Service Guide
020-103257-02

CineLife+ 4K-RGB

CP4415-RGB, CP4420-RGB, CP4425-RGB, CP4435-RGB

CHRISTIE

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Please help us to conserve the environment we live in!

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Introduction

This document provides technical information for assisting Christie-qualified technicians in the servicing of CP4415-RGB, CP4420-RGB, and CP4435-RGB projectors.

Every effort has been made to make sure the information in this document is accurate and complete. However, due to continuing research, all information is subject to change without notice. Christie assumes no responsibility for omissions or inaccuracies.

Product documentation

For installation, setup, and user information, see the product documentation available on the Christie Digital Systems USA Inc. website. Read all instructions before using or servicing this product.

1. Access the documentation from the Christie website:
   - Go to this URL: *https://bit.ly/3vxrm4Y* or *https://www.christiedigital.com/products/cinema/projection/cinelife-plus-series/*.
   - Scan the QR code using a QR code reader app on a smartphone or tablet.

2. On the product page, select the model and switch to the **Downloads** tab.

Related documentation

Additional information on the projector is available in the following documents.

- *CineLife+ 4K-RGB Installation and Setup Guide (P/N: 020-103244-XX)*
- *CineLife+ User Guide (P/N: 020-103073-XX)*
- *CineLife+ 4K-RGB Product Safety Guide (P/N: 020-103243-XX)*
- *CineLife+ Serial Commands Guide (P/N: 020-103075-XX)*

Models

- CP4415-RGB
- CP4420-RGB
- CP4425-RGB
- CP4435-RGB

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Site requirements

To safely install and operate the CineLife+ 4K-RGB, the installation location must meet these minimum requirements.

Physical operating environment

- Ambient temperature (operating) 10 to 35°C (50 to 95°F)
- Humidity (non-condensing) 10% to 80%
- Operating altitude 0 to 3000 meters (0 to 9843 feet)

External exhaust ducting

Sufficient ventilation is required around the projector to regulate the temperature of the internal laser module. If necessary, air intake and exhaust HVAC ducts can be installed.

An exhaust duct is also available for purchase as an optional accessory (P/N: 163-102104-XX). Instructions for installing the exhaust duct are included with the accessory part.

The installation site must provide an airflow 450 cubic feet per minute (CFM) at 1 to 1000 meters (3280.8 feet) elevation, and must accommodate a heat load of 4 kW.

For each additional 1000 meters above sea level, increase the airflow (CFM) value by 15%. If an extraction duct is not used, the operating temperature range is restricted to 10 to 25°C (50 to 77°F) at a maximum altitude of 3000 meters (9842.5 feet).

Permanent power connection

The projector must be connected to power using a hard-wired connection. The projector light source (main input) requires the permanent AC connection to operate. There is also an available connector for an uninterruptible power supply (UPS) to provide backup power for the projector electronics only.

Certified wall breakers are required as part of the installation. Breakers must be part of the building and easily accessible. The size of the breaker is determined from the power requirements of the projector and can be up to 30A maximum for the main input and up to 20A maximum for the UPS input.

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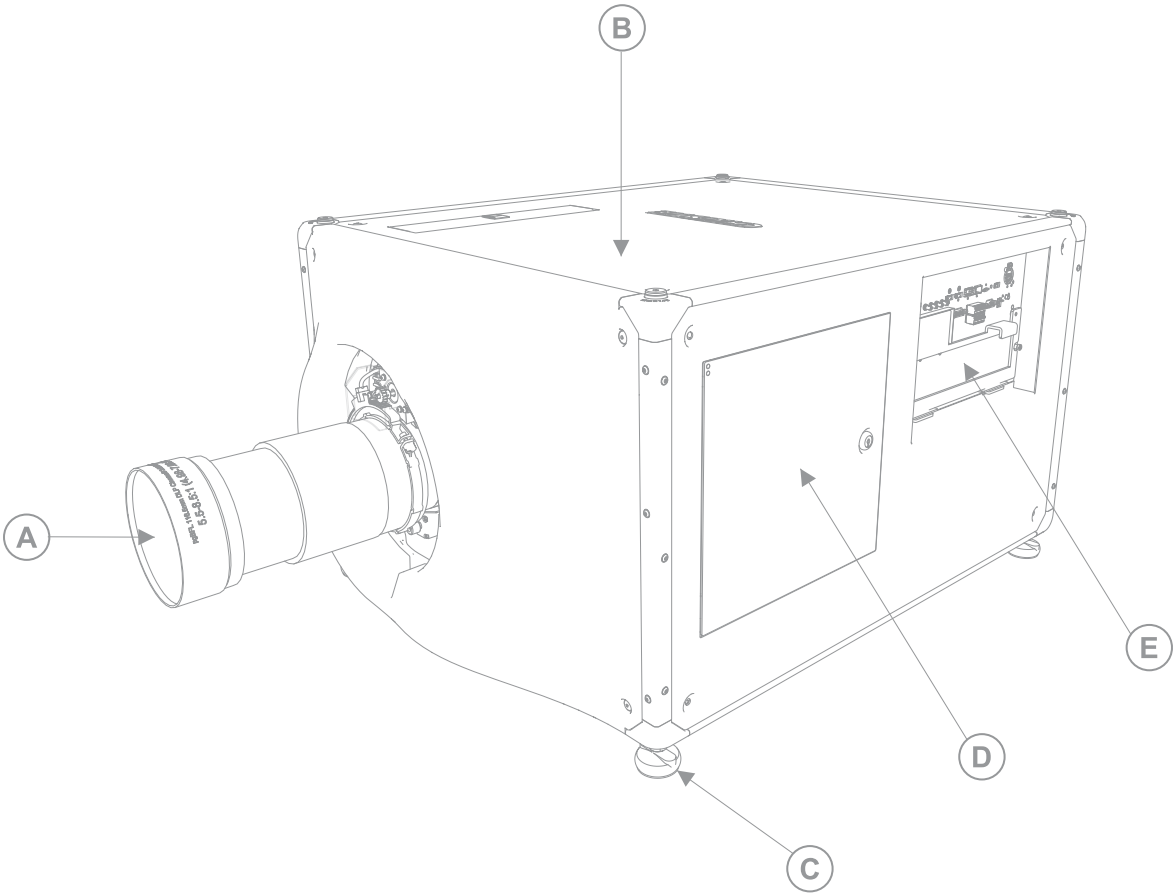
Projector components (front)

Learn about the components on the front of the projector.



ID	Component
A	Projector lens
B	Top cover
C	Adjustable feet—Turn the adjustable feet to increase or decrease the projector height.
D	Service access door
E	Communications panel—External devices are connected here.

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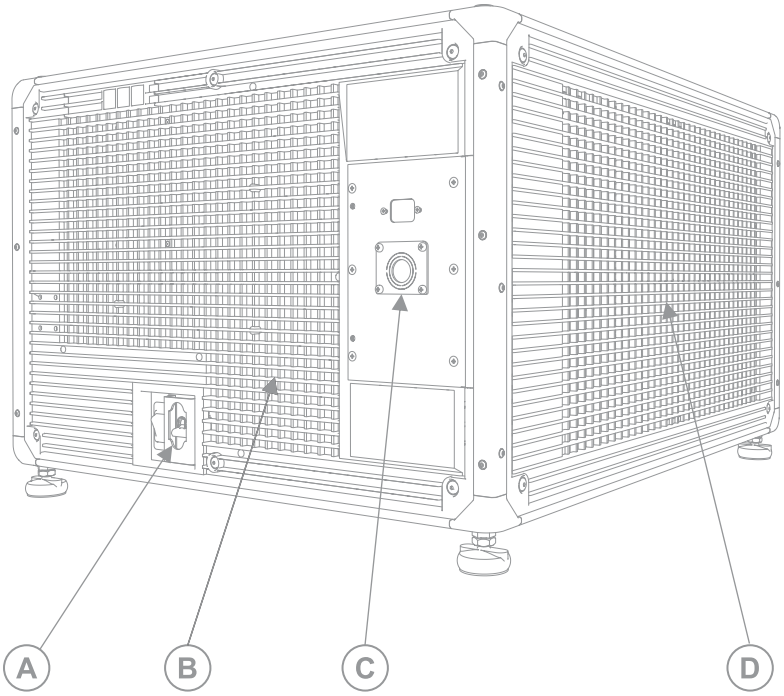
Projector components (rear)

Learn about the components on the rear of the projector.



A	AC circuit breakers
B	Air exhaust
C	Power cord and AC receptacle
D	Air intake

Security roles

Only Christie authorized service technicians should perform field repair, marriage setup, and service to the unit.

Theater personnel should only perform diagnostic functions, such as running the projector interrogator. After performing a procedure mandating the use of the high-security key, theater personnel must ensure the security of the system is reestablished.

Technical support

Technical support for Christie Cinema products is available at:

- *Support.cinema@christiedigital.com*
- +1-877-334-4267
- Christie Professional Services: +1-800-550-3061 or *NOC@christiedigital.com*

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Service guidelines

Review safety guidelines and information required for replacing modules.

Ordering parts

When ordering replacement parts, quote the part numbers of the items required. Quote the projector model number, serial number, and date of manufacture, as indicated on the license label.

Not all parts are available separately. In addition, some parts stocked as inventory are available only while the current supply lasts.

All part numbers are subject to change.

Replacing modules

To ensure you have the correct module, check the module markings and parts lists. To ensure you replace the projector module correctly, check the relevant disassembly and replacement procedures.

Replace components with exact equivalents or Christie-approved replacement parts. Failure to do so may result in unsafe operation.

Observing original lead dressing

Before servicing, always carefully observe the original lead dress. Take extra precautions to secure all harnessing properly, especially in the high voltage circuitry areas. Replace any wire that appears to have damaged insulation.

Interconnection and line drawings

The interconnect diagram illustrates the path of electrical connections between modules. Manufacturer’s part numbers are included. Part numbers are subject to change.

Line drawings provide projector dimensions and sizes for installation.

To download the latest interconnect diagram or line drawings, visit *www.christiedigital.com*.

Important safeguards

To prevent personal injury and to protect the device from damage, read and follow these safety precautions. This projector is intended for use in a cinema environment.

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General safety precautions

Read all safety and warning guidelines before installing or operating the projector.

Warning! If not avoided, the following could result in death or serious injury.

- TRIP OR FIRE HAZARD! Position all cables where they cannot contact hot surfaces, be pulled, be tripped over, or damaged by persons walking on or objects rolling over the cables.
- This product must be installed within a restricted access location not accessible by the general public.
- Only personnel who are trained on the precautions for the restricted access location can be granted entry to the area.
- Install the product so users and the audience cannot enter the restricted area at eye level.
- ELECTRICAL and BURN HAZARD! Use caution when accessing internal components.
- High leakage current present when connected to IT power systems.
- FIRE AND SHOCK HAZARD! Use only the attachments, accessories, tools, and replacement parts specified by Christie.
- FIRE HAZARD! Do not use a power cord, harness, or cable that appears damaged.
- A minimum of four people or appropriately rated lift equipment is required to safely lift, install, or move the product.
- Do not install or operate the projector in any position that does not meet the stated product specifications for alignment and orientation.

Caution! If not avoided, the following could result in minor or moderate injury.

- Only Christie qualified technicians are permitted to open product enclosures.

Laser safety precautions

Read all safety and warning guidelines before operating the projector laser.

Warning! If not avoided, the following could result in death or serious injury.

- Do not operate the cinema projector without all of its covers in place.
- LASER RADIATION HAZARD! This projector has a built-in Class 4 laser module. Never attempt to disassemble or modify the laser module.
- Do not look directly into the lens when the light source is on. The extremely high brightness can cause permanent eye damage.
- Possible hazardous optical radiation emitted from this product. (Risk group 3)

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AC power precautions

Read all safety and warning guidelines before connecting to AC power.

Warning! If not avoided, the following could result in death or serious injury.

- SHOCK HAZARD! Only use the AC power cord provided with the product or recommended by Christie.
- FIRE AND SHOCK HAZARD! Do not attempt operation unless the power cord, power socket, and power plug meet the appropriate local rating standards.
- SHOCK HAZARD! Do not attempt operation if the AC supply is not within the specified voltage and current, as specified on the license label.
- SHOCK HAZARD! The optional UPS power cord must be inserted into an outlet with grounding.
- SHOCK HAZARD! Disconnect the product from AC before installing, moving, servicing, cleaning, removing components, or opening any enclosure.
- Install the product near an easily accessible AC receptacle.

Caution! If not avoided, the following could result in minor or moderate injury.

- FIRE HAZARD! Do not use a power cord, harness, or cable that appears damaged.
- FIRE OR SHOCK HAZARD! Do not overload power outlets and extension cords.
- SHOCK HAZARD! Power supply uses double pole/neutral fusing.

Light intensity hazard distance

This projector has been classified as Risk Group 3 as per the IEC 62471-5:2015 standard due to possible hazardous optical and thermal radiation being emitted.

Warning! If not avoided, the following could result in serious injury.

- PERMANENT/TEMPORARY BLINDNESS HAZARD! No direct exposure to the beam must be permitted. Class 1 Laser Product - Risk Group 3 according to IEC 60825-1:2014 and IEC 62471-5:2015.
- PERMANENT/TEMPORARY BLINDNESS HAZARD! Operators must control access to the beam within the hazard distance or install the product at the height that prevents exposure of spectators' eyes within the hazard distance. The hazard zone must be no lower than 2.5 meters (US installations) or 2.0 meters (global installations) above any surface upon which any persons are permitted to stand and the horizontal clearance to the hazard zone must be a minimum 1.0 meters.
- EXTREME BRIGHTNESS! Do not place reflective objects in the product light path.

The following show the zones for ocular and skin hazard distances.

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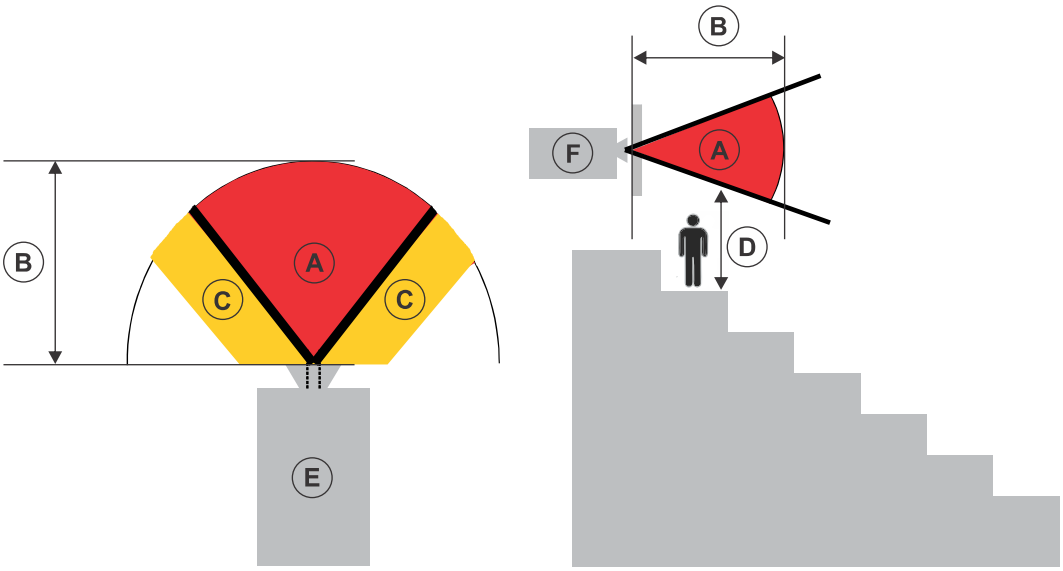

- A—Hazard zone. The region of space where the projection light from the laser-illuminated projector is above emission limits for Risk Group 2. The light intensity may cause eye damage after a momentary or brief exposure (before a person can avert his or her eyes away from the light source). The light may cause skin burns to occur.
- B—Hazard distance. Operators must control access to the beam within the hazard distance or install the product preventing potential exposure of the spectators' eyes from being in the hazard distance.
- C—No access zone. Horizontal clearance of the no access zone must be a minimum of 1.0 meters.
- D—Vertical distance to hazard zone. The hazard zone must be no lower than 2.5 meters (US installations) or 2.0 meters (global installations) above any surface upon which any persons are permitted to stand.

  If the vertical distance to hazard zone requirement (Zone D) is satisfied, the horizontal clearance distance (Zone C) is not needed.
- E—Represents the top view of the projector.
- F—Represents the side view of the projector.

For information detailing the hazard distance for each lens, refer to the *CineLife+ 4K-RGB Installation and Setup Guide (P/N: 020-103244-XX)*.

For Installations in the United States

The following must be in place for laser-illuminated projector installations in the United States:

- The projection room shall be clearly identified by the posting of laser warning and restricted access signs, and by restricting entry through physical means. The projection room sign must display the warning "No direct exposure to beam shall be permitted".
- The Christie Laser Projection System Installation Checklist must be fully completed after the installation and sent to *lasercompliance@christiedigital.com*. A copy can remain on-site. This checklist can be found as a separate document in the accessory box with the manual.
- Certain US states have additional laser regulatory requirements. Contact *lasercompliance@christiedigital.com* for additional regulatory requirements.

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Servicing live equipment

Only Christie accredited technicians who are knowledgeable about the hazards associated with hazardous voltage and high temperatures are authorized to assemble, install, and service Christie equipment.

To make sure you remain safe when servicing energized (live) Christie equipment:

- Locate the main AC power shut off prior to servicing the equipment. This will allow you to turn the power off quickly in an emergency.
- Disconnect the projector from the communication and management network so it cannot receive commands to turn the light source on, open the shutter, and move the lens.
- Familiarize yourself with all potential safety hazards prior to servicing the equipment. This includes, but is not limited to, the location and accessibility of hazardous voltages.
- Read and understand all written procedures prior to commencing a service procedure.
- Understand and follow all local safety codes and requirements when servicing energized (live) equipment.
- Perform equipment service in a location free of obstructions and other hazards. For example, you must have an unobstructed view of the area being serviced.

Wear personal protective equipment (PPE) clothing appropriate to the service you are performing. This includes, but is not limited to, protective (electrically insulated) footwear, safety glasses, and gloves rated for the working voltage of the equipment you are servicing.

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Service setups

Understand the special internal hardware and software adjustments and related details that may require the attention of a qualified service technician, whether done periodically or after a specific module replacement.

Turning the projector on or off

Turn on the projector to display content or turn off the projector to conserve energy or service the projector.

To operate the projector, the circuit breakers must be in the ON position. If servicing the projector or removing the protective covers, ensure the MAIN and UPS circuit breakers are in the OFF position.

In the right toolbar, select and hold **Power**.

If the light source is on when turning off the projector, the light source automatically enters a ten-minute cool-down period.

Calibrating the Intelligent Lens System

On CineLife+ 4K-RGB projectors, the Intelligent Lens System (ILS) is activated by default.

Use the Auto Calibrate feature of the ILS to find and compensate for motor backlash, and to determine the movement range for the currently installed lens.

1. In the left navigation menu, select **Image Settings** > **ILS File Setup**.
2. From the ILS File list, select an available ILS file.
3. Select **Auto Calibrate**.
4. Select **Continue**.
   The system performs the lens calibration.

Adjusting boresight

A boresight adjustment balances the tilt of the lens mount to compensate for screen-to-projector tilt.

Warning! If not avoided, the following could result in death or serious injury.

- Do not look directly into the lens when the light source is on. The extremely high brightness can cause permanent eye damage.
- FIRE HAZARD! Keep hands, clothes, and all combustible material away from the concentrated light beam of the projector.

Caution! If not avoided, the following could result in minor or moderate injury.

- This procedure must be performed by Christie qualified technicians.

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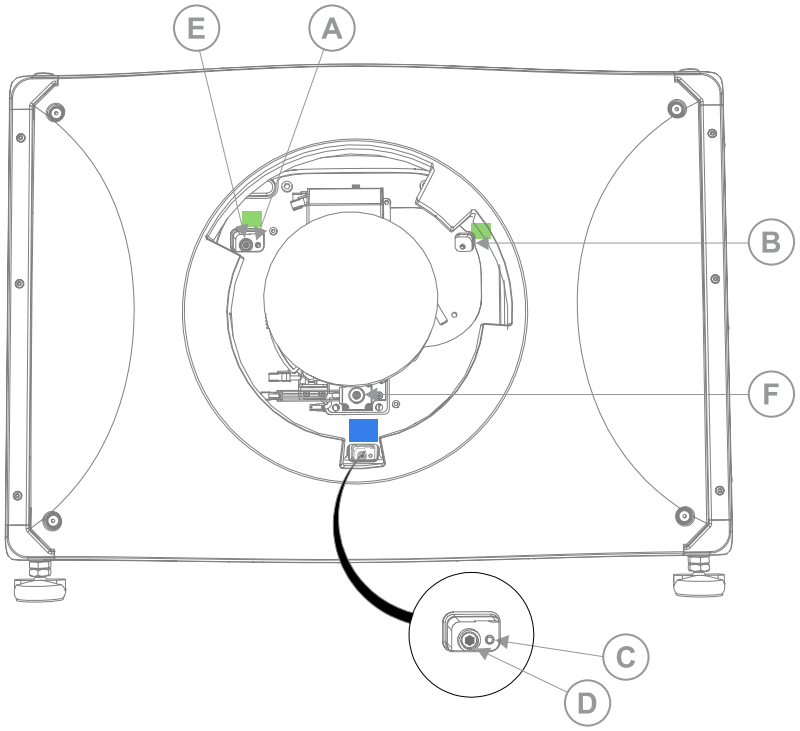
When making the adjustments, set the light source to minimum power.

To following steps are intended to achieve the highest quality image distributed across the full screen.

1. Close the shutter on the projector to avoid accidental exposure to the projection beam when working in close proximity to the projection lens.
2. Unlock the horizontal and vertical lock screws (locks A, B, and C).



A	Horizontal lock screw (lock A)
B	Horizontal lock screw (lock B)
C	Vertical lock screw (lock C)
D	Vertical boresight screw
E	Horizontal boresight screw
F	Manual focus knob

3. Open the shutter on the projector.
4. In the right toolbar, select **Test Patterns** .
5. Select the **RGB-4K-Boresight** pattern and display it full screen.
   Make sure the **Uncorrected Color Box** option is selected.

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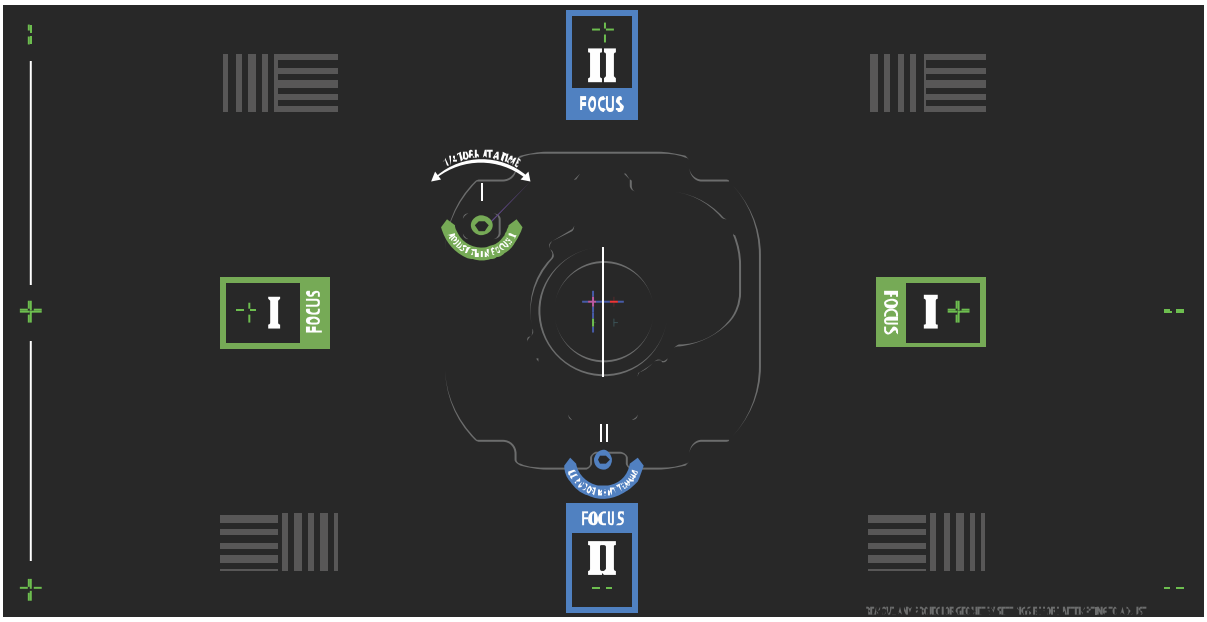

When adjusting the boresight screws, ensure the shutter is closed to avoid accidental exposure to the projection beam when operating in close proximity to the projection lens. Only open the shutter to view the test pattern.

6. To start with the horizontal boresight adjustment, use the ILS controls to move the projection lens into the projector or turn the manual focus knob (F in the images in step 2) counterclockwise to slightly defocus the green cross-hair patterns (+) at the right and left edges of the test pattern.
7. Use the ILS controls or turn the focus knob (F in the images in step 2) clockwise to begin focusing the image.

   Watch for either the left or right cross-hair patterns (+) to come into focus.
8. If the left side comes into focus first, turn the horizontal boresight adjustment screw (E in the images in step 2) clockwise until the left and right are equally out of focus.

   If the right side comes into focus first, turn the horizontal boresight screw counterclockwise.
9. Repeat steps 6 to 8 as required to obtain an even focus at the right and left edges of the screen.
10. To perform the vertical boresight adjustment, use the ILS controls to move the projection lens into the projector, or turn the focus knob (F in the images in step 2) counterclockwise to slightly defocus the green cross-hair patterns (+) at the top and bottom of the screen.
11. Use the ILS controls or turn the focus knob (F in the images in step 2) clockwise to begin focusing the image.

    Watch for either the top or bottom cross-hair patterns (+) to come into focus.
12. If the bottom comes into focus first, turn the vertical boresight adjustment screw (D in the images in step 2) counterclockwise until the top and bottom are equally out of focus.

    If the top comes into focus first, turn the vertical boresight screw clockwise.
13. Repeat steps 10 to 12 as required to obtain an even focus at the top and bottom of the screen.
14. Once the correct focus has been achieved, lock the three lock screws.

    When locking the lock screws, start with the horizontal lock screws (locks A and B in the images in step 2) and turn them until they just touch the base.

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Repeat for the vertical lock screw (lock C in the images in step 2).

Continue the gradual tightening of each screw, until all lock screws are tight.

When stabilizing image vibration, lock B may be left locked or unlocked at the discretion of the installer.

15. If you used the focus knob (F in the images in step 2) to make the adjustments manually, run an ILS auto calibration.
16. Fine tune the focus on cross-hair patterns **I** (horizontal) and **II** (vertical) using the ILS controls only.

    The goal is to obtain good focus at the center and on all sides of the screen, including the square patterns across the screen.

Adjusting the LOS coupling mirrors

Learn how to adjust the Laser Optical Subsystem (LOS) coupling mirrors.

The LOS coupling mirrors can only be adjusted after replacing an optical module such as the LOS, integrator, and coupling mirror assembly. The coupling mirror screws are potted in position from production and not adjustable without replacing the mirror.

1. If the projector is equipped with LiteLOC, disable this feature so the RGB controls can be accessed.
2. On a tripod in front of the lens, set up an illuminance meter (such as the Konica Minolta T10 Illuminance Meter) positioned in the center of the projection beam sent to the screen.

   The illuminance meter must be facing the lens.
3. Navigate to the laser power setting page, and decrease the red laser power to low (30% to 40%).
4. Set the green and blue laser power levels to 0.
5. Turn on the light source.
6. Display a white test pattern on the screen.
7. Wait one minute for the lasers to stabilize.
8. *Remove the electronics-side cover* (on page 46).
9. Adjust the LOS coupling mirrors independently to maximize the lux reading on the illuminance meter.

   Only small adjustments are necessary. You can use a small 2.5 mm flathead screwdriver bit.

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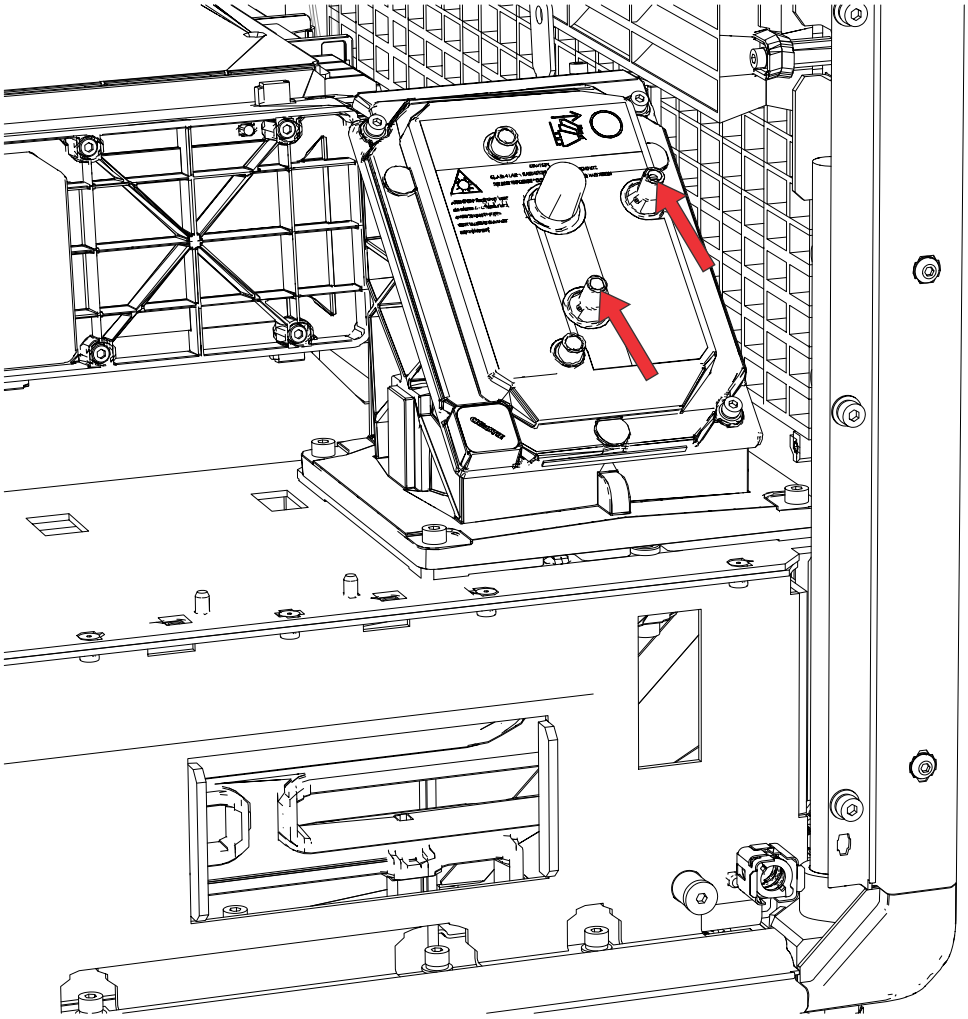

10. Remove the illuminance meter from in front of the light beam and adjust the blue and green power levels to achieve a DCI white point, as measured by the color meter.

    Make sure the red laser power is still set to low.

11. Visually check for uniformity and fine tune the optical adjustments.
12. Once the adjustment is complete, adjust the laser power to the preferred level.
13. Re-install the electronics-side cover previously removed.
14. *Proceed to adjusting the integrator rod and fold mirror* (on page 20).

Adjusting the integrator rod and fold mirror

Understand how to adjust the integrator rod and fold mirror to control the illumination spot on the DMD.

Extreme misalignment of projection optics can cause permanent damage to critical optical components. Only Christie qualified technicians can perform internal optical adjustments.

The integrator rod and fold mirror adjustments are set by Christie. Make adjustments only if screen shadows are visible.

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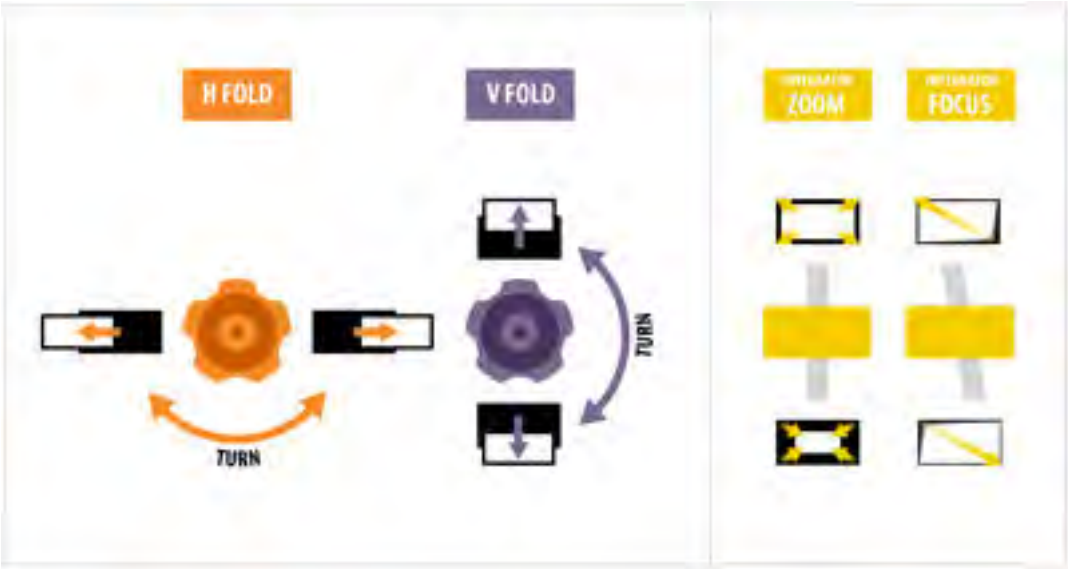
When adjusting the fold mirror, set the light source to minimum power.

1. In the right toolbar, select **Test Patterns**.
2. Set the Red/Green/Blue power to less than 40%.
   High power and misalignment can damage the DMDs.
3. Select the **RGB-4K-Integrator Rod** test pattern and display it full screen.



   Refer to the test pattern for guidance on making the adjustments. The right panel of the test pattern provides information about the integrator zoom and focus adjustments. The left panel provides information about the fold mirror adjustments.
4. Open the Service door on the side of the projector.
5. To use the integrator rod optical controls, open the access door for the Zoom and Focus paddles.

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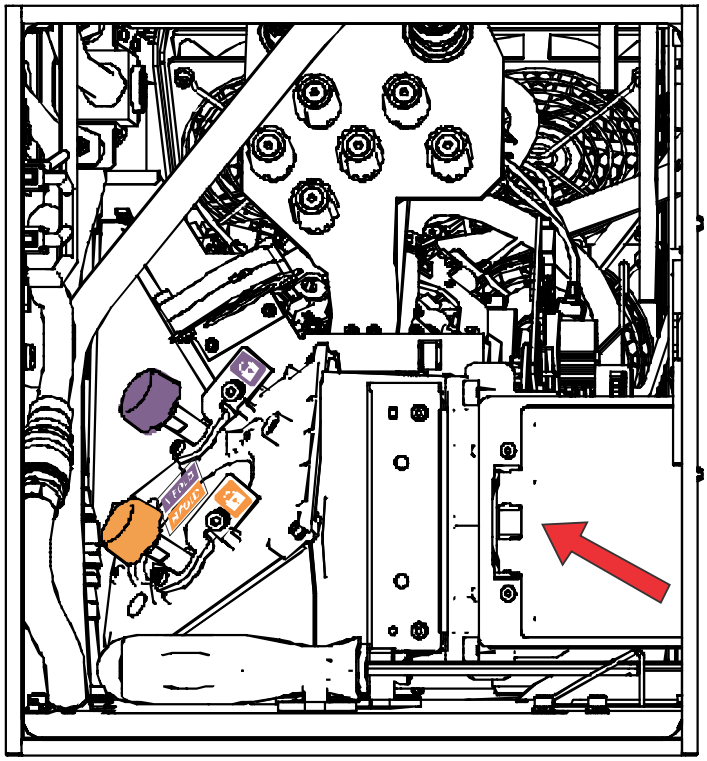
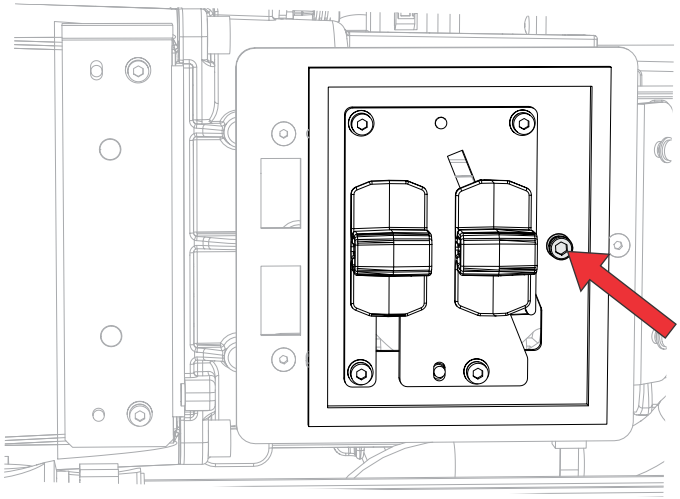


6. Loosen the lock screw for the Zoom and Focus paddles.



7. Set the integrator rod Zoom paddle to the minimum.
8. Loosen the fold mirror screws to unlock the fold mirror adjustment knobs.

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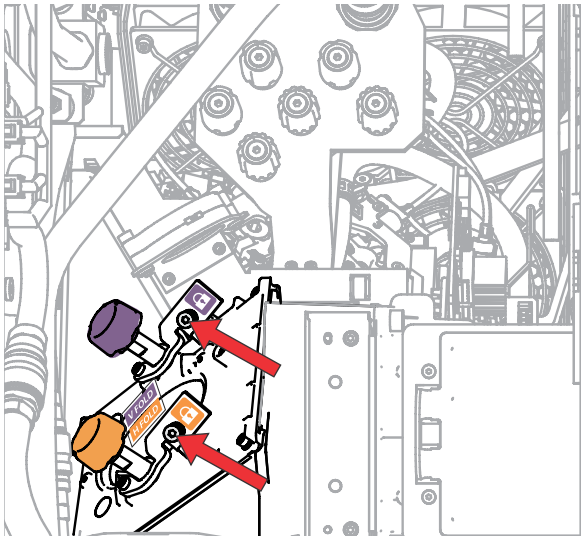
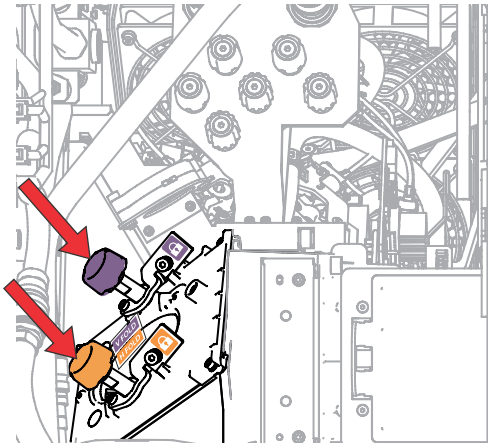


9. To make horizontal adjustments on the fold mirror, use the orange adjustment knob.
   To make vertical adjustments on the fold mirror, use the purple adjustment knob.



10. Adjust the fold mirror until either the top left edge or the bottom right edge of the illumination spot becomes visible on the DMD.
11. Adjust the integrator rod Focus paddle to optimize focus for one of the following:
    - Along the top edge of the image, approximately one-third across the image from the left.
    - Along the bottom edge of the image, approximately one-third across the image from the right.
12. Adjust the fold mirror to center the image on the DMD array.
13. Use the integrator rod Zoom paddle to increase the zoom until the entire active area is filled, with no dark areas at the edges or corners.
    Ensure the overfill is minimized to improve DMD life and system optical efficiency for brightness.
14. Once the adjustments are complete, tighten the lock screw for the Zoom and Focus paddles and the two fold mirror screws.
15. Close the access door for the Zoom and Focus paddles.

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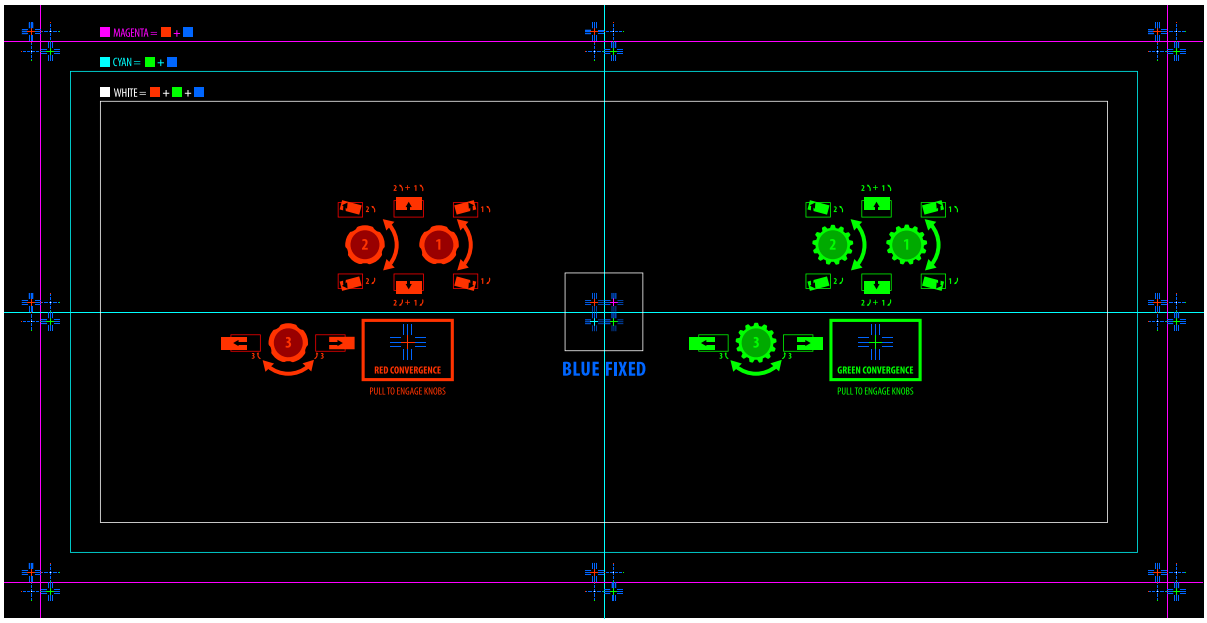
Mechanically adjusting DMD convergence

Use the convergence knobs behind the Service door to mechanically adjust convergence.

1. Before adjusting DMD convergence, make sure the projector has reached a steady operational state.

   If switching from a white or bright test pattern to a dark convergence test pattern or if warming up the projector after a shutdown, allow 15 minutes for stabilization so the optics can reach a steady state.
2. Make sure the electronic convergence (ECC) is defaulted before doing mechanical convergence.
3. In the right toolbar, select **Test Patterns**.
4. Select the **RGB-4K-Convergence** test pattern and display it full screen.

   Make sure the **Uncorrected Color Box** option is selected.



5. Open the Service door on the side of the projector.
6. To adjust the convergence knobs, use the 3 mm driver included with the projector.

   If adjusting by hand without using the tool, pull out the convergence adjustment knobs to engage them.

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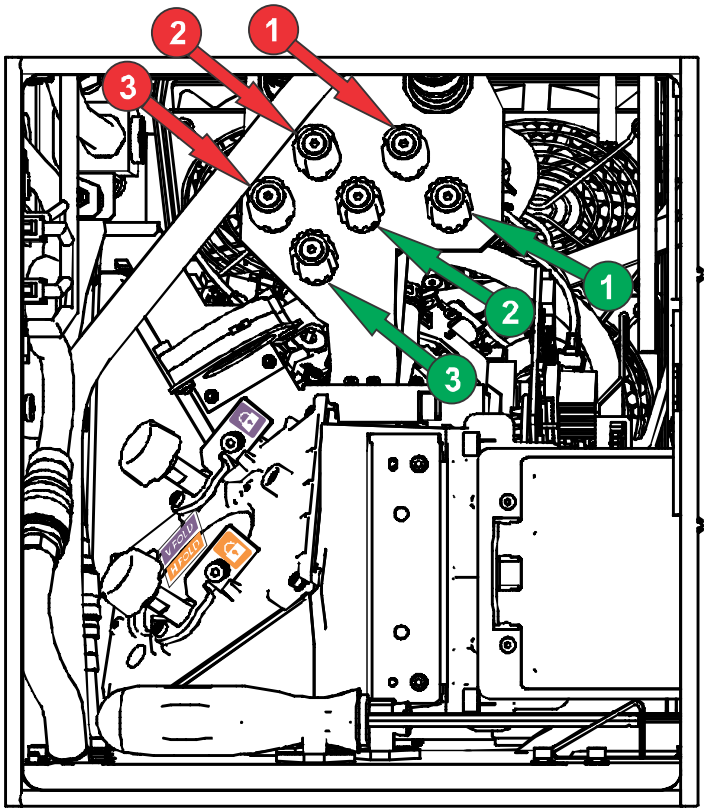

7. Use the Convergence test pattern to assist with adjusting the horizontal and vertical lines.

   Horizontal adjustments are controlled by adjusting knob 3.

   Vertical convergence and rotation are controlled by adjusting knobs 1 and 2. Christie recommends rotating a single knob a maximum of a quarter rotation before adjusting the second knob a quarter rotation. For example, if using one hand, turn the left knob a quarter rotation and then the right knob a quarter rotation, and so on. Adjusting a single knob for vertical or rotational adjustment to an extreme before adjusting the second knob may result in the convergence mechanism binding.

   For the best stability, Christie recommends setting convergence while rotating the knobs in a clockwise direction. This may require first adjusting convergence by turning the knobs counter-clockwise and finalizing the convergence with a clockwise approach. This applies to all knobs.

8. When complete, push in all the convergence adjustment knobs to disengage them.

   If the colors at the corners of the screen require further correction, see *Electronically adjusting convergence* (on page 25).

Electronically adjusting convergence

Use the electronic convergence feature in the menu to adjust convergence. Only perform electronic convergence when satisfied with the position of the image on the screen.

Adjusting the convergence is accomplished by aligning a red, green and blue sprite, which is displayed at the four corners of the displayed image. For electronic convergence all three colors can be adjusted.

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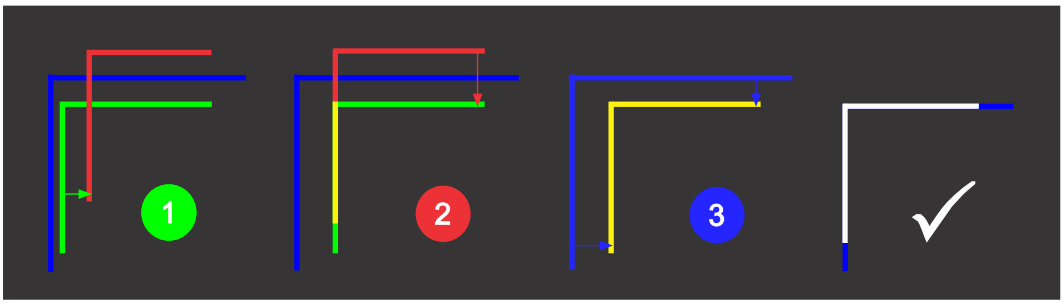
Always align the color components of the sprite to the inner most line color (for each axis). When converged, the three colors should overlap to form white lines. Applying the sprite alignment settings to the screen results in the three colors overlapping to form white lines throughout the image.

One or more poorly converged individual colors may appear adjacent to some or all of the lines.



If you wear glasses with corrective lenses when performing this adjustment, ensure you are viewing the test pattern on a straight angle through the optical axis of your glasses and not from a tilted or angled perspective. This avoids a prismatic effect that can appear to shift convergence when viewing at an angle.

1. In the left navigation menu, select **Image Settings** > **ILS File Setup**.
2. Use the arrow to select an ILS file to store the ECC settings.
3. On the ILS File Setup page, select **ECC**.

   Each corner of the screen displays three separate sprites, one for each primary color. The user interface displays the Test Pattern controls.
4. Set the Screen Type to **Flat** or **Scope**.

   This sets the test pattern and the location of the sprites on the screen. Each sprite appears as the letter L.
5. Set the Sprite Color to **Move** and **Show**.

   When first opening the ECC, all Show and all Move colors are selected, so all three sprites are displayed and all three sprites are moved by the directional pad.
6. Select a **Step Size** to control the granularity of the steps from coarse (1/8 pixel per step) to fine (1/64 pixel per step) when using the directional pad.

   Sprites can be moved a maximum of 20 pixels.
7. Choose a corner by selecting the circle at a corner of the dashed rectangle.

   The selected corner is indicated by a green circle. The X/Y pixel offset (from no correction) displays in red, green, and blue text corresponding to each sprite.
8. Use the directional pad to move the sprites towards the center of the screen.
9. Adjust each sprite so they overlap to create a single white sprite.

   In the example below, the red sprite (in image 1 below) was moved down and the blue sprite (in image 1 below) was moved to the right so they overlap to create the single white sprite (image 2 below).

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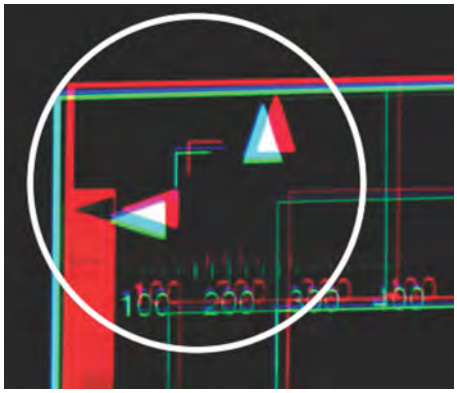
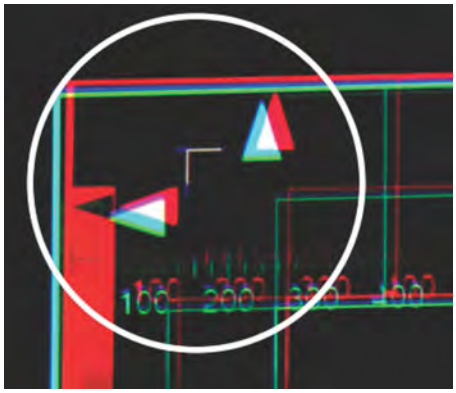
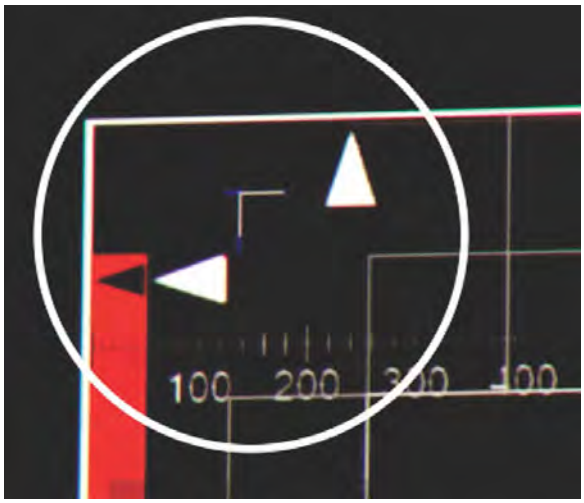


1



2

10. To set the convergence for that corner of the screen, select **Apply**.



11. Repeat steps 7 to 10 for the remaining corners.
12. If necessary, reset the correction back to zero (no correction) or the previously saved correction by selecting **Reset**.

    In the Reset dialog, reset the current corner or all four corners. When the locations and value are set, select **Reset**.
13. To save the current ECC settings, when the convergence is complete, select **Save** beside the ILS file named at the top of the panel.

LiteLOC™ sensor-to-screen calibration

The LiteLOC sensor-to-screen calibration is performed in the factory under specific setup conditions which include the type of lens, screen, and the spectroradiometer used for measuring screen color and brightness.

Your projector's setup conditions may not match the factory setup which may result in an discrepancy in color accuracy. Upon first installation, check the accuracy of the color point and if unsatisfactory, perform this calibration. Doing this calibration captures all the variables of your setup and achieves the

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best results. By doing this calibration, you will not overwrite the factory calibration. Once satisfied, some scenarios may exist in which you may need to re-do the calibration in the future.

Re-doing this calibration is required if the following is replaced:

- Color sensor board

Christie recommends re-doing this calibration if any of the following are replaced:

- Light engine
- Lens
- LOS (laser optical subsystem)
- Screen
- Port window
- Any other optical components in the optical path between the LOS and the screen

After replacing these components, check the accuracy of the color point and if unsatisfactory, re-do this calibration.

LiteLOC™ sensor-to-screen calibration: Workflow

Identify the recommended order for performing the sensor-to-screen calibration.

LiteLOC™ sensor-to-screen calibration requires the following:

- Spectroradiometer
- Service user is the minimum level user access

- *Create a new calibration file* (on page 28).
- *Recalibrate the calibration file* (on page 30), if required.
- *Edit the existing calibration file parameters* (on page 31) on the Sensor-to-screen menu, if required.
- *Verify the calibration* (on page 31), if required.
- *Add the calibration file to the Channel Setup* (on page 32).

Creating a new calibration file

The Sensor-to-screen Calibration wizard guides you through the steps required to create a new calibration file.

1. Set up a spectroradiometer to obtain screen measurements later in the process.
2. Select **Menu** > **Color Settings** > **Sensor-to-screen Calibration**.
3. To create a new calibration file, select **Create** .

   The projector checks if the light source is on and the douser is open. If either condition is not met, a warning dialog is displayed prompting you to make sure these conditions are met before starting the wizard.
4. In the Create dialog, enter a name for the new calibration file and select **Create**.
5. In step 1 of the Sensor-to-screen Calibration wizard, set the maximum brightness and color point.
   a) Enable the **Display White Test Pattern** option.

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b) To set the maximum expected room and chiller (for chiller-based products) temperatures, use the plus (**+**) or minus (**-**) signs.

c) Adjust the RGB sliders to set the brightness and color point.

d) Select **Next**.

6. Wait 20 minutes for the projector to stabilize or select **Skip** during the stabilization time period.

7. In step 2 of the Sensor-to-screen Calibration wizard, measure and enter the screen values.

   a) To trigger the measurement at a specific operating point, under Sensor to screen, select **Capture**.

   The Capture button changes color to indicate the capture process is activated. Only one Capture button is active at a time but the buttons can be selected in any order.

   The projector automatically sets the red, green, and blue output laser powers to the pre-determined settings calculated and displayed in the Drive Percentage (Calculated) area of the wizard.

   A 10 second countdown begins to allow the projector white point and brightness to stabilize and no changes can be made. At the end of the count down period, the Color Sensor values fields are automatically populated by the projector for the currently selected drive percentage value.

   b) When the countdown ends, take x, y, and fL measurements using the spectroradiometer.

   Christie recommends taking meter readings from the center of the screen to obtain accurate screen measurements.

   c) Under Measured Values, using the numeric keypad record the associated spectroradiometer values for x, y, and fL.

   The projector holds the on-screen color and brightness level until the same or another Capture button is selected.

   d) Repeat steps a to c for the remaining drive percentage set points until all x, y, and fL values are entered.

   Spectroradiometer measurements can be captured in any order but all three x, y, and fL measurements must be entered before moving onto the next capture. You can recapture a specific measurement at any time during the process by selecting the Capture button. In this case, the measured spectroradiometer and color sensor values are reset.

   e) Once all the color sensor and measured values are entered for all nine rows, select **Apply and Save**.

8. Verify and complete the calibration.

   a) Select a white point to measure by selecting either the **DCI**, **D65**, or **Custom** white point buttons.

   Once selected, the projector automatically enables LiteLOC, selects a White test pattern with uncorrected colors at the white point specified, and sets the brightness to 80%.

   b) Using a spectroradiometer, measure screen x and y values at the center of the screen.

   To verify the calibration has been successfully applied, the measured white point must be within the expected tolerance.

   c) When complete, select **Finish**.

   The projector output is configured according to the currently selected calibration file and you are returned to the Sensor-to-screen Calibration menu.

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Recalibrating an existing calibration file

The Sensor-to-screen Calibration wizard guides you through the steps required to re-calibrate an existing calibration file, if required.

1. Select **Menu** > **Color Settings** > **Sensor-to-screen Calibration**.
2. Select a user-defined calibration file to recalibrate.
3. Select **Recalibrate**.

   The projector checks if the light source is on and the douser is open. If either condition is not met, a warning dialog is displayed prompting you to make sure these conditions are met before starting the wizard.
4. In step 1 of the Sensor-to-screen Calibration wizard, set the maximum brightness and color point.
   a) Enable the **Display White Test Pattern** option.
   b) To set the maximum expected room and chiller (for chiller-based products) temperatures, use the plus (**+**) or minus (**-**) signs.
   c) Adjust the RGB sliders to set the brightness and color point.
   d) Select **Next**.
5. Wait 20 minutes for the projector to stabilize or select **Skip** during the stabilization time period.
6. In step 2 of the Sensor-to-screen Calibration wizard, measure and enter the screen values.
   a) To trigger the measurement at a specific operating point, under Sensor to screen, select **Capture**.

      The Capture button changes color to indicate the capture process is activated. Only one Capture button is active at a time but the buttons can be selected in any order.

      The projector automatically sets the red, green, and blue output laser powers to the pre-determined settings calculated and displayed in the Drive Percentage (Calculated) area of the wizard.

      A 10 second countdown begins to allow the projector white point and brightness to stabilize and no changes can be made. At the end of the count down period, the Color Sensor values fields are automatically populated by the projector for the currently selected drive percentage value.
   b) When the countdown ends, under Measured Values, using the numeric keypad capture and record the associated spectroradiometer values for x, y, and fL.

      The projector holds the on-screen color and brightness level until the same or another Capture button is selected.
   c) Repeat steps a and b for the remaining drive percentage set points until all x, y, and fL values are entered.

      Spectroradiometer measurements can be captured in any order but all three x, y, and fL measurements must be entered before moving onto the next capture. You can recapture a specific measurement at any time during the process by selecting the Capture button. In this case, the measured spectroradiometer and color sensor values are reset.
   d) Once all the color sensor and measured values are entered for all nine rows, select **Apply and Save**.
7. Verify and complete the calibration.
   a) Select a white point to measure by selecting either the **DCI**, **D65**, or **Custom** white point buttons.

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Once selected, the projector automatically enables LiteLOC, selects a White test pattern with uncorrected colors at the white point specified, and sets the brightness to 80%.

b) Using a spectroradiometer, measure screen x and y values at the center of the screen.

To verify the calibration has been successfully applied, the measured white point must be within the expected tolerance.

c) When complete, select **Finish**.

The projector output is configured according to the currently selected calibration file and you are returned to the Sensor-to-screen Calibration menu.

Editing the existing calibration file parameters

Make corrections to the existing calibration file parameters, when the values from the spectroradiometer were entered in error.

1. Select **Menu** > **Color Settings** > **Sensor-to-screen Calibration**.
2. Select a user-defined calibration file.
3. Edit any of the x, y, or fL values by selecting the field under Measured Values and using the numeric keypad to enter the updated value.
   - x and y value range: 0.0001 to 0.9999
   - fL value range: 0.01 to 9999.99.
4. To save the updated file to the projector, select **Save**.

Verifying the sensor-to-screen calibration

Check the integrity of the calibration, if required.

1. Navigate to **Menu** > **Color Settings** > **Sensor-to-screen Calibration**.
2. Select the **White** test pattern.
3. Select **Verify Calibration**.

   If the douser is closed and/or the light source is off, a dialog is displayed informing the user that the douser must be open and the light source turned on before verification can occur.

   Step 3 of the Calibration wizard opens.
4. Verify and complete the calibration.
   a) Select a white point to measure by selecting either the **DCI**, **D65**, or **Custom** white point buttons.

   Once selected, the projector automatically enables LiteLOC, selects a White test pattern with uncorrected colors at the white point specified, and sets the brightness to 80%.

   b) Using a spectroradiometer, measure screen x and y values at the center of the screen.

   To verify the calibration has been successfully applied, the measured white point must be within the expected tolerance.

   c) When complete, select **Finish**.

   The projector output is configured according to the currently selected calibration file and you are returned to the Sensor-to-screen Calibration menu.

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Adding a calibration file to the Channel Setup

Select any of the available calibration files stored on the projector system by accessing the 2D Sensor-to-Screen Calibration File or 3D Sensor-to-Screen Calibration File list in the Channel Setup menu.

By default, the 2D and 3D sensor-to-screen calibration files are set to the factory or field calibration data identified as Default in the list. The Default selection references the factory calibration data as long as no field calibration data is available. If field calibration data is available, it is selected as the Default. When a 2D and 3D Sensor-to-screen Calibration file is selected in the Channel Setup, the active channel automatically applies the calibration data according to the 2D or 3D operation of the projector.

1. In the left navigation menu, select **Channel Setup**.
2. Select the channel you want to add the calibration file to.
3. From either the **2D Sensor-to-Screen Calibration File** or **3D Sensor-to-Screen Calibration File** list, select the calibration file.
4. Select **Save**.

Aligning the image

Only perform image alignment after the projector is fully assembled and powered up in its final location.

Basic image alignment ensures the image reflected from the DMDs is parallel and well-centered with the lens and screen. This initial optical alignment is the foundation for optimizing images on the screen and must be completed before final boresight adjustments. Before beginning, make sure the projector is properly positioned in relation to the screen.

1. Ensure the projector is positioned in the throw distance range for the particular lens.
2. Display a test pattern.
3. Do a quick preliminary focus and (if available) zoom adjustment with the primary lens.

   Do not worry about consistency across the image at this point, just center focus. It is good practice to have zoom adjustment color and focus adjustment color in the center of its range.
4. Holding a piece of paper at the lens surface, adjust offsets as necessary until the image is centered within the lens perimeter. A full black field works best for this.
5. If the projector is mounted off center to the screen axis, offset the lens as much as required. Aim the projector over slightly towards the center of the screen, but use caution when doing so, as too much tilt will cause excessive keystone distortion.
6. With a framing pattern on screen, double-check projector leveling so the top edge of the image is parallel to the top edge of the screen.

Performing the DAC calibration

Calibrate the black levels for the new color sensor board.

1. Prepare the projector for DAC calibration:
   a) Turn off the laser light.
   b) Close the shutter.
   c) Install the lens cap.

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The lens cap minimizes any stray light entering through the lens and maximizes darkness around the sensor during the calibration.

2. Enable direct communication to photon controller.
   a) Set the IP address of the projector and the IP address of the laptop to be on the same subnet.

      This connection can be a direct connection to the management port on the FMAIN through wired/wireless network.

   b) Connect the laptop to the projector using Net Terminal or Kore Librarian, with port 5000.
   c) Log in as the Service account.
   d) To enable the communication to the photon controller, send the command `(CAL+PASS 1)`.
3. Connect the laptop to the photon controller using Net Terminal or Kore Librarian, with port 5103.
4. To start the DAC calibration, send the following command: `(ENG+CALB 0 0)`.

   This process takes approximately one minute. The system displays information on the start and finish of the calibration process. DAC calibration is only required after replacing the color sensor board.
5. Remove the lens cap.
6. To complete the calibration, power cycle the projector.
7. Proceed to the instructions in Calibrating LiteLOC.

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Maintenance and cleaning

Maintain the cleanliness of all internal components during any service procedure. All of the projector optics must remain free of contaminants to perform at the level specified. Even a small amount of dust or a fingerprint may degrade the image or cause a noticeable reduction of brightness.

In environments where dust, smog, dirt, and other contaminants are higher than normal, Christie strongly recommends performing more frequent maintenance than your maintenance schedule indicates.

Always power down and disconnect/disengage all power sources to the projector before servicing or cleaning the lens or before any of the projection covers or doors (if applicable) are loosened and removed. If the seal is broken while the intake fans are still operating, internal components are immediately vulnerable to contamination from inbound particles.

Caution! If not avoided, the following could result in minor or moderate injury.

- Observe all electrostatic precautions. Use a grounded wrist strap and insulated tools when handling, servicing, or cleaning electronic assemblies.

Notice. If not avoided, the following could result in property damage.

- Avoid touching optical elements.
- Always wear clean, lint-free gloves when handling the product.

Guidelines for cleaning

Use the following guidelines when cleaning components.

Component	Preventative measures	How to clean
Illumination Optics System	Never touch or blow on exposed components. Wear gloves (supplied).	Use ionized pneumatic guns only. Keep imaging components and yourself grounded at all times.
Integrator	Never disassemble the integrator module.	Blow off particles with clean, dry de-ionized air.
Illumination system, internal lenses/ prisms	Never touch or blow on interior components. Wear gloves (supplied). Normally the internal parts should not be accessed.	Blow off particles with clean, dry de-ionized air. If necessary, wipe in a single direction with a clean high quality optical cloth.
Light engine components	Never touch or blow on components. Wear gloves (supplied).	Blow off particles with clean, dry de-ionized air. If necessary, use a Q-tip with pure isopropyl alcohol on the

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Component	Preventative measures	How to clean
		glass surface. Never touch the imaging panels.
Light engine, DMD panels	Never touch or blow on the panels. Normally the internal parts should not be accessed.	Blow off particles with clean, dry de-ionized air.
Projection lens	To avoid the risk of scratching the lens, only clean the lenses if absolutely necessary. A small amount of dust on the lenses has little effect on picture quality. The projection lens should be free of dust and fingerprints. If the lenses must be cleaned, use a dry, soft cotton cloth and gently rub in a circular motion.	Use filtered compressed air to blow out dust and a clean lint-free cloth.

Filtration

Filters help to prevent dust, smoke, fog, and other foreign materials from entering the projector.

In environments where dust, smog, dirt, and other contaminants are higher than normal, Christie strongly recommends replacing the air filter more frequently than your maintenance schedule indicates.

Notice. If not avoided, the following could result in property damage.

- Do not operate the product without the filter installed.
- Do not operate the product with an incorrectly installed filter.
- Do not reuse an old air filter.

Replacing the light engine compartment air filter

This air filter is located on the air intake side of the projector, behind the radiator.

These instructions detail accessing the air filter from the top of the projector.

1. Slide the small door on the top of the unit towards the middle and open the door.

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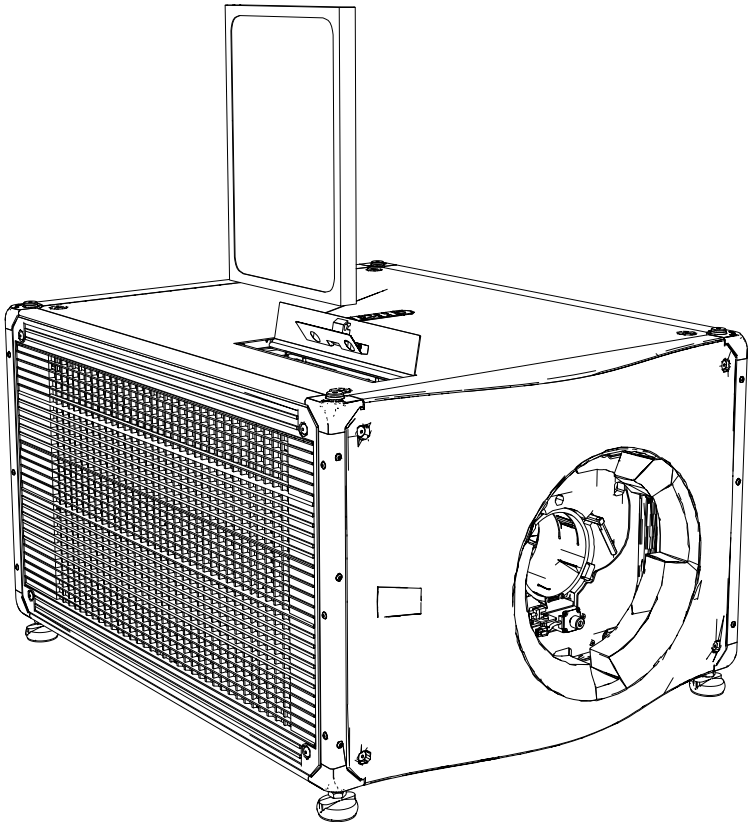

2. Lift the air filter out of the projector.
3. Replace the used air filter with a new one.
   The airflow indicator on the new filter must point towards the fan assembly.
4. Close the air filter door on the top of the unit.

Replacing the main intake air filter

The main intake air filter is located behind the side-intake cover.

1. *Remove the side-intake cover* (on page 47).
2. Pull out the air filter from the projector.
3. Replace the used air filter with a new one. Feed the air filter behind the tabs.

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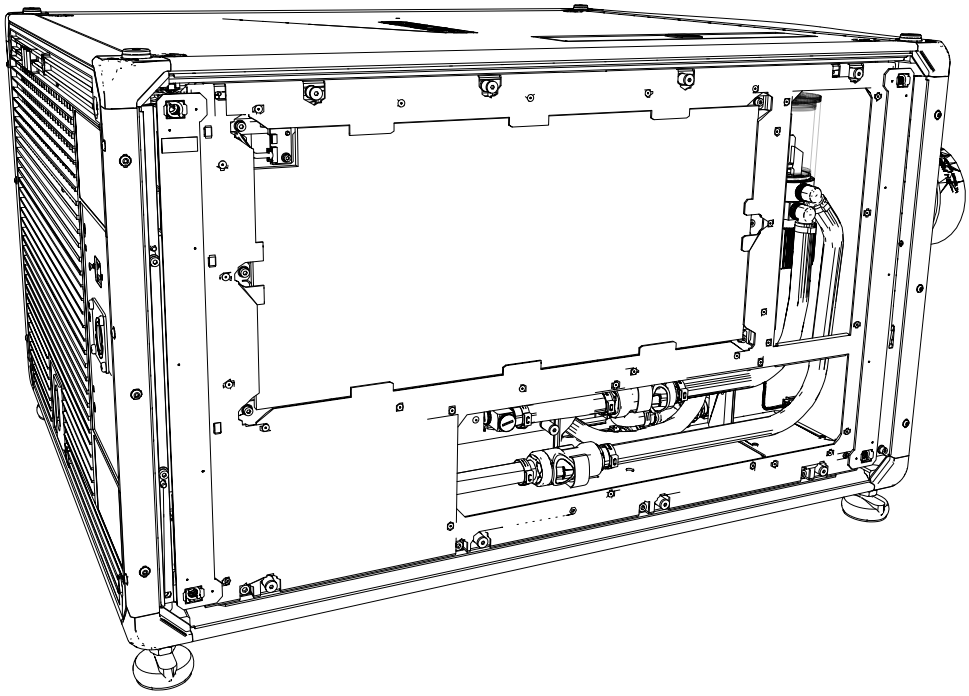
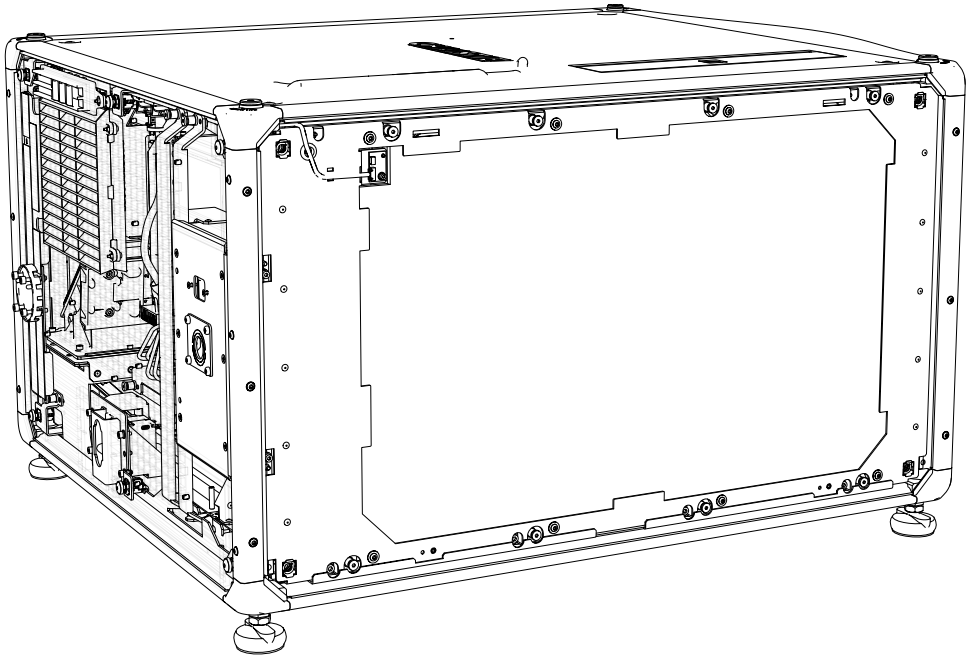


CP4420-RGB shown above.



CP4435-RGB shown above.

4. Re-install the side cover.

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Replacing or refilling the coolant

CineLife+ 4K-RGB projectors rely on liquid coolant to maintain the laser optical subsystem at the required operating temperatures. This section provides service instructions and safety precautions for filling the reservoir unit and handling coolant.

Caution! If not avoided, the following could result in minor or moderate injury.

- Use protective eye wear and gloves. Follow workplace guidelines for using personal protective equipment when installing, cleaning, and servicing the product.

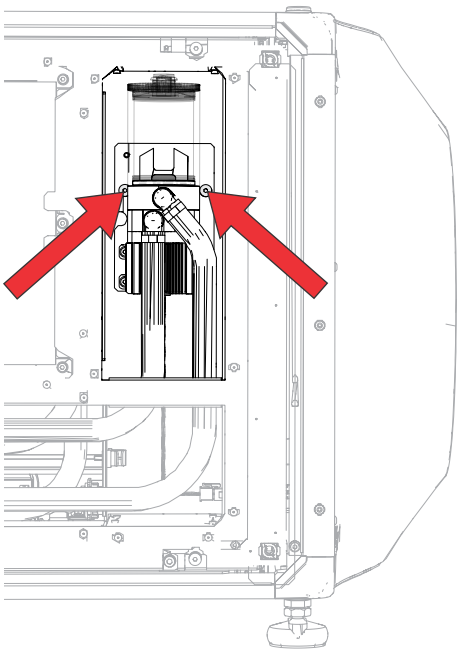
Notice. If not avoided, the following could result in property damage.

- Fill the coolant to the recommended level only. Do not fill above the maximum level line shown on the reservoir unit.

For CP4415-RGB and CP4420-RGB, do not attempt to fill the coolant reservoir when it is installed in the projector chassis.

1. *Remove the front cover* (on page 47).
2. If necessary, loosen the two screws so that a screwdriver can access the top of the reservoir.

CP4415-RGB and CP4420-RGB:



CP4425-RGB and CP4435-RGB:

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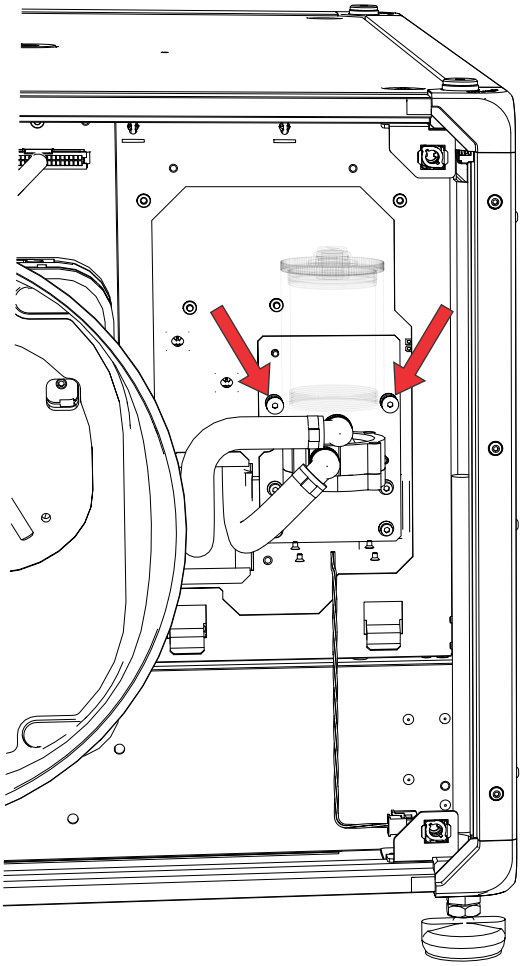

3. Use a flat-head screwdriver to open the top cap on the reservoir fill port.
4. Pour the required coolant (Koolance LIQ-740PR P/N: 003-005179-XX) into the fill port. Fill only to the recommended level.
5. Re-install the top cap on the reservoir fill port.
6. Using the flat-head screwdriver, tighten the top cap to seal it. Be careful not to strip the threads; use no more than 12 in-lb of torque.
7. If necessary, tighten the two screws securing the reservoir.
8. Use a soft cloth to wipe away any coolant that drips outside the reservoir.
9. Re-install the front cover.

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Parts and module replacement

When ordering replacement parts, provide the following information found on the product license label:

- Projector model
- Projector serial number
- Manufacture date

Service prerequisites

Before servicing the projector, perform the following tasks.

- Always power down and disengage all power sources to the projector prior to servicing.
- Follow all service safety precautions.
- For a detailed breakdown of serviceable modules, see *Index of parts and modules* (on page 41).

Completing the maintenance

After servicing the projector, perform the following tasks.

- Check the card cage and top cover locking pins for engagement.
- Ensure all M3 screws are torqued to 8 in-lb.
- Ensure all M4 screws are torqued to 15 in-lb.
- Ensure the lock nut on the projector foot is torqued to 30 in-lb.
- When reconnecting the DC outputs, ensure all positive and negative terminal connections are torqued to 30 in-lb.

Disposing of replaced components and packaging

To help conserve the environment, determine which replaced product components can be recycled, reused, or sent back to Christie. Dispose appropriately and according to your local regulations.

In addition, for replacement parts not being returned to Christie, reuse or recycle the replacement part packaging according to your local regulations.

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Tools required for service

Before servicing the projector, ensure the following tools and components are available:

The projector toolbox is located inside the service compartment. On the left side of the projector, use the high security key to open the service access door and obtain the available tools.

- High security key
- Long and stubby neck ball drivers—2.5 mm, 3 mm, and 5 mm (provided in the projector toolbox)
- #2 Phillips screwdriver
- 2 mm and 6 mm hex drivers
- 8 mm deep socket nut driver
- 13 mm wrench or adjustable wrench (open jaw)
- Flat-head screwdriver
- Torque driver
- Needle nose pliers
- Magnetizer
- Side cutters and cable ties
- Electrostatic protective strap and pad
- Disposable lint-free gloves (included with optical components)
- Cloth wipes

Index of parts and modules

The following table lists the parts and modules for CP4415-RGB, CP4420-RGB, CP4425-RGB, and CP4435-RGB.

Description	Part Number
Covers	
Front cover	003-107374-XX
Rear cover	003-107371-XX
Top cover with filter access door	003-109695-XX
Bottom cover	003-107335-XX
Left cover (electronics-side)	003-109441-XX
Right cover (side-intake)	003-107373-XX
Lens mount	
Motor lens mount assembly	003-003903-XX
Manual lens mount assembly	003-102333-XX
Zoom motor kit for Series II	003-103912-XX

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Description	Part Number
Ventilation and cooling	
Blue light engine FPGA fan	003-112556-XX
Green/red light engine FPGA fan	003-112555-XX
12V 0.50A 4WIR 120x25 fan assembly	003-121494-XX
12V 2.3A 120 mm fan	003-121677-XX
12V 1.7A 4-wire 140x38 fan (CP4425-RGB, CP4435-RGB)	003-122053-XX
CAVE fan	003-114437-XX
Radiator assembly (CP4415-RGB, CP4420-RGB)	003-200411-XX
Radiator assembly (CP4425-RGB, CP4435-RGB)	003-200238-XX
Light engine inlet tubing assembly (CP4415-RGB, CP4420-RGB)	003-200008-XX
Light engine outlet tubing assembly (CP4415-RGB, CP4420-RGB)	003-200009-XX
Pump assembly	003-200240-XX
Electronics	
Card Cage	003-109987-XX
AC breaker assembly	003-107755-XX
Electric AC Line 250V 20A assembly	003-002881-XX
AC inlet assembly	003-109683-XX
12V power supply (CP4415-RGB, CP4420-RGB)	003-122119-XX
12V power supply (CP4425-RGB, CP4435-RGB)	003-121461-XX
54V 1.5KW power supply (CP4415-RGB, CP4420-RGB)	003-121897-XX
54V 2KW power supply (CP4425-RGB, CP4435-RGB)	003-121460-XX
Optics	
Light engine	003-109995-XX
Coupling fold mirror assembly	003-107231-XX
Shutter assembly	003-104955-XX
Integrator zoom/focus	003-107325-XX
Fold mirror adjustment assembly	003-107316-XX
Rotating diffuser assembly	003-107244-XX
IOS rear assembly (integrator, coupling elbow, and coupling mirror for CP4415-RGB and CP4420-RGB)	003-109931-XX
IOS rear assembly (integrator, coupling elbow, and coupling mirror for CP4425-RGB, CP4435-RGB)	003-109696-XX
LOS (CP4425-RGB)	003-201425-XX
LOS (CP4435-RGB)	003-200156-XX

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Description	Part Number
Printed circuit boards	
GaN laser driver board (CP4415-RGB, CP4420-RGB)	003-114434-XX
Laser driver board (CP4425-RGB, CP4435-RGB)	003-114517-XX
Housekeeping board 5.2 (HKBB)—CP4415-RGB, CP4420-RGB	003-113426-XX
Housekeeping board 3.2 (HKGB)—CP4425-RGB, CP4435-RGB	003-114192-XX
Dual temperature sensor (DTSM)	003-111269-XX
Light engine temperature sensor	003-100618-XX
Status LED board (SLB)	003-006587-XX
Diffuser interface board 1.0 (DIB)	003-113605-XX
Color sensor board (CSBC)	003-114427-XX
Harnesses	
SID harness	003-005668-XX
Light engine Mini-SAS cable 750 mm	003-006741-XX
Miscellaneous	
Touch screen monitor	003-121784-XX
LCD touch panel USB-C cable	003-121785-XX
Leveling feet	003-005359-XX
Touch panel MTG hardware assembly	003-003326-XX
SLOS 2-1-1/6/2 (CP4415-RGB, CP4420-RGB)	003-109880-XX
SLOS 2-2-2/9/3 (CP4415-RGB, CP4420-RGB)	003-109881-XX
Manifold assembly (CP4415-RGB, CP4420-RGB)	003-109898-XX

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Projector covers and feet

Learn how to remove the covers and feet of the projector.

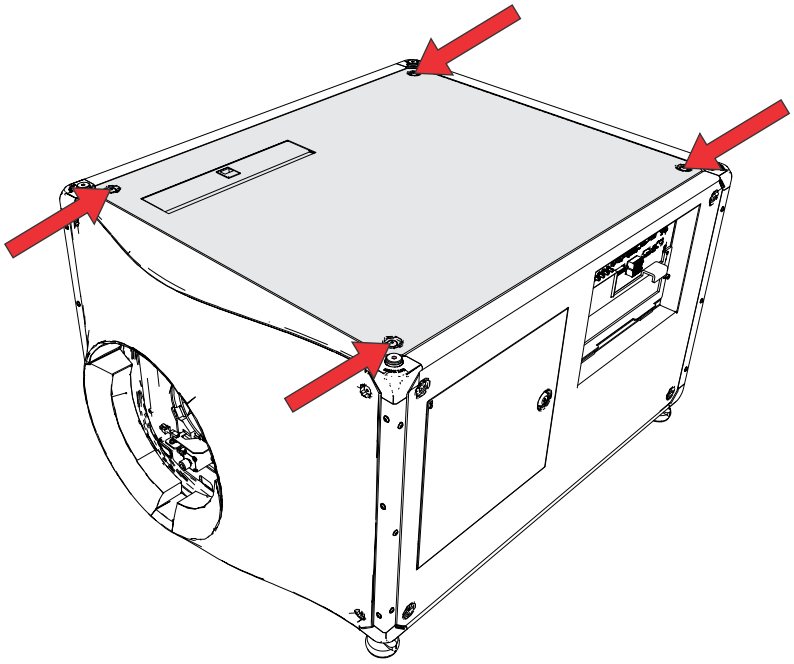
Warning! If not avoided, the following could result in death or serious injury.

- Prior to rigging the projector, inspect the quarter-turn fasteners on the covers to ensure they are safely secured.
- Prior to rigging the projector, always tighten the lock nut on the projector feet against the bottom of the projector to lock the feet. Otherwise, the feet must be removed.

Top cover

The top cover provides access to the light engine, electronics, and various other internal components.

1. Loosen the four screws securing the top cover.



2. Use the high security key to open the projector service access door.
3. Disengage the top cover lock pin by pulling on the pin and lift up the top cover to remove it.

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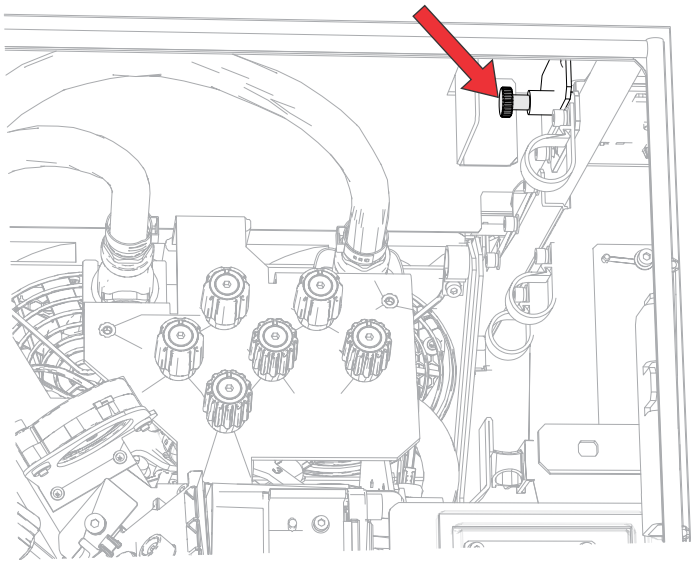
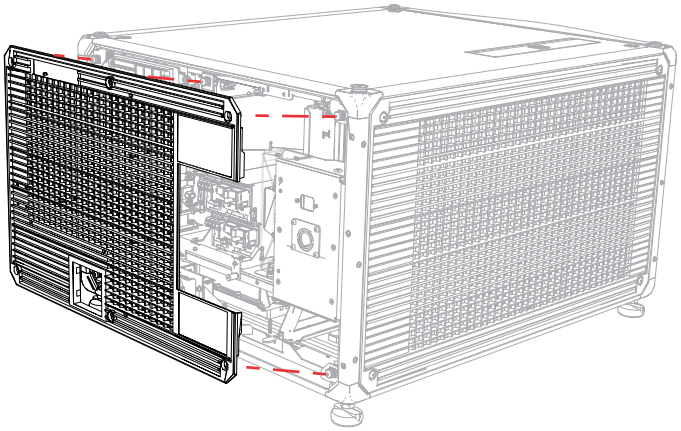


4. Replace the top cover, if required.
5. To re-install, follow these steps in reverse order.

Rear cover

Removing the rear cover provides access to the power supplies and other components allowing removal of the integrator assembly.

1. Loosen the six screws securing the rear cover.
2. Remove the rear cover.



CP4415-RGB/CP4420-RGB shown

3. Replace the rear cover, if required.
4. Before re-installing the rear cover of a CP4435-RGB projector, ensure the handles are in place. The handles are held at the bottom of the projector by magnets and at the top by screws.

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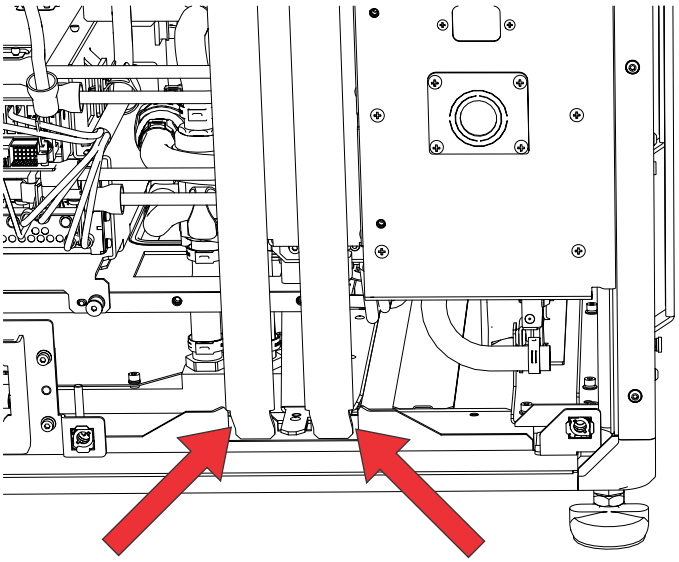
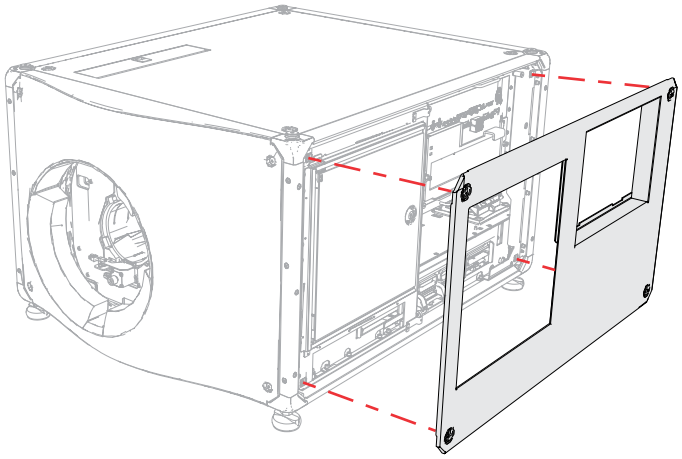


5. To re-install, follow these steps in reverse order.

Electronics-side cover

The electronics-side cover provides access to the card cage, rear IOS, and reservoir module.

1. Loosen the four screws securing the electronics-side cover.



2. Remove the electronics-side cover.
3. Replace the electronics-side cover, if required.
4. To re-install, follow these steps in reverse order.

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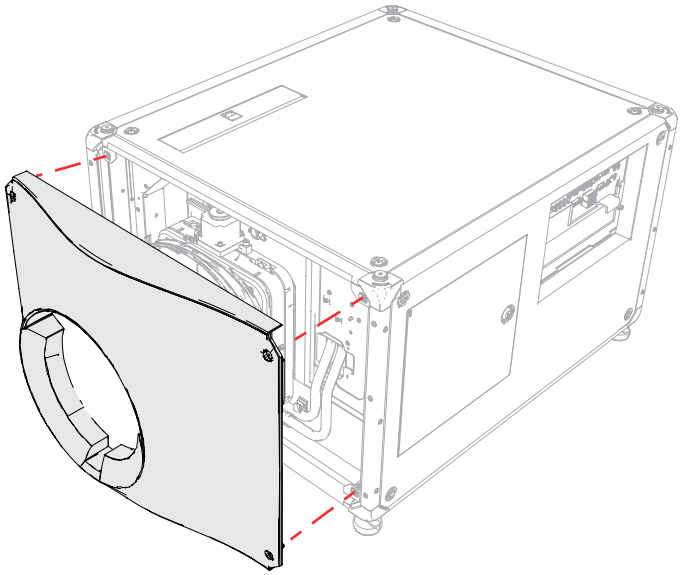
Front cover

The front cover provides access to the lens assembly. On the CP4435-RGB, the front cover also provides access to the coolant reservoir.

1. Loosen the four screws securing the front cover.

   CP4415-RGB/CP4420-RGB shown below.



2. Remove the front cover.
3. Replace the front cover, if required.
4. To re-install, follow these steps in reverse order.

   Verify the lens boot is properly aligned and sealed against the front cover.

Side-intake cover

The side-intake cover provides access to the radiator, filter, and fans.

1. Loosen the four screws securing the side-intake cover.
2. Remove the side-intake cover.

   CP4415-RGB/CP4420-RGB shown below.

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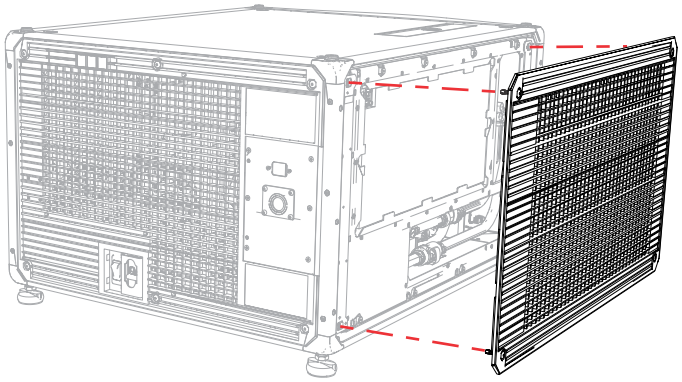

3. Replace the side-intake cover, if required.
4. To re-install, follow these steps in reverse order.

Bottom cover

The bottom cover provides access to the laser optical subsystem (LOS) and color sensor.

1. Loosen the six screws securing the bottom cover.
2. Loosen the four screws securing the bottom cover.

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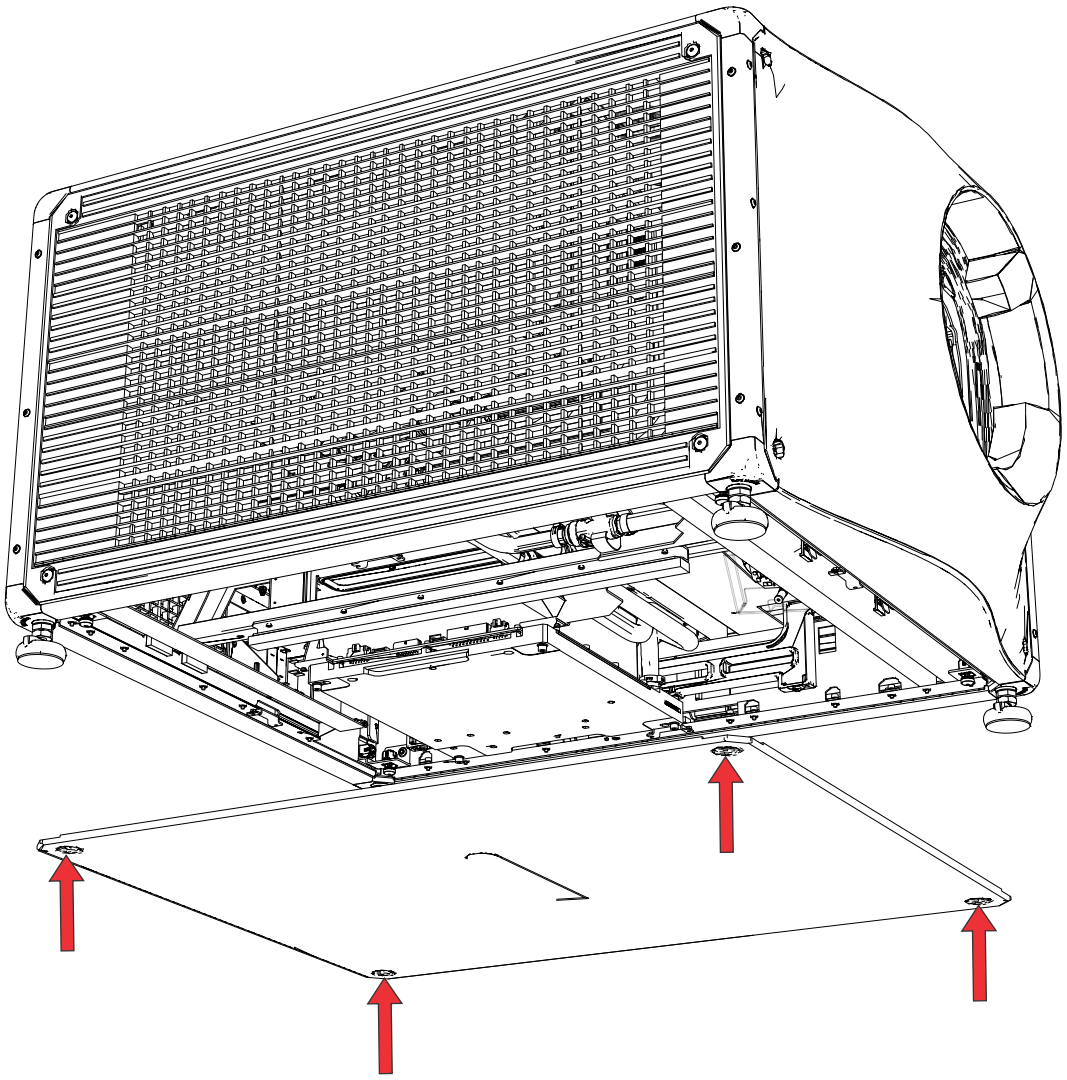

CP4420-RGB shown

3. Lower the cover from the projector and slide it out.
4. Replace the bottom cover, if required.
5. To re-install, follow these steps in reverse order.

Projector feet

The adjustable feet can be raised or lowered when positioning the projector to make sure it is level on all sides so the displayed image appears rectangular without any keystone.

1. Make sure the projector is in a secure position.

   Christie does not recommend having the projector overhang the supporting surface when replacing the feet, unless the projector is securely positioned.
2. Loosen the lock nut on the affected foot.

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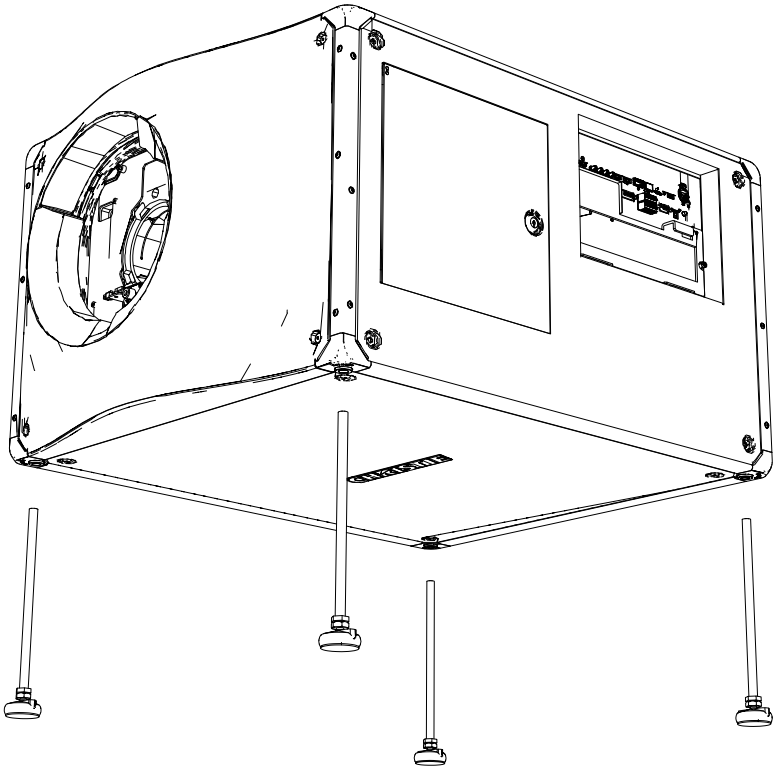

3. Unscrew the foot until it is no longer engaged in the baseplate.
4. Replace the foot.
5. To re-install, follow these steps in reverse order.
   Make sure the lock nut on the projector foot is torqued to 30 in-lb.

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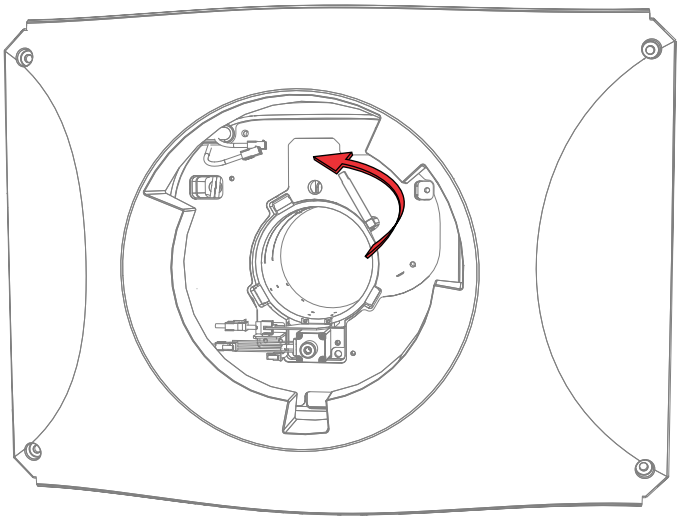
Lens mount components

The lens mount provides a means of securing a projection lens to the projector. Components include the lens boot, lens mount barrel, and the lens mount offset.

Projection lens

Use the correct method of removing the lens.

1. For motorized lens mounts, disconnect the lens zoom motor from the two zoom motor harness connectors.
2. Turn the clamp on the lens mount to unlock the projection lens.



3. Slide the lens straight out of the projector.

   If the lens does not slide out easily, reset the lens offset. Lock the lens before performing reset so that it does not fall out.
4. Attach the lens cap to avoid damage to the lens.
5. To re-install, follow these steps in reverse order.

Lens mount

The lens mount, located at the front of the projector, is an assembly of mechanical and electrical components that securely holds and positions the projection lens.

1. *Remove the projection lens* (on page 51).

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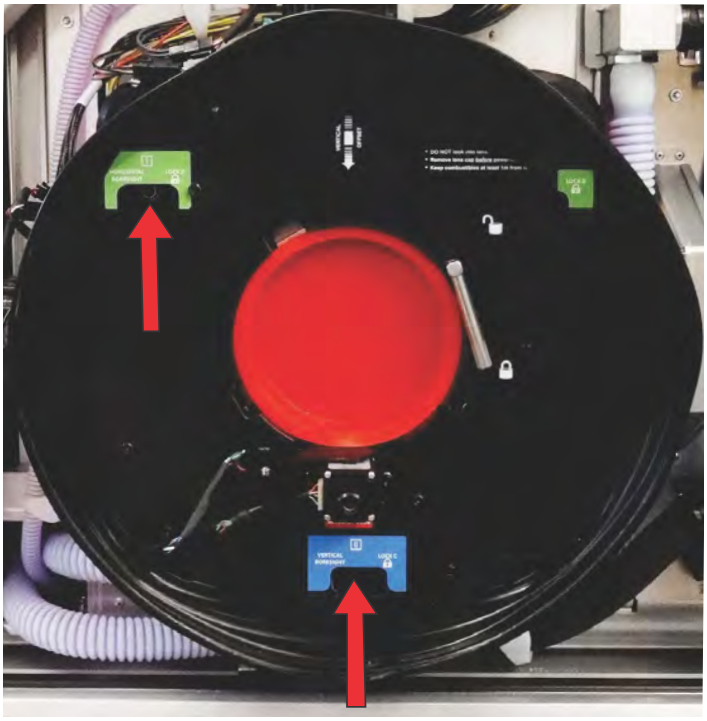
2. *Remove the front cover* (on page 47).
3. Make sure the lens mount is centered vertically and horizontally.
4. Disconnect the lens mount harness.
5. Remove the harness cables from the four P-clips.
6. Loosen the two boresight alignment screws.

   Ensure the lens mount is supported while removing the screws as no pins are available to rest it on and it will fall off.



7. Loosen the pivot screw in the center of the lens mount.

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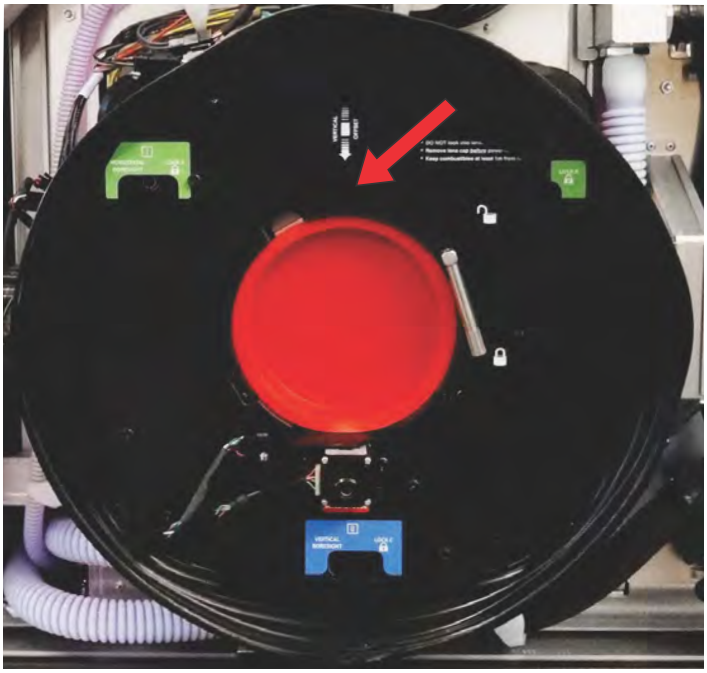

8. Remove the lens mount from the projector head and carefully set it aside.
9. To re-install, follow these steps in reverse order.
   Make sure the springs are kept on the mounting screws when installing.

The new lens mount includes three post screws that set the required distance of the lens mount from the projector head. To avoid damaging the lens mount, do not adjust the post screws.

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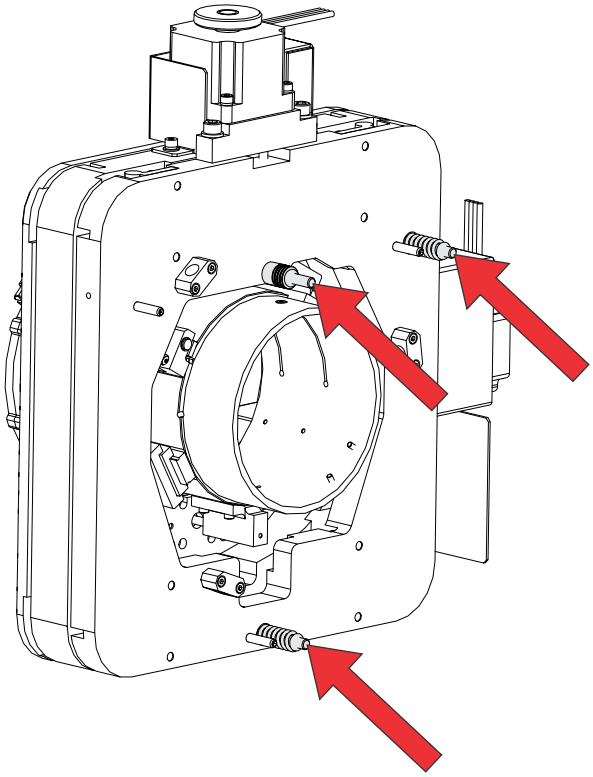

10. *Adjust the boresight* (on page 16) after replacing lens mount.

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Ventilation and cooling

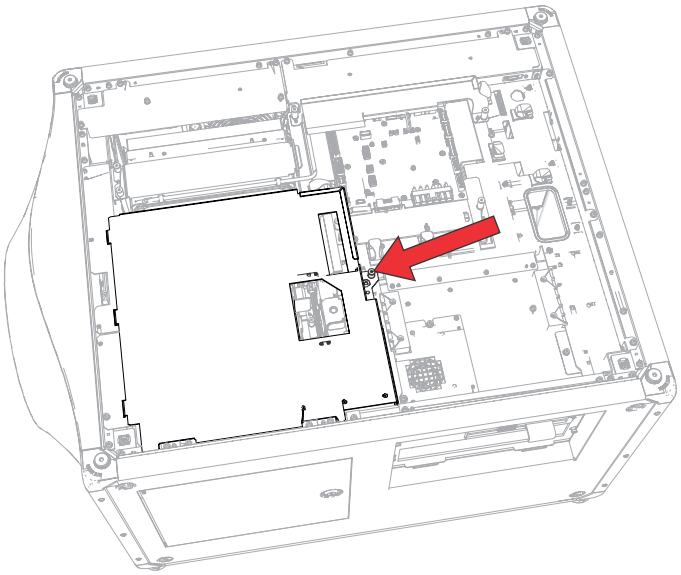
Vents and louvers provide ventilation, both for intake and exhaust, keeping the projector components within their operating temperature specifications.

When replacing fans, ensure you confirm the fan direction for airflow. The correct orientation of the fan also ensures that the fan harness reaches the connector.

Blue formatter fan (#3)

The blue formatter fan provides cooling for the blue light engine formatter board.

1. *Remove the top cover* (on page 44).
2. To remove the light engine security cover, loosen the screw.



3. Remove the light engine intake fans.
4. Disconnect the fan #3 harness inline connector.
5. To remove the fan and bracket, loosen the screw.

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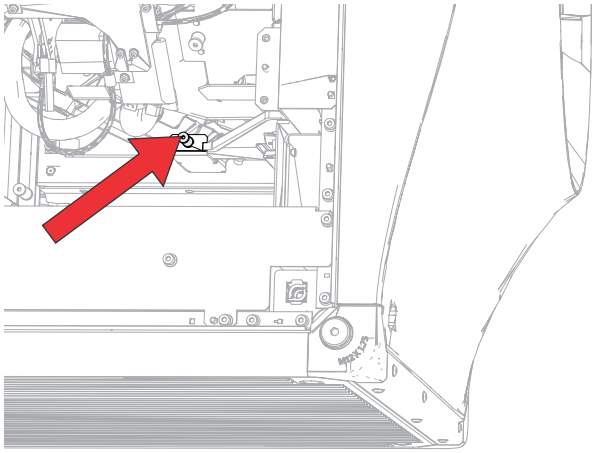
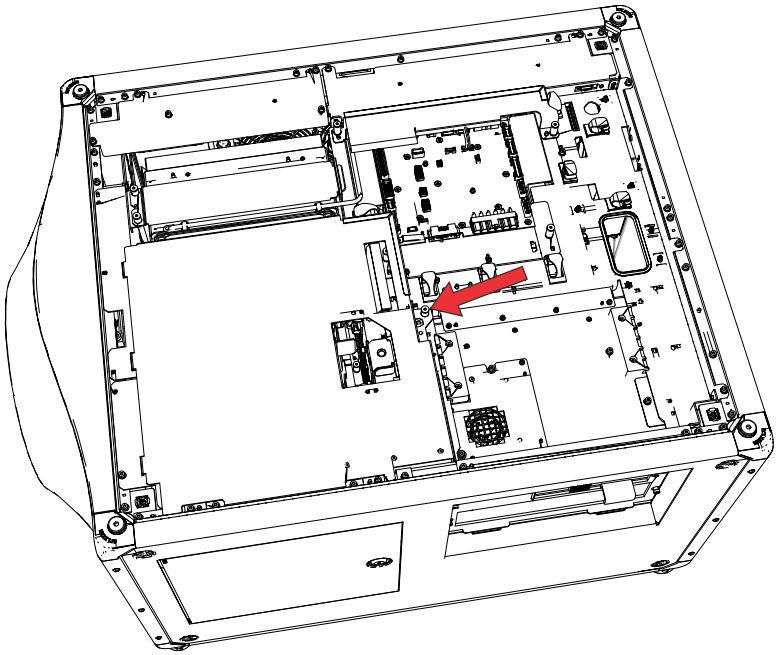


6. Remove the four screws securing the fan to the bracket.
7. Replace the fan, if required.
8. To re-install, follow these steps in reverse order.

Green formatter fan (#4)

The green formatter fan provides cooling for the green light engine formatter board.

1. *Remove the top cover* (on page 44).
2. To remove the light engine security cover, loosen the screw.



3. Disconnect the fan #4 harness inline connector.
4. To remove the fan, loosen the two screws.

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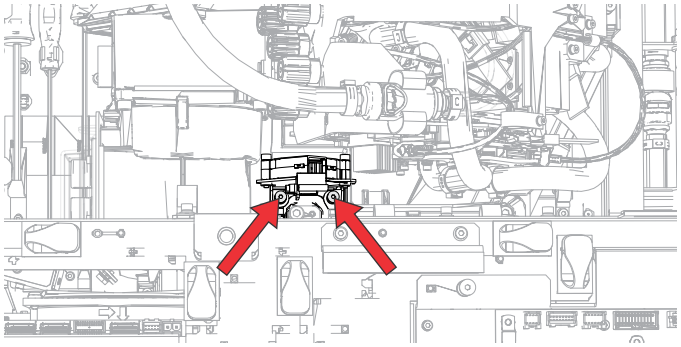
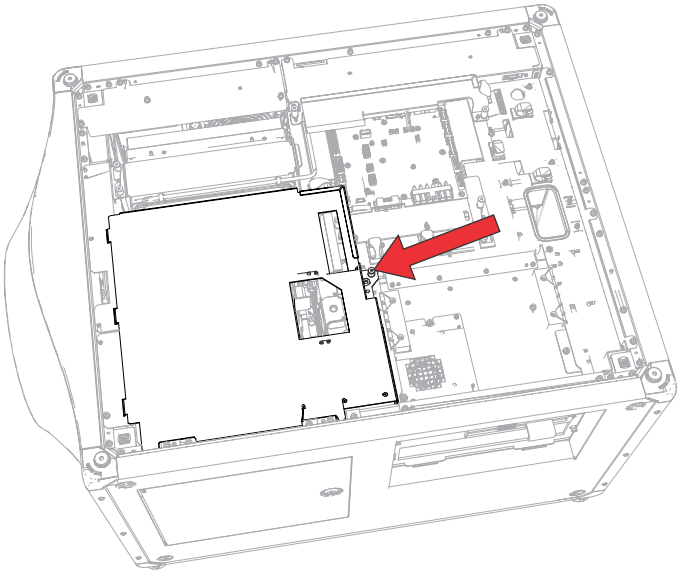


5. Replace the fan, if required.
6. To re-install, follow these steps in reverse order.

Red formatter fan (#5)

The red formatter fan provides cooling for the red light engine formatter board.

1. *Remove the top cover* (on page 44).
2. If the light engine coolant hoses are in the way, disconnect them.
3. To remove the light engine security cover, loosen the screw.



4. Disconnect the fan #5 harness inline connector.
5. To remove the fan with the bracket, loosen the three screws.

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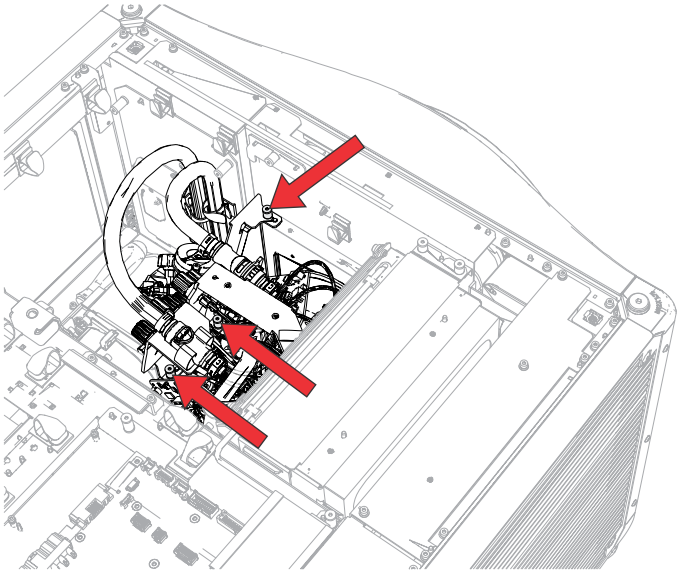

6. Remove the two screws securing the fan to the bracket.
7. Replace the fan, if required.
8. To re-install, follow these steps in reverse order.

Radiator intake fans (#12-19 for CP4415-RGB and CP4420-RGB)

The radiator intake fans draw cool air in to assist in cooling the projector.

1. *Remove the radiator* (on page 68).
2. Disconnect the fan harness connector.
3. For the affected fan, remove the grill.

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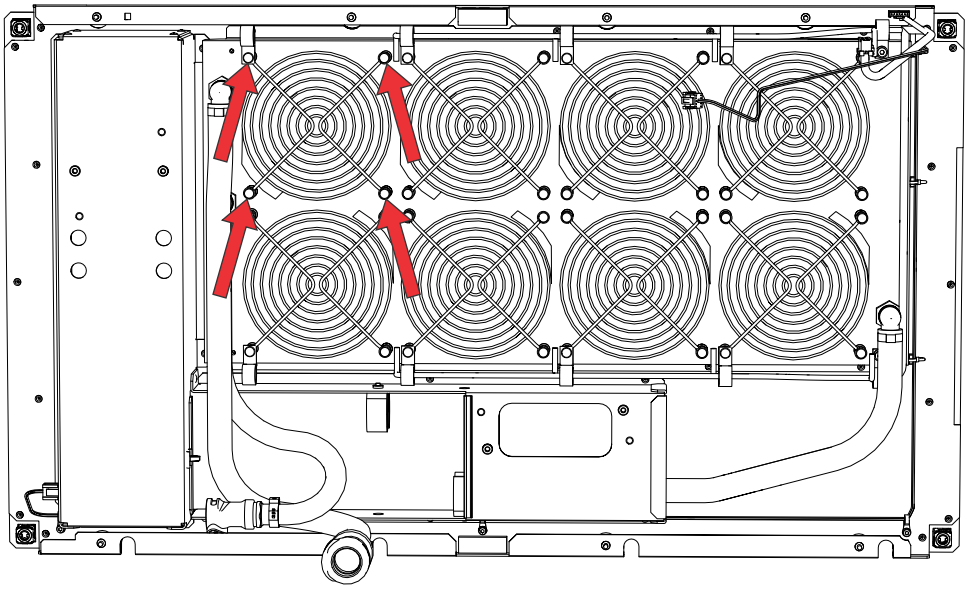
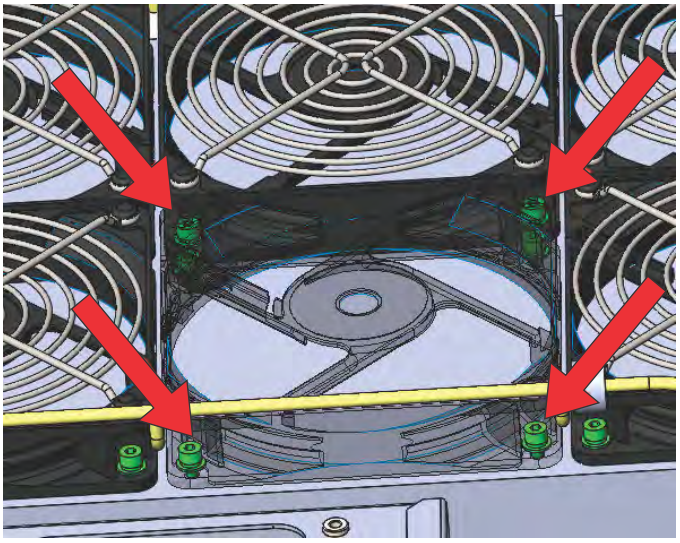


4. Remove the four screws securing the fan.



5. Replace fan.
6. To replace additional fans, repeat steps 3 to 5.
7. To re-install, follow these steps in reverse order.

Radiator intake fans (# 12-19, 24-27 for CP4425-RGB and CP4435-RGB)

The radiator intake fans draw cool air in to assist in cooling the projector.

1. *Remove the radiator* (on page 69).

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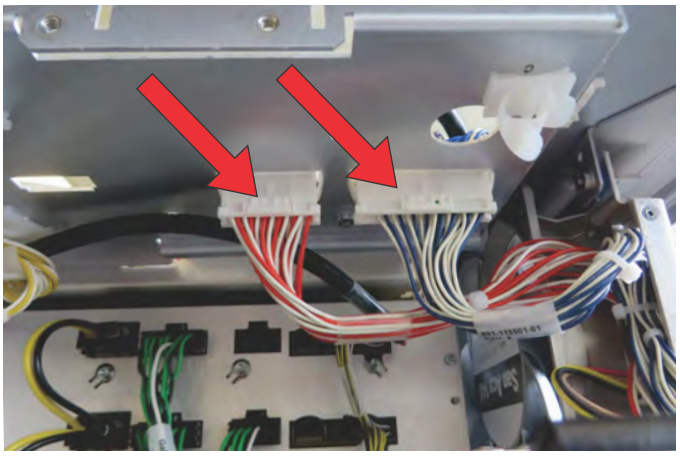
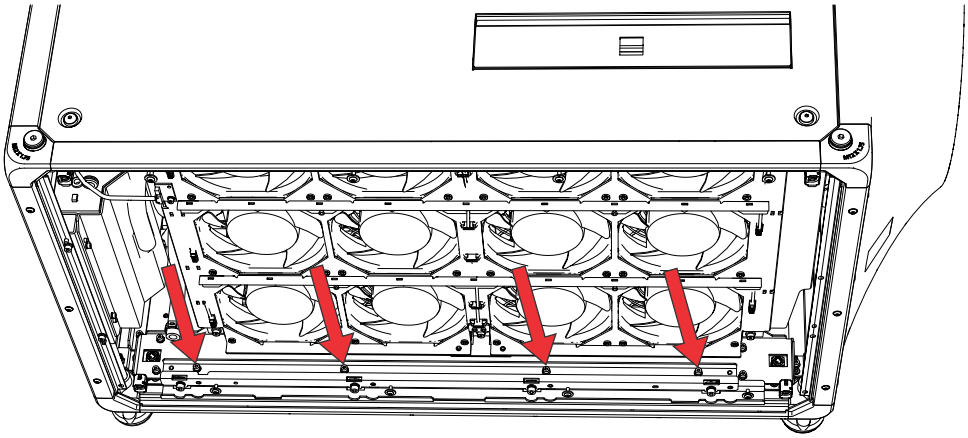
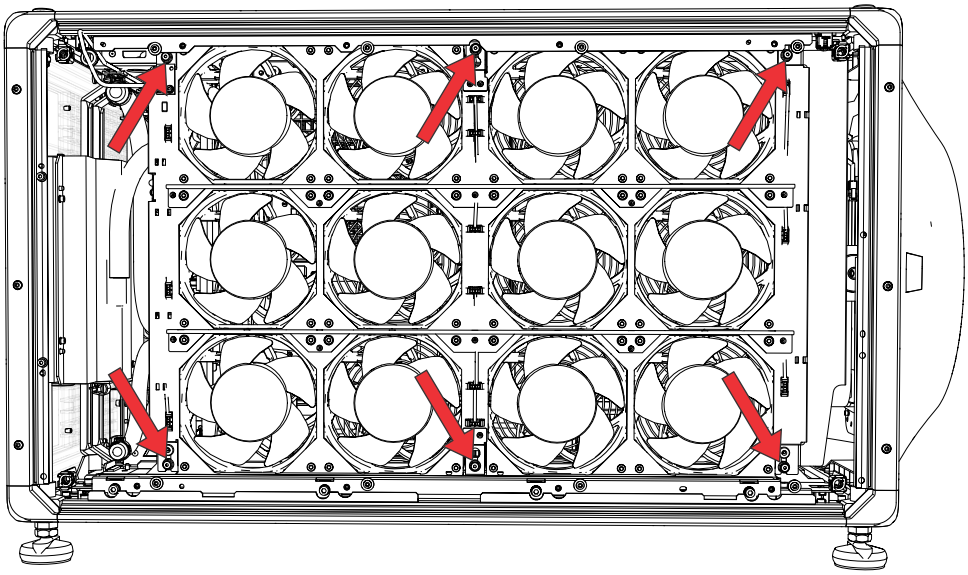
2. Disconnect the two fan harnesses G and H at the rear of the projector (white/blue and white/red).



3. Remove the four screws securing the radiator bottom bracket.



4. Loosen the six screws securing the radiator intake fan assembly.



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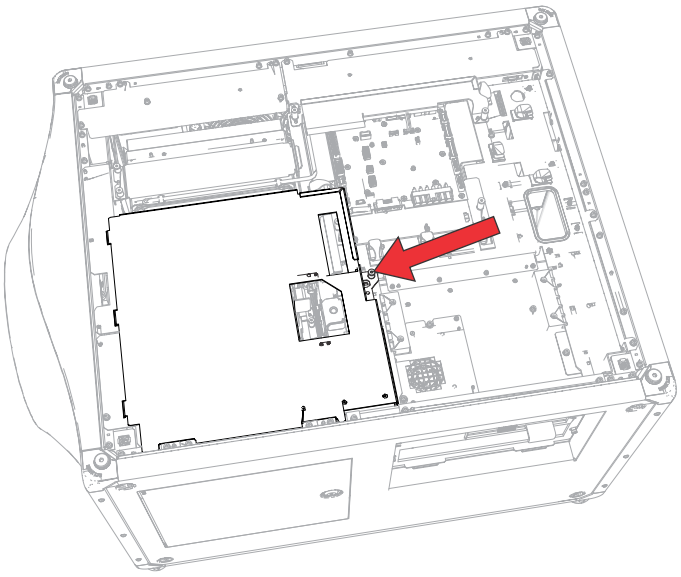
5. Swing the fan pack out to remove it from the radiator assembly.
6. For the affected fan, remove the grill.
7. Remove the four screws securing the fan.
8. Replace the fan.
9. To replace additional fans, repeat steps 6 to 8.
10. To re-install, follow these steps in reverse order.

Light engine intake fans (#25-30 for CP4415-RGB and CP4420-RGB; #6-11 for CP4425-RGB and CP4435-RGB)

The light engine intake fans draw air into the projector to cool the light engine.

These instructions detail accessing the air filter from the top of the projector. The filter can also be removed from the side of the projector. Contact Christie Technical Support for more details.

1. *Remove the top cover* (on page 44).
2. To remove the light engine security cover, loosen the screw and lift the plate from over the fan pack.



3. To remove the light engine intake fan cover, loosen the two screws and remove the plate over the fan pack.

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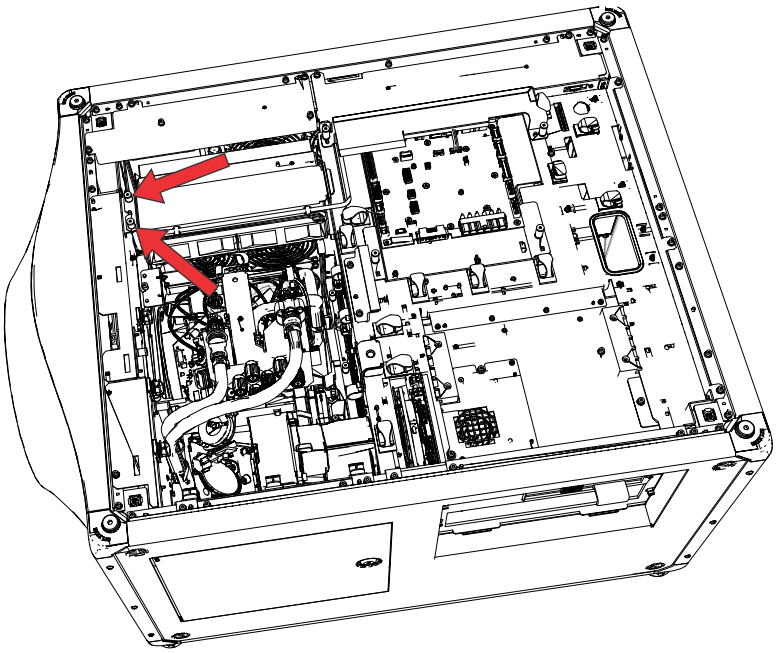
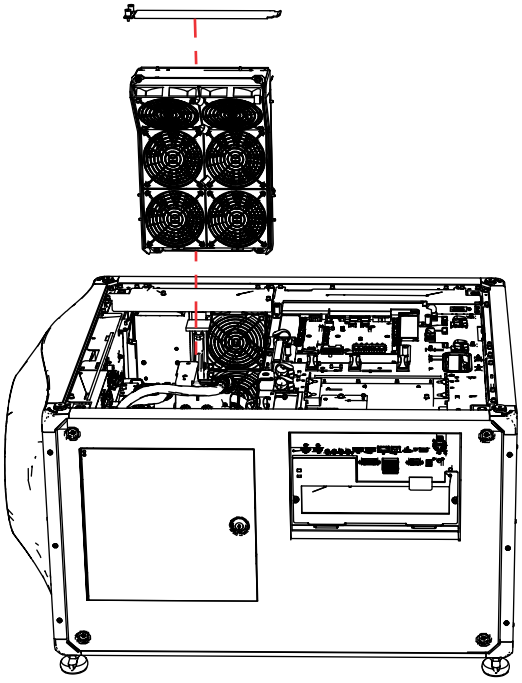


4. Disconnect the fan harness from the housekeeping board:
   - For a CP4415-RGB and CP4420-RGB, disconnect J105.
   - For CP4425-RGB and CP4435-RGB, disconnect the fan harness J102.
5. Release the fan harness from the cable clips.
6. Pull the light engine intake fan assembly up out of the projector.



7. Disconnect the affected fan inline harness connection.
   Note the harness routing prior to disconnecting and releasing the harness.

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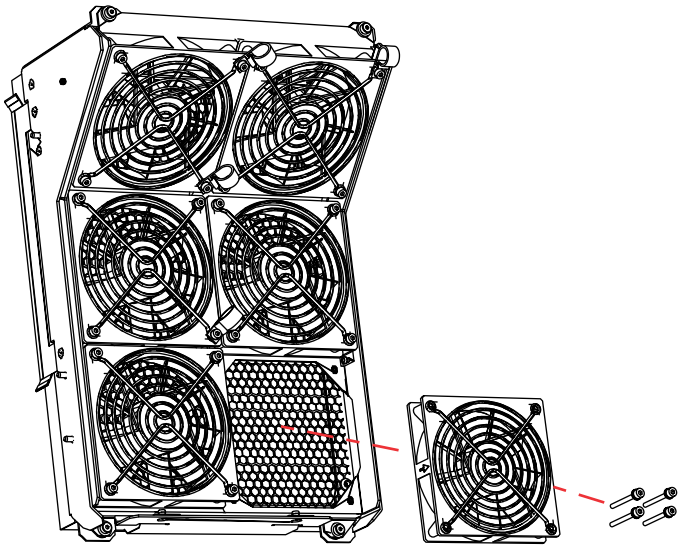
8. Remove the four screws securing the affected fan and remove it, along with any P-clips between the fan grill and fan chassis.



9. Replace the fan and install the harnesses into the P-clips.

   Ensure the airflow direction label on top of the fan pack matches the airflow indicator on the replacement fan.

10. To re-install, follow these steps in reverse order.

Card cage exhaust fan (#101)

The card cage exhaust fan (#101) draws the hot air out of the card cage.

1. *Remove the card cage* (on page 78).
2. Remove the screw securing the fan guard.

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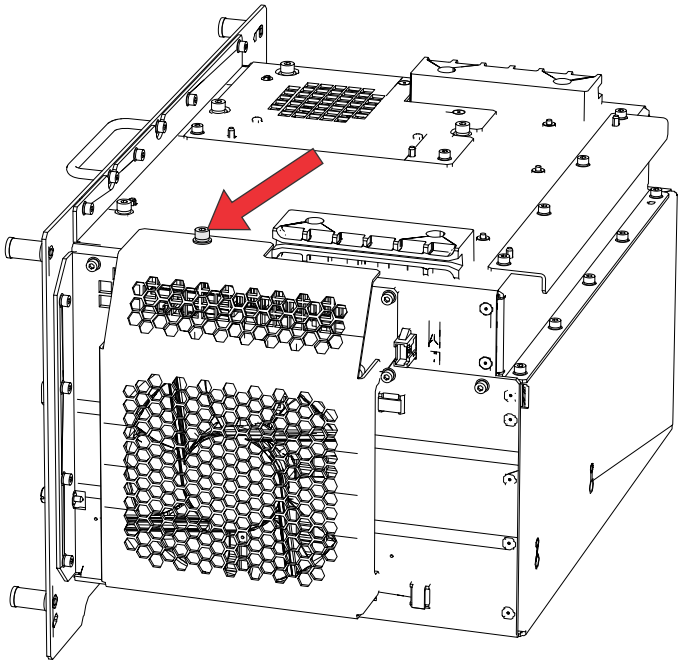

3. Disconnect the fan harness connector (#101).
4. Remove four screws securing the fan.
5. Remove and replace the fan.
6. To re-install, follow these steps in reverse order.

CAVE fan (#102)

The CAVE fan cools the CAVE module, which provides the master control, video input, and video processing.

1. *Remove the top cover* (on page 44).
2. *Remove the electronics-side cover* (on page 46).
3. Loosen the screw securing the light engine cover and remove it.

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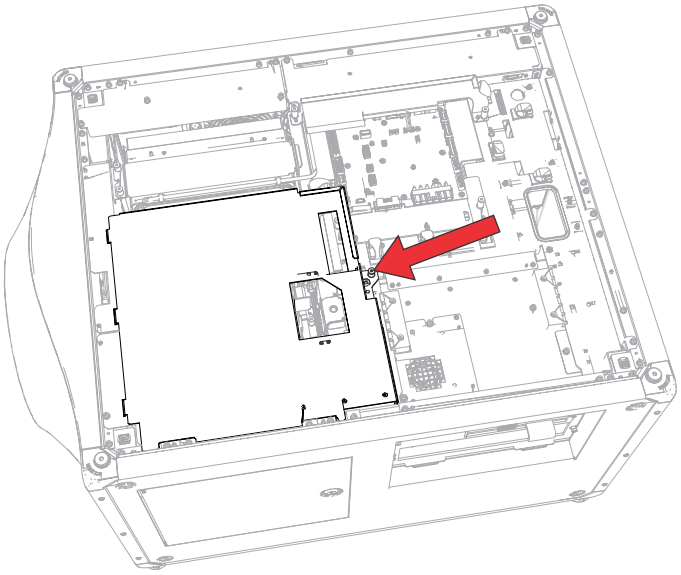
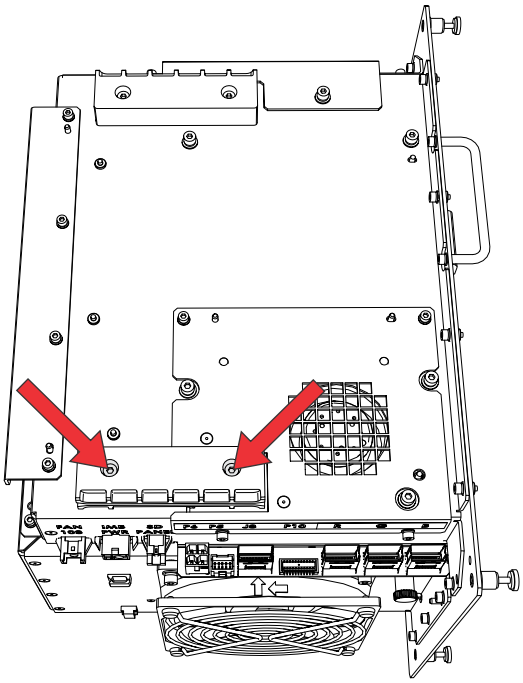


4. *Remove the card cage* (on page 78).
5. Remove two screws securing the guide rail.



6. Remove four screws (two on top, two on the side) securing the CAVE fan cover.

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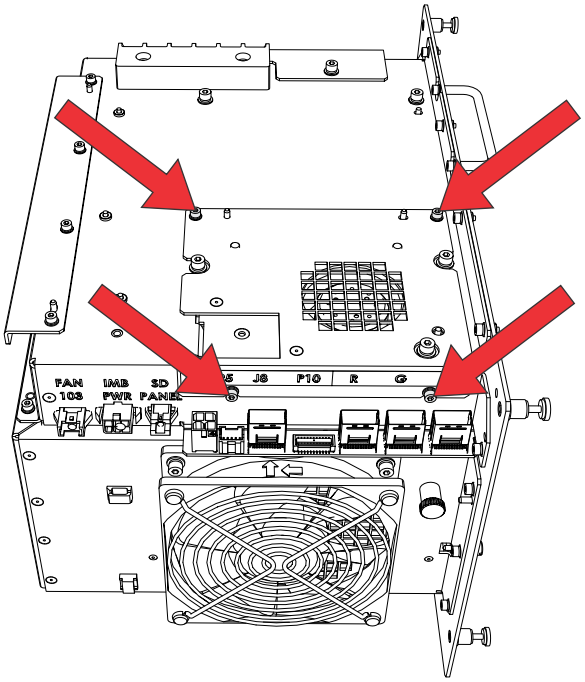
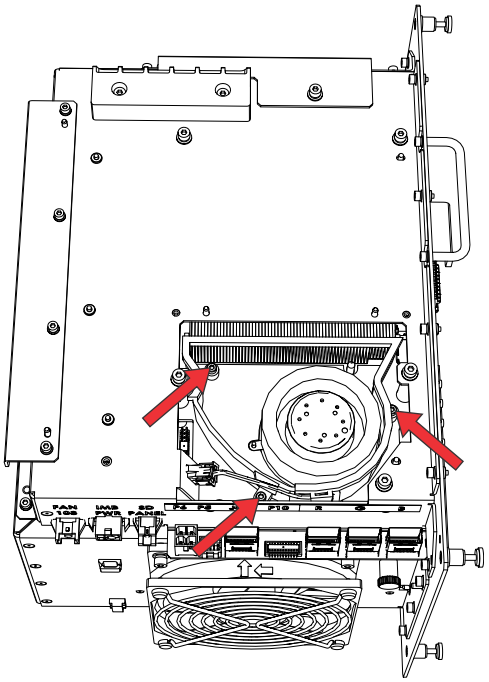


7. Disconnect the fan connector.
8. Loosen the three screws securing the fan.



9. Remove and replace the fan.
10. To re-install, follow these steps in reverse order.

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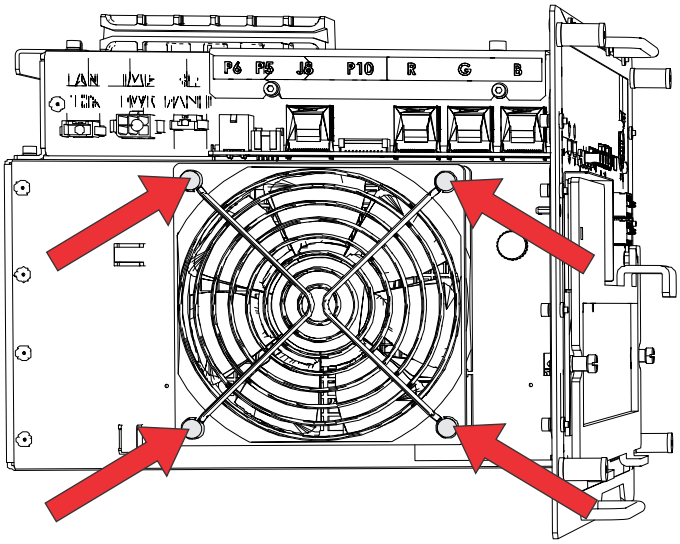
Card cage intake fan (#103)

The card cage intake fan draws in air to assist with cooling.

1. *Remove the card cage* (on page 78).
2. Disconnect the fan harness connector (#103).
3. Remove the four fan-guard rivets.
4. Remove the four screws securing the fan.



5. Remove and replace the fan.
6. To re-install, follow these steps in reverse order.

Laser driver card cage exhaust fan for CP4425-RGB and CP4435-RGB

The laser driver card cage fan draws the hot air out of the card cage.

Only applies to: CP4425-RGB and CP4435-RGB

1. *Remove the laser driver card cage* (on page 88).
2. Disconnect the laser driver card cage exhaust fan harness connector.
3. Remove the four fan guard rivets.
4. Remove the four screws securing the fan to the laser driver card cage housing.

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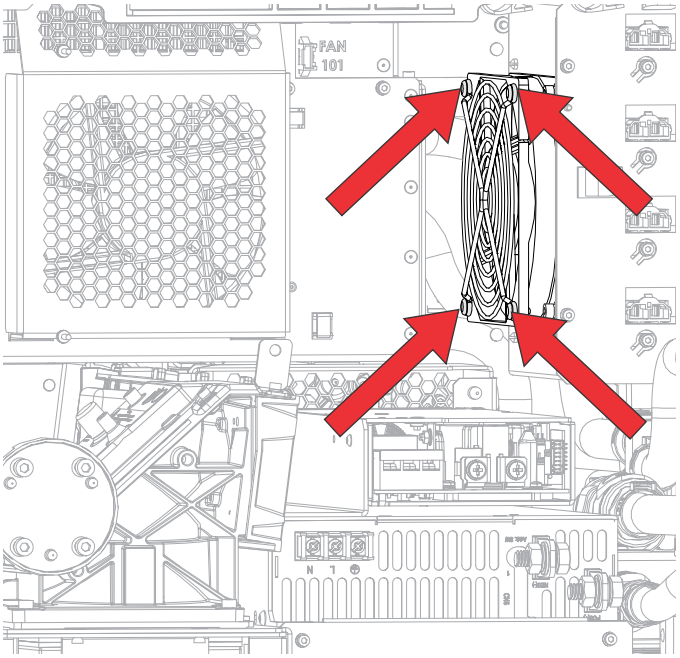
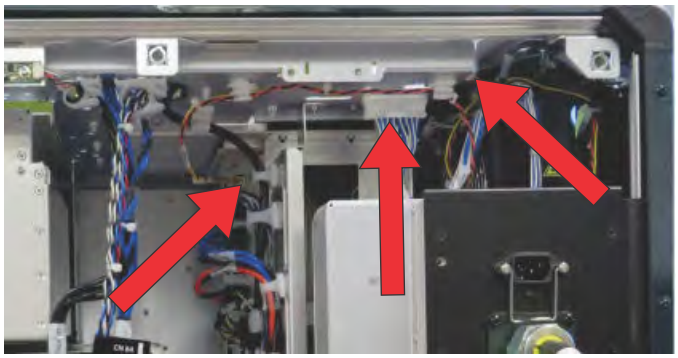


5. Remove the fan and replace it.
6. To re-install, follow these steps in reverse order.

Radiator for CP4415-RGB and CP4420-RGB

The radiator provides the system cooling to the liquid in the liquid cooling module.

1. *Remove the top cover* (on page 44).
2. *Remove the rear cover* (on page 45).
3. *Remove the side-intake cover* (on page 47).
4. *Remove the bottom cover* (on page 48).
5. Remove the light engine compartment air filter.
6. Disconnect the three radiator harnesses.



7. Disconnect the two laser optical subsystem (LOS) coolant connectors and the two light engine coolant connectors.

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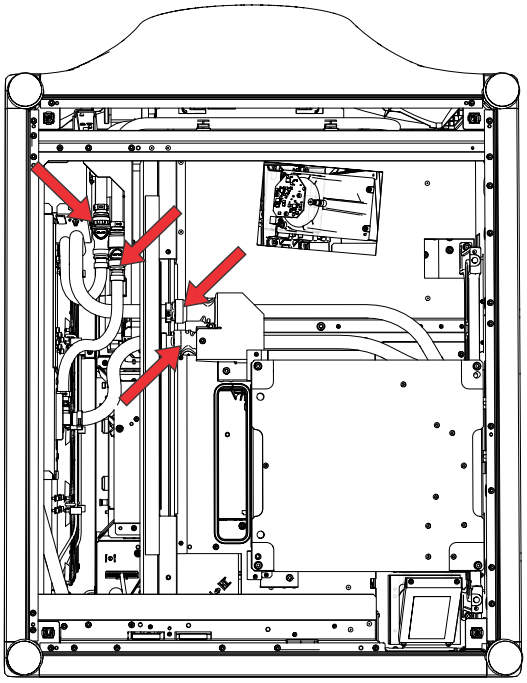
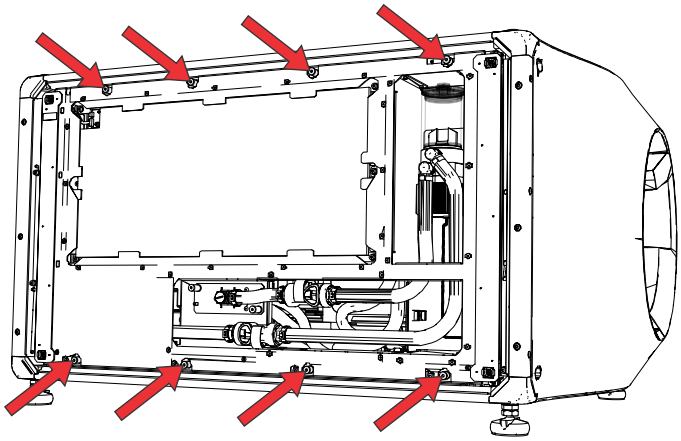


8. Loosen the eight screws securing the radiator.

Leave one of the top screws for last to prevent the radiator from falling.



9. Remove the fans from the radiator, then remove the radiator from the bracket.
10. Replace the radiator.
11. To re-install, follow these steps in reverse order.

Radiator for CP4425-RGB and CP4435-RGB

The radiator provides the system cooling to the liquid in the liquid cooling module.

1. *Remove the rear cover* (on page 45).

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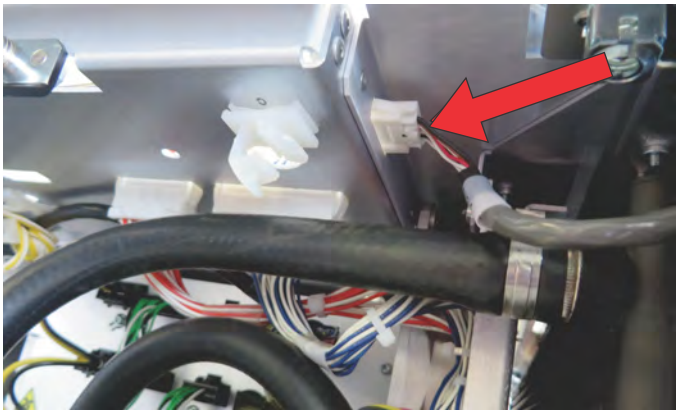
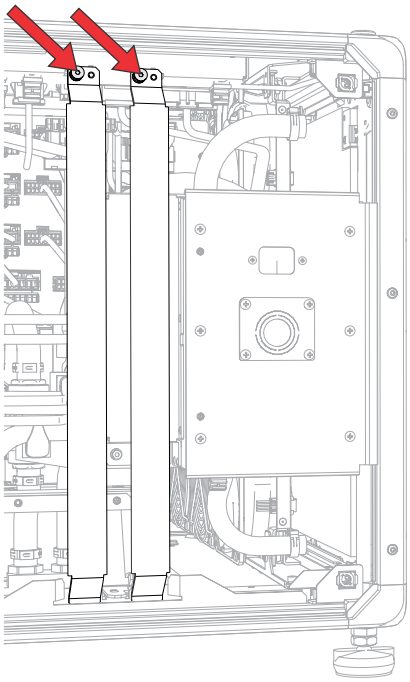
2. *Remove the side-intake cover* (on page 47).
3. Remove the air filter.
4. Disconnect the harness from the back of the unit.



To unlock the connector, push up on the tab at the bottom-center of the connector nearest the wires.

5. Place cloth wipes around the cooling hose connection points to capture any excess coolant that may drip upon disconnect.
6. Disconnect the laser optical subsystem (LOS) coolant connector and the two light engine coolant connectors.
7. Free the hoses from their clips.
8. Loosen the two screws and remove the two radiator handles from the back of the projector.



9. Slide the handles into the top of the radiator assembly and tighten the screws to attach the handles to the radiator assembly.

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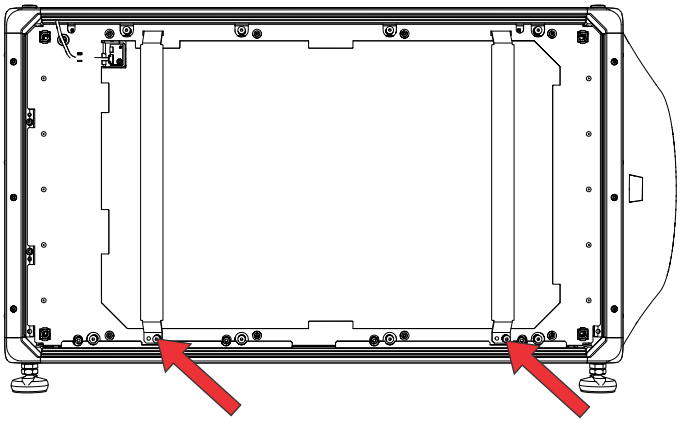
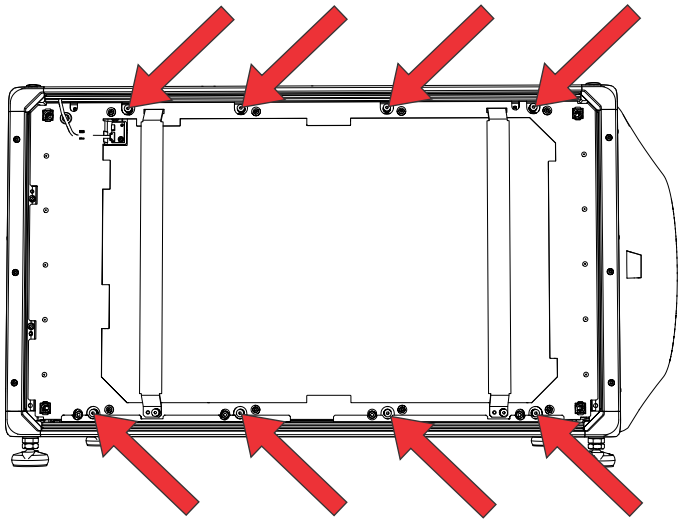


10. Remove the radiator as follows.
    a) Loosen the eight screws.
       Loosen the bottom screws first, then loosen the top screws.



    b) Swing the radiator out from the projector, being mindful of the coolant lines attached to the radiator.
    c) Lifting the radiator handles, remove the radiator.
11. Remove the eight screws securing radiator bracket housing.

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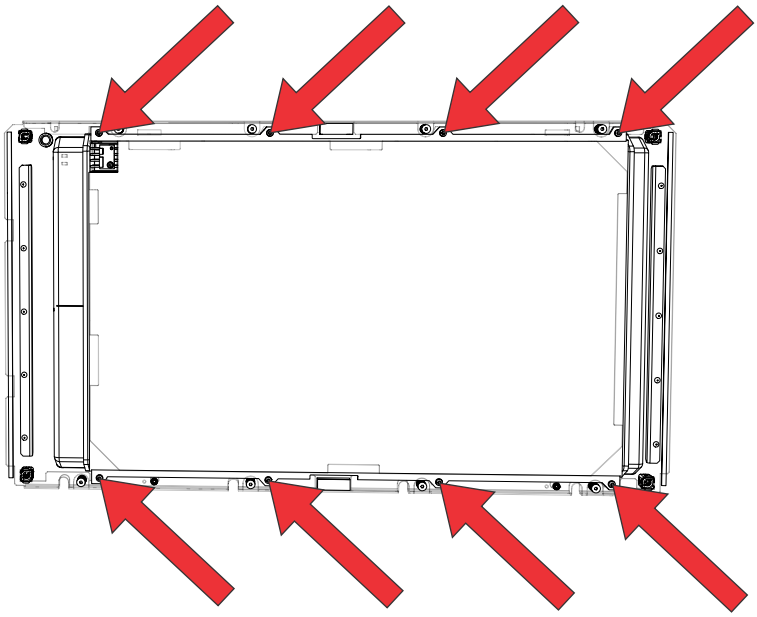

12. Transfer the radiator bracket housing to the new radiator.
13. Replace the radiator.
14. To re-install, follow these steps in reverse order.

Light engine coolant hoses for CP4415-RGB and CP4420-RGB

The light engine coolant hoses provide liquid cooling from the coolant pump module to the light engine.

1. *Remove the front cover* (on page 47).
2. *Remove the bottom cover* (on page 48).
3. Open the side door.
4. Remove the coolant hose bracket by loosening the screw.

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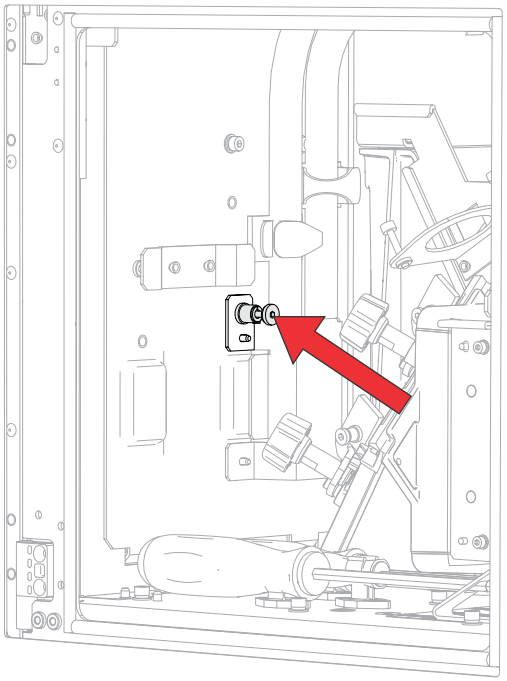
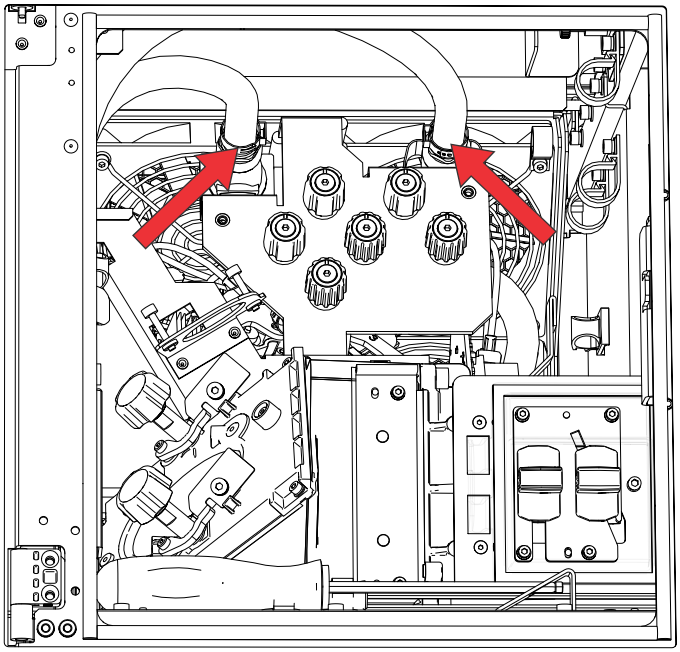


5. Disconnect the hoses from the light engine.



6. Loosen the plastic nut from the quick disconnect and release it from the bracket.

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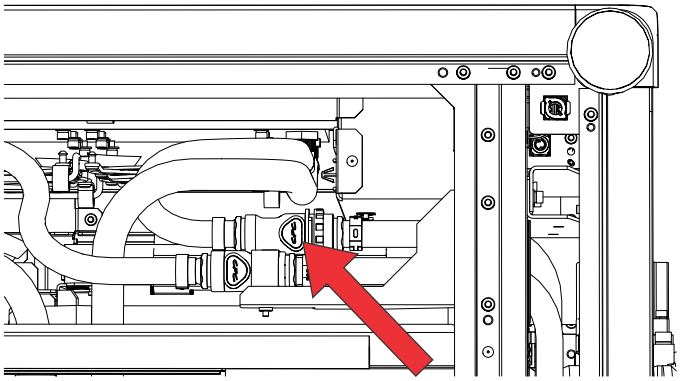
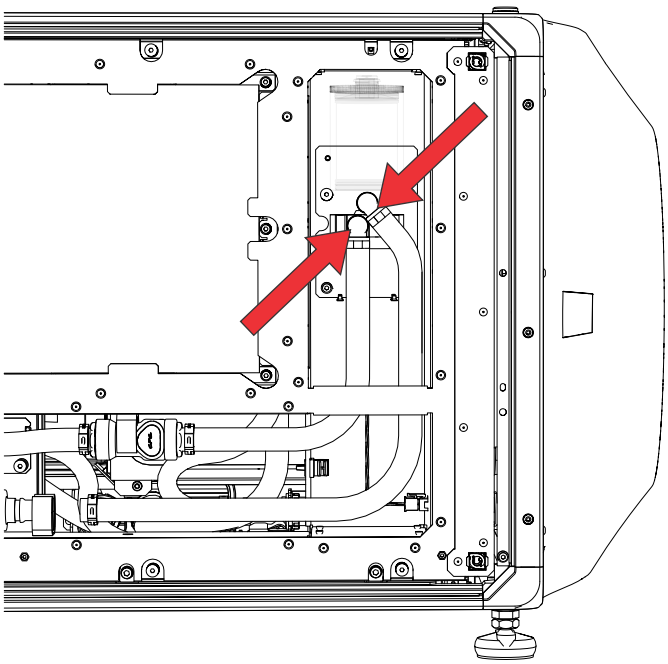


7. Disconnect the hoses from the radiator.
8. Release the hoses from all clips.
9. Remove and replace the coolant hoses.
10. To re-install, follow these steps in reverse order.

Coolant pump module for CP4415-RGB and CP4420-RGB

Learn how to remove the coolant pump module from CP4415-RGB and CP4420-RGB projectors.

1. *Remove the side-intake cover* (on page 47).
2. Release the pump module coolant connectors quick disconnects.



3. Disconnect the power-harness connector.

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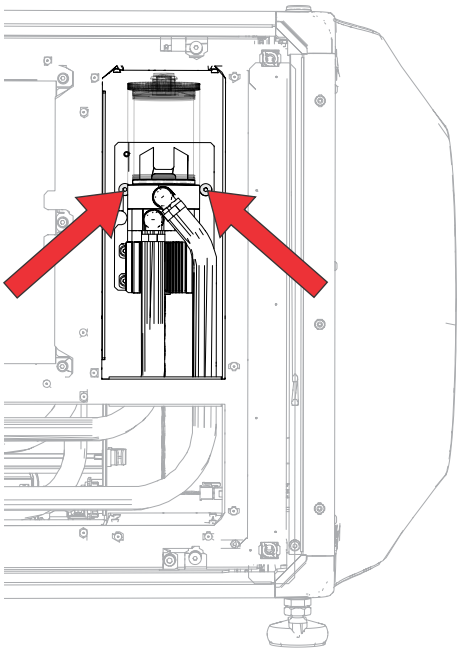
4. Loosen the two screws to release the pump.



5. Remove the coolant pump module.
6. Replace the pump module.
7. To re-install, follow these steps in reverse order.

   Christie recommends fully securing the pump module before starting to reroute and connect the hoses.

   To avoid damage when re-routing the hoses, take care not to kink the hoses.

Coolant pump module for CP4425-RGB and CP4435-RGB

Learn how to remove the coolant pump module from CP4425-RGB and CP4435-RGB projectors.

1. *Remove the front cover* (on page 47).
2. *Remove the top cover* (on page 44).
3. To remove the light engine security cover, loosen the screw.

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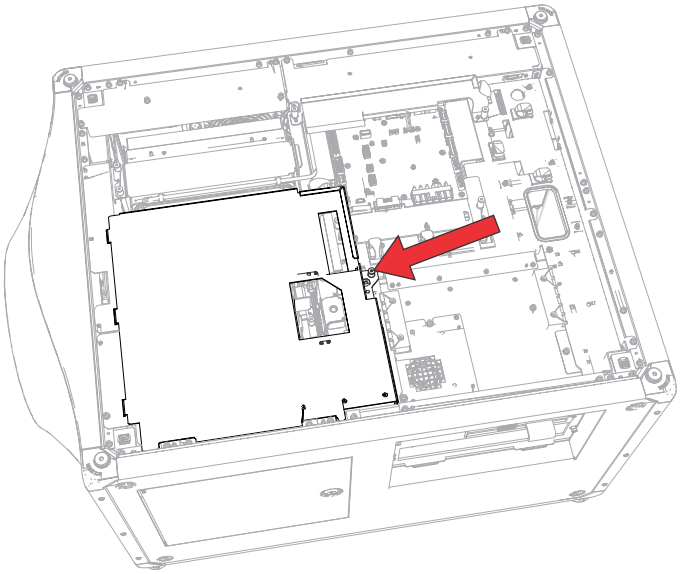
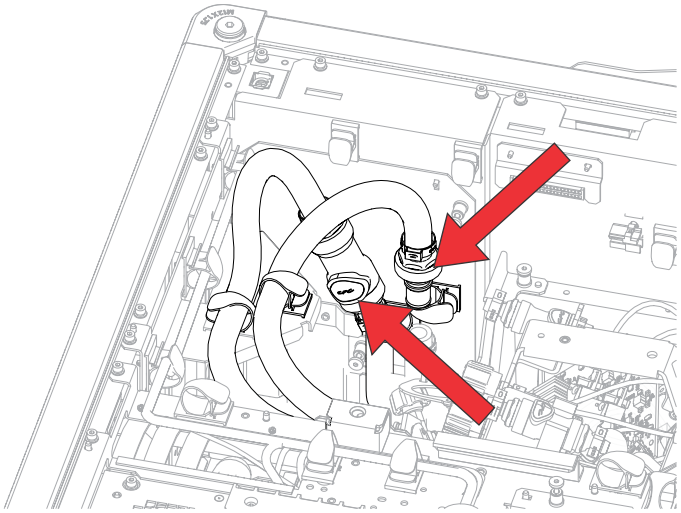


4. Remove the aluminum bracket that covers the hoses at the front behind the inside the projector and remove the hoses from their clamps.



5. Disconnect the pump module coolant connectors (LOS line and light engine line).
6. Disconnect the power-harness connector.
7. Loosen the two screws to release the pump.

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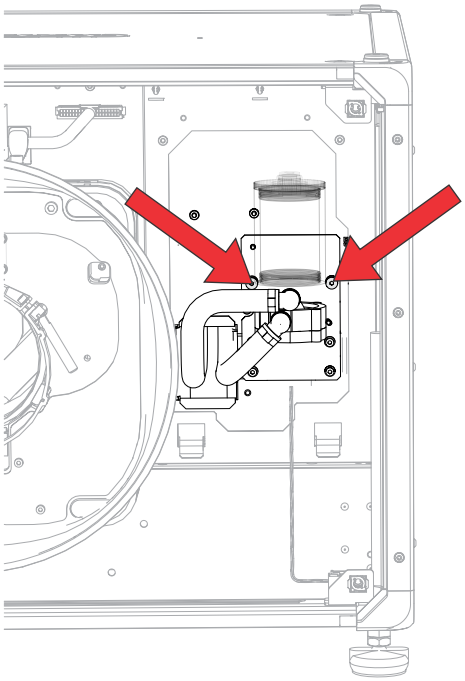

8. Remove the coolant pump module.
9. Replace the pump module.
10. To re-install, follow these steps in reverse order.

To avoid damage when re-routing the hoses, take care not to kink the hoses.

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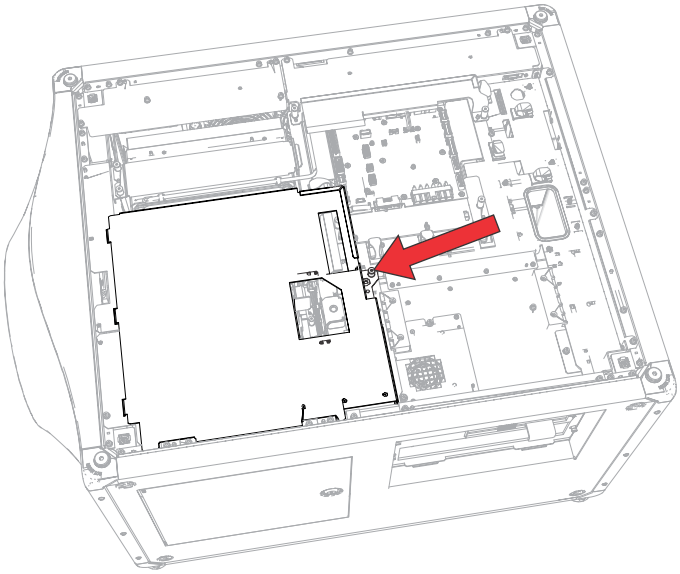
Electronics

Learn how to replace the boards, cards, and other electronic components in the projector.

Card cage

The card cage contains the CAVE and VOM-CI boards, as well as a slot for the IMB.

1. Disconnect all external card cage connections and any input sources.
2. *Remove the top cover* (on page 44).
3. *Remove the electronics-side cover* (on page 46).
4. To remove the light engine security cover, loosen the screw.



5. Disconnect the red, green, and blue mini-SAS harnesses from the card cage through the projector service access door and from the top.
6. Disconnect the three harnesses from the CAVE on top of the card cage.

   For CP4415-RGB and CP4420-RGB: P5, P6, P10; for CP4425-RGB and CP4435-RGB: P5, P6, P8. These are beside the red, green, and blue mini-SAS harness connectors.
7. Disconnect harnesses J51 (IMB Power) and J53 (SD Panel).
8. Loosen the four screws securing the card cage.
9. To release the security ring, pull on the locking pin (thumb screw) located on the left side of the card cage.

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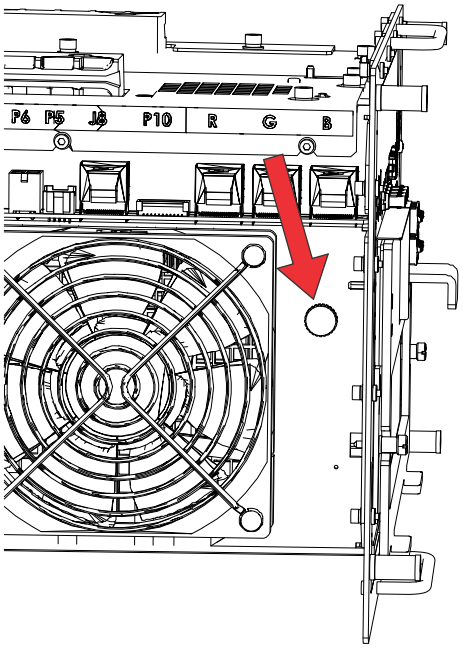
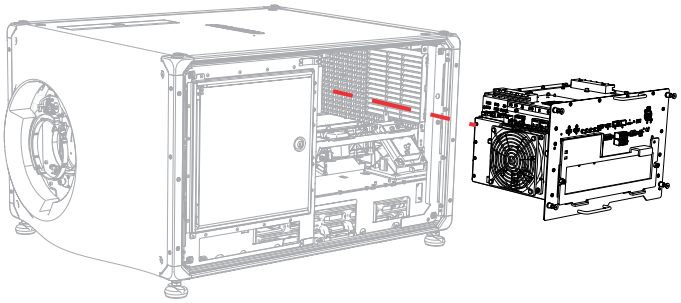


10. Slide the card cage out along the guides.



To avoid possible damage, carefully place the card cage on a clean, flat surface.

11. Remove the marriage ring from the card cage.
12. Replace the card cage, if required.
13. To re-install, follow these steps in reverse order.

AC breakers

The AC breakers (Mains and UPS) are located at the rear of the projector.

1. *Remove the rear cover* (on page 45).
2. Uninstall the ground harness ends.

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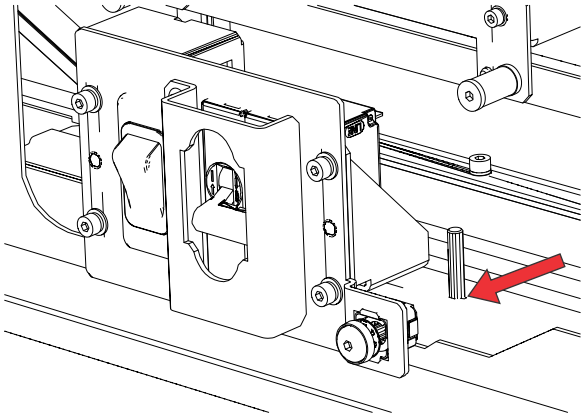
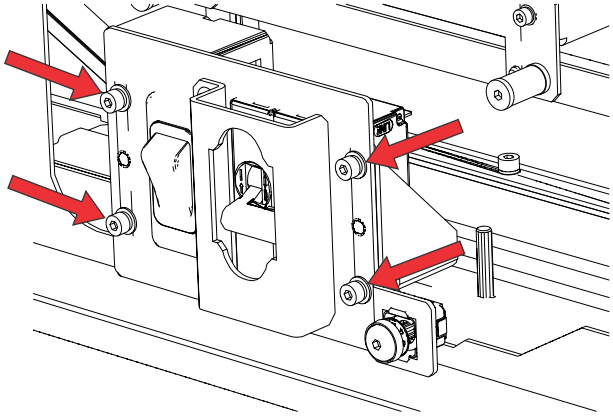


3. Remove the four screws.



4. Disconnect the three AC breakers inline harnesses (MAIN/UPS connected to the 12V power supply, 54V power supply harness, and AC inlet).
5. Replace the AC breakers.
6. To re-install, follow these steps in reverse order.

Hi-Pot testing must be performed after removing and replacing the AC breakers.

AC line filter (20 amp)

Learn how to remove the 20 amp AC line filter.

1. *Remove the rear cover* (on page 45).
2. *Remove the side-intake cover* (on page 47).
3. Remove the three screws securing the AC panel.
4. Remove the six screws securing the AC line filter cover.

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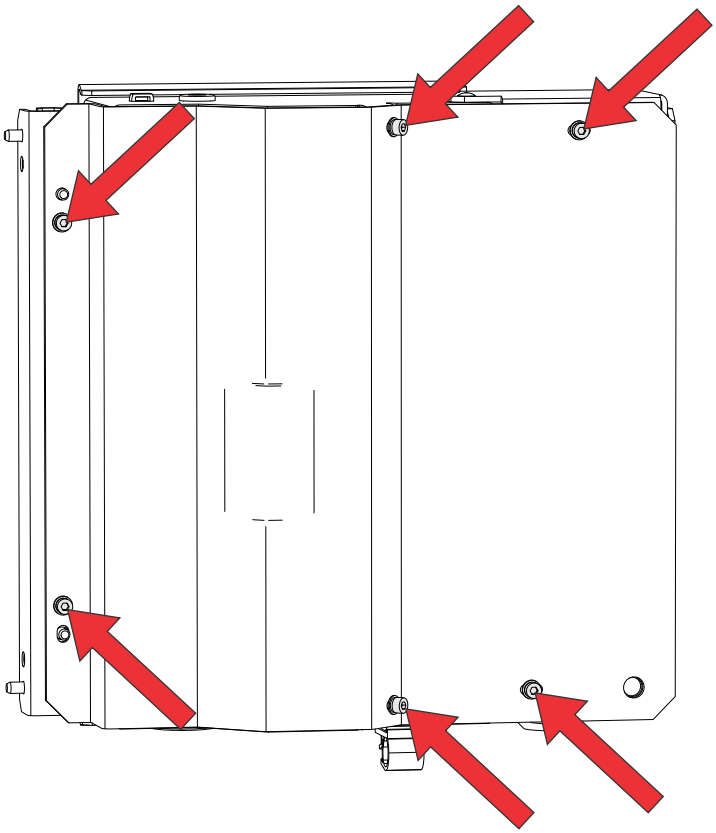
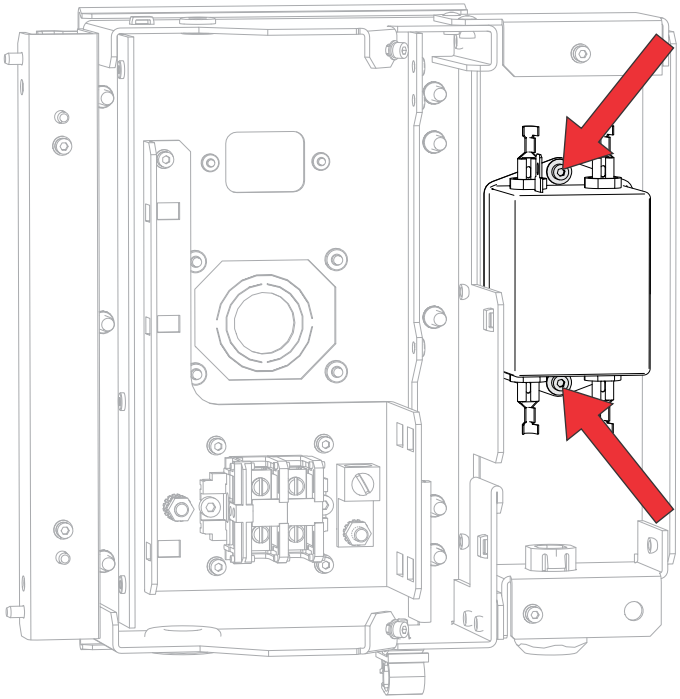


5. Remove two screws from the line filter.



6. Disconnect the four connectors.

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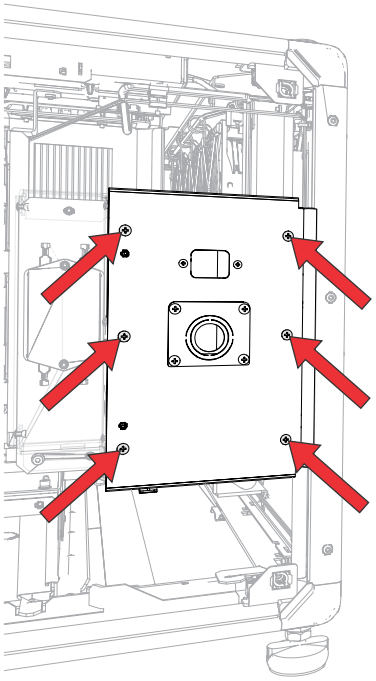
7. Replace the AC line filter.
8. To re-install, follow these steps in reverse order.

AC line filter (10 amp)

Learn how to replace the 10 amp AC line filter.

1. *Remove the rear cover* (on page 45).
2. Remove six screws securing the AC line filter cover.



3. Remove two screws from the line filter.
4. Disconnect the three connectors.
5. Replace the AC line filter.
6. To re-install, follow these steps in reverse order.

Power supplies for CP4415-RGB and CP4420-RGB

The CineLife+ 4K-RGB power supply assembly includes individual 12V and 54 power supply modules secured within a support bracket.

Only applies to: CP4415-RGB and CP4420-RGB

The 12V power supply module provides the required voltages for operating the electronics in the projector and for receiving a UPS connection (if installed).

The 54V power supply module provides the required voltages for the lasers and pumps.

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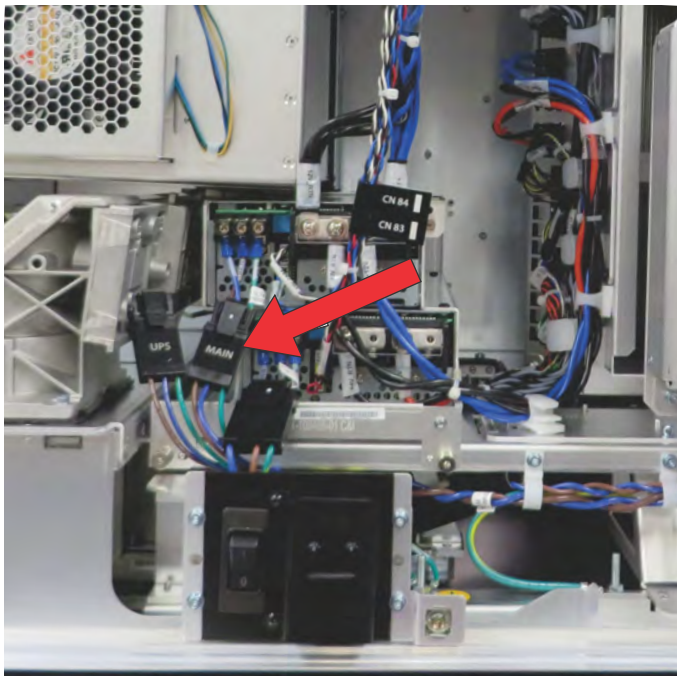
Before servicing, always carefully observe the original lead dress. Take extra precautions to secure all harnessing properly, especially in the high voltage circuitry areas. Replace any wire that appears to have damaged insulation.

1. Shut down the projector and ensure it is disconnected from AC.
2. *Remove the rear cover* (on page 45).
3. Disconnect the three-pin MAIN or UPS inline connector (whichever is already connected) from the 12V power supply module.
4. Disconnect the 4-pin unmarked inline connector from the 54V power supply module.



5. On both power supply modules, disconnect the DC output cables from the positive and negative terminals. Retain all screws, washers, and lock washers.

   There are four cables for the 12V power supply and two cables for the 54V power supply.
6. Loosen the three fasteners securing the power supply module to the projector system.

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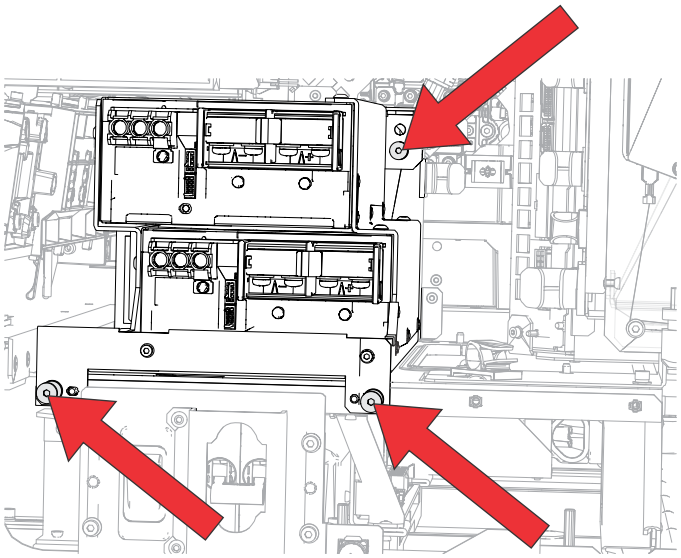
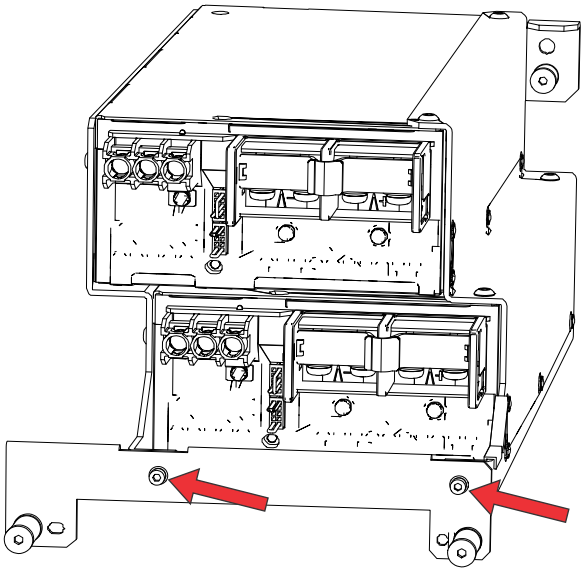


7. Slide the power supply assembly over the rails and out of the projector, and set it on a clean, level surface.
8. Remove the two screws securing the handle bracket to the power supply assembly.



9. Remove the eight screws securing the support bracket around the power supply assembly.
10. Remove the affected power supply module.
11. Replace it with the new power supply module.
12. To re-install, follow these steps in reverse order.

When reconnecting the DC outputs, ensure all positive and negative terminal connections are torqued to 30 in-lb.

When correctly oriented in the projector, the 12V power supply is located at the top of the assembly, with the handle and support brackets fitting over the three locating pins.

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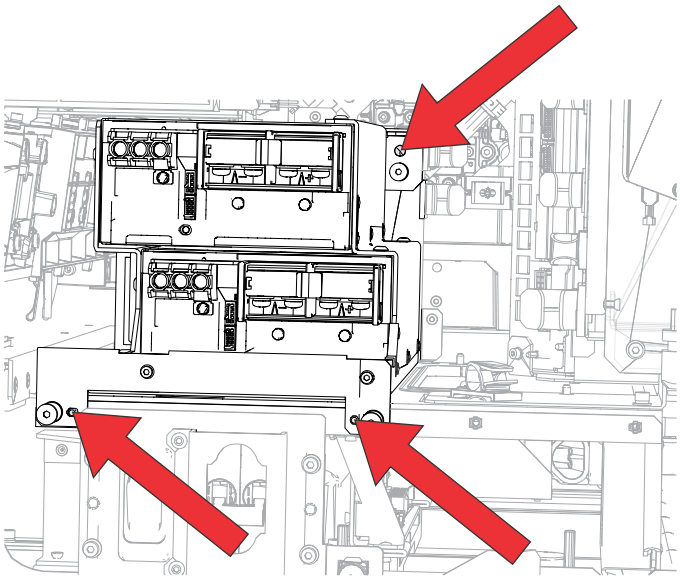

Power supplies for CP4425-RGB and CP4435-RGB

The CineLife+ 4K-RGB power supply assembly includes individual 12V and 48V power supply modules secured within a support bracket.

Only applies to: CP4425-RGB and CP4435-RGB

The 12V power supply module provides the required voltages for operating the electronics in the projector and for receiving a UPS connection (if installed).

The 48V power supply module provides the required voltages for the lasers and pumps.

Before servicing, always carefully observe the original lead dress. Take extra precautions to secure all harnessing properly, especially in the high voltage circuitry areas. Replace any wire that appears to have damaged insulation.

1. Shut down the projector and ensure it is disconnected from AC.
2. *Remove the rear cover* (on page 45).
3. Disconnect the three-pin MAIN or UPS inline connector (whichever is already connected) from the 12V power supply module.
4. Disconnect the 4-pin unmarked inline connector from the 48V power supply module.
5. For CP4425-RGB and CP4435-RGB, disconnect the following:
   - 12V LVPS (Comm) harness from the 12V power supply
   - Two DC output cables from the 12V power supply
   - CN2 (Comm) harness connector from the 48V power supply
   - Two DC output cables from the 48V power supply
6. Loosen the three screws securing the power supply module to the projector system.

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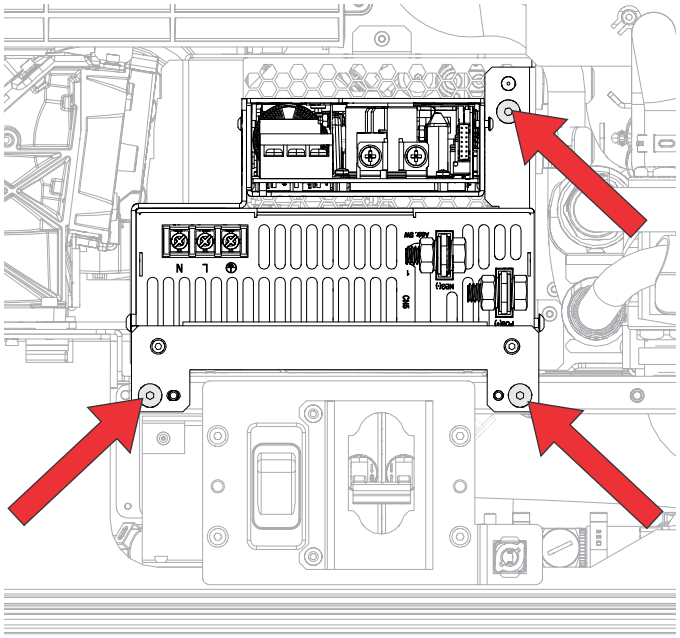
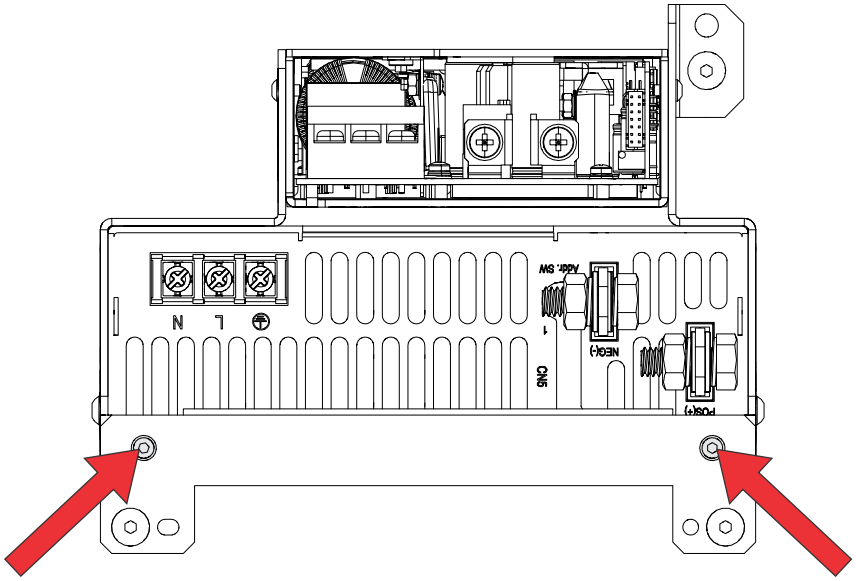


7. Slide the power supply assembly over the rails and out of the projector, and set it on a clean, level surface.
8. Remove the two screws securing the handle bracket to the power supply assembly.



9. Remove the eight screws securing the support bracket around the power supply assembly.
10. Remove the affected power supply module.
11. Replace it with the new power supply module.
12. To re-install, follow these steps in reverse order.

When reconnecting the DC outputs, make sure all positive and negative terminal connections are torqued to 30 in-lb.

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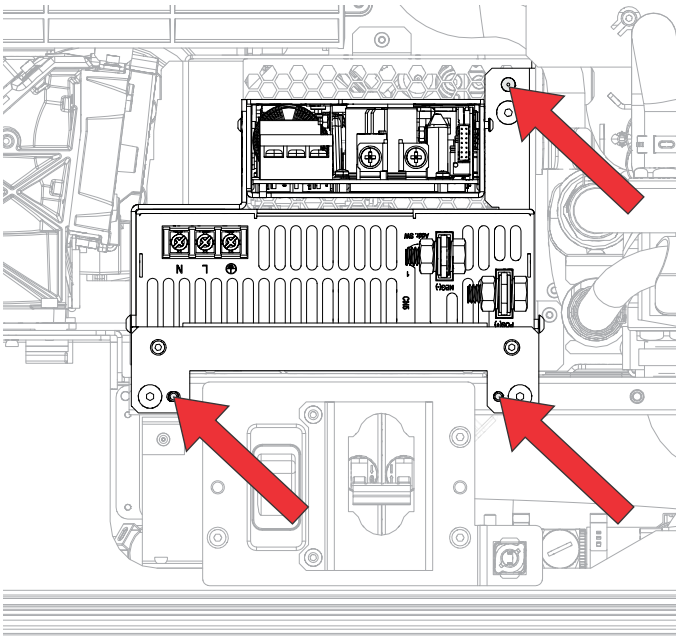
When correctly oriented in the projector, the 12V power supply is located at the top of the assembly with the 48V beneath it, with the handle and support brackets fitting over the three locating pins.

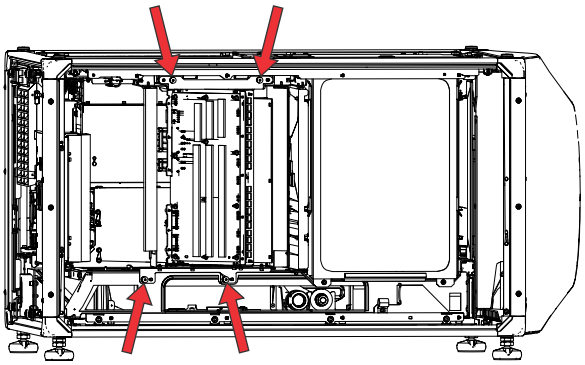


Laser driver card cage for CP4415-RGB and CP4420-RGB

The laser drive card cage powers the lasers and contains the CS18G6 board.

Only applies to: CP4415-RGB and CP4420-RGB

1. *Remove the radiator intake fans for CP4415-RGB and CP4420-RGB* (on page 58).
2. Disconnect the harness connectors J172, J113, J111, J164, J128, J171, and J170.
3. Loosen the four screws securing the laser driver DCC module to the projector frame.



4. Using the metal flanges provided, pull the laser driver card cage out of the projector.

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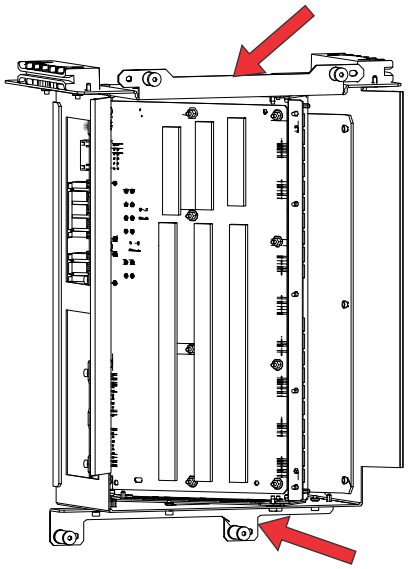

5. Replace the laser driver card cage.
6. To re-install, follow these steps in reverse order.

Laser driver card cage for CP4425-RGB and CP4435-RGB

The laser driver card cage powers the lasers. It contains three CS12G0 boards for CP4425-RGB, four CS12G0 boards for CP4435-RGB.

Only applies to: CP4425-RGB and CP4435-RGB

1. *Remove the radiator intake fans for CP4425-RGB and CP4435-RGB* (on page 59).
2. Make note of the harness locations and then disconnect the harness connectors.

   The laser driver faceplate is marked with GaN_1 to GaN_4 and each connector per board is also labeled. The harnesses are labeled with a laser driver board number and connector number that they plug into. GaN_1 P142, GaN_1 P144, and GaN_2 P144 are unused. For CP4425-RGB GaN_3 P144 is not used, For CP4435-RGB GaN_3 P144 and GaN_4 P144 are not used.
3. Loosen the four screws securing the laser driver card cage to the projector frame.

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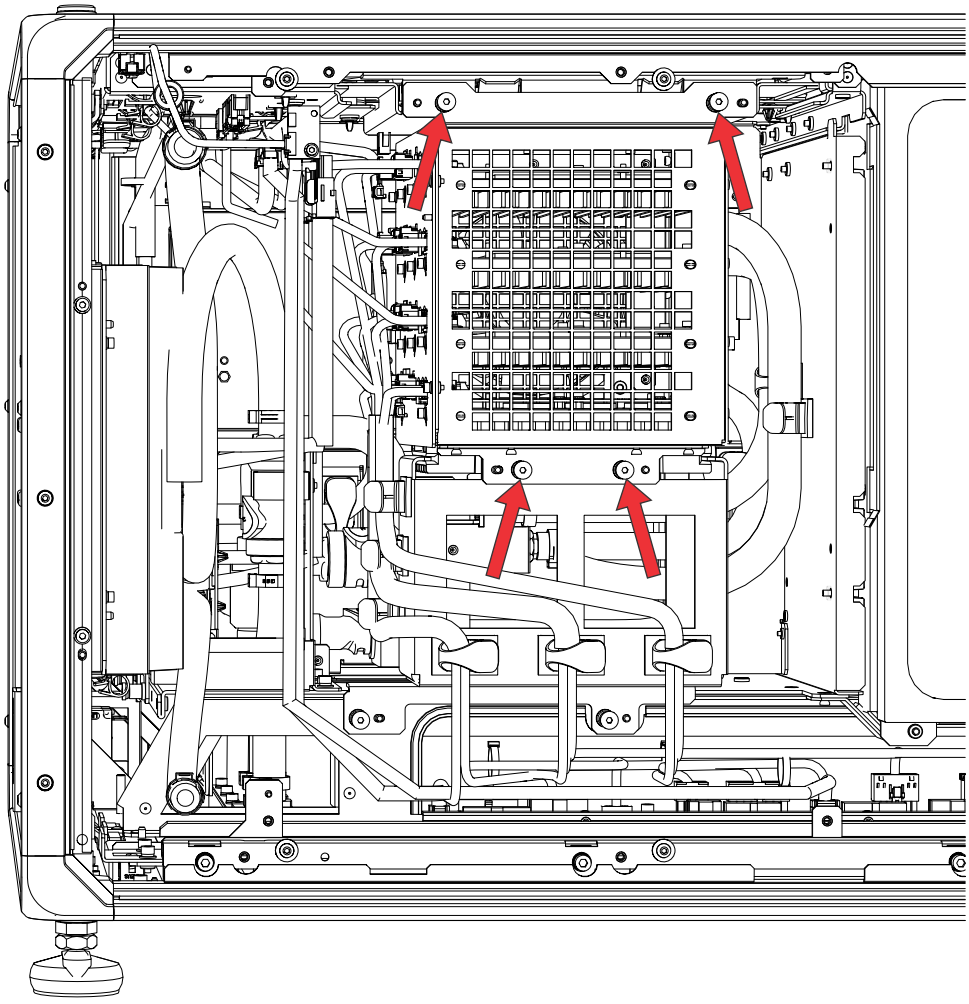

4. Using the metal flanges provided, pull the laser driver card cage out of the projector.
5. Replace the laser driver card cage.
6. To re-install, follow these steps in reverse order.

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Optics

Learn how to replace the light source, mirrors, and other optical components.

Warning! If not avoided, the following could result in death or serious injury.

- The projector must be powered off and all components must be re-installed before powering on the projector for doing any optical alignment.

Caution! If not avoided, the following could result in minor or moderate injury.

- SHOCK HAZARD! Disconnect the product from AC before installing, moving, servicing, cleaning, removing components, or opening any enclosure.
- HOT SURFACE HAZARD! If light output is unexpectedly low, shut down and allow adequate time for potentially hot components to cool before performing any service operations.

- Always wear powder-free latex gloves when handling optical components.
- Wear an electrostatic discharge (ESD) strap and use insulated tools when replacing the light engine.

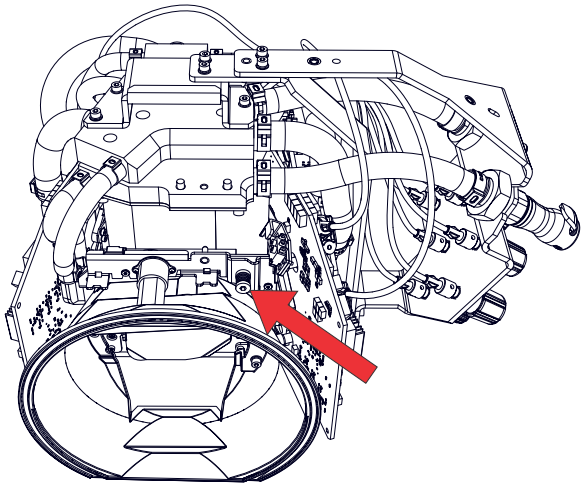
Shutter

The shutter blocks the light coming into the projector lens.

1. *Remove the top cover* (on page 44).
2. Disconnect the two inline harnesses cables on the shutter.
3. Loosen the screw securing the shutter.

   Christie recommends using a short, right-angle 3 mm Allen key.

   If a right-angle Allen key is unavailable, the engine can be removed for front access using the provided straight 3 mm ball driver.



4. Pull out the shutter.

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5. Replace the shutter.
6. To re-install, follow these steps in reverse order.

Light engine

The light engine modulates incoming light from the light source to create an image, which is projected to the screen.

Always wear an electrostatic discharge (ESD) strap and use insulated tools when replacing the light engine.

1. *Remove the lens* (on page 51).
2. *Remove the top cover* (on page 44).
3. *Remove the light engine fan pack* (on page 61).
4. Disconnect the three mini-SAS cables from the card cage.
5. Disconnect the two coolant hoses to the light engine.
6. Disconnect the motor and switch position harnesses coming from the housekeeping board.
7. Loosen the three screws securing the light engine to the projector base.

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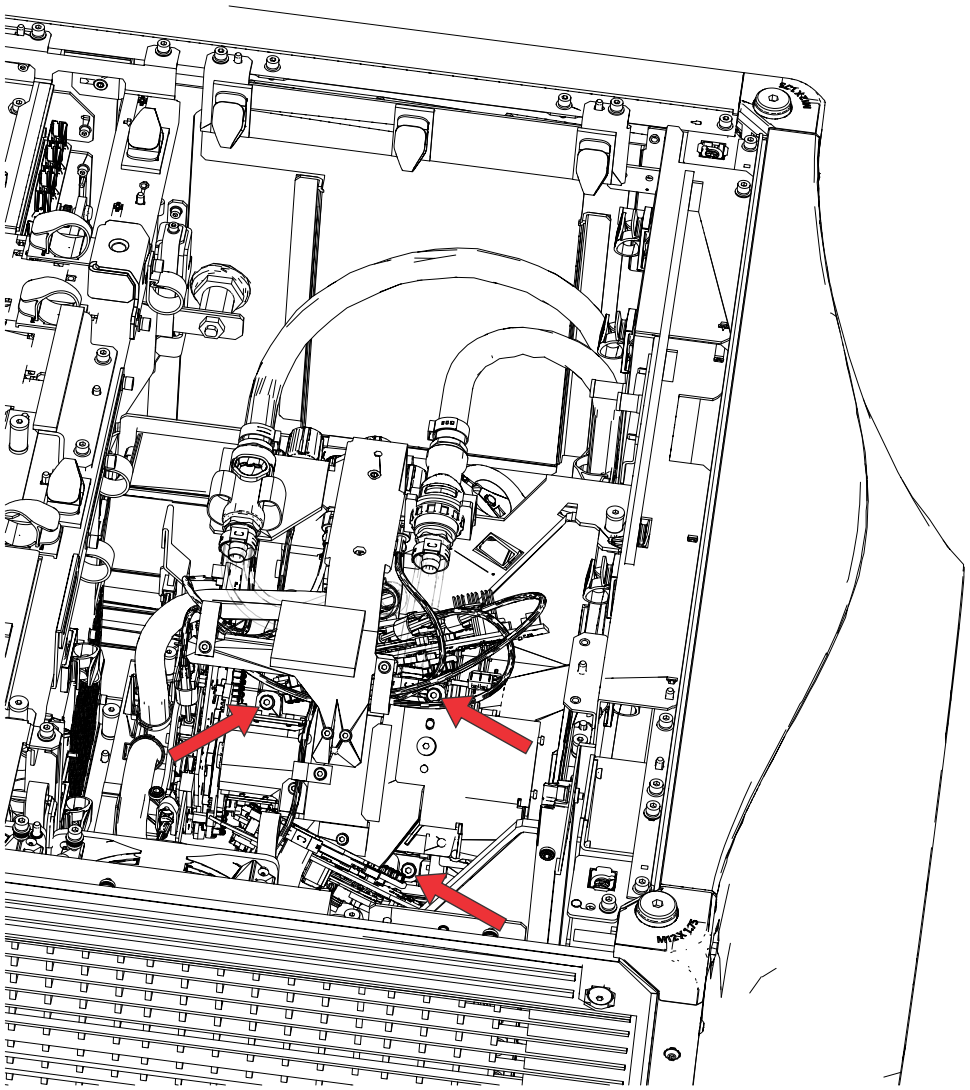

8. Remove the light engine from the projector.
9. Place the light engine on the light engine plate.
   If you do not have the light engine plate, place the light engine on the front light engine cover.
10. Replace the light engine.
11. To re-install, follow these steps in reverse order.
    When packaging the light engine, follow the instructions in the replacement light engine box.

Integrator assembly

The integrator assembly captures light from the RGB laser source and combines it into a uniform rectangular light source for the light engine.

1. *Remove the rear cover* (on page 45).
2. *Remove the card cage* (on page 78).

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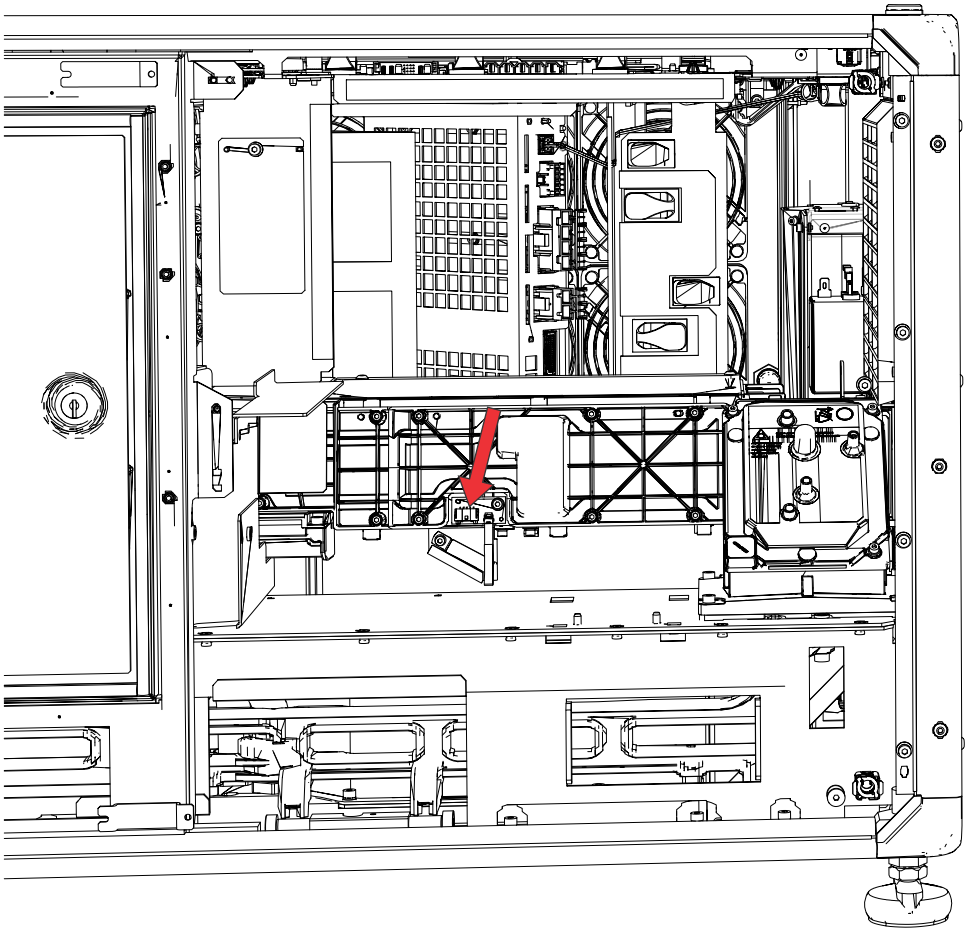
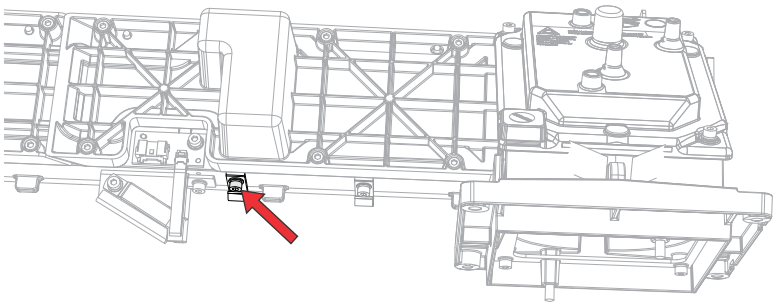
3. Disconnect the diffuser harness (J135) from the diffuser interface board (DIB).



4. Remove the diffuser harness from the clip.



5. Remove the two screws securing the DCI bracket to the projector.

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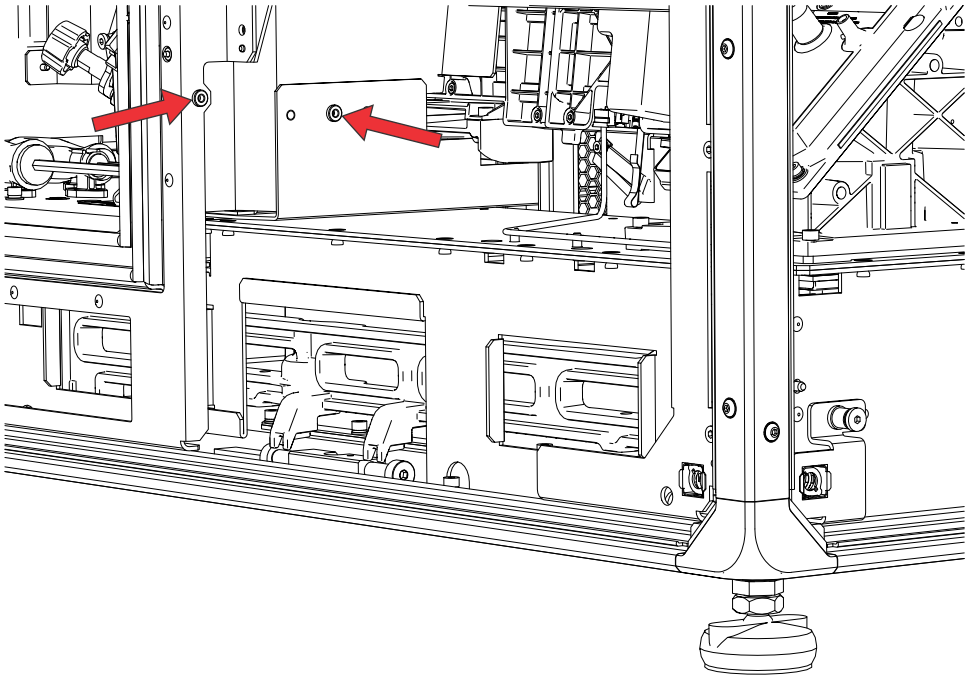
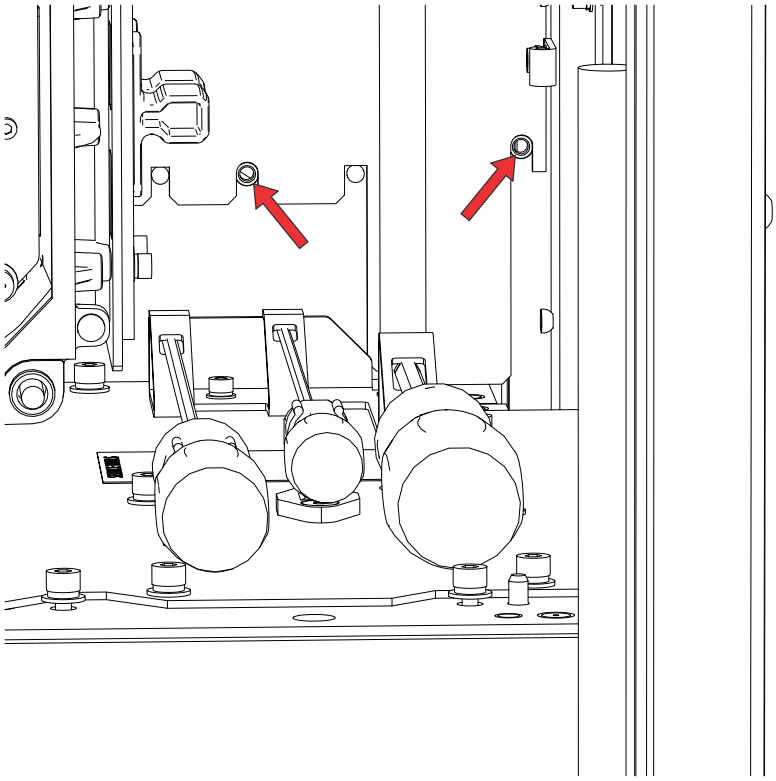


Access the screws through the service door.



6. Remove the six screws securing the integrator assembly.
   Two of the screws are on the side of the integrator assembly closest to the service door.

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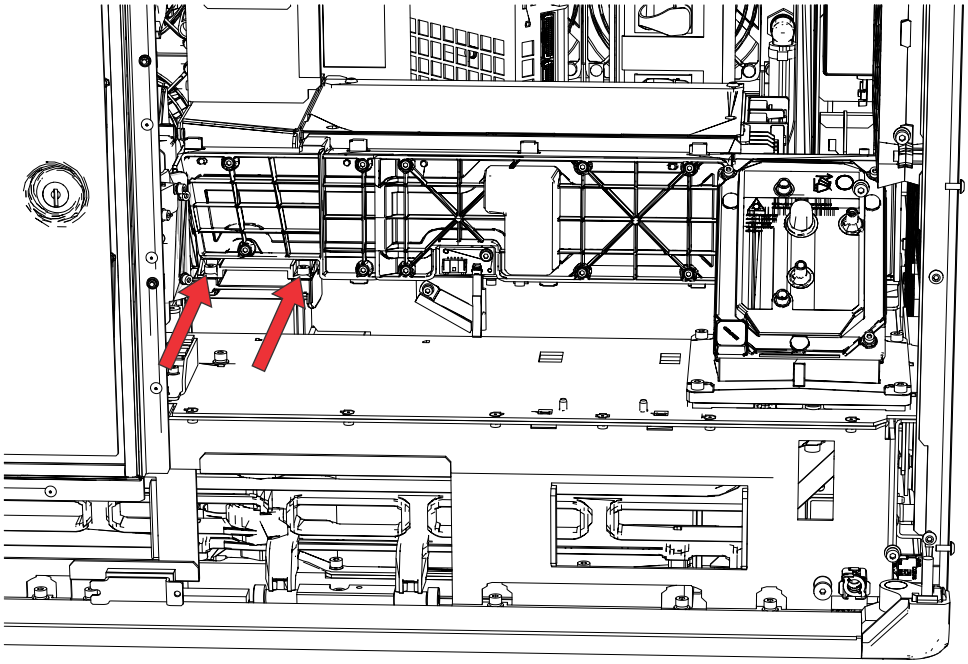
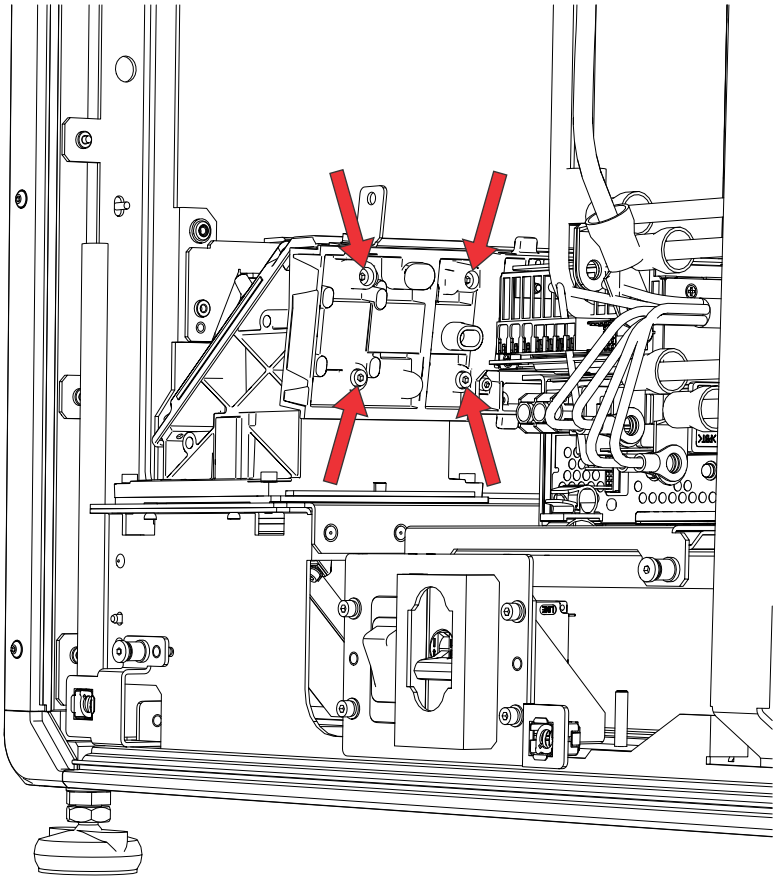


The remaining screws are behind the coupling elbow assembly. Use the ball-end hex key supplied with the projector to access these screws.



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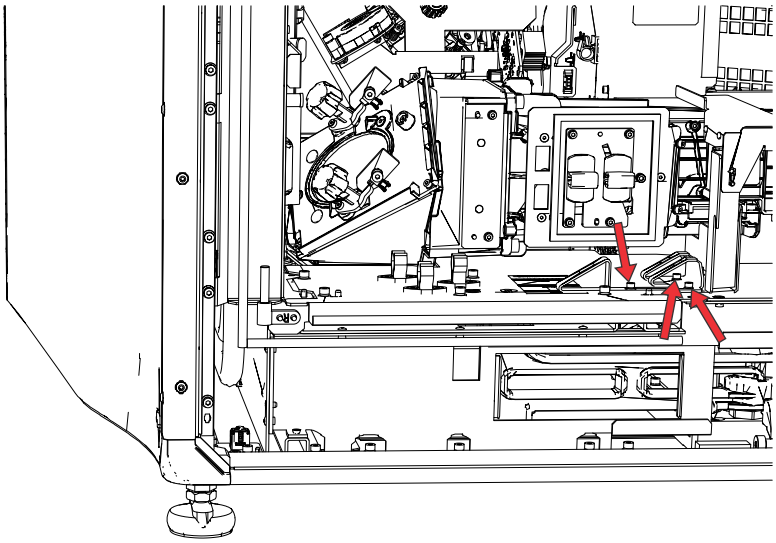
7. Pull out the integrator assembly through the back of the projector and place it on a clean, flat surface.

   To keep out dust and other contaminant, Christie recommends covering the LOS opening with a lint-free cloth.
8. To re-install, follow these steps in reverse order.
9. After replacing the integrator assembly, perform the tasks described in *Adjusting the LOS coupling mirrors* (on page 19) and *LiteLOC sensor-to-screen calibration* (on page 27).

Zoom and focus assembly

The zoom and focus assembly is located at the front of the integrator assembly.

1. *Remove the integrator assembly* (on page 92).
2. Remove the three screwdriver tools.
3. Remove the three screws securing the tool holder bracket.



4. Remove the tool holder bracket.
5. Remove the screws securing the plastic cover.

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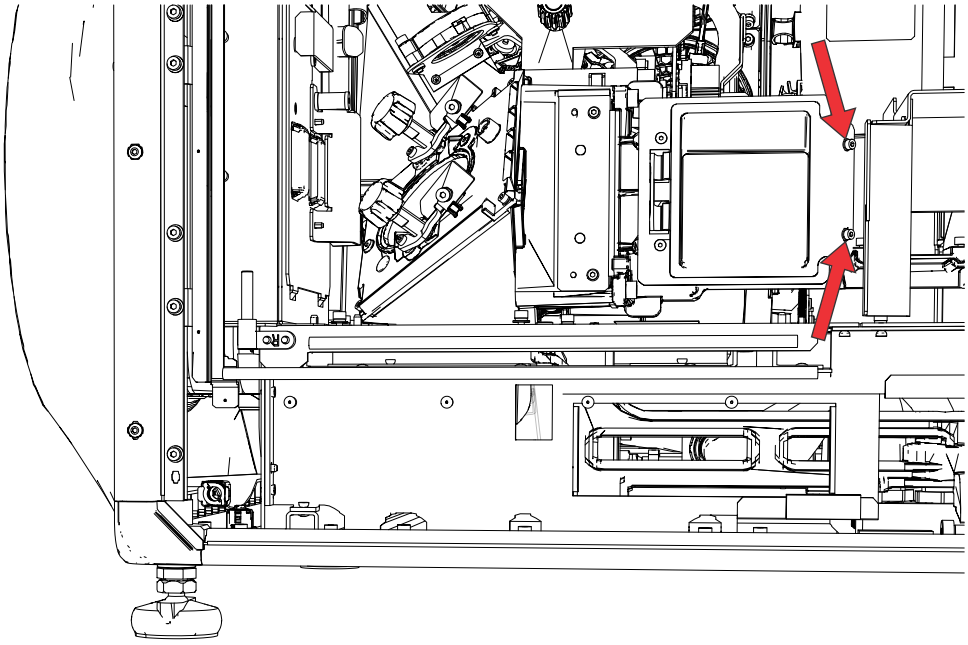
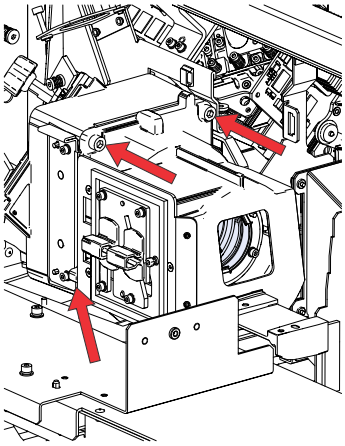


6. Remove the plastic cover.
7. Remove the three screws securing the zoom and focus assembly.



8. Remove and replace the zoom and focus assembly.
9. To re-install, follow these steps in reverse order.
10. After replacing the integrator assembly, perform the following tasks as described in the *CineLife+ User Guide (P/N: 020-103073-XX)*.
    - *Perform an LOS coupling mirror alignment* (on page 19).
    - *Perform a LiteLOC™ calibration* (on page 27).

Fold mirror adjustment assembly

The fold mirror directs light towards the light engine.

1. *Remove the top cover* (on page 44).

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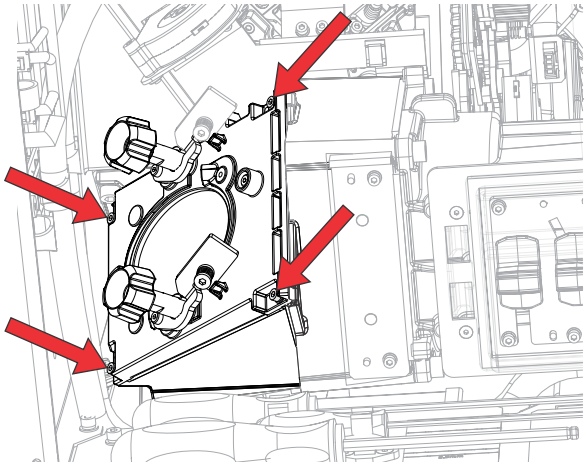
2. *Remove the electronics-side cover* (on page 46).
3. *Remove the front cover* (on page 47).
4. Unlock the service door and open the door.
5. Release the light engine coolant lines from the clips.
6. Loosen the screw on the light engine coolant hose guard.
7. Disconnect the light engine coolant hoses.
8. Loosen two screws on the coolant hose front plate.
9. Remove the four screws securing the fold mirror housing.



10. Remove the fold mirror adjustment assembly and replace.
11. To re-install, follow these steps in reverse order.
12. After the re-installation, follow the instructions in *Adjusting the integrator rod and fold mirror* (on page 20).

Rotating diffuser assembly

Learn how to remove the rotating diffuser.

1. *Remove the electronics side cover* (on page 46).
2. *Remove the card cage* (on page 78).
3. Loosen the six screws securing the rotating diffuser cover.

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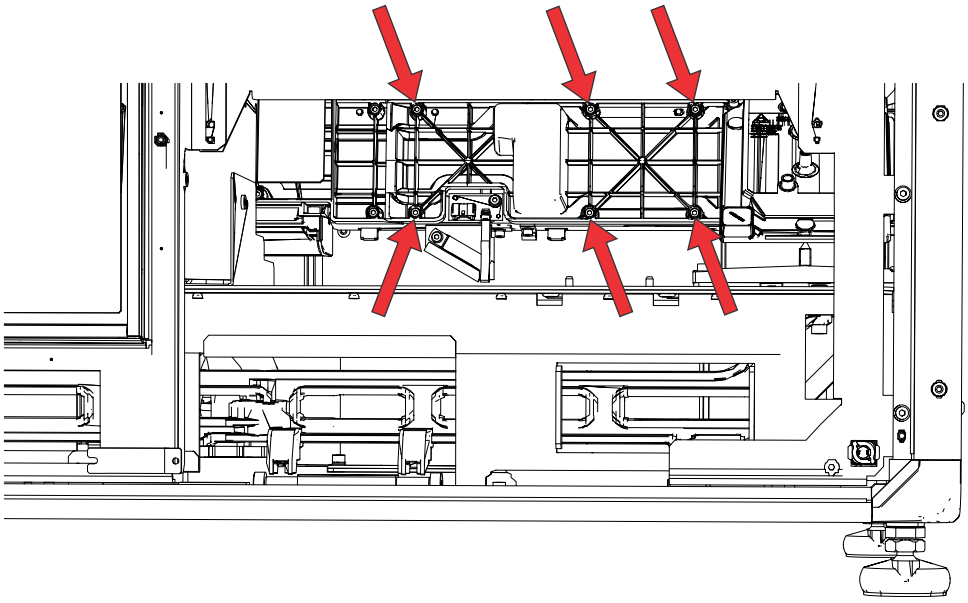
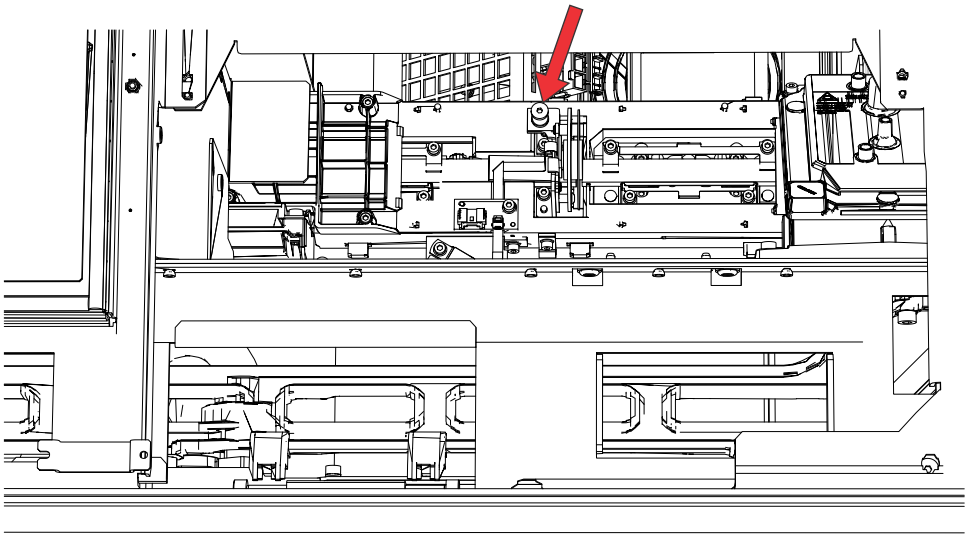


4. *Remove the diffuser control board (DIB board)* (on page 118).
5. Loosen the screw to release the rotating diffuser and remove.



6. Replace the rotating diffuser.
7. To re-install, follow these steps in reverse order.

Rear illumination optic system (IOS)

Learn how to replace the rear illumination optic system (IOS).

Always wear powder-free latex gloves when handling IOS components.

1. *Remove the top cover* (on page 44).

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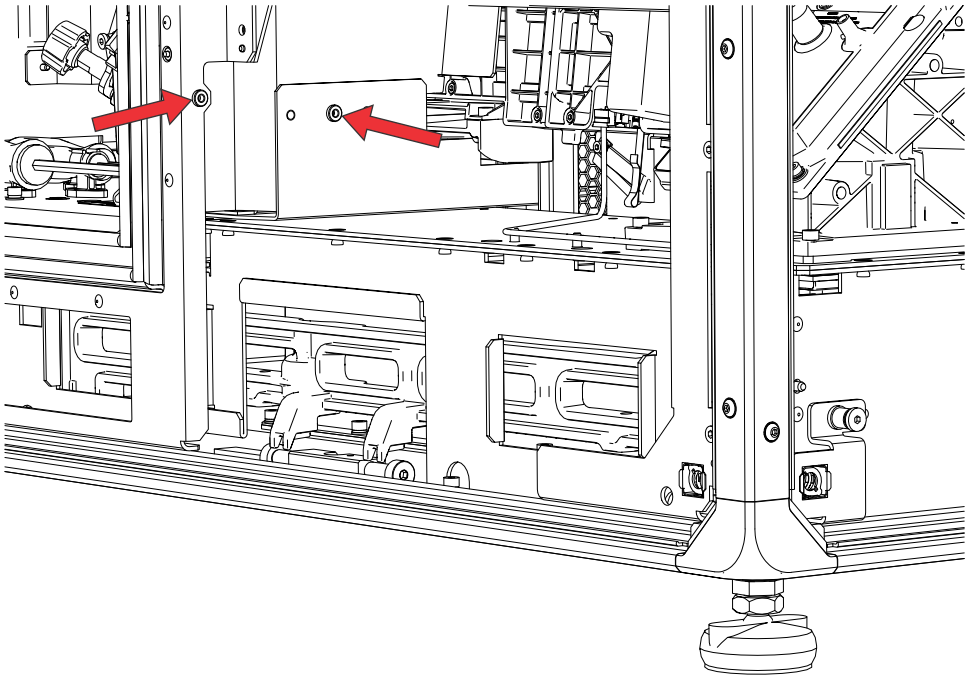
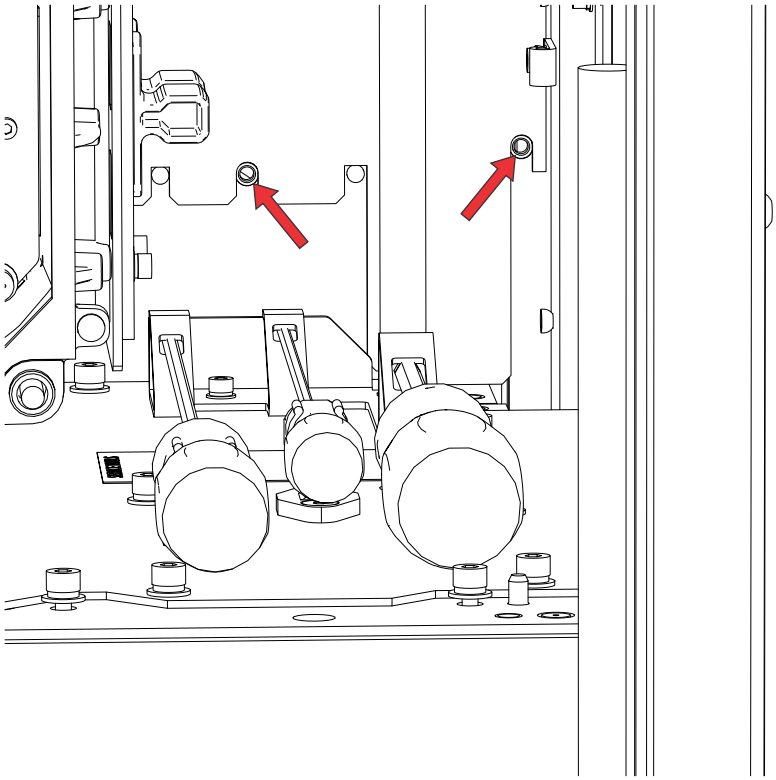
2. *Remove the electronics-side cover* (on page 46).
3. Remove the two screws securing the DCI bracket to the projector.



Access the screws through the service door.



4. *Remove the card cage* (on page 78).

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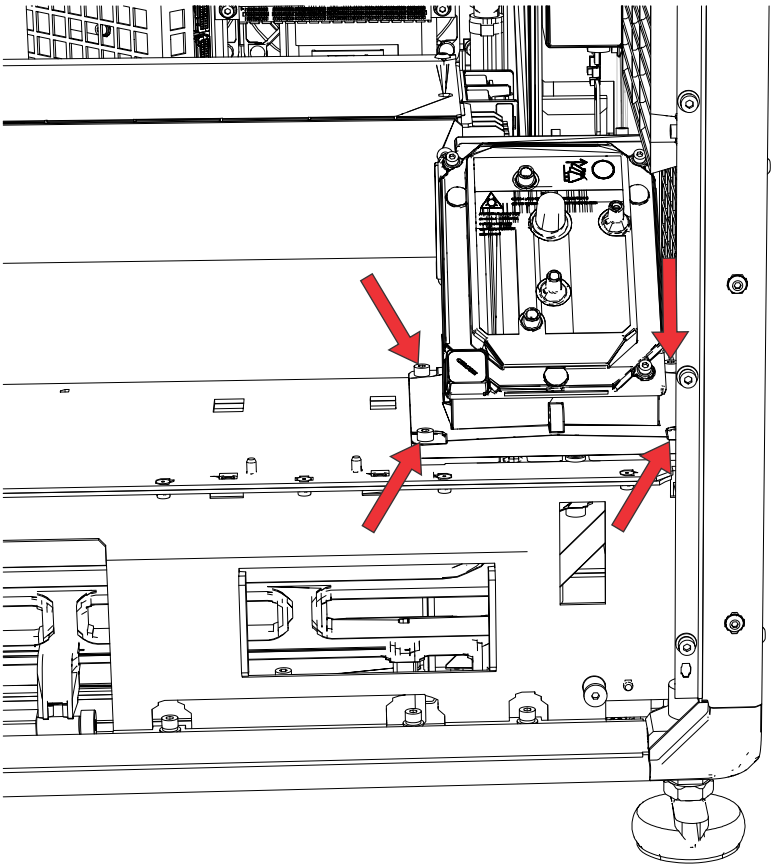
5. *Remove the integrator assembly* (on page 92).
6. Remove the four screws securing the coupling elbow to the base plate.



7. Install the new coupling elbow on the integrator assembly.
8. To re-install these components (except the top and electronics-side covers), follow these steps in reverse order.

   Ensure the card cage and top cover locking pins are engaged when re-installing.

   The electronics-side cover must be removed for making LOS coupling mirror adjustments. For more information, refer to *Aligning the image* (on page 32).
9. *Perform a LiteLOC calibration* (on page 27).

Coupling elbow mirror

Learn how to replace the coupling elbow mirror.

1. *Remove the card cage* (on page 78)
2. Remove the screws securing the mirror.

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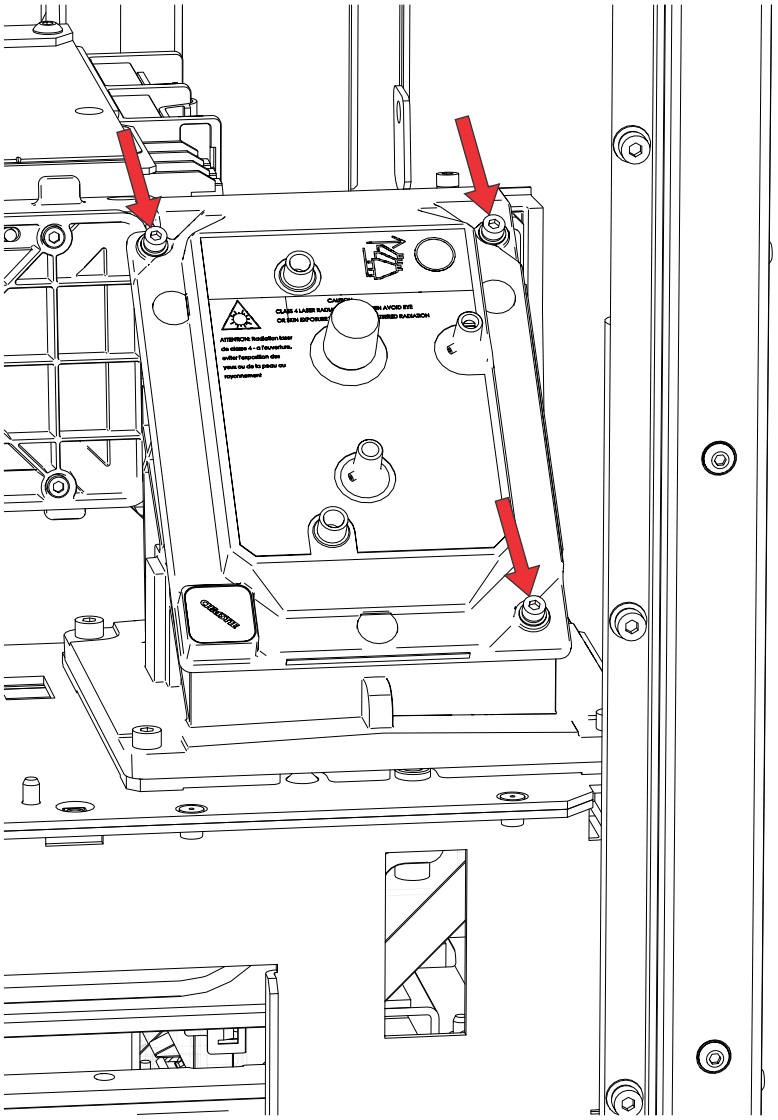

3. Replace the mirror assembly.
4. To re-install, follow these steps in reverse order.
5. After re-installing the assembly, perform *optical adjustments* (on page 32) and the steps in *LiteLOC sensor-to-screen calibration* (on page 27).

Laser optical subsystem (LOS) for the CP4415-RGB and CP4420-RGB

Learn how to remove the LOS.

1. Extend the feet of the unit so that you have at least 15 cm (6 inches) of clearance.

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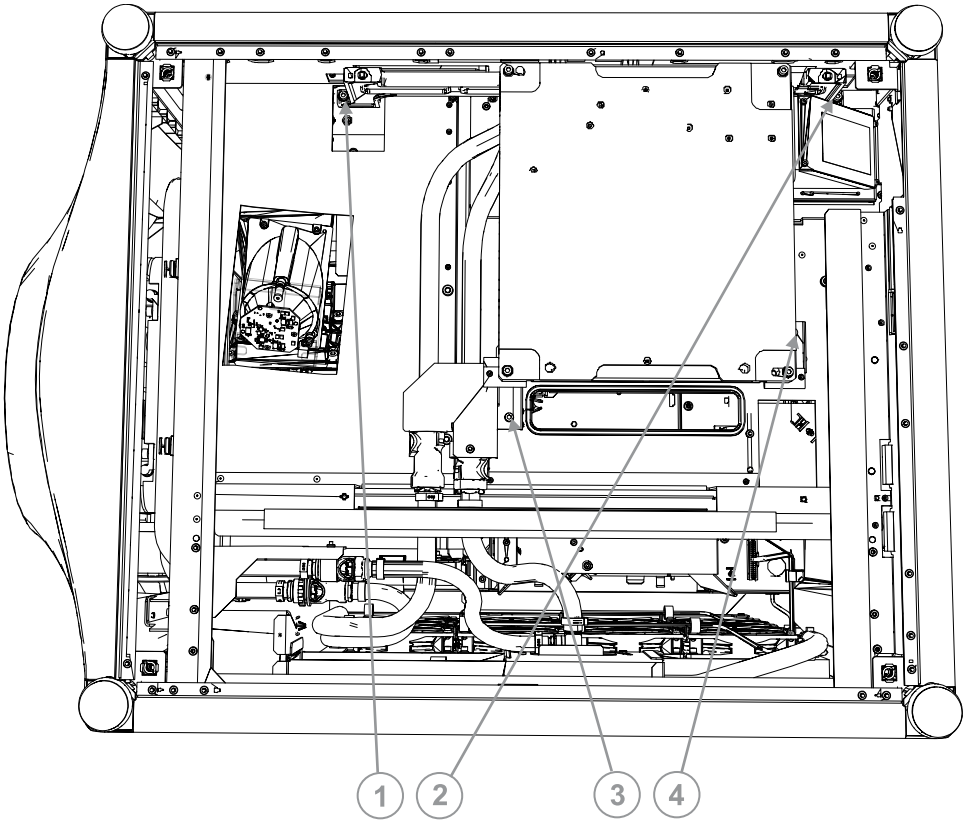
2. Remove the following covers from the projector: *top cover* (on page 44), *rear cover* (on page 45), *electronics-side cover* (on page 46), *side-intake cover* (on page 47), and *bottom cover* (on page 48).
3. *Remove the radiator* (on page 68).
4. *Remove the radiator intake fan pack* (on page 58).
5. Verify the two LOS liquid cooling hoses have been disconnected.
6. Disconnect the harnesses from the LOS.

   J150, J151, J152, and J153 from the red board and J155, J156, J157, J158, and J159 from the green board.

   If having problems accessing the harnesses, remove the laser card cage.
7. Loosen the four screws on the bottom of the LOS brackets.



   a) Loosen screws 3 and 4 (show in the image in step 7) by a few turns.
   b) Back out screws 1 and 2 (show in the image in step 7) so that the pivot lands on the pivot screws.
   c) Fully back out screws 3 and 4 (show in the image in step 7).
8. Remove the LOS from the projector.

   When handling the LOS, insert the ESD protection plugs into the connections of the LOS.

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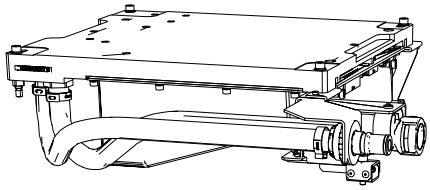

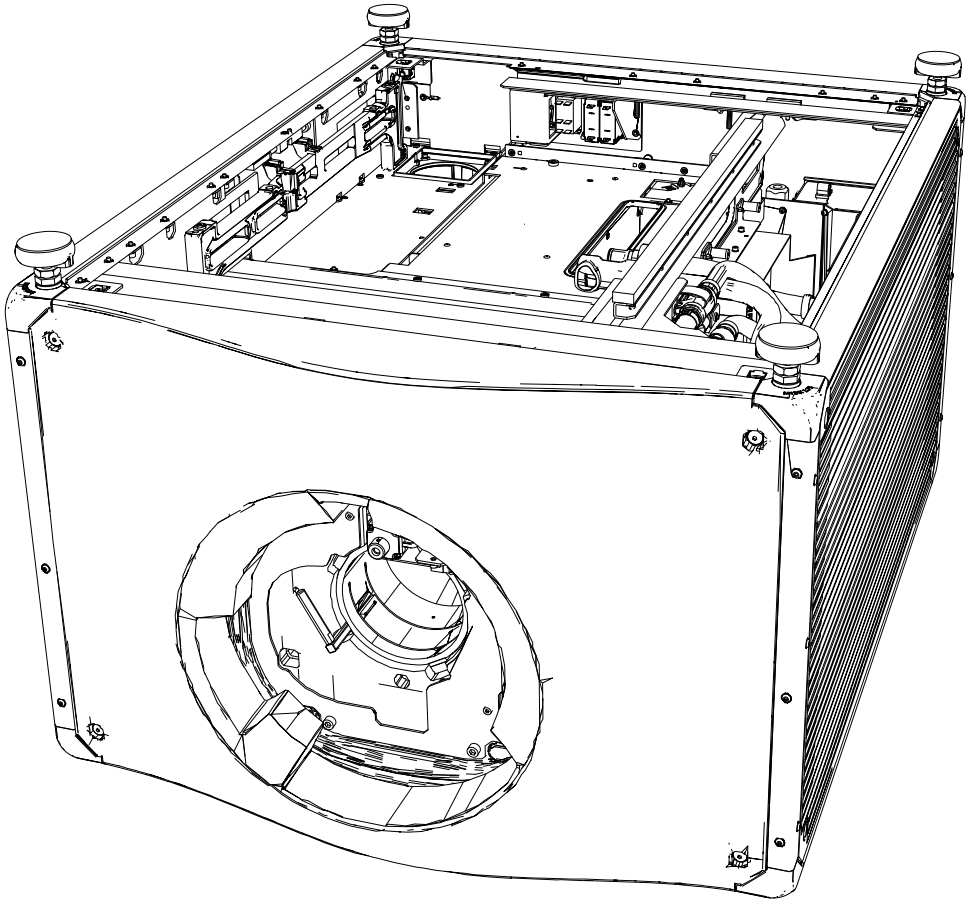

9. Remove the bracket datum and the bracket MTG from the LOS coldplate by backing out two screws per bracket.

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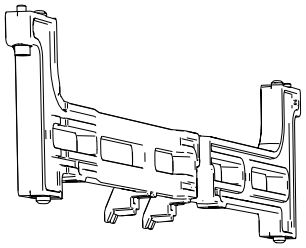

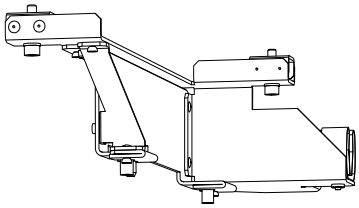

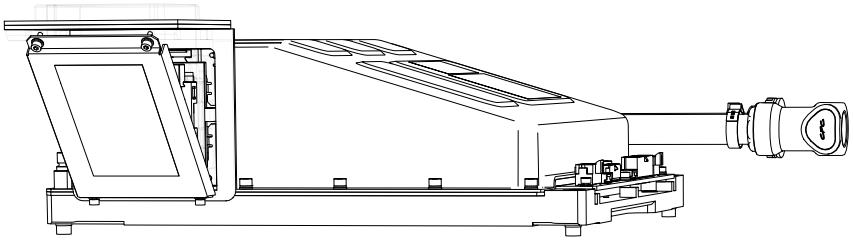

10. Replace the LOS.
11. To re-install, follow these steps in reverse order.
12. After re-installing the LOS, perform *optical adjustments* (on page 32) and software calibration.

Laser optical subsystem (LOS) for CP4425-RGB and CP4435-RGB

The laser optical subsystem (LOS) generates the light for the projector.

1. Extend the feet of the unit so that you have at least 15 cm (6 inches) of clearance.
2. Remove the following covers from the projector: *electronics-side cover* (on page 46), *side-intake cover* (on page 47), *rear cover* (on page 45) (to disconnect the cooling loop connections that feed the LOS cold-plate), and *bottom cover* (on page 48).
3. *Remove the radiator* (on page 69).
4. *Remove the radiator intake fan pack* (on page 59).
5. Disconnect the two LOS liquid cooling hose connectors marked B and C in the image below.

   To access the B connector, you may have to first disconnect the A connector (in the image below).

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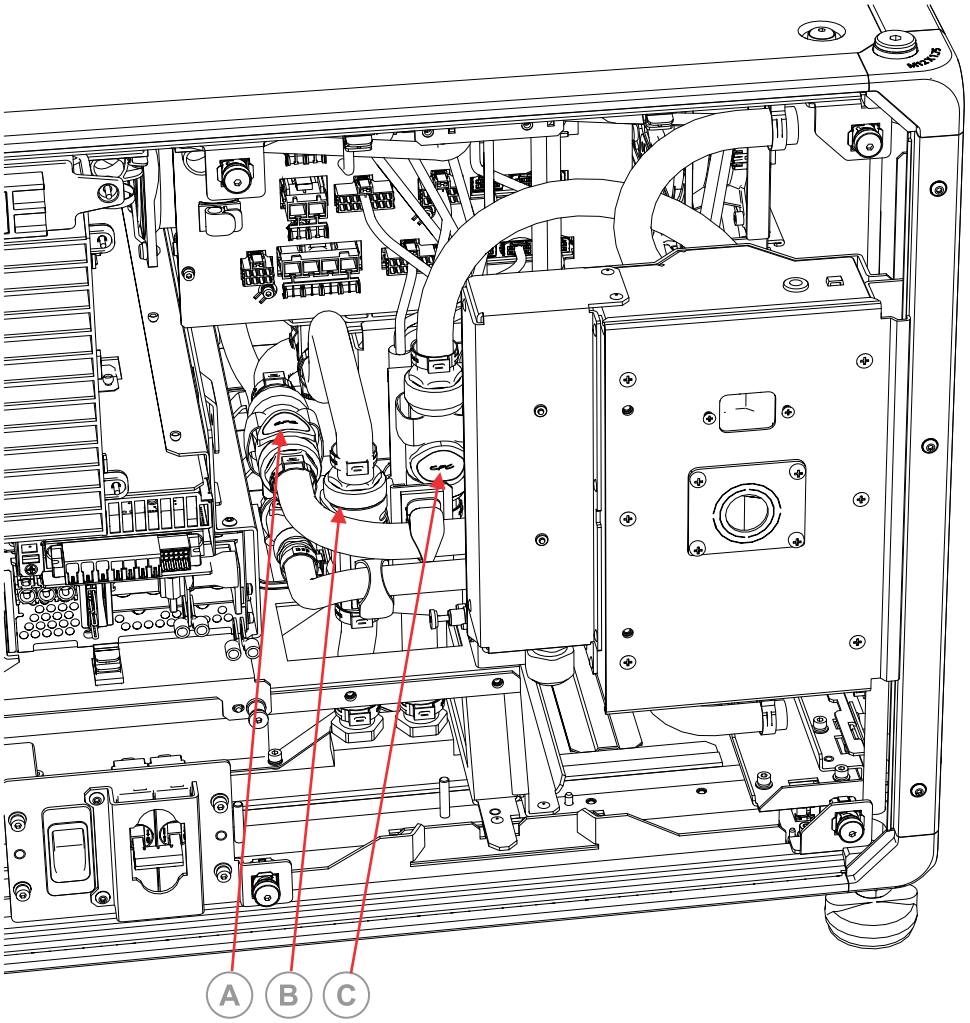

6. Disconnect the blue 1 and 2 J161 and J160 connectors.
7. Disconnect the J159, J153, J158, J155, J157, J152, and J156 connectors.
8. Partially loosen the two screws nearest the radiator side and loosen the two screws nearest the electronics side securing the LOS.

   The LOS lowers onto the pins.

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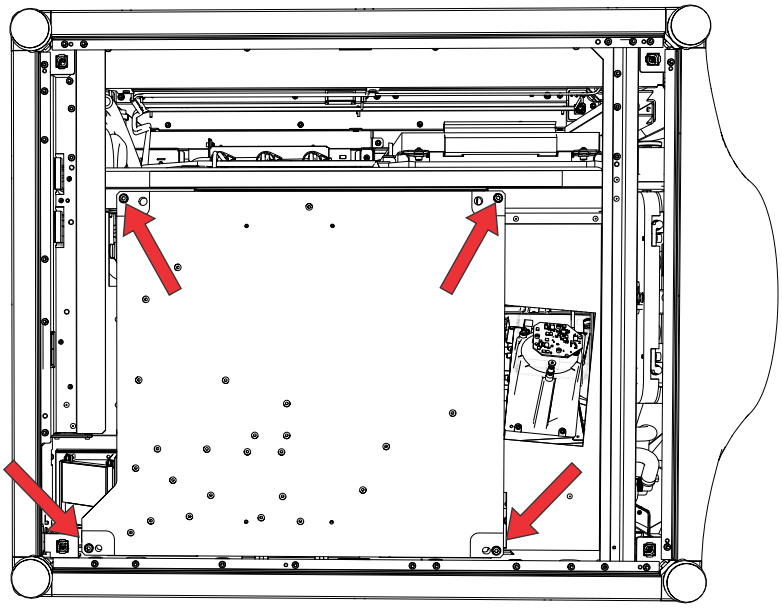
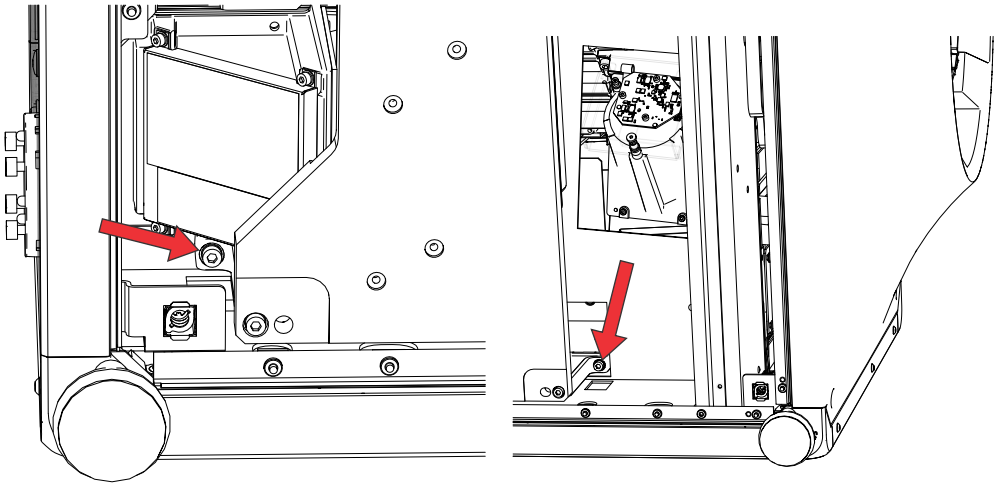


Detail of the bracket screw locations:



9. Loosen the two LOS screws nearest the radiator side.
   The LOS pivots and then drops.

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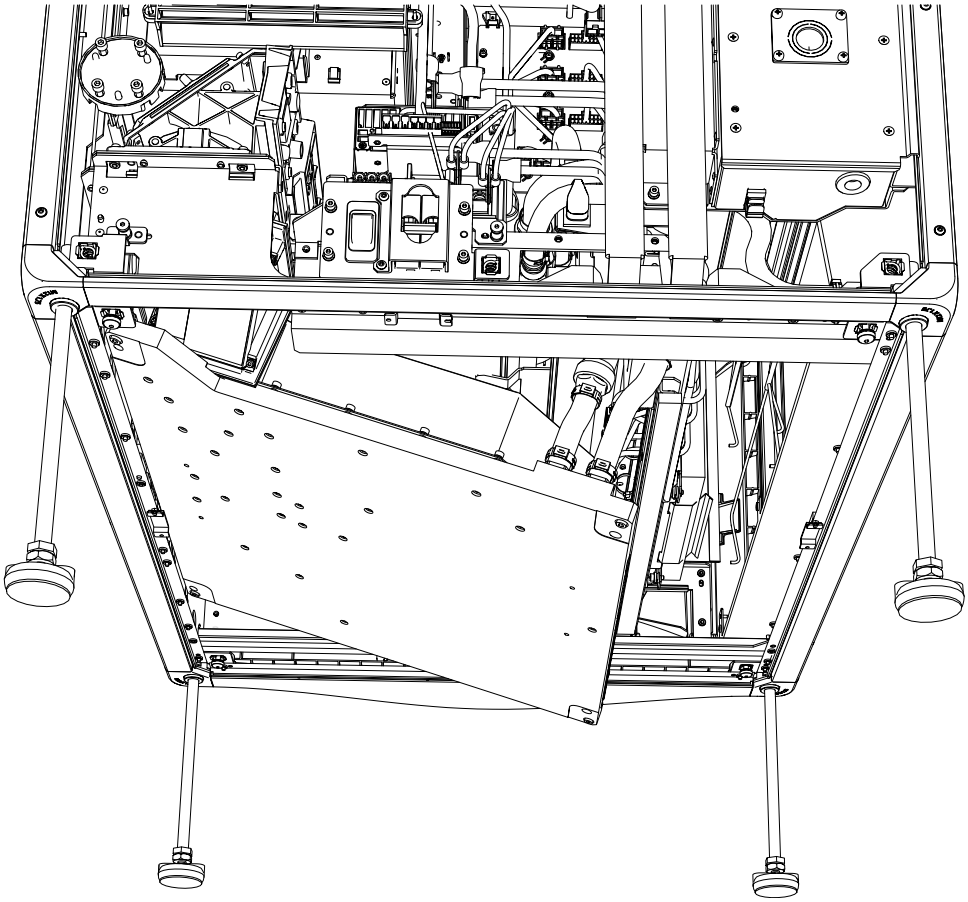
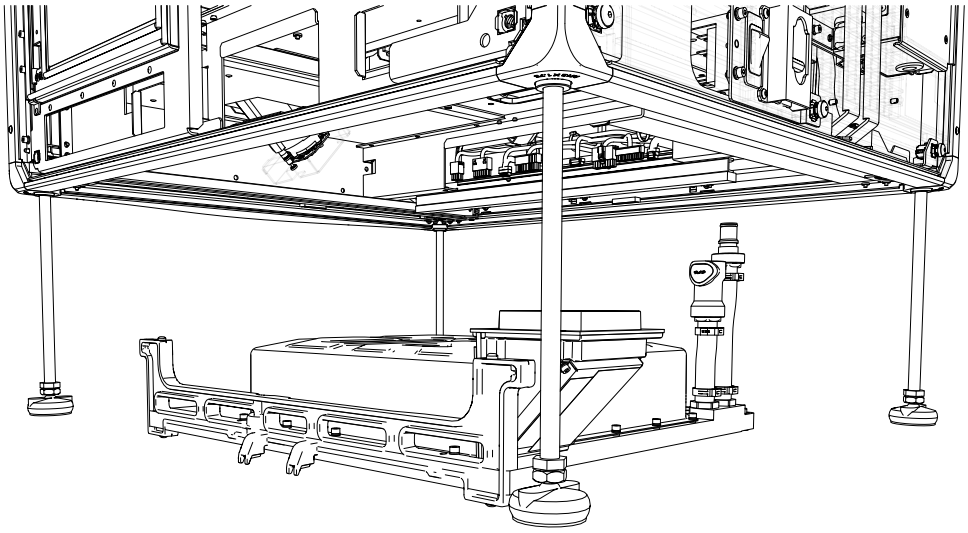


10. If replacing the LOS, remove the bracket from the original LOS and install it on the replacement LOS.



11. To re-install, follow these steps in reverse order.

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Printed circuit boards and sensors

Printed circuit boards (PCB) mechanically support and electrically connect the projector components. Sensors convert information such as temperature, light, and communication into electrical signals.

Always wear an electrostatic discharge (ESD) strap and use insulated tools when replacing circuit boards.

CS18G6 board for CP4415-RGB and CP4420-RGB

The CS18G6 board is also known as the laser driver board. The CS18G6 laser driver service kit includes a laser driver cage.

1. *Remove the rear cover* (on page 45).
2. *Remove the radiator* (on page 68).
3. Disconnect the seven harnesses: P128, P164, J111, J113, J170, J171, and J172.

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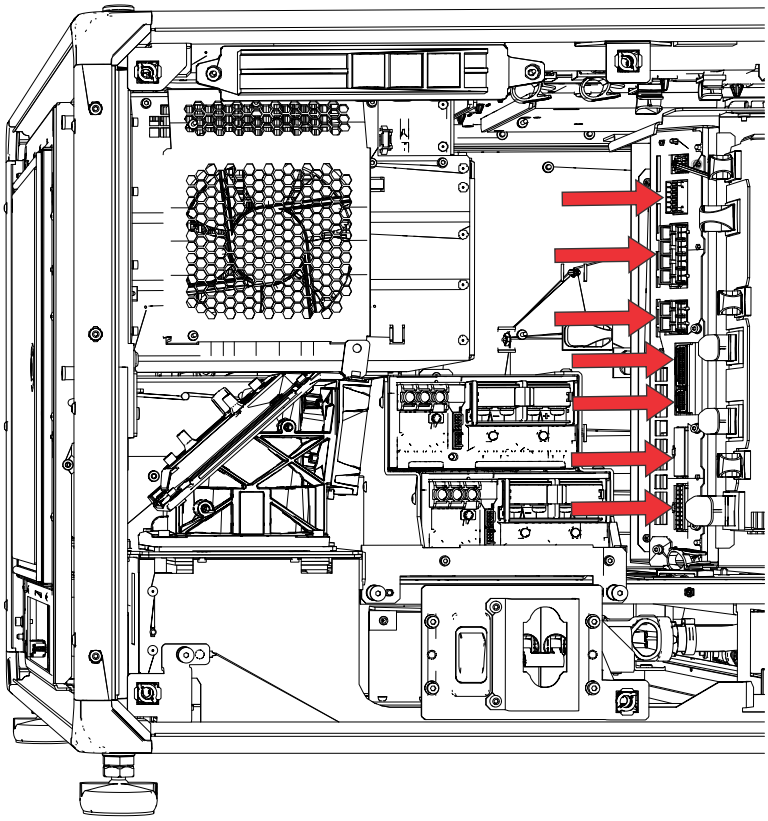
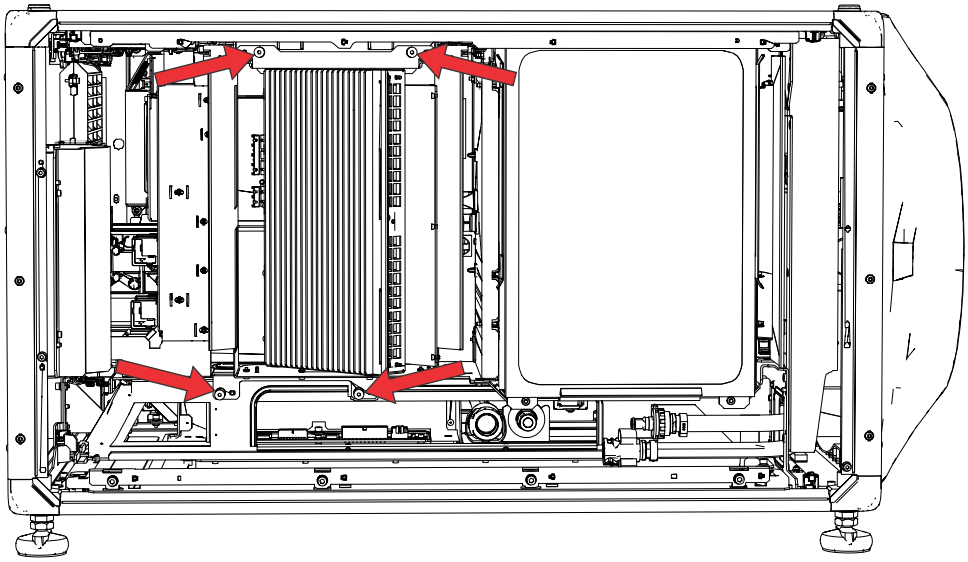


4. Loosen the four screws securing the laser driver card frame.



5. Remove and replace the laser driver cage.
6. To re-install, follow these steps in reverse order.

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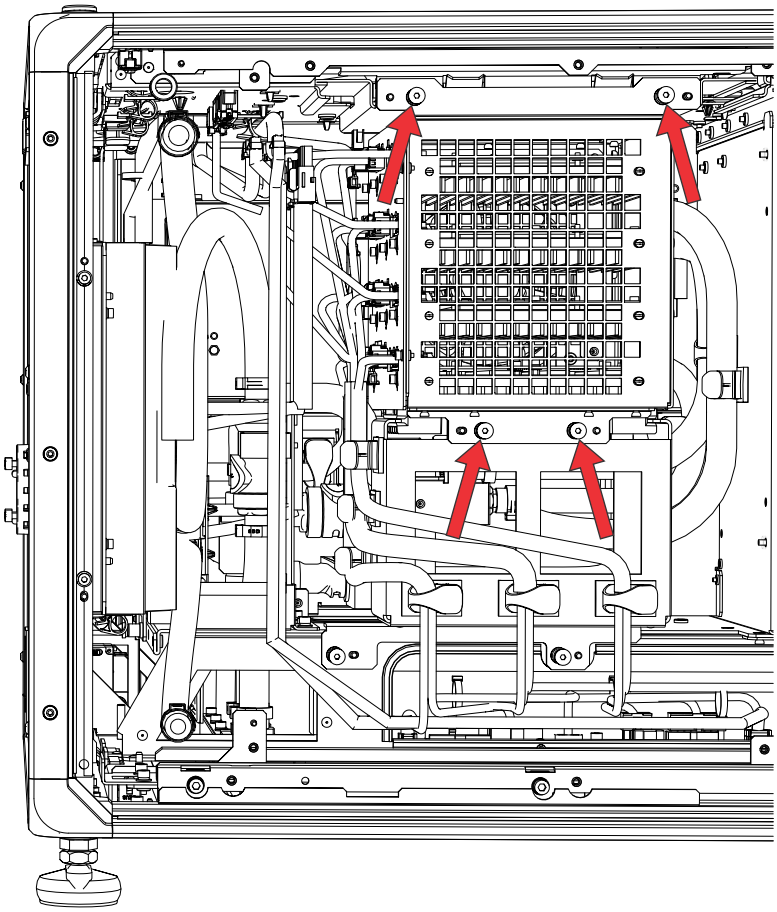
Laser boards for CP4425-RGB and CP4435-RGB

The laser driver card cage includes three CS12G0 boards for CP4425-RGB and four CS12G0 boards for CP4435-RGB.

Always use an anti-static wrist strap and use a grounded anti-static mat when handling circuit boards.

1. *Remove the rear cover* (on page 45).
2. *Remove the radiator* (on page 69).
3. *Remove the radiator intake fans* (on page 59).
4. For CP4425-RGB, disconnect the 14 harnesses from the side of the laser driver cage.
5. For CP4435-RGB, disconnect the 18 harnesses from the side of the laser driver cage.
6. Disconnect the laser driver exhaust fan harness connector.
7. Loosen the four screws and remove the laser driver cage.



8. Remove the four cage screws.

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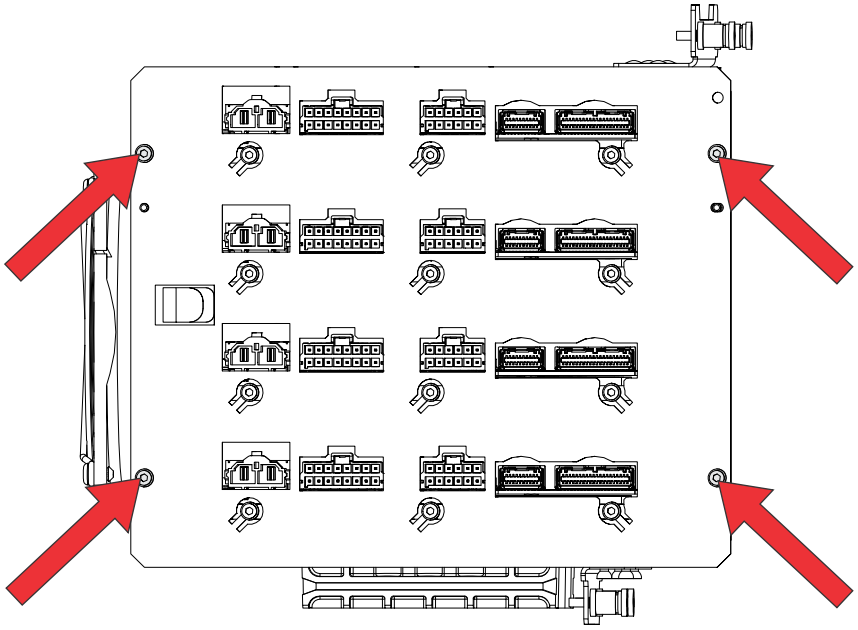
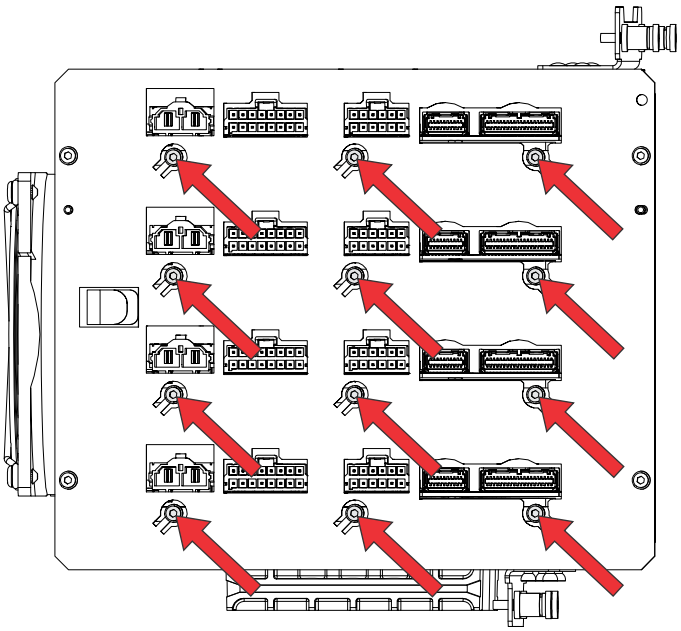


9. Remove the connector-side plate of the laser driver cage by first removing the twelve screws and .



10. On the other side of the laser driver cage, remove the pair of screws securing the board to be removed.
11. Wearing an anti-static wrist strap, remove and replace the laser driver board.
12. To re-install, follow these steps in reverse order.

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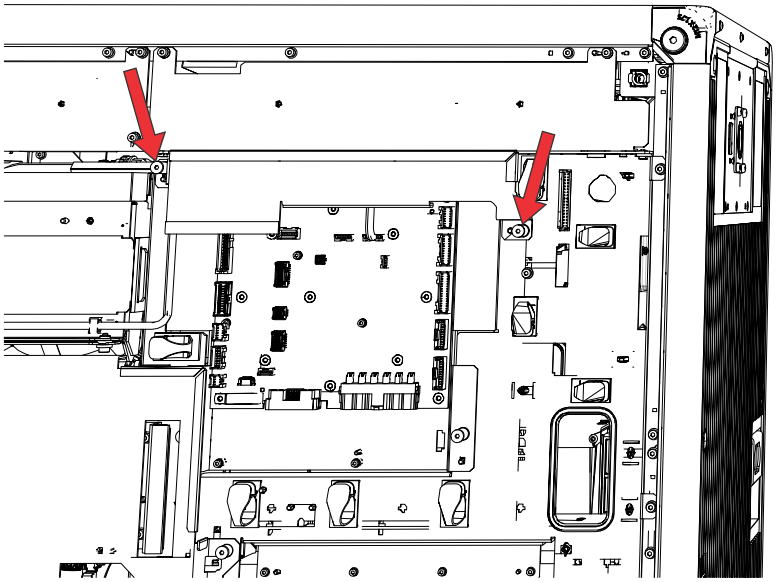
Housekeeping board (HKBB) for CP4415-RGB and CP4420-RGB

The housekeeping board (HKBB) acts as an interface board with the majority of the control devices feeding into it, including fans, power supply input, shutter, IR receivers, and so on.

1. *Remove the top cover* (on page 44).
2. Loosen the two screws securing the housekeeping bracket and remove the bracket.



3. Disconnect the 11 harnesses from the housekeeping board.

   The harnesses to disconnect: J30 (Core5 power and communication), J81, J85, J87, J89, J101, J103, J105, J110, J112 (12V input), and J129. Check the interconnect.
4. Loosen the two screws securing the housekeeping board tray to the projector, then remove the tray.
5. Remove the screws securing the housekeeping board.

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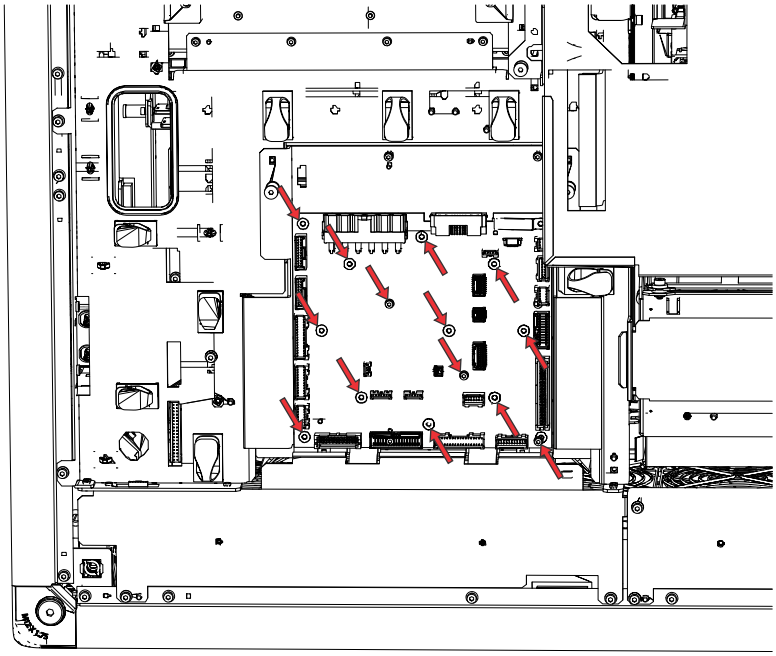
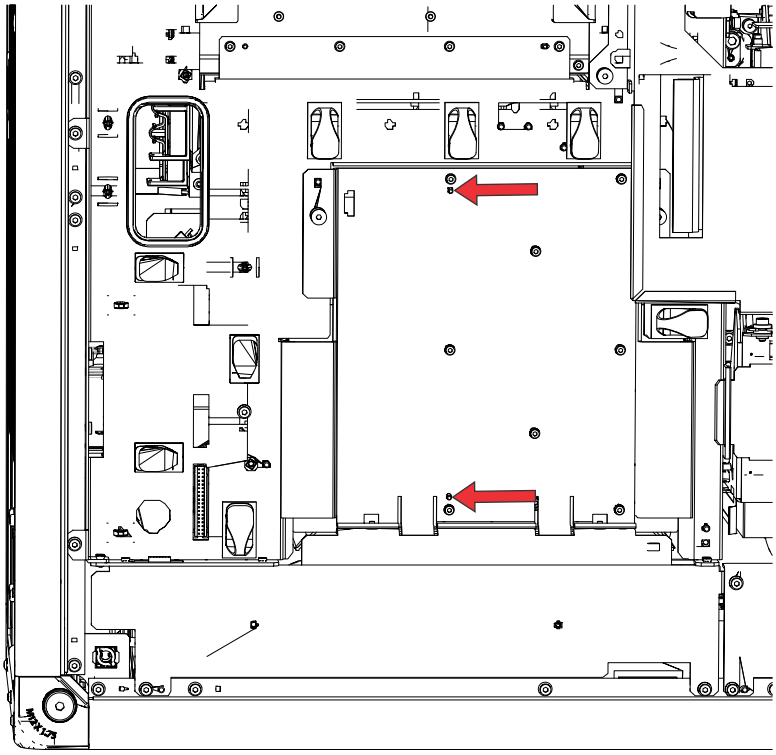


6. Place the new board, making sure to align it with the two locating pins.



7. To re-install, follow these steps in reverse order.

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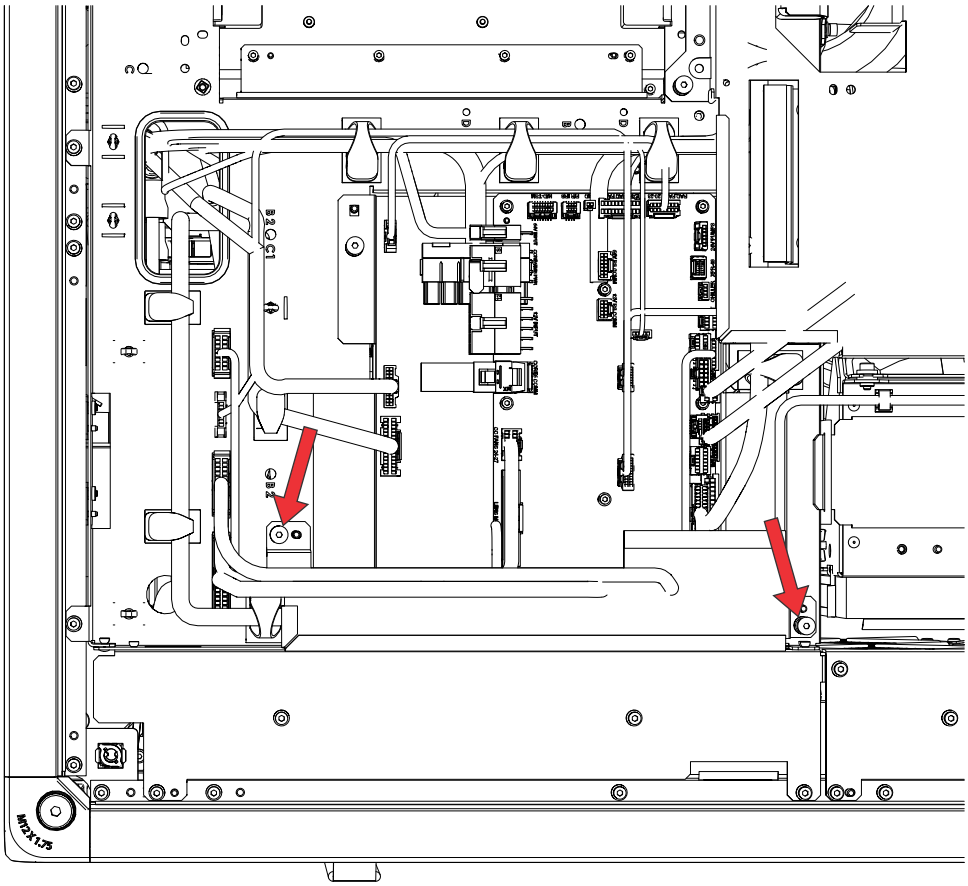
Housekeeping board (HKBG) for CP4425-RGB and CP4435-RGB

The housekeeping board (HKBG) acts as an interface board with the majority of the control devices feeding into it, including fans, power supply input, shutter, IR receivers, and so on.

1. *Remove the top cover* (on page 44).
2. Loosen the two screws securing the HKBG bracket and remove the bracket.



3. Disconnect the 19 harnesses from the housekeeping board.

   The harnesses to disconnect: J6, J76, J77, J81, J85, J87, J89, J101, J102, J103, J104, J105, J106, J110, J112, J113, J114, J129, and P8. Check the interconnect.
4. Loosen the two screws securing the HKBG tray to the projector, then remove the tray.
5. Remove the screws securing the HKBG board.
6. Place the new board, making sure to align it with the two locating pins.
7. To re-install, follow these steps in reverse order.

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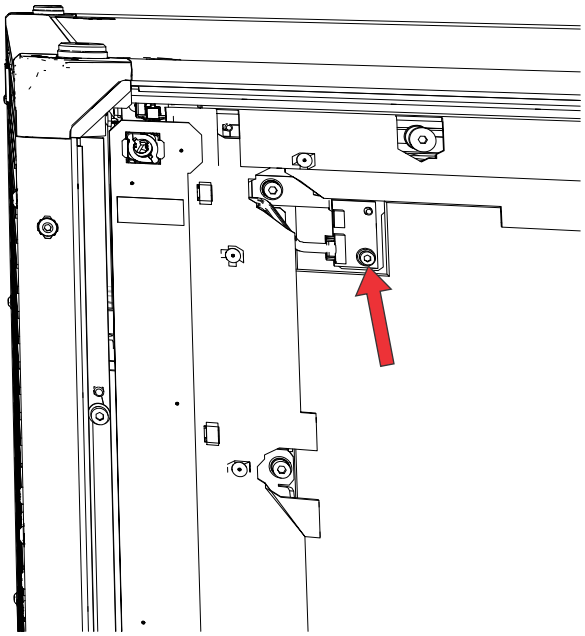
Dual temperature sensor module (DTSM)

The dual temperature sensor module (DTSM) monitors the ambient air temperature going into the projector.

1. *Remove the side-intake cover* (on page 47).
2. Disconnect the DTSM inline harness connector F and connector J82.
3. Remove the screw securing the DTSM.



4. Replace the DTSM.
5. To re-install, follow these steps in reverse order.

Light engine temperature sensor

The temperature sensor is located on the light engine.

1. Remove the light engine.
2. Disconnect the connector to the temperature sensor.
3. Remove the screw securing the temperature sensor and remove it.

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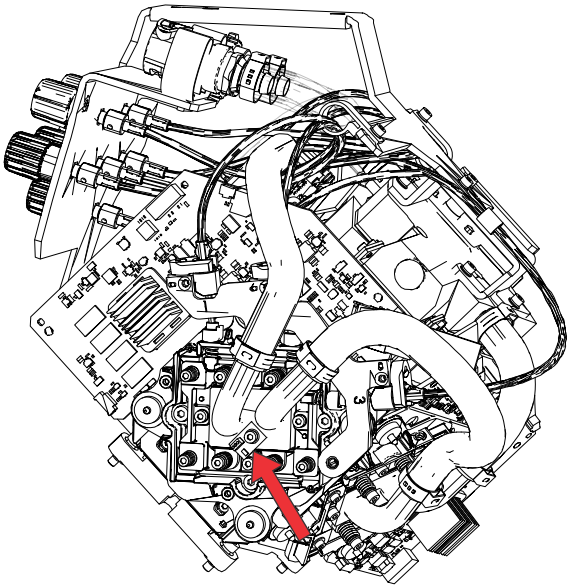
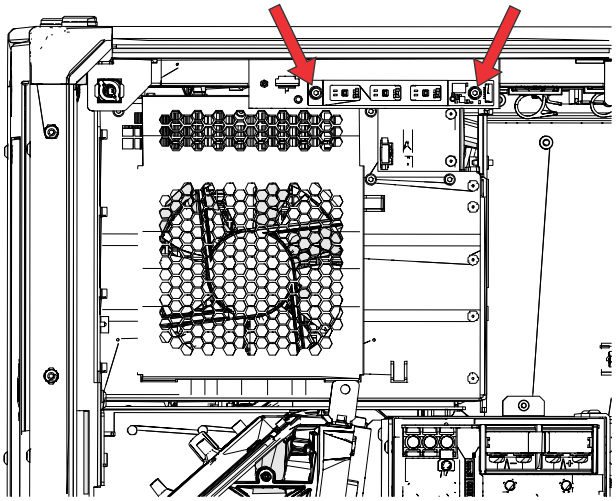


4. Replace the temperature sensor.
5. To re-install, follow these steps in reverse order.

Status LED board (SLB)

The status LED board (SLB) provides visual information about the operational state of the projector.

1. *Remove the rear cover* (on page 45).
2. Disconnect the SLB harness connector J1 from the SLB.
3. Remove the two screws securing the SLB and remove the board.



4. Replace the SLB assembly.
5. To re-install, follow these steps in reverse order.

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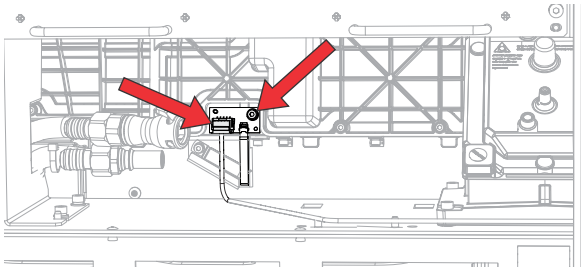
Diffuser control board (DIB PCB)

Learn how to replace the diffuser control board (DIB).

1. *Remove the electronics-side cover* (on page 46).
2. Disconnect the J135 harness connector, the J136 harness connector, and the harness to the diffuser.



3. Remove the screw (the right arrow in the image in step 2) securing the board and remove the board.
4. Replace the board.
5. To re-install, follow these steps in reverse order.

Color sensor board

Remove the color sensor board and replace it with the upgraded board. A mechanical upgrade to the housing is also required.

1. Disconnect the projector from power.

   Allow approximately 10 minutes for the projection system and mirror to cool down before servicing.
2. Raise the projector feet to create a clearance under the projector of approximately 12 cm (4 ¾ inches).

   Alternatively, tip the projector so it is resting on its side.
3. *Remove the bottom cover* (on page 48).
4. Loosen the fastener from the installed cover (A in the image below).

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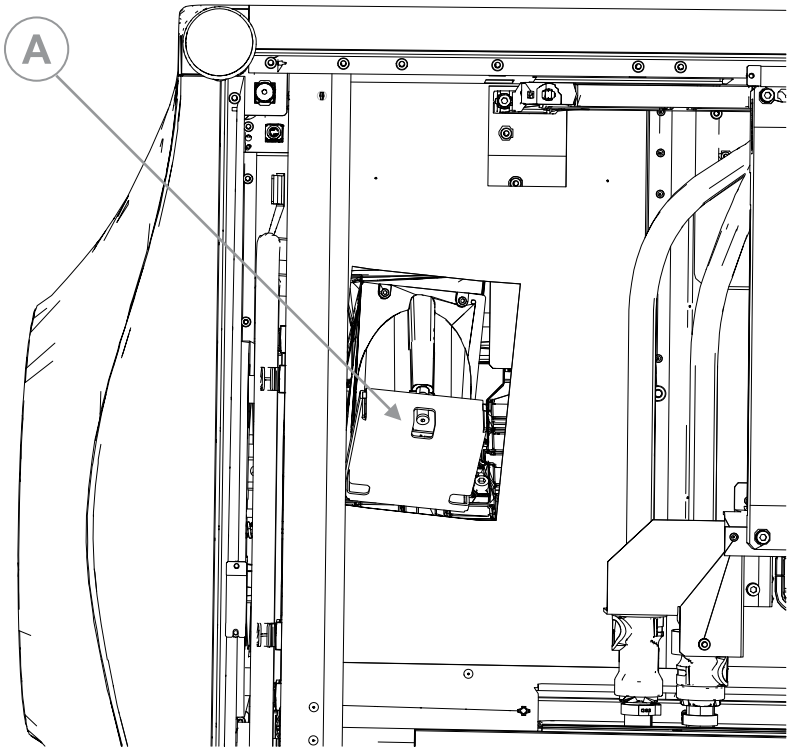
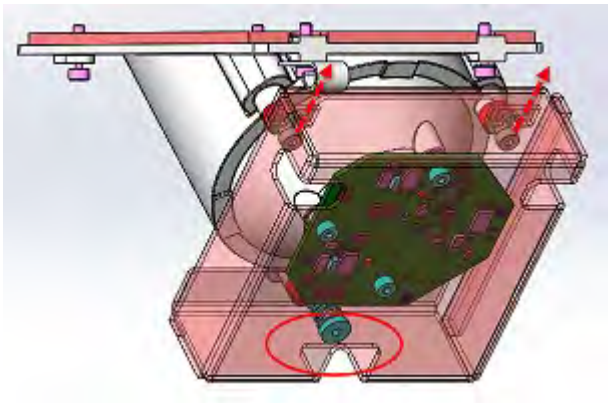


5. Remove the cover and set it aside.
6. Disconnect the harness.
7. Slide the metal guard from the shoulder screws holding it in place.



8. To re-install, follow these steps in reverse order.

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Harnesses

Harnesses can transmit signals or electrical power.

Before servicing, always carefully observe the original lead dress. Take extra precautions to secure all harnessing properly, especially in the high voltage circuitry areas (such as lamp cables). Replace any wire that appears to have damaged insulation.

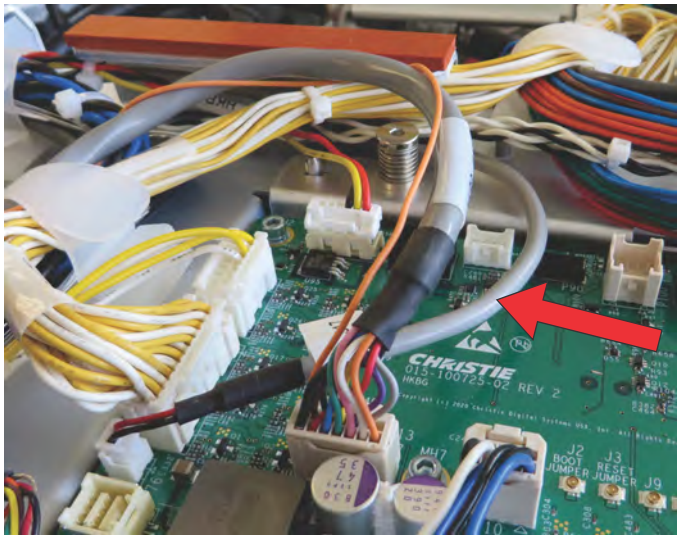
SID harness

Learn how to replace the SID harness.

1. *Remove top cover* (on page 44).
2. Release the cable clip that holds the SID harness.

   On a CP4415-RGB or a CP4420-RGB, one end of the SID harness is fastened to the projector frame top structure and the other end is connected to an in-line connector connecting to P89 on the housekeeping board.

   On a CP4435-RGB, one end of the SID harness is fastened to the projector frame top crossbar and the other end is connected to P76 on the housekeeping board.

3. Gently separate the other cables in the same run away from the SID cable.
4. Remove the screw securing the SID harness to the projector.
5. On a CP4415-RGB or a CP4420-RGB, cut the zip tie restraining the SID harness to the near-by harness.
6. Unplug the SID harness at the in-line connector.
7. Remove the SID harness.
8. Replace the SID harness.
9. To re-install, follow these steps in reverse order.

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Mini-SAS cables

The mini-SAS harnesses move data from the card cage to the light engine.

1. *Remove the top cover* (on page 44).
2. Take note of the routing of the mini-SAS cables.

   You must match the routing when you install the new cables.
3. Disconnect the red, green, and blue mini-SAS harnesses from the card cage through the projector service access door and from the top.
4. Remove the light engine.
5. Disconnect the red, green, and blue mini-SAS harnesses from the light engine.
6. Replace the mini-SAS harnesses.
7. Reconnect the mini-SAS harnesses to the light engine.

   Make sure the access and bends are identical to what was installed or the harnesses do not route properly.
8. Re-install the light engine.
9. Reconnect the mini-SAS harnesses to the card cage.
10. Reconnect the shutter harness.

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