

BenQ MP5 series (MP515/515ST/525ST/525/525P/575) DLP Projector Training Course

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Course Outline

- Product Introduction
- Electric Circuit Block Diagram
- Service Tool
- Download Firmware
- Factory mode
- Alignment and Adjustment
- Trouble shooting
- Mechanical Part - Assembly Concern

Product Introduction

Product Introduction

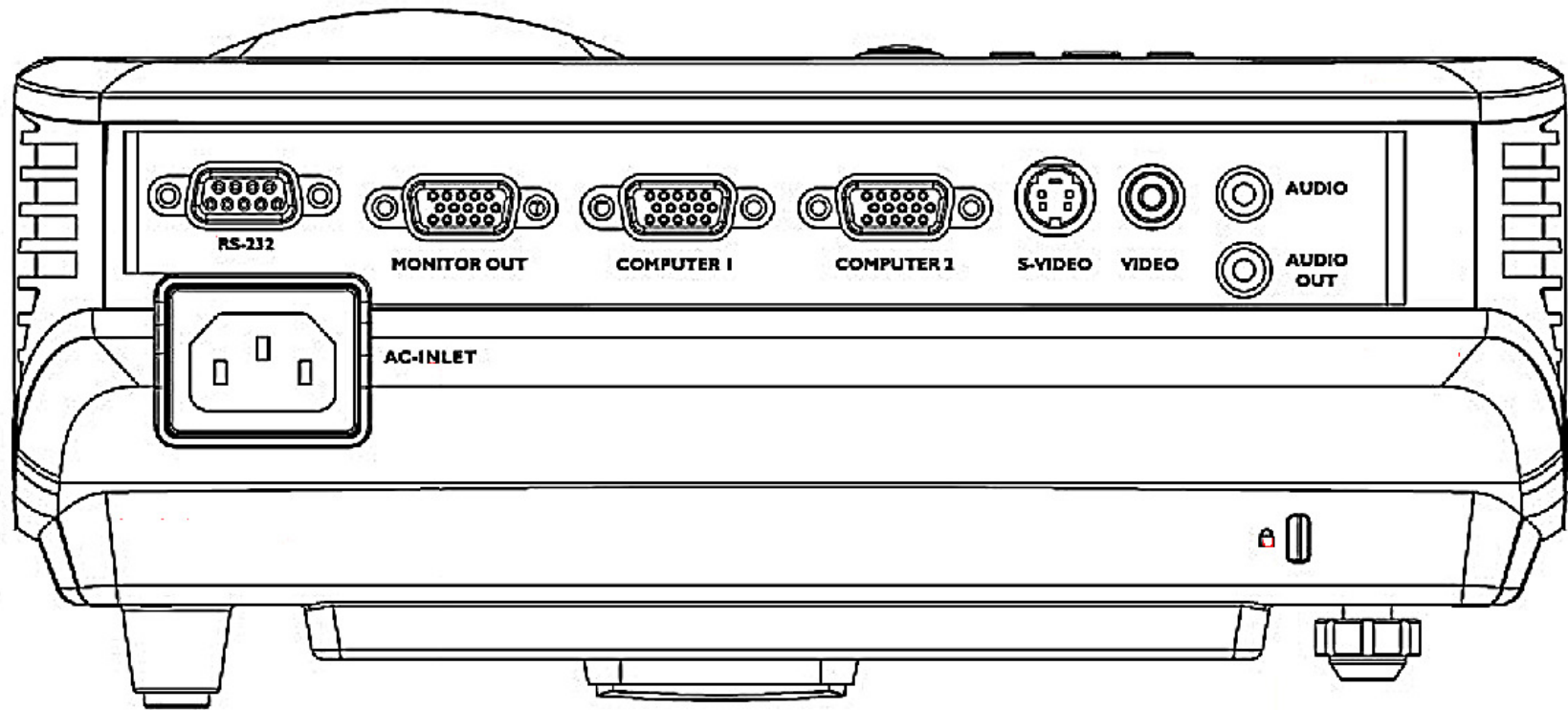
Model Name	MP515	MP515ST	MP525ST	MP525	MP525P	MP575
Resolution	SVGA	SVGA	XGA	XGA	XGA	XGA
ANSI Brightness	>2000	>2000	>2000	>2000	>2000	>2400
ANSI Contrast Ratio	150:1	150:1	150:1	150:1	150:1	150:1
FOFO Contrast Ratio	1800:1	1800:1	1600:1	1600:1	1800:1	1800:1
Lens	Normal	Short Throw	Short Throw	Normal	Normal	Normal
Throw Ratio	53"±3% @2m,Wide	54.5"±3% @1m,Wide	54.5"±3% @1m,Wide	53"±3% @2m,Wide	53"±3% @2m,Wide	53"±3% @2m,Wide
Lamp	Phoenix 220W DC	Phoenix 220W DC	Philips 210W AC	Phoenix 220W DC	Philips 210W AC	Philips 210W AC
Lamp Life	Nor:2000 Eco:3000	Nor:2000 Eco:3000	Nor:3000 Eco:4000	Nor:2000 Eco:3000	Nor:3000 Eco:4000	Nor:3000 Eco:4000
DMD Type	0.55" SVGA 2xLVDS Series 450 DMD	0.55" SVGA 2xLVDS Series 450 DMD	0.55" XGA 2xLVDS Series 450 DMD	0.55" XGA 2xLVDS Series 450 DMD	0.55" XGA 2xLVDS Series 450 DMD	0.55" XGA 2xLVDS Series 450 DMD
Weight	<2.3kg	<2.5kg	<2.5kg	<2.3kg	<2.3kg	<2.3kg

Product Introduction

Model Name	MP515	MP515ST	MP525ST	MP525	MP525P	MP575
Input Terminals						
Computer 1 (DB-15pin)	1	1	1	1	1	1
Computer 2 (DB-15pin)	1	NA	NA	NA	NA	NA
HDMI (1.2 w/ audio)	NA	1	1	NA	NA	NA
Video (RCA)	1	1	1	1	1	1
S-video (Mini DIN 4 pin)	1	1	1	1	1	1
Audio (mini jack)	1	NA	NA	1	1	1
Audio L/R (RCA)	NA	1	1	NA	NA	NA
Output Terminals						
Monitor out (DB-15pin)	1	1	1	1	1	1
Audio out (mini jack)	1	NA	NA	1	1	1
Speaker	2Wx1	5Wx2	5Wx2	2Wx1	2Wx1	2Wx1
Control Terminals						
RS232C (DB-9pin male)	1	1	1	1	1	1
IR	Front	Front	Front	Front	Front	Front

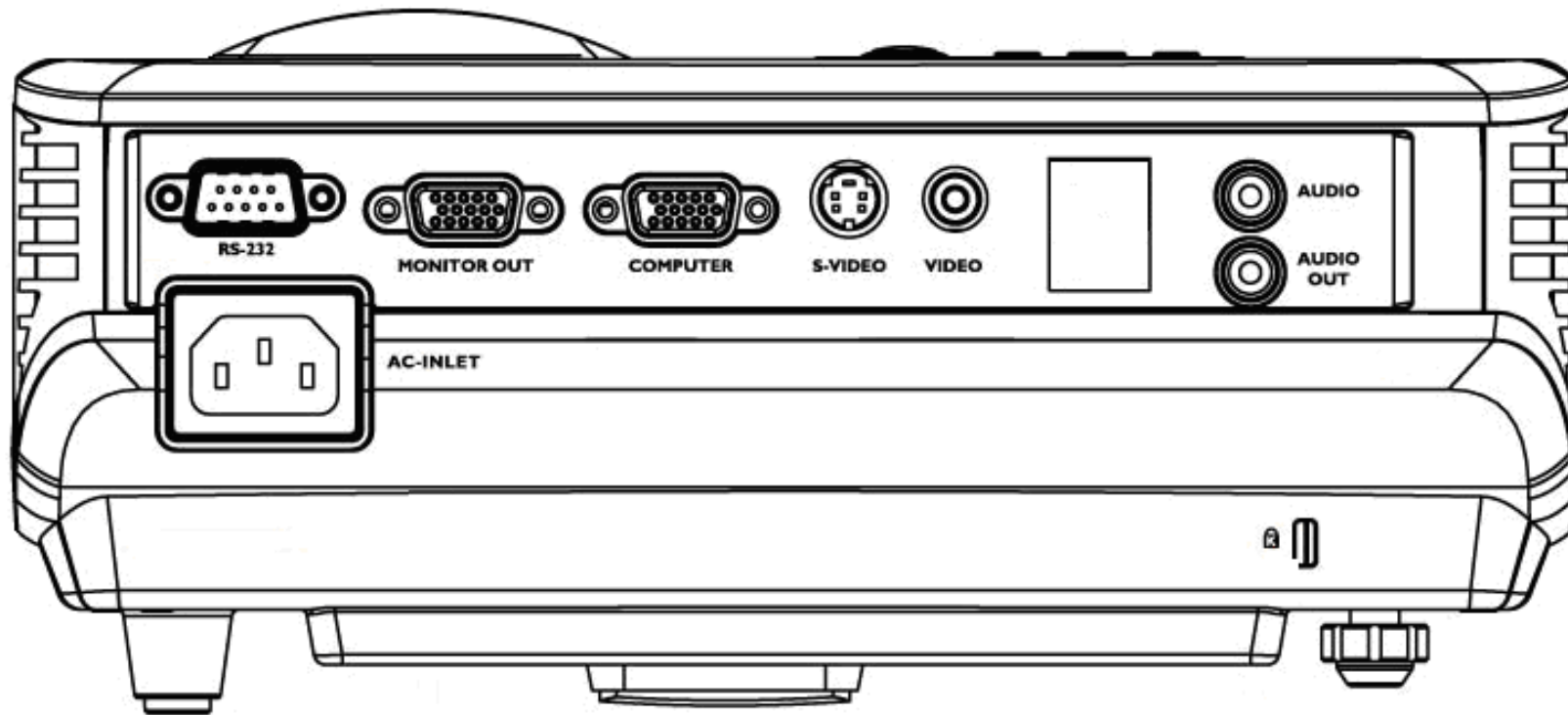
Terminals / Connectors

- MP515



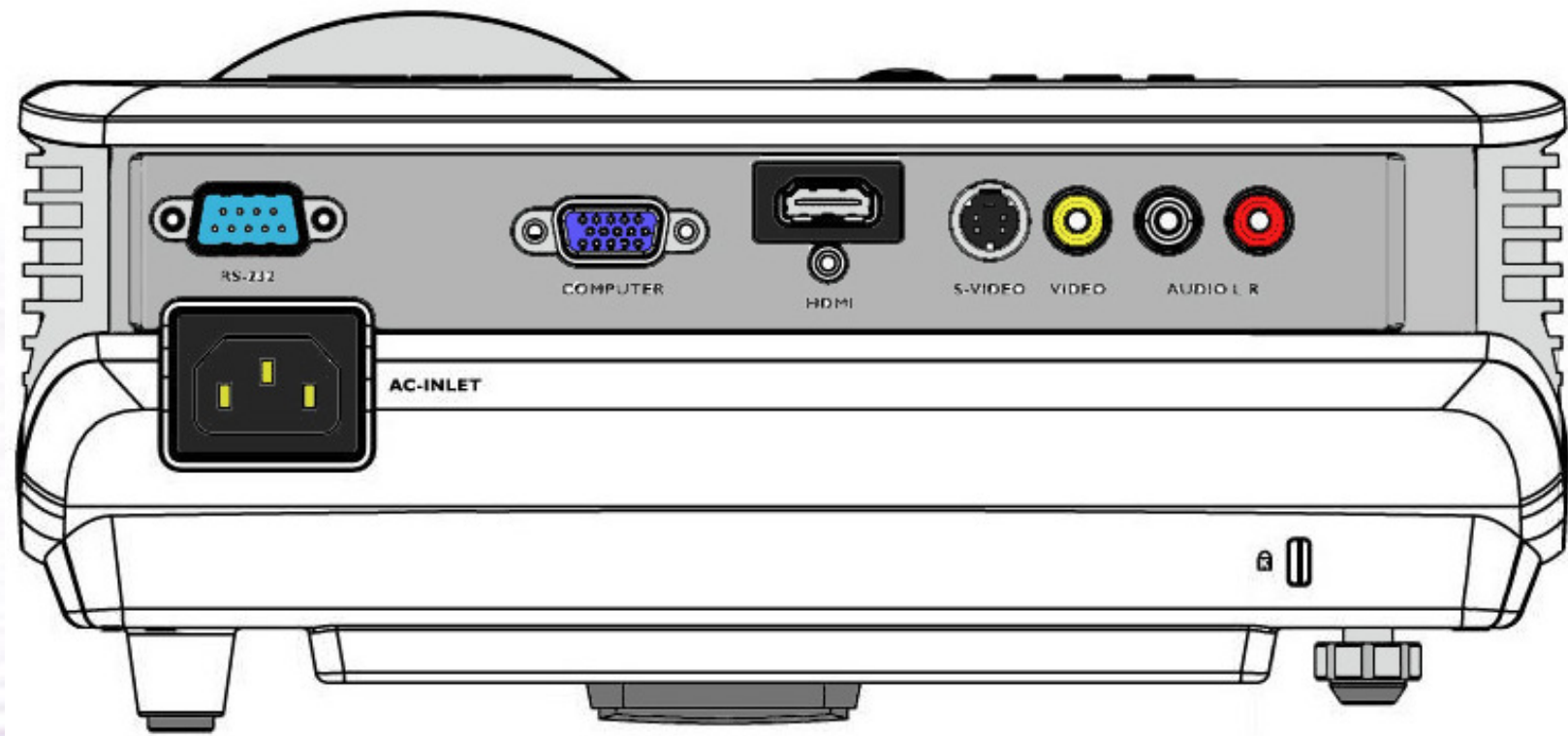
Terminals / Connectors

- MP525/MP525P/MP575



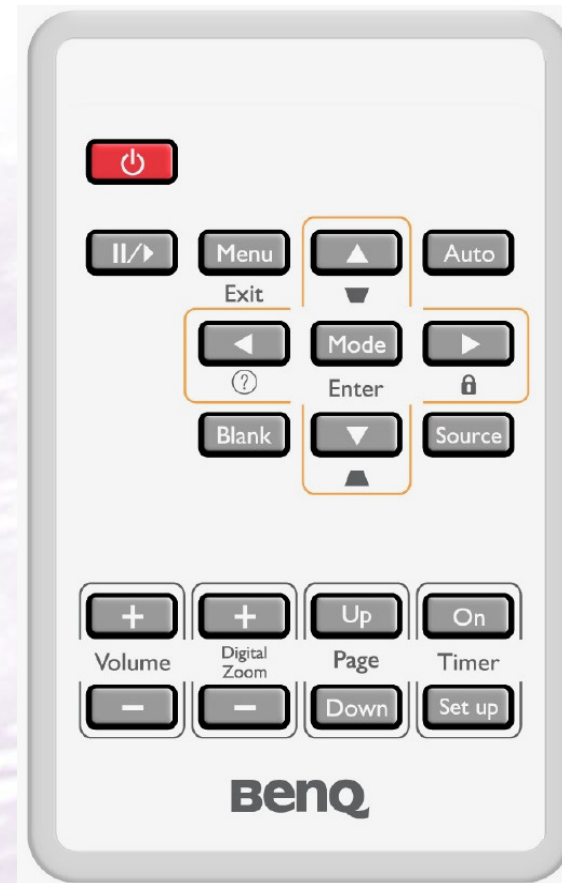
Terminals / Connectors

- MP515ST/MP525ST

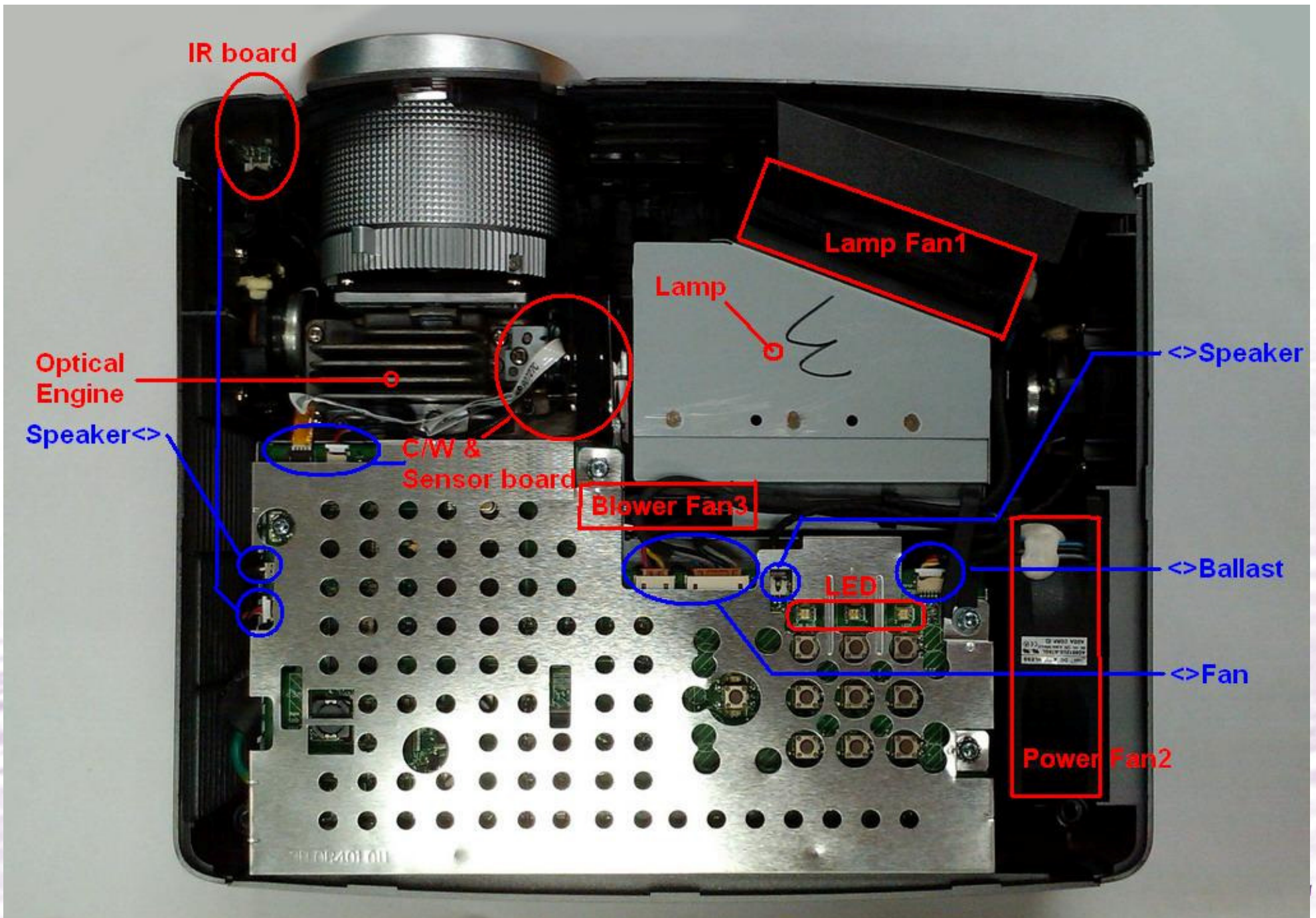


Remote Control

- MP5 series
- Only for MP515ST



Projector Structure



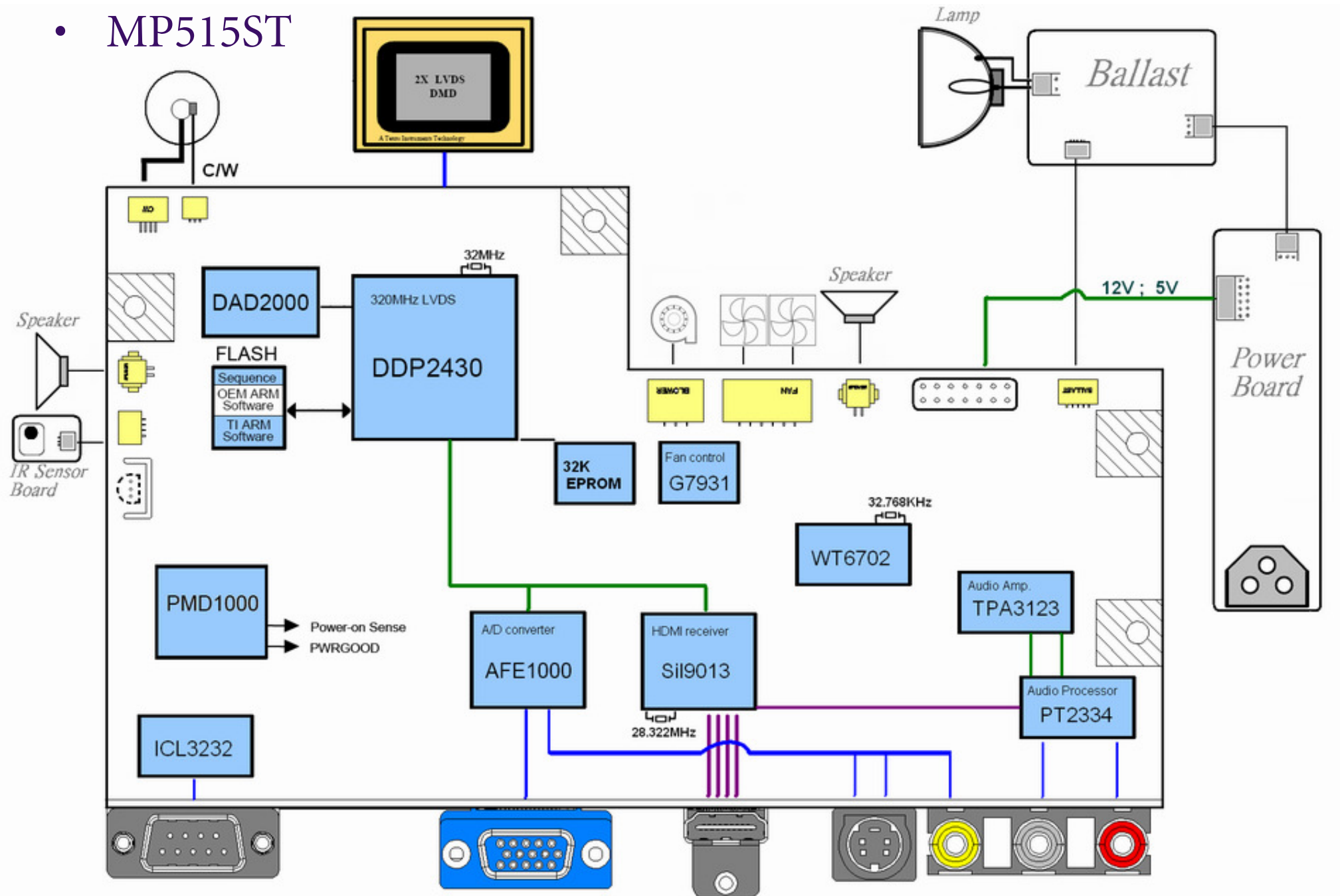
Electric Circuit Block Diagram

New Technology

- New DLP Data Processor ASIC – DDP2430
- New Analog Front End ASIC (A/D & V/D) – AFE1000
- New DMD – 0.55” Series 450 DMD
- 1W Standby – MCU WT6702F
- Auto Blank for Short Throw model

System Block Diagram

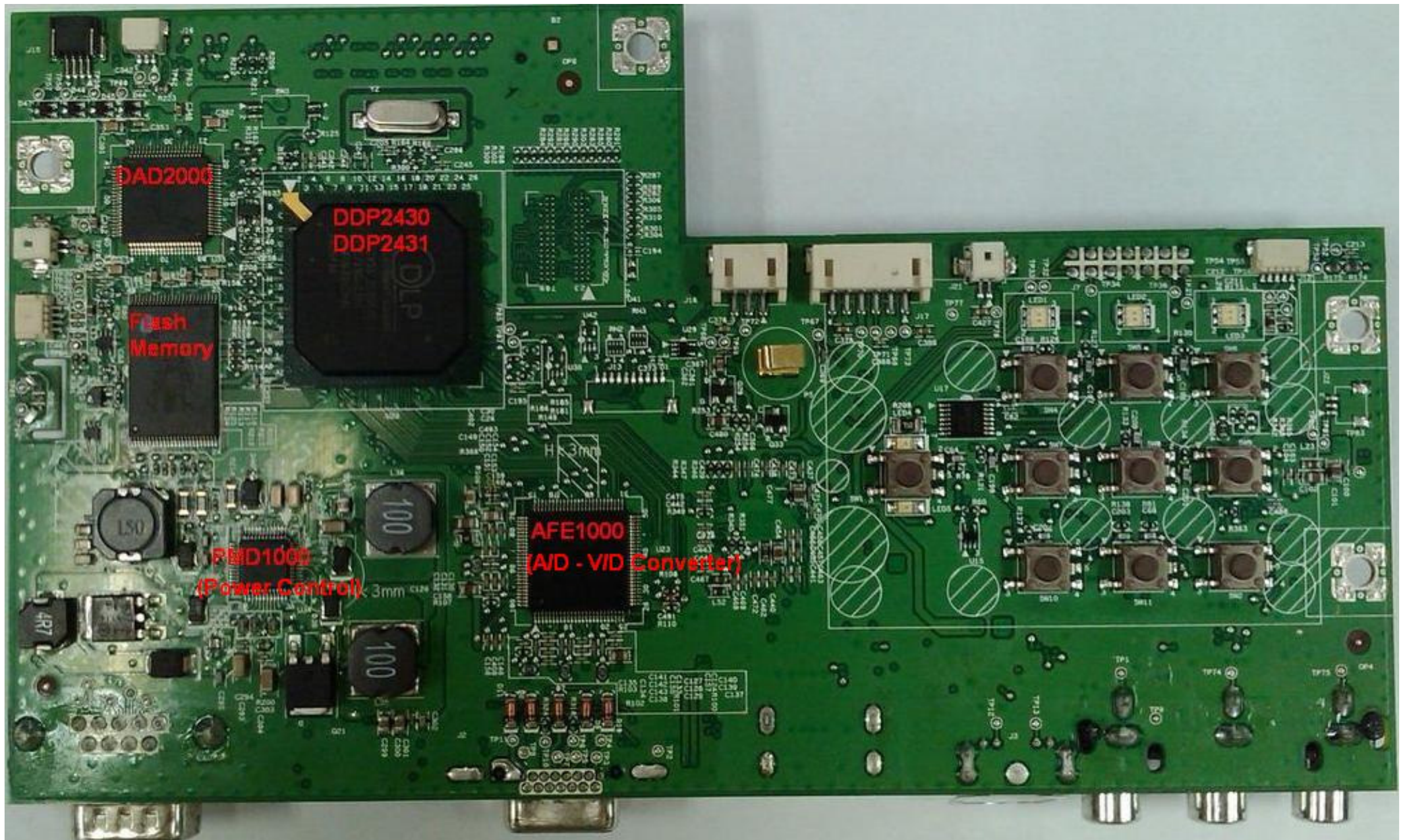
- MP515ST



Main board – Key Components

Key Components	Function
DDP2430/2431	DLP Data Processor ASIC
AFE1000	Analog Front End ASIC (A/D & V/D)
DAD2000	DMD Power and Reset Driver
PMD1000	Power Manager IC
WT6702F	1W standby MCU
64MB Flash	Flash memory
G7931	Fan Control IC
PT2334	Audio processor
Sil9013	HDMI receiver

Main board View (Bottom)

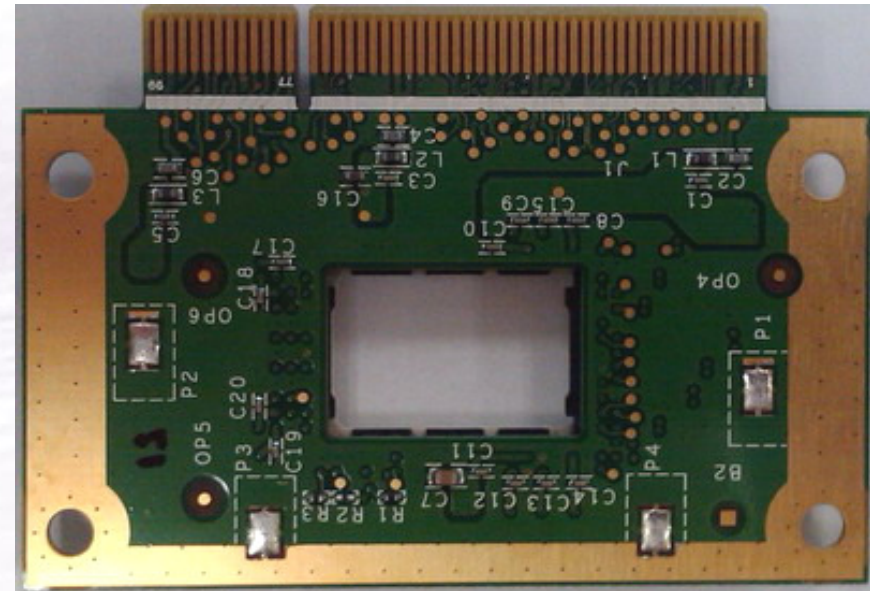
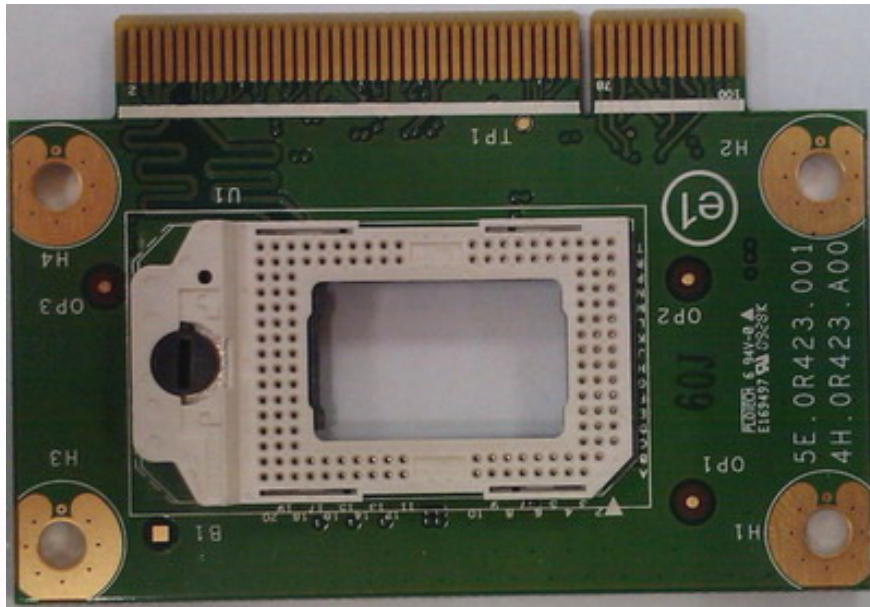


Main board View (Top)



BenQ

Chip board View

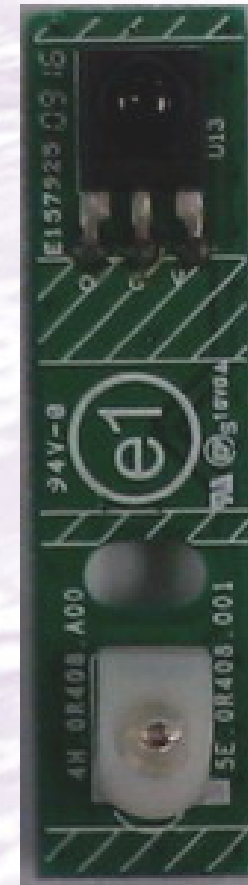


IR board View

- Normal



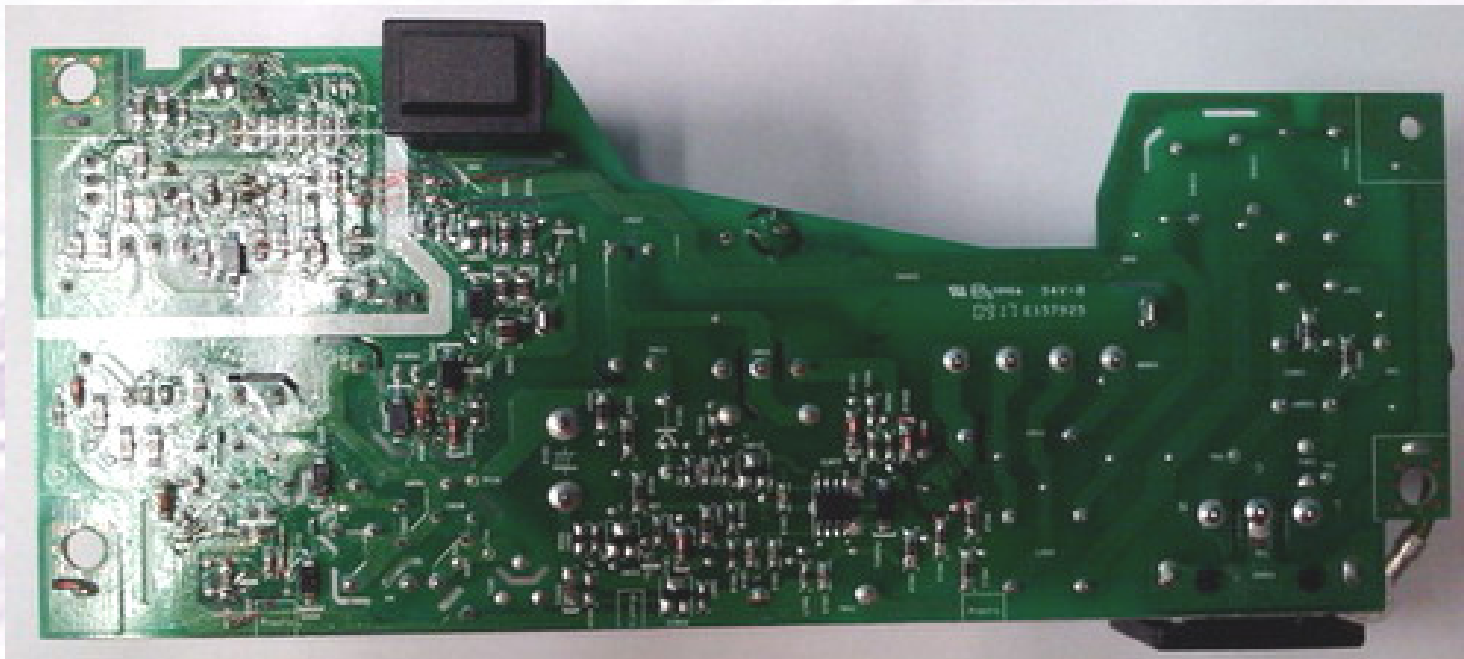
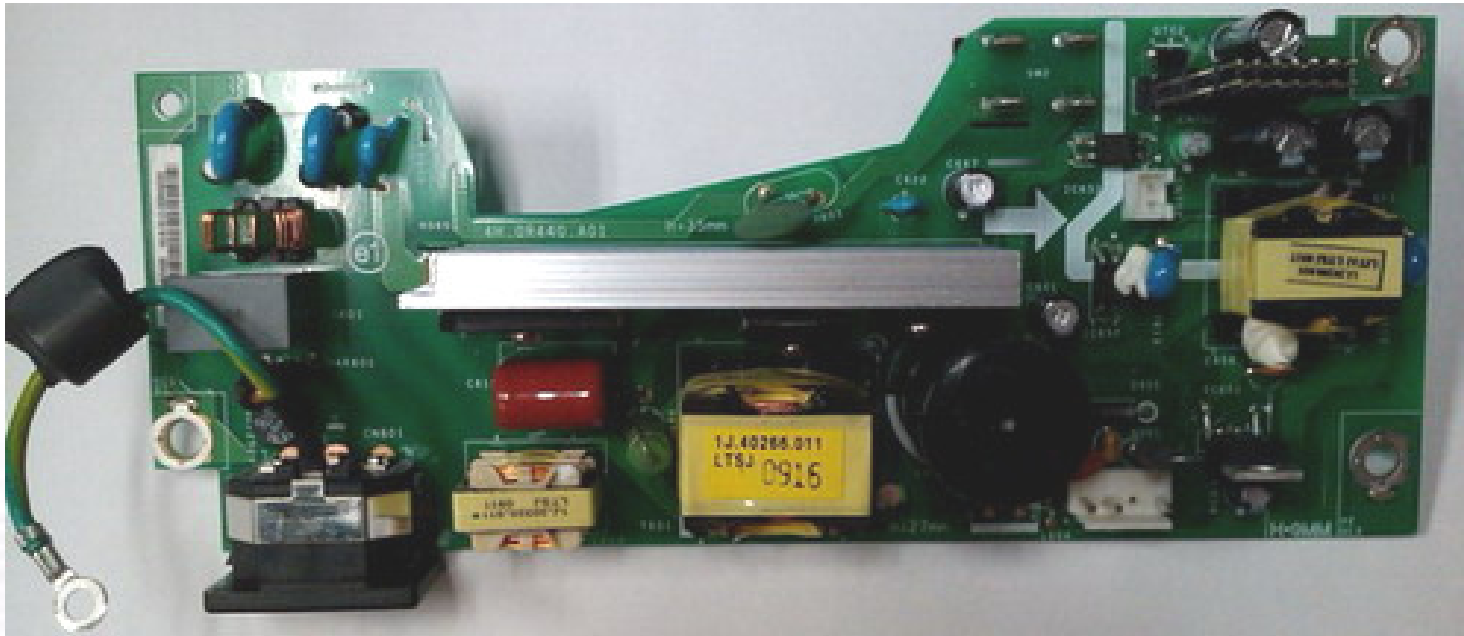
- Short Throw
 - Auto Blank



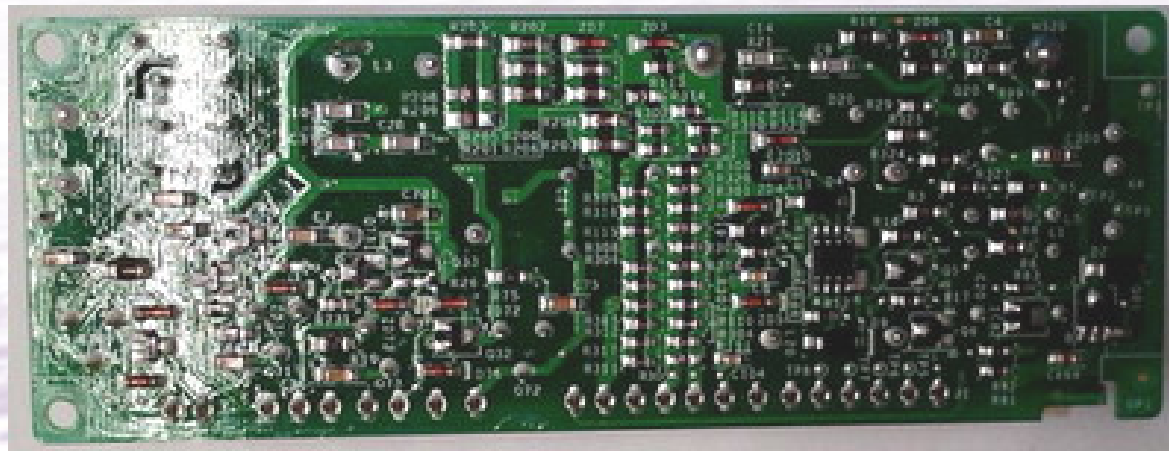
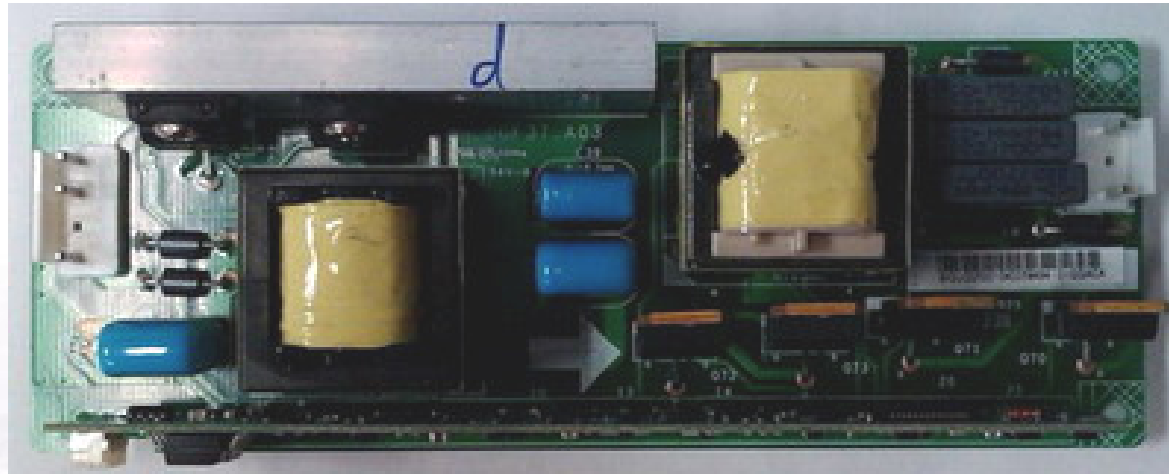
CW board View



Power board View



Ballast board View



Service Tool

Service Tool Operating

The screenshot shows the 'Projector Service Tool' window. It contains several sections for configuration: 'ADC Calibration Data' with RGBHD (RED, GREEN, BLUE) Gain and Offset values, and Component (Pb, Pr) Offset values; 'Lamp' settings for LAMP1, LAMP2, FACTORY1, and FACTORY2; 'DLP' settings for C/W Index Delay; and 'sRGB' settings for R, G, and B. At the bottom, there is a workflow diagram with four main steps: 'Read System Data', 'Save', 'Retrieve System', and 'Load From Data'. A 'Port Close' button is also present. A status window at the bottom right shows 'Read Complete!!' repeated three times. Red arrows indicate the sequence: 'Read System Data' leads to 'Save', 'Save' leads to 'Retrieve System', 'Retrieve System' leads to 'Load From Data', and 'Load From Data' leads back to 'Read System Data'. Additionally, a red arrow points from the 'Port Close' button to the 'Read System Data' step.

Service Tool 3.0

Projector Service Tool

ADC Calibration Data

	RED	GREEN	BLUE
GAIN	1259	1291	1295
OFFSET	548	519	540

Component

	Pb	Pr
OFFSET	512	512

Lamp

LAMP1	5	FACTORY1	5
LAMP2	0	FACTORY2	0

DLP

C/W Index Delay	50
-----------------	----

sRGB

R	100	G	100	B	100
---	-----	---	-----	---	-----

COM1
BR 115200

Port Close

Read System Data → Save → Retrieve System → Load From Data → Read System Data

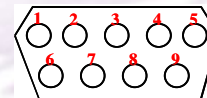
Read Complete!!
Read Complete!!
Read Complete!!

- Read data before download or other changes
- Data Record:
 - RGB Gain & Offset
 - Lamp Hour
 - C/W Index Delay
- Operating:
 - Port Open: Open RS-232 port
 - Read System Data: Read data from projector
 - Save: Save data to a *.xls file
 - Retrieve System: Write the current data to projector
 - Load From Data: load data from the *.xls file to current data of service tool

Download Firmware

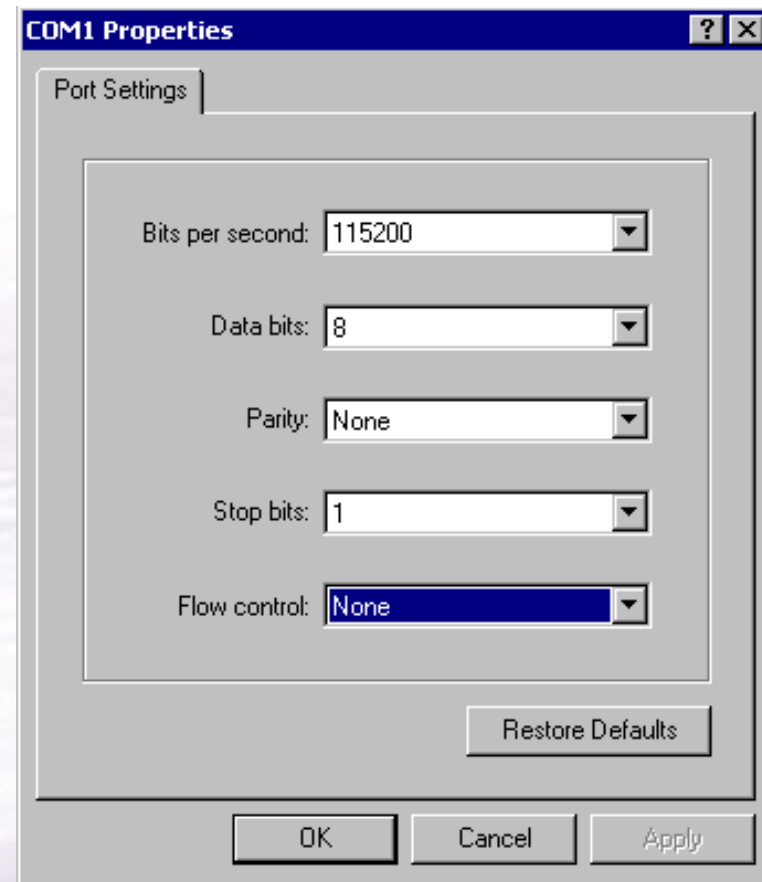
Download Firmware

- Download Tools Required:
 - Software :
 - DLP Composer Lite 9.2/10.0 ↑
 - New version image file
 - Hardware :
 - PC or Notebook : With RS-232 Connector
 - RS-232 Download cable : D-sub 9-pin Female for Both terminals



Download Firmware

- PC RS-232 Setting :

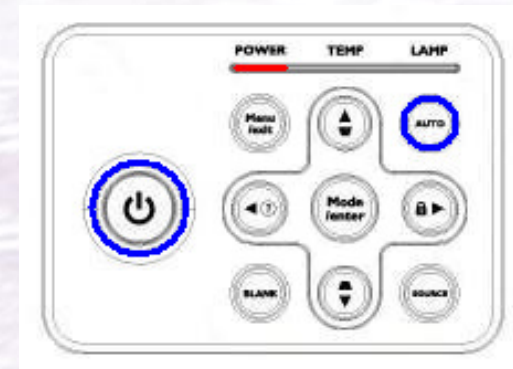


Download Firmware

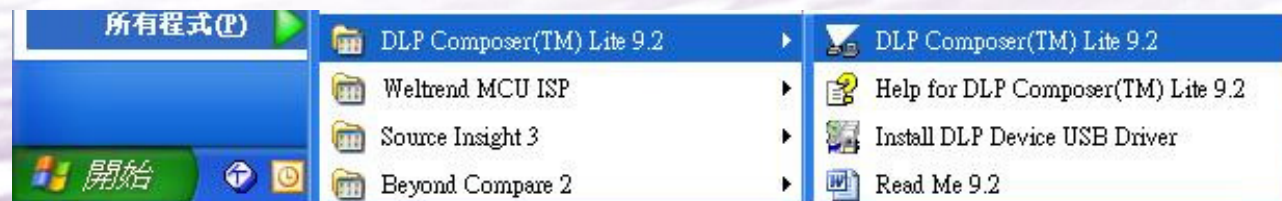
- Download Procedure :

1. Connect RS-232 cable to PC and projector.
2. Let projector be in Download Mode.

(Press and hold keypad **Power** and **Auto** together, then plug in power cord. Release the two keypads. And then Power LED will show **red** light)

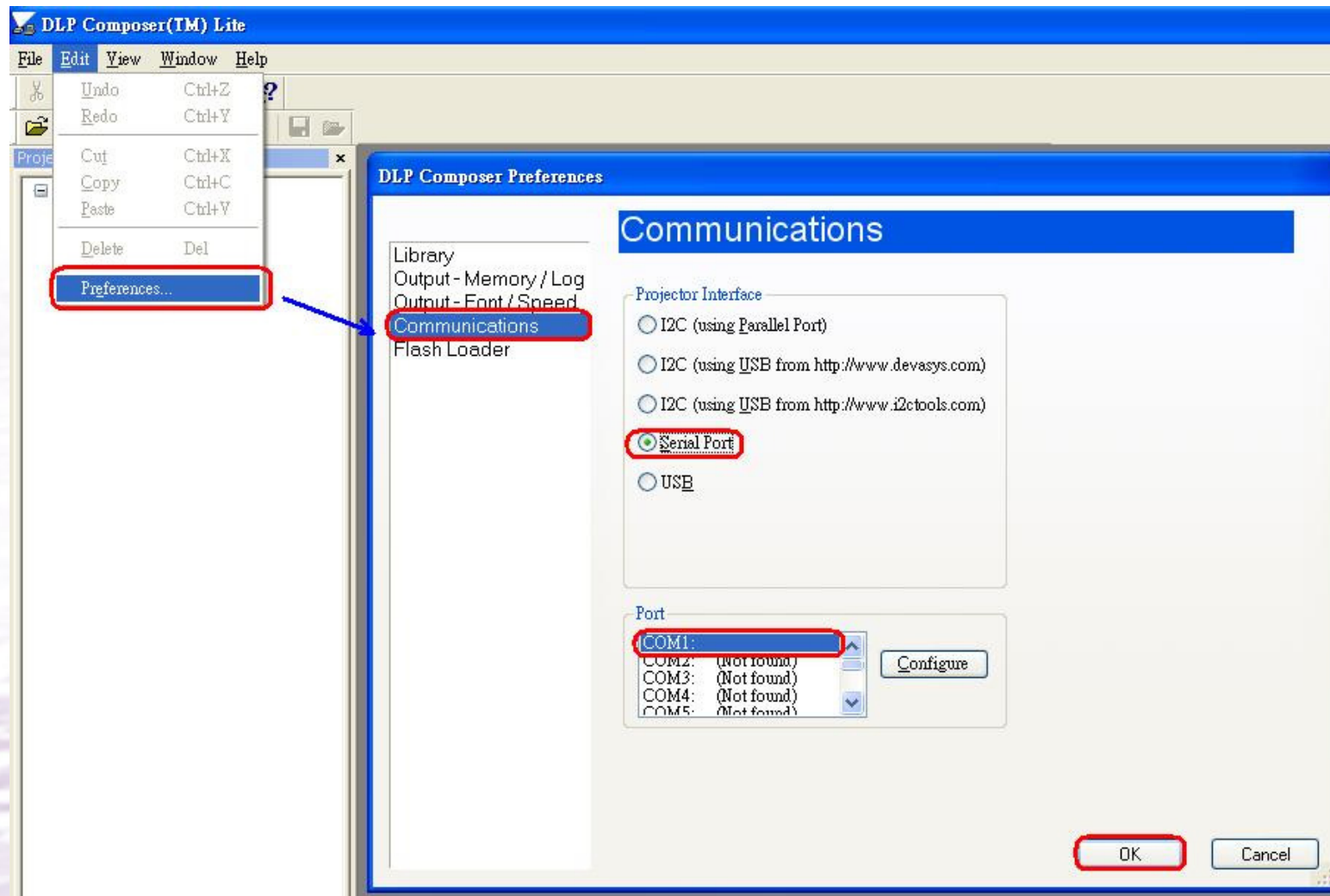


3. Launch “DLP Composer Lite 9.2” program.



Download Firmware

4. Check communication is “Serial Port”

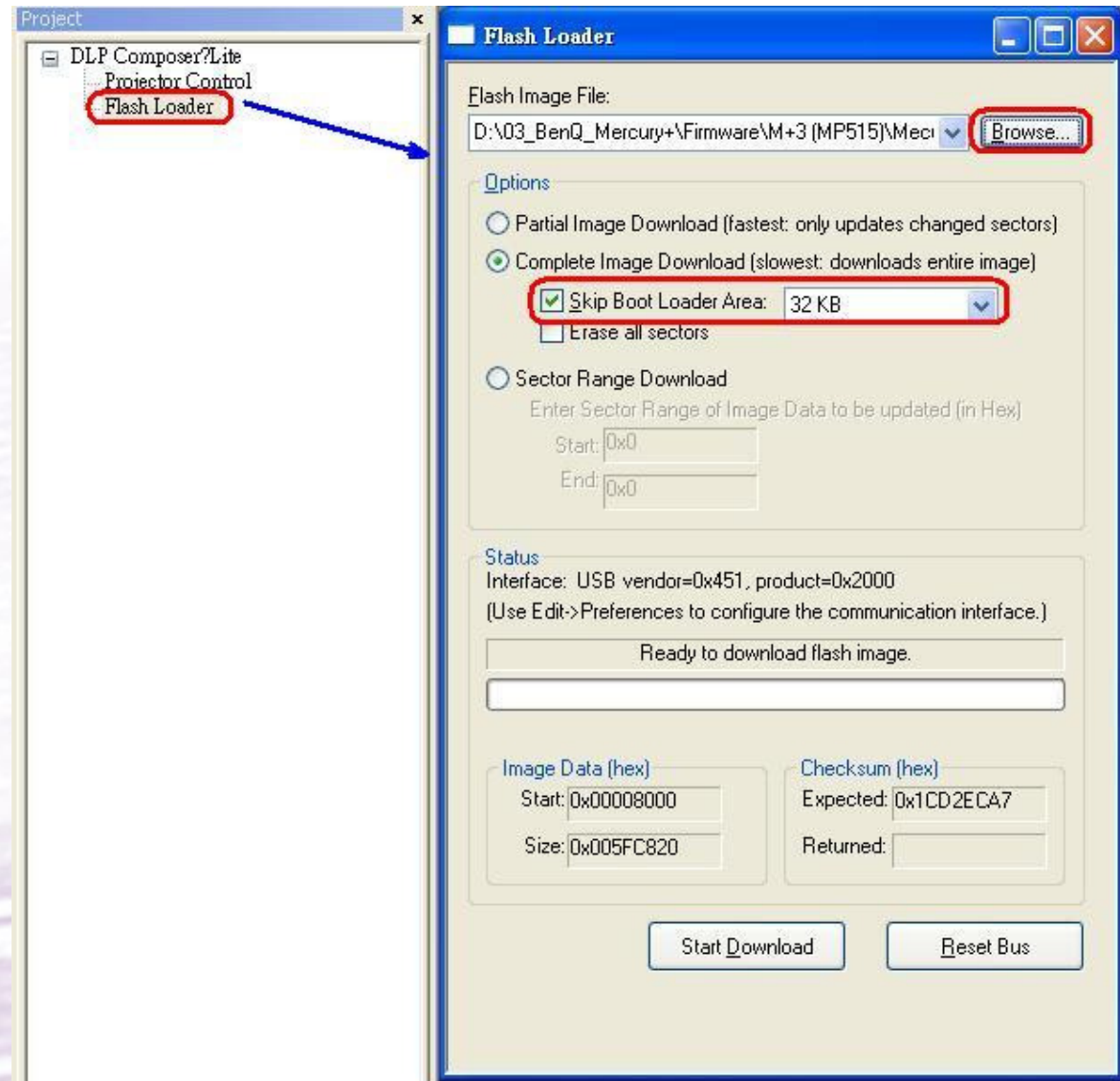


Download Firmware

5. Select Flash Loader

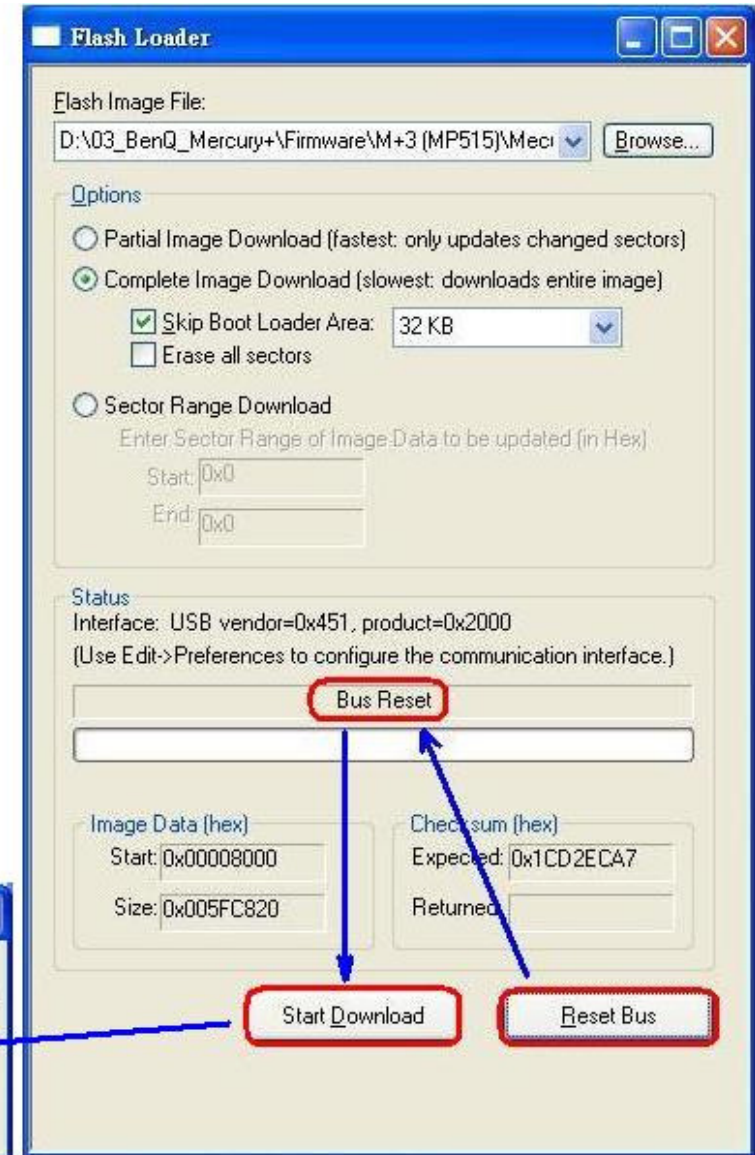
a. Browse Flash Image File

b. Skip boot Loader Area : 32KB



Download Firmware

6. Press “Reset Bus” and check the status which should show “Bus Reset”.
7. Press “Start Download” to start.
8. Press “Yes” to continue.

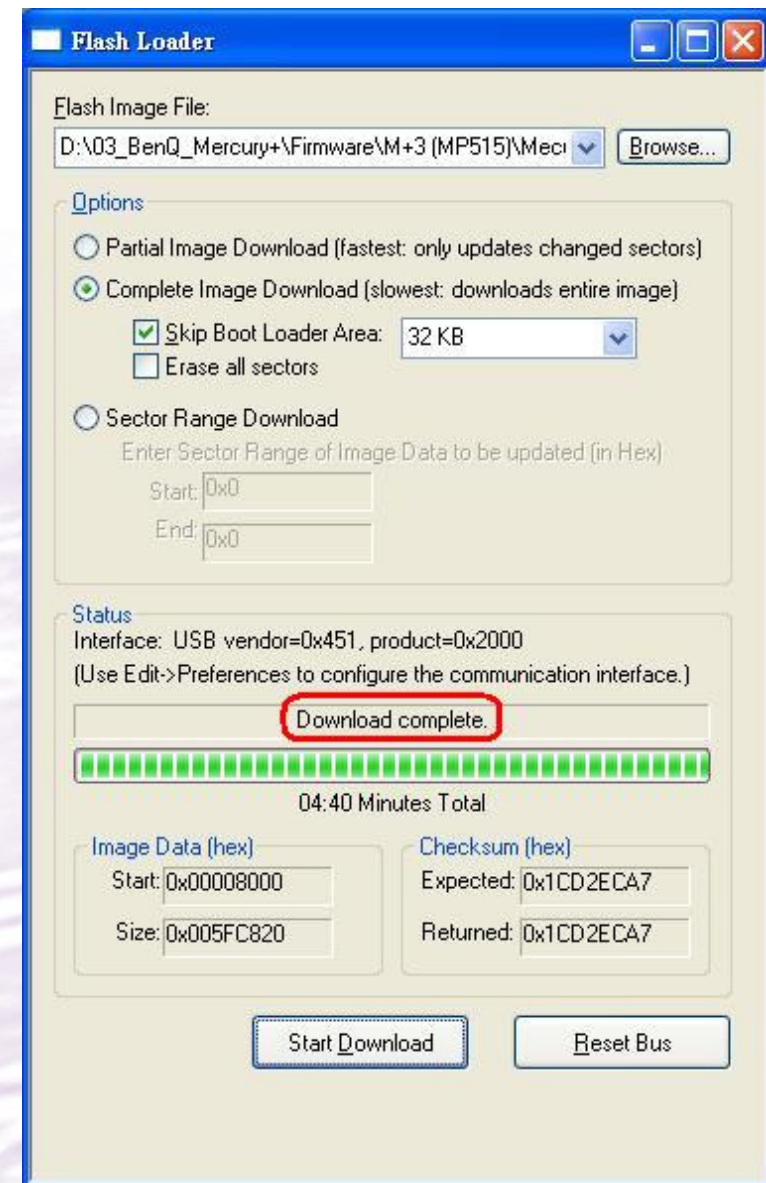


Download Firmware

9. Download Complete :

Check Status which should show “Download Complete.”

- Caution : Do NOT interrupt download, such as unplug power cord.
If you skip boot loader area and interrupt download, projector would NOT turn on anymore.



Firmware Download

- **MCU Code Download** (system download automatically)

- **Condition :**

- MCU code is empty
 - The 1st time to plug in power cord
- MCU version update

- **System Action :**

- System needs around 2 sec to download WT6702 MCU itself.
- **Downloading :** Power LED will show **Red** and Lamp LED will show **Green**.
- **Download Fail :** Power LED will show **Orange** and Lamp LED will show **Red**.
- **Download Success :** System will go back Low-Power standby mode and Power LED will show **Orange**.



- **Notice :**

- Do NOT interrupt power when downloading.
- If download fail, re-plug the power cord.

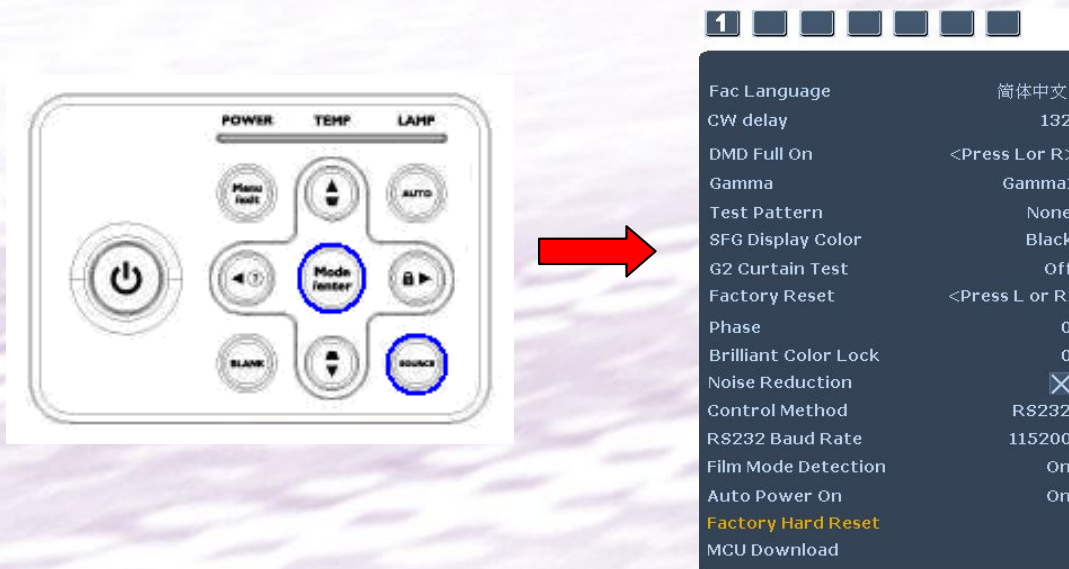
Factory Mode

Enter the Factory mode

1. Press keypad Menu and image will show menu OSD



2. Press keypad Mode + Source together, then enter the Factory mode.



Factory Block 1



Fac Language	简体中文
CW delay	132
DMD Full On	<Press L or R>
Gamma	Gamma1
Test Pattern	None
SFG Display Color	Black
G2 Curtain Test	Off
Factory Reset	<Press L or R>
Phase	0
Brilliant Color Lock	0
Noise Reduction	☒
Control Method	RS232
RS232 Baud Rate	115200
Film Mode Detection	On
Auto Power On	On
Factory Hard Reset	
MCU Download	

Factory language
(Eng/Simplified Chinese)

C/W delay

Do NOT Change

Factory Block 2



Temperature #1	0
Temperature #2	0
Temperature #3	0
Fan1-RPM	0
Fan2-RPM	0
Fan3-RPM	0
Fan4-RPM	0
Fan1-Target	0
Fan2-Target	0
Fan3-Target	0
Fan4-Target	0
Manual fan speed	X
Fan Check Detect	X
BenQ MP575	000
MCU Version	000

Temperature and Fan
speed Monitor

Do NOT Change

F/W version
MCU version

Factory Block 3



Calibration RGB	<Press Lor R>	RGB Calibration
Calibration YPbPr	<Press Lor R>	No Need
Cal R Offset	0	Calibration Value Display
Cal G Offset	0	
Cal B Offset	0	
Cal R Gain	0	
Cal G Gain	0	
Cal B Gain	0	
YPbPr R Offset	0	No Need
YPbPr B Offset	0	
AutoKeystone Cal	<Press Lor R>	No Function
Tilt Ratio Flat	0	
Tilt Period Flat	0	

Factory Block 4



Lamp Fail	0
Fan 1 Speed Error	0
Fan 2 Speed Error	0
Fan 3 Speed Error	0
Fan 4 Speed Error	0
Sensor 1 Open Error	0
Sensor 2 Open Error	0
Sensor 3 Open Error	0
Sensor 1 Short Error	0
Sensor 2 Short Error	0
Sensor 3 Short Error	0
Temperature 1 Error	0
Temperature 2 Error	0
Temperature 3 Error	0
FanIC 1 I2C Error	0
FanIC 2 I2C Error	0
Color Wheel Error	0
Abnormal Power down	0
First Burn-In Error Minutes	0
LAN DOWNLOAD ERROR	0
Error Count reset	<Press L or R>

Error Count

Error Count Reset

Factory Block 5

5	
Burn-In On Minute	0
Burn-In Off Minute	0
Burn-In Cycle Time	0
Normal Burn-In Hour	0
Burn-In Active	☒
Life Time Burn-In Active	☒
Recall Number 0	0
Recall Number 1	0
Recall Number 2	0
Recall Number 3	0
Decode	<Press L or R>
000000	

For Burn-In Test
Do NOT Change

Factory Block 6

					6	
sRGB Red	255					Do Not Change
sRGB Blue	255					
sRGB Green	255					
Reset sRGB value	<Press L or R>					
Lamp Hours	0					
Total Hours	0					
Lamp Hours 2	0					Lamp hour record
Total Hours 2	0					
Lamp Module Hours	0					
Lamp Module Hours 2	0					
Reset All Hours	<Press L or R>					Do NOT Change
Audio Step	31					

Factory Block 7



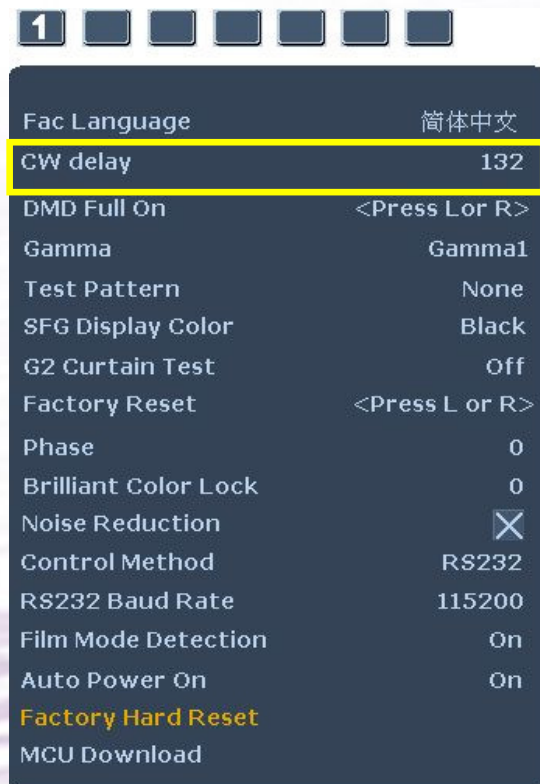
Lan DownLoad	Off
Lan Boot Mode	On
Write Mac	<Press Lor R>
Reset Lan Settings	<Press Lor R>
Mac Address	00,00,00,00,00,00
Lan Version	000
Only CS6209 Download	Off
Only EEPROM Download	Off

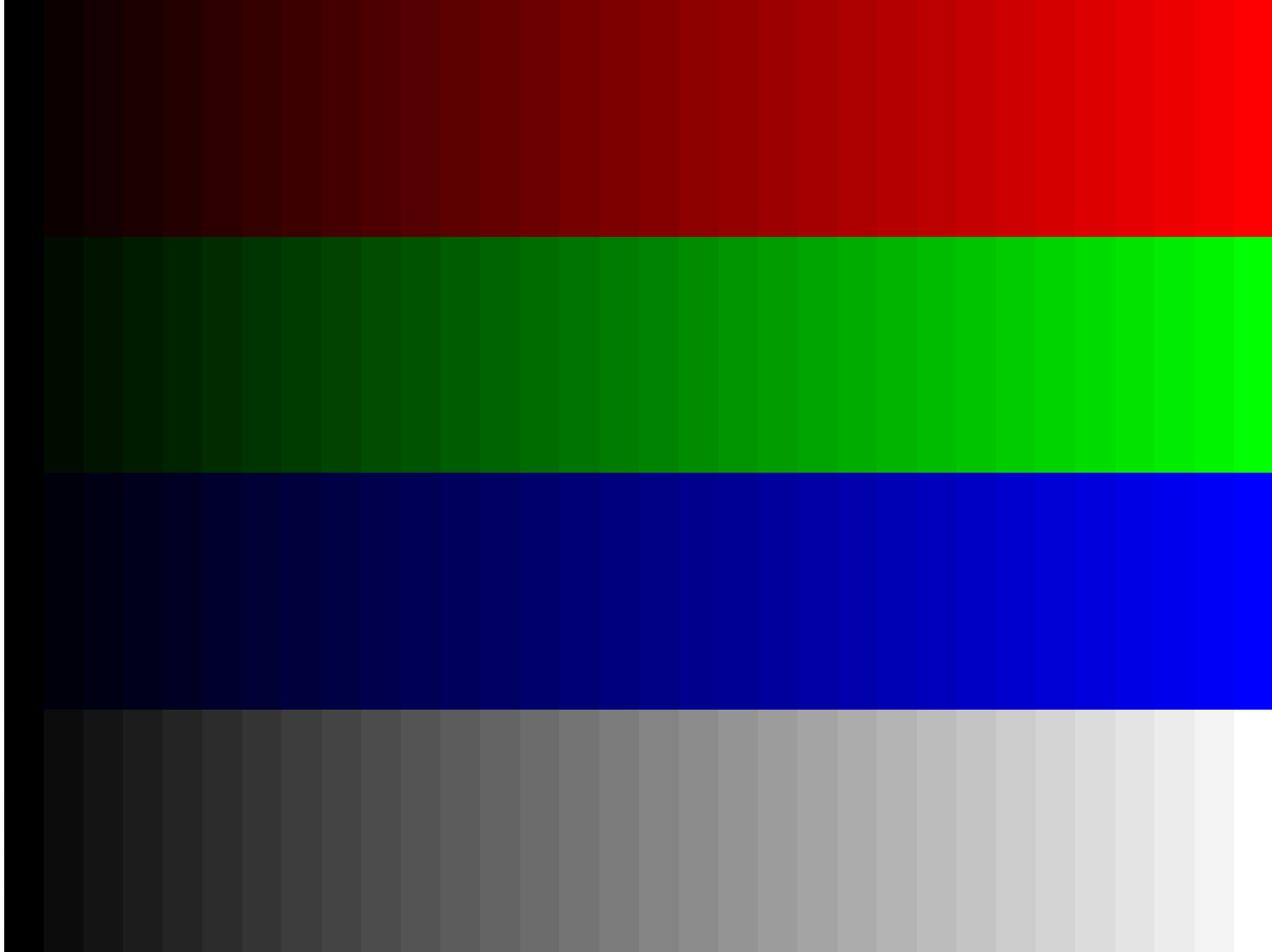
Do NOT Change

Alignment and Adjustment

DLP C/W delay Alignment

1. Enter Factory mode
2. Enter Factory block 1
3. Change CW Delay (by the attached grey-level pattern)

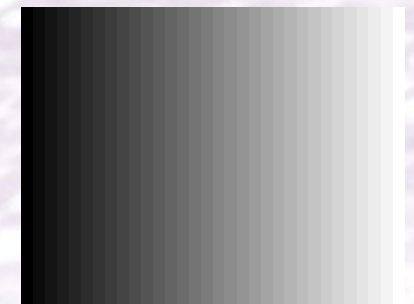
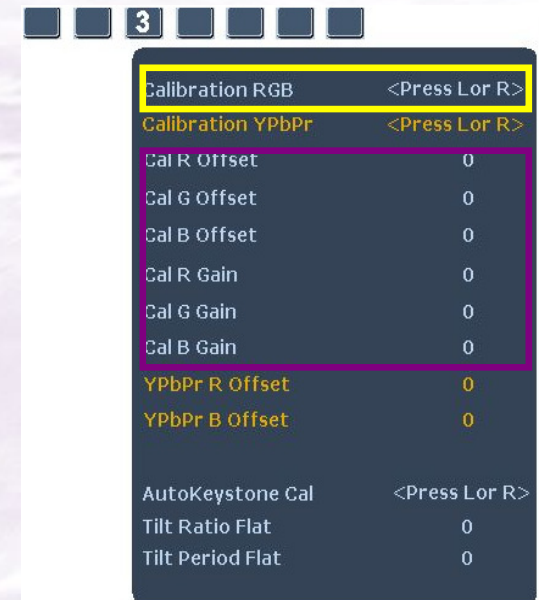
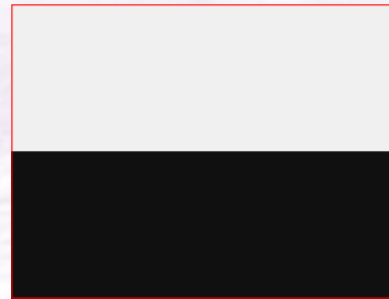
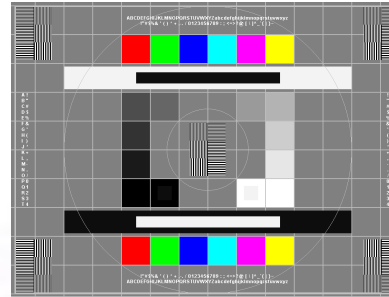




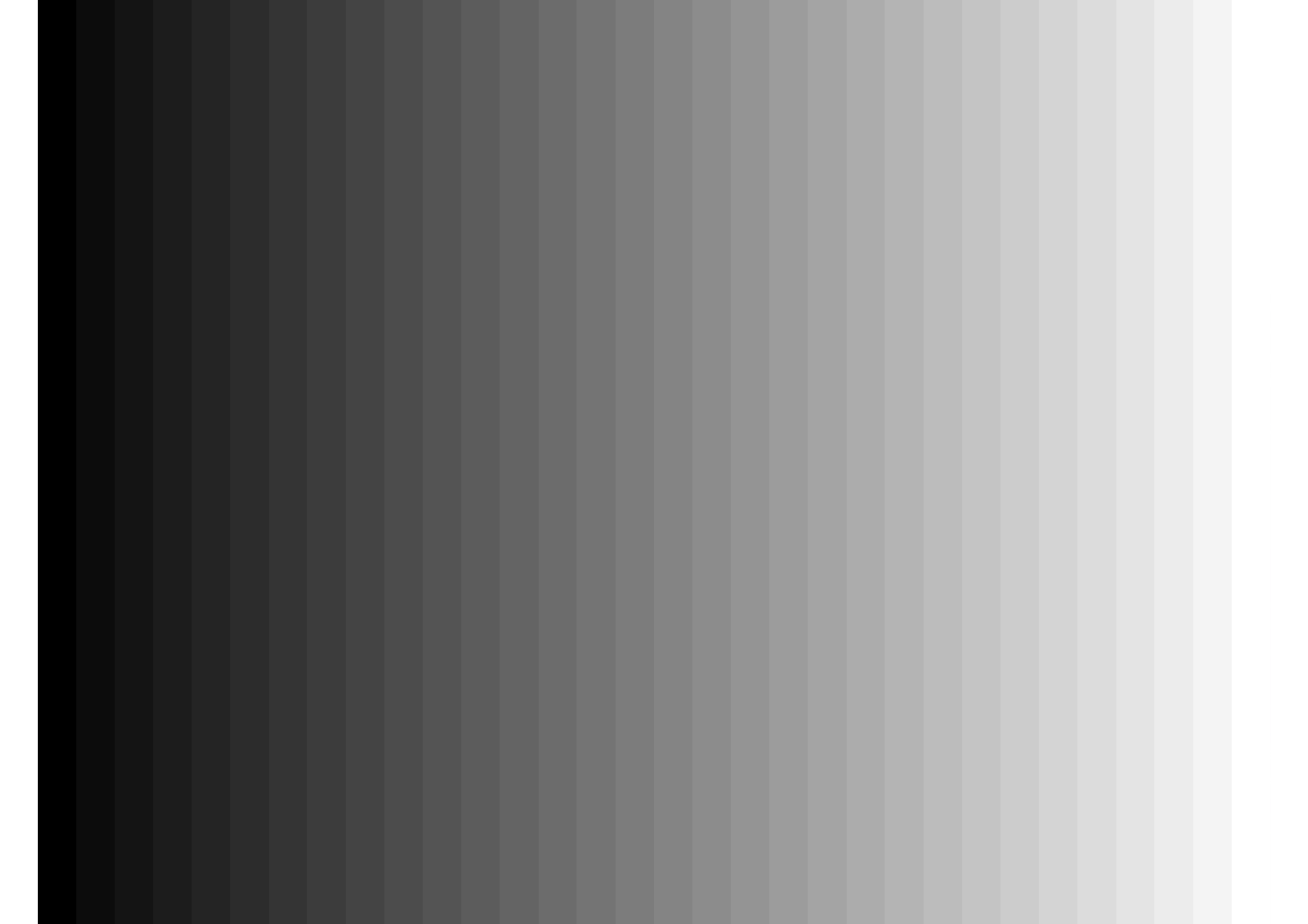
PC Alignment

- Procedure:

- Connect power cord and **PC D-sub source** into projector.
- Turn on projector.
- Change **Timing** of pattern generator:
 - Timing: 1024*768 @60Hz (XGA models)
800*600@60Hz (SVGA models)
- Change **Pattern** of pattern generator:
 - Pattern: Full frame pattern, ex.pattern1
- Press “Auto” to catch the full screen
- Change **Pattern** of pattern generator:
 - Pattern: A near white color (240,240,240) and a near black color(16,16,16)
- **Enter Factory mode, block 3.**
- Press “**Calibration RGB <Press L or R>**” to let the black level to just distinguish, and the light output of white level to just max.
- Check the 32 levels of gray. All steps must appear.



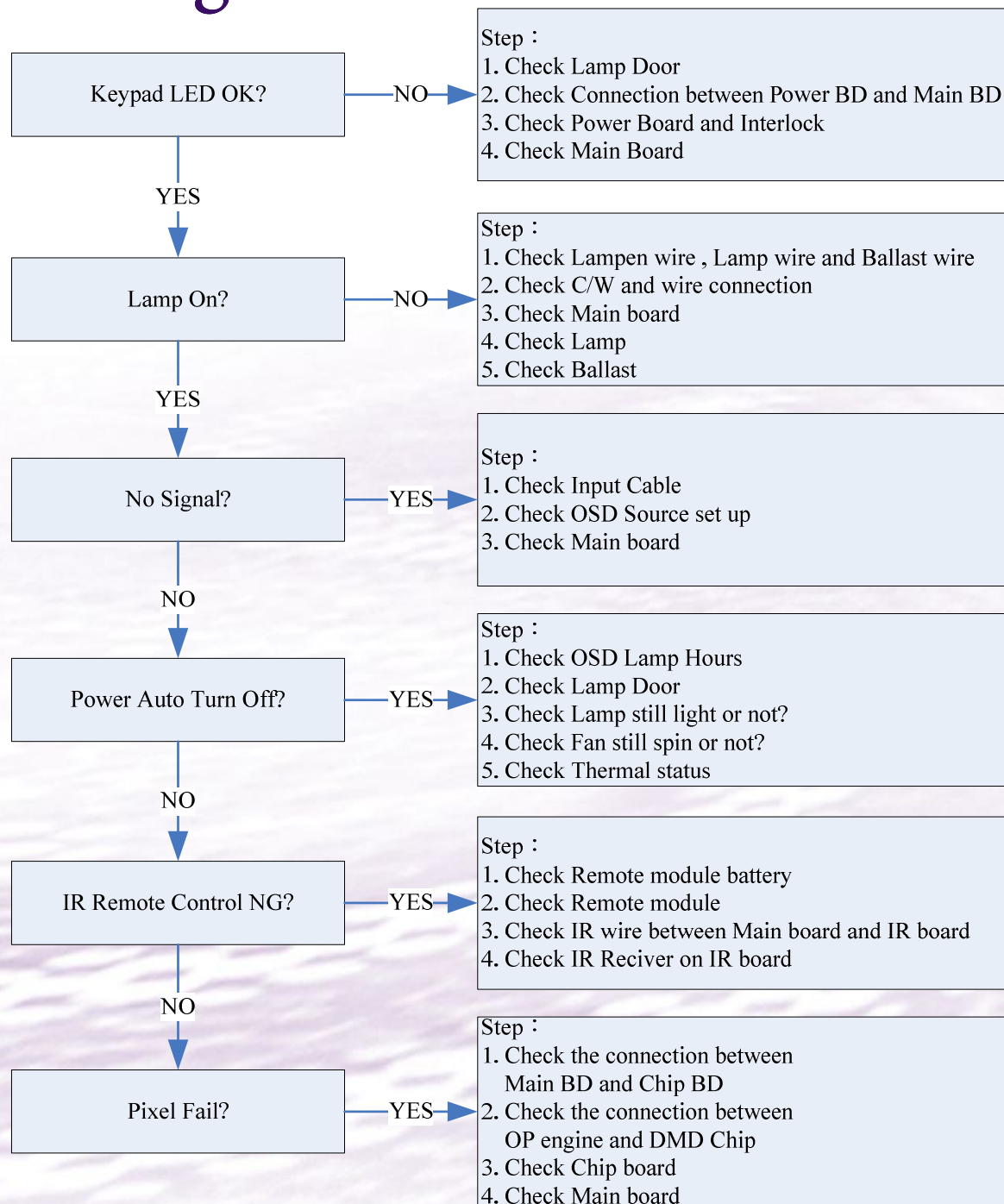




Trouble shooting

- Error message

Trouble shooting Flow



LED Error Message

Power◀ Temp◀ Lamp◀	Status↗	Note↗
 - -	Stand-by	
 - -	Powering up	
 - -	Normal operation	
 - -	Normal power-down cooling	
 - -	First Lamp-Lit error cooling	

Remark :

 : Continuous lighting

 : Flash lighting

 : Green Light

 : Orange Light

 : Red Light

LED Error Message

Lamp Error Messages		
-	-	 Lamp error in normal operation ²

When Lamp Error Occur:

1. Check lamp condition and connection
2. Check power, ballast and ballast power wire
3. Check C/W wire and C/W rotating condition when power on

LED Error Message

Fan Error Messages		
·  ·	Fan 1 error (the actual fan speed is $\pm 20\%$ outside the desired speed.)	
·  	Fan 2 error (the actual fan speed is $\pm 20\%$ outside the desired speed.)	
·  	Fan 3 error (the actual fan speed is $\pm 20\%$ outside the desired speed.)	

When Fan Error Occur:

1. Check there's nothing in Fan
2. Check Fan connector
3. Check Fan Power signal and Flag signal

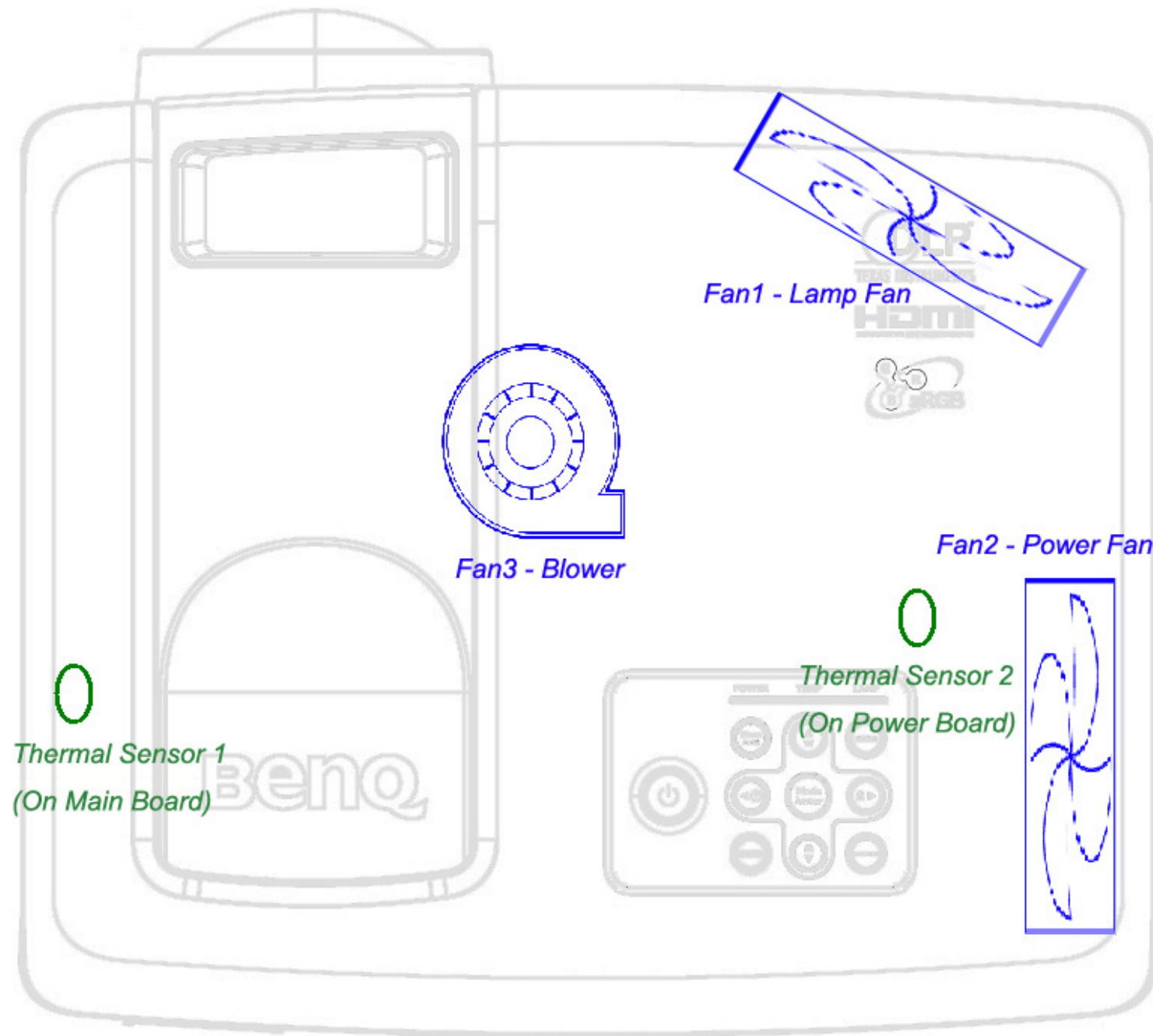
LED Error Message

Thermal Error Messages			
R	R	R	Thermal Sensor 1 open error (the remote diode has an open-circuit condition.)
R	R	G	Thermal Sensor 2 open error (the remote diode has an open-circuit condition.)
G	R	R	Thermal Sensor 1 short error (the remote diode has a short-circuit condition.)
G	R	G	Thermal Sensor 2 short error (the remote diode has a short-circuit condition.)
O	R	R	Temperature 1 error (over limited temperature)
O	R	G	Temperature 2 error (over limited temperature)
-	G	R	Fan IC #1 I2C Connection error

When Thermal sensor Error Occur:

1. Check Thermal Sensor status

FAN & TH Sensor Placement



Error Count

1. Enter Factory Mode
2. Enter Factory block 4
3. Check Error Count

■ ■ ■ 4 ■ ■ ■

Lamp Fail	0
Fan 1 Speed Error	0
Fan 2 Speed Error	0
Fan 3 Speed Error	0
Fan 4 Speed Error	0
Sensor 1 Open Error	0
Sensor 2 Open Error	0
Sensor 3 Open Error	0
Sensor 1 Short Error	0
Sensor 2 Short Error	0
Sensor 3 Short Error	0
Temperature 1 Error	0
Temperature 2 Error	0
Temperature 3 Error	0
FanIC 1 I2C Error	0
FanIC 2 I2C Error	0
Color Wheel Error	0
Abnormal Power down	0
First Burn-In Error Minutes	0
LAN DOWNLOAD ERROR	0
Error Count reset	<Press L or R>

Error Count

Error Count Reset

Mechanical Part - Assembly Concern

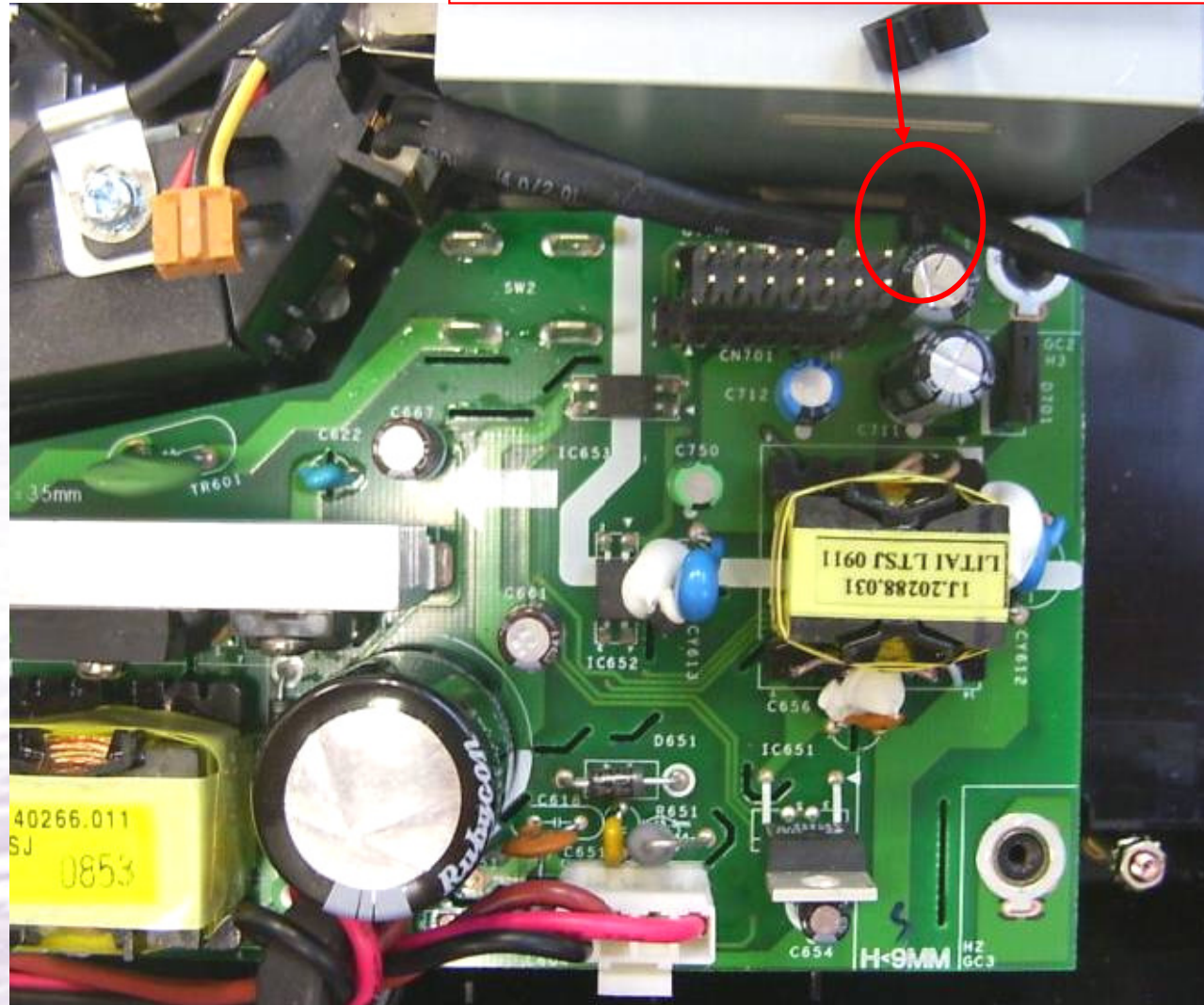
Lamp and Ballast to MB wire alignment

Ballast wire dressing direction



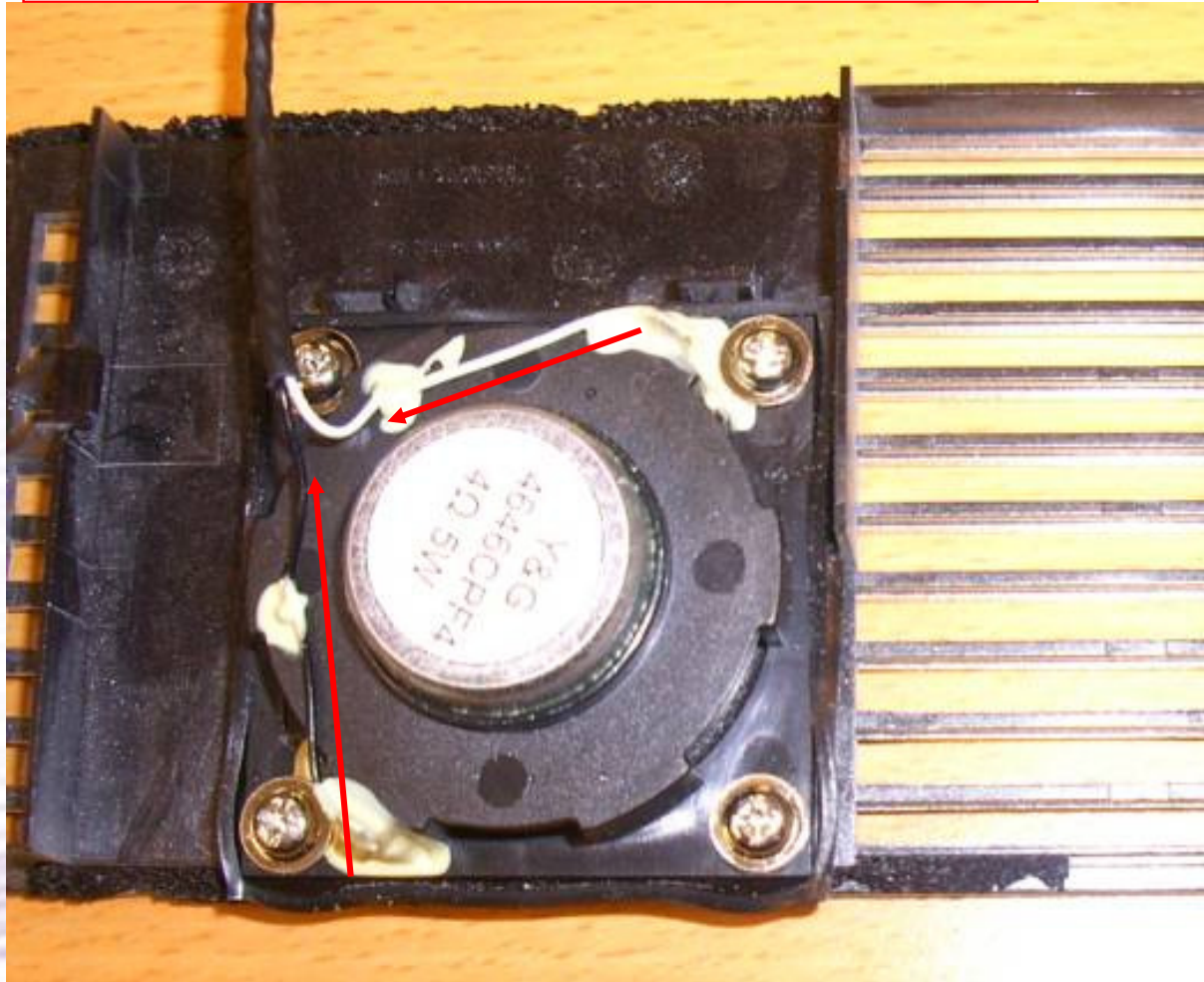
Ballast to MB wire alignment

Ballast-M/B wire dressing direction



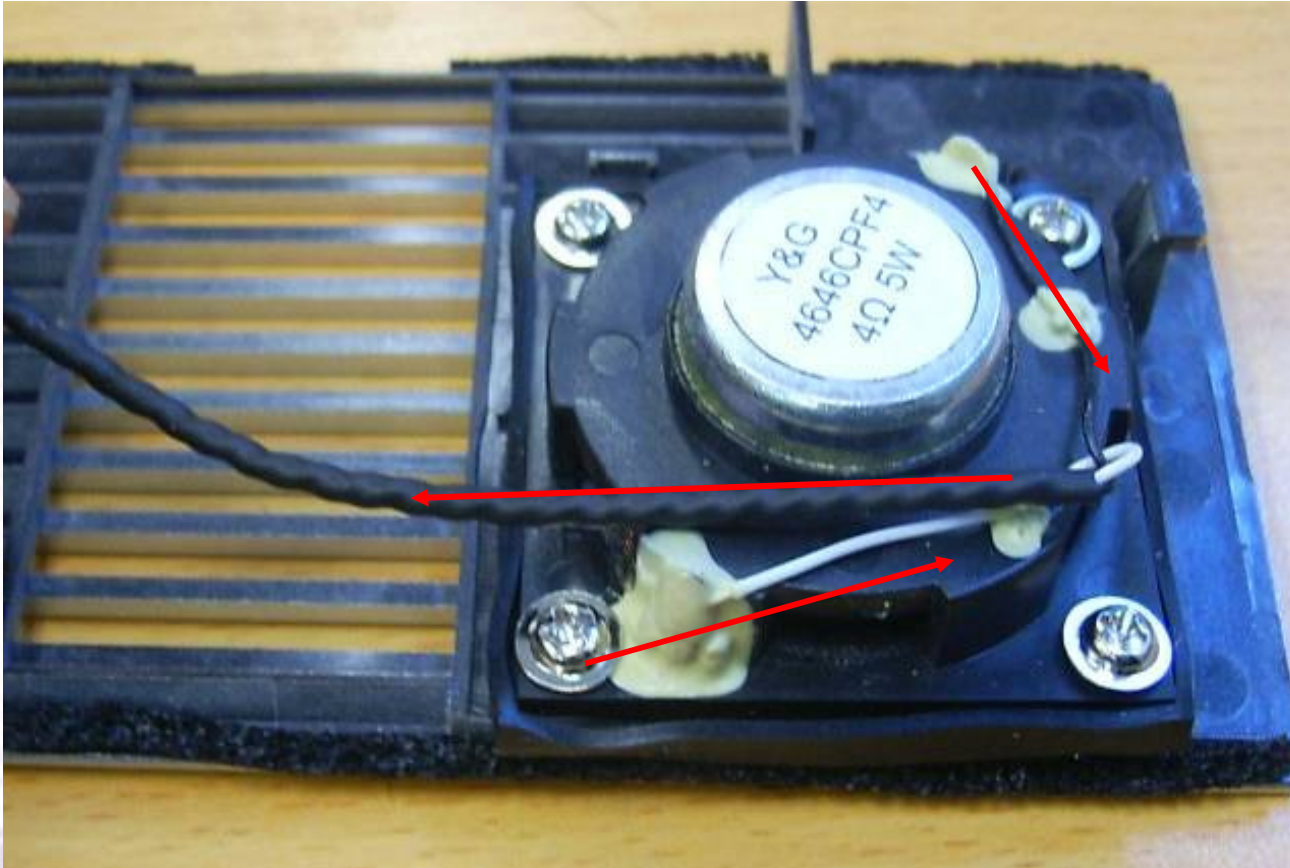
Outlet Case

Speaker wire dressing direction



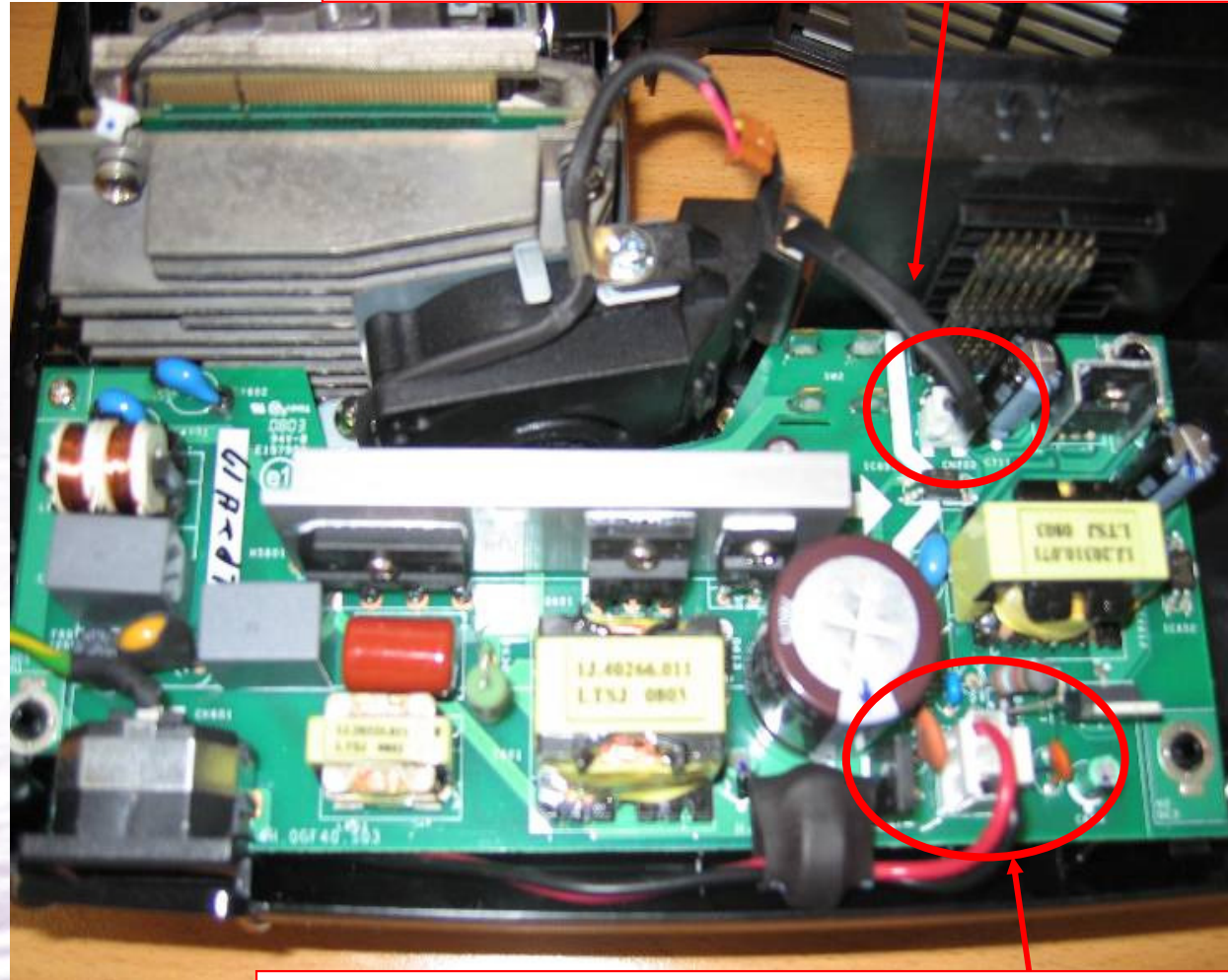
Inlet Case

Speaker wire dressing direction



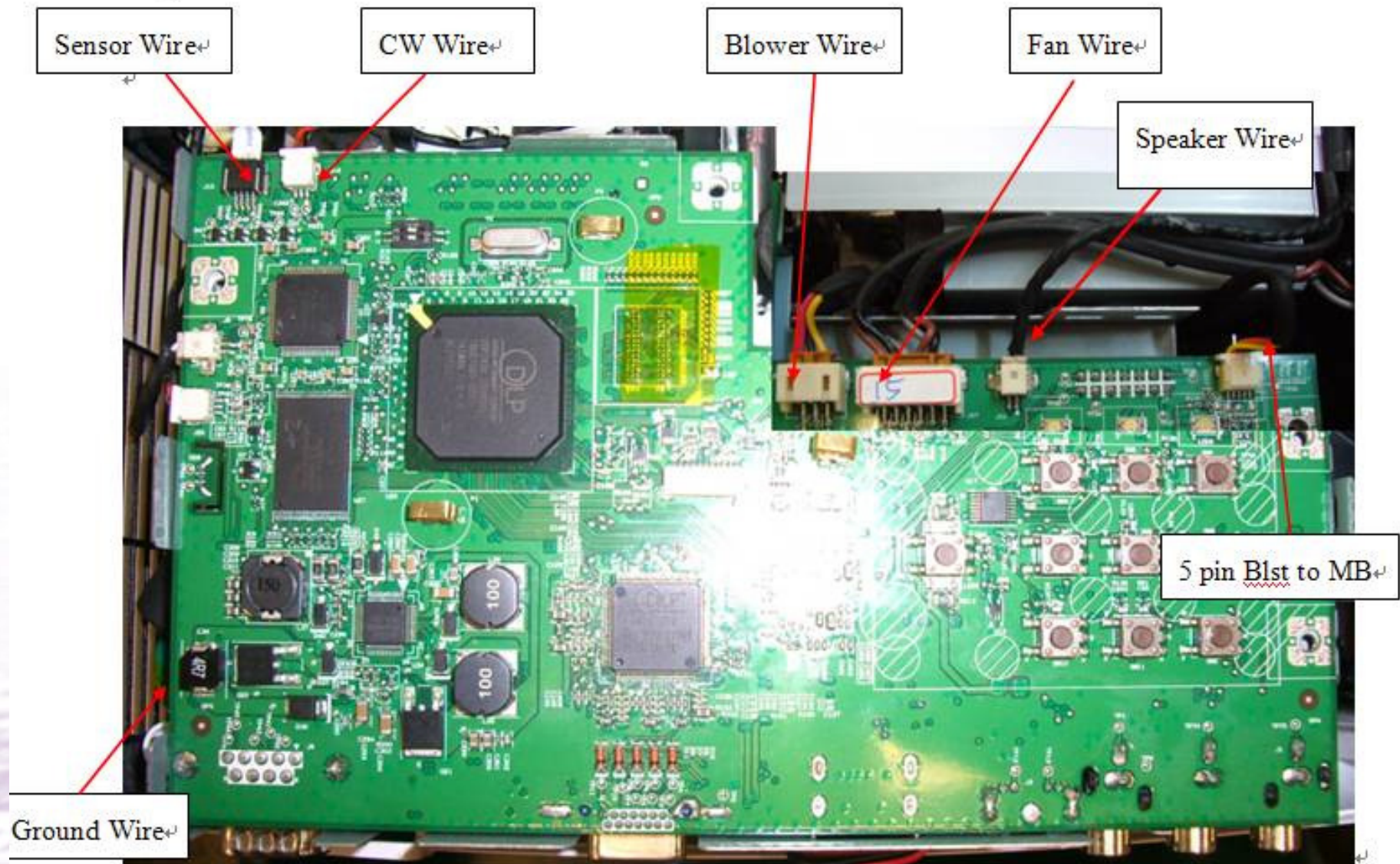
Power BD Wire alignment

Thermal break wire dressing direction



Power-Ballast wire dressing direction

MB Wire alignment

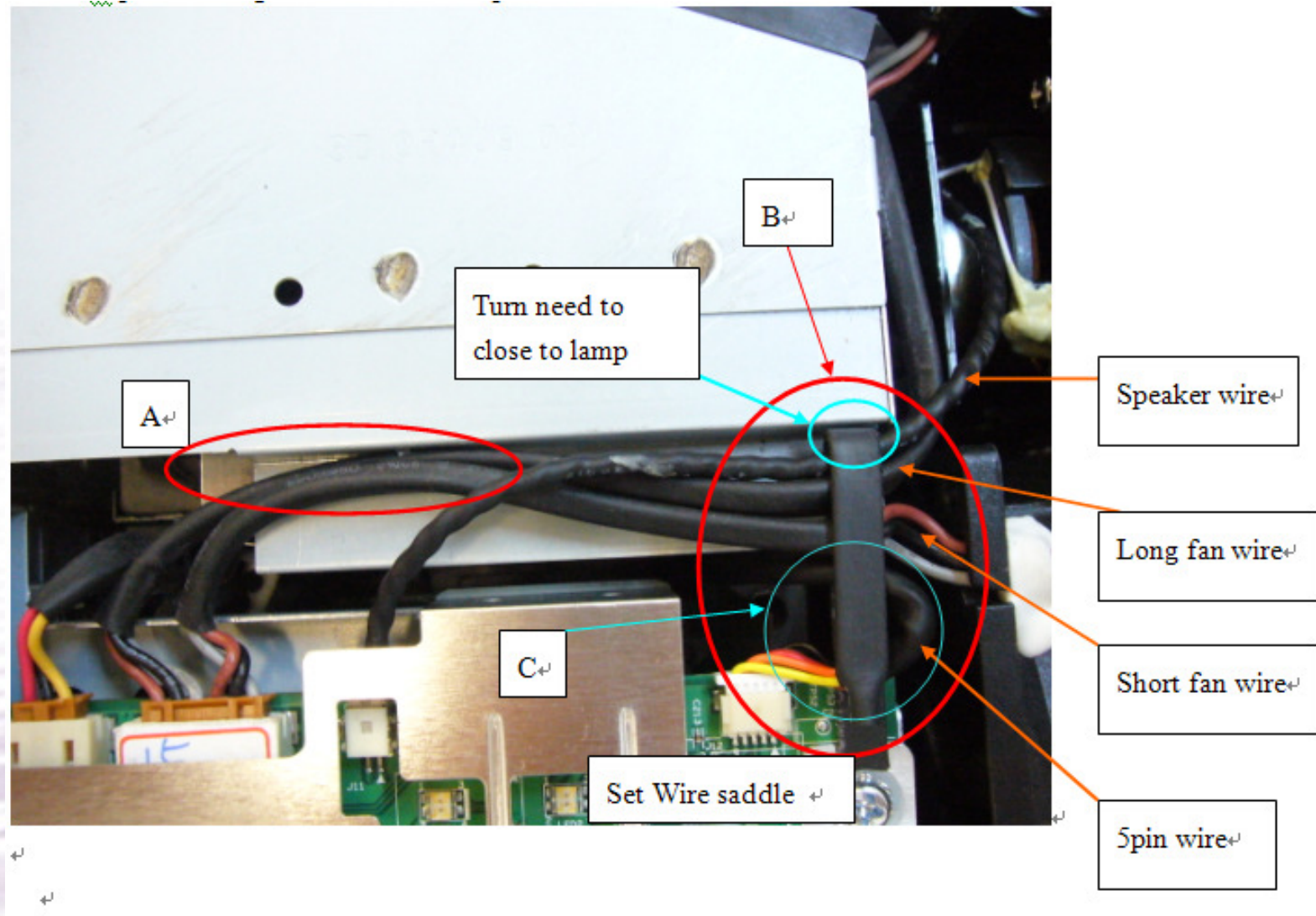


MB / HDMI --BKT

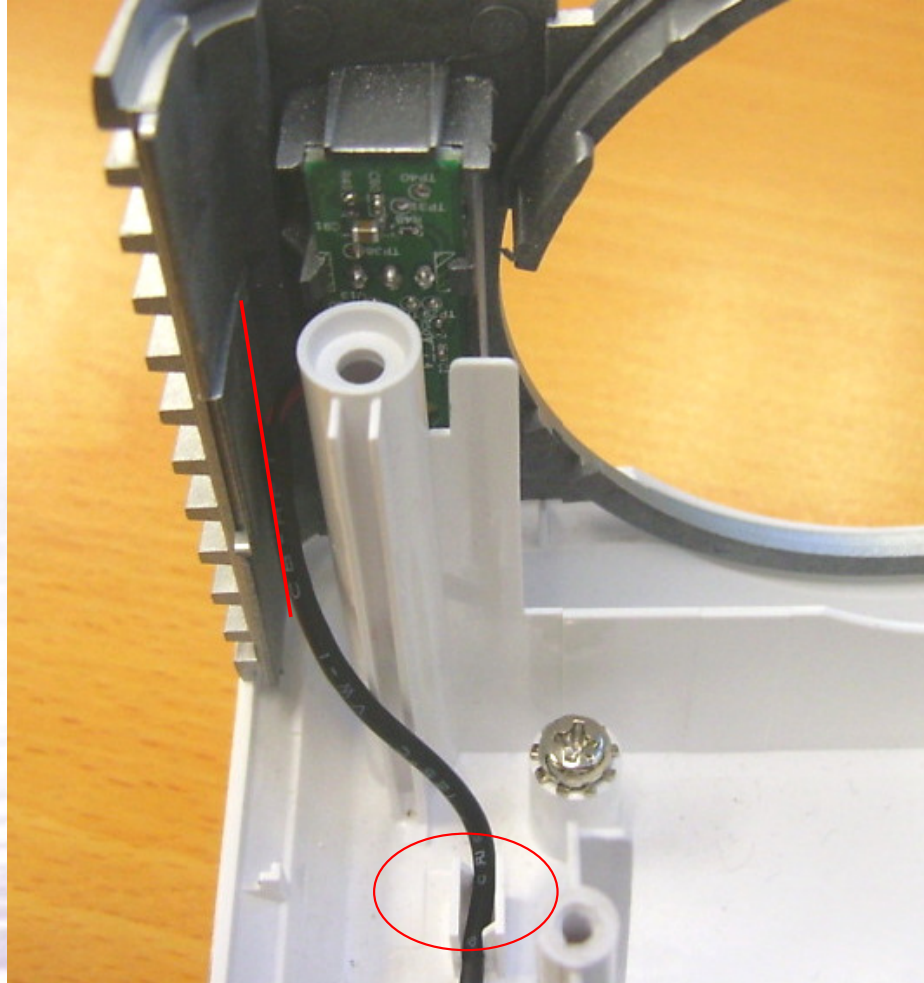
M/B and Bracket assembly notice



FAN and Speaker wire alignment

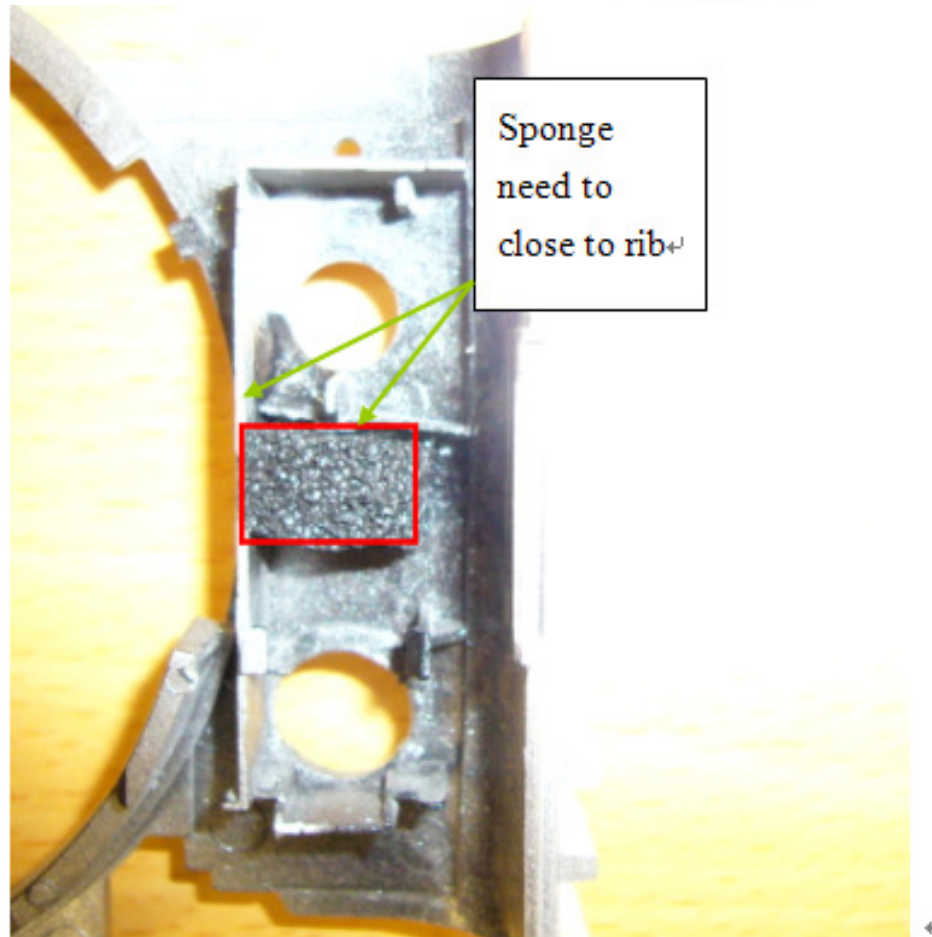


IR BD wire alignment



Front Case sponge

IR board sponge assembly notice



Q & A

An aerial photograph of a beach with a checkered pattern, overlaid with a solid purple color. The checkered pattern is formed by the shadows of beach chairs or umbrellas, creating a series of parallel lines that recede into the distance.

BenQ

Enjoyment Matters