SANYO

SERVICE MANUAL

Multimedia Projector

Model No. PDG-DSU21N
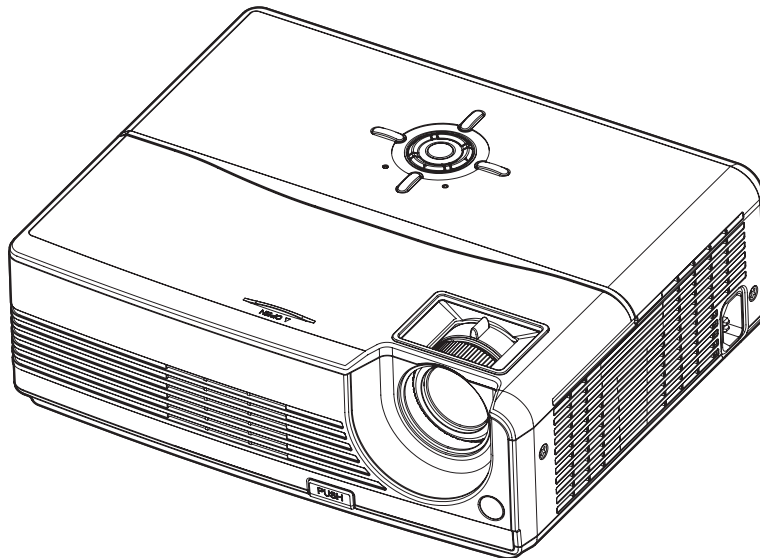U.S.A, Canada,
PDG-DSU21E
Europe, Asia
PDG-DSU21B
U.K.

Original Version

Chassis No. KA7-DSU21N00
LA7-DSU21E00
LA7-DSU21B00

Match the Chassis No. on the unit's back cover with the Chassis No. in the Service Manual.
If the Original Version Service Manual Chassis No. does not match the unit's, additional Service Literature is required. You must refer to "Notices" to the Original Service Manual prior to servicing the unit.

Safety Instructions

Safety Precautions

WARNING:

The chassis of this projector is isolated (COLD) from AC line by using the converter transformer. Primary side of the converter and lamp power supply unit circuit is connected to the AC line and it is hot, which hot circuit is identified with the line (⊼⊼⊼) in the schematic diagram. For continued product safety and protection of personnel injury, servicing should be made with qualified personnel.

The following precautions must be observed.

1: An isolation transformer should be connected in the power line between the projector and the AC line before any service is performed on the projector.

2: Comply with all caution and safety-related notes provided on the cabinet back, cabinet bottom, inside the cabinet or on the chassis.

3: When replacing a chassis in the cabinet, always be certain that all the protective devices are installed properly, such as, control knobs, adjust-

ment covers or shields, barriers, etc.

DO NOT OPERATE THIS PROJECTOR WITHOUT THE PROTECTIVE SHIELD IN POSITION AND PR OPERLY SECURED.

4: Before replacing the cabinet cover, thoroughly inspect the inside of the cabinet to see that no stray parts or tools have been left inside.

Before returning any projector to the customer, the service personnel must be sure it is completely safe to operate without danger of electric shock.

Product Safety Notice

Product safety should be considered when a component replacement is made in any area of the projector. Components indicated by mark ⚠ in the parts list and the schematic diagram designate components in which safety can be of special significance. It is, therefore, particularly recommended that the replacement of there parts must be made by exactly the same parts.

Service Personnel Warning

Eye damage may result from directly viewing the light produced by the Lamp used in this equipment. Always turn off Lamp before opening cover. The Ultraviolet radiation eye protection required during this servicing.
Never turn the power on without the lamp to avoid electric-shock or damage of the devices since the stabilizer generates high voltages (15kV - 25kV) at its starts.
Since the lamp is very high temperature during units operation replacement of the lamp should be done at least 45 minutes after the power has been turned off, to allow the lamp cool-off.

Conventions

The following conventions are used in this manual

Screen Messages	Denote actual messages that appear on screen.
Note	Give bits and pieces of additional information related to the current topic.
Warning	Alert you any damage that might result form doing or not doing specific actions.
Caution	Give precautionary measures to avoid possible hardware or software problems.
Important	Remind you doing specific actions relevant to the accomplishment of procedures.

Table of Contents

1. System Introduction

1. 1. Technical Specification

PDG-DSU21	
Display Type	DLP Single Panel Projector
Resolution(Pixels)	800 x 600
Lens	Manual Zoom (1.1x)
Input Source	D-Sub 15 pin, S-video, composite video, USB, AUDIO IN (stereo phone jack), RS-232C
Lamp	180W
Projection Type	Front, Rear, Ceiling
Video Compatibility	NTSC3.58, NTSC4.43 PAL-60, M, N, SECAM HDTV(480i/p,576i/p,720p,1080i)
Scanning Frequency Horizontal Frequency Vertical Frequency	31 -79 KHz 50 – 85 Hz
Digital Keystone Correction	Vertical: +/- 15 degree
Integrated Speaker	2W x 1
Environment	Operating: Temperature: 5˚C to 35˚C Humidity:30% - 85% (No condensation) Storage: Temperature:-20 ˚C to 60 ˚C (-40˚F~140˚F) Humidity: 30% - 85%(No condensation)
Power Requirement	AC100 ~ 240 V, 50 ~ 60 Hz
Power Consumption	230W
Dimension	271 mm(W) x 218 mm(D) x85 mm(H)
Weight	2.5kg(5.5lb)

Note: Designs and specifications are subject to change without prior notice.

Lamp Specification

Product Type: Short arc mercury lamp with reflector.

The product is a lamp system consisting of a short arc burner within a reflector and an electronic lamp driver.

Type lamp	P-VIP 150-180/1.0 E20.6
	Identcode: A 535 278
Type driver	PT VIP O3 MID (180W) – UNISHAPE
	Identcode: A 508 431

The lamp must be operated with the OSRAM lamp driver only.

Initial Characteristics

	nominal	tolerance
Input Voltage standby (non-operating)	380V DC	350...400V DC min. 120V DC
Input Current	0.55 A	
Max. input voltage ripple	30Vpp @ 100-120Hz	
Input Wattage	max. 210 W @180W lamp wattage	
Input Wattage standby operation	1,7W @ 380V DC	
Output wattage		
nominal	180W	± 3% [4]
DIM mode	150W	± 3% [4]
controlled by UART	150W...180W	in step width of 1/128 of nominal power
Output current limitation	3.4A (RMS)	± 5%
Ignition pulse	typ. 2.6 kVpeak symm.	2.4 .. 3.5 kVpeak
Ignition Phase Duration	typ. 3,0s	max. 6 s
Enable-Disable-Enable Cycle	15 s minimum (see note to components overheating in chapter 3.4	
Acoustic sound power level	typical 34 dB(A) acc. to EN ISO 3744, which is conform with an acoustic sound pressure level of 38 dB(A) at 25cm measuring distance; measured in steady state lamp operation [5]	
Switch-off lamp voltage	140V	± 5V
Cooling method	forced air cooling at ≥1.5 m/s minimum	
Thermal Protection	Tc1 switch point 75°C	± 5°C
Safety Protections	The lamp connections are not mains isolated. The lamp can be switched on via the Start Control Input signal (SCI). A Flag Output signal indicates if the lamp has lit rightly. The Start Control Input and the Flag Output are mains isolated.	

Note: More information about lamp replacement procedure, resetting lamp timer and lamp part number, please check the page 23.

Attention for handling

- Do not touch the lamp until it has cooled completely, because the lamp is very hot during operation and immediately after turned off.
- The lamp has to be fixed firmly to the base or socket.
- Turn off the power supply during maintenance.
- Do not hold the lamp except outer surface of the reflector.
- Wear protective gloves and eyeglasses when handling the lamp.
- Any unusual shock or vibration to the lamp should be avoided.
- The lamp contains the mercury. Its breakage might cause mercury to flow out of the reflector. Please manage provision at the customer's product.
- Do not pull the lead wire and plug by more than 24.5N.
- Please be careful of handling the lamp because it is made of glass.
- Please notice for keeping or handling the lamp, because there is a projection of this lamp with reflector ahead.
- Do not touch the bulb and the mirror area of the reflector.

Attention for use

- Do not close or cover the lamp with any flammable stuff.
- During operation, the lamp is under extremely high pressure. Please manage provision at the customer's product to prevent fragments of bulb and mercury from flowing out of it. If the lamp bursts in case of an emergency, the sound will be occurred.
- Lamp operation should be with the specified lamp driver and the system ONLY.
- Do not look at the lamp directly during operations.
- Do not expose your skin directly. We recommend to you to put on something for protection for your skin. For example, long sleeve shirt, gloves, glassed and so on.
- Do not modify the lamp and never use a lamp that has been modified.
- Any unusual shock or vibration to the lamp should be avoided during operation.
- Do not use any broken lamps.
- Dispose of used lamps according to your local instruction.
- Do not turn on the lamp while the system is opened.
- The lamp contains mercury. If the lamp bursts during operation ventilate the area sufficiently to avoid inhaling harmful mercury fumes.
- Use the lead below 200˚C to prevent a deterioration of cladding clad of the fluorocarbon resin.
- The lead wire insulation clad shouldn't touch the reflector.
- Exchange the lamp that has already passed the life time immediately.

1.2. DSU21 System Block Diagram
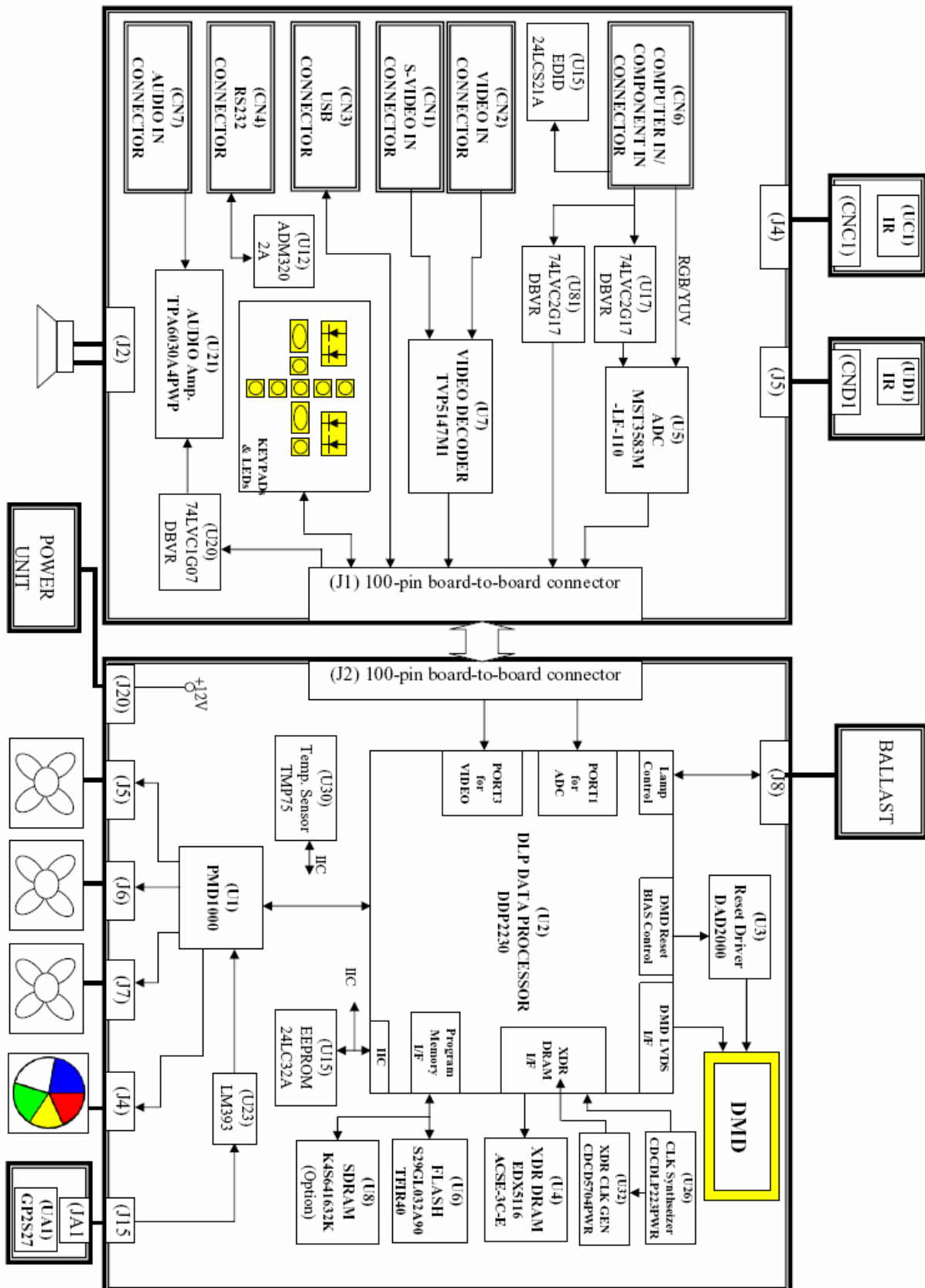
2. Firmware Upgraded Flow

This chapter provides the information regarding relevant equipments and upgrading procedure for firmware upgrade.

Note:

Please check the firmware and composer version before any firmware upgrade procedures. During firmware download period, please do not shut down PC or projector, this will cause flash memory's damage. And need to return the unit to manufacturer for flash memory recovery.

Setup Tool/Equipment
- Computer
- USB Cable (See the picture)
- Power Cord

2. 1. **Upgrading Procedure**

Installing [DLP Composer (TM) Lite]

1. Double-click **[DLP Composer Lite Vx.x Setup.exe].**

2. Installation starts. Click **[Next]** to continue the installation process.

3. On the **[License Agreement]** screen, move the scroll bar on the right to the bottom, select **[I accept and agree to be bound by all the terms and conditions of this License Agreement]**, and click Next to continue the installation process.

4. On the Select **[Installation Type]** screen, select **[ALL]** and click **[Next]** to continue the installation process.
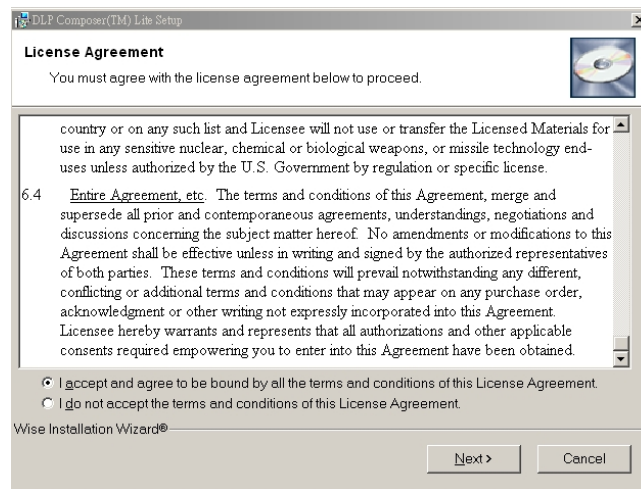

5. When the installation is finished, click [Finish] and reboot the PC. (A shortcut to DLP Composer (TM) Lite is created on the desktop.)
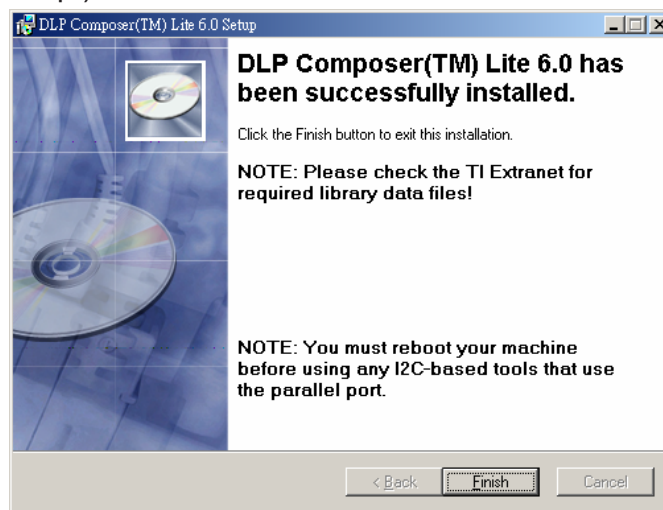
USB Support - Installation (All Platforms)

This release includes support for a USB communications interface to DDP2000-based projectors. The setup program includes the files needed to install USB support (for Windows 98/Me/2000/XP only -- Win95, WinNT and Windows Vista are not supported). After DLP Composer™ Lite is installed, to install the USB support, choose the "Install DDP2000 USB Driver" icon under "DLP Composer™ Lite" in your Start menu.
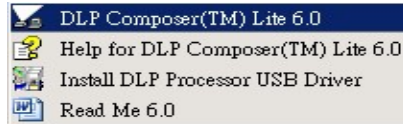
Follow the instruction on the screen to press any key and wait for the installation done.
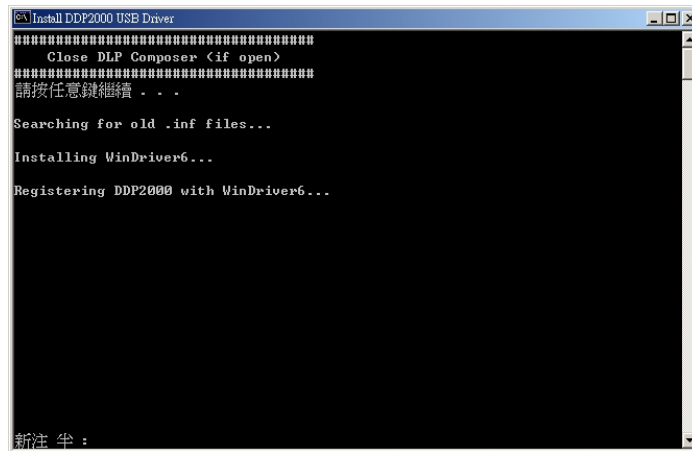
And copy the file "**FlashDeviceParameters.txt**" into the **C:\ Program Files\ DLP Composer Lite X.X**

Operating procedure

1. Connect the Projector and PC via USB cable.

2. Double-click **[DLP Composer (TM) Lite].** The following screen will appear.


3. Select **[Edit]/[Preferences]/[Communications]** to check **USB** in **[Projector Interface]**.
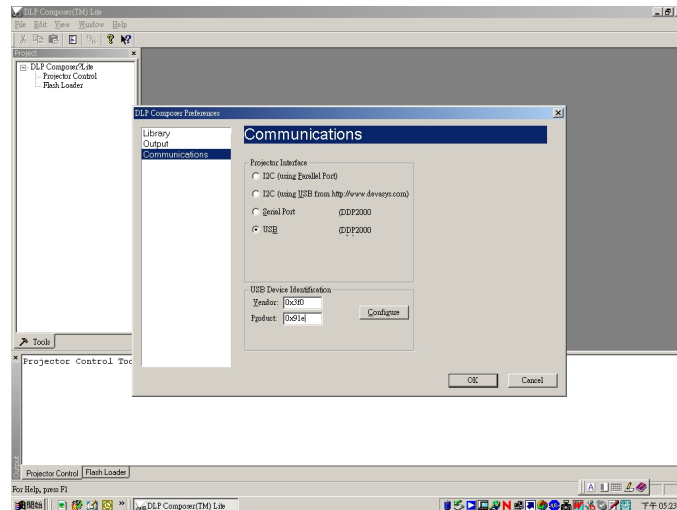
4. Click **[USB Device Identification].**

5. Set the items on the **[Vendor 0x451, Product 0x2000].**

6. Click **[OK]**

7. Move the cursor to **[Flash Loader]** on the Project window of **[DLP Composer Lite]**. (The **[Flash Loader]** screen will appear.)

8. Click **[Browse]** and select where the firmware **[xxxxxxxxx.img]** is for download.

9. Make sure **[Skip Boot Loader Area]** is with a check.

10. Press Menu and Power buttons constantly and then give power supply (switch power on). Power LED and Lamp LED will become amber. That indicates the projector is in the download mode. At this moment, you can release these two buttons.

11. Click **[Start Download]**. When the dialog box is displayed, click **[Yes]**.

Put checkmark next to [Skip Boot Loader Area]，VALUE SETTING 32KB

Click [Browse] and select

Click [Start Download]

⑤ Click [Yes].
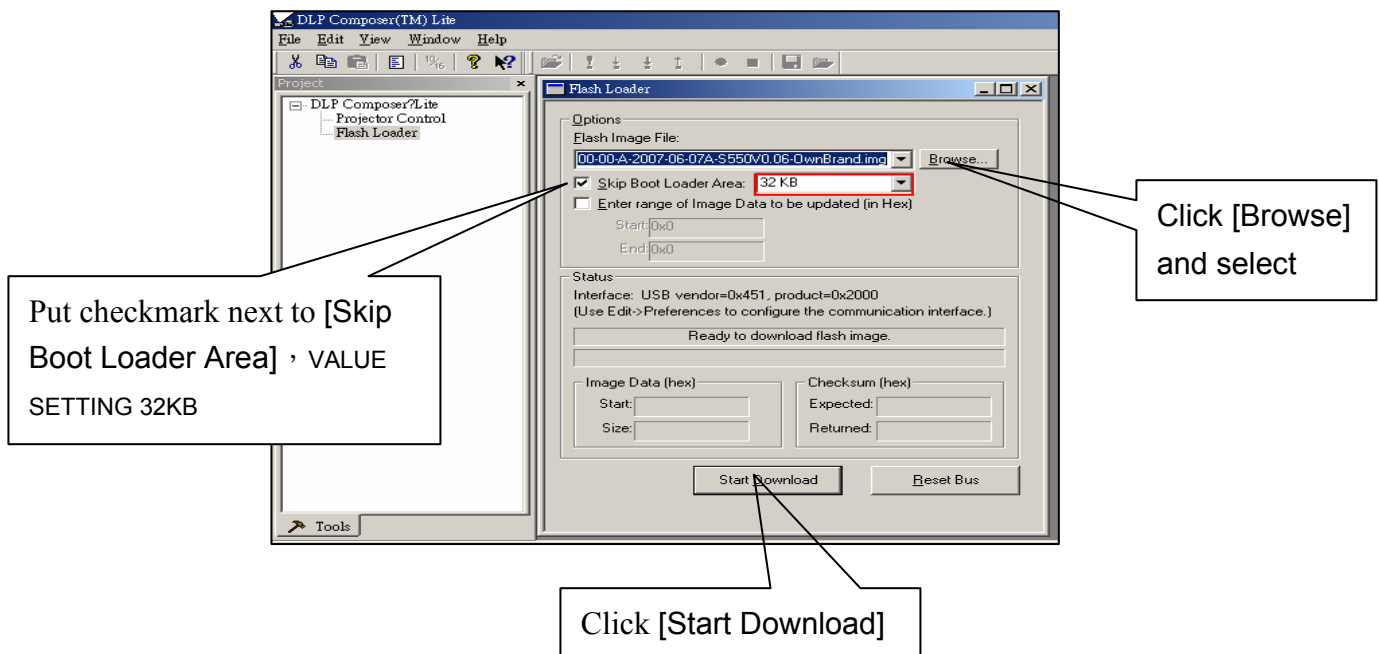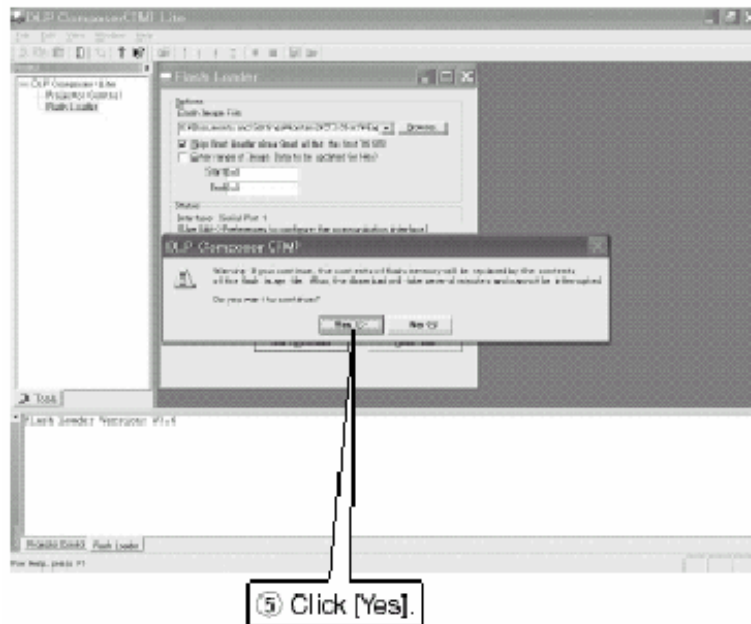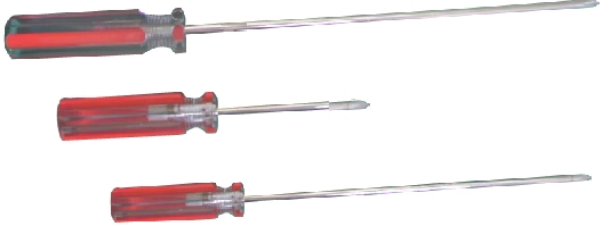
12. Wait for the Completion of Burning and then remove Power Cord and Burning Cord

Note: In case, the device manager can't recognize the DDP2000 as blow, please disable this device. This will not affect upgrade procedure.

3. Machine Disassembly and Replacement

3.1. Tools
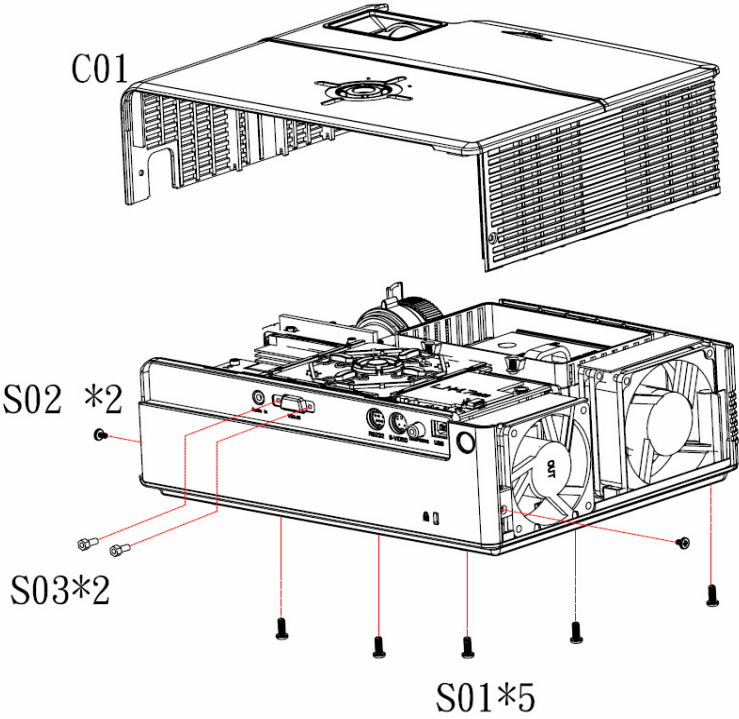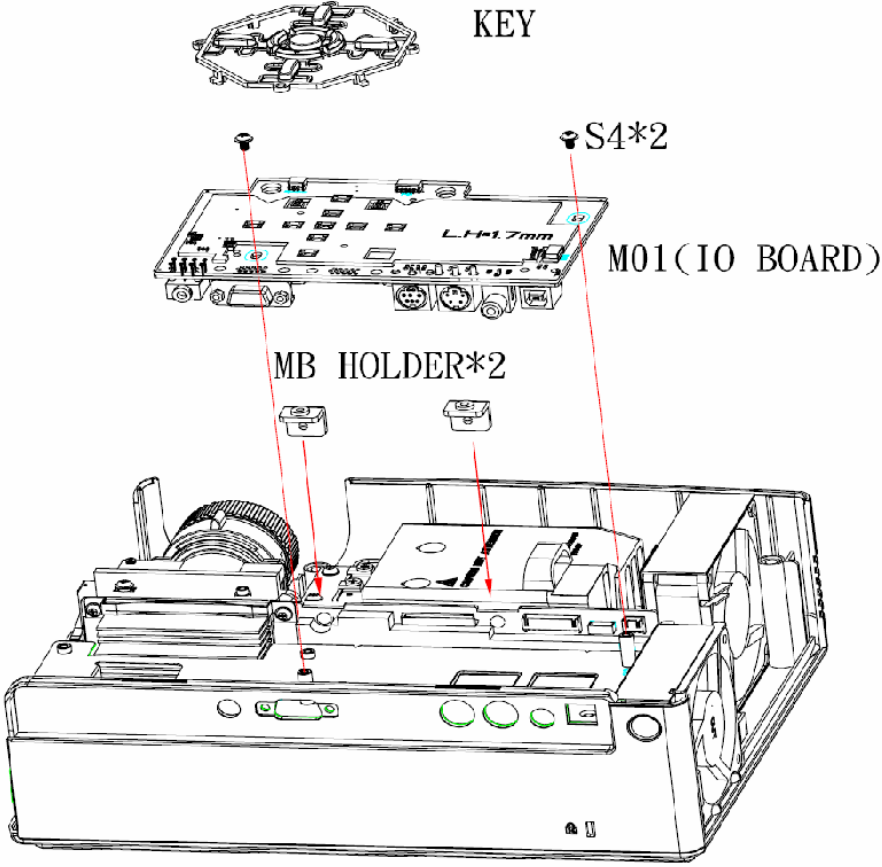
Item	Photo
Long Nose Nipper	
Hex Sleeves 5mm	
Screw Bit(+):107 Screw Bit(+):101 Screw Bit(+):102	
Anti-static wrist strap	
Anti-static wrist gloves	
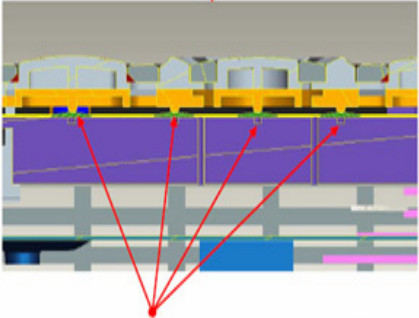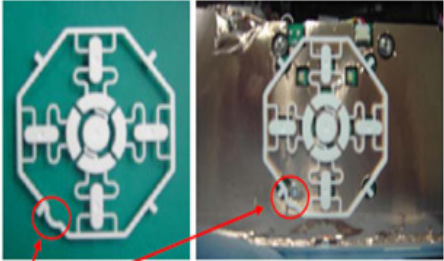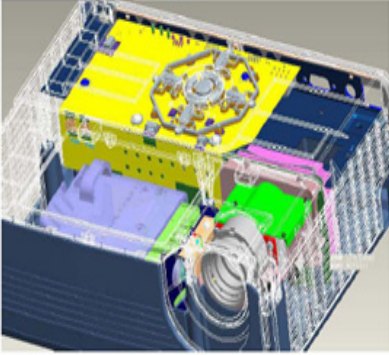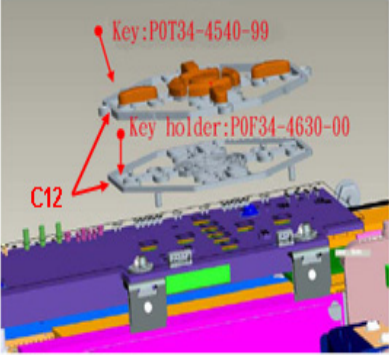
3. 2. **Disassembly Procedure**
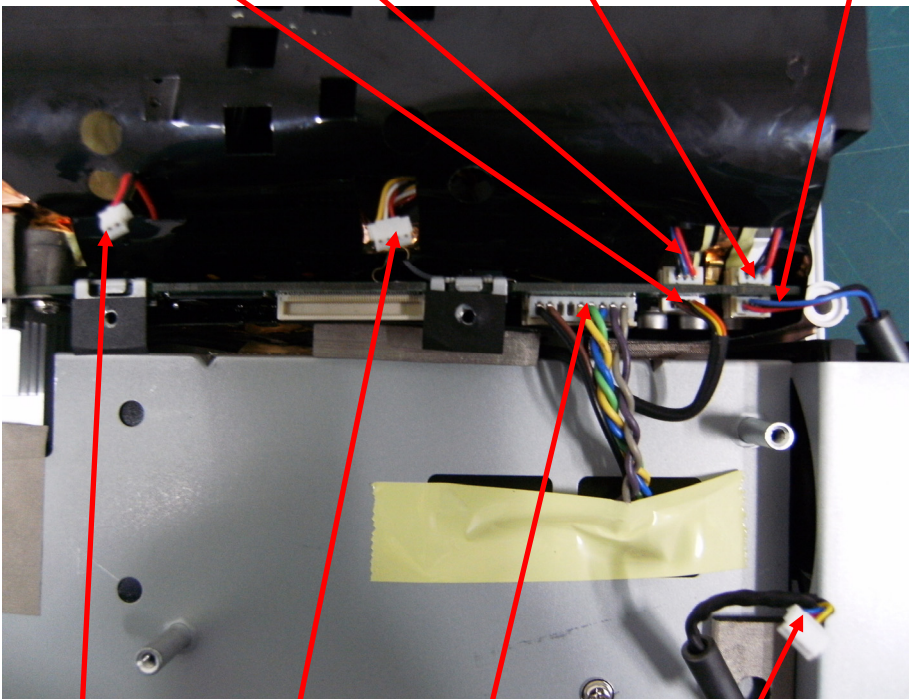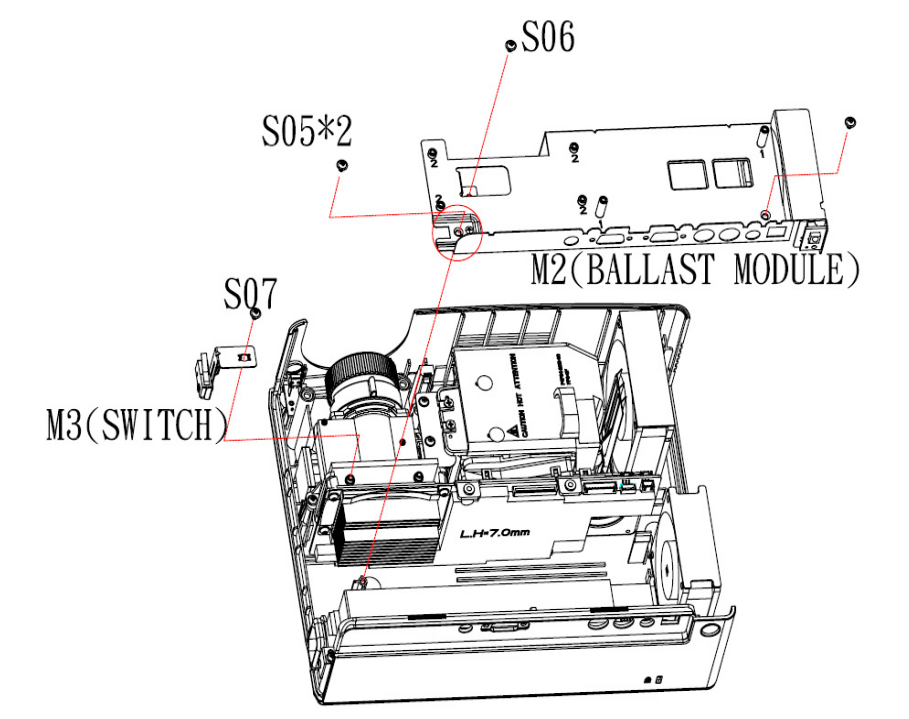
Warning
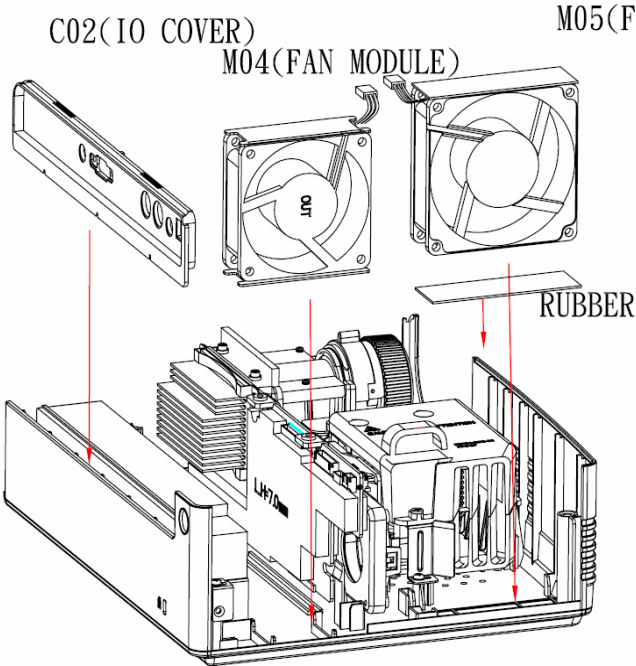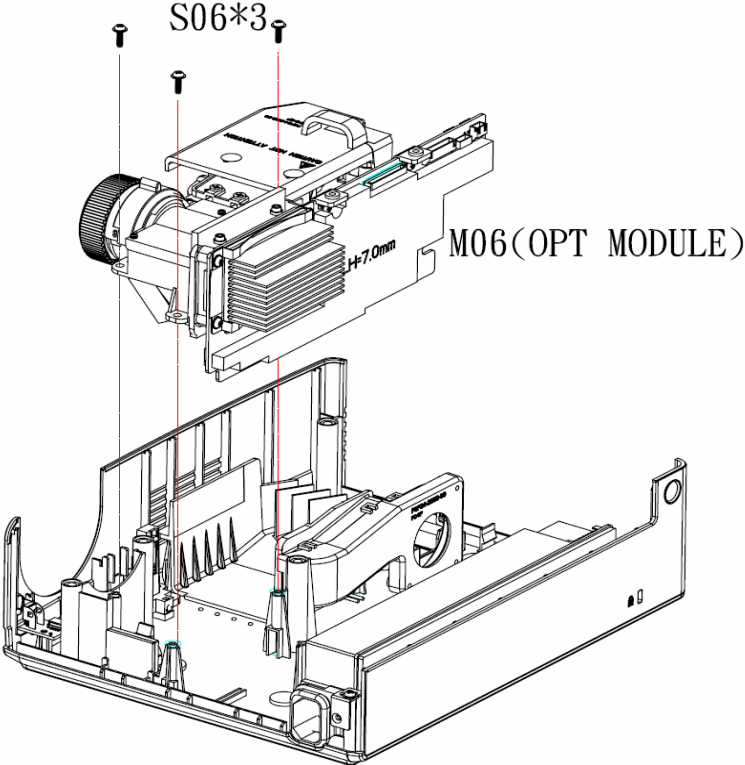
♦ Put on the Static Electricity Ring when starting for repair.

♦ Repair Environment suggest in Clean-room class 10000. Do not remove Optical Engine or DMD panel outside the clean room. Please return the optical engine to supplier if your repair condition can not meet the requirement.
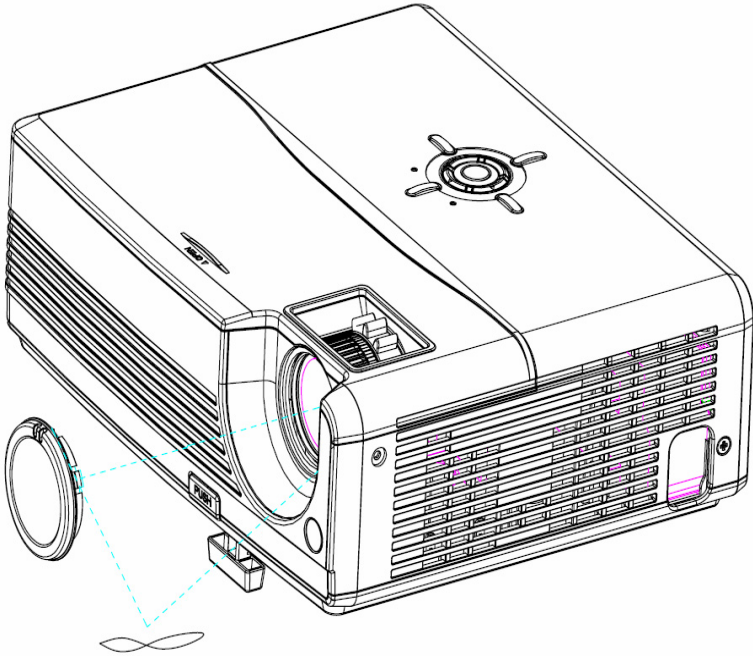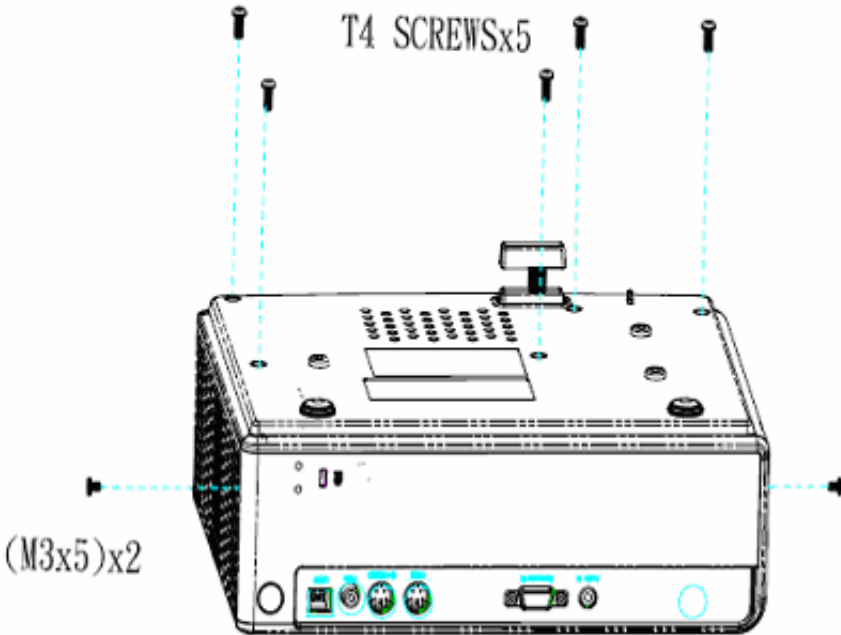
♦ While screwing or unscrewing screws, please keep the screwdriver straight. Keeping screwdriver inclined will damage the screw holes.

♦ Please turn off the power before replacing any parts.

♦ Please wait for the projector lamp cooling down and turn off the power before changing it. Never touch or hit the lamp module when replacing the lamp.

♦ When you replace the projector lamp, never touch the new lamp with your bare hands. The invisible residue left by the oil on your hands may shorten the lamp life. Use lint-free gloves or finger cots are recommended.
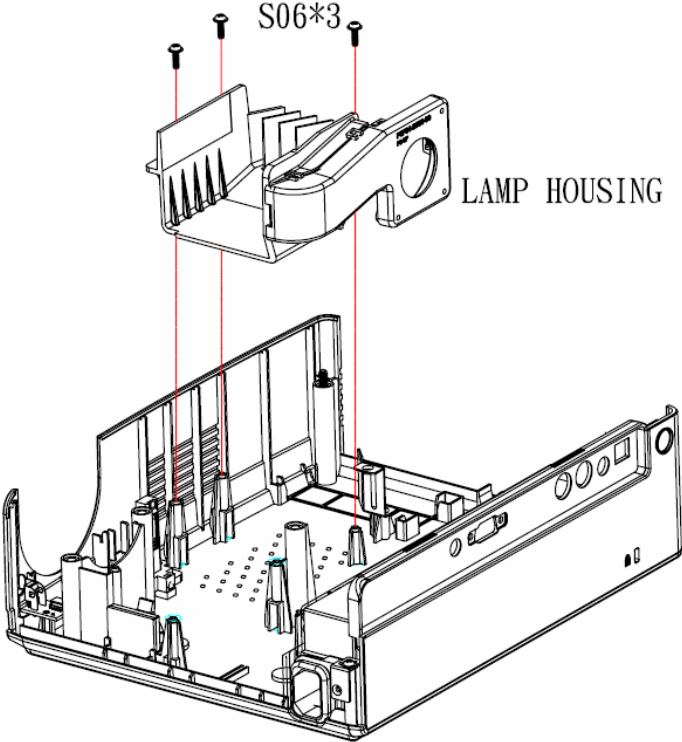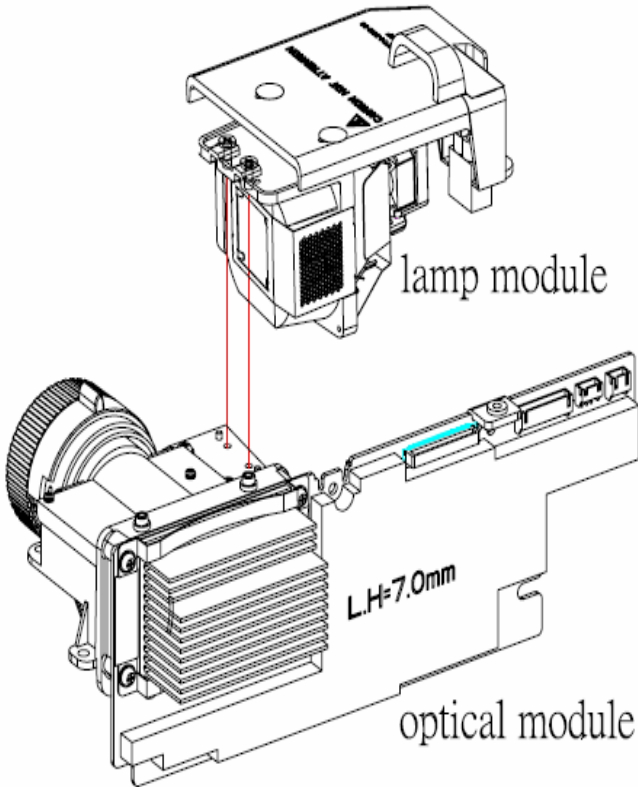
Step	Figure	Description
1		Press the power button to shutdown the projector and disconnect the power cord. If the lamp is hot, please do not start any procedure until the projector lamp cools down. Flip the projector and remove the lens cover.
2	T4 SCREWSx5 (M3x5)x2	1.Remove the screws S01 x5 on the back cover as shown. 2. Remove the screwsS02 x2 on the top cover
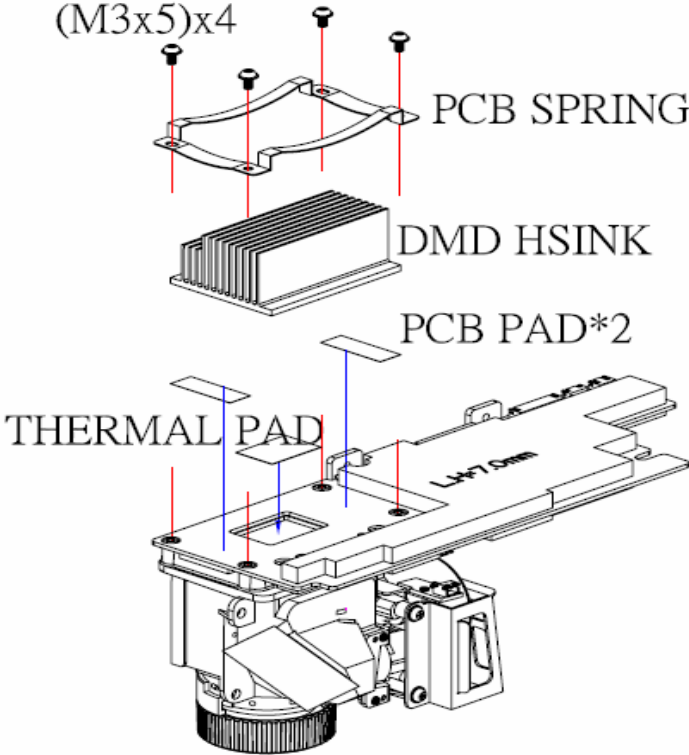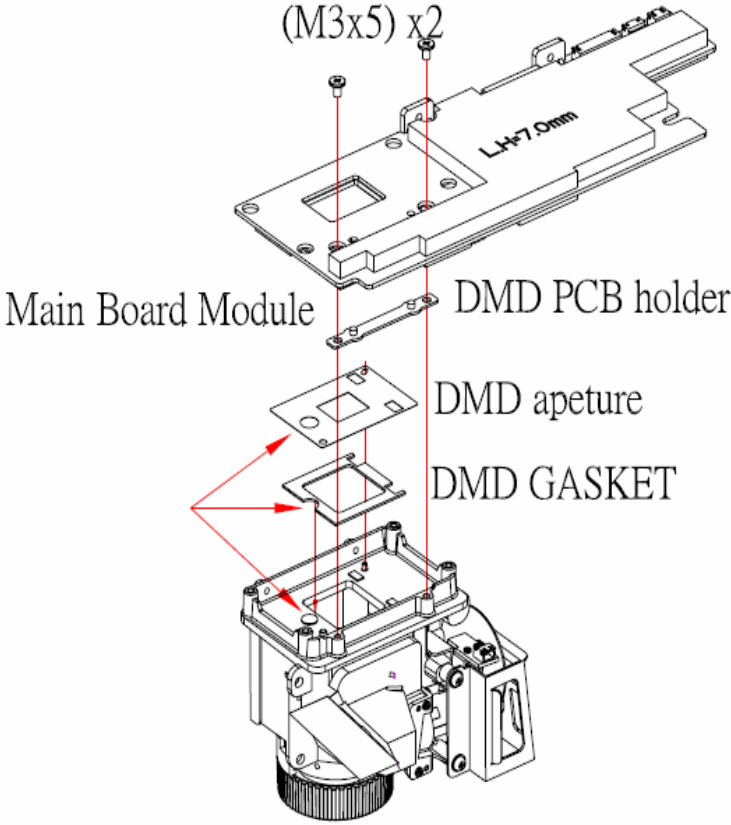
Step	Figure	Description
3	C01 S02 *2 S03*2 S01*5	3. Remove the Top Cover 4. Remove the screwsS03 x2 on the I/O cover
4	KEY S4*2 M01(IO BOARD) L.H=1.7mm MB HOLDER*2	1.Remove the Key 2.Remove the screws S04x2 on the I/O board 3.Remove the IO board
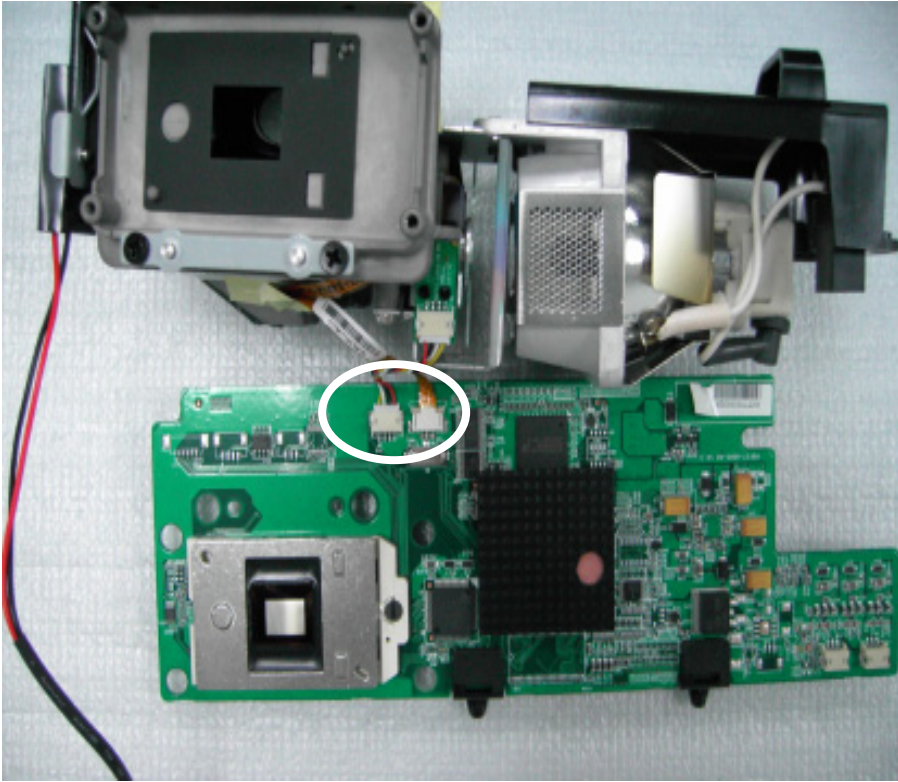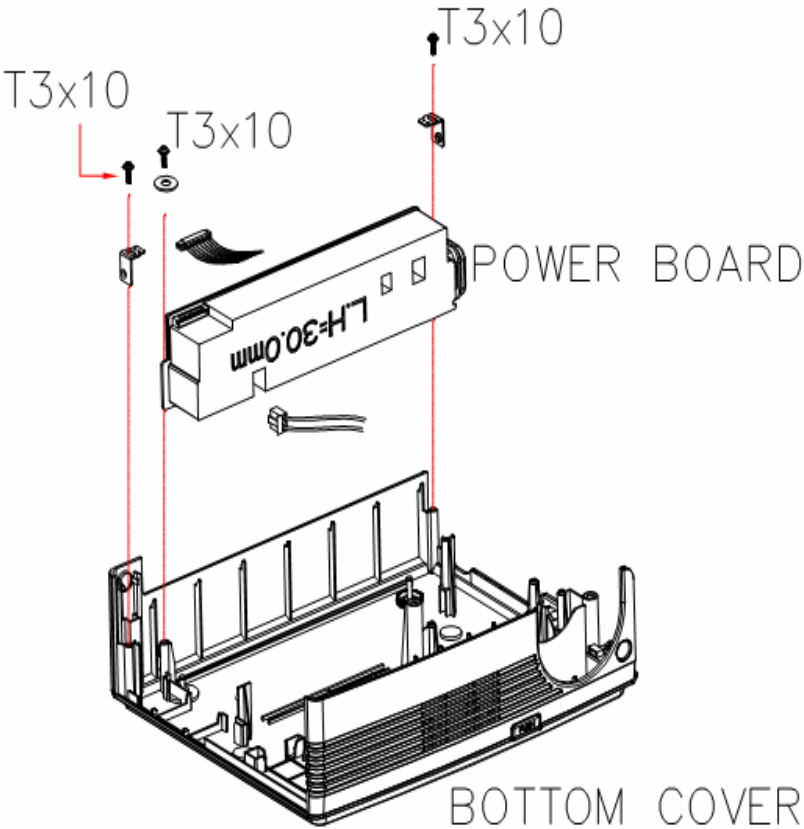
Step	Figure	Description
Note	 **Part of the key holder is sticking out and situated at the screw on the I/O board ,to prevent incorrect installation of keypad**　　**Once button can directly touch the metal spring**	Add one more key holder under the KEY. Detail procedure as left.
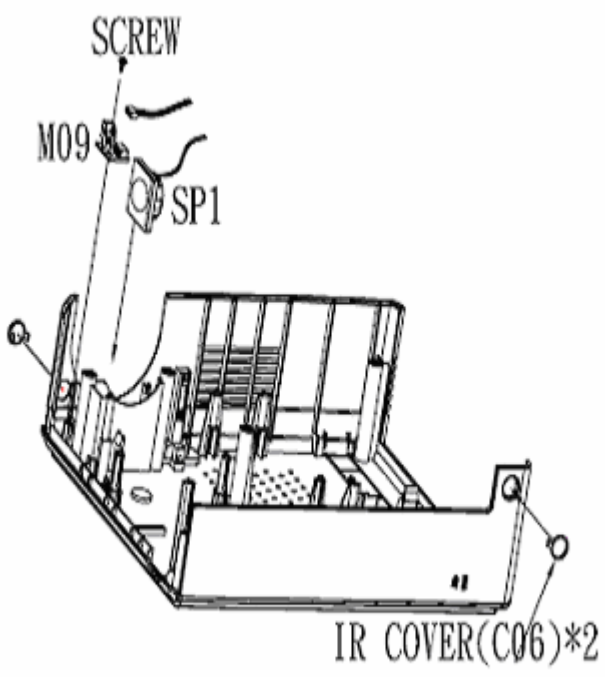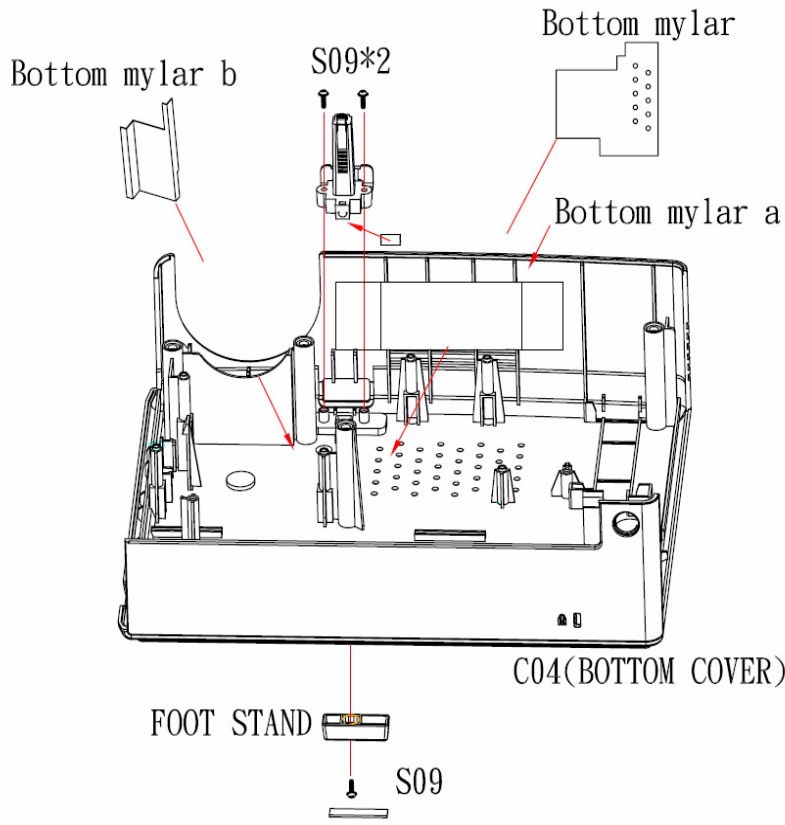
Step	Figure	Description
5	5pin for Ballast　　O/E Fan　　Lamp Fan　　Right Fan Speaker　　Front IR　　7 pin for Power　　Black　IR	1.Show you what the connector should be. 2.Remove all the wires
6	S06 S05*2 M2(BALLAST MODULE) S07 M3(SWITCH) L.H=7.0mm	1.Remove all screws on the Ballast module Note:　screws S05　is connect ground 2. Remove the one screw S07 and safety switch
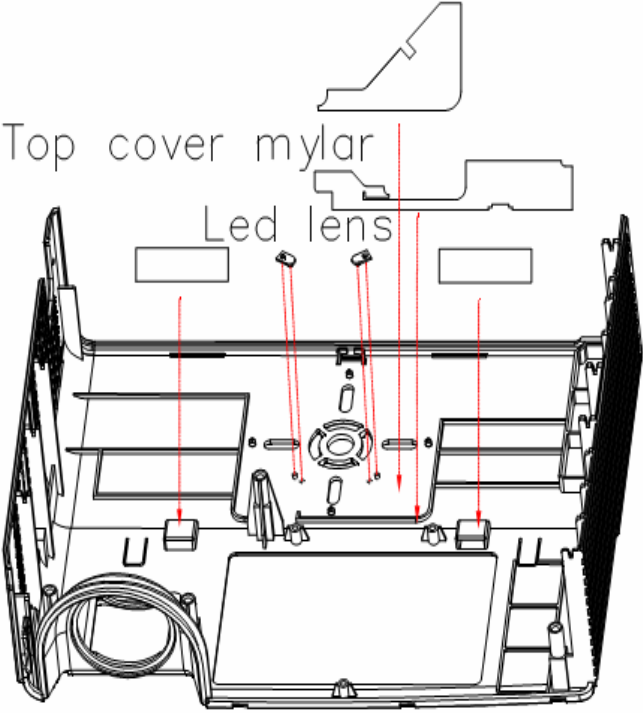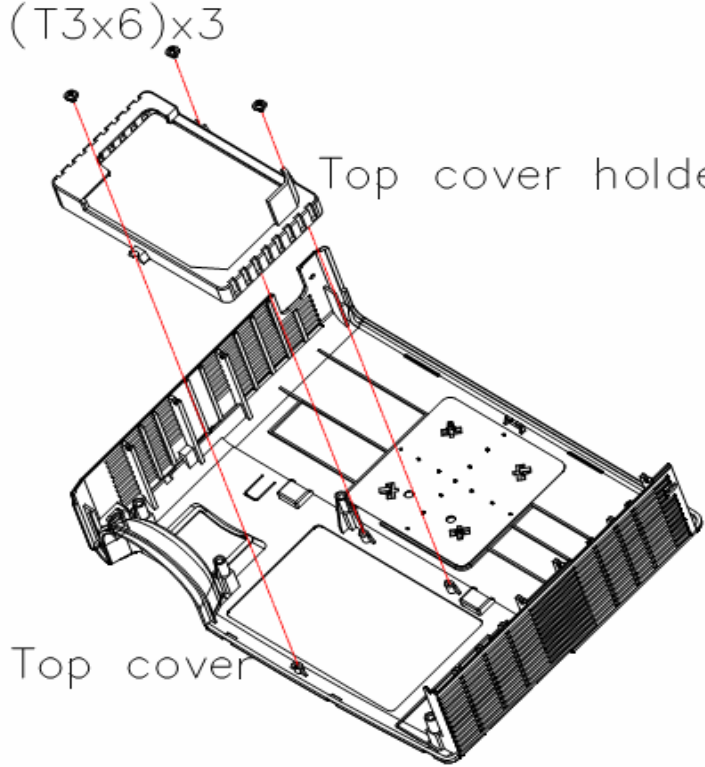
Step	Figure	Description
7	C02(IO COVER) M04(FAN MODULE) M05(FAN MODULE) RUBBER	1. Remove the I/O cover 2. Remove the FAN Module(M04&M05)
Note	S06*3 M06(OPT MODULE)	1.Remove the screws S06 On the optical engine 2. Remove the optical engine
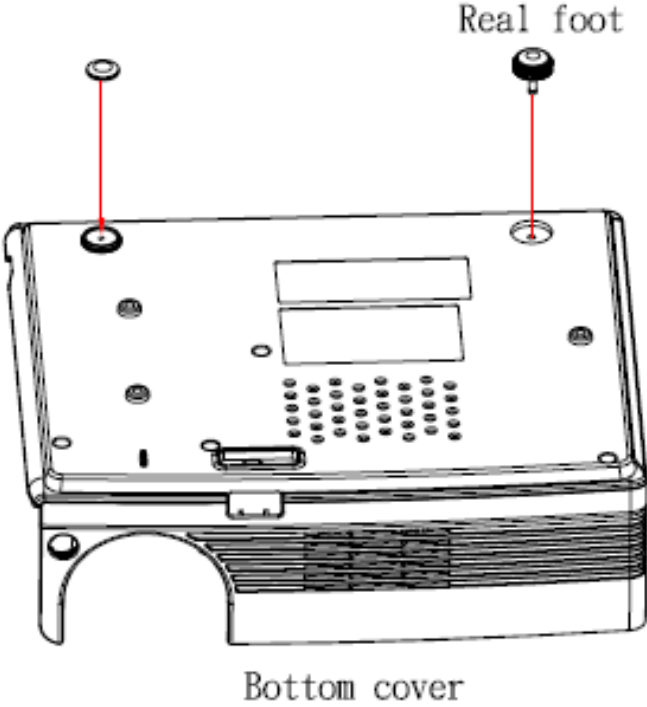
Step	Figure	Description
8	S06*3 LAMP HOUSING	Remove the Lamp house
9	lamp module L.H=7.0mm optical module	Loosen screws and remove the lamp module from optical engine. Note: Those screws and mesh are included in the Lamp module.

Step	Figure	Description
10	(M3x5)x4 PCB SPRING DMD HSINK PCB PAD*2 THERMAL PAD LH=7.0mm	Loose the screws and remove the DMD Hsink
11	(M3x5) x2 LH=7.0mm Main Board Module DMD PCB holder DMD apeture DMD GASKET	Loose the screws and remove the mainboard and DMD
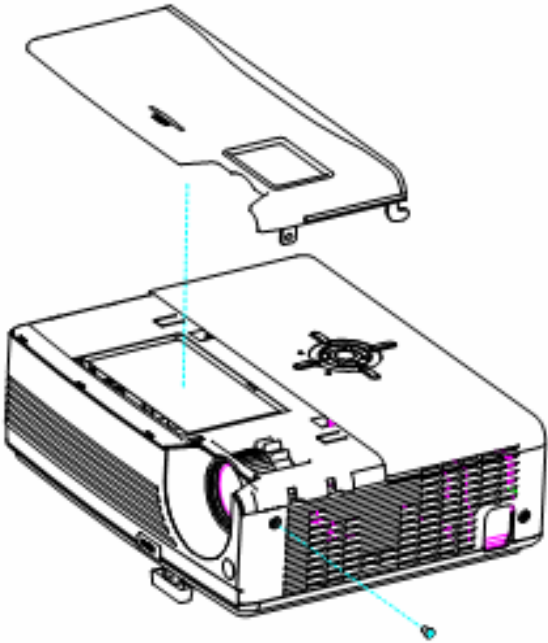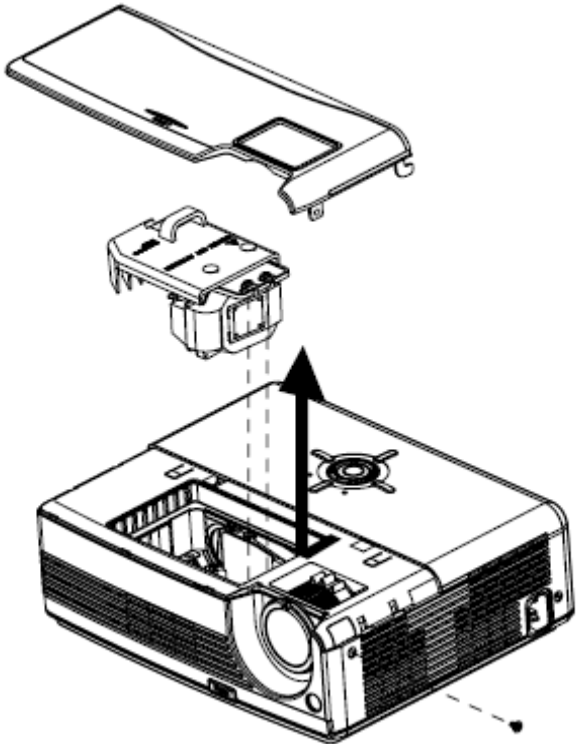
Step	Figure	Description
Note		Note: 2 wires still have connection under mainboard. Disconnect these two wires before remove mainboard.
12		Loosen screws and remove the Power module from Bottom cover

Step	Figure	Description
13	SCREW M09 SP1 IR COVER(C06)*2	1.Remove Speaker 2.Loosen the screw and remove front IR
14	Bottom mylar b S09*2 Bottom mylar Bottom mylar a C04(BOTTOM COVER) FOOT STAND S09	Remove the foot stand
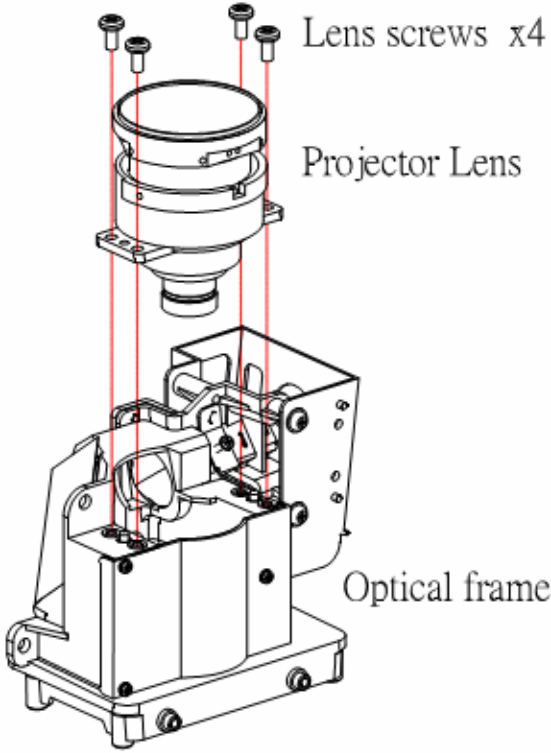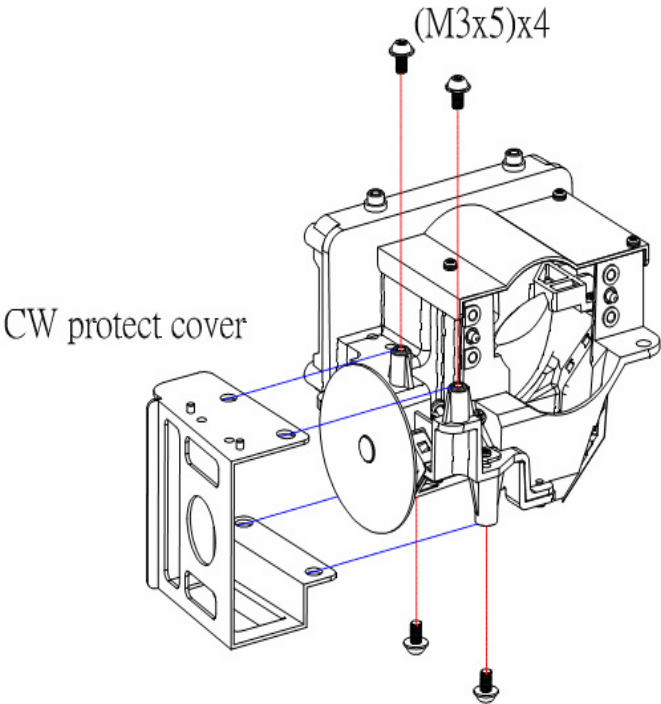
Step	Figure	Description
15	Top cover mylar Led lens Top cover	Remove led lens and Top cover
16	(T3x6)x3 Top cover holder Top cover	Loosen the screws and Remove the Top cover holder
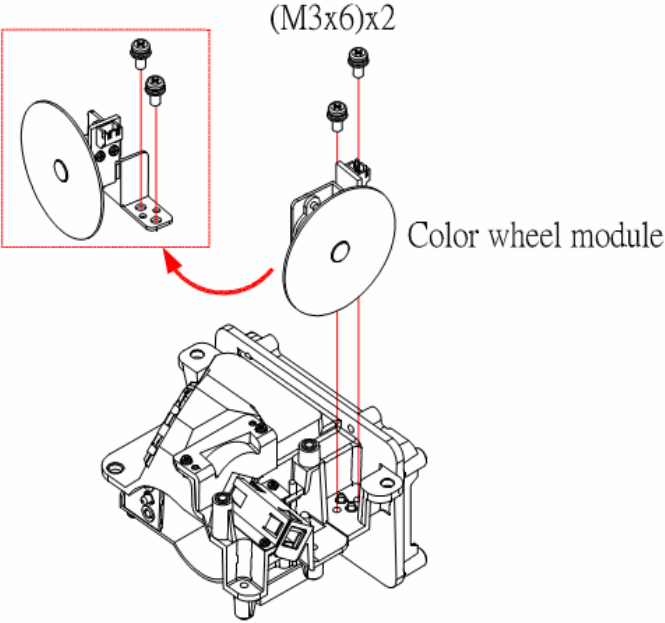
Step	Figure	Description
17.	Real foot Bottom cover	Remove the foot stand

Disassembly Lamp Module

Step	Figure	Description
1		• Turn off the projector. • If the projector is installed in a ceiling mount, remove it from the mount. • Unplug the power cord • Loosen the screw in the side of the lamp cover and slide forward and remove the cover.
2		• Loosen the three screws of lamp module • Pull the lamp module out by lamp handle. • Insert the new lamp module into the projector and tighten the screws. • Replace the lamp cover and tighten the screws. • Reset the lamp timer. Press **MENU**, go to **Main MENU > SETTING >LAMP COUNTER RESET>YES**, and press **MENU**. Note: Turn on the projector. If the lamp does not turn on after the warm-up period, please reinstall the lamp.

3.3. **Disassembly the Optical engine(Lens&Color Wheel)**

Step	Figure	Description
1	Lens screws x4 Projector Lens Optical frame	**Disassembly the Lens** ● Remove the Lens screws ● Take the Lensr off.
2	(M3x5)x4 CW protect cover	**Disassembly the Color Wheel** ● Remove the screws(M3x5)x4 ● Remove Color Wheel project cover

3	(M3x6)x2 Color wheel module	• Remove the screws M3x6x2 • Remove Color wheel module

4. Troubleshooting and Verifying the Repair

This chapter provides technicians with electronic background how to maintain the product. Moreover, you can get the appropriate operation to solve some complicated problems of component repairing and professional problems.

4.1. Troubleshooting

Warning

■ Do not directly look into the lens to avoid eyesight damages.

■ The projector is equipped with ventilation holes (intake) and ventilation holes (exhaust). Do not block or place anything near these slots, or internal heat build-up may occur, causing picture degradation or damage to the projector.

Confirm Software and hardware

(1) Confirm FW version and lamp using hours

(2) Confirm LED indicator

LED Type	Color	Status	Meaning
Lamp LED	Green	Flash	The projector is in standby mode.
Temp LED	Off	-	
Lamp LED	Green	Solid	The projector system has some problems with its fan,
Temp LED	Green	Flash	so the projector cannot start up.
Lamp LED	Green	Solid	The lamp is in good condition and is projecting at
Temp LED	Green	Solid	maximum brightness.
Lamp LED	Amber	Solid	The lamp has reached its end of life and must be
Temp LED	Green	Solid-	changed soon. The lamp will continue to operate until it fails. Change the lamp. If the lamp is off, then the ballast will become malfunction.
Lamp LED	Amber	Solid	The projector is shutting the fan motor is cooling the
Temp LED	Amber	Solid-	lamp for Shutdown. Do not unplug the power cable or turn the power switch off before the Lamp LED Change to Flashing. The fan motor will turn off when the lamp has cooled.
Lamp LED	Green	Solid	Temperature is too high. The lamp will turn off. The
Temp LED	Red	Flash	fan motor is cooling the lamp.
Lamp LED	Amber	Solid	The lamp ignition failed. If temperature is too high,
Temp LED	Off	-	the fans will be cooling the lamp.

Flash : 2Hz

(3) Confirm cable connection well.

Note: Swapping modules that may be defective with others known to be good is generally an ideal way to find the module responsible for the problem. A failure symptom is rarely caused by more than one module, so you will not usually need to replace more than one to correct a particular failure. Whatever main board, ballast, IR board, power board, lamp module or optical engine are all suitable to check by swapping modules.

Power Source Troubleshooting:
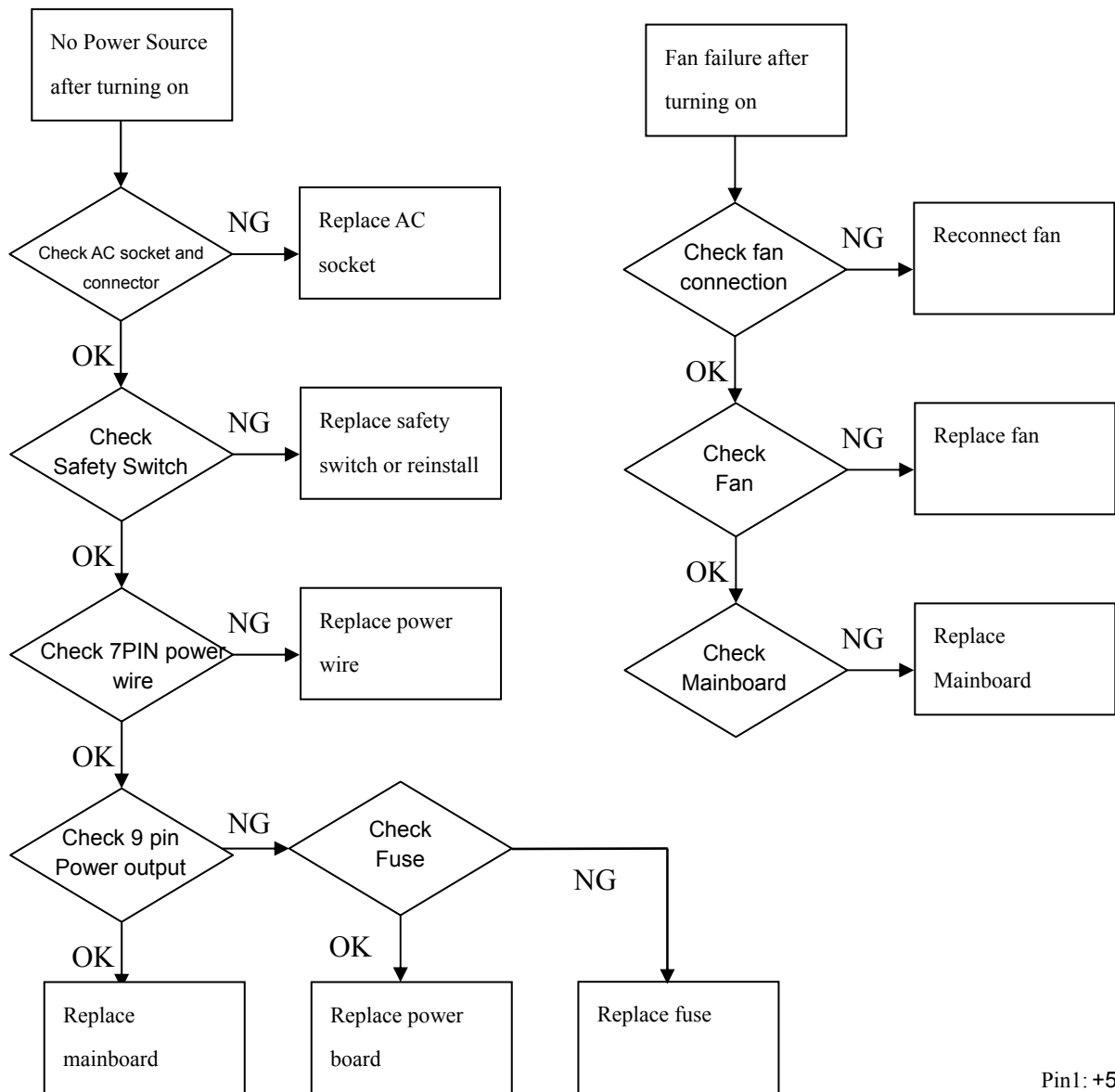
How to check the power board?
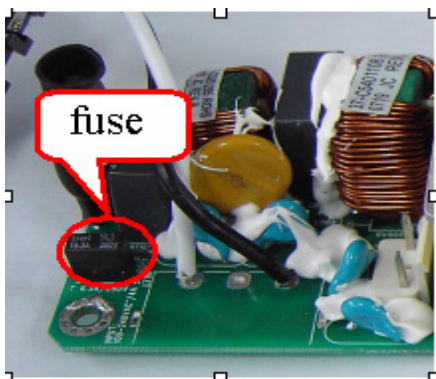
- check the 380v output on connector 3 see page 44
- check the fuse on the power board

How to check the main board?
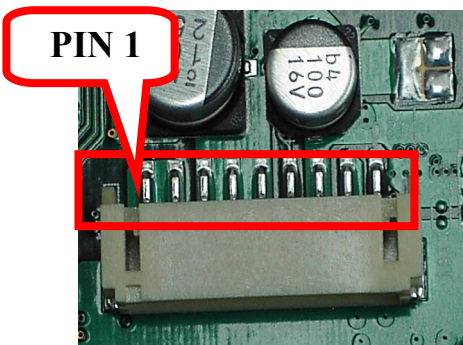
- check the voltage on the 9 pins.
- Other M/B information in Appendix D.

Pin1: +5VS

Pin2: GND

Pin3: +5VS

Pin4:TP40
(function:Change
power net)

Pin5: GND

Pin6: GND

Pin7: GND

Pin8: +12V

Pin9: +12V

```
┌─────────────────┐                         ┌─────────────────┐
│ Fail to light up│                         │   No Volume     │
└────────┬────────┘                         └────────┬────────┘
         │                                           │
         ▼                                           ▼
    ╱Check LED╲    NG  ┌──────────────┐        ╱ Check ╲   NG  ┌──────────┐
   ╱ indication ╲─────▶│Refer to LED  │       ╱ Speaker ╲─────▶│ Replace  │
   ╲            ╱      │indicator and │       ╲         ╱      │ Speaker  │
    ╲         ╱        │follow        │        ╲       ╱       └──────────┘
       OK             │indicative    │          OK
        │             │actions       │           │
        ▼             └──────────────┘           ▼
```

Fail to light up

- Check LED indication — NG → Refer to LED indicator and follow indicative actions
- OK → Check Lamp life — NG → Replace Lamp Module
- OK → Check Power board 380V output — NG → Replace Power board
- OK → Check Ballast — NG → Replace Ballast
- OK → Check Mainboard — NG → Replace Mainboard
- OK → Check CW Rotation while power on — NG → Replace Optical Engine

No Volume

- Check Speaker — NG → Replace Speaker
- OK → Check I/Oboard — NG → Replace I/Oboard
- OK → Check Mainboard — NG → Replace Mainboard

Video Signal Troubleshooting

Computer No Signal → Check Source → (NG) Turn on Source / (OK) → Check Cable → (NG) Replace Cable / (OK) → Check monitor in signal → (NG) Replace I/Oboard / (OK) → Check u5 Output signal → (NG) Replace Mainboard

Video No Signal → Check Source → (NG) Turn on Source / (OK) → Check Cable → (NG) Replace Cable / (OK) → Check I/O Board → (NG) Replace I/O Board → Check Mainboard → (NG) Replace Mainboard

```
┌─────────────────┐                              ┌─────────────────┐
│  Image abnormal │                              │  Color abnormal │
└────────┬────────┘                              └────────┬────────┘
         │                                                │
         ▼                                                ▼
    ◇─────────◇                                      ◇─────────◇        NG   ┌──────────────┐
   Power on again and                              Check input cable ──────▶│ Adjust       │
     reset OSD                                     and signal setting        │ Input signal │
    ◇─────────◇                                      ◇─────────◇             └──────────────┘
         │ OK                                             │ OK
         ▼                                                ▼
    ◇─────────◇    NG   ┌──────────────┐             ◇─────────◇        NG   ┌──────────────┐
  Check input cable ──▶│ Adjust       │            Check Color ────────────▶│ Adjust Color │
   and signal setting   │ Input signal │            Wheel Index              │ Wheel Index  │
    ◇─────────◇         └──────────────┘             ◇─────────◇             └──────────────┘
         │ OK                                             │ OK
         ▼                                                ▼
    ◇─────────◇    NG   ┌──────────────┐             ◇─────────◇        NG   ┌──────────────┐
     Check ───────────▶│ Replace      │               Check ──────────────▶│ Replace      │
    Mainboard           │ Mainboard    │             Mainboard              │ Mainboard    │
    ◇─────────◇         └──────────────┘             ◇─────────◇             └──────────────┘
         │ OK                                             │ OK
         ▼                                                ▼
    ◇─────────◇    NG   ┌──────────────┐             ◇─────────◇        NG   ┌──────────────┐
     Check ───────────▶│ Replace      │               Check ──────────────▶│ Replace      │
   Optical Engine       │ Optical Engine│            Optical Engine          │ Optical Engine│
    ◇─────────◇         └──────────────┘             ◇─────────◇             └──────────────┘
```

Operation Function Troubleshooting

```
┌─────────────────┐                              ┌─────────────────┐
│ Remote Control  │                              │ Button Failure  │
│ Failure         │                              │                 │
└────────┬────────┘                              └────────┬────────┘
         │                                                │
         ▼                                                ▼
      ╱───────╲      NG    ┌─────────────┐            ╱───────╲      NG    ┌─────────────┐
     ╱  Check  ╲──────────▶│ Replace     │           ╱  Check  ╲──────────▶│ Replace     │
     ╲ Battery ╱           │ Battery     │           ╲ I/Oboard╱           │ I/Oboard    │
      ╲ Level ╱            └─────────────┘            ╲───────╱            └─────────────┘
       ╲───╱                                           ╲───╱
    OK   │                                          OK   │
         ▼                                                ▼
      ╱───────╲      NG    ┌─────────────┐            ╱───────╲      NG    ┌─────────────┐
     ╱  Check  ╲──────────▶│ Replace     │           ╱  Check  ╲──────────▶│ Replace     │
     ╲ Remote  ╱           │ Remote      │           ╲Mainboard╱           │ Mainboard   │
      ╲Control╱            │ Control     │            ╲───────╱            └─────────────┘
       ╲───╱               └─────────────┘
    OK   │
         ▼
      ╱───────╲      NG    ┌─────────────┐
     ╱  Check  ╲──────────▶│ Replace     │
     ╲   IR    ╱           │ IR          │
      ╲───────╱            └─────────────┘
    OK   │
         ▼
      ╱───────╲      NG    ┌─────────────┐
     ╱  Check  ╲──────────▶│ Replace     │
     ╲I/Oboard ╱           │ I/Oboard    │
      ╲───────╱            └─────────────┘
         │
         ▼
      ╱───────╲            ┌─────────────┐
     ╱  Check  ╲──────────▶│ Replace     │
     ╲Mainboard╱           │ Mainboard   │
      ╲───────╱            └─────────────┘
```
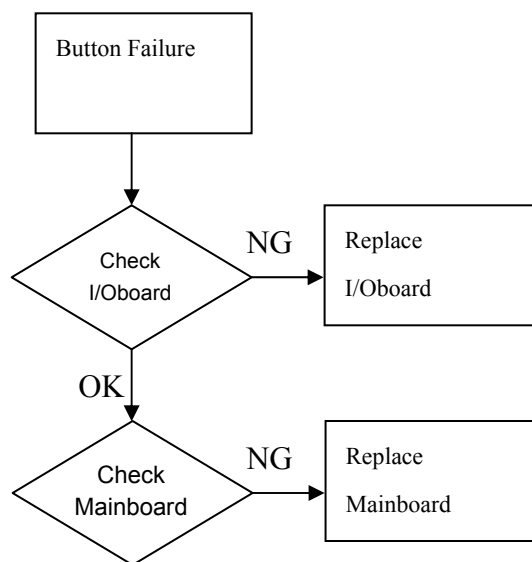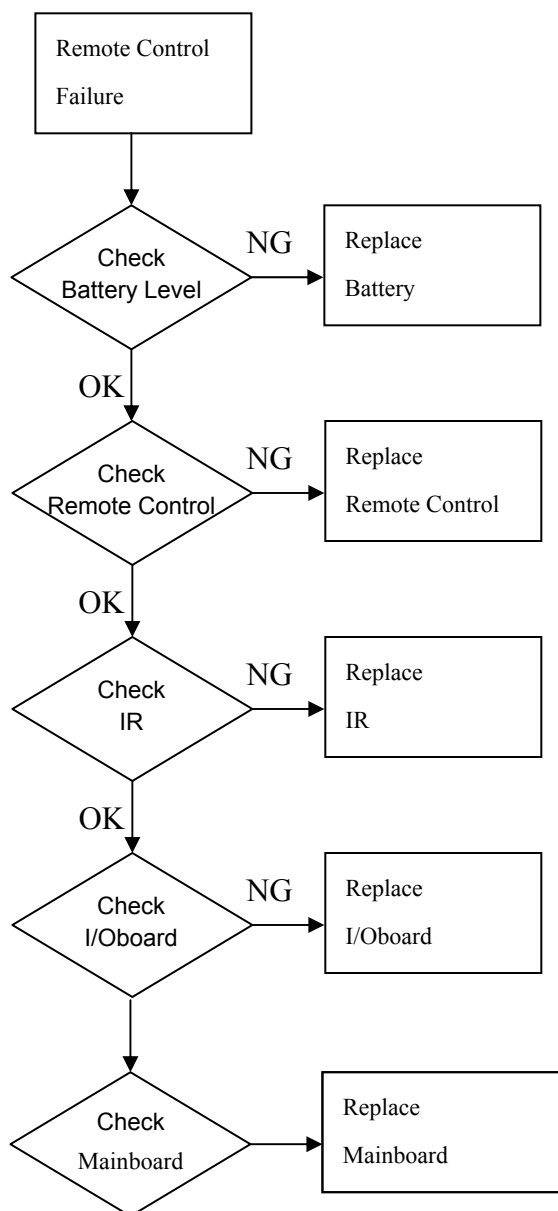
4. 2. **Verifying the Repair**

After repairing projector (Dissembling and assembling projector), Repair center should verify the quality of repaired unit.

(1) Signal test (Each I/O can function normally)

Connect all connector to the jacks one after the other to check whether each channel can project normally

I/O port	Monitor In (VGA)
Test Equipment	Standard Pattern generator (Ex. Quantum data)
Signal format	800*600 60Hz

I/O port	Video
Test Equipment	Standard Pattern generator (Ex. Quantum data) or DVD player
Signal format	NTSC

I/O port	S-Video
Test Equipment	Standard Pattern generator or DVD player
Signal format	480i

I/O port	USB
Test Equipment	PC and Remote controller
Test method	1. Connect PC (laptop) VGA output to projector. Set PC (laptop) output signal to projector 2. Connect projector USB to PC. Press remote controller page up/down to scroll presentation file up and down (ex Microsoft office series)

I/O port	Audio input
Test Equipment	Connect audio input to audio output of DVD player
Signal format	480i

(2) Operation test

<u>**Buttons operation**</u>

Button description	Test criteria
Power button	1. Mechanical motion (Up & Down) should be free from getting stuck when pressing the button 2. Press "power" button and projector will switch on
Menu	1. Mechanical motion (Up & Down) should be free from getting stuck when pressing the button. 2. Press Menu button can make projector function normally.
4-way button	1. Mechanical motion (Up & Down) should be free from getting stuck when pressing the 4-way button. 2. Press 4-way button can be used to scroll through OSD (On-Screen Display) menus and make adjustments.
Source	1. Mechanical motion (Up & Down) should be free from getting stuck when pressing the button 2. Press Source button manually selects an input source
Resync	1.Mechanical motion (Up & Down) should be free from getting stuck when pressing the button 2.Press Resync button automatically adjusts frequency and phase

<u>**Foot adjuster operation**</u>

Foot adjuster.	Test criteria
Foot adjuster button	Foot adjusters should stretch downward smoothly by pressing the foot adjuster buttons on the two sides

<u>**Zoom ring and Focus ring**</u>

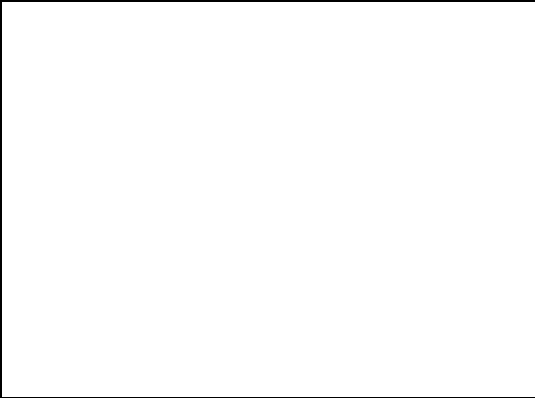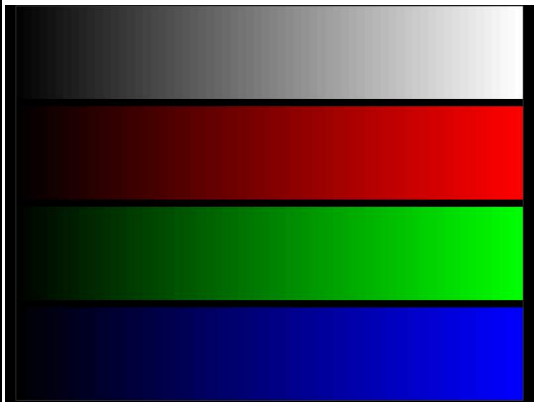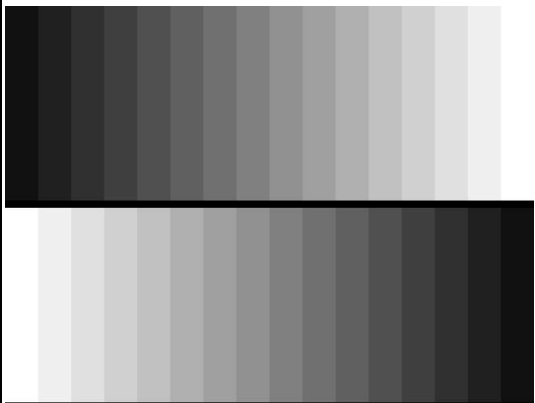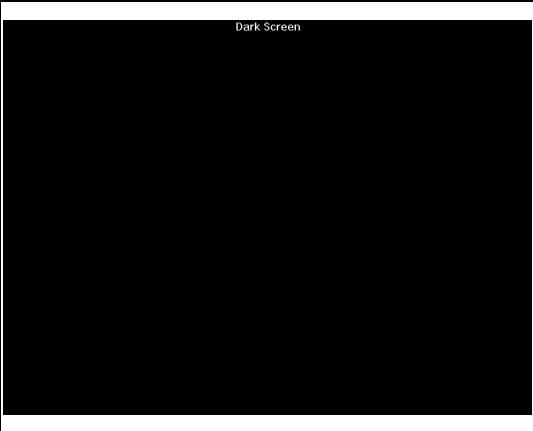| Ring	Test criteria
Zoom ring	Mechanical motion of rotating Zoom ring to the end of right and left by hand should be free from getting stuck.
Focus ring	The feeling of rotating Focus ring to the end of right and left by hand should free from seizing

(3) Image Quality

Projected image size: 60 inches (diagonal length)

Zoom ring: Adjust zoom ring to wide (Maximum projection size)

SVGA

I/O port	Monitor In (SVGA)
Test Equipment	Standard Pattern generator (Ex. Quantum data)
Signal format	800*600 60Hz
Projected image size	60" in diagonal length

Test Pattern	Test criteria
	Full white Apparent color strip, bend and streak corner on the projected image are not allowable
	256 level RGB --256 level of RGB color should be distinguishable, at least Red color scales should be. -- For each RGB 256 levels, Noise or color deviation in R, G, and B single level respectively are acceptable.
	16 gray level --16 level of gray level color should be distinguishable --When Gamma selected to "RGB" Not distinguishable of 2 brightest levels /2 darkest levels are acceptable.

	Gray 10
	Blemish, stain are not allowable on the projected screen
	Full darkness
Dark Screen	Light leak in the non-effective area.
	Should be less than 0.7 lux(<0.7lux)

S-Video

I/O port	S-Video
Test Equipment	Standard Pattern generator (Ex. Quantum data)&DVD player
Signal format	480i
Criteria	No apparent color deviation on the projected image

Video

I/O port	Video
Test Equipment	Standard Pattern generator (Ex. Quantum data)&DVD player
Criteria	No apparent color deviation on the projected image

(4) Resolution

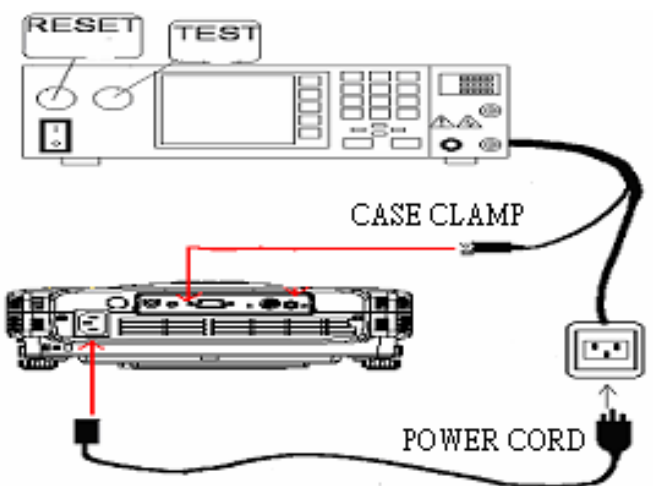| I/O port	SVGA
Test Equipment	PC
Test Method	1. Rotate Zoom ring to wide mode (Maximum projected image)
	2. Fix projector to set diagonal length of projected image to 60".
	3. Adjust focus ring to make resolution of 4 corners and center are balanced.
	4. Check he characters should be recognized easily.
	5. Rotate Zoom ring to tele mode (Minimum projected image)
	6. Adjust focus ring to make resolution of 4 corners and center are balanced.
	7. Check the characters should be recognized easily.

(5) Front and Rear infrared sensor

Device	Front and Rear infrared
Test Equipment	Remote controller
Test method	1. Cover front sensor and operate remote controller to test rear sensor
	2. Cover rear sensor and operate remote controller to test front sensor

(6) Brightness measurements

Test items	Brightness measurements
Test Equipment	Chroma automatic system (The alternative is CL-200)
Test method	Measure 9 points
Criteria	Marketing spec 20% off

(7) Safety test equipments

| Test items	Safety test
Test Equipment	Safety analyzer
Test method	1. Clamp the metal shell of SVGA connector 2. Plug the power cord to socket
Test criteria	GND 30A 3sec 100mΩ DCW 2506V 1sec 10000uA Single Step OFF

(8) Cosmetic standard for repaired projector

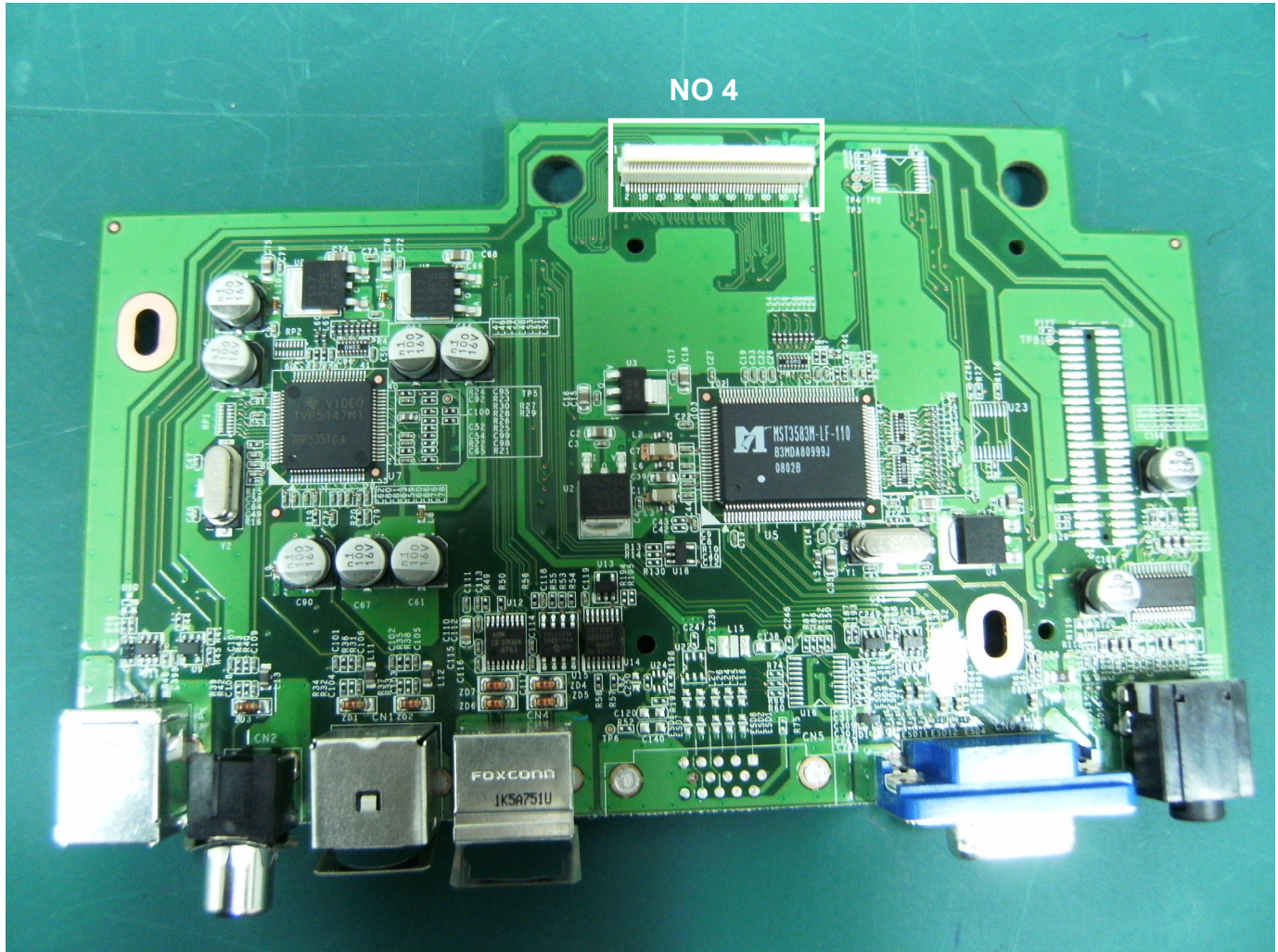Follow cosmetic standard for repair center.

5. Connector Information

This section provides each connector location on boards and function of each board. They will be useful for your detecting the defective boards.
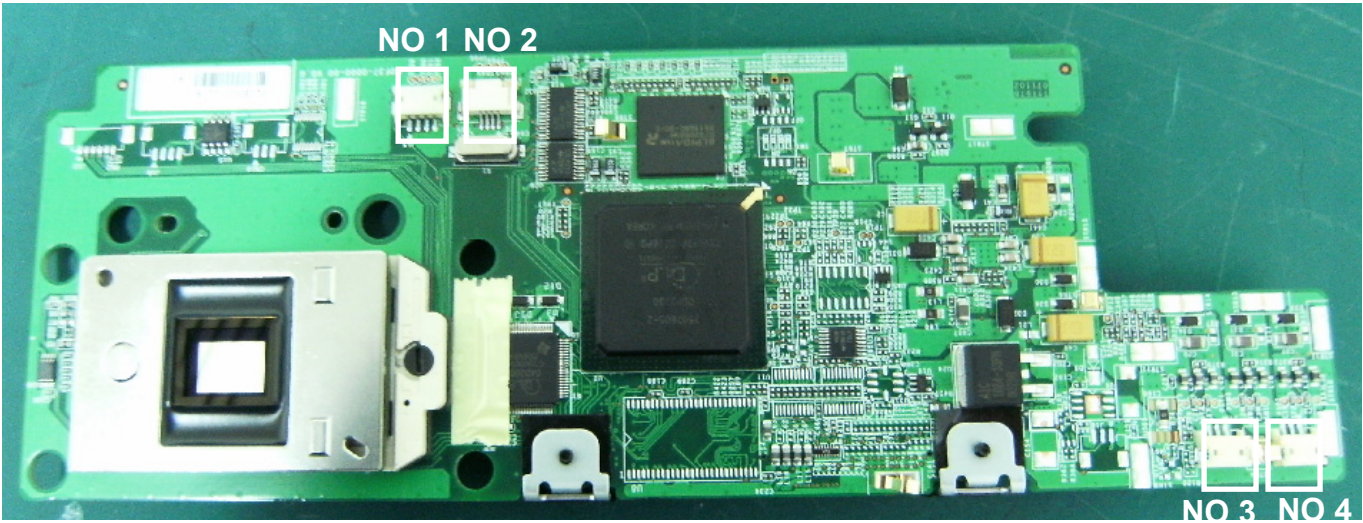
5.1. I/O Board
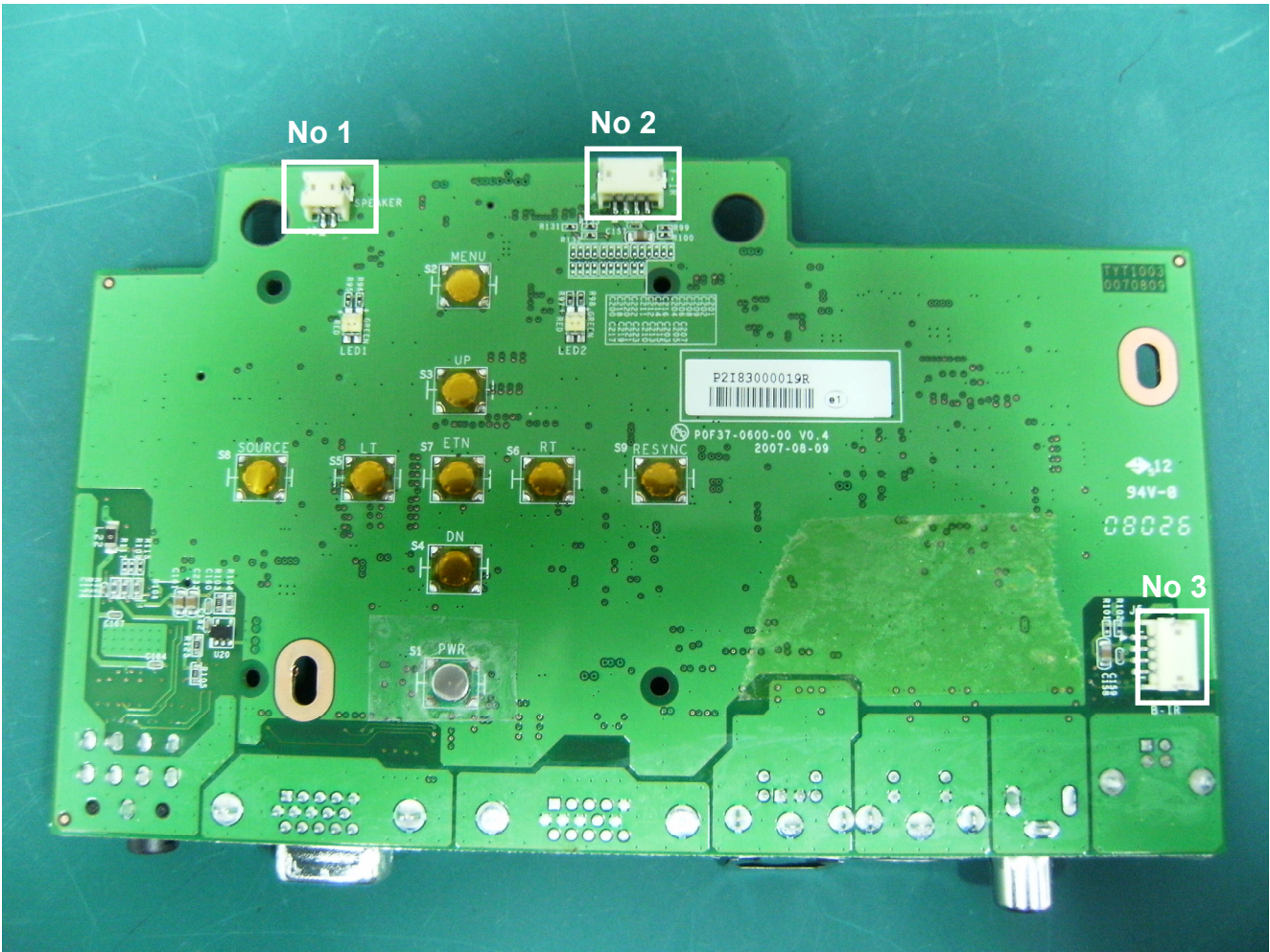
Connector	Description
No 1	Speaker
No 2	Front IR
No 3	Back IR

5.2. **The backside of I/O Board**

Connector	Description
No 4	Connect to Main board(100PIN)

5.3. Main Board

Connector	Description
No 1	Color Wheel Sensor
No 2	Color Wheel control
No 3	FAN
No 4	FAN

5.4. The backside of Main Board
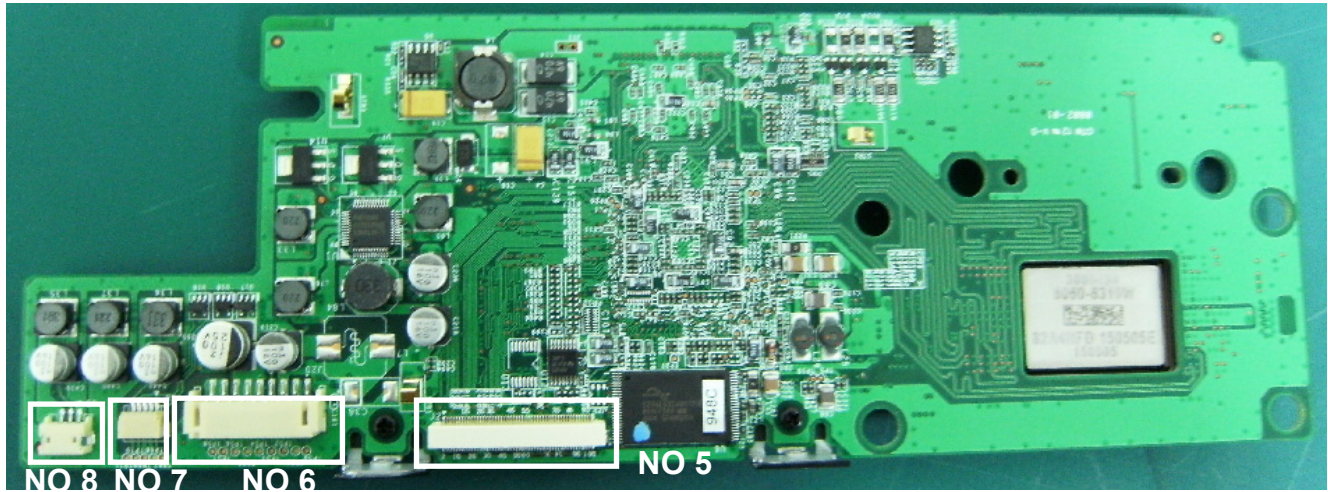
Connector	Description
No 5	Connect to I/O board(100PIN)
No 6	Connect to Power board(7PIN)
No 7	Ballast Control
No 8	FAN

5. 5 Ballast Board
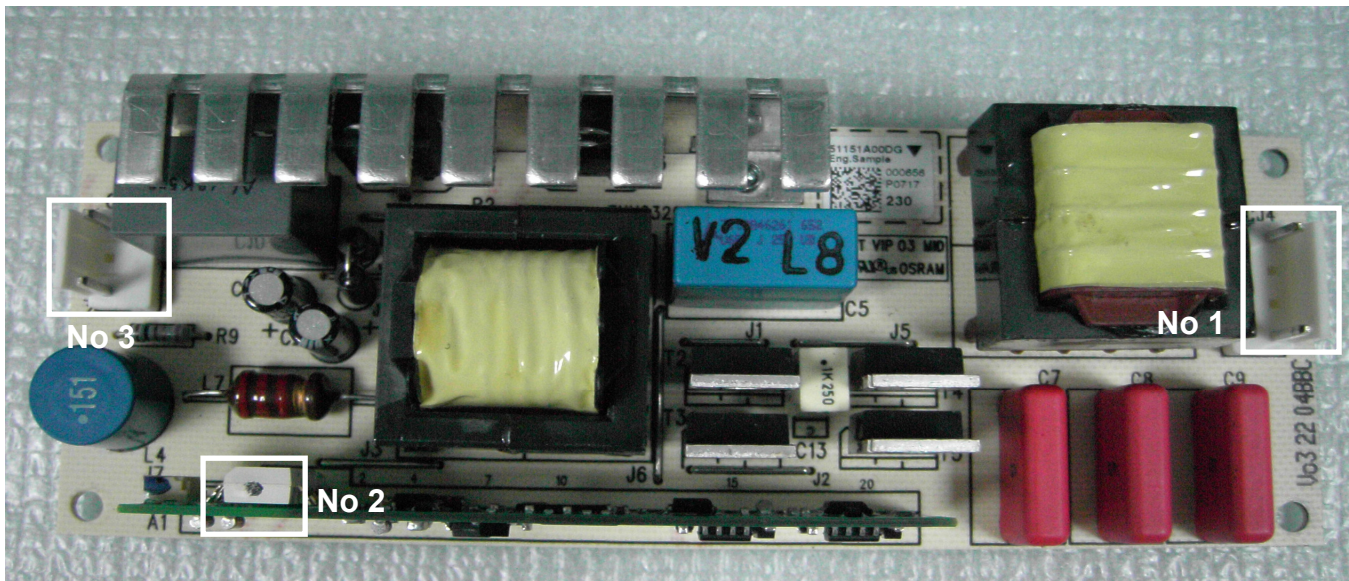
Connector	Description
No 1	Lamp power supply
No 2	Ignite signal connected to Mainboard
No 3	Power supply

5.6 Power board
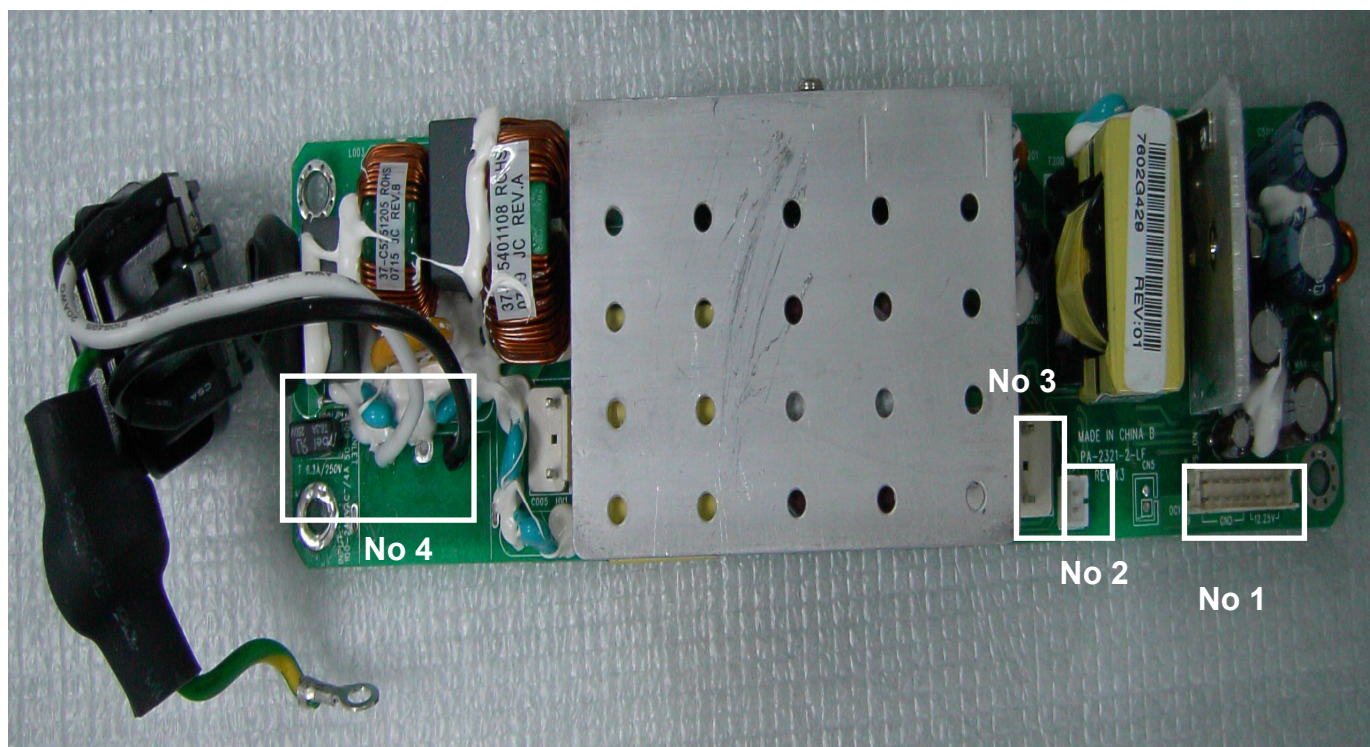
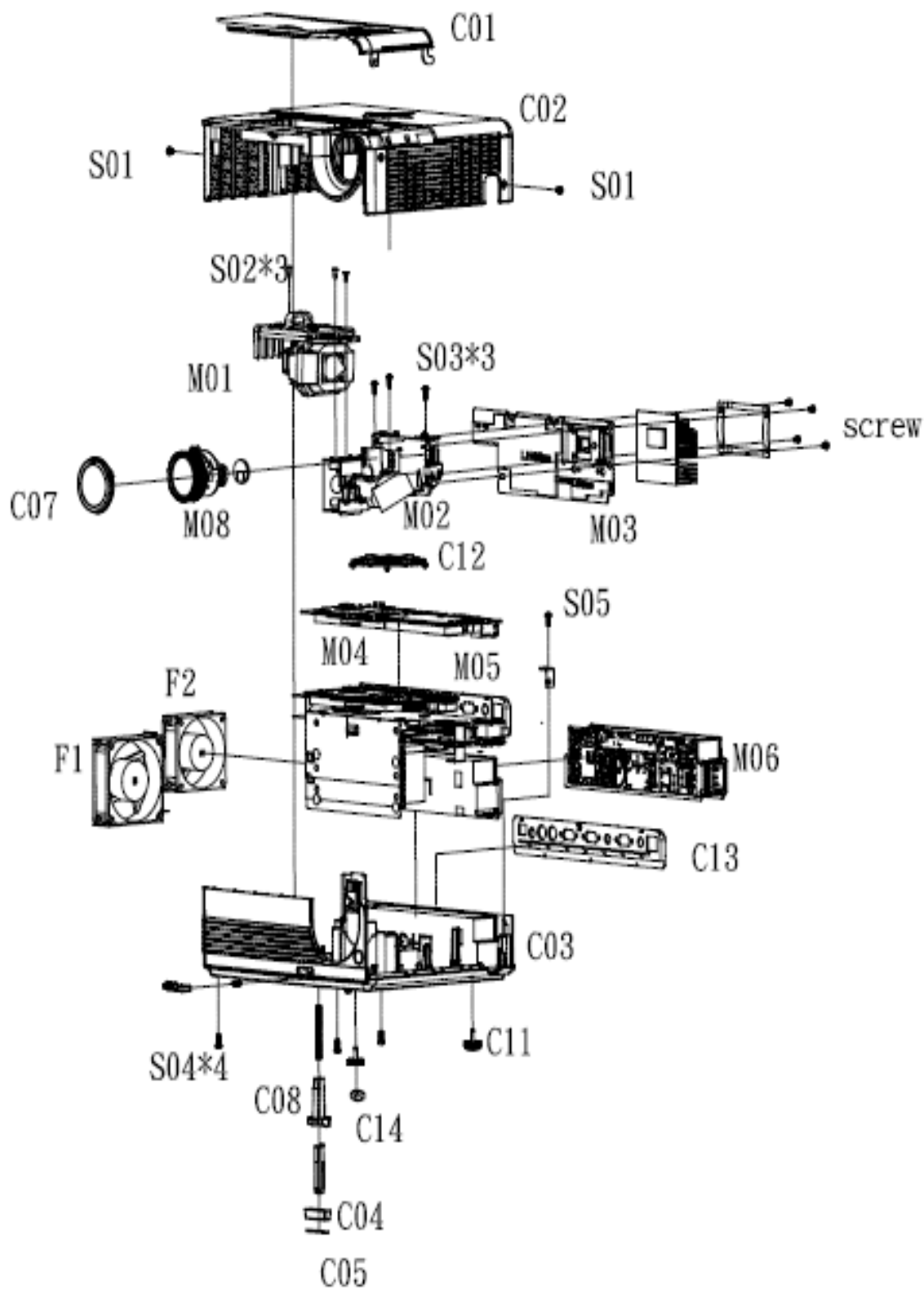| Connector	Description
No 1	7-pin control
No 2	Safety switch
No 3	380V output
No 4	AC Input

6. FRU (Field Replaceable Unit) List

Introduction

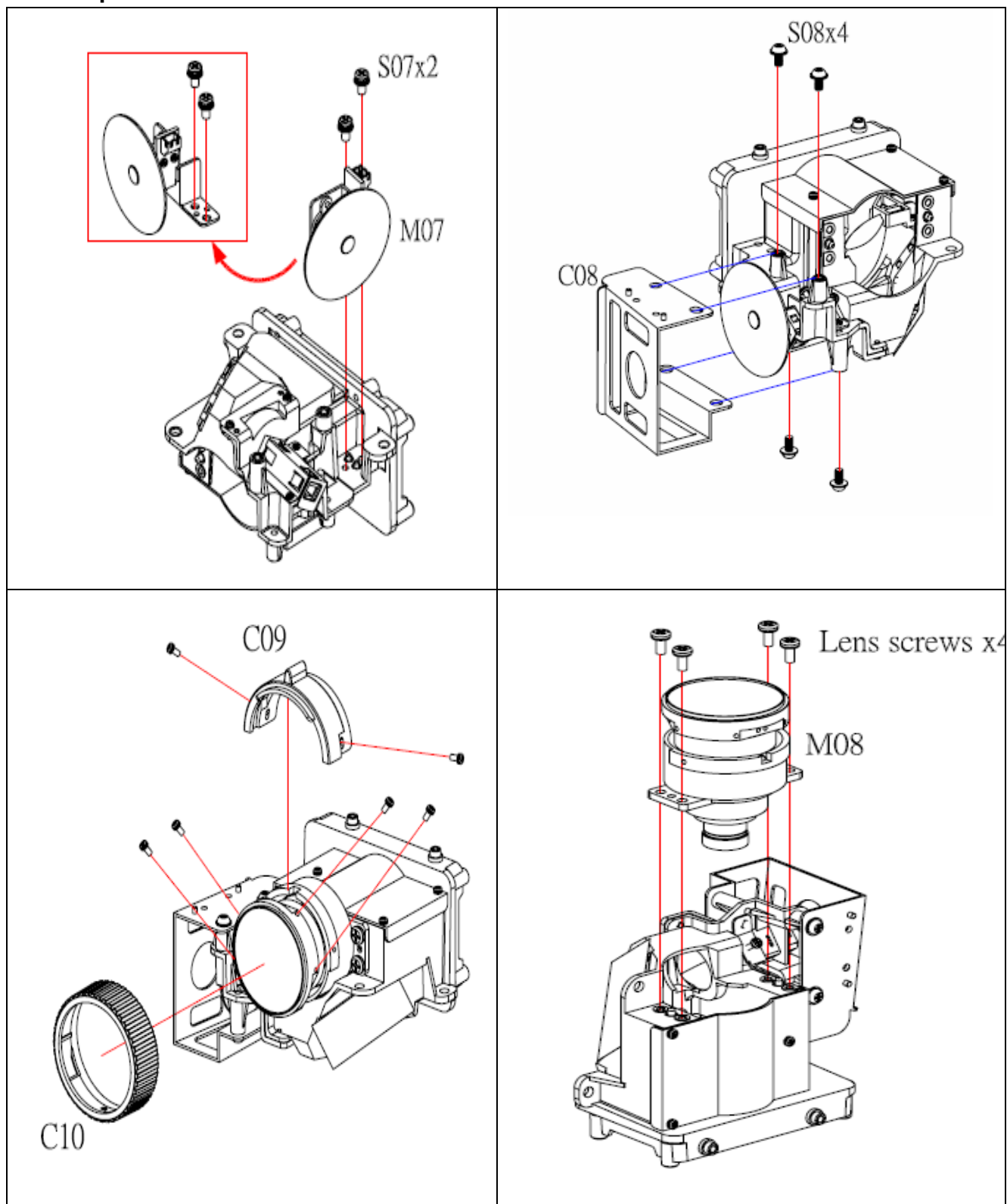This section is a list of all the FRU removal. Following the FRU table of contents is an enlarged view of the entire projector, which shows the primary FRUs in the projector.
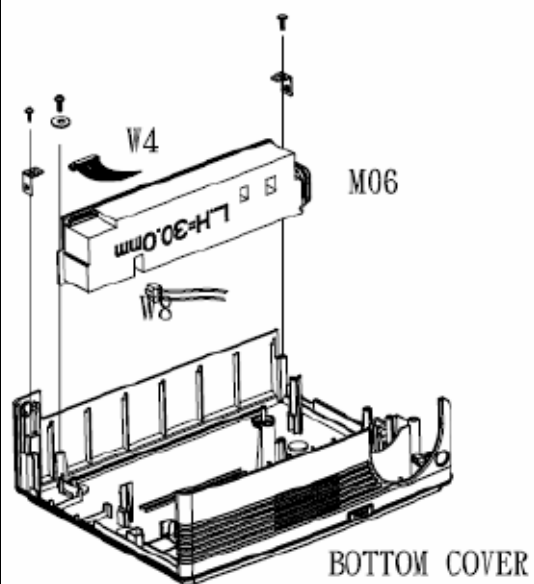
When working on the projector, use appropriate anti-static precautions such as anti-static mats, wrist straps and grounded work surfaces.   Failure to do this can destroy static-sensitive components and make the product inoperable.

6.1 Mechanical Drawing

6.2 Optical Parts Location

T-Breaker Clamp
T-Breaker
W1
Lamp housing
Fan Tunnel
Mylar
F3
W7
SCREW*2

FOOT-KEY
SPRING A-LEAVER
SPRING B-SCREW
C8
FRONT FOOT SCREW
C4
FRONT FOOT COVER
SCREW
FRONT-FOOT-RUBBER(C5)

SCREW
W5
M09
SP1
IR COVER(C06)*2

W4
M06
L.H=30.0mm
W2
BOTTOM COVER

Ballast

Ballast Mylar

W3

Ballast holder

M10(back IR module)
W2(back IR wire)

GINLINA*4

W6

SWITCH HOLDER

SCREW 01635-A073-00
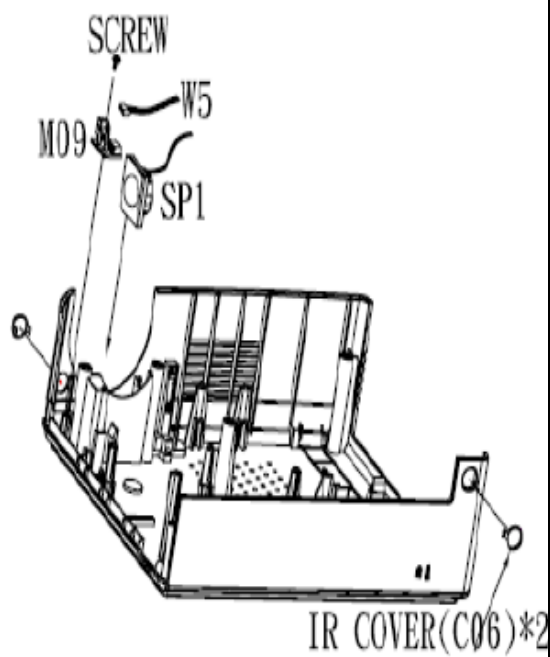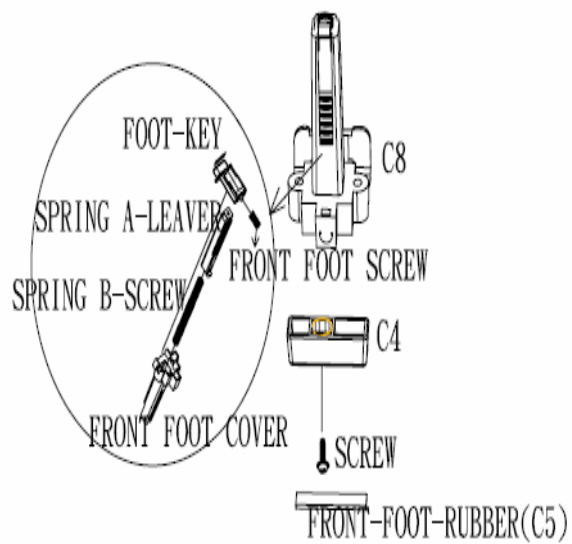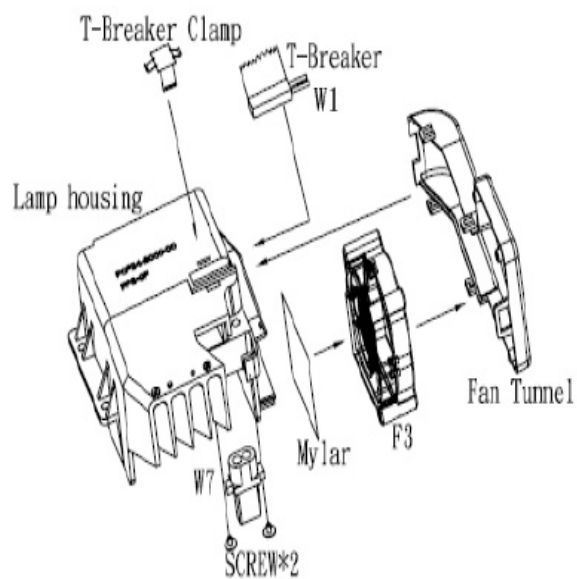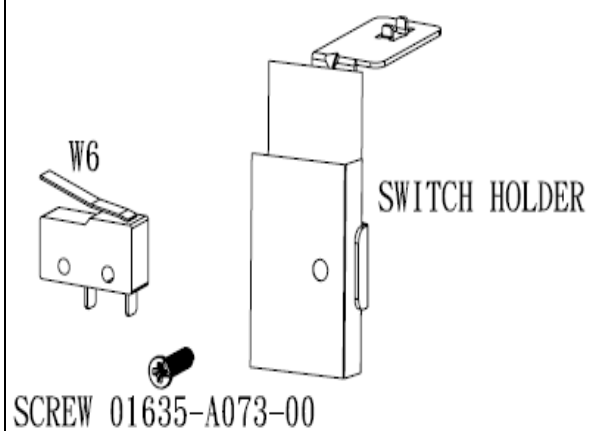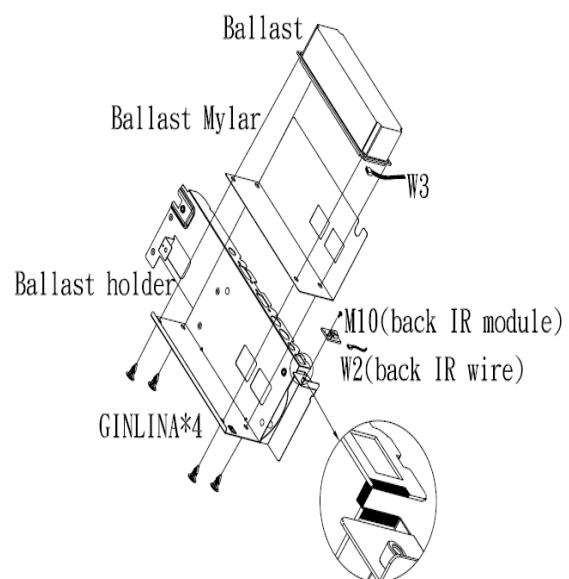
6.3 Accessory&Packing

Key No.	P/N	Description
RC	645 096 2523	REMOTE CONTROL
ACC	645 098 1319	OWNERS MANUAL(US,EU,UK)
ACC	645 098 1326	QUICK SETUP GUIDE(US,EU,U
ACC	645 098 1333	OWNERS MANUAL(CHN)
ACC	645 096 8747	VGA−15P CABLE
AC CORD	645 098 1258	POWER CORD(JAPAN)
AC CORD	645 096 8709	POWER CORD(CHINA)
AC CORD	645 096 8716	POWER CORD(EUROPE)
AC CORD	645 096 8730	POWER CORD(UK)
AC CORD	645 096 8723	POWER CORD(USA)
PKG	645 098 1289	CARTON (US)
PKG	645 098 1265	CARTON_(EUROPE)
PKG	645 098 1296	CARTON (UK)
PKG	645 098 1272	CARTON(CHINA)
PKG	645 096 8778	CUSHION(RIGHT)
PKG	645 096 8761	CUSHION (LEFT)
PKG	645 098 1302	PE BAG GLOBAL

6.4 Board/Module

Key No.	P/N	Description
M01	610 337 1764	COMPL,OPTICAL LMP O180W−KA7A
M02	645 098 1357	OPTICAL ENGINE MOD W M/B
M03	645 098 1364	MAIN BOARD MODULE
M04	645 098 1371	I/O PCB
M05	645 098 1388	BALLAST MODULE
M06	645 098 1395	POWER MODULE
M07	645 098 1401	COLORWHEEL MODULE
M08	645 098 1418	LENS MODULE
M09	645 095 7208	FRONT IR MODULE
M10	645 095 7215	BACK IR MODULE

6.5 Case/Cover/Bracket Assembly

Key No.	P/N	Description
C01	645 095 7222	LAMP−COVER
C02	645 098 1425	TOP−COVER
C03	645 098 1432	BOTTOM−COVER

C04	645 095 7253	FRONT FOOT STAND
C05	645 095 7260	FRONT FOOT RUBBER
C06	645 095 7277	IR COVER
C07	645 095 7284	LENS COVER
C08	645 095 7291	FRONT FOOT
C09	645 095 7307	ZOOM-RING
C10	645 098 1449	FOCUS-RING
C11	645 095 7321	REAR FOOT
C12	645 098 1456	KEY ASSY
C13	645 098 1463	I/O COVER
C14	645 095 7352	FOOT RUBBER

6.6 Fans

Key No.	P/N	Description
F01	645 098 1470	FAN1(L=50MM)
F02	645 098 1487	FAN2(L=50MM)
F03	645 098 1494	FAN3(L=140MM)

6.7 Speaker

Key No.	P/N	Description
SP1	645 098 1500	SPEAKER

6.8 Wire

Key No.	P/N	Description
W01	645 095 7406	WIRE CON-MOTOR(TEMP.SENSO
W02	645 095 7413	WIRE CON-CON.(BACK IR,CLR
W03	645 095 7420	WIRE CON-CON(BALAST-M/B)
W04	645 098 1517	WIRE(PWR-M/B)
W05	645 098 1524	WIRE(FRONT IR)
W06	645 098 1531	WIRE(SAFETY SW)
W07	645 098 1548	WIRE(BALLAST-LAMP)
W08	645 098 1555	WIRE(LAMP-BALLAST)

6.9 Screws

Key No.	P/N	Description
S01	645 096 2516	T4
S02	645 095 7499	M3X5XE1.2

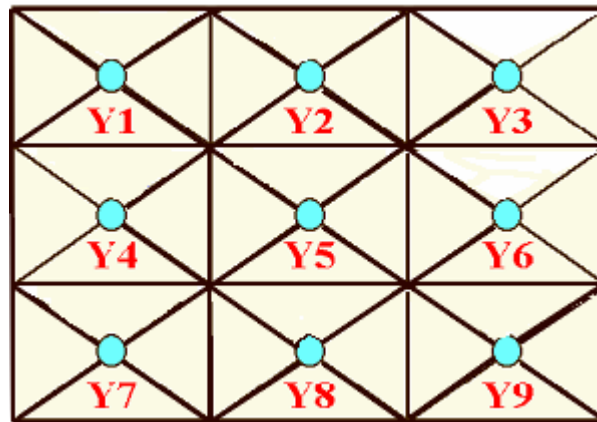# Appendix A: ANSI Lumen Measuring

Chroma 7600 Video Pattern Generator values

Set diaphragm to wide size

Projection test chart to 60 inches (projection distance 2m) and measurement 9 points

Measuring equation: Brightness = [(Y1+Y2+...+Y9)/9] × Projection ratio

DVI Pattern: 102

Appendix B: Service Level Definition

Level 1 : Cosmetic Parts ; Easy To Repair	Lamp Module / Lens Cap assy
Level 2 : Module Replacement	Top Case assy / Low Case assy / Housing R Vent / Housing L Vent assy / Ring Zoom / Lens Deco CVR / Lamp Door / Power assy / Ballast Board assy / Video Board / Driver Board / Keypad assy / FAN assy / Speaker assy / IR sensor assy / thermal sensor
Level 3 : Board Level Repair or RTV	Optical Engine (DMD Panel / Color Wheel / lens / light tunnel)

Level 1: End user can replace by themselves

Level 2: Service Center

Level 3: Return to vendor
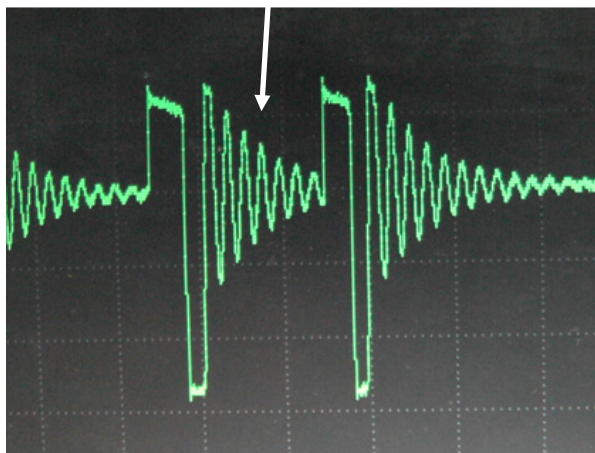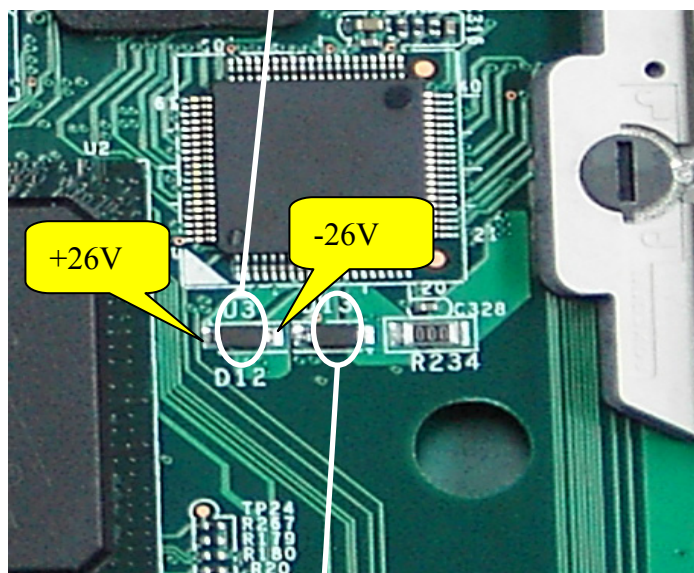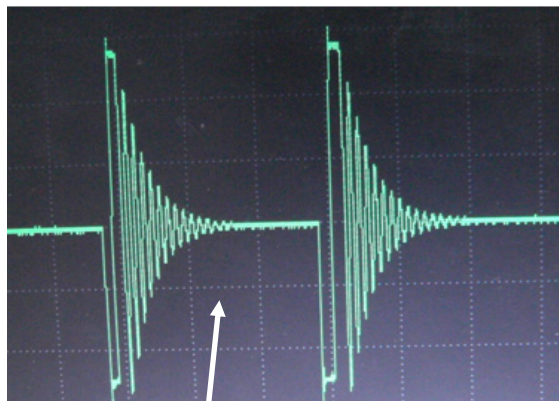
Appendix C: Connection Definition

1). VGA IN

PIN	DEFINITION
1	R/Pr
2	G/Y
3	B/Pb
4	Ground
5	Ground
6	Ground
7	Ground
8	Ground
9	VCC
10	Ground
11	WC-A
12	EDIDA-SDA
13	Hsync
14	Vsync
15	EDIDA-SCL

2). USB

PIN	DEFINITION
1	EOT
2	USB-
3	USB+
4	Ground
5	Ground
6	Ground

● Appendix D: More details for main board measurement

1. Signal of DAD2000:

2. Ballast Feedback Signal:

SANYO

SANYO Electric Co., Ltd.