ОРТОМА

ES550/ES551 EX550/EX551

Service Manual





100% Recycled Paper

Date: 2011/10/12

Update History

Date of issue	Published by	Version	Desc.
2011/05/30	Ciom	A	New version released.
2011/06/20	Ciom	В	Updated the Chapter 2 Firmware Upgraded Flow
2011/07/14	Ciom	С	Update the Disassembly SOP and the Mechanical Drawing
2011/10/12	Ciom	D	Modify the FW update tool

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 (\checkmark) 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, adjustment covers or shields, barriers, etc.

DO NOT OPERATE THIS PROJECTOR WITHOUT THE PROTECTIVE SHIELD IN POSITION AND PROPERLY 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 \triangle in the parts list and the schematic diagram designate components in which safety can be of special significance. It is, therefore, particularly recommended that 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.



DO NOT ATTEMPT TO SERVICING THE REMOTE CONTROL UNIT.

Laser Beam may be leaked out when in disassemble the Unit. As the Laser Beam used in this Remote control unit is harmful to the eyes.

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1 System Introduction

1.1 Technical Specification

Item	CONTENT	
Display Type	Single 0.55" DLP panel	
Resolution(Pixels)	ES550/ES551: SVGA (800x600pixels)	
	EX550/EX551: XGA (1024x768 pixels)	
Lamp	180W	
Zoom Ratio	1.1X	
F/No.	1.97 - 2.17	
Focal length	21.95 - 24.18mm	
Screen size	30" - 300"	
Projection Type	Front, Rear, Ceiling	
Input Source	D-Sub 15-pin x 2,	
	S-Video x 1,	
	Video x 1,	
	Audio signal input (3.5mm stereo mini jack) x 1,	
	HDMI (ES551/EX551 only)	
Output Source	D-Sub 15 pin x 1,	
	Audio signal output (3.5 mm stereo mini jack) x1	
Control terminal	RS-232 x 1, Mini USB type x1 (supports firmware upgrade and remote	
	mouse control)	
Speaker	2 watt x 1	
Scanning frequency		
Horizontal frequency	31 - 100 KHz	
Vertical frequency	50 - 120 Hz	
Power requirement	AC 100-240 V, 50 - 60 Hz, 2.6A	
Power consumption	245 W (Max.)	
Digital Keystone Correction	Vertical + / - 30°	
Environment	Operating:	
	Temperature:0°C to 40°C	
	Humidity: 10-80% maximum	
	Storage:	
	Temperature: -20°C to 60°C	
	Humidity: 30-85%	
Dimension (W x D x H)	282.9 x 231.1 x 94.7 mm	
Weight	2.2 Kg	

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

Attention for handing

- 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 ES550/ES551/EX550/EX551 System Block Diagram

2 Firmware Upgraded Flow

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

Purpose:

Flash Loader v10.3.X.exe flash loader is for upgrading image file to projector and is be designed to execute on Windows 2000/Windows XP/Windows Vista/Win 7.

Note:

Please check the firmware 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.

2.1 Setup Tool/Equipment

- Computer
- Power Cord
- USB Cable



2.2 Upgrading Procedure 1) Upgrading the Firmware on the Unit

To update the firmware on your ES550/ES551/EX550/EX551 projector, you first need to install the Firmware Update Utility software DPL Composer Lite v10.3.x on your PC.

Open Windows Explorer, locate the DLP Composer Lite v10.3.x Setup, and then double-click the icon to launch installation procedure, and follow the on-screen instructions to finish the installation procedure.



Verify you have opened the DPL Composer , then click Next >



Once you have read the License Agreement and agree, select the I Agree radio button , then click **Next >**.

🔂 DLI	P Composer(TM) Lite Setup	×
Lice	ense Agreement You must agree with the license agreement below to proceed.	
	Agreement for which the licenses or government approvals are required.]
11.6	Entire Agreement. The terms and conditions of this Agreement merge and supersede all prior and contemporaneous agreements, understandings, negotiations and discussions concerning the subject matter hereof. No amendments or modifications to this Agreement shall be effective unless in writing and signed by the authorized representatives of both parties. These terms and conditions will preval notwithstanding any different, conflicting or additional terms and conditions that may appear on any purchase order, acknowledgment or other writing not expressly incorporated into this Agreement. Licensee hereby warrants and represents that all authorizations and other applicable consents required empowering you to enter into this Agreement have been obtained.	
	accept and agree to be bound by all the terms and conditions of this License Agreement.	
	Next > Cancel	

In the box of Readme Information, after read click Next>

🔂 DLP Composer(TM) Lite 10.3.2 Setup	_ 🗆 🗙
Readme Information The following information describes this installation.	<u>e</u>
DLP Composer™ Tool Suite Release 10.3	
Installation Location	- 8
The default installation directory is:	
C:\Program Files\DLP Composer 10.3	
To install in a different directory, click the Browse button on the Sele Features page.	ect
USB Support - Installation	
This release includes USB sunnort for DLP™ Devices. The seturion	nogram 💌
<u>N</u> ext >	Cancel

Select which features you would like to install, and then click Next>

🛃 DLP Composer(TM) Lite 10.3.2 Setup	_ 🗆 🗙
Select Features Please select which features you would like	to install.
DLP Composer Lite Tool Suite	Feature Description: DLP Composer Lite Tool Suite
	This feature will be installed on the local hard drive. This feature requires 7701KB on your hard drive.
Current location: C:\Program Files\DLP Composer Lite 10.3.2\	Browse
Disk Cost Reset	< <u>B</u> ack <u>N</u> ext > Cancel

Click Next to begin installation

🛃 DLP Composer(TM) Lite 10.3.2 Setup		_ 🗆 🗵
Ready to Install the Application Click Next to begin installation.		
Click the Back button to reenter the installation the wizard.	on information or click Car	icel to exit
	< <u>B</u> ack Next	> Cancel

You'll see a progress bar as the DLP Composer is installed

🔂 DLP Composer(TM) Lite 10.3.2 Setup	<u> </u>
Updating System The features you selected are currently being installed.	I all a construction of the construction of th
Copying new files File: usbupdate.exe Directory: C:\Program Files\DLP Composer Lite 10.3.2\ Size: 16384	
	Cancel

Once the installation is complete, select Finish



The DLP Composer Icon will appear on desktop of WindowsTM after successful installation.



2) Install DLP Processor USB Driver

- 1. If DLP Composer Lite does not be installed yet, please follow the description of section DLP Composer Lite Installation to install it first.
- 2. Please click the "Install DLP Processor USB Driver" (as below graphic) to install USB Driver.



During installation, the installer will show a DOS screen. This screen will close itself and the install will continue automatically.

🚰 USBUpdate - DLP USB Driver Installation	- 🗆 ×
	
This installs/updates the DLP USB device driver and supporting files.	
Administrator privileges are required!	
Please close any running instances of DLP Composer -and- DLP Composer Lite before continuing	
NANNANNANNANNANNANNANNANNANNANNANNANNAN	
	-

3) Upgrade the firmware on the projector

To update firmware, you need a USB type A to USB type B cable (available at any electronics store). Don't connect the cable until these instructions tell you to do so.

IMPORTANT! While the firmware is being downloaded to the projector, do not shut down the computer or projector or disconnect the USB cable. This could result in flash memory damage, requiring the projector to be returned for service.

Firmware upgrade procedure:

- 1. If DLP Composer Lite does not be installed yet, please follow the description of section DLP Composer Lite Installation to install it first.
- 2. If USB Driver does not be installed yet, please follow the description of section Install DLP Composer USB Driver to install it.
- Please press and hold (do not release) both POWER and MENU/EXIT button of projector, then connect AC power to projector. After few seconds, the LEDs, which on the up-cover of projector, will become POWER LED blue/solid light and TEMP/LAMP LED purple/flash light. It denotes that the projector is ready for firmware update.
- 4. Please connect laptop and projector with USB cable. After connect laptop and projector, you may find Jungo\Texas Instruments DLP[™] Processor at Device Manager of Windows OS.



- 5. Please locate file FlashDeviceParameters.txt and image file of firmware in folder C:\dev\Library\.
- 6. Launch DLP Composer Lite, manipulate Edit\Preferences... menu, and change the Library path of DLP Composer Lite to be C:\dev\Library\.

	Library	
Library Output - Memory / Log Output - Font / Speed Communications	Library path Where do library files reside?	
	C:\dev\library\	Browse

 Change the USB Device Identification of DLP Composer Lite to be Vendor: 0x451, Product: 0x2000.

	Communications	
Library Output - Memory / Log Output - Font / Speed Communications Flash Loader Pico Loader	Projector Interface I2C (using USB from http://www.devasys.com) I2C (using USB from http://www.i2ctools.com) Serial Port USE MMK USB (TI/Debug only)	
	USB Device Identification <u>V</u> endor: 0x451 <u>C</u> onfigure P <u>r</u> oduct: 0x2000	
	Install/Uninstall Device Drivers	

- 8. Click DLP Composer Lite\Flash Loader, and change Flash Image File to be C:\dev\Library\. Comment:
 - I. If the target projector is SVGA with HDMI (ES551/OPD-S5001) then use firmware image file PC337-9660-00--V0.10--OPD-S5000--0x10BA991C.img.
 - II. If the target projector is XGA with HDMI (EX551/OPD-X5001) then use firmware image file PC437-9660-00--V0.10--OPD-X5000--0x10C86D1A.img.

Flash Loader	
Elash Image File:	
PC337-9660-00V0.100PD-S5000)0x10BA991C.img 🗸 🖪rowse
_ <u>O</u> ptions	
Partial Image Download (faste:	st: only updates changed sectors)
O Complete Image Download (sk	owest: downloads entire image)
✓ Skip Boot Loader Area: Erase all sectors	128 KB
O Sector Range Download	
Enter Sector Hange of Image	2 Data to be updated (in Hex)
End to www	
- Joxuuu	
Status Interface: USB vendor=0x451, pr (Use Edit->Preferences to configu	oduct=0x2000 re the communication interface.)
Ready to down	oad flash image.
Image Data (hex) Start: 0x00020000 Size: 0x003006A0	Checksum (hex) Expected: 0x10BA991C Returned:
Start <u>D</u> owr	iload <u>R</u> eset Bus

- 9. Select the Skip Boot Loader Area check box, when you do not want to overwrite boot loader of projector, **as picture 1 (recommend)**. Otherwise, do not select the Skip Boot Loader Area check box, when you want to overwrite the boot loader, as picture 2.
- Picture 1: Skip boot loader

🗖 Flash Loader 📑 🗖 🔀
<u>F</u> lash Image File:
C:\dev\Library\PC337-9660-00V0.10OPD-S5000(🗸 🖪 rowse
<u>Options</u>
O Partial Image Download (fastest: only updates changed sectors)
 Complete Image Download (slowest: downloads entire image)
Skip Boot Loader Area: 128 KB
Erase all sectors
Sector Range Download
Enter Sector Range of Image Data to be updated (in Hex)
Start: 0x0
End: Oxfffff

Picture 2: Overwrite boot loader

🗖 Flash Loader 🔄 🗖 🔀		
Elash Image File:		
C:\dev\Library\PC337-9660-00V0.10OPD-S5000(V Browse		
C Options		
O Partial Image Download (fastest: only updates changed sectors)		
Complete Image Download (slowest: downloads entire image)		
Skip Boot Loader Area: 128 KB		
Sector Range Download		
Enter Sector Range of Image Data to be updated (in Hex)		
Start: 0x0		
End: Oxfffff		

10.Press	Start <u>D</u> ownload	to start download firmware into projector.
		Flash Loader
		Elash Image File: C:\dev\Library\PC337-9660-00V0.100PD-\$5000-C 💌 📴rowse
		Options Partial Image Download (fastest: only updates changed sectors) Complete Image Download (slowest: downloads entire image) Skip Boot Loader Area: Erase all sectors Sector Range Download Enter Sector Range of Image Data to be updated (in Hex) Start: End: Data: Other Sector Range of Image Data to be updated (in Hex) Start: Dx0 End: Dxffffff Status Interface: USB vendor=0x451, product=0x2000 (Use Edit->Preferences to configure the communication interface.)
		Downloaded 0xA4F38 bytes
		00:47 Minutes Bemaining
		Image Data (hex) Checksum (hex) Start: 0x00020000 Expected: 0x10BA391C Size: 0x003006A0 Returned:
		Start Download <u>R</u> eset Bus

11. Projector will turn on automatically when FW update is finished ("Download complete" will appear). Press "MENU" or "4-direction" navigator button to turn off the projector (NOTE: "Power" button does not function at this point). Cooling process (fans spinning) will then start. Unplug the power cord when the cooling process is complete; otherwise, the projector will automatically switch back on again.

volocuments and settings tab	b2\桌面\FW勿刪\OPE <u>Browse</u> .
Įptions	
Partial Image Download (fe	astest: only updates changed sectors)
Complete Image Download	d (slowest: downloads entire image)
✓ Skip Boot Loader Ar ✓ Erase all sectors	rea: 128 KB 🗾
Sector Range Download	
Enter Sector Range of Im	rage Data to be updated (in Hex)
Start 0x20000	
End: Oxeffff	=
-1-	
tatus nterface: USB vendor=0x451	, product=0x2000
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itatus nterface: USB vendor=0x451 Use Edit->Preferences to con Down 03:27 Image Data (hex) Start: 0x00020000	, product=0x2000 figure the communication interface.) load complete. Minutes Total Checksum (hex) Expected: 0x10A40878
itatus nterface: USB vendor=0x451 Use Edit->Preferences to con Down 03:27 Image Data (hex) Start: 0x00020000 Size: 0x00316D00	, product=0x2000 figure the communication interface.) load complete: Minutes Total Checksum (hex) Expected: 0x10A40878 Returned: 0x10A40878
tatus hterface: USB vendor=0x451 Jse Edit->Preferences to con Down 03:27 Image Data (hex) Start: 0x00020000 Size: 0x00316D00	, product=0x2000 (figure the communication interface.) load complete. Minutes Total Checksum (hex) Expected: 0x10A40878 Returned: 0x10A40878

12. Plug in the power cord, press "Power" button to turn on the projector. The projector will function as usual

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	CONCEPT OF THE

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.















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 lamp using hours
- (2) Confirm LED indicator

The Status Indicator Panel on top of the projector indicates the state of the projector and can help you troubleshoot.

Projector Status	POWER	ТЕМР	LAMP
Standby mode	Blue solid	Off	Off
Normal running mode	Flashing 30 seconds after powering on and then become solid Blue	Off	Off
Normal cooling	Blue solid	Blue solid	Red solid
Lamp ignition failed	Blue solid	Off	Red flashing
Lamp life end	Blue solid	Off	Red solid
Temp error	Blue solid	Blue flashing	Off
Fan error	Blue solid	Blue solid	Off
Color wheel or DMD error	Blue flashing	Blue flashing	Red flashing

(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:



Video Signal Troubleshooting





Operation Function Troubleshooting





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	VGA In (SVGA/XGA)	
Test Equipment	Standard Pattern generator (Ex. Quantum data)	
Signal format	800*600	60Hz for ES550/ES551
	1024*768	60Hz for EX550/EX551

I/O port	Audio input
Test Equipment	Connect audio input to audio output from video equipment
Signal format	480i

I/O port	Video input
Test Equipment	Video source device
Signal format	NTSC

I/O port	S-Video input	
Test Equipment	S-Video source device	
Signal format	NTSC	

I/O port	HDMI(ES551/EX551 only)
Test Equipment	HDMI source device (DVD player)

(2) Operation test

Buttons operation

Button description	Test criteria
Power button	1. Touch "power" button and projector will switch on, and in standby
	mode the LED should solid.
	2. Touch the "power" button (Up & Down) should be sensitive
	3. The LED indicator lighteness and uniformity normally
Menu/Enter	1. Touch Menu/Enter button can make projector function normally.
	Touch the button (Up & Down) should be sensitive
	3. The LED indicator lighteness and uniformity normally
4-way button	1. Mechanical motion (Up & Down) should be sensitive when touch the
	4-way button.
	2. Touch 4-way button button can make projector function normally.
	3. The LED indicator lighteness and uniformity normally

Foot adjuster operation

Foot adjuster.	Test criteria	
Foot adjuster button	Foot adjusters should stretch downward smoothly by rotate the foot	
	adjuster feet	

Zoom ring and Focus ring

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)

VGA			
I/O port	Monitor In (SVGA/XGA/WXGA)		
Test Equipment	Standard Pattern generator (Ex. Quantum data)		
Signal format	800*600 60Hz for ES550/ES551		
	1024*768 60Hz for EX550/EX551		
Projected image size	60" in diagonal length		

TOP SMPTE133

- Use to confirm overall image quality.
- Verify there is no noise, tint in the gray background, duplicated columns or other general image abnormalities.
- No twinkling pixels allowed.
- Verify the 5% box is visible within the black square.
- Verify the 95% box is visible within the white square.



RGB Ramps

- Use to confirm correct colorwheel index delay setting and DMD data line integrity.
- Verify proper red, green, and blue chromaticity.
- Verify transition from dark to light in each ramp is smooth and consistent.
- Verify there are no missing parts (vertical black bars) of any ramp due to stuck bits.
- Verify there are no light or faded areas in ramps.

If there are colorwheel index delay is not correctly set.



BLUE 120

- Use for dark blemish and ghost inspection.
- Confirm there are no more than four blemishes darker than Blue 120.
- No blemish greater than one inch or 25mm in length/diameter is allowed.
- Confirm there is no ghosting.
- No ghosting is allowed.



GRAY 50

- Use for light blemish inspection including bright (stuck ON) pixels.
- Confirm there are no more than four visible blemishes brighter than Gray50.
- No blemish greater than one inch or 25mm in length/diameter is allowed.
- Confirm there are no stuck ON (bright) pixels brighter than Gray50.
- Confirm there are no flickering pixels.
- No more than one bright pixel is allowed in the Pond of Mirrors.



WHITE

- Use for lumens and uniformity measurements, banding adjustment and inspection of dark (stuck OFF) pixels, minor blemishes.
- Confirm there are no more than six total of light and dark blemishes
- Confirm no blemish is greater than five inches in length/diameter.
- Confirm there are no more than four stuck off pixels.
- Verify no banding.
 - If banding adjustment can't completely eliminate banding use **Banding Referee** image to make final determination.



BANDING REFEREE GRAY 245

• The goal is always to completely eliminate banding. If there still is a very small amount of residual banding after the best banding adjustment has been made use the Banding Referee to make final determination of acceptance.

Set UUT to Film gamma when using this image

- Distance from edge of image to Gray 245 band is 20 pixels.
- No banding appearing beyond the outer rectangle is allowed.
- No banding appearing darker than the Gray 245 band is allowed.
 - Both of the above two conditions must be satisfied for acceptance.



FOCUS

- Use to evaluate focus sharpness and uniformity.
- Focus on the center icon. Then adjust focus to achieve best overall focus.
- Verify all icons have clear resolution and white space can be seen between the green lines.
- Zoom to full Tele (small image) and verify all icons have clear resolution and white space can be seen between the green lines.



Audio		
I/O port	Audio	
Test Equipment	Speaker &DVD player	
Signal format	480i	
Criteria	The audio out is normal	

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

<u>HDMI</u>	
I/O port	HDMI(ES551/EX551 only)
Test Equipment	HDMI source device, standard Pattern generator or DVD player
Criteria	No apparent color deviation on the projected image

(4) Resolution

I/O port		VGA	
Test Equipmer	nt	P	C
Test Method		1.	Rotate Zoom ring to wide mode (Maximum projected image)
and four time typics of points which there is a single transmission of the typical tr	For the file (i) point, if is part in the file course of those events become executivy for an people is distributed printical two days have considered from the shorts, and its assure, any event proposed on a start barrier, a course of the short is and the shorts and the short of traces which may be the short of the short these sign. Conserved as a related area plan, dening black and short the sign. Short of the short of the short of the short of short of the short of	2. 3.	Adjust focus ring to make resolution of 4 corners and center are balanced
When on this count of inputs, used (b). Stored as accurate in the part of the same many many factor is the same of the same o	When it the strates of format a control future interpret integrate the root specific the manual strategies and the strategies	4.	Check he characters should be recognized easily.
which the Luws of Induce and of Maker's Gold refits from, ascert stopped in the operand in which regards that they hold drafts the sources which meet them is the separation	which the Lowis of Index and of Index 16 doe rathe brans, as doesn't expected the expense of index index and the disk with disk with the lower which meet frame to the second doesn't be carried with the lower of the disk with	5. 6.	Adjust focus ring to make resolution of 4 corners and center
There is much device the cases which into the characteristic of the second seco	mining and the cause with registration of physical depuisite the start with the cause with registration of the physical registration. Avail Ford Size: 13 pixels 9B points When in the course of human event at be come have received and them with another, and to assume among the power of the cause the separate and equal station to which the Laws of the labelers God entitle them, a decent respect to the burdless maintain dequares that they should declare the causes which registrations and the sparate and physical the cause and the causes which registrations and the sparate and physical the cause and the causes which registrations and the physical states to which the cause which registrations are also be assumed and the cause which registrations and the physical declarest the causes which registrations are also be also be also be also be assumed and the causes which registrations are also be also	7.	are balanced. Check the characters should be recognized easily.

(5) Front infrared sensor

Device	Front infrared
Test Equipment	Remote controller
Test method and Criteria	Operate remote controller to test front sensor is normal

(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 VGA connector	
	2. Plug the power cord to socket	
	Case Clamp	
	Power Cord	
Test criteria	GND 30A 3sec 100m Ω	
	DCW 2506V 1sec 10mA	
	Single Step OFF	

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 Main Board



Connector	Description
No 1	Safety switch
No 2	Thermal sensor
No 3	Fan3
No 4	Fan1
No 5	Color Wheel control
No 6	Front IR
No 7	Speaker

5.2 The backside of mainboard



Connector	Description
No 1	1
No 2	Connect to DMD Board
No 3	Fan2
No 4	Color Wheel Sensor
No 5	Connect to Power Board
No 6	Ballast control

5.3 Ballast Board



Connector	Description
No 1	Lamp power supply
No 2	Ignite signal connected to Mainboard
No 3	Power supply

5.4 Power board



Connector	Description
No 1	AC Input
No 2	Ballast Power Supply
No 3	Connect to Main Board

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 Board/Module

Key No.	P/N	Description
D 04	PA784-7100	ES550_MAIN_DIP_PCB
	PA884-7100	EX550_MAIN_DIP_PCB
BUI	PC384-7100	ES551_MAIN_DIP_PCB
	PC484-7100	EX551_MAIN_DIP_PCB
B02	PA884-8100	POWER_ASY
B03	PA884-9000	BALLAST_ASY
B04	PA884-7500	FIR_DIP_PCB_ASY

6.3 Case/Cover/Bracket Assembly

Key No.	P/N	Description
C01	PA884-4540	LAMP-COVER_ASY
C02	PA884-4500	TOP-COVER_ASY
C03	PA134-4540-99	KEY_ASY
C04	PA884-4510	BOTTOM-COVER_ASY

6.4 Optical Device

Key No.	P/N	Description
	PA784-2200	OPTICAL ENGINE SIMPLE_ES550
001	PA884-2200	OPTICAL ENGINE SIMPLE_ EX550
	PC384-2200	OPTICAL ENGINE SIMPLE_ES551
	PC484-2200	OPTICAL ENGINE SIMPLE_ EX551
002	PA884-2400	LAMP MODULE_ES550_EX550
002	PC484-2400	LAMP MODULE_ES551_EX551

6.5 Fans

Key No.	P/N	Description
F01	02394-0151-00	FAN.1
F02	02394-0150-00	FAN 2
F03	02394-0152-00	FAN 3

6.6 Speaker

Key No.	P/N	Description
SP01	02413-0117-00	SPEAKER