

# Projection Engines

Entero RPMSP-LED01

Entero RPMHD-LED01

Entero RPMWU-LED01

# Cubes

CC50

CC67

CC70

CC70HD

CC72

Installation Manual

020-100839-01

**CHRISTIE®**



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## NOTICES

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This Class A digital apparatus complies with CAN ICES–3.

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- a. Damage occurring during shipment, in either direction.
- b. Projector lamps (See the separate Christie lamp program policy).
- c. Damage caused by use of a projector lamp beyond the recommended lamp life, or use of a lamp supplied by a supplier other than Christie.
- d. Problems caused by combination of the product with non-Christie equipment, such as distribution systems, cameras, video tape recorders, etc., or use of the product with any non-Christie interface device.
- e. Damage caused by misuse, improper power source, accident, fire, flood, lightning, earthquake or other natural disaster.
- f. Damage caused by improper installation/alignment, or by product modification, if by other than a Christie authorized repair service provider.
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- h. Failure due to normal wear and tear.

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**1: Introduction**

1.1 Safety Warnings and Guidelines ..... 1-1  
 1.2 Contact Support ..... 1-2

**2: Cube Installation and Setup**

2.1 Christie Pedestals ..... 2-1  
 2.2 Stacking Limitations ..... 2-1  
 2.3 Components and Hardware ..... 2-2  
     2.3.1 Cube Enclosures ..... 2-2  
     2.3.2 Screens ..... 2-2  
     2.3.3 Pedestals ..... 2-2  
     2.3.4 Entero Projectors ..... 2-3  
     2.3.5 Recommended Installation Tools ..... 2-3  
 2.4 Unpack Cube Enclosures and Pedestals ..... 2-4  
 2.5 Unpack and Stabilize Screens ..... 2-5  
 2.6 Install the Pedestals ..... 2-5  
     2.6.1 Construct a Multiple Pedestal Platform ..... 2-6  
 2.7 Install Display Cube Enclosures ..... 2-8  
 2.8 Install Permanent External Support ..... 2-11  
     2.8.1 Tieback Application ..... 2-11  
     2.8.2 Lag Bolt Application ..... 2-12  
 2.9 Install Screens ..... 2-13

**3: Projector Installation and Setup**

3.1 What’s in the Box ..... 3-1  
 3.2 Unpack Projectors ..... 3-1  
 3.3 Projector Components ..... 3-2  
     3.3.1 Projection Head Module (PHM) ..... 3-2  
     3.3.2 Light Module (LM) ..... 3-2  
     3.3.3 Electronics Module (EM) ..... 3-2  
 3.4 Install Projectors into Cube Enclosures ..... 3-3  
     3.4.1 Tools and Hardware Required ..... 3-3  
 3.5 Installing the Projector in a Custom Structure ..... 3-5  
     3.5.1 Change Projector Orientation for Direct Throw Installations ..... 3-5  
 3.6 Wiring ..... 3-7  
     3.6.1 Tips for Running External Cables to Projectors ..... 3-7  
     3.6.2 Connect the PHM to the EM and AC ..... 3-8  
     3.6.3 Connect Projectors for External Communication ..... 3-9  
         Ethernet ..... 3-9  
         Mixed Network ..... 3-10  
         RS232 Network ..... 3-11  
         Mixed Serial Network (RS232 and RS422) ..... 3-12  
 3.7 Connect Projectors for ArrayLOC ..... 3-13  
     3.7.1 Hardware Requirements ..... 3-13  
     3.7.2 ArrayLOC Over PHM Network ..... 3-14

Calculate Your Hardware Requirement .....3-14

PHM Network Example: 2 x 3 Wall .....3-14

PHM Network Example: 4 x 6 wall .....3-15

3.7.3 ArrayLOC Over EM Network .....3-15

    Calculate Hardware Requirements .....3-16

    EM Network Example: 2 x 3 Wall .....3-16

    EM Network Example: 4 x 6 Wall .....3-17

3.7.4 Enable ArrayLOC .....3-18

3.8 Source Connections .....3-18

    3.8.1 DVI Digital Video.....3-18

    3.8.2 Dual Link DVI Input Card .....3-19

    3.8.3 Twin HDMI Input Card .....3-19

    3.8.4 Analog BNC Input Card .....3-20

    3.8.5 Dual SD/HD – SDI Input Card .....3-20

    3.8.6 Video Decoder Input Card .....3-21

3.9 System Integration – GPIO Connector .....3-22

**4: Adjust the Image**

4.1 Adjustment Tips.....4-1

4.2 Power the Projector On.....4-1

4.3 Focus .64:1 Fixed Lens .....4-2

4.4 Adjust Image Geometry Using the 6–axis Adjuster .....4-3

4.5 Fine–tune Image Geometry using the Mirror .....4-5

    4.5.1 Mirror Adjustment Screws .....4-6

    4.5.2 Adjust the Mirror .....4-6

    4.5.3 Image Geometry Troubleshooting using the Mirror .....4-7

    4.5.4 Barrel and Pincushion Distortion .....4-9

4.6 Optimize Image Setup and Display .....4-9

    4.6.1 Initialization and Auto Setup .....4-9

    4.6.2 Adjust Image Geometry Using the Projector Software .....4-10

    4.6.3 Adjust Black Levels and Input Drives .....4-10

4.7 Adjust Color Using ArrayLOC.....4-10

4.8 Adjust Brightness Uniformity.....4-11

    4.8.1 Cancel Brightness Uniformity .....4-11

**5: Troubleshooting**

5.1 System Warnings and Errors .....5-1

5.2 Error Codes .....5-2

5.3 LED Status Indicators .....5-3

5.4 Projector Does Not Turn On.....5-4

5.5 Light Module Suddenly Goes Off .....5-4

5.6 No Display When the Projector is On.....5-4

5.7 The Display is Unstable .....5-4

5.8 The Display is Faint .....5-4

5.9 The Upper Portion of the Display is Waving, Tearing or Jittering.....5-5

5.10 Portions of the Display are Cut Off or Warped to the Opposite Edge ..... 5-5

5.11 Display Appears Compressed (Vertically Stretched) ..... 5-5

5.12 Data is Cropped from Edges ..... 5-5

5.13 Inconsistent Picture Quality ..... 5-5

5.14 Static Display ..... 5-5

5.15 Inaccurate Display Colors ..... 5-5

5.16 Display is Not Rectangular ..... 5-5

5.17 Display is Noisy ..... 5-6

**6: Maintenance**

6.1 Ventilation ..... 6-1

6.2 Clean the Mirror ..... 6-1

    6.2.1 Items Required ..... 6-1

    6.2.2 Prerequisites ..... 6-1

    6.2.3 Instructions ..... 6-1

        Remove Water Droplet rings, marks, and other surface stains ..... 6-1

        Remove Finger Prints ..... 6-2

6.3 Clean the Screen ..... 6-2

    6.3.1 Items Required ..... 6-2

    6.3.2 Prerequisites ..... 6-2

    6.3.3 Instructions ..... 6-2

6.4 Clean the Projection Lens ..... 6-3

    6.4.1 Items Required ..... 6-3

    6.4.2 Instructions ..... 6-3

        Remove Dust ..... 6-3

        Remove Fingerprints, Smudges, or Oil ..... 6-3

**A: Specifications**

A.1 CC50 Specifications ..... A-2

    A.1.1 CC50 Brightness and Performance Characteristics ..... A-3

A.2 CC67 Specifications ..... A-4

    A.2.1 CC67 Brightness and Performance Characteristics ..... A-5

A.3 CC70 Specifications ..... A-6

    A.3.1 CC70 Brightness and Performance Characteristics ..... A-7

A.4 CC72 Specifications ..... A-8

    A.4.1 CC72 Brightness and Performance Characteristics ..... A-9



# 1 Introduction

This manual provides instructions for installing a display system using Christie Entero RPMSP–LED01, RPMWU–LED01 or RPMHD–LED01 projectors, CC50, CC67, CC70, CC70HD and CC72 display cubes, and PE50, PE67, PE70, PE70HD and PE72 pedestals.

The information within this manual is intended for audio visual technicians with experience installing display systems. To avoid personal injury or damage to the projector, read all procedures before starting the installation and observe all precautions. For information on installing the projector in a non–Christie enclosure, contact your dealer. For information about using the projector, see *RPMSP/RPMWU/RPMHD–LED01 User Manual (P/N: 020-100367-xx)*.

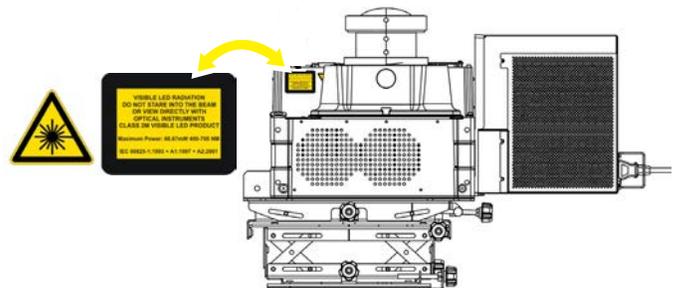
## 1.1 Safety Warnings and Guidelines

**⚠ WARNING** Failure to comply with the following may result in death or serious injury:

- **Tip Load!** The maximum stacking limitation is 5 cubes high in a minimum 2 column display wall. The display wall must be properly anchored anytime the wall is 2 rows or higher to prevent tipping and provide stability. Use all the hardware provided to fasten the display cubes to the support structure. See 2.8 Install Permanent External Support, on page 2-11.
- **Disconnect the AC cord before disconnecting the light module from the Projector Head Module (PHM).**

**⚠ CAUTION** Failure to comply with the following could result in minor or moderate injury:

- **Do not look directly into the projection lens.** The high brightness of this projector could cause permanent eye damage. For protection, keep all projector shielding intact during operation.
- **Lift equipment must be used to lift the display cubes into position on rows 2 or higher.** A crew of 2 or more can lift a display cube into position on the first row.
- **Always power down and disconnect/disengage all power sources to the projector before servicing or cleaning.**
- **Mount the projector in a Christie display cube or to a sturdy, flat surface that fits the entire projector.** Use all 4 mounting points to secure the projector to the surface.
- **Power should always be disconnected from the light module before servicing, to avoid the possibility of inadvertent exposure to visible LED radiation.** Directly viewing the light module optical output through certain optical instruments (for example, eye loupes, magnifiers and microscopes) within a distance of 100 mm (3.94") may pose an eye hazard.



**NOTICES:**

*Failure to comply with the following may result in equipment damage:*

- *Maintain a minimum clearance of 25 mm (1.0") around the projector for air circulation and a 75 mm (3") clearance for cable connections to the input panel. Insufficient clearance can cause the projector to overheat during operation and/or place undue stress on source connections.*
- *This projector must be operated in an environment that meets the operating range specification, as listed in Appendix A Specifications.*

## **1.2 Contact Support**

Trained service technicians are available to diagnose and correct system-related problems. If you encounter any problems during the setup and installation of your system, contact the authorized dealer or Christie Partner from whom the system was purchased.

## 2 Cube Installation and Setup

**NOTICE:** Only qualified installers should attempt installation of a Christie display wall.

**NOTE:** A clearance of 3 ft or more is recommended behind the display cube for serviceability and installation.

### 2.1 Christie Pedestals

Christie pedestals (models PE50, PE67, PE70, PE70HD, PE72) are recommended when you install Christie display cubes (models CC50, CC67, CC70, CC70HD, CC72).

### 2.2 Stacking Limitations

**⚠ WARNING** Tip Load! The maximum stacking limitation is 5 cubes high in a minimum 2 column display wall. The display wall must be properly anchored anytime the wall is 2 rows or higher to prevent tipping and provide stability. Use all the hardware provided to fasten the display cubes to the support structure. See 2.8 Install Permanent External Support, on page 2-11.

When stacking display cubes, they must be installed on a level surface. If the surface is not level the stacked cubes could tip over and cause personal injury or damage to the cubes. Stacking limitations apply to all the display cube models; the CC50, CC67, CC70, CC70HD, and CC80. Anytime the display wall is 2 rows or higher the wall must be anchored to prevent tipping and provide stability. Christie recommends either using tiebacks or lag bolts to secure the display wall. For details, see [2.8 Install Permanent External Support, on page 2-11](#). Do not stack display cubes higher than the specified stacking limits. Stacking display cubes higher than what is recommended increases the possibility of the display wall becoming unstable and unsafe. It also increases the chance that the pedestals may buckle from the extra weight. death or serious injury.

STACKING HEIGHT (2 COLUMNS WIDE OR MORE)	ANCHORING REQUIRED
1	No
2	Yes
3	Yes
4	Yes
5	Yes

## 2.3 Components and Hardware

All major components required to assemble a complete display cube are packaged and shipped separately to the installation site. This includes the display cube enclosure, projector, display screen, and pedestal. Each component comes with the hardware required for installation. Check the contents of your shipment against the list below to make sure that you have all the necessary hardware. Hardware is listed by component and applies to all models unless otherwise noted.

### 2.3.1 Cube Enclosures

- M6 x 75mm hex screws (Qty. 10)
- M6 x 18mm flat washers (Qty. 20)
- M6 lock washers (Qty. 10)
- M6 hex nuts (Qty. 10)
- M6 x 60mm hex screws (Qty. 2)
- M6 x 24mm flat washers (Qty. 4)
- Cable covers
- Long-screen bolts (Qty. 4)
- Short-screen bolts (Qty. 2)
- Panel plug

### 2.3.2 Screens

- M6 screws (Qty. 8)
- M8 set screws (Qty. 4)

**NOTE:** *The long and short-screen bolts required to secure a screen to the cube are shipped with the cube.*

### 2.3.3 Pedestals

- M6 x 75mm hex screws (Qty. 4)
- M6 flat washers (Qty. 8)
- M6 lock washers (Qty. 4)
- M6 hex nuts (Qty. 4)
- Cable covers (Qty. 4)

### 2.3.4 Entero Projectors

Each display wall requires a User Kit (P/N: 125-108100-xx). One User Kit is provided with each order, and 2 are provided with every 4 or more units ordered.

- Power Cord
- Entero User Kit (P/N:125-108100-xx).

Each kit includes:

- Entero Projector and Cube Installation Guide (this manual, P/N: 020-100839-xx)
- Entero RPMSP/RPMWU-LED01 User Manual (P/N: 020-100367-xx)
- IR remote control with 2 AA batteries
- Ball drivers: 8 mm, 5 mm, 4 mm (long), 2 mm
- Lint-free gloves (required for mirror and screen handling)

### 2.3.5 Recommended Installation Tools

- Level
- 10 mm hex wrench or socket driver
- 5 mm ball driver (provided with the user kit)
- 4 mm ball driver (provided with the user kit)
- Adjustable wrench
- Torque wrench
- #2 Phillips™ screwdriver

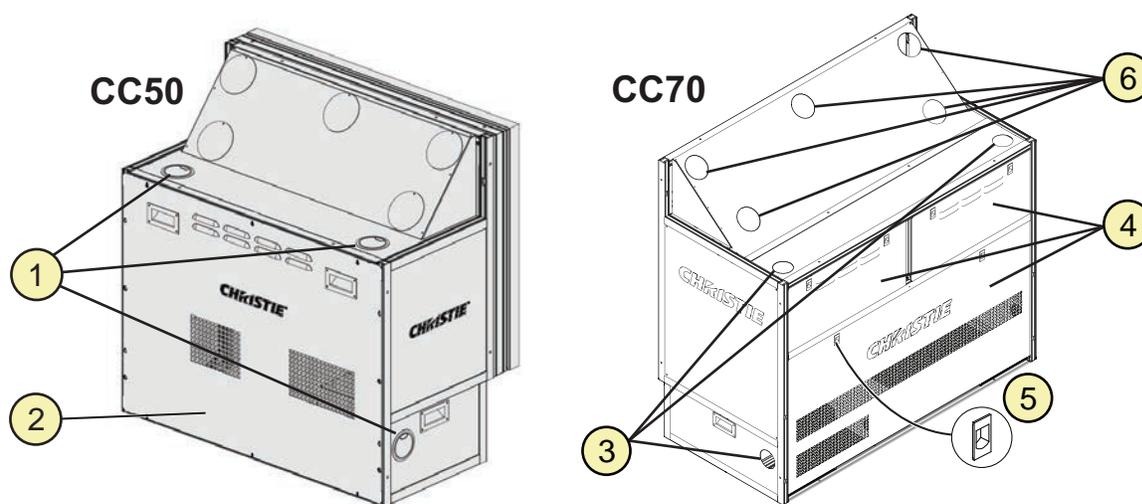
## 2.4 Unpack Cube Enclosures and Pedestals

**NOTICES:**

*Failure to comply with the following may result in equipment damage:*

- Do not cut the protective film off the mirror with a knife.
- Do not touch the optical mirror with your bare hands. Fingerprints left on the surface can impact image quality.

1. Lift the cardboard packaging off of the cube enclosures and pedestals. Do not cut the packaging with a knife.



1, 3	Cable covers
2	CC50 back panel. Similar for CC72.
4	3 rear access panels for CC67, CC70, and CC70HD
5	Rear access panel spring release
6	Panel plugs

2. Remove the back panels and set aside in a location where the panels will not be damaged.
  - CC50/CC72 panels are secured with 10 screws in keyhole slots. To remove the panel, loosen the screws and slide the panel up.
  - CC67/CC70/CC70HD panels are secured with 2 spring clips each. Press down on the spring clips and tilt the top of the panel out. Lift the panel away.
3. Put on the lint-free cotton gloves from the user kit and remove the protective film from the optical mirror. Do not bump or scratch the mirror during unpacking.
4. Install a cable cover over each exposed opening. See the illustration above.

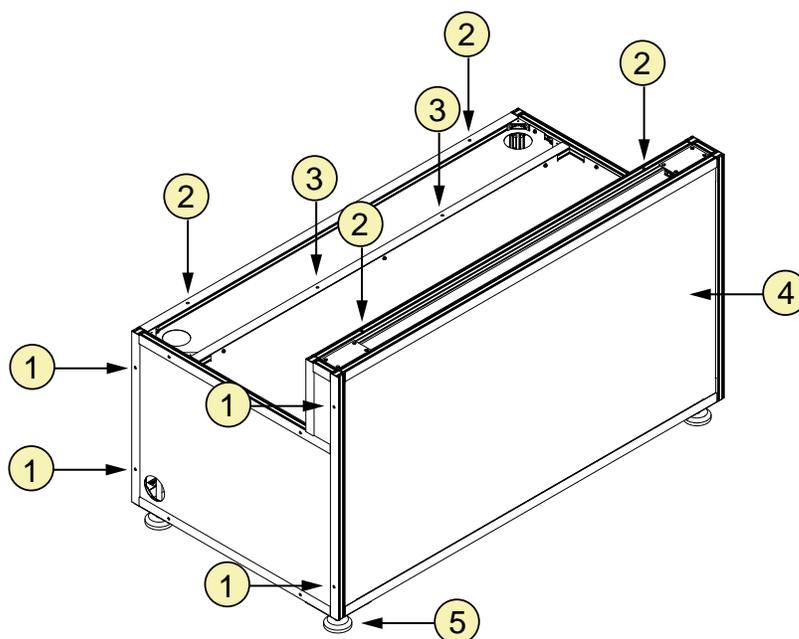
## 2.5 Unpack and Stabilize Screens

1. Wear the lint-free cotton gloves provided in the user kit, remove the screen from the packaging and stand it vertically against a wall or flat surface. Select a low-traffic area away from the installation to protect the screens from accidental scratching or tipping.
2. Let the screen stabilize to ambient site conditions for a minimum 24 hours.
3. Wearing lint-free cotton gloves, remove the protective film from the back of the screen.

## 2.6 Install the Pedestals

When you install Christie display cubes, Christie recommends that you use a Christie pedestal which is designed to support the maximum stacking limit of the display cubes. Alternatively, custom designed pedestals can be used; however, it is the responsibility of the designer/installer to make sure the custom structure meets performance and safety requirements.

<b>CUBE</b>	<b>PEDESTAL</b>
CC50	PE50
CC67	PE67
CC70	PE70
CC70HD	PE70HD
CC72	PE72



1	Use to fasten pedestals together, 4 on each side panel
2	Use to install display cubes, 2 at the back and 2 at the front
3	On PE67/PE70/PE72 pedestals only, use to install display cubes, 2 on support bracket
4	Front Panel (faces the room)
5	Adjustable feet (Qty. 4)

### 2.6.1 Construct a Multiple Pedestal Platform

Before starting, check that you have all the required hardware. See [2.3 Components and Hardware](#).

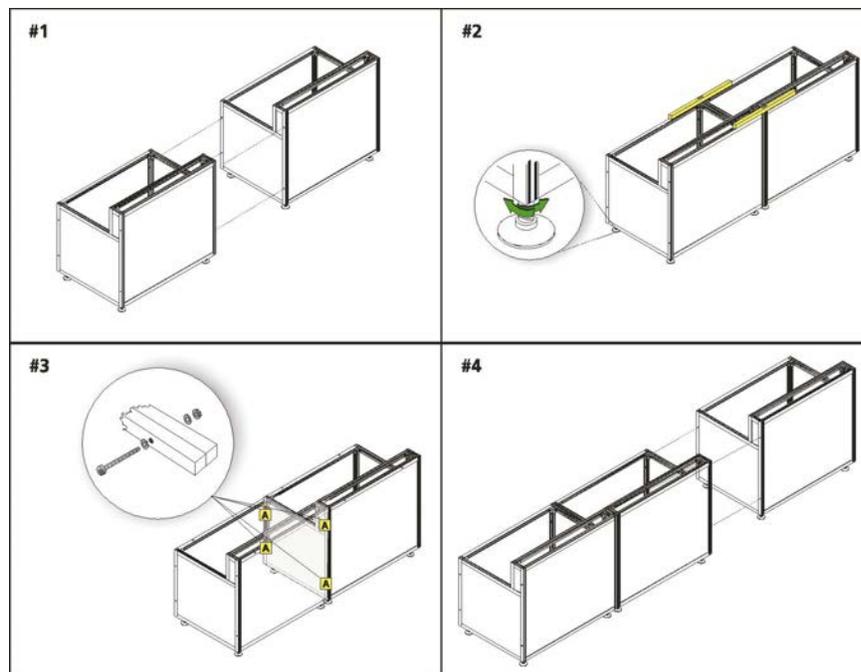
**⚠ CAUTION** Failure to comply with the following could result in minor or moderate injury:

- Make sure that the appropriately rated lifting equipment and a minimum of 2 people are available for installation.
- Mount the pedestals on a permanent, hard surface such as a concrete floor. Elevated surfaces, such as wood platforms are not recommended.

**NOTES:** **1)** Always start at the center and work outward, ensuring each pedestal is level. **2)** Do not fully tighten the hardware that attaches pedestals together until you have completed all of your adjustments and installed all of the pedestals.

1. Slide 2 pedestals together and align the front and rear edges.
2. Apply downward pressure on the pedestal to make sure that the feet are flat to the floor.
3. Match the height of adjacent pedestals. Turn the bottom nut on each pedestal foot to raise or lower the pedestal.
4. Use a level to verify that the pedestal is level on all sides and with the other pedestal.

5. Tighten the middle nut against the top nut to lock the pedestal foot in position.
6. Check that you can see threads inside the pedestal, at the top of the corner bracket where the foot is installed. If threads are not visible, then you have over-extended the pedestal foot. Readjust the foot before continuing with the installation.
7. Hand-tighten the 2 pedestals together using 4 M6 x 75mm hex screws, 8 flat washers, 4 lock washers, and 4 M6 hex nuts. Make sure that the vertical seam between adjacent pedestals is as narrow as possible and uniform from top to bottom.
8. Slide the next pedestal into position and repeat steps 2 to 7.
9. Confirm that the platform is level and that all of the rear edges of the pedestals are aligned.
10. To secure the pedestals, tighten the loose hardware to a maximum torque setting of 11.1 Nm / 98 lbf-in.
11. Use a level to confirm that the platform structure is level.



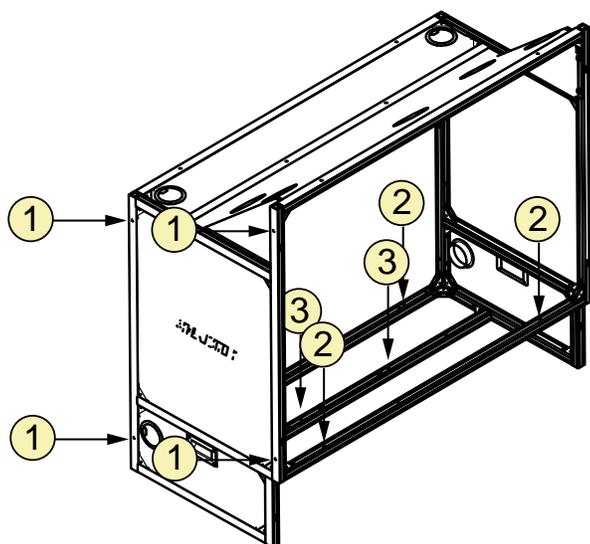
## 2.7 Install Display Cube Enclosures

**⚠ WARNING** Failure to comply with the following may result in death or serious injury:

- **Tip Load!** The maximum stacking limitation is 5 cubes high in a minimum 2 column display wall. The display wall must be properly anchored anytime the wall is 2 rows or higher to prevent tipping and provide stability. Use all the hardware provided to fasten the display cubes to the support structure. See 2.8 Install Permanent External Support, on page 2-11.
- When stacking display cubes, they must be installed on a level surface. If the surface is not level the stacked cubes could tip over and cause personal injury or damage to the cubes.
- Appropriate lift equipment must be used to list display cubes onto rows 2 or higher.

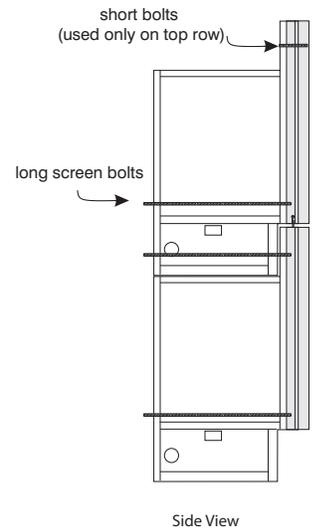
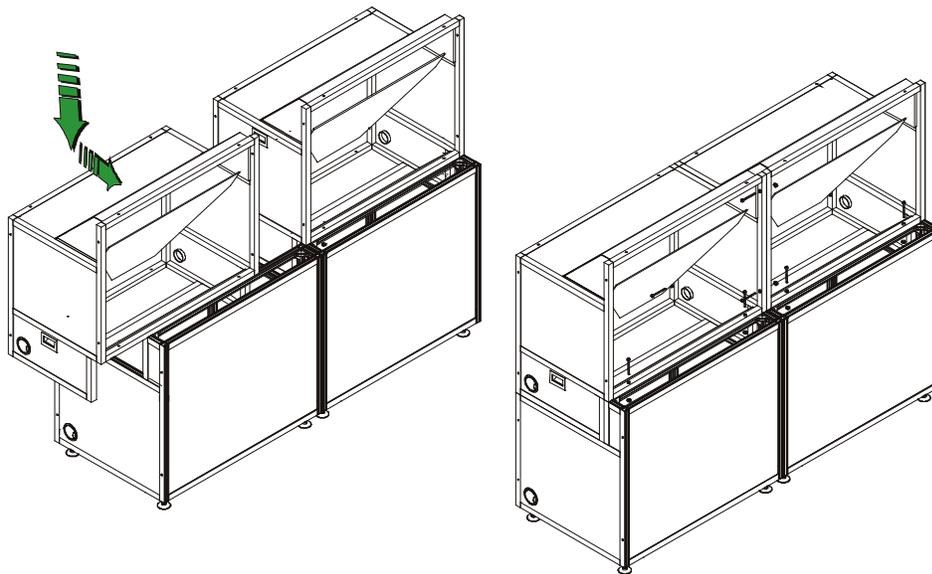
**NOTE:** A clearance of 3 ft. or more is recommended behind the display cubes for serviceability and installation.

Before starting, check that you have all the required hardware. See [2.3 Components and Hardware](#). Complete each row of cube enclosures before starting the next. Proper alignment reduces issues with image geometry and makes sure that the wall has a seamless appearance. Once the wall is installed, it is difficult and time-consuming to fix an alignment problem near the bottom of a wall.



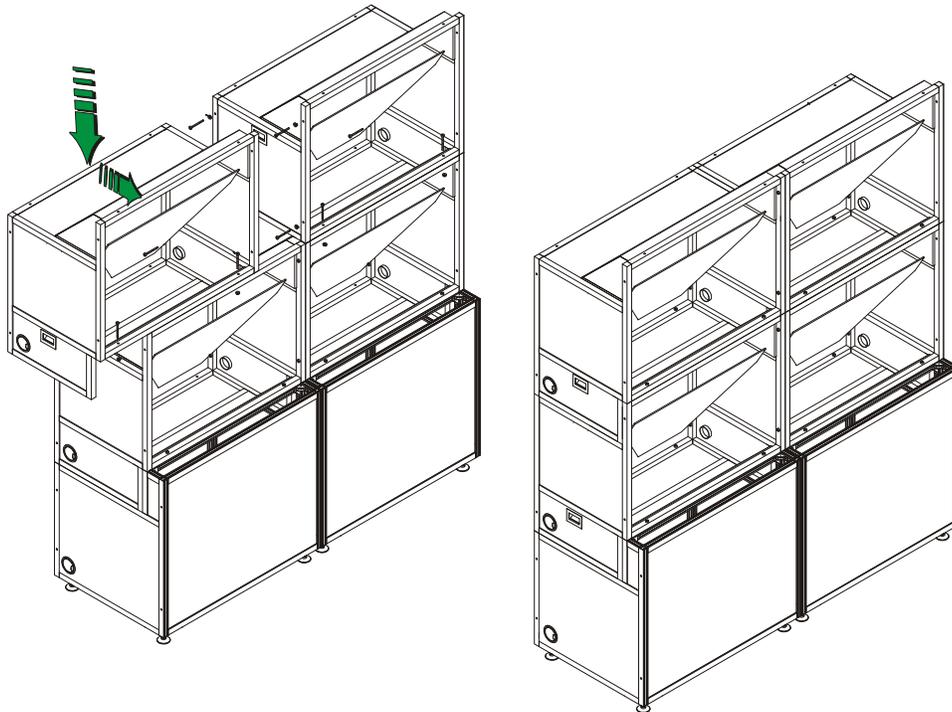
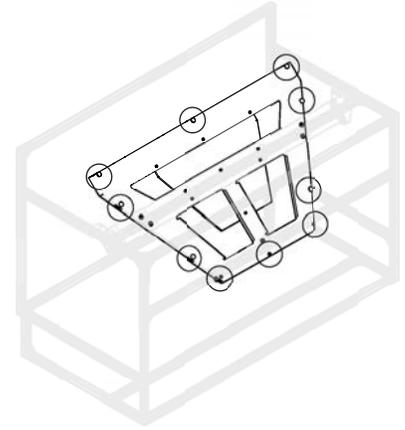
1	Use to fasten side-by-side display cubes together, 4 on each side panel.
2	Use to fasten the display cube to the pedestal or to the cube below, 2 at the back and 2 at the front.
3	For CC67/CC70/CC72 display cubes only, use to fasten the display cube to the pedestal or cube below it, 2 on the support bracket.

1. If space behind the display wall is limited, it is recommended the long-screen bolts are inserted into the back of the cubes before the cubes are installed.
2. Install the first row of cube enclosures starting from the center and working outwards.
  - a. From the back of the display structure, lift the cube enclosure over the pedestal or cube row and lower it in the center of the pedestal or cube. A crew of 2 or more can lift a display cube into position on the first row.
  - b. With the display cube enclosure resting on the lower level, adjust its alignment so that the side and rear edges between the 2 components are flush and the mounting holes are aligned.



- c. Use 6 M6 x 75 mm screws (4 for CC50) with washers and hex nuts to secure the cube to the pedestal or cube in the lower level. To allow for small adjustments, do not fully tighten the mounting hardware. **NOTE:** For a single, stand-alone unit, tighten the hardware until components are fully secured, then proceed to 2.9 Install Screens, on page 2-13.
- d. Use 4 M6 x 75 mm screws with washers and hex nuts to attach the cube to the one adjacent to it. Hand tighten the mounting hardware.

3. Loosen each of the adjustment screws on the optical mirror to minimize tension against the mirror at each adjustment point.
4. Check the alignment between all of the display cubes and make adjustments as required. All cubes must be aligned vertically and horizontally.
5. Tighten all mounting hardware between the display cubes and pedestals before installing another row of display cubes. Tighten hardware to a maximum torque setting of 11.1 Nm / 98 lbf.-in.
6. Make sure that the wall is externally supported before adding the second row of display cubes. See [2.8 Install Permanent External Support](#), on page 2-11.
7. To add the next row of cube enclosures, repeat the installation instructions from step 1.



## 2.8 Install Permanent External Support

**⚠ WARNING** Tip Load! The maximum stacking limitation is 5 cubes high in a minimum 2 column display wall. The display wall must be properly anchored anytime the wall is 2 rows or higher to prevent tipping and provide stability. Use all the hardware provided to fasten the display cubes to the support structure.

When stacking display cubes, they must be installed on a level surface. If the surface is not level the stacked cubes could tip over and cause personal injury or damage to the cubes.

Failure to comply may result in death or serious injury.

**⚠ CAUTION** External support for a display wall must be designed and implemented by a qualified installer and must comply to local area safety standards. All display walls must have permanent external supports. Failure to comply could result in minor or moderate injury.

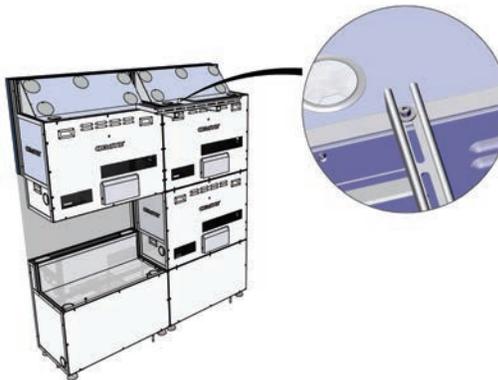
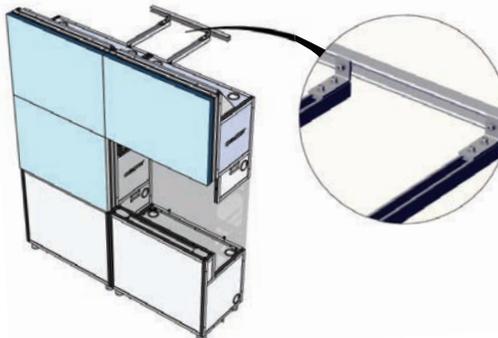
All display walls must be supported externally anytime the display wall is 2 rows or higher. External support prevents the wall from tipping and causing personal injury or damage to the display cubes. Christie requires that either the tieback or the lag bolt application is used to support a display wall.

### 2.8.1 Tieback Application

Every column of cubes requires 1 tie back. Each tieback must be capable of withstanding a pull out force of 500 lbs.



**DANGER!** The amount of external support required is dependent on the size of the display wall. Support structures must be designed and implemented by a qualified installer and comply to local area safety standards. Failure to comply results in death or serious injury.

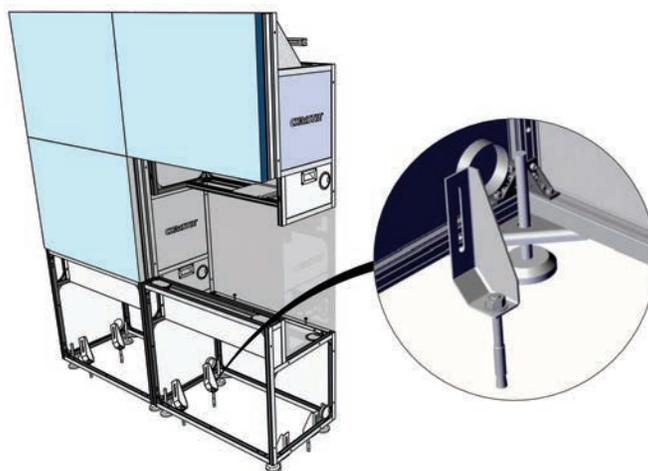


## 2.8.2 Lag Bolt Application

Each column of cubes requires 4 lag bolts. Each lag bolt must be capable of withstanding a pull out force of 500 lbs.



**DANGER!** The amount of external support required is dependent on the size of the display wall. Support structures must be designed and implemented by a qualified installer and comply to local area safety standards. Failure to comply results in death or serious injury.



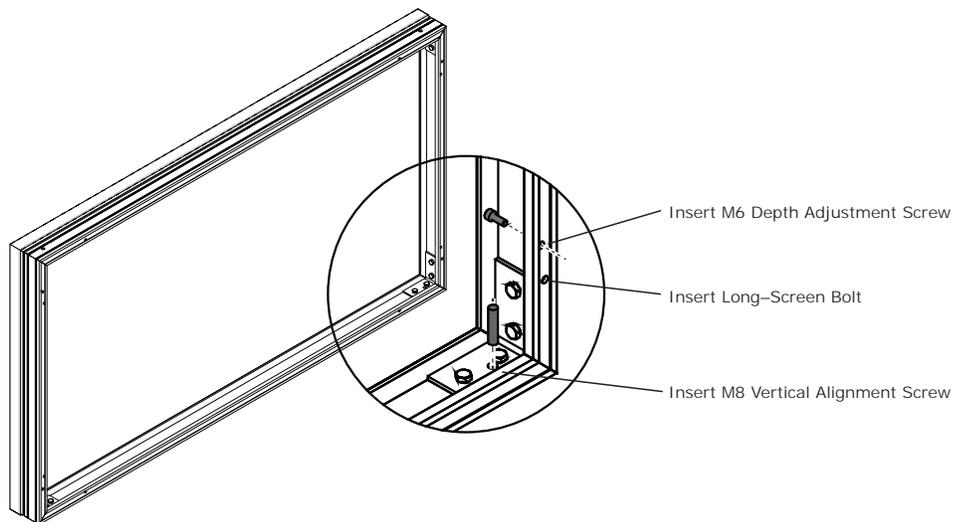
## 2.9 Install Screens

**NOTICE:**

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

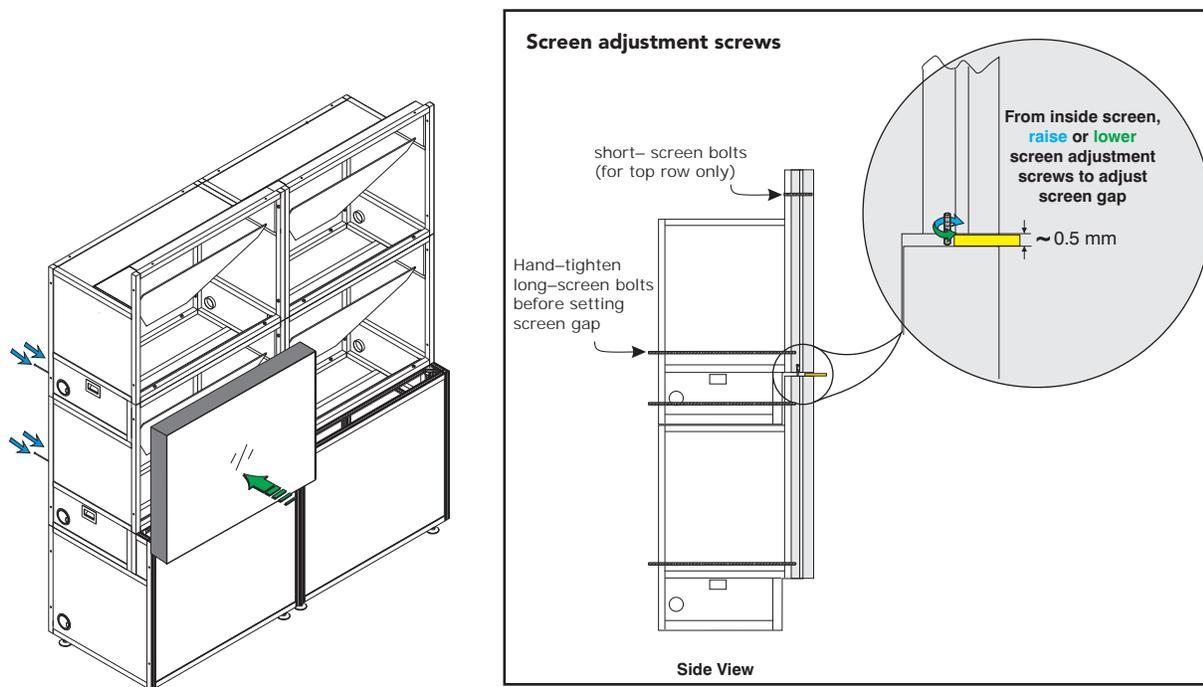
- Read this entire section before installing the screens.
- Wear the lint-free gloves provided in the user kit when handling the screens to prevent leaving fingerprints on the surface.
- Start with the center cube of the first row and work outwards.
- Check that you have all the required hardware. See [2.3 Components and Hardware](#).

1. Install the M6 depth adjustment screws and the M8 vertical alignment screws into the designated positions on the screen. Make sure the screws are flush with the frame.



2. Working with a partner, lift the screen into position at the front of the display cube. Align the screen with the cube face.
3. With 1 person supporting the screen from the front, secure the screen to the display cube using 4 long-screen bolts. Hand-tighten the mounting hardware. Leave enough play to allow for alignment adjustments. Install the long-screen bolts from the rear of the display cube and run them through the body of the cube.
4. For screens on the top row, use 2 long-screen bolts to secure the bottom of the screen and 2 short M6 x 60 mm screws to secure the top. Each M6 x 60 mm screw should have 2 M6 x 24 mm washers on it.  
**NOTE:** Always complete installing screens on the first row before starting onto the next row.
5. Check and correct alignment and screen gap issues before adding another screen. **NOTE:** These adjustments require 2 people. One person to make the adjustments on the inside of the frame and the other person to check the adjustments on the outside of the frame.
  - a. **For depth adjustment:** Insert 4 M6 screws at each corner of the screen, from the inside of the frame so that the screw surfaces are flush. Turn a screw clockwise to push the corresponding corner out from the cube body.

- b. **For vertical adjustment:** Insert 2 M8 vertical alignment screws at each end of the screen, from the inside of the frame so that they are flush with the inside surface of the screen frame. Turn a screw clockwise to increase the height on that side of the screen. Use vertical adjustments to equalize the seams between the cubes.



6. For the bottom row only, adjust the screen height so that the screen touches the pedestals to prevent the screen from shifting.
7. Repeat steps 1 to 4 to install additional screens in the row. Leave a 0.5 mm (0.019”) gap between each screen. **Work from the center outwards.**
8. Check and correct alignment and screen gap issues before adding a row of screens. Misalignment is difficult to correct once all screens are in place.
9. Repeat steps 1 to 7 to install additional rows. As rows are added, adjust the screen depth adjustment screws to make sure the screen is flat.
10. Once the second row of screens has been installed, adjust the depth screws on the first row of screens, and tighten the long-screen bolts to lock in place.
11. Once the third row of screens has been installed, adjust the depth screws on the second row, and tighten the long-screen bolts to lock in place.
12. Continue until all rows have been completed.
13. Tighten all screen mounting hardware to a maximum torque setting of 4.5 Nm / 39.6 lbf.in.

## 3 Projector Installation and Setup

The projector is designed for installation in a Christie cube display or a custom display structure. Before installing projectors, make sure that the screens have been installed and that screen depth and height adjustments are complete.

For information about installing an Entero projector in a custom installation, see [3.5 Installing the Projector in a Custom Structure](#).

Use a stable cart to transport the projector. See the drawings given for your specific projector model for the mounting hole location, and other technical information and restrictions which may be useful during installation.

### 3.1 What's in the Box

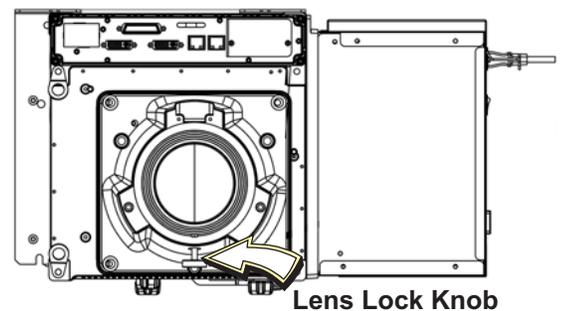
- Projector Head Module (PHM), with attached Light Module (LM)
- Electronics Module (EM)
- Warranty Card
- Web Registration Form
- Line Cord (rated, North American)

**NOTE:** A User Kit is supplied with each projection system. Additional User Kits can be purchased separately (P/N: 125-108100-xx).

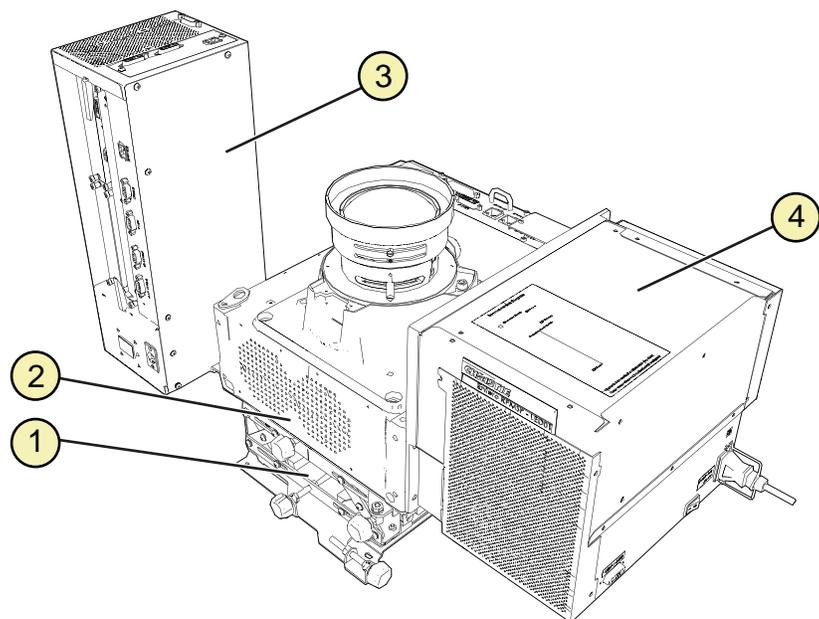
### 3.2 Unpack Projectors

The projector is shipped fully assembled.

1. Remove the projector from the box. **NOTE:** *Keep packaging for 1 projector to use for returning a projector for servicing.*
2. Tighten the lens lock knob.



### 3.3 Projector Components



1	6-axis Adjuster
2	Projection Head Module (PHM)
3	Electronics Module (EM)
4	Light Module (LM)

#### 3.3.1 Projection Head Module (PHM)

The PHM contains the projection lens, infrared sensor, digital micromirror device (DMD), light module, and other optical components. The module includes the electrical connections that are used to drive these components.

#### 3.3.2 Light Module (LM)

The LM consists of 3 LEDs and associated optics.

#### 3.3.3 Electronics Module (EM)

The EM module contains the main electronics and input connectors. If additional connections are required, install an optional input module.

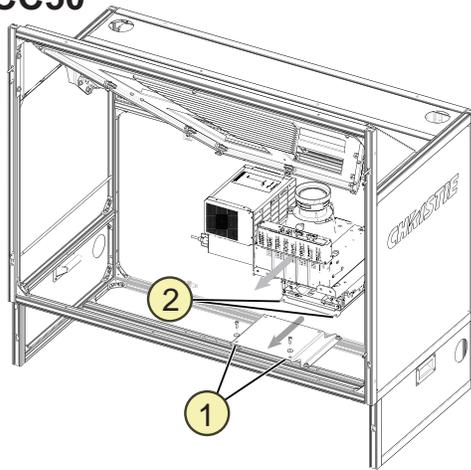
### 3.4 Install Projectors into Cube Enclosures

The PHM and adjuster plate are shipped installed on the 6-axis adjuster.

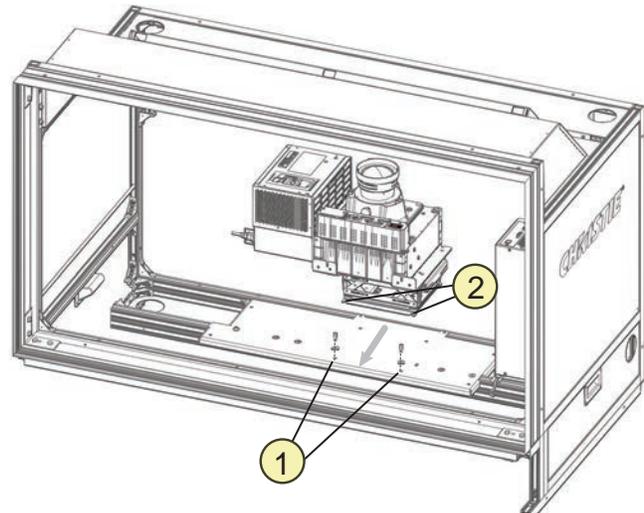
#### 3.4.1 Tools and Hardware Required

- M6 Cap screws (Qty. 8)
- M5 Cap screws (Qty. 5)
- M6 flat washers (Qty. 8)
- M3 Phillips™ screwdriver (Qty. 2)
- Cable ties (Qty. 5)
- Cable anchor
- M5 hex key
- M4 hex key

#### CC50



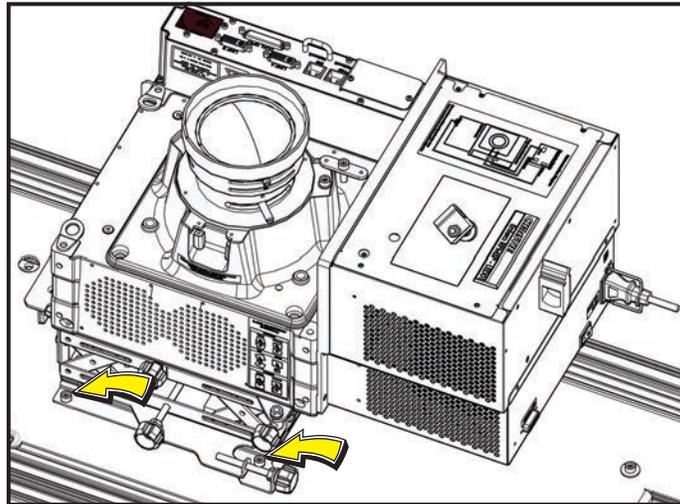
#### Others



1	Location for 2 front M6 cap screws and washers, viewed from the front.
2	Slotted mounts on the 6-axis adjuster, viewed from the front.

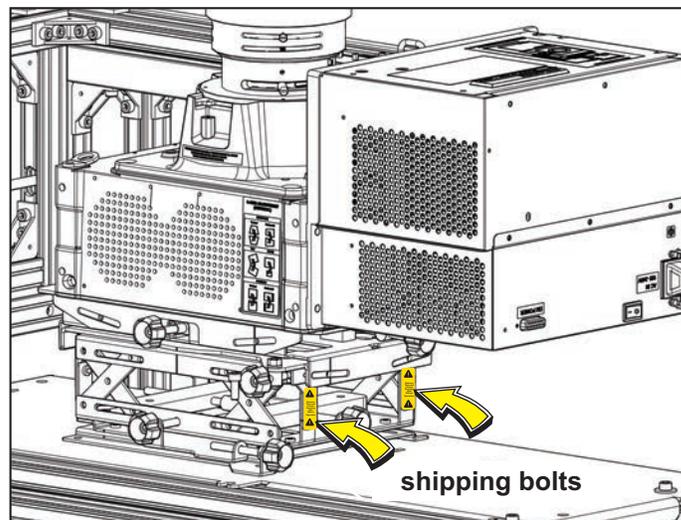
1. For custom installation requiring direct throw, change the orientation of the projector before installing. See [3.5 Installing the Projector in a Custom Structure](#).
2. Install the 2 front M6 cap screws and washers on the mounting plate in the cube. To allow for adjustment, do not fully tighten the bolts. **NOTE:** *The cube model determines the type and height of the mounting plate. Projector installation is the same for all.*
3. From the rear of the display cube, place the projector assembly on the mounting plate with the 6-axis adjuster controls toward the back of the display cube.
4. Slide the projector assembly forward so that the slotted mounts in the base of the 6-axis adjuster align with the M6 cap screws.

5. Install the remaining 2 M6 cap screws and M6 flat washers. Tighten all 4 screws.



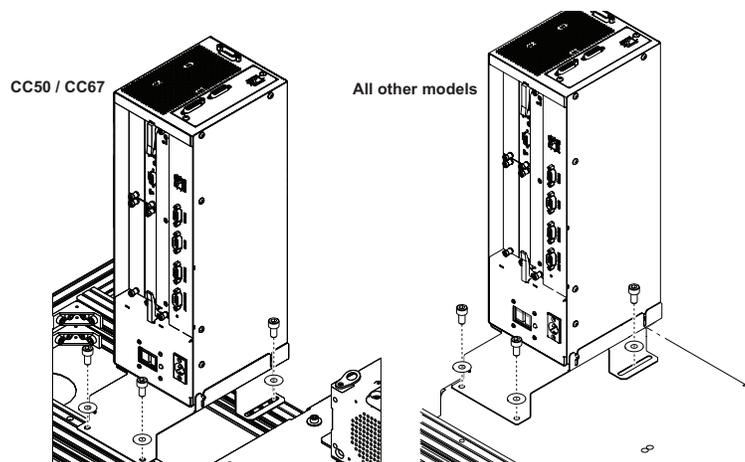
only front screws shown

6. Remove the 4 shipping bolts from the adjuster.



shipping bolts

7. Turn the EM so the bracket extension faces the back of the cube.
8. Install the EM to the left of the projector using the 3 M6 cap screws and 3 flat washers. The EM mounting location is determined by the cube model. For example in a CC70 cube, the EM bracket is mounted to the rail.

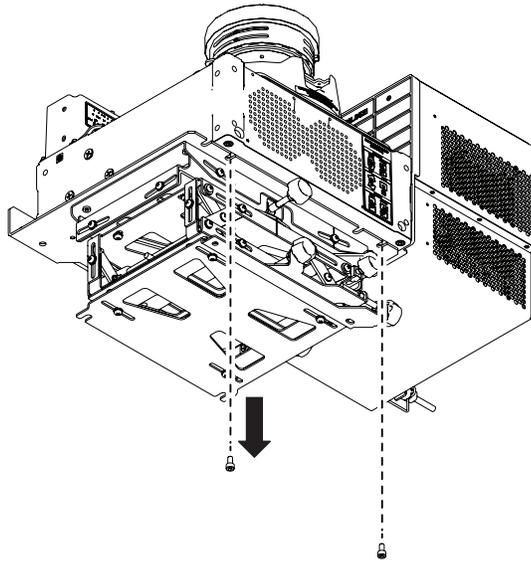


## 3.5 Installing the Projector in a Custom Structure

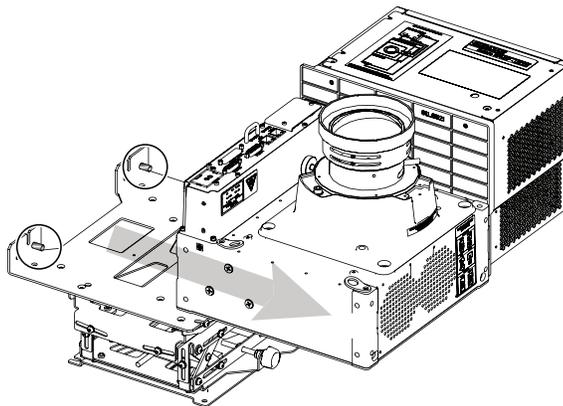
When installing in a custom structure, refer to the design and installation instructions for the custom structure. Projector position and orientation should be part of the installation design. To review Christie–provided information about the projector such as measurements, clearance requirements, and throw distance calculation, download the CAD drawing for the projector. Visit [www.christiedigital.com](http://www.christiedigital.com) and search for your projector model and CAD, for example RPMXX–LED01 CAD.

### 3.5.1 Change Projector Orientation for Direct Throw Installations

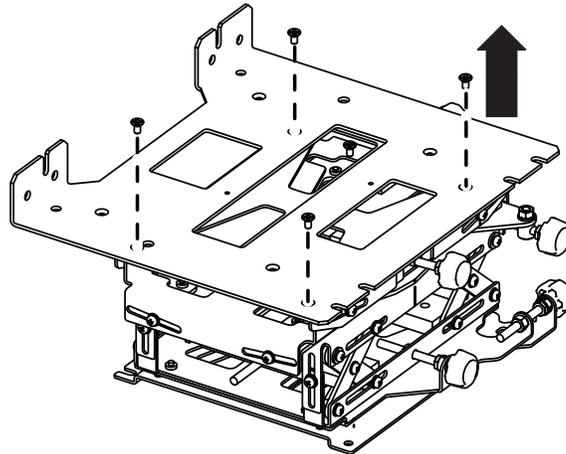
1. Remove the 2 M6 screws that secure the projector to the adjuster and set them aside.



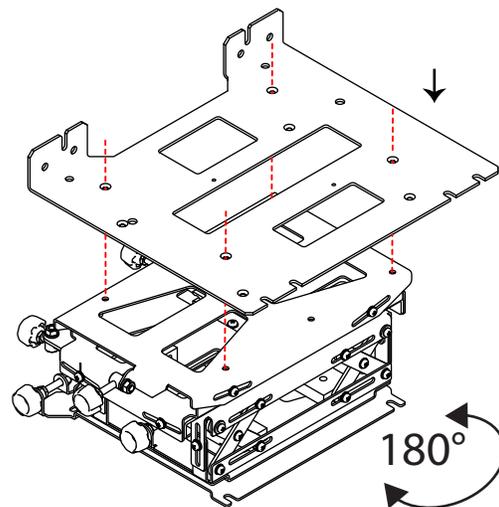
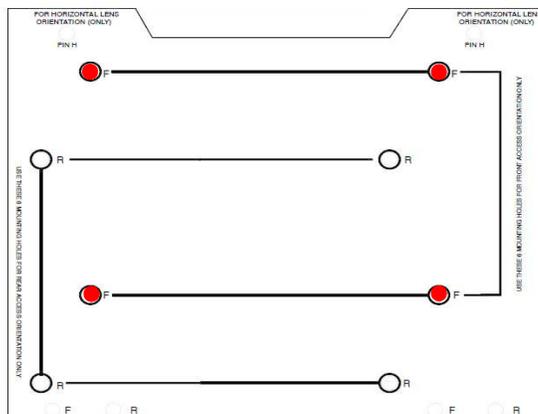
2. Slide the projector back off of the pins on the flange of the mounting plate.



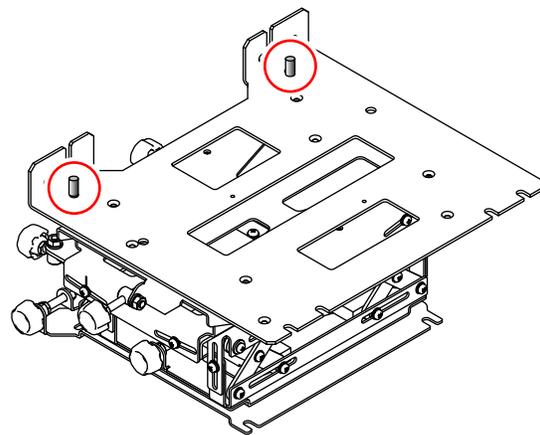
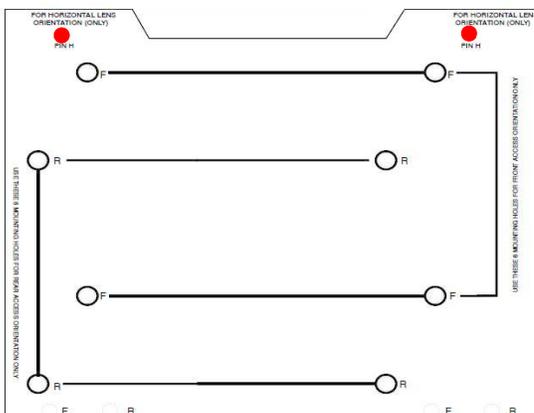
3. Set the projector on a level, stable surface.
4. Remove the 4 screws that secure the mounting plate to the adjuster, and set them aside.



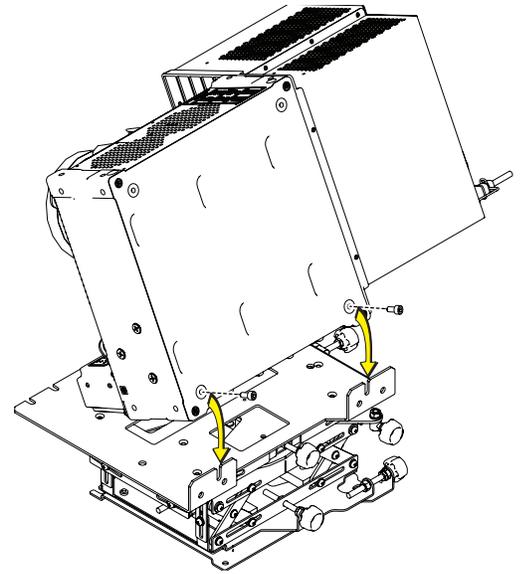
5. Turn the adjuster 180°.
6. Align the holes on the mounting plate with the 4 holes on the adjuster, as shown.



7. Secure with 4 mounting screws removed in step 4.
8. Unscrew the guide pins and re-install them in the mounting plate in the holes marked *Pin H*.



9. Loosely install 2 M6 cap screws (removed in step 1) onto the back of the projector, as shown.
10. Position the projector with the guide holes over the guide pins and the loosely install the screws over the slots in the flange.
11. Settle the projector on the guide pins and secure to the flange with M5 screws installed in step 9.

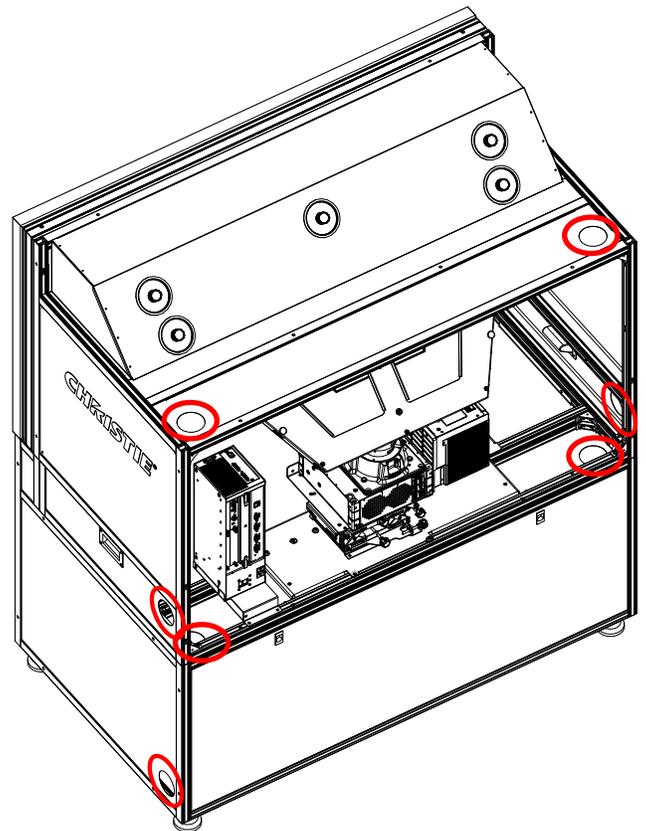


## 3.6 Wiring

### 3.6.1 Tips for Running External Cables to Projectors

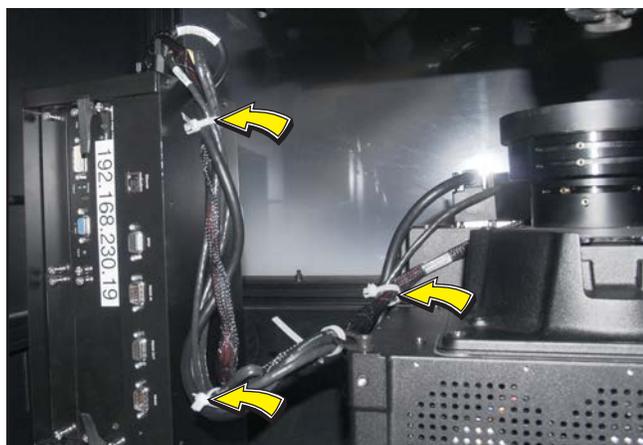
All Christie cubes have cable channels in standard locations. Cable covers are included for external cube walls.

- System wide, keep cabling down to the lengths you need.
- Run cables across the display wall through the pedestals. Always keep cable lengths to a minimum needed length.
- Run cables up the columns to displays.
- When you have run your cables, zip tie bundles of like cables (zip ties not included). Zip tie cable bundles to the anchors on the projector to prevent putting strain on cables and connectors.

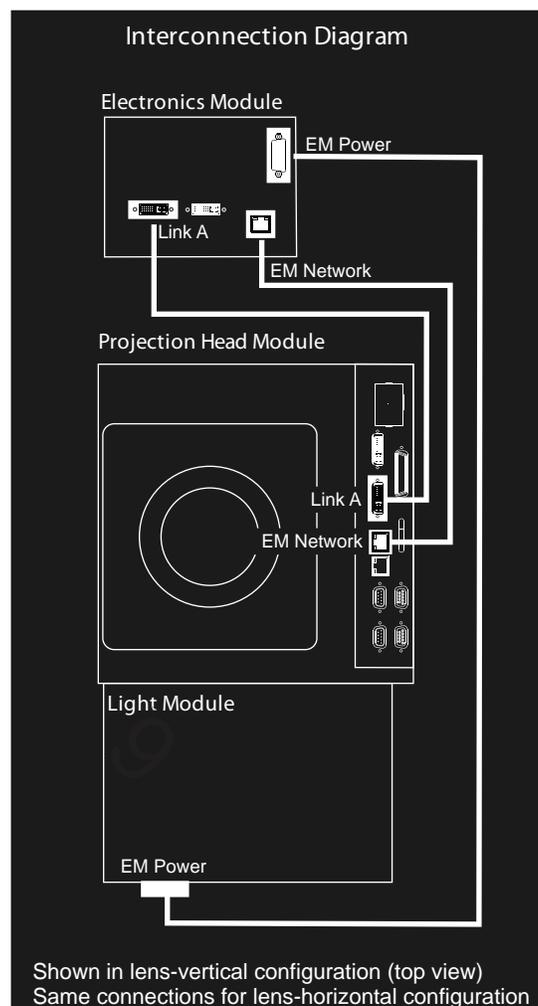
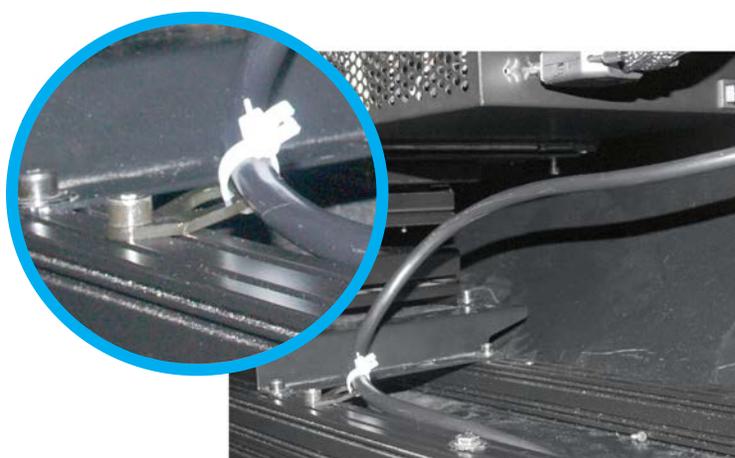


### 3.6.2 Connect the PHM to the EM and AC

1. Install the projector cables. To determine the location of each cable, see the Interconnection Diagram affixed to the LM.
2. Move the cables connecting the projector to the EM away from the projector vents and the light path, and secure with cable ties.



3. Attach a cable anchor to the cube frame with an M6 cap screw and a flat washer. Secure the projector power cable to the anchor with a cable tie.



### 3.6.3 Connect Projectors for External Communication

By default, communications originating from one type of serial controller (RS232, RS422, or Ethernet) stay on the corresponding network path. A **Configuration > Communications > Network Routing > Separate** setting indicates this separation. For example, when using an RS422 controller, it will communicate only with the projector to which it is connected, unless the setting is changed to **RS232 and RS422 Joined** or **All Joined**.

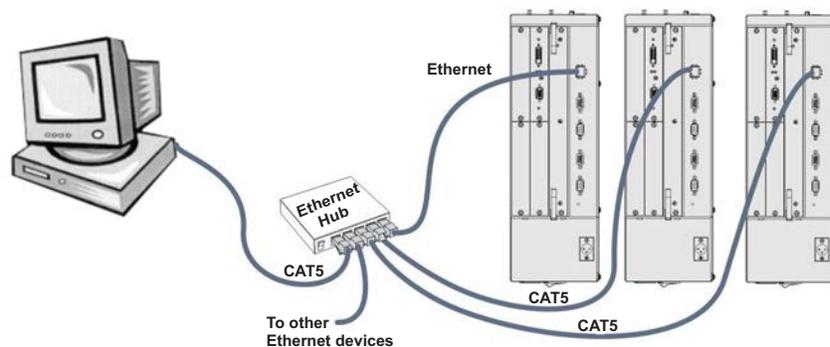
#### Ethernet

In the illustrated Ethernet network, the controller communicates with each projector separately.

To add a projector to an Ethernet network:

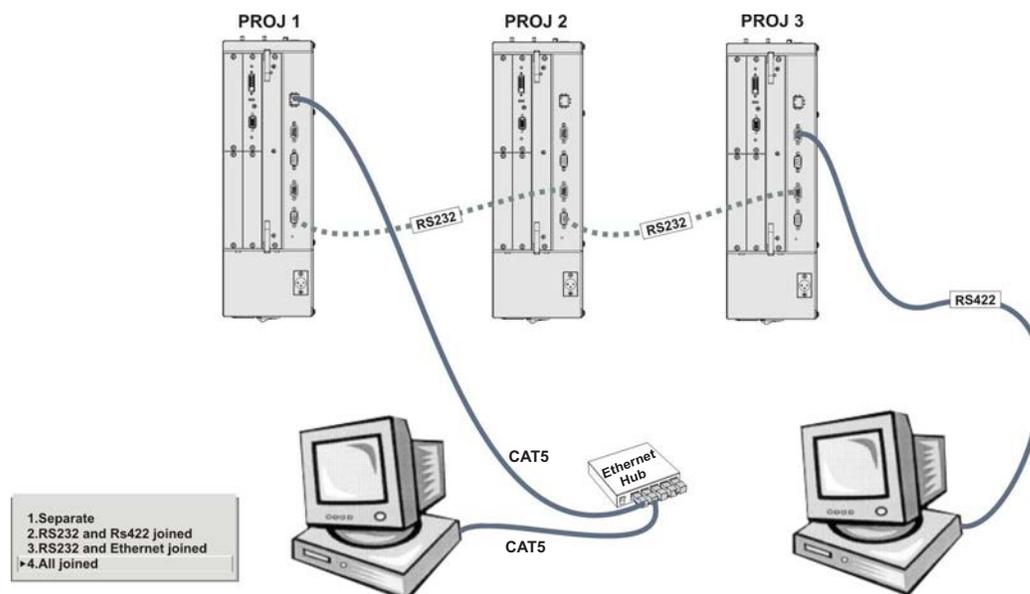
1. Connect a standard CAT5 Ethernet cable between the controller (or Ethernet hub) and the Ethernet port on the projector EM.
2. Set the projector IP address in **Configuration > Communications > Ethernet Settings**.
3. Set **Configuration > Communications > Network Routing** to **Separate**.

See the *Entero RPMWU/RPMSP/RPMHD-LED01 User Manual (P/N: 020-100367-xx)* for information about projector menu options.



## Mixed Network

In the illustrated mixed network, the controller can communicate with the first projector and the command can be relayed to each serially connected projector. This configuration is useful if you are using a non-RS232 controller with the RS232 linking available between these projectors. The example shows both an RS422-compatible controller and an Ethernet-connected PC for working with a network of projectors linked using their RS232 IN/OUT ports.



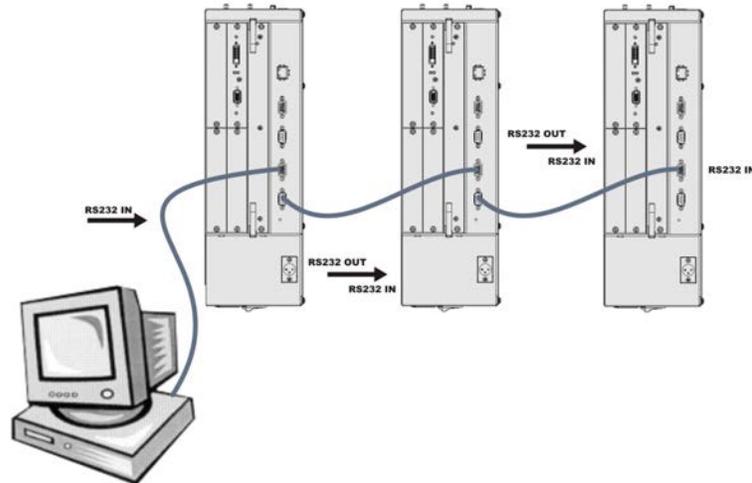
1. Connect the controller to 1 projector:
  - A standard CAT5 Ethernet cable between the controller (or Ethernet hub) and the Ethernet port on the EM.
  - A RS422 serial cable between the PC and the RS422 IN (pictured).
2. Connect a serial cable between the RS232 OUT connector of the first projector's electronics module and the RS232 IN connector of the next projector's electronics module. Connect the remaining projectors. RS232 communication cables must be of good quality and no more than 25 ft (7.6 m) in length.
3. If you connected the controller, using an Ethernet cable, set the IP address in **Configuration > Communications > Ethernet Settings**. Set the serial options in **Configuration > Communications**.
4. Set **Configuration > Communications > Network Routing**:
  - To relay commands to all projectors set Network Routing to **All Join**.
  - To isolate just RS422 communications, select **RS232 and Ethernet Joined**. Only projector #3 will respond to the RS422 controller.
  - To isolate Ethernet communications, select **RS232 and RS422 Joined**—only projector #1 will respond using Ethernet.

See the *Entero RPMWU/RPMSP/RPMHD-LED01 User Manual (P/N: 020-100367-xx)* for information about projector menu options.

## RS232 Network

In the illustrated RS232 network, the controller can communicate with the first projector and the command can be relayed to each serially connected projector.

**NOTICE:** *Using the wrong type of serial cable can damage the projector.*

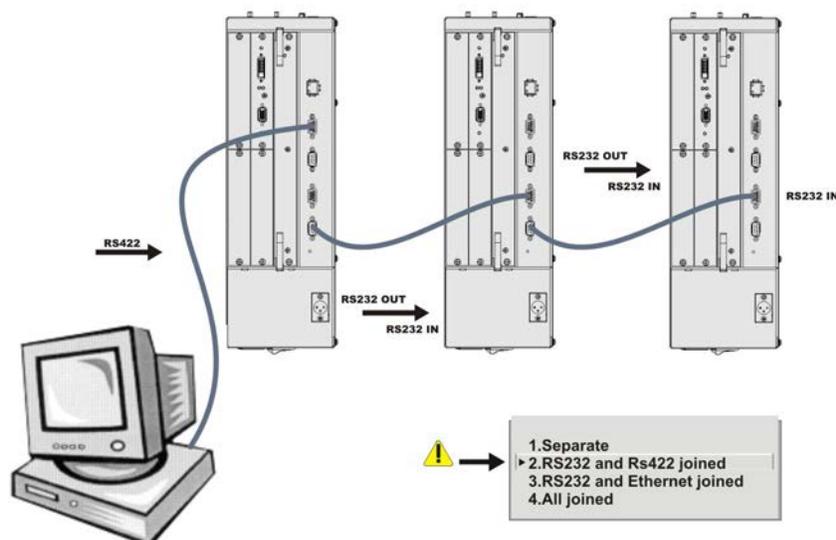


1. Connect the controller to one projector using a serial cable between the PC and the RS232 IN port on the electronics module.
2. Connect a serial cable between the RS232 OUT connector of the first projector's electronics module and the RS232 IN connector of the next projector's electronics module. Connect the remaining projectors. RS232 communication cables must be of good quality and no more than 25 ft (7.6 m) in length.
3. Set the RS232 serial options in **Configuration > Communications**.
4. Set **Configuration > Communications > Network Routing** to **RS232 and RS422 Joined**.

### Mixed Serial Network (RS232 and RS422)

RS422 serial communication is better over long distances than RS232 communication. Use the RS422 port only if your device has the capability. Always read the equipment literature before connecting.

**NOTICE:** Connecting to the RS422 port with incompatible equipment, including the wrong type of serial cable, can damage the projector.



In the illustrated RS-422 network, the controller can communicate with the first projector and the command can be relayed to each serially connected projector.

1. Connect the controller to 1 projector using a RS422 serial cable between the PC and the RS422 IN port on the electronics module.
2. Connect an RS232 serial cable between the RS232 OUT connector of the first projector's electronics module and the RS232 IN connector of the next projector's electronics module. Connect the remaining projectors using RS232 cables. RS232 communication cables must be good of quality and no more than 25 ft (7.6 m) in length.
3. Set the serial options in **Configuration > Communications**.
4. Set **Configuration > Communications > Network Routing** to **RS232 and RS422 Joined**.

### 3.7 Connect Projectors for ArrayLOC

Christie Entero projectors use Christie ArrayLOC technology to automatically and continuously synchronize color and brightness settings across all projectors in an array.

#### 3.7.1 Hardware Requirements

One or more external Ethernet switches are required to create a private ArrayLOC network. To make sure the network operates effectively, do not connect the ArrayLOC network to other external or internal networks. To isolate the ArrayLOC network, you can physically separate the ArrayLOC network switches. You can also isolate specific ports on some switches. If you are able to isolate specific ports, you might not need to purchase additional hardware.

There are 2 configuration methods for ArrayLOC wiring: PHM and EM. PHM is the recommended method. See the chart below for the hardware requirements.

	Selected ArrayLOC Network	
	PHM Network	EM Network
<b>Description</b>	Recommended option for new installations to reduce switch size	Typically used in installations with pre-existing network hardware between the EM and PHM.
<b>Supported projector software versions</b>	1.3.x or later	1.2.x or later
<b>Additional Hardware Requirements</b>		
<b>Additional Ethernet cables required</b>	1	At least 1
<b>Network switches required</b>	At least 1	At least 1
<b>Number of ports per switch</b> N = # of projectors S = # of switches	$(N + 2S) / S$ See <i>Calculate Your Hardware Requirement, on page 3-14.</i>	$(2N + 2S) / S$ See <i>Calculate Hardware Requirements, on page 3-16.</i>

- NOTES:** **1)** Network switches do not need to contain a DHCP server (i.e., switches do not have to be routers).  
**2)** Christie recommends, at minimum, a 100BASE-T type switch, 100 megabit Ethernet standard.

### 3.7.2 ArrayLOC Over PHM Network

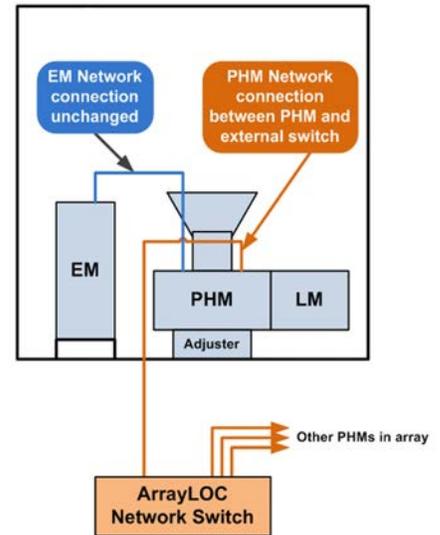
In a PHM Network for ArrayLOC, only the PHM of each projector is connected to the network switch. The projector EM remains connected to the PHM.

#### Calculate Your Hardware Requirement

In an PHM Network for ArrayLOC, each projector requires 1 port on a network switch. For example, if you install a 2 x 4 cube wall with 8 projectors, 8 ports are required ( $8 \times 1 = 8$ ).

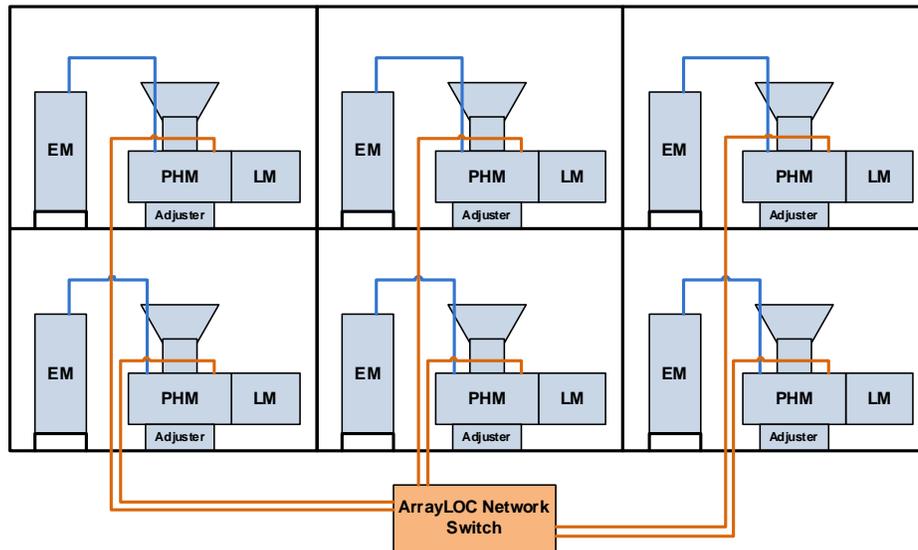
If you use multiple switches, they must be connected to one another to form a single network. Typically, 2 extra ports are required on each switch when you install multiple switches. For example, 14 ports are required if you install 3 switches for a 2 x 4 cube wall with 8 projectors ( $8 \times 1 = 8$ ) + ( $2 \times 3 = 6$ ) = 14.

Typical Entero Configuration for ArrayLOC over PHM Network



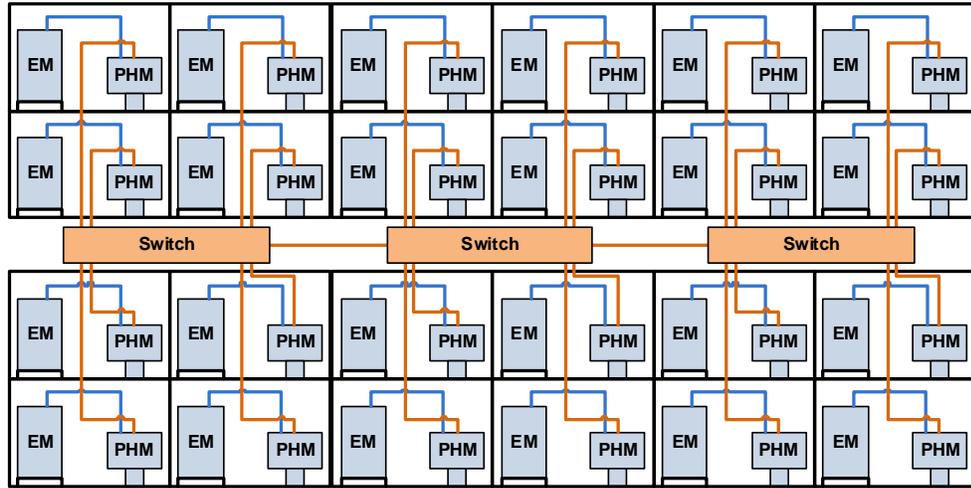
#### PHM Network Example: 2 x 3 Wall

This illustration shows a 2 x 3 wall with a single 6-port switch.



**PHM Network Example: 4 x 6 wall**

This illustration shows a 4 x 6 ArrayLOC configuration with three 10-port network switches.



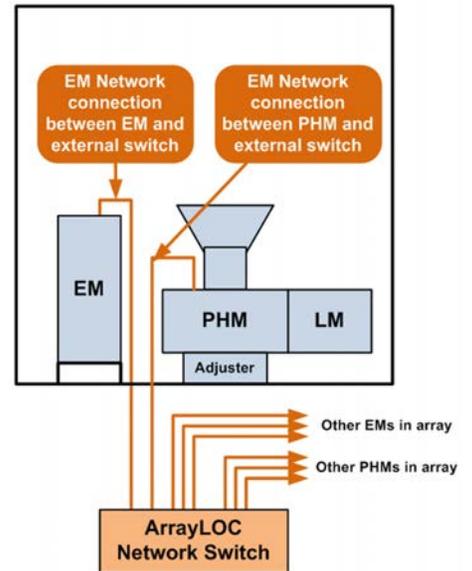
**3.7.3 ArrayLOC Over EM Network**

In an EM Network for ArrayLOC, the projector EM and PHM are connected to a network switch.

To interconnect the projectors:

1. Disconnect the connection between the EM and the PHM.
2. Connect the EM Network port on the EM to an ArrayLOC network switch.
3. Connect the EM Network port on the PHM to an ArrayLOC network switch

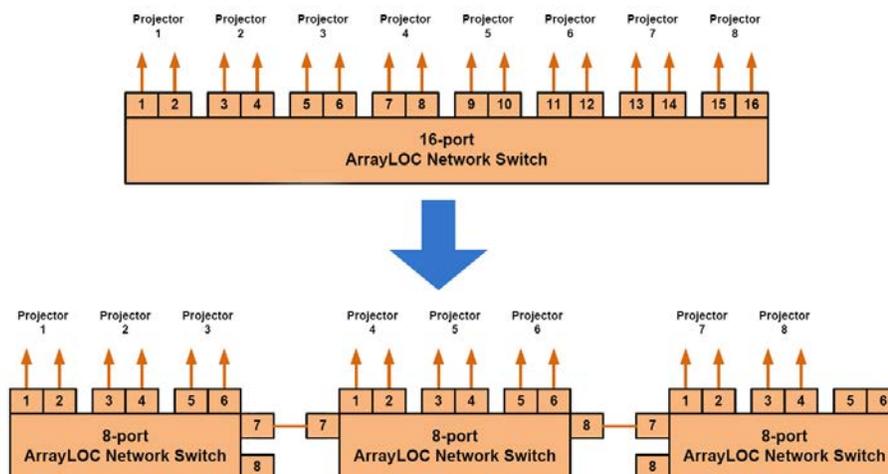
**Typical Entero Configuration for ArrayLOC over EM Network**



### Calculate Hardware Requirements

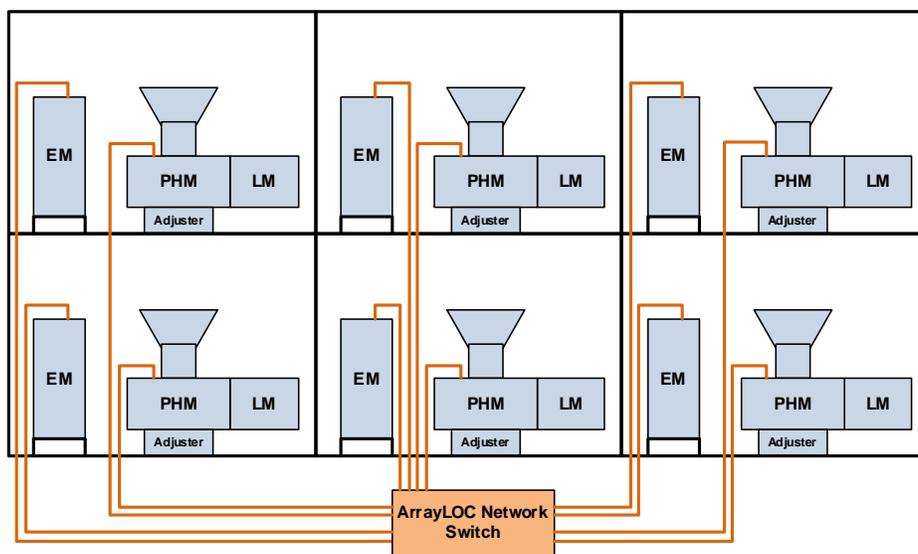
In an EM Network for ArrayLOC, each projector requires 2 ports on a network switch. For example, if you install a 2 x 4 cube wall with 8 projectors, 16 ports are required ( $8 \times 2 = 16$ ).

Multiple switches must be connected to one another to form a single network. Typically, 2 extra ports are required on each switch when you install multiple switches. For example, 22 ports are required if you install 3 switches for a 2 x 4 cube wall with 8 projectors ( $8 \times 2 = 16$ ) + ( $2 \times 3 = 6$ ).



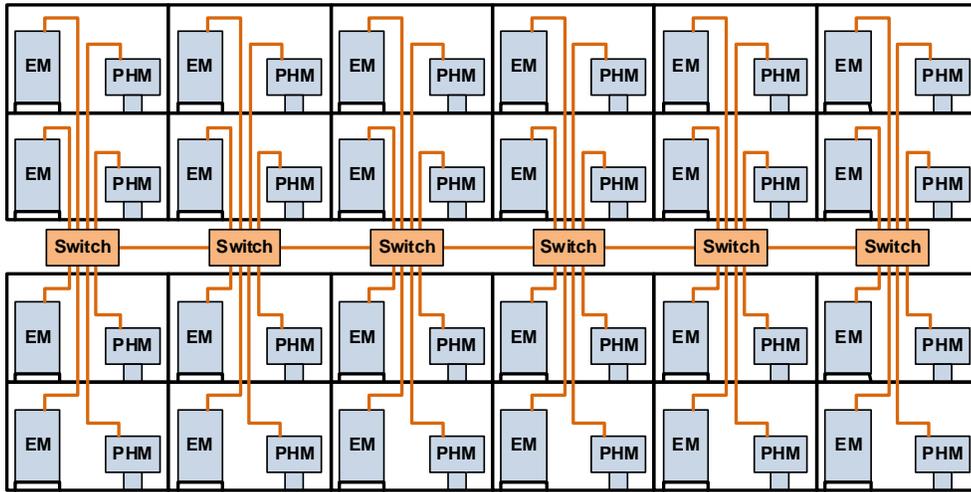
### EM Network Example: 2 x 3 Wall

This illustration shows a 2x3 wall with a single 12-port network switch.

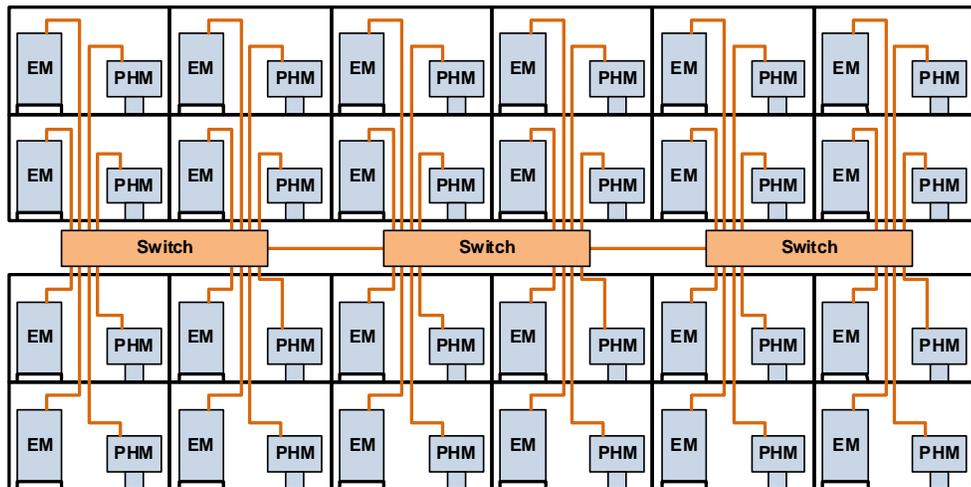


### EM Network Example: 4 x 6 Wall

To reduce the length of the Ethernet cabling for larger installations, use multiple, smaller switches instead of a single, large switch. This illustration shows an ArrayLOC configuration with 6 10-port network switches.



This illustration shows a 4 x 6 ArrayLOC configuration with 3 18-port network switches.



### 3.7.4 Enable ArrayLOC

If using projector software version 1.3.x or later, the type of ArrayLOC network configuration being used must be specified.

1. Navigate to the **Main Menu > Configuration > ArrayLOC > ArrayLOC Configuration > ArrayLOC Network** option.
2. Select an **ArrayLOC Network** type in the list.

**IMPORTANT:** *For the ArrayLOC functionality to work correctly, each projector in the array must be configured to use the same ArrayLOC network configuration.*

## 3.8 Source Connections

All source connections are made to the input panel of the EM. The input panel has 1 slot for an image processor board, and 4 slots for input cards. The first slot includes a standard Dual Link DVI input module, which includes a single dual link DVI input and an analog VGA input.

Input cards are hot swappable; they can be inserted and removed while the projector is running. Sources can also be plugged in and unplugged while the projector is running.

There are 5 input cards available:

- Twin HDMI (High-Definition Multimedia Interface)
- Analog BNC
- Dual SD/HD-SDI (Serial Digital Interface)
- Dual Link DVI (standard with the projector)
- Video Decoder

These cards slide into any of the available input slots. One or more of the input slots may be used with any combination of option cards, including multiples of the same card type. There may be up to 2 active inputs displayed at any time, either from 1 card or from 2 cards. These 2 inputs can be routed to outputs or to the main or PIP video image.

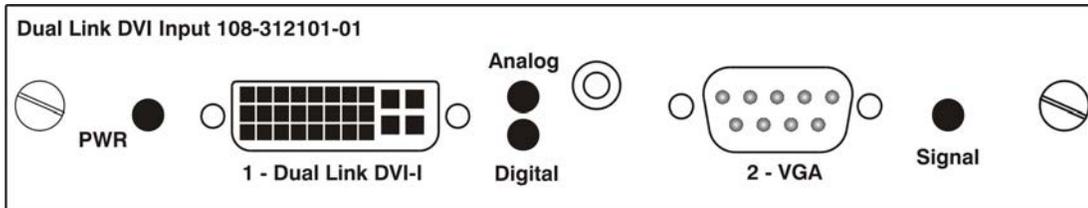
**NOTE:** *Use the correct cable(s) to connect your source. Use only high-quality shielded cables for all connections.*

### 3.8.1 DVI Digital Video

- Use the DVI-I connector to connect either analog or digital video devices to the projector. Use a cable with DVI-I connectors at both ends to connect devices that transmit digital and analog video signals such as high-quality DVD players, satellite receivers and digital cable televisions.
- For true digital output from devices that transmit digital signals, connect to the DVI-I connector.

### 3.8.2 Dual Link DVI Input Card

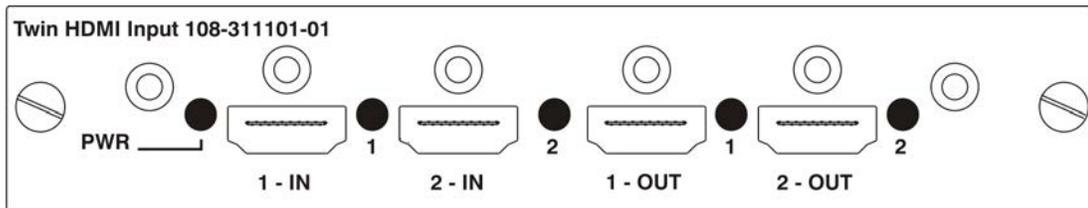
This card accepts a single DVI signal over a DVI-I connector and analog video signals over the DVI-I or 15-pin VGA connector. The module can simultaneously support a digital signal on the DVI input and an analog signal on the VGA port; however, it does not support 2 analog signals at the same time. There are 4 LEDs on the module faceplate. PWR indicates that power is applied and the card is initialized, and the other 3 LEDs on the right-side of the corresponding connectors indicate that a valid signal has been detected. **NOTE:** Entero projectors do not support High-bandwidth Digital Content Protection (HDCP) video signal.



### 3.8.3 Twin HDMI Input Card

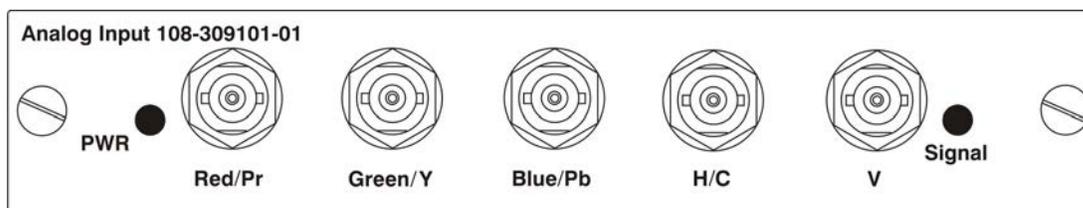
This card accepts 1 or 2 HDMI inputs, and can route 1 or both inputs to the card’s outputs. Any input from any card can be looped out of this card. The output label **1-OUT** loops out the main image being displayed on the projector. The output labelled **2-OUT** loops out the image displayed in the picture-in-picture (PIP). Any input from any optional input card can be looped out of this card.

There are 5 LEDs on the module faceplate. The PWR LED on the left side indicates power is applied, and that the card is initialized. The LEDs to the right side of the corresponding connectors indicate that a valid signal is detected. In the case of the outputs, the LED indicates that a signal is currently being looped out.



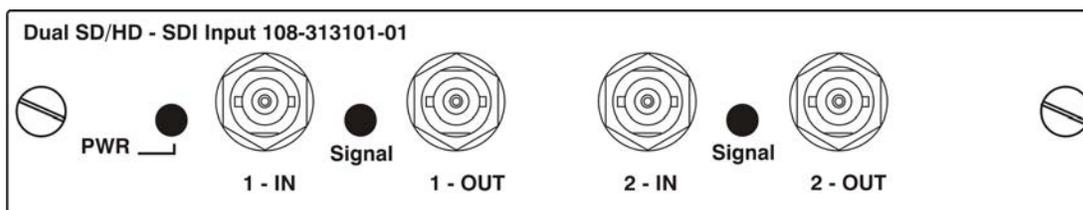
### 3.8.4 Analog BNC Input Card

This card accepts several types of Sync modes. In 5-wire Sync mode, all 5 BNC connectors are used. If H/C and V connectors are swapped, this card will still operate normally. An analog graphic source, such as a VGA from a PC, can be connected. The card can operate in 4-wire Sync mode, which accommodates 4-wire RGBC sources. The composite Sync cable can be connected to either the H/C BNC or the V BNC. The card supports 3-wire RGB or YPBPr Sync modes, sometimes called Sync-On-Green (SOG). In this mode, the H/C and V connectors are not used. The Sync is connected to the Green/Y BNC connector. This card offers no loop-out capability. There are 2 LEDs on the module faceplate. PWR indicates power has been applied, and the card is initialized. Signal indicates a valid signal has been detected.



### 3.8.5 Dual SD/HD – SDI Input Card

This card accepts both standard-definition (SD) and high-definition (HD) serial-digital-interface (SDI) signals from 1 of 2 SD or HD SDI sources. Both single-link HD and dual-link HD signals are accepted. The card has 2 SD/HD-SDI outputs, each of which is “loop through” for its respective input. There are 3 LEDs on the module faceplate. PWR indicates power has been applied and the card is initialized, and the 2 Signal LEDs indicate a valid signal has been detected on the respective input.

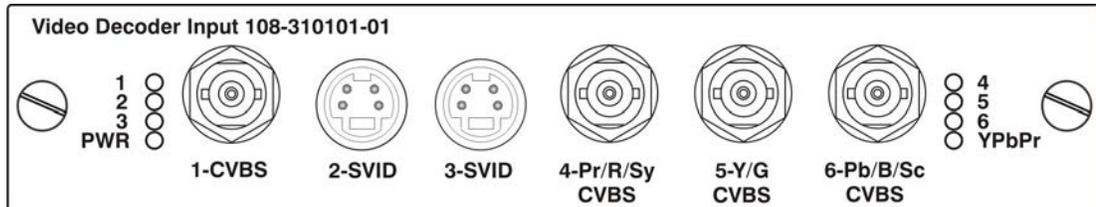


### 3.8.6 Video Decoder Input Card

This card accepts and decodes SD video. This includes CVBS (composite video), S-Video, and component sources. This card supports as many as 6 video signals, 4 of them on BNC connectors and 2 on 4-pin mini-DIN connectors. Each mini-DIN connector accepts one S-Video signal. The first BNC accepts composite video (only), while the remaining 3 BNCs can be grouped to allow one of the following combinations:

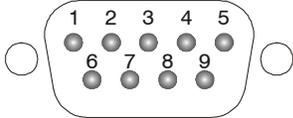
- 3 CVBS sources on 4, 5 & 6
- 1 CVBS source, 1 S-Video source: Luma (Y) connected to 4 (Sy) and Chroma (C) connected to 6 (Sc)
- 1 YPbPr source: component signal on 4(Pr), 5(Y) & 6(Pb)

The video decoder input card has 8 LED indicators. The PWR LED indicates that the module is installed properly, and has been successfully configured. The YPbPr LED indicates that a valid component signal has been detected on inputs 4, 5, and 6. Component Input grouping must also be selected in the projector menu. The remaining LEDs are each associated with 1 of the inputs and indicate that a valid signal has been detected on that input.



### 3.9 System Integration – GPIO Connector

The General Purpose Input Output (GPIO) connector located on the input panel provides a flexible method of interfacing external I/O devices to the projector. There are 7 GPIO pins on the 9-pin D-Sub GPIO connector, which are configured via RS232 commands. The other 2 pins are reserved for ground, and power. The cable required for connecting the external device to the projector GPIO connector, whether it is a standard serial cable or a custom one, must be compatible with the external device.

	Pin Number	Signal
	1,9	+ 12V (200mA)
	2	GPIO 1
	3	GPIO 2
	4	GPIO 3
	5	Ground
	6	GPIO 4
	7	GPIO 5
	8	GPIO 6
	9	GPIO 7

The GPIO connector can be configured to automate any number of events using the GPIO serial command code. Each pin is defined as either an input or output depending on the desired outcome. In general, configure the pin as an input if you want the projector to respond to something the device does, and as an output if you want the external device to respond to an action taken by the projector. For example, configure the pin as an output if you want the lighting in a room to automatically dim when the projector is powered on. By using the GPIO command, you can also set the state of each pin as **high** or **low**. By default, the state of each pin is **high**. The voltage applied to pins in the high state is + 3.3V. See (GPIO) General Purpose Input/Output in the *Entero RPMWU/RPMSP/RPMHD-LED01 User Manual (P/N: 020-100367-xx)*.

## 4 Adjust the Image

If necessary, make the adjustments outlined in this section for each display. Obtain the best results possible before moving on to the next adjustment.

Image adjustments include:

- 6-axis adjustment: Adjusts image geometry to best match the screen perimeter.
- Lens focus adjustment: Adjust for best image focus on the screen.
- Mirror adjustment (only if required): Adjusts fine geometry around the perimeter of the screen.
- Color primaries and brightness adjustment of individual projectors, if required.

### 4.1 Adjustment Tips

- In a multiple-cube display, adjust the center cube first, and then adjust the adjacent cubes to match, working out and up from the center.
- Adjust 1 projector at a time until the entire wall is adjusted.
- Make a rough adjustment of the 6-axis adjuster, focus the image using the focus adjustment knob on the lens, and lock the focus by tightening the focus adjustment knob. Then make a fine adjustment to the 6-axis adjuster.
- Do not over-adjust the knobs on the 6-axis adjuster. A slight resistance during adjustment indicates the end of the adjustment range for that knob.
- Use small 1/4 – 1/2 turns on the 6-axis adjuster to achieve the desired image. This will aid in returning the adjuster back to an original position in the event you lose track of your adjustments and want to start over.
- The adjuster is shipped in nominal position. Nominals are marked; a flashlight may assist in locating the marks.

### 4.2 Power the Projector On

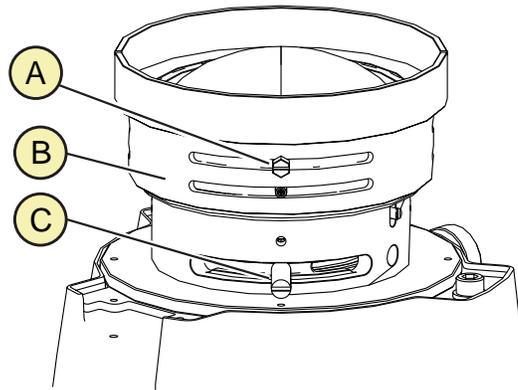
Each projector is supplied with a power cord appropriate for your territory.

1. Plug 1 end of the power cord into the AC receptacle on the projector.
2. Plug the other end of the power cord into a grounded AC outlet. Use only an AC supply within the specified voltage and power range.
3. Flip On the Power switch on the LM (Light Module). The projector takes about 2 minutes to initialize.
4. When the LED display shows 2 dashes and the status light is yellow, press the Power button, and then the up arrow on the remote control.

### 4.3 Focus .64:1 Fixed Lens

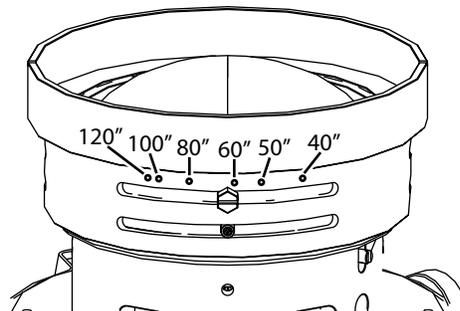
The focus and geometry for Entero projectors are preset for installation in CC67 cubes. For all other installations, follow the steps outlined below.

1. Press **Test** once on the remote to display the internal geometry test pattern. The test image should approximately fill the screen. If not, make a course adjustment using the 6-axis adjuster (see [4.4 Adjust Image Geometry Using the 6-axis Adjuster](#)).
2. Loosen the corner focus-locking screw (A) and the center focus-locking screw (C).



#### 3. Adjust the focus:

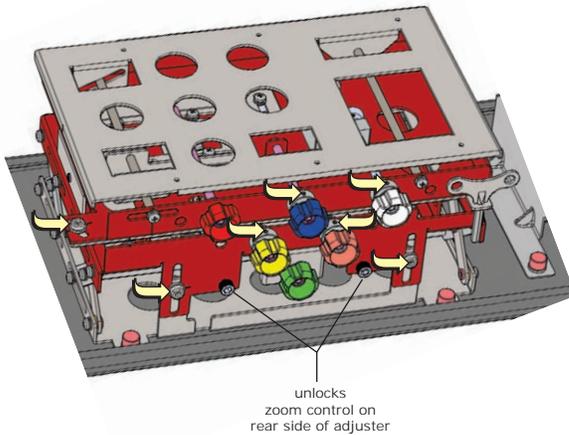
- a. Adjust the focus at screen center (B).
- b. Adjust corner focus and geometry by rotating the collar on the front of the lens. Use the illustration below to gauge the preset position for your screen size.



- c. Adjust the center focus (2) again for best overall screen focus.
4. Tighten the locking screws loosened in step 1.

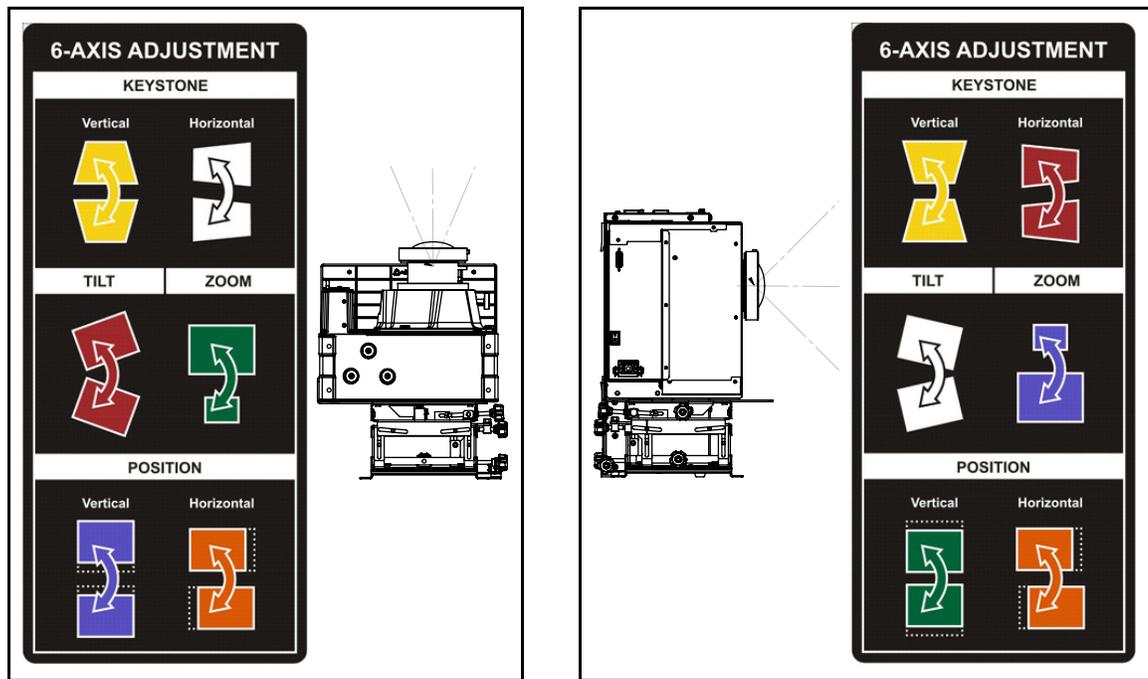
## 4.4 Adjust Image Geometry Using the 6-axis Adjuster

Use the adjuster controls to adjust image geometry: position, keystone, zoom and tilt. Adjustment knobs are color-coded. The 6-axis adjustment label on the product illustrates the function of each. Before making adjustments, make sure the lock screws for each adjustment knob are loosened. Use the 5 mm hex key provided to loosen the M6 lock screws and a 2 mm hex key (not provided) to loosen the collar lock screws. Tighten all lock screws after image adjustments are complete.



- Red Adjustment Knob: Use to adjust tilt.
- Blue Adjustment Knob: Use to adjust the vertical position.
- White Adjustment Knob: Use to adjust keystone.
- Yellow Adjustment Knob: Use to adjust keystone.
- Orange Adjustment Knob: Use to adjust the horizontal position.
- Green Adjustment Knob: Use to adjust zoom.

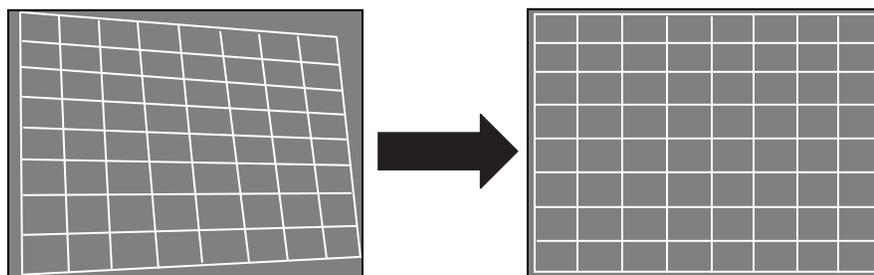
The orientation of the projector in relation to the screen changes the effect of the knob adjustments. Vertical (lens up) is the default installation. A label for the horizontal (lens forward) installation is included with the projector for installations where the projector is configured for direct throw.



**NOTES: 1)** *If it is necessary to make mirror adjustments do so only after you have completed this procedure.*

**2)** *Start with the displays in the center of the bottom row and work towards the end of the row.*

1. Work from the back of the display cube. Make sure you can see all 4 sides of the image on the inside of the screen.
2. Adjust the lens for best image focus on the screen. See [4.5 Fine-tune Image Geometry using the Mirror, on page 4-5](#).
3. Press **Test** on the remote once to display the internal geometry test pattern. The image on the left in the illustration below provides an example of what you will observe after installing the light engine and before any adjustments are made.
4. Make the following adjustments for each display to achieve the image shown on the right in the illustration below. The edge of the test image should be within 5 mm (0.2”) of the perimeter.
  - a. Adjust the vertical and horizontal position of the image until it is centered on the screen.
  - b. Zoom the image until it fits just inside the borders of the screen.
  - c. Adjust vertical and horizontal keystone, and tilt.
5. Once the image is geometrically aligned with the screen, as illustrated below in the image on the right, zoom out until the edge of the test pattern is evenly aligned along the edges of the screen.
6. If necessary, readjust lens focus.
7. For each screen make sure image geometry matches between each display.



These adjustments usually require a second person in front of the display providing feedback and guidance with display to display alignment. Start with the displays in the center cubes in the bottom row and work towards the ends of the row. Then start with the next row in the same way.

- a. Zoom out the image until it completely fills the screen.
- b. If necessary, repeat step 4.
- c. Repeat steps 1 to 6 for each display.

## 4.5 Fine-tune Image Geometry using the Mirror

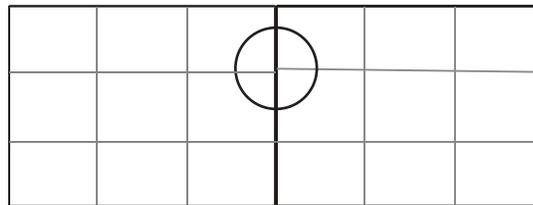
**NOTICE:** Do not use tools to tighten the thumbscrews on the mirror to prevent the possibility of it cracking.

**NOTE:** Adjust the optical mirror only when image geometry cannot be corrected with the 6-axis adjuster.

This section outlines how to fine adjust the image geometry using the mirror adjustments. For example when the edges of a single corner do not properly line up to the screen, or when a side of the image bows in or out slightly. Guidance for fixing specific issues follows the general instructions for mirror adjustments. Mirror adjustments should only be performed if absolutely necessary.



You can also use the mirror to correct slight misalignments between projected images where the edges align properly with the screens, but adjoining images do not line up correctly.

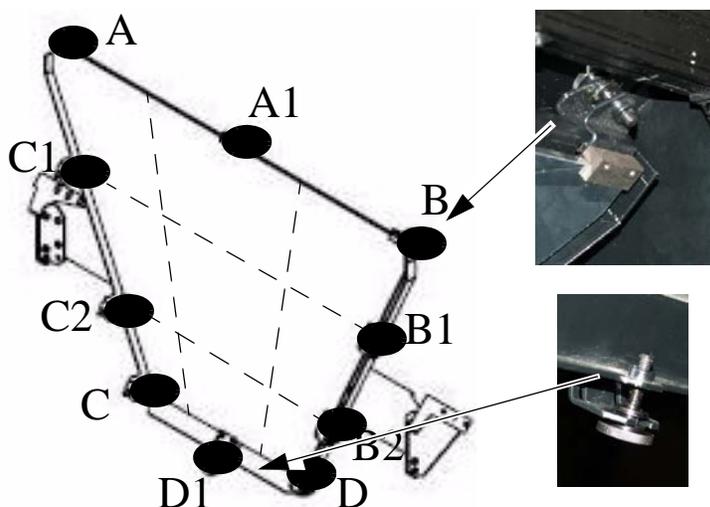


### 4.5.1 Mirror Adjustment Screws

Turn screws clockwise to pull the mirror away from the screen and make the image larger in the corresponding area. **NOTE:** *Turning the D1 adjustment screw clockwise pushes the mirror towards the screen.*

Turn screws counter-clockwise to push the mirror towards the screen and make the image smaller in the corresponding area. **NOTE:** *Turning the D1 adjustment screw counter-clockwise pulls the mirror away from the screen.*

The illustration on the right shows the locations of adjustment screws on the mirror and the corresponding zone on the screen that they affect. The adjustment screws allow you to adjust the mirror in both directions. Meaning the mirror can be pushed in or pulled out.



### 4.5.2 Adjust the Mirror

1. Loosen each of the thumbscrews. Turn each thumbscrew in either direction until you feel resistance. This is the neutral position.
2. Turn the thumbscrews, in either direction to move the image 1 to 2 pixels from any corner or edge. Adjust the corners of the image first, then the edges.
3. See [4.5.3 Image Geometry Troubleshooting using the Mirror, on page 4-7](#) for information on the adjustments required to troubleshoot specific image problems.

### 4.5.3 Image Geometry Troubleshooting using the Mirror

The following examples illustrate what areas of the optical mirror to adjust to achieve the desired image.

Image Problem	Screws to Adjust	Direction of Movement by Mirror During Adjustment

Turn thumbscrews clockwise in zones C1–A–A1 to pull the mirror

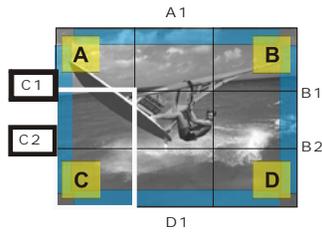
Turn thumbscrews counter-clockwise in zones C1–A–A1 to push the mirror

Turn thumbscrews clockwise in zones C1–C2–A to pull the mirror

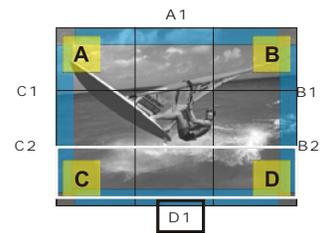
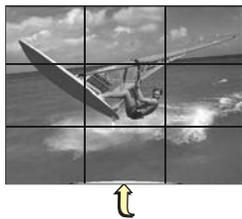
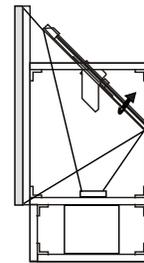
Image Problem

Screws to Adjust

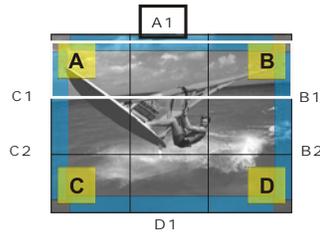
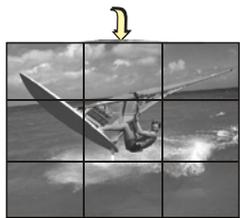
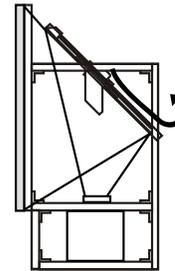
Direction of Movement by Mirror During Adjustment



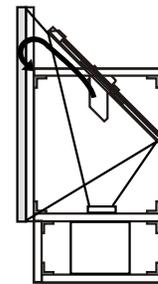
Turn thumbscrews clockwise in zones C1– C2 to pull the mirror



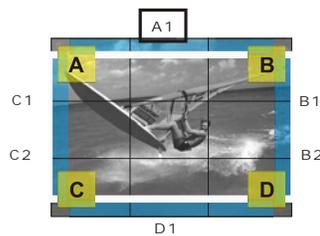
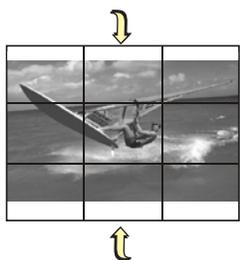
Turn thumbscrews clockwise in zones C and D, and counter-clockwise in D1 to pull the mirror



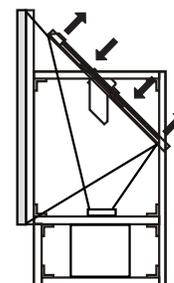
Turn thumbscrews counter-clockwise in zones A–A1–B to push the mirror.



Linearity Problem



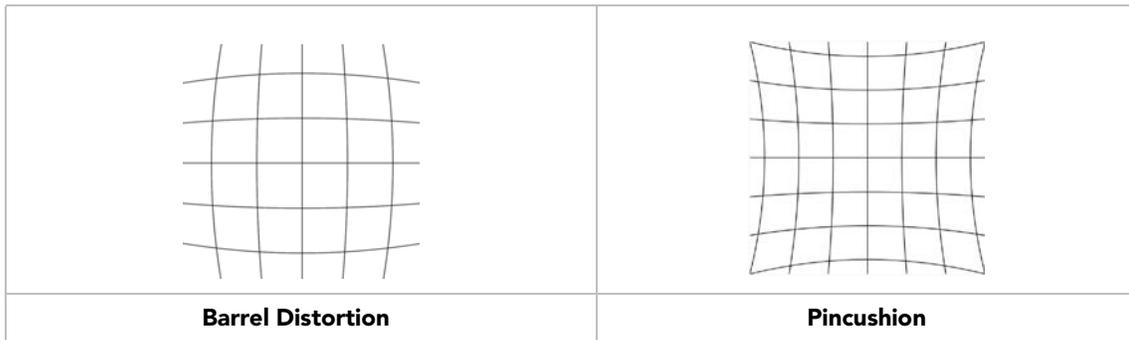
Turn thumbscrews counter-clockwise in zones C and B to push the mirror.  
 And/Or  
 Turn thumbscrews clockwise in zones A–A1–B, C–D–D1 to pull the mirror.  
 And/Or  
 D–D1 counter-clockwise to pull the mirror.



NOTE: This adjustment is required if the mirror is slightly curved in.

#### 4.5.4 Barrel and Pincushion Distortion

To correct barrel or pincushion distortion, adjust the A1 and B1, B2, C1, C2, and D1 mirror screws.



### 4.6 Optimize Image Setup and Display

#### 4.6.1 Initialization and Auto Setup

**NOTE:** To adjust image position, size/zoom, tilt, or keystone in a display wall system, see 4.4 Adjust Image Geometry Using the 6-axis Adjuster, on page 4-3. Software adjustments to image geometry in a display wall are rarely used.

1. Display an image from an external source. Use an image that has no black border and that contains at least 3 adjacent black and 3 adjacent white pixels for input level adjustments for analog sources.
2. If the image is not oriented correctly, select **Configuration > Output Settings > Image Orientation** and change the orientation of the displayed image to suit the installation. For example, for Christie cube installations, select **Rear Projection Inverted**.
3. Assign a unique projector ID number for each projector. Select **Main Menu > Configuration > Communications > Projector Address**.
4. If the projectors are connected serially, you can check **Broadcast Keys** in the **Communications** menu for the master projector. All other serially connected projectors should have this option cleared. Control the master projector with a wired remote and commands are automatically forwarded to the other serially linked projectors.
5. Select **Auto Setup** to allow the projector to setup the best possible settings for the chosen incoming signal: image size based on resolution, horizontal and vertical phase and pixel tracking, and video input levels (for analog sources).
6. Make sure that the **Processing Mode (Image Settings menu)** is correct for the selected source.
7. Change **Resize Presets** if you want the image displayed at a resolution other than **Native**. Native resolution gives the best image quality.
8. For analog sources, adjust **Pixel Phase** and **Pixel Tracking** from the **Size and Position** menu to eliminate noise from the displayed image.

Image settings for an input are stored in projector memory locations called channels. Starting Auto Setup will create a new channel if any of the following conditions are met:

- Change in the vertical frequency > .17Hz
- Change in the horizontal frequency > 90 Hz
- Change in either horizontal or vertical sync polarity
- An interlaced signal is encountered

For information about managing channels, see the *Entero RPMWU/RPMSP/RPMHD-LED01 User Manual (P/N: 020-100367-xx)*.

### 4.6.2 Adjust Image Geometry Using the Projector Software

Only use projector software options if the images still requires adjusting after the hardware has been optimized and Auto Setup has been run. See the *Entero RPMWU-RPMSP-RPMHD-LED01 User Manual (P/N: 020-100367-xx)* for details about software based geometry changes: Size and Position, Resize Presets, Geometry Correction.

### 4.6.3 Adjust Black Levels and Input Drives

For analog sources, optimize input levels.

1. Display the source image. The image must have at least 3 adjacent black and 3 adjacent white pixels. For best results, display a 16-step grayscale pattern.
2. Select **Main Menu > Image Settings > Input Levels**.
3. Select **Auto Input Levels**.
4. When the values for black levels and input drives start to stabilize, clear **Auto Input Levels**.
5. Exit the projector menus.

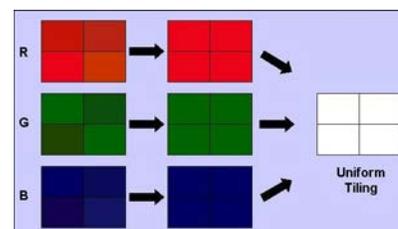
**NOTE:** To adjust input drives and black levels manually, set black levels for all colors at full black. Set drive levels at 60–70% white.

## 4.7 Adjust Color Using ArrayLOC

Use projector color adjustments to match the color primaries for all the projectors in the array.

This procedure requires that the projectors are wired for ArrayLOC. See [3.7 Connect Projectors for ArrayLOC, on page 3-13](#).

1. Select **Main Menu > Configuration > ArrayLOC > Array Color Target**.
2. Set **Target Color Space** to **User 1**.
3. Check that **Copy Color Space From** is set to **Maximum**.
4. Check that **Select White Point** is set to 6500 (D65).
5. Select 1 projector to work with and select **Main Menu > Configuration > ArrayLOC > Synchronize to This Projector**.
6. Adjust colors for each projector in the array to calibrate the array as a system.
  - a. Select **Main Menu > Configuration > ArrayLOC > Projector Color Adjustment**.
  - b. Set **Target Color Space** to **User 1**
  - c. Use **White Brightness Adjustment** to match the brightness on all the projectors in the array.
  - d. Use the color settings (red part/green part/blue part) to adjust the color primaries to match across all projectors.
    - You may need to add some green to some of the reds.
    - Greens are usually pretty consistent.



- You may have to add some red to some of the blues.
- e. Use the white color settings to achieve a uniform white across all projectors.
  - f. Exit the color adjustment menus.

Once you have completed these adjustments, the ArrayLOC feature automatically monitors and maintains the color and brightness uniformity across the display wall.

## 4.8 Adjust Brightness Uniformity

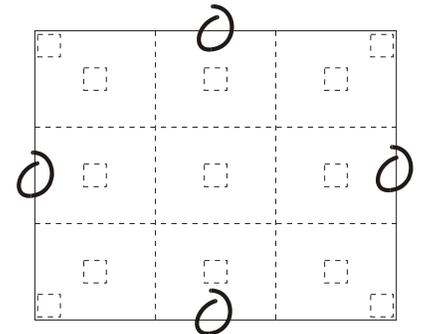
This brightness uniformity adjustment improves the brightness uniformity of the selected display cube; it does not affect the uniformity across the display wall. This adjustment is rarely required, but when used it slightly decreases the overall brightness of the projector.

1. Adjust the primary colors before attempting to work with **Brightness Uniformity**. Make sure that primary colors, color temperature, and maximized light output are all well matched from 1 screen to another. These matches are needed before you can achieve good brightness uniformity results. See the *Entero RPMWU-RPMSP-RPMHD-LED01 User Manual (P/N: 020-100367-xx)*.

**IMPORTANT:** Double-check that all **WHITES** and **LIGHT OUTPUT** are well-matched.

2. Select **Main Menu > Configuration > Geometry & Color > Brightness Uniformity**. Select the **Brightness Uniformity Enable** check box. This will enable access to the uniformity controls and will apply the settings to the image.
3. From **Test Pattern**, select the 13-Point test pattern for Full White for display. The 13-Point test pattern provides 9 screen “zones” with 13 targets.
4. Determine by eye or meter which areas need to be adjusted.

**FOR BEST RESULTS** Rather than examining the **CENTER** of each zone when assessing **Brightness Uniformity** adjustments, focus on extreme edges, as indicated in the illustration to the right.



13-Point Test Pattern

### 4.8.1 Cancel Brightness Uniformity

If you do not want to use or apply brightness uniformity settings, clear the **Uniformity Enable** check box at the top of the **Brightness Uniformity** menu.



# 5 Troubleshooting

**NOTICE:** *To avoid personal injury or damage to the projector read, understand, and observe all warnings and precautions before servicing the projector.*

This section provides information and procedures for resolving common display issues. If you cannot resolve a display issue, contact your dealer. Only Christie accredited service technicians are authorized to service this product.

When diagnosing an issue:

- Make sure that the system is plugged in.
- Make sure that cables are connected and not damaged.
- Power off the system, wait 90 seconds to allow for cooling, and power the projector back on. Check for a normal power up sequence.
- Check the projector LEDs for error codes and correct any issues if possible. See the user manual for your projector.
- Check source connectivity. Switch sources if possible.
- Use RS232 serial communications to communicate with the projector during diagnosis.

## 5.1 System Warnings and Errors

A warning or error message appears when a projector malfunction occurs. These options are available for viewing status and error information:

- LEDs on the input panel. See [5.3 LED Status Indicators](#).
- The Status window in the projector and web menus. The Status window updates automatically when the error condition is corrected.
- On the projector display if system messages are enabled. To clear an error code on the projector display, press **Exit** twice. If an error code recurs, reset the projector by turning it off and on. If an error code persists, contact Christie Support.
- A warning message replaces the input signal message and disappears when the input signal status changes. The projector remains operational, but the message indicates a serious problem that should be reported to the Christie.
- A error message indicates a serious malfunction has occurred and it must be reported to the Christie. The projector is not operational.

## 5.2 Error Codes

If the status display window shows one of the codes in the Error Codes table you may need a Christie accredited service technician to repair the component identified by the error code.

Error codes are displayed in a 3–phase format:

- First 2 digits represent the component or error category
- Second 2 digits represent the specific problem
- Display off

This cycle repeats. The LED will be red while the error code is displayed.

Acknowledge and clear the error by pressing **Exit** twice when at the presentation level (no OSD on the screen). If the error recurs then try resetting the projector by powering off and on again. Contact the dealer if the problem persists or if you see a code not listed in the table.

	CODE	DESCRIPTION
<b>Light Engine (LE)</b>		
LE	01	Light engine link error
LE	02	Light engine initialization error
LE	03	Light engine run time error
<b>Link (LI)</b>		
LI	01	Error on EM network
LI	02	Error on PHM network
LI	03	Error on ArrayLOC link
<b>Projector Head Module Fan (FP)</b>		
FP	01	PHM FD Fan 1 stalled
FP	02	PHM FD Fan 2 stalled
FP	03	PHM LMC Fan 1 stalled
FP	04	PHM LMC Fan 1 stalled
<b>Electronic Module Fan (FE)</b>		
FE	01	EM Fan 1 stalled
FE	02	EM Fan 2 stalled
<b>Projector Head Module Sensors (SP)</b>		
SP	01	PHM FD sensor 1 overtemp or sensor not functioning
SP	02	PHM FD air inlet overtemp or sensor not functioning
SP	03	PHM FD air exhaust overtemp or sensor not functioning
SP	04	PHM FD DMD overtemp or sensor not functioning
SP	05	PHM QDPC board overtemp or sensor not functioning

SP	06	LM Air inlet overtemp or sensor not functioning
SP	07	LM C Air exhaust overtemp or sensor not functioning
SP	08	LM LED Driver overtemp or sensor not functioning
SP	09	LM Power supply overtemp or sensor not functioning
SP	10	LM ambient overtemp or sensor not functioning
SP	11	LM Red thermistor overtemp or sensor not functioning
SP	12	LM Green thermistor overtemp or sensor not functioning
SP	13	LM Blue thermistor overtemp or sensor not functioning
SP	14	LM IR thermistor overtemp or sensor not functioning
<b>Electronics Module Sensors (SE)</b>		
SE	01	PHM FD sensor 1 overtemp or sensor not functioning

### 5.3 LED Status Indicators

LEDs on the projector indicate the projector status. This table lists the LED state and its associated meaning.

LED STATUS	2-CHARACTER DISPLAY	DESCRIPTION
 Solid yellow	Rotating	<ul style="list-style-type: none"> <li>• Hardware initializing</li> <li>• Waiting to establish connection with PHM</li> <li>• Standby (connected to PHM)</li> </ul>
 Solid green	<b>BO</b> (Booting) when power first applied <b>B1</b> (Boot phase 1) starting main script <b>B2</b> (Boot phase 2) starting projector code <b>B3</b> (Boot phase 3) about to initialize connections <b>SH</b> (Shutter Mode) active EM	When powering on (booting) the projector the LED will go through phases, which are shown on the status display. <ul style="list-style-type: none"> <li>• Powered ON</li> <li>• Normal operations</li> <li>• EM on</li> </ul>
 Solid Red	System error – see corresponding error code on status display	
 yellow	<b>PR</b> (Programming TI)	
 Flashing green		Keypad command sent – command received
 Flashing red		<ul style="list-style-type: none"> <li>• Key press error</li> <li>• Wrong protocol sent</li> </ul>

## 5.4 Projector Does Not Turn On

- Make sure the projector is plugged in.
- Make sure cables are connected and not damaged.

## 5.5 Light Module Suddenly Goes Off

1. Check shutter setting – if status display shows **SH** then the shutter may be active. Toggle through shutter modes. In **gray** shutter mode it should be possible to display menus.
2. Verify **RGB Brightness** is set sufficiently higher than zero to ensure a visible image. The DMDs may be overheated. Check for an alarm condition.

## 5.6 No Display When the Projector is On

1. Make sure the lens cover is removed from the lens.
2. Make sure the correct display button is selected in the channel setups.
3. Make sure AC power is connected.
4. Make sure an active source is connected properly. Check the cable connections and make sure the alternative source is selected.
5. Make sure that the DVI cable from the PHM to the EM is connected.
6. Make sure the test patterns are accessible? If so, check source connections again.

## 5.7 The Display is Unstable

1. If the non–cinema display is jittery or blinking erratically, make sure the source is properly connected and of adequate quality for detection. With a poor quality or improperly connected source, the projector repeatedly tries to display an image, however briefly.
2. The horizontal or vertical scan frequency of the input signal may be out of range for the projector.
3. The sync signal may be inadequate. Correct the source problem.

## 5.8 The Display is Faint

1. The source may be double terminated. Make Sure the source is terminated only once.
2. The source (if non–video) may need sync tip clamping.
3. Make sure the **RGB Brightness** setting and the **Brightness Uniformity** settings are set to 100%.
4. If the Twist™ software was used, test by disabling the blend.
5. Brightness and/or contrast may be set very low.

## **5.9 The Upper Portion of the Display is Waving, Tearing or Jittering**

1. Check that the **RGB Brightness** setting is not too low.
2. Check the signal level on the input device.

## **5.10 Portions of the Display are Cut Off or Warped to the Opposite Edge**

If you have resized the image, adjust the resizing settings until the entire image is visible and centered.

## **5.11 Display Appears Compressed (Vertically Stretched)**

1. Adjust the frequency of the pixel sampling clock for the input source.
2. Verify the size and position settings are correct for the input source.
3. Check the geometry correction for warp or keystone correction.

## **5.12 Data is Cropped from Edges**

1. To display the missing material, reduce image size to fill the display area available in the projector, then stretch vertically to fill the screen from top to bottom. Add the anamorphic lens to regain image width.
2. Check blend settings and masking.

## **5.13 Inconsistent Picture Quality**

1. Verify the quality of the signal from the input source.
2. Verify the H and V frequencies of the input source are correct.

## **5.14 Static Display**

1. Power the projector off and unplug the power cord from the power source.
2. Plug the projector power cord into a power source and power the projector on.

## **5.15 Inaccurate Display Colors**

Adjust the color, tint, color space, and color temperature settings of the input source. Make sure you select the correct PCF, TCGD, or color space file for the source.

## **5.16 Display is Not Rectangular**

1. Verify the projector is level and the lens surface and screen are parallel to one another.
2. Adjust the vertical offset of the lens mount.
3. Verify the geometry correction settings.

## 5.17 Display is Noisy

1. Adjust the input source pixel tracking, phase, and filter.
2. Verify the video input is terminated (75 ohms). If the device is the last device in a linked series, verify the video input is terminated at the last input source.
3. Verify the cables connecting the input device to the projector meet the minimum requirements.
4. Add signal amplification or conditioning if the distance between the input device and the projector exceeds 25 ft (7.6 m).

## 6 Maintenance

The following procedures are provided for use as needed. There is no required set maintenance schedule for this product.

### 6.1 Ventilation

The operating environment in which you operate the display cubes should not exceed the temperatures defined in [Appendix A Specifications](#). Make sure there is adequate airflow around the display cubes.

### 6.2 Clean the Mirror

**NOTICE:** *Typically, it is not necessary to clean the mirror; however, if required do not use ammoniated window cleaner. This can damage the protective layer of the mirror. Aggressive cleaning techniques increase the risk of mirror damage.*

#### 6.2.1 Items Required

- Distilled or de-ionized water
- Isopropyl alcohol (high purity with no coloration or additives)
- Clean pure acetone (high purity with no additives)
- Lint-free cloths (without color)
- Cotton swabs, with non-synthetic stalks (wooden-stick)
- Dry, clean compressed air
- Cotton exam gloves and/or vinyl or latex exam gloves

#### 6.2.2 Prerequisites

- Make sure the work area is free of fumes, fluids and dust.
- Put a support below the mirror to make sure it is equally supported during cleaning.
- Use cotton, vinyl or latex gloves when handling the mirror.

#### 6.2.3 Instructions

**NOTICE:** *Make sure there is no direct or diffused sunlight in the room. Do not wipe or rub the mirror surface. Only light touch or “dab” the mirror.*

##### **Remove Water Droplet rings, marks, and other surface stains**

Use isopropyl alcohol on the corner of a cotton wipe or a swab to “dab” the area. If stains cannot be removed with the isopropyl alcohol use acetone as an alternative. Stains located in or under the protective layer can not be removed.

### **Remove Finger Prints**

1. Use a lint free cotton cloth with acetone and alcohol to dab the stain. For a finger print that is hard to remove, use a cotton swab dipped in acetone.
2. Use compressed air to dry the solvent.

## **6.3 Clean the Screen**

Notice: Typically, it is not necessary to clean the screen; however, if required follow the guidelines listed here.

### **6.3.1 Items Required**

- Mild soap or detergent diluted with luke warm water
- Lint-free cloths (without color)
- Chamois
- Cotton exam gloves and/or vinyl or latex exam gloves

### **6.3.2 Prerequisites**

- Make sure the work area is free of fumes, fluids and dust.
- Never drop or slide screens on their edges or surfaces.
- Before laying screens onto flat work surfaces, lay foam slip sheets down to protect screen.
- Avoid laying screens on uneven or dirty work surfaces. Small chips or dirt particles can damage the screen surface.
- Use cotton, vinyl or latex gloves when touching or handling the screen.

### **6.3.3 Instructions**

1. Apply soap or detergent solution to lint-free cloth.
2. Wipe the screen surface to remove dirt or oils. Apply light pressure only.
3. Use another lint-free cloth and clean water to wipe the soap from the screen surface. Apply light pressure only.
4. Use a dry lint-free cloth to blot the surface dry.

## 6.4 Clean the Projection Lens

**NOTICE:** *Clean only if necessary. A small amount of dust on the lens has little effect on picture quality.*

### 6.4.1 Items Required

- Camel-hair brush
- Lint free cloths (without color)
- Coated optics cleaning solution

### 6.4.2 Instructions

#### Remove Dust

1. Brush most of the dust from the lens with a camel-hair brush or blow dust away with a dust-free blower.
2. Fold a microfibre cloth smooth and gently wipe remaining dust particles from the lens. Wipe evenly with the smooth portion of the cloth that has no folds or creases. Do not apply pressure with your fingers - use the tension in the folded cloth itself to collect dust.
3. If significant dust is still bound to the surface, dampen a clean microfibre cloth with coated optics cleaning solution (damp, not dripping). Wipe gently until clean.

#### Remove Fingerprints, Smudges, or Oil

**NOTICE:** *Do not use a cleaning solvent that contains ammonia. Avoid lens contact with Xylene and Ether.*

1. Brush away most of the dust with a camel-hair brush and/or blow away using a dust-free blower.
2. Roll a lens tissue around a swab and soak it in coated optics cleaning solution. Tissue should be damp, but not dripping.
3. Gently wipe the surface using a figure-8 motion. Repeat this motion until the blemish is removed.



# A Specifications

This appendix includes specifications and brief dimension drawings for the following display units:

- CC50
- CC67
- CC70
- CC70HD
- CC72

Additional information and drawings are available for download from [www.christiedigital.com](http://www.christiedigital.com).

## A.1 CC50 Specifications

		SXGA+	
Product make-up <sup>1</sup>	cube	• CC50-2301	
	projection engine	• RPMSP-LED01	
	screen options	• SC50-LE02 • SC50-XP01	
Imaging technology	imaging	• 1-chip DLP, Dark Chip	
	native resolution	• SXGA+ (1400 x 1050)	
	illumination	• Light Emitting Diodes (Red, Green, Blue)	
Pixel density	pitch	• 35 pixels per linear inch	
Screen	gap	• 1 mm nominal gap between adjacent images/screens	
	types	• Wide angle cross prism • High gain lenticular	
Inputs	standard	• Digital DVI-I with analog VGA	
	scan rates	• Horizontal: 15-120kHz • Vertical: 23.97-150Hz • Pixel clock: 165 MHz	
	expansion	• 3 input module slots available	
	optional modules	• VGA, Digital (DVI), Analog (RGB), dual SDI/HDSI, twin HDMI	
	compatibility	• Compatible with Christie TVC Series video wall controllers or other input sources from VGA to QXGA as well as standard HD for	
Illumination	technology	• LED (RGB)	
	LED life rating <sup>2</sup>	• >60,000 hrs	
Color	temperature range	• 3200-9300K	
	gamut	• Beyond 100% EBU	
	adjustment and control	• Screen to Screen: ArrayLOC automatic brightness and color management • Individual: Comprehensive Color Adjustment (CCA™)	
Optical	lens types	• 0.69:1 low distortion, zero offset, with field curvature correction	
	brightness uniformity	• Brightness uniformity control provides up to 100% uniformity capability for critical applications	
	contrast ratio <sup>3</sup>	• >100,000:1 (full field using shutter mode) • 1400:1 (full field); up to 450:1 ANSI	
Control/networking	ports/controls	• 2 RS-232 ports and 1 RS-422 port • Field upgradable software via RS-232 network or Ethernet • IR remote control • GPIO port • On-board ChristieNET™ connectivity (RJ45)	
Upgradability	software	• Christie KoRE™ 10-bit librarian communication software for field upgrade of firmware	
Optional Accessories	inputs	• See input option modules above	
	other	• Wired remote control • Pedestal	
Physical characteristics	dimensions	• Depth: 24" • See included line drawings for additional dimensions	
	weight (approx.)	• Cube enclosure: 97lbs (44kg) • Screen (XPS type): 46lbs (21kg) • Light engine: 60lbs (27kg)	
	shipping weight (approx.)	• Cube enclosure: 130lbs (59kg) • Screen (XPS type): 70lbs (31.5kg) • Light engine: 68lbs (31kg)	
	stackability	• Maximum of up to 5 units high. Tie backs or lagging required for units <2 units high.	
Environment	service type	• Rear access	
	operating temperature <sup>4</sup>	Cube	• 40-95°F (5-35°C)
		Screens	• 63-88°F (17-31°C)
	non-operating temperature		• -4-122°F (-20-50°C)
	humidity	• 20-80% non-condensing • Storage: 35-65% non-condensing	• 40-60% non-condensing
altitude	• 0-3000m (0-10,000ft)	• 0-3000m (0-10,000ft)	
Power rating (projection engine)	voltage	• 100-240 VAC 50/60Hz	
	current	• 4.5A	
	consumption	• Rating: 370W	
	dissipation (maximum)	• 1263 BTU/hr	
Reliability and serviceability	MTBF	• >50,000 hrs MTBF for all major modules	
	MTTR	• <15 minutes with modular design • <5 minutes for lamp	
Regulatory (projection engine)		• Directives: (EC) 2002/95/EC (RoHS) • 2002/96/EC (WEEE) • Regulation (EC) No. 1907/2006 (REACH) • CAN/CSA C22.2 No. UL 60950-1 • IEC 60950-1 • FCC, Part 15, Subpart B, Class A • EN55022/CISPR22 Class A • EN55024/CISPR24 • Certifications marks (check with Christie for latest update): • cULus (Canada & US) • CE (EU) • CCC (China) • GoSTR (Rus) • KC (Korea) • PSE (Japan) • C-Tick (Australia & New Zealand)	
Calibration		• All projection units are factory calibrated for best color performance	
Limited warranty		• Two years parts and labor • Contact an authorized Christie representative for full details of our limited warranty	
Additional features and benefits		• Integrated 6-axis adjustment system for precise geometry alignment • Full-function remote keypad with easy-to-use men • Multiple set-up memories to manage multiple input sources • Picture-in-Picture capability • Control and status monitor	

### A.1.1 CC50 Brightness and Performance Characteristics

		Engine option	Screen option	Screen type	Viewability		Screen 1/2 gain		Brightness <sup>1</sup> (cd/m <sup>2</sup> )
					Horiz.	Verti.	Horiz.	Verti.	
SXGA+	A	RPMS-LED01	· SC50-LE02	· Lenticular	· 160°	· 60°	· ±40°	· ±10°	· 913
	B	RPMS-LED01	· SC50-XP01	· Cross prism	· 180°	· 120°	· ±35°	· ±27°	· 470

<sup>1</sup> Brightness specifications are at reduced color space settings.

## A.2 CC67 Specifications

		SXGA+	
Product make-up <sup>1</sup>	cube	• CC67-3001	
	projection engine	• RMPSP-LED01	
	screen options	• SC67-XP01	
Imaging technologies	imaging	• 1-chip DLP, Dark Chip	
	native resolution	• SXGA+ (1400 x 1050)	
	illumination	• Light Emitting Diodes (Red, Green, Blue)	
Pixel density	pitch	• 26.1 pixels per linear inch	
Screen	gap	• 1mm nominal gap between adjacent images/screens	
	types	• Wide angle cross prism	
Inputs	standard	• Digital DVI-I with analog VGA	
	scan rates	• Horizontal: 15-120kHz • Vertical: 23.97-150Hz • Pixel clock: 165 MHz	
	expansion	• 3 input module slots available	
	optional modules	• VGA, Digital (DVI), Analog (RGB), dual SDI/HDSI, twin HDMI	
	compatibility	• Compatible with Christie TVC Series video wall controllers or other input sources from VGA to QXGA as well as standard HD formats	
Illumination	technology	• LED (RGB)	
	LED life rating <sup>2</sup>	• >60,000 hrs	
Color	temperature range	• 3200-9300K	
	gamut	• Beyond 100% EBU	
	adjustment and control	• Screen to Screen: ArrayLOC automatic brightness and color management • Individual: Comprehensive Color Adjustment (CCA™)	
Optical	lens types	• 0.69:1 low distortion, zero offset, with field curvature correction	
	brightness uniformity	• Brightness uniformity control provides up to 100% uniformity capability for critical applications	
	contrast ratio <sup>3</sup>	• >100,000:1 (full field using shutter mode) • 1400:1 (full field); up to 450:1 ANSI	
Control/networking	ports/controls	• 2 RS-232 ports and 1 RS-422 port • Field upgradable software via RS-232 network or Ethernet • IR remote control • GPIO port • On-board ChristieNET™ connectivity (RJ45)	
	Upgradability	software • Christie KoRE™ 10-bit librarian communication software for field upgrade of firmware	
Optional Accessories	inputs	• See input option modules above	
	other	• Wired remote control • Pedestal	
Physical characteristics	dimensions	• Depth: 30" • See included line drawings for additional dimensions	
	weight (approx.)	• Cube enclosure: 141lbs (64kg) • Screen (XPS type): 90lbs (41kg) • Light engine: 60lbs (27kg)	
	shipping weight (approx.)	• Cube enclosure: 196lbs (89kg) • Screen (XPS type): 125lbs (45kg) • Light engine: 68lbs (31kg)	
	stackability	• Maximum of up to 5 units high. Tie backs or lagging required for units <2 units high.	
	service type	• Rear access	
Environment		Cube	Screens
	operating temperature <sup>4</sup>	• 40-95°F (5-35°C)	• 63-88°F (17-31°C)
	non-operating temperature	• -4-122°F (-20-50°C)	• -4-95°F (20-35°C)
	humidity	• 20-80% non-condensing • Storage: 35-65% non-condensing	• 40-60% non-condensing
	altitude	• 0-3000m (0-10,000ft)	• 0-3000m (0-10,000ft)
Power rating (projection engine)	voltage	• 100-240 VAC 50/60Hz	
	current	• 4.5A	
	consumption	• Rating: 370W	
	dissipation (maximum)	• 1263 BTU/hr	
Reliability and serviceability	MTBF	• >50,000 hrs MTBF for all major modules	
	MTTR	• <15 minutes with modular design • <5 minutes for lamp	
Regulatory (projection engine)		• Directives: (EC) 2002/95/EC (RoHS) • 2002/96/EC (WEEE) • Regulation (EC) No. 1907/2006 (REACH) • CAN/CSA C22.2 No. 60950-1 • UL 60950-1 • IEC 60950-1 • FCC, Part 15, Subpart B, Class A • EN55022/CISPR22 Class A • EN55024/CISPR24 • Certifications marks (check with Christie for latest update): • cULus (Canada & US) • CE (EU) • CCC (China) • GoST-R (Russia) • KC (Korea) • PSE (Japan) • C-Tick (Australia & New Zealand)	
Calibration		• All projection units are factory calibrated for best color performance	
Limited warranty		• Two years parts and labor • Contact an authorized Christie representative for full details of our limited warranty	
Additional features and benefits		• Integrated 6-axis adjustment system for precise geometry alignment • Full-function remote keypad with easy-to-use menu system • Multiple set-up memories to manage multiple input sources • Picture-in-Picture capability • Control and status monitoring over IP • Extensive scaling capability • Window/screen processing – external inputs can be displayed across an array of screens up to 3x3 without an external processor (a single input must be distributed to all cubes or it can be daisy-chained via use of the cube's optional Twin HDMI module) • 3 x Redundant cooling fans • Innovative water-filled, sealed heat pipe cooling system (maintenance free, no motorized pumps, hazardous chemicals or concern of leakage)	

<sup>1</sup> Cube, light engine and screen are sold separately. <sup>2</sup> LED lifetime is based on expected useful life to 50% brightness. field and ANSI methods. Such values are critical for proper contrast performance assessment – especially for video walls. electronic equipment, such as projection systems, are regularly operated at temperatures below 77°F (25°C).

<sup>3</sup> The contrast ratio specified is the "natural" contrast ratio measured by both full  
<sup>4</sup> For best long-term performance and reliability, Christie recommends that all

## A.2.1 CC67 Brightness and Performance Characteristics

	Engine option	Screen option	Screen type	Viewability		Screen 1/2 gain		Brightness <sup>1</sup> (cd/m <sup>2</sup> )
				Horiz.	Verti.	Horiz.	Verti.	
SXGA+	RPMS-LED01	· SC67-XP01	· Cross prism	· 180°	· 120°	· ±35°	· ±27°	· 260

<sup>1</sup> Brightness specifications are at reduced color space settings.

## A.3 CC70 Specifications

		WUXGA	
Product make-up <sup>1</sup>	cube	• CC70-3501	
	projection engine	• RPMHD-LED01	
	screen options	• SC70-XP01	
Imaging technologies	imaging	• 1-chip DLP, Dark Chip	
	native resolution	• HD (1920 x 1080)	
	illumination	• Light Emitting Diodes (Red, Green, Blue)	
Pixel density	pitch	• 31.4 pixels per linear inch	
Screen	gap	• 1mm nominal gap between adjacent images/screens	
	types	• Wide angle cross prism	
Inputs	standard	• Digital DVI-I with analog VGA	
	scan rates	• Horizontal: 15-120kHz · Vertical: 23.97-150Hz · Pixel clock: 165 MHz	
	expansion	• 3 input module slots available	
	optional modules	• VGA, Digital (DVI), Analog (RGB), dual SDI/HDSI, twin HDMI	
	compatibility	• Compatible with Christie TVC Series video wall controllers or other input sources from VGA to QXGA as well as standard HD formats	
Illumination	technology	• LED (RGB)	
	LED life rating <sup>2</sup>	• >60,000 hrs	
Color	temperature range	• 3200-9300K	
	gamut	• Beyond 100% EBU	
	adjustment and control	• Screen to Screen: ArrayLOC automatic brightness and color management • Individual: Comprehensive Color Adjustment (CCA™)	
Optical	lens type	• 0.69:1 low distortion, zero offset, with field curvature correction	
	brightness uniformity	• Brightness uniformity control provides up to 100% uniformity capability for critical applications	
	contrast ratio	• >100,000:1 (shutter mode) · 1400:1 (full field)	
Control/networking	ports/controls	• 2 RS-232 ports and 1 RS-422 port · Field upgradable software via RS-232 network or Ethernet • IR remote control · GPIO port · On-board ChristieNET™ connectivity (RJ45)	
Upgradability	software	• Christie KoRE™ 10-bit librarian communication software for field upgrade of firmware	
Optional accessories	inputs	• See input option modules above	
	other	• Wired remote control · Pedestal	
Physical characteristics	dimensions	• Depth: 35.0" · See included line drawings for additional dimensions	
	weight (approx.)	• Cube enclosure: 139lbs (63kg) · Screen (XPS type): 81lbs (37kg) · Light engine: 60lbs (27kg)	
	shipping weight (approx.)	• Cube enclosure: 196.5lbs (89kg) · Screen (XPS type): 119lbs (54kg) · Light engine: 68lbs (31kg)	
	stackability	• Maximum of up to 5 units high. Tie backs or lagging required for units <2 units high.	
	service type	• Rear access	
Environment		<b>Cube</b>	<b>Screens</b>
	operating temperature <sup>3</sup>	• 40-95°F (5-35°C)	• 63-88°F (17-31°C)
	non-operating temperature	• -4-122°F (-20-50°C)	• -4-95°F (-20-35°C)
	humidity	• 20-80% non-condensing · Storage: 35-65% non-condensing	• 40-60% non-condensing
	altitude	• 0-3000m (0-10,000ft)	• 0-3000m (0-10,000ft)
Power rating (projection engine)	voltage	• 100-240 VAC 50/60Hz	
	current	• 4.8A	
	consumption	• Rating: 370W	
	dissipation (maximum)	• 1263 BTU/hr	
Reliability and serviceability	MTBF	• >50,000 hrs MTBF for all major modules	
	MTTR	• <15 minutes with modular design · <5 minutes for lamp	
Regulatory (projection engine)		• Directives: (EC) 2002/95/EC (RoHS) · 2002/96/EC (WEEE) · Regulation (EC) No. 1907/2006 (REACH) · CAN/CSA C22.2 No. 60950-1 • UL 60950-1 · IEC 60950-1 · FCC, Part 15, Subpart B, Class A · EN55022/CISPR22 Class A · EN55024/CISPR24 • Certifications marks (check with Christie for latest update): · cULus (Canada & US) · CE (EU) · CCC (China) · GoSTR (Russia) • KC (Korea) · PSE (Japan) · C-Tick (Australia & New Zealand)	
Calibration		• All projection units are factory calibrated for best color performance	
Limited warranty		• Two years parts and labor · Contact an authorized Christie representative for full details of our limited warranty	
Additional features and benefits		• Integrated 6-axis adjustment system for precise geometry alignment · Full-function remote keypad with easy-to-use menu system • Multiple setup memories to manage multiple input sources · Picture-in-Picture capability · Control and status monitoring over IP • Extensive scaling capability · Window/screen processing – external inputs can be displayed across an array of screens up to 3x3 without an external processor (a single input must be distributed to all cubes or it can be daisy-chained via use of the cube's optional Twin HDMI module) · 3 x Redundant cooling fans · Innovative water-filled, sealed heat pipe cooling system (maintenance free, no motorized pumps, hazardous chemicals or concern of leakage)	

<sup>1</sup> Cube, light engine and screen are sold separately. <sup>2</sup> LED lifetime is based on expected useful life to 50% brightness. <sup>3</sup> For best long-term performance and reliability, Christie recommends that all electronic equipment, such as projection systems, are regularly operated at temperatures below 77°F (25°C).

### A.3.1 CC70 Brightness and Performance Characteristics

	Engine option	Screen option	Screen type	Viewability		Screen 1/2 gain		Brightness <sup>1</sup> (cd/m <sup>2</sup> )
				Horiz.	Verti.	Horiz.	Verti.	
HD native	RPMHD-LED01	· SC70-XP01	· Cross prism	· 180°	· 120°	· ±35°	· ±27°	· 216

<sup>1</sup> Brightness specifications are at reduced color space settings.

## A.4 CC72 Specifications

		WUXGA	
Product make-up <sup>1</sup>	cube	• CC72-3301	
	projection engine	• RPMWU-LED01	
	screen options	• SC72-XP01	
Imaging technologies	imaging	• 1-chip DLP, Dark Chip	
	native resolution	• WUXGA+ (1920 x 1200 – HD compatible)	
	illumination	• Light Emitting Diodes (Red, Green, Blue)	
Pixel density	pitch	• 31.4 pixels per linear inch	
Screen	gap	• 1mm nominal gap between adjacent images/screens	
	types	• Wide angle cross prism	
Inputs	standard	• Digital DVI-I with analog VGA	
	scan rates	• Horizontal: 15-120kHz • Vertical: 23.97-150Hz • Pixel clock: 165 MHz	
	expansion	• 3 input module slots available	
	optional modules	• VGA, Digital (DVI), Analog (RGB), dual SDI/HDSI, twin HDMI	
	compatibility	• Compatible with Christie TVC Series video wall controllers or other input sources from VGA to QXGA as well as standard HD formats	
Illumination	technology	• LED (RGB)	
	LED life rating <sup>2</sup>	• >60,000 hrs	
Color	temperature range	• 3200-9300K	
	gamut	• Beyond 100% EBU	
	adjustment and control	• Screen to Screen: ArrayLOC automatic brightness and color management • Individual: Comprehensive Color Adjustment (CCA™)	
Optical	lens type	• 0.69:1 low distortion, zero offset, with field curvature correction	
	brightness uniformity	• Brightness uniformity control provides up to 100% uniformity capability for critical applications	
	contrast ratio <sup>3</sup>	• >100,000:1 (full field using shutter mode) • 1400:1 (full field); up to 450:1 ANSI	
Control/networking	ports/controls	• 2 RS-232 ports and 1 RS-422 port • Field upgradable software via RS-232 network or Ethernet • IR remote control • GPIO port • On-board ChristieNET™ connectivity (RJ45)	
Upgradability	software	• Christie KoRE™ 10-bit librarian communication software for field upgrade of firmware	
Optional accessories	inputs	• See input option modules above	
	other	• Wired remote control • Pedestal	
Physical characteristics	dimensions	• Depth: 33" • See included line drawings for additional dimensions	
	weight (approx.)	• Cube enclosure: 147lbs (67kg) • Screen (XPS type): 81lbs (37kg) • Light engine: 60lbs (27kg)	
	shipping weight (approx.)	• Cube enclosure: 200lbs (97kg) • Screen (XPS type): 119lbs (54kg) • Light engine: 68lbs (31kg)	
	stackability	• Maximum of up to 5 units high. Tie backs or lagging required for units <2 units high.	
	service type	• Rear access	
Environment		Cube	Screens
	operating temperature <sup>4</sup>	• 40-95°F (5-35°C)	• 63-88°F (17-31°C)
	non-operating temperature	• -4-122°F (-20-50°C)	• -4-95°F (-20-35°C)
	humidity	• 20-80% non-condensing • Storage: 35-65% non-condensing	• 40-60% non-condensing
	altitude	• 0-3000m (0-10,000ft)	• 0-3000m (0-10,000ft)
Power rating (projection engine)	voltage	• 100-240 VAC 50/60Hz	
	current	• 4.8A	
	consumption	• Rating: 370W	
	dissipation (maximum)	• 1263 BTU/hr	
Reliability and serviceability	MTBF	• >50,000 hrs MTBF for all major modules	
	MTTR	• <15 minutes with modular design • <5 minutes for lamp	
Regulatory (projection engine)		• Directives (EC) 2002/95/EC (RoHS) • 2002/96/EC (WEEE) • Regulation (EC) No. 1907/2006 (REACH) • CAN/CSA C22.2 No. 60950-1 • UL 60950-1 • IEC 60950-1 • FCC, Part 15, Subpart B, Class A • EN55022/CISPR22 Class A • EN55024/CISPR24 • Certifications marks (check with Christie for latest update): • cULus (Canada & US) • CE (EU) • CCC (China) • GoSTR (Russia) • KC (Korea) • PSE (Japan) • C-Tick (Australia & New Zealand)	
Calibration		• All projection units are factory calibrated for best color performance	
Limited warranty		• Two years parts and labor • Contact an authorized Christie representative for full details of our limited warranty	
Additional features and benefits		• Integrated 6-axis adjustment system for precise geometry alignment • Full-function remote keypad with easy-to-use menu system • Multiple set-up memories to manage multiple input sources • Picture-in-Picture capability • Control and status monitoring over IP • Extensive scaling capability • Window/screen processing – external inputs can be displayed across an array of screens up to 3x3 without an external processor (a single input must be distributed to all cubes or it can be daisy-chained via use of the cube's optional Twin HDMI module) • 3 x Redundant cooling fans • Innovative water-filled, sealed heat pipe cooling system (maintenance free, no motorized pumps, hazardous chemicals or concern of leakage)	

<sup>1</sup> Cube, light engine and screen are sold separately. <sup>2</sup> LED lifetime is based on expected useful life to 50% brightness. <sup>3</sup> The contrast ratio specified is the "natural" contrast ratio measured by both full field and ANSI methods. Such values are critical for proper contrast performance assessment – especially for video walls. <sup>4</sup> For best long-term performance and reliability, Christie recommends that all electronic equipment, such as projection systems, are regularly operated at temperatures below 77°F (25°C).

<sup>3</sup> The contrast ratio specified is the "natural" contrast ratio measured by both full field and ANSI methods. Such values are critical for proper contrast performance assessment – especially for video walls. <sup>4</sup> For best long-term performance and reliability, Christie recommends that all electronic equipment, such as projection systems, are regularly operated at temperatures below 77°F (25°C).

## A.4.1 CC72 Brightness and Performance Characteristics

	Engine option	Screen option	Screen type	Viewability		Screen 1/2 gain		Brightness <sup>1</sup> (cd/m <sup>2</sup> )
				Horiz.	Verti.	Horiz.	Verti.	
WUXGA	RPMWU-LED01	· SC72-XP01	· Cross prism	· 180°	· 120°	· ±35°	· ±27°	· 240

<sup>1</sup> Brightness specifications are at reduced color space settings.





ASSY TECH DOCS Entero Projector and Cube Install

#### Corporate offices

USA – Cypress  
ph: 714-236-8610  
Canada – Kitchener  
ph: 519-744-8005

#### Worldwide offices

United Kingdom  
ph: +44 118 977 8000  
France  
ph: +33 (0) 1 41 21 00 36  
Germany  
ph: +49 2161 664540

Eastern Europe  
ph: +36 (0) 1 47 48 100  
Middle East  
ph: +971 (0) 4 299 7575  
Spain  
ph: + 34 91 633 9990

Singapore  
ph: +65 6877-8737  
Beijing  
ph: +86 10 6561 0240  
Shanghai  
ph: +86 21 6278 7708

Japan  
ph: 81-3-3599-7481  
South Korea  
ph: +82 2 702 1601

