The top half of the page features a complex, abstract background of overlapping, semi-transparent blue triangles and polygons in various shades of blue, creating a dynamic, crystalline effect. This pattern transitions into a white background at the bottom.

Installation and Setup Guide
020-103773-03

CP4415-RGB and CP4420- RGB Gen2

CHRISTIE®

NOTICES

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For the most current technical documentation and office contact information, visit <https://www.christiedigital.com/>.

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Products are warranted under Christie's standard limited warranty, the details of which are available at <https://www.christiedigital.com/help-center/warranties/> or by contacting your Christie dealer or Christie.

PREVENTATIVE MAINTENANCE

Preventative maintenance is an important part of the continued and proper operation of your product. Failure to perform maintenance as required, and in accordance with the maintenance schedule specified by Christie, voids the warranty. For preventative maintenance schedules, refer to www.christiedigital.com.

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. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment

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

이 기기는 업무용(A급)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 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, separate collection systems are for used electrical and electronic products.

If printing this document, consider printing only the pages you need and select the double-sided option.

Please help us to conserve the environment we live in!

Notation

Learn the hazard and information symbols used in the product documentation.



Danger messages indicate a hazardous situation which, if not avoided, results in death or serious injury.



Warning messages indicate a hazardous situation which, if not avoided, could result in death or serious injury.



Caution messages indicate a hazardous situation which, if not avoided, could result in minor or moderate injury.



Notice messages indicate a hazardous situation which, if not avoided, may result in equipment or property damage.



Information messages provide additional information, emphasize or provide a useful tip.

Content

Introduction.	6
Product documentation.	6
Related documentation.	6
Models.	6
Safety precautions.	7
General safety precautions.	7
Laser safety precautions.	7
AC power precautions.	8
Light intensity hazard distance.	8
Product labels.	13
Projector components (front).	16
Projector components (rear).	17
List of components.	17
Accessories.	17
Key features.	20
CineMaster cinema calculator tool.	20
Contact your dealer.	20
Technical support.	20
Installing and setting up.	21
Site requirements.	21
Power specifications.	21
Preparing the installation site.	22
Lifting and positioning the projector.	22
Securing the rack stand with foot lock brackets.	22
Connecting to power.	23
Connecting to an uninterruptible power supply.	26
Installing the lens.	28
Projector power modes.	29
Using the Remote user interface (UI).	30
Turning on or off the projector.	31
Logging into the projector.	31
Turning on or off the light source.	31
Activating marriage.	31

Disposing of the product packaging. 32

Completing the installation checklist. 32

Video Input panel. 33

 HDMI video source. 34

 HDMI video formats. 34

 SDI video source. 36

 SDI video formats. 36

 DisplayPort video source. 46

 DisplayPort video formats. 46

 Integrated Media Block (IMB) video source. 47

 Series 2 Integrated Media Block (IMB) video formats. 47

 Series 4 Integrated Media Block (IMB) video formats. 49

 HDMI video source connection from an Integrated Media Block (IMB). 52

 SDI video source connection from an Integrated Media Block (IMB). 52

 GPIO connector. 52

Managing the light source. 55

 Creating a new laser file. 55

 Modifying an existing laser file. 56

 Copying existing laser settings to a new file. 56

 Deleting a laser file. 56

 LiteLOC™ sensor-to-screen calibration 57

 LiteLOC™ sensor-to-screen calibration: Workflow. 57

 Creating a new calibration file. 57

 Recalibrating an existing calibration file. 59

 Editing the existing calibration file parameters. 60

 Verifying the sensor-to-screen calibration 60

 Adding a calibration file to the Channel Setup. 61

Adjusting the image. 62

 Calibrating the Intelligent Lens System. 62

 Correcting vignetting. 62

 Adjusting tilt and leveling the projector. 62

 Correcting keystone effect. 63

 Displaying a test pattern. 64

 Adjusting the integrator rod and fold mirror. 64

 Adjusting boresight 67

 Correcting on-screen color. 70

Electronic Color Correction (ECC).70

 Electronically adjusting convergence.71

 Mechanically adjusting digital micromirror device (DMD) convergence.72

Regulatory. 75

 Safety. 75

 Electro-magnetic compatibility. 75

 Emissions. 75

 Immunity. 75

 California law on security.76

 Environmental. 76

Introduction

This manual is intended for professionally trained operators of Christie high-brightness CP4415-RGB and CP4420-RGB Gen2 projection systems.

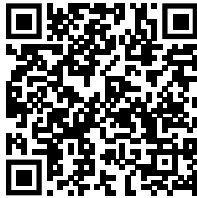
Only trained Christie qualified technicians who are knowledgeable about the hazards associated with high-voltage, laser safety, and the high temperatures generated by the projector are authorized to assemble and install the projector. Only Christie qualified technicians are authorized to service the projector.

For complete product documentation and technical support, go to www.christiedigital.com.

Product documentation

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

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



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

Related documentation

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

- *CineLife+ User Guide (P/N: 020-103073-XX)*
- *CineLife+ 4K-RGB Product Safety Guide (P/N: 020-103243-XX)*
- *CP4415-RGB and CP4420-RGB Gen2 Service Guide (P/N: 020-103774-XX)*
- *CineLife+ Serial Commands Guide (P/N: 020-103075-XX)*

Models

- CP4415-RGB Gen2
- CP4420-RGB Gen2

Safety precautions

Learn about the safety precautions related to the Christie CP4415-RGB and CP4420-RGB Gen2 projector. This projector is intended for use in a cinema environment.

General safety precautions

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



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

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



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

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

Laser safety precautions

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



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

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

AC power precautions

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



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

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



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

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

Light intensity hazard distance

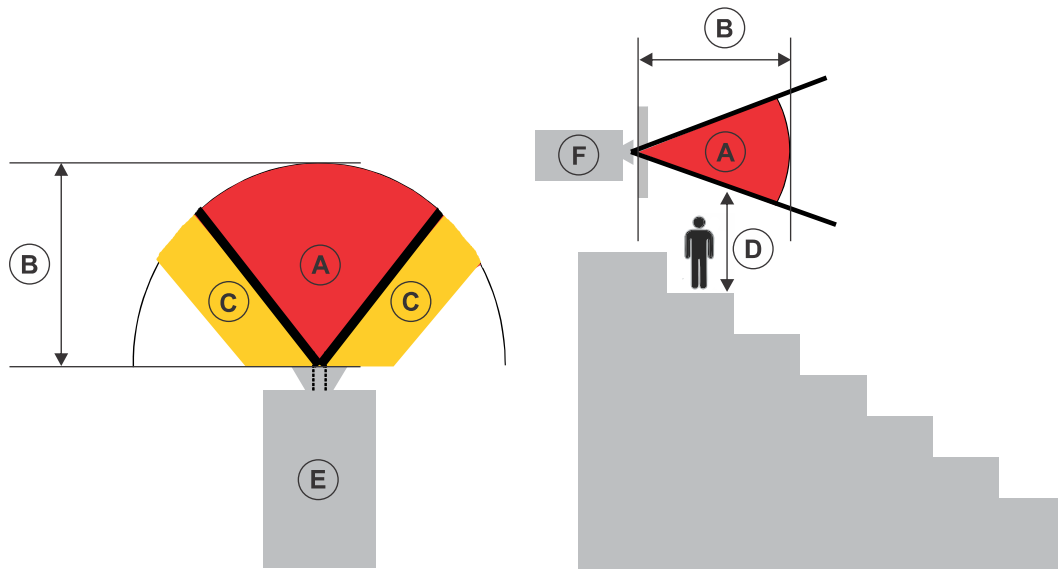
This projector has been classified as Risk Group 3 as per the IEC 62471-5:2015 standard due to possible hazardous optical and thermal radiation being emitted.



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

- PERMANENT/TEMPORARY BLINDNESS HAZARD! No direct exposure to the beam must be permitted. Class 1 Laser Product - Risk Group 3 according to IEC 60825-1:2014 and IEC 62471-5:2015.
- PERMANENT/TEMPORARY BLINDNESS HAZARD! Operators must control access to the beam within the hazard distance or install the product at the height that prevents exposure of spectators' eyes within the hazard distance. The hazard zone must be no lower than 2.5 meters/8.2 feet (US installations) or 2.0 meters/6.6 feet (global installations) above any surface upon which any persons are permitted to stand and the horizontal clearance to the hazard zone must be a minimum 1.0 meters (3.3 feet).
- EXTREME BRIGHTNESS! Do not place reflective objects in the product light path.

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



- A—Hazard zone. The region of space where the projection light from the laser-illuminated projector is above emission limits for Risk Group 2. The light intensity may cause eye damage after a momentary or brief exposure (before a person can avert their eyes away from the light source). The light may cause skin burns to occur.
- B—Hazard distance. Operators must control access to the beam within the hazard distance or install the product preventing potential exposure of the spectators' eyes from being in the hazard distance.
- C—No access zone. Horizontal clearance of the no access zone must be a minimum of 1.0 meters (3.3 feet).
- D—Vertical distance to hazard zone. The hazard zone must be no lower than 2.5 meters/8.2 feet (US installations) or 2.0 meters/6.6 feet (global installations) above any surface upon which any persons are permitted to stand.
If the vertical distance to hazard zone requirement (Zone D) is satisfied, the horizontal clearance distance (Zone C) is not needed.
- E—Represents the top view of the projector.
- F—Represents the side view of the projector.

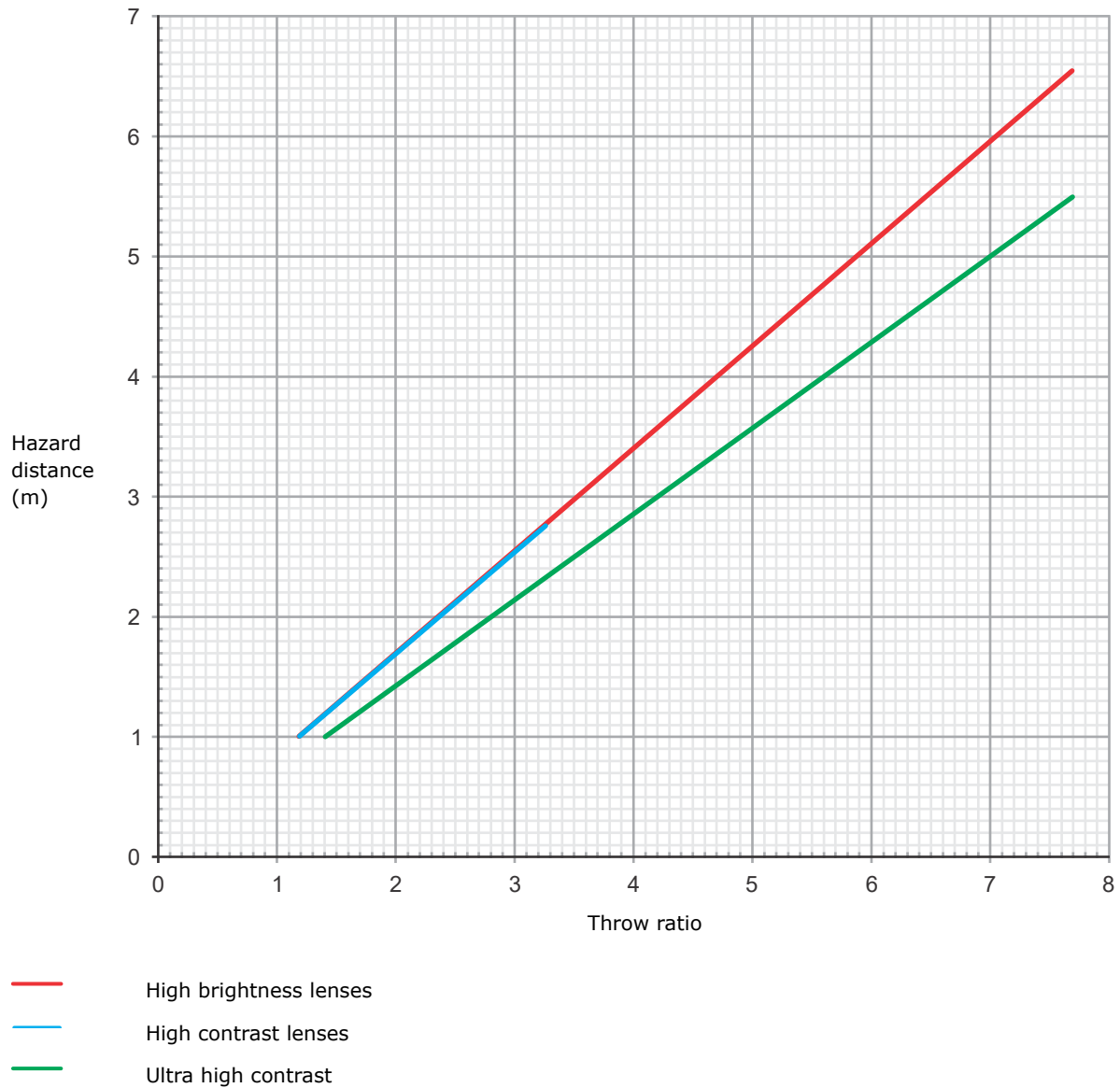
Lens	Part number	Hazard distance (m)	Category
High brightness fixed			
0.9:1	38-809071-XX	N/A	RG2
High brightness zoom			
1.13-1.66	108-342100-XX	See hazard distance graphs below	RG3
1.31-1.85	108-335102-XX		
1.45-2.17	108-336103-XX		
1.63-2.71	108-337104-XX		
1.95-3.26	108-338105-XX		

Lens	Part number	Hazard distance (m)	Category
2.71-3.89	108-278101-XX		
3.89-5.43	108-279101-XX		
4.98-7.69	108-280101-XX		
High brightness premium zoom			
1.13-1.72	163-141107-XX	See hazard distance graphs below	RG3
1.35-1.84	163-142108-XX		
1.45-2.10	163-143109-XX		
1.65-2.70	163-144100-XX		
High contrast zoom			
1.13-1.66	152-117100-XX	See hazard distance graphs below	RG3
1.31-1.85	152-118101-XX		
1.45-2.17	152-119102-XX		
1.63-2.71	152-120104-XX		
1.95-3.26	108-404109-XX		
High contrast premium zoom			
1.13-1.72	152-155102-XX	See hazard distance graphs below	RG3
1.35-1.84	152-156103-XX		
1.45-2.10	152-157104-XX		
1.65-2.70	152-158105-XX		
Ultra-high contrast fixed			
0.9:1	163-117100-XX	N/A	RG2
Ultra-high contrast zoom			
1.13-1.66	163-103105-XX	See hazard distance graphs below	RG3
1.31-1.85	163-104106-XX		
1.45-2.17	163-105107-XX		
1.63-2.71	163-106108-XX		
1.95-3.26	163-107109-XX		
2.71-3.89	163-108100-XX		
3.89-5.43	163-109101-XX		
4.98-7.69	163-110103-XX		
Ultra-high contrast premium zoom			
1.13-1.72	163-145101-XX	See hazard distance graphs below	RG3
1.35-1.84	163-146102-XX		

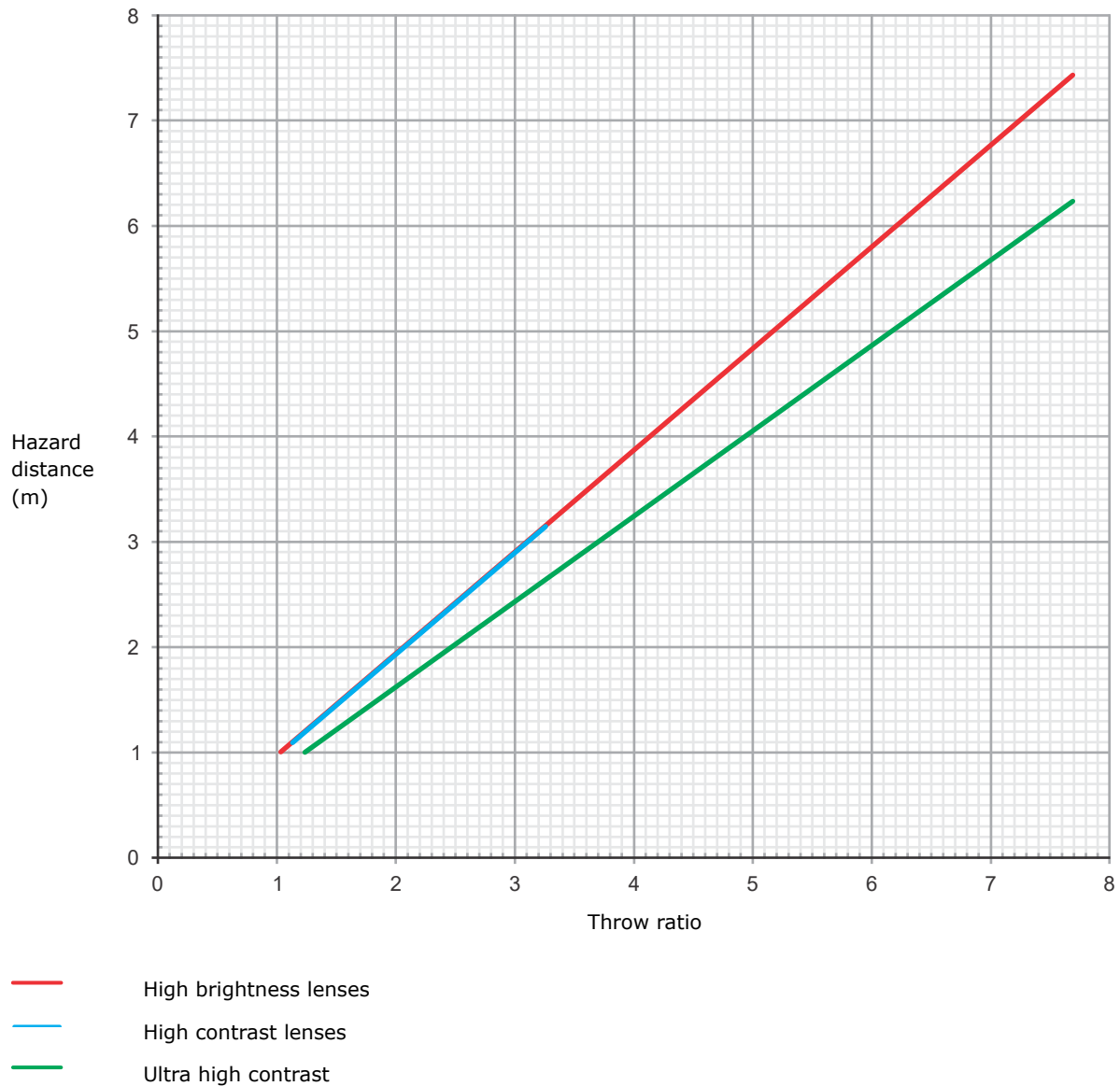
Lens	Part number	Hazard distance (m)	Category
1.45-2.10	163-147103-XX		
1.65-2.70	163-148104-XX		

The following give the hazard distance for the projector lens with the zoom adjusted to its most hazardous position.

Hazard distance graph for CP4415-RGB Gen2 lenses



Hazard distance graph for CP4420-RGB Gen2 lenses



For Installations in the United States

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

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



- Certain US states have additional laser regulatory requirements. Contact lasercompliance@christiedigital.com for additional regulatory requirements.

Product labels

Learn about the labels that may be used on the product. Labels on your product may be yellow or black and white.

General hazards

Hazard warnings also apply to accessories once they are installed in a Christie product connected to power.

Fire and Shock Hazard	
	<p>To prevent fire or shock hazards, do not expose this product to rain or moisture.</p> <p>Do not alter the power plug, overload the power outlet, or use it with extension cords.</p> <p>Do not remove the product enclosure.</p> <p>Only Christie qualified technicians are authorized to service the product.</p>
Electrical Hazard	
	<p>Risk of electric shock.</p> <p>Do not remove the product enclosure.</p> <p>Only Christie qualified technicians are authorized to service the product.</p>



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



Electric shock hazard. To avoid personal injury, disconnect all power sources before performing maintenance or service.



Electrocution hazard. To avoid personal injury, always disconnect all power sources before performing maintenance or service procedures.



Optical radiation hazard. To avoid personal injury, never look directly at the light source.



Voltage hazard. To avoid personal injury, always disconnect all power sources before performing maintenance or service procedures.



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



General hazard.



Hot surface hazard. To avoid personal injury, allow the product to cool for the recommended cool down time before touching or handling for maintenance or service.



Burn hazard. To avoid personal injury, allow the product to cool for the recommended cool down time before touching or handling for maintenance or service.



Moving parts hazard. To avoid personal injury, keep hands clear and loose clothing tied back.



Moving fan blades. To avoid personal injury, keep hands clear and loose clothing tied back. Always disconnect all power sources before performing maintenance or service procedures.



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



General hazard.



Not for household use.

Mandatory actions



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



Consult the service manual.



Disconnect all power sources before performing maintenance or service procedures. IEC 60417-6172 (2012-09)

Electrical labels



Indicates the presence of a protective earth ground.



Indicates the presence of an earth ground.

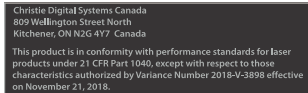
Additional hazard labels



Indicates high leakage current. Earth or ground connection essential before connecting the power supply.

Indicates a light hazard. Do not look directly into the lens. The extreme high brightness can cause permanent eye damage.

Laser labels



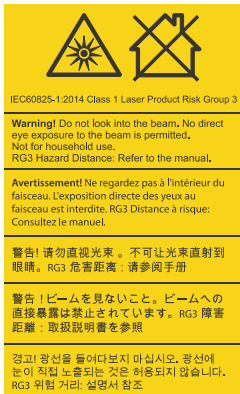
CP4415-RGB Gen2 and CP4420-RGB Gen2 FDA laser variance (US projectors only)

This product is in conformity with performance standards for laser products under 21 CFR 1040, except with respect to those characteristics authorized by Variance Number 2018-V-3898 effective on November 21, 2018.

CLASS 1 LASER PRODUCT IEC 60825-1:2014

CP4415-RGB Gen2 wavelengths: 450 nm - 661 nm

CP4420-RGB Gen2 wavelengths: 450 nm - 661 nm



Indicates a light hazard. Do not look directly into the lens. The extreme high brightness can cause permanent eye damage.

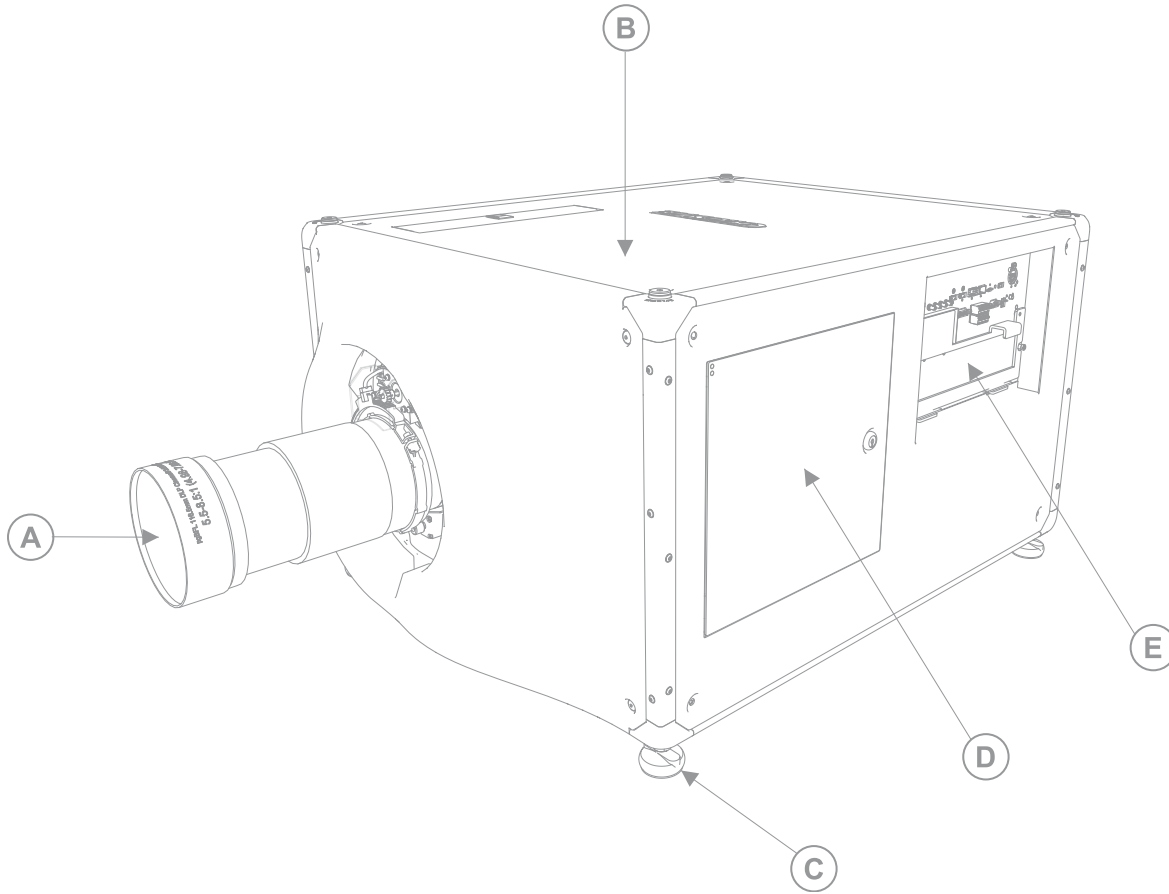
Class 1 Laser Product - Risk Group 3 according to IEC 60825-1:2014 and IEC 62471-5:2015



Indicates Class 4 laser radiation when open. Avoid eye or skin exposure to direct or scattered radiation.

Projector components (front)

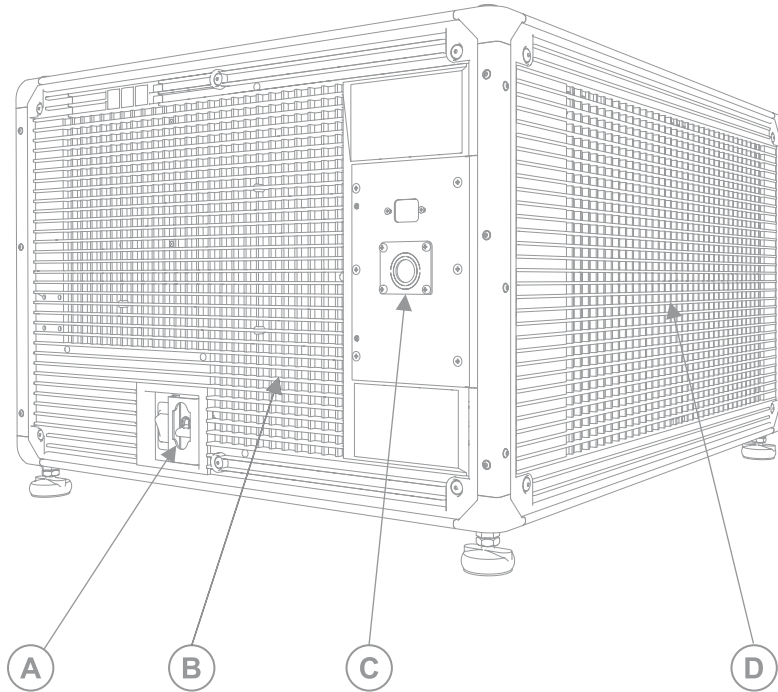
Learn about the components on the front of the projector.



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

Projector components (rear)

Learn about the components on the rear of the projector.



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

List of components

Verify all components were received with the projector.

- High security key to open the projector service access door

Accessories

Learn about the accessories (sold separately) available for the projector.

Lenses

Lens	Part number
High brightness fixed	
0.9:1	38-809071-XX

Lens	Part number
High brightness zoom	
1.13-1.66	108-342100-XX
1.31-1.85	108-335102-XX
1.45-2.17	108-336103-XX
1.63-2.71	108-337104-XX
1.95-3.26	108-338105-XX
2.71-3.89	108-278101-XX
3.89-5.43	108-279101-XX
4.98-7.69	108-280101-XX
High brightness premium zoom	
1.13-1.72	163-141107-XX
1.35-1.84	163-142108-XX
1.45-2.10	163-143109-XX
1.65-2.70	163-144100-XX
High contrast zoom	
1.13-1.66	152-117100-XX
1.31-1.85	152-118101-XX
1.45-2.17	152-119102-XX
1.63-2.71	152-120104-XX
1.95-3.26	108-404109-XX
High contrast premium zoom	
1.13-1.72	152-155102-XX
1.35-1.84	152-156103-XX
1.45-2.10	152-157104-XX
1.65-2.70	152-158105-XX
Ultra-high contrast fixed	
0.9:1	163-117100-XX
Ultra-high contrast zoom	
1.13-1.66	163-103105-XX
1.31-1.85	163-104106-XX
1.45-2.17	163-105107-XX
1.63-2.71	163-106108-XX
1.95-3.26	163-107109-XX

Lens	Part number
2.71-3.89	163-108100-XX
3.89-5.43	163-109101-XX
4.98-7.69	163-110103-XX
Ultra-high contrast premium zoom	
1.13-1.72	163-145101-XX
1.35-1.84	163-146102-XX
1.45-2.10	163-147103-XX
1.65-2.70	163-148104-XX

Filters and coolant

Description	Part number
Light engine air filter (6 pack)	003-006464-XX 003-007282-XX
Radiator intake filter (6 pack)	003-006463-XX
Coolant propylene glycol 740	003-005179-XX

Line cords

Description	Part number
Australia 250V/10A	108-392105-XX
China 250V/10A	108-373104-XX
EU/Korea 250V/10A	108-390103-XX
Japan 125V/12A	108-371102-XX
North America 125V/15A	108-382104-XX
South Africa 250V/10A	108-487100-XX
UK 250V/10A	108-388100-XX

Miscellaneous

Description	Part number
Touch screen monitor	003-121784-XX
Touch panel mounting hardware assembly	003-003326-XX
Rack Mount Pedestal kit	108-416102-XX
Driver set	003-007010-XX
OPAL Tools Power Meter kit	003-007163-XX

Key features

Understand the important features of the projector.

- Solid-state Christie ReaLaser™ RGB laser illumination
- Three-chip 1.38 inch 4K DLP™ light engine
- Christie CineLife+™ electronics
- Ability to work with Mystique software
- LiteLOC™ color lock feature for constant image brightness and color
- Direct-coupled laser module integrated in the projector chassis
- Compact form to fit in existing projection booths
- Exhaust air extraction (using optional accessory)

CineMaster cinema calculator tool

The CineMaster cinema calculator tool helps you calculate and configure the optimal cinema set up. Use this tool to help determine the right projector, lens, and lamp based on the unique needs of your installation, as well as your preferred projector type, screen configuration, and brightness requirements.

<https://cinemaster.christiedigital.com/>

Contact your dealer

Record the information about your installation and keep this information with your records to assist with any servicing of your product. If you encounter a problem, contact your dealer.

Purchase record
Dealer:
Dealer or Christie Sales/Service contact phone number:
Serial number: The serial number can be found on the license label.
Purchase date:
Installation date:

Technical support

Technical support for Christie Cinema products is available at:

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

Installing and setting up

Learn how to position and install the projector.

Site requirements

To safely install and operate the CP4415-RGB and CP4420-RGB Gen2, the installation location must meet these minimum requirements.

Physical operating environment

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

External exhaust ducting

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

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

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



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

Power specifications

Learn the power requirements for the projector.

Item	CP4415 Gen2	CP4420 Gen2
Main input		
Rated voltage	200-240 VAC	200-240 VAC
Rated current	11A, 1Φ	13A, 1Φ
Line frequency	50/60 Hz	50/60 Hz
UPS input		
Rated voltage	100-240 VAC	100-240 VAC
Rated current	7A, 1Φ	7A, 1Φ
Line frequency	50/60 Hz	50/60 Hz

Preparing the installation site

Make sure the installation area is ready for the components.

1. Clear the installation area.
2. Place each component near its installation location.

Lifting and positioning the projector

Safely lift and position the projector in the location where it will be used.



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

- A minimum of four people or appropriately rated lift equipment is required to safely lift, install, or move the product.
- Do not install or operate the projector in any position that does not meet the stated product specifications for alignment and orientation.

This product must be installed in a landscape orientation, with all four feet supported on a level surface. Do not install or operate the projector in an inverted position. If your site has any installation requirements other than a typical theater projection booth, contact Christie for assistance.



Before lifting and positioning the projector, refer to the light intensity hazard distances.

1. Position each person at the corners of the projector.
2. Place both hands under the corner, grasping the projector frame.
Do not lift the projector using any feature on the projector cover, such as the cover louvers or lens opening.
3. Lift up the projector and move it to the location where it will be used.
4. If installing the projector with the optional rack stand (P/N: 108-416102-XX) and adapter (P/N: 163-101103-XX), follow the instructions provided with that accessory.
For more information on available accessories, see the *CP4415-RGB and CP4420-RGB Gen2 Service Guide* (P/N: 020-103774-XX).
5. Position the projector so it is centered and parallel with the theater screen.
If space is limited, aim the projector slightly off-center and use lens offset to center the image on the screen.

Related information

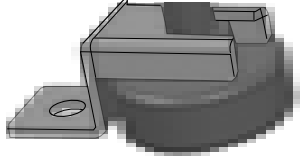
Light intensity hazard distance (on page 8)

Securing the rack stand with foot lock brackets

Complete these steps to secure the rack stand assembly.

Once installation is complete, the rack stand assembly must be secured to the building structure using the four foot lock brackets provided in the kit (P/N: 108-416102-XX).

1. Place a foot lock bracket over each leveling foot.
2. Secure the bracket to the floor.



The hardware to secure the bracket to the floor is not provided in the CP4415-RGB and CP4420-RGB Gen2 kit (P/N: 108-416102-XX). Contact Christie Technical Support to order the Anchor Bottom Pedestal Foot kit (P/N: 163-161109-XX).

Connecting to power

The recommended setup is to provide a hard-wired connection to AC power. When connecting the projector to AC power, follow all electrical codes for your location.

This product is suitable for connection to an IT power distribution system.



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

- Always connect the ground or earth first to reduce shock hazard.
- FIRE HAZARD! Do not use a power cord, harness, or cable that appears damaged.
- FIRE AND SHOCK HAZARD! Do not attempt operation unless the power cord, power socket, and power plug meet the appropriate local rating standards.
- SHOCK HAZARD! Do not attempt operation if the AC supply is not within the specified voltage and current, as specified on the license label.
- SHOCK HAZARD! A dedicated, protected ground or earth wire must be installed on the product by Christie qualified technicians or electricians before it can be connected to power.
- A certified electrician must be present during installation to make sure the installation meets the local electrical code.

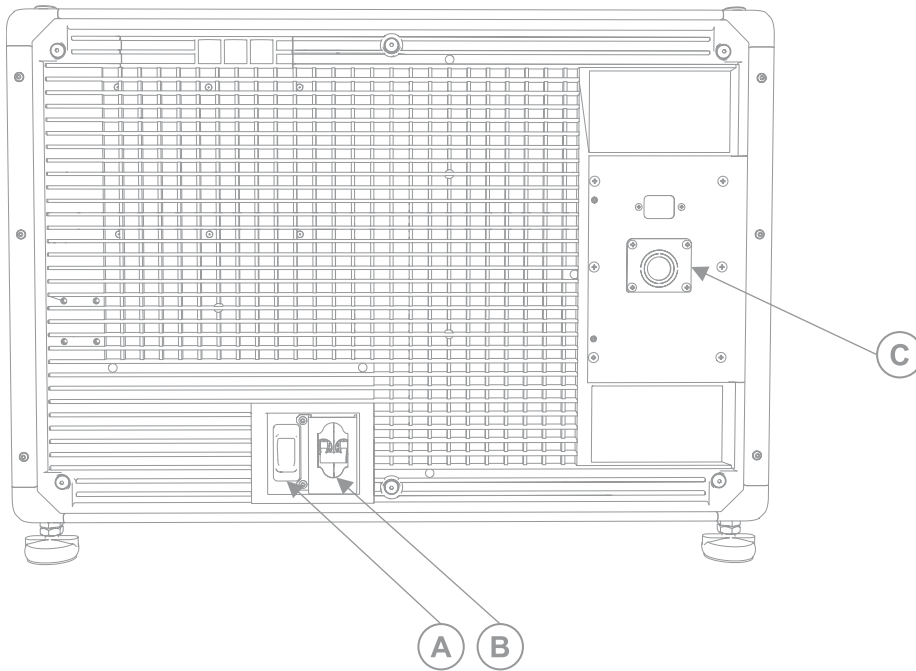


Caution! If not avoided, the following could result in minor or moderate injury.

- Use an appropriately sized strain relief connector with the knockout plate provided, to make sure adequate environmental sealing and to prevent the AC supply cable from accidentally being torn out or rubbing against the knockout plate.

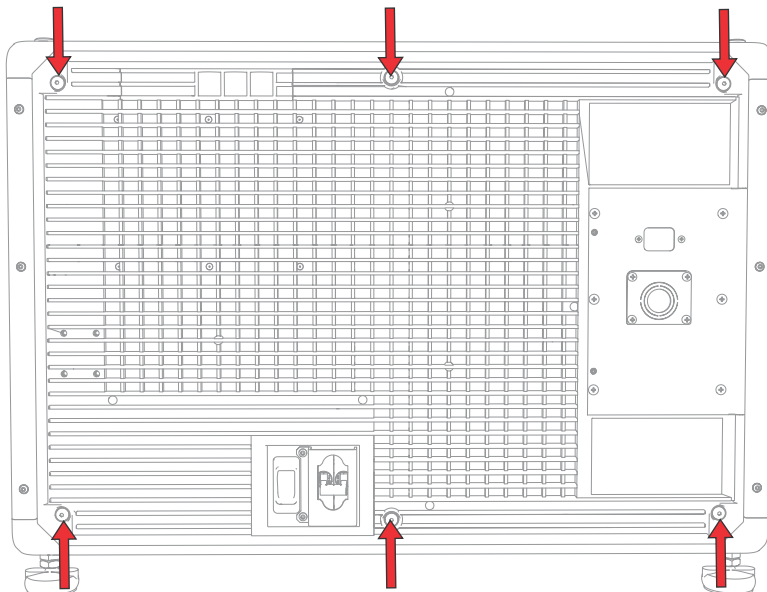


- A 30 A maximum rated, certified wall circuit breaker is required. It must be part of the building and easily accessible.
- Use a minimum of 12 AWG copper wire, grounding included, for the connection of the main AC supply to the projector's ground lug.
- Either copper or aluminum is acceptable as conductor wiring material to the terminal block.



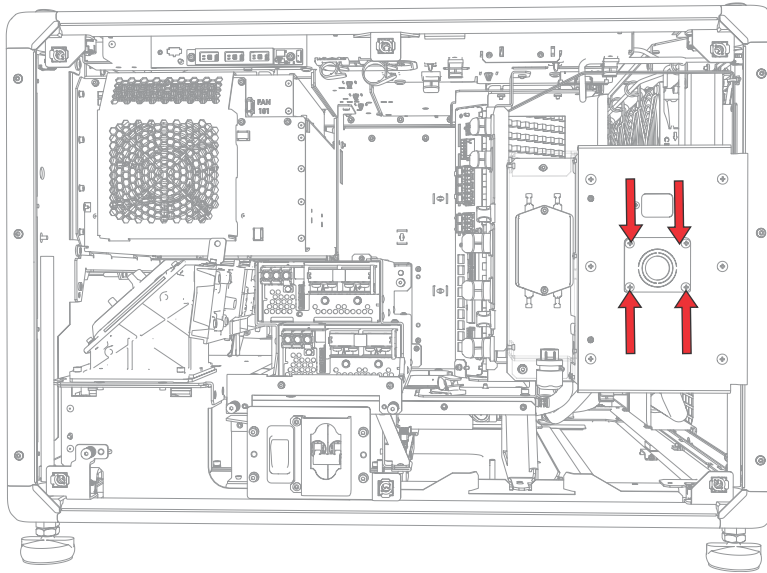
A	UPS circuit breaker
B	MAIN input circuit breaker
C	200-240 V main inlet

1. Loosen the six screws to remove the rear cover.

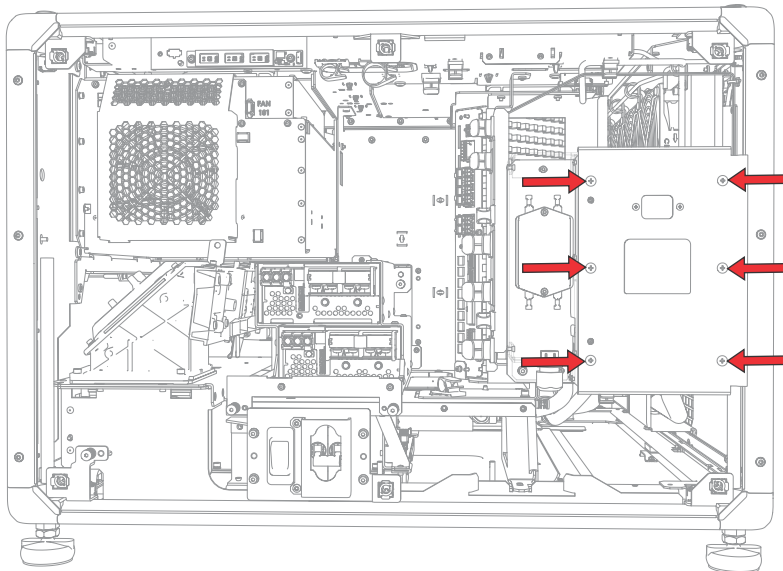


2. On the back right side of the projector, remove the four screws securing the AC receptacle knockout plate.

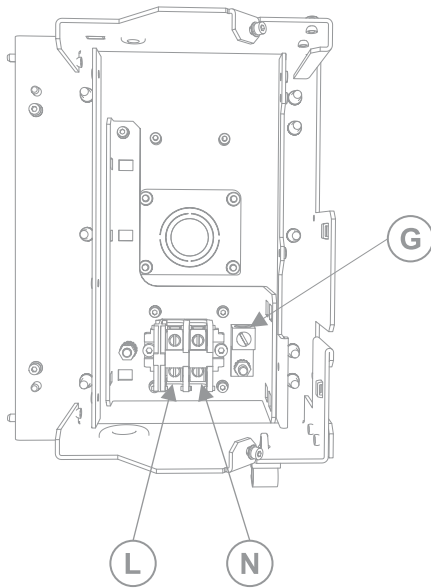
The AC supply is routed to the terminal block through an appropriate strain relief mounted on this knockout plate.



3. To open the AC input area of the projector, remove the six screws securing the cover and swing the cover downwards to open it.



4. Taking the approved line cord for your location, strip the cable jacket to expose a 120 mm length of the bundled wires.
5. Cut the Line (black or brown) and Neutral (white or blue) wires to shorten them to a length between 80 to 100 mm.
6. Using a wire stripper, strip the insulation from each individual wire to expose 10 mm of bare wire on the end.
7. Pass the wires through the strain relief on the knockout plate and through the AC input cover.
8. Fasten the bare end of the wires into the Ground (G), Line (L), and Neutral (N) terminal block connectors, starting first with the Ground (green) connection, followed by the Line (black or brown) and Neutral (white or blue) connections.



9. Lift the AC input cover into place and re-attach it using the six screws.
10. Using the four screws, re-attach the knockout plate and make sure the appropriate strain relief is in place.
11. Using the six screws, re-install the rear cover.

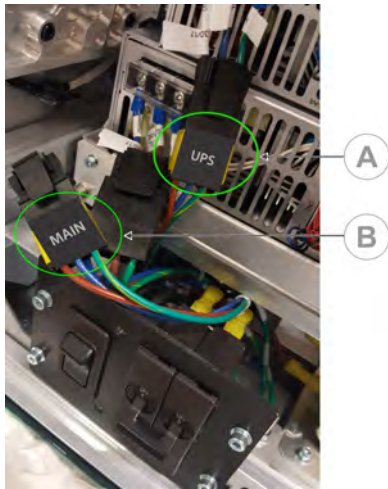
Connecting to an uninterruptible power supply

An uninterruptible power supply (UPS) allows the cinema projector head electronics to remain operable during a power failure.



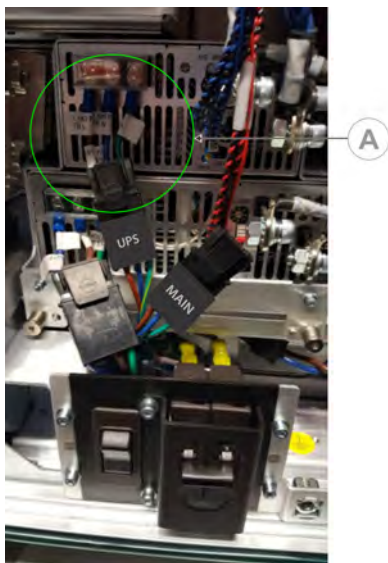
Warning! If not avoided, the following could result in death or serious injury.

- SHOCK HAZARD! The optional UPS power cord must be inserted into an outlet with grounding.
1. If installed, remove the touch panel.
 2. Loosen the six screws to remove the rear cover.
 3. Behind the MAIN input circuit breaker, disconnect the MAIN input plug from the top power supply.



A	UPS input plug
B	MAIN input plug

4. Remove the protective cap from the UPS input plug.
5. Connect the UPS input plug to the top power supply (A).



6. Place the protective cap from the UPS plug on the MAIN input plug.
7. Re-install the rear panel of the projector.
8. Re-install the projector touch panel.
9. Plug in the appropriate UPS power cord to the UPS and then into the UPS input (Input B) on the projector.

Related information

Accessories (on page 17)

Installing the lens

The lens seals the projection head, preventing contaminants from entering the main electronics area.



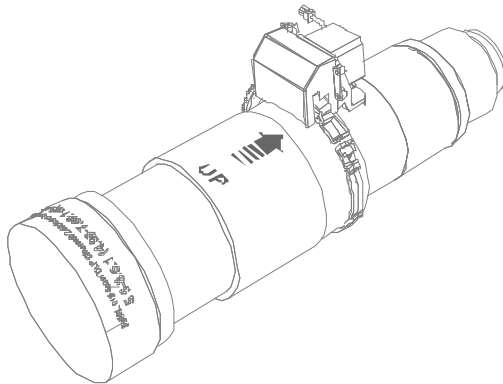
Notice. If not avoided, the following could result in property damage.

- Do not operate the product without a lens installed.
 - Always use a lens plug when installing or moving the product. This prevents contaminants from entering the product.
 - Do not insert the lens into the product at an angle. This can damage the lens and the optical components inside the product.
 - Always place the lens cap onto the lens when moving the projector to avoid scratching the lens.
 - Remove the lens cap before turning on the product to avoid damaging the lens.
1. Before installing the lens, make sure you turn off the projector and the circuit breaker switches.
 2. Remove the lens caps from the front and rear of the lens.

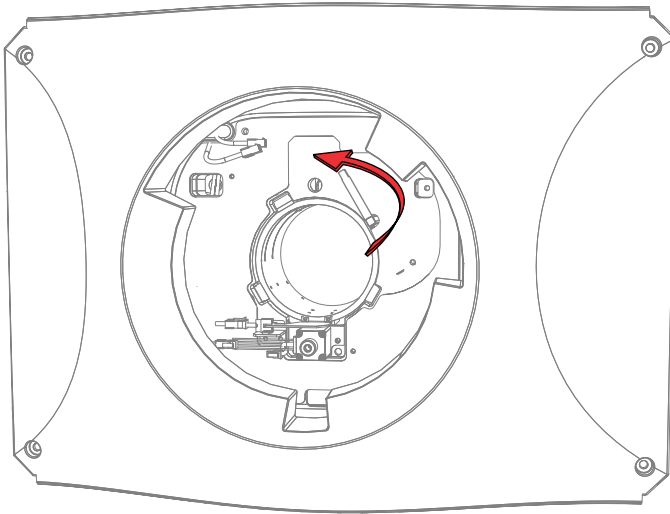


Lens caps must be removed or they can melt and damage the lens.

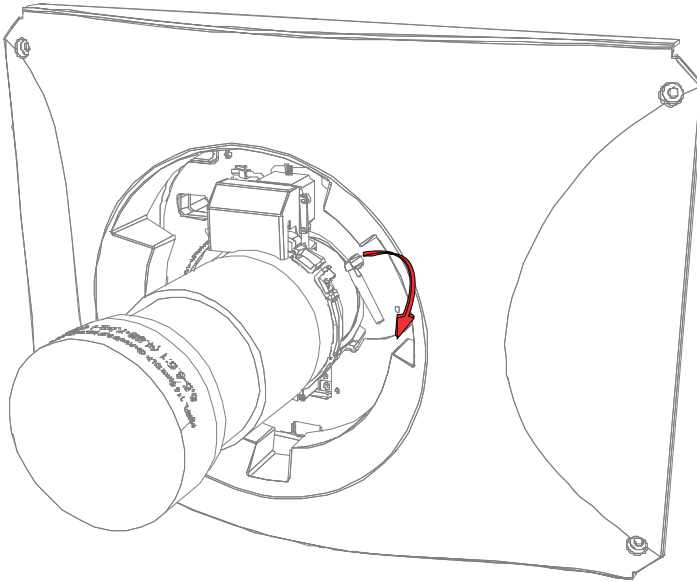
3. Position the lens so the **UP** label is facing upward.



4. Turn the clamp on the lens mount to the open position.



5. Fully insert the lens into the lens mount opening without turning, until it reaches the stop position.
6. Connect the lens zoom motor to the two zoom motor harness connectors.
7. Lock the lens assembly in place by rotating the lens clamp downward.



Projector power modes

The CP4415-RGB and CP4420-RGB Gen2 projectors track laser operation hours for the laser optical subsystem (LOS).

The projector operates with the following power modes:

Mode	Description
Projector on	<ul style="list-style-type: none"> • CineLife+ electronics and light engine are on • Laser optical subsystem (LOS) is off • Integrated Media Block (IMB) is on
Light source on	<ul style="list-style-type: none"> • CineLife+ electronics and light engine are on • LOS is on • Fans run at full speed • IMB is on
Standby	<ul style="list-style-type: none"> • CineLife+ electronics remain on standby with the light engine off • Fans and LOS are off • IMB is off—IMB automation does not function
IMB powered in Standby	<ul style="list-style-type: none"> • Turns on the IMB • Increases the air flow inside the projector to cool the card cage electronics

Using the Remote user interface (UI)

Use the remote user interface (UI) to access projector functionality.

1. Log into the Remote UI.
The default IP address is 192.168.206.110.
2. From the Remote UI default page, to access the main projector user interface, select the **Projector Control** tab.
3. To upload and download files from the projector, use the **File Menu**.

Examples of items that can be uploaded include:

- Projector upgrade packages
- Backup packages to restore from
- Rental files to license the projector for Rental mode
- Test patterns (PNG files only)
- Gamma files


Examples of items that can be downloaded include:

- Projector backup files
- Projector certificates (required for content decryption)
- Interrogator files (for support and troubleshooting)

4. If the projector has a GDC IMB SR-1000 installed and configured, access the GDC IMB Web UI by using the **Media Block** tab.

Turning on or off the projector

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

1. To operate the projector, make sure the circuit breakers are in the ON position.
If servicing the projector or removing the protective covers, make sure the MAIN and UPS circuit breakers are in the OFF position.
2. In the right toolbar, select and hold **Power**. 
If the light source is on when turning off the projector, the light source automatically enters a three-minute cool-down period.


Logging into the projector

Log into the projector to access projector menus.

1. Select **Login**.
If using the Web UI, you do not need to select **Login**.
2. In the User list, select a username.
3. Enter your password.
4. Select **Login**.

Turning on or off the light source

Turn on the light source to display content or view test patterns. Turn off the light to extend the life of the light source.

- To turn on or off the light source, in the right toolbar, select and hold **Light**. 

Activating marriage

After selecting the Integrated Media Block (IMB) type, you must install the IMB and complete marriage to display secure content and to comply with the Digital Cinema Initiatives (DCI) specification. You cannot complete marriage remotely.

For more information on marriage, refer to *CineLife+ User Guide (P/N: 020-103073-XX)*.

You cannot complete marriage remotely because you must select the **Marriage** button on the input panel during the marriage process.

1. Verify the marriage ring is installed correctly and an anti-tamper alarm does not appear on the touch panel.
2. In the left navigation menu, select **Service Setup > Marriage Setup**.
3. Select **Start** and complete the Marriage Setup wizard.
At the Arming stage, enter the Marriage password.
4. Select **Finish**.

Disposing of the product packaging

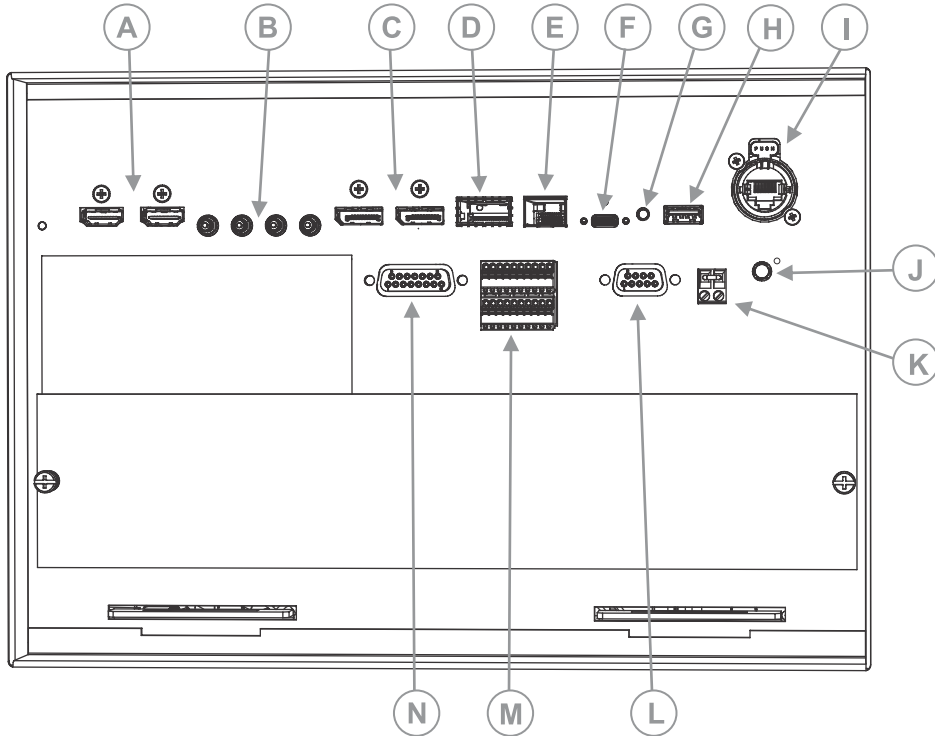
Once the product has been installed and set up, Christie recommends reusing or recycling the product packaging according to your local regulations.

Completing the installation checklist

Complete the provided installation checklist (P/N: 020-103137-XX) and return it to Christie.

Video Input panel

The Video Input panel, located on the projector side input panel (operator side), has a variety of ports that can supply alternative video content to the projector.



ID	Port	Description
A	HDMI input 1 and HDMI input 2	Type A connector Accepts digital video data from HDMI v2.0 input supporting EDID 1.3 with HDCP v1.4 and 2.2 support.
B	SDI input 1, SDI input 2, SDI input 3, and SDI input 4	75 ohm Micro-BNC Connector Multi-Rate SDI in accordance with SMPTE ST 259 (270 Mb/s), ST 292-1 (1.5 Gb/s), ST 424 (3.0 Gb/s), ST 2081-1 (6 Gb/s) and ST 2082-1 (12 Gb/s)
C	DisplayPort (DP1 and DP2)	Accepts digital video data from DisplayPort 1.2 input supporting EDID 1.3 with HDCP 1.3 support.
D	Christie Link port	Not used.
E	Software-Defined Video over Ethernet (SDVoE) port	Not used.
F	USB-C port	Connects the projector touch panel.

ID	Port	Description
G	Recessed button	Select the button to transition the projector from Standby mode to Power ON mode.
H	USB port	Connects to external memory device for import and export of projector software, configuration files, and status information.
I	Management port	Connects to the local network and can send CineLife+ serial commands and used for Web UI access.
J	Marriage button	Used during the Integrated Media Block (IMB) marriage setup process. <ul style="list-style-type: none"> • Select and hold the button for 5 seconds to display the IP address and status information. • Select and hold the button for 30 seconds to reset the IP address to the default address. The marriage status LED indicator is located to the right of the Marriage button. In full power mode, a green LED indicates the projector is properly married and encrypted content can be displayed. A red LED indicates marriage is broken and encrypted content cannot be displayed.
K	Fire alarm connection	Connects to the Theater Fire Management system for automatic shut down in emergency situations.
L	RS232 communication port	Not used.
M	GPIO port	Connects the projector to external automation or automation devices.
N	3D sync connector	Connects the projector to 3D devices.

HDMI video source

For the projector to accept digital video data from HDMI sources, plug the HDMI source directly into the Video Input panel.

The input configurations listed below are supported.

Input configuration	Description
Single-input	Accepts connection of one HDMI cable. Supports both 2D and 3D frame-packed, top and bottom. In this configuration, the HDMI input supplies the entire video raster.
Dual-input	Enables connection of two HDMI cables in support of 3D LR, where HDMI Input 1 = left eye and HDMI Input 2 = right eye.

HDMI video formats

The following image formats are supported by the two HDMI inputs.



Fractional 1/1.001 frame rates, 1920 x 1080 (HD), and 3840 x 2160 (UHD) formats are also supported.

Single-input 2D 2K and 4K HDMI 2.0 image formats

Each HDMI input supports the following single-input (one cable) 2D 2K and 4K HDMI 2.0 image formats.

	Format	Cables	Frame rate (Hz)	Sampling	Bit-depth
2K	2048x1080	1	24, 25, 30, 50, 60, 120	Y'C _B C _R /RGB/4:4:4 Y'C _B C _R /4:2:2	8/10/12 bpc
4K	4096x2160	1	24, 25, 30	Y'C _B C _R /RGB/4:4:4 Y'C _B C _R /4:2:2	8/10/12 bpc
	4096x2160	1	50, 60	Y'C _B C _R /RGB/4:4:4	8 bpc
	4096x2160	1	50, 60	Y'C _B C _R /4:2:2	8/10/12 bpc

Single-input 2D HD HDMI 2.0 image formats

Each HDMI input supports the following single-input (one cable) 2D HD HDMI 2.0 image formats.

	Format	Cables	Frame rate (Hz)	Sampling	Bit-depth	Notes
HD	1280x720	1	24, 25, 30, 50, 60	Y'C _B C _R /RGB/4:4:4 Y'C _B C _R /4:2:2	8/10/12 bpc	-
	1920x1080i	1	25, 30	Y'C _B C _R /RGB/4:4:4 Y'C _B C _R /4:2:2	8/10/12 bpc	2048x1080 interlaced (50/60 Hz field rate)

Single-input 2D HDMI 2.0 PC image formats

Each HDMI input supports the following single-input 2D HDMI 2.0 PC image formats.

	Format	Cables	Frame rate (Hz)	Sampling	Bit-depth
PC	1280x800	1	60	RGB	8 bpc
	1280x960	1	60	RGB	8 bpc
	1280x1024	1	60	RGB	8 bpc
	1440x900	1	60	RGB	8 bpc
	1680x1050	1	60	RGB	8 bpc
	1600x1200	1	60	RGB	8 bpc
	2048x1200	1	60	RGB	8 bpc

Single-input 3D 2K/HD HDMI 2.0 image formats

Each HDMI input supports the following single-input (one cable) 3D 2K/HD HDMI 2.0 image formats.

	Format	Cables	Frame rate (Hz)	Sampling	Bit-depth	Notes
3D	1280x720	1	50, 60	Y'C _B C _R /RGB/4:4:4	8/10/12 bpc	Frame-packing/top-and-bottom

Format	Cables	Frame rate (Hz)	Sampling	Bit-depth	Notes
			Y'C _B C _R /4:2:2		
2048x1080	1	24, 25, 30, 50, 60	Y'C _B C _R /RGB/4:4:4 Y'C _B C _R /4:2:2	8/10/12 bpc	Frame-packing

Dual-input 3D 2K/4K HDMI 2.0 image formats

The following dual-input 3D 2K/4K HDMI 2.0 image formats are supported, where HDMI Input 1 = left eye and HDMI Input 2 = right eye. Frame rate is expressed per eye in the following table.

Format	Cables	Frame rate (Hz)	Sampling	Bit-depth	
2K	2048x1080	2	24, 25, 30, 50, 60	Y'C _B C _R /RGB/4:4:4 Y'C _B C _R /4:2:2	8/10/12 bpc
4K	4096x2160	2	24, 25, 30	Y'C _B C _R /RGB/4:4:4 Y'C _B C _R /4:2:2	8/10/12 bpc
	4096x2160	2	50, 60	Y'C _B C _R /RGB/4:4:4	8 bpc
	4096x2160	2	50, 60	Y'C _B C _R /4:2:2	8/10/12 bpc

SDI video source

For the projector to accept digital video data from 12G, 6G, 3G, or HD/SD SDI video source, plug the source directly into the Video Input panel.

The input configurations listed below are supported.

Input configuration	Description
Single-link	Accepts connection of 12G, 6G, 3G, and HD/SD SDI input standards.
Dual-link	Accepts connection of dual-link 6G, 3G, and HD SDI input standards.
Quad-link	Accepts connection of quad-link (2SI) 6G or 3G SDI input standards. Accepts connection of quad-link (SQ div) 6G, 3G, or 1.5G SDI input standards.

SDI video formats

Each of the SDI inputs supports the following single-Link 2D SD and HD image formats, single-link 2D HD and UHD/4K image formats, dual-link 2D SDI image formats, and quad-link 2D image formats.



Fractional 1/1.001 frame rates, 1920 x 1080 (HD), and 3840 x 2160 (UHD) formats are also supported.

Single-link 2D: SD, 720p and 1080i image formats

The following SDI inputs support the following single-link (one cable) 2D SD, 720p, and 1080i image formats.

	Format	Cables	Frame rate (Hz)	Sampling	Bit-depth	Notes
SD	720x480	1	30	Y'C _B C _R /4:2:2	10 bpc	SD interlaced component at 270 Mb/s (ST 259 level C) interlaced (60 Hz field rate)
	720x576	1	25	Y'C _B C _R /4:2:2	10 bpc	SD interlaced component at 270 Mb/s (ST 259 level C) interlaced (50 Hz field rate)
HD	1280x720	1	24, 25, 30, 50, 60	Y'C _B C _R /4:2:2	10 bpc	HD 720p Y'C _B C _R component at 1.5 Gb/s (ST 292-1)
	1280x720	1	24, 25, 30, 50, 60	Y'C _B C _R /4:4:4(4)	10 bpc	HD 720p Y'C _B C _R /RGB component at 3.0 Gb/s (ST 425-1) level A
2K	2048x1080	1	25, 30	Y'C _B C _R /4:2:2	10 bpc	HD 1080i component at 1.5 Gb/s (ST 292-1) interlaced (50/60 Hz field rate)

Single-link 2D: 2K and 4K HD/UHD

The following SDI inputs support the following single-link (one cable) 2D HD and UHD/4K image formats.

	Format	Cables	Frame rate (Hz)	Sampling	Bit-depth	Notes
2K	2048X1080	1	24, 25, 30	Y'C _B C _R /4:2:2	10 bpc	HD 1080p component at 1.5 Gb/s (ST 292-1)
	2048X1080	1	48, 50, 60	Y'C _B C _R /4:2:2	10 bpc	HD 1080p component at 3.0 Gb/s (ST 425-1) level A
	2048X1080	1	24, 25, 30	Y'C _B C _R /RGB/4:4:4(4)	10 bpc	HD 1080p Y'C _B C _R /RGB component at 3.0 Gb/s (ST 425-1) level A

Format	Cables	Frame rate (Hz)	Sampling	Bit-depth	Notes	
2048X1080	1	24, 25, 30	Y'C _B C _R /RGB/ 4:4:4(4)	12 bpc	HD 1080p Y'C _B C _R /RGB component at 3.0 Gb/s (ST 425-1) level A	
2048X1080	1	24, 25, 30	Y'C _B C _R /4:2:2(4)	12 bpc	HD 1080p Y'C _B C _R component at 3.0 Gb/s (ST 425-1) level A	
2048X1080	1	48, 50, 60	Y'C _B C _R /RGB/ 4:4:4(4)	10 bpc	HD 1080p Y'C _B C _R /RGB component at 6.0 Gb/s (ST 2081-10) mode 2 structure II	
2048X1080	1	48, 50, 60	Y'C _B C _R /RGB/ 4:4:4	12 bpc	HD 1080p Y'C _B C _R /RGB component at 6.0 Gb/s (ST 2081-10) mode 2 structure III	
4K	4096X2160	1	48, 50, 60	Y'C _B C _R /4:2:2	10 bpc	2160p Y'C _B C _R component at 6.0 Gb/s (ST 2081-10) mode 1 structure 1
	4096X2160	1	24, 25, 30	Y'C _B C _R /RGB/ 4:4:4(4)	10 bpc	2160p Y'C _B C _R /RGB component at 12.0 Gb/s (ST 2082-10) mode 1 structure 2
	4096X2160	1	24, 25, 30	Y'C _B C _R /RGB/ 4:4:4	12 bpc	2160p Y'C _B C _R /RGB component at 12.0 Gb/s (ST 2082-10) mode 1 structure 3
	4096X2160	1	24, 25, 30	Y'C _B C _R /4:2:2(4)	12 bpc	2160p Y'C _B C _R component at 12.0 Gb/s (ST 2082-10) mode 1 structure 4

Dual-link 2D: 2K and 4K HD/UHD

The following dual-link (two cable) 2D HD and UHD/4K image formats are supported. Dual-link SDI is a fixed configuration.

- SDI 1 = link 1 of input 1
- SDI 2 = link 2 of input 1
- SDI 3 = link 1 of input 2
- SDI 4 = link 2 of input 2



Fractional 1/1.001 frame rates, 1920x1080, and 3840x2160 (UHD) formats are also supported.

	Format	Cables	Frame rate (Hz)	Sampling	Bit-depth	Notes
2K	2048x1080	2	48, 50, 60	Y'C _B C _R /RGB/ 4:4:4(4)	10 bpc	Y'C _B C _R /RGB component at dual-link 3 Gb/s (ST 425-3) level A structure II
	2048x1080	2	48, 50, 60	Y'C _B C _R /RGB/ 4:4:4	12 bpc	Y'C _B C _R /RGB component at dual-link 3 Gb/s (ST 425-3) level A structure III
	2048x1080	2	48, 50, 60	Y'C _B C _R /4:2:2	12 bpc	Y'C _B C _R component at dual-link 3 Gb/s (ST 425-3) level A structure IV
	2048x1080	2	48, 50, 60	Y'C _B C _R /4:2:2:4	12 bpc	Y'C _B C _R component at dual-link 3 Gb/s (ST 425-3) level A structure IV
4K	4096X2160	2	48, 50, 60	Y'C _B C _R /4:2:2	10 bpc	Y'C _B C _R component at dual-link 6 Gb/s (ST 2081-11) mode 1
	4096X2160	2	24, 25, 30	Y'C _B C _R /RGB/ 4:4:4(4)	10 bpc	Y'C _B C _R /RGB component at dual-link 6 Gb/s (ST 2081-11) mode 1
	4096X2160	2	24, 25, 30	Y'C _B C _R /RGB/ 4:4:4	12 bpc	Y'C _B C _R /RGB component at dual-link 6 Gb/s (ST 2081-11) mode 1
	4096X2160	2	24, 25, 30	Y'C _B C _R /4:2:2	12 bpc	Y'C _B C _R component at dual-link 6 Gb/s (ST 2081-11) mode 1

Format	Cables	Frame rate (Hz)	Sampling	Bit-depth	Notes
4096X2160	2	24, 25, 30	Y'C _B C _R /4:2:2:4	12 bpc	Y'C _B C _R component at dual-link 6 Gb/s (ST 2081-11) mode 1

Quad-link (2SI) 2D: 4K UHD

The following quad-link (four cable) 2D image formats are supported. The quad-link SDI is a fixed configuration.

- SDI 1 = link 1
- SDI 2 = link 2
- SDI 3 = link 3
- SDI 4 = link 4



Fractional 1/1.001 frame rates and 3840x2160 (UHD) formats are also supported.

Format	Cables	Frame rate (Hz)	Sampling	Bit-depth	Notes	
4K	4096x2160	4	24, 25, 30	Y'C _B C _R /RGB/4:4:4(4)	10 bpc	Y'C _B C _R /RGB component at quad-link 3 Gb/s (ST 425-5) level A structure 2
	4096x2160	4	24, 25, 30	Y'C _B C _R /RGB/4:4:4	12 bpc	Y'C _B C _R /RGB component at quad-link 3 Gb/s (ST 425-5) level A structure 3
	4096x2160	4	24, 25, 30	Y'C _B C _R /4:2:2(4)	12 bpc	Y'C _B C _R component at quad-link 3 Gb/s (ST 425-5) level A structure 4
	4096x2160	4	24, 25, 30	Y'C _B C _R /4:2:2	12 bpc	Y'C _B C _R component at quad-link 3 Gb/s (ST 425-5) level A structure 4
	4096x2160	4	48, 50, 60	Y'C _B C _R /RGB/4:4:4(4)	10 bpc	Y'C _B C _R /RGB component at quad-link 6 Gb/s (ST 2081-12) mode 2 structure III
	4096x2160	4	48, 50, 60	Y'C _B C _R /RGB/4:4:4	12 bpc	Y'C _B C _R /RGB component at

Format	Cables	Frame rate (Hz)	Sampling	Bit-depth	Notes
					quad-link 6 Gb/s (ST 2081-12) mode 2 structure III
4096x2160	4	48, 50, 60	Y'C _B C _R /4:2:2:4	12 bpc	Y'C _B C _R component at quad-link 6 Gb/s (ST 2081-12) mode 2 structure IV

Quad-link (SQ div) 2D: 4K UHD

The following quad-link (four cable) 2D image formats are supported in the square-division mapping format. The quad-link square division (SQ div) SDI is a fixed configuration.

- SDI 1 = link 1
- SDI 2 = link 2
- SDI 3 = link 3
- SDI 4 = link 4

In this mode, each SDI input represents one quarter of the total image assigned as shown in the following diagram:

Input 1 SDI 1	Input 2 SDI 2
Input 3 SDI 3	Input 4 SDI 4



Fractional 1/1.001 frame rates and 3840x2160 (UHD) formats are also supported.

Format	Cables	Frame rate (Hz)	Sampling	Bit-depth	Notes	
4K	4096x2160	4	48, 50, 60	Y'C _B C _R /4:2:2	10 bpc	Y'C _B C _R component at quad-link 3 Gb/s (ST 425-5) annex B square division of 2160-image formats, B.1 level A mapping
	4096x2160	4	24, 25, 30	Y'C _B C _R /RGB/4:4:4(4)	10 bpc	Y'C _B C _R /RGB component at quad-link 3 Gb/s (ST 425-5) annex B square division of 2160-image formats, B.1 level A mapping

Format	Cables	Frame rate (Hz)	Sampling	Bit-depth	Notes
4096x2160	4	24, 25, 30	Y'C _B C _R /RGB/ 4:4:4	12 bpc	Y'C _B C _R /RGB component at quad-link 3 Gb/s (ST 425-5) annex B square division of 2160-image formats, B.1 level A mapping
4096x2160	4	24, 25, 30	Y'C _B C _R /4:2:2:4	12 bpc	Y'C _B C _R component at quad-link 3 Gb/s (ST 425-5) annex B square division of 2160-image formats, B.1 level A mapping
4096x2160	4	24, 25, 30	Y'C _B C _R /4:2:2	12 bpc	Y'C _B C _R component at quad-link 3 Gb/s (ST 425-5) annex B square division of 2160-image formats, B.1 level A mapping
4096x2160	4	48, 50, 60	Y'C _B C _R /RGB/ 4:4:4(4)	10 bpc	Y'C _B C _R /RGB component at quad-link 6 Gb/s (ST 2081) mode 2 structure II
4096x2160	4	48, 50, 60	Y'C _B C _R /RGB/ 4:4:4	12 bpc	Y'C _B C _R /RGB component at quad-link 6 Gb/s (ST 2081) mode 2 structure II

Where each SDI Input corresponds to one of the following input signal formats:

Format	Cables	Frame rate (Hz)	Sampling	Bit-depth	Notes	
2K	2048x1080	1	48, 50, 60	Y'C _B C _R /4:2:2	10 bpc	HD 1080p component at 3.0 Gb/s (ST 425-1) level A
	2048x1080	1	24, 25, 30	Y'C _B C _R /RGB/ 4:4:4(4)	12 bpc	HD 1080p Y'C _B C _R /RGB component at 3.0 Gb/s (ST 425-1) level A
	2048x1080	1	24, 25, 30	Y'C _B C _R /4:2:2(4)	12 bpc	HD 1080p Y'C _B C _R

Format	Cables	Frame rate (Hz)	Sampling	Bit-depth	Notes
					component at 3.0 Gb/s (ST 425-1) level A
2048x1080	1	48, 50, 60	Y'C _B C _R /RGB/4:4:4(4)	10 bpc	HD 1080p Y'C _B C _R /RGB component at 6.0 Gb/s (ST 2081-10) structure II
2048x1080	1	48, 50, 60	Y'C _B C _R /RGB/4:4:4	12 bpc	HD 1080p Y'C _B C _R /RGB component at 6.0 Gb/s (ST 2081-10) mode 2 structure III

3D LR (1,2) and 3D LR (3,4): 2K & 4K UHD

The following dual-input (two cable) 3D image formats are supported. The dual-input 3D SDI is a fixed configuration.

- SDI 1 = input 1 left eye
- SDI 2 = input 1 right eye
- SDI 3 = input 2 left eye
- SDI 4 = input 2 right eye



Fractional 1/1.001 frame rates and 1920x1080 (HD) & 3840x2160 (UHD) formats are also supported.

Format	Cables	Frame rate (Hz) per eye	Sampling	Bit-depth	Notes	
2K	2048x1080	2	24, 25, 30	Y'C _B C _R /4:2:2	10 bpc	HD 1080p component at 1.5 Gb/s (ST 292-1)
	2048x1080	2	48, 50, 60	Y'C _B C _R /4:2:2	10 bpc	HD 1080p component at 3.0 Gb/s (ST 425-1) level A
	2048x1080	2	24, 25, 30	Y'C _B C _R /RGB/4:4:4(4)	12 bpc	HD 1080p Y'C _B C _R /RGB component at 3.0 Gb/s (ST 425-1) level A
	2048x1080	2	24, 25, 30	Y'C _B C _R /4:2:2(4)	12 bpc	HD 1080p Y'C _B C _R component at 3.0 Gb/s (ST 425-1) level A

	Format	Cables	Frame rate (Hz) per eye	Sampling	Bit-depth	Notes
	2048x1080	2	48, 50, 60	Y'C _B C _R /RGB/4:4:4(4)	10 bpc	HD 1080p Y'C _B C _R /RGB component at 6.0 Gb/s (ST 2081-10) mode 2 structure II
	2048x1080	2	48, 50, 60	Y'C _B C _R /RGB/4:4:4	12 bpc	HD 1080p Y'C _B C _R /RGB component at 6.0 Gb/s (ST 2081-10) mode 2 structure III
4K	4096x2160	2	48, 50, 60	Y'C _B C _R /4:2:2	10 bpc	2160p Y'C _B C _R component at 6.0 Gb/s (ST 2081-10) mode 1 structure 1
	4096x2160	2	24, 25, 30	Y'C _B C _R /RGB/4:4:4(4)	10 bpc	2160p Y'C _B C _R /RGB component at 12.0 Gb/s (ST 2082-10) mode 1 structure 2
	4096x2160	2	24, 25, 30	Y'C _B C _R /RGB/4:4:4	12 bpc	2160p Y'C _B C _R /RGB component at 12.0 Gb/s (ST 2082-10) mode 1 structure 3
	4096x2160	2	24, 25, 30	Y'C _B C _R /4:2:2(4)	12 bpc	2160p Y'C _B C _R component at 12.0 Gb/s (ST 2082-10) mode 1 structure 4

Dual-link 3D LR (1,2)(3,4): 2K and 4K HD/UHD

The following dual-link (four cable) 3D image formats are supported. The dual-link 3D SDI is a fixed configuration.

- SDI 1&2 = left eye
- SDI 3&4 = right eye



Fractional 1/1.001 frame rates, 1920x1080, and 3840x2160 (UHD) formats are also supported.

	Format	Cables	Frame rate (Hz) per eye	Sampling	Bit-depth	Notes
2K	2048x1080	4	48, 50, 60	Y'C _B C _R /RGB/4:4:4(4)	10 bpc	Y'C _B C _R /RGB component at dual-link 3 Gb/s (ST 425-3) level A structure II
	2048x1080	4	48, 50, 60	Y'C _B C _R /RGB/4:4:4	12 bpc	Y'C _B C _R /RGB component at dual-link 3 Gb/s (ST 425-3) level A structure III
	2048x1080	4	48, 50, 60	Y'C _B C _R /4:2:2	12 bpc	Y'C _B C _R component at dual-link 3 Gb/s (ST 425-3) level A structure IV
	2048x1080	4	48, 50, 60	Y'C _B C _R /4:2:2:4	12 bpc	Y'C _B C _R component at dual-link 3 Gb/s (ST 425-3) level A structure IV
4K	4096x2160	4	48, 50, 60	Y'C _B C _R /4:2:2	10 bpc	Y'C _B C _R component at dual-link 6 Gb/s (ST 2081-11) mode 1
	4096x2160	4	24, 25, 30	Y'C _B C _R /RGB/4:4:4(4)	10 bpc	Y'C _B C _R /RGB component at dual-link 6 Gb/s (ST 2081-11) mode 1
	4096x2160	4	24, 25, 30	Y'C _B C _R /RGB/4:4:4	12 bpc	Y'C _B C _R /RGB component at dual-link 6 Gb/s (ST 2081-11) mode 1
	4096x2160	4	24, 25, 30	Y'C _B C _R /4:2:2	12 bpc	Y'C _B C _R component at dual-link 6 Gb/s (ST 2081-11) mode 1
	4096x2160	4	24, 25, 30	Y'C _B C _R /4:2:2:4	12 bpc	Y'C _B C _R component at dual-link 6 Gb/s (ST 2081-11) mode 1

DisplayPort video source

For the projector to accept digital video data, plug the DisplayPort source directly into the Video Input panel.

The input configurations listed below are supported.

Input configuration	Description
Single-input	Enables connection of one DisplayPort cable. Supports both 2D and 3D frame sequential transmission format. In this configuration the DisplayPort input supplies the entire video raster.
Dual-input	Enables connection of two DisplayPort cables. Supports both 2D and 3D frame sequential transmission format.

DisplayPort video formats

The following image formats are supported by the DisplayPort inputs.



Frame rates also include fractional 1/1.001 frame rates.

Single-input DisplayPort 1.2 image formats

The following single-input DisplayPort 1.2 image formats are supported on each of the DP 1.2 inputs.

	Format	Cables	Frame rate (Hz)	Sampling	Bit-depth
HD	1280x720	1	24, 25, 30, 50, 60, 120	Y'C _B C _R /RGB/4:4:4	8/10/12bpc
	1920x1080	1	24, 25, 30, 50, 60, 120	Y'C _B C _R /RGB/4:4:4	8/10/12bpc
	2048x1080	1	24, 25, 30, 50, 60, 120	Y'C _B C _R /RGB/4:4:4	8/10/12bpc
4K	3840x2160	1	24, 25, 30, 50, 60	Y'C _B C _R /RGB/4:4:4	8/10bpc
	4096x2160	1	24, 25, 30, 50, 60	Y'C _B C _R /RGB/4:4:4	8/10bpc

Single-input 3D DisplayPort 1.2 image formats

The following single-input 3D DisplayPort image formats are supported in frame sequential transmission format. Frame rate is expressed per eye in the following table.

	Format	Cables	Frame rate (Hz)	Sampling	Bit-depth
HD	1280x720	1	24, 25, 30, 50, 60	Y'C _B C _R /RGB/4:4:4	8/10/12bpc
	1920x1080	1	24, 25, 30, 50, 60	Y'C _B C _R /RGB/4:4:4	8/10/12bpc
	2048x1080	1	24, 25, 30, 50, 60	Y'C _B C _R /RGB/4:4:4	8/10/12bpc
4K	3840x2160	1	24, 25, 30	Y'C _B C _R /RGB/4:4:4	8/10bpc
	4096x2160	1	24, 25, 30	Y'C _B C _R /RGB/4:4:4	8/10bpc

Dual-input 3D DisplayPort 1.2 image formats

The following dual-input 3D DisplayPort 1.2 image formats are supported. Frame rate is expressed per eye in the following table.

	Format	Cables	Frame rate (Hz)	Sampling	Bit-depth
HD	1280x720	2	24, 25, 30, 50, 60	Y'C'B'C'R/RGB/4:4:4	8/10/12bpc
	1920x1080	2	24, 25, 30, 50, 60	Y'C'B'C'R/RGB/4:4:4	8/10/12bpc
	2048x1080	2	24, 25, 30, 50, 60	Y'C'B'C'R/RGB/4:4:4	8/10/12bpc
4K	3840x2160	2	24, 25, 30, 50, 60	Y'C'B'C'R/RGB/4:4:4	8/10bpc
	4096x2160	2	24, 25, 30, 50, 60	Y'C'B'C'R/RGB/4:4:4	8/10bpc

Single-link DisplayPort PC image formats

The following single-link DisplayPort PC image formats are supported.

	Format	Cables	Frame rate (Hz)	Sampling	Bit-depth
PC	1280x800	1	60	RGB	8bpc
	1280x960	1	60	RGB	8bpc
	1280x1024	1	60	RGB	8bpc
	1440x900	1	60	RGB	8bpc
	1680x1050	1	60	RGB	8bpc
	1600x1200	1	60	RGB	8bpc
	1920x1200	1	60	RGB	8bpc

Integrated Media Block (IMB) video source

Christie Series 4 projectors support both the legacy Series 2 (S2) and newer Series 4 (S4) HDRConnect™ IMB interfaces to send digital video data from an IMB to the projector.

Contact Christie Technical Support to learn which S2 and S4 IMB devices are compatible with Christie projectors.

Series 2 Integrated Media Block (IMB) video formats

S2 Integrated Media Block (IMB) video format support is determined by the IMB make and model. Refer to the associated IMB documentation to understand which of the following video signals are supported.

All MPEG-2 content is converted in the media block to RGB 4:4:4 8-bit before play out.

MPEG image formats

Format	Resolution	Max frame rate 2D	Max frame rate 3D	Min frame rate	Bit-depth
VGA	640x480	120.0	120.0	23.0	8-bits
4CIF	704x576	120.0	120.0	23.0	8-bits
525 SD	720x480	120.0	120.0	23.0	8-bits
625 SD	720x568	120.0	120.0	23.0	8-bits
XGA	1024x768	79.6	79.6	23.0	8-bits
720p HD	1280x720	68.0	68.0	23.0	8-bits
4VGA	1280x960	51.0	51.0	23.0	8-bits
SXGA	1280x1024	47.8	N/A	23.0	8-bits
525 16SIF	1408x960	46.3	N/A	23.0	8-bits
16CIF	1408x1152	38.6	N/A	23.0	8-bits
4SVGA	1600x1200	32.6	N/A	23.0	8-bits
1080 HD	2048x1080	30.0	N/A	23.0	8-bits

MPEG-2 MXF interop 2D image formats

Format	Resolution	Max frame rate 2D	Max frame rate 3D	Min frame rate	Bit-depth
VGA	640x480	120.0	120.0	23.0	8-bits
525 4SIF	704x480	120.0	120.0	23.0	8-bits
525 SD	720x480	120.0	120.0	23.0	8-bits
4CIF	704x576	120.0	120.0	23.0	8-bits
625 SD	800x600	120.0	120.0	23.0	8-bits
SVGA	1024x768	79.6	79.6	23.0	8-bits
XGA	1024x768	79.6	79.6	23.0	8-bits
720p HD	1280x720	68.0	68.0	23.0	8-bits
4VGA	1280x960	51.0	51.0	23.0	8-bits
SXGA	1280x1024	47.8	N/A	23.0	8-bits
525 16SIF	1408x960	46.3	N/A	23.0	8-bits
16CIF	1408x1152	38.6	N/A	23.0	8-bits
4SVGA	1600x1200	32.6	N/A	23.0	8-bits
1080 HD	2048x1080	30.0	N/A	23.0	8-bits

SMPTTE-compatible 2D (JPEG 2000) cinema image formats

Specification	Resolution	Frame rate	Color format	Bit-depth
SMPTTE 428-1-2019	2048x1080	24.0	X'Y'Z' (4:4:4)	12-bits
SMPTTE 428-11-2013	2048x1080	25.0	X'Y'Z' (4:4:4)	12-bits
SMPTTE 428-11-2013	2048x1080	30.0	X'Y'Z' (4:4:4)	12-bits
SMPTTE 428-1-2019	2048x1080	48.0	X'Y'Z' (4:4:4)	12-bits
SMPTTE 428-11-2013	2048x1080	50.0	X'Y'Z' (4:4:4)	12-bits
SMPTTE 428-11-2013	2048x1080	60.0	X'Y'Z' (4:4:4)	12-bits
SMPTTE 428-1-2019	4096x2160	24.0	X'Y'Z' (4:4:4)	12-bits
SMPTTE 428-11-2013	4096x2160	25.0	X'Y'Z' (4:4:4)	12-bits
SMPTTE 428-11-2013	4096x2160	30.0	X'Y'Z' (4:4:4)	12-bits

SMPTTE-compatible 3D (JPEG 2000) cinema image formats

Specification	Resolution	Frame rate (per eye)	Color format	Bit-depth
SMPTTE 428-1-2019	2048x1080	24.0x2	X'Y'Z' (4:4:4)	12-bits
SMPTTE 428-1-2019	2048x1080	48.0x2	X'Y'Z' (4:4:4)	12-bits
SMPTTE 428-11-2013	2048x1080	60.0x2	X'Y'Z' (4:4:4)	12-bits

Series 4 Integrated Media Block (IMB) video formats

S4 Integrated Media Block (IMB) video format support is determined by the IMB make and model. Refer to the associated IMB documentation to understand which of the following video signals are supported.

All MPEG-2 content is converted in the media block to RGB 4:4:4 8-bit before play out.

MPEG image formats

Format	Resolution	Max frame rate 2D	Max frame rate 3D	Min frame rate	Bit depth
VGA	640x480	120.0	120.0	23.0	8-bits
525 4SIF	704x480	120.0	120.0	23.0	8-bits
525 SD	720x480	120.0	120.0	23.0	8-bits
4CIF	704x576	120.0	120.0	23.0	8-bits
625 SD	800x600	120.0	120.0	23.0	8-bits
SVGA	1024x768	79.6	79.6	23.0	8-bits
XGA	1024x768	79.6	79.6	23.0	8-bits

Format	Resolution	Max frame rate 2D	Max frame rate 3D	Min frame rate	Bit depth
720p HD	1280x720	68.0	68.0	23.0	8-bits
4VGA	1280x960	51.0	51.0	23.0	8-bits
SXGA	1280x1024	47.8	N/A	23.0	8-bits
525 16SIF	1408x960	46.3	N/A	23.0	8-bits
16CIF	1408x1152	38.6	N/A	23.0	8-bits
4SVGA	1600x1200	32.6	N/A	23.0	8-bits
1080 HD	2048x1080	30.0	N/A	23.0	8-bits

MPEG-2 MXF interop 2D image formats

Format	Resolution	Max frame rate 2D	Max frame rate 3D	Min frame rate	Bit depth
VGA	640x480	120.0	120.0	23.0	8-bits
525 4SIF	704x480	120.0	120.0	23.0	8-bits
525 SD	720x480	120.0	120.0	23.0	8-bits
625 SD	720x568	120.0	120.0	23.0	8-bits
4CIF	704x576	120.0	120.0	23.0	8-bits
XGA	1024x768	79.6	79.6	23.0	8-bits
720p HD	1280x720	68.0	68.0	23.0	8-bits
4VGA	1280x960	51.0	51.0	23.0	8-bits
SXGA	1280x1024	47.8	N/A	23.0	8-bits
525 16SIF	1408x960	46.3	N/A	23.0	8-bits
16CIF	1408x1152	38.6	N/A	23.0	8-bits
4SVGA	1600x1200	32.6	N/A	23.0	8-bits
1080 HD	2048x1080	30.0	N/A	23.0	8-bits

SMPTE-compatible 2D (JPEG 2000) cinema image formats

Specification	Resolution	Frame rate	Color format	Bit depth
SMPTE 428-1-2019	2048x1080	24.0	X'Y'Z' (4:4:4)	12-bits
SMPTE 428-11-2013	2048x1080	25.0	X'Y'Z' (4:4:4)	12-bits
SMPTE 428-11-2013	2048x1080	30.0	X'Y'Z' (4:4:4)	12-bits
SMPTE 428-1-2019	2048x1080	48.0	X'Y'Z' (4:4:4)	12-bits
SMPTE 428-11-2013	2048x1080	50.0	X'Y'Z' (4:4:4)	12-bits
SMPTE 428-11-2013	2048x1080	60.0	X'Y'Z' (4:4:4)	12-bits

Specification	Resolution	Frame rate	Color format	Bit depth
SMPTE 428-11-2013	2048x1080	96.0	X'Y'Z' (4:4:4)	12-bits
SMPTE 428-11-2013	2048x1080	100.0	X'Y'Z' (4:4:4)	12-bits
SMPTE 428-11-2013	2048x1080	120.00	X'Y'Z' (4:4:4)	12-bits
SMPTE 428-1-2019	4096x2160	24.0	X'Y'Z' (4:4:4)	12-bits
SMPTE 428-11-2013	4096x2160	25.0	X'Y'Z' (4:4:4)	12-bits
SMPTE 428-11-2013	4096x2160	30.0	X'Y'Z' (4:4:4)	12-bits
SMPTE 2048-1-2011 Am1:2016	4096x2160	48	X'Y'Z' (4:4:4)	12-bits
SMPTE 2048-1-2011 Am1:2016	4096x2160	50	X'Y'Z' (4:4:4)	12-bits
SMPTE 2048-1-2011 Am1:2016	4096x2160	60	X'Y'Z' (4:4:4)	12-bits
SMPTE 2048-1-2011 Am1:2016	4096x2160	96	X'Y'Z' (4:4:4)	12-bits
SMPTE 2048-1-2011 Am1:2016	4096x2160	100	X'Y'Z' (4:4:4)	12-bits
SMPTE 2048-1-2011 Am1:2016	4096x2160	120	X'Y'Z' (4:4:4)	12-bits

SMPTE-compatible 3D (JPEG 2000) cinema image formats

Specification	Resolution	Frame rate (per eye)	Color format	Bit depth
SMPTE 428-1-2019	2048x1080	24.0x2	X'Y'Z' (4:4:4)	12-bits
SMPTE 428-11-2013	2048x1080	25.0x2	X'Y'Z' (4:4:4)	12-bits
SMPTE 428-11-2013	2048x1080	30.0x2	X'Y'Z' (4:4:4)	12-bits
SMPTE 428-1-2019	2048x1080	48.0x2	X'Y'Z' (4:4:4)	12-bits
SMPTE 428-11-2013	2048x1080	50.0x2	X'Y'Z' (4:4:4)	12-bits
SMPTE 428-11-2013	2048x1080	60.0x2	X'Y'Z' (4:4:4)	12-bits
SMPTE 428-1-2019	4096x2160	24.0x2	X'Y'Z' (4:4:4)	12-bits
SMPTE 428-11-2013	4096x2160	25.0x2	X'Y'Z' (4:4:4)	12-bits
SMPTE 428-11-2013	4096x2160	30.0x2	X'Y'Z' (4:4:4)	12-bits
SMPTE 2048-1-2011 Am1:2016	4096x2160	48.0x2	X'Y'Z' (4:4:4)	12-bits
SMPTE 2048-1-2011 Am1:2016	4096x2160	50.0x2	X'Y'Z' (4:4:4)	12-bits
SMPTE 2048-1-2011 Am1:2016	4096x2160	60.0x2	X'Y'Z' (4:4:4)	12-bits

HDMI video source connection from an Integrated Media Block (IMB)

The projector can accept digital video data from HDMI sources connected to applicable Integrated Media Block (IMB) devices. The input configurations supported are determined by the IMB device directly.

Contact Christie Technical Support to learn which IMB devices provide HDMI source selection from the projector user interface.

HDMI input selection directly from the IMB may also be possible using the IMB user interface. The input configurations supported are determined by the IMB make and model.

SDI video source connection from an Integrated Media Block (IMB)

The projector can accept digital video data from SDI sources connected to applicable Integrated Media Block (IMB) devices.

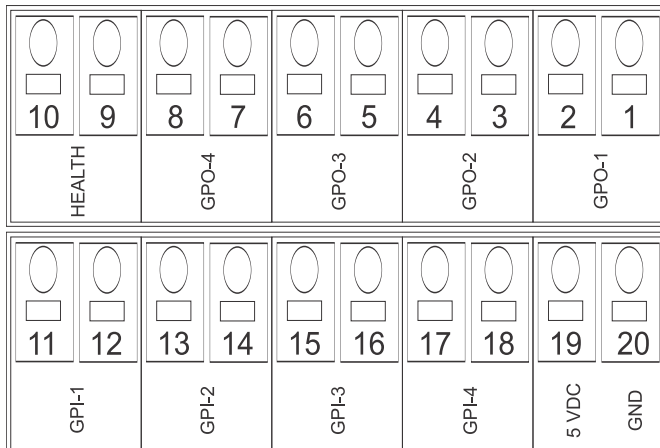
The input configurations supported are determined by the IMB device directly. Contact Christie Technical Support to learn which IMB devices provide SDI source selection from the projector user interface.

SDI input selection directly from the IMB may also be possible using the IMB user interface. The input configurations supported are determined by the IMB make and model.

GPIO connector

The Generic Purpose Input Output (GPIO) connector provides a flexible method of interfacing with the projector. 18 GPIO pins are available on the GPIO connector. Two other pins are reserved for ground and power.

The GPIO connector is located on the input panel (*M in the Video Input panel image (on page 33)*).

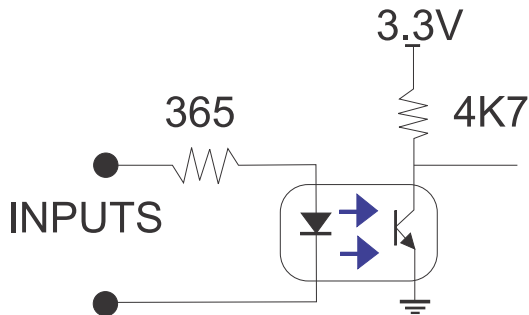


Pin number	Signal name	Direction
Pin 1	GPO1_POS	Out
Pin 2	GPO1_NEG	Out

Pin number	Signal name	Direction
Pin 3	GPO2_POS	Out
Pin 4	GPO2_NEG	Out
Pin 5	GPO3_POS	Out
Pin 6	GPO3_NEG	Out
Pin 7	GPO4_POS	Out
Pin 8	GPO4_NEG	Out
Pin 9	HEALTH_POS	Out
Pin 10	HEALTH_NEG	Out
Pin 11	GPI1_POS	In
Pin 12	GPI1_NEG	In
Pin 13	GPI2_POS	In
Pin 14	GPI2_NEG	In
Pin 15	GPI3_POS	In
Pin 16	GPI3_NEG	In
Pin 17	GPI4_POS	In
Pin 18	GPI4_NEG	In
Pin 19	+5V	—
Pin 20	GND	—

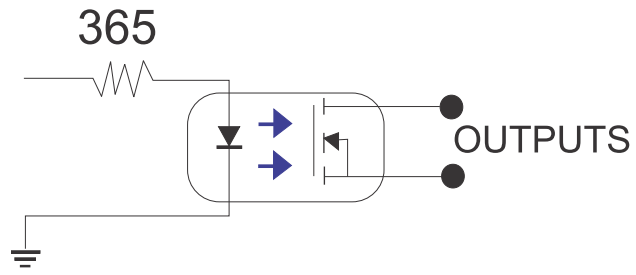
GPIO inputs

The 5 VDC (pin 19 and pin 20) is intended for use to supply the inputs.



GPIO outputs

Outputs are solid state relays with a 1 A AC/DC rating at up to 48 V.



Managing the light source

Learn how to configure a laser file and use the projector's LiteLOC™ feature.


Use the laser file to control the power settings of the red, green, and blue (RGB) lasers. The LiteLOC™ feature ensures that color and brightness are held at the level you set.

Create multiple laser files to manage varying screen sizes, brightness requirements, room temperatures in the projection booth, and types of content (such as 2D, 3D, and alternative content).


Creating a new laser file

Create a laser file to store the power settings for the RGB laser light source and the maximum expected room temperature for the projection booth.

To make sure color and brightness are held at the required levels for your installation, enable LiteLOC for each laser file you create. If you make significant change to the brightness level when refining the laser power settings, it takes a few minutes for the color and brightness to stabilize.

1. Log in as service.
2. Turn on the laser.
3. For systems upgraded to v1.5.0 and already using the calibration file, set a channel to use the appropriate calibration file and activate the channel.
For details on setting up and activating the channel, refer to the *CineLife+ User Guide (P/N: 020-103073-XX)*.
4. Display a test pattern, such as DC4K 17 L Point, to locate the center of the screen.
5. Set up the color meter to aim at the center of the screen.
6. In the left navigation menu, select **Laser Settings > Laser Power/LiteLOC Setup**.
7. Select **Display White Test Pattern**.
8. To create a new laser file, select **Create**. 
9. In the Create dialog, enter a name for the new laser file and select **Create**.
10. In the White Coordinates dialog, set the required white point.
For a typical cinema setup, the white point is Digital Cinema Initiative (DCI) white $x=0.314$ and $y=0.351$.
11. Select **Apply**.
12. Adjust the brightness level until you achieve the required brightness at the specified white point.
13. If the laser file will be associated with a 3D channel, complete the following steps:
 - a) Engage the 3D system in the light path by enabling **3D Sync** when selecting the test pattern.


- b) Mount a 3D glass or filter on the color meter to measure the brightness.
- c) Select **3D Sync** on the LiteLOC setup page.
- d) Adjust the brightness level until you achieve the required brightness while the 3D system is engaged.

14. To save the new laser file, select **Save**. 

Modifying an existing laser file


Modify the settings in the laser file to change the laser power settings or the maximum expected room temperature.

When refining the laser power settings, the amount of time required to re-stabilize the projector depends on the size of the adjustment. For small adjustments to the expected room temperature or power settings, the projector requires only 1 or 2 minutes to re-stabilize. For larger adjustments, the projector may require up to 15 minutes to re-stabilize.

1. In the left navigation pane, select **Laser Settings > Laser Power/LiteLOC Setup**.
2. From the Laser File list, select the laser file to edit.
3. Select the **Display White Test Pattern**, if required.
4. Adjust the brightness slider as required.
5. To change the white point, select White coordinates box, modify the coordinates, and select **Apply**.
Selecting **Default** returns it to the Digital Cinema Initiative (DCI) white point.
6. Once the correct brightness is achieved and the projector has stabilized, to save the new settings select **Save** .


Copying existing laser settings to a new file

Copy an existing laser file when you want to create a new file with similar settings.

1. In the left navigation pane, select **Laser Settings > Laser Power/LiteLOC Setup**.
2. From the Laser File list, select the file you want to copy.
3. To save the new laser file, select **Save As** .
4. Enter a new name for the laser file and select **Save**.
5. Adjust the brightness and white settings as required for the new configuration.

Deleting a laser file

Delete a laser file when the configuration is no longer required.

1. In the left navigation menu, select **Laser Settings > Laser Power/LiteLOC Setup**.
2. In the Laser File list, select the file to delete.
3. Select **Delete** .

4. To confirm the deletion, select **Delete**.

LiteLOC™ sensor-to-screen calibration

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

Your projector's setup conditions may not match the factory setup which may result in a discrepancy in color accuracy. Upon first installation, check the accuracy of the color point and if unsatisfactory, perform this calibration. Doing this calibration captures all the variables of your setup and achieves the best results. By doing this calibration, you do not overwrite the factory calibration. Once satisfied, some scenarios may exist in which you may need to re-do the calibration in the future.

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

- Color sensor board

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

- Light engine
- Lens
- Light source
- Screen
- Port window
- Any other optical components in the optical path between the light source and the screen

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

LiteLOC™ sensor-to-screen calibration: Workflow

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



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

- Spectroradiometer
- Service user is the minimum level user access
- *Create a new calibration file* (on page 57).
- *Recalibrate the calibration file* (on page 59), if required.
- *Edit the existing calibration file parameters* (on page 60) on the Sensor-to-screen menu, if required.
- *Verify the calibration* (on page 60), if required.
- *Add the calibration file to the Channel Setup* (on page 61).

Creating a new calibration file

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

1. Set up a spectroradiometer to obtain screen measurements later in the process.

2. In the left navigation menu, select **Color Settings > Sensor-to-screen Calibration**.
3. To create a new calibration file, select **Create** .

The projector checks if the light source is on and the douser is open. If either condition is not met, a warning dialog is displayed prompting you to make sure these conditions are met before starting the wizard.

4. In the Create dialog, enter a name for the new calibration file and select **Create**.
5. In step 1 of the Sensor-to-screen Calibration wizard, set the maximum brightness and color point.
 - a) Enable the **Display White Test Pattern** option.
 - b) To set the maximum expected room and chiller (for chiller-based products) temperatures, use the plus (+) or minus (-) signs.
 - c) Adjust the RGB sliders to set the brightness and color point.
 - d) Select **Next**.
6. Wait 20 minutes for the projector to stabilize or select **Skip** during the stabilization time period.
7. In step 2 of the Sensor-to-screen Calibration wizard, measure and enter the screen values.
 - a) To trigger the measurement at a specific operating point, under Sensor to screen, select **Capture**.

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

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

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

- b) When the countdown ends, take x, y, and fL measurements using the spectroradiometer. Christie recommends taking meter readings from the center of the screen to obtain accurate screen measurements.
 - c) Under Measured Values, using the numeric keypad record the associated spectroradiometer values for x, y, and fL.

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

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

- Once selected, the projector automatically enables LiteLOC™, selects a White test pattern with uncorrected colors at the white point specified, and sets the brightness to 80%.
- b) Using a spectroradiometer, measure screen x and y values at the center of the screen. To verify the calibration has been successfully applied, the measured white point must be within the expected tolerance.
 - c) When complete, select **Finish**.
The projector output is configured according to the currently selected calibration file and you are returned to the Sensor-to-screen Calibration menu.

Recalibrating an existing calibration file

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

1. Select **Menu > Color Settings > Sensor-to-screen Calibration**.
2. Select a user-defined calibration file to recalibrate.
3. Select **Recalibrate**.
The projector checks if the light source is on and the douser is open. If either condition is not met, a warning dialog is displayed prompting you to make sure these conditions are met before starting the wizard.
4. In step 1 of the Sensor-to-screen Calibration wizard, set the maximum brightness and color point.
 - a) Enable the **Display White Test Pattern** option.
 - b) To set the maximum expected room and chiller (for chiller-based products) temperatures, use the plus (+) or minus (-) signs.
 - c) Adjust the RGB sliders to set the brightness and color point.
 - d) Select **Next**.
5. Wait 20 minutes for the projector to stabilize or select **Skip** during the stabilization time period.
6. In step 2 of the Sensor-to-screen Calibration wizard, measure and enter the screen values.
 - a) To trigger the measurement at a specific operating point, under Sensor to screen, select **Capture**.
The Capture button changes color to indicate the capture process is activated. Only one Capture button is active at a time but the buttons can be selected in any order.
The projector automatically sets the red, green, and blue output laser powers to the pre-determined settings calculated and displayed in the Drive Percentage (Calculated) area of the wizard.
A 10 second countdown begins to allow the projector white point and brightness to stabilize and no changes can be made. At the end of the count down period, the Color Sensor values fields are automatically populated by the projector for the currently selected drive percentage value.
 - b) When the countdown ends, under Measured Values, using the numeric keypad capture and record the associated spectroradiometer values for x, y, and fL.
The projector holds the on-screen color and brightness level until the same or another Capture button is selected.
 - c) Repeat steps a and b for the remaining drive percentage set points until all x, y, and fL values are entered.

- Spectroradiometer measurements can be captured in any order but all three x, y, and fL measurements must be entered before moving onto the next capture. You can recapture a specific measurement at any time during the process by selecting the Capture button. In this case, the measured spectroradiometer and color sensor values are reset.
- d) Once all the color sensor and measured values are entered for all nine rows, select **Apply and Save**.
7. Verify and complete the calibration.
- a) Select a white point to measure by selecting either the **DCI**, **D65**, or **Custom** white point buttons.
Once selected, the projector automatically enables LiteLOC™, selects a White test pattern with uncorrected colors at the white point specified, and sets the brightness to 80%.
 - b) Using a spectroradiometer, measure screen x and y values at the center of the screen.
To verify the calibration has been successfully applied, the measured white point must be within the expected tolerance.
 - c) When complete, select **Finish**.
The projector output is configured according to the currently selected calibration file and you are returned to the Sensor-to-screen Calibration menu.


Editing the existing calibration file parameters

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

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

Verifying the sensor-to-screen calibration

Check the integrity of the calibration, if required.

1. Navigate to **Menu > Color Settings > Sensor-to-screen Calibration**.
2. In the right toolbar, select **Test Patterns**. 
3. Select the **White** test pattern.
4. Close the Test Patterns window.
5. Select **Verify Calibration**.

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

Step 3 of the Calibration wizard opens.

6. Verify and complete the calibration.

- a) Select a white point to measure by selecting either the **DCI**, **D65**, or **Custom** white point buttons.
Once selected, the projector automatically enables LiteLOC™, selects a White test pattern with uncorrected colors at the white point specified, and sets the brightness to 80%.
- b) Using a spectroradiometer, measure screen x and y values at the center of the screen.
To verify the calibration has been successfully applied, the measured white point must be within the expected tolerance.
- c) When complete, select **Finish**.
The projector output is configured according to the currently selected calibration file and you are returned to the Sensor-to-screen Calibration menu.

Adding a calibration file to the Channel Setup

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

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

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

Adjusting the image

Learn how to adjust image geometry so it displays correctly.

Calibrating the Intelligent Lens System

On CP4415-RGB and CP4420-RGB Gen2 projectors, the Intelligent Lens System (ILS) is activated by default.

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

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

Correcting vignetting

An image that is brighter at the center than it is at the sides needs vignetting correction.

If your image suffers from vignetting, the lens has reached the end of its offset travel range.

If your installation does not allow the image to be centered with the center of the screen, move the entire projector in the direction of lens travel.

Adjusting tilt and leveling the projector

To ensure optimum performance, install the projector so it is centered and parallel with the screen.

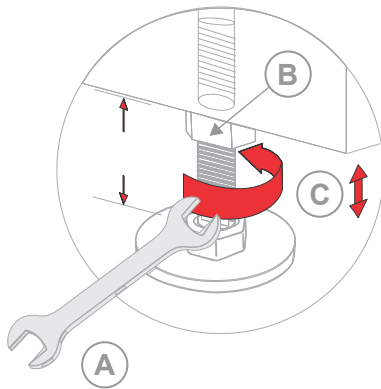
To compensate for tilt or offset, you can adjust the projector feet and the lens mount position.

This product must be installed in a landscape orientation, with all four feet supported on a level surface. Do not install or operate the projector in an inverted position. If your site has any installation requirements other than a typical theater projection booth, contact Christie for assistance.



The front-to-back tilt of the projector must not exceed 15° in a downward direction or 5° in an upward direction. The side-to-side tilt must be within +3° to -3° of level.

1. To adjust the height of the projector, loosen the lock nut on the adjustable feet on the bottom of the projector.



A	19 mm (0.75 in.) wrench
B	Lock
C	Turn to adjust height

2. Extend or retract the feet.
3. When the adjustment is correct, tighten the lock nut.

Correcting keystone effect

Keystone effect occurs when you project an image onto the screen at an angle. As a result, the image appears distorted and resembles a trapezoid.



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

Horizontal keystone	Vertical keystone
Projector skewed horizontally to the screen	Projector tilted vertically to the screen


1. If the image suffers from slight keystone effect, it can be corrected with electronic cropping.
2. If the keystone effect is severe, unevenly adjust the feet to compensate for projector tilt.

Christie recommends using the lens offset to align the center of the image to the center of the screen before correcting the keystone effect.

3. If one side of the image is longer than another, adjust the tilt and level of the projector.

Displaying a test pattern

Display a test pattern to refine and adjust the projected image or to diagnose and correct image issues.

1. In the right toolbar, select **Test Patterns**. 
2. Select **Full Screen**.
3. Select a test pattern.
When a test pattern is active, a blue bar appears below the test pattern icon in the right pane.
4. To display a 2D test pattern in 3D mode, select the **3D Sync** option.
The **3D Sync** option is selected automatically for 3D test patterns. 3D test patterns cannot be displayed in 2D mode.
5. To change the frame rate of the test pattern display, select from the available Frame Rate options:
 - For 2D test patterns, the available frame rates are 24, 30, 48, and 60 Frames Per Second (FPS). The default value is 24 FPS.
 - For 3D test patterns, the available frame rates are 48 and 60 FPS. The default value is 48 FPS.

Changing the frame rate of the display can assist with color measurement when working with corrected colors.

When changing the frame rate option, the option is applied to the next test pattern you select unless it is not available for that pattern. If a selected frame rate is not available, the default frame rate is applied for the test pattern display.

Adjusting the integrator rod and fold mirror


Understand how to adjust the integrator rod and fold mirror to control the illumination spot on the digital micromirror device (DMD).

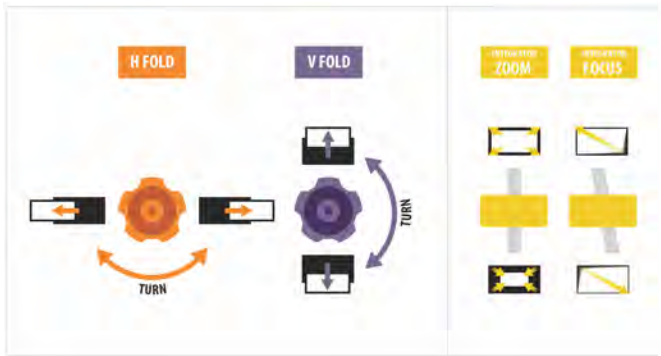
Extreme misalignment of projection optics can cause permanent damage to critical optical components. Only Christie qualified technicians can perform internal optical adjustments.

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



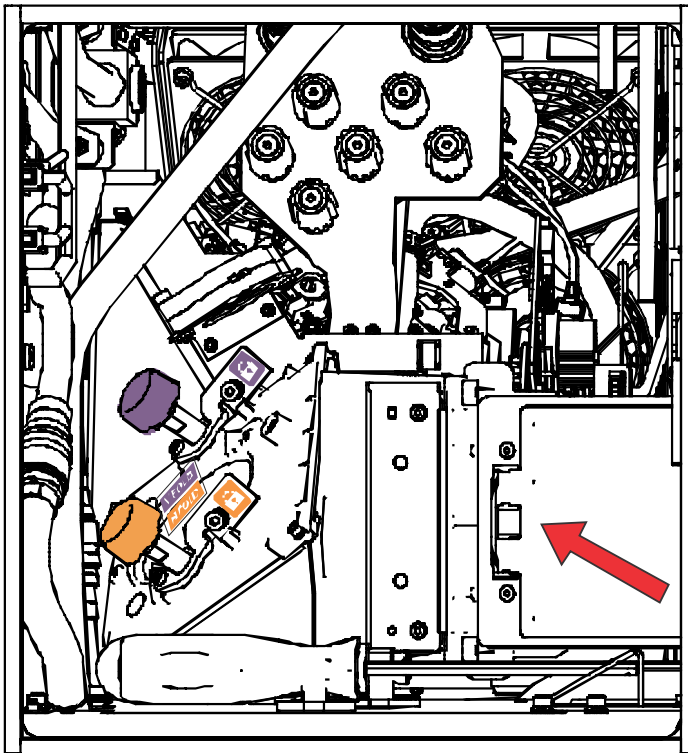
When adjusting the fold mirror, set the light source to minimum power.

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

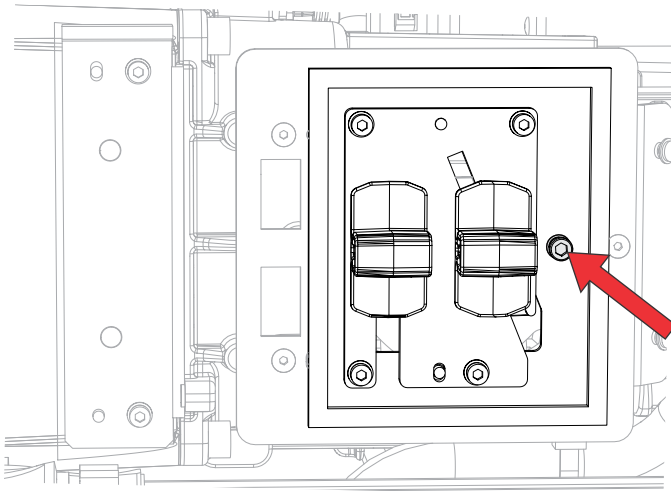


Refer to the test pattern for guidance on making the adjustments. The right panel of the test pattern provides information about the integrator zoom and focus adjustments. The left panel provides information about the fold mirror adjustments.

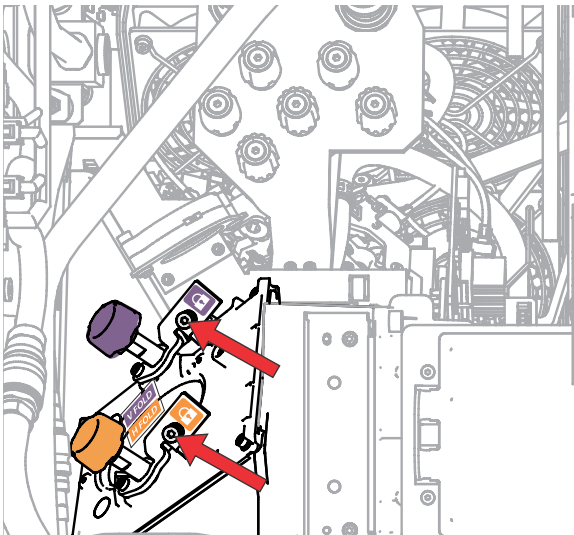
4. Open the Service door on the side of the projector.
5. To use the integrator rod optical controls, open the access door for the Zoom and Focus paddles.



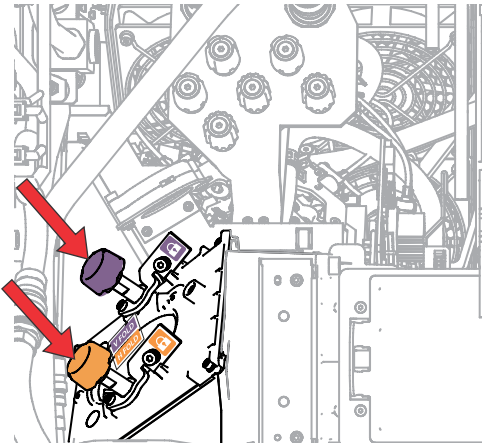
6. Loosen the lock screw for the Zoom and Focus paddles.



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



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



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

Adjusting boresight

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



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

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



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

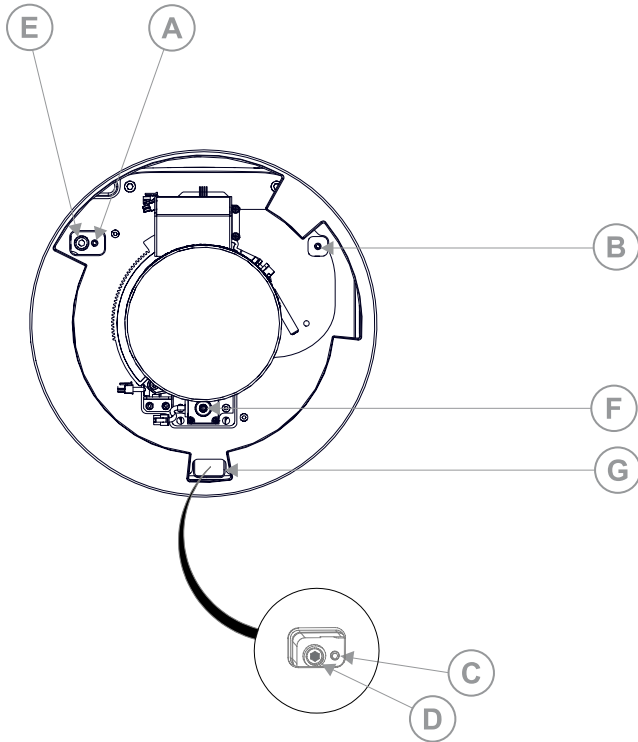
- This procedure must be performed by Christie qualified technicians.




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

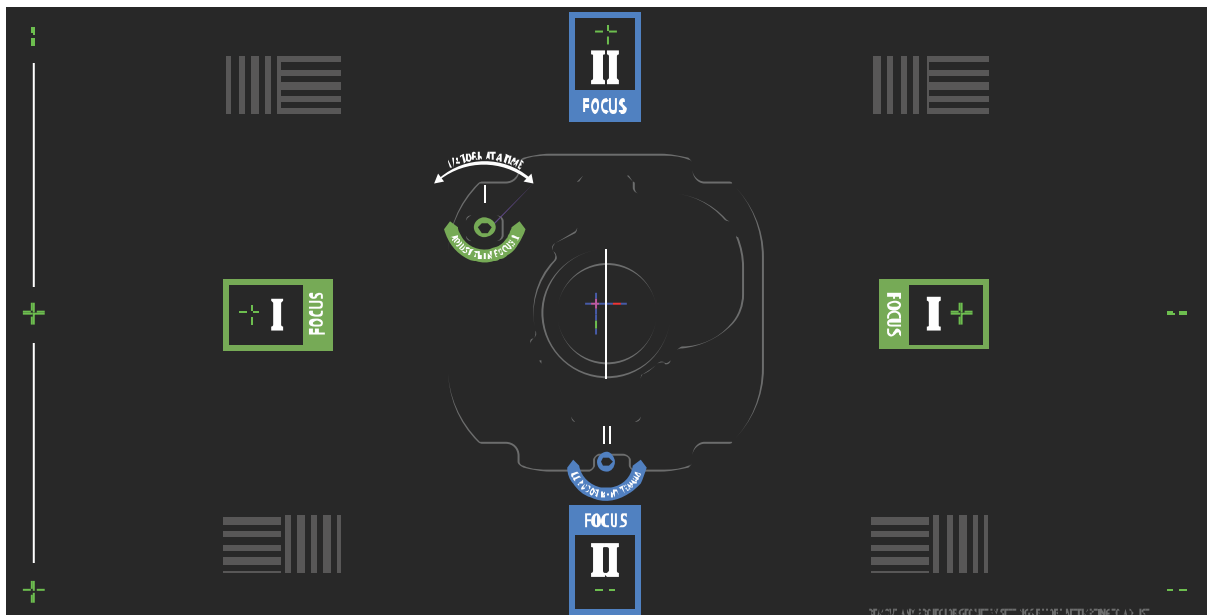
The following steps are intended to achieve the highest quality image distributed across the full screen.

1. Close the shutter on the projector to avoid accidental exposure to the projection beam when working in close proximity to the projection lens.
2. Unlock the horizontal and vertical lock screws (locks A, B, and C).
If applicable for your model, unlock the vertical lock screw (lock C in the image below) by opening the cover flap (G in the image below) using the screwdriver.



A	Horizontal lock screw (lock A)
B	Horizontal lock screw (lock B)
C	Vertical lock screw (lock C)
D	Vertical boresight screw
E	Horizontal boresight screw
F	Manual focus knob
G	Cover flap (if applicable for your model)

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



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

6. To start with the horizontal boresight adjustment, use the Intelligent Lens System™ (ILS) controls to move the projection lens into the projector or turn the manual focus knob (F in the image in step 2) counterclockwise to slightly defocus the green cross-hair patterns (+) at the right and left edges of the test pattern.
7. Use the ILS controls or turn the focus knob (F in the image in step 2) clockwise to begin focusing the image.
Watch for either the left or right cross-hair patterns (+) to come into focus.
8. If the left side comes into focus first, turn the horizontal boresight adjustment screw (E in the image in step 2) clockwise until the left and right are equally out of focus.
If the right side comes into focus first, turn the horizontal boresight screw counterclockwise.
9. Repeat steps 6 to 8 as required to obtain an even focus at the right and left edges of the screen.
10. To perform the vertical boresight adjustment, use the ILS controls to move the projection lens into the projector, or turn the focus knob (F in the image in step 2) counterclockwise to slightly defocus the green cross-hair patterns (+) at the top and bottom of the screen.
11. Use the ILS controls or turn the focus knob (F in the image in step 2) clockwise to begin focusing the image.
Watch for either the top or bottom cross-hair patterns (+) to come into focus.
12. If the bottom comes into focus first, turn the vertical boresight adjustment screw (D in the image in step 2) counterclockwise until the top and bottom are equally out of focus.
If the top comes into focus first, turn the vertical boresight screw clockwise.
13. Repeat steps 10 to 12 as required to obtain an even focus at the top and bottom of the screen.
14. Once the correct focus has been achieved, lock the three lock screws.
When locking the lock screws, start with the horizontal lock screws (locks A and B in the image in step 2) and turn them until they just touch the base.

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

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



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

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

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

Correcting on-screen color

After installation, further image adjustments may be required to correct color on the screen.

The next steps may include creating a Measured Color Gamut Data (MCDG) file and configuring a Pureformity Color™ Technology (PCT) file to achieve optimal color and brightness uniformity.

For more information on managing color settings, see the *CineLife+ User Guide (P/N: 020-103073-XX)*.

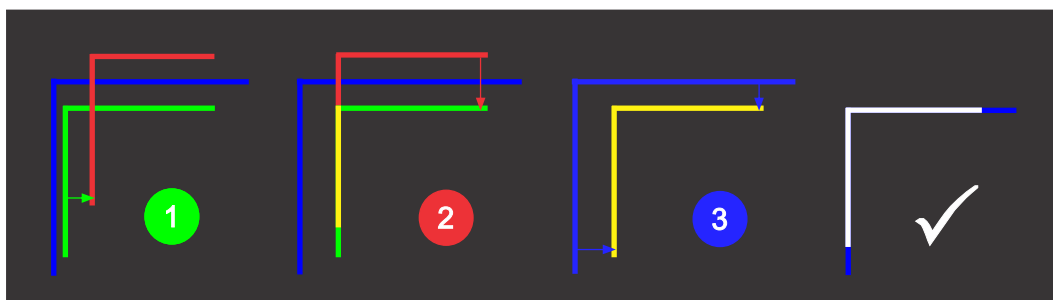
Electronic Color Correction (ECC)

A lateral convergence error occurs when the red, green, and blue (RGB) primary colors are not converged through projected lenses and is most noticeable at the edges of the screen. To address this, use ECC.

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

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


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



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

Electronically adjusting convergence

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

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

Each corner of the screen displays three separate sprites, one for each primary color. The user interface displays the Test Pattern controls.

4. Set the Screen Type to **Flat** or **Scope**.

This sets the test pattern and the location of the sprites on the screen. Each sprite appears as the letter L.

5. Set the Sprite Color to **Move** and **Show**.

When first opening the ECC, all Show and all Move colors are selected, so all three sprites are displayed and all three sprites are moved by the directional pad.

6. Select a **Step Size** to control the granularity of the steps from coarse (1/8 pixel per step) to fine (1/64 pixel per step) when using the directional pad.

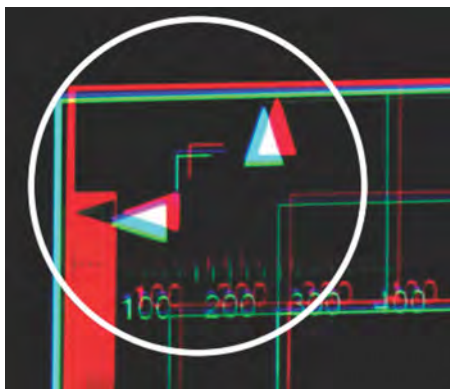
Sprites can be moved a maximum of 20 pixels.

7. Choose a corner by selecting the circle at a corner of the dashed rectangle.

The selected corner is indicated by a green circle. The X/Y pixel offset (from no correction) displays in red, green, and blue text corresponding to each sprite.

8. Use the directional pad to move the sprites towards the center of the screen.
9. Adjust each sprite so they overlap to create a single white sprite.

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

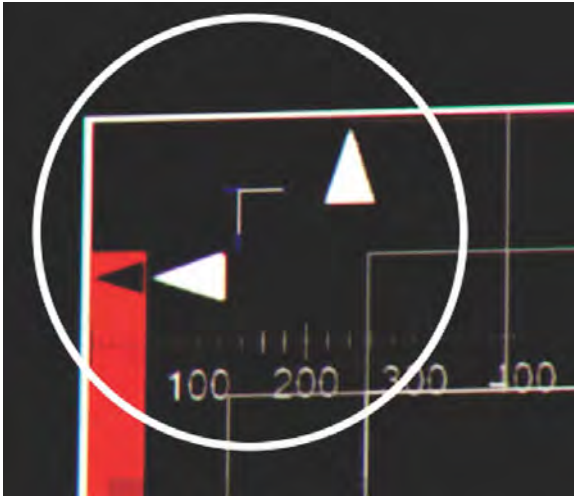


1



2


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

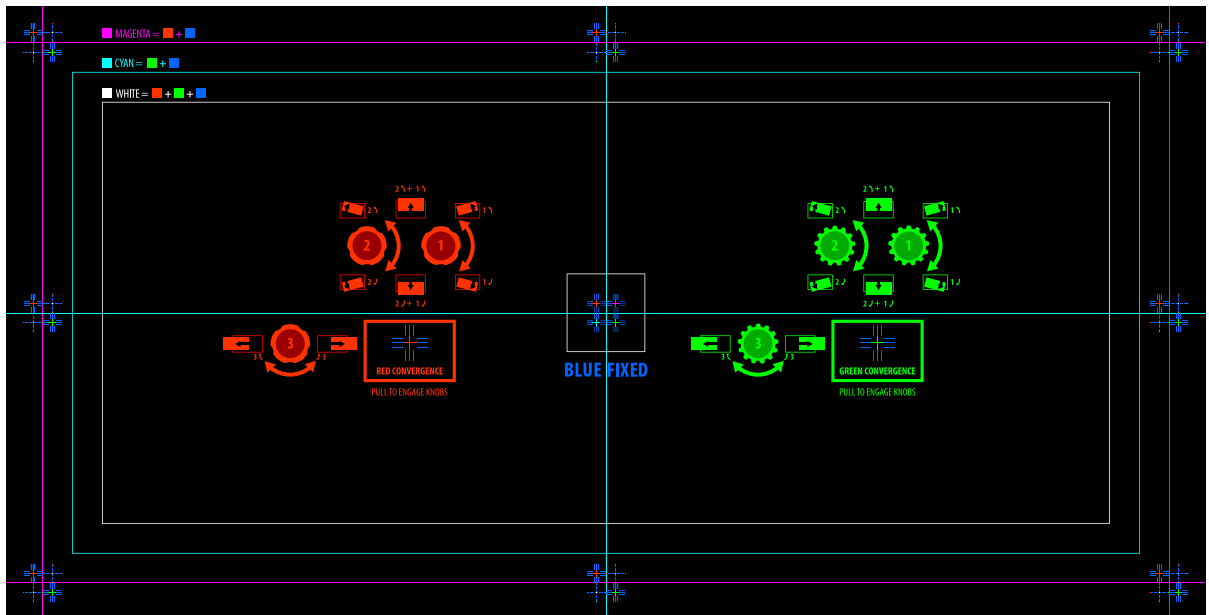


11. Repeat steps 7 to 10 for the remaining corners.
12. If necessary, reset the correction back to zero (no correction) or the previously saved correction by selecting **Reset**.
In the Reset dialog, reset the current corner or all four corners. When the locations and value are set, select **Reset**.
13. To save the current ECC settings, when the convergence is complete, select **Save** beside the ILS file named at the top of the panel.

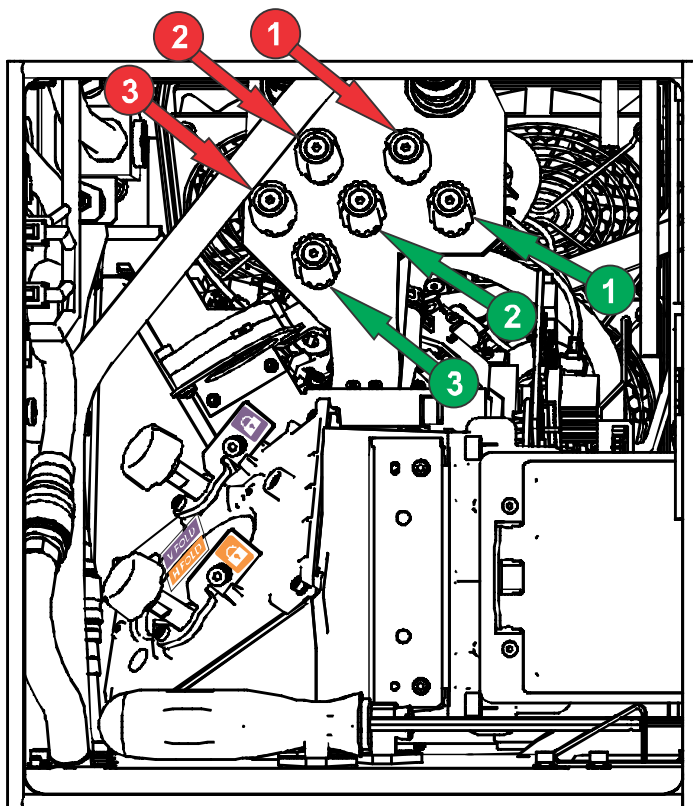
Mechanically adjusting digital micromirror device (DMD) convergence

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

1. Before adjusting digital micromirror device (DMD) convergence, make sure the projector has reached a steady operational state.
If switching from a white or bright test pattern to a dark convergence test pattern or if warming up the projector after a shutdown, allow 15 minutes for stabilization so the optics can reach a steady state.
2. Make sure the electronic convergence (ECC) is defaulted before doing mechanical convergence.
3. In the right toolbar, select **Test Patterns**. 
4. Select the **RGB-4K-Convergence** test pattern and display it full screen.
Make sure the **Uncorrected Color Box** option is selected.



5. Open the Service door on the side of the projector.
6. To adjust the convergence knobs, use the 3 mm driver included with the projector.
If adjusting by hand without using the tool, pull out the convergence adjustment knobs to engage them.



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

Horizontal adjustments are controlled by adjusting knob 3.

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



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

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

If the colors at the corners of the screen require further correction, see *Electronically adjusting convergence* (on page 71).

Regulatory

This product conforms to the latest regulations and standards related to product safety, environmental, and electromagnetic compatibility (EMC) requirements.

Safety

- IEC 62368-1:2018 3rd Ed - Audio/Video, Information And Communication Technology Equipment - Part 1: Safety Requirements
- EN 62368-1:2014 2nd Ed - Audio/Video, Information And Communication Technology Equipment - Part 1: Safety Requirements
- UL 62368-1:2018 - Audio/Video, Information And Communication Technology Equipment - Part 1: Safety Requirements
- CSA CAN/CSA-22.2 No. 62368-1:2018 - Audio/Video, Information And Communication Technology Equipment - Part 1: Safety Requirements
- IEC 62471-5:2015 - Photobiological Safety Of Lamps And Lamp Systems - Part 5: Image Projectors
- IEC 60825-1:2014 - Safety of Laser Products - Part 1: Equipment Classification and Requirements
- ANSI Z136.1 (2014) – Safety of Lasers

Electro-magnetic compatibility

Emissions

- CAN ICES-003 (A)/NMB-003 (A) – Information Technology Equipment (Including Digital Apparatus) – Limits and Methods of Measurement
- CISPR 32/EN 55032, Class A – Electromagnetic Compatibility of Multimedia Equipment – Emission Requirements
- FCC CFR47, Part 15, Subpart B, Class A – Unintentional Radiators
- IEC 61000-3-2/EN61000-3-2: Limits for harmonic current emissions for equipment with input current ≤ 16 A
- IEC 61000-3-3/EN 61000-3-3: Limitations of Voltage Changes, Voltage Fluctuations, and Flicker input current ≤ 16 A per phase and not subject to conditional connection

Immunity

- CISPR 35/EN 55035 Electromagnetic compatibility of multimedia equipment - Immunity requirements

California law on security

- California Law SB-327 Requiring Internet Connected Devices To Include Reasonable Security Features (California Civil Code Section 1798.91.04)

Environmental

- China Ministry of Information Industry (along with 7 other Government Agencies) Order No.32 (01/2016) on the control of pollution caused by electronic information products, hazardous substances concentration limits (GB/T 26572 - 2011), and the applicable product marking requirement (SJ/T 11364 - 2014).
- EU Directive (2011/65/EU) on the restriction of the uses of certain hazardous substances (RoHS) in electrical and electronic equipment and the applicable official amendment(s).
- EU Directive (2012/19/EU) on waste and electrical and electronic equipment (WEEE) and the applicable official amendment(s).
- Regulation (EC) No. 1907/2006 on the registration, evaluation, authorization and restriction of chemicals (REACH) and the applicable official amendment(s).