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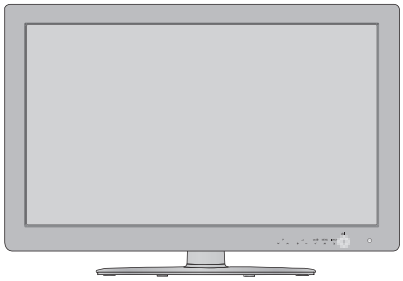
LCD TV
SERVICE MANUAL

CHASSIS : LC01A

MODEL : 26LE5300 26LE5300-CA

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



P/NO : MFL62863012 (1007-REV00) Printed in China

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SAFETY PRECAUTIONS

IMPORTANT SAFETY NOTICE

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

General Guidance

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

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

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

When replacing a high wattage resistor (Oxide Metal Film Resistor, over 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,

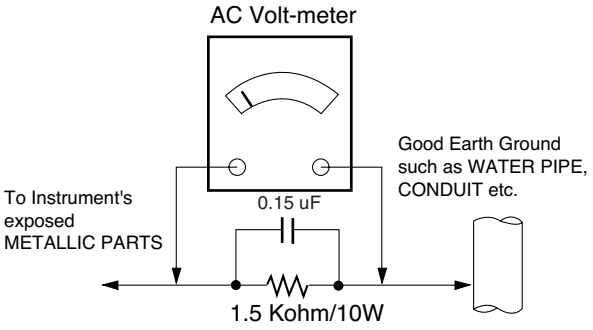
always perform an **AC leakage current check** on the exposed metallic parts of the cabinet, such as antennas, terminals, etc., to be sure the set is safe to operate without damage of electrical shock.

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 MΩ and 5.2 MΩ.
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 uF 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 0.5 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

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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 LC03E chassis.

2. Requirement for Test

Each part is tested as below without special appointment.

1) Temperature: 25 ºC ± 5 ºC(77 ºF ± 9 ºF), CST: 40 ºC ± 5 ºC
2) Relative Humidity : 65 % ± 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. Module General Specification

No.	Item	Specification		Remark
1	Display Screen Device	26 inch wide color display module		
2	Aspect Ratio	16:9		
3	LCD Module	26 inch TFT LCD FHD		
4	Operating Environment	Temp. : 0 deg ~ 50 deg		
		Humidity : 20 % ~ 90 %		
5	Storage Environment	Temp. : -20 deg ~ 60 deg		
		Humidity : 10 ~ 90 %		
6	Input Voltage	AC 100-240V~, 50 / 60Hz		
7	Power Consumption	Power on (White)		
		LGD	Typ : 43.2W	LCD (Module) + Backlight(Lamp)
8	Module Size	613(H) x 361(V) x 14.9 mm(D)		
8	Pixel Pitch	0.1405 (H) x 0.4215 (V)		
9	Back Light	LED(EDGEL)		
10	Display Colors	1.06 B(true) colors		
11	Coating	3H,AG		

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5. LCD Module

5.1. 22” LCD Module (LGD) LC216EXN-SCA1

No.	Item	Specification		Min.	Typ.	Max.	Remark
1.	Viewing Angle<CR>10>	Right/Left/Up/Down		89			Degree
2.	Luminance	Luminance (cd/m^2)			300		
		Variation			-	1.3	MAX/MIN
3.	Contrast Ratio	CR		700	1000		
4.	CIE Color Coordinates	White	WX	Typ - 0.03	0.279	Typ +0.03	
			WY		0.292		
		RED	Xr		0.651		
			Yr		0.332		
		Green	Xg		0.308		
			Yg		0.597		
		Blue	Xb		0.149		
			Yb		0.059		

1) Optical characteristics are determined after the unit has been ‘ON’ and stable in a dark environment at 25 °C ± 2 °C
2) Surface luminance is the luminance value at center 1-point across the LCD surface 50cm from the surface with all pixels displaying white.

6. Chroma (Vivid)

- except “RGB PC Mode PSM: Standard, Color Temperature:Medium”
** The W/B Tolerance is ±0.002 for Adjustment, but for DQA ±0.015

No.	Item		Min	Typ	Max	Remark	
1.	Cool	White Balance,X axis	0.274	0.276	0.278	DQA : ±0.015	PSM: Vivid,
		White Balance,Y axis	0.281	0.283	0.285		White (85IRE)
2.	Medium	White Balance,X axis	0.283	0.285	0.287		Color Temp : C50 -> Cool
		White Balance,Y axis	0.291	0.293	0.295		0 -> Medium
3.	Warm	White Balance,X axis	0.311	0.313	0.315		W50 -> Warm
		White Balance,Y axis	0.327	0.329	0.331		

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7. Component Video Input (Y, CB/PB, CR/PR)

No	Specification				Remark
	Resolution	H-freq(kHz)	V-freq(Hz)		
1.	720x480	15.73	60.00	SDTV,DVD 480i	
2.	720x480	15.63	59.94	SDTV,DVD 480i	
3.	720x480	31.47	59.94	480p	
4.	720x480	31.50	60.00	480p	
5.	720x576	15.625	50.00	SDTV,DVD 625 Line	
6.	720x576	31.25	50.00	HDTV 576p	
7.	1280x720	37.50	50.00	HDTV 720p	
8.	1280x720	44.96	59.94	HDTV 720p	
9.	1280x720	45.00	60.00	HDTV 720p	
10.	1920x1080	28.125	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	67.43/67.5	59.94/60	HDTV 1080p	

8. RGB (PC)

No	Specification				Proposed	Remark
	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 60Hz, 852*480 60Hz -> 640*480 60Hz Display
3.	800*600	37.879	60.31	40.00	VESA	
4.	1024*768	48.363	60.00	65.00	VESA(XGA)	
5.	1280*768	47.78	59.87	79.5	WXGA	
6.	1360*768	47.72	59.8	84.75	WXGA	FHD model
7.	1366*768	47.56	59.6	84.75	WXGA	WXGA model
8.	1280*1024	63.595	60.0	108.875	SXGA	FHD model
9.	1280*720	45	60	74.25	720p	DTV standard
10.	1920*1080	66.587	59.93	138.625	WUXGA	FHD model

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9. HDMI Input (PC/DTV)

9.1. 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	

9.2. 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.	1280*768	47.78	59.87	79.5	WXGA	HDCP
6.	1360*768	47.72	59.8	84.75	WXGA	HDCP
7.	1280*1024	63.595	60.0	108.875	SXGA	HDCP, FHD model
8.	1920*1080	67.5	60	148.5	WUXGA	HDCP, FHD model

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ADJUSTMENT INSTRUCTION

1. Application Range

This specification sheet is applied to all of the LCD TV with LC01A chassis.

2. Designation

1) The adjustment is according to the order which is designated and which must be followed, according to the plan which can be changed only on agreeing.
2) Power Adjustment: Free Voltage
3) Magnetic Field Condition: Nil.
4) Input signal Unit: Product Specification Standard
5) Reserve after operation: Above 5 Minutes (Heat Run)
   Temperature : at 25 ºC ± 5 ºC
   Relative humidity : 65 % ± 10 %
   Input voltage : 220 V, 60 Hz
6) Adjustment equipments: Color Analyzer (CA-210 or CA-110), Pattern Generator(MSPG-925L or Equivalent), DDC Adjustment Jig equipment, Service remote control.
7) Push the "IN STOP" key - For memory initialization.

Case1 : Software version up
1. After downloading S/W by USB, TV set will reboot automatically
2. Push "In-stop" key
3. Push "Power on" key
4. Function inspection
5. After function inspection, Push "I n-stop" key.

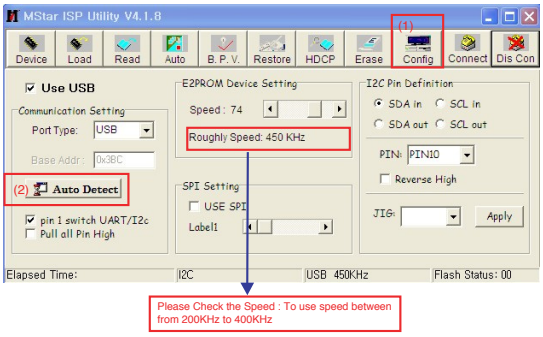
Case2 : Function check at the assembly line
1. When TV set is entering on the assembly line, Push "In-stop" key at first.
2. Push "Power on" key for turning it on.
   -> If you push "Power on" key, TV set will recover channel information by itself.
3. After function inspection, Push "In-stop" key.

3. Main PCB check process

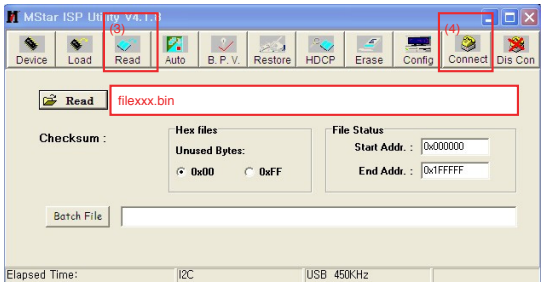
* APC - After Manual-Insert, executing APC

* Boot file Download

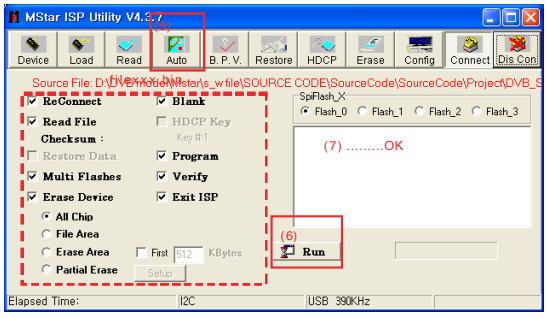
(1) Execute ISP program "Mstar ISP Utility" and then click "Config" tab.
(2) Set as below, and then click "Auto Detect" and check "OK" message.
If "Error" is displayed, Check connection between computer, jig, and set.



(3) Click "Read" tab, and then load download file (XXXX.bin) by clicking "Read".

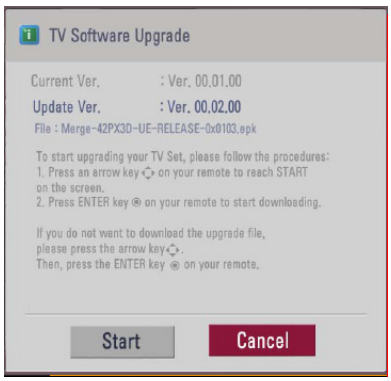


(4) Click "Connect" tab. If "Can't" is displayed, check connection between computer, jig, and set.
(5) Click "Auto" tab and set as below
(6) Click "Run".
(7) After downloading, check "OK" message.



* USB DOWNLOAD(*.epk file download)

(1) Put the USB Stick to the USB socket.
(2) Automatically detecting update file in USB Stick.
- If version of update file in USB Stick is Lower, it didn't work. But version of update file is Higher, USB data is automatically detecting



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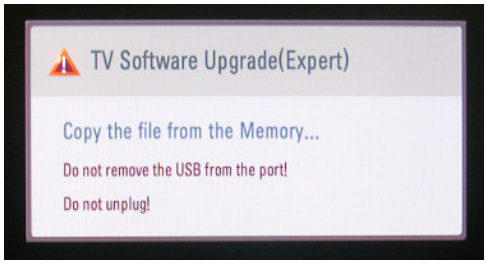
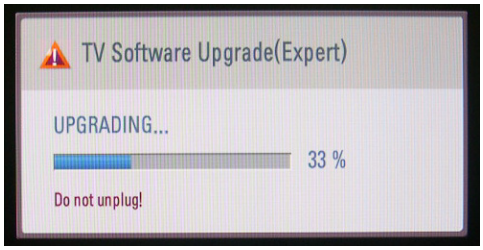
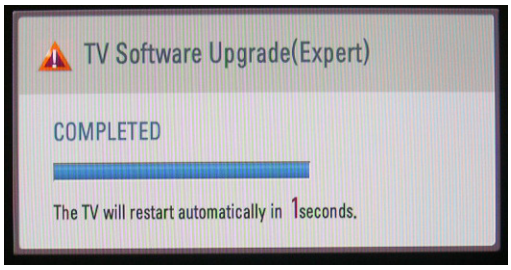
(3) Show the message “Copying files from memory”



(4) Updating is staring.



(5) After updating is complete, the TV will restart automatically.



(6) If TV turns on, check your updated version and Tool option. (refer to the next page about tool option)

* If downloading version is higher 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) Enter ‘EZ ADJUST’ mode by pushing ‘ADJ’ key.
(2) Select each ‘Tool Option(1~5)’ and push ‘OK’ or ‘►’ key.
(3) Correct the number. (Each model has their number.)

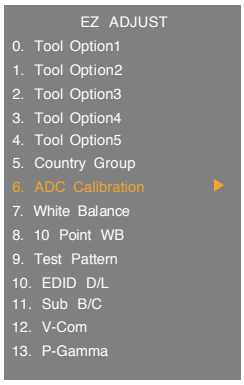
Model	Tool option1	Tool option2	Tool option3	Tool option4	Tool option 5
26LE5300	12512	18954	52260	14604	32

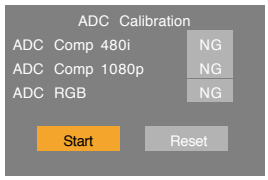
(4) Correction Tool option is complete.

3.1. ADC Process

* You need not connecting RGB(D-sub) cable. Because ADC uses TV internal pattern.

• Enter ‘EZ ADJUST’ mode by pushing ‘ADJ’ key,
• Enter ‘ADC Calibration’ mode by pushing ‘OK’ or “►” key after selecting “6. ADC Calibration”.





<Caution> Turn on Tv by pushing ‘POWER ON’ or ‘P-ONLY’ key.

* ADC Calibration Protocol (RS232)

Item	CMD1	CMD2	Data0		
Adjust ‘Mode In’	A	A	0	0	When transfer the ‘Mode In’, Carry the command.
ADC Adjust	A	D	1	0	Automatically adjustment (The use of a internal pattern)

Adjust Sequence
• aa 00 00 [Enter Adjust Mode]
• xb 00 40 [Component1 Input (480i)]
• ad 00 10 [Adjust 480i Comp1]
• xb 00 60 [RGB Input (1024*768)]
• ad 00 10 [Adjust 1024*768 RGB]
• aa 00 90 End Adjust mode
* Required equipment : factory Service Remote control

3.2. Function Check

(1) Check display and sound
- Check Input and Signal items.
1) TV
2) AV
3) COMPONENT (480i)
4) RGB (PC : 1024 x 768 @ 60hz)
5) HDMI 1/2/3
6) PC Audio In

* Display and Sound check is executed by remote control.

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4.3. White Balance Adjustment

4.3.1 Overview

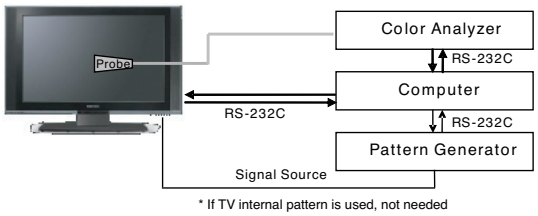
(1) W/B adj. Objective & How-it-works
(2) Objective: To reduce each Panel's W/B deviation
(3) How-it-works : When R/G/B gain in the OSD is at 192, it means the panel is at its Full Dynamic Range. In order to prevent saturation of Full Dynamic range and data, one of R/G/B is fixed at 192, and the other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

4.3.2 Equipment

1) Color Analyzer: CA-210 (LED Module : CH 14)
2) Adj. Computer(During auto adj., RS-232C protocol is needed)
3) Adjust Remocon
4) Video Signal Generator MSPG-925F 720p/216-Gray (Model:217, Pattern:78)
  -> Only when internal pattern is not available

■ Color Analyzer Matrix should be calibrated using CS-1000

4.3.3. Equipment connection MAP



4.3.4. Adj. Command (Protocol)

<Command Format>

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

- LEN: Number of Data Byte to be sent
- CMD: Command
- VAL: FOS Data value
- CS: Checksum of sent data
- A: Acknowledge

Ex) [Send: JA_00_DD] / [Ack: A_00_okDDX]

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

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

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(end)) -> Off-set adj.
wb 00 ff -> End white balance auto-adj.

■ Adj. Map

	ITEM	Command (lower case ASCII)		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					

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4.3.5. 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 -> 7. 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 7.White Balance, you can select one of 2 Test-pattern: ON, OFF. Default is inner(ON). By selecting OFF, you can adjust using RF signal in 216 Gray pattern.

■ Adj. condition and cautionary items
1) Lighting condition in surrounding area
Surrounding lighting should be lower 10 lux. Try to isolate adj. area into dark surrounding.
2) Probe location
: Color Analyzer (CA-210) probe should be within 10 cm 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.

4.3.6. Reference (White Balance Adj. coordinate and temperature)

■ Luminance : 216 Gray
■ Standard color coordinate and temperature using CS-1000 (over 66cm(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 9)

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

■ 10 Point White Balance

On / Off	On / Off
Pattern	Outer(default)
IRE	100
Luminance	130
Red(130.0 nit)	0
Green(130.0 nit)	0
Blue(130.0 nit)	0

■ Color Coordinate Variation by Aging time

LGD Edge LED	Aging Time (Min.)	Cool (13,000 K)	Medium (93,000 K)	Warm (65,000 K)
1	0-2	276/285	292/305	315/334
2	3-5	274/282	290/302	313/332
3	6-9	273/280	289/300	312/330
4	10-15	272/278	288/298	311/328
5	20-35	271/276	287/296	310/326
6	36-49	269/274	286/294	309/324
7	50-79	269/273	286/293	308/323
8	Over 80	269/273	285/293	308/323

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4.3. DDC EDID Write (RGB 128Byte)

· Connect D-sub Signal Cable to D-Sub Jack.
· Write EDID DATA to EEPROM (24C02) by using DDC2B protocol.
· Check whether written EDID data is correct or not.
* For SVC main Ass'y, EDID have to be downloaded to Insert Process in advance.

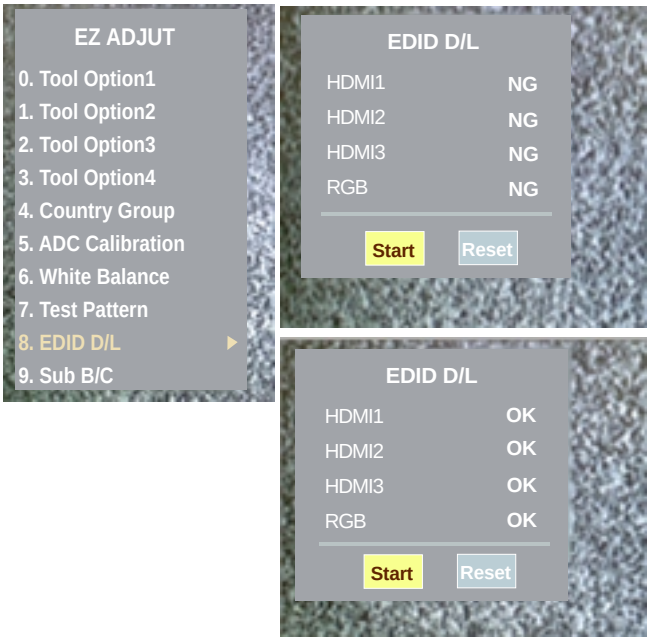
4.4 DDC EDID Write (HDMI 256Byte)

· Connect HDMI Signal Cable to HDMI Jack.
· Write EDID DATA to EEPROM(24C02) by using DDC2B protocol.
· Check whether written EDID data is correct or not.
* For SVC main Ass'y, EDID have to be downloaded to Insert Process in advance.

4.5 EDID DATA

1) All Data : HEXA Value
2) Changeable Data :
*: Serial No : Controlled / Data:01
**: Month : Controlled / Data:00
***:Year : Controlled
****:Check sum

- Auto Download



* EDID data and Model option download (RS232)

Item	CMD1	CMD2	Data0		
Download 'Mode In'	A	A	0	0	When transfer the 'Mode In', Carry the command.
Download	A	E	00	10	Automatically Download (The use of a internal pattern)

- Manual Download

* Caution
1) Use the proper signal cable for EDID Download
- Analog EDID : Pin3 exists
- Digital EDID : Pin3 exists
2) Nerver connect HDMI & D-sub Cable at the same time.
3) Use the proper cables below for EDID Writing.
4) Download HDMI1, HDMI2 separately because each data is different.

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

(1) RGB EDID data : 128 byte

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	00	FF	FF	FF	FF	FF	FF	00	1E	6D	ⓐ		ⓑ			
10	ⓒ		01	03	68	10	09	78	0A	EE	91	A3	54	4C	99	26
20	0F	50	54	A1	08	00	81	80	61	40	45	40	31	40	01	01
30	01	01	01	01	01	01	02	3A	80	18	71	38	2D	40	58	2C
40	45	00	A0	5A	00	00	00	1E	01	1D	00	72	51	D0	1E	20
50	6E	28	55	00	A0	5A	00	00	00	1E	00	00	00	FD	00	3A
60	3E	1E	53	10	00	0A	20	20	20	20	20	20	ⓓ			
70	ⓓ														00	ⓔ

(2) HDMI EDID data : 256 byte

0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
00	00	FF	FF	FF	FF	FF	FF	00	1E	6D	ⓐ		ⓑ			
10	ⓒ		01	03	80	10	09	78	0A	CF	74	A3	54	4C	99	26
20	0F	50	54	A1	08	00	81	80	61	40	45	40	31	40	01	01
30	01	01	01	01	01	01	02	3A	80	18	71	38	2D	40	58	2C
40	45	00	A0	5A	00	00	00	1E	01	1D	00	72	51	D0	1E	20
50	6E	28	55	00	A0	5A	00	00	00	1E	00	00	00	FD	00	3A
60	3E	1E	53	10	00	0A	20	20	20	20	20	20	ⓓ			
70	ⓓ														01	ⓔ
80	02	03	20	F1	4E	10	1F	84	13	05	14	03	02	12	20	21
90	22	15	01	26	15	07	50	09	57	07	ⓕ					
A0	ⓕ		E3	05	03	01	01	1D	80	18	71	1C	16	20	58	2C
B0	25	00	A0	5A	00	00	00	9E	01	1D	00	80	51	D0	0C	20
C0	40	80	35	00	A0	5A	00	00	00	1E	02	3A	80	18	71	38
D0	2D	40	58	2C	45	00	A0	5A	00	00	00	1E	66	21	50	B0
E0	51	00	1B	30	40	70	36	00	A0	5A	00	00	00	1E	00	00
F0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	ⓔ

Item	Condition	Data(Hex)
Manufacturer ID	GSM	1E6D
Version	Digital : 1	01
Revision	Digital : 3	03

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* Detail EDID Options are below

ⓐ Product ID

MODEL	HEX	EDID Table	DDC Fuction
FHD	0001	01 00	Analog/Digital

ⓑ Serial No: Controlled on production line.

ⓒ Week, Year:Fixed as S/W released day(same as MES data)
ex) Week : 0x02(2), Year 0x13(2009)

ⓓ Model Name(Hex):

MODEL	Model name(HX)
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.

MODEL	RGB	HDMI1	HDMI2	HDMI3	Remark
HD	0x93	0x7A, 0xD5	0x7A, 0xC5	0x7A, 0xB5	*HDMI3:only 26LE5300

ⓕ Vendor Specific(HDMI)

INPUT	MODEL NAME(HEX)	Remark
HDMI1	65 03 0C 00 10 00	
HDMI2	65 03 0C 00 20 00	
HDMI3	65 03 0C 00 30 00	* Only LD550

4.7. Outgoing condition Configuration

- When pressing IN-STOP key by SVC remocon, Red LED are blinked alternatively. And then Automatically turn off. (Must not AC power OFF during blinking)

4.8. Internal pressure

Confirm whether is normal or not when between power board's ac block and GND is impacted on 1.5 kV(dc) or 2.2 kV(dc) for one second.

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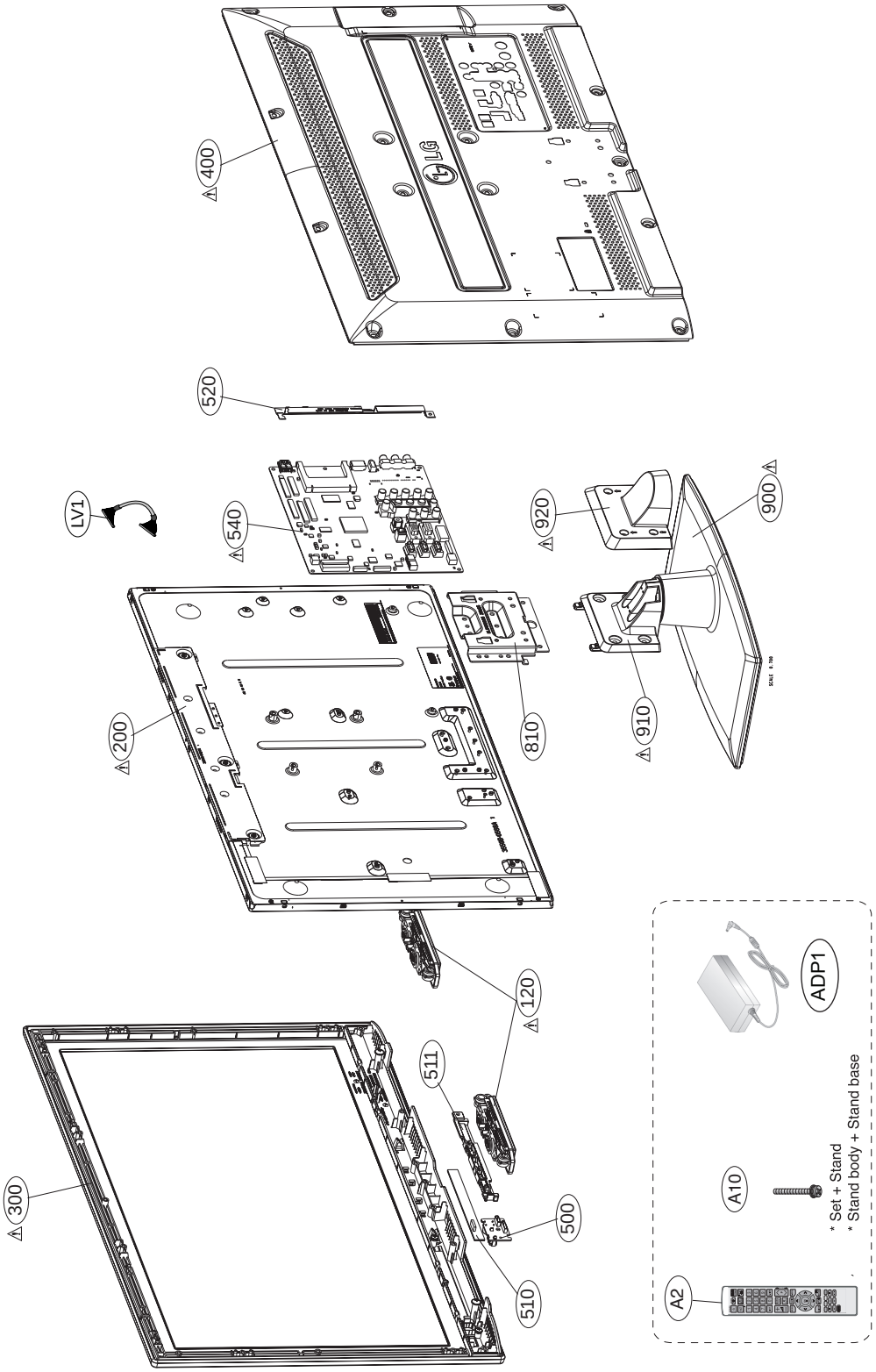
EXPLODED VIEW

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.



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NAND FLASH MEMORY

IC102
HY27UF082G2B-TPCB
2GBIT

+3.3V_Normal

/PF_CE0
H : Serial Flash
L : NAND Flash
/PF_CE1
H : 16 bit
L : 8 bit

/F_RB
/PF_OE
/PF_CE0
/PF_CE1
PF_ALE
/PF_WE
/PF_WP

R107 1K
R109 3.9K
R108 1K OPT
C101 0.1uF
R105 1K OPT
R104 10K OPT
R103 0
R101 3.3K
R102 3.3K
R106 4.7K
Q101 KRC103S OPT
+3.5V_ST

NC_1 NC_2 NC_3 NC_4 NC_5 NC_6 R/B RE CE NC_7 NC_8 VCC_1 VSS_1 NC_9 NC_10 CLE ALE WE WP NC_11 NC_12 NC_13 NC_14 NC_15

NC_29 NC_28 NC_27 NC_26 I/O7 I/O6 I/O5 I/O4 NC_25 NC_24 NC_23 VCC_2 VSS_2 NC_22 NC_21 NC_20 I/O3 I/O2 I/O1 I/O0 NC_19 NC_18 NC_17 NC_16

AR101
PCM_A[7] PCM_A[6] PCM_A[5] PCM_A[4]
22
C102 10uF
C103 0.1uF

AR102
PCM_A[3] PCM_A[2] PCM_A[1] PCM_A[0]
22

PCM_A[0-7]

<T3 CHIP Config(AUD_LRCH)>

Boot from SPI flash : 1'b0
Boot from NOR flash : 1'b1

<T3 CHIP Config>
(AUD_SCK, AUD_MASTER_CLK, PWM1, PWM0)

MIPS_no_EJ_NOR8 : 4'h3 (MIPS as host. No EJ PAD. Byte mode NAND flash.)
MIPS_EJ1_NOR8 : 4'h4 (MIPS as host. EJ use PAD1. Byte mode NAND flash.)
MIPS_EJ2_NOR8 : 4'h5 (MIPS as host. EJ use PAD2. Byte mode NAND flash.)
B51_Secure_no scramble : 4'hb (8051 as host. Internal SPI flash secure boot, no scramble)
B51_Sesure_scramble : 4'hc (8051 as host. Internal SPI flash secure boot with scarmble)

+3.3V_Normal
R115 1K OPT
R117 1K OPT
R120 1K OPT
R123 1K OPT
R125 1K OPT
R118 1K OPT
R119 1K OPT
R121 1K OPT
R124 1K OPT
R126 1K OPT
AUD_LRCH
AUD_SCK
AUD_MASTER_CLK
PWM1
PWM0

IC101
LGE101D (S7 Non_Tcon/RM)

S7_DIVX

PCM_D[0-7] → PCM_D[0] U22, PCM_D[1] T21, PCM_D[2] T22, PCM_D[3] AB18, PCM_D[4] AC18, PCM_D[5] AC19, PCM_D[6] AC20, PCM_D[7] AC21
PCM_A[0-14] → PCM_A[0] U21, PCM_A[1] V21, PCM_A[2] Y22, PCM_A[3] AA22, PCM_A[4] R22, PCM_A[5] R21, PCM_A[6] T23, PCM_A[7] T24, PCM_A[8] AA23, PCM_A[9] Y20, PCM_A[10] AB17, PCM_A[11] AA21, PCM_A[12] U23, PCM_A[13] Y23, PCM_A[14] W23

PCM_D0 PCM_D1 PCM_D2 PCM_D3 PCM_D4 PCM_D5 PCM_D6 PCM_D7
PCM_A0 PCM_A1 PCM_A2 PCM_A3 PCM_A4 PCM_A5 PCM_A6 PCM_A7 PCM_A8 PCM_A9 PCM_A10 PCM_A11 PCM_A12 PCM_A13 PCM_A14

/PCM_REG → PCM_REG_N W22
/PCM_OE → PCM_OE_N AA17
/PCM_WE → PCM_WE_N V22
/PCM_IORD → PCM_IORD_N W21
/PCM_IOWR → PCM_IOWR_N Y21

+5V_Normal
R132 10K
R133 10K
/PCM_CE → PCM_CE_N AA20
/PCM_IRQA → PCM_IRQA_N V23
/PCM_CD → PCM_CD_N P23
/PCM_WAIT → PCM_WAIT_N R23
PCM_RST → PCM_RESET P22
C108 0.1uF OPT
C109 0.1uF

AR104
/PF_CE0 → PCM_PF_CE0Z AC17
/PF_CE1 → PCM_PF_CE1Z AB20
/PF_OE → PCM_PF_OEZ AA18
/PF_WE → PCM_PF_WEZ AB21
PF_ALE → PCM_PF_ALE AB19
/PF_WP → PCM_PF_AD[15] AD17
/F_RB → PCM_PF_RBZ AA19
AR103
22

S7_TXD → UART_TX2/GPIO65 M23
S7_RXD → UART_RX2/GPIO64 N23
R134 22
R135 22

for SYSTEM/HDCP EEPROM&URSA3
I2C_SDA → DDCR_DA/GPIO71 M22
I2C_SCL → DDCR_CK/GPIO72 N22
R136 22
R137 22
RGB_DDC_SDA → DDCA_DA/UART0_TX A5
RGB_DDC_SCL → DDCA_CK/UART0_RX B5
R138 22
R139 22

TO SCART1
PWM0 → PWM0/GPIO66 K23
PWM1 → PWM1/GPIO67 K22
PWM2 → PWM2/GPIO68 G23
SC_RE2 → PWM3/GPIO69 G22
SC_RE1 → PWM4/GPIO70 G21

DSUB_DET → SAR0/GPIO31 C6
MODEL_OPT_0 → SAR1/GPIO32 B6
PCM_5V_CTL → SAR2/GPIO33 C8
/RST_PHY → SAR3/GPIO34 C7
/RST_HUB → SAR4/GPIO35 A6

TCON0/POL → 5V_DET_HDMI_1 N21
TCON2/GSP_R/GCLK1 → 5V_DET_HDMI_2 M21
TCON4/CPV/GSC/GCLK3 → 5V_DET_HDMI_4 L22
TCON6/FLK → 5V_DET_HDMI_3 L21
TCON8/CS2/FLK3 → SIDEAV_DET P21

GPIO36/UART3_RX → WIRELESS_DL_RX K21
GPIO37/UART3_TX → WIRELESS_DL_TX L23
GPIO38 → ET_RXER K20
GPIO39 → FRC_RESET L20
GPIO40 → SC1/COMP1_DET M20
GPIO41 → ERROR_OUT G20
GPIO42 → MODEL_OPT_0 G19
for WIRELESS READY
for ETHERNET PHY

OPT
GPIO50/UART1_RX → M_REMOTE_RX F20 22 R148
GPIO51/UART1_TX → M_REMOTE_TX F19 22 R149
OPT

GPIO6/PM0/INT0 → USB1_OCD E7
GPIO7/PM1/PM_UART_TX → USB1_CTL D7
GPIO8/PM2 → HP_DET E11
GPIO9/PM3 → CONTROL_ATTEN G9 0 R150
GPIO10/PM4 → MODEL_OPT_6 F9 0 R110
GPIO11/PM5/PM_UART_RX/INT1 → MODEL_OPT_1 C5
PM_SPI_CS1/GPIO12/PM6 E8 33 R146
PM_SPI_WP1/GPIO13/PM7 → /FLASH_WP E9
PM_SPI_WP2/GPIO14/PM8/INT2 → MODEL_OPT_2 F7
GPIO15/PM9 → TUNER_RESET F6
PM_SPI_CS2/GPIO16/PM10 → DEMOD_RESET D8
GPIO17/PM11/INT3 → AV_CVBS_DET G12
GPIO18/PM12/INT4 F10

PM_SPI_CK/GPIO1 → SPI_SCK D9 33 R147
GPIO0/PM_SPI_CZ → /SPI_CS D11
PM_SPI_DI/GPIO2 → SPI_SDI E10
PM_SPI_DO/GPIO3 → SPI_SDO D10 33 R151
for SERIAL FLASH

TS0_CLK → CI_TS_CLK AA9
TS0_VLD → CI_TS_VAL AA5
TS0_SYNC → CI_TS_SYNC AA10
CI_TS_DATA[0-7]
from CI SLOT

TS0_D0 CI_TS_DATA[0] AB5
TS0_D1 CI_TS_DATA[1] AC4
TS0_D2 CI_TS_DATA[2] Y6
TS0_D3 CI_TS_DATA[3] AA6
TS0_D4 CI_TS_DATA[4] W6
TS0_D5 CI_TS_DATA[5] AA7
TS0_D6 CI_TS_DATA[6] Y9
TS0_D7 CI_TS_DATA[7] AA8

TS1_CLK → FE_TS_CLK AC5
TS1_VLD → FE_TS_VAL_ERR AC6
TS1_SYNC → FE_TS_SYNC AB6
FE_TS_DATA[0-7]
Internal demod out /External demod in

TS1_D0 FE_TS_DATA[0] AC10
TS1_D1 FE_TS_DATA[1] AB10
TS1_D2 FE_TS_DATA[2] AC9
TS1_D3 FE_TS_DATA[3] AB9
TS1_D4 FE_TS_DATA[4] AC8
TS1_D5 FE_TS_DATA[5] AB8
TS1_D6 FE_TS_DATA[6] AC7
TS1_D7 FE_TS_DATA[7] AB7

MPIF_CLK → D12
MPIF_CS_N → /PIF_SPI_CS D14
R160 1K
MPIF_BUSY → E14
MPIF_D0 E12
MPIF_D1 F12
MPIF_D2 D13
MPIF_D3 E13

IC102-*1
HY27US08121B-TPCB
512MBIT

NC_1 NC_2 NC_3 NC_4 NC_5 NC_6 R/B RE CE NC_7 NC_8 VCC_1 VSS_1 NC_9 NC_10 CLE ALE WE WP NC_11 NC_12 NC_13 NC_14 NC_15

NC_28 NC_27 NC_26 NC_25 I/O7 I/O6 I/O5 I/O4 NC_24 NC_23 PRE VCC_2 VSS_2 NC_22 NC_21 NC_20 I/O3 I/O2 I/O1 I/O0 NC_19 NC_18 NC_17 NC_16

IC102-*2
NAND01GW3A2CN6E
1GBIT

NC_1 NC_2 NC_3 NC_4 NC_5 NC_6 RB E NC_7 NC_8 VDD_1 VSS_1 NC_9 NC_10 CL AL W WP NC_11 NC_12 NC_13 NC_14 NC_15

NC_29 NC_28 NC_27 NC_26 I/O7 I/O6 I/O5 I/O4 NC_25 NC_24 NC_23 VDD_2 VSS_2 NC_22 NC_21 NC_20 I/O3 I/O2 I/O1 I/O0 NC_19 NC_18 NC_17 NC_16

HDCP EEPROM

IC103
CAT24WC08W-T
$0.199
+3.3V_Normal
A0 A1 A2 VSS VCC WP SCL SDA
R112 4.7K
C107 0.1uF
R127 4.7K
R128 22
R129 22
I2C_SCL
I2C_SDA

EEPROM

IC104
M24M01-HRMN6TP
+3.3V_Normal
NC E1 E2 VSS VCC WP SCL SDA
A0'h
C105 0.1uF
R111 22 I2C_SCL
R112 22 I2C_SDA
C104 8pF OPT
C106 8pF OPT

IC101-*1
LGE101 (S7 NON_TCON/DIX/RM)
S7_NON_DIVX

URSA degug port

UART_FRC_RX
UART_FRC_TX
FRC_SCL
FRC_SDA

I2C

+3.3V_Normal
R140 1K
R141 1K
R142 3.3K
R143 3.3K
R144 2.2K
R145 2.2K
AMP_SDA
AMP_SCL
I2C_SDA
I2C_SCL
NEC_SDA
NEC_SCL

DIMMING

A_DIM R156 10K PWM0
PWM_DIM R157 100 PWM2
R155 0
C111 2.2uF OPT
SCAN_BLK2 R158 100 FRC_PWM1
OPT
SCAN_BLK1/OPC_OUT R159 100 FRC_PWM0

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
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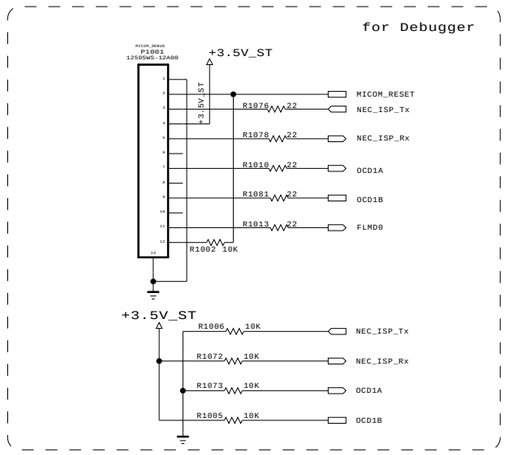
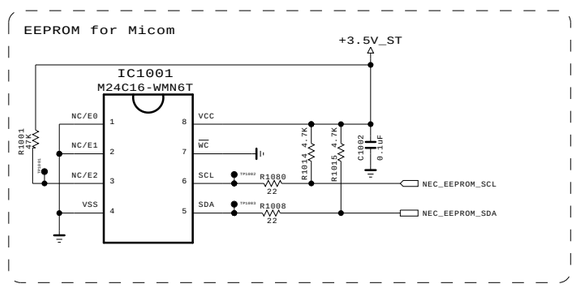
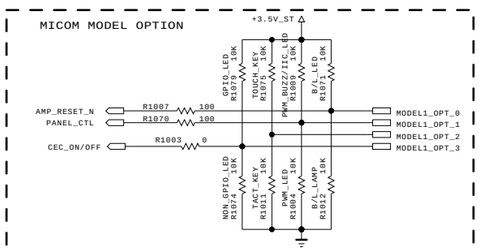
MODEL	GP2_Saturn7	DATE	Ver. 2.0
BLOCK	FLASH/EEPROM/GPIO	SHEET	1



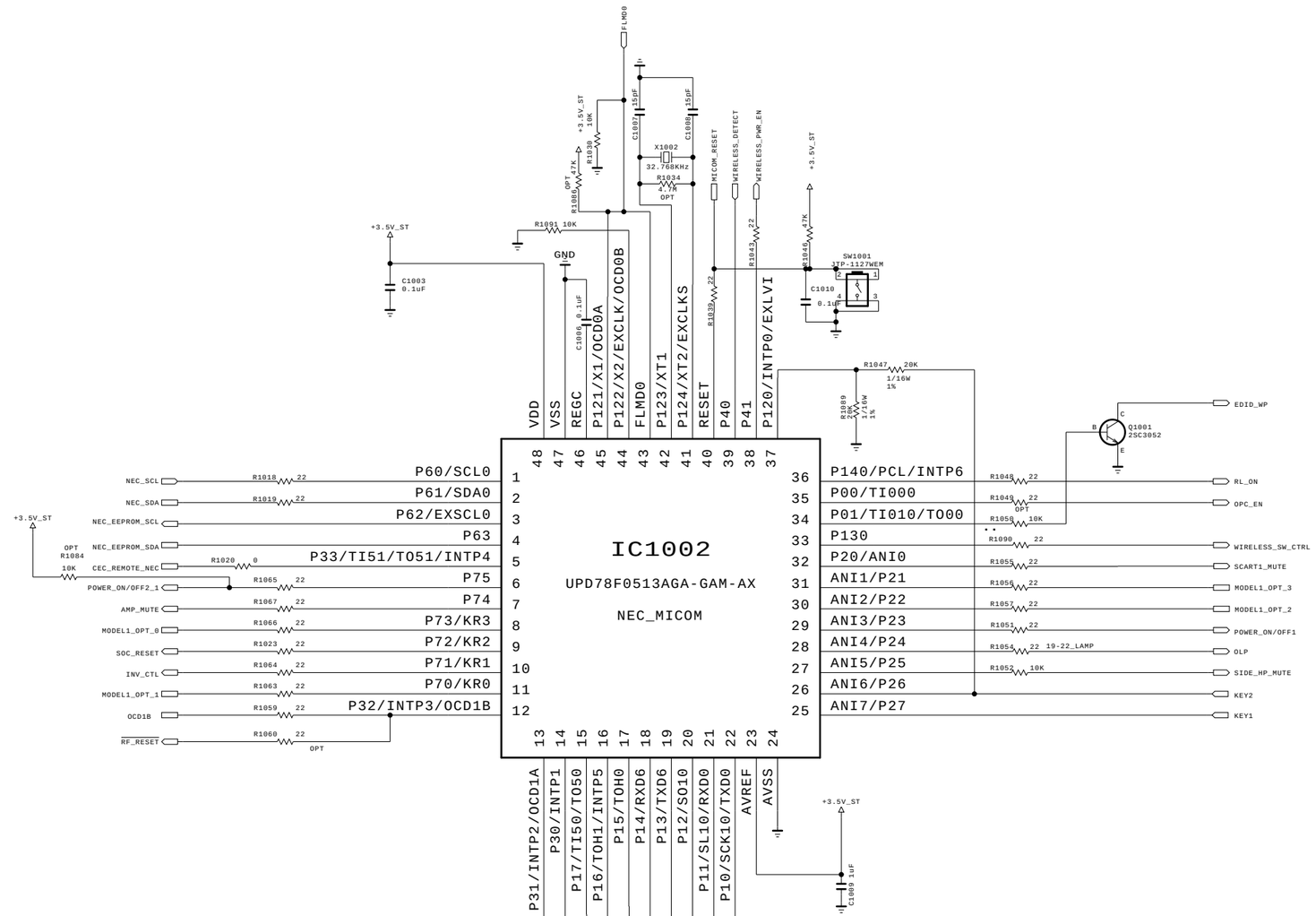




MODEL OPTION

PIN NAME	PIN NO.	HIGH	LOW
MODEL_OPT_0	8	B/L_LED	B/L_LAMP
MODEL_OPT_1	11	PWM_BUZZ/IIC_LED	PWM_LED
MODEL_OPT_2	30	TOUCH_KEY	TACT_KEY
MODEL_OPT_3	31	GPIO_LED	NON_GPIO_LED

MODEL_OPT_0	MODEL_OPT_1	MODEL_OPT_2	MODEL_OPT_3	
LOW	LOW	LOW	LOW	LD350/450/550
HIGH	LOW	HIGH	LOW	19/22/26LE3300(5500)
HIGH	HIGH	HIGH	LOW	32/37/42/47/55LE5300(10)
LOW	HIGH	LOW	LOW	LD420
HIGH	LOW	LOW	HIGH	LE7300
	HIGH		HIGH	TBD



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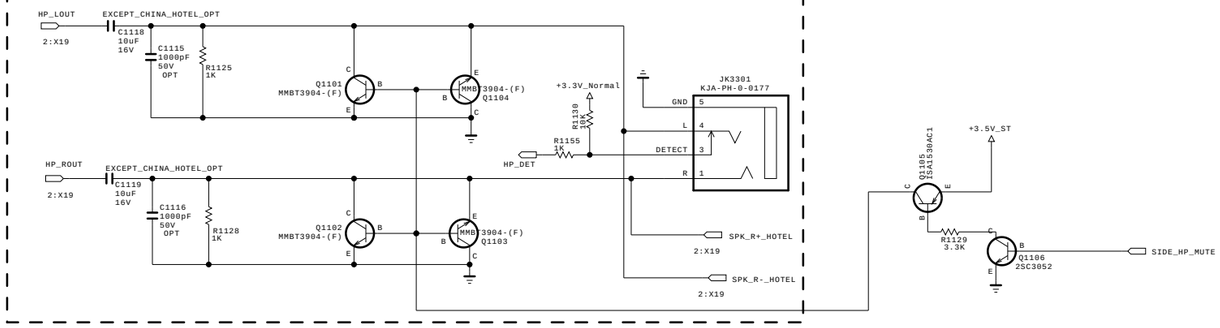
MODEL	GP2_Saturn7M	DATE	Ver. 1.4
BLOCK	MICOM	SHEET	5

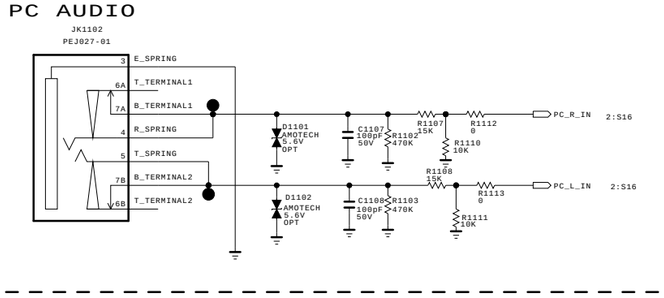
COMMON AREA

New Item Development

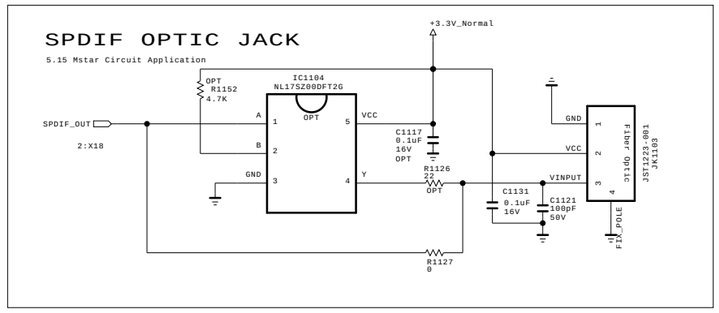
EARPHONE BLOCK



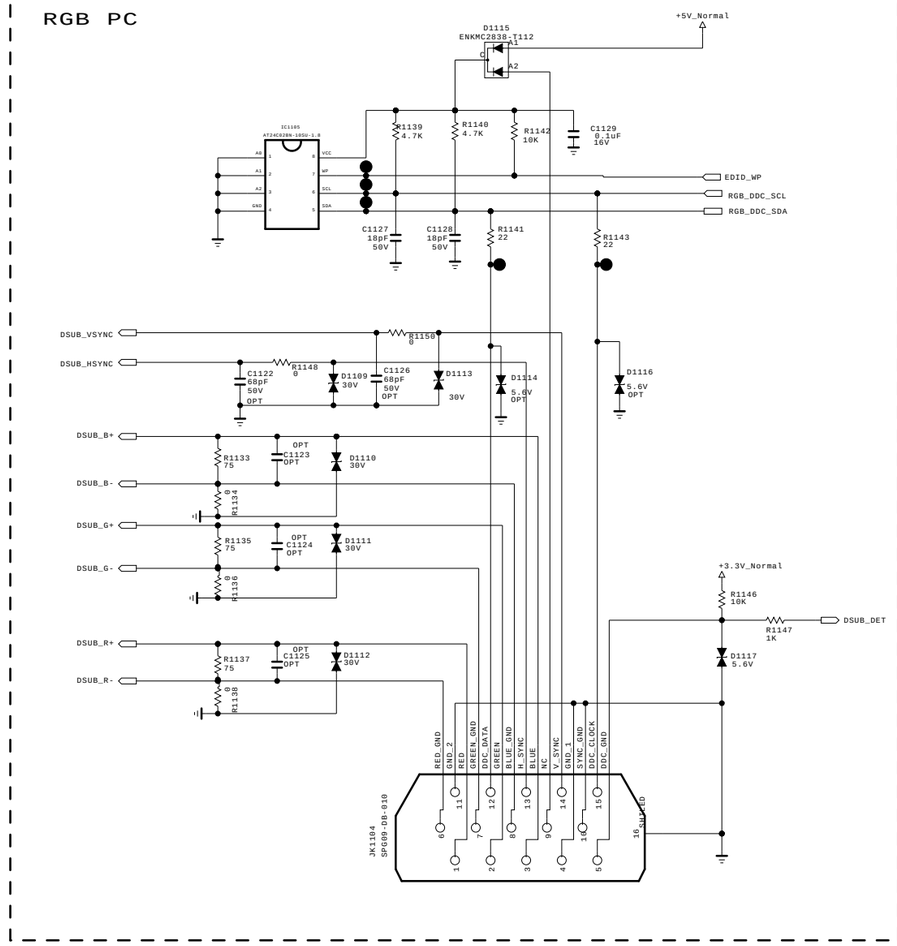
PC AUDIO



SPDIF OPTIC JACK



RGB PC



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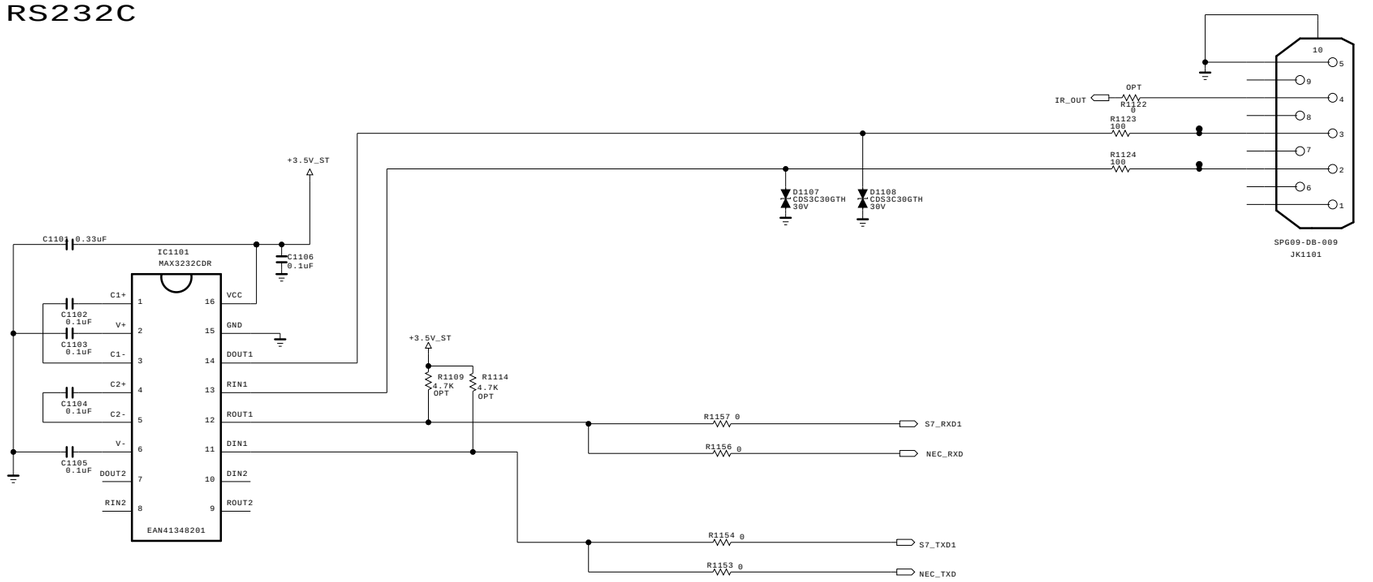
MODEL	GP2_Saturn7M	DATE	Ver. 1.0
BLOCK	COMMON AREA	SHEET	9

RS232C



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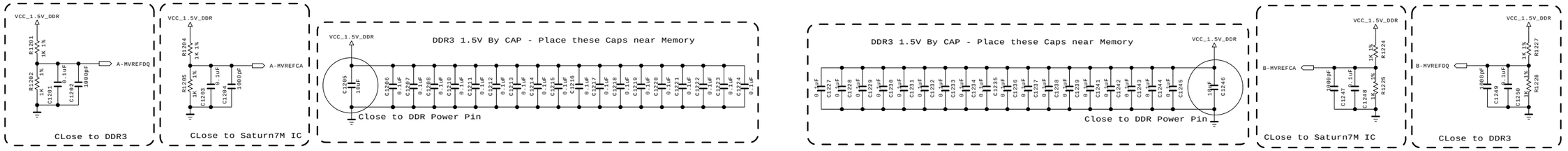
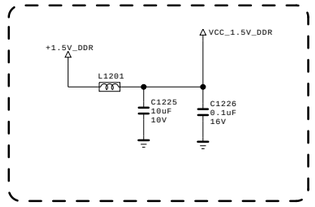
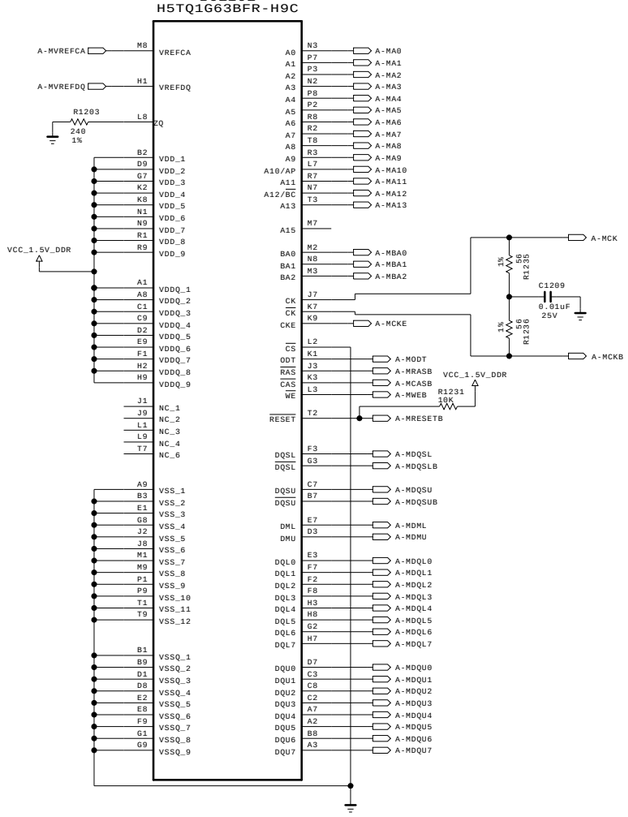
SECRET
LGElectronics

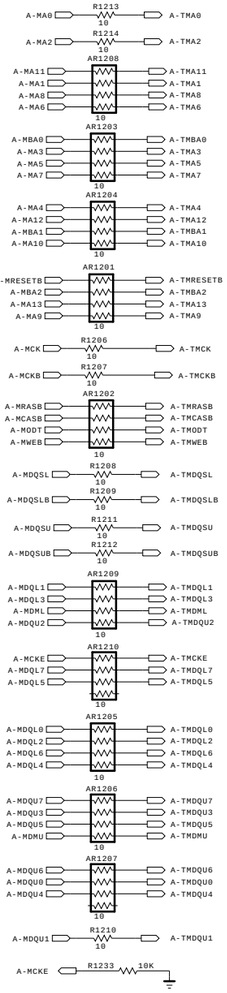
LG ELECTRONICS

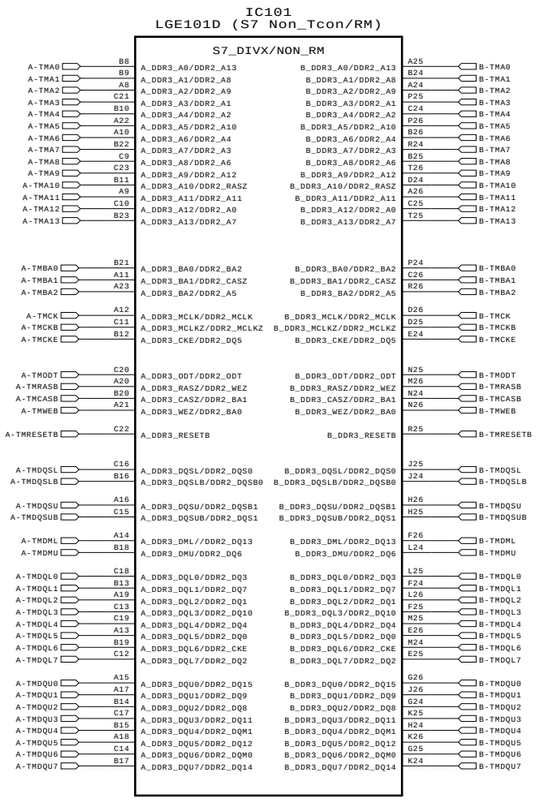
MODEL	GP2_Saturn7	DATE	Ver. 2.0
BLOCK	RS232C 9PIN	SHEET	10

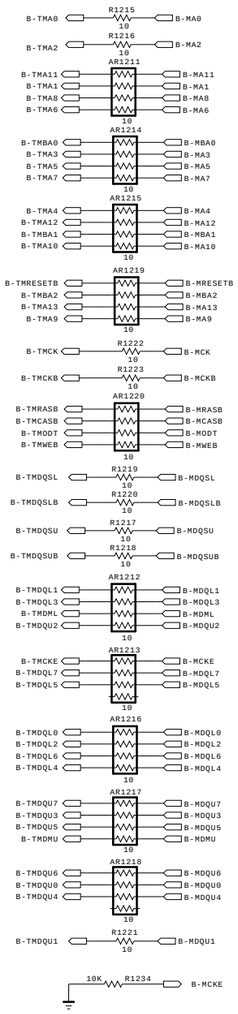


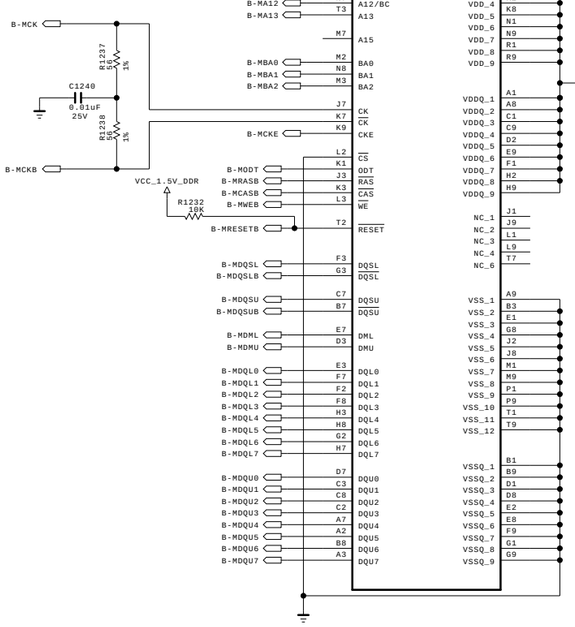












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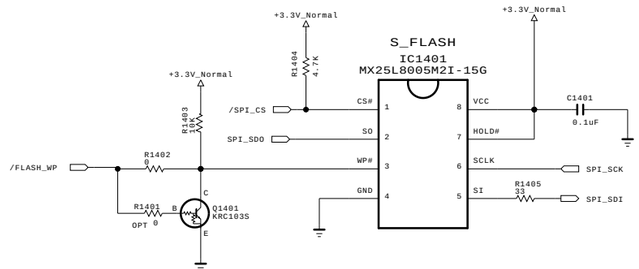
SECRET

LGElectronics

LG ELECTRONICS

MODEL	GP2_Saturn7	DATE	Ver. 2.0
BLOCK	DDR3(256MB)	SHEET	21



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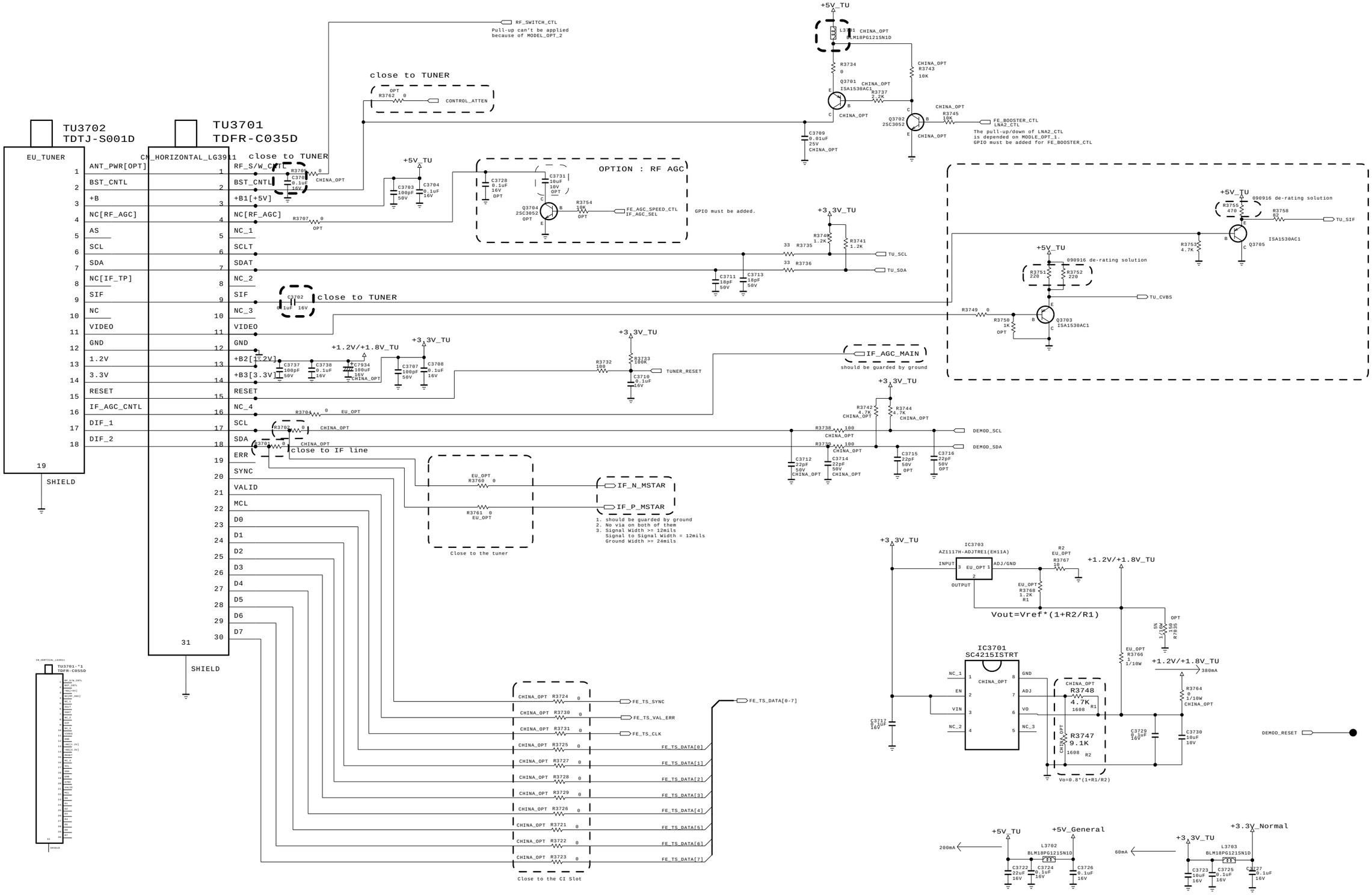
SECRET

LGElectronics

LG ELECTRONICS

MODEL	GP2_Saturn7	DATE	Ver. 2.0
BLOCK	S-Flash(1MB)	SHEET	23

LGIT CAN NIM_H/N TUNER for EU & CHINA



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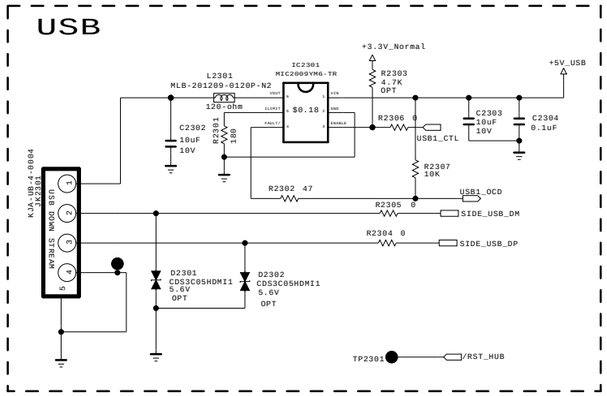
SECRET
LGElectronics

LG ELECTRONICS

MODEL	GP2_Saturn7	DATE	VER 2.0
BLOCK	EU CAN TUNER	SHEET	27

USB1 OPTION



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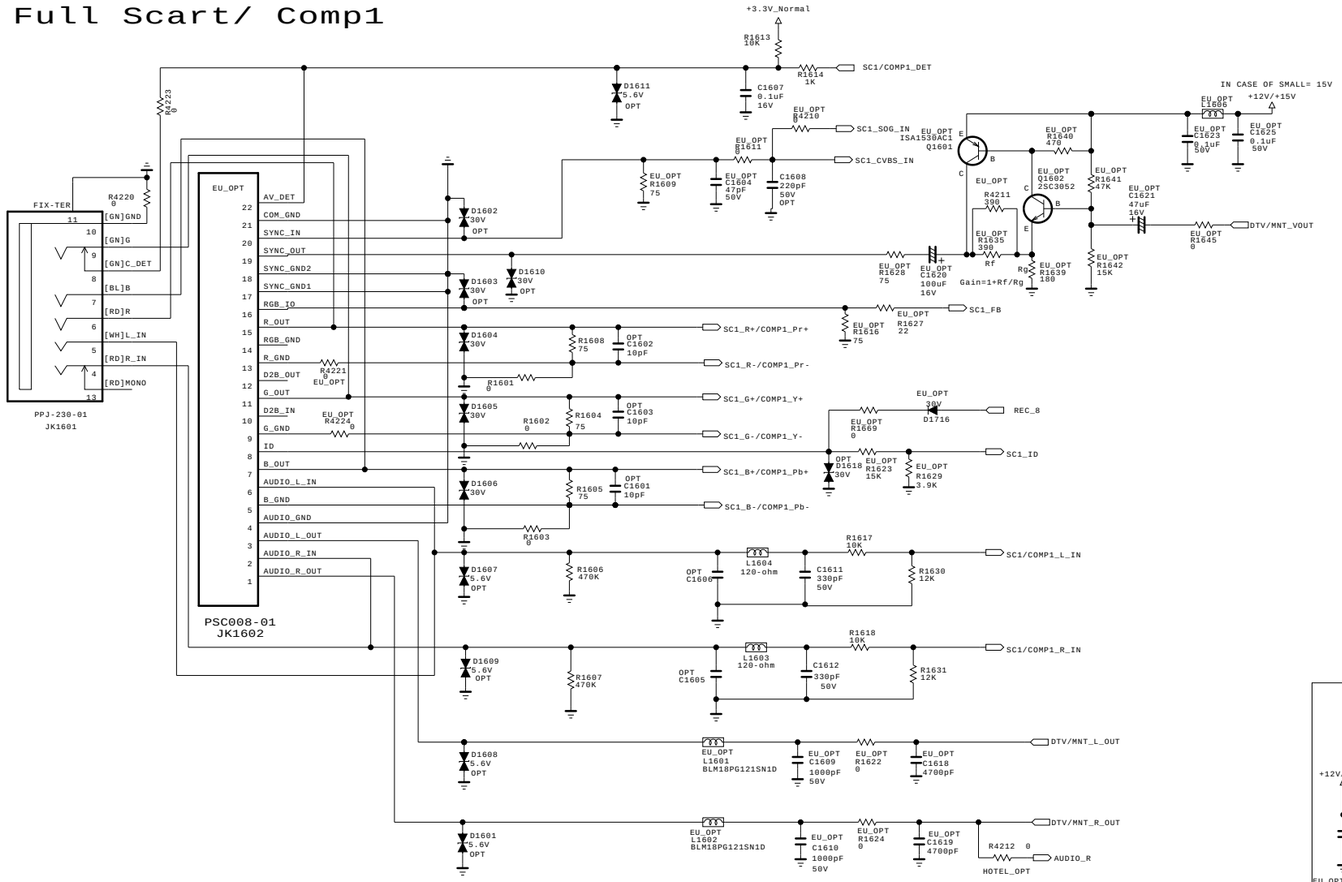
LGElectronics

LG ELECTRONICS

MODEL	GP2_Saturn7M	DATE	Ver. 1.0
BLOCK	USB	SHEET	39

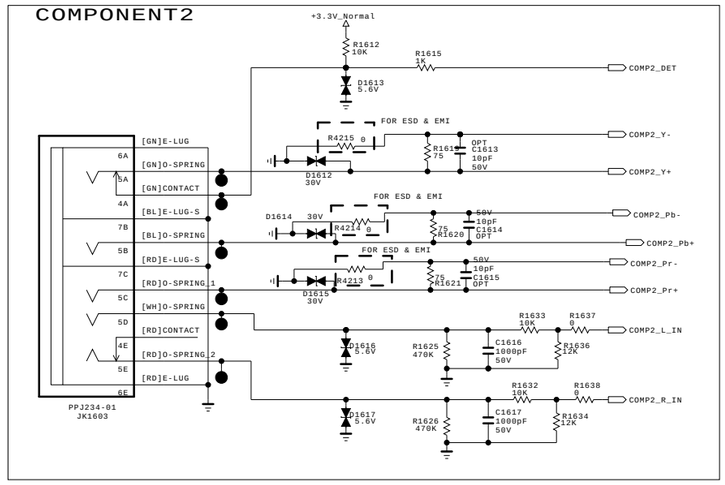
For EU & CHINA

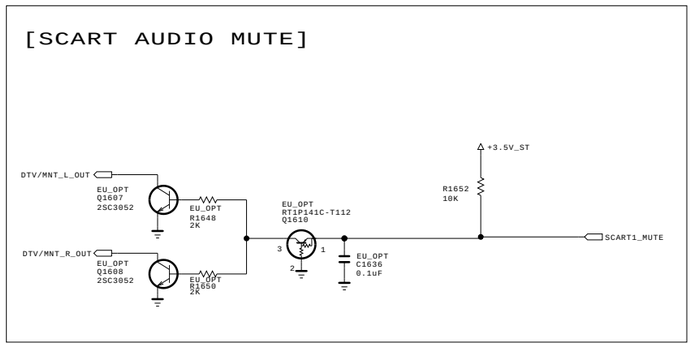
Full Scart/ Comp1

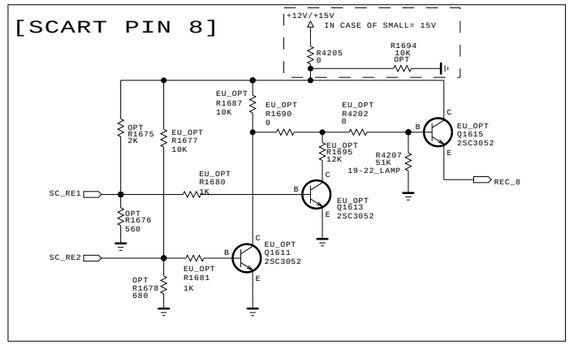


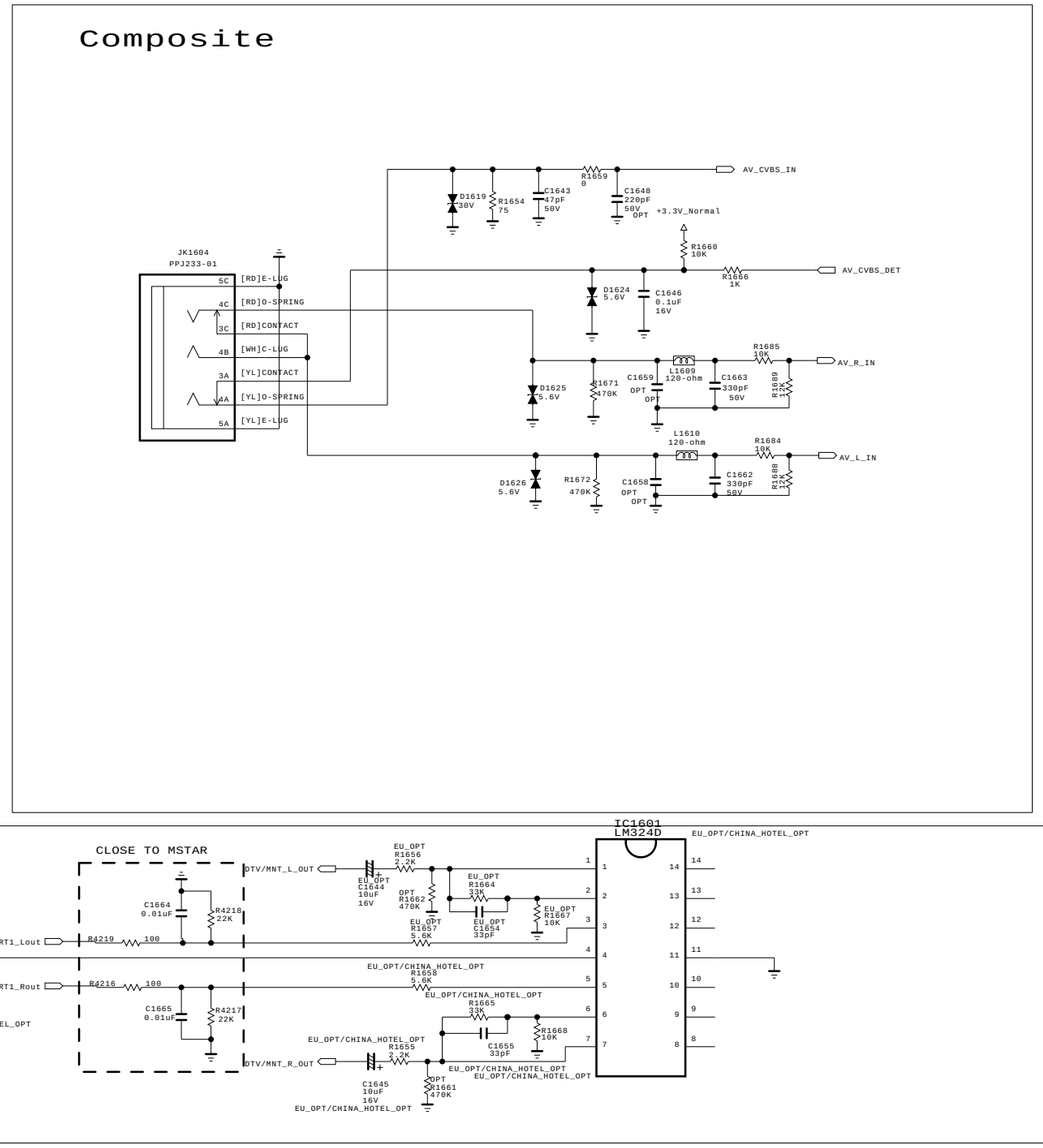
OPTION TABLE

NAME	STATUS
AV_OPT	EU : Not Using China : Using
CHINA_OPT	EU : Not Using China : Using
EU_OPT	EU :Using China:NotUsing









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SECRET

LGElectronics

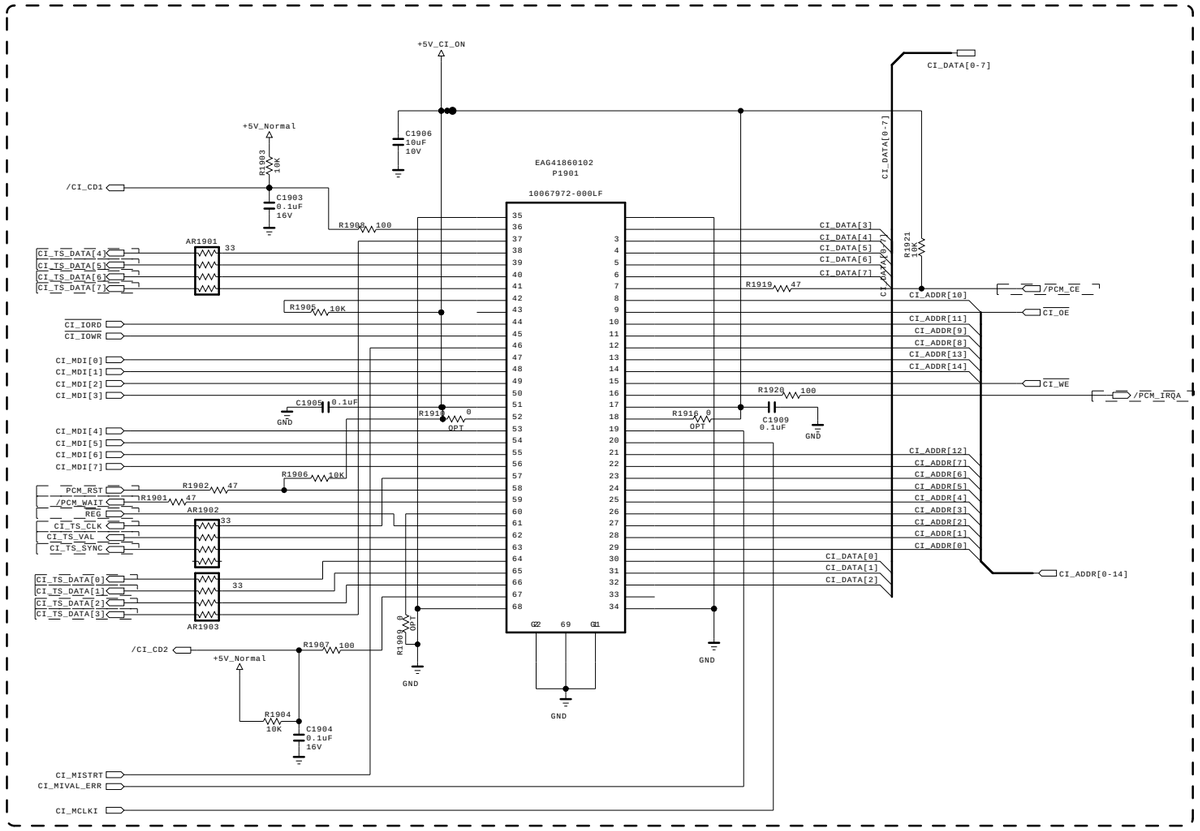
LG ELECTRONICS

MODEL	GP2_Saturn7M	DATE	Ver. 1.1
BLOCK	SCART/RCA	SHEET	41

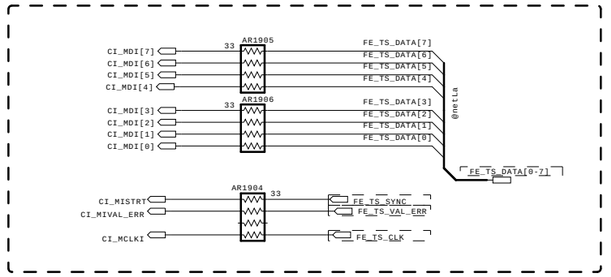
CI Region

* Option name of this page : CI_SLOT
(because of Hong Kong)

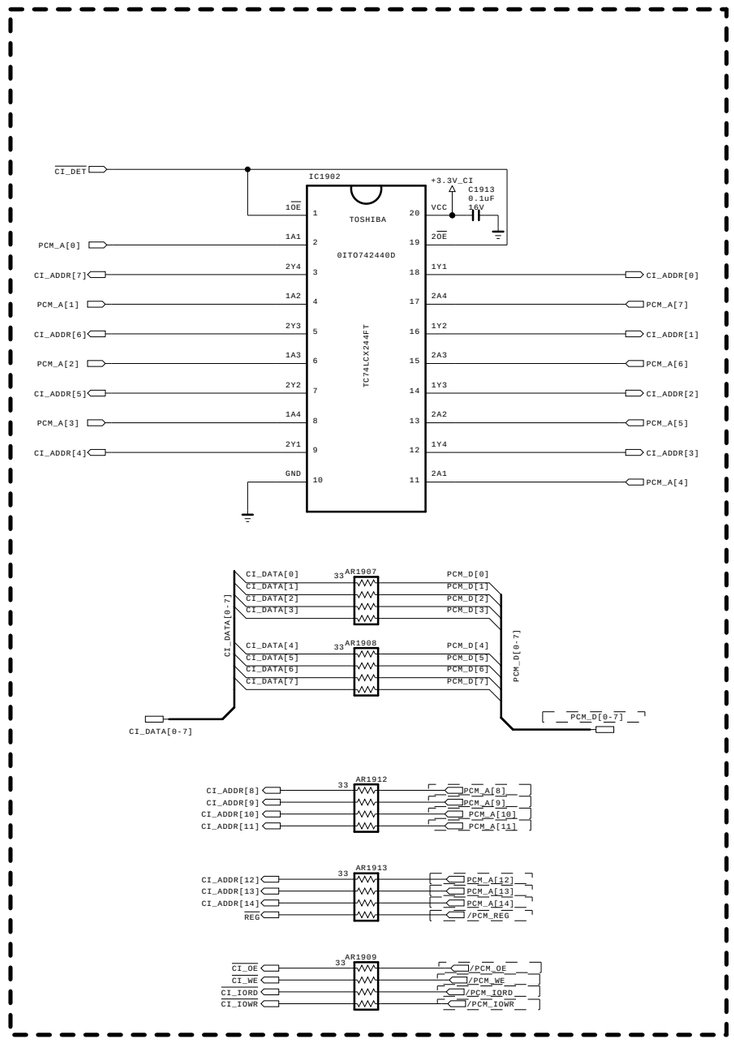
CI SLOT

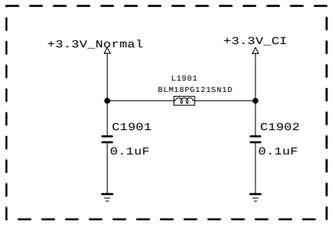


CI TS INPUT

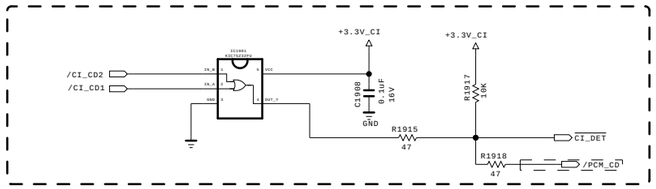


CI HOST I/F

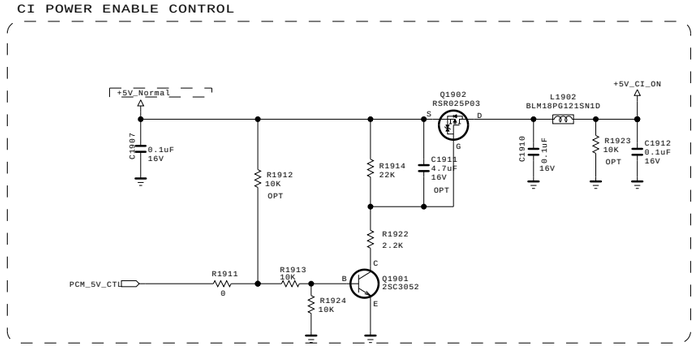




CI DETECT



CI POWER ENABLE CONTROL



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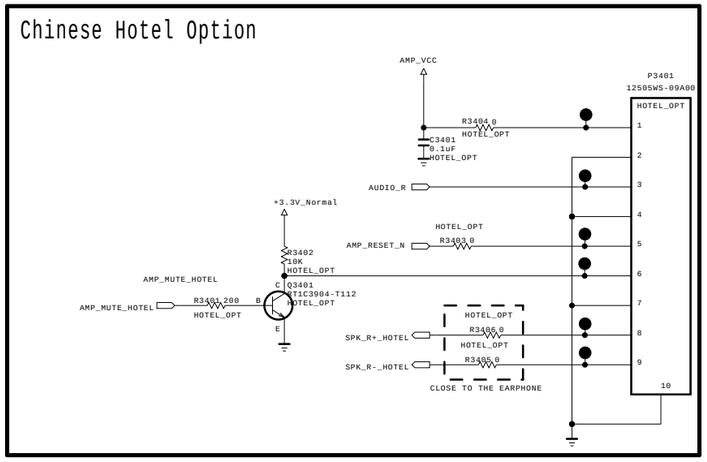
SECRET
LGElectronics

LG ELECTRONICS

MODEL	GP2_Saturn7M	DATE	Ver. 1.0
BLOCK	PCMCI	SHEET	45

China HOTEL Option



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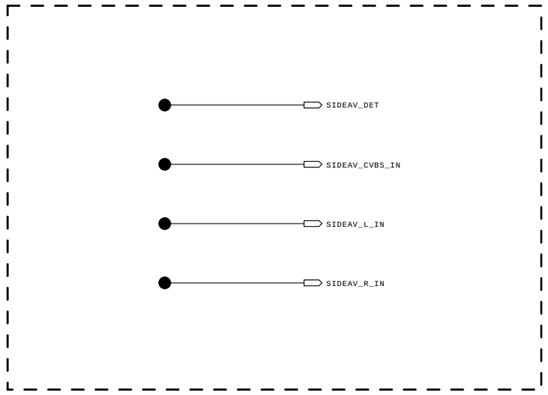
SECRET
LGElectronics

LG ELECTRONICS

MODEL	GP2_Saturn7M	DATE	Ver. 1.0
BLOCK	CHINA HOTEL	SHEET	51



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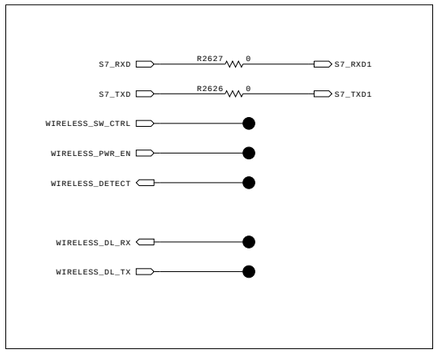
SECRET
LGElectronics

LG ELECTRONICS

MODEL	GP2_Saturn7M	DATE	Ver. 1.0
BLOCK	NON SIDE AV	SHEET	53

NON-WIRELESS MODEL



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SECRET

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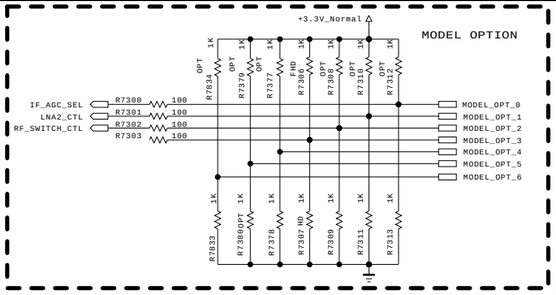
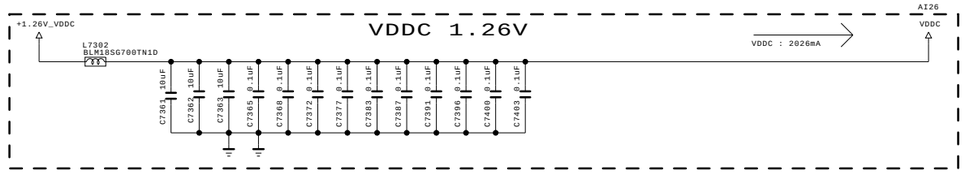
LG ELECTRONICS

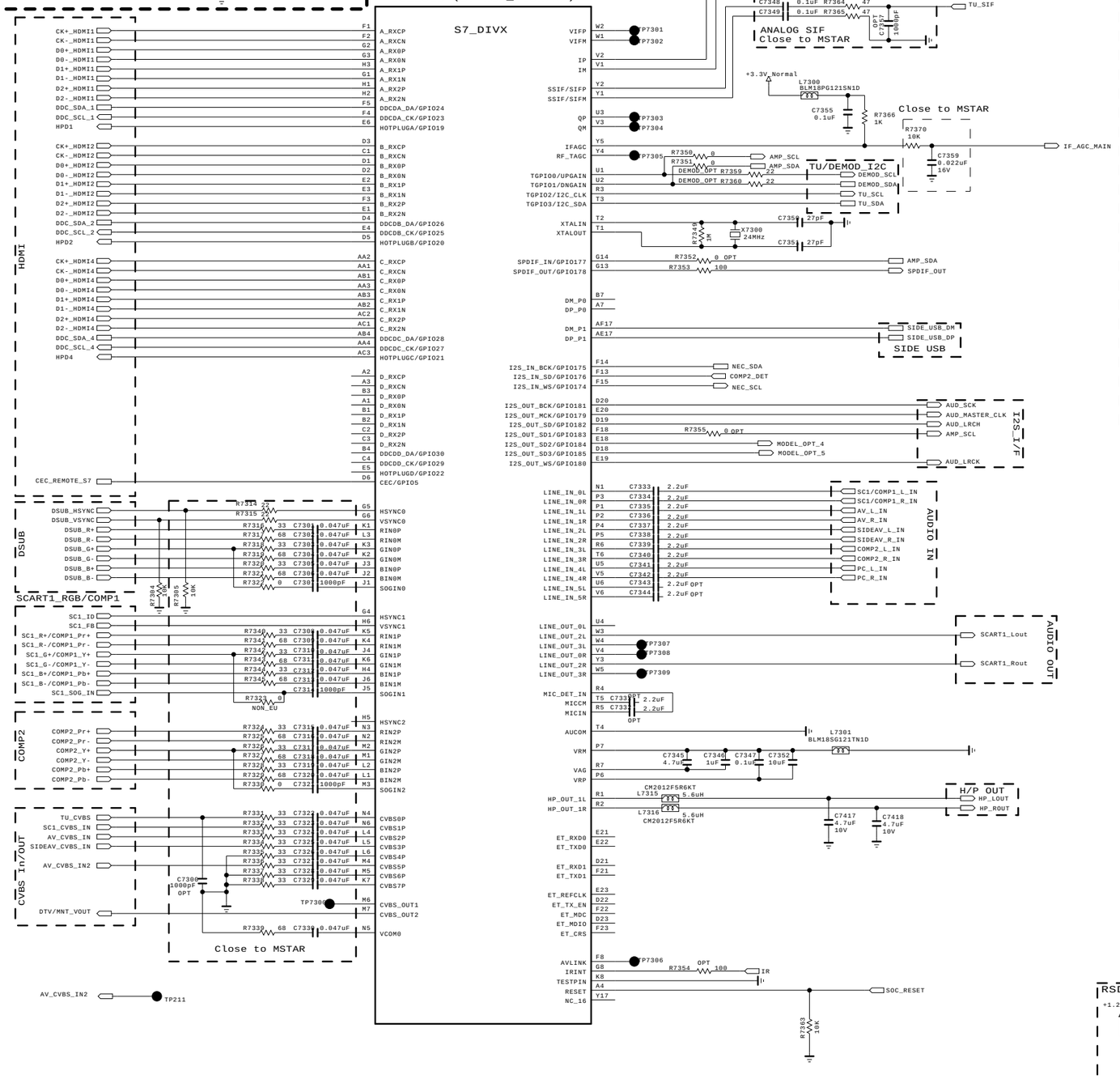
MODEL	GP2_Saturn7M	DATE	Ver. 1.0
BLOCK	NON WIRELESS READY	SHEET	54

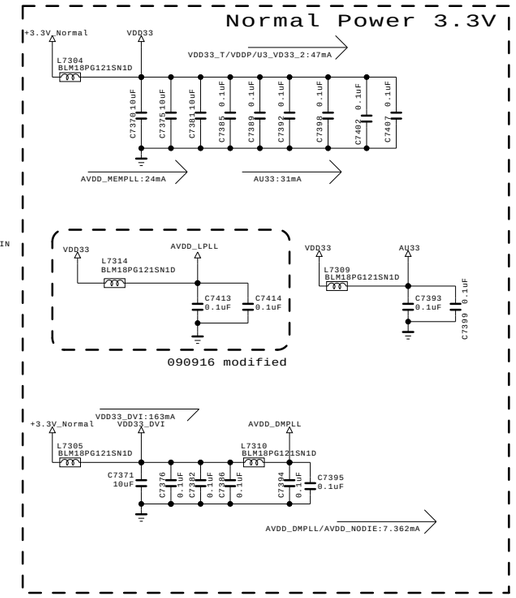
MODEL OPTION

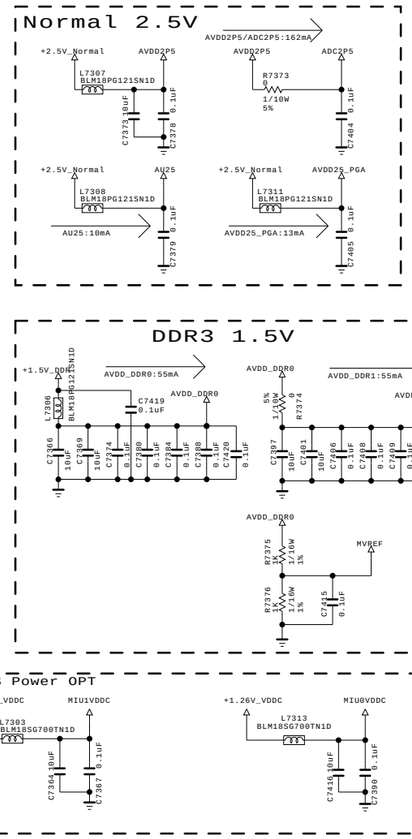
PIN NAME	PIN NO.	HIGH	LOW
MODEL_OPT_0	G19	FRC	NO FRC
MODEL_OPT_1	C5	MINI LVDS	LVDS
MODEL_OPT_2	F7	DDR_512MB	DDR_256MB
MODEL_OPT_3	B6	FHD	HD
MODEL_OPT_4	E18	100/120Hz LVDS	50/60Hz LVDS
MODEL_OPT_5	D18	GIP	NON_GIP
MODEL_OPT_6	F9	OLED	LCD

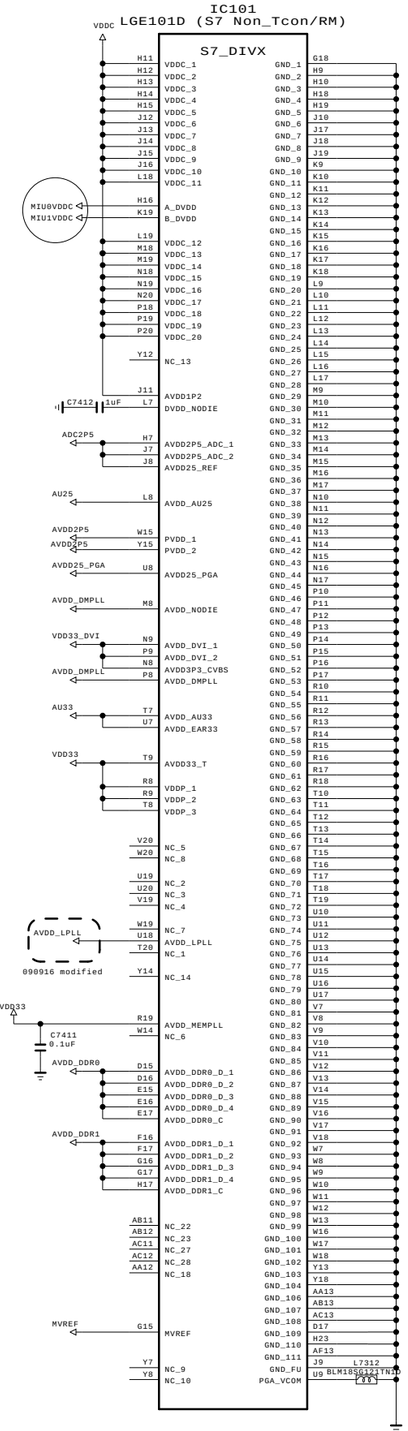












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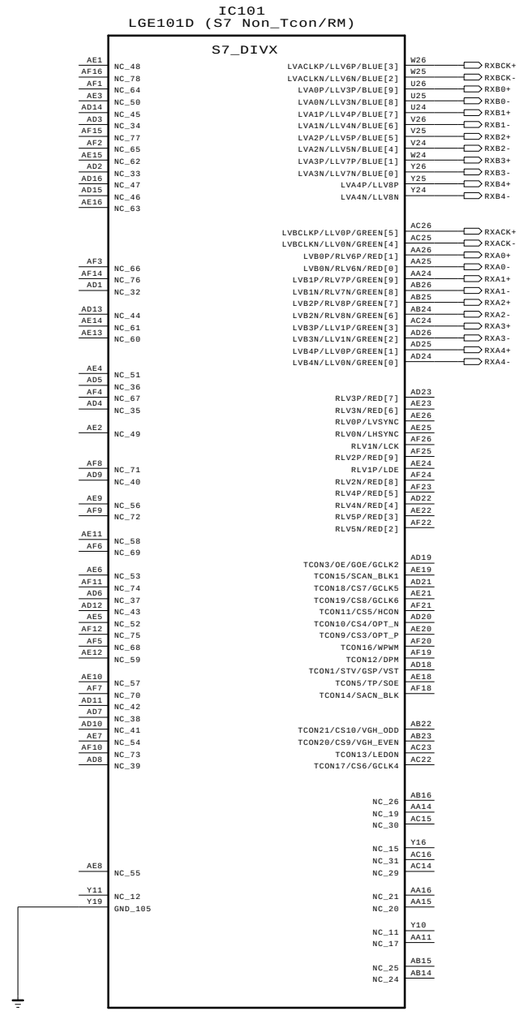
SECRET

LGElectronics

LG ELECTRONICS

MODEL	GP2_Saturn7M	DATE	Ver. 1.4
BLOCK	MAIN_2	SHEET	2 /



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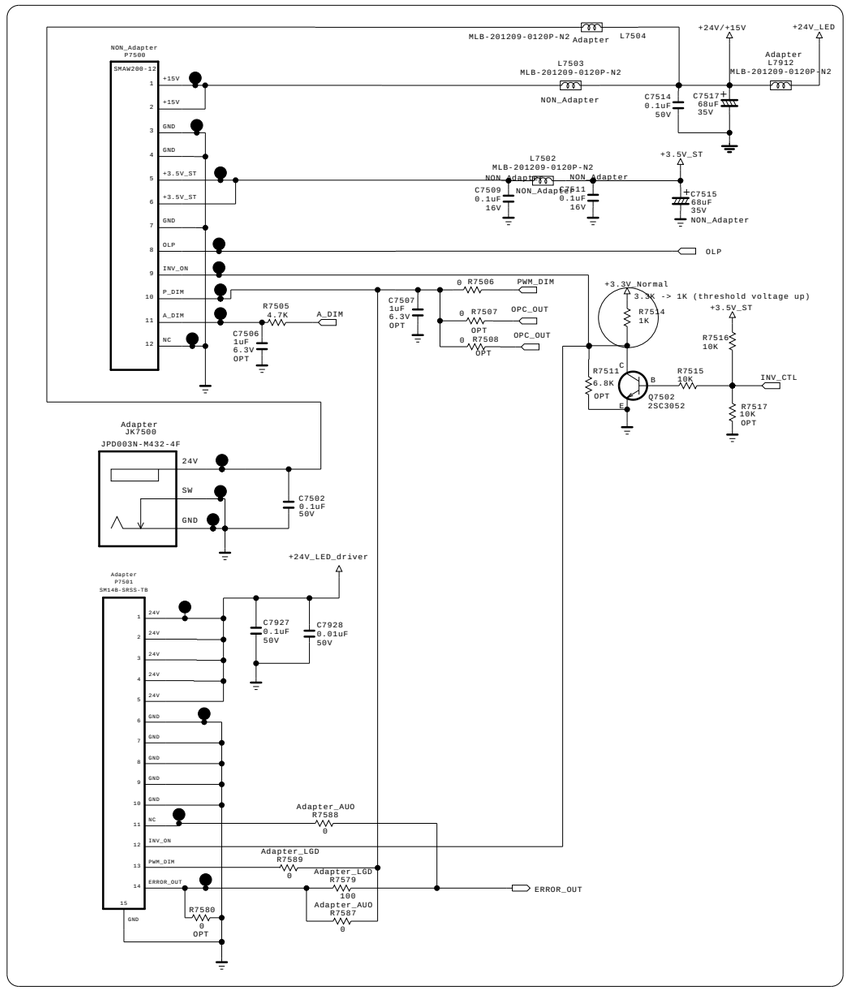
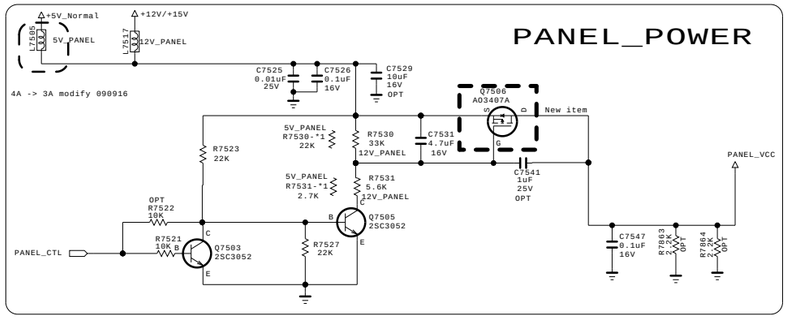
SECRET

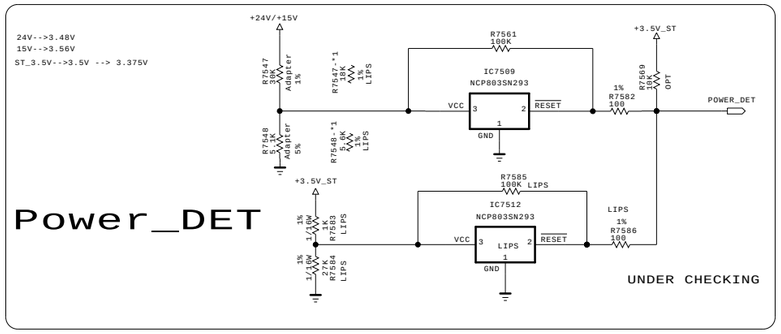
LGElectronics

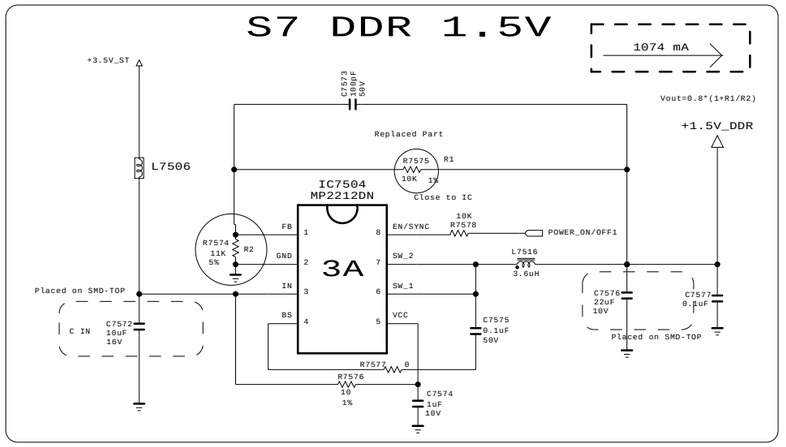
LG ELECTRONICS

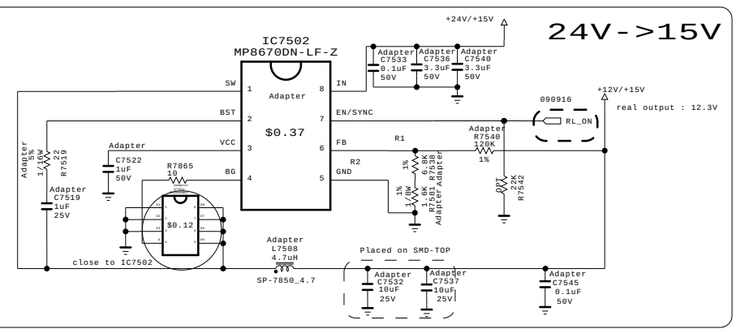
MODEL	GP2_Saturn7M	DATE	Ver. 1.4
BLOCK	DDR3(FRC)	SHEET	3

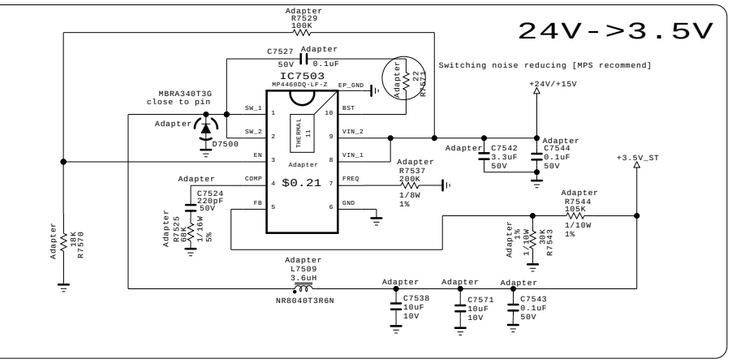


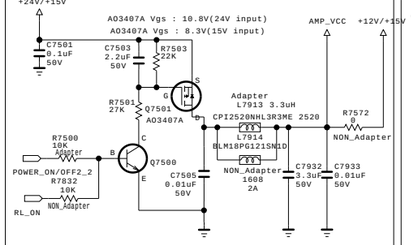


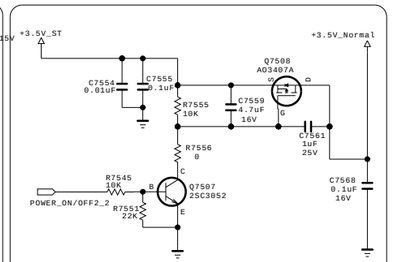


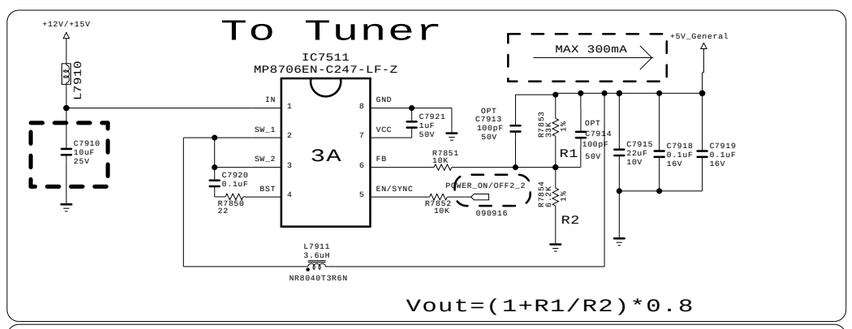


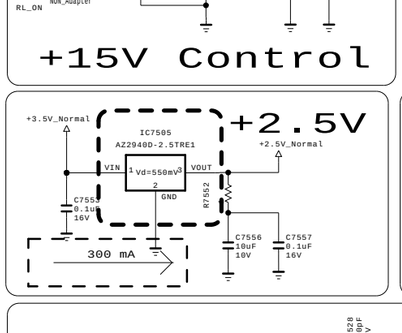


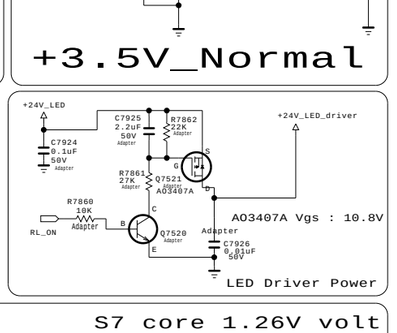


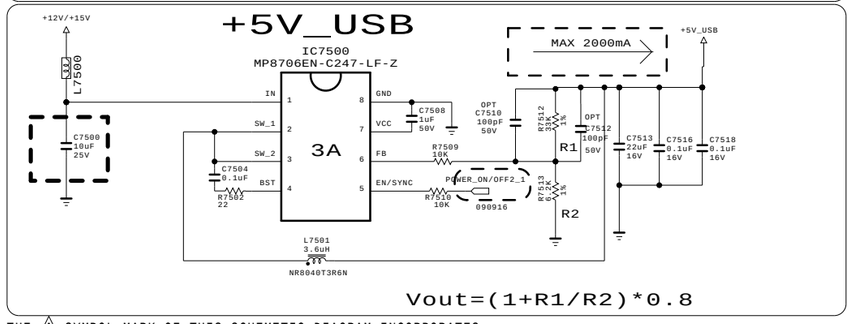


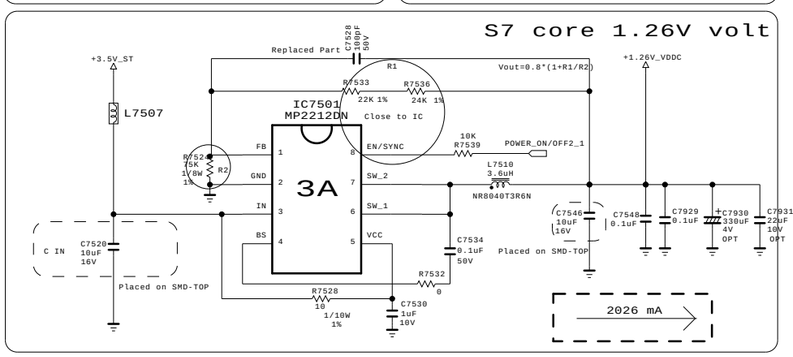


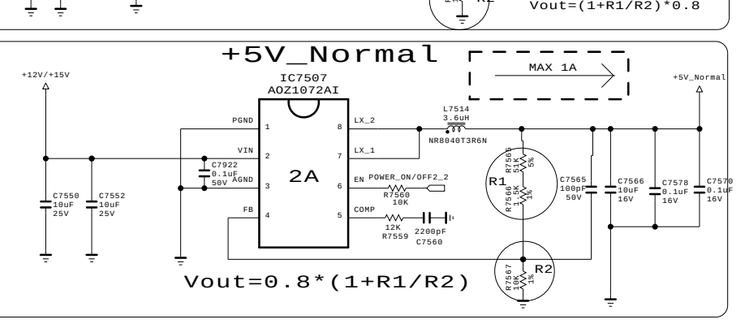












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SECRET

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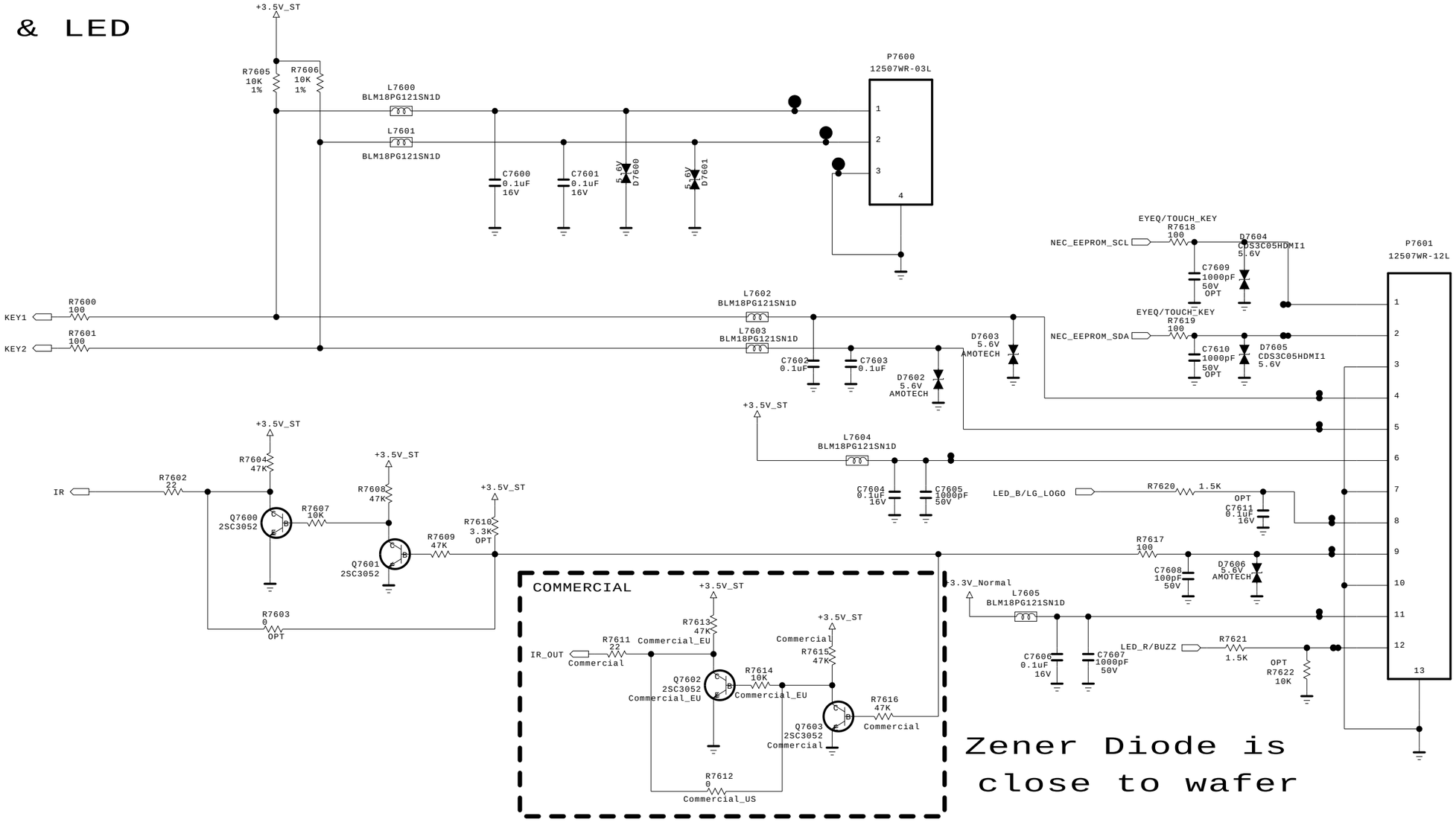
LG ELECTRONICS

MODEL	GP2_Saturn7	DATE	Ver. 1.00
BLOCK	POWER_SMALL	SHEET	92

CONTROL

IR & LED



Zener Diode is close to wafer

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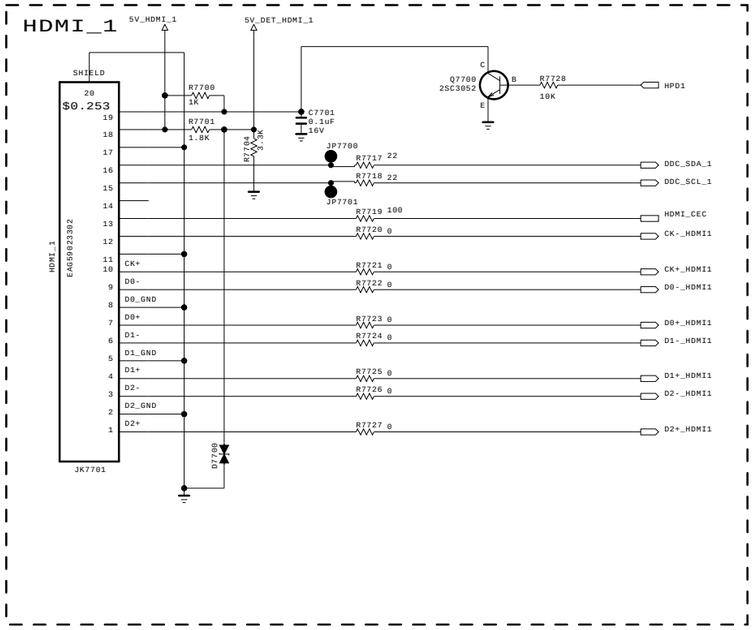
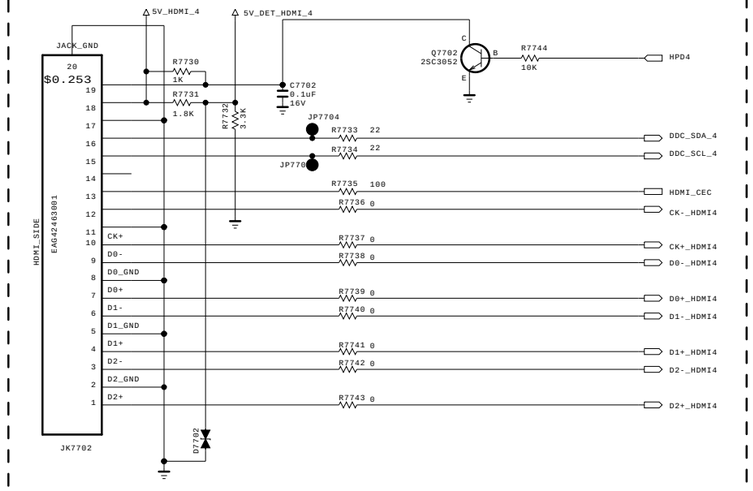
MODEL	GP2_Saturn7M	DATE	Ver. 1.2
BLOCK	IR & LED	SHEET	6

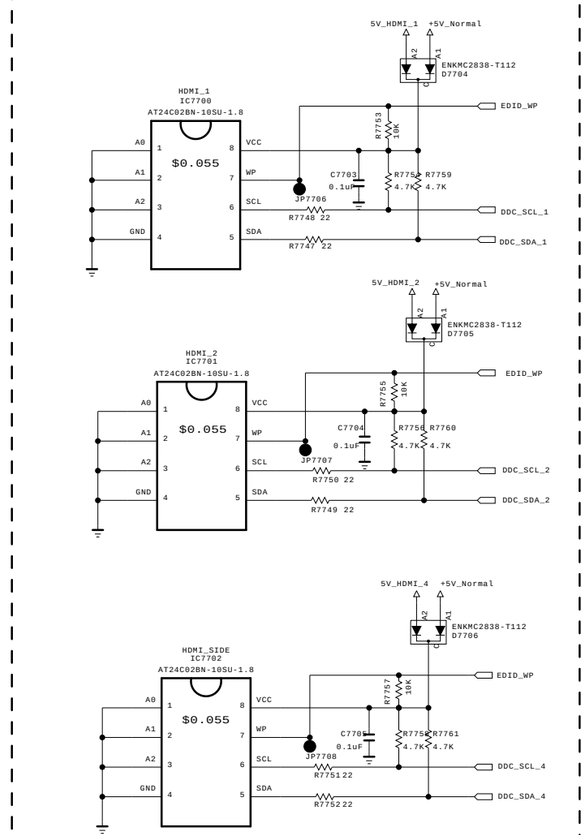
HDMI_1



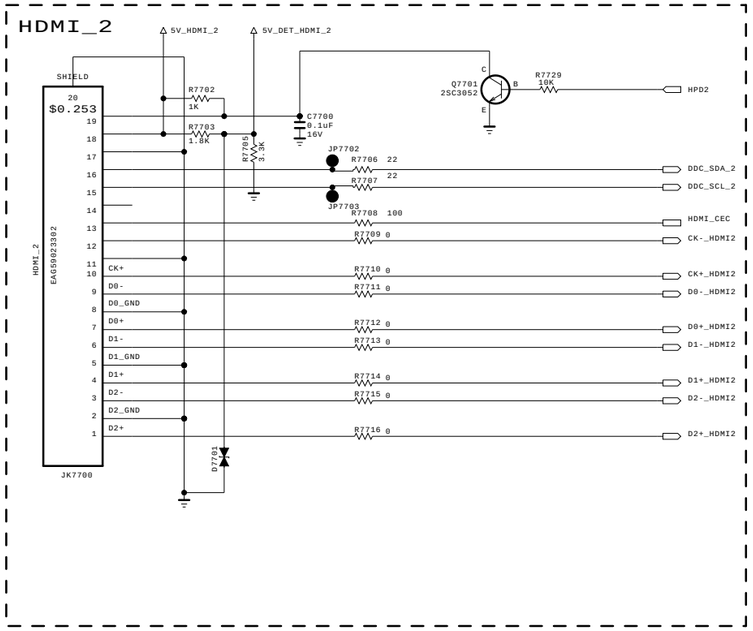
SIDE_HDMI



HDMI EEPROM



HDMI_2



For CEC

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MODEL	GP2_Saturn7M	DATE	Ver. 1.2
BLOCK	HDMI	SHEET	94

MAIN1 BLOCK

TP7013 — 5V_DET_HDMI_3

TP7014 — FRC_RESET

TP7016 — SCAN_BLK2

TP7017 — SCAN_BLK1/OPC_OUT

TP7018 — WIRELESS_DL_RX

TP7019 — WIRELESS_DL_TX

TP7020 — /PIF_SPI_CS

TP7021 — ET_RXER

TP7022 — /RST_PHY

TP7023 — M_REMOTE_RX

TP7024 — M_REMOTE_TX

TP7025 — FRC_SCL

TP7026 — FRC_SDA

TP7027 — UART_FRC_RX

TP7028 — UART_FRC_TX

TP7029 — FRC_PWM0

TP7030 — FRC_PWM1

MICOM BLOCK

TP7032 — WIRELESS_DETECT

TP7033 — WIRELESS_PWR_EN

TP7034 — WIRELESS_SW_CTRL

TP7035 — RF_ENABLE

TP7036 — $\overline{\text{RF\_RESET}}$

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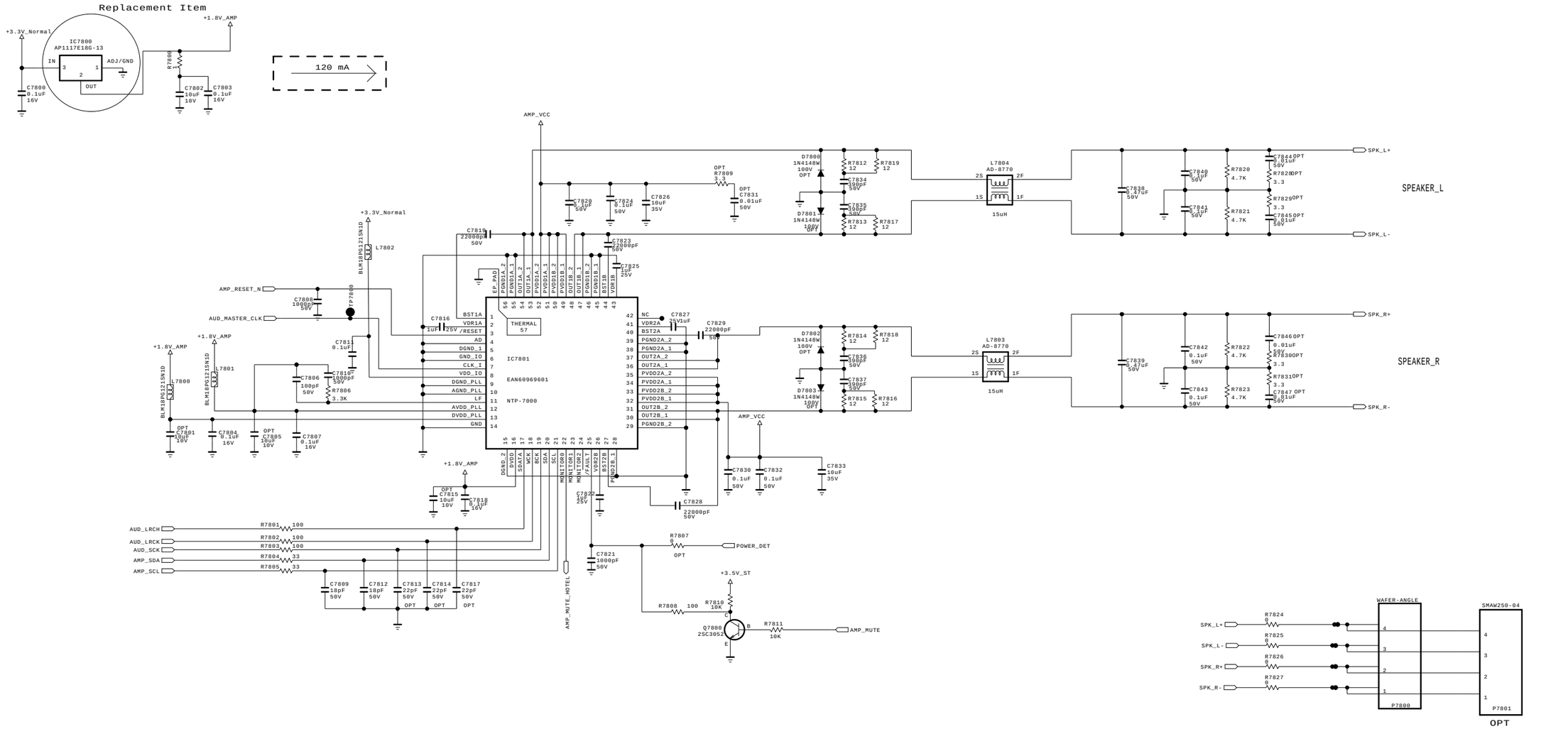
MODEL	GP2_Saturn7	DATE	Ver. 1.0
BLOCK	TP_SMALL	SHEET	75



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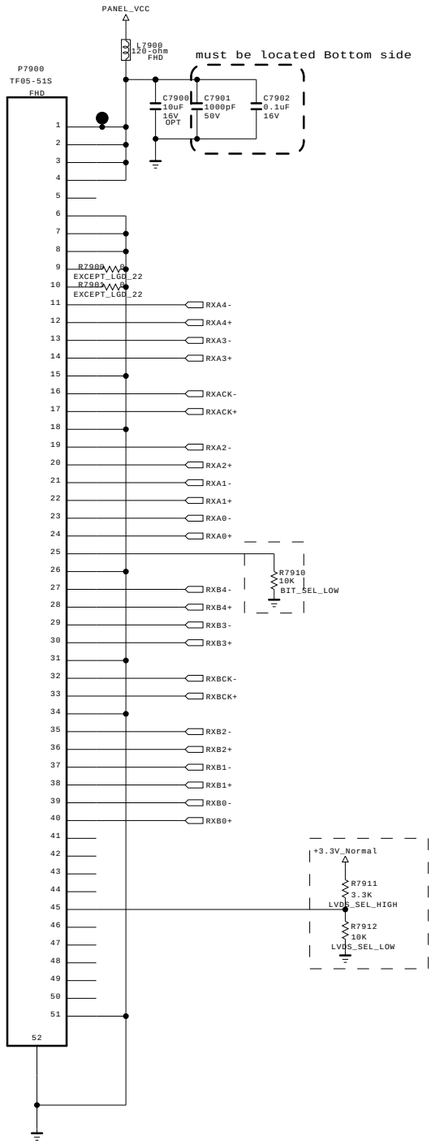
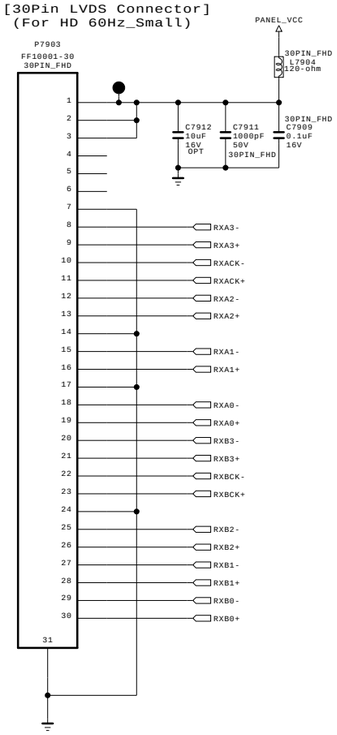
MODEL	GP2_Saturn7M	DATE	Ver. 1.1
BLOCK	AUDIO[NTP]	SHEET	96

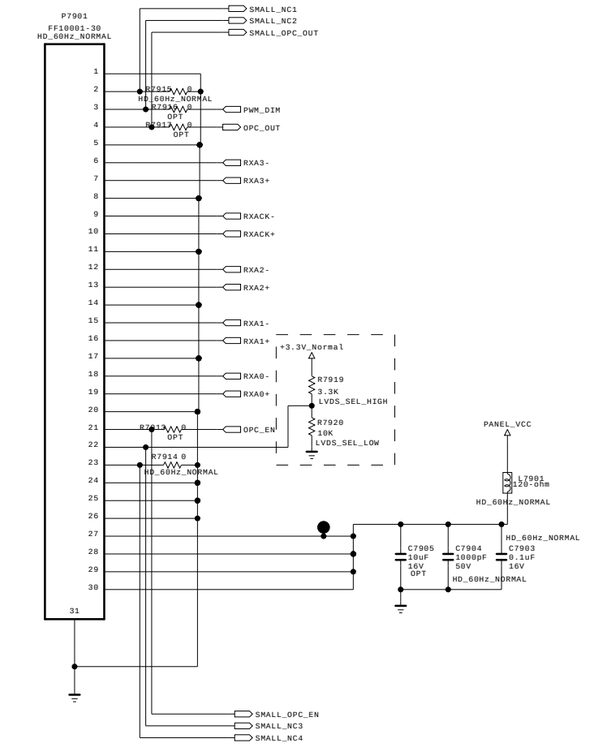
[51Pin LVDS Connector] (For FHD 60Hz)



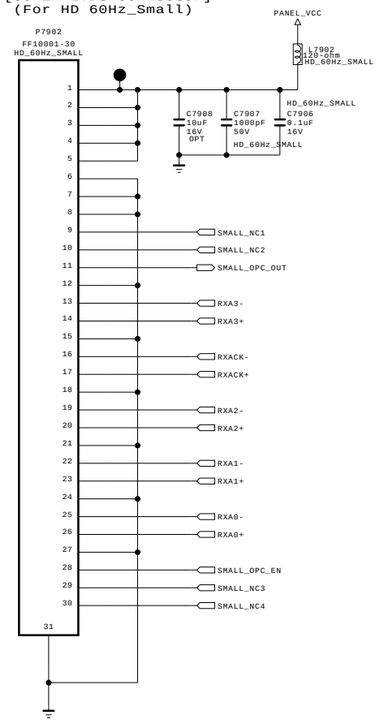
[30Pin LVDS Connector] (For HD 60Hz_Small)



[30Pin LVDS Connector] (For HD 60Hz_Normal)



[30Pin LVDS Connector] (For HD 60Hz_Small)



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MODEL	GP2_Saturn7M	DATE	Ver. 1.0
BLOCK	LVDS	SHEET	33


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