Service Guide for the

X1

InFocus®
CORPORATION

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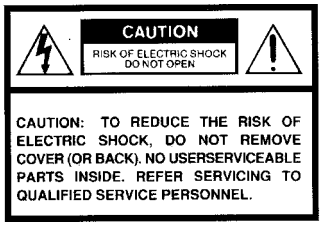
SAFETY PRECAUTIONS



The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE. DANGEROUS HIGH VOLTAGES ARE PRESENT INSIDETHE ENCLOSURE. DO NOT OPEN THE CABINET. REFER SERVICING TO QUALIRED PERSONNEL ONLY.

CAUTION: Laser beam is emitted when the laser button of the remote control is pressed. Do not look from the front of the remote control. Do not face toward a person or to a mirror.

FCC Radio Frequency Interference Statement

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiates radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

WARNING: Changes or modifications made to this equipment, not expressly approved by Toshiba, or parties authorized by Toshiba, could void the user's authority to operate the equipment.

Notice: This Class A digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

IMPORTANT PRECAUTIONS

Save Original Packing Materials

The original shipping carton and packing materials will come in handy if you ever have to ship your LCD projector. For maximum protection, repack the set as it was originally packed at the factory.

Avoid Volatile Liquid

Do not use volatile liquids, such as an insect spray, near the unit. Do not leave rubber or plastic products touching the unit for a long time. They will mar the finish.

Moisture Condensation

Never operate this unit immediately after moving it from a cold location to a warm location. When the unit is exposed to such a change in temperature, moisture may condense on the crucial internal parts. To prevent the unit from possible damage, do not use the unit for at least 2 hours when there is an extreme or sudden change in temperature.

In the spaces provided below, record the Model and Serial No. located at the rear of your LCD projector.

Mode No._____ Serial No. _____

Retain this information for future reference.

IMPORTANT SAFETY INSTRUCTIONS

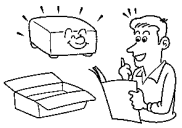
CAUTION: PLEASE READ AND OBSERVE ALLWARNINGS AND INSTRUCTIONS GIVEN IN THIS OWNER'S MANUAL AND THOSE MARKED ON THE UNIT. RETAIN THIS BOOKLET FOR FUTURE REFERENCE.

This set has been designed and manufactured to assure personal safety. Improper use can result in electric shock or fire hazard. The safeguards incorporated in this unit will protect you if you observe the following procedures for installation, use and servicing. This unit is fully transistorized and does not contain any parts that can be repaired by the user.

DO NOT REMOVE THE CABINET COVER, OR YOU MAY BE EXPOSED TO DANGEROUS VOLTAGE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL ONLY.

1. Read Owner's Manual

After unpacking this product, read the owner's manual carefully, and follow all the operating and other instructions.



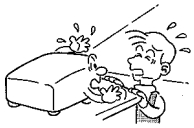
2. Power Sources

This product should be operated only from the type of power source indicated on the marking label. If you are not sure of the type of power supply to your home, consult your product dealer or local power company.

For products intended to operate from battery power, or other sources, refer to the operating instructions.

3. Source of Light

Do not look into the lens while the lamp is on. The strong light from the lamp may cause damage to your eyes or sight.



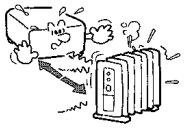
4. Ventilation

Openings in the cabinet are provided for ventilation and to ensure reliable operation of the product and to protect it from overheating, and these openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, sofa, rug or other similar surface. This product should not be placed in a built-in installation such as a bookcase or rack unless proper ventilation is provided or the manufacturer's instructions have been adhered to.

IMPORTANT SAFETY INSTRUCTIONS

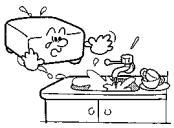
5. Heat

The product should be situated away from heat sources such as radiators heat registers, stoves, or other products (including amplifiers) that produce heat.



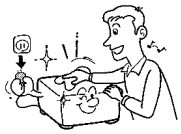
6. Water and Moisture

Do not use this product near water - for example, near a bath tub, wash bowl, kitchen sink, or laundry tub; in a wet basement; or near a swimming pool and the like .



7. Cleaning

Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.

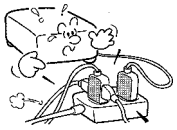


8. Power-Cord Protection

Power-supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the product.

9. Overloading

Do not overload wall outlets; extension cords, or integral convenience receptacles as this can result in a risk of fire or electric shock.



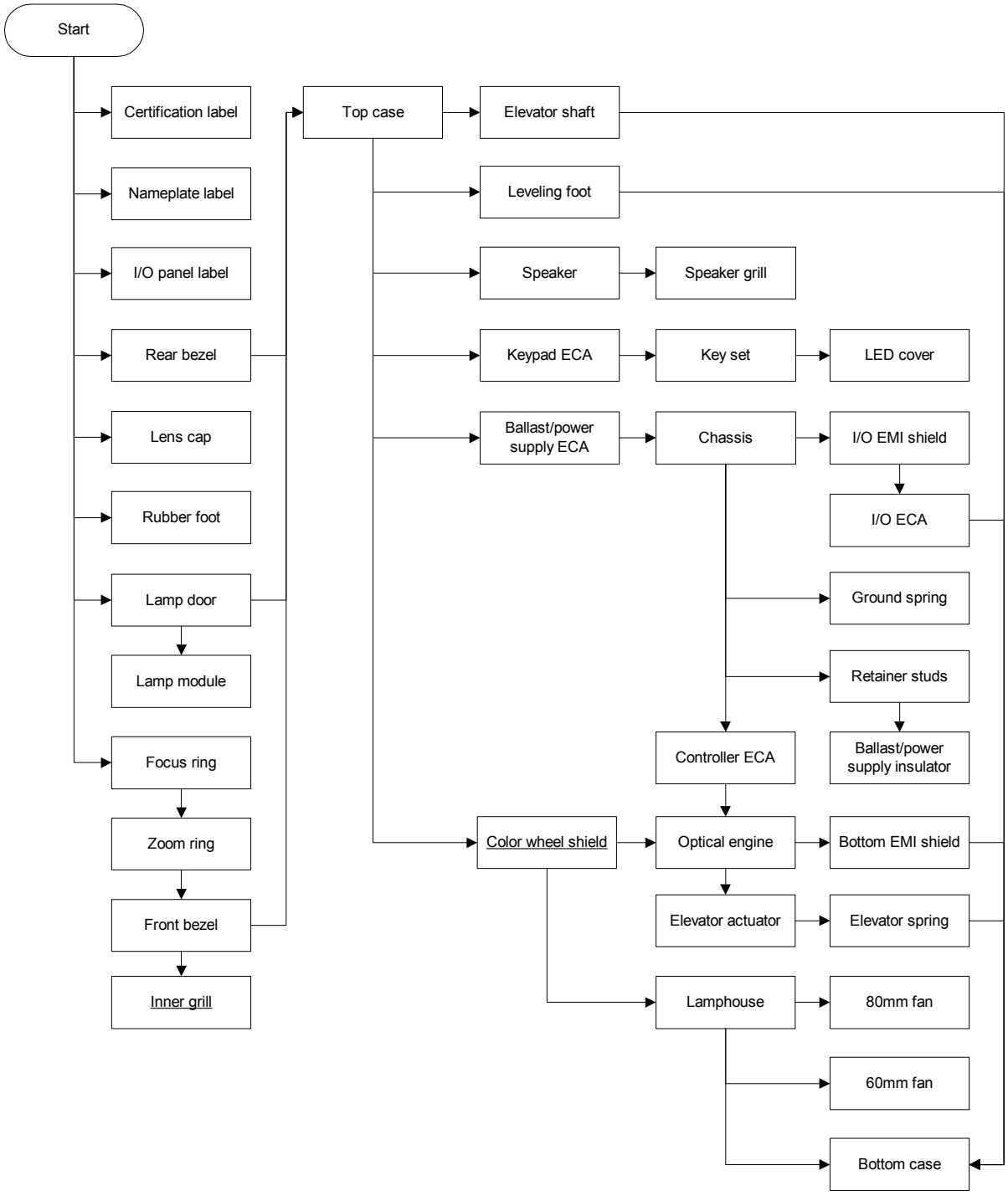
10. Lightning

For added protection for this product during storm, or when it is left unattended and unused for long periods of time, unplug it from the wall outlet.

This will prevent damage to the product due to lightning and power-line surges.

Parts Replacement

Removable Parts Hierarchy



Remove and Replace the Ballast/Power Supply ECA

The **ballast/power supply ECA** (520-0114-xx) fastens to the chassis. It converts 100-240 VAC supply voltage to various low voltage DC levels required internally by the projector. The power supply directly interfaces with the ballast to control lamp strike and operation. The ballast steps up voltage from the power supply to ignite the lamp module. The ballast/power supply ECA also interfaces with the controller ECA to provide DC power and exchange control signals.

Audio amplification and takes place on the ballast/power supply ECA.

Fuses on the ballast/power supply ECA protect against internal shorts or supply surges. The fuses are not available as FRU parts as a blown fuse usually indicates circuit damage and the need for ECA replacement.

DANGER Do not attempt to measure the output voltage from the ballast when the lamp strikes. High voltage produced by the ballast to strike the lamp can ruin test instruments as well as cause personal injury.

1. Remove the following items:

   Lamp module (page 42)

   Focus ring (page 30)

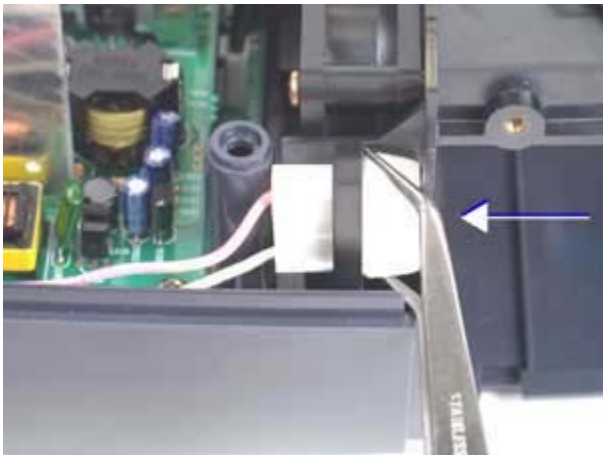
   Zoom ring (page 30)

   Front bezel (page 32)

   Rear bezel (page 49)

   Top case (page 52)

2. Detach the lamp cable connector from the side of the lamphouse. Squeeze the two tabs on the side of the connector and slide it rearward through the retainer on the lamphouse.

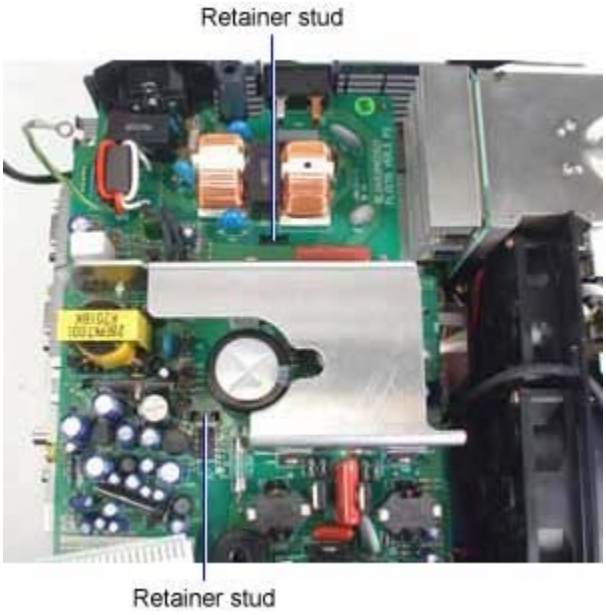


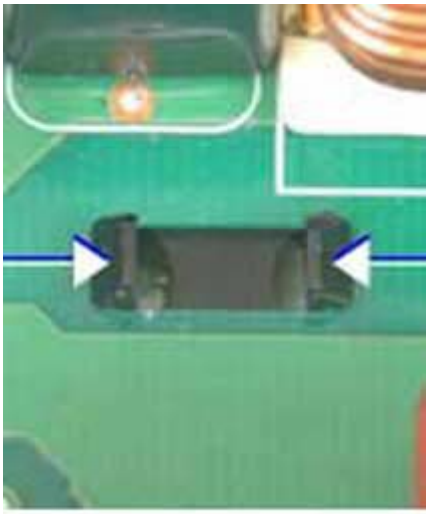
3. Unplug the power supply/controller ECA cable from the ballast/power supply ECA

4. Remove the M4x6 Phillips screw that fastens the ground terminal to the chassis.

5. Remove the seven M3x12 Plastite Phillips screws that fasten the ballast/power supply ECA to the chassis.

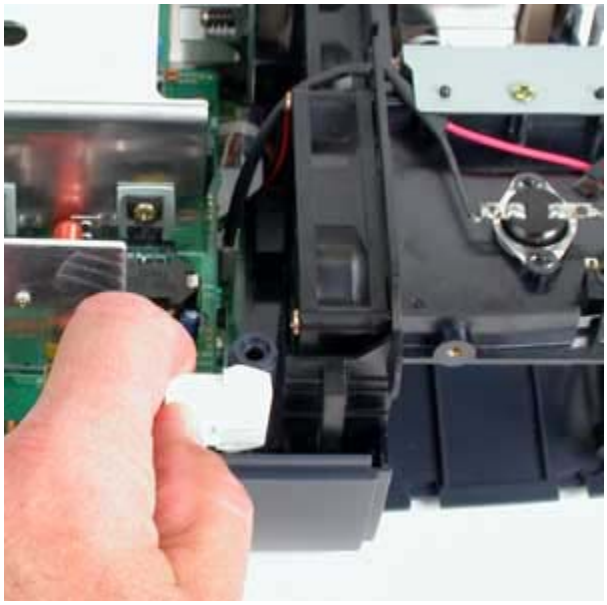
6. Squeeze the tabs on each of the two retainer studs that secure the ballast/power supply ECA to the chassis. Then lift the ECA away from the chassis.





Assembly Notes

- Ensure that the two retainer studs on the chassis engage the slots in the ballast/power supply ECA. Press down on the ECA to lock the retainers into the slots.
- Tighten the seven M3x12 Plastite Phillips screws securely. Do not overtighten the screws.
- Connect the ground terminal to the chassis. Tighten the M4x6 Phillips screw securely.
- Connect the power supply/controller ECA cable to CN651 on the ballast/power supply ECA.
- Insert the lamp cable connector into the slot on the side of the lamphouse. Ensure that the slot for the connector lock faces outward.



Remove and Replace the Bottom EMI Shield

The **bottom EMI shield** (330-0965-xx) lies in the bottom case. It provides ground continuity between the optical engine and the chassis.

1. Remove the following items:

   Lamp module (page 42)

   Focus ring (page 30)

   Zoom ring (page 30)

   Front bezel (page 32)

   Rear bezel (page 49)

   Top case (page 52)

   Ballast/power supply ECA (page 6)

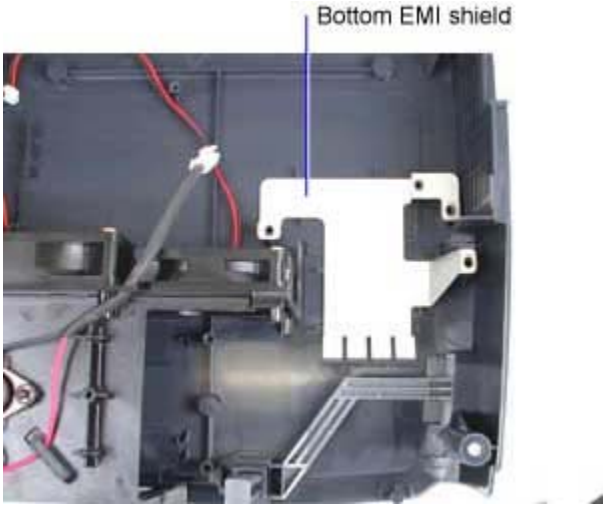
   Chassis (page 12)

   Controller ECA (page 19)

   Color wheel shield (page 17)

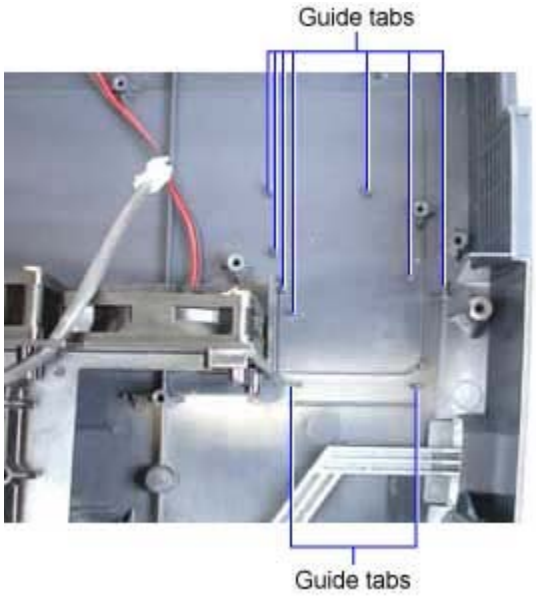
   Optical engine (page 24)

2. Lift the bottom EMI shield away from the bottom case.



Assembly Notes

- Make sure the shield isn't bent and that the fingers on the shield will contact the bottom housing on the optical engine when it's replaced.
- Position the bottom EMI shield between the guide tabs on the bottom case. Then press the shield into position to secure it in the bottom case.



Remove and Replace the Chassis

The metal **chassis** (330-0963-xx) provides the necessary rigidity for the projector's internal components without adding much overall weight. The ballast/power supply ECA fastens to the chassis. The **ground spring** (321-0218-xx) attaches to the chassis and provides ground continuity to the optical engine.

The **ballast/power supply insulator** (329-0433-xx) also fastens to the chassis. It provides electrical insulation between the chassis and components on the ECA. Two **retainer studs** (340-1115-xx) fasten the insulator to the chassis.

A new chassis does not include the ground spring, ballast/power supply insulator, or retainer studs.

If you're removing the chassis to access other FRUs in the projector, you don't need to remove the ground spring or ballast/power supply insulator.

Remove the Chassis and Ground Spring

1. Remove the following items:

   Lamp module (page 42)

   Focus ring (page 30)

   Zoom ring (page 30)

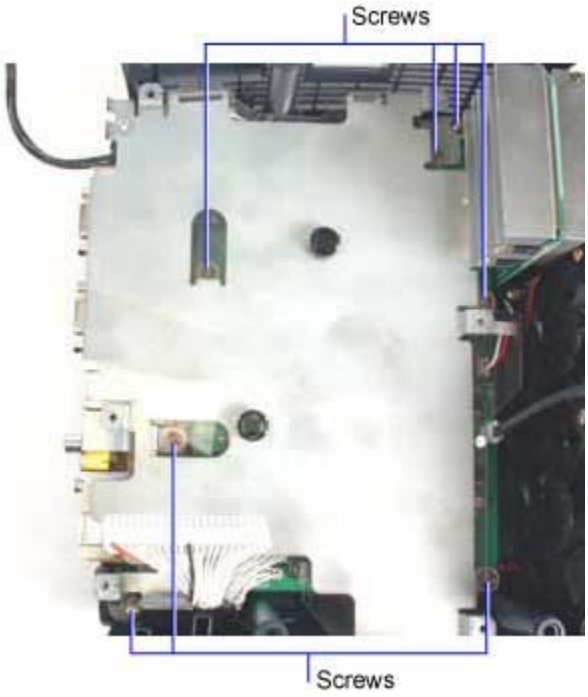
   Front bezel (page 32)

   Rear bezel (page 49)

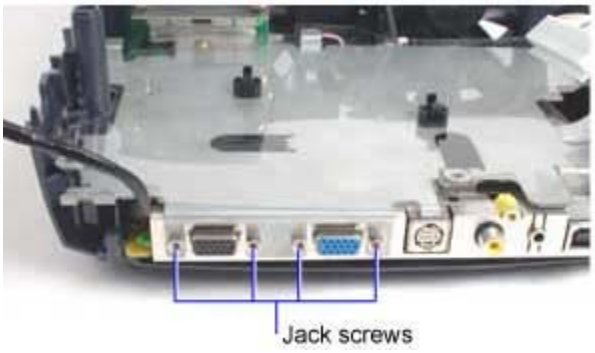
   Top case (page 52)

   Ballast/power supply ECA (page 6)

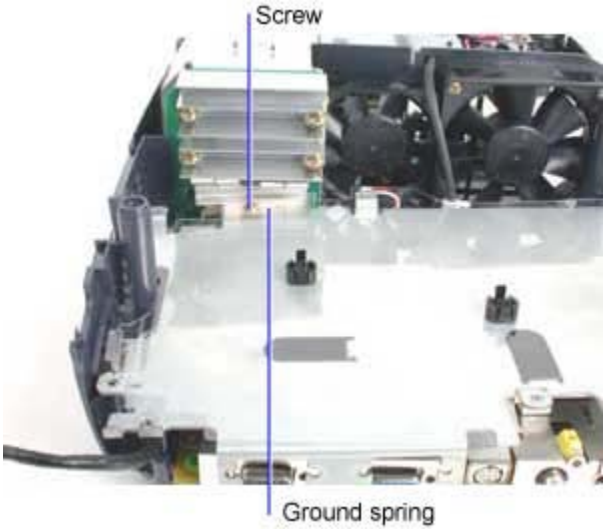
2. Remove the seven M3x10 Plastite Phillips screws that fasten the chassis to the bottom case. You need to lift the ballast/power supply insulator to reach the two screws near the center of the chassis.



3. Remove the four #4-40 jack screws that fasten the chassis around the 15-pin D-sub connectors on the I/O panel.



4. Lift the chassis near the rear of the projector, then slide the chassis rearward to disengage the ground spring from the bottom side of the DMD heat shield on the optical engine.



5. Lift the chassis away from the projector.

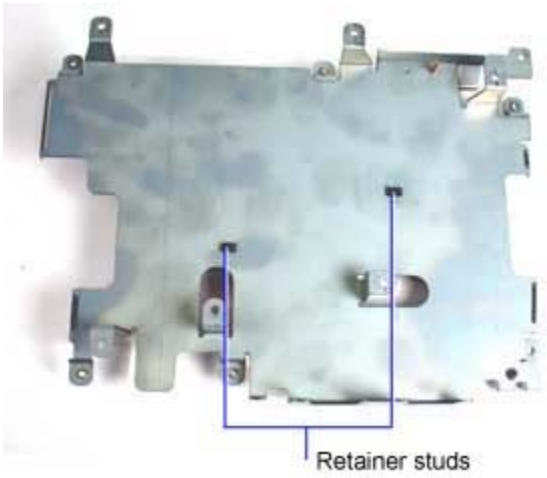
6. If you need to remove the ground spring, lift the ballast/power supply insulator and remove the M3x8 Plastite Phillips screw that fastens the ground spring to the chassis.

Assembly Notes

- Ensure that the ground spring is in proper position on the chassis to provide ground continuity to the optical engine.
- Place the chassis into the projector, then slide the chassis forward to engage the ground spring against the bottom side of the DMD heat shield on the optical engine.
- Press down on the chassis to position it over the two 15-pin D-sub connectors on the I/O panel. Replace the four jack screws and torque them to 2 in-lbs (.226 Nm).
- Replace and tighten the seven M3x10 Plastite Phillips screws securely. Do not overtighten the screws.

Remove the Ballast/Power Supply Insulator

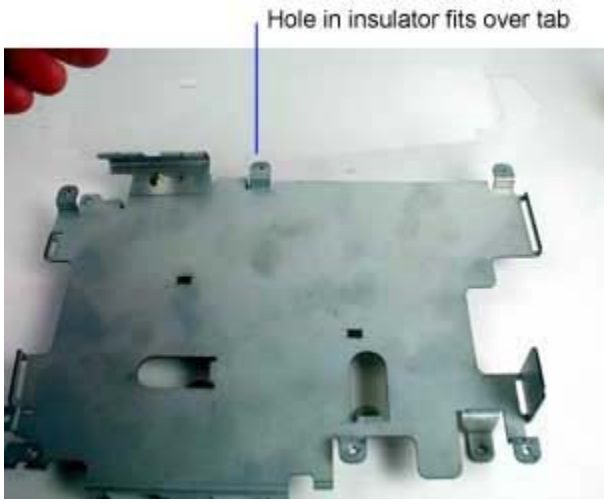
1. Place the chassis upside down on the work surface.
2. Squeeze the tabs on each of the two retainer studs that secure the ballast/power supply insulator to the chassis. Remove the studs from the chassis.



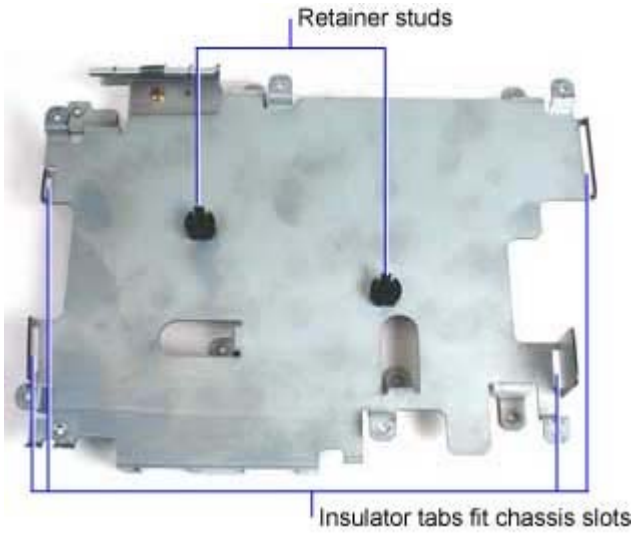
3. Turn the chassis over. Then lift the insulator away from the chassis.

Assembly Notes

- Place the triangular hole in the ballast/power supply insulator over the mounting tab on the chassis. Then lay the insulator flat against the chassis.



- Insert the two retainer studs into the chassis slots. Then place the four tabs on the insulator into the corresponding slots on the chassis.



Remove and Replace the Color Wheel Shield

The **color wheel shield** (330-0968-xx) fastens to the lamphouse and the optical engine. The shield provides protection to the fragile color wheel and bracing for the lamphouse which is otherwise open to the optical engine.

1. Remove the following items:

   Lamp module (page 42)

   Focus ring (page 30)

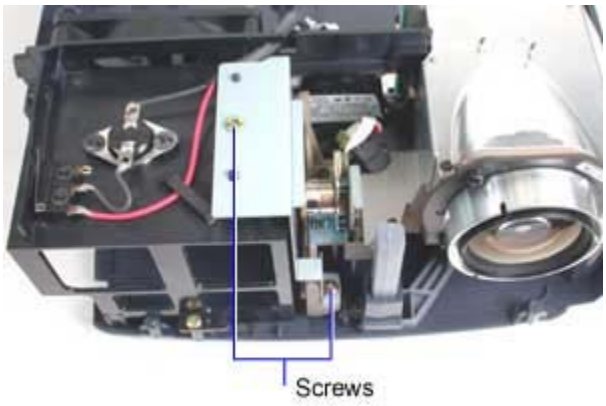
   Zoom ring (page 30)

   Front bezel (page 32)

   Rear bezel (page 49)

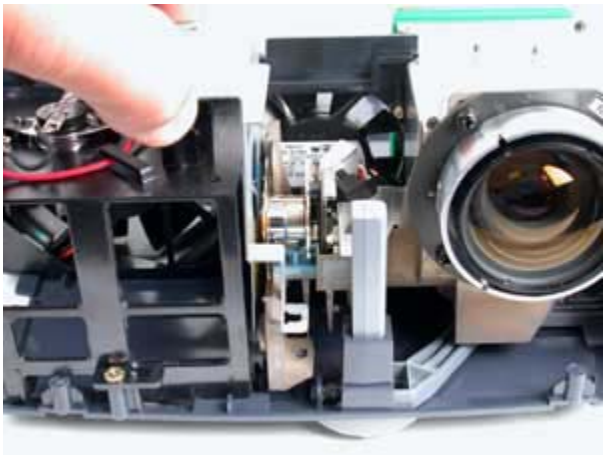
   Top case (page 52)

2. Remove the two M3x10 Plastite Phillips screws that fasten the color wheel shield to the top of the lamphouse and the optical engine.



3. Carefully lift the color wheel shield **straight upward** and out of the projector.

CAUTION The shield is very close to the color wheel. Don't allow the shield to scrape the color wheel and break or damage it.



Assembly Notes

- Be careful as you replace the color wheel shield. Don't allow it to contact the color wheel.
- Make sure that the holes in the color wheel shield align properly with the two pins on the lamphouse.
- Replace and tighten the two M3x10 Plastite Phillips screws securely. Do not overtighten the screws.

Remove and Replace the Controller ECA

The **controller ECA** (510-1773-xx) mounts beneath the metal chassis and ballast/power supply ECA and behind the optical engine. It fastens to the bottom case with seven screws and connects to the DMD ECA through two connectors at the front side of the controller.

A new controller ECA includes the keypad and ballast/power supply cables. These cables permanently connect to the controller ECA. Do not attempt to remove them.

WARNING Be sure to take proper ESD precautions while working near the controller ECA. It can be easily damaged by static electricity. ECAs damaged by static electricity require replacement.

1. Remove the following items:

   Lamp module (page 42)

   Focus ring (page 30)

   Zoom ring (page 30)

   Front bezel (page 32)

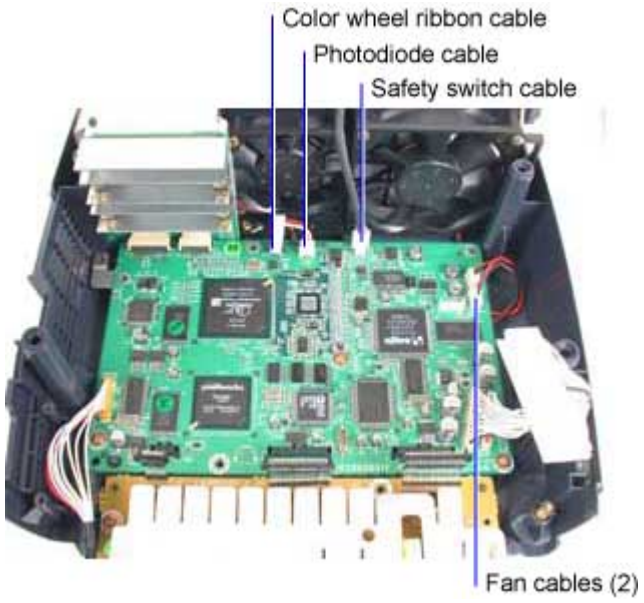
   Rear bezel (page 49)

   Top case (page 52)

   Ballast/power supply ECA (page 6)

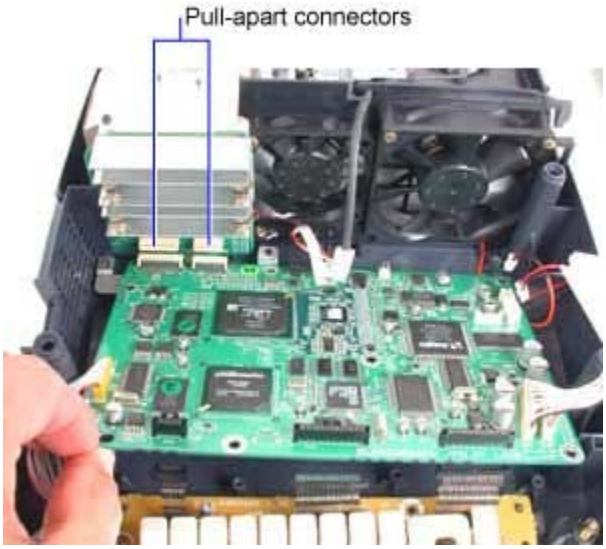
   Chassis (page 12)

2. Unplug the safety switch cable, the two fan cables, the color wheel ribbon cable, and the photodiode cable from the controller ECA.



3. Remove the three M3x10 Plastite Phillips screws that fasten the controller ECA to the bottom case.

4. Lift the rear of the controller ECA away from the bottom case. Then gently pull the controller rearward to separate the two connectors at the DMD ECA.

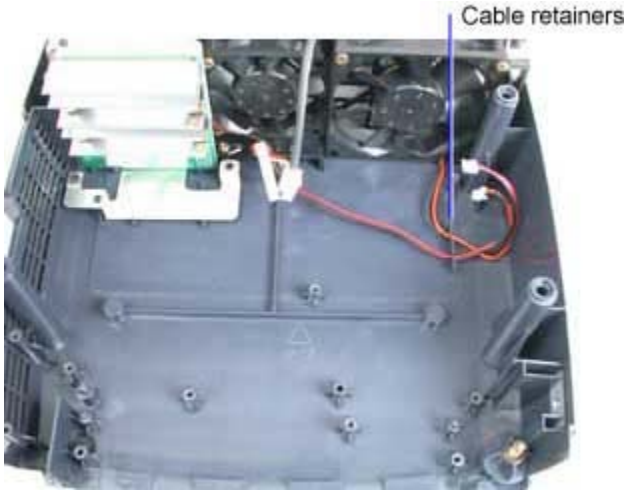


5. Lift the controller ECA away from the projector.

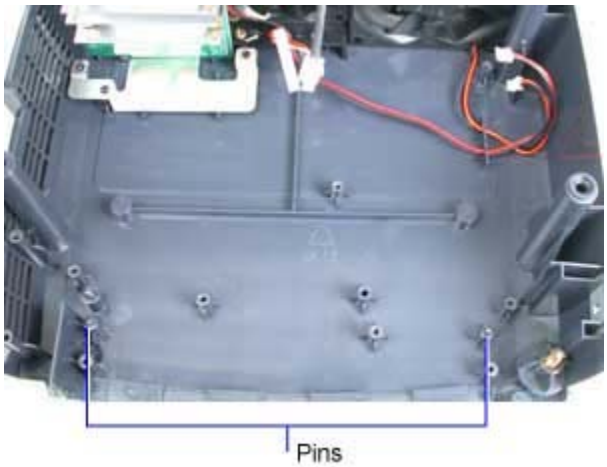
Store the controller ECA in a static-free container while it is removed from the projector.

Assembly Notes

- Ensure that the cables from the 60mm and 80mm fans route through the retainers in the bottom case.



- Place the controller ECA into the projector, then slide it forward to engage the two connectors at the DMD ECA.
- Make sure that the holes in the controller ECA align properly with the two pins on the bottom case. Gently press down on the controller ECA to ensure that it is in proper position over the pins on the bottom case.



- Connect the following cables to the controller ECA:
  - Safety switch cable to CN708
  - Photodiode cable to CN300
  - Color wheel cable to CN301
  - 60mm fan cable to CN704
  - 80mm fan cable to CN705
- Replace and tighten the three M3x10 Plastite Phillips screws securely. Do not overtighten the screws.

Remove and Replace the Elevator

The elevator is comprised of the **elevator spring** (321-0107-xx), **elevator actuator** (340-1119-xx) and **elevator shaft** (340-1120-xx). The elevator shaft includes a molded foot. The actuator allows the shaft to extend or retract and adjust the level of the projected image. The elevator housing is molded into the bottom case. Except for the housing, each part can be replaced separately.

Remove the Elevator Shaft

1. Remove the following items:

   Lamp module (page 42)

   Focus ring (page 30)

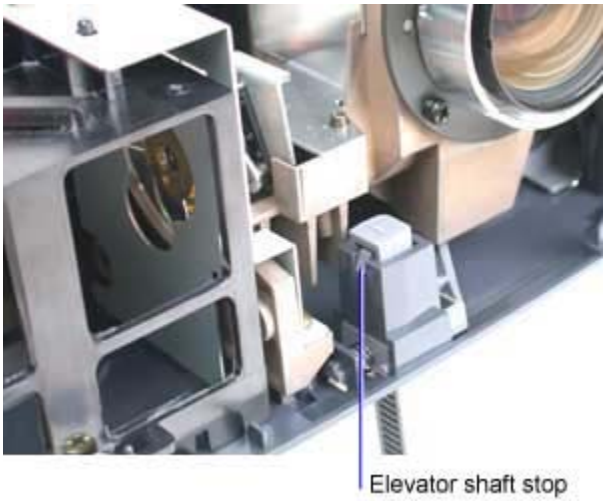
   Zoom ring (page 30)

   Front bezel (page 32)

   Rear bezel (page 22)

   Top case (page 52)

2. Fully extend the elevator shaft. Then use a small flat-blade screwdriver to gently depress the stop on the elevator shaft. This allows the elevator shaft to pass through the housing and out of the bottom case.



3. Depress the elevator actuator as you pull the elevator shaft out from the bottom side of the projector.

Assembly Note

- Make sure that the grooves on the elevator shaft face the lamphouse. Then depress the elevator actuator and replace the elevator shaft in the bottom case.

Remove the Elevator Actuator and Spring

1. Remove the elevator shaft, then remove the:

   Ballast/power supply ECA (page 6)

   Chassis (page 12)

   Controller ECA (page 19)

   Color wheel shield (page 17)

   Optical engine (page 24)

2. Gently slide the elevator actuator out of the bottom case.

3. Slide the elevator spring off of the end of the actuator.

Assembly Note

- Replace the elevator spring on the end of the actuator. Then replace the elevator actuator in the bottom case.

Remove and Replace the Optical Engine

The **optical engine** (505-1506-xx) fastens to the bottom case. It produces the projected image by directing focused light from the lamp module through the color wheel and onto the Digital Micromirror Device (DMD). The optical engine contains a formatter ECA that processes the image signal from the controller ECA before the the signal is delivered to the DMD.

It also comprises other elements in the light path, including the:

- Light tunnel
- Photodiode
- Projection lens

CAUTION The color wheel is unprotected on the side of the optical engine. Avoid touching the color wheel. The edge of the glass wheel is sharp and can cause personal injury. Touching the color wheel can break it or leave smudges that degrade the image.

1. Remove the following items:

   Lamp module (page 42)

   Focus ring (page 6)

   Zoom ring (page 30)

   Front bezel (page 32)

   Rear bezel (page 49)

   Top case (page 52)

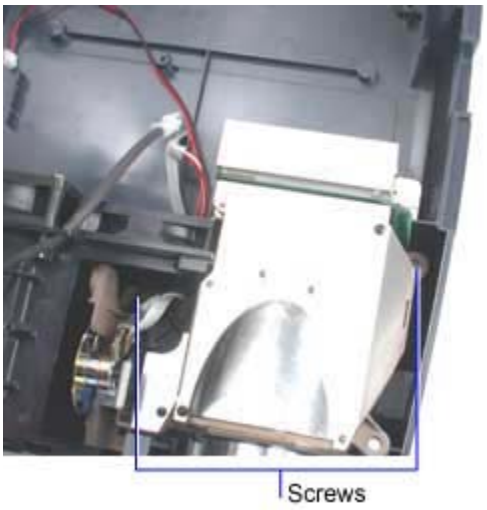
   Ballast/power supply ECA (page 6)

   Chassis (page 12)

   Controller ECA (page 19)

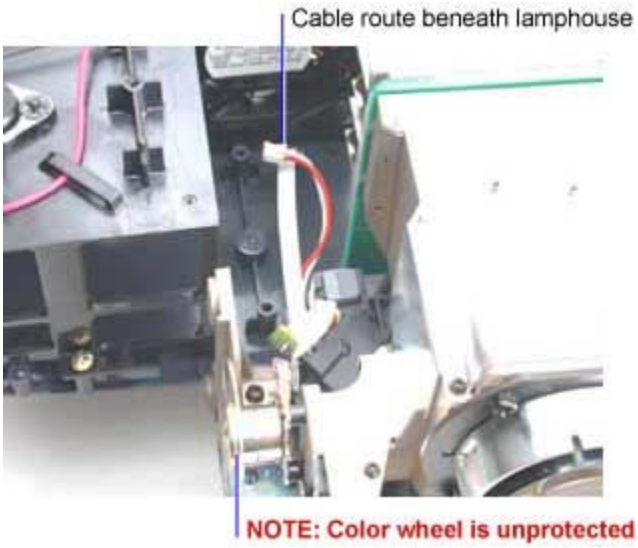
   Color wheel shield (page 17)

2. Remove the two M3x10 Plastite Phillips screws that fasten the optical engine to the bottom case.



3. Fully extend the elevator shaft to minimize its interference as you remove the optical engine.

4. Grasp the optical engine around the body behind the lens barrel. Carefully lift it up and forward. The photodiode and color wheel ribbon cables pass through a retainer guide beneath the lamphouse. As you lift the optical engine, gently pull these cables through the retainer guide and out from beneath the lamphouse.



CAUTION Avoid touching or damaging the color wheel.

5. Lift the optical engine away from the projector.

6. Place the engine on a soft, static-free surface or in an ESD-protected container.

Assembly Notes

- Fully extend the elevator shaft to minimize its interference as you replace the optical engine.
- As you lower the optical engine into the projector, route the photodiode and color wheel ribbon cables through the retainer guide beneath the lamphouse.
- Replace and tighten the two M3x10 Plastite Phillips screws securely. Do not overtighten the screws.

Remove and Replace the Cooling Fans

Two fans provide all the cooling air necessary for the projector. The **80mm fan** (526-0152-xx) provides primary cooling for the lamp module and lamphouse. The **60mm fan** (526-0153-xx) cools the color wheel and optical engine. Both fans draw cool air across the electronic components in the projector and exhaust heated air through the front bezel. The fans fasten to the rear side of the lamphouse.

1. Remove the following items:

   Lamp module (page 42)

   Focus ring (page 30)

   Zoom ring (page 30)

   Front bezel (page 32)

   Rear bezel (page 49)

   Top case (page 52)

   Ballast/power supply ECA (page 6)

   Chassis (page 12)

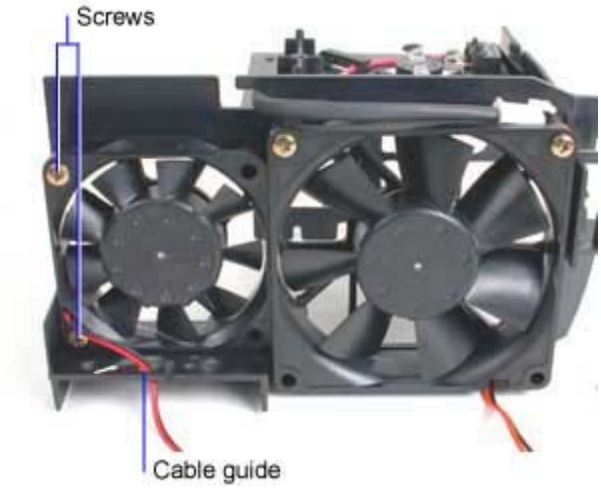
   Controller ECA (page 19)

   Color wheel shield (page 17)

   Lamphouse (page 45)

Removing the 60mm Fan

1. Remove the two M3x25 Plastite Phillips screws that fasten the fan to the lamphouse. Then remove the fan cables from the retainer guide on the lamphouse.



2. Lift the fan away from the lamphouse.

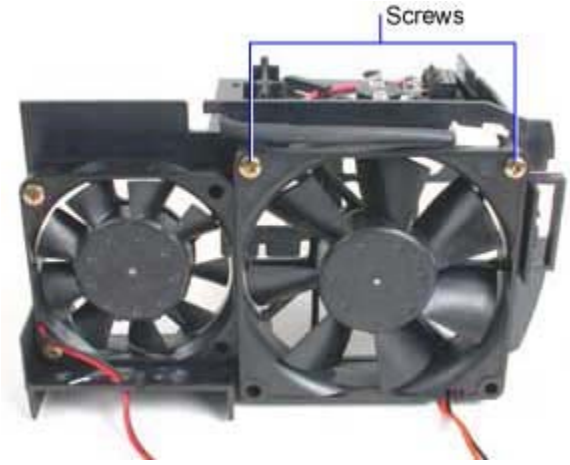
Assembly Notes

- Position the fan against the lamphouse with fan label facing the lamphouse and the cable recess at the left lower side. The cables should exit the fan at the recess on the side opposite the label.

- Replace and tighten the two M3x25 Plastite Phillips screws. Do not overtighten the screws.
- Make sure that the cables are clear of the fan blades.

Removing the 80mm Fan

1. Remove the two M3x30 Plastite Phillips screws that fasten the fan to the lamphouse.



2. Lift the fan away from the lamphouse.

Assembly Notes

- Position the fan against the lamphouse with fan label facing the lamphouse and the cable recess at the bottom right side. The cables should exit the fan at the recess on the side opposite the label.

- Replace and tighten the two M3x30 Plastite Phillips screws. Do not overtighten the screws.
- Make sure that the cables are clear of the fan blades.

Remove and Replace the Focus and Zoom Rings

The **focus ring** (340-1117-xx) fits around the front of the projection lens. The **zoom ring** (340-1116-xx) is behind the focus ring. The **lens cap** (505-1247-xx) snaps onto the focus ring.

Both the focus ring and the zoom ring snap into place on the lens barrel. They can be replaced without removing any other projector parts.

Three retainer tabs inside the zoom ring engage the outside of the lens. Three retainer tabs on the focus ring engage the inner lens barrel.

1. Place the projector right side up on a soft work surface. Then remove the lens cap.
2. Grasp the focus ring and pull it off of the lens barrel. The retainer tabs disengage from the lens ring.

3. Grasp the zoom ring and pull it off of the lens barrel. The retainer tabs disengage from the lens barrel.

Assembly Notes

- When you replace the zoom ring, push it as far as it will go onto the lens barrel. The lens barrel fits snugly against the collar inside the zoom ring. Rotate the zoom ring to ensure that the alignment tab properly engages one of the slots on the lens barrel.
- Press the focus ring onto the lens. Then rotate the ring to ensure that the retainer tabs engage to lock it in place on the inner lens barrel.
- Place the lens cap over the focus ring.

Remove and Replace the Front Bezel

The **front bezel** (505-1509) covers the front of the projector and helps to secure the top case to the bottom case. Two screws at the bottom and two tabs and a slotted receiver on the top of the front bezel hold it in place on the projector. The front bezel includes the front IR lens.

Remove the Front Bezel

1. Remove the following items:

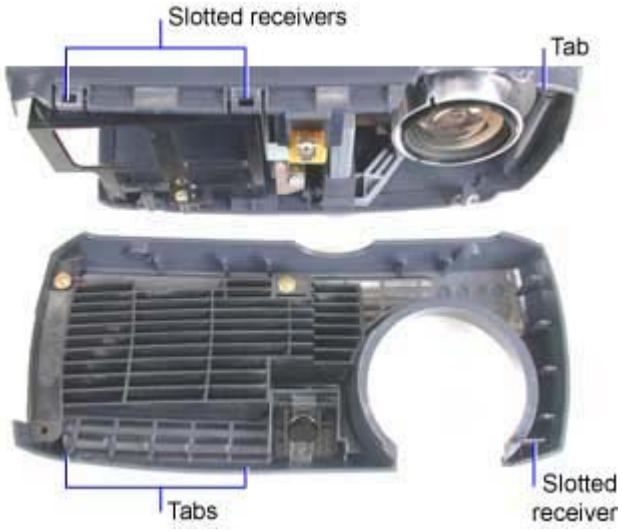
   Focus ring (page 30)

   Zoom ring (page 30)

2. Place the projector upside down on a soft work surface.
3. Remove the two M3x10 Plastite Phillips screws that fasten the front bezel to the bottom case.

4. Turn the projector right side up on the work surface. Gently pull the top of the front bezel away from the projector. The two tabs and slotted receiver on the front bezel disengage from the projector. You may need to use a small flat-blade screwdriver to depress the slotted receivers on the top case to get them to disengage from the tabs on the front bezel.

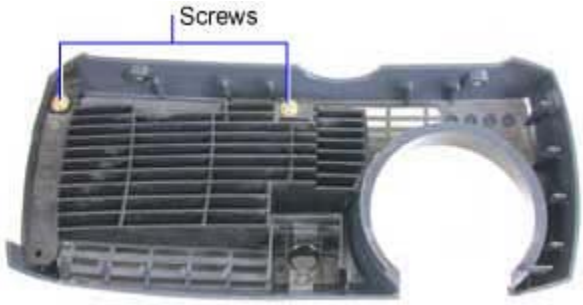
CAUTION Don't pry the front bezel to remove it.



5. Pull the front bezel away from the projector.

Remove the Inner Grill

1. Remove the two M3x8 Plastite Phillips screws that fasten the inner grill to the front bezel.



2. Lift the inner grill away from the front bezel.

Assembly Notes

- Lay the front grill in position inside the front bezel. Replace and tighten the two M3x8 Plastite Phillips screws securely. Do not overtighten the screws.
- Align the front bezel against the front of the projector. Press the bezel into position to lock the two tabs and slotted receiver against the top case.
- Tighten the two M3x10 Plastite Phillips screws securely. Do not overtighten the screws.

Remove and Replace the I/O ECA

The **I/O ECA** (510-1800-xx) contains the connectors for interfacing the projector with external devices. Ribbon cables carry the I/O signals into and out of the controller ECA where all signal processing takes place. The I/O ECA is located at the backside of the projector behind the controller ECA

1. Remove the following items:

   Lamp module (page 42)

   Focus ring (page 30)

   Zoom ring (page 30)

   Front bezel (page 32)

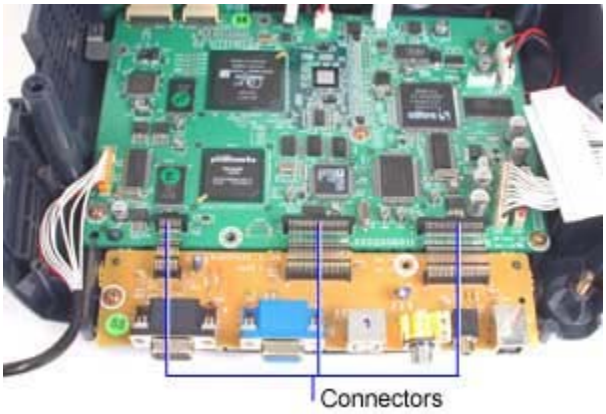
   Rear bezel (page 49)

   Top case (page 52)

   Ballast/power supply ECA (page 6)

   Chassis (page 12)

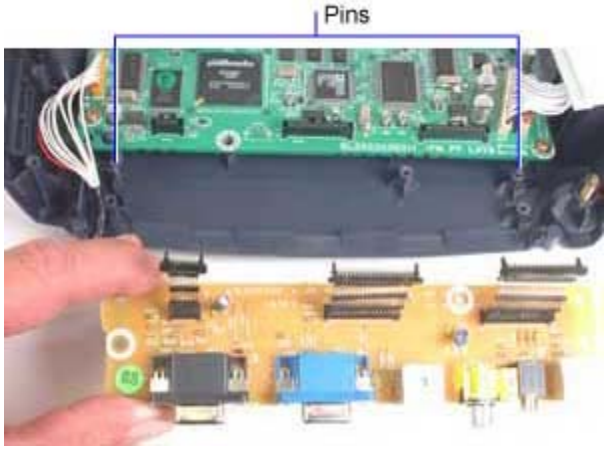
2. Unplug the connectors at the ends of the three ribbon cables that connect the I/O ECA to the controller ECA.



3. Remove the M3x10 Plastite Phillips screws that fastens the I/O ECA to the bottom case.

Assembly Notes

- Avoid sharply bending the ribbon cables that connect the I/O ECA to the controller ECA. When you replace the I/O ECA, ensure that the connectors on the cables fully engage connectors CN702, CN700 and CN701 on the controller ECA.
- Make sure that the holes in the I/O ECA align properly with the two pins on the bottom case.



- Replace and tighten the M3x10 Plastite Phillips screw securely. Do not overtighten the screw.

Remove and Replace the I/O EMI Shield

The **I/O EMI shield** (330-0964-xx) fits over the I/O connectors on the rear of the I/O ECA. The shield lies behind the chassis. The I/O EMI shield and chassis fasten to the I/O ECA with four jack screws.

1. Remove the following items:

   Lamp module (see page 42)

   Focus ring (see page 30)

   Zoom ring (see page 30)

   Front bezel (see page 32)

   Rear bezel (see page 49)

   Top case (see page 52)

   Ballast/power supply ECA (see page 6)

   Chassis (see page 12)

2. Pull the I/O EMI shield off of the connectors on the I/O ECA. Take care not to bend the shield or the contact fingers as you work the shield off.

Assembly Notes

- Make sure the shield and contact fingers aren't bent and that the shield contacts the I/O connectors.

Remove and Replace the Keypad

The keypad fastens to the inside of the top case. The keypad consists of the **keypad ECA** (510-1774-xx), the **key set** (505-1515-xx), and the **LED cover** (340-1123-xx. The keypad ECA permanently connects to the front IR receiver ECA. A ribbon cable extends between them. The LED cover nests in the recess between the keypad ECA and the top case. It focuses light from the power LED on the keypad ECA through a hole in the top case.

1. Remove the following items:

   Lamp module (page 42)

   Focus ring (page 30)

   Zoom ring (page 30)

   Front bezel (page 32)

   Rear bezel (page 49)

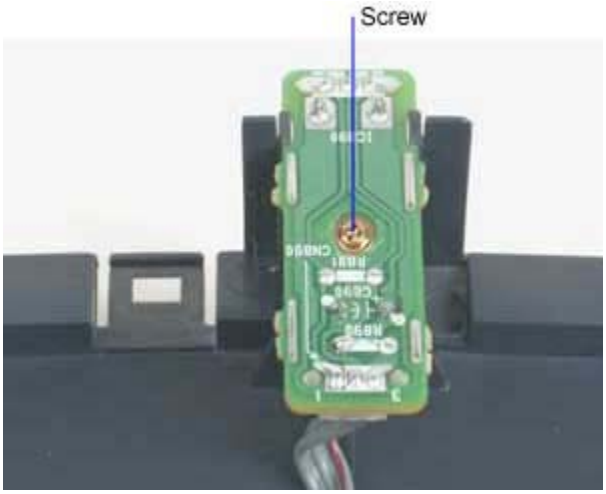
   Top case (page 52)

2. Place the top case face down on a soft work surface.
3. Remove the four M3x10 Plastite Phillips screws that fasten the keypad to the top case. Then then lift the keypad ECA out of the top case.

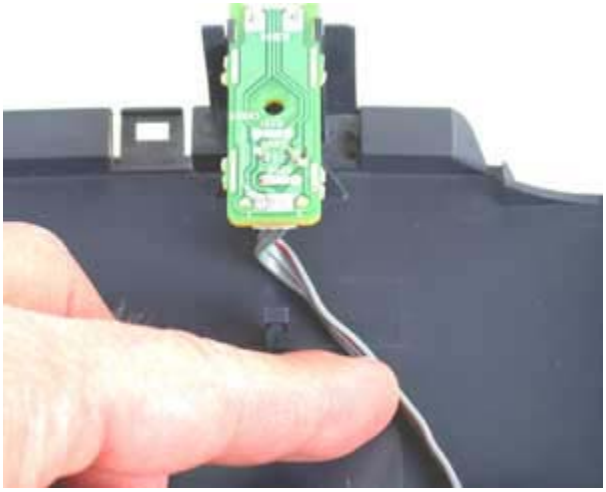
4. Lift the key set out of the top case.

5. Lift the LED cover out of the top case.

6. Remove the M3x10 Plastite Phillips screw that fastens the front IR receiver ECA to the top case.



7. Remove the front IR receiver cable from the retainer in the top case.

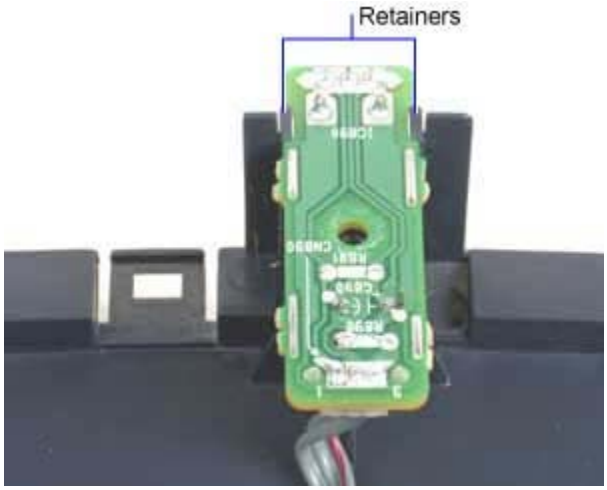


8. Lift the front IR receiver ECA out of its recess in the top case.

Assembly Notes

- The keypad ECA, the front IR receiver ECA, the key set and the LED cover fit only one way in the top case.
- Make sure that the alignment holes in the LED cover fit over the pins in the top case.
- 
- Position the key set in the top case such that the holes in the key set frame fit over the pins in the top case.

- Position the front IR receiver ECA between the retainers in the top case.



- Route the IR receiver cable beneath the retainer near the mounting location of the IR receiver ECA.
- Replace and tighten the M3x10 Plastite Phillips screws securely. Do not overtighten the screws.

Remove and Replace Lamp Module

The **lamp door** (505-1513-xx) fits over the lamp cavity in the projector. A pin on the lamp door closes the safety switch on top of the lamphouse when the door is shut.

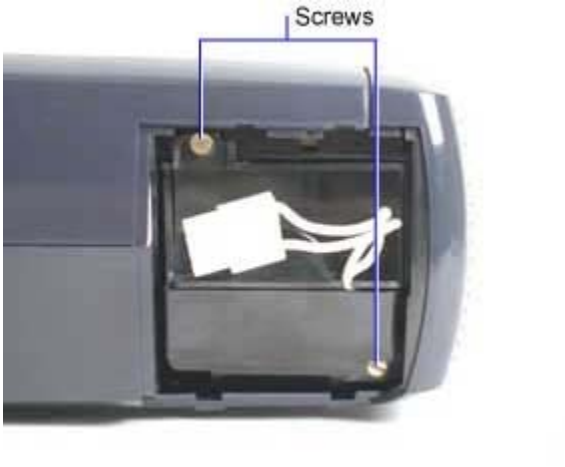
The **lamp module** (SP-LAMP-009) consists of a metal housing and enclosed reflector assembly and arc tube. Air flow from the 80 mm fan passes through openings on two sides of the lamp module. Screens over these openings provide air filtration and contain quartz fragments in the event of lamp rupture.

CAUTION The lamp module gets very hot during operation. Allow the lamp to cool for 30 minutes before handling it.

1. To remove the lamp door, insert a small flat-blade screwdriver into one of the recesses at the top of the door. Gently pry the top of the door away from the projector. The door detaches from the projector.

2. Squeeze the locking tab on the lamp cable connector and unplug it from the connector inside the lamphouse.

3. To remove the lamp, loosen the two captive screws that secure it in the projector.



4. Slide the lamp module straight out of the lamphouse.

Assembly Notes

- Check the screens over the openings on the sides of the lamp module to make sure they're clean. Vacuum away any dust on the screens so cooling air can flow freely through the lamp module.
- Slide the lamp module straight into the lamphouse. The alignment pins on the innermost side of the lamp module engage holes on the optical engine.

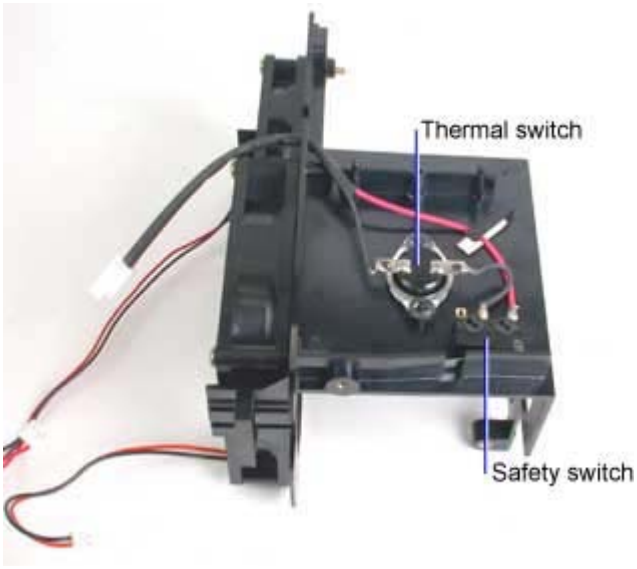
- Gently tighten the two captive screws on the lamp module to secure it in the projector.
- Plug the cable on the lamp module into the connector inside the lamphouse. Ensure that the locking tab securely holds the connector halves together.
- Place the two tabs on the bottom side of the lamp door in their respective slots on the projector. Then press the top of the door against the projector to engage the alignment pin and the two upper tabs that secure the lamp door in position.
- If you installed a new lamp module, follow the directions below to **reset the lamp timer**.
- Press the **Menu** button and navigate to the Main Menu>Settings>Service menu. Select Lamp Reset to reset the lamp timer.

  After you reset the lamp timer, read the timer value to make sure it was reset. Navigate to the About screen from the Main Menu, then view the Lamp Hour value. It should show 0 hours.

Remove and Replace the Lamphouse

The **lamphouse** (505-1514-xx) fastens to the bottom case. It provides an alignment mechanism for the lamp module to ensure precise beam focus into the optical path.

The lamphouse includes the safety switch and thermal switch.



Two cooling fans fasten to the rear side of the lamphouse. If you need to replace a fan, refer to **Remove and Replace the Cooling Fans** on page 27. If you're removing the lamphouse to access another FRU, you don't need to remove the fans.

1. Remove the following items:

   Lamp module (page 42)

   Focus ring (page 30)

   Zoom ring (page 30)

   Front bezel (page 32)

   Rear bezel (page 49)

   Top case (page 52)

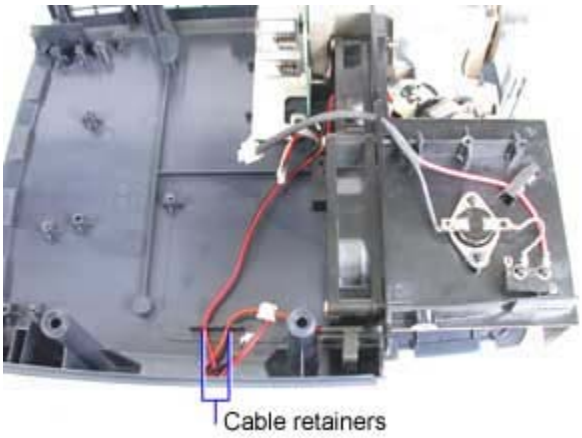
   Ballast/power supply ECA (page 6)

   Chassis (page 12)

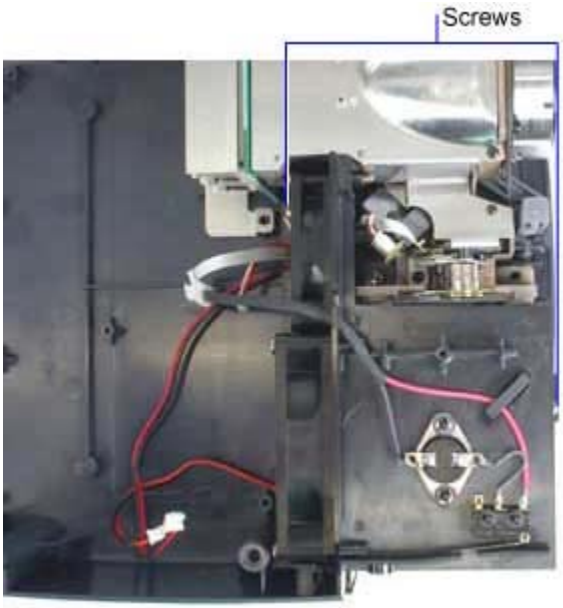
   Controller ECA (page 19)

   Color wheel shield (page 17)

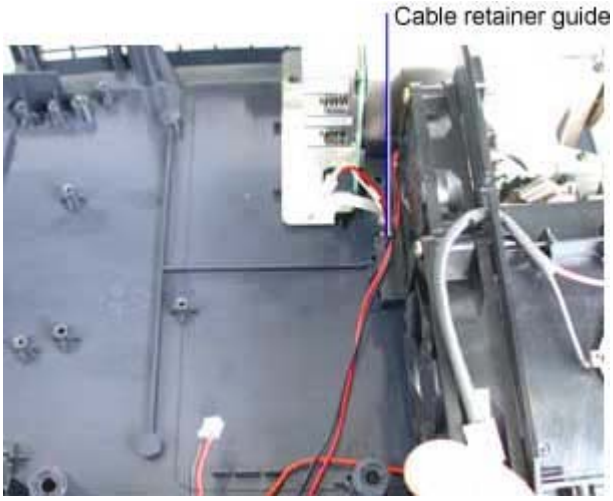
2. Remove the fan cables from their retainers in the bottom case.



3. Remove the two M3x10 Plastite Phillips screws that fasten the lamphouse to the bottom case.



4. Carefully lift the lamphouse up and out of the projector. The photodiode and color wheel ribbon cables pass through a retainer guide on the rear side of the lamphouse. As you lift the lamphouse, remove these cables from the retainer guide.



CAUTION The lamphouse is very close to the color wheel. Avoid touching the color wheel. The edge of the glass wheel is sharp and can cause personal injury. Touching the color wheel can break it or leave smudges that degrade the image.

Assembly Notes

- Be careful as you replace the lamphouse. Don't allow it or your fingers to contact the color wheel.
- As you lower the lamphouse into the projector, route the photodiode and color wheel ribbon cables through the retainer guide. Make sure that the lamphouse aligns properly with the two pins on the bottom case.

- Replace and tighten the two M3x10 Plastite Phillips screws securely. Do not overtighten the screws.

Remove and Replace the Leveling Foot

The **leveling foot** (340-1118-xx) consists of the leveling foot and shaft, and a retainer. Rotating the leveling foot extends or retracts it in the bottom case. The shaft threads through the bottom case from the outside. A circular retainer stops the leveling foot at its maximum extension.

1. Remove the following items:

   Lamp module (page 42)

   Focus ring (page 30)

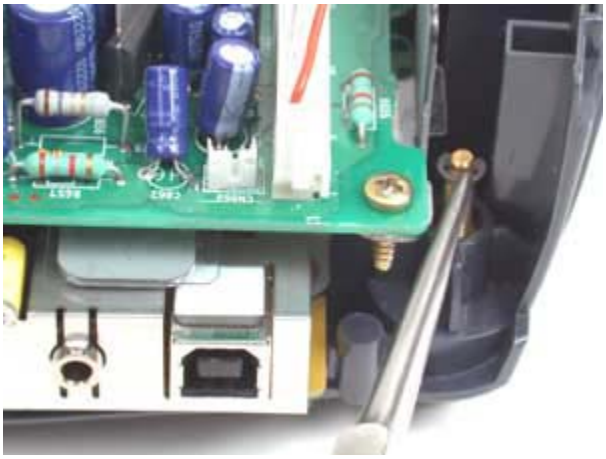
   Zoom ring (page 30)

   Front bezel (page 32)

   Rear bezel (page 49)

   Top case (page 52)

2. Rotate the leveling foot to fully retract it in the bottom case.
3. Remove the retainer from the groove at the top of the leveling foot shaft.



4. Rotate the leveling foot to extend it until it detaches from the bottom case.

Assembly Notes

- Insert the leveling foot shaft into the bottom side of the projector. Rotate the foot until it's fully retracted in the bottom case.
- Replace the retainer in the groove at the top of the leveling foot shaft. Make sure the retainer fully seats in the groove.
- Adjust the leveling foot to be level with the bottom of the projector.

Remove and Replace the Rear Bezel

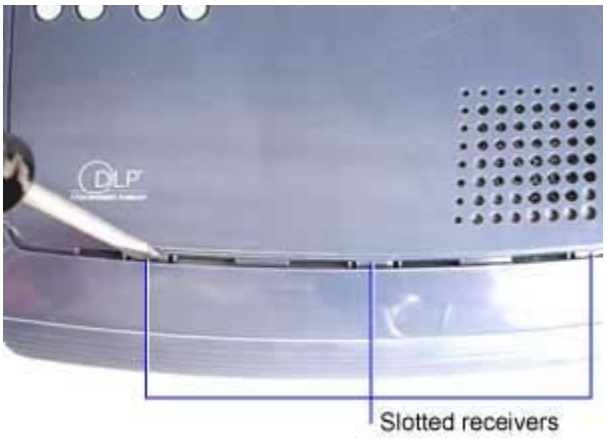
The **rear bezel** (505-1510-xx) fastens to the rear of the projector and surrounds the I/O ports. The **I/O panel label** (020-1775-xx) adheres to the outside of the rear bezel.

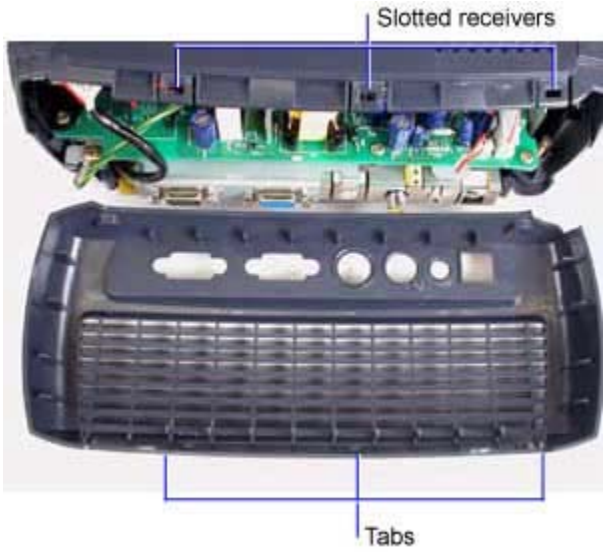
If you replace the rear bezel, you need a replacement I/O panel label. You cannot remove the label from the rear bezel.

1. Place the projector upside down on a soft work surface.
2. Remove the two M3x10 Plastite Phillips screws that fasten the rear bezel to the bottom case.

3. Remove the M2.6x10 Plastite Phillips screw that fastens the rear bezel to the chassis.

4. Turn the projector right side up on the work surface. Three tabs on the rear bezel engage slotted receivers on the top case. While firmly pulling the top of the rear bezel away from the projector, carefully insert the tip of a flat blade screwdriver into the space between the rear bezel and top case. Position the screwdriver blade at the location of one of the slotted receivers and press down to release it.





You may need to repeat this step, pressing down on one of the other two tabs in order to release the rear bezel from the top case.

5. Pull the rear bezel away from the projector.

Assembly Notes

- Align the rear bezel against the rear of the projector. Press the bezel into position to lock the three tabs against the top case.
- Tighten the two M3x10 and the M2.6x10 Plastite Phillips screws securely. Do not overtighten the screws.

When you install a new rear bezel:

- Adhere a new I/O panel label to the outside of the bezel.

Remove and Replace the Rubber Feet

The **rubber foot** (328-0155-xx) adheres to the bottom case at the rear of the projector, opposite the leveling foot.

If you need to remove an old rubber foot, gently pry it away from the bottom case. To replace the rubber foot, peel the protective paper from the replacement foot. Then press the foot into the recess in the bottom case.

Remove and Replace the Top Case

The **top case** (505-1508-xx) covers the top half of the half of the projector. Once you remove the top case, you have access to FRUs inside the projector. When you replace the top case, you need to adhere a new **nameplate** (020-1118-xx) to the top case.

1. Remove the following items:

   Lamp module (see page 42)

   Focus ring (see page 30)

   Zoom ring (see page 30)

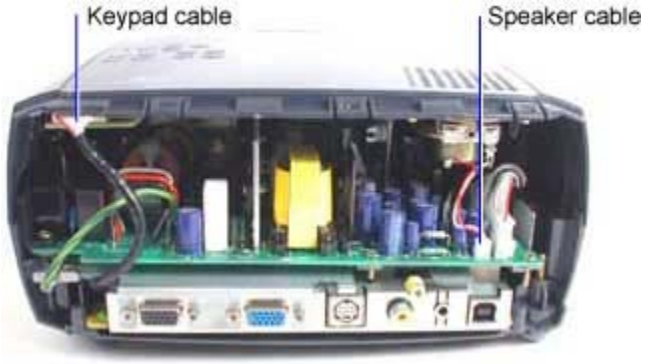
   Front bezel (see page 32)

   Rear bezel (see page 49)

2. Place the projector upside down on a soft work surface. Remove the four M4x18 Plastite Phillips screws from the bottom case.

3. Holding the top case against the bottom case, turn the projector over and place it right side up on the work surface.

4. At the rear of the projector, unplug the keypad cable from the keypad ECA and the speaker cable from the power supply ECA.



5. Slowly lift the top case away from the projector.

If you're replacing the top case with a new one, remove the keypad (page 38) and remove the speaker (page 54) from the old one.

Assembly Notes

- If you're replacing the top case with a new one, install any top case parts that you removed from the old one.
- Adhere a new nameplate to the top case.

- Connect the keypad cable at the keypad ECA and the speaker cable at the power supply ECA.
- Make sure that the top case fits flush over the bottom case.
- Tighten the four M4x18 Plastite Phillips screws securely. Do not overtighten the screws.

Remove and Replace the Speaker

The **speaker** (526-0151-xx) fastens to the top case. The **speaker grill** (330-0967-xx) protects the speaker from damage by objects that could pass through the holes in the top case.

1. Remove the following items:

   Lamp module (page 42)

   Focus ring (page 30)

   Zoom ring (page 30)

   Front bezel (page 32)

   Rear bezel (page 49)

   Top case (page 52)

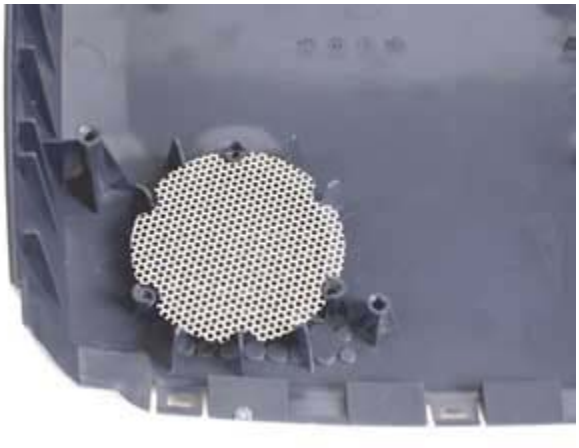
2. Place the top case face down on a soft work surface.

3. Remove the three M3x10 Plastite Phillips screws that fasten the speaker to the top case. Then lift the speaker away from the top case.

4. Lift the speaker grill away from the top case.

Assembly Notes

- Position the speaker grill in the top case. The recesses in the grill align with ribs and mounting studs in the top case.



- Position the speaker in the top case with the leads facing toward the rear of the projector. Tighten the three M3x10 Plastite Phillips screws securely. Do not overtighten the screws.

Functional Tests

You perform the functional tests after you've repaired the projector to make sure all components of the projector operate properly. You can also perform the functional tests if you're having trouble determining what is wrong with the projector. For additional help in diagnosing trouble with the projector, see Troubleshooting on page 60.

Required equipment

Equipment	Notes
Composite video DVD player with S-video capability	Make sure the video player has an S-video Out port and cables. The player should also have a Composite video output port (RCA). **InFocus strongly suggests you use a DVD player to test the video quality.** DVD players reproduce colors better and project sharper images. The least preferable is a VCR. If you must use a VCR, make sure you use a commercially produced recording, not one recorded from a broadcast source. The VCR must include an S-video connector in addition to a composite connector.
Commercially produced video to test S-video, composite video, and audio.	You'll need the video in DVD, laser disc, or videocassette format. InFocus strongly suggests you use *Video Essentials, Optimizing Your Audio/Video System* (DVD International, 1997) available at http://www.infocus.com/service/asc/lp530/english/tests_ve.asp
Video cables	S-video, RCA composite, component video to S-Video adapter cable, and RGB component with RGB to SCART adapter
Computer cables	HD15 VESA cable for analog video
Audio cable	3.5 mm mono audio cable
RGB test screens in a PowerPoint presentation	We recommend that you use test patterns you can download from the InFocus web site to check image quality. (http://www.infocus.com/service/software/downloads/test_screens.exe)
PC	The computer must have a CD-ROM and a standard VESA connector for analog output.
Remote control	Ensure that the remote has fresh AA batteries.
Projection screen	Use a flat screen, not a curved one.

Before beginning

Make sure the work surface where you perform the functional tests is level and clean. Place the projector on a soft surface (such as an anti-static mat) when running the tests.

Connect the following to the I/O panel on the projector:

- DVD player through component video, composite video and S-video ports
- Computer through VESA cable

Perform the following tests

Test	Verification
Power Up Connect AC power, and turn the unit on.	Verify that the proper splash (logo) screen appears. Verify image quality.
Cosmetics and mechanicals Adjust the projector so that the image is square. Make sure the lens is at a 90° angle to the wall.	Verify that the elevator and leveling foot are functional. Verify that the focus and zoom rings operate properly. Verify cosmetics.
Component video from DVD player 1. Press the **Source** button on the keypad to select a video source. 2. Connect the component video adapter cable and to the projector. 3. Disconnect any other video sources.	Verify that the video automatically synchronizes. Verify there is no distortion, noise or other abnormalities.
Composite video from DVD player 1. Connect the composite video cable to the projector. 2. Disconnect any other video sources.	Verify that the video automatically synchronizes. Verify there is no distortion, noise or other abnormalities
S-Video from DVD player 1. Disconnect any other video sources. 2. Connect the S-video cable to the projector.	Verify that the video automatically synchronizes. Verify there is no distortion, noise or other video abnormalities.

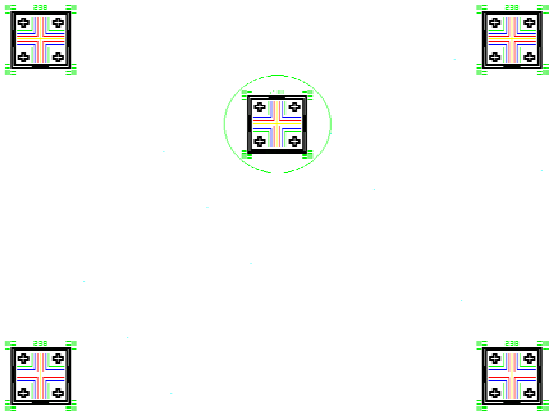
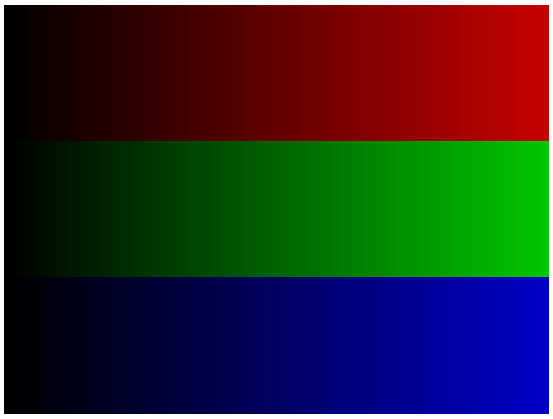
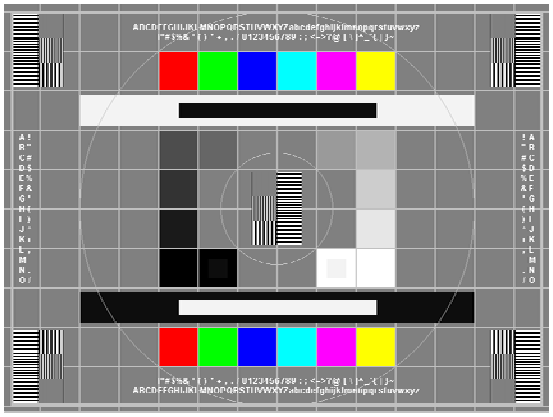
Audio from DVD player Connect the audio cable to the projector.	Verify that the audio system produces clear sound. Verify that the volume controls function properly
Software Version / Keystone / Reset All 1. Press and hold the **Keystone up** and **Keystone down** button on the keypad. 2. Press the **Menu** button. Navigate to the **Settings** menu. Select **Service**. In Service menu, select Service Info. In the **About** message box, check the software version. 3. Return to the **Service** menu. Select **Factory Reset**. Press the menu button to close the menus.	Verify the keys function properly and are not sticky. Verify that the lamp hours are well within normal life range. Verify that the projector uses the current software version.
The next step is to observe 3 computer images. These will confirm that the computer input works properly, and will test image quality. On the keypad, press the **Source Select** button to select Computer.	Verify that the images project synchronize properly through **both** of the following inputs: ❖ M1 Analog ❖ M1 Digital
Image #1: Focus Test Image Turn off any local light. Turn the **zoom ring** to make the smallest image. Focus the image so the middle icon is clearly focused. Focus the image on the 4 green squares. After focusing on the green squares on the middle icon, turn the **zoom ring** to make the largest image, then repeat the focus tests.	 Verify that all four corner icons have clear resolution Verify that the white space is visible on all 5 bar/line icon areas (between green). Verify that the image focuses through the full zoom range. Verify that the image remains in focus when the Image Shift knob is turned.

Image #2: Color Ramp Project the Color Ramp image.	 Verify there are no missing parts of the ramp. Verify that the bars are not flashing. Verify that the transitions from light to dark are smooth and gradual.
Image #4: SMPTE133 Project the SMPTE133 image.	 Verify that there are no noise, tint, duplicating columns, or other general image abnormalities present
On the keypad, press Menu. On the Display menu, select Reset All.	Verify that the image synchronizes.
Power Down After all tests are complete, turn the power off and disconnect all cables. Attach the lens cap.	Verify unit is powered off before disconnecting cables.

Troubleshooting

You use the Troubleshooting section to diagnose problems with the projector. In this section, you will find troubleshooting flowcharts for a variety of symptoms. Each flowchart leads you through a series of steps that will ultimately result in a solution. The solutions begin with the most simple and progress to the most complex.

In this section, you will find troubleshooting flowcharts for a variety of symptoms. Each flowchart leads you through a series of steps that will ultimately result in a solution. The solutions begin with the most simple and progress to the most complex.

What do you want help solving?

Power problems, including lamp issues, partial power up, shutdown and no power (page 61)

Image problems, including no image, bad color, dim image and other picture distortions (page 67)

Keypad problems (page 71)

Remote problems (page 72

Audio problems (page 73)

Check Internal Voltages and Signals

In addition to the troubleshooting flowcharts, you can also check internal voltages and signals to diagnose a defective part.

This section includes diagrams of internal voltages and signals that should be present at locations on the controller ECA, ballast/power supply ECA, and the I/O ECA. You can use this section to verify a problem that you diagnose from the troubleshooting flowcharts, or you can perform voltage checks as a starting point for diagnosis.

What do you want to check?

- The controller ECA (page 19)
- The ballast/power supply ECA (page 6)
- The I/O ECA (page 35)

Power and Start-up Problems

The projector communicates its status via an LED located on the keypad. When this status LED is green, you know that the projector is working properly. When the status LED is solid red or flashing red, you know there are lamp, power or startup problems. The frequency with which the status indicator blinks red indicates one of several error codes. These error codes provide crucial information about projector malfunctions.

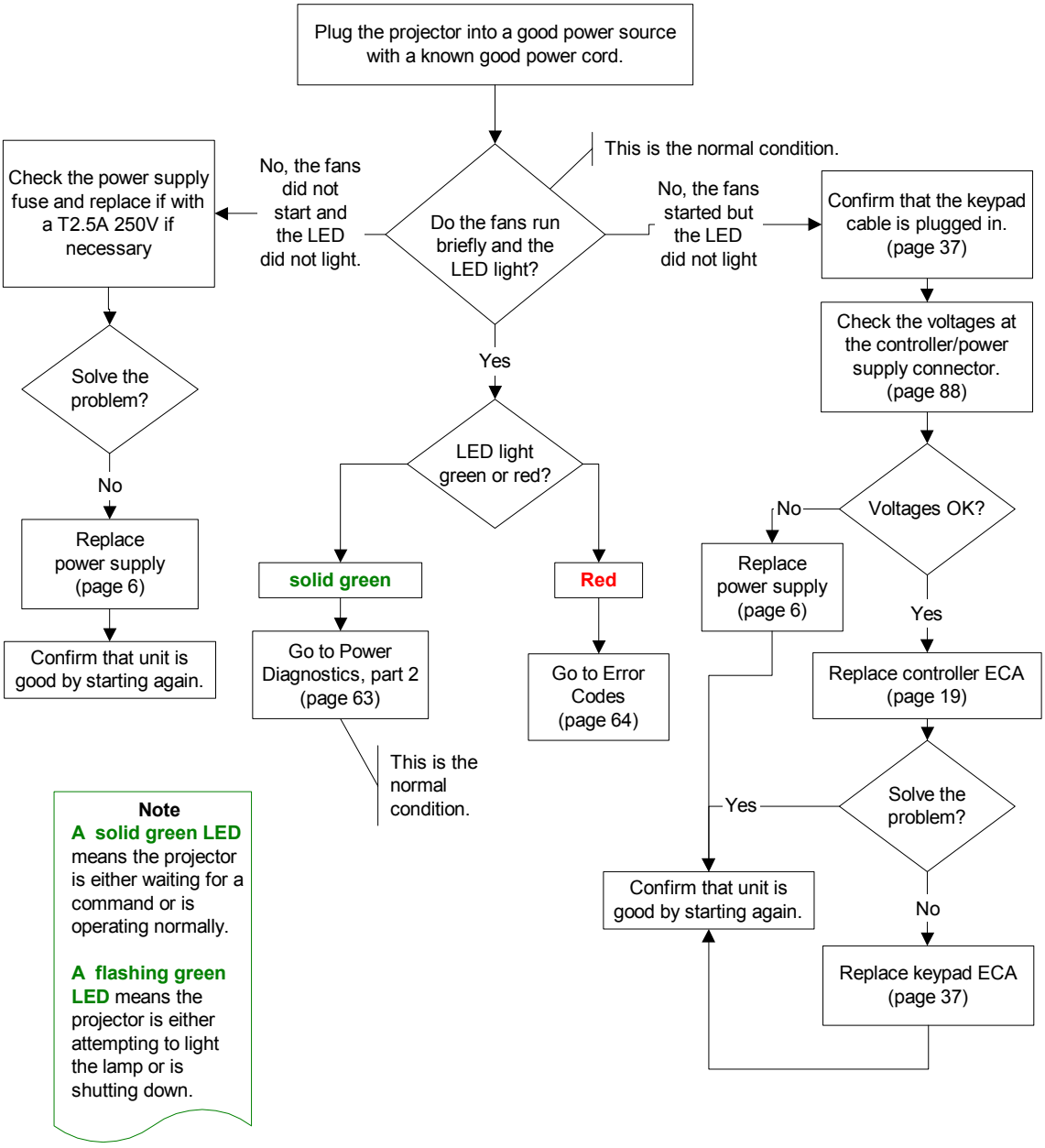
Go to the next page to begin the power diagnosis sequence.

Below is a table that shows the meaning the various LED states.

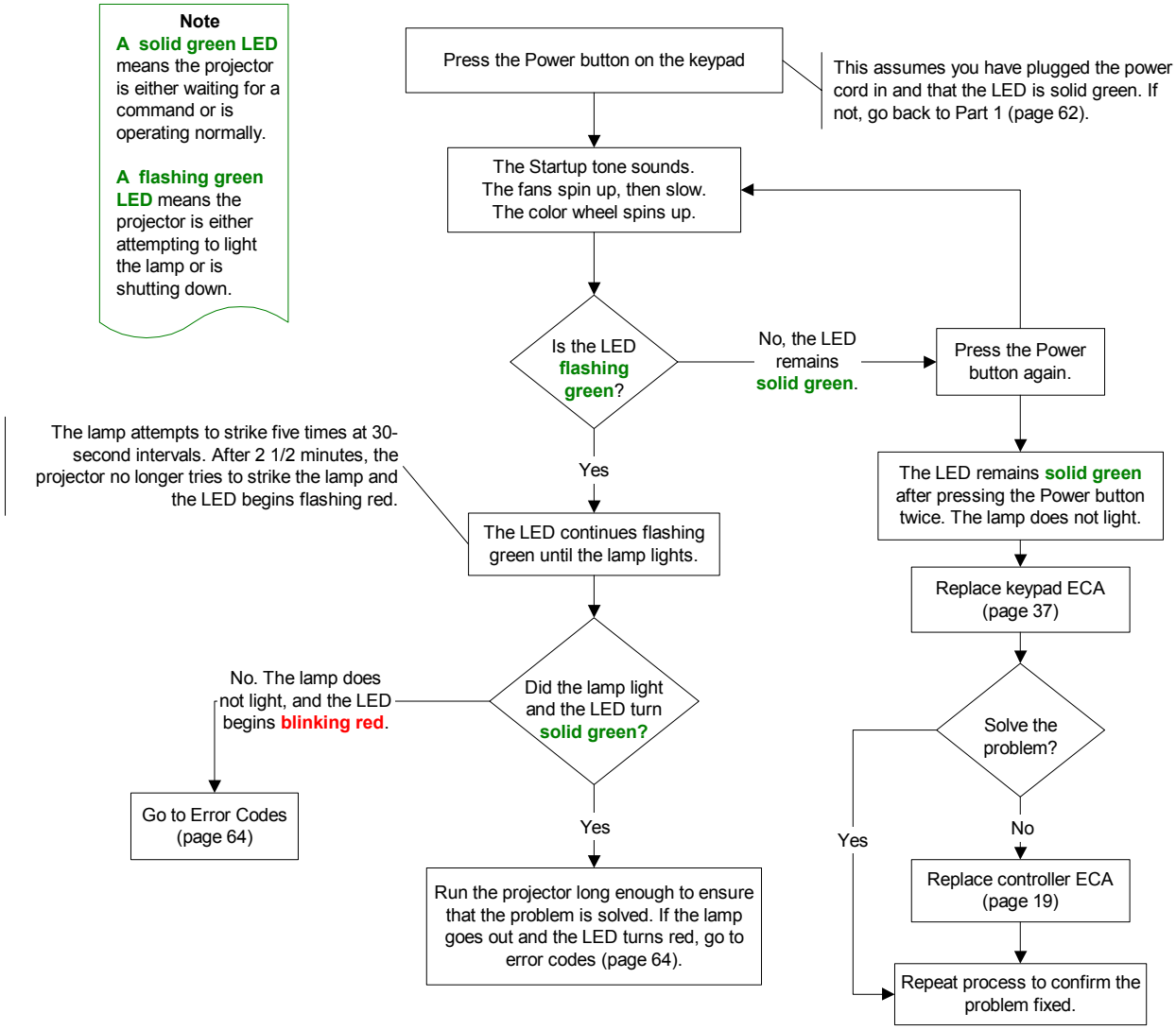
NOTE We **strongly** suggest that you follow the entire power diagnosis sequence, which begins on the next page.

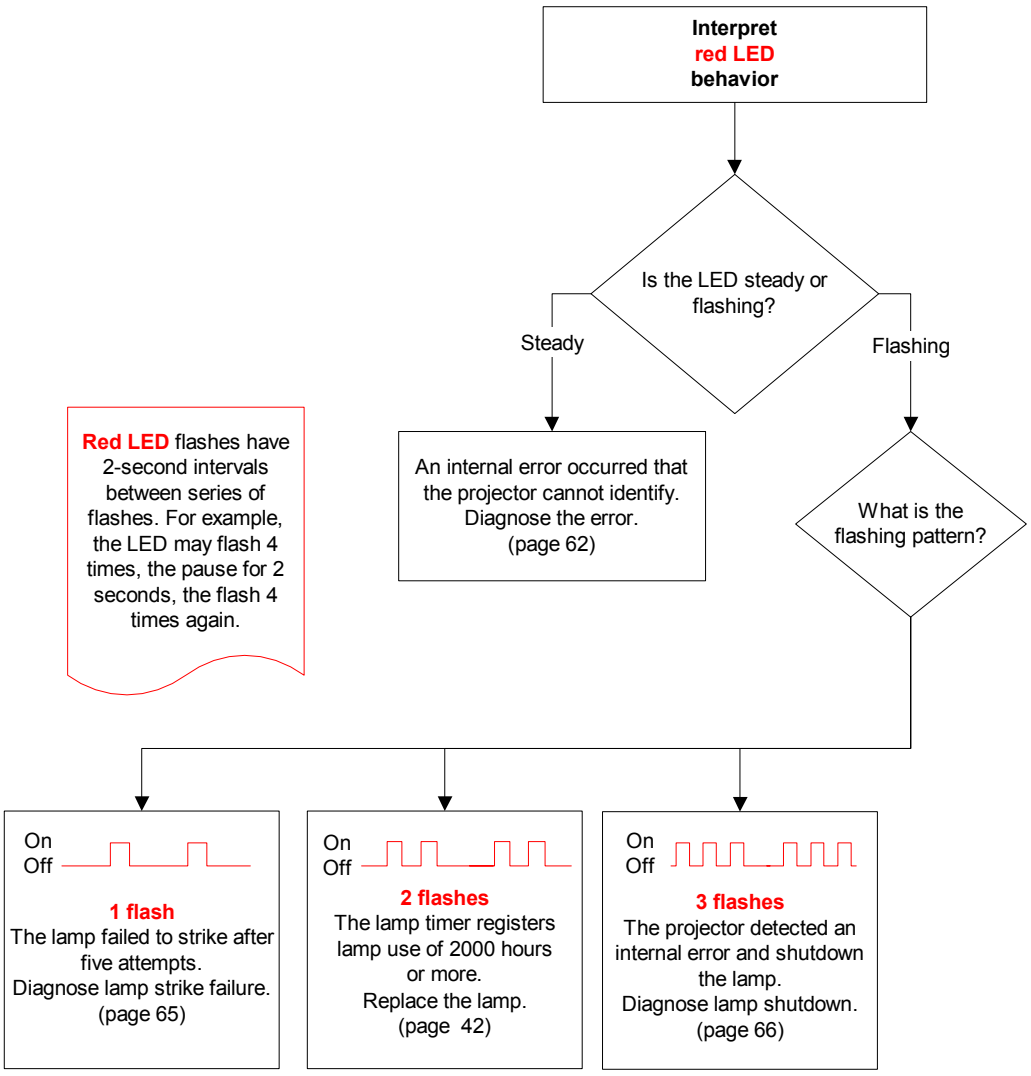
LED Status	
LED flashes green	The projector is starting up after the Power button was pressed, or the projector is shutting down after the Power button was pressed.
LED is solid green	The projector is ready to light the lamp when the Power button is pressed. Or the lamp is lit and the projector is operating properly.
LED flashes red once	The lamp will not strike after five tries (2 1/2 minutes).
LED flashes red two times	The lamp has more than 2,980 hours of use. Requires replacement. Projector shuts down.
LED flashes red three times	Lamp failure. Projector shuts down.
LED is solid red	Undiagnosed error. Projector shuts down.

Power Diagnostics, part 1

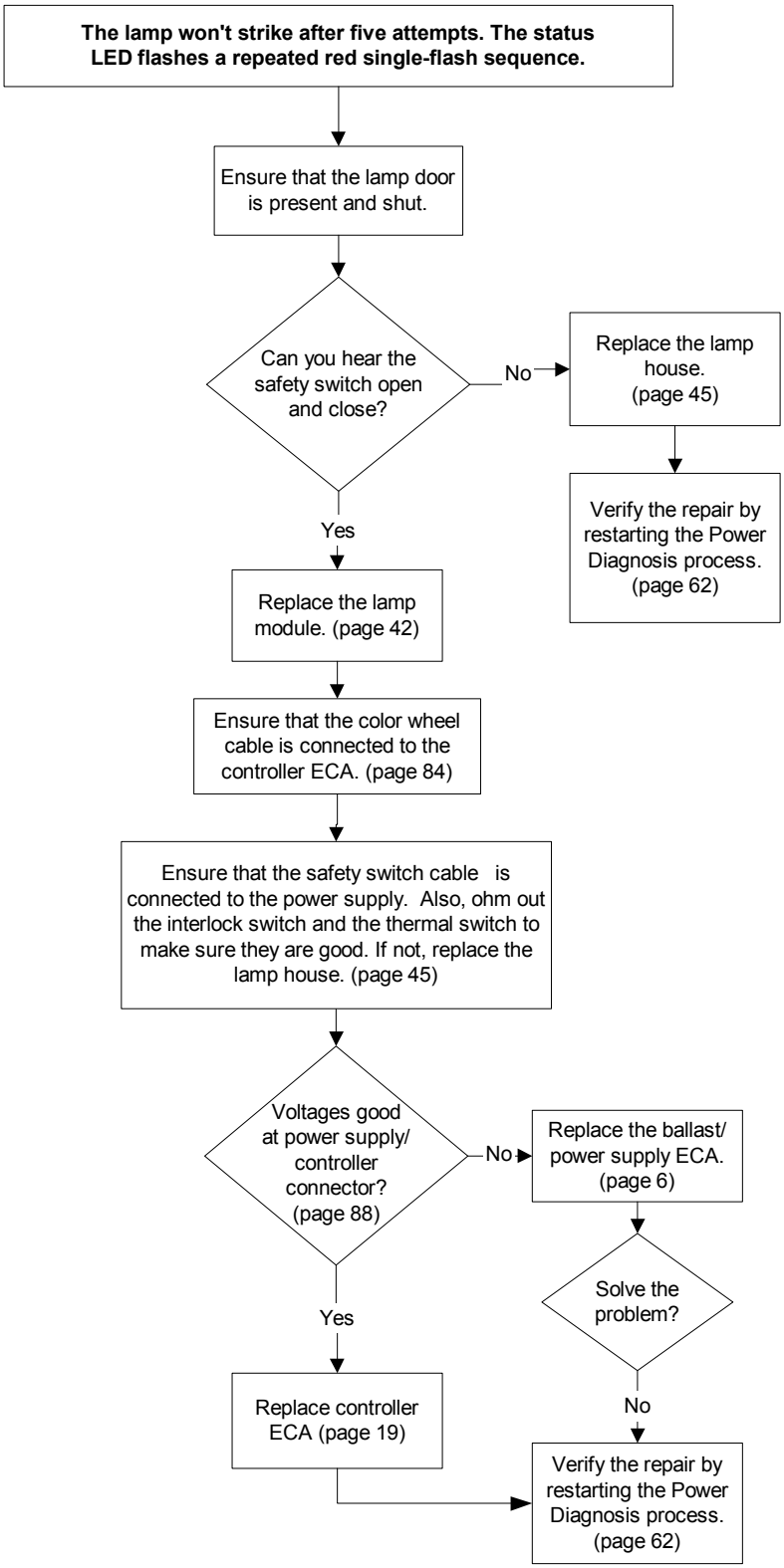


Power Diagnostics, part 2




Interpret red LED behavior
Is the LED steady or flashing?
Steady
Flashing
An internal error occurred that the projector cannot identify. Diagnose the error. (page 62)
What is the flashing pattern?
Red LED flashes have 2-second intervals between series of flashes. For example, the LED may flash 4 times, the pause for 2 seconds, the flash 4 times again.
On
Off
1 flash
The lamp failed to strike after five attempts. Diagnose lamp strike failure. (page 65)
On
Off
2 flashes
The lamp timer registers lamp use of 2000 hours or more. Replace the lamp. (page 42)
On
Off
3 flashes
The projector detected an internal error and shutdown the lamp. Diagnose lamp shutdown. (page 66)

LED flashes single red



LED repeats 3 flash sequence

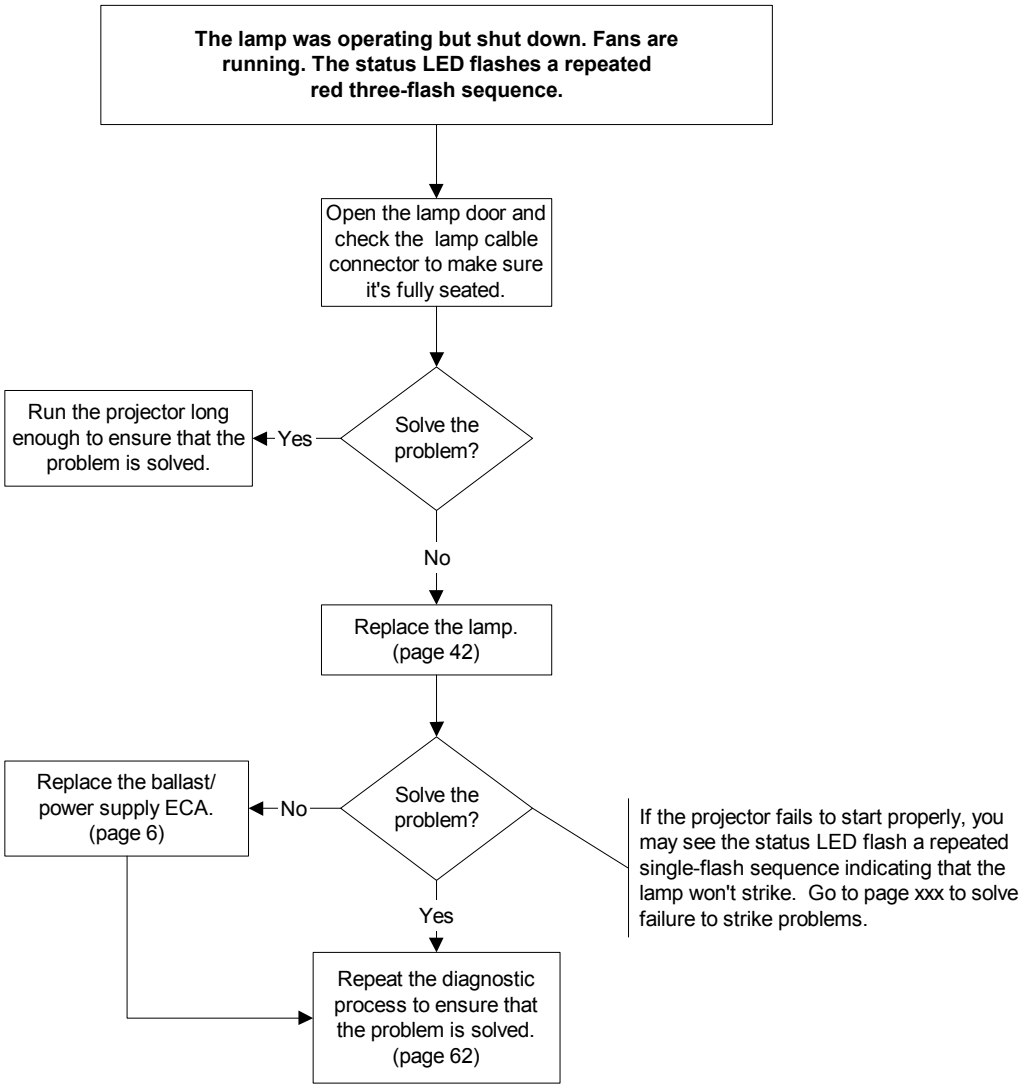
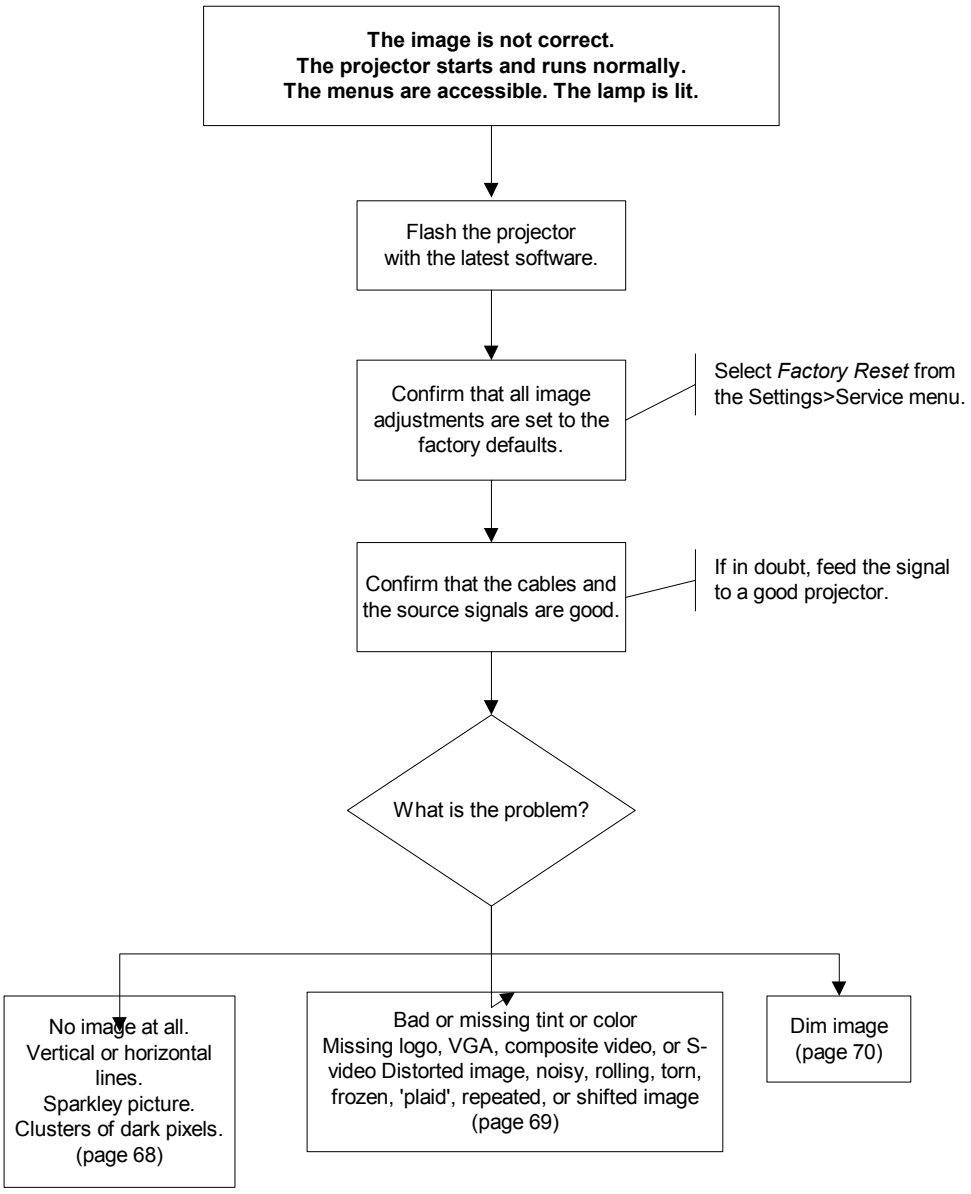
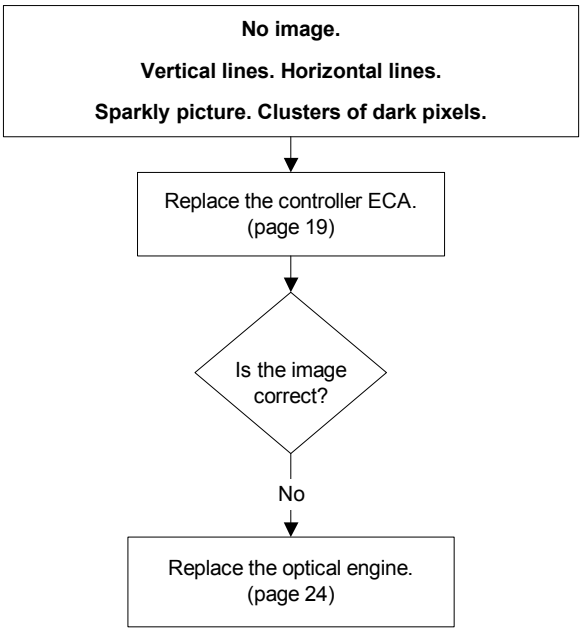


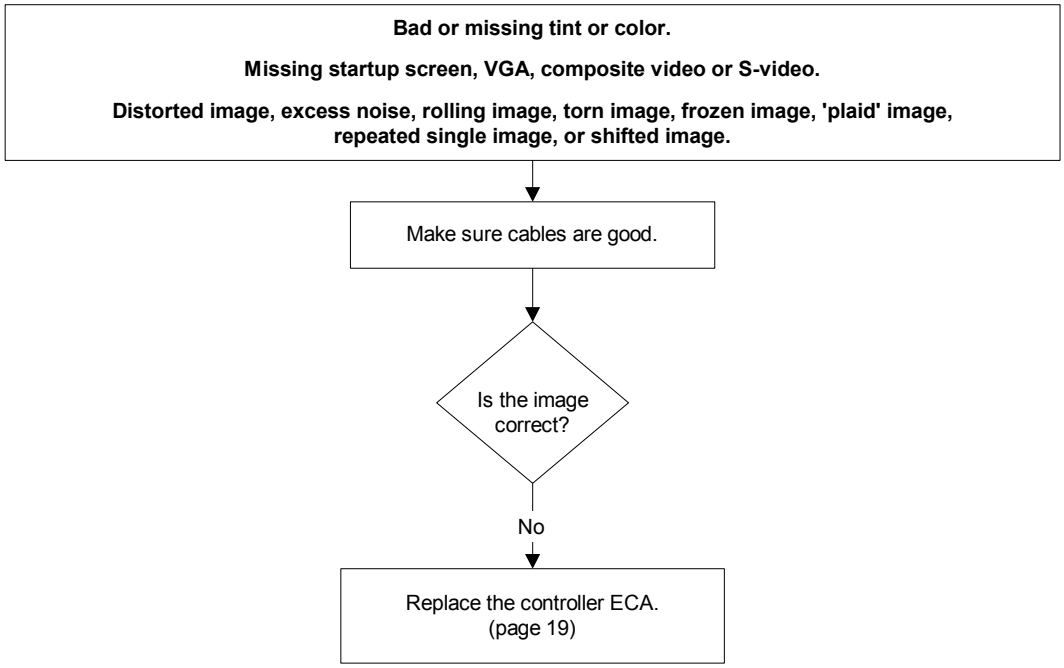
Image Problems



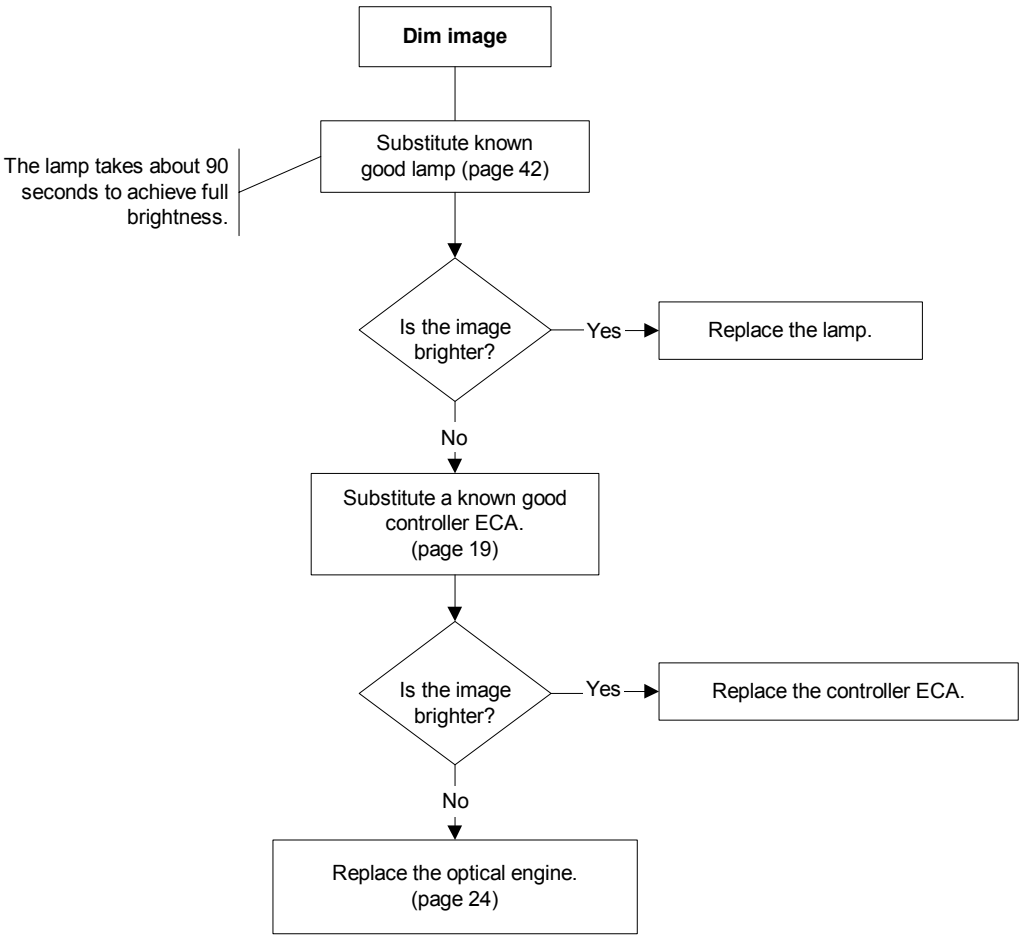
No image


No image.
Vertical lines. Horizontal lines.
Sparkly picture. Clusters of dark pixels.
Replace the controller ECA.
(page 19)
Is the image correct?
No
Replace the optical engine.
(page 24)

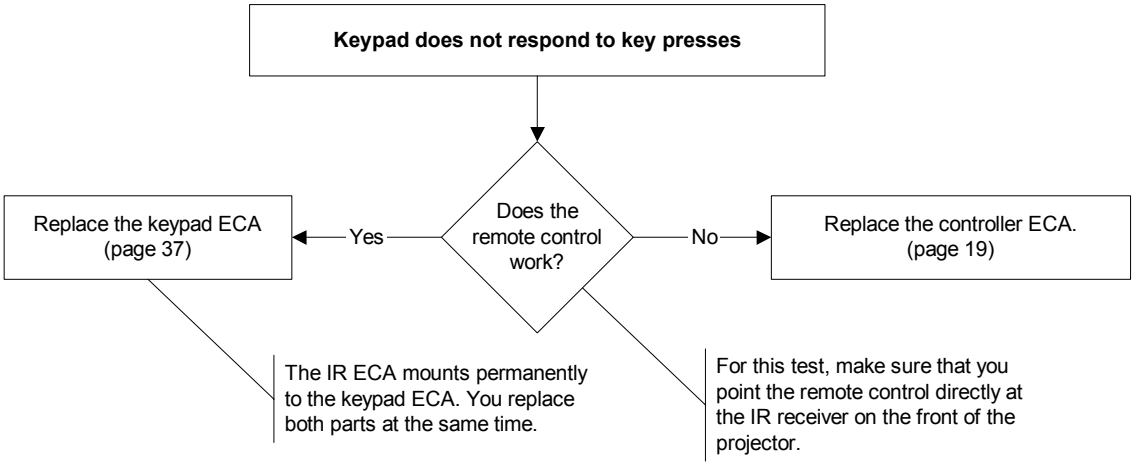
Bad image


Bad or missing tint or color.
Missing startup screen, VGA, composite video or S-video.
Distorted image, excess noise, rolling image, torn image, frozen image, 'plaid' image, repeated single image, or shifted image.
Make sure cables are good.
Is the image correct?
No
Replace the controller ECA. (page 19)

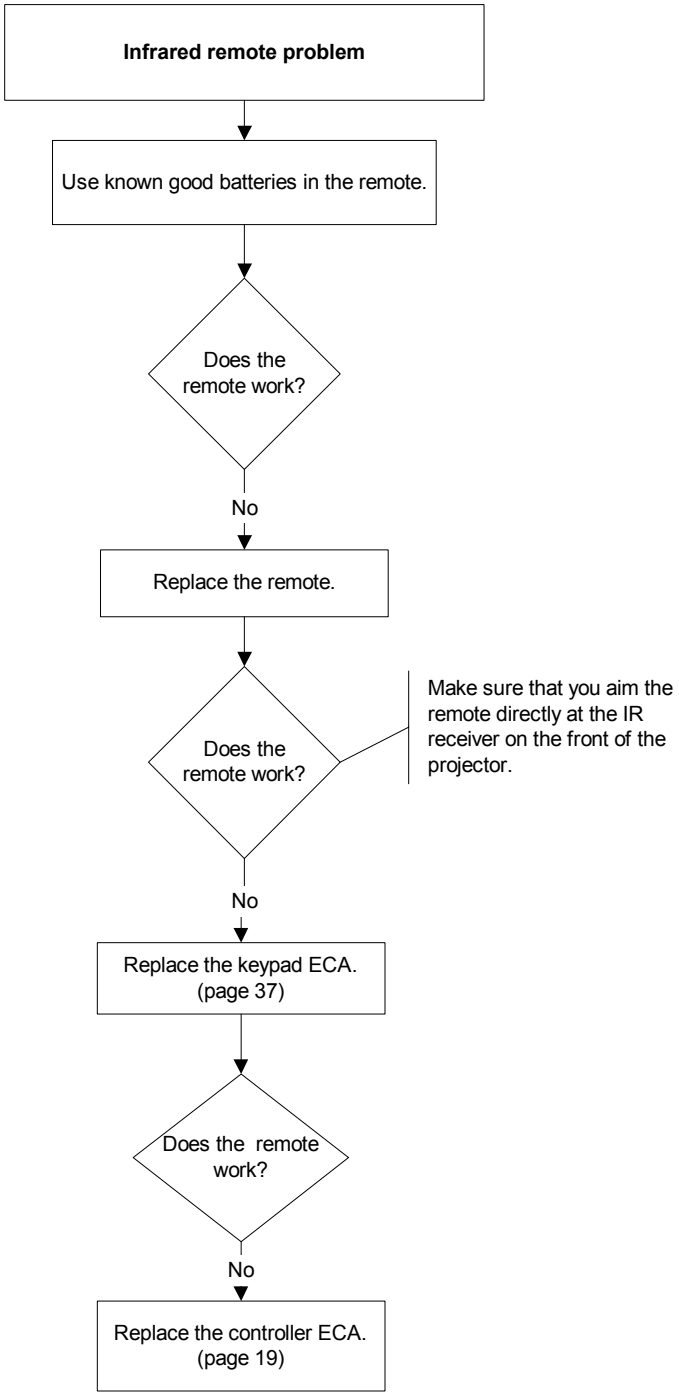
Dim image


Dim image
Substitute known good lamp (page 42)
The lamp takes about 90 seconds to achieve full brightness.
Is the image brighter?
Yes
Replace the lamp.
No
Substitute a known good controller ECA. (page 19)
Is the image brighter?
Yes
Replace the controller ECA.
No
Replace the optical engine. (page 24)

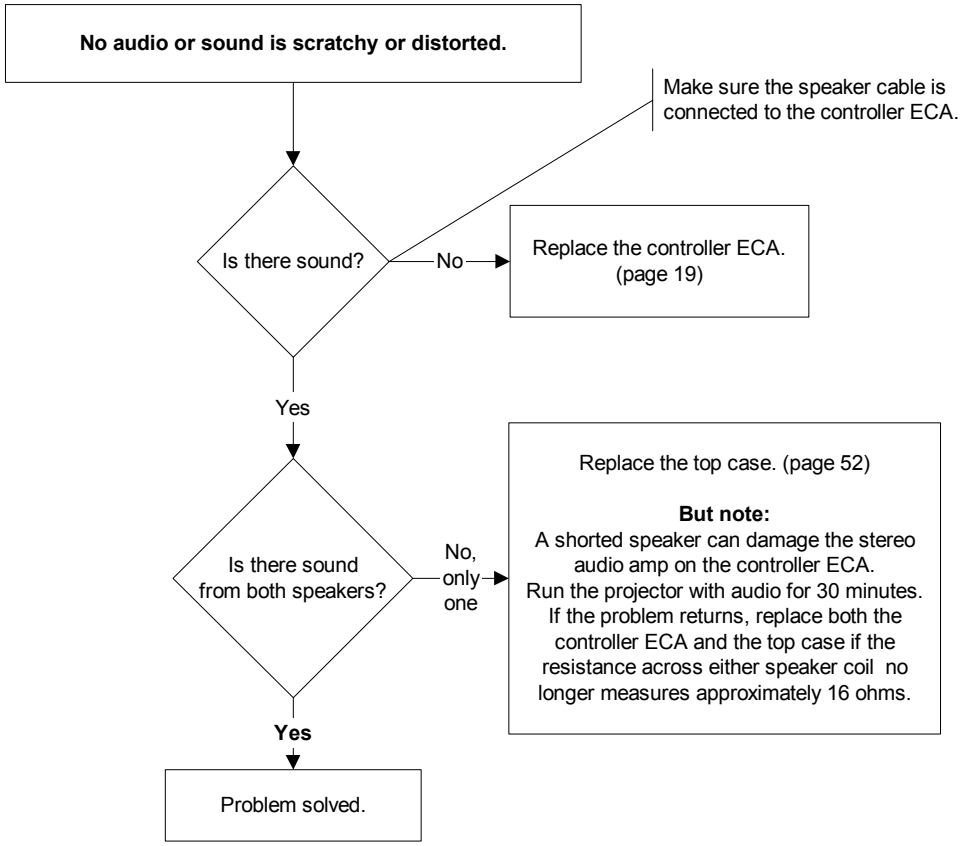
Keypad Problems



Remote Problems



Audio Problems

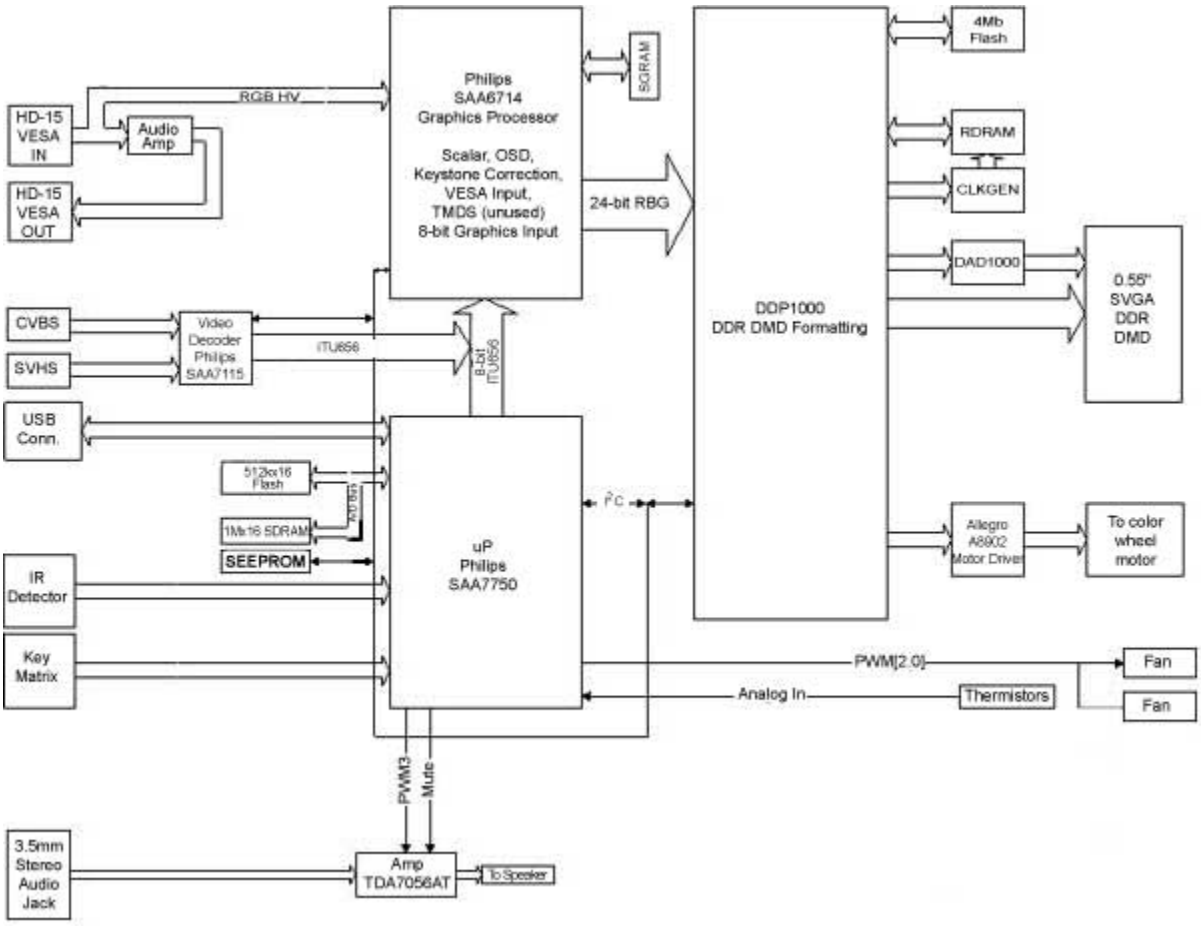


Block Diagram

The diagram below illustrates the projector's electrical architecture.

This section also contains information about:

- Controller ECA functions (page 75)
- System memory (page 75)
- System states (page 76)
- Remote control features and functions (page 79)



Controller ECA Functions

A Pixelworks PW164B processor is responsible for control of the entire system as well as processing of the graphics and video data, including GUI insertion and rescaling to the DMD's native SVGA resolution. The processor consists of an Intel 80C186 core CPU with on-chip peripherals including GPIO, Timers, UART, IR receiver logic, interrupt controller, and a 16-bit memory interface. The PW164B also includes video input and graphic input ports, a synchronization decoder and automatic image optimizer. The image data is processed and fed to an on-board frame buffer. The data is then scaled and the on-screen display information is laid over the image. The processor also supports color lookup-tables, color-space expansion, and keystone correction. The processor outputs all timing and image data required for the TI DLP driver logic. The processor's internal vertical and horizontal image scaler is bypassed; a Faroudja FLI2200 deinterlacer performs scaling. A voltage-controlled amplifier controls audio volume and balance.

System Memory

The Pixelworks processor is interfaced to a single 8Mbit word-wide FLASH memory for code storage, and a 32kbit serial EEPROM for unit-specific and dynamic data storage. The FLASH is attached to the PW164B's word-wide memory interface. An EEPROM is also located on the DMD board. This EEPROM stores DMD and engine-specific data.

System States

The projector always operates in one of the following states:

- **Boot up**

  Condition: the power switch is ON but the LED is OFF and all user input is ignored. Boot-up takes approximately 2 seconds. The projector moves to the Startup state automatically when boot-up is complete

- **Off**

  The projector skips the OFF state when it is first booted. Off state can be entered via the Power key on the IR remote or by the Power Save feature. In the OFF state, the LED is steady green. The lamp is off and no source is selected but the software is booted up and the projector can communicate or be powered on via USB. The Power key on the remote or any key on the projector keypad can also power up the projector. A power up command from any of these sources causes the projector to move to the Startup state.

- **Startup**

  Startup begins when boot-up is complete or when a power-on command is received during the Off state. Power-on commands can be generated by the power key on the IR remote, any key on the projector keypad, or via USB. Startup can also be entered from the Power Save state if a signal is detected before Power Save shuts down the projector. The lamp strikes during the Startup state. During this time, the LED slowly flashes green and all external control of the projector is locked out (no keys active). If Auto Source is enabled, the currently selected Startup Logo displays as the lamp brightens. When Startup is complete, the projector moves to the Search state. If Auto Source is not enabled, the currently selected Startup Logo still displays, but only briefly before the projector moves to the Setting Up Image state.

- **Search**

  In Search State, the currently selected Startup Logo continues to be displayed, the LED is steady green, and all user input is accepted. Source selection is determined by a combination of the settings for Default Power Up Source and Auto Source. If Auto Source is enabled, the projector begins searching for a source, and the Searching message displays. Audio is disabled at this time. If Auto Source is disabled, the source name displays and audio is enabled. If no active source is detected, the projector remains in Search state and continues to display the Startup Logo for a preset amount of time. If no source is detected and no keys are pressed during this preset time, the projector goes to either the Screen Save state or the Power Save state. If a source is detected, the projector goes to the Setting Up Image state.

- **Image setup**

  Auto Image runs during this time, the logo continues to be displayed and the LED is steady green. All user input is accepted. The selected source (either auto or manually selected) displays, with the Setting Up Image message below it. If the source is locked, the projector switches to the Display state. If the source is locked but then lost, the projector switches to the Search state. If a signal is detected but cannot be

resolved, the Signal out of Range message displays. When the projector leaves the Setting Up Image state, the logo no longer displays; this would include a change to either Display state or Menu state.

- **Display**

  This is the projector's primary mode of operation and the one the user spends the most time in. The LED is steady green and the projector displays an image from the selected source. If the source is lost, the projector goes to the Search State.

- **Menu**

  The user interacts with the projector through configuration of on-screen menus. The menus are rendered in an overlay memory that becomes visible on top of the current image during menu mode. The Menu state provides access to parameters not accessible directly through the keypad. The Menu state can be executed from the Zoom state, Search state, Setting Up Image state, Screen Saver state, or Display state. The Menu state can be enabled or disabled via the infrared remote (except the Executive remote) or projector keypad. The LED remains steady green.

- **Power save**

  When more than 20 minutes has elapsed since a source was locked or a key was pressed, and Power Save is enabled, the lamp is extinguishes and a one-minute cool-down period begins. If a source is detected or the Power key is pressed during the cool-down period, the projector will not react immediately but switches to the Startup state at the end of the cool-down period. The LED slow flashes green during cool-down. At the end of cool-down, the LED changes to a slow blip green and the projector enters the Power Save state. The Power Save state lasts for 10 minutes. If there is no activity during this 10 minutes, the projector switches to the Off state. If a source is detected or the IR remote power key is pressed or any key on the projector keypad is pressed during this 10 minutes, the projector immediately switches to Startup state.

- **Screen save**

  When more than the preset time has elapsed since a source was locked or a key was pressed, and Power Save is not enabled, the projector switches to a black screen that prevents damage to the DMD. The projector remains in the Screen Save state until a key is pressed, a source is detected, or the projector is shut down. The projector will respond to any key by switching from Screen Save to the Search mode. Note that key-presses are not processed other than to exit Screen Save mode. The LED flashes a slow blip green. Screen Save is always enabled, except when Power Save is enabled.

- **Power down confirm**

  The LED lights solid green and the projector displays a blank curtain screen. Only the Power key is active. If it is not pressed in less than 3 seconds, power down is cancelled. The projector displays the message “Powering down. Press Power to confirm.”

- **Cool down**

  The lamp cool-down state provides 1 minute of cooling time, beginning when the lamp is extinguished, before the lamp can be re-struck. The fans continue to run during this time. All projector control is disabled for of the 1-minute cool-down period. The LED changes to slow flashing green during cool-down.

- **Error**

  A flashing red LED indicates an error condition (see Troubleshooting Power Problems). The lamp is turned off and the projector ignores any user input. Only a hard reset exits this state.

- **Freeze**

  Freeze Mode halts, or “freezes”, the incoming external source image. This feature can be used to freeze a frame of TV video or an image from a computer, allowing other operations to be performed that are not visible to the audience. Freeze can be executed only from Display mode. Freeze can only be enabled or disabled via the infrared remotes, using the Effect key. The LED remains steady green.

- **Blank**

  Blank, as the name implies, blanks the screen. Blank can be executed from the Search state, Display mode, or Menu mode. Blank can only be enabled or disabled via the infrared remotes, using either the Blank key or the Effect key. The LED remains steady green.

- **Zoom**

  The Zoom feature allows a selected area of the screen to be magnified. There is no dedicated Zoom key on the projector keypad or on the remote for this feature. Instead, the Effect key must be programmed for Zoom, or an infrared remote with a dedicated Zoom key may be used. Zoom mode can be initiated only while the projector is in Display mode. Zoom will be cancelled if the source changes, the signal is lost, the projector goes into the Power Save state, or the projector is powered off. Menu mode can be entered while in Zoom mode.

  Zoom mode consists of two parts: Magnify and Pan. Magnify is the part that allows closer viewing of a certain portion of the screen; Pan is the part that determines what portion of the screen to magnify. There are no dedicated Magnify and Pan keys on the standard remote but during Zoom mode, the Mouse keys become Magnify and Pan keys.

  Zoom mode always starts with magnification at 1X and Pan in the center of the screen. There are 20 steps of magnification in Zoom mode, covering approximately 1X to 16X. When Zoom mode is cancelled, the magnification factor and position of the last zoom are not saved. The magnification level is not indicated to the user. The LED remains steady green.

  When Zoom mode is no longer needed, it can be cancelled by again pressing the Effect key on the remote.

Remote Control Features and Functions

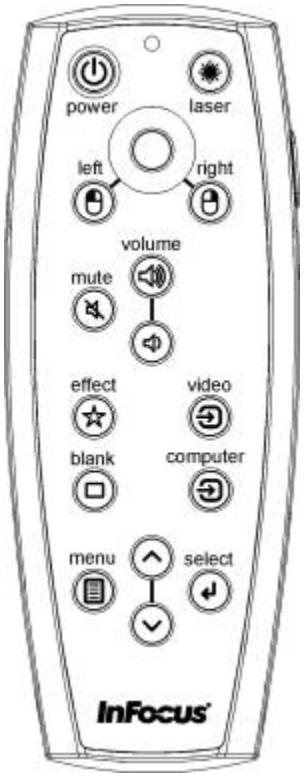
- **Presenter Remote**

The Presenter Remote is a hand held remote control device that can be used with the X1 and other InFocus projectors. It consists of an electronic circuit board including a microcontroller with embedded firmware, IR interface, batteries, an elastomeric keypad and plastic case.

A green status LED lights when the user presses any key. The laser button controls an FDA Class II laser pointing device. Function keys are the complete set of matrix keys minus the laser key. Function key communication takes place with the projector via IR.

The remote will go into sleep mode immediately after each operation. The remote will also go into sleep mode when any key except the laser key is held down continuously for more than one minute. To wake from sleep mode, a discrete key press of any key is required. If the laser key is held down continuously for more than 2 minutes, the laser will power off. To reactivate the laser after accidental timeout, the laser key must be released and pressed again. The remote uses two AAA alkaline batteries which are included. The battery life with typical use is about 6 months.

- **Conductor and Conductor+ Remotes**



The Conductor+ is the same as the Conductor except for the addition of a laser pointer. The projector ships with the Conductor remote. Operational information for the Presenter remote above also applies to the Conductor and Conductor+.

Depressing the backlight button on the side of the remote activates the backlight. The backlight remains active for 10 seconds or until the backlight button is depressed again, whichever comes first. If any key on the keypad is depressed while the backlight is active, the backlight will go out during the period of the key press and reactivate when the key is released. The 10 second timer resets at the time of the key press.

Prepare for Power Up with Top Case Removed

You can remove the top case and power up the projector to check fan or thermal switch operation. You also do this to check internal voltages and signals, which may require additional projector disassembly. Here's how to prepare the projector for power up with the top case removed.

1. Remove the top case (page 52)

   NOTE The lamp must be in place and connected to start the projector with the top case removed.

2. Use vinyl electrical tape or other non-conductive means to hold the safety switch actuator in the depressed (closed) position.

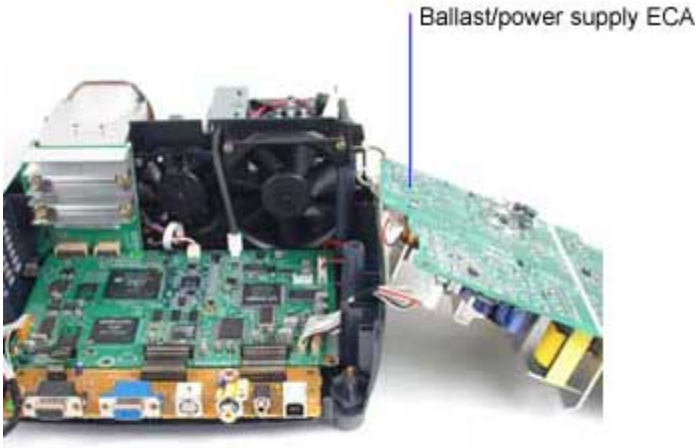
3. Do one of the following:
   - Check controller ECA voltages and signals (page 81)
   - Check the thermal switch (page 86)
   - Check the color wheel cable (page 84)
   - Check the fans (page 87)
   - Check the ballast/power supply ECA voltages and signals (page 88)
   - Check the I/O ECA voltages and signals (page 90)

Check Controller Voltages

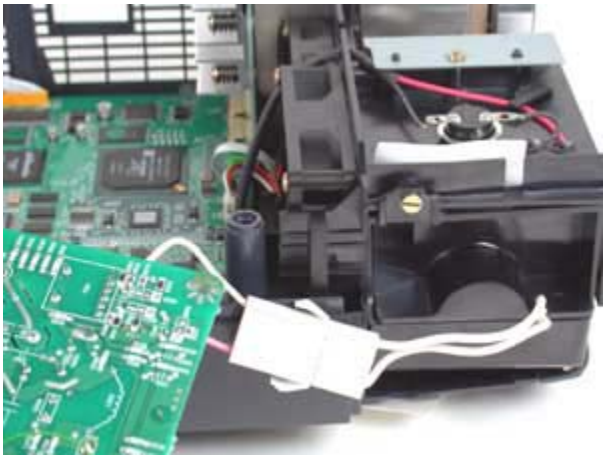
To check voltages, you need to power up the projector with the top case removed. See page 80 for instructions on how to do this.

Check Controller ECA Voltages and Signals

1. Prepare to power up the projector with the top case removed. (page 80)
2. Remove the chassis. (page 12)
3. Position the ballast/power supply ECA near enough to the projector to connect the controller/power supply cable from the controller ECA. You can do this if you turn the ballast/power supply ECA over and connect it to the controller ECA in an upside-down position. This also leaves you room to access the controller ECA with measurement probes.



4. Connect the lamp to the lamp cable connector at the side of the lamphouse. Make sure the connector fully engages the connector on the lamp module.

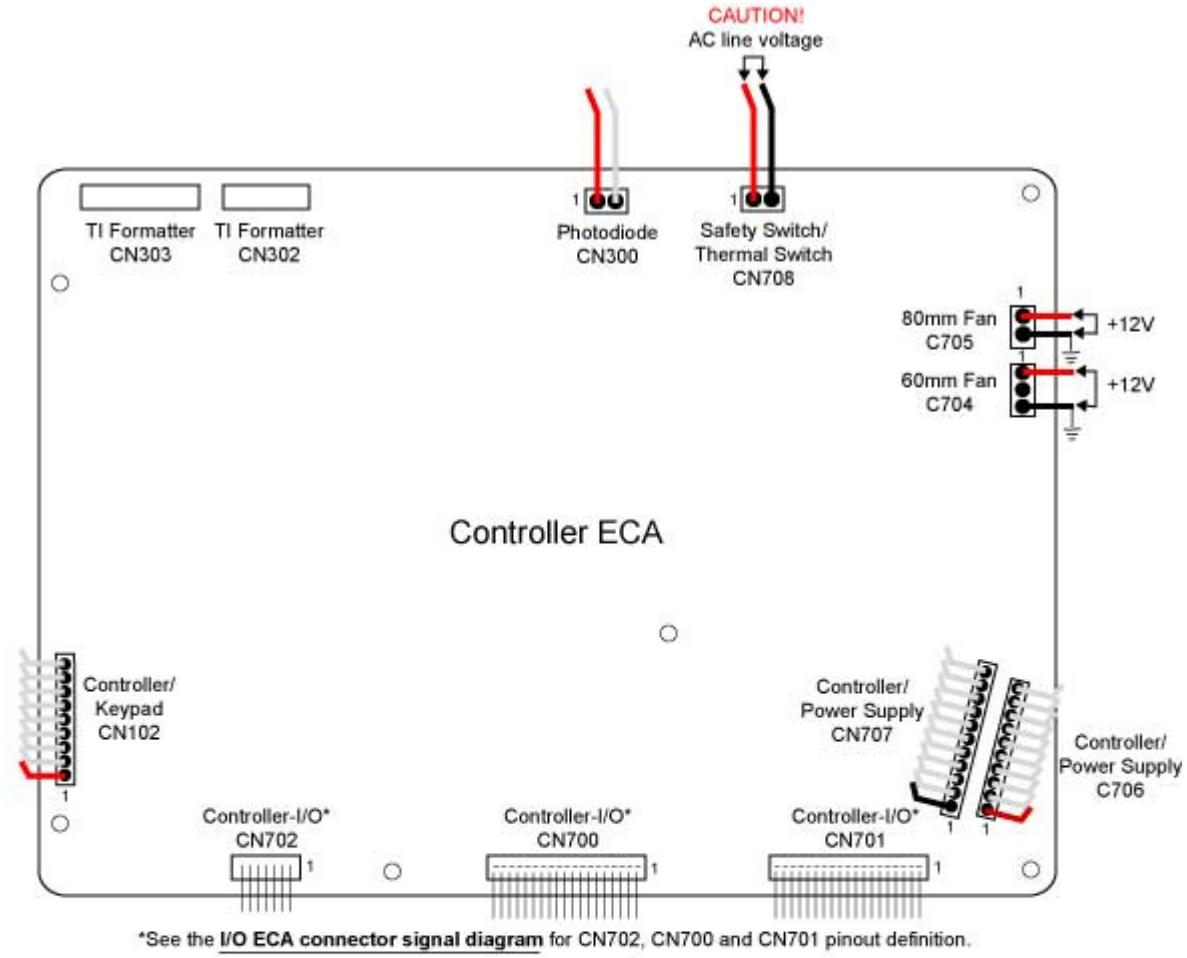


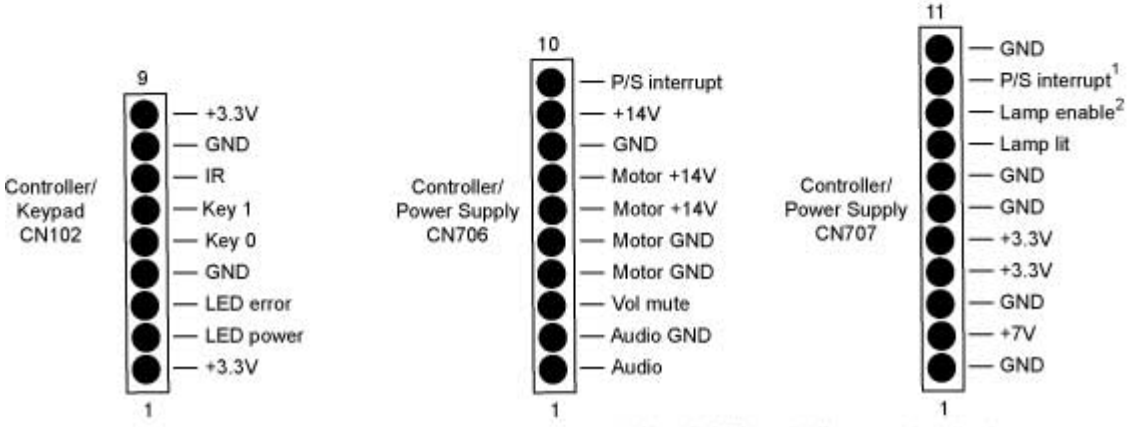
5. Position the top case right side up at the rear of the projector.
6. Extend the keypad cable from the rear of the projector and plug it into the keypad connector on the top case.

7. Connect the projector to AC power.
8. Power up the projector, and check the voltages using the illustration on the next page.

CAUTION When you start the projector, there is voltage present on the controller ECA and power supply. Be very careful where you probe and where you touch.

9. Use measurement equipment to check the controller ECA for voltages and signals.





Check the Color Wheel and Reseat the Cable

If the color wheel cable is not properly seated in its connector, the color wheel will not start when the projector powers up. When the color wheel does not spin, there is no lamp enable signal, and the lamp will not strike.

Normally, you hear the brief high-pitched sound when the color wheel spins up to speed. If you don't hear the sound, or if you are not sure, you can do a visual check to confirm the color wheel operation.

If the color wheel does not spin, the first item to check is the color wheel ribbon cable connection and reseat it if necessary. The cable seats at connectors on the color wheel and the controller ECA.

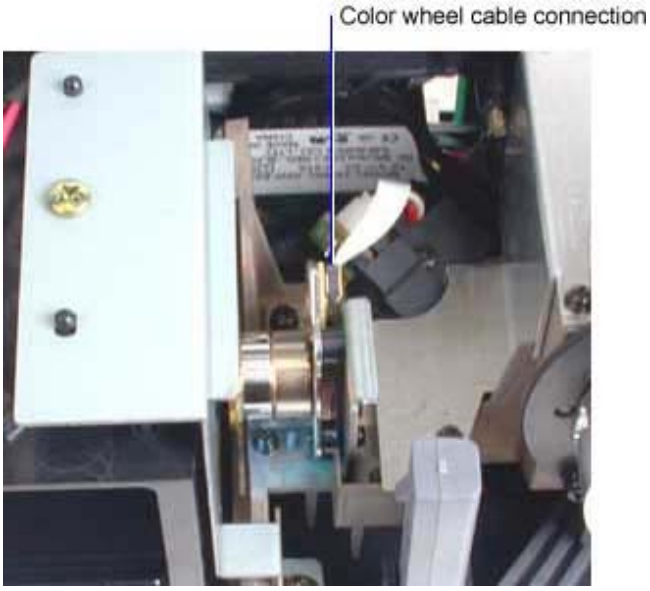
To check color wheel operation and reseat the cable, do the following:

1. Power up the projector with the top off. (page 80)

   NOTE The lamp must be in place and you must close the safety switch to start the projector with the top case removed.

2. Examine the color wheel to see if it is spinning. The color wheel is located between the lamphouse and the optical engine.

3. If the color wheel is not spinning, check the ribbon cable connection. The ribbon cable inserts into a connector at the color wheel motor.



Ensure that the cable is fully seated in the connector. Then power up the projector again and recheck color wheel operation.

4. If the color wheel still does not spin, remove the chassis (page 12) to gain access to the color wheel cable connection on the controller ECA.

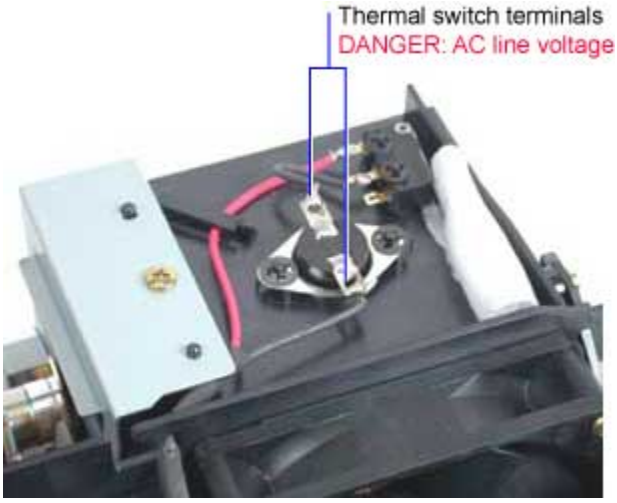
5. Check and reseat the color wheel cable at the controller ECA.

To reseat the cable, pull it out of the connector on the controller ECA. Re-insert the cable fully, making sure it seats all the way into the connector.

Check the Thermal Switch

The thermal switch is designed to open when the temperature inside the projector gets too high. When the switch opens, the power supply shuts down, turning the projector off.

When the projector shuts down after operating for a few minutes or when the lamp fails to strike after repeated attempts at startup, check the thermal switch. First, power up the projector with the top off (page 80). Let the projector run until it shuts down. Measure resistance across the terminals at the thermal switch. If the resistance is **infinite** (Ω), replace the lamphouse, which includes the thermal switch.



Go to remove and replace the lamphouse. (page 45)

Check fan operation

You can visually check the operation of the fans to see if they both work properly. Check the fans if the projector exhibits symptoms of overheating or if the red status LED indicates that a thermal issue is present.

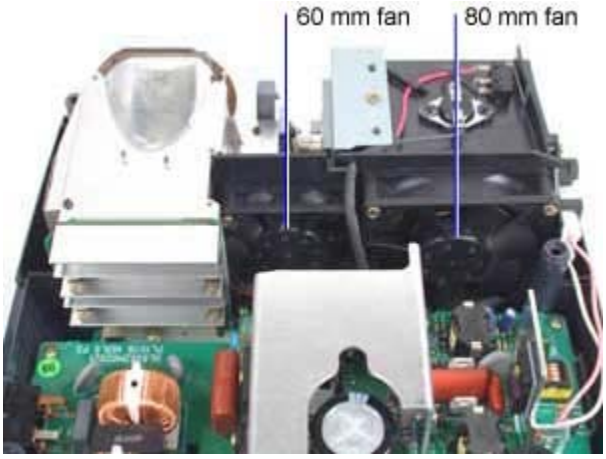
To check the fans, first prepare for projector power up with the top case removed (page 80). Then follow these steps:

1. Connect the projector to AC power.
2. Power up the projector.

CAUTION When you start the projector, there is voltage present on the controller ECA and power supply. Be very careful where you probe and where you touch.

3. Follow the directions below to check the fans.

   The fans should both start up when you press the power button.



   If a fan fails to operate, check the voltage at the connector on the controller ECA (page 81) to verify that the fan is receiving power. Or unplug the fan cable from the controller ECA and substitute a known good fan.

   If a fan has failed, remove the fan and replace it (page 27).

Check Ballast/Power Supply Voltages and Signals

To check voltages and signals on the controller ECA, first prepare for projector power up with the top case removed. Then follow these steps:

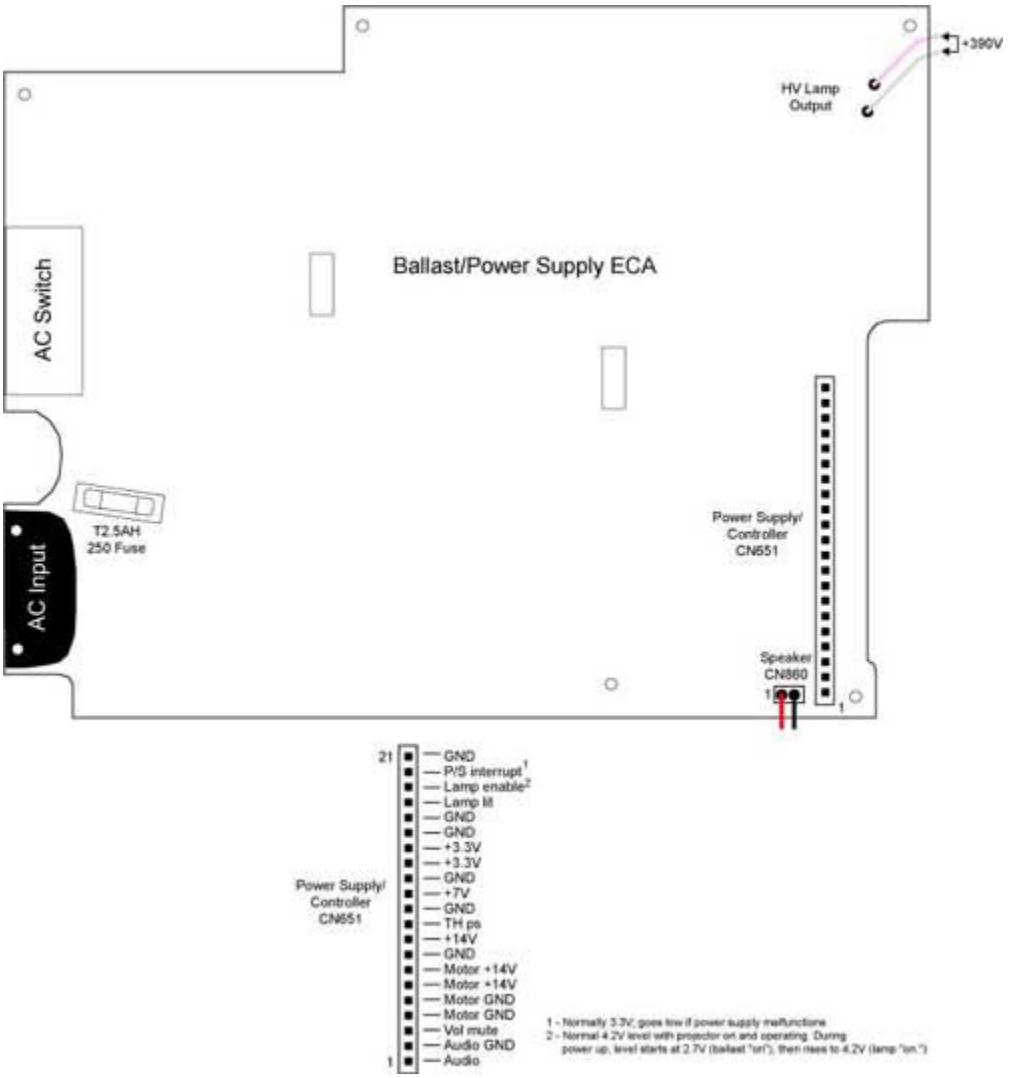
1. Position the top case right side up at the rear of the projector.
2. Extend the keypad cable from the rear of the projector and plug it into the keypad connector on the top case.

3. Connect the projector to AC power.
4. Power up the projector.

CAUTION When you start the projector, there is voltage present on the controller ECA and power supply. Be very careful where you probe and where you touch.

5. Use measurement equipment to check the ballast/power supply ECA for voltages and signals.

DANGER Do not attempt to measure the output voltage from the ballast when the lamp strikes. High voltage produced by the ballast to strike the lamp can ruin test instruments as well as cause personal injury.



Check I/O ECA Voltages and Signals

1. Prepare for projector power up with the top case removed. (page 80)
2. Remove the chassis. (page 12)
3. Position the ballast/power supply ECA in or near enough to the projector to connect the controller/power supply cable from the controller ECA. Be sure that there is enough space above the I/O ECA to allow use of measurement probes.

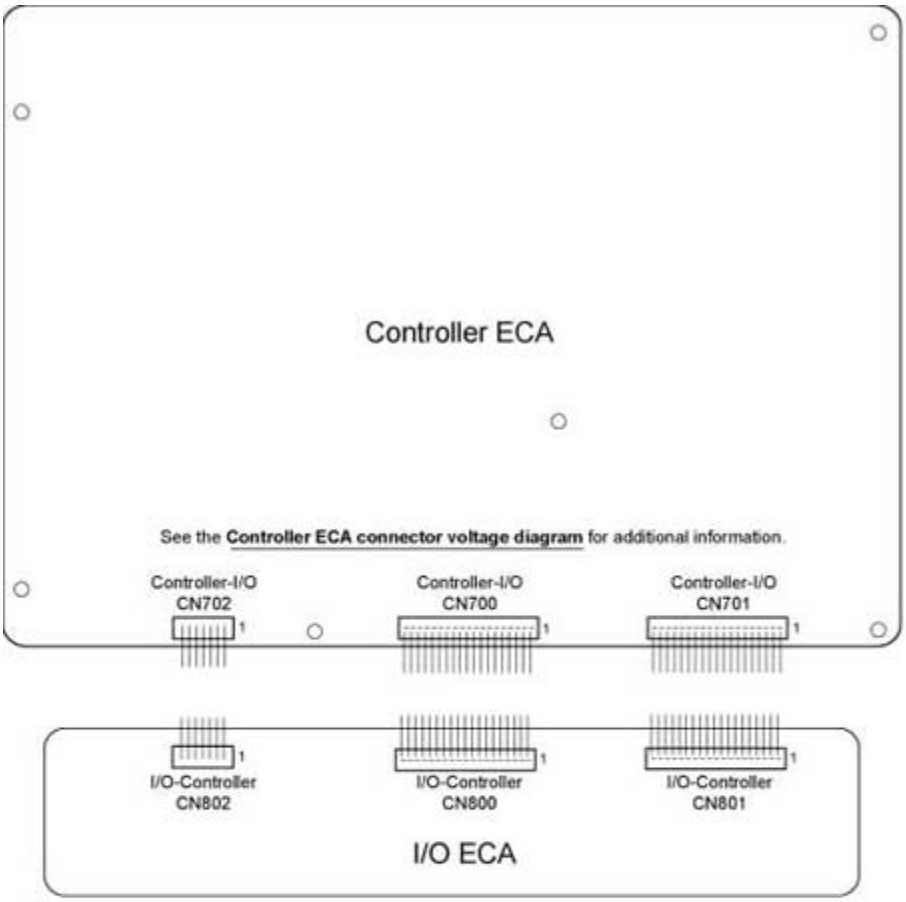
4. Connect the lamp to the lamp cable connector at the side of the lamphouse. Make sure the connector fully engages the connector on the lamp module.

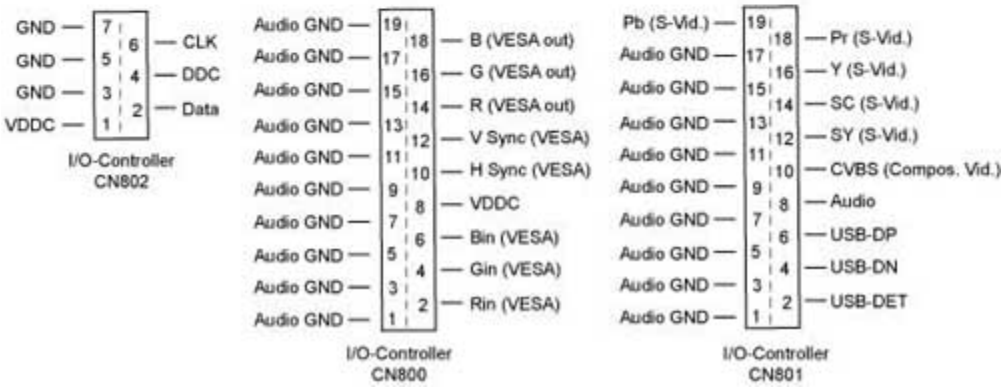
5. Position the top case right side up at the rear of the projector.
6. Extend the keypad cable from the rear of the projector and plug it into the keypad connector on the top case.

7. Connect the projector to AC power.
8. Power up the projector.

CAUTION When you start the projector, there is voltage present on the controller ECA and power supply. Be very careful where you probe and where you touch.

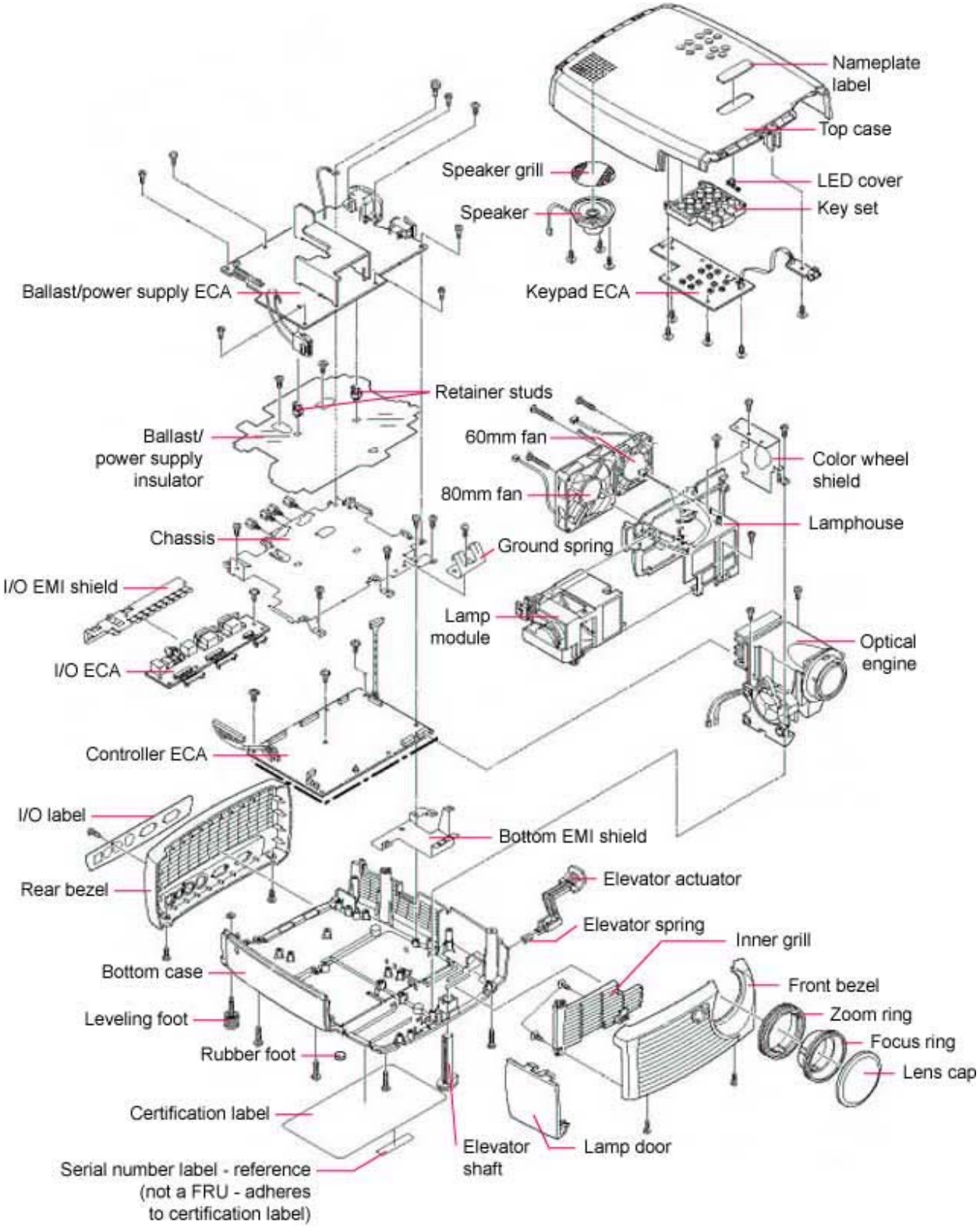
9. Use measurement equipment to check the I/O ECA for voltages and signals.





Parts Lists

Parts Exploded View



FRUs by alphabetic listing

Part Name	Part Number	Notes
Ballast/Power Supply ECA	520-0114-xx	
Ballast /Power Supply Insulator	329-0433-xx	
Bottom EMI Shield	330-0965-xx	
Chassis	330-0963-xx	
Color Wheel Shield	330-0968-xx	
Controller ECA	510-1773-xx	
Elevator Actuator	340-1119-xx	
Elevator Shaft	340-1120-xx	
Elevator Spring	321-0107-xx	
Fan, 60 mm	526-0153-xx	
Fan, 80 mm	526-0152-xx	
Focus Ring	340-1117-xx	
Front Bezel	505-1509-xx	
Ground Spring	321-0218-xx	
I/O ECA	510-1800-xx	
I/O EMI Shield	330-0964-xx	
IO Panel Label	020-1775-xx	
Key Set	505-1515-xx	
Keypad ECA	510-1774-xx	
Lamp Door	505-1513-xx	
Lamphouse	505-1514-xx	
Lamp Module	SP-LAMP-009	
LED Cover	340-1123-xx	
Lens Cap	505-1247-xx	
Leveling Foot	340-1118-xx	
Nameplate	020-1777-xx	
Optical Engine	505-1506-xx	
Rear Bezel	505-1510-xx	
Retainer Studs	340-1115-xx	
Rubber Foot	328-0155-xx	
Speaker	526-0151-xx	
Speaker Grill	330-0967-xx	
Top Case	505-1508-xx	
Zoom Ring	340-1116-xx	