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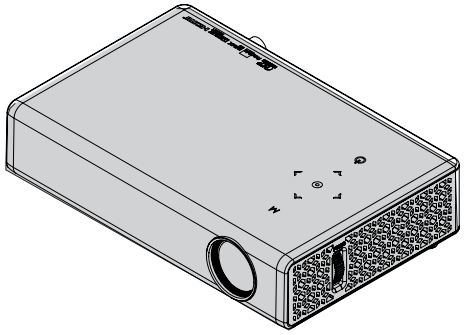
DLP PROJECTOR
SERVICE MANUAL

CHASSIS : FM21B

MODEL : PB63U PB63U-JE

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



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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 PROJECTOR 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,

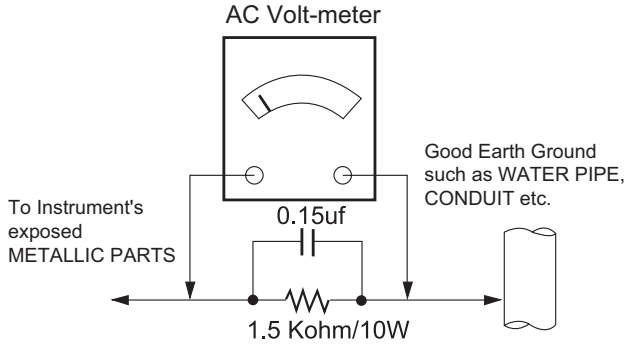
always perform an **AC leakage current check** on the exposed metallic parts of the cabinet, such as antennas, terminals, etc., to be sure the set is safe to operate without damage of electrical shock.

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
*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 DLP Projector with FM21B 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 PROJECTOR test method followed

(2) Demanded other specification

Safety : UL, CSA, IEC, CE specification (EN55022 Class B)

EMC : FCC, ICES, IEC, CE specification (EN60950-1)

4. Model General Specification

No	Item	Specification			Remark
		Min	Max	Unit	
1	Video input applicable system	1) NTSC M 2) PAL-B,D,G,H,I 3) PAL M 4) PAL N 5) PAL 60 6) SECAM			3.579545 / 60 Hz 4.433618 / 50 Hz 3.575611 / 60 Hz 3.582056 / 50 Hz 4.433618 / 60Hz
2	Power	Adapter - DC 19.5V @ 4.62A (90W)			
3	Input Voltage	AC 100 ~ 240(± 10 %)V, 50/ 60Hz			
4	Market	US			
5	Picture size	WXGA (1280 x 800)			
6	Aspect ratio	16:10			Panel Resolution
7	Operating Temperature	0	40	deg	
8	Operating Humidity		80	%	
9	Storage Temperature	-20	60	deg	
10	Storage Humidity		85	%	

ADJUSTMENT INSTRUCTION

1. Application Object

This instruction is for the application to the DLP Projector (Chassis: FM21B).

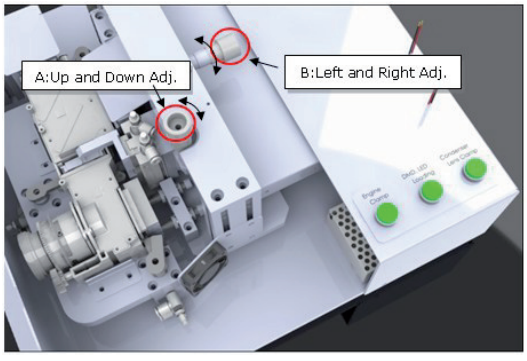
2. Notes

(1) The power source insulation of this DLP Projector is not charging type and you may not use the transformer for insulation. It is advised to use an insulation transform between the power supply cable and power input of the set to protect the test equipment.
(2) The adjustment must be performed under the correct sequence. But, it can be changed within the error boundary of performance, considering the mass productivity.
(3) The adjustment must be performed in the circumstance of 25 °C ± 5 °C of temperature and 65 % ± 10 % of relative humidity.
(4) For the adjustment, the receptor's input voltage shall be maintained at 220 V, 60 Hz.
(5) The set must be on for 5 minutes prior to any adjustment.
After receiving possible 100 % White Pattern, it is ready for adjustment. If it is inevitable, it can be regardless of the signal.

3. Composition of Adjustment Mode

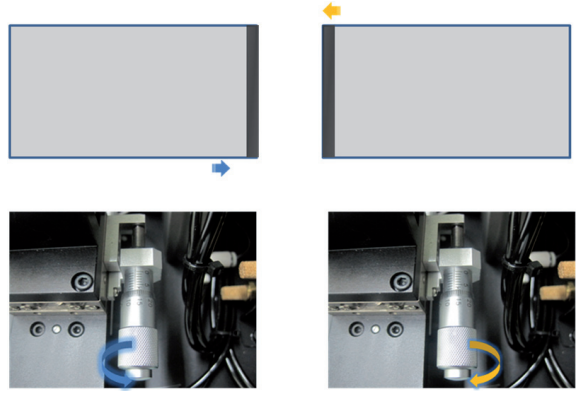
(1) Adjustment mode can be entered by pressing ADJ key of the adjustment remote controller, and may exit by pressing EXIT key after the adjustment.
(2) Preparation for adjustment.
1) Connect power to the Set, and make it Power On state.
2) Heat Run for at least 5 min. before the adjustment.
(3) Adjustment specification
1) Composition of adjustment mode
A. Turn on the power of the set with Power on key.
B. Select Default mode for input source.
C. Adjustment mode can be entered by pressing ADJ key of the adjustment remote controller, and may exit by pressing EXIT key after the adjustment.
D. Preparation for adjustment.
E. Connect power to the Set, and make it Power On state.
F. Heat Run for at least 5 min. before the adjustment.

4. Folding Mirror Adjustment



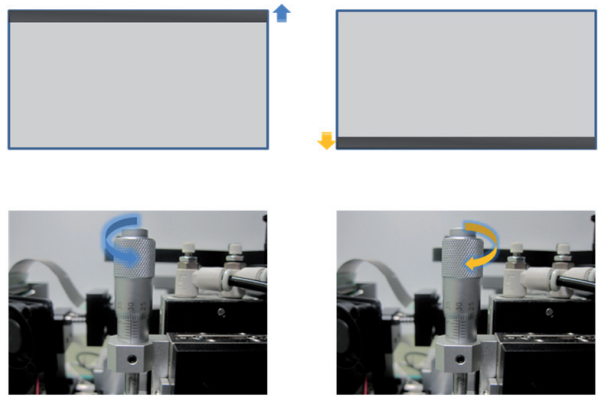
4.1. Lighting System Adjustment Procedure

(1) Settle down optical engine in the standard position of Jig.
(2) Press Engine Clamp button to fix the engine, and press Lens Clamp button to lock the lighting adjustment lens.
(3) Adjust screen size with 40 inch as standard, and after bringing up Full White screen, adjust Focus.
(4) In a case where a lightening is installed to a horizontal direction as shown (a), an adjustment micro-meter is rotated to counter-clockwise whereas it is rotated to clockwise in a case of the left side installation to adjust a lightening margin; after a width of a lightening margin is confirmed by rotating 0.2 mm more to the rotation direction, it is rotated back by 0.1 mm to the opposite direction.
(5) In a case where a lightening is installed to a vertical direction, confirm with a method like the above (4).



In a case where installed to the right side(right)
In a case where installed to the left side(left)

(Fig. 4-1-1) In a case where installed to a horizontal direction



In a case where installed to the upper part(right)
In a case where installed to the lower part(left)
(Fig. 4-1-2) In a case where installed to a vertical direction

4.2. Final Adjustment

Repeat the adjustments of 5) and 6) 2 times to check again whether the lighting margin of the left screen is at the end, and also check whether end of the right lighting margin went over. After foreign object inspection, focus line width(measurement category: refer to the figure), and Focus Stopper location inspection, fix the lighting system adjustment lens.

4.3. Lighting System Margin Inspection Method and Spec.

- Apply for the sample that the decision for good/fail is difficult during visual inspection of lighting margin.

(1) Prepare CL-200 with measurement surface of width 20mm, length 5mm as in (Fig. 4-3-1)

(Fig. 4-3-1) CL-200 for lighting margin inspection (right side)

(2) Bring up Full White pattern and check whether Light Cyan shows.

(Fig. 4-3-2) CL-200 for lighting margin inspection (right side)

(3) Measure the brightness at the boundary of the screen. (Refer to Fig. 4-3-3)

(Fig. 4-3-3) Measure brightness of screen boundary

(4) Measure brightness at 10mm in the inner direction from screen boundary. (Refer to Fig. 4-3-4)

(Fig. 4-3-4) Measure brightness at 10mm inside the screen

(5) Lighting Margin Spec shall be smaller than 104% of (4) brightness/(3)brightness.

4.4. Focus test method and subject

- Test pattern : Resolution Pattern , White Cross-Hatch Pattern
- Tools : Focus width measurement ruler

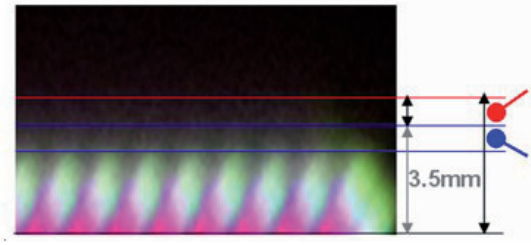
4.4.1. Focus adjustment method

(1) Set the projection distance of Engine as 1200 mm (40 Inch screen).

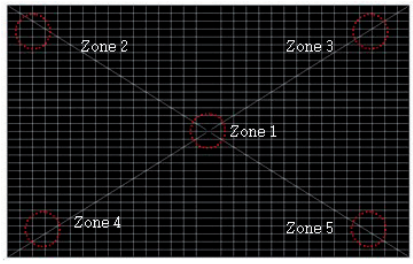
(2) Pop up the Resolution Pattern among the Test Patterns of Set, and fix the Focus on the part where the Resolution Pattern is classified on each part of screen. (all parts Balancing)

(3) Popup the White Cross-Hatch Pattern and measure the width of each Point.

(4) Focus judging standard : 3.5 mm or less (Measure line width excluding light Flare: Refer to Fig. 4-4-1-1)



Red Line (light Flare), Blue Line (Thick Flare)
(Fig. 4-4-1-1) Standard for deciding line width



(Fig. 4-4-1-2) Resolution Pattern

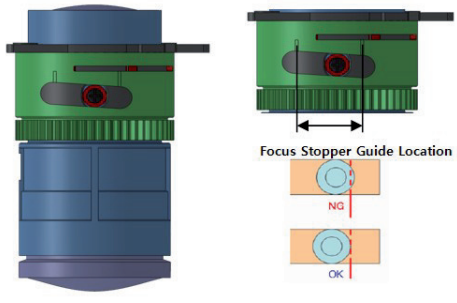
4.4.2. Focus Stopper Location Verification

(1) Test pattern : White cross-hatch

(2) Visually verify focus after locating a white board 594 mm from the projection lens so that screen is set to 20 inches.

(3) Inspect the location of the stopper after locating a white board 1210 mm from the projection lens so that screen is set to 40 inches

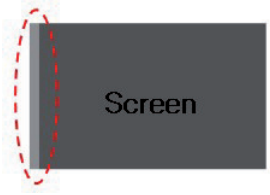
(4) Evaluation criteria for stopper location
Non-defective : Bushing shall be located within A marking.
(Fig. 4-4-2-1)



(Fig. 4-4-2-1) Bushing verification location

4.4.3. Verification of DMD light source

(1) Finish after verifying if the light source in the right side of DMD screen in Gray Pattern – Full Gray 10 Pattern inside DMD Check Pattern can be seen with naked eyes. (Refer to Fig. 4-4-3-1)
(DMD Light Source Spec: It is not seen with naked eyes in Full Gray 10 Pattern.)



(Fig. 4-4-3-1) Verification of DMD light source

5. Caution for DMD(Digital Micro-mirror Device)

5.1. Caution for DMD ESD

(1) Connector the grounding to prevent a damage of ESD (Electrostatic Discharge) when handing the DMD.
(2) Wear a wrist strap to connect the ESD grounding in flesh necessarily.
(3) Connect the ESD ground to workstation and an electric conductor.
(4) Save the DMD after getting rid of a static electricity. Keep it at an exclusive case when moving it When grounding, open the case.
(5) Put on gloves for preventing static electricity.
(6) All work is done at static free location. Attach the tape or remove a dust on the DMD front or DMD back pin

5.2. Caution for DMD Clean

(1) Follow the procedure and caution to prevent the screen from being scratched.
(2) When DMD glass stains with dust, polish the front and back DMD glass with soft cloth. Then, do it again after rotating 180 degree the DMD. If necessary, keep under observation.
(3) Don't clean the DMD with the high pressure. The static electricity and pressure will damage the DMD.

* Attachment)TI Reference :
DMD Handling Specification, DMD Cleaning

6. Country Adjustment and Verification

6.1. Country Adjustment Method

(1) Enter to the adjustment mode by selecting “IN-START”.
(2) Press the right arrow key in “Adjust check” to locate a cursor on “Country Group Code”.
(3) In case of PB63U-JE, change “Country Group Code” to “02” and press the down arrow key once to change "Country" and then press OK. (PB63U_ EBT62523101)

Main chassis assy P/N	EBT62523101
Suffix	AUS
Country	US

(4) Press Exit to complete the adjustment.

(In case of EBT62523101, Change both "Country Group Code" and "Country," then press OK.

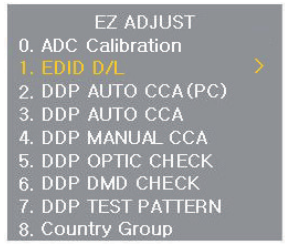
7. EDID Data Download

7.1. Used Device

: Adjustment remote control

7.2. Adjustment Method

(1) Enter to adjustment mode with selecting "ADJ"on remote control.
(2) Enter to "1. EDID D/L" with pressing right direction key to get in EDID Download adjustment menu (Fig. 7-2-1)
(3) Select "START".
(4) When adjustment is completed, check RGB "OK(PCM)" HDMI1 "OK(PCM)". (Fig. 7-2-2)
When it fails, Reset and check by trying the (3) process again.
(5) To exit, press "ADJ" or "EXIT" of the adjustment remote controller again to exit.
(6) To verify the adjustment result, enter EDID D/L or IN-START and verify.



(Fig.7-2-1) Adjustment Menu when ADJ is selected (Left)
(Fig.7-2-2) Selection Category on ADJ Adjustment Menu (Right)

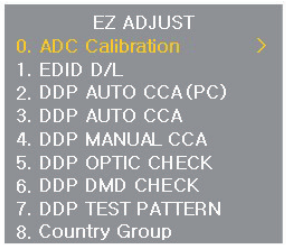
8. ADC Adjustment

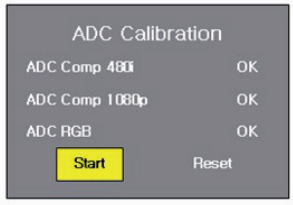
8.1. Used Device

- Adjustment remote control

8.2. Adjustment Method

(1) Enter to adjustment mode with selecting "ADJ" on remote control.
(2) Enter to "0. ADC Calibration" with pressing right direction key to get in EDID Download adjustment menu (Fig. 8-2-1)
(3) Select "START".
(4) When the adjustment is completed, Success message is displayed, and if it fails, Fail message is displayed.
(5) To exit, press "ADJ" or "EXIT" of the adjustment remote controller again to exit.
(6) To verify the adjustment result, enter ADC Calibration or IN-START and verify.





(Fig.8-2-1) Selection Category on ADJ Menu (Left)
(Fig.8-2-2) Selection Category on ADJ Adjustment Menu (Right)

< Common Adjustment for Circuit Board Line / Assembly Line>

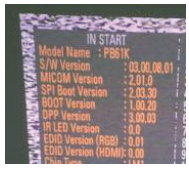
9. Verify DPP Version

9.1. Used Device

: Adjustment remote controller 1EA

9.2. DPP Version Verification Method

(1) Run IN-START and check the DPP version in the sixth item on the left of the screen (Fig. 9-2-1).
(2) If the version information is displayed wrong as shown in (Fig. 9-2-2), exit and re-enter the IN-START menu to check the version.



(Fig. 9-2-1)

(Fig. 9-2-2)

<Adjustment for Assembly Line>

10. Total Assembly Adjustment

10.1. Enter Power Only mode

(1) After assembling the SET, DC on the SET at the start of post process. (use keypad or remote controller)
(2) Press 'P-ONLY' key of the adjustment remote controller to enter 'Power Only' mode. (Full White screen is displayed)
(3) To enter the next adjustment, enter 'EXIT' of the remote controller to exit Full white screen, and proceed to the adjustment.

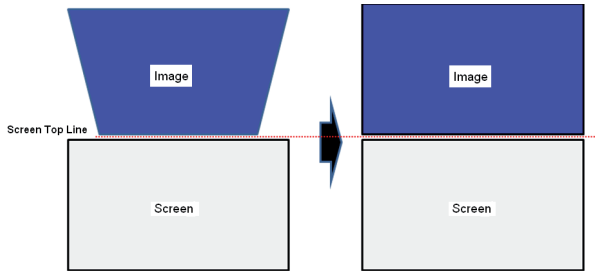
11. Compensate Auto Keystone

11.1. Used Device

- Adjustment remote control
- Projector remote control

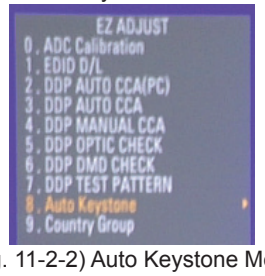
11.2. Adjustment Preparations and Device Configuration

(1) Adjustment Preparations
1) Input source: Default (no need to specify an input source)
2) The set must be adjusted on a plate, glass or table with a flatness degree between more than -1 and less than +1.
3) Incline upward the set to project an image over the top line of the screen. After the keystone changes, adjust the image to the adjusting position. (Fig. 11-2-1)



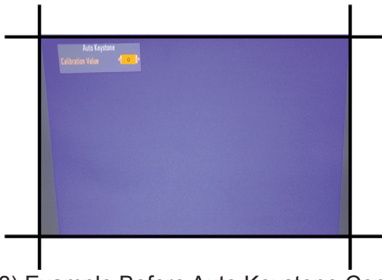
(Fig. 11-2-1) Preparations before Auto Keystone Compensation

(2) Adjustment Method
1) Make sure the set is placed on an adjusting position.
2) Check the keystone value using the projector remote control.
A. Enter the Menu button.-> Move through the options.-> Check the Keystone value.
3) Enter the menu to compensate the keystone using the adjustment remote controller.
A. ADJ -> 8. Auto Keystone -> Enter the right arrow key

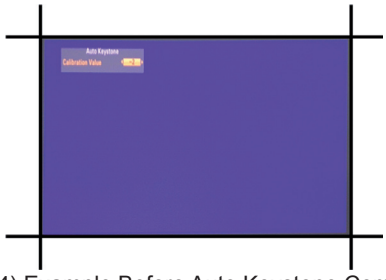


(Fig. 11-2-2) Auto Keystone Menu

4) Compensate keystone distortion by pressing the left/ right arrow keys according to the keystone value you have checked in B).
- If the value you have checked in B) is positive (+), press the left arrow key.
- If it is negative (-), press the right arrow key as many times as the value. (ex. If the value was -3, then press the right arrow key 3 times to make it +3.)



(Fig. 11-2-3) Example Before Auto Keystone Compensation



(Fig. 11-2-4) Example Before Auto Keystone Compensation

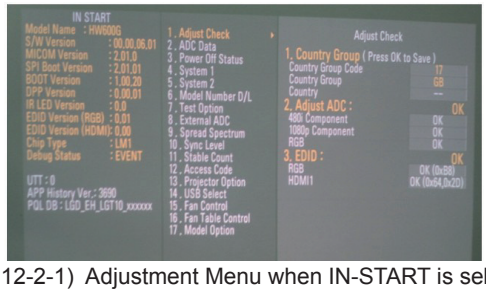
12. EDID/ADC Verification Adjustments

12.1. Used Device

- Adjustment Remote Controller

12.2. EDID/ADC verification Methode

(1) Select “IN-START” of the adjustment remote controller. (Input ‘0413’ for password)
(2) Go to “1. Adjust Check” > “3. EDID (PCM)” and check if RGB and HDMI1 are set to “0K”. (Fig. 12-2-1)
(3) Go to “1. Adjust Check” > “2. Adjust ADC” and check if ADC Comp 480i, ADC Comp 1080p and ADC RGB are all set to “0K”.
(4) To exit, press “IN-START” or “EXIT” of the adjustment remote controller again to exit.



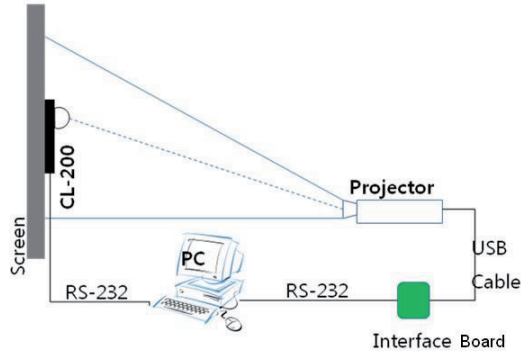
(Fig. 12-2-1) Adjustment Menu when IN-START is selected

13. White Balance (CCA) Adjustment.

13.1. Used Device

(1) Photometer (Model Name: CL-200 or CL-200A) 1EA --> Measure color coordinate at the center of the projection screen
(2) Adjustment remote controller 1EA
(3) Interface board - 1EA, RS-232C Cable - 1EA
(4) CL200A UART Cable (T - A11), USB Cable - 1EA

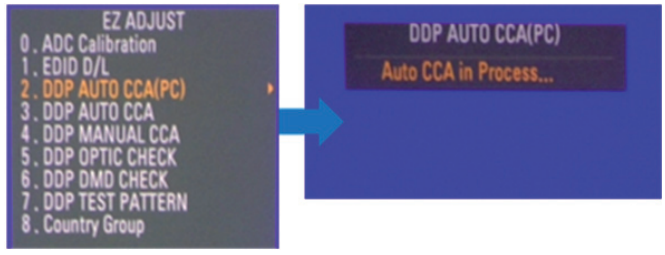
13.2. Composition of the equipment



(Fig. 13-2-1) Device Setting Diagram

13.3. Adjustment Method

* Heat Run for at least 5 min. before the adjustment.
(1) After connecting as in the Device Composition Diagram, select “ADJ” of the adjustment remote controller to enter the adjustment mode.
(2) Select 2.DDP AUTO CCA(PC) and enter the right direction key(►) of the adjustment remote controller to enter. Then, it becomes the screen state as in the right side of Figure 2, and it means that the SET is ready for CCA adjustment.

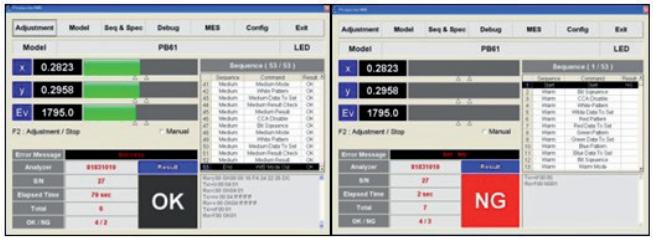


(Fig. 13-3-1) Selection Category on ADJ Menu

(3) When ‘ProjectorWB.exe’ as the following icon is run in CCA adjustment PC screen, window as in (Fig. 13-3-2) is displayed.
1) Click ‘Model’ to select ‘PB63U’ model,
2) And click ‘Adjustment’, then the adjustment starts.

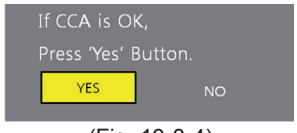
(Fig. 13-3-2)

3) If adjustment is properly completed, ‘OK’ as in the bottom left figure is displayed.
If it is ‘NG’ as in the bottom left figure, check again whether device composition is properly done as in (Fig. 13-3-3), and click 2) ‘Adjustment’ again to try re-adjustment.



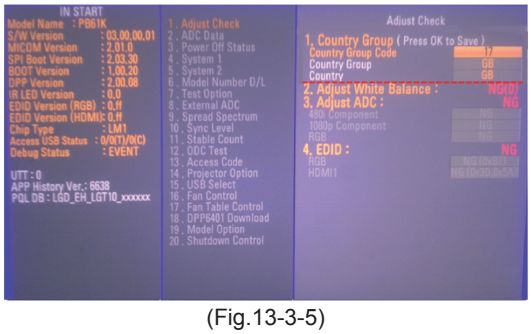
(Fig. 13-3-3)

(4) Press the "Back" or "Exit" key when the compensation is completed. Then a window will be displayed to verify it is completed normally as shown in (Fig. 13-3-4). If the CCA result is OK, select YES on the screen as shown in (Fig. 13-3-4); if NG, select NO.



(Fig. 13-3-4)

(5) You can check whether the result of CCA adjustment is OK or NG by selecting "IN-START" > 1. Adjust Check > 2. Adjust White Balance. If you selected Yes on the screen as shown in (Fig. 13-3-4), OK is displayed; if you selected NO then NG is displayed. (Fig. 13-3-5)



(Fig.13-3-5)

14. Brightness Inspection

- Measure the subjects below and it should satisfy the spec of product specification.

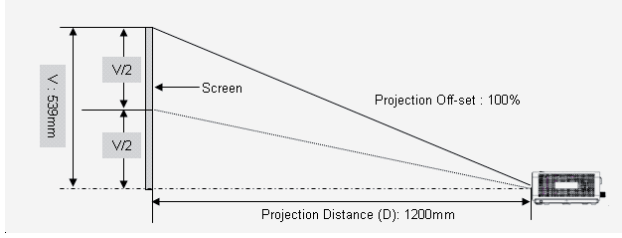
(1) Brightness(Annsi-Lumen)
(2) Whiteness color coordinate
(KAGA measures R,G,B color coordinate)
(3) Color Uniformity
(4) Brightness Uniformity

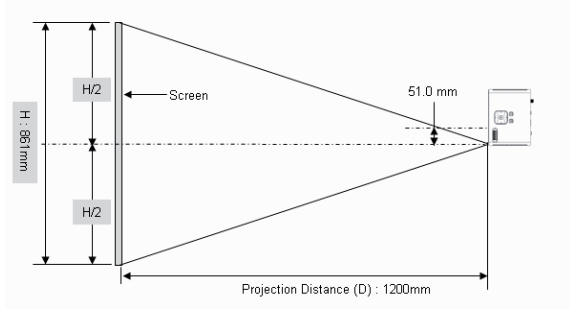
14.1. Preparation for Adjustment and Device Composition

14.1.1. Adjustment Preparation

(1) Input source: Default (No need to designate Source)
(2) The order of operating the adjustment remote controller buttons
- IN-STAR -> 4. DDP OPTIC CHECK -> Select Full White.

14.1.2. Brightness Measurement Screen Setting



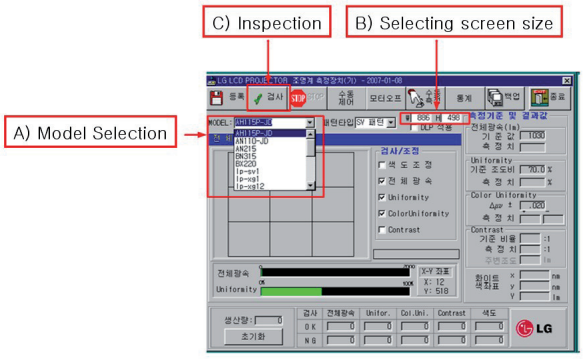


(Fig. 14-1-2-1)
Brightness Measurement Screen Setting Composition

14.1.3. Projector Brightness Measurement JIG Software Organization

(1) Model Selection: PB63U-JE

(2) Selecting screen size : W: 861 , H : 539



(Fig. 14-1-3-1)

1) Press the direction key of the adjustment remote controller to change the screen of the projector to White Pattern.
   - After 2~3 seconds, White Color Coordinate Data is transmitted from CL200.
   - In the result display window in the right center of the screen, color coordinate and brightness value are recorded.
2) Press 'Finish' button of the screen.

(3) White brightness inspection: Check if HW600 brightness is Min Spec 350 ANSI lm or more. (Typ: 400 ANSI-lm)

15. Final Inspection

- Carry out according to the contents of the final inspection in the Working Guide. (Auto Keystone Inspection and 3D Inspection Category are added)

(1) In 3D Inspection, select Master Equipment Model No 2/ Pattern No 703, and reflect DLP link 3D glasses against the screen, and if it shows Left: red / Right: blue, it is normal.

(2) Check the Keystone value using the projector remote control.
   1) The set must be inspected on a plate, glass or table with a flatness degree between more than-1 and less than +1.
   2) Incline upward the set to project an image over the top line of the screen. After the keystone changes, adjust the image to the inspecting position. Fig 9. 0
   3) Enter the Menu button.-> Move through the options.-> Check the Keystone value.
   4) It is O.K, if the keystone value is -2 or higher and +2 or lower.

[Reference]

1. EDID Data

- RGB : BLOCK 0

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	00	FF	FF	FF	FF	FF	FF	00	1E	6D	DD	36	01	01	01	01
10	01	16	01	03	08	80	50	78	0A	31	A8	A5	4D	37	B3	24
20	06	48	4C	A1	08	00	31	40	45	40	61	7C	71	40	81	80
30	90	40	B3	00	01	01	9E	20	00	90	51	20	1F	30	48	80
40	36	00	00	20	53	00	00	1E	66	21	50	B0	51	00	1B	30
50	40	70	36	00	50	00	53	00	00	1E	00	00	00	FD	00	3A
60	7A	1E	69	10	00	0A	20	20	20	20	20	20	00	00	00	FC
70	00	4C	47	20	50	4A	54	52	0A	20	20	20	20	20	00	B7

- HDMI : BLOCK 0

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	00	FF	FF	FF	FF	FF	FF	00	1E	6D	DE	36	01	01	01	01
10	01	16	01	03	80	80	50	78	0A	31	A8	A5	4D	37	B3	24
20	06	48	4C	A1	08	00	31	40	45	40	61	7C	71	40	81	80
30	90	40	B3	00	01	01	9E	20	00	90	51	20	1F	30	48	80
40	36	00	00	20	53	00	00	1E	66	21	50	B0	51	00	1B	30
50	40	70	36	00	50	00	53	00	00	1E	00	00	00	FD	00	3A
60	7A	1E	69	10	00	0A	20	20	20	20	20	20	00	00	00	FC
70	00	4C	47	20	50	4A	54	52	0A	20	20	20	20	20	01	3D

- HDMI : BLOCK 1

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	02	03	21	F1	4D	10	1F	84	13	05	14	03	02	12	20	22
10	11	01	26	15	07	50	09	57	07	67	03	0C	00	10	00	80
20	1E	9E	20	00	90	51	20	1F	30	48	80	36	00	00	20	53
30	00	00	1E	01	1D	80	18	71	1C	16	20	58	2C	25	00	80
40	38	74	00	00	9E	01	1D	00	72	51	D0	1E	20	6E	28	55
50	00	00	D0	52	00	00	1E	8C	0A	D0	8A	20	E0	2D	10	10
60	3E	96	00	D0	E0	21	00	00	18	26	36	80	A0	70	38	1F
70	40	30	20	25	00	80	38	74	00	00	1A	00	00	00	00	5A

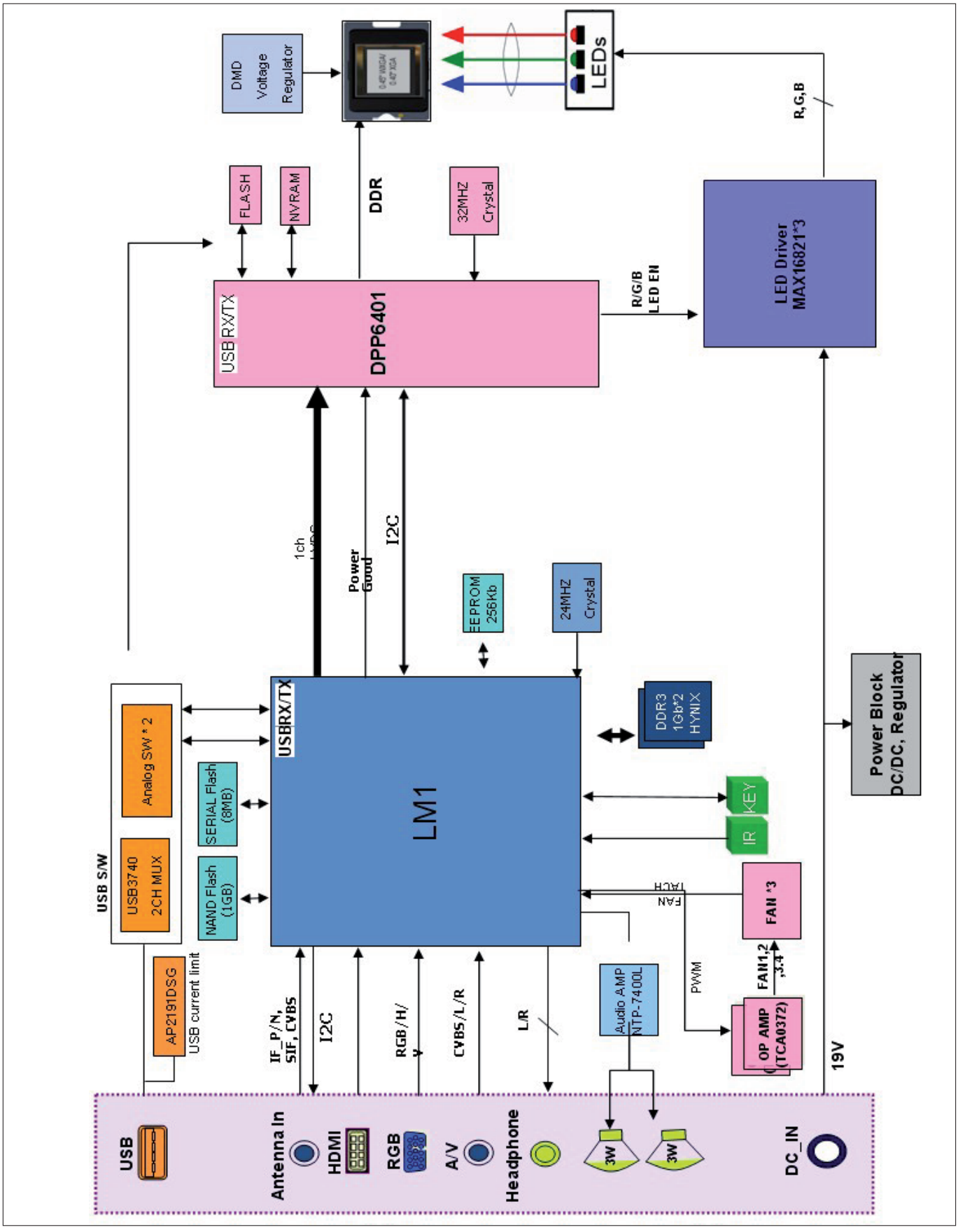
* HDMI (Country : US Only) : BLOCK 0

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	00	FF	FF	FF	FF	FF	FF	00	1E	6D	DE	36	01	01	01	01
10	01	16	01	03	80	80	50	78	0A	31	A8	A5	4D	37	B3	24
20	06	48	4C	A1	08	00	31	40	45	40	61	7C	71	40	81	80
30	90	40	B3	00	01	01	9E	20	00	90	51	20	1F	30	48	80
40	36	00	00	20	53	00	00	1E	66	21	50	B0	51	00	1B	30
50	40	70	36	00	50	00	53	00	00	1E	00	00	00	FD	00	3A
60	7A	1E	69	10	00	0A	20	20	20	20	20	20	00	00	00	FC
70	00	4C	47	20	50	4A	54	52	0A	20	20	20	20	20	01	3D

* HDMI (Country : US Only) : BLOCK 1

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	02	03	21	F1	4D	10	1F	84	13	05	14	03	02	12	20	22
10	11	01	26	00	00	00	09	57	07	67	03	0C	00	10	00	80
20	1E	9E	20	00	90	51	20	1F	30	48	80	36	00	00	20	53
30	00	00	1E	01	1D	80	18	71	1C	16	20	58	2C	25	00	80
40	38	74	00	00	9E	01	1D	00	72	51	D0	1E	20	6E	28	55
50	00	00	D0	52	00	00	1E	8C	0A	D0	8A	20	E0	2D	10	10
60	3E	96	00	D0	E0	21	00	00	18	26	36	80	A0	70	38	1F
70	40	30	20	25	00	80	38	74	00	00	1A	00	00	00	00	C6

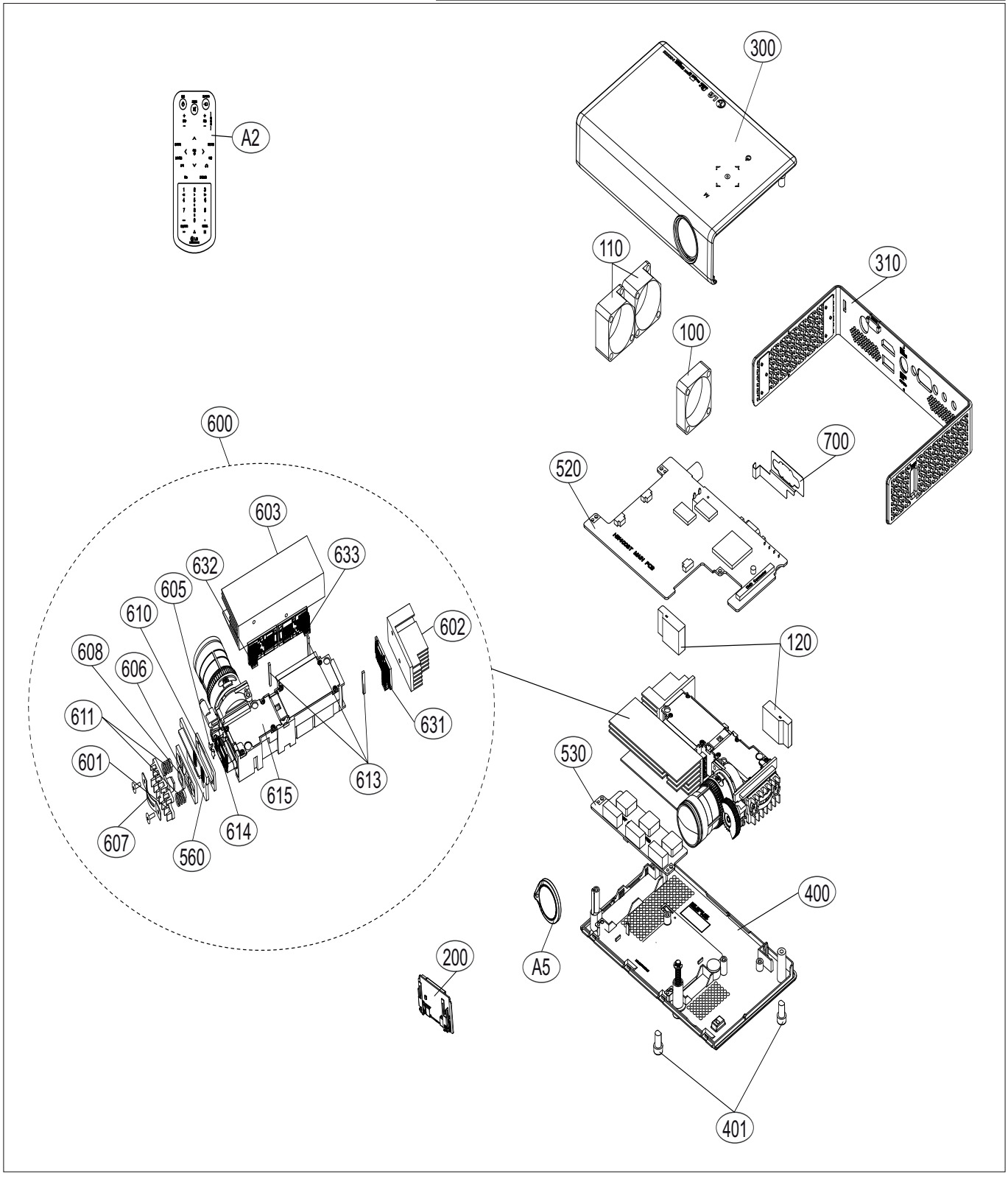
BLOCK DIAGRAM



EXPLODED VIEW

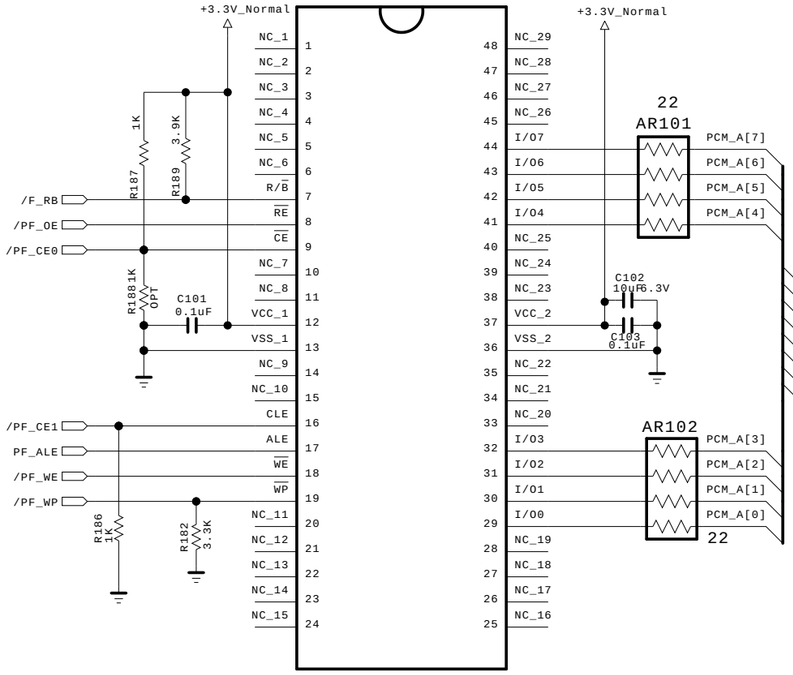
IMPORTANT SAFETY NOTICE

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

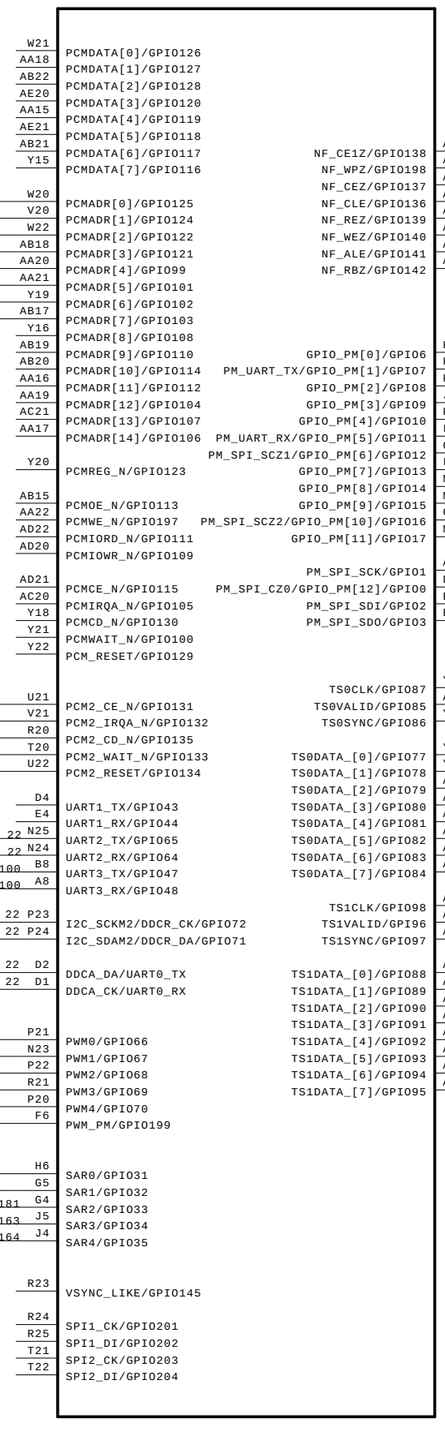


NAND FLASH MEMORY

IC102
H27U1G8F2BTR-BC



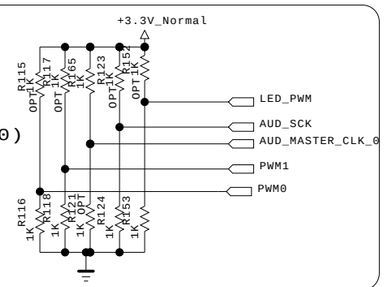
IC101
LGE2111A-W1 [MULTI]

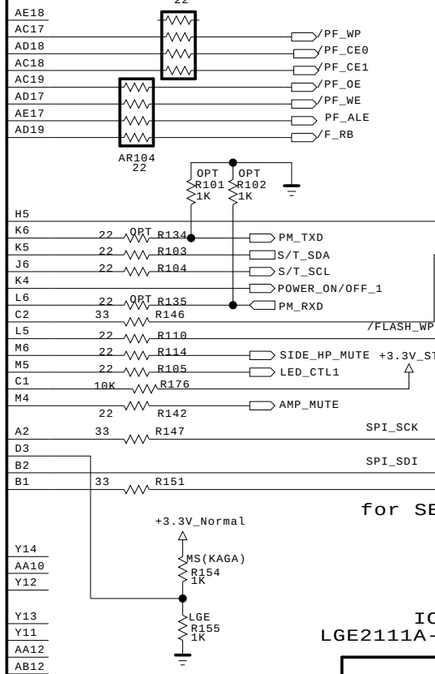


<CHIP Config(LED_R/BUZZ)>
Boot from SPI CS1N(EXT_FLASH) 1'b0
Boot from SPI_CS0N(INT_FLASH) 1'b1

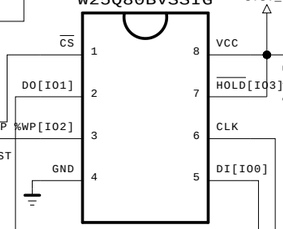
<CHIP Config>
(I2S_OUT_BCK,I2S_OUT_MCK,PAD_PWM1PAD_PWM0)

B51_no_EJ	: 4'b0000	Boot from 8051 with SPI flash
SB51_WOS	: 4'b0001	Secure B51 without scramble
SB51_WS	: 4'b0010	Secure B51 with scramble
MIPS_SPE_NO_EJ	: 4'b0100	Boot from MIPS with SPI flash
MIPS_SPI_EJ_1	: 4'b0101	Boot from MIPS with SPI flash
MIPS_SPI_EJ_2	: 4'b0110	Boot from MIPS with SPI flash
MIPS_WOS	: 4'b1001	Secure MIPS without scramble
MIPS_WS	: 4'b1010	Scerur MIPS with SCRAMBLE

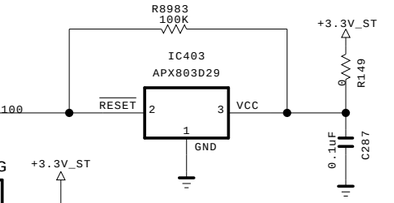




IC1401
W25Q80BVSSIG

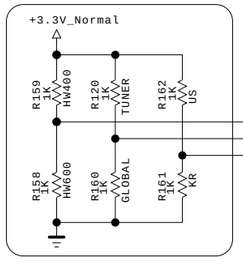


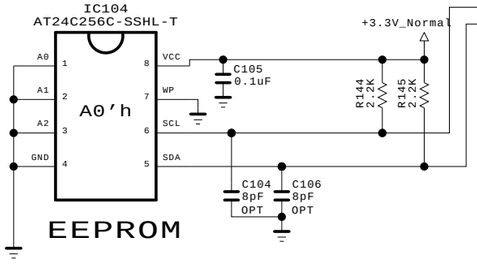
for SERIAL FLASH



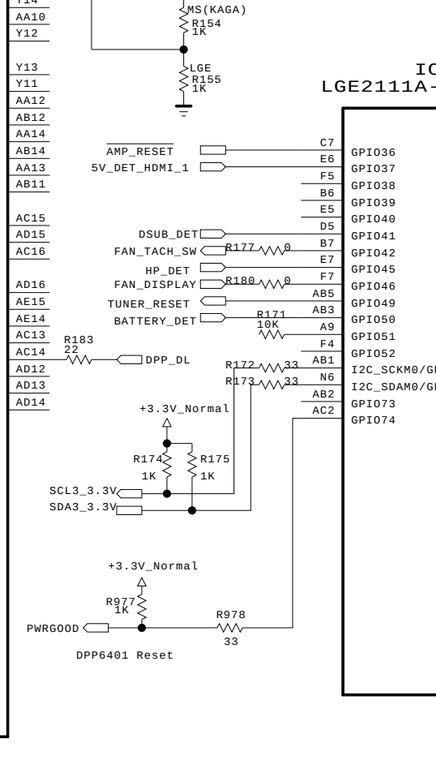
<Projector Model Option>

	MODEL_OPT_0	MODEL_OPT_1		MODEL_OPT_2	
HW600	0	HW600G	0		0
		HW600T	1		
HW400	1	HW400G	0	KR	0
		HW400T	1	US	1

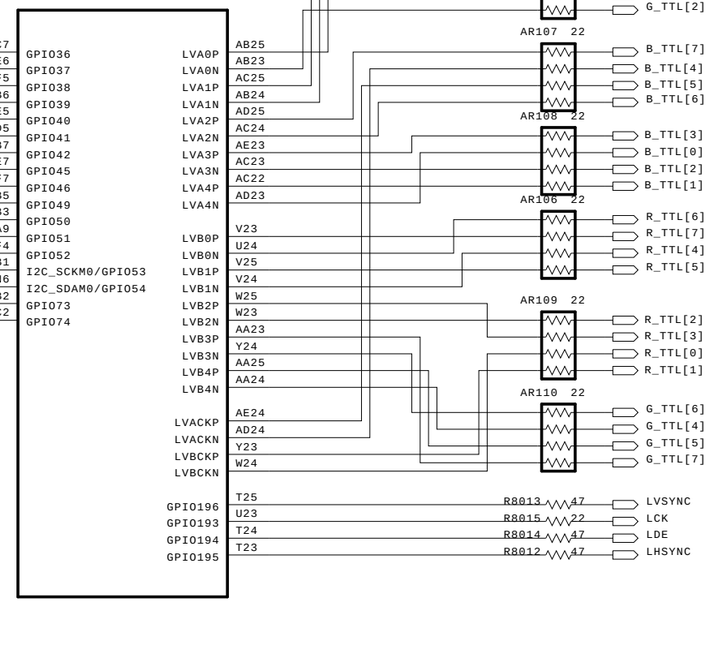




EEPROM



IC101
LGE2111A-W1 [MULTI]



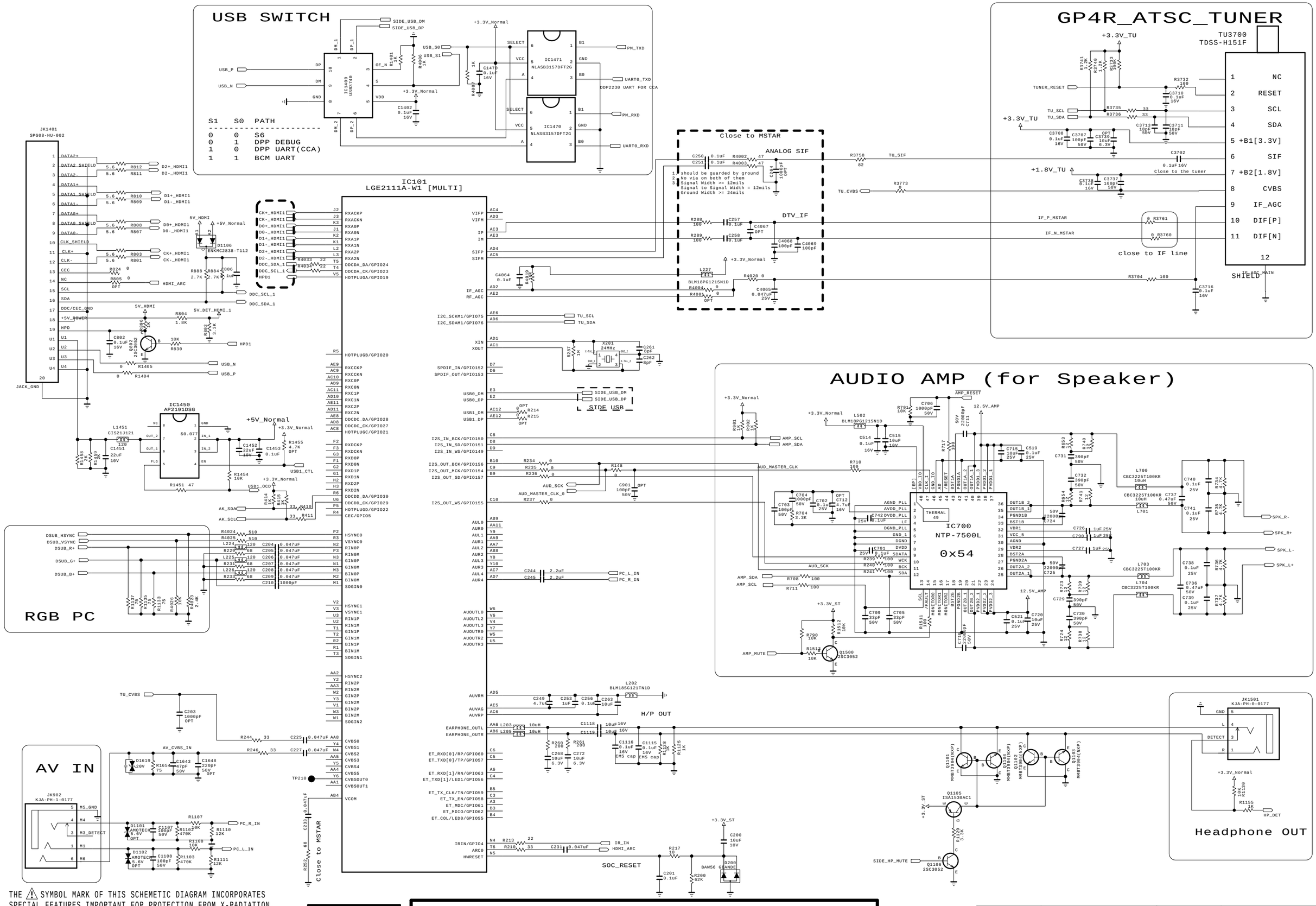
THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFATURES SPECFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

SECRET
LGElectronics

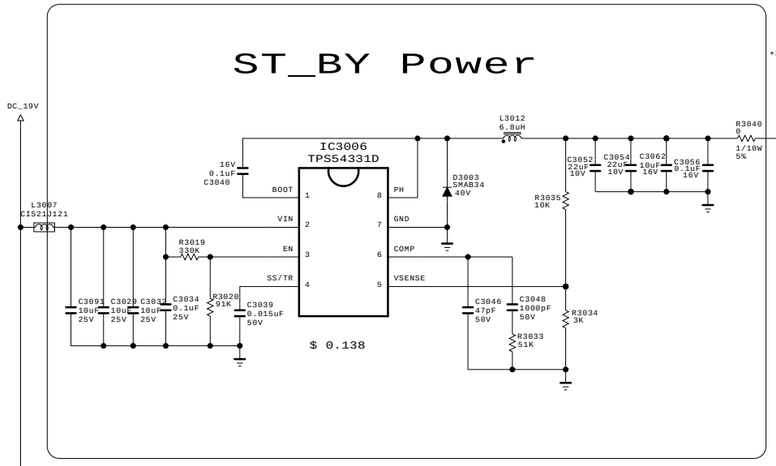
LG ELECTRONICS

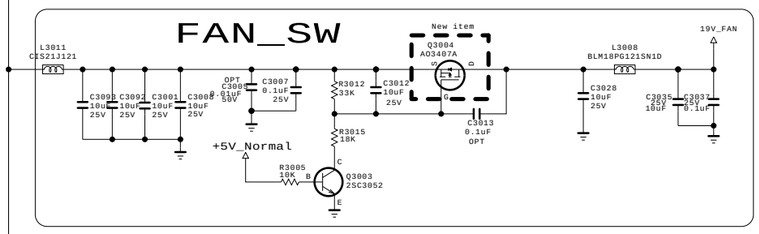
MODEL	LM1_HW600G	DATE	20120221
BLOCK	MAIN1 FLASH/EEPROM/GPIO	SHEET	1 / 6

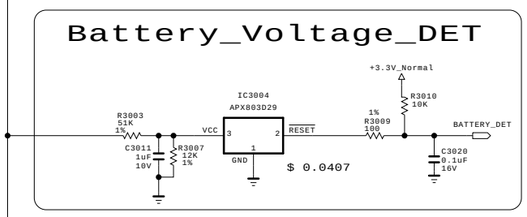
LGE Internal Use Only

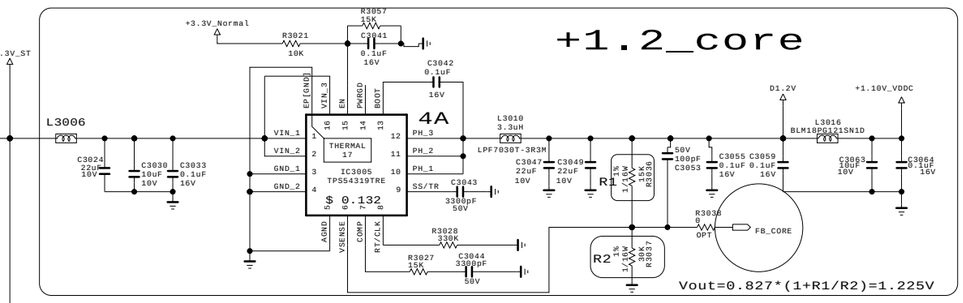


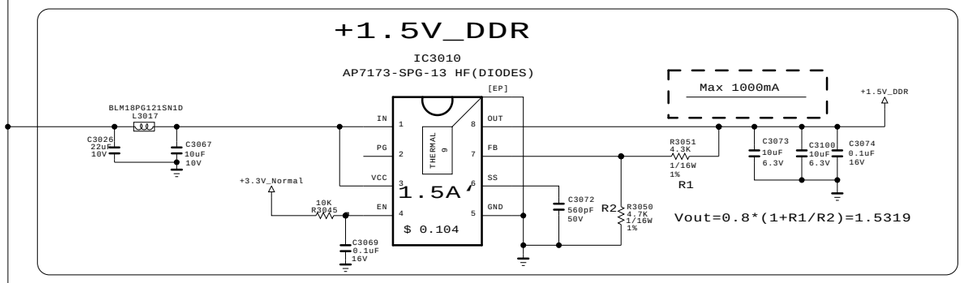
THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFATURES SPECFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

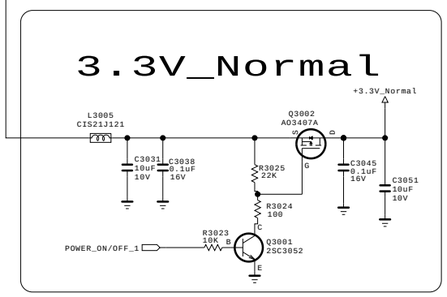


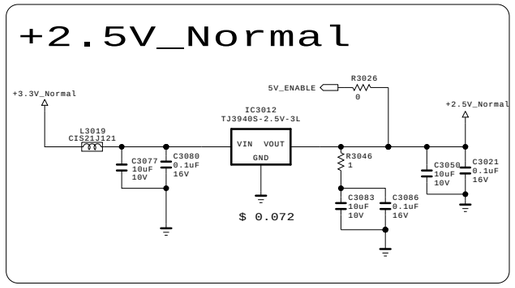


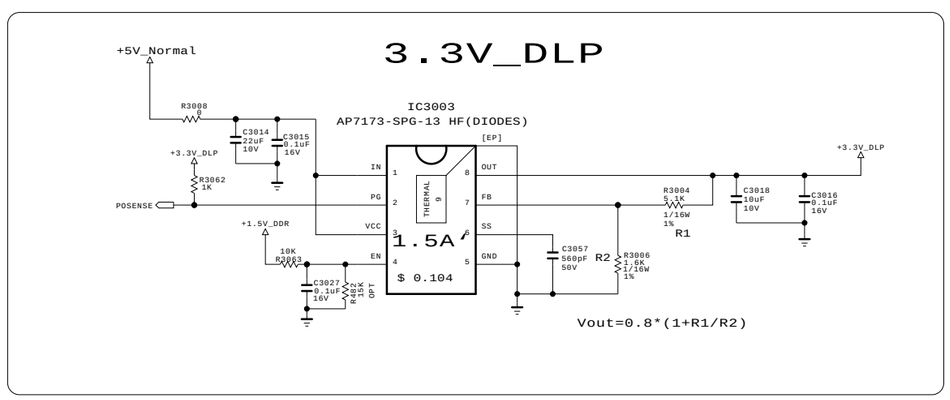


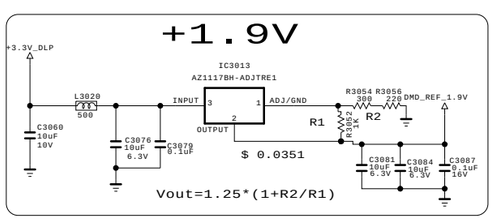


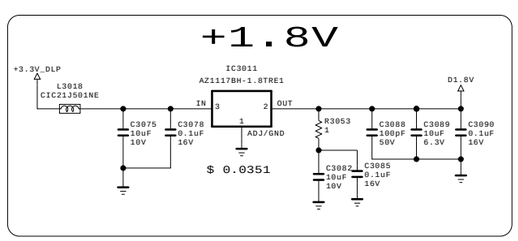


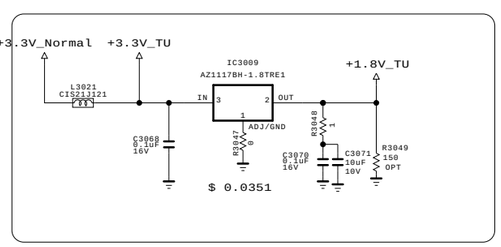


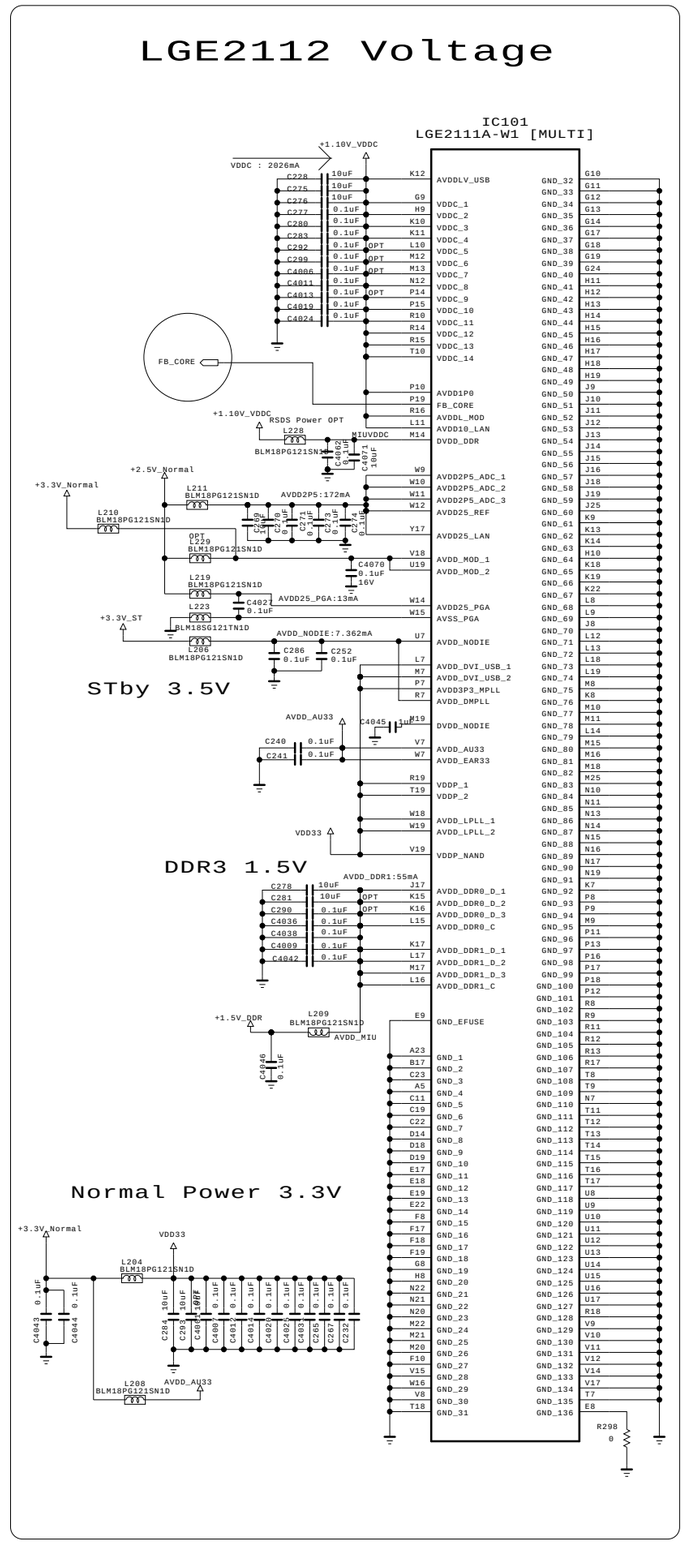












THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFATURES SPECFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

SECRET

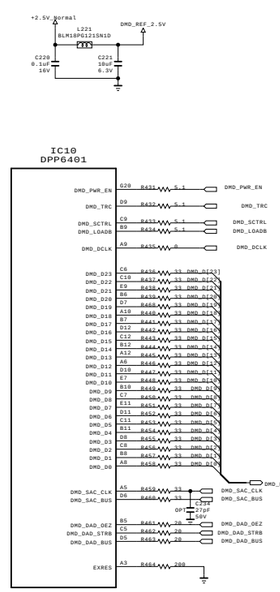
LGElectronics

LG ELECTRONICS

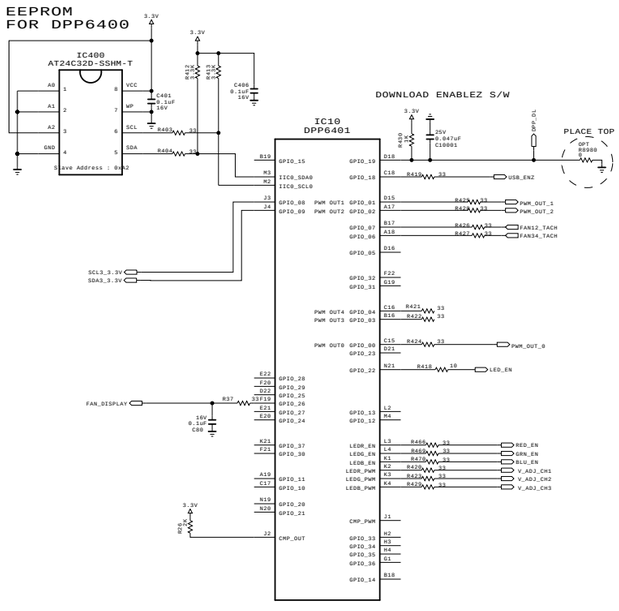
MODEL	HW600G	DATE	20120221
BLOCK	POWER	SHEET	3 / 6

LGE Internal Use Only

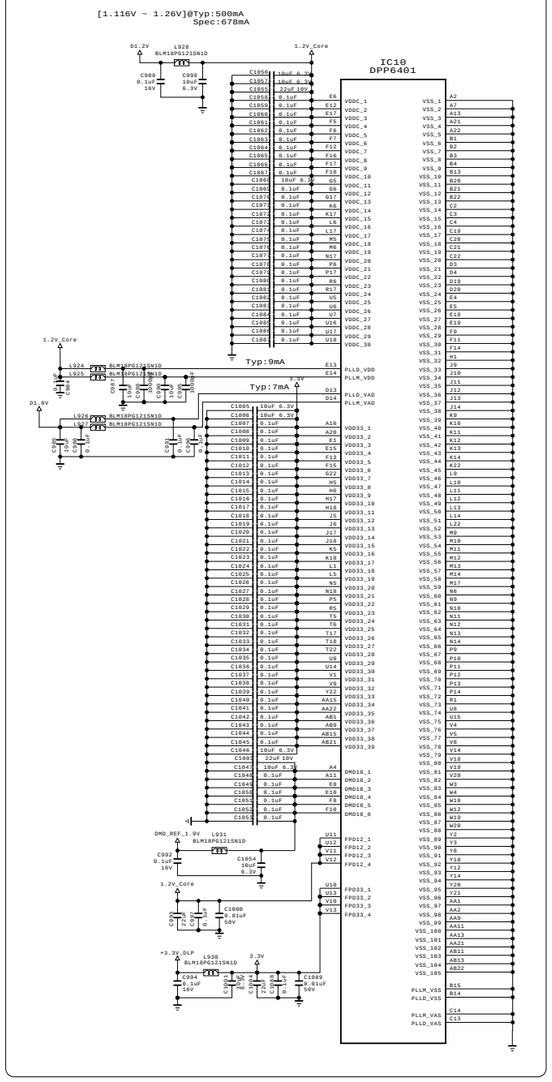
TO DMD BOARD



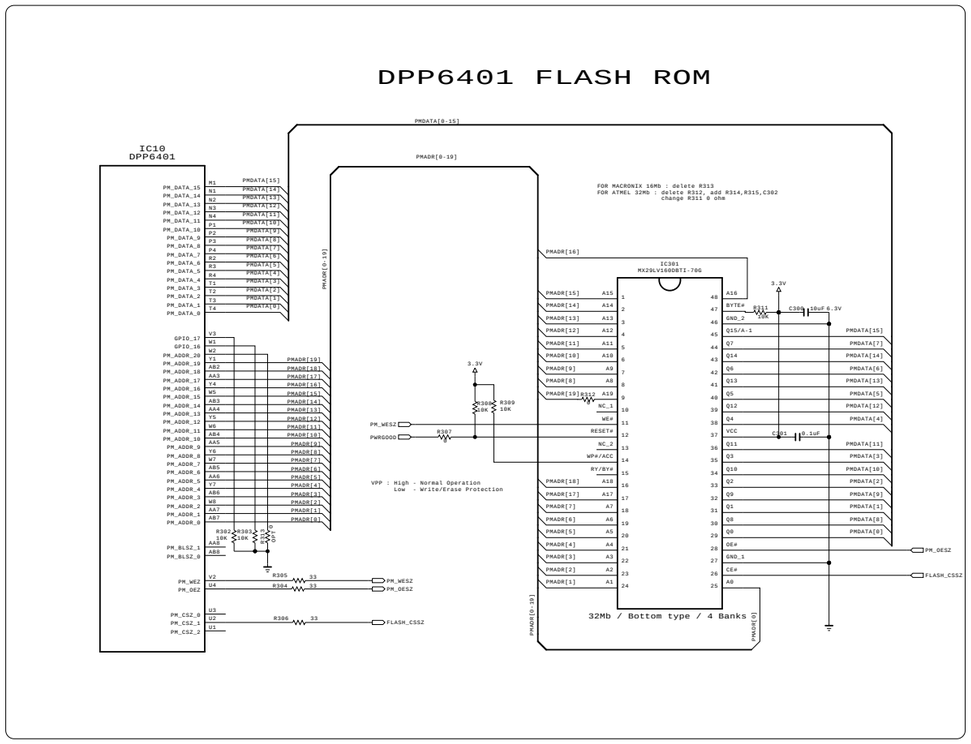
DPP6401 GPIO

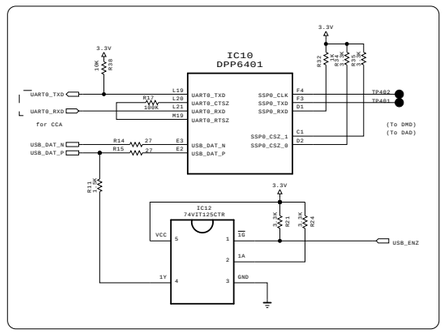


DPP6401 Voltage

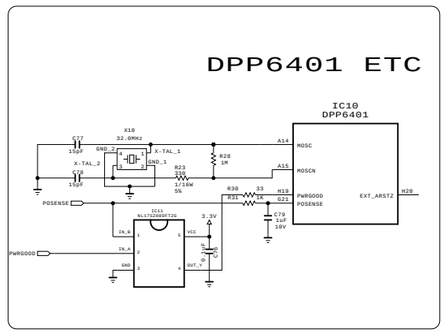


DPP6401 FLASH ROM

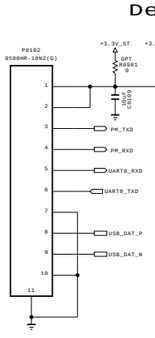




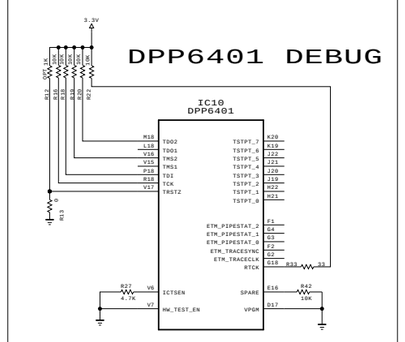
DPP6401 ETC



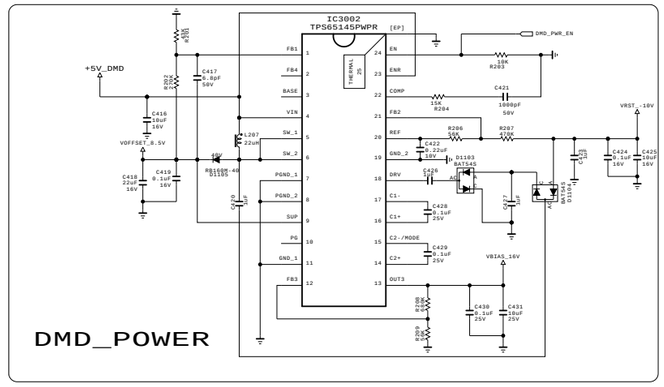
Debugg



DPP6401 DEBUG



DMD_POWER



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

SECRET
LGElectronics

LG ELECTRONICS

MODEL	LM1_HW600G	DATE	20120221
BLOCK	DDP6401	SHEET	4 / 6

DDR3 1.5V By CAP - Place these Caps near Memory

+1.5V_DDR
AVDD_DDR0
L1202 BLM18PG121SN1D
OPT C1251
10uF C1205 10uF
C1206 0.1uF C1207 0.1uF C1208 0.1uF C1210 0.1uF C1211 0.1uF C1212 0.1uF C1213 0.1uF C1214 0.1uF C1215 0.1uF C1216 0.1uF C1217 0.1uF C1218 0.1uF C1219 0.1uF C1220 0.1uF C1221 0.1uF C1222 0.1uF C1223 0.1uF C1224 0.1uF
Close to DDR Power Pin

DDR3 1.5V By CAP - Place these Caps near Memory

AVDD_DDR1
+1.5V_DDR
L1203 BLM18PG121SN1D
C1227 0.1uF C1228 0.1uF C1229 0.1uF C1230 0.1uF C1231 0.1uF C1232 0.1uF C1233 0.1uF C1234 0.1uF C1235 0.1uF C1236 0.1uF C1237 0.1uF C1238 0.1uF C1239 0.1uF C1241 0.1uF C1242 0.1uF C1243 0.1uF C1244 0.1uF C1245 0.1uF
10uF C1246
OPT C1252 10uF 10V
Close to DDR Power Pin

AVDD_DDR0
R1204 1K 1%
R1205 1K 1%
C1203 0.1uF
C1204 1000pF
A-MVREFCA
CLose to Saturn7M IC

AVDD_DDR0
R1201 1K 1%
R1202 1K 1%
C1201 0.1uF
C1202 1000pF
A-MVREFDQ
CLose to DDR3

EAN61828901
IC1201
H5TQ1G63DFR-H9C

A-MVREFCA → M8 VREFCA
A-MVREFDQ → H1 VREFDQ
R1203 240 1%
L8 ZQ
AVDD_DDR0 → B2 D9 G7 K2 K8 N1 N9 R1 R9 VDD_1 VDD_2 VDD_3 VDD_4 VDD_5 VDD_6 VDD_7 VDD_8 VDD_9
A1 A8 C1 C9 D2 E9 F1 H2 H9 VDDQ_1 VDDQ_2 VDDQ_3 VDDQ_4 VDDQ_5 VDDQ_6 VDDQ_7 VDDQ_8 VDDQ_9
J1 J9 L1 L9 T7 NC_1 NC_2 NC_3 NC_4 NC_6
A-MA14 → T7
A9 B3 E1 G8 J2 J8 M1 M9 P1 P9 T1 T9 VSS_1 VSS_2 VSS_3 VSS_4 VSS_5 VSS_6 VSS_7 VSS_8 VSS_9 VSS_10 VSS_11 VSS_12
B1 B9 D1 D8 E2 E8 F9 G1 G9 VSSQ_1 VSSQ_2 VSSQ_3 VSSQ_4 VSSQ_5 VSSQ_6 VSSQ_7 VSSQ_8 VSSQ_9

A0	N3	A-MA0
A1	P7	A-MA1
A2	P3	A-MA2
A3	N2	A-MA3
A4	P8	A-MA4
A5	P2	A-MA5
A6	R8	A-MA6
A7	R2	A-MA7
A8	T8	A-MA8
A9	R3	A-MA9
A10/AP	L7	A-MA10
A11	R7	A-MA11
A12/BC	N7	A-MA12
A13	T3	A-MA13
NC_5	M7	
BA0	M2	A-MBA0
BA1	N8	A-MBA1
BA2	M3	A-MBA2
CK	J7	A-MCK
CK	K7	A-MCKB
CKE	K9	A-MCKE
CS	L2	
ODT	K1	A-MODT
RAS	J3	A-MRASB
CAS	K3	A-MCASB
WE	L3	A-MWEB
RESET	T2	A-MRESETB
DQSL	F3	A-MDQSL
DQSL	G3	A-MDQSLB
DQSU	C7	A-MDQSU
DQSU	B7	A-MDQSUB
DML	E7	A-MDML
DMU	D3	A-MDMU
DQL0	E3	A-MDQL0
DQL1	F7	A-MDQL1
DQL2	F2	A-MDQL2
DQL3	F8	A-MDQL3
DQL4	H3	A-MDQL4
DQL5	H8	A-MDQL5
DQL6	G2	A-MDQL6
DQL7	H7	A-MDQL7
DQU0	D7	A-MDQU0
DQU1	C3	A-MDQU1
DQU2	C8	A-MDQU2
DQU3	C2	A-MDQU3
DQU4	A7	A-MDQU4
DQU5	A2	A-MDQU5
DQU6	B8	A-MDQU6
DQU7	A3	A-MDQU7

A-MCK → C1209 0.01uF
R1235 56
R1236 56
R1231 10K → AVDD_DDR0

IC101
LGE2111A-W1 [MULTI]

A-MA0	A11	A_DDR3_A[0]
A-MA1	C14	A_DDR3_A[1]
A-MA2	B11	A_DDR3_A[2]
A-MA3	F12	A_DDR3_A[3]
A-MA4	C15	A_DDR3_A[4]
A-MA5	E12	A_DDR3_A[5]
A-MA6	A14	A_DDR3_A[6]
A-MA7	D11	A_DDR3_A[7]
A-MA8	B14	A_DDR3_A[8]
A-MA9	D12	A_DDR3_A[9]
A-MA10	C16	A_DDR3_A[10]
A-MA11	C13	A_DDR3_A[11]
A-MA12	A15	A_DDR3_A[12]
A-MA13	E11	A_DDR3_A[13]
A-MA14	B13	A_DDR3_A[14]
A-MBA0	F13	A_DDR3_BA[0]
A-MBA1	B15	A_DDR3_BA[1]
A-MBA2	E13	A_DDR3_BA[2]
A-MCK	C17	A_DDR3_MCLK
A-MCKB	A17	A_DDR3_MCLKZ
A-MCKE	B16	A_DDR3_MCLKE
A-MODT	E14	A_DDR3_ODT
A-MRASB	B12	A_DDR3_RASZ
A-MCASB	A12	A_DDR3_CASZ
A-MWEB	C12	A_DDR3_WEZ
A-MRESETB	F11	A_DDR3_RESET
A-MDQSL	B19	A_DDR3_DQSL
A-MDQSLB	C18	A_DDR3_DQSLB
A-MDQSU	B18	A_DDR3_DQSU
A-MDQSUB	A18	A_DDR3_DQSUB
A-MDML	E15	A_DDR3_DQML
A-MDMU	A21	A_DDR3_DQMU
A-MDQL0	D17	A_DDR3_DQL[0]
A-MDQL1	G15	A_DDR3_DQL[1]
A-MDQL2	B21	A_DDR3_DQL[2]
A-MDQL3	F15	A_DDR3_DQL[3]
A-MDQL4	B22	A_DDR3_DQL[4]
A-MDQL5	F14	A_DDR3_DQL[5]
A-MDQL6	A22	A_DDR3_DQL[6]
A-MDQL7	D15	A_DDR3_DQL[7]
A-MDQU0	G16	A_DDR3_DQU[0]
A-MDQU1	B20	A_DDR3_DQU[1]
A-MDQU2	F16	A_DDR3_DQU[2]
A-MDQU3	C21	A_DDR3_DQU[3]
A-MDQU4	E16	A_DDR3_DQU[4]
A-MDQU5	A20	A_DDR3_DQU[5]
A-MDQU6	D16	A_DDR3_DQU[6]
A-MDQU7	C20	A_DDR3_DQU[7]

B_DDR3_A[0]	B23	B-MA0
B_DDR3_A[1]	D25	B-MA1
B_DDR3_A[2]	F22	B-MA2
B_DDR3_A[3]	G22	B-MA3
B_DDR3_A[4]	E24	B-MA4
B_DDR3_A[5]	F21	B-MA5
B_DDR3_A[6]	E23	B-MA6
B_DDR3_A[7]	D22	B-MA7
B_DDR3_A[8]	D24	B-MA8
B_DDR3_A[9]	D21	B-MA9
B_DDR3_A[10]	C24	B-MA10
B_DDR3_A[11]	C25	B-MA11
B_DDR3_A[12]	F23	B-MA12
B_DDR3_A[13]	E21	B-MA13
B_DDR3_A[14]	D23	B-MA14
B_DDR3_BA[0]	G20	B-MBA0
B_DDR3_BA[1]	F24	B-MBA1
B_DDR3_BA[2]	F20	B-MBA2
B_DDR3_MCLK	G25	B-MCK
B_DDR3_MCLKZ	G23	B-MCKB
B_DDR3_MCLKE	F25	B-MCKE
B_DDR3_ODT	D20	B-MODT
B_DDR3_RASZ	B25	B-MRASB
B_DDR3_CASZ	B24	B-MCASB
B_DDR3_WEZ	A24	B-MWEB
B_DDR3_RESET	E20	B-MRESETB
B_DDR3_DQSL	K24	B-MDQSL
B_DDR3_DQSLB	K25	B-MDQSLB
B_DDR3_DQSU	J21	B-MDQSU
B_DDR3_DQSUB	J20	B-MDQSUB
B_DDR3_DQML	H24	B-MDML
B_DDR3_DQMU	L20	B-MDMU
B_DDR3_DQL[0]	L23	B-MDQL0
B_DDR3_DQL[1]	J24	B-MDQL1
B_DDR3_DQL[2]	L24	B-MDQL2
B_DDR3_DQL[3]	J23	B-MDQL3
B_DDR3_DQL[4]	M24	B-MDQL4
B_DDR3_DQL[5]	H23	B-MDQL5
B_DDR3_DQL[6]	M23	B-MDQL6
B_DDR3_DQL[7]	K23	B-MDQL7
B_DDR3_DQU[0]	G21	B-MDQU0
B_DDR3_DQU[1]	L22	B-MDQU1
B_DDR3_DQU[2]	H22	B-MDQU2
B_DDR3_DQU[3]	K20	B-MDQU3
B_DDR3_DQU[4]	H20	B-MDQU4
B_DDR3_DQU[5]	L21	B-MDQU5
B_DDR3_DQU[6]	H21	B-MDQU6
B_DDR3_DQU[7]	K21	B-MDQU7

EAN61828901
IC1202
H5TQ1G63DFR-H9C

A0	N3	A-MA0
A1	P7	A-MA1
A2	P3	A-MA2
A3	N2	A-MA3
A4	P8	A-MA4
A5	P2	A-MA5
A6	R8	A-MA6
A7	R2	A-MA7
A8	T8	A-MA8
A9	R3	A-MA9
A10/AP	L7	A-MA10
A11	R7	A-MA11
A12/BC	N7	A-MA12
A13	T3	A-MA13
NC_5	M7	
BA0	M2	A-MBA0
BA1	N8	A-MBA1
BA2	M3	A-MBA2
CK	J7	A-MCK
CK	K7	A-MCKB
CKE	K9	A-MCKE
CS	L2	
ODT	K1	A-MODT
RAS	J3	A-MRASB
CAS	K3	A-MCASB
WE	L3	A-MWEB
RESET	T2	A-MRESETB
DQSL	F3	A-MDQSL
DQSL	G3	A-MDQSLB
DQSU	C7	A-MDQSU
DQSU	B7	A-MDQSUB
DML	E7	A-MDML
DMU	D3	A-MDMU
DQL0	E3	A-MDQL0
DQL1	F7	A-MDQL1
DQL2	F2	A-MDQL2
DQL3	F8	A-MDQL3
DQL4	H3	A-MDQL4
DQL5	H8	A-MDQL5
DQL6	G2	A-MDQL6
DQL7	H7	A-MDQL7
DQU0	D7	A-MDQU0
DQU1	C3	A-MDQU1
DQU2	C8	A-MDQU2
DQU3	C2	A-MDQU3
DQU4	A7	A-MDQU4
DQU5	A2	A-MDQU5
DQU6	B8	A-MDQU6
DQU7	A3	A-MDQU7

B-MCK → C1240 0.01uF
R1237 56
R1238 56
R1232 10K → AVDD_DDR1

AVDD_DDR1
R1224 1K 1%
C1247 1000pF
C1248 0.1uF
R1225 1K 1%
B-MVREFCA
CLose to Saturn7M IC

AVDD_DDR1
R1227 1K 1%
C1249 1000pF
C1250 0.1uF
R1228 1K 1%
B-MVREFDQ
CLose to DDR3

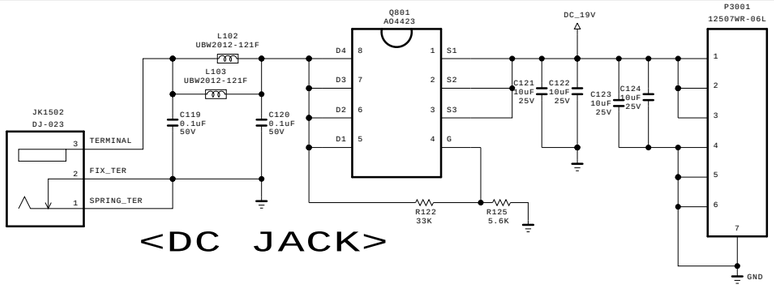
VREFCA	M8	B-MVREFCA
VREFDQ	H1	B-MVREFDQ
ZQ	L8	R1226 240 1%
VDD_1 VDD_2 VDD_3 VDD_4 VDD_5 VDD_6 VDD_7 VDD_8 VDD_9	B2 D9 G7 K2 K8 N1 N9 R1 R9	
VDDQ_1 VDDQ_2 VDDQ_3 VDDQ_4 VDDQ_5 VDDQ_6 VDDQ_7 VDDQ_8 VDDQ_9	A1 A8 C1 C9 D2 E9 F1 H2 H9	
NC_1 NC_2 NC_3 NC_4 NC_6	J1 J9 L1 L9 T7	B-MA14
VSS_1 VSS_2 VSS_3 VSS_4 VSS_5 VSS_6 VSS_7 VSS_8 VSS_9 VSS_10 VSS_11 VSS_12	A9 B3 E1 G8 J2 J8 M1 M9 P1 P9 T1 T9	
VSSQ_1 VSSQ_2 VSSQ_3 VSSQ_4 VSSQ_5 VSSQ_6 VSSQ_7 VSSQ_8 VSSQ_9	B1 B9 D1 D8 E2 E8 F9 G1 G9	

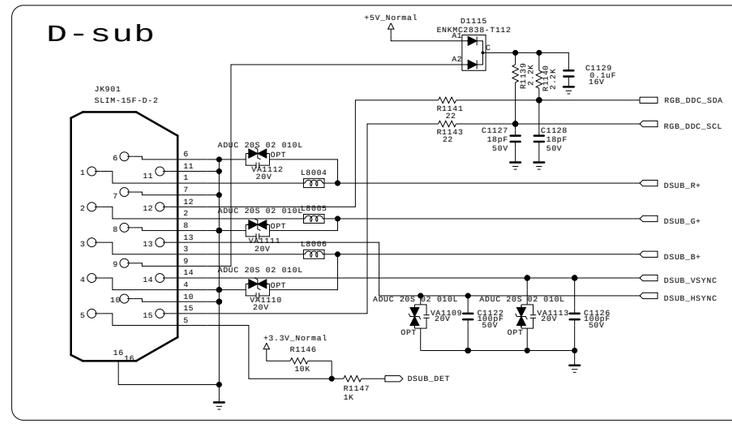
THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFATURES SPECFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

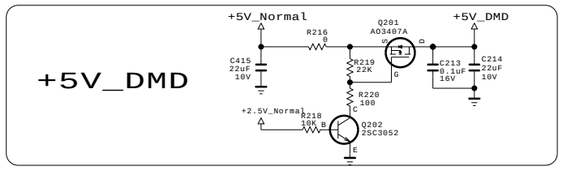
SECRET
LGElectronics

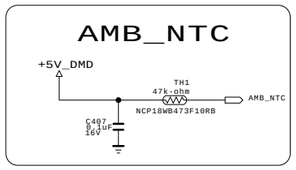
LG ELECTRONICS

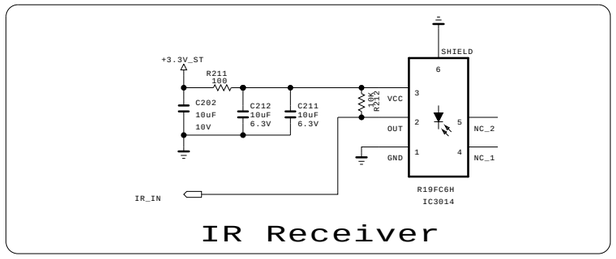
MODEL	LM1_HW600G	DATE	20120221
BLOCK	DDR_256	SHEET	5 / 6

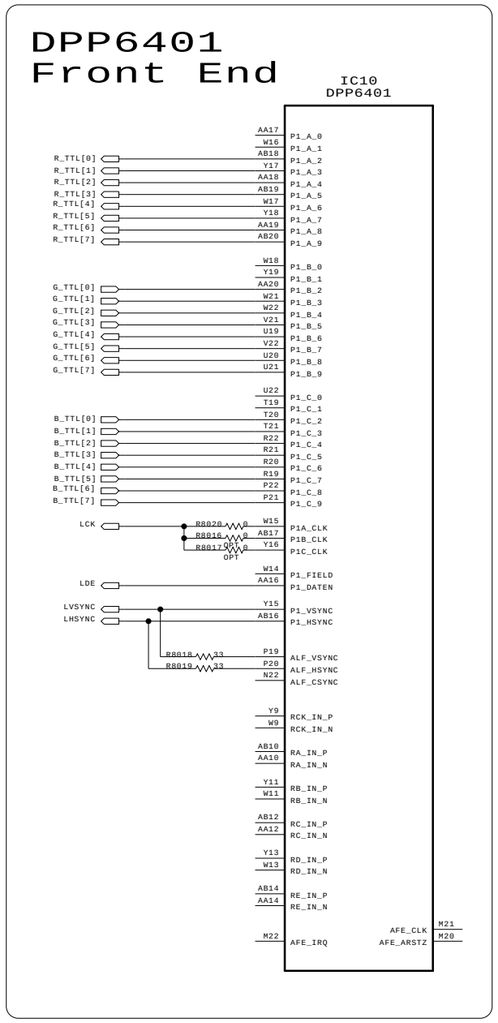


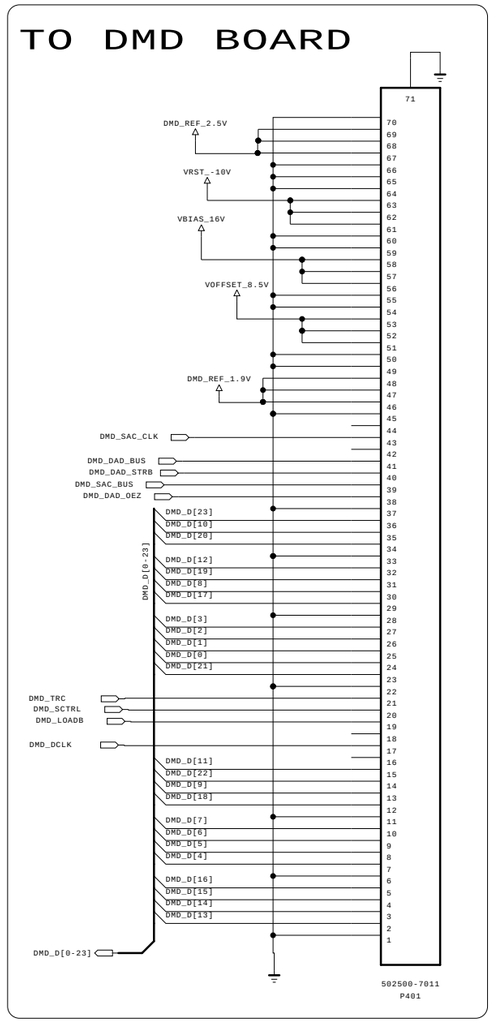


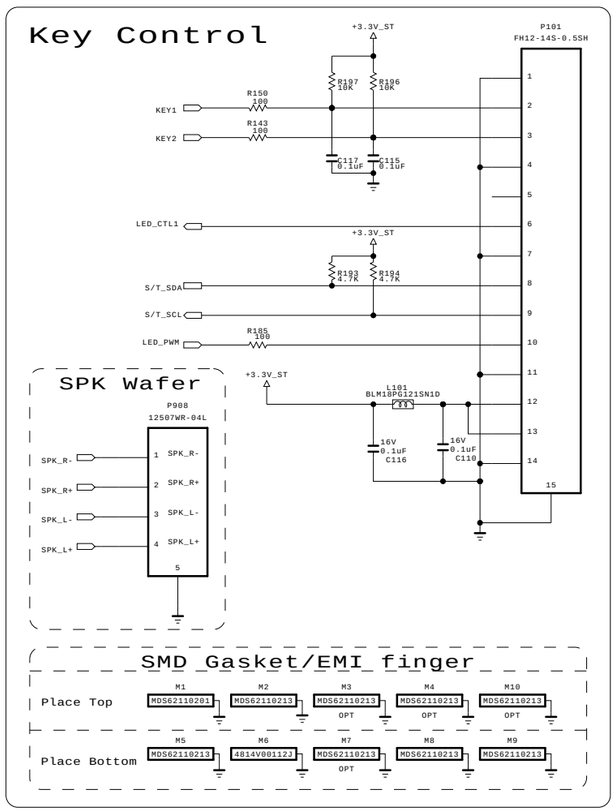


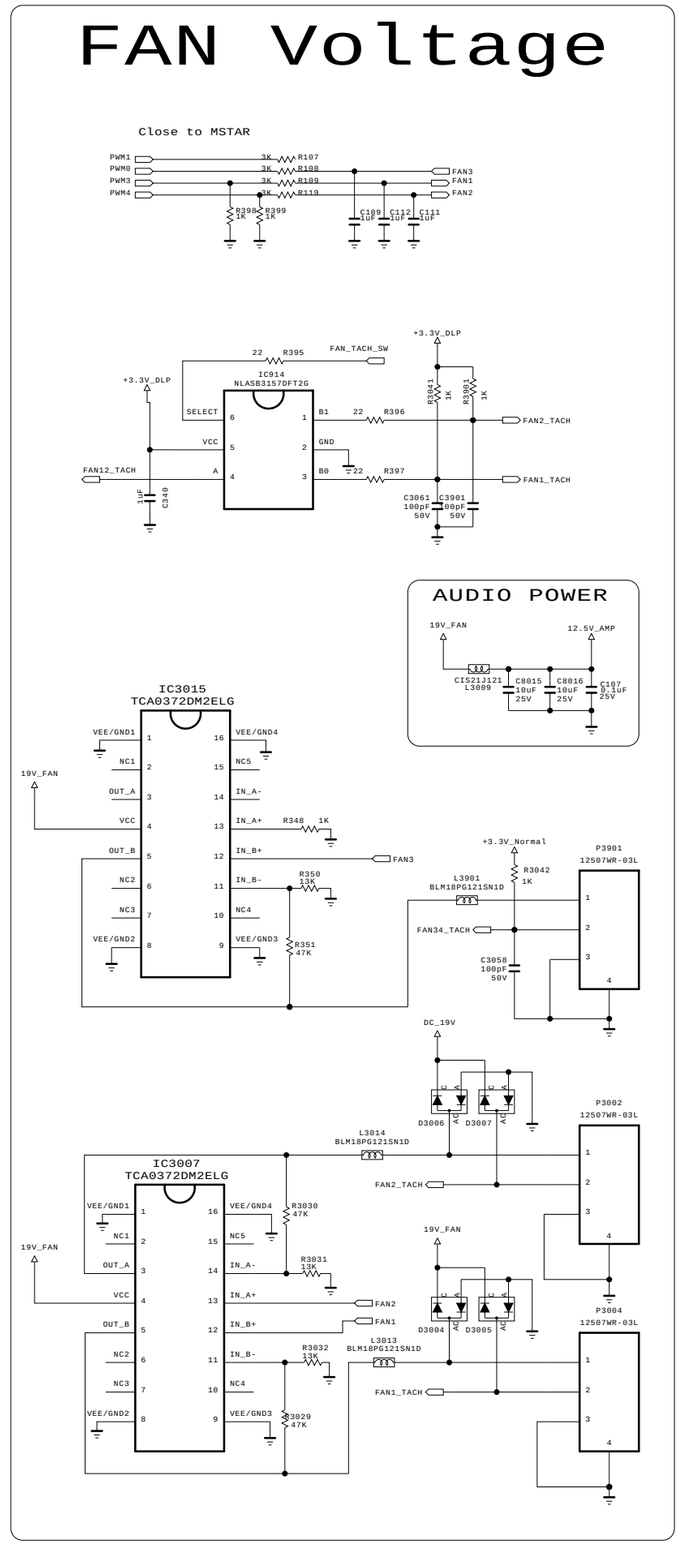












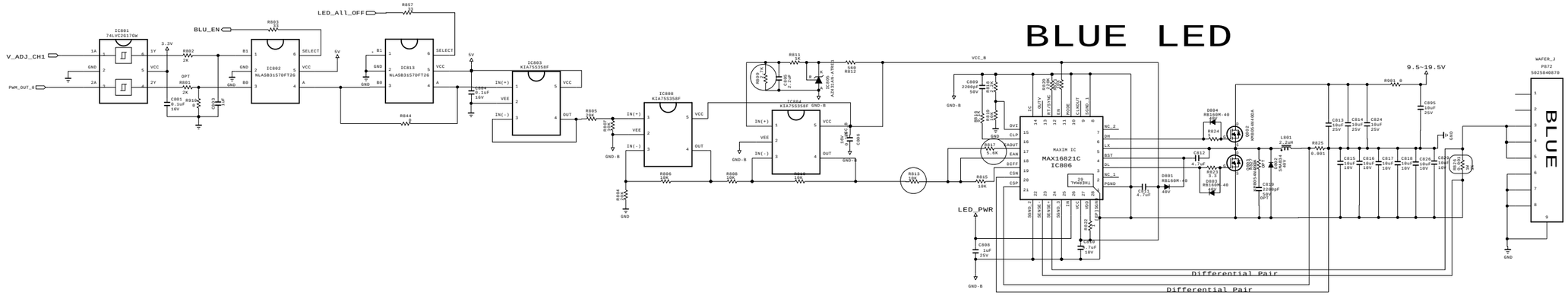
THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFATURES SPECFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

SECRET
LGElectronics

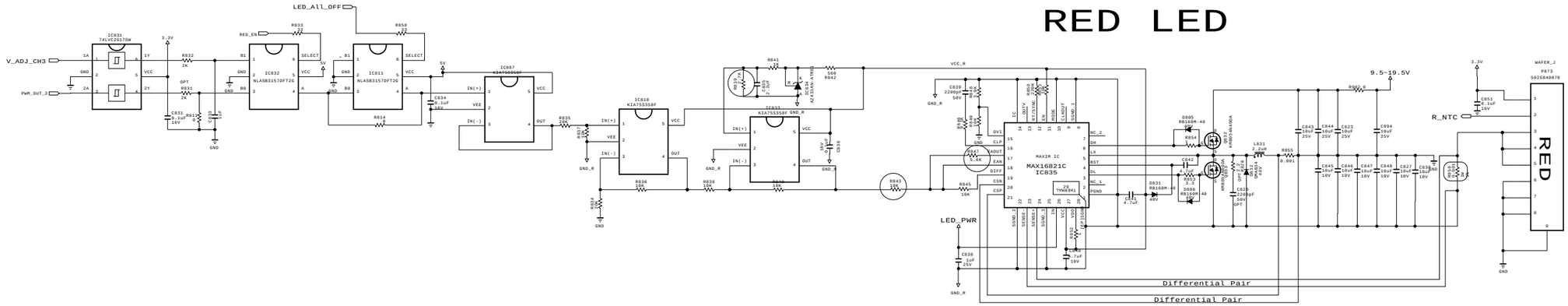
LG ELECTRONICS

MODEL	LM1_HW600G	DATE	20111129
BLOCK	ETC	SHEET	6/8

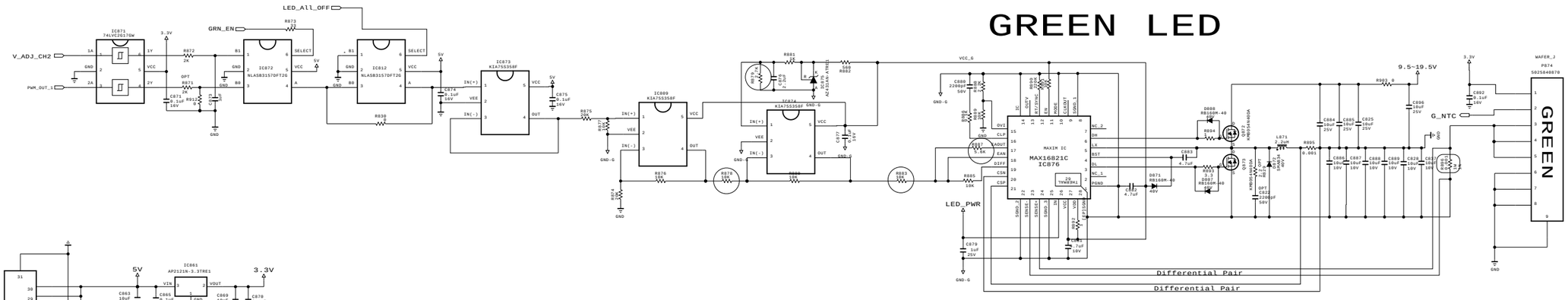
BLUE LED

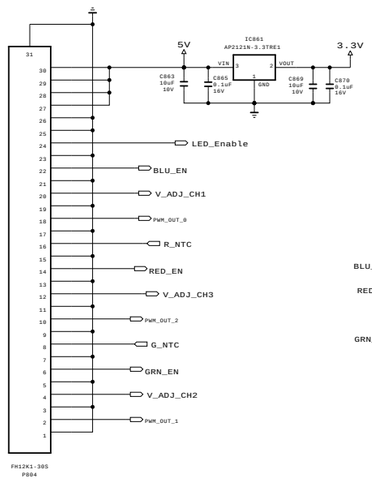


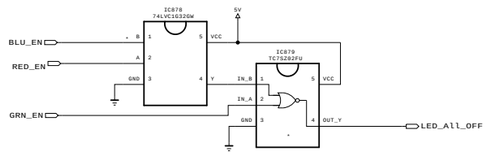
RED LED

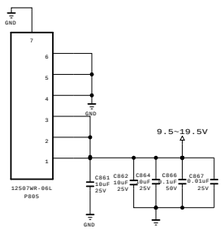


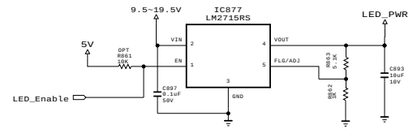
GREEN LED









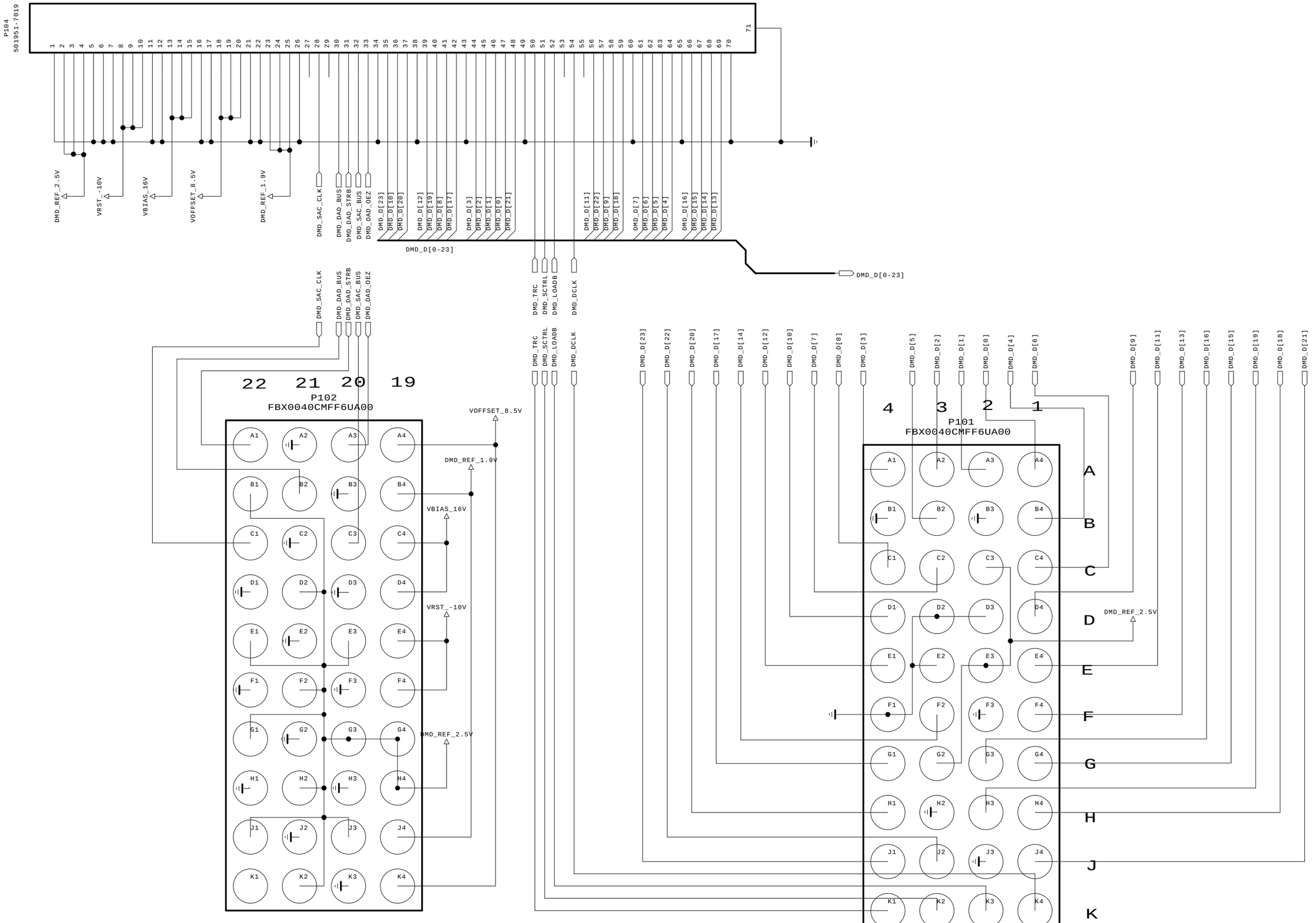


THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFATURES SPECFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

SECRET
LGElectronics

LG ELECTRONICS

MODEL	HX300-JE	DATE	10.01.08
BLOCK	LED DRIVER	SHEET	01 / 01



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	HW400ST	DATE	2011.10.27
BLOCK	DMD	SHEET	/


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