Installation and Setup Guide
020-102956-08

Mirage SST

CHRISTIE®

NOTICES

GENERAL

Every effort has been made to ensure accuracy, however in some cases changes in the products or availability could occur which may not be reflected in this document. Christie reserves the right to make changes to specifications at any time without notice. Performance specifications are typical, but may vary depending on conditions beyond Christie's control such as maintenance of the product in proper working conditions. Performance specifications are based on information available at the time of printing. Christie makes no warranty of any kind with regard to this material, including, but not limited to, implied warranties of fitness for a particular purpose. Christie will not be liable for errors contained herein or for incidental or consequential damages in connection with the performance or use of this material. Our centers of excellence for manufacturing in Kitchener, Ontario, Canada and in Shenzhen, China are ISO 9001:2015 Quality Management System-certified.

For the most current technical documentation and office contact information, visit *http://www.christiedigital.com*.

Warranty

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, will void the warranty.

REGULATORY

The product has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the product is operated in a commercial environment. The product generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of the product in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at the user's own expense. 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 that electrical and electronic equipment, at their end-of-life, should be disposed of separately from regular waste. Please dispose of the product appropriately and according to local regulations. In the European Union, there are separate collection systems for used electrical and electronic products.

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!

Content

Introduction

This manual is intended for professionally trained operators of Christie high-brightness projection systems.

The illustrations in this document are for representation only and may not depict your projector model exactly.

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

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

Important safeguards

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

Safety and warning guidelines

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

This projector is intended for use in a fixed install environment (also known as a cinema environment).

This projector must be operated in an environment that meets the operating range specification. Use only the attachments and/or accessories recommended by Christie. Use of others may result in the risk of fire, shock, or personal injury.

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

- This product must be operated in an environment that meets the operating range as specified in this document.
- Do not look directly into the lens when the light source is on. The extremely high brightness can cause permanent eye damage.
- ELECTRICAL and BURN HAZARD! Use caution when accessing internal components.
- FIRE HAZARD! Keep hands, clothes, and all combustible material away from the concentrated light beam of the projector.
- Keep fingers and other body parts away from the moving parts in the product. Tie back long hair, and remove jewelry and loose clothing before manually adjusting the product.
- FIRE AND SHOCK HAZARD! Use only the attachments, accessories, tools, and replacement parts specified by Christie.
- 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.
- RADIATION HAZARD! Use of controls or adjustments, or performing procedures other than those specified may result in hazardous radiation exposure.

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

Installation safety and warning guidelines

Read all safety and warning guidelines before installing the projector.

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

- Possible hazardous optical radiation emitted from this product. (Risk group 3)
- Christie products must be installed and serviced by Christie qualified technicians.
- Do not operate the product without all of its covers in place.
- A minimum of two people or appropriately rated lift equipment is required to safely lift, install, or move the product.
- Always install safety straps when the frame and projector are installed overhead.
- Observe load ratings and applicable local safety codes.
- When installing the projector in portrait mode, the rigging device must have a sufficient load rating, as identified in this manual.
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- This product must be installed within a restricted access location not accessible by the general public.
- Install the product so users and the audience cannot enter the restricted area at eye level.
- Only personnel who are trained on the precautions for the restricted access location can be granted entry to the area.
- Only Christie qualified technicians are permitted to open product enclosures.

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

- ELECTRICAL and BURN HAZARD! Use caution when accessing internal components.
- Only Christie qualified technicians are authorized to use the tools provided in the toolbox.

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 AC power cord must be inserted into an outlet with grounding.
- 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.
- 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. Disconnect all power sources before opening the product.

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.

- 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.
- LASER RADIATION HAZARD! This projector has an external Class 4 laser module. Never attempt to disassemble or modify the laser module.
- Possible hazardous optical radiation emitted from this product. (Risk group 3)
- Only Christie qualified technicians who are knowledgeable about the hazards associated with laser use, high-voltage, and high temperatures generated by the product are authorized to assemble, install, and service the Christie Laser Projection System.
- RADIATION HAZARD! Use of controls or adjustments, or performing procedures other than those specified may result in hazardous radiation exposure.
- Do not look directly into the lens when the light source is on. The extremely high brightness can cause permanent eye damage.
- Do not operate the product without all of its covers in place.
- LASER RADIATION! Do not short the contact rings.
- Always keep a protective cap on disconnected fiber optic cables.

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 3.0 meters above the floor and the horizontal clearance to the hazard zone must be a minimum 2.5 meters.
- EXTREME BRIGHTNESS! Do not place reflective objects in the product light path.

The following show the zones for ocular and skin hazard distances.
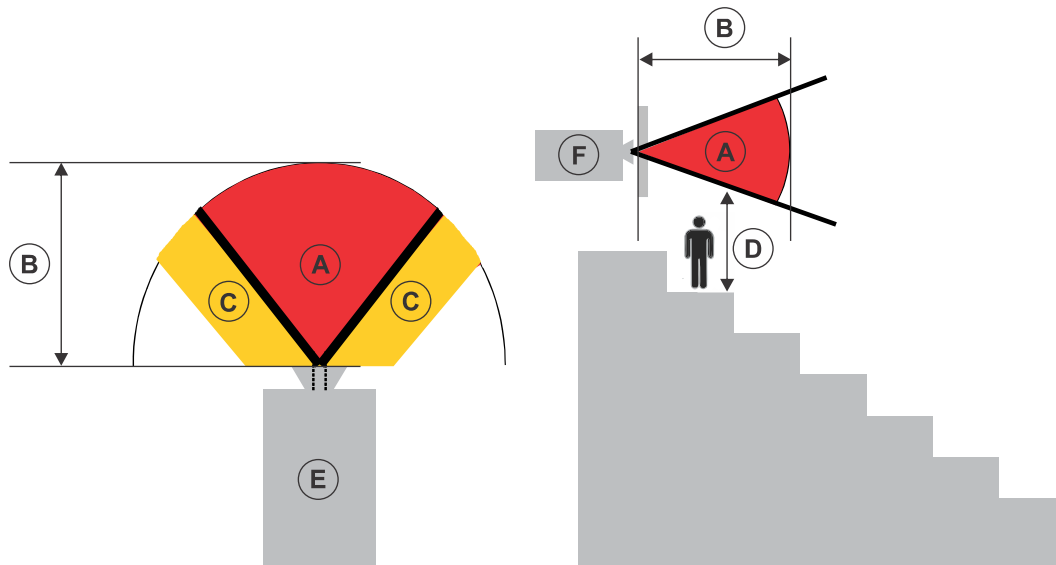
- A—Hazard zone. The region of space where the projection light from the laser-illuminated projector is above emission limits for Risk Group 2. The light intensity may cause eye damage after a momentary or brief exposure (before a person can avert his or her eyes away from the light source). The light may cause skin burns to occur.
- B—Hazard distance. Operators must control access to the beam within the hazard distance or install the product preventing potential exposure of the spectators' eyes from being in the hazard distance.
- C—No access zone. Horizontal clearance of the no access zone must be a minimum of 2.5 meters.
- D—Vertical distance to hazard zone. The hazard zone must be no lower than 3.0 meters above the floor.

  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.

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

For US and international hazard distances based upon IEC 62471-5:2015, *Photobiological Safety of Lamps and Lamp Systems – Part 5: Image Projectors*.

Projection lens	Part number	Hazard distance (m)	
		Type A*	Types B, C, D, E*
High brightness (HB) lenses			
0.38:1 4K enhanced	144-136101-XX	1.0	1.0
0.72:1 HB fixed	144-110103-XX	1.0	1.0
0.9:1 fixed lens	144-111014-XX	1.2	1.0
1.13-1.31:1 HB zoom (Discontinued)	144-103105-XX	1.6	1.4
1.13-1.66:1 HB zoom	144-129103-XX	2.1	1.8
1.31-1.63:1 HB zoom	144-104106-XX	2.1	1.8
1.45-2.17:1 HB zoom	144-130105-XX	2.8	2.5
1.63-2.17:1 HB zoom (Discontinued)	144-105107-XX	2.7	2.4
1.95-3.26:1 HB zoom	144-131106-XX	4.1	3.6
1.99-2.71:1 HB zoom	144-106108-XX	3.4	3.0
2.71-3.89:1 HB zoom	144-107109-XX	4.8	4.3
3.89-5.43:1 HB zoom	144-108100-XX	7.0	6.0
4.98-7.69:1 HB zoom	144-109101-XX	9.9	8.6
Ultra high contrast (UHC) lenses			
0.72:1 UHC fixed	163-116109-XX	1.0	1.0
0.9:1 UHC fixed	163-117100-XX	1.0	1.0
1.13-1.66 UHC zoom	163-118101-XX	1.7	1.6
1.45-2.17 UHC zoom	163-119102-XX	2.3	2.1
1.95-3.26 UHC zoom	163-120103-XX	3.4	3.1
2.71-3.89 UHC zoom	163-121105-XX	3.8	3.6
3.89-5.43 UHC zoom	163-122106-XX	5.4	5.1

* For specific Christie-supplied model names and part numbers, refer to the *Mirage SST Projector Head Specifications Guide (P/N: 020-102994-XX)*.

Type A	168-1011XX-XX
Type B	168-1061XX-XX
Type C	168-1071XX-XX
Type D	168-1081XX-XX

Type E   168-1091XX-XX

📝   The below graphs are for reference only and the above hazard distance of the table must be followed.

Hazard distance graph for Type A high brightness and ultra high contrast lenses:
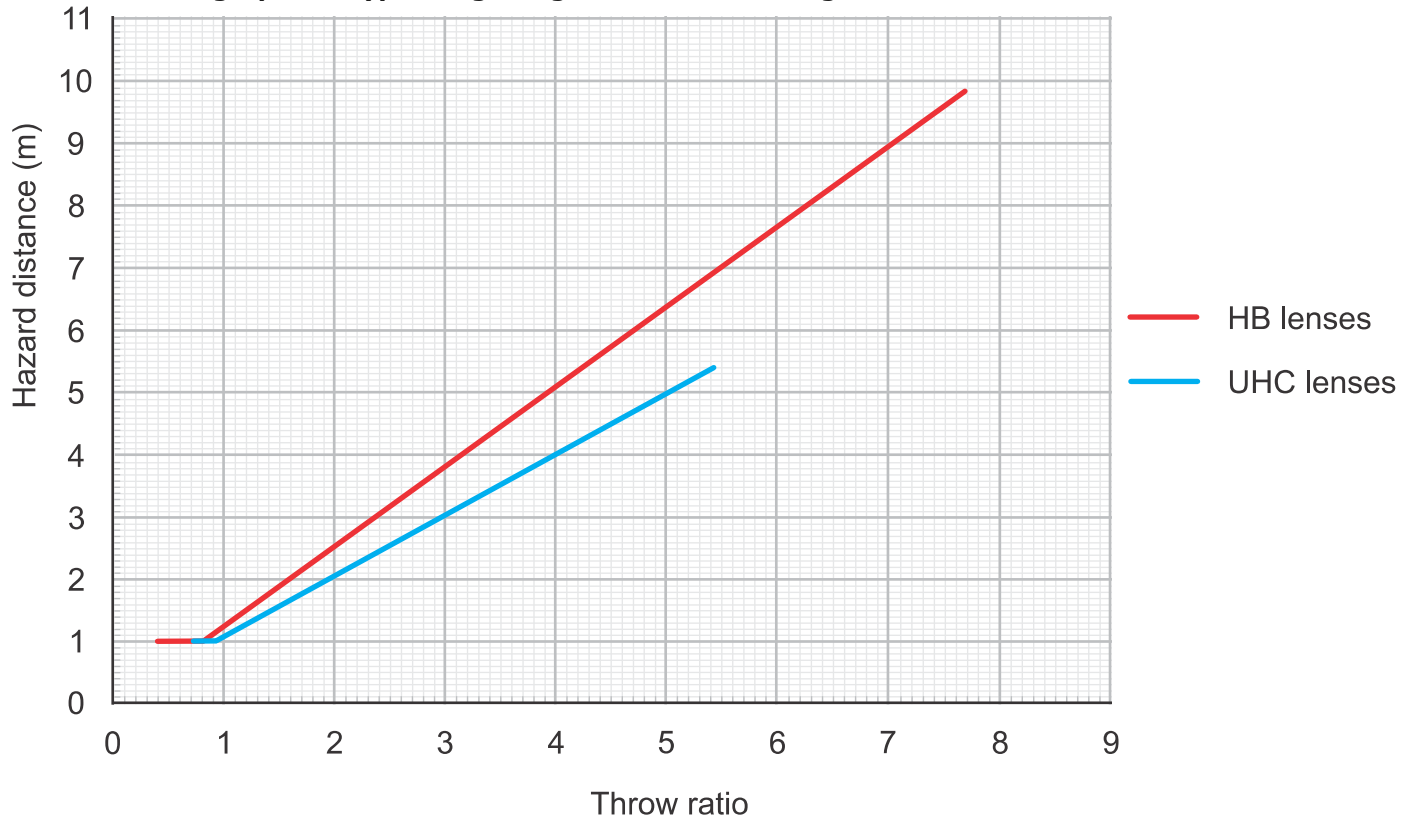
Hazard distance graph for Type B, C, D, E high brightness and ultra high contrast lenses:
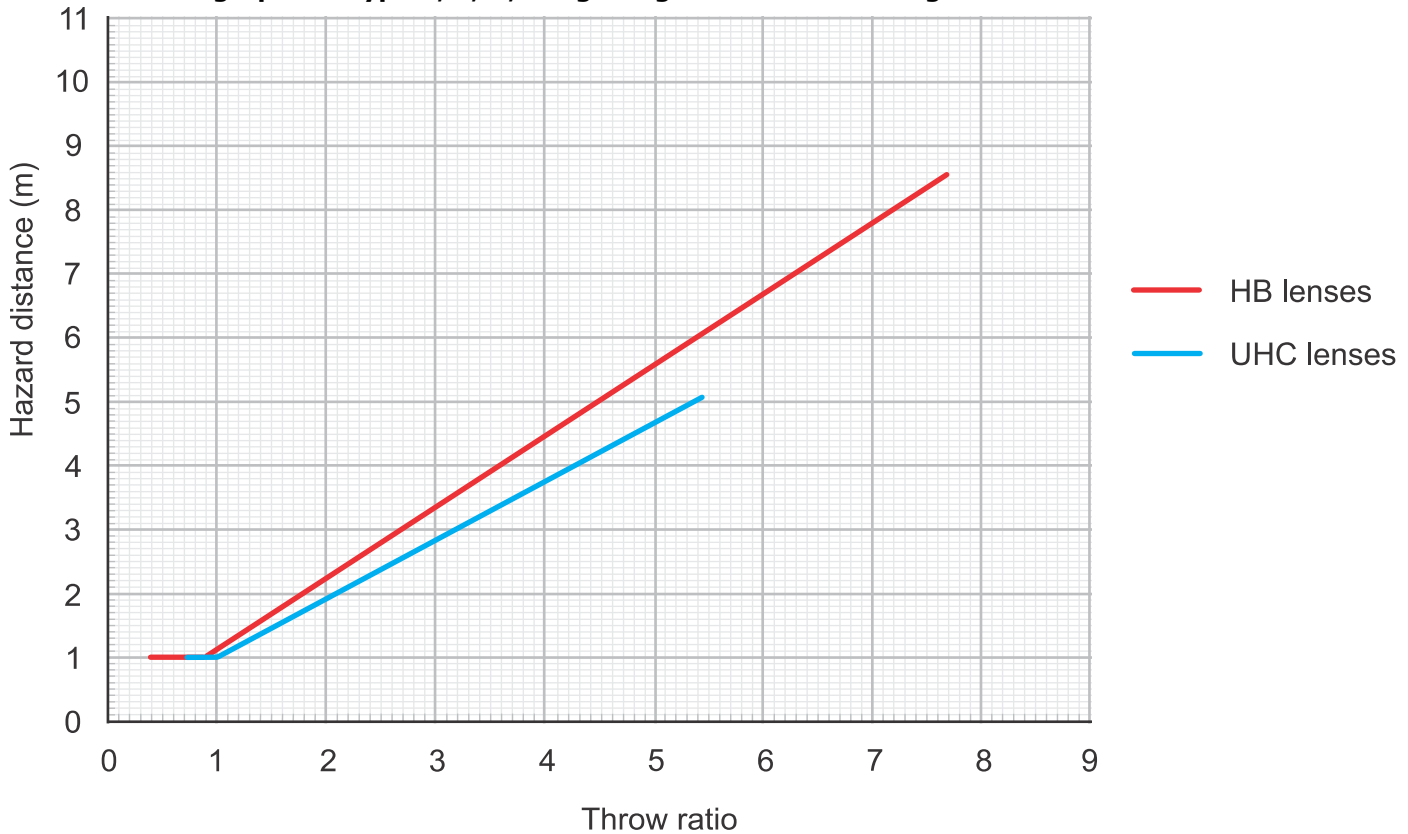
For Installations in the United States

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

- Any human access to the hazard zone, if applicable, must be restricted by barriers to enforce the no access zone.

- Permanent show installations containing Risk Group 3 laser-illuminated projectors must meet the following conditions:

    - Installed by Christie or by Christie-authorized and trained installers.

      Refer to the EXTERNAL - Laser safety awareness training (Course code: CS-ELSA-01) on the *http://www.christieuniversity.com* site.

    - Performed according to instructions provided by Christie.

    - Make sure the projection system is securely mounted or immobilized to prevent unintended movement or misalignment of the projections.

- A copy of the FDA variance approval letter must be with the operator or other responsible individual.

- Temporary show installations containing Risk Group 3 laser-illuminated projectors may be installed by Christie or sold or leased only to valid laser light show variance holders (laser light show manufacturers) for image projection applications. Such manufacturers may currently hold a valid variance for production of Class IIIb and IV laser light shows and/or for incorporation of the Risk Group 3 laser-illuminated projectors into their shows. This requirement applies also to dealers and distributors of these laser-illuminated projectors.

- For temporary installations, the FDA variance holder must maintain complete records of all show itineraries with dates, locations, operator name, and contact information clearly and completely identified.

- 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.

Third-party products

This projector is certified to work only with certain specified third-party components. Use only third-party components approved by Christie with the projector. Using non-approved components with the projector can lead to potential safety hazards and void the projector warranty.

For detailed safety information on third-party components, refer to the product documentation provided by the manufacturer of the component.

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 that is connected to power.

Fire and Shock Hazard	
⚠️🔥 ⚠️⚡	To prevent fire or shock hazards, do not expose this product to rain or moisture.
	Do not alter the power plug, overload the power outlet, or use it with extension cords.
	Do not remove the product enclosure.
	Only Christie qualified technicians are authorized to service the product.

Electrical Hazard	
⚠️⚡	Risk of electric shock.
	Do not remove the product enclosure.
	Only Christie qualified technicians are authorized to service the product.

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.

Laser hazard. To avoid personal injury, avoid eye or skin exposure to direct or scattered radiation.

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

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.

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 action

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

SHOCK HAZARD! Disconnect all power sources before performing maintenance or service procedures.

Consult the service manual.

Electrical labels

Indicates the presence of a protective earth ground.

Laser labels
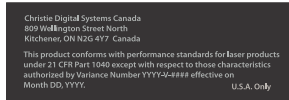
FDA laser variance (US projectors only)

This product conforms with performance standards for laser products under 21 CFR Part 1040 except with respect to those characteristics authorized by Variance Number 2019-V-0640 effective on March 8, 2019.
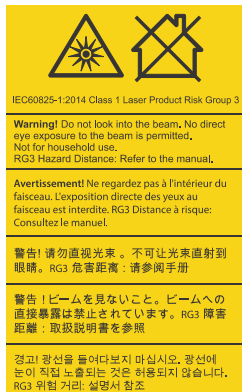
Indicates a light hazard. Do not look directly into the lens. The extreme high brightness can cause permanent eye damage. Class 1 Laser Product - Risk Group 3 according to IEC 60825-1: 2014 and IEC 62471-5:2015
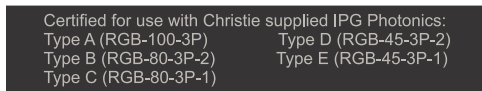
Indicates the product is certified for use with the listed Christie-supplied light illumination sources.
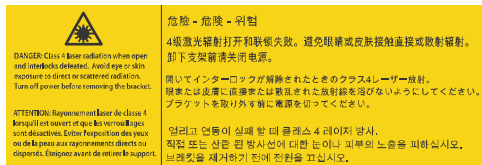
Indicates a danger Class 4 laser radiation when open and interlocks are defeated. Avoid eye or skin exposure to direct or scattered radiation. Turn off power before removing the bracket.

Additional safety hazards
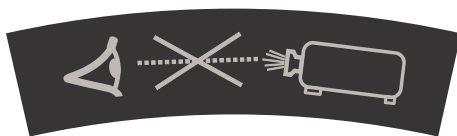
Do not look directly into the lens. The extremely high brightness can cause permanent eye damage.

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

Product documentation

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

1. Access the documentation from the Christie website:

   - Go to this URL: *http://bit.ly/2TI2aEW* or
     https://www.christiedigital.com/en-us/3d/products-and-solutions/projectors/mirage-sst.

   - Scan the QR code using a QR code reader app on a smartphone or tablet.
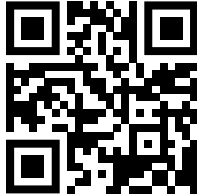
2. On the product page, switch to the **Downloads** tab.

Related documentation

Additional information on this product is available in the following documents.

- *Mirage SST Product Safety Guide (P/N: 020-102992-XX)*
- *Mirage SST User Guide (P/N: 020-102993-XX)*
- *Mirage SST Projector Head Specifications Guide (P/N: 020-102994-XX)*
- *Mirage SST Status System Guide (P/N: 020-103007-XX)*
- *Mirage SST Serial Commands Guide (P/N: 020-103005-XX)*
- *Mirage SST Projector Head Service Guide (P/N: 020-103039-XX)*

Technical support

Technical support for Christie Enterprise products is available at:

- North and South America: +1-800-221-8025 or *Support.Americas@christiedigital.com*
- Europe, Middle East, and Africa: +44 (0) 1189 778111 or *Support.EMEA@christiedigital.com*
- Asia Pacific (*support.apac@christiedigital.com*):
  - Australia: +61 (0)7 3624 4888 or *tech-Australia@christiedigital.com*
  - China: +86 10 6561 0240 or *tech-supportChina@christiedigital.com*
  - India: +91 (80) 6708 9999 or *tech-India@christiedigital.com*
  - Japan: 81-3-3599-7481
  - Singapore: +65 6877-8737 or *tech-Singapore@christiedigital.com*
  - South Korea: +82 2 702 1601 or *tech-Korea@christiedigital.com*
- Christie Professional Services: +1-800-550-3061 or *NOC@christiedigital.com*

Projector overview

Learn about the Mirage SST projectors.

Mirage SST are professional quality projectors using Digital Light Processing (DLP^TM) technology from Texas Instruments. Mirage SST are engineered specifically for complex, high-end applications like planetariums, dome theaters, and theme park attractions to offer stunning wide screen, high resolution 4K images up to 120 frames (for Mirage SST) per second.

The systems can be 3P (single) or 6P (dual).

Mirage SST provide several design and installation advantages. Their small form factor allows them to be installed independently, or as part of a multi-projector array, into tight, challenging environments. Both single (3P) and dual (6P) systems are available. The remote light source also allows the chilling equipment to be located away from the projector head where its noise will not impact the audience's enjoyment of the show.

Contact your dealer

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

Purchase record
Dealer:
Dealer or Christie Sales/Service contact phone number:
Projector serial number: The serial number can be found on the license label located on the display panel
Purchase date:
Installation date:

Ethernet settings	
Default gateway:	
Projector IP address:	
Subnet mask:	

Key features

Understand the important features of the projector.

- Built in warp and blend of projected images
- Improved lens mount with bayonet style insertion
- Single phase 100-240 V
- Side access to optical adjustments
- 4K resolution for flexibility and future proofing
- Omnidirectional operation

- TruLife electronics
- LCD display to provide information at-a-glance

How the projector works

The Mirage SST accepts a variety of input signals for projection on front or rear projection screens, typical in commercial or other large screen applications.

High-brightness light is generated by a laser illumination source, then fed to the projector through a fiber optic cable, where it is modulated by three Digital Micromirror Device (DMD) panels responding to incoming data streams of digitized red, green and blue color information. Based on digital signals from the source, light from the responding on pixels of each panel is reflected, converged and then projected to the screen through a projection lens, where all pixel reflections are superimposed into a sharp full-color image.

The Mirage SST projector head provides all configuration and control for the laser illumination source. Never connect a laptop to the laser illumination source unless directed by Technical Support.

List of components

Verify all components were received with the projector.

- Power cord
- IR remote keypad
- Network cable
- Tools
- Fiber optic support
- Laser illumination source J33 terminal block 1 (P/N: 001-114198-XX)
- Fiber connector safety cover

Chiller and laser illumination source components

For information on the approved chiller and laser illumination source products, see the *Mirage SST Projector Head Specifications Guide (P/N: 020-102994-XX)*.

- Laser unit, including attached fiber optic cable
- Third-party chiller unit

Installation and setup

Learn how to install, connect, and optimize the projector display.

Site requirements

To safely install and operate the projector, the installation location must have restricted access for authorized personnel only and meet these minimum requirements.

Physical operating environment

Provides specifications for the operating environment.

- Ambient temperature (operating) up to 500 m (1640.42 ft):
  - Type A: 10 to 24°C (50 to 75°F) at full power and at reduced power above 24°C (75°F)
  - Type B: 10 to 30°C (50 to 86°F) at full power and at reduced power above 30°C (86°F)
  - Type C, D, E : 10 to 35°C (50 to 95°F) at full power
- Humidity (non-condensing) 20 to 80%
- Operating altitude: 3,000 m (10,000 ft) maximum at 10 to 25°C (50 to 77°F) ambient

Power connection

A 15A rated wall breaker is required at the installation of the projector.

Ensure a qualified electrician connects the AC power to the laser illumination source and chiller as per electrical codes.

Projector components

Identify the main components of the projector.
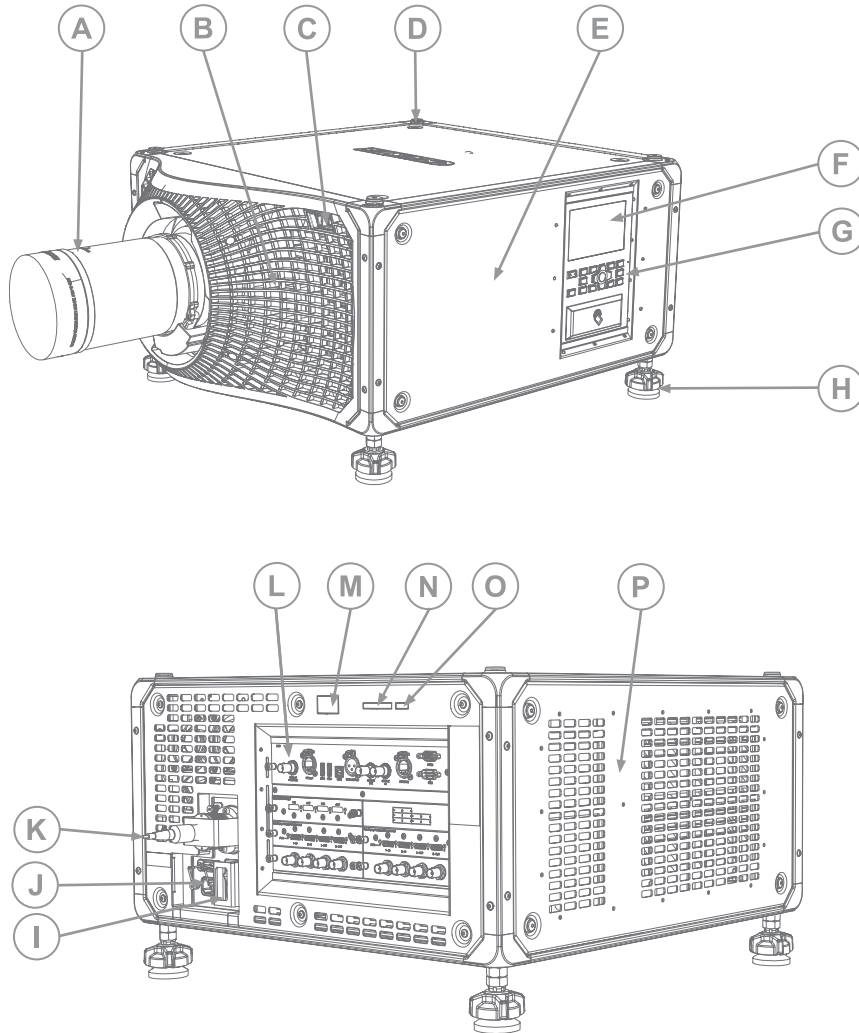
ID	Component	Description
A	Projection lens	A variety of lenses can be used with the projector. Available lenses are listed in accessories.
B	Front filter door	Provides access to the front air filter.
C	Front IR	Receives transmissions from the IR remote.
D	Mounting and rigging holes	M12 x 1.75 holes for projector feet installation and offer mounting and rigging points.
E	Service compartment	Access to fold mirror, optical zoom/focus, and DMD convergence adjustments.
F	Display panel	Displays the projector menu and status.

ID	Component	Description
G	Keypad interface	Controls the projector.
H	Adjustable feet	Raise or lower these feet when positioning the projector to make sure it is level on all sides so the displayed image appears rectangular without any keystone.
I	Power switch	Shuts off AC power.
J	AC input and lock	Use this IEC 320-C14 inlet to connect to an appropriately rated power cord provided for your region and lock it in place.
K	Light source input	Receives the input for the light source. Remove the security bracket before plugging in the light source.
L	Communication and input panel	Access to fold mirror, optical zoom/focus, and DMD convergence adjustments.
M	Rear IR	Receives transmissions from the IR remote.
N	LED status indicator	Indicates lamp and power status.
O	Shutter LED status indicator	Indicates shutter status.
P	Air filter side	Provides access to the side air filter.

IR/wired remote keypad

The IR/wired remote keypad controls the projector by way of either wireless communications from a battery-powered infrared (IR) transmitter or a wired interface.
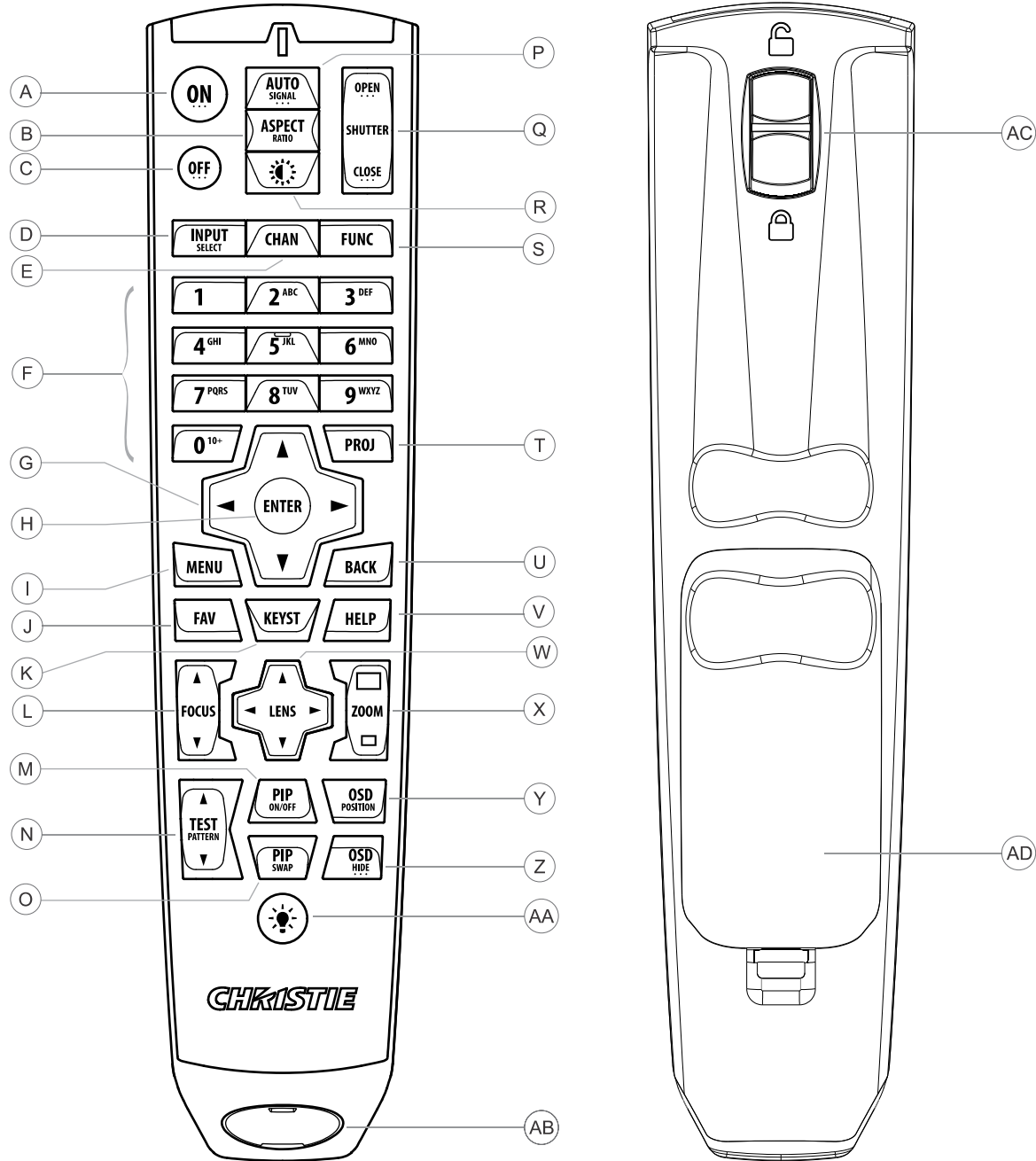
Button	Description
A	Powers on the projector light source.
B	Opens the aspect ratio dialog.

Button	Description
C	Turns off the light source and puts the projector in standby.
D	Selects an active or inactive input on any slot.
E	Not supported.
F	Enter a number, such as menu, item index or value.
G	Use the arrows to navigate within a menu or to adjust settings.
H	Selects a highlighted menu item and changes or accepts a value.
I	Toggles the menus on/off.
J	Not supported.
K	Opens the keystone dialog.
L	Adjusts the lens focus.
M	Not supported.
N	Displays a test pattern.
O	Not supported.
P	Optimizes the image automatically.
Q	Opens or closes the shutter.
R	Not supported.
S	Initiates a custom action when a number is selected.
T	Selects a projector in multi-projector installations.
U	Returns to the previous menu level or exits menus if at the top level.
V	Displays context-sensitive help.
W	Arrows adjust the lens offset.
X	Adjust the lens zoom.
Y	Opens the on-screen display position menu.
Z	Shows or hides the on-screen display menus.
AA	Turns the remote backlight on.
AB	Male 3-pin XLR connector for wired option.
AC	Lock/unlock the keypad.
AD	Battery door.

Display panel components

Identify the main components of the display panel (also known as the home page).
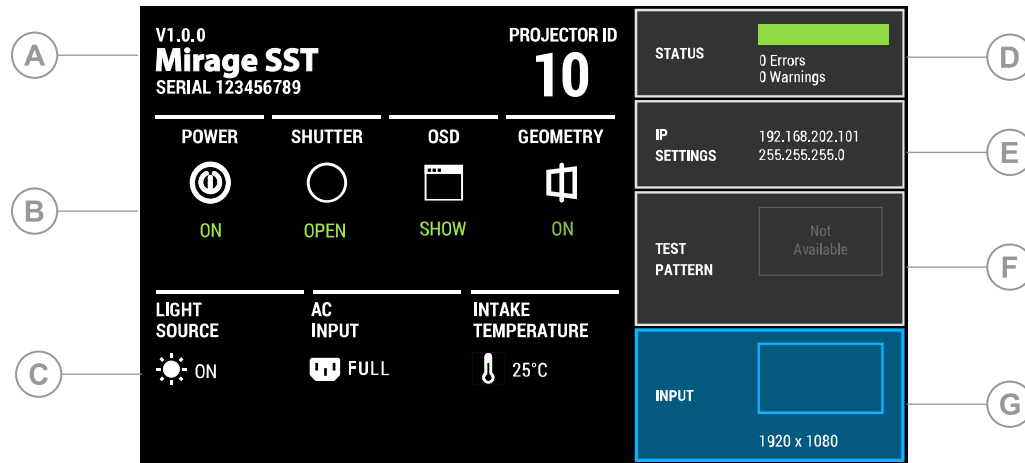
ID	Component	Description
A	Projector information	Provides information about the projector such as the projector name, serial number, software version, and projector ID.
B	Projector and Component Controls	Indicates the states of the projector and its components.
C	Power and Temperature	Indicates the light source mode, power mode, and intake temperature.
D	Status	Contains information about the health of the projector including the number of warnings and errors. Provides access to the status system.
E	IP Settings	Indicates the incoming voltage, measured in Volts, and intake temperature, measured in Celsius.
F	Test Pattern	Displays the currently selected test pattern. If no test pattern is selected, Off is displayed. Provides access to the list of test patterns.
G	Input	Displays the signal for the currently selected input. Provides access to the list of input signals.

Workflow: Installing and setting up the Mirage SST system

Identify the recommended order for installing and setting up the components of the Mirage SST system.

These tasks detail the steps for installing both single (3P) and dual (6P) systems. For the dual system, repeat the tasks for both the left-eye and right-eye systems, making sure you connect the correct light source to the correct projector head.
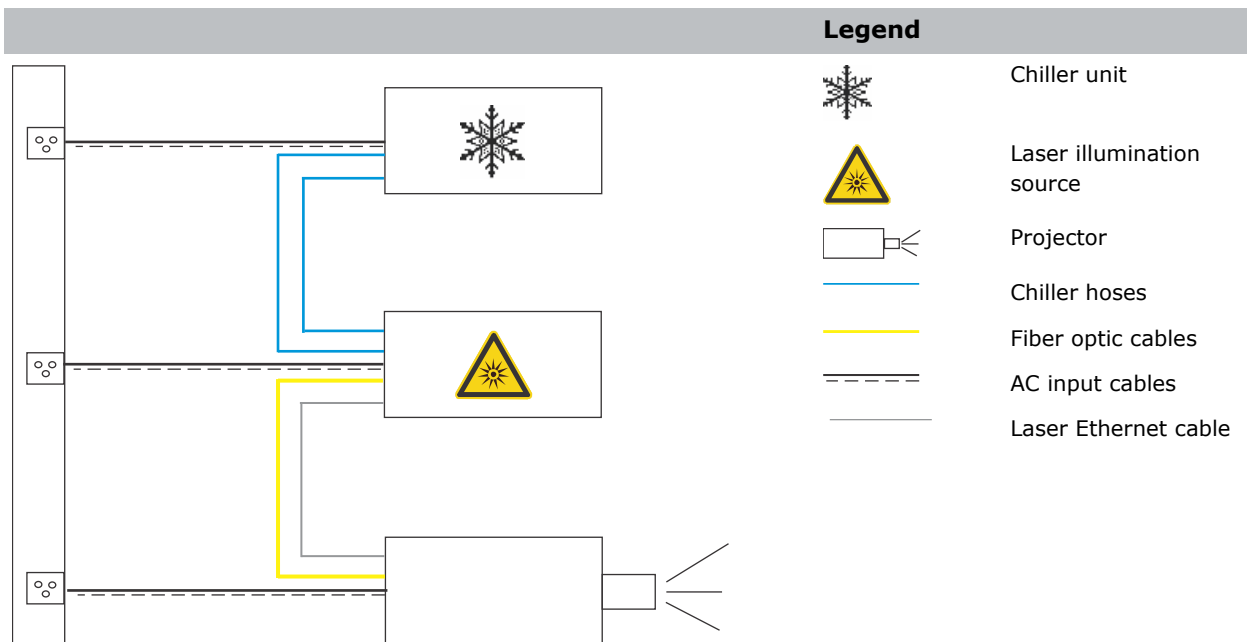
Legend	
❄	Chiller unit
⚠	Laser illumination source
▭◁	Projector
——	Chiller hoses
——	Fiber optic cables
- - - -	AC input cables
——	Laser Ethernet cable

> The Mirage SST projector head provides all configuration and control for the laser illumination source. Never connect a laptop to the laser illumination source unless directed by Technical Support.

1. *Set up the projector head* (on page 26).
    a) Position the projector as perpendicular to the screen as possible, even if significantly above the screen center.
    b) *Install the projection lens* (on page 27).
    c) If required, *connect the Ethernet cable* (on page 61) from the Ethernet port on the projector head to the input source.
    d) *Connect the projector head to AC power* (on page 28).
2. *Set up the laser illumination source* (on page 28).
    a) Position the laser illumination source on level ground and ensure the fiber optic cable is routed in a way to avoid any damage.
    b) *Install the J33 terminal block* (on page 29) on the laser illumination source.
    c) To protect the fiber optic cable, *install the fiber connector safety cover* (on page 30) on the fiber connector.
    d) Connect the fiber optic cable from the laser illumination source to the projector head.
        • *Connect using the curved strain relief* (on page 33).
        • *Connect using the straight strain relief* (on page 35).
    e) Ensure a qualified electrician connects the AC power to the laser illumination source.
3. *Set up the chiller unit* (on page 28).
4. *Perform initial system start-up* (on page 40) or *turn on the system* (on page 42).
5. *Calibrate the lens motor* (on page 47).
6. *Align the image* (on page 48).
    a) *Adjust the offset* (on page 49).

    b) *Adjust the boresight* (on page 49).

    c) *Adjust the fold mirror* (on page 51).

    d) *Optimize the integrator zoom and focus* (on page 53).

    e) *Adjust the DMD convergence* (on page 55).

    f) *Align the image with lens zoom and focus* (on page 56).

    g) *Run Auto Setup to optimize display settings* (on page 56).

7. *Configure Mirage SST to work with Christie Link* (on page 57).

Setting up the projector head

1. Position the projector as perpendicular to the screen as possible, even if significantly above the screen center.

   When a particularly short throw distance combines with a wide screen, you may have to forfeit some aim and stay more perpendicular to the screen. In such cases, some lens offset can reduce the keystone distortion.

   For information on positioning the projector in a rigging frame, refer to the *Assembling the Precision 1 Rigging Frame (P/N: 020-102719-XX)* or *Upgrading the Boxer Rigging Frame (P/N: 020-102746-XX)* instruction sheet.

2. *Level the projector* (on page 26) as required.

3. *Install the projection lens* (on page 27).

4. If required, *connect the Ethernet cable* (on page 61) from the Ethernet port on the projector head to the input source.

5. *Connect the projector head to AC power* (on page 28).

Leveling the projector

Use the projector feet to level the projector.

1. To adjust the vertical position of the projector, extend or retract the adjustable feet on the bottom of the projector using the adjustable knobs on the feet.

   Christie recommends adjusting the feet from the side or rear of the projector and not the front to avoid exposure to the output light.
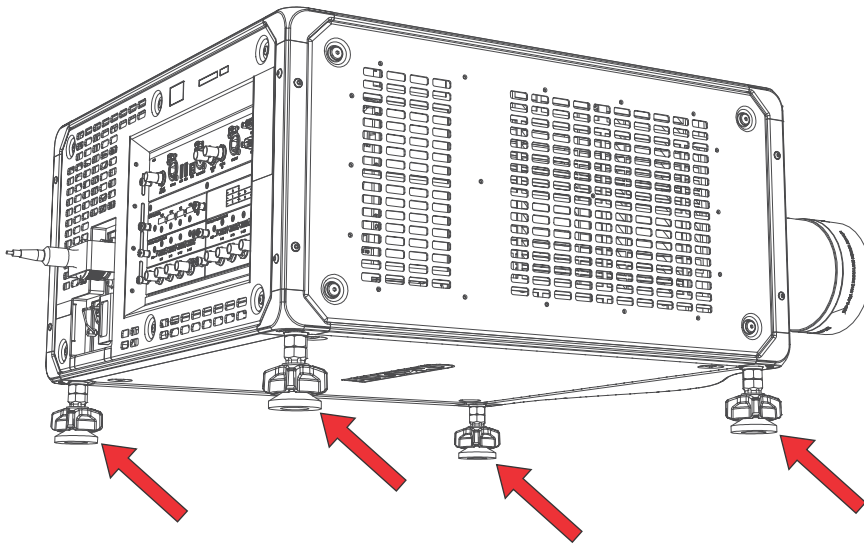
2. Once the required adjustment is made, using a wrench, tighten the lock nut against the bottom of the projector.

Installing the projector lens

Only use lenses designed for Mirage SST projectors. Installing a lens not designed for Mirage SST, results in a warning that the lens is not present.

1. Turn off the lasers.

2. Remove the lens caps from the lens.

   The packaging tape is required to ensure safe shipment of the projection lens to restrain the zoom ring from rotating during shipping.

3. Align the guides on the front cover and the lens marked by a red line.
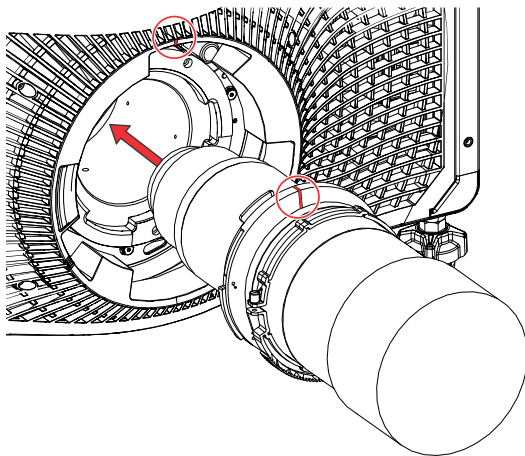
4. Insert the lens into the projector and turn it clockwise until you hear two clicks.

   The first click indicates the safety lock mechanism has been engaged.

5. Continue to turn the lens clockwise until you hear a second click.

   The second click indicates the lens is fully locked in position. The top center label should face up and be aligned to the lens guide on the front cover.
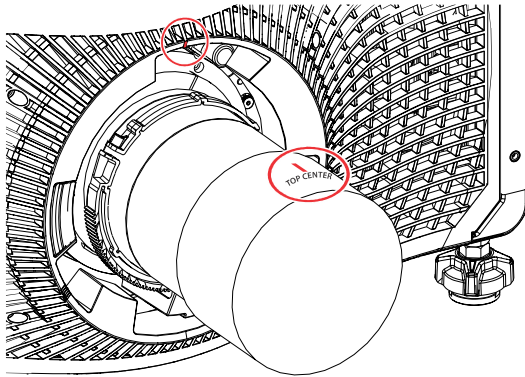
Connecting the projector head to AC power

Connect the projector head to the AC power.

1. On the projector head, ensure the AC breaker/switch is in the off position.

2. Connect AC power to the AC inlet on the projector.

   For electrical rating information, refer to the license label on the projector.

3. To ensure the AC power cord does not fall out, pull out the safety retainer clip from the holder and clip over the power cord connector.

   To unplug, raise up the retainer clip and pull out the cord.
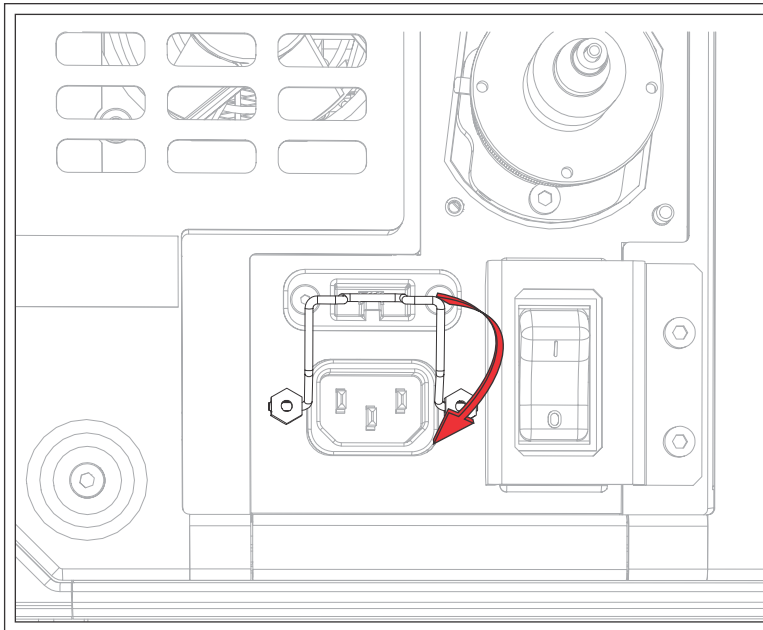
Setting up the laser illumination source

Follow these steps to set up the laser illumination source.

1. Position the laser illumination source on level ground and make sure the fiber optic cable is routed in a way to avoid any damage.

2. *Install the J33 terminal block* (on page 29) on the laser illumination source.

3. To protect the fiber optic cable, *install the fiber connector safety cover* (on page 30) on the fiber connector.

4. Connect the fiber optic cable from the laser illumination source to the projector head.

   • *Connect using the curved strain relief* (on page 33).

   • *Connect using the straight strain relief* (on page 35).

5. *Connect the laser Ethernet cable* (on page 38) from the laser illumination source to the projector head.

6. Make sure a qualified electrician connects the AC power to the laser illumination source.

   For electrical rating information, refer to the license label on the laser illumination source. Additional information is available in the laser illumination source's product documentation.

Installing the J33 terminal block on the laser illumination source

The J33 terminal block on the light illumination source is used for an external interlock E-stop and fire alarm E-stop triggers. The J33 terminal block closes off the connector to the interlock allowing Mirage SST to turn on.

As of October 2020, a J33 terminal block and a 30.4 m (100 foot) cable are optionally available with the laser rack to enable the Power key in the remote position. For racks purchased before this date, contact Christie Technical Support for information on upgrading the laser rack to use this feature.

Determine which terminal block and features you require:

• J33 terminal block 1—Self-contained with no external wires and shipped with the projector head packaging. Use this terminal block when manual control and no external E-stop are required. If using the J33 terminal block 1, remote operation or remote E-stop is not available.

• J33 terminal block 2—Includes a 30.4 m (100 foot) cable. Use this terminal block when external control and/or an external E-stop are required.

1. On the laser rack, install either the J33 connector with cable provided with the laser rack or the J33 connector provided with the projector.

   • J33 terminal block 1—Install the J33 terminal block by tightening the two screws.

 J33 terminal block 1 shown here with the location of the mounting screws indicated with the red arrows

   • J33 terminal block 2—Install the J33 terminal block with the integrated cable (in the same location as shown above for the J33 terminal block 1) by tightening the two screws and proceed to step 2.

Terminal block 2 shown below with cable:

Terminal block 2 shown here with cable

 Terminate all wires or the projector may not operate.

2. To make use of the remote operation feature (J33 terminal block option 2), terminate the wires for correct operation.

   Each wire has a label indicating what pin it is connected to.

   a) Make sure pins/wires 17 and 20 and 18 and 19 are closed or the projector will not operate in the local or remote position.

   These pins can be connected to a remote E-stop button and/or the remote fire disconnect and/or each circuit closed if the remote E-stop is not required. Keep each circuit isolated from other circuits.

   b) Wire the automation device to provide the ability to maintain a closed circuit between the J33 pins 8 and 9 when the equipment is operating.

   This circuit is used to turn the laser illumination source on and off. When the circuit is open and the key is in the REM position, functionally this is the same as if the key was turned to off.

   c) Wire the automation device to provide the ability to momentarily close the circuit between the J33 pins 21 and 22.

   This circuit is used to turn on the lasers when the key is in the REM position. Functionally it is the same as pressing the green button when the key is in the ON position.

    The green button/light illuminates when this contact is closed (if the system is ready); however, the button does not operate as a button. It is only a light when the key is in the REM position.

   A momentary 500ms contact closure is required to turn on the lasers with pins 21 and 22.

Protecting the fiber connector

Before placing or setting up any system components, you must install the supplied fiber connector safety cover on the fiber connector to protect the fiber optic cable.

The fiber connector safety cover, wire lanyard, and cable ties, are supplied in the projector package. The fiber connector safety cover provides additional physical protection for the fiber connector to reduce the risk of damage during installation work.

The fiber connector safety cover (safety cover) must be tethered to the fiber optic cable and then placed over the fiber connector and its dust cap. The safety cover and dust cap should be removed only when you are ready to connect the fiber optic cable to the projector.

When handling the fiber optic cable, the minimum bend radius allowed is 150 mm.

Legend	
A	Fiber connector safety cover
B	Captive screw
C	Cover lid
D	Wire lanyard
E	Eye of wire lanyard
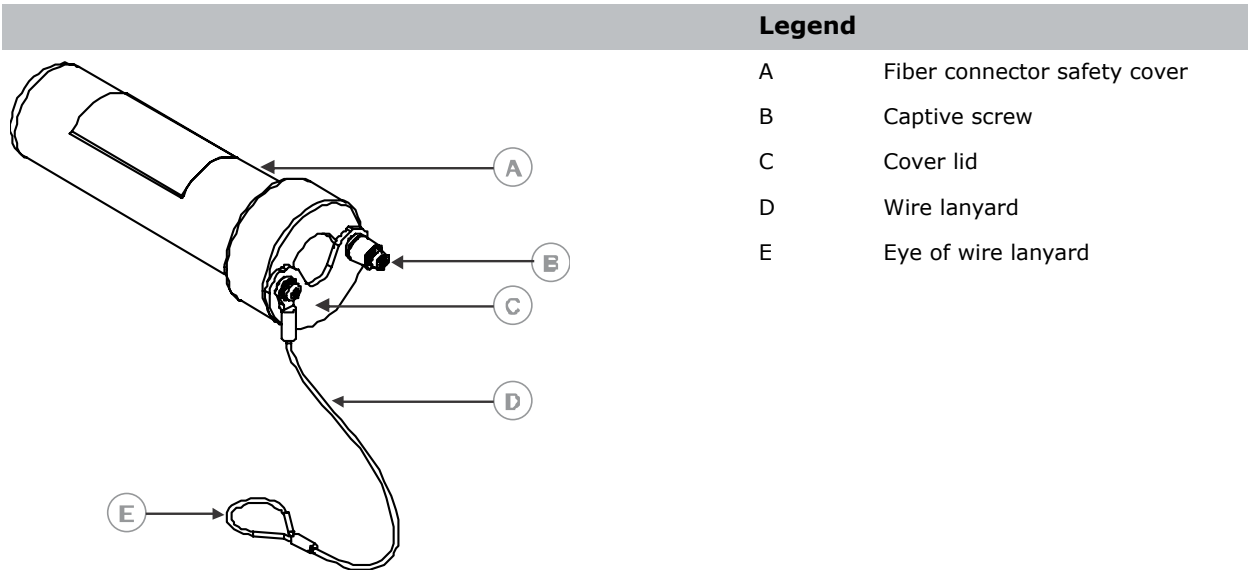
1. Slide a cable tie through the eye of the wire lanyard and loop the cable tie loosely around the fiber optic cable.
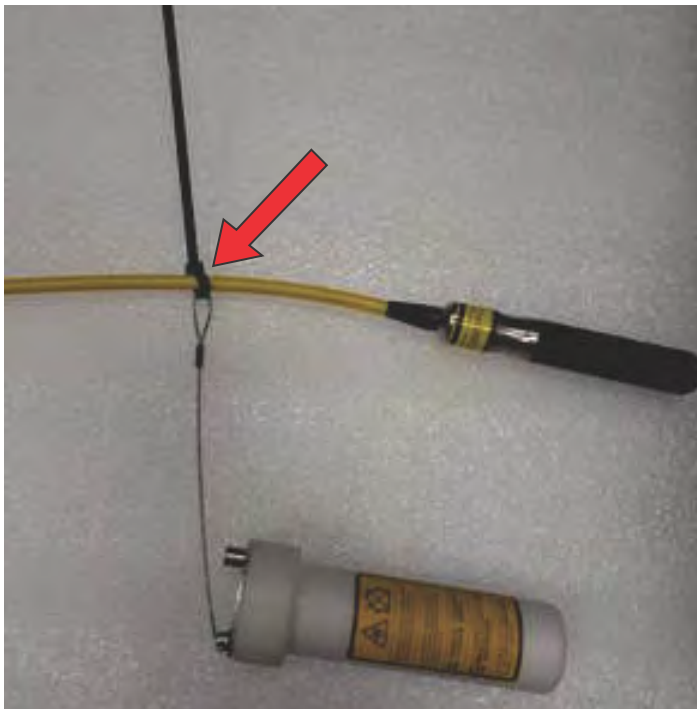
When attached to the fiber optic cable, make sure the tethered safety cover can be placed over the fiber connector and the cable tie is sufficiently loose to slide the tether up and down the fiber cable.

2. Measure a distance approximately 650 mm (25.6 inches) from the end of the fiber connector down the fiber cable.

3. At this location, create a stop point by placing one cable tie and tightening it.

4. At this same location, place a second cable tie directly beside the first one and tighten it.

   To form the stop point, both cable ties should be tightened sufficiently so they cannot slide down the fiber optic cable.
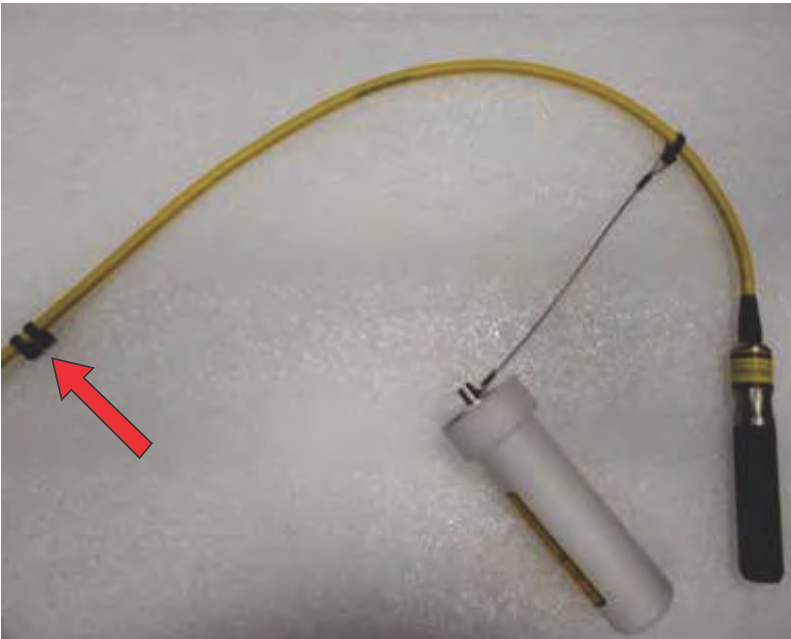
5. Make sure the tethered safety cover cannot slide past the stop point.

6. Trim all the cable ties.

7. Slide the tethered safety cover back to the connector end and place the cover over the fiber connector and its dust cap.
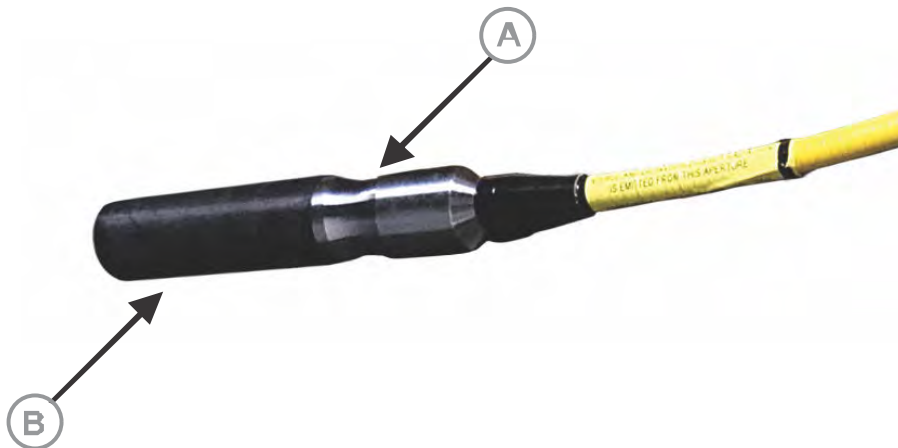
A	Fiber connector
B	Dust cap

8. Close the safety cover lid and tighten the screw.
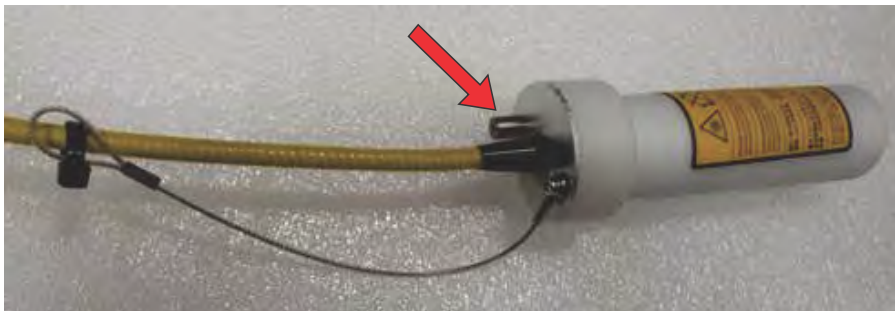
The tethered safety cover must remain installed on the fiber connector whenever the fiber optic cable is not connected to the projector.

When the fiber optic cable is connected to the projector, store the fiber connector dust cap inside the tethered safety cover.

Connecting the fiber optic cable to the projector through the curved strain relief

Attach the fiber optic cables from the laser illumination source to the projector using a curved strain relief.

For additional information on the laser illumination source and the fiber optic cable, refer to the laser illumination source's product documentation.

1. On the rear of the projector, loosen the screw securing the laser safety bracket.

2. Remove the fiber connector safety cover.

3. Remove the dust cover from the fiber input location and ensure the knurled ring and locking pin are both rotated counterclockwise.

4. To remove the top clamp from the bottom of the strain relief, remove the four screws.
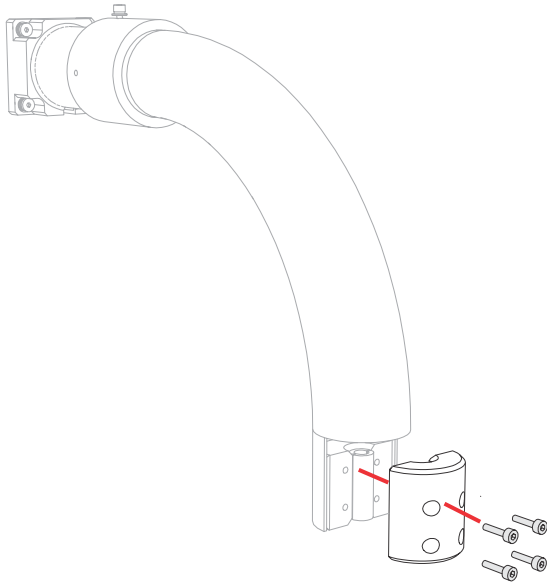
5. Discard the dummy rod located inside the protective pad.

6. Feed the fiber optic cable with the fiber connector dust cap attached on the tip through the strain relief.
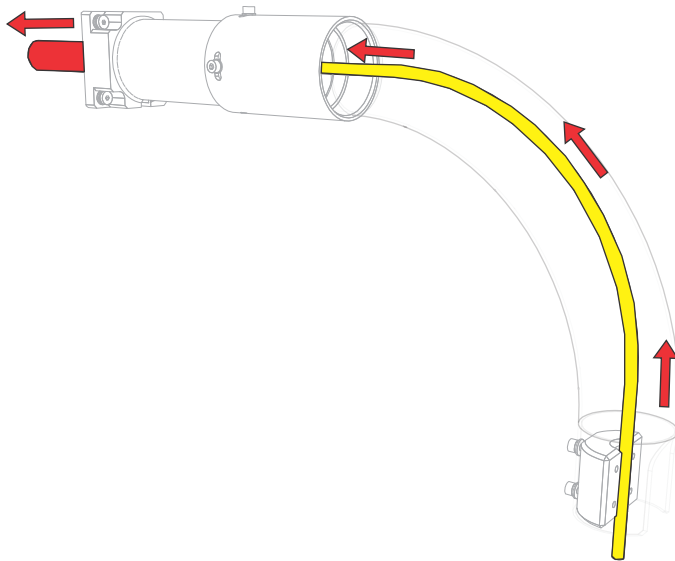
7. Remove the dust cap from the end of the fiber optic cable and store it in the safety cover.

8. To secure the fiber connector dust cap inside the safety cover, tighten the screw.

9. Gently slide the fiber optic cable into the fiber input ensuring the red dots line up.
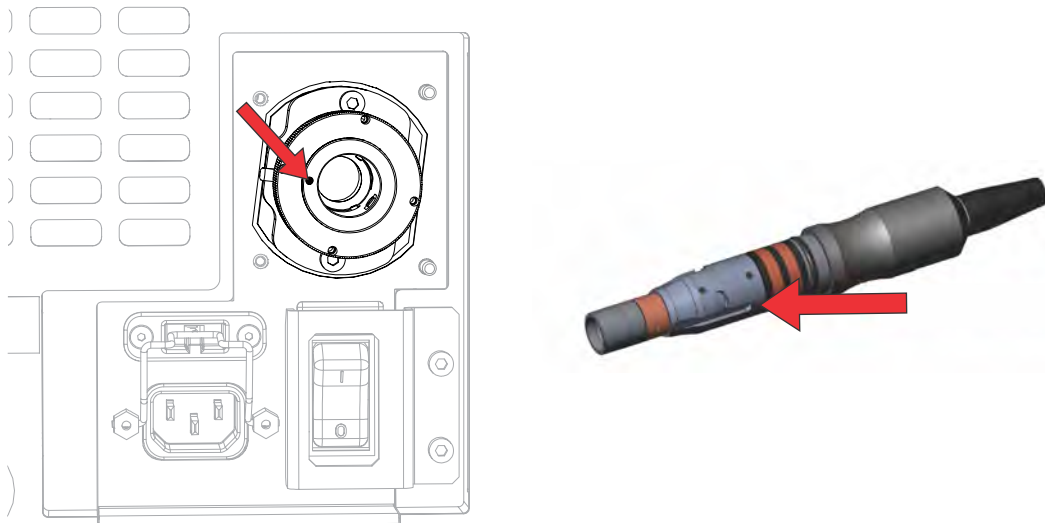
10. To lock the fiber in place, rotate the locking collar clockwise until you see the locking pin start to turn and no longer moves forward and then rotate the knurled ring clockwise.

11. Attach the strain relief to the projector and tighten the two screws to secure it.

12. Wrap the fiber optic cable inside the protective pad and position in the groove.
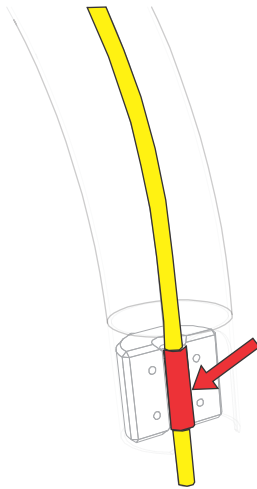
13. To install the back portion of the clamp over the fiber optic cable and tighten the four screws removed in step 4.

Connecting the fiber optic cable to the projector through the straight strain relief

Attach the fiber optic cables from the laser illumination source to the projector using a straight strain relief.

For additional information on the laser illumination source and the fiber optic cable, refer to the laser illumination source's product documentation.

1. Remove the curved portion of the strain relief.

a) Remove the three screws securing the top of the curved portion of the strain relief to the straight portion.
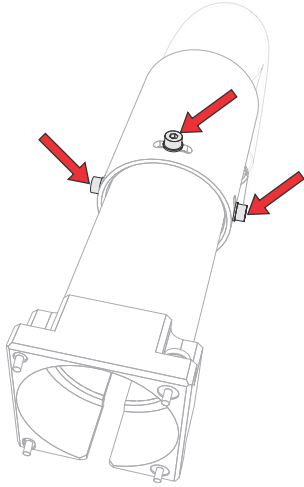
b) Remove the two screws securing the clamps from the curved portion of the strain relief.
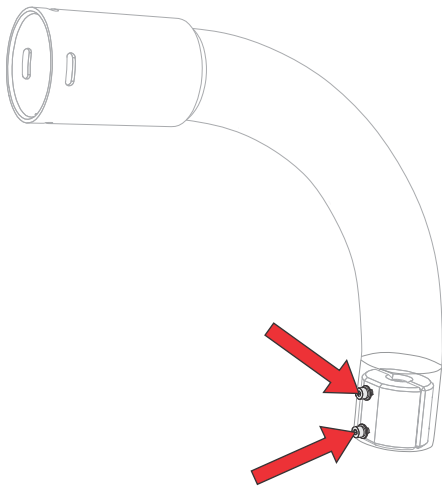
c) Re-install the clamp to the pieces to the straight portion of the strain relief using the two screws removed in step b.
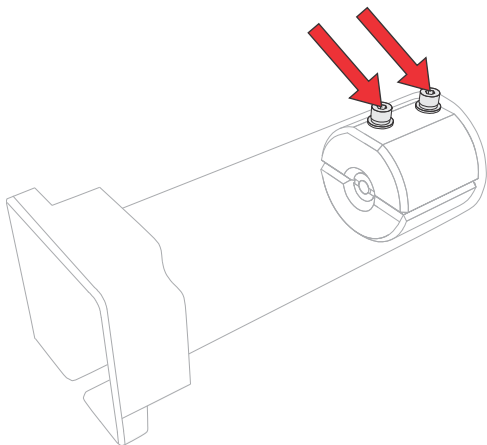
2. On the rear of the projector, loosen the screw securing the laser safety bracket.

3. Remove the fiber connector safety cover.

4. Remove the dust cover from the fiber input location and make sure the knurled ring and locking pin are both rotated counterclockwise.

5. To remove the top clamp from the bottom of the strain relief, remove the four screws.
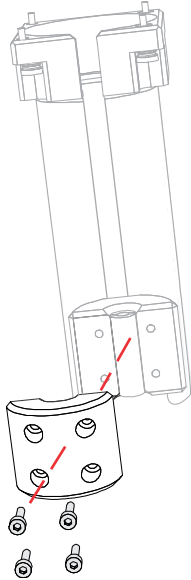
6. Discard the dummy rod located inside the protective pad.

7. Feed the fiber optic cable with the fiber connector dust cap attached on the tip through the strain relief.
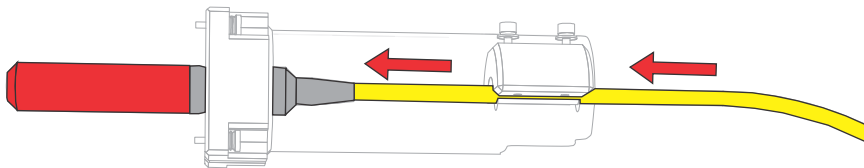
8. Remove the dust cap from the end of the fiber optic cable and store it in the safety cover.

9. To secure the fiber connector dust cap inside the safety cover, tighten the screw.

10. Gently slide the fiber optic cable into the fiber input ensuring the red dots line up.
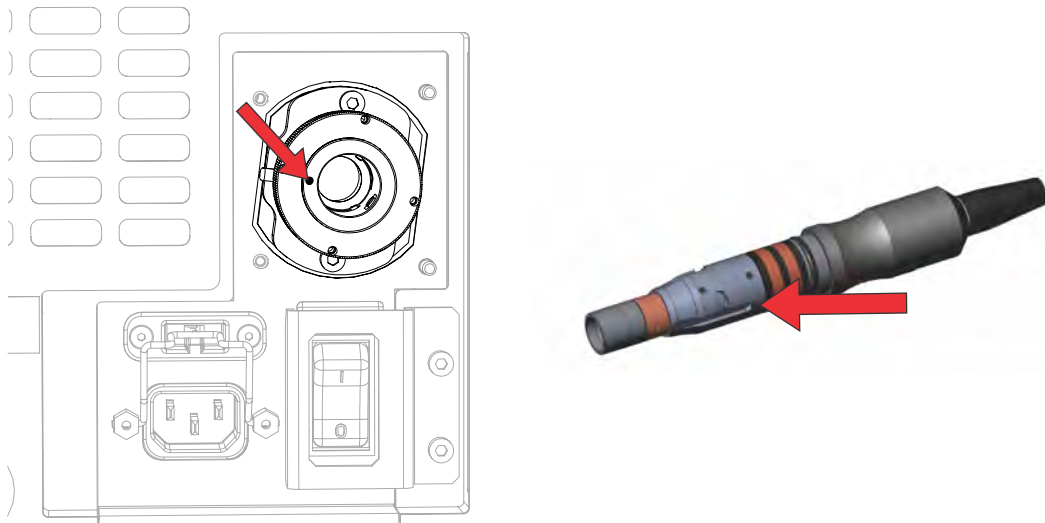
11. To lock the fiber in place, rotate the locking collar clockwise until you see the locking pin start to turn and no longer moves forward and then rotate the knurled ring clockwise.

12. Attach the strain relief to the projector and tighten the two screws to secure it.

13. Wrap the fiber optic cable inside the protective pad and position in the groove.
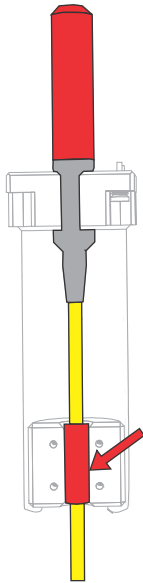
14. Install the back portion of the clamp over the fiber optic cable and tighten the four screws removed in step 5.

# Connecting the Ethernet cable to the projector

Connect the projector to the laser illumination source with an Ethernet cable.

1. Connect one end of an Ethernet cable to the Laser Rack network port on the IMXB of the projector.
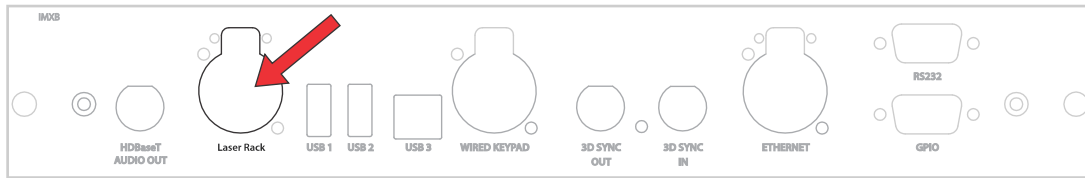
2. Connect the other end of the Ethernet cable to the network port on the lower-left rear side of the laser illumination source.

   Two Ethernet port styles are available on the laser illumination source and the style shown below may not match the style on your laser illumination source.
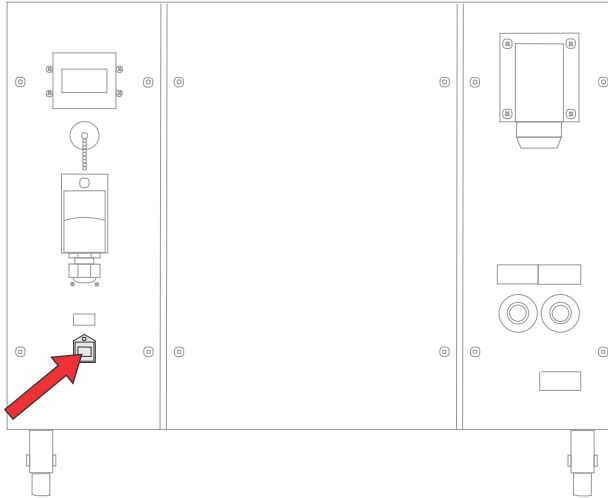
Setting up the chiller unit

For detailed information on setting up the chiller, refer to the documentation provided by the manufacturer of the chiller unit.

1. Position the chiller on level ground.

2. Confirm the chiller can operate and maintain proper specifications as stated in the *Mirage SST Projector Head Specifications Guide (P/N: 020-102994-04 or newer)* as it is plumbed to the laser illumination source.

3. Connect the chiller hoses to the laser illumination source ensuring the output of the chiller is connected to the port on the laser rack marked **SUPPLY** and the port on the laser rack marked **RETURN** is connected to the return port on the chiller.

   > If a Christie dripless quick disconnect (QD) solution was provided, confirm the male QD connectors are on the output of the chiller and the **RETURN** side of the laser rack, and the female QD connectors are on the port marked **SUPPLY** on the laser rack and on the return side of the chiller. Hoses supplied for use with the Christie-supplied QD system have a male QD on one end and a female QD on the other end regardless of the presence of any 90° elbows that may or may not be used in the system. This essentially eliminates the opportunity of connecting each system incorrectly.

   For more details, refer to the *Dripless Quick Disconnect and Chiller Hose Kit Instructions for the Mirage SST Light Source and Chiller (P/N: 020-103501-XX)*.
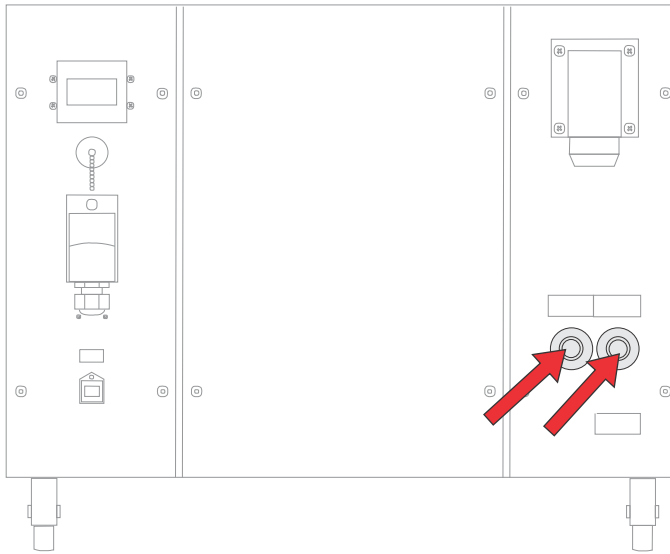
4. Make sure a qualified electrician connects the AC power to the chiller.

   For electrical rating information, refer to the license label on the chiller. Additional information is available in the chiller's product documentation.

Performing initial system start-up

Learn how to turn on all components of the Mirage SST system for the first time: chiller, laser illumination source, and projector head.

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

   • SHOCK HAZARD! Do not attempt operation if the AC supply is not within the specified voltage and current, as specified on the license label.

Never run the laser illumination source without the cooling system already running. The chiller must be the first item turned on before power is applied to the laser rack and kept operating until after the AC lockout/switch is rotated to the off position.

1. Verify the coolant lines are connected correctly.

2. Fill the chiller reservoir with an approved coolant.

3. Turn on the chiller, set the temperature to between 19°C (66°F) to 22°C (71.6°F).

   For more information on how to turn on the chiller, refer to the chiller's product documentation.

4. Check that no leaks exist in the system.

5. Check the coolant level in the reservoir and hoses and top up the coolant as required.

6. Allow the chiller to run until the system is operating with no new bubbles entering the reservoir. Add additional coolant as necessary.

   This typically takes approximately 5 to 10 minutes.

7. Power on the laser illumination source:

   • Local operation— Rotate the main AC lockout/switch (A) to the ON position and rotate the Power key (B) clockwise to the ON position.

- Remote operation—Rotate the main AC lockout/switch (A) to the ON position and rotate the Power key (B) counter clockwise to the REM (remote) position. From the automation device, turn on the laser illumination source (by closing circuits 8/9 from the J33 wire).

The Interlock status indicator (C) on the laser illumination source turns yellow.
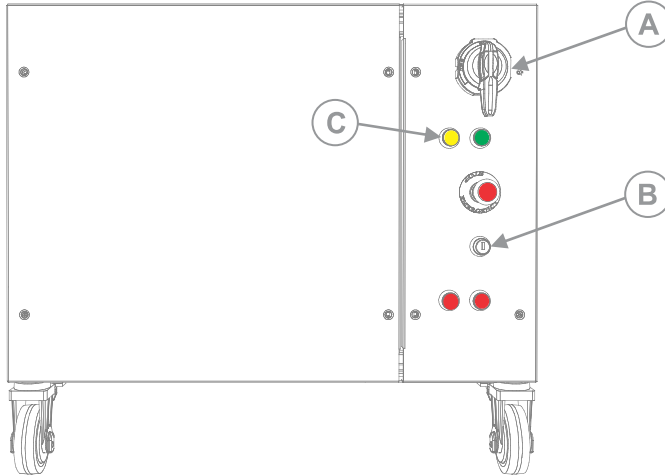
8. On the projector beside the AC inlet, move the AC breaker/switch to the ON position.

   The projector boots into standby mode after approximately 30 seconds. If the projector is properly connected, the light on the back of the projector should be yellow.
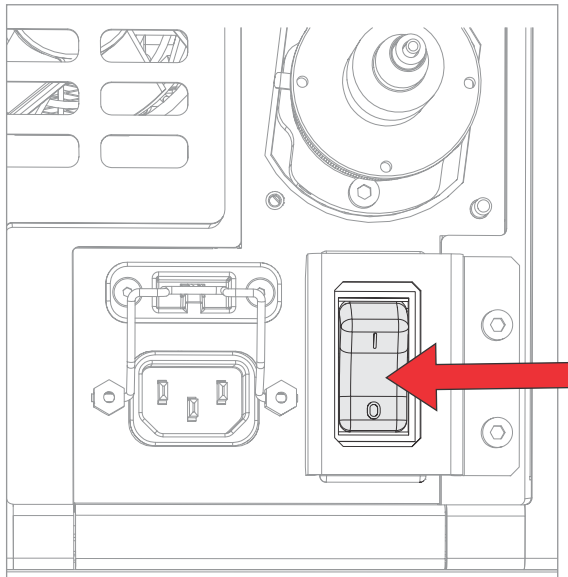
9. Once the projector is in standby, on the projector keypad or the projector remote, press and hold the power ⏻ button until you hear a beep.

   The projector can also be turned on using the web user interface. After a few seconds, the projector moves to the on state, causing the yellow light on the laser illumination source to turn off. The laser is ready to be turned on but no illumination occurs until the green button is pressed and the lasers have warmed up.

10. Turn on the lasers:

- Local operation— On the laser illumination source, press the green **Start** button (D). This illuminates the green (button) light and the yellow light goes out.

- Remote operation—From the automation device, turn on the lasers with a 500ms contact closure of circuits 21/22 on the J33 wire. This illuminates the green (button) light and the yellow light goes out.

The two Emission status indicators (E) turn red. When the lasers are warmed up and the projector is ready, the shutter automatically opens and you can display an image (use test pattern if no source image is connected).

On the projector, the **Status** > **Laser Info** > **Laser Bank State** menu displays the message "Warming Up". When that message disappears, the lasers are ready. It typically takes the lasers approximately 10 to 15 minutes to warm up when turning on the first time from the off position. This could be longer if the start-up temperatures are approaching minimum or maximum temperatures for operation. The projector will operate with the shutter closed until the lasers are warmed up.

Turning on the system

After the system has been initiated for the first time, not all steps need to be performed when subsequently turning on the system.

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

- SHOCK HAZARD! Do not attempt operation if the AC supply is not within the specified voltage and current, as specified on the license label.

Never run the laser illumination source without the cooling system already running. The chiller must be the first item turned on before power is applied to the laser rack and kept operating until after the AC lockout/switch is rotated to the off position.

1. Check the coolant level and if the coolant level is low, check for leaks.

   It is expected to see periodic evaporation of the fluid in the system. Do one of the following:

   - If no leak exists, **only** add distilled water (not drinking water).

   - If a leak exists, after the leak is repaired, add premixed coolant at the recommended 2:1 ratio.

> Never add premix coolant to a system that does not have a leak as only the water in the system evaporates over time. If coolant is added instead of distilled water, the correct concentration of the ratio of coolant to water (80/20) becomes too concentrated and overheating problems occur.

2. Turn on the chiller.

   For more information on how to turn on the chiller, refer to the chiller's product documentation.

3. Turn on the laser illumination source: On the laser illumination source, rotate the main AC lockout/switch (A) to the on position and rotate the Power key (B) clockwise to the on position.

   - Local operation— Rotate the main AC lockout/switch (A) to the ON position and rotate the Power key (B) clockwise to the ON position.

   - Remote operation—Rotate the main AC lockout/switch (A) to the ON position and rotate the Power key (B) counter clockwise to the REM (remote) position. From the automation device, turn on the laser illumination source (by closing circuits 8/9 from the J33 wire).

   The Interlock status indicator (C) on the laser illumination source turns yellow.
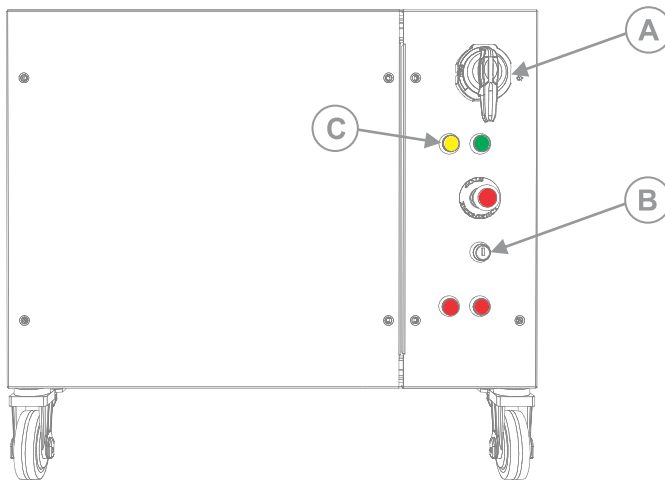
4. If the breaker is off, on the projector beside the AC inlet, move the AC breaker/switch to the on position.

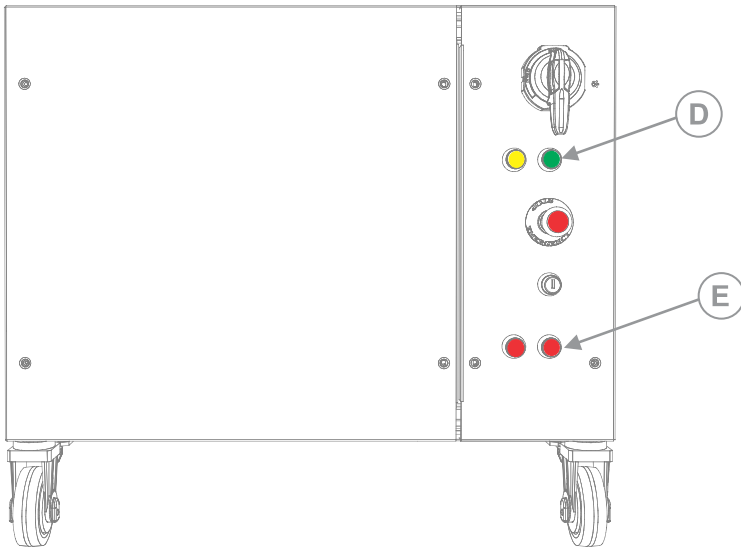   The projector boots into standby mode after approximately 30 seconds.
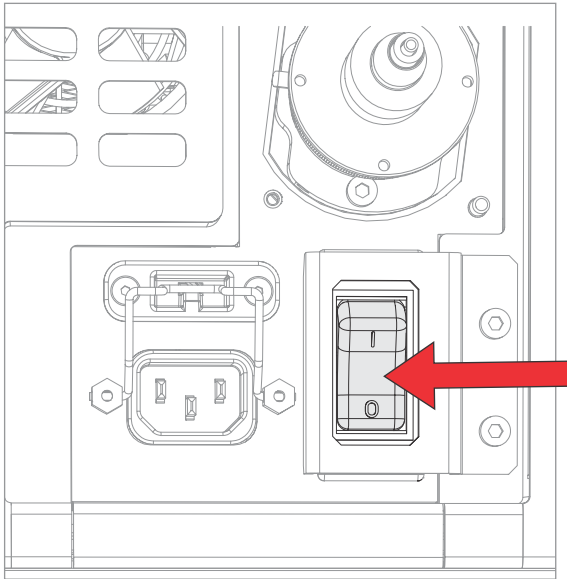
5. Once the projector is in standby, on the projector keypad or the projector remote, press and hold the power ⏻ button until you hear a beep.

    The projector can also be turned on using the web user interface. After a few seconds, the projector moves to the on state, causing the yellow light on the laser illumination source to turn off. The laser is ready to be turned on but no illumination occurs until the green button is pressed and the lasers have warmed up.

6. Turn on the lasers:

    *   Local operation— On the laser illumination source, press the green **Start** button (D). This illuminates the green (button) light and the yellow light goes out.

    *   Remote operation—From the automation device, turn on the lasers with a 500ms contact closure of circuits 21/22 on the J33 wire. This illuminates the green (button) light and the yellow light goes out.

    The two Emission status indicators (E) turn red. When the lasers are warmed up and the projector is ready, the shutter automatically opens and you can display an image (use test pattern if no source image is connected).

On the projector, the **Status** > **Laser Info** > **Laser Bank State** menu displays the message "Warming Up". When that message disappears, the lasers are ready. It typically takes the lasers approximately 10 to 15 minutes to warm up when turning on the first time from the off position. This could be longer if the start-up temperatures are approaching minimum or maximum temperatures for operation. The projector will operate with the shutter closed until the lasers are warmed up.

Turning off the system

Learn how to turn off all components of the Mirage SST system: projector head, laser, and chiller.

> When powering off in preparation for inspection or maintenance, always disconnect from AC.

1. To turn the light source off using the projector keypad or remote, press and hold the ⏻ button until you hear a beep.

   The projector can also be turned off with the web user interface. Always allow the projector to complete the 10 minute cool down cycle before power is turned off at the breaker or unplugged or projector damage could occur.

2. Turn off the laser illumination source:

   - Local operation— On the laser illumination source, rotate the Power key (B) counter clockwise to the OFF position and, if required, after 10 seconds rotate the main AC lockout/switch (A) to the OFF position.

   - Remote operation—From the automation device, turn off the laser illumination device. By opening the circuits 8/9 on the J33 connector wire, it is not necessary on the laser rack to turn the main AC lockout/switch (A) to the OFF position.

   > The main AC lockout/switch (A) does not need to be turned off. If the lockout is in the ON position, you may hear a dehumidifier operating. This is normal. Christie recommends, if possible, to keep the chiller operating for 10 minutes after the laser AC lockout/switch (A) has been rotated to the OFF position.
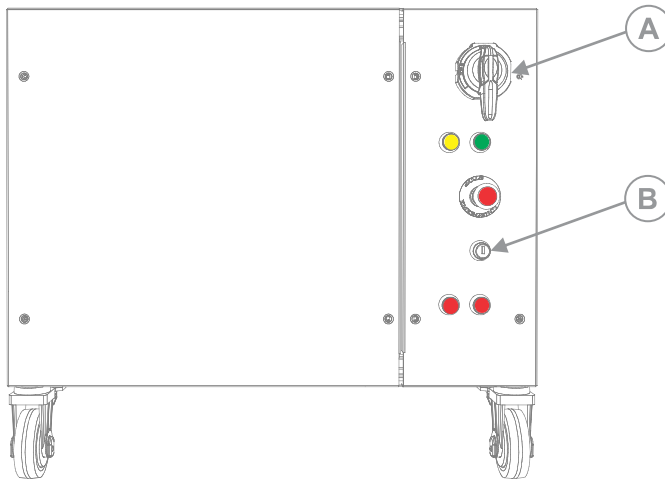
For more information on the chiller operation, refer to the chiller's product documentation.

Projector LED status indicators

Identify the LED state colors and meaning.

LED	State		Description
Blue	Solid	Standby	Light source is off. Video electronics are off. Projector status is OK.
	Flashing	Cool down	Projector is moving to one of the two standby states: • Light source is off and video electronics are booting up. • Light source is off. Video electronics and light source is cooling down.
Green	Solid	Light source on	Light source is on. Projector status is OK.
	Flashing	Startup	Projector is moving to light source on state. Light source is warming up. Video electronics are initializing.
Yellow	Solid	Warning in standby	Projector is in standby state. A problem exists with the projector that does not prevent it from operating.
	Flashing yellow/green	Warning during startup	Projector is in a startup state. A problem exists with the projector that does not prevent it from operating.
	Flashing	Warning with light source on	Light source is on. A problem exists with the projector that will not cause it to shut down.
	Flashing yellow/blue	Warning during cool down	Projector is in a cool down state. Light source is off. Video electronics and light source are cooling down. A problem exists with the projector that does not prevent it from operating.

LED	State		Description
Red	Solid	Error in standby	Projector is in standby. An error exists that prevents the projector from starting up.
	Flashing	Error	An error with the projector exists during startup, cool down, or when the light source is off. Projector will proceed to shut down.
Off		AC off	The AC power is off.

Projector LED shutter indicators

Identify the shutter LED state colors and meaning.

LED	State	Description
Solid magenta	Shutter closed	The shutter is closed. In standby, the shutter is always automatically closed and the magenta light is muted.
Off	Shutter open	The shutter is open.

Calibrating the lens motor

Ensure the lens motor is calibrated before using the projector.

If the lens motors are not calibrated properly, implications may include:

- Incorrect reporting of the lens motor position.
- Inability to use the full range of the lens motors.
- Lens motors traveling outside of the pre-defined keep-out area.
- Damage to the projector.

Calibrate the lens motors when any of the following conditions are met:

- After a lens change.
- After the projector is moved and/or jostled.
- After any manual adjustment is made to the zoom or focus.

To calibrate the lens:

1. Select **MENU** > **Configuration** > **Lens Settings** > **Lens Calibration**.
2. Select **Enter**.

Removing the projection lens

Use the correct method of removing the lens.

1. Turn off the lasers.
2. Push in and hold the lens release button.
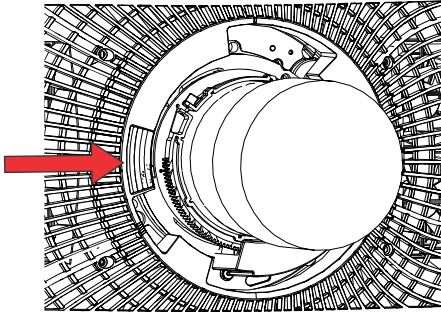
3. Turn the lens counterclockwise until the lens guides are aligned.

4. Slide the lens straight out of the projector.

   If the lens does not slide out easily, reset the lens offset before removing the lens.

5. Attach the lens cap to avoid damage.

> ⚠️ **Warning!** If not avoided, the following could result in death or serious injury.
>
> • Once the lens removal has begun the safety retention features of the lens are defeated. To re-engage the safety lock mechanism, the lens must be removed and re-inserted, or fully rotated clockwise until a click is heard.
>
> • Packaging tape is required to ensure safe shipment of the projection lens to restrain the zoom ring from rotating during shipping.

Aligning the image

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

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

1. Make sure the projector is positioned in the throw distance range for the particular lens.

2. Display a test pattern.

3. Do a quick preliminary focus and (if available) zoom adjustment with the primary lens.

   Do not worry about consistency across the image at this point, just center focus. It is good practice to have zoom adjustment and focus adjustment in the center of its range.

4. Holding a piece of paper at the lens surface, adjust offsets as necessary until the image is centered within the lens perimeter. A full black field works best for this.

5. If the projector is mounted off center to the screen axis, offset the lens as much as required. Aim the projector over slightly towards the center of the screen, but use caution when doing so, as too much tilt causes excessive keystone distortion.

6. With a framing pattern on screen, double-check projector leveling so the top edge of the image is parallel to the top edge of the screen.

Selecting a test pattern

Many test patterns are available to assist with the configuration of the projector and to diagnose any issues that may occur.

1. From the display panel, use the arrows to select **Test Pattern**.

   You can also select the test patterns from **MENU** > **Test Pattern** or pressing **N** on the IR remote.

2. Scroll through the list of test patterns.

3. Select the required test pattern.

4. To confirm your selection, select **Enter**.

Adjusting offset

Adjust the offset to align the image on the screen. Always adjust offset before adjusting boresight.

> For the best optical performance and minimal keystone, use offsets instead of aiming at the center of the image, in off-axis installations. Avoid extreme tilts or offsets. Corner vignettes on a white test pattern indicate extreme offset that should be avoided using mechanical alignment.

1. Project an image with the primary lens.

2. Select a framing test pattern.

3. Select **LENS OFFSET**.

   You can also select **MENU** > **Configuration** > **Lens Settings** > **Lens Offset**.

4. Use the arrows to adjust the offset to display a square image on the screen, with minimal projector aiming error.

5. To exit to the home page, select **Back**.

Resetting the lens to home position

Realign the lens to the home position after the lens has been offset and out of alignment.

1. Select **LENS OFFSET**.

   You can also select **MENU** > **Configuration** > **Lens Settings** > **Lens Offset**.

2. To reset the lens to the default home position, select **Enter**.

3. To confirm the reset, select **OK**.

Adjusting boresight

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

> ⚠ **Caution!** If not avoided, the following could result in minor or moderate injury.
>
> - Do not look directly into the lens when the light source is on. The extremely high brightness can cause permanent eye damage.

1. Close the shutter on the projector.

2. Unlock the three lens mount stabilization screws.
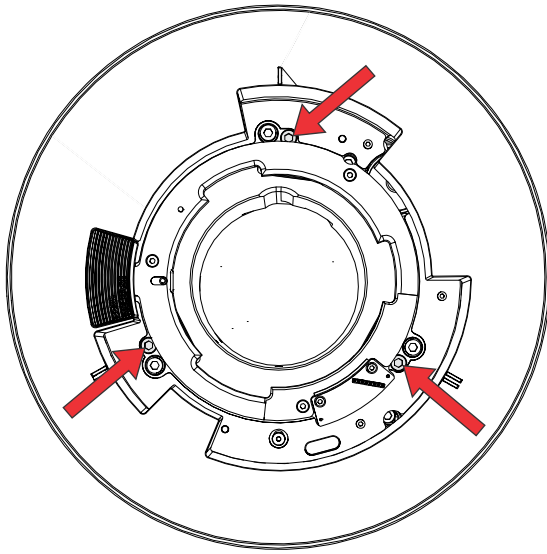
3. Open the shutter.

4. From the Test Pattern menu, select the **Boresight** test pattern.

   The Boresight test pattern assists with adjusting the boresight for the three focus points.
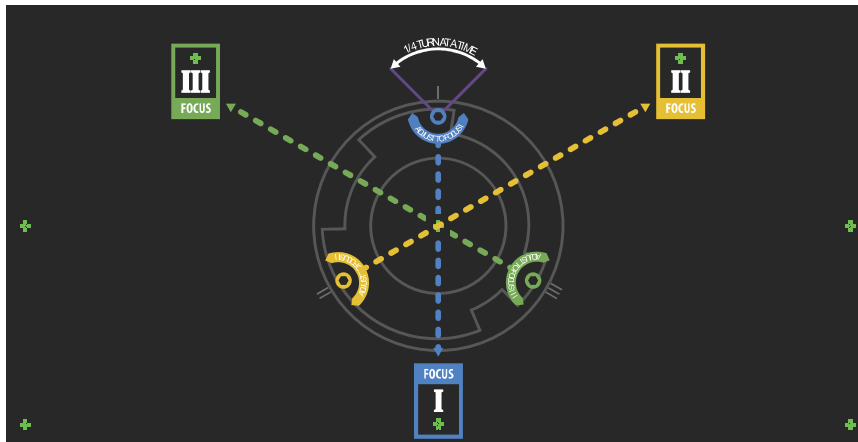
5. To focus the bottom boresight guide, adjust the blue boresight screw.

   Adjust the screw 1/4 turn. If you get to the end, further unlock the corresponding stabilization screw.
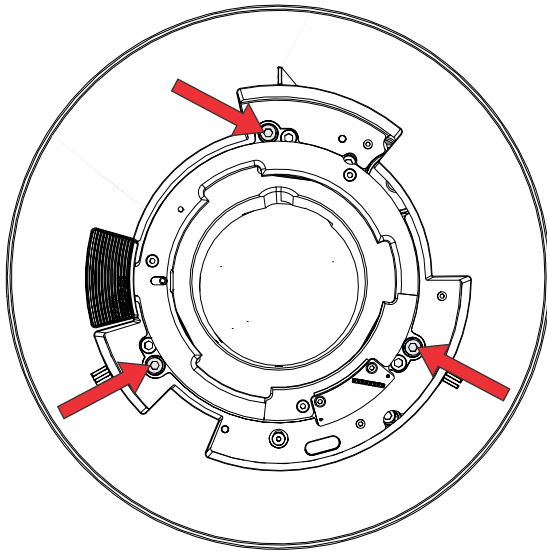
6. To focus the right boresight guide, adjust the green boresight screw.

7. To focus the left boresight guide, adjust the yellow boresight screw.

8. To continue to refine the focus, repeat steps 5 to 7.

9. Before adjusting the stabilization screws, close the shutter.

10. To maintain the adjustments, lock the stabilization screws.

    When locking the screws, start with the top stabilization screw and turn it so it just touches the base. Repeat for the other two stabilization screws. Continue to adjust the locking screws until they are tight.

11. Open the shutter.

Adjusting the fold mirror

Fold mirror adjustment must be completed by trained personnel.

> **Notice.** If not avoided, the following could result in property damage.
>
> • Misalignment of the fold mirror may cause permanent damage to the product.

1. Set the projector to minimum power.

2. From the Test Pattern menu, select the **Integrator Rod** test pattern.

3. Loosen the four screws securing the optics-side cover and remove it.

4. Unlock the fold mirror screws to unlock the adjustment knobs.
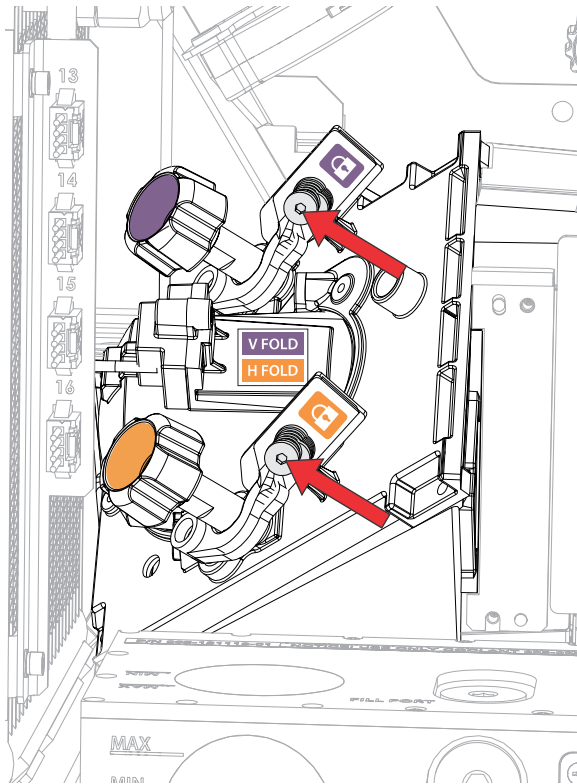
5. To make horizontal adjustments, use the orange knob labeled Horizontal.

6. To make vertical adjustments, use the purple knob labeled Vertical.
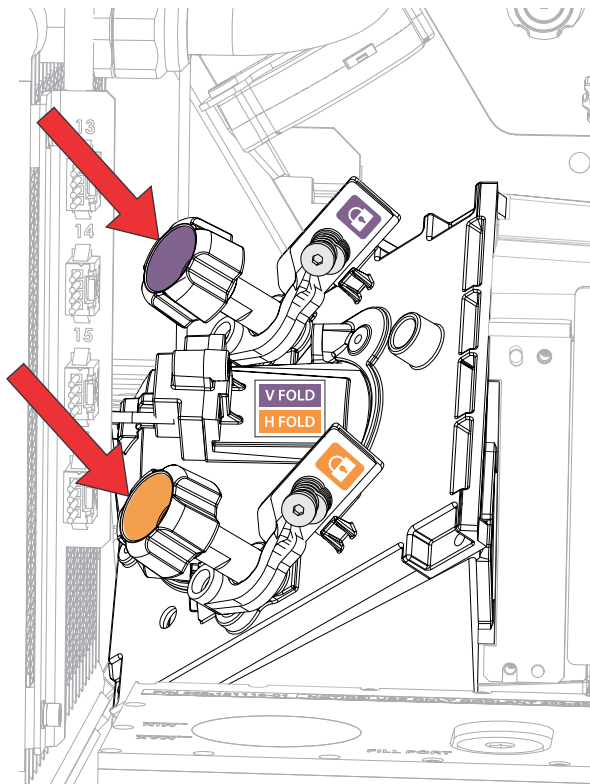
7. To continue to refine the fold mirror adjustment, repeat the horizontal and vertical adjustments.

8. Lock the fold mirror screw to lock the adjustment knobs.

9. Once satisfied with the alignment, increase the projector power.

Optimizing the integrator zoom and focus

Learn how to optimize the integrator zoom and focus.

1. From the Test Pattern menu, select the **Integrator Rod** test pattern.
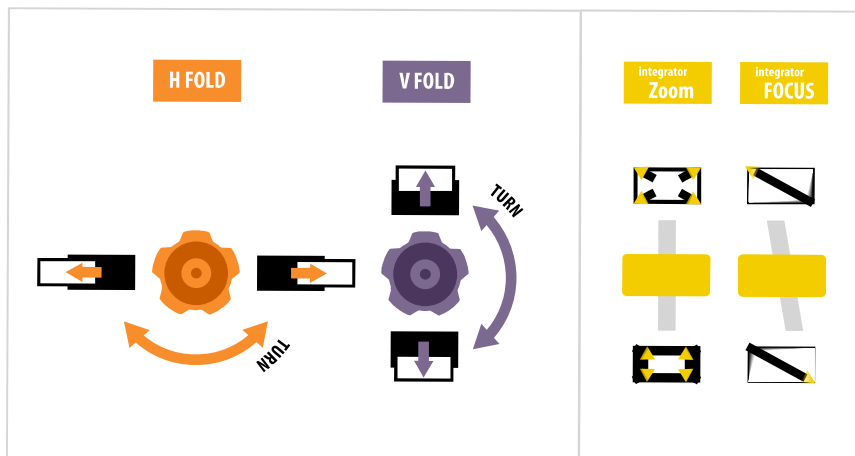
2. Loosen the four screws securing the optics-side cover and remove it.

3. Unlock the Zoom and Focus paddles.
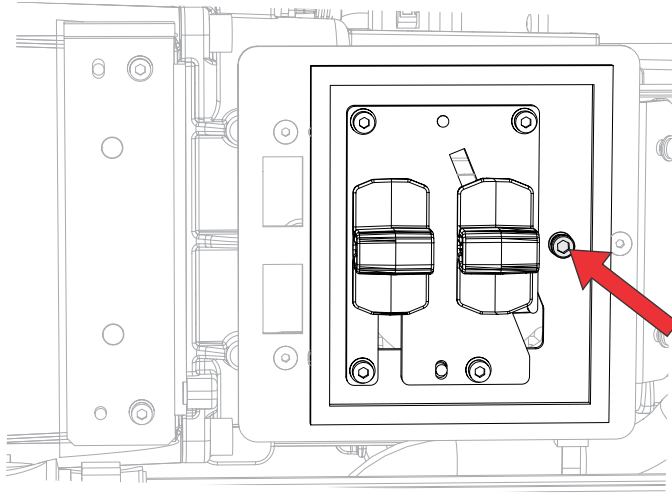
4. Adjust the magnification using the Zoom paddle.
    Make sure you do not see any corners.
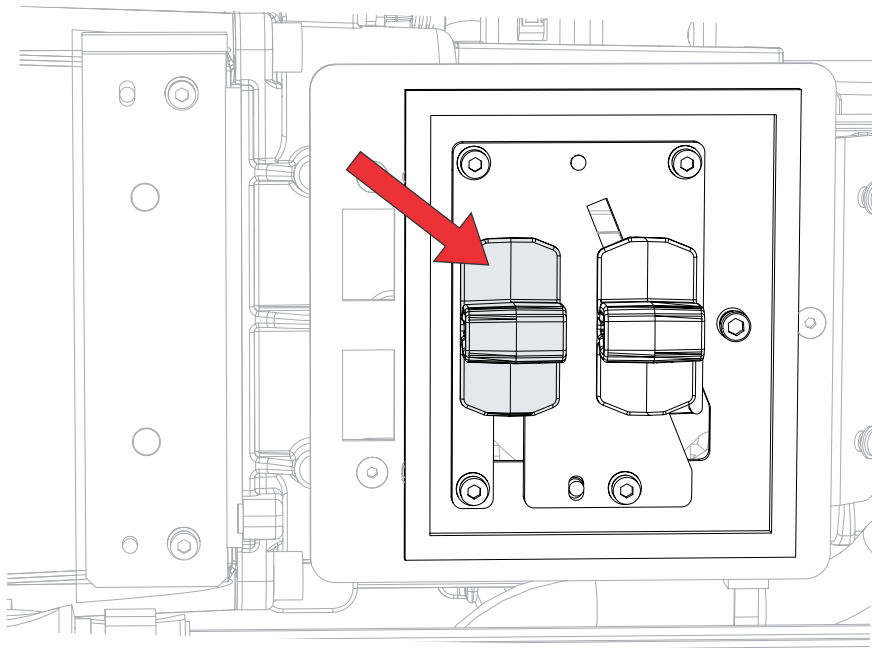
5. Adjust the focus using the Focus paddle.
    Always focus the center of the image first and then make sure no blurry edges exist.
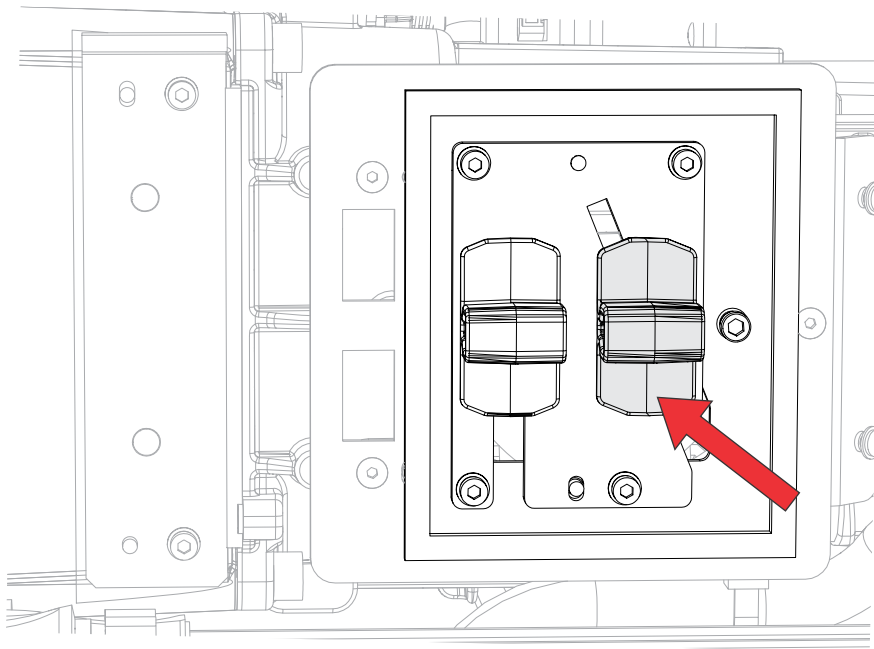
6. To continue to refine the zoom and focus, repeat steps 4 and 5.

7. When complete, lock the Zoom and Focus paddles.

Adjusting DMD convergence

A convergence problem occurs when one or more projected colors (red, green, and blue) appears misaligned when examined with a convergence test pattern.

The three colors should overlap to form pure white lines throughout the image and one or more poorly converged individual colors may appear adjacent to some or all of the lines.

When adjusting the convergence, you are adjusting red and green to blue.

1. From the Test Pattern menu, select the **Convergence** test pattern.
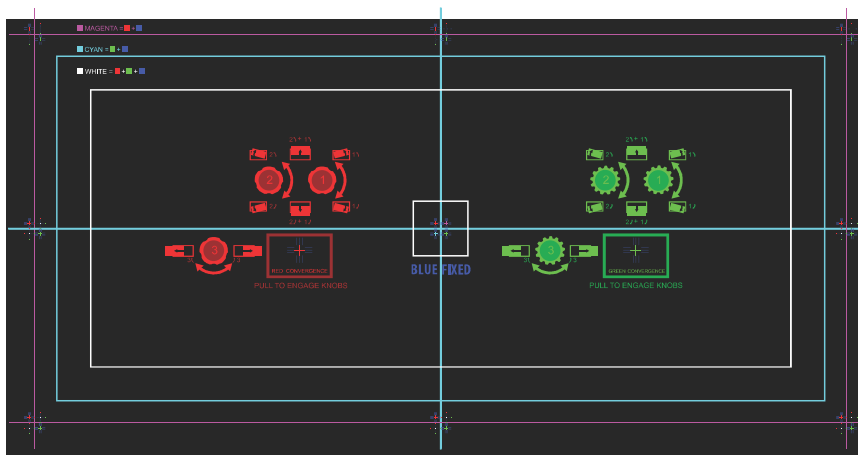
2. Loosen the four screws securing the optics-side cover and remove it.

3. To adjust the convergence knobs, use the 3 mm tool included with the projector.

If adjusting by hand without using the tool, pull out the convergence adjustment knobs to engage them.
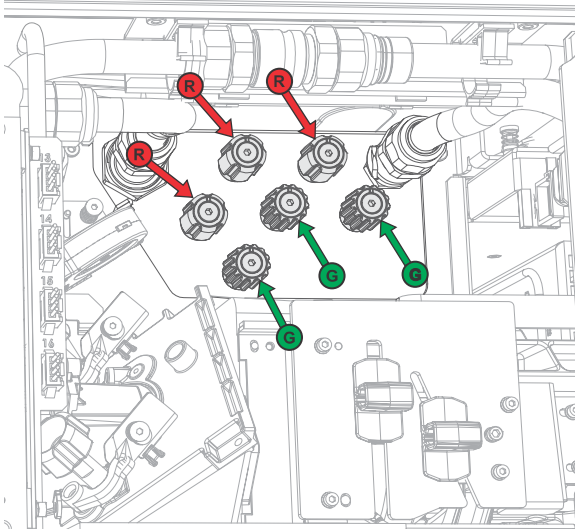
4. Use the **Convergence** test pattern to assist with adjusting the horizontal and vertical lines.

   Vertical convergence and rotation is done by adjusting two knobs. 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.

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

Aligning the image with lens zoom and focus

The lens zoom and focus adjustment allows the projected image to be focused and shifted to align with the screen.

1. Display an image or test pattern that can be used to analyze image focus and geometry.
2. Select **ZOOM**.
3. Use the up and down arrows to zoom in or out of the image.
4. To exit, select **Back**.
5. Select **FOCUS**.
6. Use the up and down arrows to adjust the focus of the image.
7. To exit, select **Back**.
8. To refine your adjusts, repeat steps 2 to 7.

Running Auto Setup to optimize display settings

Auto Setup initiates an automated process in which the projector optimizes video settings for the active signal. Auto Setup helps to save time in perfecting a display and you can modify the adjustments as required.

1. Make sure of the following before running Auto Setup:

- *Test patterns are turned off* (on page 49).
  - The active signal is valid.
2. From the remote, select **Auto Signal** or from the web UI, select **Auto Setup**.
3. Select **Run Auto Setup**.
   The system optimizes the active signal and displays a progress message on screen.

Configuring Mirage SST to work with Christie Link

Configure Mirage SST to work with Christie Link, which provides a fully integrated fiber solution for long range video transport.

1. Turn on Mirage SST.
2. Verify the HBMIC has been installed in slot 0.
3. To enable the Christie Link option, select **MENU** > **Configuration** > **Input Settings** > **Enable Christie Link (Slot 0)**.
   This option is disabled if an HBMIC is not installed.
4. Select **Enter**.
5. Select the QSFP+ option as the input setting.
   a) From the side panel home page, select **Input**.
   b) On the Input selection page, select the appropriate input marked **Christie Link**.
      More than one input source may be listed as **Christie Link**, depending on how many signals are being sent from Christie Link. For example, 0-1, 0-2, and so on, where 0 is the slot number.

Related information

Performing initial system start-up (on page 40)
Turning on the system (on page 42)

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.

Connecting devices and establishing communication

Learn how to connect external devices to the projector.

Communication and input ports are located on the projector side input panel (operator side). The image below shows an example of the video option card slot numbers and the IMXB panel; your panel may look different.

Video sources can be connected to either the ports on the video option cards or the Ethernet Laser Rack port on the IMXB.
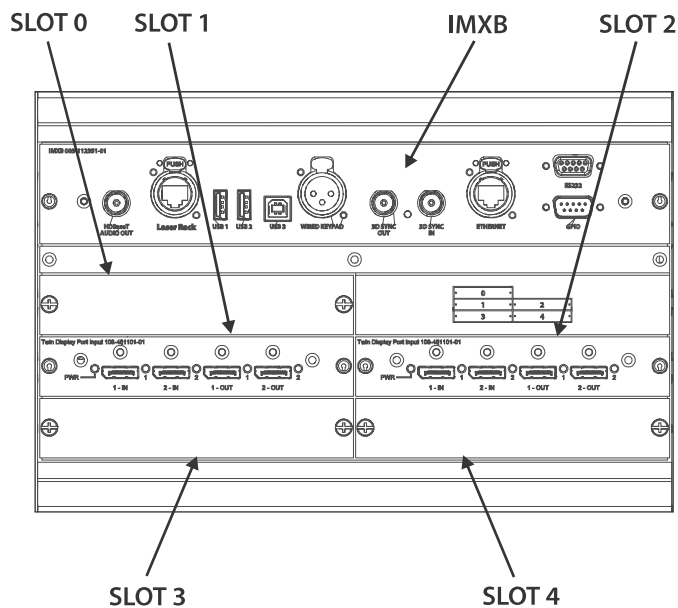
IMXB ports

The IMXB has a variety of ports that can be used for control, 3D sync, upgrading, retrieving interrogators, and connecting audio.
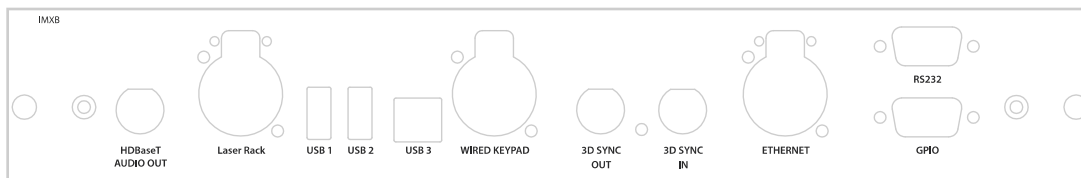
Port	Description
Audio Out	Not supported.
Laser rack	Provides the Ethernet connection to the light source.
USB 1/USB 2	Connects a USB flash drive that has been formatted with a FAT32 file system. Can be used for upgrades, backups, restores,a nd interrogators.
USB 3	For manufacturing use only.
Wired Keypad	Physically connects a remote control to the projector.
3D Sync In/3D Sync Out	Supported for 3D-enabled projectors.
Ethernet	Connects to the web user interface and can send Christie serial commands.
RS232	Sends Christie serial commands using a standard RS232 serial cable.
GPIO	Provides a method for controlling the projector using electrical signals.

Connecting a video source using 3G input card

The 3G input card (3GIC) accepts digital video data from HD and 3G-SDI (Serial Digital Interface) sources.

Part number: 108-313101-02+
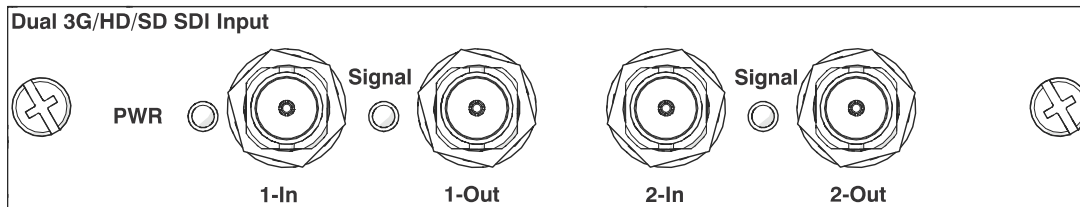
This card may or may not be included with your model. Standard inputs are subject to change.

Connecting a video source using DVI

The Dual Link DVI input card (DDIC) accepts digital video source from DVI sources. It does not support incoming analog signals.

Part number: 108-312101-XX
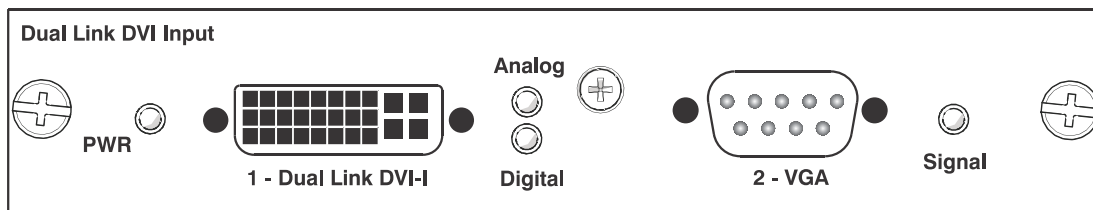
This card may or may not be included with your model. Standard inputs are subject to change.

Connecting a video source using DisplayPort

The Twin DisplayPort input card (TDPIC) or QDPIC card accepts digital video data from the DisplayPort sources.

Part number: 108-451101-XX (TDPIC)
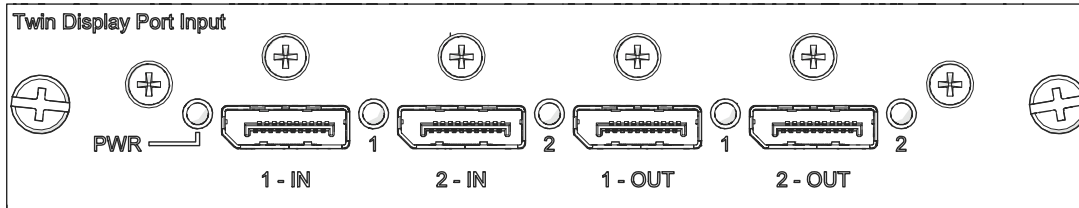
This card may or may not be included with your model. Standard inputs are subject to change.

Connecting a video source using HDMI

The Twin HDMI input card (THIC) accepts digital video data from HDMI sources.

Part number: 108-311101-XX
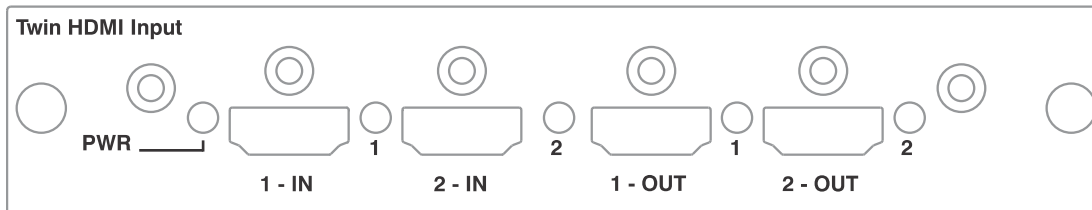
This card may or may not be included with your model. Standard inputs are subject to change.

Connecting a video source using HBMIC

The high bandwidth multi-input card (HBMIC) accepts digital video data from QSFP+, DisplayPort, HDMI, and 12G, 6G, 3G, and HD SDI sources.

Part number: 144-116109-XX
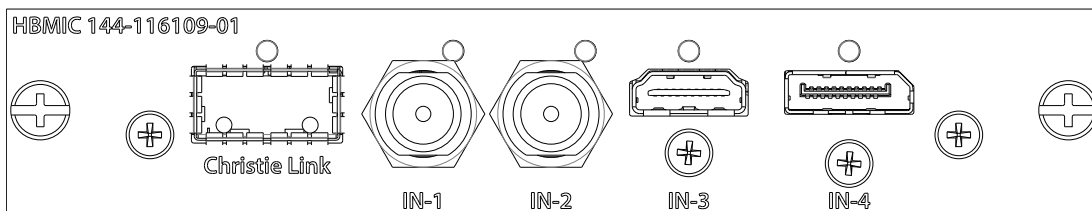
Connecting a video source using TSIC

The Terra SDVoE (TSIC) input card accepts digital video data from a Christie Terra Transmitter.

Part number: 144-132107-XX

Input configuration	Description	Requirements
One-Port	Enables a connection from an SDVOE source (such as the Christie Terra Transmitter) and routes it to the backplane interface. Refer to the signal chart for more information about what resolution, frame rates, and formats are supported based on the projector the card is installed in.	1 TSIC card
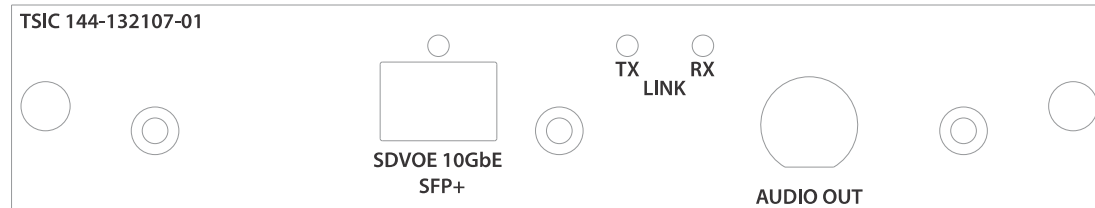
This card may or may not be included with your model. Standard inputs are subject to change.

Selecting a video source

After connecting a video source to the projector and making sure your port configuration is correct, you must select it.

1. From the display panel, select **INPUT**.

2. Navigate the list of input selections until you find a selection that best matches your configuration.

   The range of available input selections depends on the projector model and/or input/output combinations. When the Default configuration is selected, the following inputs are supported for each configuration:

   • One-port—HDMI, SDI, DisplayPort, Christie Link, HDBaseT

   • Two-port—DisplayPort, Christie Link

   • Four-port quadrants—SDI

   • One-port dual-input 3D (3D license-specific)—SDI, DisplayPort, Christie Link

   When SDVoE is selected, the HDMI, SDVoE, Christie Link, and HDBaseT inputs are supported for the one-port configuration.

3. To select the input, select **Enter**.

Connecting to a computer or server

Communicate with a remote computer, server, or an existing network using a RJ-45 cable.

The RS232 port located on the IMXB faceplate uses the Christie proprietary protocol and is intended for Christie accessories or automation controllers only.

For more information, on the serial commands, see the *Mirage SST Serial Commands Guide (P/N: 020-103005-XX)* .

1. Use an RJ-45 cable to connect the Ethernet hub or switch to the Ethernet port, located on the projector IMXB faceplate.

2. When using the Christie serial protocol over Ethernet, connect to port 3002.

3. For applications or equipment using serial communications, use the Christie proprietary serial protocol to communicate with the RS232 port on the IMXB faceplate.

Configuring the RS232 port

Configure the RS232 port to send Christie serial commands using a standard RS232 serial cable.

For more information, on the serial commands, see the *Mirage SST Serial Commands Guide (P/N: 020-103005-XX)* .

1. Select **Menu** > **Communications** > **Projector Communication**.
2. Use the down arrow to select **Baud Rate**.
3. Select the appropriate baud rate and select **Enter**.
4. Use the down arrow to select **Network Routing**.
5. Select the type network routing appropriate for your projector and select **Enter**.

Setting up the Ethernet

Ethernet is set up to obtain an IP address automatically if a DHCP server is on the network, modify IP settings, or manually enter an address.

> You cannot change the IP settings using the web interface. Only connect external networks to the external Ethernet port on the IMXB, not the laser rack RJ45.

1. From the display panel, use the arrow keys to select **IP Settings**.
2. To set the type of network, select **DHCP** or **Static**.
3. If you selected Static, manually enter the network information for the **IP Address**, **Subnet**, and **Gateway**.
4. Select **Apply** and select **Enter**.
5. Select **MENU** > **Communications** > **Network Settings**.
6. Select **Device name**.
7. Use the up and down keys to enter the name of the projector.
8. Select **Enter**.

3D setup

The projector is capable of displaying stereoscopic 3D video sources, relying on additional hardware (stereo emitters and glasses) to complete the display system.

Images generated from a stereo 3D video source consist of a series of images (frames) that alternate quickly between two slightly different viewpoints, corresponding to our left and right eyes. When these frames are displayed fast enough and viewed with special glasses synchronized to the left/right (L/R) changes, the resulting image appears with the same depth and perspective sense in the real world.

> The type of 3D glasses can be active or passive stereo depending on the type of stereo controllers and screen used.

3D requirements

Stereo 3D applications require a stereo 3D-capable source, special hardware and software setups, and the projector's 3D Settings menu option to control the projector's processing, synchronization, and displaying of the stereoscopic 3D source material.

Hardware requirements

Understand the hardware requirements for stereo 3D applications.

- Mirage SST projector
- 3D stereo sync cable for direct-input 3D (and frame doubled)
- A source, usually a computer with a 3D graphics card(s)
- Emitter for controlling active shutter glasses

  or

  A qualified device that mounts in front of the lens of the projector to process the light from the lens into a passive polarized light. Contact your Immersive dealer for more information.

Software and content requirements

Understand the software and content requirements for stereo 3D applications.

- Any 3D computer software that supports 3D stereo on a supported computer(s) with associated graphic cards (suggested cards include ATI or NVIDIA)
- A video stream from a video source prepared to be sequential content (for direct-input 3D) or two video streams from a video source that has been prepared to be supplied left eye and right eye concurrently and frame locked (dual-input 3D)

3D system timing

The projected video must be optimized for the glasses' shutter speed or polarization filter performance to prevent obvious "ghosting" of the video content (known as cross-talk in stereo 3D applications) or other more subtle color artifacts.

Visual performance can be optimized by adjusting the Dark Interval and the 3D Sync Delay settings. Consult the documentation for your glasses or polarization filter and keep their specifications in mind when configuring the projector for 3D operation.

3D input video configurations

The stereo 3D input video stream may be supplied from the video server to the projector in two configurations: direct-input 3D or dual-input 3D.

Configuration	Description
Direct-input 3D	In this configuration a single video stream is provided by the video server, with the left eye and right eye frames supplied as alternate frames within the video stream. A 3D input sync may be used to identify the left eye frames.
	The direct-input 3D video stream may be supplied by either a Four-Port input video configuration (such as four cables each supplying one quadrant of the image) or an One-Port input video configuration (such as one cable supplying the entire frame).
Dual-input 3D	In this configuration two video streams are provided by the video server, with the left eye supplied by one stream and the right eye supplied by the other. The video streams are frame locked and supplied concurrently.
	The dual-input 3D video streams may be supplied by either two Four-Port input video configurations (such as four cables each supplying one quadrant of the image for each eye, with a total of eight cables) or two One-Port input video configurations (such as one cable supplying the entire frame for each eye, with a total of two cables).

Setting up a single projector to display 3D content

The projector must be installed correctly to display 2D content (optically aligned, focused, and so on) before completing the following steps to display the 3D content.

1. *Enable 3D mode* (on page 64).
2. *Confirm the emitter setup* (on page 65).
3. *Configure the projector for the 3D source* (on page 65).

Enabling 3D mode

Select the mode for your 3D operation.

1. To enable 3D mode, select **MENU** > **Image Settings** > **3D Settings** > **3D Mode**.
2. Select the appropriate 3D mode:
   - Off—Disable the 3D operation.

- Auto Detect—Automatically determine which 3D mode to use based on auxiliary video data, for example, HDMI info frame.
- Multi-Flash 3D—Display content multiple times to provide a 3D image.

Confirming the emitter setup

Define whether the 3D Sync is output and control how it is processed.

1. To set the 3D output to emitter, select **MENU** > **Image Settings** > **3D Settings** > **3D Sync Output**.
2. Select **To Emitter**.
3. Select **Enter**.
4. To enable the 3D test pattern, select **3D Test Pattern**.
5. Select **Enter**.
6. To configure the dark interval so the amount of dark time aligns with the amount of time required for the glasses to switch, select **Dark Interval**.
7. Adjust the slider or enter the dark interval value as required.
8. To confirm your selection, select **Enter**.
9. View the displayed test pattern. If you can see both Ls and Rs with both eyes, increase the dark interval until the Ls are only visible to the left eye and the Rs are only visible to the right eye.
10. Optionally, to adjust the 3D Sync delay, select **3D Sync Delay**.

    This adjusts the timing of the sync pulse in relation to the dark time transition on the DMDs. Use the default value of 0 as a starting point.
11. Adjust the slider or enter the delay value.
12. To confirm your selection, select **Enter**.

Configuring the projector for the 3D source

Configure the projector for the 3D source.

1. Select the appropriate port configuration and then set the *inputs for your video source* (on page 61).
2. To select the correct EDID timing, select **MENU** > **Configuration** > **Input Settings** > **EDID Timing**.
3. Select the required EDID timing and select **Enter**.
4. Connect all the required cables between the 3D source and the projector.
5. Configure your 3D source.

Connecting devices to the 3D sync ports

The 3D Sync Input and Output ports located on the IMXB faceplate provide a convenient method for interfacing the projector to the 3D stereo projection system.

Connect the 3D Sync Input to the video source for synchronization of the left eye/right eye frames of Direct input 3D or for frame doubled content.

The 3D Sync Input is not required for Dual-Input 3D. The 3D Sync Output is available for control of an IR Emitter for active glasses or a polarization device for passive glasses.

Regulatory

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

Safety

- ANSI/UL 60950-1 – Information Technology Equipment – Safety – Part 1: General Requirements
- CAN/CSA C22.2 No. 60950-1-07 – Information Technology Equipment – Safety – Part 1: General Requirements
- IEC/EN 60825-1 – Safety of Laser Products – Part 1: Equipment Classification and Requirements
- IEC/EN 60950-1 – Information Technology Equipment – Safety – Part 1: General Requirements
- IEC/EN 62471-5 – Photobiological Safety of Lamps and Lamp Systems – Part 5: Image projectors

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/EN61000-3-3: Limitations of Voltage Changes, Voltage Fluctuations, and Flicker input current ≤ 16 A

Immunity

- CISPR 24/EN55024 EMC Requirements – Information Technology Equipment

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).

Signal connectivity specifications for

Identify the signal connectivity specifications for .

The list of formats listed below are not exhaustive and other formats may be supported. For more information, contact Christie Technical Support.

For a list of supported Christie Link video formats, see the *Christie Link User Manual (P/N: 020-102234-XX)*.

HBMIC video formats

Identify the video formats for the HBMIC card.

DisplayPort 1.2

This interface supports HDCP 1.x.

	Format	Hres	Vres	Frame rate (Hz)	Sampling	Bit-depth
HD	1280x720	1280	720	24, 25, 30, 50, 60, 120	RGB/4:4:4	8/10/12bpc
	1920x1080	1920	1080	24, 25, 30, 50, 60, 120	RGB/4:4:4	8/10/12bpc
	2048x1080	2048	1080	24, 25, 30, 50, 60, 120	RGB/4:4:4	8/10/12bpc
4K	3840x2160	3840	2160	24, 25, 30, 50, 60	RGB/4:4:4	8/10bpc
	4096x2160	4096	2160	24, 25, 30, 50, 60	RGB/4:4:4	8/10bpc

HDMI 2.0

This interface supports HDCP 1.x and 2.2.

	Format	Hres	Vres	Frame rate (Hz)	Sampling	Bit-depth	Notes
HD	1280x720	1280	720	24, 25, 30, 50, 60, 120	RGB/4:4:4/4:2:2	8/10/12bpc	—
	1920x1080i	1920	1080	50, 60	RGB/4:4:4/4:2:2	8/10/12bpc	—
	1920x1080	1920	1080	24, 25, 30, 50, 60, 120	RGB/4:4:4/4:2:2	8/10/12bpc	—
	2048x1080	2048	1080	24, 25, 30, 50, 60, 120	RGB/4:4:4/4:2:2	8/10/12bpc	—
4K	3840x2160	3840	2160	24, 25, 30	RGB/4:4:4/4:2:2	8/10/12bpc	4:2:2 12-bit only

	Format	Hres	Vres	Frame rate (Hz)	Sampling	Bit-depth	Notes
	3840x2160	3840	2160	50, 60	RGB/4:4:4	8bpc	—
	3840x2160	3840	2160	50, 60	4:2:2/4:2:0	8/10/12bpc	4:2:2 12-bit only
	4096x2160	4096	2160	24, 25, 30	RGB/4:4:4/4:2:2	8/10/12bpc	4:2:2 12-bit only
	4096x2160	4096	2160	50, 60	RGB/4:4:4	8bpc	—
	4096x2160	4096	2160	50, 60	4:2:2/4:2:0	8/10/12bpc	4:2:2 12-bit only
3D	1280x720	1280	720	60	RGB/4:4:4/4:2:2	8/10/12bpc	Frame-packing, top-and-bottom
	1920x1080	1920	1080	24, 25	RGB/4:4:4/4:2:2	8/10/12bpc	Frame-packing

SDI (HD, 3G, 6G, and 12G-SDI)

A valid SMPTE-352 payload is required for this interface.

	Format	Hres	Vres	Frame rate (Hz)	Sampling	Bit-depth	Notes
HD	1280x720	1280	720	24, 25, 30, 50, 60	4:2:2	10bpc	—
	1920x1080i	1920	1080	50, 60	4:2:2	10bpc	—
	1920x1080	1920	1080	24, 25, 30	4:2:2	10bpc	—
	2048x1080	2048	1080	24, 25, 30	4:2:2	10bpc	—
3G	1280x720	1280	720	24, 25, 30, 50, 60	RGB/4:4:4	10/12bpc	Level-A only
	1920x1080i	1920	1080	50, 60	RGB/4:4:4	10/12bpc	Level-A only
	1920x1080	1920	1080	24, 25, 30	RGB/4:4:4	10/12bpc	Level-A only
	1920x1080	1920	1080	50, 60	4:2:2	10bpc	Level-A only
	2048x1080	2048	1080	24, 25, 30	RGB/4:4:4	10/12bpc	Level-A only
	2048x1080	2048	1080	50, 60	4:2:2	10bpc	Level-A only
6G	1920x1080	1920	1080	50, 60	RGB/4:4:4	10/12bpc	—
	2048x1080	2048	1080	50, 60	RGB/4:4:4	10/12bpc	—
	3840x2160	3840	2160	24, 25, 30	4:2:2	10bpc	—
	4096x2160	4096	2160	24, 25, 30	4:2:2	10bpc	—
12G	3840x2160	3840	2160	24, 25, 30	RGB/4:4:4	10/12bpc	—
	3840x2160	3840	2160	50, 60	4:2:2	10bpc	—
	4096x2160	4096	2160	24, 25, 30	RGB/4:4:4	10/12bpc	—
	4096x2160	4096	2160	50, 60	4:2:2	10bpc	—

TSIC video formats

Identify the video formats for the Terra SDVoE (TSIC) input card.

The TSIC (HDMI 2.0) interface supports HDCP 1.x and 2.2.

	Format	Hres	Vres	Frame rate (Hz)	Sampling	Bit-depth	Notes
HD	1280x720	1280	720	24, 25, 30, 50, 60, 120	RGB/4:4:4/4:2:2	8/10/12bpc	—
	1920x1080	1920	1080	50, 60	RGB/4:4:4/4:2:2	8/10/12bpc	—
	1920x1080	1920	1080	24, 25, 30, 50, 60, 120	RGB/4:4:4/4:2:2	8/10/12bpc	—
	2048x1080	2048	1080	24, 25, 30, 50, 60, 120	RGB/4:4:4/4:2:2	8/10/12bpc	—
4K	3840x2160	3840	2160	24, 25, 30	RGB/4:4:4/4:2:2	8/10/12bpc	4:2:2 12-bit only
	3840x2160	3840	2160	50, 60	RGB/4:4:4	8bpc	—
	3840x2160	3840	2160	50, 60	4:2:2/4:2:0	8/10/12bpc	4:2:2 12-bit only
	4096x2160	4096	2160	24, 25, 30	RGB/4:4:4/4:2:2	8/10/12bpc	4:2:2 12-bit only
	4096x2160	4096	2160	50, 60	RGB/4:4:4	8bpc	—
	4096x2160	4096	2160	50, 60	4:2:2/4:2:0	8/10/12bpc	4:2:2 12-bit only
3D	1280x720	1280	720	60	RGB/4:4:4/4:2:2	8/10/12bpc	Frame-packing, top-and-bottom
	1920x1080	1920	1080	24, 25	RGB/4:4:4/4:2:2	8/10/12bpc	Frame-packing

QDPIC video formats

Identify the video formats for the QDPIC card.

The DisplayPort 1.2 interface supports HDCP 2.2.

	Format	Cables	Hres	Vres	Frame rate (Hz)	Sampling	Bit-depth
HD	1280x720	—	1280	720	24, 25, 30, 50, 60, 120	RGB/4:4:4	8/10/12bpc
	1920x1080	—	1920	1080	24, 25, 30, 50, 60, 120	RGB/4:4:4	8/10/12bpc
	2048x1080	—	2048	1080	24, 25, 30, 50, 60, 120	RGB/4:4:4	8/10/12bpc
4K	3840x2160	—	3840	2160	24, 25, 30, 50, 60	RGB/4:4:4	8/10bpc
	4096x2160	—	4096	2160	24, 25, 30, 50, 60	RGB/4:4:4	8/10bpc
	3840x2160	2x	1920	2160	120	RGB/4:4:4	8/10bpc
	4096x2160	2x	2048	2160	120	RGB/4:4:4	8/10bpc

TDPIC video formats

Identify the video formats for the TDPIC card.

The DisplayPort 1.1a interface supports HDCP 1.x.

	Format	Cables	Hres	Vres	Frame rate (Hz)	Sampling	Bit-depth	Notes
HD	1280x720	—	1280	720	24, 25, 30, 50, 60, 120	RGB/4:4:4	8/10bpc	—
	1920x1080	—	1920	1080	24, 25, 30, 50, 60, 120	RGB/4:4:4	8/10bpc	—
	2048x1080	—	2048	1080	24, 25, 30, 50, 60, 120	RGB/4:4:4	8/10bpc	—
4K	3840x2160	—	3840	2160	24, 25, 30	RGB/4:4:4	8/10bpc	—
	4096x2160	—	4096	2160	24, 25, 30	RGB/4:4:4	8/10bpc	—
	3840x2160	2x	1920	2160	50, 60	RGB/4:4:4	8/10bpc	Cannot use both TDPIC inputs at once; requires two separate TDPICs
	4096x2160	2x	2048	2160	50, 60	RGB/4:4:4	8/10bpc	Cannot use both TDPIC inputs at once; requires two separate TDPICs
	3840x2160	4x	1920	1080	50, 60	RGB/4:4:4	8/10bpc	—
	4096x2160	4x	2048	1080	50, 60	RGB/4:4:4	8/10bpc	—
	3840x2160	4x	1920	1080	120	RGB/4:4:4	8/10bpc	Cannot use both TDPIC inputs at once; requires four separate TDPICs
	4096x2160	4x	2048	1080	120	RGB/4:4:4	8/10bpc	Cannot use both TDPIC inputs at once; requires four separate TDPICs

DDIC video formats

Identify the video formats for the DDIC card. The DVI-D interface supports HDCP 1.x.

	Format	Cables	Hres	Vres	Frame rate (Hz)	Sampling	Bit-depth	Notes
HD	1280x720	—	1280	720	60	RGB/4:4:4	8bpc	Dual-link (120 Hz)

Format	Cables	Hres	Vres	Frame rate (Hz)	Sampling	Bit-depth	Notes
1920x1080	—	1920	1080	24, 25, 30, 50, 60, 120	RGB/4:4:4	8bpc	Dual-link (120 Hz)
2048x1080	—	2048	1080	24, 25, 30, 50, 60, 120	RGB/4:4:4	8bpc	Dual-link (120 Hz)
4K 3840x2160	—	3840	2160	24, 25, 30	RGB/4:4:4	8bpc	Dual-link
4096x2160	—	4096	2160	24, 25, 30	RGB/4:4:4	8bpc	Dual-link
3840x2160	2x	1920	2160	50, 60	RGB/4:4:4	8bpc	Dual-link
4096x2160	2x	2048	2160	50, 60	RGB/4:4:4	8bpc	Dual-link
3840x2160	4x	1920	1080	50, 60, 120	RGB/4:4:4	8bpc	Dual-link (120 Hz)
4096x2160	4x	2048	1080	50, 60, 120	RGB/4:4:4	8bpc	Dual-link (120 Hz)

THIC video formats

Identify the video formats for the THIC card. The HDMI 1.3 interface supports HDMI 1.4a 3D formats and HDCP 1.x.

Format	Cables	Hres	Vres	Frame rate (Hz)	Sampling	Bit-depth	Notes
HD 1280x720	—	1280	720	24, 25, 30, 50, 60, 120	RGB/4:4:4/4:2:2	8/10/12bpc	—
1920x1080i	—	1920	1080	50, 60	RGB/4:4:4/4:2:2	8/10/12bpc	—
1920x1080	—	1920	1080	24, 25, 30, 50, 60	RGB/4:4:4/4:2:2	8/10/12bpc	—
2048x1080	—	2048	1080	24, 25, 30, 50, 60	RGB/4:4:4/4:2:2	8/10/12bpc	—
4K 3840x2160	4x	1920	1080	24, 25, 30, 50, 60	RGB/4:4:4/4:2:2	8/10/12bpc	—
4096x2160	4x	2048	1080	24, 25, 30, 50, 60	RGB/4:4:4/4:2:2	8/10/12bpc	—
3D 1280x720	—	1280	720	60	RGB/4:4:4/4:2:2	8/10/12bpc	Frame-packing, top-and-bottom
1920x1080	—	1920	1080	24, 25	RGB/4:4:4/4:2:2	8/10/12bpc	Frame-packing

3GIC video formats

Identify the video formats for the 3GIC card for HD and 3G-SDI.

Format	Cables	Hres	Vres	Frame rate (Hz)	Sampling	Bit-depth	Notes
HD 1280x720	—	1280	720	24, 25, 30, 50, 60	4:2:2	10bpc	—

	Format	Cables	Hres	Vres	Frame rate (Hz)	Sampling	Bit-depth	Notes
	1920x1080i	—	1920	1080	50, 60	4:2:2	10bpc	—
	1920x1080	—	1920	1080	24, 25, 30	4:2:2	10bpc	—
	2048x1080	—	2048	1080	24, 25, 30	4:2:2	10bpc	—
3G	1280x720	—	1280	720	24, 25, 30, 50, 60	RGB/4:4:4	10/12bpc	Level-A recommended
	1920x1080i	—	1920	1080	50, 60	RGB/4:4:4	10/12bpc	Level-A recommended
	1920x1080	—	1920	1080	24, 25, 30	RGB/4:4:4	10/12bpc	Level-A recommended
	1920x1080	—	1920	1080	50, 60	4:2:2	10bpc	Level-A recommended
	2048x1080	—	2048	1080	24, 25, 30	RGB/4:4:4	10/12bpc	Level-A recommended
	2048x1080	—	2048	1080	50, 60	4:2:2	10bpc	Level-A recommended
3G-4K	3840x2160	4x	1920	1080	24, 25, 30	RGB/4:4:4	10/12bpc	Level-A recommended
	3840x2160	4x	2048	1080	50, 60	4:2:2	10bpc	Level-A recommended
	4096x2160	4x	1920	1080	24, 25, 30	RGB/4:4:4	10/12bpc	Level-A recommended
	4096x2160	4x	2048	1080	50, 60	4:2:2	10bpc	Level-A recommended

Dual-input 3D and HFR 2D

Identify the video formats for the Dual-input 3D and HFR 2D.

One set of cables is required for left-eye and another set is required for right-eye. The output rate depends on the input rate (per eye) as follows:

- 24 Hz signals are triple-flashed resulting in an output rate of 144 Hz.
- 25 Hz signals are triple-flashed resulting in an output rate of 150 Hz.
- 30 Hz signals are double-flashed resulting in an output rate of 120 Hz.
- 60 Hz signals are single-flashed resulting in an output rate of native 120 Hz.

HBMIC

A valid SMPTE-352 payload is required for the SDI interface (HD, 3G, 6G, and 12G-SDI).

	Format	Cables	Hres	Vres	Frame rate (Hz)	Sampling	Bit-depth
HD	1280x720	2x	1280	720	24, 25, 30, 60	4:2:2	10bpc

	Format	Cables	Hres	Vres	Frame rate (Hz)	Sampling	Bit-depth
	1920x1080	2x	1920	1080	24, 25, 30	4:2:2	10bpc
	2048x1080	2x	2048	1080	24, 25, 30	4:2:2	10bpc
3G	1280x720	2x	1280	720	24, 25, 30, 60	RGB/4:4:4	10/12bpc
	1920x1080	2x	1920	1080	24, 25, 30	RGB/4:4:4	10/12bpc
	1920x1080	2x	1920	1080	60	4:2:2	10bpc
	2048x1080	2x	2048	1080	24, 25, 30	RGB/4:4:4	10/12bpc
	2048x1080	2x	2048	1080	60	4:2:2	10bpc
6G	1920x1080	2x	1920	1080	60	RGB/4:4:4	10/12bpc
	2048x1080	2x	2048	1080	60	RGB/4:4:4	10/12bpc
	3840x2160	2x	3840	2160	24, 25, 30	4:2:2	10bpc
	4096x2160	2x	4096	2160	24, 25, 30	4:2:2	10bpc
12G	3840x2160	2x	3840	2160	24, 25, 30	RGB/4:4:4	10/12bpc
	3840x2160	2x	3840	2160	60	4:2:2	10bpc
	4096x2160	2x	4096	2160	24, 25, 30	RGB/4:4:4	10/12bpc
	4096x2160	2x	4096	2160	60	4:2:2	10bpc

QDPIC

The DisplayPort 1.2 interface supports HDCP 2.2.

	Format	Cables	Hres	Vres	Frame rate (Hz)	Sampling	Bit-depth
HD	1280x720	2x	1280	720	24, 25, 30, 60	RGB/4:4:4	8/10/12bpc
	1920x1080	2x	1920	1080	24, 25, 30, 60	RGB/4:4:4	8/10/12bpc
	2048x1080	2x	2048	1080	24, 25, 30, 60	RGB/4:4:4	8/10/12bpc
4K	3840x2160	2x	3840	2160	24, 25, 30, 60	RGB/4:4:4	8/10bpc
	4096x2160	2x	4096	2160	24, 25, 30, 60	RGB/4:4:4	8/10bpc

TDPIC

The DisplayPort 1.1a interface supports HDCP 1.x.

	Format	Cables	Hres	Vres	Frame rate (Hz)	Sampling	Bit-depth	Notes
HD	1280x720	2x	1280	720	24, 25, 30, 60	RGB/4:4:4	8/10bpc	—
	1920x1080	2x	1920	1080	24, 25, 30, 60	RGB/4:4:4	8/10bpc	—
	2048x1080	2x	2048	1080	24, 25, 30, 60	RGB/4:4:4	8/10bpc	—
4K	3840x2160	2x	3840	2160	24, 25, 30	RGB/4:4:4	8/10bpc	Cannot use both TDPIC inputs at

	Format	Cables	Hres	Vres	Frame rate (Hz)	Sampling	Bit-depth	Notes
								once; requires two separate TDPICs
	4096x2160	2x	4096	2160	24, 25, 30	RGB/4:4:4	8/10bpc	Cannot use both TDPIC inputs at once; requires two separate TDPICs
	3840x2160	4x	1920	2160	60	RGB/4:4:4	8/10bpc	Cannot use both TDPIC inputs at once; requires four separate TDPICs
	4096x2160	4x	2048	2160	60	RGB/4:4:4	8/10bpc	Cannot use both TDPIC inputs at once; requires four separate TDPICs
	3840x2160	8x	1920	1080	60	RGB/4:4:4	8/10bpc	—
	4096x2160	8x	2048	1080	60	RGB/4:4:4	8/10bpc	—

DDIC

The DVI-D interface supports HDCP 1.x.

	Format	Cables	Hres	Vres	Frame rate (Hz)	Sampling	Bit-depth	Notes
HD	1280x720	2x	1280	720	60	RGB/4:4:4	8bpc	—
	1920x1080	2x	1920	1080	24, 25, 30, 60	RGB/4:4:4	8bpc	—
	2048x1080	2x	2048	1080	24, 25, 30, 60	RGB/4:4:4	8bpc	—
4K	3840x2160	2x	3840	2160	24, 25, 30	RGB/4:4:4	8bpc	Dual-link
	4096x2160	2x	4096	2160	24, 25, 30	RGB/4:4:4	8bpc	Dual-link
	3840x2160	4x	1920	2160	60	RGB/4:4:4	8bpc	Dual-link
	4096x2160	4x	2048	2160	60	RGB/4:4:4	8bpc	Dual-link

THIC

The HDMI 1.4 interface supports HDCP 1.x.

	Format	Cables	Hres	Vres	Frame rate (Hz)	Sampling	Bit-depth
HD	1280x720	2x	1280	720	24, 25, 30, 60	RGB/4:4:4/4:2:2	8/10/12bpc
	1920x1080	2x	1920	1080	24, 25, 30, 60	RGB/4:4:4/4:2:2	8/10/12bpc
	2048x1080	2x	2048	1080	24, 25, 30, 60	RGB/4:4:4/4:2:2	8/10/12bpc

	Format	Cables	Hres	Vres	Frame rate (Hz)	Sampling	Bit-depth
4K	3840x2160	8x	1920	1080	24, 25, 30, 60	RGB/4:4:4/4:2:2	8/10/12bpc
	4096x2160	8x	2048	1080	24, 25, 30, 60	RGB/4:4:4/4:2:2	8/10/12bpc

3GIC (HD and 3G-SDI)

	Format	Cables	Hres	Vres	Frame rate (Hz)	Sampling	Bit-depth	Notes
HD	1280x720	2x	1280	720	24, 25, 30, 60	4:2:2	10bpc	—
	1920x1080	2x	1920	1080	24, 25, 30	4:2:2	10bpc	—
	2048x1080	2x	2048	1080	24, 25, 30	4:2:2	10bpc	—
3G	1280x720	2x	1280	720	24, 25, 30, 60	RGB/4:4:4	10/12bpc	Level-A recommended
	1920x1080	2x	1920	1080	24, 25, 30	RGB/4:4:4	10/12bpc	Level-A recommended
	1920x1080	2x	1920	1080	60	4:2:2	10bpc	Level-A recommended
	2048x1080	2x	2048	1080	24, 25, 30	RGB/4:4:4	10/12bpc	Level-A recommended
	2048x1080	2x	2048	1080	60	4:2:2	10bpc	Level-A recommended
3G-4K	3840x2160	8x	1920	1080	24, 25, 30	RGB/4:4:4	10/12bpc	Level-A recommended
	3840x2160	8x	2048	1080	60	4:2:2	10bpc	Level-A recommended
	4096x2160	8x	1920	1080	24, 25, 30	RGB/4:4:4	10/12bpc	Level-A recommended
	4096x2160	8x	2048	1080	60	4:2:2	10bpc	Level-A recommended