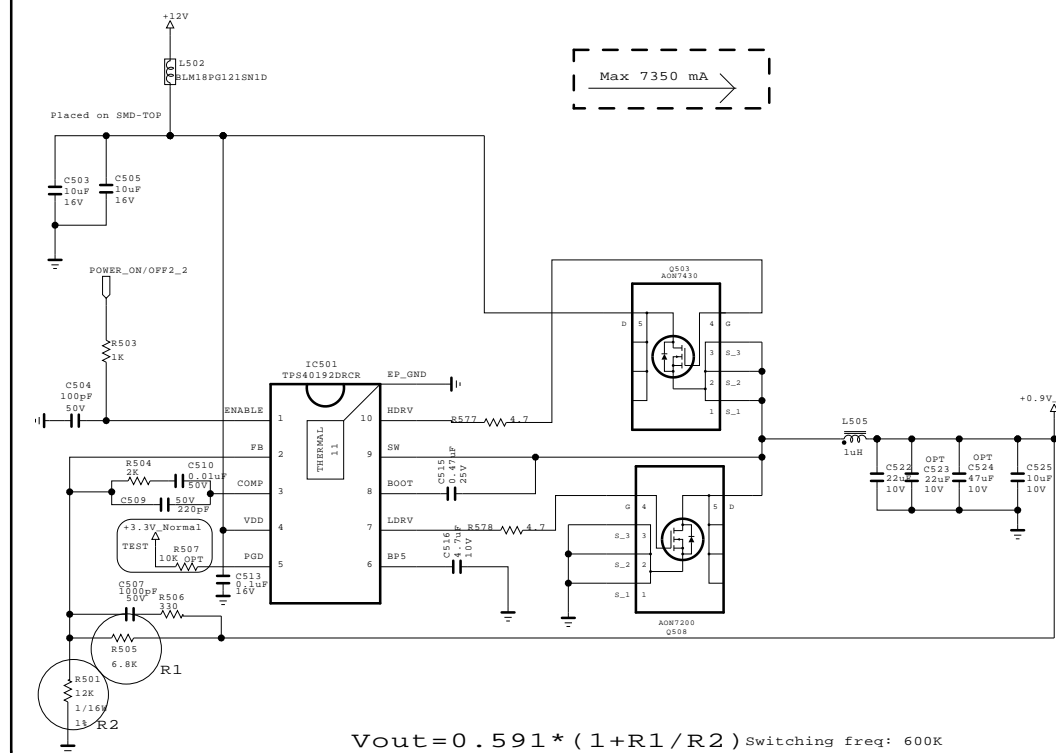




#16/#20/#23  
LD - GND OR USE  
LE(N.L.D.) - OPEN  
LE(L.D.) - USE

## Power\_DET



## +0.9V\_CORE\_BCM35230



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

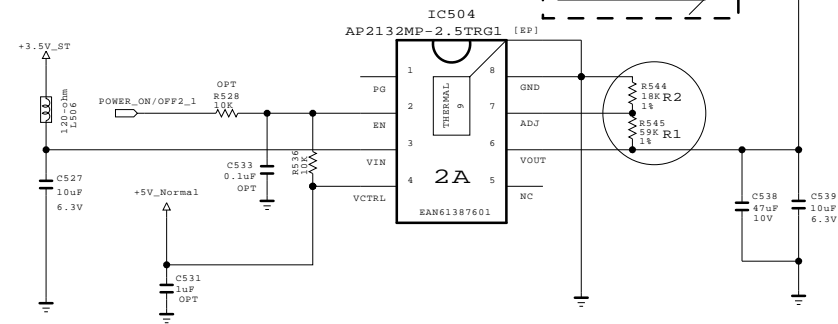
SECRET

LGElectronics

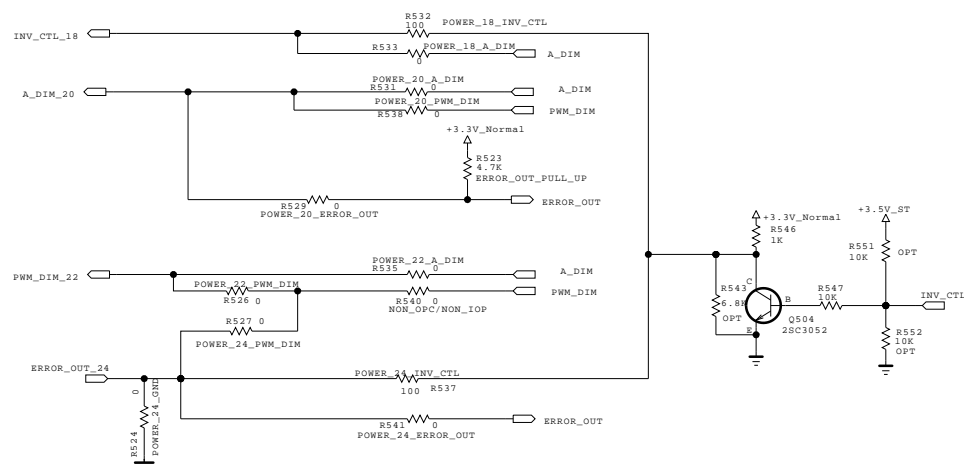


Vout=0.6\*(1+R1/R2)

## +2.5V\_BCM35230



## OS Module OPT

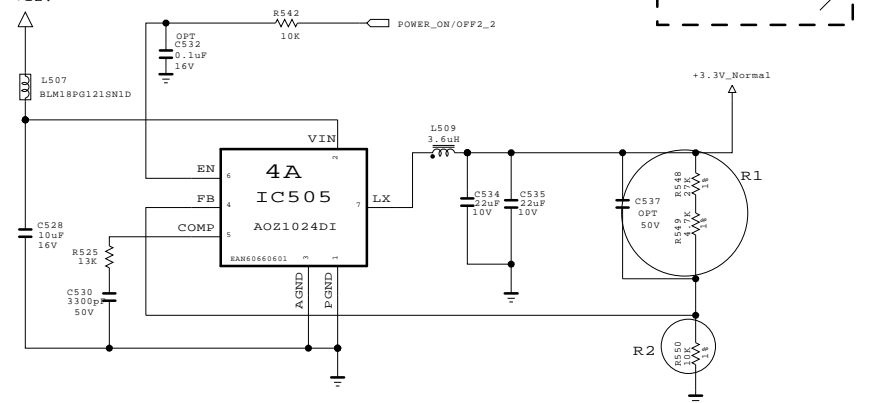


<OS MODULE PIN MAP>

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

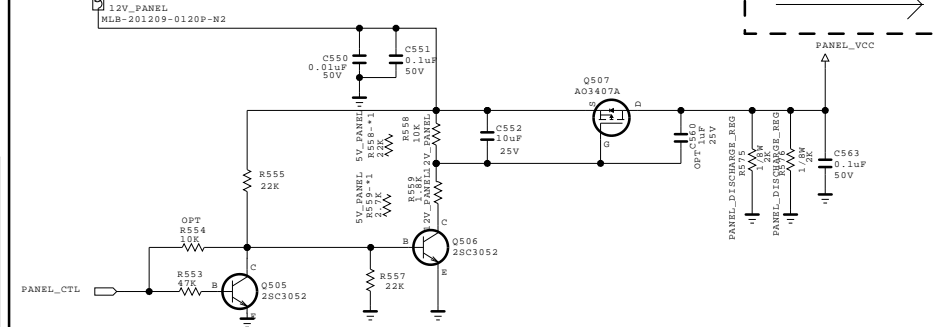
CHECK PWR/MODULE PIN MAP

## +3.3V\_NORMAL

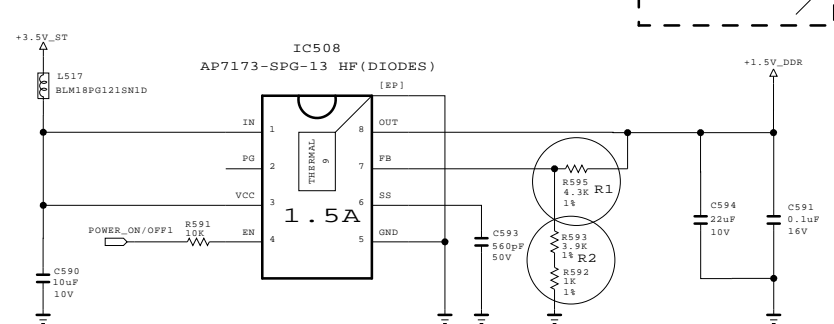


Vout=0.8\*(1+R1/R2)

## PANEL\_POWER

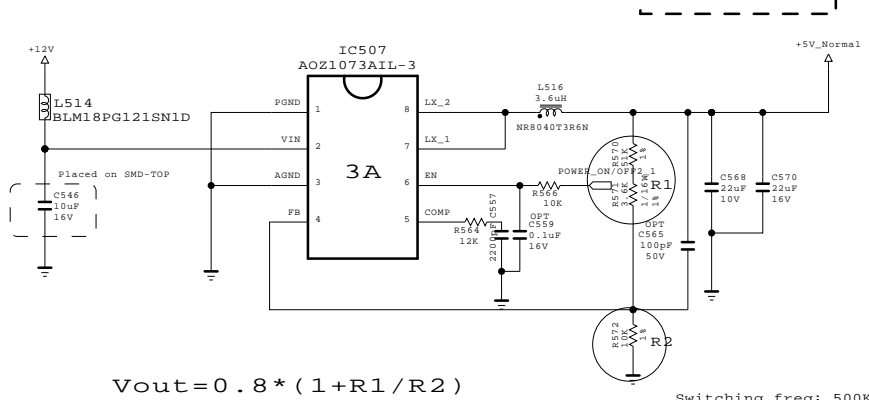


## +1.5V\_DDR



Vout=0.8\*(1+R1/R2)

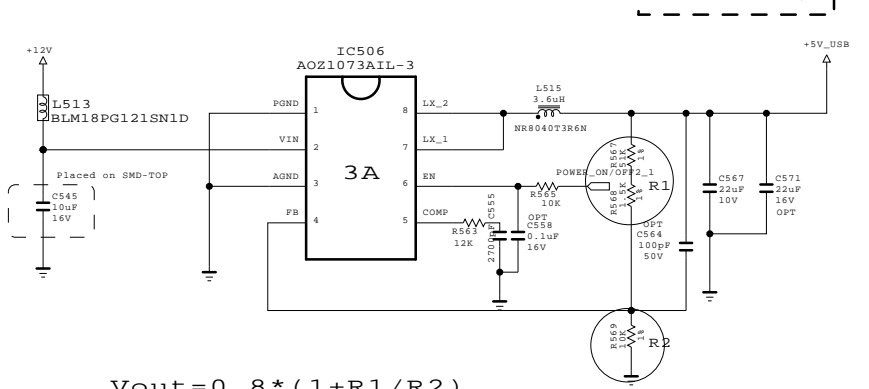
## +5V\_Normal



Vout=0.8\*(1+R1/R2)

Switching freq: 500K

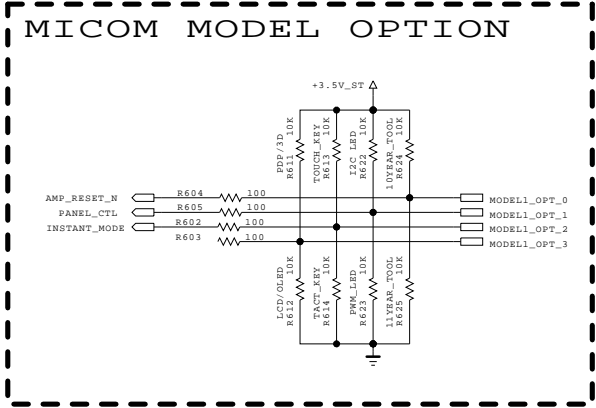
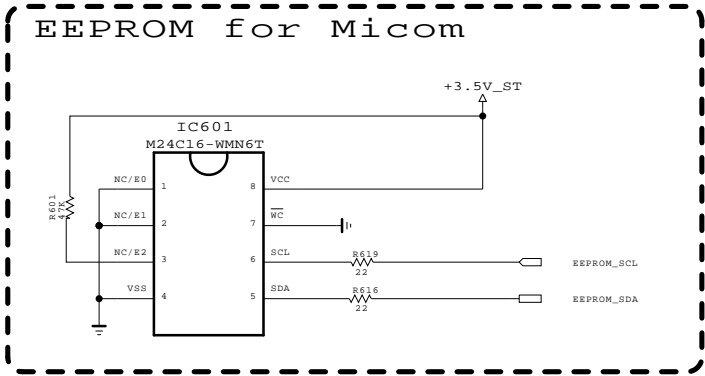
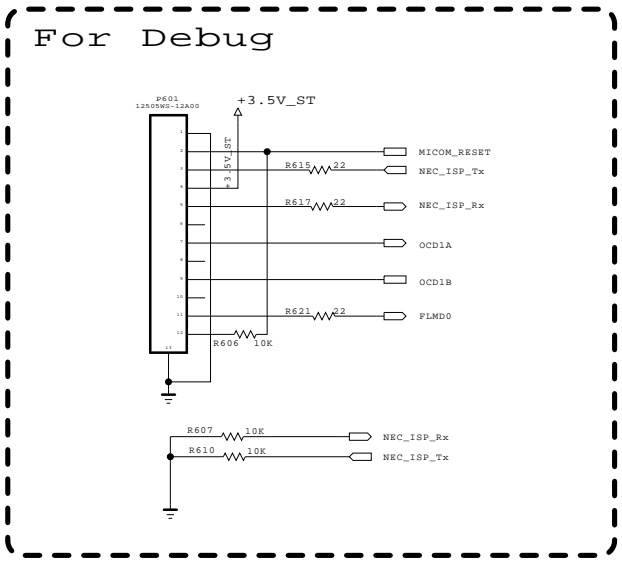
## +5V\_USB+WIFI



Vout=0.8\*(1+R1/R2)

Switching freq: 500K

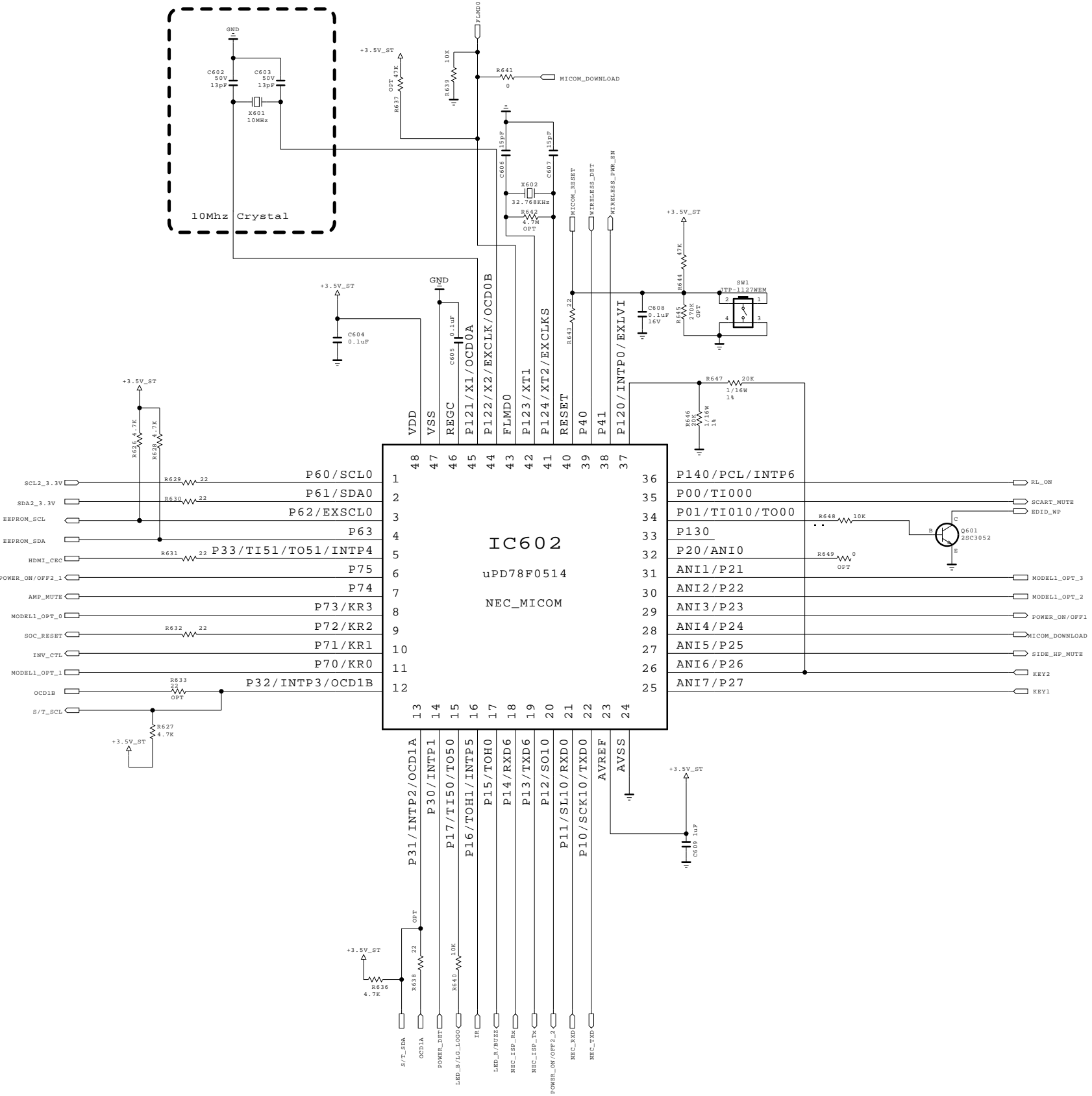
MODEL	BCM35230	DATE		
BLOCK	POWER	SHEET	5	58





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



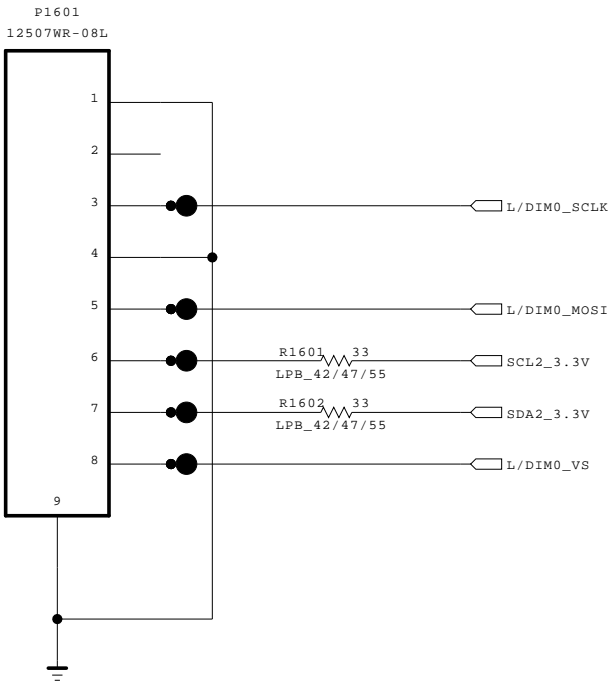
THE  SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE  SYMBOL MARK OF THE SCHEMATIC.



SECRET  
LGElectronics



MODEL	BCM35230	DATE	
BLOCK	MICOM	SHEET	6 / 50

[Local Dimming Block]

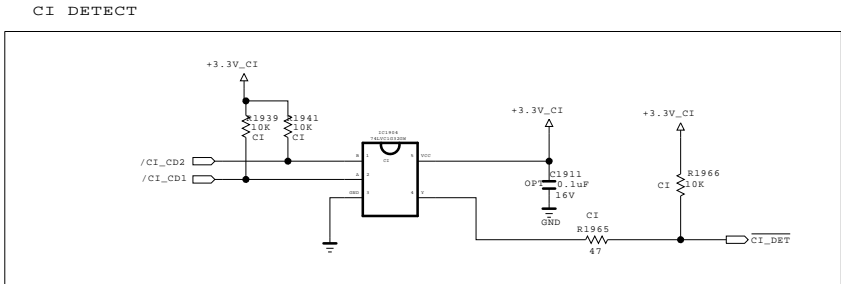
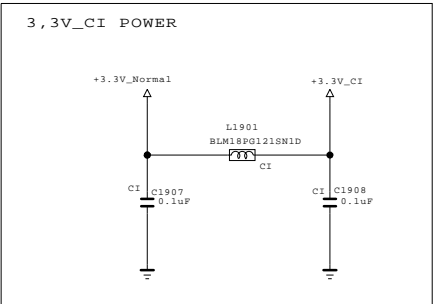
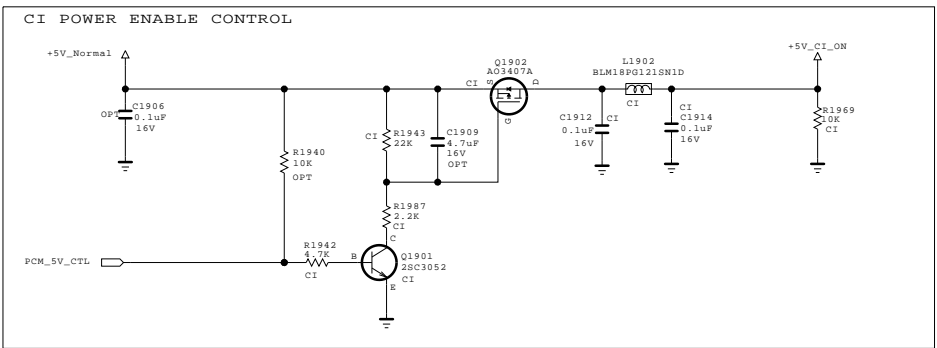
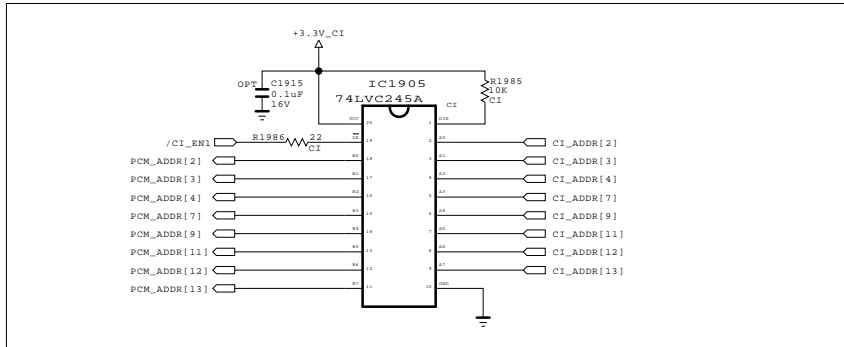
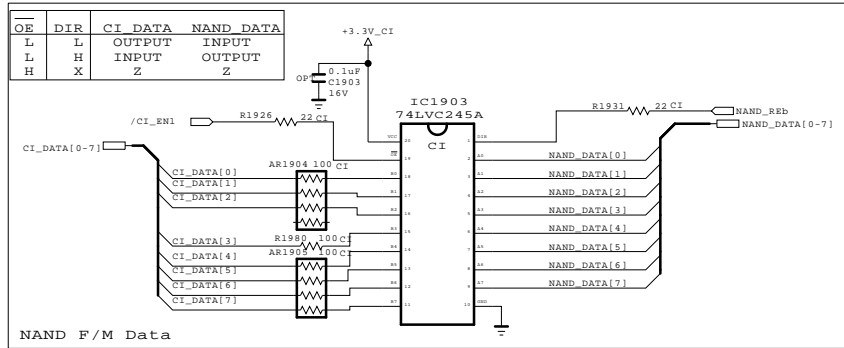
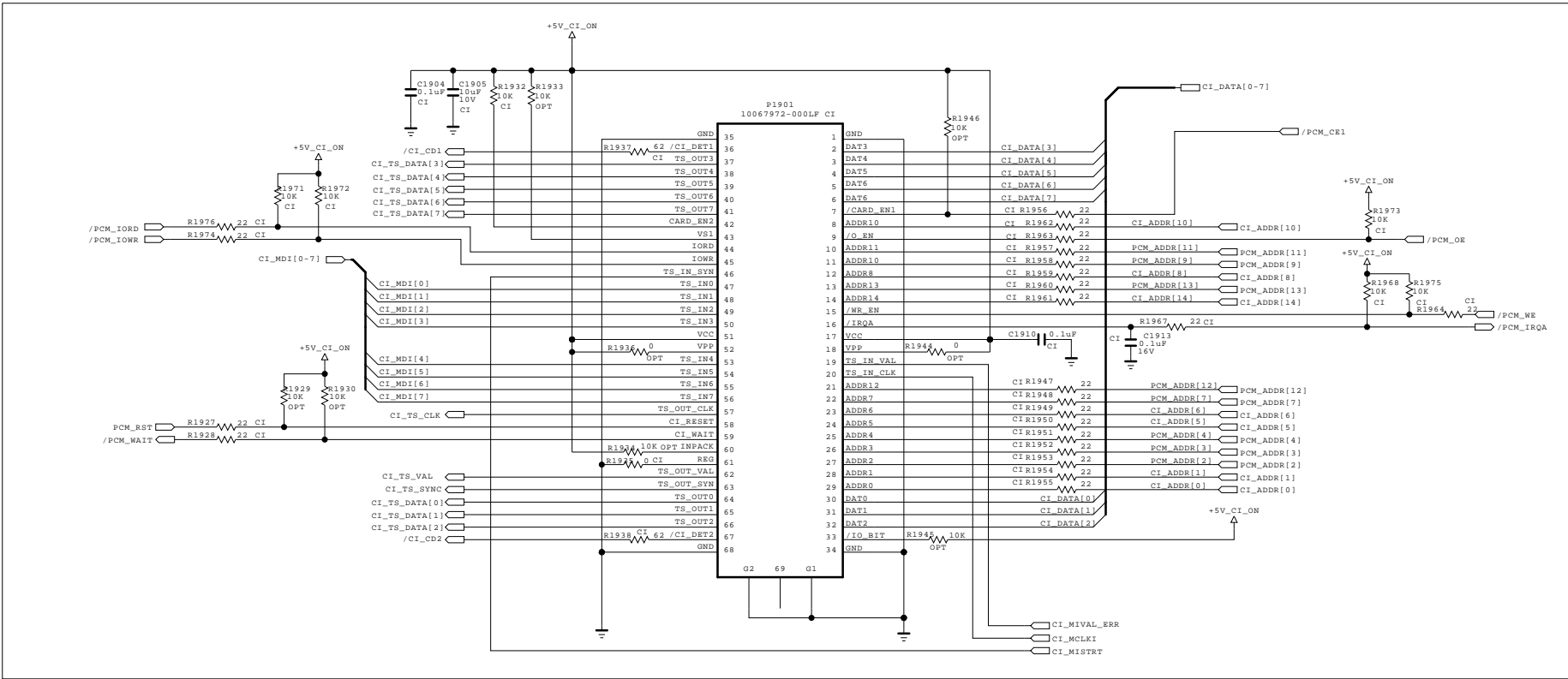
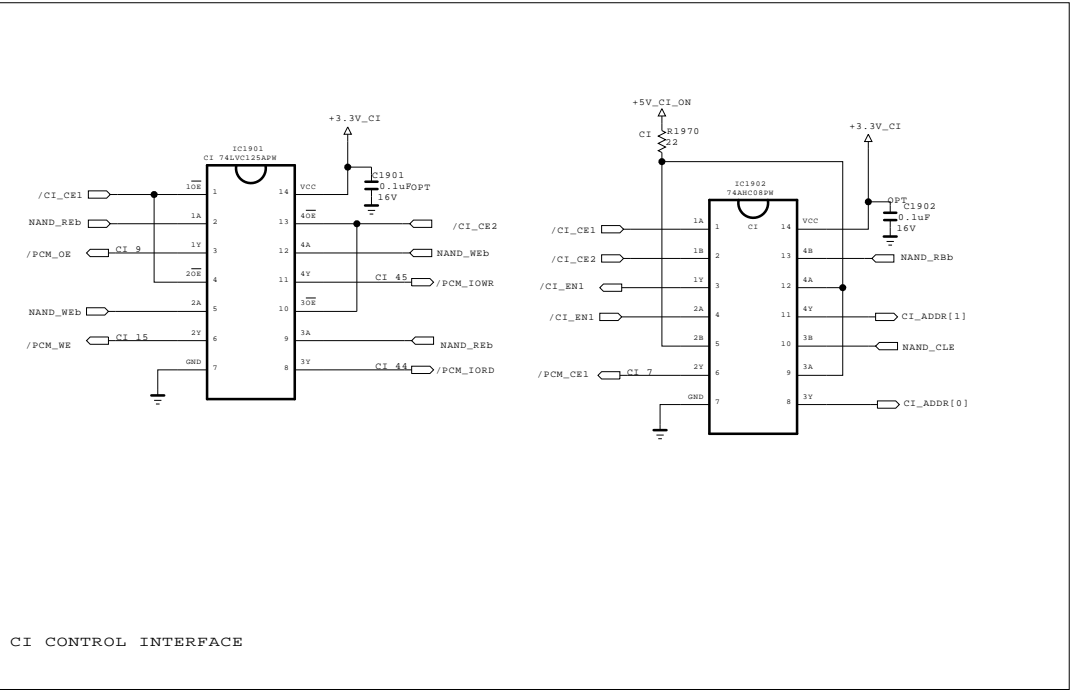
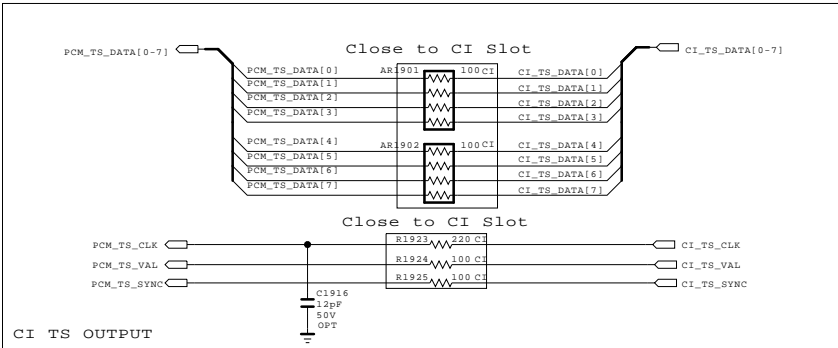
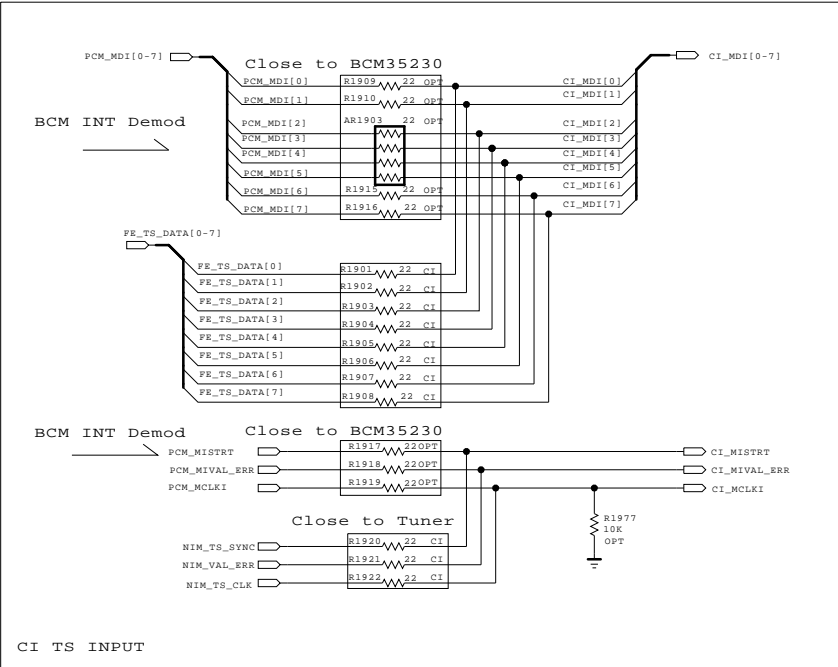




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SECRET	 LG ELECTRONICS
LGElectronics	

MODEL	BCM35230	DATE	
BLOCK	L_DIMMING	SHEET	16 / 50

DUAL COMPONENT		
Q1901	1ST : 0TRIY80001A	2ND : 0TR387500AA
Q1902	1ST : EBK60752501,	2ND : EBK61011501
IC1904	1ST : 0ISTLPH062A,	2ND : EAN40055001



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

SECRET

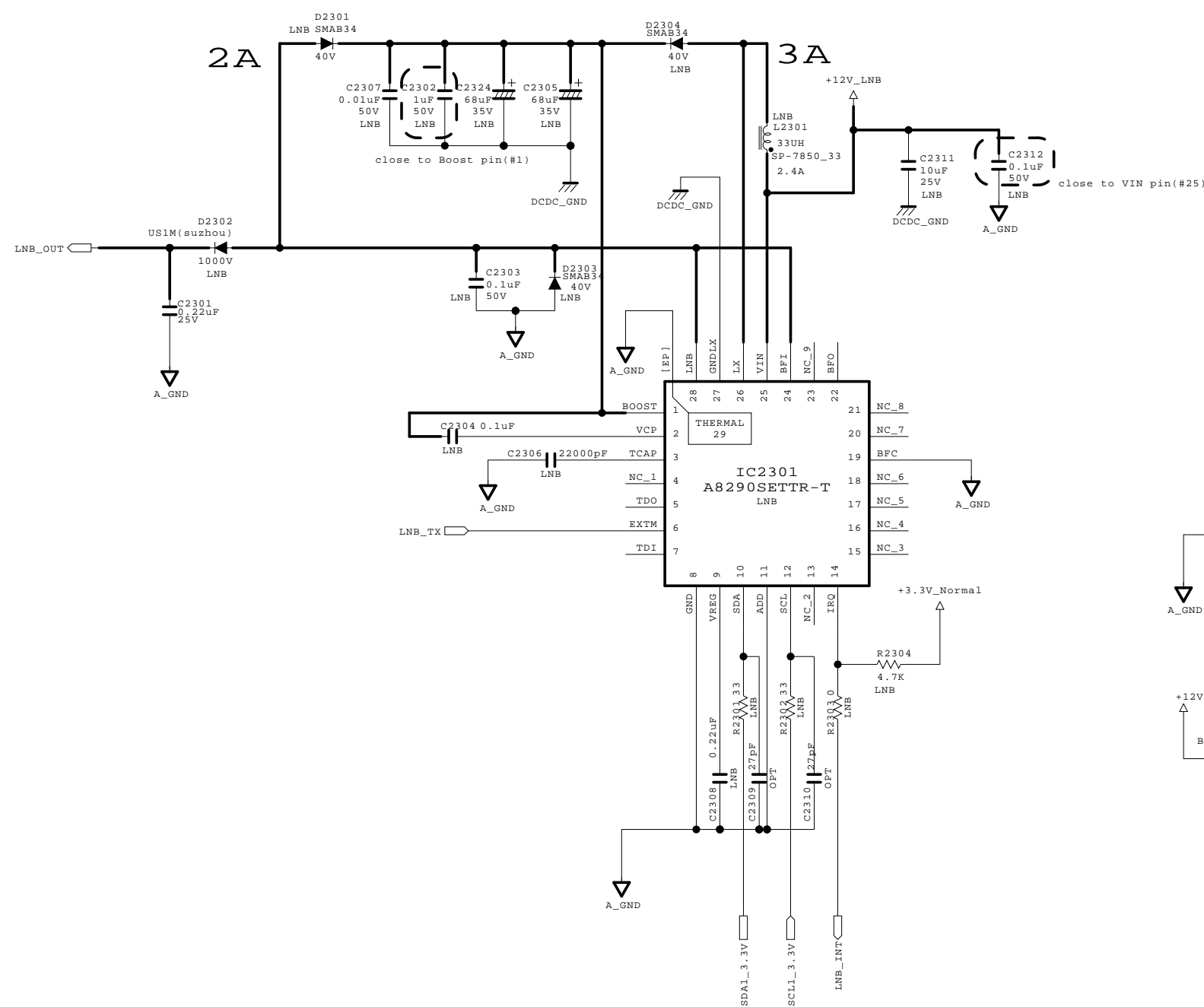
LGElectronics



MODEL	BCM35230	DATE	2010.11.11
BLOCK	CI	SHEET	19 / 58

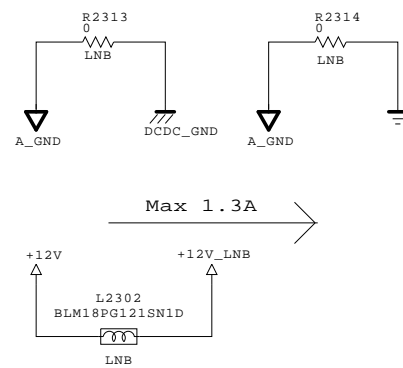
DVB-S2 LNB Part Allegro



(Option:LNB)



DCDC\_GND and A\_GND are connected  
DCDC\_GND and A\_GND are connected in pin#27  
PCB\_GND and A\_GND are connected

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



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

SECRET

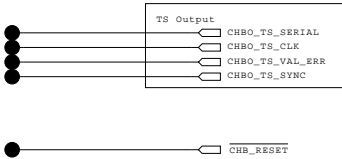
LG Electronics



 LG ELECTRONICS

MODEL	BCM35230	DATE	2010.11.02
BLOCK	LNB	SHEET	23 / 57



NON CHB

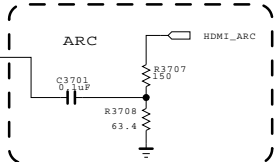


THE  SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE  SYMBOL MARK OF THE SCHEMATIC.

SECRET  
LGElectronics



MODEL	BCM35230	DATE	
BLOCK	NON CHB	SHEET	28 / 50



5V\_HDMI\_2

16V

10V

HDMI\_HPD\_2

1K

DDC\_SDA\_2

DDC\_SCL\_2

20

19

18

17

16

15

14

13

12

11

10

9

8

7

6

5

4

3

2

1

RSD-105156-100 JK3701

HDMI I2C

Diagram 1 (Top Left): 5V\_HDMI\_1. D3713 connector. Pin 2 to +5V\_Normal. Pin 3 to R3709 (4.7K) to DDC\_SDA\_1. Pin 5 to R3711 (4.7K) to DDC\_SCL\_1.

Diagram 2 (Top Right): 5V\_HDMI\_2. D3713 connector. Pin 2 to +5V\_Normal. Pin 3 to R3713 (4.7K) to DDC\_SDA\_2. Pin 5 to R3714 (4.7K) to DDC\_SCL\_2.

Diagram 3 (Bottom): 5V\_HDMI\_3. D3714 connector. Pin 2 to +5V\_Normal. Pin 3 to R3710 (4.7K) to DDC\_SDA\_3. Pin 5 to R3712 (4.7K) to DDC\_SCL\_3.

EDID Pull-up

5V\_HDMI\_3

0.1uF VR3706  
16V 10V

0.1uF VR3719  
1K

GND

HDMI\_HPD\_3

DDC\_

DDC\_

CEC\_REMOTE

CK+\_HDMI3

DO+\_HDMI3

DO+\_HDMI3

D1+\_HDMI3

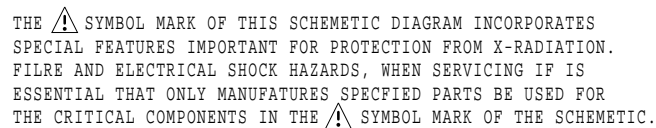
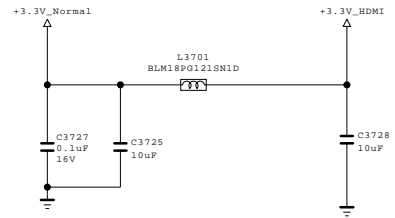
D2+\_HDMI3

D2+\_HDMI3

RSD-105156-100  
JK3702

HDMI 3

DUAL COMPONENT	
D3716	1ST : T-BAT54_SUZHO, 2ND : 0DSON00138A
IC3702	1ST : EAN60991801, 2ND : T-AZ1117BH_1.8, 3RD : EAN54428201



LG Electronics



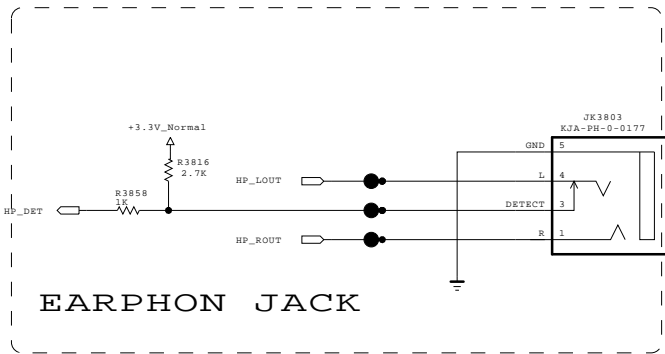
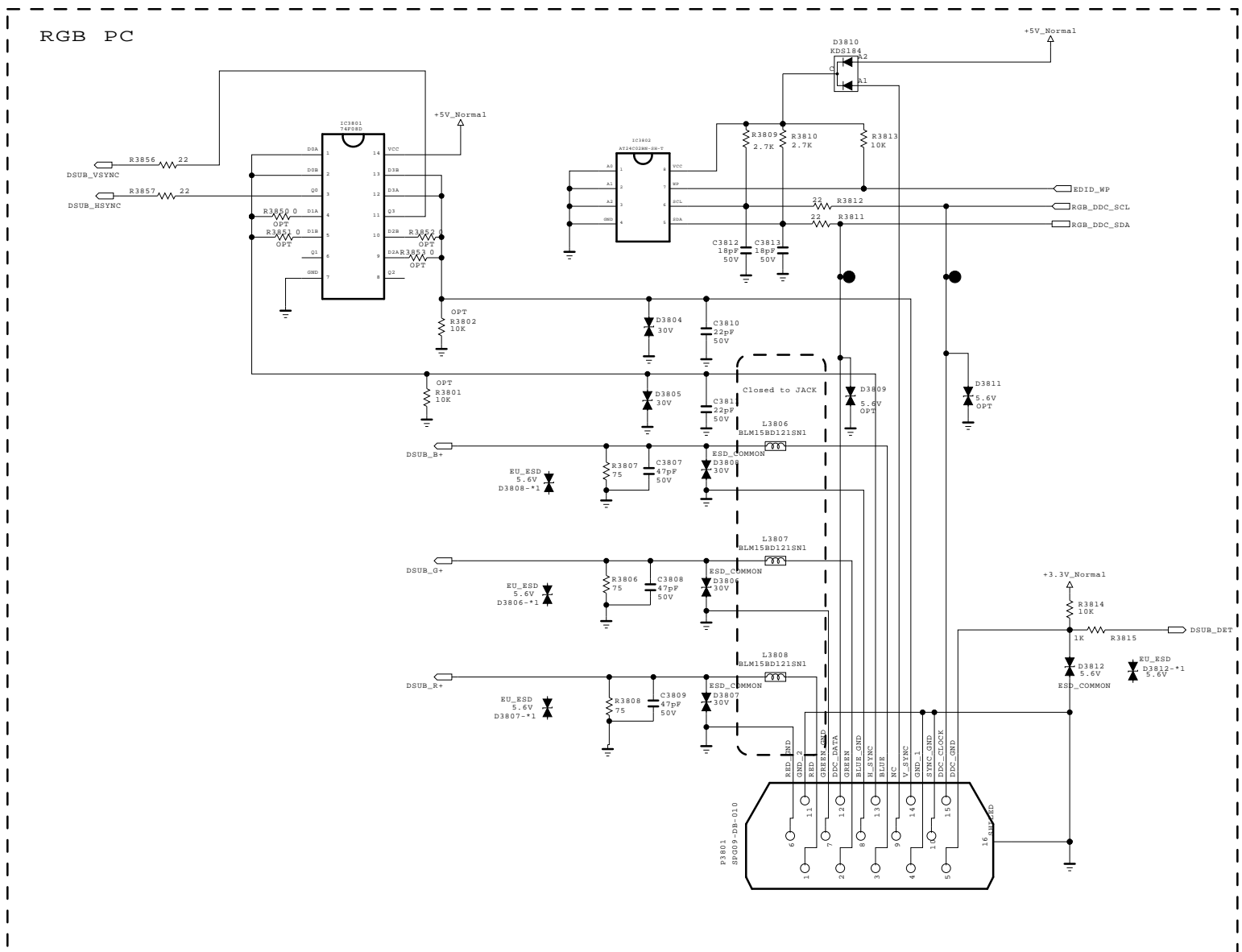
BLOCK

LV7	HDMI
-----	------

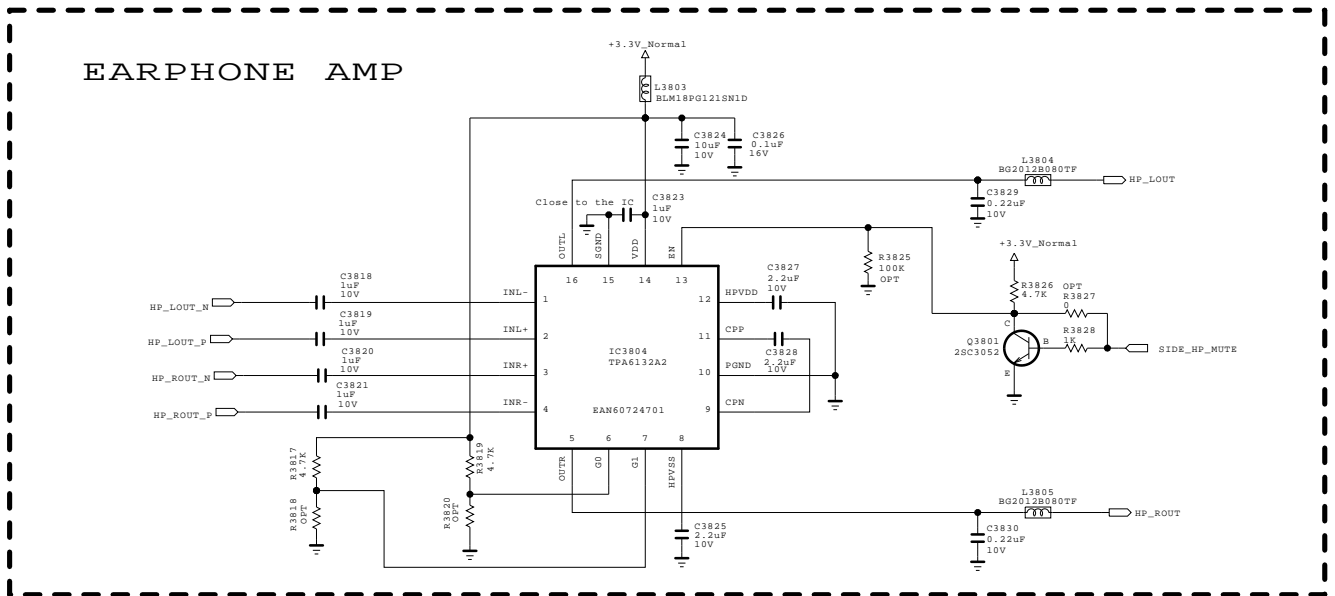
SHEET

$$37 \text{ } \bigg/ \text{ } 50$$

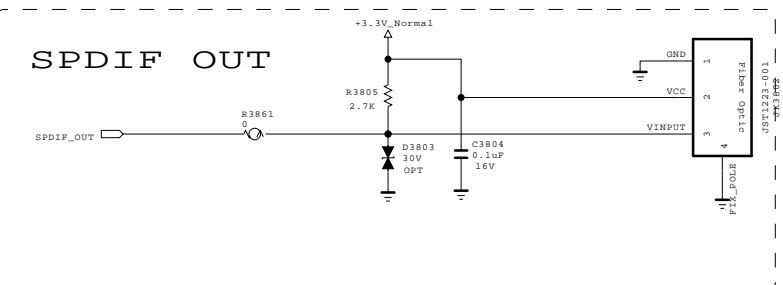
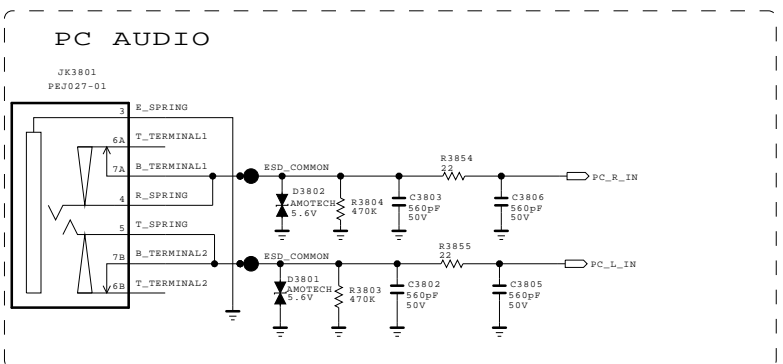
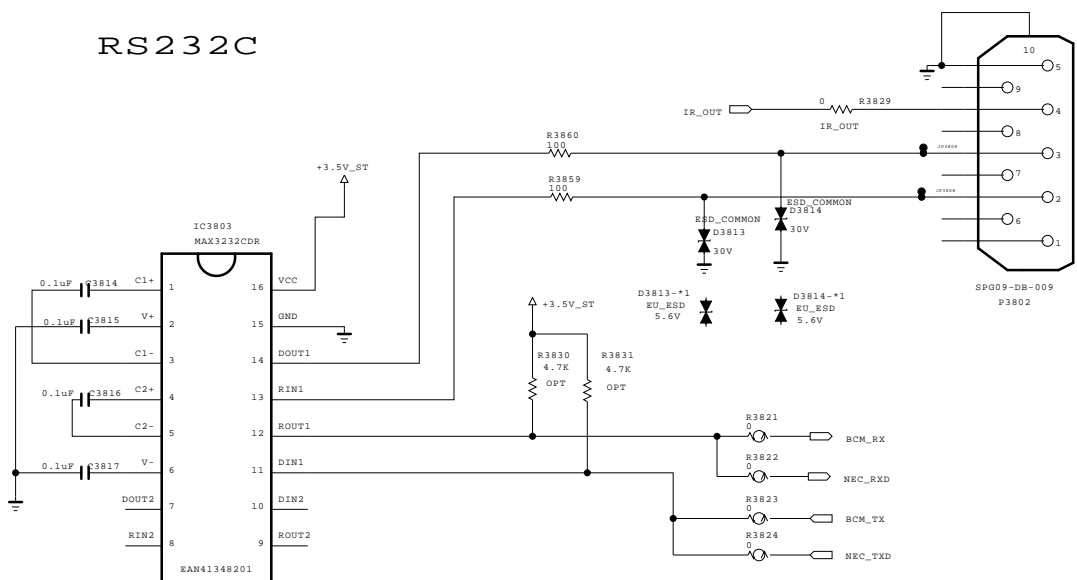
## RGB/ PC AUDIO/ SPDIF/ EARPHONE/ RS232C





DUAL COMPONENT	
D3804, D3805, D3806 D3807, D3808, D3813 D3814	1ST : EAH39491601, 2ND : EAH33945901
D3810	1ST : 0DD184009AA, 2ND : 0DSIH00028A
Q3801	1ST : 0TRIY80001A, 2ND : 0TR387500AA



## RS232C



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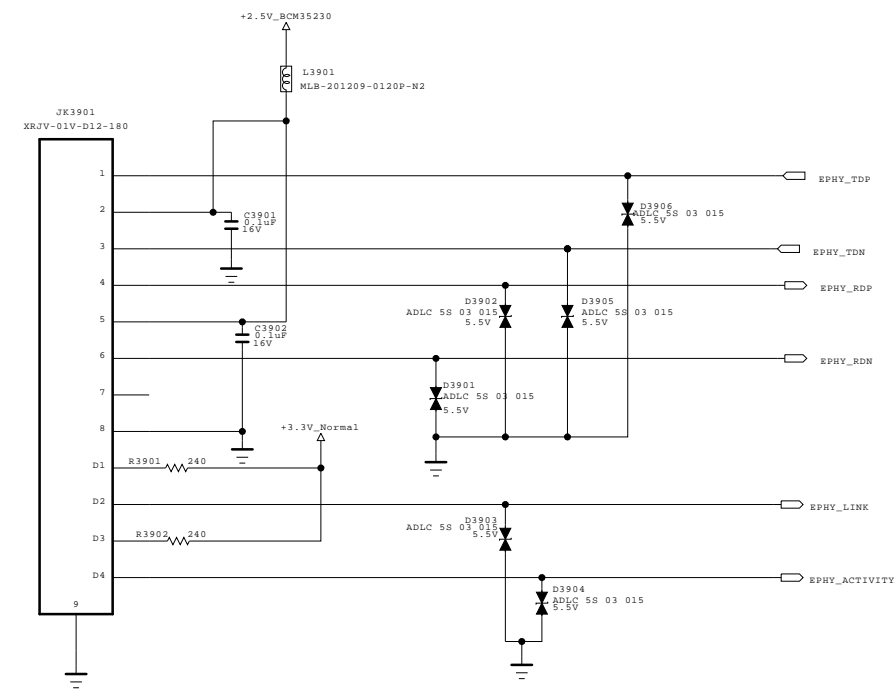
SECRET



LG Electronics



MODEL	BCM35230	DATE	
BLOCK	LV7 COMM JACK	SHEET	38 / 50

# Ethernet Block



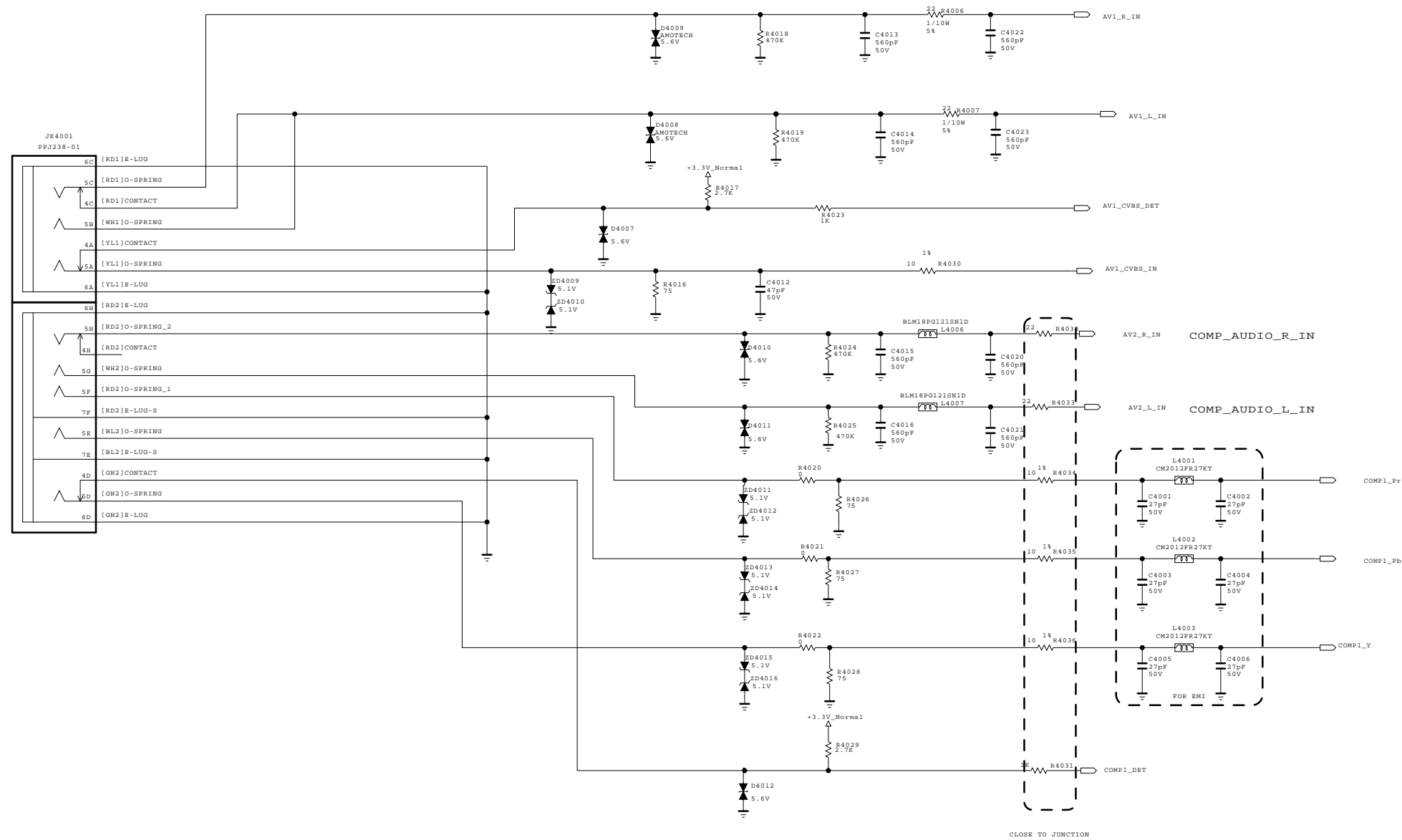
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SECRET  
LGElectronics



MODEL	BCM35230	DATE	
BLOCK	LV7 ETHERNET	SHEET	39 / 50

## COMP / AV JACK PACK



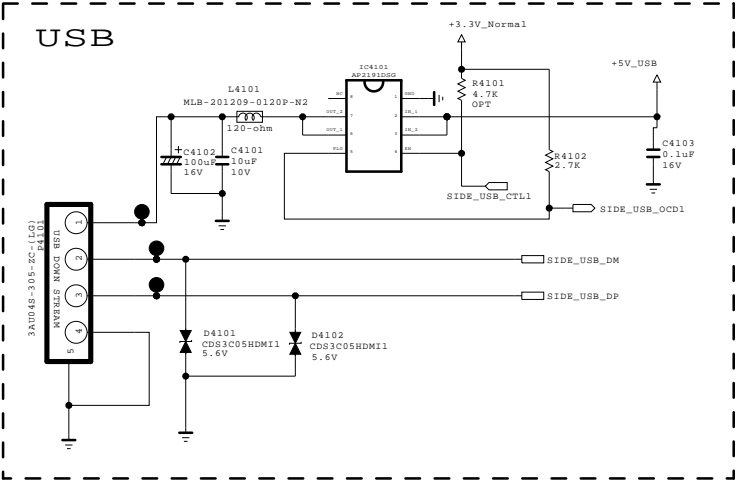
THE ⚠ SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMATIC.



LG Electronics



MODEL	BCM35230	DATE	
BLOCK	LV7 EU COMP/AV	SHEET	40 / 50

DUAL COMPONENT	
D4101,D4102	1ST : EAH42720601 2ND : EAH60994401

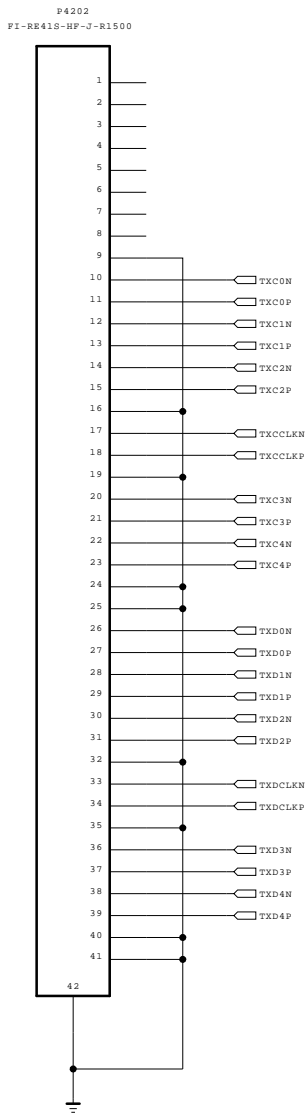


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SECRET  
LGElectronics



MODEL	BCM35230	DATE	
BLOCK	LV7 EU USB	SHEET	41 / 50



SECRET  
LGElectronics



## H/NIM &amp; F/NIM &amp; T/C/S2 Combo Tuner

Option Table		
H/NIM (EU)	F/NIM-T/C	DVB-T/C/S2 (Eu, Asia)
Non_S	Non_S	S
H/NIM	F/NIM	H/NIM
SCART	SCART	SCART
BOOSTER	BOOSTER	
	EU_BR_F/NIM	
	RF_SW_CTL	
	EU_F/NIM	
	TD_F/NIM	

\* DVB-T/C/S2 combo Tuner: DVB-T/C is H/NIM, and DVB-S2 is F/NIM

```

NON_S: not use DVB-T/C/S2 combo Tuner(use H/NIM and F/NIM)
      : use DVB-T/C/S2 combo Tuner

H/NIM: use H/NIM(H/NIM, DVB-T/C/S2 combo Tuner)
F/NIM: use F/NIM(EU-T/C, EU_DVB-T2, China)

SCART: use Scart Jack

CN   : use China F/NIM

BOOSTER: use BOOSTER_CTL

SW_CTL: use RF_SWITCH_CTL

C_F_NIM: use EU_DVB-T/C F/NIM

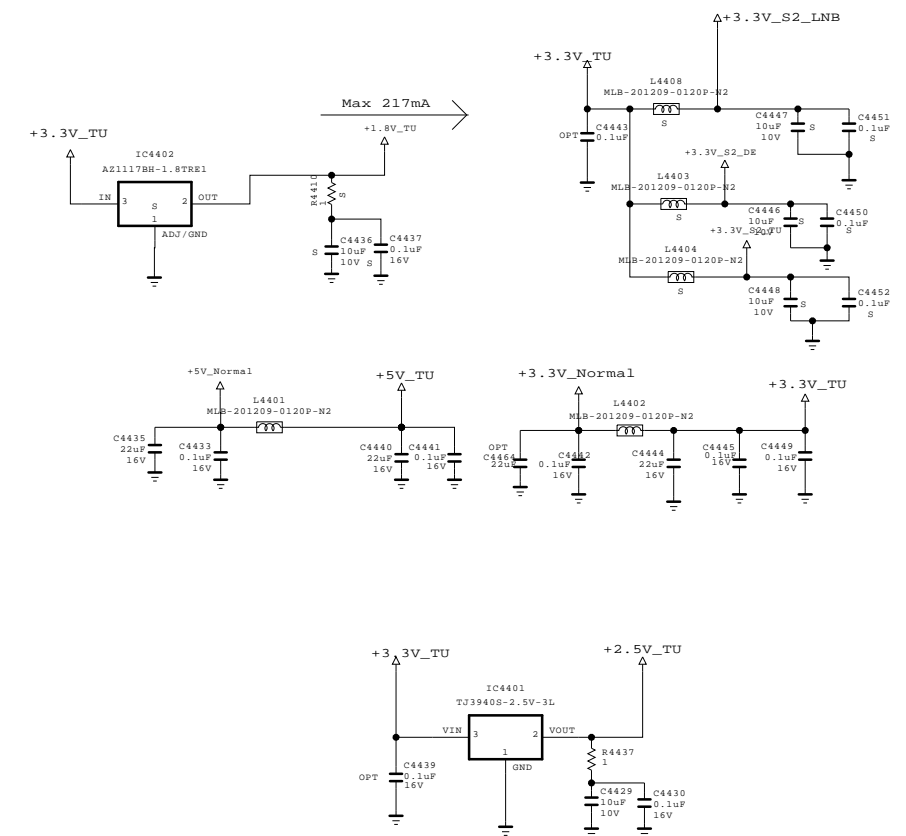
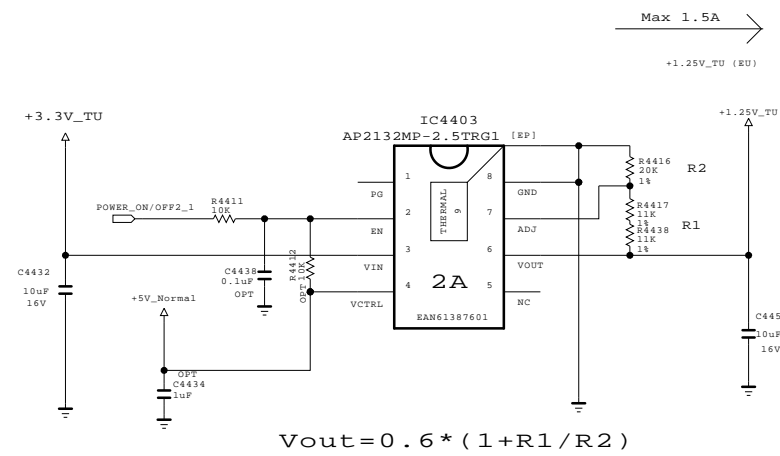
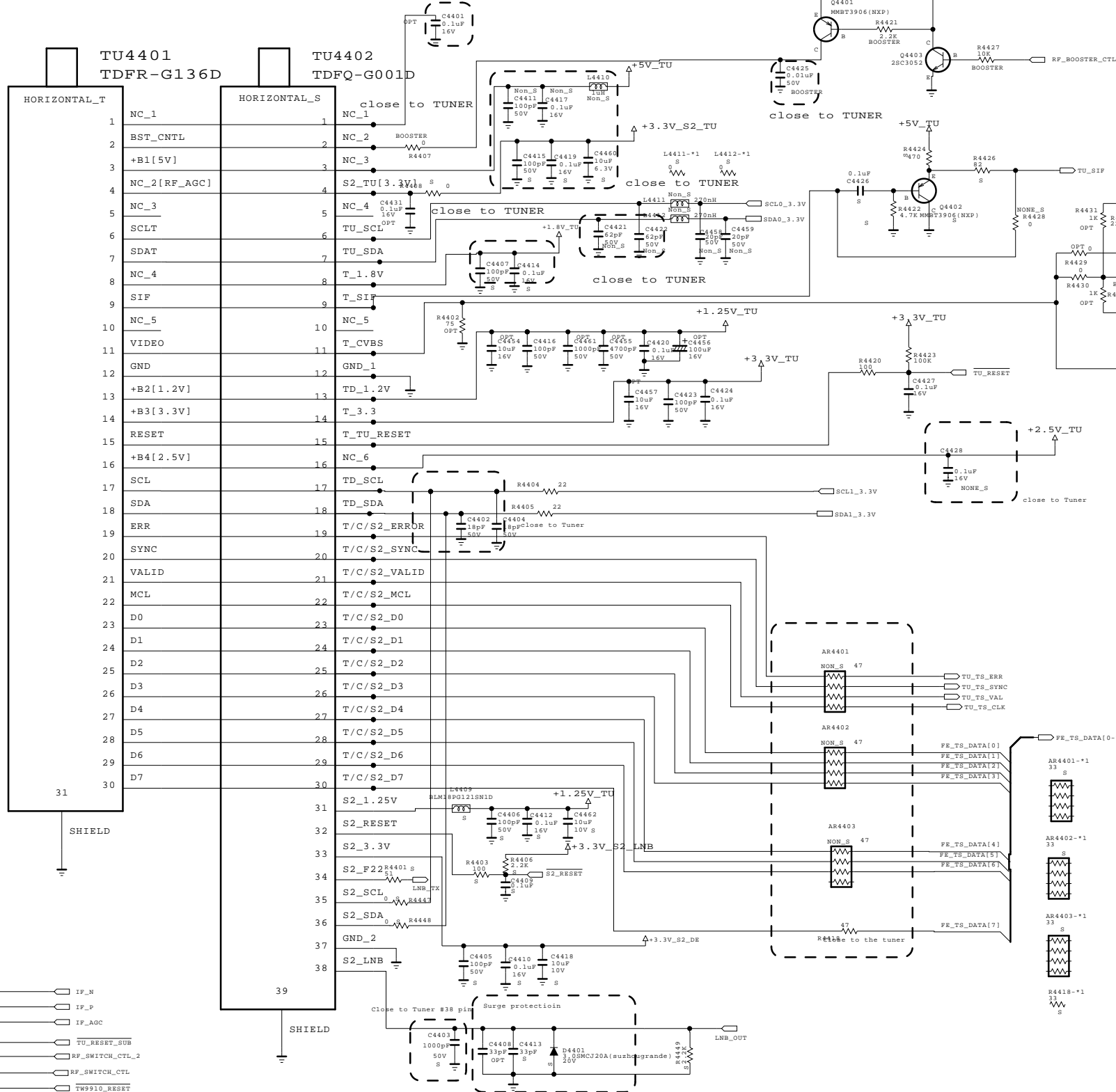
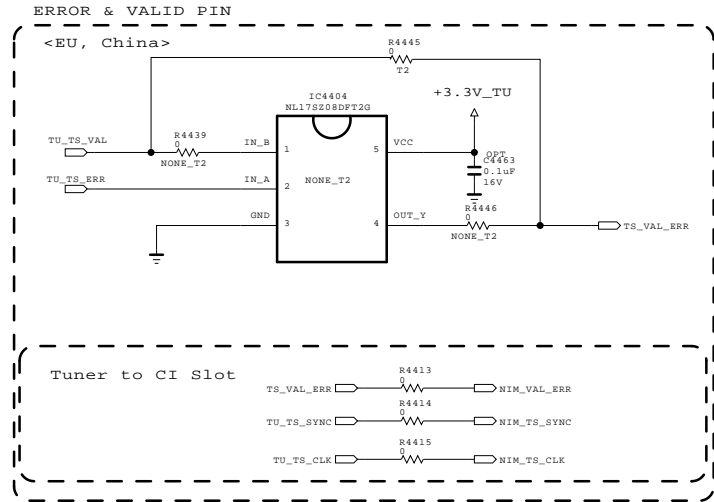
NIM_BR: use EU_DVB-T2, China F/NIM, BRZIL F/NIM



U_F_NIM: use EU_F/NIM

U_R_P_NIM: use EU_F/NIM and Brazil F/NIM

```

DUAL COMPONENT	
IC4401	1ST : T-TJ3940S_XX, 2ND : T-AP2114H_2.5TRG1



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G Electronic



В ПСК

LV7 EU TUNER

54FF

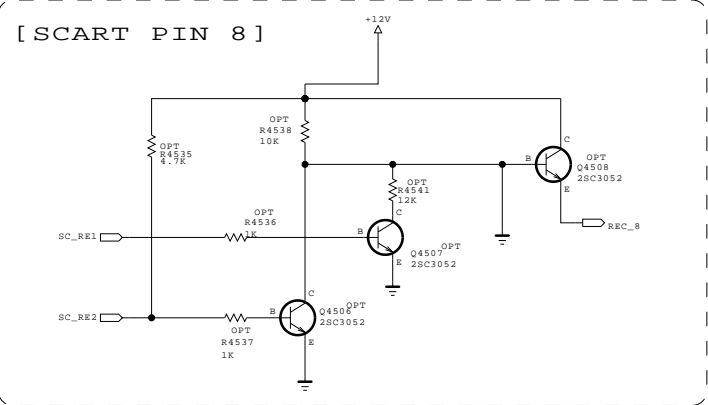
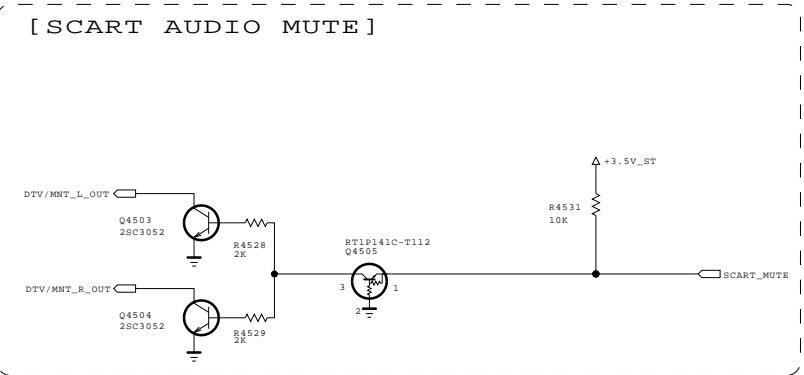
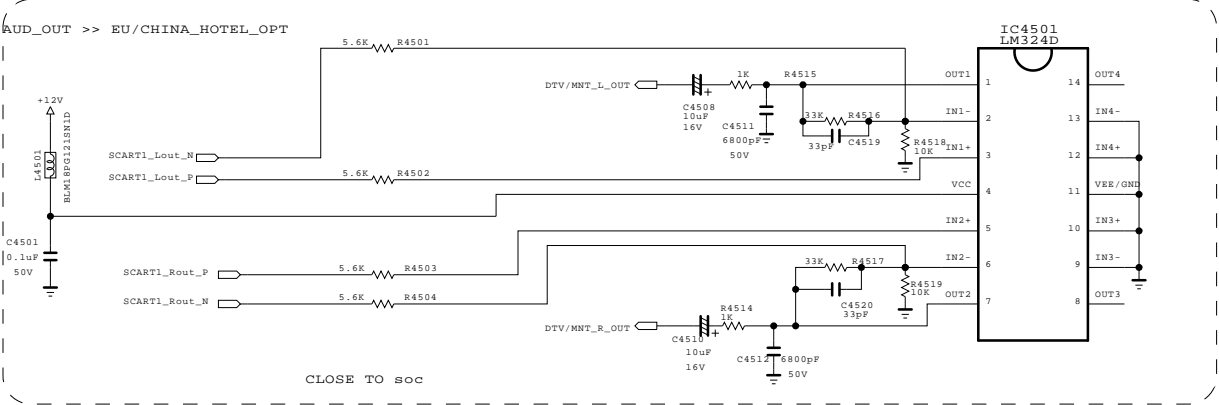
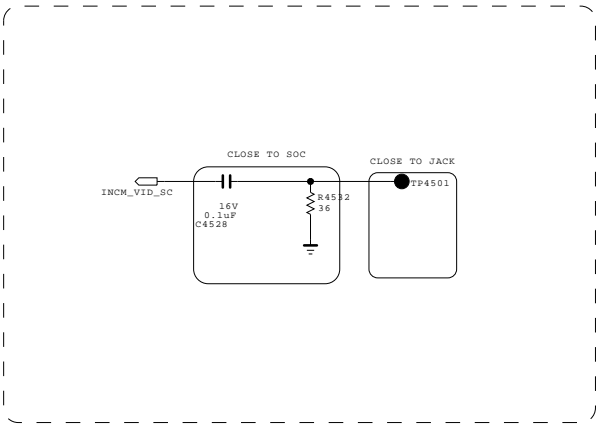
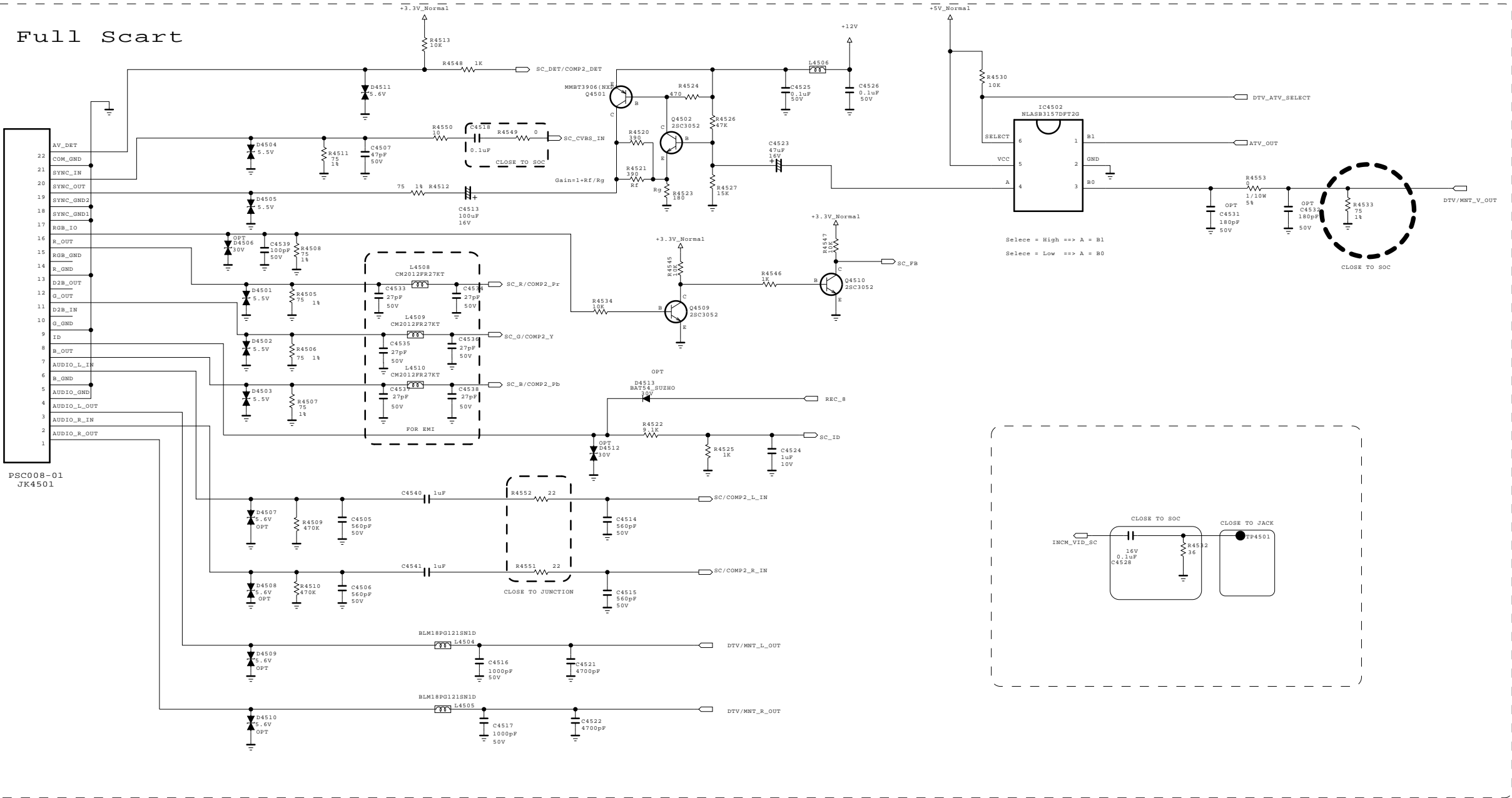
44 / 50



LGE Internal Use Only



DUAL COMPONENT	
Q4502,Q4503 Q4504,Q4506 Q4507,Q4508	1ST : 0TRIY80001A 2ND : 0TR387500AA
Q4501	1ST : EBK61012701, 2ND : EBK58172301
Q4505	1ST : 0TRI80004A, 2ND : EBK61012501, 3RD : 0TRI02009AM
D4513	1ST : T-BAT54_SUZHO, 2ND : 0DSON00138A

Full Scart



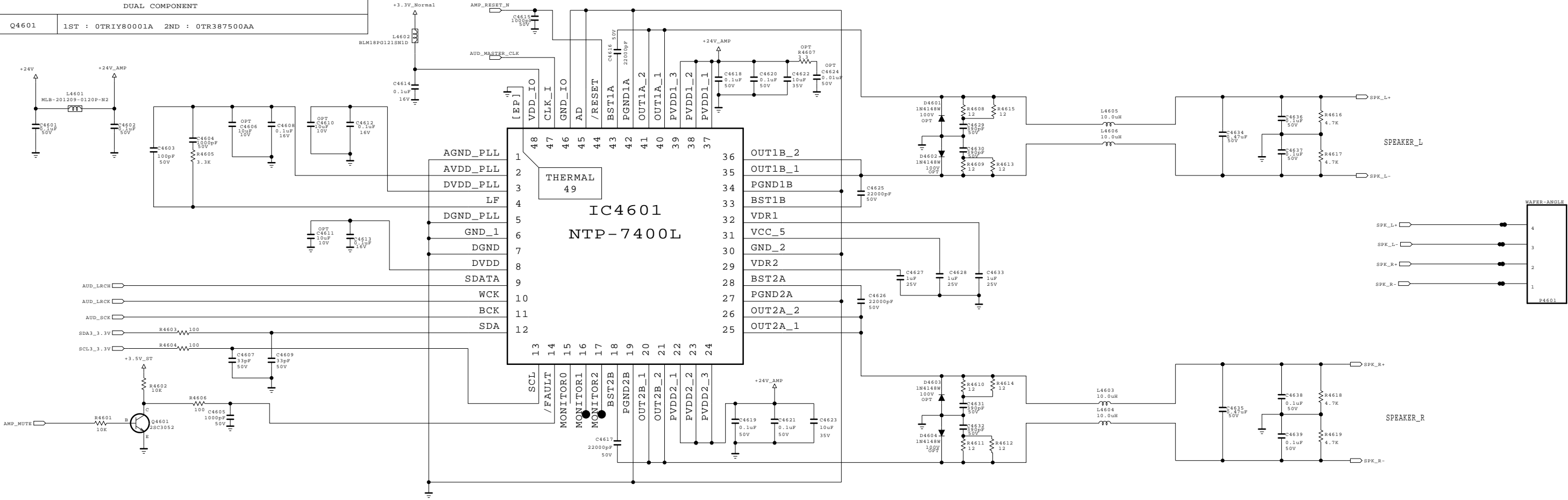
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SECRET  
LGElectronics



MODEL	BCM35230	DATE	
BLOCK	LV7 EU SCART	SHEET	45 / 50

DUAL COMPONENT		
Q4601	1ST : 0TRIY80001A 2ND : 0TR387500AA	



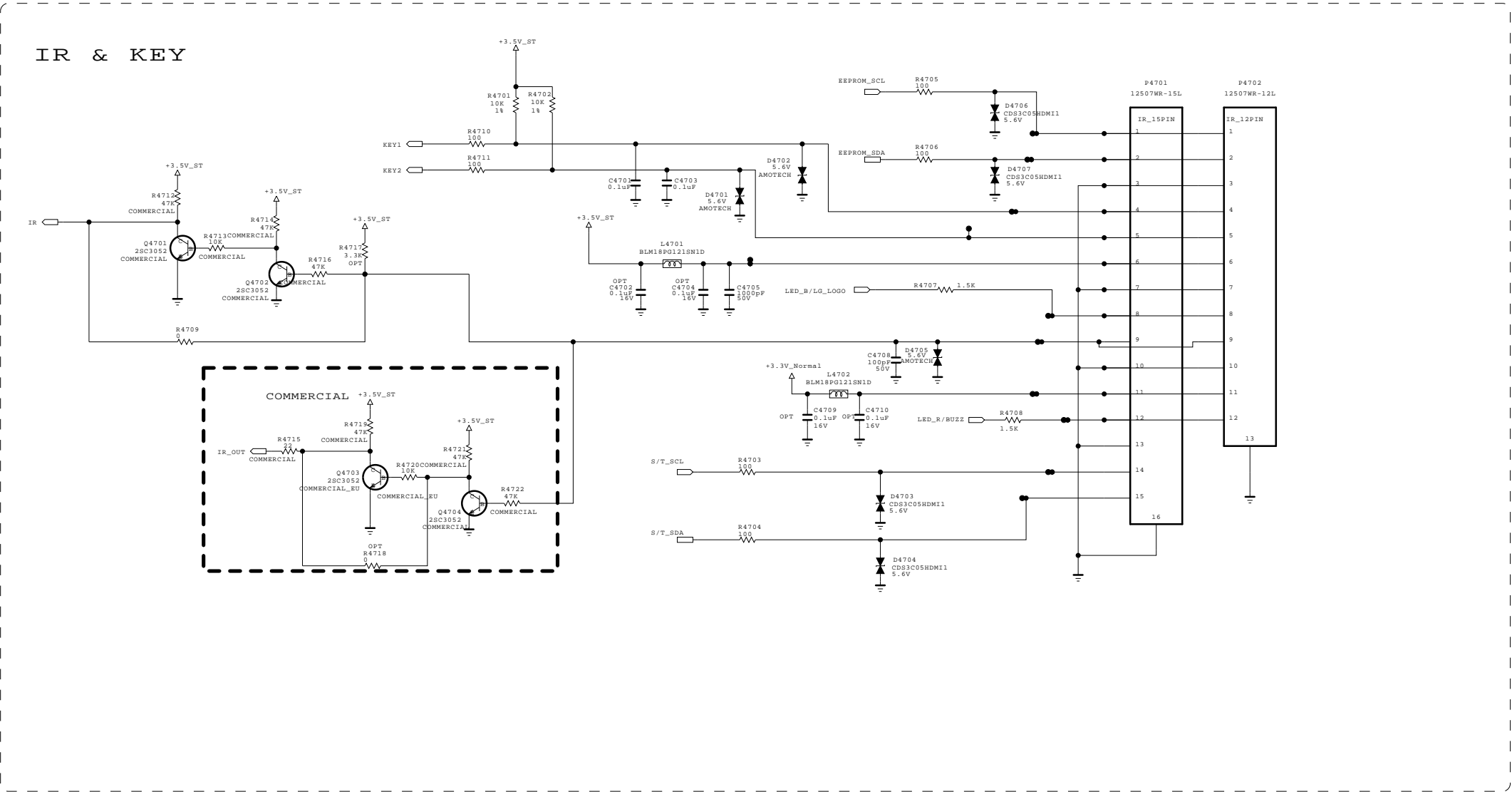
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SECRET
LGElectronics



MODEL	BCM35230	DATE	
BLOCK	LV7 EU AMP	SHEET	46 / 50

DUAL COMPONENT	
D4703,D4704 D4705,D4706	1ST : EAH42720601, 2ND : EAH60994401

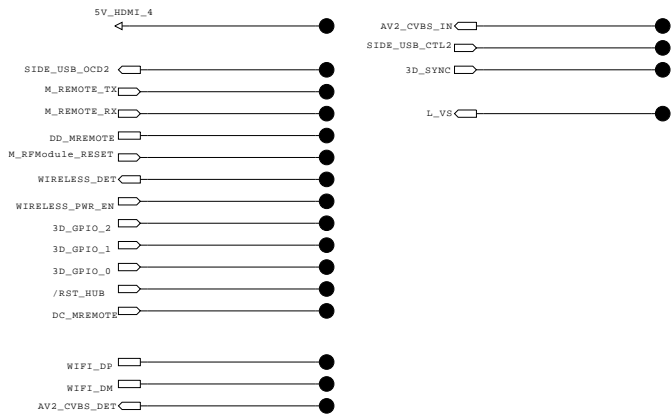




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SECRET  
LGElectronics



MODEL	BCM35230	DATE	
BLOCK	LV7 EU IR	SHEET	47 / 50



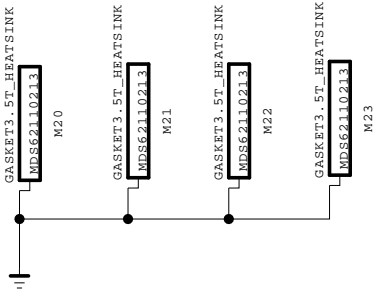
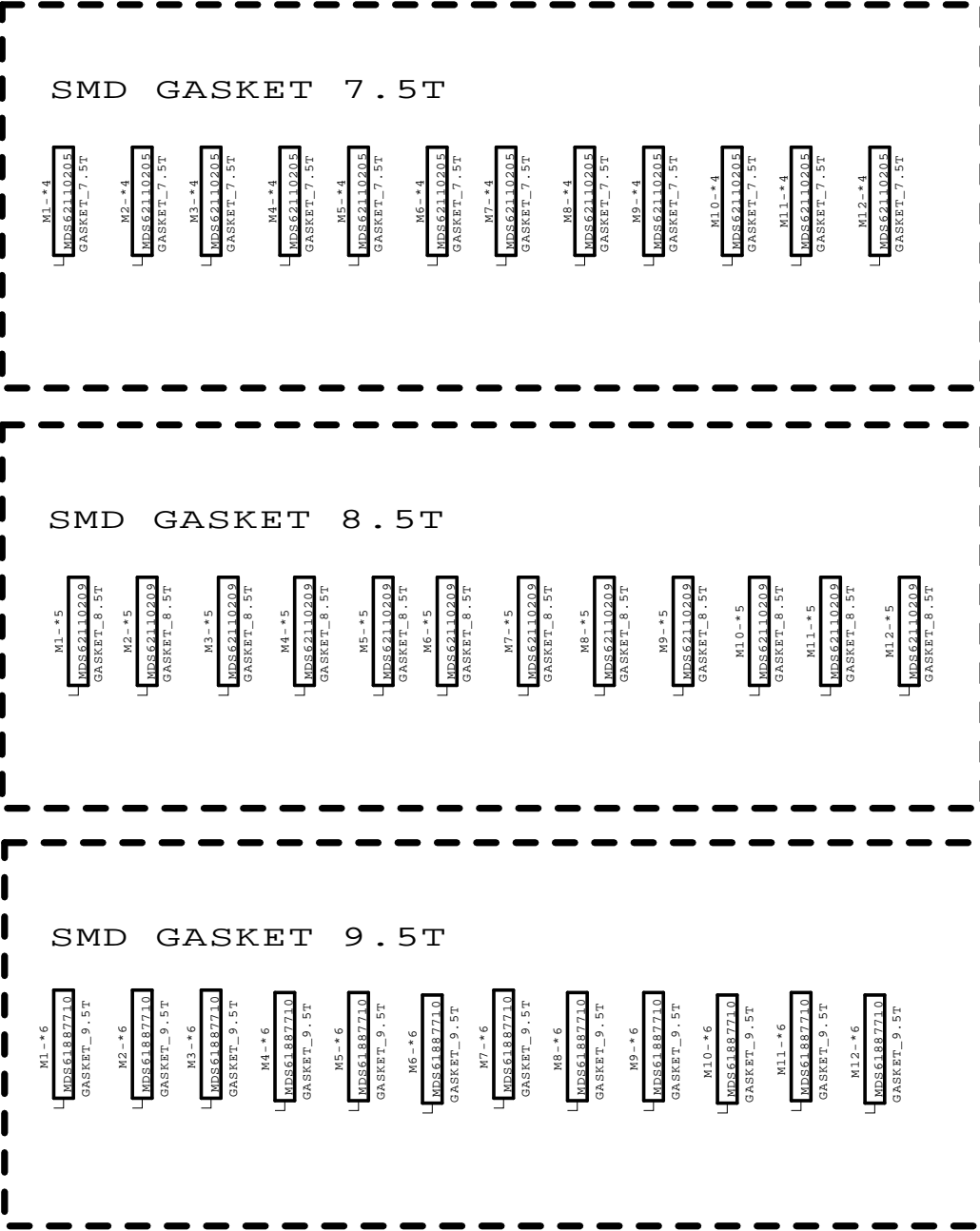
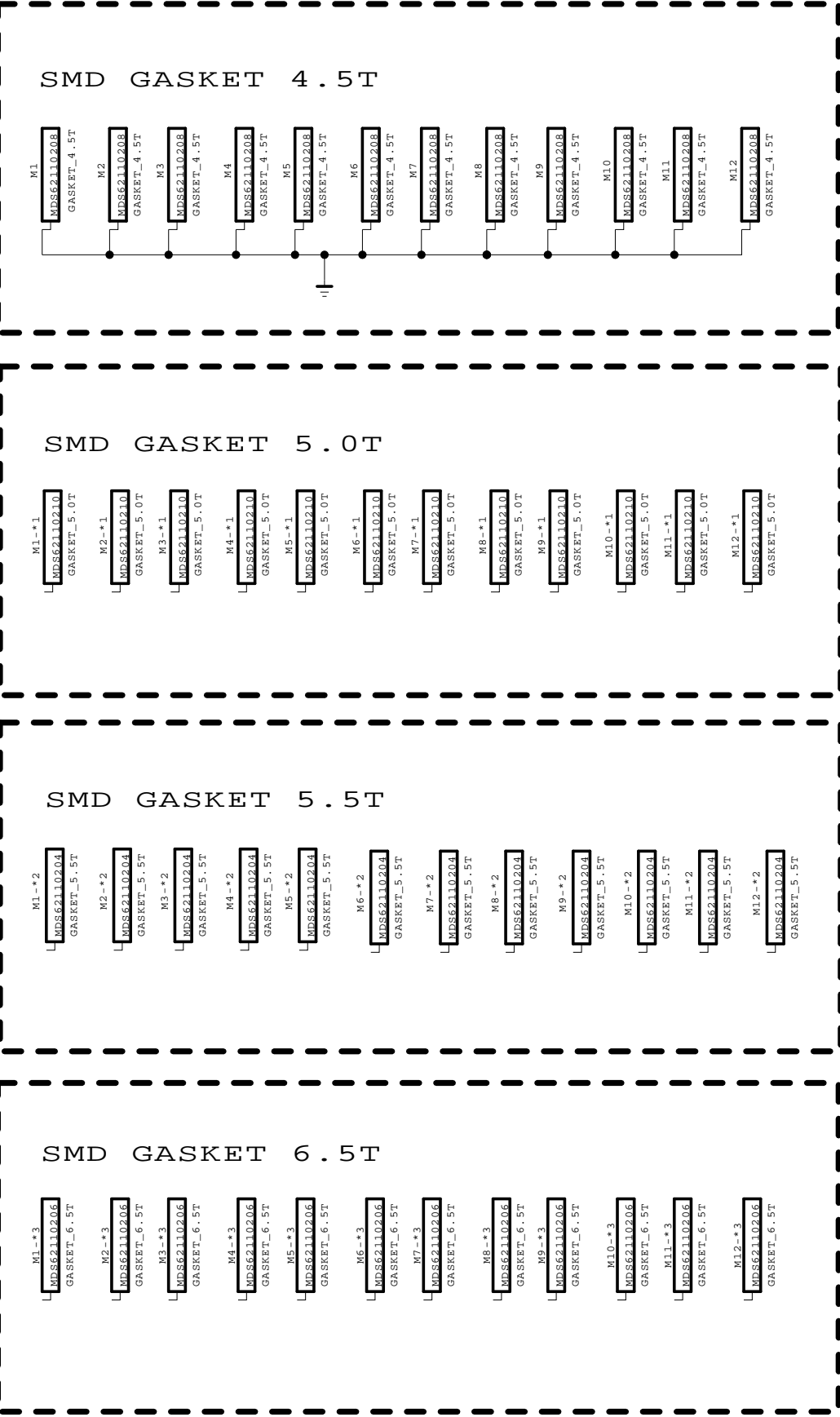
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SECRET  
LGElectronics



MODEL	BCM35230	DATE	
BLOCK	LV7 EU	SHEET	48 / 50

SMD GASKET



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

SECRET

LGElectronics

 LG ELECTRONICS

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

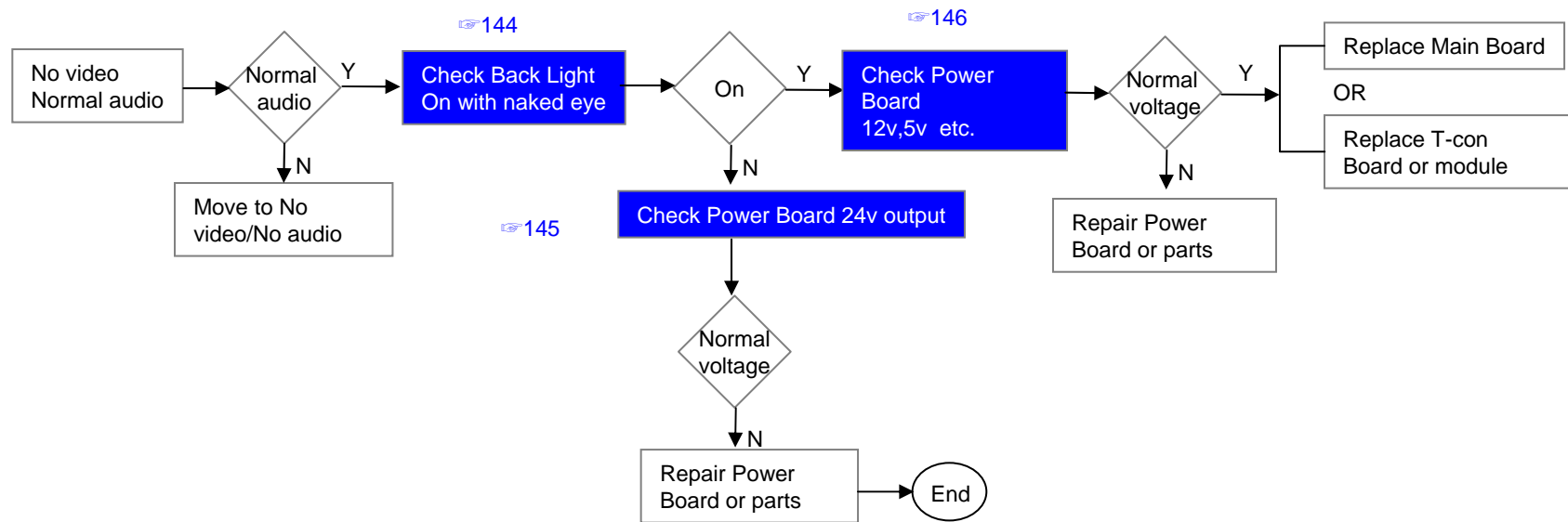


# Electronic Product Standard Repair Process



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LCD TV	Error symptom	<b>A. Video error</b>	Established date	2008. 2 . 1	Electronics 6-3
		No video/Normal audio	Revised date		1/13



※ Precaution

147

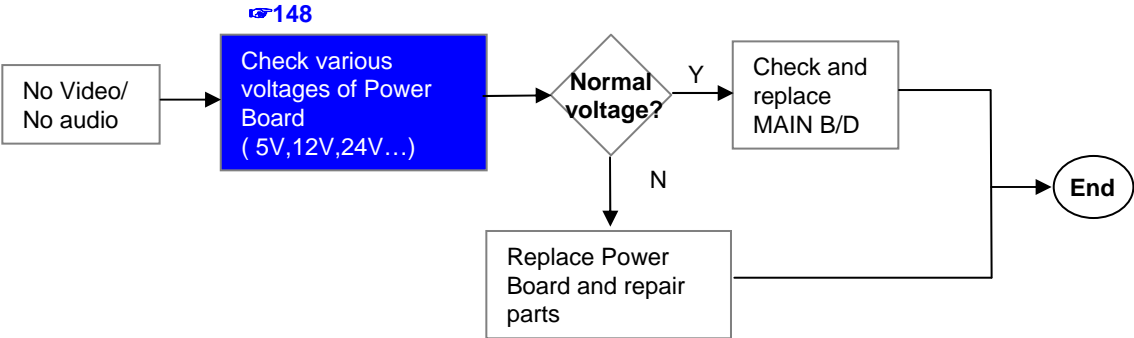
Always check/record S/W Version and White Balance value before replacing the Main /Digital Board

Replace Main Board

Re-enter White Balance value

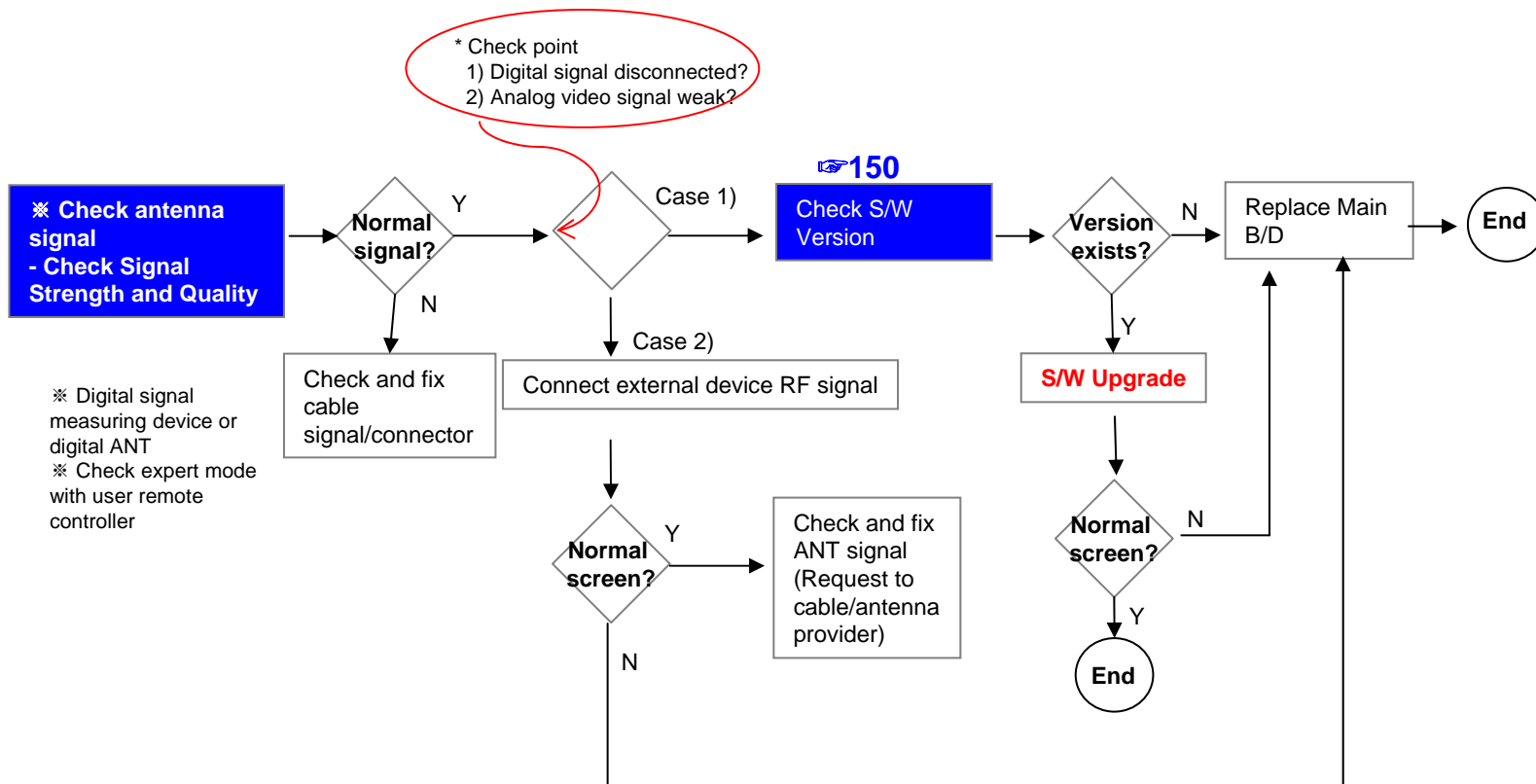


Standard Repair Process					
LCD TV	Error symptom	A. Video error	Established date	2008. 2 . 1	Electronics 6-3
		No video/No audio	Revised date		2/13



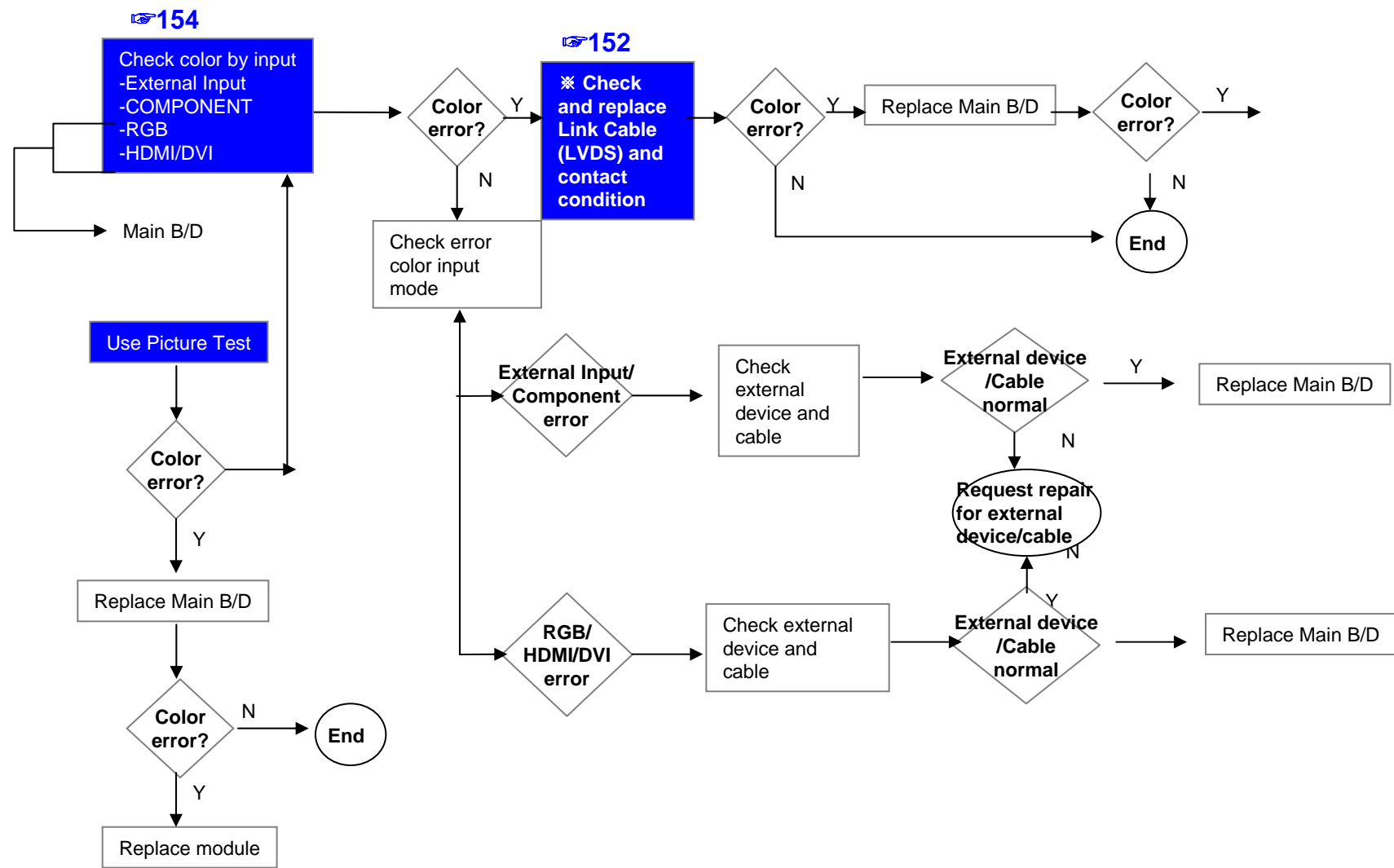
# Standard Repair Process

LCD TV	Error symptom	A. Video error	Established date	2008. 2 . 1	Electronics 6-3
		Video error, video lag/stop	Revised date		3/13



# Standard Repair Process

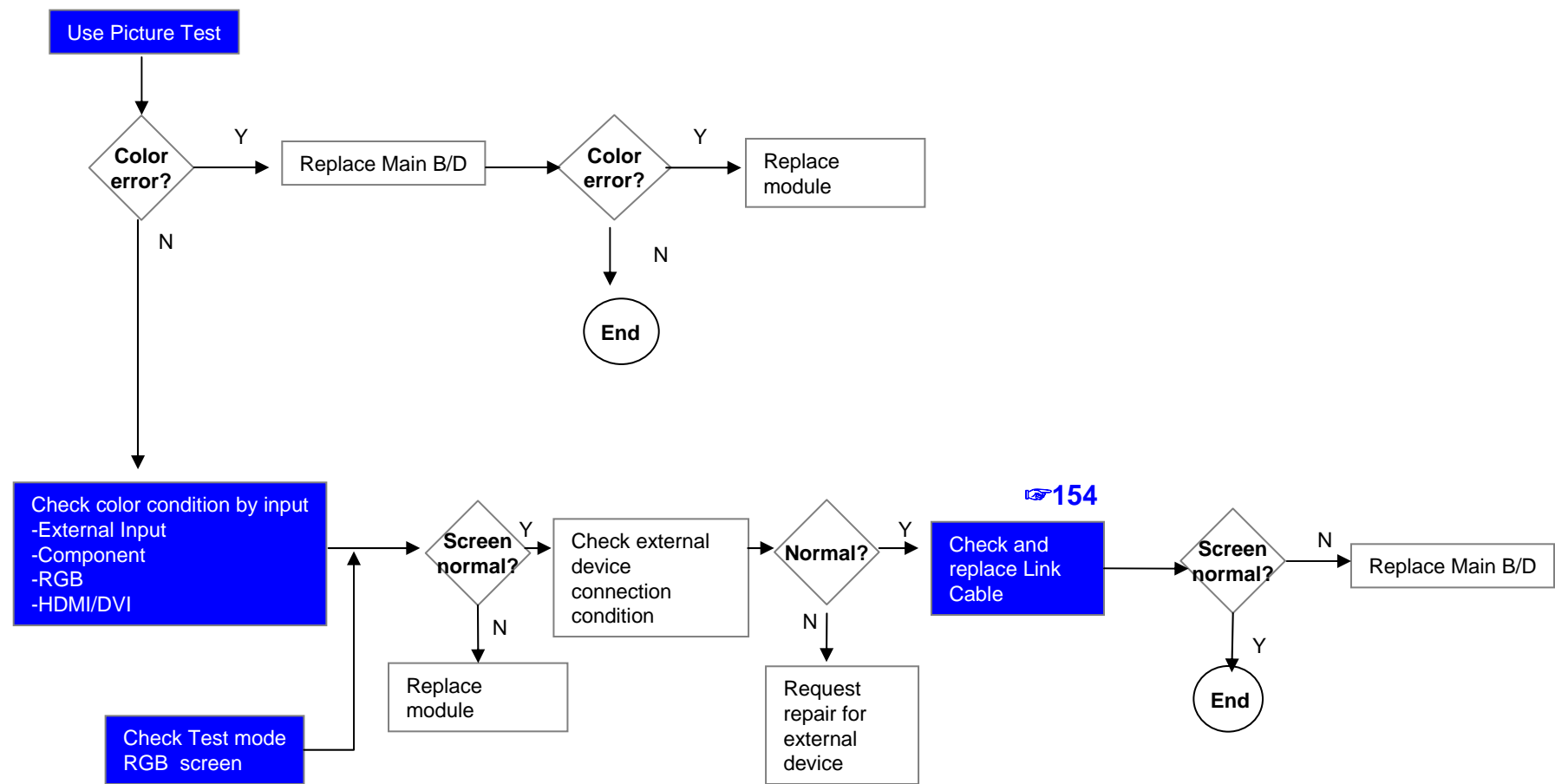
LCD TV	Error symptom	A. Video error	Established date	2008. 2 . 1	Electronics 6-3
		Color error	Revised date		4/13



# Standard Repair Process

LCD TV	Error symptom	A. Video error	Established date	2008. 2 . 1	Electronics 6-3
		Vertical/Horizontal bar, residual image, light spot, external device color error	Revised date		5/13

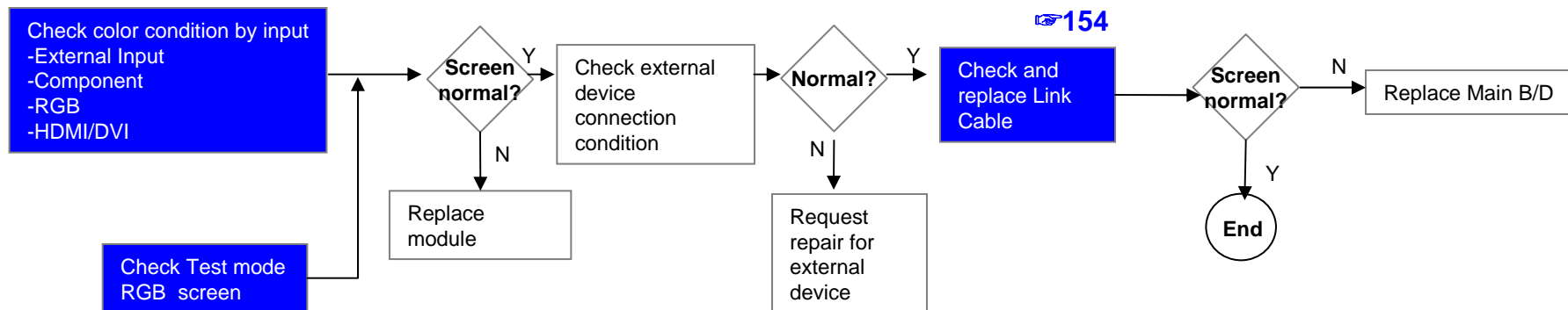
Vertical/Horizontal bar, residual image, light spot



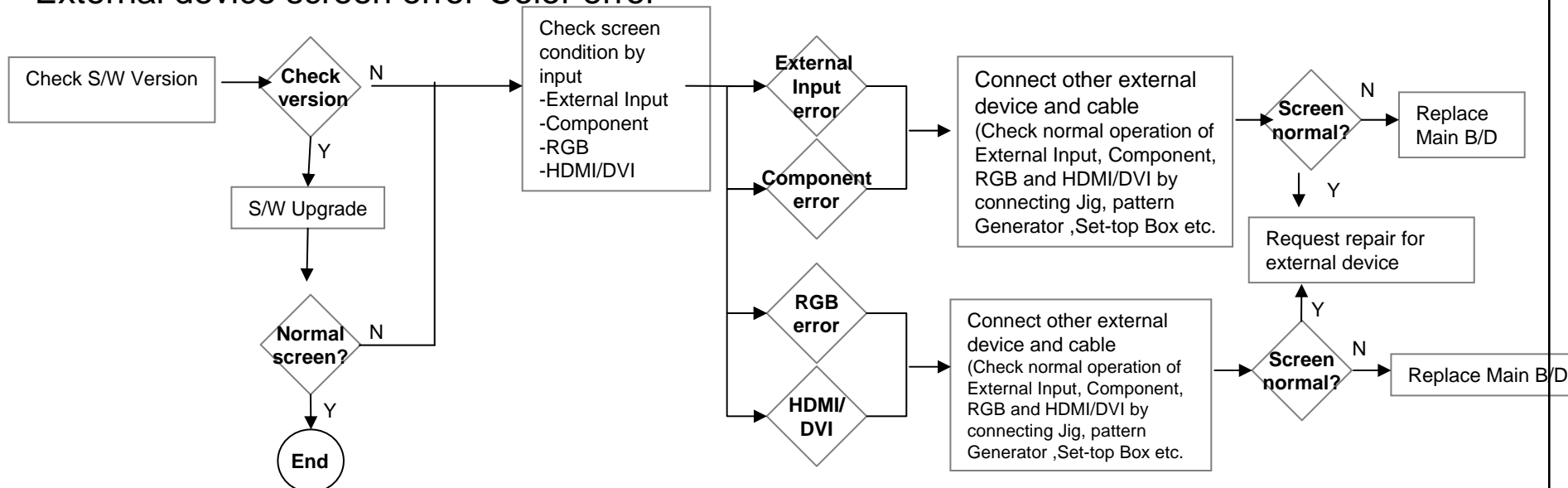
# Standard Repair Process

LCD TV	Error symptom	A. Video error	Established date	2008. 2 . 1	Electronics 6-3
		Vertical/Horizontal bar, residual image, light spot, external device color error	Revised date		5/13

## Vertical/Horizontal bar, residual image, light spot

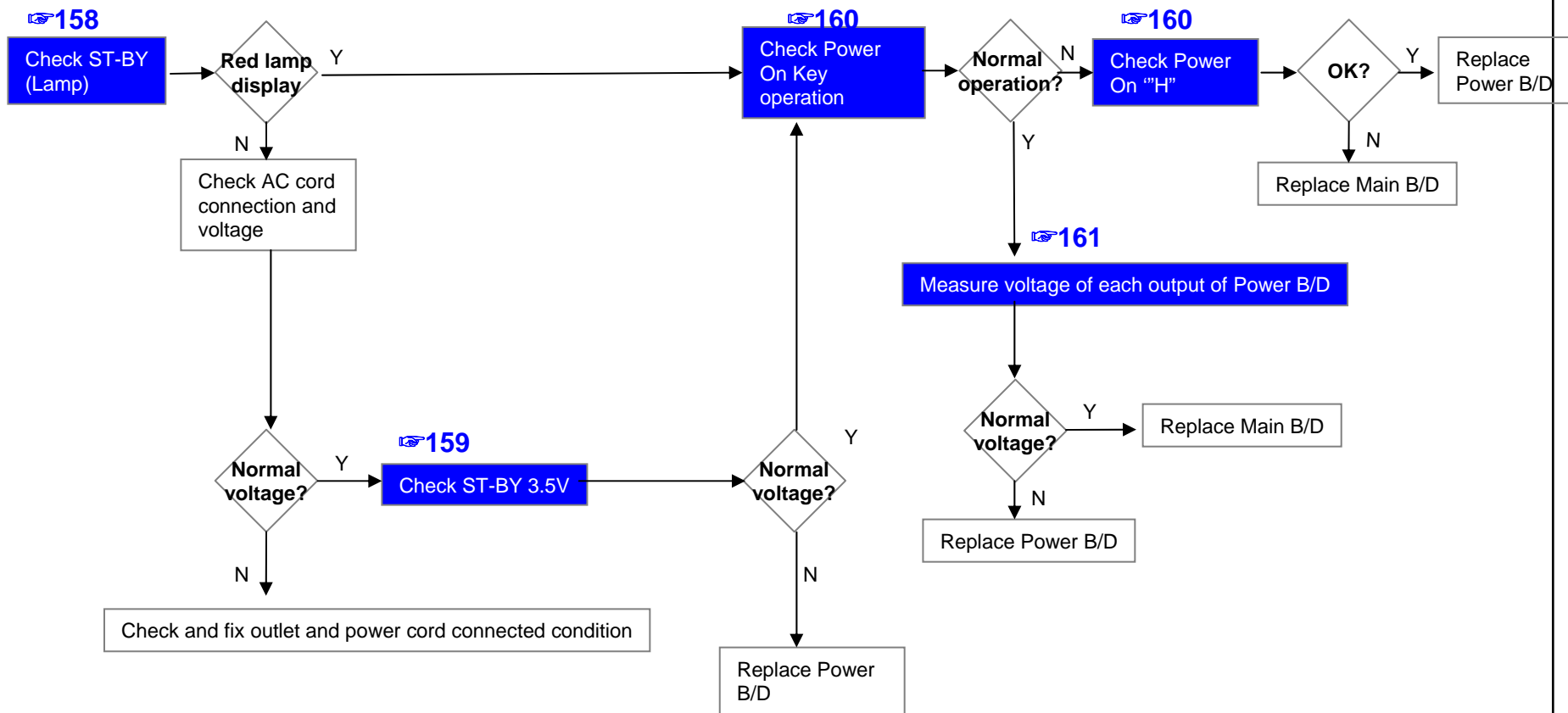


## External device screen error-Color error



# Standard Repair Process

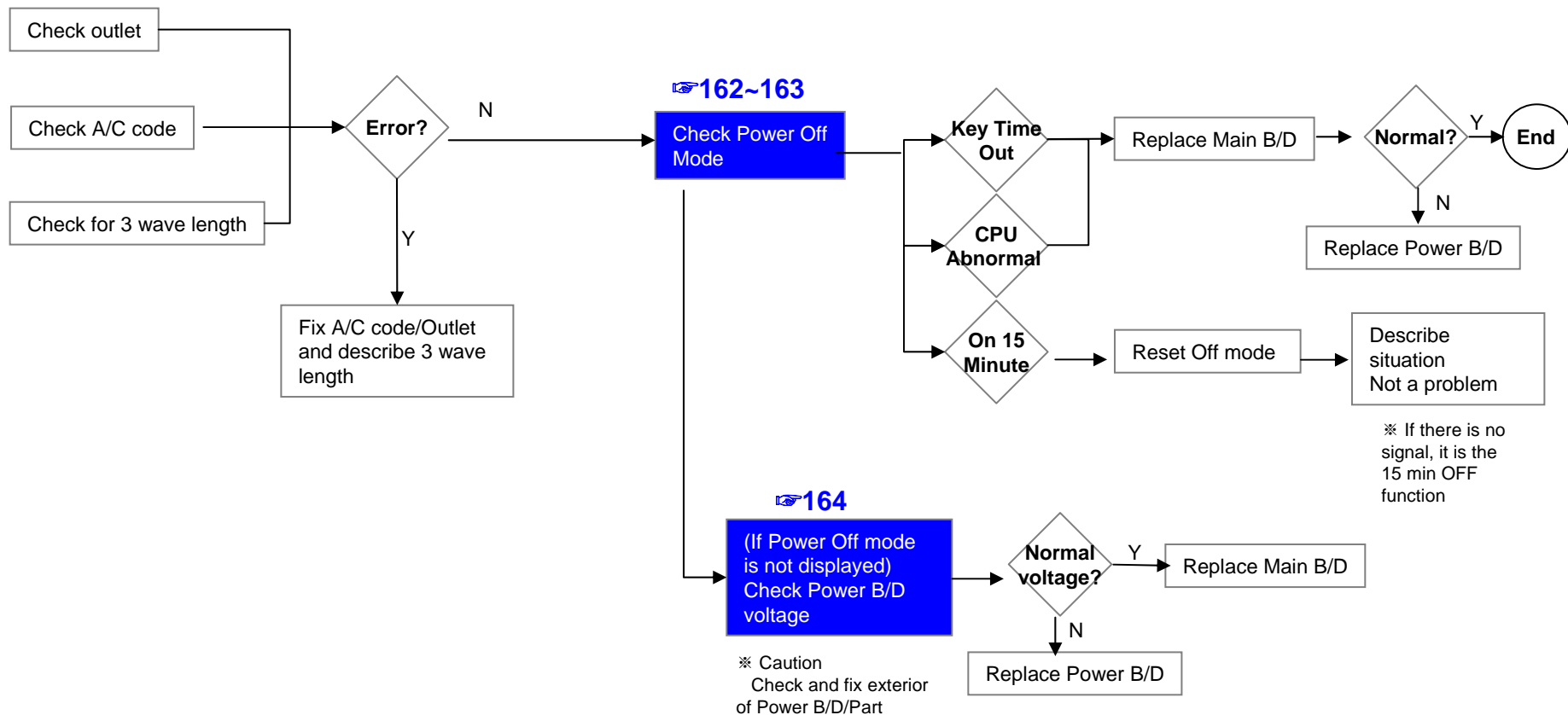
LCD TV	Error symptom	B. Power error	Established date	2008. 2 . 1	Electronics 6-3
		No power	Revised date		6/13



※ For Pacific 2, operation display LED can be off even with ST-BY output of 3.5V  
 → In this case, replace the Digital B/D instead of the Power Board

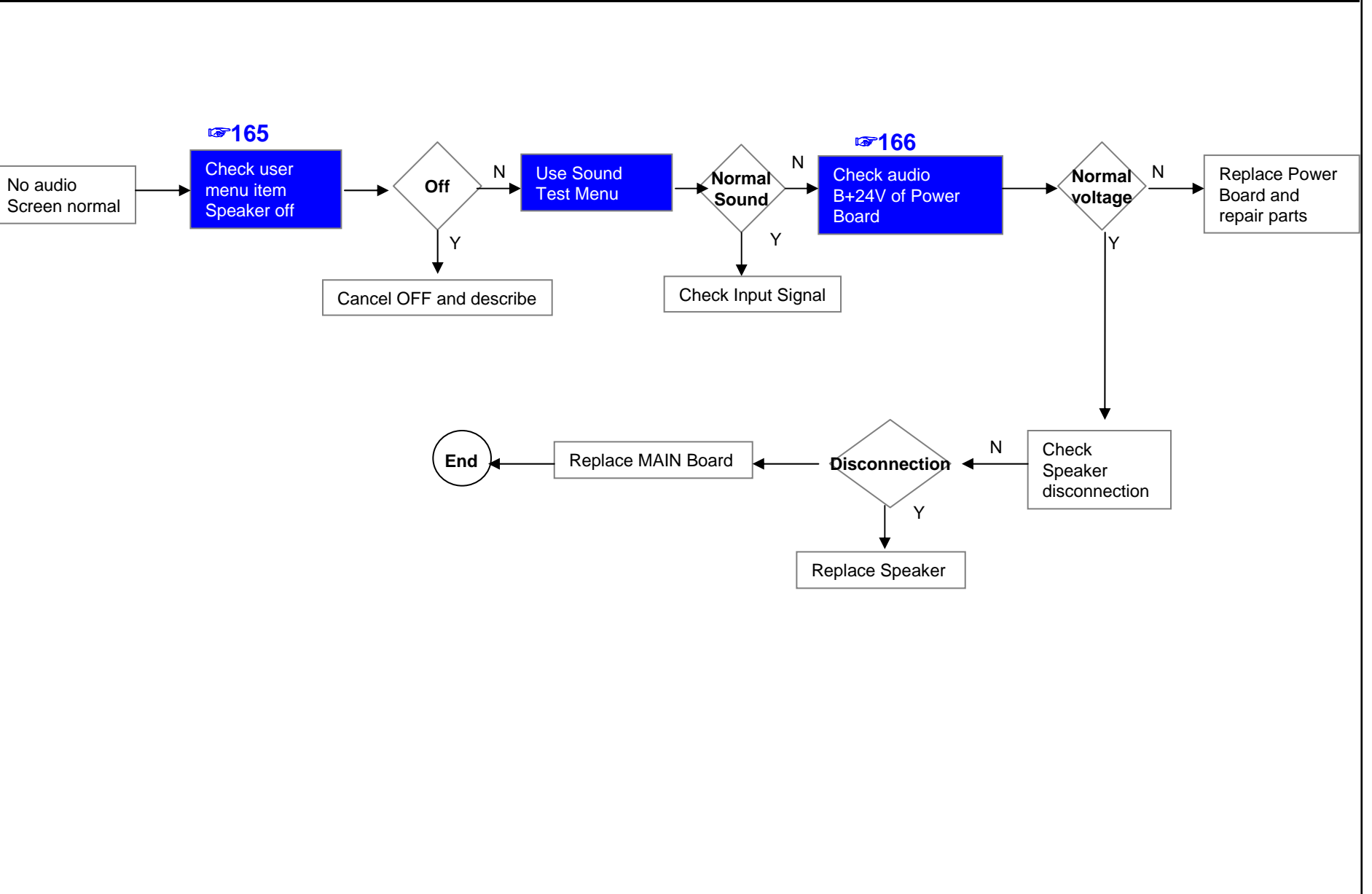
# Standard Repair Process

LCD TV	Error symptom	B. Power error	Established date	2008. 2 . 1	Electronics 6-3
		Off when on, off while viewing, power auto on/off	Revised date		7/13



Standard Repair Process

LCD TV	Error symptom	C. Audio error	Established date	2008. 2 . 1	Electronics 6-3
		No audio/Normal video	Revised date		8/13

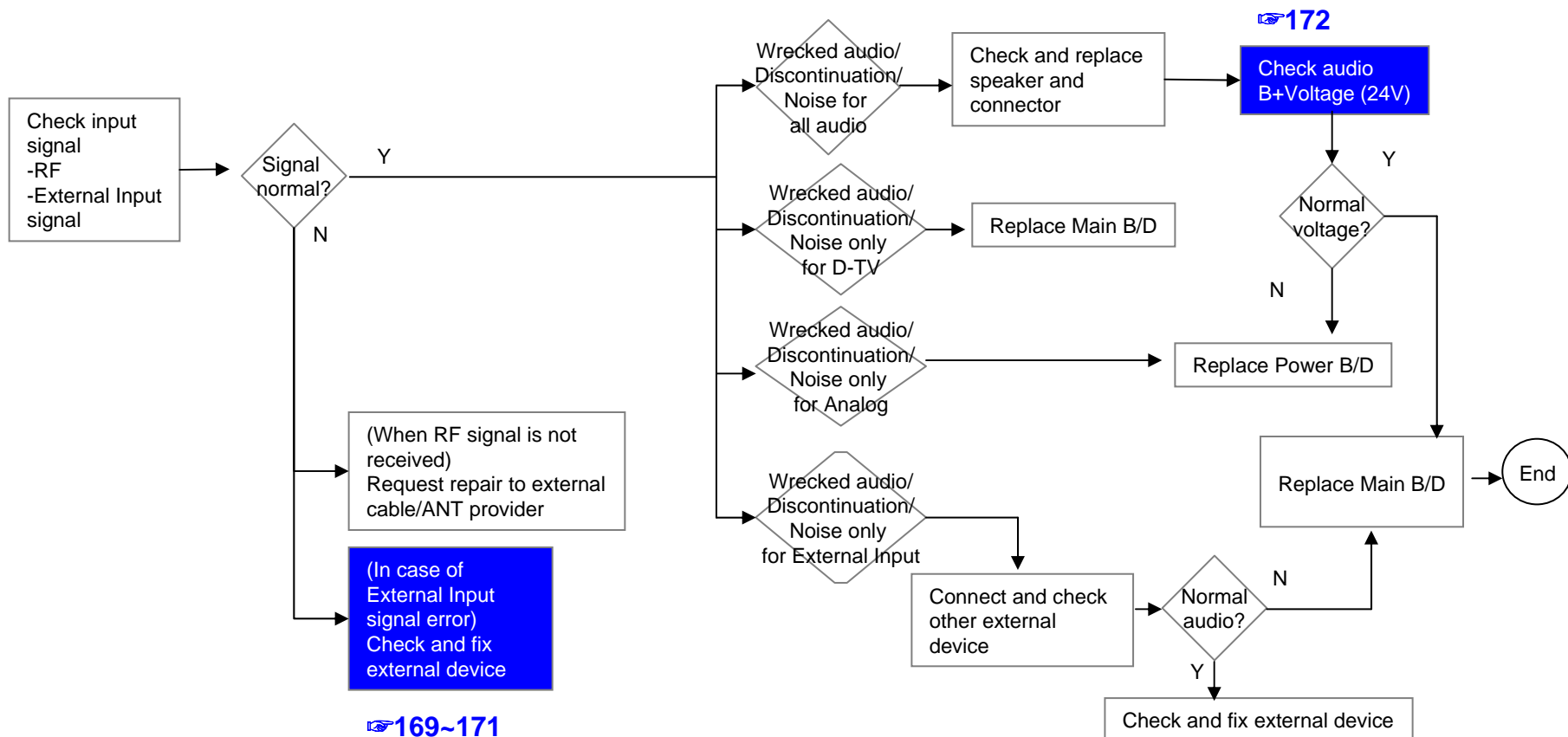




# Standard Repair Process

LCD TV	Error symptom	C. Audio error	Established date	2008. 2 . 1	Electronics 6-3
		Wrecked audio/discontinuation/noise	Revised date		9/13

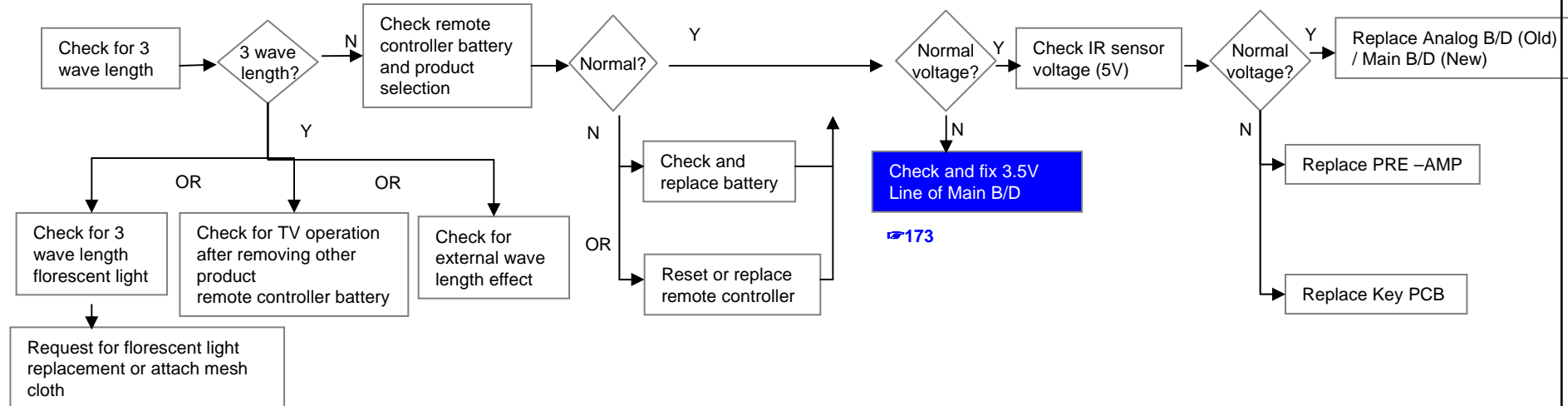
→ Wrecked audio/discontinuation/noise is same after “Check input signal” compared to No audio



# Standard Repair Process

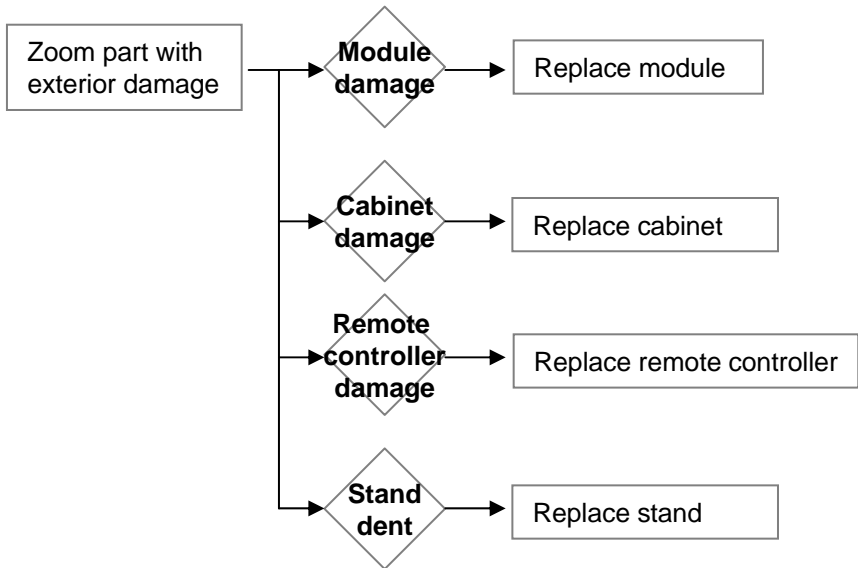
LCD TV	Error symptom	D. Function error	Established date	2008. 2 . 1	Electronics 6-3
		No response in remote controller, key error, recording error, memory error	Revised date		10/13

## No response in remote controller and main unit key error



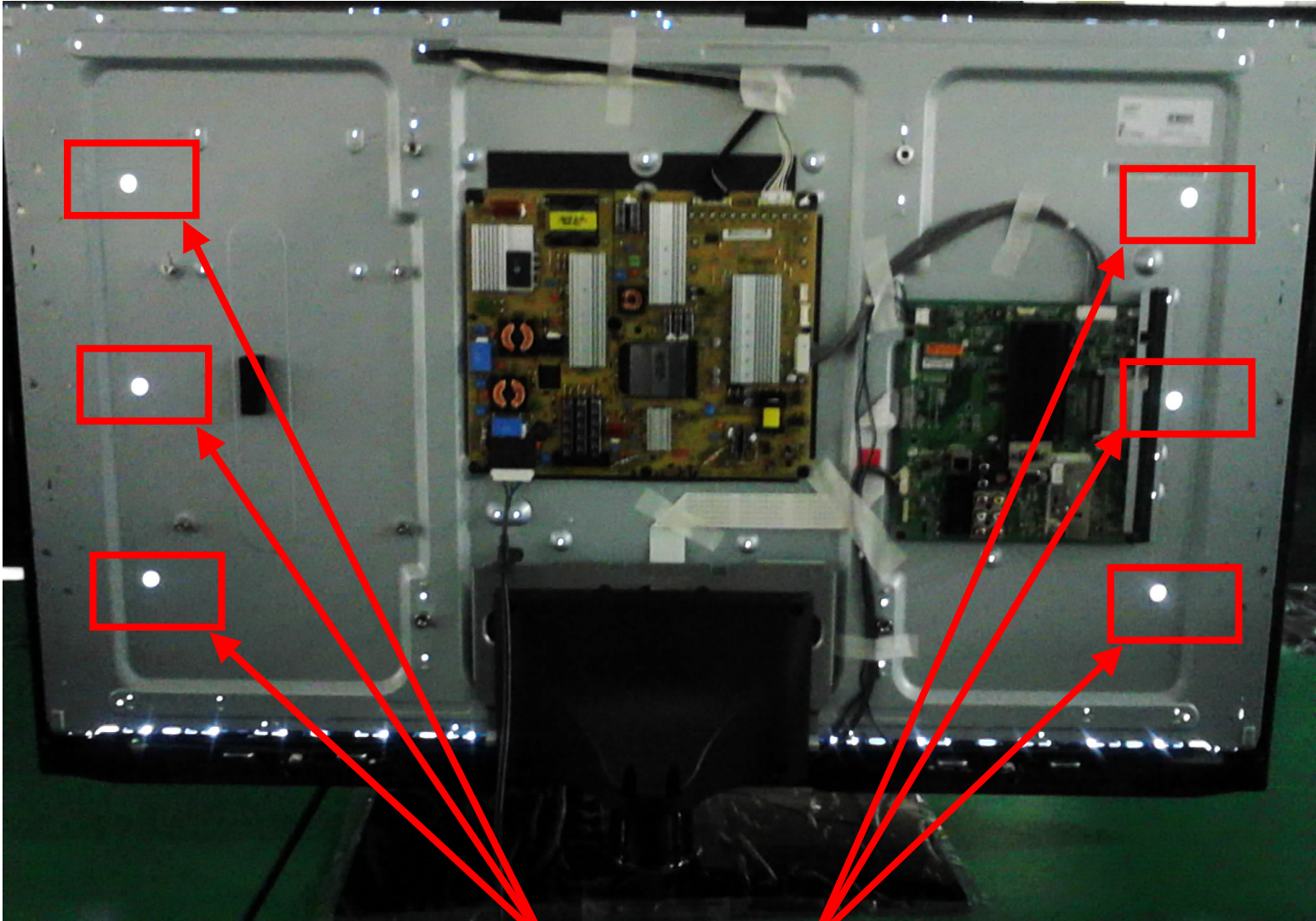
# Standard Repair Process

LCD TV	Error symptom	F. Exterior defect	Established date	2008. 2 . 1	Electronics 6-3
		Exterior defect	Revised date		13/13



# Standard Repair Process Detail Technical Manual

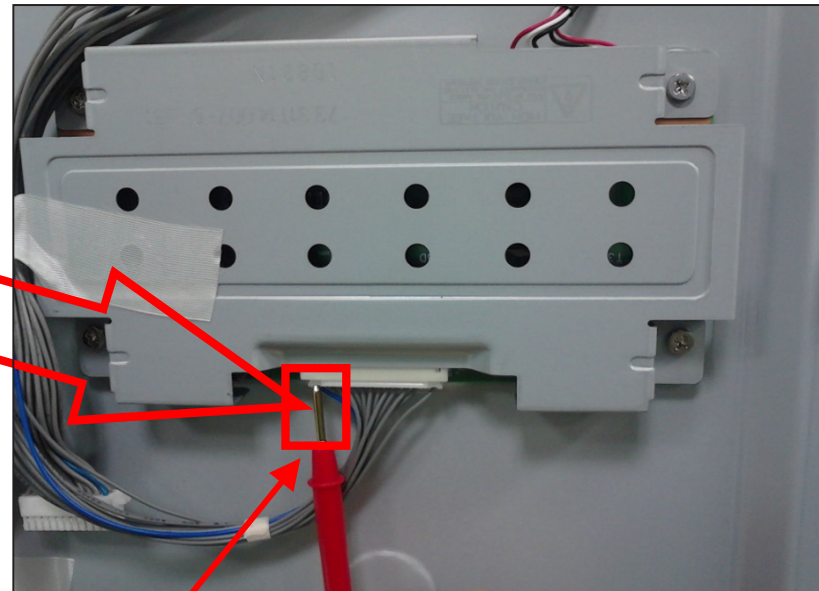
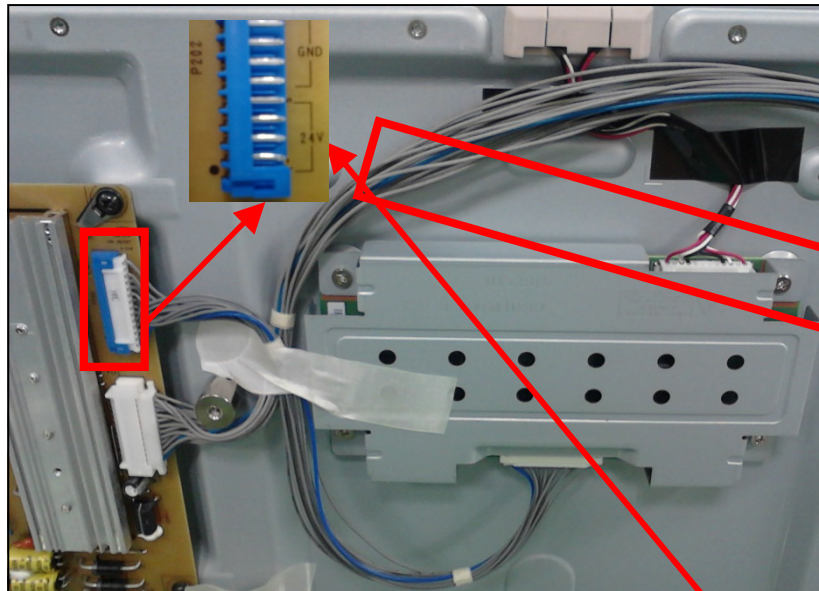
LCD TV	Error symptom	A. Video error_No video/Normal audio	Established date	2008. 2 . 1	Electronics 6-3
	Content	Check LCD back light with naked eye	Revised date		1/33 - 1/13



After turning on the power and disassembling the case, check with the naked eye, whether you can see light from 6 locations.

# Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error_No video/Normal audio	Established date	2008. 2 . 1	Electronics 6-3
	Content	LED Driver B+ 24V measuring method	Revised date		2/33 - 1/13

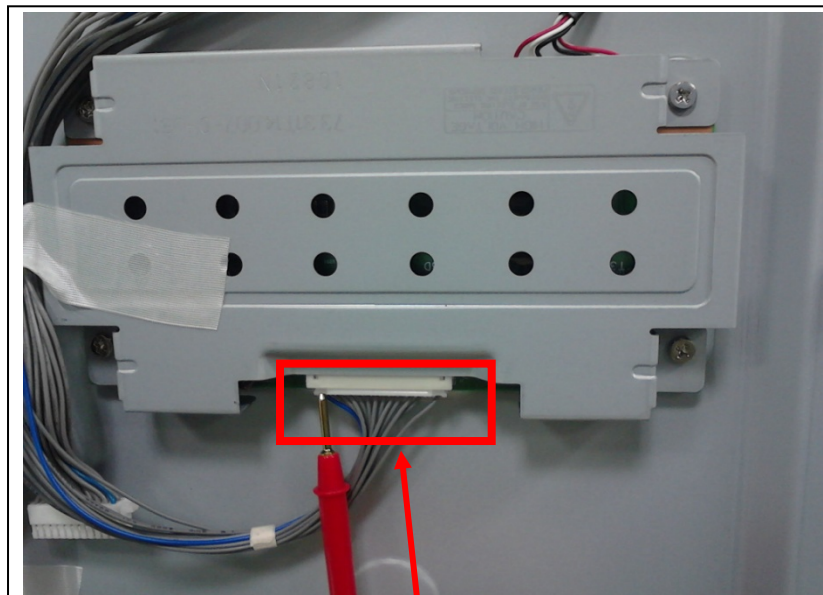


Measure the DC 24V supplied to LED Driver from the Power Board.

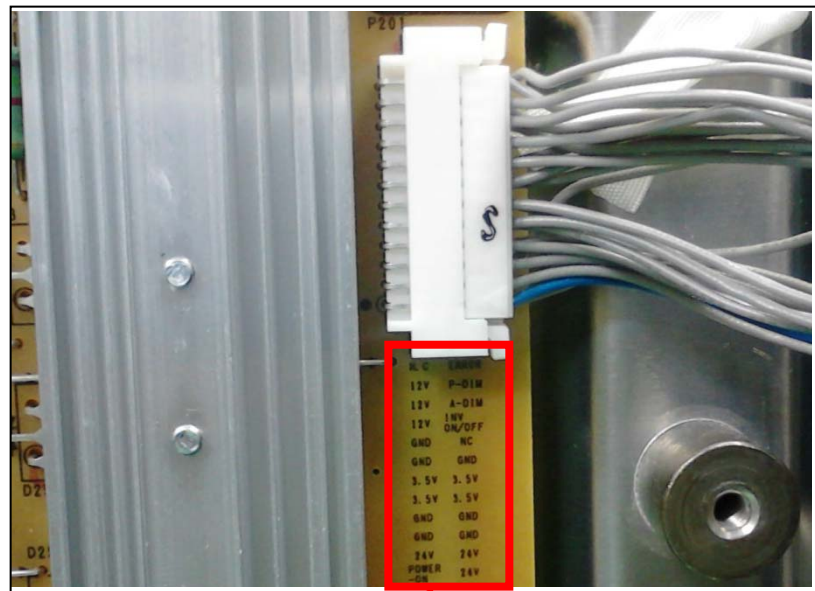


# Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error_No video/Normal audio	Established date	2008. 2 . 1	Electronics 6-3
	Content	Check LED Driver PCB supply voltage	Revised date		3/33 - 1/13



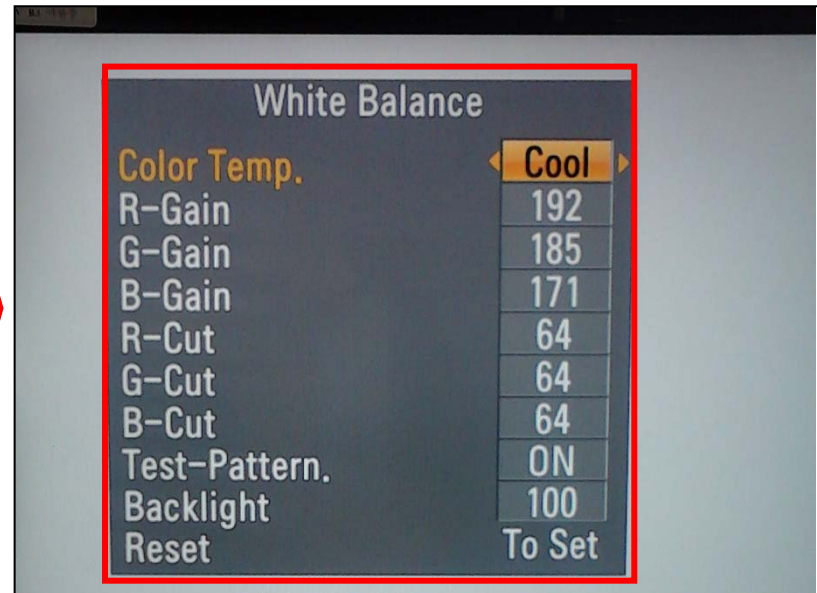
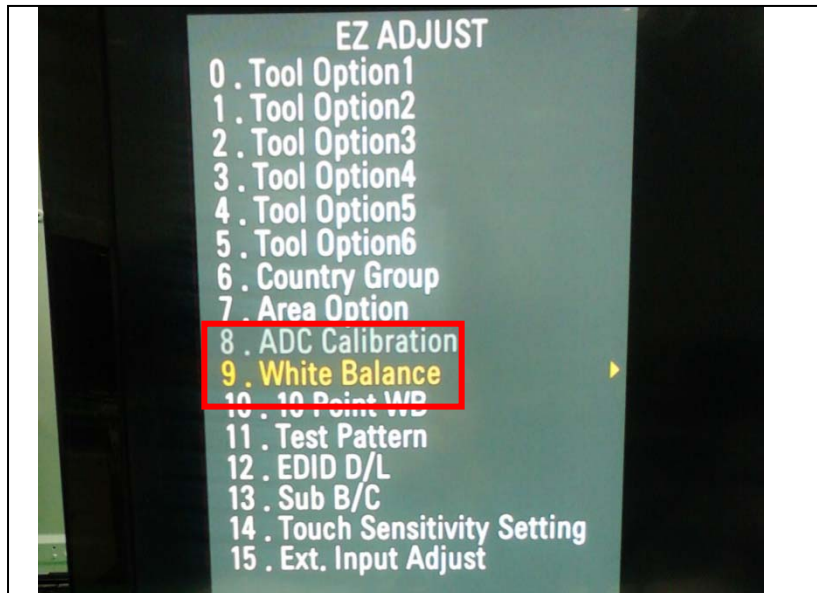
24V is provided from the Power Board and supplied to LED Driver PCB. Check the PIN contact condition and connection.



Check each voltage output (5V,12V,24V) in the Power Board.

# Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error_No video/Normal audio	Established date	2008. 2 . 1	Electronics 6-3
	Content	Check White Balance value	Revised date		4/33 - 1/13

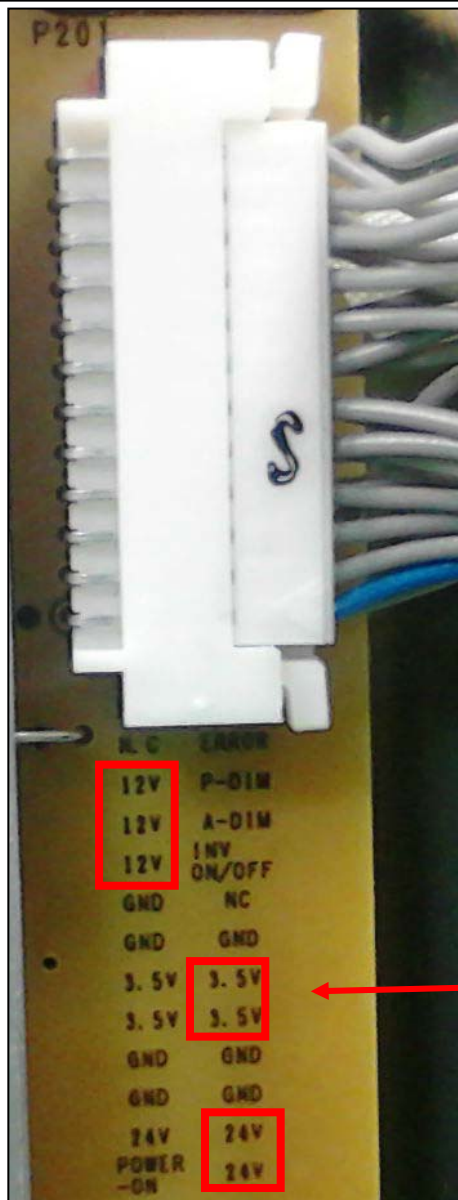


## Entry method

1. Press the ADJ button on the remote controller for adjustment.
2. Enter into White Balance of item 9.
3. After recording the R, G, B (GAIN, Cut) value of Color Temp (Cool/Medium/Warm), re-enter the value after replacing the MAIN BOARD.

# Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error_No video/No audio	Established date	2008. 2 . 1	Electronics 6-3
	Content	Power Board voltage measuring method	Revised date		5/33 - 2/13

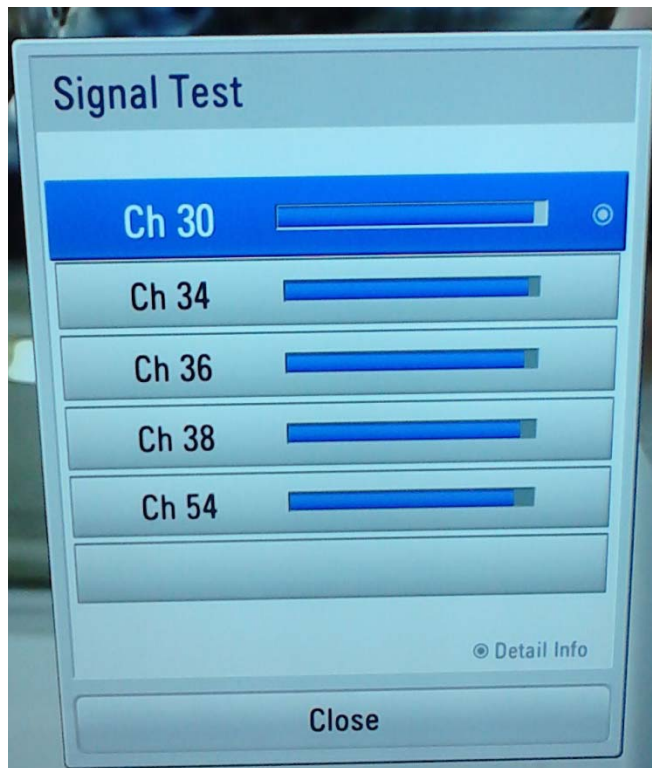


Check each voltage output (3.5V, 12V, 24V) supplied from Power Board to Main Board.

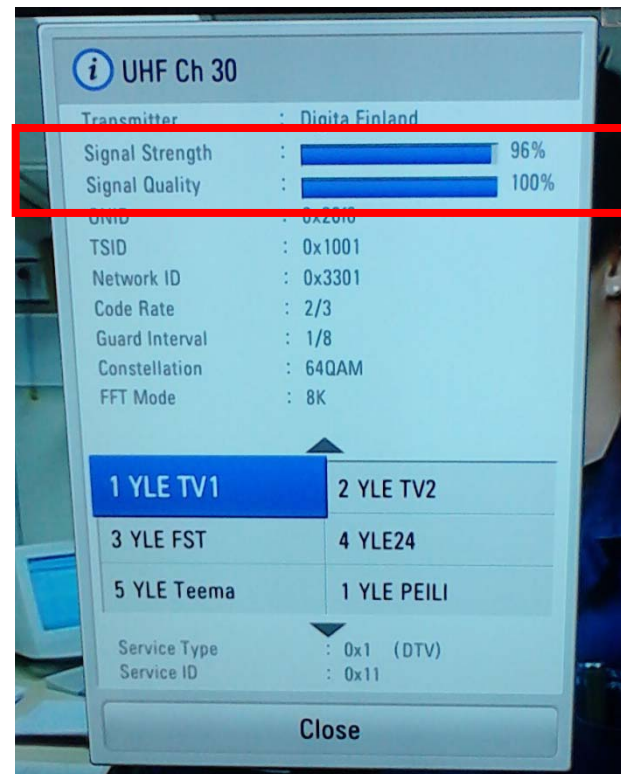


# Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error_Video error, video lag/stop	Established date	2008. 2 . 1	Electronics 6-3
	Content	TUNER input signal strength checking method	Revised date		7/33 - 3/13



Check MENU -> SETUP -> Support -> Signal Test

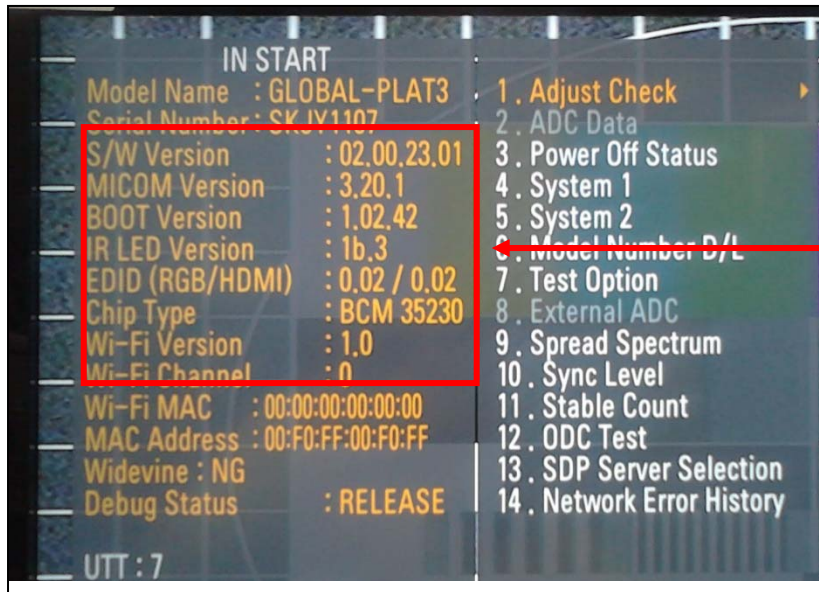


Check Signal Strength and Quality

# Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error_Video error, video lag/stop	Established date	2008. 2 . 1	Electronics 6-3
	Content	LCD-TV Version checking method	Revised date		7/33 - 3/13

## 1. Checking method for remote controller for adjustment



Version

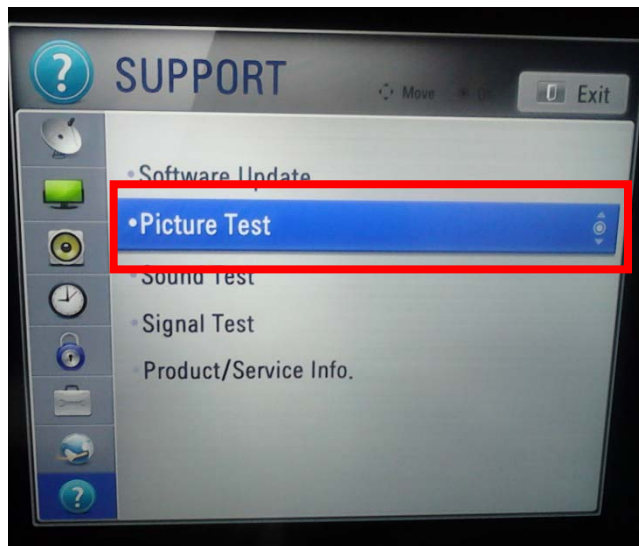


Press the IN-START with the remote controller for adjustment

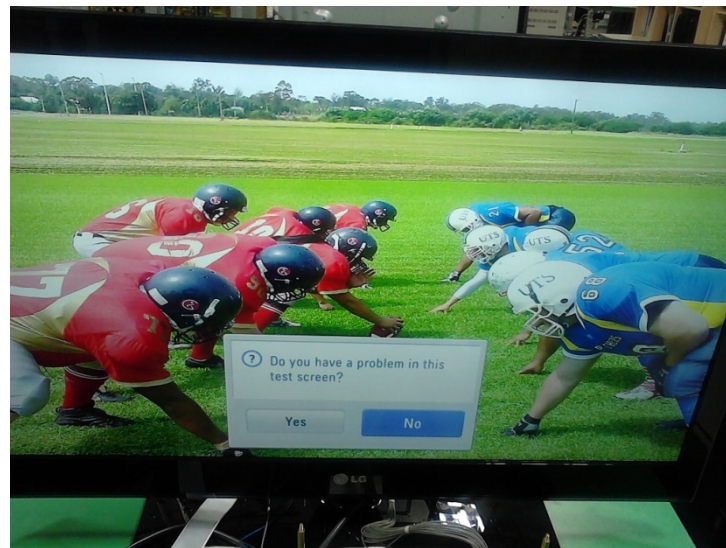
\* Press the Menu button on the remote controller  
Enter Auto Channel  
Press the number button 1,1,1,1,1  
HOST menu is displayed on the screen.

# Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error_Color error	Established date	2008. 2 . 1	Electronics 6-3
	Content	Use Picture Test Mode	Revised date		9/33 - 4/13



Menu -> Support -> Picture Test



Test Image

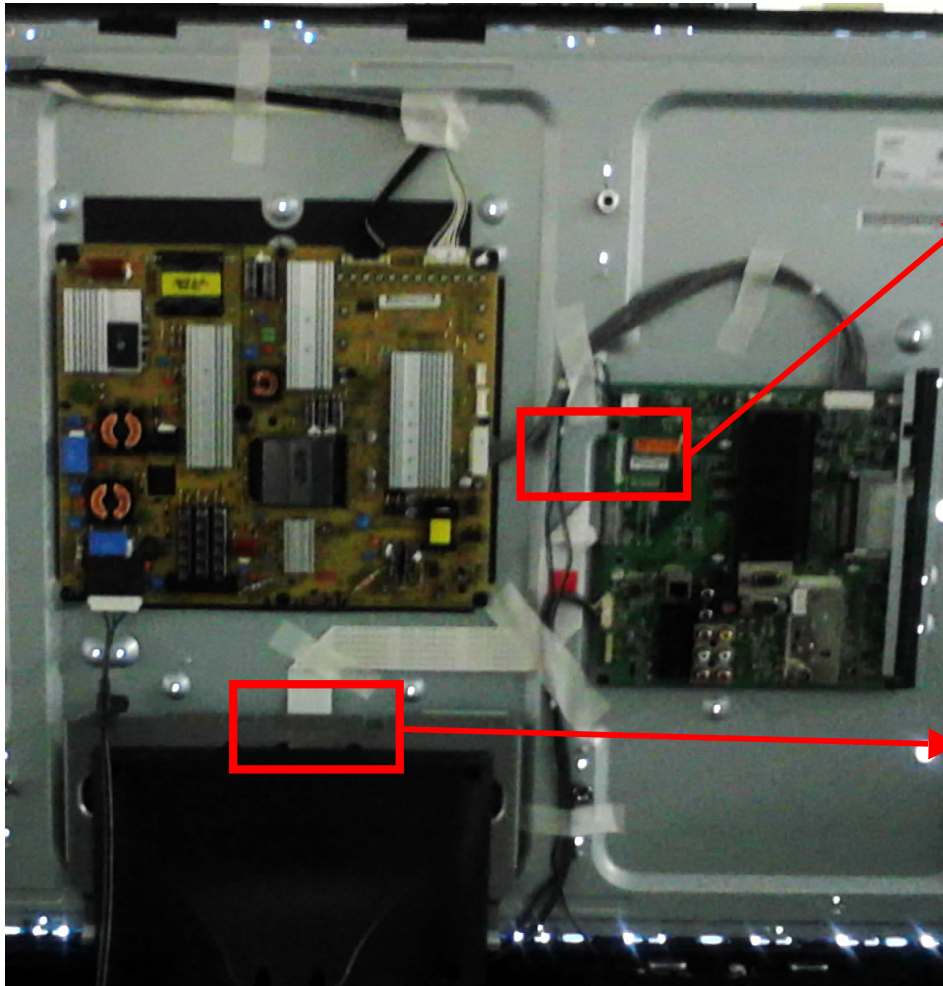
## Entry method

1. Press the Menu button on the remote controller
2. Enter into Support -> Picture Test
3. The TV Display Test Image

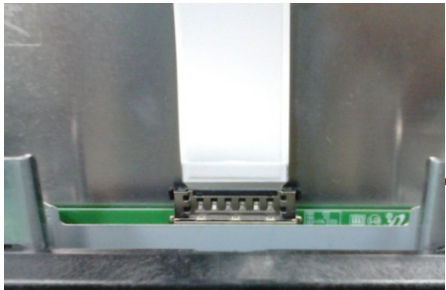


# Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error_Color error	Established date	2008. 2 . 1	Electronics 6-3
	Content	Check Link Cable (LVDS) reconnection condition	Revised date		9/33 - 4/13

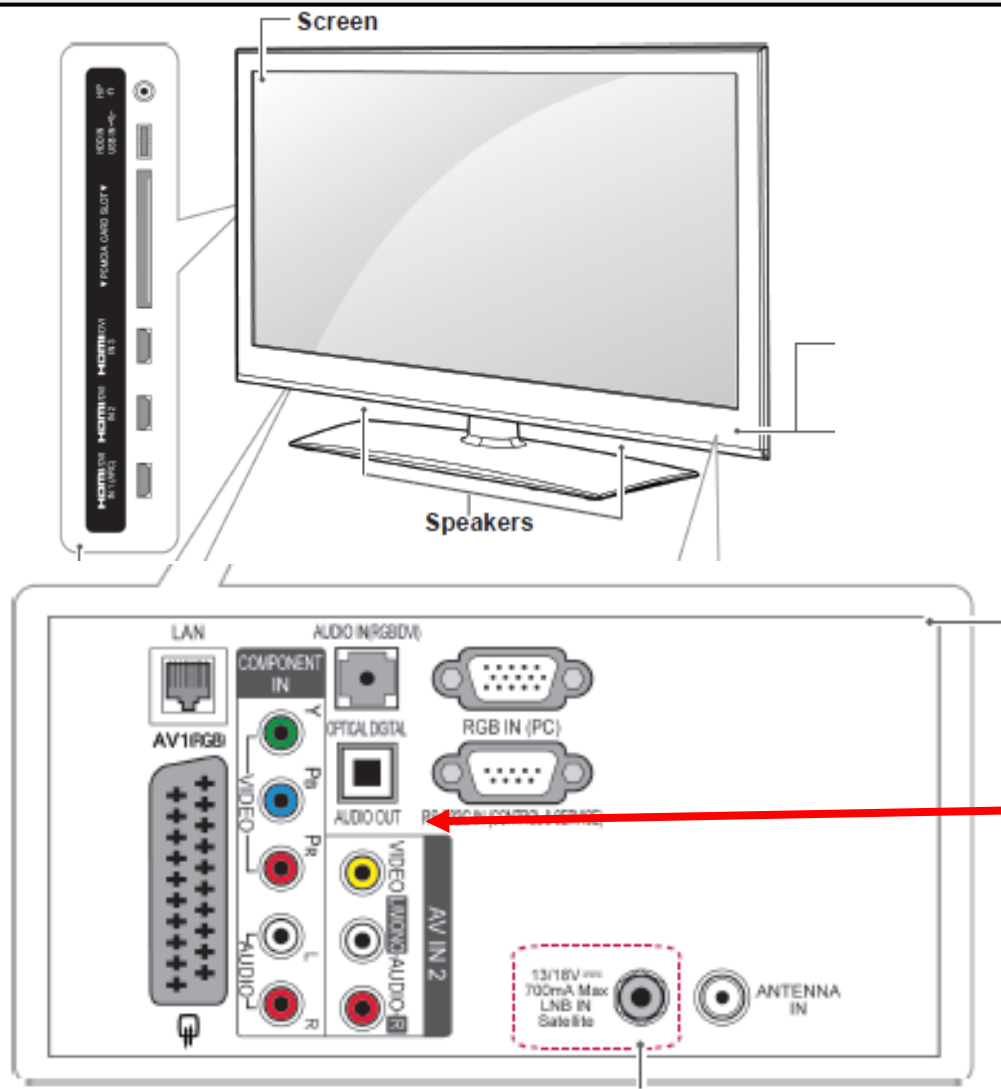


Check the contact condition of the Link Cable



# Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error _Vertical/Horizontal bar, residual image, light spot	Established date	2008. 2 . 1	Electronics 6-3
	Content	LCD TV connection diagram (09)	Revised date		12/33 - 5/13



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

# Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error _ Vertical/Horizontal bar, residual image, light spot	Established date	2008. 2 . 1	Electronics 6-3
	Content	LCD TV connection diagram (09)	Revised date		12/33 - 5/13



Menu -> Support -> Picture Test



Test Image

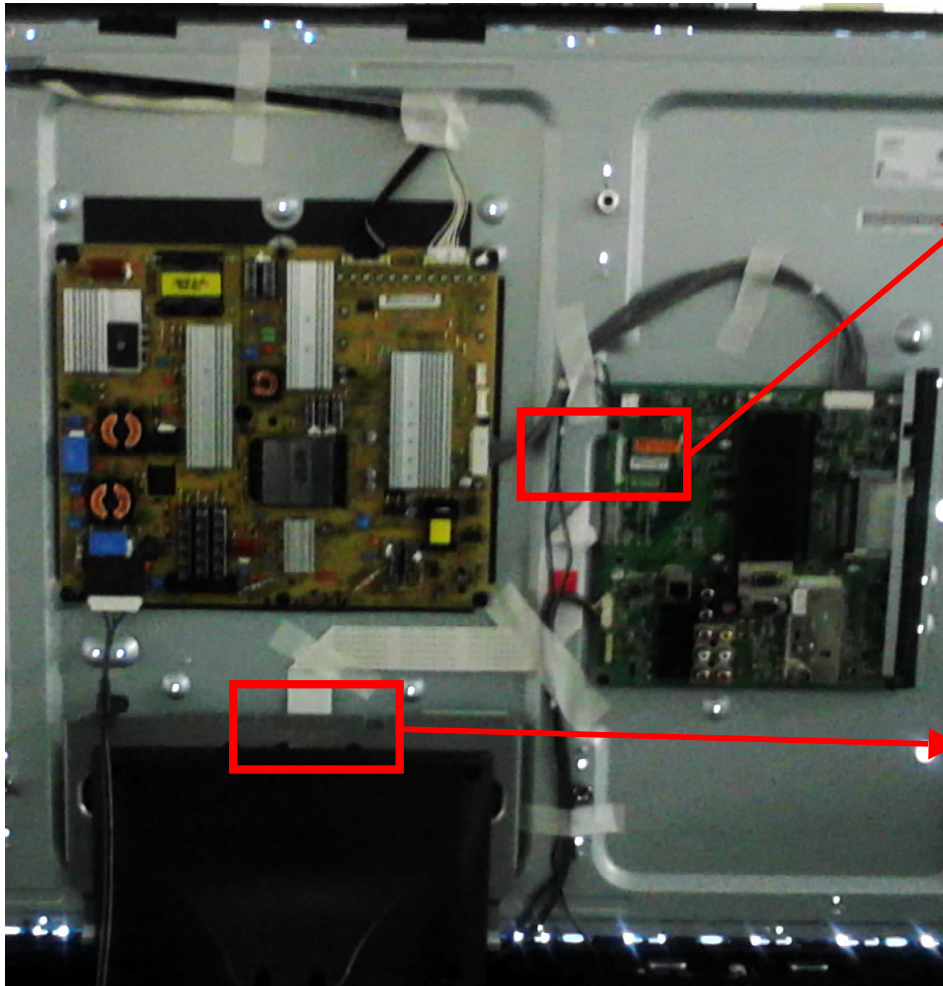
## Entry method

1. Press the Menu button on the remote controller
2. Enter into Support -> Picture Test
3. The TV Display Test Image

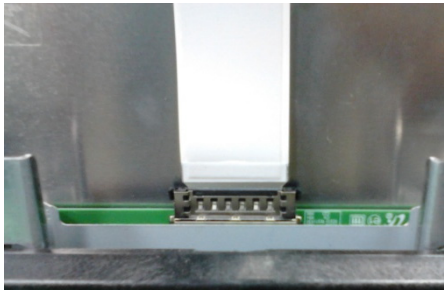


# Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error _Vertical/Horizontal bar, residual image, light spot	Established date	2008. 2 . 1	Electronics 6-3
	Content	Check Link Cable (LVDS) reconnection condition	Revised date		13/33 - 5/13



Check the contact condition of the Link Cable



# Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	B. Power error _No power	Established date	2008. 2 . 1	Electronics 6-3
	Content	Check front display LED	Revised date		15/33 - 6/13

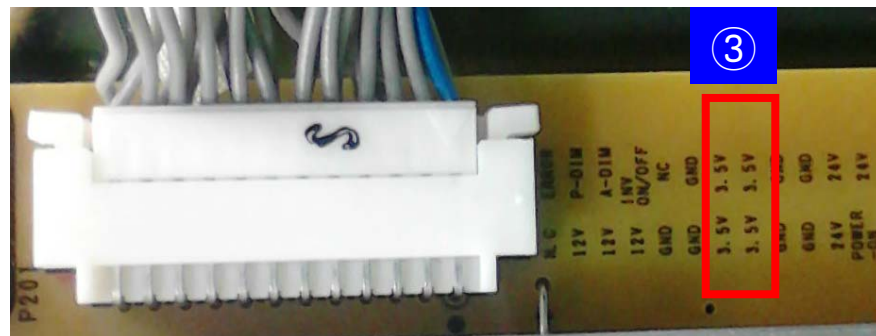
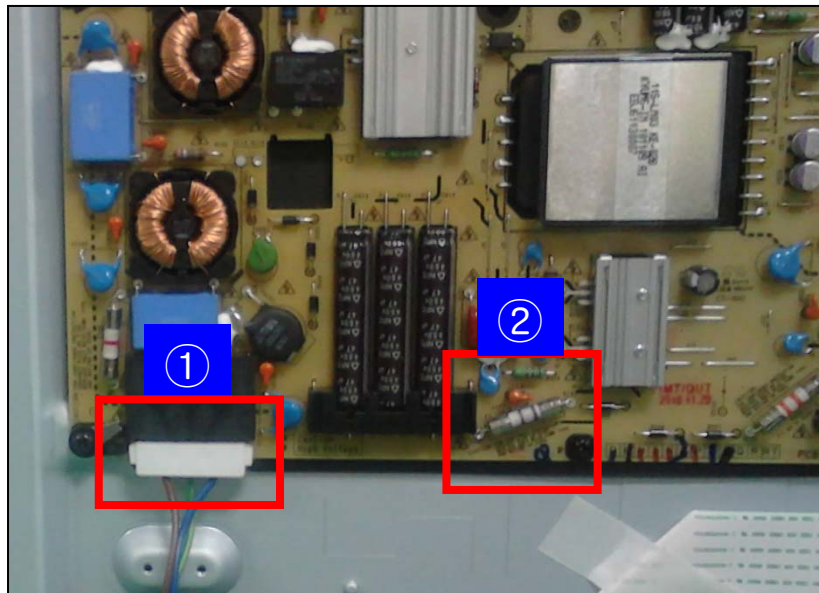


ST-BY condition: Red  
Power ON condition: Blue



# Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	B. Power error _No power	Established date	2008. 2 . 1	Electronics 6-3
	Content	Check power input voltage and ST-BY 3.5V	Revised date		16/33 - 6/13

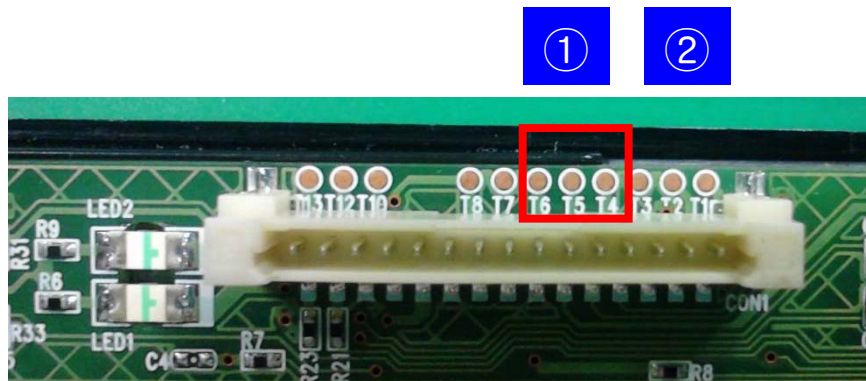


## Power checking method

1. Check the AC220V input in the power cord.
2. Check the connected part with input from the POWER BOARD and whether the fuse is connected.
3. Check the ST-BY DC 3.5V output voltage from the POWER BOARD.

# Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	B. Power error _ No power	Established date	2008. 2 . 1	Electronics 6-3
	Content	Checking method when power is ON	Revised date		17/33 - 6/13

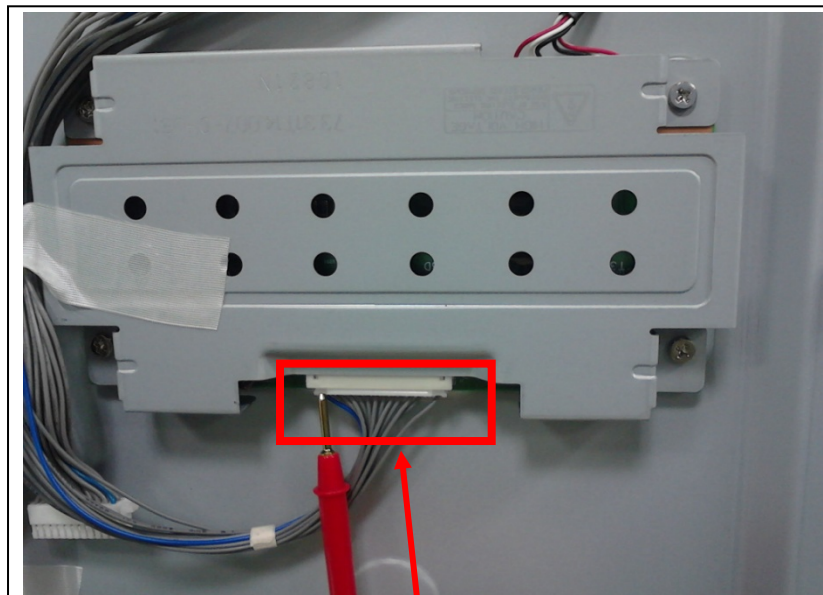


## Checking method when power is ON

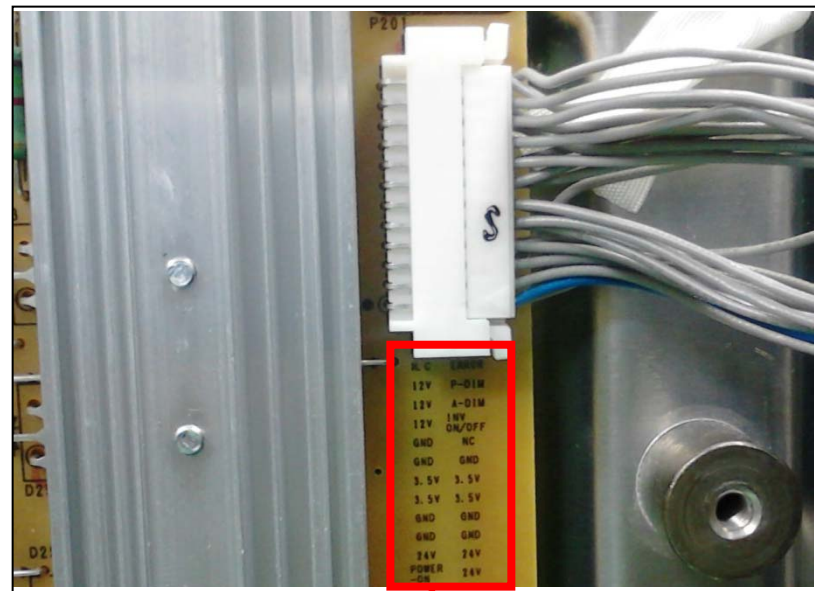
1. Check the ST-BY DC 3.5V output voltage from Soft Touch PCB Test Point T6
2. Check the operating condition of the power KEY on the Soft Touch PCB (Test Point P4, T5)
3. Check the AC-DET (AC) DC3.5V voltage on POWER BOARD.
4. Check the POWER ON High (About DC 1.8V or above) voltage with input from POWER BOARD.

# Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	B. Power error _ No power	Established date	2008. 2 . 1	Electronics 6-3
	Content	POWER BOARD voltage measuring method	Revised date		18/33 - 6/13



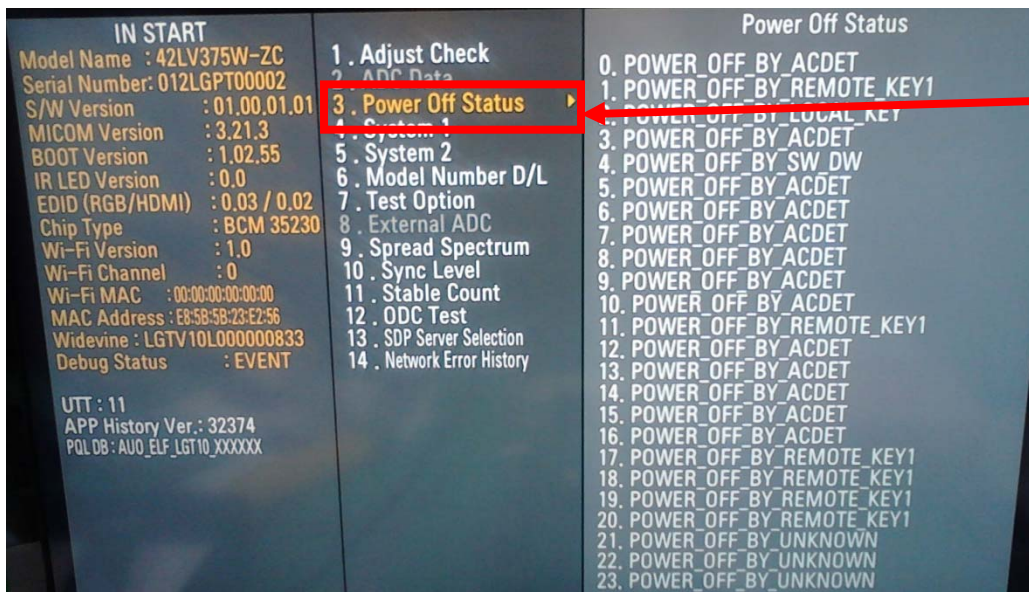
24V is provided from the Power Board and supplied to LED Driver PCB. Check the PIN contact condition and connection.



Check each voltage output (5V,12V,24V) in the Power Board.

# Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	B. Power error _ Off when on, off whiling viewing	Established date	2008. 2 . 1	Electronics 6-3
	Content	POWER OFF MODE checking method	Revised date		1/2 - 19/33 - 7/13



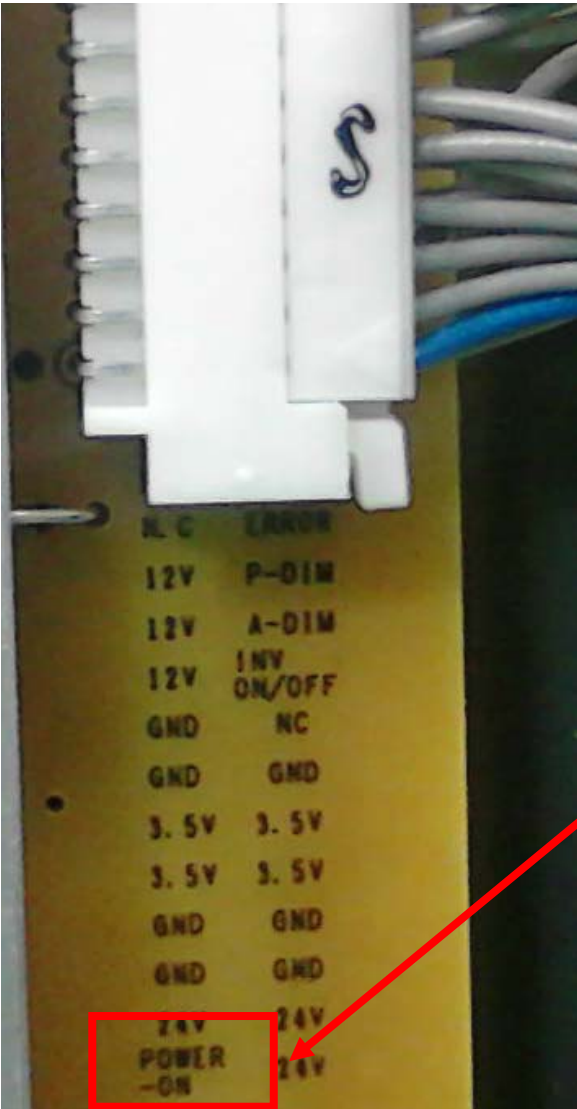
## Entry method

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



# Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	B. Power error _ Off when on, off whiling viewing	Established date	2008. 2 . 1	Electronics 6-3
	Content	POWER BOARD PIN voltage checking method	Revised date		20/33 - 7/13



Check the voltage when the Power OFF mode is not shown

# Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	C. Audio error_ No audio/Normal video	Established date	2008. 2 . 1	Electronics 6-3
	Content	Checking method in menu when there is no audio	Revised date		21/33 - 8/13

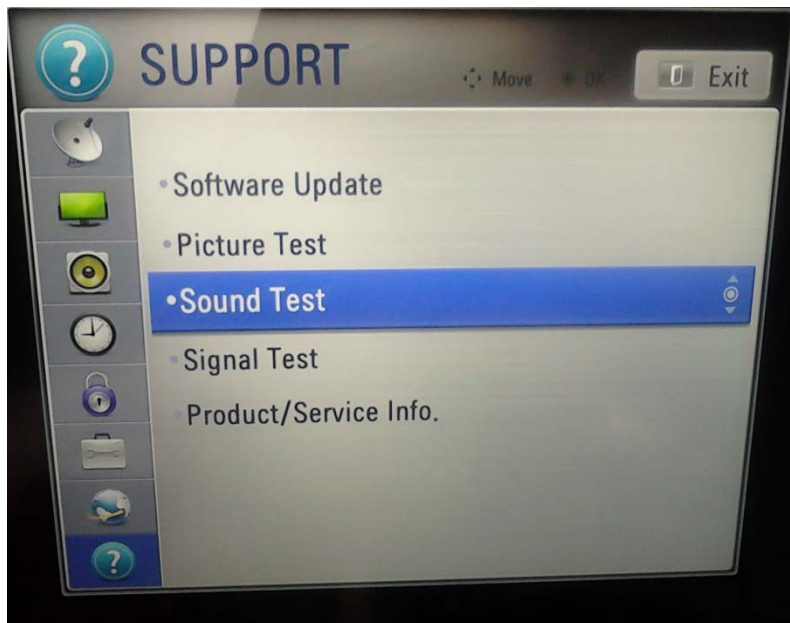


## Checking method

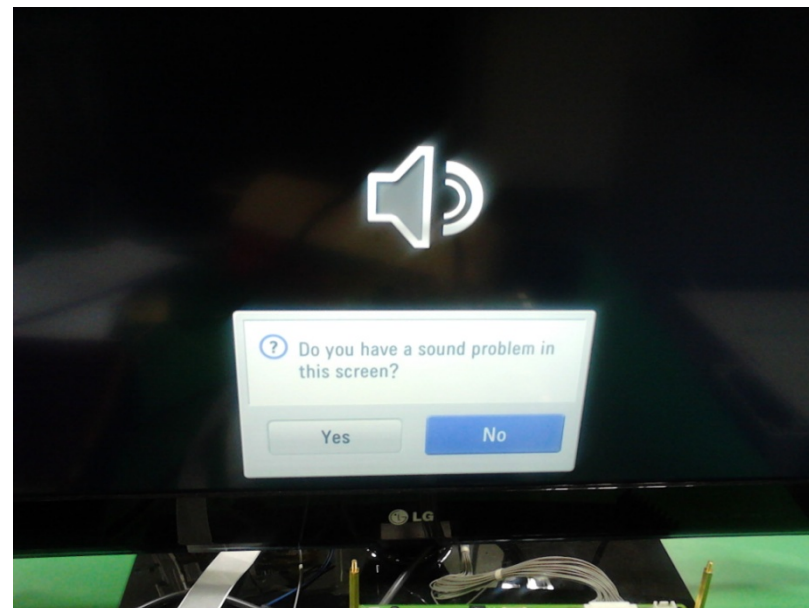
1. Press the MENU button on the remote controller
2. Select the AUDIO function of the Menu
3. Select TV Speaker from Off to On

# Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	C. Audio error_ No audio/Normal video	Established date	2008. 2 . 1	Electronics 6-3
	Content	Use Sound Test Mode	Revised date		21/33 - 8/13



Menu -> Support -> Sound Test



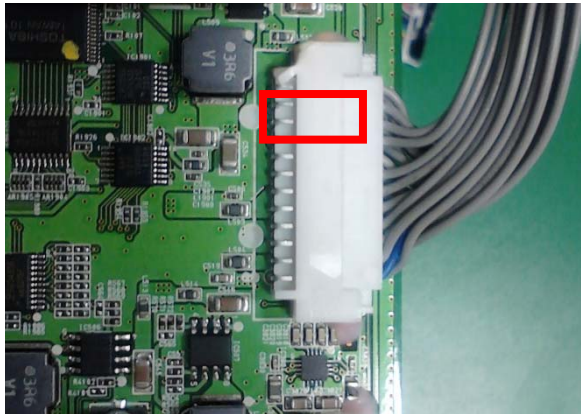
Sound Test (Play the Music)

## Entry method

1. Press the Menu button on the remote controller
2. Enter into Support -> Sound Test
3. The TV Play the Test Music

# Standard Repair Process Detail Technical Manual

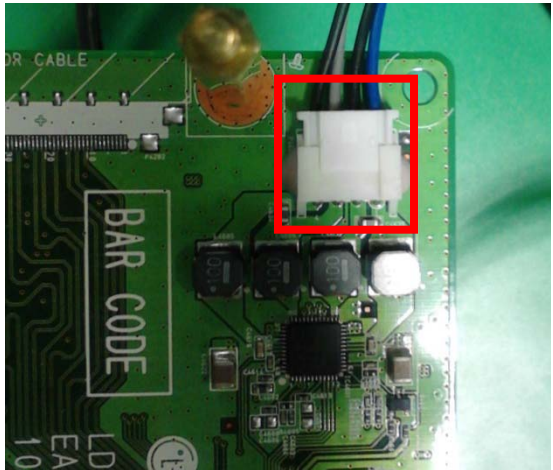
LCD TV	Error symptom	C. Audio error_ No audio/Normal video	Established date	2008. 2 . 1	Electronics 6-3
	Content	Voltage and speaker checking method when there is no audio	Revised date		22/33 - 8/13



①



②



③

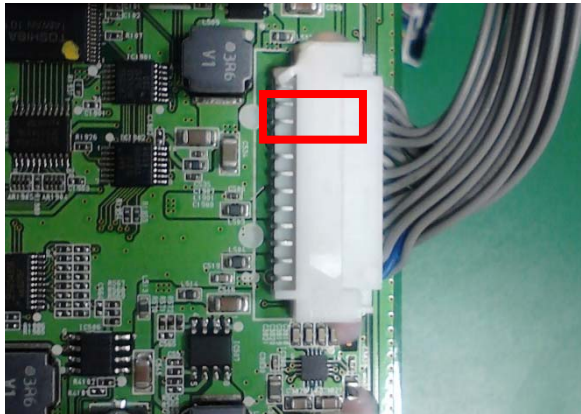
## Checking order when there is no audio

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



# Standard Repair Process Detail Technical Manual

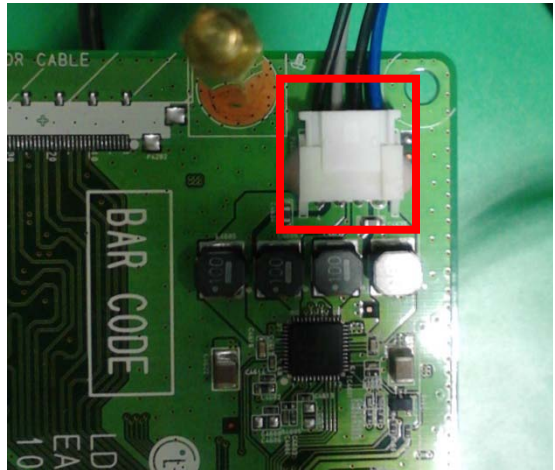
LCD TV	Error symptom	C. Audio error_ Wrecked audio/discontinuation/noise	Established date	2008. 2 . 1	Electronics 6-3
	Content	Voltage and speaker checking method in case of audio error	Revised date		25/33 - 9/13



①



②



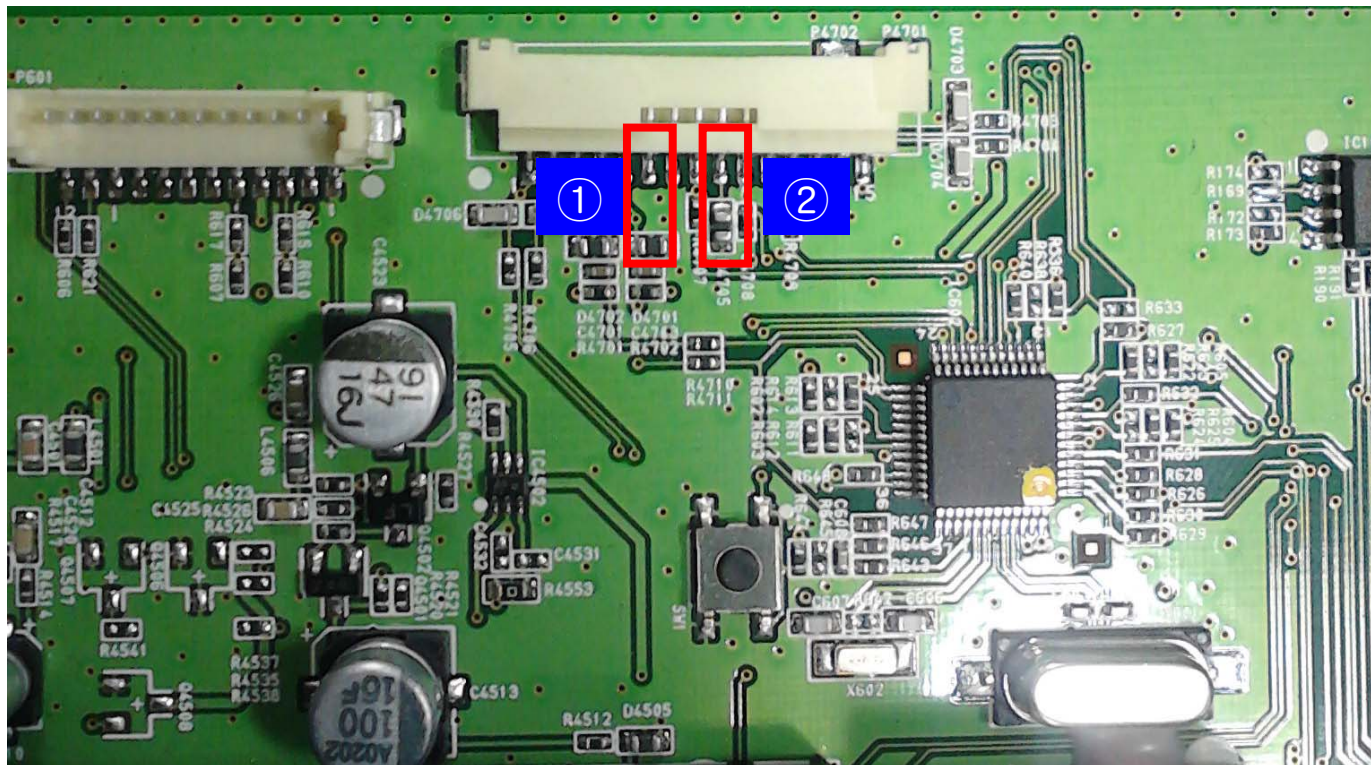
③

## Checking order when there is no audio

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

# Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	D. Function error_ No response in remote controller, key error	Established date	2008. 2 . 1	Electronics 6-3
	Content	Remote controller operation checking method	Revised date		26/33 - 10/13



## Checking order

1. Check the DC 5V on the 3.5V\_ST terminal. (Pin 6)
  2. When checking the Pre-Amp when the power is in ON condition, it is normal when the Analog Tester needle moves slowly, and defective when it does not move at all.
- Input voltage terminal: 3.5V\_ST (Pin 6)  
Remote controller receiver terminal: IR (Pin 9)