CP42LH

Service Manual

020-101686-03

CHRISTIE®

NOTICES

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GENERAL

Every effort has been made to ensure accuracy, however in some cases changes in the products or availability could occur which may not be reflected in this document. Christie reserves the right to make changes to specifications at any time without notice. Performance specifications are typical, but may vary depending on conditions beyond Christie's control such as maintenance of the product in proper working conditions. Performance specifications are based on information available at the time of printing. Christie makes no warranty of any kind with regard to this material, including, but not limited to, implied warranties of fitness for a particular purpose. Christie will not be liable for errors contained herein or for incidental or consequential damages in connection with the performance or use of this material. Canadian manufacturing facility is ISO 9001 and 14001 certified.

WARRANTY

Products are warranted under Christie's standard limited warranty, the complete details of which are available by contacting your Christie dealer or Christie. In addition to the other limitations that may be specified in Christie's standard limited warranty and, to the extent relevant or applicable to your product, the warranty does not cover:

a. **Problems or damage occurring during shipment, in either direction.**
b. **Projector lamps (See Christie's separate lamp program policy).**
c. **Problems or damage caused by use of a projector lamp beyond the recommended lamp life, or use of a lamp other than a Christie lamp supplied by Christie or an authorized distributor of Christie lamps.**
d. **Problems or damage caused by combination of a product with non-Christie equipment, such as distribution systems, cameras, DVD players, etc., or use of a product with any non-Christie interface device.**
e. **Problems or damage caused by the use of any lamp, replacement part or component purchased or obtained from an unauthorized distributor of Christie lamps, replacement parts or components including, without limitation, any distributor offering Christie lamps, replacement parts or components through the internet (confirmation of authorized distributors may be obtained from Christie).**
f. **Problems or damage caused by misuse, improper power source, accident, fire, flood, lightening, earthquake or other natural disaster.**
g. **Problems or damage caused by improper installation/alignment, or by equipment modification, if by other than Christie service personnel or a Christie authorized repair service provider.**
h. **Problems or damage caused by use of a product on a motion platform or other movable device where such product has not been designed, modified or approved by Christie for such use.**
i. **Problems or damage caused by use of a projector in the presence of an oil-based fog machine or laser-based lighting that is unrelated to the projector.**
j. **For LCD projectors, the warranty period specified in the warranty applies only where the LCD projector is in "normal use" which means the LCD projector is not used more than 8 hours a day, 5 days a week.**
k. **Except where the product is designed for outdoor use, problems or damage caused by use of the product outdoors unless such product is protected from precipitation or other adverse weather or environmental conditions and the ambient temperature is within the recommended ambient temperature set forth in the specifications for such product.**
l. **Image retention on LCD flat panels.**
m. **Defects caused by normal wear and tear or otherwise due to normal aging of a product.**

The warranty does not apply to any product where the serial number has been removed or obliterated. The warranty also does not apply to any product sold by a reseller to an end user outside of the country where the reseller is located unless (i) Christie has an office in the country where the end user is located or (ii) the required international warranty fee has been paid.

The warranty does not obligate Christie to provide any on site warranty service at the product site location.

PREVENTATIVE MAINTENANCE

Preventative maintenance is an important part of the continued and proper operation of your product. Please see the Maintenance section for specific maintenance items as they relate to your product. Failure to perform maintenance as required, and in accordance with the maintenance schedule specified by Christie, will void the warranty.

REGULATORY

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

CAN ICES-3 (A) / NMB-3 (A)

이 기기는 업무용 (A 급) 으로 전자파적합등록을 한 기기이오니 판매자 또는 사용자는 이점을 주의하시기 바라며 , 가정 외의 지역에서 사용하는 것을 목적으로 합니다 .

Environmental

The product is designed and manufactured with high-quality materials and components that can be recycled and reused. **This symbol**  means that electrical and electronic equipment, at their end-of-life, should be disposed of separately from regular waste. Please dispose of the product appropriately and according to local regulations. In the European Union, there are separate collection systems for used electrical and electronic products. Please help us to conserve the environment we live in!

Table of Contents

Introduction

This manual provides technical information for assisting qualified Christie service technicians in the servicing and repair of the Christie laser projection system.

Every effort has been made to make sure the information in this manual 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.

⚠WARNING

Failure to comply with the following could result in death or serious injury.

- The components of the Christie Laser Projection System are designed and certified to work together as a unit. Christie components should never be used with third-party components. Use of non-Christie components with Christie systems may pose safety concerns and void your warranty.
- Only Christie qualified technicians who are knowledgeable about the hazards associated with laser use, high-voltage and high temperatures generated by the projector are authorized to assemble, install, and service the Christie laser projection system.

Turn the system on

1. Check the interlock cables are securely attached to the laser modules.
2. Check the interlock cable to the projector is securely attached.
3. Check the Ethernet cable between the projector and the laser system network switch is securely attached.
4. Check the Ethernet cable between the laser bank manager and the laser system network switch is securely attached.
5. Turn the Rack Switch on.
6. Turn on the laser bank manager.
7. Turn on the circuit breaker on the projector baseplate under the front lens-side corner.
8. If the emergency-stop button on either the laser rack or the projector is activated, release it by turning the button clockwise.
9. Turn the Beam Stop on the projector to **OPEN**.
10. Turn the laser rack key switch on.

    The key must be in the switch at all times.
11. Turn on the laser system network switch at the rear of the laser rack.
12. Turn on the breakers (one per laser module) in the power distribution unit in the front of the laser rack.
13. Press **MANUAL RESET** on the side of the laser rack or on the back of the projector.
14. Verify the status lights on the back of the projector and the front of the laser modules are white.

    The projector is armed, but the lasers are off.

Turn the system off

1. On the home screen, tap and hold the **Power** button.

Emergency shut down

1. To shut down the system in an emergency, press E-stop on the back of the projector (see *Projector safety features* on page 21) or on the operator side of the laser rack (see *LM Rack safety features* on page 20).

   The laser modules turn off.

Single laser module operation

Some image adjustments require only low power from a single laser module. Turn off laser modules when you do not require the extra light to perform an image adjustment.

1. On the laser bank manager, Turn the lasers off.
2. In the laser bank control application, under **Connected Modules**, select the IP address of a laser module you want to disconnect.
3. Click **Disconnect**.
4. Repeat steps 1 to 2 until there is only one laser module connected.

Upgrade the software

You need Administrator or Service permissions to complete this procedure.

1. Download the software from the Christie web site (www.christiedigital.com).
2. Upload the software:
   a. On the projector touch panel controller (TVC), tap **Menu** > **Administrator Setup** > **Upgrade**.
   b. Tap **Upload**.
   c. Select the location of the upgrade file in the **Drive Letter** list.
   d. Browse to the location of the upgrade file in the **Folder** list.
   e. Tap the upgrade file and then tap **Open**.
3. Tap **Menu** > **Administrator Setup** > **Upgrade**.
4. Tap an upgrade file in the **Available Upgrade Files** list.
5. Tap **Next**.
6. Tap a component in the **Component** list.

7. Select one of these options:

Option	Description
Upgrade Different Components Only	Upgrades system components that are newer or older than the currently installed version.
ICP Only Force Install	Forces an ICP install regardless of what current version is installed.
Force Upgrade All	Upgrades all components in the upgrade package.
Factory Install	Removes all configurations and upgrades all components.

8. Tap **Next**.

Technical support

North and South America: +1-800-221-8025 or *tech-support@christiedigital.com*

Europe, Middle East, and Africa: +44 (0) 1189 778111 or *techsupport-emea@christiedigital.com*

Asia Pacific: *tech-asia@christiedigital.com*

Christie Managed Services: +1-800-550-3061 or *NOC@christiedigital.com*

Safety Information

Read all instructions before servicing. Always take extra precautions to secure all harnessing properly, especially in the high voltage circuitry areas. Replace any wire with damaged insulation. Components must be replaced with exact equivalents. Failure to do so may result in unsafe operation.

General safety precautions

When working with the projector, observe these important safety rules to avoid personal injury or damage to the projector:

⚠DANGER

When accessing a restricted access location for projector service or maintenance, avoid exposure to the projector beam path by making sure to

- Turn the projector power off and disconnect the projector from AC power.
- Rotate the Beam Stop to Closed.

Failure to comply results in death or serious injury.

⚠WARNING

Failure to comply with the following could result in death or serious injury.

- The projection head must use Christie laser modules and laser rack.
- Never look directly into the projector lens. 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.
- Qualified technician is required for all installations.
- Never operate the projector without all of its covers in place.

⚠CAUTION

Position all cables where they cannot contact hot surfaces or be pulled or tripped over. Failure to comply could result in minor or moderate injury.

NOTICE

- This Christie laser projection system must be operated in an environment that meets the operating range specification.
- Always wear gloves and follow proper electrostatic discharge (ESD) precautions when handling, servicing, or cleaning components. Failure to comply may result in equipment damage.

Laser precautions

The Christie laser projection system components have laser classifications, as outlined by the International Electrotechnical Commission (IEC), ranging from Class 1 to Class 4. Immediate skin hazard and eye hazard can occur from exposure to either the direct or specular reflected beam. This may pose a fire hazard or a diffuse reflection hazard.

- Wavelength: 435 nm to 660 nm
- Beam divergence: 0.1 rad to 0.96 rad, lens dependent
- Pulse pattern: Continuous Wave (CW).
- Maximum output: < 10 W

⚠DANGER

Failure to comply with the following results in death or serious injury.

- This product must be installed within a restricted access location which is normally inaccessible by the general public, including workers, visitors, and residents in the immediate vicinity, by means of engineering or administrative control measures but is accessible to authorized personnel that have had specific safety training.
- The installation setup must prevent access to the nominal ocular hazard area.

⚠WARNING

Failure to comply with the following could result in death or serious injury.

- A qualified technician is required for all installations.
- Never look into the end of a fiber optic cable while the device is operational. Laser radiation can be harmful to the human eye and injury may occur.
- Invisible infrared LED radiation might be emitted from disconnected fibers or connectors. Do not stare into beams or view directly with optical instruments.
- Lasers contain a high energy density. These can be dangerous for skin tissue as well as pose an electrical, chemical, and non-ionizing radiation hazard.
- Do not operate the Christie Laser Projection System with the laser rack access panels removed.

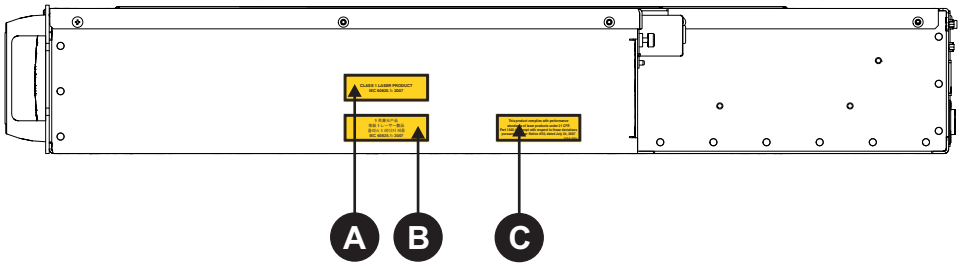
⚠CAUTION

Failure to comply with the following could result in minor or moderate injury.

- Turn the laser module breakers off before inspecting the fiber optic cable.
- Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Laser module laser safety labels

This diagram shows the laser safety labels on the right side of the laser module.

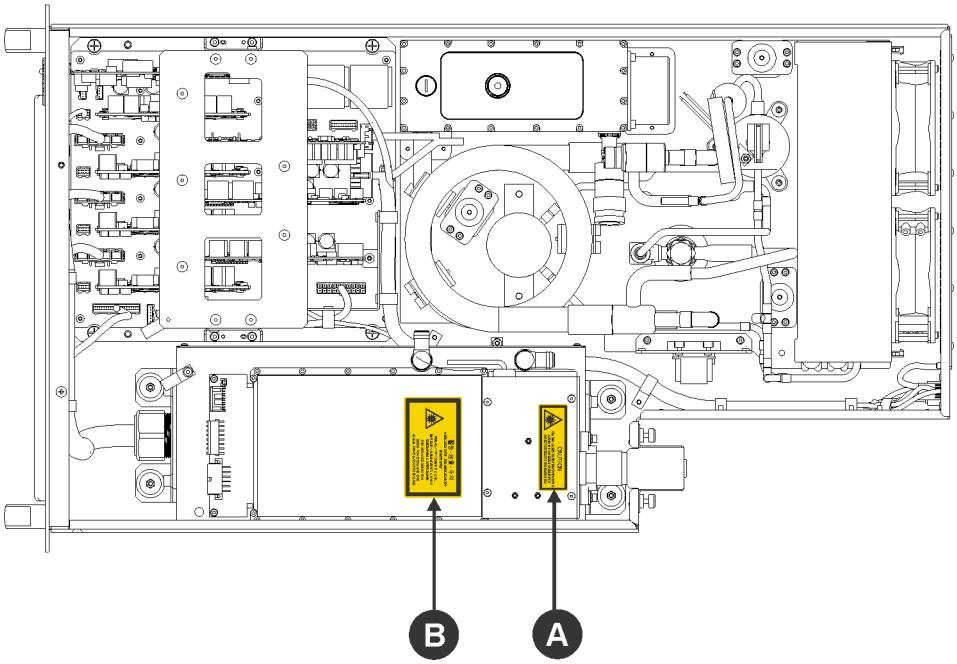


A	CLASS 1 LASER PRODUCT IEC 60825.1: 2007	CLASS 1 LASER PRODUCT IEC630825-1: 2007
B	Produit Laser De Classe 1 1 类激光产品 等級 1 レーザー製品 클래스 1 레이저 제품 IEC 60825.1: 2007	Translation of label A in French, Chinese, Japanese, and Korean
C	Christie Digital Systems Canada Inc. 809 Wellington Street North Kitchener, ON N2G 4Y7 Canada This product complies with performance standard of laser products under 21 CFR Part 1040.10 except with respect to those deviations pursuant to Laser Notice #50, dated July 24, 2007 U.S.A. Only	Christie Digital Systems Canada Inc. 809 Wellington Street North Kitchener, ON N2G 4Y7 Canada This product complies with performance standards of laser products under 21 CFR Part 1040.10 except with those deviations pursuant to Laser Notice #50, dated July 24, 2007 U.S.A. Only

This diagram shows labels below the laser module cover.

⚠WARNING Do not remove the laser module cover for maintenance or service. The laser module must be repaired at a Christie Digital Factory. Removing the cover voids the warranty. Failure to comply could result in death or serious injury.

- Wavelength: 435 nm to 660 nm
- Beam divergence: 10 mrad
- Pulse Pattern: Continuous Wave
- Maximum power: 64 W



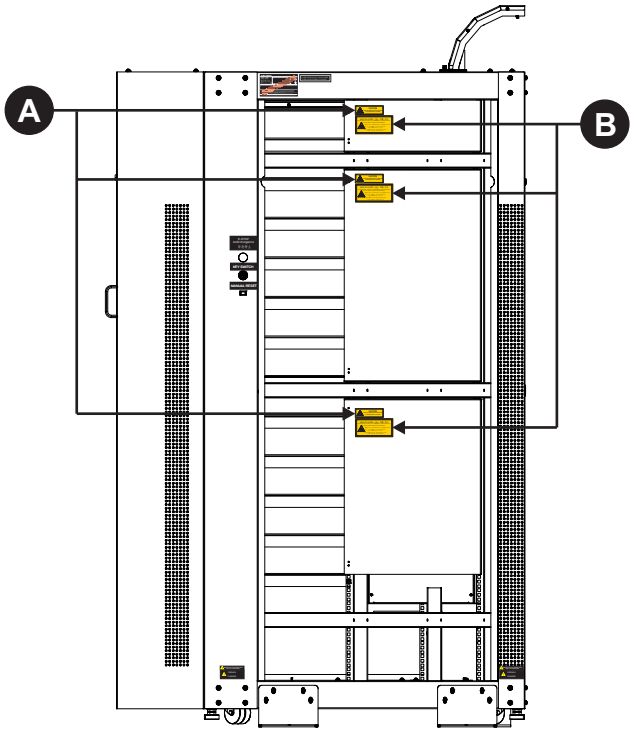
A		CAUTION CLASS 4 LASER RADIATION WHEN OPEN AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION
B		Translation of label A in French, Chinese, Japanese, and Korean

LM Rack laser safety labels

This diagram identifies laser safety labels on the laser rack underneath the operator side door.

⚠WARNING The laser rack contains a Class 3B laser product. Do not disassemble components in the laser rack. Disassembling components voids the warranty. Failure to comply result in death or serious injury.

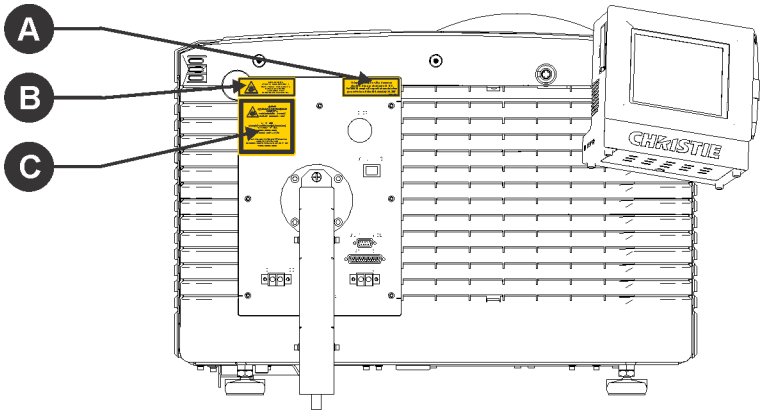
- Wavelength: 435 nm to 660 nm
- Beam divergence: 260 mrad
- Pulse Pattern: Continuous Wave
- Maximum power: 100 mW

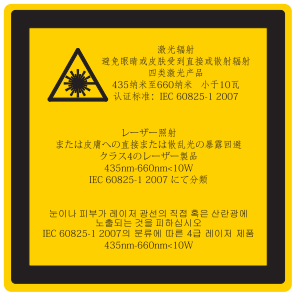


A		CAUTION CLASS 3B LASER RADIATION WHEN OPEN AVOID EXPOSURE TO BEAM
B		Translation of label A in French, Chinese, Japanese, and Korean

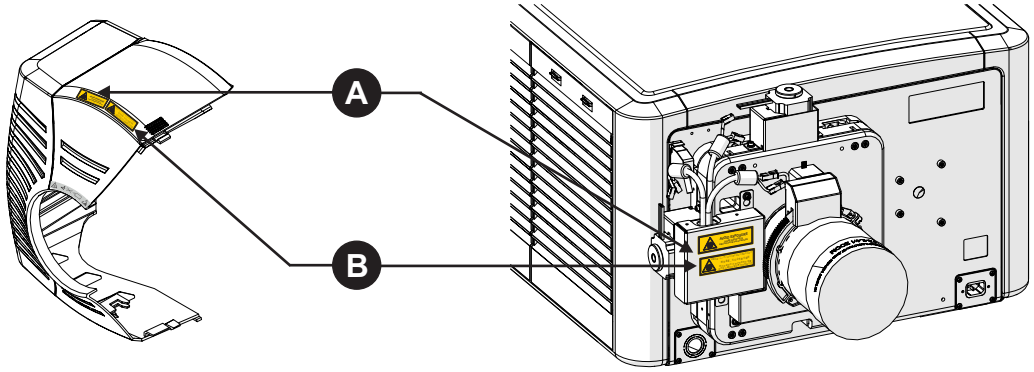
Projector laser safety labels

This diagram shows the laser safety labels on the operator side of the projector.



A		Christie Digital Systems Canada Inc. 809 Wellington Street North Kitchener, ON N2G 4Y7 Canada This product complies with performance standards of laser products under 21 CFR Part 1040.10 except with respect to those characteristics authorized by Variance number <*number*> effective <*date*> and deviations pursuant to Laser Notice #50, dated July 24, 2007 U.S.A. Only
B		LASER RADIATION AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATIONS CLASS 4 LASER PRODUCT 435nm-660nm <10W CLASSIFIED PER IEC 60825-1 2007
C		Translation of label B in French, Chinese, Japanese, and Korean

This diagram shows the laser safety labels on the lens side of the projector.

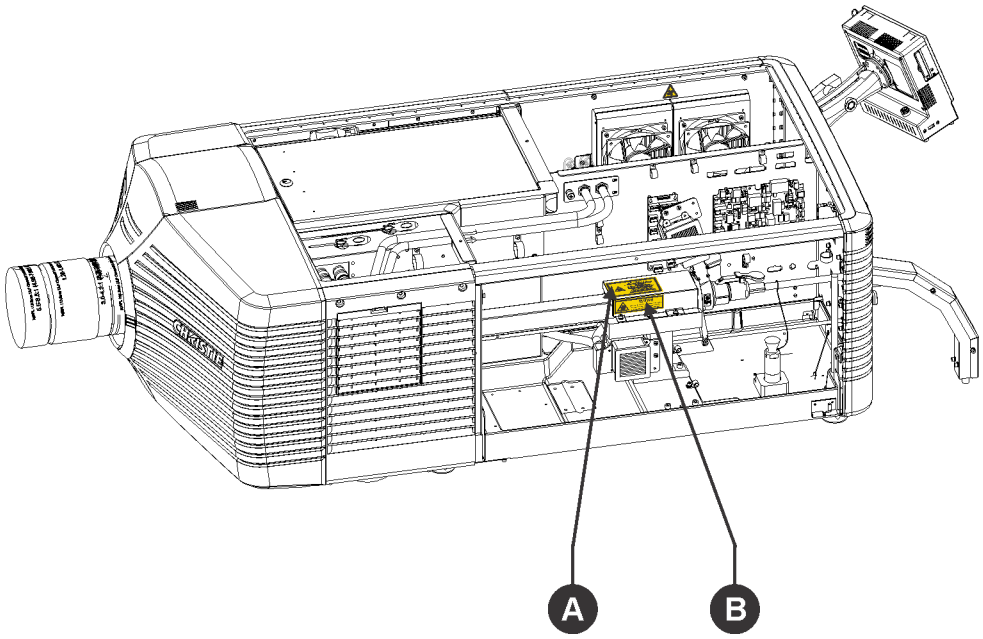


A		AVOID EXPOSURE LASER RADIATION IS EMITTED FROM THIS APERTURE
B		Translation of label A in French, Chinese, Japanese, and Korean

This diagram shows the laser safety labels that appear on the fiber bundle relay optics.

⚠WARNING Do not remove the protective housing. Failure to comply could result in death or serious injury.

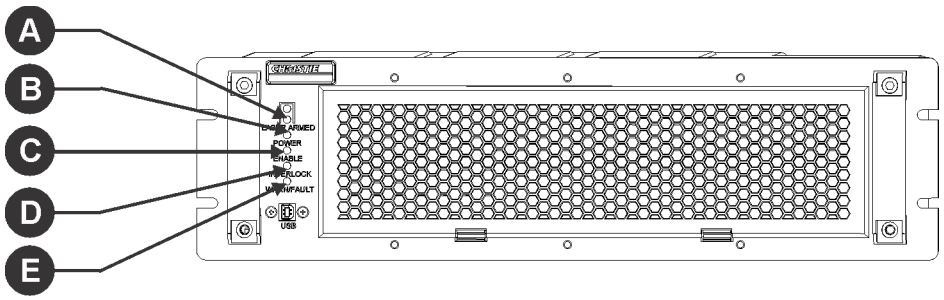
- Wavelength: 435 nm to 660 nm
- Beam divergence: 260 mrad
- Pulse Pattern: Continuous Wave
- Maximum power: 775 W



A		CAUTION CLASS 4 LASER RADIATION WHEN OPEN AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION
B		Translation of label A in French, Chinese, Japanese, and Korean

Laser module status lights

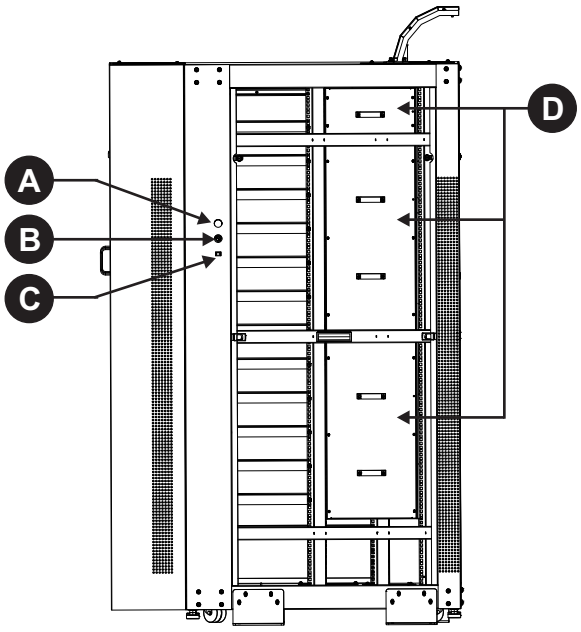
This diagram shows the location of the laser module LED status lights. The laser module is off when the Power LEDs are off.



	LED	Red	Green	Amber	White
A	LASER ARMED				Armed (Interlocks OK, lasers are charged; may or may not be emitting)
B	POWER		On (lasers are active and emitting)	Standby (Chiller and fans running)	
C	ENABLE				Lasers are active and emitting
D	INTERLOCK	Not blinking: external interlock failure Blinking: IR interlock failure	OK		
E	WARN/FAULT	Fault (laser module does not turn on or has turned off)	No fault	Warning (laser module is on but a laser temperature or voltage is above the warning threshold)	

LM Rack safety features

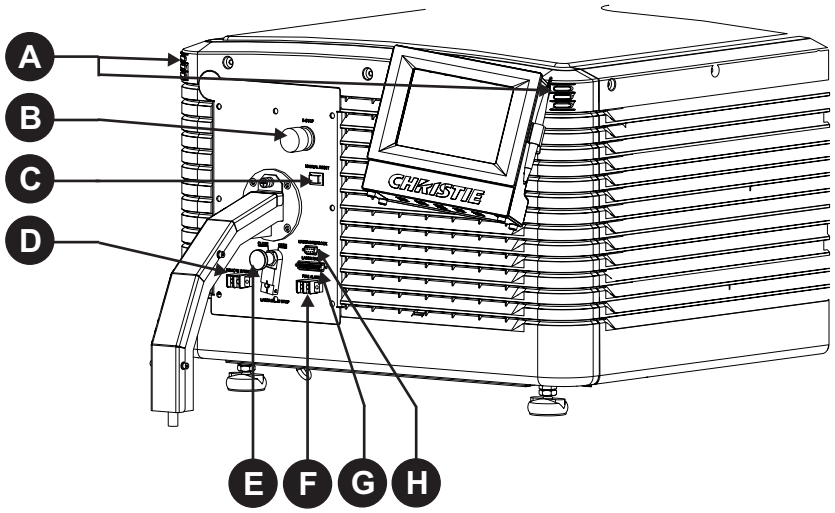
This diagram shows the laser safety features on the operator side of the laser rack.



A	Emergency stop To shut down the laser modules in an emergency, press **E-stop**.
B	Key switch Key must be present for the system to run. Laser radiation is not accessible when the key is removed.
C	Manual reset Press **Reset** following a system restart.
D	Fiber carrier panel When any panel is removed, the laser interlock opens and the lasers cannot be armed.

Projector safety features

This diagram shows the location of the laser safety features on the projector.

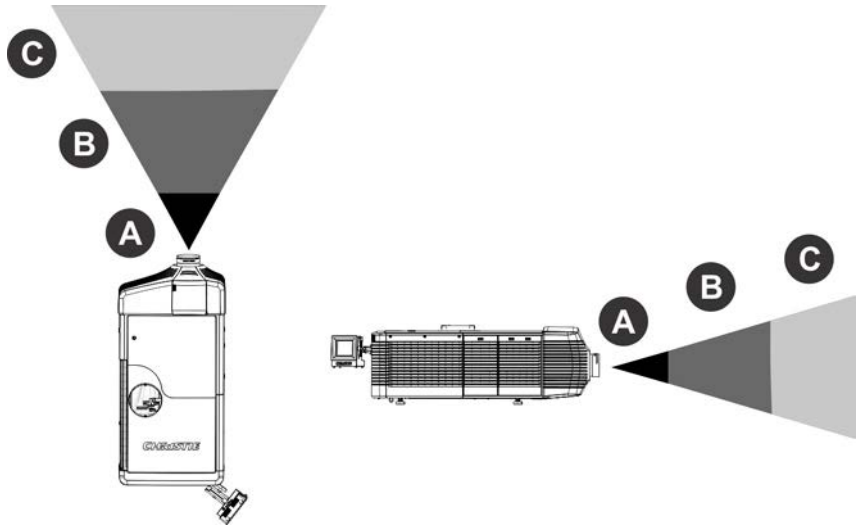


A	Laser emission indicator lights Bottom two LEDs on both sides emit white light when the lasers are armed. They are off when the lasers are not armed.
B	Emergency stop Turns off the laser modules off in an emergency.
C	Manual reset Re-arms the system after a system shutdown. Pressing **Manual Reset** indicates it is safe to arm the lasers.
D	Remote interlock Enables remote shutdown of the projector (optional).
E	Laser beam stop Blocks the laser light path. Rotate the beam stop to **Closed** when performing service or maintenance on the projector. The laser projector system cannot be armed when the laser beam stop is closed.
F	Fire alarm Enables the projector to be connected to the facility fire alarm system (optional). When the alarm is activated, the laser modules turn off.
G	LM Rack (interlock) Connects the projector to the laser rack.
H	Laser interlock Connects the projector to the laser modules. When the interlock is tripped, accessible radiation is reduced below the maximum permissible exposure (MPE) level.

Nominal ocular hazard distance

DANGER The installation setup must prevent access to the nominal ocular hazard area. Failure to comply results in death or serious injury.

The nominal ocular hazard distance (NOHD) is the distance from the projector where the light exceeds the maximum permissible exposure (MPE) on the eye and eye injuries can occur. The Skin Nominal Hazard Zone (SNHZ) is the area where skin burns are possible. This diagram illustrates the typical SNHZ (**A**), the NOHD (**A** + **B**), and the area (**C**) that is within permissible limits:



Hazard calculations are dependent on the number of light modules and the lens installed. This table lists hazard distances for Christie projector lenses with the zoom adjusted to its most hazardous position. Contact Christie support for assistance calculating hazard distances specific to your installation.

Light Modules	Projection Lens	4K Throw Ratio	Extended Source NOHD (m)	Skin NHZ (m)
7	1.25-1.45 DLPCine HB Zoom Lens (108-274101-01)	1.31:1	1.65	0.50
12	1.25-1.45 DLPCine HB Zoom Lens (108-274101-01)	1.31:1	2.8	0.65
7	1.25-1.83 DLPCine HB Zoom Lens (108-342100-01)	1.66:1	2.05	0.60
12	11.25-1.83 DLPCine HB Zoom Lens (108-342100-01)	1.66:1	3.50	0.80
7	1.45-2.05 DLPCine HB Zoom Lens (108-335102-01)	1.86:1	2.30	0.70
12	1.45-2.05 DLPCine HB Zoom Lens (108-335102-01)	1.86:1	3.90	0.80
7	1.6-2.4 DLPCine HB Zoom Lens (108-336103-01)	2.17:1	2.65	0.75
12	1.6-2.4 DLPCine HB Zoom Lens (108-336103-01)	2.17:1	4.55	1.05
7	1.8-3.0 DLPCine HB Zoom Lens (108-337104-01)	2.71:1	3.30	0.80
12	1.8-3.0 DLPCine HB Zoom Lens (108-337104-01)	2.71:1	5.65	1.30

Light Modules	Projection Lens	4K Throw Ratio	Extended Source NOHD (m)	Skin NHZ (m)
7	2.15-3.6 DLPCine HB Zoom Lens (108-338105-01)	3.26:1	3.95	1.20
12	2.15-3.6 DLPCine HB Zoom Lens (108-338105-01)	3.26:1	6.80	1.55
7	3.0-4.3 DLPCine HB Zoom Lens (108-278101-01)	3.89:1	4.70	1.40
12	3.0-4.3 DLPCine HB Zoom Lens (108-278101-01)	3.89:1	8.05	1.85
7	4.3-6.0 DLPCine HB Zoom Lens (108-279101-01)	5.43:1	6.55	2.00
12	4.3-6.0 DLPCine HB Zoom Lens (108-279101-01)	5.43:1	11.25	2.60
7	5.5-8.0 DLPCine HB Zoom Lens (108-280101-01)	7.24:1	8.75	2.65
12	5.5-8.0 DLPCine HB Zoom Lens (108-280101-01)	7.24:1	14.95	3.45

This table lists hazard distances for Christie projector high contrast lenses with the zoom adjusted to its most hazardous position.

Light Modules	Projection Lens	4K Throw Ratio	Extended Source NOHD (m)	Skin NHZ (m)
7	1.13-1.66:1 DLPCine HC Zoom Lens (108-400105-01)	1.66:1	2.25	0.60
12	1.13-1.66:1 DLPCine HC Zoom Lens (108-400105-01)	1.66:1	3.85	0.80
7	1.31-1.85:1 DLPCine HC Zoom Lens (108-401106-01)	1.86:1	2.50	0.70
12	1.31-1.85:1 DLPCine HC Zoom Lens (108-401106-01)	1.86:1	4.30	0.90
7	1.45-2.17:1 DLPCine HC Zoom Lens (108-402107-01)	2.17:1	2.95	0.80
12	1.45-2.17:1 DLPCine HC Zoom Lens (108-402107-01)	2.17:1	5.00	1.05
7	1.63-2.71:1 DLPCine HC Zoom Lens (108-403108-01)	2.71:1	3.65	1.00
12	1.63-2.71:1 DLPCine HC Zoom Lens (108-403108-01)	2.71:1	6.25	1.30
7	1.95-3.26:1 DLPCine HC Zoom Lens (108-404109-01)	3.26:1	4.35	1.20
12	1.95-3.26:1 DLPCine HC Zoom Lens (108-404109-01)	3.26:1	7.50	1.55

AC/power precautions

⚠WARNING

Failure to comply with the following could result in death or serious injury.

- Use only the AC power cord provided with the projector. Do **not** attempt operation if the AC supply is not within the specified voltage and power range, as specified on the license label.
- As a safety feature the projector is equipped with a three-wire plug with a third (grounding) pin. If you cannot insert the plug into the outlet, contact an electrician to have the outlet replaced. Do **not** defeat the safety purpose of the grounding-type plug.
- Loose cables provide a trip or fire hazard. Position all cables where they cannot contact hot surfaces, be pulled, or be tripped over.
- Damaged cables provide a fire hazard. Do not allow anything to rest on the power cord. Never operate the projector if a cable appears damaged.
- Overloaded power outlets and extension cords provide a fire and shock hazard. Do not overload power outlets or extension cords.
- Disconnect projector from AC before opening any enclosure.

⚠CAUTION

Only qualified service technicians are permitted to open projector enclosures and only if the projector is disconnected from AC power. Failure to comply could result in minor or moderate injury.

Lead dress

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

Test the interlocks

Once the projector is running, ensure the safety interlocks are functioning.

⚠WARNING

Before displaying an image from the projector, test the three interlock devices. Every time the interlock is activated, the laser modules turn off. Failure to comply could result in death or serious injury.

Test the key switch

1. Turn the key switch on the laser rack off.
2. Check the status lights on the back of the projector are off.
3. Turn on the key switch.
4. Press **Manual Reset** on the projector.

Test the laser rack emergency stop

1. Press the emergency stop button on the laser rack.

2. Check the status lights on the back of the projector are off.
3. To release the E-stop, rotate the knob clockwise.
4. Press **Manual Reset** on the projector.

Test the projector emergency stop

1. Press the emergency stop button on the projector.
2. Check the status lights on the back of the projector are off.
3. To release the E-stop, rotate the knob clockwise.
4. Press **Manual Reset** on the projector.

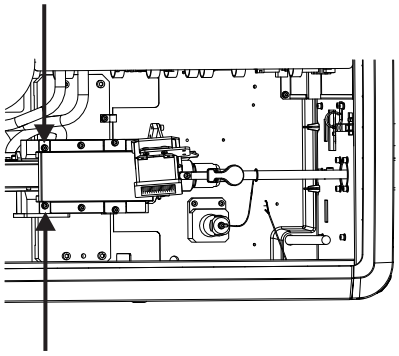
Adjust the Image

This section describes 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. The following lists the most common alignment procedures required after a specific part is replaced.

Rotate the integrator rod

If there are screen shadows, perform this procedure.

1. Turn off the laser modules until only one is enabled. See *Single laser module operation* on page 9.
2. Unlock and open the optical access door. See *Optical access door* on page 43.
3. Loosen the 2 screws securing the retaining clip to the rear of the integrator.



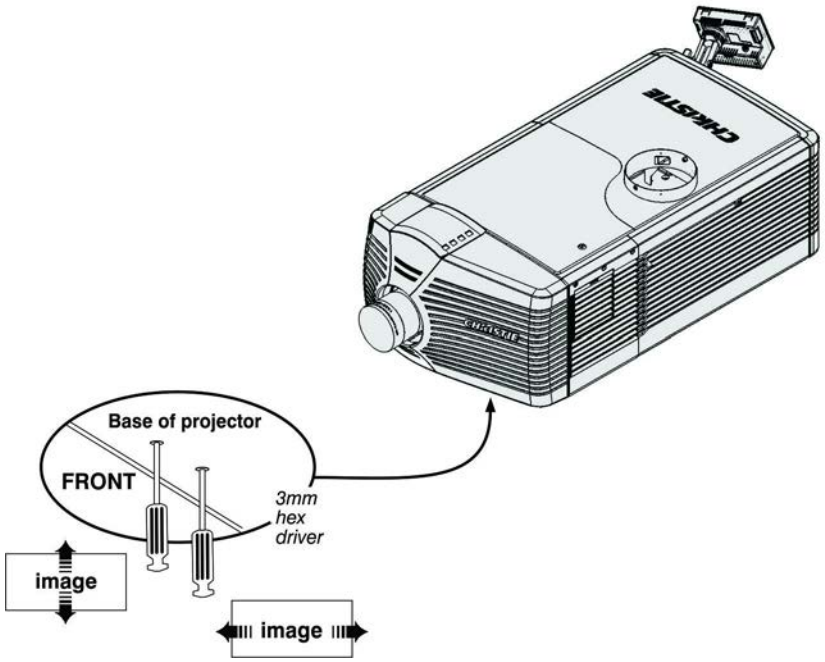
   Use caution when removing these screws to avoid damaging the Remote Temperature Sensor Module (RTSM).
4. Rotate the integrator rod to remove the shadow from the corners.
5. To focus the integrator rod, slide it forward and back until the image focused.
6. Tighten the two retaining clip screws to secure the integrator rod.
7. Close and lock the optical access door.

Align the fold mirror

Align the fold mirror if a corner or edge of an image is missing.

1. Turn off the laser modules until only one is operating. See *Single laser module operation* on page 9.
2. Adjust the two screws located on the bottom front of the projector.

3. To raise or lower the image, adjust the screw closest to the operator side (right-side when facing screen).
4. To move the image left or right, adjust the screw furthest from the right (facing the lens).



You may have to repeat the integrator and the fold mirror alignments until the corners are focused and the shadows are off the screen.

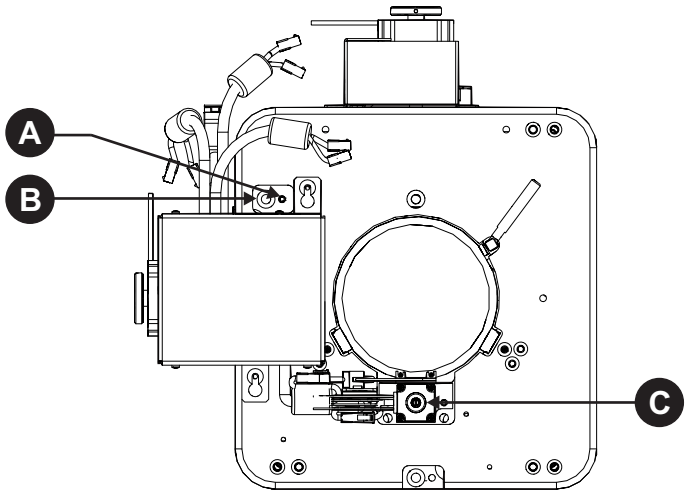
Adjust horizontal boresight

⚠WARNING Failure to comply with the following could result in death or serious injury.
- Do not look into the lens. The extreme brightness will cause permanent eye damage.
- Keep hands, clothing, and all combustible material away from the light path.

⚠CAUTION Adjust the Boresight with low light levels from a single laser module. Failure to comply could result in minor or moderate injury.

Adjust the boresight if the image cannot be focused uniformly across the screen.

1. Loosen the horizontal lock screw (A).



2. Extend the lens focus completely.

   Retract the lens with the focus knob (C) to adjust the **Focus**. Watch the image at the left edge of the screen until it comes into focus.

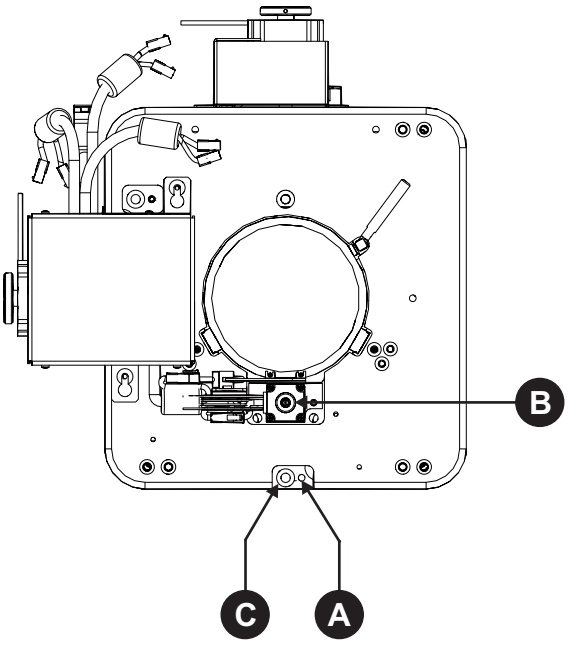
3. If the entire screen is in focus, proceed to step 8.
4. Continue retracting the lens.
   a. If the right side of the image comes into focus before the lens is completely retracted, adjust the horizontal boresight bolt (B) to balance the left and right edges.
   b. If the right side of the image fails to focus, adjust the horizontal boresight bolt (B).
5. When both sides appear equally blurry, adjust the focus (C) to re-center the image.
6. Repeat steps 2 to 5 until both sides of the image are focused.
7. Tighten the horizontal lock screw (A) to maintain the adjustments.
8. Check the boresight again.
9. If you need to adjust the vertical boresight, skip to the next section. See *Adjust vertical boresight* on page 28.

Adjust vertical boresight

Perform this procedure if there is no ILS. If there is an ILS, see *Adjust vertical boresight with an ILS* on page 29.

1. Focus the image at the top edge of the screen.

2. Loosen the vertical lock screw (A).



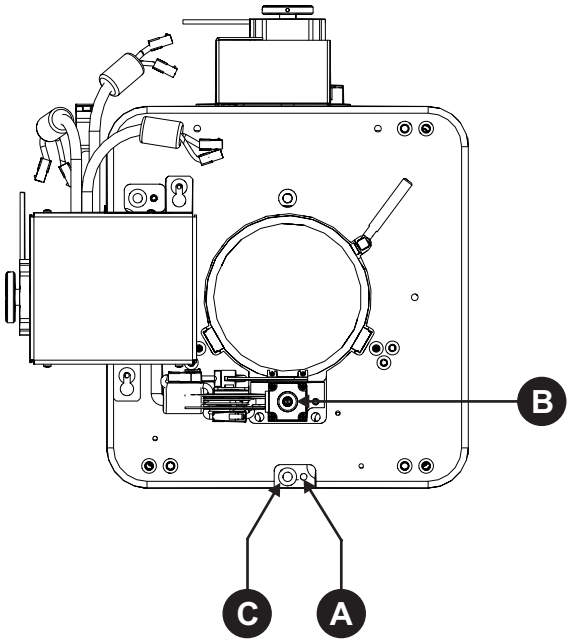
3. Extend the lens focus (B) completely.
4. To retract the lens, adjust the **Focus** knob (B). Watch the image at the top edge of the screen until it comes into focus.

   If the entire screen is in focus, proceed to step 8.
5. Continue retracting the lens.
   a. If the bottom edge of the image comes into focus before the lens is completely retracted, adjust the vertical boresight bolt (C) to direct or aim the lens mount UP towards the top of the screen to balance the top/bottom edges.
   b. If the top edge of the image is not in focus, adjust the vertical boresight bolt (C) to direct or aim the lens mount toward the bottom of the screen.
6. When both sides appear equally blurry, adjust the horizontal and/or vertical offset to re-center the image on the screen.
7. Repeat steps 2 to 6 until the top and bottom of the screen are both well-focused.
8. Re-focus the center of the image. The goal is for good focus at the center and on all sides.
9. Tighten the vertical lock screw (A) to maintain the adjustments.
10. Check the boresight again.

Adjust vertical boresight with an ILS

Perform this procedure if there is an ILS. If there is no ILS, see *Adjust vertical boresight* on page 28.

1. Focus the image at the top edge of the screen.
2. Loosen the vertical lock screw (A).



3. Extend the lens focus (B) completely.
4. To retract the lens, adjust the **Focus** using the counter-clockwise button on the ILS Adjust window. Watch the image at the top edge of the screen until it comes into focus. If the image appears well-focused on the top edge but not on the bottom, determine if the bottom edge focuses in front of or behind the screen.

   If the entire screen is in focus, proceed to step 8.
5. Continue retracting the lens.
   a. If the bottom edge of the image comes into focus before the lens is completely retracted, adjust the vertical boresight bolt (C) to direct or aim the lens mount UP towards the top of the screen to balance the top/bottom edges.
   b. If the top edge of the image is not in focus, adjust the vertical boresight bolt (C) to direct or aim the lens mount toward the bottom of the screen.
6. When both sides appear equally blurry, tap menu > Advanced Setup > ILS File Setup and tap the directional arrows in the Offset area to center the image on the screen.
7. Repeat steps 2 to 6 until the top and bottom of the screen are both well-focused.
8. Re-focus the center of the image. The goal is for good focus at the center and on all sides.
9. Tighten the vertical lock screw (A) to maintain the adjustments.
10. Check the boresight again.

Adjust DMD convergence

⚠CAUTION

Failure to comply with the following could result in minor or moderate injury.

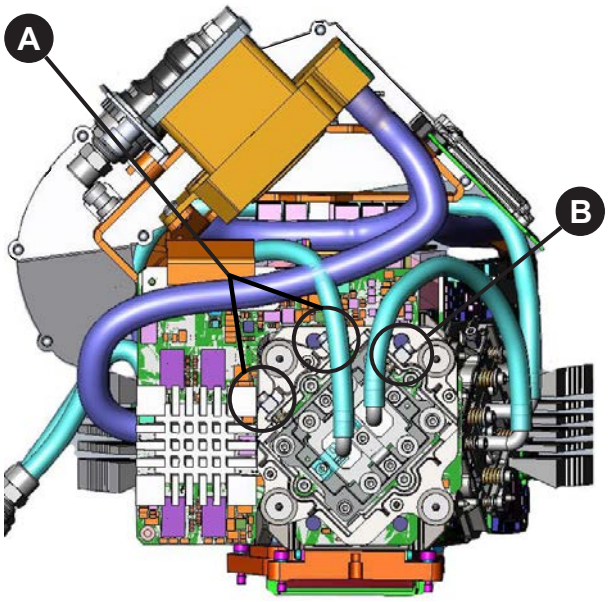
- Always wear an electrostatic discharge (ESD) strap and use insulated tools when replacing the light engine or any other circuit board; however, Christie does not recommend wearing a strap while converging a live unit, but to instead ensure frequent contact with the bare metal of the projector to prevent static buildup.
- Do not touch the heat sink in the Light Engine compartment when converging a projector as it is can cause burns.

NOTICE

Do not run the projector while performing convergence with the Light Engine Fan Pack removed. This causes overheating of the Satellite Formatter Board FPGAs. Failure to comply may result in equipment damage.

- All procedures must be followed as described and performed by Christie authorized, trained personnel.
- Safety glasses are not required for convergence as exposures greater than Class 1 are not possible.
- These instructions are intended to be a supplement descriptive guideline for information on convergence. Personal tool preference, mechanical experience, and individual techniques are all variables that make this document a subjective tool for use only by experienced professional technicians.

The projector uses three separate digital micromirror device (DMD) panels to produce three separate red, green, and blue image components. To ensure the most accurate color representation across the whole image, adjust the convergence to perfectly align the three panels so that all pixels line up. Read this entire section before adjusting convergence.



A	Screws 1 and 2: Vertical and Twist Adjustment
B	Screw 3: Horizontal Adjustment

Before convergence

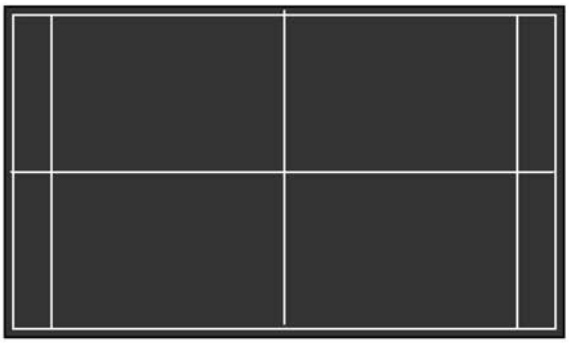
- Make sure image zoom and centering is complete.
- Make sure boresight procedures are completed.
- Turn the lasers on.
- Allow the projector to warm up for 15 minutes to reach nominal operating temperature.
- During convergence, the lid and/or filter side of the projector is open, causing decreased prism cooling performance and possible shifts in convergence or DMD focus. The prism temperature must be monitored during the adjustment and kept within a few degrees of the nominal temperature achieved above by lowering the laser power or periodically replacing the cover for a cool-down.
- If the procedure takes longer than an hour, watch for over-temperature alerts. Replacement of the lids and covers may be necessary.
- Typically the blue image component can be used as the fixed reference, so no adjustment is required. However, if you need to adjust the blue image component it is easy to adjust, but the side panel must be removed. The recommended normal convergence adjustments are from green to blue and red to green.
- Christie recommends that the vertical and rotation adjustment be done first, as they work dependently together, and the horizontal adjustment done last.
- Use extreme caution to not damage any electronic components.
- Do not force the adjustment, the card should move easily with gentle pressure.

Evaluate convergence

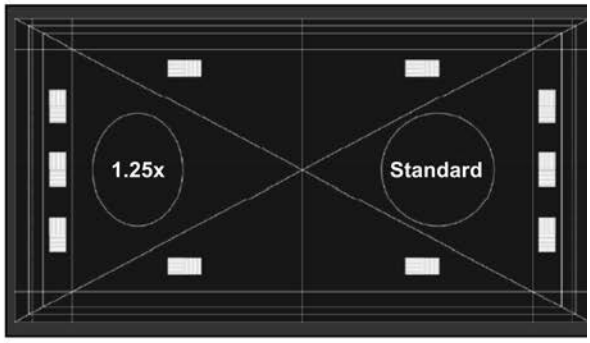
1. Display either the **Alignment Pattern** or the **Framing Pattern**.

   The framing pattern may not be installed on the projector in some cases. Keep a copy of this pattern on your computer and load it to the projector you are working on if not present.

2. Zoom and focus the image to see the entire outer edge of the test pattern frame.



Alignment Pattern



Framing Pattern

3. Using the horizontal and vertical white lines, you can judge the convergence issues. Look at one color at a time and remember that you can see a possible seven colors to lead you to a valid conclusion. The stripe pattern boxes along the outer frames can be helpful as well.

Magenta=Blue+Red / Yellow=Green+Red / Cyan=Green+Blue / White=Red+Green+Blue

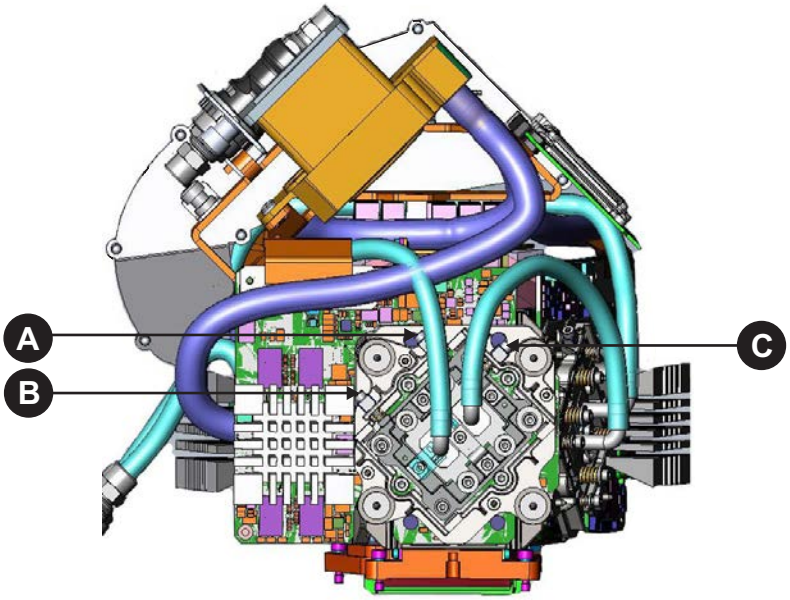
4. Look for *twist* using the center vertical and horizontal lines—scan from one side of the screen to the other, observing any change in vertical position of the color in question relative to the point where you started.

Adjust formatter convergence

⚠CAUTION Remove all jewelry (rings, watches, necklaces, bracelets and so on) before adjusting convergence.

Do not apply excessive force on the adjustment screws. This might cause the convergence adjustment to become misaligned once you remove the adjustment tool.

The red and green formatters are identical in physical layout and adjuster function. The blue formatter card is slightly different in physical layout, but the adjustment functions are the same. The twist and vertical adjustments interact with each other on the horizontal axis.



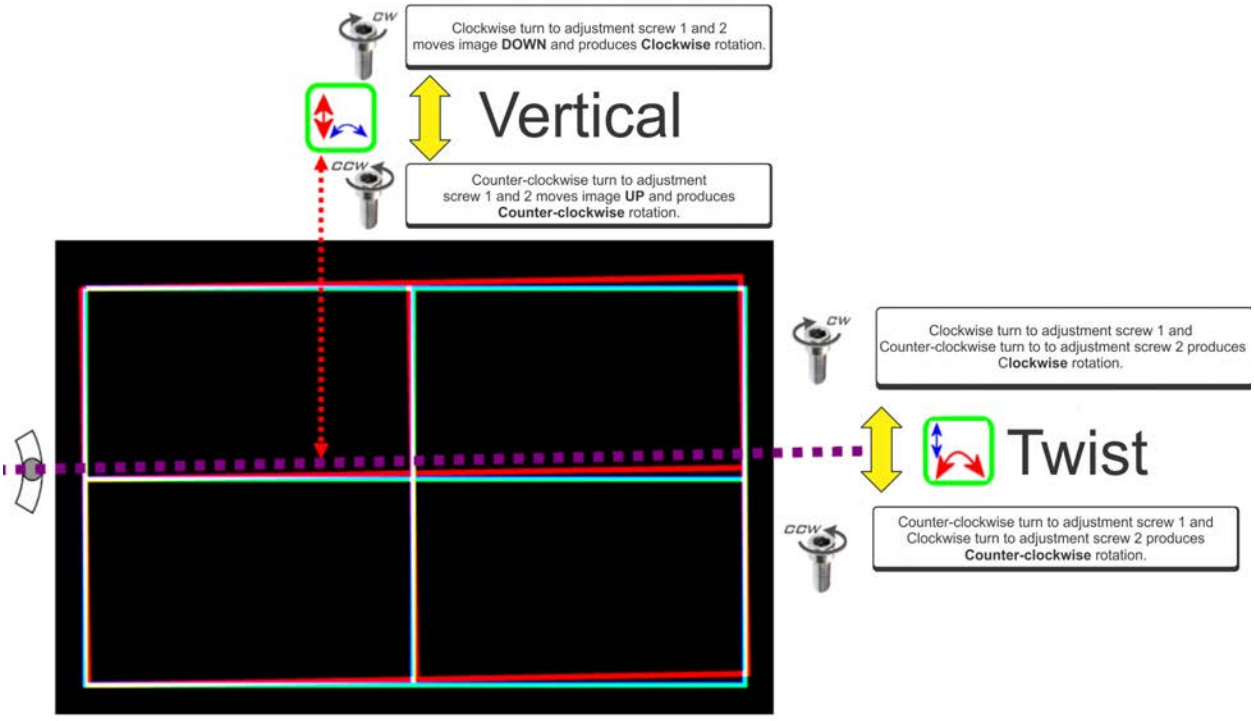
Screen / Screw	A	B	C
↻	↻	↻	N/A
↻	↻	↻	N/A
⇧	↻	↻	N/A
⇩	↻	↻	N/A
⇦	N/A	N/A	↻
⇨	N/A	N/A	↻

The physical layout of the Formatter cards dictates the behavior of the twist and vertical adjustments:

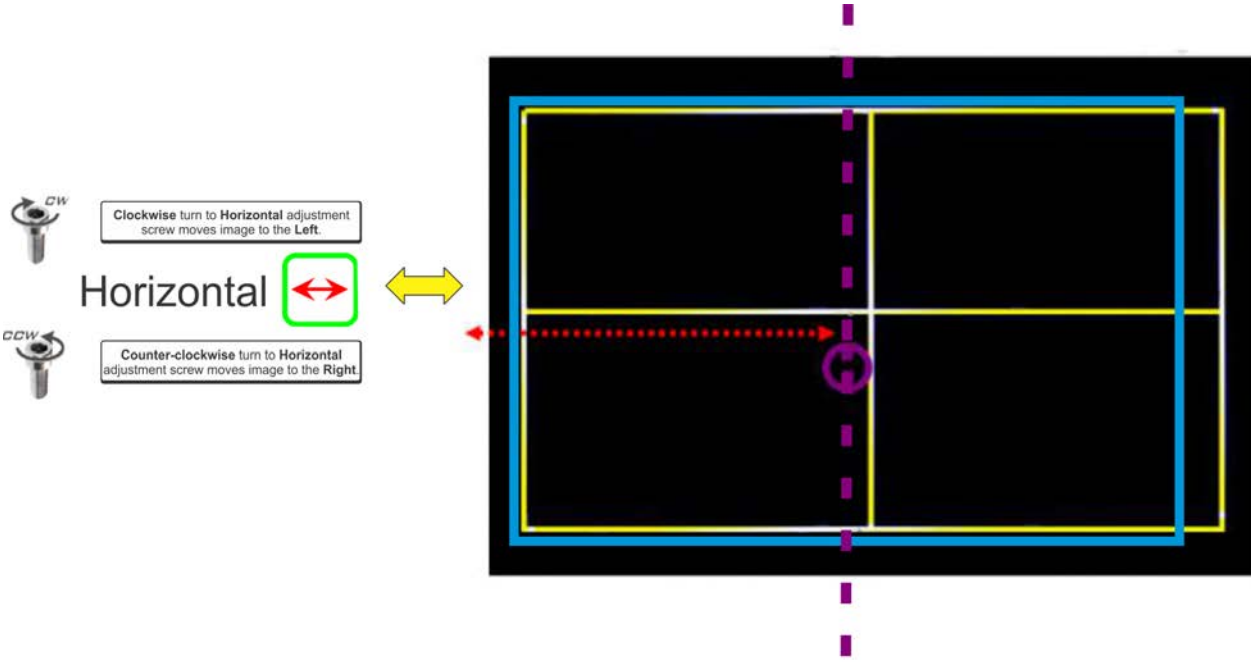
- The adjustment is like a “Twist with the left-side of the screen as a sliding hinge point to allow vertical travel”.
- The vertical adjustment screw and twist adjustment screw interact with each other such that if one is turned in the opposite direction of the other, the twist is affected.
- If both screws are turned equal amounts in the same direction, the image moves vertically.
- Remove the light engine air filter and fan pack to access the blue convergence adjustment screws.

  Cooling is affected by removing the filter and fan pack assembly.

You do not always have to turn the screws simultaneously; however, adjusting one at a time requires equal or equal and opposite turn on the other to prevent binding and achieve the required adjustment. It is recommended to locate the shorter blade 2.5 mm driver on adjusting screw #2 (especially on the red), and use the longer blade 2.5 mm driver for screw#1 and horizontal (screw #3).



- The horizontal adjustment screw is independent of the twist and vertical adjustments.

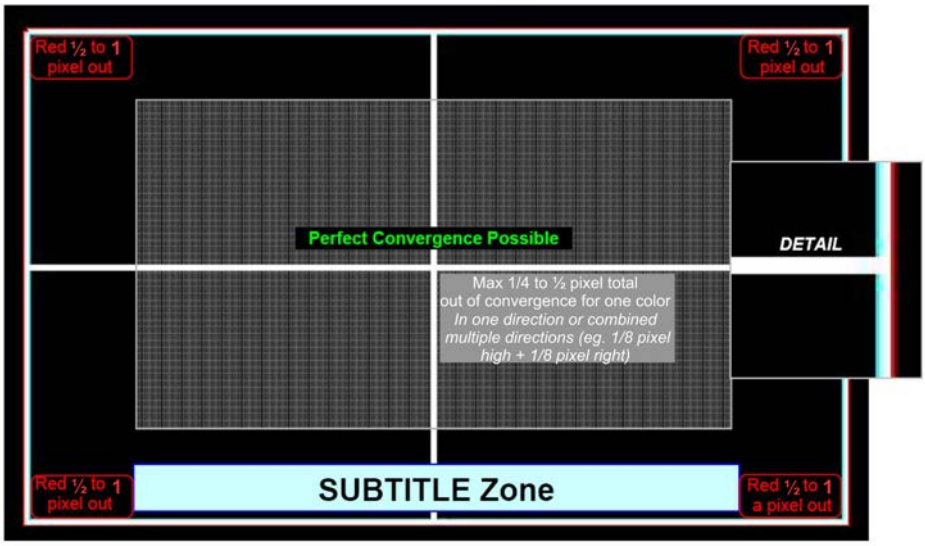


- Christie recommends that you locate the twist adjustment screw with the 2.5mm Allen driver and leave it in place, resting against the lens mount/formatter card.
- Use a second driver to adjust the horizontal/twist adjustment screw or the vertical adjustment screw.

Final convergence assessment

1. On the prisms, the red image is slightly larger than the blue and green. The larger size is caused by the natural properties of Red light due to a *slow* wavelength compared to blue and green. The angle that light is traveling is affected by every medium it travels through, and in this case several pieces of glass are between red and the screen—the red image is affected more so as it ends up slightly larger.
    a. This means that the best possible convergence would be the center area should be perfectly aligned showing solid white pixels, as shown in the simplified diagram.
    b. The Red must be evenly 1/4 to 1/2 a pixel out all the way around the outer area, showing cyan (green + blue) towards the center of the screen.

c. Green and blue must always be perfectly aligned to each-other (to within 1/4 pixel total in one or a combination of directions.)



2. In certain circumstances, there may be further tolerance deficiencies in the prism assembly in combination with the projection lens that causes the normal Red over-sizing to become slightly non-uniform.

   a. In practice, this extra increase in size has generally appeared on the lower-right of the image, causing an apparent clockwise twist in the lower-right corner only—the upper left, right and lower-left all look fine.

   b. To “Split the difference” push the rest of the image slightly twisted counter-clockwise to minimize the effect on the bottom of the screen, keep the subtitle zone as converged as possible.

   c. If the problem appears to be more than an extra 1/2 of a pixel out of uniformity, a new lens/prism assembly may be the only solution.

Obtain the white point and brightness

Create a white point laser setting file for 3D and 2D channels. You may also need to create one for scope and flat features.

1. In the laser bank control application under Screens, click **System**.
2. Under Color Levels, move the System Green control (CTL) slider to 100%.
3. Wait approximately 30 seconds for the green lasers to respond.

   Every time you adjust the green lasers, wait for the lasers to move to the new value.

4. Using a spectroradiometer, such as Photo Research PR-655 SpectraScan® measure the brightness and color of the screen.

5. Move the System Red and System blue CTL sliders up or down to bring the measured values closer to the target white point values:

   DCI: x = 0.314, y = 0.351

   D65: x = 0.3127, y = 0.3290

   For more precise adjustments, click the cap on the slider and press the up and down arrow keys.

6. Repeat steps 4 to 5 until the measured values are approximately the same as the target white point.

Save the laser settings

1. Open the laser manager application.
2. Click the **System** tab.
3. Click **Save** in the **Configuration Management** area.
4. Type a name for the settings file and press **Enter**.

Parts and Module Replacement

When reinstalling a module, follow the removal instructions in reverse unless otherwise indicated. See *Interconnections* on page 88 when re-connecting harnesses. Make sure the system is disconnected from AC power before you start repairing, removing, or installing any modules. This system is internationally approved and is designed for safe and reliable operation. To assure complete safety at all times, the following precautions must be taken during servicing and the original projector design must remain intact.

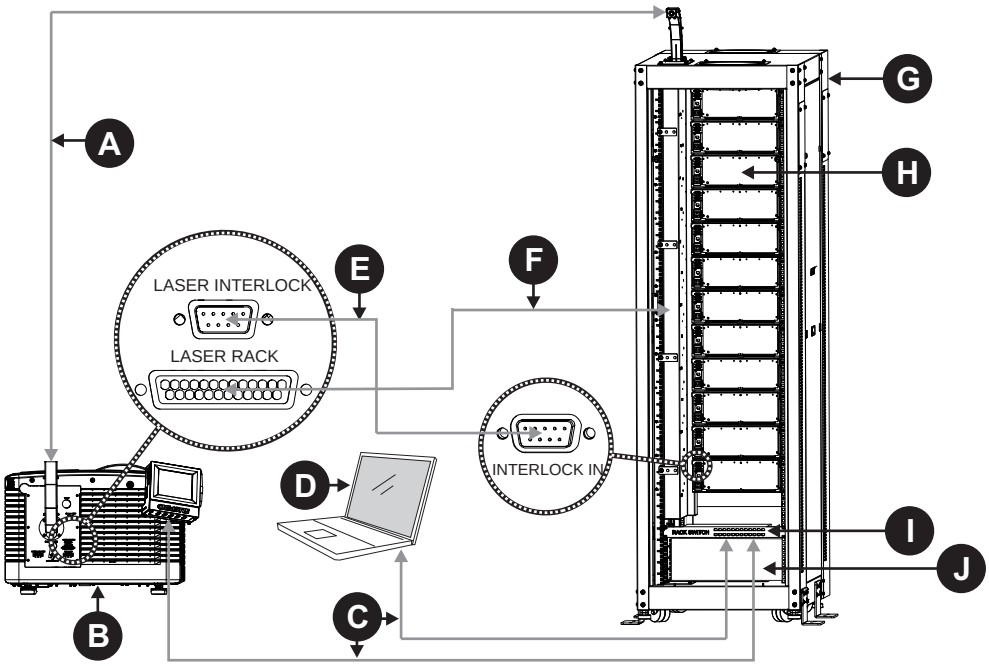
Safety warnings and guidelines

- Read and adhere to all safety warnings and guidelines. See See *Safety Information* on page 11.
- Always turn off and disengage all power sources to the system before servicing. See *Shut down the projector* on page 41.
- When re-connecting harnesses, see *Interconnections* on page 88.

Tools required

- Security lid keys
- Convergence Tool Set - 2.5 mm driver with heat-shrink tubing (2.0 inch and 6.5 inch lengths)
- Long and stubby neck magnetic-tip Phillips screwdrivers—#1, #2, #3
- Slot screwdriver
- Hex keys/drivers: 1.5 mm 2.5 mm, 3 mm, 5 mm, 6 mm
- Nut driver: 5.5 mm, 6 mm
- Ratchet: 19 mm
- Pliers
- Electrostatic protective strap and pad
- Disposable Nitrile gloves (included with optical components)

Christie laser projection system components



A	Fiber optic bundle Transmits the collected laser light to the projector.
B	Projector Modulates light from the laser modules and passes it through a projection lens to produce the image on the screen.
C	Ethernet cables Connects the laser bank manager and the projector to the network.
D	Laser bank manager Runs the laser bank control application that manages the laser modules.
E	Interlock cable (9-pin) Carries the signal for the emergency stop, key switch, and laser modules to verify a safe connection between the laser modules and the projector.
F	Interlock cable (25-pin) Carries the signal for the Manual Reset button to the projector.
G	Laser rack (rear side shown) Accommodates up to 12 laser modules, the power distribution unit, and the Rack switch and equipped with a key switch and an emergency stop for safety.
H	Laser module Generates laser light for the projector.
I	Rack switch Provides Ethernet connection to laser modules, laser bank manager, and projector.
J	Power distribution unit Contains rectifiers and breakers to provide DC power to laser modules.

Shut down the projector

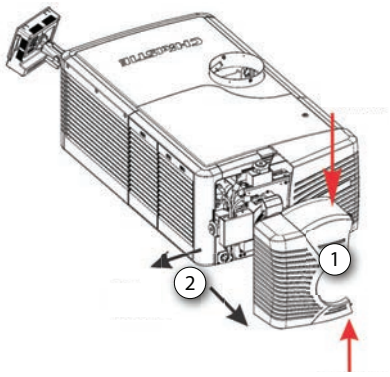
Perform these steps before servicing the system.

1. Move the projector breaker switch to the off position.
2. Disconnect the projector from AC power.
3. Rotate the beam stop to the closed position.
4. Remove the key from the laser rack key switch.

Projector covers and components

⚠CAUTION Never operate the projector or the fans without all the covers installed. Failure to comply could result in minor or moderate injury.

Shroud



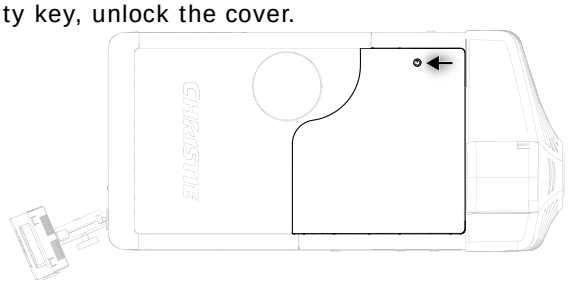
Estimated replacement time: 2 minutes

1. With light pressure, push down on the top of the shroud while pushing upward on the bottom of the shroud.
2. Carefully slide the shroud sideways and forward away from the lens mount and the lens.
3. Set the shroud covers on a clean, stable surface.

Front top lid

Estimated replacement time: 0.5 minutes

1. Using the low security key, unlock the cover.



2. Lift the cover up and remove.

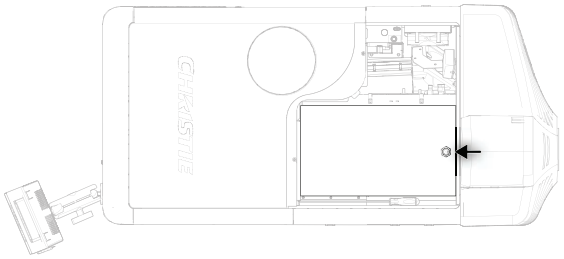
Light engine lid

NOTICE Only Christie authorized service technicians should open the light engine lid. Failure to comply may result in equipment damage.

Estimated replacement time: 1 minute

Remove the light engine lid to access components in the light engine and card cage compartments.

1. Remove the *Front top lid*, see page 41.
2. Using the high security key, unlock the light engine lid.
3. Lift up the lid and remove.

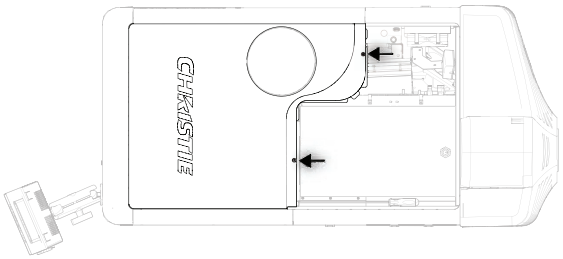


Rear top lid

Estimated replacement time: 5 minutes

Remove the rear top lid to access the LVPS/liquid cooling and the rear optical compartments.

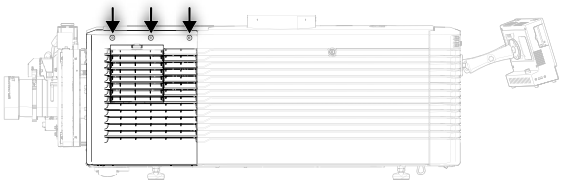
1. Remove the *Front top lid*, see page 41.
2. Remove the 2 screws securing the rear lid to the chassis.
3. Open the *Optical access door*, see page 43.
4. Remove the rear top lid.



Left access cover

Estimated replacement time: 1 minute

1. Loosen the 3 captive screws securing the cover.

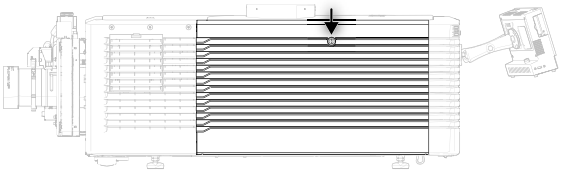


2. Lift the cover up and away from the projector and set it on a flat stable surface.

Optical access door

Estimated replacement time: 1 minute

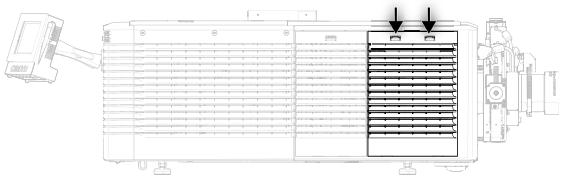
The optical access door is locked using a low security key. To access to the optical compartment and the laser fiber bundle, the lamp door can either be removed or tethered open at 90°.



1. Using the low security key, unlock and open the optical access door.
2. Pull the pin to release the securing tether on the right side of the door and secure the door.
3. To release the door, slide the locking pin (accessible through the cutout located on the right side of the door) towards the inside of the door.

Light engine air filter cover

Estimated replacement time: 0.5 minutes



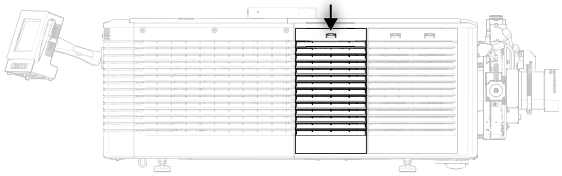
1. Push down on the 2 snap tabs on the top of the cover.
2. Tilt and lift the cover away from the projector.

   The filter comes out with the cover.

Card cage cover

Estimated replacement time: 0.5 minutes

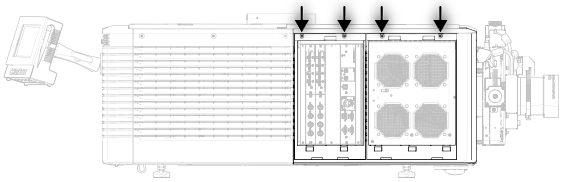
Remove the card cage cover to access the electronics panel and input cards.



1. Push down on the snap tab on the top of the cover.
2. Tilt and lift the cover away from the projector.

Access panel frame

Estimated replacement time: 4 minutes

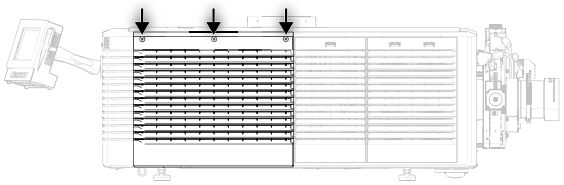


1. Remove the *Card cage cover*, see page 43.
2. Remove the *Light engine air filter cover*, see page 43.
3. Remove the 4 screws securing the top of the cover to the chassis.
4. Tilt the access panel frame outward to clear the rear cover and lift it up and out of the projector.

LVPS/liquid cooling cover

Estimated replacement time: 1 minute

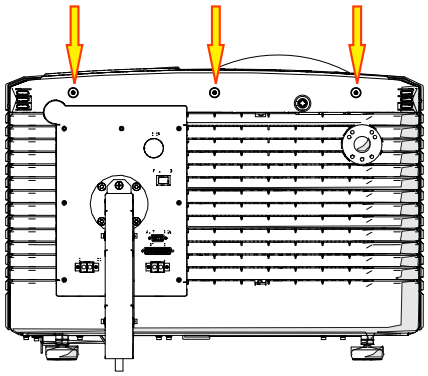
Remove the LVPS/liquid cooling cover to gain access to the liquid cooling assembly filter.



1. Loosen the 3 captive screws on the top of the cover.
2. Lift up the cover up and away from the projector.

Rear cover

Estimated replacement time: 12 minutes



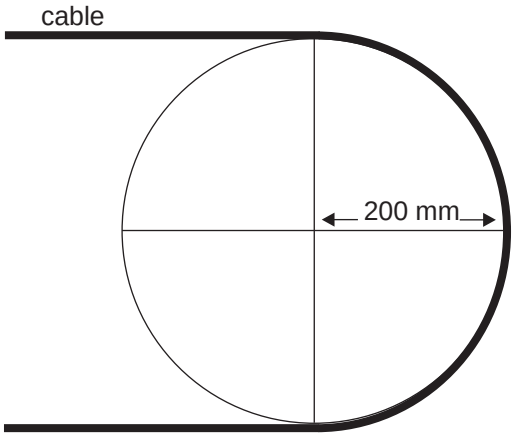
1. Remove the *Fiber bundle*, see page 45.
2. Remove the *Beam stop*, see page 46.
3. Remove *Front top lid*, see page 41.
4. Remove *Rear top lid*, see page 42.
5. Disconnect the P1, P8, J2, J4, and J5 connectors from the interlock card.
6. Loosen the 3 screws securing the rear cover.
7. Disconnect the touch panel controller (TPC) cable.
8. Tilt and lift the back cover away from the projector.

Fiber bundle

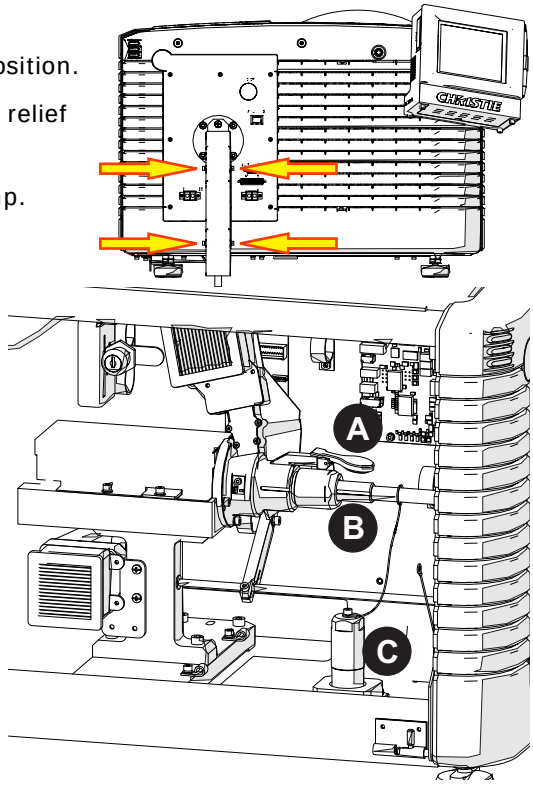
NOTICE

Failure to comply with the following may result in equipment damage.

- Always keep a protective cap on disconnected fiber optic cables.
- Dispose of any used fiber optic cleaning material after use.
- Never touch or blow air from your mouth into the end of a fiber optic cable as it can become contaminated and damaged.
- Bending the cable more than the minimum bend radius of 200 mm (7 $^{7}/_{8}$ inches) may cause internal breaks.



Estimated replacement time: 3.5 minutes.



1. Pull and rotate the beam stop knob to the closed position.
2. Remove the 4 screws securing the fiber optic strain relief cover.
3. Remove the 4 screws securing the strain relief clamp.
4. Open the *Optical access door*, see page 43.
5. Lift the dust cover on the fiber receiver. (A).
6. Loosen the coupler on the fiber optic connection. (B)
7. Remove the tethered end cap which is secured to the threaded holder on the base of the projector. (C)
8. Remove the fiber bundle from the connection and attach the tethered end cap.
9. Carefully remove the fiber bundle from the projector and fiber optic stress relief, making sure to maintain the minimum bend radius of 200 mm.

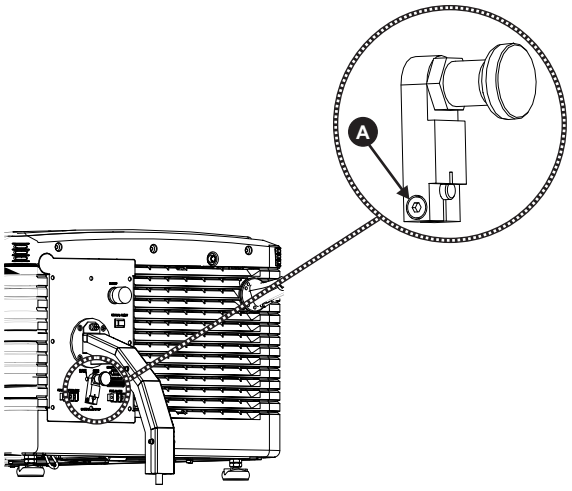
Beam stop

NOTICE Do not use the beam stop to turn off the laser modules. Failure to comply may result in equipment damage.

Estimated replacement time: 2.5 minutes.

The beam stop is a stainless steel plate that blocks the light from the fiber bundle. Use it to prevent the laser modules from inadvertently turning on during service.

1. Loosen the screw (A) on the beam stop handle and remove the handle.

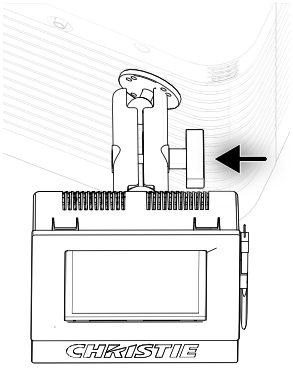


2. Open the optical access door with the low security key.
3. Rotate the beam stop arm clear of the ferrule connection.
4. Remove the retaining clip.
5. Pull the shaft assembly toward the rear cover until it is out of the bushing.
6. Position the shaft assembly away from the stand and pull the shaft assembly until it is clear from the back cover.

   When reassembling the beam stop, make sure the nylon washer is inserted between the back cover and the c-clip.

Touch panel controller

Estimated replacement time: 2 minutes + 15 minutes for the software upgrade.

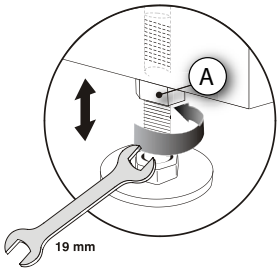


1. Disconnect the touch panel controller (TPC) harness from the connector on the back of the projector.
2. Loosen the TPC mounting to remove the TPC assembly from the ball joint at the back of the projector.

Feet

⚠CAUTION Use of the projector's rear safety strap is **mandatory** during foot replacement to prevent the projector from tipping. Keep three of the projector's feet on the table at all times. Failure to comply could result in minor or moderate injury.

Estimated replacement time: 6 minutes + 10 minutes for image adjustment



1. Loosen the foot lock nut (A).
2. Unscrew the foot until it is no longer engaged in the baseplate.
3. Remove the foot.

Filters

NOTICE Use only high efficiency Christie approved filters. Never operate the projector without the filter installed. Never reuse an old paper air filter. Failure to comply may result in equipment damage.

Clean a washable filter

While used paper filters must be discarded, you can clean the blue electrostatic filters. If the amount of dirt on the filter is minimal, use a vacuum or compressed air to remove it. If you use compressed air, the air must move through the filter in the opposite direction of the air flow indicator on the side of the filter.

⚠WARNING The installation of a filter that has not been allowed to dry completely can cause an electrical short and damage the projector.

1. Hold the filter on an angle under warm running water so the water flows through the filter in the opposite direction of the air flow indicator on the side of the filter.
2. Rinse the filter thoroughly.

3. Submerge the filter for a minimum of 30 minutes in a container of warm water and two tablespoons of mild detergent or liquid dish soap.

   If the filter is extremely dirty, move the filter from side to side occasionally, or remove the excess dirt by brushing both sides of the filter with a soft brush.

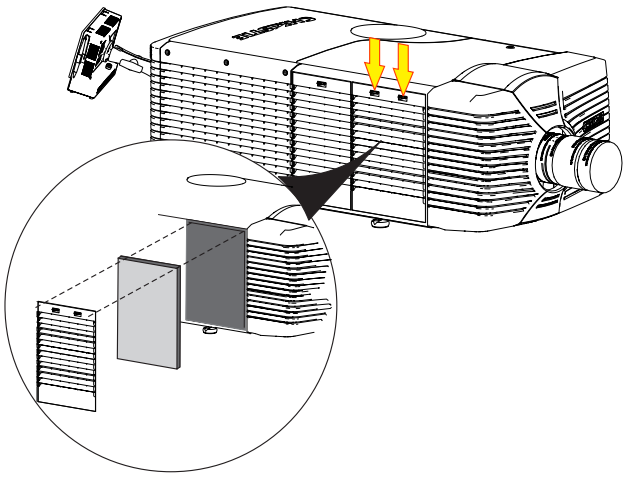
4. Rinse the filter thoroughly by holding it on an angle under cool running water. The air flow arrow on the side of the filter should face down.
5. Repeat steps 3 and 4 if the filter still appears dirty.
6. Shake the filter over a container until most of the water is removed.
7. Place the filter on its edge on a flat, stable surface and allow it to dry thoroughly for a minimum of 24 hours.
8. To confirm that the filter is dry, place it over a dry paper towel and shake it. If the paper towel remains dry, the filter can be installed in the projector.
9. Record the date the filter was cleaned.
10. Replace the filter following the instructions for the specific filter.

Light engine air filter

Estimated replacement time: 1 minute

This filter is located on the operator side near the front of the projector, behind the air filter cover.

1. On the air filter cover, push down on snap tab at top.
2. Tilt the top of the cover towards you and lift it up to remove.
3. Remove the old air filter and discard.



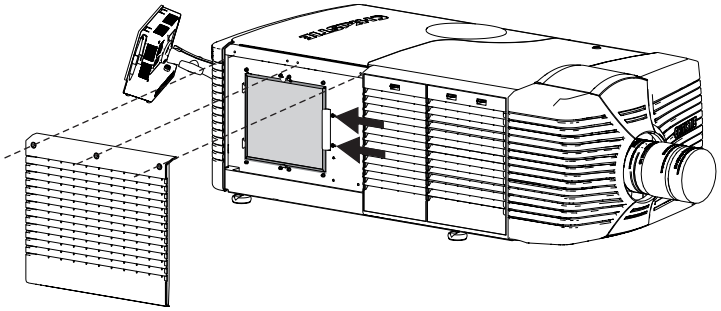
4. Install a clean air filter with the airflow indicator pointing toward the projector.
5. Align the bottom tabs of the air filter cover and close.

Liquid cooling air filter

Estimated replacement time: 1 minute

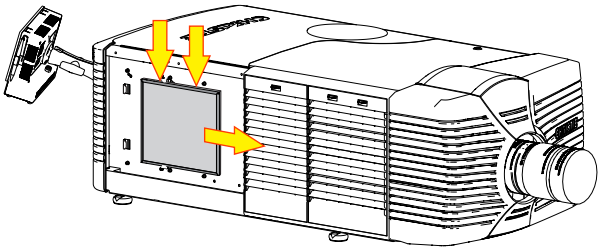
This filter is located on the operator side near the rear of the projector, behind a small air filter cover. The Liquid Cooling filter is an electrostatic reusable filter.

1. Remove the *LVPS/liquid cooling cover*, see page 44.
2. Loosen the 2 screws securing the filter retaining bracket.



3. Slide the retaining bracket away from the filter.
4. Push downward on the top of the filter so it clears the clip.
5. Pull the filter out and wash it.

   See *Clean a washable filter* on page 47..



IOS filter

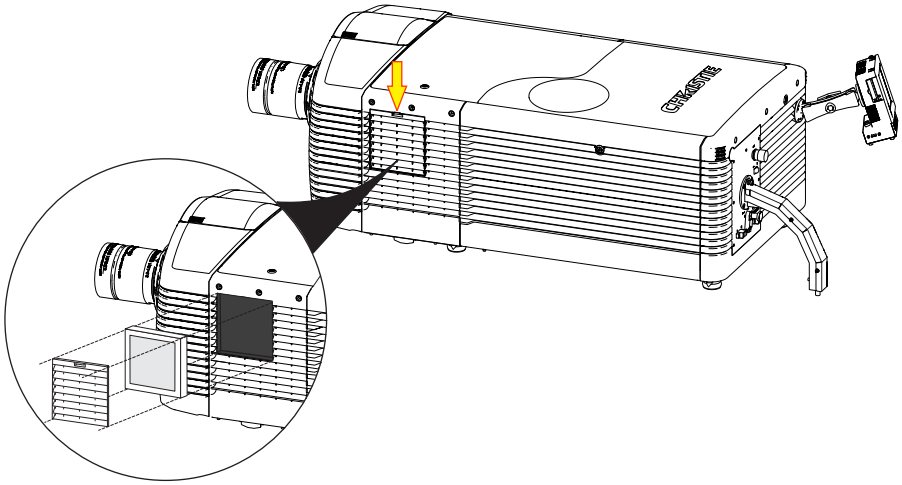
Estimated replacement time: 1 minute

This filter is located on the front side of the projector, behind a small air filter cover.

1. Press down on the snap tab to release filter cover.
2. Tilt and lift the cover up ward to remove it.

   The filter comes out with the cover.
3. Remove the old air filter and discard.

4. Install a clean air filter with the airflow indicator pointing toward the projector.

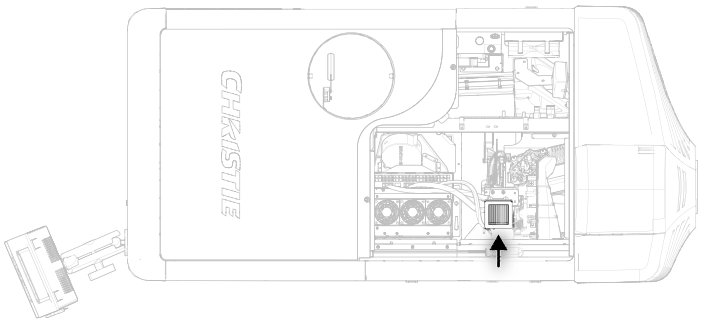


5. Replace the cover.

Blue/Green LAD Filter

Estimated replacement time: 2 minutes

The Light Engine Laminar Airflow Device (LAD) filter is attached to the light engine assembly handle in the light engine compartment.

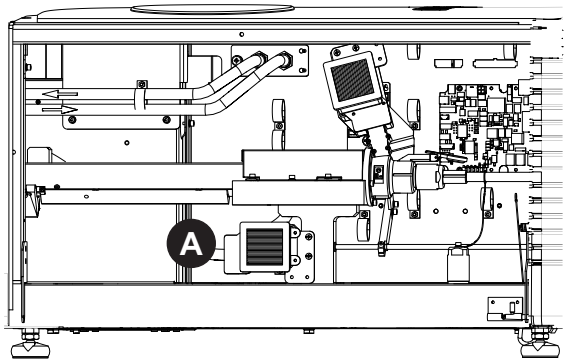


1. Remove the *Front top lid*, see page 41.
2. Remove the *Light engine lid*, see page 42.
3. Remove and replace the LAD filter.

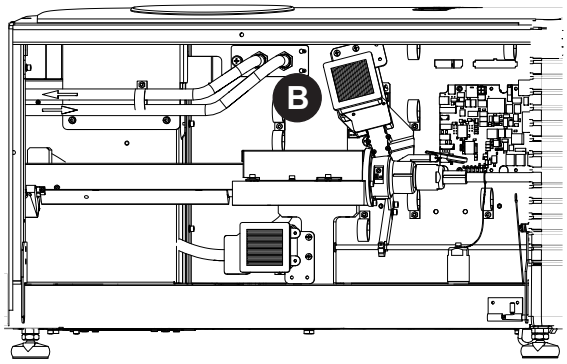
LAD filters

1. Open the *Optical access door*, see page 43.

2. Remove the Light Engine Laminar Airflow Device (LAD) filter from the ferrule fan 22 (A).



3. Remove the LAD filter from the diffuser integrator fan 23 (B).



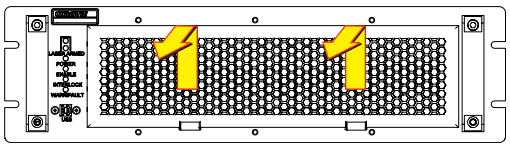
Red LAD Filter

1. Remove the *Light engine air filter*, see page 48.
2. Remove the *Light engine fans (fans 1, 2, 3, and 4)*, see page 53.
3. Remove the filter from the filter housing.

Laser module filter

This filter is on the front of the laser module.

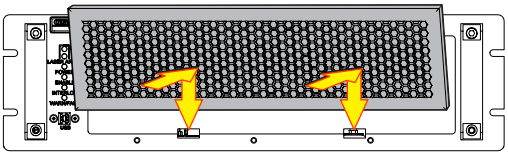
1. At the front of the laser module, tilt the top of the air filter toward you and lift out.



2. Pull the filter out and wash it.

   See *Clean a washable filter* on page 47.

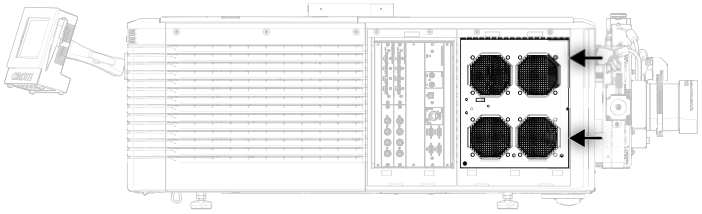
3. To replace the filter when dry, hold the air filter with the airflow indicator pointing toward the laser module.
4. Tilt the lower end of the filter into the bracket and attach to the laser module.



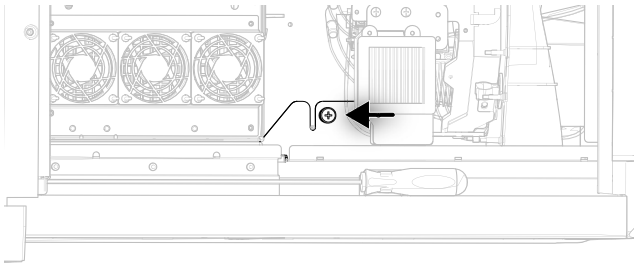
Ventilation and cooling

Fan pack assembly

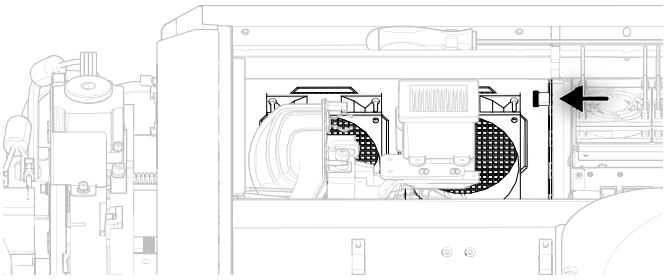
1. Remove the *Front top lid*, see page 41.
2. Remove the *Light engine lid*, see page 42.
3. Remove the *Access panel frame*, see page 43.
4. Remove the 2 screws from the side of the fan pack.



5. Reach into the light engine compartment and loosen the captive thumbscrew.



6. Push down the lever in the light engine compartment.



7. Pull the fan pack assembly out of the projector.

Light engine fans (fans 1, 2, 3, and 4)

NOTICE Do not operate the projector with the light engine fan pack or light engine removed. This causes overheating of the SFB FPGAs. Failure to comply may result in equipment damage.

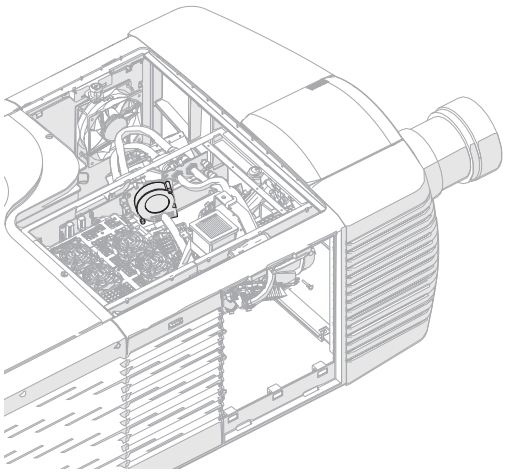
Estimated replacement time: 10 minutes per fan

1. Remove the *Fan pack assembly*, see page 52.
2. Disconnect the inline connector for the defective fan.
3. Release the harness from the routing clips.
4. Remove the fan and the rubber isolators.

Install the fan with the directional arrow facing into the projector.

Red FPGA fan (fan 5)

Estimated replacement time: 9.5 minutes



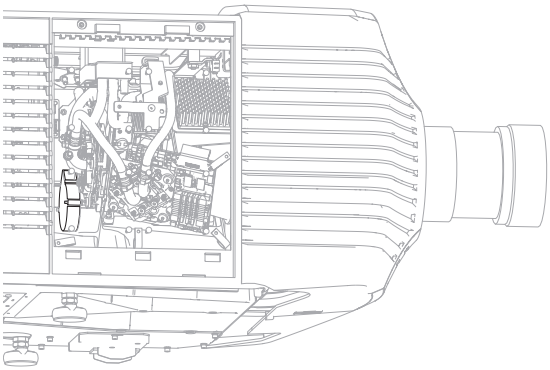
1. Remove the *Fan pack assembly*, see page 52.
2. Disconnect the fan #5 inline connector from underneath.

3. Remove the 2 screws securing fan #5 to the mounting bracket.
4. Lift the fan up and out of the projector.

Green FPGA fan (fan 6)

Estimated replacement time: 20 minutes

Fan #6 provides cooling to the green satellite card in the light engine compartment.



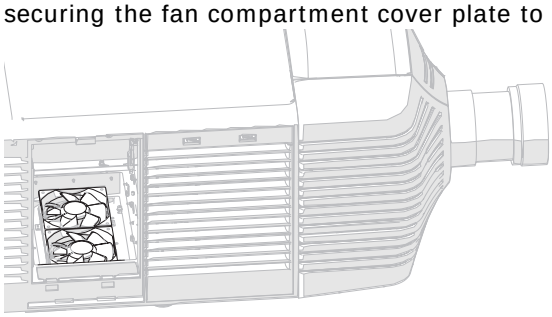
1. Remove the *Light engine*, see page 58.
2. Disconnect the fan #6 inline connector and free from routing clips.
3. Remove the 2 screws securing fan #6.
4. Lift out the fan.

Card cage exhaust fans (fans 6 and 8)

Estimated replacement time: 18 minutes per fan

The card cage fans are mounted below the card cage.

1. Remove the *Card cage assembly*, see page 70.
2. Loosen the 2 screws securing the fan compartment cover plate to the base of the projector.



3. Slide the cover plate off the base plate.
4. Remove the 4 screws securing the fan assemblies to the base.
5. Cut the cable tie securing the fan harnesses.
6. Disconnect the defective fan inline connector.
7. Pull the defective fan away from the rubber isolators.

Card cage intake fans (fans 9, 10, 11)

Estimated replacement time: 4 minutes per fan

The card cage fans are on top of the card cage and push cool air into the electronic card cage.

1. Remove the *Front top lid*, see page 41.

2. Remove the *Light engine lid*, see page 42.
3. Disconnect the inline connector and release the harness from the routing clip.
4. Remove the 4 screws securing each fan.
5. Remove the fan from the rubber isolators.

IOS fan (fan 14)

Estimated replacement time: 6.5 minutes

The IOS fan provides air cooling to the optical compartment.

1. Remove the *Front top lid*, see page 41.
2. Remove the *IOS filter*, see page 49.
3. Remove the *Left access cover*, see page 42.
4. Pull the IOS fan from the 4 rubber mounts.
5. Remove the fan from the fan bracket.
6. Disconnect the harness from the routing clip.
7. Remove the fan.

Blue/Green LAD fan (fan 15)

Estimated replacement time: 13 minutes

1. Remove the *Front top lid*, see page 41.
2. Remove the *Light engine lid*, see page 42.
3. Loosen the 2 screws securing the LAD fan assembly to the light engine assembly.
4. Disconnect the LAD fan harness from the inline connector and cut the cable tie to release the harness.
5. Remove the fan.

Radiator Fans (fans 16, 17, 18, and 19)

Estimated replacement time: 16.5 minutes per fan

The radiator fans provide air cooling to the liquid cooling radiator.

1. Remove the *Liquid cooling assembly*, see page 56.
2. Remove the 4 screws to release each fan.

Red LAD fan (fan 20)

1. Remove the *Front top lid*, see page 41.
2. Remove the *Light engine lid*, see page 42.

3. Remove the *Fan pack assembly*, see page 52.
4. Loosen the screw securing the LAD hose to the blower bracket.
5. Pull the hose out of the bracket.
6. Remove the 2 screws securing the blower bracket to the base plate.
7. Remove the red LAD fan assembly from the projector and place it on a flat, stable surface.
8. Remove the 3 screws securing the filter housing to the blower bracket
9. Remove the filter housing and set it aside. Make sure the o-ring is not damaged or misplaced; it will be reused.

LAD fans (Ferrule fan 22 and Integrator diffuser fan 23)

Estimated replacement time: 3 minutes per fan assembly

The LAD fans are build within the LAD housing and mounted to the IOS assembly.

1. Open the *Optical access door*, see page 43.
2. Remove 4 self-tapping screws from the air filter compartment and remove the filter and LAD housing cover.
3. Disconnect the inline connector.
4. Remove the fan harness from the routing clip.
5. Remove the fan assembly from the housing, noting the orientation of the label.

For proper cooling, ensure the fan is placed on the securing pins and the O-rings are properly seated.

Liquid cooling assembly

The liquid cooling assembly is located across from the low voltage power supply (LVPS) in the projection head. It provides primary cooling to the light engine DMDs.

Estimated replacement time: 23 minutes

1. Remove the *Front top lid*, see page 41.
2. Remove the *Rear cover*, see page 44..
3. Remove the *LVPS/liquid cooling cover*, see page 44.
4. Disconnect the 4 radiator fan connectors.
5. Disconnect the liquid cooling pump control harness.
6. Disconnect the 2 liquid cooling pump connectors.
7. Remove the liquid cooling hoses from the retaining clips.
8. Loosen the 3 captive screws securing the liquid cooling assembly pump and reservoir.
9. Remove the 8 screws securing the radiator blocks and fans.
10. Lift the liquid cooling assembly up and out of the projector.

11. Remove the sixteen screws securing fans 16, 17. 18, and 19 to the liquid cooling assembly.
12. Install the fans on the replacement liquid cooling assembly.

Liquid coolant hoses

Estimated replacement time: 5 minutes

1. Remove the *Front top lid*, see page 41.
2. Remove the *Rear top lid*, see page 42.
3. Open the optical access door.
4. Remove the liquid cooling hoses from the retaining clips.
5. Disconnect the 4 liquid cooling quick disconnects.
6. Loosen the captive screw securing the liquid coolant tube mounting plate to the projector.
7. Remove the liquid coolant tube mounting plate and coolant tubes from the projector.

Light engine waterblocks

Estimated replacement time: 35 minutes

1. Remove the light engine.
2. Disconnect the red, green, and blue temperature sensor cables.
3. Remove the 3 screws securing the temperature sensors.
4. Cut and remove the 2 tie wraps securing the blue liquid cooling hose to the handle.
5. Remove the 4 screws, washers, and springs securing each water block assembly to the light engine.
6. Remove the waterblocks from the projector.

Optical components

Diffuser lens element

The Diffuser Lens Element is positioned right after the connection of the fiber.

Estimated replacement time: 7 minutes + 30 minutes for calibration.

1. Remove the *Front top lid*, see page 41.
2. Open the *Optical access door*, see page 43.
3. Remove the *Integrator assembly*, see page 59.
4. Remove the 4 screws from the integrator cover.
5. Remove the 2 screws securing the diffuser lens element clamp and remove the clamp.
6. Repeat step 5 to remove the second diffuser lens element clamp.

7. Lift the diffuser lens element up and out of the integrator holder.

   Do not touch the integrator rod.

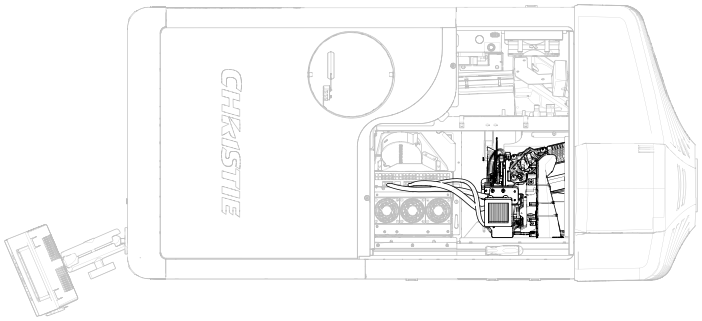
8. When replacing the diffuser element:

   a. Recreate your Measured Color Gamut Data (MCGD) files. See the user manual for instructions.

   b. Re-align the image at low laser power. See *Single laser module operation* on page 9.

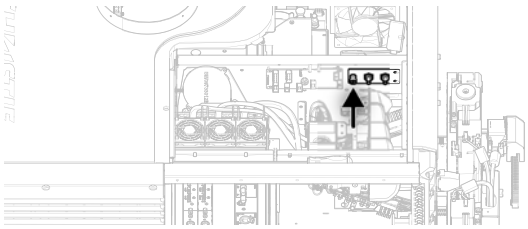
Light engine

Estimated replacement time: 15 minutes + 30 minute calibration



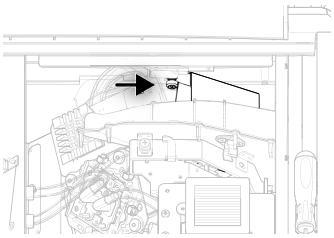
Removal

1. Remove the *Projection lens* on page 62.
2. Remove the *Front top lid* on page 41.
3. Remove the *Fan pack assembly* on page 52.
4. Remove the *Light engine lid* on page 42.
5. Remove the *LVPS/liquid cooling cover* on page 44.
6. Open the fan-pack access door, see *Light engine fans (fans 1, 2, 3, and 4)* on page 53.
7. Disconnect the 2 coolant hoses from the quick disconnects.
8. Loosen the screw securing the liquid cooling hose bracket to the firewall.
9. Remove the bracket.



10. Loosen the screw securing the heat dump.

11. Remove the heat dump.



12. Disconnect the LAD fan connection from the EVB card.
13. Remove the *Light engine quick disconnect* on page 68.
14. Loosen the 3 captive screws securing the light engine.
15. Carefully lift the light engine assembly out of the projector with the handle.

Replacement

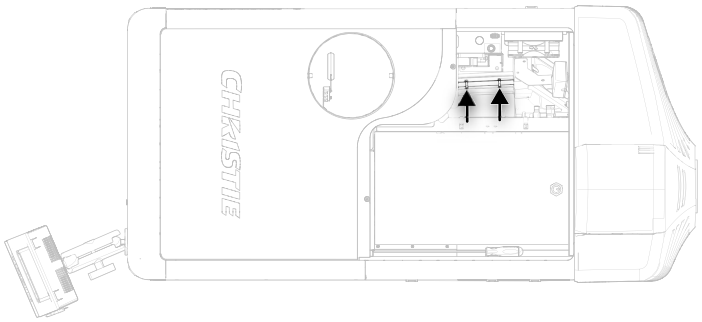
1. To complete the installation, follow the removal steps in reverse order.
2. Adjust convergence, as described in *Adjust DMD convergence* on page 31.
3. Adjust appropriate optical items described in *Adjust the Image*, see page 26.

Integrator assembly

NOTICE Wear the gloves provided in the Service Kit when handling the integrator. Failure to comply may result in equipment damage.

Estimated replacement time: 12 minutes + 30 minutes for calibration

1. Remove the *Front top lid*, see page 41.
2. Remove the *Rear top lid*, see page 42.
3. Open the *Optical access door*, see page 43.
4. Disconnect the integrator and diffuser temperature sensor connectors.
5. Remove the 2 screws securing the diffuser cooling connection.
6. Remove the 2 screws from the relay lens cover.
7. Remove the 2 screws securing the integrator clamp.



8. Wearing the gloves provided with the service kit, pull the integrator assembly toward the lens element and lift it up and out of the projector.
9. Set the integrator assembly in a clean area where it cannot be damaged.
10. Recreate your Measured Color Gamut Data (MCGD) files. See the user manual for instructions.

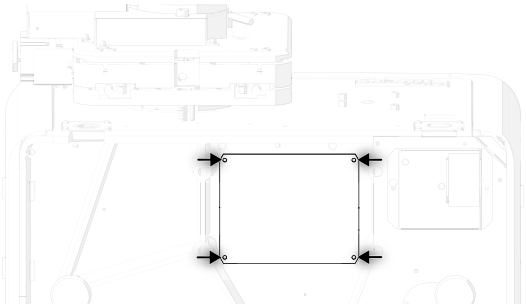
When reinstalling the integrator assembly, adjust the integrator/fold mirror for proper aperture alignment. See *Align the fold mirror* on page 26.and *Rotate the integrator rod* on page 26.

Fold mirror access panel

The fold mirror access panel is located underneath the front section of the projector.

Estimated replacement time: 15 minutes + 30 minutes for calibration

1. Open the *Optical access door*, see page 43.
2. Disconnect the P14 connector.
3. Pull the harness through the cable retaining clips to allow movement of the harness.
4. Remove the screw securing the retaining clip.
5. Remove the 4 screws securing the fold mirror access panel.



6. Disconnect the color sensor connector.
7. Remove the fold mirror access panel.

Cold mirror

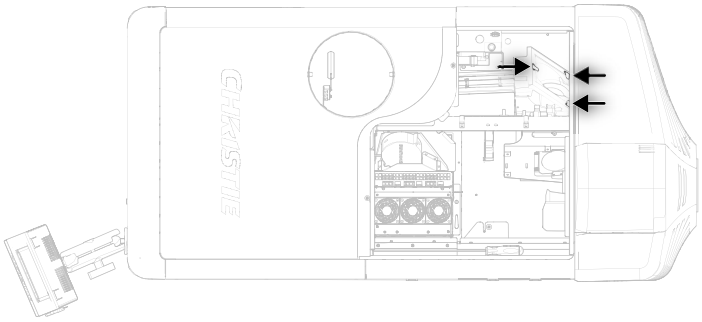
NOTICE Wear clean lint-free cotton gloves when handling the cold mirror and handle by the edges only. Fingerprints left on the surface can negatively impact a displayed image.

The cold mirror is located close to the integrator assembly.

Estimated replacement time: 20 minutes + 30 minutes for calibration

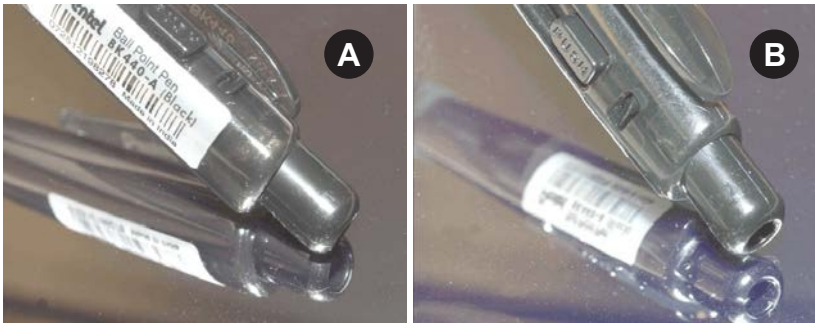
1. Remove the *Front top lid*, see page 41.
2. Remove the 2 screws securing the infrared emitter housing.
3. Remove and set aside the infrared emitter housing.
4. Remove one of the screws from each of the 3 clips securing the cold mirror.

5. Loosen the other screws from each of the tabs.



6. Move the tabs out of the way.
7. Wearing clean, lint-free gloves provided in the service kit, carefully slide out the cold mirror.
8. Recreate your Measured Color Gamut Data (MCGD) files. See the user manual for instructions.

   When replacing the cold mirror, make sure the cold mirror is inserted into the holder with its reflective surface (A) facing inward. Image (B) shows the non-reflective surface.



Fold mirror

The fold mirror is located underneath the front section of the projector.

Estimated replacement time: 15 minutes + 30 minutes for calibration

1. Remove the *Fold mirror access panel*, see page 60.
2. Remove one of the screws from each of the 3 tabs.
3. While holding the mirror in position, move each of the tabs out of the way.
4. Wearing the gloves provided with the service kit, hold the mirror in place and swing the tabs to the side.
5. Lower the mirror and remove.

   When reinstalling the fold mirror, *Align the fold mirror*, see page 26..

6. Recreate your Measured Color Gamut Data (MCGD) files. See the user manual for instructions.

Projection lens

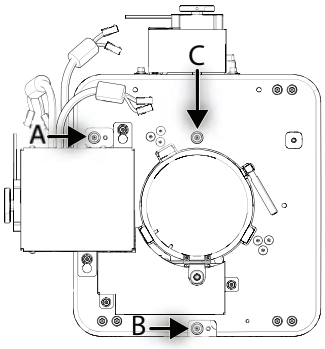
The lens seals the projection head, preventing contaminants from entering the main electronics area. Do not operate the projector without a lens installed. Install a lens plug when you install or transport the projector.

1. Tap and hold the red power button  on the TPC **Main** panel to turn the projector off.
2. Install the lens cap and turn the lens clamp to the open position.
3. Pull the lens out of the lens mount and then install a small lens cap on the rear of the lens.
4. Remove the small rear cap from the new lens. Keep the front cap on.
5. Remove the lens cap from the front of the lens.

Lens mount

⚠CAUTION Due to the weight of the lens mount, two people must complete this step. Failure to comply may result in personal injury or property damage.

Estimated replacement time: 8 minutes + 10 minutes for boresight alignment



1. Remove the lens. See *Projection lens* on page 62.
2. Adjust the offset to center the lens mount vertically and horizontally.
3. Disconnect the motorized control cable from the front plate.
4. Remove the focus hex head screw.
5. Remove the lens mount pivot screw (C).
6. Remove the lens mount assembly.

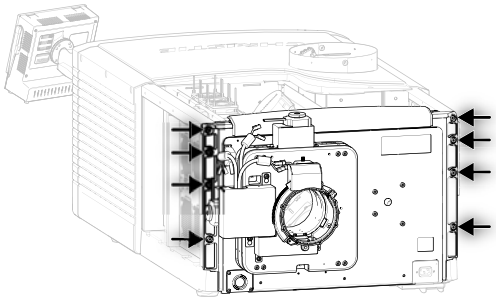
Illumination optic system

The illumination optic system (IOS) is mounted to the base in the front compartment of the projector. It includes the optical components between the integrator and light engine assembly.

Estimated replacement time: 45 minutes + 30 minutes for calibration

1. *Projection lens*, see page 62.
2. Remove the *Front top lid*, see page 41.
3. Remove the *Left access cover*, see page 42.
4. Remove the *Light engine lid*, see page 42.
5. Remove the *Integrator assembly*, see page 59.
6. Remove the 2 screws securing the infrared emitter bracket to the projector and remove the bracket.

7. Remove the *Light engine*, see page 58.
8. Remove the 4 screws from the AC line filter plate.
9. Disconnect the J34 connector from the EVB and release the harness from the routing clips.
10. Remove the 8 screws from the front plate of the projector.



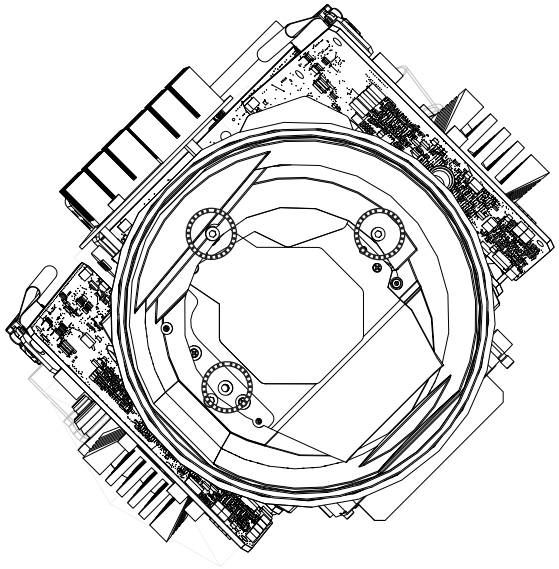
11. Remove the 2 screws from the inside (bottom of base plate).
12. Loosen the 2 thumbscrews on the front bracket, located behind the front plate.
13. Remove the 3 screws securing the high security interlock bracket.
14. Remove the front plate.
15. Remove the aperture plate access screw.
16. Remove the 4 screws securing the fold mirror cover.
17. Remove the 4 screws securing the IOS to the base plate.
18. Disconnect the connector from the color PC card.
19. Remove the IOS.

When installing the IOS, adjust convergence, fold mirror alignment, and integrator alignment.

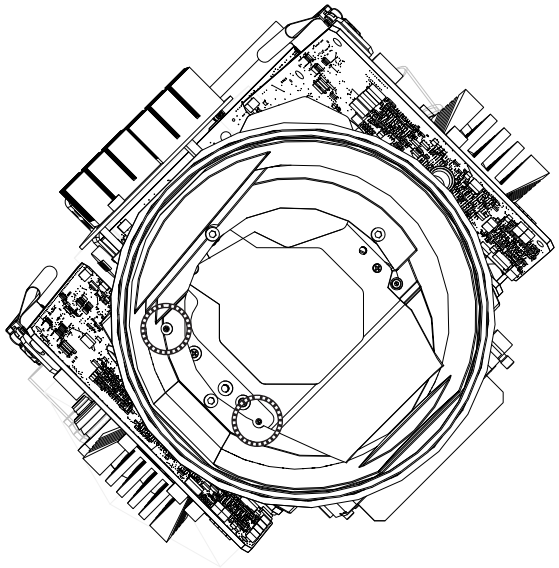
20. Recreate your Measured Color Gamut Data (MCGD) files. See the user manual for instructions.

Shutter assembly

1. Remove the *Light engine*, see page 58.
2. Remove the 3 screws from the snood.



3. Remove the 2 screws securing the shutter mounting bracket to the projector.

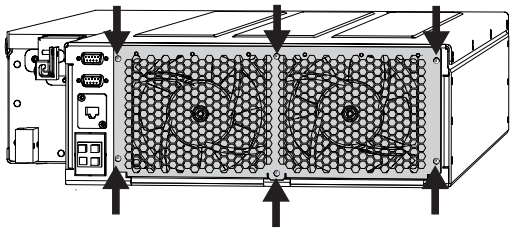


4. Remove the shutter assembly.

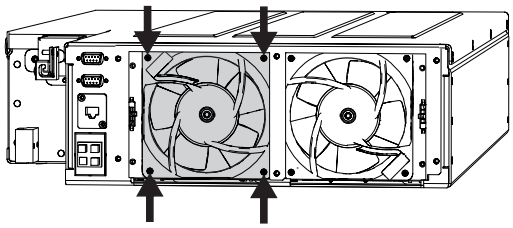
Laser modules

Laser module fan

1. *Shut down the projector* on page 41.
2. At the wall circuit breaker, disconnect the power to the laser rack.
3. In the power distribution unit, turn off the breaker for the laser module.
4. Remove the 6 screws securing the grill and set the grill and screws aside.



5. Remove the 4 screws securing the fan and set aside.



6. Pull the fan outward until you can access the connector.
7. Disconnect the fan connector and remove the fan.

Remove a laser module for service

⚠WARNING

Failure to comply with the following could result in death or serious injury.
- Two or more people are required to safely lift a laser module.
- Keep the laser module level at all times as tilting can cause the cooling fluid to leak and damage the unit. The maximum tip/tilt specification is 30 degrees from its normal vertical orientation.

1. At the wall circuit breaker, disconnect the power to the laser rack.
2. In the power distribution unit, turn off the breaker for the laser module.
3. To remove the operator-side door, slide the locking clips, tilt the top of the door toward you and lift.
4. Set the door aside.
5. Remove the fiber carrier panel covering the laser module you want to remove.
6. From the input end of the fiber optic cable attached to that laser module, remove the red cap from the tethered fiber cable end cap.

7. Disconnect the fiber optic cable.
8. Attach the red end cap to the laser module SMA termination point.
9. Attach the black circular cap that protects the SMA termination point. (Saved from installation.)
10. Disconnect the power cable and the ethernet cable.
11. Disconnect the 2 Interlock cables.
12. Connect the 2 cables together to complete the interlock circuit and enable the other modules to work when the system is restarted.
13. Remove the 4 screws from the front of the laser module and set aside.
14. With another person, slide the laser module out of the laser rack.

    If you are shipping the laser module to Christie, keeping the laser module level and slide it into the original packing box.

    If you plan to turn the system on without the laser module, attach a panel (saved at the base of the laser rack during installation) to the now empty slot with the 4 screws that secured the laser module.

Remove the laser module LOS

1. You have to remove the LOS to access the chiller.Remove the laser module from the rack. See *Remove a laser module for service* on page 65.
2. Ensure that you are grounded.
3. Remove and set aside the 11 screws from the laser module lid.
4. To remove the lid, lift up the front end first.
5. Set the lid aside.
6. Disconnect the red (middle) terminator for the IR interlock.
7. To remove the plate over the cards, remove the 4 screws and set the plate and screws aside.
8. Remove blue laser card (second from left).
9. Disconnect the connectors on the backplane near the base for the blue laser card, then replace the blue card.
10. Disconnect the connectors on the backplane near the green laser cards.
11. To remove the wire harness from the plastic mounting bracket/routing clips, press and push down on the green and black wires.
12. Disconnect the gray and white wire harness.
13. Disconnect connectors on the outside of the chiller.
14. Detach 2 cooling hose quick-disconnect terminals.
15. Remove the 4 nuts on the LOS.
16. Lift the LOS with your left hand and bracket under the nose with your right hand.

    Do not lift the LOS from the nose.

Replace the laser module chiller

You must remove the LOS first before you can access the chiller. See *Remove the laser module LOS* on page 66.

1. Disconnect the black wire harness from the chiller card.
2. To remove the chiller card from the backplane, tilt the front end up toward the back.
3. Remove the nuts on chiller base plate.

   Two are near the back, one near the center.
4. To lift the chiller out, hold near the screws on the fan and the black nose.

Install a laser module LOS

1. Rest the LOS on the edge of the wall of the laser module.
2. Thread chiller hose in place.
3. Lower the LOS in place.
4. Replace the washers and nuts.
5. Attach the cooling hoses to the quick disconnect terminals.
6. Attach the cooling hose to the black hose with plastic tie wraps.
7. Thread harness and attach it to the backplane near the blue laser card.
8. Attach the 3 black and green harnesses to the backplane.
9. Attach plastic harness guide to LOS.
10. Attach connectors to the wire harnesses.
11. Secure the LOS metal plate with 4 screws.
12. Attach the red IR interlock connector beside the LOS.
13. To replace the lid, hook the back edge of the lid underneath the back wall of the laser module.
14. Install and tighten the eleven screws.

Electronics

Projector intelligence board

Estimated replacement time: 4 minutes + 15 minutes for the software update

1. Remove the *Front top lid*, see page 41.
2. Remove the *Light engine lid*, see page 42.
3. Remove the *Card cage cover*, see page 43.
4. Remove the card cage security ring.

5. Press the red ejector tabs at the top and bottom of the PIB inward.
6. Press the red and black ejector tabs at the top and bottom of the PIB inward to release the PIB from the backplane.
7. Pull the PIB from the card cage.
8. Activate marriage when replacing the PIB. See the User Manual for instructions.

Integrated cinema processor

Estimated replacement time: 4 minutes + 15 minutes for the software update

1. Remove the *Front top lid*, see page 41.
2. Remove the *Light engine lid*, see page 42.
3. Remove the *Card cage cover*, see page 43.
4. Remove the card cage security ring.
5. Press the red ejector tabs at the top and bottom of the ICP inward.
6. Press the red and black ejector tabs at the top and bottom of the ICP inward to release the ICP from the backplane.
7. Pull the ICP from the card cage.
8. Activate marriage when replacing the ICP. See the User Manual for instructions.

Integrated media block

Estimated replacement time: 4 minutes + 15 minutes for the software update

1. Remove the *Front top lid*, see page 41.
2. Remove the *Light engine lid*, see page 42.
3. Remove the *Card cage cover*, see page 43.
4. Remove the card cage security ring.
5. Press the red ejector tabs at the top and bottom of the IMB inward.
6. Press the red and black ejector tabs at the top and bottom of the IMB inward to release the IMB from the backplane.
7. Pull the IMB from the card cage.
8. Activate marriage when replacing the IMB. See the User Manual for instructions.

Light engine quick disconnect

Estimated replacement time: 10 minutes

1. Remove the *Front top lid*, see page 41.
2. Remove the *Light engine lid*, see page 42.
3. Loosen the thumbscrew securing the LEQD to the projector.

4. Press the black ejector tabs on the sides of the LEQD inward to release it.
5. Disconnect the 3 power connectors.
6. Remove the LEQD.

Interlock module

The interlock module is located inside the optical compartment.

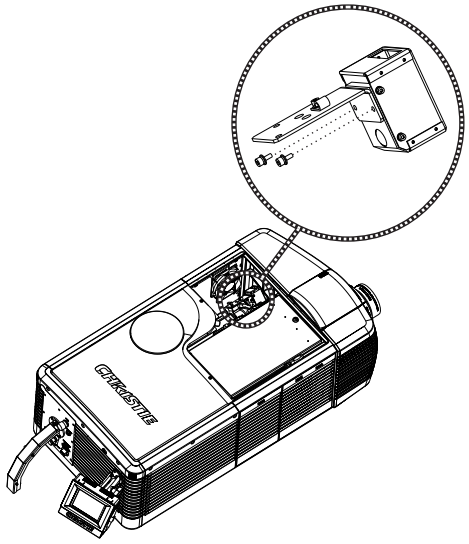
Estimated replacement time: 7 minutes + 15 minutes for the software upgrade

1. Open the *Optical access door*, see page 43.
2. Disconnect the J1, J2, J3, J4, J5, J7, J8, J11, J12, and J14 connectors.
3. Remove the 4 screws securing the interlock module to the mounting bracket.
4. Remove the interlock module.

Infrared emitter module

Estimated replacement time: 12 minutes

1. Remove the *Front top lid*, see page 41.
2. Open the *Optical access door*, see page 43.
3. Disconnect the 2 coolant tubes connected to the light engine.
4. Remove the infrared emitter harness from the retaining clip.
5. Remove the 2 screws from the infrared emitter mounting bracket.



6. Remove the infrared emitter assembly and place it on a flat, stable surface.
7. Remove the 4 screws securing the cover to the infrared emitter assembly.
8. Remove the 4 screws securing the infrared emitter module to the infrared emitter assembly.

9. Disconnect the J1 connector.
10. Remove the infrared emitter module.

Color sensor module

Estimated replacement time: 4 minutes

1. Remove the *Fold mirror access panel*, see page 60.
2. Remove the 2 screws securing the color sensor module to the projector.
3. Remove the color sensor module.

Remote temperature sensor module light engine compartment

Temperature sensors are located in the optical compartment, the air intake, the prism assembly, and each of the DMDs. These sensors monitor the projector components to make sure they do not exceed the recommended operating temperatures.

Estimated replacement time: 5 minutes per sensor

1. Remove the *Light engine*, see page 58.
2. Remove the *Light engine fans (fans 1, 2, 3, and 4)*, see page 53.
3. Disconnect the harness from the required remote temperature sensor module (RTSM).
4. Remove the screws securing the RTSM.

Remote temperature sensor module optical compartment

1. Open the *Optical access door*, see page 43.
2. Disconnect the harness from the required remote temperature sensor module (RTSM).
3. Remove the screws securing the RTSM on the diffuser, integrator, and fiber receiver.

Card cage assembly

Estimated replacement time: 14 minutes

The card cage assembly is beside the light engine compartment.

1. Remove the *Fan pack assembly*, see page 52.
2. Remove the 4 screws securing the bracket holder to the card cage and top tube and remove it.
3. Loosen the captive thumb screw securing the card cage to the bottom of the chassis.
4. Disconnect the light engine quick disconnect (LEQD) board from the backplane.Disconnect the LEQD from the backplane.Disconnect the card cage intake fan harnesses 9, 10, 11, and 12 from the inline connectors.
5. Disconnect these harnesses from the active backplane: P7, P8, P10, and P13.P13.
6. Lift the card cage up and out.

Backplane

The backplane is located at the back of the card cage. The PIB and ICP are connected directly to the backplane.

Estimated replacement time: 55 minutes

1. Remove the *Front top lid*, see page 41.
2. Remove the *Card cage cover*, see page 43.
3. Remove the *Light engine lid*, see page 42.
4. Reach into the projector and press down on the latch located on the side of the card cage and remove the security ring.
5. Remove the blank faceplate, PIB, and ICP from the backplane.
6. Remove the hex driver holder plates from the top of the card cage assembly.
7. Disconnect the *Light engine quick disconnect*, see page 68.
8. Disconnect the 8 connectors from the backplane.
9. Disconnect the 2 top card cage fans from the inline connectors.
10. Disconnect the 2 optional fans from the top of the card cage (if installed).
11. Loosen the thumbscrew securing the front side of the card cage to the baseplate.
12. Pull the card cage up and out of the projector and set it on a stable surface.
13. Remove the fifteen screws securing the backplane to the card cage.
14. Slide the backplane out of the card cage.

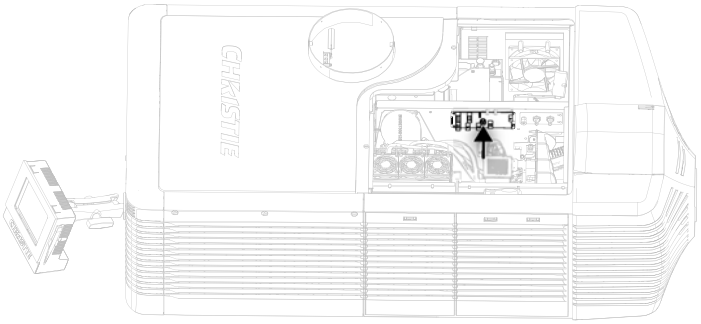
Primary environmental card

Estimated replacement time:22 minutes + 15 minutes for software upgrade

The environmental card primary (EVB-P) controls fans, the pump, temperature sensors, light sensor, and motor control harnesses.

1. Remove the *Front top lid*, see page 41.
2. Remove the *Light engine lid*, see page 42.
3. Remove the *Cold mirror*, see page 60.*Card cage assembly*, see page 70.
4. Disconnect 10 harnesses the 8 connectors from the environmental card.

5. Loosen the thumbscrew.



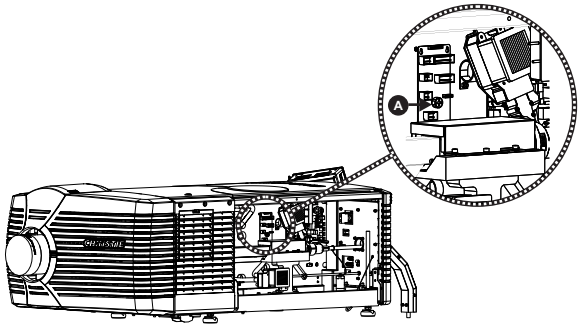
6. Remove the environmental card.

Secondary environmental card

Estimated replacement time: 3 minutes + 15 minutes for the software upgrade

The environmental card secondary (EVB-S) controls fans and is mounted to the optical compartment wall.

1. Open the *Optical access door*, see page 43.
2. Disconnect the J18, J32, J39, J71connectors.
3. Loosen the captive screw (A).



4. Release the tabs and lift the card out.

Integrated motor control card

Estimated Replacement Time: 13 minutes + 10 minutes for calibration

1. Remove the *Light engine lid*, see page 42.
2. Disconnect the 9 connectors from the integrated motor control card (IMCB).
3. Loosen the thumbscrew securing the IMCB.
4. Remove the IMCB.

Electrical components

Low voltage power supply

Estimated replacement time: 19 minutes

1. Remove the *Rear cover*, see page 44.
2. Disconnect the low voltage power supply (LVPS) harness from the AC relay.
3. Disconnect all inline connections to the LVPS.
4. Disconnect the 5 connectors from the LVPS.
5. Remove the 4 screws securing the LVPS to the LVPS mounting plate.
6. Remove the 4 screws securing the LVPS mounting brackets.
7. Transfer the mounting brackets to the replacement LVPS.

Standby power supply

Estimated replacement time: 14 minutes

1. Remove the *Rear cover*, see page 44.
2. Disconnect both the DC and AC power cables from the standby power supply.
3. Remove the standby power supply harness from the cable clip.
4. Disconnect the standby power supply inline connector.
5. Loosen the thumbscrew securing the standby power supply to the mounting bracket.
6. Push up and pull to clear the two slotted tabs securing the standby power supply.
7. Remove the standby power supply.

AC line filter

Estimated replacement time: 4 minutes

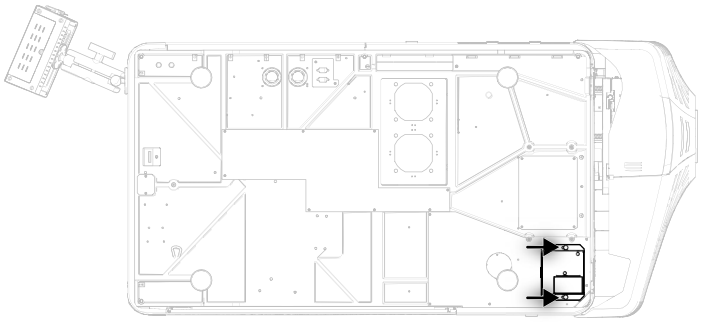
1. Remove the 4 screws securing the cover plate to the projector.
2. Disconnect the 3 connectors from the AC breaker.
3. Remove the 2 screws securing the AC line filter to the baseplate.
4. Remove the AC line filter.

AC breaker switch

The AC breaker switch is located in the front of the projector, directly under the IOS. It is accessible from the bottom of the projector by removing the bottom cover.

Estimated replacement time: 5 minutes

1. Loosen the 2 screws securing the cover plate to the projector.



2. Disconnect the 4 connectors from the AC breaker switch.
3. Push in the AC breaker switch tabs.
4. Push the AC breaker switch through the access plate.
5. Remove the AC breaker switch.

High security interlock switch

Estimated replacement time: 5 minutes + 5 minutes to perform marriage

1. Remove the *Front top lid*, see page 41.
2. Remove the *Light engine lid*, see page 42.
3. Remove the 2 screws securing the switch.
4. Disconnect the harness from the switch.
5. Remove the 2 nuts from the switch.
6. Remove the interlock switch.
7. Activate marriage when replacing the high security interlock switch. See the User Manual for instructions.

Marriage interlock switch

Estimated replacement time: 5 minutes + 5 minutes to perform marriage

1. Remove the *Front top lid*, see page 41.
2. Remove the *Light engine lid*, see page 42.
3. Reach into the projector and press down on the lever on the right side of the card cage to release the security ring.
4. Remove the *Integrated cinema processor*, see page 68.
5. Remove the *Integrated media block*, see page 68.
6. Remove the 2 screws securing the switch.
7. Disconnect the harness from the switch.

8. Remove the 2 nuts from the switch.
9. Remove the interlock switch.
10. Activate marriage when replacing the marriage interlock switch. See the User Manual for instructions.

Maintenance

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

- Projector Model
- Projector Serial Number
- Manufacture Date

Read all instructions before servicing. Always take extra precautions to secure all harnessing properly, especially in the high voltage circuitry areas. Replace any wire that appears to have damaged insulation. Components must be replaced with exact equivalents. Failure to do so may result in unsafe operation.

Shut down the projector

Perform these steps before beginning any projector inspection or maintenance procedures.

1. If the projector is operating, turn it off.
2. Disconnect the projector from AC power.
3. Rotate the Beam Stop to **CLOSED**.
4. Remove the key from the laser rack Key switch.

Inspect and clean optics

NOTICE

- Unnecessary cleaning of optics can increase the risk of degrading delicate coatings and surfaces. If you are not a qualified service technician, you can only inspect and clean the lens. Any other optical maintenance should be performed only by qualified service technicians.

Check these components periodically in a clean, dust-free environment using a high-intensity light source or flashlight. Clean them only when dust, dirt, oil, fingerprints, or other marks are obvious. Never touch an optical surface with bare hands. Always wear lint-free lab gloves.

The following tools are recommend for removing dust or grease:

- Powder free latex gloves
- Soft camel-hair brush
- Dust-free blower - air bulb or a canned air duster without additives such as Techspray 1671-10S Ultra-Pure Duster
- Lint-free lens tissue, such as Lensx 90 tissue or Newport Optics cleaning tissue
- Lens cleaning solution and a microfiber cloth (for the lens only)
- Isopropyl Alcohol Reagent Grade (ACS) 99.9%
- Acetone Reagent Grade (ACS)

- Optical grade cotton swabs with wooden stems
- Sticklers Fiber Optic Cleaner (can be used on all optical components)
- A bright, portable illumination device such as an LED flashlight

Remove dust from the projection lens

1. Brush most of the dust off with a camel-hair brush or use a dust-free blower.
2. Fold a microfiber cloth and wipe the remaining dust particles off the lens with the smooth portion of the cloth that has no folds or creases. Do not apply finger pressure. Instead, use the tension in the folded cloth to remove the dust.
3. If significant dust remains on the lens surface, dampen a clean microfiber cloth with lens cleaning solution and wipe gently until clean.

Remove fingerprints, smudges, or oil from the projection lens

1. Brush most of the dust off with a camelhair brush or use a dust-free blower.
2. Wrap a lens tissue around a swab and soak it in lens cleaning solution.

   The tissue should be damp but not dripping.
3. Gently wipe the surface using a figure eight motion.
4. Repeat until the blemish is removed.

Inspect and clean the fiber optic cable

⚠WARNING Beam stop must be in the closed position. Failure to comply could result in death or serious injury.

NOTICE

- Secure the tethered protective end cap to the threaded hole in the base of the projector whenever the fiber optic cable is disconnected. Failure to comply may result in equipment damage.
- When handling optical fibres, wear powder free Nitrile gloves.

Recommended service kit

- Techspray 1671-10S Ultra-Pure Duster
- Kapton tape
- Optipop R cassette style fiber optic connector cleaner
- 99.9% isopropyl alcohol
- TEC2313-30 double-tipped pointed cotton stick
- Powder free Nitrile gloves
- Mitsubishi fiber input inspection microscope (50x magnification)

- Mitsubishi bundle output inspection microscope (15x magnification)
- 1/8” tapered double headed cotton swabs

Prepare the fiber bundle for inspection and cleaning

1. Turn off the laser module breakers.
2. Pull the beam stop knob on the projector and rotate it to the closed position.
3. Unlock and open the optical access door. See *Optical access door* on page 43.
4. Remove the 4 screws securing the fiber optic strain relief cover and set the screws and cover aside.
5. Remove the 4 screws securing the breakout ferrule and set the screws and ferrule aside.
6. Thread the fiber optic cable through the strain relief and out of the projector.

Inspect the fiber bundle input

1. Prepare the fiber bundle for inspection and cleaning. See *Prepare the fiber bundle for inspection and cleaning* on page 78.
2. Put on a pair of powder free Nitrile gloves.
3. Remove a 1/8” cotton swab from its packaging, taking care not to touch the cotton tips.
4. Soak one end of the cotton swab in isopropyl alcohol.
5. Lightly shake the cotton swab to remove any excess liquid and clean the microscope adapter by rotating the swab around and then in and out of the adapter.
6. Remove the tethered cap from the fiber optic cable.
7. Attach the SMA connector to the Mitsubishi fiber input inspection microscope.
8. Press and hold the black button on the handle of the Mitsubishi fiber input inspection microscope to turn the inspection light on.
9. Turn the dial of the microscope barrel until the fiber bundle input is focused.
10. Examine the fiber bundle input for contaminants.

    If the fiber bundle input appears clean, see *Reassemble the projector and connect the fibers to the light modules* on page 81.

    If the fiber bundle input appears dirty, see *Clean the fiber bundle input with an aerosol duster* on page 78.

Clean the fiber bundle input with an aerosol duster

1. Prepare the fiber bundle for inspection and cleaning. See *Prepare the fiber bundle for inspection and cleaning* on page 78.
2. Inspect the fiber bundle for cleanliness. See *Inspect the fiber bundle input* on page 78.

3. Firmly attach the red output tube to the output nozzle on the Techspray 1671-10S cannister.
4. While pointing the output tube away from the fiber bundle and the projector, press the trigger rapidly three times to clear contaminants from the output tube.
5. Hold the Techspray 1671-10S cannister 50mm (2 inches) from the surface of fiber bundle input, and press the trigger rapidly 3 times.

   You must hold the Techspray 1671-10S cannister vertically. Holding the cannister at an angle can release liquid refrigerant and contaminate the fiber bundle input.
6. Inspect the fiber bundle for cleanliness. See *Inspect the fiber bundle input* on page 78.

   If the fiber bundle input appears clean, see *Reassemble the projector and connect the fibers to the light modules* on page 81.

   If the fiber bundle input appears dirty, see *Clean the fiber bundle input with a dry cassette style cleaner* on page 79.

Clean the fiber bundle input with a dry cassette style cleaner

1. Prepare the fiber bundle for inspection and cleaning. See *Prepare the fiber bundle for inspection and cleaning* on page 78.
2. Inspect the fiber bundle for cleanliness. See *Inspect the fiber bundle input* on page 78.
3. Disconnect the fiber bundle input from the Mitsubishi fiber input inspection microscope.
4. Open the cover of the Optipop R cassette style fiber optic connector cleaner and expose a section of cleaning cloth.
5. Hold the end of the fiber bundle vertically on the cleaning cloth and move the fiber on the cloth in the direction of the directional arrow on the package.

   Do not move the fiber bundle input back and forth on the cleaning cloth. Do not use the same cleaning cloth more than once.
6. Attach the SMA connector to the Mitsubishi fiber input inspection microscope.
7. Press and hold the black button on the handle of the Mitsubishi fiber input inspection microscope to turn the inspection light on.
8. Turn the dial of the microscope barrel until the fiber bundle input is focused.
9. Inspect the fiber bundle for cleanliness. See *Inspect the fiber bundle input* on page 78.

   If the fiber bundle input appears clean, see *Reassemble the projector and connect the fibers to the light modules* on page 81.

   If the fiber bundle input appears dirty, see *Clean the fiber bundle input with isopropyl alcohol* on page 79.

Clean the fiber bundle input with isopropyl alcohol

1. Prepare the fiber bundle for inspection and cleaning. See *Prepare the fiber bundle for inspection and cleaning* on page 78.

2. Inspect the fiber bundle for cleanliness. See *Inspect the fiber bundle input* on page 78.
3. Remove a 1/8” cotton swab from its packaging, taking care not to touch the cotton tips.
4. Soak one end of the cotton swab in isopropyl alcohol.
5. Lightly shake the cotton swab to remove any excess liquid.
6. While looking through the Mitsubishi fiber input inspection microscope, move the moistened end of the swab sideways across the surface of the fiber bundle in a single motion.

   Use a new cotton swab for every cleaning attempt. Do not drag the swab back and forth. Movements made using the microscope are reversed.
7. Inspect the fiber bundle for cleanliness. See *Inspect the fiber bundle input* on page 78.

   If the fiber bundle input appears clean, see *Reassemble the projector and connect the fibers to the light modules* on page 81.

   If the fiber bundle input appears dirty, repeat steps 3 to 7 with a clean cotton swab.

   If the fiber bundle input continues to appear dirty after several cleaning attempts, clean with a wet cassette or contact Christie support. See *Clean the fiber bundle input with a wet cassette style cleaner* on page 80, or *Technical support* on page 10.

Clean the fiber bundle input with a wet cassette style cleaner

1. Prepare the fiber bundle for inspection and cleaning. See *Prepare the fiber bundle for inspection and cleaning* on page 78.
2. Inspect the fiber bundle for cleanliness. See *Inspect the fiber bundle input* on page 78.
3. Disconnect the fiber bundle input from the Mitsubishi fiber input inspection microscope.
4. Open the cover of the Optipop R cassette style fiber optic connector cleaner and expose a section of cleaning cloth.
5. Remove a 1/8” cotton swab from its packaging, taking care not to touch the cotton tips.
6. Soak one end of the cotton swab in isopropyl alcohol.
7. Apply the isopropyl alcohol to the exposed Optipop R cassette cleaning cloth.
8. Hold the end of the fiber bundle vertically on the cleaning cloth and move the fiber on the cloth in the direction of the directional arrow on the package.

   Do not move the fiber bundle input back and forth on the cleaning cloth. Do not use the same cleaning cloth more than once.
9. Attach the SMA connector to the Mitsubishi fiber input inspection microscope.
10. Press and hold the black button on the handle of the Mitsubishi fiber input inspection microscope to turn the inspection light on.
11. Turn the dial of the microscope barrel until the fiber bundle input is focused.
12. Inspect the fiber bundle for cleanliness.

    If the fiber bundle input appears clean, see *Reassemble the projector and connect the fibers to the light modules* on page 81.

    If the fiber bundle input continues to appear dirty after several cleaning attempts, repeat steps 5 to 12 or contact Christie support. See *Technical support* on page 10.

Reassemble the projector and connect the fibers to the light modules

1. Reinstall the fiber optic cable, breakout ferrule, and fiber optic strain relief cover.
2. Close and lock the optical access door.
3. Remove the Kapton tape from the light module lens barrel.
4. Guide the fiber on an angle into the lens barrel with your index finger.
5. Slowly insert the fiber into the lens barrel and tighten the SMA connector.

Replacement Parts and Modules

This section list the parts and accessories that are available for the CP42LH projector.

Fan assemblies

Description	Part number
Fan 12V 0.45A 4-Wire 60mm	003-111069-XX
Fan 12V 0.5A 4-Wire 120mm	003-120453-XX
Fan 12V 0.6A 4-Wire 92mm	003-110827-XX
Fan 12V blower	003-111697-XX
Fan 12V DC 50mm blower	003-110854-XX

Lenses

Description	Part number
1.25-1.45 DLPCine HB Zoom Lens	108-274101-XX
1.25-1.83 DLPCine HB Zoom Lens	108-342100-XX
1.45-1.8 DLPCine HB Zoom Lens	108-275101-XX
1.45-2.05 DLPCine HB Zoom Lens	108-335102-XX
1.45-2.1 DLPCine HB Zoom Lens	108-421108-XX
1.6-2.4 DLPCine HB Zoom Lens	108-336103-XX
1.8-2.4 DLPCine HB Zoom Lens	108-276101-XX
1.8-3.0 DLPCine HB Zoom Lens	108-337104-XX
2.15-3.6 DLPCine HB Zoom Lens	108-338105-XX
2.2-3.0 DLPCine HB Zoom Lens	108-277101-XX
3.0-4.3 DLPCine HB Zoom Lens	108-278101-XX
4.3-6.0 DLPCine HB Zoom Lens	108-279101-XX
5.5-8.0 DLPCine HB Zoom Lens	108-280101-XX
1.25-1.83 DLPCine HC Zoom Lens	108-400105-XX
1.45-2.05 DLPCine HC Zoom Lens	108-401106-XX
1.6-2.4 DLPCine HC Zoom Lens	108-402107-XX
1.8-3.0 DLPCine HC Zoom Lens	108-403108-XX
2.15-3.6 DLPCine HC Zoom Lens	108-404109-XX

Light engine

Description	Part number
Light engine	003-104171-XX

Optical assemblies

Description	Part number
Illumination optics system (IOS)	003-103169-XX
Cold mirror (12 X 90 Boro)	003-001527-XX
Cold mirror (13 X 90 Boro)	003-001528-XX
Integrator module	003-104162-XX
Lens relay module	003-104167-XX
Infrared module	003-104158-XX
IOS air filter	003-003082-XX

PCB assemblies

Description	Part number
Projector intelligence board (PIB) projector control board (PCB)	003-101341-XX
Integrated cinema processor (ICP) PCB	003-101342-XX
LEQD2 PCB	003-102056-XX
Environmental board (EVB2) PCB	003-112293-XX
LEDB2 PCB	003-112297-XX
CSENSE PCB	003-112324-XX
Integrated media board (IMB-S2)	108-384107-XX
Backplane (BBP2) PCB	003-111469-XX
Interlock PCB	003-112202-XX

Power supplies

Description	Part number
Power supply LV 600W	003-120508-XX
Power supply LV 60W	003-120509-XX

Racks

Description	Part number
Ground harness	003-112420-XX
Power harness 2.7m	003-112233-XX
Power Harness 2.3m	003-112402-XX
Power harness 1.8m	003-112403-XX
Power harness 1.3m	003-112404-XX
DB9 Cable	003-005061-XX
Interlock harness	003-112421-XX
Harness rack reset to DB25	003-112398-XX
Ethernet cable - 2'	003-005062-XX
Ethernet cable - 5'	003-005063-XX
Ethernet cable - 7'	003-005064-XX
Circuit breaker 30A SBST	003-005065-XX
Fan (Laser Module)	003-112343-XX
Washable filter	003-005066-XX

Miscellaneous

Description	Part number
Touch panel controller (TPC)	003-104678-XX
Lens mount motor control PCB module	003-104279-XX
Manual reset button	003-005014-XX
Liquid cooling module (LCM)	003-120911-XX
LCM hose	003-120912-XX
Intake LE filter	003-001184-XX
Lens mount center detector	003-111069-XX
Lens mount focus motor	003-101194-XX
Projector head leveling feet	003-001193-XX
TPC harness	003-111169-XX
Knock out plate	003-001515-XX
LAD filter (3)	03-001982-51P
Lens mount	003-102333-XX
Low security lock set	003-003081-XX

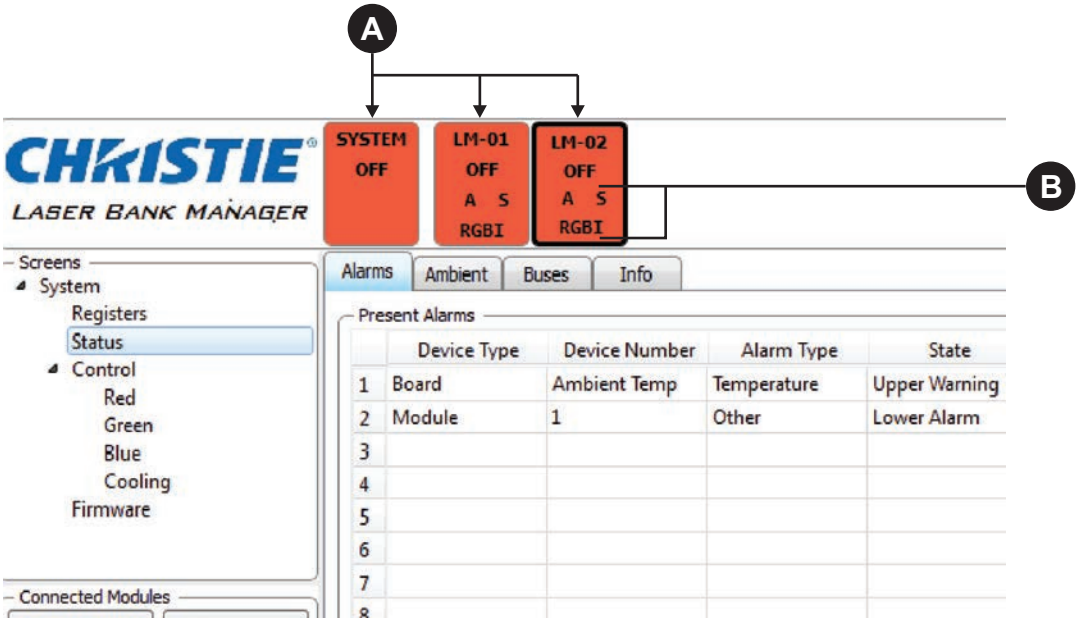
Description	Part number
High security lock set	003-001526-XX
Lens mount offset motor	003-003903-XX
Lens mount slide hardware	003-101198-01
Interlock switch	003-001559-XX
Temperature sensor	003-003326-XX
TPC mounting hardware	003-003326-XX
Light engine waterblock cooling Kit	003-120904-XX
Emergency stop button	003-005015-XX
Fiber bundle protection hardware	003-104152-XX
Light engine LVDS Twinax harness	003-003630-XX
Radiator washable filter	003-005009-XX
Shutter module	003-104117-XX

Troubleshooting

The section provides information about troubleshooting the Christie Laser Projection System.

Check the laser module status

1. Open the Christie Laser Bank Manager application.
2. Review the quick status panels (A).



During normal operation, the quick status panels have a green background. A yellow background indicates a warning, and a red background indicates an alarm condition.

Do not operate a laser module if the humidity sensor is not working. Operating with a failed humidity sensor can reduce the longevity of the laser and void the warranty. Failure to comply may result in equipment damage.

3. Check the alarm codes (B).

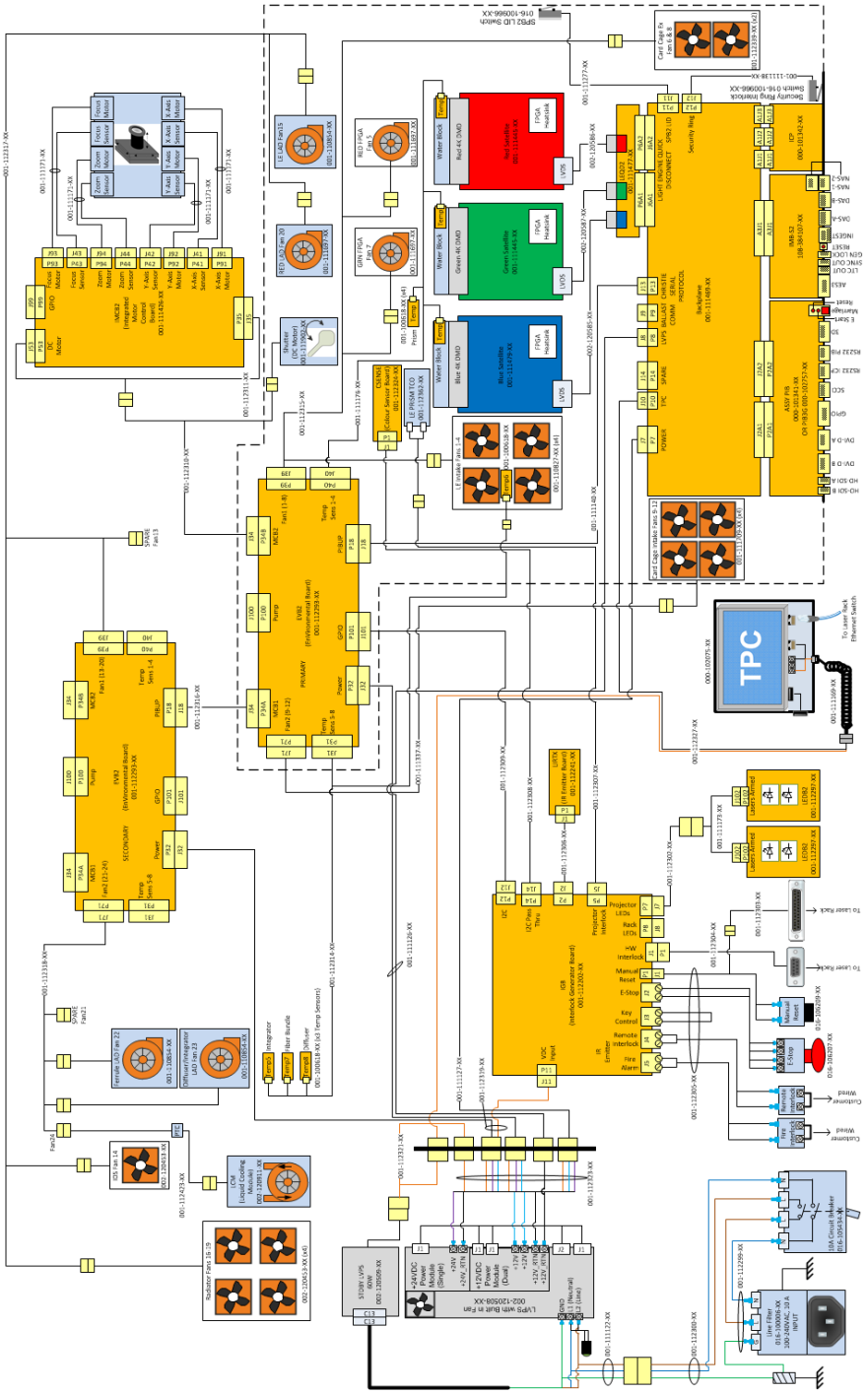
Code	Description
V	Bus voltages
A	Ambient temperature
F	Fans
C	Chiller
S	File System (SD card)
E	Red enclosure

Code	Description
R	Red laser
G	Green laser
B	Blue laser
I	Interlock
P	Power-up

4. Click the corresponding quick status panel to open a status pane for a specific laser module.
5. Click the **Alarms** tab to view the alarm type and status.
6. To view the current ambient temperature and warning and alarm thresholds, click the **Ambient** tab.
7. To view bus voltage levels, click the **Buses** tab.
8. To view laser module build, software, and use data, click the **Info** tab.

Interconnections

Interconnect diagrams illustrate electrical connections between modules. Manufacturer's part numbers are included, but are subject to change.


TPC
Red Satellite
Green Satellite
Blue Satellite
Water Block
Red 4K DMD
Green 4K DMD
Blue 4K DMD
Projector Interlock
Projector LEDs
Rack LEDs
Manual Reset
E-Stop
Key Control
Remote Interlock
Fire Alarm
Laser Interlock
Laser Rack
Customer Wired
Customer Wireless
Line Filter
INPUT

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