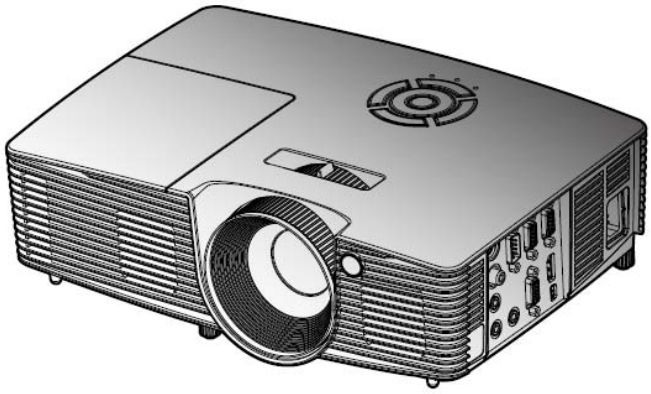
SERVICE MANUAL



S310e/X312

Date	Revise Version	Description
2014/11/5	V1.0	Initial Issue

Prepared: Mina Checked: Amy Approved: Alick

Preface

This manual is applied to S310e/X312 projection system.The manual gives you a brief description of basic technical information to help in service and maintain the product.

Your customers will appreciate the quick response time when you immediately identify problems that occur with our products.We expect your customers will appreciate the service that you offer them.

This manual is for technicians and people who have an electronic background. Please send the product back to the distributor for repairing and do not attempt to do anything that is complex or not mentioned in the troubleshooting.

Note: The information found in this manual is subject to change without prior notice.Any subsequent changes made to the data herein will be incorporated in future edition.

S310e/X312 Service Manual

Manual Version Rev1.0

S310e/X312 Comparison List

Parts	S310e	X312
Speaker	NA	49.8KU01G001
DMD CHIP	48.8EH01G003	48.8CQ01G008
IO Cover	70.73605GR01	70.73711GR01
Daughter Board	80.73606G001	80.73706G001
Main Board	80.73606G002	80.73706G002

Table of Content

Chapter 1

Introduction

1-1 Highlight

No	Item	Description
1	Dimensions (WxDxH)	● 314.3x223.6x88.2 mm (with feet) ● 314.3x223.6 x101.7 mm (w/o feet)
2	Weight	● 2.5±0.5Kg
3	Power Supply	● Universal AC 100V-240V±10%, 50-60Hz
4	Power Consumption	● Bright mode: Typical 254W MAX 280W @110VAC Typical 249W MAX 274W @220VAC ● ECO mode: Typical 196W MAX 216W @110VAC Typical 194W MAX 213W @220VAC ● Standby< 0.5W@110V/220VAC
5	Keystone correction	● +/-40 degree
6	Throw ratio	● 1.95~2.15(D/W)@60”
7	Projection lens	● YM99
8	Offset	● 115%±5%
9	Lamp life	Normal Mode: ● 5000 hours Standard @190W,50% survival rate ECO Mode: ● 6000 hours Typical @160W,50% survival rate Bright Mode w/ Dynamic Eco+: ●10K Hours 100%~30% dynamic eco cycle, 50% Survival Rate
10	DMD Chip&Number of active dots	For X312 ● 0.55”, XGA DMD,S450, Dark Chip 3 ● Number of active dots:1024x768 For S310e ● 0.65”, SVGA DMD,S450, Dark Chip 3 ● Number of active dots:800x600
11	System controller	● TI DDP 4421
12	Video compatibility	● NTSC: M/J,3.58MHz,4.43MHz ● PAL: B, D, G, H, I, M, N,4.43MHz ● SECAM: B, D, G, K, K1, L,4.25/4.4MHz ● SDTV: 480i/p, 576i/p, ● HDTV: 720p(50/60Hz), 1080i(50/60Hz),1080p(50/60Hz)

No	Item	Description
13	Aspect ration	● 4:3,16:9,Native, Auto
14	Input signal spec	● VGA-in x1 ● Composite Video x1 ● S-Video x1 ● RS232(9 pin) x1 ● USB x1 ● HDMI V1.4 x 1(for X312) ● Audio In(stereo),3.5mm x1(for X312)
15	Temperature	● Non-operation: Sea Level to 40,000 feet Operating: Sea Level to 10,000 feet (@23°C); manual switch to high altitude mode @5000 feet & above ● Operating: 5 ~ 40°C in bright(normal) mode and ECO mode; Tolerance +/- 2°C ● Non-operation: -10°C ~ 60°C
16	Altitude&Temperature	● Operating: 0~2,500 ft 5°C~40°C 2,500~5,000 ft 5°C~35°C 5,000~10,000 ft 5°C~30°C

1-2 Compatible Mode

Computer Compatibility

Compatibility	Resolution	Refresh Rate [Hz]
VGA	640x480	60
	640x480	67
	640x480	72
	640x480	85

Compatibility	Resolution	Refresh Rate [Hz]
SVGA	800x600	56
	800x600	60(*2)
	800x600	72
	800x600	85
	800x600	120(*2)
XGA	1024x768	48
	1024x768	50(*4)
	1024x768	60(*2)
	1024x768	70
	1024x768	75
	1024x768	85
	1024x768	120(*2)
HDTV(720P)	1280x720	50
	1280x720	60(*2)
	1280x720	120(*2)
WXGA	1280x768	60
	1280x768	75
	1280x768	85
	1280x800	48
	1280x800	50(*4)
	1280x800	60
WXGA(*3)	1366x768	60
WXGA(*5)	1366x768	60
SXGA	1280x1024	60
	1280x1024	75
	1280x1024	85
SXGA+	1400x1050	60
UXGA	1600x1200	60
HDTV(1080p)	1920x1080	24
	1920x1080	50
	1920x1080	60
WUXGA	1920x1200	60
	1920x1200	50(*4)

Compatibility	Resolution	Refresh Rate [Hz]
WSVGA	1024x600	60(3)
SDTV(480i)	720x480	60
SDTV(480P)	720x480	60
SDTV(576i)	720x576	50
SDTV(576P)	720x576	50
WSVGA	1024x600	60(*3)
WXGA	1280x800	60(*2)
	1280x800	120(*2)
	1366x768	60
WXGA+	1440x900	60
SXGA	1280x1024	60
	1280x1024	75
	1280x1024	85
	1440x900	*60*
SXGA+	1400x1050	60
UXGA	1600x1200	60
HDTV(1080I)	1920x1080	50
	1920x1080	60
HDTV(1080p)	1920x1080	24
	1920x1080	30
	1920x1080	50
	1920x1080	60

Note: If the Computer Compatibility supportive signal is different from User's Manual, please refer to User's Manual.

Chapter 2

Disassembly & Assembly Process

2-1 Equipment Needed & Product Overview

1. Screw Bit (+): 105
2. Screw Bit (+): 107
3. Screw Bit (-): 107
4. Hex Sleeves 5mm
5. Long Nose Nipper
6. Tweezers
7. Projector

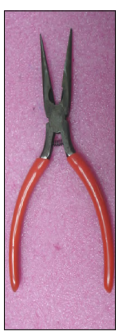
** Before you start: This process is protective level II.Operators should wear electrostatic chains.*

** Note: - If you need to replace the main board, you have to get into service mode and record the lamp usage hour, please refer to section 4-8.*

- As the process of X312 disassembling is the same as S310e, we take S310e for example here.







2-2 Disassemble Lamp Cover Module

1. Loosen 1 M3*8.5 screw (as red circle) on the lamp cover.

2. Disassemble the lamp cover module.

Lamp Cover

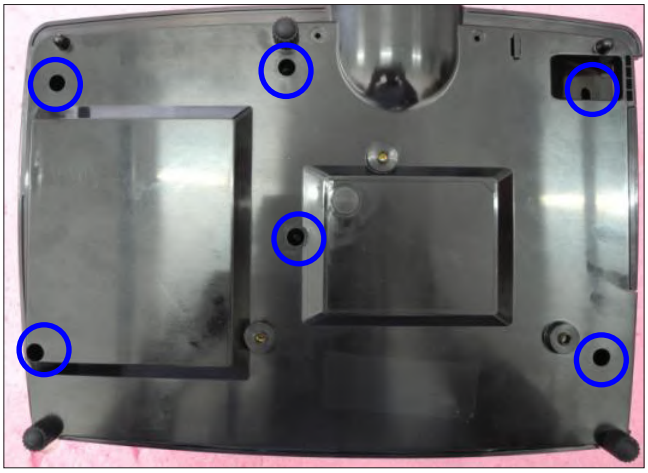
2-3 Disassemble Lamp Module

1. Loosen 1 M3.5*8.5 screw (as red circle) on the lamp module.

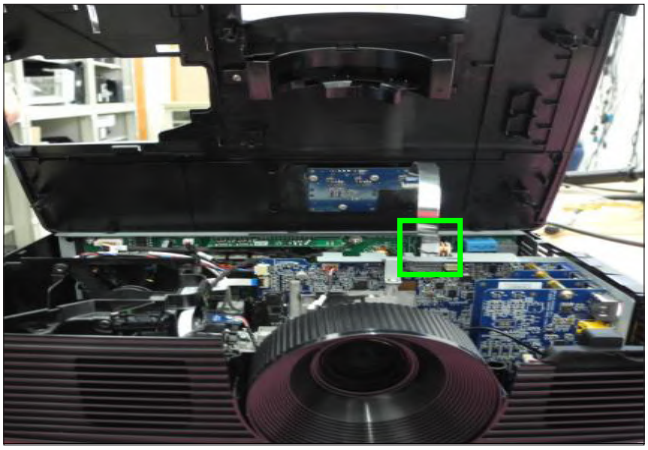
2. Take off the lamp module.

2-4 Disassemble Top Cover Module

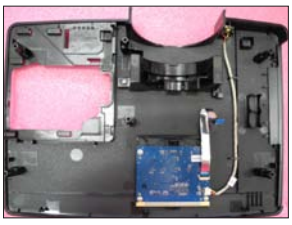
1. Unscrew 6 M3*8 screws (as blue circle) from the bottom cover.



2.Unplug FFC cable(as green square)

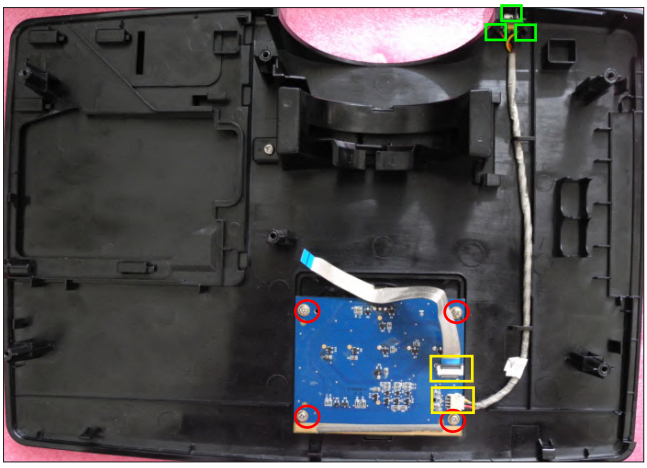


3. Remove the top cover module.



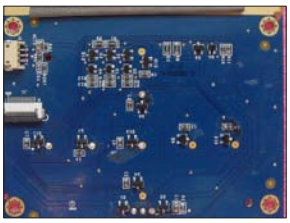
2-5 Disassemble Keypad Board and Zoom Ring

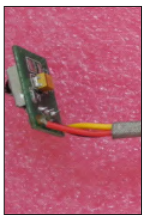
1. Unplug 2 connectors(as yellow square).



2.Unfasten 3 tenons (as green square) to disassemble the IR sensor board.

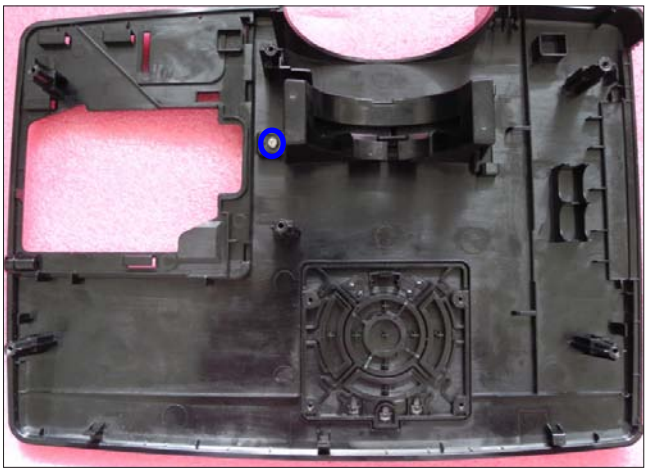
3.Unscrew 4 M2.6*5 screws (as red circle).





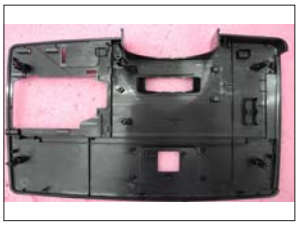
Keypad Board IR Board

4. Remove the keypad board.



5. Unscrew 1 M3*6 screw(as blue circle).

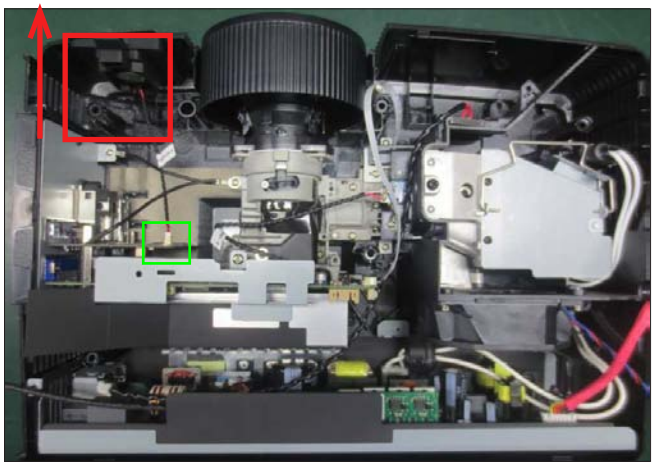
6. Remove the zoom ring from top cover module.



Zoom Ring Top Cover

2-6 Disassemble Speaker(Only for X312)

1.Unplug 1 connector(as green square).

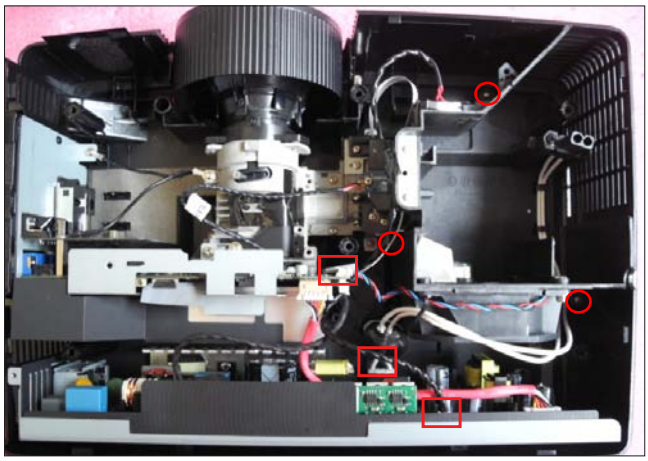


2.Remove the speaker(as red square).

3 .Separate rubber and the speaker.

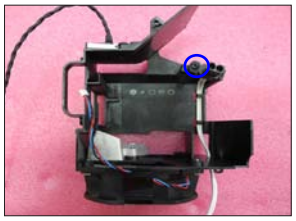
2-7 Disassemble Lamp Housing

1.Unplug 3 connectors(as red square).



2.Unscrew 3 M2.6*6 screws (as red circle) to disassemble the lamp housing.

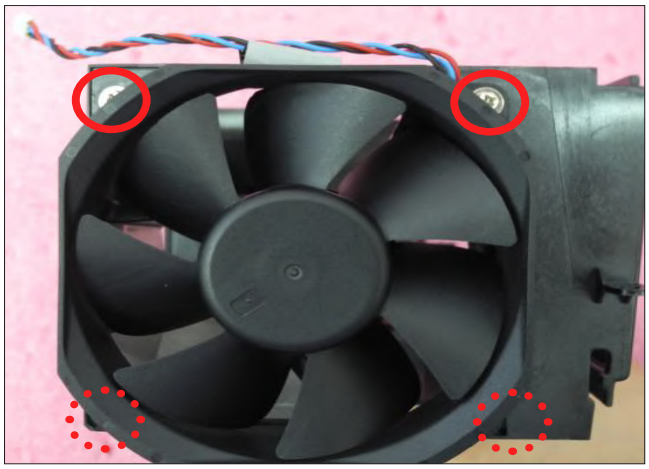
3.Unscrew 1 M3*4 screw (as blue circle).



Lamp cable

2-8 Disassemble System Fan

1. Unscrew 4 M3*10 screws (as red circle) to disassemble the System Fan.



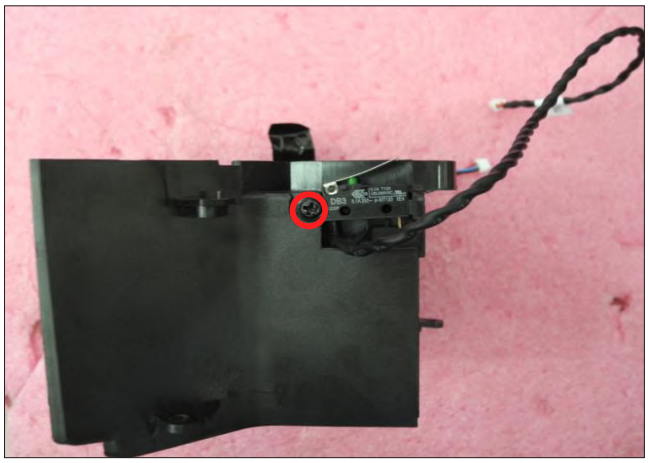
Note: - Take the fan module as the right gesture.

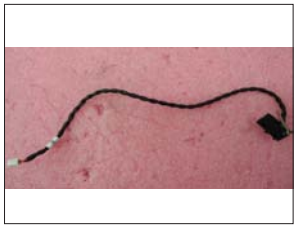
the right gesture

the wrong gesture

2-9 Disassemble Interlock Switch

1. Unscrew 1 M2.6*7 screw (as red circle) to disassemble the Interlock switch.

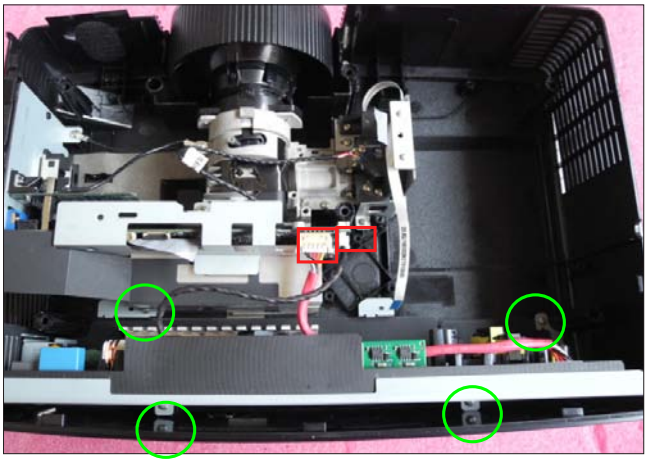




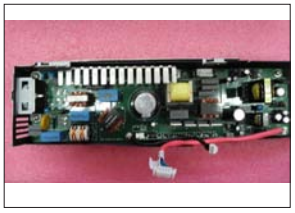
Interlock Switch

2-10 Disassemble LVPS

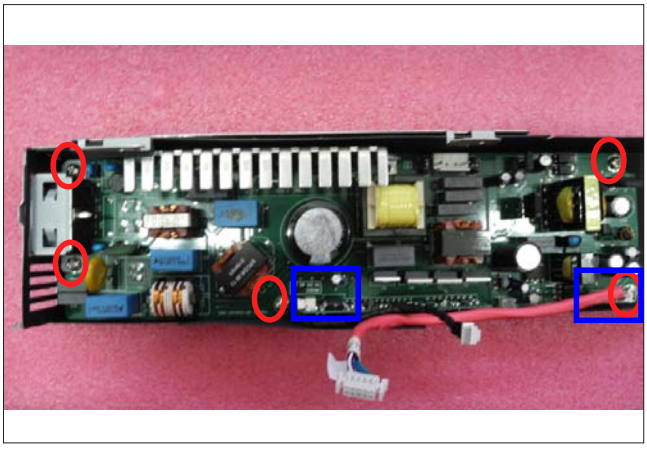
1. Unplug 2 connector(as red square).



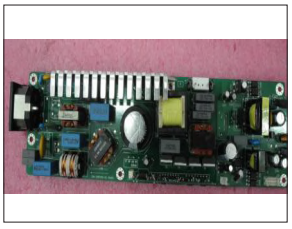
2. Unscrew 4 M2.6*6 screws (as green circle) to disassemble the LVPS and holder .

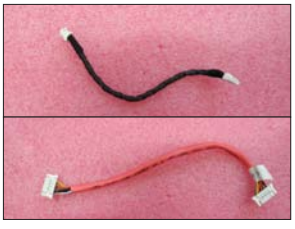


3. Unplug 2 connectors(as blue spuare).



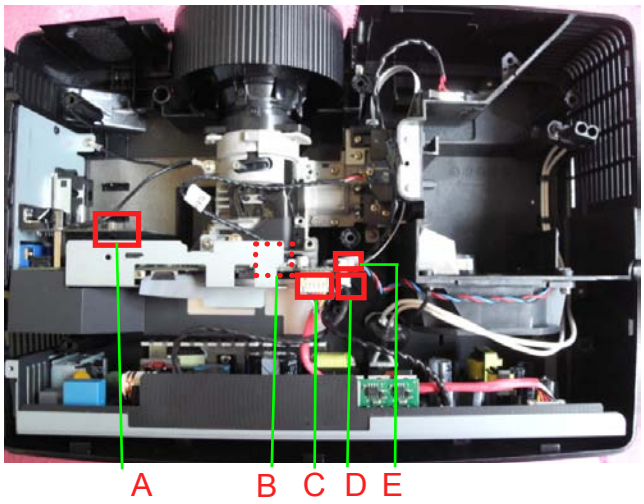
4. Unscrew 5 M3*8 N**I** screws (as red circle) to disassemble the LVPS .





LVPS

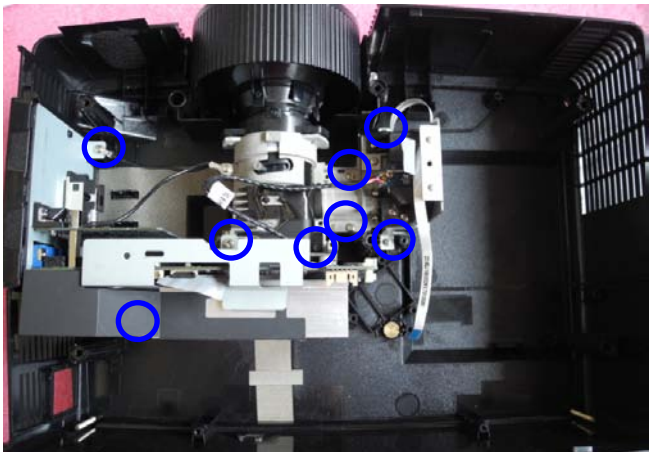
2-11 Disassemble Engine Module and Main Board Module

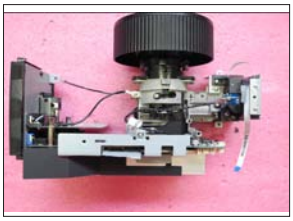


Please refer to the table as below for details of each connector.

Item	Male Conector on Main Board	The key feature	Figure
A	Speaker (Only for X312)	Compose of Red/Black Wire (2 pin)	
B	Photo Sensor	Compose of Red/White/ Black Wire (3 pin)	
C	LVPS A	Red wire tube (10 pin)	
D	LVPS B	Black wire tube (5 pin)	
E	Fan	Compose of Red/Blue/ Black Wire (3 pin)	

1. Unscrew 8 M2.6*8 screws (as blue circle)

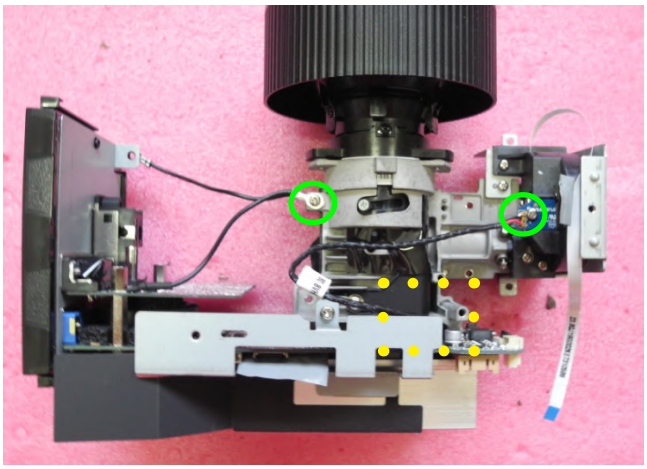




2. Unscrew 4 H4*L8 hex screws (as green circle) and 1 M2.6*8 screw to disassemble IO cover .

3. Remove IO cover

4.Unscrew 2 M2.6*6 Ni screws(as green circle)



5.Unplug 1 connector(as yellow square) to disassemble photo sensor board.

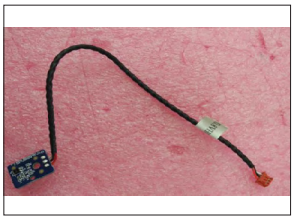


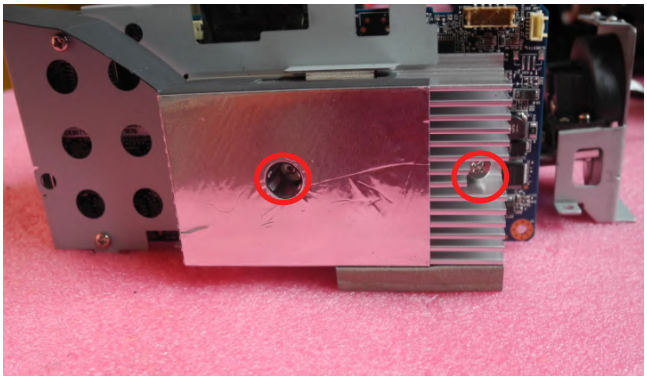
Photo Sensor Board

6.Unscrew 1 screw M1.7*4(as red circle)and unfasten 2 tenons (as green square) to push out the focus ring (as red arrow).

7. Remove the zoom ring.

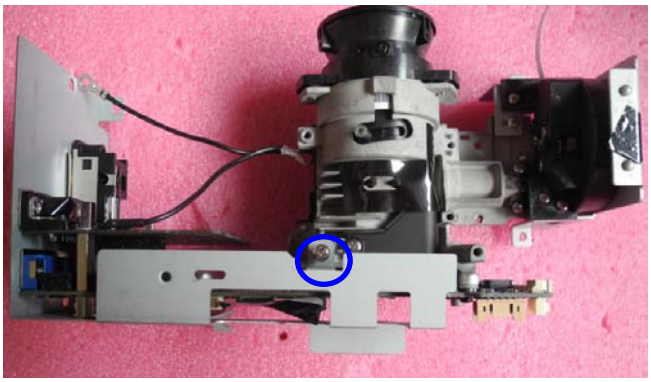
Focus Ring

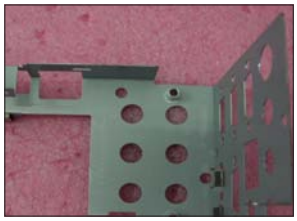
8. Unscrew 2 M2.6*16.2 screws to disassemble heatsink(as red circle).



9. Unscrew 2 MECH M3*6 screws (as green circle)

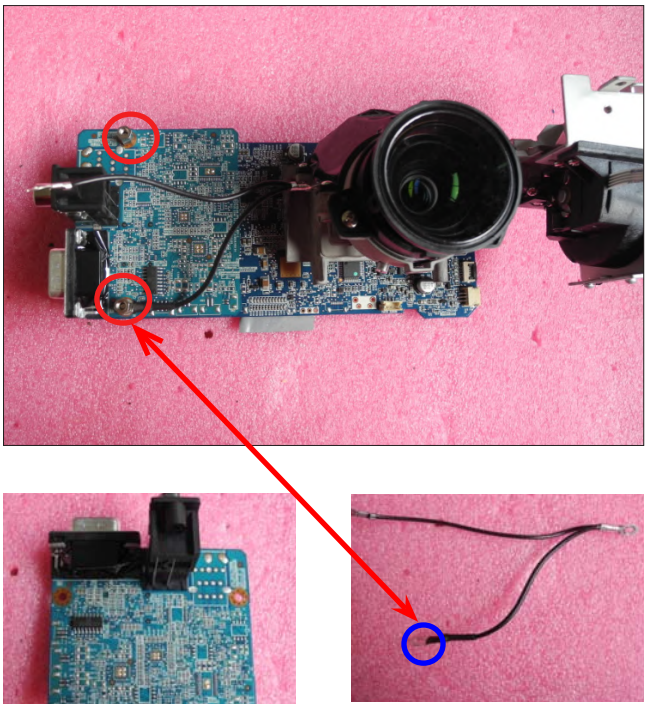
10.Unscrew 1 screw M3*6 to disassemble the top shielding.



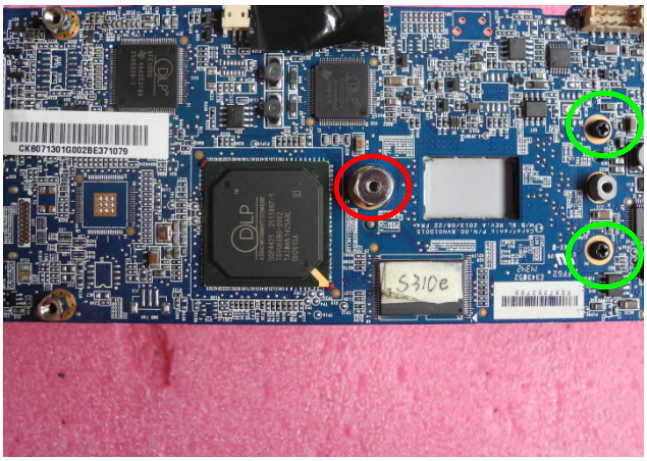


11.Unscrew 2 hex screws (as red circle) to disassemble the daughter board.

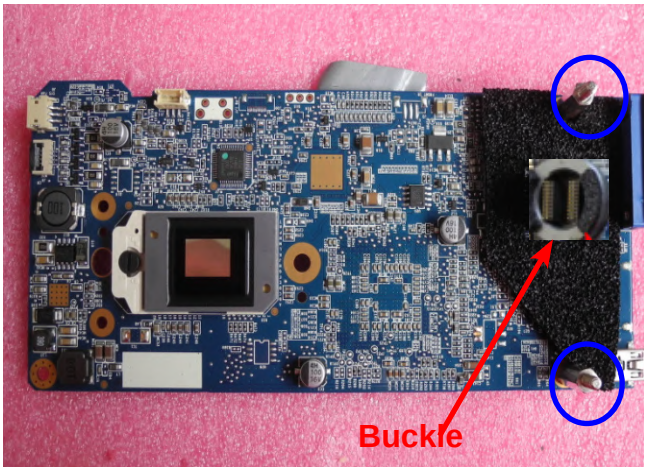
Note:Assemble the daughter board,please make sure the iron does not touch IC of daughter board(as blue circle).



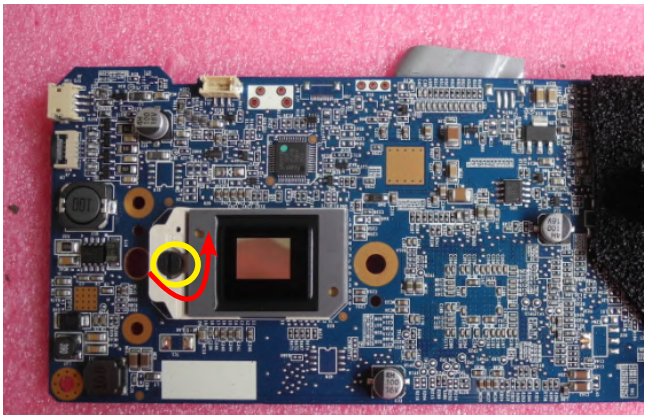
12.Unscrew 2 M2.6*5 screws(as green circle) and unscrew 1 M2.6 screw(as red circle) to separate engine module and main board module.



13.Take off buckle and unscrew 2 hex screws (as blue circle) .

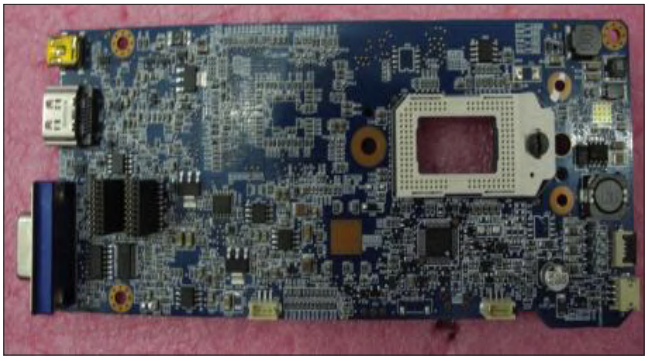


14.Rotate the screw (as yellow circle) 180° counterclockwise to disassemble DMD chip.

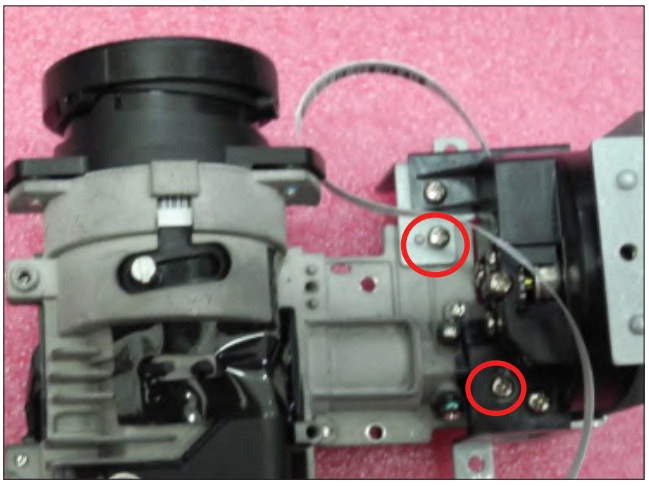


Note: - Avoid touching the DMD Chip when you disassemble it.

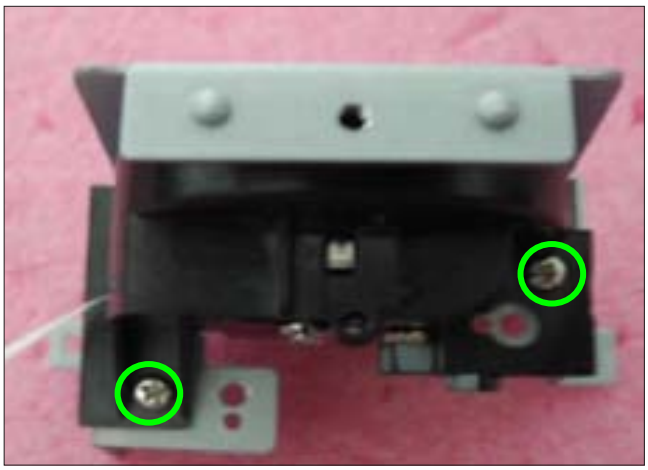
- Pay attention to the fixed position when assembling the DMD Chip.



15. Unscrew 2 M2.6*6 screws(as red circle) to disassemble the color wheel module and color wheel holder.

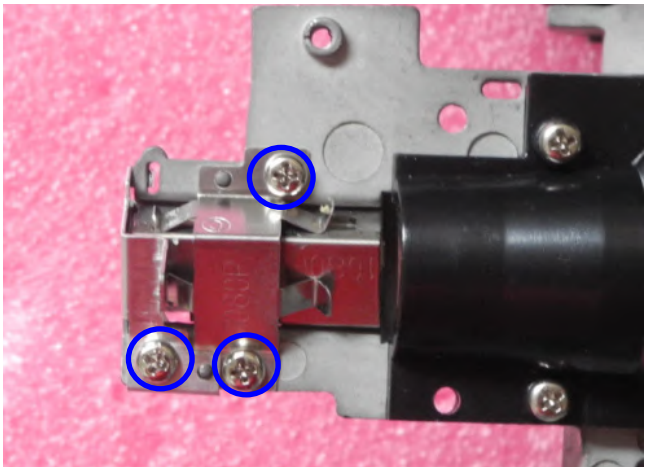


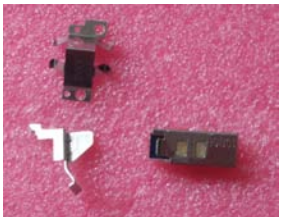
17. Unscrew 2 M2.6*6 Ni screws (as green circle) to disassemble the color wheel module.



Color Wheel Modulle

18.Unscrew 3 M2.6*6 Ni screws (as blue circle) to disassemble the ROD module.





ROD Module

Engine Module

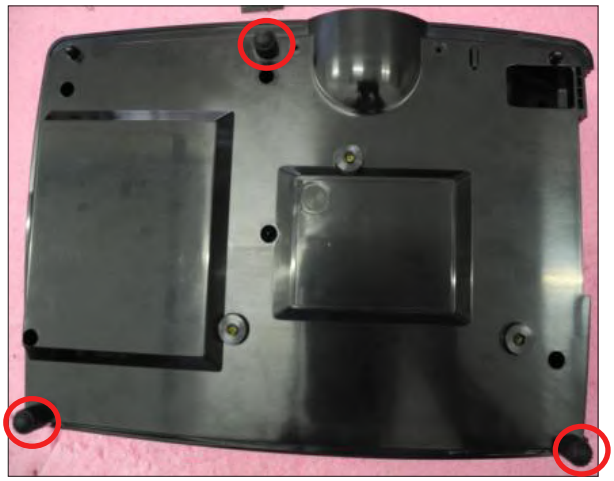
2-12 Disassemble Lens

1.Unscrew 3 BINDING MECH M2.6*6 screws (as red circles)

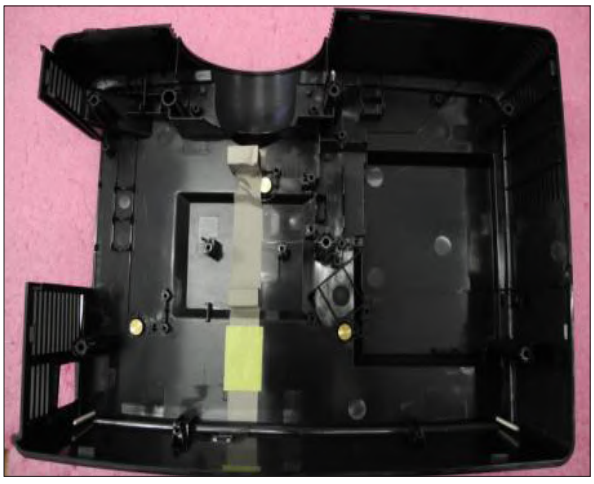
Note:1.Before assemble the new engine,please clean the dusty from engine base by air gun firstly .

2-13 Disassemble Bottom Cover Module

1. Unscrew 3 adjust feet. (as red circle).



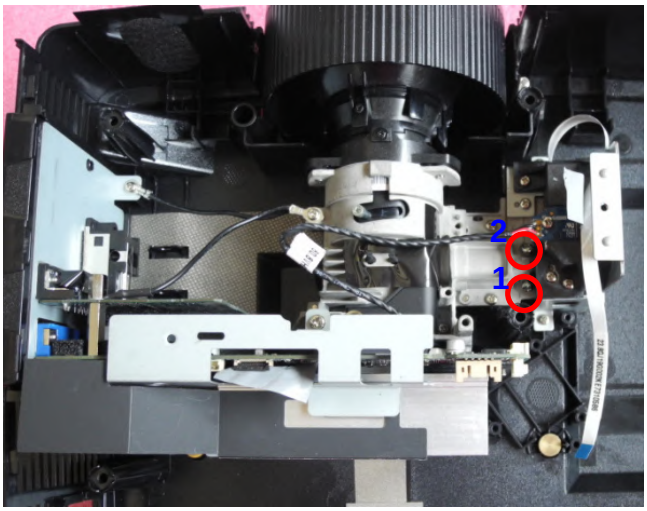
2. The remaining is Bottom Cover Module.



Bottom Cover

3. Disassemble is completed.

2-14 Rod Adjustment



1. Environment Adjustment

   - The size of screen is 60".

   - This process should be done at a dark environment (under 2 Lux).

2. Procedure Adjustment

   - Change the screen to "white screen".

   - Adjust the screws by using the rod on the engine module to readjust the image.

     ("Screw 1" should be adjusted first, and then "screw 2". Adjust until the yellowish or bluish parts disappeared.)

3. Abnormal image inspection

   - It should not have any abnormal color at the frame of the image by estimating through the eyes.

Note: - To avoid over adjusting the rod.

- After the opreation,please use the glue to fix the screws.

2-14 Screw Torque

Description	Torque
LOCK SCREW PAN MECH M3*8.5-3.5 BLACK NYLOCK SPRING WASHER	5.0±0.2 Kgf-cm
SCREW PAN TAP M3*8 NI	6.5±0.3 Kgf-cm
SCREW PAN TAP M3*6 NI	5.0±0.5kgf-cm
SCREW PAN HEAD TAP M2.6*6	5.0±0.2 Kgf-cm
SCREW CAP TAP M2.6*7 WASHER BLACK	5.0±0.5kgf-cm
SCREW PAN MECH M3*10 NI NYLOK	3.0±0.5kgf-cm
SCREW ISO M3*8MM NI PH W/LW	3.0±0.5kgf-cm
SCREW PAN HEAD TAP M2.6*8	5.0±0.2 Kgf-cm
SCREW HEX I/O #4-40 H4*L8 NI NYLOK	3.0±0.2 Kgf-cm
SCREW PAN MECH M2.6*6 Ni NYLOK	3.0±0.5 Kgf-cm
STEP SCREW FOR DMD M2.6*16.2mm X116	3.0±0.2 Kgf-cm
SCREW PAN MECH M2.6*5 Ni NYLOK	3.0±0.5 Kgf-cm
ADAPTER SCREW M2.6 X113	5.0±0.2Kgf-cm
SCREW PAN MECH M3*6 NI	3.0±0.5kgf-cm
HEX SPACER M3 H=17mm L=5mm AL PD726	1.5±0.5 Kgf-cm
SCREW BINDING MECH M2.6*6 Ni NYLOK	3.0±0.5kgf-cm

2-15 Repair Action

Repair action	Change parts					Software	Description page
	Main Board	Lamp Module	Engine Module	Fan	Color Wheel	Firmware	
Firmware Update	v					v	Chapter 5
ADC Calibration	v					v	Chapter 4-4
Color Wheel Index	v				v		Chapter 4-5-1.8
OSD Reset	v	v				v	Chapter 4-7.2
EDID	v						Chapter 6
Re-write Lamp Usage Hours	v						Chapter 4-8
S Video port test/ Video port test	v						chapter 4-5-3/4
Fan Calibration	v			v		v	Chapter 4-3
Optical Performance Measure			v				Chapter 4-5-1.9

Note: - If Color appears abnormal after changing Main Board Module,please do Color Wheel index adjustment and after changing parts,check the information above table.

Chapter 3

Troubleshooting

3-1 LED Lighting Message

Message	Power LED		Temp_LED	Lamp_LED
	Red	Green	Red	Red
Standby State (Input Power cord)	*	--	--	--
Power on (Warming)	--	Flashing	--	--
Lamp lighting	--	*	--	--
Power off (Cooling)	--	Flashing	--	--
Error (Lamp Fail)	Flashing	--	--	*
Error (Fan Fail)	Flashing	--	Flashing	--
Error (Over Temp)	Flashing	--	*	--

Note: No Light: "--"

** Steady light*

3-2 Main Procedure

No	Symptom	Procedure
1	No Power	- Ensure the Power Cord and AC Power Outlet are securely connected - Ensure all connectors are securely connected and aren't broken - Check LVPS - Check Main Board
2	Auto Shut Down	- Ensure the projector is not put on a soft pad and the air vent is not blocked. a. Lamp failed:Power LED(flashes red),Lamp LED lights red - Check Lamp - Check LVPS - Check Main Board b. Fan failed:Power LED (flashes red), Temp LED (flashes red) - Check whether have execute Fan Calibration - Check Fan - Check Main Board - Check Color Wheel Module - Check Photo Sensor Board c. Over Temp:Power LED (flashes red),Temp LED lights red - Check Fan - Check Main Board
3	No Light On	- Ensure all connectors are securely connected and aren't broken - Check Lamp Cover, Intelock Switch - Check Lamp Module - Check LVPS - Check Main Board - Check Color Wheel - Check Photo Sensor Board

No	Symptom	Procedure
4	No Image	- Ensure the Signal Cable and Source work (If you connect multiple sources at the same time, use the "Source" button switch) - Ensure all connectors are securely connected and aren't broken - Check Main Board - Check DMD Chip - Check Color Wheel - Check Engine Module - Daughter Board
5	Mechanical Noise	- Check Color Wheel - Check Fan Module
6	Line Bar/Line Defect	- Check Main Board - Check DMD Chip
7	Image Flicker	- Do "Reset (All data)" of the OSD Menu - Ensure that the signal cables and source are work as well - Check Lamp Module - Check Color Wheel - Check Photo Sensor and clean Photo Sensor - Check Main Board
8	Color Abnormal	- Do "Reset (All data)" of the OSD Menu - Adjust Color Wheel Index - Check Main Board - Check Color Wheel
9	Poor Uniformity/ Shadow	- Ensure the projection screen without dirt - Ensure the projection lens is clean - Ensure the Brightness is within spec - Check rod alignment - Check Engine Module

No	Symptom	Procedure
10	Dead Pixel/Dust (Out of spec.)	- Ensure the projection screen without dirt - Ensure the projection lens is clean - Clean DMD Chip and Engine Module - Check DMD Chip - Check Engine Module
11	Garbage Image	- Ensure that the signal cables and source work as well - Check Main Board
12	Remote Controller Failed	- Remote Controller a. Check Battery b. Check Remote Controller c. Check IR Sensor Board d. Check Main Board
13	Function Abnormal	- Do "Reset (All data)" of the OSD Menu - Check Main Board - Daughter Board
14	Audio Abnormal (For the projector has speaker)	- Ensure that the signal cables and source are work as well - Ensure that your Projector is not in “Mute” mode - Check Main Board - Daughter Board - Check Speaker
15	3D Image Abnormal	- Ensure the using 3D glasses is good and you must face the projection. - Ensure the signal source is 3D format. - Ensure the 3D function of projector OSD is on and 3D sync invert is on. - Check Main Board.

Chapter 4

Test & Inspection

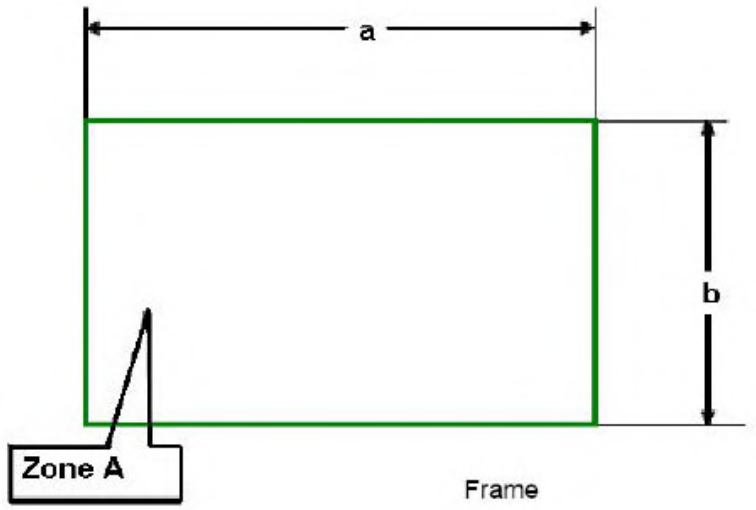
4-1 Test Equipment Needed

- PC support HDTV resolution & Independent graphic card
- Blue- ray DVD player support “S-Video”,“3D source files”,”HDMI” and “Video”
- Minolta CL-200
- Quantum Data 802B or CHROMA2327 (Color Video Signal & Pattern Generator)

4-2 Test Condition

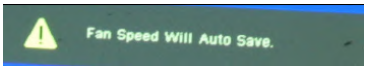
- Circumstance brightness: Dark room less than 2 lux.
- Product must be warmed up for 3 minutes.
- Screen size: 60 inches diagonal.

Zone Definition

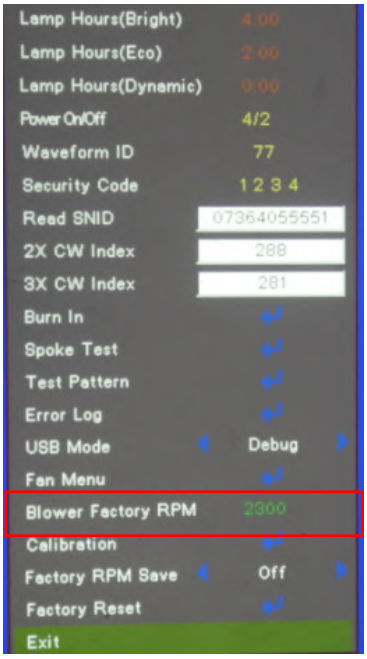


< Figure: Zone A(as green line) Definition >

4-3 Fan Calibration



Picture A



After replacing main board, fan, or upgrading the firmware, please follow steps as below:

1. Power on the projector,after the “Logo” disappeared,then press “power”,”left”,”left”,”right”,the Picture A will show.

2. After several minutes, you can check the fan RPM as red circle:
   a. Please get into Service Mode.
   b. Select “Fan menu”, then press “Enter”, Fan detail information will be shown.

Note:- If the factory fan value don’t show in service mode, please repeat the step 1,2 again.
- Make sure the “Blower Factory RPM “is 1840-2760.

4-4 ADC Calibration

Note: X312 the native resolution of test signal is 1024x768@60HZ.
S310e the native resolution of test signal is 800x600@60HZ.
We take S310e for example here.

1. PC Calibration

Procedure

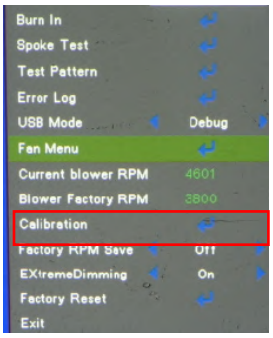
- Test equipment: video generator
- Once Main Board is changed. PC Calibration should be done as well.
  (1) Test signal analog: 800 x 600@60Hz
  (2) Test Pattern: 94%White(up)/6% Black (down)

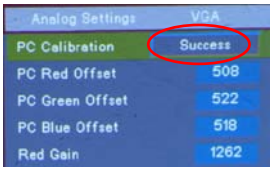
- Note
  (1) Calibration pattern should be in full screen

White/Black

(2) Please press "power", “up”,”right”,”up”,"left", "Menu" buttons sequentially to get into service mode.

(3)Choose "Calibration", press "Enter" button then select “PC Calibration”,When the message “Success” appears, it means “ADC Calibration”is OK. Choose “Menu” or “Exit” to leave service mode.





Check pattern - Test signal: 800 x 600 @60Hz

- Test pattern: 64 gray RGBW

* After finishing ADC adjustment, check 64 gray RGBW pattern.

Inspection item - Color saturation

Criteria - There should not have any lack of RGBW. The color should appear normal and sort in right order.

- Color levels should be sufficient and normal. (the unidentified color levels on both left and right sides should not over 8 color levels.)

64 gray RGBW

4-5 I/O Port Test

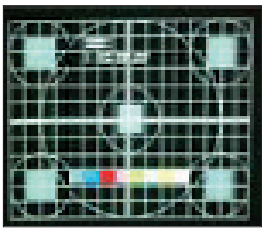
4-5-1 VGA Port Test

Note:1.If you don’t have the professional equipments such as Quantum Data 802B or CHROMA2327,please use the PC that support HDTV resolution & Independent graphic card to output the corresponding PC pattern.You can download the “test pattern by PC” from website as right picture.

2.X312 the native resolution of test signal is 1024x768@60HZ. S310e the native resolution of test signal is 800x600@60HZ. We take S310e for example here.

1. Frequency and tracking boundary

Procedure
- Test equipment: video generator.
- Test signal: analog 800x600@60Hz
- Test Pattern: general-1 or master
- Check and see if the image sharpness is well performed.
- If not, re-adjust by the following steps:
  (1) Select “Frequency” function to adjust the image appears to flicker vertically.
  (2) Select “Phase” function and use right or left arrow key to image appears to be unstable or flickers.
- Adjust Resync or Frequency/Phase/H. Position/V. Position to the inner screen.



General-1

Inspection item
- Eliminate visual wavy noise by Resync, Frequency or Tracking selection.
- Check if there is noise on the screen.
- Horizontal and vertical position of the video should be adjustable to the screen frame.

Criteria
- If there is noise on the screen, the product is considered as failure product.
- If there is noise on the screen, use auto or manual “frequency” function or “tracking” function to adjust the screen.
- The PC mode functionally sure be workable include support format with frequency and auto detected functional will be workable.

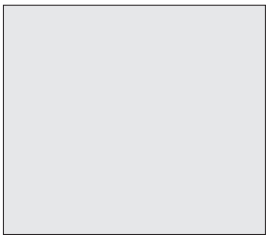
Master

2. Bright Pixel

Procedure
- Test equipment: video generator.
- Test signal: analog 800x600@60Hz
- Test Pattern: gray 10

Inspection item
- Bright pixel check.

Criteria
- Please refer to Pixel specification table.



Gray 10

3. Dark Pixel

Procedure - Test equipment: video generator.
- Test signal: analog 800x600@60Hz
- Test Pattern: full white

Inspection item - Dead pixels check.

Criteria - Please refer to Pixel specification table.

Full white

4. Bright Blemish

Procedure - Test equipment: video generator.
- Test signal: analog 800x600@60Hz
- Test Pattern: gray 10

Inspection item - Bright blemish check.

Criteria - Please refer to Pixel specification table.

Gray 10

5. Dark Blemish

Procedure - Test equipment: video generator.
- Test signal: analog 800x600@60Hz
- Test Pattern: blue 60

Inspection item - Dark blemish check

Criteria - Please refer to Pixel specification table.

Blue 60

Pixel specification

For X312

Order	Symptom	Pattern	Criteria
1	Dark Blemish	Blue 60	1. ≤ 4 visible dark blemishes are allowed in the active area 2. No blemish will be > 1.5” long/ diameter
2	Light Blemish	Gray 10	1. ≤ 4 visible light blemishes are allowed in the active area 2. No blemish will be > 1.5” long/ diameter
3	Reset Boundary Artifact	Gray 30	1. No reset boundary artifacts allowed

Order	Symptom	Pattern	Criteria
4	Eyecatchers / Border Artifacts	Black	1. Eyecatcher and border artifacts are allowed
5	Projected Images	1. Any screen 2. Gray 10 3. Any screen 4. Gray 10 5. White 6. Any screen 7. Black or White	1. No adjacent pixels 2. No bright pixels in Active Area 3. No unstable pixels in Active Area 4. ≤ 1 bright pixel in the POM 5. ≤ 4 dark pixels in the Active Area 6. No DMD window aperture shadowing on the Active Area 7. Blemishes are allowed

For S310e

Order	Symptom	Pattern	Criteria
1	Dark Blemish	Blue 60	1. ≤4 visible dark blemishes are allowed in the active area 2. No blemish will be > 1.5” long/ diameter
2	Light Blemish	Gray 10	1. ≤ 4 visible light blemishes are allowed in the active area 2. No blemish will be > 1.5” long/ diameter
3	Reset Boundary Artifact	Gray 30	1.No reset boundary artifacts allowed
4	Eyecatchers / Border Artifacts	Black	1.Eyecatcher and border artifacts are allowed
5	Projected Images	1. Any screen 2. Gray 10 3. Any screen 4. Gray 10 5. White 6. Any screen 7. Black or White	1. No adjacent pixels 2. No bright pixels in Active Area 3. No unstable pixels in Active Area 4. ≤ 1 bright pixel in the POM 5. ≤ 3 dark pixels in the Active Area 6. No DMD window aperture shadowing on the Active Area 7. Blemishes are allowed

6. Focus Test

Procedure	- Test equipment: video generator. - Test signal: analog 800x600@60Hz - Test Pattern: full screen
Inspection item	- Focus check
Criteria	- look at the entire screen, focus shall be clear, crisp, and sharp over the entire surface of the display pattern. (Blur word on one of the corner after adjustment is acceptable. However, the word should at least be recognizable.)

7.Unbalance test

Procedure	- Test equipment: video generator. - Test signal: analog 800x600@60Hz - Test Pattern: full screen
Inspection item	- Unbalance check
Criteria	- Test signal:analog 800x600@60Hz - Unbalance <=37cm@60”

Full screen

Note:If focus could not clarify,you can use the unbanlance test that you put a white paper far away screen front or behind until the focus is best ,then measure the distance from paper and screen within the specification.

8. Color Performance

Procedure	- Test equipment: video generator. - Test signal: 800x600@60Hz, 1080i - Test Pattern: 64 gray RGBW Please get into service mode.Use 720p & 1080p signal, pattern to do color performance. Color cannot discolor to purple and blue.
Inspection item	- Check if each color level is well-functioned. - Color saturation

Criteria

- Screen appears normal. It should not have any abnormal condition, such as lines appear on the screen and so on.
- Color appears normal.
- It is unacceptable to have few lines flashing.
- RGBW should all appear normal on the screen and sort from R-G-B-W.
- Color levels should be sufficient and normal. (The unidentified color levels on both left and right sides should not over 4 color levels.)
- Gray level should not have abnormal color or heavy lines.
- If color appears abnormal, please get into service mode to do color wheel index adjustment.

64 gray RGBW

9. Optical Performance

Inspection Condition
- Environment luminance: 2 Lux
- Product must be warmed up for 5 minutes
- Screen Size: Screen size: 60 inches diagonal.

a. Measure setting

Procedure

- Please get into OSD menu, select “Lamp Setting” under “Options”, press “Enter” button, then select “Brightness “mode,
- “Format” is “4:3”
- Test equipment: Select “Spoke Test”.
- Test signal: analog 1024x768@60Hz(For X312)
  analog 1280x800@60Hz(For S310e)

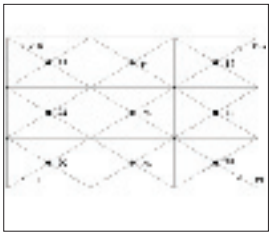
b. Brightness

Procedure
- Full white pattern
- Use CL100 to measure brightness values of P1~P9.
- Follow the brightness formula to calculate brightness values.

☼ Brightness Formula

Avg. (P1~P9)*1.1m2

Criteria
•1028 ANSI lumen



Full white pattern

c. Full On/Full Off Contrast

Procedure
- Full white pattern & Full black pattern
- Use CL100 to measure brightness values of full white pattern P5 & full black pattern B5 (see image: full white)
- Follow Contrast formula to calculate contrast values.

☼ Contrast Formula

P5/B5

Note: P5 = Lux of center in full white pattern

B5 = Lux of center in full black pattern

Criteria
• 1760:1

Full black pattern

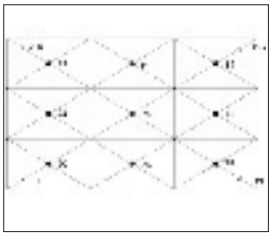
d. Uniformity

Procedure
- Full white pattern
- Use CL100 to measure brightness values of P1~P9 (see image: full white).
- Follow the Uniformity formula to calculate average values.

☼ Uniformity Formula

JBMA Uniformity = Avg. (P1, P3, P7, P9) / P5 *100%

Criteria
• 70%



Full white pattern

4-5-2 Audio Port Test(Only for X312)

Procedure - Test equipment: DVD Player

- Test signal: CVBS

Inspection item - Audio performance test

Criteria - Check the sound from speaker

- Plug Audio cable into Audio in port,

check whether “Volume” is normal.

-Adjust the volume to “0→ 8” by using the remote controller.

- Check the sound from speaker.

4-5-3 S-Video Port Test

Motion video

Procedure - Test equipment: DVD player

- Test signal: Video

Inspection item - Video performance test

Criteria - Check any abnormal color, line distortion or any noise on the screen.

4-5-4 Video Port Test

Procedure - Test equipment: DVD player

- Test signal: Video

Inspection item - Video performance test

Criteria - Check any abnormal color, line distortion or any noise on the screen.

- Check the sound from speaker.

4-5-5 HDMI Port Test(Only for X312)

Procedure	- Test equipment: DVD Player with HDMI output. - Test signal: 1080p@60 Hz
Inspection item	- HDMI performance test.
Criteria	- Ensure the image is well performed and the color can not discolor.

4-5-6 3D Test

Procedure	- Test equipment: 1. Blue-Ray DVD player & 3D format CD
Inspection item	- 3D test (S-Vide) - Press “3D”key on the remote and 3D is set to “DLP-Link”.
Criteria	- The image should not appear noise, flicker shadow, shocking,abnormal color.

4-5-7 3D Test(Only for X312)

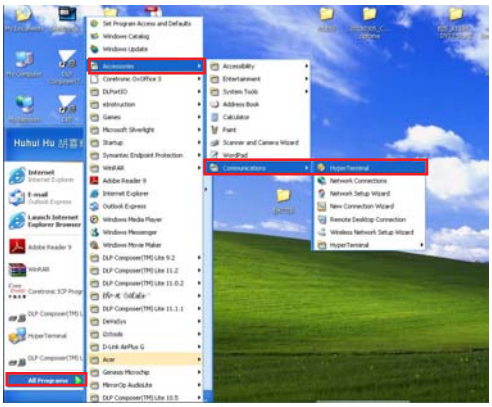
Procedure	- Test equipment: 1. Blue-Ray DVD player & 3D format CD - Test signal: 720p@60Hz 1080i@50Hz
Inspection item	- 3D test (HDMI)
Criteria	- The image should not appear noise, flicker shadow, shocking,abnormal color.

4-5-7 RS232 Port Test

1. Projector setting

- Plug in the power cord, turn on the power switch.
  Connect projector and PC by RS232 cable

Note: RS232 cable: Female to female RS232 Cable :42.86603G001



2. Setup Hyper Terminal

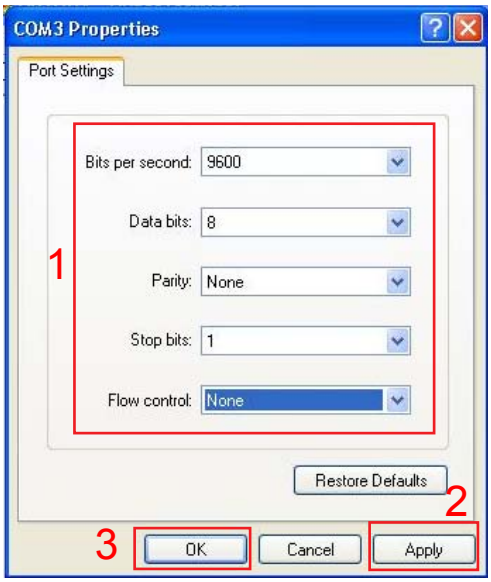
(1) Enter to Hyper terminal via communication.

(2) Enter a name, then click “OK”.

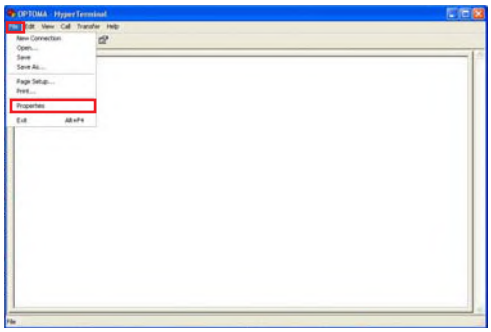
(3) Select com port which you are using, then click “OK”.

(4) Setup COM port properties.

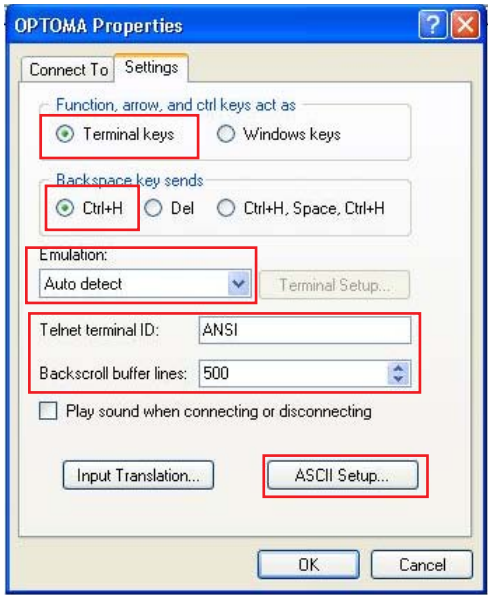
- Bits per second:9600
- Data bits:8
- Parity:None
- Stop bits:1
- Flow control:None



(5) Click “Apply”,then click “OK”.



(6) Select “File” and choose “Properties”.

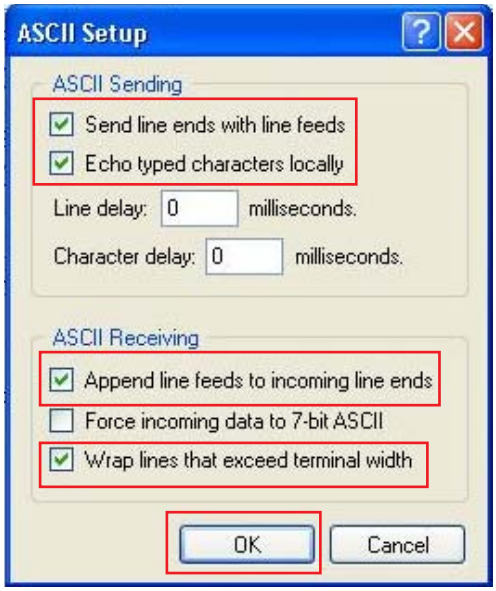


(7) Terminal Settings

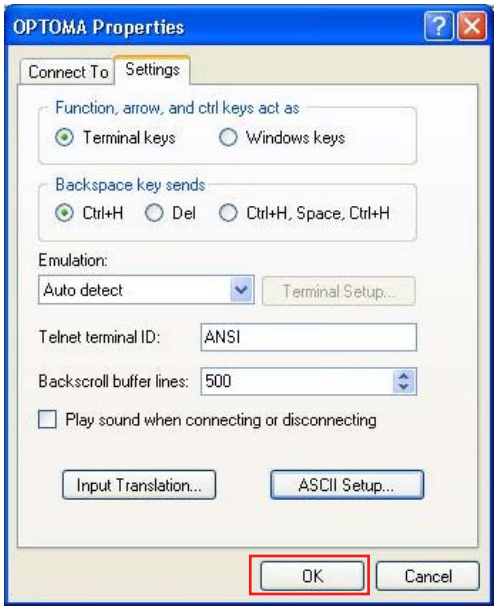
- Function,arrow, and ctrl keys act as: Termina keys
- Backspace keys sends:Ctrl+H
- Emulation:Auto detect
- Telnet terminal ID:ANSI
- Backscroll buffer lines:500
- Then choose “ASCII Setup”.

(8) ASCII Setup

- Choose “Send line ends with line feeds”
- Choose “ Echo typed characters locally”
- Choose “ Append line feeds to incoming line ends”
- Choose “ Wrap lines that exceed terminal width”
- Then click “OK”.



(9) Click “OK” to close the window.

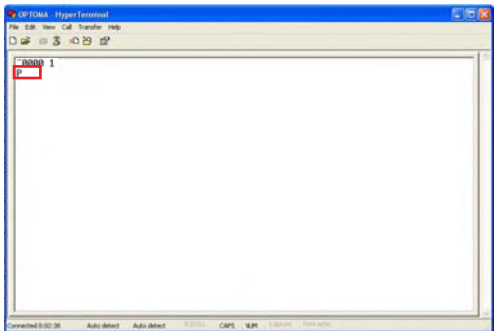


(10) Input the RS232 commond “~0000 1”,
then press “Enter”.

- The projector will feedback “P” from the hyper terminal. and the projector will be powered on.
- If you have turned on the projetor, you also can use the RS232 command “~0000 0” to turn off the projector.

Note:Projector returns “P”:Pass

Projector returns “F”:Fail



4-6 Run In Test

- Temperature: 15°C~35°C
- Circumstance brightness: Normal environment
- Screen size: No concern
- Display mode: ECO mode

After repairing each unit, a Run-in test is necessary (refer to the below table).

Symptom	Run-in Time
Normal repair	2 hours
NFF	4 hours
Auto shutdown	6 hours

- Get into Burn-In Mode

** Cycle setting is based on the defect symptoms. ie: If it is NFF, the run-in time is 4 hours. You have to set the lamp on for 60 min. and lamp off for 10 min for 4 cycles.*

Press Power off >Up >Right >Up >Left >Menu buttons sequentially on remote controller to get into service mode.	
Choose Burn-In Test > enter	
Lamp On	Press right key to adjust the time (60)
Lamp Off	Press right key to adjust the time (10)
Set burn in cycle	Press right key to adjust the cycle
After setting up the time, choose “Get into Burn-In Mode” and press enter	

Note:During Brun in test,if you want to end the process,please enter power button.

4-7 Test Inspection Procedure

1. Check Points

Check item	Check point
Firmware version	All firmware version must be the latest version
TB implementation	Related TB must be implement
Cosmetic	Cosmetic can not be broken
Logo	Missing logo, missing prints and blurry prints are unacceptable
Lamp cover	It should be locked in the correct place.
Zoom in/out	The function should work smoothly
Keypad	All keypad buttons must operate smoothly

2. OSD Reset

After final QC step, we have to erase all saved change again and restore the OSD default setting.

The following actions will allow you to erase all end-users' settings and restore the default setting:

(1) Please enter OSD menu.

(2) Choose "SETUP" and then execute "Reset" function,select "All".

4-8 Re-write Lamp Hours Usage

1. Get into service mode

   - Press power→up→right→up→left→ Menu to get into service mode.

   -Select “Exit”,then press”left” or “right” key for six times.

2. Re-write Projection Hours

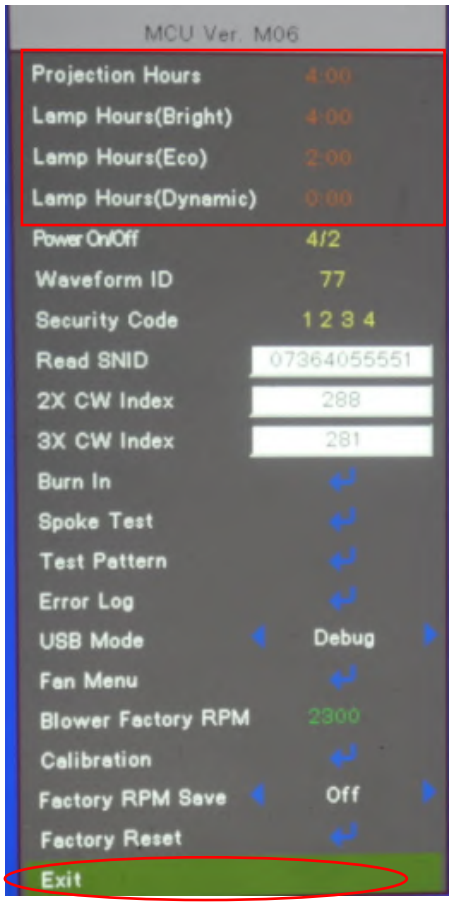
   -Select System Hours and use “left” or “right” buttons to re-write the projection hours.

3. Re-write Lamp Hours(Bright)

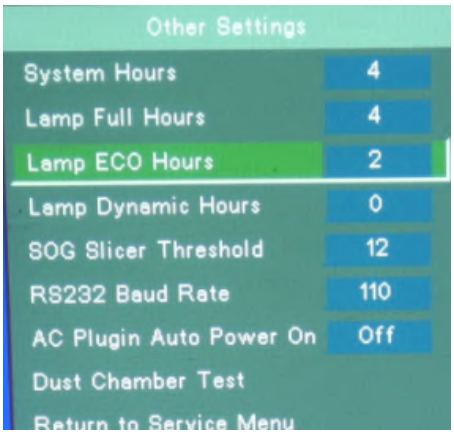
   -Select Lamp Full Hours and use “left” or “right” buttons to re-write the lamp hours(Normal).

4. Re-write Lamp Hours(ECO)

   -Select Lamp ECO Hours and use “left” or “right” buttons to re-write the lamp hours(ECO).



5. Re-write Lamp Hours(Dynamic)
   -Select Lamp Dynamic Hours and use “left”or “right” buttons to re-write the lamp hours(ECO).



6. Choose “Exit”, press “Enter” to exit

Note: left key = decrease lamp hour

right key =increase lamp hour

Chapter 5

Firmware Upgrade

5-1 Equipment Needed

Software:

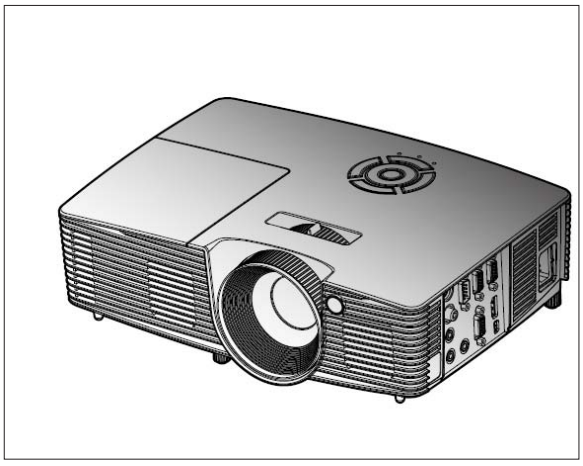
- DLP Composer Lite V11.2
- Firmware (*.img)
- 11.2 FlashDeviceParameters

Note: - Please download "DLP Composer Lite 11.2" and "11.2 FlashDeviceParameters" from website to upgrade FW procedure.

Hardware:

- Projector
- Power cord: 42.50115G001
- Mini USB Cable: 42.00284G001
- PC or Laptop

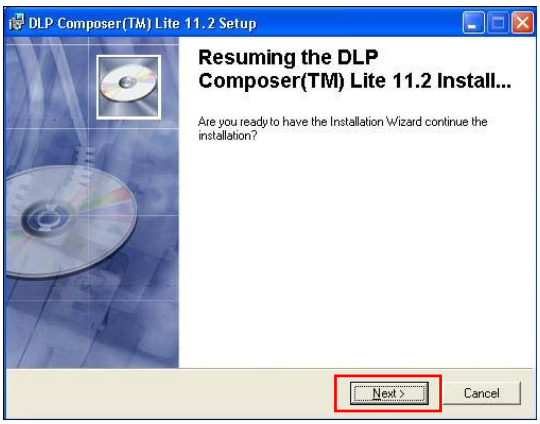
Note: - The FW upgrade procedures for S310e is the same as X312, we take S310e for example here.




5-2 DLP Composer Lite Setup Procedure

1. Choose "DLP Composer Lite V11.2 Setup" Program.

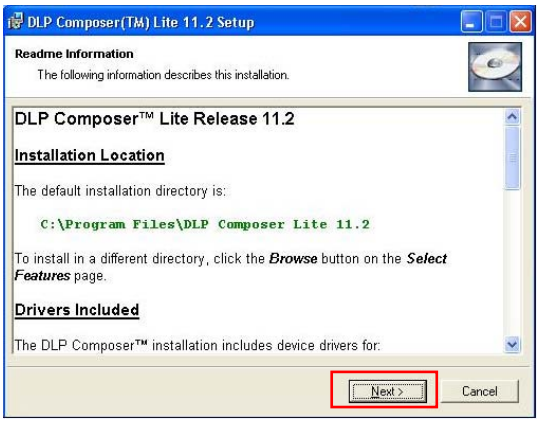
2. Click "Next".



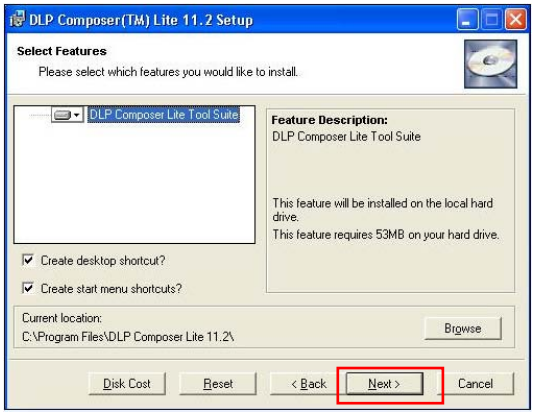
3. Read "License Agreement".

   - Choose "I accept and agree to be bound by all the terms and conditions of this License Agreement".
   - Click "Next".

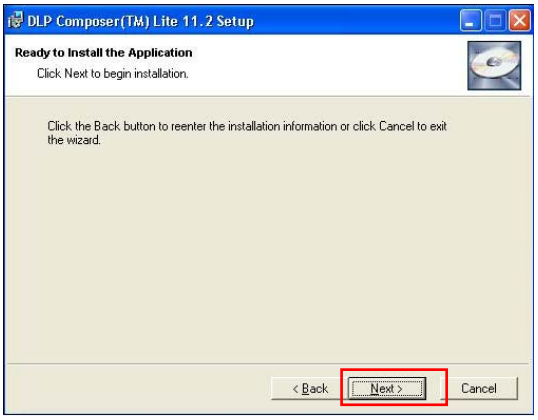
4. Click "Next".



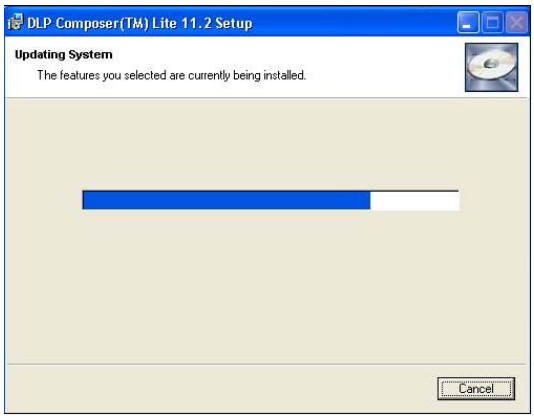
5. Click "Next".



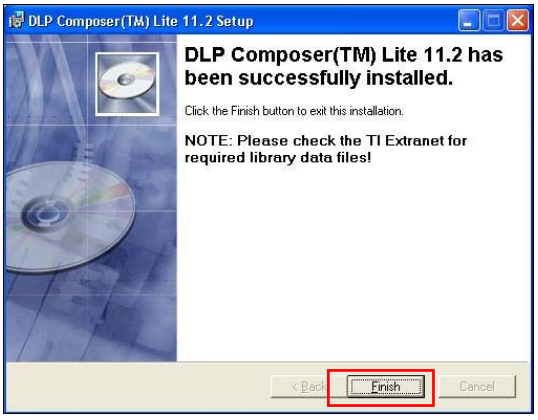
6. Click "Next".



7. The program is executing "installing" status.



8. Click "Finish".



5-3 Get into Firmware Download Mode

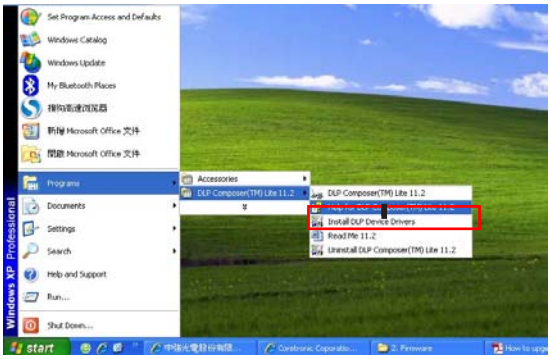
1. Set-up

- Hold on "Power" button and plug in the power cord .
- After the power LED lighted blue,lamp and temp LED lighted red,then release "Power" button.(as right picture shows)

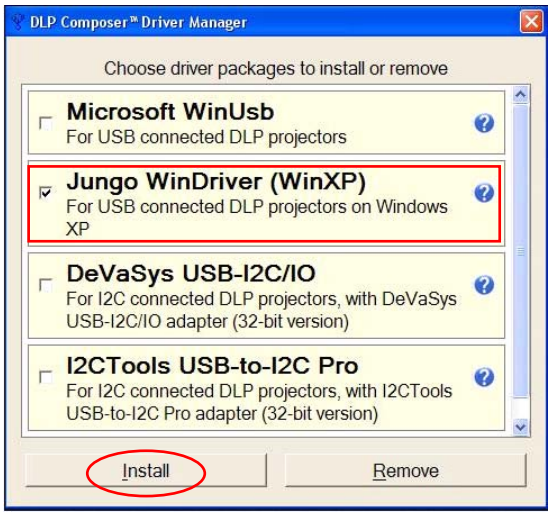
-Connect the projector with PC by USB cable.

5-3-1 USB Driver Upgrade Procedure

1.Execute"Install DLP Device Drivers" in start menu.



2.Select "Jungo WinDriver(WinXP),then click "install".



Note: If OS is Windows XP, select "Jungo WinDriver (WinXP)"; If OS is Windows7, select Jungo WinDriver" Win 7)

3.Click”Next”.

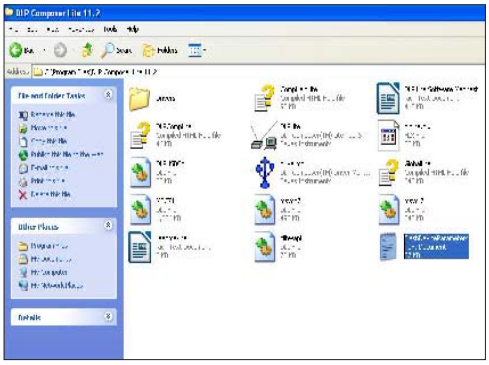
4.Click"Finish".

5-3-2 Firmware Upgrade Procedure

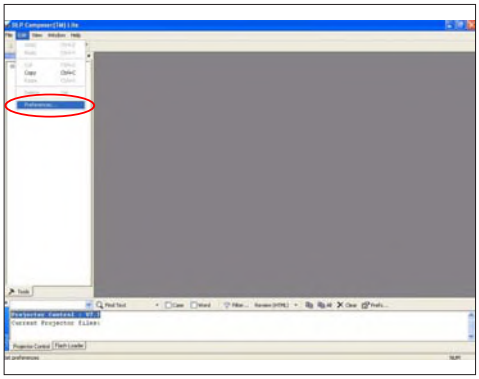
1. Execute the "DLP Composer™ Lite 11.2" file.

2. Setting "FlashDeviceParameters".

- Select the file "11.2 FlashDeviceParameters".
- Put "11.2 FlashDeviceParameters" file into the folder where you setup "DLP Composer Lite 11.2".

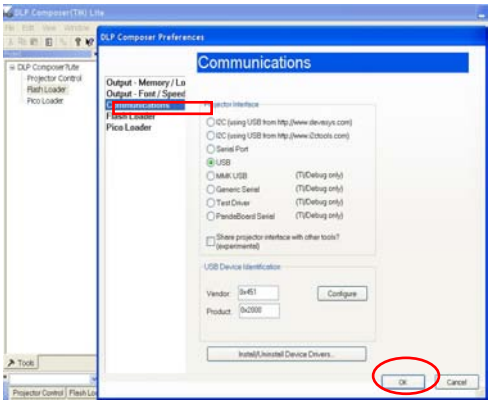


3. Click "Edit" and "Perferences".



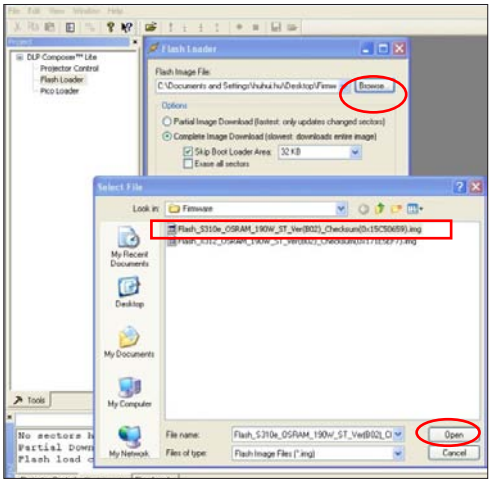
4. Click "Communications".

- Select "USB"
- Click "OK".



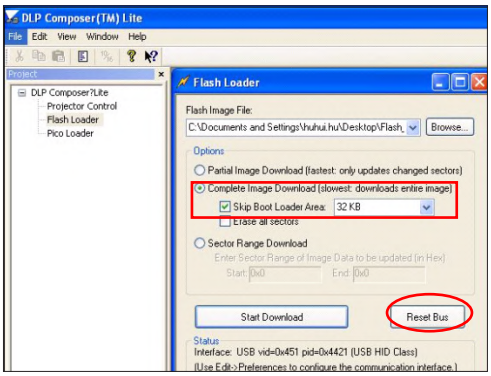
5. Choose "Flash Loader".

- Click "Browse" to search the firmware file (*.img).
- Click "Open".



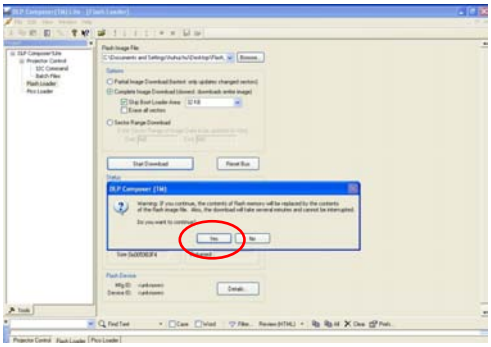
6. Selete the item skip Boot Loader Area

- Select “32KB”.
- Click “Reset Bus” to erase the flash memory.



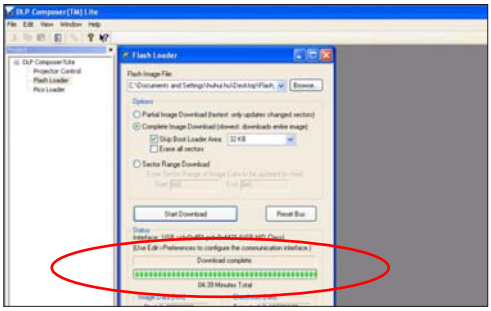
7. If the FW is ready, click “Start Download” to execute the firmware upgrade.

- Click “Yes” to erase the flash memory.



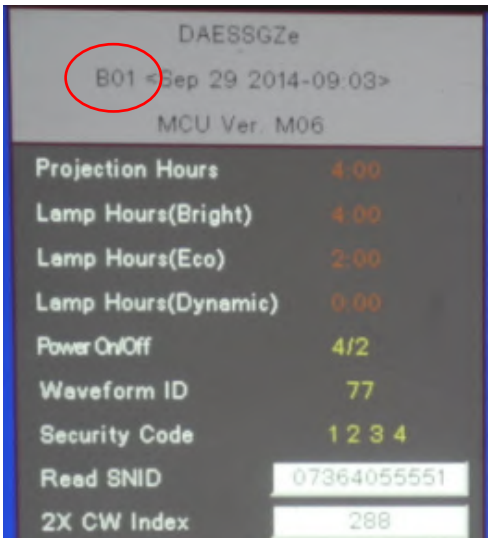
8. It takes about several minutes, the firmware upgrade process is finished, "Download completed" will appear on the screen.

   - Unplug USB cable and power cord.



9. Check System FW version.

   - Re-plug in power cable, then restart the unit and get into the Service Mode to check the system firmware version.



Section 2: MCU Firmware Upgrade Procedure

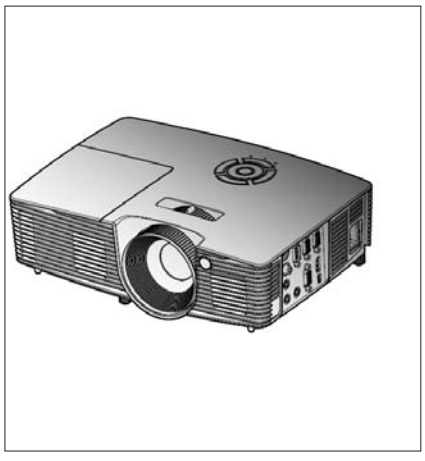
5-2-1 Equipment Needed

Software :

- FLASHMAGIC_6.72 (include these files: a.FlashMagic.exe b.Setup.exe)
- Program file (*.hex)

Hardware :

- Projector
- Power Cord
- NXP MCU download tool (80.8TL07G001)
- PC or Laptop
- USB Cable mini USB to USB (A) (42.00284G001)



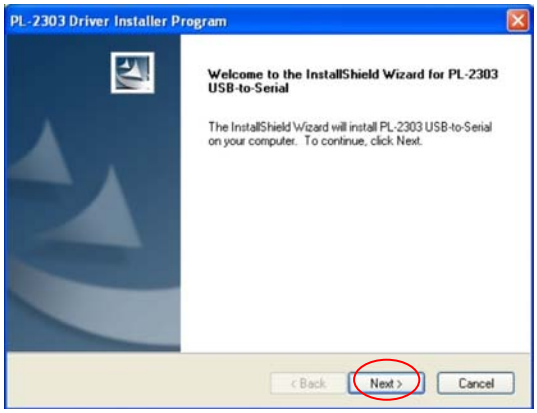


5-2-2 Setup Procedure

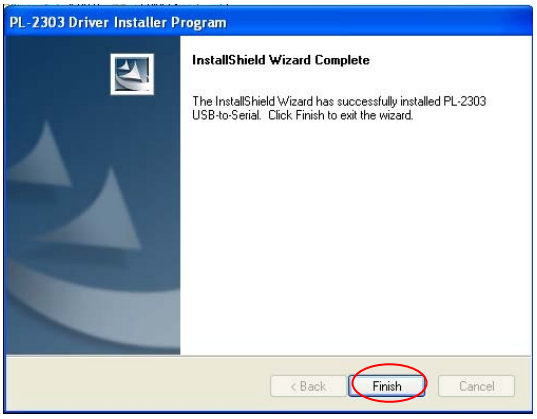
Install PL2303_Prolific_Driver

1. Double click "Setup.exe"

2. Click "Next".



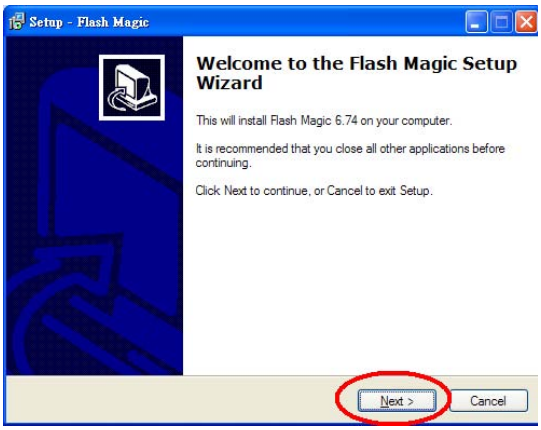
3. Click "Finish" to end PL2303_Prolific_Driver installed.



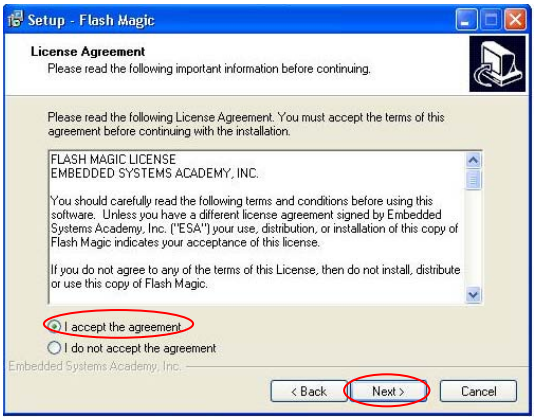
Install FlashMagic

1. Double click "FlashMagic.exe"

2. Click "Next".



3. Select “I accept the agreement”,then click “ Next”.



4. Click "Next".

5. Click "Next".

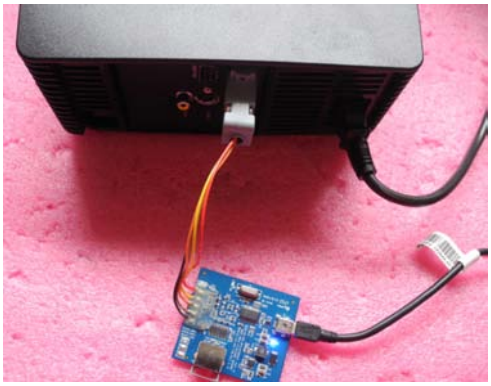
6. Select “Create a desktop icon” and “Create a Quick Launch icon”,then click "Next".

7. Select “Install”.

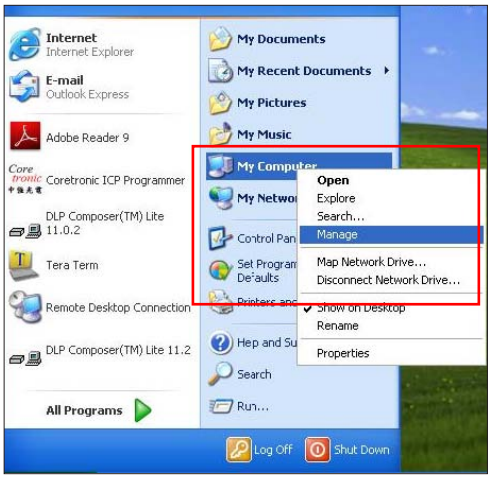
8.Wait a moment,after installing successfully then click "Finish".

5-2-3 Upgrade Procedure

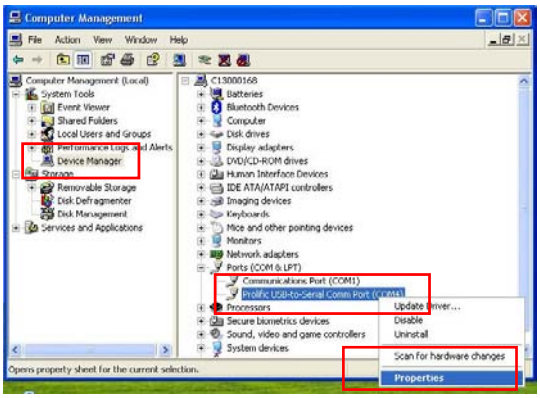
1.Plug in the power cord,then connect the PC and MCU download tools by mini USB cable and insert the another side of MCU download tools into the projector (VGA-in).



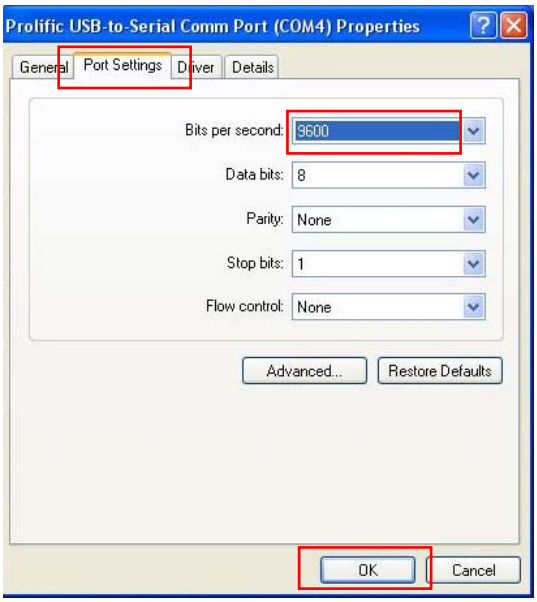
2.Select "Start" -->"My Computer",then right click select the "Manage".



3.Select "Device Manager",then select the "Ports(COM&LPT)",confirm the Prolific USB-to-Serial Comm Port.

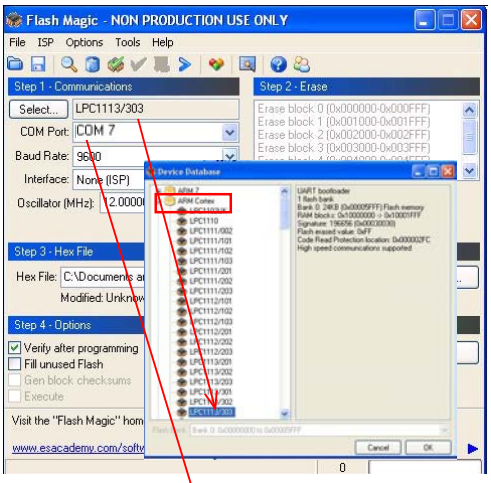


4.Right click the "Prolific USB-to-Serial Comm Port",select "Properties"-->"Port Setting",then select the Bits per second:9600,click "OK".

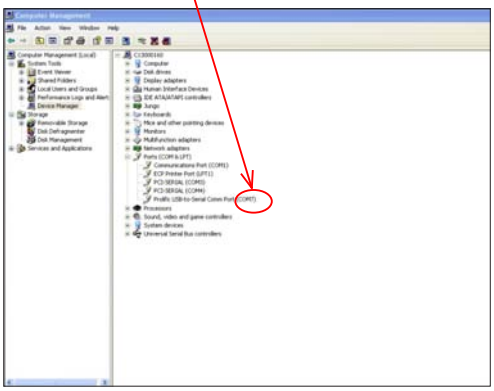


5.Select "Flash Magic".

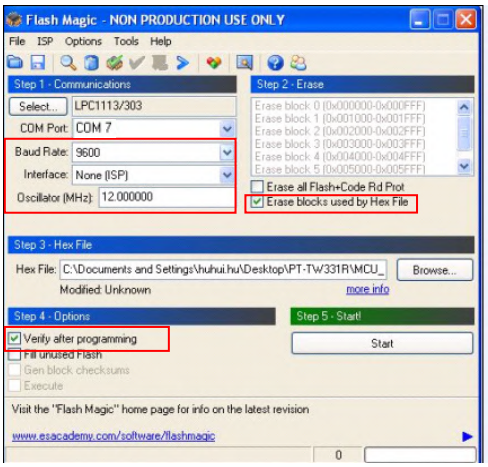
6.Choose "ARM Cortex" ,select "LPC113/303"



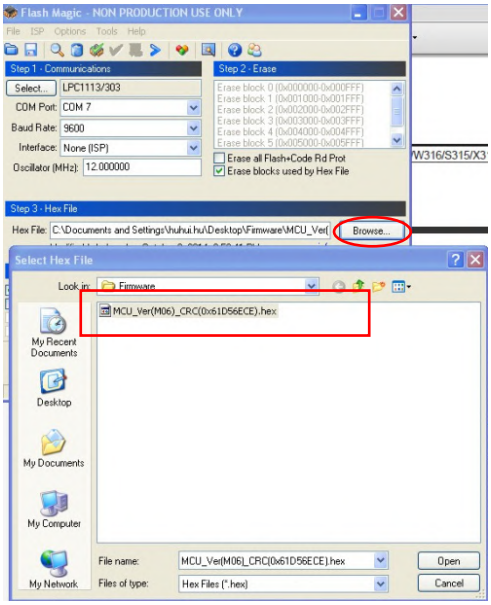
7.Select the COM Port which is same as Prolific USB-to-Serial Comm Port.



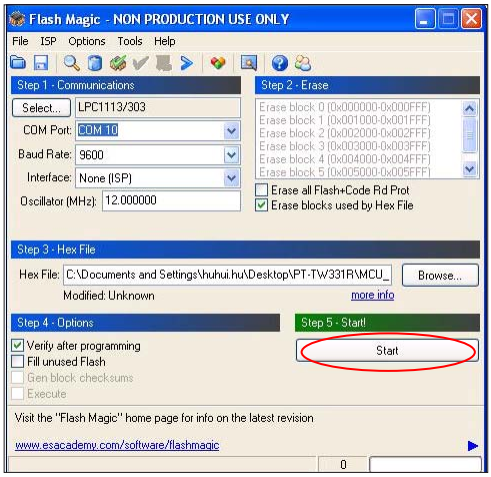
8.Program settings.
- Select Baud Rate:9600
- Select Interface:None(ISP)
- input the "12.000000"under the Oscillator(MHZ)
- Select"Erase blocks used by Hex File
- Select"Verify after programming".



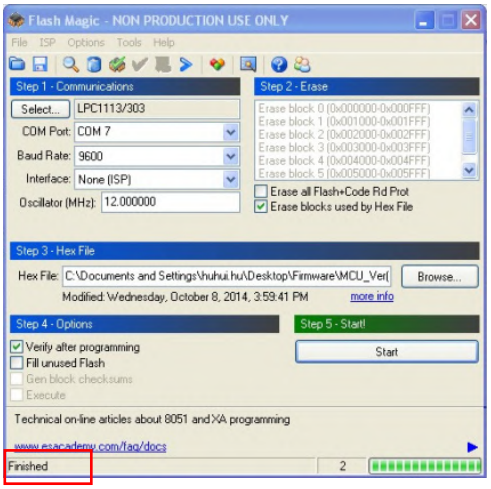
9. Click Browse and select the MCU file where you put the file in,



10.Click “Start”.

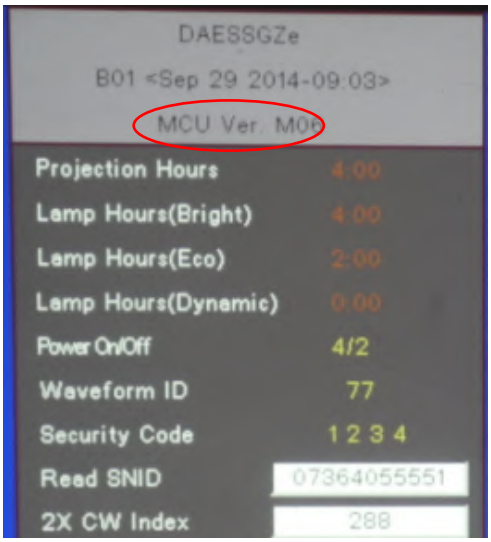


11.When MCU upgrade process is finished, “Finished” will be shown.



12. Check MCU firmware version.

- Re-plug in power cord and Power on the projector. Get into the service mode (Power--Up--Right--Up--Left--Menu) to check the MCU firmware version.



Chapter 6

EDID Upgrade

6-1 EDID Introduction

Extended Display Identification Data is a VESA standard data format that contains basic information about a display device and its capabilities, including vendor information, maximum image size, color characteristics, factory pre-set timings, frequency range limits, and character strings for the monitor name and serial number.

The information is stored in the display and is used to communicate with the system through a Display Data Channel (DDC), which sites between the display device and the PC graphics adapter. The system uses this information for configuration purposes, so the monitor and system can work together.

Note: - If a display device has digital input ports, like DVI or HDMI, but without EDID in its Main Board, the display device will show no image while the input source is digital signal.

- The EDID Upgrade procedure for S310e is the same as X312, we take S310e for example here.

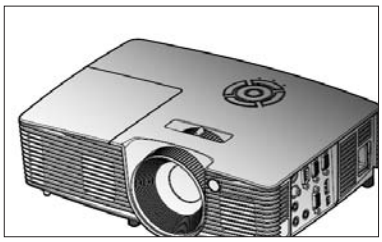
6-2 Equipment Needed

Software

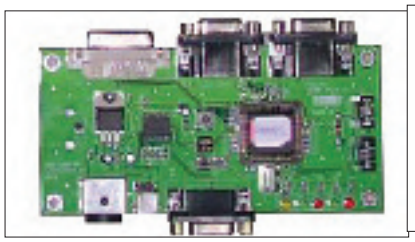
- EDID Program (All models_EDID Tool_Ver.0.81)
- EDID File (*.ini)

Hardware

- Projector
- Power Cord for Projector (42.53506G002)
- VGA Cable (42.87305G102)
- HDMI(M) to DVI(F) cable (42.00256G001)
- Generic Fixture (80.00001.001) for EDID Key-in (Fixture: JP3 must be closed)
- RS-232 9 Pin Cable (pin to pin, F-M) (42.83C07G001)
- Power Adapter (Output DC 12V)
- Monitor
- PC

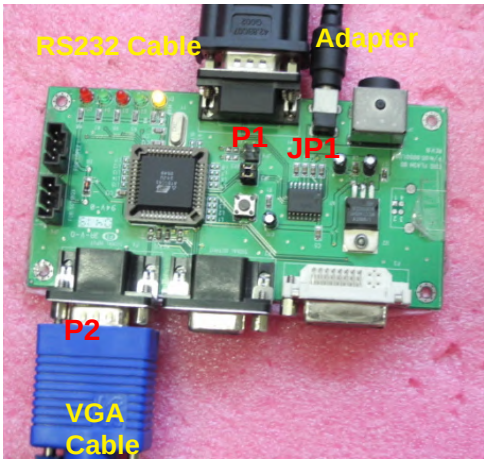








6-3 Setup Procedure (VGA)



1. Connect all ports

   (1) Connect P1 of fixture with COM Port of PC/Laptop by RS232 Cable.

   (2) Connect P2 of fixture with VGA Port of projector by VGA Cable.

   (3) Plug Power Adapter to JP1 of fixture.

   (4) Hold on "power" button and plug in the power cord, release the “power” button until all LEDs solid on.(as right picture shows).

6-4 EDID Key-In Procedure

1. Execute EDID Program

   - Click "EDID" to execute EDID program.

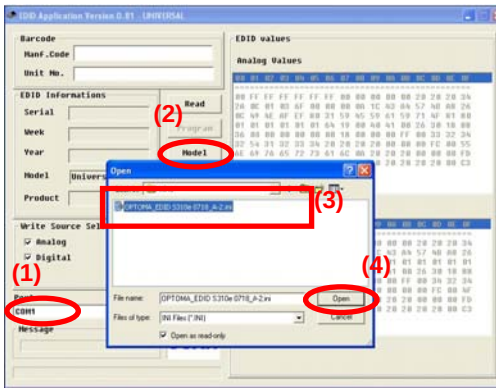
2. Process

(1) Select the COM Port which you are using.

(2) Click "Model".

(3) Select the source file (*.ini).

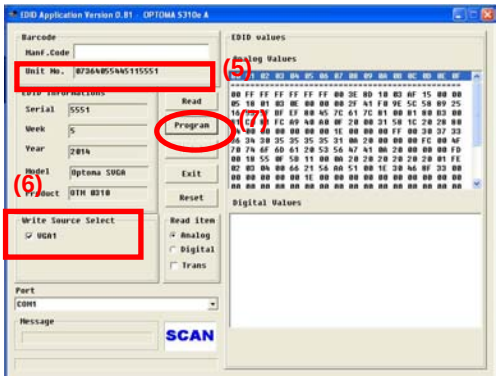
(4) Click "Open".



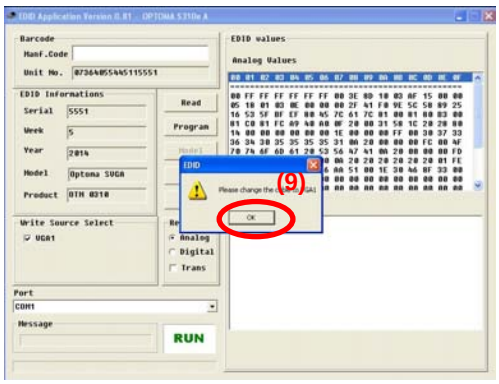
(5) Key in the Serial Number into the Barcode blank space.

(6) In "Write Source Select" item,select "VGA1"

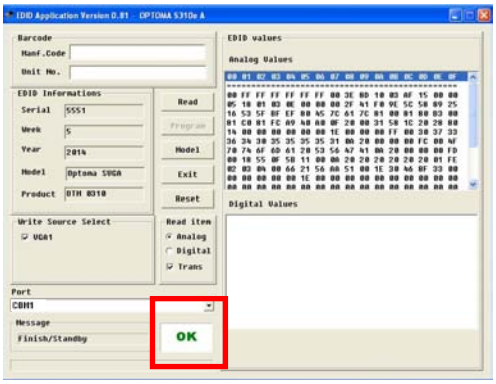
(7) Click "Program".



(8)Click "OK".

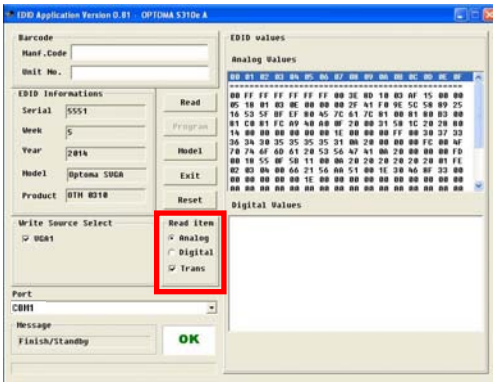


3. When the EDID program is completed, a message "OK" will appear on the screen.



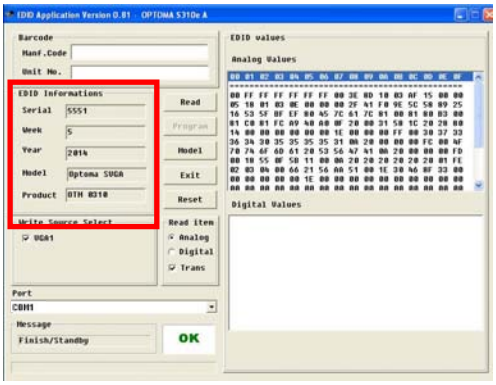
4. Read EDID "VGA" information

- In the Read item, select "Analog" and "Trans", then click "Read" button.



5. EDID "VGA" information

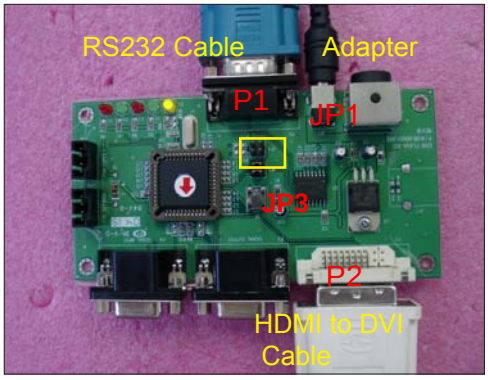
- EDID informations will show the result.



6-5 Setup Procedure (HDMI)(Only for X312)

1. Connect all ports

(1) Connect P1 of fixture with COM Port of PC/Laptop by RS232 Cable.



(2) Connect P2 of the fixture with HDMI(M) to DVI(F)Adapter by DVI Cable.

(3) Plug Power Adapter to JP1 of fixture.

(4)Connect HDMI to DVI cable to the projector.

(5) Hold on "power" button and plug in the power cord, release the “power” button until all LEDs solid on.(as right picture shows).

6-6 EDID Key-In Procedure

1. Execute EDID Program

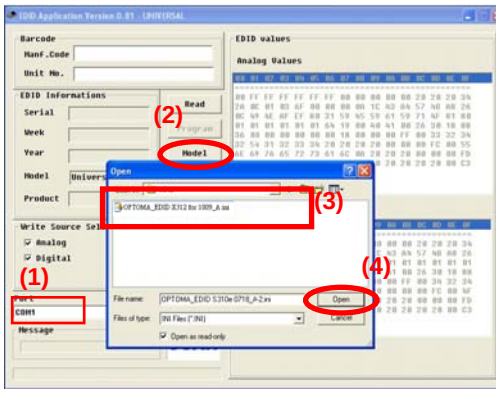
- Click "EDID" to execute EDID program.

2. Process

(1) Select the COM Port which you are using.

(2) Click "Model".

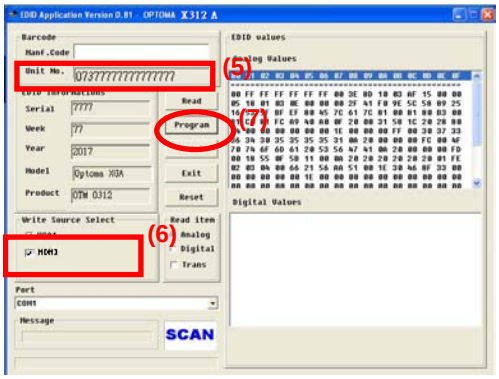
(3) Select the source file (*.ini).



(4) Click "Open".

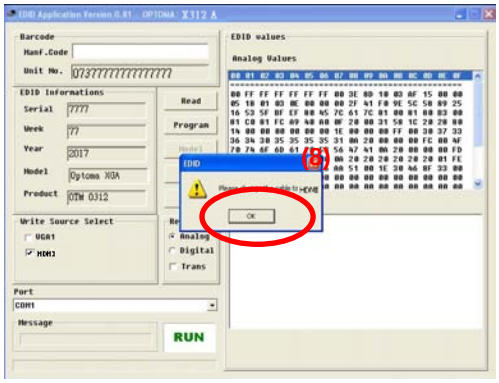
(5) Key in the Serial Number into the Barcode blank space.

(6) In "Write Source Select" item,select "HDMI".

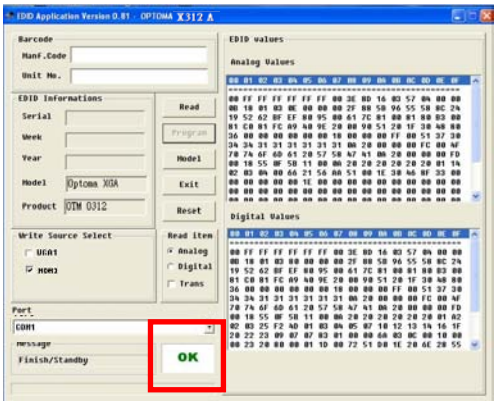


(7) Click "Program".

(8)Click "OK".

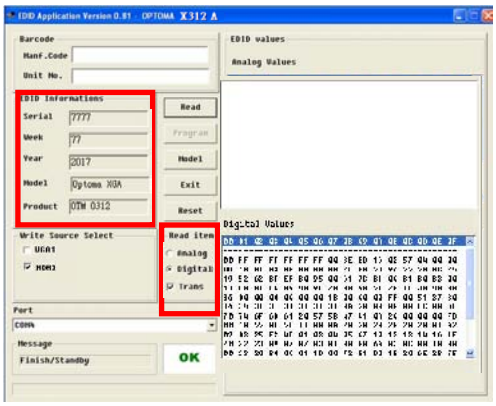


3. When the EDID program is completed, a message "OK" will appear on the screen.



4. Read EDID "HDMI" information

- In the Read item, select "Digital" and "Trans", then click "Read" button.

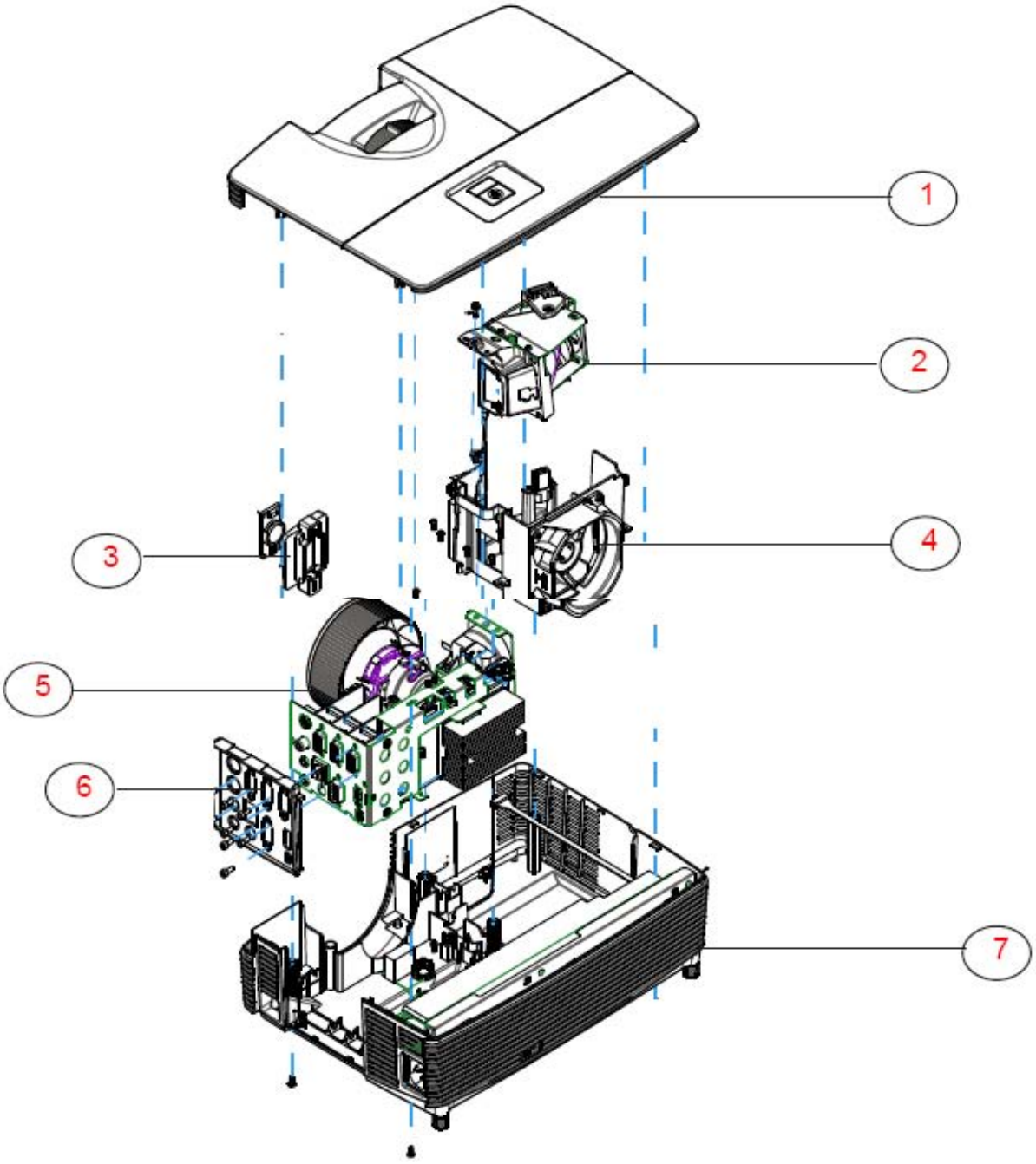


5. EDID "HDMI" information

- EDID informations will show the result.

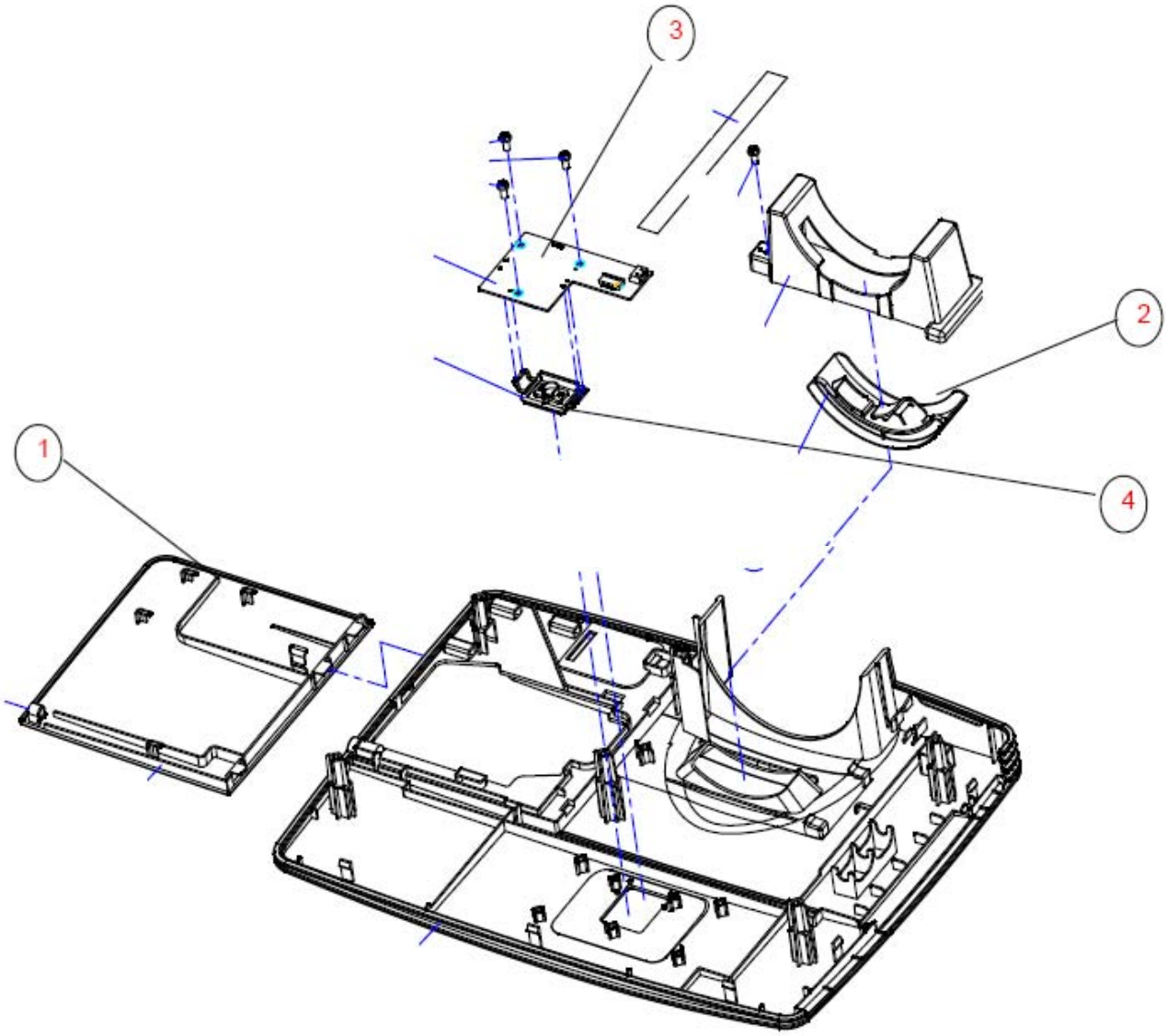
Appendix A (Exploded Image)

Note: This chapter is only designed to show the exploded image of the projector.For updated part numbers,please refer to RSPL report.



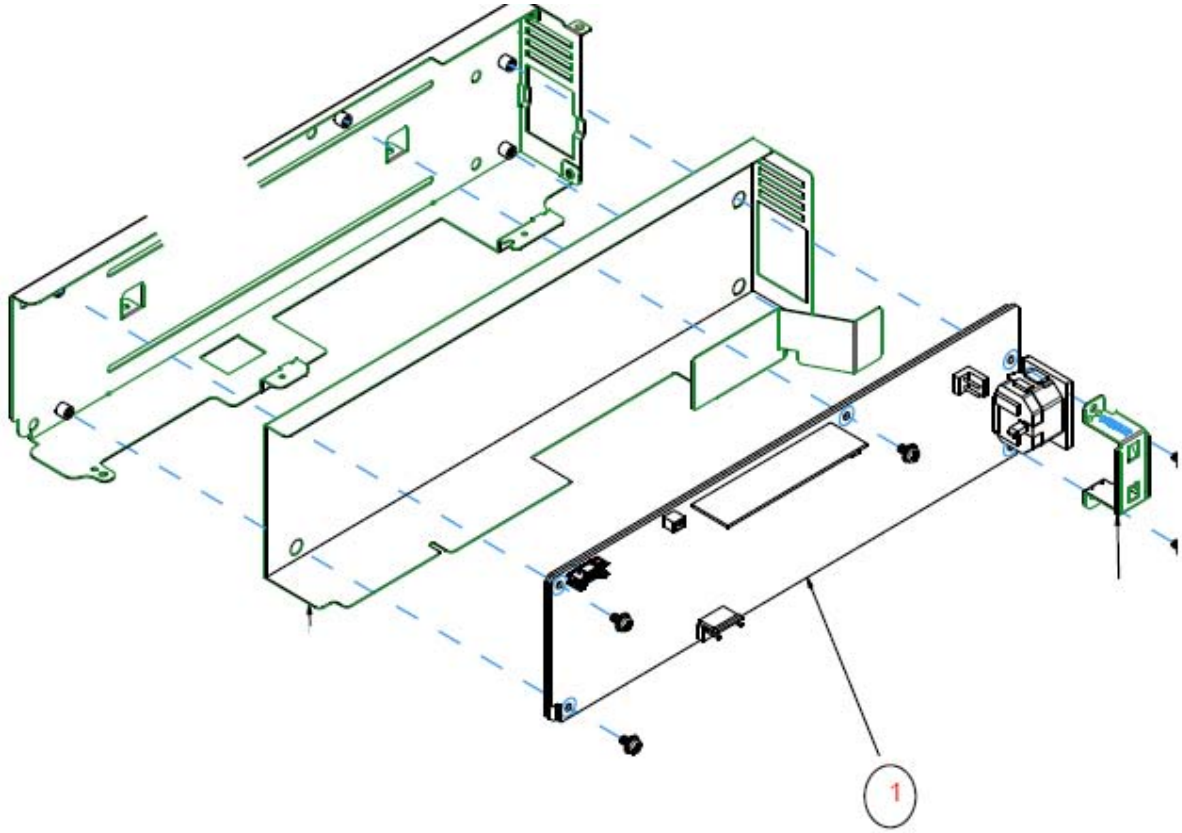
Item	Description	Parts Supply
1	ASSY TOP COVER 8 KEY	V
2	LAMP MODULE	V
3	SPEAKER	V
4	AXIAL FAN	V
5	FOCUS RING	
6	ASSY IO COVER BLACK MODULE FOR 736(SERV-ICE)	V
7	BOTTOM COVER	V

ASSY TOP COVER MODULE



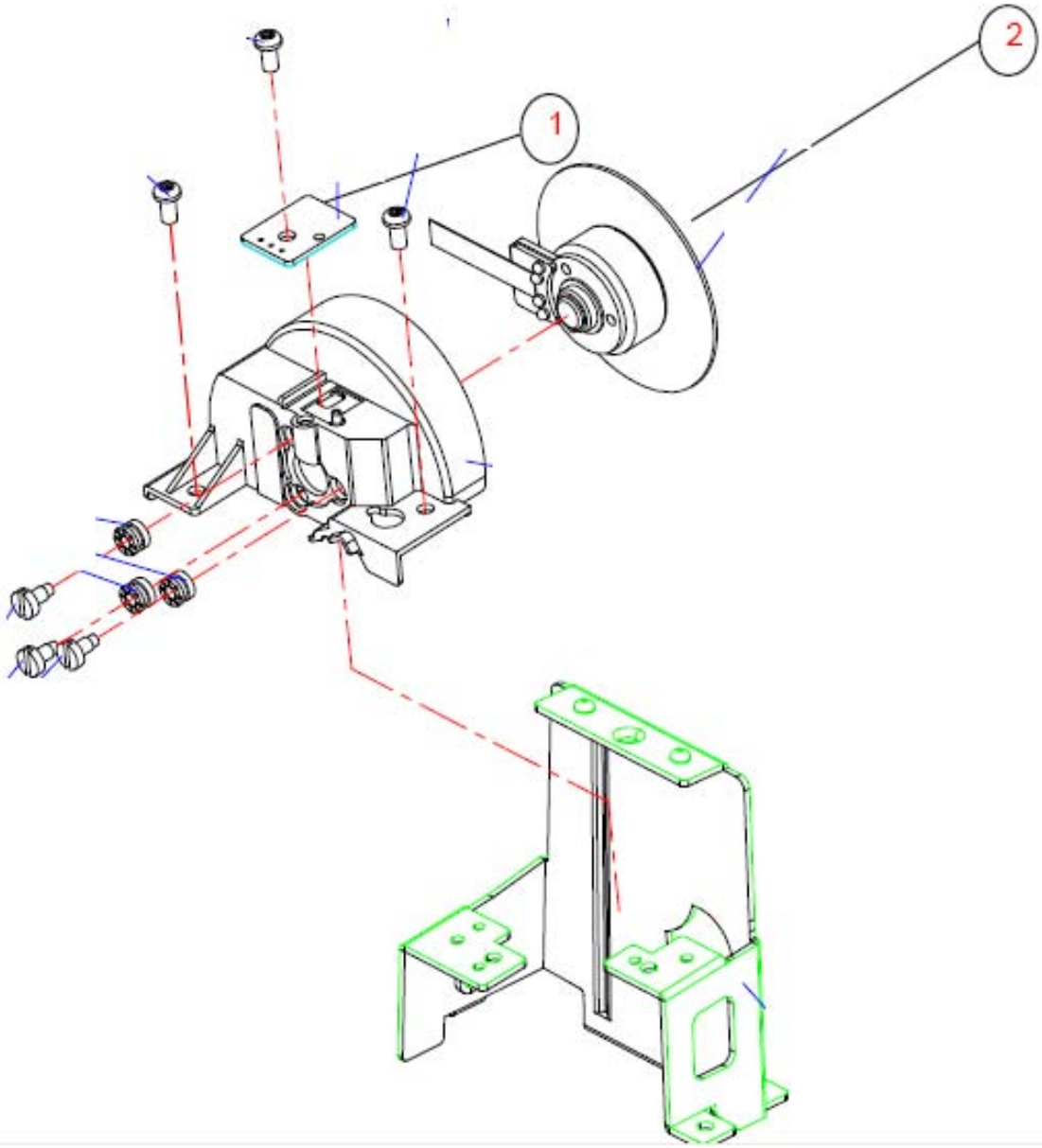
Item	Description	Parts Supply
1	LAMP COVER	V
2	ZOOM RING	
3	KEYPAD BOARD	V
4	KEYPAD	

ASSY LVPS



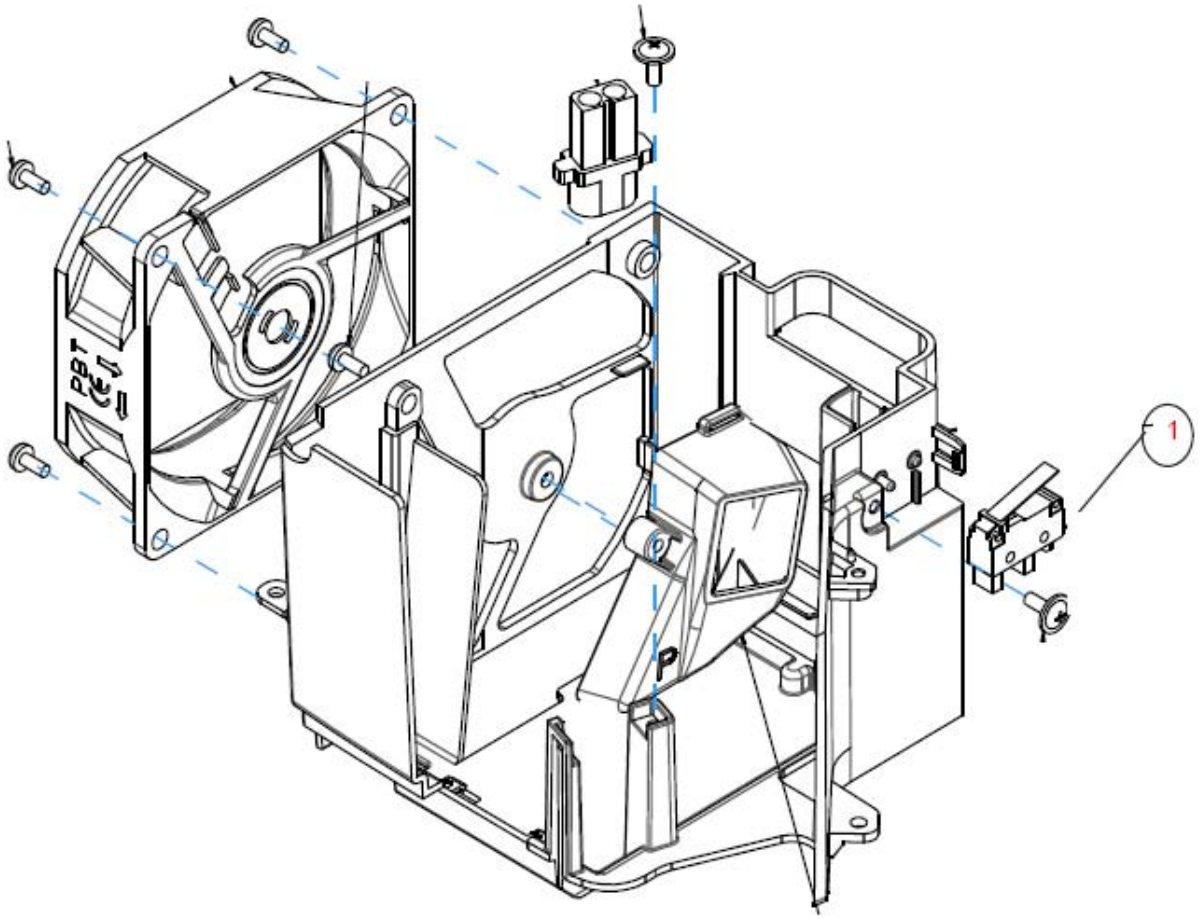
Item	Description	Parts Supply
1	POWER SUPPLY	V

ASSY COLOR WHEEL MODULE



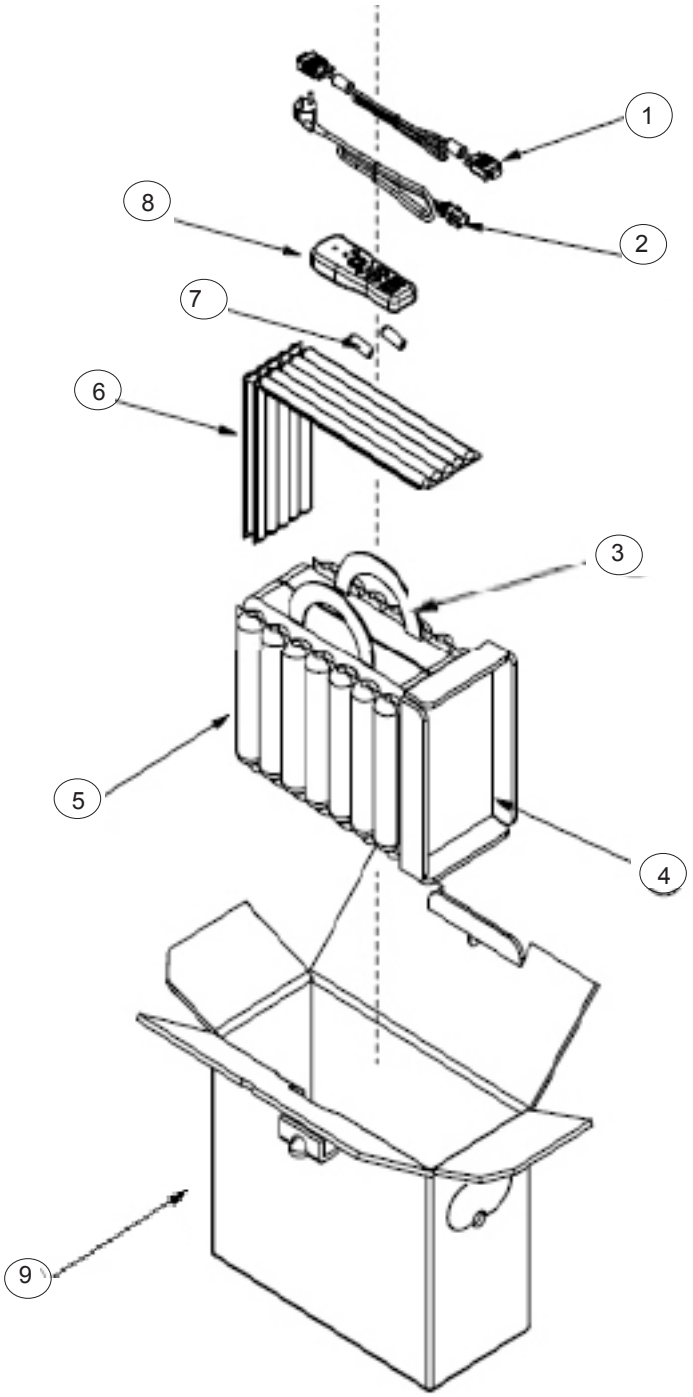
Item	Description	Parts Supply
1	PHOTO SENSOR BOARD	V
2	COLOR WHEEL MODULE	V

ASSY INTERLOCK SWITCH



Item	Description	Parts Supply
1	INTERLOCK SWITCH	V

AK



Item	Description	Parts Supply
1	CABLE VGA	V
2	CABLE POWER CORD	V
3	CARRY BAG FOR OPTOMA	V
4	PARTITION PAPER FOR AIRBAG	
5	PACKING AIRBAG INSIDE	
6	PACKING AIR BAG WITHOUT	
7	BATTERY	
8	INFRARED REMOTE CONTROL	V
9	OUTSIDE CARTON	V

Appendix B

I. Serial Number System Definition

Serial Number Format for Projector (take W301 as example)

Q 736 4 15 AAAAA C 0001

① ② ③ ④ ⑤ ⑥ ⑦

① : **Q = Optoma**

② : **736= Project Code (S310e)**

③ : **4= Last number of the manufacture year (ex:2014 = 4)**

④ : **15 = week of the manufacture year (ex:the fifteenth week of the year = 15)**

⑤ : **AAAAA = not-defined**

⑥ : **C = Manufacture factory (CPC)**

⑦ : **0001 = Serial Code**

EX: Q736415AAAAAC0001

This label "Q736415AAAAAC0001" represents the serial number for S310e. It is produced at CPC on fifteenth of 2014. Its serial code is 0001.

II. PCBA Code Definition

PCBA Code for Projector

A	B	XXXXXXXXXXX	C	XXX	EEEE
①	②	③	④	⑤	⑥

① : ID

② : Vendor Code

③ : P/N

④ : Revision

⑤ : Date Code

⑥ : S/N