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LED LCD TV

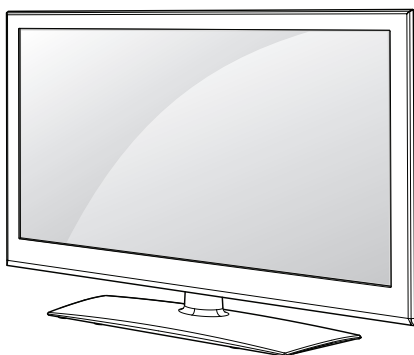
SERVICE MANUAL

CHASSIS : LD12B

MODEL : 42LV3700/370S 42LV3700/370S-ZC
42LV375G/S/W 42LV375G/S/W-ZC

CAUTION

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



P/NO : MFL67002302 (1101-REV00)

Printed in Korea

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SAFETY PRECAUTIONS

IMPORTANT SAFETY NOTICE

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

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

Do not modify the original design without permission of manufacturer.

General Guidance

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

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

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

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

Keep wires away from high voltage or high temperature parts.

Before returning the receiver to the customer,

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

Leakage Current Cold Check(Antenna Cold Check)

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

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

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

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

Leakage Current Hot Check (See below Figure)

Plug the AC cord directly into the AC outlet.

Do not use a line Isolation Transformer during this check.

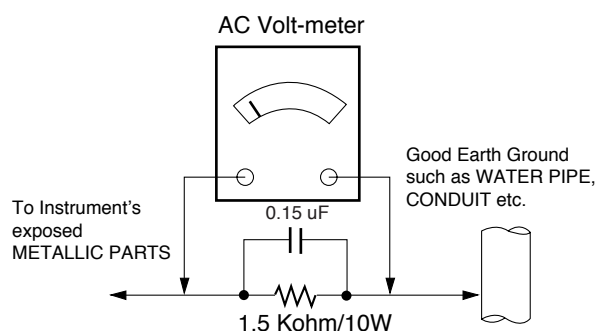
Connect 1.5 K / 10 watt resistor in parallel with a 0.15 μ F capacitor between a known good earth ground (Water Pipe, Conduit, etc.) and the exposed metallic parts.

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

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

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

Leakage Current Hot Check circuit



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

*Base on Adjustment standard

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)	DTV & Analog (Total 36 countries) DTV (MPEG2/4, DVB-T) : 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) DTV (MPEG2/4, DVB-T2): 5 countries (England/Sweden/Finland/Denmark/Norway) DTV (MPEG2/4, DVB-C): 10 countries (Sweden/Finland/Denmark/Norway/Austria/Swiss/Germany/Netherlands/Hungary/Slovenia) Analog Only - 5 countries (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	► DVB-T - 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 ► DVB-C - Symbolrate : 4.0Msymbols/s to 7.2Msymbols/s - Modulation : 16QAM, 64-QAM, 128-QAM and 256-QAM ► DVB-T2 - 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 ► DVB-S ► DVB-S2
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, C_B/P_B, C_R/P_R)

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°C , it should be placed in the circumstance of above 15°C for 2 hours

In case of keeping module is in the circumstance of below -20°C , it should be placed in the circumstance of above 15°C for 3 hours.

[Caution]

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

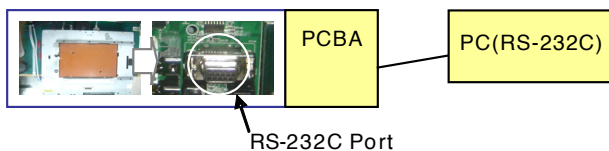
3. Automatic Adjustment

3.1. MAC Address

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

- (2) Download method

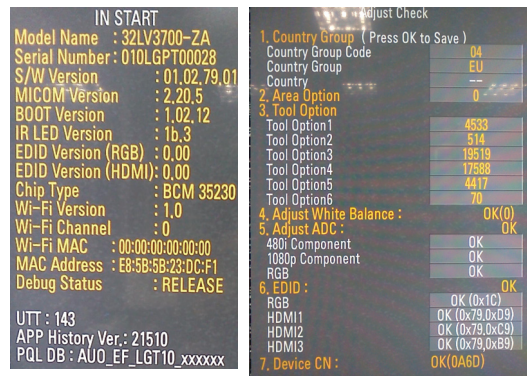
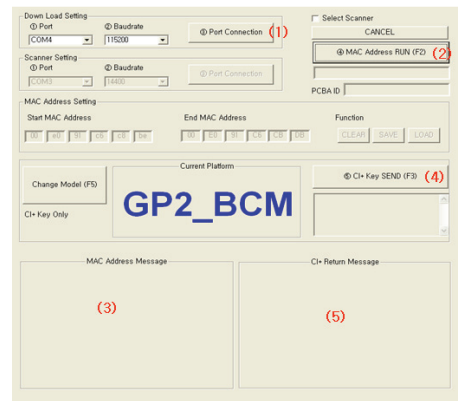
- 1) Communication Prot connection



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

- 2) MAC Address & CI+ key Download

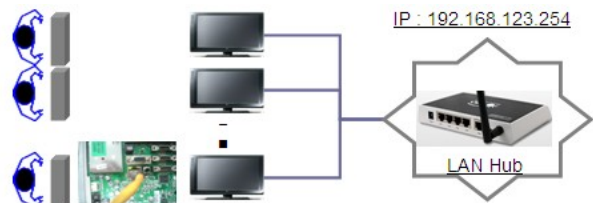
- Set CI+ key path Directory at start Mac & CI Download Program
- Com 1,2,3,4 and 115200(Baud rate)
- Port connection button click(1)
- Push the (2) MAC Address write.
- At success Download, check the OK(3)
- Start CI+ Download, Push the (4)
- Check the OK or NG.(5)



3.2. LAN

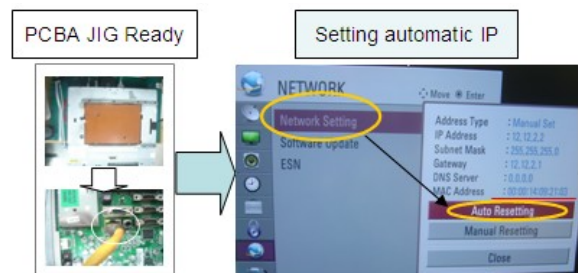
- (1) Equipment & Condition

- 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.

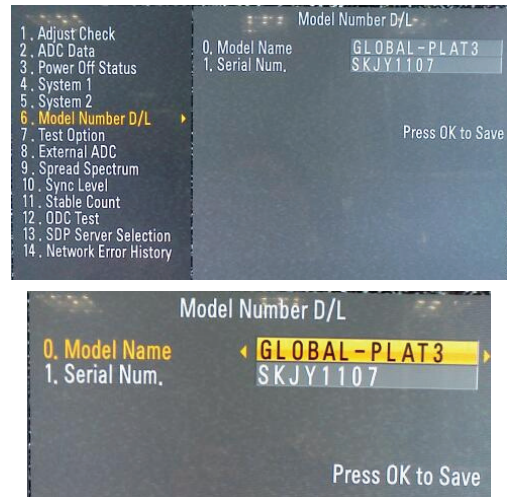
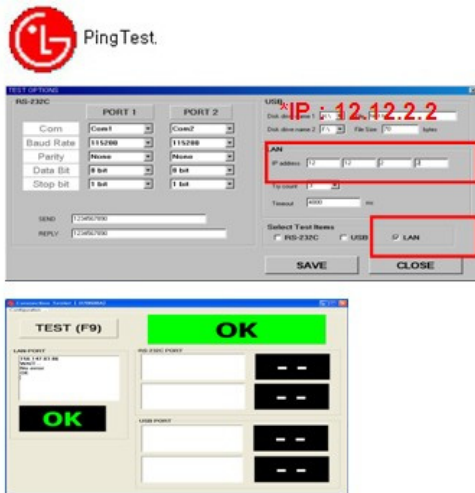


3.3. LAN PORT INSPECTION(PING TEST)

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)

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

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.

■ 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

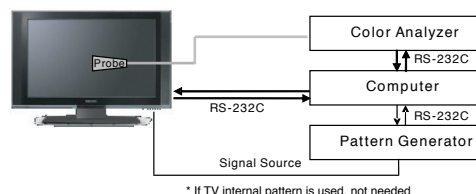
- (1) W/B adj. Objective & How-it-works
- (2) Objective: To reduce each Panel's W/B deviation
- (3) How-it-works : When R/G/B gain in the OSD is at 192, it means the panel is at its Full Dynamic Range. In order to prevent saturation of Full Dynamic range and data, one of R/G/B is fixed at 192, and the 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

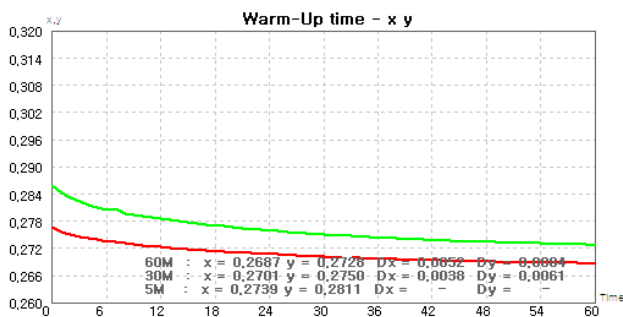
■ Standard color coordinate and temperature using CA-210(CH 14)

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

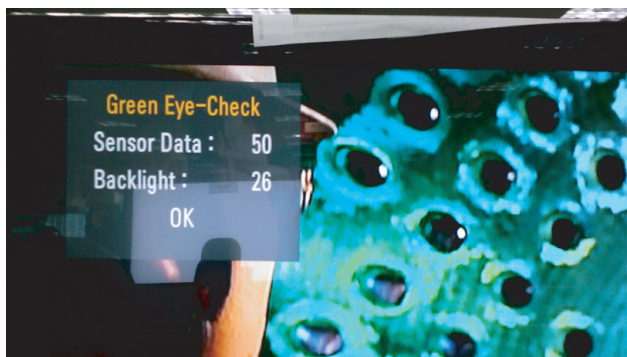
- IOP & Edge LED module change color coordinate because of aging time.
- apply under the color coordinate table, for compensated aging time.
- EDGE LED(LV3700)

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

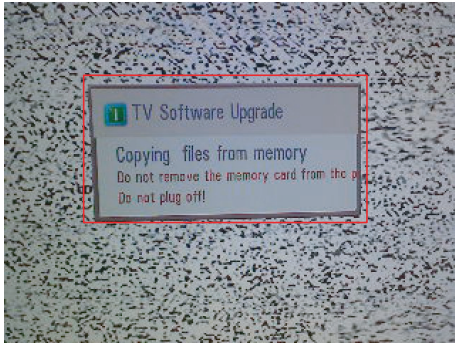
- 1) GND & Internal Pressure auto-check preparation
 - Check that Power Cord is fully inserted to the SET. (If loose, re-insert)
- 2) Perform GND & Internal Pressure auto-check
 - Unit fully inserted Power cord, Antenna cable and A/V arrive to the auto-check process.
 - Connect D-terminal to AV JACK 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

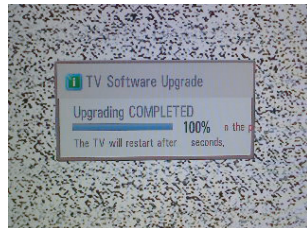
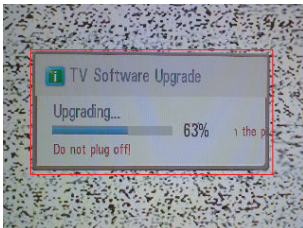
- TEST voltage
 - GND: 1.5 KV/min at 100 mA
 - SIGNAL: 3 KV/min at 100 mA
- TEST time: 1 second
- TEST POINT
 - GND TEST = POWER CORD GND & SIGNAL CABLE METAL GND
 - Internal Pressure TEST = POWER CORD GND & LIVE & NEUTRAL
- LEAKAGE CURRENT: At 0.5 mArms

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"

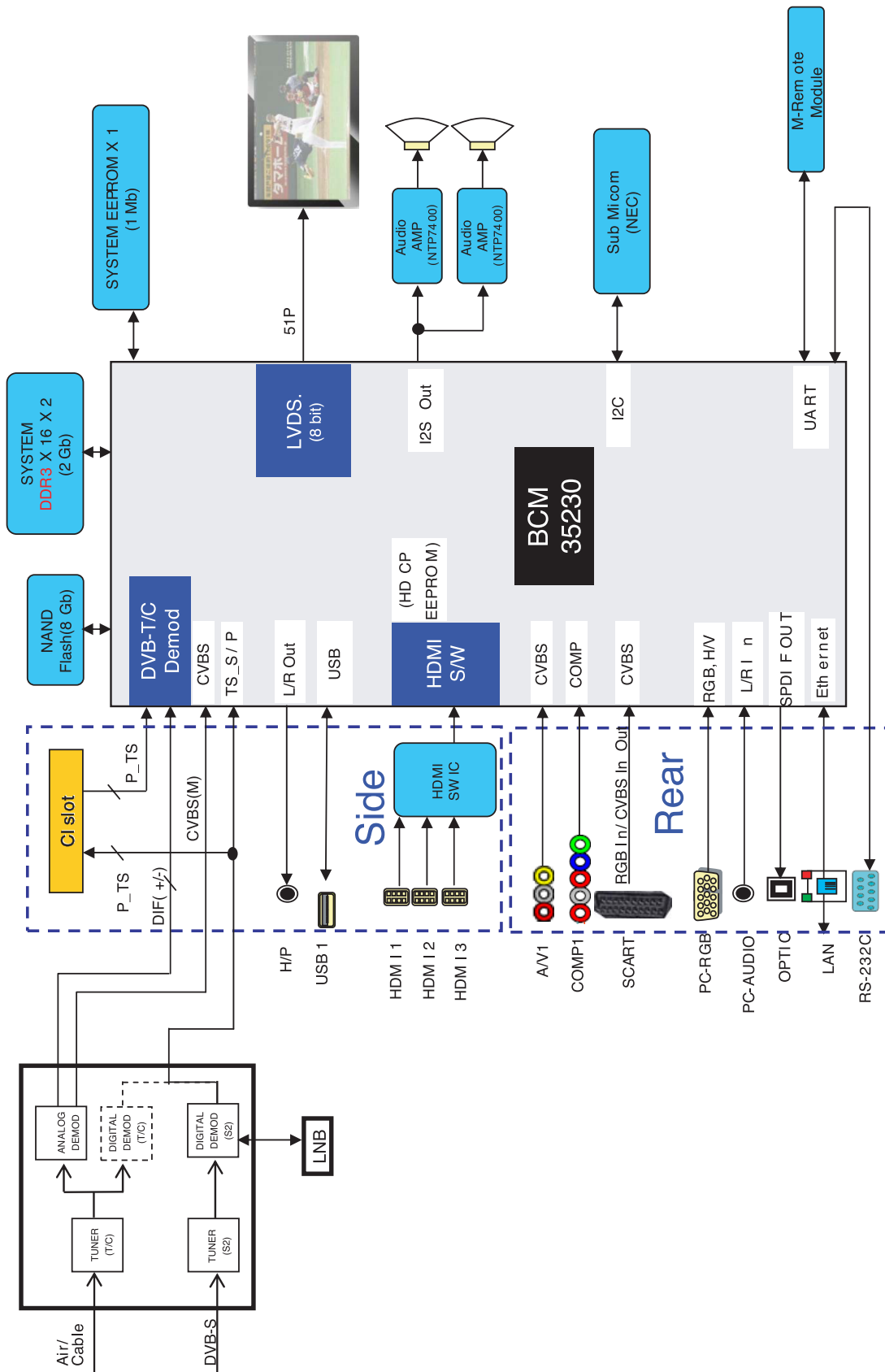


- 4) Updating is starting.



- 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.)

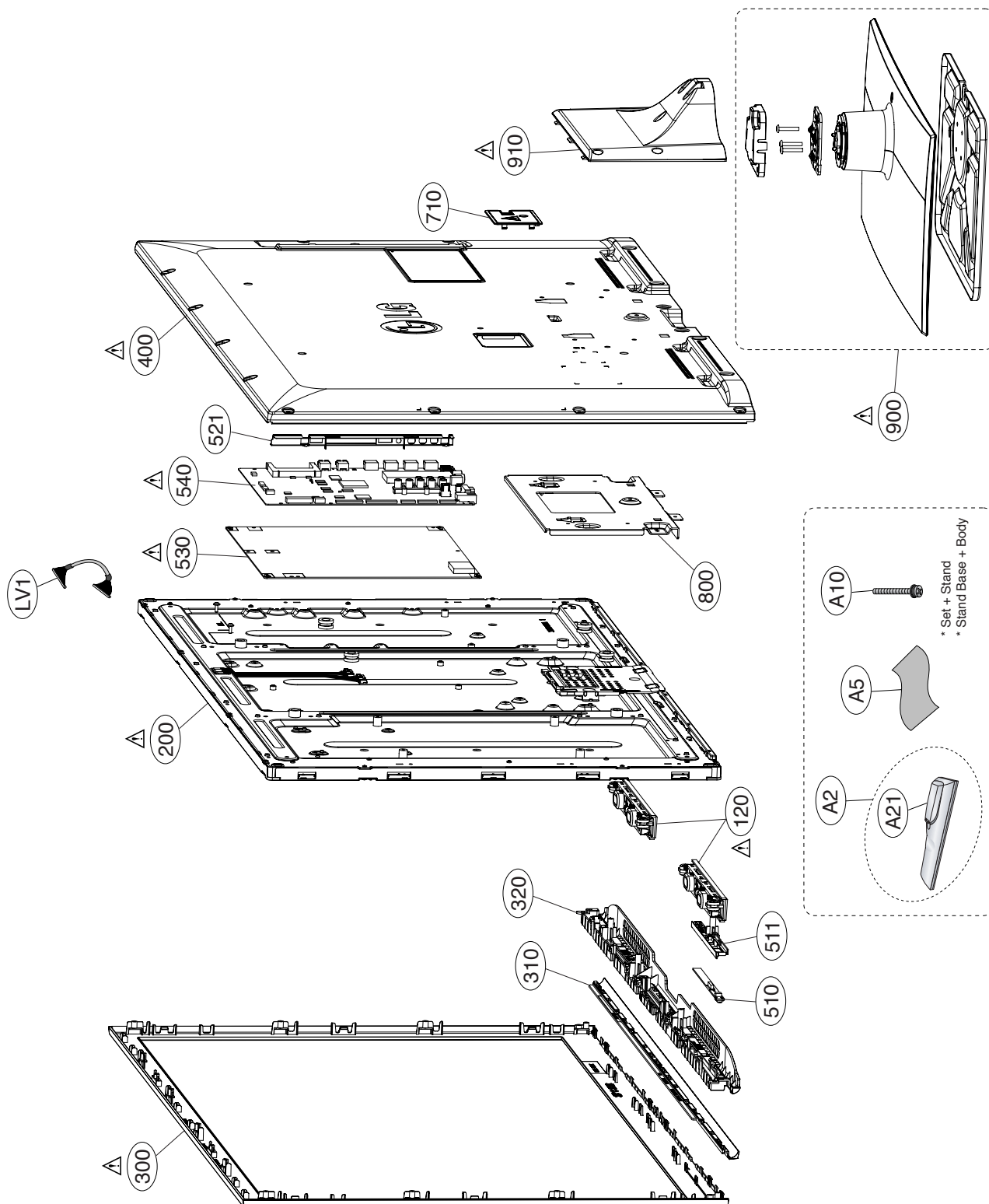
BLOCK DIAGRAM



EXPLODED VIEW

IMPORTANT SAFETY NOTICE

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



[illegible]

IC102-+*1		
TH58BDV4S08TA20		
NC_1	1	
NC_2	2	DEV_HAND_16GbIt
NC_3	3	48
NC_4	4	47
NC_5	5	46
RY/BV2	6	45
RY/BV1	7	44
RE	8	43
CE1	9	42
CE2	10	41
NC_6	11	40
VCC_1	12	39
VSS_1	13	38
NC_7	14	37
NC_8	15	36
ClE	16	35
AlE	17	34
WE	18	33
WD	19	32
NC_9	20	31
NC_10	21	30
NC_11	22	29
NC_12	23	28
NC_13	24	27

The schematic shows two NAND ECC circuit configurations. The top configuration, labeled "NAND ECC (FA3, FA2, FAL)", features a 3.3V_Nominal supply connected to a network of resistors (R113, R117, R122, R127, R114, R118, R123, R128) and optoisolators (OPT). This network is connected to four input pins: CI_ADDR[4], NAND_DATA[2], NAND_DATA[1], and NAND_DATA[1]. To the right, a memory map lists various flash devices and their addresses.

The bottom configuration, labeled "NAND ECC (FA3, FA2, FAE)", also uses a 3.3V_Nominal supply and a similar resistor/optoisolator network (R111, R115, R119, R112, R116, R120). Its four input pins are CI_ADDR[3], CI_ADDR[2], NAND_ALE, and NAND_ALE. A corresponding memory map is provided to its right.

NAND ECC (FA3, FA2, FAL)

```

0000: ST Micro W25P or compatible Serial Flash
0010: 8-bit 512Mbit 512B page SLC NAND Flash device
0100: 8-bit 128, 256Mbit 512B page SLC NAND Flash
0110: 8-bit 10Bit 2KB page SLC NAND Flash devices
0120: 8-bit 20bit, 40bit, 80bit 2KB page SLC NAND
0130: 8-bit 160bit, 320bit 4KB page SLC NAND Flash
0001: 8-bit 8/16/320bit 2KB page MLC NAND Flash de
0101: 8-bit 16/320bit 4KB page MLC NAND Flash dev
0111: 8-bit 320bit 8GB page MLC NAND Flash devi
0111: 3B dual IO Serial Flash
0010: 8B dual IO Serial Flash
1011: fast Serial Flash > 50MHz
1011: OnNand Flash (always 16-bit)
1110: Reserved
1101, 1111: Reserved

```

NAND ECC (FA3, FA2, FAE)

```

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

```

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

NAND_DATA[0]
CI_ADDR[7]
NAND_DATA[6]
NAND_DATA[5]
NAND_CLE
NAND_DATA[4]
CI_ADDR[9]
CI_ADDR[11]
CI_ADDR[12]
CI_ADDR[13]
NAND_DATA[3]
NAND_DATA[5]

```

    R154 10K OPT
    R157 10K OPT
    R160 10K OPT
    R164 10K OPT
    R167 10K OPT
    R170 10K OPT
    R175 10K OPT
    R177 10K OPT
    R179 10K OPT
    R181 10K OPT
    R183 10K OPT
    R187 10K OPT
    R192 10K OPT
    R155 10K OPT
    R158 10K OPT
    R161 10K OPT
    R165 10K OPT
    R168 10K OPT
    R171 10K OPT
    R176 10K OPT
    R178 10K OPT
    R180 10K OPT
    R182 10K OPT
    R184 10K OPT
    R188 10K OPT
    R193 10K OPT

```

VDD

GND

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: 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/Off only) at end of RESETB pulse (0)

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

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

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

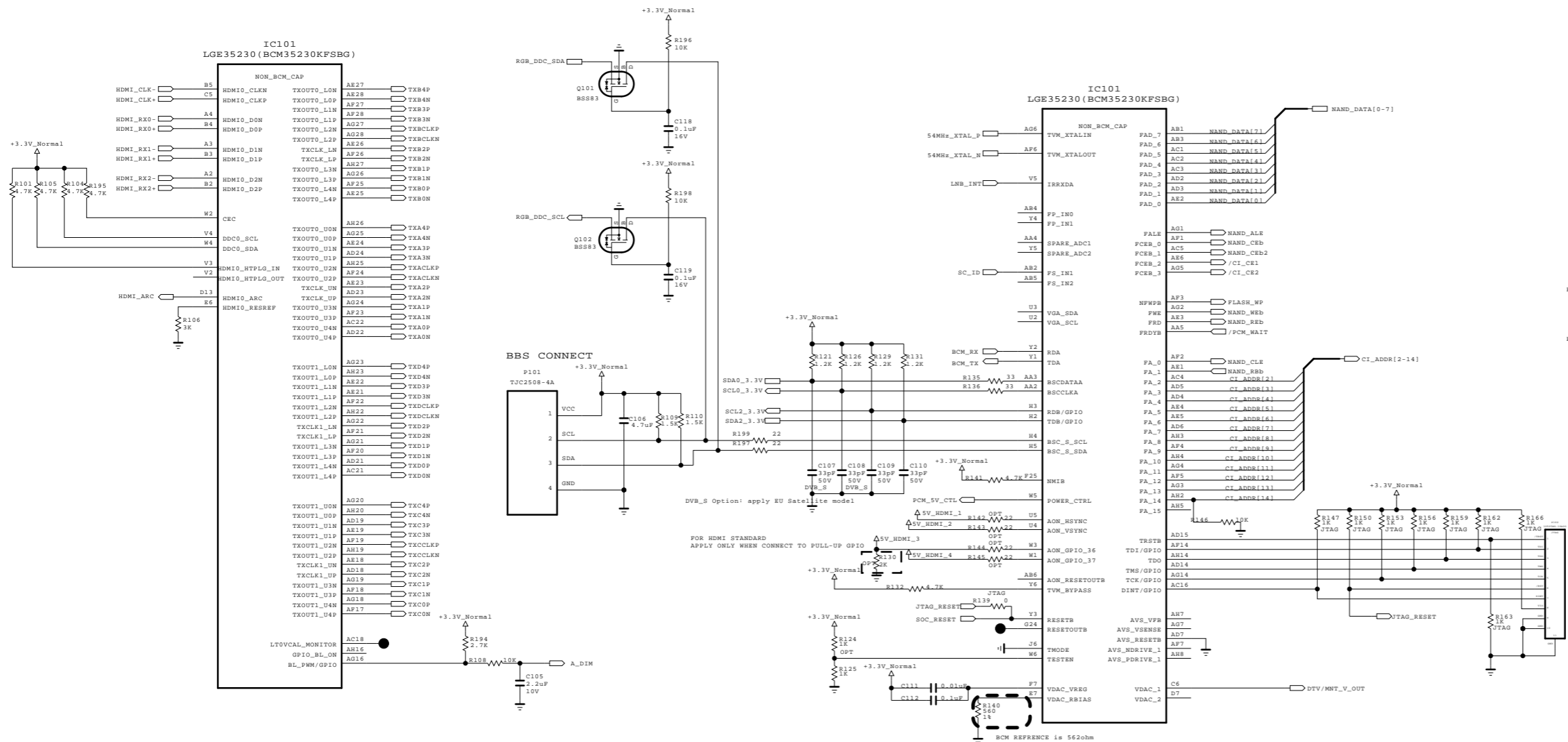
CI_ADDR[7]:
0: Disable EDID automatic Downloading from Flash (0)
1: Enable EDID automatic Downloading from Flash

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 250 Mhz (0)
1: Host MIPS run at 500 Mhz

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

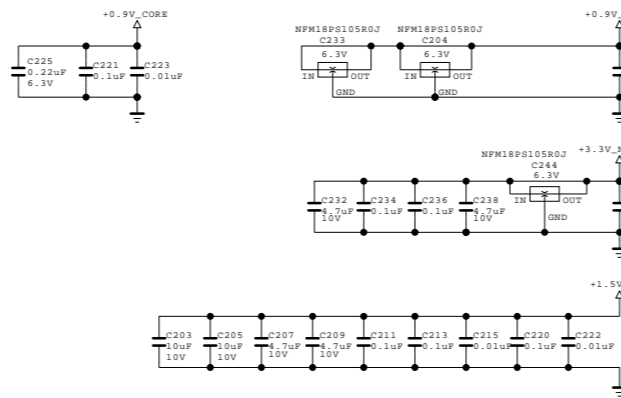
NAND_DATA[4]:
0: 27MHz TVM Crystal Frequency
1: 54MHz TVM Crystal Frequency (0)



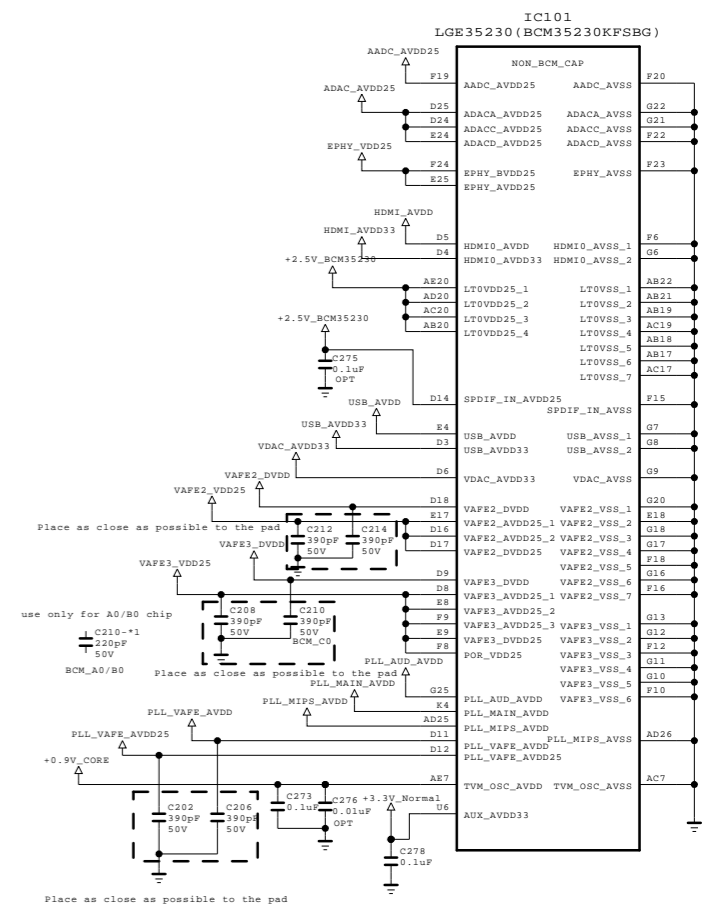
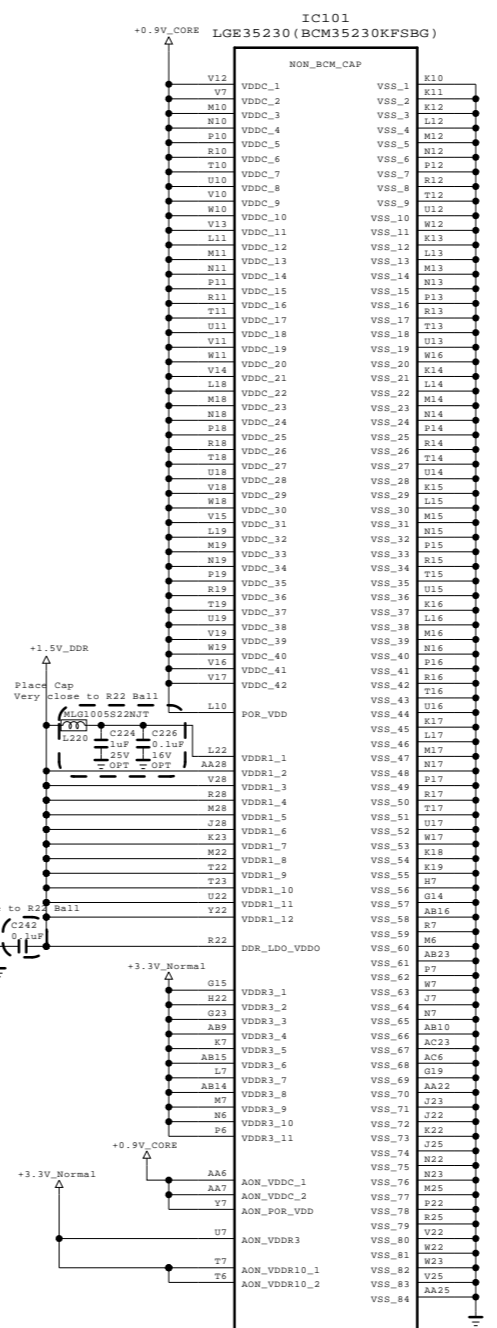
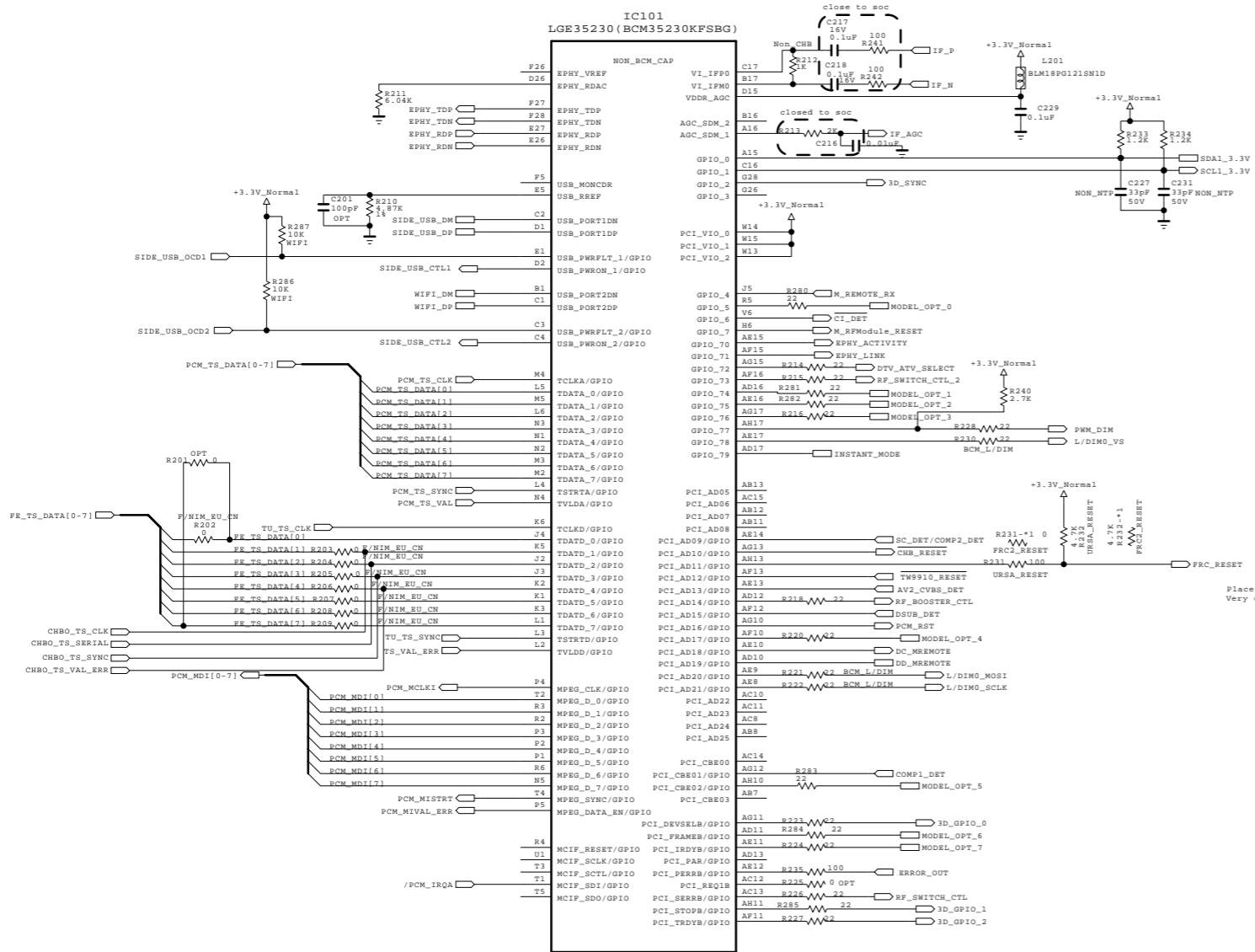
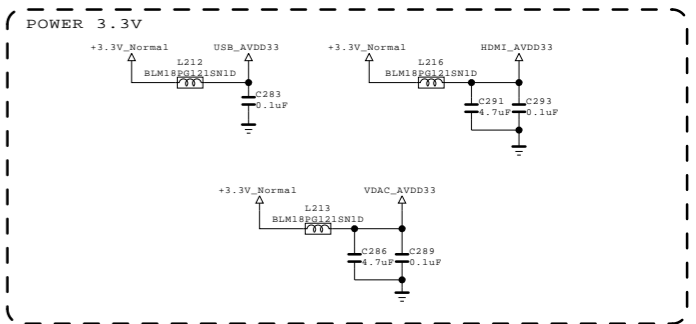
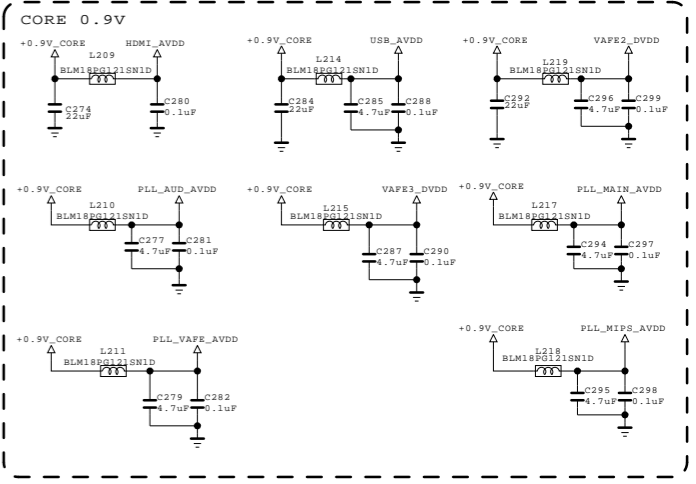
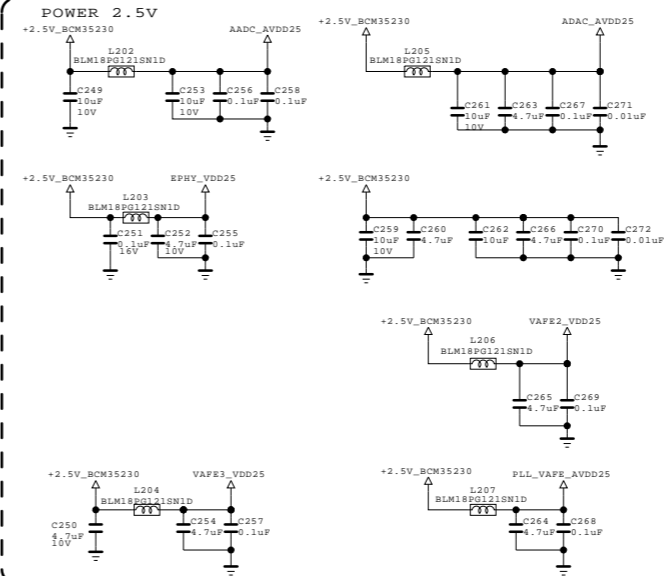
SECRET
Electronic



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



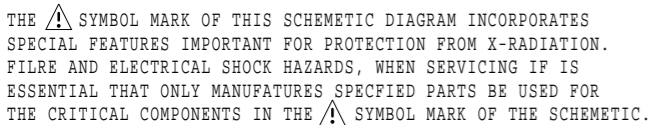
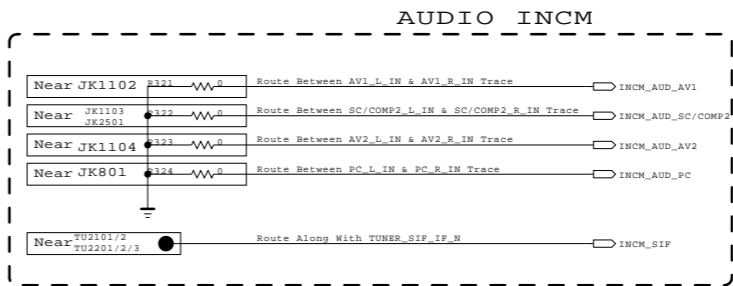
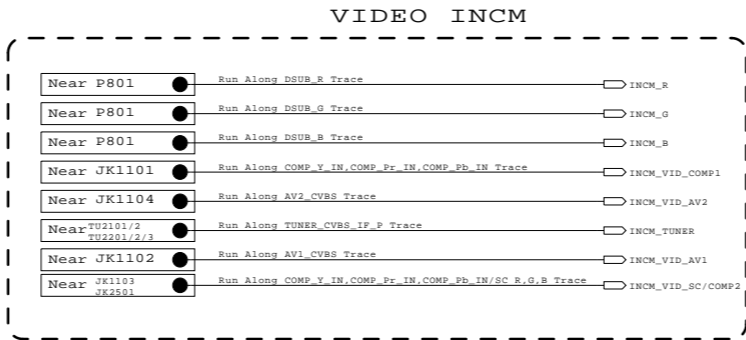
		HIGH	LOW
MODEL_OPT_2		FHD	HD
MODEL_OPT_3		OLED	LCD
MODEL_OPT_4	DDR speed	1333	1600
MODEL_OPT_5	T2 Tuner	Support	Not Support
MODEL_OPT_6	S Tuner	Support	Not Support
MODEL_OPT_7	PHM	Enable	Disable



THE ⚠ SYMBOL MARK OF THIS 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.



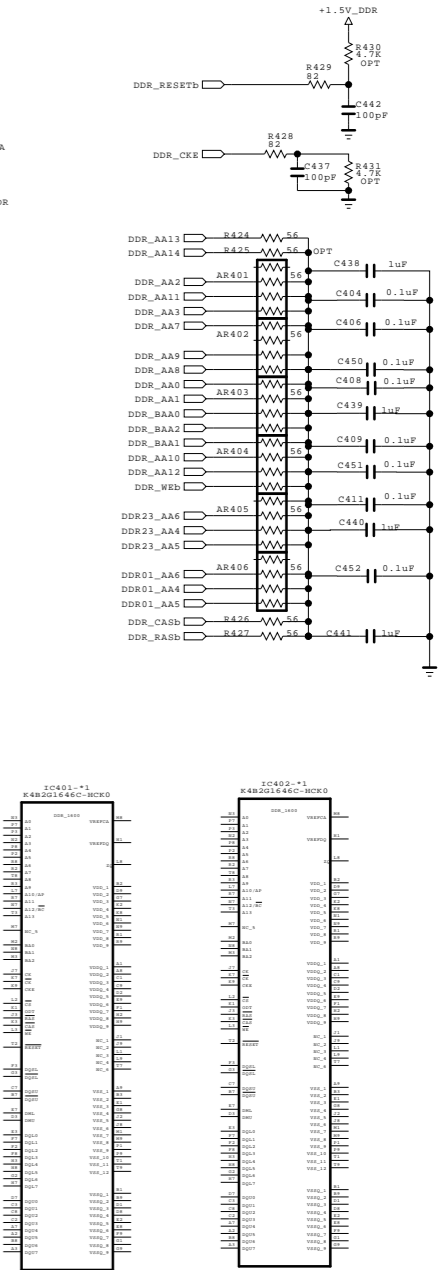
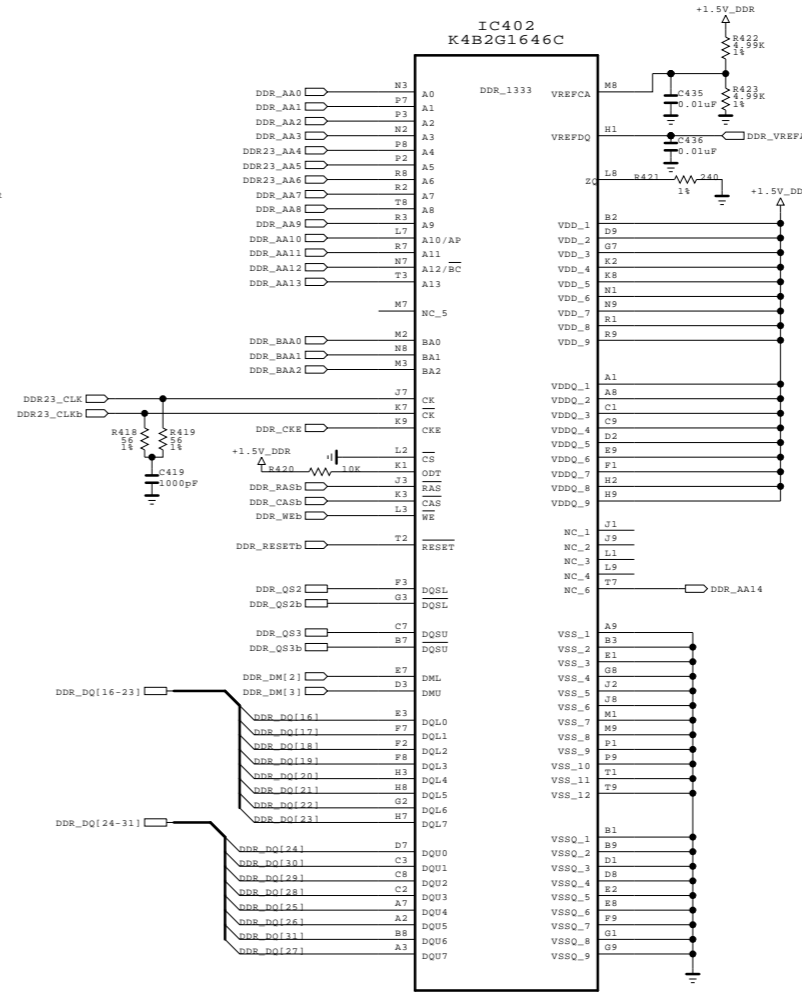
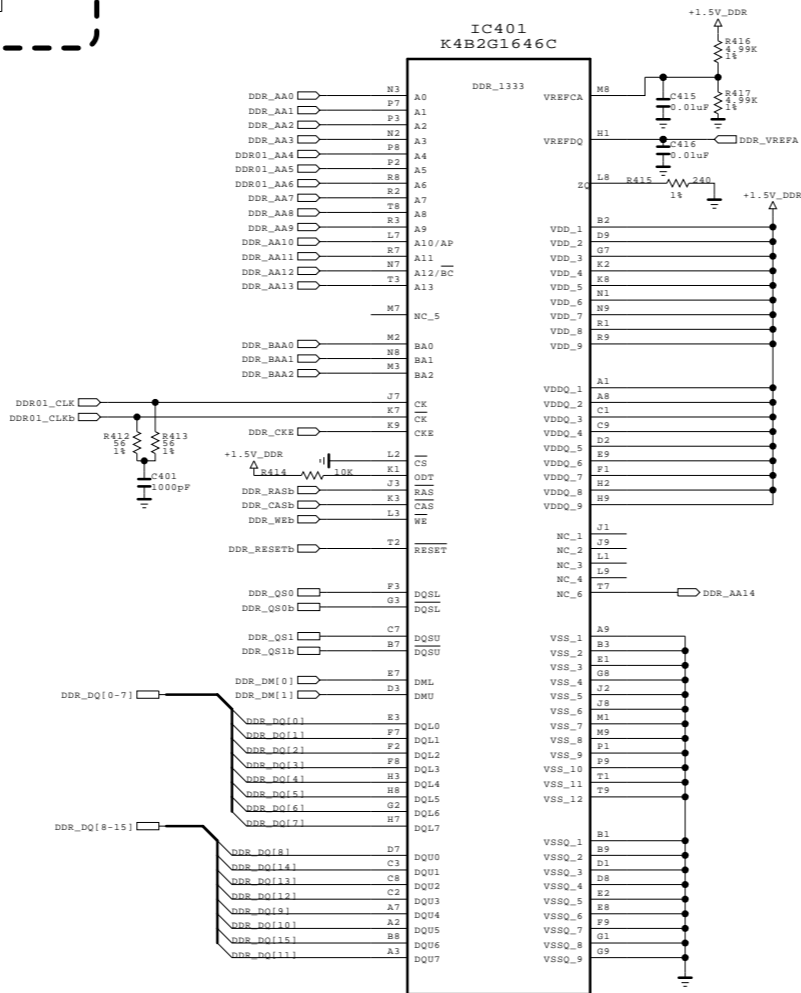
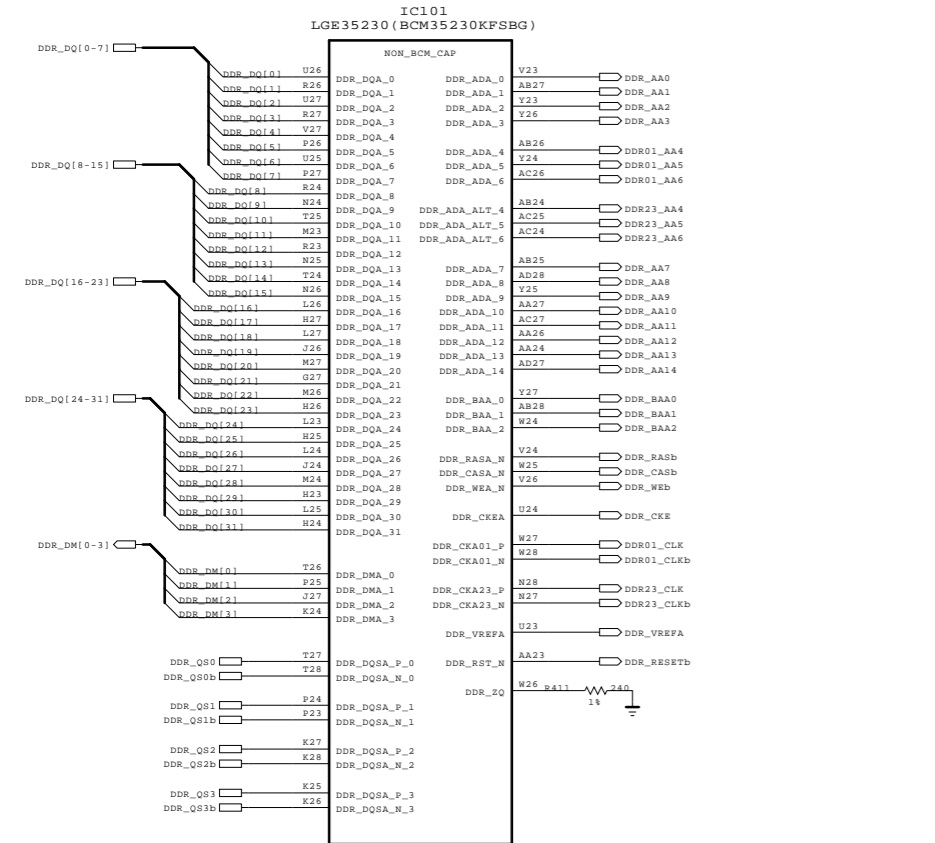
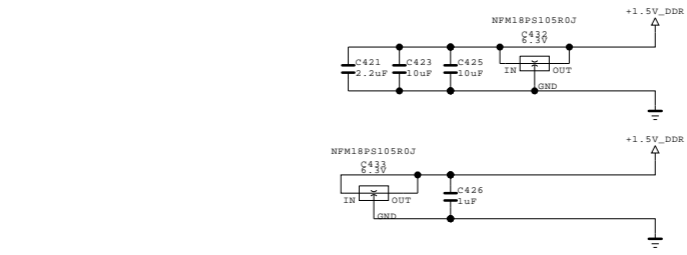
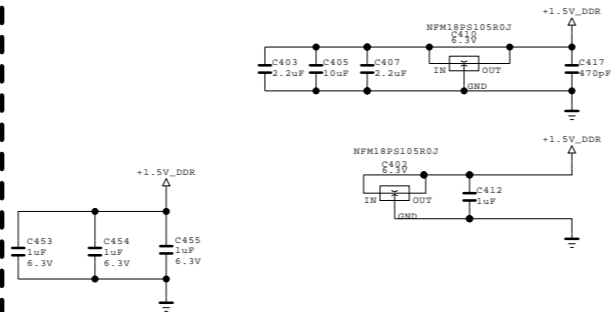
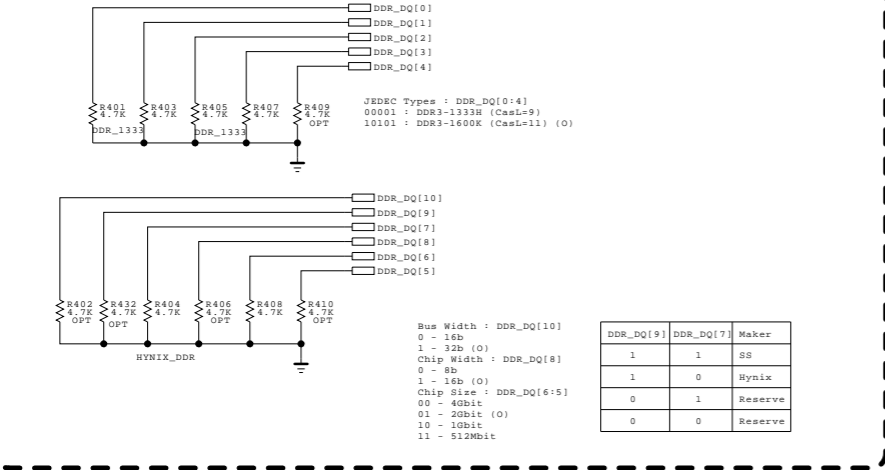
MODEL	BCM35230	DATE	
BLOCK	MAIN POWER	SHEET	2 / 50





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



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	MAIN DDR	SHEET	4 / 50

FROM LIPS & POWER B/D

FROM LIPS & POWER B/D

16/20/23

LD - GND OR USE

LE(N.L.D.) - OPEN

LE(L.D.) - USE

Power_DET

The diagram illustrates a Power_DET circuit using an ICS03 APX803D29 comparator. The circuit is divided into two main input sections and one output section.

Top Input Section:

- Input 1: PD_+12V (12V) through R512 (2.7K) and R513 (1.21K) to GND.
- Input 2: PD_+3.5V (3.5V) through R515 (5K) to GND.

Bottom Input Section:

- Input 1: PD_+20V (20V) through R510 (*4) (5.46K) and R511 (*4) (1.3K) to GND.
- Input 2: PD_+18.5V (18.5V) through R510 (*3) (5.70K) and R511 (*3) (1.21K) to GND.

Comparator Section:

- IC: ICS03 APX803D29.
- VCC: Connected to 3.5V through R580 (0.1uF) and C580 (16V).
- GND: Connected to GND through R516 (100K).
- Inputs: Pin 3 (VCC) and Pin 2 (RESET).
- Output: Pin 1 (GND).

Output Section:

- Output: POWER_DET.
- ESD Protection: ESD network with C520 (0.1uF) and R520 (100K).
- Note: not to RESET at 8kV ESD.

Legend:

- 15V-->3.6V
- 20V-->3.5V
- 24V-->3.48V
- 12V-->3.58V
- ST_3.5V-->3.5V

+0.9V_CORE_BCM35230

Max 7350 mA

Placed on SMD-TOP

POWER_ON/OFF2_2

ENABLE

FB

COMP

VDD

PGD

SW

BOOT

LDRV

BP5

EP_GND

HDRV

Q501 TP840192DRCR

Q503 AOW7410

Q508 AOW7200

+0.9V_CORE

$V_{out} = 0.591 * (1 + R1/R2)$ Switching freq: 600K

SECRET
LGElectronics

CHECK PWR/MODULE PIN MAP

+ 3.3V_NORMAL

Vout=0.8*(1+R1/R2)

MAX 2.8A

+3.3V_Normal

R1

R2

Vout=0.8*(1+R1/R2)

Switching freq: 500K

+2.5V_BCM35230

Max 960 mA

IC504
AP2132MP-2.5TRG1

PG
EN
VIN
VCTEL

GND
ADJ
VOUT
NC

R544 18k
R545 50k
R546 1k

C527 10uF 6.3V
C538 47uF 10V
C539 10uF 6.3V

POWER_ON/OPF2_1
OPT
R528 10k
C533 0.1uF OPT
C531 1uF OPT

+3.5V_ST
120 ohm
150k

+5V_Normal

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

[illegible][illegible]

+5V_Normal

MAX 1A

IC507
AOZ1073AIL-3

3A

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

L514
BLM18PG121SN1D

Placed on SMD-TOP

C546
10uF
16V

R564
12K

2200pF

R565
10K

OPT
C559
0.1uF
16V

POWER ON RSTO
R570
10K

R1
10K

OPT
C565
100pF
50V

R572
10K

C568
22uF
10V

C570
22uF
16V

+5V_Normal

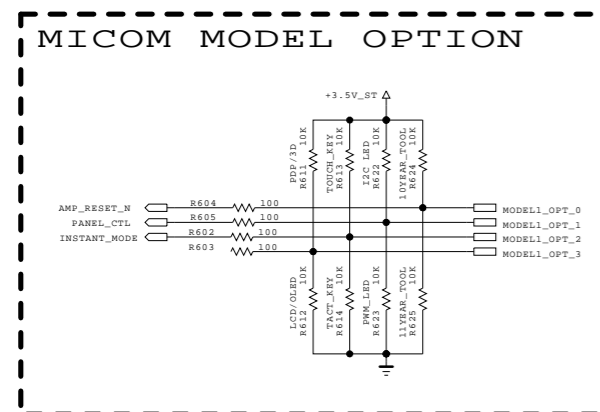
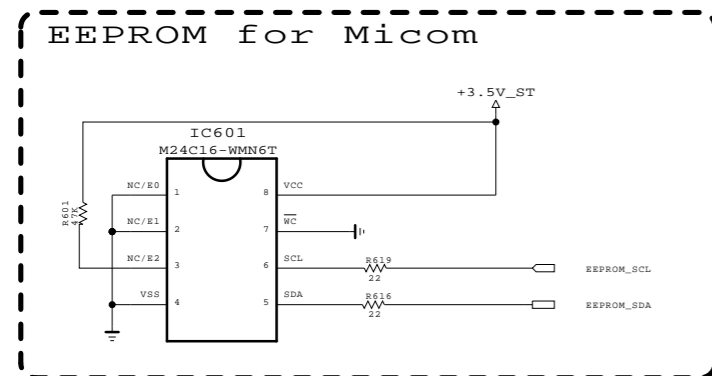
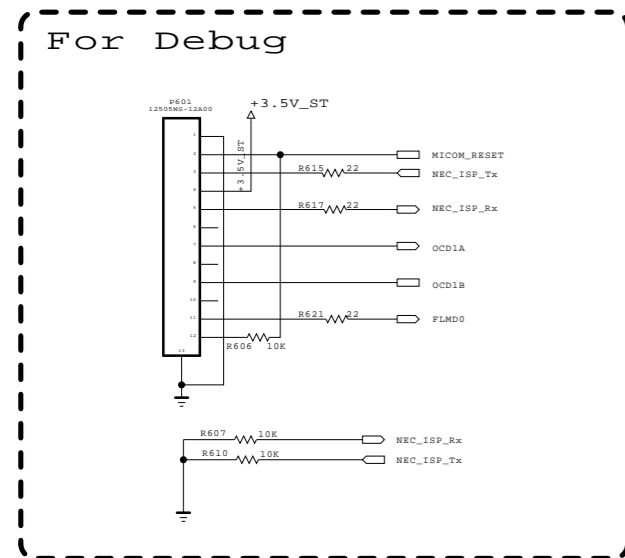
$$V_{out} = 0.8 * (1 + R1/R2)$$

Switching freq: 500K

The diagram shows a USB to 5V converter circuit. The input is +12V, which is connected to the VIN pin of the IC506 (AOZ1073AIL-3). The IC is a 3A MOSFET. The output is +5V_USB. The circuit includes a 3.6uH inductor (L515) and a 3A MOSFET (R1). The output voltage is calculated as $V_{out} = 0.8 * (1 + R1/R2)$. The switching frequency is 500K.

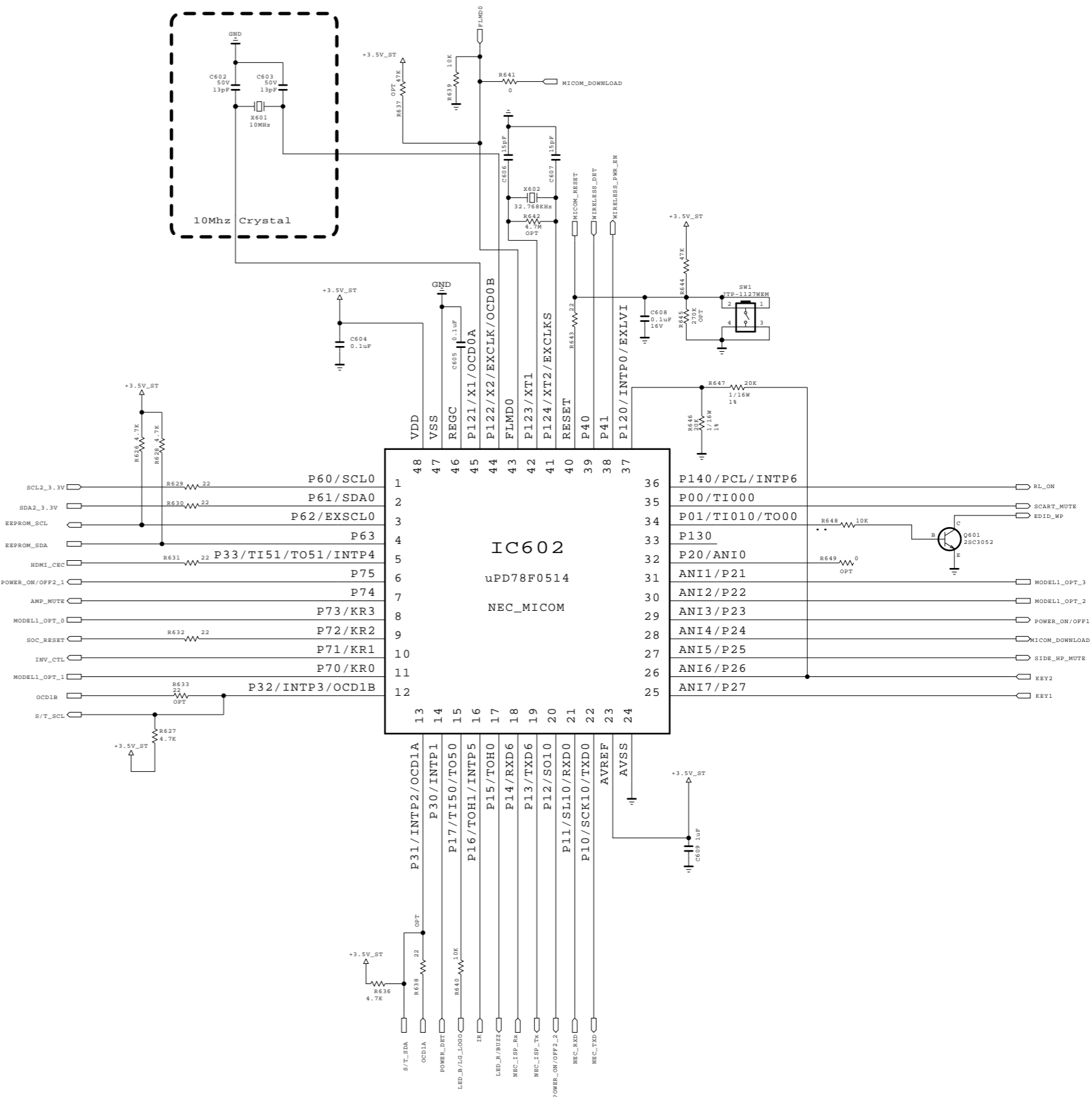
MODEL	BCM35230	DATE	
BLOCK	POWER	SHEET	5 / 58

NEC MICOM



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



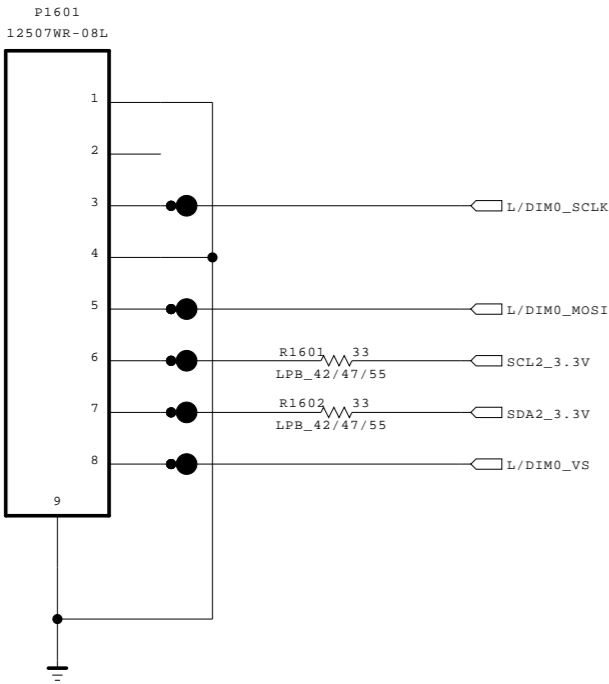
THE ⚠ SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMATIC.



SECRET
LGElectronics



MODEL	BCM35230	DATE	
BLOCK	MICOM	SHEET	6 / 50

[Local Dimming Block]



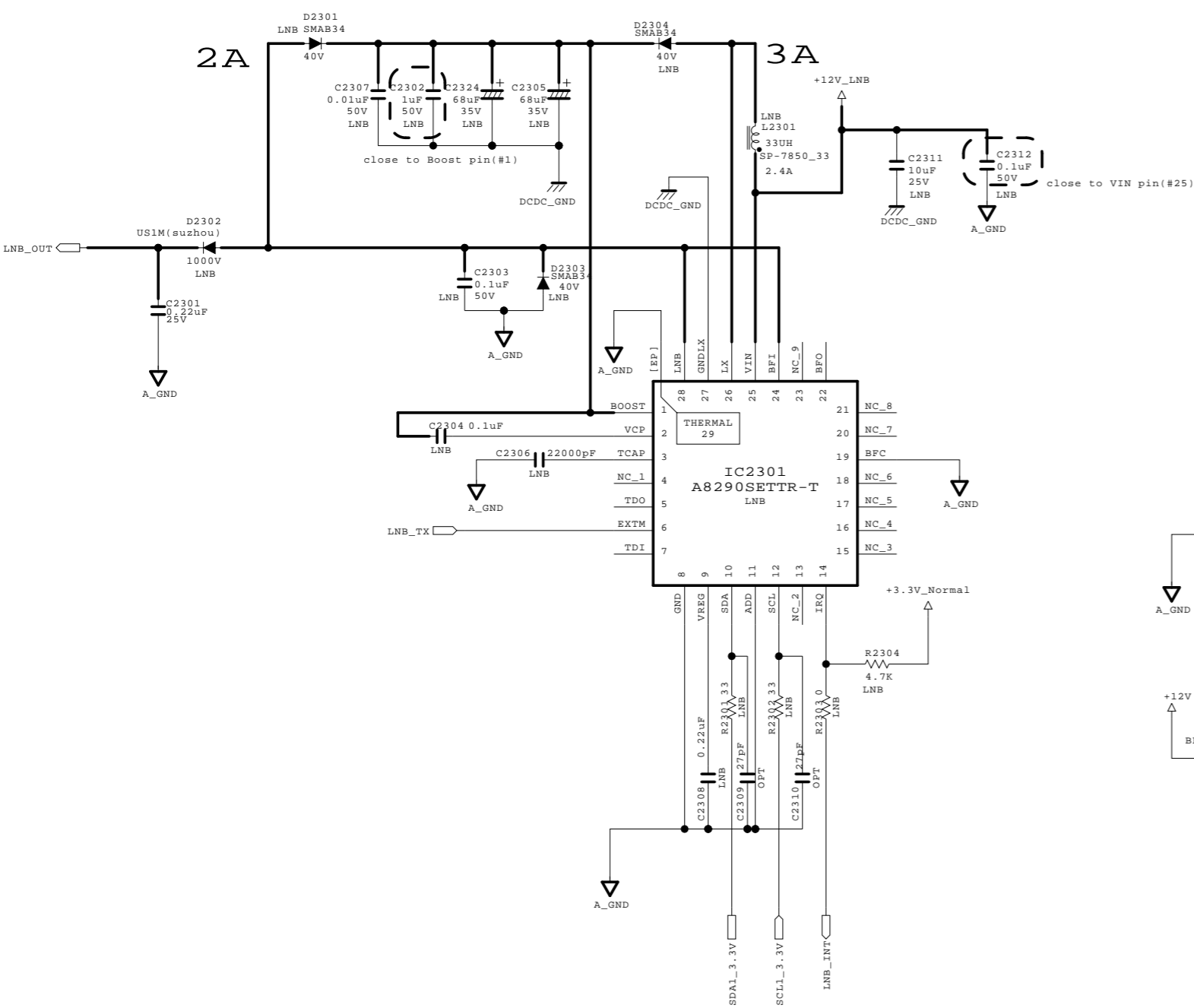
THE  SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE  SYMBOL MARK OF THE SCHEMATIC.

SECRET	 LG ELECTRONICS
LGElectronics	

MODEL	BCM35230	DATE	
BLOCK	L_DIMMING	SHEET	16 / 50

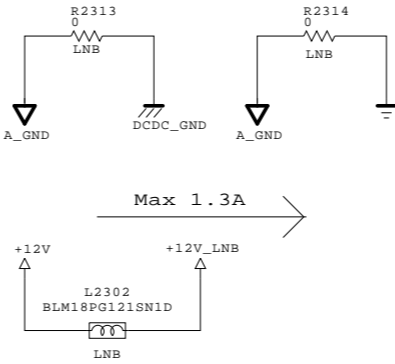
DVB-S2 LNB Part Allegro



(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.

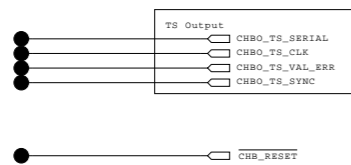
SECRET



LG Electronics

 LG ELECTRONICS

MODEL	BCM35230	DATE	2010.11.02
BLOCK	LNB	SHEET	23 / 57

NON CHB

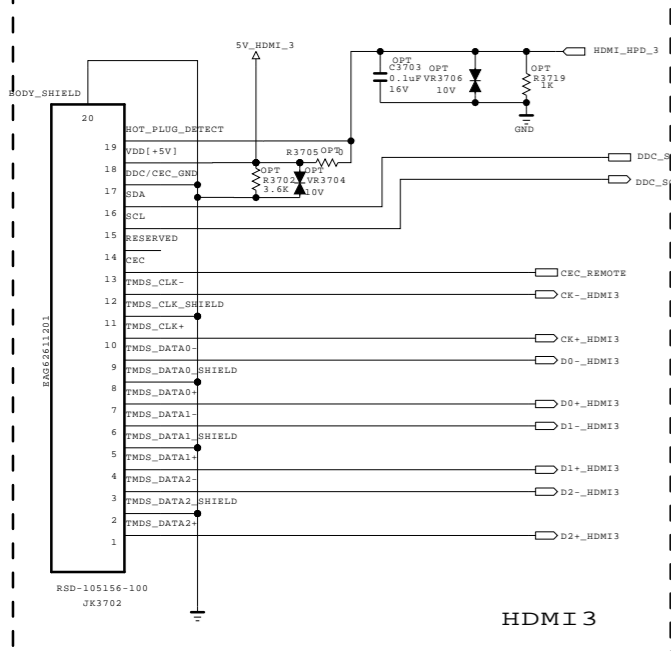
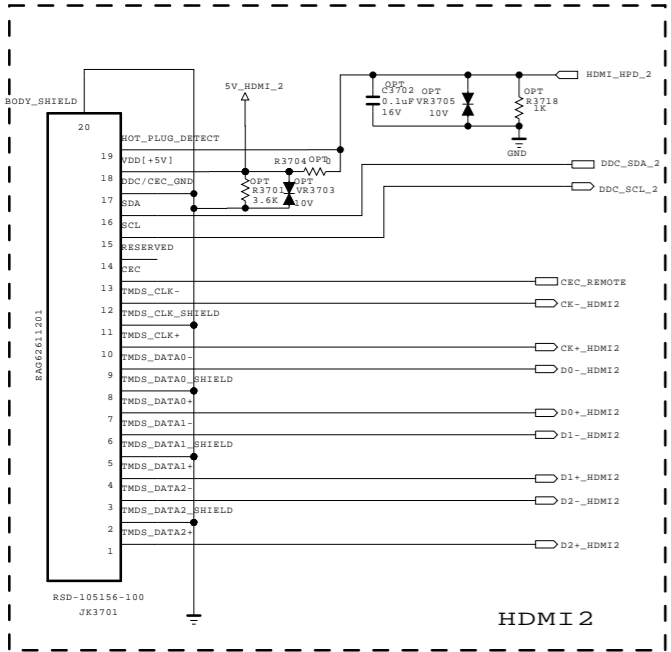
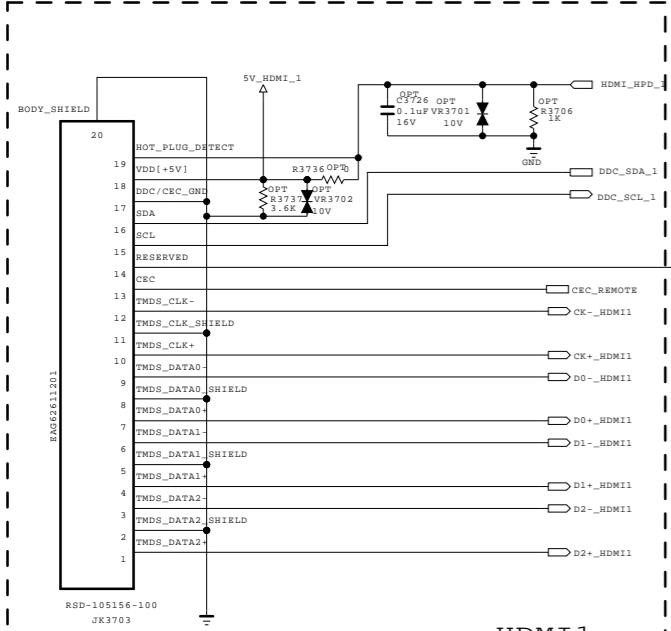




THE  SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE  SYMBOL MARK OF THE SCHEMATIC.

SECRET
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MODEL	BCM35230	DATE	
BLOCK	NON CHB	SHEET	28 / 50



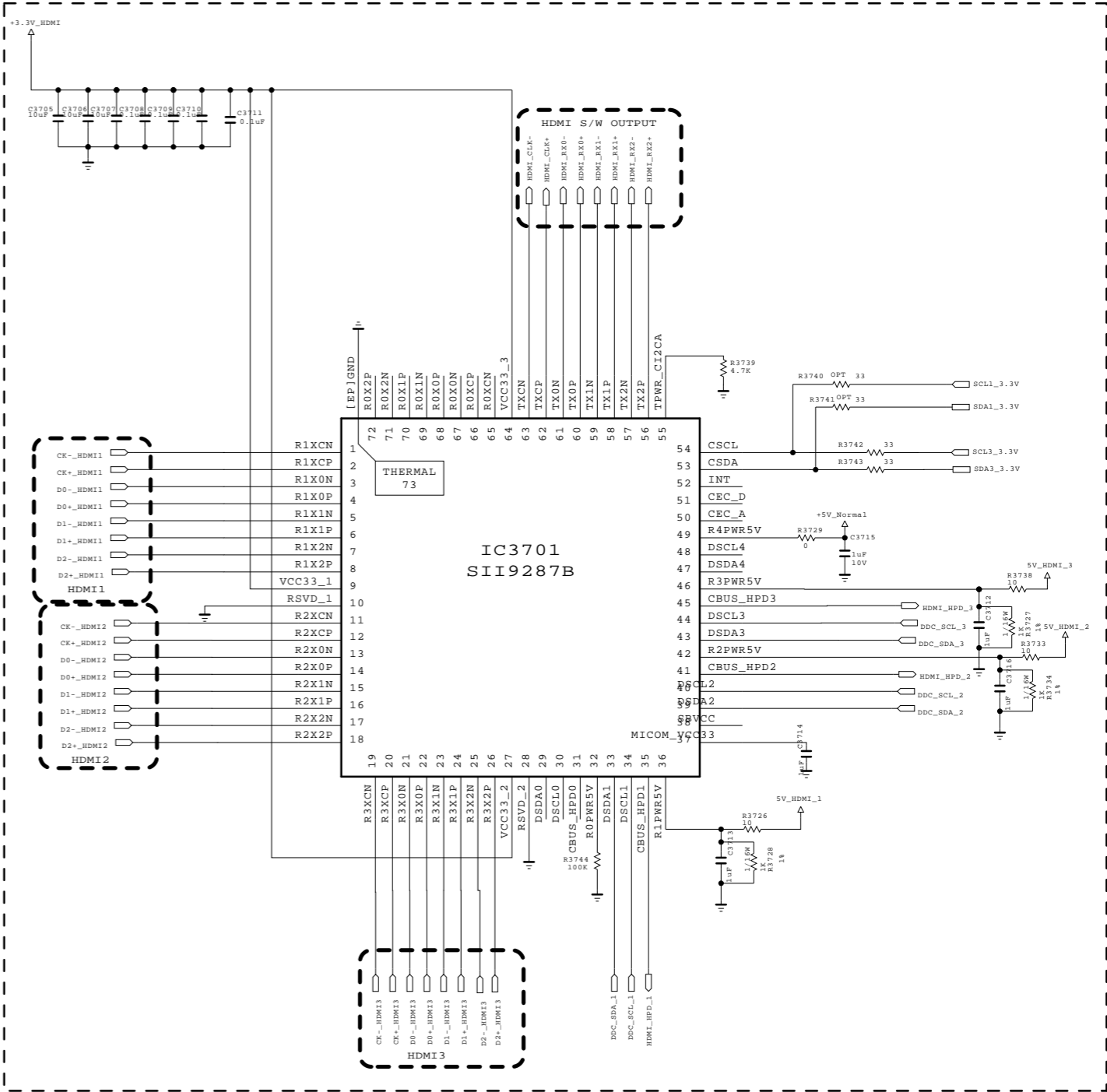
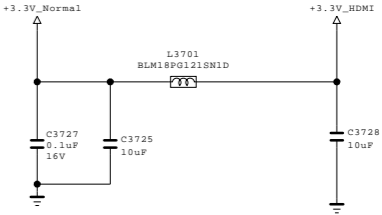
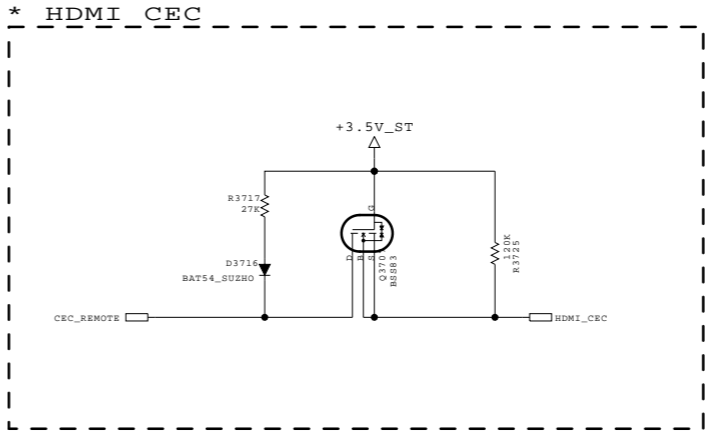
THE  SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILTRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE  SYMBOL MARK OF THE SCHEMATIC.

SECRET
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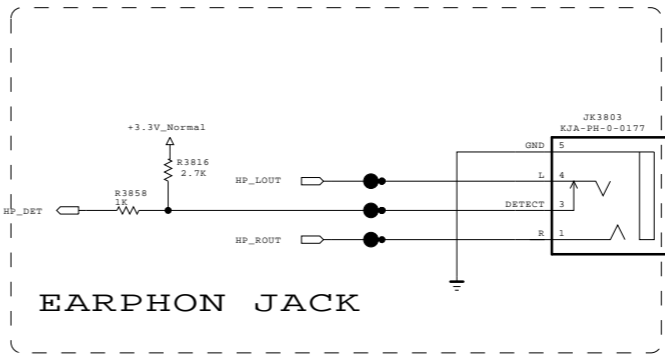
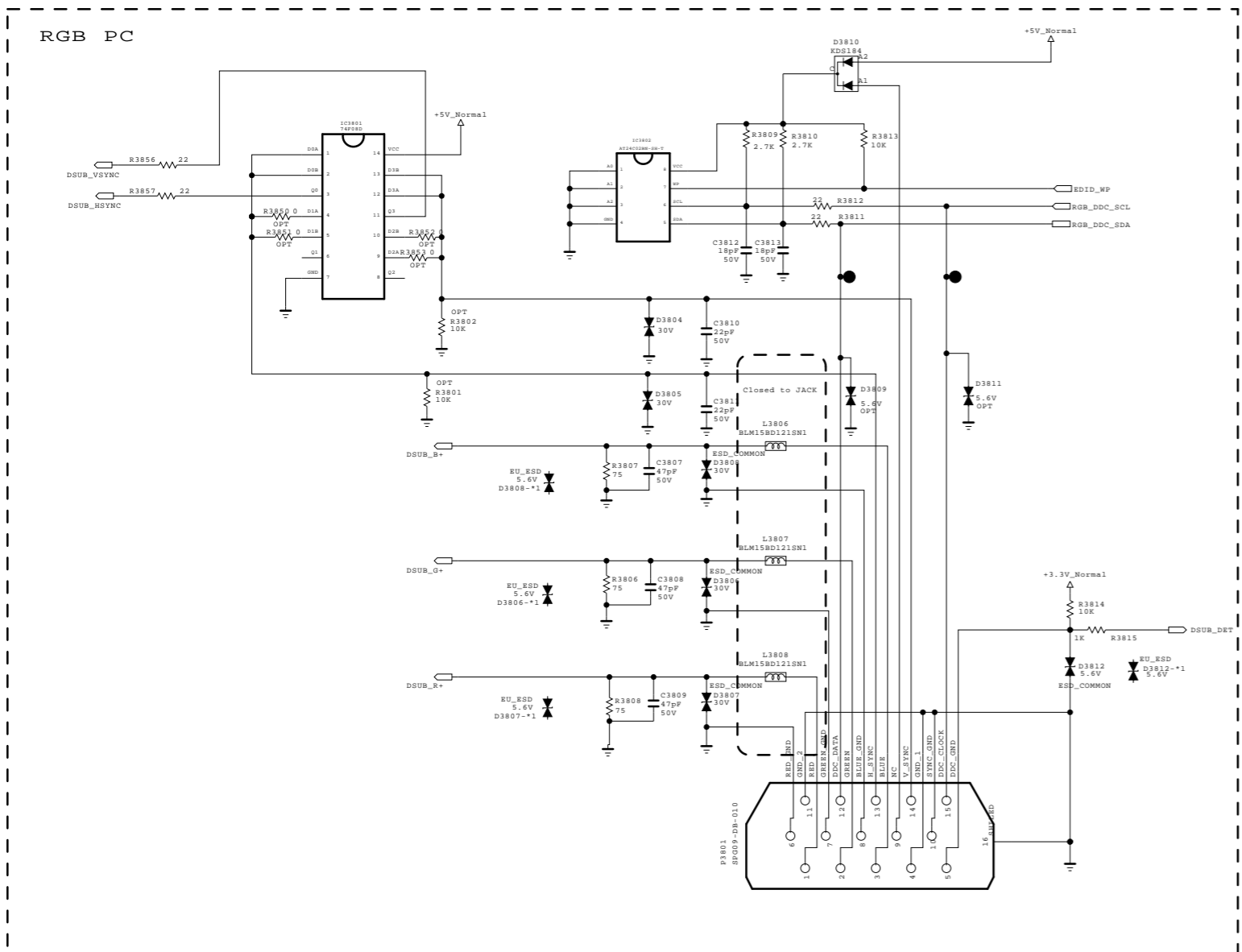


MODEL	BCM35230	DATE	
BLOCK	LV7 HDMI	SHEET	37 / 50

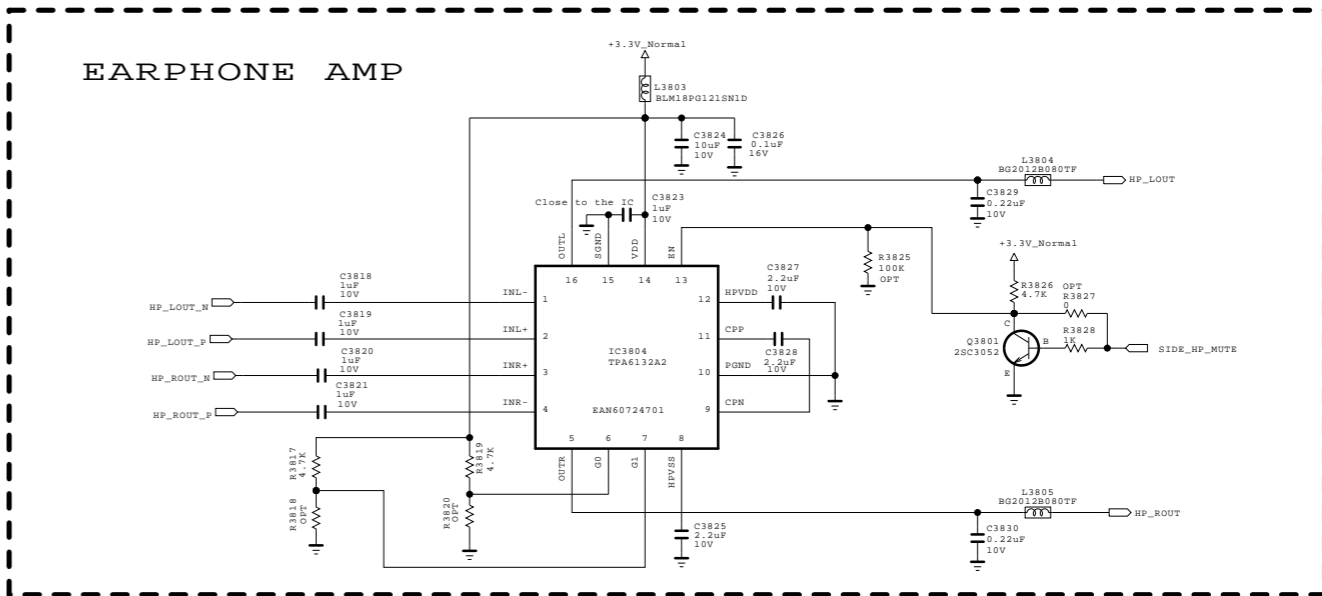
DUAL COMPONENT	
D3716	1ST : T-BAT54_SUZHO, 2ND : ODSON00138A
IC3702	1ST : EAN60991801, 2ND : T-AZ1117BH_1.8, 3RD : EAN54428201



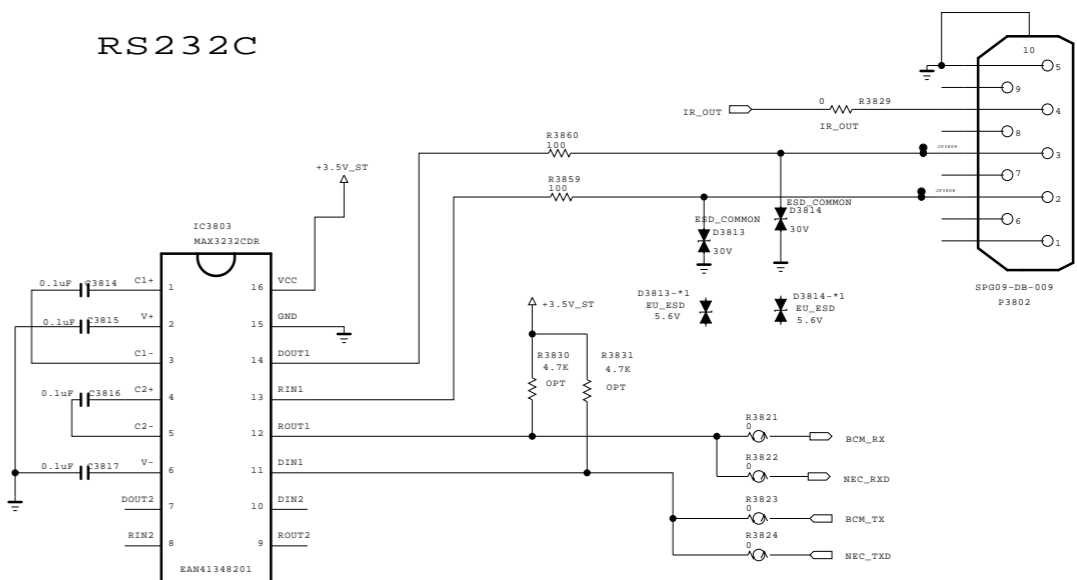
RGB/ PC AUDIO/ SPDIF/ EARPHONE/ RS232C





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



RS232C



HIGH : SELECT X1, Y1, SELECT MAIN TX/RX
LOW : SELECT X0, Y0, SELECT MICOM TX/RX

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MODEL

BLOCK

BCM35230

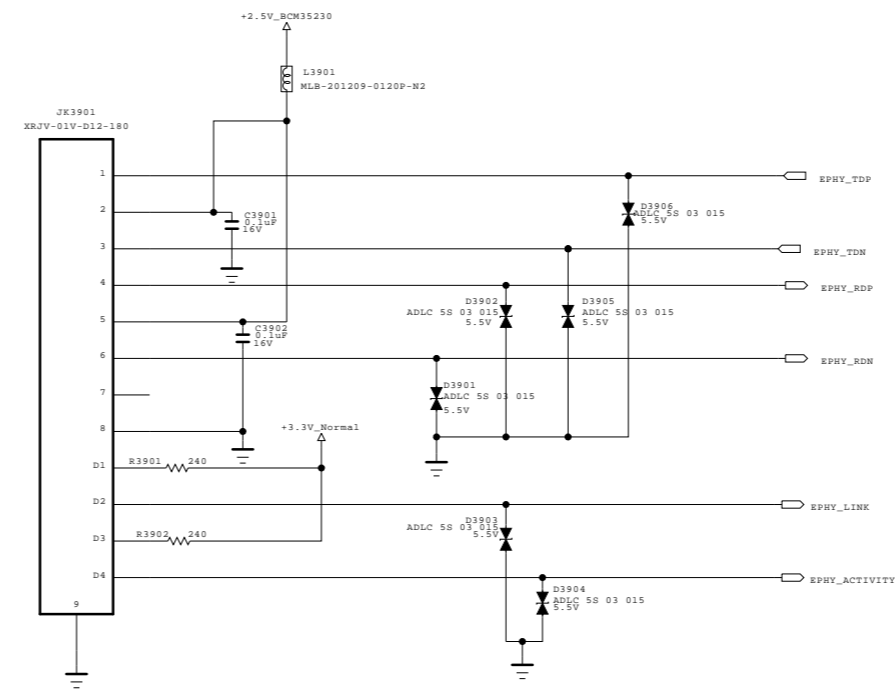
LV7 COMM JACK

DATE

SHEE

38 / 50

Ethernet Block



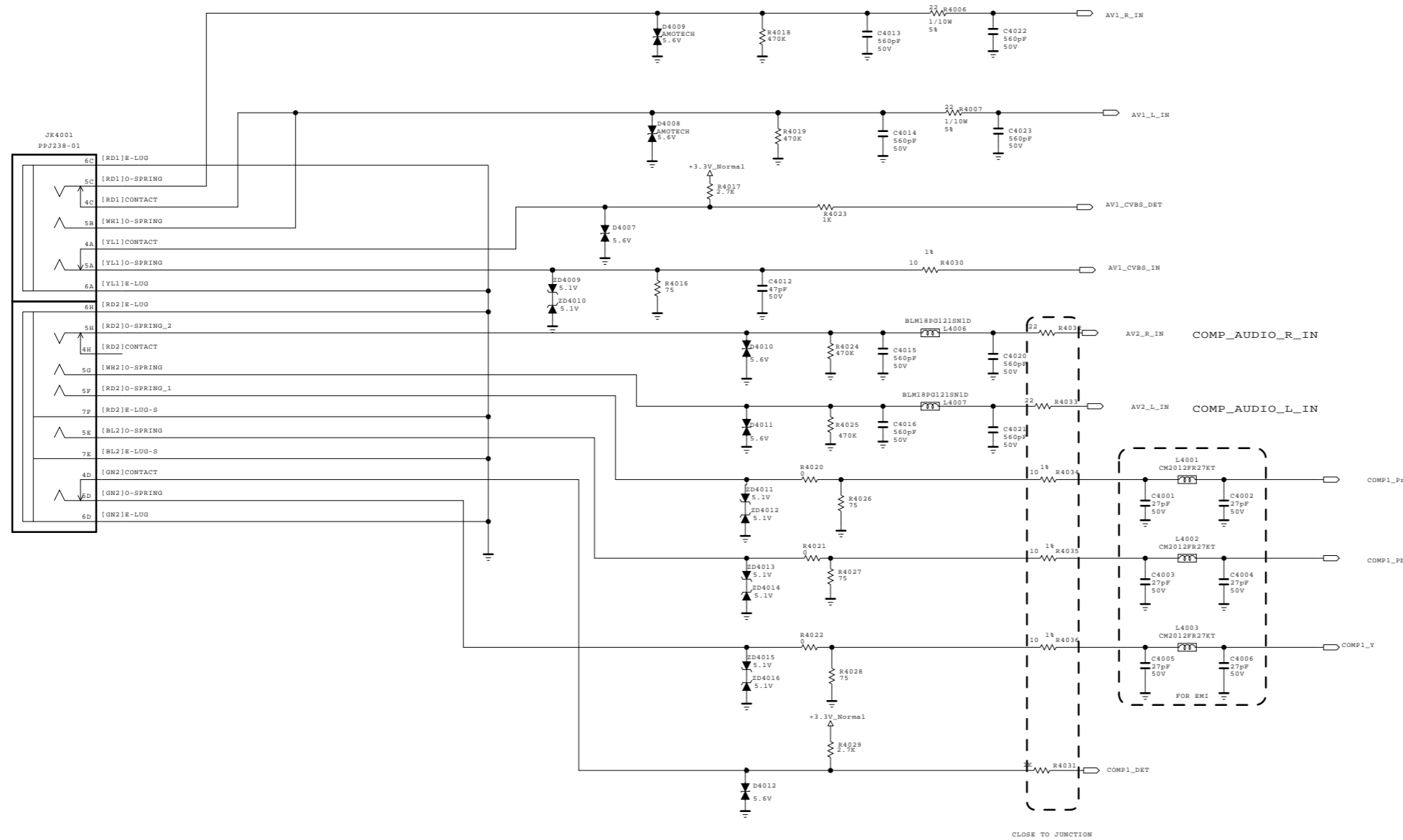
THE ⚠ SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMATIC.



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MODEL	BCM35230	DATE	
BLOCK	LV7 ETHERNET	SHEET	39 / 50

COMP/AV JACK PACK



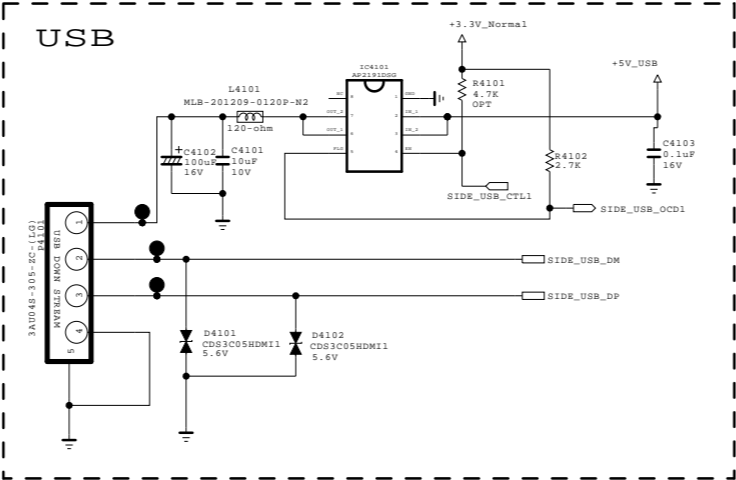
THE  SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE  SYMBOL MARK OF THE SCHEMATIC.



SECRET
LGElectronics



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

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

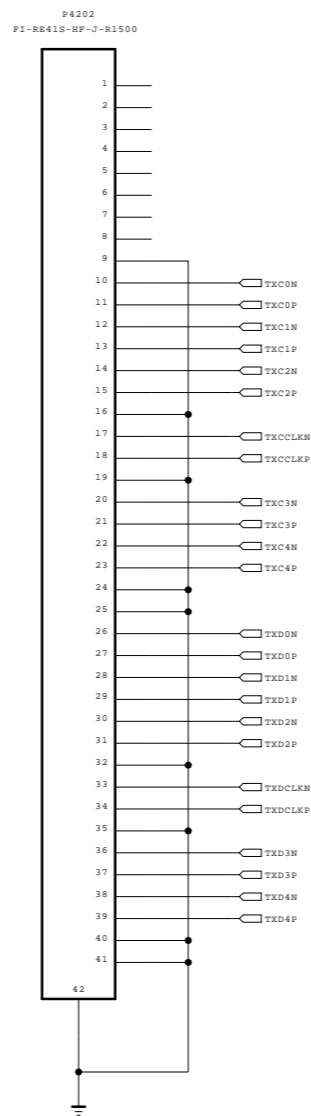
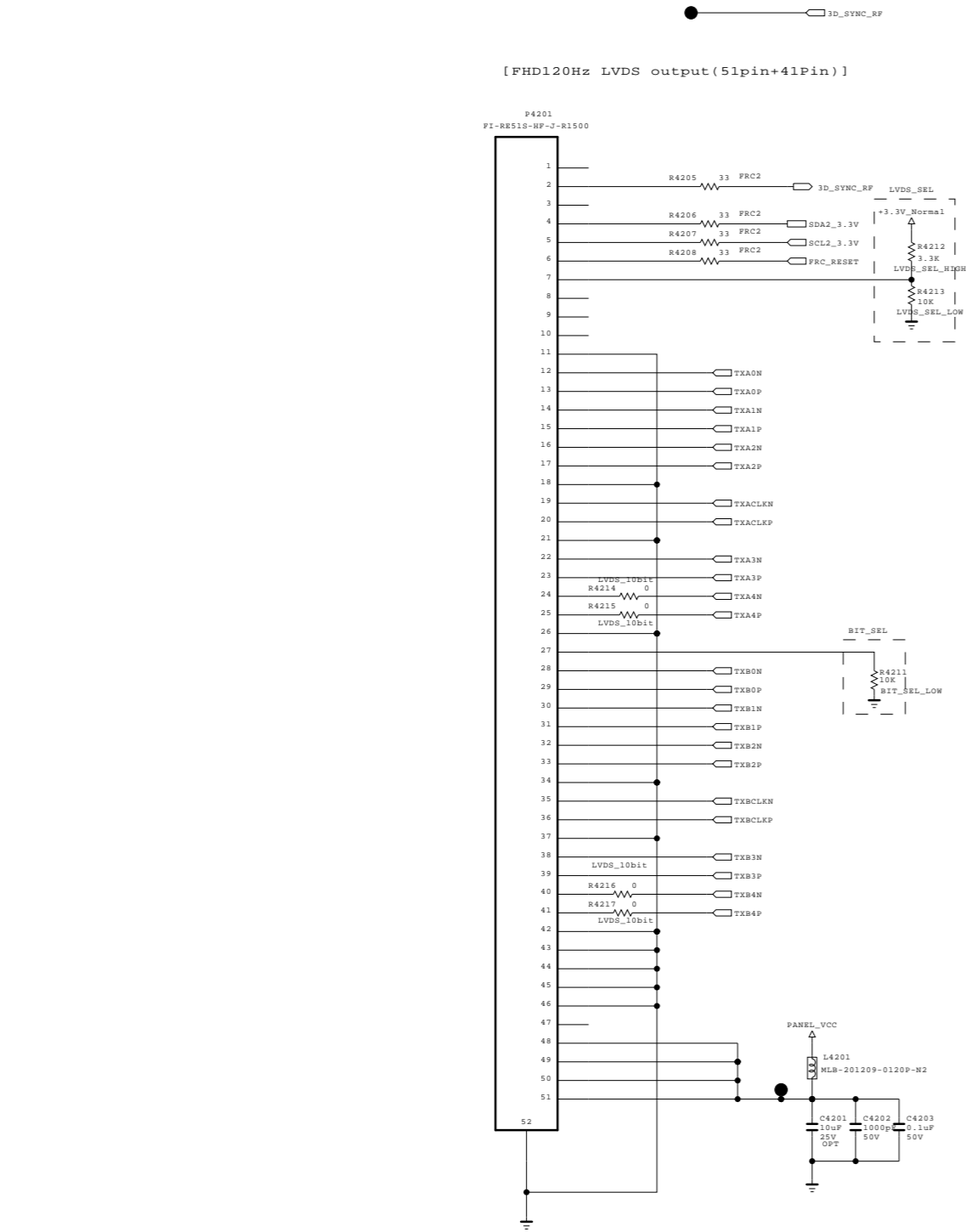




THE  SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE  SYMBOL MARK OF THE SCHEMATIC.

SECRET
LGElectronics



MODEL	BCM35230	DATE	
BLOCK	LV7 EU USB	SHEET	41 / 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 SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE  SYMBOL MARK OF THE SCHEMATIC.

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LGElectronics



MODEL	BCM35230	DATE	
BLOCK	LV7 EU LVDS	SHEET	42 / 50

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

Option Table		
H/NIM (EU)	F/NIM_T/C	DVB-T/C/S2 (Ru,Alsa)
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	
	TC_F/NIM	

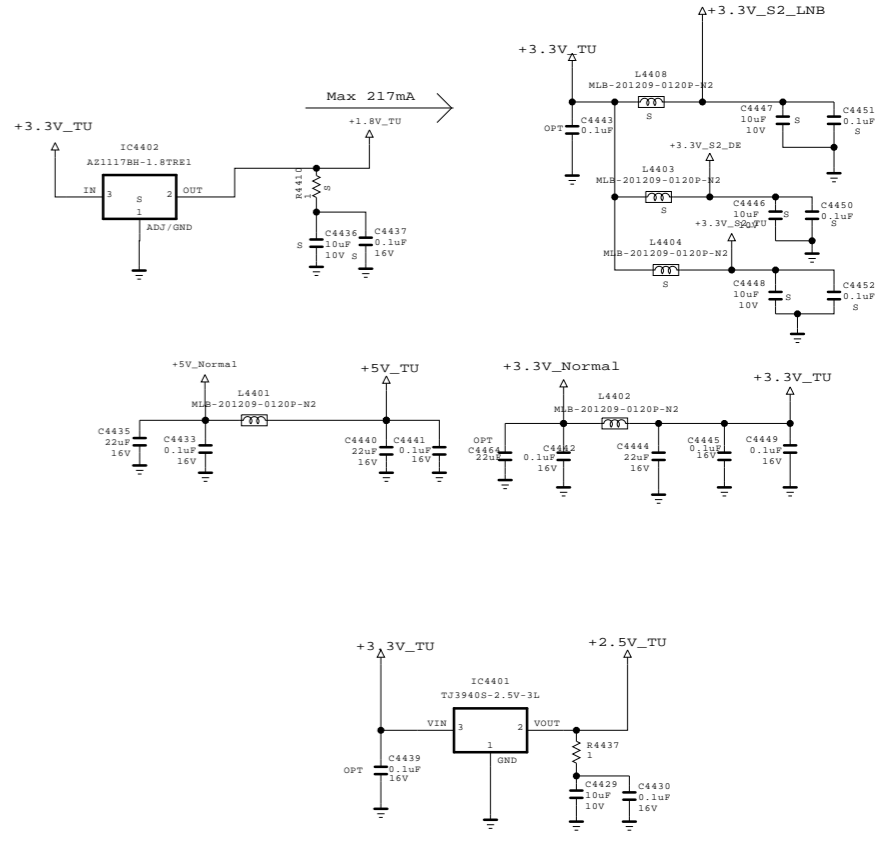
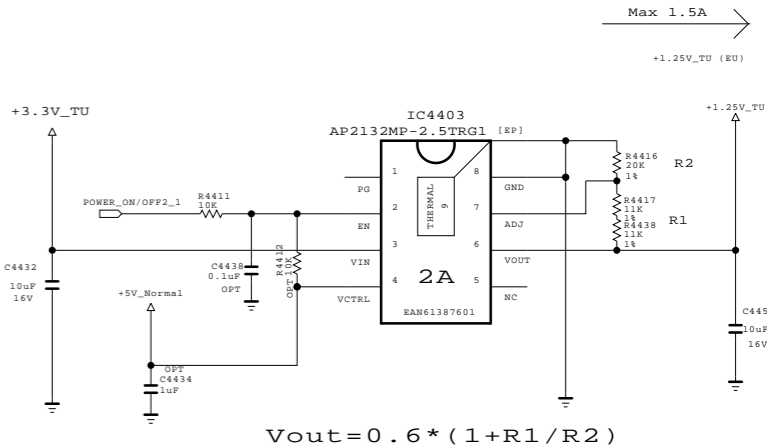
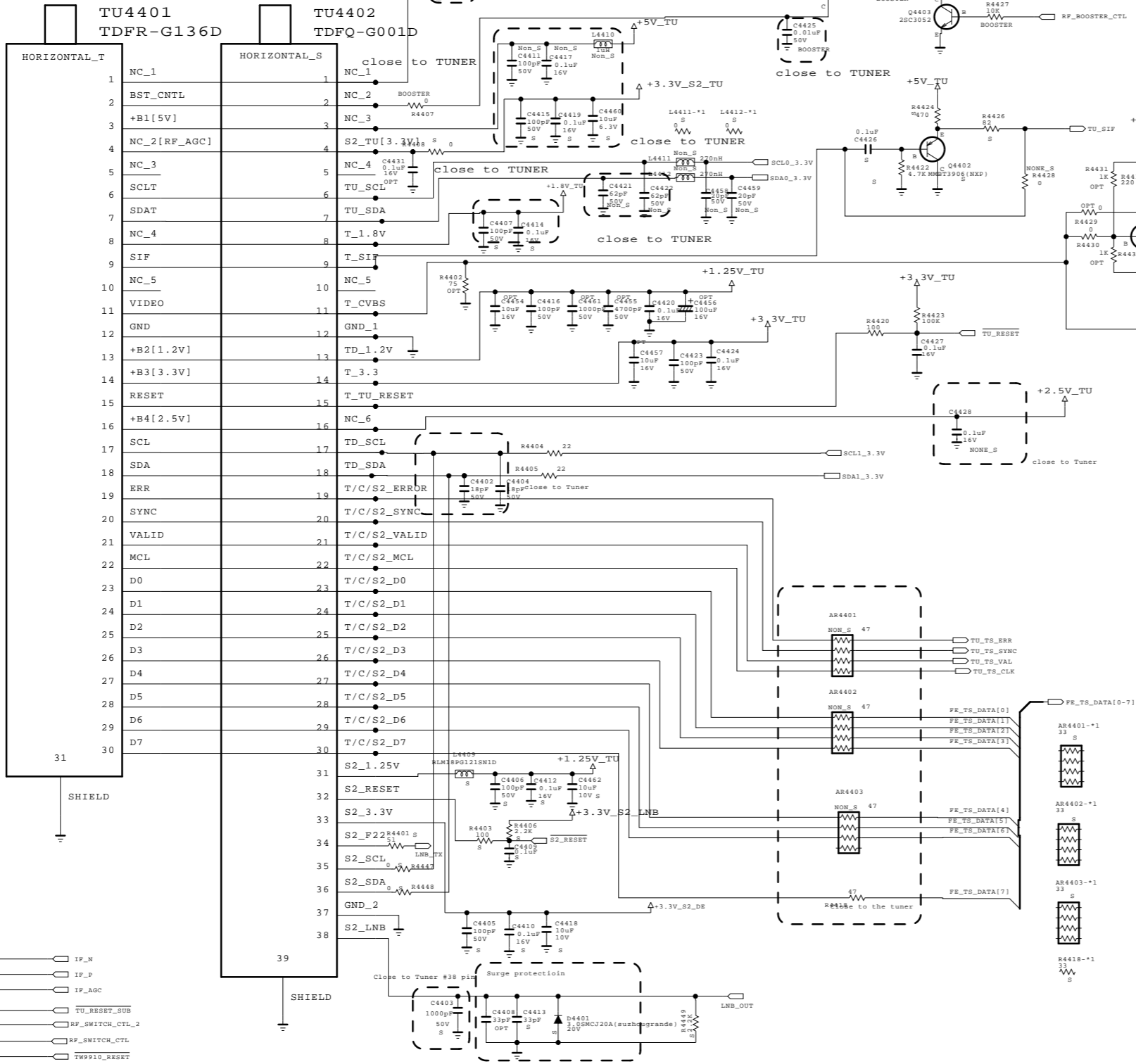
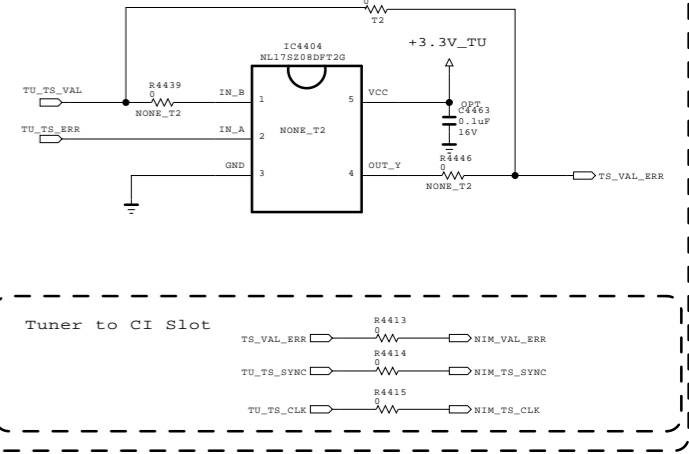
* DVB-T/C/S2 combo Tuner: DVB-T/C is H/NIM, and DVB-S2 is F/NIM

Non_S: not use DVB-T/C/S2 combo Tuner(use H/NIM and F/NIM)
 S: 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
 CH : use China F/NIM
 BOOSTER: use BOOSTER_CTL
 RF_SW_CTL: use RF_SWITCH_CTL
 TC_F/NIM: use EU_DVB-T2, China F/NIM, BRZIL F/NIM
 EU_F/NIM: use EU_F/NIM
 EU_BR_F/NIM: use EU_F/NIM and Brazil F/NIM

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

ERROR & VALID PIN

<EU, China>

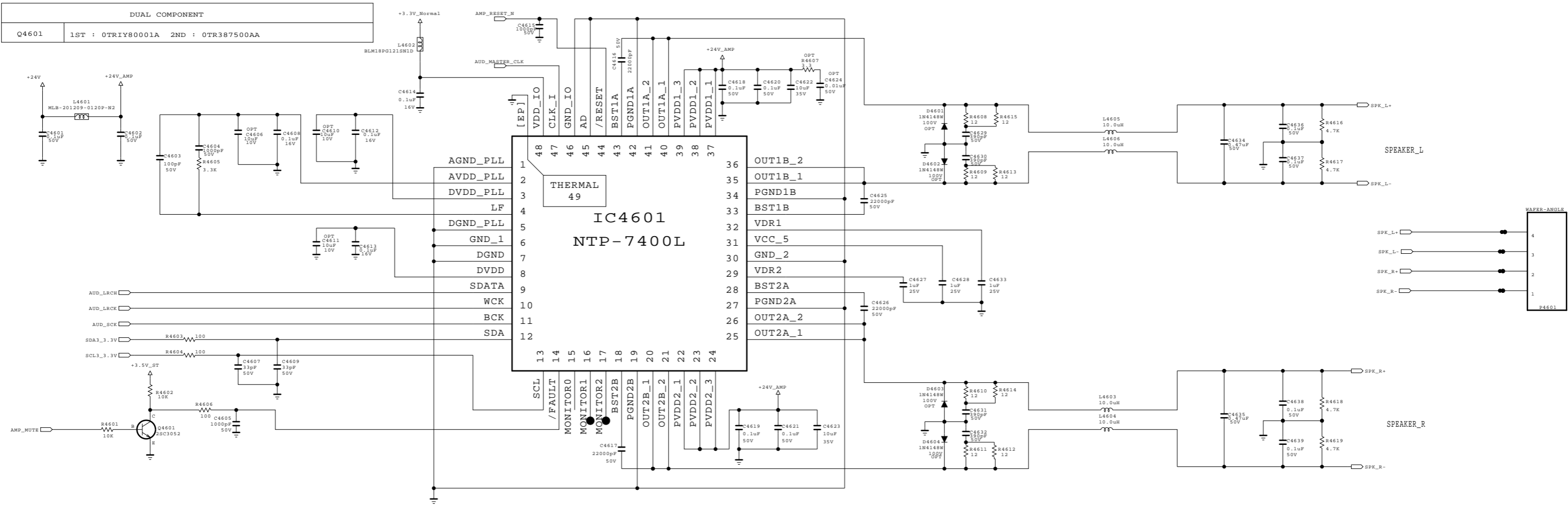




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MODEL	BCM35230	DATE	
BLOCK	LV7 EU TUNER	SHEET	44 / 50

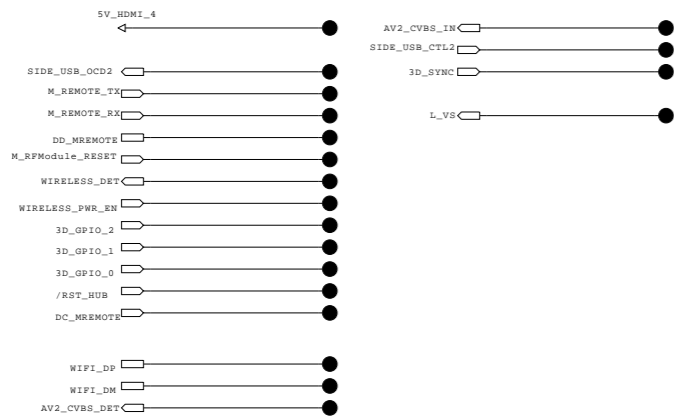




THE  SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE  SYMBOL MARK OF THE SCHEMATIC.

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MODEL	BCM35230	DATE	
BLOCK	LV7 EU AMP	SHEET	46 / 50



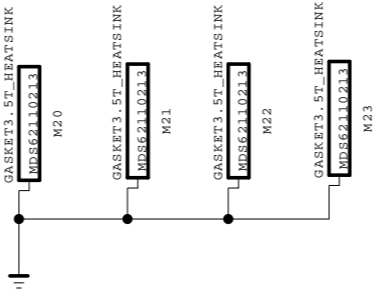
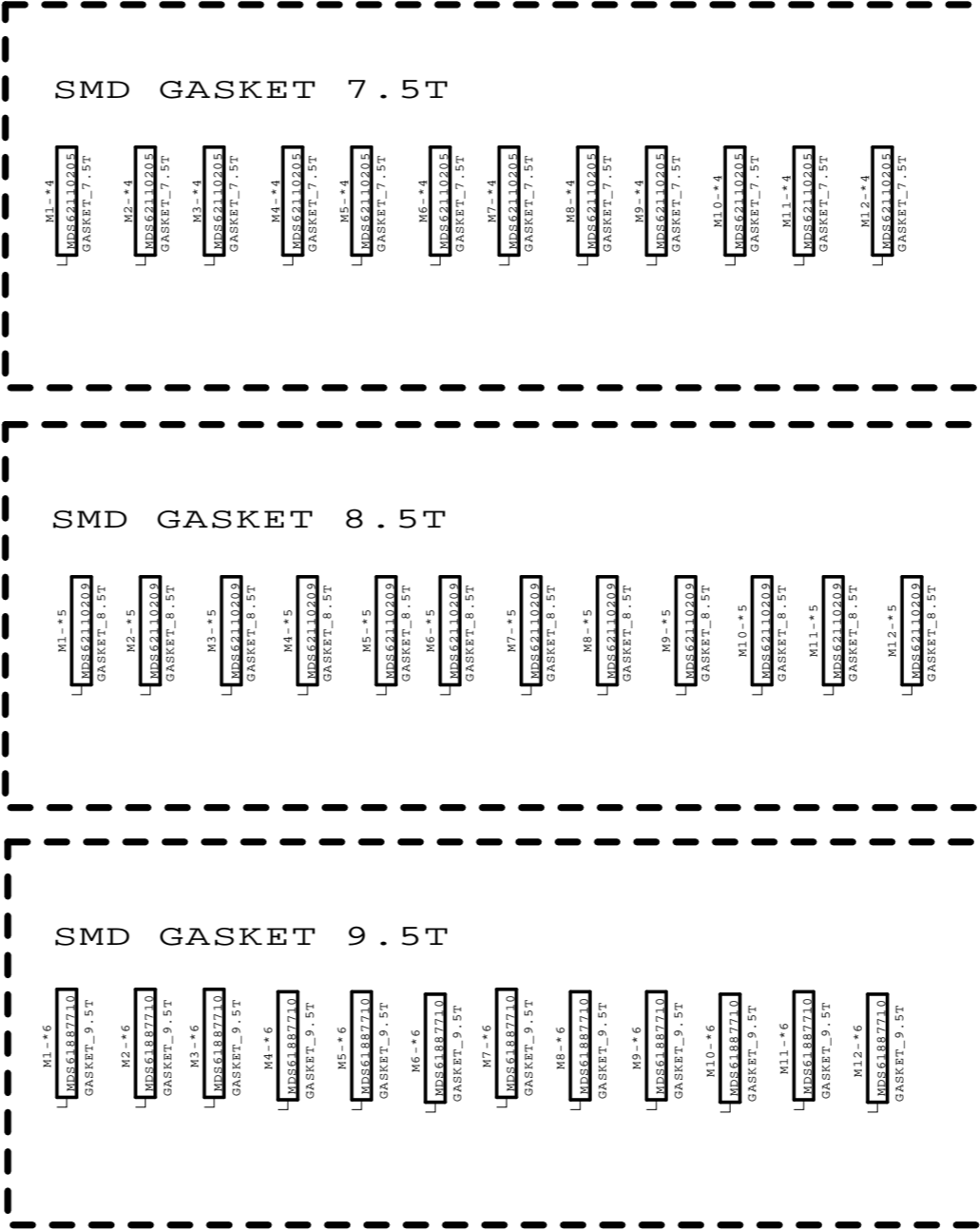
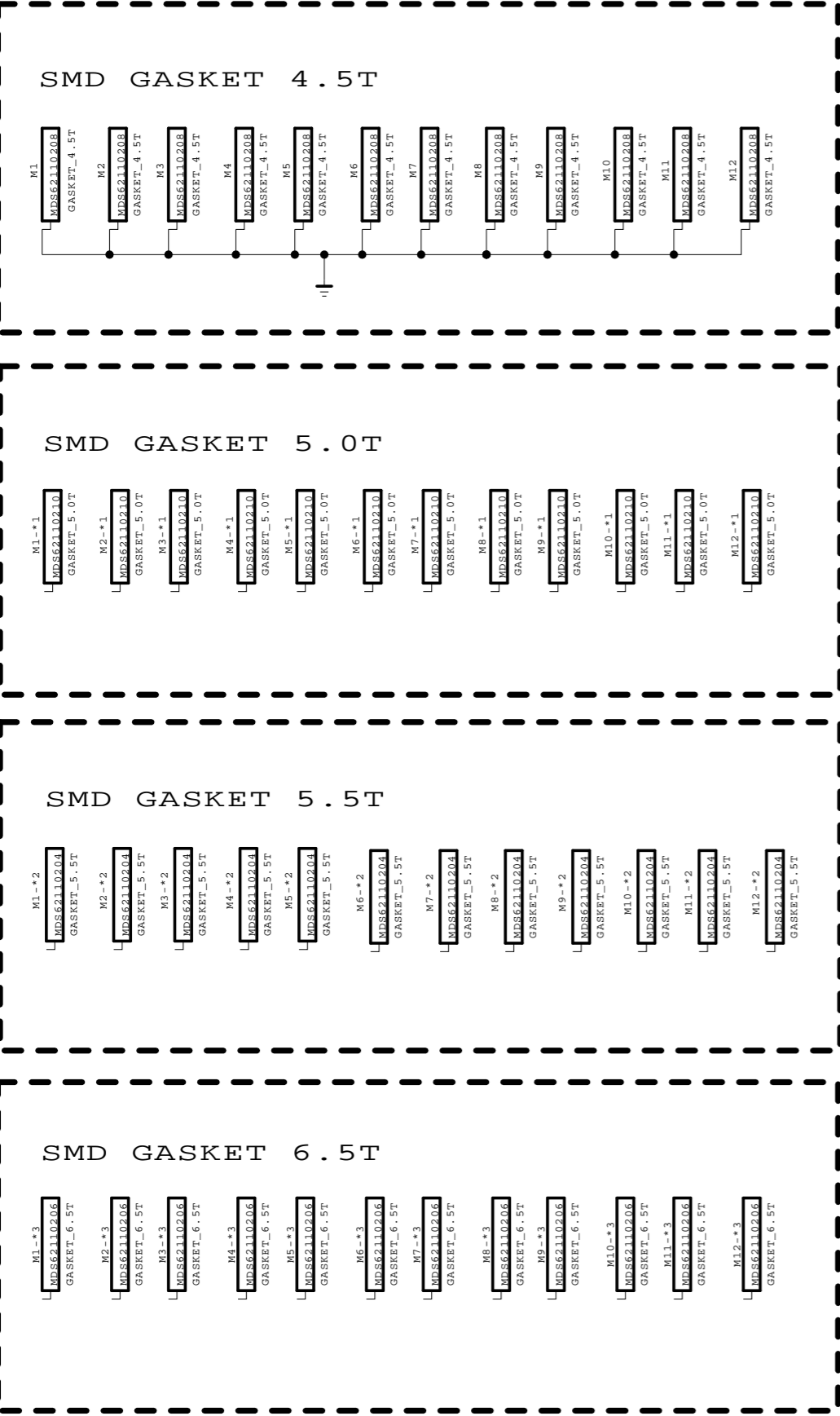
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MODEL	BCM35230	DATE	
BLOCK	LV7 EU	SHEET	48 / 50

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.

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LG ELECTRONICS

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

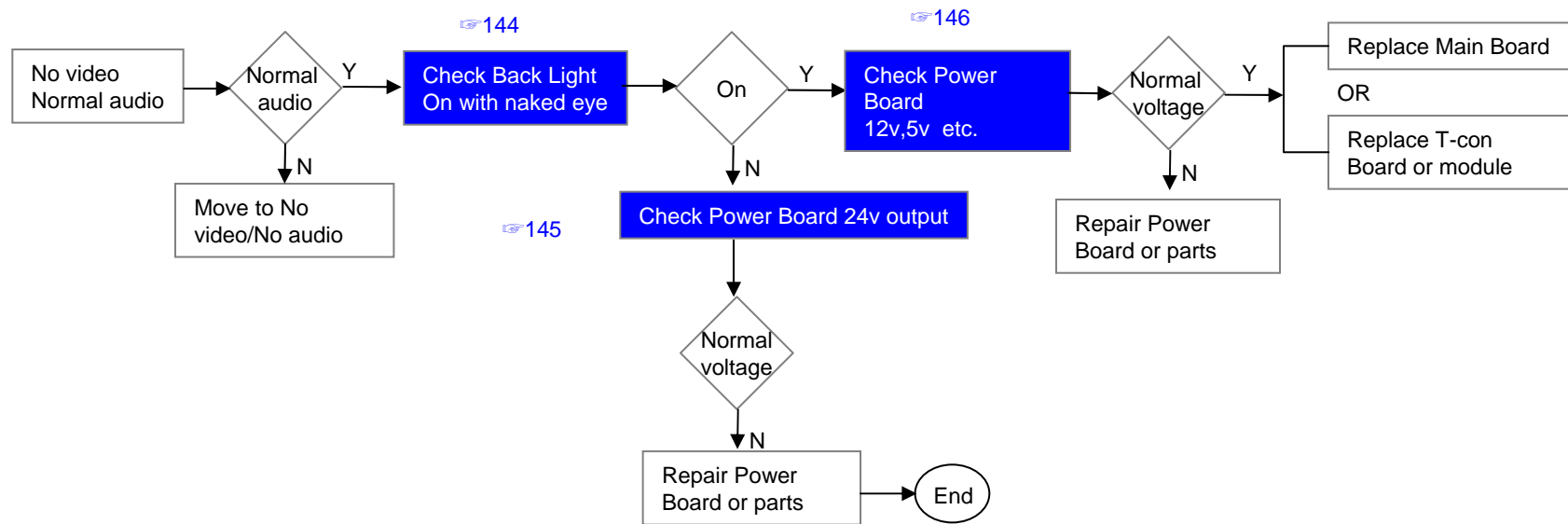


Electronic Product Standard Repair Process



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



※ Precaution

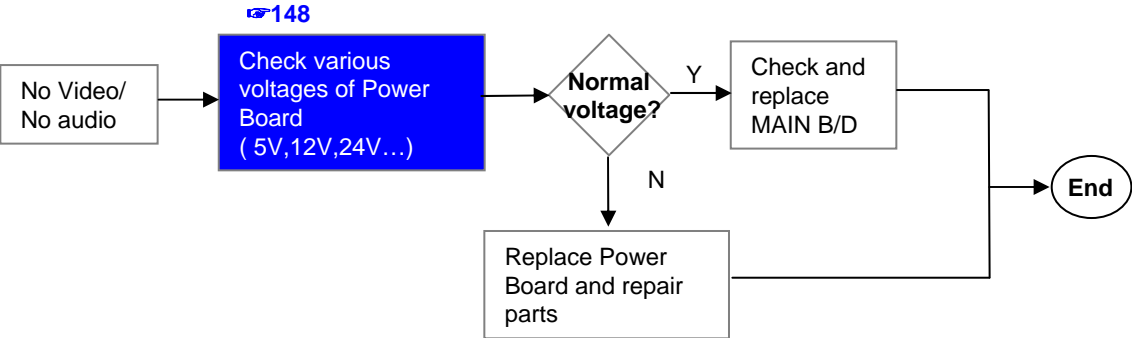
147

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

Replace Main Board

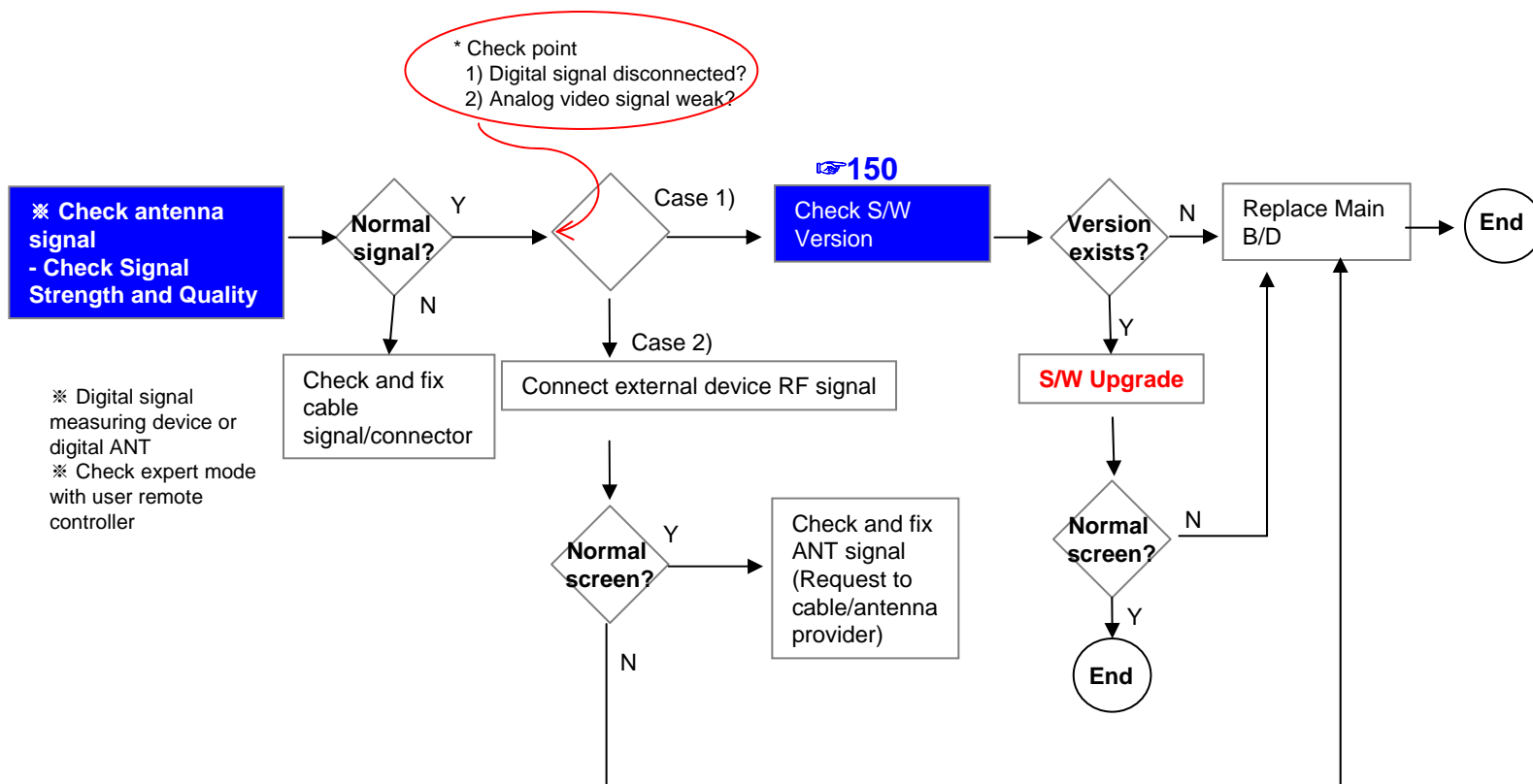
Re-enter White Balance value

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



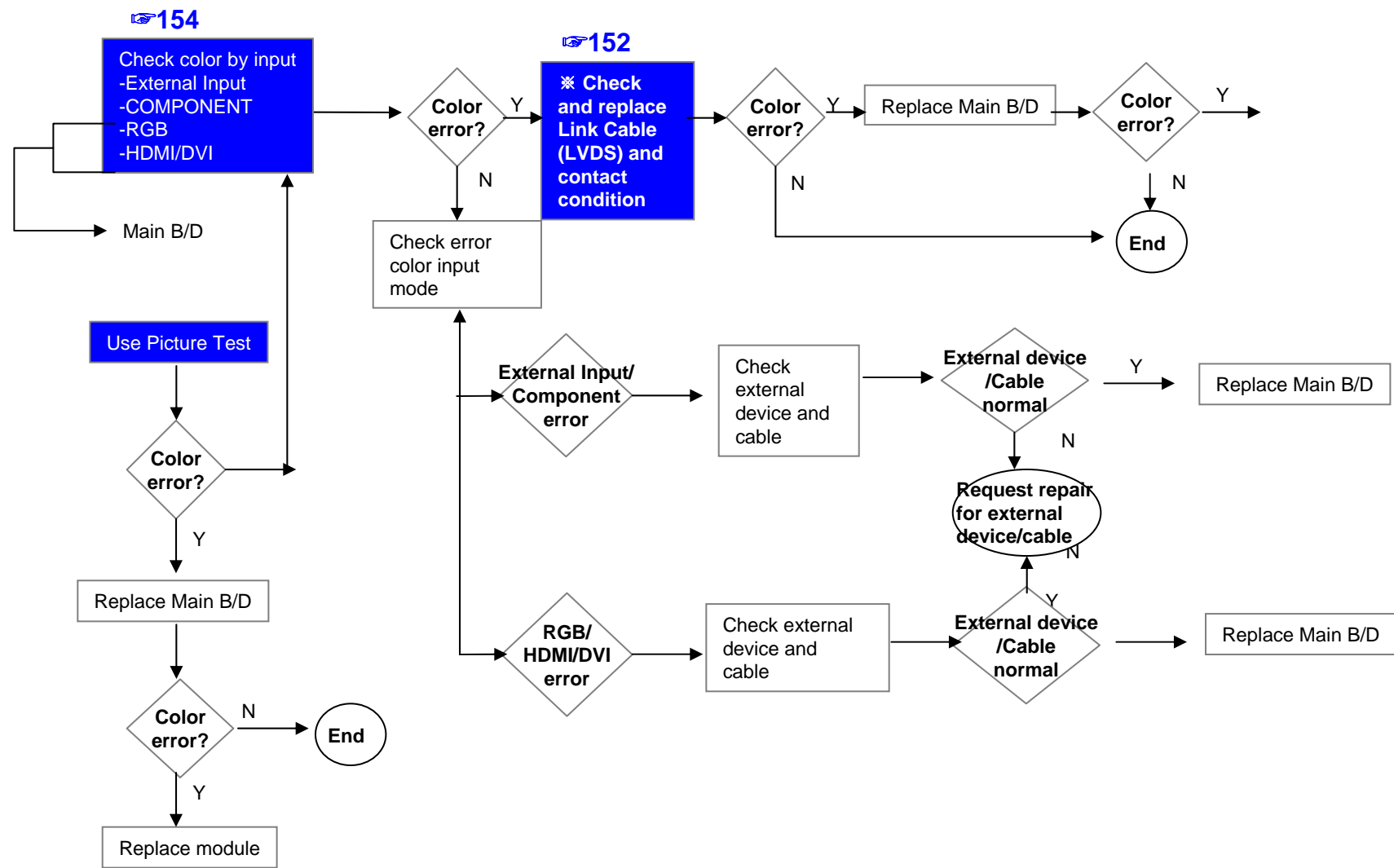
Standard Repair Process

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

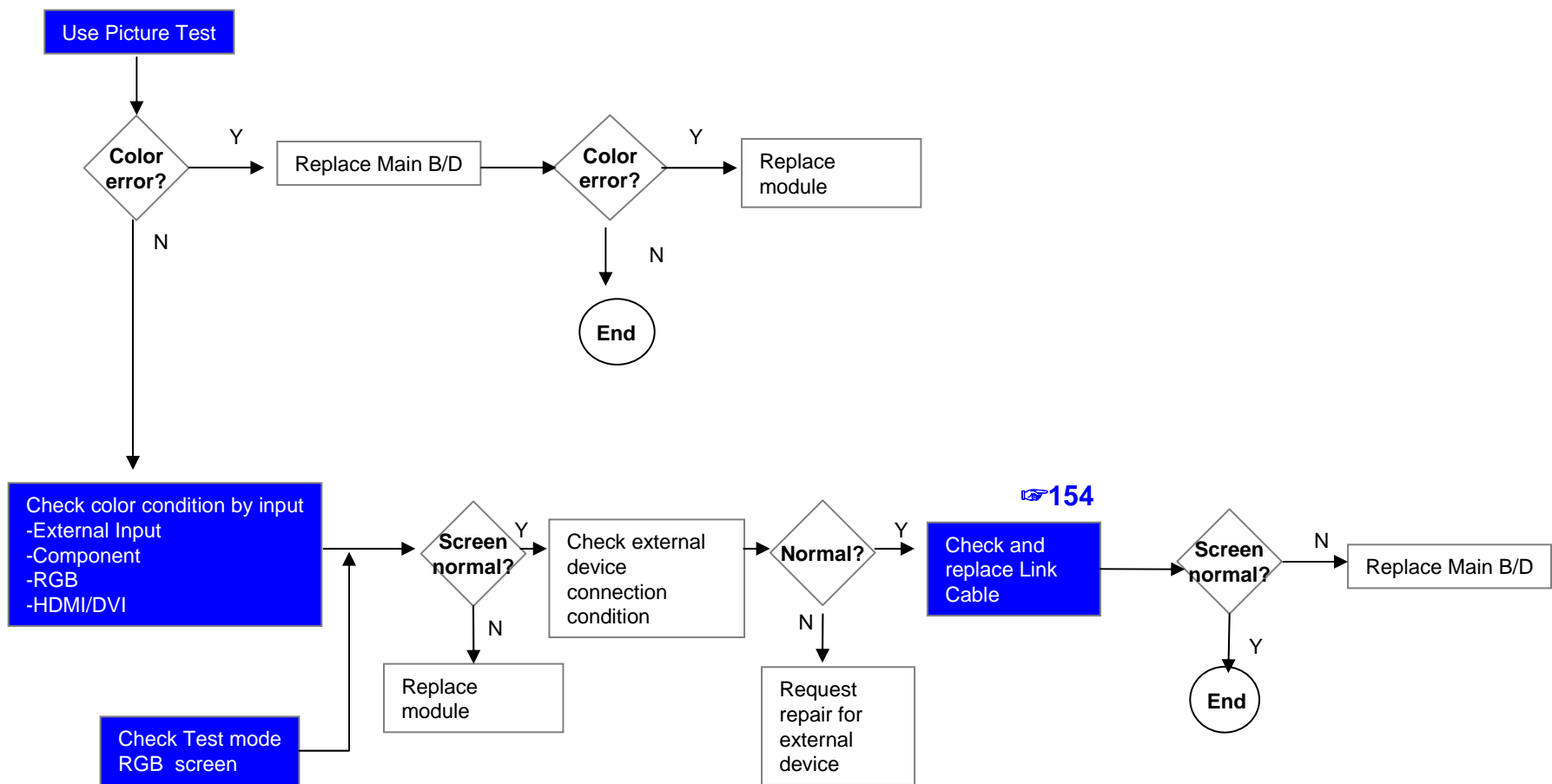
LCD TV	Error symptom	A. Video error	Established date	2008. 2 . 1	Electronics 6-3
		Color error	Revised date		4/13



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

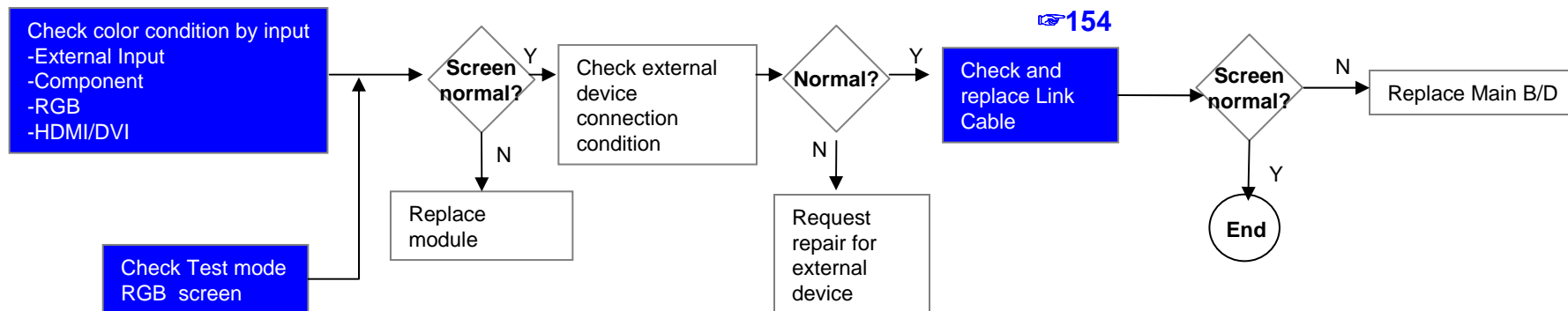


154

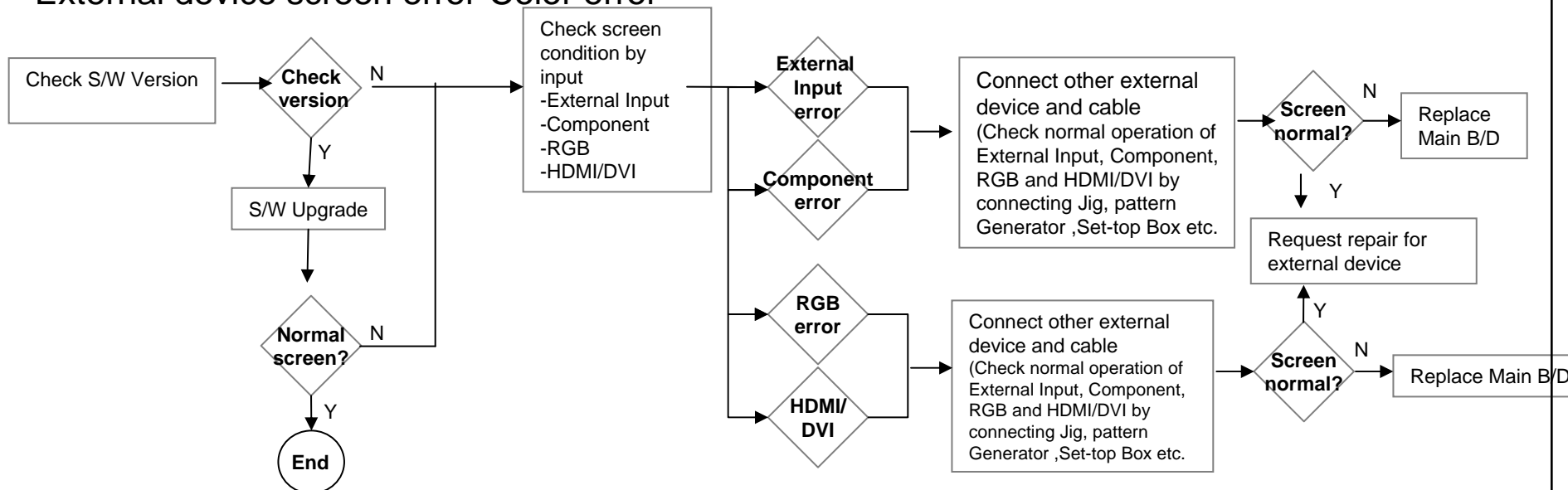
Standard Repair Process

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

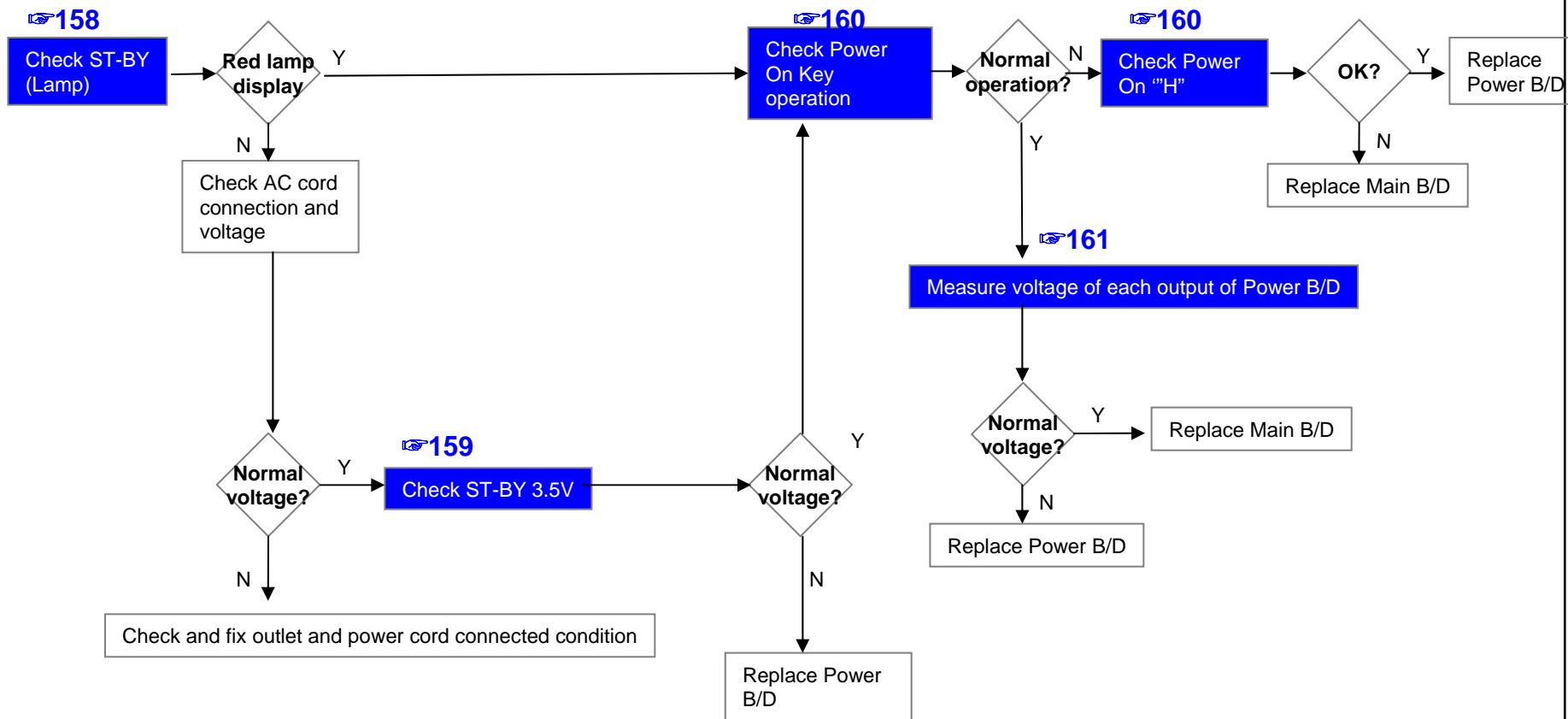


External device screen error-Color error



Standard Repair Process

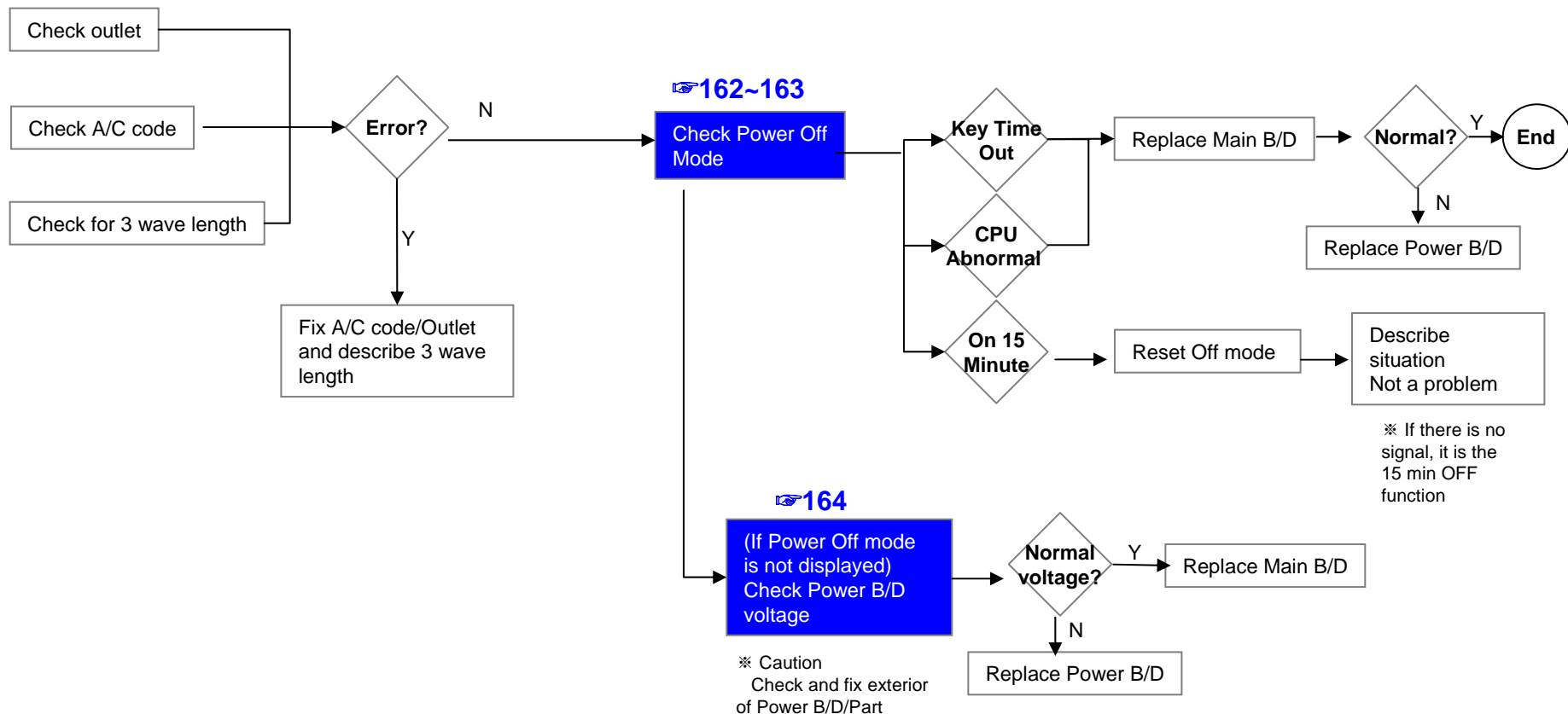
LCD TV	Error symptom	B. Power error	Established date	2008. 2 . 1	Electronics 6-3
		No power	Revised date		6/13



※ 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

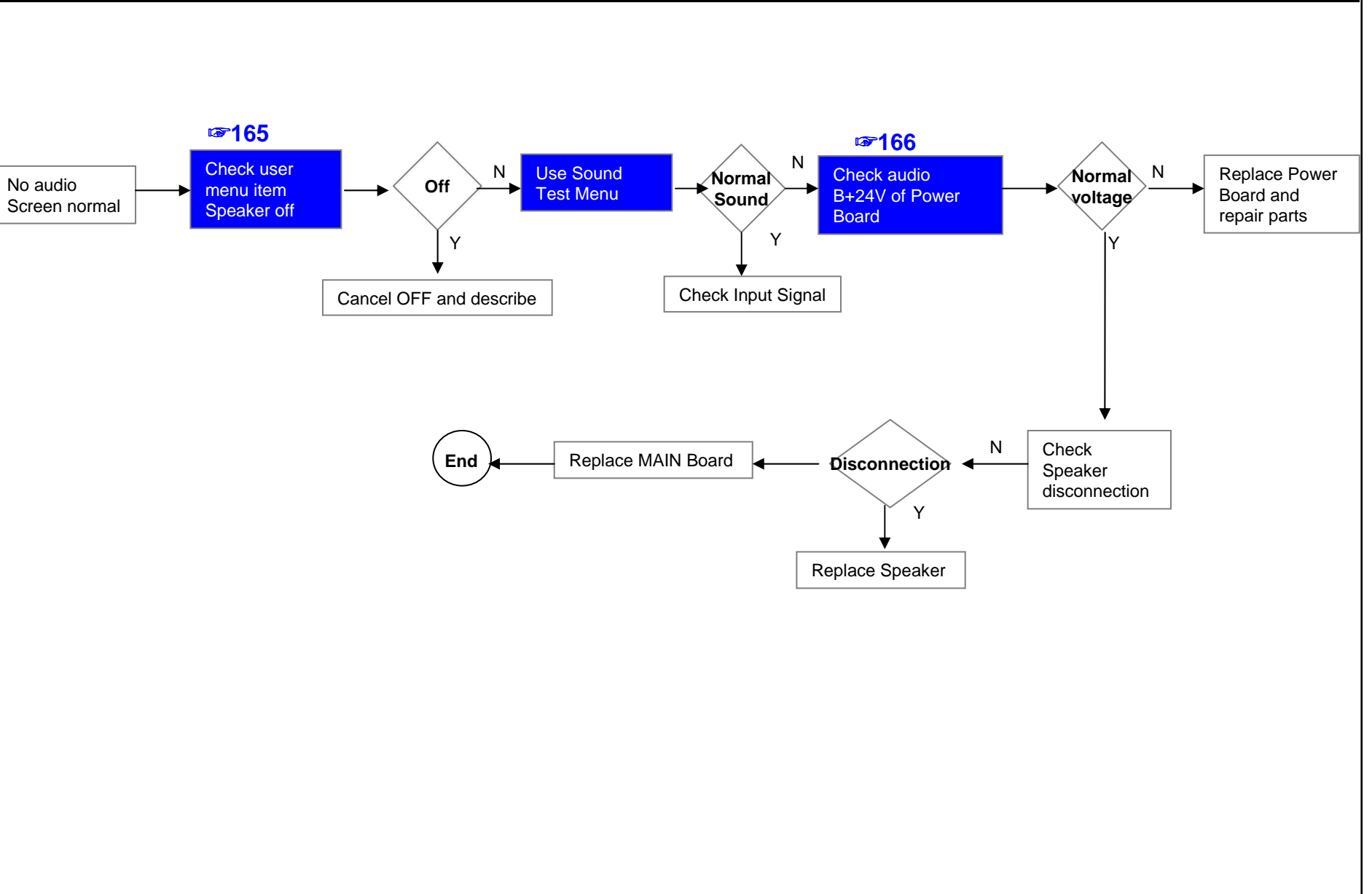
Standard Repair Process

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

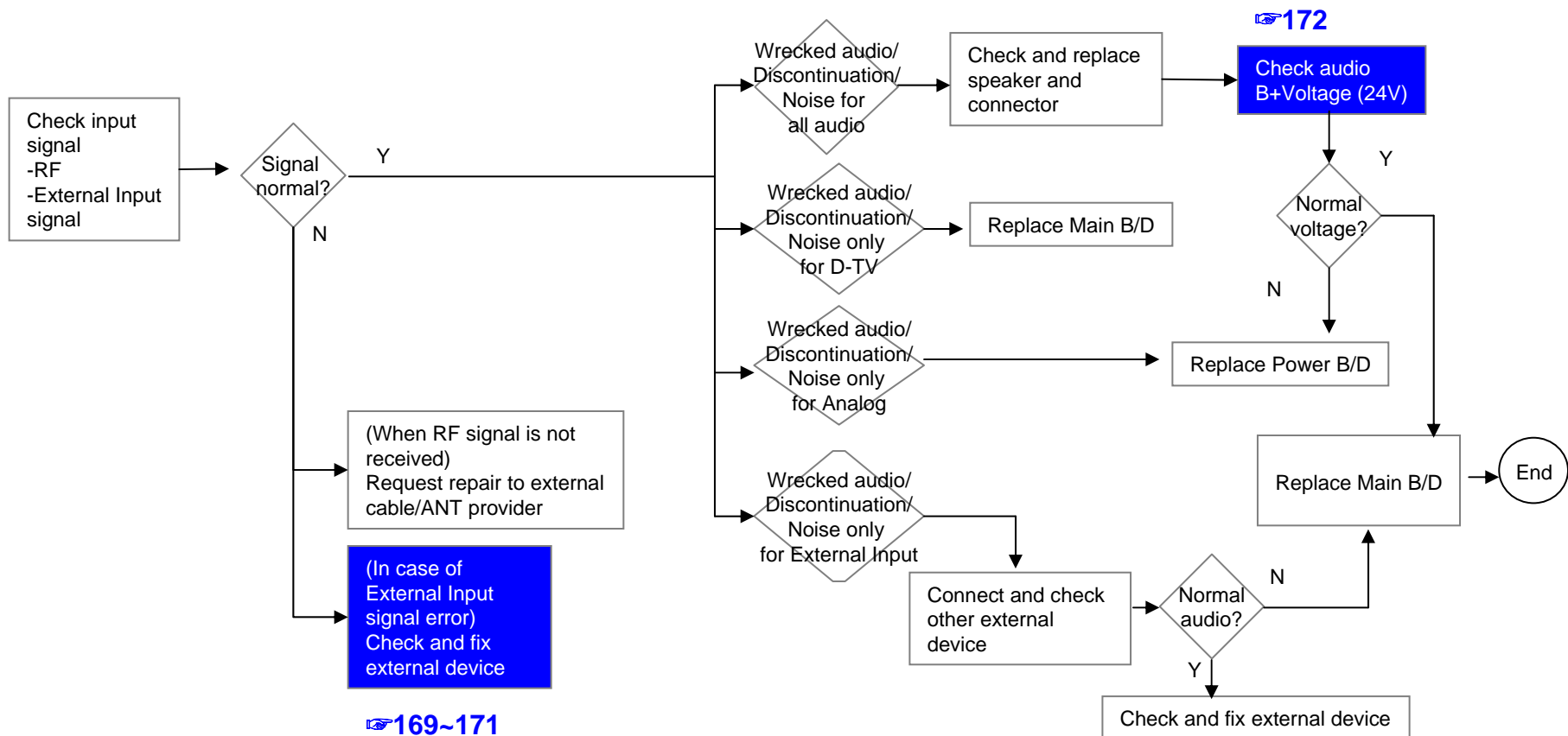
LCD TV	Error symptom	C. Audio error	Established date	2008. 2 . 1	Electronics 6-3
		No audio/Normal video	Revised date		8/13



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

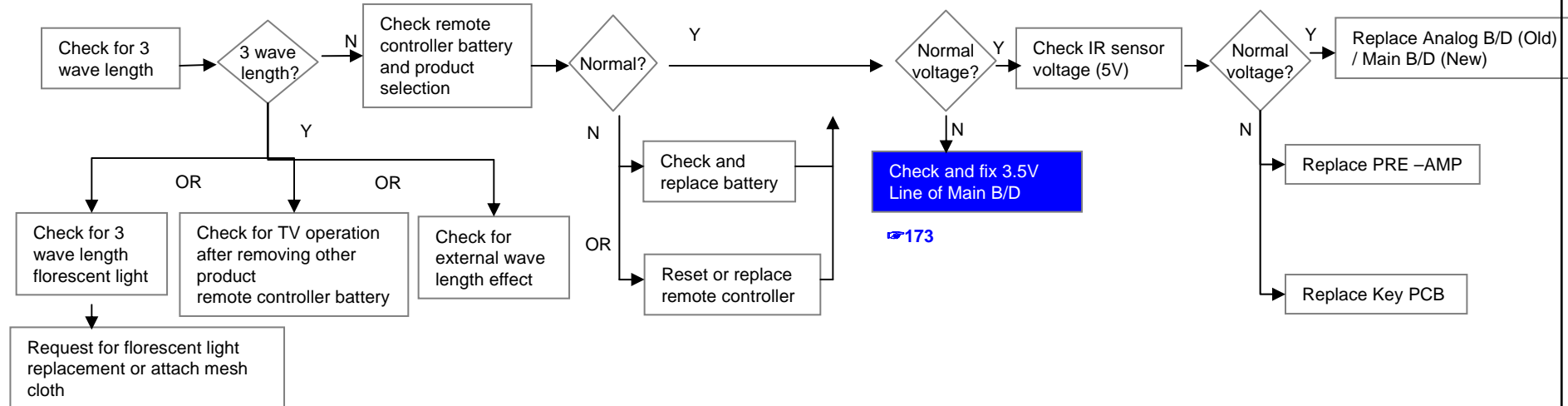
→ Wrecked audio/discontinuation/noise is same after “Check input signal” compared to No audio



Standard Repair Process

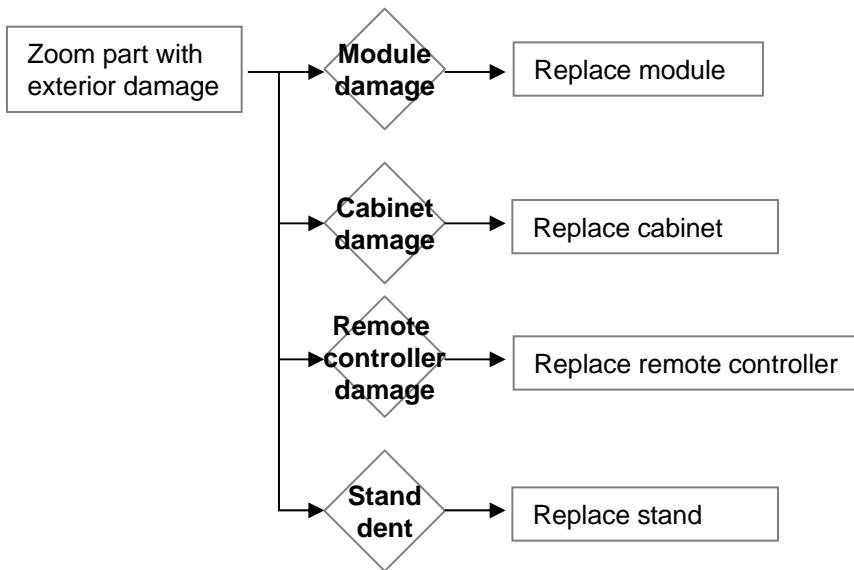
LCD TV	Error symptom	D. Function error	Established date	2008. 2 . 1	Electronics 6-3
		No response in remote controller, key error, recording error, memory error	Revised date		10/13

No response in remote controller and main unit key error



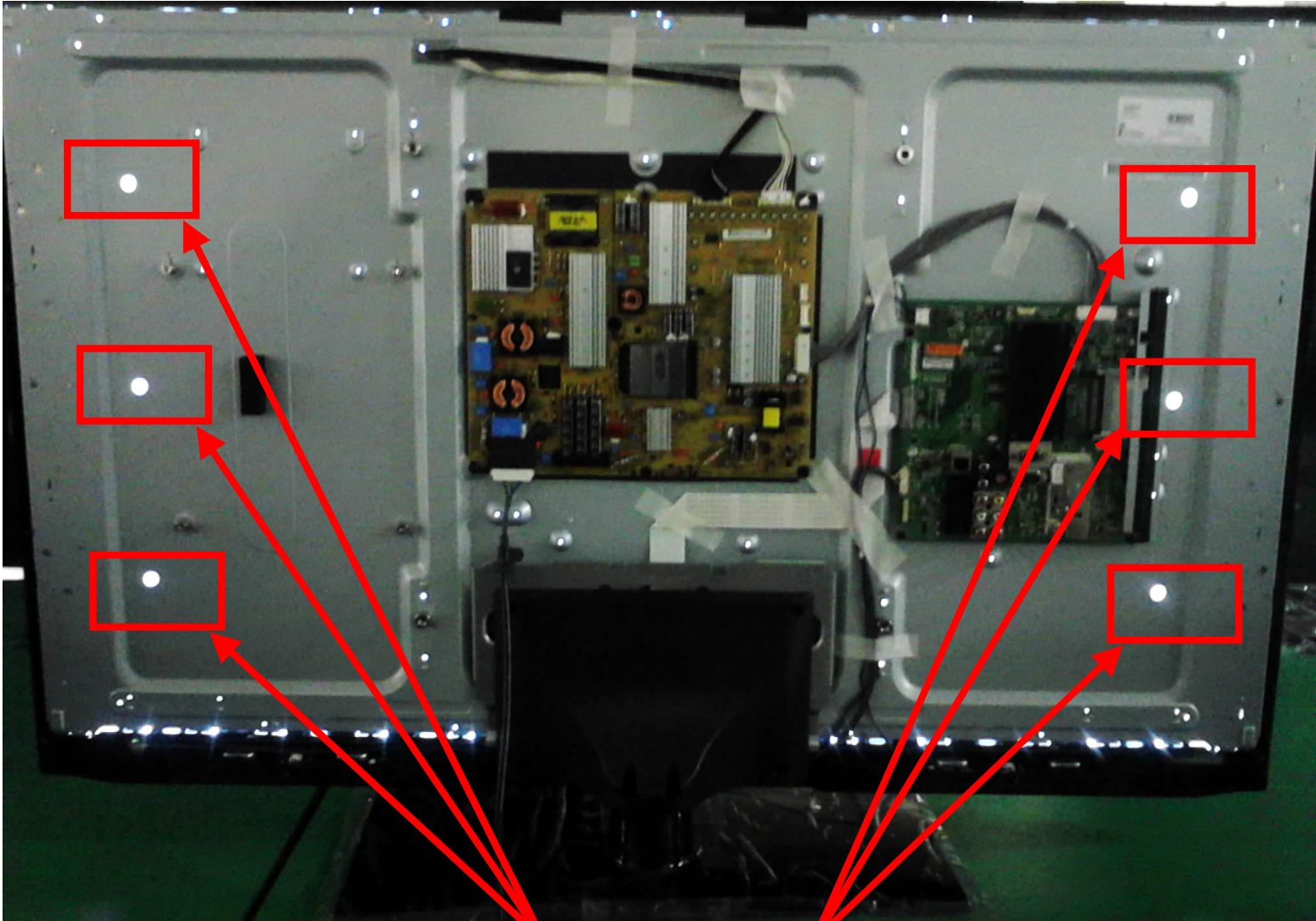
Standard Repair Process

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

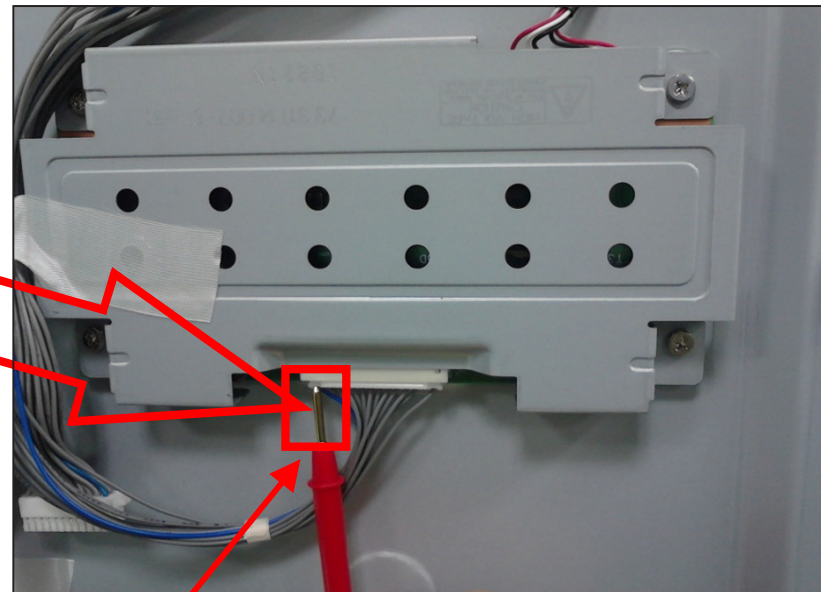
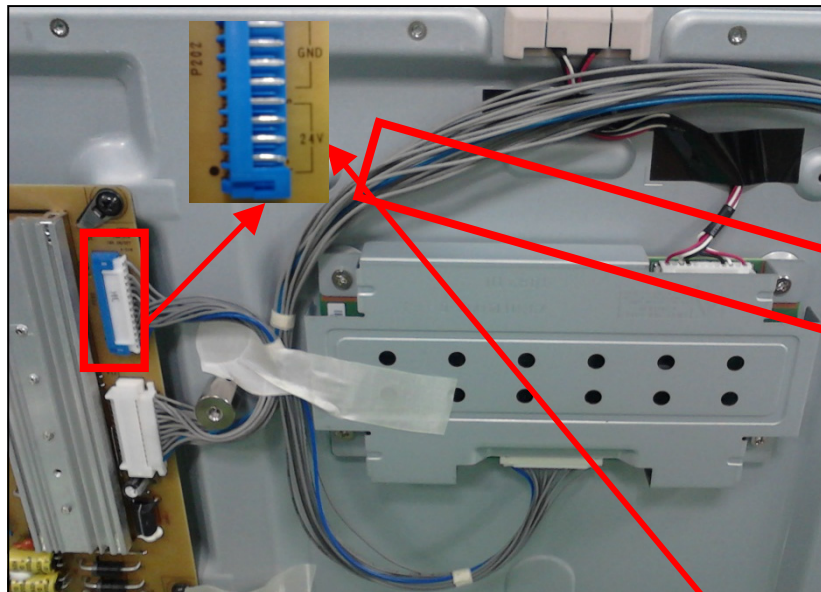
LCD TV	Error symptom	A. Video error_No video/Normal audio	Established date	2008. 2 . 1	Electronics 6-3
	Content	Check LCD back light with naked eye	Revised date		1/33 - 1/13



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

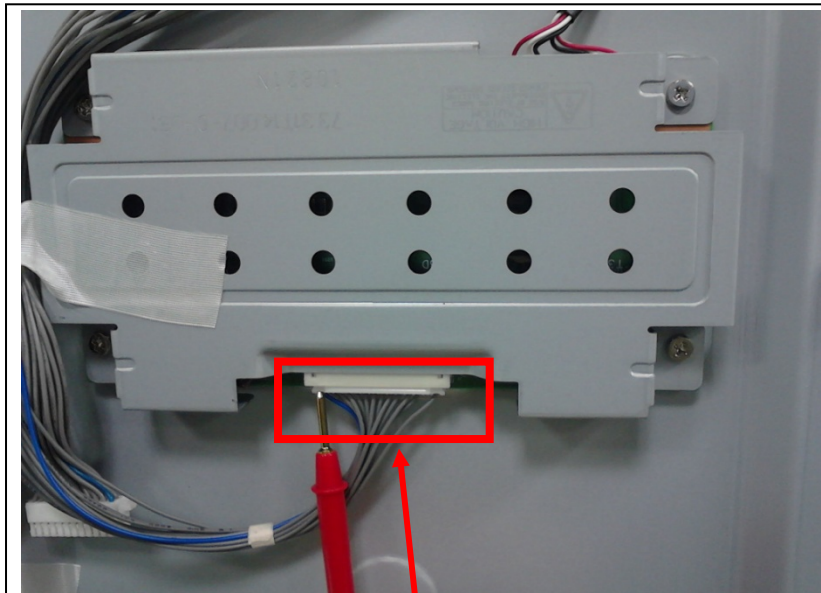
LCD TV	Error symptom	A. Video error_No video/Normal audio	Established date	2008. 2 . 1	Electronics 6-3
	Content	LED Driver B+ 24V measuring method	Revised date		2/33 - 1/13



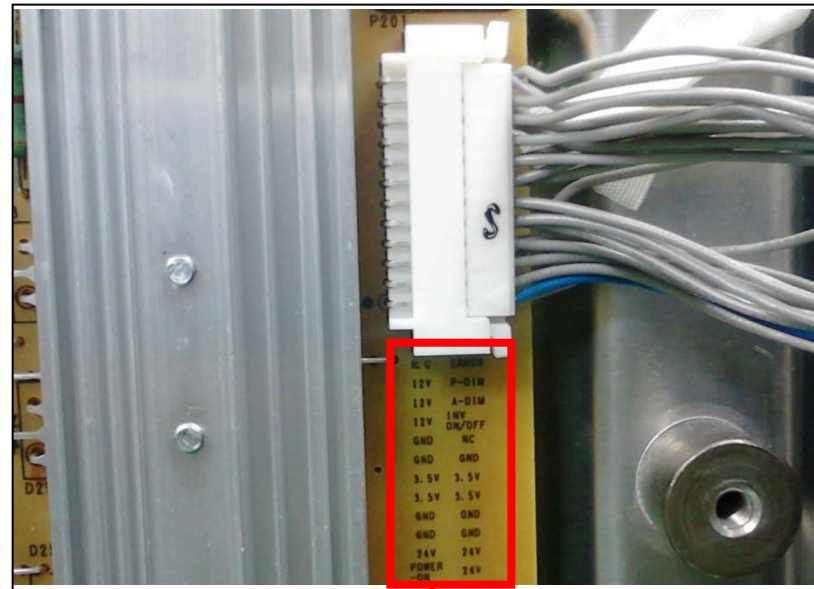
Measure the DC 24V supplied to LED Driver from the Power Board.

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



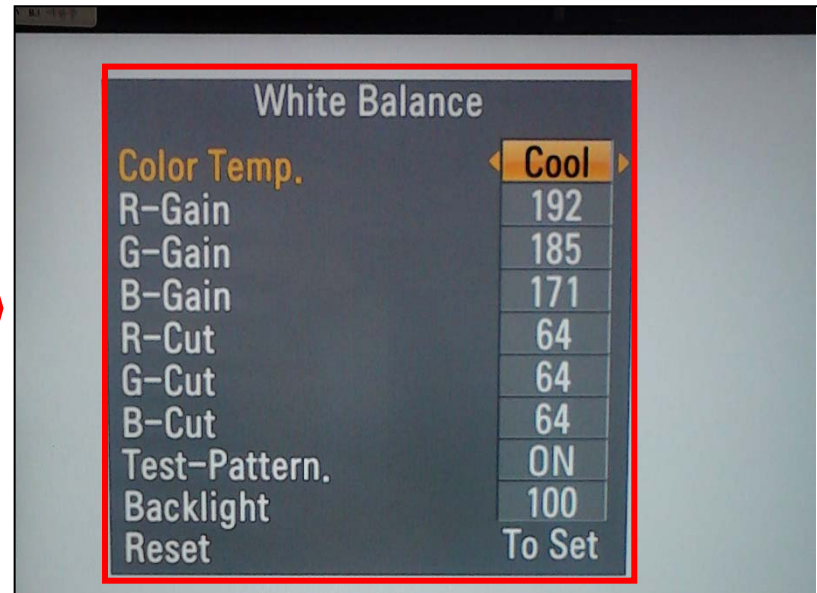
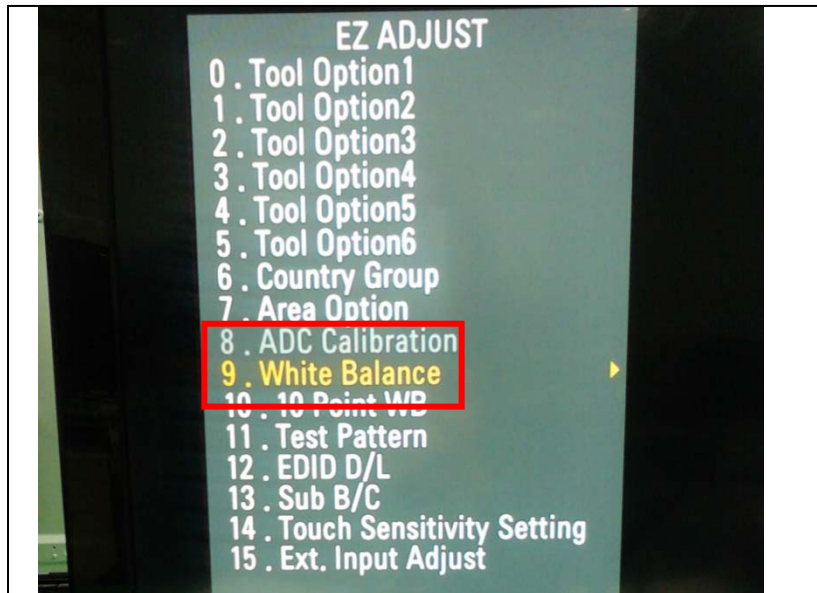
24V is provided from the Power Board and supplied to LED Driver PCB. Check the PIN contact condition and connection.



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

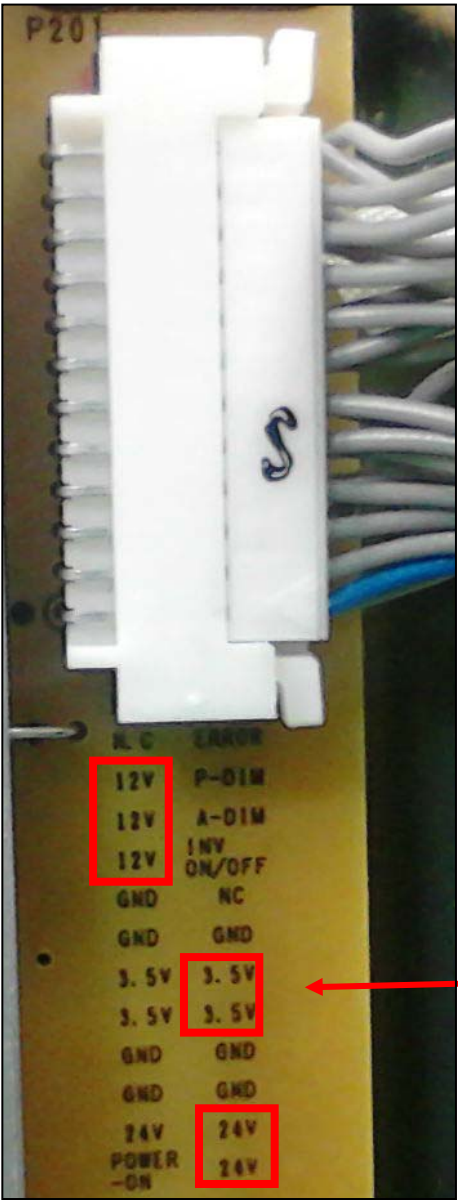


Entry method

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

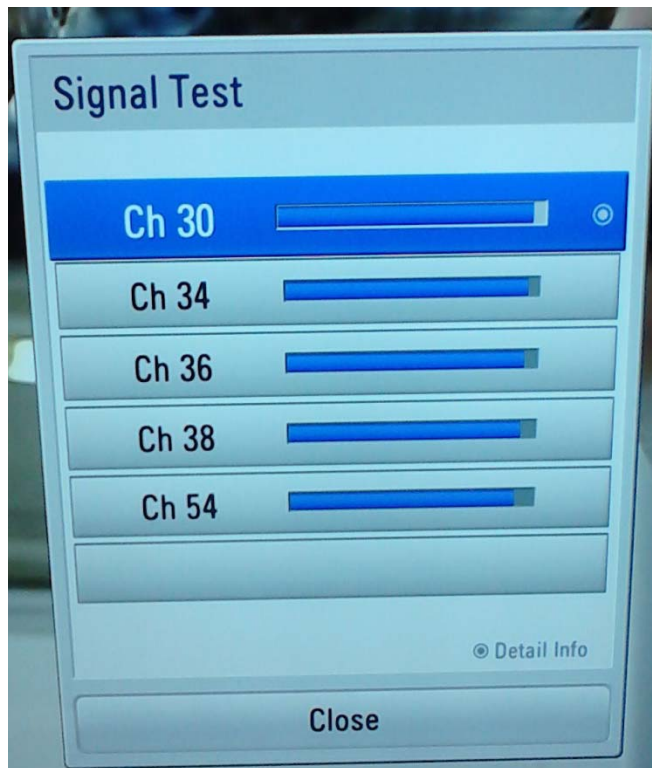
LCD TV	Error symptom	A. Video error_No video/No audio	Established date	2008. 2 . 1	Electronics 6-3
	Content	Power Board voltage measuring method	Revised date		5/33 - 2/13



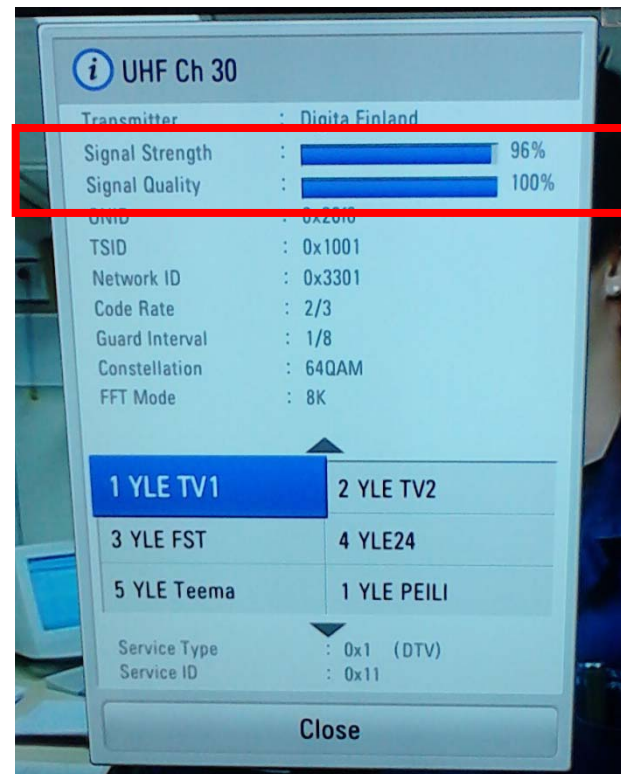
Check each voltage output (3.5V, 12V, 24V) supplied from Power Board to Main Board.

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

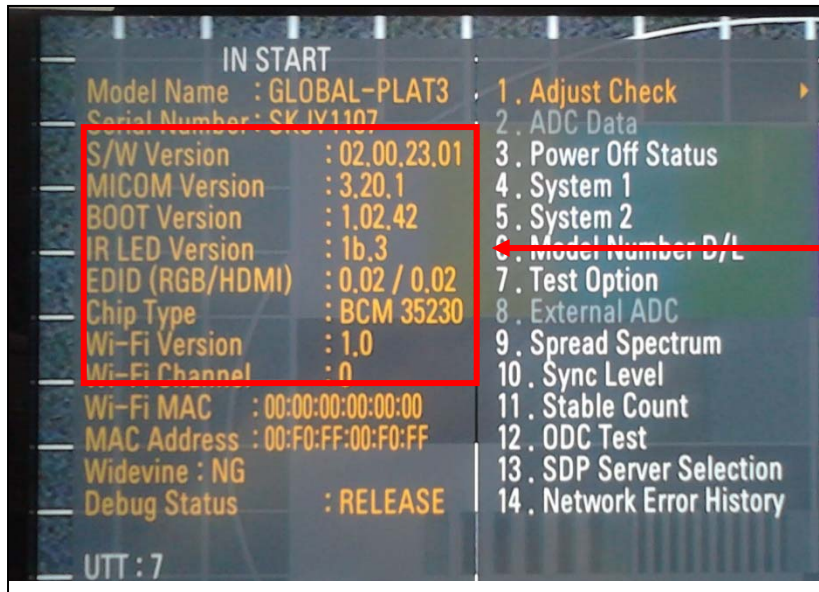


Check Signal Strength and Quality

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



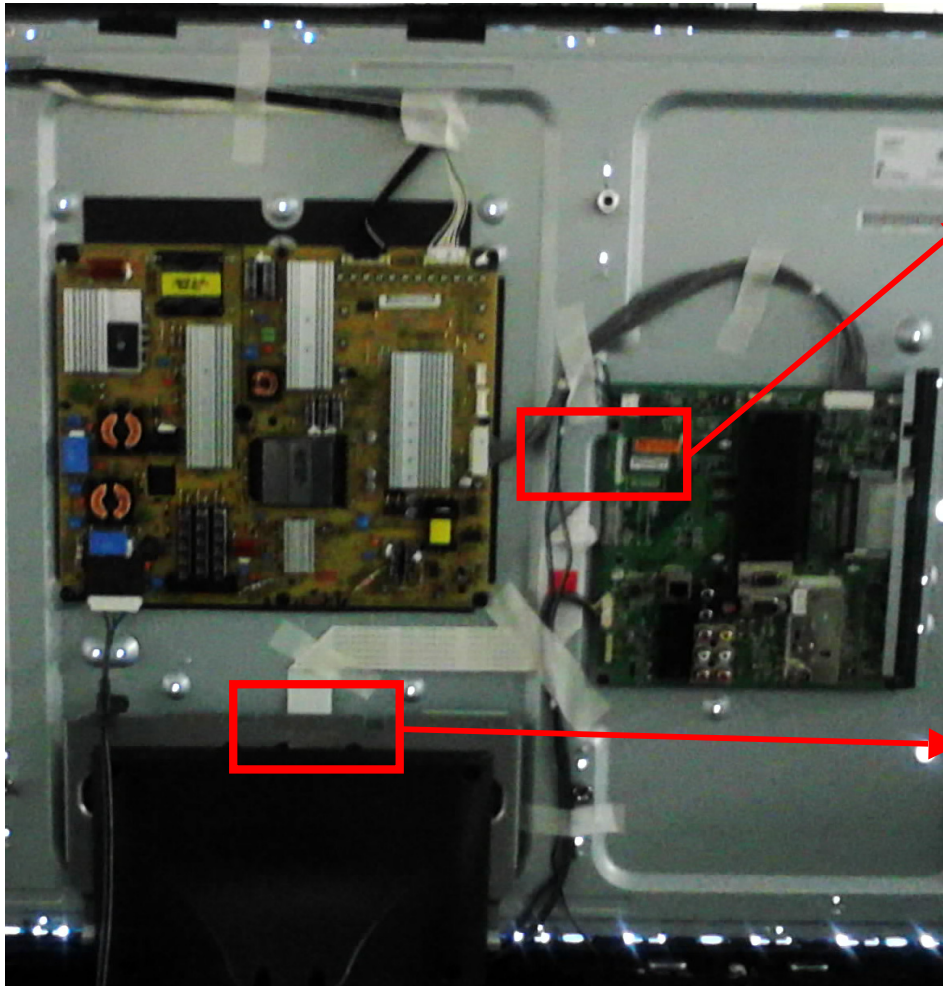
Test Image

Entry method

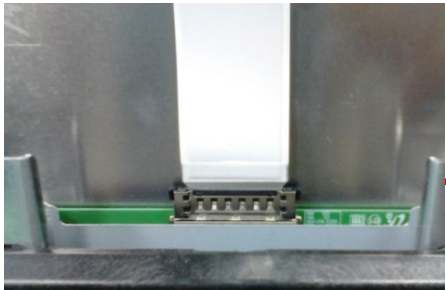
1. Press the Menu button on the remote controller
2. Enter into Support -> Picture Test
3. The TV Display Test Image

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

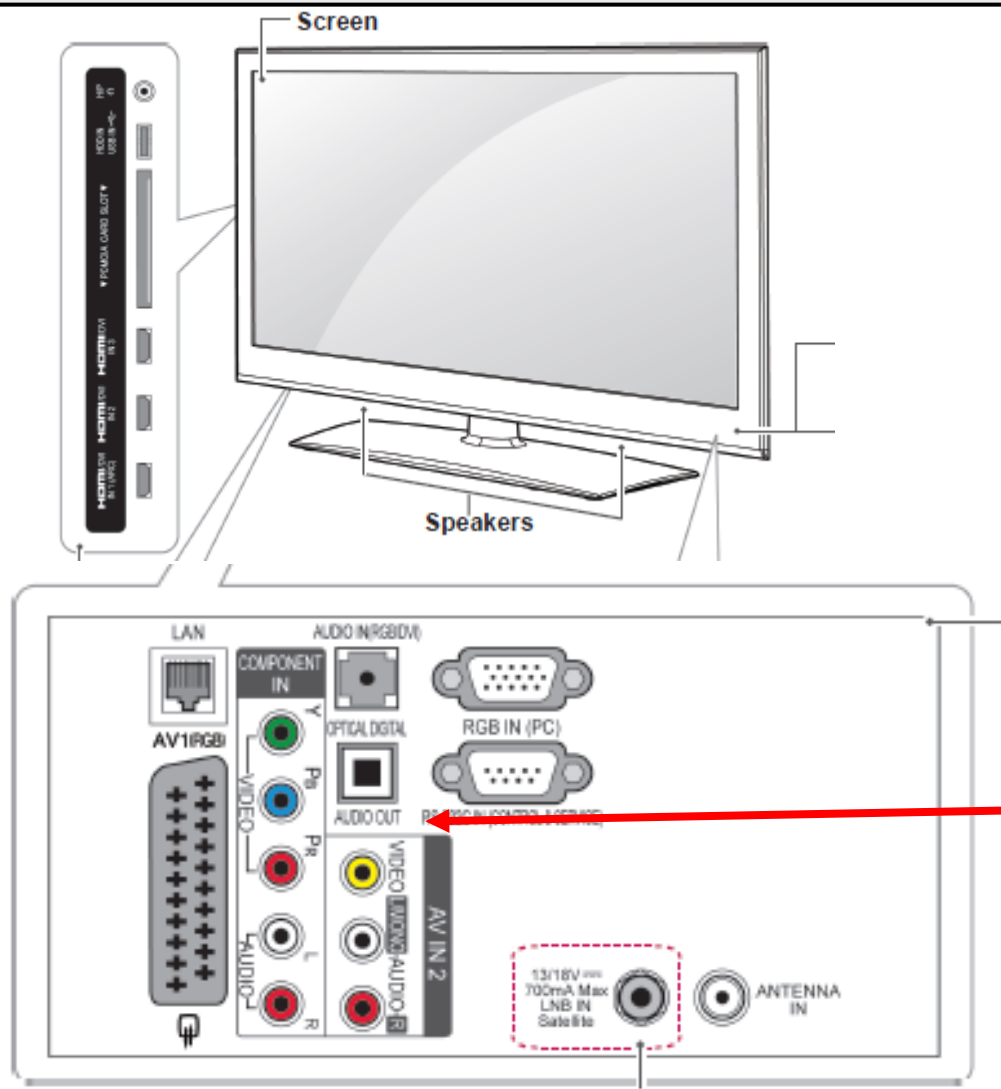


Check the contact condition of the Link Cable



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



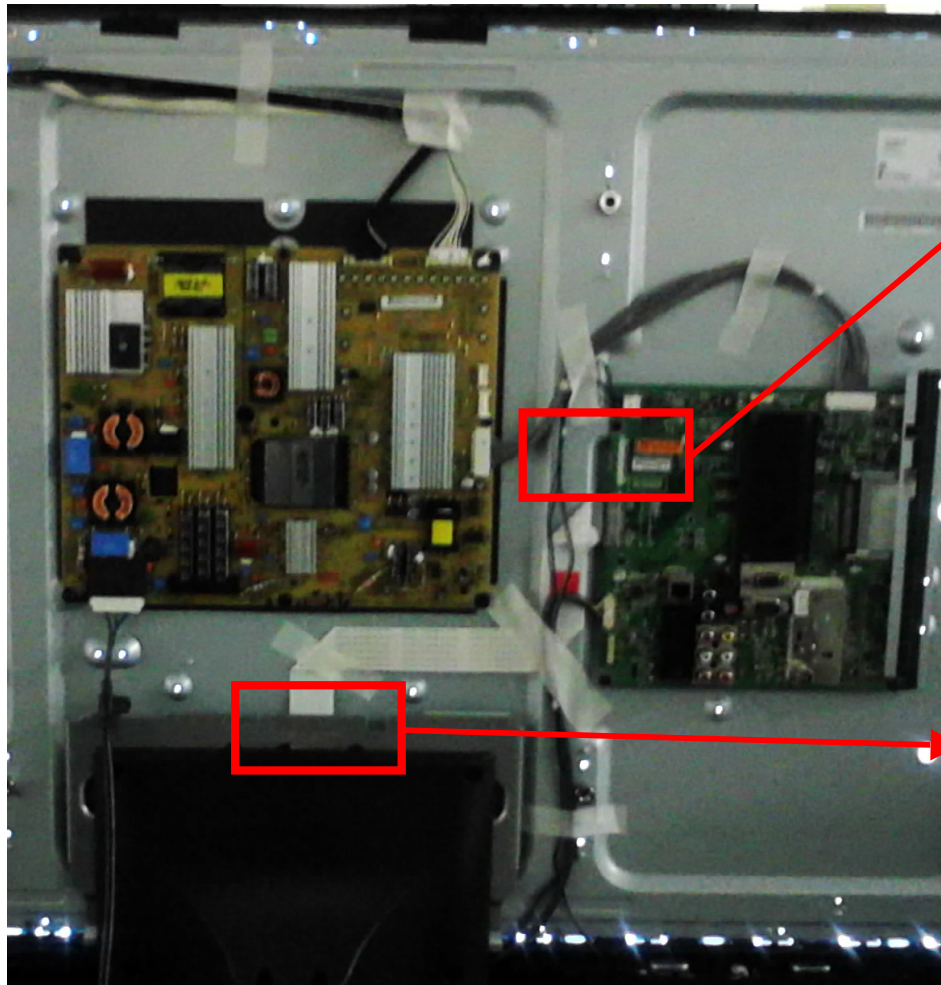
Test Image

Entry method

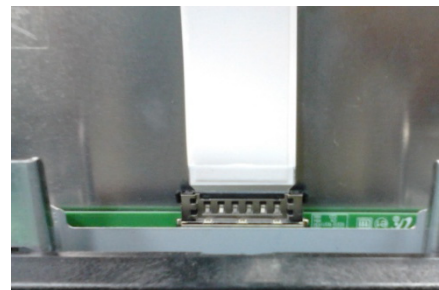
1. Press the Menu button on the remote controller
2. Enter into Support -> Picture Test
3. The TV Display Test Image

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

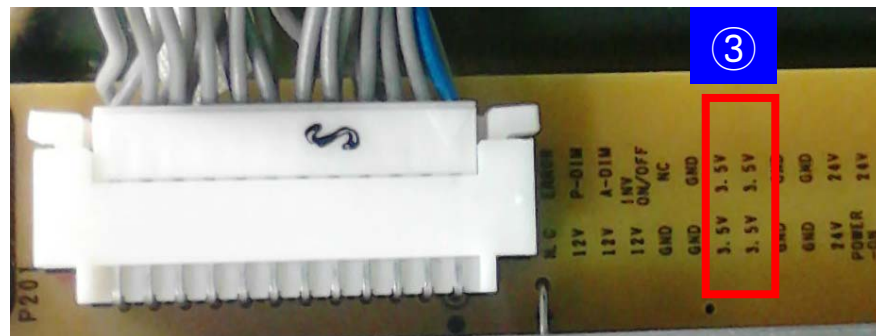
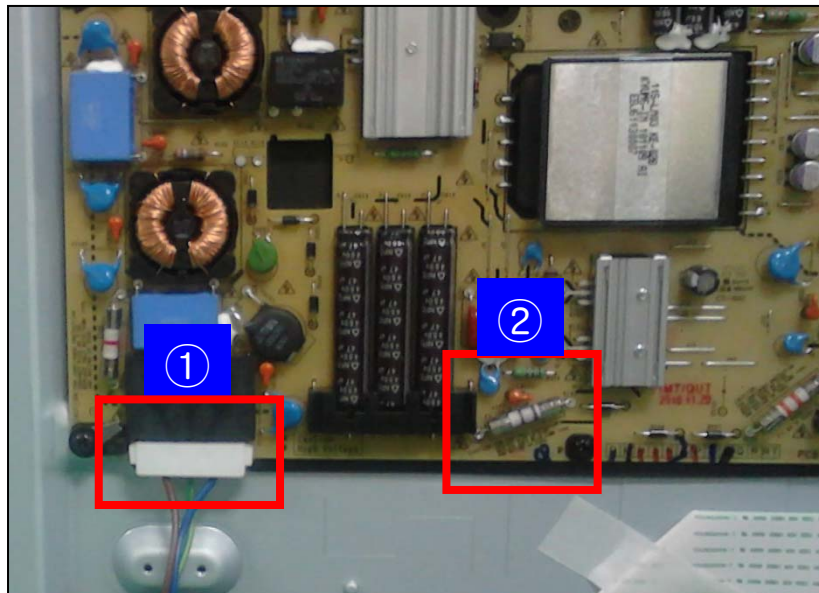
LCD TV	Error symptom	B. Power error _No power	Established date	2008. 2 . 1	Electronics 6-3
	Content	Check front display LED	Revised date		15/33 - 6/13



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

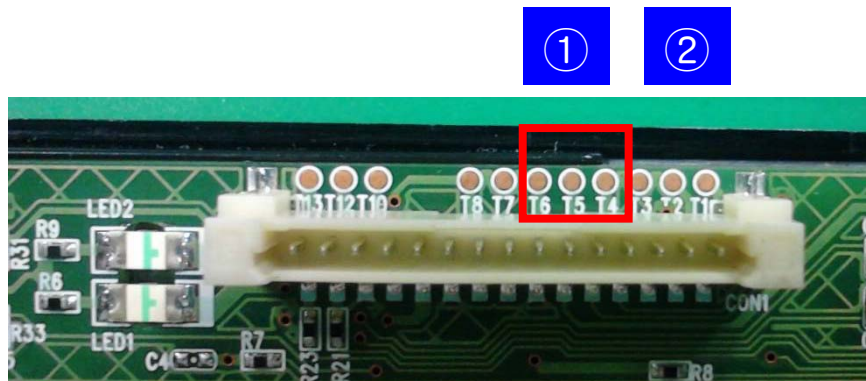


Power checking method

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

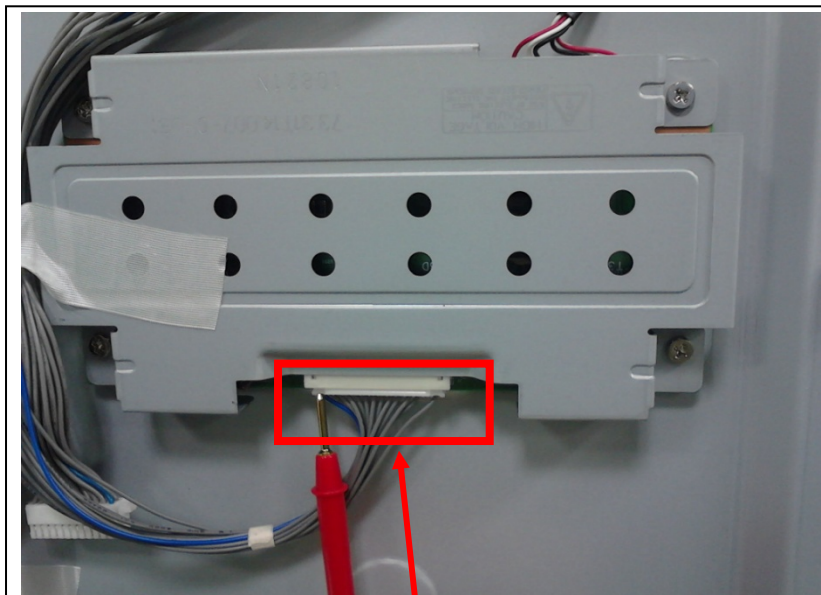


Checking method when power is ON

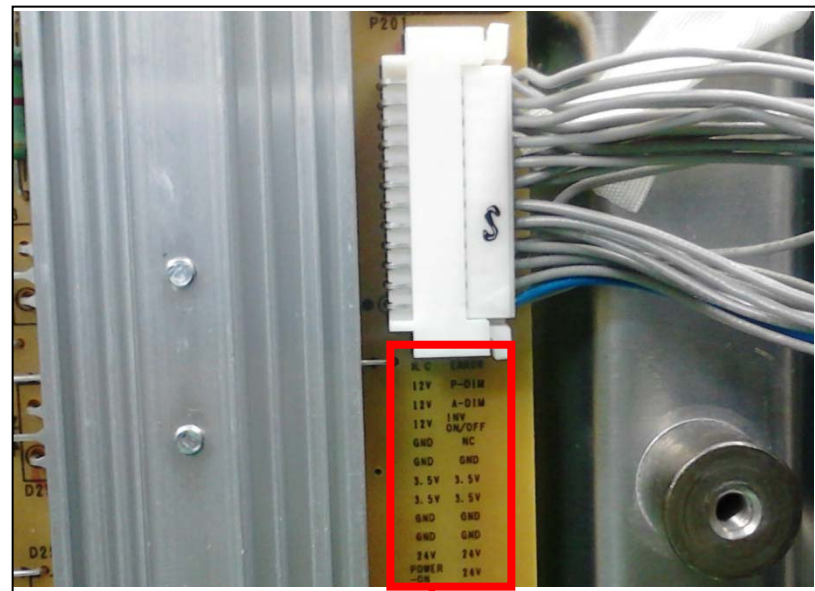
1. Check the ST-BY DC 3.5V output voltage from Soft Touch PCB Test Point T6
2. Check the operating condition of the power KEY on the Soft Touch PCB (Test Point P4, T5)
3. Check the AC-DET (AC) DC3.5V voltage on POWER BOARD.
4. Check the POWER ON High (About DC 1.8V or above) voltage with input from POWER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



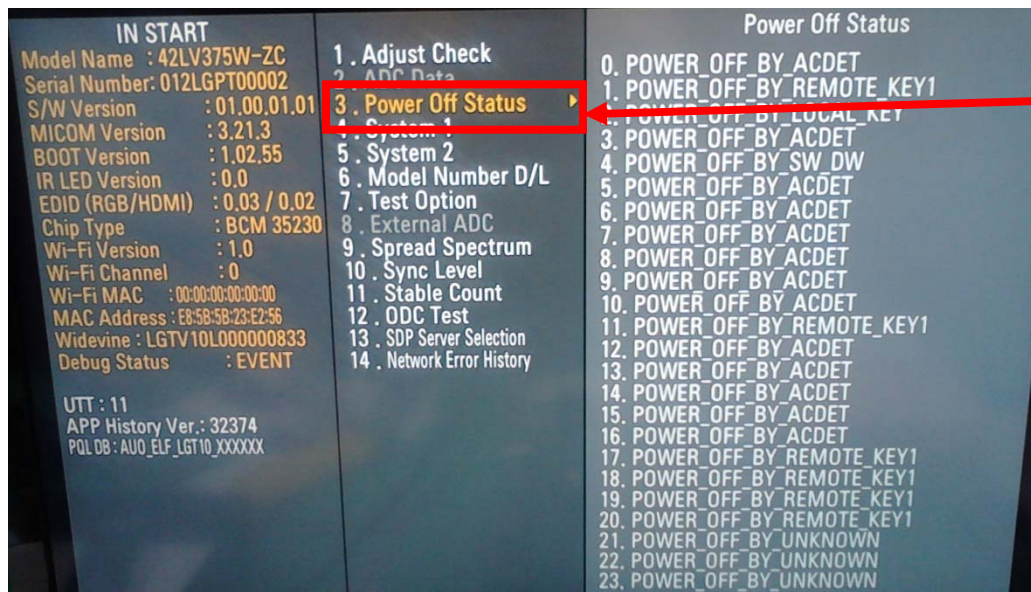
24V is provided from the Power Board and supplied to LED Driver PCB. Check the PIN contact condition and connection.



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

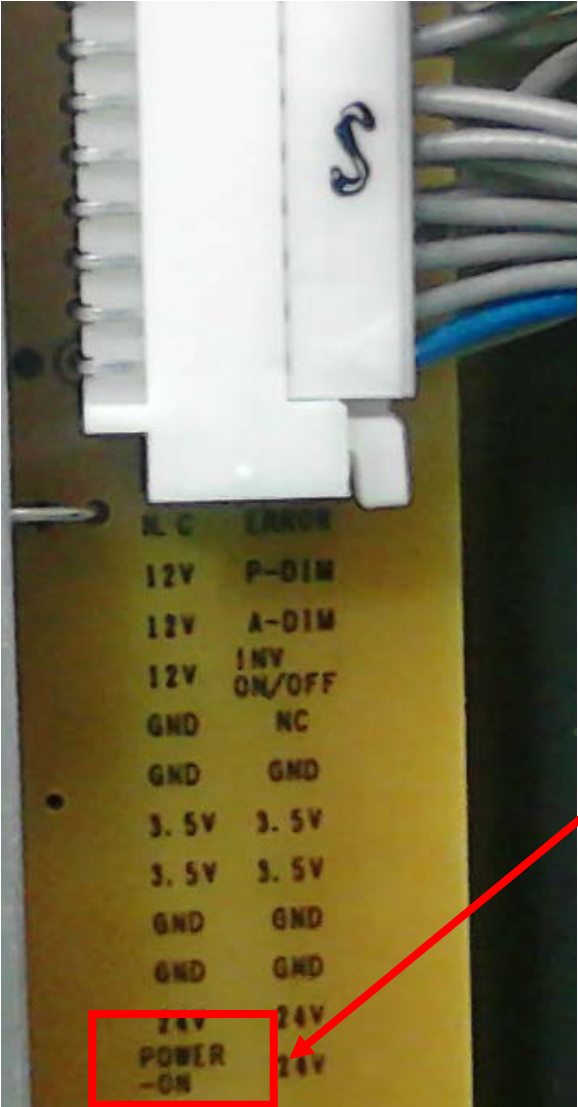


Entry method

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

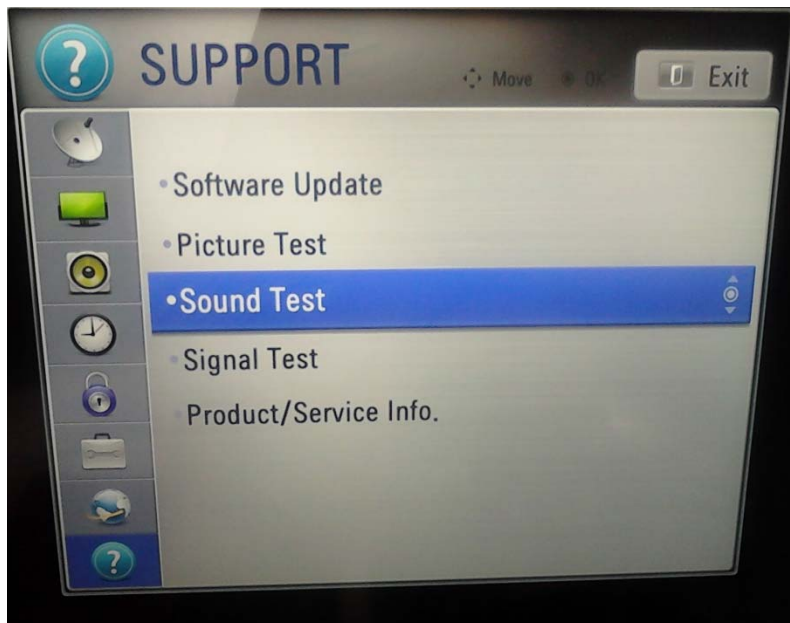


Checking method

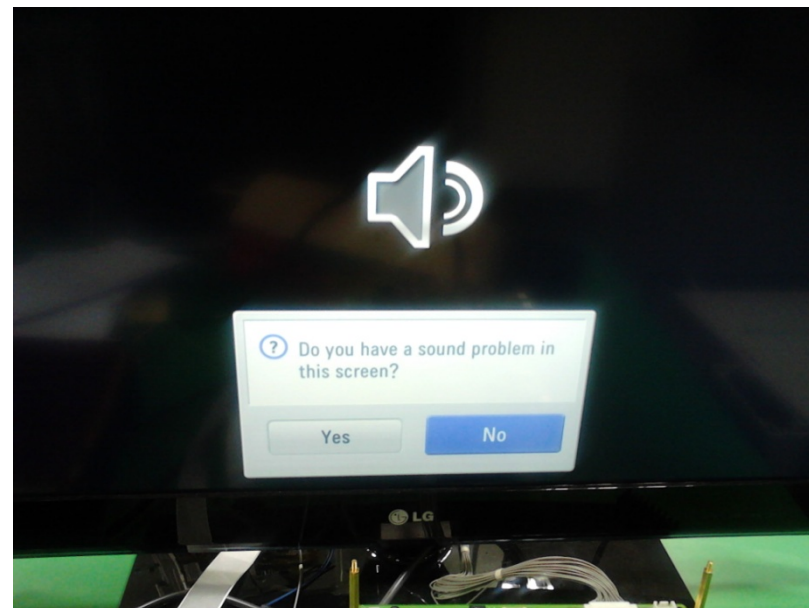
1. Press the MENU button on the remote controller
2. Select the AUDIO function of the Menu
3. Select TV Speaker from Off to On

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



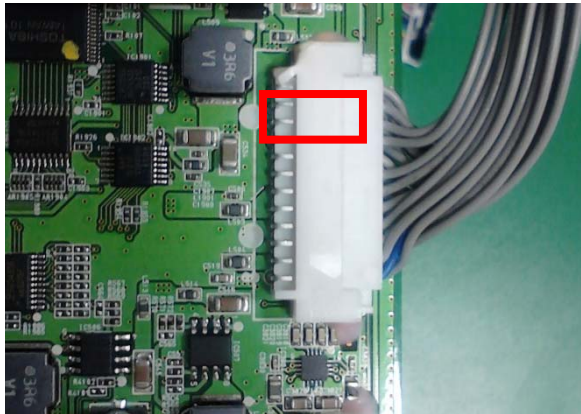
Sound Test (Play the Music)

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

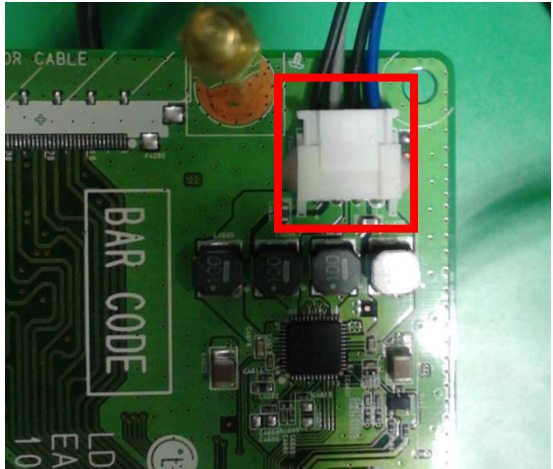
LCD TV	Error symptom	C. Audio error_ No audio/Normal video	Established date	2008. 2 . 1	Electronics 6-3
	Content	Voltage and speaker checking method when there is no audio	Revised date		22/33 - 8/13



①



②



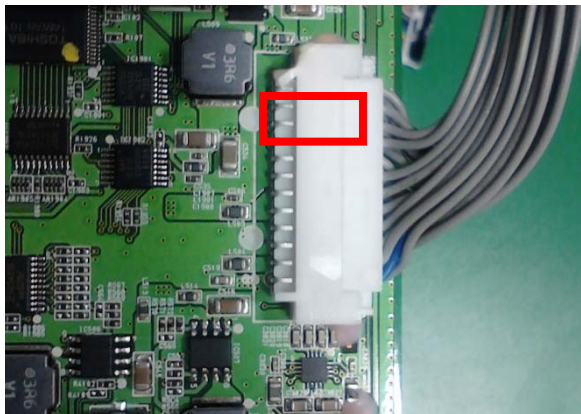
③

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

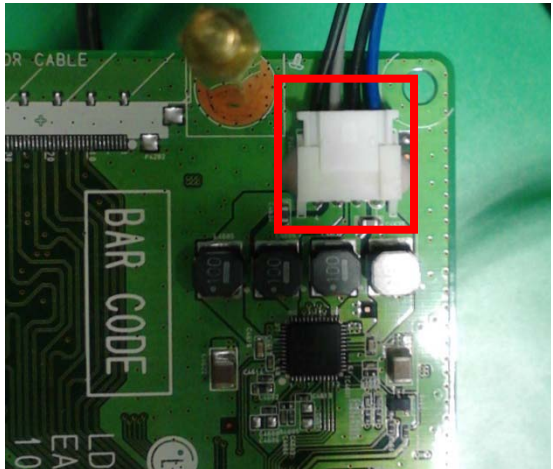
LCD TV	Error symptom	C. Audio error_ Wrecked audio/discontinuation/noise	Established date	2008. 2 . 1	Electronics 6-3
	Content	Voltage and speaker checking method in case of audio error	Revised date		25/33 - 9/13



①



②



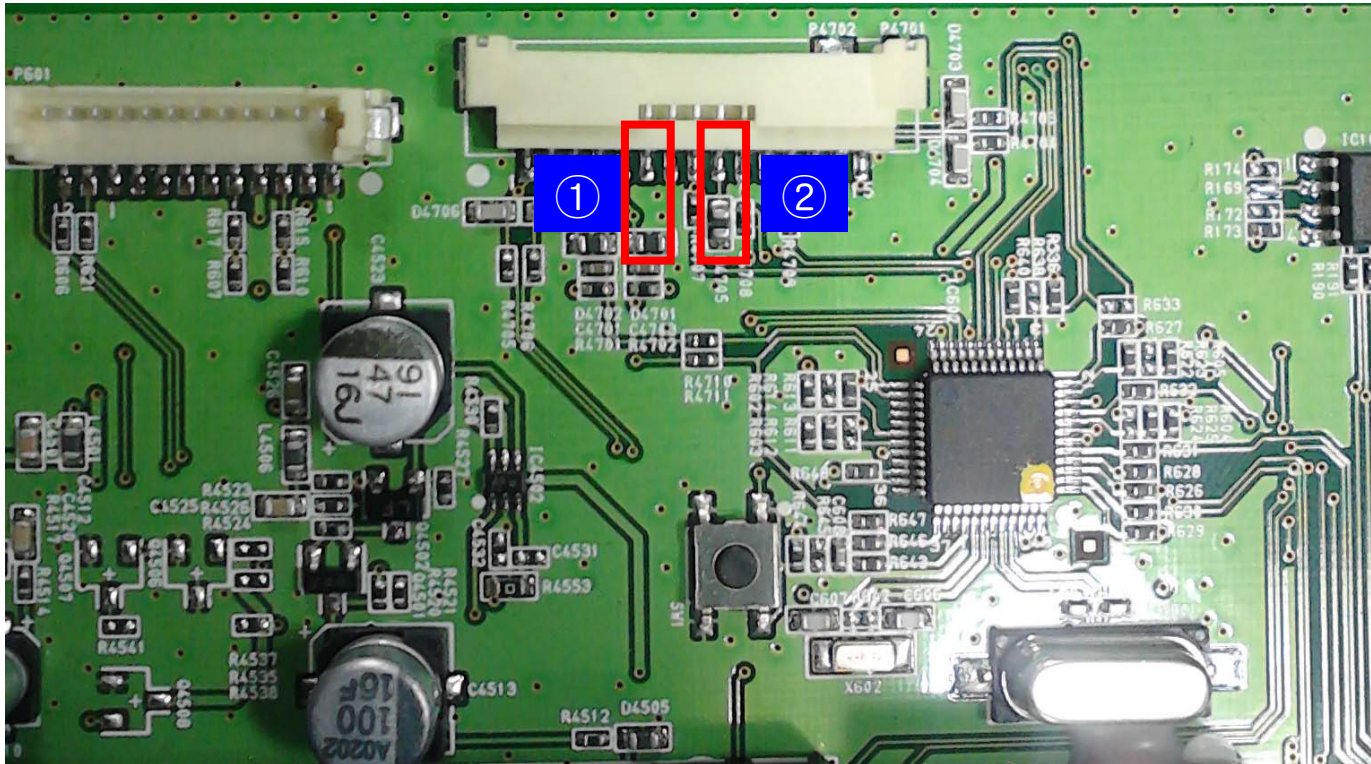
③

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)