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PLASMA TV

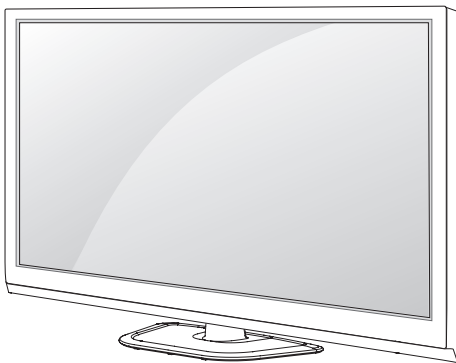
SERVICE MANUAL

CHASSIS : PB31A

MODEL : 42PN4600 42PN4600-SA

CAUTION

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



P/NO : MFL67648807 (1304-REV00)

Printed in Korea

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SAFETY PRECAUTIONS

IMPORTANT SAFETY NOTICE

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

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

Do not modify the original design without permission of manufacturer.

General Guidance

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

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

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

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

Keep wires away from high voltage or high temperature parts.

Before returning the receiver to the customer,

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

Leakage Current Cold Check(Antenna Cold Check)

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

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

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

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

Leakage Current Hot Check (See below Figure)

Plug the AC cord directly into the AC outlet.

Do not use a line Isolation Transformer during this check.

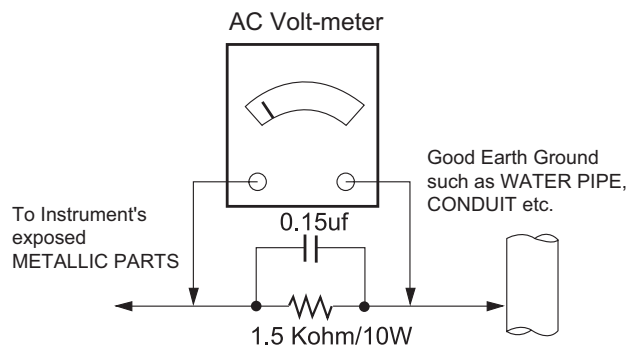
Connect 1.5 K / 10 watt resistor in parallel with a 0.15 uF capacitor between a known good earth ground (Water Pipe, Conduit, etc.) and the exposed metallic parts.

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 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

*Base on Adjustment standard

SPECIFICATION

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

1. Application range

This spec sheet is applied all of the 42" 50", 60" PDP TV with PB31A chassis.

2. Requirement for Test

Each part is tested as below without special appointment.

- (1) Temperature: 25 °C ± 5 °C (77 °F ± 9 °F), CST: 40 °C ± 5 °C
- (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. Model General Specification

No	Item	Specification	Remark
1	Receiving System	1) SBTVD / NTS-M / PAL-M / PAL-N	42PN4600-SA
2	Available Channel	1) VHF : 2~13 2) UHF : 14~69 3) DTV : 7-69 4) CATV : 1~135	42PN4600-SA
3	Input Voltage	1) AC 100 ~ 240V 50/60Hz	
4	Market	Brazil / chile / Peru / Venezuela / Costarica / Uruguay	
5	Screen Size	42 inch Wide(1024 × 768)	42PN all model
		50 inch Wide(1024 × 768)	50PN4 all model
		50 inch Wide(1920 × 1080)	50PN6 all model
		60 inch Wide(1920 × 1080)	60PN6 all model
6	Aspect Ratio	16:9	
7	Tuning System	FS	
8	Module	PDP42T4#### (1024 × 768)	42PN all model
		PDP50T4#### (1024 × 768)	50PN4 all model
		PDP50R4#### (1920 × 1080)	50PN6 all model
		PDP60R4#### (1920 × 1080)	60PN6 all model
9	Operating Environment	1) Temp : 0 ~ 40 deg 2) Humidity : ~ 80 %	
10	Storage Environment	1) Temp : -20 ~ 60 deg 2) Humidity : ~ 85 %	

ADJUSTMENT INSTRUCTION

1. Application Range

This spec. sheet applies to PB31A chassis applied PDP TV all models manufactured in TV factory.

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. But it is flexible when its factory local problem occurs.
- (3) The adjustment must be performed in the circumstance of $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ of temperature and $65\% \pm 10\%$ of relative humidity if there is no specific designation.
- (4) The input voltage of the receiver must keep AC 100-240 V~, 50/60 Hz.
- (5) Before adjustment, execute Heat-Run for 5 minutes.

■ After Receive 100% Full white pattern (06CH) then process Heat-run
(or "8. Test pattern" condition of Ez-Adjust status)

■ How to make set white pattern

- 1) Press Power ON button of Service Remocon
- 2) Press ADJ button of Service remocon. Select "10. Test pattern" and, after select "White" using navigation button, and then you can see 100% Full White pattern.

* In this status you can maintain Heat-Run useless any pattern generator

* Notice: if you maintain one picture over 20 minutes (Especially sharp distinction black with white pattern – 13Ch, or Cross hatch pattern – 09Ch) then it can appear image stick near black level.

3. Adjustment items

3.1. PCB Assembly adjustment

- Adjust 480i Comp1
- Adjust 1080p Comp1/RGB
 - If it is necessary, it can adjustment at Manufacture Line
 - You can see set adjustment status at "9. ADJUST CHECK" of the "In-start menu"

3.2. Set Assembly Adjustment

- EDID (The Extended Display Identification Data)
- Color Temperature (White Balance) Adjustment
- Make sure RS-232C control
- Selection Factory output option

4. PCB Assembly Adjustment

4.1. Using RS-232C

- Adjust 3 items at 3.1. PCB assembly adjustments
- " 4.1. ■ Adjustment sequence" one after the order.

■ Adjustment sequence

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 1080p 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 : component1 480i, RGB 1080p) 000000000000000000000000000000007c007b006dx (main : component1 1080p) 000000070000000000000000000000007c00830077x
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

< See ADC Adjustment RS232C Protocol_Ver1.0 >

■ Necessary items before Adjustment items

- Pattern Generator : (MSPG-925FA)
- Adjust 480i comp1
(MSPG-925FA:model :209, pattern :65) - comp1 Mode
- Adjust 1080p comp1
(MSPG-925FA:model :225, pattern :65) - comp1 Mode
- Addjust RGB (MSPG-925FA:model :225, pattern :65)
- RGB-Pc Mode

* If you want more information then see the below Adjustment method (Factory Adjustment)

■ Adjustment sequence

- aa 00 00: Enter the ADc Adjustment mode.
- xb 00 40: change the mode to component1 (No actions)
- ad 00 10: Adjust 480i comp
- ad 00 10: Adjust 1080p comp
- xb 00 60: change to RGB-Pc mode(No action)
- ad 00 10: Adjust 1080p RGB
- xb 00 90: Endo of Adjustmennt

5. Factory Adjustment

-> PB31A : USE INTERNAL ADC(LM1) : using internal pattern.

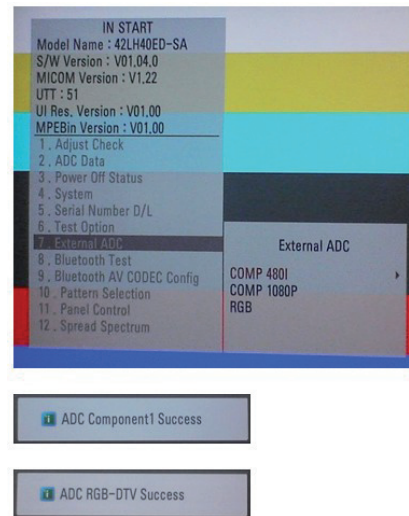
5.1. Auto Adjust Component 480i/1080p RGB 1080p

- Summary : Adjustment component 480i/1080i and RGB 1080p is Gain and Black level setting at Analog to Digital converter, and compensate the RGB deviation
- Using instrument
 - Adjustment remocon, 801GF(802B, 802F, 802R) or MSPG925FA pattern generator (It can output 480i/1080i horizontal 100% color bar pattern signal, and its output level must setting $0.7V \pm 0.1V$ p-p correctly)



< Adjustment pattern : 480i / 1080p 60Hz Pattern >

- You must make it sure its resolution and pattern cause every instrument can have different setting
- Adjustment method 480i Comp1, Adjust 1080p Comp1/ RGB (Factory adjustment)
- ADC 480i Component1 adjustment
 - Check connection of Component1
 - MSPG-925FA -> Model: 209, Pattern 65
- Set Component 480i mode and 100% Horizontal Color Bar Pattern(HozTV31Bar), then set TV set to Component1 mode and its screen to "NORMAL"
- ADC 1080p Component1 / RGB adjustment
 - Check connection both of Component1 and RGB
 - MSPG-925FA -> Model: 225, Pattern 65
- Set Component 1080p mode and 100% Horizontal Color Bar Pattern(HozTV31Bar), then set TV set to Component1 mode and its screen to "NORMAL"
- After get each the signal, wait more a second and enter the "IN-START" with press IN-START key of Service remocon. After then select "7. External ADC" with navigator button and press "Enter".
- After Then Press key of Service remocon "Right Arrow (VOL+)"
- You can see "ADC Component1 Success"
- Component1 1080p, RGB 1080p Adjust is same method.
- Component 1080p Adjustment in Component1 input mode
- RGB 1080p adjustment in RGB input mode
- If you success RGB 1080p Adjust. You can see "ADC RGB-DTV Success"



* caution : Set Volume 0 after adjustment

5.2. Use Internal ADC(S7R)

- ADJ(EZ ADJUST) -> 6.ADC Calibration -> ADC Calibration(START)

* EDID (The Extended Display Identification Data)/DDC (Display Data Channel) Download.

■ Summary

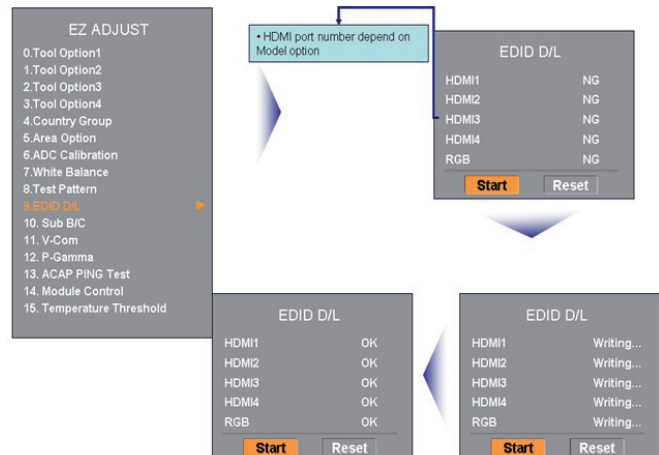
- It is established in VESA, for communication between PC and Monitor without order from user for building user condition. It helps to make easily use realize "Plug and Play" function.
- For EDID data write, we use DDC2B protocol.

- Auto Download

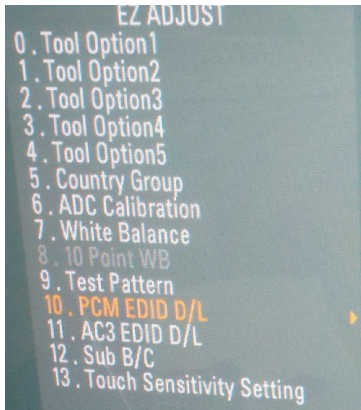
- After enter Service Mode by pushing "ADJ" key,
- Enter EDID D/L mode.
- Enter "START" by pushing "OK" key.

* Caution:

- Never connect HDMI & D-sub Cable when the user downloading .
- Use the proper cables below for EDID Writing



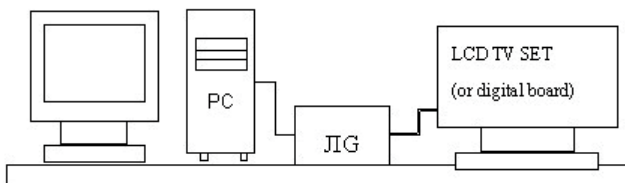
- It only needs to PCM EDID D/L for North America Product.



- * Edid data and Model option download(RS232)
- Manual Download

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

- Write HDMI EDID data
 - Using instruments
 - Jig. (PC Serial to D-Sub connection) for PC, DDC adjustment.
 - S/W for DDC recording (EDID data write and read)
 - D-sub jack
 - Additional HDMI cable connection Jig.
 - Preparing and setting.
 - Set instruments and Jig. Like pic.5), then turn on PC and Jig.
 - Operate DDC write S/W (EDID write & read)
 - It will operate in the DOS mode.



< For write EDID data, setting Jig and another instruments >

- EDID data (Model name = LG TV)

- MODEL NAME : 42/50PN4###

- HD_HDMI 1

00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01
01	17	01	03	80	A0	5A	78	0A	EE	91	A3	54	4C	99
0F	50	54	A1	08	00	31	40	45	40	61	40	01	01	01
01	01	01	01	01	01	64	19	00	40	41	00	26	30	18
36	00	B0	84	43	00	00	18	A0	0F	20	00	31	58	1C
28	80	14	00	B0	84	43	00	00	1E	00	00	00	FD	00
3E	1E	53	10	00	0A	20	20	20	20	20	20	00	00	FC
00	4C	47	20	54	56	0A	20	20	20	20	20	20	01	3E
02	03	21	F1	4D	10	1F	04	93	05	14	03	02	12	20
15	01	26	15	07	50	09	57	07	67	03	0C	00	10	00
2D	01	1D	00	72	51	D0	1E	20	6E	28	55	00	40	84
00	00	1E	02	3A	80	18	71	38	2D	40	58	2C	45	00
84	63	00	00	1E	01	1D	80	18	71	1C	16	20	58	2C
00	40	84	63	00	00	9E	00	00	00	00	00	00	00	00
00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
00	00	00	00	00	00	00	00	00	00	00	00	00	00	24

- HD_HDMI 2

00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01
01	17	01	03	80	A0	5A	78	0A	EE	91	A3	54	4C	99
0F	50	54	A1	08	00	31	40	45	40	61	40	01	01	01
01	01	01	01	01	01	64	19	00	40	41	00	26	30	18
36	00	B0	84	43	00	00	18	A0	0F	20	00	31	58	1C
28	80	14	00	B0	84	43	00	00	1E	00	00	00	FD	00
3E	1E	53	10	00	0A	20	20	20	20	20	20	00	00	FC
00	4C	47	20	54	56	0A	20	20	20	20	20	20	01	3E
02	03	21	F1	4D	10	1F	04	93	05	14	03	02	12	20
15	01	26	15	07	50	09	57	07	67	03	0C	00	20	00
2D	01	1D	00	72	51	D0	1E	20	6E	28	55	00	40	84
00	00	1E	02	3A	80	18	71	38	2D	40	58	2C	45	00
84	63	00	00	1E	01	1D	80	18	71	1C	16	20	58	2C
00	40	84	63	00	00	9E	00	00	00	00	00	00	00	00
00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
00	00	00	00	00	00	00	00	00	00	00	00	00	00	14

- See Working Guide if you want more information about EDID communication.

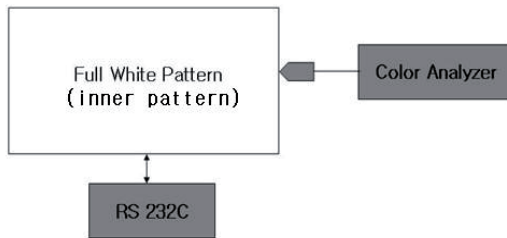
- Adjustment Color Temperature(White balance)

■ Using Instruments

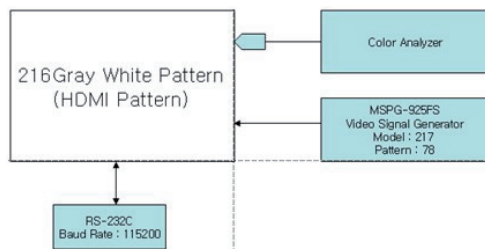
- Color Analyzer: CA-210 (CH 10)
 - Using LCD color temperature, Color Analyzer (CA-210) must use CH 10, which Matrix compensated (White, Red, Green, Blue compensation) with CS-2100. See the Coordination bellowed one.
- Auto-adjustment Equipment (It needs when Auto-adjustment – It is availed communicate with RS-232C : Baud rate: 115200)
- Video Signal Generator MSPG-925F 720p, 216Gray (Model: 217, Pattern 78)

■ Connection Diagram (Auto Adjustment)

- Using Inner Pattern



- Using HDMI input



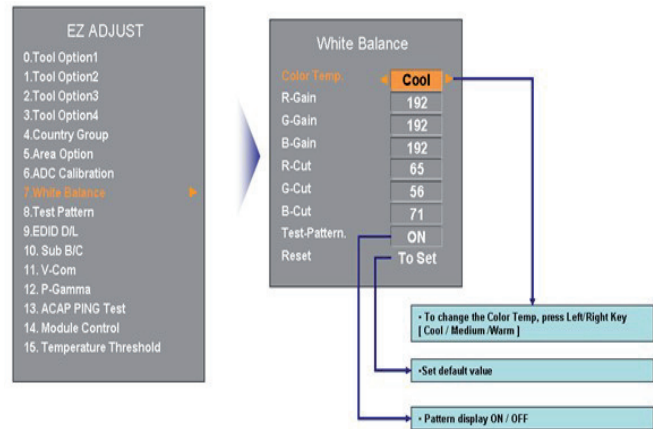
< connection Diagram for Adjustment White balance >

■ White Balance Adjustment

If you can't adjust with inner pattern, then you can adjust it using HDMI pattern. You can select option at "Ez-Adjust Menu – 7. White Balance" there items "NONE, INNER, HDMI". It is normally setting at inner basically. If you can't adjust using inner pattern you can select HDMI item, and you can adjust.

In manual Adjust case, if you press ADJ button of service remocon, and enter "Ez-Adjust Menu – 7. White Balance", then automatically inner pattern operates. (In case of "Inner" originally "Test-Pattern. On" will be selected in The "Test-Pattern. On/Off".

- Connect all cables and equipments like Pic.5)
- Set Baud Rate of RS-232C to 115200. It may set 115200 originally.
- Connect RS-232C cable to set
- Connect HDMI cable to set



■ RS-232C Command (Commonly apply)

RS-232C COMMAND [CMD ID DATA]			Meaning
wb	00	00	White Balance adjustment start.
wb	00	10	Start of adjust gain (Inner white pattern)
wb	00	1f	End of gain adjust
wb	00	20	Start of offset adjust (Inner white pattern)
wb	00	2f	End of offset adjust
wb	00	ff	End of White Balance adjust (Inner pattern disappeared)

- "wb 00 00": Start Auto-adjustment of white balance.
- "wb 00 10": Start Gain Adjustment (Inner pattern)
- "jb 00 c0" :
- ...
- "wb 00 1f": End of Adjustment
 - * If it needs, offset adjustment (wb 00 20-start, wb 00 2f-end)
- "wb 00 ff": End of white balance adjustment (inner pattern disappear)

■ Adjustment Mapping information

	RS-232C COMMAND [CMD ID DATA]			M I N	CENTER (DEFAULT)			M A X
	Cool	Mid	Warm		Cool	Mid	Warm	
R Gain	jg	Ja	jd	00	184	192	192	192
G Gain	jh	Jb	je	00	187	183	159	192
B Gain	ji	Jc	jf	00	192	161	95	192
R Cut					64	64	64	127
G Cut					64	64	64	127
B Cut					64	64	64	127

- When Color temperature (White balance) Adjustment (Automatically)
 - Press "Power only key" of service remocon and operate automatically adjustment.
 - Set BaudRate to 115200.
- You must start "wb 00 00" and finish it "wb 00 ff".
- If it needs, then adjustment "Offset".
- White Balance Adjustment (Manual adjustment)
 - Test Equipment: CA-210
 - Using PDP color temperature, Color Analyzer (CA-210) must use CH 10, which Matrix compensated (White, Red, Green, Blue compensation) with CS-2100. See the Coordination bellowed one.
 - Manual adjustment sequence is like bellowed one.
 - Turn to "Ez-Adjust" mode with press ADJ button of service remocon.
 - Select "10.Test Pattern" with CH+/- button and press enter. Then set will go on Heat-run mode. Over 30 minutes set let on Heat-run mode.
 - Let CA-210 to zero calibration and must has gap more 10cm from center of PDP module when adjustment.
 - Press "ADJ" button of service remocon and select "7.White-Balance" in "Ez-Adjust" then press "►" button of navigation key. (When press "►" button then set will go to full white mode)
 - Adjust at three mode (Cool, Medium, Warm)
 - If "cool" mode
 - Let B-Gain to 192 and R, G, B-Cut to 64 and then control R, G gain adjustment High Light adjustment.
 - If "Medium" and "Warm" mode Let R-Gain to 192 and R, G, B-Cut to 64 and then control G, B gain adjustment High Light adjustment.
 - All of the three mode
 - Let R-Gain to 192 and R, G, B-Cut to 64 and then control G, B gain adjustment High Light adjustment.
 - With volume button (+/-) you can adjust.
 - After all adjustment finished, with Enter (■ key) turn to Ez-Adjust mode. Then with ADJ button, exit from adjustment mode

* Attachment: White Balance adjustment coordination and color temperature.

- Using CS-1000 Equipment.
 - COOL : T=11000K, $\Delta uv=0.000$, $x=0.276$ $y=0.283$
 - MEDIUM : T=9300K, $\Delta uv=0.000$, $x=0.285$ $y=0.293$
 - WARM : T=6500K, $\Delta uv=0.000$, $x=0.313$ $y=0.329$



- When tester will measure on Cool condition, adjust W30 on TV display menu.



- When tester will measure on medium condition, adjust 0 on TV display menu.



- When tester will measure on warm condition, adjust W30 on TV display menu.

- Using CA-210 Equipment. (10 CH)
 - Contrast value: 216 Gray

Color temperature	Test Equipment	Color Coordination	
		x	y
COOL	CA-210	0.276 ± 0.002	0.283 ± 0.002
MEDIUM	CA-210	0.285 ± 0.002	0.293 ± 0.002
WARM	CA-210	0.313 ± 0.002	0.329 ± 0.002

- Brightness spec.

Item	White average brightness	Brightness uniformity
Min	49	-20
Typ	60	
Max		+20
Unit	cd/m ²	%
Remark	- 100% Window White Pattern - 100IRE(255Gray) - Picture: Vivid(Medium)	- 85IRE(216Gray) 100% Window White Pattern - Picture: Vivid(Medium)

5.3. Test of RS-232C control.

- Press In-Start button of Service Remocon then set the "4.Baud Rate" to 115200. Then check RS-232C control and

5.4. Selection of Country option.

- Selection of country option is allowed only North American model (Not allowed Korean model). It is selection of Country about Rating and Time Zone.
 - Models: All models which PU31A Chassis (See the first page.)
 - Press "In-Start" button of Service Remocon, then enter the "Option" Menu with "PIP CH-" Button
 - Select one of these three (USA, CANADA, MEXICO) depends on its market using "Vol. +/-"button.

* Caution : Don't push The INSTOP KEY after completing the function inspection.

* Caution : Inspection only PAL M / NTSC

6. GND and ESD Testing

6.1. Prepare GND and ESD Testing.

- Check the connection between set and power cord

6.2. Operate GND and ESD auto-test.

- Fully connected (Between set and power cord) set enter the Auto-test sequence.
- Connect D-Jack AV jack test equipment.
- Turn on Auto-controller(GWS103-4)
- Start Auto GND test.
- If its result is NG, then notice with buzzer.
- If its result is OK, then automatically it turns to ESD Test.
- Operate ESD test
- If its result is NG, then notice with buzzer.
- If its result is OK, then process next steps. Notice it with Good lamp and STOPER Down.

6.3. Check Items.

- Test Voltage
 - GND: 1.5KV/min at 100mA
 - Signal: 3KV/min at 100mA
- Test time: just 1 second.
- Test point
 - GND test: Test between Power cord GND and Signal cable metal GND.
 - ESD test: Test between Power cord GND and Live and neutral.
- Leakage current: Set to 0.5mA(rms)

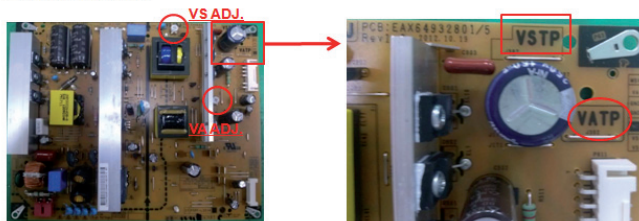
6.4. POWER PCB Ass'y Voltage adjustment (Va, Vs voltage adjustment)

6.4.1. Test equipment : : D.M.M 1EA

6.4.2. Connection Diagram for Measuring

: refer to fig.1

<XPOWER4 42T4H PSU>



(fig.1) PCB Assy Voltage adjustment

6.4.3. Adjustment method

6.4.3.1. Vs adjustment (refer fig.1)

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

6.4.3.2. Va adjustment (refer fig.1)

- (1) After receiving 100% Full White Pattern, HEAT RUN.
- (2) Connect + terminal of D.M.M. to Va pin of P811, connect -terminal to GND pin of P811
- (3) After turning VR502, voltage of D.M.M adjustment as same as Va voltage which on label of panel left/top (deviation; $\pm 0.5V$)

7. Default Service option.

7.1. ADC-Set.

- R-Gain adjustment Value (default 128)
- G-Gain adjustment Value (default 128)
- B-Gain adjustment Value (default 128)
- R-Offset adjustment Value (default 128)
- G-Offset adjustment Value (default 128)
- B-Offset adjustment Value (default 128)

7.2. White balance. Value.

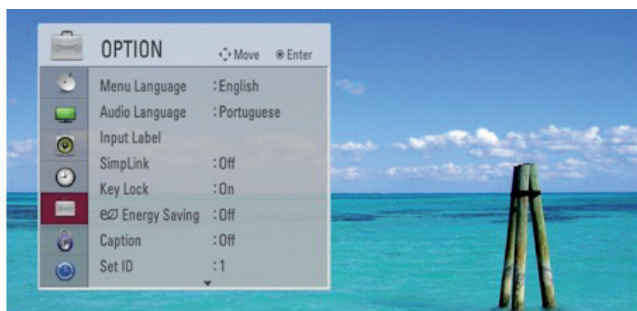
	Center(Default)		
	COOL	Mid	Warm
R Gain	192	192	192
G Gain	192	192	192
B Gain	192	192	192
R Cut	64	64	64
G Cut	64	64	64
B Cut	64	64	64

7.3. Temperature Threshold

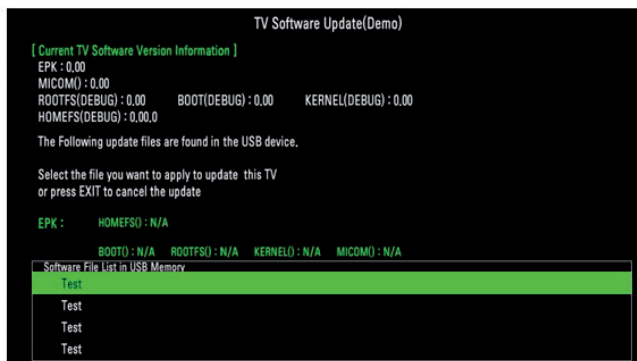
- Threshold Down Low 20
- Threshold Up Low 23
- Threshold Down High 70
- Threshold Up High 75

8. USB DOWNLOAD(*.epk file download)

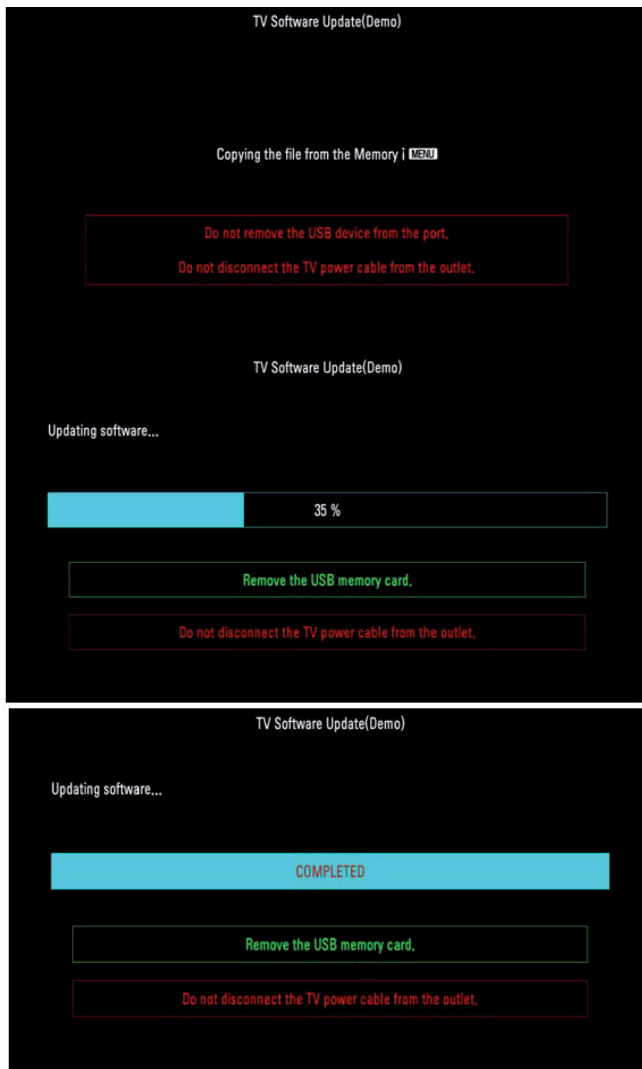
- Put the USB Stick to the USB socket
- Press Menu key, and move OPTION



- Press "FAV" Press 7 times



- Select download file (epk file)

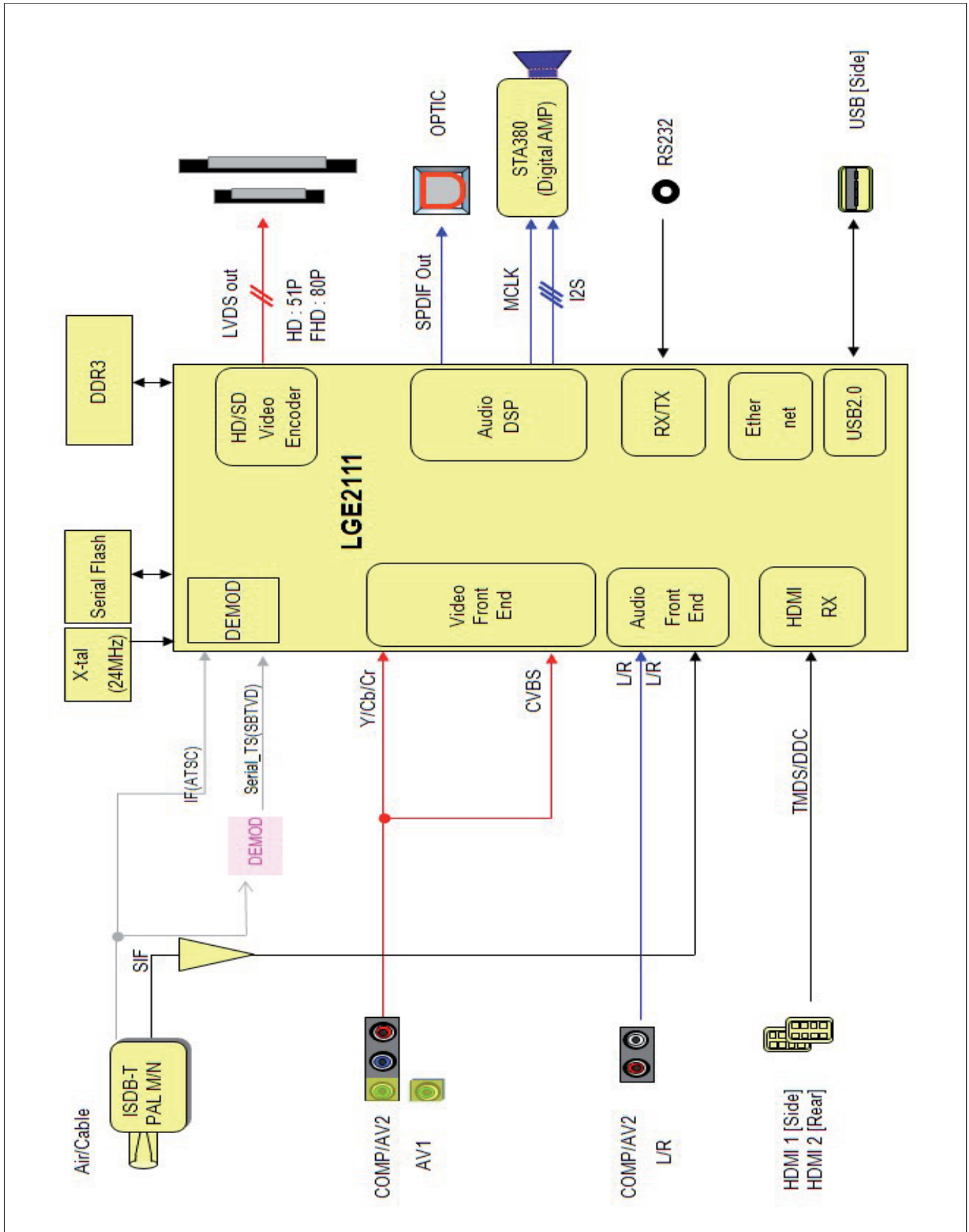


- After download is finished, remove the USB stick.
- Press "IN-START" key of ADJ remote control, check the S/W version.

9. Tool option

	42PN4600-SA
Tool option 1	24832
Tool option 2	5392
Tool option 3	3313
Tool option 4	50310
Tool option 5	2058
Country Group Code	3
Country Group	BR
Country	N/A

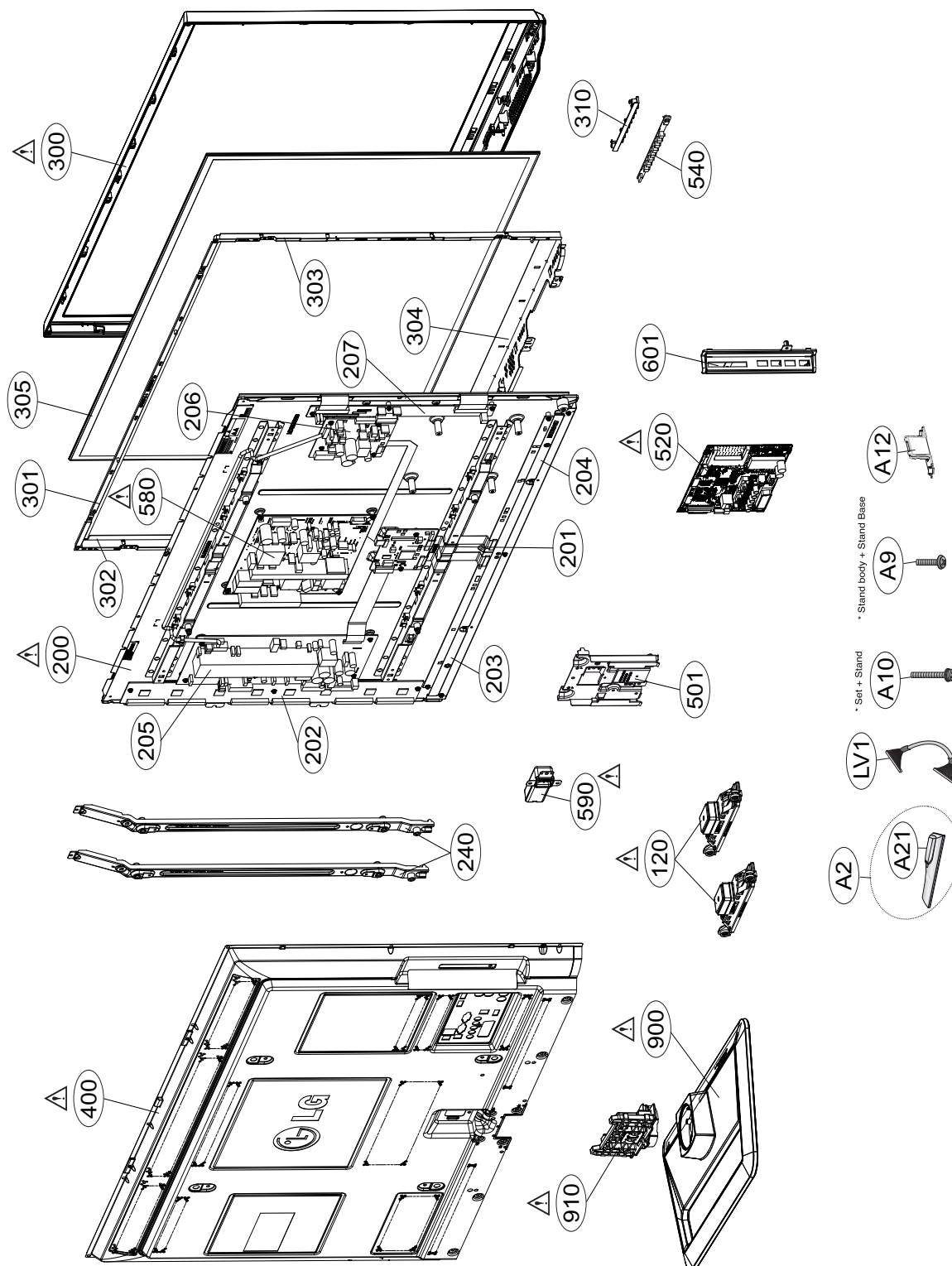
BLOCK DIAGRAM



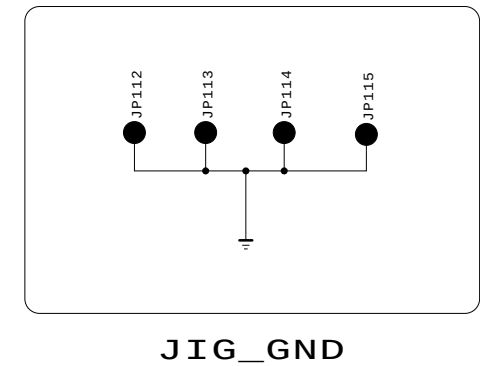
EXPLODED VIEW

IMPORTANT SAFETY NOTICE

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



```
PDP L13
EAX65071305
```



SECRET
LGElectronics



MODEL	L13	DATE	2012-09-20
BIPOCK	SCART, CI Slot	SHEET	1 / 7

<COMPONENT>

JK208
PPJ234-02

6A [GN]E-LUG
5A [GN]CONTACT
4A [BL]E-LUG-S
7B [BL]O-SPRING
5B [RD]E-LUG-S
7C [RD]O-SPRING_1
5C [RD]CONTACT_1
4C
5D [WH]O-SPRING
4E [RD]CONTACT_2
5E [RD]O-SPRING_2
[RD]E-LUG

COMP2_Y+
COMP2_Pb+
COMP2_Pr+
COMP2_L_IN
COMP2_R_IN

3+3.3V
R251 1K
R252 1K
R253 1K
R254 1K
R255 1K
R256 1K
R257 1K
R258 1K
R259 1K
R260 1K
R261 1K
R262 1K
R263 1K
R264 1K
R265 1K
R266 1K
R267 1K
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R665 1K
R666 1K
R667 1K
R668 1K
R669 1K
R670 1K
R671 1K
R672 1K
R673 1K
R674 1K
R6

The image displays four detailed circuit diagrams for different interfaces, each with a title and a list of component values.

<RS232C>

This diagram shows the RS232C interface circuit. It includes a MAX3232CDB (MAX3232) IC, a MAX3232CDB (MAX3232) IC, and a MAX3232CDB (MAX3232) IC. The circuit is powered by +3.3V_ST and +5V_ST. It features a JK203 SPG09-DB-009 connector, a MAX3232CDB (MAX3232) IC, and a MAX3232CDB (MAX3232) IC. The circuit is powered by +3.3V_ST and +5V_ST. It features a JK203 SPG09-DB-009 connector, a MAX3232CDB (MAX3232) IC, and a MAX3232CDB (MAX3232) IC.

<PHONE JACK>

This diagram shows the PHONE JACK interface circuit. It includes a JK206 PE3097-04 connector, a MAX3232CDB (MAX3232) IC, and a MAX3232CDB (MAX3232) IC. The circuit is powered by +3.3V_ST and +5V_ST. It features a JK206 PE3097-04 connector, a MAX3232CDB (MAX3232) IC, and a MAX3232CDB (MAX3232) IC.

<RGB PC>

This diagram shows the RGB PC interface circuit. It includes a JK205 SPG09-DB-010 connector, a MAX3232CDB (MAX3232) IC, and a MAX3232CDB (MAX3232) IC. The circuit is powered by +3.3V_ST and +5V_ST. It features a JK205 SPG09-DB-010 connector, a MAX3232CDB (MAX3232) IC, and a MAX3232CDB (MAX3232) IC.

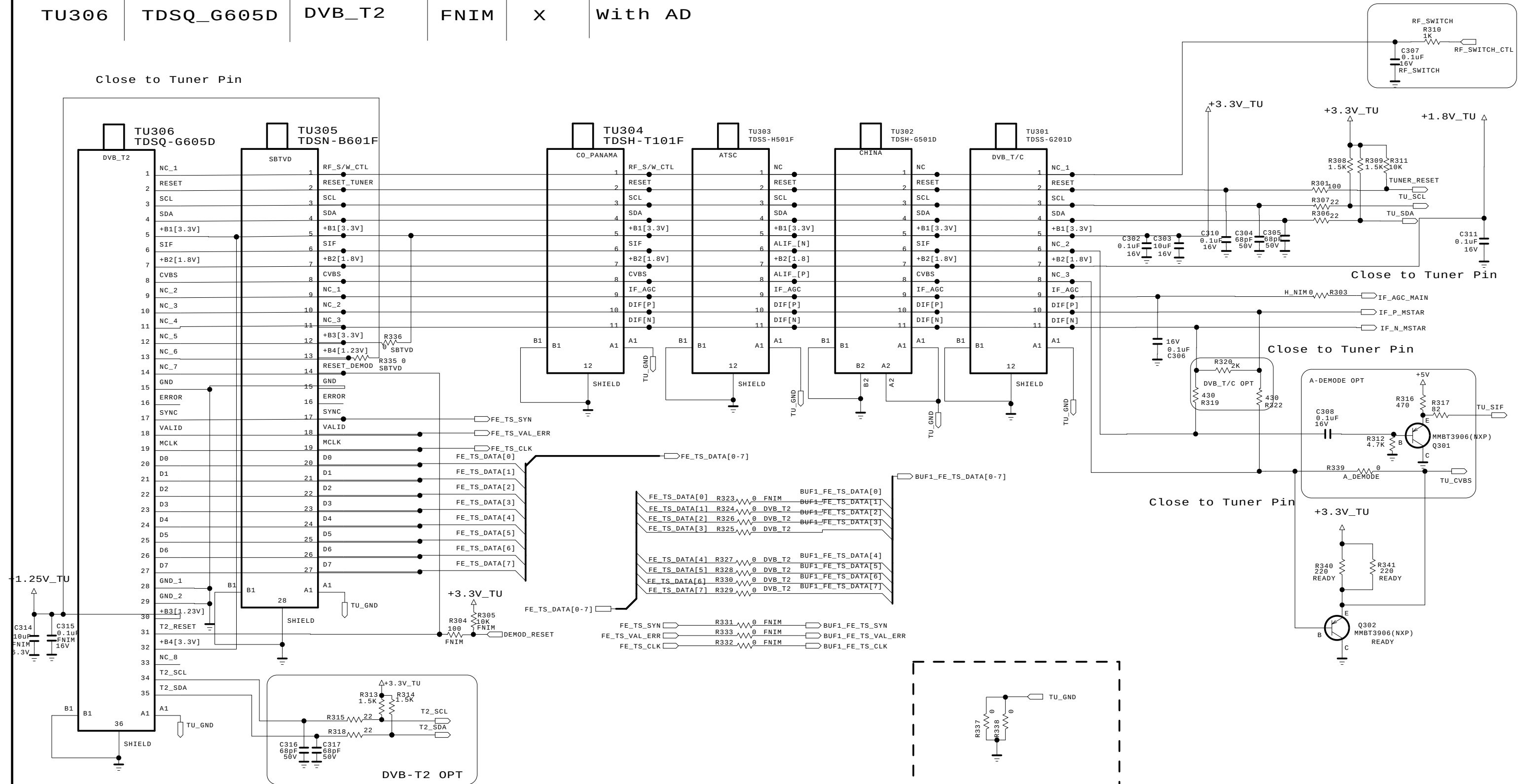
<WIRED IR>

This diagram shows the WIRED IR interface circuit. It includes a JK206 PE3097-04 connector, a MAX3232CDB (MAX3232) IC, and a MAX3232CDB (MAX3232) IC. The circuit is powered by +3.3V_ST and +5V_ST. It features a JK206 PE3097-04 connector, a MAX3232CDB (MAX3232) IC, and a MAX3232CDB (MAX3232) IC.

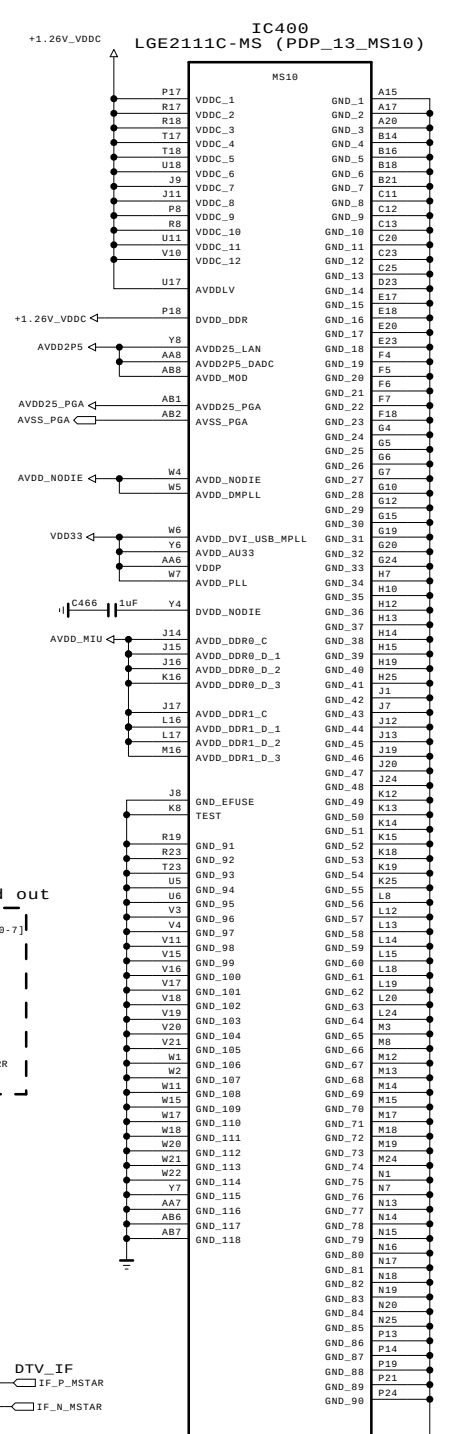
SECRET
LGElectronics



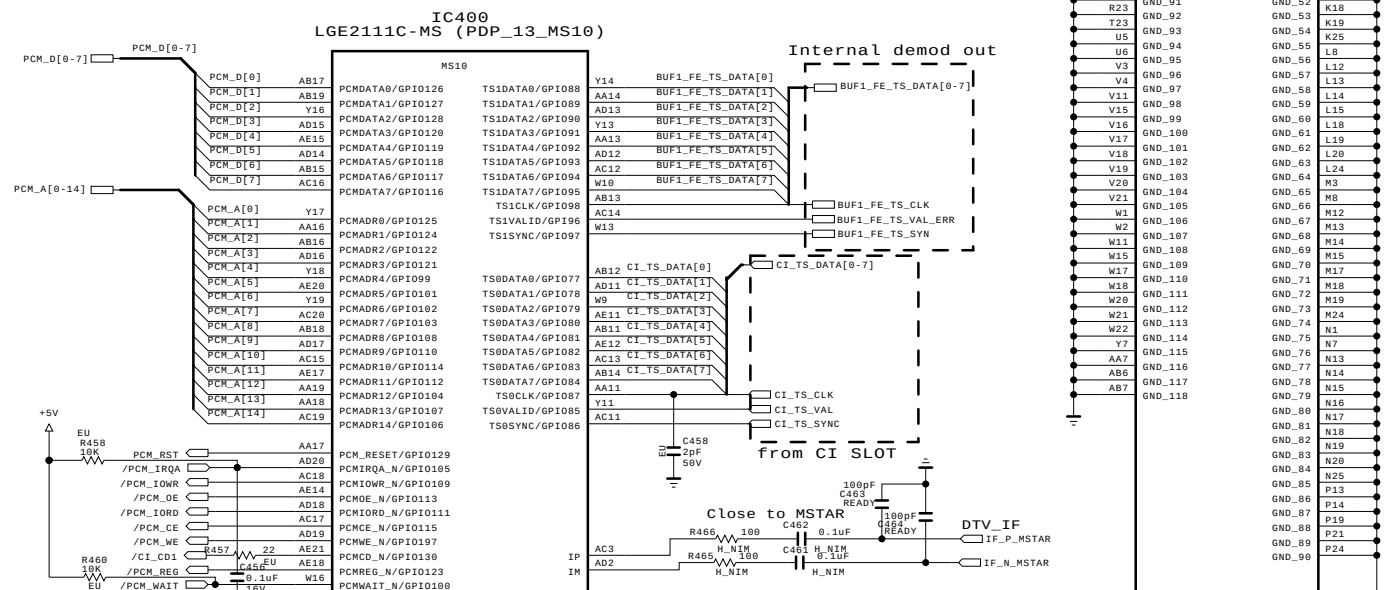
	TUNER	OPT1	OPT2	OPT3	OPT4
TU301	TDSS-G501D	DVB-T/C	HNIM	X	W/O AD
TU302	TDSH-G501D	China	HNIM	X	W/O AD
TU303	TDSS-H501F	ATSC	HNIM	X	W/O AD
TU304	TDSN-T501F	DVB-T_SCA	HNIM	RF_SW	W/O AD
TU305	TDSN_B601F	SBTVD	FNIM	RF_SW	With AD
TU306	TDSQ_G605D	DVB_T2	FNIM	X	With AD



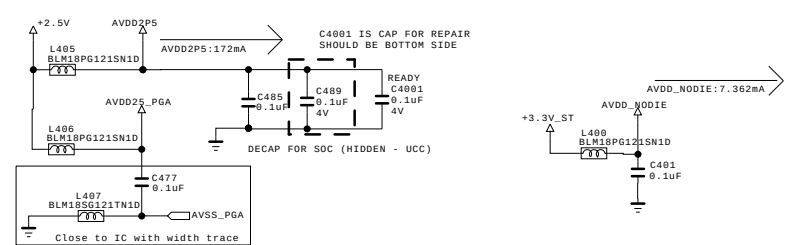
<VCC &GND>



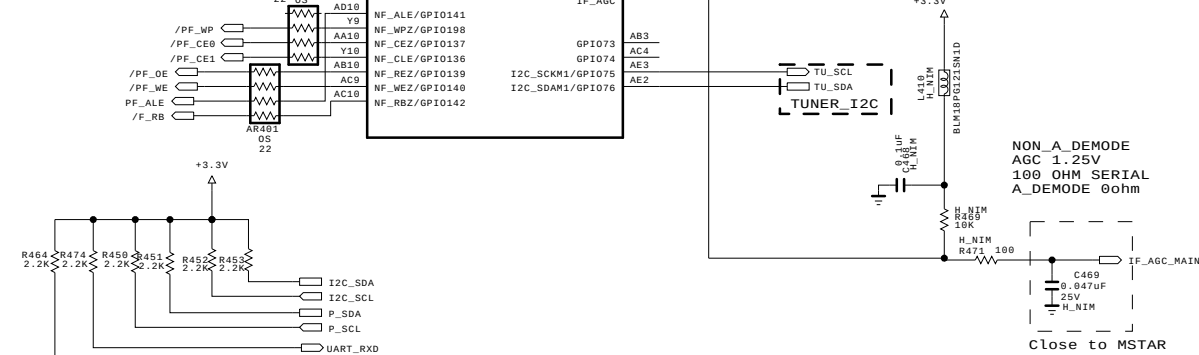
IC400
LGE2111C-MS (PDP_13_MS10)



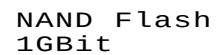
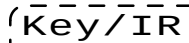
<STby 3.3V>



<SOC RESET>



MODEL	L13	DATE	2012-06-201
BLOCK	MAIN	SHEET	4 / 7



SECRET
LGElectronics

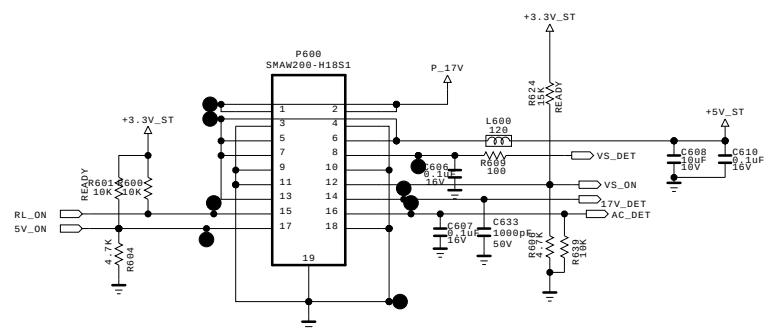


MODEL
BLOCK

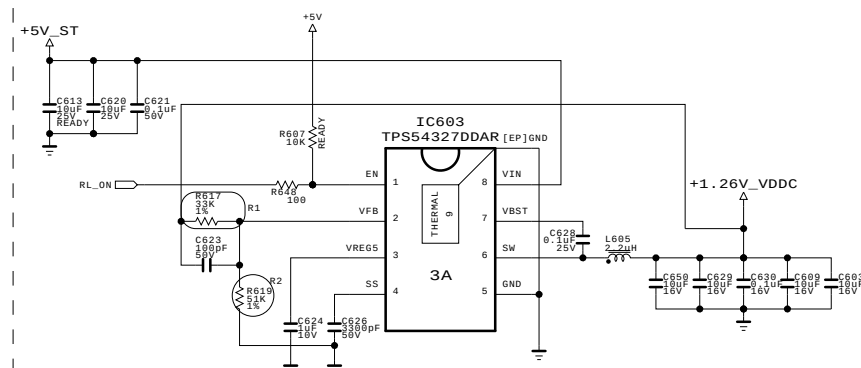
POWER & AMP

<ST-BY>

<Power Wafer>

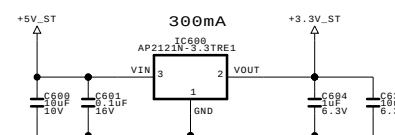


1.26V Core

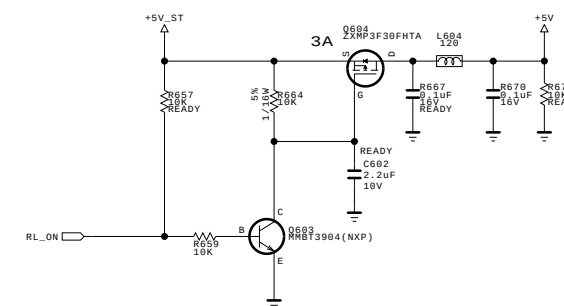


$$V_{out} = 0.765 * (1 + R1/R2)$$

+5V_ST --> 3.3Vst

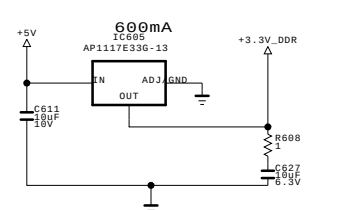


5V_STBY --> MULTI 5V

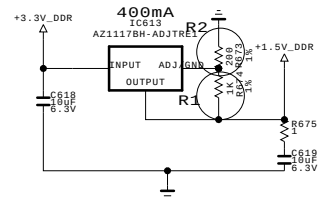


<MUTI>

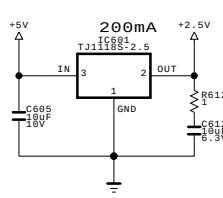
+5V->+3.3V_DDR



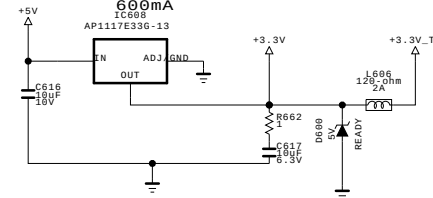
--> +1.5V_DDR



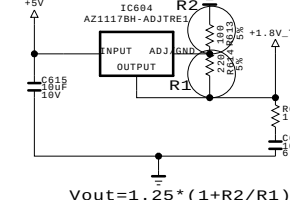
+5V->+2.5V



+5V->+3.3V
->+3.3V_TU

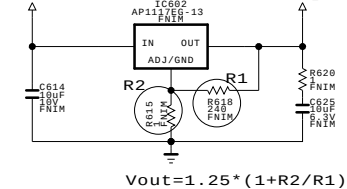


+5V->+1.8V_TU



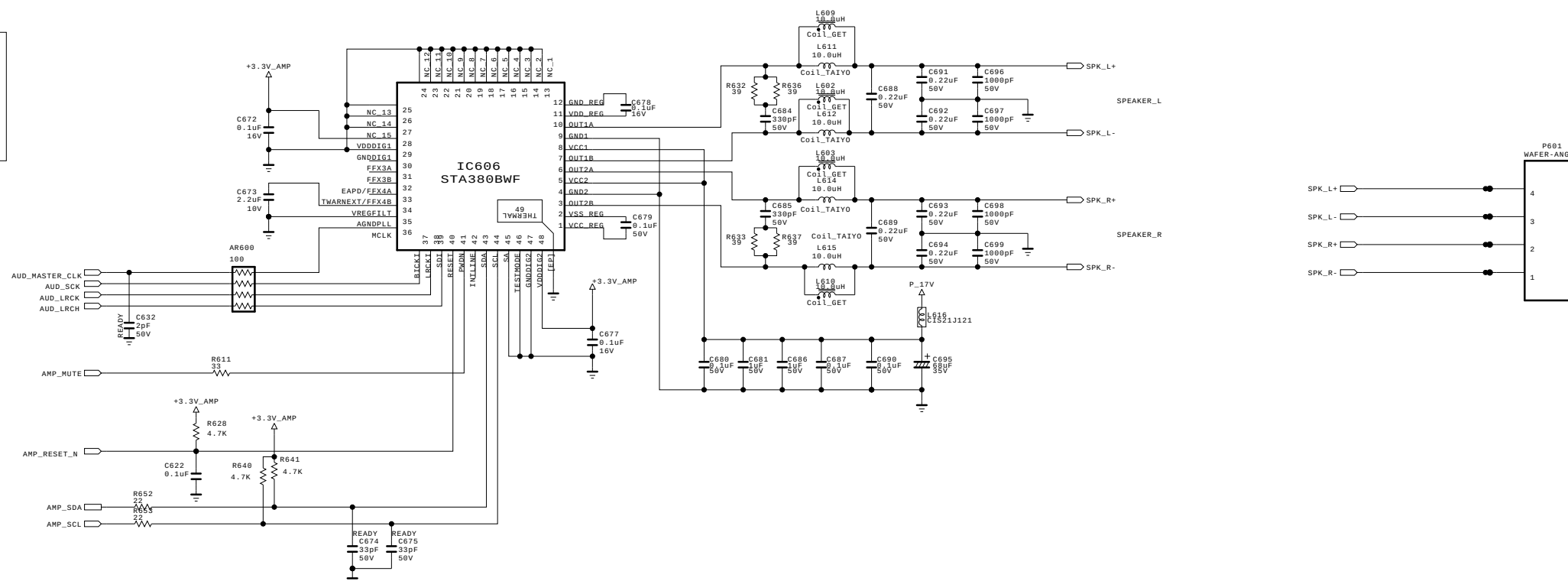
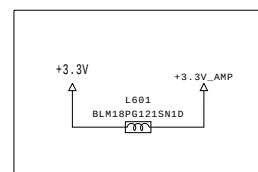
$$V_{out} = 1.25 * (1 + R2/R1)$$

+5V->+1.25V_TU



$$V_{out} = 1.25 * (1 + R2/R1)$$

<AUDIO AMP>

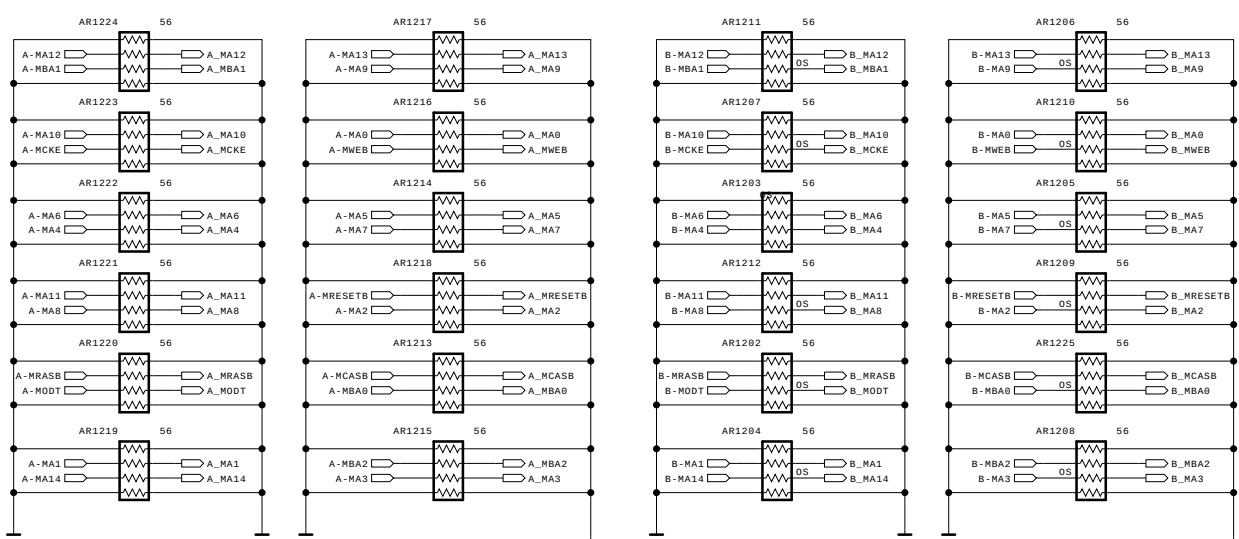
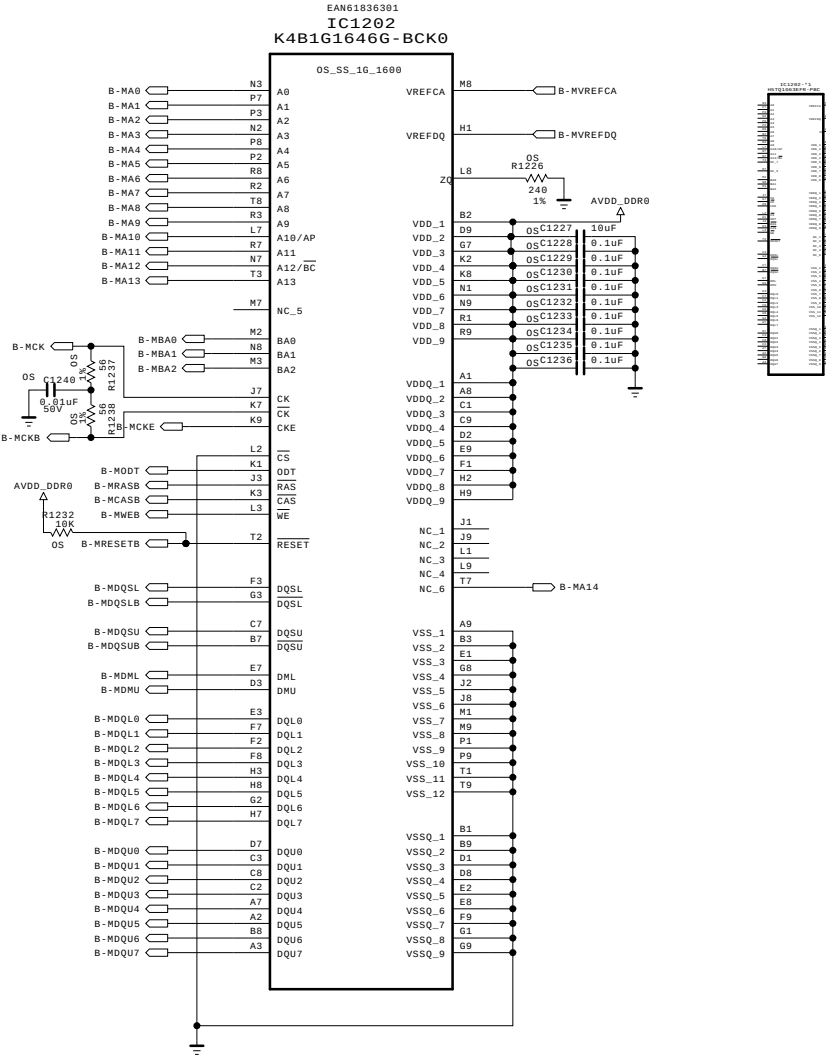
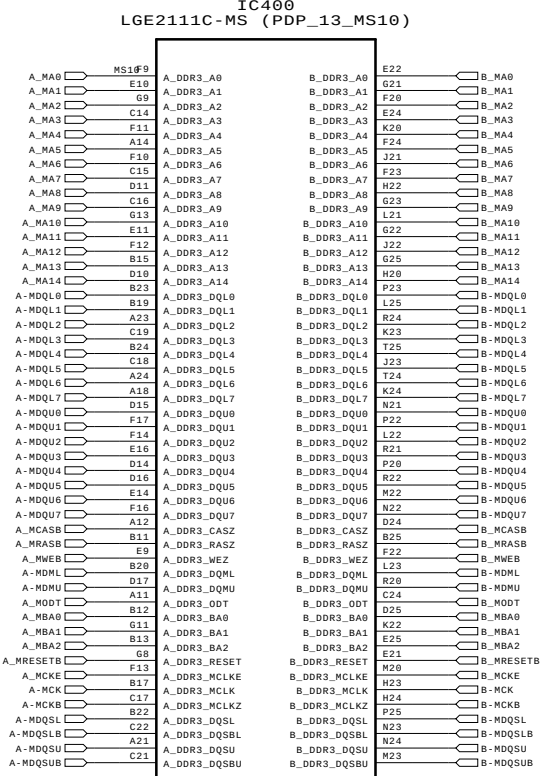
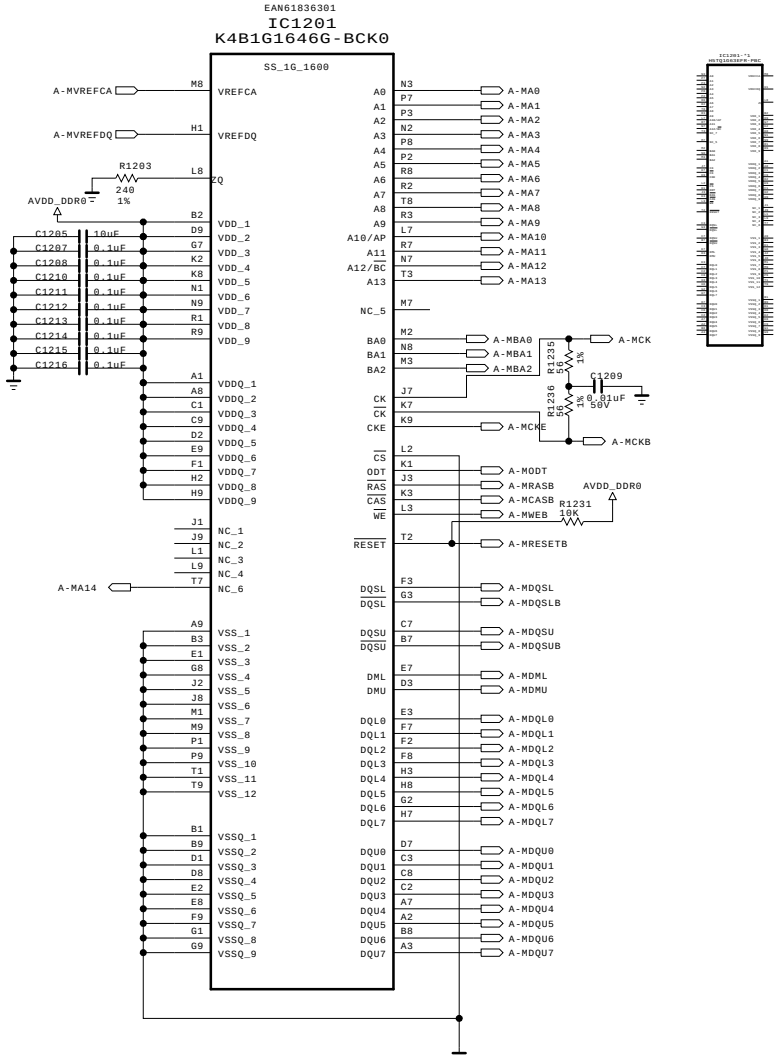
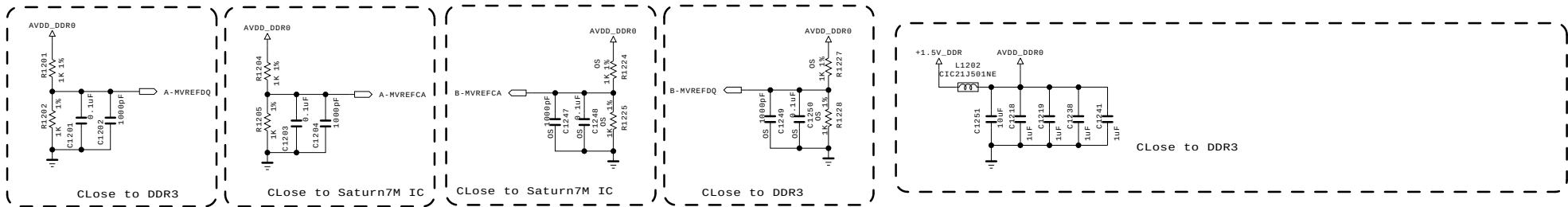


THE SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILTRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE SYMBOL MARK OF THE SCHEMATIC.

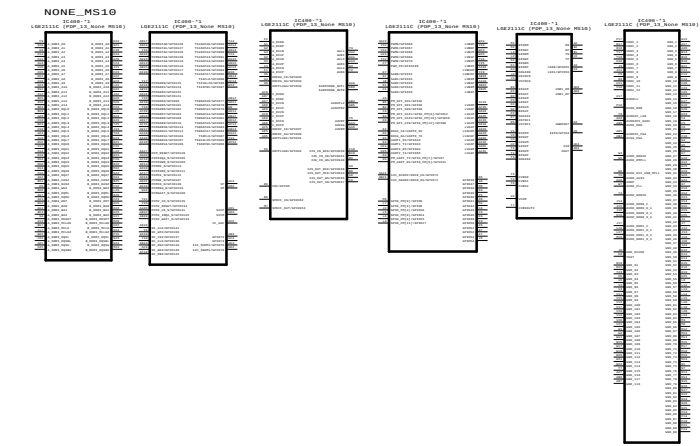
SECRET
LGElectronics

LG ELECTRONICS

MODEL	L13	DATE	2012-06-01
BLOCK	Power, AMP	SHEET	6 / 7



<NONE MS10>



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

SECRET
LGElectronics



MODEL	GP4L_S7LR2	DATE	2011/06/03
BLOCK	DDR_256	SHEET	12 /



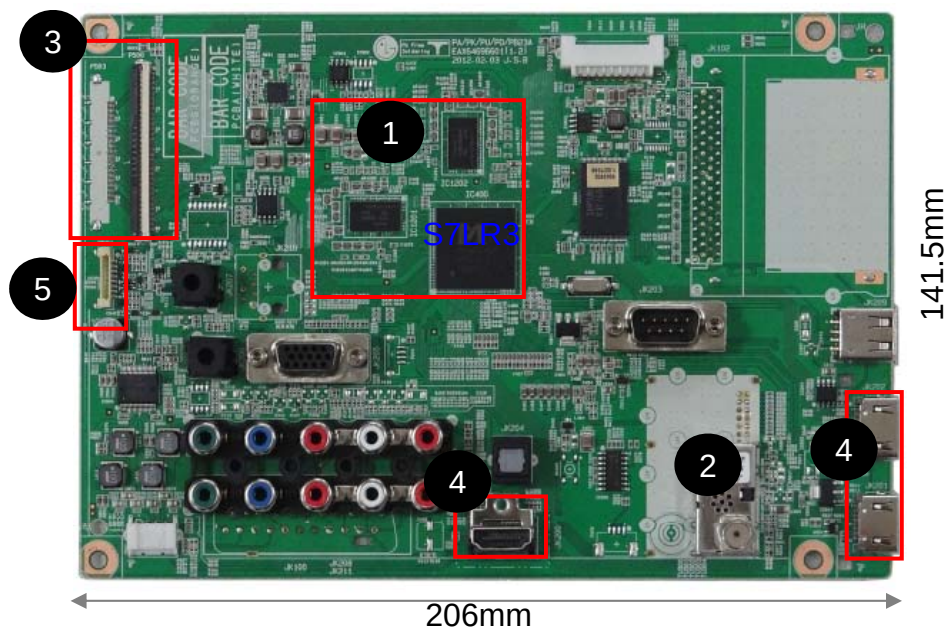
L13 Training Manual(PB31A)

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- 1. L13 Concept('12 Vs. '13)**
- 2. L13 Power On/Off sequence**
- 3. L13 Power Block**
- 4. L13 I2C MAP**
- 5. L13 Front End**

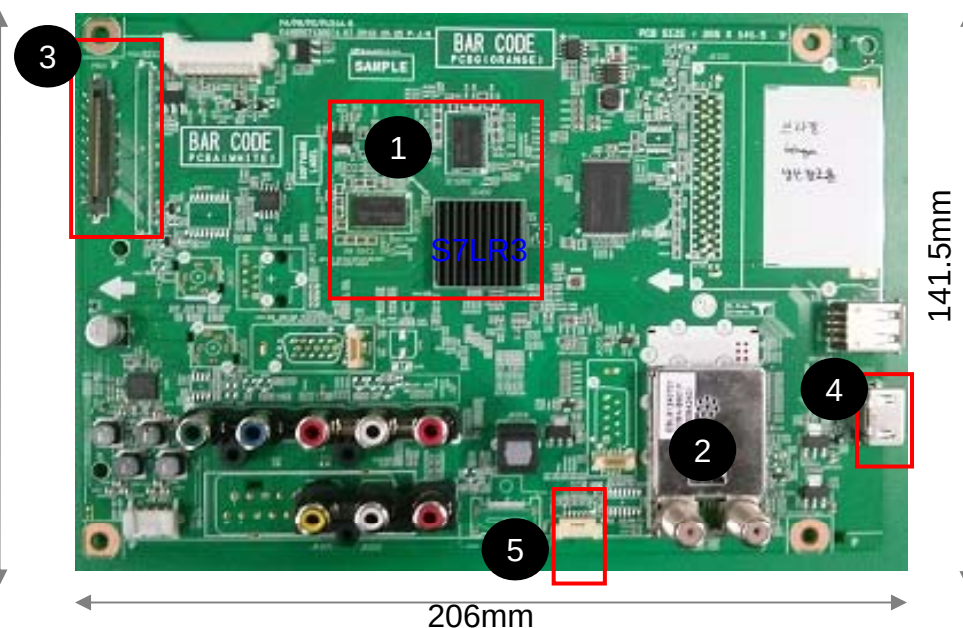
1. L13 Concept('12 Vs. '13)

42PA4500/50PA4500
50PA6500/60PA6500



- 1 Main processor, DDR, NAND
- 2 Tuner
- 3 LVDS Wafer
- 4 HDMI Block
- 5 Tact Key+LED+EYE+IR

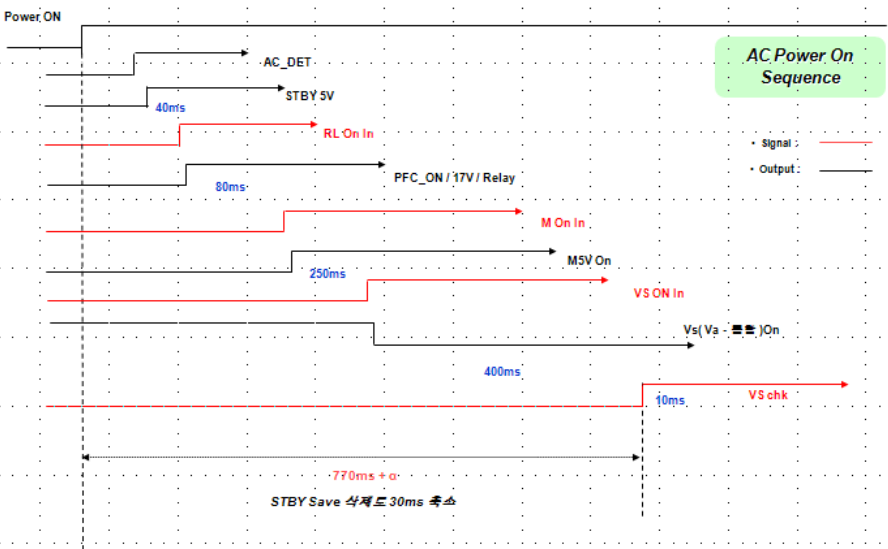
42PN4500/50PN4500
50PN6500/60PN6500



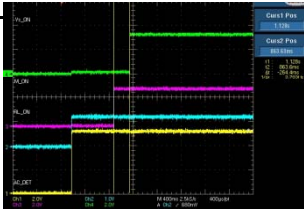
Jack ERRC

- 1) RGB ,RS-232C and PC-Audio is removed
- 2) Comp./Comp. Hybrid → Comp. Hybrid (1ea)
- 3) HDMI 1 Jack is removed

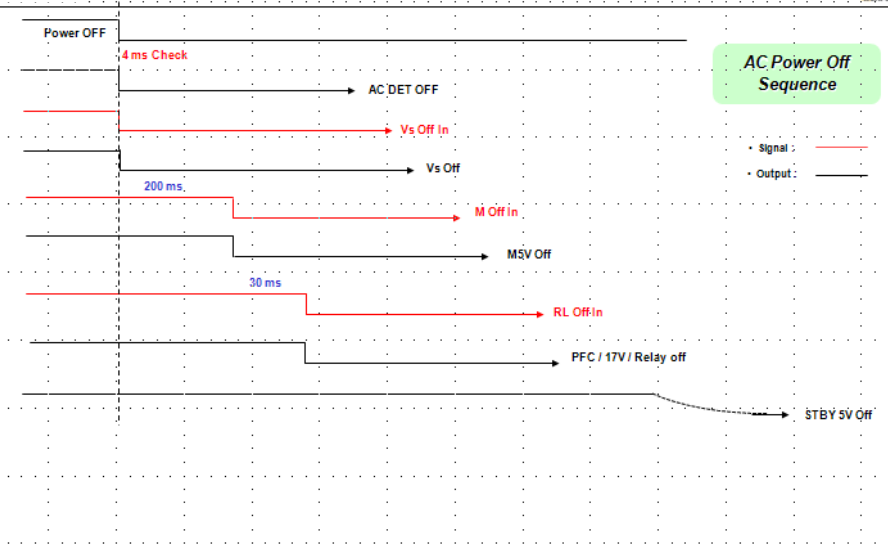
2. Power On/Off sequence (AC)



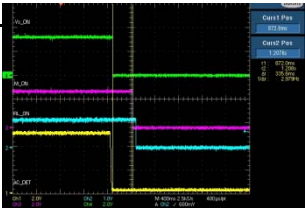
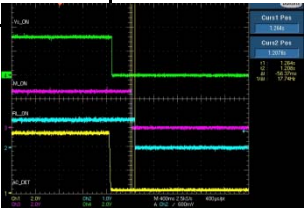
Signal	Spec.(min)	Measure	Graph	Remark
RL_On	40ms	0		
M_On	80ms	700ms		
VS_On	250ms	260ms		
VS_DET		-		



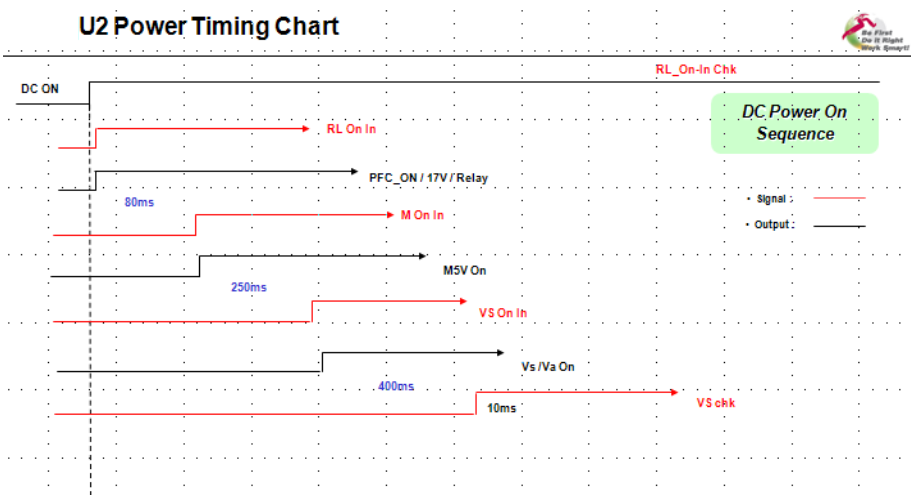
U2 Power Timing Chart



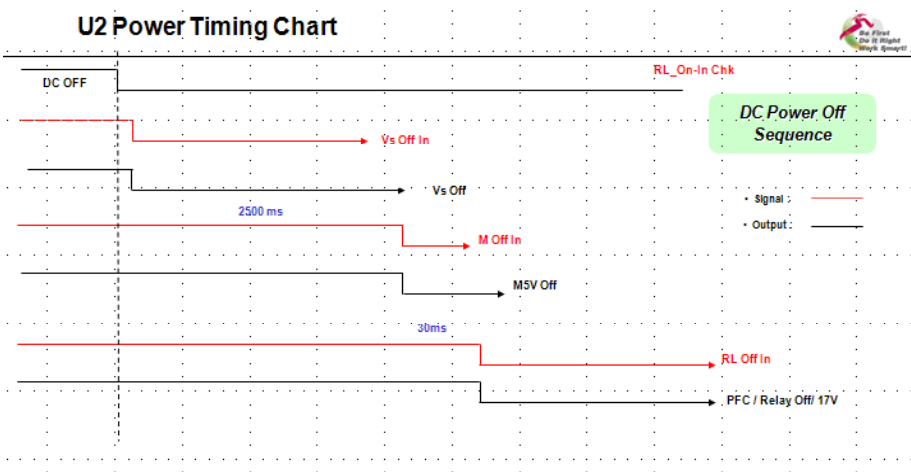
Signal	Spec.(min)	Measure	Graph	Remark
VS_On	0	40ms		
RL_On	200ms	335ms		
M_On	30ms	56ms		



2. Power On/Off sequence (DC)

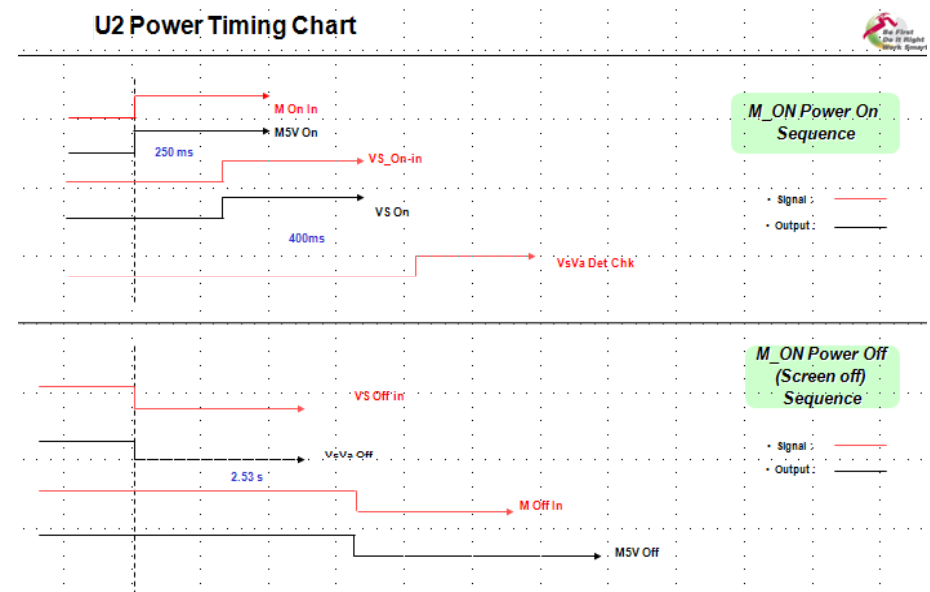


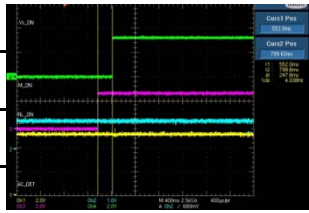
Signal	Spec.(min)	Measure	Graph	Remark
RL_On				
M_On	80ms	87ms		
VS_On	250ms	280ms		
VS_DET				

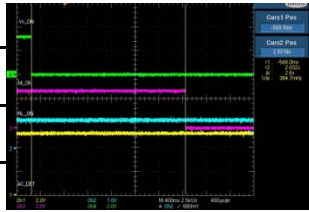


Signal	Spec.(min)	Measure	Graph	Remark
M_On	2500ms	3000ms		
RL_On	30ms	56ms		

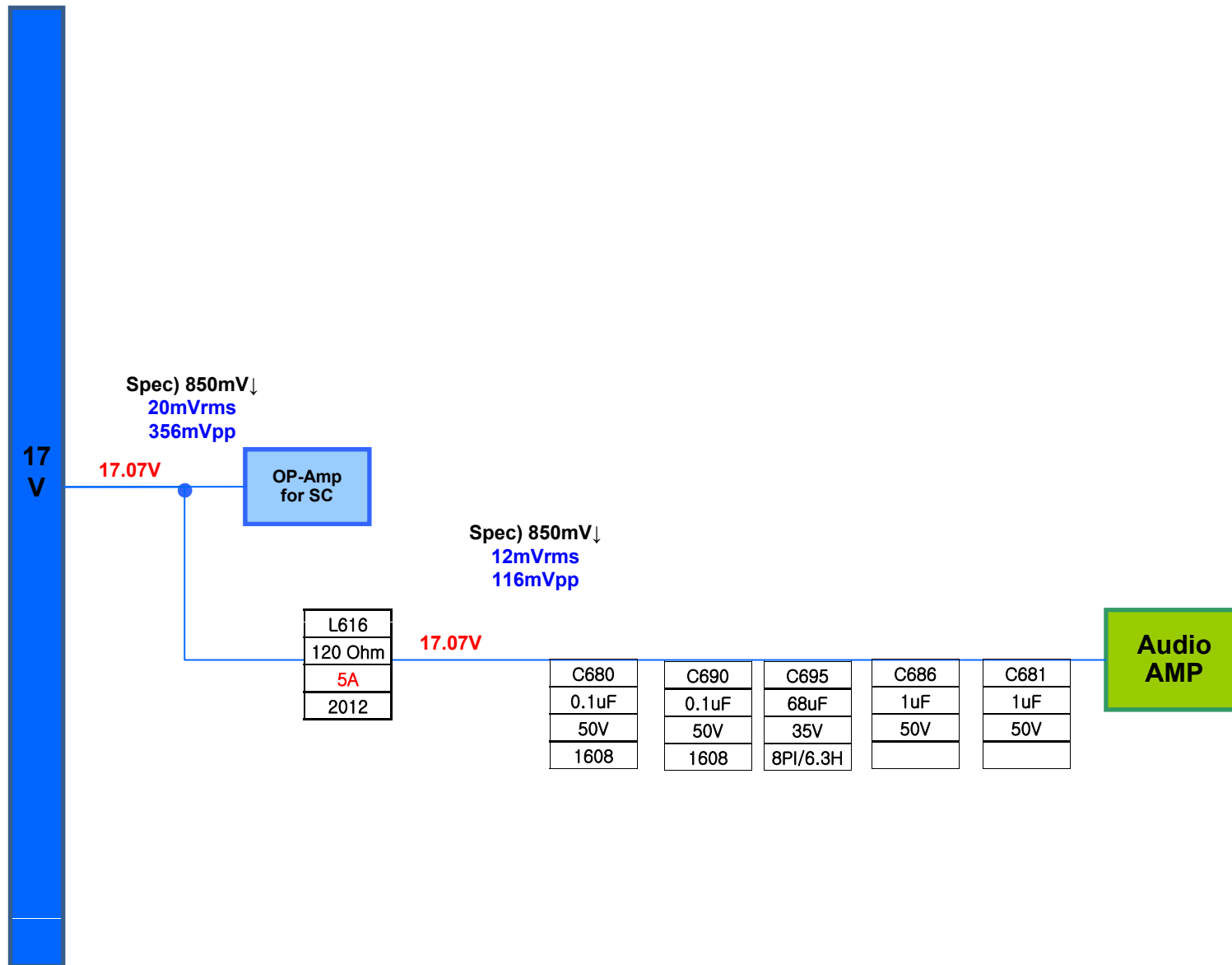
2. Screen On/Off sequence



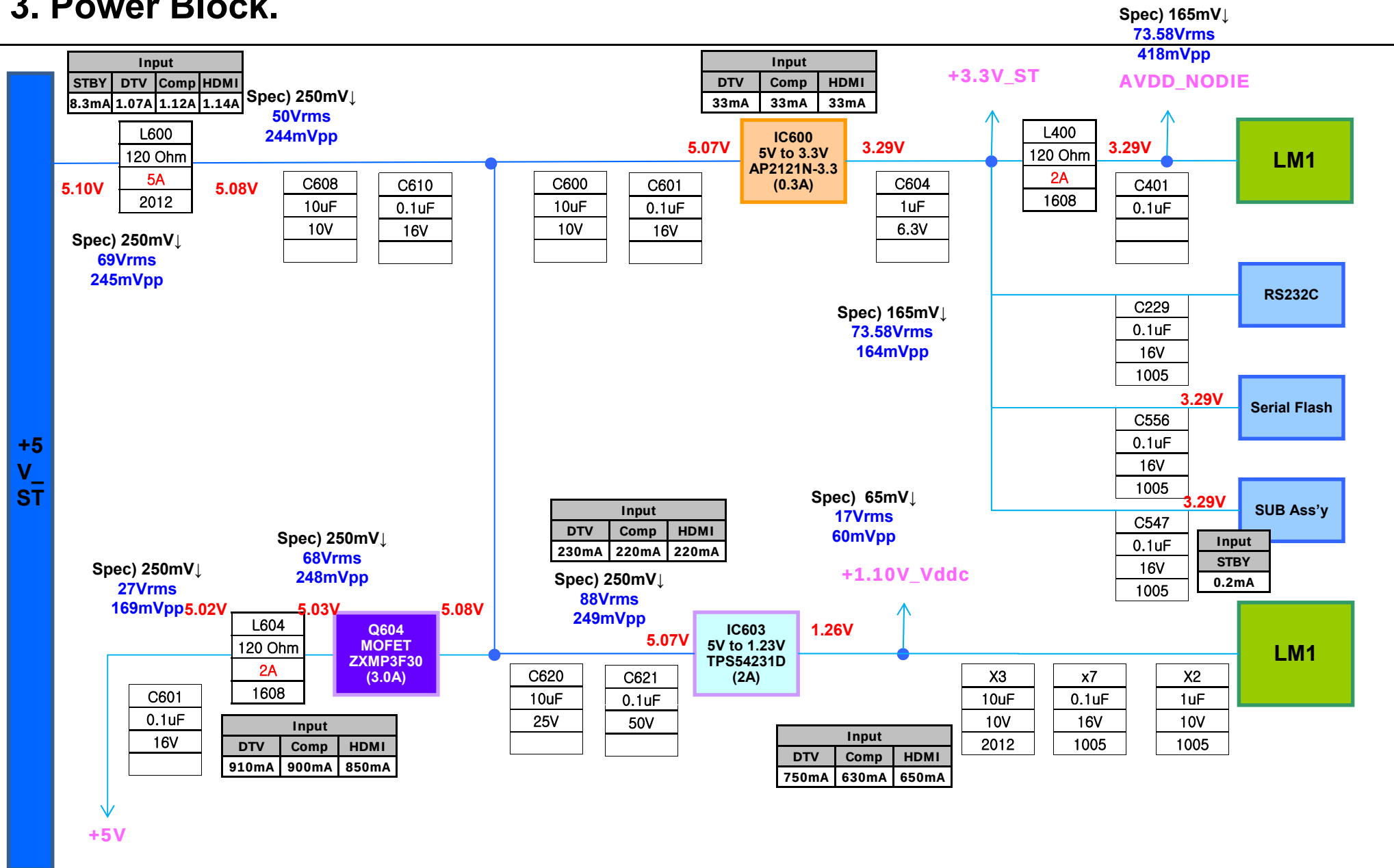
Signal	Spec.(min)	Measure	Graph	Remark
VS_On	250ms	247ms		
VS_DET	400ms	-		

Signal	Spec.(min)	Measure	Graph	Remark
M_On	2530ms	2600ms		

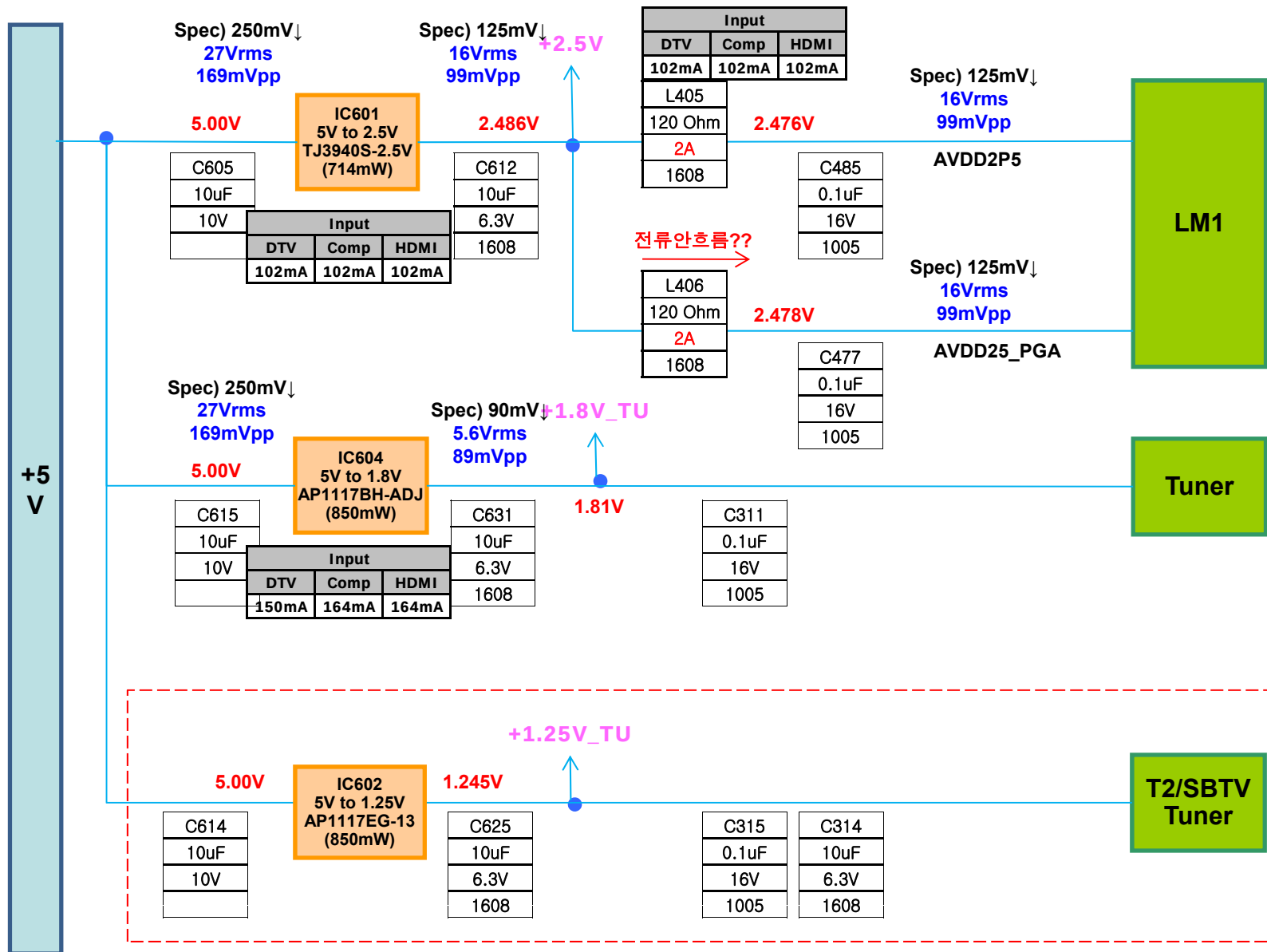
3. Power Block.



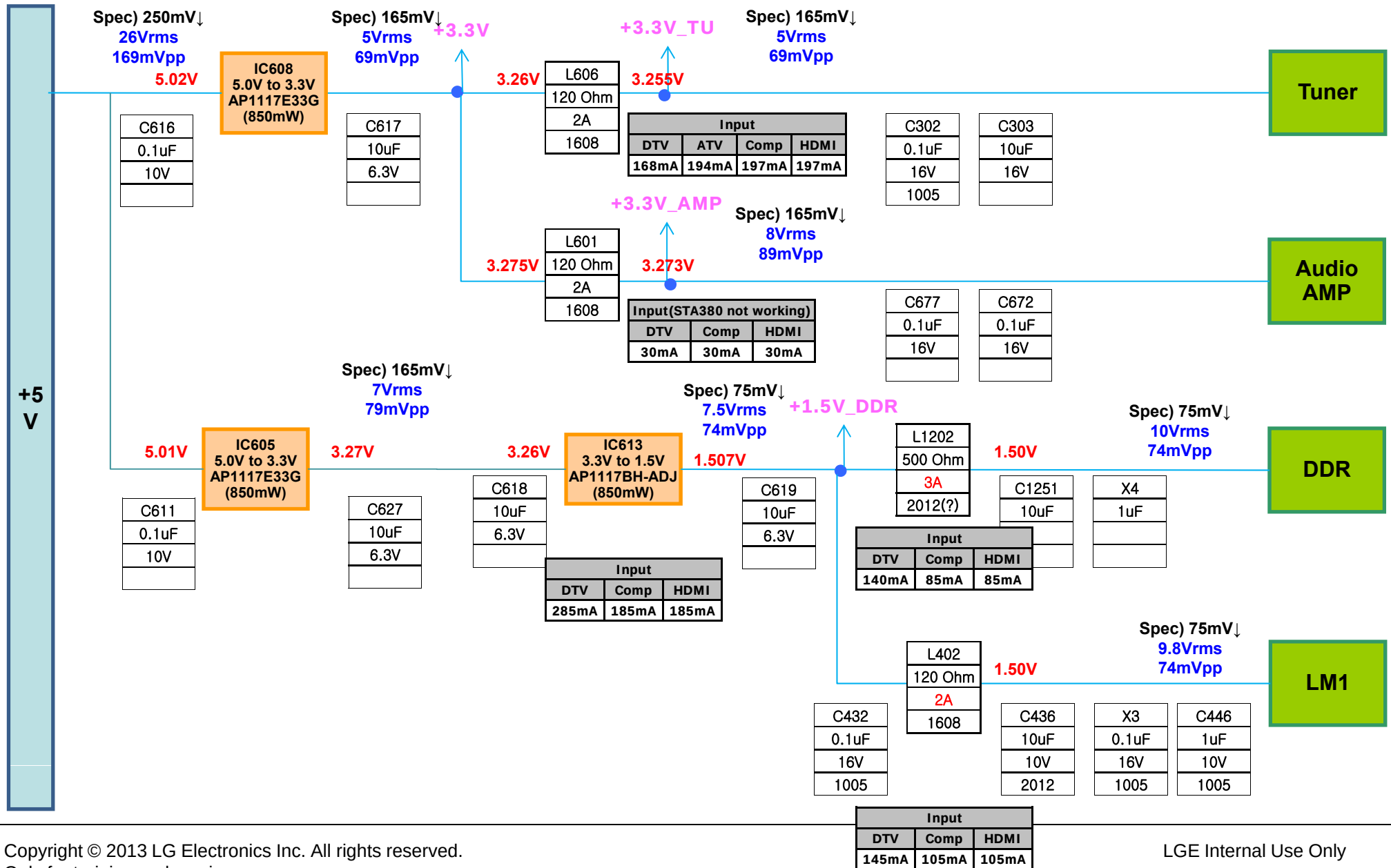
3. Power Block.



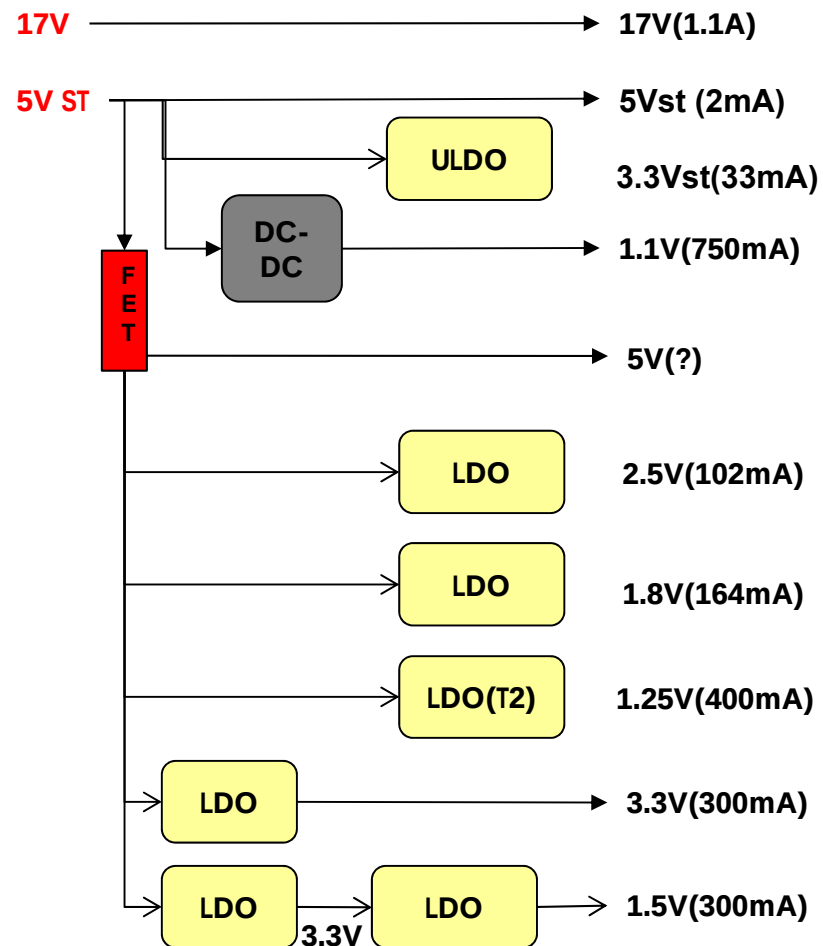
3. Power Block.



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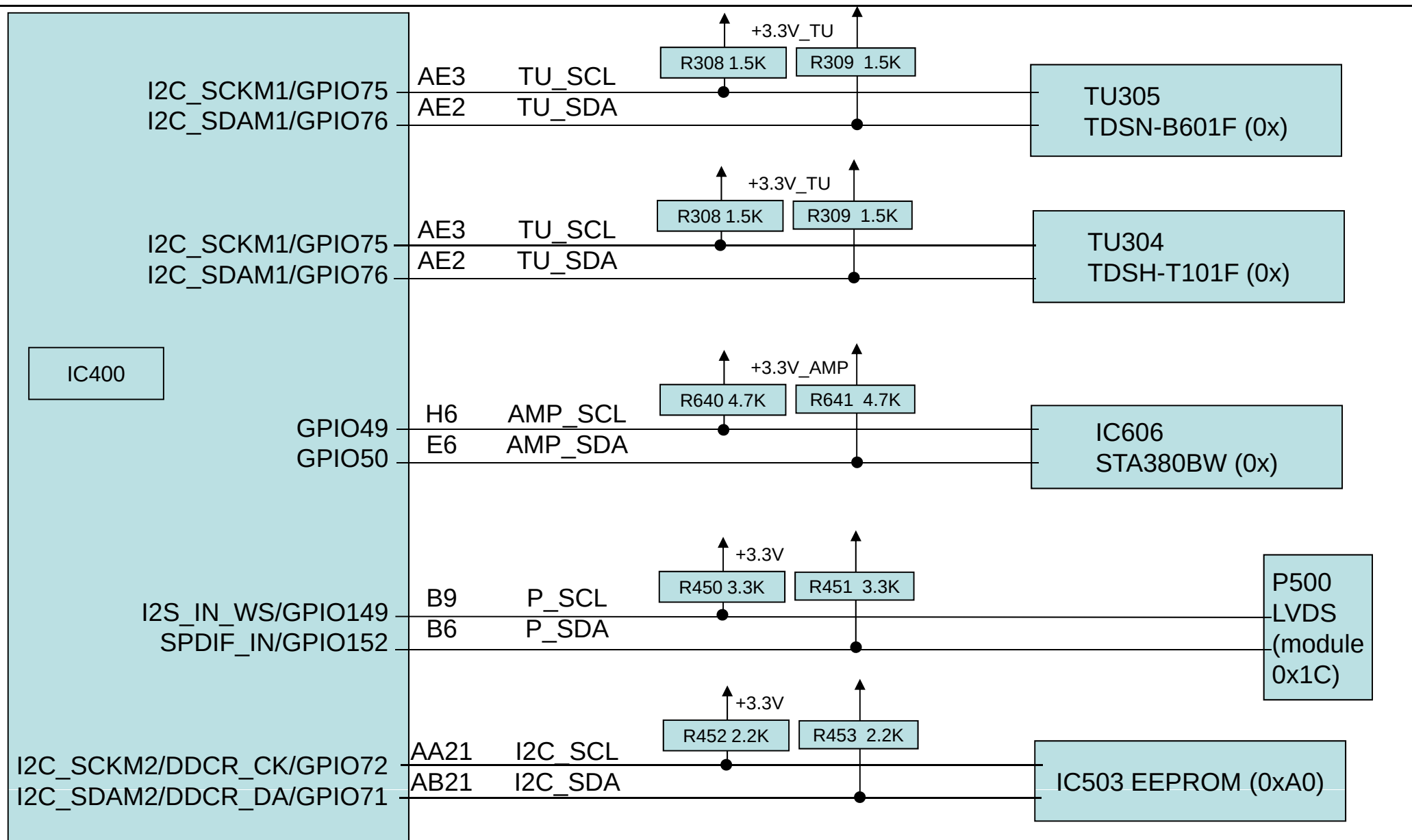


3. Power Block.



In	Out	Current	type	
5Vst	5Vst	2mA	STBY	
5Vst	3.3Vst	35mA	ULDO 0.3A	60mW
17V	17V	1.1A	Multi	
5Vst	5V	910mA + 1A	FET 3A	
5V	5V	1A	Multi	USB 1A
5Vst	1.1V	(Input 220mA) 750mA	DCDC 3A	1/4
5V	2.5V	102mA	LDO 714mW	255mW
5V	1.8V	164mA	LDO 850mW	525mW
5V	1.25V	400mA(?)	LDO 850mW	1500mW
5V	3.3V	300mA	LDO 850mW	510mW
5V	3.3V	300mA	LDO 850mW	510mW
3.3V	1.5V	300mA	LDO 850mW	480mW

4. L13 I2C MAP



5. L13 Front End (ATSC/ISDB-T/DVB-T)

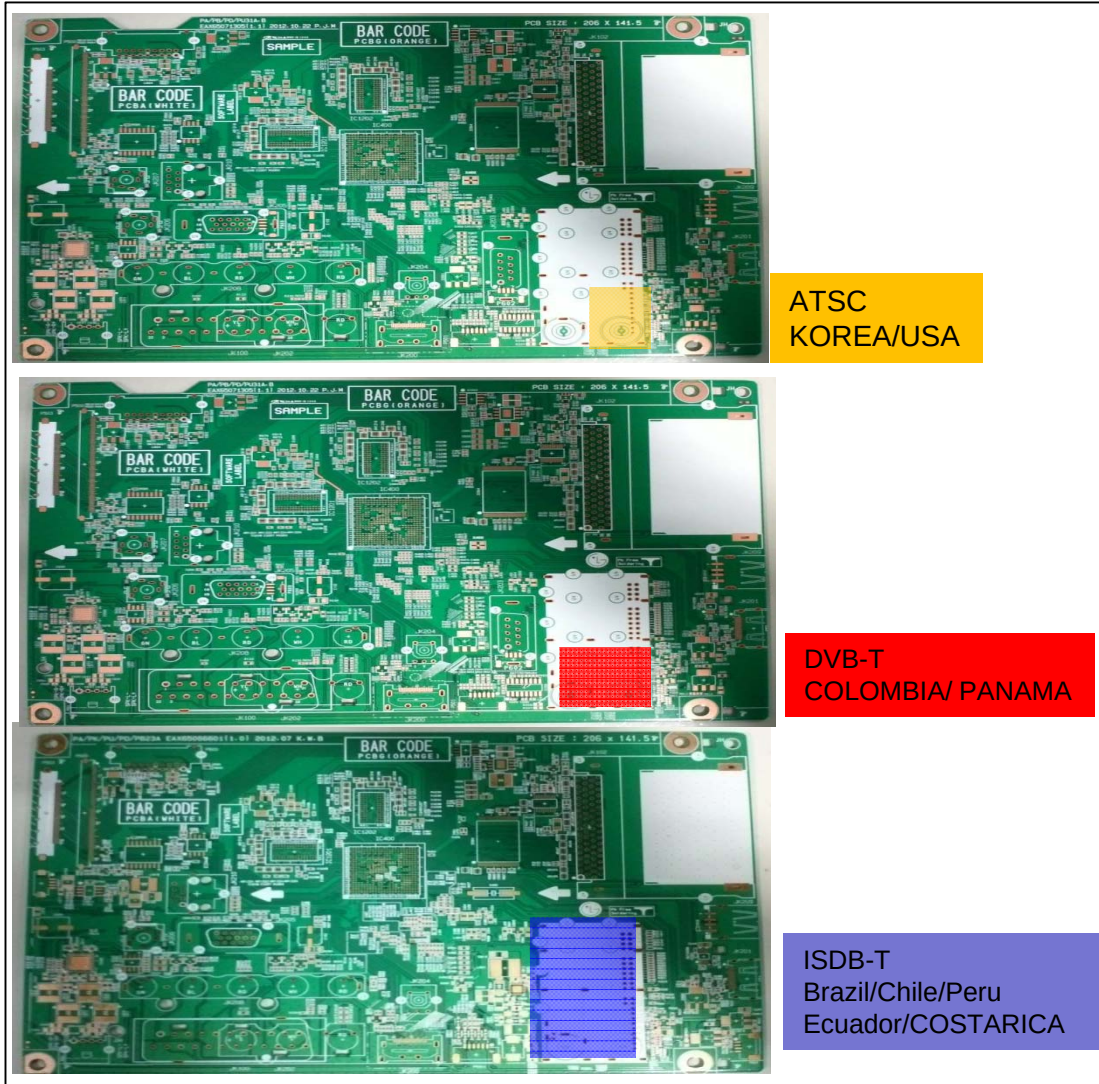
Net-Cast 4.0 Low model (Mstar) use three kind of tuner as below

But we apply 3ea PCB(NTSC/ISDB-T/DVB-T), for each tuner and distinguish by circuit option and tool option

	ATSC	ISDB-T	DVB-T
2013 Tuner Figure			
2013 Tuner Block Diagram	Si2158: With out Analog Demod (Half NIM)	Si2178 : With Analog Demod (Full NIM) Si2169 : ISDB-T Demod	Si2176 : With Analog Demod (Half NIM)
2012 Tuner Block Diagram	Tuner TDSS-H001F	Tuner TDSN-B001F	Tuner TDSH-T1001F

5. L13 Front End (ATSC/ISDB-T/DVB-T)

Use 3ea PCB for each tuner and apply different circuit option and tool option



Tool option3

-USA
TUNER : SI2158
DEMOD : ATSC-S7

Tool option4

-KOREA
Digital Demod : ATSC_7
Digital DemodS : NO_DEMOD_S
Analog Demod : MSTAR_58

Tool option4

-COLOMBIA/PANAMA
Digital Demod : DVB_S7
Digital DemodS : NO_DEMOD_S
Analog Demod : SI2176

Tool option4

-Brazil/Chile/Peru/Ecuador/COSTARICA
Digital Demod : ISDB_TC90527
Digital DemodS : NO_DEMOD_S
Analog Demod : SI2178

- ATSC Tuner Area
- DVB-T Tuner Area
- ISDB-T Tuner Area