Internal Use Only

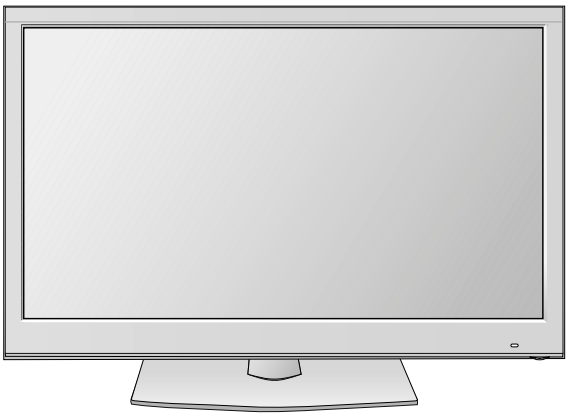
North/Latin America http://aic.lgservice.com
Europe/Africa http://eic.lgservice.com
Asia/Oceania http://biz.lgservice.com

PLASMA TV
SERVICE MANUAL

CHASSIS : PA02B

MODEL : 50PX950 50PX950-AA

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



P/NO : MFL63289209(1008-REV00)

Printed in Korea

CONTENTS

SAFETY PRECAUTIONS

IMPORTANT SAFETY NOTICE

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

General Guidance

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

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

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

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

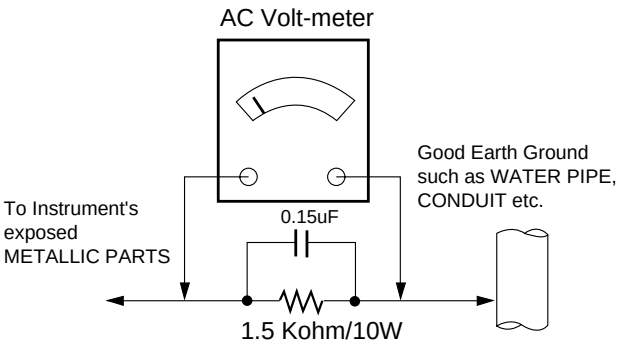
Keep wires away from high voltage or high temperature parts.

Due to high vacuum and large surface area of picture tube, extreme care should be used in **handling the Picture Tube.**
Do not lift the Picture tube by it's Neck.

Leakage Current Cold Check(Antenna Cold Check)
With the instrument AC plug removed from AC source, connect an electrical jumper across the two AC plug prongs. Place the AC switch in the on position, connect one lead of ohm-meter to the AC plug prongs tied together and touch other ohm-meter lead in turn to each exposed metallic parts such as antenna terminals, phone jacks, etc.
If the exposed metallic part has a return path to the chassis, the measured resistance should be between 1MΩ and 5.2MΩ.
When the exposed metal has no return path to the chassis the reading must be infinite.
An other abnormality exists that must be corrected before the receiver is returned to the customer.

Leakage Current Hot Check (See below Figure)
Plug the AC cord directly into the AC outlet.
Do not use a line Isolation Transformer during this check.
Connect 1.5K/10watt resistor in parallel with a 0.15uF capacitor between a known good earth ground (Water Pipe, Conduit, etc.) and the exposed metallic parts.
Measure the AC voltage across the resistor using AC voltmeter with 1000 ohms/volt or more sensitivity.
Reverse plug the AC cord into the AC outlet and repeat AC voltage measurements for each exposed metallic part. Any voltage measured must not exceed 0.75 volt RMS which is corresponds to 0.5mA.
In case any measurement is out of the limits specified, there is possibility of shock hazard and the set must be checked and repaired before it is returned to the customer.

Leakage Current Hot Check circuit



SPECIFICATIONS

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

■ Application Range

This spec is applied to PDP TV used PA02B Chassis.

Model Name	Market Place	Brand
50PX950-AA	Australia, New Zealand	LG

■ Specification

Each part is tested as below without special appointment.

(1) Temperature : 25 °C ± 5 °C (77 °F ± 9 °F), CST : 40 ± 5
(2) Relative Humidity: 65 % ± 10 %
(3) Power Voltage: Standard Input voltage (100 V - 240 V ~, 50 / 60 Hz)
* Standard Voltage of each product is marked by models.
(4) Specification and performance of each parts are followed each drawing and specification by part number in accordance with SBOM.
(5) The receiver must be operated for about 20 minutes prior to the adjustment.

■ Test Method

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

Model Name	Market	Remark
50PX950-AA	Australia, New Zealand	Safety : IEC/ EN60065, EMI : CISPR13

■ Module Specification

(1) 50” 3D FHD

No	Item	Specification	Remark
1	Display Screen Device	127 cm (50 inch) wide Color Display Module	PDP
2	Aspect Ratio	16:9	
3	PDP Module	PDP50R103##,	3D module
		RGB Closed (Well) Type, Glass Filter (43%)	
		Pixel Format: 1920 horiz. By 1080 ver.	
4	Operating Environment	1) Temp. : 0 deg ~ 40 deg	LGE SPEC
		2) Humidity : 20 % ~ 80%	
5	Storage Environment	3) Temp. : -20 deg ~ 60 deg	
		4) Humidity : 10 % ~ 90 %	
6	Input Voltage	AC 100 V ~ 240 V, 50 / 60 Hz	Maker LG

■ Model General Specification

No	Item	Specification		Remark
1	Market	50/60PX950-AA	New Zealand, Austrailia	*DTV Region: Australia/New Zealand(AU),
2	Broadcasting system	1) PAL/SECAM-B/G/D/K 2) PAL-I/II, 3) NTSC M 4) DVB-T		Australia, India : only PAL Singapore : Except NTSC M ATV market : Except DVB-T
3	Receiving system	Analog : Upper Heterodyne Digital : COFDM		
4	Video Input (2EA)	PAL, SECAM, NTSC		
5	Component Input (2EA)	Y/Cb/Cr, Y/ Pb/Pr		
6	RGB Input	RGB-PC		Analog (D-Sub 15Pin)
7	HDMI Input (4EA)	HDMI-PC HDMI-DTV		HDMI1/DVI 1,2,3,4 Upper 70 tool, But under 60 tool HDMI 3EA.
8	Audio Input (5 EA)	RGB/DVI Audio, Component, AV		L/R Input
9	SPDIF Out(1 EA)	SPDIF Out		
10	USB(2.0)	For SVC, S/W Download, X-Studio, DivX		
11	Bluetooth	Bluetooth Phone(JPEG, MP3), Bluetooth Headset(mono, stereo)		Profile : A2DP,BIP,FTP,GAVDP,HSP, OPP Only 50/60PK*50R-TA
12	Ethernet LAN			

ADJUSTMENT INSTRUCTION

1. Application Range

This spec sheet is applied to all of the PA02B chassis.

2. Specification

(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 °C ± 5 °C of temperature and 65 % ± 10 % of relative humidity if there is no specific designation.
(4) The input voltage of the receiver must keep 100 V ~ 240 V, 50 / 60 Hz.
(5) The receiver must be operated for about 5 minutes prior to the adjustment when module is in the circumstance of over 15 °C
- 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,.

● After RGB Full White in HEAT-RUN Mode, the receiver must be operated prior to the adjustment.
● Enter into HEAT-RUN MODE
1) Press the POWER ON KEY on R/C for adjustment.
2) OSD display and screen display PATTERN MODE.
- Set is activated HEAT run without signal generator in this mode.
- Single color pattern (WHITE) of HEAT RUN MODE uses to check panel.
- Caution : If you turn on a still screen more than 20 minutes (Especially digital pattern, cross hatch pattern), an after image may be occur in the black level part of the screen.

3. MAC Address.

* Connect TV SET and PC which download MAC Address Writing program by RS232C-Cable
(1) Start “MAC+CIKeyI.exe”Program and Click (3) Button to connect TV and PC.
(2) Click (4) to download MAC Address.
(3) When download succeed, you can see “OK” on (6)

* Each Chassis has it’ own MAC Address. Please be careful of download.

3-2. Ping TEST

* This test is to check Network operation.
(1) Press "Power on" button of a service R/C.(Baud rate : 115200 bps)
(2) Connect RS232-C Signal Cable.
(3). Connect LAN cable to MAIN PCB Assembly.
(4) When network operates normally, you can see “OK”.

3-3. ADC Adjustment

● Auto-control adjustment protocol(RS-232C)

Order	Command	Set response
1. Inter the Adjustment mode	aa 00 00	a 00 OK00x
2. Change the Source	xb 00 40 xb 00 60	b 00 OK40x (Adjust 480i Comp1) (Adjust 1080p Comp1) b 00 OK60x (Adjust 1920* 1080 RGB)
3. Start Adjustment	ad 00 10	
4. Return the Response		OKx (Success condition) NGx (Failed condition)
5. Read Adjustment data	(main) ad 00 20 (main) ad 00 30	(main : component 1 480i, RGB 1080p) 0000000000000000000000007c007b006dx (main : component 1 1080p) 0000007f00000000000000007c00f00077x
6. Confirm Adjustment	ad 00 99	NG 03 00x (Failed condition) NG 03 01x (Failed condition) NG 03 02x (Failed condition) OK 03 03x (Success condition)
7. End of Adjustment	ad 00 90	d 00 OK90x

(1) Adjustment of RGB
1) Convert to PC in Input-source.
2) Signal equipment displays
Output Voltage: 700 mVp-p
Impress Resolution XGA (1920 x 1080 @ 60Hz)
Model : 225 in Pattern Generator
Pattern : 65 in Pattern Generator
(MSPG-925 SERISE)
3) Adjust by commanding AUTO_COLOR_ADJUST

(2) COMPONENT input ADC
■ Convert to Component in Input-source.
■ Signal equipment displays
Impress Resolution 480i
MODEL: 209 in Pattern Generator(480i Mode)
PATTERN : 65 in Pattern Generator
(MSPG-925 SERISE)
Impress Resolution 1080i
MODEL: 225 in Pattern Generator(1080P Mode)
PATTERN: 65 in Pattern Generator
(MSPG-925 SERISE)

3-4. Insert Tool OPTION and Model Name download.

(1) Press IN_START key on R/C to insert Tool OPTION
(2) On the " Tool Option ", Insert Tool Option by a number key
(3) Press the ENTER(■)
(4) Press ENTER(■) again.
(5) Select "OK to Download" by using ◄/►(VOL +/-) and press ►(VOL +)

1) 50/60PX950-AA

Model Name	Tool Value 1	Tool Value 2	Tool Value 3	Tool Value 4	Tool Value 5
50PX950-AA	37536	31831	54920	24940	2866
60PX950-AA	49824				

3-5. EDID(The Extended Display Identification Data) download

(1) Press the ADJ KEY on R/C and enter EZ ADJUST.
(2) Select "5.EDID D/L" by using ▲/▼(CH +/-) and press ENTER(■).
(3) Select "Start" and press navigation key(►).
(4) EDID download is executed automatically.
(5) Press EXIT key on R/C

* Caution
- Never connect HDMI & D-sub Cable when the user download EDID .
■ Use the proper cables below for EDID Writing.

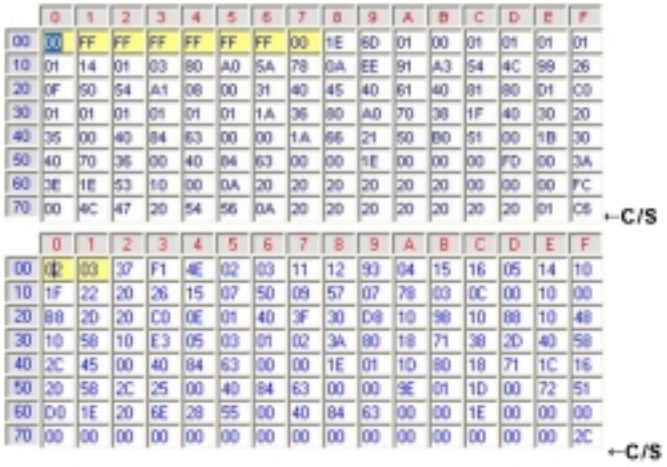
* Edid data and Model option download(RS232)

NO	Item	CMD 1	CMD 2	Data 0		
Enter download MODE	Download 'Mode In'	A	E	0	0	When transfer the 'Mode In', Carry the command.
Edid data and Model option download	Download	A	E	*Note1	*Note2	Automatically download (The use of a internal Data)
	Adjust 'Mode Out'	A	E	9	0	
	Adjustment Confirmation	A	E	9	9	To check Download on Assembly line.

* EDID DATA

(1) Analog RGB

(2) HDMI 1



a. Vender ID

INOUT	HEX
HDMI1	10
HDMI2	20
HDMI3	30
HDMI4	40

INOUT RGB	C/S 3E
HDMI1	C62C
HDMI2	C61C
HDMI3	C60C
HDM4	C6FC

3-6. Confirmation

(1) Press 'InStart' Key on Factory SVC Remote Controller. And MUST check ADC & EDID ADJ status is OK.

4. SET assembly adjustment method

* Caution : Each PCB assembly must be checked by check JIG set. (Because power PCB Assembly damages to PDP Module, especially be careful)

4-1.POWER PCB Assembly Voltage adjustment (Va/Vs Voltage Adjustment)

Test equipment : D.M.M 1EA
Connection Diagram for Measuring : refer to fig.4
Adjustment method

(1) Va adjustment
1) Connect + terminal of D. M.M. to Va pin of P811, connect -terminal to GND pin of P811.
2) After turning VR901,voltage of D.M.M adjustment as same as Va voltage which on label of panel right/top (deviation; ±0.5V)

(2) Vs adjustment
1) Connect + terminal of D. M..M. to Vs pin of P811, connect -terminal to GND pin of P811.
2) After turning VR951, voltage of D.M.M adjustment as same as Vs voltage which on label of panel right/top (deviation ; ±0.5V)

4-2. Download Serial number (RS-232C)

■ Press "Power on" key of service R/C.
(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 the Diagnostics of SET UP menu.
(Refer to below '6.SET INFORMATION').

4-3. Adjustment of White Balance

Required Equipment
● Remote controller for adjustment
● Color Analyzer (CS-1000, CA-100,100+,CA-210 or same produc: CH 10 (PDP)
* Please adjust CA-210, CA-100+ by CS-1000 before measuring
● Auto W/B adjustment instrument(only for Auto adjustment)
● 9 Pin D-Sub Jack(RS232C) is connected to the AUTO W/B EQUIPMENT.

Before Adjust of White Balance, Please press POWER ONLY key
Adjust Process will start by execute RS232C Command.
● Color temperature standards according to CSM and Module

CSM	PLASMA
Cool	11000K
Medium	9300K
Warm	6500K

● CS-1000/CA-100+/CA-210(CH 10) White balance adjustment coordinates and color temperature.

CSM	Color Coordinate		Temp	±Color Coordinate
	x	y		
Cool	0.276	0.283	11000K	0.002
Medium	0.285	0.293	9300K	0.002
Warm	0.313	0.329	6500K	0.002

* Manual W/B process (using adjusts Remote control)
Please Adjust in AV 1 MODE, Turn off Energy Saving Mode.
(1) Enter 'PICTURE RESET' on Picture Mode, then turn off Fresh Contrast and Fresh colour in Advanced Control
(2) After enter Service Mode by pushing "ADJ" key,
(3) Enter White Pattern off of service mode, and change off -> on.
(4) Enter "W/B ADJUST" by pushing "►" key at "3. W/B ADJUST".

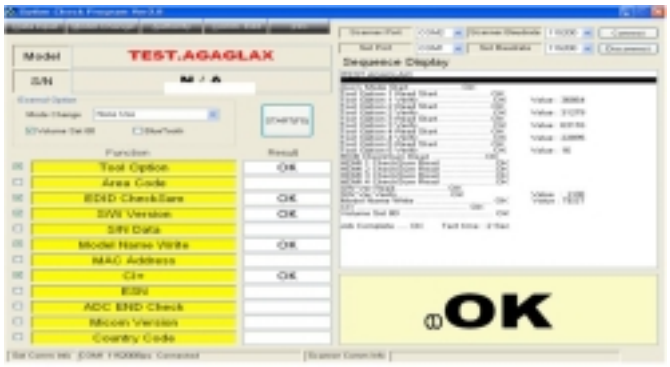
* Gain Max Value is 192. So, Never make any Gain Value over 192 and please fix one Value on 192, between R, G and B.

	Min	Tpy	Max
R-GAIN	0	192	192
G-GAIN	0	192	192
B-GAIN	0	192	192

* Auto-control interface and directions
  (1) Adjust in the place where the influx of light like floodlight around is blocked. (Illumination is less than 10ux).
  (2) Measure and adjust after sticking the Color Analyzer (CA-100+, CA210) to the side of the module.
  (3) Aging time
  After aging start, keep the Power on (no suspension of power supply) and heat-run over 5 minutes

4-4. Serial number download & Model name D/L and Check Tool Option.

(1) Press "Power on" button of a service R/C.(Baud rate : 115200 bps)
(2) Connect RS232-C Signal Cable and start 'Option Check Program Ver3.8'
(3) Scan serial Number and press 'F5' button.
(4) Check 'OK' on program (1) program.
(5) Press 'In start' button on SVC R/C, check Serial Number and Model Name.



4-5. Checking the EYE-Q Operation.

(1) Press the EYE Key on the adjustment remote controller.
(2) Check the Sensor DATA (It must be under 10) and keep the data longer than 1.5s
(3) Check 'OK'

(Sensor DATA 0 ~ 4095, Power Saving Mode 0 ~ 12)
* IF you press IN-STAP Button, change Green Eye-check OSD.

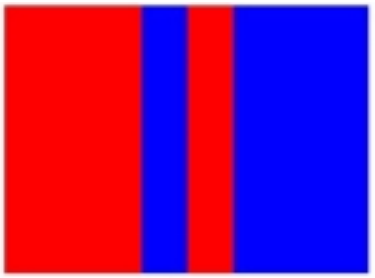
4-6. Ping TEST

* This test is to check Network operation.
  (1) Connect LAN cable from Computer to TV Set
  (2) When network operates normally, you can see "OK" on Computer

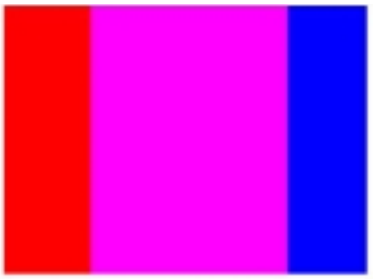
5. 3D Function Test

(Pattern Generator MSPG-3233, HDMI mode NO. 371 , pattern No. 81)

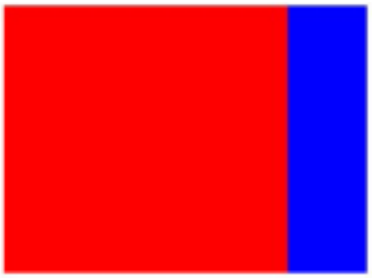
(1) Please input 3D test pattern like below



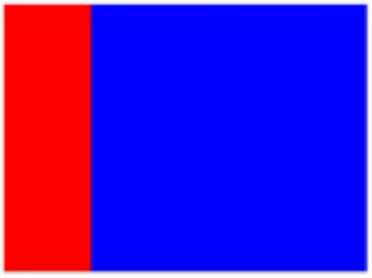
(2) Enter 3D mode , then select side by side
(If you don't wear a 3D Glasses, you will see the picture like below)



(3) Put on the 3D Glasses, And block the right side of Glasses (LEFT:OPEN[TEST], RIGHT:CLOSED)
And check the middle sides of picture , RED -> normal , others -> abnormal

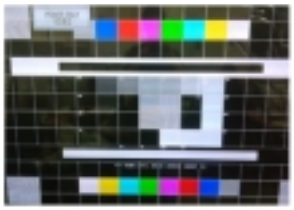


(4) Put on the 3D Glasses, And block the right side of Glasses (LEFT:CLOSED, RIGHT:OPEN[TEST])
And check the middle sides of picture , BLUE -> normal , others -> abnormal



6. 2D to 3D convert inspection

(1) Input Combination Pattern like below in HDMI Input



(2) Enter the Swap Button(Yellow Color) like below.

* When you enter the swap button. Depth value is set to Maximum value(20) automatically
  Enter the ETC Key Before using the swap button

(3) Check the separated line in the SET

7. Set Information (Serial No & Model name)

7-1. Check the serial number & Model Name

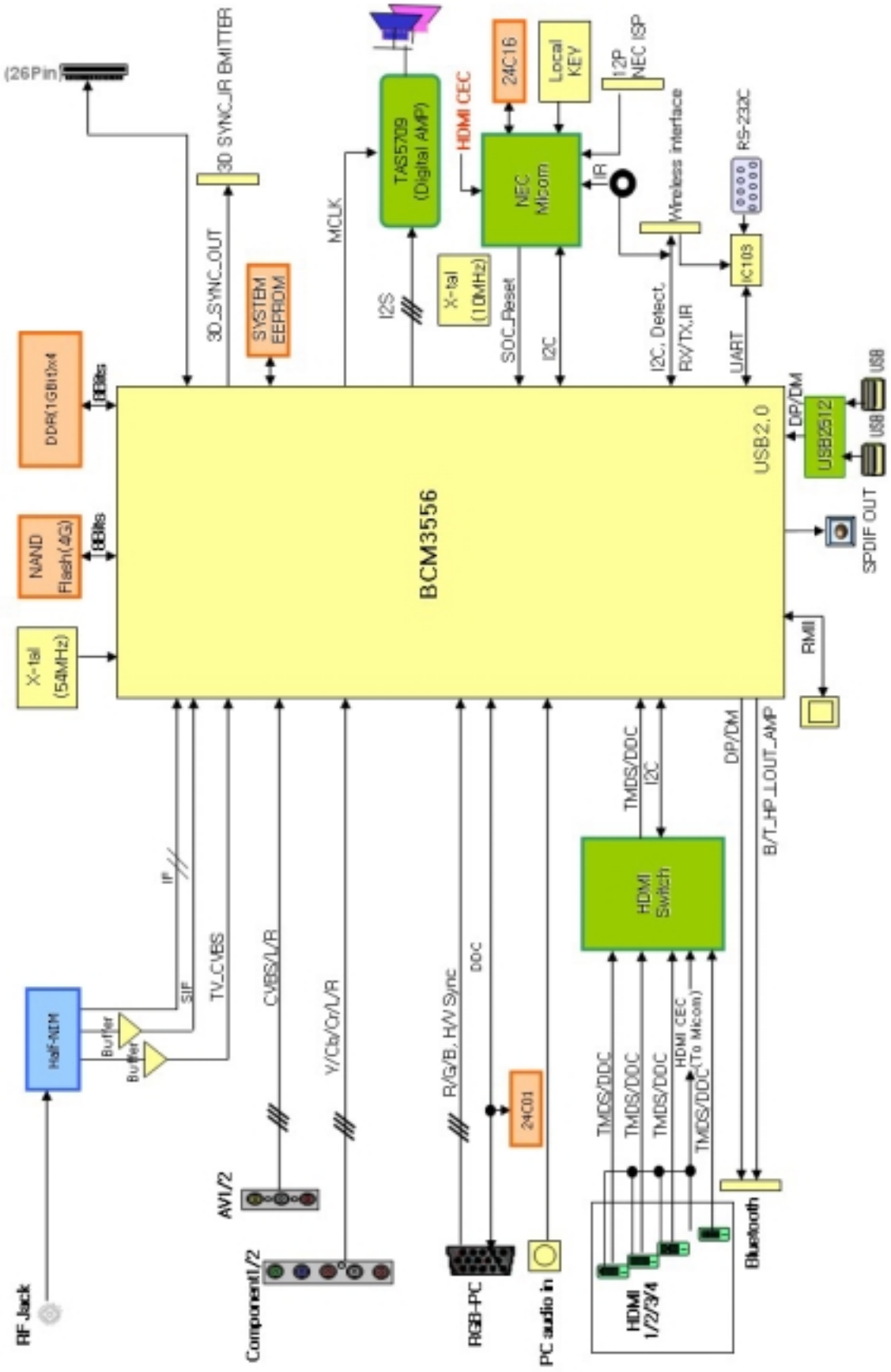
(1) Push the menu button in DTV mode.
(2) Check the Serial Number
  Select the STATION -> Diagnostics -> To set

8. SW Download Guide.

* Before put a *.epk to USB Stick make 'LG_DTV' folder in USB. Then, put *.epk file to 'LG_DTV' folder and Turn on TV

(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 staring.
(5) Updating Completed, The TV will restart automatically.
  After turn on TV, Please press 'IN-STOP' button on ADJ Remote-control.
  * IF you don't have ADJ R/C, enter 'Factory Reset' in OPTION MENU.
(6) When TV turn on, check the Updated version on Diagnostics MENU.

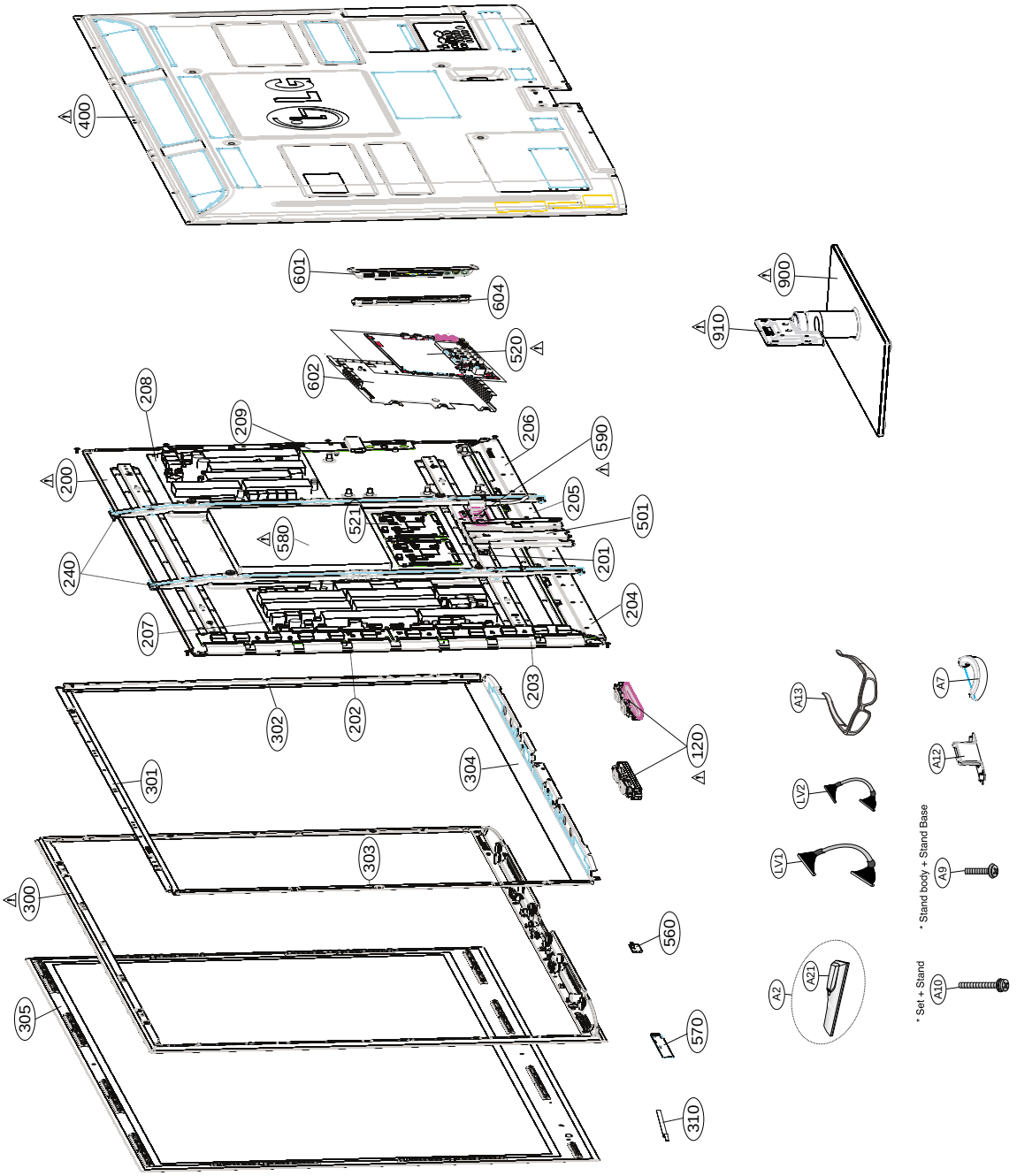
BLOCK DIAGRAM



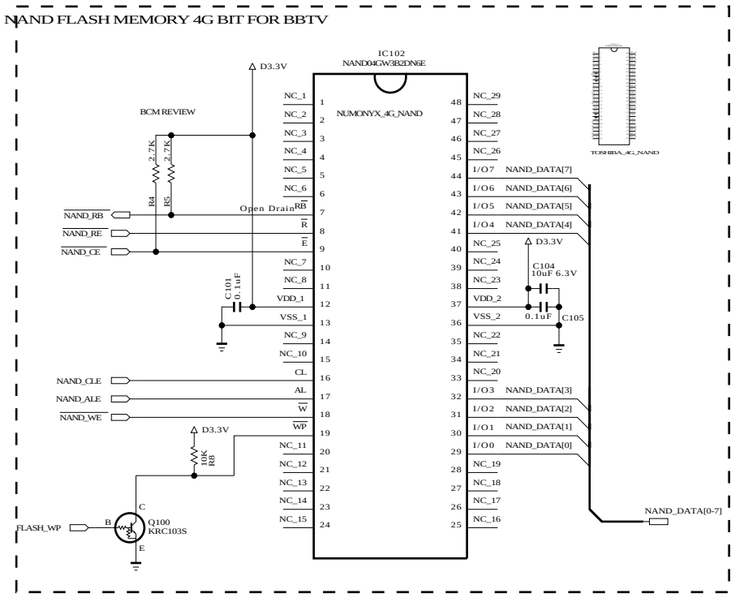
EXPLODED VIEW

IMPORTANT SAFETY NOTICE

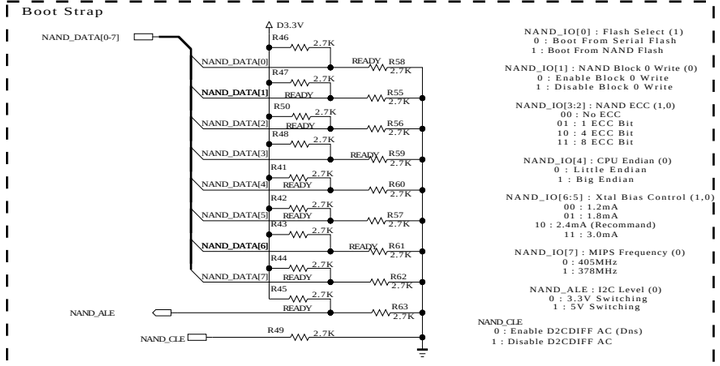
Many electrical and mechanical parts in this chassis have special safety-related characteristics. These parts are identified by ⚠ in the Schematic Diagram and EXPLODED VIEW.
It is essential that these special safety parts should be replaced with the same components as recommended in this manual to prevent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



NAND FLASH MEMORY 4G BIT FOR BBTV



Boot Strap



NAND_IO[0] : Flash Select (1)
0 : Boot From Serial Flash
1 : Boot From NAND Flash

NAND_IO[1] : NAND Block 0 Write (0)
0 : Enable Block 0 Write
1 : Disable Block 0 Write

NAND_IO[3:2] : NAND ECC (1,0)
00 : No ECC
01 : 1 ECC Bit
10 : 4 ECC Bit
11 : 8 ECC Bit

NAND_IO[4] : CPU Endian (0)
0 : Little Endian
1 : Big Endian

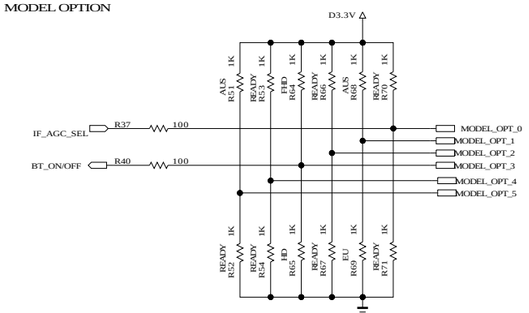
NAND_IO[6:5] : Xtal Bias Control (1,0)
00 : 1.2mA
01 : 1.8mA
10 : 2.4mA (Recommand)
11 : 3.0mA

NAND_IO[7] : MIPS Frequency (0)
0 : 405MHz
1 : 378MHz

NAND_ALE : I2C Level (0)
0 : 3.3V Switching
1 : 5V Switching

NAND_CLE
0 : Enable D2CDIFF AC (Dns)
1 : Disable D2CDIFF AC

MODEL OPTION

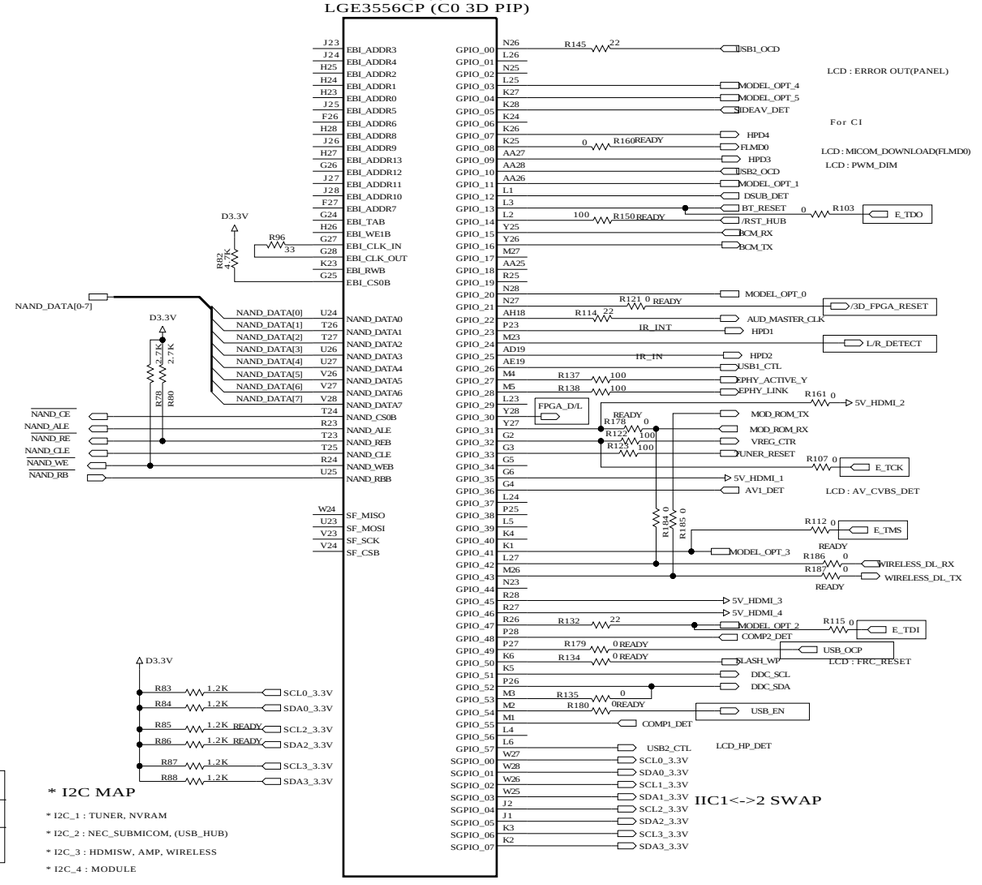


PIN NAME	PIN NO.	HIGH	LOW
MODEL_OPT_0	G19	FRC	NO FRC
MODEL_OPT_1	C5	BRAZIL&AUS	EURO
MODEL_OPT_2	F7	NOT USE	
MODEL_OPT_3	B6	FHD	HD
MODEL_OPT_4	E18	XGA	WXGA
MODEL_OPT_5	D18	EURO&AUS	BRAZIL

PDP CHASSIS OPTION

	BRAZIL	EURO	AUSTRALIA
MODEL_OPT_1	1	0	1
MODEL_OPT_5	0	1	1

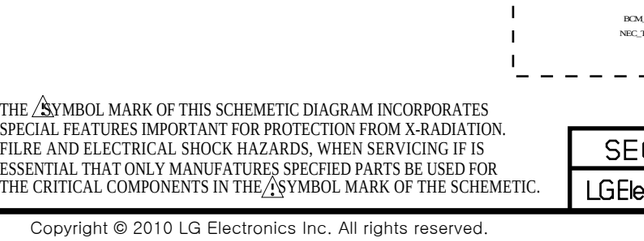
IC100
LGE3556CP (C0 3D PIP)



* I2C MAP

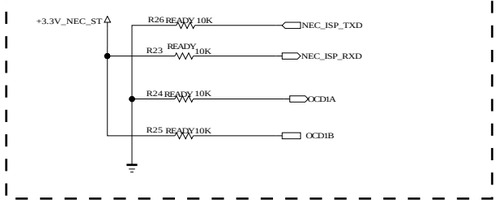
* I2C_1 : TUNER, NVRAM
* I2C_2 : NEC_SUBMICOM, (USB_HUB)
* I2C_3 : HDMISW, AMP, WIRELESS
* I2C_4 : MODULE

SYSTEM EEPROM

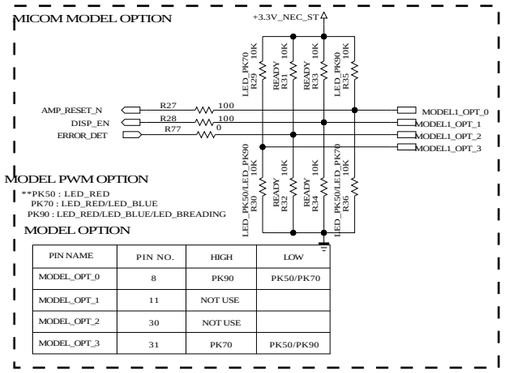


RESET

NEC CONFIGURATION



MICOM MODEL OPTION



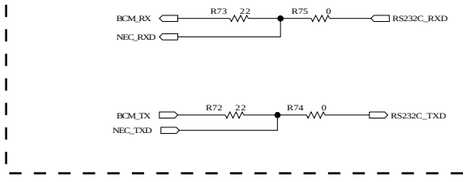
MODEL PWM OPTION

**PK50 : LED_RED
PK70 : LED_RED/LED_BLUE
PK90 : LED_RED/LED_BLUE/LED_BREADING

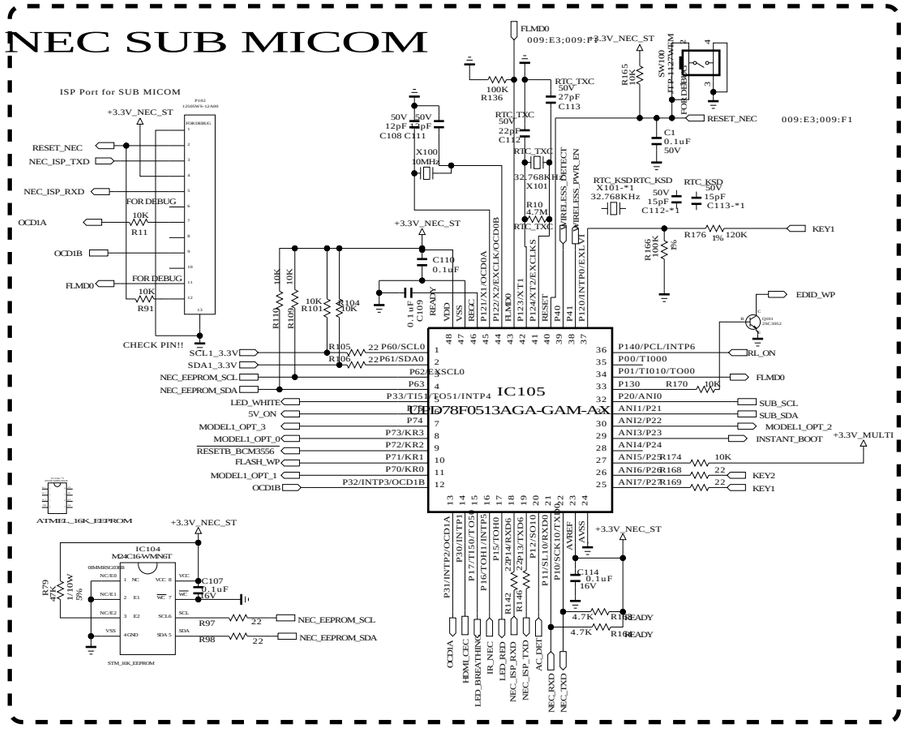
MODEL OPTION

PIN NAME	PIN NO.	HIGH	LOW
MODEL_OPT_0	8	PK90	PK50/PK70
MODEL_OPT_1	11	NOT USE	
MODEL_OPT_2	30	NOT USE	
MODEL_OPT_3	31	PK70	PK50/PK90

UART BYPASS(WIRED OR)



NEC SUB MICOM



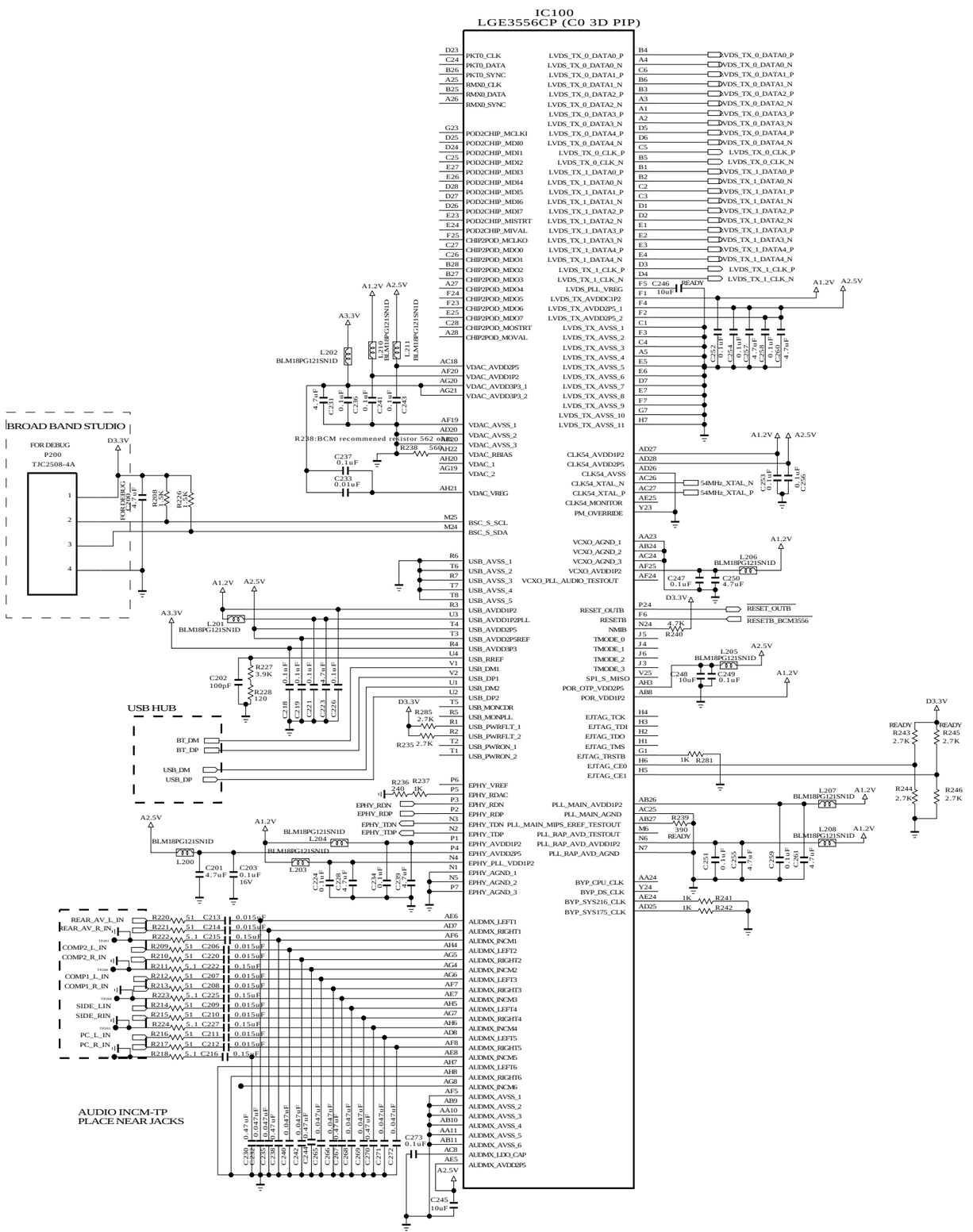
THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFATURES SPECFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

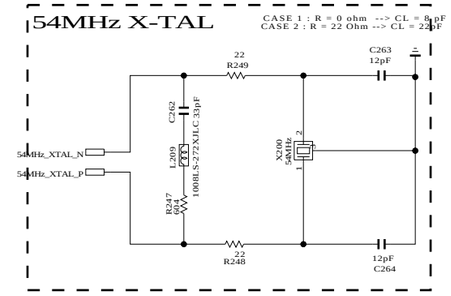
SECRET
LGElectronics

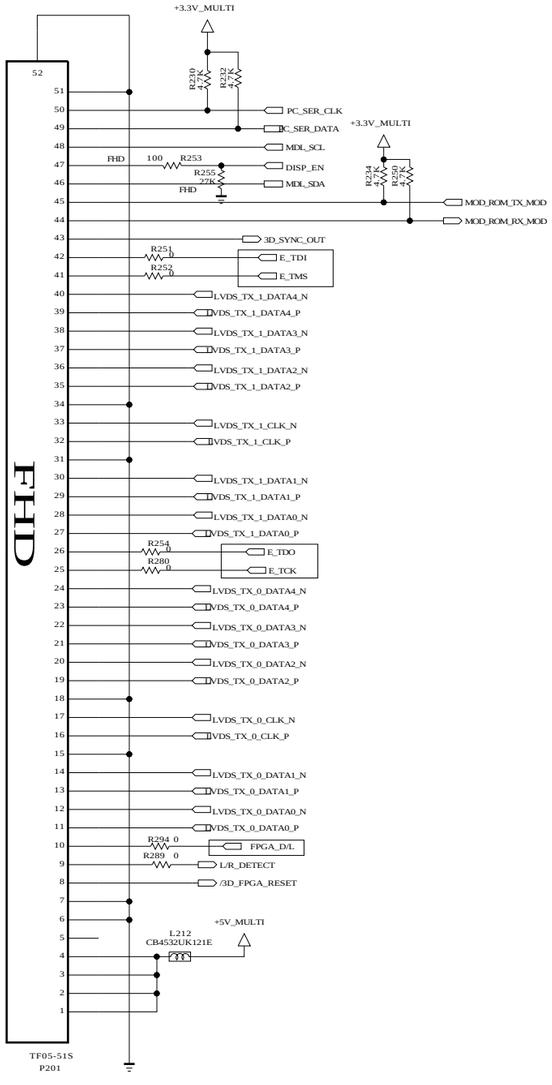
LG ELECTRONICS

MODEL	BCM GPIO & NEC MICOM & FLASH & SYS EEPROM	DATE	08/10/28
BLOCK	BCM GPIO/NEC MICOM/FLASH/SYS EEPROM	SHEET	1/13

LVDS







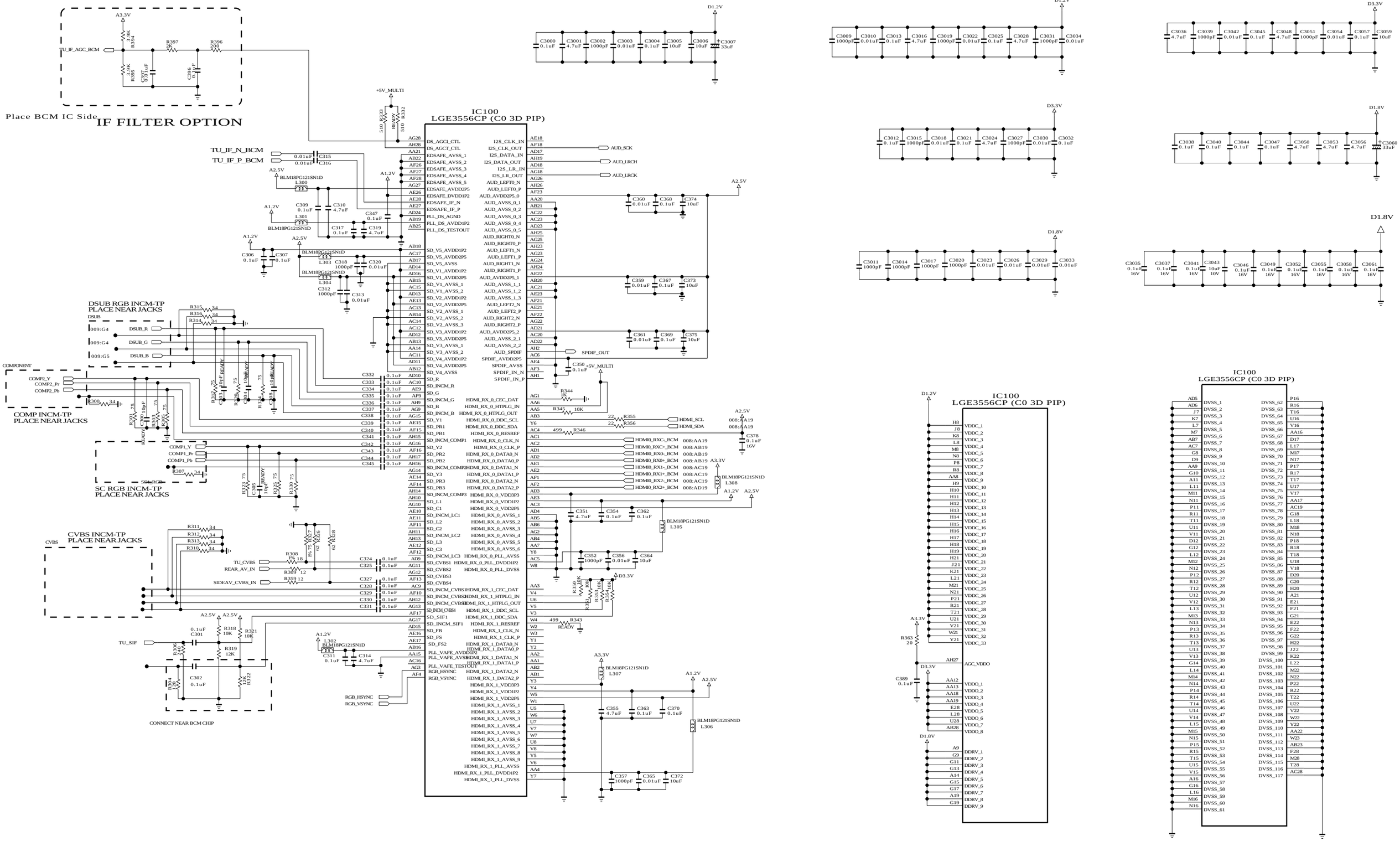
005:B6 SCL3_3.3V — 22 R283 — MDL_SCL 002:G4
005:B6 SDA3_3.3V — 22 R284 — MDL_SDA 002:G4
005:B6 MOD_ROM_RX — 22 R259 — MOD_ROM_RX_MOD 002:G4
005:B6 MOD_ROM_TX — 22 R274 — MOD_ROM_TX_MOD 002:G4

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

SECRET
LGElectronics

LG ELECTRONICS

MODEL	BCM AUS DVR	DATE	08/10/27
BLOCK	BCM AUDIO/LVDS	SHEET	2 / 13



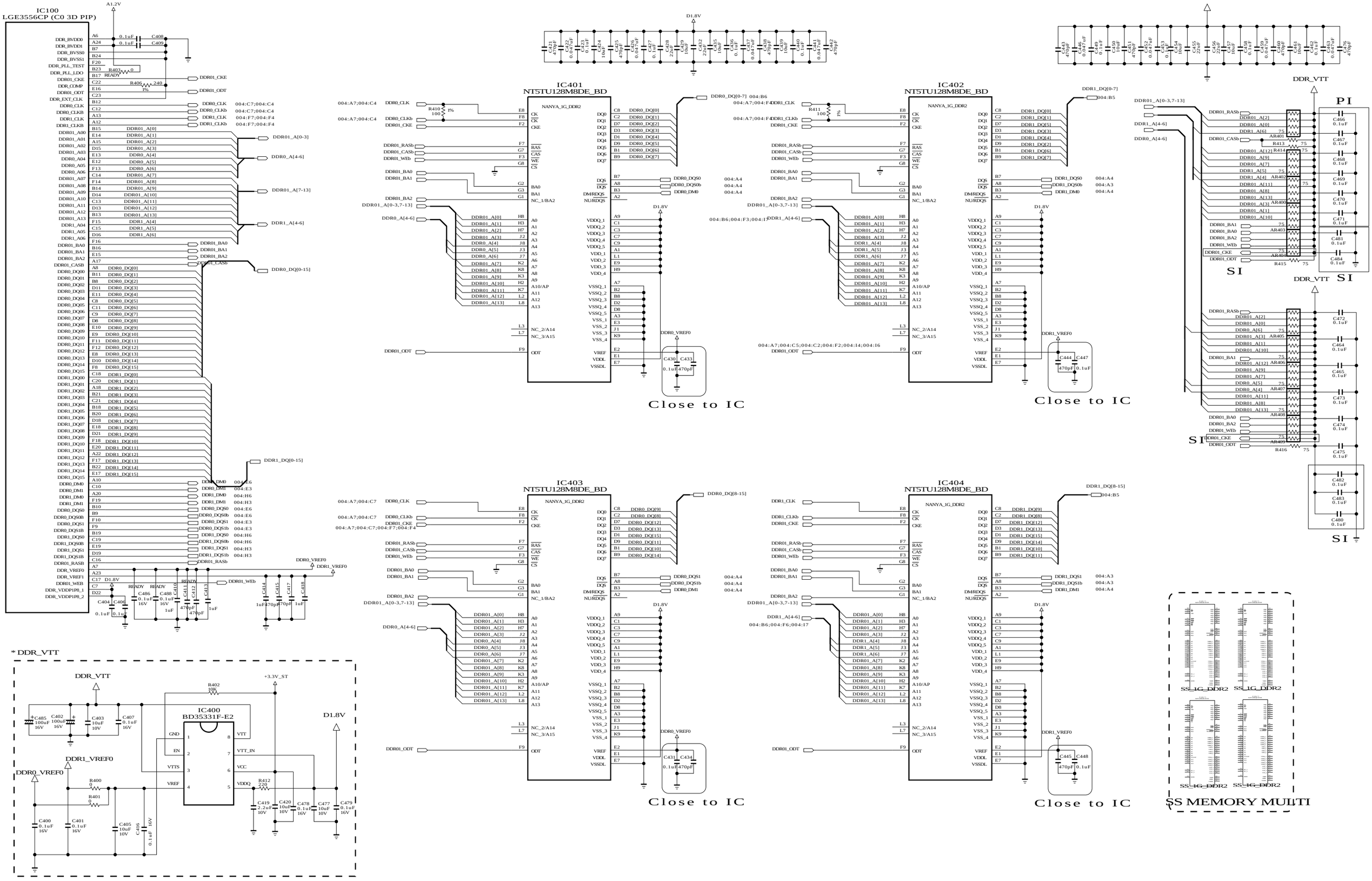
THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFATURES SPECFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

SECRET

LGElectronics

LG ELECTRONICS

MODEL		DATE	08/10/xx
BLOCK	VIDEO IN/BCM POWER	SHEET	3/13



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

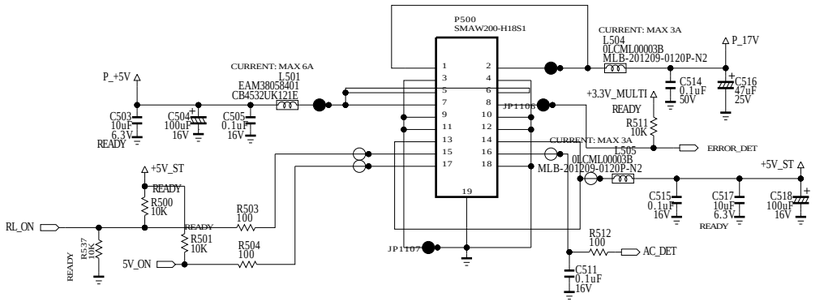
SECRET
LGElectronics

LG ELECTRONICS

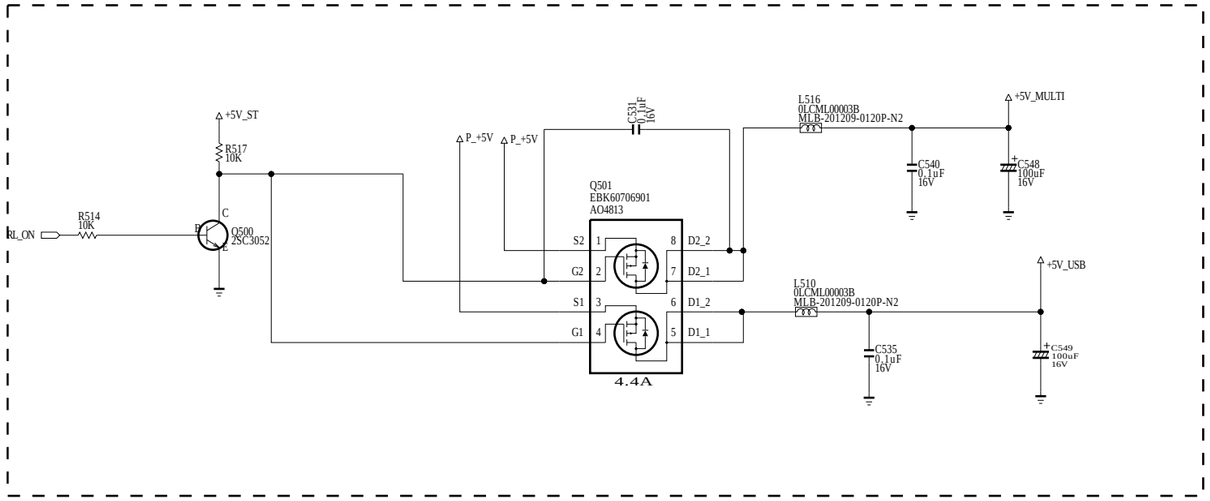
MODEL	BCM AUS DVR	DATE	08/06/xx
BLOCK	DDR2 MEMORY INTERFACE	SHEET	4 / 13

POWER B/D

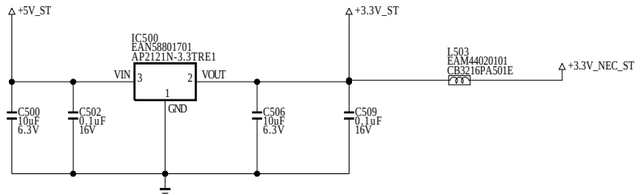
POWER Wafer 24P



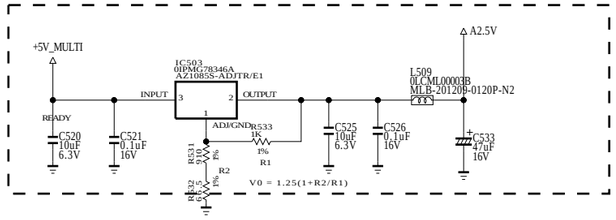
FRC DDR 1.5V & Multi 5V Switch

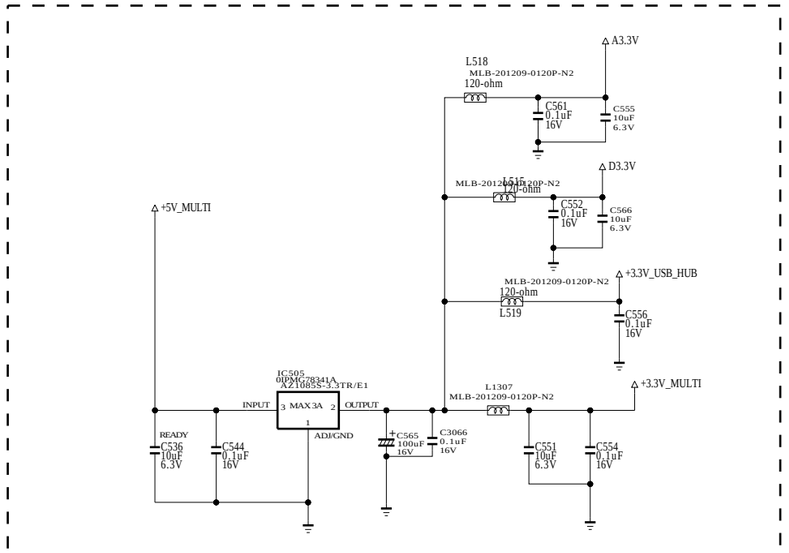


Stand-by (5VST --> +3.3V)

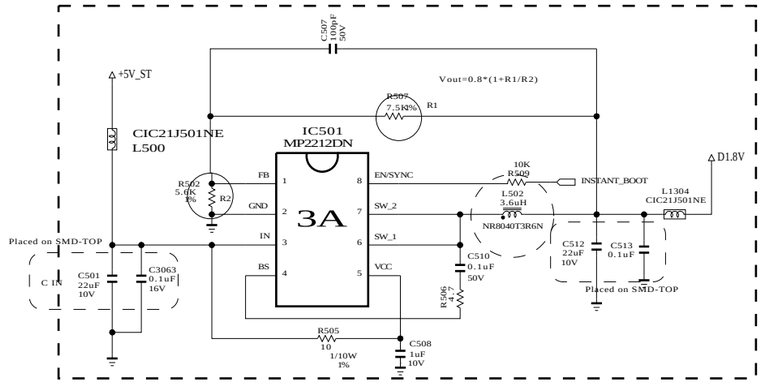


Multi Power(5V -->2.5V) BCM3556 core 2.5V Multi Power(5V -->3.3V)

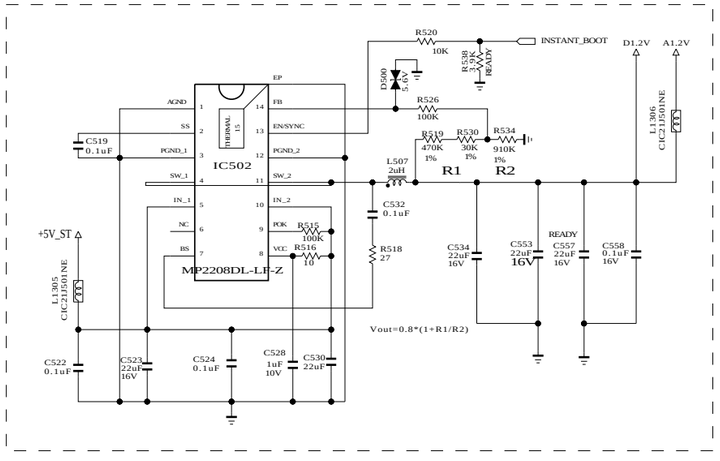


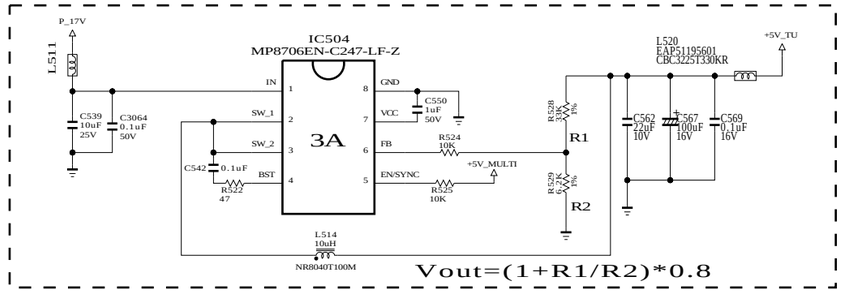


Instant Boot (5V -->1.8V_DDR)



Instant Boot (5V -->BCM3556 CORE 1.2V)





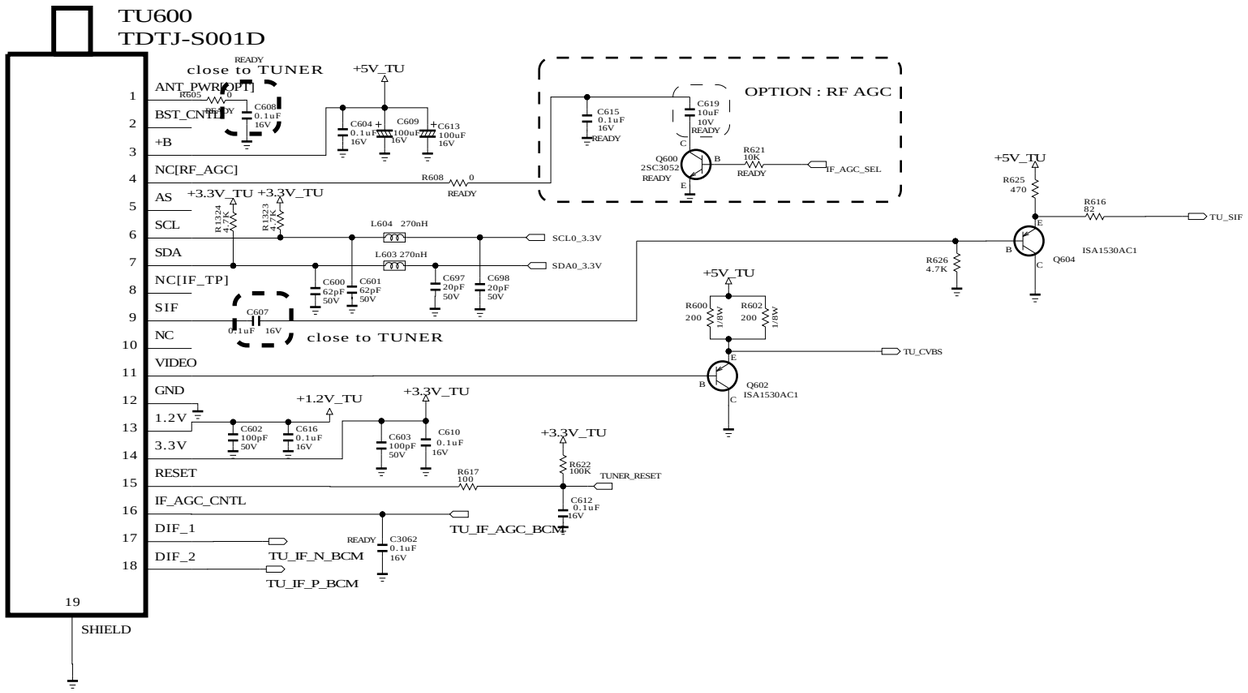
THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFATURES SPECFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

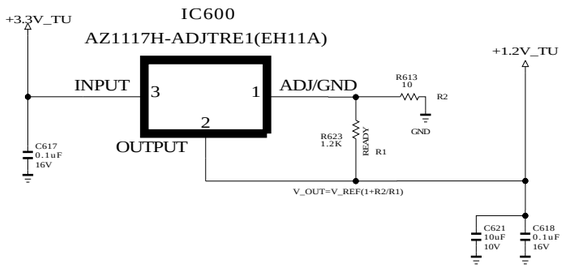
SECRET
LGElectronics

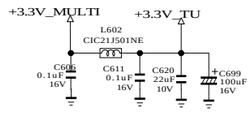
LG ELECTRONICS

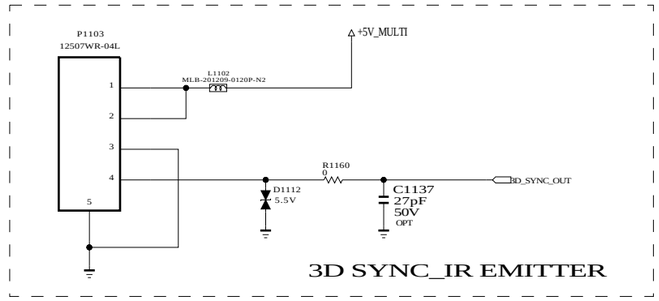
MODEL	BCM AUS DVR	DATE	08/10/xx
BLOCK	SMPS POWER	SHEET	5 / 13

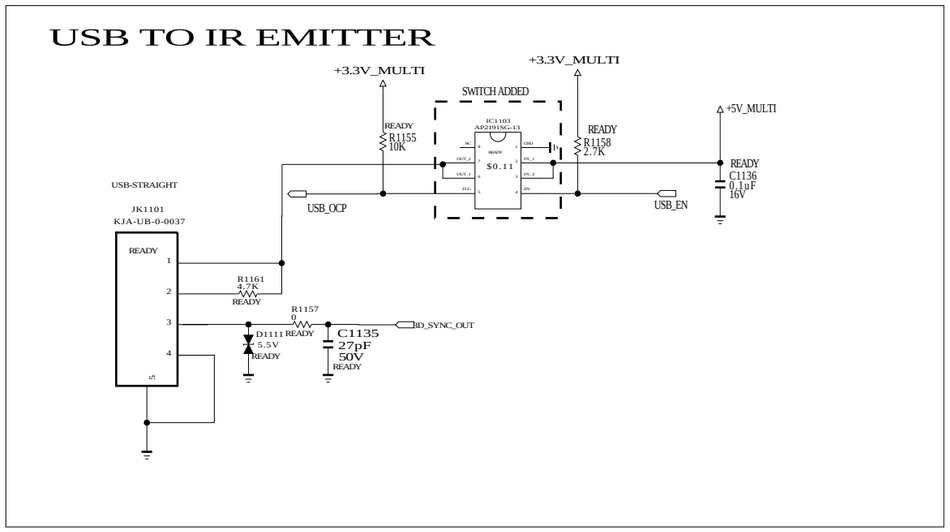
CAN H-NIM/NIM TUNER for EU











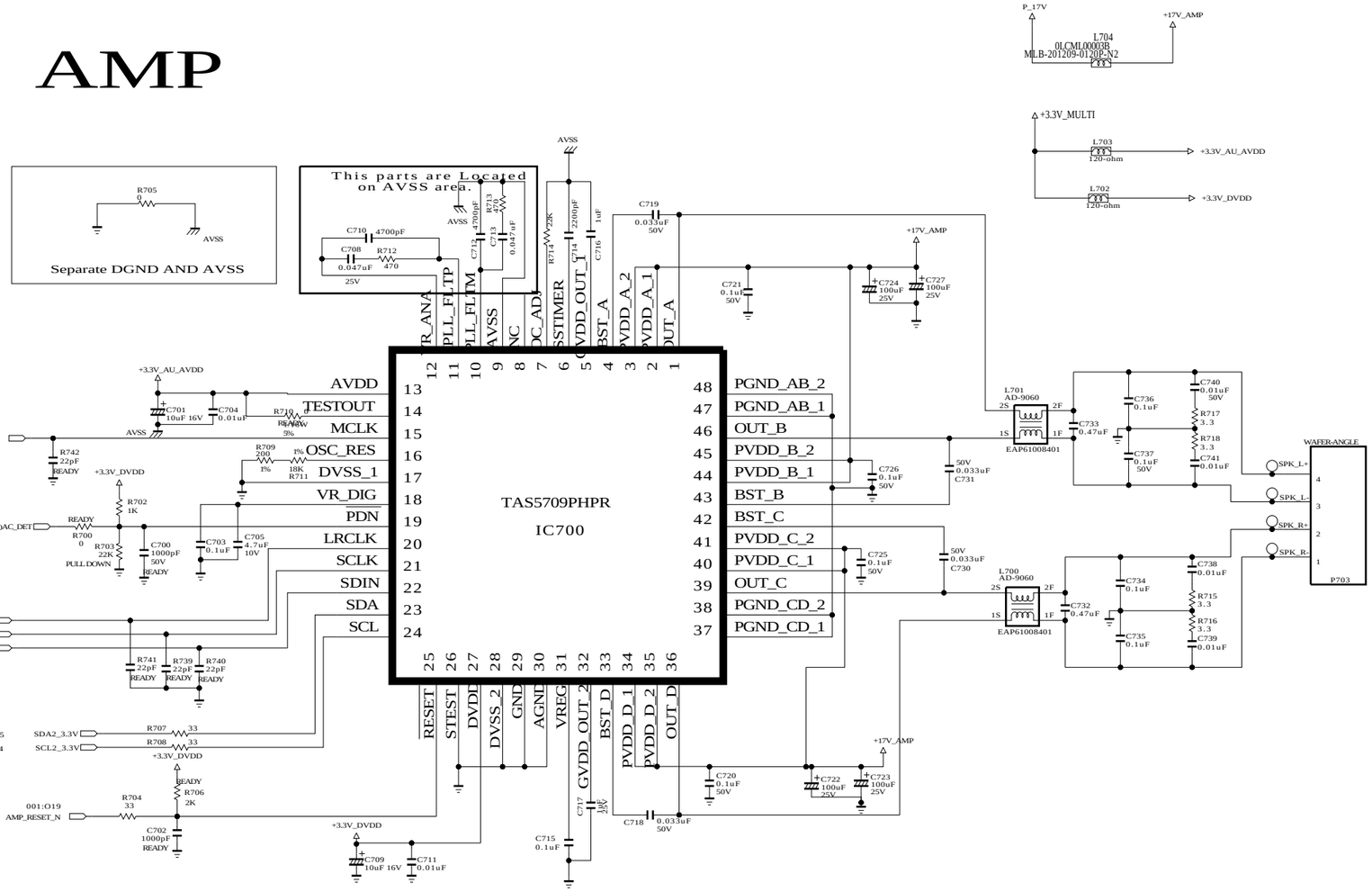
THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFATURES SPECFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

SECRET
LGElectronics

LG ELECTRONICS

MODEL	EAX61354901	DATE	
BLOCK	TUNER	SHEET	11 / 13

AMP



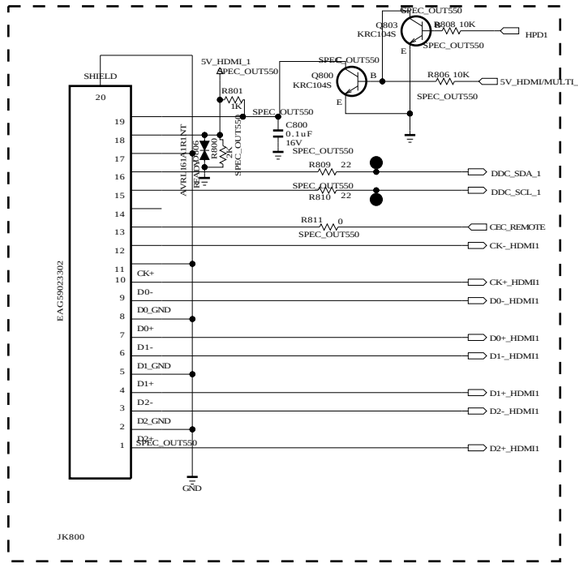
THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFATURES SPECFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

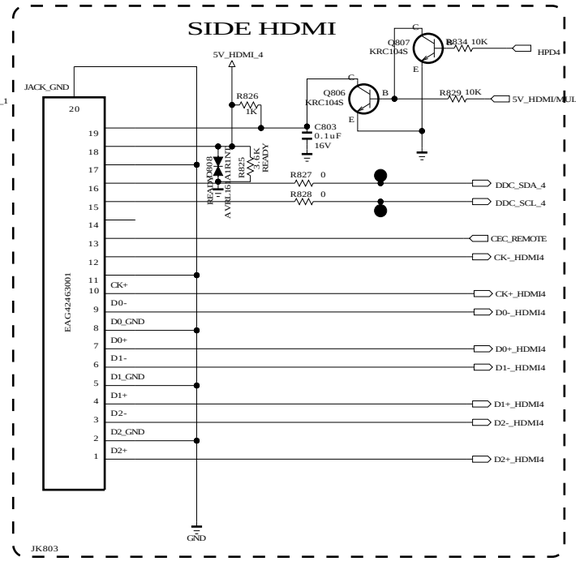
SECRET

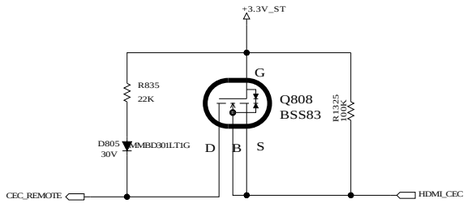
LGElectronics

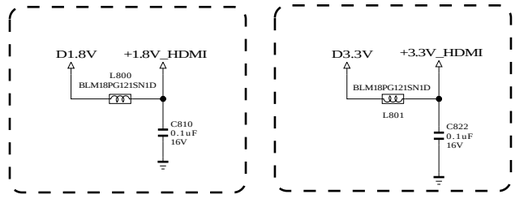
LG ELECTRONICS

MODEL	EAX61354901	DATE	
BLOCK	AUDIO AMP	SHEET	7 / 13



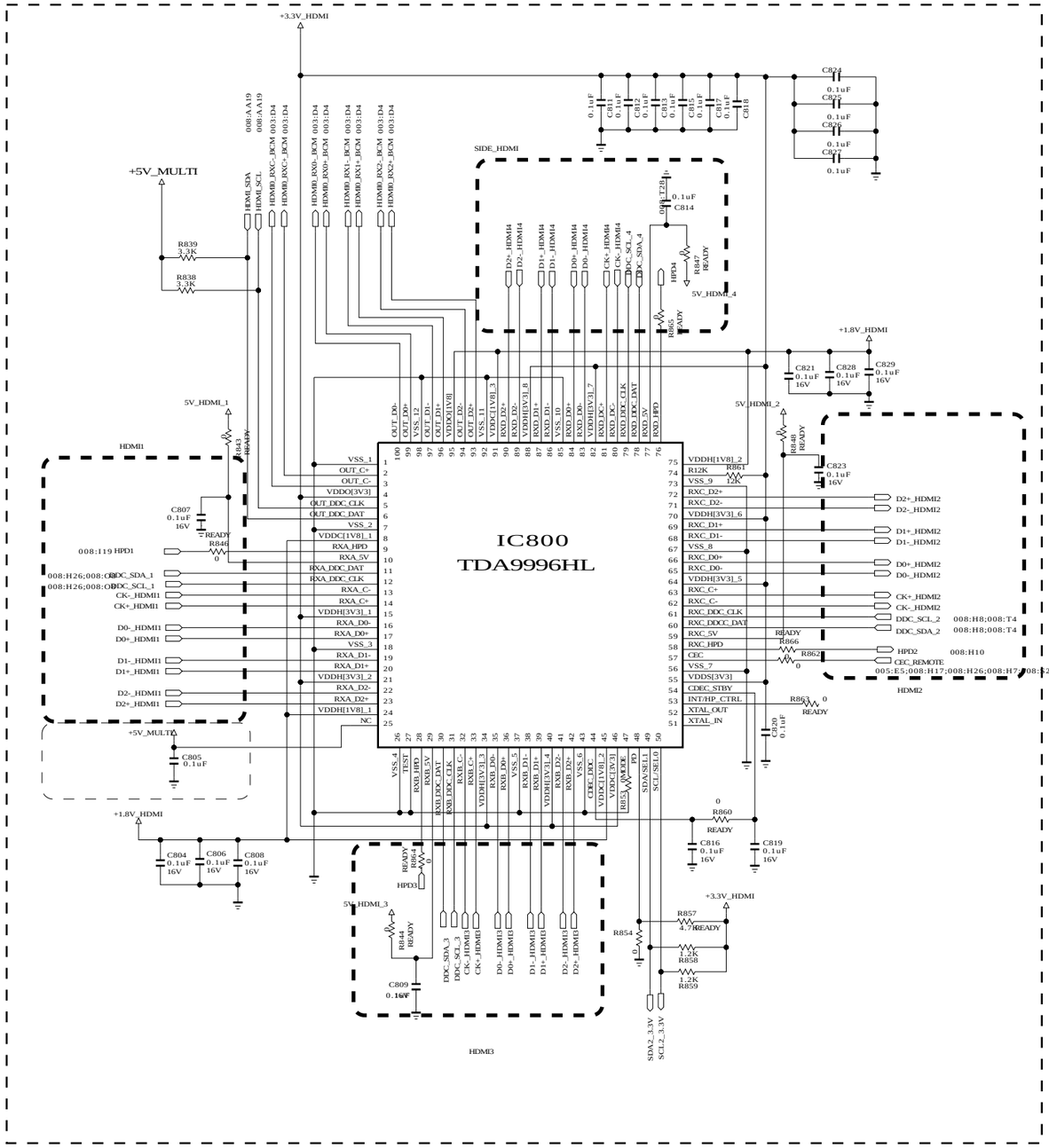


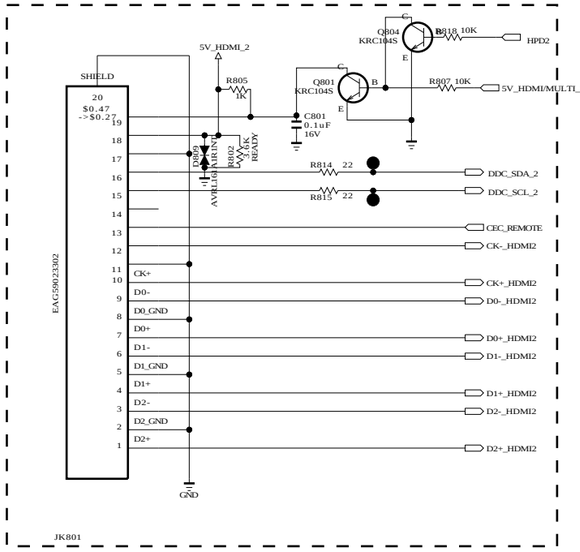


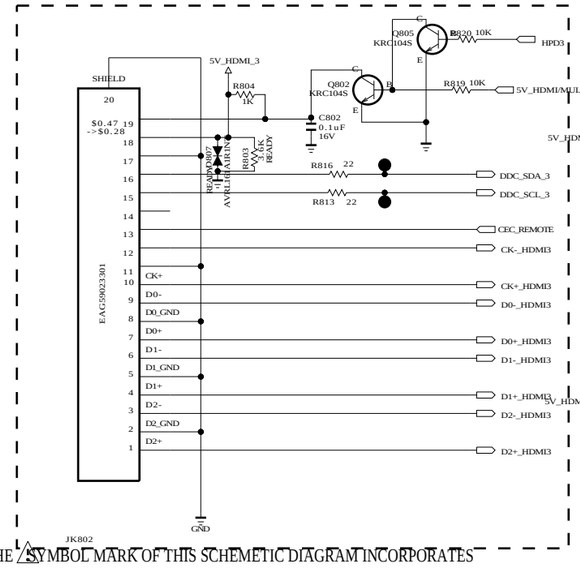


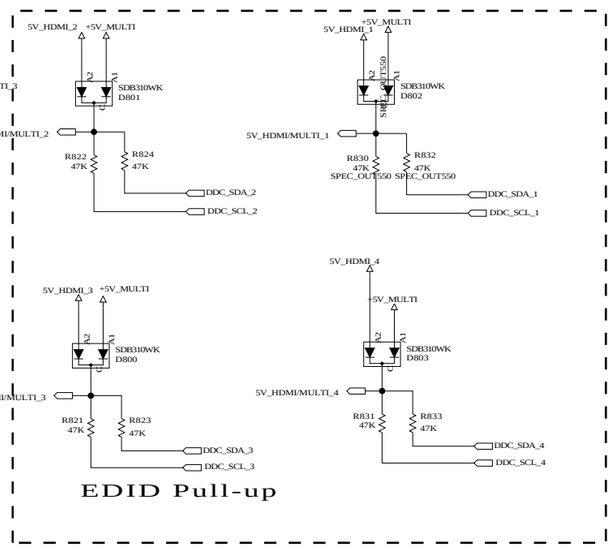
NEED TO CHECK THE CASE OF INSTANT BOOT

HDMI S/W For Platform









EDID Pull-up

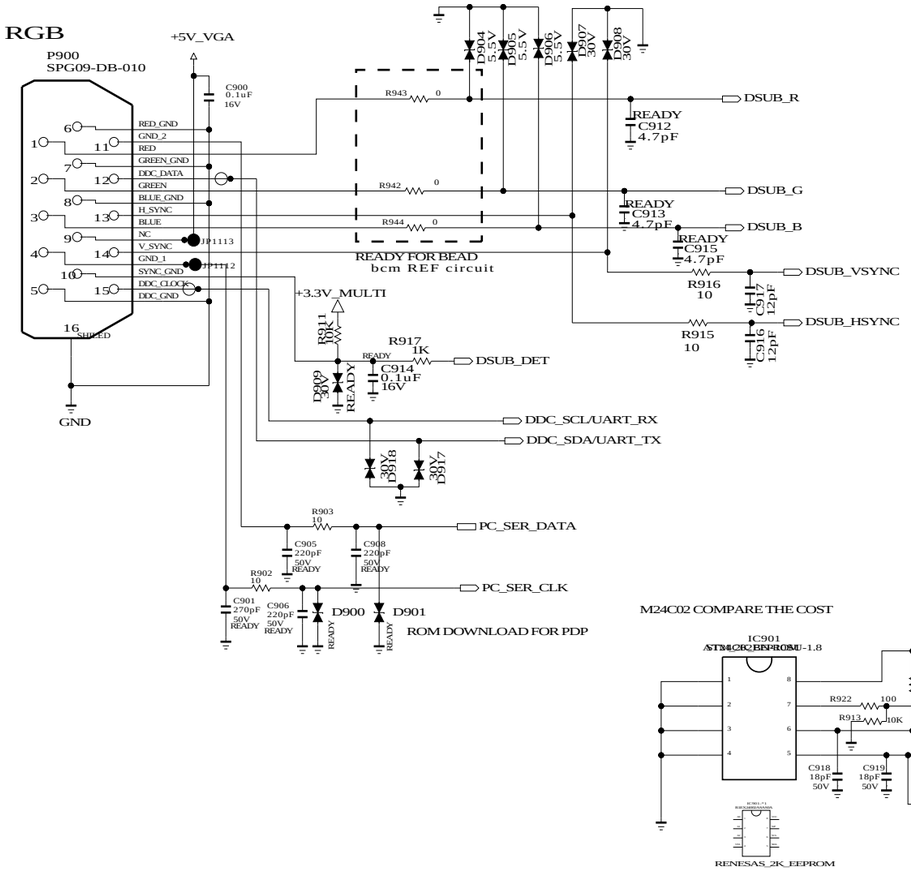
THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFATURES SPECFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

SECRET
LGElectronics

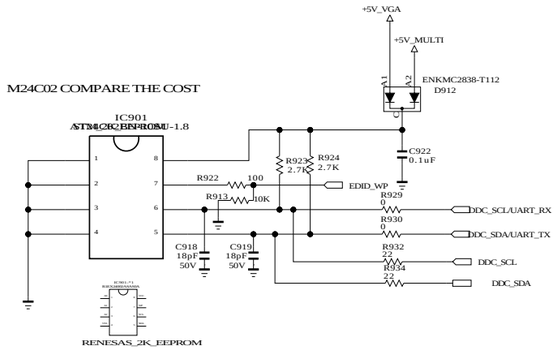
LG ELECTRONICS

MODEL	BCM3556-C0	DATE	09/10
BLOCK	HDMI	SHEET	6 / 13

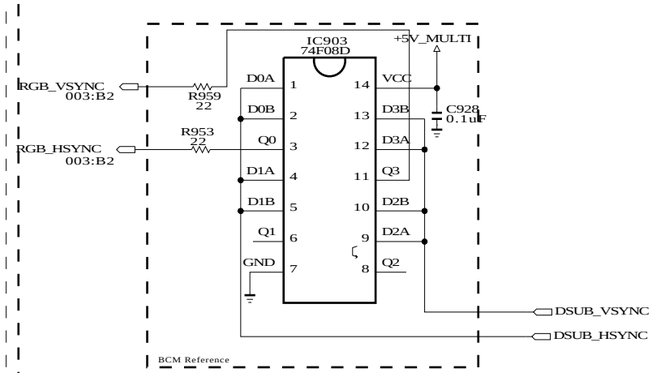
RGB



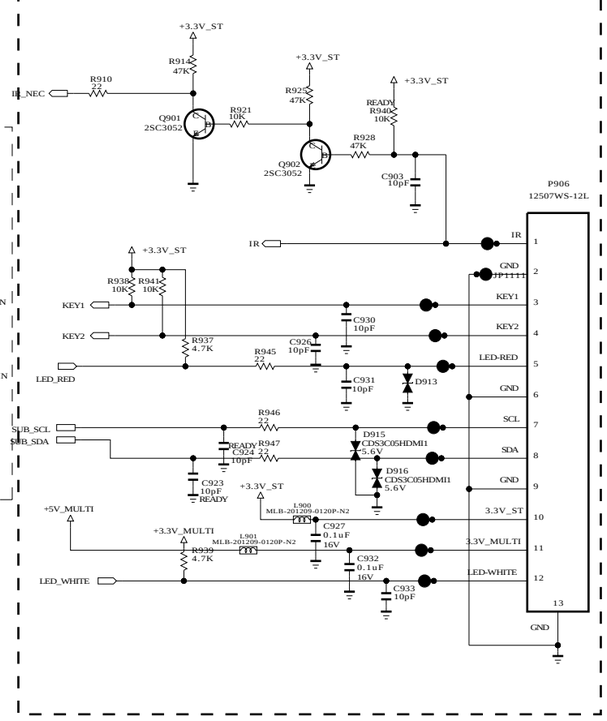
M24C02 COMPARE THE COST



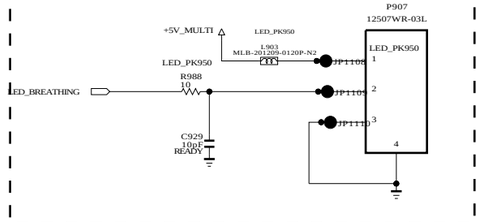
RGB V/HSYNC BUUFFER



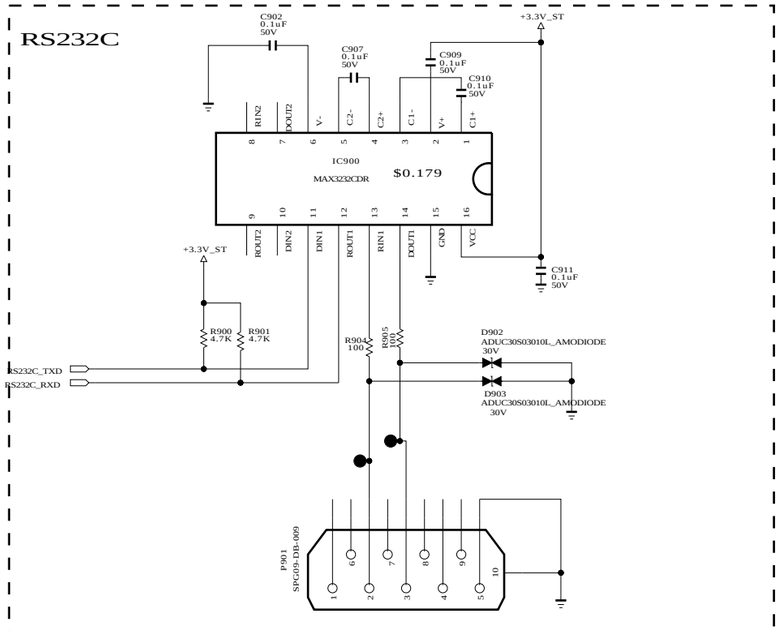
SUB Board I/F



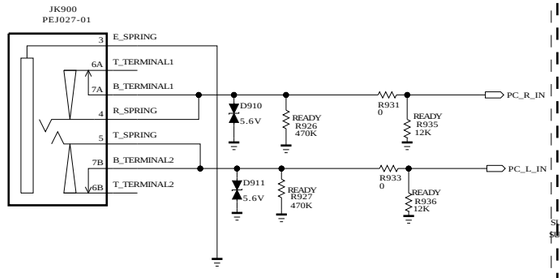
FOR PK/J90 - BREATING



RS232C



PC AUDIO



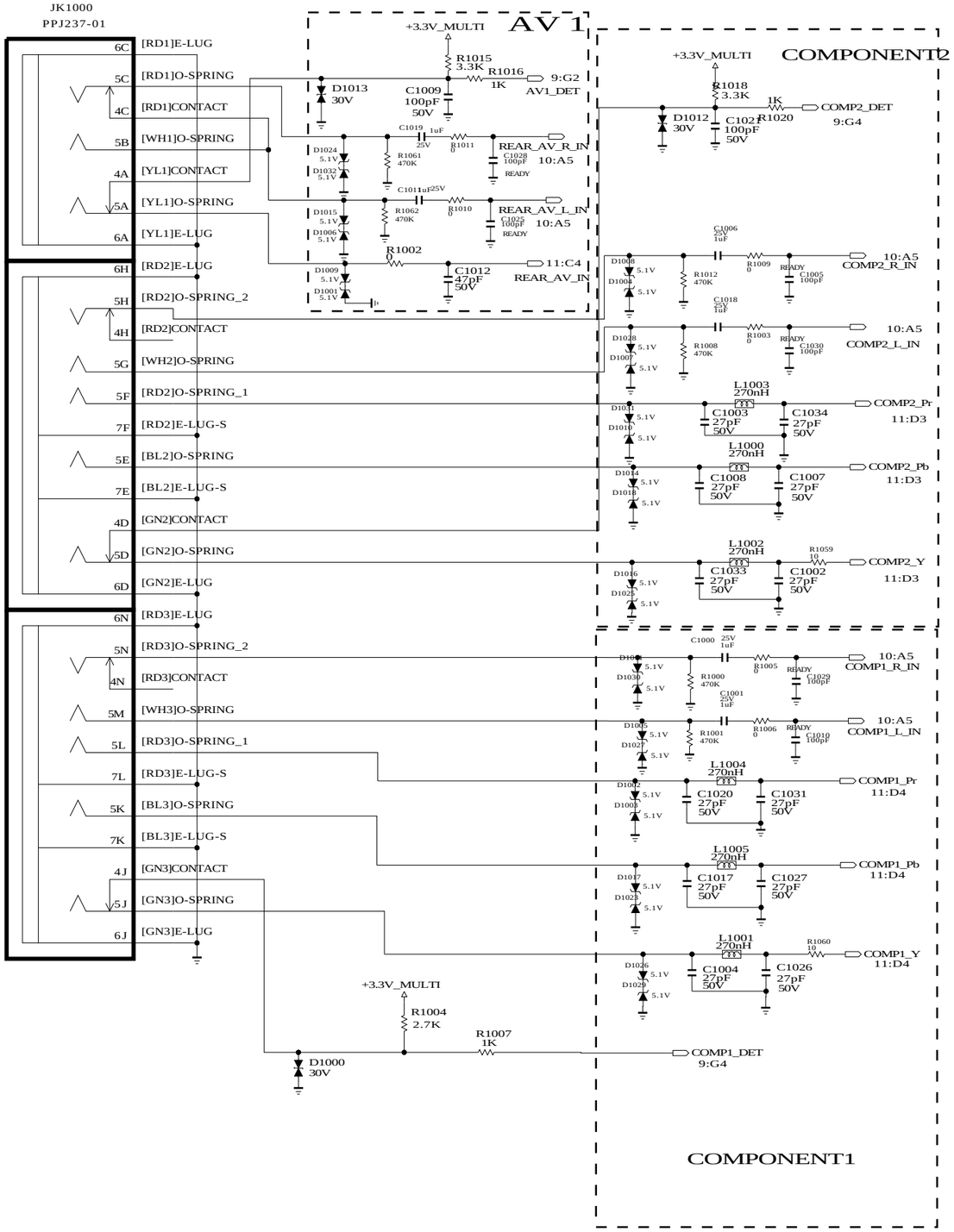
THE ⚠SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFATURES SPECFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠SYMBOL MARK OF THE SCHEMETIC.

SECRET
LGElectronics

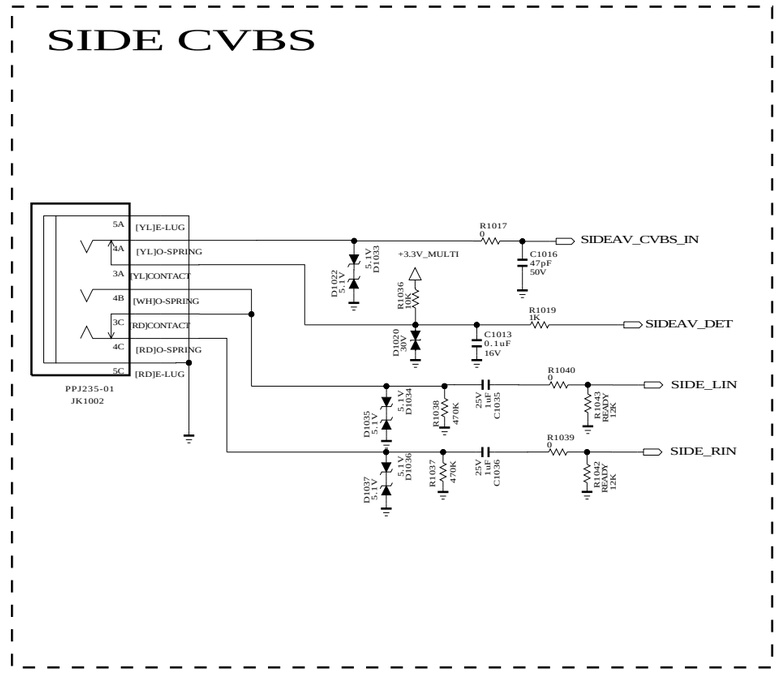
LG ELECTRONICS

MODEL	EAX61354901	DATE	
BLOCK	LVDS/RS232//RGB	SHEET	10 / 13

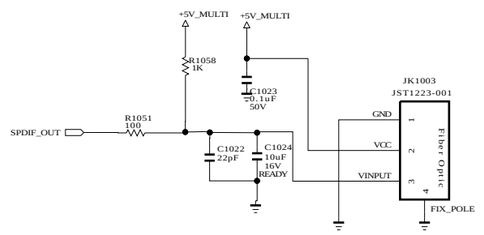
COMPONENT1/2,AV1



SIDE CVBS



SPDIF



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

SECRET
LGElectronics

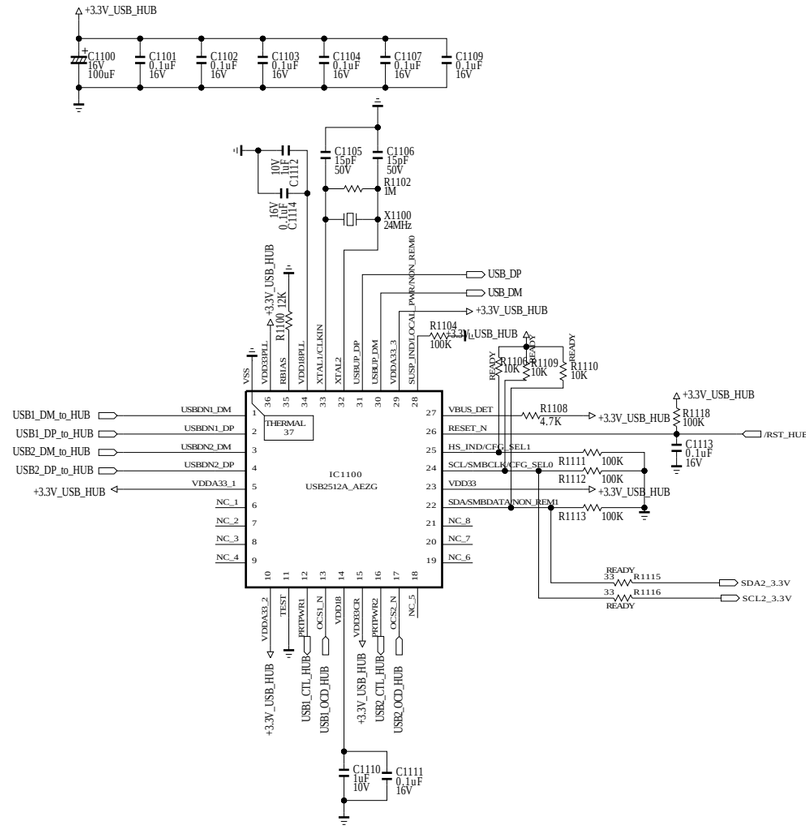
LG ELECTRONICS

MODEL		DATE	
BLOCK		SHEET	/

EAX61354901

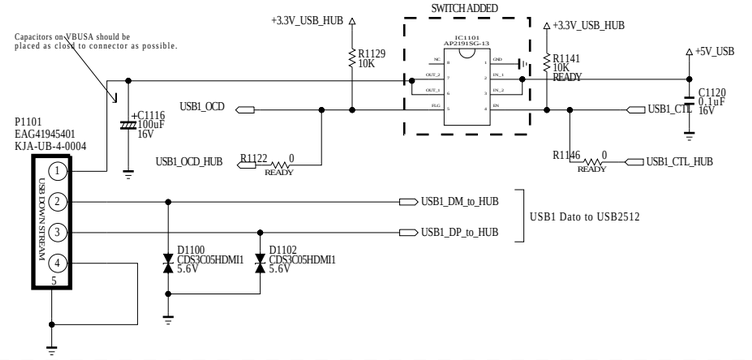
JACK 9 13

USB HUB

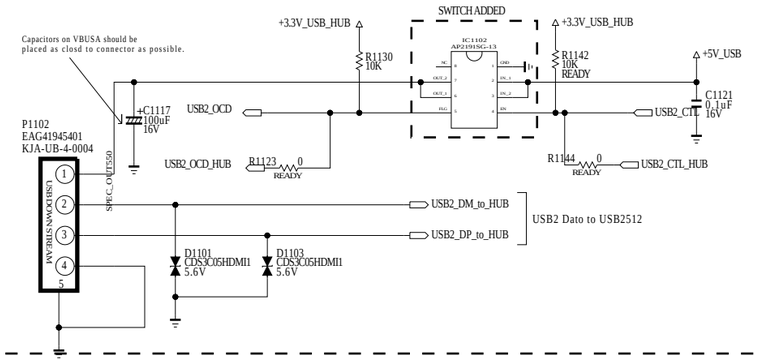


004:E17;001:Y15

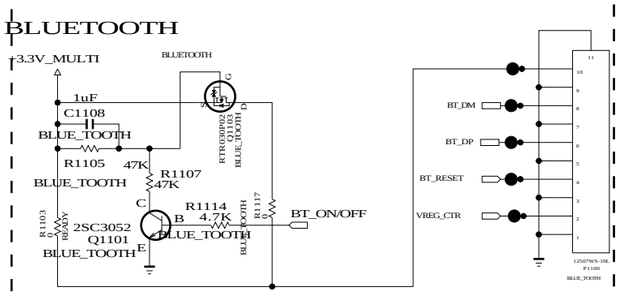
USB1 SIDE UPPER



USB2 SIDE UNDER



BLUETOOTH



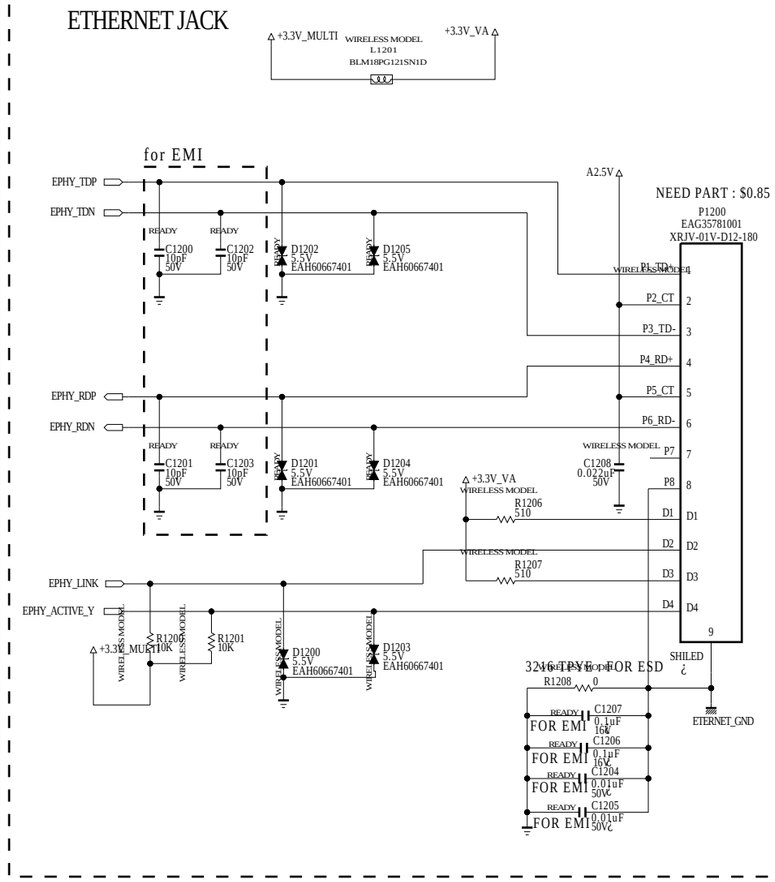
THE ⚠SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFATURES SPECFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠SYMBOL MARK OF THE SCHEMETIC.

SECRET
LGElectronics

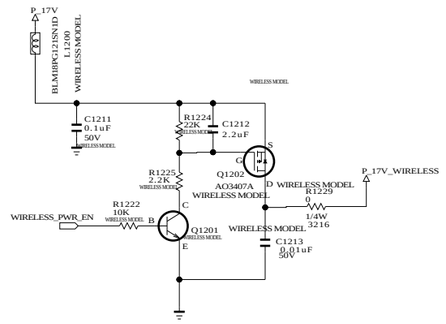
LG ELECTRONICS

MODEL	BCM3556	DATE	09/10
BLOCK	USB HUB	SHEET	13 / 13

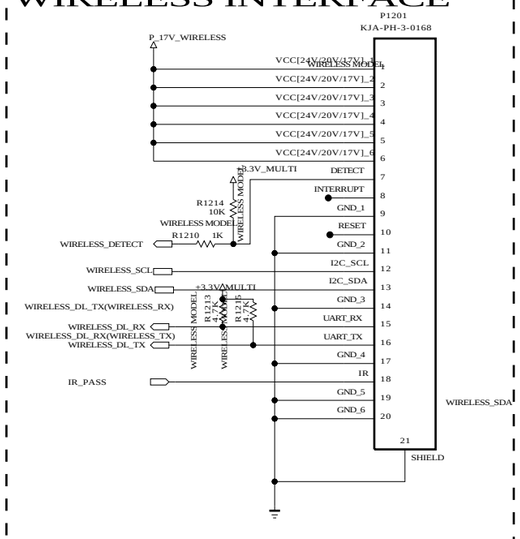
ETHERNET JACK



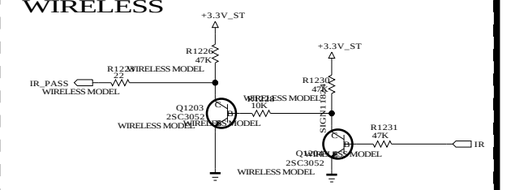
WIRELESS DIP POWER ON/OFF



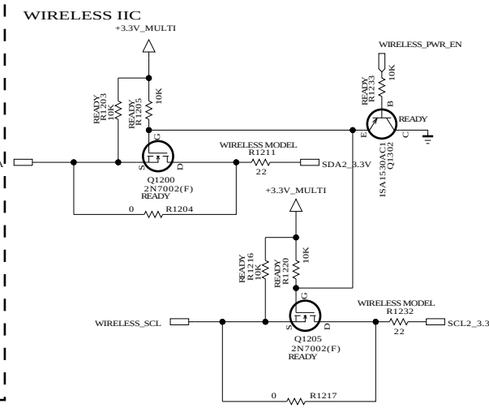
WIRELESS INTERFACE



WIRELESS



WIRELESS IIC



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

SECRET
LGElectronics

LG ELECTRONICS

MODEL	BCM3556-C0	DATE	09/10
BLOCK	ETHERNET	SHEET	12 / 13


LG Electronics Inc.

Great Company Great People

XCUTE 125

Think New

ERRC Eliminate, Reduce, Raise, Create

2010.8.13

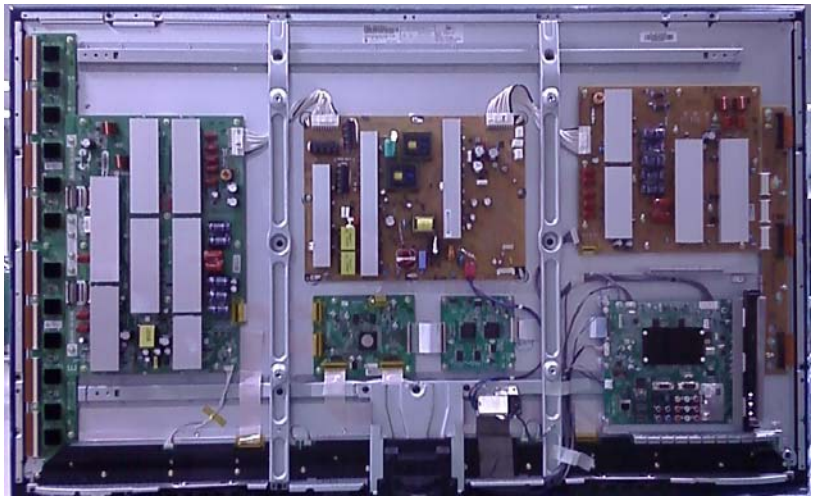
3DTV (PA02B) Training manual

Contents

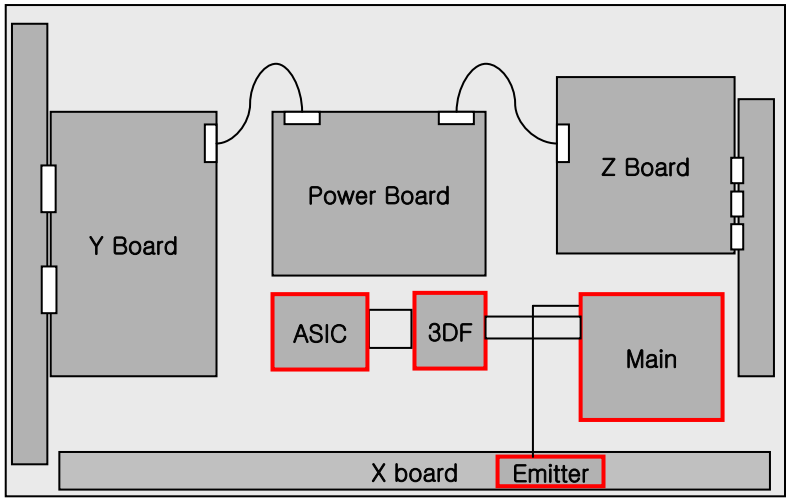
PDP DVB Gr. JANG EUN KWANG

Trouble Shooting Guide for LG Service Man

SET Layout



50PX950-AA model image

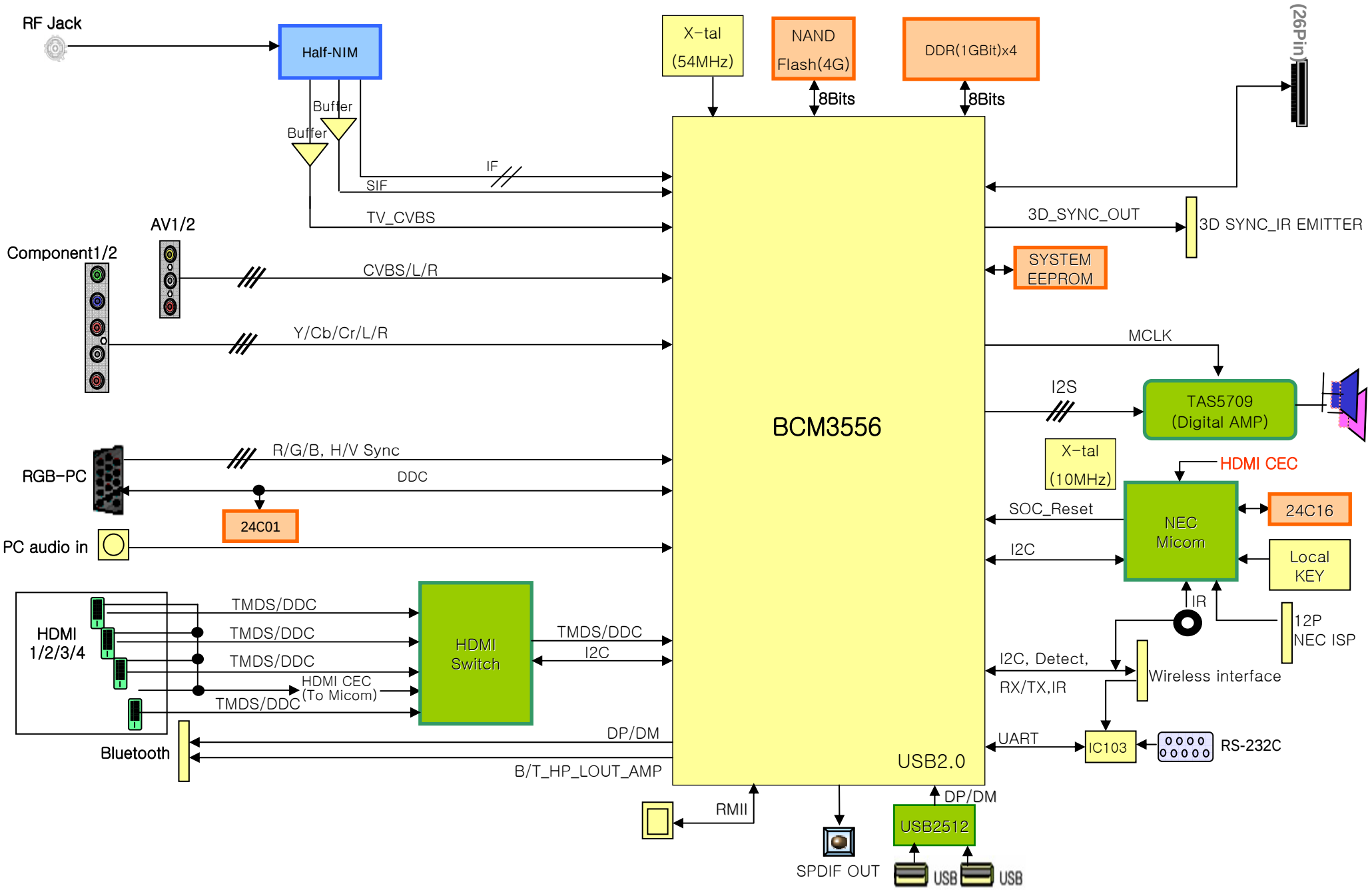


50PX950-AA model block diagram

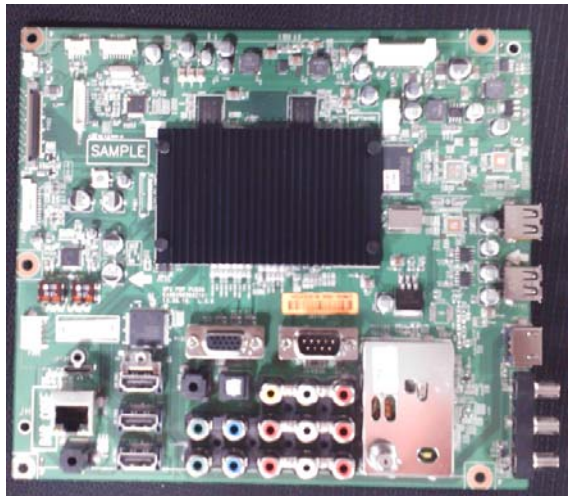
Changed Point

1. Add 3D formatter board (3DF)
   - 3DF board received LVDS data and make L/R image for 3D
   - Main to 3DF cable : 51pin FFC / 3DF to ASIC cable : 80pin FFC
2. Change the module ASIC board
   - ISIS-F3.0 to ISIS-A1.0 for 3D
3. Add 3D IR emitter sub Assy and wafer
   - 3D IR emitter make 3D sync for 3D Active glasses
   - IR emitter signal form ASIC to Main board and it connect to IR emitter Assy through 4pin wafer on Main board

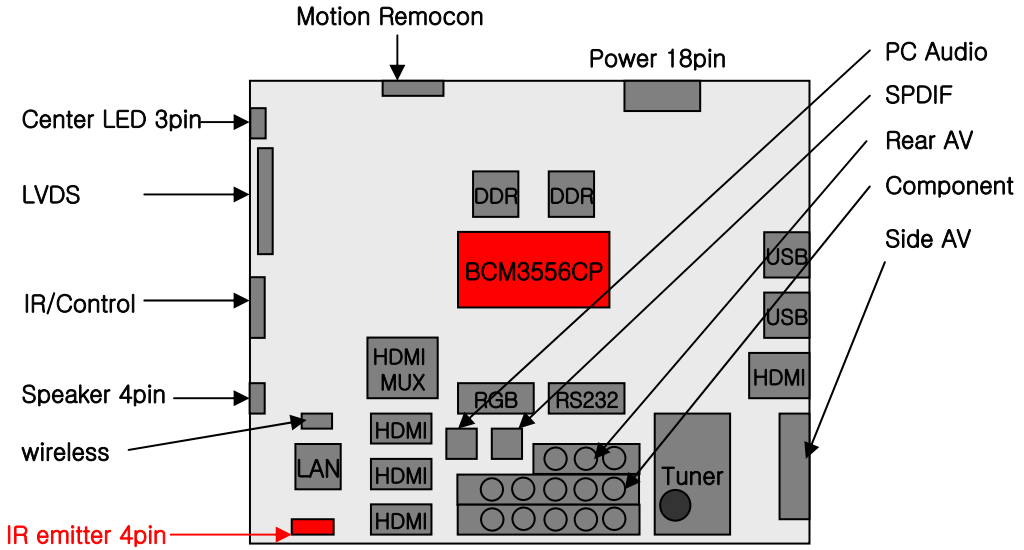
Block Diagram - Overview



Main board (GP2 modify)



Main board for 3D image



Main board for 3D block diagram

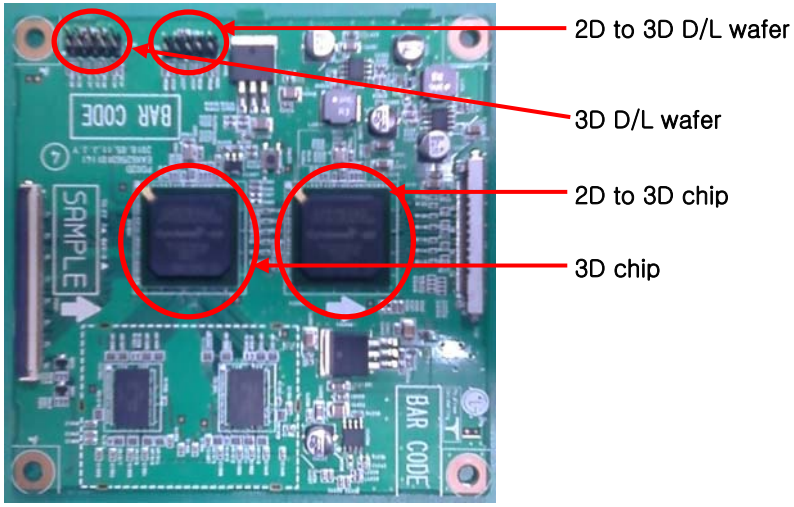
IR emitter assy – front

IR emitter assy – back

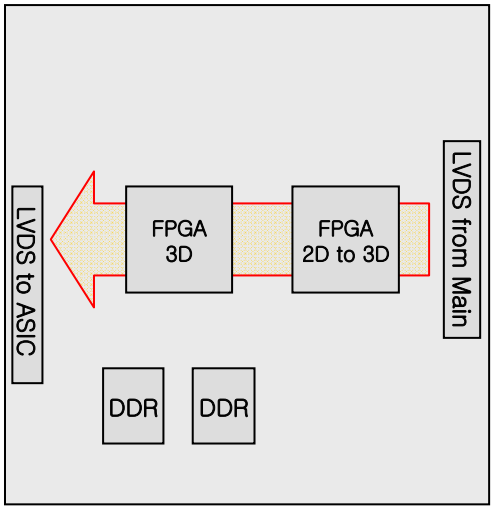
Changed Point

1. BCM 3556 revision
   - BCM3556 -> BCM3556CP
   - Change the BCM version to support HDMI1.4a 3D
2. Add IR emitter wafer
   - IR signal from ASIC to Main through the LVDS cable.
   - IR assy connect to 4pin wafer on the main board.
3. Another block is almost same as GP2 chassis

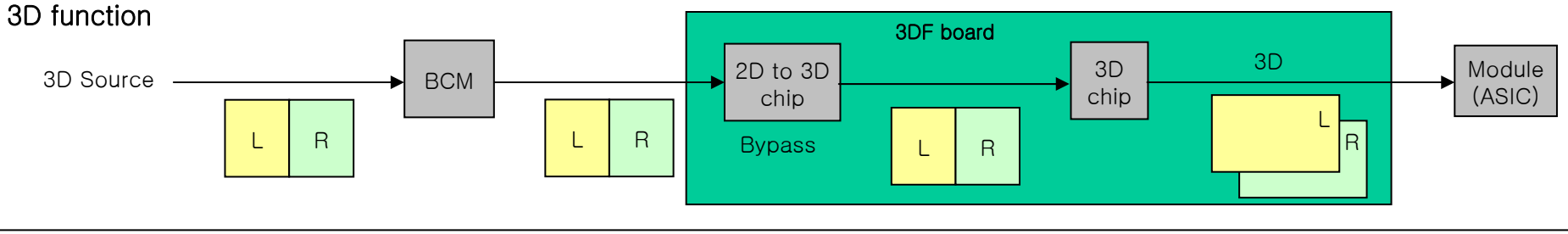
3D Formatter Board (3DF)

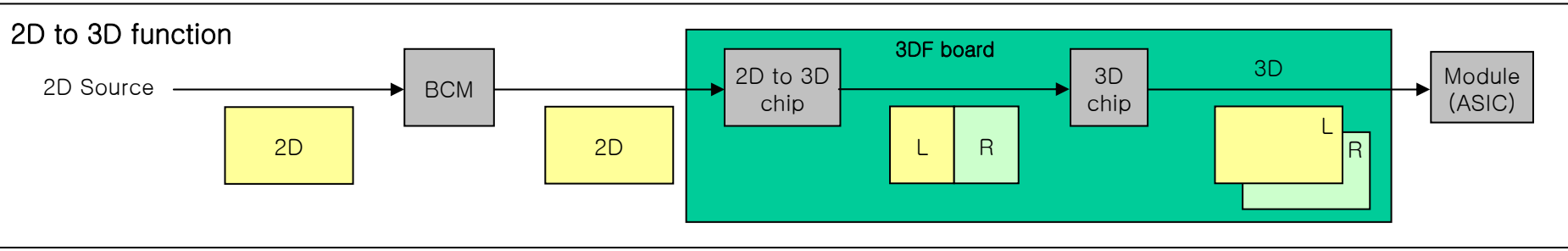


3D formatter board image

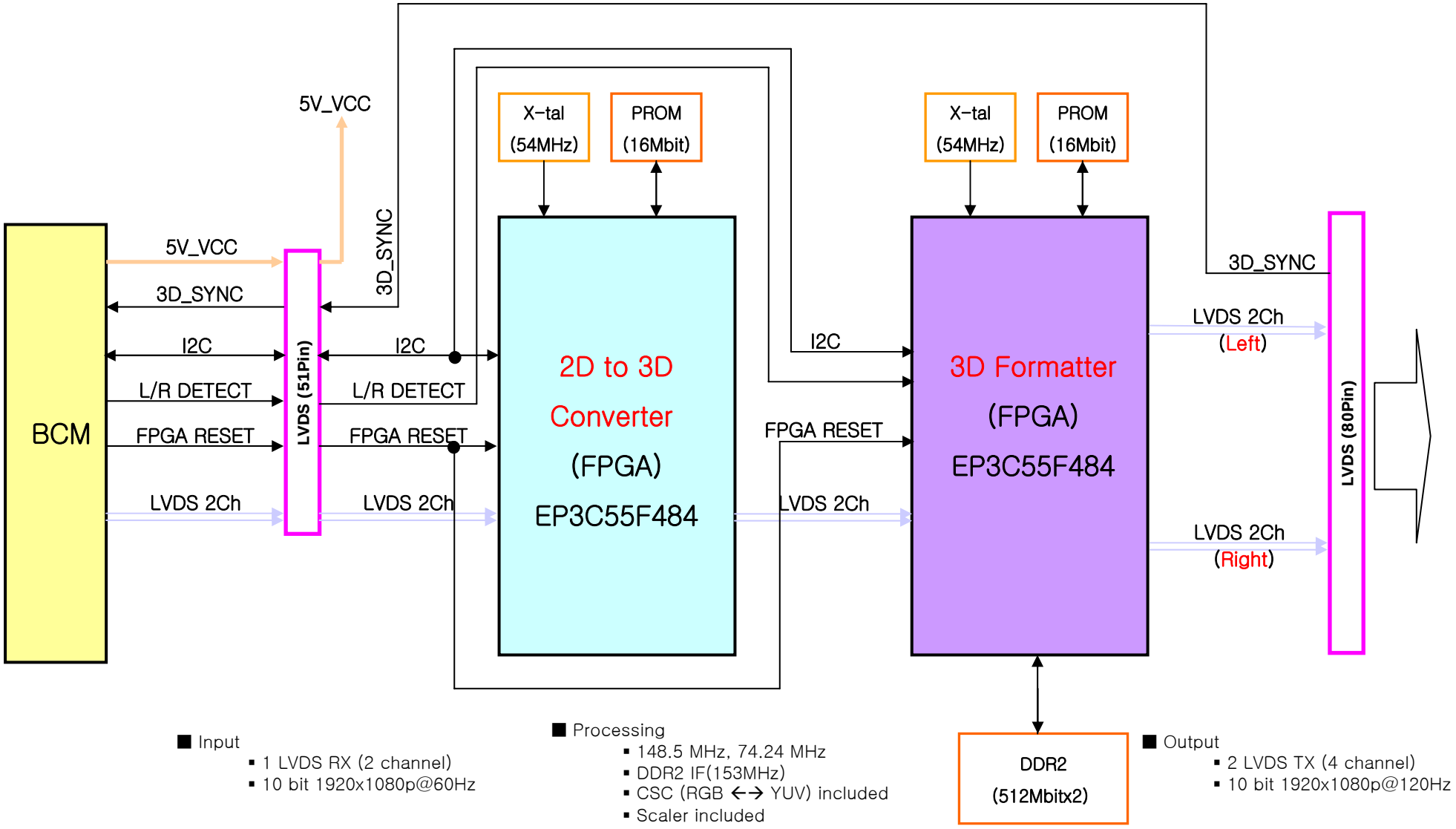


3D formatter board layout





Block Diagram – 3DF B/D (PDP 3DTV)



■ Input
- 1 LVDS RX (2 channel)
- 10 bit 1920x1080p@60Hz

■ Processing
- 148.5 MHz, 74.24 MHz
- DDR2 IF(153MHz)
- CSC (RGB ←→ YUV) included
- Scaler included
- I2C input from LVDS RX

■ Output
- 2 LVDS TX (4 channel)
- 10 bit 1920x1080p@120Hz

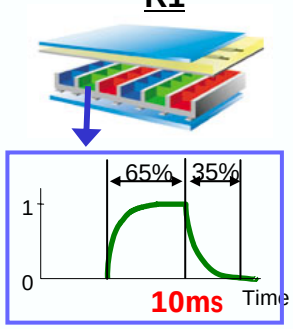
Changes List : Module

- ❑ To improve 3D Crosstalk, change R/G fluorescent substance (Afterglow time 10㎳ → 4㎳)
- ❑ New ASIC for 3D (A1.0) and apply 3D sustain waveform

As is (60R1)

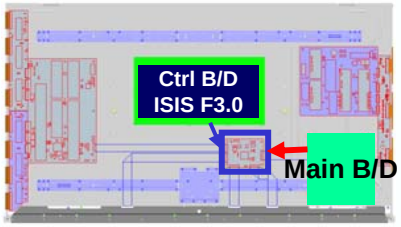
R1

panel



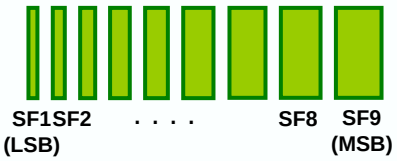
- ▶ fluorescent substance
  - Afterglow time: 10ms (R,G)
- ▶ 3D Cross Talk ratio
  - 17%
- ▶ color temp : 6500K
- ▶ brightness : 500cd/m²

circuit / tool



- ▶ ISIS-F3.0
  - not support 3D
  - apply DCC
- ▶ 51pin LVDS Cable

waveform



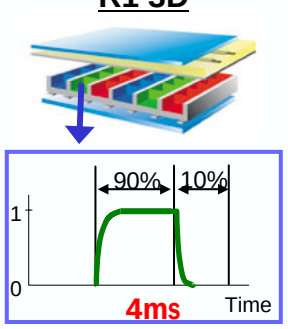
2D SF Mapping

- ▶ SF : 9
- ▶ 1st LSB SF Mapping

To be (60R1X 3D)

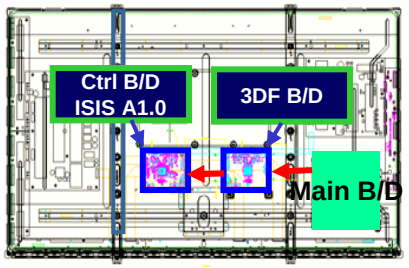
R1 3D

panel



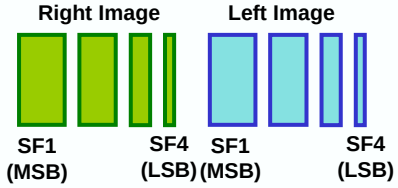
- ▶ fluorescent substance
  - Afterglow time : 4ms(R,G)
- ▶ 3D Cross Talk ratio
  - About 2.5%
- ▶ color temp : 7200K↑
- ▶ brightness : 410cd/m²

circuit / tool



- ▶ ISIS-A1.0
  - support 3D
  - apply DPCS
- ▶ 80pin & 51pin LVDS Cable
  - L / R Image Input
- ▶ Apply 3D Formatter B/D

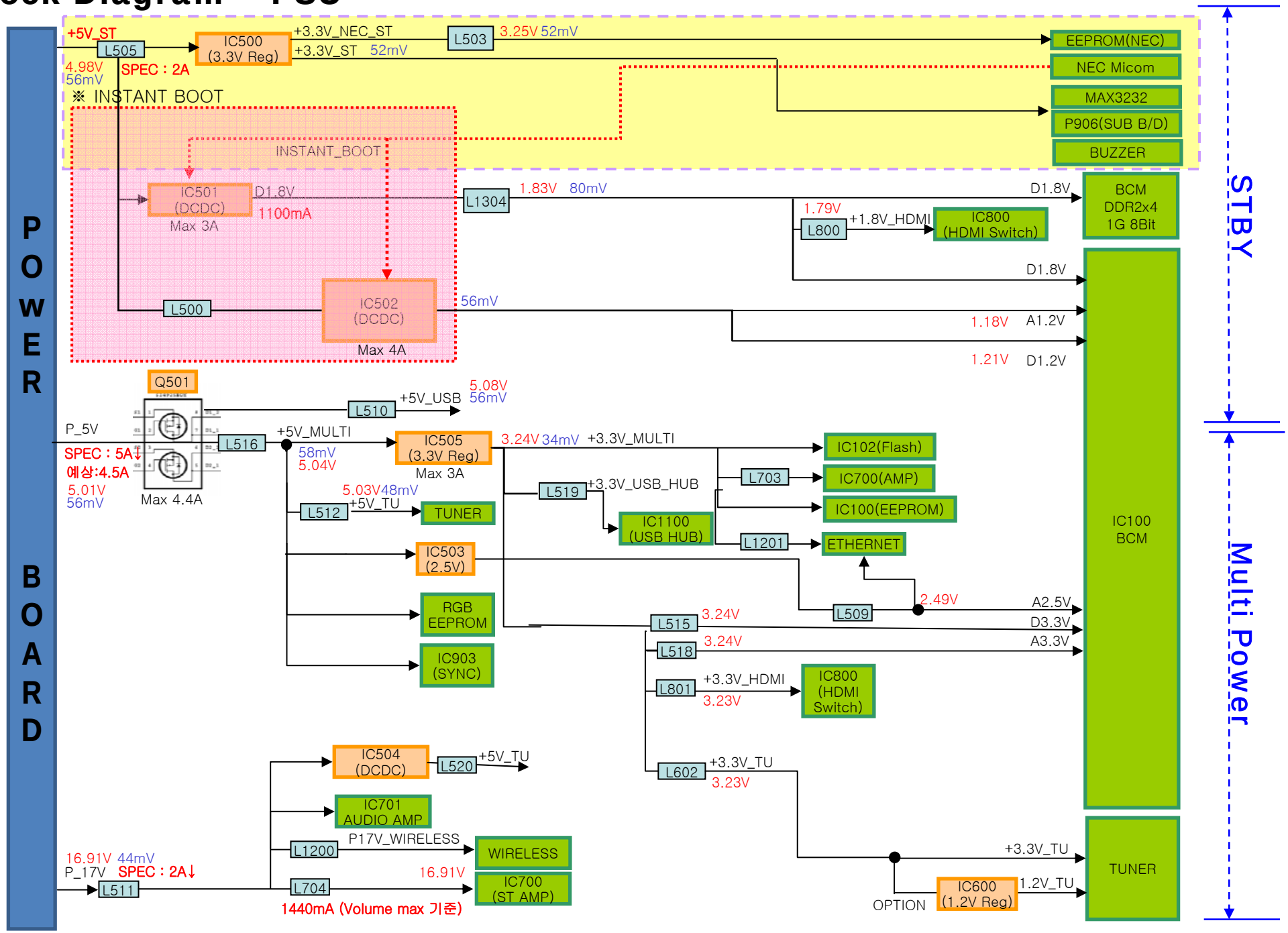
waveform



3D SF Mapping

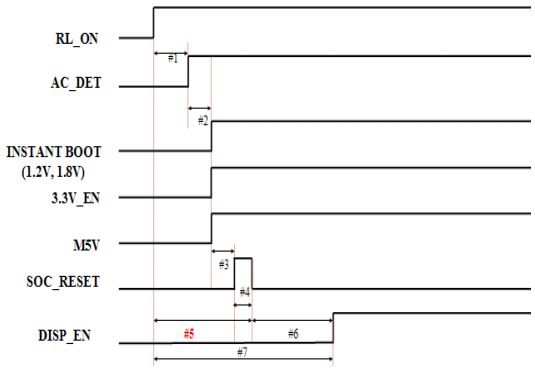
- ▶ SF : 4(L) + 4(R)
- ▶ 1st MSB SF Mapping

Block Diagram – PSU



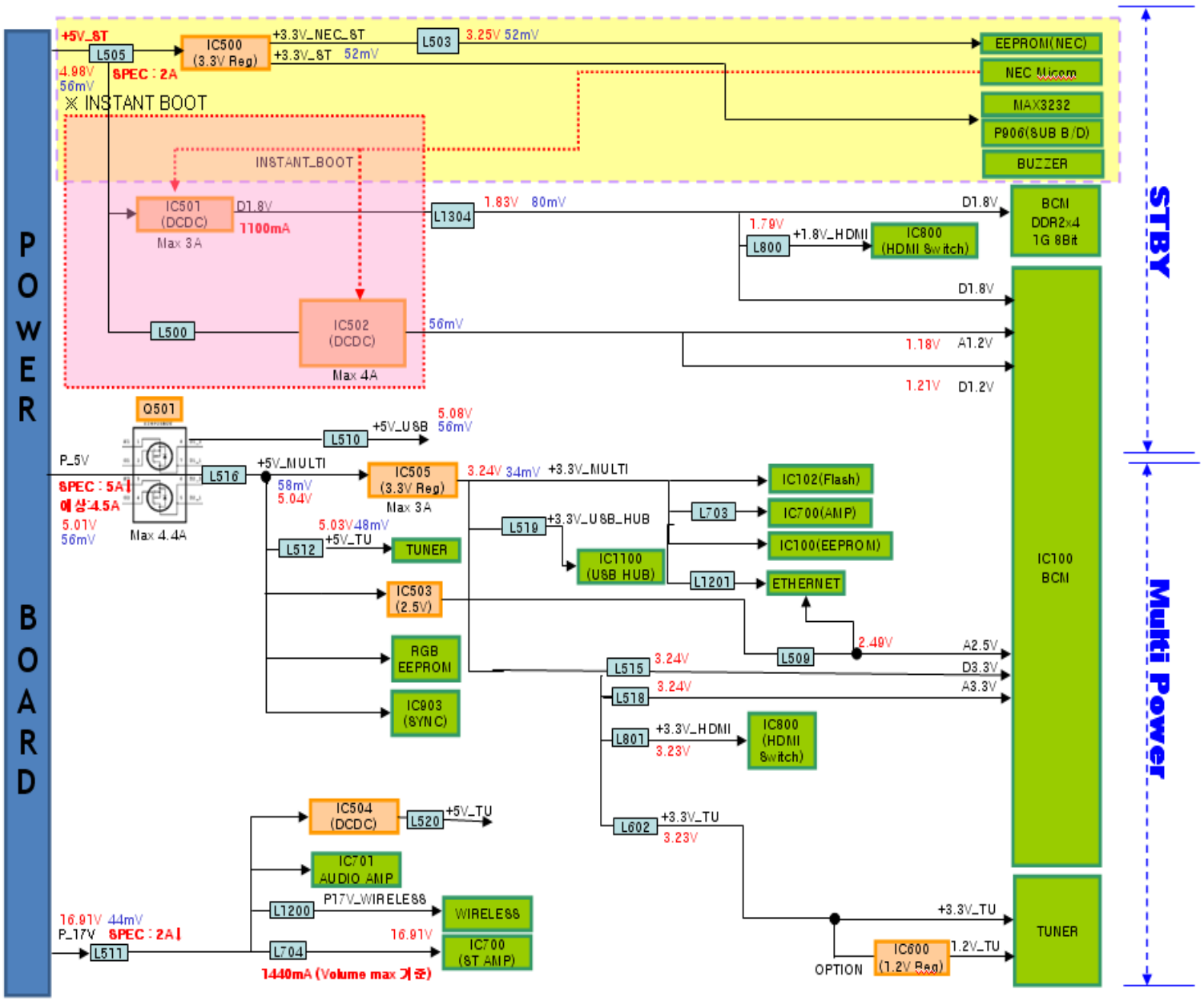
Power Flow Diagram

P814			
1	17V	2	17V
3	GND	4	GND
5	5V	6	5V
7	5V	8	Error_DET
9	GND	10	GND
11	GND	12	GND
13	STBY	14	STBY
15	RL_ON	16	AC DET
17	M_ON	18	AUTO_GND
	SMAW200-H18S2		



Symbol	Description	Time
#1	Time interval between Relay on and AC Detect	400ms (Min. 300ms)
#2	Time interval between AC Detect and Multi Module 5V on	400ms(Min. 320ms) ~ 400ms + Waiting until AC_DET is true
#3	Time interval between Multi Module 5V on and Soc Reset off	0ms ~ Wait until 3.3V Detect port(Pin 27) is true (0xF9, 3.0V)
#4	Time interval between Soc Reset off and Soc Reset on	30ms
#5	Time interval between Relay on and Soc Reset on	830ms
#6	Time interval between Soc Reset on and Display Enable	3270ms
#7	Time interval between Relay on and Display Enable	Min. 4100ms

<BCM Power Sequence>



PDP TV Repair Process Index

- Trouble shooting by worst symptom

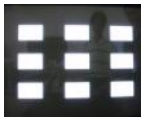
First of all, Check whether there is SVC Bulletin in GCSC System for these model.

Repair Process

PDP TV	Symptom	A. Picture Problem	Making	2010. 8 . 13	전자 - 6-2
		No Picture/Sound OK	Revision		1/9

First of all, Check whether all of cable between board was inserted properly or not.
(Main B/D↔ Power B/D, Power B/D↔ Y-sus B/D,Y-Sus B/D ↔Z-Sus B/D,LVDS Cable,Speaker Cable,IR B/D Cable,,,)

Check Module pattern by using “TILT” key on SVC R/C



<SVC R/C & Pattern>

Normal Y → Check Sound → **Sound OK** Y → Check LVDS Cable → **Normal** Y → Close

Sound OK N → Move No Picture/No sound Section

Normal N → Replace Main B/D

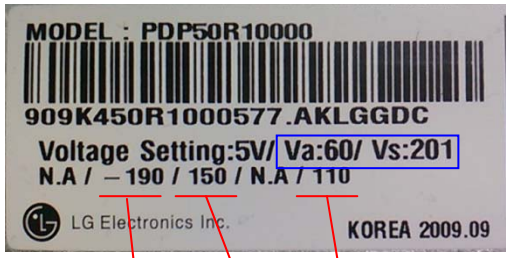
Normal N → Check Vs, Va → **Normal** Y → Check voltage
. -VY
. VSC
. VZB
→ **Normal** Y → Check B+ Voltage on Power Board / Control Board
.Check B+(5V)
→ **Normal** Y → 1.Check Control Board
. LED on
. Crystal(X101)
. 1.8V, 3V, 5V FET
. Rom update
2.Replace Control B/D

Normal N → Move Power problem Section

Normal N → 1. Check Y-Sus/ Z-Sus Board
2. Replace defective B/D

Normal N → Move Power problem Section

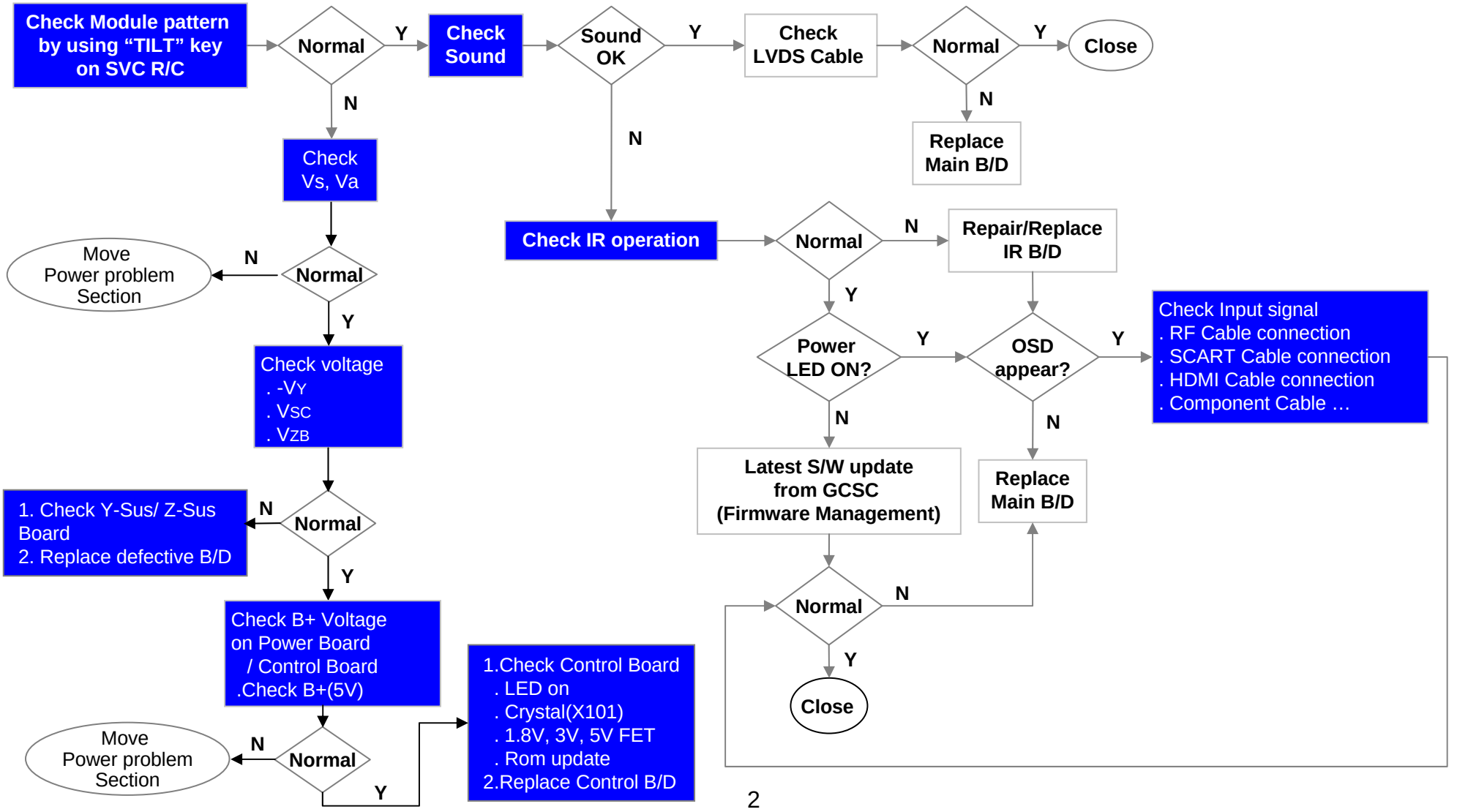
※Refer to the Module label for each voltage



-VY VSC VZB

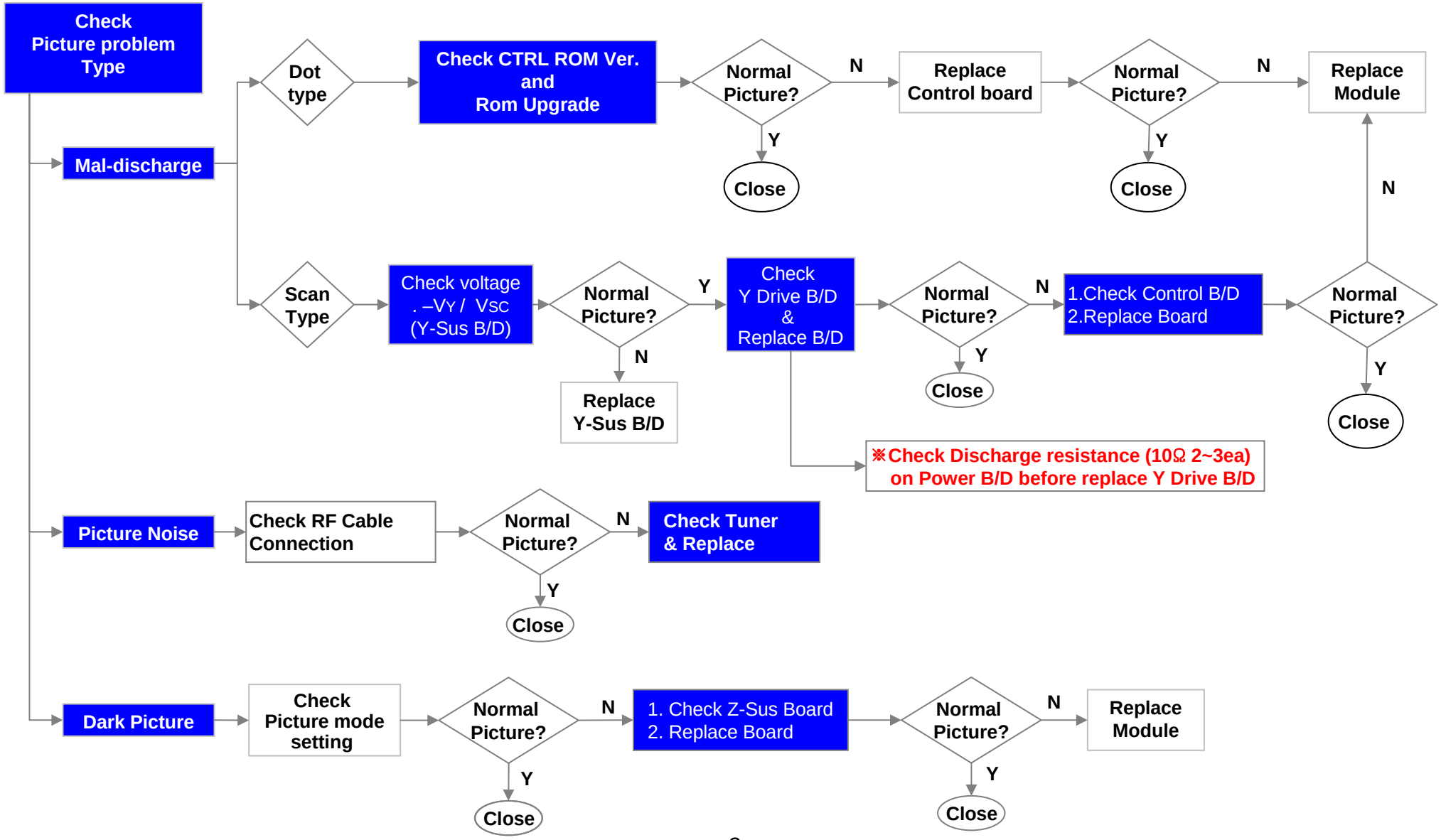
Repair Process

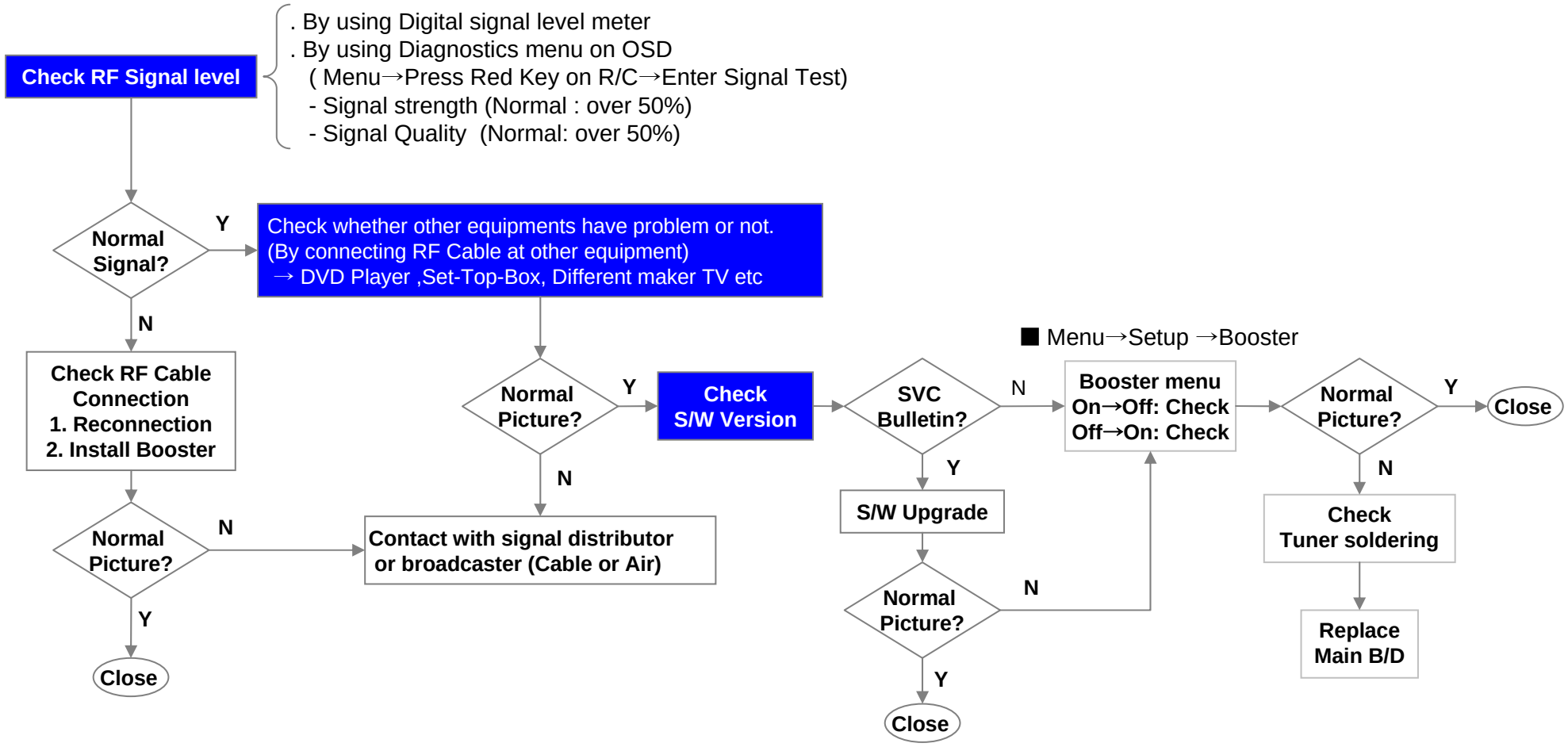
PDP TV	Symptom	A. Picture Problem	Making	2010. 8 . 13	전자 - 6-2
		No Picture/No Sound	Revision		2/9



Repair Process

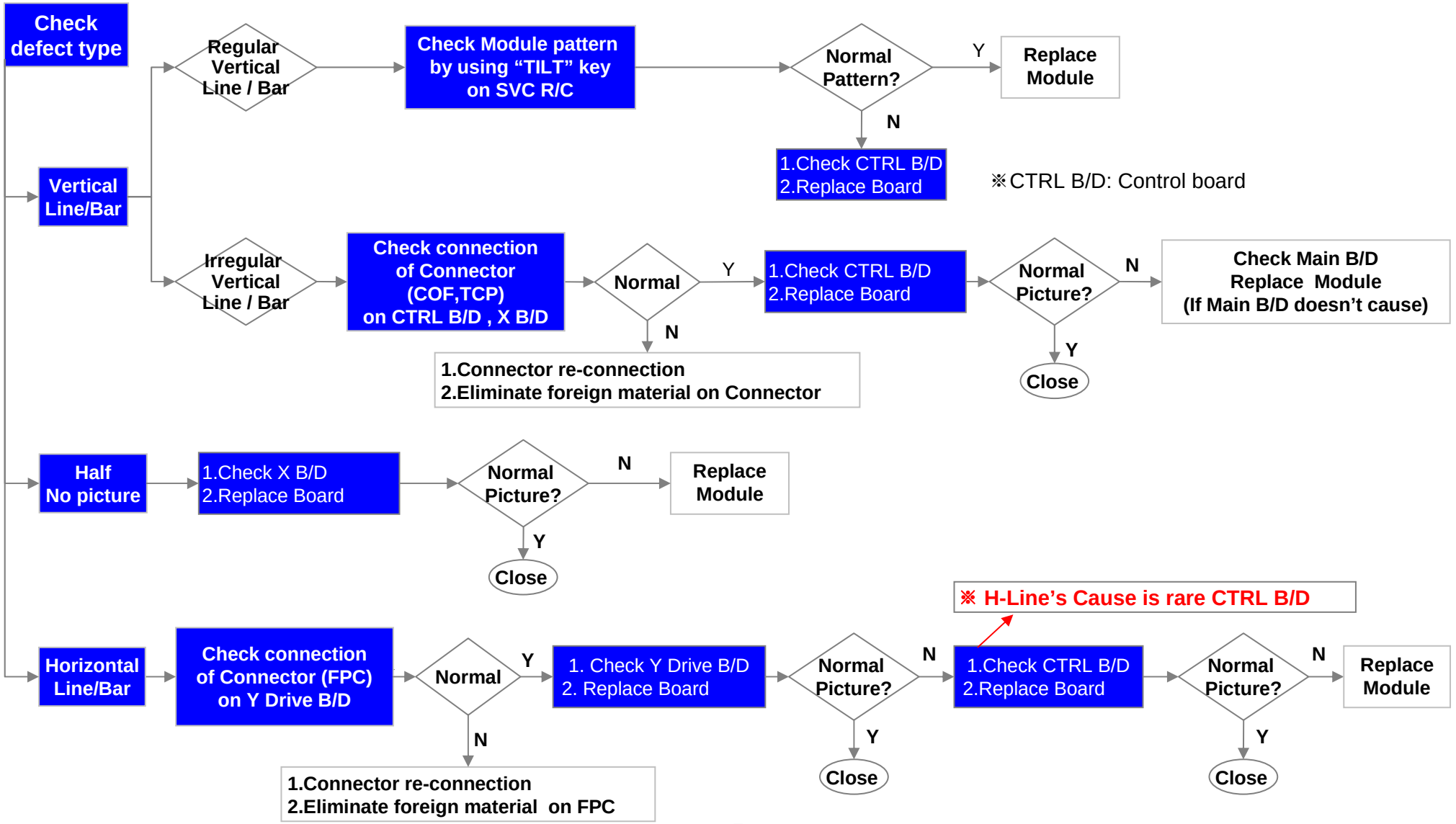
PDP TV	Symptom	A. Picture Problem	Making	2010. 8 . 13	전자 - 6-2
		Mal-discharge/Noise/dark picture	Revision		3/9




Check RF Signal level
. By using Digital signal level meter
. By using Diagnostics menu on OSD
(Menu→Press Red Key on R/C→Enter Signal Test)
- Signal strength (Normal : over 50%)
- Signal Quality (Normal: over 50%)
Normal Signal?
Y
N
Check whether other equipments have problem or not.
(By connecting RF Cable at other equipment)
→ DVD Player ,Set-Top-Box, Different maker TV etc
Check RF Cable Connection
1. Reconnection
2. Install Booster
Normal Picture?
N
Y
Close
Normal Picture?
Y
N
Check S/W Version
Contact with signal distributor or broadcaster (Cable or Air)
■ Menu→Setup →Booster
SVC Bulletin?
N
Y
Booster menu
On→Off: Check
Off→On: Check
S/W Upgrade
Normal Picture?
N
Y
Close
Normal Picture?
Y
N
Close
Check Tuner soldering
Replace Main B/D

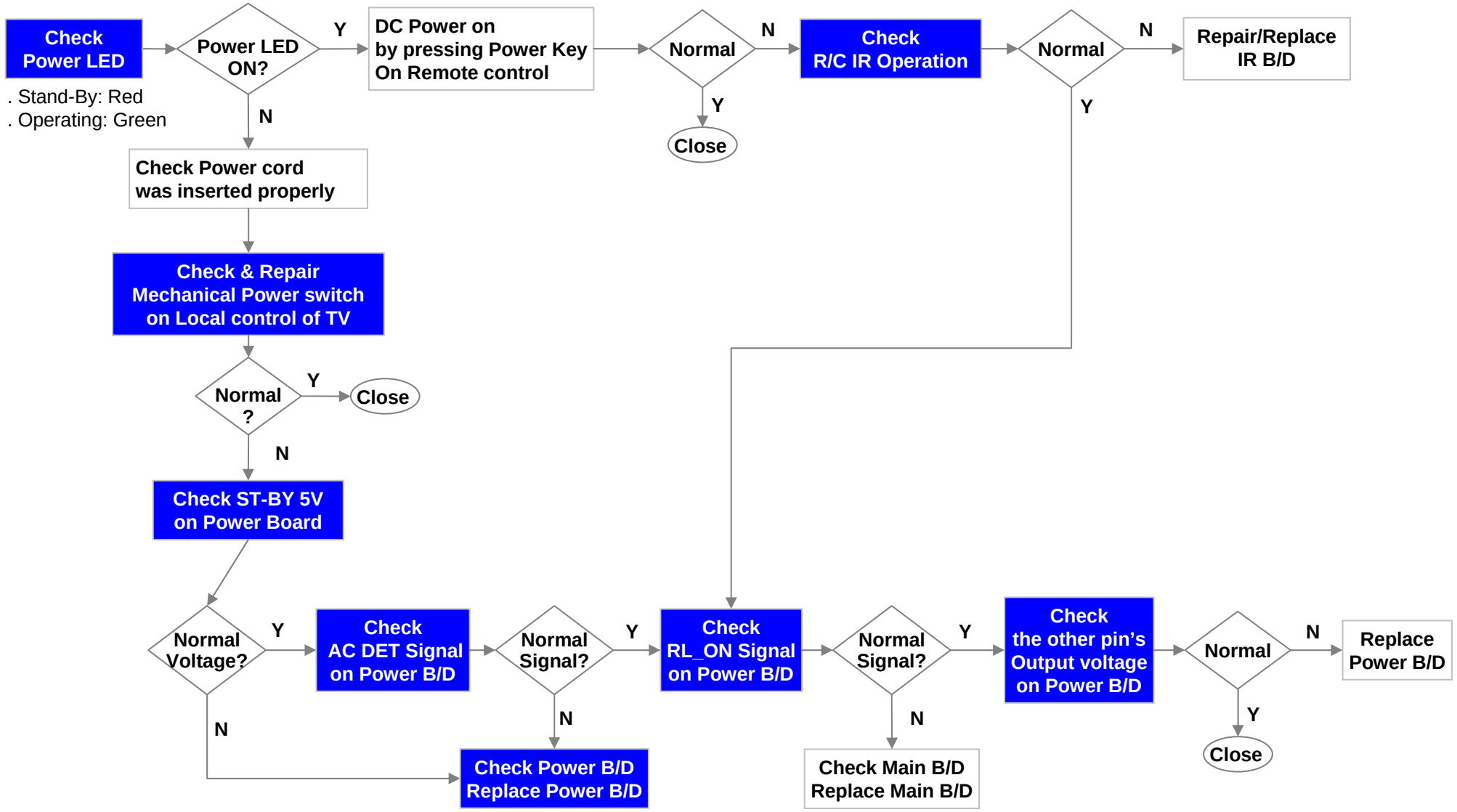
Repair Process

PDP TV	Symptom	A. Picture Problem	Making	2010. 8 . 13	전자 - 6-2
		Vertical bar/ Horizontal Bar	Revision		5/9

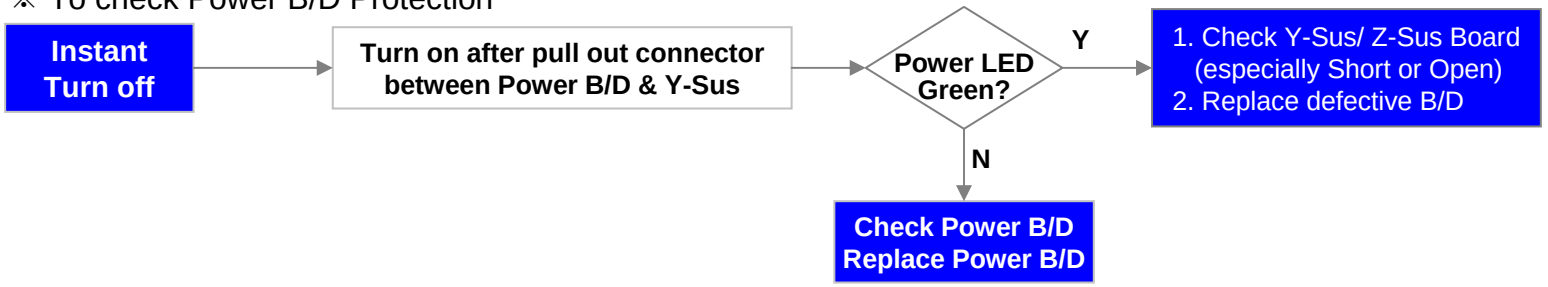


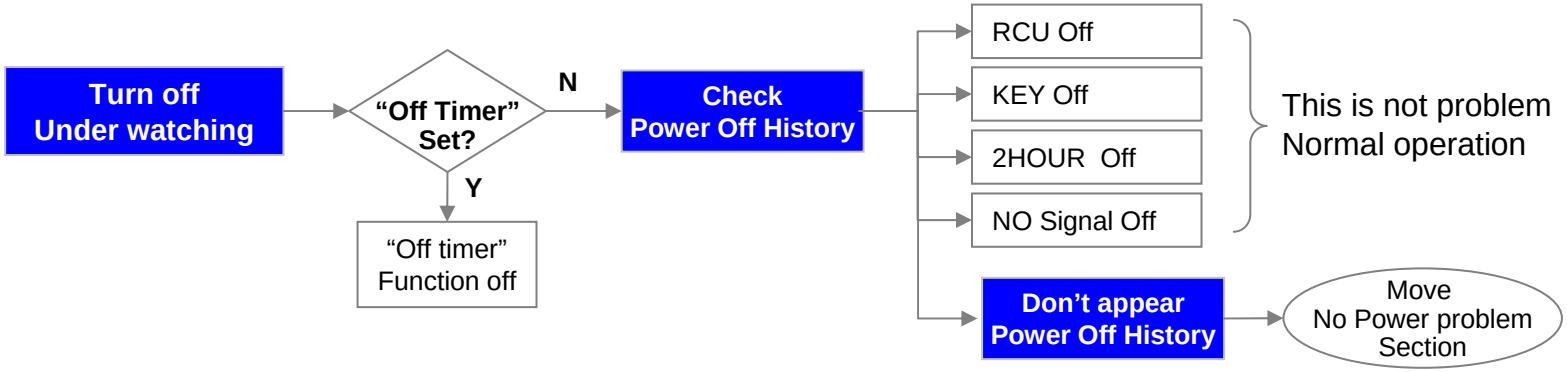
Repair Process

PDP TV	Symptom	B. Power Problem	Making	2010. 8 . 13	전자 - 6-2
		No Power (Not turn on)	Revision		6/9

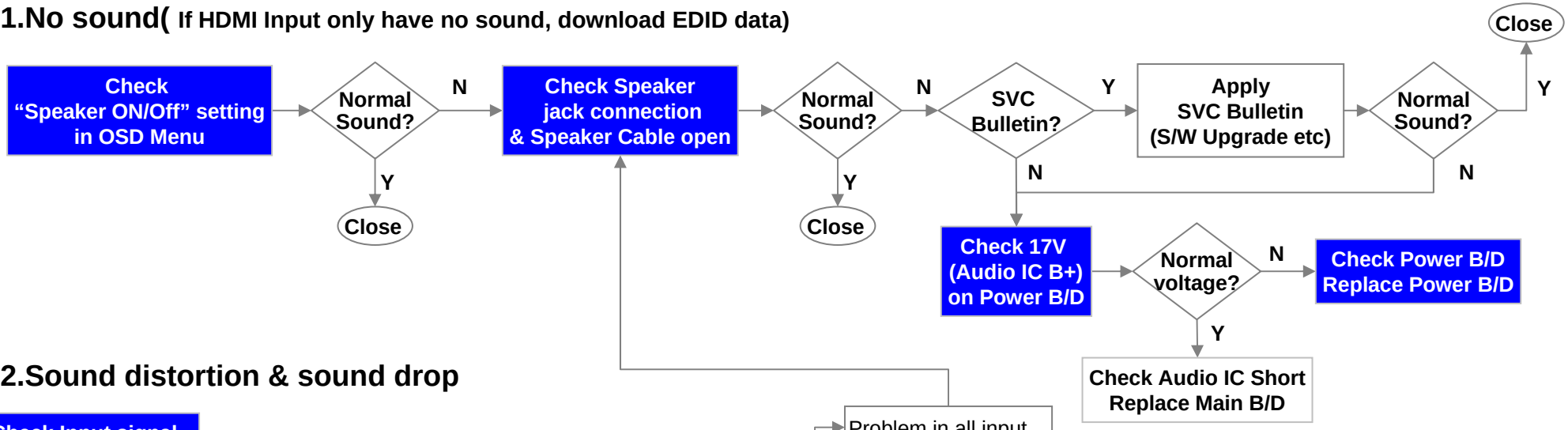


※ To check Power B/D Protection

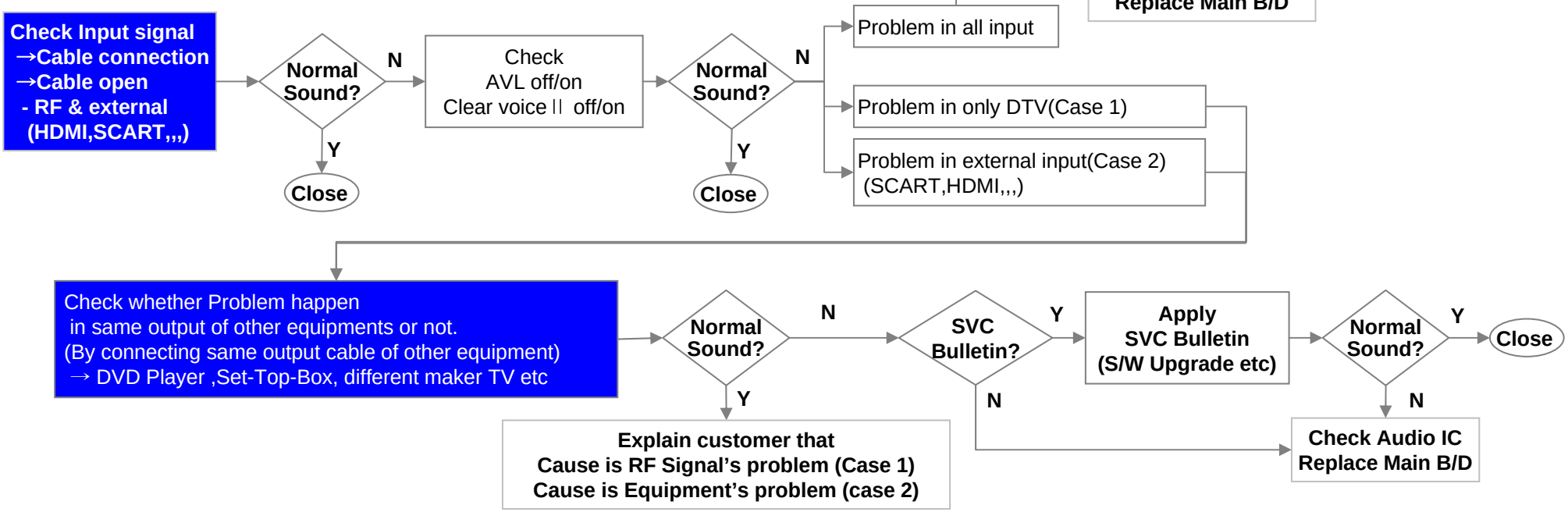




1.No sound(If HDMI Input only have no sound, download EDID data)



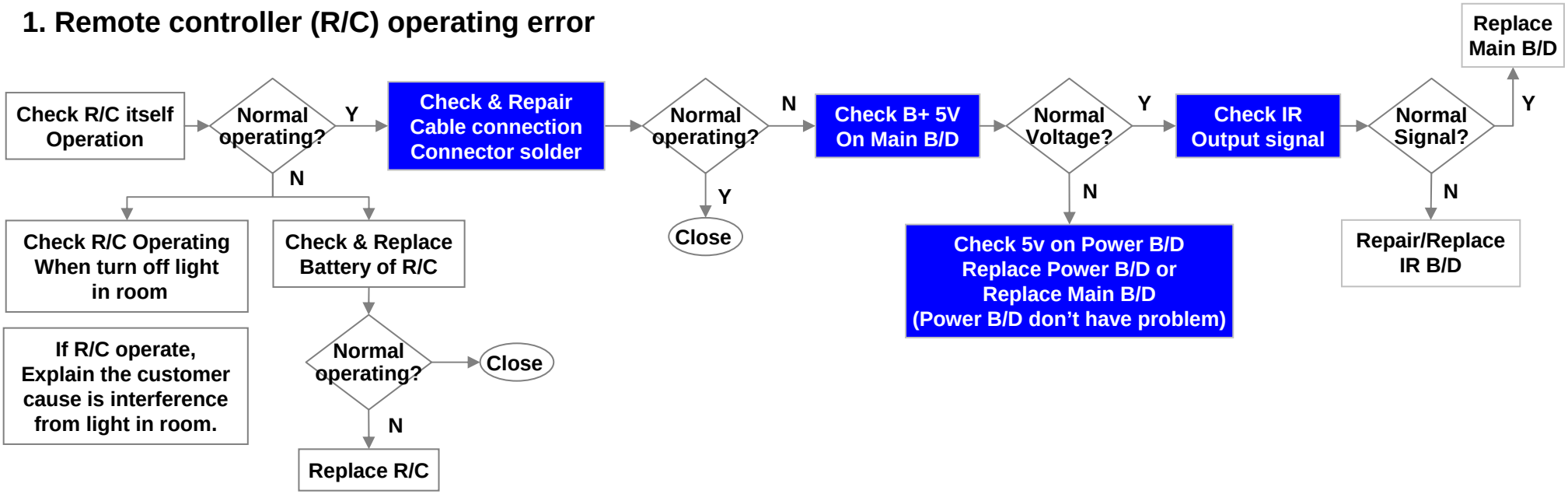
2.Sound distortion & sound drop



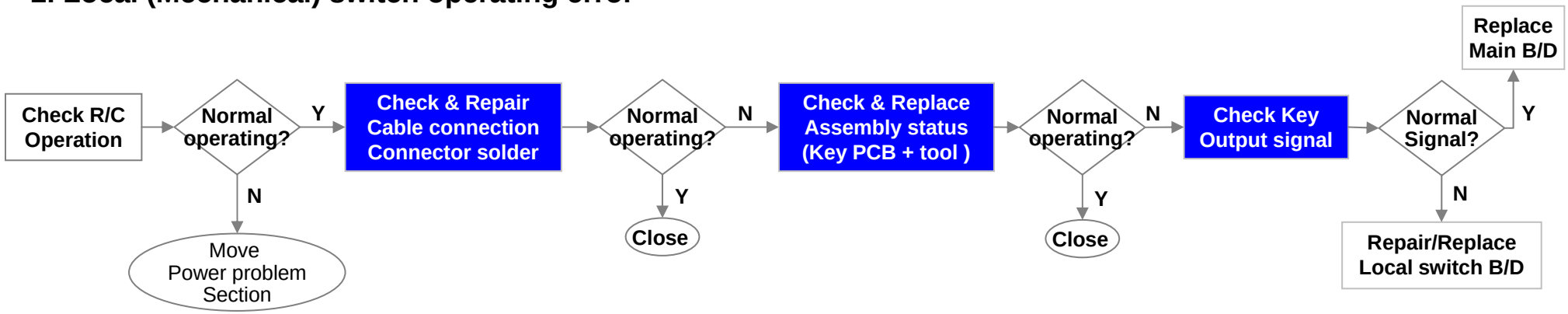
Repair Process

PDP TV	Symptom	D. General Function Problem	Making	2010. 8 . 13	전자 - 6-2
		Remote control & Local switch checking	Revision		9/9

1. Remote controller (R/C) operating error



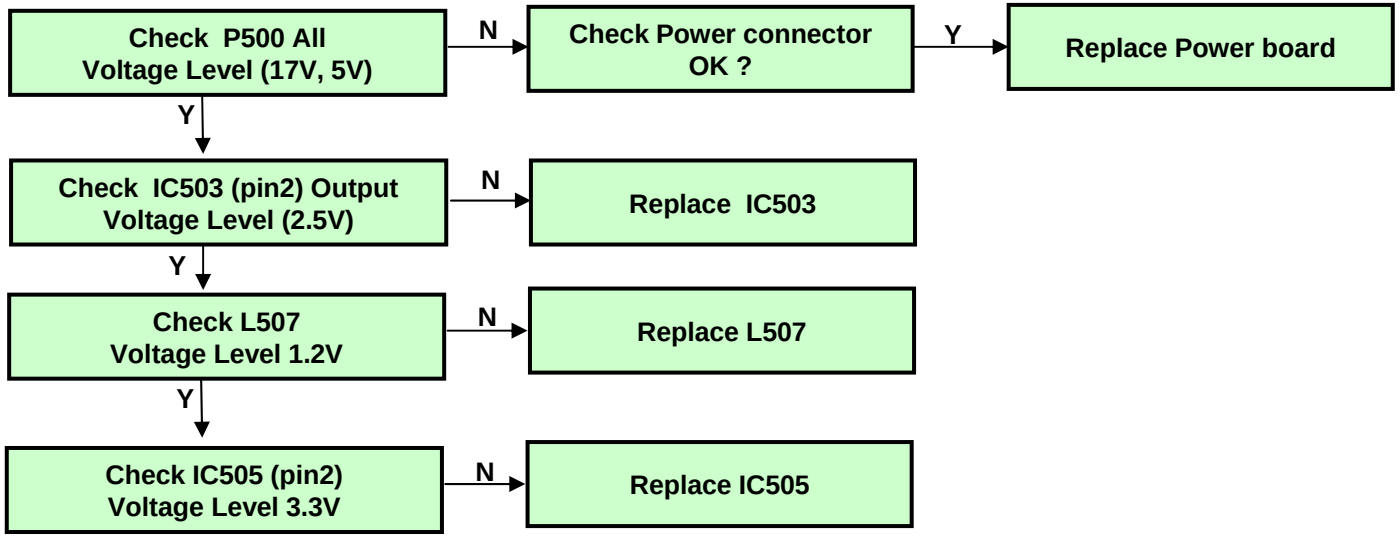
2. Local (Mechanical) switch operating error

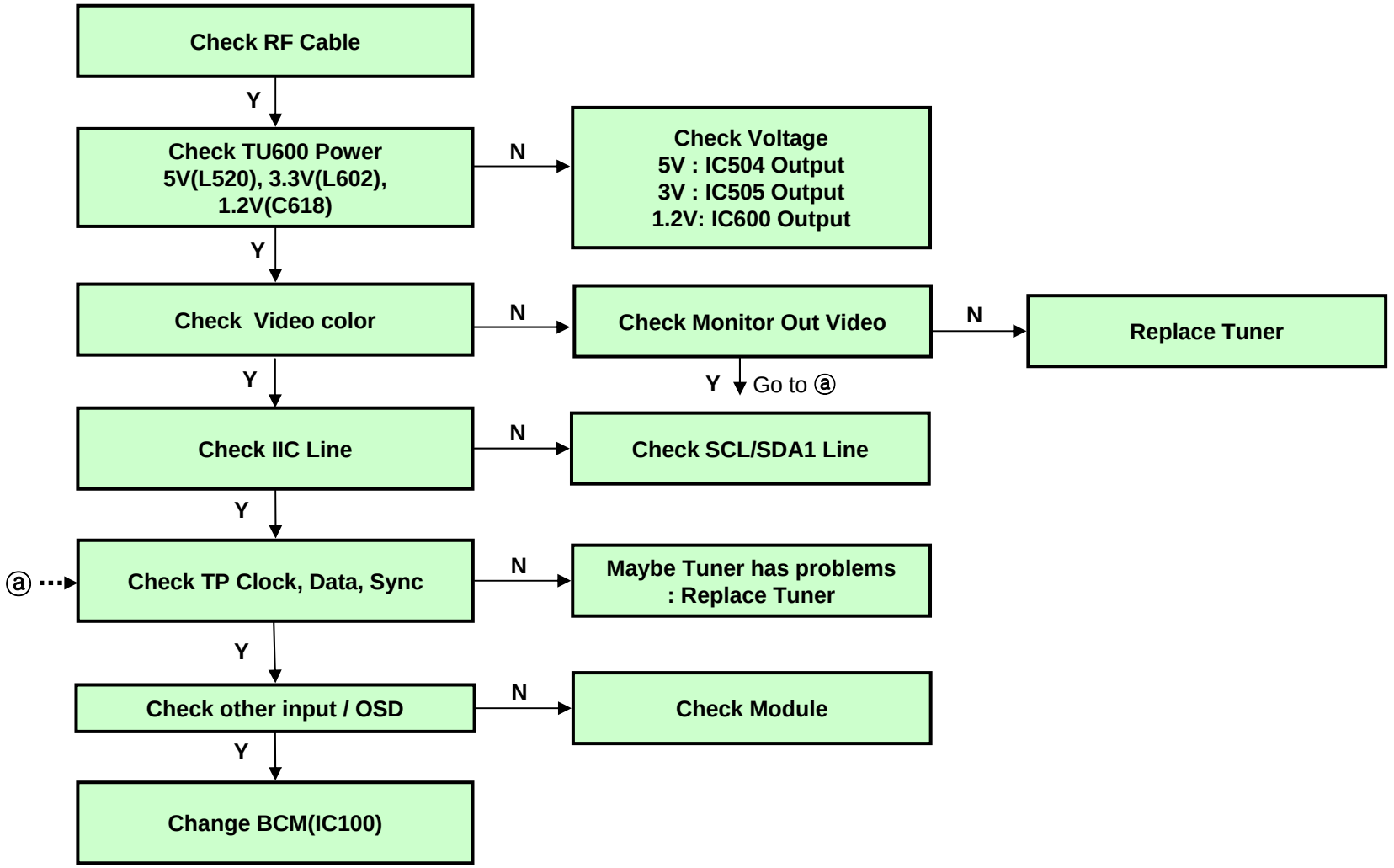


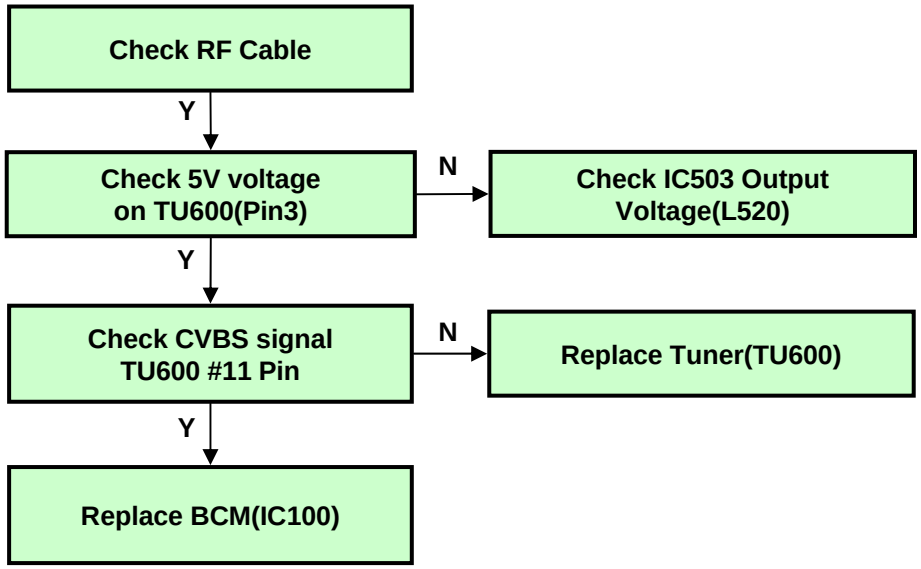
PDP TV Repair Process Index

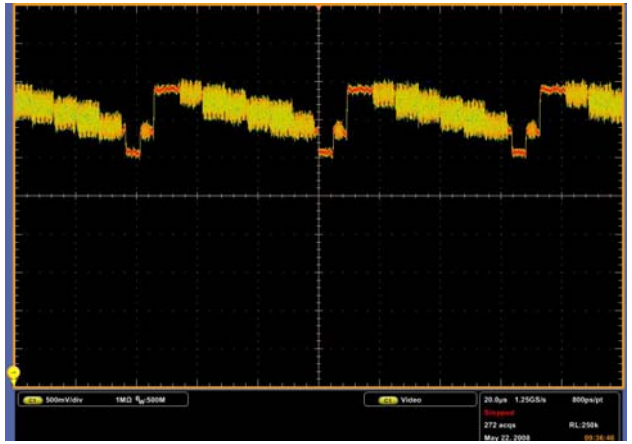
- Trouble shooting by input block (Component level check)

PDP TV	Symptom	Power-Up Boot Fail	Making	2010. 8 . 13	전자 - 6-2
			Revision		1/15

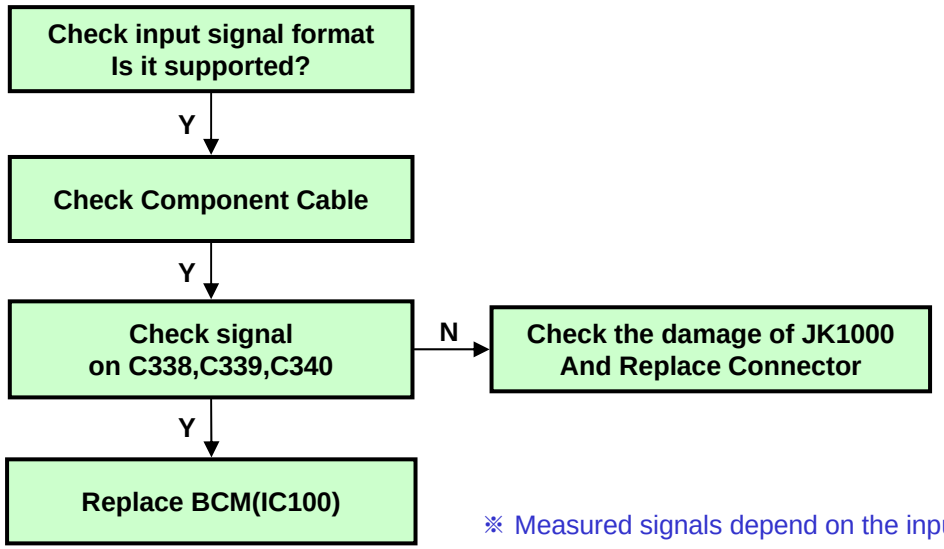



Check RF Cable
Y
Check TU600 Power
5V(L520), 3.3V(L602),
1.2V(C618)
N
Check Voltage
5V : IC504 Output
3V : IC505 Output
1.2V: IC600 Output
Y
Check Video color
N
Check Monitor Out Video
N
Replace Tuner
Y
Y Go to ⓐ
Check IIC Line
N
Check SCL/SDA1 Line
Y
ⓐ
Check TP Clock, Data, Sync
N
Maybe Tuner has problems
: Replace Tuner
Y
Check other input / OSD
N
Check Module
Y
Change BCM(IC100)

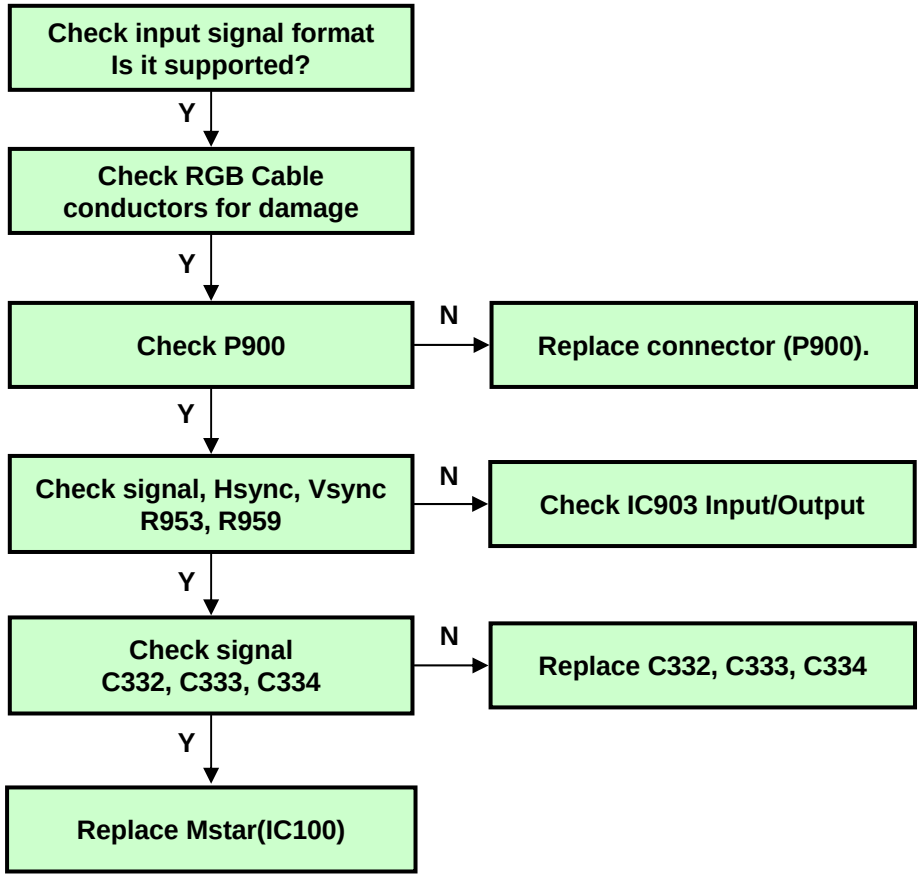




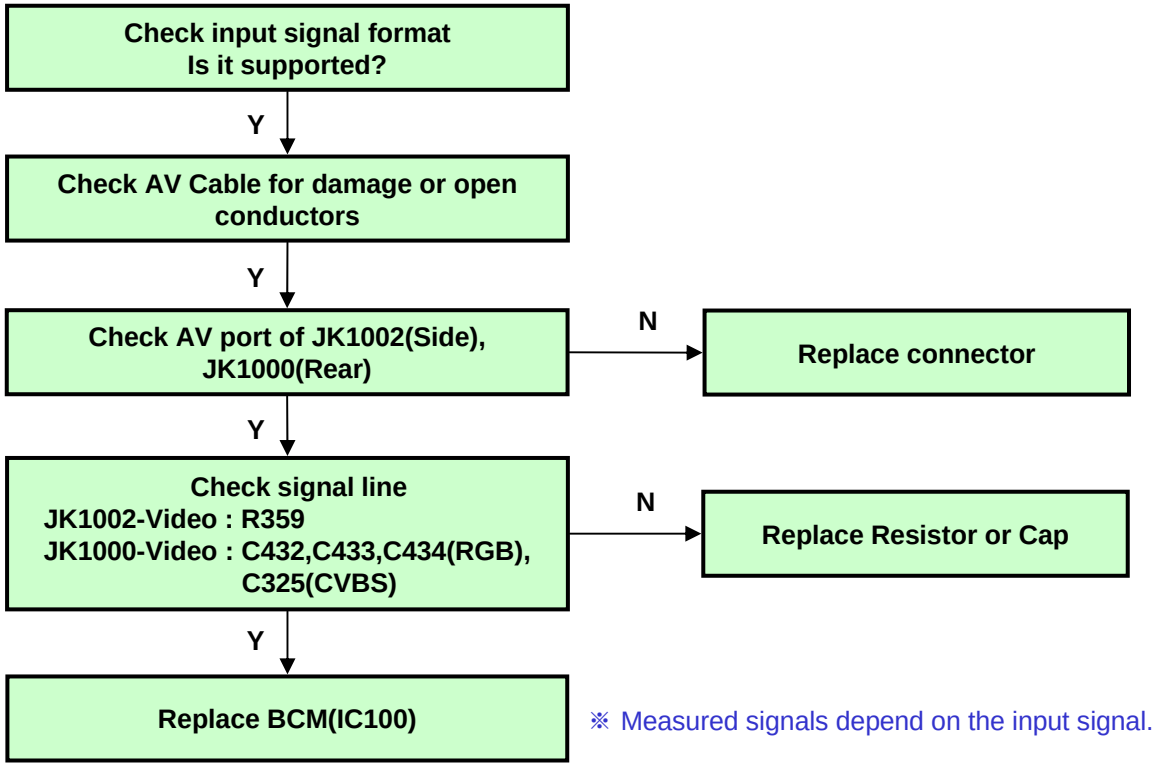
< CVBS waveform – sample >
- Defend on the input signal.



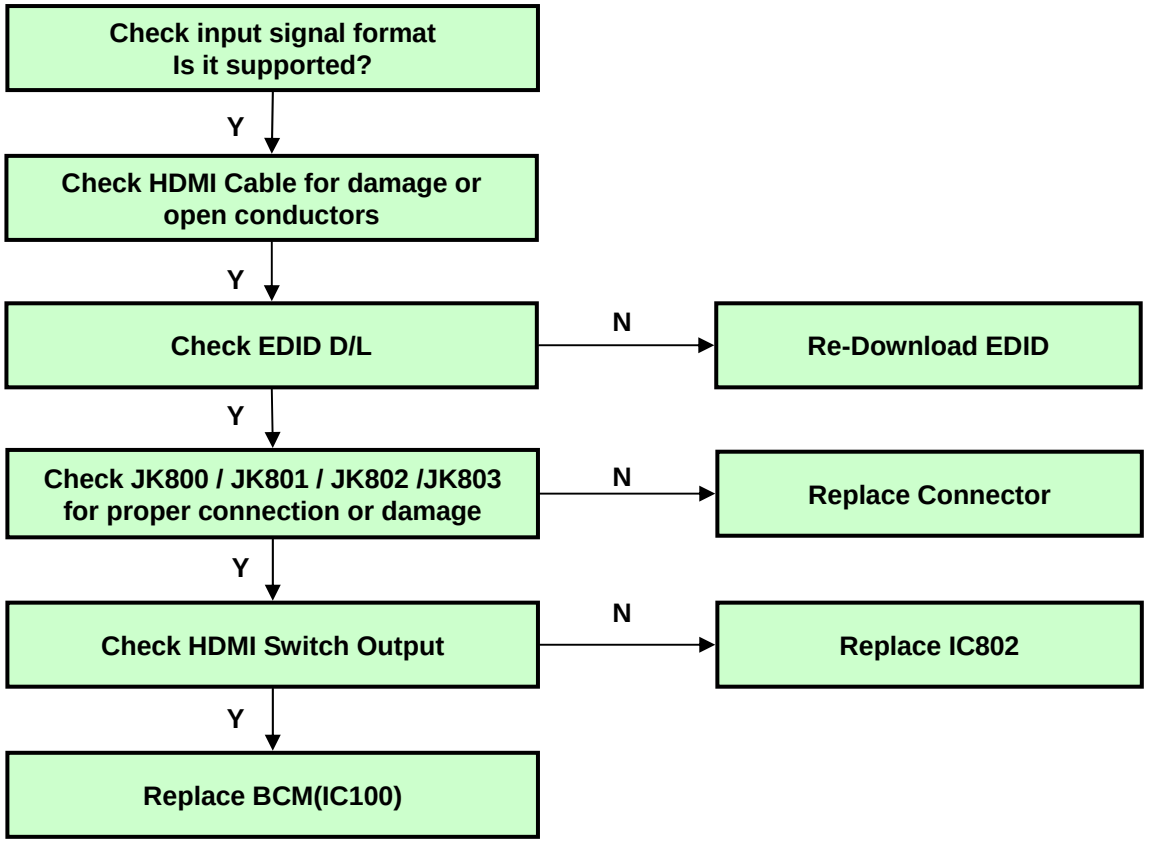
※ Measured signals depend on the input signal.

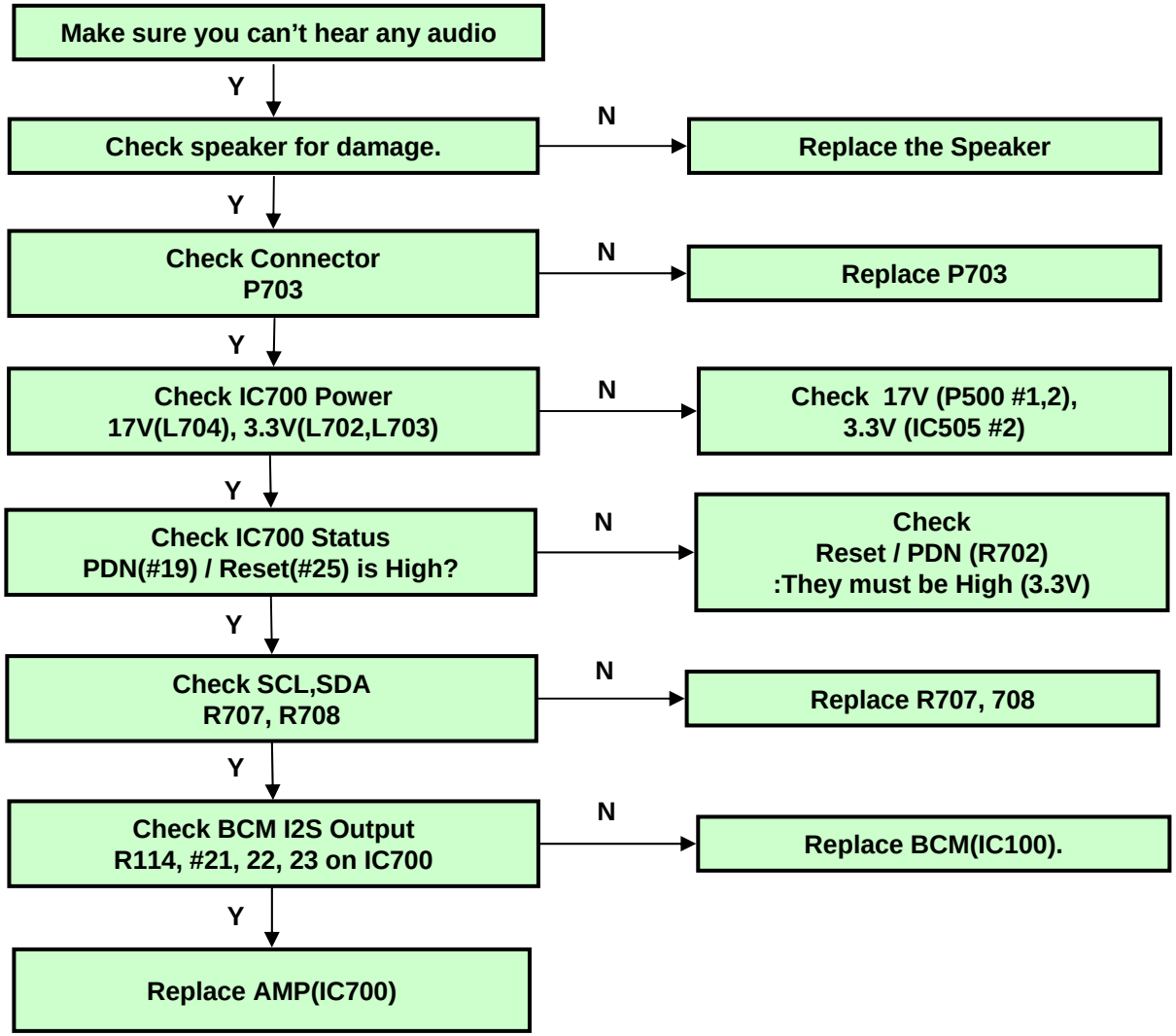


※ Measured signals depend on the input signal.

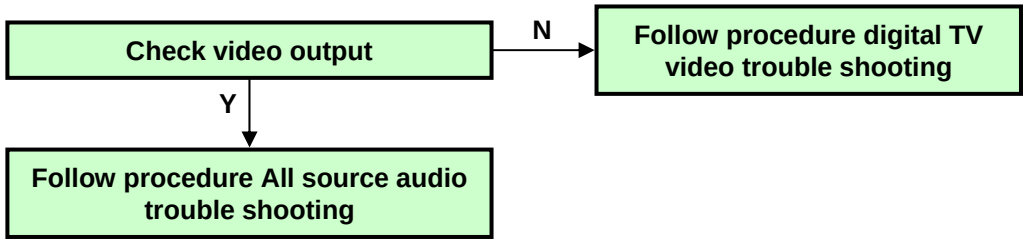


※ Measured signals depend on the input signal.

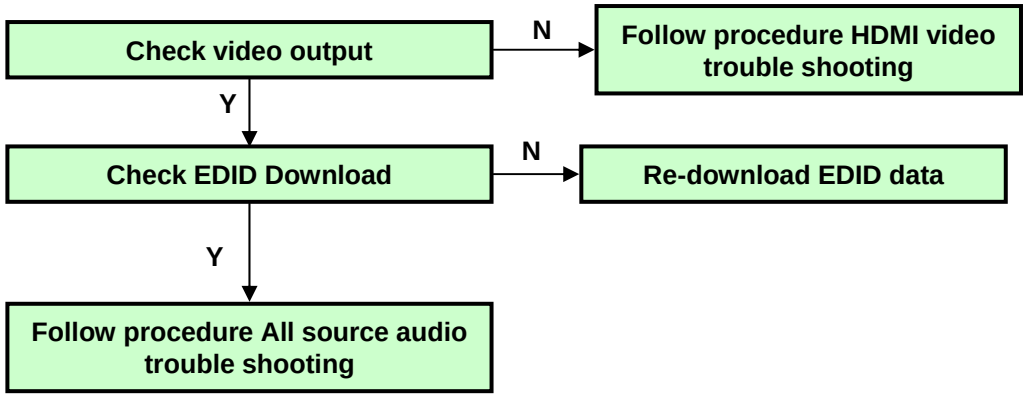

Check input signal format
Is it supported?
Y
Check HDMI Cable for damage or
open conductors
Y
Check EDID D/L
N
Re-Download EDID
Y
Check JK800 / JK801 / JK802 /JK803
for proper connection or damage
N
Replace Connector
Y
Check HDMI Switch Output
N
Replace IC802
Y
Replace BCM(IC100)

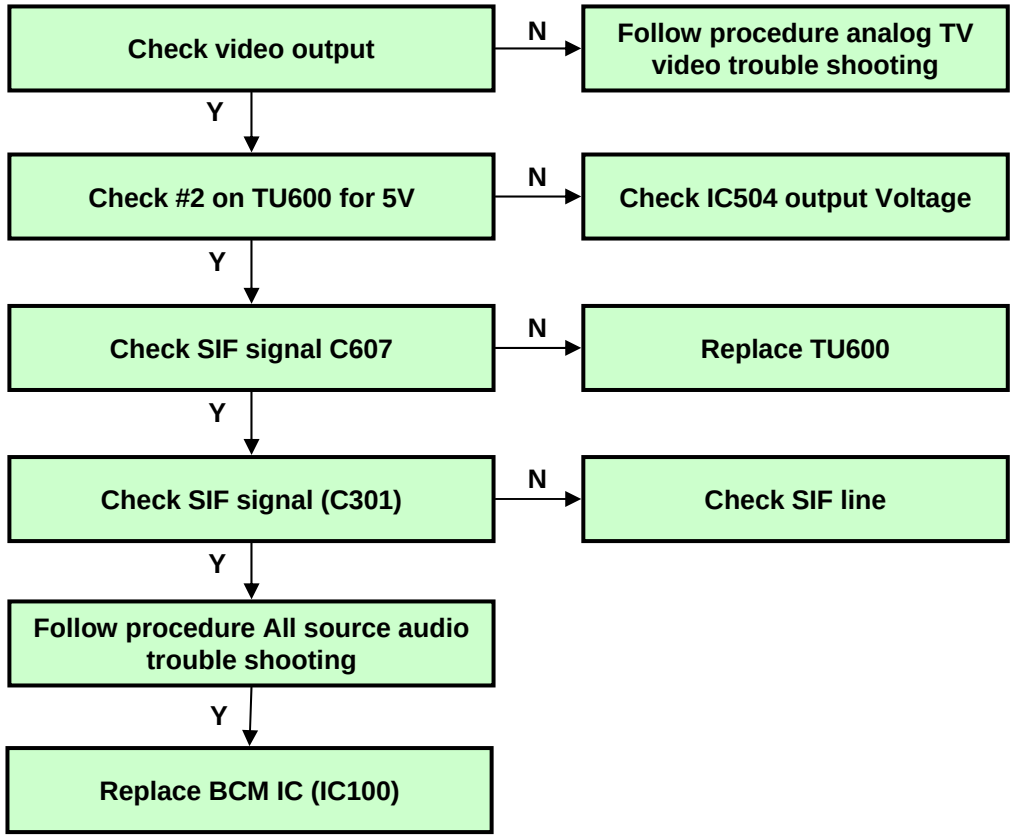

Make sure you can't hear any audio
Y
Check speaker for damage.
N
Replace the Speaker
Y
Check Connector P703
N
Replace P703
Y
Check IC700 Power 17V(L704), 3.3V(L702,L703)
N
Check 17V (P500 #1,2), 3.3V (IC505 #2)
Y
Check IC700 Status PDN(#19) / Reset(#25) is High?
N
Check Reset / PDN (R702) :They must be High (3.3V)
Y
Check SCL,SDA R707, R708
N
Replace R707, 708
Y
Check BCM I2S Output R114, #21, 22, 23 on IC700
N
Replace BCM(IC100).
Y
Replace AMP(IC700)

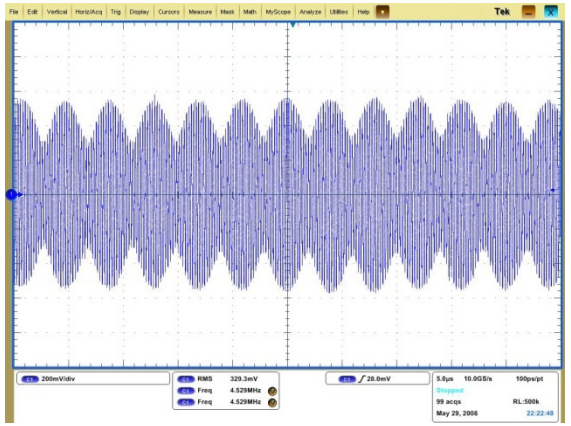
◆ Digital TV



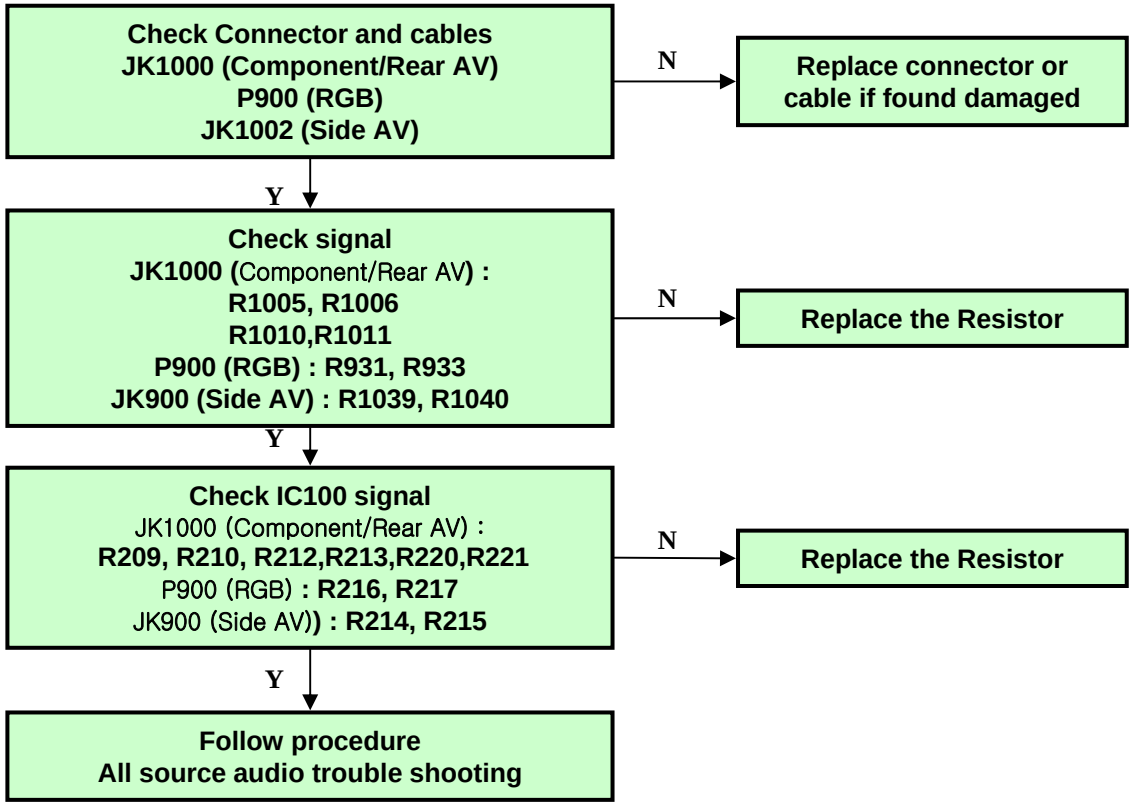
◆ HDMI

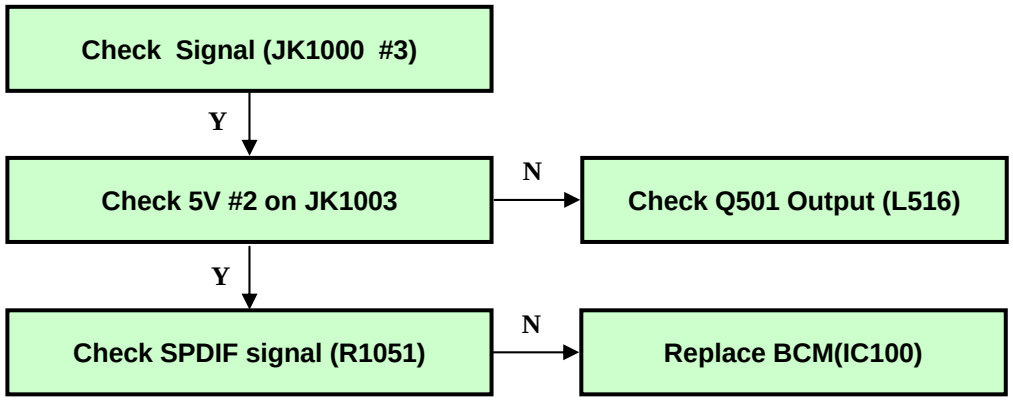


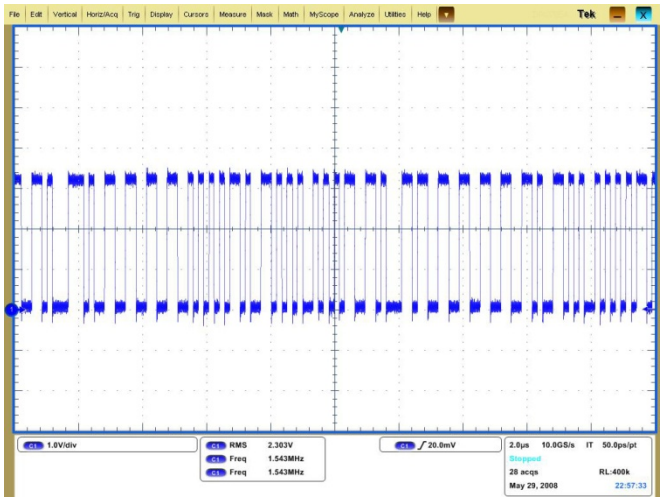




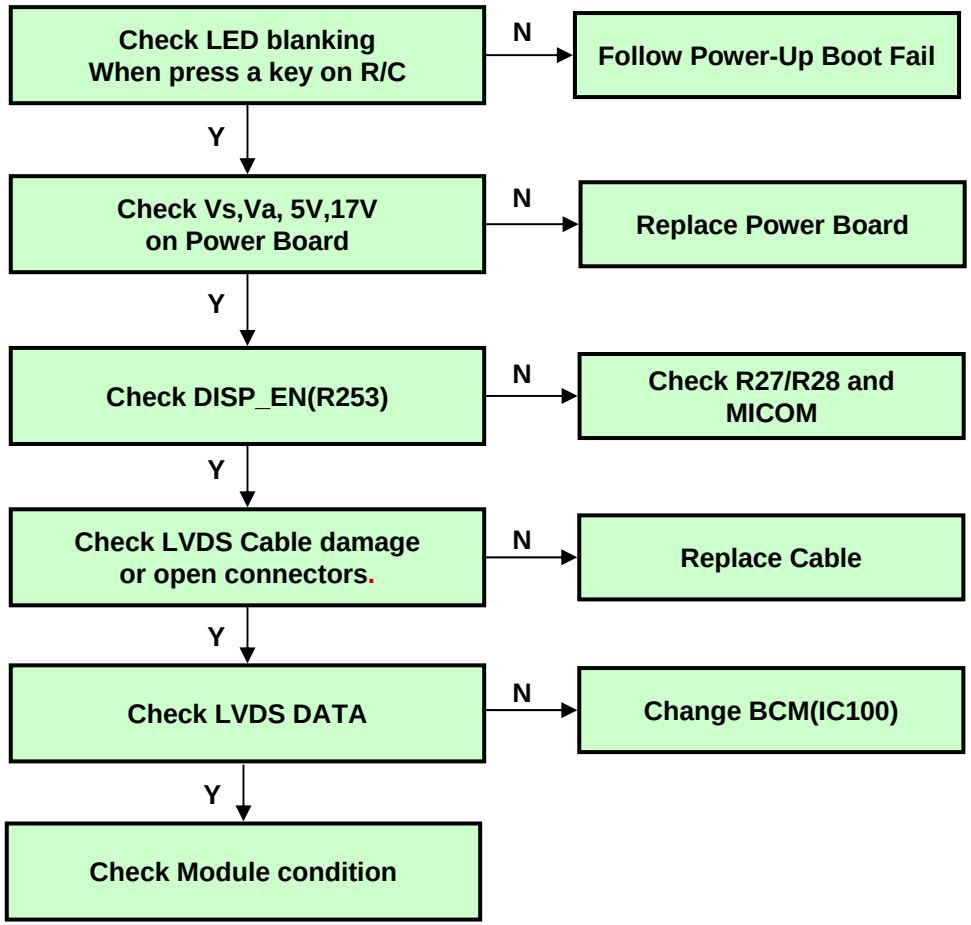
< SIF waveform – sample >
- Defend on the input signal.

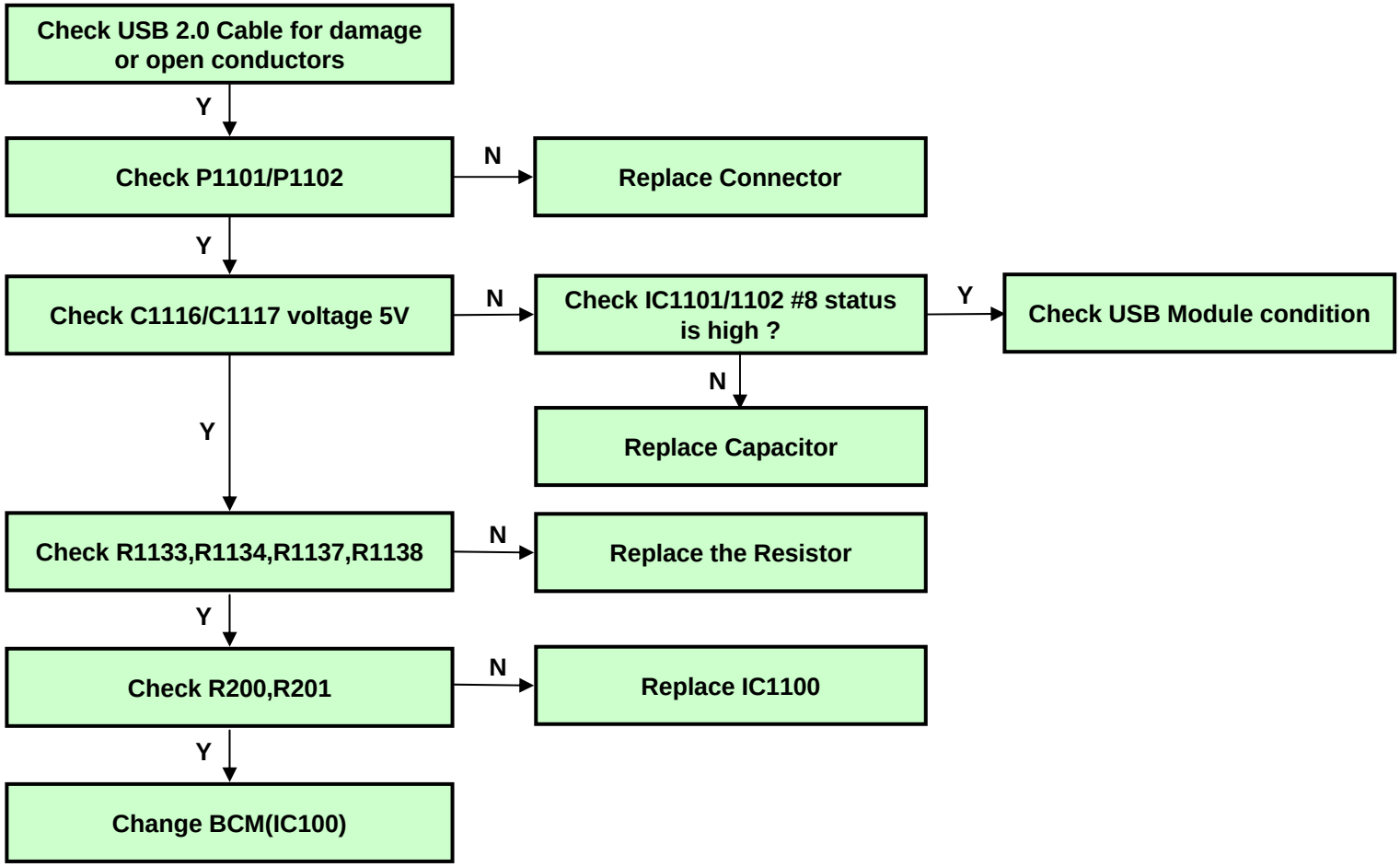

Check Connector and cables
JK1000 (Component/Rear AV)
P900 (RGB)
JK1002 (Side AV)
N
Replace connector or cable if found damaged
Y
Check signal
JK1000 (Component/Rear AV) :
R1005, R1006
R1010,R1011
P900 (RGB) : R931, R933
JK900 (Side AV) : R1039, R1040
N
Replace the Resistor
Y
Check IC100 signal
JK1000 (Component/Rear AV) :
R209, R210, R212,R213,R220,R221
P900 (RGB) : R216, R217
JK900 (Side AV)) : R214, R215
N
Replace the Resistor
Y
Follow procedure
All source audio trouble shooting

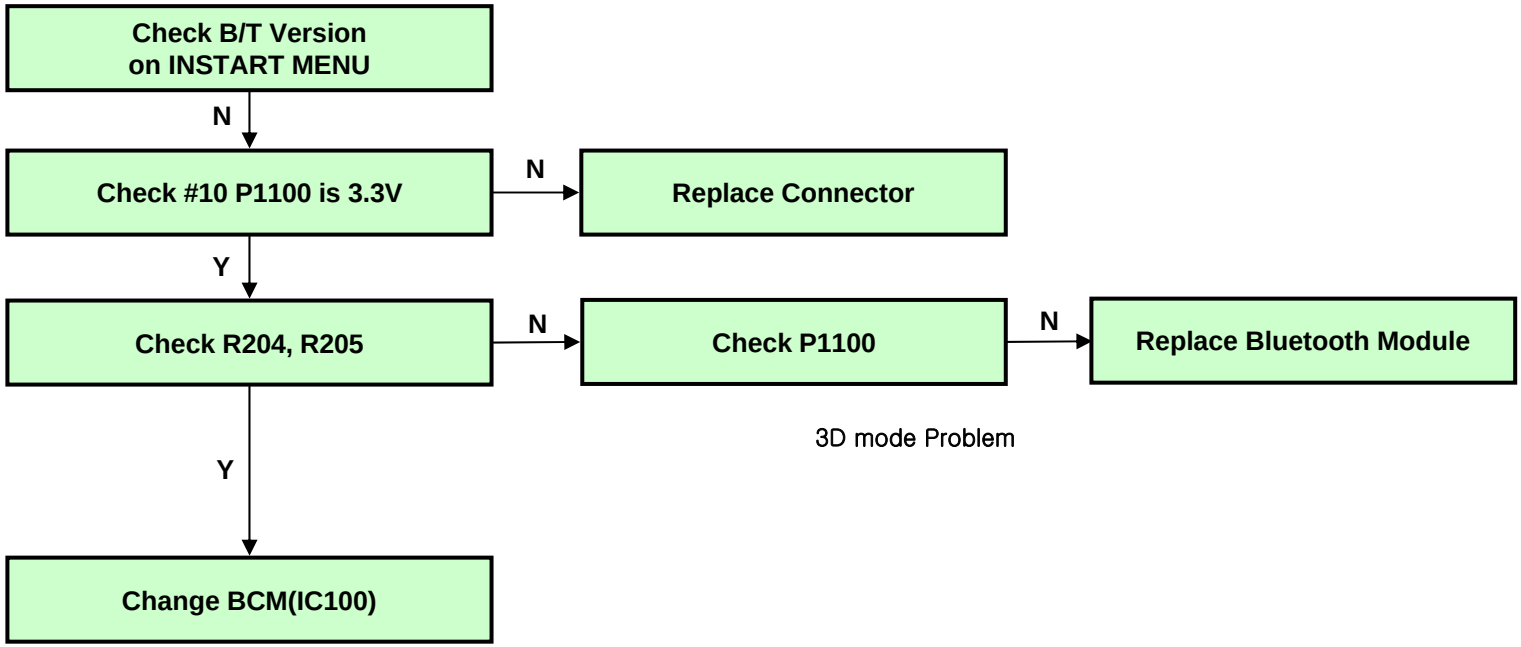




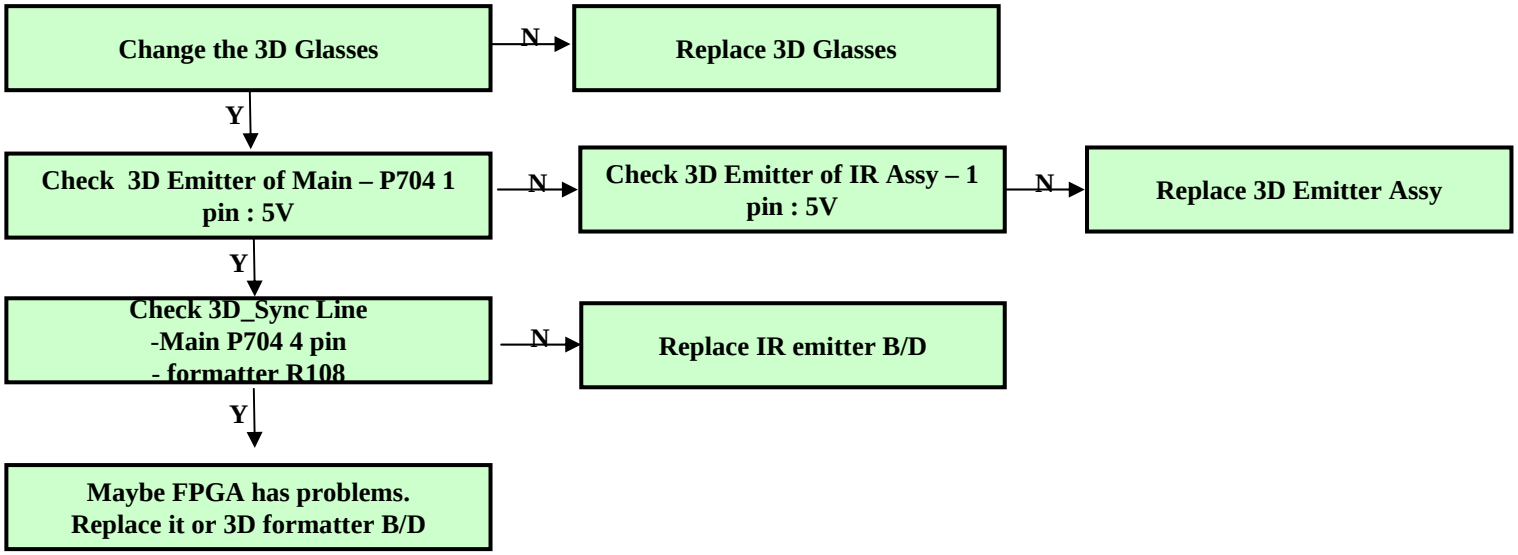
< SPDIF waveform – sample >
- Defend on the input signal.


Check LED blanking
When press a key on R/C
N
Follow Power-Up Boot Fail
Y
Check Vs,Va, 5V,17V
on Power Board
N
Replace Power Board
Y
Check DISP_EN(R253)
N
Check R27/R28 and
MICOM
Y
Check LVDS Cable damage
or open connectors.
N
Replace Cable
Y
Check LVDS DATA
N
Change BCM(IC100)
Y
Check Module condition


Check USB 2.0 Cable for damage or open conductors
Y
Check P1101/P1102
N
Replace Connector
Y
Check C1116/C1117 voltage 5V
N
Check IC1101/1102 #8 status is high ?
Y
Check USB Module condition
N
Replace Capacitor
Y
Check R1133,R1134,R1137,R1138
N
Replace the Resistor
Y
Check R200,R201
N
Replace IC1100
Y
Change BCM(IC100)



3D mode Problem


Change the 3D Glasses
N
Replace 3D Glasses
Y
Check 3D Emitter of Main – P704 1 pin : 5V
N
Check 3D Emitter of IR Assy – 1 pin : 5V
N
Replace 3D Emitter Assy
Y
Check 3D_Sync Line
-Main P704 4 pin
- formatter R108
N
Replace IR emitter B/D
Y
Maybe FPGA has problems.
Replace it or 3D formatter B/D